# Annual Stock Assessment and Fishery Evaluation Report for U.S. Pacific Island Pelagic Fisheries Ecosystem Plan 2024



Western Pacific Regional Fishery Management Council
1164 Bishop St., Suite 1400
Honolulu, HI 96813

PHONE: (808) 522-8220
FAX: (808) 522-8226
www.wpcouncil.org

**Cover Photo:** Tuna off of the Marianas. Photo by: Cassandra Pardee.

A report of the Western Pacific Regional Fishery Management Council
1164 Bishop Street, Suite 1400, Honolulu, HI 96813

Prepared by the Pelagic Fishery Ecosystem Plan Team, Western Pacific Regional Fishery Management Council staff, and Thomas Remington.

Edited by Thomas Remington (Lynker); Cassandra Pardee (Poseidon Fisheries); Mark Fitchett and Asuka Ishizaki (Western Pacific Regional Fishery Management Council).

© Western Pacific Regional Fishery Management Council 2024.
All rights reserved.

Published in the United States by the Western Pacific Regional Fishery Management Council under NOAA Award #NA20NMF4410013.

ISBN 978-1-950193-57-8

**This document can be cited as follows:**

*WPRFMC, 2025. Annual SAFE Report for the Pacific Pelagic Fisheries Fishery Ecosystem Plan 2024. T Remington, C Pardee, M Fitchett, A Ishizaki (Eds.). Honolulu: Western Pacific Regional Fishery Management Council.*

The **Western Pacific Regional Fishery Management Council** acknowledges the valuable contributions of the following Plan Team members for contributing to this report:

**Hawaii Division of Aquatic Resources**: Jason Helyer and Bryan Ishida.

**American Samoa Department of Marine and Wildlife Resources**: Sean Felise and Domingo Ochavillo.

**Guam Division of Aquatic and Wildlife Resources**: Frank Roberto and Brent Tibbatts.

**CNMI Division of Fish and Wildlife**: Nathan Van Ee.

**NMFS Pacific Islands Fisheries Science Center**: Emily Crigler, Donald Kobayashi, Russel Ito, Jenny Suter, Phoebe Woodworth-Jefcoats, T. Todd Jones, Ashley Tomita, Minling Pan, Michael Kinney, Kirsten Leong, Robert Ahrens, Réka Domokos, and Felipe Carvalho.

**NMFS Pacific Islands Regional Office**: Chelsey Young, Lynn Rassel, Melissa Snover, Jason Philibotte, and Valerie Post.

The Council also acknowledges the staff of the **NMFS PIFSC Fisheries Research and Monitoring Division data programs** for providing the technical support to generate the data summaries.

The Council would like to thank Clay Tam, Roy Morioka, Justin Hospital, Johanna Wren, Amanda Bradford, Alexander Goas, and David O'Brien for their contributions to the report.

**Version Edits:**

v2 (7/11/2025) – updated the 2.6 the International Module including Tables 41-43 to present catch data from 2024. Minor typos and formatting issues were addressed throughout the report.

v2.1 (7/24/2025) – updated Table 2 on page 25 to fix the column heading for Hawaii to the correct years.

v2.2 (11/3/2025) – corrected typos, grammar, formatting, and references throughout Chapters 1 through 3.

v2.3(12/8/2025) – updated y-axis on Figure 87.

v2.4(12/22/2025) – updated y-axis on Figure 93.

v2.5(12/26/2025) – fixed broken cross reference links in Appendix A.

This page was intentionally left blank.

## GLOSSARY OF TERMS AND LIST OF ACRONYMS

| Term | Definition |
|---|---|
| Alia | Samoan fishing catamaran, about 30 ft. long, constructed of aluminum or wood with fiberglass. Used for various fisheries including trolling, longline, and bottomfish fishing. |
| American Samoa | A U.S. territory in the South Pacific Ocean, southeast of Samoa. |
| Bycatch | Fish harvested in a fishery that are not sold or kept for personal use, including economic discards and regulatory discards, except in a recreational fishery catch and release fishery management program. |
| Commercial | Commercial fishing, where the catch is intended to be sold, bartered, or traded. |
| CNMI | A U.S. territory in the Marianas Archipelago. North of and adjacent to Guam. |
| Council | The Western Pacific Regional Fishery Management Council, one of eight regional fishery management councils established by Congress in 1976. Under the Magnuson-Stevens Fishery Conservation and Management Act, it has authority over fisheries seaward of state/territorial waters of Hawaii and the U.S. Pacific Islands. |
| Guam | A U.S. territory in the Marianas Archipelago. South of and adjacent to the Commonwealth of the Northern Marianas Islands. |
| Hawaii | U.S. state. See MHI, NWHI. Composed of the islands, atolls, and reefs of the Hawaiian Archipelago from Hawaii to Kure Atoll, except the Midway Islands. Capitol - Honolulu. |
| Ika-Shibi | Hawaiian term for night tuna handline fishing method. Fishing for tuna using baited handlines at night with a nightlight and chumming to attract squid and tuna. |
| Incidental Catch | Fish caught that are retained in whole or part, though not necessarily the targeted species. Examples include monchong, opah, and sharks. |
| Interaction | Catch of protected species, which is required to be released. Examples: sea turtles, marine mammals, seabirds. |
| Logbook | Journal kept by fishing vessels for each fishing trip; records catch data, including bycatch and incidental catch. Required in the federally regulated longline and crustacean fisheries in the Hawaiian EEZ. |
| Longline | Fishing method utilizing a main line that exceeds 1 nm in length, is suspended horizontally in the water column either anchored, floating, or attached to a vessel, and from which branch or dropper lines with hooks are attached; except that, within the protected species zone, longline gear means a type of fishing gear consisting of a main line of any length that is suspended horizontally in the water column either anchored, floating, or attached to a vessel, and from which branch or dropper lines with hooks are attached. |
| Longliner | Fishing vessel specifically adapted to use the longline fishing method. |
| Palu-Ahi | Hawaiian term for day tuna handline fishing. Fishing for tuna using baited handlines and chumming with cut bait in a chum bag or wrapped around a stone. Also, drop-stone, make-dog, etc. |

| Term | Definition |
|---|---|
| Pelagic | The pelagic habitat is the upper layer of the water column from the surface to the thermocline. The pelagic zone is separated into several subzones depending on water depth: epipelagic - ocean surface to 200 meters depth; mesopelagic – 200 to 1,000 meters depth; bathypelagic – 1,000 to 4,000 meters depth; and abyssopelagic – 4,000 to 6,000 meters depth. The pelagic species include all commercially targeted highly migratory species such as tuna, billfish, and some incidental-catch species such as sharks, as well as coastal pelagic species such as akule and opelu. |
| Pole-and-Line | Fishing for tuna using poles and fixed leaders with barbless lures and chumming with live baitfish. Poles can be operated manually or mechanically. Also, fishing vessels called baitboats or aku-boats (Hawaii). |
| PRIA | A group of U.S. island territories in the Central Pacific Ocean. |
| Protected Species | Refers to species which are protected by federal legislation such as the Endangered Species Act, Marine Mammal Protection Act, and Migratory Bird Treaty Act. Examples: Black-footed and Laysan albatrosses, sea turtles, dolphins. |
| Purse Seine | Fishing for tuna by surrounding schools of fish with a large net and trapping them by closing the bottom of the net. |
| Recreational | Recreational fishing for sport or pleasure, where the catch is not sold, bartered, or traded. Also, non-commercial. |
| Secretary | When capitalized and used in reference to fisheries within the U.S. EEZs, it refers to the U. S. Secretary of Commerce. |
| Small Pelagics | Species such as akule (big-eye scad - *Selar* spp.) And opelu (mackerel scad - *Decapterus* spp). These fish occur mainly in shallow inshore waters but may also be found in deeper offshore waters. Classified as ecosystem component species in the FEP and not part of the PMUS. |
| Trolling | Fishing by towing lines with lures or live-bait from a moving vessel. |

| Acronym | Meaning |
|---|---|
| ACE | Accumulated Cyclone Energy |
| ACL | Annual Catch Limit |
| AS | American Samoa. Includes the islands of Tutuila, Manua, Rose and Swains Atolls |
| ASG | American Samoa Government |
| AVHRR | Advanced Very High Resolution Radiometer |
| B | Biomass |
| $B_{FLAG}$ | Warning Reference Point. Set equal to $B_{MSY}$ |
| $B_{MSY}$ | Biomass at MSY |
| BET | Bigeye Tuna |
| BiOp | Biological Opinion |
| BOEM | Bureau of Ocean Energy Management |
| BSIA | Best Scientific Information Available |
| C | Recent Average Catch |
| CFEAI | Commercial Fishing Economic Assessment Index |
| CFR | Code of Federal Regulations |
| CML | Commercial Marine License data |
| CNMI | Commonwealth of the Northern Mariana Islands. Also, Northern Mariana Islands, Northern Marianas, and NMI. Includes the islands of Saipan, Tinian, Rota, and many others in the Marianas Archipelago |
| $CO_2$ | Carbon Dioxide |
| CMM | Conservation and Management Measures |
| CPC | Climate Prediction Center, NOAA |
| CPDF | Catch-Per-Day-Fished |
| CPI | Consumer price index |
| CPUE | Catch-Per-Unit-Effort. A standard fisheries index usually expressed as numbers of fish caught per unit of gear per unit of time, e.g., number of fish per hook per line-hour or number of fish per 1,000 hooks |
| CV | Coefficient of Variation |
| DAR | Division of Aquatic Resources, State of Hawaii |
| DAWR | Division of Aquatic and Wildlife Resources, Guam |
| DEIS | Draft Environmental Impact Statement |
| DFW | Division of Fish and Wildlife, Northern Mariana Islands |
| DIC | Dissolved Inorganic Carbon |
| DMWR | Department of Marine and Wildlife Resources, American Samoa |
| DOD | Department of Defense |
| DOJ | Department of Justice |
| DPS | Distinct Population Segment |
| DWFN | Distant Water Fishing Nation |
| E-A | Euro-American |

| Acronym | Meaning |
|---|---|
| EEZ | Exclusive Economic Zone, refers to waters of a nation, recognized internationally under the United Nations Convention on the Law of the Sea as extending 200 nautical miles from shore. Within the U.S., the EEZ is typically between three and 200 nautical miles from shore |
| EF | Expansion Factor |
| EFH | Essential Fish Habitat |
| EIS | Environmental Impact Statement |
| ELAPS | Effort Limit Area for Purse Seine |
| ENSO | El Niño-Southern Oscillation Index |
| EO | Executive Order |
| EPO | East Pacific Ocean |
| ESA | Endangered Species Act. An Act of Congress passed in 1966 that establishes a federal program to protect species of animals whose survival is threatened by habitat destruction, overutilization, disease, etc. |
| ESD | Equivalent Spherical Diameter |
| ESRL | Earth System Research Laboratory, NOAA |
| F | Fishing Mortality |
| $F_{MSY}$ | Fishing Mortality at MSY |
| FAD | Fish Aggregating Device; a raft or buoy, drifting or anchored to the sea floor, and under which, pelagic fish will concentrate |
| FDM | Farallon de Medinilla, CNMI |
| FEP | Fisheries Ecosystem Plan |
| FMP | Fishery Management Plan |
| FR | Federal Register |
| FWS | Fish and Wildlife Service |
| GAC | Global Area Coverage |
| GAM | General Additive Models |
| GOES | Geostationary Operational Environmental Satellites |
| GFCA | Guam Fishermen's Cooperative Association |
| GODAS | Global Ocean Data Assimilation System |
| GRT | Gross Registered Tonnes |
| HAPC | Habitat Areas of Particular Concern |
| HDAR | Hawaii Division of Aquatic Resources. Also, DAR |
| HLF | Hawaii Longline Fishery |
| HMRFS | Hawaii Marine Recreational Fishing Survey |
| HOT | Hawaii Ocean Time Series |
| HP | Horsepower |
| HSTT | Hawaii-Southern California Training and Testing |
| IATTC | Inter-American Tropical Tuna Commission |
| IFA | Interjurisdictional Fisheries Act |
| IFP | International Fisheries Program |

| Acronym | Meaning |
|---|---|
| ISC | International Scientific Committee |
| ITS | Incidental Take Statement |
| K-A | Korean-American |
| LAA | Likely to adversely affect |
| LOC | Letter of Concurrence |
| LOF | List of Fisheries |
| LRP | Limit Reference Point |
| LVPA | Large Vessel Protected Area |
| M | Natural Mortality |
| M&SI | Mortality and Serious Injury |
| MSA | Magnuson-Stevens Fishery Conservation and Management Act |
| ME | McCracken Estimates |
| MEI | Multivariate ENSO Index |
| MFMT | Maximum Fishing Mortality Threshold |
| MHI | Main Hawaiian Islands |
| MITT | Mariana Islands Training and Testing |
| MMA | Marine Managed Area |
| MMPA | Marine Mammal Protection Act |
| MODIS | Moderate Resolution Imaging Spectroradiometer |
| MOU | Memorandum of Understanding |
| MPA | Marine Protected Area |
| MPCC | Marine Planning and Climate Change |
| MPCCC | Marine Planning and Climate Change Committee |
| MRFSS | Marine Recreational Fishing Statistical Survey |
| MSST | Minimum Stock Size Threshold |
| MSY | Maximum Sustainable Yield |
| MUS | Management Unit Species |
| MW | Megawatt |
| NA | Not applicable |
| NCADAC | National Climate Assessment and Development Advisory Committee |
| NCDC | National Climatic Data Center |
| NCEI | National Centers for Environmental Information, NOAA |
| NCRMP | National Coral Reef Monitoring Program |
| NELHA | Natural Energy Laboratory of Hawaii Authority |
| NEPA | National Environmental Policy Act |
| NESDIS | National Environmental Satellite, Data, and Information Service |
| NLAA | Not likely to adversely affect |
| NMFS | National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce. Also, NOAA Fisheries |
| NMSAS | National Marine Sanctuary of American Samoa |
| NOAA | National Oceanic and Atmospheric Administration, U.S. Department of Commerce |

| Acronym | Meaning |
|---|---|
| NOI | Notice of Intent |
| NS2 | National Standard 2 |
| NS8 | National Standard 8 |
| NWHI | Northwestern Hawaiian Islands. All islands in the Hawaiian Archipelago, other than the Main Hawaiian Islands (MHI) |
| NWR | National Wildlife Refuge |
| OC-CCI | Ocean Color Climate Change Initiative |
| OEIS | Overseas Environmental Impact Statement |
| OFP-SPC | Oceanic Fisheries Program of the Secretariat of the Pacific Community |
| OFL | Overfishing Limit |
| OLE | Office of Law Enforcement, NOAA |
| ONI | Oceanic Niño Index |
| OTEC | Ocean Thermal Energy Conversion |
| OY | Optimum Yield |
| PBF | Pacific Bluefin Tuna |
| PBR | Potential Biological Removal |
| PDO | Pacific Decadal Oscillation |
| PICTs | Pacific Island Countries and Territories |
| PIFSC | Pacific Islands Fisheries Science Center |
| PIRO | Pacific Islands Regional Office, National Marine Fisheries Service. Also, NMFS PIRO |
| PMUS | Pacific Pelagic Management Unit Species. Species managed under the Pelagic FEP |
| POES | Polar Operational Environmental Satellites |
| PPGFA | Pago Pago Game Fishing Association |
| ppm | Parts per Million |
| PPT | Pelagic Fishery Ecosystem Plan Team |
| PRIA | Pacific Remote Island Areas |
| RFMA | Regional Fishery Management Agreements |
| RFMO | Regional Fishery Management Organization |
| RIMPAC | Rim of the Pacific |
| RPB | Regional Planning Body |
| ROD | Record of Decision |
| SA | Spawning Abundance |
| $SA_{MSY}$ | Spawning Abundance at MSY |
| SAFE | Stock Assessment and Fishery Evaluation |
| SAR | Stock Assessment Report |
| SB | Spawning Biomass |
| $SB_{MSY}$ | Spawning Biomass at MSY |
| SC | Standing Committee of the Western and Central Pacific Fisheries Commission |
| SDC | Status Determination Criteria |

| Acronym | Meaning |
|---|---|
| SEIS | Supplemental Environmental Impact Statement |
| SEZ | Southern Exclusion Zone, Hawaii |
| SFA | Saipan Fishermen's Association |
| SFD | Sustainable Fisheries Division, NMFS PIRO |
| SFM | Shortfin Mako shark |
| SHARKWG | Shark Working Group, ISC |
| SPC | Secretariat of the Pacific Community. A technical assistance organization comprising the independent island states of the tropical Pacific Ocean, dependent territories and the metropolitan countries of Australia, New Zealand, USA, and France; now Pacific Community |
| SPR | Spawning Potential Ratio. A term for a method to measure the effects of fishing pressure on a stock by expressing the spawning potential of the fished biomass as a percentage of the unfished virgin spawning biomass. Stocks are deemed to be overfished when the SPR<20%. |
| SSB | Spawning Stock Biomass |
| $SSB_{MSY}$ | Spawning Stock Biomass at MSY |
| SSC | Scientific and Statistical Committee, an advisory body to the Council comprising experts in fisheries, marine biology, oceanography, etc. |
| SST | Sea Surface Temperature |
| STD | Standard Deviation |
| STF | Subtropical Front |
| SWAC | Seawater Air Conditioning |
| SWG | Spatial Working Group |
| SWO | Swordfish |
| TA | Total Alkalinity |
| TRP | Target Reference Point |
| TZCF | Transition Zone Chlorophyll Front |
| US | United States |
| USAF | United States Air Force |
| USACE | United States Army Corps of Engineers |
| USFWS | United States Fish and Wildlife Service, Department of Interior |
| V-A | Vietnamese-American |
| WCNPO | Western and Central North Pacific Ocean |
| WCP–CA | Western and Central Pacific Fisheries Commission Convention Area |
| WCPFC | Western and Central Pacific Fisheries Commission |
| WCPO | Western and Central Pacific Ocean |
| WETS | Wave Energy Test Site |
| WPacFIN | Western Pacific Fishery Information Network, NMFS |
| WPFMC | Western Pacific Regional Fishery Management Council |
| WPUE | Weight per Unit Effort |
| WSEP | Weapon Systems Evaluation Program |
| XBT | Expendable Bathythermographs |

# CONTENTS

## Section Page

**Glossary of Terms and List of Acronyms** ..... v
**Contents** ..... xii
**Executive Summary** ..... 1
Summary of SAFE Stock Assessment Requirements ..... 3
Summary of Fishery Data in the Pacific Island Region ..... 5
American Samoa ..... 6
CNMI ..... 7
Guam ..... 8
Hawaii ..... 9
Oceanic and Climate Indicators ..... 11
Essential Fish Habitat ..... 12
Marine Planning ..... 12
**1 Introduction** ..... 13
1.1 Background to the SAFE Report ..... 14
1.2 Pelagic MUS List ..... 14
1.3 Summary of Pelagic Fisheries and Gear Types Managed under the FEP ..... 16
1.3.1 American Samoa ..... 17
1.3.2 Commonwealth of the Northern Marianas Islands ..... 19
1.3.3 Guam ..... 20
1.3.4 Hawaii ..... 21
1.3.5 Pacific Remote Island Area ..... 23
1.4 Administrative and Regulatory Actions ..... 24
1.5 Total Pelagic Landings in the Western Pacific Region for All Fisheries ..... 25
1.6 Plan Team Recommendations ..... 26
**2 Data Modules** ..... 27
2.1 American Samoa ..... 27
2.1.1 Data Sources ..... 27
2.1.2 Summary of American Samoan Pelagic Fishery ..... 29
2.1.3 Plan Team Recommendations ..... 30
2.1.4 Overview of Participation – All Fisheries ..... 31
2.1.5 Overview of Landings – All Fisheries ..... 32
2.1.6 American Samoa Longline Participation, Effort, Landings, Bycatch, and CPUE 38
2.1.7 American Samoa Trolling Bycatch and CPUE ..... 48
2.2 Commonwealth of the Northern Mariana Islands ..... 51
2.2.1 Data Sources ..... 51
2.2.2 Summary of CNMI Pelagic Fisheries ..... 51
2.2.3 Plan Team Recommendations ..... 52
2.2.4 Overview of Participation and Effort ..... 53
2.2.5 Overview of Landings ..... 55
2.2.6 Overview of Catch per Unit Effort – All Fisheries ..... 63
2.3 Guam ..... 68
2.3.1 Data Sources ..... 68

2.3.2 Summary of Guam Pelagic Fisheries ..... 68
2.3.3 Plan Team Recommendations ..... 70
2.3.4 Overview of Participation ..... 71
2.3.5 Overview of Total and Reported Commercial Landings ..... 71
2.3.6 Overview of Effort and CPUE ..... 79
2.4 Hawaii ..... 84
2.4.1 Data Sources ..... 84
2.4.2 Summary of Hawaii Pelagic Fisheries ..... 86
2.4.3 Plan Team Recommendations ..... 91
2.4.4 Overview of Participation – All Fisheries ..... 92
2.4.5 Overview of Landings and Economic Data ..... 92
2.4.6 Hawaii Deep-set Longline Fishery Effort, Landings, Revenue, and CPUE ..... 104
2.4.7 Hawaii Shallow-set Longline Fishery Effort, Landings. Revenue, and CPUE ..... 111
2.4.8 MHI Troll Fishery Effort, Landings, Revenue, and CPUE ..... 111
2.4.9 MHI Handline Fishery Effort, Landings, Revenue, and CPUE ..... 120
2.4.10 Offshore Handline Fishery Effort, Landings, Revenue, and CPUE ..... 122
2.4.11 Pelagic Small Boat Fishery Bycatch Summaries ..... 124
2.5 Non-Commercial Pelagic Fisheries ..... 127
2.5.1 Overview of Non-Commercial Pelagic Fisheries ..... 127
2.6 International ..... 129
2.6.1 Introduction ..... 129
2.6.2 Data Sources ..... 130
2.6.3 Plan Team Recommendations ..... 130
2.6.4 Summary of Fisheries ..... 130
2.6.5 Status of the Stocks ..... 140
2.6.6 Information on OFL, ABC, and ACL ..... 142
2.6.7 Stock Assessments Completed Since the Last Pelagic SAFE Report ..... 142
2.6.8 U.S. Longline Landings Reported to WCPFC and IATTC for 2022 ..... 147
**3 Fishery Ecosystems ..... 147**
3.1 Fisher Observations ..... 150
3.1.1 Information from Advisory Panel Meetings ..... 150
3.1.2 Annual Fisher Observation meeting American Samoa ..... 156
3.1.3 Annual Fisher Observation meeting from the CNMI ..... 157
3.1.4 Annual Fisher Observation meeting from Guam ..... 157
3.1.5 Annual Fisher Observation meeting from Hawaii ..... 158
3.2 Socioeconomics ..... 159
3.2.1 Response to Previous Council Recommendations ..... 160
3.2.2 Social and Cultural Elements ..... 161
3.2.3 Economic Performance of Main Commercial fisheries ..... 182
3.2.4 Ongoing Research and Information Collection ..... 212
3.2.5 Relevant PIFSC Economics and Human Dimensions Publications: 2024 ..... 214
3.3 Protected Species ..... 216
3.3.1 Hawaii Shallow-Set Longline Fishery ..... 216
3.3.2 Hawaii Deep-set Longline Fishery ..... 238
3.3.3 American Samoa Longline Fishery ..... 261
3.3.4 Hawaii Troll Fishery ..... 273

3.3.5 MHI Handline Fishery ..... 274
3.3.6 Hawaii Offshore Handline Fishery ..... 275
3.3.7 American Samoa, Guam, and CNMI Troll Fishery ..... 276
3.3.8 Identification of Emerging Issues ..... 277
3.3.9 Identification of Research, Data, and Assessment Needs ..... 280
3.4 Climate and Oceanic Indicators ..... 282
3.4.1 Indicators at a Glance ..... 282
3.4.2 Selected Indicators ..... 284
3.4.3 Response to Previous Council Recommendations ..... 318
3.4.4 Observational and Research Needs ..... 318
3.4.5 Acknowledgements ..... 319
3.5 Essential Fish Habitat ..... 319
3.5.1 Introduction ..... 319
3.5.2 Response to Previous Council Recommendations ..... 320
3.5.3 Habitat Use by MUS and Trends in Habitat Condition ..... 320
3.5.4 Report on Review of EFH Information ..... 320
3.5.5 New EFH-Relevant Data Stream: Larval Fish Surveys and Ichthyoplankton Monitoring ..... 320
3.5.6 Research Needs and Ongoing Projects ..... 321
3.6 Marine Planning ..... 323
3.6.1 Introduction ..... 323
3.6.2 Response to Previous Council Recommendations ..... 323
3.6.3 Marine Managed Areas ..... 326
3.6.4 Activities and Facilities Occurring in the Western Pacific Region ..... 332
3.6.5 Additional Considerations ..... 340
**4 Data Integration ..... 349**
4.1 Ecosystem-Based Fisheries Management Project for Portected Species Impacts Assessment for Hawaii and American Samoa Longline Fisheries ..... 349
4.2 Attrition in Longline Fleets ..... 354
4.2.1 American Samoa Longline ..... 354
4.2.2 Hawaii Longline: Shallow-Set Fishery ..... 354
4.2.3 Factors Affecting CPUE of Target Species ..... 356
**5 References ..... 361**
**Appendix A: Supporting Data Tables for Figures in Chapter 2 and Section 3.1 .... A-1**
Tables for Section 2.1: American Samoa ..... A-4
Tables for Section 2.2: Commonwealth of the Northern Mariana Islands ..... A-14
Tables for Section 2.3: Guam ..... A-27
Tables for Section 3.3: Socioeconomics ..... A-37
**Appendix B: List of Protected Species and Designated Critical habitat ..... B-1**
**Appendix C: Observer Program Bycatch Data ..... C-1**
**Appendix D: List of Plan Team Members ..... D-1**
**Appendix E: Pelagic Plan Team Report – May 2025 ..... E-1**

**Table** **Page**

Table ES-1. Fulfillment of National Standard 2 requirements within the 2023 annual SAFE report for the U.S. Pacific Island Pelagic Fisheries Ecosystem Plan....2
Table ES-2. Summary of the total pelagic landings during 2024 in the Western Pacific and the percentage change between 2023 and 2024 ....5
Table 1. Names of U.S. Pacific Island pelagic management unit species .... 15
Table 2. Total pelagic landings (lb) in the Western Pacific Region in 2024 and percent change from the previous year.... 25
Table 3. Estimated total landings (lb) of pelagic species in American Samoa by gear in 2024... 32
Table 4. Number of permitted and active longline fishing vessels by size class in American Samoa.... 38
Table 5. Longline effort by American Samoa vessels in 2024.... 39
Table 6. Number of fish kept, released, and percent released for all American Samoa longline vessels from federal logbook data in 2024.... 41
Table 7. Total estimated bycatch in number of fish for the top 10 bycatch species from the Pacific Islands Region Observer Program for the American Samoa longline fishery.... 43
Table 8. Catch per 1,000 hooks for alia vessels in American Samoa from 1996 to 1998.... 44
Table 9. Catch per 1,000 hooks for two types of longline vessels in American Samoa from 1999 to 2002.... 45
Table 10. Catch per 1,000 hooks for two types of longline vessels in American Samoa from 2003 to 2005.... 45
Table 11. Catch per 1,000 hooks for all types of longline vessels in American Samoa from 2006 to 2011.... 46
Table 12. Catch per 1,000 hooks for all types of longline vessels from 2013 to 2017.... 47
Table 13. Catch/1,000 hooks for all types of longline vessels in American Samoa from 2018 to 2024.... 47
Table 14. American Samoa trolling bycatch summary (released fish).... 48
Table 15. Pelagic species composition of boat-based creel survey total estimated catch (lb) in the CNMI in 2024 .... 55
Table 16. Commercial pelagic landings (lb), value ($), and average price ($) in the CNMI in 2024.... 56
Table 17. Bycatch summary for pelagic fisheries in the CNMI .... 56
Table 18. Total estimated, non-charter, and charter landings (lb) for Guam in 2024 .... 71
Table 19. Bycatch summary for pelagic trolling fisheries in Guam.... 77
Table 20. Bycatch species summary for pelagic trolling fisheries in Guam .... 77
Table 21. Number of HDAR Commercial Marine Licenses .... 92
Table 22. Hawaii commercial pelagic catch, revenue, and price by species.... 93
Table 23. Hawaii commercial pelagic catch, revenue, and price by fishery .... 93
Table 24. Hawaii-permitted deep-set longline catch (number of fish) by area .... 106
Table 25. Total estimated bycatch in number of fish for the top 10 bycatch species from the Pacific Islands Region Observer Program for the Hawaii deep-set longline fishery.... 108
Table 26. Released catch, retained catch, and total catch for the Hawaii-permitted deep-set longline fishery in 2024.... 109

Table 27. Average weight (lb) of the catch by the Hawaii-permitted deep-set longline fishery. Calculated by taking the total weight of all landings and dividing by the total number of pieces. ..... 110
Table 28. Hawaii-permitted shallow-set longline catch (number of fish) by area ..... 113
Table 29. Total estimated bycatch in number of fish for the top 10 bycatch species from the Pacific Islands Region Observer Program for the Hawaii shallow-set longline fishery ..... 115
Table 30. Released catch, retained catch, and total catch for the Hawaii-permitted shallow-set longline fishery in 2024 ..... 116
Table 31. Average weight (lb) of the catch by the Hawaii-permitted shallow-set longline fisheries ..... 117
Table 32. Average weight (lb) of the catch by the Hawaii troll and handline fisheries ..... 123
Table 33. Total reported commercial bycatch (number of individuals) from the MHI troll fishery for fishing years 2014-2024 ..... 125
Table 34. Total reported commercial bycatch (number of individuals) from the MHI handline fishery for fishing years 2014-2024 ..... 126
Table 35. Estimated annual catch (mt) of tuna species in the Pacific Ocean ..... 131
Table 36. Total reported purse seine catch (mt) of skipjack, yellowfin, and bigeye tuna in the Pacific Ocean ..... 133
Table 37. Total reported longline catch (mt) of PMUS in the Pacific Ocean ..... 137
Table 38. Total reported pole-and-line catch (mt) of skipjack in the Pacific Ocean ..... 140
Table 39. Estimates of stock status in relation to overfishing and overfished reference points for WPFMC PMUS ..... 144
Table 40. U.S. and territorial longline catch (mt) by species in the WCPFC Statistical Area, 2020-2024 ..... 147
Table 41. U.S. longline catch (mt) by species in the North Pacific Ocean, 2020-2024 ..... 148
Table 42. U.S. longline catch (mt) by species in the Eastern Pacific Ocean, 2020-2024 ..... 149
Table 43. Catch disposition by fisher category ..... 177
Table 44. Pacific Islands Region 2024 Commercial Fishing Economic Assessment Index ..... 213
Table 45. Pacific Islands Region 2025 Commercial Fishing Economic Assessment Index ..... 213
Table 46. Summary of ESA consultations for the Hawaii shallow-set longline fishery ..... 218
Table 47. Summary of Incidental Take Statements (ITS) for the Hawaii shallow-set longline fishery ..... 219
Table 48. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for sea turtles in the Hawaii shallow-set longline fishery based on interaction date for comparison with the shallow-set sea turtle hard caps, 2004-2024[a] ..... 222
Table 49. Observed interactions and estimated total mortality (M)[a] (using Ryder et al. 2006) of sea turtles in the Hawaii shallow-set longline fishery compared to the 1-year ITS in the 2019 Biological Opinion[b] and the 5-year ITS in the 2024 Supplemental Biological Opinion for Loggerhead Sea Turtles ..... 223
Table 50. Number of shallow-set longline trips by the number of loggerhead and leatherback turtle interactions per trip, January 1 – December 31, 2024. The total number of trips in this period was 54. ..... 225
Table 51. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for dolphins in the Hawaii shallow-set longline fishery, 2004-2024[a] ..... 227
Table 52. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for small whales in the Hawaii shallow-set longline fishery, 2004-2024[a] ..... 228

Table 53. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for large whales in the Hawaii shallow-set longline fishery, 2004-2024[a] ..... 229
Table 54. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for unidentified dolphins, beaked whales, and cetaceans in the Hawaii shallow-set longline fishery, 2004-2024[a] ..... 230
Table 55. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for pinnipeds in the Hawaii shallow-set longline fishery, 2004-2024[a] ..... 231
Table 56. Observed interactions and estimated total mortalities (M) of Guadalupe fur seals in the Hawaii shallow-set longline fishery compared to the 1-year ITS in the 2019 Biological Opinion[a] ..... 232
Table 57. Summary of mean annual mortality and serious injury (M&SI) and potential biological removal (PBR) by marine mammal stocks with observed interactions in the Hawaii shallow-set longline fishery ..... 233
Table 58. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for seabirds in the Hawaii shallow-set longline fishery, 2004-2024[a] ..... 235
Table 59. Observed and estimated interactions with elasmobranchs in the Hawaii shallow-set longline fishery, 2004-2024[a] ..... 236
Table 60. Observed interactions and estimated total mortalities (M) of oceanic whitetip shark and giant manta ray in the Hawaii shallow-set longline fishery compared to the 1-year ITS in the 2019 Biological Opinion[a] ..... 237
Table 61. Summary of ESA consultations for the Hawaii deep-set longline fishery ..... 239
Table 62. Summary of ITSs for the Hawaii deep-set longline fishery ..... 240
Table 63. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for sea turtles in the Hawaii deep-set longline fishery, 2002-2024[a] ..... 244
Table 64. Estimated total interactions (extrapolated using quarterly observer coverage) of sea turtles in the Hawaii deep-set longline fishery compared to the 5-year running sum ITS in the 2024 Biological Opinion[a] ..... 245
Table 65. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for dolphins in the Hawaii deep-set longline fishery, 2002-2024[a] ..... 247
Table 66. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for small whales in the Hawaii deep-set longline fishery, 2002-2024[a] ..... 248
Table 67. Observed takes, takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for large whales in the Hawaii deep-set longline fishery, 2002-2024[a] ..... 249
Table 68. Observed takes, takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates for unidentified species of cetaceans in the Hawaii deep-set longline fishery, 2002-2024[a] ..... 250
Table 69. Estimated total interactions (extrapolated using quarterly observer coverage) of cetaceans in the Hawaii deep-set longline fishery compared to the 5–year running sum ITS in the 2024 Biological Opinion[a] ..... 251
Table 70. Mean estimated annual M&SI and PBR by marine mammal stocks with observed interactions in the Hawaii deep-set longline fishery ..... 252

Table 71. Observed takes, mortalities (M), takes per fishing effort (sets and 1,000 hooks), and estimated annual takes using expansion factor estimates and ME for albatross species in the Hawaii deep-set longline fishery, 2002-2024[a] ..... 255
Table 72. Observed takes, mortalities (M), takes per fishing effort (sets and 1,000 hooks), and estimated annual takes using expansion factor estimates and ME for other seabird species in the Hawaii deep-set longline fishery, 2002-2024[a] ..... 256
Table 73. Observed takes, mortalities (M), takes per fishing effort (sets and 1,000 hooks), and estimated annual takes using expansion factor estimates and ME for ESA-listed elasmobranch species in the Hawaii deep-set longline fishery, 2004-2024[a] ..... 258
Table 74. Estimated total interactions (extrapolated using quarterly observer coverage) of oceanic whitetip sharks and giant manta rays in the Hawaii deep-set longline fishery compared to the 5-year running sum ITS in the 2024 Biological Opinion[a] ..... 259
Table 75. Annual proportion of leader material used in the Hawaii deep-set longline fishery by month, 2020-2024[a] ..... 260
Table 76. Summary of oceanic whitetip shark interaction events reported on the observer program's elasmobranch form, 2022-2024. ..... 261
Table 77. Summary of ESA consultations for the American Samoa longline fishery ..... 263
Table 78. Summary of ITSs for the American Samoa longline fishery ..... 263
Table 79. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), estimated annual takes using expansion factor estimates and ME for sea turtles in the American Samoa longline fishery, 2006-2024[a] ..... 266
Table 80. Estimated total interactions[a] (extrapolated using quarterly observer coverage) of sea turtles in the American Samoa longline fishery compared to the 5-year running sum Incidental Take Statement (ITS) in the 2023 Biological Opinion ..... 267
Table 81. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates for marine mammals in the American Samoa longline fishery, 2006-2024[a] ..... 269
Table 82. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for seabirds in the American Samoa longline fishery, 2006-2024[a] ..... 270
Table 83. Observed and estimated total elasmobranch interactions with the American Samoa longline fishery for 2006-2024[a] ..... 271
Table 84. Estimated total interactions (extrapolated using quarterly observer coverage) of oceanic whitetip sharks and giant manta rays in the American Samoa longline fishery compared to the 5-year running sum ITS in the 2023 Biological Opinion[a] ..... 272
Table 85. Status of ESA listing, status reviews, critical habitat and recovery plan for species occurring in the Pelagic FEP region ..... 279
Table 86. MMAs established under FEPs from 50 CFR § 665 ..... 328
Table 87. Offshore aquaculture facilities near Hawaii ..... 332
Table 88. Alternative Energy Facilities and Development in the Western Pacific region ..... 333
Table 89. DOD major activities in the Western Pacific region ..... 334
Table 90. Notices to mariners for military exercises in the Mariana Archipelago from 2013-2024 ..... 337

**Figure** **Page**

Figure ES-1. Specification of fishing mortality and biomass reference points in the Pelegic FEP and current stock status in the WCPO and EPO. North Pacific albacore is not represented due to the use of different status determination criteria....4
Figure 1. Map of the Western Pacific region.... 13
Figure 2. Number of boats landing any pelagic species in American Samoa by longlining, trolling, and all methods.... 31
Figure 3. Number of fishing trips and sets for pelagic species in American Samoa.... 31
Figure 4. Total estimated landings of tuna and non-tuna PMUS in American Samoa.... 33
Figure 5. Commercial landings of tuna and non-tuna PMUS in American Samoa.... 34
Figure 6. Total estimated landings of yellowfin tuna in American Samoa.... 34
Figure 7. Total estimated landings of skipjack tuna in American Samoa.... 35
Figure 8. Total estimated landings of wahoo in American Samoa.... 35
Figure 9. Total estimated landings of mahimahi in American Samoa.... 36
Figure 10. Total estimated landings of blue marlin in American Samoa.... 36
Figure 11. Total estimated landings of sailfish in American Samoa.... 37
Figure 12. Number of active longline fishing vessels in American Samoa by size classes: Small (0-50 ft) and Large (> 51 ft).... 38
Figure 13. Number of longline hooks set from federal logbook data in American Samoa.... 39
Figure 14. Total estimated landings of bigeye tuna by longlining in American Samoa.... 40
Figure 15. Total estimated landings of albacore by longlining in American Samoa.... 40
Figure 16. Total estimated landings of swordfish by longlining in American Samoa.... 41
Figure 17. Number of fish released by longline vessels in American Samoa according to federal logbook data.... 43
Figure 18. Albacore catch per 1,000 hooks by monohull vessels from longline logbook data in American Samoa.... 44
Figure 19. Catch-per-hour for trolling and number of trolling hours in American Samoa.... 49
Figure 20. Trolling CPUE for skipjack and yellowfin tuna in American Samoa.... 49
Figure 21. Trolling CPUE for blue marlin, mahimahi, and wahoo in American Samoa.... 50
Figure 22. Number of fishers with commercial pelagic landings in the CNMI.... 53
Figure 23. Number of trips with commercial pelagic landings in the CNMI.... 53
Figure 24. Estimated number of trolling trips from boat-based creel surveys in the CNMI.... 54
Figure 25. Estimated number of trolling hours from boat-based creel surveys in the CNMI.... 54
Figure 26. Estimated average troll trip length from boat-based creel surveys in the CNMI.... 55
Figure 27. Total estimated catch for all pelagics, tuna PMUS, and non-tuna PMUS from boat-based creel surveys in the CNMI.... 57
Figure 28. Total estimated catch for all pelagics in the CNMI.... 58
Figure 29. Total estimated catch for tuna PMUS in the CNMI.... 58
Figure 30. Total estimated catch for non-tuna PMUS in the CNMI.... 59
Figure 31. Total estimated catch for skipjack tuna in the CNMI.... 59
Figure 32. Total estimated catch for yellowfin tuna in the CNMI.... 60
Figure 33. Total estimated catch for mahimahi in the CNMI.... 60
Figure 34. Total estimated catch for wahoo in the CNMI.... 61
Figure 35. Total estimated catch for blue marlin in the CNMI.... 61

Figure 36. Commercial purchase landings for all pelagics, tuna PMUS, and non-tuna PMUS in the CNMI ..... 62
Figure 37. Commercial purchase landings for skipjack and yellowfin tunas in the CNMI ..... 62
Figure 38. Commercial purchase landings for mahimahi, wahoo, and blue marlin in the CNMI 63
Figure 39. Estimated total trolling catch rates (lb/hr) in the CNMI ..... 64
Figure 40. Estimated trolling catch rates (lb/hr) for skipjack tuna in the CNMI ..... 64
Figure 41. Estimated trolling catch rates (lb/hr) for yellowfin tuna in the CNMI ..... 65
Figure 42. Estimated trolling catch rates (lb/hr) for mahimahi in the CNMI ..... 65
Figure 43. Estimated trolling catch rates (lb/hr) for wahoo in the CNMI ..... 66
Figure 44. Estimated trolling catch rates (lb/hr) for blue marlin in the CNMI ..... 66
Figure 45. Estimated trolling catch rates (lb/trip) for mahimahi, wahoo, and blue marlin in the CNMI ..... 67
Figure 46. Estimated trolling catch rates (lb/trip) for skipjack and yellowfin in the CNMI ..... 67
Figure 47. Total estimated number of vessels in Guam pelagic fisheries with upper and lower 95% confidence intervals (grey dashed lines) ..... 71
Figure 48. Total estimated landings for all pelagics, tuna PMUS, and non-tuna PMUS from boat-based creel surveys in Guam ..... 72
Figure 49. Total estimated landings for all pelagics in Guam ..... 73
Figure 50. Total estimated landings for tuna PMUS in Guam ..... 73
Figure 51. Total estimated landings for skipjack tuna in Guam ..... 74
Figure 52. Total estimated landings for yellowfin tuna in Guam ..... 74
Figure 53. Total estimated landings for non-tuna PMUS in Guam ..... 75
Figure 54. Total estimated landings for mahimahi in Guam ..... 75
Figure 55. Total estimated landings for wahoo in Guam ..... 76
Figure 56. Total estimated landings for blue marlin in Guam ..... 76
Figure 57. Commercial purchase landings for all pelagics, tuna PMUS, and non-tuna PMUS in Guam ..... 78
Figure 58. Estimated number of trolling trips from boat-based creel surveys in Guam ..... 79
Figure 59. Estimated number of trolling hours from boat-based creel surveys in Guam ..... 79
Figure 60. Estimated fishing trip length (hr/trip) from boat-based creel surveys in Guam ..... 80
Figure 61. Estimated total trolling catch rates (lb/hr) in Guam ..... 80
Figure 62. Estimated trolling catch rates (lb/hr) for skipjack tuna in Guam ..... 81
Figure 63. Estimated trolling catch rates (lb/hr) for yellowfin tuna in Guam ..... 81
Figure 64. Estimated trolling catch rates (lb/hr) for mahimahi in Guam ..... 82
Figure 65. Estimated trolling catch rates (lb/hr) for wahoo in Guam ..... 82
Figure 66. Estimated trolling catch rates (lb/hr) for blue marlin in Guam ..... 83
Figure 67. Hawaii commercial tuna, billfish, other PMUS and PMUS shark catch ..... 94
Figure 68. Total commercial pelagic catch by gear type ..... 94
Figure 69. Hawaii commercial tuna catch by gear type ..... 95
Figure 70. Species composition of tuna catch ..... 95
Figure 71. Hawaii bigeye tuna catch by gear type ..... 96
Figure 72. Hawaii yellowfin tuna catch by gear type ..... 96
Figure 73. Hawaii skipjack tuna catch by gear type ..... 97
Figure 74. Hawaii albacore catch by gear type ..... 97
Figure 75. Hawaii commercial billfish catch by gear type ..... 98
Figure 76. Species composition of billfish catch ..... 98

Figure 77. Hawaii swordfish catch by gear type ..... 99
Figure 78. Hawaii blue marlin catch by gear type ..... 99
Figure 79. Hawaii striped marlin catch by gear type ..... 100
Figure 80. Hawaii commercial catch of other PMUS by gear type ..... 100
Figure 81. Species composition of other PMUS catch ..... 101
Figure 82. Hawaii moonfish catch by gear type ..... 101
Figure 83. Hawaii mahimahi catch by gear type ..... 102
Figure 84. Hawaii ono (wahoo) catch by gear type ..... 102
Figure 85. Hawaii pomfret catch by gear type ..... 103
Figure 86. Hawaii PMUS shark catch by gear type ..... 103
Figure 87. Number of Hawaii-permitted deep-set longline vessels and trips ..... 104
Figure 88. Number of hooks set by the Hawaii-permitted deep-set longline fishery ..... 104
Figure 89. Catch and revenue for the Hawaii-permitted deep-set longline fishery ..... 105
Figure 90. Tuna CPUE for the Hawaii-permitted deep-set longline fishery ..... 107
Figure 91. Billfish CPUE for the Hawaii-permitted deep-set longline fishery ..... 107
Figure 92. Blue shark CPUE for the Hawaii-permitted deep-set longline fishery ..... 108
Figure 93. Number of Hawaii-permitted shallow-set longline vessels and trips ..... 111
Figure 94. Number of hooks set by the Hawaii-permitted shallow-set longline fishery ..... 111
Figure 95. Catch and revenue for the Hawaii-permitted shallow-set longline fishery ..... 112
Figure 96. Tuna CPUE for the Hawaii-permitted shallow-set longline fishery ..... 114
Figure 97. Billfish CPUE for the Hawaii-permitted shallow-set longline fishery ..... 114
Figure 98. Blue shark CPUE for the Hawaii-permitted shallow-set longline fishery ..... 115
Figure 99. Number of MHI troll fishers and days fished ..... 118
Figure 100. Catch and revenue for the MHI troll fishery ..... 118
Figure 101. Tuna CPUE for the MHI troll fishery ..... 119
Figure 102. Marlin CPUE for the MHI troll fishery ..... 119
Figure 103. Mahimahi and Ono CPUE for the MHI troll fishery ..... 120
Figure 104. Number of MHI handline fishers and days fished ..... 120
Figure 105. Catch and revenue for the MHI handline fishery ..... 121
Figure 106. Tuna CPUE for the MHI handline fishery ..... 121
Figure 107. Number of offshore handline fishers and days fished ..... 122
Figure 108. Catch and revenue for the offshore tuna handline fishery ..... 122
Figure 109. Tuna CPUE for the offshore tuna handline fishery ..... 123
Figure 110. The Western and Central Pacific Ocean, Eastern Pacific Ocean and the WCPFC Convention Area (WCP–CA) [in dashed lines]) ..... 130
Figure 111. Estimated total annual catch of tuna species in the Pacific Ocean: albacore (ALB), bigeye tuna (BET), skipjack tuna (SKJ), and yellowfin tuna(YFT) ..... 131
Figure 112. Total purse seine catch of skipjack (SKJ), yellowfin (YFT), and bigeye tuna (BET) in the Pacific Ocean ..... 134
Figure 113. Reported longline tuna catches in the Pacific Ocean: albacore (ALB), bigeye tuna (BET), and yellowfin tuna(YFT) ..... 138
Figure 114. Reported longline billfish catches in the Pacific Ocean: black marlin (BLM), blue marlin (BUM), striped marlin (MLS), swordfish (SWO) ..... 138
Figure 115. Reported pole-and-line catch (mt) in the Pacific Ocean ..... 140
Figure 116. MSY control rule and reference points for pelagic MUS ..... 142
Figure 117. Settlement of the Pacific Islands[1] ..... 160

Figure 118. American Samoa employment estimates[1] ..... 163
Figure 119. Commercial landings and revenue for the American Samoa longline fishery (adjusted to 2024 dollars)[1] ..... 183
Figure 120. Albacore whole-weight price as reported by American Samoan fishers (adjusted to 2024 dollars)[1] ..... 184
Figure 121. The cost structure for an average American Samoa longline trip in 2024[1] ..... 185
Figure 122. Costs per set[1] for the American Samoa longline fishery not including labor cost and fixed costs (adjusted to 2024 dollars)[2] ..... 186
Figure 123. Net revenue per set for the American Samoa longline fishery (adjusted to 2024 dollars)[1] ..... 187
Figure 124. Revenue per-day-at-sea for the American Samoa longline fishery[1] ..... 188
Figure 125. Revenue distribution (revenue per vessel and Gini coefficient) for the American Samoa longline fishery[1] ..... 188
Figure 126. PMUS pounds sold and revenue in the American Samoa troll fishery (adjusted to 2024 dollars)[1] ..... 189
Figure 127. Adjusted and nominal price of PMUS harvested by trolling in American Samoa (adjusted to 2024 dollars)[1] ..... 190
Figure 128. Average cost for American Samoa troll trips (adjusted to 2024 dollars)[1] ..... 191
Figure 129. PMUS pounds sold and revenue in the CNMI for all gears (adjusted to 2024 dollars)[1] ..... 192
Figure 130. Adjusted and nominal prices of PMUS for fish sold in the CNMI from all gears[1]. 192
Figure 131. Average cost for CNMI troll trips (adjusted to 2023 dollars)[1] ..... 193
Figure 132. PMUS pounds sold and revenue in Guam for all gears (adjusted to 2024 dollars)[1] 194
Figure 133. Adjusted and nominal prices of PMUS for fish sold in the CNMI from all gears[1]. 195
Figure 134. Average cost for Guam troll trips (adjusted to 2024 dollars)[1] ..... 196
Figure 135. Commercial landings and revenue of Hawaii-permitted longline fleet (landed in Hawaii markets; adjusted to 2024 dollars)[1] ..... 197
Figure 136. Trends in Hawaii longline revenue species composition (nominal value)[1] ..... 198
Figure 137. Adjusted and nominal price trends for three main species (bigeye tuna, yellowfin tuna, and swordfish) harvested by the Hawaii longline fishery[1] ..... 198
Figure 138. The cost structure of an average deep-set fishing trip[1] ..... 200
Figure 139. The cost structure of an average shallow-set fishing trip[1] ..... 200
Figure 140. Average trip costs for Hawaii longline deep-set fishing (adjusted to 2024 dollars)[1] ..... 201
Figure 141. Average trip costs for Hawaii longline shallow-set fishing (adjusted to 2024 dollars)[1] ..... 201
Figure 142. Average net revenue per trip for Hawaii longline deep-set trips (adjusted to 2024 dollars)[1] ..... 202
Figure 143. Average net revenue per trip for Hawaii longline shallow-set trips (adjusted to 2024 dollars)[1] ..... 203
Figure 144. Revenue per-day-at-sea for the Hawaii longline fishery (adjusted to 2024 dollars)[1] ..... 204
Figure 145. Revenue per vessel and Gini coefficient for the Hawaii longline fishery[1] (adjusted to 2024 dollars)[2] ..... 204
Figure 146. Total number of licensed fishers participating in small scale (i.e., non-longline) PMUS fisheries in Hawaii[1] ..... 206

Figure 147. Total pounds sold from MHI commercial non-longline gears[1] ..... 206
Figure 148. Revenue from Hawaii pelagic non-longline gears (adjusted to 2024 dollars)[1] ..... 207
Figure 149. Price trends of PMUS by gear (adjusted to 2024 dollars)[1] ..... 207
Figure 150. Fishing trip cost by gear type in 2014 and 2021[1] ..... 208
Figure 151. Pounds sold and revenue for the MHI troll fishery (adjusted to 2024 dollars)[1] ..... 209
Figure 152. Pounds sold and revenue for MHI handline fishery (adjusted to 2024 dollars)[1] ..... 210
Figure 153. The pounds sold and revenue for the offshore handline (adjusted to 2024 dollars)[1] ..... 211
Figure 154. Pounds sold and revenue for all other pelagic gears in Hawaii (excluding aku boat; adjusted to 2024 dollars)[1] ..... 212
Figure 155. Leader material (based on observed sets) used in the Hawaii deep-set longline fishery by month before and during the voluntary transition period (2020–2021) ..... 260
Figure 156. Summary of the trends and status of the ocean and climate indicators in 2024 ..... 283
Figure 157. Schematic diagram illustrating the relationships between the ocean and climate indicators from the perspective of natural climate variability ..... 285
Figure 158. Schematic diagram illustrating the relationships between the ocean and climate indicators from the perspective of anthropogenic climate change ..... 286
Figure 159. Concentration of atmospheric carbon dioxide at Mauna Loa Observatory on the island of Hawai‘i ..... 288
Figure 160. Time series and long-term trend of oceanic pH measured at Station ALOHA ..... 290
Figure 161. Oceanic Niño Index from 1950–2024 El Niño periods in red, La Niña periods in blue, and neutral periods in grey ..... 291
Figure 162. Pacific Decadal Oscillation from 1854–2024 with positive warm periods in red and negative cool periods in blue ..... 292
Figure 163 North Pacific Gyre Oscillation from 1950–2024 ..... 294
Figure 164. 2024 Pacific basin tropical cyclone tracks ..... 295
Figure 165. Storm counts (bars) and Accumulated Cyclone Energy (ACE) index values (lines) in each region of the Pacific. Both annual ACE index (black lines) and 1991–2020 average ACE index (grey lines) are shown ..... 295
Figure 166. Average 2024 sea surface temperature (shaded) and the difference from the 1985–2009 average (contoured). The white rectangle identifies the area targeted by Hawai‘i’s longline fisheries. SST is averaged over this area for the time series shown in Figure 167 and Figure 168 ..... 298
Figure 167. Time series of monthly average sea surface temperature over the longline fishing grounds outlined in Figure 166 ..... 298
Figure 168. Time series of monthly average sea surface temperature anomaly over the longline fishing grounds outlined in Figure 166 ..... 299
Figure 169. Average temperatures at 200–300 m depth in 2024 (shaded) and the difference from the 1980–2009 average (contoured). The white rectangle identifies the area targeted by Hawai‘i’s longline fisheries. Temperatures is averaged over this area for the time series shown in Figure 170 ..... 300
Figure 170. Time series of monthly 200–300 m temperatures over the longline fishing grounds outlined in Figure 169 ..... 301
Figure 171. Average chlorophyll-a concentration in 2024 (shaded) and the difference from the 1998–2009 average (contoured). The white rectangle identifies the area targeted by

Hawai‘i’s longline fisheries. Chlorophyll-a is averaged over this area for the time series shown in Figure 172 and Figure 173 ..... 302
Figure 172. Time series of monthly average chlorophyll concentration over the longline fishing grounds outlined in Figure 173 ..... 303
Figure 173. Time series of monthly average chlorophyll concentration anomaly over the longline fishing grounds outlined in Figure 172 ..... 303
Figure 174. Average position of the subtropical front (STF) in 2024 (solid black line), over the 1985–2009 average (dotted line), locations from previous years (1985–2023; solid grey lines), and ocean temperatures for the first quarter of 2024 (shaded) ..... 305
Figure 175. Average position of the transition zone chlorophyll front (TZCF) in 2024 (solid black line) over the 1998–2009 average (dotted black line), locations from previous years (1985–2023; solid grey lines), and ocean color for the first quarter of 2024 (shaded) ..... 305
Figure 176. Average estimated median phytoplankton size in 2024 (shaded) and the difference from the 1998–2009 average (contoured) across the area targeted by Hawai‘i’s longline fisheries ..... 307
Figure 177. Time series of monthly median phytoplankton size over the longline fishing grounds shown in Figure 176 ..... 307
Figure 178. Time series of monthly median phytoplankton size anomaly over the longline fishing grounds shown in Figure 176 ..... 308
Figure 179. The climatological (2000–2009; grey) and 2024 (color) distribution of weights for all fish (top), bigeye tuna from deep sets (middle), and swordfish from shallow sets (bottom) 310
Figure 180. The annual distribution of weights of all fish, showing the full range of weights (top) and truncated to better demonstrate the distribution of the majority of weights (bottom) with large circles denoting median weight, black lines showing the range of the middle 50% of fish, small circles denoting the $20^{th}$ and $80^{th}$ percentiles of the weight distributions, and width of shading proportional to the number of fish of a given weight ..... 311
Figure 181. The annual distribution of weights of bigeye tuna from deep sets (top) and swordfish from shallow sets (bottom), with large circles denoting median weight, black lines showing the range of the middle 50% of fish, small circles denoting the $20^{th}$ and $80^{th}$ percentiles of the weight distributions, and width of shading proportional to the number of fish of a given weight. Horizontal dashed lines denote the weight corresponding to $L_{50}$ for bigeye tuna (17 kg; (Farley et al. 2018)), female swordfish (55.5 kg; (Kapur et al. 2017)), and male swordfish (19.4 kg, (Kapur et al. 2017)) ..... 312
Figure 182. Quarterly deep-set bigeye tuna weight per unit effort for 2022–2024 (color) and the climatological average (2000–2009) ..... 314
Figure 183. Annual CPUE of bigeye tuna ≤ 15 kg (grey solid line), CPUE of all bigeye tuna (pink dashed line), and biomass CPUE (blue dotted line) from 2000–2024, all from deep sets ..... 315
Figure 184. Annual observed (solid lines) and forecast (dotted lines) CPUE (upper panel; green) and WPUE (lower panel; purple) of bigeye tuna from deep sets. The forecasts’ 95% confidence intervals are shaded ..... 317
Figure 185. Regulated Fishing Areas of the Western Pacific Region ..... 327
Figure 186. Map showing Warning Areas around the Mariana Archipelago ..... 339
Figure 187. Present or planned locations of FADs in deep water around American Samoa in 2020 (Source: DMWR) ..... 340

Figure 188. Map of FAD locations around the CNMI. Yellow depicts present FADs, and red depicts missing FADs as of the beginning of April 2022 (Source: DFW) ..... 341
Figure 189. Map of FAD locations around Guam (Source: DAWR) ..... 343
Figure 190. Map of the 12 BRFAs around the MHI; green boxes indicate those areas were opened to bottomfish fishing in 2019 and red boxes indicate areas that remained closed to bottomfish fishing at this time. All BRFAs are now open (DAR 2021). ..... 344
Figure 191. Diagram of the typical arrangement of FADs around the MHI (from Hawaii Sea Grant) ..... 346
Figure 192. Map of FADs in the waters around the Big Island; red letters indicate a FAD that is known to be missing, and green letters indicate an active FAD (as of January 9, 2025, from Hawaii Sea Grant) ..... 347
Figure 193. Map of FADs in the waters around Maui; red letters indicate a FAD that is known to be missing, and green letters indicate an active FAD (as of January 9, 2025, from Hawaii Sea Grant) ..... 347
Figure 194. Map of FADs in the waters around Oahu; red letters indicate a FAD that is known to be missing, and green letters indicate an active FAD (as of January 9, 2025, from Hawaii Sea Grant) ..... 348
Figure 195. Map of FADs in the waters around Kauai; red letters indicate a FAD that is known to be missing, and green letters indicate an active FAD that has been recently deployed (as of January 9, 2025, from Hawaii Sea Grant) ..... 348
Figure 196. Quarterly sea surface temperature distribution of telemetered sea turtles (Tags), of telemetered sea turtles in the minimum convex hull of the Hawaii shallow-set longline sets (Tags in MCH), the shallow-set fishery sets (Sets), and the interactions between loggerheads and the shallow-set fishery (Interactions) relative to the 1º TurtleWatch band (17.5-18.5ºC), the red hash. ..... 351
Figure 197. Latitudinal overlap between the Hawaii shallow-set longline fishery (blue triangles) and the loggerhead locations (orange circles). The line is the mean, the darker shading is the 50%, and the lighter shading is the 95%. ..... 352
Figure 198. Left: Map depicting the five regions by which the fishery is examined overlaid on the climatological (1995-2015) median depth of preferred thermal habitat ..... 357
Figure 199. Annual deep-set bigeye tuna (black) and lancetfish (gray) CPUE ..... 358
Figure 200. Mean weight (A), catch per unit effort (B), and weight per unit effort (WPUE) for all fish in the Hawaii-based longline fishery from dealer provided data. ..... 359
Figure 201. Temporally- and spatially-adjusted annual catch per 1000 hooks ..... 360

# EXECUTIVE SUMMARY

The Western Pacific Regional Fishery Management Council (WPFMC; the Council) manages the pelagic resources specified in the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA) and that occur in the United States (U.S.) Exclusive Economic Zone (EEZ) around American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), Guam, Hawaii, and the U.S. possessions in the Western Pacific Region (Johnston Atoll, Kingman Reef and Palmyra, Jarvis, Howland, Baker, Midway, and Wake Islands) known as the Pacific Remote Island Area (PRIA). The Council developed and the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) implemented the Fishery Management Plan (FMP) for Pelagic Fisheries of the Western Pacific Region in 1987, which has since been replaced by the Fishery Ecosystem Plan (FEP) implemented in 2010. Since this time, the Council has generated an annual report that provides fishery performance data, including but not limited to landings, value of the fishery, and catch rates, for each of the areas the Council manages.

In July 2013, NMFS issued a final rule (78 FR 43066, July 19, 2013) that revised National Standard 2 (NS2) guidelines and clarified the content and purpose of the Stock Assessment and Fishery Evaluation (SAFE) report to manage fisheries using of the best scientific information available (BSIA) (see Title 50 Code of Federal Regulations [CFR] Part 600.315). In 2015, the Council, in partnership with NMFS Pacific Islands Fisheries Science Center (PIFSC), local fishery resource management agencies, and the NMFS Pacific Islands Regional Office (PIRO), agreed to revise and expand the contents of future annual reports to include the range of ecosystem elements, including protected species interactions, oceanographic parameters, essential fish habitat (EFH) review, and marine planning activities. SAFE reports provide regional fishery management councils and NMFS with information for determining the annual catch limits (ACLs) for each stock in the fishery, documenting significant trends or changes in the resource, marine ecosystems, and fishery over time, implementing required EFH provisions, and assessing the relative success of existing relevant state and federal fishery management programs. The annual SAFE report is intended to serve as a source document for developing the FEPs, amendments, and other analytical documents needed for management decisions.

Table ES-1 was developed from a review of NS2 guidelines and the 2013 revisions under the Final Rule for Provisions on Scientific Information for NS2 (78 FR 43066).

Table ES-1. Fulfillment of National Standard 2 requirements within the 2024 annual SAFE report for the U.S. Pacific Island Pelagic Fisheries Ecosystem Plan

| Requirement | Data Needs | Citation for Additional Guidance | Section |
|---|---|---|---|
| Description of the Status Determination Criteria (SDC) | Maximum fishing mortality threshold (MFMT), OFL, and minimum stock size threshold (MSST) | 600.310(e)(2) | 2.6.5.1 |
| Information on Overfishing Level (OFL) | Data collection, estimation methods, and consideration of uncertainty | 600.310(f)(2) | 2.6.6 |
| Information determining Annual Catch Limits (ACLs) | Needed for each stock to document significant trends or changes in the resource or marine ecosystem | 600.310(f)(5) | 2.6.6 |
| Information on Optimum Yield (OY) | The harvest level for a species that achieves the greatest overall benefits, including economic, social, and biological considerations | 600.310 | NA1 |
| Information on Acceptable Biological Catch | Most recent stock assessment | 600.310(c)<br>600.310(f)(2) | 2.6.7 |
| | | | |
| Fishing mortality | Sources of fishing mortality (both landed and discarded), including commercial and recreational catch and bycatch in other fisheries | 600.310(i) | Ch. 2 |
| Bycatch by fishery | Including target and non-target species | | Ch. 2 |
| | | | |
| Rebuilding overfished stocks | Best Scientific Information Available[2] on biological condition of stocks | | NA |
| Condition of ecosystems | BSIA to assess success of FEP | | 3.4 + Ch. 4 |
| Condition of EFH | Report on review of available information; full review every five years | 600.815(a)(10) | 3.5 |
| Socioeconomic conditions of fishery | BSIA to assess success of FEP | | 3.2 |
| Socioeconomic conditions of fishing communities | BSIA to assess success of FEP | | 3.2 |
| Socioeconomic conditions of processing industry | BSIA to assess success of FEP | | NA |
| Safety at sea by fishery | BSIA to assess success of FEP | | NA |
| Information/data gaps | Explanation of data gaps and emphasis on future scientific work to address gaps | | NA |

NA = 'Not Applicable'

1 A numeric OY is not currently used to manage pelagic fisheries in the Pacific Islands Region.

2 The National Standard 2 Guidelines define BSIA as: "Relevance, inclusiveness, objectivity, transparency, timeliness, verification, validation, and peer review of fishery management information as appropriate. The revised NS2 guidelines do not prescribe a static definition of BSIA because science is a dynamic process involving continuous improvements." (78 FR 43067, July 19, 2013).

## SUMMARY OF SAFE STOCK ASSESSMENT REQUIREMENTS

Many of the fish managed under the Pacific Island Pelagic Fisheries Ecosystem Plan (Pelagic FEP) are also managed under the international agreements governing the Western and Central Pacific Fisheries Commission (WCPFC) and/or the Inter-American Tropical Tuna Commission (IATTC), to which the U.S. is a party. Both the WCPFC and IATTC have adopted criteria for 'overfishing' and 'overfished' designations for certain species that differ from those under the Pelagic FEP. For the purposes of stock status determinations, NMFS will determine stock status of pelagic management unit species (MUS) using the Status Determination Criteria (SDC) described in the Pelagic FEP.

For all pelagic MUS (PMUS) the Council adopted a maximum sustainable yield (MSY) control rule (see Section 2.6.5). The Council has also adopted a warning reference point, $B_{FLAG}$, set equal to $B_{MSY}$ to provide a trigger for consideration of management action before a stock's biomass reaches the minimum stock size threshold (MSST). A stock is approaching an overfished condition when there is more than a 50 percent chance that the biomass will decline below the MSST within two years.

For pelagic species in the Pacific Island Region, most stock assessments are conducted by several international organizations. In the eastern Pacific Ocean (EPO), IATTC staff conduct stock assessments for Eastern Pacific Ocean bigeye, yellowfin, striped marlin, and swordfish.

In the western and central Pacific Ocean (WCPO), the Secretariat of the Pacific Community Oceanic Fisheries Program (SPC) conducts stock assessments on tropical tunas, as well as for South Pacific albacore, southwest Pacific swordfish, and striped marlin. In the North Pacific Ocean, the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) conducts similar stock assessments.

In 2022, stock assessments were completed for Western and Central Pacific Ocean skipjack tuna (Castillo-Jordan et al. 2022), Pacific bluefin tuna (ISC 2022a), and North Pacific blue shark (ISC 2022b). Details of these stock assessments can be found in Section 2.6.7. This section also provides an overview of stock status in relation to overfishing and overfished reference points for species managed under this Pelagic FEP. This section has yet to be updated for the 2024 report.

Figure ES-1 provides the current stock status for all species in the Pelagic FEP for which stock assessments have been completed as of last year's report.

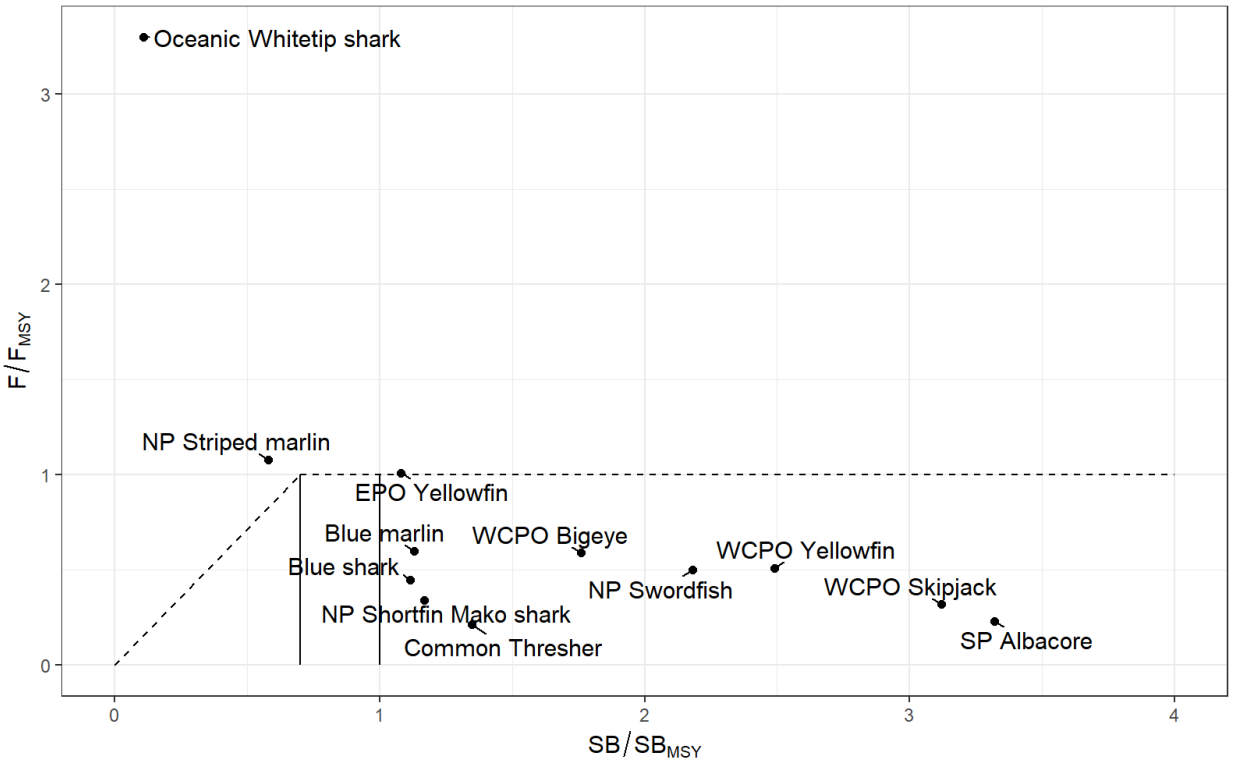



Figure ES-1. Specification of fishing mortality and biomass reference points in the Pelegic FEP and current stock status in the WCPO and EPO. North Pacific albacore is not represented due to the use of different status determination criteria

## SUMMARY OF FISHERY DATA IN THE PACIFIC ISLAND REGION

Table ES-2. Summary of the total pelagic landings during 2024 in the Western Pacific and the percentage change between 2023 and 2024

| Species | American Samoa | | CNMI | | Guam | | Hawaii | |
|---|---|---|---|---|---|---|---|---|
| | Landings (lb) | % Change | Landings (lb) | % Change | Landings (lb) | % Change | Landings (lb) | % Change |
| Swordfish | 6,965 | -1.4 | - | - | 0 | - | 1,892,044 | -7.7 |
| Blue marlin | 86,555 | -26.3 | 0 | - | 14,199 | 63.0 | 948,684 | -23.7 |
| Striped marlin | 3,715 | -6.9 | - | - | 0 | - | 445,442 | -30.9 |
| Other billfish* | 4,668 | 10.3 | 0 | - | 2,077 | 100.5 | 482,644 | 49.5 |
| Mahimahi | 3,079 | -77.0 | 11,427 | -80.3 | 52,698 | -44.6 | 895,092 | 14.5 |
| Wahoo | 25,557 | 0.2 | 13,875 | -33.3 | 45,682 | -20.5 | 899,647 | 34.6 |
| Opah (moonfish) | 296 | -76.0 | - | - | - | - | 492,093 | -6.5 |
| Sharks (whole wt.) | 90 | - | 0 | - | 786 | - | 8,260 | -16.3 |
| Albacore | 1,913,266 | -23.8 | - | - | 0 | - | 1,125,002 | 146.3 |
| Bigeye tuna | 81,664 | 70.4 | - | - | 0 | - | 14,520,258 | -1.9 |
| Bluefin tuna | 238 | - | - | - | - | - | 4,411 | 33.7 |
| Skipjack tuna | 104,153 | 0.8 | 76,217 | -42.2 | 491,671 | 16.1 | 393,000 | -14.6 |
| Yellowfin tuna | 460,279 | 35.1 | 19,368 | 36.5 | 97,424 | 188.0 | 7,350,841 | 2.4 |
| Other pelagics** | 2,210 | 21.0 | 5,606 | -37.0 | 13,805 | 16.3 | 503,356 | -16.2 |
| **Total** | **2,692,735** | **-15.3** | **126,493** | **-46.7** | **718,342** | **13.7** | **29,960,774** | **0.7** |

Note: Total pelagic landings are based on commercial reports and/or creel surveys; % change based on 2023 landings relative to 2024 landings.

*Other billfish include black marlin, spearfish, and sailfish.

**Other pelagics include kawakawa, unknown tunas, pelagic fishes (dogtooth tuna, rainbow runner, barracudas), oilfish, and pomfret. Of these, only oilfish and pomfret are PMUS. While other tables in Chapter 2 excluded or separated out non-MUS, data could not accurately provide individual landings data for these species presented in this total landings table.

## AMERICAN SAMOA

Pago Pago Harbor on the island of Tutuila is a regional base for the transshipment and processing of tuna taken by domestic fleets from other South Pacific nations, the distant-water longline fleets, and purse seine fleets. As the NMFS Pacific Island Region does not directly manage these fisheries, data on the purse seine and non-U.S. vessel landings are not included in this report.

**Participation.** The largest fishery in American Samoa directly managed as part of this FEP is the American Samoa longline fishery. The majority of these vessels are greater than 50 feet (ft), are required to fish beyond 50 nautical miles (nm) from shore, and sell most of their catch, primarily albacore, to the Pago Pago canneries. In 2024, there were nine active longline vessels, all large (> 60 feet). Smaller long-line vessels called *alias* (i.e., locally built, twin-hulled vessels about 30 ft long, powered by 40 horsepower gasoline outboard engines) can fish within 50 nm from shore, but due to the low participation in recent years, these data are confidential and can be reported only in combination with the large vessel fishery. Trolling is the next largest fishery with ten boats that landed pelagic species in 2024, one more than in 2023. Non-commercial pelagic fisheries in American Samoa are less common.

**Landings.** The estimated annual pelagic landings have varied from 2.0 to 5.6 million lb between 2015 and 2024. The 2024 landings were approximately 3.4 million lb, which is the highest since 2019. Pelagic landings consist mainly of four tuna species (albacore, yellowfin, skipjack, and bigeye), which, when combined with other tuna species, made up 94% of the total landings. Albacore made up 71% of the tuna species in 2024. Blue marlin, wahoo, swordfish, sailfish, striped marlin and mahimahi make up most of the non-tuna species landings. Skipjack, sailfish, wahoo, and blue marlin increased in 2024.

**Bycatch**. There was no recorded bycatch for the troll fishery in 2024 (Table 14). In the longline fishery, around 2.2% of the tuna catch was released. Yellowfin and bigeye were the most released bycatch tuna species at 5.1 and 5.5%, respectively. Sharks, oilfish, and pomfret had the highest release numbers of non-tunas, from 88% to 100% of each species released (Table 6). In total, 7.3% of all pelagic species caught by the longline fishery were released in 2024, a decrease from 2023. Fish are released for various reasons including quality, handling and storage difficulties, and marketing problems.

**Effort.** In 2024, there were 22 vessels known to be fishing in the waters of American Samoa according to federal logbooks collected. The 9 vessels that fished in 2024 made 47 trips (averaging 5.2 trips/vessel), deployed 1,359 sets, (151 sets/vessel) using 4.06 million hooks (Table 5). The number of troll trips precipitously decreased from 339 in 2023 to 72 in 2024 at the lowest level since 2015. There were 247 effective trolling hours in 2024, a precipitous drop from 1,577, the lowest since 2015.

**Catch Rate.** The total pelagic catch rate by all longline vessels was 13.0 fish/1,000 hooks in 2024. The tuna catch rate by longliners increased by 0.4 fish/1,000 hooks in 2024 from 12.6 fish/1,000 hooks in 2023. The catch rates have been increasing since 2020. The 2024 albacore catch rate of 13.0 fish/1,000 hooks is slightly above the average of 11.9 fish/1,000 hooks. Trolling catch rates dramatically increased from 3 lb/hr in 2023 to 22 lb/hr in 2024.

**Revenues.** In 2024, the total longline fleet revenue (estimated landed value) was $3.23 million, and albacore composed a majority of the total landed value. Other main species included

yellowfin tuna, bigeye tuna, skipjack tuna, and wahoo. The overall average fish price was $0.86 per pound in 2024. Albacore price was $1.15 per pound in 2024, a decrease of $0.24 from 2023.

**Protected Species Interactions.** Protected species interactions are monitored in the American Samoa longline fishery with mandatory observer coverage targeting approximately 20% of all trips, however, coverage for 2020 was at 2.13% and for 2021 was at 4.65% due to impacts from the COVID-19 pandemic. Coverage has remained relatively consistent from 2022-2024 between 8.7-9.3%. However, there were still very few protected species interactions observed (i.e., only two sea turtles and 1 giant manta ray).

**CNMI**

The CNMI's pelagic fisheries occur primarily from the island of Farallon de Medinilla south to the Island of Rota.

**Participation.** The number of fishers involved in CNMI's pelagic fishery has decreased since 2001, when there were 113 reporting commercial pelagic landings. In 2024, 34 fishers reported landing pelagic species, representing a decrease of nearly 40% from the 87 fishers in 2022.

**Landings.** Skipjack tuna is the principal species landed, comprising approximately 48% of the total estimated pelagic landings in 2024 based on expanded creel survey data. Commercial landings of skipjack were 65,076 lb. Commercial catch of yellowfin tuna (12,394 lb) and dogtooth tuna (11,650 lb) ranked second and third by weight of commercial pelagic species landings in 2024. The amount of blue marlin landed in 2024 increased substantially in 2024 to close to 40,000 lb based on CREEL data.

**Effort**. Estimated trolling trips decreased about 30% to 1,668 trips in 2024. From commercial invoices, there were 873 trips that caught pelagic species from 34 fishers. The exact number of vessels registered for non-commercial and commercial fishing is currently unknown.

**Catch Rate.** In 2024, trolling catch rates increased from 10.3 lb per trolling hour to 12.3 lb per trolling hour, however that is still a decrease compared to the 10-year average (20.0 lb/hr). The skipjack catch rate decreased to 5.8 lb per hour fished. This catch rate is 8.3 lb/hr less than the 10-year average (14.1 lsb/hr). Yellowfin catch rate also decreased to 0.3 lb/hr in 2024 (77% decrease from the 10-year average).

**Bycatch.** Bycatch is not a significant issue in the CNMI, as fishermen retain their catch regardless of species, size, or condition. Based on creel survey interviews, only two fish were caught as bycatch in the trolling fisheries in 2020, both mahimahi. No bycatch was observed during boat-based creel surveys in 2024.

**Revenue.** The total value of the pelagic fishery in 2024 was $267,191. The average price for all pelagic species was $2.69/pound.

**Protected Species Interactions.** There have not been any reported or observed interactions with protected species in the CNMI pelagic fisheries.

## GUAM

Guam's pelagic fishery consists of small, primarily recreational, trolling boats that fish within the local waters of Guam's EEZ or the adjacent EEZ of the Northern Mariana Islands.

**Participation.** The number of boats involved in Guam's pelagic fishery gradually increased from 193 in 1983 to a high of 546 in 2021. There were 447 boats involved in Guam's pelagic fishery in 2024. The majority of the fishing boats are less than 10 m (33 ft) in length and are usually owner-operated by fishers who earn a living outside of fishing. Most fishers sell a portion of their catch, and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. A small but economically significant segment (~5%) of the pelagic fishery is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews.

**Landings.** The estimated annual pelagic landings vary widely in the 43-year time series, ranging between 383,000 and 958,000 lb. The average total catch has shown a slowly increasing trend over the reporting period. The 2024 total expanded pelagic landings were 699,120 lb., a decrease of 2.67% when compared with the catch from 2023. Tuna PMUS landings in 2024 were 456,156 lb., a decrease of 22.62%, while non-tuna PMUS increased 105.3% to 237,040 lb. in 2024.

Landings consisted primarily of five major species: mahimahi, wahoo, bonita or skipjack tuna, yellowfin tuna, and Pacific blue marlin, with skipjack comprising over 58.25% of total landings. There are wide year-to-year fluctuations in the estimated landings of the five major pelagic species. Landings for three of the five common species decreased in 2024 from the previous year's levels. Skipjack decreased by 17.15%, and yellowfin decreased by 15.01%. Wahoo catch decreased 43.53%, mahimahi catch increased by 220.0%, and blue marlin increased by 183.6%

**Effort.** In 2024, the total number of trolling trips and trolling hours remained constant from 2023 levels at 8,386 trips and 38,655 hours respectively.

In early 2010, the U.S. military began exercises in an area south and southeast of Guam designated W-517. W-517 is a special use airspace (approximately 14,000 $nm^2$) that overlays deep open ocean approximately 50 miles south-southwest of Guam. Exercises in W-517 generally involve live fire and/or pyrotechnics. When W-517 is in use, a notice to mariners is issued, and vessels attempting to use the area are advised to be cautious of objects in the water and other small vessels. This discourages access to virtually all banks south of Guam, including Galvez, Santa Rosa, White Tuna, and other popular fishing areas. According to the NTM announcements for 2024, there were 55 days closed in W-517, 171 days closed in Orote Point Firing Range, and 33 days closed at Camp Blaz, due to military exercises.

Also in 2024, there were 66 small-craft advisory days, 96 high-surf advisory/warning days, and 5 typhoon warning days (i.e., seven in May and seven in October

**Catch Rate.** Trolling catch rates (lb./per hour fished) for 2024 were 18.0 lb./hr., a decrease from 2023. Total CPUE decreased by 2.70% in 2024. Skipjack tuna showed a decrease in CPUE, while yellowfin tuna showed a decrease in CPUE from 2023 to 2024. Marlin showed an increase in CPUE from 2023 to 2024. Mahi showed an increase in CPUE and wahoo CPUE decreased from 2023 to 2024. The fluctuations in CPUE are possibly due to variability in the year-to-year abundance and availability of the stocks.

**Bycatch.** There is low bycatch in the charter fishery. In 2024, interview data indicated there was again a low bycatch rate; there were 1011 fish reported as bycatch in 6,692 tallied fish caught, for a 15.10% rate. Bycatch occasionally occurs in the troll fishery including sharks, shark-bitten and undersized fish.

In 2024, fishers were asked if they experienced any shark interactions. There was a total of 664 interviews for boat-based fishing in 2024, with 198 of these inappropriate for determining shark interaction. Of the remaining 466 interviews, 195 reported interactions with sharks and 271 reported no interactions with sharks for a 41.84% positive rate, a decrease from 2023.

**Revenues.** Commercial data for Guam pelagic fisheries are non-disclosed due to confidentiality rules that prevent data derived from fewer than three sources to be reported. Because there were fewer than three vendors that reported sales of pelagic fish on Guam in 2024, the data are not able to be presented in this report.

**Protected Species Interactions.** There have not been any reported or observed interactions with protected species in the Guam pelagic fisheries.

## HAWAII

Compared to the other regions, Hawaii has a diverse fishery sector which includes shallow- and deep-set longline, Main Hawaiian Islands (MHI) troll and handline, offshore handline, and the aku boat (pole and line) fisheries.

**Participation.** A total of 2,997 fishermen were licensed in 2024 by HDAR, including 59% (1,775) who indicated that their primary fishing method and gear were intended to catch pelagic fish. There was a 4% decrease in total fishing licenses issued from the previous year, but <2% decrease in fishing licenses with the primary method intended to target pelagic fish. The primary licenses issued were for longline (52%), trolling (28%), and handline methods.

**Landings.** Hawaii commercial fisheries caught and landed 33.6 million pounds of pelagic species in 2024, an 8.5% increase from the previous year. The vast majority of the pelagic catch is from the deep-set longline fishery (87%) with an increase in 2024 to 29.4 million pounds. The shallow-set longline fishery and MHI troll fisheries catch similar proportions (5% and 4% respectively), with the smallest proportions composed of the MHI and offshore handline and other gear fisheries (3.4%). In 2024, the shallow-set longline fishery caught 2.0 million pounds, the MHI troll fishery 1.3 million pounds, and the MHI and offshore handline and other fisheries caught 1.1 million pounds of pelagic catch.

The largest component of the pelagic catch was tunas, comprising 75% of catch in 2024 with an increase from 2023. The largest proportion of tuna catch was bigeye tuna accounting for 41% of all pelagic catch followed by yellowfin tuna with much smaller proportions of albacore and skipjack tuna. The yellowfin tuna catch has been increasing since 2020. Billfish catch comprised 18% of total catch in 2024. Swordfish catch dominates the billfish catch composition comprising 7% of total pelagic catch; in 2024 swordfish catch declined. Catches of Other PMUS represented 8% of the total pelagic catch in 2024 with ono being the largest component representing 8% of total pelagic catch.

**Bycatch.** In 2024, fishers reported on logbooks catching 553,804 fish in the deep-set longline fishery with 81% of catch retained and 19% released and 26,320 fish in the shallow-set longline fishery with 54% retained and 46% released. The shallow-set longline fishery likely had a higher

discard rate due to releasing more marketable fish with a prioritization of hold space for large swordfish and not retaining fish with a shorter shelf life, as this fishery typically has longer trips. The majority of releases were blue sharks with 74% of total catch in deep-set and 36% in shallow-set longline fishery There is almost no market demand for sharks in Hawaii.

**Effort.** In 2024, the Hawai`i-permitted deep-set longline fishery had 150 active vessels, 1,635 trips, and 65.9 million hooks set with effort similar to 2023 but with a slight overall increase in the last 10 years. The Hawai`i-permitted shallow-set longline fishery had 21 vessels, 54 trips, and 1.1 million hooks set with a decline in trips and vessels in 2024. In 2024, 1,042 fishers participated in the MHI troll fishery with 12,396 days fished, 327 fishers participated in the MHI handline fishery with 2,632 days fished, and 5 fishers participated in the offshore handline fishery with 140 number of days fished.

**CPUE.** The deep-set longline fishery CPUE for bigeye tuna continued an overall declining trend since 2015 with a slight decline in 2024 (2.3 fish/1000 hooks) compared to 2023 (2.5 fish/1000 hooks). The 2024 yellowfin tuna CPUE (1.9 fish/1000 hooks) increased slightly from 2023 (1.3 fish/1000 hooks). While the 2024 albacore CPUE (0.2 fish/1000 hooks) declined slightly from 2023 (0.5 fish/1000 hooks). In 2024, there were sharp increases in blue and striped marlin CPUE (0.2 fish/1000 hooks for blue marlin and 0.4 fish/1000 hooks) from 2023 (0.1 fish/1000 hooks for blue marlin and 0.1 fish/1000 hooks for striped marlin).

In 2024, the shallow-set longline fishery had an increase in bigeye tuna and yellowfin tuna CPUE (0.7 fish/1,000 hooks and 1.5 fish/1000 hooks respectively). However, there was a decrease in albacore CPUE ( 0.3 fish/1000 hooks).

The 2024 MHI troll fishery CPUE for yellowfin tuna was lower (27.9 fish/days fished) than 2023 (39.2 fish/days fished). While the skipjack tuna CPUE was similar in 2023 (16.6 fish/days fished) and 2024 (17.1 fish/days fished).

**Fish Size.** The 2024 deep-set longline fishery average weights for all tuna species, with the exception of Pacific bluefin tuna, were above 10-year averages; all billfish species below, with the exception of sailfish; other PMUS of opah below, mahimahi above, and ono, pomfrets, and oilfish similar to the 10-year averages.

The 2024 shallow-set longline fishery average weights for bigeye, skipjack, and bluefin tuna were above the 10 year averages, yellowfin tuna below, and albacore similar; swordfish above; striped and blue marlin and spearfish below; with Other PMUS species of mahimahi below, pomfrets above, and ono, opah, and oilfish above 10 year averages (Table 31).

The 2024 Hawaii troll and handline fisheries average weights were above the 10-year averages for bigeye, skipjack, and yellowfin tuna with the albacore average weight below. All billfish (blue and striped marlin and swordfish) were below 10-year average weights, and the Other PMUS of mahimahi and ono were above the 10-year average weights (Table 32).

**Revenue.** The total nominal revenue from Hawai'i's pelagic fisheries was $110.8 million in 2024 a 7% decline from 2023 ($119.4 million). The average price per pound continued to drop with a 19% decline in 2024 with an average of $2.81 compared to $3.47 in 2023. Nominal revenue from tuna was $93.9 million or 85% of the total pelagic nominal revenue with bigeye tuna ($56.3 million) and yellowfin tuna ($36.2 million) representing 51% and 33%. In 2024, billfish contributed $8.4 million, 8% of the total pelagic revenue with swordfish accounting for $5,550, 5% of the total pelagic revenue. The deep-set longline generated the vast majority (88%)

of the pelagic revenue with $98.4 million while the shallow-set longline fishery generated $4.5 million, 4% of the total pelagic revenue. The Hawaii small boat fisheries generated $8.7 million, 8% of total pelagic revenue with the MHI troll at $6.0 million.

**Protected Species Interactions.** Protected species interactions are monitored in the Hawaii-based longline fishery with mandatory observer coverage at 100% for shallow-set vessels and a target of a minimum of 20% for deep-set vessels; however, observer coverage in the deep-set longline fishery in 2020 and 2021 was 15.25% and 17.84%, respectively, due to impacts related to pandemic restrictions. Coverage of fishing trips dropped to 17% in 2023 and to 13% in 2024. The shallow-set longline fishery has maintained coverage rates of 100%. Nearly all sea turtles observed in the Hawaii shallow-set longline fishery from 2004 to 2024 were released alive. Observed number of loggerhead turtle interactions in 2024 was lower than in 2023, which had the highest (48) since the reopening of the fishery in 2004. Further, in the shallow-set fishery, trends of interactions with the Laysan albatross had been increasing over time with 54 interactions in 2024. A recent study on the potential use of tori lines to improve mitigation measures for the fishery concluded that the approach is not effective. In the deep-set longline fishery, olive ridley and black-footed albatross interactions have decreased over the last three to four years after four to five years of higher interactions. Prior analyses showed that higher interactions were likely driven by oceanographic factors.

## OCEANIC AND CLIMATE INDICATORS

In an effort to improve ecosystem-based fishery management, the Council is utilizing a conceptual model that allows for the application of data from specific climate change indicators that may affect marine systems and ultimately the productivity or catchability of managed stocks. While the indicators that the Council monitors may change as the Council continues to improve ecosystem-based management, this 2024 report provides information on the following list of climate and oceanic indicators being tracked:

- Atmospheric Concentration of Carbon Dioxide ($CO_2$)
- Oceanic pH (at Station ALOHA)
- Oceanic Niño Index (ONI)
- Pacific Decadal Oscillation (PDO)
- Tropical Cyclones
- Sea Surface Temperature
- Temperature at 200 – 300 m Depth
- Ocean Color (Chlorophyll-*a* concentration)
- North Pacific Subtropical Front (STF)/Transition Zone Chlorophyll Front (TZCF)
- Estimated Median Phytoplankton Size
- Fish Community Size Structure
- Bigeye Tuna Weight-Per-Unit-Effort
- Bigeye Tuna Recruitment Index
- Bigeye Tuna Catch Rate Forecast

Section 3.4.2 provides a description of each of these indicators, a 2024 snapshot of the current conditions accompanied by time series data, and a rationale for how these data may progress ecosystem-based fishery management.

## ESSENTIAL FISH HABITAT

NS2 requires that the Council review and revise EFH provisions periodically and to report on this review as part of the annual SAFE report process, with a complete review conducted as recommended by the Secretary at least once every five years. No pelagic EFH reviews were completed in 2024. Non-fishing and cumulative impact components were reviewed from 2016 through 2017 (Minton 2017), and a habitat review for crustaceans in Guam and Hawaii was completed in 2019. The Council expects to amend the EFH for Hawaii precious corals in 2025.

## MARINE PLANNING

In 2016, the Council approved a new FEP objective to "consider the implications of spatial management arrangements in Council decision-making". To monitor implementation of this objective, the 2024 annual SAFE report includes the Council's spatially based fishing restrictions (or marine managed areas, MMAs), the goals associated with them, and the most recent evaluation. In addition, to meet EFH and National Environmental Policy Act (NEPA) mandates, this annual SAFE report monitors activities of interest to the Council that may contribute to cumulative impact. This includes observing fishing and non-fishing activities and facilities, including aquaculture operations, alternative energy facilities, and military training and testing activities.

# 1 INTRODUCTION

The Fishery Management Plan (FMP) for Pelagic Fisheries of the Western Pacific Region was implemented by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) on March 23, 1987. The Western Pacific Regional Fishery Management Council (WPFMC; the Council) developed the FMP to manage the pelagic resources under the authority of the Magnuson Fishery Conservation and Management Act of 1976 (MSA) and that occur in the United States (U.S.) Exclusive Economic Zone (EEZ) around American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), Guam, Hawaii, and the U.S. possessions in the Western Pacific Region (i.e., Johnston Atoll, Kingman Reef, Palmyra Atoll, and Jarvis, Howland, Baker, Midway, and Wake Islands). In 2010, the Council and NMFS implemented the Fishery Ecosystem Plan (FEP) for the U.S. Pacific Island Pelagic Fisheries (Pelagic FEP), which includes management measures and strives to integrate vital ecosystem elements important to decision-making, including social, cultural, and economic dimensions, protected species, habitat considerations, climate change effects, and the implications to fisheries from various spatial uses of the marine environment.

For more information regarding the FEP's objectives, past amendments, and other information, refer to the Pelagic FEP found on Council website and regulations at 50 CFR 665.

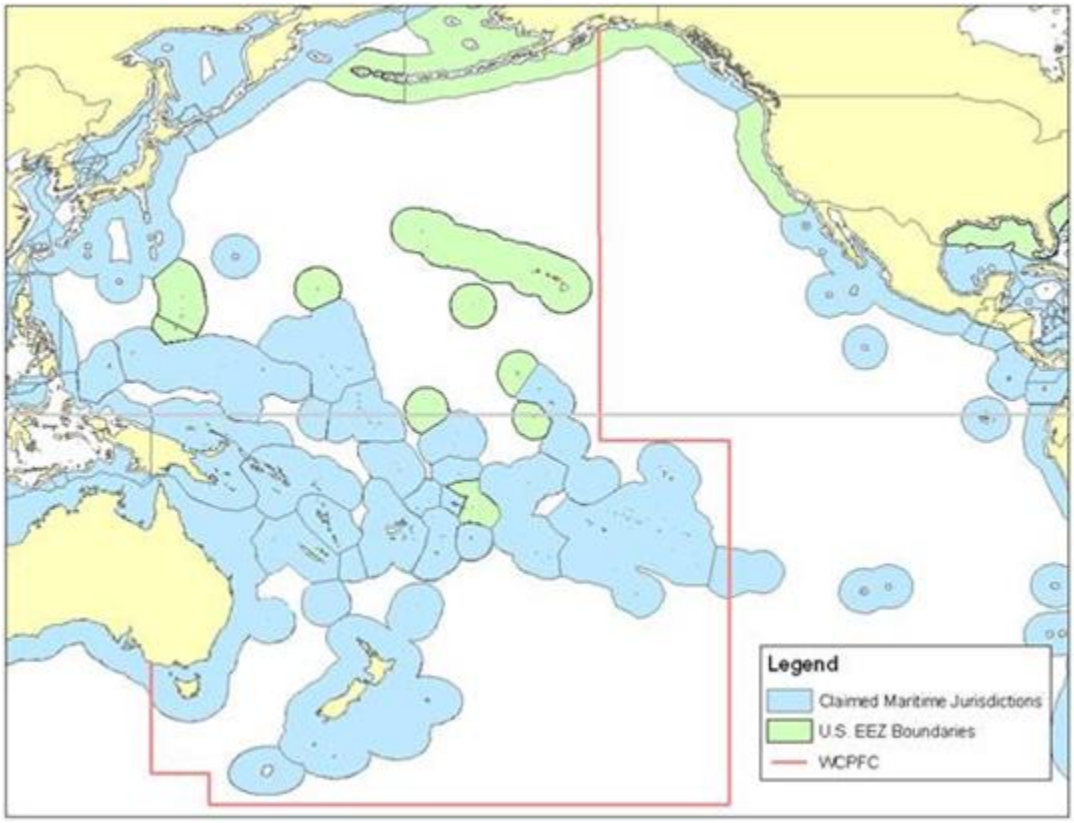
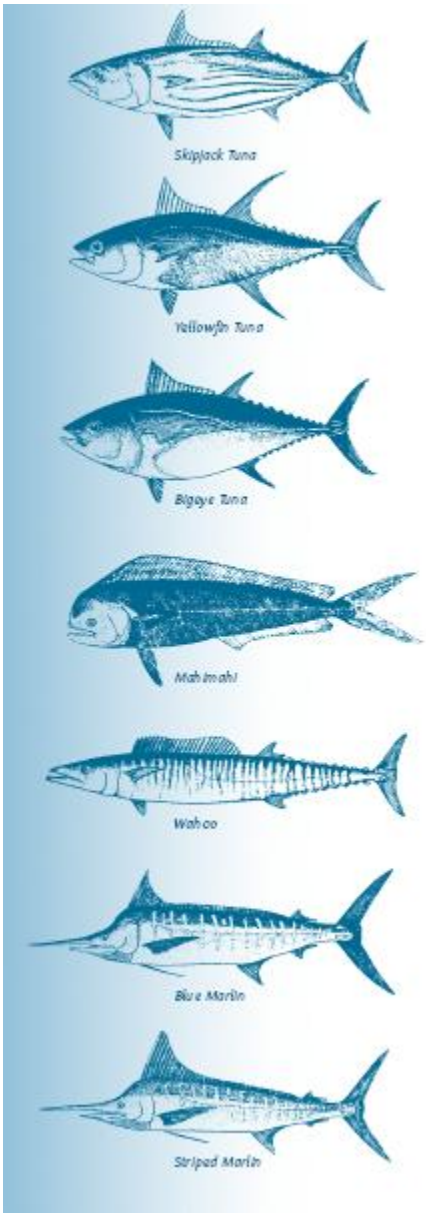



Figure 1. Map of the Western Pacific region

## 1.1 BACKGROUND TO THE SAFE REPORT

Following the Pelagic FEP requirements, the Council has been generating annual reports that assist the Council and NMFS in assessing the status of the stocks, fisheries, and effectiveness of the management regime. In July 2013, NMFS issued a final rule (78 FR 43066) that revised National Standard 2 (NS2) guidelines to manage fisheries using the best scientific information available (BSIA) and clarify the content and purpose of the Stock Assessment and Fishery Evaluation (SAFE) Report. In 2015, the Council, in partnership with NMFS Pacific Islands Fisheries Science Center (PIFSC), local fishery resource management agencies, and the NMFS Pacific Islands Regional Office (PIRO), agreed to revise and expand the contents of future annual reports to include the range of ecosystem elements described above. This year marks the seventh iteration of the SAFE report that combines the requirements of reporting for the FEP with those required under NS2 guidelines.




## 1.2 PELAGIC MUS LIST

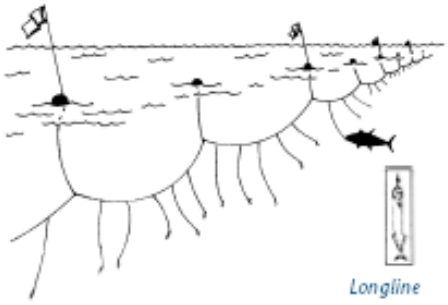
The management unit species (MUS) managed under the Pelagic FEP include large pelagic species such as tunas (tribe Thunnini), billfishes (Istiophoridae and Xiphiidae), and other harvested species with distribution straddling domestic and international waters. The MUS excludes some scombrids found predominantly near land, such as little bonitos (tribe Sardini, e.g., dogtooth tuna, *Gymnosarda unicolor*). Although they are sometimes caught by the FEP-managed fisheries and reported herein, the MUS also exclude all jacks (Carangidae, e.g., rainbow runner, *Elagatis bipinnulata*), all barracudas (Sphyraenidae), all sharks except the following nine species: pelagic thresher shark (*Alopias pelagicus*), bigeye thresher shark (*Alopias superciliosus*), common thresher shark (*Alopias vulpinus*), silky shark (*Carcharhinus falciformis*), oceanic whitetip shark, (*Carcharhinus longimanus*), blue shark (*Prionace glauca*), shortfin mako shark (*Isurus oxyrinchus*), longfin mako shark (*Isurus paucus*), salmon shark (*Lamna ditropis*), and squid (class Cephalopoda) except those listed in Table 1. Although caught frequently, most shark MUS are discarded alive and with fins attached in U.S. fisheries managed under the FEP. Shark finning is illegal in U.S. fisheries.

Table 1. Names of U.S. Pacific Island pelagic management unit species

| English Common Name | Scientific Name | Samoan or AS local | Hawaiian or HI local | Chamorroan or Guam local | S. Carolinian or CNMI local | N. Carolinian or CNMI local |
|---|---|---|---|---|---|---|
| Mahimahi (dolphinfishes) | *Coryphaena* spp. | Masimasi | Mahimahi | Botague | Sopor | Habwur |
| Wahoo | *Acanthocybium solandri* | Paala | Ono | Toson | Ngaal | Ngaal |
| Indo-Pacific blue marlin<br>Black marlin | *Makaira mazara*<br>*Makaira indica* | Sa'ula | A'u, Kajiki | Batto' | Taghalaar | Taghalaar |
| Striped marlin | *Tetrapturus audax* | | Nairagi | | | |
| Shortbill spearfish | *Tetrapturus angustirostris* | Sa'ula | Hebi | Spearfish | | |
| Swordfish | *Xiphias gladius* | Sa'ula malie | A'u kū, Broadbill, Shutome | Swordfish | Taghalaar | Taghalaar |
| Sailfish | *Istiophorus platypterus* | Sa'ula | A'u lepe | Guihan layak | Taghalaar | Taghalaar |
| Pelagic thresher shark<br>Bigeye thresher shark<br>Common thresher shark<br>Silky shark<br>Oceanic whitetip shark<br>Blue shark<br>Shortfin mako shark<br>Longfin mako shark<br>Salmon shark | *Alopias pelagicus*<br>*Alopias superciliosus*<br>*Alopias vulpinus*<br>*Carcharhinus falciformis*<br>*Carcharhinus longimanus*<br>*Prionace glauca*<br>*Isurus oxyrinchus*<br>*Isurus paucus*<br>*Lamna ditropis* | Malie | Mano | Halu'u | Paaw | Paaw |
| Albacore | *Thunnus alalunga* | Apakoa | 'Ahi palaha, Tombo | Albacore | Angaraap | Hangaraap |
| Bigeye tuna | *Thunnus obesus* | Asiasi, To'uo | 'Ahi po'onui, Mabachi | Bigeye tuna | Toghu, Sangir | Toghu, Sangir |
| Yellowfin tuna | *Thunnus albacares* | Asiasi, To'uo | 'Ahi shibi | 'Ahi, Shibi | Yellowfin tuna | Toghu |
| Northern bluefin tuna | *Thunnus thynnus* | | Maguro | | | |
| Skipjack tuna | *Katsuwonus pelamis* | Atu, Faolua, Ga'oga | Aku | Bunita | Angaraap | Hangaraap |
| Kawakawa | *Euthynnus affinis* | Atualo, Kavalau | Kawakawa | Kawakawa | Asilay | Hailuway |
| Moonfish | *Lampris* spp | Koko | Opah | | Ligehrigher | Ligehrigher |
| Oilfish family | Gempylidae | Palu talatala | Walu, Escolar | | Tekiniipek | Tekiniipek |
| Pomfret | Family Bramidae | Manifi moana | Monchong | | | |
| Other tuna relatives | *Auxis* spp, *Scomber* spp; *Allothunus* spp | (various) | Ke'o ke'o, saba (various) | (various) | (various) | (various) |
| Neon flying squid<br>Diamondback squid<br>Purple flying squid | *Ommastrephes bartamii*<br>*Thysanoteuthis rhombus*<br>*Sthenoteuthis oualaniensis* | | Squid, ika<br>Squid, ika<br>Squid, ika | | | |

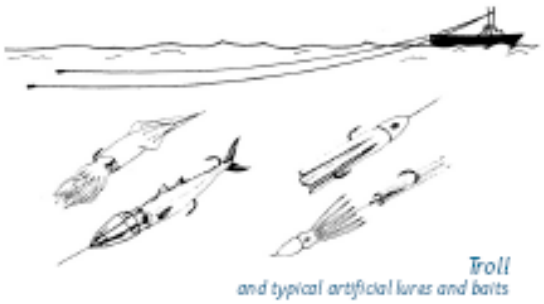
## 1.3 SUMMARY OF PELAGIC FISHERIES AND GEAR TYPES MANAGED UNDER THE FEP

U.S. pelagic fisheries in the Western Pacific Region are, with the exception of purse seining, primarily variations of hook-and-line fishing. These include longlining, trolling, handlining, and pole-and-line fishing. The U.S. purse-seine fishery is managed under an international convention and is therefore not discussed in this report. In addition, while the U.S. fleet of albacore trollers, based at West Coast ports, occasionally operates in the Western Pacific, this fishery is not directly managed by the Council, and is also not described in this report.



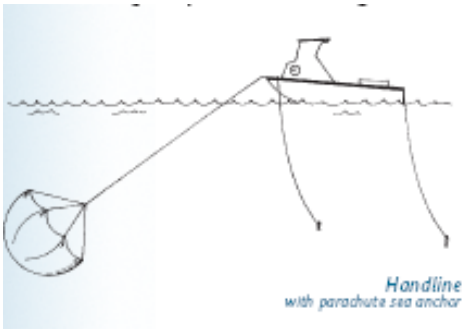

U.S. longline vessels in the Western Pacific Region are based primarily in Hawaii and American Samoa, although Hawaii-based vessels targeting swordfish and bigeye tuna have also fished seasonally out of California. The Hawaii fishery, with 150 active vessels, targets a range of species, with vessels setting shallow longlines to catch swordfish or fishing deep to maximize catches of bigeye tuna. Catches by the Hawaii fleet also include yellowfin tuna, mahimahi, wahoo, blue and striped marlins, opah (moonfish) and monchong (pomfret). The Hawaii fishery does not freeze its catch, which is sold to the fresh fish and sashimi markets in Hawaii, Japan, and the U.S. mainland.

The American Samoa longline fleet fishes almost exclusively for albacore, which is landed at the cannery in American Samoa. Pelagic landings consist primarily of four tuna species: albacore, yellowfin, bigeye, and skipjack. The pelagic species wahoo, blue marlin, and mahimahi comprise most of the non-tuna landings.




Trolling and, to lesser extent, handline fishing for pelagic species are the largest commercial fisheries in terms of participation, although they catch a relatively modest volume of fish annually compared to longline and purse seine gears. Troll and handline catches are dominated by yellowfin tuna in Hawaii, skipjack tuna in Guam and the CNMI, and skipjack and yellowfin tuna in American Samoa. Other commonly caught troll catches include mahimahi, wahoo, and blue marlin. Most of the troll and handline landings are made by Hawaii vessels.

Troll fishing for pelagic species is the most common recreational (i.e., non-commercial) fishery in the islands of the Western Pacific region. The definition of recreational fishing, however, continues to be problematic in a region where many fishermen who are fishing primarily for recreation may sell their fish to cover their expenses.




The Western and Central Pacific Ocean (WCPO) supports the world's largest tuna fishery, with a total tuna catch of around 3.3 million mt of fish annually. Most of the catch is taken by fleets of longliners and purse seiners from countries such as Japan, Taiwan, United States (including the U.S. purse seine fleet), Korea and China; however, around a third of purse seine vessels operating in the WCPO are flagged to Pacific Island countries and these fleets are growing. Small scale artisanal longlining is also conducted in Pacific Island countries like Samoa.

Fishing has been a way of life for millennia across the Pacific Island Region. Each of the archipelagos within this region have a rich and fascinating history, where fishing maintains a critical part in the cultural identity and health of the people. Today, fishing is both a modern enterprise, sustaining an important industry and providing fresh seafood to all of the region's inhabitants, as well as an important pastime that maintains connections to the surrounding environment.

### 1.3.1 AMERICAN SAMOA

The islands of American Samoa are an area of modest productivity relative to areas to the north and west. The region is traversed by two main currents: the southern branch of the westward-flowing South Equatorial Current from June to October and the eastward-flowing South Equatorial Counter Current from November to April. Surface temperatures vary between 27° and 29° C and are highest from January to April. The upper limit of the thermocline in ocean areas is relatively shallow (27° C isotherm at 100 m depth, approximately 328 ft) but the thermocline itself is diffuse (lower boundary at 300 m depth, approximately 984 ft).

#### 1.3.1.1 TRADITIONAL AND HISTORICAL PELAGIC FISHERIES

The pelagic fishery in American Samoa is and has been an important component of the American Samoan domestic economy. American Samoan dependence on fishing undoubtedly goes back as far as the peopled history of the islands of the Samoan archipelago, about 3,500 years ago. Many aspects of the culture have changed in contemporary times, but American Samoans have retained a traditional social system that continues to strongly influence and depend upon the culture of fishing. Centered around an extended family (*'aiga*) and allegiance to a hierarchy of chiefs (*matai*), this system is rooted in the economics and politics of communally-held village land. It has effectively resisted Euro-American colonial influence and has contributed to a contemporary cultural resiliency unique in the Pacific Island Region.

American Samoa is a landing and canning port for the U.S. purse seine fishery for skipjack and yellowfin tuna, with the largest catch of all U.S. pelagic fisheries in the region. The U.S. longline fishery for South Pacific albacore is conducted primarily in the American Samoa EEZ and comprises the second-largest of the U.S. longline fisheries in the FEP (after Hawaii). The ecosystem based fishery management approach to regulation under the MSA has focused on the socioeconomics of allocating catch and access to EEZ areas by fleet sectors and creating domestic regulations to monitor and mitigate longline fishery impacts to sea turtles and other protected species. American Samoa is a participating U.S. territory in the Western and Central Pacific Fisheries Commission (WCPFC), which status exempts it from certain WCPFC measures so as not to restrict responsible fishery development. The Western and Central Pacific Fisheries

Commission (WCPFC) establishes conservation and management measures that NMFS implements under its authorities, including the MSA.

Prior to the mid-1990s, the pelagic fishery was largely a troll fishery. Horizontal longlining was introduced to the territory by Western Samoan fishermen in 1995. Local fishers have found longlining worthwhile as they land more with less effort and use less gasoline for trips. Initially the vessels used for longlining were "alias", locally built, twin-hulled (wood with fiberglass or aluminum) vessels about 30 ft. long, powered by 40 horsepower gasoline outboard engines. Larger monohull vessels capable of longer multi-day trips began joining the longline fleet soon after the alias. The number of alias participating in the fishery decreased to below three by 1995 and due to confidentiality requirements cannot be directly reported. Landings from these vessels are added to the total landings. The number of commercial troll vessels has also declined.

Vessels longer than 50 ft are restricted from fishing within 50 nm of Tutuila, Manu'a, Swains Island and Rose Atoll (see Section 3.6 for details). Albacore is the primary species caught longlining, with the bulk of the longline catch sold to the Pago Pago canneries. Remaining catch is sold to stores, restaurants, and local residents or donated for customary trade or traditional functions. Pago Pago Harbor on the island of Tutuila is a regional base for the transshipment and processing of tuna taken by domestic fleets from other South Pacific nations, distant-water longline fleets, and purse seine fleets. Purse seine vessels land skipjack, yellowfin and other tunas, and a small portion of albacore.

#### 1.3.1.2 CURRENT PELAGIC FISHERIES

The small-scale longline fishery is nearly defunct. Most participants in the small-scale domestic longline fishery were indigenous American Samoans with vessels under 50 ft in length, of which the remaining vessels are *alia* boats under 40 ft in length. The motivation for American Samoa's commercial fishermen to shift from troll or handline gear to longline gear in the mid-1990s was the fishing success of 28-foot alia catamarans that engaged in longline fishing in the EEZ around Independent Samoa. Following this example, the fishermen in American Samoa deployed a short monofilament longline, with an average of 350 hooks per set, from a hand-powered reel. An estimated 90 percent of the crews working in the American Samoa small-scale alia longline fleet were from Independent Samoa. Like the conventional monohull longline fishery (see below) the predominant catch from the small-scale fishery has been albacore, which is marketed to the local tuna canneries.

American Samoa's domestic longline fishery expanded rapidly in 2001. Much of the growth was due to the entry of monohull vessels larger than 50 ft in length. The number of permitted longline vessels in this sector increased from seven in 2000 to 38 by 2003. Of these, five permits for vessels between 50.1 ft – 70 ft, and five permits for vessels larger than 70 ft were believed to be held by indigenous American Samoans as of March 21, 2002. Economic barriers have prevented more substantial indigenous participation in the large-scale sector of the longline fishery. The lack of capital appears to be the primary constraint to substantial indigenous participation in this sector. In 2024, there were nine active longline vessels. Poor economic conditions have plagued the large vessel fleet for several years. All other fishing effort indicators from 2024 indicate a declining longline fishery: the number of active vessels was at an all-time low, the number hooks set have decreased since 2021 and was just slightly higher in 2024 than the all-time low of 3.65 million in 2020.

While the smallest (≤40 ft) vessels average 350 hooks per set, vessels over 50 ft can set five to six times more hooks and have a greater fishing ranges and capacity for storing fish (from eight to 40 mt on a larger vessel as compared to less than two mt on a small-scale vessel). Larger vessels are also outfitted with hydraulically-powered reels to set and haul mainline, as well as modern electronic equipment for navigation, communications and fish finding. Most are presently being operated to freeze albacore onboard, rather than to land chilled fish.

From October 1985 to the present, catch and effort data in American Samoa troll and handline fisheries have been collected through a creel survey that includes subsistence and recreational fishing, as well as commercial fishing. However, differentiating commercial fishing from non-commercial activity has been difficult, and there have been recent focuses on non-target longline catches that are sold to the local community instead of the cannery.

Recreational fishing underwent a renaissance in American Samoa with the establishment of the Pago Pago Game Fishing Association (PPGFA), founded in 2003 by a group of recreational anglers. The motivation to form the PPGFA was the desire to host regular fishing competitions. Recreational fishing vessels range from 10 ft single engine dinghies to 35 ft twin diesel engine cabin cruisers. The PPGFA has annually hosted international tournaments over the past 15 years, including the Steinlager I‘a Lapo‘a Game Fishing Tournament (a qualifying event for the International Game Fish Association’s Offshore World Championship in Cabo San Lucas, Mexico). The recreational vessels use anchored fish aggregating devices (FADs) extensively, and, during tournaments, venture to the various outer banks which include the South Bank (35 miles south), North East Bank (35 miles northeast), South East bank (37 miles southeast), 2% bank (29 miles east-southeast), and East Bank (24 miles east).

There was no full-time regular charter fishery in American Samoa similar to those in Hawaii or Guam prior to 2015, however, Pago Pago Marine Charters began operating a full-time charter fishery since then.

Estimates of the volume and value of recreational fishing in American Samoa are not precise. A volume approximation of boat based recreational fishing is generated in this annual report based on the annual sampling of catches, conducted by the American Samoa Department of Marine and Wildlife Resources (DMWR) and provided to NMFS PIFSC Fisheries Research and Monitoring Division (FRMD). While boat-based recreational catches were as high as over 46,000 lb in the 2000s, total non-commercial catch was estimated to be over 97,000 lb in 2019. It is likely that non-commercial fishing data in recent years have been affected by impacts associated with the COVID-19 pandemic.

While no permits have been issued to date, non-commercial fishing and recreational charter fishing are permitted within the Rose Atoll Marine National Monument. These permits are available only to community residents of American Samoa or charter businesses established legally under the laws of American Samoa.

### 1.3.2 COMMONWEALTH OF THE NORTHERN MARIANAS ISLANDS

Generally, the major surface current affecting the Mariana Archipelago is the North Equatorial Current, which flows westward through the archipelago. However, the Subtropical Counter Current affects the Northern Islands and generally flows in an easterly direction. Depending on the season, sea surface temperatures near the Northern Mariana Islands vary between 80.9° – 84.9° Fahrenheit. The mixed layer extends to between depths of 300 – 400 ft.

#### 1.3.2.1 TRADITIONAL AND HISTORICAL PELAGIC FISHERIES

Fishery resources have played a central role in shaping the social, cultural, and economic fabric of the CNMI. The aboriginal peoples indigenous to these islands relied on seafood as their principal source of protein and developed exceptional fishing skills. Later immigrants to the islands from East and Southeast Asia also possessed a strong fishing tradition. Under the MSA, the CNMI is defined as a fishing community.

#### 1.3.2.2 CURRENT PELAGIC FISHERIES

The CNMI's pelagic fisheries occur mainly from the island of Farallon de Medinilla (FDM) south to the island of Rota. Trolling is the primary fishing method utilized in the pelagic fishery. The pelagic fishing fleet consists mostly of vessels less than 24 ft in length, which usually have a limited 20-mile travel radius from Saipan. There were an estimated 1,668 trolling trips in 2024, representing a decrease of nearly 30% from 2023.

The primary target and most marketable species for the pelagic fleet is skipjack tuna (approximately 48% of 2024 landings). Schools of skipjack tuna have historically been common in nearshore waters, providing an opportunity to catch numerous fish with a minimum of travel time and fuel costs. Skipjack is readily consumed by the local populace and restaurants, primarily as sashimi. Yellowfin tuna and mahimahi are also easily marketable, but seasonal, species. During their seasonal runs, these fish are usually found close to shore and provide easy targets for the local fishermen. In addition to the economic advantages of being nearshore and their relative ease of capture, these species are widely accepted by all ethnic groups, which has kept market demand fairly high.

In late 2007, Crystal Seas became the first established longline fishing company in the CNMI to begin its operation out of the island of Rota. However, by 2009, Crystal Seas had become Pacific Seafood and relocated its operation to Saipan. In 2011, there were four licensed longline fishing vessels stationed in the CNMI, but these vessels found it difficult to market their catch and did not perform well. By 2014, there were no active longliners in the CNMI, although a few of the original vessels were experimenting with other types of fishing with limited success.

### 1.3.3 GUAM

#### 1.3.3.1 TRADITIONAL AND HISTORICAL PELAGIC FISHERIES

Fishing in Guam continues to be important not only in terms of contributing to the subsistence needs of the Chamorro people, but also in terms of preserving their history and identity. Fishing assists in perpetuating traditional knowledge of marine resources and maritime heritage of the Chamorro culture.

#### 1.3.3.2 CURRENT PELAGIC FISHERIES

Pelagic fishing vessels based in Guam are classified into two general groups: (1) distant-water purse seiners and longliners that fish outside Guam's EEZ and transship through the island; and (2) small, primarily recreational, trolling boats that are either towed to boat launch sites or berthed in marinas and fish only within local waters within Guam's EEZ or on some occasions in the adjacent EEZ of the Northern Mariana Islands. This annual report primarily covers the local, Guam-based, small-boat pelagic fishery.

Landings from Guam fisheries primarily consist of five major species: mahimahi (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), and Pacific blue marlin (*Makaira mazara*). Other minor pelagic species caught include rainbow runner (*Elagatis bipinnulatus*), great barracuda (*Sphyraena barracuda*), kawakawa (*Euthynnus affinis*), dogtooth tuna (*Gymnosarda unicolor*), double-lined mackerel (*Grammatorcynus bilineatus*), oilfish (*Ruvettus pretiosus*), and three less common species of barracuda.

The number of boats involved in Guam's pelagic or open ocean fishery has gradually increased from about 200 vessels in 1982. There were 447 boats active in Guam's domestic pelagic fishery in 2024. A majority of the fishing boats are less than 10 m (33 ft) in length and are usually owner-operated by fishermen who earn a living outside of fishing. Most fishermen sell a portion of their catch, and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. A small, but significant, segment of Guam's pelagic fishery is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews.

### 1.3.4 HAWAII

The archipelago's position in the Pacific Ocean lies within the clockwise rotating North Pacific Subtropical Gyre, extending from the northern portion of the North Equatorial Current into the region south of the Subtropical High, where the water moves eastward in the North Pacific Current. At the pass between the Main Hawaiian Islands (MHI) and the Northwestern Hawaiian Islands (NWHI), there is often a westward flow from the region of Kauai along the lee side of the lower NWHI. This flow, the North Hawaiian Ridge Current, is extremely variable and can also be absent at times. The analysis of 10 years of shipboard acoustic Doppler current profiler data collected by the NOAA Ship *Townsend Cromwell* shows mean flow through the ridge between Oahu and Nihoa, and extending to a depth of 200 m.

Embedded in the mean east-to-west flow are an abundance of mesoscale eddies created from a mixture of wind, current, and sea floor interactions. The eddies, which can rotate either clockwise or counterclockwise, have important biological impacts. For example, eddies create vertical fluxes, with regions of divergence (i.e., upwelling) where the thermocline shoals and deep nutrients are pumped into surface waters enhancing phytoplankton production, and also regions of convergence (i.e., downwelling) where the thermocline deepens. Sea surface temperatures around the Hawaiian Archipelago experience seasonal variability, but generally vary between 18° - 28° C (64° - 82° F) with colder waters occurring more often in the NWHI.

A significant source of inter-annual physical and biological variation around Hawaii are El Niño and La Niña events. During an El Niño, the normal easterly trade winds weaken, resulting in a weakening of the westward equatorial surface current and a deepening of the thermocline in the central and eastern equatorial Pacific. Water in the central and eastern equatorial Pacific becomes warmer and more vertically stratified with a substantial drop in surface chlorophyll.

Physical and biological oceanographic changes have also been observed on decadal time scales. These low frequency changes, termed regime shifts, can impact the entire ocean ecosystem. Recent regime shifts in the North Pacific have occurred in 1976 and 1989, with both physical and biological (including fishery) impacts. In the late 1980s, an ecosystem shift from high carrying capacity to low carrying capacity occurred in the NWHI. The shift was associated with the weakening of the Aleutian Low Pressure System (North Pacific) and the Subtropical Counter Current. The ecosystem effects of this shift were observed in lower nutrient and productivity

levels and decreased abundance of numerous species in the NWHI including the spiny lobster, the Hawaiian monk seal, various reef fish, the red-footed booby, and the red-tailed tropic bird.

#### 1.3.4.1 TRADITIONAL AND HISTORICAL PELAGIC FISHERIES

In old Hawaii, fishing in nearshore waters (from the shoreline to the edges of the reefs and where there happens to be no reef, to a distance of nearly a mile from the beach) was regulated by the chiefs and closed seasons were determined by the life history of specific organisms. Areas known as nurseries were not used for fishing. This understanding of natural forces has been captured in the Hawaiian moon calendar, which incorporates the tides and seasons to explain the cycles of scarcity and abundance and provide guidance on what activities should occur at what times of the year. Deep sea fishing (beyond the reefs) was available and open to everyone and conducted based on annual/seasonal weather conditions. Those who fished in the deep ocean sought out these fishing grounds and kept them secret (Kahaulelio 2006). Fish caught in the deep sea included skipjack (aku), dolphinfish (mahimahi), billfish (a‘u), tuna (ahi), and other pelagics.

#### 1.3.4.2 CURRENT PELAGIC FISHERIES

Hawaii’s pelagic fisheries, which include longlining, MHI troll and handline, offshore handline, and the aku boat (pole and line) fisheries, are the State’s largest and most valuable fishery sector. The target species are tuna and billfish, but a variety of other species are also important. Collectively, these pelagic fisheries harvested approximately 33.6 million lb of commercial landings with a total ex-vessel value of $110.8 million in 2024. The deep-set longline fishery was the largest of all commercial pelagic fisheries in Hawaii and represented 87% of the total commercial pelagic catch and ex-vessel revenue. The shallow-set longline fishery was the second largest fishery in Hawaii and accounted for 5% of the catch and revenue. The MHI troll, MHI handline, aku boat, offshore handline fisheries, and other gear types made up the remainder.

The largest component of the pelagic catch was tuna, which comprised 75% of the total in 2024. Bigeye tuna alone accounted for 41% of all the pelagic catch. Billfish catch made up 18% of the total catch in 2023. Swordfish was the largest of these, at 50% of the billfish and 6% of the total catch. Catches of other PMUS represented 8% of the total catch in 2024 with ono being the largest component at 8% of the total catch.

The Hawaii longline fishery is by far the most important economically, with the deep-set fishery sector accounting for about 88% percent of the estimated ex-vessel value of the total commercial fish landings in the State in 2024. In 2017, it is estimated that the commercial fishing and seafood industries in Hawaii generated $900.6 million in sales, $262 million in income, and $402.2 million in value-added impacts while supporting 9,827 full- and part-time jobs (NMFS 2021a). In 2018, these industries supported 8,086 full- and part-time jobs and generated $776.2 million in sales, $233.4 million in income, and $343.6 million in value-added impacts (NMFS 2021b). More recently, in 2019, 7,693 jobs were supported by the industries, which generated $786 million in sales, $229.5 million in income, and $340.9 million in value-added impacts (NMFS 2022).

Recreational fisheries are also extremely important in the State of Hawaii economically, socially, and culturally. The total estimated pelagic recreational fisheries production in 2020 was nearly 14.5 million lb. The number of small vessels in Hawaii declined to approximately 11,000 in 2018 since a peak of over 16,000 vessels in 2008. Boat-based anglers took 632,088 fishing trips in 2019, with only 7,744 designated charter vessel trips. Although unsold or not entering the typical

commercial channels for fish sales, the total estimated value of the recreational catch was approximately $20 million in 2018 based on an average of $3.00/lb provided by PIFSC FRMD.

### 1.3.5 PACIFIC REMOTE ISLAND AREA

Baker Island lies within the westward flowing South Equatorial Current. Baker Island also experiences an eastward flowing Equatorial Undercurrent that causes upwelling of nutrient and plankton rich waters on the west side of the island (Brainard et al. 2005). Sea surface temperatures of pelagic EEZ waters around Baker Island are often near 30° C. Although the depth of the mixed layer in the pelagic waters around Baker Island is seasonally variable, the average mixed layer depth is around 100 m.

Howland Island lies within the margins of the eastward flowing North Equatorial Counter Current and the margins of the westward flowing South Equatorial Current. Sea surface temperatures of pelagic EEZ waters around Baker Island are often near 30° C. Although the depth of the mixed layer in the pelagic waters around Howland Island is seasonally variable, the average mixed layer depth is around 70 m – 90 m.

Jarvis Island lies within the South Equatorial Current which runs in a westerly direction. Sea surface temperatures of pelagic EEZ waters around Jarvis Island are often 28°- 30° C. Although depth of the mixed layer in the pelagic waters around Jarvis Island is seasonally variable, the average mixed layer depth is around 80 m.

Palmyra Atoll and Kingman Reef lie in the North Equatorial Counter-current, which flow in a west to east direction. Sea surface temperatures of pelagic EEZ waters around Palmyra Atoll are often 27°- 30° C. Although the depth of the mixed layer in the pelagic waters around Kingman Reef is seasonally variable, the average mixed layer depth is around 80 m.

Sea surface temperatures of pelagic EEZ waters around Johnston Atoll are often 27°- 30° C. Although the depth of the mixed layer in the pelagic waters around Johnston Atoll is seasonally variable, the average mixed layer depth is around 80 m.

Sea surface temperatures of pelagic EEZ waters around Wake Island are often 27°- 30° C. Although the depth of the mixed layer in the pelagic waters around Wake Atoll is seasonally variable, the average mixed layer depth is around 80 m.

#### 1.3.5.1 TRADITIONAL AND HISTORICAL PELAGIC FISHERIES

As many tropical pelagic species (e.g., skipjack tuna) are highly migratory, the fishing fleets targeting them often travel great distances. Although the EEZ waters around Johnston Atoll and Palmyra Atoll are over 750 nm and 1000 nm (respectively) away from Honolulu, the Hawaii longline fleet does seasonally fish in those areas. For example, the EEZ around Palmyra is visited by Hawaii-based longline vessels targeting yellowfin tuna, whereas at Johnston Atoll, albacore is often caught in greater numbers than yellowfin or bigeye tuna. Similarly, the U.S. purse seine fleet also targets pelagic species (primarily skipjack tuna) in the EEZs around some Pacific Remote Island Area (PRIA), specifically, the equatorial areas of Howland, Baker, and Jarvis Islands. The combined amount of fish harvested from these areas from the U.S. purse seine on average is less than five percent of their total annual harvest.

#### 1.3.5.2 CURRENT PELAGIC FISHERIES

The U.S. Fish and Wildlife Service (USFWS) prohibits fishing within the Howland Island, Jarvis Island, and Baker Island National Wildlife Refuge boundaries. Currently, Jarvis Island, Howland

Island, and Baker Island are uninhabited. The USFWS manages Johnston Atoll as a National Wildlife Refuge but does allow some recreational fishing within the Refuge boundary.

## 1.4 ADMINISTRATIVE AND REGULATORY ACTIONS

This section describes NMFS management actions for the pelagic fisheries in the Pacific Islands Region over the course of 2024.

On March 1, 2024, NMFS published a final rule that modifies its seabird interaction mitigation measures to require federally permitted Hawaii deep-set longline vessels that set fishing gear from the stern to use a tori line (i.e., bird scaring streamer) in place of the currently required thawed, blue-dyed bait and strategic offal (i.e., fish, fish parts, or spent bait) discharge when fishing above latitude (lat.) 23° N. This action is expected to improve the overall efficacy and operational practicality of required seabird mitigation measures by reducing seabird bycatch and creating operational and administrative efficiency for fishermen and NMFS. The rule was effective April 1, 2024.

On May 2, 2024, NMFS announced the approval of Amendments to the five fishery ecosystem plans (FEP) for fisheries in the Pacific Islands Region, including the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific. The FEPs are amended to update data collection mechanisms identified as standardized bycatch reporting methodologies (SBRM) and to revise descriptions of SBRM for consistency with current NMFS regulations. These Amendments ensure conformance with national guidance for compliance with the SBRM requirement in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

On August 8, 2024, NMFS published an interim final rule issued under authority of the Western and Central Pacific Fisheries Convention Implementation Act (WCPFC Implementation Act) that implements a recent decision of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the western and central Pacific Ocean (WCPFC or Commission) increasing the WCPFC bigeye tuna catch limit for U.S. longline fishing vessels from 3,554 metric tons (mt) to 6,554 mt. This action is necessary to satisfy the obligations of the United States as a member of the Commission. The interim final rule was effective August 6, 2024.

## 1.5 TOTAL PELAGIC LANDINGS IN THE WESTERN PACIFIC REGION FOR ALL FISHERIES

A summary of the 2024 total pelagic landings in the Western Pacific and the change between 2023 and 2024 are shown in Table 2.

Table 2. Total pelagic landings (lb) in the Western Pacific Region in 2024 and percent change from the previous year

| Species | American Samoa | | | CNMI | | | Guam | | | Hawaii | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2023 lb | 2024 lb | % Change | 2023 lb | 2024 lb | % Change | 2023 lb | 2024 lb | % Change | 2023 lb | 2024 lb | % Change |
| Swordfish | 6,965 | 9,054 | 30.0 | - | - | - | 0 | 0 | | 2,690,879 | 2,247,830 | -16.5 |
| Blue marlin | 86,555 | 147,574 | 70.5 | - | 39,075 | - | 14,163 | 40,279 | 184 | 1,068,833 | 1,838,813 | 72.0 |
| Striped marlin | 3,715 | 4,197 | 13 | - | - | - | 0 | 0 | | 503,499 | 1,420,498 | 182.1 |
| Other billfish* | 4,708 | 8,999 | 91.1 | 0 | 0 | - | 2,063 | 2,018 | -2 | 495,583 | 458,161 | -7.6 |
| Mahimahi | 3,104 | 2,597 | -16.3 | 11,427 | 0 | -100 | 52,410 | 168,668 | 222 | 896,895 | 570,509 | -36.4 |
| Wahoo | 26,147 | 38,569 | 47.5 | 13,887 | 875 | -93.7 | 45,262 | 25,794 | -43 | 903,034 | 1,276,212 | 41.3 |
| Opah (moonfish) | 296 | 395 | 33.4 | - | - | - | - | - | | 504,996 | 290,495 | -42.5 |
| Sharks (whole wt.) | 90 | 271 | 201.1 | 0 | 0 | - | 786 | 0 | -100 | 8,260 | 5,357 | -35.1 |
| Albacore | 1,942,582 | 2,258,160 | 16.2 | - | - | - | 0 | 0 | | 1,126,593 | 608,329 | -46.0 |
| Bigeye tuna | 82,624 | 116,332 | 40.8 | - | - | - | 0 | 0 | | 14,525,856 | 13,775,508 | -5.2 |
| Bluefin tuna | 238 | 0 | -100 | - | - | - | - | - | | 4,407 | 6,354 | 44.2 |
| Skipjack tuna | 109,282 | 354,458 | 224.4 | 76,218 | 39,853 | -47.7 | 488,775 | 407,346 | -17 | 396,387 | 547,545 | 38.1 |
| Yellowfin tuna | 487,587 | 460,191 | -5.6 | 19,393 | 2,143 | -88.9 | 96,832 | 48,700 | -50 | 7,358,261 | 10,117,375 | 37.5 |
| Other pelagics** | 2,193 | 3,567 | 62.7 | 8,520 | 2,387 | -72.0 | 13,737 | 6,315 | -54 | 504,084 | 458,161 | -9.1 |
| **Total** | **2,756,086** | **3,404,364** | **23.5** | **129,445** | **84,333** | **-34.9** | **714,028** | **699,120** | **-2** | **30,987,567** | **33,621,147** | **8.5** |

Note: Total Pelagic Landings based on commercial reports and/or creel surveys. % change based on 2023 landings relative to 2024 landings. Hawaii data reflect commercial reports only.

*Other billfish include black marlin, spearfish, and sailfish.

**Other pelagics include: kawakawa, unknown tunas, pelagic fishes (dogtooth tuna, rainbow runner, barracudas), oilfish, and pomfret. Of these, only kawakawa, unknown tunas, oilfish and pomfret are Pelagic MUS. While other tables in Chapter 2 excluded or separated out non-MUS, data could not accurately provide individual landings data for these species presented in this total landings table.

## 1.6 PLAN TEAM RECOMMENDATIONS

At its May 2025 meeting, the Pelagic Plan Team made several recommendations:

*Regarding crew training, the Pelagic Plan Team* supports implementation of the crew training requirement under Alternative 1, and recommends a 2-year certification requirement (Sub-alternative 2), which would reduce burden compared to an annual certification requirement while providing opportunities for refresher training for crew members who stay in the fishery for longer than 2 years. The Plan Team encourages the crew training program to provide opportunities for more frequent refresher trainings on a voluntary basis.

*Regarding electronic monitoring, the Pelagic Plan Team* supports authorizing electronic monitoring (EM) as a mandatory monitoring program for Hawaii and large vessel American Samoa limited entry fisheries, and recommends implementing EM by randomly selecting vessels (Sub-Alternative 2A) during the phase-in period. The Plan Team notes that random selection is more representative of the fisheries. For American Samoa vessels, the Plan Team recommends flexibility for those vessels as conducted in electronic reporting implementation, acknowledges possible delay in implementation, and recommends that the American Samoa fleet should be considered separately in the random selection process.

*Regarding Hawaii pelagic small boat fisheries, the Pelagic Plan Team* recommends Plan Team members, Hawaii DAR and Council staff present Hawaii pelagic small boat fishery catch and effort data at Council IRA project and Council advisory group meetings. These include, but are not limited to, the Hawaii AP, FIAC, and NCFAC. This is for the purpose of documenting characteristics of Hawaii pelagic small boat fisheries and gleaning fishery performance by Hawaiian island and gear type reported.

*Regarding fishery data collection, the Pelagic Plan Team* recommends the Council, in coordination with PIFSC through the Fisheries Data Collection and Research Committee, work with the jurisdictional fisheries management agencies in identifying and removing the barriers that prevents efficient and effective collection of fisheries data resulting in a decline in survey interviews and reporting of the fishery constituents affecting representativeness of data reported in the Annual SAFE Reports and future benchmark assessments.

# 2 DATA MODULES

## 2.1 AMERICAN SAMOA

### 2.1.1 DATA SOURCES

This report contains the most recently available information on American Samoa's pelagic fisheries, as compiled from data generated by the Department of Marine and Wildlife Resources (DMWR) through a program established in conjunction with the National Marine Fisheries Service (NMFS) Pacific Islands Fisheries Science Center (PIFSC) and supported in part through funding from the Interjurisdictional Fisheries Act (IFA). Purse seine and non-U.S. vessel landings are not included in this module but are discussed in general in the International module (see Section 2.6).

Prior to 1985, only commercial landings were monitored. From October 1985 to the present, data have been collected through the Tutuila and Manu'a creel survey program to include subsistence, recreational, as well as commercial fishing. Surveyors have noted that fishermen may not accurately report the number of fish released at sea, although the troll fishery in American Samoa has not been known to release fish. However, the Pago Pago Gamefishing Association, a recreational troll fishery, catches and releases blue marlin.

In September 1990, a commercial purchase system (i.e., receipt book) was instituted requiring all businesses that buy fish commercially in American Samoa, with an exception for the canneries, to submit a copy of their purchase receipts to the DMWR. In January 1996, NMFS implemented a federal longline logbook system. All longline fishermen are required to obtain a federal permit and to submit logs containing detailed data on each of their sets and the resulting catch, including the number of hooks set and number of fish released as bycatch. Confidentiality requirements prohibit providing a breakdown of the catch or effort from alia and monohull longline vessels in recent years. Changes to the data collection and analysis methodology have occurred periodically and are described in previous annual reports. No changes to the data collection or analysis were made in 2020, except that the number of vendors participating in the commercial purchase system decreased.

Participation (i.e., number of boats) is determined through both logbook entries and creel interviews. Effort (i.e., number of trips, hooks) is determined by direct reporting for longline trips, but is indirectly calculated for trolling trips, based on total pounds landed (reported), and average hourly catch rate and duration for trip (from creel interviews). Since 2009 (the year of the tsunami), only the longline logbook database has been useful in determining the number of active boats. Prior to that, DMWR's boat-based creel survey data were also used to assess whether or not longline vessels were active to include information from alia longline vessels that did not frequent the canneries and exclude alias that exclusively conducted bottomfish fishing and/or trolling.

DMWR implemented a fuel subsidy program from 2015 to 2018 that required DMWR to meet fishers at a designated time and location for mandatory surveys in order to receive fuel subsidies. This extended the creel survey schedule and detracted from the random sampling design at other times of the day. The fuel was dispensed to vessel owners, including those who rent their vessels to fishermen. The new program caused changes in fishing behavior that may have impacted catch estimates. Generally, more fuel was used and there were longer and more frequent trips,

but otherwise, catch per unit effort (CPUE) and species composition were not affected. There was an increase in the number of trolling trips and trip length that may have affected the relative amount of pelagic species in the catch.

Average weight (pounds) per fish is calculated directly from creel-weighed fish sampled over the year. In the past, cannery fish weight was determined based on a length to weight conversion from cannery sampling data, since longline boats have been landing their catches gilled and gutted since 1999. However, the cannery sampling program was discontinued in 2015, so those average weight data are no longer available. There is no cannery sampling data available since 2016. Therefore, PIFSC used proxies to estimate the weight and value of fish landings for the longline fishery in American Samoa.

For estimated weights, the current summaries are based on the best available average weight data for 2020, which is from DMWR's creel surveys. It should be noted that the weight of fish from the small boats is somewhat smaller than fish caught on the larger oceangoing vessels, contributing to a somewhat lower weight estimate for the fishery. Over the course of 2016, the PIFSC Fisheries Research and Monitoring Division (FRMD) International Fisheries Program (IFP) began estimating the average weight of fish kept for the longline fishery from observer data. This alternative source provides trip-level average weights for vessels with observers. These weights will be more representative of the longline fishery, but they will not be available for trips that do not carry observers. The protocol for handling unobserved trips is being developed by IFP, which will provide the data for this report in future years, but the information is not yet available. The information will be provided in the Regional Fishery Management Organization (RFMO) report for US Pacific longline fisheries.

Another item lost with the discontinuation of the longline cannery sampling program by the Pacific Islands Regional Office (PIRO) in Pago Pago was data on the proportion of longline fish (by species) sold to the cannery versus local market and village/take home (given, not sold). While the cannery buys a much higher volume of fish, their prices are low. The lesser amount of fish sold to the markets and local restaurants garners a higher price. Another portion of the catch is given away or taken home. In the absence of a cannery sampling program in 2016, PIFSC had to apply a number of estimates. For the top five cannery species (albacore, skipjack, yellowfin and big eye tuna and wahoo) the assumption of 100% sold to the cannery was applied. For other species also previously sampled at the cannery, for which a large percentage are not sold, proxy values from previous years were applied. The net result of using lower average weights (from creel surveys) and lower percentages sold to the market (or sold period) is likely to be responsible in part for a decrease in estimated weight and value of the catch sold.

Total landings data cover all fish caught and brought back to shore, whether it enters the commercial market or not. Commercial landings cover the portion of the total landings that was sold both to the canneries and other smaller local business. The difference between total landings and commercial landings is assumed to be the recreational/subsistence component of the fishery.

This module was prepared by DMWR and PIFSC FRMD and was reviewed by the WPFMC, its Scientific and Statistical Committee (SSC), and its Pelagic Plan Team (PPT).

### 2.1.2 SUMMARY OF AMERICAN SAMOAN PELAGIC FISHERY

**Landings.** The estimated annual pelagic landings have varied from 2.0 to 5.6 million lb between 2015 and 2024. The 2024 landings were approximately 3.4 million lb, higher than the 2.7 million lb landings in 2023 and highest since 2019 (Figure 4). Pelagic landings consist mainly of four tuna species (albacore, yellowfin, skipjack, and bigeye), which when combined with other tuna species, made up 94% of the total landings. Albacore made up 71% of the tuna species in 2024. Blue marlin, wahoo, swordfish, sailfish, striped marlin and mahimahi make up most of the non-tuna species landings. Landings of skipjack, blue marlin, wahoo and sailfish increased in 2024.

**Longline and Trolling Effort.** There were 9 vessels known to be fishing in the waters of American Samoa in 2024, one less than in 2023 according to the PIRO Sustainable Fisheries Division permit program. The vessel size classes were recently changed from four to two: small (< 40 feet) and large vessels (> 60 feet). There were 9 active large vessels and no active small vessels in 2024; there have been no active small longline vessels since 2021. The 9 vessels that fished in 2024 made 47 trips (averaging 5.2 trips/vessel), deployed 1,359 sets, (151 sets/vessel) using 4.06 million hooks and zero light sticks (Table 5). All other historical fishing effort indicators indicate a declining longline fishery. The number of boats is an all-time low. However, there has been a slight increase in other fishing effort indicators with increase in trips, sets and number of hooks. The number of boats trolling was 10, up from nine in 2023 and 2022, and up from five in 2021 at the end of a long-term decline since 2014. However, the number of troll trips precipitously decreased from 339 in 2023 to 72 in 2024 and now the lowest since 2015. There were 247 effective trolling hours in 2024, a precipitous drop from 1,577 and now the lowest since 2015. The catch rate was 22 lb/hr in 2024, a dramatic increase from 3 lb/hr in 2023, with an average catch rate of 23 lb/hr since 2015. The trolling effort estimates seem to wildly vary from year to year probably owing to low fishing participation coupled with the expansion algorithm that does not account for this level of effort. These values are being reviewed by PIFSC and the Council.

**Longline CPUE.** The total pelagic catch rate by all longline vessels was 13.0 fish/1,000 hooks in 2024. The tuna catch rate by longliners increased by 0.4 fish/1,000 hooks in 2024 from 12.6 fish/1,000 hooks in 2023. The catch rates have been increasing since 2020 and this reflects the monohull albacore catch rates since there have been no alia longlining since 2020. The catch rate of 13.0 fish/1,000 hooks is slightly above the average of 11.9 fish/1,000 hooks. The highest albacore catch rate on record is 32.9 fish/1,000 hooks in 2001.

**Lb-Per-Hour Trolling.** Trolling catch rates dramatically increased from 3 lb/hr in 2023 to 22 lb/hr in 2024 (Figure 19). Trolling catch rates have fluctuated with peaks in 2016 at 45 lb/hr and 2021 at 34 lb/hr. The fluctuations in catch rates could be attributed to skipjack catch rates and to some extent yellowfin catch rates especially in 2016. The catch rates for skipjack ranged from 17.9 lb/hr in 2016, 26.3 lb/hr in 2021 and 18.8 lb/hr in 2022. The catch rates for yellowfin fluctuated from 17.5 lb/hr in 2016 with the lower ends of 0.05 lb/hr in 2022 and 1.33 lb/hr in 2023. Catch rates for both skipjack and yellowfin increased from 2022 and 2023, respectively (Figure 20).

**Fish Size.** Since the last year of available data from the cannery sampling program was 2015 average weight-per-fish are no longer presented in this report. Average albacore weight ranged from 38 to 40 lb from 2010 to 2015. However, the boat-based creel surveys recorded

a size range of 35 to 38 lb from 2013 to 2020. Yellowfin and bigeye tuna weight per fish from the cannery sampling program seemed to decline from 2011 to 2015, at 57 to 39 lb and 54 to 38 lb, respectively.

**Revenue.** In 2024, the total longline fleet revenue (estimated landed value) was $3.23 million, and albacore composed a majority of the total landed value. Other main species included yellowfin tuna, bigeye tuna, skipjack tuna, and wahoo. The overall average fish price was $0.86 per pound in 2024. Albacore price was $1.15 per pound in 2024, a decrease of $0.24 from 2023. See the Socioeconomics (Section 3.2.2.1) module for additional data on American Samoa pelagic fisheries.

**Bycatch**. There was no recorded bycatch for the troll fishery in 2024 (Table 14). In the longline fishery, around 2.2% of the tuna catch was released. Yellowfin and bigeye were the most released bycatch tuna species at 5.1 and 5.5%, respectively. These are much higher release rates compared to 2021. Conversely, sharks (98 to 100%), oilfish (99.7%), and pomfret (88.6%) had the highest release numbers of non-tunas (Table 6). In total, 7.3% of all pelagic species caught by the longline fishery were released in 2024, lower than the 9.8% release rate in 2023, and up from 3.8% in 2022. Fish are released for various reasons including quality, handling and storage difficulties, and marketing problems.

### 2.1.3 PLAN TEAM RECOMMENDATIONS

There were no Plan Team recommendations to the Council relevant to the American Samoa pelagic fisheries data module.

### 2.1.4 OVERVIEW OF PARTICIPATION - ALL FISHERIES

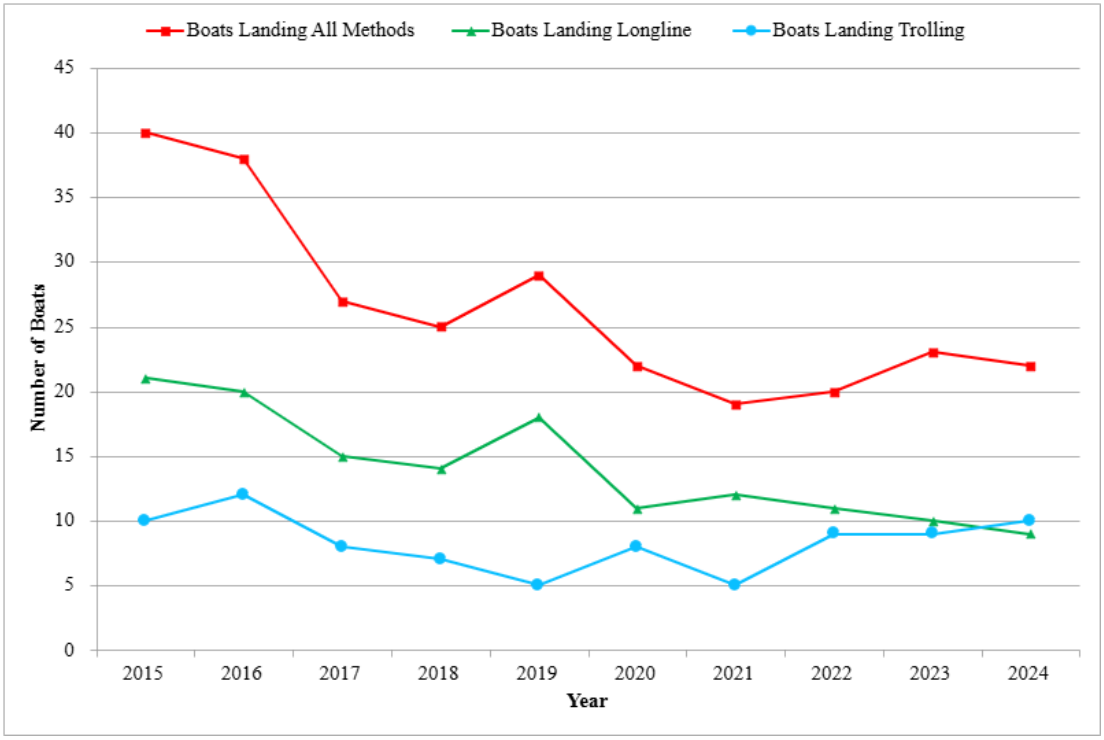



Figure 2. Number of boats landing any pelagic species in American Samoa by longlining, trolling, and all methods

Supporting data shown in Table A-2.

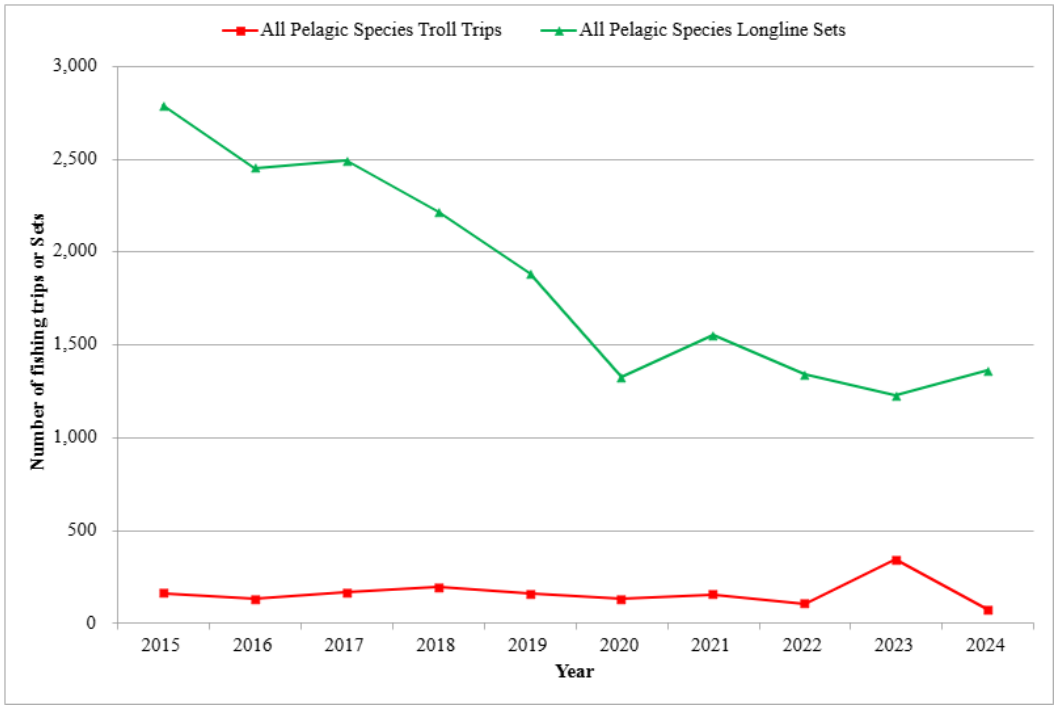



Figure 3. Number of fishing trips and sets for pelagic species in American Samoa

Supporting data shown in Table A-3.

### 2.1.5 OVERVIEW OF LANDINGS – ALL FISHERIES

Table 3. Estimated total landings (lb) of pelagic species in American Samoa by gear in 2024

| Species | Longline Pounds | Troll Pounds | Other Pounds | Total Pounds |
|---|---|---|---|---|
| Skipjack tuna | 352,044 | 2,414 | 0 | 354,458 |
| Albacore tuna | 2,258,160 | 0 | 0 | 2,258,160 |
| Yellowfin tuna | 458,942 | 1,249 | 0 | 460,191 |
| Kawakawa | 0 | 392 | 0 | 392 |
| Bigeye tuna | 116,332 | 0 | 0 | 116,332 |
| Bluefin tuna | 0 | 0 | 0 | 0 |
| Tunas (unknown) | 0 | 0 | 0 | 0 |
| **TUNAS TOTAL** | **3,185,478** | **4,055** | **0** | **3,189,533** |
| Mahimahi | 2,597 | 0 | 0 | 2,597 |
| Black marlin | 0 | 0 | 0 | 0 |
| Blue marlin | 147,574 | 0 | 0 | 147,574 |
| Striped marlin | 4,197 | 0 | 0 | 4,197 |
| Wahoo | 38,356 | 213 | 0 | 38,569 |
| Swordfish | 9,054 | 0 | 0 | 9,054 |
| Sailfish | 7,516 | 0 | 0 | 7,516 |
| Spearfish | 966 | 517 | 0 | 1,483 |
| Moonfish | 395 | 0 | 0 | 395 |
| Oilfish | 76 | 0 | 0 | 76 |
| Pomfret | 158 | 0 | 0 | 158 |
| Pelagic thresher shark | 0 | 0 | 0 | 0 |
| Thresher shark | 0 | 0 | 0 | 0 |
| Shark (unknown pelagic) | 181 | 0 | 0 | 181 |
| Snake mackerel | 0 | 0 | 6 | 6 |
| Bigeye thresher shark | 0 | 0 | 0 | 0 |
| Silky shark | 0 | 0 | 0 | 0 |
| White tip oceanic shark | 0 | 0 | 0 | 0 |
| Blue shark | 0 | 0 | 0 | 0 |
| Shortfin mako shark | 90 | 0 | 0 | 90 |
| Longfin mako shark | 0 | 0 | 0 | 0 |
| Billfishes (unknown) | 0 | 0 | 0 | 0 |
| **NON-TUNA PMUS TOTAL** | **211,160** | **730** | **6** | **211,896** |
| Pelagic fishes (unknown) | 0 | 0 | 0 | 0 |
| Double-lined mackerel | 0 | 0 | 10 | 10 |
| Mackerel | 0 | 0 | 0 | 0 |

| Species | Longline Pounds | Troll Pounds | Other Pounds | Total Pounds |
|---|---|---|---|---|
| Long-jawed mackerel | 0 | 0 | 0 | 0 |
| Barracudas | 2,322 | 0 | 0 | 2,322 |
| Great barracuda | 0 | 0 | 0 | 0 |
| Small barracudas | 0 | 0 | 0 | 0 |
| Rainbow runner | 79 | 184 | 0 | 263 |
| Dogtooth tuna | 0 | 151 | 189 | 340 |
| **OTHER PELAGICS TOTAL** | **2,401** | **335** | **199** | **2,935** |
| **TOTAL PELAGICS** | **3,399,039** | **5,120** | **205** | **3,404,364** |

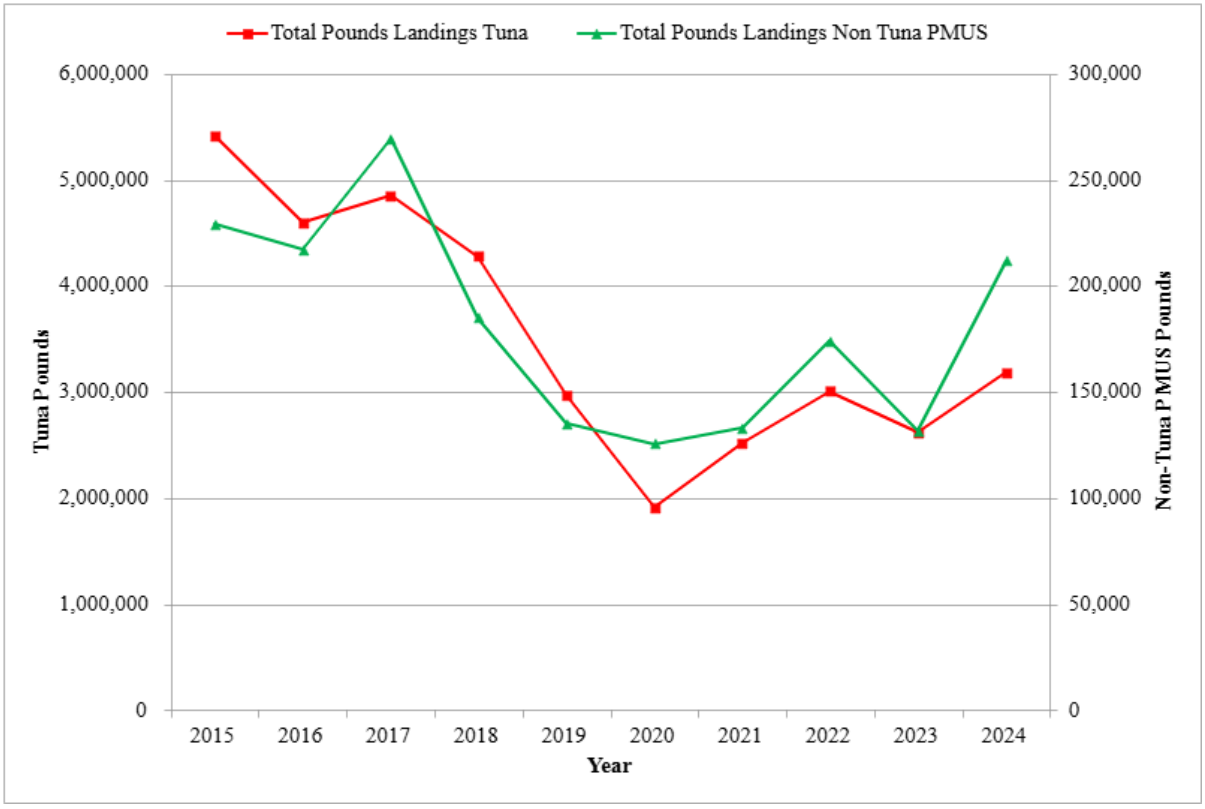



Figure 4. Total estimated landings of tuna and non-tuna PMUS in American Samoa

Supporting data shown in Table A-4.

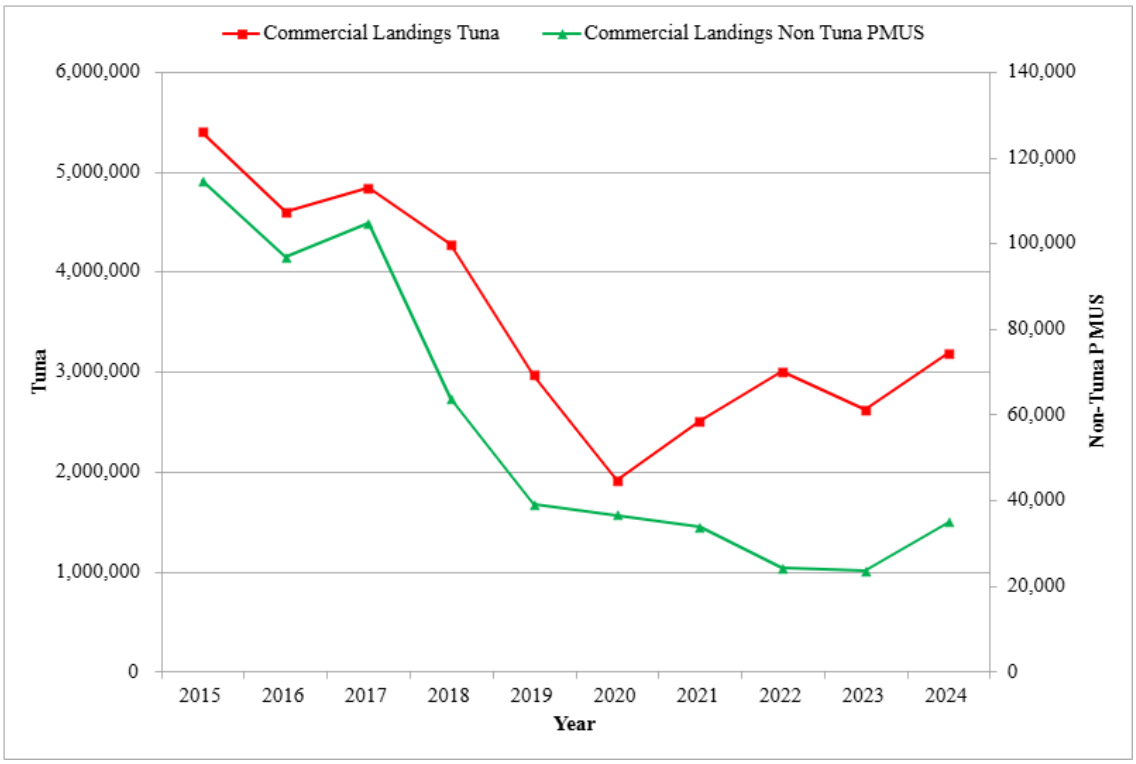



Figure 5. Commercial landings of tuna and non-tuna PMUS in American Samoa

Supporting data shown in Table A-5.

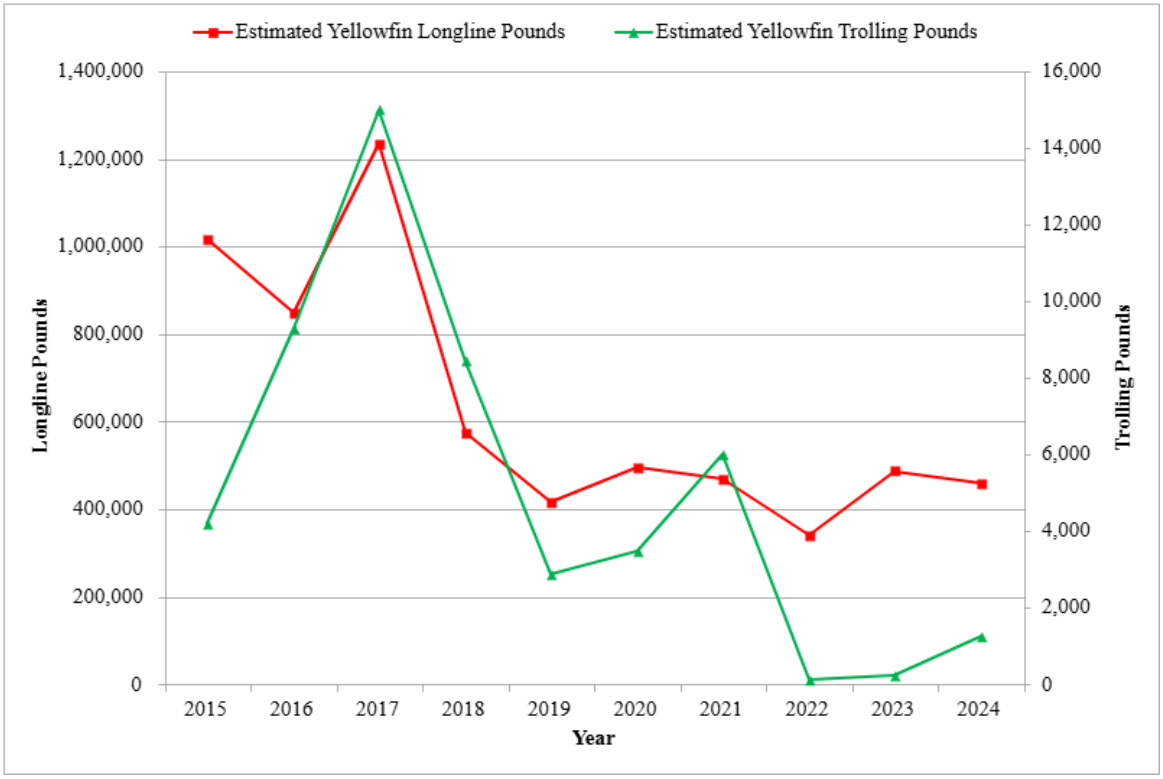



Figure 6. Total estimated landings of yellowfin tuna in American Samoa

Supporting data shown in Table A-6.

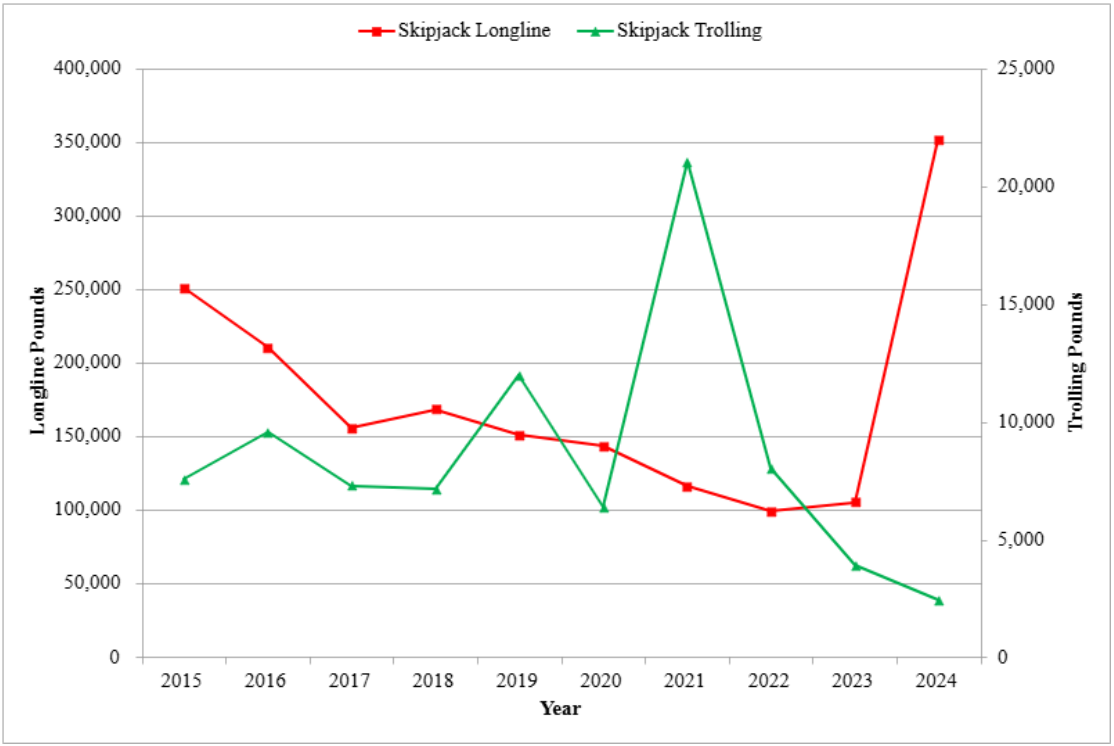



Figure 7. Total estimated landings of skipjack tuna in American Samoa

Supporting data shown in Table A-7.

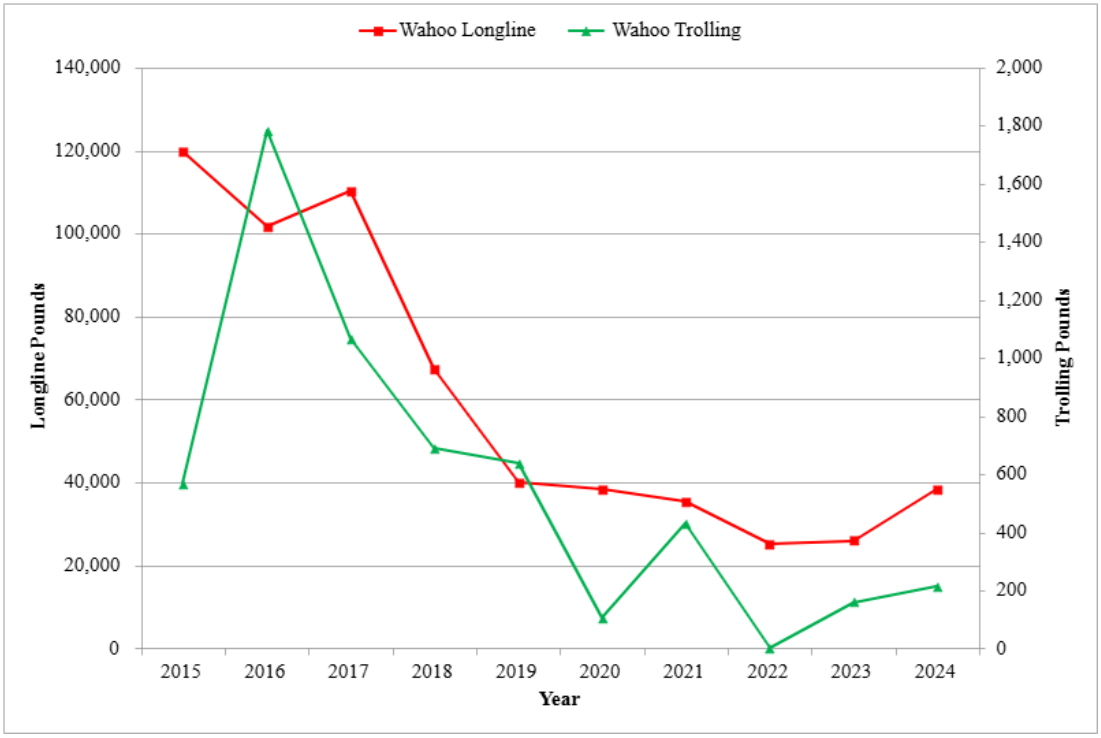



Figure 8. Total estimated landings of wahoo in American Samoa

Note: An unrepresentative amount of wahoo was caught by trolling one day in 2016. Supporting data shown in Table A-8.

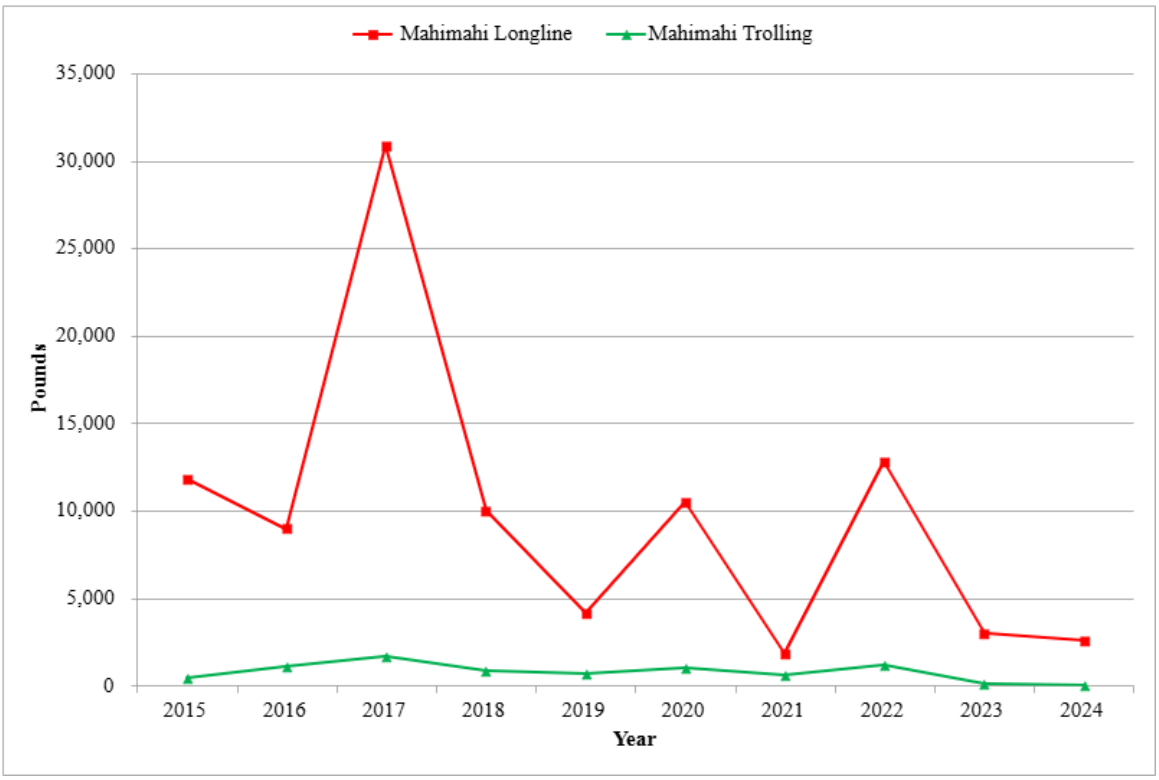



Figure 9. Total estimated landings of mahimahi in American Samoa

Supporting data shown in Table A-9.

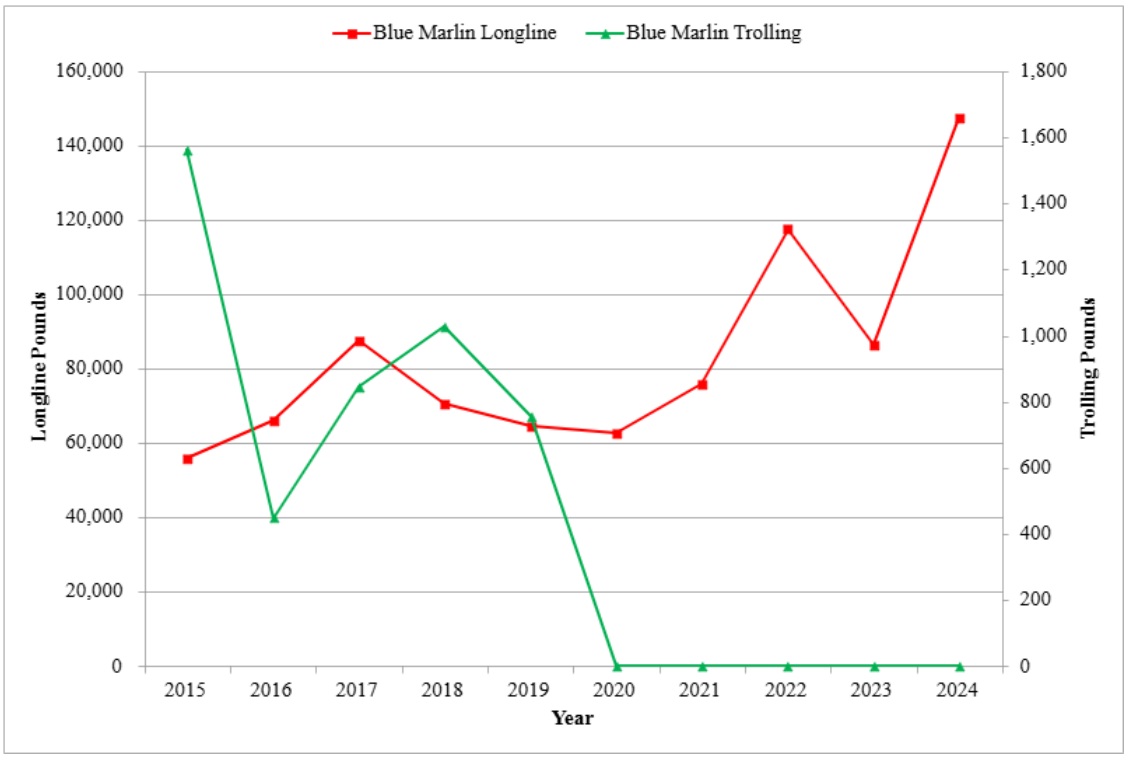



Figure 10. Total estimated landings of blue marlin in American Samoa

Supporting data shown in Table A-10.

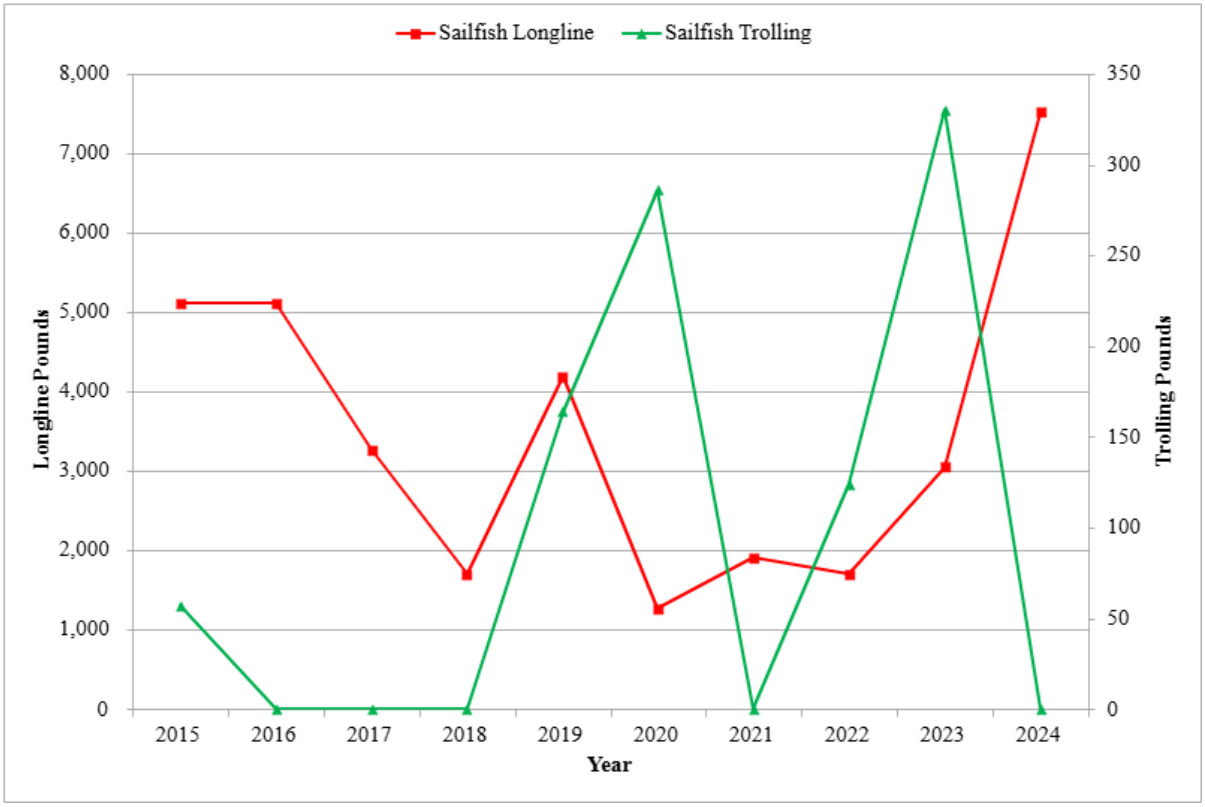



Figure 11. Total estimated landings of sailfish in American Samoa

Supporting data shown in Table A-11.

### 2.1.6 AMERICAN SAMOA LONGLINE PARTICIPATION, EFFORT, LANDINGS, BYCATCH, AND CPUE

Table 4. Number of permitted and active longline fishing vessels by size class in American Samoa

| Year | Class A Permits | Class A Active | Class B Permits | Class B Active | Class C Permits | Class C Active | Class D Permits | Class D Active |
|---|---|---|---|---|---|---|---|---|
| 2015 | 0 | 3 | 0 | 0 | 0 | 6 | 0 | 12 |
| 2016 | 7 | 2 | 4 | 0 | 12 | 5 | 27 | 13 |
| 2017 | 7 | 1 | 3 | 0 | 11 | 5 | 27 | 9 |
| 2018 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 9 |
| 2019 | 0 | 3 | 0 | 0 | 0 | 5 | 0 | 10 |
| 2020 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 7 |
| 2021 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 8 |
| 2022 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 7 |
| 2023 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 |
| 2024 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 6 |

Notes: These data are used for Figure 12 that follows. The "small" size class includes alia vessels, whereas the "large" size class typically includes larger monohull vessels fishing in the Southern Pacific Ocean. Dual-permitted vessels are included. These designations shifted from Classes A through D to Small and Large due to Amendment 9 to the Pelagic FEP (86 FR 55743, October 7, 2021) that reduced the original four size classes to the two presented here.

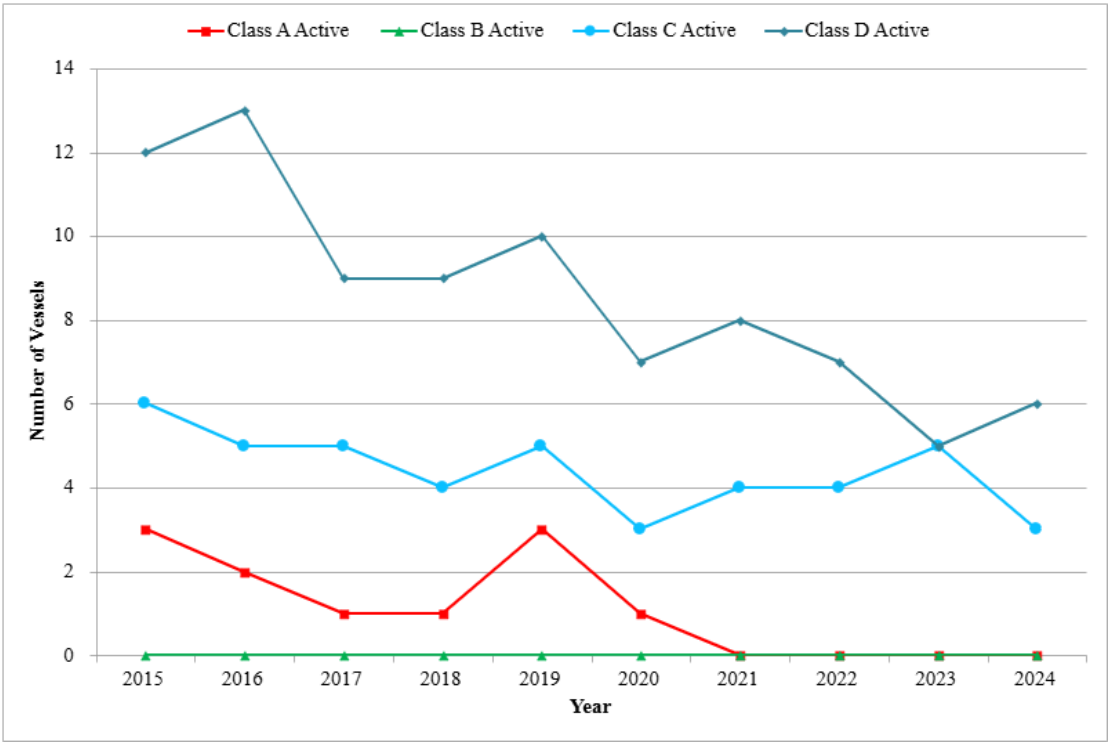



Figure 12. Number of active longline fishing vessels in American Samoa by size classes: Small (0-50 ft) and Large (> 51 ft)

Table 5. Longline effort by American Samoa vessels in 2024

| Effort Type | Amount |
|---|---|
| Boats | 9 |
| Trips | 47 |
| Sets | 1,359 |
| Hooks (Thousands) | 4,063 |
| Lightsticks | 0 |

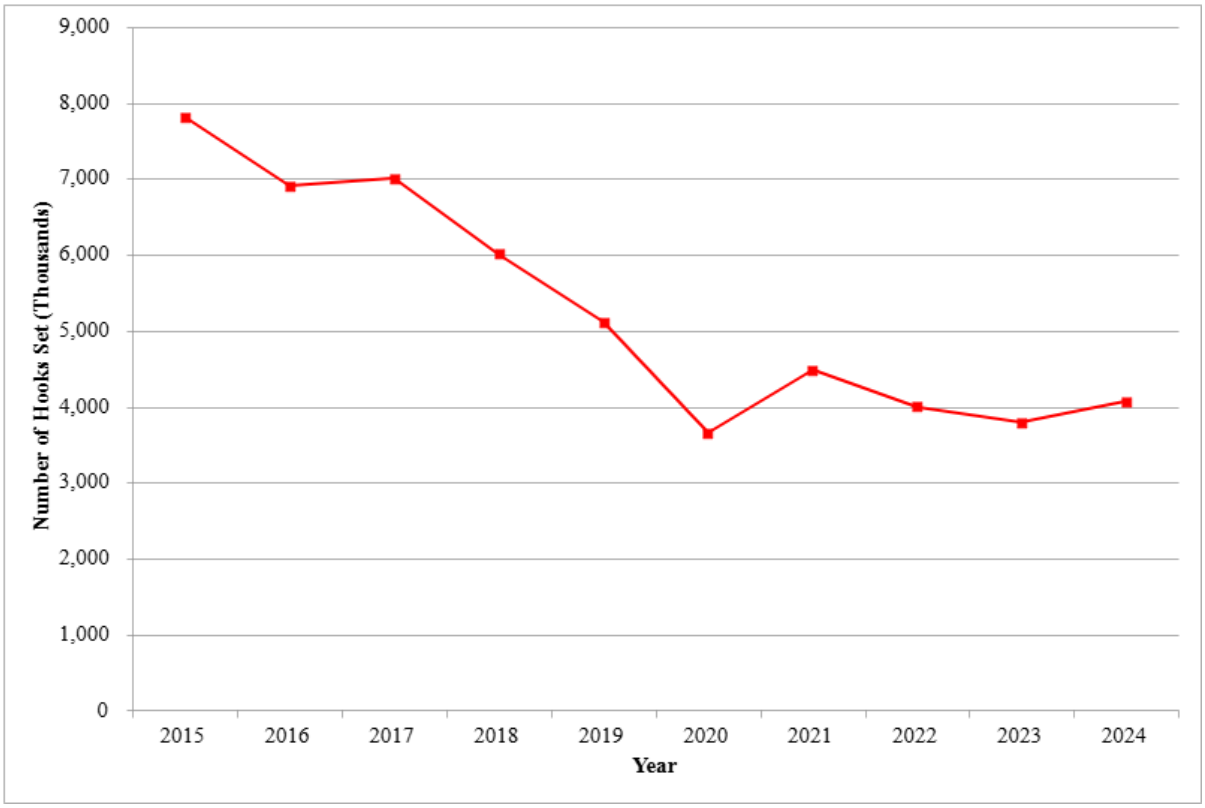



Figure 13. Number of longline hooks set from federal logbook data in American Samoa
Supporting data shown in Table A-12.

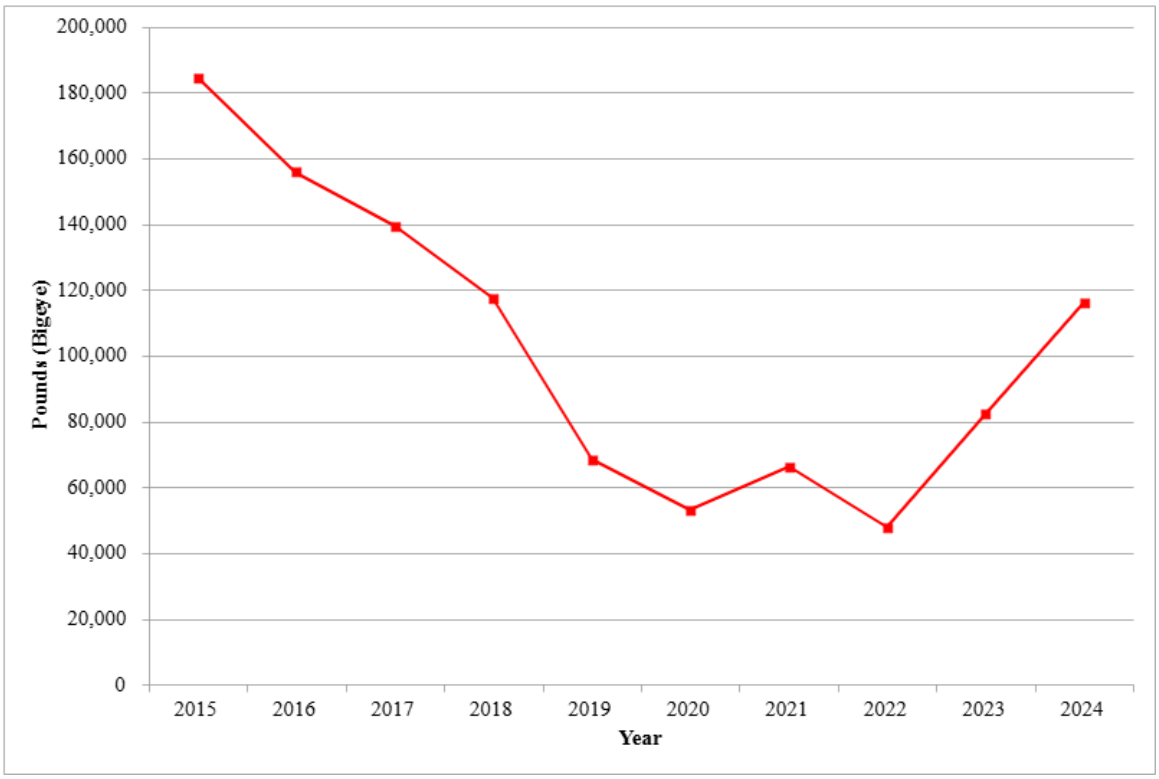



Figure 14. Total estimated landings of bigeye tuna by longlining in American Samoa
Supporting data shown in Table A-13.

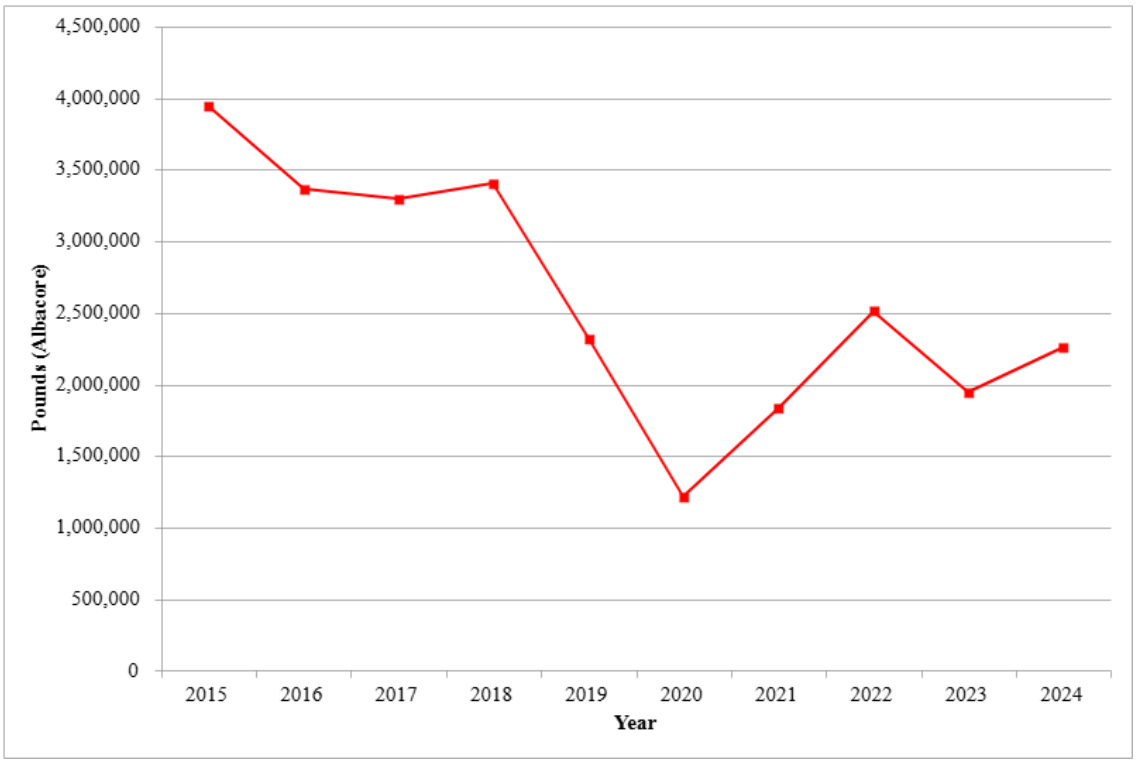



Figure 15. Total estimated landings of albacore by longlining in American Samoa
Supporting data shown in Table A-14.

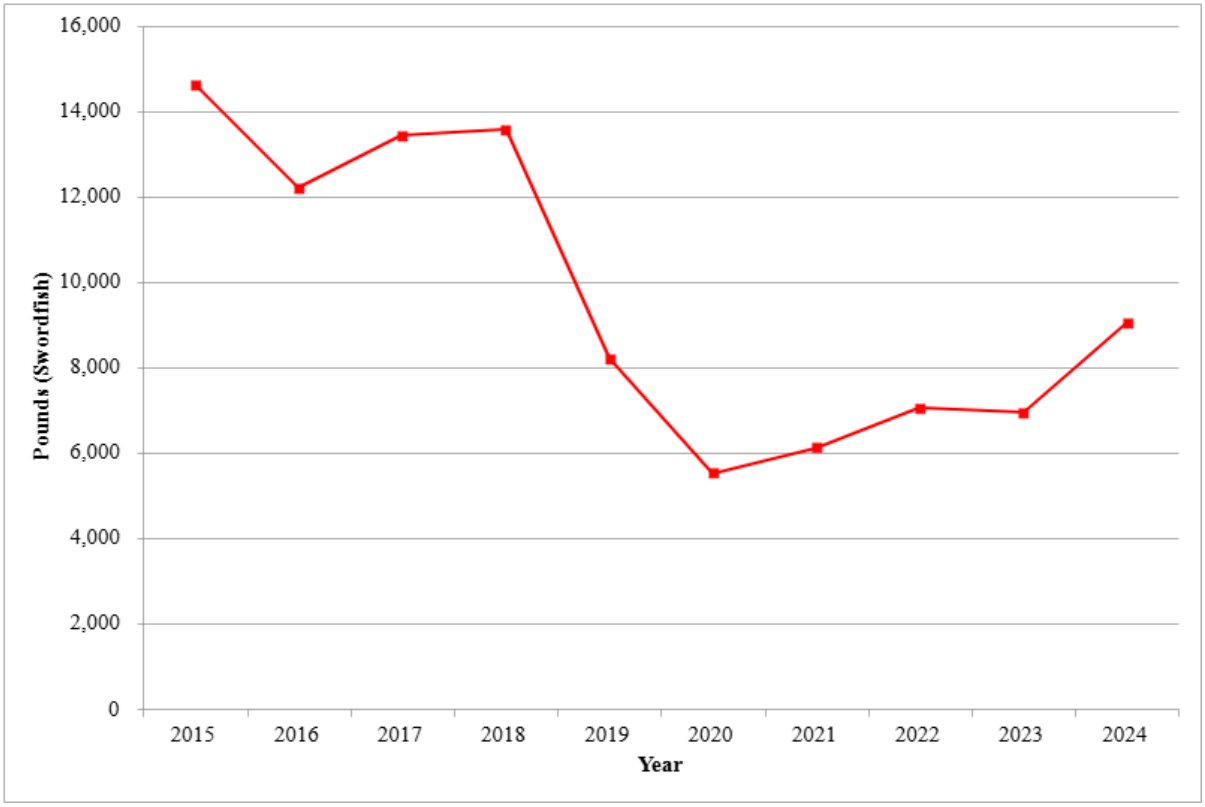



Figure 16. Total estimated landings of swordfish by longlining in American Samoa
Supporting data shown in Table A-15.

Table 6. Number of fish kept, released, and percent released for all American Samoa longline vessels from federal logbook data in 2024

| Species | Number Kept | Number Released | Total Caught | Percent Released |
|---|---|---|---|---|
| Skipjack tuna | 22,850 | 504 | 23,354 | 2.2 |
| Albacore tuna | 52,048 | 853 | 52,901 | 1.6 |
| Yellowfin tuna | 9,295 | 495 | 9,790 | 5.1 |
| Kawakawa | 0 | 0 | 0 | 0.0 |
| Bigeye tuna | 2,298 | 135 | 2,433 | 5.5 |
| Bluefin tuna | 0 | 0 | 0 | 0.0 |
| Tunas (unknown) | 0 | 0 | 0 | 0.0 |
| **TUNAS TOTAL** | **86,491** | **1,987** | **88,478** | **2.2** |
| Mahimahi | 119 | 7 | 126 | 5.6 |
| Black marlin | 0 | 0 | 0 | 0.0 |
| Blue marlin | 1,149 | 64 | 1,213 | 5.3 |
| Striped marlin | 61 | 2 | 63 | 3.2 |
| Wahoo | 1,504 | 29 | 1,533 | 1.9 |
| Swordfish | 90 | 95 | 185 | 51.4 |

| Species | Number Kept | Number Released | Total Caught | Percent Released |
|---|---|---|---|---|
| Sailfish | 106 | 95 | 201 | 47.3 |
| Spearfish | 21 | 114 | 135 | 84.4 |
| Moonfish | 8 | 9 | 17 | 52.9 |
| Oilfish | 4 | 1,535 | 1,539 | 99.7 |
| Pomfret | 18 | 140 | 158 | 88.6 |
| Pelagic thresher shark | 0 | 0 | 0 | 0.0 |
| Thresher shark | 0 | 64 | 64 | 100.0 |
| Shark (unknown pelagic) | 2 | 0 | 2 | 0.0 |
| Snake mackerel | 0 | 123 | 123 | 100.0 |
| Bigeye thresher shark | 0 | 0 | 0 | 0.0 |
| Silky shark | 0 | 997 | 997 | 100.0 |
| White tip oceanic shark | 0 | 541 | 541 | 100.0 |
| Blue shark | 0 | 927 | 927 | 100.0 |
| Shortfin mako shark | 1 | 56 | 57 | 98.2 |
| Longfin mako shark | 0 | 0 | 0 | 0.0 |
| Billfishes (unknown) | 0 | 2 | 2 | 100.0 |
| **NON-TUNA PMUS TOTAL** | **3,083** | **4,800** | **7,883** | **60.9** |
| Pelagic fishes (unknown) | 0 | 6 | 6 | 100.0 |
| Double-lined mackerel | 0 | 0 | 0 | 0.0 |
| Mackerel | 0 | 0 | 0 | 0.0 |
| Long-jawed Mackerel | 0 | 0 | 0 | 0.0 |
| Barracudas | 186 | 251 | 437 | 57.4 |
| Great barracuda | 0 | 0 | 0 | 0.0 |
| Small barracudas | 0 | 0 | 0 | 0.0 |
| Rainbow runner | 13 | 0 | 13 | 0.0 |
| Dogtooth tuna | 0 | 0 | 0 | 0.0 |
| **OTHER PELAGICS TOTAL** | **199** | **257** | **456** | **56.4** |
| **TOTAL PELAGICS** | **89,773** | **7,044** | **96,817** | **7.3** |

Table 7. Total estimated bycatch in number of fish for the top 10 bycatch species from the Pacific Islands Region Observer Program for the American Samoa longline fishery

| Species | 2019 | 2020 | 2021 | 2022 | 2023 | Average | SD |
|---|---|---|---|---|---|---|---|
| Stingray, Pelagic | 11,908 | 8,395 | 8,259 | 6,487 | 13,056 | 9,621 | 2,748.16 |
| Lancetfish, Longnose | 4,991 | 4,063 | 3,913 | 2,749 | 6,199 | 4,383 | 1,290.42 |
| Escolar, Longfin | 6,609 | 5,037 | 4,788 | 3,706 | 5,859 | 5,200 | 1,100.89 |
| Escolar | 5,094 | 5,540 | 5,517 | 3,111 | 3,989 | 4,650 | 1,066.11 |
| Tuna, Albacore | 1,584 | 1,136 | 1,077 | 1,258 | 2,131 | 1,437 | 434.59 |
| Tuna, Yellowfin | 1,180 | 1,476 | 1,363 | 1,755 | 1,893 | 1,533 | 289.67 |
| Shark, Silky | 1,840 | 1,227 | 1,238 | 949 | 1,734 | 1,398 | 375.73 |
| Shark, Blue | 2,681 | 2,958 | 2,721 | 1,752 | 1,451 | 2,313 | 666.27 |
| Snake Mackerel, Unidentified | 0 | 3 | 2 | 1 | 873 | 176 | 389.74 |
| Pomfret, Sickle | 535 | 407 | 425 | 515 | 782 | 533 | 149.89 |

Note: The top 10 species comprised 84% of total bycatch in 2023.

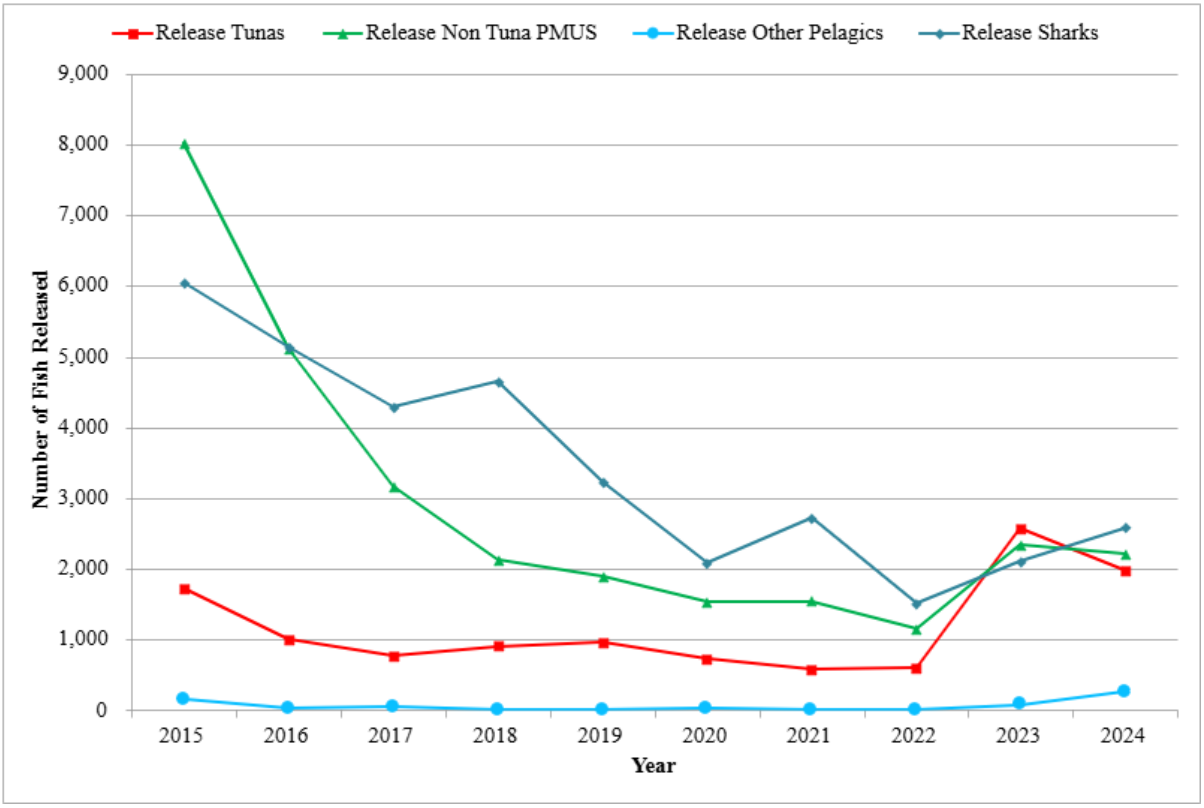



Figure 17. Number of fish released by longline vessels in American Samoa according to federal logbook data

Supporting data shown in Table A-16.

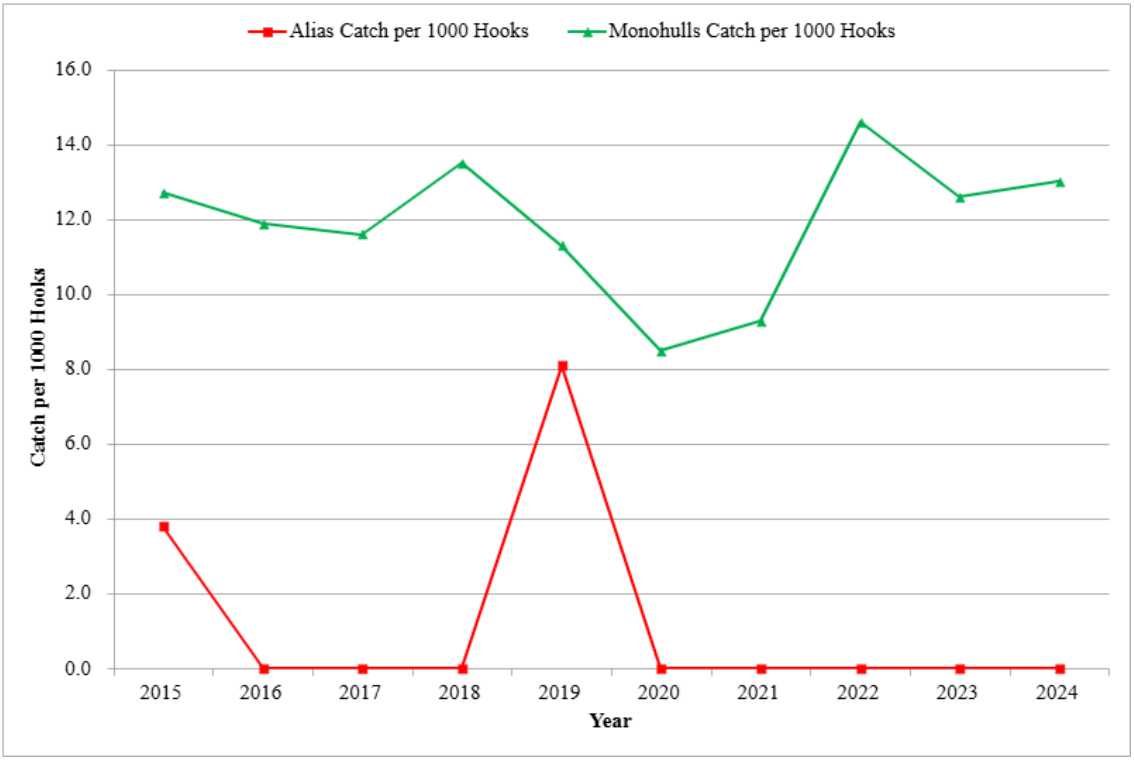



Figure 18. Albacore catch per 1,000 hooks by monohull vessels from longline logbook data in American Samoa

Note: Data for alia vessels are typically non-disclosed due to confidentiality rules. Supporting data shown in Table A-17.

Table 8. Catch per 1,000 hooks for alia vessels in American Samoa from 1996 to 1998

| Species | Alia 1996 | Alia 1997 | Alia 1998 |
|---|---|---|---|
| Skipjack tuna | 0.1 | 1.2 | 3.7 |
| Albacore tuna | 40.6 | 32.8 | 26.6 |
| Yellowfin tuna | 6.5 | 2.7 | 2.2 |
| Bigeye tuna | 1.3 | 0.3 | 0.3 |
| **TUNAS TOTAL** | **48.5** | **37.0** | **32.8** |
| Mahimahi | 2.3 | 2.2 | 1.7 |
| Blue marlin | 0.9 | 0.7 | 0.5 |
| Wahoo | 0.8 | 0.9 | 2.2 |
| Swordfish | 0.0 | 0.1 | 0.0 |
| Sailfish | 0.2 | 0.2 | 0.1 |
| **NON-TUNA PMUS TOTAL** | **4.2** | **4.3** | **4.6** |
| Pelagic fishes (unknown) | 0.0 | 0.0 | 0.2 |
| **OTHER PELAGICS TOTAL** | **0.0** | **0.0** | **0.2** |
| **TOTAL PELAGICS** | **52.7** | **41.3** | **37.6** |

Table 9. Catch per 1,000 hooks for two types of longline vessels in American Samoa from 1999 to 2002

| Species | Alia 1999 | Monohull 1999 | Alia 2000 | Monohull 2000 | Alia 2001 | Monohull 2001 | Alia 2002 | Monohull 2002 |
|---|---|---|---|---|---|---|---|---|
| Skipjack tuna | 5.0 | 4.5 | 2.0 | 1.7 | 3.1 | 2.1 | 6.0 | 4.9 |
| Albacore tuna | 18.8 | 14.8 | 19.8 | 28.0 | 27.3 | 32.9 | 17.2 | 25.8 |
| Yellowfin tuna | 6.7 | 2.1 | 6.2 | 3.1 | 3.3 | 1.4 | 7.1 | 1.3 |
| Bigeye tuna | 0.7 | 0.5 | 0.4 | 1.0 | 0.6 | 1.0 | 0.6 | 0.9 |
| **TUNAS TOTAL** | **31.2** | **21.9** | **28.4** | **33.8** | **34.3** | **37.4** | **30.9** | **32.9** |
| Mahimahi | 2.2 | 0.3 | 1.7 | 0.4 | 3.4 | 0.5 | 4.0 | 0.6 |
| Black marlin | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| Blue marlin | 0.5 | 0.1 | 0.5 | 0.2 | 0.4 | 0.2 | 0.2 | 0.3 |
| Striped marlin | 0.0 | 0.2 | 0.1 | 0.3 | 0.0 | 0.1 | 0.1 | 0.0 |
| Wahoo | 2.1 | 1.2 | 1.2 | 1.0 | 1.5 | 0.6 | 2.7 | 1.0 |
| Swordfish | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |
| Sailfish | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| Spearfish | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Moonfish | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 |
| Oilfish | 0.0 | 0.6 | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 | 0.5 |
| Pomfret | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 |
| **NON-TUNA PMUS TOTAL** | **5.1** | **3.1** | **3.7** | **2.5** | **5.6** | **1.8** | **7.3** | **2.6** |
| Barracudas | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| **OTHER PELAGICS TOTAL** | **0.3** | **0.2** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.4** |
| **TOTAL PELAGICS** | **36.6** | **25.2** | **32.1** | **36.3** | **39.9** | **39.2** | **38.2** | **35.9** |

Table 10. Catch per 1,000 hooks for two types of longline vessels in American Samoa from 2003 to 2005

| Species | Alia 2003 | Monohull 2003 | Alia 2004 | Monohull 2004 | Alia 2005 | Monohull 2005 |
|---|---|---|---|---|---|---|
| Skipjack tuna | 4.7 | 2.9 | 3.0 | 3.9 | 1.0 | 2.7 |
| Albacore tuna | 17.3 | 16.4 | 13.7 | 12.9 | 10.3 | 17.4 |
| Yellowfin tuna | 5.9 | 2.0 | 8.8 | 3.2 | 7.0 | 2.6 |
| Bigeye tuna | 1.6 | 1.1 | 0.8 | 1.3 | 1.0 | 0.9 |
| **TUNAS TOTAL** | **29.5** | **22.4** | **26.3** | **21.3** | **19.3** | **23.6** |
| Mahimahi | 2.2 | 0.4 | 2.1 | 0.2 | 2.0 | 0.3 |
| Blue marlin | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 |
| Striped marlin | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |

| Species | Alia 2003 | Monohull 2003 | Alia 2004 | Monohull 2004 | Alia 2005 | Monohull 2005 |
|---|---|---|---|---|---|---|
| Wahoo | 1.8 | 1.1 | 3.0 | 1.6 | 2.3 | 1.4 |
| Swordfish | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |
| Sailfish | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 |
| Spearfish | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| Moonfish | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Oilfish | 0.3 | 0.5 | 0.0 | 0.7 | 0.0 | 0.3 |
| Pomfret | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 |
| **NON-TUNA PMUS TOTAL** | **5.0** | **2.4** | **5.5** | **3.1** | **4.9** | **2.5** |
| Pelagic fishes (unknown) | 0.2 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 |
| **OTHER PELAGICS TOTAL** | **0.2** | **0.2** | **0.0** | **0.1** | **0.0** | **0.1** |
| **TOTAL PELAGICS** | **34.7** | **25.0** | **31.8** | **24.5** | **24.2** | **26.2** |

Table 11. Catch per 1,000 hooks for all types of longline vessels in American Samoa from 2006 to 2011

| Species | All Vessels 2006 | All Vessels 2007 | All Vessels 2008 | All Vessels 2009 | All Vessels 2010 | All Vessels 2011 |
|---|---|---|---|---|---|---|
| Skipjack tuna | 3.2 | 2.3 | 2.4 | 2.3 | 2.4 | 2.5 |
| Albacore tuna | 18.4 | 18.4 | 14.2 | 14.8 | 17.4 | 12.1 |
| Yellowfin tuna | 1.6 | 1.9 | 1.0 | 1.1 | 1.8 | 2.0 |
| Bigeye tuna | 0.9 | 0.9 | 0.5 | 0.6 | 0.8 | 0.7 |
| **TUNAS TOTAL** | **24.1** | **23.5** | **18.1** | **18.8** | **22.4** | **17.3** |
| Mahimahi | 0.4 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 |
| Blue marlin | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Wahoo | 1.5 | 1.0 | 0.7 | 1.0 | 1.0 | 0.9 |
| Swordfish | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sailfish | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Spearfish | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| Oilfish | 0.5 | 0.5 | 0.4 | 0.5 | 0.6 | 0.6 |
| Pomfret | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| **NON-TUNA PMUS TOTAL** | **2.9** | **2.2** | **2.0** | **2.5** | **2.5** | **2.4** |
| Pelagic fishes (unknown) | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| **OTHER PELAGICS TOTAL** | **0.0** | **0.0** | **0.0** | **0.0** | **0.1** | **0.0** |
| **TOTAL PELAGICS** | **27.0** | **25.7** | **20.1** | **21.3** | **25.0** | **19.7** |

Table 12. Catch per 1,000 hooks for all types of longline vessels from 2013 to 2017

| Species | All Vessels 2012 | All Vessels 2013 | All Vessels 2014 | All Vessels 2015 | All Vessels 2016 | All Vessels 2017 |
|---|---|---|---|---|---|---|
| Skipjack tuna | 4.3 | 1.1 | 2.5 | 2.0 | 2.0 | 1.5 |
| Albacore tuna | 14.8 | 11.7 | 10.6 | 12.7 | 11.9 | 11.5 |
| Yellowfin tuna | 1.2 | 1.9 | 2.5 | 2.6 | 2.6 | 3.6 |
| Bigeye tuna | 0.6 | 0.4 | 0.7 | 0.6 | 0.5 | 0.4 |
| **TUNAS TOTAL** | **20.9** | **15.1** | **16.3** | **17.9** | **17.0** | **17.0** |
| Mahimahi | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 |
| Blue marlin | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Wahoo | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| Spearfish | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 |
| Moonfish | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Oilfish | 0.8 | 0.7 | 0.6 | 0.8 | 0.6 | 0.3 |
| Pomfret | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Thresher shark | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| Silky shark | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| White tip oceanic shark | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Blue shark | 0.4 | 0.2 | 0.4 | 0.5 | 0.5 | 0.4 |
| Shortfin mako shark | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| **NON-TUNA PMUS TOTAL** | **2.5** | **2.2** | **2.4** | **2.7** | **2.4** | **2.1** |
| Pelagic fishes (unknown) | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| **OTHER PELAGICS TOTAL** | **0.1** | **0.1** | **0.0** | **0.0** | **0.0** | **0.0** |
| **TOTAL PELAGICS** | **23.5** | **17.4** | **18.7** | **20.6** | **19.4** | **19.1** |

Table 13. Catch/1,000 hooks for all types of longline vessels in American Samoa from 2018 to 2024

| Species | All Vessels 2018 | All Vessels 2019 | All Vessels 2020 | All Vessels 2021 | All Vessels 2022 | All Vessels 2023 | All Vessels 2024 |
|---|---|---|---|---|---|---|---|
| Skipjack tuna | 1.8 | 2.2 | 2.7 | 1.5 | 1.4 | 1.6 | 5.7 |
| Albacore tuna | 13.5 | 11.3 | 8.4 | 9.3 | 14.6 | 12.6 | 13.0 |
| Yellowfin tuna | 1.7 | 1.9 | 2.6 | 2.3 | 1.5 | 2.7 | 2.4 |
| Bigeye tuna | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.5 | 0.6 |
| **TUNAS TOTAL** | **17.4** | **15.8** | **14.0** | **13.4** | **17.8** | **17.4** | **21.7** |
| Mahimahi | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 | |
| Blue marlin | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 |

| Species | All Vessels 2018 | All Vessels 2019 | All Vessels 2020 | All Vessels 2021 | All Vessels 2022 | All Vessels 2023 | All Vessels 2024 |
|---|---|---|---|---|---|---|---|
| Wahoo | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 |
| Oilfish | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.4 | 0.4 |
| Pomfret | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | |
| Thresher shark | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Silky shark | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 |
| White tip oceanic shark | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Blue shark | 0.5 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 |
| **NON-TUNA PMUS TOTAL** | **1.8** | **1.3** | **1.6** | **1.2** | **1.3** | **1.6** | **1.6** |
| Barracudas | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| **OTHER PELAGICS TOTAL** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.1** | **0.1** |
| **TOTAL PELAGICS** | **19.2** | **17.1** | **15.6** | **14.6** | **19.1** | **19.1** | **23.4** |

### 2.1.7 AMERICAN SAMOA TROLLING BYCATCH AND CPUE

Data for participation, effort, landings, and revenue are found in previous sections of this chapter. Statistics summarizing bycatch for American Samoa trolling are shown in Table 14.

Table 14. American Samoa trolling bycatch summary (released fish)

| Year | Number Release | Percent Release | Number Kept | Number Caught | Charter |
|---|---|---|---|---|---|
| 2015 | 0 | 0.0 | 616 | 616 | F |
| 2016 | 0 | 0.0 | 1,374 | 1,374 | F |
| 2017 | 0 | 0.0 | 915 | 915 | F |
| 2018 | 0 | 0.0 | 743 | 743 | F |
| 2019 | 0 | 0.0 | 640 | 640 | F |
| 2020 | 0 | 0.0 | 465 | 465 | F |
| 2021 | 0 | 0.0 | 607 | 607 | F |
| 2022 | 0 | 0.0 | 132 | 132 | F |
| 2023 | 0 | 0.0 | 49 | 49 | F |
| 2024 | 0 | 0.0 | 64 | 64 | F |

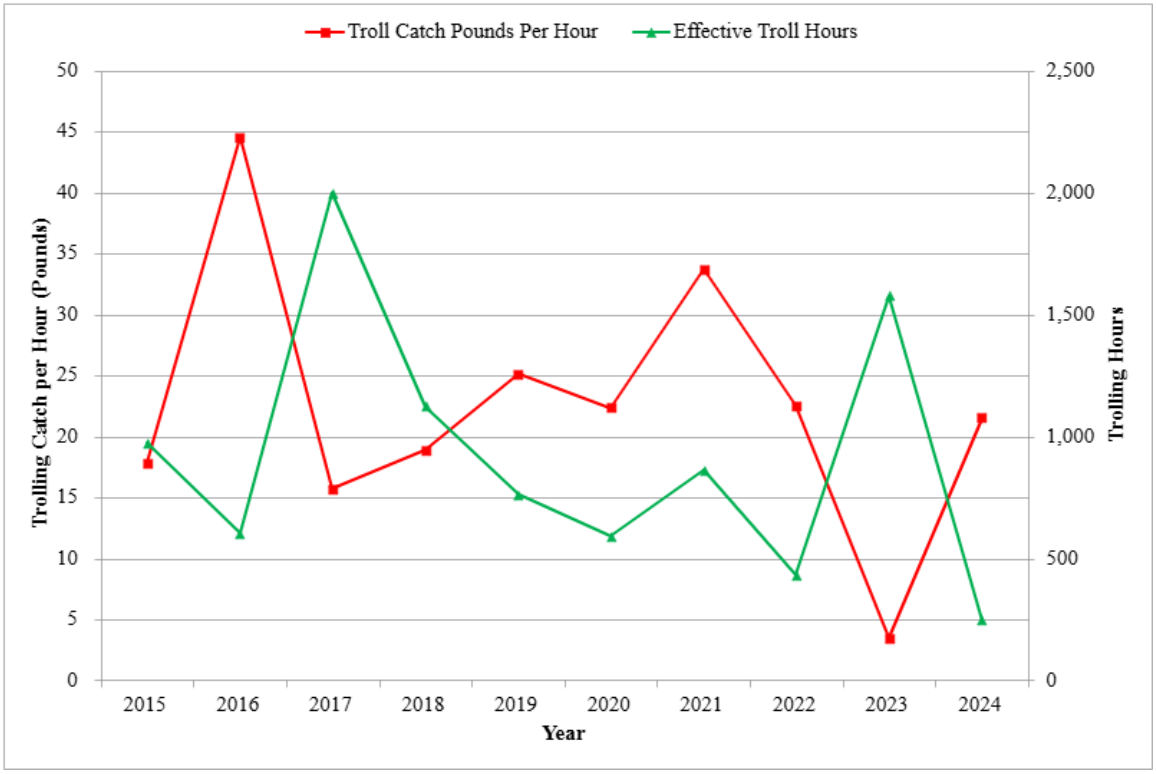



Figure 19. Catch-per-hour for trolling and number of trolling hours in American Samoa
Supporting data shown in Table A-18.

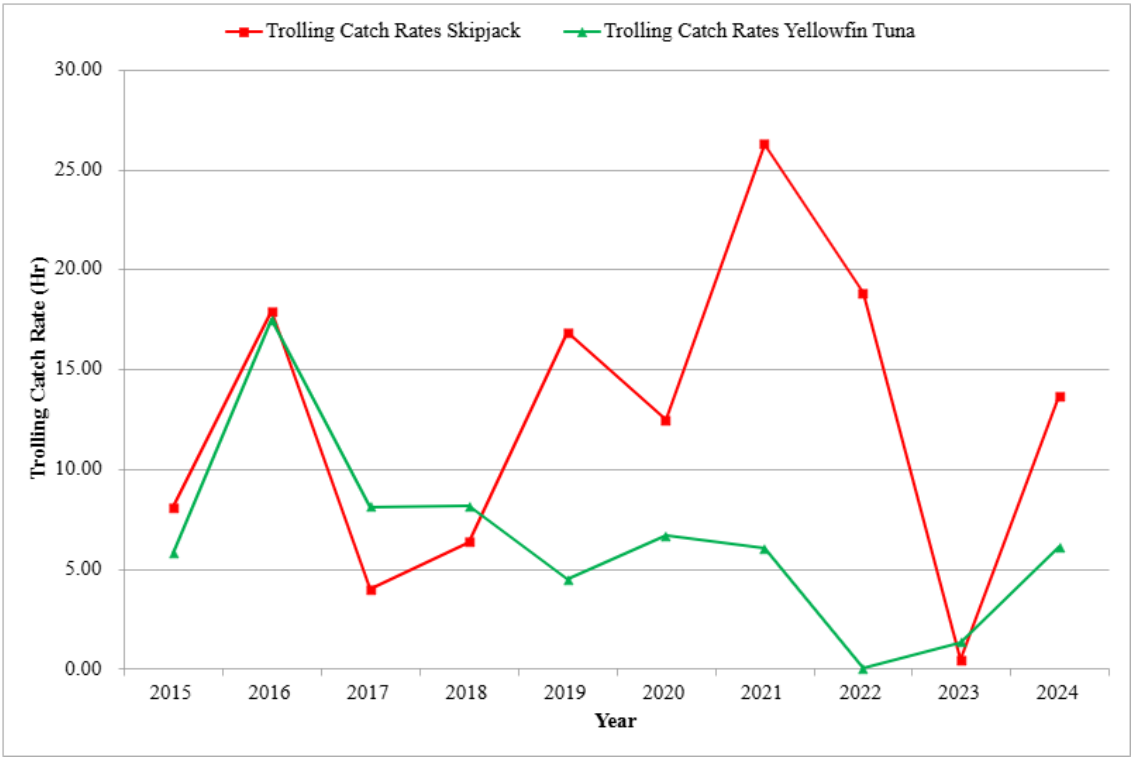



Figure 20. Trolling CPUE for skipjack and yellowfin tuna in American Samoa
Supporting data shown in Table A-19.

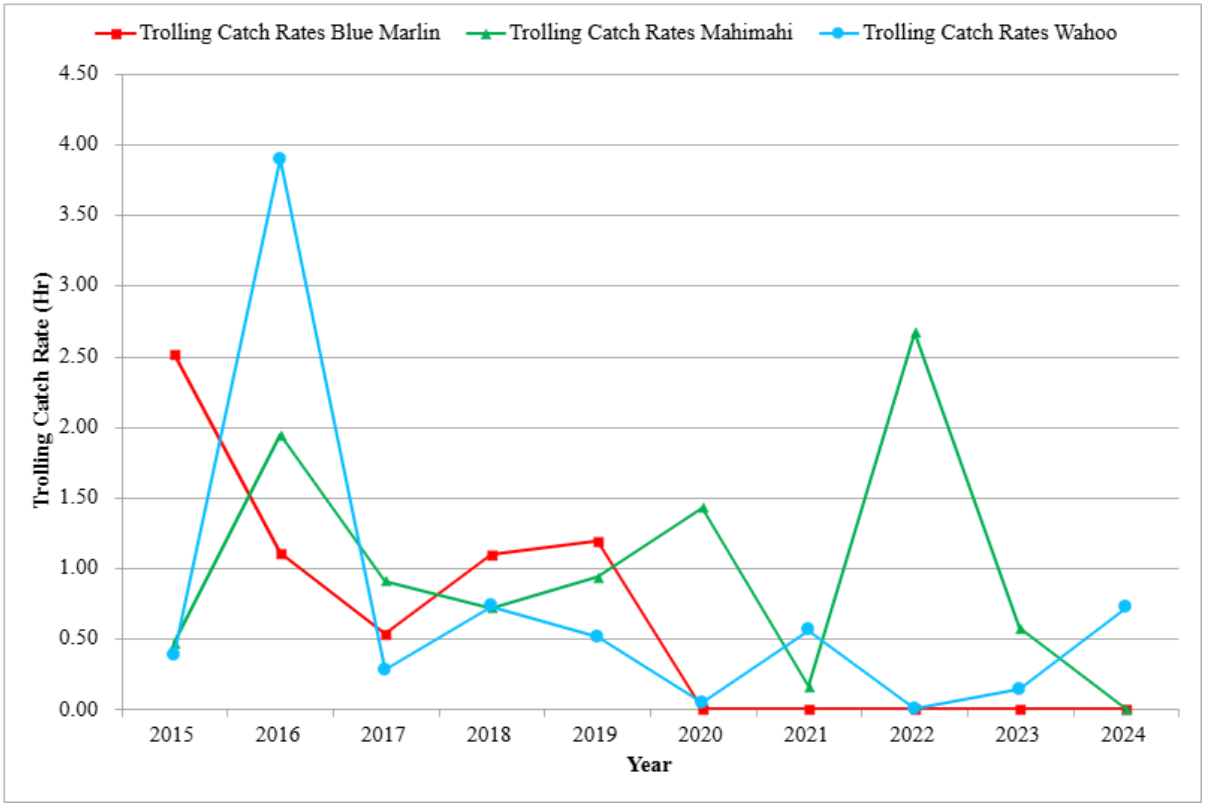



Figure 21. Trolling CPUE for blue marlin, mahimahi, and wahoo in American Samoa
Supporting data shown in Table A-20.

## 2.2 COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS

### 2.2.1 DATA SOURCES

The CNMI Division of Fish and Wildlife (DFW) monitors this fishery using commercial purchase invoices and boat-based creel surveys. DFW issues paper invoices to all known fish and shellfish buyers, who submit them biweekly or upon request. Nearly all buyers prefer paper reporting, and transitioning to electronic systems would require substantial training due to limited user familiarity.

Currently, commercial invoice and creel data collection occur only in Saipan, though fishing activity around other islands is captured in survey data. While invoices have been collected since the mid-1970s, only data from 1983 onward are considered reliable. Purchase data are estimated to account for 80–90% of commercial pelagic landings in Saipan. In 2024, DFW requested updated business listings from the CNMI Department of Finance to identify unreported buyers using NAICS codes, but no updates had been received at the time of writing.

The boat-based creel survey has operated since April 2000. Although surveys are not conducted on other islands, trips returning to Saipan from those areas are included, with associated fishing locations identified. The survey collects trip-level, interview, catch, size, and economic data.

In 2024, there were 18 survey days, with 18 trips observed and 15 interviews completed. Estimated catch declined from 126,557 pounds in 2023 to 84,333 pounds in 2024 (–33%). Tuna PMUS comprised 41,996 pounds (50%), and non-tuna PMUS 39,950 pounds (50%). A 365-day annual expansion is run for each calendar year of DFW boat-based creel survey data to produce catch and effort estimates for the pelagic fishery, while avoiding over-estimating landings due to seasonal increases in catches of pelagic species.

Percent species composition is calculated by weight for the sampled catch (raw interview data) for each method and applied to the pounds landed to produce catch estimates by species for the expansion period. CPUE data are calculated from the total annual landings of each fishery divided by the total number of hours spent fishing (gear in use), or by trip assuming that a trip is one day in length. Bycatch data are not expanded to the level of estimated annual trips and are reported as a direct summary of raw interview data. Some tables include landings of non-PMUS that may not be included in other tables in this report. This artifact of the reporting method results in a slight difference in the total landings and other values within a single table and between tables in this section.

### 2.2.2 SUMMARY OF CNMI PELAGIC FISHERIES

Estimated landings declined from 126,557 pounds in 2023 to 84,333 pounds in 2024 (–33%). Tuna PMUS accounted for 41,996 pounds (50%) and non-tuna PMUS for 39,950 pounds (50%). Commercial landings of Skipjack and Yellowfin tuna fell to 65,076 pounds (–33%) and 12,394 pounds (–35%), respectively. Non-tuna PMUS landings declined to 8,585 pounds (–54%).

The overall decline is largely attributed to reduced sampling effort, with only 18 surveys conducted from June to October 2024 (–57%). This reduction was due to administrative and

logistical delays in processing fuel payments and securing vehicle maintenance and repairs. The economic downturn in the CNMI also contributed to decreased fishing activity, though to a lesser extent.

**Landings.** Skipjack tuna had the highest estimated landings at 39,853 pounds (–48%), followed by blue marlin at 39,075 pounds (increase from zero). Estimated landings for yellowfin tuna were 2,143 pounds (–89%) and for wahoo, 875 pounds (–94%).

Commercial landings for skipjack and yellowfin tunas were 65,076 pounds (–33%) and 12,394 pounds (–35%), respectively. Landings for mahimahi were 7,566 pounds (–46%), wahoo 573 pounds (–85%), and blue marlin 446 pounds (–42%).

**Effort.** In 2024, estimated trolling trips declined to 1,668 (–30%). Reported trips and the number of fishers decreased to 873 (–40%) and 34 (–61%), respectively.

**Boat Ramps.** The CNMI has eight boat ramps: five in Saipan, two in Rota, and one in Tinian. Saipan's facilities include Sugar Dock, Fishing Base, Smiling Cove Marina, Lower Base, and the Tanapag ramp. Smiling Cove Marina provides berth parking for tenants and floating docks for passenger and cargo loading. It serves privately-owned fishing vessels, charter fishing vessels, and non-fishing vessels. The other access points in Saipan are used by both fishing and non-fishing vessels but do not offer tenant berthing.

Rota has two boat ramps: Rota West Harbor Marina, which includes berth parking for tenants, and East Harbor without tenant berthing. Tinian Marina Facility has a ramp and tenant berthing.

From 2022 through October 2024, Sugar Dock was inaccessible and replaced by Lower Base for access point surveys. Following dredging in late 2024, survey operations resumed at Sugar Dock.

**Weather.** Typical high surf and small-craft advisories were issued throughout the year when wind speed increased seasonally.

**Fish Aggregating Devices (FADs).** Two FADs, KK and LL, were deployed on March 28, 2024, by DFW.

**CPUE.** Estimated average pounds per hour for trolling increased to 12.3 (+19%).

**Revenue.** Revenue for pelagic fish was $267,191 while weighted price was $2.69/pound.

**Bycatch.** Bycatch was not measured in 2024.

### 2.2.3 PLAN TEAM RECOMMENDATIONS

There were no Plan Team recommendations to the Council relevant to the CNMI pelagic fisheries data module.

### 2.2.4 OVERVIEW OF PARTICIPATION AND EFFORT

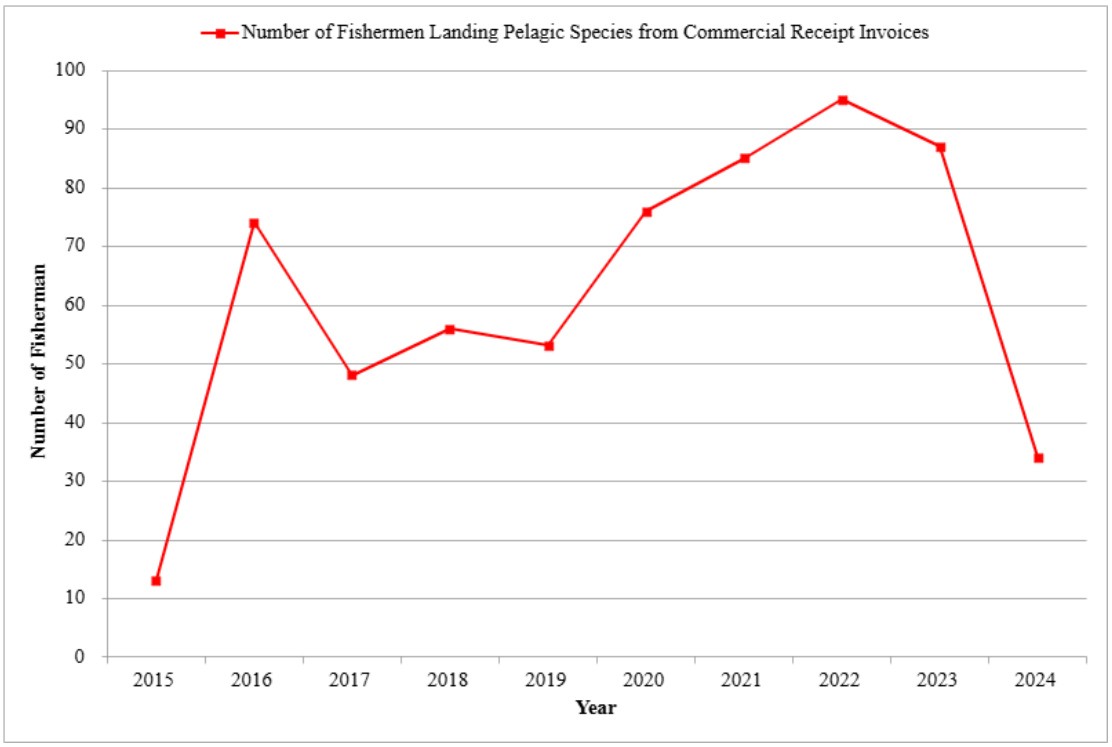



Figure 22. Number of fishers with commercial pelagic landings in the CNMI

Note: Due to reporting methods, this number includes duplicate counts. Supporting data shown in Table A-22.

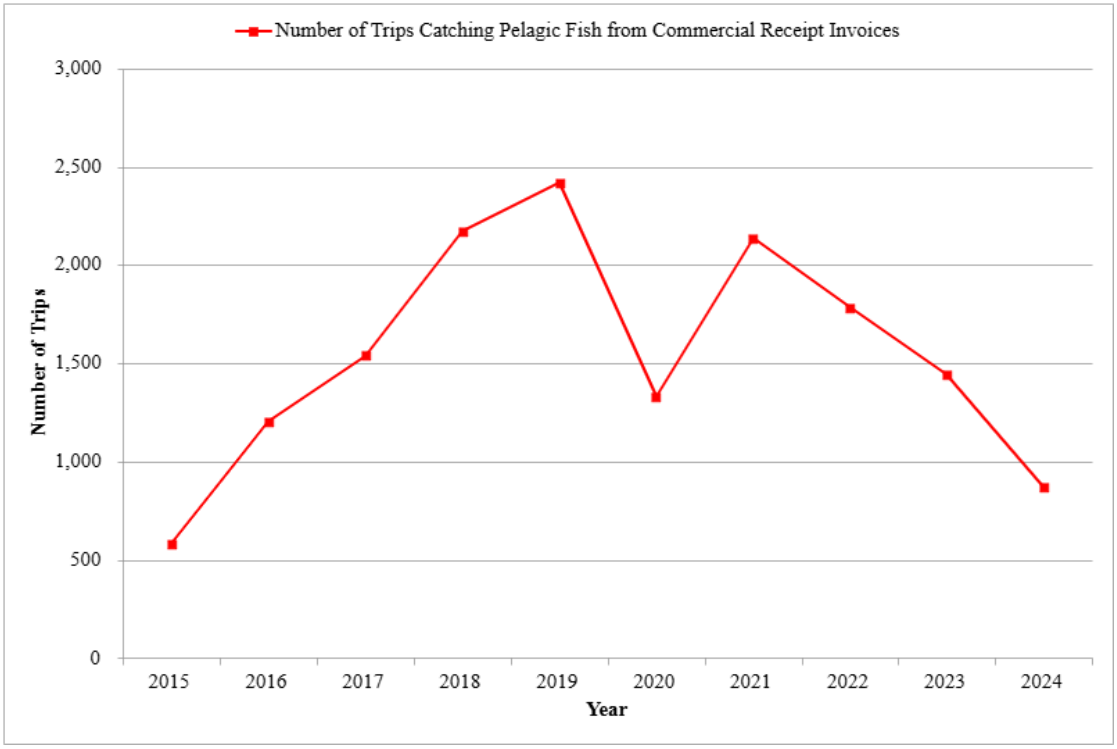



Figure 23. Number of trips with commercial pelagic landings in the CNMI

Supporting data shown in Table A-23.

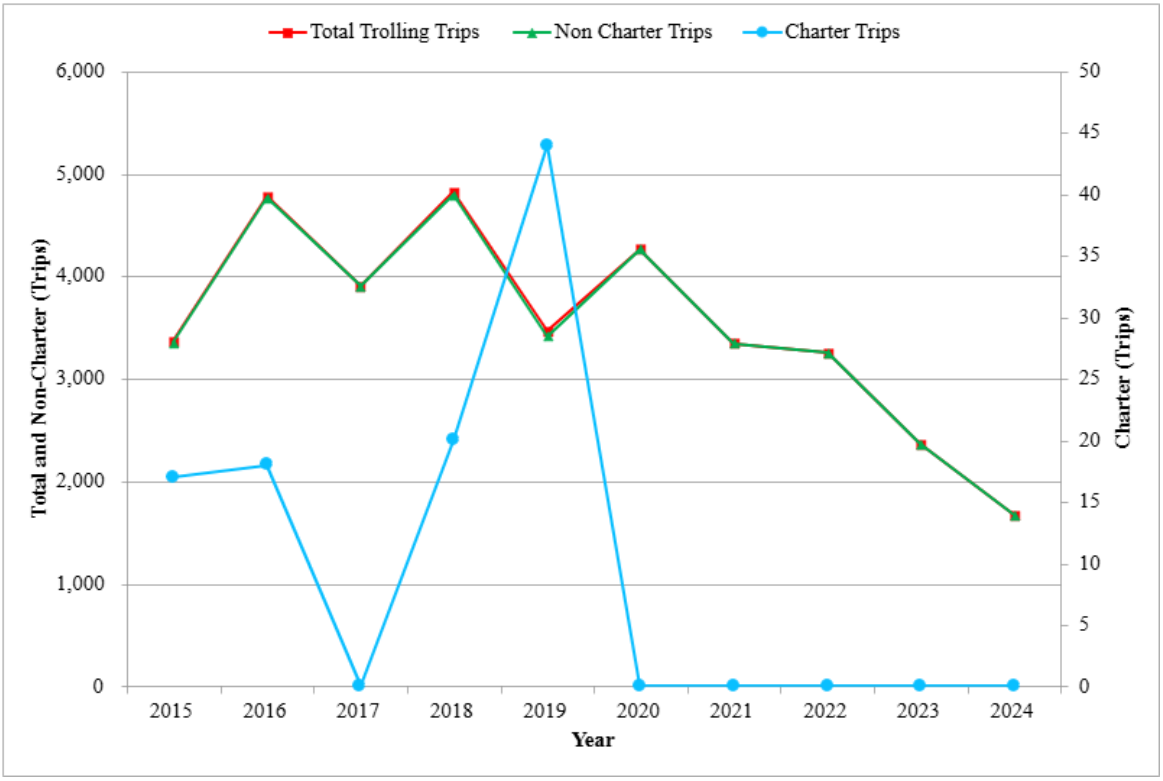



Figure 24. Estimated number of trolling trips from boat-based creel surveys in the CNMI
Supporting data shown in Table A-24.

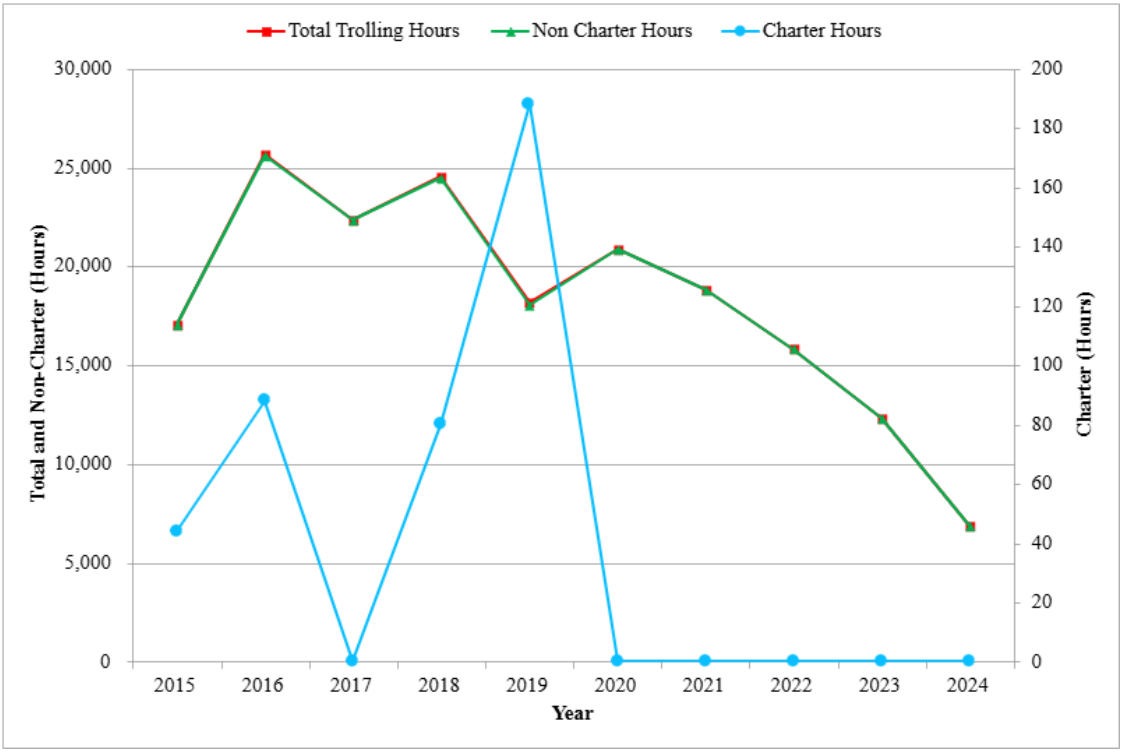



Figure 25. Estimated number of trolling hours from boat-based creel surveys in the CNMI
Supporting data shown in Table A-25.

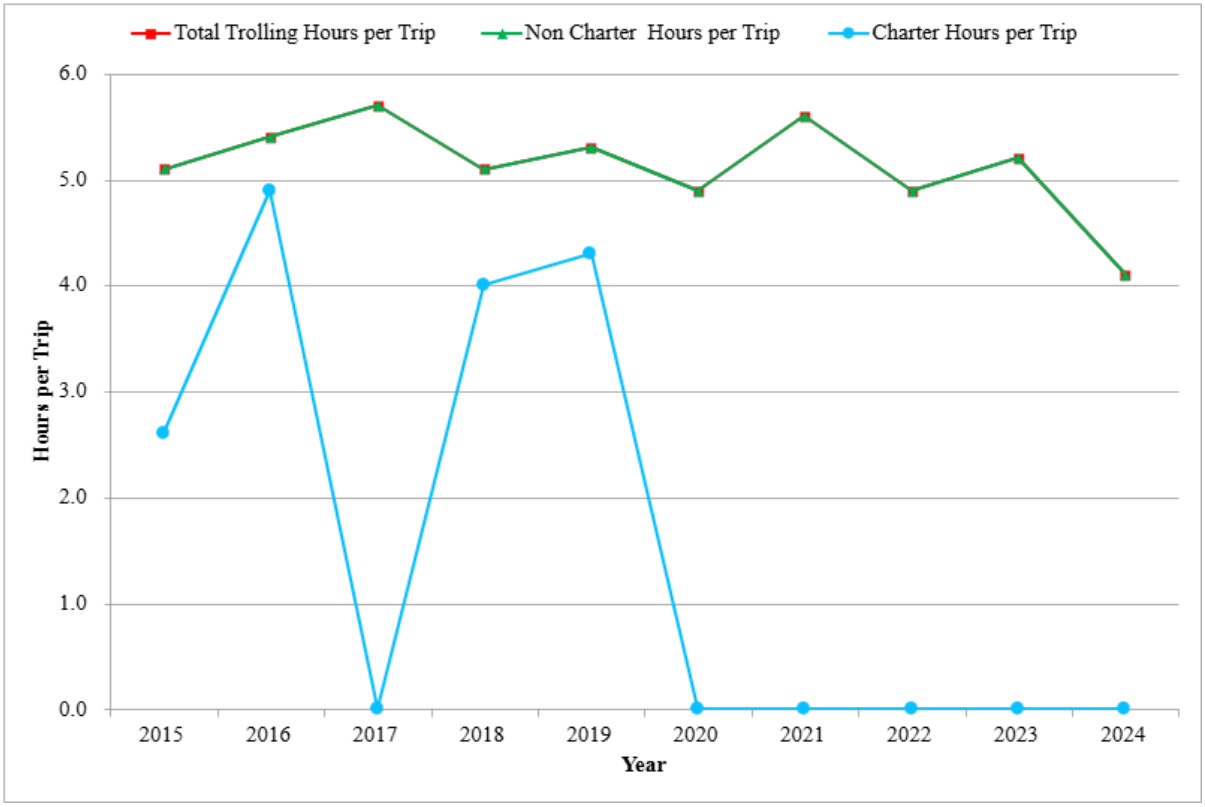



Figure 26. Estimated average troll trip length from boat-based creel surveys in the CNMI
Supporting data shown in Table A-26.

### 2.2.5 OVERVIEW OF LANDINGS

Table 15. Pelagic species composition of boat-based creel survey total estimated catch (lb) in the CNMI in 2024

| Species | Total Landings | Non-Charter | Charter |
|---|---|---|---|
| Skipjack Tuna | 39,853 | 39,853 | 0 |
| Yellowfin Tuna | 2,143 | 2,143 | 0 |
| Saba (Kawakawa) | 0 | 0 | 0 |
| Tunas (Misc.) | 0 | 0 | 0 |
| **Tunas Total** | **41,996** | **41,996** | **0** |
| Mahimahi | 0 | 0 | 0 |
| Wahoo | 875 | 875 | 0 |
| Blue Marlin | 39,075 | 39,075 | 0 |
| Sailfish | 0 | 0 | 0 |
| Spearfish | 0 | 0 | 0 |
| Sharks | 0 | 0 | 0 |
| Sickle Pomfret | 0 | 0 | 0 |
| **Non-Tuna PMUS Total** | **39,950** | **39,950** | **0** |

| Species | Total Landings | Non-Charter | Charter |
|---|---|---|---|
| Dogtooth Tuna | 1,634 | 1,634 | 0 |
| Rainbow Runner | 753 | 753 | 0 |
| Barracuda | 0 | 0 | 0 |
| Troll Fish (Misc.) | 0 | 0 | 0 |
| **Other Pelagics Total** | **2,387** | **2,387** | **0** |
| **Total Pelagics** | **84,333** | **84,333** | **0** |

Note: Total pelagic landings may be greater than the sum of the individual species due to an artifact in reporting process, where the difference accounts for non-PMUS reported as part of the creel surveys.

Table 16. Commercial pelagic landings (lb), value ($), and average price ($) in the CNMI in 2024

| Species | Pounds | Value | Average Price |
|---|---|---|---|
| Skipjack Tuna | 65,075.7 | 172,308.3 | 2.65 |
| Yellowfin Tuna | 12,393.8 | 38,597.6 | 3.11 |
| Saba (Kawakawa) | 497.5 | 1,492.5 | 3.00 |
| **Tunas Total and Average Price** | **77,967.0** | **212,398.4** | **2.72** |
| Mahimahi | 7,565.9 | 21,015.5 | 2.78 |
| Wahoo | 572.5 | 1,957.2 | 3.42 |
| Blue Marlin | 446.3 | 1,337.5 | 3.00 |
| Sickle Pomfret | 138.8 | 531.5 | 3.83 |
| **Non-Tuna PMUS Total and Average Price** | **8,723.5** | **24,841.6** | **2.85** |
| Dogtooth Tuna | 11,650.3 | 26,427.4 | 2.27 |
| Rainbow Runner | 878.8 | 2,941.9 | 3.35 |
| Barracuda | 195.0 | 581.3 | 2.98 |
| **Other Pelagics Total and Average Price** | **12,724.0** | **29,950.6** | **2.35** |
| **Pelagics Total and Average Price** | **99,414.6** | **267,190.6** | **2.69** |

Note: Total pelagic landings may be greater than the sum of the individual species due to an artifact in reporting process, where the difference accounts for non-PMUS reported as part of the creel survey.

Table 17. Bycatch summary for pelagic fisheries in the CNMI

| Year | Number Release | Percent Release | Number Kept | Number Caught | Charter |
|---|---|---|---|---|---|
| 2015 | 0 | 0.0 | 2,567 | 2,567 | F |
| 2016 | 0 | 0.0 | 1,667 | 1,667 | F |
| 2017 | 0 | 0.0 | 2,199 | 2,199 | F |
| 2018 | 0 | 0.0 | 1,761 | 1,761 | F |
| 2019 | 0 | 0.0 | 1,270 | 1,270 | F |
| 2020 | 2 | 0.1 | 1,929 | 1,931 | F |

| Year | Number Release | Percent Release | Number Kept | Number Caught | Charter |
|---|---|---|---|---|---|
| 2021 | 0 | 0.0 | 2,655 | 2,655 | F |
| 2022 | 0 | 0.0 | 1,021 | 1,021 | F |
| 2023 | 0 | 0.0 | 797 | 797 | F |
| 2024 | 0 | 0.0 | 83 | 83 | F |

* Both individuals released were mahimahi.
Note: Bycatch information is calculated from raw interview creel survey data and represents the percent of fish caught or percent of interviews with bycatch.

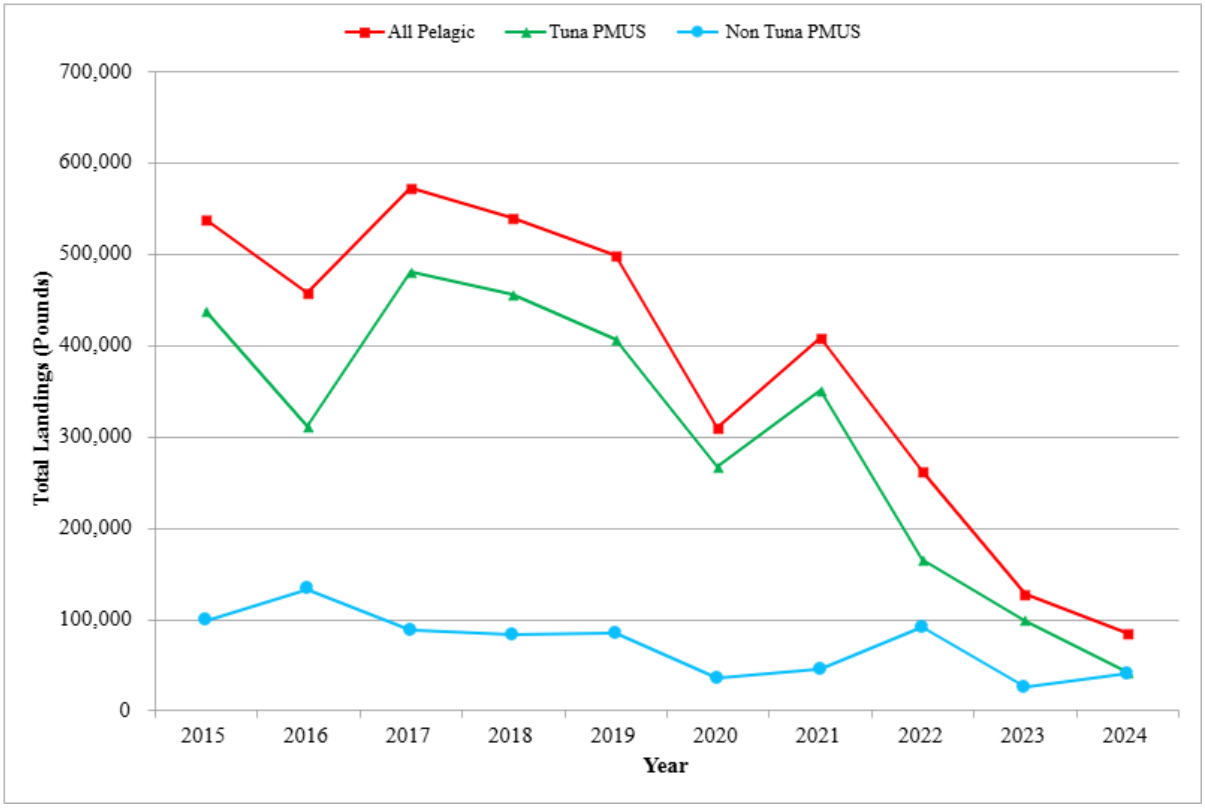



Figure 27. Total estimated catch for all pelagics, tuna PMUS, and non-tuna PMUS from boat-based creel surveys in the CNMI

Supporting data shown in Table A-27.

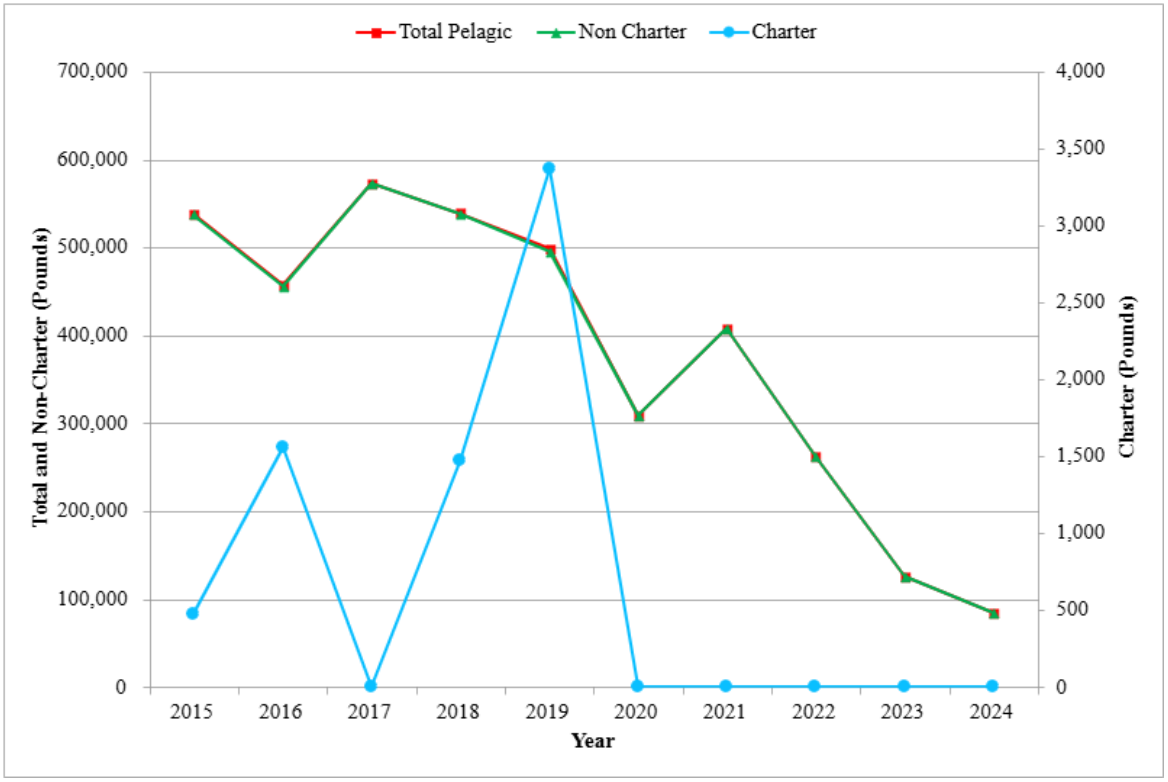



Figure 28. Total estimated catch for all pelagics in the CNMI

Supporting data shown in Table A-28.

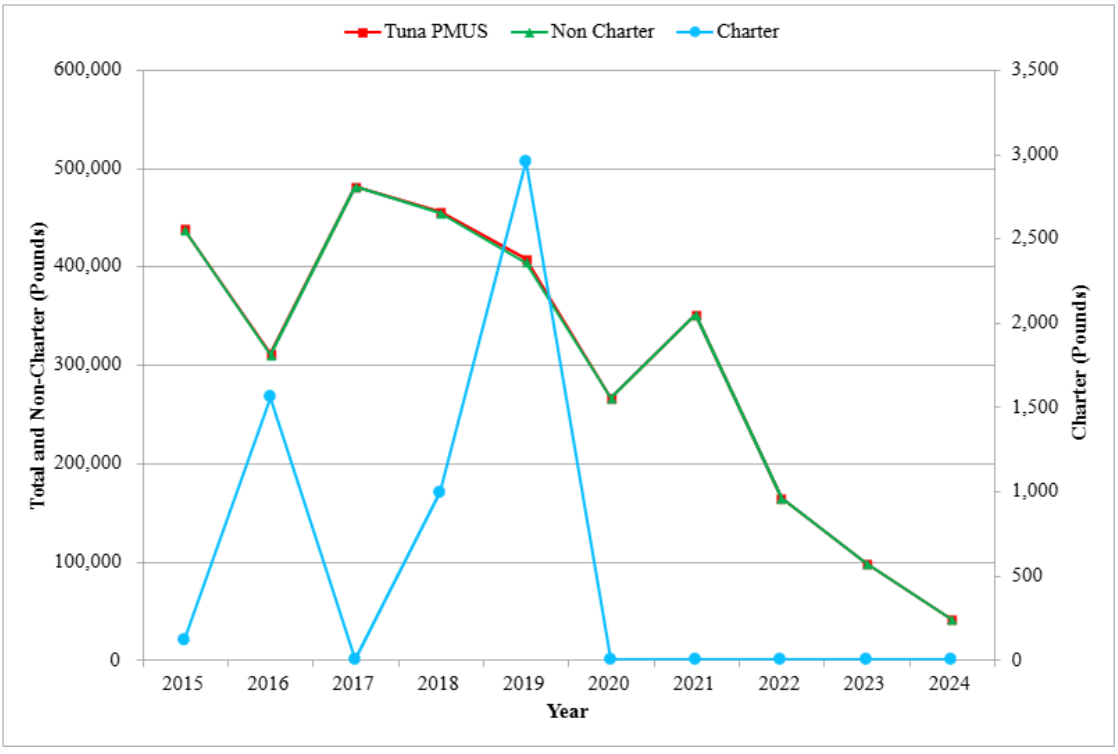



Figure 29. Total estimated catch for tuna PMUS in the CNMI

Supporting data shown in Table A-29.

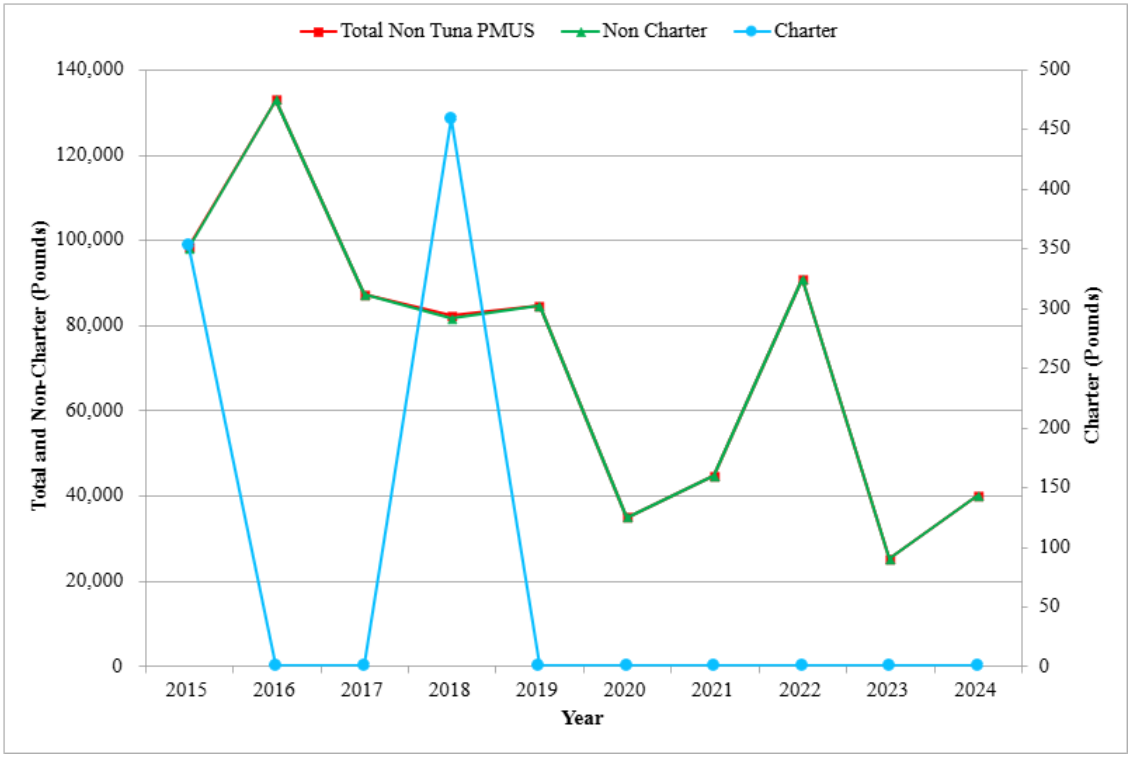



Figure 30. Total estimated catch for non-tuna PMUS in the CNMI

Supporting data shown in Table A-30.

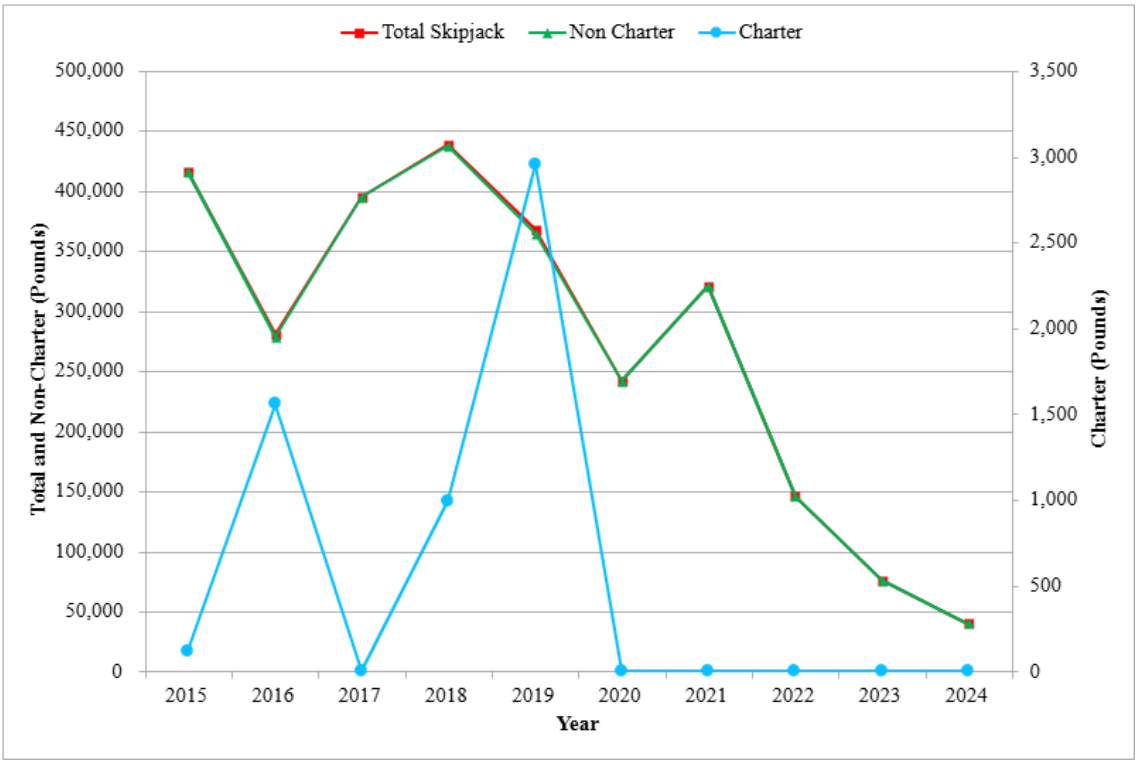



Figure 31. Total estimated catch for skipjack tuna in the CNMI

Supporting data shown in Table A-31.

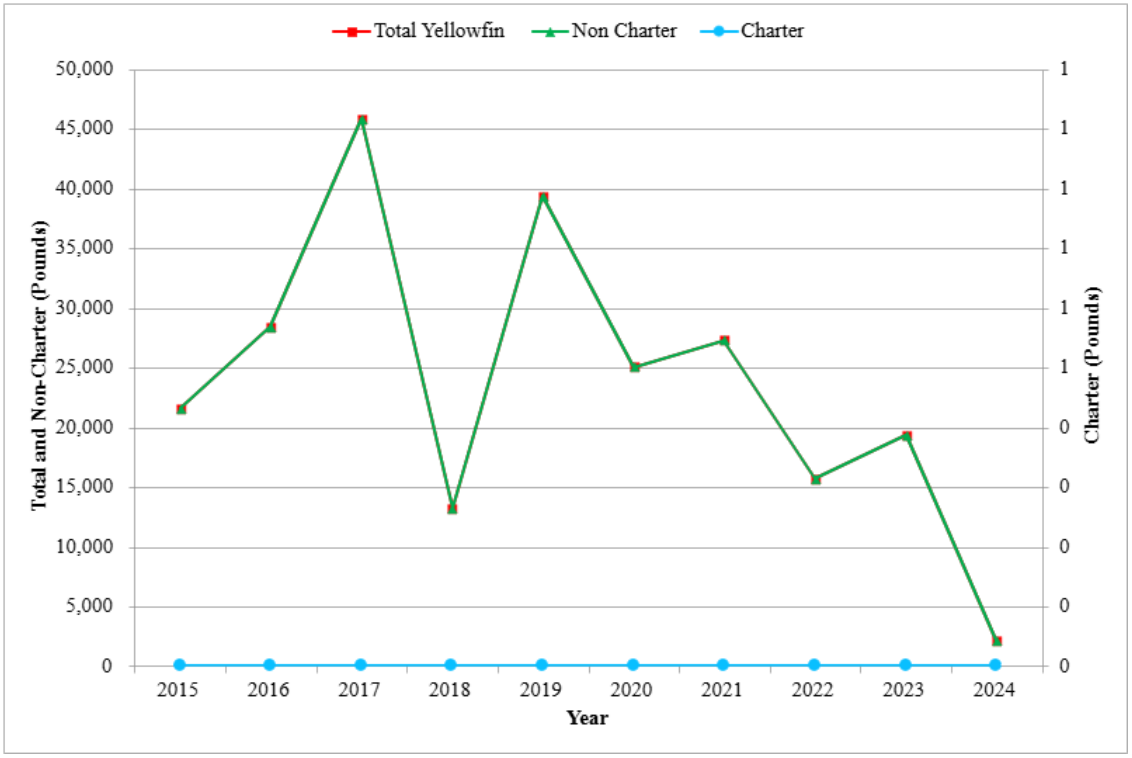



Figure 32. Total estimated catch for yellowfin tuna in the CNMI

Supporting data shown in Table A-32.

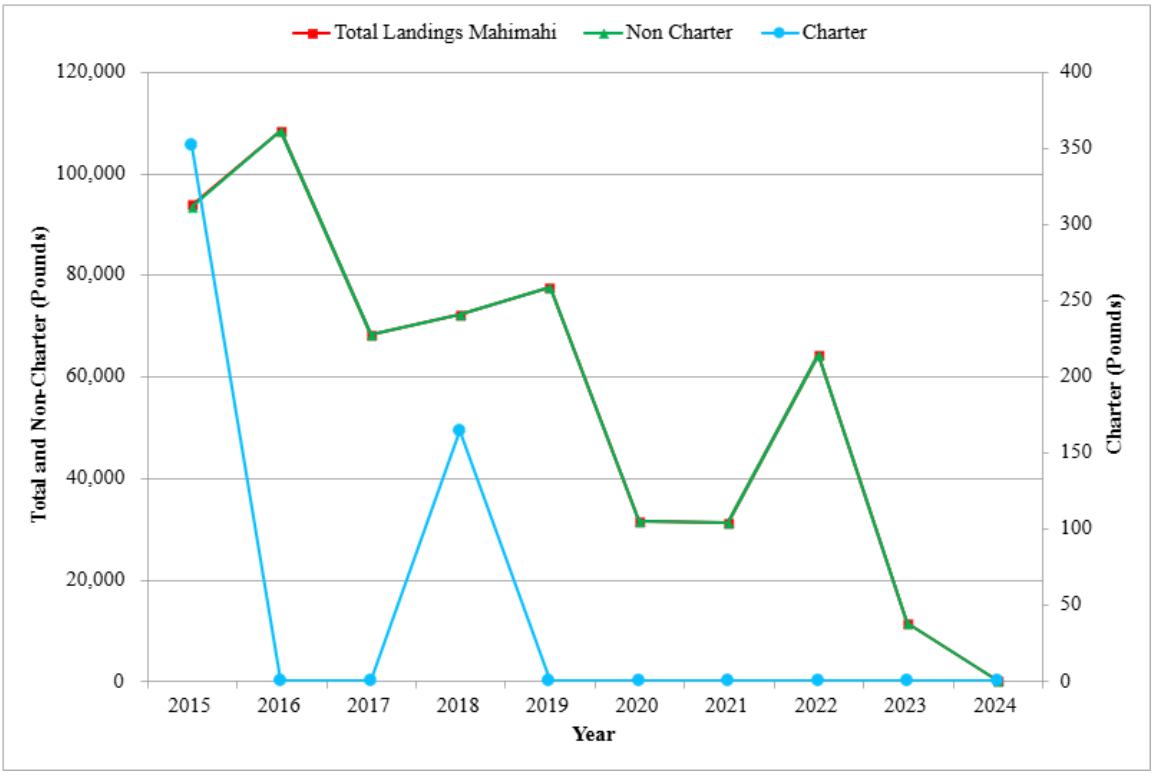



Figure 33. Total estimated catch for mahimahi in the CNMI

Supporting data shown in Table A-33.

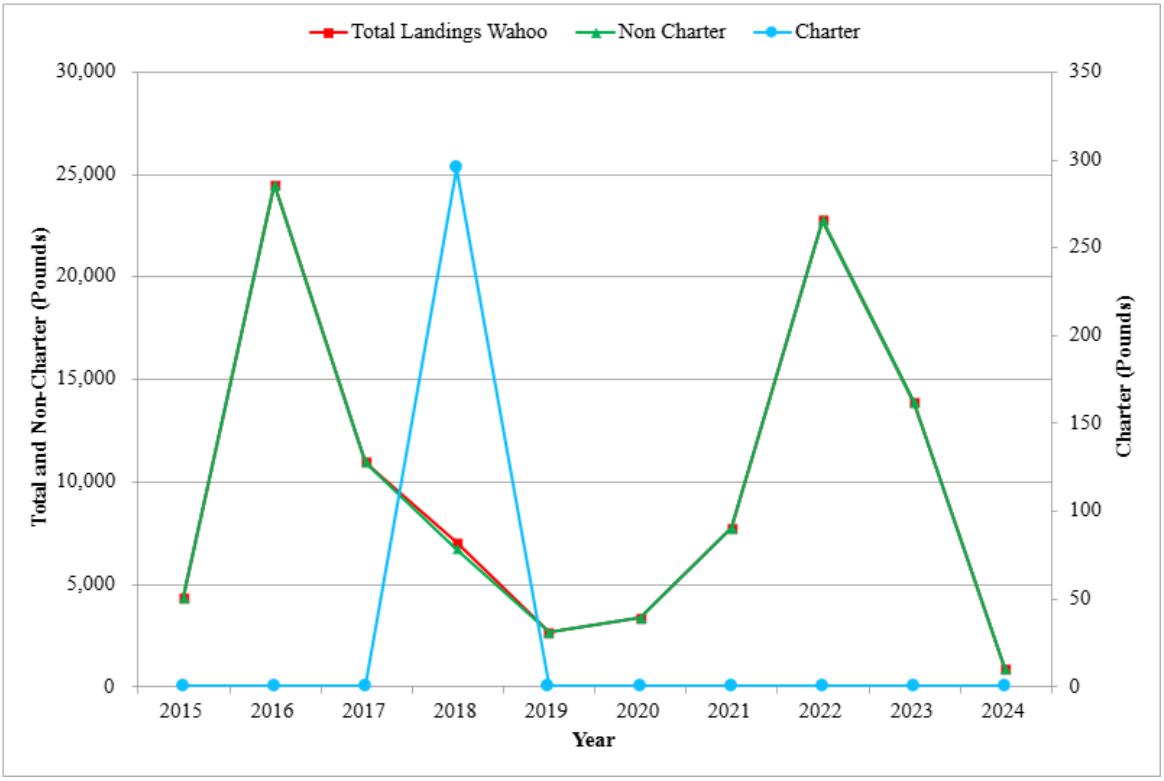



Figure 34. Total estimated catch for wahoo in the CNMI

Supporting data shown in Table A-34.

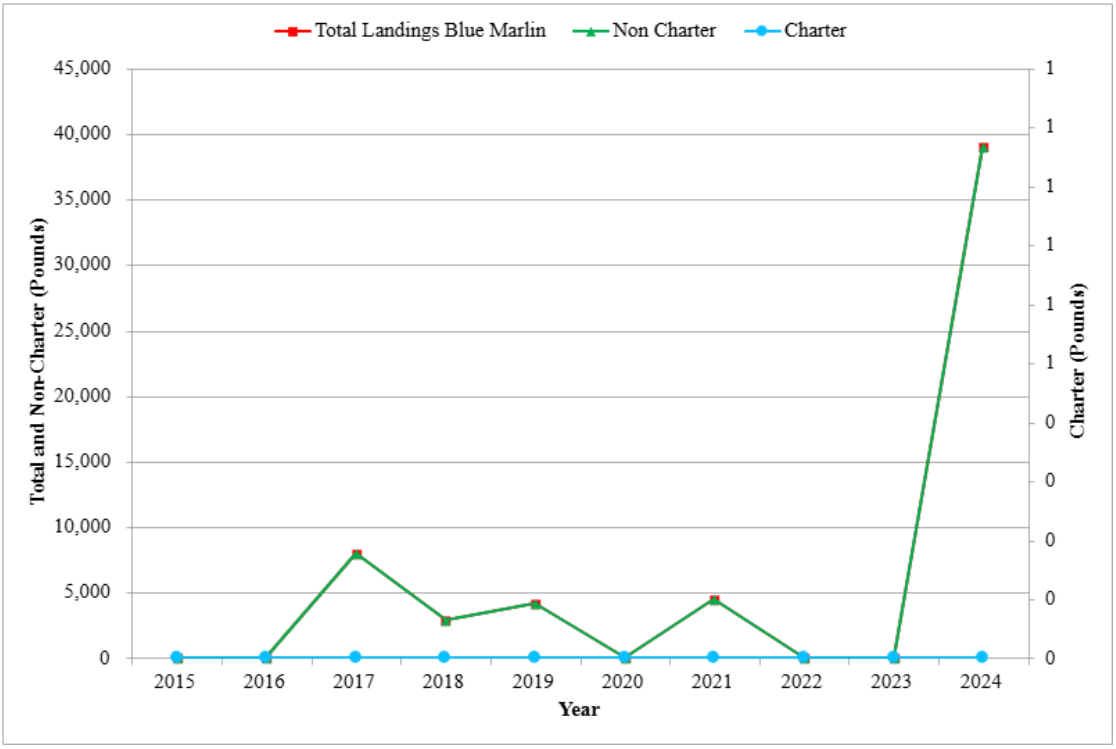



Figure 35. Total estimated catch for blue marlin in the CNMI

Supporting data shown in Table A-35.

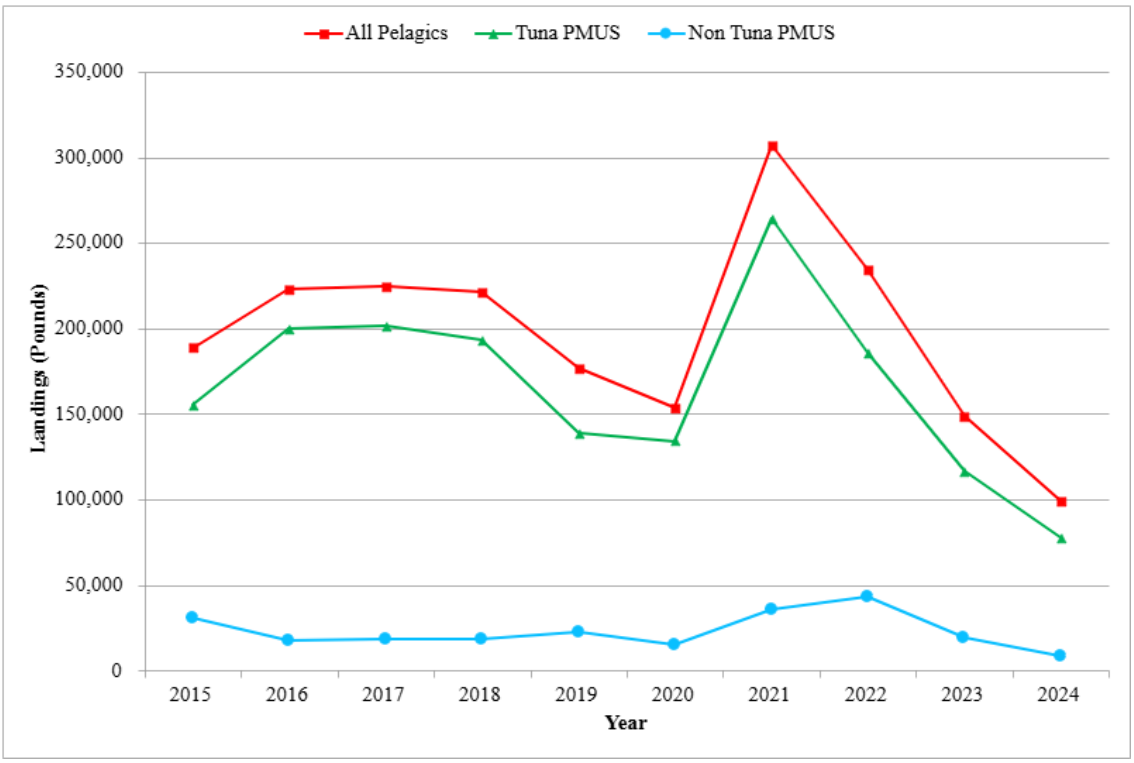



Figure 36. Commercial purchase landings for all pelagics, tuna PMUS, and non-tuna PMUS in the CNMI

Supporting data shown in Table A-36.

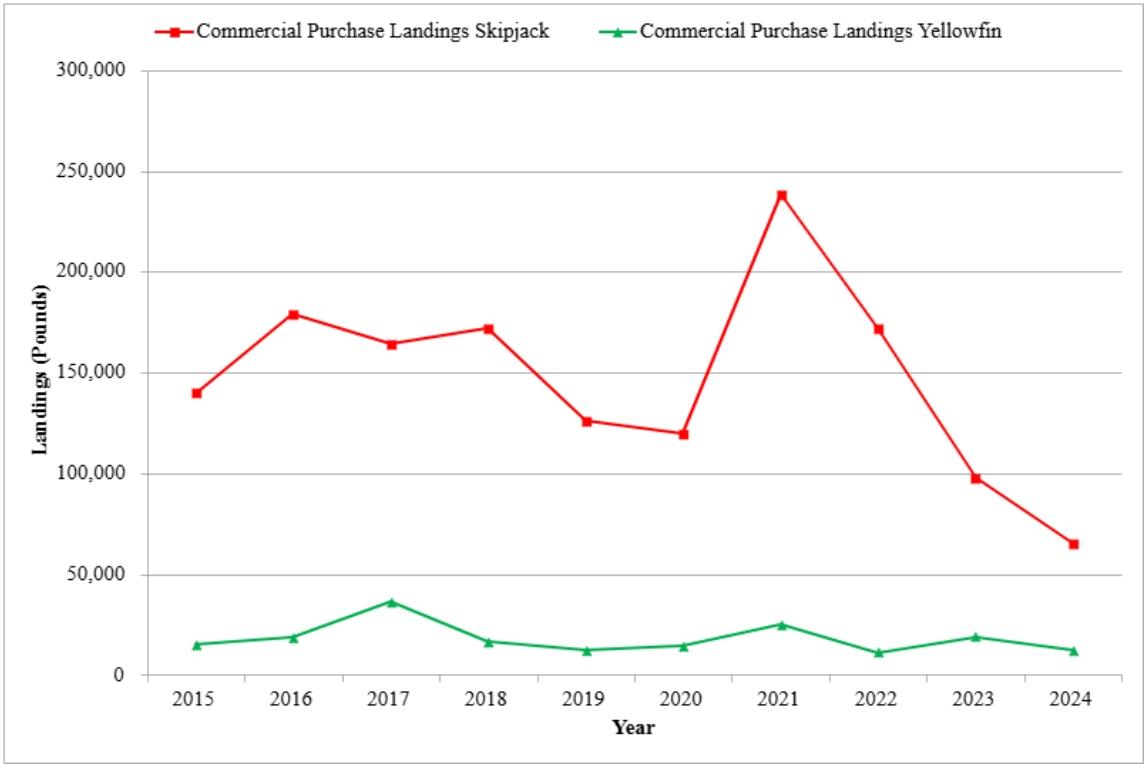



Figure 37. Commercial purchase landings for skipjack and yellowfin tunas in the CNMI

Supporting data shown in Table A-37.

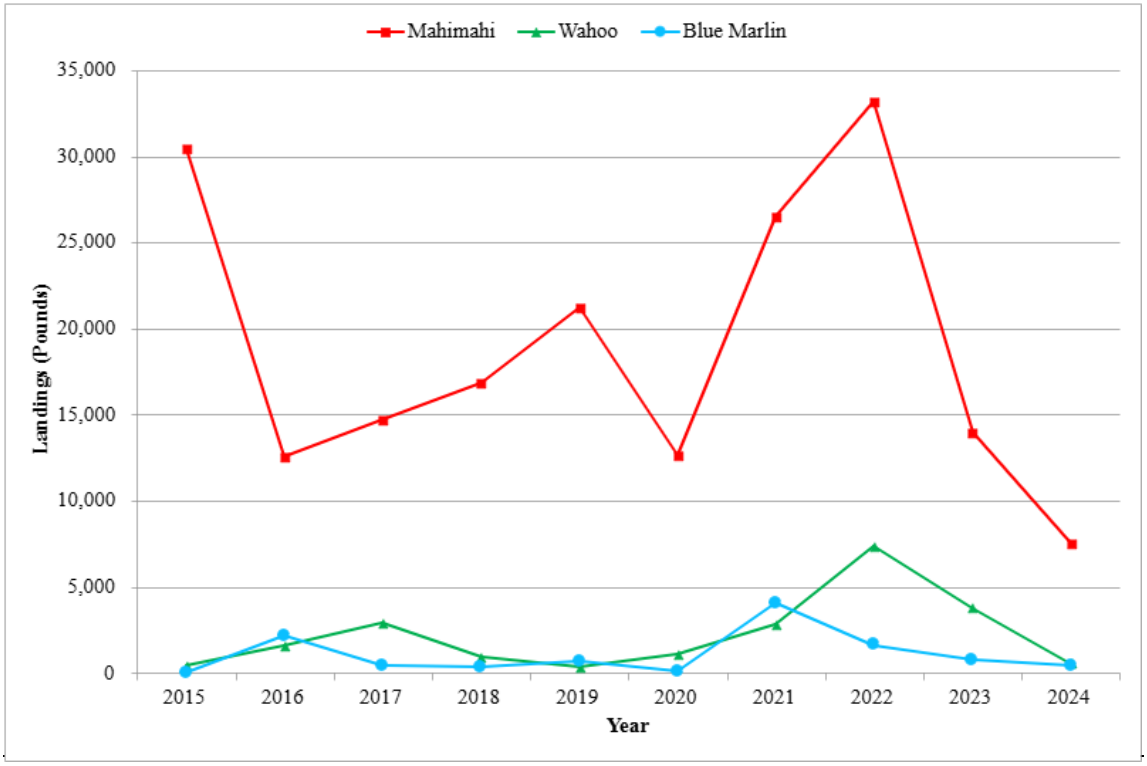



Figure 38. Commercial purchase landings for mahimahi, wahoo, and blue marlin in the CNMI

Supporting data shown in Table A-38.

### 2.2.6 OVERVIEW OF CATCH PER UNIT EFFORT - ALL FISHERIES

This section provides catch rates for the five main species landed by trolling. “Pounds per hour trolled” is determined from creel survey interviews and includes charter and non-charter sectors, while “pounds per trip” is determined from commercial invoice receipts.

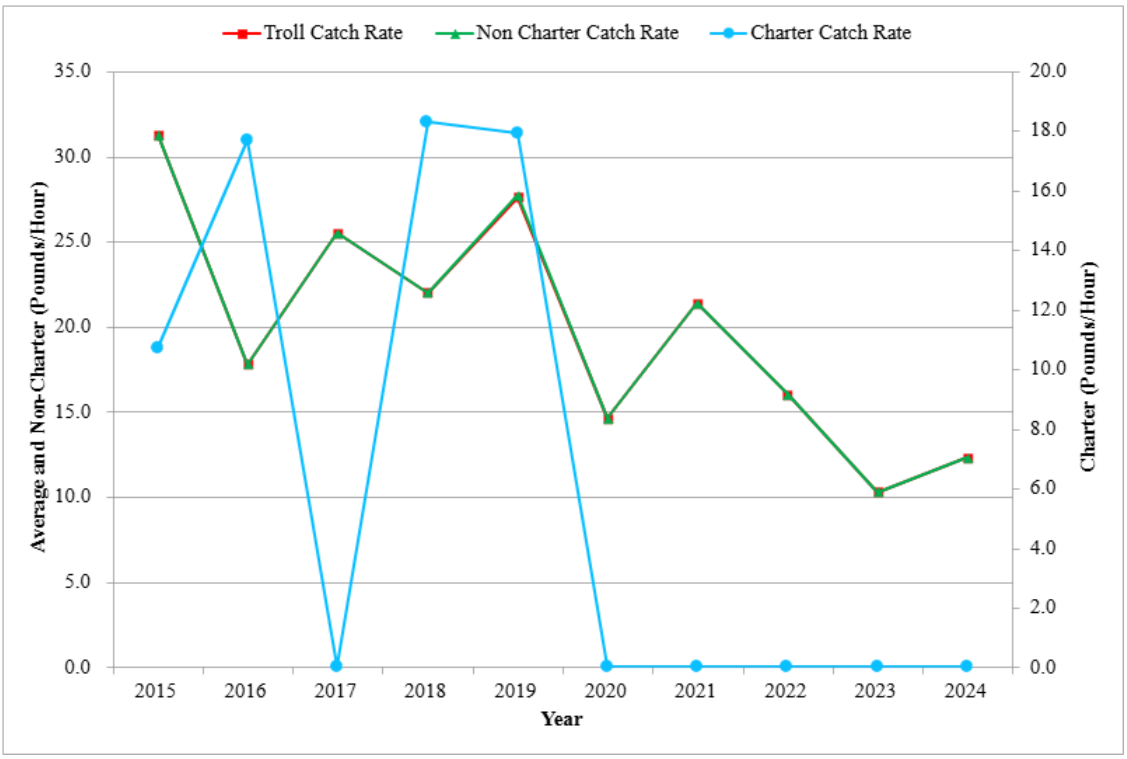



Figure 39. Estimated total trolling catch rates (lb/hr) in the CNMI

Supporting data shown in Table A-39.

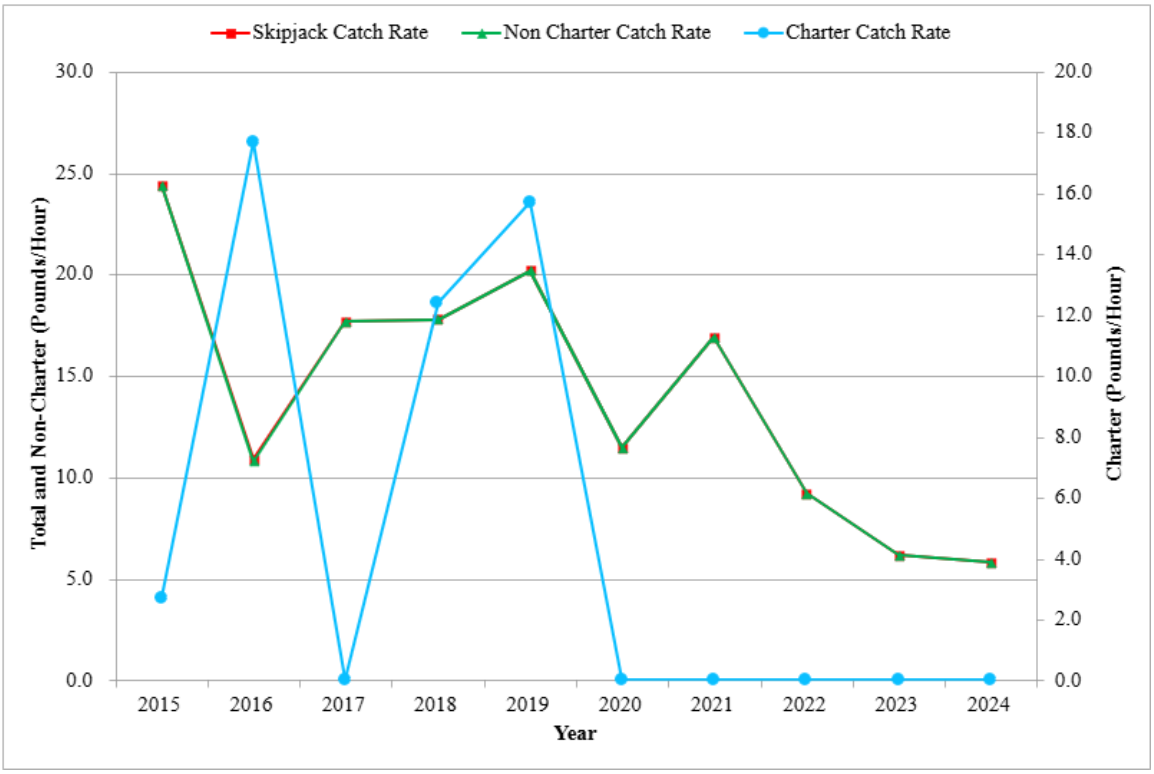



Figure 40. Estimated trolling catch rates (lb/hr) for skipjack tuna in the CNMI

Supporting data shown in Table A-40.

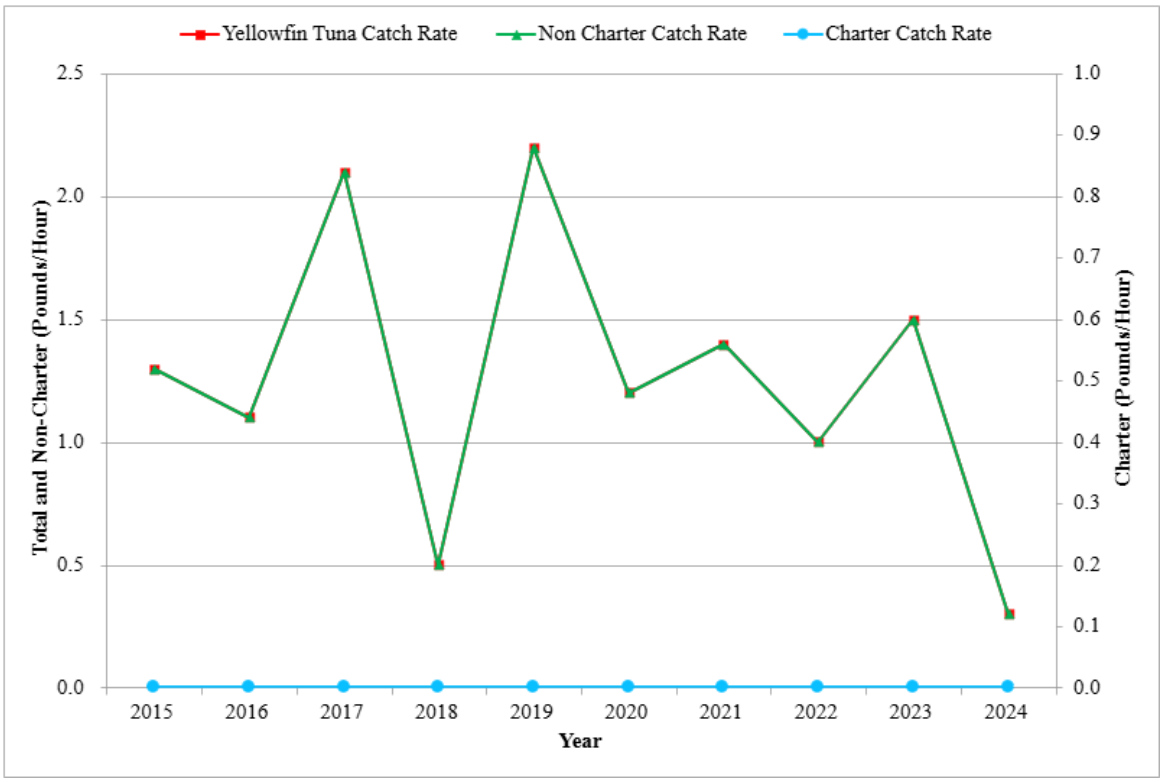



Figure 41. Estimated trolling catch rates (lb/hr) for yellowfin tuna in the CNMI

Supporting data shown in Table A-41.

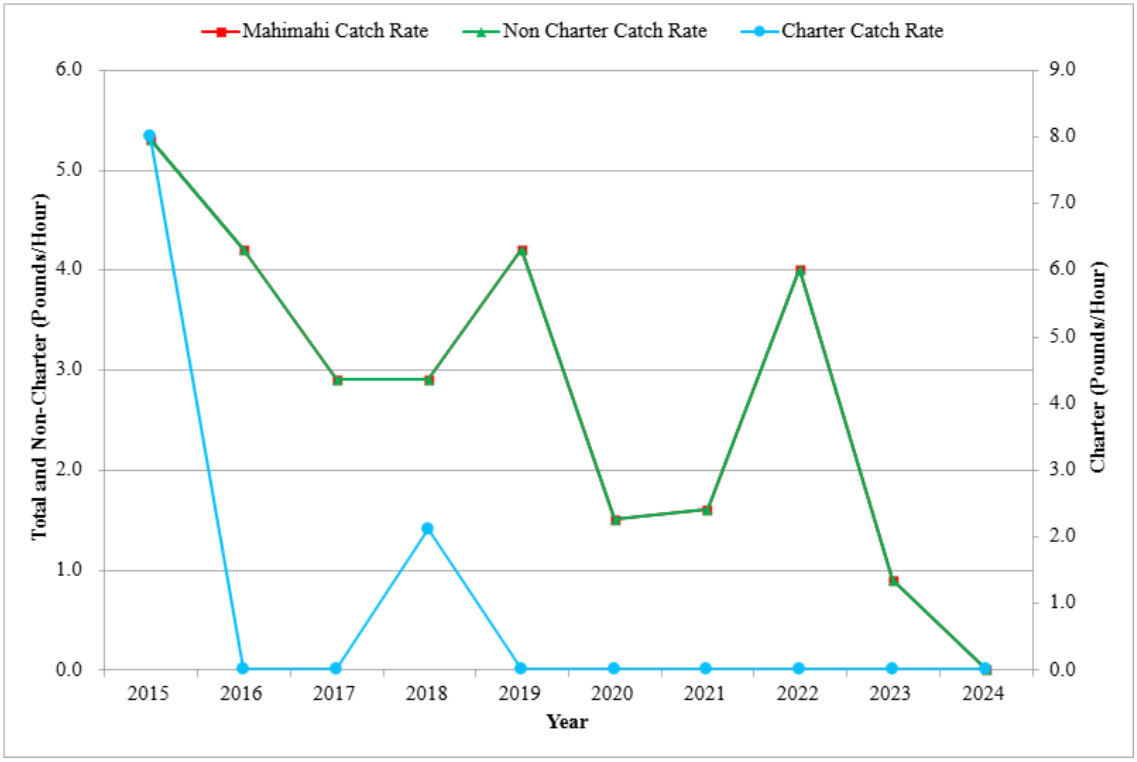



Figure 42. Estimated trolling catch rates (lb/hr) for mahimahi in the CNMI

Supporting data shown in Table A-42.

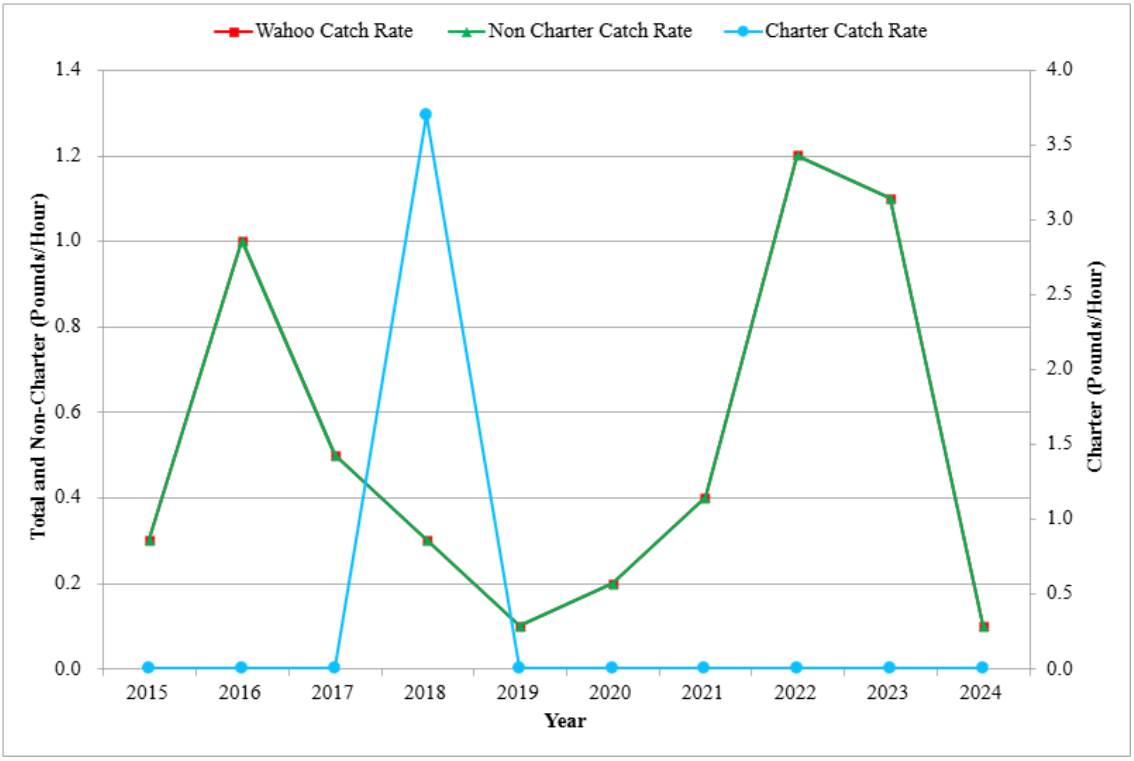



Figure 43. Estimated trolling catch rates (lb/hr) for wahoo in the CNMI

Supporting data shown in Table A-43.

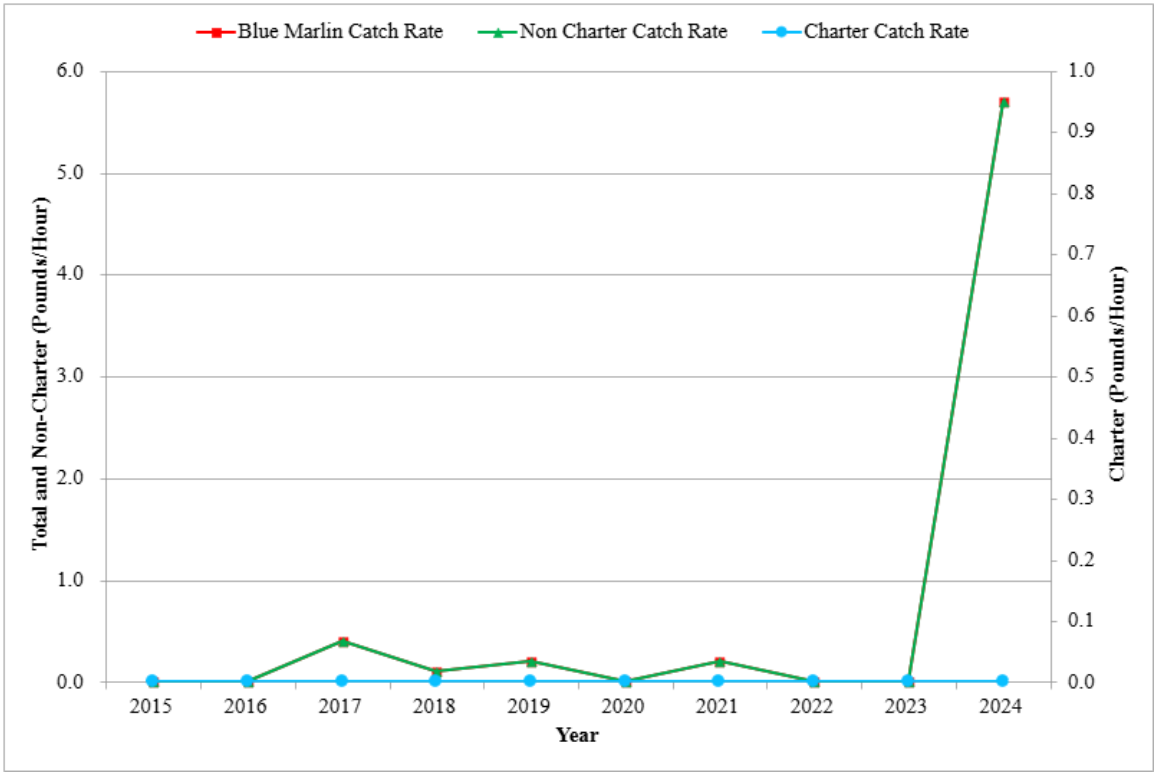



Figure 44. Estimated trolling catch rates (lb/hr) for blue marlin in the CNMI

Supporting data shown in Table A-44.

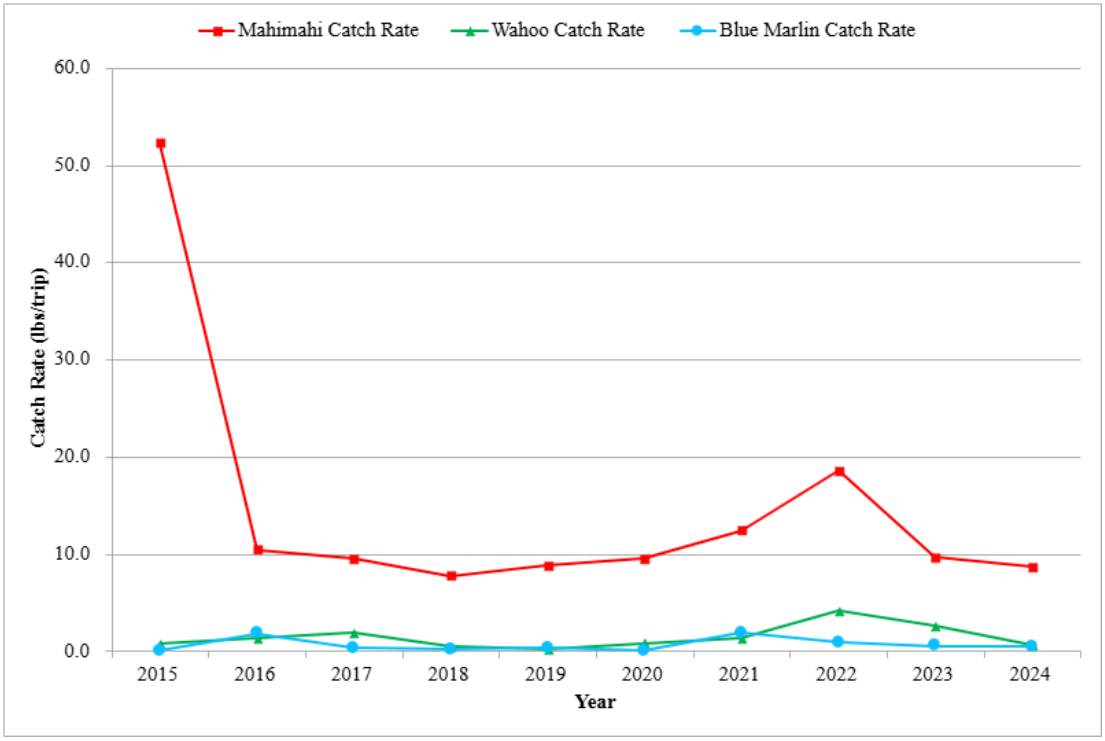



Figure 45. Estimated trolling catch rates (lb/trip) for mahimahi, wahoo, and blue marlin in the CNMI

Supporting data shown in Table A-45.

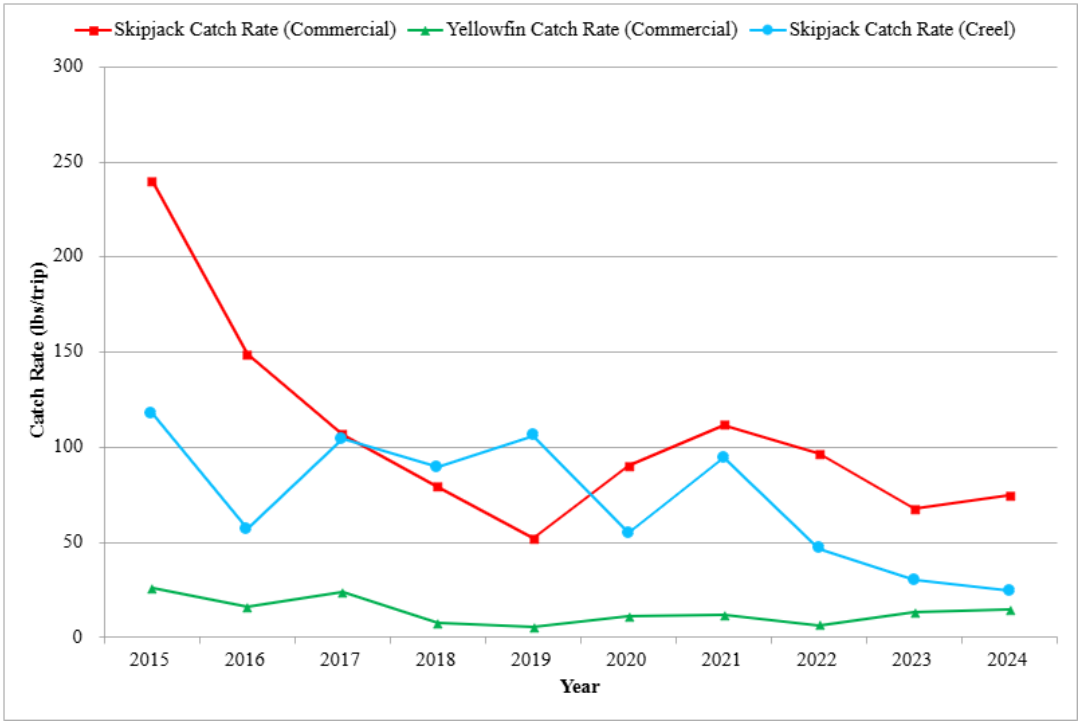



Figure 46. Estimated trolling catch rates (lb/trip) for skipjack and yellowfin in the CNMI

Supporting data shown in Table A-46.

## 2.3 GUAM

### 2.3.1 DATA SOURCES

This report contains the most recently available information on Guam's pelagic fisheries, as compiled from data generated by the Division of Aquatic and Wildlife Resources (DAWR) through a program established in conjunction with PIFSC and the WPFMC. Data are gathered through the offshore creel survey data program. In the past 10 years, DAWR staff have logged between 89 and 97 survey days annually (see Table A-47). The number of trips logged in boat logs has varied from 837 to 1,147 during that period, with the number of interviews slightly greater than half of that year's total trips. In 2024, DAWR completed 95 of 95 scheduled survey days, documented 1,287 trips and conducted 664 interviews. Participation, total landings, effort, CPUE, and bycatch are generated from the creel survey. Using the DAWR computerized data expansion system files (with the assistance of NMFS to avoid over-estimating seasonal pelagic species), a 365-day quarterly expansion of survey data is run for each calendar year to produce catch and effort estimates for the pelagic fishery. Commercial landings, revenue, and price per pound data are obtained from the PIFSC-sponsored commercial landings system through the commercial receipt book. Transshipment landings data are obtained from the Bureau of Statistics and Plans. All transshipment through Guam ceased as of December 31, 2020.

DAWR has added one biologist in the past 12 months, which should help address chronic manpower shortages of the past. The one biologist is still employed under DAWR. DAWR staff biologists continue to oversee several projects simultaneously, while providing on-going training to ensure the high quality of data being collected by all staff. All fisheries staff are trained to identify the most commonly caught fish to the species level. New staff are mentored by biologists and senior technicians in the field before conducting creel surveys on their own.

Total commercial landings are estimated by summing the weight fields in the commercial landings database from the principal fish wholesalers in Guam and then multiplying by an estimated percent coverage expansion factor. The annual expansion factor (described above) is subjectively created based on the available information in a given year including: an analysis of the "disposition of catch" data available from the DAWR offshore creel survey, an evaluation of the fishermen in the fishery and their entry/exit patterns, general "dock side" knowledge of the fishery and the status of the marketing conditions and structure, the overall number of records in the database, and a certain measure of best guesses.

### 2.3.2 SUMMARY OF GUAM PELAGIC FISHERIES

**Landings.** The estimated annual pelagic landings vary widely in the 43-year time series, ranging between 383,000 and 958,000 lb. The average total catch has shown a slowly increasing trend over the reporting period. The 2024 total expanded pelagic landings were 699,120 lb., a decrease of 2.67% when compared with the catch from 2023. Tuna PMUS landings in 2024 were 456,156 lb., a decrease of 22.62%, while non-tuna PMUS increased 105.3% to 237,040 lb. in 2024. Landings consisted primarily of five major species: mahimahi, wahoo, bonita or skipjack tuna, yellowfin tuna, and Pacific blue marlin, with skipjack comprising over 58.25% of total landings. Other minor species caught include rainbow runner, barracudas, and pomfrets. Sharks were also caught during 2024, with sharks noted in specific fishermen interviews conducted in 2024 regarding shark encounters (see

bycatch below). However, these species were not encountered during offshore creel surveys and were not available for expansion for this year's report. Sharks are often discarded as bycatch. In addition to the above pelagic species, approximately half a dozen other species was landed incidentally this year.

There are wide year-to-year fluctuations in the estimated landings of the five major pelagic species. Landings for three of the five common species decreased in 2024 from the previous year's levels. Skipjack decreased by 17.15%, and yellowfin decreased by 15.01%. Wahoo catch decreased 43.53%, mahimahi catch increased by 220.0%, and blue marlin increased by 183.6%.

**Effort.** The number of boats involved in Guam's pelagic fishery gradually increased from 193 in 1983 to a high of 546 in 2021. There were 447 boats involved in Guam's pelagic fishery in 2024, a decrease of 3.66% from 2023. The majority of the fishing boats are less than 10 m (33 ft) in length and are usually owner-operated by fishers who earn a living outside of fishing. Most fishers sell a portion of their catch, and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. A small but economically significant segment (~5%) of the pelagic fishery is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews. Data and figures for non-charter fishing, charter operations, and bycatch are represented in this report.

In early 2010, the U.S. military began exercises in an area south and southeast of Guam designated W-517. W-517 is a special use airspace (approximately 14,000 $nm^2$) that overlays deep open ocean approximately 50 miles south-southwest of Guam. Exercises in W-517 generally involve live fire and/or pyrotechnics. When W-517 is in use, a notice to mariners is issued, and vessels attempting to use the area are advised to be cautious of objects in the water and other small vessels. This discourages access to virtually all banks south of Guam, including Galvez, Santa Rosa, White Tuna, and other popular fishing areas. From 1995 to 2009, DAWR surveys recorded an annual average of 13.5 weekday trips to the south, and 31 weekend trips to the south, for a total of 44.5 trips per year. Since 2010, DAWR surveys have recorded an annual average of 6.7 weekday trips to the south, and 19.8 weekend trips to the south, for an average of 26.5 trips per year, a decrease of 40.5% per year. As the majority of NTMs for W-517 cover weekdays, the decrease in weekday trips is greater at 50.4%.

According to the NTM announcements for 2024, there were 55 days closed in W-517, 171 days closed in Orote Point Firing Range, and 33 days closed at Camp Blaz, due to military exercises.

Also in 2024, there were 66 small-craft advisory days, 96 high-surf advisory/warning days, and 5 typhoon warning days (i.e., seven in May and seven in October).

The small-boat bottomfish and trolling fisheries in Guam relies on boat ramp access and FADs. Recent activities to support the Guam fishery follow.

On Guam, the makeshift ramp at Ylig Bay was eliminated in 2010. Widening of the main road on the southeast coast of Guam will cause removal of the ramp. In December 2006, a new launch ramp and facility was opened in Acfayan Bay, located in the village on Inarajan on the southeast coast of Guam. Monitoring of this ramp for pelagic fishing activity began at the start of 2007. In early 2007, this facility was damaged by heavy surf and has yet to be repaired. Monitoring of this ramp is currently on hold until the ramp is repaired. The current

financial situation in Guam makes it unlikely this ramp will be repaired in the near future. DAWR staff are meeting with landowners and Department of Public Works officials to develop a new boat launching facility in Talo'fo'fo' Bay on the east side of Guam, and land ownership may determine final placement.

**CPUE.** Trolling catch rates (lb./per hour fished) for 2024 were 18.0 lb./hr., a decrease from 2023. Total CPUE decreased by 2.70% in 2024. Skipjack tuna showed a decrease in CPUE, while yellowfin tuna showed a decrease in CPUE from 2023 to 2024. Marlin showed an increase in CPUE from 2023 to 2024. Mahi showed an increase in CPUE and wahoo CPUE decreased from 2023 to 2024. The fluctuations in CPUE are possibly due to variability in the year-to-year abundance and availability of the stocks.

**Revenues.** Commercial data for Guam pelagic fisheries are non-disclosed due to confidentiality rules that prevent data derived from fewer than three sources to be reported. Because there were fewer than three vendors that reported sales of pelagic fish on Guam in 2024, the data are not able to be presented in this report.

A majority of troll fishers do not rely on the catch or selling of fish as their primary source of income. Previously, Guam law required the Government of Guam to provide locally caught fish to food services in government agencies, such as Department of Education and Department of Corrections. In 2002, the Government of Guam began implementing cost-saving measures, including privatization of food services. The requirement that locally-caught fish be used for food services, while still a part of private contracts, is not being enforced. This has allowed private contractors to import cheaper foreign fish and reduced the sales of vendors selling locally caught fish. This represented a substantial portion of sales of locally caught pelagic fish. The decrease in commercial sales seen following 2002 may be, in part, due to this change.

**Bycatch.** There is low bycatch in the charter fishery. In 2024, interview data indicated there was again a low bycatch rate; there were 1011 fish reported as bycatch in 6,692 tallied fish caught, for a 15.10% rate. Bycatch occasionally occurs in the troll fishery including sharks, shark-bitten and undersized fish.

In 2024, fishers were asked if they experienced a shark interaction. There was a total of 664 interviews for boat-based fishing in 2024, with 198 of these inappropriate for determining shark interaction. Of the remaining 466 interviews, 195 reported interactions with sharks and 271 reported no interactions with sharks for a 41.84% positive rate, a decrease from 2023, for interviews where fishers were asked about shark interactions.

### 2.3.3 PLAN TEAM RECOMMENDATIONS

While there were no Plan Team recommendations to the Council relevant to the Guam pelagic fisheries data module, the Pelagic Plan Team developed several associated work items, including:

- In the 2025 SAFE report and beyond, authors should consider separating out the troll handline fishery from the small boat troll sector of the fishery, due to a recent effort increase in that specific sector of the small boat fishery, and in order to more accurately represent the catch and effort between the two distinct sectors.

### 2.3.4 OVERVIEW OF PARTICIPATION

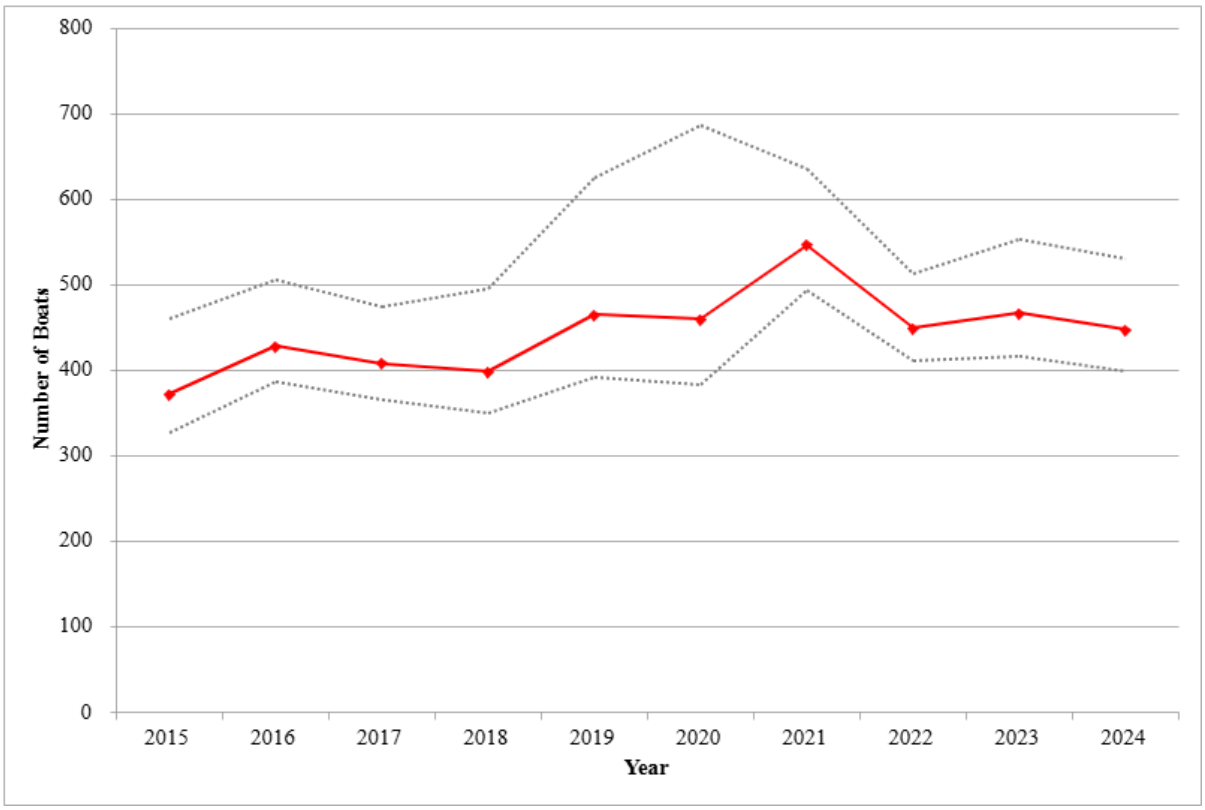



Figure 47. Total estimated number of vessels in Guam pelagic fisheries with upper and lower 95% confidence intervals (grey dashed lines)

Supporting data shown in Table A-48.

### 2.3.5 OVERVIEW OF TOTAL AND REPORTED COMMERCIAL LANDINGS

Table 18. Total estimated, non-charter, and charter landings (lb) for Guam in 2024

| Species | Total | Non-Charter | Charter |
|---|---|---|---|
| Skipjack Tuna | 407,346 | 404,785 | 2,560 |
| Yellowfin Tuna | 48,700 | 48,598 | 102 |
| Kawakawa | 110 | 110 | 0 |
| Albacore | 0 | 0 | 0 |
| Bigeye Tuna | 0 | 0 | 0 |
| Other Tuna PMUS | 0 | 0 | 0 |
| **TUNAS Total** | **456,156** | **453,493** | **2,662** |
| Mahimahi | 168,668 | 150,631 | 18,037 |
| Wahoo | 25,794 | 20,831 | 4,963 |
| Blue Marlin | 40,279 | 38,671 | 1,608 |
| Black Marlin | 1,383 | 1,383 | 0 |

| Species | Total | Non-Charter | Charter |
|---|---|---|---|
| Striped Marlin | 0 | 0 | 0 |
| Sailfish | 635 | 635 | 0 |
| Shortbill Spearfish | 0 | 0 | 0 |
| Swordfish | 0 | 0 | 0 |
| Oceanic Sharks | 0 | 0 | 0 |
| Pomfrets | 289 | 289 | 0 |
| Oilfish | 0 | 0 | 0 |
| **NON-TUNA PMUS Total** | **237,048** | **212,440** | **24,608** |
| Dogtooth Tuna | 3,943 | 3,939 | 4 |
| Rainbow Runner | 1,407 | 1,303 | 104 |
| Barracudas | 566 | 566 | 0 |
| Double-lined Mackerel | 0 | 0 | 0 |
| Misc. Troll Fish | 0 | 0 | 0 |
| **OTHER PELAGICS Total** | **5,916** | **5,808** | **108** |
| **TOTAL PELAGICS** | **699,120** | **671,741** | **27,378** |

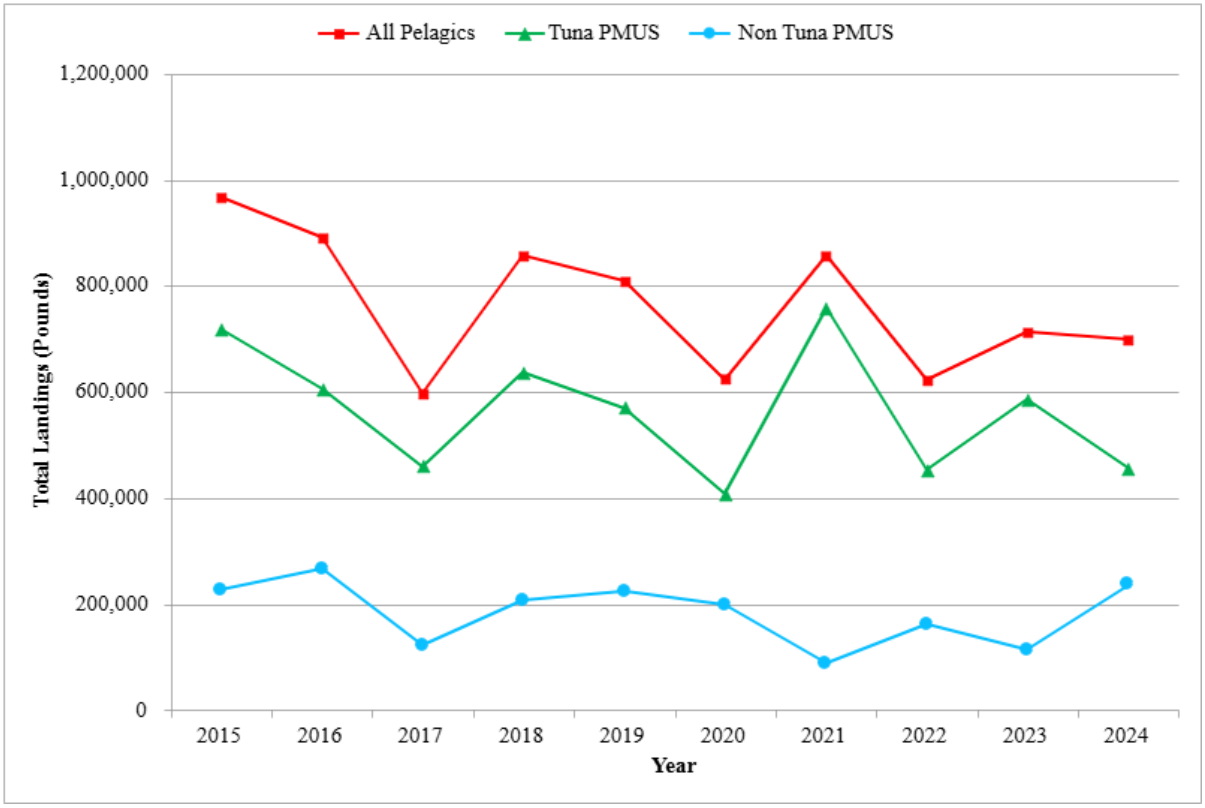



Figure 48. Total estimated landings for all pelagics, tuna PMUS, and non-tuna PMUS from boat-based creel surveys in Guam

Supporting data shown in Table A-49.

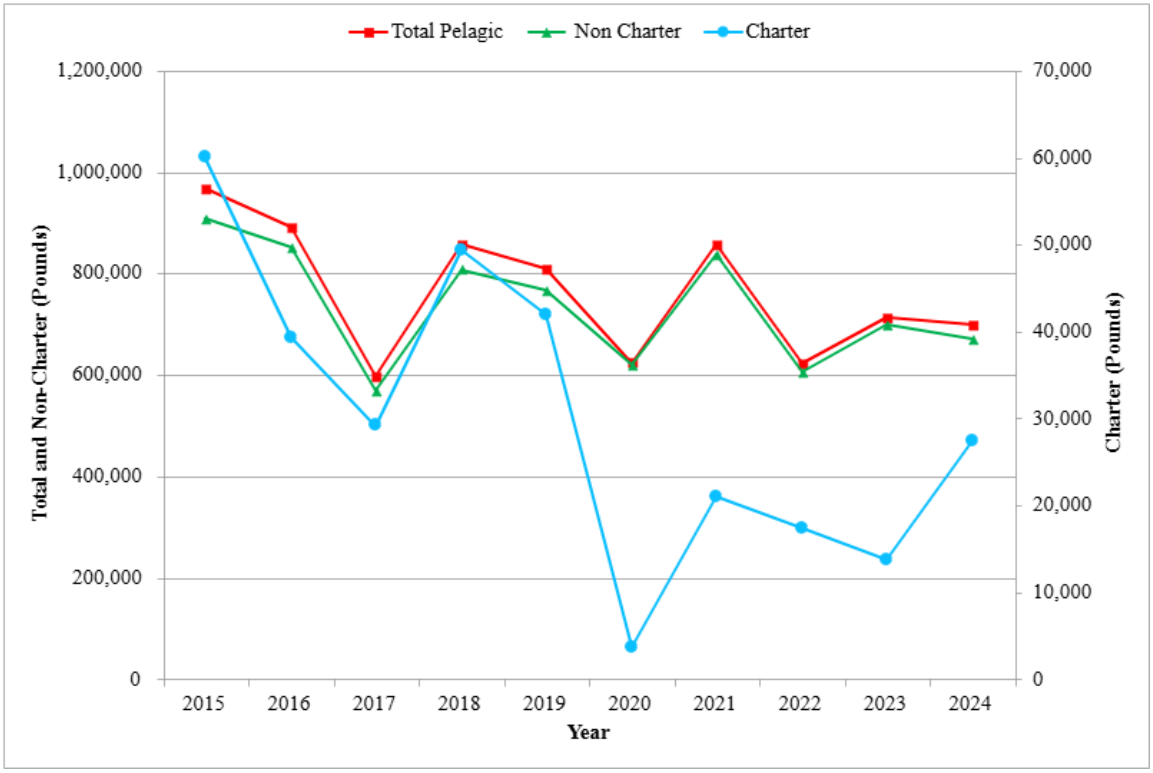



Figure 49. Total estimated landings for all pelagics in Guam

Supporting data shown in Table A-50.

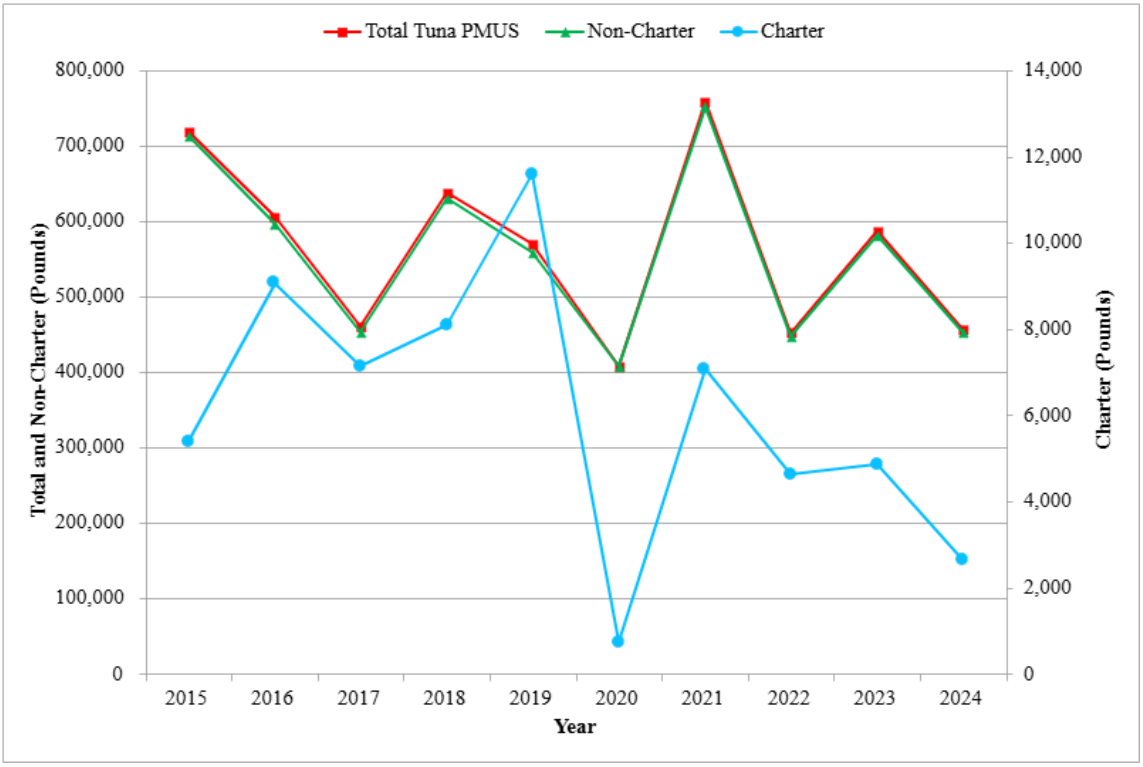



Figure 50. Total estimated landings for tuna PMUS in Guam

Supporting data shown in Table A-51.

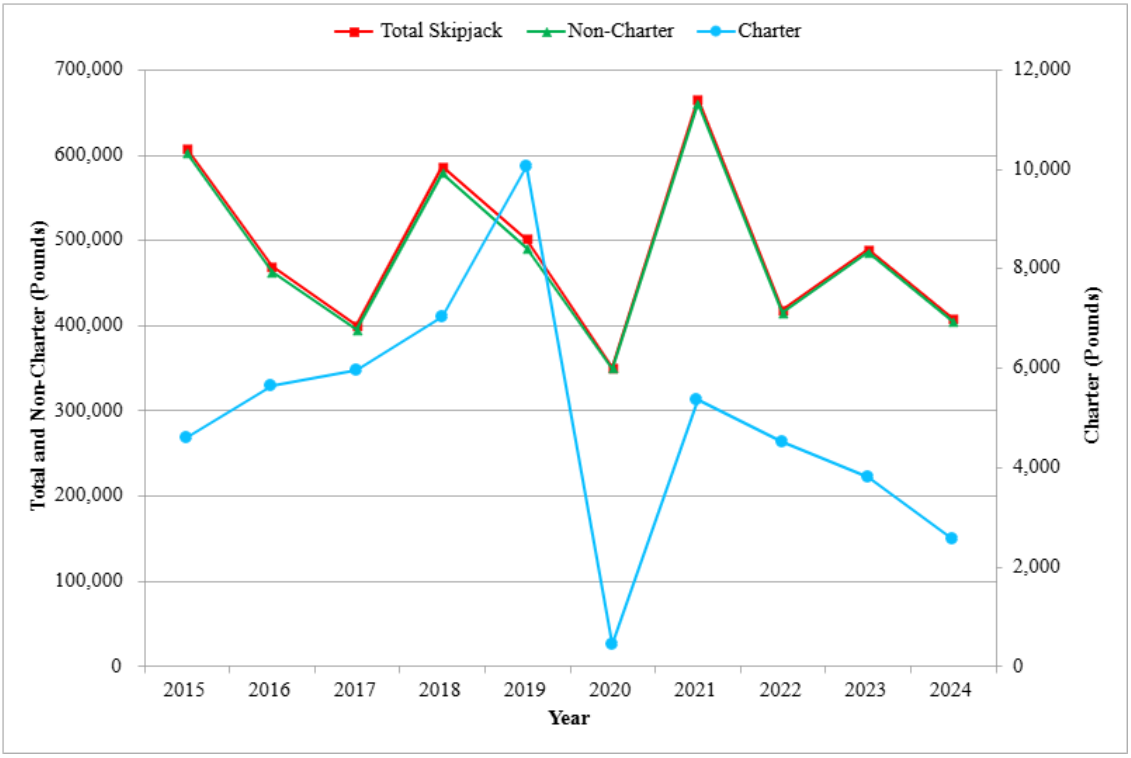



Figure 51. Total estimated landings for skipjack tuna in Guam

Supporting data shown in Table A-52.

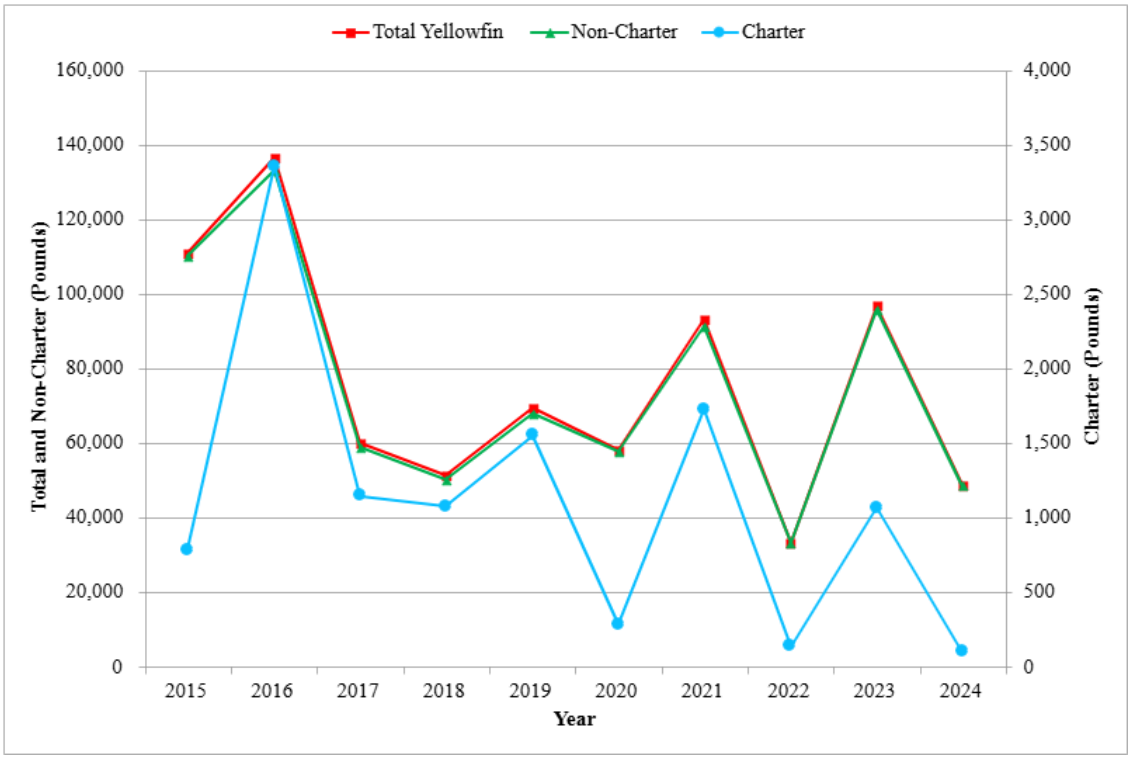



Figure 52. Total estimated landings for yellowfin tuna in Guam

Supporting data shown in Table A-53.

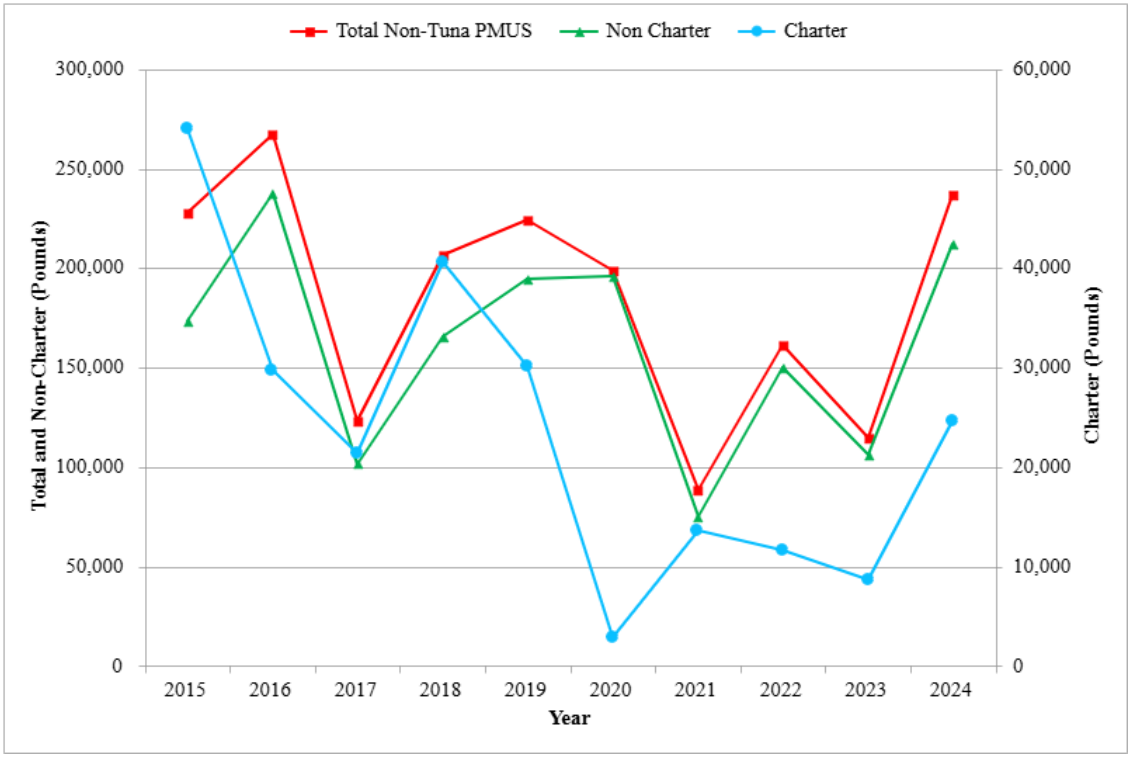



Figure 53. Total estimated landings for non-tuna PMUS in Guam

Supporting data shown in Table A-54.

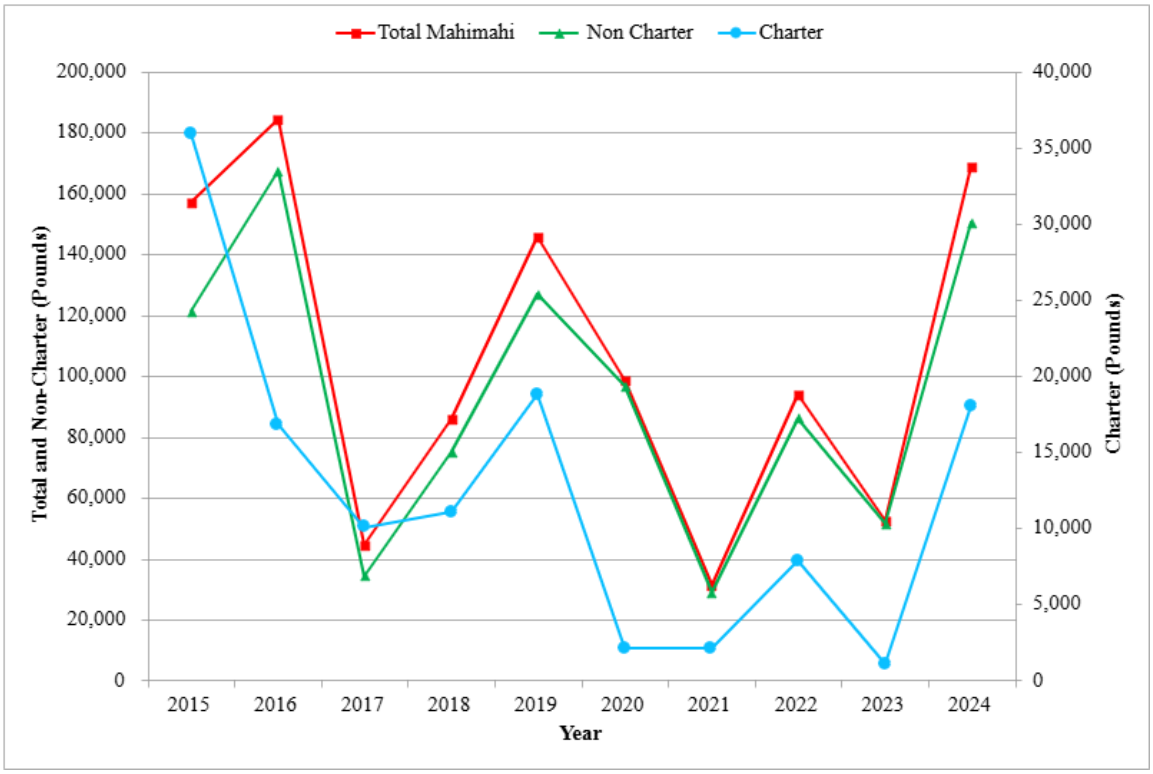



Figure 54. Total estimated landings for mahimahi in Guam

Supporting data shown in Table A-55.

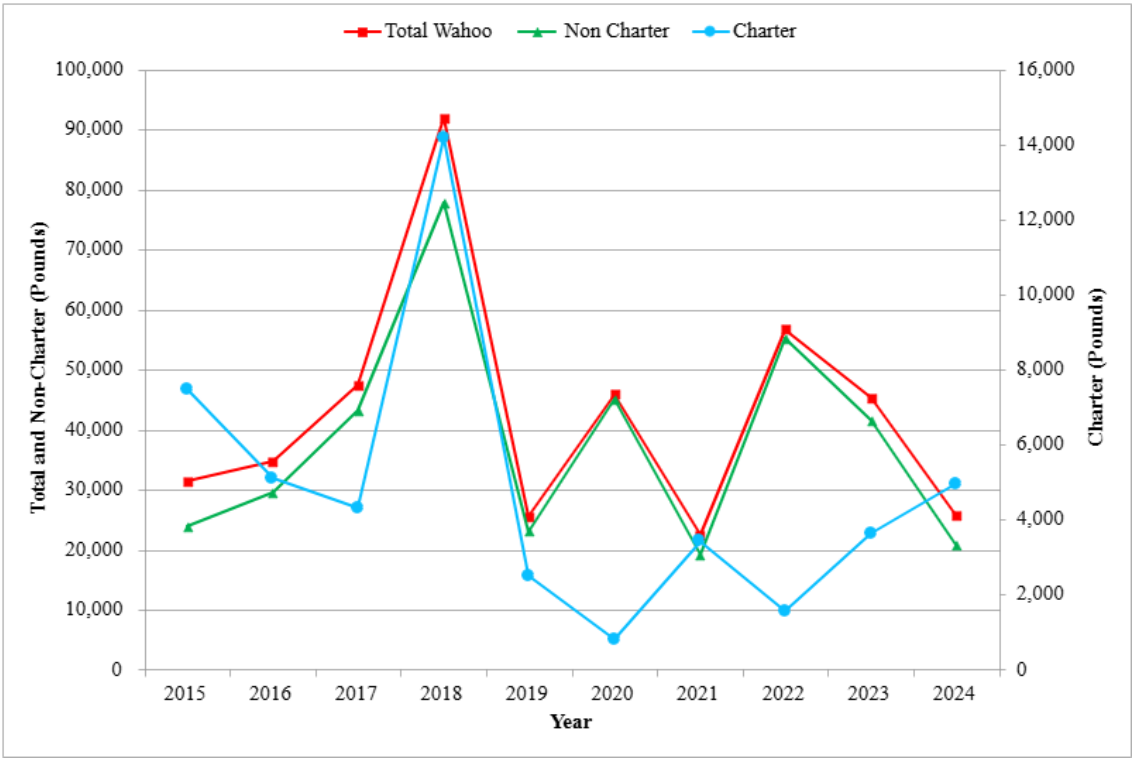



Figure 55. Total estimated landings for wahoo in Guam

Supporting data shown in Table A-56.

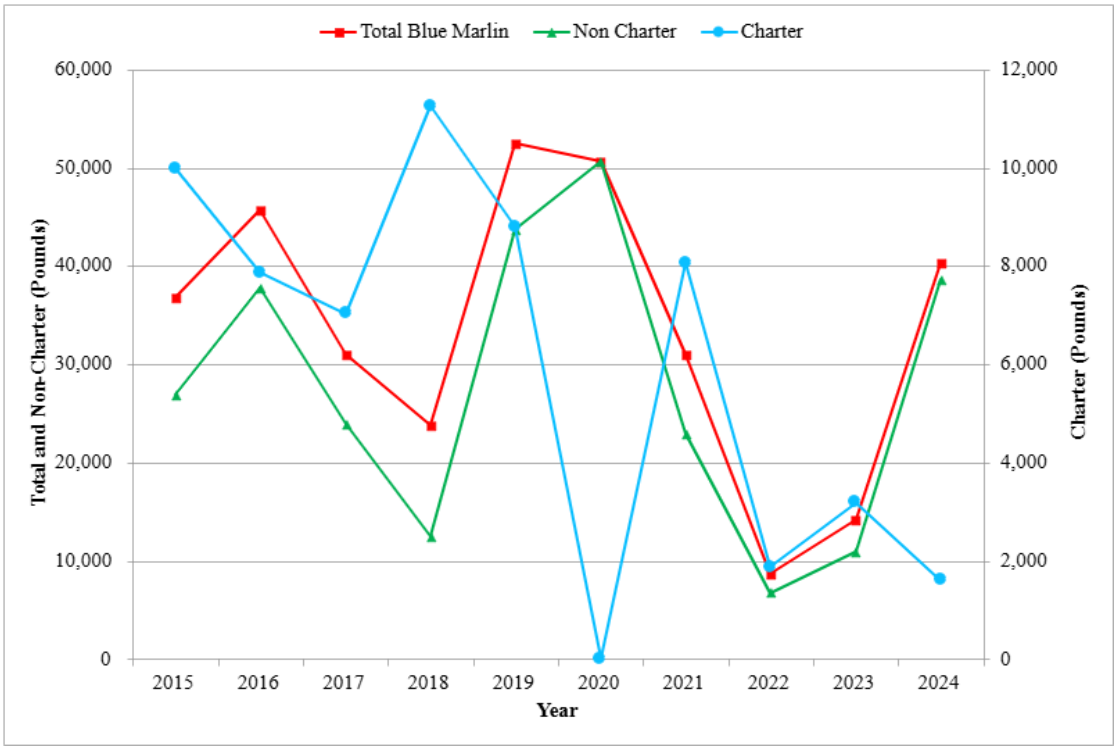



Figure 56. Total estimated landings for blue marlin in Guam

Supporting data shown in Table A-57.

Table 19. Bycatch summary for pelagic trolling fisheries in Guam

| Year | Number Release | Percent Release | Number Kept | Number Caught | Charter |
|---|---|---|---|---|---|
| 2015 | 0 | 0.0 | 6,864 | 6,864 | F |
| 2016 | 0 | 0.0 | 8,897 | 8,897 | F |
| 2017 | 0 | 0.0 | 6,371 | 6,371 | F |
| 2018 | 2 | 0.0 | 7,994 | 7,996 | F |
| 2019 | 150 | 2.0 | 7,335 | 7,485 | F |
| 2020 | 4 | 0.1 | 3,247 | 3,251 | F |
| 2021 | 14 | 0.2 | 7,785 | 7,799 | F |
| 2022 | 72 | 1.2 | 5,772 | 5,844 | F |
| 2023 | 94 | 1.4 | 6,607 | 6,701 | F |
| 2024 | 1,006 | 15.1 | 5,658 | 6,664 | F |

Table 20. Bycatch species summary for pelagic trolling fisheries in Guam

| Year | Species | Number Release | Percent Release | Number Kept | Number Caught | Charter |
|---|---|---|---|---|---|---|
| 2018 | Wahoo | 1 | 0.2 | 568 | 569 | F |
| 2018 | Yellowfin Tuna | 1 | 0.3 | 344 | 345 | F |
| 2019 | Skipjack Tuna | 148 | 2.5 | 5,864 | 6,012 | F |
| 2019 | Yellowfin Tuna | 2 | 0.4 | 531 | 533 | F |
| 2020 | Mahimahi | 4 | 1.9 | 204 | 208 | F |
| 2021 | Skipjack Tuna | 10 | 0.2 | 6,724 | 6,734 | F |
| 2021 | Yellowfin Tuna | 4 | 0.5 | 775 | 779 | F |
| 2022 | Blue Marlin | 1 | 11.1 | 8 | 9 | F |
| 2022 | Mahimahi | 6 | 2.9 | 200 | 206 | F |
| 2022 | Skipjack Tuna | 65 | 1.3 | 5,062 | 5,127 | F |
| 2023 | Mahimahi | 1 | 0.4 | 256 | 257 | F |
| 2023 | Skipjack Tuna | 67 | 1.3 | 5,268 | 5,335 | F |
| 2023 | Wahoo | 4 | 1.4 | 290 | 294 | F |
| 2023 | Yellowfin Tuna | 22 | 3.1 | 694 | 716 | F |
| 2024 | Blue Marlin | 9 | 34.6 | 17 | 26 | F |
| 2024 | Mahimahi | 13 | 1.7 | 746 | 759 | F |
| 2024 | Other Tuna PMUS | 47 | 100.0 | 0 | 47 | F |
| 2024 | Skipjack Tuna | 859 | 16.6 | 4,315 | 5,174 | F |
| 2024 | Wahoo | 3 | 3.1 | 93 | 96 | F |
| 2024 | Yellowfin Tuna | 75 | 14.3 | 450 | 525 | F |
| 2016 | Mahimahi | 3 | 2.1 | 141 | 144 | T |
| 2016 | Skipjack Tuna | 3 | 2.5 | 116 | 119 | T |
| 2023 | Skipjack Tuna | 1 | 1.1 | 92 | 93 | T |

| Year | Species | Number Release | Percent Release | Number Kept | Number Caught | Charter |
|---|---|---|---|---|---|---|
| 2024 | Blue Marlin | 4 | 80.0 | 1 | 5 | T |
| 2024 | Mahimahi | 1 | 1.8 | 55 | 56 | T |

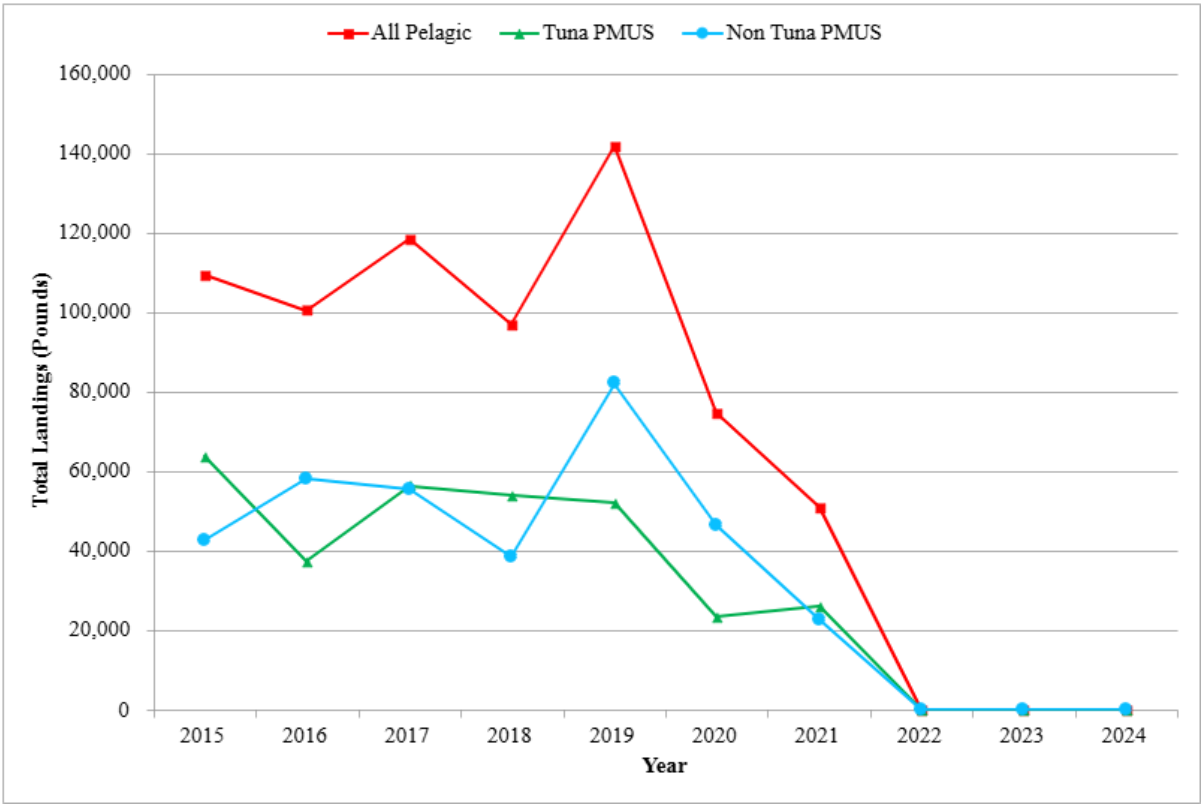



Figure 57. Commercial purchase landings for all pelagics, tuna PMUS, and non-tuna PMUS in Guam

Supporting data shown in Table A-58.

### 2.3.6 OVERVIEW OF EFFORT AND CPUE

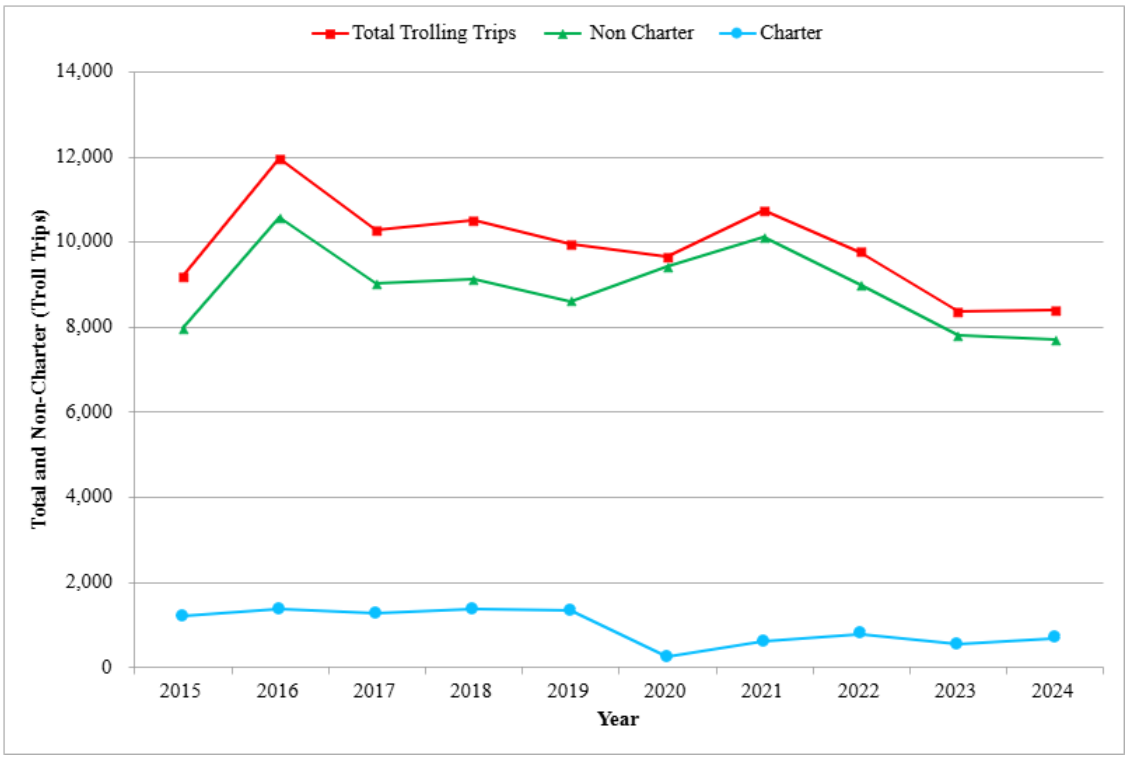



Figure 58. Estimated number of trolling trips from boat-based creel surveys in Guam
Supporting data shown in Table A-59.

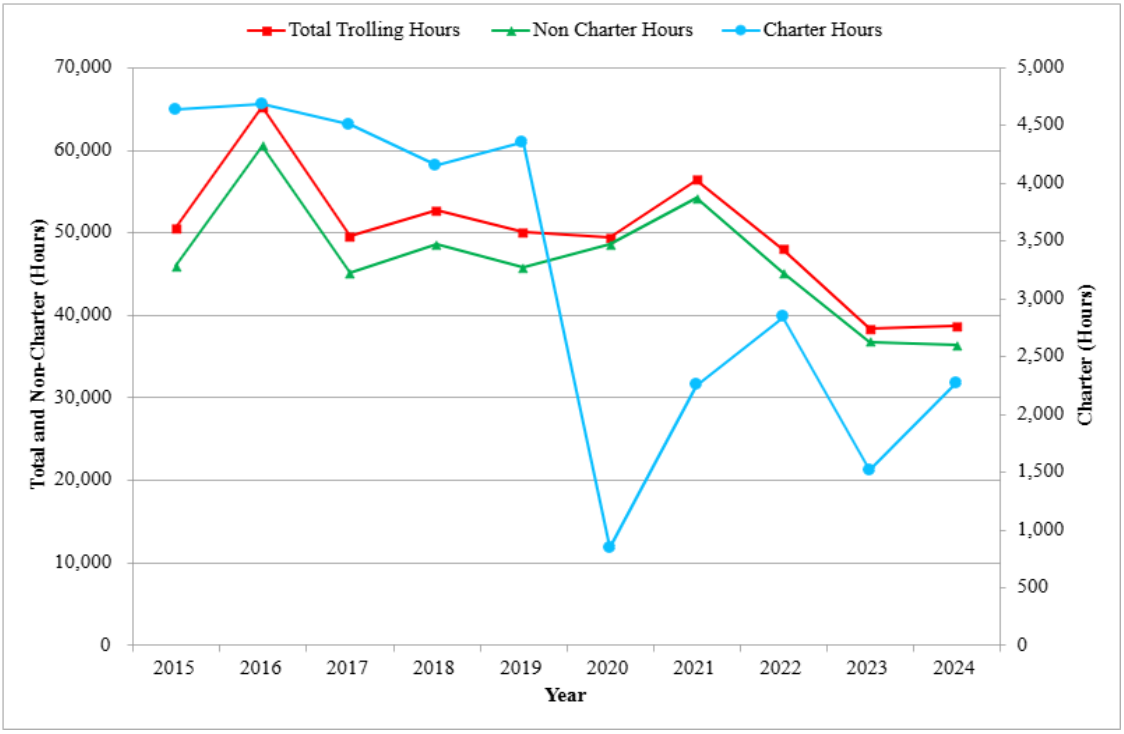



Figure 59. Estimated number of trolling hours from boat-based creel surveys in Guam
Supporting data shown in Table A-60.

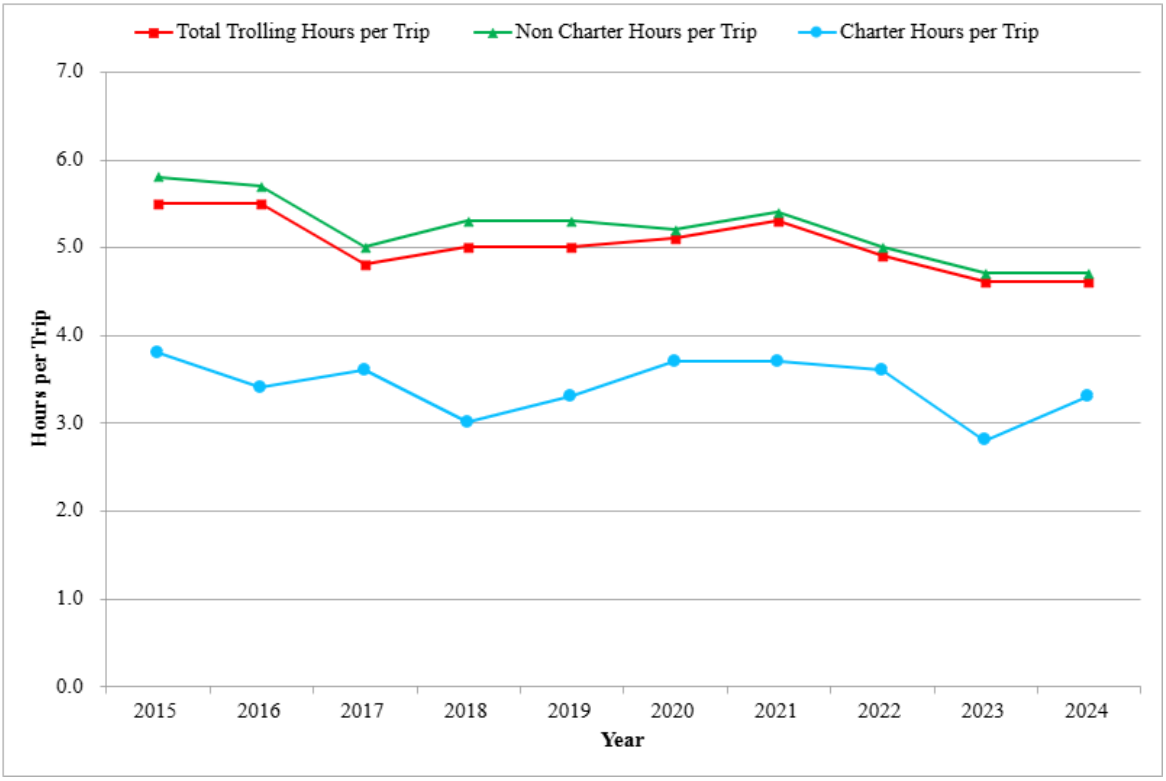



Figure 60. Estimated fishing trip length (hr/trip) from boat-based creel surveys in Guam

Supporting data shown in Table A-61.

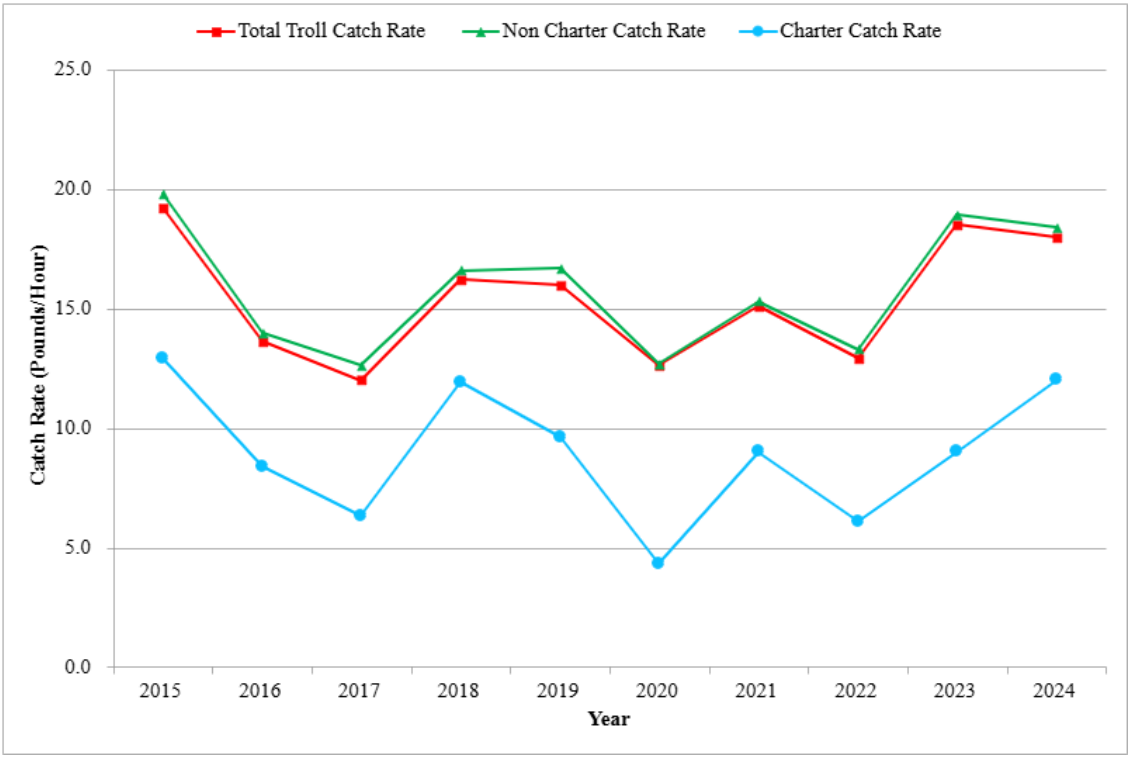



Figure 61. Estimated total trolling catch rates (lb/hr) in Guam

Supporting data shown in Table A-62.

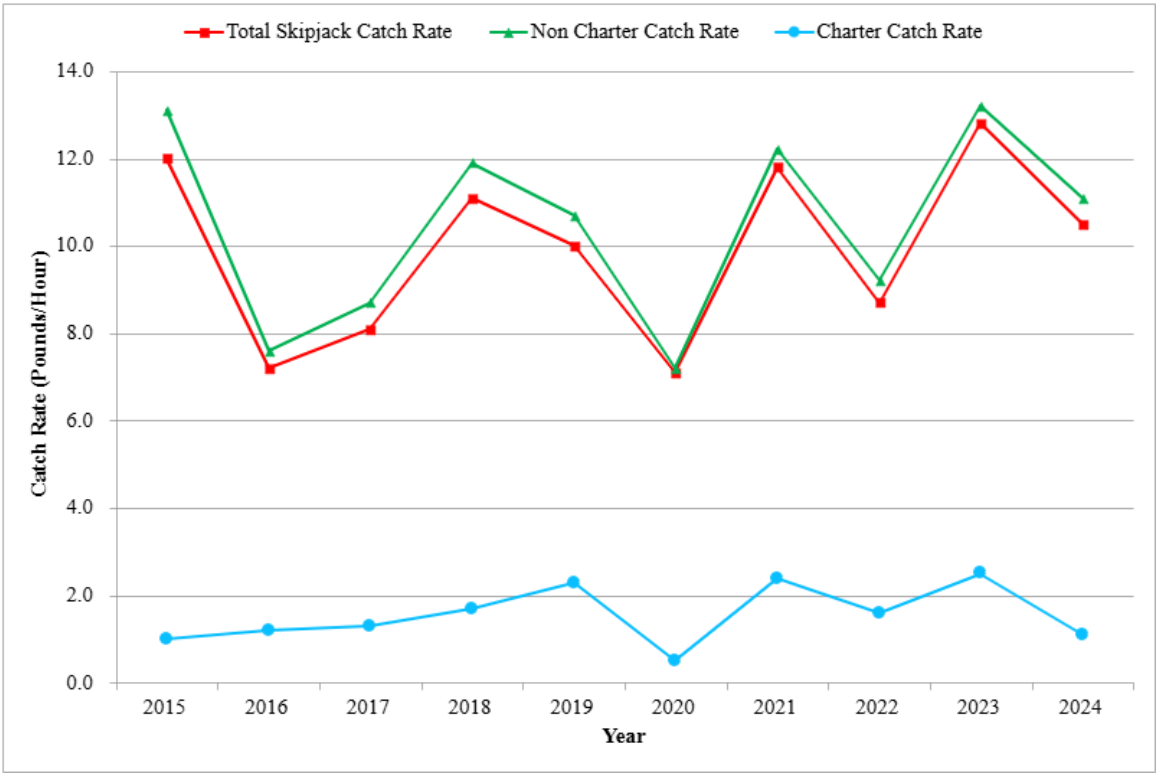



Figure 62. Estimated trolling catch rates (lb/hr) for skipjack tuna in Guam

Supporting data shown in Table A-63.

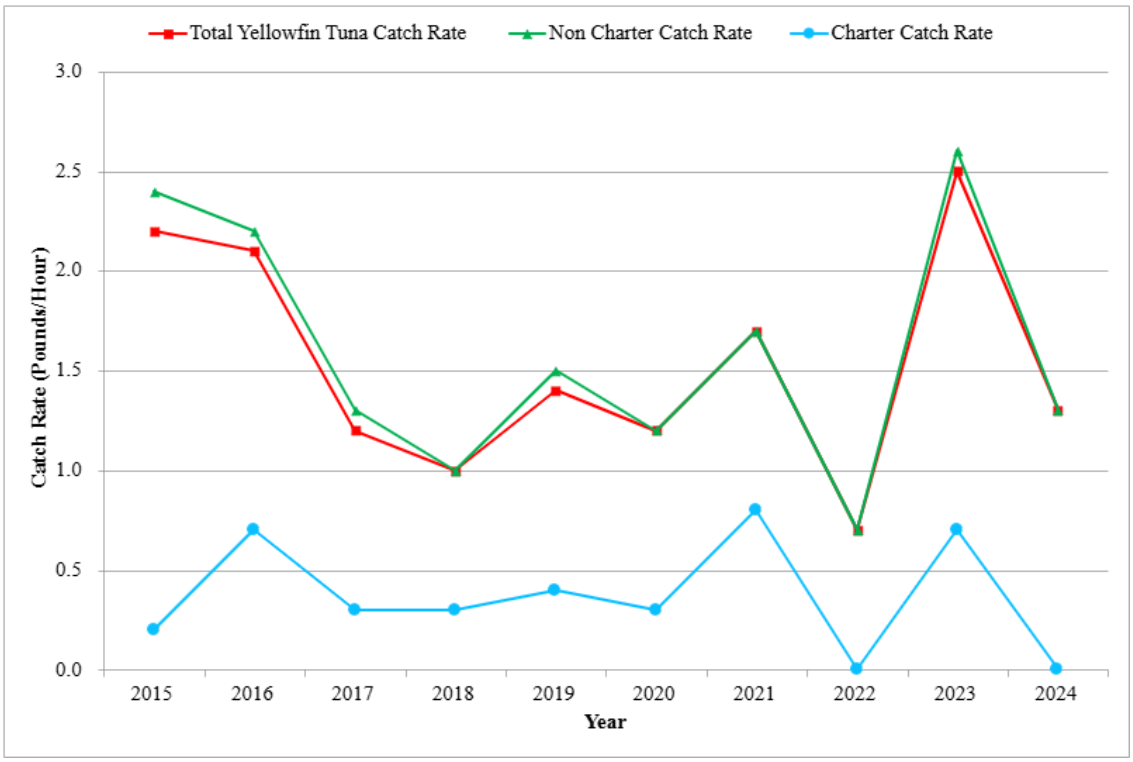



Figure 63. Estimated trolling catch rates (lb/hr) for yellowfin tuna in Guam

Supporting data shown in Table A-64.

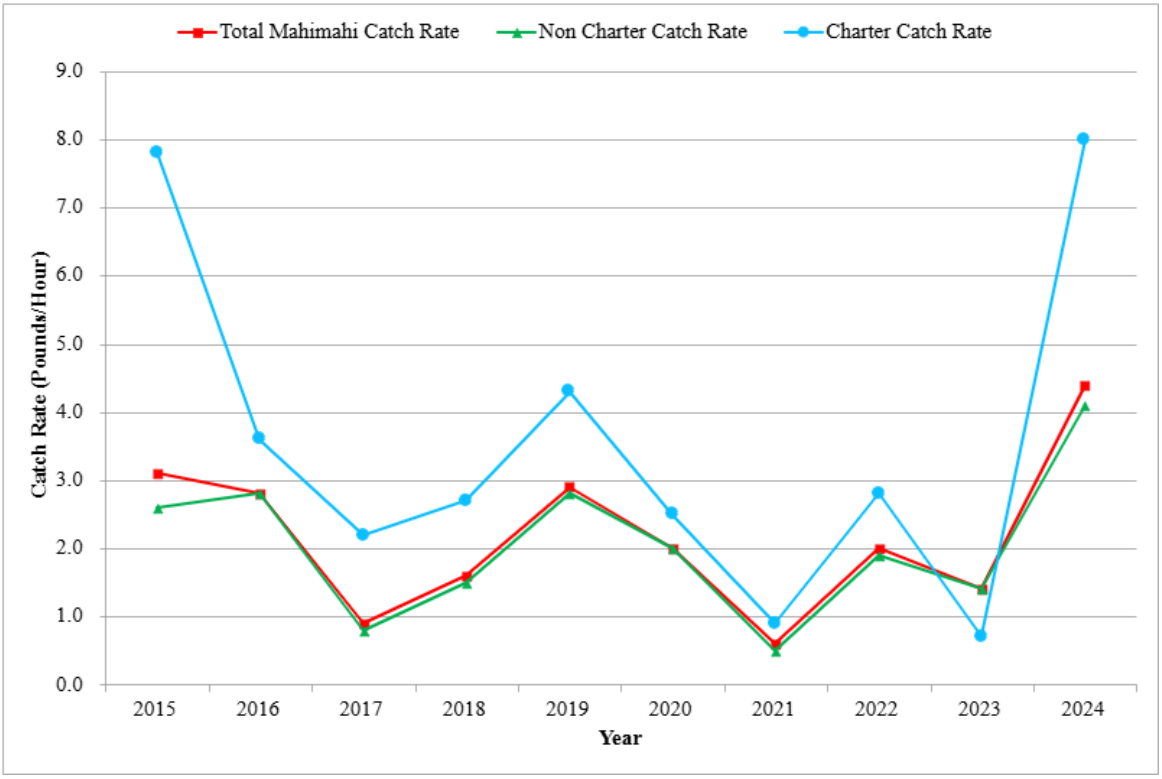



Figure 64. Estimated trolling catch rates (lb/hr) for mahimahi in Guam

Supporting data shown in Table A-65.

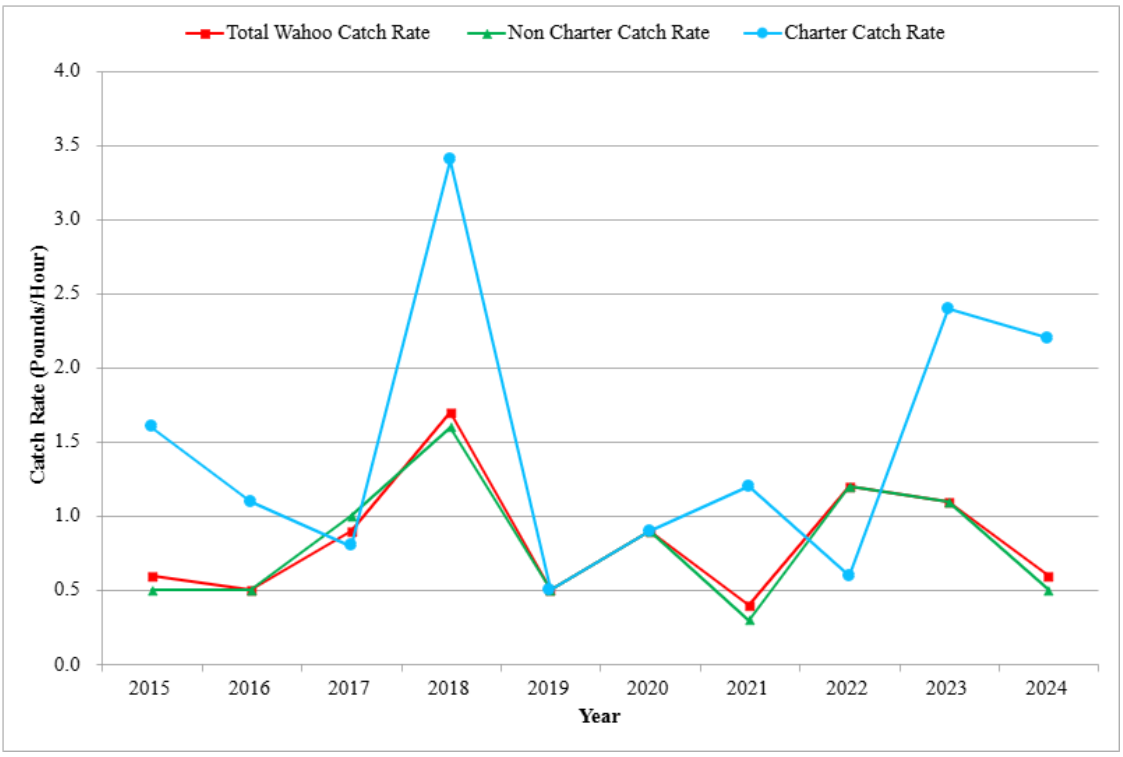



Figure 65. Estimated trolling catch rates (lb/hr) for wahoo in Guam

Supporting data shown in Table A-66.

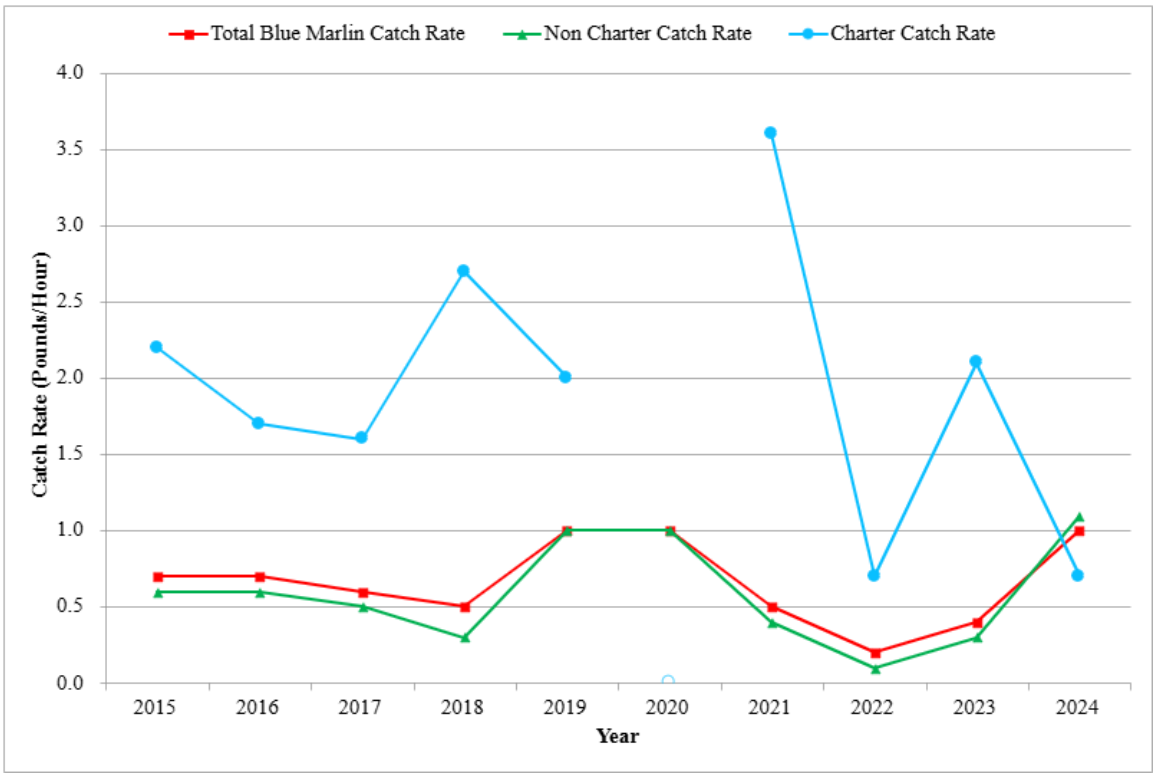



Figure 66. Estimated trolling catch rates (lb/hr) for blue marlin in Guam

Supporting data shown in Table A-67.

## 2.4 HAWAII

### 2.4.1 DATA SOURCES

This report summarizes catch, effort, size composition, and revenue data for recent years for Hawaii's commercial pelagic fisheries. Any fisherman who takes marine species in Hawaii for commercial purposes are required to have an HDAR Commercial Marine License (CML). Hawaii fishery data are compiled from the following NOAA fisheries and State of Hawaii sources:

a. Hawaii small boat fisheries:
   - State of Hawaii Division of Aquatic Resources (DAR) Commercial Fisherman's Catch Reports (catch and effort).
   - State of Hawaii DAR Commercial Marine Dealer Reports (landings, revenue, and size composition).
   - HDAR Commercial Marine License (licenses).

b. Hawaii longline fisheries:
   - State of Hawaii DAR Commercial Marine Dealer Reports (landings, revenue, and size composition).
   - NMFS federal longline paper and electronic logbooks (catch and effort).
   - Pacific Islands Region Observer Program data (bycatch estimates).
   - HDAR Commercial Marine License (licenses).

Pelagic species are caught in Hawaii by large-scale longline fisheries targeting tunas (*Thunnus* spp.) and swordfish (*Xiphias gladius*) and small boat fisheries targeting various tunas, marlins (striped marlin, *Kajikia audax*; black marlin, *Istiompax indica*; Indo-Pacific blue marlin, *Makaira mazara*), and other pelagic species (mahimahi, *Coryphaena hippurus*; wahoo, *Acanthocybium solandri*; shortbill spearfish, *Tetrapturus angustirostris*). These fisheries are described in more detail below.

**Hawaii Longline Fisheries**. The Hawaii longline fishery has two fishery sectors: a deep-set defined by >15 hooks set between floats that targets bigeye tuna and a shallow-set sector with <15 hooks set between floats that targets swordfish. Prior to departure, longline vessel operators are required to declare whether they will be participating in a deep-set or shallow-set trip. Generally, Hawaii-permitted vessels operate out of Honolulu; however, some vessels operate from California for some trips. In addition, a few longline vessels are California-permitted and operate solely out of California. Typically there are fewer than three vessels in a given year that are California-permitted, as such, these data are often confidential and are aggregated with Hawaii-permitted vessel data. For simplicity the aggregated California- and Hawaii-permitted longline fisheries are referred to as Hawaii longline fisheries thus forward.

Historically, longline catch and effort statistics include bigeye tuna catch attributed to U.S. territories of CNMI, Guam, or American Samoa. As of 2024, the WCPFC CMM 2023-01 removed the authority to approve territorial allocations of bigeye tuna and the U.S. catch limits of bigeye tuna were increased from 3,554 t to 6,554 t.

Revenue and average price are derived by integrating State of Hawaii DAR Commercial Marine Dealer Reports and NMFS federal longline logbooks.

Catch when reported by weight (lb) is estimated from the product of the number of fish retained as reported on fishers logbooks and the mean whole fish weight estimated from size composition data, primarily derived from landing data from Hawaii DAR Commercial Marine Dealer Reports. Dealers report weights (in pounds to nearest tenth of a weight) for landed whole and processed fish (e.g., gilled and gutted) by species for individual fish or aggregated with multiple fish per record; a conversion factor is applied to estimate whole weights for processed fish. In 2024, methodology for estimating weights was updated for dealer reports and these updates applied retroactively for affected years. Weight records (for certain species at particular size thresholds) with no associated processing condition now correctly have conversion factors applied to estimate round weights. These changes have resulted in higher average weights and thus higher total catch estimates for some species (e.g., billfish species) for previous years data.

For each species where size data are available by trip, a trip-specific mean weight is used to convert the number of fish caught to weight. For species where size data are not available by trip, mean weights are estimated from trip data aggregated by area, month of landing, and fishery sector (deep- or shallow-set) for species with weight data available for at least 20 fish within the area-month-sector category. If fewer than 20 fish are available for a species in an area-month-sector category, then average weights are estimated quarterly, annually, or across area-sectors, or using other reference weights. For California-based trips, size composition data may be derived from Pacific Islands Region or West Coast Region observer data or Hawaii DAR landings.

To estimate annual average weights by species for the deep- and shallow-set longline fisheries, the total estimated kept catch weight (lb) for the year was divided by the total number of fish recorded as kept in the logbooks for that year.

**Hawaii Small Boat Fisheries**. Hawaii small boat catch, effort, and size composition data are derived from the State of Hawaii DAR Commercial Fisherman's Catch Reports, which are required for all fishing trips for fishers that are commercially permitted, including charter fishers, no matter if fish are being sold on a trip. However, if small boat fishing trips are performed solely for subsistence, personal use, or recreational purposes and a fisher is not commercially permitted, then no catch reports are required. Catch (kept) is reported in weight (lb) by fishers and is used for reporting for the Hawaii small boat fishery in this document. Revenue and average price are derived by integrating State of Hawaii DAR Commercial Marine Dealer Reports with State of Hawaii DAR Commercial Fisherman's Catch Reports.

Hawaii small boat fishers catch pelagic species around the main Hawaiian Islands or offshore using various methods, often using multiple gear types on the same trip. Data are aggregated for reporting into the categories of: **Main Hawaiian Islands (MHI) Troll, MHI Handline, Offshore Handline, and Other Gear**. These broad categories were created to account for all landings of pelagic species, including those occasionally caught or misreported by fishers using gear not typically targeting pelagic fish (e.g., the deep-sea handline, a gear used primarily to target bottomfish is included in the MHI troll fishery category). The MHI troll fishery typically targets tuna, marlins and other PMUS, the MHI handline fishery targets yellowfin tuna, and the offshore handline fishery targets bigeye tuna. Catch and effort data

for a fishing trip that catch PMUS are summarized into a particular category based on the specific fishing method and HDAR statistical area defined below.

- **Main Hawaiian Islands (MHI) Troll Fishery:**
  - *Gears*: Miscellaneous Trolling Methods (6), Lure Trolling (61), Bait Trolling (62), Stick Trolling (63), Casting, Light Tackle, Spinners or Whipping (10) and Hybrid Methods (97).
  - *HDAR statistical areas*: 100 through 642. These areas cover the ocean from the shoreline out to the 20-minute latitude and longitude grid squares around the islands of Hawai‘i, Maui, Kaho‘olawe, Lana‘i, Moloka‘i, O‘ahu, Kaua‘i, and Ni‘ihau.
- **MHI Handline Fishery**:
  - *Gears*: Deep Sea or Bottom Handline Methods (3), Inshore Handline or Cowrie Shell (Tako) Methods (4), Kaka line (5), Ika-Shibi (8), Palu-Ahi, Drop Stone or Make Dog Methods (9), Drifting Pelagic Handline Methods (35) and Floatline Methods (91).
  - *HDAR statistical areas:* 100 to 642 except areas 175, 176, and 181.
- **Offshore Handline Fishery**:
  - *Gears*: Ika-Shibi (8), Palu-Ahi, Drop Stone or Make Dog Methods (9), Drifting Pelagic Handline Methods (35), Miscellaneous Trolling Methods (6), Lure Trolling (61), Hybrid Methods (97), and Deep Sea or Bottom Handline Methods (3).
  - *HDAR statistical areas:* 15217 (NOAA Weather Buoy W4), 15717 (NOAA Weather Buoy W2), 15815, 15818 (Cross Seamount) , 16019 (NOAA Weather Buoy W3), 16223 (NOAA Weather Buoy W1), 175, 176, 181, 804, 807, 816, 817, 825, 839, 842, 892, 893, 894, 898, 900, 901, 15416, 15417, 15423, 15523, 15718, 15918, 15819, and 16221, and 16223.
- **Other Gear**:
  - PMUS caught by methods or in HDAR statistical areas not specified within another category, including: Aku boat fishing; trolling in areas outside of the MHI (e.g., distant water albacore troll fishery); shortline fishing; fishing close to shore by diving, spearfishing, squidding; or netting inside of the MHI.

### 2.4.2 SUMMARY OF HAWAII PELAGIC FISHERIES

Effort, catch, catch per unit effort (CPUE), size composition, revenue, and bycatch data are summarized for the main pelagic fisheries (deep-set and shallow-set longline, MHI troll, MHI handline, and offshore handline).

**Participation:**

A total of 2,997 fishermen were licensed in 2024 by HDAR, including 59% (1,775) who indicated that their primary fishing method and gear were intended to catch pelagic fish (Table 21). There was a 4% decrease in total fishing licenses issued from the previous year, but <2% decrease in fishing licenses with the primary method intended to target pelagic fish. The primary licenses issued were for longline (52%), trolling (28%), and handline methods (ika shibi and palu ahi, 11%).

**Effort:**

*Longline:* In 2024, the Hawai`i-permitted deep-set longline fishery had 150 active vessels, 1,635 trips, and 65.9 million hooks set with effort similar to 2023 but with a slight overall increase in the last 10 years (Figure 87). The Hawai`i-permitted shallow-set longline fishery had 21 vessels, 54 trips, and 1.1 million hooks set with a decline in trips and vessels in 2024 (Figure 93). The shallow-set fishery mainly operates in the first half of the year.

For the deep-set longline fishery, there was not much change in 2024 in total hooks set. However, there was a decline in fishing outside the EEZ, where the majority of fishing occurs and an increase in fishing in the Hawaii EEZ. (Figure 88). For the shallow-set longline fishery, there was an increase in total hooks set and hooks set outside the EEZ, which is where almost all hooks are set. This continues the trend of an increase in total and hooks set outside the EEZ since 2019 for the shallow-set fishery (Figure 94).

*Hawaii Small Boat Fisheries:* In 2024, 1,042 fishers participated in the MHI troll fishery with 12,396 days fished, 327 fishers participated in the MHI handline fishery with 2,632 days fished, and 5 fishers participated in the offshore handline fishery with 140 number of days fished.

**Catch:**

Hawaii pelagic catch (kept) is shown for each PMUS or group by the gear or catch composition (Figure 67 – Figure 86). Hawaii commercial fisheries caught and landed 33.6 million pounds of pelagic species in 2024, an 8.5% increase from the previous year (Table 22). The large majority of Hawaii pelagic catch is tuna, followed by billfish and then other PMUS with catch of all three of these species groups increasing in 2024 (Figure 67). The vast majority of the pelagic catch is from the deep-set longline fishery (87%) with an increase in 2024 to 29.4 million pounds (Table 23; Figure 68) driving the increasing trends in overall Hawaii pelagic catch. The shallow-set longline fishery and MHI troll fisheries catch similar proportions of the total Hawaii pelagic catch with the smallest proportions composed of the MHI and offshore handline and other gear fisheries (Figure 68). In 2024, the shallow-set longline fishery caught (5%) 2.0 million pounds, the MHI troll fishery (4%) 1.3 million pounds, and the MHI and offshore handline and other fisheries (3.4%) 1.1 million pounds of pelagic catch (Table 23).

*Tuna:* The largest component of the pelagic catch was tunas, comprising 75% of catch in 2024 with an increase from 2023 (Table 22). The deep-set longline fishery dominated the tuna catch with small proportions of tuna catch from the MHI troll and handline fisheries (Figure 69). The largest proportion of tuna catch was bigeye tuna accounting for 41% of all pelagic catch followed by yellowfin tuna with much smaller proportions of albacore and skipjack tuna (Table 22; Figure 70). In 2024, there was an increase in total tuna catch driven by increases in yellowfin tuna (Figure 70). Almost all the bigeye tuna catch was from the deep-set longline fishery with a small proportion from the offshore handline fishery with an overall decline in bigeye tuna catch in 2024 (Figure 71). The vast majority of yellowfin tuna catch is from the deep-set longline fishery, which has been increasing since 2020 (Figure 72). Similar proportions of yellowfin tuna are caught by MHI troll and MHI handline fisheries. In 2024, there were differing trends in skipjack tuna catch in the two dominant fisheries with increases in the deep-set longline fishery and decreases in the MHI troll fishery (Figure 73). The deep-set longline fishery dominates the Hawaii catch of albacore and had a sharp

increase in 2023 followed by a decline in 2024 but with the catch still above the 10-year average (Figure 74). A small proportion of albacore catch is from the MHI troll fishery with an increase in 2024 (Figure 74).

*Billfish:* Billfish catch comprised 18% of total catch in 2024 (Table 22). The proportion of total billfish catch from the shallow- and deep-set longline fisheries was generally similar in the last 10 years. In 2024, the deep-set longline fishery outperformed the shallow-set fishery with increased billfish catch while the shallow-set billfish catch decreased (Figure 75). A small proportion of total billfish catch was from the MHI troll fishery (Figure 75). Swordfish catch dominates the billfish catch composition comprising 7% of total pelagic catch; in 2024 swordfish catch declined (Figure 76; Table 22). Blue marlin, then striped marlin compose the next highest proportions of billfish catch with both increasing in 2024. Spearfish catch remained steady in 2024 (Figure 76). The majority of swordfish catch is from the shallow-set longline fishery followed by the deep-set longline fishery with declines in catch for both fisheries (Figure 77). Blue marlin catch is dominated by the deep-set longline fishery with a steep increase in 2024 with some catch from the MHI troll fishery with a slight increase in 2024 (Figure 78). Striped marlin catch, mostly by the deep-set longline fishery, increased in 2024 to the highest level in ten years (Figure 79).

*Other PMUS:* Catches of Other PMUS represented 8% of the total pelagic catch in 2024 (Table 22). The majority of Other PMUS catch is from the deep-set longline fishery with the MHI troll fishery also catching a notable proportion of PMUS (Figure 80). All Other PMUS had an overall decline in catch in the last 10 years (Figure 81). The largest proportion of Other PMUS catch was composed of ono (wahoo) with 8% of total pelagic catch (Table 22) and an increase in catch in the last 2 years, followed by mahimahi with a slight decline in 2024 (Figure 81). Opah and pomfrets composed similar proportions of overall Other PMUS catch (Figure 81) All opah catch was from the deep-set longline fishery with a dramatic decline in catch in the last 10 years (Figure 82). Similar proportions of mahimahi are caught from the deep-set and MHI troll fisheries with a decline in 2024 (Figure 83). The majority of ono catch is from the deep-set longline fishery with a steep increase since 2022 and a notable proportion of catch by the MHI troll fishery (Figure 84). Almost all pomfret catch is from the deep-set longline fishery with a slight decline in 2024 (Figure 85). For retained PMUS sharks (shortfin mako and thresher sharks) there was a steep decline from 2015 to 2021. Since then comparatively small numbers have been retained in the deep-set fishery with almost no sharks retained in the shallow-set fishery (Figure 86).

*Longline catch by area:* Catch by species and area are shown for the deep-set and shallow-set longline fisheries for fishing locations within the Hawaii and Pacific Remote Islands Area (PRIA) EEZs, outside these EEZs, and for all areas (Table 24; Table 28). The majority of the deep-set longline catch occurred outside the EEZs (Table 24) with almost all of the shallow-set longline fishery catch outside the EEZs (Table 28).

**Revenue (nominal):**

The total nominal revenue from Hawai'i's pelagic fisheries was $110.8 million in 2024 a 7% decline from 2023 ($119.4 million) (Table 22). The average price per pound continued to drop with a 19% decline in 2024 with an average of $2.81 compared to $3.47 in 2023. In 2024, nominal revenue from tuna was $93.9 million or 85% of the total pelagic nominal revenue with bigeye tuna ($56.3 million) and yellowfin tuna ($36.2 million) representing

51% and 33%. In 2024, billfish contributed $8.4 million, 8% of the total pelagic revenue with swordfish accounting for $5,550, 5% of the total pelagic revenue.

In 2024, the deep-set longline generated the vast majority (88%) of the pelagic revenue with $98.4 million while the shallow-set longline fishery generated $4.5 million, 4% of the total pelagic revenue. The Hawaii small boat fisheries generated $8.7 million, 8% of total pelagic revenue with the MHI troll at $6.0 million (4% of the total pelagic revenue) and the gear types of MHI and offshore handline and other gears generating $4.4 million (4% of the total pelagic revenue).

For the deep-set longline fishery, revenue followed trends with catch from 2015 to 2020 but after that differed. As catch increased in the last 2 years, revenue continued to decline due to the reduction in average price (Figure 89). For the shallow-set longline fishery, the revenue and catch have followed similar trends over time with a decline in both catch and revenue in 2024 (Figure 95).

**Bycatch:**

*Longline Bycatch*: Bycatch information is documented by observers in the Pacific Islands Region Observer Program (PIROP) and from fishers on NMFS federal longline logbooks. Fisheries observers provide information for fish species that are discarded, protected species interactions, length data for retained and discarded catch, and other data on vessel operations. Information on the number of fish retained and released and vessel operations are recorded by fishers on federal logbooks with 100% coverage. However, reporting may differ across fishers and species. The PIROP has historically had about 20% observer coverage for deep-set longline fishing trips; however, coverage of fishing trips dropped to 17% in 2023 and to 13% in 2024. The shallow-set longline fishery has maintained coverage rates of 100%.

Bycatch is estimated annually from PIROP data from trips with observer coverage. The top ten species discarded in the deep-set longline fishery derived from observer data can be found in Table 25 and can be divided into three main categories: nonmarketable fish, elasmobranch, and marketable fish. Seven of the top ten discards in the deep-set fishery also occurred in the shallow-set fishery with additional marketable fish species (Table 29).

Variation in discards between deep-set and shallow-set longline fisheries may be due to differences in catch due to fishing locations, gear depth, and other operational factors. In both deep-set and shallow-set longline, fishers may prioritize hold space for the more valuable species and release small or damaged (e.g. shark or marine mammal damage) marketable fish.

In 2024, fishers reported on logbooks catching 553,804 fish in the deep-set longline fishery with 81% of catch retained and 19% released (Table 26) and 26,320 fish in the shallow-set longline fishery with 54% retained and 46% released (Table 30). The shallow-set longline fishery likely had a higher discard rate due to releasing more marketable fish with a prioritization of hold space for large swordfish and not retaining fish with a shorter shelf life, as this fishery typically has longer trips. The majority of releases were blue sharks with 74% of total catch in deep-set and 36% in shallow-set longline fishery. Note that on fisher logbooks, oilfish and escolar are reported together as “oilfish” as some fishers may have difficulty differentiating between species. Both species may be retained or discarded

depending on priorities. However, escolar, the species caught at higher catch rates, is more frequently retained.

**CPUE:**

Historically, the nominal CPUE was presented to show trends through time. However, changes to fishery operations (e.g. fishing location and time; hook depth, spacing, and soak time; bait; environmental factors; and particular fisher behaviors) may affect the CPUE and not reflect true changes in stock abundance.

*Deep-set longline:* The deep-set longline fishery CPUE for bigeye tuna continued an overall declining trend since 2015 with a slight decline in 2024 (2.3 fish/1000 hooks) compared to 2023 (2.5 fish/1000 hooks) (Figure 90). The 2024 yellowfin tuna CPUE (1.9 fish/1000 hooks) increased slightly from 2023 (1.3 fish/1000 hooks). While the 2024 albacore CPUE (0.2 fish/1000 hooks) declined slightly from 2023 (0.5 fish/1000 hooks). In 2024, there were sharp increases in blue and striped marlin CPUE (0.2 fish/1000 hooks for blue marlin and 0.4 fish/1000 hooks) from 2023 (0.1 fish/1000 hooks for blue marlin and 0.1 fish/1000 hooks for striped marlin) (Figure 91).

A substantial decline occurred with blue shark CPUE from 2020 to 2023 (Figure 92). In 2022, wire leaders were prohibited in the fleet, with some of the fleet voluntarily switching to monofilament leaders prior to the prohibition. The prohibition was implemented to reduce shark mortality as researchers observed sharks could bite through monofilament gear and free themselves more quickly and easily than if they were caught on wire leaders(Scott et al. 2022). However, there was a slight increase in blue shark CPUE from 2023 to 2024. All blue sharks recorded on logbooks in 2024 were reported by fishers as released.

*Shallow-set longline:* In 2024, the shallow-set longline fishery had an increase in bigeye tuna CPUE (Figure 96), differing from the decrease in the deep-set fishery (Figure 90). However, there was an increase in yellowfin tuna and albacore CPUE as seen with deep-set longline fishery. The shallow-set fishery CPUE for swordfish continued to follow the declining trend occurring since 2022 (Figure 97) with a 2024 CPUE of 7.1 fish/1000 hooks compared to the 2023 CPUE of 7.9 fish/1000 hooks. For blue sharks (all reported as released) the 2024 CPUE (8.0 fish/1000 hooks) was higher than the 2023 CPUE (6.3 fish/1000 hooks). Overall, the blue shark CPUE is higher in the shallow-set fishery compared to the deep-set longline fishery but has had a general decline in the last 10 years (Figure 98). However the blue shark CPUE increased in 2024 compared to 2023.

*Hawaii small boat fisheries:* The 2024 MHI troll fishery CPUE for yellowfin tuna was lower (27.9 fish/days fished) than 2023 (39.2 fish/days fished). While the skipjack tuna CPUE was similar in 2023 (16.6 fish/days fished) and 2024 (17.1 fish/days fished). The 2024 CPUE for blue marlin was higher (20.3 fish/days fished) compared to 2023 (13.2 fish/days fished). The mahimahi CPUE (25.4 fish/days fished in 2023 and 18.5 fish/days fished in 2024) was lower and the wahoo (ono) CPUE (12.4 fish/days fished in 2023 and 16.3 fish/days fished in 2024) was higher in 2024.

In 2024, the MHI handline fishery CPUE for yellowfin tuna (144.0 fish/days fished) was lower compared to 2023 (172.3 fish/days fished); however, was still relatively high compared to the CPUE for other species and fisheries. The 2024 albacore CPUE (24.2 fish/days fished)

was much higher compared to 2023 (3.8 fish/days fished). The 2024 bigeye tuna CPUE was higher (8.9 fish/days fished) compared to 2023 (6.3 fish/days fished).

**Fish Size:**

The 2024 deep-set longline fishery average weights for all tuna species, with the exception of Pacific bluefin tuna, were above 10 year averages; all billfish species below, with the exception of sailfish; other PMUS of opah below, mahimahi above, and ono, pomfrets, and oilfish similar to the 10 year averages (Table 27).

The 2024 shallow-set longline fishery average weights for bigeye, skipjack, and bluefin tuna were above the 10 year averages, yellowfin tuna below, and albacore similar; swordfish above; striped and blue marlin and spearfish below; with Other PMUS species of mahimahi below, pomfrets above, and ono, opah, and oilfish above 10 year averages (Table 31).

The 2024 Hawaii troll and handline fisheries average weights were above the 10-year averages for bigeye, skipjack, and yellowfin tuna with the albacore average weight below. All billfish (blue and striped marlin and swordfish) were below 10-year average weights, and the Other PMUS of mahimahi and ono were above the 10-year average weights (Table 32).

### 2.4.3 PLAN TEAM RECOMMENDATIONS

While there were no Plan Team recommendations to the Council relevant to the Hawaii pelagic fisheries data module, the Pelagic Plan Team developed several associated work items, including:

- In 2025 and beyond, authors should consider removing presentation and discussion of CPUE for the Hawaii small boat pelagic fishery. Due to operations of the fisheries and the confounding catch and effort of different gear types, it is likely not a good representation for these fisheries.
- Regarding CPUE time series in the Annual SAFE Reports, Fishery Performance Section Authors will work with the PIFSC Stock Assessment Program to include standardized CPUE time series in the Annual SAFE Reports where possible alongside nominal CPUE. Nominal CPUE time series should come with narratives expressing the caveats with those data. Authors are to operate in conjunction with the existing Pelagic Plan Team Working Group on Bigeye Tuna CPUE. This work item is intended to develop guidelines on priority management unit species, timelines, the periodicity of CPUE standardization updates (i.e., with assessment cycles), defining metrics of effort, and contents of narratives that accompany standardized CPUE time series. Products are to be shareable within open science tools.

### 2.4.4 OVERVIEW OF PARTICIPATION – ALL FISHERIES

Table 21. Number of HDAR Commercial Marine Licenses

| | Number of licenses | |
|---|---|---|
| **Primary Fishing Method** | **2023** | **2024** |
| Trolling | 532 | 502 |
| Longline | 912 | 924 |
| Ika Shibi & Palu Ahi | 353 | 341 |
| Aku Boat (Pole and Line) | 6 | 8 |
| Total Pelagic | 1803 | 1775 |
| Total All Methods | 3132 | 2997 |

### 2.4.5 OVERVIEW OF LANDINGS AND ECONOMIC DATA

Table 22. Hawaii commercial pelagic catch, revenue, and price by species

| | 2023 | | | 2024 | | |
|---|---|---|---|---|---|---|
| **Species** | **Catch (1,000 lbs)** | **Revenue ($1,000)** | **Price ($/lb)** | **Catch (1,000 lbs)** | **Revenue ($1,000)** | **Price ($/lb)** |
| Tuna PMUS | | | | | | |
| Skipjack tuna | 396 | $718 | $2.96 | 548 | $503 | $1.92 |
| Albacore | 1,127 | $868 | $1.30 | 608 | $907 | $1.66 |
| Yellowfin tuna | 7,358 | $28,921 | $4.48 | 10,117 | $36,193 | $4.20 |
| Bigeye tuna | 14,526 | $67,558 | $5.75 | 13,776 | $56,261 | $4.88 |
| Bluefin tuna | 4 | $42 | $10.91 | 6 | $29 | $7.37 |
| Other tunas | 4 | $32 | $5.03 | 4 | $14 | $4.03 |
| SubTotal | 23,415 | $98,139 | $5.07 | 25,059 | $93,907 | $4.01 |
| Billfish PMUS | | | | | | |
| Blue marlin | 1,069 | $2,018 | $2.68 | 1,839 | $1,410 | $1.33 |
| Striped marlin | 503 | $1,275 | $2.78 | 1,420 | $1,056 | $0.99 |
| Swordfish | 2,691 | $8,087 | $4.19 | 2,248 | $5,550 | $3.59 |
| Spearfish | 445 | $625 | $1.48 | 400 | $393 | $1.18 |
| Other marlins | 50 | $56 | $1.88 | 58 | $22 | $0.63 |
| SubTotal | 4,759 | $12,060 | $2.60 | 5,965 | $8,430 | $1.55 |
| Other PMUS | | | | | | |
| | 2023 | | | 2024 | | |
| **Species** | **Catch (1,000 lbs)** | **Revenue ($1,000)** | **Price ($/lb)** | **Catch (1,000 lbs)** | **Revenue ($1,000)** | **Price ($/lb)** |
| Opah (moonfish) | 505 | $1,273 | $3.83 | 290 | $773 | $3.54 |
| Pomfrets (monchong) | 366 | $1,959 | $4.67 | 346 | $2,042 | $5.02 |
| Ono (wahoo) | 903 | $2,646 | $3.26 | 1,276 | $3,039 | $2.76 |
| Oilfish | 131 | $228 | $1.72 | 104 | $189 | $1.53 |
| Mahimahi | 897 | $3,079 | $3.88 | 571 | $2,369 | $4.67 |
| PMUS Sharks | 8 | $0 | $0.00 | 5 | $0 | $0.00 |
| SubTotal | 2,810 | $9,185 | $2.89 | 2,593 | $8,411 | $2.92 |
| Other Pelagics | | | | | | |
| Other Pelagics | 3 | $8 | $1.67 | 3 | $2 | $1.33 |
| Total | **30,988** | **$119,392** | **$3.47** | **33,621** | **$110,750** | **$2.81** |

Table 23. Hawaii commercial pelagic catch, revenue, and price by fishery

| | 2023 | | | 2024 | | |
|---|---|---|---|---|---|---|
| | **Catch (1,000 lbs)** | **Revenue ($1,000)** | **Price ($/lb)** | **Catch (1,000 lbs)** | **Revenue ($1,000)** | **Price ($/lb)** |
| Deep-set longline | 26,057 | $101,310 | $4.85 | 29,400 | $98,379 | $4.09 |
| Shallow-set longline | 2,215 | $6,834 | $4.19 | 1,979 | $4,536 | $3.44 |
| MHI trolling | 1,603 | $6,093 | $4.32 | 1,323 | $4,263 | $3.91 |
| MHI handline | 573 | $2,712 | $4.60 | 508 | $2,186 | $4.15 |
| Offshore handline | 348 | $1,573 | $3.62 | 180 | $517 | $3.21 |
| Other gear | 383 | $1,739 | $3.86 | 461 | $1,739 | $3.94 |
| Total | **31,179** | **$120,262** | **$4.24** | **33,852** | **$111,619** | **$3.79** |

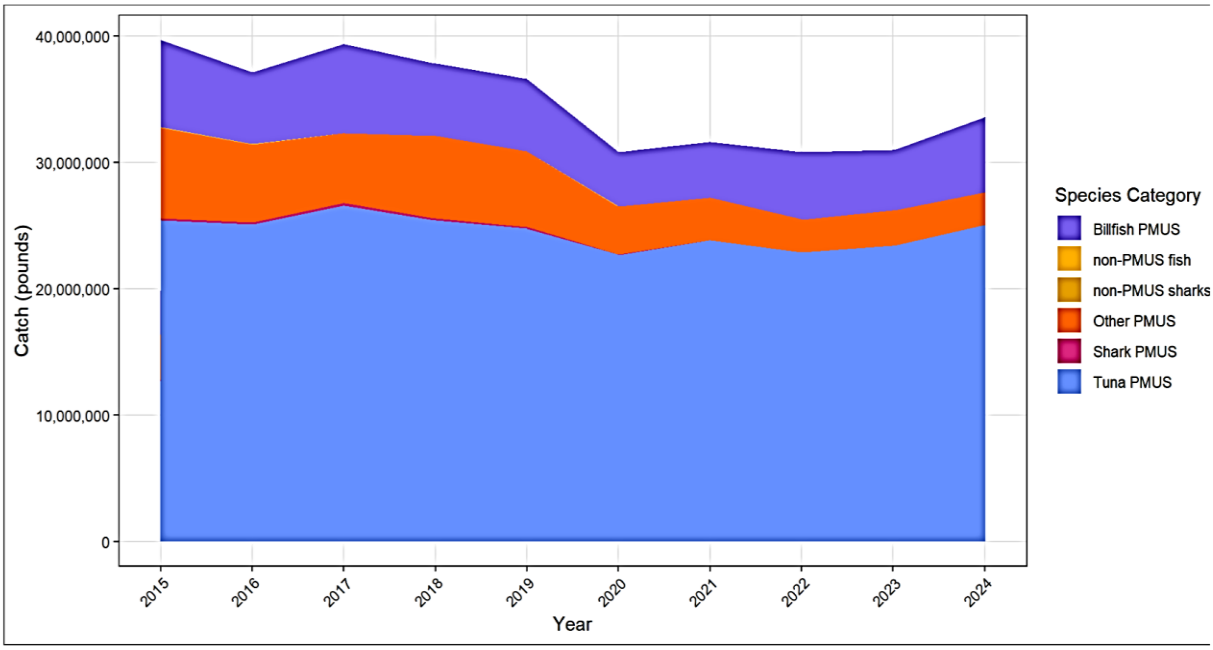



Figure 67. Hawaii commercial tuna, billfish, other PMUS and PMUS shark catch

Supporting data shown in Table A-68.

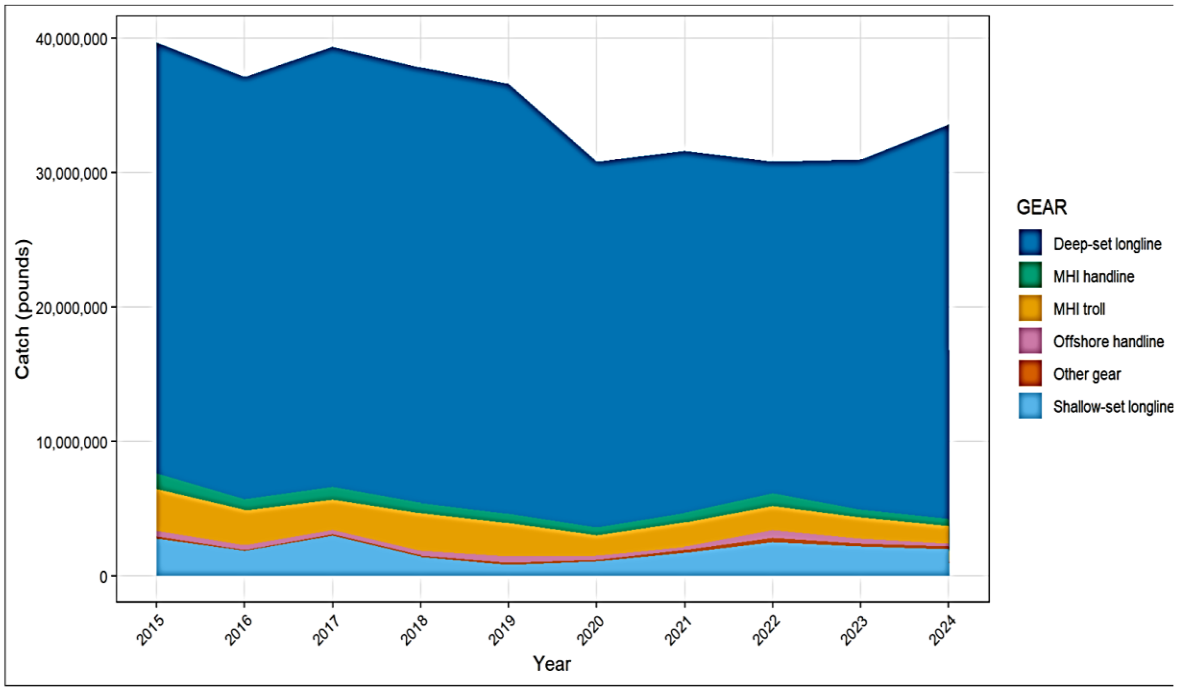



Figure 68. Total commercial pelagic catch by gear type

Supporting data shown in Table A-69.

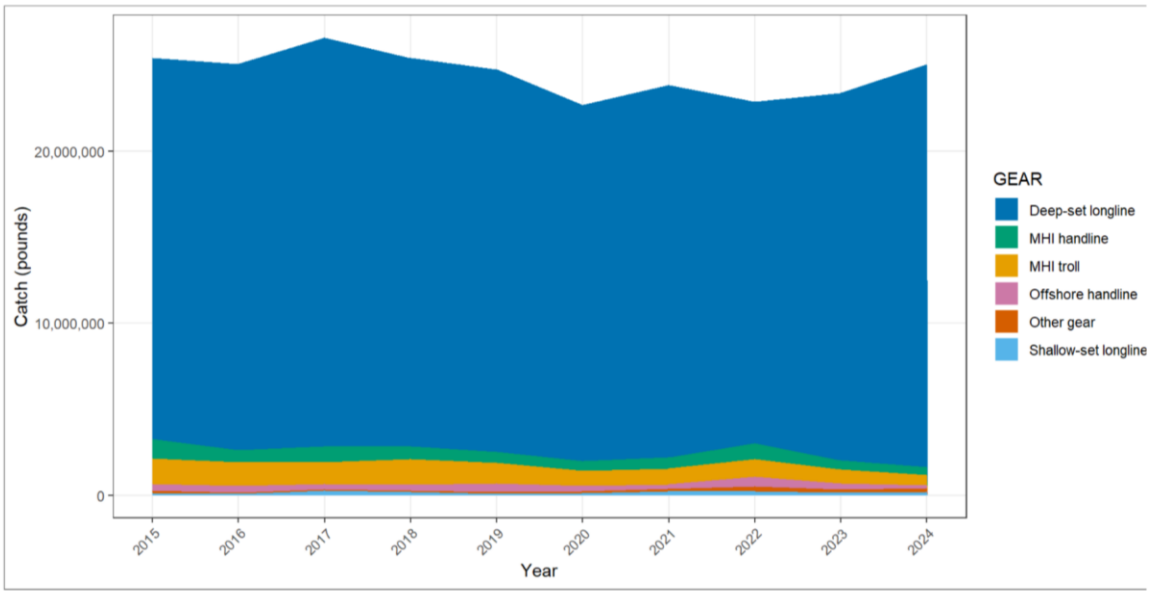



Figure 69. Hawaii commercial tuna catch by gear type

Supporting data shown in Table A-70.

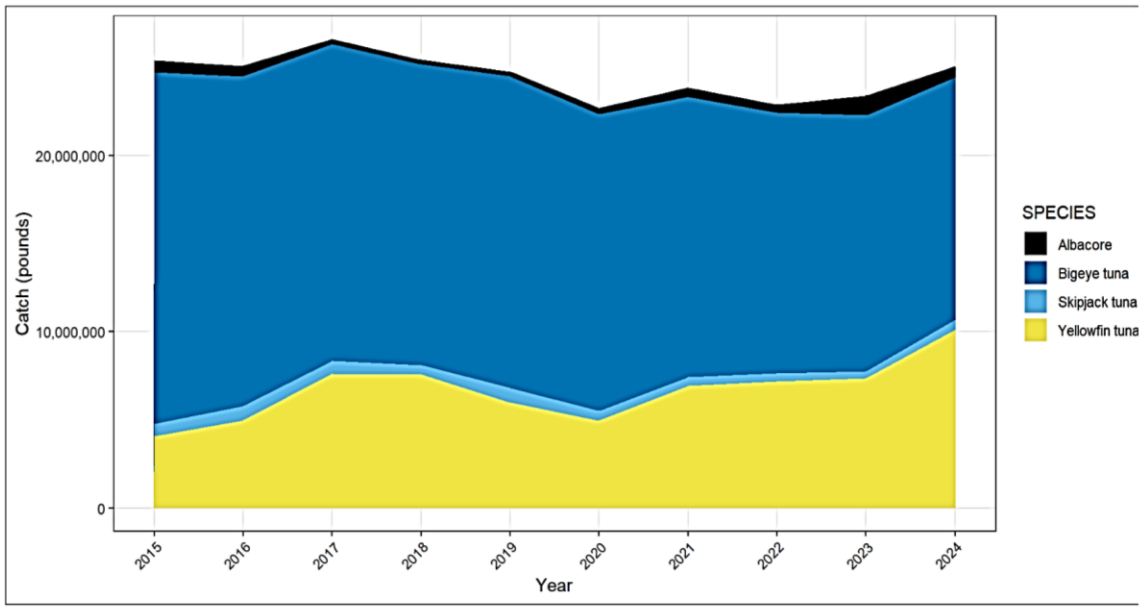



Figure 70. Species composition of tuna catch

Supporting data shown in Table A-71.

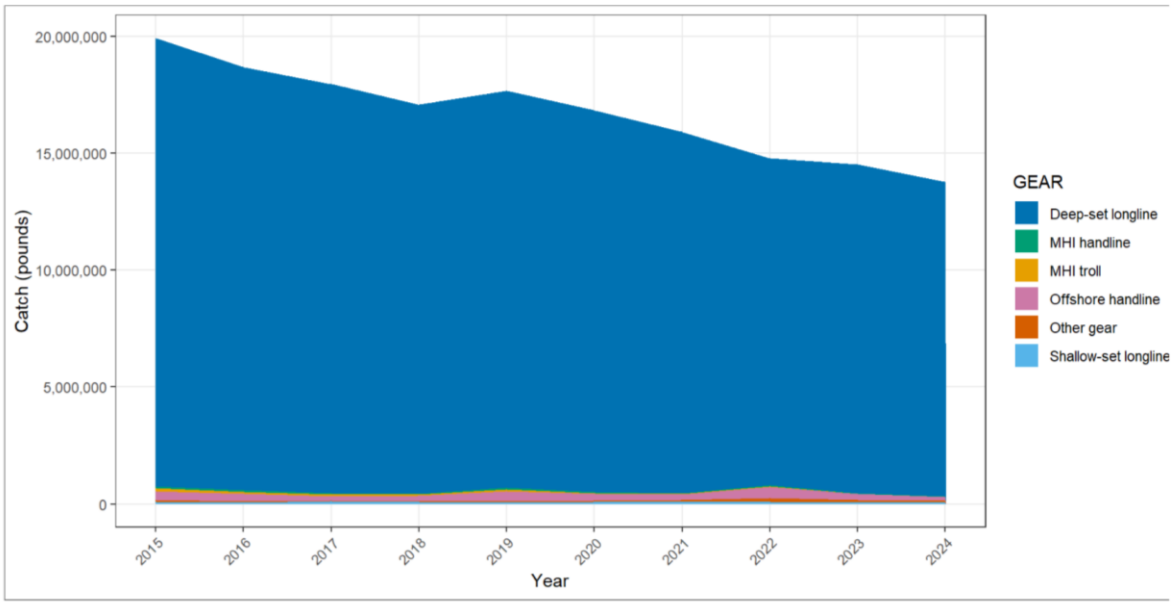



Figure 71. Hawaii bigeye tuna catch by gear type

Supporting data shown in Table A-72.

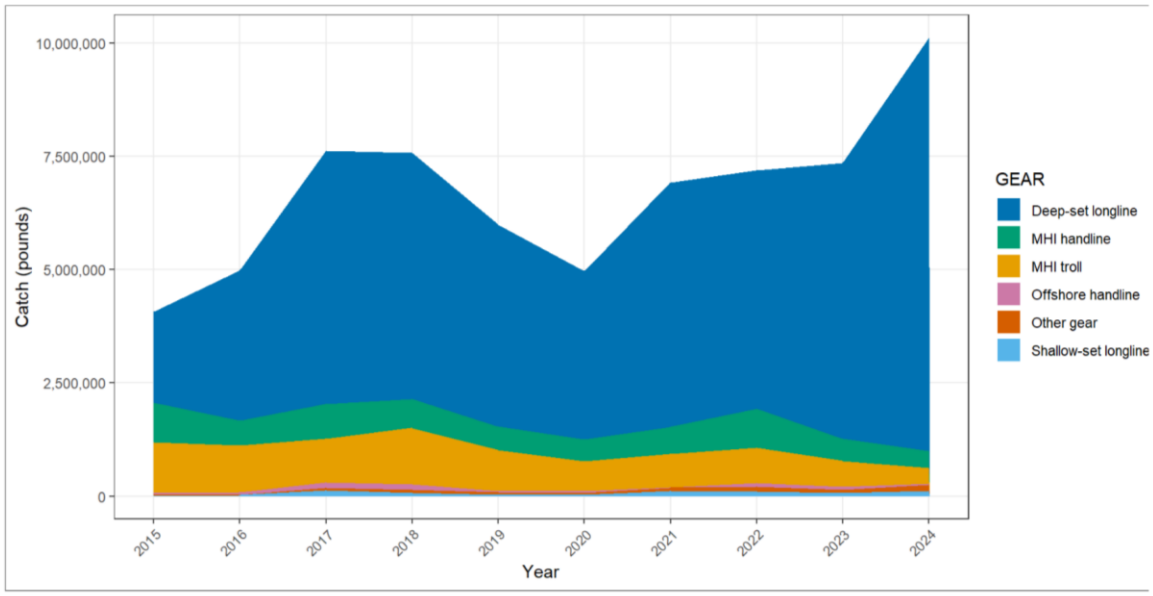



Figure 72. Hawaii yellowfin tuna catch by gear type

Supporting data shown in Table A-73.

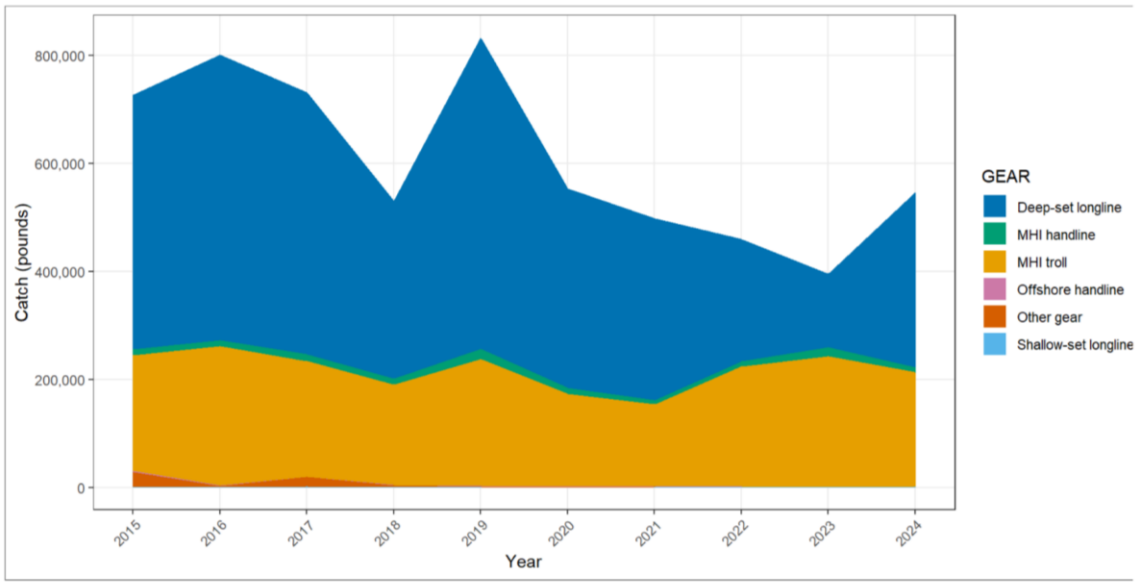



Figure 73. Hawaii skipjack tuna catch by gear type

Supporting data shown in Table A-74.

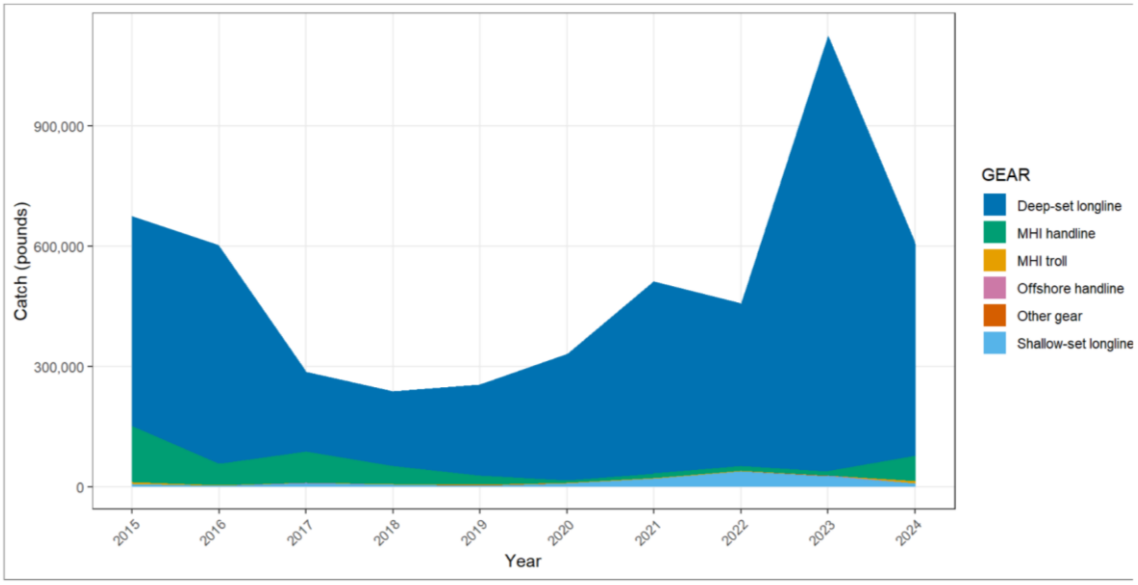



Figure 74. Hawaii albacore catch by gear type

Supporting data shown in Table A-75.

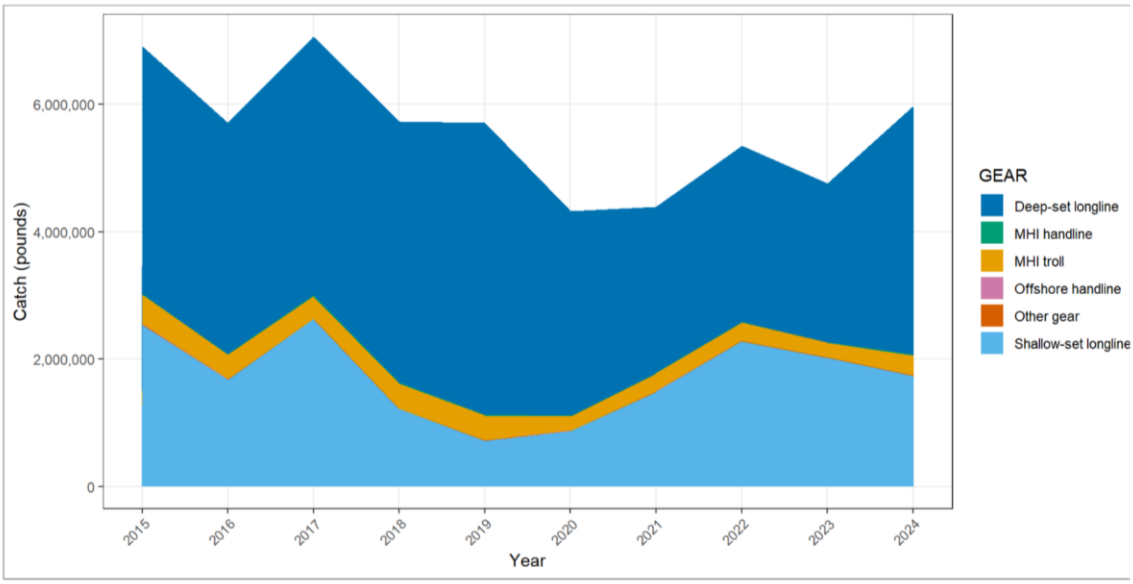



Figure 75. Hawaii commercial billfish catch by gear type

Supporting data shown in Table A-76.

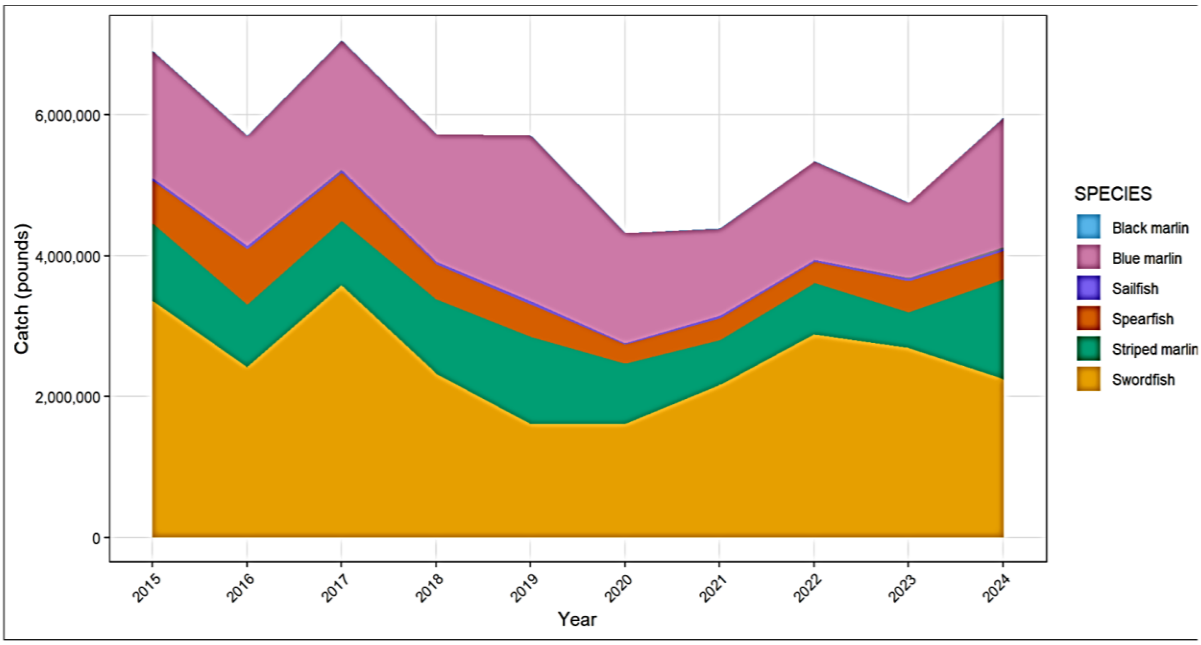



Figure 76. Species composition of billfish catch

Supporting data shown in Table A-77.

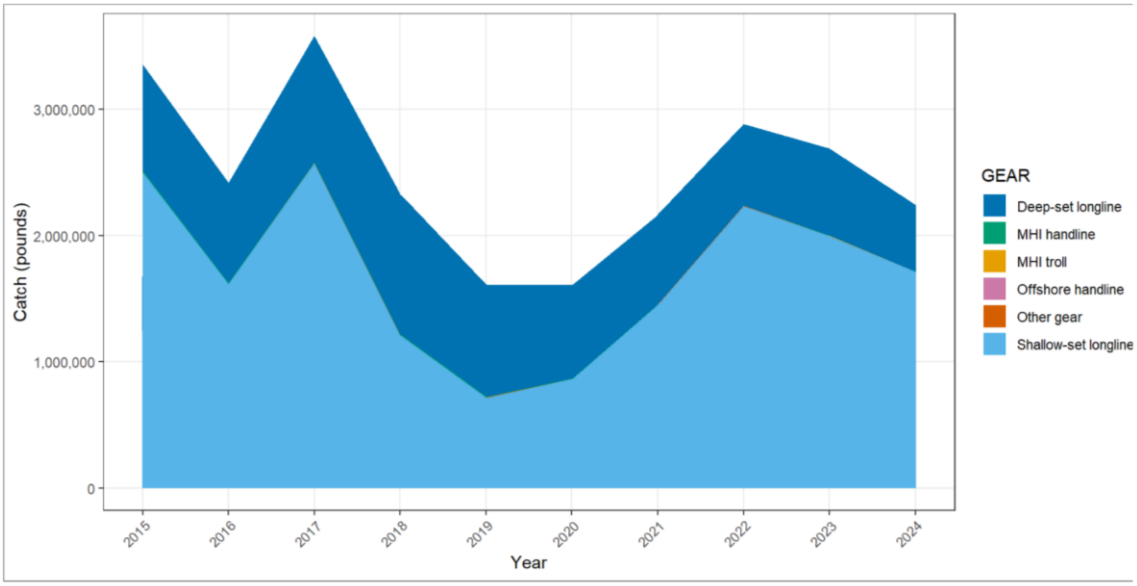



Figure 77. Hawaii swordfish catch by gear type

Supporting data shown in Table A-78.

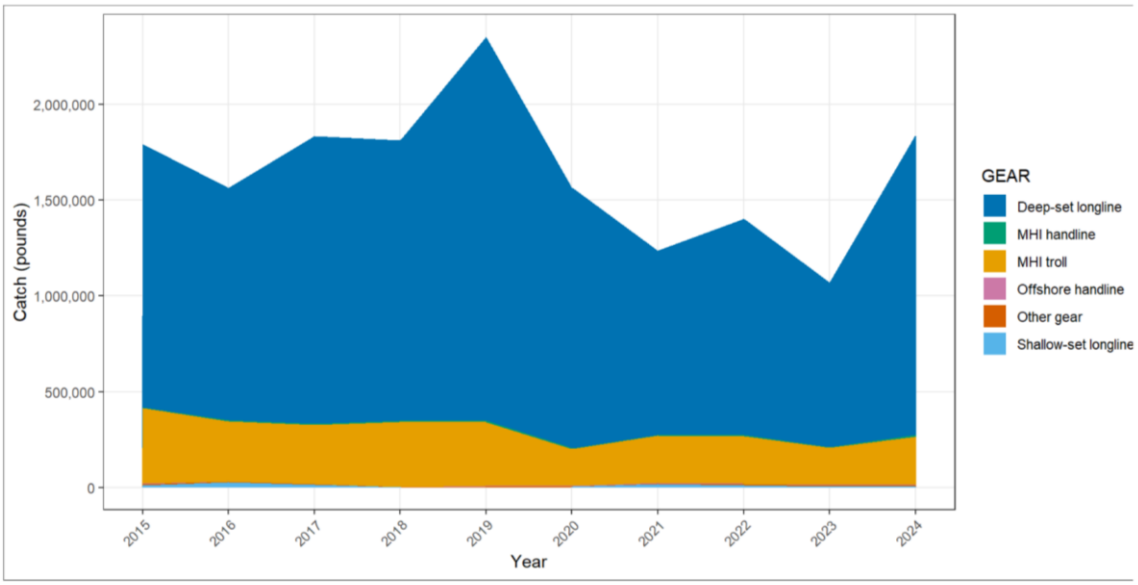



Figure 78. Hawaii blue marlin catch by gear type

Supporting data shown in Table A-79.

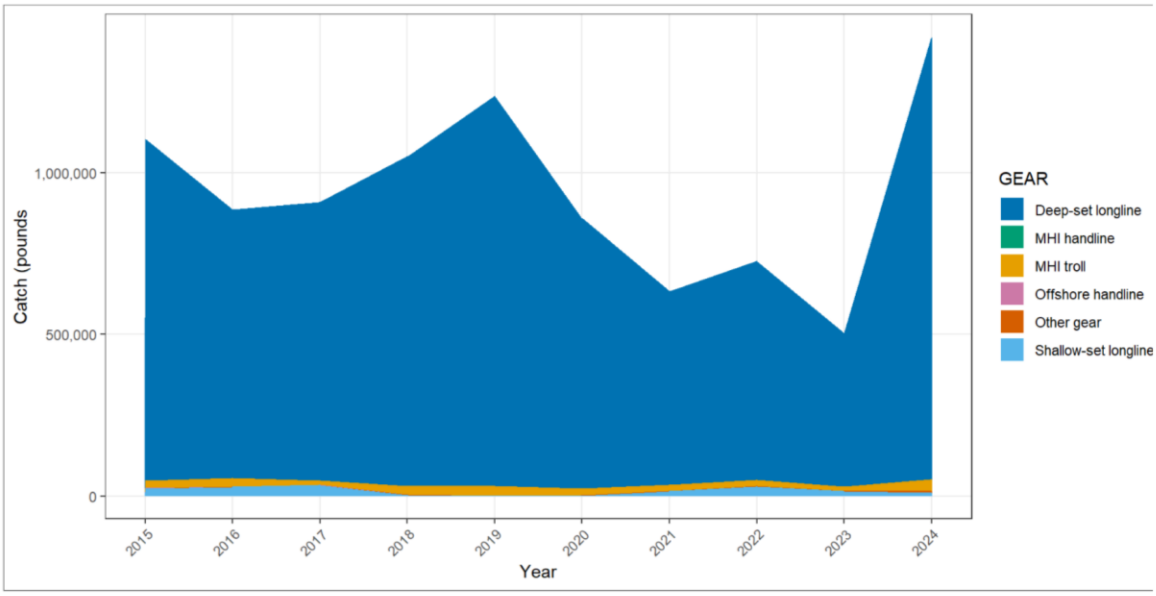



Figure 79. Hawaii striped marlin catch by gear type

Supporting data shown in Table A-80.

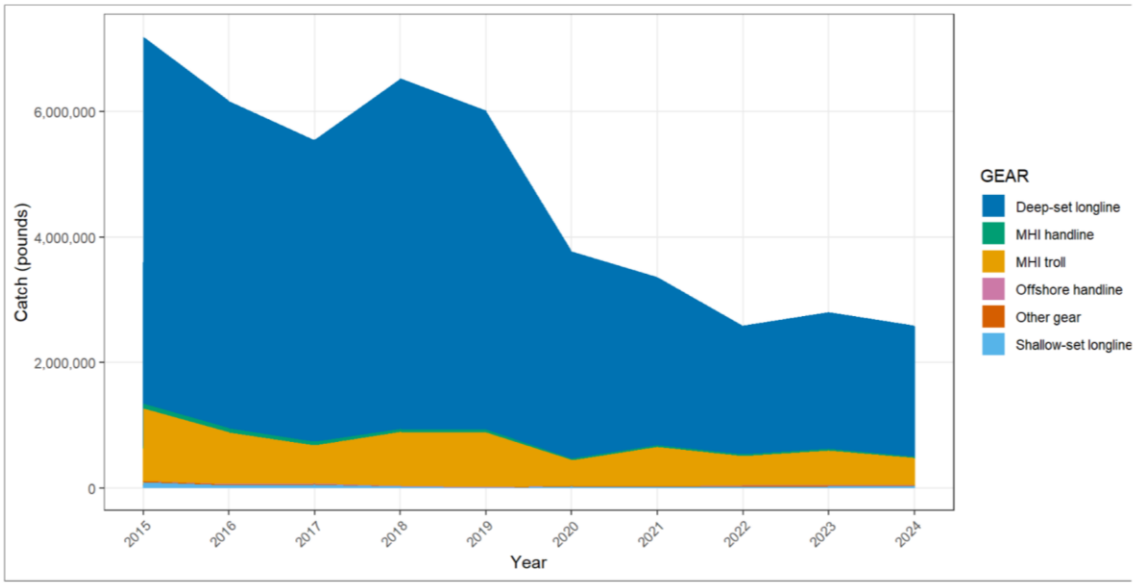



Figure 80. Hawaii commercial catch of other PMUS by gear type

Supporting data shown in Table A-81.

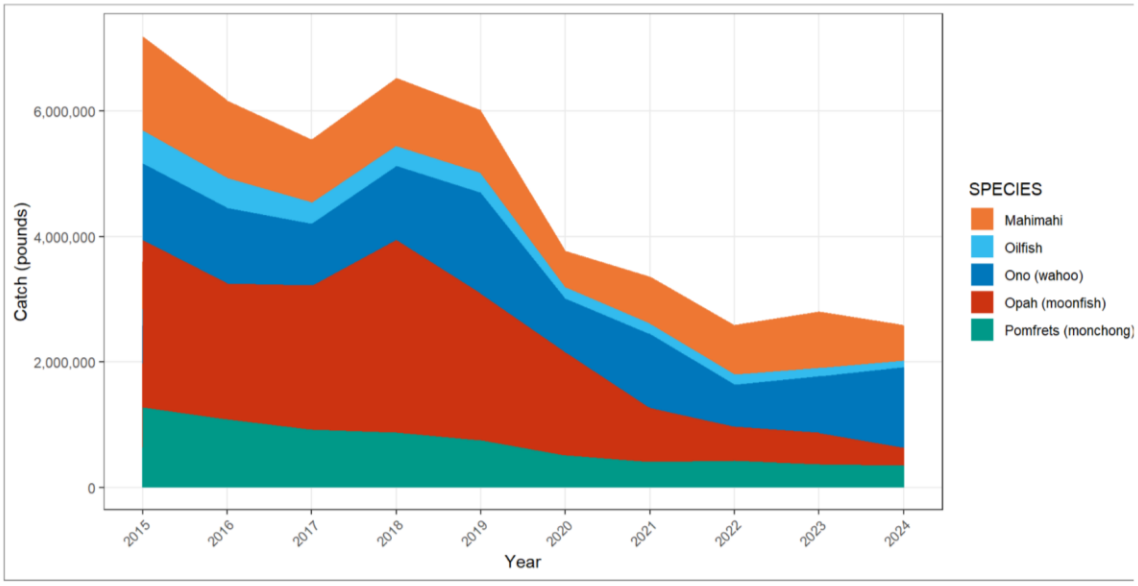
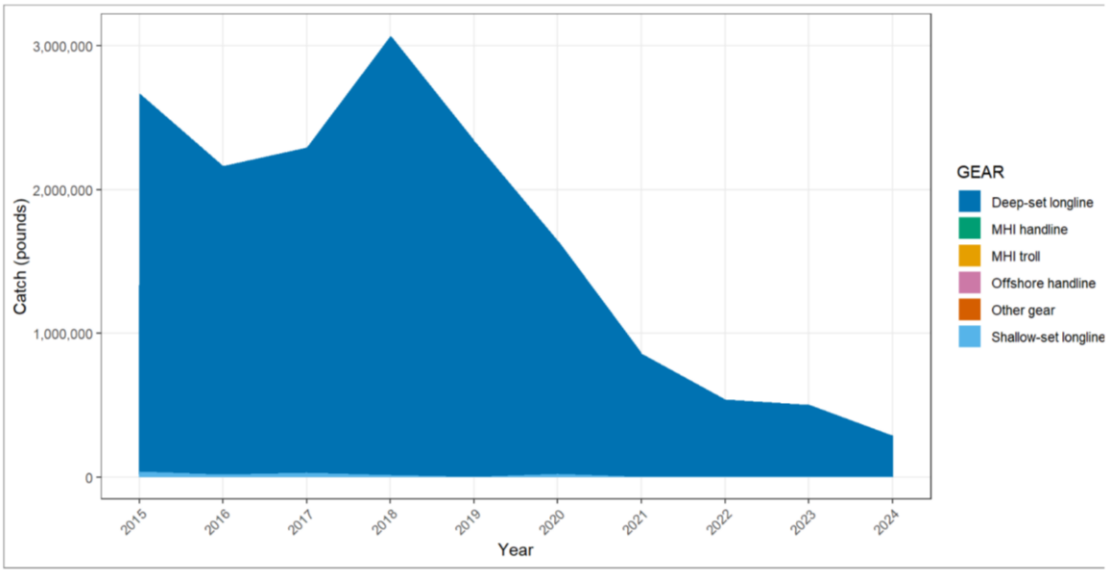



Figure 81. Species composition of other PMUS catch




Supporting data shown in Table A-82.

Figure 82. Hawaii moonfish catch by gear type

Supporting data shown in Table A-83.

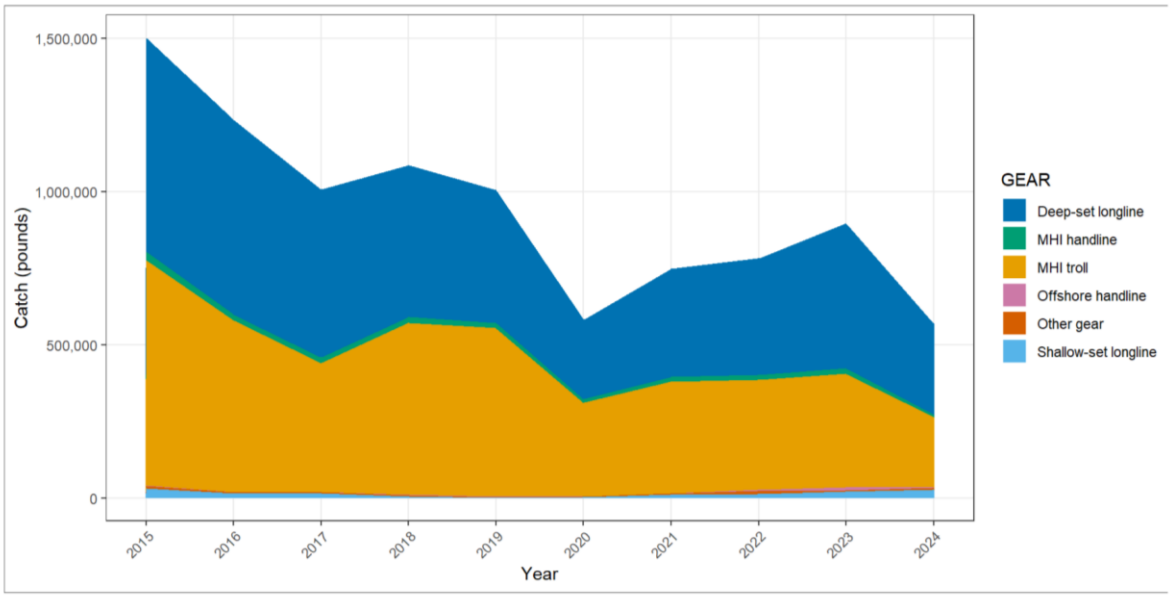



Figure 83. Hawaii mahimahi catch by gear type

Supporting data shown in Table A-84.

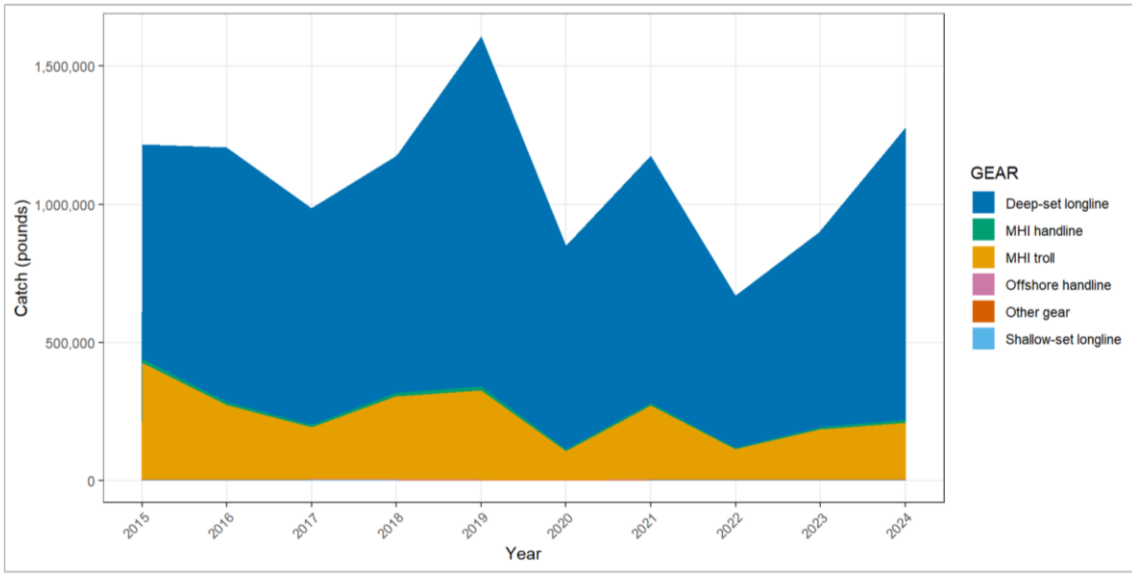



Figure 84. Hawaii ono (wahoo) catch by gear type

Supporting data shown in Table A-85.

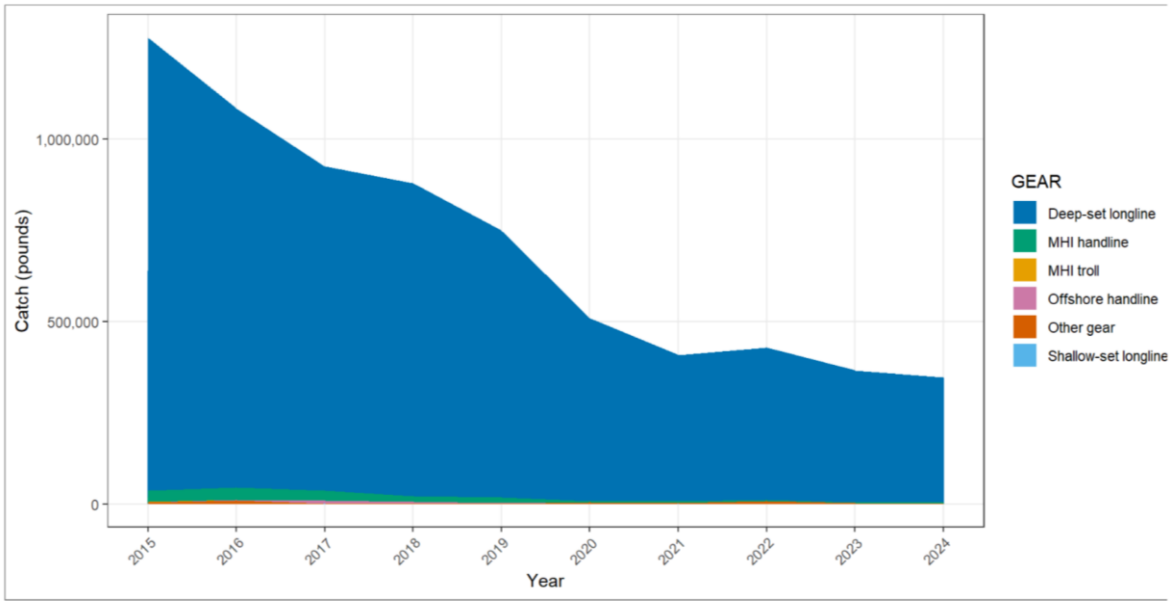



Figure 85. Hawaii pomfret catch by gear type

Supporting data shown in Table A-86.

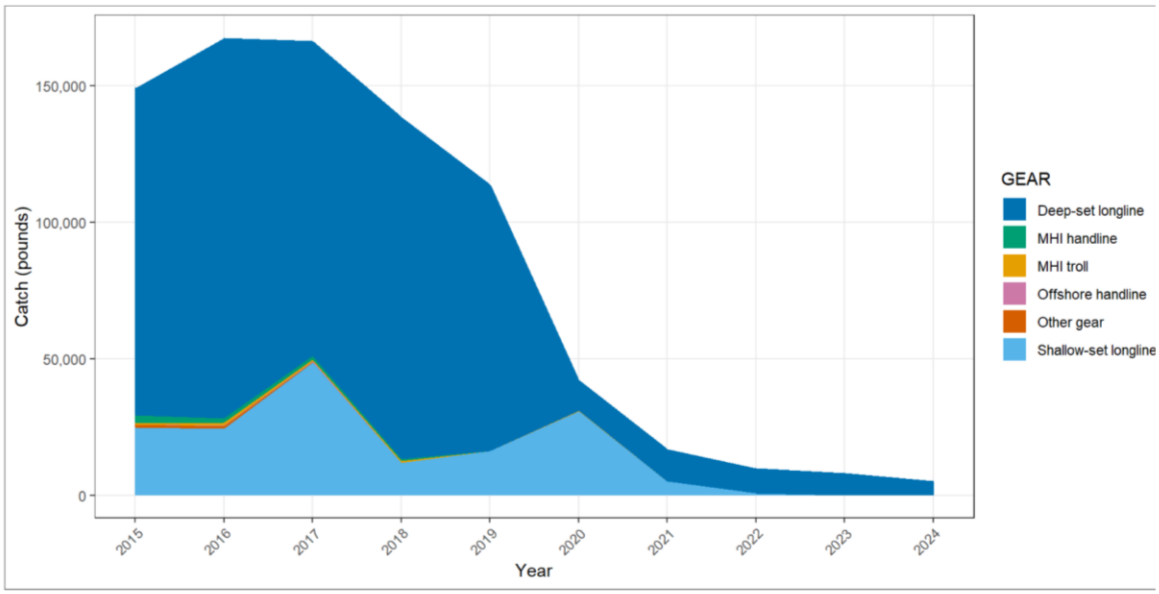



Figure 86. Hawaii PMUS shark catch by gear type

Supporting data shown in Table A-87.

### 2.4.6 HAWAII DEEP-SET LONGLINE FISHERY EFFORT, LANDINGS, REVENUE, AND CPUE

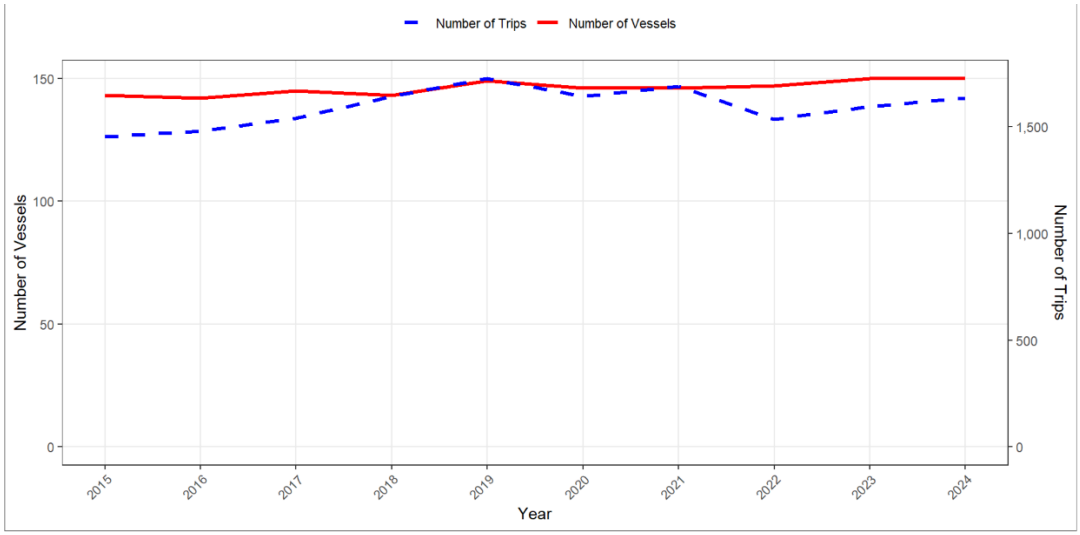



Figure 87. Number of Hawaii-permitted deep-set longline vessels and trips
Supporting data shown in Table A-88.

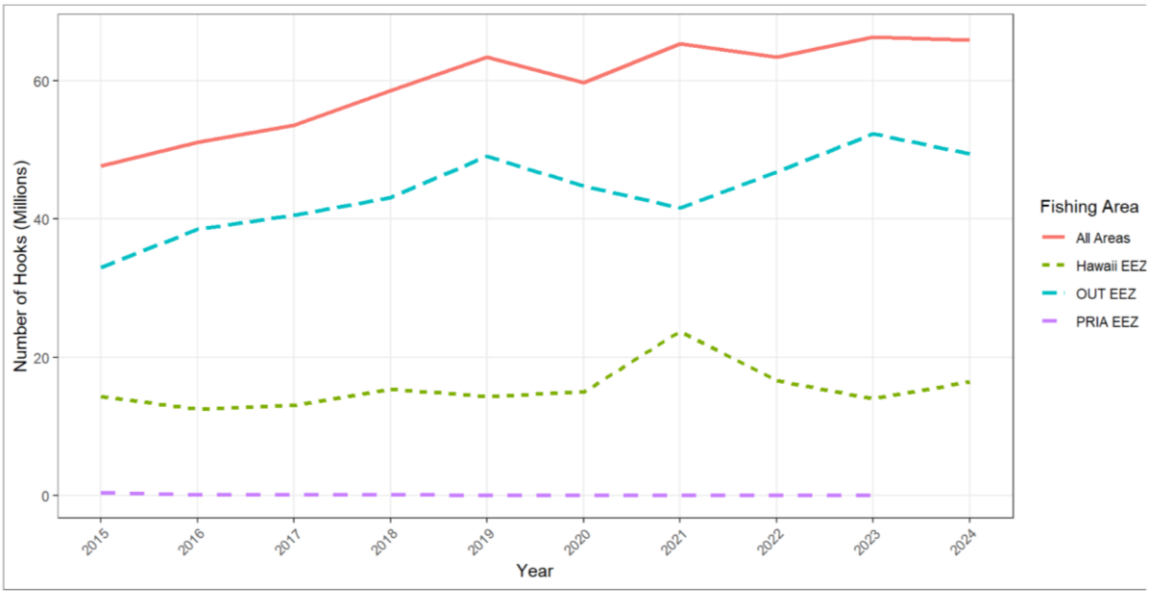



Figure 88. Number of hooks set by the Hawaii-permitted deep-set longline fishery
Supporting data shown in Table A-89.

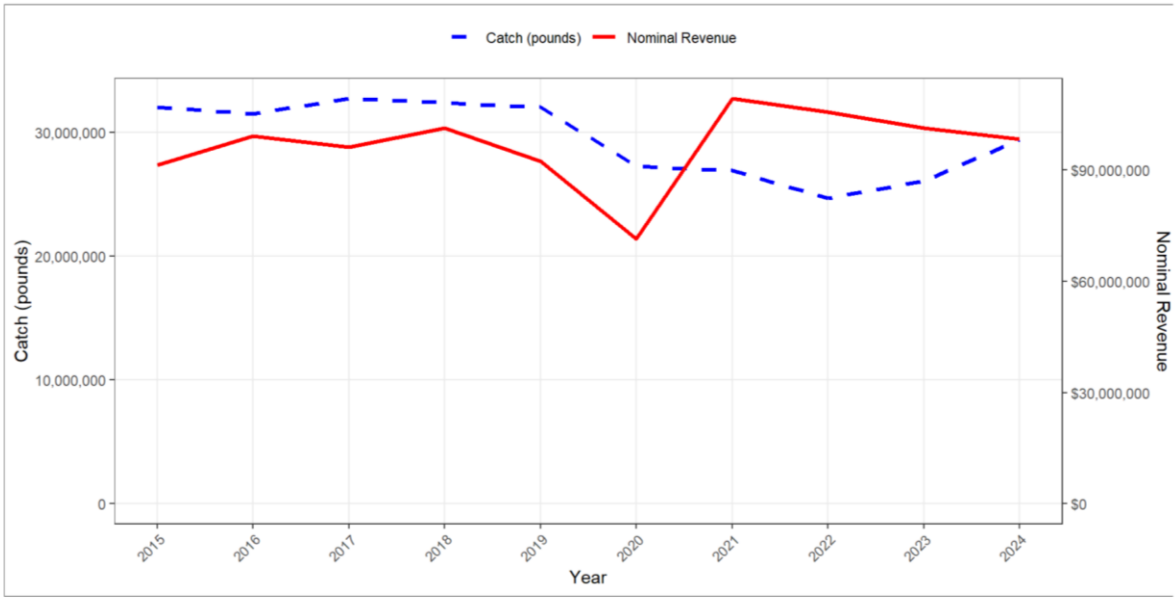



Figure 89. Catch and revenue for the Hawaii-permitted deep-set longline fishery

Supporting data shown in Table A-90.

Table 24. Hawaii-permitted deep-set longline catch (number of fish) by area

| | Tunas | | | Billfish | | | | Other PMUS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bigeye tuna | Yellowfin tuna | Albacore | Swordfish | Blue marlin | Striped marlin | Spearfish | Mahimahi | Ono (Wahoo) | Moonfish | Pomfrets | PMUS Sharks |
| **Hawaii + PRIAs EEZ** | | | | | | | | | | | | |
| **2015** | 62,393 | 11,939 | 3,135 | 1,349 | 2,647 | 5,966 | 7,146 | 15,434 | 6,562 | 2,756 | 22,092 | 26,550 |
| **2016** | 45,282 | 13,650 | 1,656 | 1,248 | 1,817 | 3,888 | 7,199 | 9,097 | 5,777 | 2,323 | 15,826 | 23,954 |
| **2017** | 52,352 | 24,337 | 277 | 825 | 2,298 | 4,314 | 5,507 | 8,849 | 5,147 | 1,795 | 12,731 | 28,022 |
| **2018** | 46,410 | 19,652 | 292 | 1,622 | 2,918 | 5,387 | 5,034 | 10,226 | 7,213 | 2,637 | 13,079 | 26,753 |
| **2019** | 39,590 | 12,178 | 167 | 1,126 | 3,860 | 5,735 | 3,748 | 6,079 | 8,235 | 2,142 | 13,211 | 30,358 |
| **2020** | 41,850 | 13,807 | 75 | 761 | 2,387 | 3,179 | 2,603 | 4,691 | 5,243 | 1,234 | 9,548 | 30,504 |
| **2021** | 58,694 | 26,613 | 516 | 1,267 | 2,522 | 4,087 | 5,068 | 6,449 | 11,010 | 777 | 9,488 | 37,561 |
| **2022** | 35,414 | 20,500 | 650 | 761 | 1,725 | 3,292 | 3,483 | 5,751 | 3,783 | 478 | 6,016 | 22,437 |
| **2023** | 26,271 | 15,125 | 1,440 | 735 | 1,179 | 2,826 | 4,589 | 4,594 | 4,043 | 326 | 4,464 | 19,382 |
| **2024** | 29,956 | 25,215 | 1,475 | 916 | 3,504 | 9,220 | 5,299 | 4,017 | 8,052 | 413 | 4,409 | 21,285 |
| **Outside EEZ** | | | | | | | | | | | | |
| **2015** | 167,550 | 15,745 | 7,072 | 4,048 | 4,868 | 7,155 | 10,707 | 44,946 | 18,337 | 26,593 | 75,363 | 59,994 |
| **2016** | 175,867 | 32,820 | 8,197 | 3,870 | 4,444 | 7,700 | 16,828 | 39,397 | 24,440 | 22,029 | 65,864 | 66,044 |
| **2017** | 172,039 | 55,283 | 3,831 | 4,751 | 5,720 | 8,705 | 15,161 | 37,297 | 20,279 | 22,999 | 55,005 | 71,687 |
| **2018** | 172,662 | 42,106 | 3,363 | 4,492 | 4,642 | 10,340 | 10,443 | 33,912 | 24,090 | 30,548 | 42,870 | 76,408 |
| **2019** | 181,754 | 49,999 | 4,177 | 3,775 | 9,066 | 14,734 | 12,548 | 31,700 | 36,311 | 22,844 | 39,891 | 95,725 |
| **2020** | 165,165 | 40,594 | 8,461 | 3,102 | 5,790 | 9,600 | 7,372 | 17,258 | 19,118 | 15,372 | 26,529 | 88,041 |
| **2021** | 128,268 | 54,688 | 12,031 | 2,846 | 3,725 | 5,559 | 6,505 | 23,376 | 21,740 | 7,564 | 24,637 | 76,691 |
| **2022** | 136,184 | 63,543 | 10,888 | 2,868 | 5,384 | 7,849 | 7,474 | 30,004 | 13,723 | 4,477 | 25,686 | 66,936 |
| **2023** | 140,436 | 68,295 | 30,544 | 3,295 | 4,537 | 4,220 | 11,244 | 37,503 | 19,801 | 4,488 | 24,686 | 64,042 |
| **2024** | 124,195 | 97,270 | 8,710 | 3,233 | 9,015 | 16,835 | 10,323 | 16,558 | 29,067 | 2,825 | 21,401 | 70,828 |
| **All areas** | | | | | | | | | | | | |
| **2015** | 229,943 | 27,684 | 10,207 | 5,397 | 7,515 | 13,121 | 17,853 | 60,380 | 24,899 | 29,349 | 97,455 | 86,544 |
| **2016** | 221,149 | 46,470 | 9,853 | 5,118 | 6,261 | 11,588 | 24,027 | 48,494 | 30,217 | 24,352 | 81,690 | 89,998 |
| **2017** | 224,391 | 79,620 | 4,108 | 5,576 | 8,018 | 13,019 | 20,668 | 46,146 | 25,426 | 24,794 | 67,736 | 99,709 |
| **2018** | 219,072 | 61,758 | 3,655 | 6,114 | 7,560 | 15,727 | 15,477 | 44,138 | 31,303 | 33,185 | 55,949 | 103,161 |
| **2019** | 221,344 | 62,177 | 4,344 | 4,901 | 12,926 | 20,469 | 16,296 | 37,779 | 44,546 | 24,986 | 53,102 | 126,083 |
| **2020** | 207,015 | 54,401 | 8,536 | 3,863 | 8,177 | 12,779 | 9,975 | 21,949 | 24,361 | 16,606 | 36,077 | 118,545 |
| **2021** | 186,962 | 81,301 | 12,547 | 4,113 | 6,247 | 9,646 | 11,573 | 29,825 | 32,750 | 8,341 | 34,125 | 114,252 |
| **2022** | 171,598 | 84,043 | 11,538 | 3,629 | 7,109 | 11,141 | 10,957 | 35,755 | 17,506 | 4,955 | 31,702 | 89,373 |
| **2023** | 166,707 | 83,420 | 31,984 | 4,030 | 5,716 | 7,046 | 15,833 | 42,097 | 23,844 | 4,814 | 29,150 | 83,424 |
| **2024** | 154,151 | 122,485 | 10,185 | 4,149 | 12,519 | 26,055 | 15,622 | 20,575 | 37,119 | 3,238 | 25,810 | 92,113 |

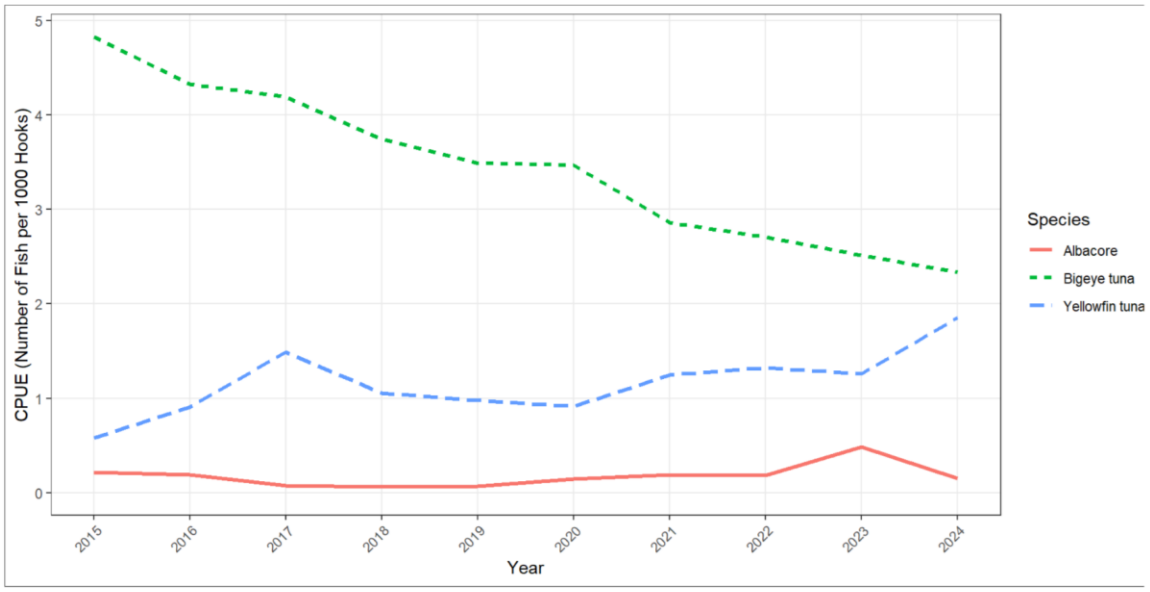



Figure 90. Tuna CPUE for the Hawaii-permitted deep-set longline fishery

Supporting data shown in Table A-91.

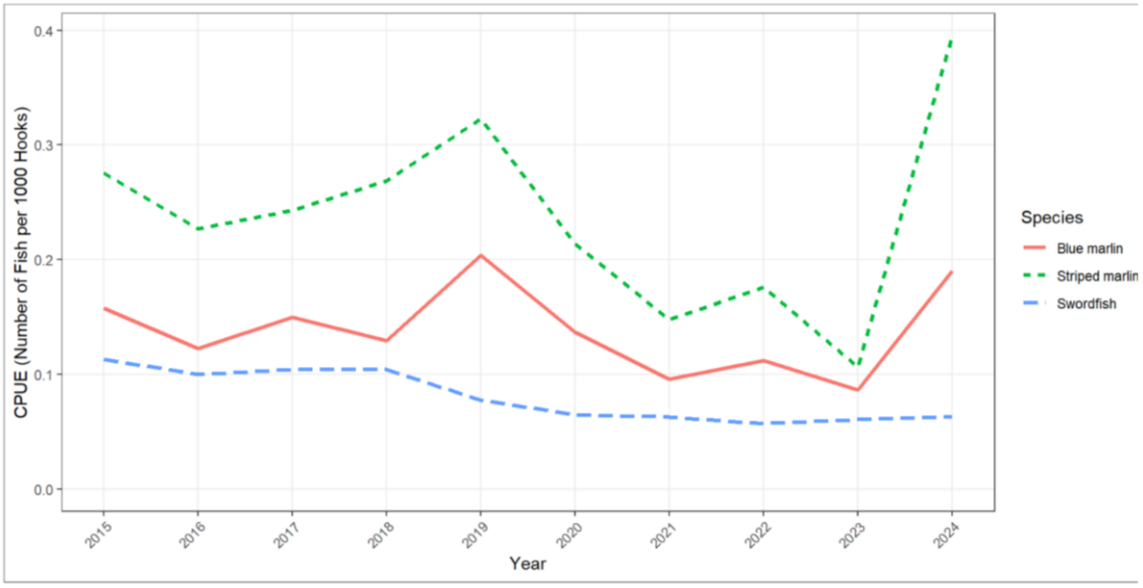



Figure 91. Billfish CPUE for the Hawaii-permitted deep-set longline fishery

Supporting data shown in Table A-92.

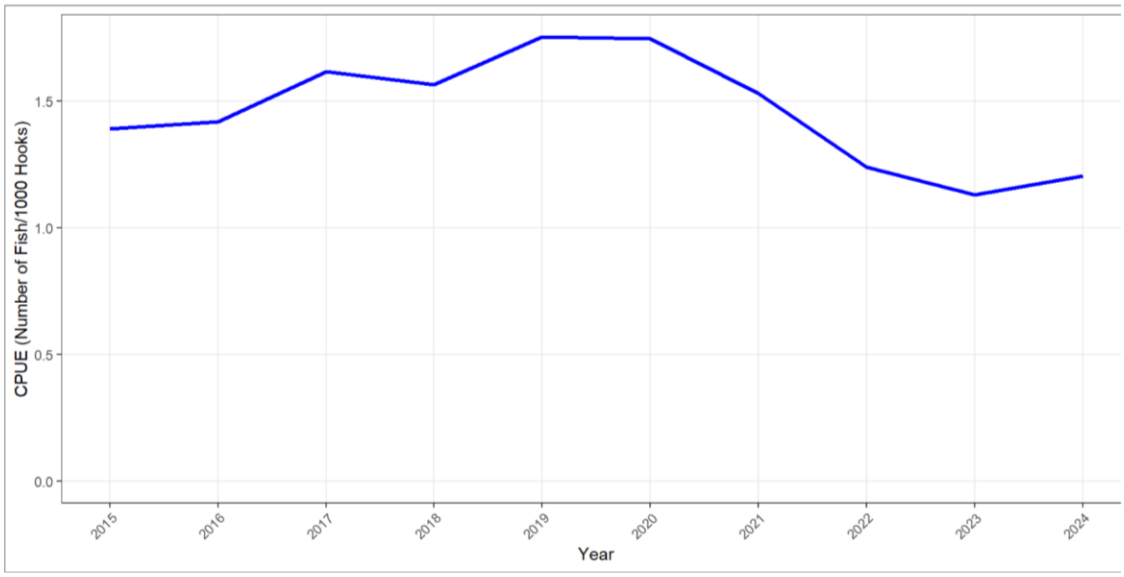



Figure 92. Blue shark CPUE for the Hawaii-permitted deep-set longline fishery

Supporting data shown in Table A-93.

Table 25. Total estimated bycatch in number of fish for the top 10 bycatch species from the Pacific Islands Region Observer Program for the Hawaii deep-set longline fishery

| Species | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | Average | SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lancetfish, Longnose | 204,042 | 229,791 | 230,048 | 309,551 | 275,802 | 288,339 | 217,244 | 153,865 | 199,574 | 165,052 | 227,331 | 51,138 |
| Shark, Blue | 93,260 | 102,250 | 123,166 | 119,306 | 134,067 | 139,284 | 124,209 | 87,911 | 88,965 | 108,592 | 112,101 | 18,640 |
| Snake Mackerel | 128,022 | 110,655 | 120,432 | 79,308 | 49,481 | 43,862 | 67,877 | 59,556 | 98,779 | 62,200 | 82,017 | 30,390 |
| Escolar | 21,762 | 37,860 | 35,052 | 44,873 | 47,973 | 50,556 | 53,089 | 45,225 | 45,246 | 61,159 | 44,280 | 10,807 |
| Tuna, Bigeye | 14,536 | 20,723 | 20,800 | 24,053 | 19,481 | 20,596 | 12,360 | 5,773 | 5,913 | 11,884 | 15,612 | 6,503 |
| Shark, Bigeye Thresher | 18,630 | 11,639 | 9,551 | 6,519 | 10,399 | 9,754 | 13,313 | 11,746 | 9,219 | 20,674 | 12,144 | 4,375 |
| Stingray, Pelagic | 4,191 | 6,958 | 6,608 | 7,234 | 10,949 | 9,357 | 8,526 | 9,533 | 10,646 | 9,970 | 8,397 | 2,124 |
| Pomfret, Dagger | 6,292 | 6,464 | 7,443 | 8,188 | 8,929 | 5,667 | 9,450 | 5,936 | 4,948 | 5,143 | 6,846 | 1,579 |
| Tuna, Yellowfin | 3,836 | 5,615 | 9,455 | 5,201 | 7,434 | 6,138 | 10,804 | 5,064 | 3,904 | 8,853 | 6,630 | 2,404 |
| Shark, Shortfin Mako | 4,490 | 6,205 | 8,184 | 8,834 | 7,362 | 7,052 | 4,678 | 2,597 | 2,364 | 2,334 | 5,410 | 2,463 |

Note: Marketable fish may be released by fishers when not as valuable (e.g., small size or damage from sharks or marine mammals) or for other reasons such as prioritization due to fish hold space.

Table 26. Released catch, retained catch, and total catch for the Hawaii-permitted deep-set longline fishery in 2024

| | Deep-set longline fishery | | | |
|---|---|---|---|---|
| | **Released catch** | **Percent released** | **Retained catch** | **Total Catch** |
| Tuna PMUS | | | | |
| Skipjack tuna | 230 | 1.4% | 15,918 | 16,148 |
| Bigeye tuna | 2,432 | 1.6% | 151,719 | 154,151 |
| Yellowfin tuna | 1,943 | 1.6% | 120,542 | 122,485 |
| Bluefin tuna | 0 | 0.0% | 11 | 11 |
| Albacore | 469 | 4.6% | 9,716 | 10,185 |
| Other tunas | 0 | 0.0% | 6 | 6 |
| SubTotal | 5,074 | 1.7% | 297,912 | 302,986 |
| Billfish PMUS | | | | |
| Striped marlin | 749 | 2.9% | 25,306 | 26,055 |
| Blue marlin | 116 | 0.9% | 12,403 | 12,519 |
| Swordfish | 114 | 2.7% | 4,035 | 4,149 |
| Spearfish | 728 | 4.7% | 14,894 | 15,622 |
| Other marlins | 34 | 4.6% | 707 | 741 |
| SubTotal | 1,741 | 2.9% | 57,345 | 59,086 |
| Other PMUS | | | | |
| Opah (moonfish) | 21 | 0.6% | 3,217 | 3,238 |
| Oilfish | 1,741 | 26.2% | 4,899 | 6,640 |
| Mahimahi | 140 | 0.7% | 20,435 | 20,575 |
| Ono (wahoo) | 187 | 0.5% | 36,932 | 37,119 |
| Pomfrets (monchong) | 214 | 0.8% | 25,596 | 25,810 |
| SubTotal | 2,303 | 2.5% | 91,079 | 93,382 |
| Non-PMUS fish | | | | |
| Non-PMUS fish | 6,114 | 98.0% | 123 | 6,237 |
| PMUS Sharks | | | | |
| Thresher shark | 9,593 | 99.9% | 10 | 9,603 |
| Blue shark | 79,426 | 100.0% | 0 | 79,426 |
| Oceanic whitetip shark | 702 | 100.0% | 0 | 702 |
| Mako sharks | 1,644 | 98.9% | 19 | 1,663 |
| Silky shark | 448 | 100.0% | 0 | 448 |
| SubTotal | 91,813 | 100.0% | 29 | 91,842 |
| Non-PMUS Sharks | | | | |
| Non-PMUS Sharks | 270 | 99.6% | 1 | 271 |
| SubTotal | **107,315** | **19.4%** | **446,489** | **553,804** |

Table 27. Average weight (lb) of the catch by the Hawaii-permitted deep-set longline fishery**.** Calculated by taking the total weight of all landings and dividing by the total number of pieces.

| | Hawaii-permitted deep-set longline fishery | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tunas | | | | | Billfish | | | | | | Other PMUS | | | | | Sharks | |
| Year | Bigeye tuna | Yellowfin tuna | Albacore | Skipjack tuna | Bluefin tuna | Swordfish | Striped marlin | Blue marlin | Spearfish | Sailfish | Black marlin | Mahimahi | Ono (wahoo) | Opah (moonfish) | Pomfrets (monchong) | Oilfish | Mako sharks | Thresher shark |
| 2015 | 85 | 74 | 52 | 18 | 237 | 165 | 81 | 185 | 33 | 59 | 219 | 12 | 31 | 91 | 13 | 18 | 195 | 219 |
| 2016 | 83 | 73 | 55 | 17 | 252 | 165 | 73 | 196 | 31 | 51 | 242 | 13 | 31 | 88 | 13 | 19 | 179 | 183 |
| 2017 | 79 | 72 | 49 | 19 | 252 | 190 | 67 | 188 | 32 | 63 | 286 | 12 | 31 | 92 | 13 | 20 | 181 | 200 |
| 2018 | 78 | 89 | 51 | 19 | 276 | 189 | 66 | 197 | 32 | 64 | 185 | 11 | 28 | 93 | 15 | 22 | 182 | 184 |
| 2019 | 79 | 74 | 53 | 18 | 269 | 187 | 61 | 157 | 28 | 31 | 182 | 12 | 29 | 94 | 14 | 22 | 190 | 190 |
| 2020 | 81 | 70 | 39 | 18 | 243 | 199 | 66 | 167 | 27 | 46 | 294 | 12 | 30 | 100 | 14 | 23 | 184 | 183 |
| 2021 | 84 | 68 | 39 | 19 | 232 | 176 | 63 | 155 | 26 | 54 | 177 | 12 | 27 | 104 | 12 | 21 | 184 | 183 |
| 2022 | 83 | 64 | 37 | 18 | 245 | 181 | 62 | 160 | 27 | 60 | 155 | 11 | 32 | 109 | 13 | 20 | 184 | 183 |
| 2023 | 85 | 74 | 37 | 20 | 254 | 179 | 67 | 151 | 28 | 64 | 143 | 11 | 30 | 105 | 12 | 21 | 184 | 183 |
| 2024 | 89 | 76 | 55 | 20 | 237 | 132 | 54 | 126 | 25 | 58 | 174 | 15 | 29 | 90 | 13 | 21 | 184 | 183 |
| Average | **82.5** | **73.4** | **46.8** | **18.5** | **249.9** | **176.4** | **66.0** | **168.3** | **28.7** | **55.0** | **205.7** | **12.0** | **29.7** | **96.6** | **13.3** | **20.8** | **184.7** | **189.1** |
| SD | **3.4** | **6.6** | **7.7** | **0.9** | **14.1** | **19.1** | **7.3** | **22.8** | **2.9** | **10.2** | **52.7** | **1.1** | **1.5** | **7.3** | **1.0** | **1.5** | **4.6** | **11.9** |

## 2.4.7 HAWAII SHALLOW-SET LONGLINE FISHERY EFFORT, LANDINGS. REVENUE, AND CPUE

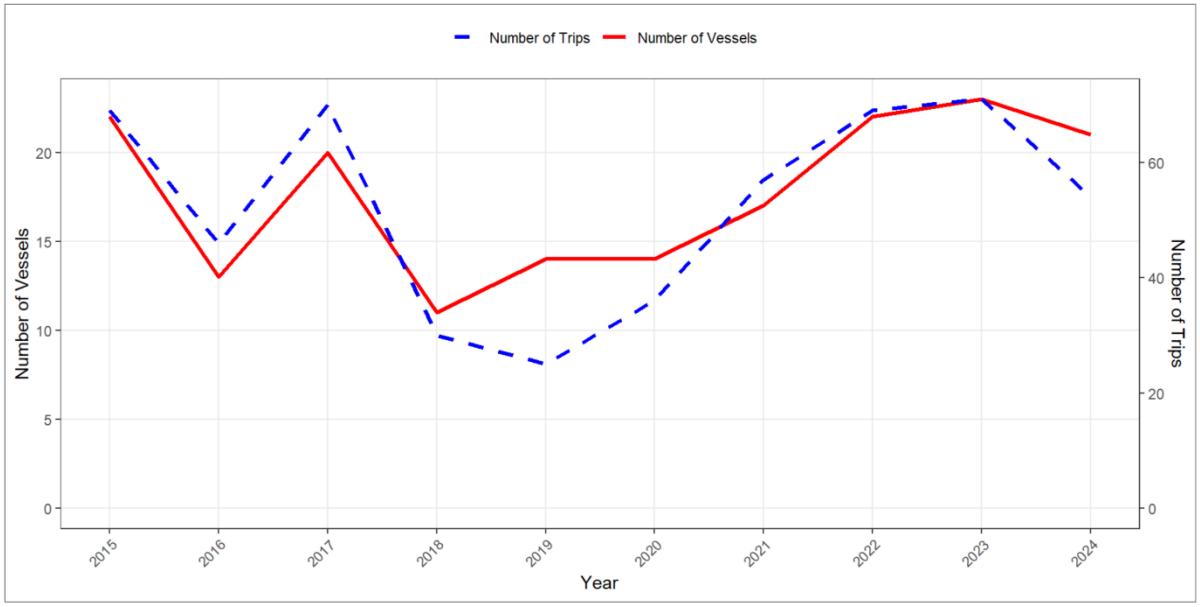



Figure 93. Number of Hawaii-permitted shallow-set longline vessels and trips
Supporting data shown in Table A-94.

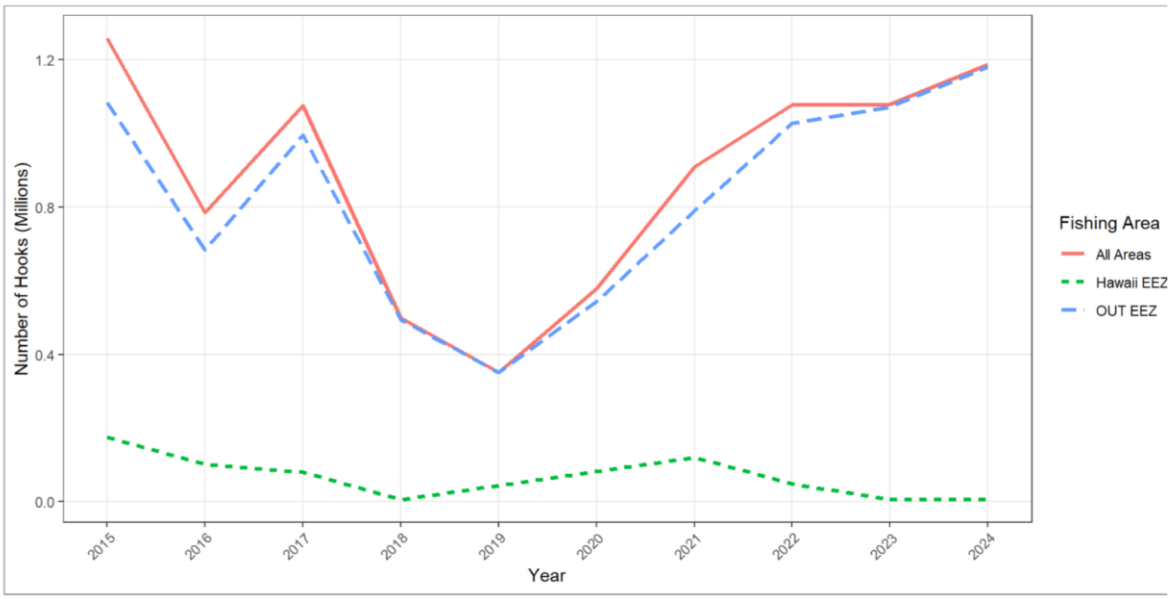



Figure 94. Number of hooks set by the Hawaii-permitted shallow-set longline fishery
Supporting data shown in Table A-95.

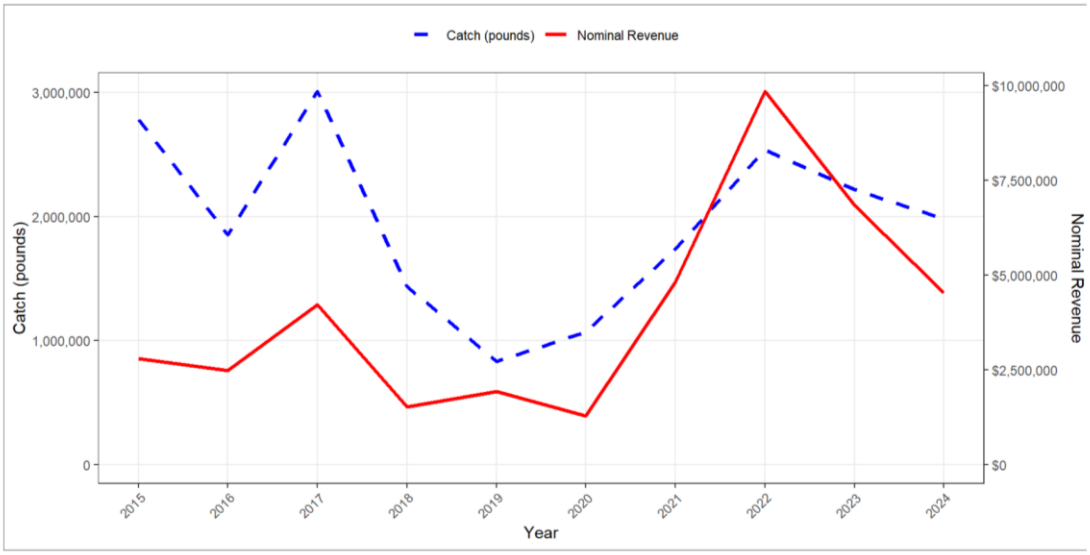



Figure 95. Catch and revenue for the Hawaii-permitted shallow-set longline fishery
Supporting data shown in Table A-96.

Table 28. Hawaii-permitted shallow-set longline catch (number of fish) by area

| | Tunas | | | Billfish | | | | Other PMUS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bigeye tuna | Yellowfin tuna | Albacore | Swordfish | Blue marlin | Striped marlin | Spearfish | Mahimahi | Ono (Wahoo) | Moonfish | Pomfrets | PMUS Sharks |
| **Hawaii + PRIAs EEZ** | | | | | | | | | | | | |
| **2015** | 40 | 36 | 1 | 2,001 | 23 | 111 | 40 | 804 | 5 | 0 | 3 | 1,537 |
| **2016** | 20 | 47 | 5 | 1,157 | 68 | 104 | 45 | 69 | 19 | 0 | 2 | 1,142 |
| **2017** | 12 | 31 | 1 | 787 | 32 | 88 | 38 | 38 | 10 | 0 | 2 | 586 |
| **2018** | 12 | 11 | 0 | 58 | 1 | 1 | 0 | 12 | 1 | 0 | 0 | 22 |
| **2021** | 100 | 94 | 0 | 424 | 41 | 69 | 65 | 34 | 23 | 4 | 36 | 485 |
| **2022** | 7 | 51 | 0 | 185 | 13 | 33 | 10 | 13 | 3 | 1 | 0 | 249 |
| **2023** | 1 | 4 | 0 | 13 | 0 | 8 | 0 | 2 | 1 | 0 | 1 | 32 |
| **2024** | 1 | 1 | 0 | 19 | 2 | 7 | 15 | 31 | 1 | 0 | 0 | 37 |
| **Outside EEZ** | | | | | | | | | | | | |
| **2015** | 1,305 | 103 | 305 | 12,988 | 26 | 155 | 66 | 1,822 | 11 | 645 | 121 | 12,544 |
| **2016** | 921 | 254 | 54 | 8,573 | 27 | 225 | 115 | 1,065 | 20 | 271 | 16 | 10,794 |
| **2017** | 1,518 | 1,522 | 286 | 13,141 | 26 | 323 | 122 | 1,263 | 64 | 431 | 37 | 10,271 |
| **2018** | 1,279 | 767 | 137 | 6,052 | 4 | 61 | 44 | 627 | 25 | 172 | 24 | 2,888 |
| **2019** | 874 | 331 | 81 | 3,435 | 0 | 12 | 18 | 247 | 3 | 31 | 5 | 3,195 |
| **2020** | 1,099 | 456 | 356 | 4,374 | 7 | 23 | 24 | 229 | 9 | 300 | 12 | 6,607 |
| **2021** | 873 | 1,067 | 626 | 6,074 | 50 | 123 | 38 | 1,218 | 38 | 20 | 1 | 5,735 |
| **2022** | 947 | 1,016 | 1,395 | 9,426 | 36 | 355 | 52 | 1,488 | 32 | 28 | 6 | 6,899 |
| **2023** | 670 | 905 | 841 | 8,554 | 23 | 165 | 35 | 2,355 | 51 | 12 | 6 | 7,534 |
| **2024** | 854 | 1,728 | 382 | 8,481 | 22 | 143 | 122 | 3,532 | 37 | 27 | 18 | 10,460 |
| **All areas** | | | | | | | | | | | | |
| **2015** | 1,345 | 139 | 306 | 14,989 | 49 | 266 | 106 | 2,626 | 16 | 645 | 124 | 14,081 |
| **2016** | 941 | 301 | 59 | 9,730 | 95 | 329 | 160 | 1,134 | 39 | 271 | 18 | 11,936 |
| **2017** | 1,530 | 1,553 | 287 | 13,928 | 58 | 411 | 160 | 1,301 | 74 | 431 | 39 | 10,857 |
| **2018** | 1,291 | 778 | 137 | 6,110 | 5 | 62 | 44 | 639 | 26 | 172 | 24 | 2,910 |
| **2019** | 874 | 331 | 81 | 3,435 | 0 | 12 | 18 | 247 | 3 | 31 | 5 | 3,195 |
| **2020** | 1,114 | 497 | 356 | 4,594 | 23 | 30 | 26 | 241 | 12 | 302 | 12 | 7,014 |
| **2021** | 973 | 1,161 | 626 | 6,498 | 91 | 192 | 103 | 1,252 | 61 | 24 | 37 | 6,220 |
| **2022** | 954 | 1,067 | 1,395 | 9,611 | 49 | 388 | 62 | 1,501 | 35 | 29 | 6 | 7,148 |
| **2023** | 671 | 909 | 841 | 8,567 | 23 | 173 | 35 | 2,357 | 52 | 12 | 7 | 7,566 |
| **2024** | 855 | 1,729 | 382 | 8,500 | 24 | 150 | 137 | 3,563 | 38 | 27 | 18 | 10,497 |

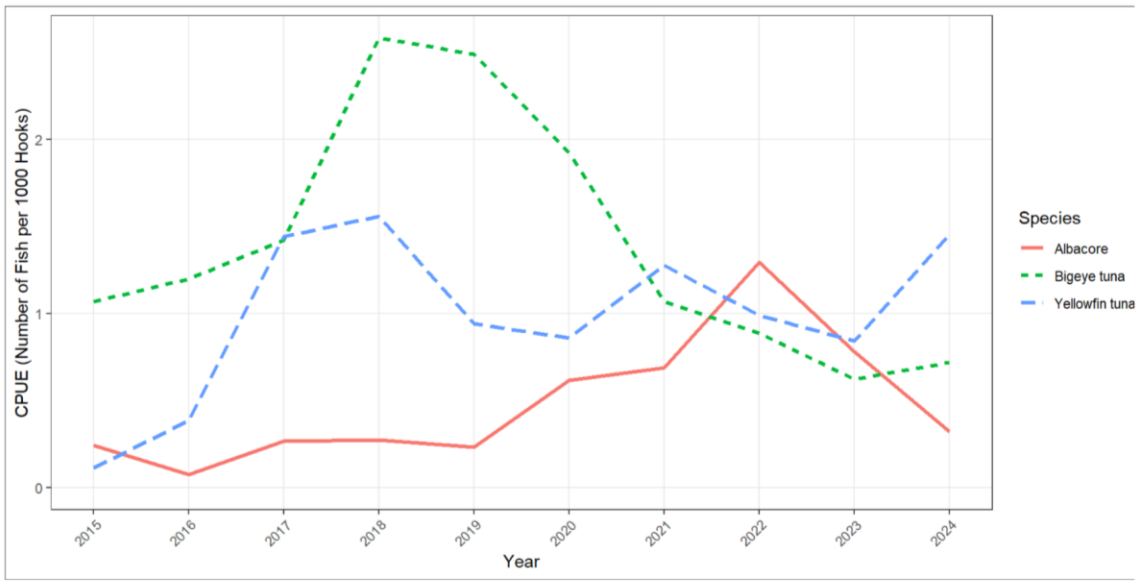



Figure 96. Tuna CPUE for the Hawaii-permitted shallow-set longline fishery

Supporting data shown in Table A-97.

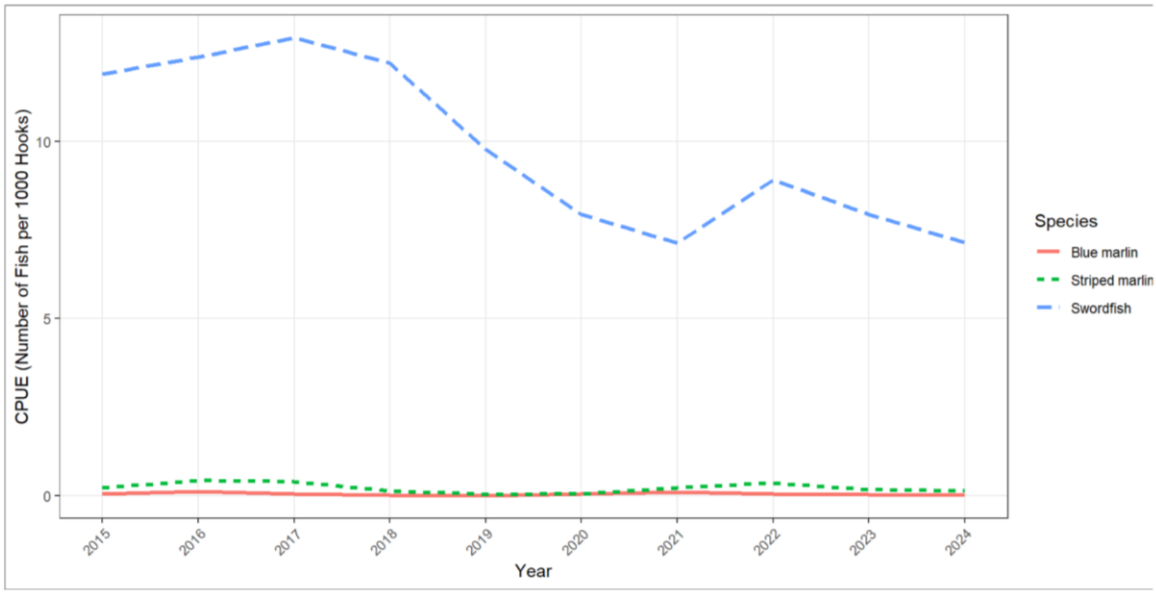



Figure 97. Billfish CPUE for the Hawaii-permitted shallow-set longline fishery

Supporting data shown in Table A-98.

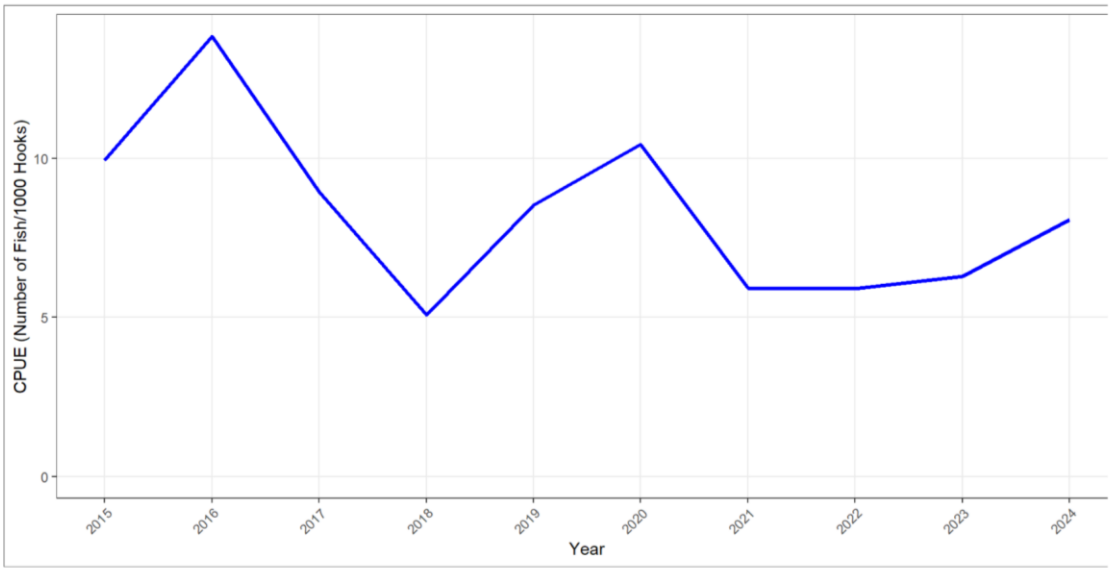



Figure 98. Blue shark CPUE for the Hawaii-permitted shallow-set longline fishery

Supporting data shown in Table A-99.

Table 29. Total estimated bycatch in number of fish for the top 10 bycatch species from the Pacific Islands Region Observer Program for the Hawaii shallow-set longline fishery

| Species | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | Average | SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shark, Blue | 13,453.0 | 11,853.0 | 10,102.0 | 4,115.0 | 4,225.0 | 6,949.0 | 6,446.0 | 8,252.0 | 7,214.0 | 10,544.0 | 8,315.3 | 3,127.3 |
| Lancetfish, Longnose | 2,597.0 | 1,784.0 | 2,728.0 | 1,211.0 | 1,232.0 | 1,268.0 | 2,480.0 | 3,150.0 | 3,121.0 | 3,940.0 | 2,351.1 | 944.1 |
| Shark, Shortfin Mako | 1,347.0 | 968.0 | 1,085.0 | 537.0 | 298.0 | 1,151.0 | 808.0 | 1,224.0 | 1,007.0 | 1,121.0 | 954.6 | 323.1 |
| Swordfish | 1,735.0 | 1,049.0 | 1,419.0 | 735.0 | 254.0 | 251.0 | 499.0 | 541.0 | 646.0 | 1,523.0 | 865.2 | 535.9 |
| Escolar | 481.0 | 459.0 | 765.0 | 150.0 | 122.0 | 152.0 | 521.0 | 557.0 | 686.0 | 498.0 | 439.1 | 226.1 |
| Stingray, Pelagic | 499.0 | 245.0 | 284.0 | 440.0 | 82.0 | 328.0 | 171.0 | 123.0 | 143.0 | 286.0 | 260.1 | 136.5 |
| Oilfish | 418.0 | 171.0 | 327.0 | 114.0 | 57.0 | 248.0 | 219.0 | 359.0 | 217.0 | 317.0 | 244.7 | 112.7 |
| Snake Mackerel | 313.0 | 315.0 | 638.0 | 62.0 | 16.0 | 31.0 | 98.0 | 151.0 | 104.0 | 85.0 | 181.3 | 191.8 |
| Dolphinfish | 222.0 | 83.0 | 107.0 | 34.0 | 18.0 | 20.0 | 75.0 | 69.0 | 86.0 | 500.0 | 121.4 | 145.3 |
| Tuna, Bigeye | 74.0 | 121.0 | 278.0 | 153.0 | 55.0 | 77.0 | 79.0 | 35.0 | 50.0 | 103.0 | 102.5 | 70.9 |

Note: Marketable fish may be released by fishers when not as valuable (e.g., small size or damage from sharks or marine mammals) or for other reasons such as prioritization due to fish hold space.

Table 30. Released catch, retained catch, and total catch for the Hawaii-permitted shallow-set longline fishery in 2024

| | Shallow-set longline fishery | | | |
|---|---|---|---|---|
| | **Released catch** | **Percent released** | **Retained catch** | **Total Catch** |
| Tuna PMUS | | | | |
| Skipjack tuna | 0 | 0.0% | 68 | 68 |
| Bigeye tuna | 54 | 6.3% | 801 | 855 |
| Yellowfin tuna | 136 | 7.9% | 1,593 | 1,729 |
| Bluefin tuna | 0 | 0.0% | 17 | 17 |
| Albacore | 117 | 30.6% | 265 | 382 |
| Other tunas | 0 | NaN | 0 | 0 |
| SubTotal | 307 | 10.1% | 2,744 | 3,051 |
| Billfish PMUS | | | | |
| Striped marlin | 8 | 5.3% | 142 | 150 |
| Blue marlin | 0 | 0.0% | 24 | 24 |
| Swordfish | 856 | 10.1% | 7,644 | 8,500 |
| Spearfish | 17 | 12.4% | 120 | 137 |
| Other marlins | 0 | NaN | 0 | 0 |
| SubTotal | 881 | 10.0% | 7,930 | 8,811 |
| Other PMUS | | | | |
| Opah (moonfish) | 4 | 14.8% | 23 | 27 |
| Oilfish | 163 | 63.4% | 94 | 257 |
| Mahimahi | 301 | 8.4% | 3,262 | 3,563 |
| Ono (wahoo) | 0 | 0.0% | 38 | 38 |
| Pomfrets (monchong) | 0 | 0.0% | 18 | 18 |
| SubTotal | 468 | 12.0% | 3,435 | 3,903 |
| Non-PMUS fish | | | | |
| Non-PMUS fish | 30 | 51.7% | 28 | 58 |
| PMUS Sharks | | | | |
| Thresher shark | 19 | 100.0% | 0 | 19 |
| Blue shark | 9,583 | 100.0% | 0 | 9,583 |
| Oceanic whitetip shark | 3 | 100.0% | 0 | 3 |
| Mako sharks | 889 | 100.0% | 0 | 889 |
| Silky shark | 0 | NaN | 0 | 0 |
| SubTotal | 10,494 | 100.0% | 0 | 10,494 |
| Non-PMUS Sharks | | | | |
| Non-PMUS Sharks | 3 | 100.0% | 0 | 3 |
| SubTotal | **12,183** | **46.3%** | **14,137** | **26,320** |

Table 31. Average weight (lb) of the catch by the Hawaii-permitted shallow-set longline fisheries

| | Hawaii-permitted shallow-set longline fishery | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tunas | | | | | Billfish | | | | | | Other PMUS | | | | | Sharks | |
| Year | Bigeye tuna | Yellowfin tuna | Albacore | Skipjack tuna | Bluefin tuna | Swordfish | Striped marlin | Blue marlin | Spearfish | Sailfish | Black marlin | Mahimahi | Ono (wahoo) | Opah (moonfish) | Pomfrets (monchong) | Oilfish | Mako sharks | Thresher shark |
| 2015 | 79 | 120 | 22 | 16 | - | 184 | 97 | 292 | 37 | 52 | - | 12 | 39 | 76 | 13 | 22 | 150 | 243 |
| 2016 | 86 | 103 | 34 | 16 | - | 179 | 97 | 304 | 39 | 52 | - | 14 | 33 | 83 | 13 | 21 | 215 | 243 |
| 2017 | 98 | 94 | 35 | 18 | 201 | 200 | 102 | 259 | 39 | 52 | - | 12 | 36 | 83 | 14 | 20 | 179 | 243 |
| 2018 | 89 | 98 | 36 | 16 | 201 | 214 | 94 | 413 | 36 | - | - | 10 | 39 | 84 | 14 | 25 | 184 | 243 |
| 2019 | 72 | 92 | 35 | 19 | - | 216 | 126 | - | 35 | 52 | - | 9 | 39 | 83 | 16 | 22 | 165 | - |
| 2020 | 90 | 76 | 28 | 18 | 201 | 193 | 97 | 176 | 34 | - | - | 12 | 36 | 83 | 17 | 19 | 175 | 243 |
| 2021 | 95 | 101 | 34 | 20 | 245 | 231 | 84 | 199 | 25 | 52 | - | 10 | 32 | 85 | 17 | 20 | 175 | 243 |
| 2022 | 106 | 92 | 28 | 18 | 214 | 239 | 77 | 225 | 26 | 43 | - | 9 | 36 | 80 | 12 | 29 | 175 | - |
| 2023 | 97 | 92 | 34 | 17 | 236 | 242 | 91 | 252 | 28 | 52 | - | 9 | 39 | 81 | 15 | 21 | - | - |
| 2024 | 94 | 77 | 31 | 21 | 220 | 224 | 81 | 200 | 25 | - | - | 9 | 36 | 83 | 13 | 22 | - | - |
| Average | **90.5** | **94.6** | **31.7** | **18.0** | **217.0** | **212.4** | **94.6** | **257.7** | **32.3** | **50.9** | — | **10.6** | **36.5** | **82.2** | **14.5** | **22.0** | **177.2** | **243.1** |
| SD | **9.8** | **12.7** | **4.4** | **1.8** | **17.7** | **22.4** | **13.7** | **72.3** | **5.8** | **3.7** | — | **1.9** | **2.6** | **2.5** | **1.6** | **2.9** | **18.6** | **0.0** |

### 2.4.8 MHI TROLL FISHERY EFFORT, LANDINGS, REVENUE, AND CPUE

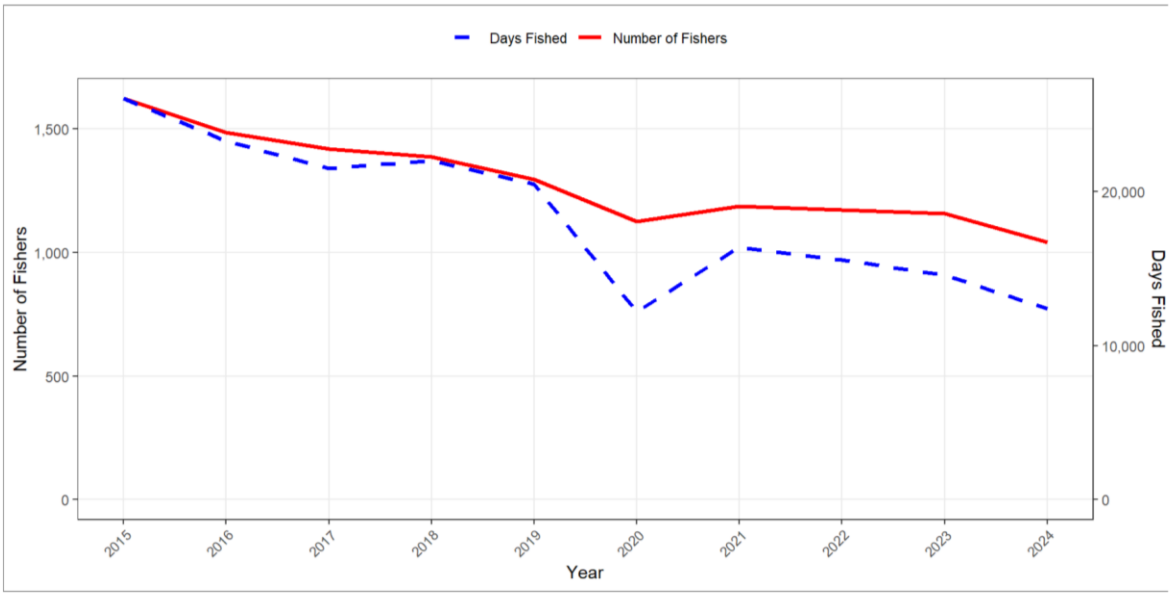



Figure 99. Number of MHI troll fishers and days fished

Supporting data shown in Table A-100.

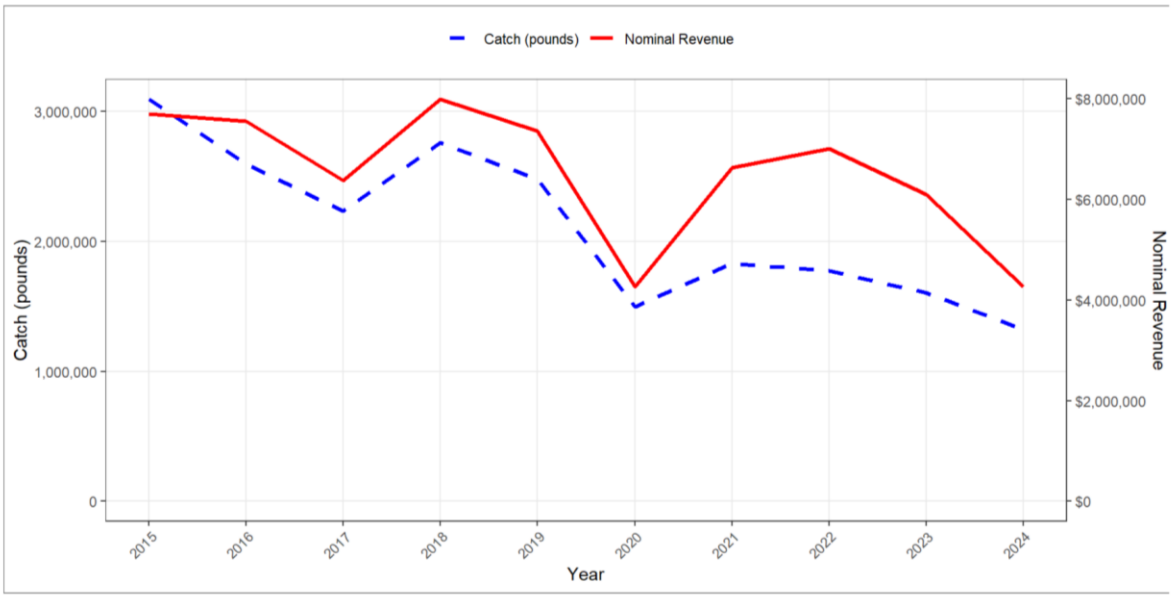



Figure 100. Catch and revenue for the MHI troll fishery

Supporting data shown in Table A-101.

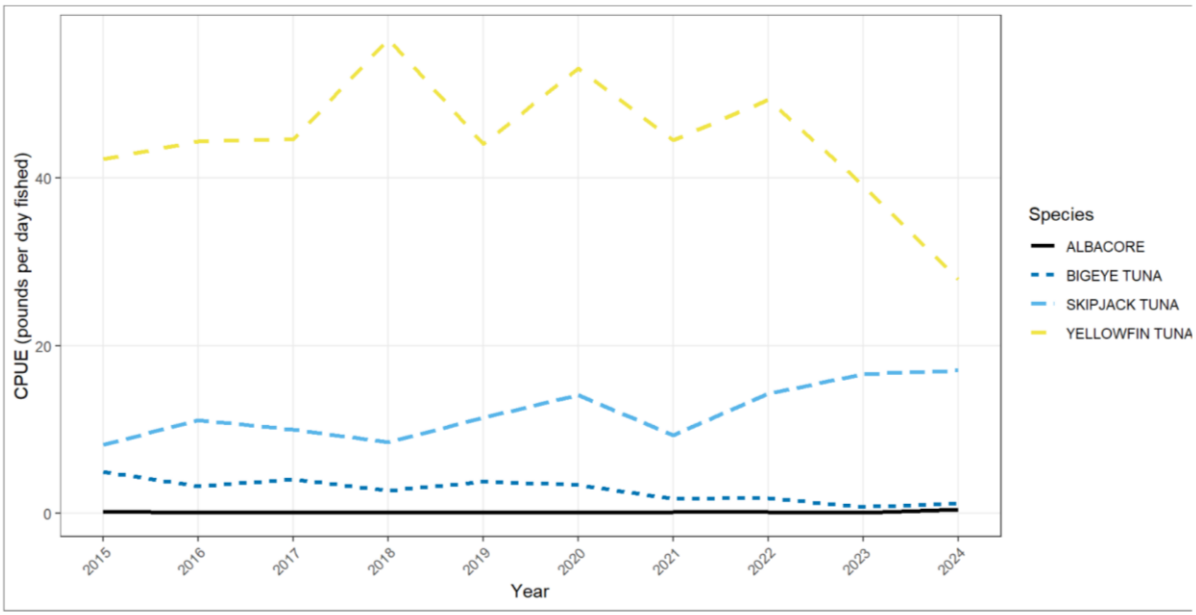



Figure 101. Tuna CPUE for the MHI troll fishery

Supporting data shown in Table A-102.

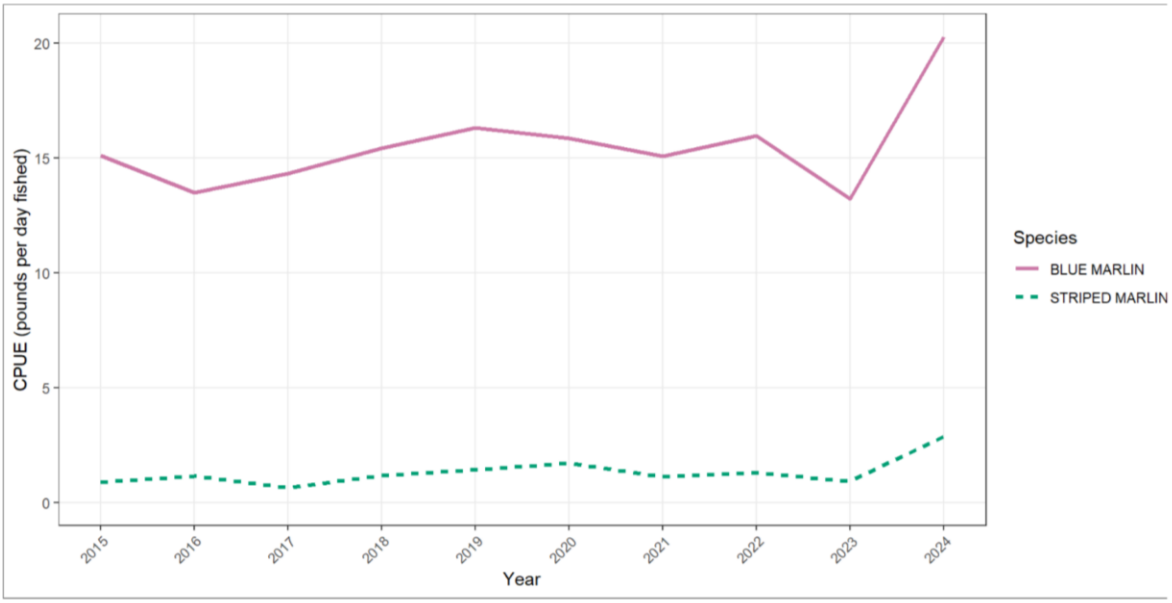



Figure 102. Marlin CPUE for the MHI troll fishery

Supporting data shown in Table A-103.

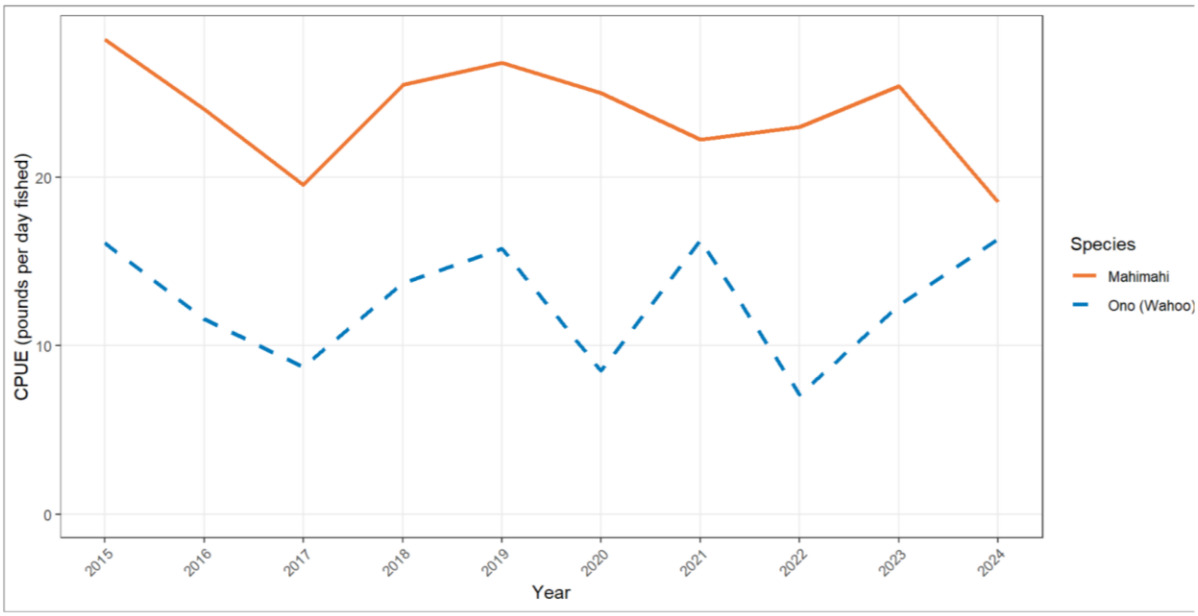



Figure 103. Mahimahi and Ono CPUE for the MHI troll fishery

Supporting data shown in Table A-104.

### 2.4.9 MHI HANDLINE FISHERY EFFORT, LANDINGS, REVENUE, AND CPUE

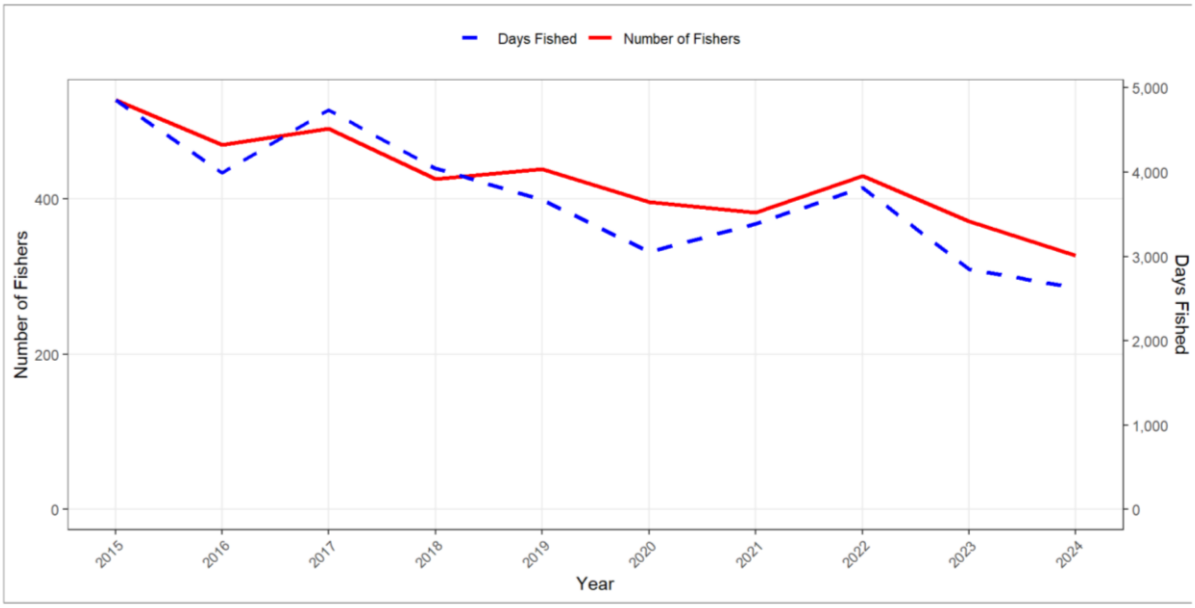



Figure 104. Number of MHI handline fishers and days fished

Supporting data shown in Table A-105.

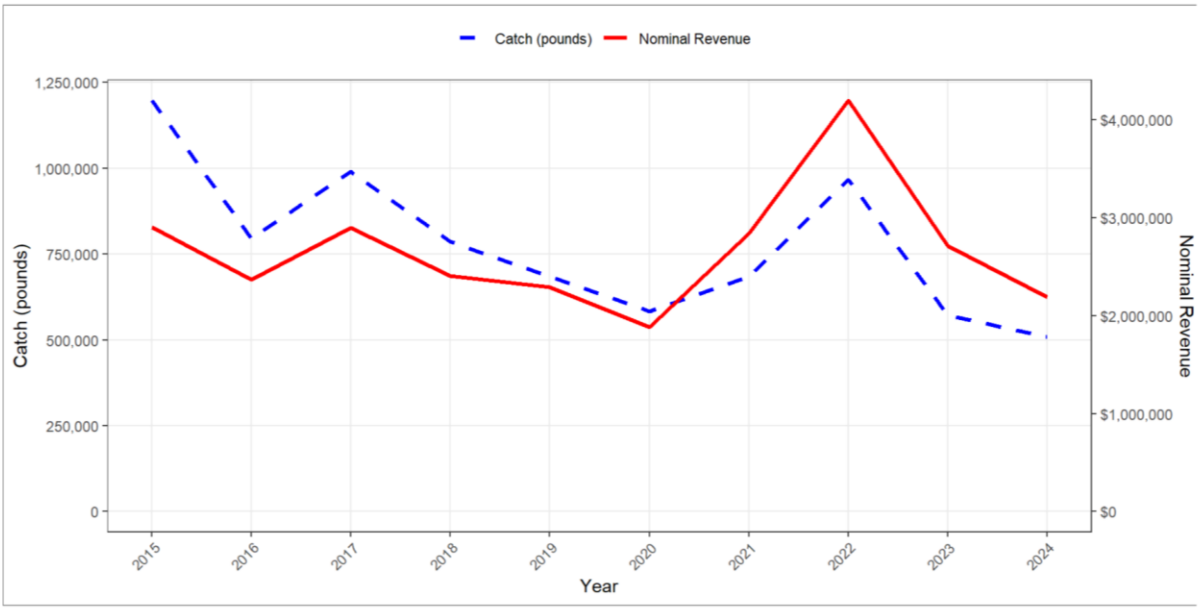



Figure 105. Catch and revenue for the MHI handline fishery

Supporting data shown in Table A-106.

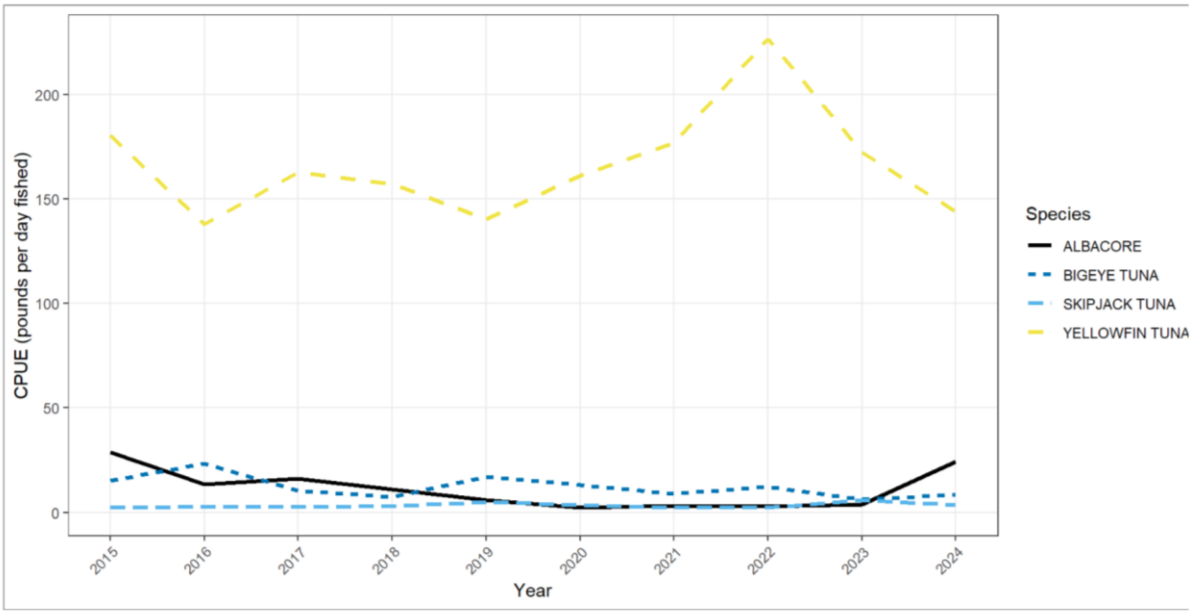



Figure 106. Tuna CPUE for the MHI handline fishery

Supporting data shown in Table A-107.

## 2.4.10 OFFSHORE HANDLINE FISHERY EFFORT, LANDINGS, REVENUE, AND CPUE

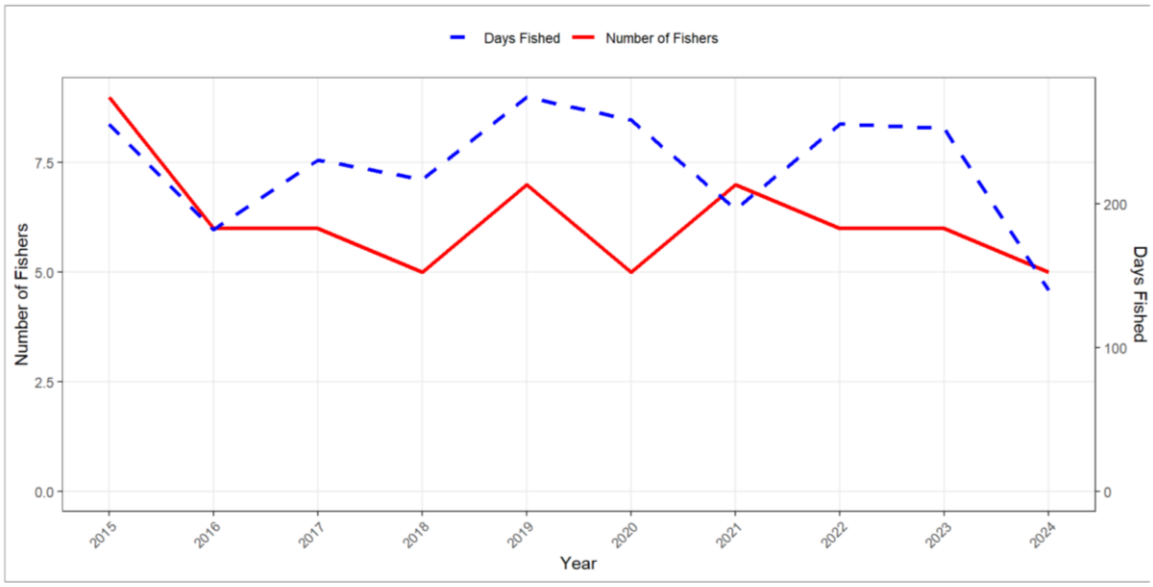



Figure 107. Number of offshore handline fishers and days fished

Supporting data shown in Table A-108.

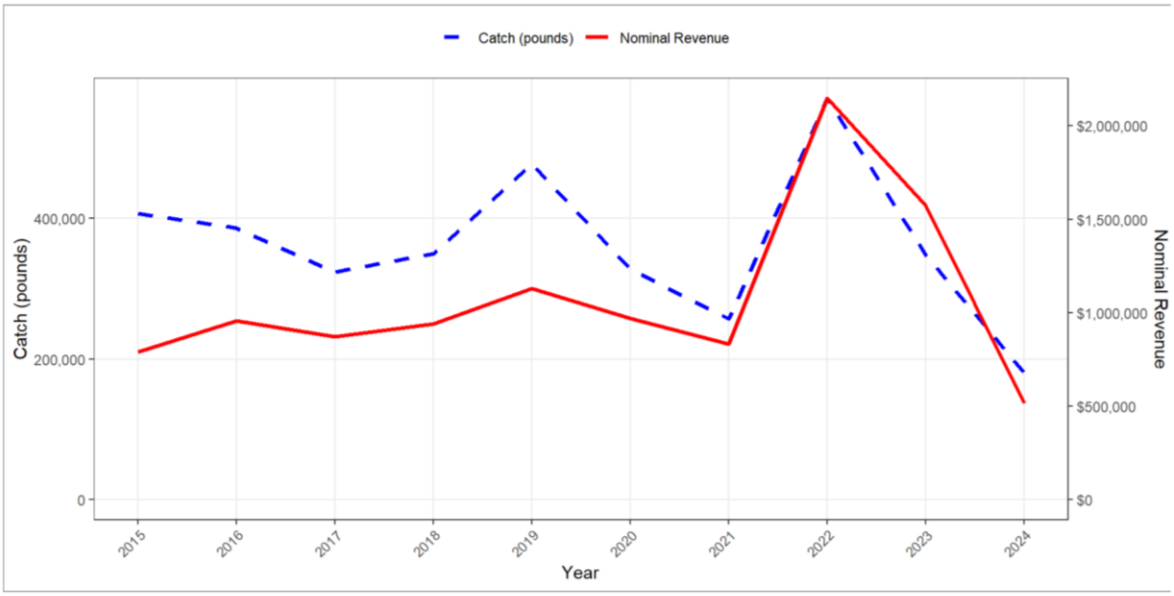



Figure 108. Catch and revenue for the offshore tuna handline fishery

Supporting data shown in Table A-109.

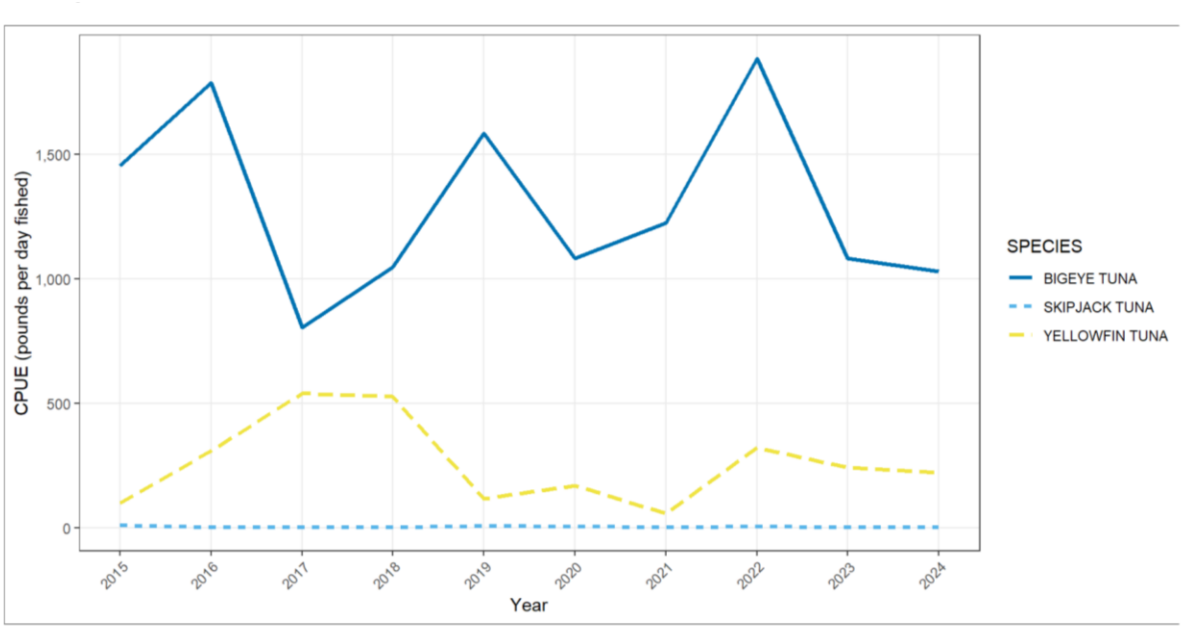



Figure 109. Tuna CPUE for the offshore tuna handline fishery

Supporting data shown in Table A-110.

Table 32. Average weight (lb) of the catch by the Hawaii troll and handline fisheries

| | Tunas | | | | Billfish | | | Other PMUS | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Albacore | Bigeye tuna | Skipjack tuna | Yellowfin tuna | Blue marlin | Striped marlin | Swordfish | Mahimahi | Ono (Wahoo) |
| **2015** | 44.1 | 19.8 | 7.4 | 28.9 | 180.7 | 75.6 | 93.2 | 13.4 | 21.7 |
| **2016** | 45.2 | 18.2 | 7.2 | 28.9 | 172.6 | 57.6 | 114.6 | 12.4 | 22.7 |
| **2017** | 51.5 | 20.5 | 9.2 | 40.0 | 187.3 | 70.2 | 116.3 | 11.3 | 22.7 |
| **2018** | 52.1 | 21.2 | 9.1 | 41.6 | 177.7 | 69.7 | 110.8 | 12.1 | 20.6 |
| **2019** | 53.4 | 19.5 | 8.6 | 31.5 | 157.1 | 66.0 | 128.1 | 12.8 | 20.6 |
| **2020** | 59.6 | 20.0 | 11.8 | 32.8 | 178.7 | 73.6 | 137.7 | 12.3 | 21.7 |
| **2021** | 51.6 | 22.0 | 9.5 | 29.9 | 167.6 | 81.0 | 93.4 | 13.0 | 22.2 |
| **2022** | 55.0 | 27.1 | 10.5 | 43.2 | 177.8 | 68.6 | 94.0 | 12.1 | 24.2 |
| **2023** | 47.4 | 31.8 | 7.8 | 38.6 | 199.5 | 70.8 | 123.3 | 12.5 | 23.5 |
| **2024** | 44.2 | 23.9 | 11.0 | 37.9 | 121.8 | 57.2 | 81.3 | 13.8 | 22.9 |
| Average | **50.4** | **22.4** | **9.2** | **35.3** | **172.1** | **69.0** | **109.3** | **12.6** | **22.3** |
| SD | **5.1** | **4.2** | **1.5** | **5.5** | **20.9** | **7.4** | **18.1** | **0.7** | **1.2** |

### 2.4.11 PELAGIC SMALL BOAT FISHERY BYCATCH SUMMARIES

CML holders are required to report all fishing activity regardless of whether the marine life is ultimately kept. Bycatch is reported at the species or species group level along with count (pieces), gear, reporting location grid number and other trip details. Fishers are not required to report bycatch in weight.

#### 2.4.11.1 FISHERY DEFINITIONS

To best represent bycatch of fisheries targeting pelagic fish, the troll and handline fishery categories were modified for bycatch estimation to exclude gear types that may catch pelagic fish (and thus included in the broad fishery definition to account for all pelagic catch) but do not typically target pelagics. Gears that were excluded for MHI troll include: casting, light tackle, spinners or whipping, and for MHI handline include: deep sea or bottom handline methods, inshore handline or cowrie shell, and kaka line.

#### 2.4.11.2 BYCATCH SUMMARIES

In 2024, 60% of the bycatch for the MHI troll fishery was blue marlin and yellowfin tuna (Table 33). High releases of blue marlin and other billfish are due in part to releases by sport charter fishers, which often target billfish, especially those fishing off West Hawai‘i Island. While high bycatch of yellowfin tuna is likely due to the State of Hawaii three-pound minimum size limit on the commercial sale of ahi (yellowfin and bigeye tuna). The MHI troll fishery also typically has bycatch of high-value species such as mahimahi, skipjack (aku), and ono that may be released because they are not at a marketable size, as well as, other species that have low market value. Small inshore species such as menpachi, 'āweoweo, and halalū are likely misreported by fishers for mixed-gear trips (e.g., trolling and inshore handline).

Reported bycatch for the MHI handline fishery was mostly yellowfin tuna and skipjack (aku) (Table 34). The majority of bycatch data are confidential and cannot be reported if less than three fishers reported catch of a particular species in a given year. Bycatch in this fishery is believed to be relatively low compared to overall catch, but underreporting may occur.

Bycatch for other pelagic fisheries including the offshore handline and offshore troll fisheries are not reported here due to data confidentiality rules. Both of these fisheries are extremely small in terms of participation compared with the MHI troll and handline fisheries.

Table 33. Total reported commercial bycatch (number of individuals) from the MHI troll fishery for fishing years 2015-2024

| Species | 2024 | 2023 | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Makaira mazara or Makaira nigricans*; Blue Marlin | 759 | 430 | 518 | 497 | 386 | 1167 | 949 | 651 | 681 | 1269 |
| *Thunnus albacares*; Yellowfin Tuna | 464 | 969 | 332 | 586 | 615 | 780 | 551 | 497 | 835 | 1240 |
| *Katsuwonus pelamis*; Aku | 285 | 457 | 248 | 224 | 187 | 124 | 151 | 193 | 417 | 411 |
| *Tetrapturus angustirostris*; Shortbill Spearfish | 200 | 39 | 30 | 30 | | 77 | 146 | 181 | 280 | 180 |
| *Coryphaena hippurus*; Mahimahi | 190 | 263 | 155 | 146 | 197 | 213 | 216 | 282 | 248 | 427 |
| *Kajikia audax*; Striped Marlin | 81 | | 48 | 21 | 38 | 101 | 54 | | 64 | 75 |
| *Selar crumenophthalmus*; Akule | n.d. | | | | | | | | | |
| *Acanthocybium solandri*; Ono | 43 | 59 | | 49 | | 56 | 66 | 60 | | |
| *Decapterus macarellus*; ʻŌpelu | n.d. | | | | | | | | | |
| *Thunnus obesus*; Bigeye Tuna | 28 | 23 | | 28 | 36 | 110 | | | 148 | 170 |
| *Euthynnus affinis*; Kawakawa | | 57 | 30 | | | | | | | 202 |
| *Seriola dumerili*; Kāhala | | 37 | 91 | 87 | 53 | 94 | 100 | 92 | 59 | |
| *Selachii (infraclass)*; Shark (Misc.) | | 30 | 29 | 21 | 26 | 53 | | | | |
| *Sphyraena barracuda*; Kākū | | | 36 | | 26 | | | | | 58 |
| *Caranx ignobilis*; White Pāpio/Ulua | | | | | 27 | | | | 59 | 55 |
| *Myripristis spp.*; Menpachi | | | | | | | n.d. | n.d. | n.d. | |
| *Heteropriacanthus cruentatus*; ʻĀweoweo | | | | | | | n.d. | n.d. | | |
| *Selar crumenophthalmus (Juvenile)*; Halalū | | | | | | | | n.d. | | |
| Percent of all Bycatch | 92 | 97 | 96 | 97 | 95 | 95 | 66 | 57 | 87 | 96 |

Note: Confidential bycatch are indicated by not disclosed (n.d.). Species presented represent the ten most frequently caught and released each year.

Table 34. Total reported commercial bycatch (number of individuals) from the MHI handline fishery for fishing years 2014-2024

| Species | 2024 | 2023 | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Thunnus albacares*; Yellowfin Tuna | 193 | 258 | 160 | 246 | 118 | 183 | 261 | 168 | 283 | 434 |
| *Katsuwonus pelamis*; Aku | 65 | 73 | 31 | n.d. | n.d. | n.d. | n.d. | 13 | 20 | 44 |
| *Myripristis spp.*; Menpachi | n.d. | | | | | | | | | |
| *Thunnus obesus*; Bigeye Tuna | 19 | n.d. | n.d. | 13 | n.d. | 46 | n.d. | 92 | 34 | 40 |
| *Elagatis bipinnulata*; Kamanu | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 26 | n.d. |
| *Selachii (infraclass)*; Shark (Misc.) | n.d. | | n.d. | n.d. | n.d. | | | n.d. | | |
| *Thunnus alalunga*; Tombo | n.d. | n.d. | | | | | | 15 | | |
| *Pristipomoides filamentosus*; ʻOpakapaka | n.d. | n.d. | | | n.d. | | | | | |
| *Caranx ignobilis*; White Pāpio/Ulua | n.d. | | n.d. | | | | | | | |
| *Coryphaena hippurus*; Mahimahi | | n.d. | 12 | n.d. | n.d. | 44 | 13 | 23 | n.d. | n.d. |
| *Acanthocybium solandri*; Ono | | n.d. | | n.d. | n.d. | n.d. | 21 | n.d. | 28 | n.d. |
| *Etelis carbunculus*; Ehu | | n.d. | | | | | | | | |
| *Aphareus rutilans*; Lehi | | n.d. | | | | | | | | |
| *Belonidae (family)*; ʻAha | | | n.d. | n.d. | | | n.d. | | | |
| *Seriola dumerili*; Kāhala | | | n.d. | | 12 | n.d. | 20 | | 7 | n.d. |
| *Isurus oxyrinchus*; Mako Shark | | | n.d. | | | | | | | |
| *Sphyraena barracuda*; Kākū | | | | n.d. | | | | | | |
| *Alopias vulpinus*; Thresher Shark | | | | n.d. | | | | | | |
| *Decapterus macarellus*; ʻŌpelu | | | | | n.d. | | | | | |
| *Euthynnus affinis*; Kawakawa | | | | | | n.d. | n.d. | n.d. | n.d. | n.d. |
| *Carcharhinus longimanus (Use Code 326) or Triaenodon obesus (Use Code 325)*; Carcharhinus longimanus (Use Code 326) or Triaenodon obesus (Use Code 325) | | | | | | n.d. | | | | 5 |
| *Balistidae (family)*; Humuhumu | | | | | | n.d. | | | | |
| *Caranx melampygus*; ʻŌmilu | | | | | | | n.d. | | | |
| *Prionace glauca*; Blue Shark | | | | | | | | n.d. | | |
| *Selar crumenophthalmus*; Akule | | | | | | | | | n.d. | n.d. |
| *Carangidae (family)*; Pāpio, Ulua (Misc.) | | | | | | | | | n.d. | |
| Percent of all Bycatch | 81 | 83 | 70 | 66 | 65 | 59 | 65 | 78 | 88 | 75 |

Note: Confidential bycatch are indicated by not disclosed (n.d.). Species presented represent the ten most frequently caught and released each year.

## 2.5 NON-COMMERCIAL PELAGIC FISHERIES

### 2.5.1 OVERVIEW OF NON-COMMERCIAL PELAGIC FISHERIES

Fishing, either for subsistence, sustenance, or recreation continues to be an important activity throughout the Western Pacific region in its four major populated island areas: Hawaii, American Samoa, Guam, and the CNMI. These non-commercial fisheries are important in island communities that depend on fish and other marine organisms as one of its few local sources of protein. This section was not updated in the 2021 or 2022 report in preparation of a revised section in the 2023 annual SAFE report, consistent with recommendations by the Council's Pelagic Plan Team.

In Hawaii, non-commercial shoreline fishing was more popular than boat-based fishing up to and after World War 2. Boat-based fishing during this period referred primarily to fishing from traditional canoes (Glazier 1999). All fishing was greatly constrained during World War 2 through time and area restrictions, which effectively stopped commercial fishing and confined non-commercial fishing to inshore areas (Brock 1947). Following World War 2, the advent of better fishing equipment, new small boat hulls, and marine inboard and outboard engines led to a growth in small vessel-based non-commercial fishing.

A major period of expansion of small vessel non-commercial fishing occurred between the late 1950s and early 1970s through the introduction of fiberglass technology to Hawaii and the further refinement of marine inboard and outboard engines. By the early 1960s there were an estimated 5,300 small boats in the State being used for non-commercial fishing. By the 1980s, the number of non-commercial craft had risen to almost 13,000 vessels, and this number increased further to about 15,000 vessels in the 1990s. There are many fishing clubs in Hawaii, and a variety of different recreational fishing tournaments organized by both clubs and independent tournament organizers. Hawaii also hosts between 150 and 200 boat-based fishing tournaments, about 30 of which are considered major international competitions. This level of interest in recreational fishing is sufficient to support local fishing magazines, *Hawaii Fishing News* and *Lawai'a*, with articles about local recreational fishing, as well as several recreational fishing television programs.

Elsewhere in the Western Pacific region, non-commercial fishing is less structured. In Guam, fishing clubs have been founded along ethnic lines by Japanese and Korean residents. These clubs had memberships of 10 to 15 people along with their families. Four such clubs were founded in Guam over the past 20 years, but none lasted for more than a 2 to 3 years (Gerry Davis, NMFS PIRO, pers. comm.). There was also a Guam Boating Association, comprised of mostly fishermen, with several hundred members. This organization functioned as a fishing club for about 10 years before disbanding. Some school groups and the boy scouts have formed fishing clubs focused on rod and reel fishing, and there is still one spearfishing club (Marianas Underwater Fishing Federation) that is active. There are also some limited fishing tournaments in Guam, including a fishing derby for children organized by the DAWR.

Every summer in Guam, the fishing community gathers to partake in several fishing derbies and the *Gupot Y Peskadot* (i.e., Fishermen's Festival). This includes several fishing competitions such as the Kid's Fishing Derby, In-Shore Tournament (rod and reel), Spearfishing Challenge and Guam Marianas International Fishing Derby (trolling).

There are a few fishing clubs in the in the Northern Mariana Islands. The Saipan Fishermen's Association (SFA) has been in existence since 1985 and is the sponsor of the annual Saipan International Fishing Tournament usually held in August or September. The SFA also developed a "Tasi to Table" Youth Fishing Club, which provides fishing experiences and training to high school students. One spearfishing club, the Marianas Apnea Spearfishing Club, was founded in 2007 and continues to instill traditional cultural fishing skills among the people of the CNMI to encourage sustainable fishing.

Levine and Allen (2009) provided an overview of fisheries in American Samoa, including subsistence and recreational fisheries. Citing a survey conducted in American Samoa by Kilarski et al. (2006), Levine and Allen (2009) noted that approximately half of the respondents stated that they fished for recreation, with 71 percent of these individuals fishing once a week or less. Fishermen also fished infrequently for cultural purposes, although cultural, subsistence, and recreational fishing categories were difficult to discern as one fishing outing could be motivated by any combination of the three reasons.

Boat-based recreational fishing in American Samoa has been influenced primarily by fishing clubs and fishing tournaments. Tournament fishing for pelagic species began in American Samoa in the 1970s, and between 1974 and 1998, a total of 64 fishing tournaments were held (Tulafono 2001). Most of the boats that participated were *alia* catamarans and small skiffs. Catches from tournaments were often sold, as most of the entrants were local small-scale commercial fishermen. In 1996, three days of tournament fishing contributed about one percent of the total domestic landings. Typically, seven to 14 local boats carrying a total of 55 to 70 fishermen participated in each tournament, which were held two to five times per year (Craig et al. 1993).

Most tournament participants operated 28-foot *alia* vessels, the same vessels that engage in the small-scale longline fishery. With more emphasis on commercial longline fishing since 1996, interest in the tournaments waned (Tulafono 2001) and pelagic fishing effort shifted markedly from trolling to longlining. Catch-and-release recreational fishing is virtually non-existent in American Samoa. Landing fish to meet cultural obligations is of such high importance such that releasing fish would generally be considered a failure to meet these responsibilities (Tulafono 2001). Nevertheless, some pelagic fishermen who fish for subsistence release fish that are in excess of their subsistence needs.

Most of the non-commercial boat-based fishing is done by the Pago Pago Game Fishing Association (PPGFA), which was founded in 2003 to host regular fishing competitions. The PPGFA has annually hosted international tournaments with fishermen from neighboring Samoa and Cook Islands attending. The non-commercial vessels extensively use anchored FADs, and venture to the various outer banks such as the South Bank (35 miles), North East Bank (40 miles NE), South East bank (37 miles SE), Two Percent Bank (40 miles), and East Bank (24 miles East) during tournaments. The PPGFA plays host to the Steinlager *I'a Lapo'a* Game Fishing Tournament, which is a qualifying event for the International Game Fish Association's Offshore World Championship. There is no full-time regular charter fishery in American Samoa similar to those in Hawaii, CNMI, or Guam. However, Pago Pago Marine Charters does include fishing charters among the services it offers.

There is also some non-commercial fishing activity within portions of the PRIA, namely at Midway, Wake Island, and Palmyra Atoll. There are no resident populations at Howland

Island, Baker Island, Johnston Atoll, or Jarvis Island, and fishing activity at these locations is likely minimal. There was a tourist facility at Midway until 2002, which operated a charter boat fishery targeting primarily pelagic fish. The company operated five vessels for charter fishing, consisting of three 22 to 26 foot catamarans for lagoon and nearshore fishing operations and two 38 foot sportfishing vessels used for blue water trolling. In addition, there were approximately seven small vessels maintained and used by Midway residents for non-commercial fishing. Of these seven, three vessels engaged primarily in offshore trolling for PMUS including yellowfin tuna, wahoo, and marlin. All vessels fishing at Midway were required to file a float plan prior to a fishing trip and complete the "Midway Sports Fishing Boat Trip Log" upon completion of each trip. The U.S. Fish and Wildlife Service was responsible for compiling these catch data.

At Palmyra Atoll, an island privately owned by The Nature Conservancy, small boats are operated within the lagoon for trolling. There are several craft used for non-commercial fishing at the military base on Wake Island, including two landing craft and two small vessels.

## 2.6 INTERNATIONAL

### 2.6.1 INTRODUCTION

The U.S Pacific Island EEZs managed by the Council are surrounded by large and diverse fisheries targeting pelagic species. The International Module contains reported catches of pelagic species in the entire Pacific Ocean by fleets of Pacific Island nations and distant water fishing nations and information for a SAFE report that includes the most recent assessment information in relation to status determination criteria. Fishery trends in the entire Pacific Ocean are illustrated for the purse seine, longline and pole-and-line fisheries. The tables of this section show the catches of pelagic MUS by U.S. longline (Hawaii and California-based) and U.S. territorial longline fisheries in the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area from 2018-2023, as reported by NMFS to the WCPFC. The catches for 2023 are preliminary.

Table 41 through Table 43 provide the U.S. longline landings as submitted to the WCPFC and Inter-American Tropical Tuna Commission (IATTC).

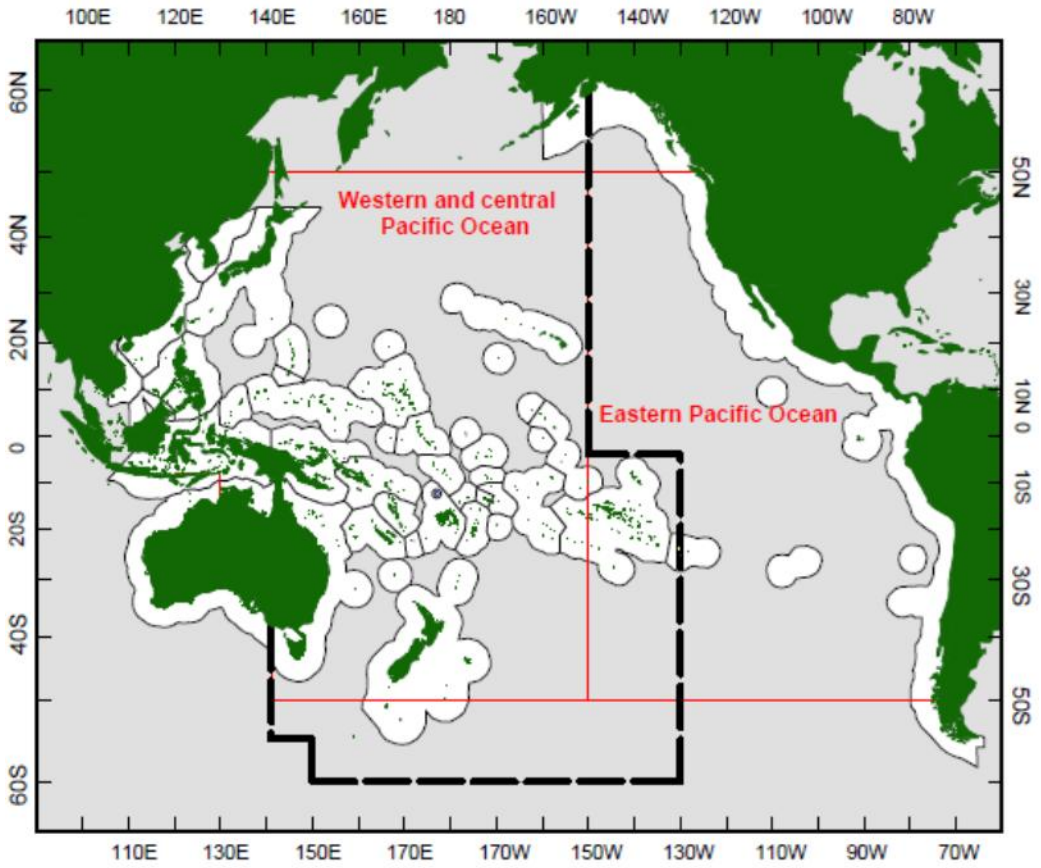



Figure 110. The Western and Central Pacific Ocean, Eastern Pacific Ocean and the WCPFC Convention Area (WCP–CA) [in dashed lines])

### 2.6.2 DATA SOURCES

The data sources for the international module of the annual SAFE report are obtained from the various literature of the WCPFC, the IATTC, and the International Scientific Committee for Tuna and Tuna-like species (ISC). These references can be found in Section 5. Additional sources of data include the U.S. data submissions to the WCPFC and IATTC documented in this module.

### 2.6.3 PLAN TEAM RECOMMENDATIONS

There were no recommendations for the International module by the Pelagic Plan Team for the 2024 annual SAFE report to be forwarded to the Council, only work items to Pelagic Plan Team members on improvements to other modules.

### 2.6.4 SUMMARY OF FISHERIES

This section presents the total catch of tuna species in the Pacific Ocean as reported to the Pacific Community (PC) from all member countries. Table 35 and Figure 111 depict the combined catch of all fisheries, while the following subsections present fishery specific data for the three main fisheries: purse seine, longline, and pole-and-line.

Table 35. Estimated annual catch (mt) of tuna species in the Pacific Ocean

| Year | Albacore | Bigeye | Skipjack | Yellowfin | Total |
|---|---|---|---|---|---|
| 2014 | 162,336 | 258,913 | 2,248,223 | 869,688 | 3,539,160 |
| 2015 | 153,528 | 250,352 | 2,118,897 | 849,074 | 3,371,851 |
| 2016 | 130,209 | 249,065 | 2,127,252 | 915,093 | 3,421,619 |
| 2017 | 153,187 | 233,260 | 1,935,794 | 934,512 | 3,256,753 |
| 2018 | 139,613 | 248,730 | 2,133,846 | 949,672 | 3,471,861 |
| 2019 | 128,290 | 228,836 | 2,392,553 | 924,331 | 3,674,010 |
| 2020 | 149,388 | 251,290 | 2,018,069 | 957,510 | 3,376,257 |
| 2021 | 121,428 | 212,563 | 2,009,287 | 1,010,430 | 3,353,708 |
| 2022 | 136,031 | 219,202 | 2,041,164 | 949,272 | 3,345,669 |
| 2023 | 121,597 | 219,037 | 1,956,552 | 999,498 | 3,296,684 |
| **Average** | 139,561 | 237,125 | 2,098,164 | 935,908 | 3,410,757 |
| **SD** | 14,432 | 16,543 | 139,727 | 50,472 | 123,183 |

Source: PC (2024).

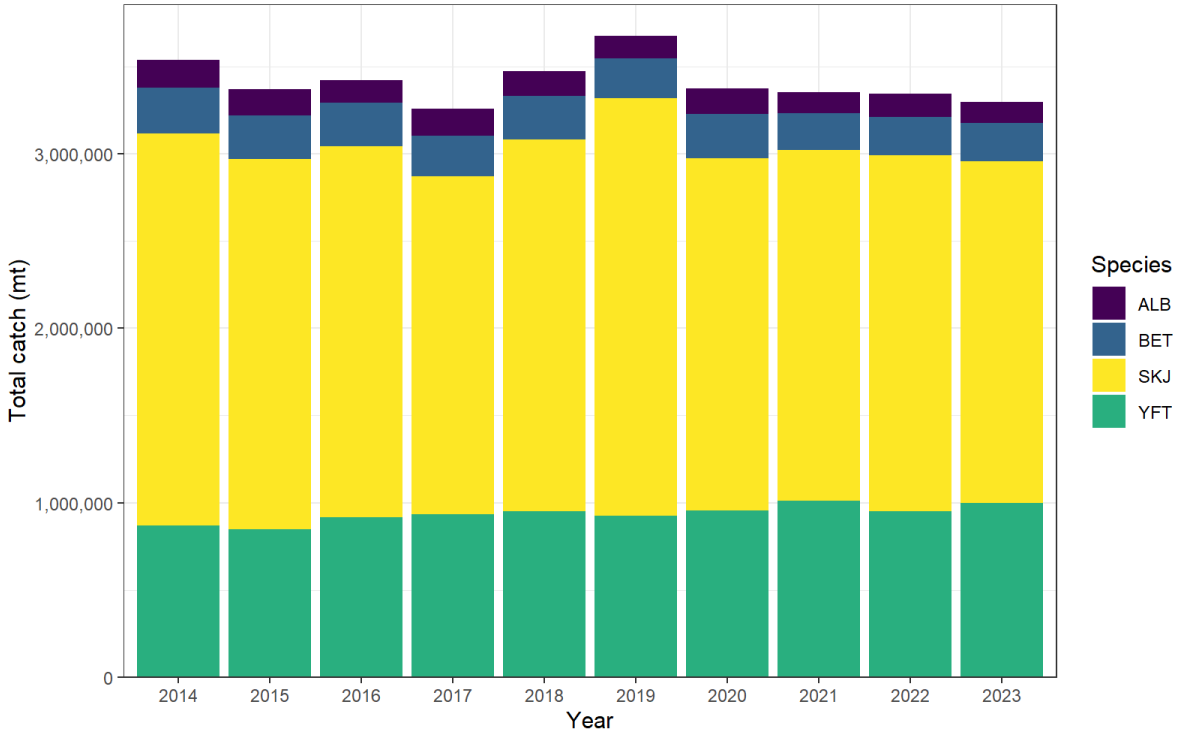



Figure 111. Estimated total annual catch of tuna species in the Pacific Ocean: albacore (ALB), bigeye tuna (BET), skipjack tuna (SKJ), and yellowfin tuna(YFT)

Source: PC (2024).

### 2.6.4.1 PURSE SEINE FISHERY IN THE WCPFC

Source: WCPFC- SC20-GN-WP-01

Vessels: The majority of the historic WCPFC Convention Area (WCPFC-CA) purse seine catch has come from the four main Distant Water Fishing Nation (DWFN) fleets – Japan, Korea, Chinese-Taipei and USA, which combined numbered 163 vessels in 1992, but declined to a low of 111 vessels in 2006 (due to reductions in the US fleet), before some rebound in recent years (up to 129 vessels in 2017 and 124 vessels in 2020, and 97 vessels in 2023). The Pacific Islands fleets have gradually increased in numbers over the past two decades to a level of 142 vessels in 2023. The remainder of the purse seine fishery includes several fleets which entered the WCPFC tropical fishery during the 2000s (e.g., China, Ecuador, El Salvador, New Zealand, and Spain).

The total number of purse seine vessels was relatively stable over the period 1990-2006 (in the range of 170–250 vessels), but thence until 2014, the number of vessels gradually increased, attaining a record level of 308 vessels in 2015, before steadily declining since (to 270 vessels in 2023). Further declines have occurred in recent years, with a significant reduction in vessels from one component of the U.S. purse seine flee.

The provisional 2023 purse seine catch of 1,843,100 mt was around 257,035 mt lower than the record catch in 2019 (2,100,135 mt). The 2023 purse seine skipjack catch (1,377,830 mt: 75% of catch) as slightly below the average catch over the past decade, and around 322,000 mt lower than the catch in 2019 (~1,700,000 mt). The 2023 purse seine catch for yellowfin tuna (408,281 mt;22% of the total purse seine tuna catch) was the fourth highest on records and around 92,000 mt lower than the record catch in 2017 (500,506 mt). The provisional catch estimate for bigeye tuna for 2023 (56,094 mt; 3% of the total purse seine fishery) was about 8,500 mt lower than the 2022 catch and a only a slight increase over the notably low purse seine bigeye tuna catch in 2019 (52,081 mt). The increased bigeye tuna catches from 2020-2022 appear to be related to a higher number of associated sets in conjunction with La Nina conditions.

Despite the FAD closure for certain periods in each year since 2010, drifting FAD sets remain an important fishing strategy, particularly to the east of 160°E. The purse seine catch/effort distribution in tropical areas of the WCPFC–CA is strongly influenced by El Niño –Southern Oscillation Index (ENSO) events. The relatively high proportion of unassociated sets in the eastern areas (e.g. Gilbert Islands) was a feature of the fishery in 2015–2016 (i.e. corresponding to El Niño conditions). The move to ENSO-neutral conditions, then weak La Niña during 2017 into early 2018 resulted in more effort in the area west of 160°E compared to recent years, and a higher use of drifting FADs in the area east of 160°E. By late 2018, weak El Niño conditions presided over the fishery and relatively high catches were taken in the eastern tropical areas, in and adjacent to the waters of Tokelau and the Phoenix Group. El Niño conditions continued into 2019 with purse seine effort extending further to the east compared to recent years and very good catches were taken in a few concentrated areas of the eastern tropical waters. The La Niña conditions experienced in 2020 to 2022 resulted in a general westward shift of fishing effort compared to 2019. Catch rates in 2023 have remained consistent with the past couple years, possibly reflecting the transition to El Niño conditions.

The US fleet typically fishes in the more eastern areas since 2020 with effort extended into the Gilberts, Phoenix and Line Islands, the Cook Islands, Tokelau and the adjacent eastern high seas areas with increasingly less effort west of 160°E; during 2021, the US fleet fished even further east, in the Line Group and the high seas areas north of the Cook Islands and French Polynesian EEZs. The difference in areas fished by the non-Pacific islands' fleets is related to the areas they have access to and perhaps also related to fishing strategy (e.g., use of traditional fishing grounds, e.g. FSM, PNG and the Solomon Islands by the Japan fleet).

Table 36. Total reported purse seine catch (mt) of skipjack, yellowfin, and bigeye tuna in the Pacific Ocean

| Year | Skipjack | Yellowfin | Bigeye | Total |
|---|---|---|---|---|
| 2014 | 1,879,297 | 620,473 | 134,058 | 2,633,828 |
| 2015 | 1,718,683 | 559,728 | 121,323 | 2,399,734 |
| 2016 | 1,713,013 | 650,714 | 130,054 | 2,493,781 |
| 2017 | 1,588,318 | 712,265 | 132,409 | 2,432,992 |
| 2018 | 1,738,395 | 618,621 | 141,276 | 2,498,292 |
| 2019 | 2,051,003 | 572,087 | 120,958 | 2,744,048 |
| 2020 | 1,703,142 | 617,023 | 151,537 | 2,471,702 |
| 2021 | 1,691,549 | 656,913 | 119,932 | 2,468,394 |
| 2022 | 1,764,462 | 621,260 | 121,171 | 2,506,893 |
| 2023 | 1,680,181 | 672,772 | 113,443 | 2,466,396 |
| **Average** | 1,752,804 | 630,186 | 128,616 | 2,511,606 |
| **SD** | 127,612 | 45,347 | 11,569 | 102,026 |

Source: SPC (2024) and IATTC (2024).

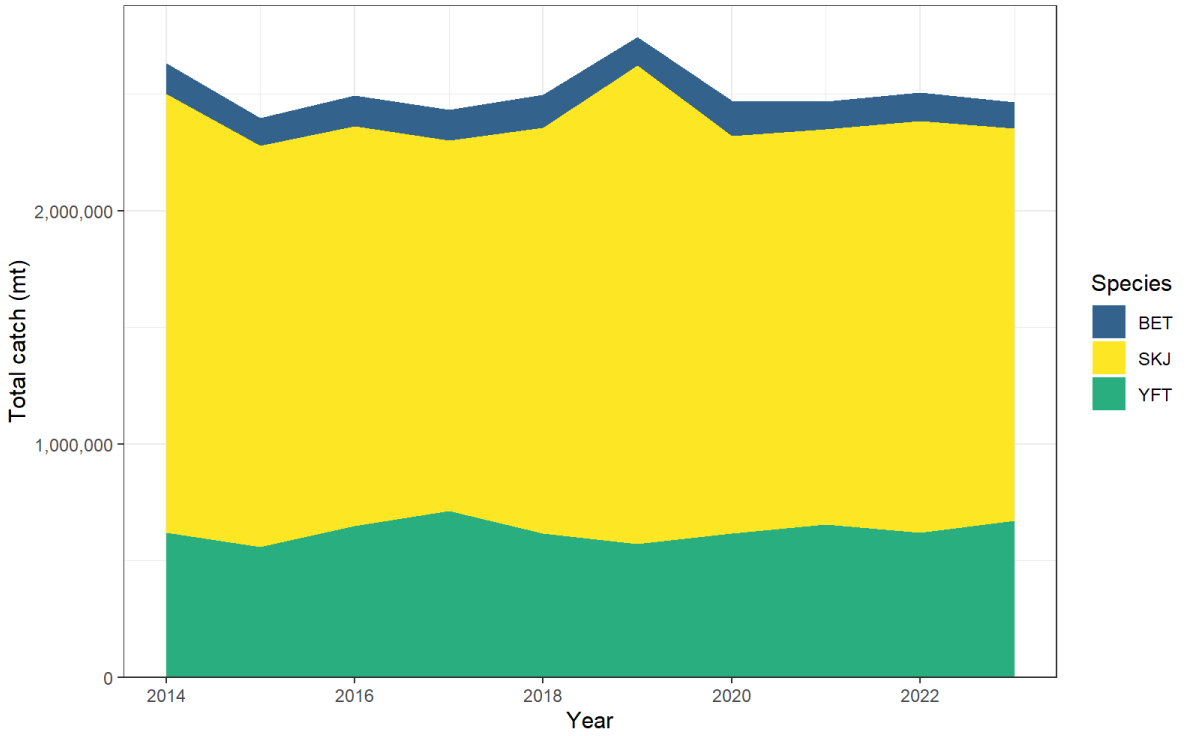



Figure 112. Total purse seine catch of skipjack (SKJ), yellowfin (YFT), and bigeye tuna (BET) in the Pacific Ocean

Source: SPC (2024) and IATTC (2024).

### 2.6.4.2 LONGLINE FISHERIES IN THE WCPFC

Source: WCPFC- SC20-GN-WP-01

The longline fishery now accounts for only 8–10% of the total WCPFC–CA catch (OFP, 2024) but approaches the much larger purse seine catch in landed value. It provides the longest time series of catch estimates for the WCP– CA, with estimates available since the early 1950s. The total number of vessels involved in the fishery generally fluctuated between 3,000 and 6,000 for the period 1970–2004, although for some distant-water fleets, vessels operating in areas beyond the WCP–CA could not be separated out and more representative vessel numbers for WCP–CA have only become available in recent years. Total longline vessel numbers have slowly declined over the past 15 years, with the provisional estimate of 1,543 vessels in 2021 showing a 57% drop on vessel numbers in 2005 and a 9% drop on 2019 vessel numbers, mainly due to a decline in the category of non-Pacific Islands domestic fleets, but also no doubt due to the impacts of COVID-19.

The fishery involves two main types of operation:

- Large (typically >250 gross registered tonnes [GRT]) distant-water freezer vessels which undertake long voyages (months) and operate over large areas of the region. These vessels may target either tropical (yellowfin, bigeye tuna) or subtropical (albacore) species. Voluntary reduction in vessel numbers by at least one fleet has occurred in recent years.

- Smaller (typically <100 GRT) offshore vessels which are usually domestically based, undertaking trips less than one month, with ice or chill capacity, and serving fresh or air-freight sashimi markets, or albacore canneries. There are several foreign offshore fleets based in Pacific Island countries.

The following broad categories of longline fishery, based on type of operation, area fished and target species, are currently active in the WCPFC–CA:

- South Pacific offshore albacore fishery comprises Pacific-Islands domestic "offshore" vessels, such as those from American Samoa, Cook Islands, Fiji, French Polynesia, Kiribati, New Caledonia, PNG, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu; these fleets mainly operate in subtropical waters, with albacore the main species taken. Two new entrants, Tuvalu and Wallis & Futuna, joined this category during 2011, although the latter fleet has not fished recently. Vessel numbers have stabilized in recent years, but they may also vary depending on charter arrangements.
- Tropical offshore bigeye/yellowfin-target fishery includes "offshore" sashimi longliners from Chinese-Taipei, based in Micronesia, Guam, Philippines and mainland Chinese vessels based in Micronesia, and domestic fleets based in Indonesia, Micronesian countries, Philippines, PNG, the Solomon Islands and Vietnam.
- Tropical distant-water bigeye/yellowfin-target fishery comprises "distant-water" vessels from Japan, Korea, Chinese-Taipei, mainland China and Vanuatu. These vessels primarily operate in the eastern tropical waters of the WCP–CA (and into the EPO), targeting bigeye and yellowfin tuna for the frozen sashimi market.
- South Pacific distant-water albacore fishery comprises "distant-water" vessels from Chinese-Taipei, mainland China and Vanuatu operating in the south Pacific, generally below 20°S, targeting albacore tuna destined for canneries.
- Domestic fisheries in the sub-tropical and temperate WCP–CA comprise vessels targeting different species within the same fleet depending on market, season and/or area. These fleets include the domestic fisheries of Australia, Japan, New Zealand and Hawai'i. For example, the Hawaiian longline fleet has a component that targets swordfish and another that targets bigeye tuna.
- South Pacific distant-water swordfish fishery is a relatively new fishery and comprises "distant-water" vessels from Spain and Portugal (one vessel started fishing in 2011).
- North Pacific distant-water albacore and swordfish fisheries mainly comprise "distant-water" vessels from Japan (swordfish and albacore), Chinese-Taipei (albacore only) and Vanuatu (albacore only).

The provisional WCPFC–CA longline catch (234,894 mt) for 2023 remains lower than the recent ten-year average but a slight increase from 2022 (243,115 mt). The COVID-19 restrictions played a role in the distribution of 2021 effort in the longline fishery, with clear declines in effort in both the south Pacific Albacore fishery and in the tropical longline fishery. The La Niña conditions in previous may also have contributed to lower catches in

the longline fishery prior to 2023, although further investigation would be required to confirm this hypothesis.

The WCPFC–CA albacore longline catch (86,957 mt – 37%) for 2023 exceeded the catch in 2022 and was the highest since 2019, but about 19,000 mt lower than the record of 106,141 mt attained in 2010. The provisional bigeye catch (56,203 mt – 24%) for 2023 was similar to the 2022 catch level which are some of the lowest catches reported since the mid-1980s, and well below on the bigeye catch levels experienced in the 2000s (e.g., the 2004 longline bigeye catch was 99,709 mt).The yellowfin catch for 2023 (89,975 mt – 38%), was higher than the previous three years, but a significant drop from the high catch level in 2019 (104,426 mt).

A significant change in the WCPFC–CA longline fishery over the past two decades has been the growth of the Pacific Islands domestic albacore fishery, which has risen from taking 33% of the total South Pacific albacore longline catch in 1998 to accounting for around 50-60% of the catch in recent years. The combined national fleets (including chartered vessels) mainly active in the Pacific Islands domestic albacore fishery have numbered more than 500 (mainly small 'offshore') vessels in some years over the past decade with catches at a similar level to the distant-water longline vessels active in the south WCPFC–CA.

The distant-water fleet dynamics have continued to evolve in recent years, with catches down from record levels in the mid-2000s initially due to a reduction in vessel numbers, although vessel numbers for some fleets appear to be on the rise again in recent years, but with variation in areas fished and target species. The Japanese distant-water and offshore longline fleets have experienced a substantial decline in both bigeye catches (from 18,172 mt in 2004 to 3,329 mt in 2023) and vessel numbers (366 in 2004 to 74 in 2023). The Chinese-Taipei distant-water longline fleet had a peak bigeye tuna catch of 22,154 mt in 2004 but has stabilized at a lower level in recent years, with 9,203 mt taken in 2023 (809 vessels). The Korean distant-water longline fleet experienced some decline in bigeye and yellowfin catches since the period of highest catches 15–20 years ago in line with a reduction in vessel numbers – from 184 vessels active in 2002 reduced to 96 vessels in 2023.

In contrast, the China longline fleet catches of albacore tuna have been amongst the highest ever in recent years, with a range of 16,000–29,000 mt of albacore tuna in the south WCPFC-CA area over the past six years; their 2023 albacore tuna catch was 25,732 mt, the second highest catch for this fleet.

With domestic fleet sizes continuing to increase as foreign-offshore and distant-water fleets decrease, this evolution in fleet dynamics no doubt has some effect on the species composition of the catch. For example, the increase in effort by the Pacific Islands domestic fleets has primarily been in albacore fisheries, although this had been balanced to some extent by the switch to targeting bigeye tuna (from albacore) by certain vessels in the distant-water Chinese-Taipei fleet almost a decade ago. More detail on individual fleet activities during recent years is available in the WCPFC–SC20 National Fisheries Reports.

Effort by the large-vessel, distant-water fleets of Japan, China, Korea and Chinese-Taipei account for most effort on the high seas in the eastern WCPFC Area, noting the reduction in vessel numbers for some fleets over the past two decades. Effort is widespread as sectors of

these fleets target bigeye and yellowfin for the frozen sashimi market in central and eastern tropical waters, and albacore for canning in the more temperate waters

Activity by the foreign-offshore fleets from Japan, China, and Chinese-Taipei is restricted to tropical waters, targeting bigeye and yellowfin for the fresh sashimi market; these fleets tend to have limited overlap with the distant-water fleets. The substantial 'domestic fleet' effort in the west of the WCPFC-CA is primarily by the Indonesian and Chinese-Taipei domestic fleets targeting yellowfin and bigeye in the lower latitudes, and the Japanese offshore and coastal fleets in their home fishery and adjacent high seas.

Table 37. Total reported longline catch (mt) of PMUS in the Pacific Ocean

| Year | Albacore | Bigeye | Yellowfin | Striped Marlin | Swordfish | Blue Marlin | Black Marlin | Total |
|---|---|---|---|---|---|---|---|---|
| 2014 | 107,887 | 104,819 | 106,660 | 2,443 | 5,557 | 18,186 | 2,157 | 347,709 |
| 2015 | 110,037 | 108,380 | 111,347 | 2,717 | 5,468 | 17,633 | 2,429 | 358,011 |
| 2016 | 93,768 | 93,509 | 96,219 | 1,677 | 6,037 | 16,132 | 1,256 | 308,599 |
| 2017 | 116,850 | 87,281 | 91,469 | 1,615 | 5,791 | 14,319 | 1,071 | 318,395 |
| 2018 | 104,259 | 91,939 | 105,089 | 1,361 | 5,076 | 13,725 | 1,189 | 322,638 |
| 2019 | 100,830 | 91,513 | 111,257 | 1,788 | 4,410 | 12,962 | 1,127 | 323,887 |
| 2020 | 89,593 | 76,561 | 81,636 | 1,555 | 3,772 | 9,893 | 1,372 | 264,382 |
| 2021 | 93,292 | 69,866 | 79,830 | 1,292 | 4,924 | 8,614 | 1,045 | 258,863 |
| 2022 | 107,233 | 70,516 | 88,957 | 1,175 | 4,941 | 8,439 | 948 | 282,209 |
| 2023 | 105,391 | 70,633 | 85,946 | 1,496 | 4,474 | 9,485 | 746 | 278,172 |
| Average | 102,914 | 86,502 | 95,841 | 1,712 | 5,045 | 12,939 | 1,334 | 306,287 |
| SD | 8,526 | 14,148 | 12,034 | 497 | 696 | 3,689 | 537 | 32,397 |

Source: SPC (2024) and IATTC (2024).

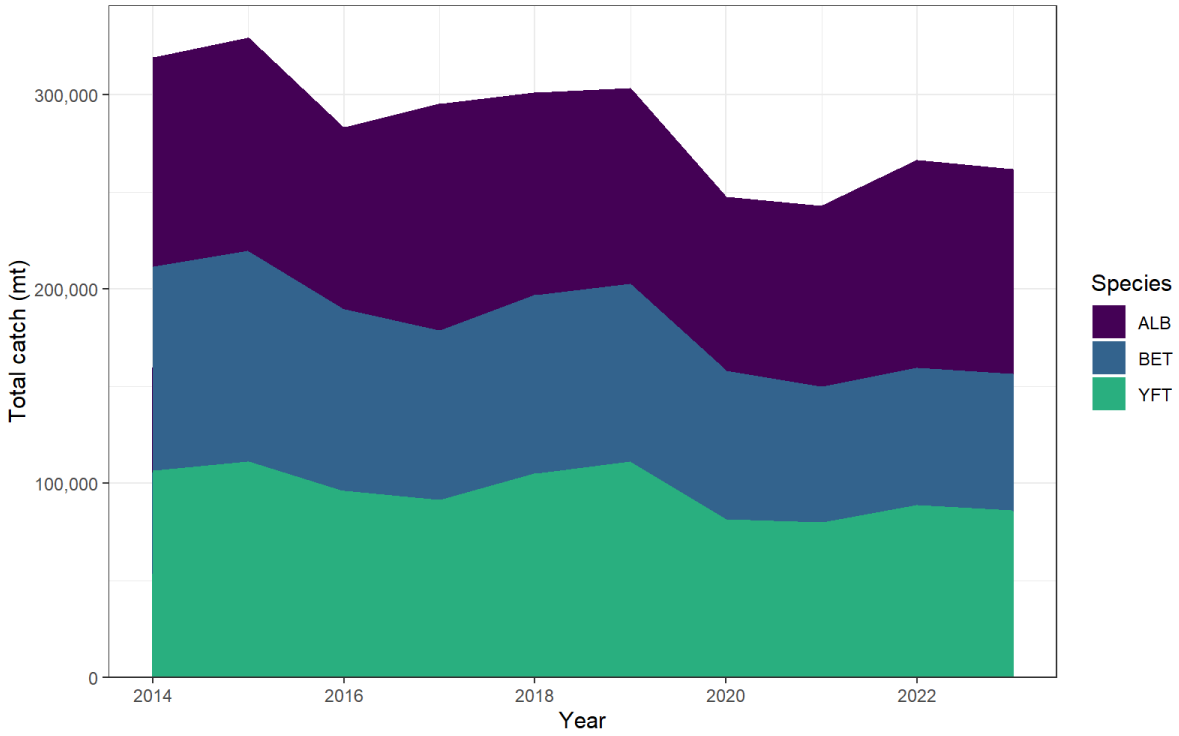



Figure 113. Reported longline tuna catches in the Pacific Ocean (2014-2023): albacore (ALB), bigeye tuna (BET), and yellowfin tuna(YFT)

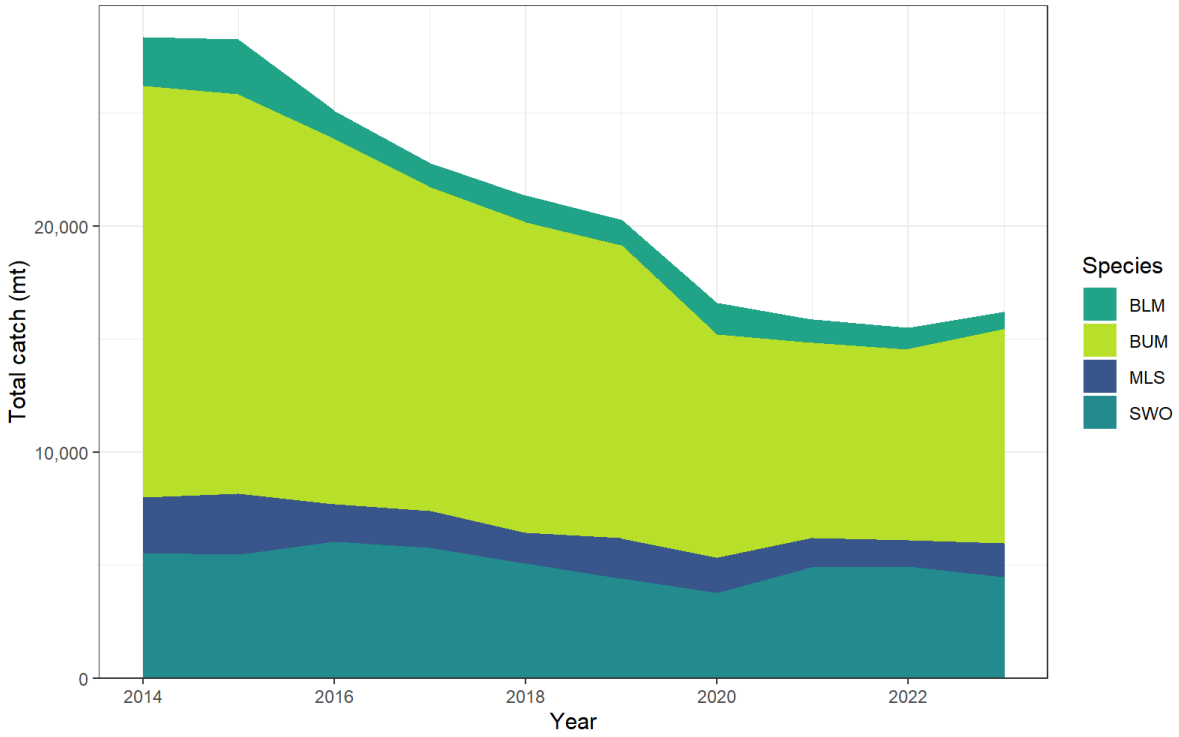



Figure 114. Reported longline billfish catches in the Pacific Ocean (2014-2023): black marlin (BLM), blue marlin (BUM), striped marlin (MLS), swordfish (SWO)

Source: SPC (2024) and IATTC (2024).

### 2.6.4.3 POLE-AND-LINE FISHERY IN THE WCPFC

Source: WCPFC- SC20-GN-WP-01

Economic factors and technological advances in the purse seine fishery (primarily targeting the same species, skipjack) have resulted in a gradual decline in the number of vessels in the pole-and-line fishery and in the annual pole-and-line catch during the past 15–20 years. The gradual reduction in numbers of vessels has occurred in all pole-and-line fleets over the past decade. Pacific Island domestic fleets have declined in recent years – fisheries formerly operating in Fiji, Palau and Papua New Guinea are no longer active, only one vessel is now operating (occasionally) in Kiribati, and fishing activity in the Solomon Islands fishery during the 2000s was reduced substantially from the level experienced during the 1990s. Several vessels continue to fish in Hawai'i, and the French Polynesian *bonitier* fleet remains active (30 vessels in 2021), but an increasing number of vessels have turned to longline fishing. Vessel and catches from Indonesian pole-and-line fleet have also declined over recent years. There is continued interest in pole-and-line fish associated with certification/ecolabelling.

The provisional 2023 pole-and-line catch (143,431 mt) is the lowest annual catch since the early-1960s, due to reduced catches in the Japanese fishery, although we note as in previous years the provisional nature of the estimates at this stage Skipjack accounts for the majority of the catch (~70-84% in recent years, but typically more than 85% of the total catch in tropical areas) and albacore (5–10% in recent years, with a reduction to 3% in 2023) is taken by the Japanese coastal and offshore fleets in the temperate waters of the north Pacific. Yellowfin tuna (recently 10–13%) and a small component of bigeye tuna (~1% in recent years) make up the remainder of the catch. There were four pole-and-line fleets active in the WCPO in 2023 (Japan, Indonesia, French Polynesia, and Solomon Islands). Japanese distant-water and offshore fleets (58,057 mt in 2023), and the Indonesian fleets (85,098 mt in 2022, carried over to 2023 at this stage), account for nearly all of the WCPFC–CA pole-and-line catch (98% in 2023). The catches by the Japanese distant-water and offshore fleets in recent years have been the lowest for several decades and this is no doubt related to the continued reduction in vessel numbers (61 vessels in 2023; although the vessel numbers have been stable at around 60-70 over the past 5 years). The Solomon Islands, resumed activity in this fishery in 2011 and participated until 2022, and have continued to participate in the fishery since then with a catch of 533 mt in 2023.

Fleet distribution: The WCPFC–CA pole-and-line fishery has several components:

- the year-round tropical skipjack fishery, mainly involving the domestic fleets of Indonesia, Solomon Islands and French Polynesia, and the distant water fleet of Japan
- seasonal sub-tropical skipjack fisheries in the domestic (home) waters of Japan, Australia, Hawaii, and Fiji
- a seasonal albacore/skipjack fishery east of Japan (largely an extension of the Japan home-water fishery).

Table 38. Total reported pole-and-line catch (mt) of skipjack in the Pacific Ocean

| Year | Catch |
|---|---|
| 2014 | 148,619 |
| 2015 | 151,157 |
| 2016 | 156,503 |
| 2017 | 123,308 |
| 2018 | 183,851 |
| 2019 | 158,161 |
| 2020 | 159,400 |
| 2021 | 165,435 |
| 2022 | 130,147 |
| 2023 | 88,936 |
| **Average** | 146,551.7 |
| **St Dev** | 26,459.9 |

Source: PC (2024).

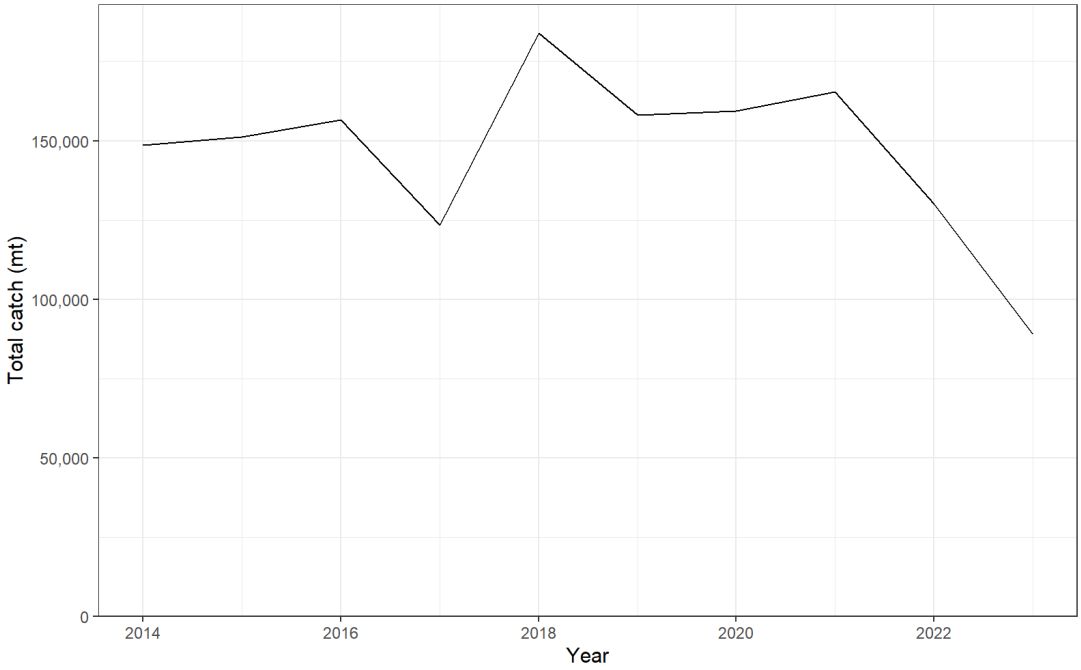



Figure 115. Reported pole-and-line catch (mt) in the Pacific Ocean

Source: PC (2024).

### 2.6.5 STATUS OF THE STOCKS

National Standard 1 of the MSA requires that conservation and management measures prevent overfishing while achieving, on a continual basis, the optimum yield from each fishery for the U.S. fishing industry. NMFS advisory guidelines for National Standard 1 require the Council to evaluate and describe in their fishery management plans, the criteria for determining if a stock is subject to overfishing, and when a stock is overfished, or

approaching a condition of becoming overfished. This section briefly summarizes the status determination criteria (SDC) for pelagic MUS described in the Pelagic FEP, the stock status relative to the SDC, and lists the stock assessments completed since the last SAFE report.

### 2.6.5.1 DESCRIPTION OF OVERFISHED STATUS DETERMINATION CRITERIA

For all PMUS, the Council adopted a maximum sustainable yield (MSY) control rule shown in Figure 116. The Pelagic FEP uses minimum stock size threshold (MSST) as the SDC for an overfished determination, and a stock is considered overfished when its biomass (B) has declined below the MSST. The MSST is determined based on the natural mortality (M) of the stock and the biomass at MSY ($B_{MSY}$). Specifically, MSST = $cB_{MSY}$, where $c$ is the greater of 0.5, or 1 minus the natural mortality rate (M). Expressed as a ratio, a stock is overfished when $B_{year}/B_{MSY} < 1\text{-M}$ or 0.50, whichever is greater. To illustrate these specifications of the MSST, for a stock with a natural mortality rate of 0.2, MSST would be set at $0.8B_{MSY}$, and the stock would be overfished if $B_{year}/B_{MSY} < 0.8$. For a stock with a natural mortality rate greater than 0.5, MSST cannot be set below $0.5B_{MSY}$, and the stock would be overfished if $B_{year}/B_{MSY} < 0.5$.

The Council has also adopted a warning reference point, $B_{FLAG}$, set equal to $B_{MSY}$ to provide a trigger for consideration of management action before a stock's biomass reaches the MSST. A stock is approaching an overfished condition when there is more than a 50 percent chance that the biomass will decline below the MSST within two years.

It is important to note that NMFS National Standard 1 guidelines at 50 CFR 665.310(e)(1)(i)(C) defines $B_{MSY}$ as the long-term average size of the stock measured in terms of spawning biomass (SB) or other appropriate measure of the stock's reproductive potential that would be achieved by fishing at $B_{MSY}$. Thus, whenever available, NMFS will use estimates of SB in determining the status of a stock. When estimates of SB are not available, NMFS may use estimates of total biomass (B), or other reasonable proxies for determining stock status.

### 2.6.5.2 OVERFISHING SDC

The Pelagic FEP uses maximum fishing mortality threshold (MFMT) as the SDC for overfishing. Specifically, overfishing occurs when fishing mortality (F) is greater than the fishing mortality rate that results in MSY ($F_{MSY}$). Expressed as a ratio, the MFMT is exceeded and a stock is subject to overfishing when $F/F_{MSY} > 1.0$. However, for a stock where biomass has declined below MSST, the default MSY control rule requires the MFMT to be reduced linearly below $F_{MSY}$ to allow for rebuilding of the stock.

It is also important to note that all finfish managed under the Pelagic FEP are also managed under the international agreements governing the WCPFC and/or the IATTC to which the U.S. is a party. Additionally, both the WCPFC and IATTC have adopted criteria for overfishing and overfished for certain species that differ from those described above. Pursuant to Section 304(e)(1), for those fisheries managed under a fishery management plan or international agreement, NMFS shall determine the status of a stock using the criteria specified in the plan, or the agreement. For the purpose of stock status determinations, NMFS will determine stock status of Pelagic MUS using the SDC described in the Pelagic FEP.

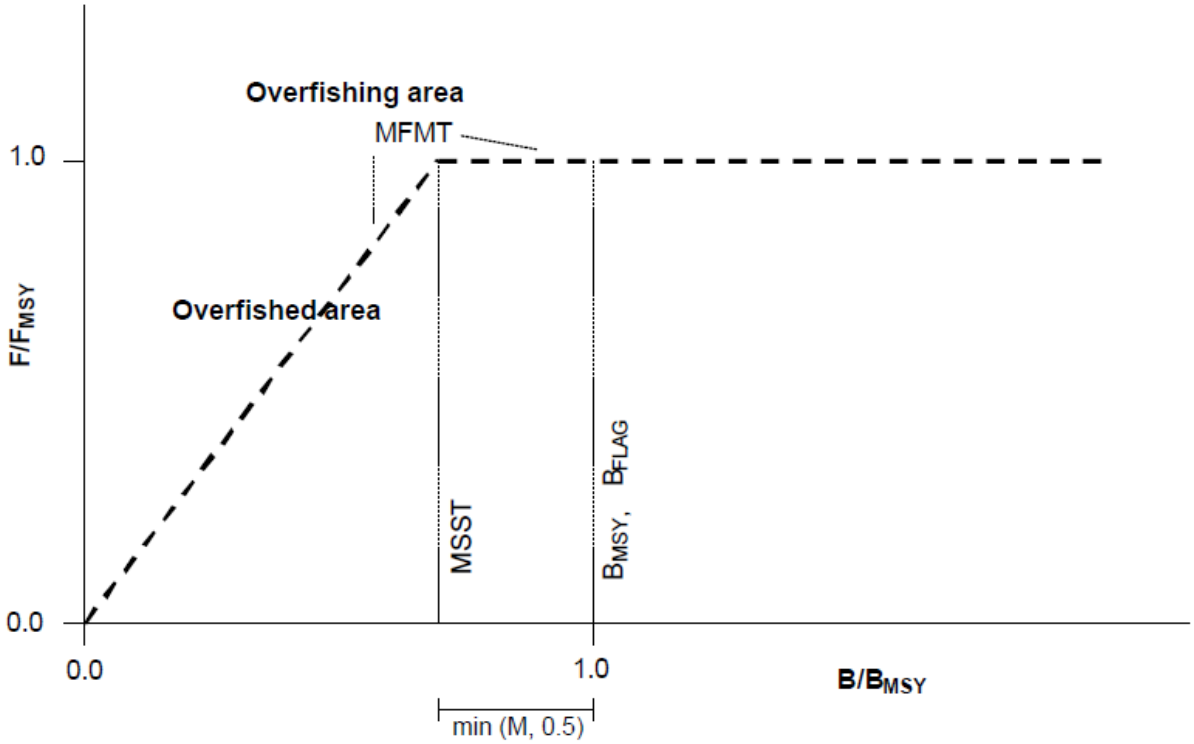



Figure 116. MSY control rule and reference points for pelagic MUS

### 2.6.6 INFORMATION ON OFL, ABC, AND ACL

Because pelagic squid have an annual life cycle, and all pelagic finfish are subject to management under the international agreements governing the WCPFC and/or the IATTC, all pelagic MUS are excepted from annual catch limit (ACL) and accountability measure requirements of section 303(a)(15) of the MSA, and related reference points. However, this statutory exception does not preclude the Council from specifying ACLs and related reference points for pelagic MUS using the ACL process described in the Pelagic FEP, if the Council deems such specifications are necessary to meet the objectives of the plan.

### 2.6.7 STOCK ASSESSMENTS COMPLETED SINCE THE LAST PELAGIC SAFE REPORT

Stock status is most reliably determined from stock assessments that integrate fishery and life history information across the range of the stock. For Pelagic MUS, most stock assessments are conducted by several international organizations. In the EPO, IATTC staff conduct stock assessments mainly for tropical tunas (bigeye and yellowfin) and some billfish (striped marlin, swordfish). These assessments are presented to the Scientific Advisory Committee of the IATTC and then to the full IATTC plenary. Assessments for IATTC managed stocks may be accessed on the IATTC meeting webpage.

In the WCPO, the Pacific Community's Oceanic Fisheries Program (OFP-SPC) conducts stock assessments as the science provider to the WCPFC. Like the IATTC, the PC-OFP generally focuses on the tropical tunas, but also conduct stock assessments for South Pacific albacore and southwest Pacific swordfish and striped marlin. In the North Pacific Ocean, the ISC for Tuna and Tuna-like Species in the North Pacific Ocean conducts stock assessments specifically for the WCPFC Northern Committee. These assessments are presented to the

Scientific Committee of the WCPFC and then to the full WCPFC plenary. Assessments for WCPFC managed stocks may be accessed on the WCPFC meeting webpage.

The following pages include links to the most recent stock assessments and assessment results completed in 2024, including descriptions provided in the WCPFC Stock Status and Management Advice Reports. For more information on stock assessments and assessment results completed in years prior, please see the past pelagic annual SAFE reports.

#### 2.6.7.1 SOUTH PACIFIC ALBACORE

**Stock assessment:** Tears et al. (2024).

**Link:** https://meetings.wcpfc.int/node/23119

Stock status and management advice: https://www.wcpfc.int/doc/04/south-pacific-albacore-tuna

#### 2.6.7.2 SILKY SHARK (WCPO)

**Stock assessment:** Neubauer et al. (2024).

**Link:** https://meetings.wcpfc.int/node/23088

Stock status and management advice: https://www.wcpfc.int/doc/13/silky-shark

This stock assessment did not provide reliable estimates of biomass and fishing mortality relative to MSY, therefore the previous stock assessment (Clark, 2018) remains as a reference for stock status and management advice.

#### 2.6.7.3 PACIFIC BLUEFIN TUNA

**Stock assessment:** ISC (2024).

**Link:** https://meetings.wcpfc.int/node/23117

Stock status and management advice: https://www.wcpfc.int/doc/06/pacific-bluefin-tuna

#### 2.6.7.4 NORTH PACIFIC SHORTFIN MAKO SHARK

**Stock assessment:** ISC (2024).

**Link:** https://meetings.wcpfc.int/node/22828

Stock status and management advice: https://www.wcpfc.int/doc/16/north-pacific-shortfin-mako-shark

Table 39. Estimates of stock status in relation to overfishing and overfished reference points for WPFMC PMUS

| Stock | Overfishing reference point | Is overfishing occurring? | Approaching Overfishing (2 yr) | Overfished reference point | Is the stock overfished? | Approaching Overfished (2 yr) | Assessment results[1] | Natural mortality[2] | MSST |
|---|---|---|---|---|---|---|---|---|---|
| Skipjack Tuna (WCPO) | $F_{2017-2020}/F_{MSY}$=0.32 | No | No | $SB_{2018-2022}/SB_{MSY}$=3.12, $SB_{2018-2021}/SB_{F=0}$=0.52 | No | No | Castillo et al. (2022), SC18 report | >0.5 yr-1 | 0.5 $SB_{MSY}$ |
| Skipjack Tuna (EPO) | NA | NA | NA | NA | NA | NA | Maunder (2018) | NA | NA |
| Yellowfin Tuna (WCPO) | $F_{2014-2017}/F_{MSY}$=0.37 | No | No | $SB_{2018}/SB_{MSY}$=2.43, $SB_{2018}/SB_{F=0}$=0.54 | No | No | Magnusson et al. 2023 | 0.8-1.6 $yr^{-1}$ | 0.5 $SB_{MSY}$ |
| Yellowfin Tuna (EPO) | $F/F_{MSY}$=1.01 | Yes, because F>MFMT | Not applicable | $SB_{2015-2017}/SB_{MSY}$=1.08, $B_{2015-2017}/B_{MSY}$=1.35 | No | No | Minte-Vera et al. (2018) | 0.2-0.7 $yr^{-1}$ | 0.5 $B_{MSY}$ |
| Albacore (S. Pacific) | $F_{2015-2018}/F_{MSY}$=0.25 | No | No | $SB_{2019}/SB_{MSY}$=2.50 $SB_{2019}/SB_{F=0}$=0.37 | No | No | Teears, et al. 2024 | 0.2-0.4 $yr^{-1}$ | 0.6 $SB_{MSY}$ |
| Albacore (N. Pacific) | $F_{2015-2017}/F_{MSY}$=0.60 | No | No | $SB_{2015-2017}/SB_{F=0}$=0.43 | No | No | ISC 2023 | 0.4 $yr^{-1}$ | 0.6 $B_{MSY}$ |
| Bigeye Tuna (WCPO) | $F_{2014-2017}/F_{MSY}$=0.74 | No | No | $SB_{2018}/SB_{MSY}$=1.70, $SB_{2018}/SB_{F=0}$=0.38 | No, because SSB>MSST | No | Day et al. 2023 | 0.4 $yr^{-1}$ | 0.6 $SB_{MSY}$ |
| Bigeye Tuna (EPO) | $F_{2015-2017}/F_{MSY}$=1.15 | Yes, because F>MFMT | Not applicable | $SB_{2015-2017}/SB_{MSY}$=1.02, $B_{2012-2015}/B_{MSY}$=0.91 | No, because SSB>MSST | Not applicable | Aires-da_Silva et al. 2018 | 0.1-0.25 $yr^{-1}$ | ~0.75 $B_{MSY}$ |
| Pacific Bluefin Tuna | F is 30.7% SPR | No | Not applicable | $SB_{2019}/SB_{F=0}$=0.102 | Yes, because SSB<MSST | Not applicable | (ISC 2022a) | 0.25-1.6 yr-1 | ~0.75 $B_{MSY}$ |
| Blue Marlin (Pacific) | $F_{2017-2019}/F_{MSY}$=0.6 | No | Unknown | $SB_{2017-2019}/SB_{MSY}$=1.13 | No | Unknown | (ISC 2021) | 0.22-0.42 $yr^{-1}$ | ~0.7 $SB_{MSY}$ |
| Swordfish (WCNPO) | $F_{2013-2015}/F_{MSY}$=0.45 | No | Unknown | $SB_{2016}/SB_{MSY}$=1.87 | No | Unknown | ISC 2023 | 0.3 $yr^{-1}$ | 0.7 $B_{MSY}$ |
| Swordfish (EPO) | $F_{2012}/F_{MSY}$ = 1.11 | Yes, because F > MFMT | Not applicable | $SB_{2012}/SB_{MSY}$ =1.87 | No | Unknown | | 0.35 $yr^{-1}$ | 0.65 $B_{MSY}$ |
| Striped Marlin (WCPO) | $F_{2015-2017}/F_{MSY}$=1.07 | Yes, because F>MFMT | Not applicable | $SB_{2017}/SB_{MSY}$=0.38 | Yes, because $SSB_{2017}$<MSST | Not applicable | ISC 2023 | 0.4 $yr^{-1}$ | 0.6 $SB_{MSY}$ |

| Stock | Overfishing reference point | Is overfishing occurring? | Approaching Overfishing (2 yr) | Overfished reference point | Is the stock overfished? | Approaching Overfished (2 yr) | Assessment results[1] | Natural mortality[2] | MSST |
|---|---|---|---|---|---|---|---|---|---|
| Striped Marlin (NEPO) | Not provided in assessment | No | No | $SB_{2009}/SB_{MSY}$=1.5 | No | Unknown | Hinton and Maunder (2011) | 0.5 $yr^{-1}$ | 0.5 $B_{MSY}$ |
| Blue Shark (N. Pacific)[2] | $F_{2017-2019}/F_{MSY}$=0.445 | No | Unknown | $SB_{2020}/SB_{MSY}$=1.17 | No | Unknown | (ISC 2022b) | 0.145-0.785 $yr^{-1}$ | ~0.8 $SB_{MSY}$ |
| Oceanic white-tip shark (WCPO)[3] | $F_{2016}/F_{MSY}$=3.30 | Yes | Not applicable | $SB_{2016}/SB_{MSY}$=0.11 | Yes | Not applicable | Tremblay-Boyer et al. (2019), SC15 Report | 0.18 $yr^{-1}$ | 0.82 $B_{MSY}$ |
| Silky shark (WCPO)[3] | $F_{2016}/F_{MSY}$=1.61 | Yes | Not applicable | $SB_{2016}/SB_{MSY}$=1.18 | No | Unknown | Neubauer, et al., 2024 | 0.18 $yr^{-1}$ | 0.82 $B_{MSY}$ |
| Silky Shark (EPO)[3] | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Clarke et al. (2018), SC14 Report | Unknown | Unknown |
| Longfin mako shark (N. Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | | Unknown | Unknown |
| Shortfin mako shark (N. Pacific) | $F_{2013-2015}/F_{MSY}$=0.62 | No | Unknown | $SB_{2016}/SB_{MSY}$=1.36 | No | Unknown | ISC 2024 | 0.128 $yr^{-1}$ | 0.872 $B_{MSY}$ |
| Common thresher shark (N. Pacific) | $F/F_{MSY}$=0.21 | No | Unknown | $SB/SB_{MSY}$=1.3 | No | Unknown | | 0.04 $yr^{-1}$ | 0.96 $B_{MSY}$ |
| Bigeye thresher shark (N. Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Pelagic thresher shark (N. Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | ISC (2018b) | Unknown | Unknown |
| Salmon shark (N. Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | | Unknown | Unknown |
| Mahimahi (Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Teo et al. (2018) | Unknown | Unknown |
| Wahoo (Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | | Unknown | Unknown |
| Opah (Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |

| Stock | Overfishing reference point | Is overfishing occurring? | Approaching Overfishing (2 yr) | Overfished reference point | Is the stock overfished? | Approaching Overfished (2 yr) | Assessment results[1] | Natural mortality[2] | MSST |
|---|---|---|---|---|---|---|---|---|---|
| Pomfret (family Bramidae, W. Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Black marlin (Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Shortbill spearfish (Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Sailfish (Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Kawakawa (Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Oilfish (family Gempylidae, Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Other tuna relatives (*Auxis* spp., *Allothunnus* spp., and *Scomber* spp, Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Squids (Pacific) | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |

[1]For some WCPO stocks, the Scientific Committee of the WCPFC may adjust the weighting of the structural uncertainty grid, based on scientific uncertainty, used to derive median limit reference points. For these stocks, the reference to the SC meeting report at which the weighting decision was made is provided in addition to the stock assessment report reference.
[2]Estimates based on Boggs et al. (2000) or assumed in the assessments.
[3]As of this publication, NMFS has not yet determined that this stock assessment is the best scientific information available for the purposes of stock status determination.

## 2.6.8 U.S. LONGLINE LANDINGS REPORTED TO WCPFC AND IATTC FOR 2022

The tables of this section show the catches of pelagic MUS by U.S. longline (Hawaii and California-based) and U.S. territorial longline fisheries in the WCPFC Convention Area from 2020-2024, as reported by NMFS to the WCPFC in 2025. The catches for 2024 are preliminary.

Table 40. U.S. and territorial longline catch (mt) by species in the WCPFC Statistical Area, 2020-2024

| | U.S. in North Pacific Ocean | | | | | CNMI in North Pacific Ocean | | | | | Guam in North Pacific Ocean | | | | | American Samoa in North Pacific Ocean | | | | | American Samoa in South Pacific Ocean | | | | | Total | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2024** | **2023** | **2022** | **2021** | **2020** | **2024** | **2023** | **2022** | **2021** | **2020** | **2024** | **2023** | **2022** | **2021** | **2020** | **2024** | **2023** | **2022** | **2021** | **2020** | **2024** | **2023** | **2022** | **2021** | **2020** | **2024** | **2023** | **2022** | **2021** | **2020** |
| **Vessels** | 144 | 145 | 142 | 137 | 135 | | 135 | 120 | 131 | 119 | | | | | | 15 | 19 | 133 | 24 | 122 | 9 | 10 | 11 | 12 | 11 | 154 | 155 | 153 | 150 | 146 |
| **Species** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Albacore, NPO | 194 | 238 | 108 | 105 | 48 | | | | | | | | | | | 25 | 26 | 22 | 30 | 8 | | | | | | 219 | 264 | 129 | 135 | 57 |
| Albacore, SPO | | | | | | | | | | | | | | | | | | | | | 1024 | 881 | 1139 | 832 | 551 | 1024 | 881 | 1139 | 832 | 551 |
| Bigeye tuna | 5317 | 3554 | 3234 | 3748 | 3548 | | 1205 | 549 | 1500 | 926 | | | | | | 344 | 371 | 1547 | 405 | 1563 | 53 | 37 | 22 | 30 | 24 | 5714 | 5167 | 5352 | 5683 | 6061 |
| Pacific bluefin tuna | 2 | 1 | 1 | 1 | 0 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 1 | 1 |
| Skipjack tuna | 128 | 52 | 85 | 130 | 124 | | | | | | | | | | | 14 | 5 | 10 | 15 | 16 | 160 | 48 | 45 | 53 | 65 | 301 | 106 | 140 | 198 | 204 |
| Yellowfin tuna | 3704 | 2329 | 1972 | 2022 | 1201 | | | | | | | | | | | 223 | 211 | 184 | 274 | 160 | 208 | 221 | 155 | 213 | 224 | 4136 | 2761 | 2310 | 2509 | 1585 |
| Other tuna | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL TUNA** | **9346** | **6174** | **5399** | **6006** | **4922** | | **1205** | **549** | **1500** | **926** | | | | | | **607** | **613** | **1763** | **725** | **1747** | **1445** | **1187** | **1360** | **1128** | **864** | **11397** | **9180** | **9071** | **9359** | **8459** |
| Black marlin | 1 | 1 | 0 | 0 | 0 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | | | | | | 1 | 1 | 0 | 0 | 0 |
| Blue marlin | 655 | 333 | 405 | 386 | 512 | | | | | | | | | | | 24 | 30 | 62 | 35 | 51 | 67 | 39 | 53 | 34 | 28 | 747 | 403 | 520 | 456 | 591 |
| Sailfish | 11 | 10 | 10 | 12 | 6 | | | | | | | | | | | 0 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 15 | 13 | 12 | 14 | 8 |
| Spearfish | 155 | 162 | 112 | 110 | 95 | | | | | | | | | | | 8 | 11 | 8 | 10 | 11 | 0 | 1 | 1 | 1 | 0 | 164 | 173 | 121 | 121 | 106 |
| Striped marlin, NPO | 554 | 191 | 261 | 222 | 272 | | | | | | | | | | | 28 | 15 | 28 | 33 | 53 | | | | | | 582 | 206 | 288 | 255 | 325 |
| Striped marlin, SPO | | | | | | | | | | | | | | | | | | | | | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 |
| Other marlins | 11 | 4 | 0 | 1 | 1 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 4 | 0 | 1 | 1 |
| Swordfish, NPO | 821 | 1066 | 1046 | 749 | 368 | | | | | | | | | | | 64 | 22 | 35 | 54 | 56 | 0 | | | | | 885 | 1088 | 1081 | 803 | 424 |
| Swordfish, SPO | | | | | | | | | | | | | | | | | | | | | 4 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 |
| **TOTAL BILLFISH** | **2209** | **1767** | **1835** | **1481** | **1254** | | | | | | | | | | | **124** | **80** | **133** | **133** | **172** | **77** | **46** | **60** | **42** | **33** | **2410** | **1893** | **2028** | **1657** | **1460** |
| Blue shark | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mako shark | 1 | 0 | 1 | 1 | 2 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 |
| Thresher | 0 | 1 | 2 | 1 | 1 | | | | | | | | | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 |
| Other sharks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Oceanic whitetip shark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silky shark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hammerhead shark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tiger shark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Porbeagle | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TOTAL SHARKS** | **1** | **2** | **3** | **1** | **3** | | | | | | | | | | | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **2** | **3** | **2** | **3** |
| Mahimahi | 127 | 164 | 130 | 109 | 76 | | | | | | | | | | | 5 | 19 | 14 | 18 | 11 | 1 | 1 | 6 | 1 | 5 | 134 | 184 | 149 | 128 | 92 |
| Moonfish | 72 | 79 | 82 | 111 | 201 | | | | | | | | | | | 4 | 13 | 12 | 26 | 40 | 0 | 0 | 1 | 1 | 1 | 76 | 92 | 94 | 138 | 242 |
| Oilfish | 38 | 39 | 57 | 52 | 55 | | | | | | | | | | | 3 | 5 | 7 | 6 | 8 | 0 | 0 | 0 | 0 | 0 | 41 | 44 | 64 | 58 | 63 |
| Pomfret | 125 | 118 | 138 | 132 | 157 | | | | | | | | | | | 9 | 9 | 17 | 18 | 23 | 0 | 0 | 0 | 0 | 0 | 134 | 127 | 155 | 150 | 181 |
| Wahoo | 406 | 240 | 195 | 316 | 240 | | | | | | | | | | | 24 | 25 | 25 | 41 | 35 | 17 | 12 | 11 | 16 | 17 | 447 | 277 | 231 | 373 | 293 |
| Other fish | 1 | 1 | 2 | 2 | 2 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 1 | 2 | 3 | 2 |
| **TOTAL OTHER** | **769** | **641** | **602** | **721** | **730** | | | | | | | | | | | **45** | **70** | **74** | **109** | **118** | **20** | **14** | **19** | **19** | **23** | **834** | **725** | **695** | **849** | **872** |
| **GEAR TOTAL** | **12324** | **8584** | **7838** | **8210** | **6909** | | **1205** | **549** | **1500** | **926** | | | | | | **777** | **763** | **1970** | **968** | **2038** | **1542** | **1248** | **1439** | **1189** | **921** | **14642** | **11800** | **11797** | **11866** | **10794** |

Table 41. U.S. longline catch (mt) by species in the North Pacific Ocean, 2020-2024

| | U.S. (ISC) | | | | |
|---|---|---|---|---|---|
| | **2024** | **2023** | **2022** | **2021** | **2020** |
| **Vessels** | 149 | 150 | 147 | 146 | 147 |
| **Species** | | | | | |
| Albacore, North Pacific | 244 | 505 | 201 | 226 | 147 |
| Albacore, South Pacific | | | | | |
| Bigeye tuna | 6129 | 6403 | 6379 | 7042 | 7442 |
| Pacific bluefin tuna | 3 | 2 | 2 | 1 | 2 |
| Skipjack tuna | 148 | 62 | 103 | 153 | 168 |
| Yellowfin tuna | 4189 | 2797 | 2428 | 2496 | 1699 |
| Other tuna | | | | | |
| **TOTAL TUNA** | **10713** | **9770** | **9113** | **9918** | **9457** |
| Black marlin | 1 | 1 | 0 | 0 | 0 |
| Blue marlin | 712 | 392 | 517 | 444 | 618 |
| Sailfish | 12 | 14 | 12 | 16 | 9 |
| Spearfish | 172 | 196 | 131 | 133 | 117 |
| Striped marlin, North Pacific | 626 | 222 | 320 | 278 | 380 |
| Striped marlin, South Pacific | | | | | |
| Other marlins | 11 | 5 | 0 | 1 | 2 |
| Swordfish, North Pacific | 1018 | 1218 | 1307 | 971 | 728 |
| Swordfish, South Pacific | | | | | |
| **TOTAL BILLFISH** | **2552** | **2048** | **2288** | **1844** | **1854** |
| Blue shark | | | | | |
| Mako shark | 2 | 2 | 2 | 5 | 16 |
| Thresher | 1 | 2 | 3 | 3 | 3 |
| Other sharks | | | | | |
| Oceanic whitetip shark | | | | | |
| Silky shark | | | | | |
| Hammerhead shark | | | | | |
| Tiger shark | | | | | |
| Porbeagle | | | | | |
| **TOTAL SHARKS** | **2** | **4** | **5** | **8** | **19** |
| Mahimahi | 148 | 224 | 178 | 166 | 119 |
| Moonfish | 132 | 229 | 245 | 391 | 747 |
| Oilfish | 47 | 59 | 75 | 74 | 83 |
| Pomfret | 155 | 164 | 189 | 182 | 228 |
| Wahoo | 480 | 323 | 251 | 408 | 335 |
| Other fish | 1 | 1 | 2 | 2 | 2 |
| **TOTAL OTHER** | **963** | **1000** | **940** | **1223** | **1514** |
| **GEAR TOTAL** | **14231** | **12822** | **12345** | **12993** | **12844** |

Table 42. U.S. longline catch (mt) by species in the Eastern Pacific Ocean, 2020-2024

| | All U.S. vessels | | | | | U.S. vessels ≥ 24 m | | | | | U.S. vessels ≤ 24 m | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2024** | **2023** | **2022** | **2021** | **2020** | **2024** | **2023** | **2022** | **2021** | **2020** | **2024** | **2023** | **2022** | **2021** | **2020** |
| **Vessels** | 98 | 121 | 108 | 112 | 121 | 21 | 25 | 21 | 23 | 26 | 77 | 96 | 87 | 89 | 95 |
| Albacore, North Pacific | 25 | 242 | 72 | 90 | 90 | 4 | 120 | 15 | 20 | 13 | 22 | 122 | 57 | 71 | 77 |
| Albacore, South Pacific | | | | | | | | | | | | | | | |
| Bigeye tuna | 468 | 1273 | 1049 | 1389 | 1404 | 91 | 258 | 177 | 357 | 329 | 376 | 1015 | 872 | 1032 | 1076 |
| Pacific bluefin tuna | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Skipjack tuna | 6 | 4 | 8 | 8 | 29 | 1 | 1 | 1 | 2 | 4 | 6 | 4 | 7 | 5 | 24 |
| Yellowfin tuna | 261 | 257 | 273 | 200 | 338 | 46 | 53 | 40 | 48 | 62 | 215 | 204 | 233 | 152 | 276 |
| Other tuna | | | | | | | | | | | | | | | |
| **TOTAL TUNA** | **761** | **1777** | **1402** | **1688** | **1863** | **142** | **431** | **233** | **427** | **410** | **619** | **1346** | **1169** | **1260** | **1453** |
| Black marlin | 0 | | | | | | | | | | | | | | |
| Blue marlin | 33 | 28 | 50 | 23 | 56 | 7 | 6 | 8 | 4 | 6 | 26 | 23 | 43 | 19 | 49 |
| Sailfish | 0 | 3 | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 2 | 1 |
| Spearfish | 9 | 23 | 11 | 13 | 11 | 2 | 4 | 2 | 4 | 2 | 7 | 18 | 9 | 9 | 9 |
| Striped marlin, North Pacific | 43 | 16 | 32 | 24 | 55 | 9 | 3 | 4 | 7 | 12 | 34 | 13 | 28 | 17 | 43 |
| Striped marlin, South Pacific | | | | | | | | | | | | | | | |
| Other marlins | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Swordfish, North Pacific | 134 | 131 | 226 | 168 | 303 | 70 | 49 | 123 | 130 | 241 | 64 | 82 | 103 | 38 | 62 |
| Swordfish, South Pacific | | | | | | | | | | | | | | | |
| **TOTAL BILLFISH** | **219** | **201** | **320** | **230** | **427** | **88** | **62** | **136** | **145** | **262** | **132** | **139** | **184** | **85** | **165** |
| Blue shark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mako shark | 1 | 1 | 1 | 5 | 14 | 1 | 1 | 1 | 4 | 13 | 0 | 0 | 0 | 1 | 1 |
| Thresher | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Other sharks | | | | | | | | | | | | | | | |
| Oceanic whitetip shark | | | | | | | | | | | | | | | |
| Silky shark | | | | | | | | | | | | | | | |
| Hammerhead shark | | | | | | | | | | | | | | | |
| Tiger shark | | | | | | | | | | | | | | | |
| Porbeagle | | | | | | | | | | | | | | | |
| **TOTAL SHARKS** | **1** | **2** | **2** | **6** | **16** | **1** | **2** | **2** | **5** | **14** | **0** | **0** | **0** | **1** | **2** |
| Mahimahi | 15 | 41 | 35 | 39 | 32 | 4 | 9 | 6 | 9 | 6 | 11 | 33 | 29 | 29 | 26 |
| Moonfish | 55 | 138 | 152 | 254 | 506 | 12 | 39 | 26 | 55 | 117 | 44 | 98 | 126 | 199 | 389 |
| Oilfish | 6 | 15 | 11 | 16 | 20 | 3 | 8 | 2 | 4 | 6 | 2 | 7 | 8 | 12 | 15 |
| Pomfret | 22 | 38 | 34 | 32 | 47 | 5 | 9 | 5 | 8 | 8 | 17 | 29 | 29 | 24 | 39 |
| Wahoo | 50 | 58 | 31 | 51 | 60 | 8 | 12 | 4 | 12 | 12 | 42 | 46 | 28 | 39 | 49 |
| Other fish | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL OTHER** | **149** | **290** | **264** | **392** | **666** | **32** | **77** | **43** | **89** | **149** | **116** | **212** | **221** | **304** | **517** |
| **GEAR TOTAL** | **1130** | **2270** | **1987** | **2316** | **2971** | **263** | **572** | **414** | **666** | **835** | **867** | **1698** | **1574** | **1649** | **2137** |

# 3 FISHERY ECOSYSTEMS

## 3.1 FISHER OBSERVATIONS

Hawai‘i fishermen Clay Tam and Roy Morioka started the fisher observations initiative in 2020 to add traditional and local ecological knowledge, and on-the-water observations that can complement fisheries dependent data sources in the Annual SAFE reports. Fisher observations from 2020-2023 can be found in the pelagic and the respective archipelagic reports. Since 2021, the Council has collected fisher observations for pelagic fisheries during quarterly advisory panel meetings for Hawai‘i, American Samoa, Guam, and the CNMI. Data collected during these meetings is limited to Advisory Panel members and were published in the 2021-2023 Pelagic SAFE reports. In 2023 Pelagic fisher observations were summarized in annual fisher observations data reports for American Samoa, Guam and the CNMI, and Hawai‘i (Ayers et al. 2024a, 2024b, 2024c).

Pelagic fisher observations from 2024 will begin with a summary quarterly advisory panel meetings, separated by island area/jurisdiction, then followed by a summary of pelagic management unit species data collected from the fisher observations meetings.

### 3.1.1 INFORMATION FROM ADVISORY PANEL MEETINGS

#### 3.1.1.1 AMERICAN SAMOA

*Second Quarter (April-June)*
The AP reported that foreign vessels have not been following regulations and selling their bycatch fish in local markets, undercutting local fish prices. They also mentioned a social media video of the foreign vessels offloading their bycatch fish right in front of an American Samoa Customs van. The AP contacted NOAA OLE and were informed that it is an American Samoa government customs issue. The sale of fish by foreign vessels was described as a “bycatch” issue, whereby Korean, Chinese, and Taiwanese flag vessels sell non-target species for $1.50/lb, while the going rate for these fish caught on American Samoa flag vessels is typically $2.50/lb. The AP asked if there might be any government assistance available for local fishers to help them be more competitive in markets. There was talk of an upcoming meeting with the U.S. Trade representative and the U.S. International Trade Commission in Honolulu in June to discuss these trade and import issues, but mainly issues related to the Hawai‘i longline fleet. American Samoa-based purse seine vessels have shifted effort to French Polynesia due to changes in seasonal fishing conditions. Some of these vessels unload their catch in South America. The fish supply at Starkist has remained good despite the shift in Purse Seine effort. American Samoa longliners are also having issues sourcing fishing bait with one of two suppliers deciding not to sell bait. This may further disadvantage American Samoa longliners relative to foreign vessels. There is talk that some American Samoa longline vessels might be for sale if there is interest. Costs are up, wages are down, and business is difficult. There is also a sportfishing boat that is bringing in spearfishers and sportfishers in to target dogtooth tuna and other species in American Samoa waters.

*Third Quarter (July-September)*
The AP noted high winds with some good days for sportfishing. They also highlighted infrastructure issues such as docks in disrepair and unusable with some ramps blocked by trash and broken pallets. The AP reported that foreign boats are dropping off albacore caught by

foreign longline vessels. Apparently, customs charged foreign vessels a fee to unload their miscellaneous catch in Pago Pago before being exported internationally. This could have influenced foreign vessels to sell this catch locally in American Samoa markets at reduced prices to avoid paying the customs fee. Despite this, market prices have returned to normal. The drop in prices may have been influenced by social media posts documenting vans purchasing lower priced fish from foreign vessels, as mentioned in the second quarter meeting. Fish supply remains good at the [Starkist] cannery. For purse seine vessels, FAD closures were reduced by one half, from 3 months to 1.5 months and the high seas FAD closure from 2 months to 1 month. The additional time enables purse seiners to better plan their operations and trips, and was viewed positively by American Samoa purse seiners. The AP were pleased that the DMWR has FADs back up after an extended period of time offline.

*Fourth Quarter (July-September)*
The AP noted the recent Akule run with fishers out targeting them. Windy conditions persisted through the quarter. The Buds and Suds tournament had a good turnout, with good conditions for trolling. A number of vessels (8 or 9) entered from Apia and there was a total catch of 2000-3000 pounds. A vessel from Apia won the tournament and all of the fish were donated to the tournament sponsor who sold them for cash prizes for the charity. The Buds and Suds was one of 3 tournaments held in 2024, including the Manu‘a Flag tournament. This is the first time in several years that all tournaments were held in the same year. There are now about 10 U.S. flagged purse seine vessels fishing out of American Samoa, but there has not been much effort in the American Samoa EEZ. Purse seine fishing in the American Samoa EEZ generally favors larger vessels and the American Samoa-based fleet mostly fishes the high seas outside the EEZ. But the size of the fleet is good to support the cannery in terms of offloading fish and capacity. American Samoa commercial fishing fleets may soon advocate for government help to address unfair fishing competition and subsidies of foreign fleets.

#### 3.1.1.2 CNMI

*Second Quarter (April-June)*
The AP observed good fishing conditions, but few large schools of fish with strong currents and birds attacking their lures. AP members thought that the larger schools might be further offshore than normal. Fishers have been catching small marlin, most around or less than 100lb. Only 5 wahoo were caught in the Tasi to Table Derby. The AP attributed this to warmer water temperatures, which may cause fish to seek and inhabit deeper depths. The AP also reported that the tunas that they have caught have been large, but are scattered all over with the bird aggregations. The AP also noted that lu‘aos (Brown boobys) have been following boats around and attacking lures. The channel at Smiling Cove Marina is becoming less navigable, with the potential that larger boats may soon be unable to navigate it.

*Third Quarter (July-September)*
The AP reported calmer ocean conditions around Saipan, Tinian and Rota with more people trolling. The AP reported that some trolling is going on, but catches are not great; fishing has been hit or miss. Despite this, the AP noted some nice runs of yellowfin tuna. Marlins they have caught are small, all under 150lb, but there have been lots observed outside the international shelf. Several earthquakes occurred in late August into early September, which may have triggered fish to feed. Weather has fluctuated between hot and small storms with high winds and rain. Fuel prices remain high. The cross light between Saipan and Tinian is also not working.

Shark depredation continues to be an issue around Rota and lights on the buoys need to be replaced. The AP also discussed a 2019 law that was passed to allow the DLNR to collect a small fee from commercial fishers that has not been enforced. The AP felt that if this law was enforced, it would be a way to identify commercial fishers and good revenue stream for the Department. The AP are still waiting for updates from the DLNR on FADs, the Tinian marina, and Smiling Cove. Tinian fishers have wanted to run a fishing derby for 4 years.

*Fourth Quarter (October-December)*
The AP reported that weather has been unfavorable for fishing and there is a possible algal bloom at the Tinian port. Ocean conditions have been rough with wind coming from different directions due to passing storms. Earthquake activity has continued from the previous quarter, from north of Maug to south of Guam. The AP reported that shark depredation remains a persistent issue, particularly on Tinian and Saipan. Another AP member reported that shark depredation has increased, perhaps due to seasonality, rough water, and strong currents. As evidence of this, one AP member reported losing a marlin to a shark right at the boat. The AP is pleased at the responsiveness of DFW in replacing a street light out at Fishing Base. The fishing community also donated equipment and labor to replace a broken faucet at the washdown area there. Tunas have been hard to find, but a few mahimahi are being caught. The marina site in Rota is broken, but parts are ordered, and it should be fixed within a month. Fishing has been slow around Rota and Saipan. For commercial fishers selling their catch, market vendors are purchasing fish at lower prices than when hotels and restaurants were buying.

#### 3.1.1.3 GUAM

*Second Quarter (April-June)*
The AP observed rough ocean conditions during the first quarter with west swell and high seas from the direction of Japan and China. Despite the weather, the fishing was great. Wahoo arrived earlier than expected, but catches were often in the 5-10lb size range until later in the season when larger-sized fish showed up. Some vessels reported catching 40-60 pieces in one trip. The mahimahi run lasted from January-April, with more fish around than last year due to the weather and cooler water temperatures. A lot of fish could be caught closer to shore in February/March. Water temperatures are getting warmer due to the change of seasons with flying fish nearer to shore than other times of the year. Tradewinds have also returned.

*Third Quarter (July-September)*
Some AP members felt that inshore fishing pressure may be greater than what is being observed. A video of silky sharks in a feeding frenzy eating bonita was circulating through the fishing community. Despite good fishing conditions, AP members reported that trolling has not been productive, with most fishers only catching bonita. Fishers also noted an abundance of small marlin under 100lb. In terms of markets, a few AP members reported fish buyers purchasing lower priced imported fish and felt that local fish buyers preferred buying imported fish to those caught locally. There was also a market-wide recall for imported mahimahi that was spoiled. The improved weather conditions had more local fish in the markets, with some fishers holding more fish than they could offload. The Guam Fishermens Co-op is getting some customers in and are hoping the new facility will be completed by late 2025. They need to finish the seawall and then they can get started on the new building.

*Fourth Quarter (October-December)*
La Niña may be affecting fishing conditions and altering fish migration patterns. Mahimahi are normally more prevalent during this time of year and wahoo showed up months later than usual. Lots of rats (small wahoo) around as well. FADS continue to be an issue (deployment costs have tripled in the last 10 years), but Guam is trying to improve the deployment and bidding processes to allow smaller outfits an opportunity to bid. Guam deployed two LIDAR systems that the fishing community recommended. There was no mañahak run in the quarter, which may have affected pelagic fishing as there were fewer bait fish available for pelagics to eat. In terms of weather, there have been a lot of tropical weather systems, with 5 systems passing over Guam in November alone. Cooler winds from China and Japan were noted in December, making ocean conditions rough. Fishers finally reported catching some wahoo loads in December and mahimahi were also around. The AP are worried that the presence of mahimahi in December could affect their regular February migration around Guam waters. Overall, fishing was a bit slow in 2024.

#### 3.1.1.3.1 Hawaii Island

*Second Quarter (April-June)*
2024 is the 50th anniversary of the Hilo troller club. Bids are due for the Wailoa Small Boat Harbor channel dredging work in Hilo. Due to the dredging work, Hilo Trollers cancelled their 2024 tournaments since the channel prevents larger boats from accessing the channel, but they are planning to celebrate the 50th anniversary in 2025. Good numbers and sizes for all numbers and sizes of pelagic fish have been observed, but Suisan Fish Market is not buying in large quantities due to their limited capacity. Fishers reported that it has been many years since the bite was this good. Small size aku and rats are being caught, ‘ahi (yellowfin) caught in the 90-198lb size range. A few of the troll days were close in, just outside Hilo. The ika shibi bite has been slow. Fuel prices remain high. Just held their first East Hawai‘i meeting, with 10 members. Another fisher reported folks are getting out fishing, but that there’s not much enforcement presence on the Hilo side. There has been steady rain every afternoon in Kona, with a lot of moisture in the air. Fishers noted a lot of otado around in the 25lb range. Honokohau Small Boat Harbor in Kona is turning away fishers that do not have a current registration on their boat trailer. Kona gas prices are in the $5/gallon range.

*Third Quarter (July-September)*
In Hilo, dredging continues on the Wailoa Harbor and completion is expected by the end of the year. The dredging operation has picked up a tremendous amount of sand, the channel was really filled in. The rains have slowed down since second quarter (springtime) and the coffee season up mauka is starting. Citrus production is down in Kona, which may be something to note. Orange, lemon, and tangerines all have low numbers on trees. There has been a decent tuna run on the Hilo side, but only the shortliners are catching tuna out of Kona. Shark depredation continues, making buoy fishing nearly impossible. Lots of ‘porpoises’ on the buoys as well. And one of the charter boats caught a grander marlin. Tuna fishing in general has been poor except for Hilo. Fishing “on the bag” or ika shibi have been more productive than trolling. Most of the shibis caught were in the low 100lb range, but a few were 200lb plus. One fisher suggested that tuna might not be as migratory as once thought. Fishers are catching onos around 1000’ depth while trolling for ‘ahi. Fishers reported catching tombos outside when fishing ika shibi and onos on the inside, which is unusual.

*Fourth quarter (October-December)*
Fishers reported that fishing around Hilo has been "unreal." There is a big eddy offshore and fish are biting from Pohoiki to Smoke stack, and probably down to South Point. Unfortunately, tombo prices are only $0.50/lb. On the Kona side, there has been a consistent ono bite up near the [Kailua-Kona] airport. Aku are still being found around Kona. Aku and otarus have been biting off Kona all year. Shark depredation remains an issue on the buoys. One fisher brought up a 900lb marlin with several bites taken out of it. An ice machine at the harbor should help out small boat fishermen. Fishers are reporting more DOCARE enforcement of boats, checking coolers for fish caught, Kona crab, lobsters, and trailers. DLNR [DOCARE] hires have helped increase enforcement. Dredging was completed at the Wailoa boat harbor channel. The project estimate for the dredging project came in at $4.8 million, but the budget was only $3.1 million. There are only a few full-time fishermen out of Honokohau harbor in Kona. The Honokohau harbor now charges $350 to use the scale to weigh and take a picture of a fish. The lack of harbors (for fishing access and safety) on Hawai'i Island is an important issue. There is no harbor south after Miloli'i / Honaunau, neither of which require a registration sticker, but your boat has to be small to launch there. Pohoiki boat ramp in the Puna region on the Southeast coast of Hawai'i Island was filled in by the 2018 lava flows. As of December 12th, a $9.2 million dollar contract was awarded to dredge Pohoiki Bay to restore ocean access to the ramp. The project is anticipated to begin in February, 2025.

#### 3.1.1.3.2 Kauai

*Second Quarter (April-June)*
One fisher reported the best trolling that they've ever seen, catching fish with any line out. Ono bite has been "amazing" too. Charter boats are catching 3-20 ono and mahimahi per day. Fishing was really good when the winds were strong. There has been a steady 'ahi bite in the west, south, and east of the island. The bites are blind strikes, no large aggregations. 'Ahi are also biting at shallower depths. Strong year for hebi and striped marlin. One 'ahi was caught with two large egg sacks, one on each side. Fuel prices for non-ethanol fuel are higher than $6/gallon. Aku in the 20lb size range are around, but not found consistently. The state of Hawai'i is nearing completion a boat ramp further up the Anini stream. A community member is working with the state to put up no swimming signs by the boat ramp, since swimmers often venture into the boat channel by the reef flat area and interactions with swimmers have increased in recent years. One fisher noted harbors are full of people fishing again, for the first time in years. Kekaha boater's association started an Instagram account to share information about their small harbor and all of the multiple users there. Near Port Allen, some thrillcraft have been running close to shore near divers/dive spots and there have been some close calls with swimmers/divers. The septic waste machine at the Port Allen boat ramp is not working, which has prevented boaters from disposing of waste. DOCARE officers are turning away boaters with unregistered trailers from boat ramps. One Kaua'i fisher reported that their island's fresh fish presentation is poor and that no one wants to buy fish from them when they catch a couple hundred pounds.

*Third Quarter (July-September)*
Fishing participation is down, with just a few trailers and boats at the boat ramp. Trolling has slowed down. Depredation continues to be an issue on fishing trips, with one shortliner reporting losing their entire catch fishing off both the west and south side of the island, but fishing in general remains above average. Fishers are reporting observations of large amounts of pilot

whales. Fishers are still not seeing large aggregations of ‘ahi. Onos are coming in on the ledge, one fisher caught a 40lber. The marlin run has been strong, but the mahimahi has not started yet.

*Fourth quarter (October-December)*
A lot of vessels are out trying to catch ‘ahi. Kaua‘i fishers starting to catch some yellowfin tuna on the buoys from 1-70lb, but pelagic dolphins, whether rough-toothed or spotted, have been wreaking havoc around the buoys. Wiliwili harbor has deferred maintenance from bumpers to no dedicated area to wash down boats, big potholes in the parking lot, and docks that need to be replaced. Port Allen fishers drew attention to maintenance needs with floating docks, wash down issues [broken water lines], and lack of parking and bathroom stalls, and dredging needed to make the harbor navigable. DOCARE has been out enforcing trailer and boat registration. The state of Hawai‘i has been working with a local landowner adjacent to Port Allen in an attempt to utilize some of their vacant land for the harbor.

#### 3.1.1.3.3 Maui

*Third Quarter (July-September)*
Infrastructure and ramp issues persist, with boats clustered in Ma‘alaea following the Lahaina fire.

*Fourth quarter (October-December)*
Maui is rebuilding after the fire and Lahaina is cleaned up. Thirty additional moorings have been built at Maalaea Harbor. Recreational boating businesses are surrounding humpback whales, which have just arrived from Alaska

#### 3.1.1.3.4 Oahu

*Second Quarter (April-June)*
A fisher reported that a commercial fisherman caught a grander marlin off the coast of Windward O‘ahu. Lots of small marlin were caught in the beginning of May. A netter caught a 25lb ‘ahi in the net, an indication that fish are coming in closer to shore. Another fisher caught a 170lb ‘ahi, a sign that there are some bigger fish around. Otados are still being seen. ‘Ahis seem to be caught / found at pretty deep depths, perhaps a reason why trolling has not been as productive. Summer longline fishing has been similar to the past 4-5 years, difficult to catch big loads of fish. High quality fish fetch high prices and low-quality fish sell for low prices. Longline vessels are catching more yellowfin tuna than previous years, but in general, the proportion of yellowfin/bigeye catches are around 50/50. Longline fishers expect false killer whale depredation, with fishers motoring away for a couple days to get away from them. Gas prices observed as low as $4.19/gallon at Costco. A big island fisher visiting O‘ahu noted ono for $7/lb in a downtown O‘ahu market.

*Third Quarter (July-September)*
Offshore fishing off of Windward O‘ahu was affected by unusual, erratic summer weather, with rain, high winds, and fewer tourists. Fish catches are down – still catching all sizes – but fewer than previous years. Climate change and the economy have increased uncertainty of fishing trips. Proposed wind energy projects may affect Waimānalo, Kailua, fishing, and traditional uses. O‘ahu fishers started the MOUSS work on the Penguin Banks after completing O‘ahu, Maui, and Big Island.

*Fourth quarter (October-December)*
Fourth quarter seemed similar to the third quarter for Hawai‘i longliners, but production is up overall. Catches are up to 25,000lb loads, yet the fish markets remain challenging. Many vessels are barely breaking even with fishing expenses. Hawai‘i longline boats implemented tory lines to reduce seabird interactions. With higher oil prices, shallow-set trips targeting swordfish have a break-even price of $3-3.50/lb, so Hawai‘i longliners targeting swordfish are watch mainland markets intently before they plan trips. O‘ahu fishers are pleased to see more DOCARE officers enforcing fishing regulations on boats. There used to be just 1 DOCARE officer on O‘ahu’s North Shore, but now there 4-5 DOCARE officers on patrol. Illegal/unpermitted moorings for shark tours are a hazard for boats heading out or coming back to Haleiwa Harbor in low light or dark conditions. One fishing boat ran into one of the moorings and got a line tangled in their propellor. Fortunately, another small boat was able to tow them back to port. One fisher reported that there are as many as 20 large aluminum vessels using the Haleiwa boat harbor to take customers on shark tours. Fishers reported that the homeless population is also a problem in the harbor with break-ins and theft. Another fisher noted that sharks remain an issue affecting fishing productivity. Lack of trailer parking can affect safety in Windward O‘ahu, particularly during busy times. Windward O‘ahu trolling was productive when fishers could make it out, with catches of otados, mahimahi, and ‘ahi. Market prices are inconsistent, so it is hard to make money on trips.

### 3.1.2 ANNUAL FISHER OBSERVATION MEETING AMERICAN SAMOA

*Social*

In American Samoa, fishing infrastructure issues were a prominent theme during the annual summit meeting. Foremost of these issues were Fish Aggregating Devices (FADs), and several fishers referenced lower productivity at FAD locations. Others described how FADs might improve fishing on the outer banks and ways to potentially recover FADs that had become unmoored to test in different locations. Another comment dealt with marina repairs that were needed at Pago Pago harbor, and praised the DMWR for fixing piers prior to a fishing tournament.

*Economic*

In American Samoa, when fishers referenced economic aspects of their fisheries, they primarily discussed costs of fishing and market conditions. For costs of fishing, one fisher explained that they will sometimes sell excess catch to recoup costs. Another fisher described challenges that the American Samoa longline (ASLL) fleet faces with low prices paid for their fish and high prices for bait and fuel. Another comment related to the ASLL fleet referenced a jigging pilot project whereby a vessel was equipped with jigging gear to fish in southern waters, but that the vessel did not find jigging to be effective or profitable when taking into account trip costs and catch rates. On market conditions, one fisher reported a decline of fish for sale in roadside markets and on social media; another decried the lack of labels on seafood available in local markets. They may know if the fish was caught locally or in Independent Samoa, but are unaware of the origin of other fish found in their markets.

*Biological*

In general, American Samoa fishers felt that fish recruitment in 2024 was not as strong as observed in previous years or past decades. Fishers saw fewer wahoo on the banks in 2024 and

smaller billfish. Some noted fewer bird aggregations offshore and posited that even small-scale commercial alia vessels may be impacting the abundance of fish. Another reported that albacore fishing was still productive for one longline operation. Fishers also reported continued shark depredation, which happens while fishing on FADs or trolling. Their frustration is worsened by the lack of options available to deal with the problem, since harvesting sharks is illegal.

*Physical/Oceanographic*

In American Samoa, for physical/oceanographic issues, fishers mentioned several aspects of weather and wind patterns that affected American Samoa in 2024. Among the most frequently mentioned aspects was westerly winds, which are associated with La Niña. The westerly winds brought large amount of sargassum with them, which negatively affect fishing. Other issues related to weather/wind patterns was more calm weather days later in the year – a shift from the norm – and more rainfall and runoff that affected roads and transported sediment into the ocean. Additional issues mentioned included king tides that affected fishing trips, stronger currents, and warmer water temperatures, even in the middle of the winter, when the water should be cooler.

### 3.1.3 ANNUAL FISHER OBSERVATION MEETING FROM THE CNMI

*Social*

In the CNMI, the only comment associated with social aspects of fisher observations dealt with fishing infrastructure; repairs needed to the Rota boat ramp.

*Economic*

In the CNMI, fishers primarily focused on market conditions. They reported a lack of fish of all types – pelagic fish species in markets, and one fisher suggested that the weather, an abundance of earthquakes (which may affect other types of fishing more), and climate change may be to blame. Fish prices have remained stable since COVID-19 began and fuel prices remain high, which continue to challenge fishing in the archipelago.

*Biological*

In the CNMI, fishers stated that 2024 was an average year for pelagic recruitment. Fishers also noted an abundance of humpback whales sighted near the beach. One fisher felt that shark depredation decreased in 2024.

*Physical/Oceanographic*

In the CNMI, weather and earthquakes affected fishing trips. Currents were also observed moving west to east, opposite of how they normally move, which might be attributed to La Niña.

*Management Uncertainty*

In the CNMI, there were no comments related to management uncertainty at the 2024 annual summit meeting.

### 3.1.4 ANNUAL FISHER OBSERVATION MEETING FROM GUAM

*Social*

In Guam, fishing infrastructure issues (FADs and overcrowded boat ramps) were notable social aspects of Guam fisheries mentioned by meeting attendees in 2024. For the FADs, there was concern about FADs becoming unmoored shortly after deployment and the costs – and procurement/bidding process – associated with replacing one makes it difficult to quickly replace

them. Fishers also described crowding at Guam boat ramps, particularly Agana, where fishers compete with other ocean users and ocean recreation businesses such as sunset cruise boats. Upgrades to the marina reduced parking spots and derelict trailers further reduce places to park after launching a fishing vessel. Fishers also discussed the mixed blessing of social media and fishing: since they often use social media to sell their catch, when they post their catch, others go fishing (and then also sell their catch), which increases supply and reduces prices. Fishers also mentioned that several small vessels are fishing at night with no navigation lights, which is a danger to other mariners.

*Economic*

In Guam, market conditions permeated discussions about the economics of Guam fisheries in 2024. Some fishers reported steady prices, but noted that demand can easily drop if too much fish enters the market. Others felt they did not have a problem with selling their fish, utilized social media, or deliver to the flea market to sell their catch. With more H2 visa contract workers on the island, there may be a greater demand for fish. Likewise, tourism is increasing and some local chefs are marketing local fish, which is good for local fishers looking to sell their catch. Fishers also noted high costs of fishing, particularly fuel costs, which remain over $5.10/gallon on Guam

*Biological*

In Guam, the beginning part of the year was good for pelagic fishing, especially mahimahi and marlin, perhaps in part due to an abundance of debris in the water acting as FADs. Depending on who you talked to, 2024 was not a good year for wahoo, which were either difficult to find and catch or big fish were being caught every week. In terms of phenology or timing/migration patterns, fishers noted an abundance of smaller marlins in the 50-100lb range. Guam fishers also frequently observed humpback whales or dolphins toward the end of 2024. Depredation continued on both pelagic fishing trips, making it difficult to land both tunas.

*Physical/Oceanographic*

In Guam, fishers reported abnormal weather conditions in 2025. Large westerly swells made trips out of west coast harbors difficult. Wet weather, tropical weather systems, and strong currents were noted throughout the year. Fishing was also affected by earthquakes.

*Management Uncertainty*

In Guam, fishers voiced concerns about military regulations that may affect fishing, fishing activity, or navigational safety. There is a bomb detonation site on the banks off of the Rota banks that fishers said is still active; and the surface danger zone of several firing ranges at the Marine Corps base extend 2-3 miles into the ocean, causing some fishers to avoid the area entirely whether fishing or transiting.

### 3.1.5 ANNUAL FISHER OBSERVATION MEETING FROM HAWAII

*Social*

In Hawai‘i, social issues reported by fishers included fishing infrastructure issues and reduced small boat fishing effort on Hawai‘i island. For fishing infrastructure, fishers referenced conflicts with tourism at Kaua‘i boat harbors over a lack of parking; the need to dredge and reopen Pohoiki and the impact that delay in dredging has had on fishers trying to launch out of Wailoa.

*Economic*

In Hawai‘i, economic issues described by Hawai‘i fishers included market conditions, marketing, changing consumer preferences, and a lack of markets on Kaua‘i. For market conditions, fishers described low prices for tombo in Hilo when markets were flooded with fish, the difficulty of timing markets for pelagic fish like ‘ahi and ono in Hilo, and the benefit of using iki jime to reduce lactic acid in fish after landing them to secure better prices. Fishers also described the challenges of marketing their catch, especially if they live on an outer island and need to transit their fish to the United Fishing Agency fish auction on O‘ahu. One fisher reported that the high fuel prices make people more selective about when they go fishing.

*Biological*

In Hawai‘i, fishers continued to catch numbers of tombo off Hawai‘i Island as they have the past couple years. Fishers across the islands reported catching marlin and striped marlin. Two granders were caught in 2024 out of Kailua-Kona. Fishers also noted some shifts in the timing in the arrival of forage fish, although some pelagic fish like tombo and ‘ahi were caught year-round. Depredation on trolling trips continued, making landing fish frustrating and difficult.

*Physical/Oceanographic*

In Hawai‘i, Kailua-Kona fishers observed strange currents at the beginning of 2024 with ka‘u currents transitioning to more regular kohala currents later in the year. The different currents may have driven greater tombo abundance around Hawai‘i island and smaller size classes of marlin. Fishers also noted warmer pelagic water temperatures, which may have led to greater catches of yellowfin tuna for Hawai‘i longliners. Fishers also noted increases in west swell events in Kona. Fishers also observed windy days and heavy rainfall that affected or prevented fishing trips in 2024.

*Management Uncertainty*

In Hawai‘i, fishers hoped that something could be done about increasing shark populations that make landing fish difficult.

## 3.2 SOCIOECONOMICS

The socioeconomics section outlines the pertinent economic, social, and community information available for assessing the performance of Fishery Ecosystem Plan (FEP) management measures for the Pelagic Fisheries (WPRFMC 2009a). This section meets the objective “Support Fishing Communities” adopted at the 165$^{th}$ Council meeting; specifically, it identifies the various social and economic groups and their interconnections within the region’s fishing communities. The section begins with an overview of the socioeconomic context for the region, and then provides a summary of relevant general studies and data for each jurisdiction, followed by summaries of relevant studies and data for each specific fishery within the jurisdiction.

In 1996, the Magnuson-Stevens Fishery Conservation and Management Act’s (MSA) National Standard 8 (NS8) specified that conservation and management measures consider the importance of fishery resources to fishing communities. In doing so, the measures would ensure the community’s sustained participation in fisheries and minimize associated adverse economic impacts provided that these considerations do not compromise local conservation. Unlike other

regions of the United States, the settlement of the Western Pacific region was intimately tied to the sea (Figure 117), which is reflected in local culture, customs, and traditions.

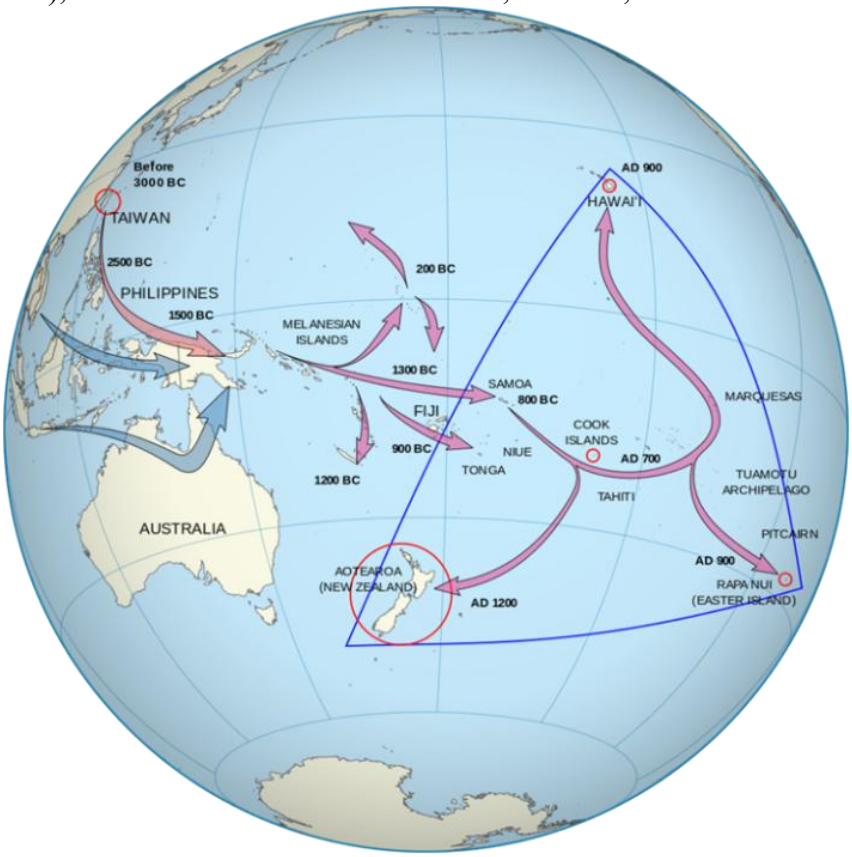



Figure 117. Settlement of the Pacific Islands[1]

[1] Source: Wikimedia Commons, **https://commons.wikimedia.org/wiki/File:Polynesian_Migration.svg.**

Polynesian voyagers relied on the ocean and marine resources on their long voyages in search of new islands, as well as in sustaining established island communities. Today, the population of the region also represents many Asian cultures from Pacific Rim countries, which hold similar significance for many marine resources. Thus, fishing and seafood are integral ways of life in the local community. This is reflected in the amount of seafood eaten in the region in comparison with the rest of the United States, as well as in the language, customs, ceremonies, and community events of the region. Because fishing is such an integral part of the culture, it is difficult to discern commercial from non-commercial fishing, with many trips involving multiple motivations and multiple uses of the catch landed. While economics are an important consideration, fishermen report other motivations (e.g., customary exchange) as being equally important, if not more so. Due to changing economies and westernization, recruitment of younger fishermen has become a concern for the sustainability of fishing and fishing traditions in the region. During the COVID-19 pandemic, the diversification of the fisheries in the region and their ability to adapt to shift from a national and global economy to a local one played a vital role in supporting local food systems, nutrition, food security, and community social cohesion (Kleiber et al. 2022; Smith et al. 2022).

### 3.2.1 RESPONSE TO PREVIOUS COUNCIL RECOMMENDATIONS

At its 199th meeting held in Honolulu and via web conference in June 2024, the Council directed staff to work with NMFS PIRO and PIFSC to explore approaches for maintaining data collection for American Samoa and Hawaii longline fisheries economic performance information through surveys. The NOAA Pacific Islands Regional Observer Program continues to collaborate in implementation of the PIFSC continuous economic trip cost data collection for regional longline fisheries. However, in light of declining human observer coverage rates, PIFSC and PIRO continue to work together to pursue future options to continue collecting economic performance data for American Samoa and Hawaii longline fisheries.

Additionally, during the 199th meeting, the Council also requested NMFS PIFSC compile information presented on cookie cutter shark depredation in Hawaii longline fisheries into a technical memorandum or report to share with Council advisory groups and stakeholders and to solicit feedback on what additional details would be useful to inform fishery operations. PIFSC SEES staff led a manuscript submitted to a peer review journal in late 2024 that estimates total revenue lost due to cookie cutter shark depredation and other damage.

At its 201st meeting held in Honolulu and via web conference in December 2024, the Council directed staff to work with NMFS PIFSC on developing a consistent definition for non-commercial fishing. During December 2024, PIFSC SEES staff presented recent published research (Leong et al. 2024) titled "Aligning fisheries terminology with diverse social benefits" to all of the Council's Advisory Panel meetings held during this 201st meeting cycle. PIFSC SEES program is willing and able to work with Council staff, Advisory Panel's and the Non-Commercial Fisheries Advisory Committee to develop a consistent definition that the fishing community can use when discussing non-commercial fishing and data collection.

### 3.2.2 SOCIAL AND CULTURAL ELEMENTS

#### 3.2.2.1 AMERICAN SAMOA

##### 3.2.2.1.1 Introduction

Fishing has played a crucial role in American Samoan culture and society since the Samoan archipelago was settled. An overview of American Samoa history, culture, geography, and relationship with the U.S. is described in Section 1.3 of the Fishery Ecosystem Plan for American Samoa (WPRFMC 2009b). Since the early 2000s, a number of studies have synthesized details about the role of fishing and marine resources in American Samoa, as well as information about the people who engage in the fisheries or use fishery resources (Levine and Allen 2009; Armstrong et al. 2011; Richmond and Levine 2012a; Grace-McCaskey 2015; Kleiber and Leong 2018; Fisk et al. 2023). These studies describe the importance of marine resources in cultural, economics, and subsistence aspects of American Samoan village life. Fishing was held in high esteem in traditional Samoan culture, with fishing skill bringing high social status and fishing activities figuring prominently in mythology. The basic components of Samoan social structure are the family and village, with the family acting as the central unit. The village leadership decides, according to season, what sort of community fishing should take place. The tautai, or master fishermen, of the village were key decision makers who were awarded higher status than others who might otherwise outrank him when it came to matters of fishing. Village-level systems of governance and resource tenure are still largely intact, and American Samoan cultural systems and representation are formally incorporated into the Territorial Government. Reciprocity is emphasized over individual accumulation. Gifts of food, especially fish and other marine resources, mark every occasion and are a pivotal part of

American Samoan social structure to this day. Women have emphasized the important role of fishing in intergenerational relationships and cultural subsistence with respect to elder care, and domestic labor, and fa'afafine have shared the cultural importance of ocean resources to their art, and design (Fisk et al. 2023).

The last U.S. Census in 2020 documented a population of just under 50K, with 98% of the population found on the island of Tutuila. This is part of 20-year downward population trend (American Samoa Government 2023). While some estimate a slight increase in population since 2020 (American Samoa Government 2023), others estimated a continued downward trend to be closer to 44K (World Factbook n.d.). American Samoa is homogeneous both ethnically and culturally. Polynesians account for the vast majority of the territory's people (at least 85%), and Samoan is the most common language (89%), though English is often spoken in school and business settings and about half the population (47%) "speak it well" (U.S. Decadal Census).

Contemporary American Samoan culture is characterized by a combination of traditional Samoan values and systems of social organization with a strong influence from Christianity. Maintaining "*fa'a samoa*", or "the Samoan way", was considered a priority under the Territorial constitution. Given the cultural homogeneity, nearly everyone in American Samoa accepts and complies with Samoan traditions of land and resource tenure.

However, over the last half century or more, fishing has become less prominent as a central and organizing community force. Through this time, modern fishing gears and new technologies were introduced, tuna canneries became a major economic force in Pago Pago, the population more than tripled, and the gradual but continuous introduction of Western cultural norms and practices altered locals' relationship with the sea. While many traditions and village-based systems of governance have been maintained, the islands have experienced a shift from a subsistence-oriented economy, where sharing of fish catch was extremely important, to a cash-based economy, where fishing is often viewed as a more commercial venture.

Levine et al. (2016) found that American Samoans still consume seafood frequently, with 78% of respondents stating that they eat fish or seafood at least once a week. Most American Samoans purchase seafood from stores or restaurants, with 65% of survey respondents listing this as their first or second choice for obtaining seafood. Other common means for obtaining fish include markets and roadside vendors (45%) and fish caught by household members (37%). This corroborates Levine and Allen's (2009) observation that American Samoans largely rely on, and in many cases prefer, store-bought food to locally-caught fish, with the majority of fish consumed in American Samoa imported from Samoa.

The introduction of outboard engines and other technology in the 1950s and 1960s allowed American Samoan boats to go farther and faster, but also made it necessary for boat owners and operators to sell a portion of their catch to pay for fuel and engine maintenance. The disruption of other traditional values, as well as the introduction of a cash economy based primarily on government jobs and cannery employment, also decreased reliance on traditional, subsistence fishing and allowed commercial fishing to develop on the islands (Levine and Allen, 2009).

Unlike other areas within the Western Pacific region, American Samoa also experienced the development of domestic industrial-scale fisheries, including tuna processing, transshipment, and home port industries. This is due to the excellent harbor at Pago Pago, 390,000 $km^2$ of surrounding exclusive economic zone (EEZ), and certain special provisions of U.S. law that allowed the development of the fish processing industry. For example, the territory is exempt

from the Nicholson Act, which prohibits foreign ships from landing their catches in U.S. ports, and American Samoan products with less than 50 percent market value from foreign sources enter the U.S. duty free.

The two most important economic sectors are the American Samoa Government (ASG), which receives income and capital subsidies from the Federal Government, and tuna canning. In 2022, main imports included fish brought in for processing (American Samoa Government 2023). Exports were primarily canned tuna and associated products. In 2022, domestic exports from American Samoa were valued at $376 million of which $371 million (over 98%) came from canned tuna sale (American Samoa Government 2023). Private business and commerce comprise a third sector. Unlike some of their neighbors in the South Pacific, American Samoa has never been known for having a robust tourist industry.

In 2022, the ASG employed 7,224 people (43% of total employment; American Samoa Government 2023), and the private sector employed 7,426 people (Figure 118). Supporting data for Figure 118 are provided in Table A-111. The canneries employed 2,275 people, which is 13% of the total people employed in the territory. Ancillary businesses involved in re-provisioning the fishing fleet generate a significant number of jobs and income for local residents.

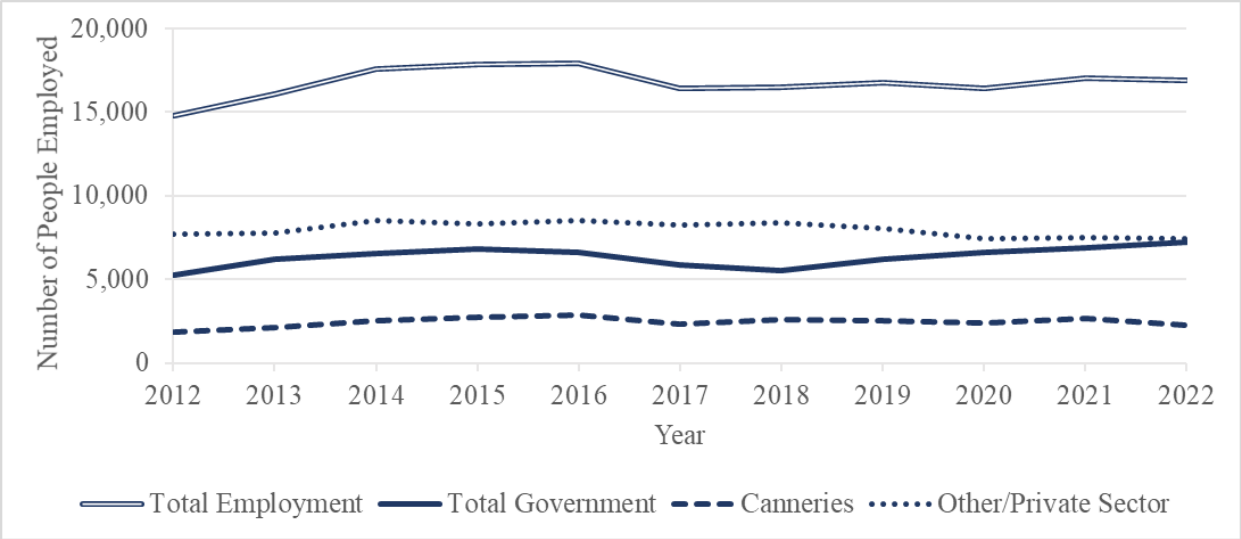



Figure 118. American Samoa employment estimates[1]

[1] Source: American Samoa Government (2023).

The canneries in American Samoa have been operating since 1954, represent the largest private-sector source of employment in the region, and, until recently, were the principal industry in the Territory. Although as many as 90% of cannery workers are not American Samoa citizens, the canneries play a large role in the American Samoa economy (e.g., delivering goods or services to tuna processors and improving buying patterns of cannery workers). Trends in world trade, specifically reductions in tariffs, have been reducing the competitive advantage of American Samoa's duty-free access to the U.S. canned tuna market. This coupled with regulations related to fishing limits and minimum wage requirements in the U.S. territories has led to uncertainty for the economic viability of the canneries (Poblete 2020). In 2009, the Chicken of the Sea cannery closed, resulting in a loss of approximately 2,000 jobs. It was bought by Tri Marine International, which invested $70 million in rebuilding and expansion, and reopened in 2015. In

October 2016, Starkist Co. suspended operations due to lack of fish, in part due to Effort Limit Area for Purse Seine (ELAPS) closures (Pacific Islands Report 2016). That same month, Tri Marine International announced that it would suspend production indefinitely in December 2016, and there are currently no plans to reopen (Pacific Islands Report 2017). Starkist Samoa is currently the only cannery operating in American Samoa and is the largest private employer with about 2,000 workers.

Even before Tri Marine International's closure, American Samoa's economy was identified as being in a highly transitional state that should be monitored closely (Grace-McCaskey 2015). It will be important to monitor any changes and developments related to the tuna industry, given the historically close connection between the tuna canneries, employment levels, population trends, and the economic welfare of the territory. It is also possible that increased federal aid in recent years has masked the full extent of the economic recession.

Members of the American Samoa fishing community had also expressed concerns about the impact of National Marine Sanctuary of American Samoa (NMSAS) expansion in 2012 and management of the Rose Atoll Marine National Monument, which was established in 2009. In both of these cases, the local communities have been concerned about the impacts on fishing practices as well as broader social and cultural issues, such as traditional marine tenure and the ability of villages to manage their own resources. In 2023 there was also strong local opposition to the proposed marine sanctuary designation for the Pacific Remote Island Areas (PRIA), including petitions signed by Starkist employees (Samoa News Staff 2023). In this case, the proposed PRIA National Marine Sanctuary raised concerns about potential impacts to the American Samoa economy related to potential reduction in fish offloaded at the cannery. A study using an IMPLAN model to examine economic contributions of U.S. commercial fisheries in American Samoa found that indirect, induced, and value-added effects of purse seine, longline, and small boat fisheries contributed the equivalent of 20% of total employment, 18% of total labor income, more than a quarter of the total economic output, and more than one-fifth of the 2019 GDP in American Samoa (Chan 2023). Hypothetical scenarios of reduced fish landings of 10%, 30%, and 50% showed large ripple effects on the local economy, leading to a potential 2-10% reduction in employment, 2-9% reduction in labor income, 2-11% reduction in GDP, and 3-14% reduction in output (Chan 2023).

In 2017, understanding the relationship of pelagic fisheries with cultural fishing practices took on a greater focus. During the peak of longline landings in 2002, NMFS created a Large Vessel Prohibited Area (LVPA) to prevent gear conflicts and catch competition between large and small vessels, as well as to preserve opportunities for fishing by American Samoa's small boat ("alia") fleet (NOAA 2017). Since 2002, both large and small vessels have experienced declining catch rates, fish prices, and increasing fuel and operating costs. In 2016, NMFS published an exemption to the LVPA rule to allow large U.S. vessels holding a federal American Samoa longline limited entry permit to fish in portions of the LVPA (NOAA 2016). NMFS and the Council were then sued by the American Samoa Government, who claimed that the 1900 and 1904 Deeds of Cession were not considered in the rulemaking process. The U.S. District Court ruled in favor of American Samoa in March 2017, requiring NMFS to preserve American Samoan cultural fishing practices as part of their obligations to the Deeds of Cession. A study examining dimensions of cultural fishing for the small and large longline fleets found that these fisheries play an important role in maintaining cultural practices, primarily through sharing of catch (Kleiber and Leong 2018). The Council took action to provide a four-year exemption for

vessels permitted under the American Samoa Longline Limited Entry permit, which reduced the area closed to large vessels from 25.5 to 11.5%. In September 2020 the Ninth Circuit Court of Appeals reversed the District Court decision in favor of NMFS. In February 2021, the ASG appealed to the Supreme Court of the United States, but the writ of certiorari was denied June 21, 2021. NMFS published the original 2016 LVPA exemption as a final rule, effective July 6, 2021.

#### 3.2.2.1.2 People Who Fish

One household survey by Levine et al. (2016) found that over half of residents participate in fishing or gathering of marine resources. Approximately 15% reported fishing once a week or more and over 30% of households stated that they engaged in fishing or gathering at least once a month. Commercial fishing is very uncommon in American Samoa, with only 3% of those who fish stated that they frequently did so to sell their catch and 62% never selling their catch. More commonly, people fish to feed themselves and their family or to give to extended friends, family, pastors, and village leaders. Information at the fishery level will be reported in the fishery specific sections below. Qualitative research has resulted in some general observations about trends in fishing by American Samoans.

While fishing and marine resources are universally considered to be important aspects of *fa'a samoa*, limited income has made American Samoans less inclined to engage in strenuous fishing activities when food imports are relatively more available (Levine and Allen 2009). Only a small number of American Samoans engage in boat-based or commercial fishing. Our best source of information about the small boat fisheries come from periodic surveys. In 2021, a total of 33 fishers responded to a cost-earnings survey of the American Samoa small boat fishery of an estimated 60 potential active participants (Dombrow and Hospital 2023). Approximately 90% engaged in nearshore or shallow bottomfish fishing, 81% engaged in deep-water bottomfish fishing, and 75% went trolling. The largest percentage of respondents (27%) identified part-time commercial fishing as their primary motivation, followed by full-time commercial (21%) and cultural fishing (18%). While fishers sold approximately 46% of their catch, they gave away 26% and kept about 21% for personal or family consumption; nearly all fishers (94%) gave away a portion of their catch and 97% kept some catch for personal and family consumption (Dombrow and Hospital 2023).

The average age of survey respondents was 50 years old, only 9% of respondents were women, and the average annual income was $19,838. When compared to the general population this means that small-boat fishers tend to be older, much more likely to be men, and earn a smaller annual income that the average American Samoan resident. However, the majority of respondents describes themselves as Samoan (82%), which was similar to the general population (Dombrow and Hospital 2023).

As described in the FEP, American Samoans have been discouraged from working on foreign longline vessels delivering tuna to the canneries for several reasons, including harsh working conditions, low wages, and long fishing trips. While American Samoans prefer employment on the U.S. purse seine vessels, the capital-intensive nature of purse seine operations limits the number of job opportunities for locals in that sector.

Local fishermen have indicated an interest in participating in the more lucrative overseas markets for fresh fish. However, they are limited by inadequate shore-side ice and cold storage facilities, as well as infrequent and expensive air transportation.

As noted by Levine and Allen (2009), the trend of decreasing reliance on local fish as a food source is reflective of a society that has been undergoing a shift from a subsistence-oriented economy to a cash economy. Changes such as a decrease in leisure time, a shift in dietary preferences towards store-bought foods, a preference to buy fish at the market rather than expend effort in fishing, and an increased availability of inexpensive imported reef fish from Western Samoa and Tonga are also likely contributing to decreasing rates of subsistence fishing in the region (Richmond and Levine 2012b).

However, during the COVID-19 pandemic, the local focus of American Samoa fisheries played a vital role in supporting local food systems, nutrition, food security, and community social cohesion (Kleiber et al. 2022). In 2023, fishers were still concerned about the slow rollout of COVID relief and CARES Act funds (Ayers et al. 2023).

#### 3.2.2.1.3 American Samoa Longline

The American Samoa longline fishery only includes landings in American Samoa by American Samoa longline permitted vessels, it does not include the bigeye landings in Hawaii by the dual (Hawaii and American Samoa) permitted vessels. The American Samoa longline fishery is a limited entry fishery with a maximum of 60 permits. Under the limited access program, NMFS issued a total of 60 initial longline limited entry permits starting from 2005 to qualified candidates. The American Samoa longline limited entry permit is required for anyone using longline gear to fish for pelagic species within the EEZ around America Samoa or anyone landing or transshipping pelagic species in American Samoa that were caught within the EEZ around American Samoa. The total active permits (vessels) fishing in the South Pacific Ocean and landed in American Samoa in 2016 was 20. The American Samoa longline permit may be used to fish and land catch with longline gear in the EEZ around Guam, the CNMI, and the Pacific Remote Island Area (PRIA). It may not, however, be used to fish with longline gear in the Hawaii EEZ.

The American Samoa longline fishery faces many challenges in recent years. A cost-earnings study conducted in 2009 had already indicated a thin profit margin and significant economic challenges encountered by the longline fleet (Arita and Pan 2013). Pan (2015) also observed that at the end of 2013, the majority of the vessels in the American Samoa fleet were tied up at dock, and 18 vessels posted “For Sale” signs. They noted that the collapse of the fishery seemed inevitable due to the poor economic performance resulting from the continuous decline in catch per unit effort, increases in fuel prices, and a sharp drop in albacore prices in 2013. The small-scale alia fleet has been greatly reduced in recent years.

#### 3.2.2.1.4 American Samoa Trolling

According to Levine and Allen (2009), until 1995, boat-based fishing in was primarily trolling and bottomfish handlining, with the pelagic fishery in American Samoa being largely troll-based. In 1996, the majority of trolling fishermen converted their alias to longlining, especially larger commercial trollers, although some continued to troll occasionally. Consequently, the alia fishery has experienced a decline in its catch and effort. In 1996, seven of the 35 trolling vessels rarely sold catch; their captains primarily fished for recreation on weekends, holidays, or competed in fishing tournaments. By 2001, longlining became the dominant fishing method in American Samoa and the number of trolling boats, and their total catch dropped dramatically. Nevertheless, alia longlining has dropped dramatically since then. The landings and revenue by alia longline are not included in this section but are included in the American Samoa longline section.

A small-boat cost-earnings survey in 2021 found that 75% of small-boat fishers engaged in tolling, with 100% of respondents in the Manu‘a Islands participating in trolling (Dombrow and Hospital 2023). Tolling trips had the highest median trip costs, and boat fuel composed the majority of tip costs (Dombrow and Hospital 2023).

#### 3.2.2.2 CNMI

##### 3.2.2.2.1 Introduction

The ancestors of the indigenous Chamorro first arrived in the Marianas around 3,500 years ago and relied on seafood as their principal source of protein (WPRFMC 2009c; Allen and Amesbury 2012; Grace-McCaskey 2014). Similar to other archipelagos in the Western Pacific, fish and marine resources have played a central role in shaping the social, cultural, and economic fabric of the CNMI that continues today. They fished for both reef and pelagic species, collected mollusks and other invertebrates, and caught sea turtles. The occupation of CNMI by foreign nations dramatically changed the island’s ecosystems, reshaped communities, and disrupted fishing traditions. In the 17$^{th}$ and 18$^{th}$ centuries, Spanish colonizers destroyed the Chamorro’s seagoing canoes, suppressed offshore fishing practices, and relocated populations from their traditional home. The CNMI was briefly occupied by Germany from 1899 to the beginning of WWII. During WWII, the CNMI was occupied by the Japanese military, and then was captured by the United States. Throughout this time, fishing remained an important activity. Later immigrants to the islands from East and Southeast Asia also possessed a strong fishing tradition. Today, only Saipan, Rota, and Tinian are permanently inhabited, with 90% of the approximately 47 thousand population living on the island of Saipan. Although the CNMI has transitioned to a tourism-based economy, fishing still plays an important cultural role and serves as a reliable source of local food (Ayers 2018). In the 2020 Census, about 50% of CNMI’s population that identified as one race, identified as Asian, while 23.9% identified as Chamorro, and 4.6% as Carolinian. The median age of the population was 34 years old.

Examination of the seascape of compliance across the US Pacific Island region found, that while the literature highlights the importance of enforcement, local experts emphasized barriers of capacity, governance process, and the lack of data. This suggests that non-instrumental and governance approaches can complement enforcement and should be part of an integrated compliance approach both in the region (Ayers and Leong 2020).

##### 3.2.2.2.2 People Who Fish

Allen and Amesbury (2012) summarized results of studies that demonstrated the sociocultural importance of fishing to Saipan residents. In a 2005 study, most of the active or commercial fishermen who responded to the survey had fished for more than 10 years. They most often participated in snorkel spearfishing at night (participated in by 73% of the fishermen) and snorkel spear fishing during daytime (58% of the fishermen), followed by hook-and-line less than 100 ft. deep (36%), trolling (21%), cast net (talaya; 14%), hook-and-line more than 100 ft. deep (9%), trapping (octopus, crabs, etc.; 19%), and foraging the reef (8%); 18% said they participated in one or more other techniques. Less than a third (~30%) said they owned a boat. The primary reasons for fishing were social, cultural, and nutrition; in addition to reporting that they enjoy the activity itself (32%), many said they needed the fish to feed their family (23%), give to family and friends to strengthen social bonds (13%), that their family has always fished (12%), and that it strengthens bonds with their children/family (6%). Only 4% said they needed the money from the fish they sold. Other motivations included strengthening the bond with their

fellow fishermen, fishing to catch fish for festivals and parties, and seasonal fishing for manahak, ti'ao, and i'e (2% each).

The fishermen reported fishing an average of 71 days per year, with 26% going once every two to three days, and 24% fishing once every two weeks. Those surveyed also reported a decrease in the amount of time they have spent fishing in the past decade, fishing 93 days per year on average. Saipan reef fish were the most frequently harvested species (caught by 54% of the fishermen), followed by shallow-water bottomfish (23%), and reef invertebrates such as octopus, shellfish and crabs (14%).

As in other parts of the region, much of the fisher's catch in the CNMI was consumed by themselves and their immediate family (70%), with another 20% consumed by extended family and friends. Only 8% of the catch was sold. There were 18 respondents that identified themselves as commercial fishermen. They reported a median monthly income of $200 from fishing, with average monthly income of just over $1,000. Costs exceeded sales for almost every income category for fishermen, suggesting that fishing is not a business for most, but that catch is simply sold to cover some of the cost. Interviews with elder fishers conducted from 2009-2010 corroborated this finding, with the most common motivation to keep fish for food (94%) and commercial sale listed as the second most common reason (40%), including some expense fishing or minor sales of excess fish; giving away fish (19%) or providing for special occasions (10%) were also prominent motivations (Iwane and Levine 2023).

While fish remain an important part of the local diet and an integral part of the people's history and culture, adaptation to and integration with a more westernized lifestyle appears to have changed people's dietary preferences on Saipan. Nearly half (45%) of the survey respondents reported eating "somewhat less fish" than they did a decade ago, although the majority still ate fish between one and three times a week. The majority also purchased their fish from a store or restaurant (40%), while 31% purchased fish from roadside vendors. Less common was acquiring fish from an extended relative/friend (13%) or their own catch (11%). Most of the fish consumed came from the U.S. mainland (41%), with other important sources coming from Saipan's coral reefs (31%), deepwater or pelagic fish caught off of Saipan (23%), or fish imported from other Pacific islands (e.g., Chuuk; 10%).

Few other surveys have been conducted on fishing in the CNMI. A household survey conducted in 2012 found that 37% of households had at least one individual that self-identified as a fisherman (Kotowicz and Allen 2015). Respondents from fishing households tended to be younger, possess lower education levels, and have a higher rate of unemployment than respondents from non-fishing households.

The designation of the Marianas Trench Marine National Monument (the Monument) in 2009 has resulted in concerns about loss of fishing access (Kotowicz and Richmond 2013; Kotowicz and Allen 2015; Richmond and Kotowicz 2015; Kotowicz et al. 2017). Despite long distance, high cost, and inconvenience, travel to the areas now protected by the Monument were rare but culturally significant events, and fishing was an essential component. While CNMI residents generally supported designation of the monument, awareness was low regarding specific impacts (Kotowicz et al. 2017). In addition, fishing households showed higher awareness of the Monument but were less likely to strongly support it.

#### 3.2.2.2.3 CNMI Trolling

While proportionally few residents own a boat, more than 400 vessels were registered in the CNMI small boat fleet between 2010 and 2011 (Allen and Amesbury 2012). More than 200 of the vessels were active and operating in CNMI waters, and more than 100 of the vessels were involved in fishing activities. However, estimates of active vessels have declined in recent years. The active small boat fleet targets tunas, other small pelagics (through trolling), and bottomfish, although with the increases in the price of gas, pelagic fishing has dropped off somewhat. The fish are marketed locally, given away to family and friends, or used for ceremonial purposes such as parties, culturally significant fiestas, and each village's patron saint's day.

On Saipan, fisheries managers estimated the active small boat fleet at approximately 100 vessels in 2010 and 2011, but it is likely that active vessels have declined in recent years. Full-time commercial fishing is primarily conducted by ethnic nonindigenous minorities, namely Filipino residents (who fish primarily as independent owners and/or operators) and recent immigrants from the Federated States of Micronesia (who are primarily employed for wages). Chamorro and Carolinians, in contrast, primarily fish for recreational and subsistence purposes, selling catch to recoup costs. A few vessel owner operators are considered "Pescadores", a term used to refer to fishermen who provide fish for important community and familial events. Pescadores customarily provide 100-200 lb of reef fish for cooked dishes and pelagic species for kelaguen (i.e., a raw fish dish) for community and family celebrations. The system of seafood distribution underwent significant changes from approximately 2000-2010 with the establishment of large seafood vendors. In contrast to individual fishermen/vendors who only market their own catch, large vendors typically own and operate a number of vessels and purchase catch from independent fishermen to sell, which is reportedly depressing prices. In addition, increases in fuel prices, low market prices for fish, and downturns in the domestic economy have led to a general decline in participation in this fishery since 2000, with respect to numbers of fishermen, trips, landings, and seafood purchasers. The Saipan Fishermen's Association (SFA) is a nonprofit organization established in 1985 that holds annual fishing derbies and participated in community involvement projects, such as beach cleanup.

On Tinian, estimates of fleet size range from 15 to 20 vessels in 2010 and 2011. An estimated 1 to 3 fishermen fished consistently with the primary intent of selling fish. Respondents suggested that fishing and eating fish was more habitual, rather than geared toward a particular event. Increasing fuel prices have reportedly led to the decline in number of active fishermen, and fishermen frequently sell fish to cover fuel costs. Three restaurants and two stores in Tinian purchase fish, although fishermen also sell house to house and commonly have an established clientele. A few charter boats serve tourist clientele; however, they do not land much catch and even trolling trips serve more as photo opportunities. Charter boats are reportedly owned by nonlocal residents and target tourists from their country of origin (Japan, China, or Korea).

On Rota, fishermen target pelagic species when in season, and fish for bottomfish the rest of the year. Like on the other islands, the number and activity of fishermen have declined as a result of increased fuel prices. Family members will often make requests for certain kinds of fish, but they will also contribute money to purchase fuel for a fishing trip. In addition, fishermen will often check demand with local restaurants, based on fuel prices. In 2010-2011, fishermen sold catch to three restaurants, or to neighbors and friends within the community (door to door or from a cooler on the roadside). One general store sold fish caught by a family member, who fishes

specifically to sell. Rota holds one fishing derby in celebration of San Francisco, the saint of their island.

A survey of the small boat fleet was also conducted in 2011 (Hospital and Beavers 2014). On average, respondents were 41 years old and had been boat fishing for an average of 15 years, providing evidence of a deep tradition of boat fishing in the CNMI. They were more likely to identify themselves as Chamorro relative to the general population of the CNMI, although they were equally likely to have been born in the CNMI. In general, small boat fishermen were more educated than the general population and of comparable affluence. Pelagic trolling as the most popular gear type, followed by deep water bottomfish fishing, shallow-water bottomfish, and spear fishing. Most (71%) fishermen reported fishing at a Fish Aggregating Device (FAD) during the past 12 months, and on nearly 22% of their fishing trips. A high degree of seasonal fishing effort was reported across most subgroups of the fleet, although fishermen on Tinian and Rota were more likely to fish year-round.

Hospital and Beavers (2014) found that a majority of fishermen (74%) reported selling at least a portion of their catch in the past 12 months. However, less than half (43%) of survey respondents indicated that they could always sell all the fish that they wanted. A significant percentage of fish caught was consumed at home (28%) or given away to relatives, friends, or for cultural events (38%), reflecting the strong family and social connections associated with fishing in the CNMI. Approximately 29% of fish catch was sold, with the remaining catch either released (2%) or exchanged for goods and services (3%). Even fishermen who regularly sell fish still retain approximately 22% of their catch for home consumption and participation in traditional fish-sharing networks and customary exchange. Additionally, 86% of respondents considered the pelagic fish they catch to be an important source of food. These findings validate the importance of fishing in building and maintaining social and community networks, perpetuating fishing traditions, and providing fish to local communities as a source of food security.

Fishing in the CNMI is a social activity; only 3% of fishermen reported to fish alone, while 70% reported that their boat is used without them on occasion. In addition, the majority of fishermen (57%) agreed that as a fisherman, they are respected by the greater community. While nearly a third of respondents were neutral (27%) and some were hesitant to express an opinion or simply did not know (13%), the study found that very few (3%) felt that they were not respected by the community.

Overall, the CNMI small boat fisheries are a complex mix of subsistence, cultural, recreational, and quasi-commercial fishermen whose fishing behaviors provide evidence of the importance of fishing to the people of the CNMI. For nearly all fishery participants, the social and cultural motivations for fishing far outweigh any economic prospects. Nearly all fishermen supplement their income with other jobs and are predominantly subsistence fishermen, selling occasionally to recover trip expenses.

#### 3.2.2.3 GUAM

##### 3.2.2.3.1 Introduction

Guam is the largest and southernmost island of the Mariana Archipelago and is also the largest and most heavily populated island in Micronesia. Over the past decade, a number of studies have synthesized more details about the role of fishing and marine resources for residents of Guam, as

well as information about the people who engage in the fisheries and/or utilize fishery resources (WPFMC 2009c).

The ancestors of the indigenous Chamorro first arrived in the Marianas around 3,500 years ago, and were expert fishermen and seafarers, relying on seafood as their principal source of protein (Allen and Bartram 2008; Hospital and Beavers 2012; Grace-McCaskey 2014). They fished on the high seas in large sailing canoes (proas) and used numerous methods to catch reef fish and bottomfish from boats. Similar to other archipelagos in the Western Pacific, fish and marine resources have played a central role in shaping the social, cultural, and economic fabric of Guam that continues today. Chamorro fished for both reef and pelagic species, collected mollusks and other invertebrates, and caught sea turtles.

The occupation of Guam by foreign nations dramatically changed the island's ecosystems, reshaped communities, and disrupted fishing traditions. In the 17$^{th}$ and 18$^{th}$ centuries, Spanish colonizers destroyed the Chamorro' seagoing canoes, suppressed offshore fishing practices, and relocated populations from their traditional home. Following the Spanish-American War in 1898, the U.S. Navy took control of Guam until it was occupied by Japan from 1941-1944. Guam became a U.S. territory in 1950, and the U.S. military is currently in the process of building up an even greater presence on the island. Throughout this time, fishing has remained an important activity, although by the time Guam became and American territory, the indigenous inhabitants had lost many of their seafaring skills, fishing skills, and even the native names of many of the offshore species. Later immigrants to the islands from East and Southeast Asia also possessed a strong fishing tradition. In 2020, 33% of Guam's population that identified as a single ethnicity were Chamorro, followed by 36% Asian (about 80% of whom were Filipino), 13% other Pacific Islander, 7% white, and 1% black. Despite rapid socioeconomic change, households still reflect the traditional pattern of extended families with multigenerational clustering of relatives, especially in Guam's southern villages. Social occasions such as neighborhood parties, wedding and baptismal parties, wakes and funerals, and especially village fiestas that follow the religious celebrations of village patron saints all require large quantities of fish and other traditional foods, reflecting the role of fish in maintaining social ties and cultural identities. Sometimes fish are also sold to earn money to buy gifts for friends and relatives on important Catholic religious occasions such as novenas, births and christenings, and other holidays.

Since the late 1970s, Guam's most important role in commercial fisheries activity has been as a major regional fish transshipment center and resupply base for domestic and foreign tuna fishing fleets. Services provided include fueling, provisioning, unloading, air and sea transshipment, net and vessel repair, crew repatriation, medical care, and warehousing. Among Guam's advantages as a home port are well-developed and highly efficient port facilities in Apra Harbor, an availability of relatively low-cost vessel fuel, a well-established marine supply/repair industry, and recreational amenities for crew shore leave. In addition, the Territory is exempt from the Nicholson Act, which prohibits foreign ships from landing their catches in U.S. ports. Initially, the majority of vessels calling in Apra Harbor to discharge frozen tuna for transshipment were Japanese purse seine boats and carrier vessels. In the late 1980s, Guam became an important port for Japanese and Taiwanese longline fleets, but port calls have steadily declined and the transshipment volume has declined accordingly. By the early 1990s, an air transshipment operation had also been established in Guam. Fresh tuna was flown into Guam from the Federated States of Micronesia and elsewhere on-air cargo planes and out of Guam to the Japanese market on wide-body passenger planes. Further, vessels from Japan and Taiwan also

landed directly into Guam, where their fish were packed and transshipped by air to Japan. A second air transshipment operation began in the mid-1990s that was transporting fish to Europe that did not meet Japanese sashimi market standards, but this has since ceased. Moreover, the entire transshipment industry has contracted markedly with only a few operators still making transshipments to Japan. Annual volumes of tuna transshipped between 2007 and 2011 averaged about 3,400 mt, with a 2012 estimate of 2,222 mt, compared to over 12,000 mt at the peak of operations between 1995 and 2001. As early as 2006, it was noted that the Port of Guam had lost much of its competitive advantage compared to alternative transshipment locations in the western Pacific and elsewhere, a trend that may not be reversible.

Otherwise, commercial fisheries have a relatively minor contribution to Guam's economy; the social and cultural importance of fisheries in Guam dwarfs their commercial value. Nearly all Guam domestic fishermen hold jobs outside the fishery, with fishing typically supplementing family subsistence. High value is placed on sharing one's fish catch with relatives and friends, and this social obligation extends to part-time and full-time commercial fishermen alike. A survey of Guam households in 2005 found that nearly one-quarter (24%) of fish consumed were caught by the respondent or an immediate family member, and an additional 14% were caught by a friend or extended family member (Allen and Bartram 2008). However, a little more than half (51%) of the fish consumed were purchased at a store or restaurant, and 9% were purchased at a flea market or from a roadside stand. The same study found that annual seafood consumption in Guam is estimated to be about 60 lb. per capita, with approximately 43% imported from the U.S.

The westernization of Guam, particularly since World War II, has not only resulted in a transition from a subsistence to wage-based economy, but has also contributed to dramatic changes in eating patterns, including lower seafood consumption. Indeed, recent years have seen steady declines in the market demand for fresh local fish across Guam (Hospital and Beavers 2012). While some families continue to supplement their diet by fishing and farming, no existing communities are completely dependent on local fishing as a source of food. A household survey conducted in 2016 found that only 29% of respondents participate in fishing (NCRMP 2016a).

As recently as the early 1970s, relatively few people from Guam fished offshore because boats and deep-sea fishing equipment were prohibitively expensive (Allen and Bartram 2008). During the economic boom from the late-1980s through most of the 1990s, Guam developed a small boat fishery that conducted trolling and bottomfish fishing mostly within 30 miles of shore.

The Guam Fishermen's Cooperative Association (GFCA) plays an important role in preserving important fishing traditions. It began operations in 1976 and was incorporated in 1977. In 2006, its membership included 164 full-time and part-time fishermen from every district in Guam, and it processed and marketed approximately 80% of the local commercial catch. In addition, it plays a role in fisheries data collection, marine education and training, and fisheries conservation and management. The GFCA strives to provide benefits not just to fishermen but to residents throughout Guam, benefitting the broader Guam community. It utilizes a Hazard Analysis and Critical Control Point (HACCP) system to ensure safe seafood, and tests fish for potential toxins or whenever requested by the Guam Department of Health and Sanitation. It has also become a focal point for community activities such as the Guam Marianas International Fishing Derby, cooking competitions, the Guam Fishermen's Festival, dissemination of educational materials on marine resources, vessel safety and seafood preparation, public meetings on resource management issues, and communications via radio base to relay information and coordinate rescues. It also has adopted a policy of purchasing local origin products that benefits 40 small

businesses in Guam, regularly donates seafood for village functions and charitable activities, and provides assistance to victims of periodic typhoons with emergency supplies of ice and fuel. In addition, the GFCA has become a voice for Guam fishermen in the policy arena to ensure that concerns of fishermen are incorporated into issues such as the military buildup.

Fishing in Guam continues to be important not only in contributing to the subsistence needs of the Chamorro and other residents but in preserving their histories and identities. Knowledge of how fish are distributed and consumed locally is crucial to understanding the social and cultural significance of fishing in Guam.

#### 3.2.2.3.2 People Who Fish

A household survey conducted in 2012 found that 35% of respondents said that they or someone else in their household was a fisherman (Kotowicz and Allen 2015). Respondents from fishing households tended to have lower education levels and have a higher rate of unemployment than respondents from non-fishing households.

A few studies have targeted pelagic fishermen or the small boat fleet. There is some indication that interest in small-boat commercial fishing for skipjack may be emerging using a specialized form of handlining (Iwane et al. 2023). While these boats also engage in bottomfish fishing and reef fishing, the primary pelagic fishing method is trolling, thus, results of these studies will be reported in the Guam Troll section.

#### 3.2.2.3.3 Guam Trolling

Similar to the CNMI, Guam's small boat fisheries are a complex mix of subsistence, cultural, recreational, and quasi-commercial fishermen whose fishing behaviors provide evidence of the importance of fishing to the island of Guam. For nearly all fishery participants, the social and cultural motivations for fishing far outweigh any economic prospects. Nearly all fishermen supplement their income with other jobs and are predominantly subsistence fishermen, selling occasionally to recover trip expenses.

In 2018, a survey was conducted of the small boat fleet, which included questions about trolling, (Dombrow et al. 2025a). Trolling was the most commonly used gear type for all respondents (86%), with an average annual catch of 858 lb of pelagic fish by the fishers that target pelagic species, in 2017. An average pelagic fishing trip cost about $241 per trip. 95% of the pelagic fishers were men, and 86% identified as Chamorro. The proportion of pelagic fishers with a bachelor's degree (14%) was mirrored in the full sample of respondents (14%). Pelagic fishers took an average of 23 trips per year, and reporting selling on average 20% of their catch. 40% of pelagic fishers that sold their catch reported yearly earnings of $1000 or less, while 54% earned between $1,001 and 10,000. Only 6% reporting earning over $10,000 a year from pelagic fishing. Fishers who primarily targeted pelagics allocated their catch mainly to home consumption (38%), giving to family (22%), and selling (19%). For the most part, pelagic fishers identified their motivation for fishing as purely recreation (62%), subsistence (32%), recreational expense (31%), cultural (20%), or part-time commercial (4.6%). Only 2% of pelagic fishers identified full-time commercial fishing as a motivation. Over half of the respondents identified multiple motivations (54%).

Most pelagic fishers (73%) also agreed that they are respected by the Guam community, and 88% felt that fishing was an important part of their identify.

Respondents were also asked to list important research and management topics. The three top topics related to enforcement (95%), understanding reef and habitat health (93%), and building and maintaining fisheries infrastructure (93%). The majority also identified the importance of knowing how many fish there are (87%), having information about fishers and fishing communities (77%), and having fisher voices included in decision making (71%). Other identified topics included:

- Fish size regulations
- Improved boat ramp infrastructure
- Perpetuate fishing culture
- Make sure the price of fish is good so fishermen will continue fishing
- Respect among other fishers
- Stop illegal forms of fishing
- Support the next generation of fishers

#### 3.2.2.4 HAWAII

##### 3.2.2.4.1 Introduction

Traditional Native Hawaiian subsistence relied heavily on fishing, trapping shellfish, and collecting seaweed to supplement land-based diets. Native Hawaiians also maintained fishponds, some of which date back thousands of years are still used today. The Native Hawaiian land and marine tenure system, known as ahupua‘a-based management, divided the islands into large parcels called moku, which are reflected in modern political boundaries (Census County Districts) (WPRFMC 2009d; Geslani et al. 2012; Richmond and Levine 2012b).

Immigrants from many other countries with high seafood consumption and cultural ties to fishing and the ocean came to work on the plantations around the turn of the 20$^{th}$ Century, establishing in Hawaii large populations of Chinese, Japanese, Koreans, Filipinos, and Portuguese, among others. In 1985, the Compact of Free Association also encouraged a large Micronesian population to migrate to Hawaii. According to the 2020 Census, the State of Hawaii’s population is almost 1.5 million. Ethnically, it has the highest percentage of Asian Americans (37.2%) and Multiracial Americans (25.3%) and the lowest percentage of White Americans (22.9%) of all states. Approximately 27% of the population identifies as Native Hawaiian or part Native Hawaiian. Tourism from many of these Asian countries also increases the demand for fresh, high-quality seafood, especially sushi, sashimi, and related raw fish products such as poke.

Today, fishing continues to play a central role in the local Hawaiian culture, diet, and economy. In 2012, an estimated 486,000 people were employed in marine-related businesses in Hawaii, with the level of commercial fishing-related employment well above the national average (Richmond et al. 2015). The Fisheries Economics of the United States (FEUS) 2022 report found an increase in sales and jobs in the commercial fishing and seafood industry in Hawaii (including the commercial harvest sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers), when compared to the FEUS 2020 report. In 2022 commercial fishing and the seafood industry generated $824 million in sales impacts (up from $557 million in 2020) and approximately 10,229 full and part-time jobs that year, which is twice the number of jobs reported in the FEUS 2020 report (NMFS 2023). However, within the recreational fisheries sector there was a decrease in sales and jobs when compared to 2020. It is

estimated that recreational anglers took 3.9 million fishing trips, with $379 million in sales impacts (down from $465 million in 2020) and 2,062 full- and part-time jobs (down from 3,929 in 2020) were generated by recreational fishing activities in the State during 2022 (NMFS 2023). Due to changes in data availability NMFS does not currently report recreational angler participation at the State level.

Seafood consumption in Hawai'i is estimated at approximately two to three times higher than the rest of the entire U.S., and Hawai'i consumes more fresh and frozen finfish while shellfish and processed seafood is consumed more across the rest of the country (Davidson et al. 2012; Geslani et al. 2012). In addition, studies have shown that seafood is eaten frequently, nearly one-third of residents ate seafood about once a week and only 3% never consumed seafood, although there is a decreasing trend in the percent of residents who consume seafood every day or a few times a week and an increase in residents who consume seafood 1-3 times a month (NCRMP 2016b; Allen et al. 2022). Fresh seafood is the most popular type of seafood purchased, and while most is purchased at markets or restaurants, a sizeable amount is reported as caught by friends, neighbors, or extended family (NCRMP 2016, 2020; Davidson et al. 2012).

At the same time, local supply is inadequate to meet the high seafood demand. In 2010, 75% of all seafood consumed in the State of Hawaii was imported from either the U.S. mainland or foreign markets, and the rise in imported fish has influenced the price of local catch (Arita et al. 2011; Hospital et al. 2011). In addition, rising costs of fuel and other expenses have made it more difficult to recover trip costs (Hospital et al. 2011). A majority of commercial fishermen report selling their fish simply to recover these costs, not necessarily to make income (Hospital et al. 2011). Many describe the importance of sharing fish as a part of maintaining relationships within family or other networks as being more important than earning income from fishing (Calhoun et al. 2020).

Pelagic fish play a large role in seafood consumption, with Hawaii residents regularly consuming substantial amounts of fresh bigeye and yellowfin tuna as 'ahi poke (bite-sized cubes of seasoned raw tuna) and ahi sashimi (sliced raw tuna). 'Ahi is also a significant part of cultural celebrations, especially during the holiday period from late November (Thanksgiving) through late January to mid-February (Lunar New Year). Changes in bigeye regulations can have far-reaching effects not only on the fishing community in Hawai'i but also on the general population (Richmond et al. 2015). While most of the fresh tuna consumed in Hawaii is supplied by the local industry, market observations suggest that imported tuna is becoming more commonplace to meet local demands (Pan 2014). However, on average, only 18% of tuna consumed is imported (Dombrow et al. 2022).

Examination of the seascape of compliance across the US Pacific Island region found, that while the literature highlights the importance of enforcement, local experts emphasized barriers of capacity, governance process, and the lack of data. This suggests that non-instrumental and governance approaches can complement enforcement and should be part of an integrated compliance approach both in the region (Ayers and Leong 2020).

#### 3.2.2.4.2 People Who Fish

Hawaii includes a mix of commercial, non-commercial, and subsistence characteristics across fisheries. Archipelagic fisheries are primarily accessed via a small boat fleet and through shoreline fishing. Within the small boat fleet, there is a nearly continuous gradation from the full-time and part-time commercial fleet to the charter and personal recreation fleets. A single

boat (and trip) will often utilize multiple gear types and target fish from multiple fisheries. Thus, other than the longline fishery, these fisheries are typically not studied individually. Rather, studies have typically been conducted based on ability to reach potential respondents. Studies have targeted fishermen via State of Hawaii Commercial Marine Licenses (CMLs) (Madge et al. 2016; Chan and Pan 2017), shoreline and boat ramp intercepts (Hospital et al. 2011; Madge et al. 2016), and vessel and angler registries (Madge et al. 2016).

The Hawaii small boat pelagic fleet was studied in 2007-2008 (hereafter, referred to as the 2008 study), following a design last utilized in 1997 (Hospital et al. 2011). Because respondents also targeted insular fish, the study is included in this report. Their work was updated in 2014 and 2021 (Chan and Pan 2017; Chan 2023) for the small boat fleet in general. All studies found that the small boat fleet is predominantly owner-operated and a male dominated activity (98% of respondents were male in all studies). The ethnic composition was predominantly Asian (45% in 2008, 41% in 2014, 38.6% in 2021) and White (23% in 2008, 26% in 2014, 26.5% in 2021), which is similar to the demographics of the State population as a whole. In 2021, proportionally more Native Hawaiians and Pacific Islanders responded to the survey than are represented in the general population (18.6% vs. 10%). In addition, most respondents had a household income above $50,000 (75% in 2008, 69% in 2014, 76% in 2021).

These studies also asked respondents to identify their motivation for fishing and allowed for multiple responses, whereas the 2014 survey had asked how they defined themselves as a fisherman. When comparing primary motivations to self-identified fisherman type, the percentage of part-time commercial fishermen decreased from 51% to 30% while the percentage of recreational expense fishermen increased from 27% to 34% and subsistence fishermen increased from 3% to 16%, perhaps in response to the COVID-19 pandemic – the survey conducted in 2021 asked respondents about conditions and activities in 2020. When comparing all three motivations reported in 2021, recreational expense, subsistence, and part-time commercial were listed by almost half or more of respondents, whereas all other motivations were reported by fewer than 30% (Chan 2023). Different activities were then compared based on motivations.

As previously mentioned, the Hawaii small boat fishery is a mixed-gear fishery. In 2008, 47% of respondents reported using more than one gear type, predominantly trolling (for pelagic fish) and handline (for bottomfish). In 2014, 65% of respondents reported trolling as their most common gear, 16% indicated bottomfish handline, and 12% stated pelagic handline was their most commonly used gear. Trolling was more commonly used by recreational fishermen whereas pelagic handline and bottomfish gears were more commonly used by commercial fishermen. In the 2021 study, trolling was still the most common gear type, but dropped to 54%. The other answer choices were changed slightly, but the majority of remaining responses still reflected bottomfish (23%) and pelagic (14%) gear types. The 2014 and 2021 studies also asked about species composition of catch. While over 90% of the respondents reporting landing pelagic fish in the past year in both studies, about half of respondents in the 2014 study also reported they caught and landed bottomfish or reef fish. In the 2021 study 56% of respondents reported catching bottomfish while 16% reported catching reef fish. Results from the 2021 study were compared to the State of Hawai‘i DAR reporting system and were found to match very well. Thus, the small boat fleet includes not only a mixture of gear types, but also targets both pelagic and insular fish stocks.

Studies also examined fisher motivations and self-identification vs. their commercial and non-commercial activities. Many people who considered themselves recreational, subsistence, or cultural fishers still sold fish. In 2008, 42% of fishermen self-classified as commercial fishermen, yet 60% of respondents reported selling fish in the past 12 months. In addition, just over 30% of fishermen who self-classified as recreational reported selling fish in the past year. Results for the 2014 study are shown in Table 43.

Table 43. Catch disposition by fisher category

| | Number of respondents (n) | Caught and released (%) | Given away (%) | Consumed at home (%) | Sold (%) |
|---|---|---|---|---|---|
| All Respondents (2014) | 738 | 5.6 | 13.9 | 15.4 | 65.0 |
| **By Fisherman Classification…** | | | | | |
| Full-time commercial | 55 | 6.2 | 9.4 | 11.6 | 72.8 |
| Part-time commercial | 369 | 5.2 | 12.9 | 14.4 | 67.5 |
| Recreational expense | 200 | 6.7 | 19.8 | 21.7 | 51.8 |
| Purely recreational | 78 | 5.4 | 37.3 | 29.6 | 27.6 |
| Subsistence | 24 | 1.9 | 20.7 | 31.0 | 46.5 |
| Cultural | 8 | 4.0 | 36.8 | 22.5 | 36.7 |
| All Respondents (2021) | 328 | 3.7 | 12.4 | 14.3 | 69.6 |
| **By Primary Motivation:** | | | | | |
| Recreational expense | *98* | 6.5 | 25.4 | 23.0 | 45.1 |
| Part-time commercial | *92* | 4.6 | 13.5 | 12.9 | 69.0 |
| Subsistence | *47* | 2.9 | 23.9 | 28.4 | 44.8 |
| Full-time commercial | *34* | 2.7 | 4.8 | 9.5 | 83.0 |
| Purely recreational | *25* | 6.0 | 36.5 | 30.3 | 27.1 |
| Cultural | *4* | 0.9 | 17.9 | 18.7 | 62.5 |

Source: Chan and Pan (2017); Chan (2023)

In 2021, the average value of fish sold by all respondents was approximately $11,913 and was seen to match well with the State of Hawaii DAR Dealer Reporting System (Chan 2023). Full-time commercial fishermen reported the highest value of fish sold ($35,709 annually), part-time commercial fishermen reported $8,983 annually, cultural fishermen $19,250, recreational expenses fishermen $3,917, subsistence fishermen $6,382, and purely recreational fishermen reported selling $2,939 annually. When adjusted for inflation, average annual revenue for full - and part-time commercial fishers decreased 5% and 11% respectively from 2014 values. Recreational expense revenue increased by 29%, while revenue from purely recreational fishing increased 162%, revenue from subsistence fishing increased 197%, and revenue from cultural fishing increased 338%. While income from fish selling served as an important source of personal income for full-time commercial fishermen, the majority of fishermen reported selling fish to cover trip expenses, not necessarily to make a profit; few fishermen reported substantial, if any, profits from fishing. In the 2008 study, respondents expressed concern about their ability to cover trip costs, noting that trip costs continued to increase from year to year, but fish prices remained relatively flat.

The 2008 study also attempted to quantify the scale of unsold fish that was shared within community networks. Approximately 38% of pelagic fish caught by commercial fishermen was not sold, 97% of survey respondents indicated they participated in fish sharing networks with friends and relatives, and more than 62% considered the fish they catch as an important food

source for their family. Community networks were also present in the outlets where fish were sold, which included the United Fishing Agency (UFA) auction in Honolulu, dealers/wholesalers, markets/stores, restaurants, roadside, but also sales to friends, neighbors, and coworkers. The 2014 study documented 27.3% of sales to friends, neighbors, or coworkers, which jumped to 49% in 2021 and 7.9% of sales at roadside/farmers' markets, which rose to 14% in 2021, illustrating the importance of informal markets. In addition, Table 59 also documents the importance of giving away fish for all self-classification categories, reflecting the prevalence of a gift economy. In the 2014 study, 17% of respondents (who all held CMLs) sold no fish in the past 12 months.

Taken together, the results from these studies suggest a disconnect between the disposition of Hawaii fishermen and public perception of their fishing activity relative to current regulatory frameworks. The small boat fleet is extremely heterogeneous with respect to gear type, target species, and catch disposition, while regulations attempt to treat each separately with clear distinctions between commercial and recreational activities. In addition to providing income, the Hawaii small boat fleet serves many vital nonmarket functions, including building social and community networks, perpetuating fishing traditions, and providing fish to local communities.

A survey was also conducted on the attitudes and preferences of Hawaii non-commercial fishers (see Madge et al. 2016). Nearly all survey respondents were male (96%). Their average age was 53, and, on average, they had engaged in non-commercial saltwater fishing in Hawaii for 31 years. The majority had household income equal to or greater than $60,000, reported high levels of education, and reflected a large racial diversity (primarily various Asian ethnicities and White). They primarily fished via private motorboat (61%), followed by shore, including beach, pier, and bridge (38%). Offshore trolling and whipping/casting, and free-dive spearfishing were the most frequent gears reported as "always" used, and a majority of respondents reported using multiple gears on a single fishing trip.

As with the small boat fleet, even though this study targeted "non-commercial fishermen", 9% reported that their primary motivation for fishing was to sell some catch to recover trip expenses. However, the primary motivation for the majority (51%) was purely for recreational purposes (only for sport or pleasure). A total of 78% of respondents indicated they "always" or "often" share catch with family and friends, and only 35% indicated they "never" supply fish for community/cultural events. Fishing for home/personal consumption was the most important trip catch outcome (36% rated it "extremely important"), followed by catching enough fish to be able to share with friends and family (20%). Thirty-six percent indicated that their catch was extremely or very important to their regular diet. Thus, similar to the small boat fleet, non-commercial fishermen demonstrate mixed motivations that include commercial activities. They also play an important role in providing fish via social and community networks, even though they report their primary motivation as fishing only for sport or pleasure.

NMFS and the Hawaii DAR have been collecting information on recreational fishing in Hawaii, administered through the Hawaii Marine Recreational Fishing Survey (HMRFS) (Allen and Bartlett 2008; Ma and Ogawa 2016). The program collected data from 1979-1981, but not from 1982-2000, and then began annual data collection again in 2001. A dual survey approach is currently used. A telephone survey of a random sample of households determines how many have done any fishing in the ocean, their mode of fishing, methods used, and effort. The telephone survey component will be discontinued after 2017 due to declining land line coverage. Concurrently, surveyors conduct in-person intercept surveys at boat launch ramps, small boat

harbors, and shoreline fishing sites. Fisher county of residence and zip code are regularly collected in the intercept surveys but has not yet been compared to the composition of the general public. As observed in the other surveys, this program documented wide range of gears used to catch a variety of both pelagic and insular fish. The majority of trips from the onsite interviews were from "pure recreational fishermen" (defined as people who do not sell their catch), with an average of almost 60% to over 80% depending on year and island. However, they also noted that in Hawaii the divisions between commercial, non-commercial, or recreational are not clearly defined, and results suggested that the majority of catch for some categories of fishermen may be consumed by themselves or given away, further reinforcing common themes from other studies.

#### 3.2.2.4.3 Hawaii Longline

The Hawaii longline fishery (HLF) is the dominant commercial fishery in the Hawaiian Islands and is described in detail in Richmond et al. (2015). It operates out of the port of Honolulu, and in 2018 there were 142 active vessels. The majority of longline fish is sold at the Honolulu fish auction, modeled after the Tsukiji auction in Tokyo, where dealers bid on individual fish. Over 40 dealers representing a variety of different market strategies regularly purchase fish at the auction. Many dealers represent locally-owned small businesses. Additional businesses connected to the bigeye fishery include processors, airline and shipping companies, ice distributors, gear stores, restaurants, and retail outlets.

Owners and operators of Hawaii's longline vessels comprise three main ethnic groups: Korean-American (K-A), Vietnamese-American (V-A), and Euro-American (E-A) (Allen and Gough 2007); and the crew is predominantly Filipino (Allen and Gough 2006). Unlike the broader Asian-American population in Hawaii, most HLF K-A and V-A fishers are first generation immigrants and speak limited English. E-A fishers largely consist of individuals from the mainland U.S. whose native language is English. The fishery is considered well regulated, although there are concerns about growing social and economic impacts from increased competition and regulation. Social network analysis revealed that fishers interacted more within ethnic groups than across ethnic groups. V-A fishers reported the most cross-scale linkages, whereas K-A fishers reported only one tie to an industry leader outside their community (Barnes-Mauthe et al. 2013). This indicates that the interests of K-A fishers may not be adequately represented in the management and policy arena. It also supports previous research that suggests the three ethnic communities should not be assumed to utilize the same fishing practices, exhibit the same attitudes toward fishery management and regulations, or display the same level of trust across groups. According to Kalberg and Pan (2016), The V-A group had the highest number of active vessels in 2012 (n=70), while the E-A had 44 active vessels, and K-A had 15. In addition, on average each vessel had more foreign crew than U.S. crew members.

An economic model documented some of the major changes to the fishery's role in the local economy, based on 2005 data (Arita et al. 2011). These included rising fuel costs, a steady rise in foreign crewmembers, and weakening profits. From 2003-2004, a study was conducted on Filipino crew members in the longline fleet (Allen and Gough 2006). Filipino crew sampled ranged from 21 to 52 years of age in 2003; the average age was 37, and 55% were older than 36. A total of 89% had completed high school, nearly 30% also completed an associate or trade school degree (often focused on maritime studies), an additional 16% completed at least some college coursework, and 5% completed college studies. In many cases, they had received more formal education than the captains or owners for whom they were working in Hawaii. Crew were

responsible for an average of five dependents, and all respondents indicated that their households depended heavily on the Hawaii longline industry for income, with 63% relying on the fishery as their sole source of income. Many had an extensive background in commercial fishing, with an average of 11 years of experience. In comparison, only 25% of respondents reported more than 5 years total involvement in seafaring in a 2004 study of overall seafarers. While there are a number of challenges to obtaining foreign laborers for employment on Hawaii longline vessels, they are often willing to work for less money and earn more money as a crew member than they would in their home country. Crew must reside on the vessel and do not receive a 'shore pass' to leave the pier area. However, many developed strong social networks and a number of Hawaii-based Filipinos developed businesses in the pier area to serve crew needs. The average annual income of a Hawaii-longline crew member was well over double the average earned in the Philippines; even the lowest paid crew members earned 62% more than the family average for the Philippines and did not have to pay for food or housing while living on the longline vessel. Nearly 70% reported high or very high levels of job satisfaction while nearly 80% reported a reasonable income and no problem with their workload or living conditions.

In 2010, the bigeye tuna fishery experienced the first extended closure of the western and central Pacific Ocean (WCPO) to U.S. longliners from the State of Hawaii. Richmond et al. (2015) monitored the socioeconomic impacts of this closure to examine how the bigeye fishery community (including fishermen, a large fish auction, dealers, processors, retailers, consumers, and support industries) perceived and were affected by the constraints of the 40-day closure over the holiday season. During the closure period, they found a reduced supply and quality of bigeye landed, an increase in price for high quality fish, and longer distances traveled to fish in rougher waters. These factors resulted in increased stress and in some cases lost revenue for individuals and businesses connected to the fishery. Different stakeholder groups responded differently to the closure, with fish dealers among those most affected. Some dealers chose to purchase high quality tuna despite abnormally high prices and sell at a loss to maintain relationships with their customers. During the closure, U.S. boats could continue to fish for bigeye in the Eastern Pacific Ocean and foreign and dual permitted vessels could still fish in the WCPO, which mitigated some of the impacts to the fishery. U.S. legislation and federal rules that have prevented subsequent closures of the fishery have since been put in place.

Frozen tuna treated with carbon monoxide to enhance color has appeared in Hawaii markets since the late 1990s. It is often labeled as "Tasteless Smoke" and is sold in markets in thawed form, which is similar in appearance to fresh 'ahi poke. The price of Tasteless Smoke tuna is lower than the price of fresh tuna landed by local vessels. During the closure, imported products were available in retail markets and the price in the retail market stayed consistent, suggesting that local and imported products are substitutes and that imports increase quickly to meet demand when local landings are low (Pan 2014). However, conversation with multiple dealers suggested that only a few dealers increased their reliance on imports during the closure (Richmond et al. 2015).

In the fall of 2016, concerns about the working conditions of foreign crewmembers garnered national media attention. In response, the Hawaii Longline Association commissioned a follow-up study, based on the methodology developed by Allen and Gough (2006), and conducted by one of the same researchers (Gough 2016). Many of the same crew members were interviewed in both 2006 and 2016 due to high retention in the fleet. The study interviewed crew from 75% of Hawaii longline vessels on crew recruitment and fees, on board conditions and access, pay

structure, medical care, document retention on board, and grievance mechanisms. There were no indications of foreign crew employed against their will, nor were there records of respondents who wished to return to their country of origin but were unable to do so; trends reported did not reflect forced labor or human trafficking. While no exploitation was reported, the study also identified potential operational flaws that could result in exploitation of foreign crew. It also suggested recommendations to improve those systems to reduce industry vulnerability to scrutiny, including safeguards for both crew and vessel owners.

On August 26, 2016, a Presidential proclamation expanded the Papahānaumokuākea Marine National Monument to include the majority of the United States Exclusive Economic Zone surrounding the Hawaiian Islands, which would largely affect the longline fleet. An internal report noted the potential for differential impacts (e.g., based on target species, vessel size, or ethnicity; see PIFSC 2017). For example, the shallow-set fishery appears to have nominally higher share of catch, effort, and revenues from the Northwest Hawaiian Islands, compared to the deep-set fishery. Multiple evaluations of the effects from the Monument expansion were published in 2020 (Chan 2002; Lynham et al. 2020).

#### 3.2.2.4.4 Hawaii Trolling

Trolling was one of the gear types included in the 2014 and 2021 Small Boat Surveys (Chan and Pan 2017; Chan 2023). Fisher demographics and catch disposition were summarized in Chapter 2. Most small boat fishermen trolled, with 65% of respondents stating that trolling was their most commonly used gear in 2014 and 54% in 2020. In 2014, approximately half of their trips occurred in State waters, and half in federal waters. Also reported in the 2014 study, a higher percentage of those who identified troll as their most commonly used gear reported using only a single gear (35%) in comparison to respondents who most commonly used other gear types; however, a larger percentage (45%) reported using two types of gear. In 2020, trolling was most commonly used by those whose primary motivation was cultural, although this was a very small number (4). The next highest percentages were purely recreational (65.4%) and recreational expense (64.2%), although respondents spanned all response categories (full-time commercial, part-time commercial, recreational expense, purely recreational, subsistence, and cultural). This finding corroborates the observation that the troll fishery has a significant cultural and subsistence role in Hawaii's fishing communities (Markrich and Hawkins 2016).

#### 3.2.2.4.5 Hawaii Pelagic Handline

Pelagic handline was one of the gear types included in the 2014 Small Boat Survey (Chan and Pan 2017) and was modified to the motivation "bait for pelagic" in 2021 (Chan 2023). Fisher demographics and catch disposition were summarized in Chapter 2. Only 12% of respondents indicated this category was their most commonly used gear in 2014, 14% in 2021. In 2014, a larger percentage of their fishing trips occurred in State waters (62%) vs. federal waters (38%). In addition, in comparison to respondents who most commonly used other gear types, those who identified pelagic handline as their most commonly used gear in 2014 reported the lowest percentage of single gear use (8%). They predominantly reported using two types of gear (49%). In both years, pelagic handline was most commonly used by fishermen whose primary motivation was full-time commercial (57.4% in 2014, 24.2% in 2021) and respondents spanned all response categories except cultural in 2021. This finding corroborates the observation that the pelagic handline fishery has a significant cultural and subsistence role in Hawaii's fishing communities (Markrich and Hawkins 2016).

#### 3.2.2.4.6 Offshore Handline

Pelagic offshore handline was one of the gear types included in the 2014 Small Boat Survey (Chan and Pan 2017) and fisher demographics and catch disposition on the offshore handline were available in Chan and Pan (2019b).

#### 3.2.2.4.7 Other Gears (including Aku Boat/Pole and Line)

This category represents pelagic species caught by methods or in areas other than those methods of longline, MHI troll and handline, and offshore handline. There is currently no socioeconomics information specific to this group of fisheries. Aku boat was included in the group. Fishers trolling in areas outside of the MHI (the distant water albacore troll fishery) or PMUS caught close to shore by diving, spearfishing, squidding, or netting inside of the MHI are also included in this category.

### 3.2.3 ECONOMIC PERFORMANCE OF MAIN COMMERCIAL FISHERIES

### 3.2.3.1 AMERICAN SAMOA

#### 3.2.3.1.1 American Samoa Longline

##### 3.2.3.1.1.1 Commercial Participation, Landings, Revenue, and Prices

The American Samoa longline fishery includes large longline vessels and small longline vessels (alia boats). Alia longline fishing has experienced declining trends in participation over the years, and no alia vessels participated in fishing activities in recent three years (i.e., 2022-2024) In 2024, there were only 9 large longline vessels (64 feet or larger), one less than in 2023, that actively fished in American Samoa EEZ. The American Samoa longline fishery mainly targets albacore, which differs from the Hawaii longline fishery targeting bigeye tuna and swordfish. The American Samoa longline fishery, especially the large longline vessels, sell the majority of their catch to the local cannery. The species sold to the local cannery includes four tuna species, albacore, yellowfin, bigeye, and skipjack, and one non-tuna species, wahoo.

In 2024, the total fleet revenue (i.e., estimated landed value for the five species sold to cannery only) was $3.23 million from 3.40 million pounds of total landings (for all species). The five species (Albacore, yellowfin, bigeye, skipjack, and wahoo) sold to cannery composed 94% of the total American Samoa longline commercial landings (estimated pounds kept). No official statistical data was available on the sold value of the 6% of the non-cannery species landings. In 2024, albacore composed over 79% of the commercial value sold to cannery while the other four primary species (yellowfin, bigeye, skipjack, and wahoo) contributed 21% of the revenue. Wahoo was one of the five species that canneries accepted and commonly sold in local markets. Traditionally, most all wahoo harvested by American Samoa longline are sold to the canneries. In recent years, fishers indicated they sold more wahoo to local markets instead of the cannery since local markets pay a higher price for wahoo. However, we used cannery price to estimate the total commercial landings of wahoo because the portion and price that sold to local markets for wahoo are not available.

Figure 119 presents the trends of commercial landings and revenue (for cannery only) from 2005-2024. Revenue presented here represents only the revenue from sale to the cannery. Supporting data for Figure 119 are provided in Table A-112. In general, American Samoa longline landings and revenue have been declining since 2008. Commercial landings in 2024

were up by 24% compared to 2023, but revenue decreased 9% in 2024 due to lower fish price by 26%.

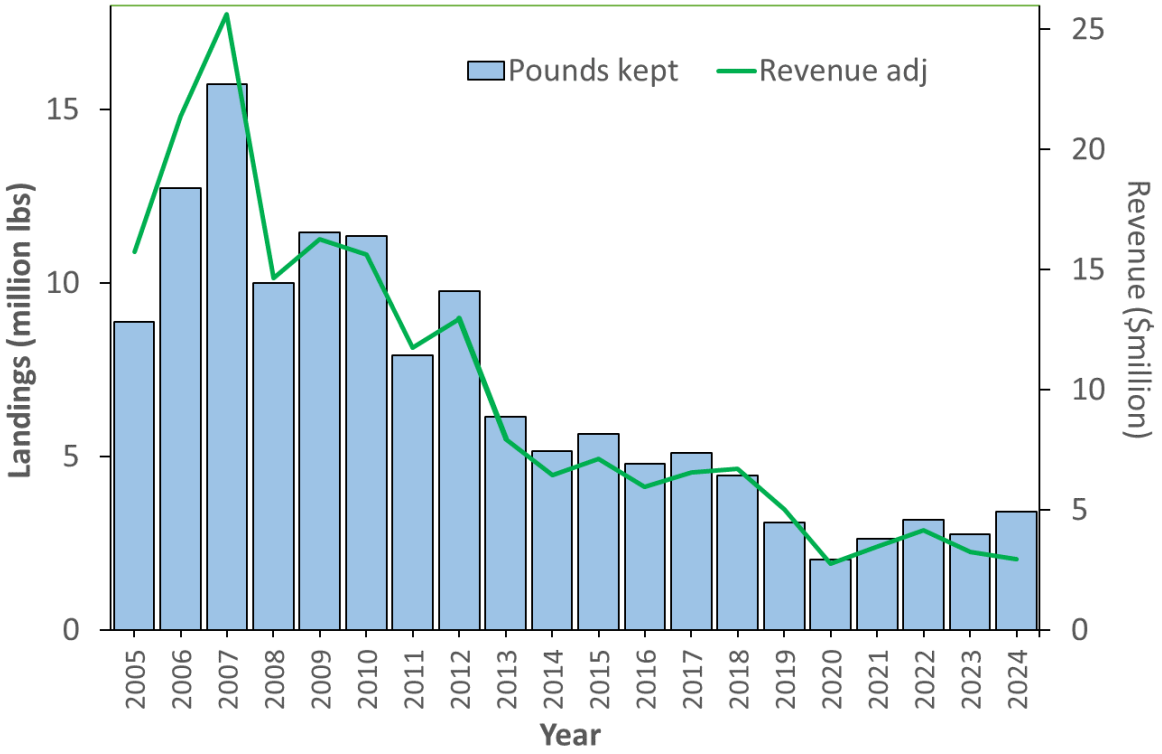



Figure 119. Commercial landings and revenue for the American Samoa longline fishery (adjusted to 2024 dollars)[1]

[1] Data source: Pacific Islands Fisheries Science Center: Fishery Economic Performance Measures (Tier 1 indicators). **https://inport.nmfs.noaa.gov/inport/item/46097**. CPI information for 2023 and 2024 were not available and assumed to be the same as 2022.

Fish price data for the five main species harvested by American Samoa longline have been collected through annual in-person interviews by PIFSC economists with owners or agents of the fishery since 2012. During 2020 and 2021 were collected by the PIRO observer program in American Samoa, as travel restrictions were in place during the pandemic period and no in-person interviews with local fishermen were able to be conducted.

Trends in albacore price from 2012 to 2024 are presented in Figure 120. Supporting data for Figure 120 are presented in Table A-113. The albacore price continued dropping in 2024 by 17% compared to 2023. The albacore price increased substantially in 2019 because the American Samoa-based US longline fleet secured certification from the Marine Stewardship Council (MSC) and Starkist Co., which led to the higher albacore price with an additional $200 per metric ton provided for vessels that fish exclusively in the US EEZ around American Samoa. The nominal average albacore price in 2019 reached a historical high of $1.61 per pound (whole weight), or $3,542 per metric ton. However, both nominal and the adjusted price decreased after 2019. The nominal price of albacore in 2024 dropped to $1.15/lb ($3057/mt) from $1.39/lb in 2023. Table A-113 also shows the average fish price of all species sold to canneries.

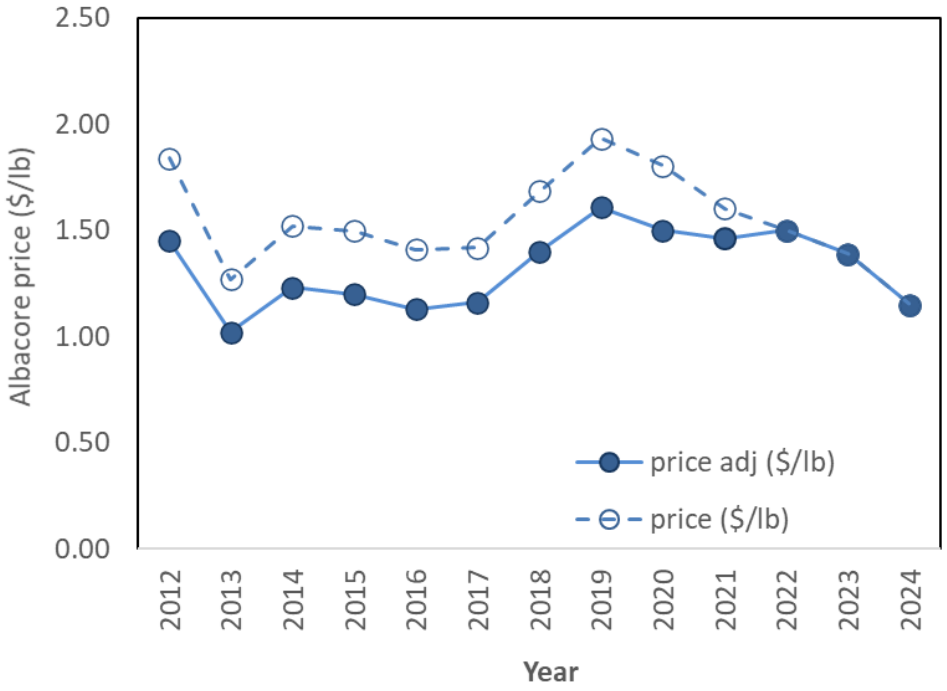



Figure 120. Albacore whole-weight price as reported by American Samoan fishers (adjusted to 2024 dollars)[1]

[1] Data source: PIFSC Continuous Economic Data Collection Program (Pan 2018).

#### 3.2.3.1.1.2 Fishing Costs

The American Samoa longline continuous economic data collection program started in 2006, the same time as PIRO started their observer program in the fishery (Pan 2018, 2019). Fisher participation in the economic data collection program is voluntary. Similar to the Hawaii longline fisheries' continuous economic data collection program, the American Samoa continuous economic data collection obtains information on the fishery via a form requesting data on 10 variable cost items common to American Samoa longline trip expenditures, excluding labor costs. For the main cost items, including diesel fuel, engine oil, and bait, information is collected on unit price, quantity used, and total cost. For other items, such as gear, provisions, and communications, information is collected on total cost only. It was often difficult for observers to collect trip cost data when vessels were operated by hired captains. In an effort to increase the number of observations for the economic data collection program, PIFSC economists began to supplement observer data by traveling to American Samoa to conduct in-person interviews of owners or agents starting in 2012. The details of the data collection program are described in a NOAA technical memorandum (Pan 2018).

Although cost data from 2020 and 2021 were not available at the reporting time because there were no in-person surveys conducted during these two years due to pandemic-related travel restrictions, the data gap were able to fill out during the 2023 in person survey with fishermen (owners or agents). Fishing trip cost data prior to 2006 were not available since trip cost data collection did not begin until 2006.

Figure 121 shows the cost structure for an average American Samoa longline trip in 2024. In 2024, the average trip costs were $44,460. While fuel usually comprises over 50% of trip costs,

in 2024 the percentage of fuel cost was 52%. While cost per trip data were collected, we present the cost per set (not per trip) to reflect better the fishing cost changes across years, as the variation in trip length is considerable across years and cost per set could better reflect cost trend overtime for this fishery. Figure 122 presents the trends in costs per set for 2006 to 2024. The cost per set in 2024 was slightly lower than 2023 due to lower fuel usage (i.e., 7,386 gallons per trip in 2023 and 6,736 gallons per trip in 2024).

The data supporting Figure 122 are presented in Table A-114. Using the average cost per set can be a better index to examine the cost trend across years because the average trip length (total trip days) for the American Samoa longline fleet varies substantially.

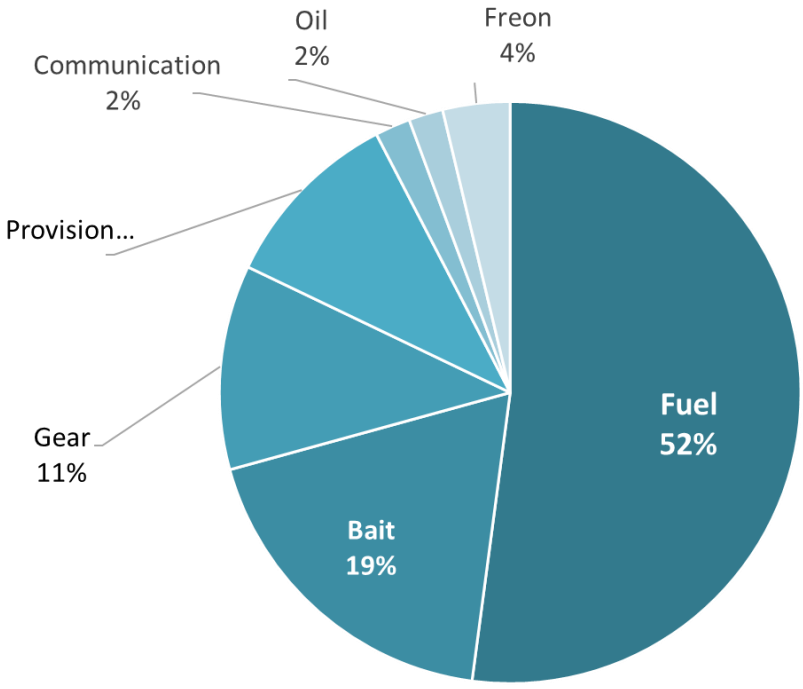



Figure 121. The cost structure for an average American Samoa longline trip in 2024[1]

[1] Data source: PIFSC Continuous Economic Data Collection Program (Pan 2018).

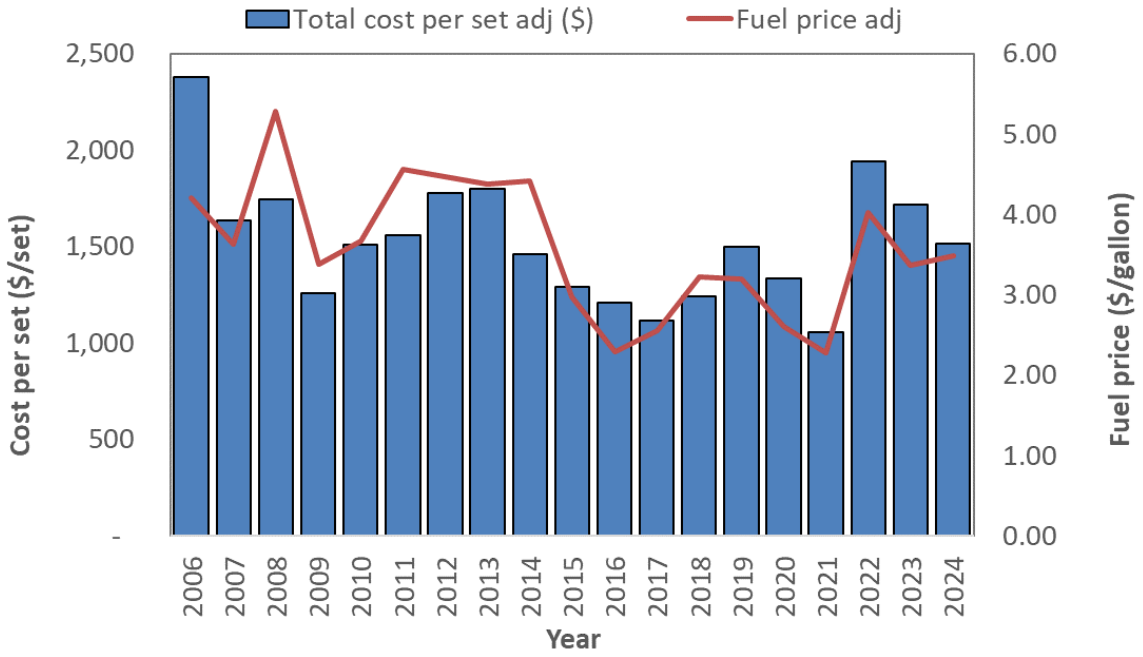



Figure 122. Costs per set[1] for the American Samoa longline fishery not including labor cost and fixed costs (adjusted to 2024 dollars)[2]

[1] Data source: PIFSC Continuous Economic Data Collection Program (Pan 2018). CPI figures are not available for 2023 and 2024).

#### 3.2.3.1.1.3 Economic Performance Indicators

The continuous economic data collection program allows for the monitoring of variation in fishing costs over time (Pan 2018). Compiling the revenue with cost and effort data, it is possible to measure the economic performance in terms of net revenue and monitor changes over time.

Figure 123 presents trends in net revenue per set for the period from 2006 to 2024. The data supporting Figure 123 are provided in Table A-114. Using the average net revenue per set can be a better index than the average net revenue per trip to present the revenue and cost trends because the average trip length (i.e., in total trip days) for the American Samoa longline fleet has varied substantially over the years. Figure 123 shows a downward trend in the economic performance (in net revenue per set) from 2006 to 2024. During this period, two deep drops in net revenue appeared in 2013 and 2020, respectively. The economic performance per set improved in 2022 due to higher albacore CPUE. However, net revenue per set dropped again in 2023 and 2024.

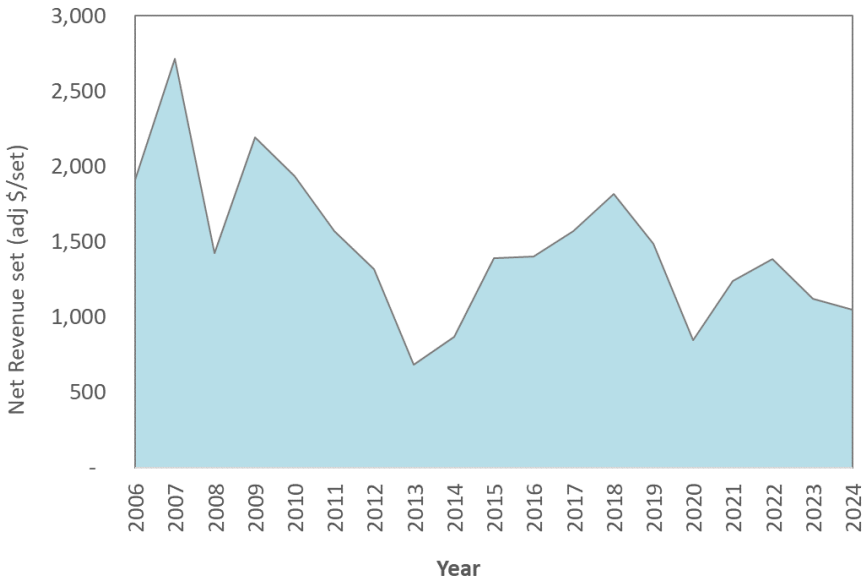



Figure 123. Net revenue per set for the American Samoa longline fishery (adjusted to 2024 dollars)[1]

[1] Data source: PIFSC economic data collection program (Pan 2018). CPI figures are not available for 2023 and 2024).

In addition to the measurement of the net revenue, NOAA Fisheries has established a national set of economic performance indicators to monitor the economic health of the nation's fisheries (Brinson et al. 2015). The PIFSC Socioeconomics Program has used this framework to evaluate select regional fisheries; specifically, the American Samoa Longline, Hawaii Longline, and Main Hawaiian Islands (MHI) Deep 7 bottomfish fisheries. These indicators include metrics related to catch, effort, and revenues. For the American Samoa longline fishery, this section will present revenue performance metrics of (a) total revenue per day at sea, (b) annual revenue per vessel, and (c) Gini coefficient (while b and c are both shown in the same figure) of annual revenue per vessel.

The Gini coefficient (value 0 to 1) measures the equality of the distribution of revenue among active vessels in the fishery. A value of zero represents a perfectly equal distribution of revenue amongst these vessels, whereas a value of one represents a perfectly unequal distribution, in the case that a single vessel earns all of the revenue. Data on aggregate revenue from species in fishery per-day-at-sea and revenue per vessel calculation (for Gini coefficient) are from Pacific Islands Fisheries Science Center, data run for the Fishery Economic Performance Measures (Tier 1 indicators).

Trends in fishery revenue per day are shown Figure 124, while the trends in revenue per vessel and distribution among vessels (i.e., the Gini coefficient) are shown in Figure 125. The revenue is presented in nominal terms to be consistent with the national Tier 1 measure. Supporting data are provided in Table A-115. The revenue per fishing day has been steady in nominal value but shows a decreasing trend in adjusted values, while the change in revenue per vessel in nominal value over time was greater than per fishing day. In nominal value, revenue per vessel in recent 10 years (i.e., 2013-2024) were generally lower than the previous 10 years (i.e., 2004-2012). The revenue per vessel and per day went down again in 2023 and 2024. The Gini coefficient was lower in 2024 compared the previous year. In general, the Gini coefficient of American Samoa

longline was relatively variable over time, indicating the variation of revenue received among individual vessels were substantial, especially compared to the Hawaii longline fishery.

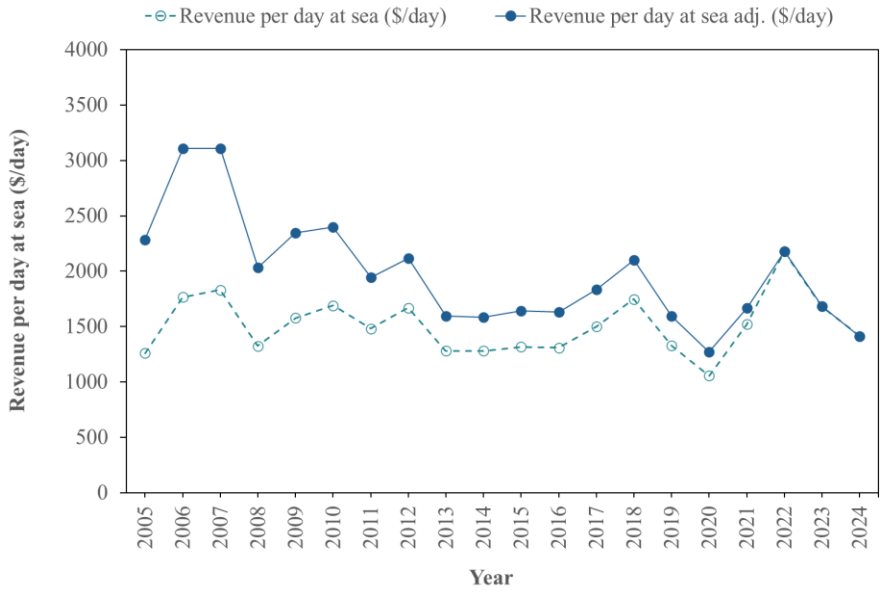



Figure 124. Revenue per-day-at-sea for the American Samoa longline fishery[1]

[1] Data sourced from the Pacific Islands Fisheries Science Center: Fishery Economic Performance Measures (Tier 1 indicators). **https://inport.nmfs.noaa.gov/inport/item/46097**.

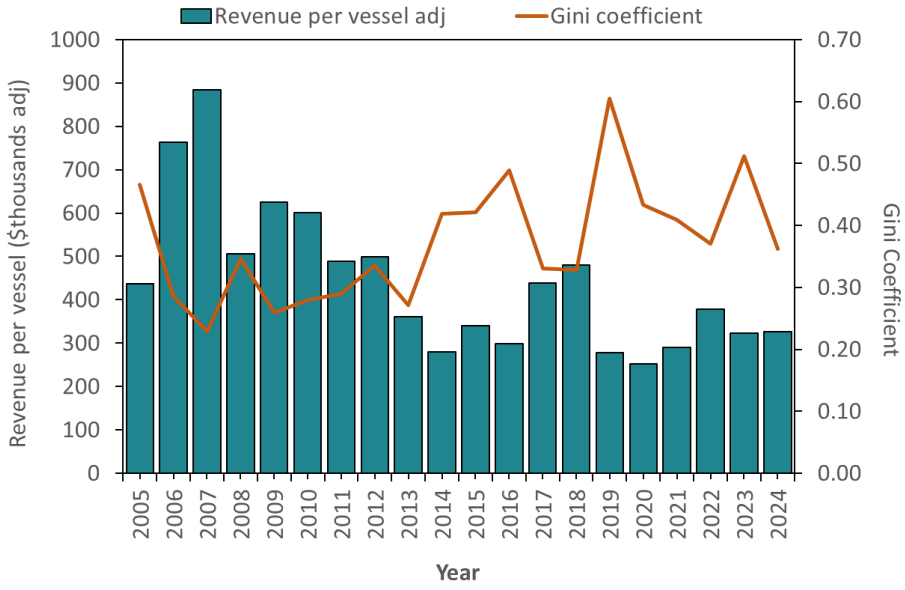



Figure 125. Revenue distribution (revenue per vessel and Gini coefficient) for the American Samoa longline fishery[1]

[1] Data sourced from the Pacific Islands Fisheries Science Center: Fishery Economic Performance Measures (Tier 1 indicators). **https://inport.nmfs.noaa.gov/inport/item/46097**.

#### 3.2.3.1.2 American Samoa Trolling

##### 3.2.3.1.2.1 Commercial Participation, Landings, Revenue, and Prices

This section describes trends in commercial participation, landings, revenue, and price for the American Samoa troll fishery. The PMUS harvested by alia longliners are not included in this section as alia fishing is included with longlining despite the small size of vessels. Figure 126 presents the trends of revenue and pounds sold for the troll fishery from 2005 to 2024, and Figure 127 presents the trend in price for PMUS sold by the trollers during this period. Supporting data for Figure 126 and Figure 127 are presented in Table A-116. There were 11 years of commercial landings and revenue data during the 20-year period were available to present while data from the other years data (including 2024) were confidential due to fewer than three vendors submitting commercial receipts to the data collection program. On average, the PMUS commercial landings from trollers have been 21% of the total landings for the non-longline pelagic fisheries (average by the years with commercial landings data available).

It is worth noting that the data for pounds caught and pounds sold are collected by two different data collection methods. The data for pounds sold were collected through "Commercial Sales Receipt Books" Program, while the data for pounds caught were collected through Boat-based and Shore-based creel surveys and expanded to an estimated total. The coverage rates of two data collection methods may change independently across individual years. Therefore, the two time-series may not move coherently with each other. For example, the low percentage of pounds sold compared to pounds caught could be due to the low coverage of dealer participation in the Commercial Receipt Books Program. In addition, the data summary for PMUS in socioeconomic module is based on the PMUS species defined in the Ecosystem Management Plan and the raw dataset frozen on March 15, 2024.

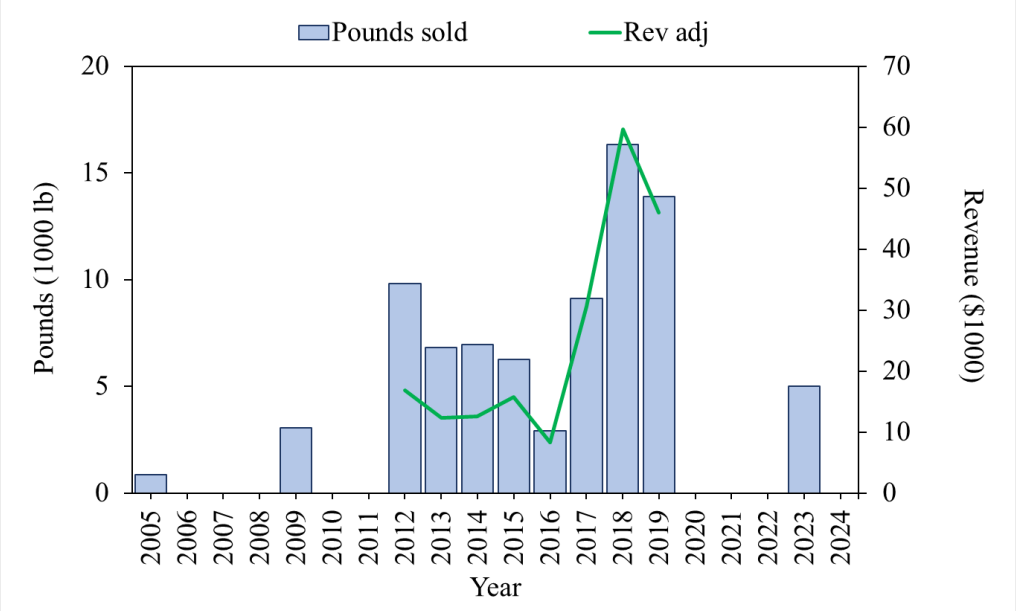



Figure 126. PMUS pounds sold and revenue in the American Samoa troll fishery (adjusted to 2024 dollars)[1]

[1] Data sourced from the PIFSC WPacFIN. CPI 2023 and 2024 is available at report time

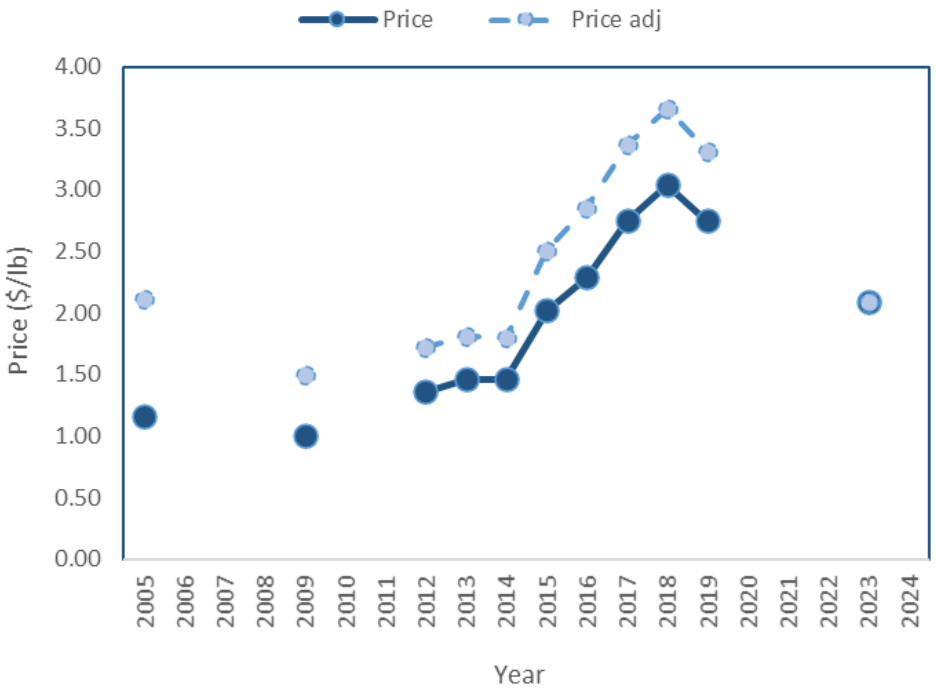



Figure 127. Adjusted and nominal price of PMUS harvested by trolling in American Samoa (adjusted to 2024 dollars)[1]

[1] Data sourced from PIFSC. Only 11 years of sale data were available to present. CPI 2023 and 2024 are not available.

#### 3.2.3.1.2.2 Fishing Costs

Since 2009, PIFSC economists have maintained a continuous small boat economic data collection program in American Samoa through collaboration with the PIFSC Fisheries Research and Monitoring Division (FRMD). The economic data collection gathers fishing expenditure data for boat-based reef fish, bottomfish, and pelagic fishing trips (trolling) on an ongoing basis. Data for fishing trip expenses include gallons of fuel used, price per gallon of fuel, cost of ice used, cost of bait & chum used, cost of fishing gear lost, and the engine type of the boat. These economic data are collected from same subset of fishing trips as the boat-based creel survey carried out by the local fisheries management agencies and PIFSC FRMD.

Figure 128 presents the average costs for American Samoa troll trips from 2009 to 2024 (adjusted to 2024 dollars). Supporting data for Figure 128 are presented in Table A-117. In general, the fishing costs of an average troll trip slightly declined during the period of 2011 to 2016, mainly as a result of decreased fuel costs. Since 2017, fuel costs have risen primarily due to fuel price increases and trip costs picked in 2021. Trip costs in 2024 were up compared to 2023 due to higher fuel usages.

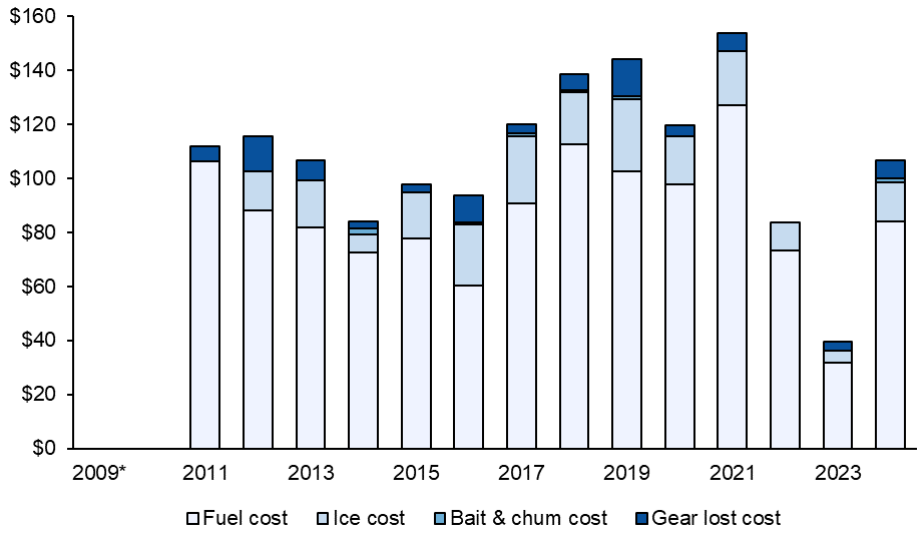



Figure 128. Average cost for American Samoa troll trips (adjusted to 2024 dollars)[1]

[1] Data sourced from Chan and Pan (2019a); CPI 2023 and 2024 are not available. *Confidential data.

### 3.2.3.2 CNMI

#### 3.2.3.2.1 CNMI Trolling

##### 3.2.3.2.1.1 Commercial Participation, Landings, Revenue, and Prices

This section presents the pounds sold, revenue, and price for all PMUS in the CNMI by all gears. Unlike American Samoa, the data for pounds sold by gear are not available for the CNMI. Figure 129 and Figure 130 present the trends of total pounds sold and revenue for all PMUS in the CNMI from 2005 to 2024. Supporting data for these two figures are presented in Table A-118.

Pelagic fishing is an important commercial fishery in the CNMI. Nearly half a million pounds of pelagic species are landed annually before 2022. However, both commercial and total PMUS landings have gone down considerably since 2022. The amount of PMUS sold was 84 thousand pounds, and total landings were 99,415 pounds. The high ratio of commercial landings to total landings since 2021 is likely a result of improvements in the implementation of the commercial data collection program. In the CNMI, a mandatory reporting program was implemented in 2019, and follow-up outreach efforts have resulted in increased vendor reporting participation, as 37 out of 42 vendors reported in 2021. The average pelagic fish price has increased since 2007 gradually up to 2022. Pelagic fish price in 2024 decreased 11% compared to 2023.

It is worth noting that the data for pounds caught and pounds sold are collected by two different data collection methods. The data for pounds sold were collected through "Commercial Sales Receipt Books" Program and expanded to an estimated total. While the data for pounds caught were collected through Boat-based and Shore-based creel surveys. Both data series are generated from an expansion algorithm built on a non-census data collection program, and the survey coverage rates of two data collection methods may change independently in individual years. Therefore, the two data series may not move coherently with each other. For example, the low percentage of pounds sold compared to pounds caught could be due to the low coverage of dealer participation in the Commercial Receipt Books Program or vice versa.

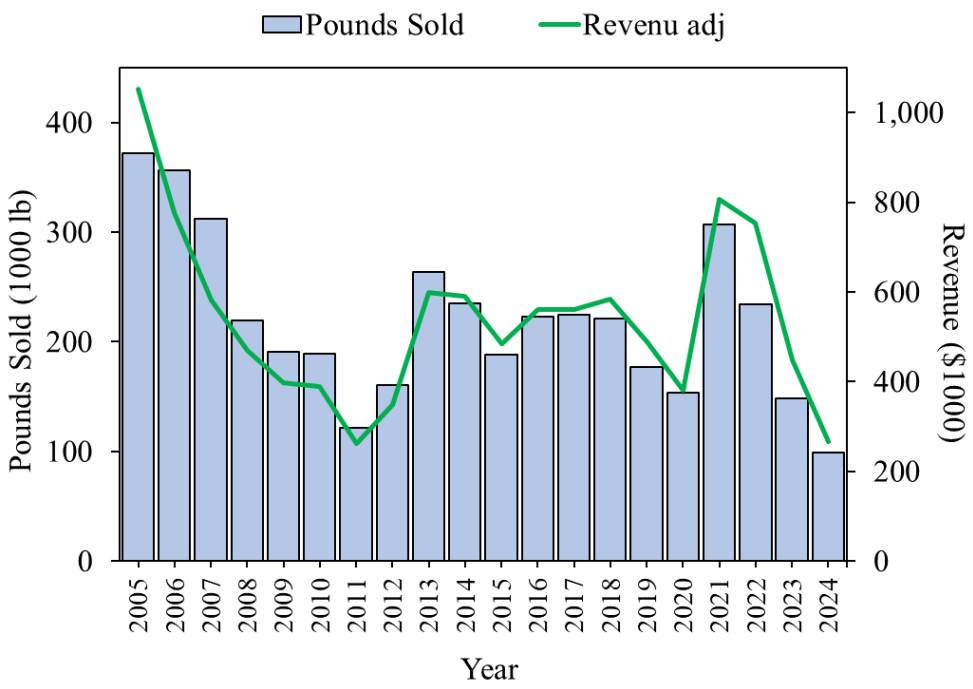



Figure 129. PMUS pounds sold and revenue in the CNMI for all gears (adjusted to 2024 dollars)[1]

[1] Data sourced from PIFSC FRMD.

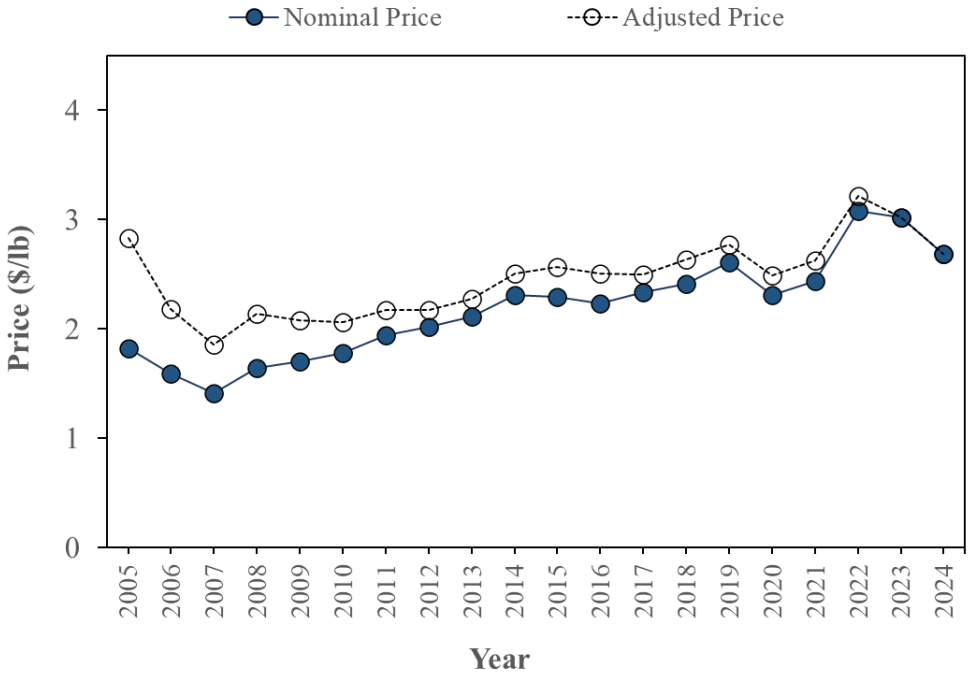



Figure 130. Adjusted and nominal prices of PMUS for fish sold in the CNMI from all gears[1]

[1] Data sourced from PIFSC FRMD.

#### 3.2.3.2.1.2 Fishing Costs

Since 2009, the PIFSC Socioeconomics Program has maintained a continuous economic data collection program in Saipan through collaboration with the PIFSC FRMD. The economic data collection program gathers fishing expenditure data for boat-based reef fish, bottomfish, and pelagic fishing trips on an ongoing basis. Data for fishing trip expenses include gallons of fuel used, price per gallon of fuel, cost of ice used, cost of bait & chum used, cost of fishing gear lost, and the engine type of the boat. These economic data are collected from same subset of fishing trips as the boat-based creel survey carried out by the local fisheries management agencies and PIFSC FRMD.

Figure 131 presents the average trip costs for CNMI troll trips from 2009 to 2023 (adjusted to 2023 dollars). In general, the costs of trolling trips had small changes across years. Costs moved up and down mainly related to changes in fuel costs. In 2023, the average cost of trolling trips was around $88, $13 lower than 2022. Fuel cost is the main component of the trolling trip costs and fuel price in 2023 was $5.41, lower than that in 2022. Supporting data for Figure 131 is presented in Table A-119. There was no update for 2024 due to low activities in data collection.

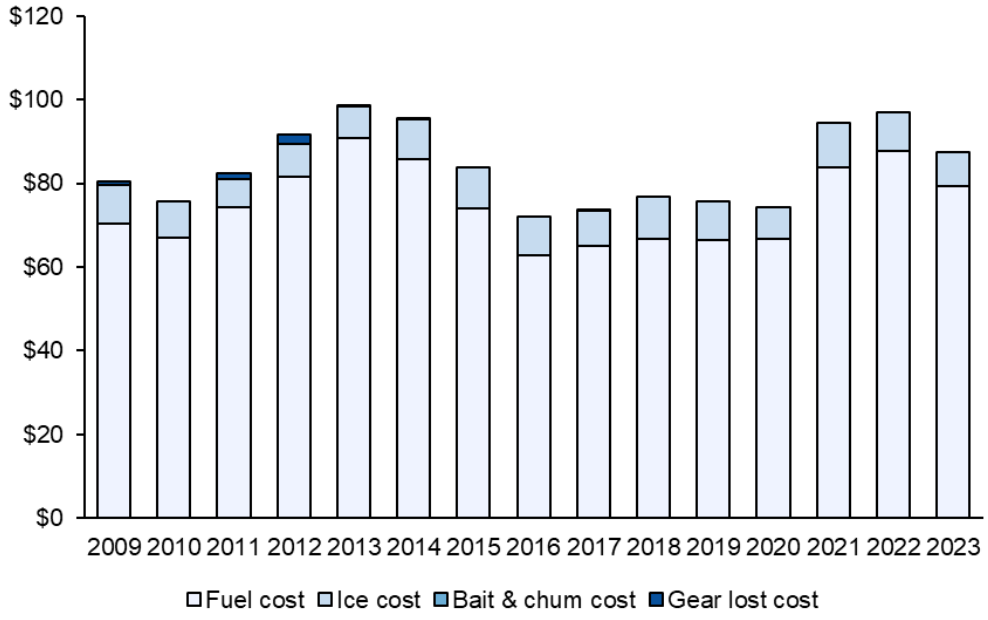



Figure 131. Average cost for CNMI troll trips (adjusted to 2023 dollars)[1]

[1] Data sourced from PIFSC Continuous Cost Data Collection Program (Chan and Pan 2019a). Trip cost data collection began in 2009. No update in 2024 due to low survey responses.

### 3.2.3.3 GUAM

#### 3.2.3.3.1 Guam Trolling

#### 3.2.3.3.1.1 Commercial Participation, Landings, Revenue, and Prices

This section describes trends in commercial landings, revenue, and price of PMUS in Guam. Figure 132 presents the trends of pounds sold and revenue for PMUS in Guam fisheries and

Figure 133 presents the trend of PMUS price during 2005 to 2024. Supporting data for Figure 132 and Figure 133 are shown in Table A-120.

Pelagic fishing is an important fishery in Guam. The average annual total pounds landed has been around 715,781 lb with 131,634 lb of commercial landings for the 14 years with data presented. Figure 132 shows only 14 years of commercial landings and revenue during the period between 2005 and 2024, because the data for the other years were confidential when there were fewer than three reporting vendors. For the 14 years presented, the average pounds sold were 18% of the total pounds landed annually. The average price of all PMUS was relatively flat over the 14 years and it was at $2.07/lb in nominal value, the most recent year with data presented, and both nominal price and inflation adjusted price showed a slowly increasing trend.

It should be noted that the data for pounds caught and pounds sold are collected by two different data collection methods. The data for pounds sold were collected through "Commercial Sales Receipt Books" Program, while the data for pounds caught were collected through Boat-based and Shore-based creel surveys. Both data series are generated from an expansion algorithm built on a non-census data collection program, and the survey coverage rates of two data collection methods may change independently in individual years. Therefore, the two data series may not move coherently with each other. For example, the low percentage of pounds sold compared to pounds caught could be due to the low coverage of dealer participations in the Commercial Receipt Books Program, or vice versa.

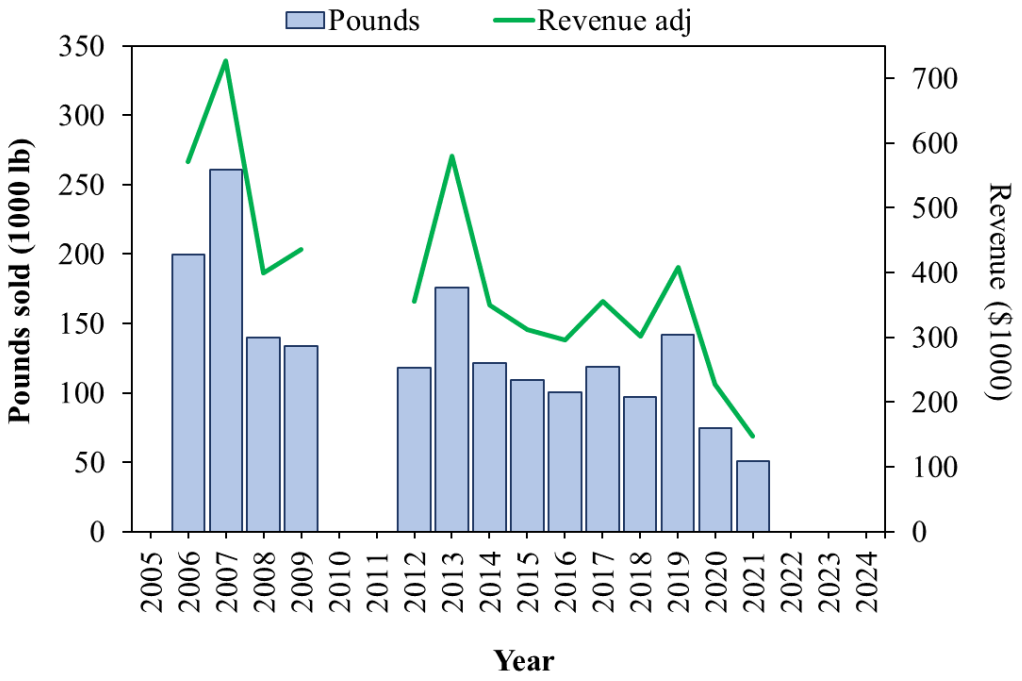



Figure 132. PMUS pounds sold and revenue in Guam for all gears (adjusted to 2024 dollars)[1]

[1] Data sourced from PIFSC FRMD.

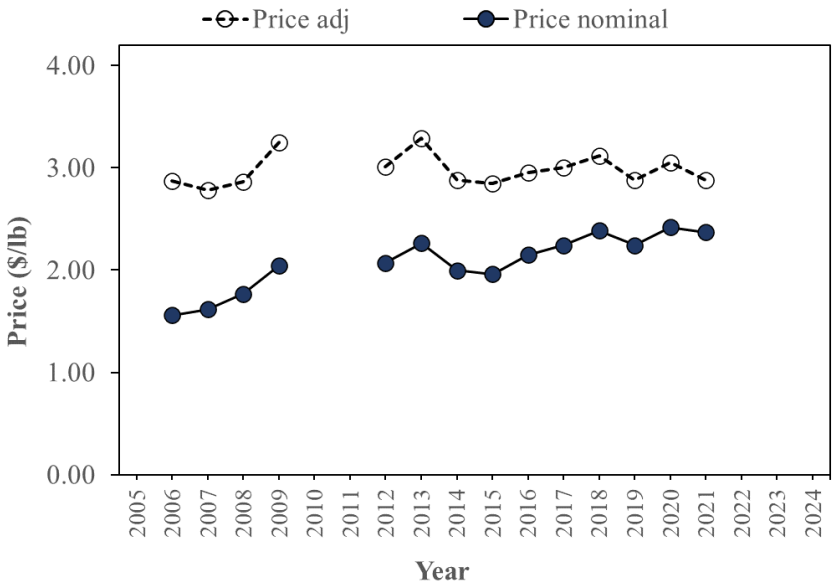



Figure 133. Adjusted and nominal prices of PMUS for fish sold in the CNMI from all gears[1]
[1]Data sourced from PIFSC FRMD.

#### 3.2.3.3.1.2 Fishing Costs

Since 2011, the PIFSC Socioeconomics Program has maintained a continuous economic data collection program on Guam through collaboration with PIFSC FRMD. The economic data collection gathers fishing expenditure data for boat-based reef fish, bottomfish, and pelagic fishing trips on an ongoing basis. Data for fishing trip expenses include gallons of fuel used, price per gallon of fuel, cost of ice used, cost of bait & chum used, cost of fishing gear lost, and the engine type of the boat. These economic data are collected from same subset of fishing trips as the boat-based creel survey carried out by the local fisheries management agencies and PIFSC FRMD.

Figure 134 shows the trend of costs for trolling trips in Guam from 2011 to 2024. Costs tend to move up and down over time mainly due to changes in fuel costs. The average cost of trolling trips in 2024 was $79 in Guam, $2 higher than the previous year. Supporting data for Figure 134 are presented in Table A-121.

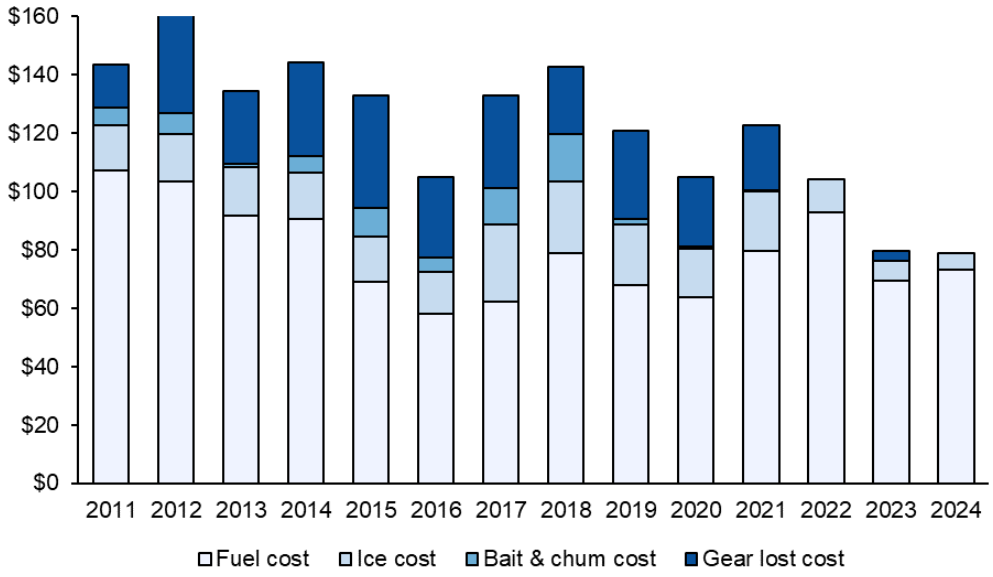



Figure 134. Average cost for Guam troll trips (adjusted to 2024 dollars)[1]

[1] Data sourced from PIFSC (Chan and Pan 2019a).

### 3.2.3.4 HAWAII

#### 3.2.3.4.1 Hawaii Longline

##### 3.2.3.4.1.1 Commercial Participation, Landings, Revenue, and Prices

The Hawaii permitted longline fishery conducts two types of fishing to target the bigeye tuna (deep-set) and swordfish (shallow-set) by setting the fishing gear at different depths in the water column. Most of the vessels only target tuna while some vessels switch between these two types of fishing depending on the season. The majority of the catches by the Hawaii permitted longline vessels were landed and sold in Honolulu, while some of catches were landed and sold on the West Coast of the US Mainland. For the period from 2003 to 2020 for which landings and revenue data are available, the fish landed and sold on the West Coast increased gradually since 2008 and stabilized from 2009 to 2020. Based on the West Coast dealers' reports, an average of $5.3 million in revenue (2.3 million pounds sold) was generated annually from West Coast during the years from 2015 to 2020, and the average annual revenue sold in Hawaii was $94 million (26 million pounds sold). However, the data of commercial landings for the West Coast were not available from 2021 to 2024. Due to the concerns of incomplete market reports, the total commercial landings and revenue trend of the Hawaii longline presented in Figure 135 were generated only from total pounds kept, value, and the fish price from Hawaii dealers.

The total active number of vessels landing fish in 2024 was 147, same as the previous year. The fleet generated total revenues sold in Hawaii markets (revenue generated from HDAR dealer reports) as presented in Figure 135, which only included the total revenue generated from HDAR dealer reports (sold in Hawaii markets). The pounds sold in Hawaii markets reported from the HDAR dealers accounted for 98% of the total estimated value of the total pelagic landings (estimated by the pounds kept from fishermen's report in 2024 assuming all pounds caught were landed and sold) by the entire fleet. In 2024, the fleet revenue (sold in Hawaii markets) was

$102.9 million, a 4% decrease compared to the previous year, although the landings increased by 13%. The total pounds sold in the Hawaii market in 2024 was 25.28 million pounds valued at $102.9 million. The average fish prices of all species in 2024 decreased to $4.07/lb from $4.98/lb in 2023 (adjusted).

Please note that the revenue in the fishery economic performance section here may differ from the revenue reported in the fishery performance section, because the revenue here were compiled based on the landed year while the other uses haul year. In addition, the total revenue of the Hawaii longline fishery can be estimated based on the reported pounds kept from the NMFS logbooks and the fish price data from fish sales of Hawaii markets. Thus, the total estimated landings by Hawaii longline fleet in 2024 was 31.0 million pounds, valued at 104.5 million. Supporting data of Figure 135 are presented in Table A-122.

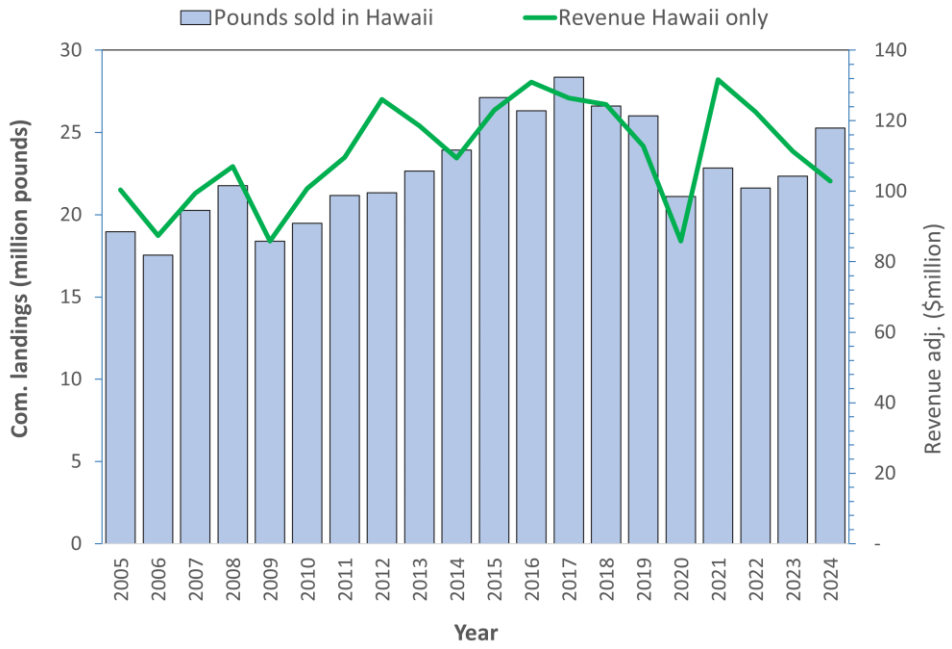



Figure 135. Commercial landings and revenue of Hawaii-permitted longline fleet (landed in Hawaii markets; adjusted to 2024 dollars)[1]

[1] Source: PIFSC Tier 1 indicators data request.

Figure 136 shows the trends of the revenue composition (based on the estimated total value, instead of sold revenue from the pounds kept ) from the main species (bigeye, swordfish, and yellowfin) and others from 2005 to 2024, and Figure 137 shows the price trends for bigeye, swordfish, and yellowfin for the same period. Supporting data for Figure 136 and Figure 137 are presented in Table A-123 and Table A-124, respectively.

It can be observed that bigeye tuna comprised the majority of fishery revenue for the longline fleet during 2005 to 2024. In 2024, bigeye tuna comprised 54% of revenue for Hawaii permitted longline vessels, dropped substantially compared with the previous years, due to lower landings and price, followed by yellowfin tuna at 32%, swordfish at 5%, and other species at 9% of the total Hawaii longline revenue, while the 20-year averages were 65%, 12%, 9%, and 15%, respectively. In 2024, the nominal prices of all the three main species went down, decreasing by 15%, 3%, and 17%, respectively, compared to that in 2023.

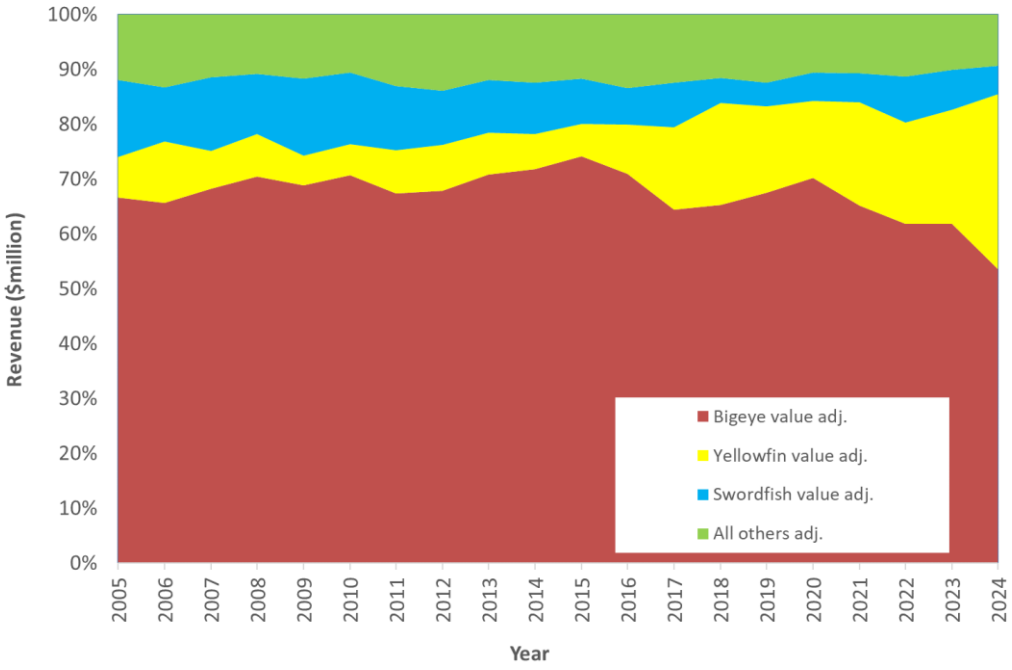



Figure 136. Trends in Hawaii longline revenue species composition (nominal value)[1]

[1] Data Source: PIFSC Tier 1 data request.

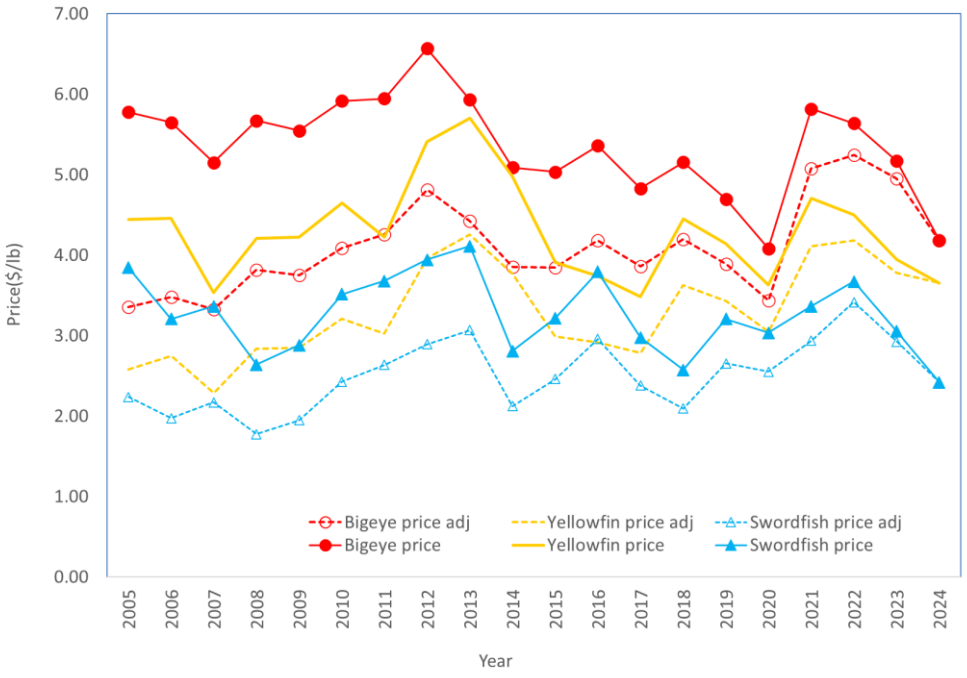



Figure 137. Adjusted and nominal price trends for three main species (bigeye tuna, yellowfin tuna, and swordfish) harvested by the Hawaii longline fishery[1]

[1] Source: Pacific Islands Fisheries Science Center, Tier 1 data request.

#### 3.2.3.4.1.2 Fishing Costs

The Economic Cost Data Collection Program for the Hawaii longline fishery was the first to establish continuous (routine) trip expenditure collection in the Pacific Islands Region. The program was implemented in August 2004 through cross-agency collaboration by the PIFSC Economics Program and the NOAA Observer Program managed by PIRO (Pan 2018). Before the establishment of these programs, trip-level economic information on the fisheries was limited primarily to the dockside value of landed fish. Data on fishing expenses were obtained intermittently through one-time surveys conducted roughly every five years (Hamilton and Huffman 1997; O'Malley and Pooley 2002; Kalberg and Pan 2016). The continuous economic data collection program has provided important trend data to track changes in economic performance for the Hawaii longline fishery on a continuous basis.

The continuous data collection form is comprised of eight cost items commonly arising in Hawaii longline trips, but it excludes labor costs. Non-labor cost items collected include diesel fuel, engine oil, bait, ice, as well as total costs for gear replacement, provisions, and communications. The form requests unit price, quantity used, and total costs of fuel, bait, and oil usage. In addition, the total number of crew members, and the subset who are not United States nationals, is collected for both tuna and swordfish trips. Survey forms are produced and available in first languages (i.e., English, Korean, and Vietnamese) to ease survey burden.

The project is designed to collect data from all observed trips. Observers conduct interviews with the captains on board while returning to port or when a trip is completed. The participation of fishers in the economic data survey is voluntary. Observers accompany 100% of the Hawaii-based shallow-set longline trips (targeting swordfish) and about 20% of the deep-set trips (targeting bigeye tuna). Since the economic data collection project was implemented in August 2004, the average response rate based on observed trips has been around 60%. The data collection program would not succeed without the generous support of vessel owners and operators. A detailed description of the continuous data collection program can be found in a NOAA technical memorandum (Pan 2018).

This report presents trip-level fishing costs for each type of longline trip since shallow-set (swordfish) trips often have a longer trip length compared to deep-set (bigeye tuna) trips. The data series of trip costs and net revenue data have been presented in the annual SAFE report from 2005 to present, as the first full-year's data were available beginning in 2005. Average swordfish trip costs generally are higher than tuna trips because the trip length of a swordfish trip is longer than a tuna trip. The average trip length for swordfish trips was 31 days per trip during the period of 2005 to 2024, while it was 22 days for tuna trips. A decreasing trend in trip length for swordfish trips has been observed over recent years. The average trip length in 2024 was consistent with the 20-year average (i.e., 31 days).

In terms of cost structure in 2024, fuel cost accounts for the largest share of total fishing trip costs (i.e., non-labor items) for both tuna and swordfish trips. Figure 138 and Figure 141 show the cost structures of an average tuna and swordfish trip, respectively, in 2024. In 2024, fuel cost was the leading item of trip costs, comprising 54% of total tuna trip costs, a lower share than 2022 (57%). Bait was the second largest item, accounting for 23% of tuna trip costs. Fuel and bait costs together made up over 77% of the trip costs for tuna fishing. For swordfish trips, the cost of fuel also made up 54% of swordfish trip costs, lower than 2022 (57%), while bait cost made up 15% of total swordfish trip costs. The cost of the lightstick gear is unique to swordfish

fishing, and it made up 13% of the total trip costs of swordfish trips in 2024. In 2024, the average trip cost for swordfish trips was $54,371 while it was $32,361 for tuna trips. Supporting data for Figure 140 and Figure 141 are presented in Table A-125 and Table A-126.

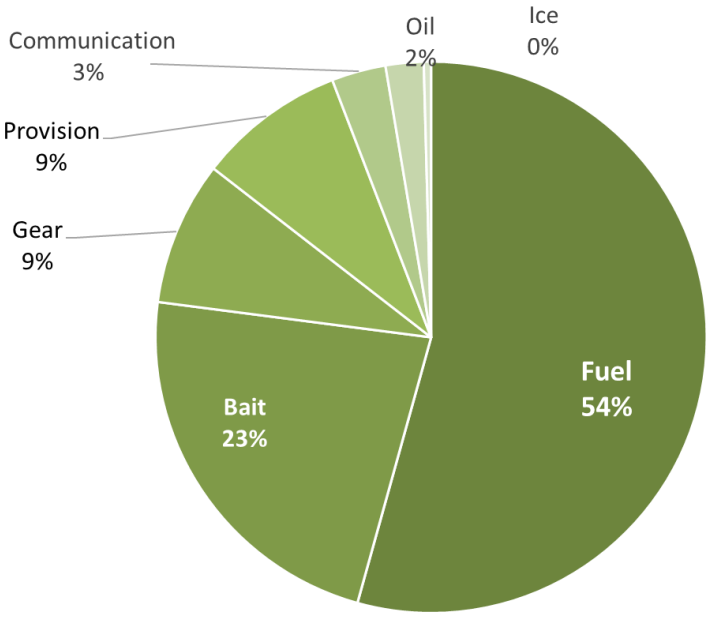



Figure 138. The cost structure of an average deep-set fishing trip[1]

[1] Data source: PIFSC continuous economic data collection program (Pan 2018).

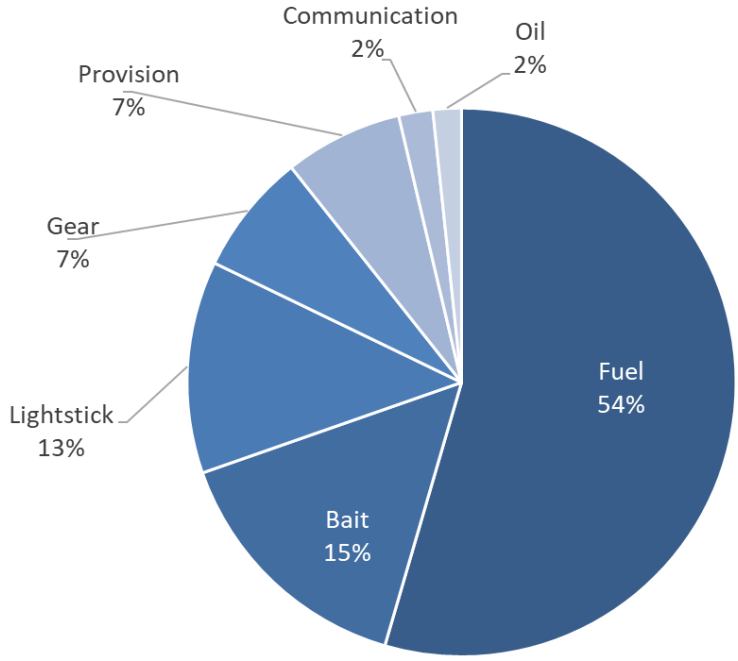



Figure 139. The cost structure of an average shallow-set fishing trip[1]

[1] Data source: PIFSC continuous economic data collection program (Pan 2018).

Figure 140 and Figure 141 show the trends of average trip costs for tuna and swordfish trips, respectively, in the Hawaii longline fishery for the 2005-2024 period. Supporting data for Figure 140 and Figure 141 are presented in Table A-125 and Table A-126. The average trip costs for both trip types differ, and swordfish trips (i.e., with longer trip lengths) usually cost more than tuna trips. The variations of trip costs across years were mainly the results of fuel costs across years, while the other trip costs were relatively steady across years. In 2024, trip costs for tuna fishing ($32,361) went down 8% compared to that in 2023, due to lower fuel price. The trip costs of swordfish fishing went up 3%, probably due to longer trip length in 2024 compared to 2023.

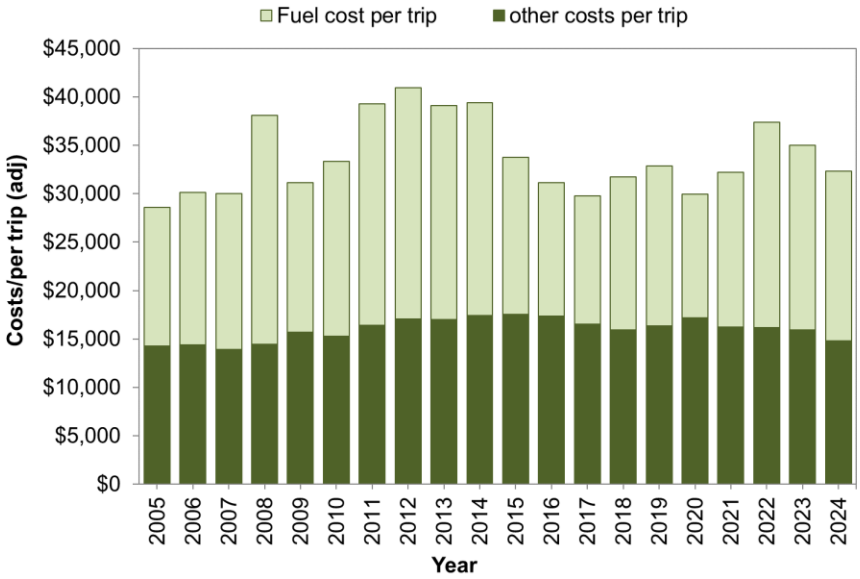



Figure 140. Average trip costs for Hawaii longline deep-set fishing (adjusted to 2024 dollars)[1]

[1] Data source: PIFSC continuous economic data collection program (Pan 2018).

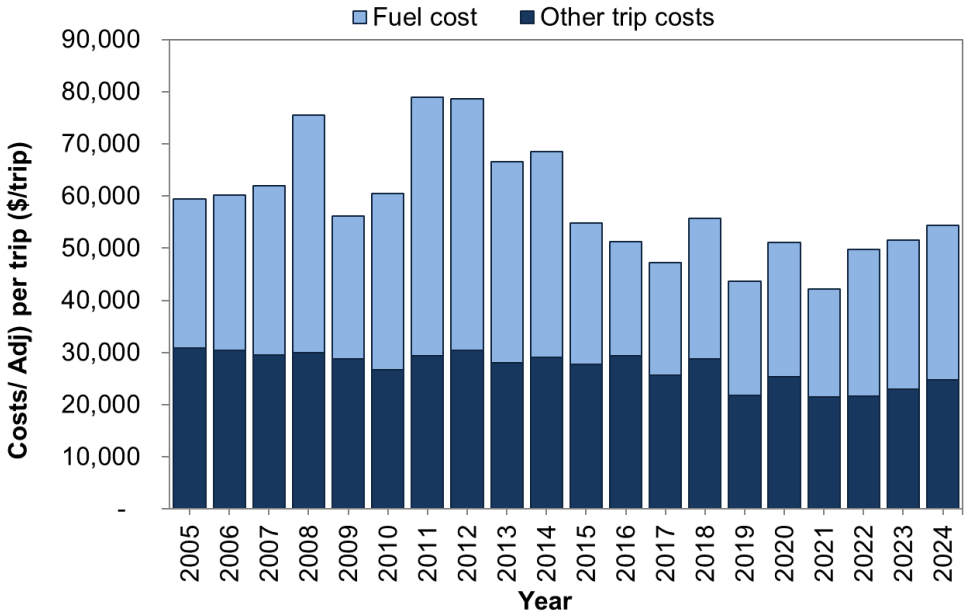



Figure 141. Average trip costs for Hawaii longline shallow-set fishing (adjusted to 2024 dollars)[1]

[1] Data source: PIFSC continuous economic data collection program (Pan 2018).

#### 3.2.3.4.1.3 Economic Performance Indicators

The continuous economic data collection program allows for the monitoring of trends in fishing cost over time (Pan 2018). Compiling revenue data with cost and effort data allows for the measurement of the economic performance in terms of trip net revenue. Figure 142 and Figure 143 present the trends of trip net revenues for two trip types for the period of 2005 to 2024. Supporting data for Figure 142 and Figure 143 are presented in Table A-127 and Table A-128, respectively. The net revenue of tuna (i.e., deep-set) fishing varied across years and peaked in 2016. However, tuna trip net revenue was in a downward trend after 2016, and it was $31,449 per trip, a historical low for the 20-year (i.e., 2005-2024) period. The net trip revenue for swordfish trips was highest in 2022 and it went down in 2023 and 2024 ($131,025 in 2022 vs. $36,670 in 2024).

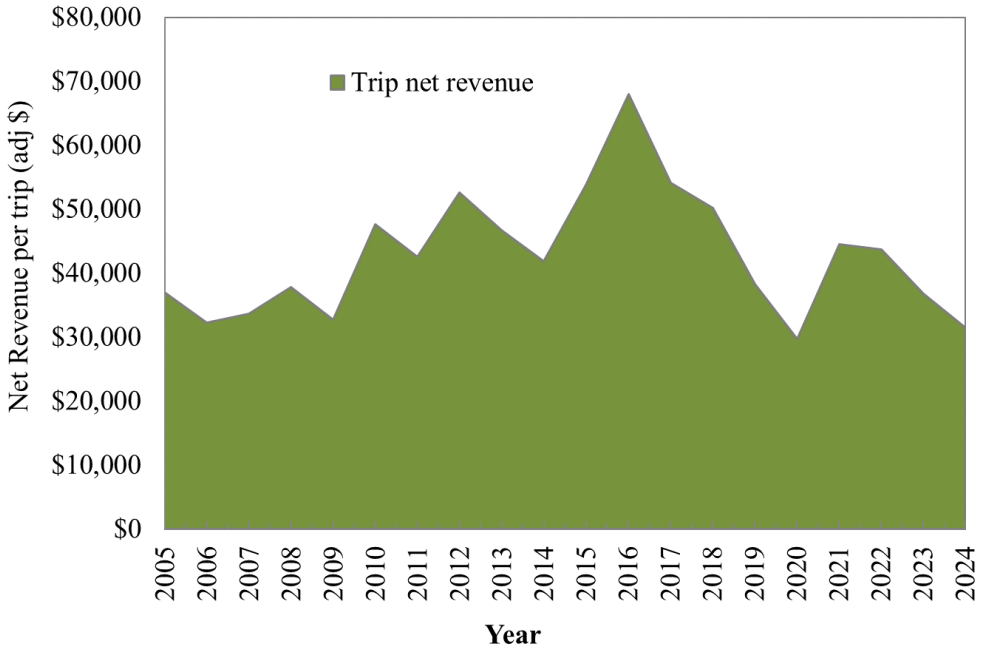



Figure 142. Average net revenue per trip for Hawaii longline deep-set trips (adjusted to 2024 dollars)[1]

[1] Data source: PIFSC continuous economic data collection program (Pan 2018).

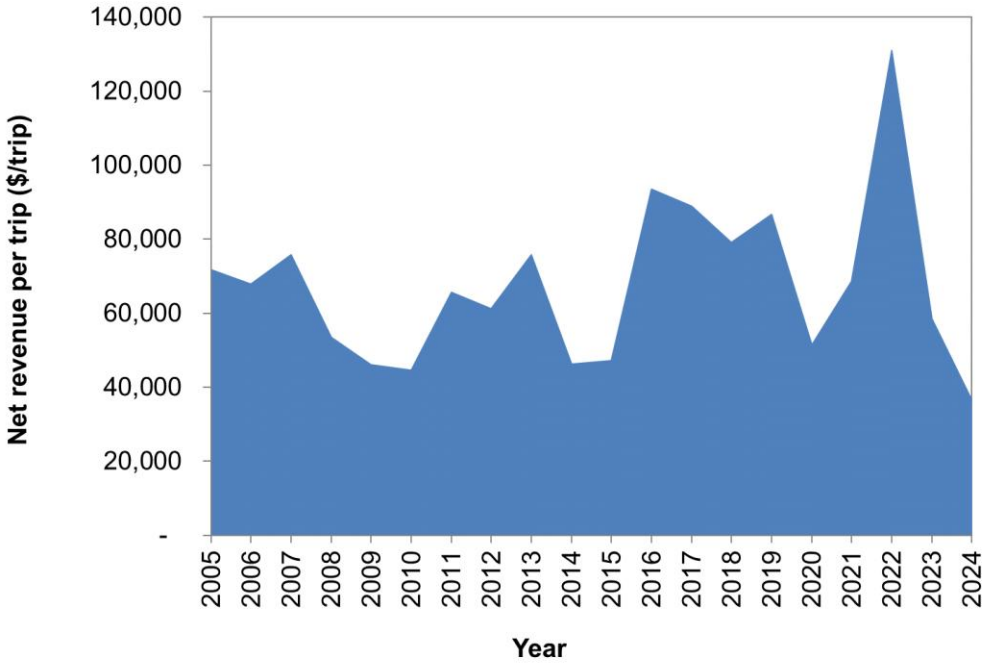



Figure 143. Average net revenue per trip for Hawaii longline shallow-set trips (adjusted to 2024 dollars)[1]

[1] Data source: PIFSC continuous economic data collection program (Pan 2018).

In addition to the measurement of the net revenue, NOAA Fisheries has established a national set of economic performance indicators to monitor the economic health of the nation's fisheries (Brinson et al. 2015). The PIFSC SEES Program has used this framework to evaluate select regional fisheries; specifically, the American Samoa Longline, Hawaii Longline, and Main Hawaiian Islands (MHI) Deep 7 bottomfish fisheries. These indicators include metrics related to catch, effort, and revenue. For the American Samoa longline fishery, this section presents revenue performance metrics of the total revenue per day at sea, annual revenue per vessel, and the Gini coefficient based on individual vessels.

The Gini coefficient measures the equality of the distribution of revenue among active vessels in the fishery. A value of zero represents a perfectly equal distribution of revenue amongst these vessels, whereas a value of one represents a perfectly unequal distribution, in the case that a single vessel earns all of the revenue. Data on aggregate revenue from species in fishery per-day-at-sea and revenue per vessel calculation (for Gini coefficient) are sourced from PIFSC FRMD. Figure 144 and Figure 145 present the revenue per-day-at-sea, revenue per vessel, and the Gini coefficient for the Hawaii longline fisheries during the period of 2005 to 2024. Supporting data for Figure 144 and Figure 145 are presented in Table A-129.

One of the economic performance indicators, revenue per-day-at-sea for the Hawaii longline fishery, presents an upward trend in general. It increased notably in 2021 and 2022 was at a similar level as 2021. However, it went down again in 2023 and 2024. Another economic performance indicator, revenue per vessel dropped notably in recent 3 years (i.e., 2022, 2023, and 2024). The income distribution (i.e., Gini coefficient in terms of revenue per vessel) among

vessels is relatively stable over the same period 2005-2024, which indicates that the variation of revenue received by individual vessels was small across the fleet.

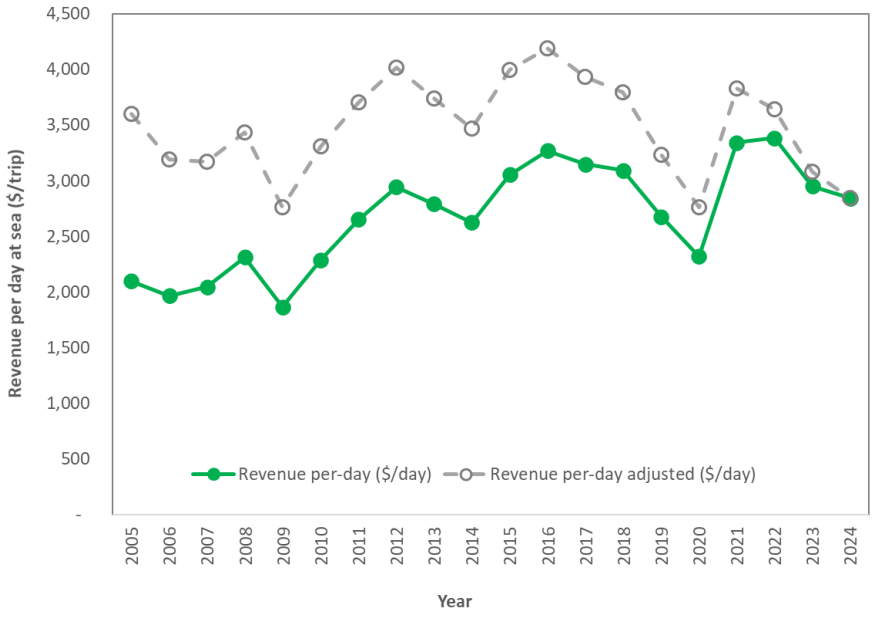



Figure 144**.** Revenue per-day-at-sea for the Hawaii longline fishery (adjusted to 2024 dollars)[1]

[1] Data Source: PIFSC Tier 1 indicators data request.

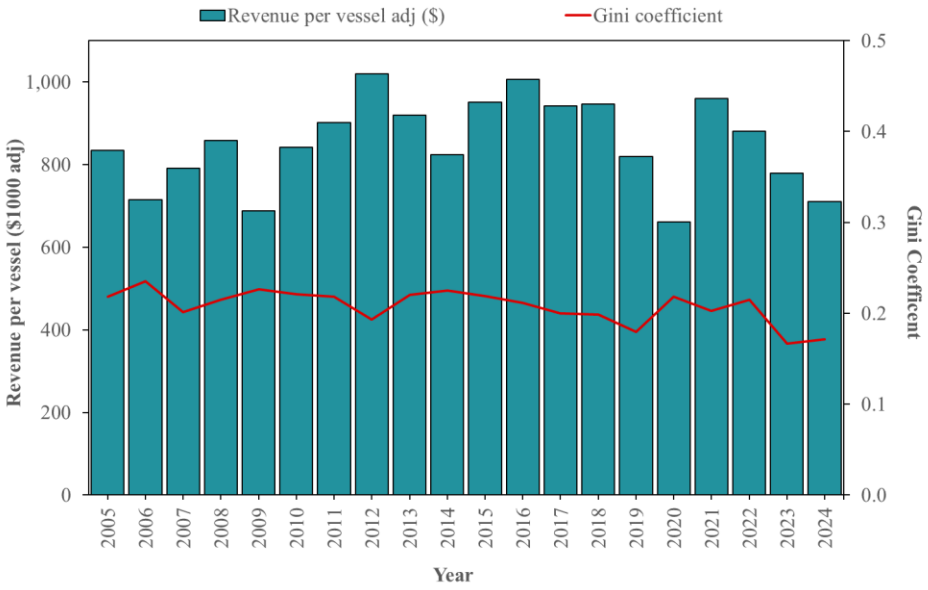



Figure 145. Revenue per vessel and Gini coefficient for the Hawaii longline fishery[1] (adjusted to 2024 dollars)[2]

[1] Revenue per vessel includes the estimation of revenue landed on the West Coast.

[2] Data source: PIFSC Tier 1 indicators data request

#### 3.2.3.4.2 Overview of the Hawaii Non-Longline Gears for PMUS

In addition to the Hawaii permitted longline vessels, there are the smaller scale fisheries, such as the MHI troll, MHI handline, offshore handline, aku boats (i.e., pole and line), among other gears, that harvest PMUS and sell to the Hawaii markets. The following figures present an overview of these various gears in terms of pounds sold, revenue, price, and participants. Aku boats were not included in "other gears" because the fishery has been declining, and the number of active vessels has been less than three since 2010. In terms of participants in the fisheries, Figure 146 presents the total fishers participating in these non-longline PMUS fisheries, including the total number of fishers who reported PMUS caught in fishers reports and the total number of fishers who reported PMUS sold in the dealer reports. The number of fishers has experienced a downward trend since 2013. In 2024, the number of fishers for PMUS was 1056, a decrease of 124 fishers, compared to 2023. The number of fishers with fish sold in 2024 was 845, which is 118 fishers fewer than 2023.

Including pelagic fish landed and sold in the Hawaii markets from all gear types (including longline), the total revenue generated from Hawaii's pelagic fisheries sold in Hawaii markets was $110.8 million in 2024 and the non-longline fisheries contributed 7% of the total PMUS revenue sold in Hawaii markets in 2024. Among the total revenue of the non-longline gears, the MHI troll was the leading sector with $4.2 million revenue and the MHI handline fishery followed at $2.2 million. The offshore handline fishery was worth $0.5 million in 2024. There has been a sharp decline in aku boat fishing since 2016, and detailed figures are not reported since 2019 due to confidentiality considerations. Figure 147 presents the trend of commercial landings by different non-longline gears, and Figure 148 presents the trend of commercial revenue by non-longline gears. The commercial landings and revenue peaked in 2004 and 2012, respectively, and were in general declining trends after 2012. Compared to the estimated total landings reported from fishers' reports, around 80% of PMUS caught by non-longline gears were sold during the period of 2005-2024. Supporting data for the Figure 147 and Figure 148 are presented in Table A-130 and Table A-131, respectively.

Figure 149 presents the price trends of PMUS harvested and sold by different gears, 2005-2024 (adjusted to 2024 dollars). As dealer data do not record gear types, the prices by species by gear were estimated by assuming that the gear distributions of fish sold in the dealers reports by species were the same as in fishers' reports. Thus, the prices by species by gear presented here may not reflect the actual price differences among gears for the same species. The estimated price data by species by gear are presented in Figure 149. In general, pelagic fish price went down slightly in 2024 for all gear types. Supporting data for Figure 149 are presented in Table A-132. Figure 150 presents the fishing trip costs by the three main small boat gears for pelagic fishing.

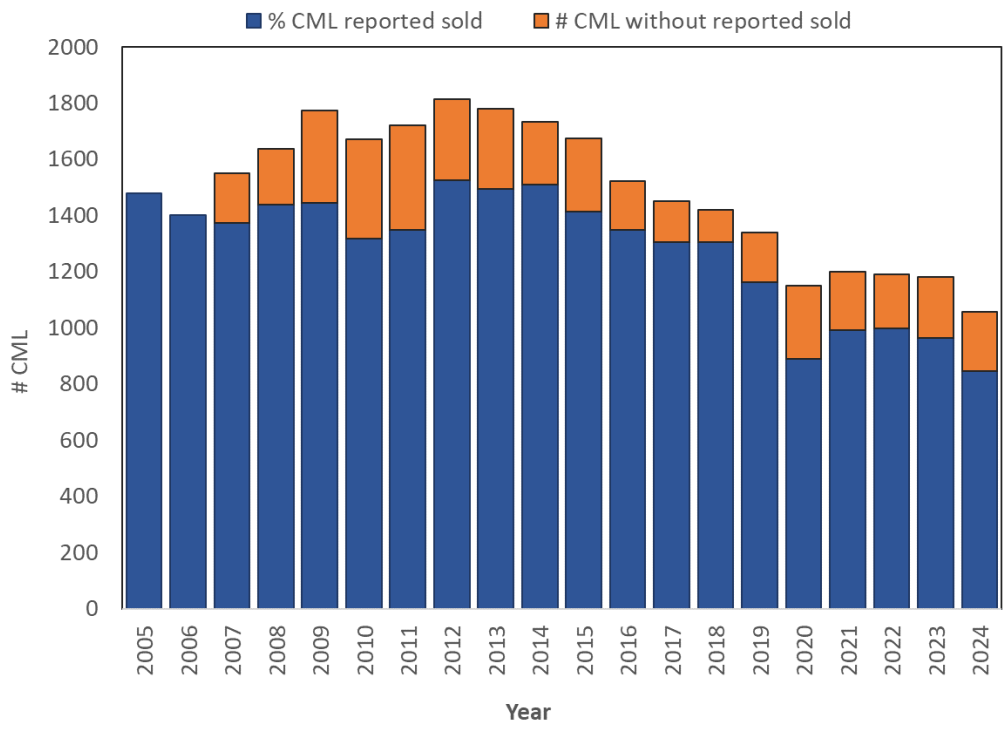



Figure 146. Total number of licensed fishers participating in small scale (i.e., non-longline) PMUS fisheries in Hawaii[1]

[1] Data source: PIFSC Pelagic Module data request.

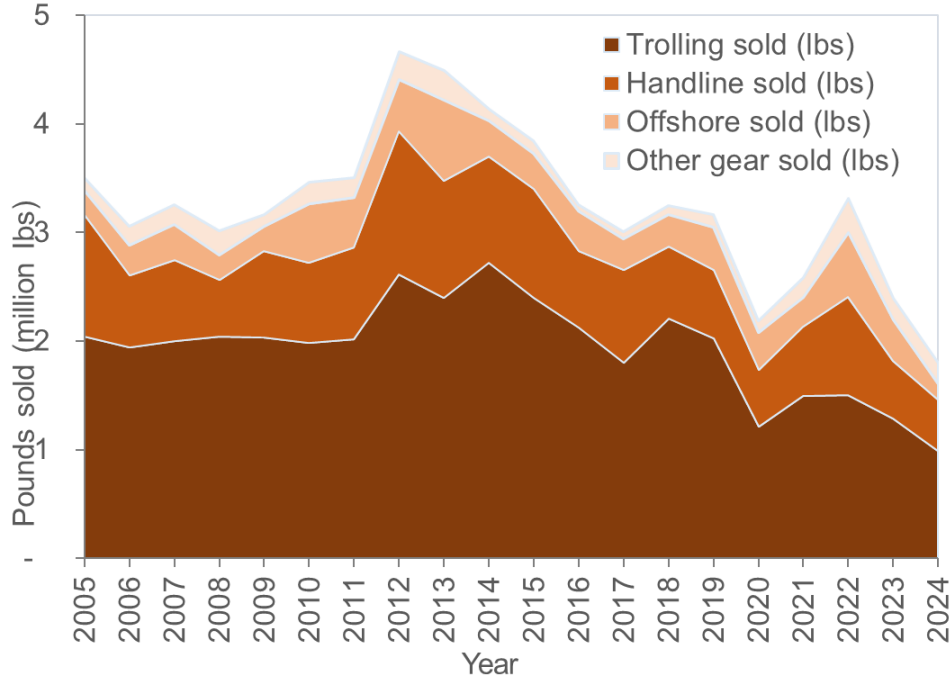



Figure 147. Total pounds sold from MHI commercial non-longline gears[1]

[1] Data source: PIFSC Pelagic Module data request.

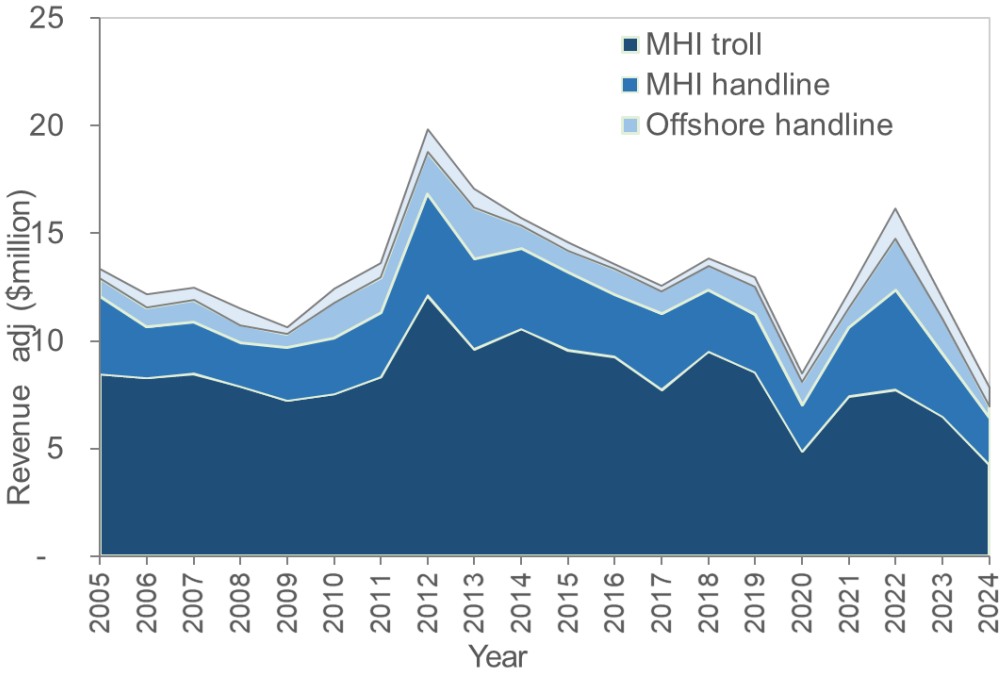



Figure 148. Revenue from Hawaii pelagic non-longline gears (adjusted to 2024 dollars)[1]

[1] Data source: PIFSC Pelagic Module data request.

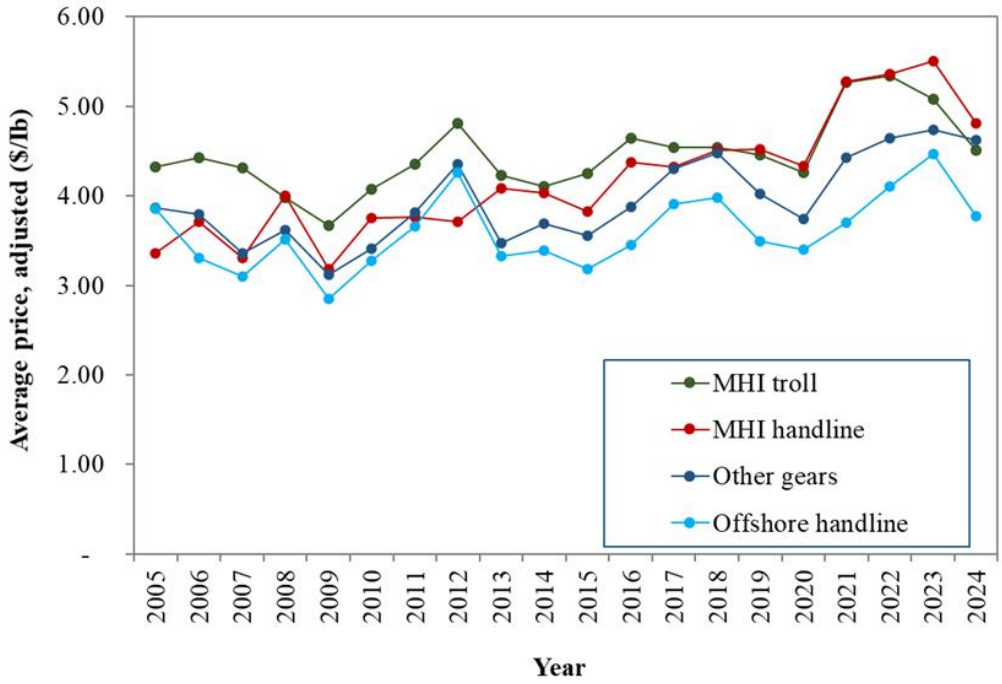



Figure 149. Price trends of PMUS by gear (adjusted to 2024 dollars)[1]

[1] Data source: PIFSC Pelagic Module data request.

#### 3.2.3.4.2.1 Fishing Costs

There is no continuous cost data collection program established for the non-longline PMUS fisheries in Hawaii. Past periodic research has documented the costs of pelagic small boat fishing in Hawaii; both trip expenditure and annual fishing expenditures (i.e., fixed costs) are provided in the literature (Hamilton and Huffman 1997; Hospital et al. 2011; Chan and Pan 2017; Chan 2022). The trip costs by gear type, collected in 2014 and 2021 studies (Chan and Pan 2017; Chan 2022), are presented in Figure 150.

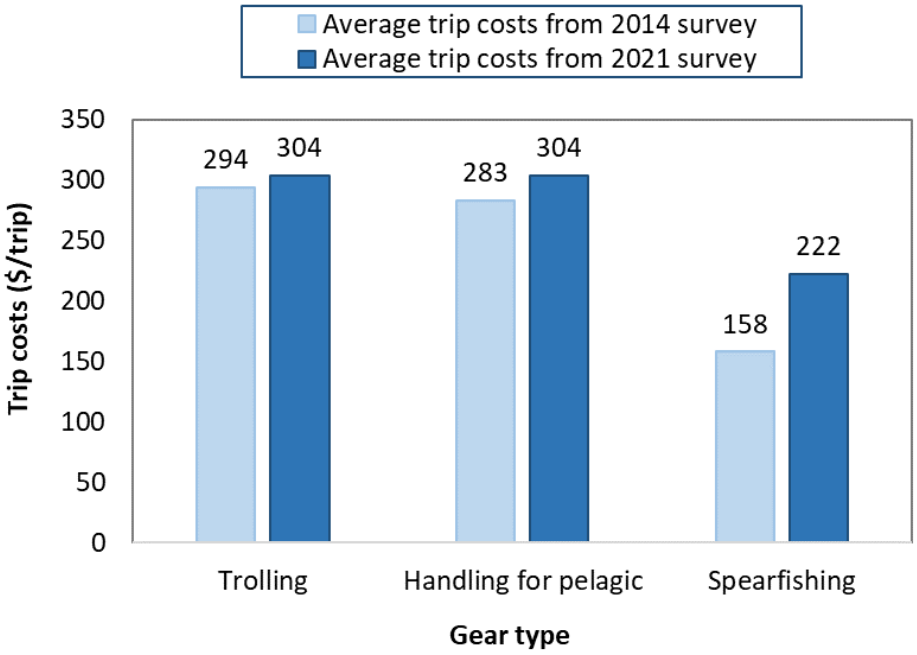



Figure 150. Fishing trip cost by gear type in 2014 and 2021[1]

[1] Data sourced from a 2014 and 2021 Hawaii small boat survey (Chan and Pan 2017 and Chan 2022)

### 3.2.3.4.3 Hawaii Trolling

#### 3.2.3.4.3.1 Commercial Participation, Landings, Revenue, and Prices

This section describes trends in commercial participation, landings, revenues, and prices for the Hawaii troll fishery. Figure 151 presents the pounds sold and revenue (adjusted to 2024 dollars) for the MHI troll fishery from 2005-2024. Supporting data of Figure 151 are presented in Table A-130 and Table A-131. Among the non-longline gears, the Hawaii troll fishery landed the largest number of pelagic fish. The commercial revenue from Hawaii troll fishery peaked in 2012 with revenue of over $10 million (inflation adjusted to 2024 dollars) from 2.6 million pounds sold, while commercial landings peaked in 2014. Since then, both commercial landings and revenue have experienced a declining trend. Landings and revenue decreased in 2024 compared to 2023. Price information is available in Figure 149.

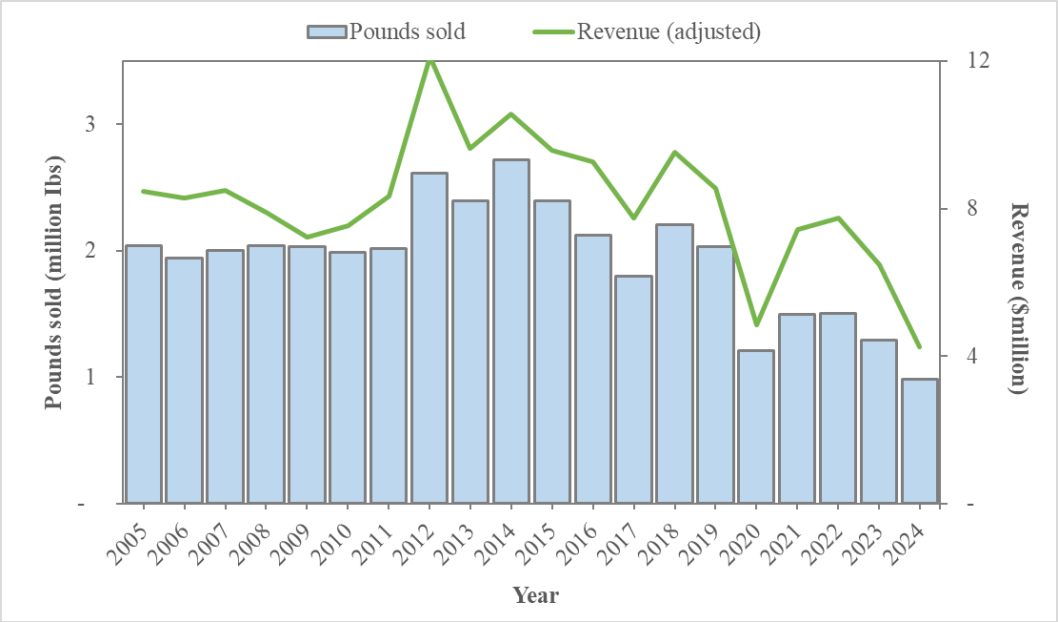



Figure 151. Pounds sold and revenue for the MHI troll fishery (adjusted to 2024 dollars)[1]

[1] Data source: PIFSC Pelagic Module data request.

#### 3.2.3.4.3.2 Fishing Costs

There are no continuous cost data collection program established for the non-longline PMUS fisheries in Hawaii. Past periodic research has documented the costs of pelagic small boat fishing in Hawaii; both trip expenditure and annual fishing expenditures (fixed costs) are provided in the literature (Hamilton and Huffman 1997; Hospital et al. 2011; Chan and Pan 2017; Chan 2022). The most updated cost data for a Hawaii trolling trip are presented in Figure 150.

### 3.2.3.4.4 Hawaii Pelagic Handline

#### 3.2.3.4.4.1 Commercial Participation, Landings, Revenue, and Prices

This section describes trends in commercial participation, landings, revenues, and prices for the Hawaii pelagic handline fishery. Figure 152 presents the pounds sold and revenue (adjusted to 2024 dollars) for the MHI handline fishery from 2005-2024. Supporting data for Figure 152 can be found in Table A-130 and Table A-131. The landings and revenue from the Hawaii handline fishery peaked in 2012 with 1.3 million pounds sold, valued at over $4 million (adjusted in 2024 dollars), before experiencing a general declining trend since 2013. Commercial landings of Hawaii handline in 2024 were 0.6 million pounds, valued at $2.2 million, both were lower than that in 2022. Price information is available in Figure 149.

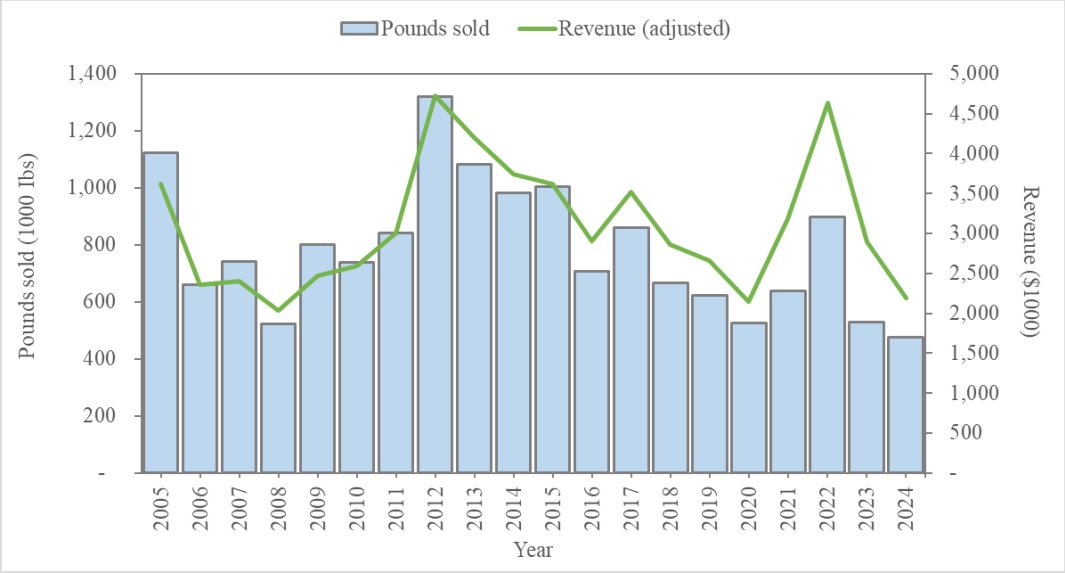



Figure 152. Pounds sold and revenue for MHI handline fishery (adjusted to 2024 dollars)[1]

[1] Data sourced from the PIFSC Pelagic Module data request.

#### 3.2.3.4.4.2 Fishing Costs

There is no continuous cost data collection program established for the non-longline PMUS fisheries in Hawaii. Past periodical research has documented the costs of pelagic small boat fishing in Hawaii; both trip expenditure and annual fishing expenditures (fixed costs) are provided in the literature (Hamilton and Huffman 1997; Hospital et al. 2011; Chan and Pan 2017; Chan 2022). The most recent cost data for MHI handline trips are presented Figure 150.

### 3.2.3.4.5 Offshore Handline

#### 3.2.3.4.5.1 Commercial Participation, Landings, Revenue, and Prices

This section describes trends in pounds sold and revenues for the Hawaii offshore handline fishery. Figure 153 presents the pounds sold and revenue (adjusted to 2024 dollars) of the offshore handline, 2005-2024. Supporting data for Figure 153 can be found in Table A-130 and Table A-131. The offshore handline fishery seems relatively stable in most of the years during the period of 2005-2024, except that the pounds sold and revenue jumped up considerably in 2013 and 2022. The offshore handline in 2024 went down to the all-time low in 2024. Price information is available in Figure 149.

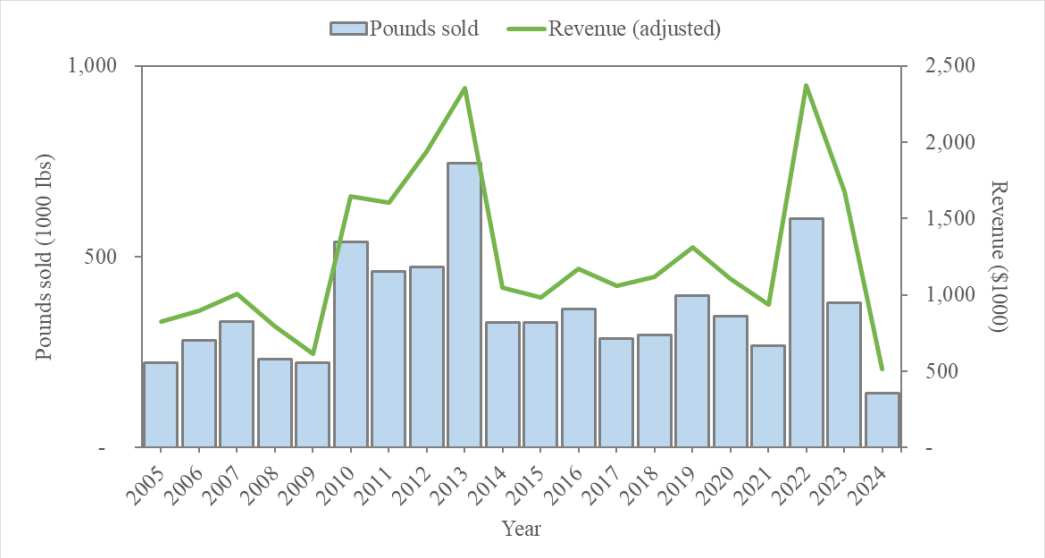



Figure 153. The pounds sold and revenue for the offshore handline (adjusted to 2024 dollars)[1]

[1] Data sourced from the PIFSC Pelagic Module data request.

#### 3.2.3.4.5.2 Fishing Costs

Fishing costs for offshore handline were first studied in the 2014 Hawaii small boat survey (Chan and Pan 2019b). Fishing trip costs were collected from the 2014 Hawaii small boat survey (Chan and Pan 2017). Fishermen were asked their fishing trip costs for the most common and second most common gear types they used in the past 12 months and the survey provides information on the variable costs incurred during the operation of vessel including boat fuel, truck fuel, oil, ice, bait, food and beverage, daily maintenance and repair, and other. However, the 2021 survey did not receive any updated cost information on the offshore handline.

### 3.2.3.4.6 Other Gears (Including Aku Boat/Pole and Line)

#### 3.2.3.4.6.1 Commercial Participation, Landings, Revenue, and Prices

This section will describe trends in commercial pounds sold and revenues for the "other gears". Figure 154 presents the pounds sold and revenue (adjusted to 2024 dollars) of the other gears 2005-2024 (excluding aku boats because data are confidential since 2019 and the dramatic changes from over $1 million revenue in 2005 to under $2,000 in 2016). Supporting data for Figure 154 can be found in Table A-130 and Table A-131. The fisheries in 2024 were similar to 2023.

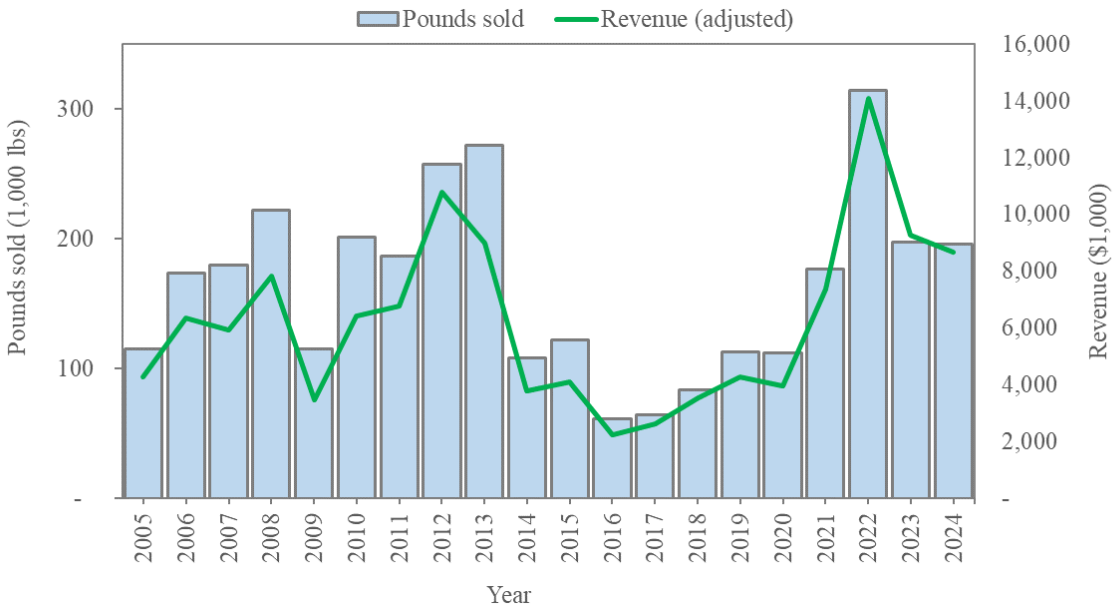



Figure 154. Pounds sold and revenue for all other pelagic gears in Hawaii (excluding aku boat; adjusted to 2024 dollars)[1]

[1] Data source: PIFSC Pelagic Module data request.

#### 3.2.3.4.6.2 Fishing Costs

Fishing cost data for the other presented gears were not available at the time of publication.

### 3.2.4 ONGOING RESEARCH AND INFORMATION COLLECTION

Each year, the PIFSC reports on the status of economic data collections for select regional commercial fisheries. This supports a national economic data monitoring effort known as the Commercial Fishing Economic Assessment Index (CFEAI). Details on the CFEAI and access to data from other regions is available at: https://www.st.nmfs.noaa.gov/data-and-tools/CFEAI-RFEAI/.

The table below represents the most recent data available for CFEAI metrics for select regional commercial fisheries for 2024. Entries for Pelagic fisheries are bolded in red. These values represent the most recent year of data for key economic data monitoring parameters (fishing revenues, operating costs, and fixed costs). The assessment column indicates the most recent publication year for specific economic assessments (returns above operating cost, profit), where available.

Table 44. Pacific Islands Region 2024 Commercial Fishing Economic Assessment Index

| | 2024 CFEAI | | | | |
|---|---|---|---|---|---|
| | 2024 Reporting Year (1/2024-12/2024) | | | | |
| | Data | | | Assessment | |
| Pacific Islands Fisheries | Fishing Revenue Most Recent Year | Operating Cost Most Recent Year | Fixed Cost Most Recent Year | Returns Above Operating Costs (Quasi Rent) Assessment Most Recent Year | Profit Assessment Most Recent Year |
| **HI Longline** | **2024** | **2024** | **2023** | **2024** | **2024** |
| **ASam Longline** | **2024** | **2024** | **2016** | **2024** | **2019** |
| **HI Offshore Handline** | **2024** | **2021** | **2021** | **2019** | **2019** |
| **HI Small Boat (pelagic)** | **2024** | **2021** | **2021** | **2023** | **2023** |
| HI Small Boat (bottomfish) | 2024 | 2021 | 2021 | 2023 | 2023 |
| HI Small Boat (reef) | 2024 | 2021 | 2021 | 2023 | 2023 |
| **Guam Small boat** | **2024** | **2024** | **2019** | **2024** | |
| **CNMI Small boat** | **2024** | **2024** | **2019** | **2025** | |
| **ASam Small boat** | **2024** | **2024** | **2021** | **2023** | |

The Economic Cost Data Collection Program for tracking change of Hawaii longline and American Samoa longline has been done in collaboration between PIFSC with the Pacific Islands Regional Observer Program (PIROP) to provide a 20-year time series of trip-level expenditures excluding labor cost (Pan 2018). However, there is uncertainty with the continuation of this data collection program due to the digitization of the PIROP system, whereas the economic performance data has been collected through paper forms. The data collection program may need to explore approaches to continue the data collection in the most feasible and efficient format for useful representation.

PIFSC also generates projections for upcoming fiscal years, and the table below provides the projected CFEAI report for 2025 (*all projected activities and analyses are subject to funding*). Based on early projections PIFSC intends to maintain ongoing economic data collections for the Hawaii and American Samoa longline fisheries (Pan 2018) and small boat fisheries in American Samoa, Guam and the CNMI (Chan and Pan 2019a) during 2025.

Table 45. Pacific Islands Region 2025 Commercial Fishing Economic Assessment Index

| | 2025 Projected CFEAI | | | | |
|---|---|---|---|---|---|
| | 2025 Reporting Year (1/2025-12/2025) | | | | |
| | Data | | | Assessment | |
| Pacific Islands Fisheries | Fishing Revenue Most Recent Year | Operating Cost Most Recent Year | Fixed Cost Most Recent Year | Returns Above Operating Costs (Quasi Rent) Assessment Most Recent Year | Profit Assessment Most Recent Year |
| **HI Longline** | **2025** | **2025** | **2023** | **2025** | **2024** |
| **ASam Longline** | **2025** | **2025** | **2016** | **2025** | **2019** |
| **HI Offshore Handline** | **2025** | **2021** | **2021** | **2019** | **2019** |
| **HI Small Boat (pelagic)** | **2025** | **2021** | **2021** | **2023** | **2023** |
| HI Small Boat (bottomfish) | 2025 | 2021 | 2021 | 2023 | 2023 |
| HI Small Boat (reef) | 2025 | 2021 | 2021 | 2023 | 2023 |
| **Guam Small boat** | **2025** | **2025** | **2025** | **2024** | |
| **CNMI Small boat** | **2025** | **2025** | **2025** | **2025** | |
| **ASam Small boat** | **2025** | **2025** | **2021** | **2023** | |

PIFSC fielded an update the Hawaii longline cost-earnings survey in 2023 and this survey provided updated information on fixed costs, labor costs, and allow for a more in-depth analysis of economic performance for the fleet while the last survey was fielded in 2013 (Kalberg and Pan 2016). Data analysis and summary are underway and PIFSC intends final survey results to be published during 2025.

PIFSC completed a cost-earnings survey of small boat fisheries in Guam and the CNMI during 2018-2019 (Dombrow et al. 2025a, 2025b), to serve as an update to the previous 2011 cost-earnings survey (Hospital and Beavers 2012, 2014). This 2018-2019 survey collected data on fishing revenues, operating costs, and fixed costs, as well as numerous elements related to fishing behavior, market participation, and fishery demographics. A cost-earnings survey of small boat fisheries in Guam and the CNMI is planned for implementation during 2025 and will provide more timely updates using a consistent survey questionnaire as the 2011 and 2018 surveys.

Community social indicators have been generated for U.S. Territories in the Pacific Islands Region (Kleiber et al. 2018) in accordance with a national framework (Jepson and Colburn 2013). Efforts are underway at PIFSC during 2025 to develop additional social indicators that are relevant to communities in the U.S. Territories of the Pacific Islands Region. Otherwise, PIFSC will continue to collect and monitor annual community social indicators (Kleiber et al. 2018; Hospital and Leong 2021) for Hawaii fishing communities, in accordance with a national framework (Jepson and Colburn 2013).

### 3.2.5 RELEVANT PIFSC ECONOMICS AND HUMAN DIMENSIONS PUBLICATIONS: 2024

| Publication | MSRA priority |
|---|---|
| Advani S, JK. O'Hara, SM. Shoffler, P Pinto da Silva, J Agar, J Arnett, L Brislen, M Cutler, A Harley, J Hospital, K Norman, E Ragland, D Squires, B Stoffle, M Szymkowiak, AJ Vega-Labiosa, JS. Stoll. 2024. Estimating the scope, scale, and contribution of direct seafood marketing to the United States seafood sector. *Marine Policy* 165, 106188. https://doi.org/10.1016/j.marpol.2024.106188 | HC1.1.4 |
| Ayers, A., Leong, K., Hospital, J., Tam, C., and Morioka, R. (2024). 2023 American Samoa fisher observations data summary and analysis. Department of Commerce. NOAA PIFSC Data Report. DR-24-13. 23 p. https://doi.org/10.25923/x85x-0y72 | HC3.1.1 HC3.1.3 HC2.1.4 PF1 |
| Ayers, A., Leong, K., Hospital, J., Tam, C., and Morioka, R. 2024. 2023 Guam and CNMI fisher observations data summary and analysis Department of Commerce. NOAA PIFSC Data Report. DR-24-12. 20 p. https://doi.org/10.25923/zh4f-4k39 | HC3.1.1 HC3.1.3 HC2.1.4 PF1 |
| Ayers A, Leong K, Hospital J, Tam C, Morioka R. 2024. 2023 Hawaii fisher observations data summary and analysis. Pacific Islands Fisheries Science Center, PIFSC Data Report, DR-24-09, 30 p. https://doi.org/10.25923/yyfz-a677 | HC3.1.1 HC3.1.3 HC2.1.4 PF1 |
| Chan HL, Cai J, Leung P. 2024. Aquaculture production and diversification: What causes what? *Aquaculture* 583, 740626. https://doi.org/10.1016/j.aquaculture.2024.740626 | PF4 |

| | |
|---|---|
| Chan HL. 2024. Economic Contributions of Small Boat Fisheries in Guam and the CNMI. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-160, 29 p. https://doi.org/10.25923/nsxb-my70 | HC1.1.7<br>HC1.1.5 |
| Dombrow, C., Rollins E., Ayers, A.L., & Hospital J. 2024. Economic and social characteristics of Guam's small boat fisheries, 2018. Department of Commerce. NOAA Administrative Report. NMFS-PIFSC-H-25-01. https://doi.org/10.25923/0c8s-tc37 | HC1.1.1<br>HC1.1.2<br>HC1.1.4<br>HC1.1.7<br>HC3.1.3<br>HC3.1.4 |
| Fisk JJ, Leong KM, Berl REW, Long JW, Landon AC, Adams MM, Hankins DL, Williams CK, Lake FK, Salerno J. 2024. Evolving wildlife management cultures of governance through Indigenous Knowledges and perspectives. *Journal of Wildlife Management*. https://doi.org/10.1002/jwmg.22584 | HC2.1.4<br>HC3.1 |
| Ingram, R. J., Leong, K. M., Nakachi, A., & Gove, J. M. (2024). Dimensions of cultural ecosystem service contributions to human well-being in marine environments. *Ecosystems and People*, 20(1). https://doi.org/10.1080/26395916.2024.2378155 | HC2.1.1<br>HC2.1.4<br>HC3.1 |
| Kleiber D, Terry J, Elliot S, Selgrath, J, et al. 2024. NOAA and Demographic Data Collection. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-163, 77 p. https://doi.org/10.25923/kw71-b226 | HC1.2.1 |
| Leong KM, Ingram RJ, Kleiber D, Long SH, Mastitski A, Norman K, Weng C, Wise S 2024. Aligning fisheries terminology with diverse social benefits *Marine Policy*, 170,106377. https://doi.org/10.1016/j.marpol.2024.106377 | HC1.1.2<br>HC1.1.4 |
| Leong KM, Quiocho K, Blacklow A, Rosa S, Kleiber D, Winter KB, Long KS, Puniwai N, Poe MR. 2024. Relational research to elevate cultural dimensions of marine organisms in Hawai'i. *Ecology and Society* 29 (4):30. https://doi.org/10.5751/ES-15573-290430 | HC2.1.1<br>HC2.1.4<br>HC3.1 |
| Perng L, Leong K, Weijerman M, Oleson K. 2024. A multi-decadal assessment of social thresholds and outcomes in marine social-ecological systems in Hawai'i. *Marine Policy*, 163, 106141. https://doi.org/10.1016/j.marpol.2024.106141 | HC2.1 |
| Wallmo K, Kleiber D, Tomberlin D, Woodworth-Jefcoats P and Oliver T (2024) The Diversity of Science Behind U.S. Seafood. *Front. Young Minds*. 12:1331893. https://doi.org/10.3389/frym.2024.1331893 | HC1.1 |

## 3.3 PROTECTED SPECIES

This section of the report summarizes information on protected species interactions in fisheries managed under the Pelagic FEP. Protected species covered in this report include sea turtles, seabirds, marine mammals, elasmobranchs, and corals. Most of these species are protected under the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), and/or the Migratory Bird Treaty Act (MBTA). A list of protected species found in or near waters where fisheries managed under the Pelagic FEP operate and a list of critical habitat designations in the Pacific Ocean are included in Appendix B.

### 3.3.1 HAWAII SHALLOW-SET LONGLINE FISHERY

#### 3.3.1.1 INDICATORS FOR MONITORING PROTECTED SPECIES INTERACTIONS AND EFFECTIVENESS OF MANAGEMENT MEASURES IN THE HAWAII SHALLOW-SET LONGLINE FISHERY

This report monitors the status of protected species interactions in the Hawaii shallow-set longline fishery using the following indicators:

- General interaction trends over time
- Effectiveness of FEP conservation measures
- Take levels compared to the incidental take statement (ITS) levels under the ESA
- Take levels compared to marine mammal Potential Biological Removals (PBRs), where applicable

Details of these indicators are discussed below.

##### 3.3.1.1.1 Conservation Measures

The Pelagic FEP includes a number of conservation measures to mitigate seabird and sea turtle interactions in the shallow-set longline fishery. These measures include the following:

- Longline vessel owners/operators are required to adhere to regulations for safe handling and release of sea turtles and seabirds.
- Longline vessel owners/operators must have on board the vessel all required turtle handling/dehooking gear specified in regulations.
- Longline vessel owners/operators are required to remove trailing gear from oceanic whitetip sharks and cut the line as close to the hook as possible.
- Longline vessel owners/operators can choose between side-setting or stern-setting longline gear with additional regulatory specifications to reduce seabird interactions (e.g., night-setting, blue-dyed bait, weighted branch lines, strategic offal discards, using a "bird curtain").
- When shallow-set longline fishing north of the Equator:
    - Use 18/0 or larger circle hooks with no more than 10° offset.
    - Use mackerel-type bait.
    - Vessel owners and operators required to annually attend protected species workshop
    - Closure for remainder of year when fishery reaches annual interaction limits ("hard caps"). Since September 17, 2020, the fishery has operated under a hard cap of 16 leatherback turtles and no hard cap for loggerhead turtles (see Section 3.3.1.3.2, this report)

- Effective September 17, 2020, vessels required to return to port when an individual trip interaction limit of 5 loggerhead turtles or 2 leatherback turtles is reached, with additional requirements if the vessel reaches the same trip limit for the second time in a calendar year (see Section 3.3.1.3.2 of this report)

In 2024, the Council initiated development of a regulatory amendment to the Pelagic FEP that would implement a crew training requirement for Hawaii and American Samoa longline fisheries. PIRO Sustainable Fisheries Division, in coordination with the Hawaii Longline Association, PIRO Protected Resources Division, and the Council initiated a one-year pilot crew training program in April 2024. The Council is scheduled to consider final action on the regulatory amendment at the 203rd Council in June 2025.

#### 3.3.1.1.2 ESA Consultations

Three valid Biological Opinions document the effects of the shallow-set fishery on ESA listed species. On January 6, 2012, the U.S. Fish and Wildlife Service issued a Biological Opinion on the effects of the Hawaii deep-set and shallow-set longline fisheries on ESA-listed seabirds (USFWS 2012). The USFWS concluded that the shallow-set fishery would not jeopardize the short-tailed albatross and included an incidental take statement of one short-tailed albatross interaction every five years. To date the fishery has not interacted with any short-tailed albatross.

On June 26, 2019, NMFS issued a biological opinion on the effects of the shallow-set fishery on ESA-listed marine species (NMFS 2019). In total, 49 listed resources comprised of 40 listed species and nine critical habitat designations occur within the area the shallow-set fishery operates and were analyzed in the 2019 Biological Opinion. These also include listed fish, marine invertebrates, and other critical habitat in vessel transiting areas of the shallow-set fishery primarily in California (Long Beach, San Francisco, and San Diego).

NMFS concluded that the continued authorization of the fishery is not likely to jeopardize the continued existence of any of the following: endangered North Pacific loggerhead sea turtle distinct population segment (DPS); endangered leatherback sea turtle; endangered Mexico breeding population of olive ridley sea turtle, and threatened (other) populations of olive ridley sea turtle; threatened Eastern Pacific green sea turtle DPS; threatened Central North Pacific green sea turtle DPS; threatened East Indian-West Pacific green sea turtle DPS; endangered Central West Pacific green sea turtle DPS; threatened Southwest Pacific green sea turtle DPS; endangered Central South Pacific green sea turtle DPS; threatened oceanic whitetip shark; threatened giant manta ray; and threatened Guadalupe fur seal.

In its 2019 Biological Opinion, NMFS issued an ITS for the loggerhead, leatherback, green, olive ridley, Guadalupe fur seal, oceanic whitetip shark, and giant manta ray, which were derived from interaction predictions generated by McCracken (2018) using a Bayesian inferential approach (Table 47). These predictions are based on observer data from 2005-2017 for all species, except for loggerheads (2005-2018) where more recent data were available.

Additionally, the 2019 Biological Opinion concluded that the shallow-set fishery may affect, but is not likely to adversely affect the following: hawksbill sea turtle; MHI insular false killer whale DPS; Mexico and Central America humpback whale DPSs; fin whale; blue whale; North Pacific right whale; sei whale; sperm whale; Eastern Pacific scalloped hammerhead shark DPS; and listed fish and invertebrate species common to transiting areas off the coast of California (Central California coast coho salmon, Central Valley spring-run Chinook salmon, Sacramento River

winter-run Chinook salmon, Central California coast steelhead, California coast steelhead, Southern North American green sturgeon, Black abalone, and White abalone).

The 2019 Biological Opinion also concluded that the shallow-set fishery is not likely to adversely modify designated critical habitat for the following: leatherback sea turtle; Hawaiian monk seal; MHI insular false killer whale; Steller sea lion; and critical habitat for listed fish and invertebrate species common to transiting areas off the coast of California (Central California coast coho salmon, Sacramento River winter-run Chinook salmon, California coast steelhead, Southern North American green sturgeon, and Black abalone).

On October 27, 2023, NMFS reinitiated ESA Section 7 consultation for the shallow-set longline fishery due to exceedance of the ITS of 36 loggerhead sea turtles in the 2019 Biological Opinion, and determined that the conduct of the fishery during the period of the consultation will not violate ESA Sections 7(a)(2) and 7(d). On March 12, 2024, NMFS issued a Supplemental Biological Opinion for loggerhead sea turtles, which concluded that the shallow-set longline fishery is not likely to jeopardize species. The new ITS took effect when the Supplemental Biological Opinion was signed in 2024 and is reflected in the tables below. The 2019 Biological Opinion remains valid for all other species.

Table 46. Summary of ESA consultations for the Hawaii shallow-set longline fishery

| Species or DPS | Consultation Date | Consultation Type[a] | Outcome[b] |
|---|---|---|---|
| Loggerhead turtle, North Pacific DPS | 2024-03-12 | BiOp | LAA, non-jeopardy |
| Leatherback turtle | 2019-06-26 | BiOp | LAA, non-jeopardy |
| Olive ridley turtle | 2019-06-26 | BiOp | LAA, non-jeopardy |
| Green turtle | 2019-06-26 | BiOp | LAA, non-jeopardy |
| Hawksbill turtle | 2019-06-26 | BiOp | NLAA |
| False killer whale, MHI insular DPS | 2019-06-26 | BiOp | NLAA |
| Fin whale | 2019-06-26 | BiOp | NLAA |
| Blue whale | 2019-06-26 | BiOp | NLAA |
| North Pacific right whale | 2019-06-26 | BiOp | NLAA |
| Sei whale | 2019-06-26 | BiOp | NLAA |
| Sperm whale | 2019-06-26 | BiOp | NLAA |
| Hawaiian monk seal | 2019-06-26 | BiOp | NLAA |
| Guadalupe fur seal | 2019-06-26 | BiOp | LAA, non-jeopardy |
| Scalloped hammerhead shark, Eastern Pacific DPS | 2019-06-26 | BiOp | NLAA |
| Oceanic whitetip shark | 2019-06-26 | BiOp | LAA, non-jeopardy |
| Giant manta ray | 2019-06-26 | BiOp | LAA, non-jeopardy |
| Listed fish and invertebrate species[c] | 2019-06-26 | BiOp | NLAA |
| Short-tailed albatross | 2012-01-06 | BiOp (FWS) | LAA, non-jeopardy |
| **Critical Habitat** | **Consultation Date** | **Consultation Type[a]** | **Outcome[b]** |
| Hawaiian monk seal | 2019-06-26 | BiOp | NLAA |
| False killer whale, MHI insular DPS | 2019-06-26 | BiOp | NLAA |
| Leatherback turtle | 2019-06-26 | BiOp | NLAA |
| Steller sea lion | 2019-06-26 | BiOp | NLAA |
| Listed fish and invertebrate species[d] | 2019-06-26 | BiOp | NLAA |

[a] BiOp = Biological Opinion; LOC = Letter of Concurrence.

[b] LAA = likely to adversely affect; NLAA = not likely to adversely affect.
[c] Listed fish and invertebrate species = Central California coast coho salmon, Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, Central California coast steelhead, California coast steelhead, Southern North American green sturgeon, Black abalone, and White abalone.
[d] Listed fish and invertebrate species = Central California coast coho salmon, Sacramento River winter-run Chinook salmon, California coast steelhead, Southern North American green sturgeon, and Black abalone.

Table 47. Summary of Incidental Take Statements (ITS) for the Hawaii shallow-set longline fishery

| Species | ITS Time Period | Takes | Mortalities | Source BiOp |
|---|---|---|---|---|
| Loggerhead turtle (North Pacific DPS) | 5-year | 135 | - | NMFS (2024) |
| Leatherback turtle | 1-year | 21 | 3 | NMFS (2019) |
| Olive ridley turtle | 1-year | 5 | 1 | NMFS (2019) |
| Green turtle | 1-year | 5 | 1 | NMFS (2019) |
| Oceanic whitetip shark | 1-year | 102 | 32 | NMFS (2019) |
| Giant manta ray | 1-year | 13 | 4 | NMFS (2019) |
| Guadalupe fur seal | 1-year | 11 | 9 | NMFS (2019) |
| Short-tailed albatross | 5-year | 1 injury or death | | USFWS (2012) |

#### 3.3.1.1.3 Non-ESA Marine Mammals

Fishery impacts to marine mammal stocks are primarily assessed and monitored through the Stock Assessment Reports (SARs) prepared pursuant to the MMPA. The SARs include detailed information on these species' geographic range, abundance, potential biological removal (PBR) estimates, bycatch estimates, and status. The most recent SARs are available online at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.

The Hawaii shallow-set longline fishery is a Category II under the MMPA 2024 List of Fisheries (LOF; 89 FR 12257, February 16, 2024), meaning that this fishery has occasional incidental mortality and serious injuries of marine mammals. The 2024 LOF lists the following marine mammal stocks that are incidentally killed or injured in this fishery:[3]

- Bottlenose dolphin, HI Pelagic stock
- False killer whale, HI Pelagic stock
- Guadalupe fur seal
- Risso's dolphin, HI stock
- Striped dolphin, HI stock

Most bycatch estimates in the SARs are based on the most recently available 5-year period, but there is a data lag of at least two years due to the SAR review process. This annual report focuses on available long-term interaction trends and summarizes relevant information from the most recent SAR.

[3] This fishery is listed in the LOF under Commercial Fisheries in the Pacific Ocean and Commercial Fisheries on the High Seas. Stocks from both lists are included here.

#### 3.3.1.2 DATA SOURCE FOR MONITORING PROTECTED SPECIES INTERACTIONS IN THE HAWAII SHALLOW-SET LONGLINE FISHERY

Protected species interactions in the Hawaii longline fishery have been monitored through mandatory observer coverage since 1994. Observer coverage in the Hawaii longline fishery was between 3 and 5 percent from 1994 through 1999 and increased to 10 percent in 2000. Since 2004, the shallow-set component of the Hawaii longline fishery has had 100 percent observer coverage.

NMFS uses the date of the interaction for tracking interactions against the ITS and the shallow-set longline sea turtle hard caps, while the PIRO Observer Program Quarterly and Annual Reports through 2020 summarized interaction data by vessel arrival dates. As a result, the annual number of interactions counting toward the ITS and hard caps may differ from the numbers reported on the historical Observer Program Quarterly and Annual Reports.[4] Starting in 2021, the PIRO Observer Program Quarterly and Annual Reports began summarizing interaction data by haul begin dates (proxy for interaction date). This report presents protected species interactions summarized by interaction date for the Hawaii shallow-set longline fishery. For the Hawaii deep-set and American Samoa longline fisheries, the annual observed interactions are based on vessel arrival date. This difference in reporting between fisheries is due to differences in management needs and observer coverage rates. In the shallow-set fishery, which has 100% observer coverage, interactions are tracked in near-real time to monitor the fleet-wide hard caps and individual trip limits for sea turtles. In the Hawaii deep-set and American Samoa longline fisheries, which have partial observer coverage, total interactions are extrapolated by PIFSC at the trip level as opposed to individual sets or interaction dates using vessels arrival date.

In 2006 and 2019, the shallow-set longline fishery closed in March, and in 2018 the fishery closed in May (see Section 3.3.1.3.2, this report). Due to these early closures in first and second quarters, data for these years are not representative of typical fishing years and should be interpreted with caution.

#### 3.3.1.3 SEA TURTLE INTERACTIONS IN THE HAWAII SHALLOW-SET LONGLINE FISHERY

Table 48 summarizes the sea turtle interaction data based on interaction date to allow comparison with the hard caps. The incidental take data in this section were compiled from unpublished observer data and are for monitoring purposes. Since there is full observer coverage for this fishery, all sea turtle interactions have been documented. Many of these interactions have been examined further by PIFSC, and updated information necessary for any data analyses is available from PIFSC. The incidental take data for the fourth quarter of 2007 were combined with 2008 data due to vessel confidentiality rules.

Nearly all sea turtles observed in the Hawaii shallow-set longline fishery from 2004 to 2024 (Table 48) were released alive, with the exception of four total loggerhead turtles released dead in 2018, 2020, and 2023, and one olive ridley turtle released dead in 2019. Additionally, one loggerhead in 2013 was entangled in marine debris that was entangled with fishing gear and NMFS did not count this turtle towards the annual shallow-set interaction limit. Unidentified hardshell turtles are classified by NMFS as loggerheads per protocol and count towards the annual shallow-set interaction limit or individual trip limit for loggerheads. The highest

[4] https://www.fisheries.noaa.gov/resource/data/pacific-islands-longline-quarterly-and-annual-reports

interaction rates involved both leatherback and loggerhead turtles, whereas interactions with greens, olive ridleys, and unidentified hard-shell turtles were much less frequent.

The observed number of sea turtle takes per year has been variable for green, olive ridley, leatherback, and unidentified hard shell turtles. Higher numbers of interactions with loggerhead turtles were observed starting in late 2017. In total, 21, 33, and 20 loggerhead turtles were observed in 2017, 2018, 2019, respectively, based on interaction date summary (Table 48) The fishery was closed May-December 2018 due to a stipulated settlement, and March-December 2019 due to reaching the loggerhead hard cap, thus interaction rate data for these years are not directly comparable to other years in which the fishery operated throughout the year. Loggerhead turtle interactions in 2020 were lower than the previous three years, although shallow-set effort in 2020 was not reflective of a typical fishing year due to 1) the shallow-set vessels voluntarily reducing effort in the first quarter after majority of the 2020 loggerhead turtle interactions were observed in January; and 2) impacts from the COVID-19 pandemic especially in second quarter. Observed loggerhead turtle interactions in 2021 and 2022 returned to 2017-2019 levels with 19 and 24 interactions respectively. Observed number of loggerhead turtle interactions in 2024 was lower than in 2023, which had the highest (48) since the reopening of the fishery in 2004.

Additional discussion regarding the higher number of loggerhead turtle interactions observed since 2017, as well as the outcome of a Pelagic Plan Team Working Group review of the trip limit measure in 2024, are provided in Section 3.3.1.3.2, and a summary of an analysis evaluating the experimental oceanographic TurtleWatch product is provided in Section 4.1.

Table 48. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for sea turtles in the Hawaii shallow-set longline fishery based on interaction date for comparison with the shallow-set sea turtle hard caps, 2004-2024[a]

| Year | Observer Coverage (%) | Sets | Hooks | Green | | Leatherback | | Loggerhead | | Olive ridley | | Unidentified hard shell | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Takes | Takes/ 1,000 hooks | Takes | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes | Takes/1,000 hooks |
| 2004 | 100 | 135 | 115,718 | 0 | 0.000 | 1 | 0.009 | 1 | 0.009 | 0 | 0.000 | 0 | 0.000 |
| 2005 | 100 | 1,646 | 1,358,247 | 0 | 0.000 | 8 | 0.006 | 12[b] | 0.009 | 0 | 0.000 | 0 | 0.000 |
| 2006 | 100 | 850 | 676,716 | 0 | 0.000 | 2 | 0.003 | 15[b] | 0.022 | 0 | 0.000 | 2[c, g] | 0.003 |
| 2007[d] | 100 | 1,569 | 1,353,761 | 0 | 0.000 | 5 | 0.004 | 15 | 0.011 | 1 | 0.001 | 0 | 0.000 |
| 2008 | 100 | 1,595 | 1,460,042 | 1 | 0.001 | 2 | 0.001 | 0 | 0.000 | 2 | 0.001 | 0 | 0.000 |
| 2009 | 100 | 1,761 | 1,694,550 | 1 | 0.001 | 9 | 0.005 | 3 | 0.002 | 0 | 0.000 | 0 | 0.000 |
| 2010 | 100 | 1,872 | 1,835,182 | 0 | 0.000 | 8 | 0.004 | 7 | 0.004 | 0 | 0.000 | 0 | 0.000 |
| 2011 | 100 | 1,474 | 1,505,467 | 4 | 0.003 | 16 | 0.011 | 12 | 0.008 | 0 | 0.000 | 0 | 0.000 |
| 2012 | 100 | 1,364 | 1,476,969 | 0 | 0.000 | 7[e] | 0.005 | 6 | 0.004 | 0 | 0.000 | 0 | 0.000 |
| 2013 | 100 | 962 | 1,074,909 | 0 | 0.000 | 11 | 0.009 | 6[f] | 0.006 | 0 | 0.000 | 1[g] | 0.001 |
| 2014 | 100 | 1,338 | 1,470,683 | 1 | 0.001 | 16 | 0.011 | 14 | 0.010 | 1 | 0.001 | 1 | 0.001 |
| 2015 | 100 | 1,156 | 1,274,805 | 0 | 0.000 | 5 | 0.004 | 13 | 0.011 | 1 | 0.001 | 0 | 0.000 |
| 2016 | 100 | 727 | 796,165 | 0 | 0.000 | 5 | 0.006 | 15 | 0.019 | 0 | 0.000 | 0 | 0.000 |
| 2017 | 100 | 1,005 | 1,083,216 | 2 | 0.002 | 4 | 0.004 | 21(1) | 0.019 | 4 | 0.004 | 0 | 0.000 |
| 2018 | 100 | 420 | 486,013 | 1 | 0.002 | 6 | 0.012 | 33(1) | 0.068 | 1 | 0.002 | 0 | 0.000 |
| 2019 | 100 | 314 | 374,487 | 0 | 0.000 | 0 | 0.000 | 20 | 0.053 | 2(1) | 0.005 | 0 | 0.000 |
| 2020 | 100 | 479 | 624,579 | 0 | 0.000 | 2 | 0.003 | 15(1) | 0.024 | 0 | 0.000 | 0 | 0.000 |
| 2021 | 100 | 804 | 1,026,373 | 1 | 0.001 | 3 | 0.003 | 19 | 0.019 | 2 | 0.002 | 1 | 0.001 |
| 2022 | 100 | 971 | 1,242,997 | 0 | 0.000 | 11 | 0.009 | 24 | 0.019 | 2 | 0.002 | 0 | 0.000 |
| 2023 | 100 | 909 | 1,139,864 | 0 | 0.000 | 11 | 0.010 | 48(1) | 0.042 | 2 | 0.002 | 1[g] | 0.001 |
| 2024 | 100 | 875 | 1,170,372 | 0 | 0.000 | 8 | 0.007 | 37 | 0.032 | 2 | 0.002 | 0 | 0.001 |

[a] Take data based on interaction dates. Set and hook data based on haul begin date as a proxy for interaction date.
[b] The released conditions of one loggerhead was unknown.
[c] The released condition of one unidentified hard shell turtle was unknown.
[d] Due to vessel confidentiality rules, data for the fourth quarter in 2007 are combined with data for 2008. Take data for 2007 reflect those from first, second and third quarters.
[e] The released condition of one leatherback was unknown.
[f] One injured loggerhead was entangled in marine debris, which became entangled with fishing gear. This loggerhead will not count toward the annual shallow-set interaction limit but is included in this table.
[g] Turtles listed as an unidentified hard shell sea turtle in the Observer Program Status Report are classified as a loggerhead per protocol for the shallow-set interaction limit and count toward the annual shallow-set limit or individual trip limit.
Sources: PIRO Sustainable Fisheries Division unpublished data.

#### 3.3.1.3.1 Comparison of Interactions with ITS

Due to a fishery closure in March 2019, the Hawaii shallow-set longline fishery in 2019 operated solely under the ITSs in the 2012 Biological Opinion (NMFS 2012). The ITS from the June 26, 2019 Biological Opinion took effect in January 2020 when the fishery reopened.

Under the 2019 Biological Opinion, NMFS will monitor the ITSs for the Hawaii shallow-set longline fishery annually starting in January 2020 to track incidental take. NMFS uses the date of the interaction for tracking sea turtle interactions against the ITS (Table 49), regardless of when the vessel returns to port. NMFS uses the post-hooking mortality criteria (Ryder et al. 2006) to estimate sea turtle mortality rates. Total mortality estimates are rounded to the nearest integer.

The ITS for loggerhead sea turtles were exceeded in 2023. On October 27, 2023, NMFS reinitiated ESA Section 7 consultation for the shallow-set longline fishery due to exceedance of the ITS of 36 loggerhead sea turtles in the 2019 Biological Opinion and determined that the conduct of the fishery during the period of the consultation will not violate ESA Sections 7(a)(2) and 7(d). On March 12, 2024, NMFS issued a Supplemental Biological Opinion for loggerhead sea turtles, which concluded that the shallow-set longline fishery is not likely to jeopardize species. The new ITS for loggerhead sea turtles took effect when the Supplemental Biological Opinion was signed in 2024.

The 2019 Biological Opinion remains valid for all other species, and no ITS was exceeded in 2024.

Table 49. Observed interactions and estimated total mortality (M)[a] (using Ryder et al. 2006) of sea turtles in the Hawaii shallow-set longline fishery compared to the 1-year ITS in the 2019 Biological Opinion[b] and the 5-year ITS in the 2024 Supplemental Biological Opinion for Loggerhead Sea Turtles

| Species | 1-Year ITS Interactions (M) | 5-Year ITS Interactions (M) | Interactions (M) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 2020 | 2021 | 2022 | 2023 | 2024 |
| Green turtle | 5(1) | - | 0(0) | 1(0) | 0(0) | 1(0) | 0(0) |
| Leatherback turtle | 21(3) | - | 2(1) | 3(1) | 11(3) | 11(3) | 8(2) |
| Olive ridley turtle | 5(1) | - | 0(0) | 2(0) | 2(0) | 2(0) | 2(0) |
| Loggerhead turtle (North Pacific DPS) | - | 135 | 15(2) | 20(4)[c] | 24(4) | 49(10)[c] | 37(6) |

[a] Mortality estimates are round to the nearest whole number.
[b] Takes are counted based on interaction date.
[c] Includes one unidentified hardshell turtle

#### 3.3.1.3.2 Effectiveness of FEP Conservation Measures

Management measures in the Hawaii shallow-set longline fishery have been effective in reducing the number of sea turtle interactions. The introduction of sea turtle bycatch reduction measures for the fishery in 2004, such as switching from J-hooks to circle hooks, and from squid bait to mackerel bait, resulted in an 89% decrease in sea turtle interactions in 2004-2006 compared to interactions observed in 1994 through 2002 (Gilman et al. 2007). Swimmer et al. (2017) found similar reductions of 84% and 95% for leatherback and loggerhead turtle interactions respectively for data through 2014. The rate of deeply hooked sea turtles, which is thought to

result in higher mortality levels, also declined after those measures were implemented (Gilman et al. 2007).

From 2012 to 2018, the fishery did not reach the annual hard cap for either leatherback or loggerhead turtles (26 and 34, respectively, based on the 2012 Biological Opinion ITSs). The Hawaii shallow-set longline fishery was closed in May 2018 pursuant to a settlement agreement. At the time of the closure, the fishery had 33 loggerhead interactions (Table 48), thus the fishery was closed prior to reaching the annual hard cap limit of 34 turtles. From 2004 to 2012, the shallow-set fishery operated under hard caps of 17 loggerhead turtles and 16 leatherback turtles (except in 2010 when the loggerhead hard cap was 46 under Pelagic FEP Amendment 18; later returned to 17 loggerheads due to litigation). The fishery reached the loggerhead hard cap in 2006 and the leatherback hard cap in 2011 (Table 48). Due to the 2018 stipulated settlement agreement, the hard cap limit of 17 loggerhead turtles was reinstated based on the 2004 Biological Opinion when the fishery reopened on January 1, 2019, and remained in place until September 17, 2020. In 2019, the fishery closed on March 19 due to reaching the loggerhead hard cap limit of 17[5], and the fishery reopened on January 1, 2020.

In 2017–2019, loggerhead turtle interactions in the Hawaii shallow-set longline fishery were higher than levels previously observed since the fishery reopened in 2004. A total of 21 loggerhead interactions were observed in 2017, 33 loggerhead interactions observed from January 2018 to the fishery closure in May, and 20 loggerhead interactions observed from January 2019 to the fishery closure in March. The increase in loggerhead interactions may be explained by the high reproductive output at their source nesting beaches in Japan. Loggerhead turtle nest counts increased nearly an order of magnitude from 1997 to 2014. The high levels of nesting likely resulted in higher hatchling production. Most of the loggerhead turtles observed interacting with the Hawaii shallow-set longline fishery in 2017 and 2018 were in the range of 40 to 60 cm straight carapace length, which is estimated to be approximately 3 to 10 years in age and consistent with the period of high nesting in Japan.

In response to the higher number of loggerhead turtle interactions in the shallow-set fishery, the Council in 2018 developed management measures to provide managers and fishery participants with the necessary tools to respond to and mitigate fluctuations in loggerhead and leatherback turtle interactions, and to ensure a continued supply of fresh swordfish to U.S. markets, consistent with the conservation needs of these sea turtles. At its 179th Meeting in August 2019, the Council took final action to amend the Pelagic FEP to modify sea turtle mitigation measures for the shallow-set fishery, incorporating provisions required under the 2019 Biological Opinion Reasonable and Prudent Measures (RPMs) and Terms and Conditions 1a and 1b. Specifically, the Council recommended 1) setting an annual fleet-wide hard cap limit on the number of leatherback turtle interactions at 16, consistent with RPMs and Terms and Conditions 1a under the 2019 Biological Opinion; 2) not setting an annual fleet-wide hard cap limit on the number of North Pacific loggerhead turtle interactions; and 3) establishing individual trip interaction limits for loggerhead and leatherback turtles for the shallow-set fishery, consistent with RPMs and Terms and Conditions 1b under the 2019 Biological Opinion. NMFS published the Notice of Availability for Amendment 10 on January 23, 2020 (85 FR 3889) and the proposed rule on February 4, 2020 (85 FR 6131). Amendment 10 became effective on April 22, 2020, and the

[5] The actual observed number of interactions for 2019 was 20 loggerhead turtles due to the fishery having multiple observed interactions on the day the hard cap was reached.

regulations implementing the amendment became effective on September 17, 2020 (85 FR 57988).

As part of the final action for Amendment 10, the Council recommended an annual review of the fishery's performance under the trip interaction limits in the Annual SAFE Report. Table 50 shows the distribution of the shallow-set vessels' interactions with loggerhead and leatherback turtle interactions from January 1 – December 31, 2024. The current limits are five loggerhead turtle interactions per trip or two leatherback turtle interactions per trip. In 2024, no trips reached the leatherback or the loggerhead trip limit.

Recognizing the relatively high turtle catch in 2023, the Pelagic Plan Team at its May 2023 meeting formed a working group to initiate a detailed review of fishery performance under the loggerhead and leatherback turtle trip interaction limits. The Working Group provided its report to the Pelagic Plan Team and other advisory groups at their May 2024 meetings, and to the Council in June 2024. Loggerhead turtle interactions appear to have increased following the removal of the hard cap, but the Working Group's analysis indicate there is no statistical difference in the interactions before and after the measure change, in part due to the fishery closures in 2018 and 2019. The Working Group's analysis also looked at fisher behavior, but there is no significant difference in the distance that the SSLL vessels move after they had a turtle encounter, although there is some indication that the vessels may make bigger moves after the fourth loggerhead interaction. There were also no significant differences with the leatherback turtle interactions before and after the measure. The Working Group concluded that additional years of monitoring is warranted before the Council considers any revisions to the trip limits.

Table 50. Number of shallow-set longline trips by the number of loggerhead and leatherback turtle interactions per trip, January 1 – December 31, 2024. The total number of trips in this period was 54.

| Loggerhead turtles | | Leatherback turtles | |
|---|---|---|---|
| Number of turtles per trip | Number of trips[a] | Number of turtles per trip | Number of trips |
| 0 | 29 | 0 | 46 |
| 1 | 17 | 1 | 8 |
| 2 | 5 | ≥2 | 0 |
| 3 | 2 | -- | -- |
| 4 | 1 | -- | -- |

[a] Number of trips based on haul begin date.

### 3.3.1.4 MARINE MAMMAL INTERACTIONS IN THE HAWAII SHALLOW-SET LONGLINE FISHERY

Table 51 through Table 55 summarize the incidental take data of marine mammals from 2004 to 2024 in the Hawaii shallow-set longline fishery. Since there is full observer coverage for this fishery, all marine mammal interactions are documented. The incidental take data in this section were compiled from the PIRO Observer Program Annual Status Reports and are for monitoring purposes. Reported interactions listed in these tables reflect all observed interactions, including mortalities, serious injuries, and non-serious injuries. Refer to the most recent SARs for mortality and serious injury estimates and stock-specific estimates of interactions. Many of these interactions have been further examined by NMFS, and updated information necessary for any data analyses is available from PIFSC. The incidental take data for the fourth quarter of 2007 were combined with 2008 data due to vessel confidentiality rules.

The majority of observed cetacean interactions and all mortalities during this time period involved small dolphin species (Table 51). Of these species, Risso's dolphins had the highest rate of interactions over time, followed by bottlenose dolphins, striped dolphins, common dolphins, and rough-toothed dolphins with a single take. In 2023, a spotted dolphin was recorded observed in the fishery for the first time and in 2024, a Cuvier's beaked whale was recorded observed for the first time. Marine mammals grouped as small whales (Table 52) and large whales (Table 53) had comparatively lower rates of interactions than most small dolphin species. Small and large whales with observed interactions since 2004 include false killer whale, Blainville's beaked whale, unidentified *Kogia* species, ginkgo-tooth beaked whale, Bryde's whale, humpback whale, and fin whale. Observed interactions with unidentified cetaceans are shown in Table 54.

Interactions with pinnipeds, including Northern elephant seals, Guadalupe fur seals, and unidentified pinniped species have been occasionally observed since 2013 (Table 55). All pinniped interactions were observed outside of the EEZ off of California, while fishing under the Hawaii longline limited entry permit. No pinniped interactions were observed in 2016, 2018, 2021, 2023, and 2024.

Most of the pinniped interactions to date have occurred in the fourth quarter in areas east of 130 degrees west. Effort in this quarter has increased since 2012, which likely partially explains the increase in pinniped interactions. However, demographic and oceanographic influences may also be playing a role in the increase in interactions, particularly for Guadalupe fur seals. The rebound of this species from near extinction has resulted in an increase in both the overall number of seals and their spatial extent, as they reoccupy the northern portion of their historic migration range (D'Agnese et al. 2020). Further, foraging studies have indicated that during anomalous warming events in the northeastern Pacific, such as those that occurred between 2014 and 2016, Guadalupe fur seals expand their foraging areas to the north and offshore (Amador-Capitanachi et al. 2020). These conditions may have also precipitated the Unusual Mortality Event, which has involved the stranding of over 700 predominantly young Guadalupe fur seals along the US West Coast between 2015 and 2021.[6] Although the marine heatwave of 2014-2016 was the largest and longest on record since monitoring began in 1982, large marine heatwaves have occurred each year since 2019.[7] The occurrence of Guadalupe fur seal interactions in 2015-2017, 2020, and 2022 is thus not surprising. In 2018, 2021, 2023 and 2024, there was limited fishing effort east of 130 degrees west and no pinniped interactions, suggesting a dynamic relationship between oceanographic conditions and fishing effort is likely driving pinniped interactions in this fishery.

[6] https://www.fisheries.noaa.gov/national/marine-life-distress/2015-2021-guadalupe-fur-seal-unusual-mortality-event-california

[7] https://www.integratedecosystemassessment.noaa.gov/california-current-marine-heatwave-tracker-blobtracker

Table 51. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for dolphins in the Hawaii shallow-set longline fishery, 2004-2024[a]

| Year | Observer Coverage (%) | Sets | Hooks | Bottlenose dolphin | | Risso's dolphin | | Rough-toothed dolphin | | Short-beaked common dolphin | | Striped dolphin | | Pantropical spotted dolphin | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks |
| 2004 | 100 | 135 | 115,718 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2005 | 100 | 1,646 | 1,358,247 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2006 | 100 | 850 | 676,716 | 1 | 0.001 | 2(1) | 0.003 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2007[b] | 100 | 1,569 | 1,353,761 | 3 | 0.002 | 3 | 0.002 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2008 | 100 | 1,595 | 1,460,042 | 0 | 0.000 | 5(1) | 0.003 | 0 | 0.000 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |
| 2009 | 100 | 1,761 | 1,694,550 | 0 | 0.000 | 3(1) | 0.002 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2010 | 100 | 1,872 | 1,835,182 | 3 | 0.002 | 7 | 0.004 | 0 | 0.000 | 0 | 0.000 | 2(1) | 0.001 | 0 | 0.000 |
| 2011 | 100 | 1,474 | 1,505,467 | 1 | 0.001 | 3 | 0.002 | 0 | 0.000 | 1[c] | 0.001 | 0 | 0.000 | 0 | 0.000 |
| 2012 | 100 | 1,364 | 1,476,969 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |
| 2013 | 100 | 962 | 1,074,909 | 2(1) | 0.002 | 4 | 0.004 | 1(1) | 0.001 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2014 | 100 | 1,338 | 1,470,683 | 4 | 0.003 | 5(2) | 0.003 | 0 | 0.000 | 1 | 0.001 | 2 | 0.001 | 0 | 0.000 |
| 2015 | 100 | 1,156 | 1,274,805 | 2 | 0.002 | 3(2) | 0.002 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2016 | 100 | 727 | 796,165 | 1 | 0.001 | 2 | 0.003 | 0 | 0.000 | 0 | 0.000 | 2 | 0.003 | 0 | 0.000 |
| 2017 | 100 | 1,005 | 1,083,216 | 0 | 0.000 | 3 | 0.003 | 0 | 0.000 | 0 | 0.000 | 0 | 0.001 | 0 | 0.000 |
| 2018 | 100 | 420 | 486,013 | 1 | 0.002 | 1 | 0.002 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2019 | 100 | 314 | 374,487 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2020 | 100 | 479 | 624,579 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2021 | 100 | 804 | 1,026,373 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2022 | 100 | 971 | 1,242,997 | 1 | 0.001 | 2 | 0.002 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2023 | 100 | 909 | 1,139,864 | 2(1) | 0.002 | 2(1) | 0.002 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 1 | 0.001 |
| 2024 | 100 | 875 | 1,170,372 | 1 | 0.001 | 3[d] | 0.003 | 0 | 0.000 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |

[a] Take data based on interaction dates. Set and hook data based on haul begin date as a proxy for interaction date.
[b] Due to vessel confidentiality rules, data for the fourth quarter in 2007 are combined with data for 2008. Take data for 2007 reflect those from first, second and third quarters.
[c] Animal is identified as only a common dolphin in the Observer Program Status Report.
[d] One of the three observed Risso's dolphin was accompanied by a dependent calf, which will be counted as an additional take for purposes of estimating MSI in the SAR.
Source: 2004-2020 PIRO Observer Program Annual and Quarterly Status Reports, PIRO Sustainable Fisheries Division unpublished data.

Table 52. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for small whales in the Hawaii shallow-set longline fishery, 2004-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Blainville's beaked whale | | False killer whale | | *Kogia* spp. | | Cuvier's Beaked Whale | | Ginkgo-toothed beaked whale | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks |
| 2004 | 100 | 135 | 115,718 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2005 | 100 | 1,646 | 1,358,247 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2006 | 100 | 850 | 676,716 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2007[b] | 100 | 1,569 | 1,353,761 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2008 | 100 | 1,595 | 1,460,042 | 0 | 0.000 | 1 | 0.001 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 |
| 2009 | 100 | 1,761 | 1,694,550 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2010 | 100 | 1,872 | 1,835,182 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2011 | 100 | 1,474 | 1,505,467 | 1 | 0.001 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2012 | 100 | 1,364 | 1,476,969 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2013 | 100 | 962 | 1,074,909 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2014 | 100 | 1,338 | 1,470,683 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 1 | 0.001 |
| 2015 | 100 | 1,156 | 1,274,805 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2016 | 100 | 727 | 796,165 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2017 | 100 | 1,005 | 1,083,216 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2018 | 100 | 420 | 486,013 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2019 | 100 | 314 | 374,487 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2020 | 100 | 479 | 624,579 | 0 | 0.000 | 1 | 0.002 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2021 | 100 | 804 | 1,026,373 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2022 | 100 | 971 | 1,242,997 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2023 | 100 | 909 | 1,139,864 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2024 | 100 | 875 | 1,170,372 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |

[a] Take data based on interaction dates. Set and hook data based on haul begin date as a proxy for interaction date.
[b] Due to vessel confidentiality rules, data for the fourth quarter in 2007 are combined with data for 2008. Take data for 2007 reflect those from first, second and third quarters. Source: 2004-2020 PIRO Observer Program Annual and Quarterly Status Reports; PIRO Sustainable Fisheries Division unpublished data.

Table 53. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for large whales in the Hawaii shallow-set longline fishery, 2004-2024[a]

| Year | Observer Coverage (%) | Sets | Hooks | Bryde's whale | | Humpback whale | | Fin whale | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Takes (M) | Takes/1,000 hooks | Takes (M) | Takes/1,000 hooks | Takes (M) | Takes/1,000 hooks |
| 2004 | 100 | 135 | 115,718 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2005 | 100 | 1,646 | 1,358,247 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 |
| 2006 | 100 | 850 | 676,716 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |
| 2007[b] | 100 | 1,569 | 1,353,761 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2008 | 100 | 1,595 | 1,460,042 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |
| 2009 | 100 | 1,761 | 1,694,550 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2010 | 100 | 1,872 | 1,835,182 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2011 | 100 | 1,474 | 1,505,467 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |
| 2012 | 100 | 1,364 | 1,476,969 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2013 | 100 | 962 | 1,074,909 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2014 | 100 | 1,338 | 1,470,683 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2015 | 100 | 1,156 | 1,274,805 | 0 | 0.000 | 1 | 0.001 | 1 | 0.001 |
| 2016 | 100 | 727 | 796,165 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2017 | 100 | 1,005 | 1,083,216 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2018 | 100 | 420 | 486,013 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2019 | 100 | 314 | 374,487 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2020 | 100 | 479 | 624,579 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2021 | 100 | 804 | 1,026,373 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2022 | 100 | 971 | 1,242,997 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2023 | 100 | 909 | 1,139,864 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2024 | 100 | 875 | 1,170,372 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |

[a] Take data based on interaction dates. Set and hook data based on haul begin date as a proxy for interaction date.

[b] Due to vessel confidentiality rules, data for the fourth quarter in 2007 are combined with data for 2008. Take data for 2007 reflect those from first, second and third quarters.

Source: 2004-2020 PIRO Observer Program Annual and Quarterly Status Reports; PIRO Sustainable Fisheries Division unpublished data.

Table 54. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for unidentified dolphins, beaked whales, and cetaceans in the Hawaii shallow-set longline fishery, 2004-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Unidentified dolphin[b] | | Unidentified beaked whale | | Unidentified cetacean[b] | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks |
| 2004 | 100 | 135 | 115,718 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2005 | 100 | 1,646 | 1,358,247 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2006 | 100 | 850 | 676,716 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2007[c] | 100 | 1,569 | 1,353,761 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2008 | 100 | 1,595 | 1,460,042 | 0 | 0.000 | 0 | 0.000 | 2 | 0.001 |
| 2009 | 100 | 1,761 | 1,694,550 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2010 | 100 | 1,872 | 1,835,182 | 1 | 0.001 | 0 | 0.000 | 1 | 0.001 |
| 2011 | 100 | 1,474 | 1,505,467 | 0 | 0.000 | 1 | 0.001 | 1 | 0.001 |
| 2012 | 100 | 1,364 | 1,476,969 | 0 | 0.000 | 0 | 0.000 | 1 | 0.001 |
| 2013 | 100 | 962 | 1,074,909 | 0 | 0.000 | 2 | 0.002 | 0 | 0.000 |
| 2014 | 100 | 1,338 | 1,470,683 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2015 | 100 | 1,156 | 1,274,805 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2016 | 100 | 727 | 796,165 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2017 | 100 | 1,005 | 1,083,216 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2018 | 100 | 420 | 486,013 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2019 | 100 | 314 | 374,487 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2020 | 100 | 479 | 624,579 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2021 | 100 | 804 | 1,026,373 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |
| 2022 | 100 | 971 | 1,242,997 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 |
| 2023 | 100 | 909 | 1,139,864 | 0 | 0.000 | 1 | 0.001 | 1 | 0.001 |
| 2024 | 100 | 875 | 1,170,372 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |

[a] Take data based on interaction dates. Set and hook data based on haul begin date as a proxy for interaction date.

[b] Unidentified species identification based on PIRO Observer Program classifications. Unidentified cetacean refers to a marine mammal not including pinnipeds (seal or sea lion), and for the purpose of this table, includes animals coded as unidentified whales; unidentified dolphin refers to a small cetacean with a visible beak; and unidentified beaked whale refers to an animal in the Ziphiidae family. Further classifications based on observer description, sketches, photos, and videos may be available from the PIFSC.

[c] Due to vessel confidentiality rules, data for the fourth quarter in 2007 are combined with data for 2008. Take data for 2007 reflect those from first, second and third quarters.

Source: 2004-2020 PIRO Observer Program Annual and Quarterly Status Reports; PIRO Sustainable Fisheries Division unpublished data.

Table 55. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for pinnipeds in the Hawaii shallow-set longline fishery, 2004-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Northern elephant seal | | Guadalupe fur seal | | Unidentified pinniped | | Unidentified sea lion | | Unidentified seal | | Unidentified fur seal | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks |
| 2004 | 100 | 135 | 115,718 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2005 | 100 | 1,646 | 1,358,247 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2006 | 100 | 850 | 676,716 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2007[b] | 100 | 1,569 | 1,353,761 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2008 | 100 | 1,595 | 1,460,042 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2009 | 100 | 1,761 | 1,694,550 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2010 | 100 | 1,872 | 1,835,182 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2011 | 100 | 1,474 | 1,505,467 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2012 | 100 | 1,364 | 1,476,969 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2013 | 100 | 962 | 1,074,909 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2014 | 100 | 1,338 | 1,470,683 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 |
| 2015 | 100 | 1,156 | 1,274,805 | 0 | 0.000 | 1 | 0.001 | 3[c] | 0.002 | 2[c] | 0.002 | 0 | 0.000 | 0 | 0.000 |
| 2016 | 100 | 727 | 796,165 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2017 | 100 | 1,005 | 1,083,216 | 0 | 0.000 | 3[c] | 0.003 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2018 | 100 | 420 | 486,013 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2019 | 100 | 314 | 374,487 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 1 | 0.003 | 0 | 0.000 |
| 2020 | 100 | 479 | 624,579 | 0 | 0.000 | 7 | 0.011 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 2 | 0.003 |
| 2021 | 100 | 804 | 1,026,373 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2022 | 100 | 971 | 1,242,997 | 0 | 0.000 | 2(1) | 0.002 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2023 | 100 | 909 | 1,139,864 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |
| 2024 | 100 | 875 | 1,170,372 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 |

[a] Take data based on interaction dates. Set and hook data based on haul begin date as a proxy for interaction date.
[b] Due to vessel confidentiality rules, data for the fourth quarter in 2007 are combined with data for 2008. Take data for 2007 reflect those from first, second and third quarters.
[c] The interactions with these pinnipeds and sea lions occurred off the California coast, outside the EEZ, while fishing under the Hawaii Longline Permit.
Source: 2004-2020 PIRO Observer Program Annual and Quarterly Status Reports; PIRO Sustainable Fisheries Division unpublished data.

#### 3.3.1.4.1 Comparison of Interactions with ITS

The 2019 Biological Opinion includes a 1-year ITS of 11 interactions and 9 mortalities with the Guadalupe fur seal. NMFS will monitor the ITSs for the Hawaii shallow-set longline fishery annually starting in January 2020 to track incidental take. NMFS uses the date of the interaction for tracking pinniped interactions against the ITS (Table 56) regardless of when the vessel returns to port. Prior to 2021, NMFS counted interactions based on vessel arrival dates in the PIRO Observer Program Quarterly and Annual Reports. For this reason, the number of annual interactions counted against an ITS may vary from those reported on the Observer Program's quarterly and annual reports. For the purpose of ITS tracking, NMFS uses the mortality rate estimate of 0.80 from the 2019 Biological Opinion to estimate the Guadalupe fur seal mortalities.

Table 56. Observed interactions and estimated total mortalities (M) of Guadalupe fur seals in the Hawaii shallow-set longline fishery compared to the 1-year ITS in the 2019 Biological Opinion[a]

| Species | 1-Year ITS Interactions (M) | Interactions (M) | | | | |
|---|---|---|---|---|---|---|
| | | 2020 | 2021 | 2022 | 2023 | 2024 |
| Guadalupe fur seal | 11(9) | 7(6) | 0(0) | 2(2) | 0(0) | 0(0) |
| *Unidentified fur seal*[b] | N/A | 2(2) | 0(0) | 0(0) | 0(0) | 0(0) |
| *Unidentified pinniped* | N/A | 0(0) | 0(0) | 1(1) | 0(0) | 0(0) |

[a] Takes are counted based on interaction date.
[b] Unidentified fur seal interactions are also tracked as the ITS was based on interaction data that included unidentified pinniped species that may have been Guadalupe fur seals.

#### 3.3.1.4.2 Comparison of Interactions with PBR under the MMPA

Marine mammal takes against the PBR are monitored through the SARs. A summary of the current mean annual M&SI and the PBR for stocks relevant to the Hawaii shallow-set longline fishery is presented in Table 57. The PBR of a stock reflects only marine mammals of that stock observed within the EEZ around Hawaii, with the exception of the Hawaii stock of humpback whales and Guadalupe fur seals for which PBR applies to the entire stock. The mean annual M&SI specified in the SARs includes only interactions determined as mortalities and serious injuries; it does not include interactions classified as non-serious injuries.

For marine mammal stocks where the PBR is available, the mean annual M&SI for the shallow-set longline fishery inside the EEZ around Hawaii is well below the corresponding PBR in the time period covered by the current SAR (Table 57).

Table 57. Summary of mean annual mortality and serious injury (M&SI) and potential biological removal (PBR) by marine mammal stocks with observed interactions in the Hawaii shallow-set longline fishery

| Stock | Years Included in 2023 SAR | Outside EEZ[a] | Inside EEZ | |
|---|---|---|---|---|
| | | Mean Annual M&SI | Mean Annual M&SI | PBR (Inside EEZ only)[c] |
| Bottlenose dolphin, HI Pelagic | 2017-2021 | 1 | 0 | 158 |
| Risso's dolphin, HI | 2017-2021 | 0.8 | 0 | 53 |
| Rough-toothed dolphin, HI | 2017-2021 | 0 | 0 | 511 |
| Striped dolphin, HI | 2017-2021 | 0.2 | 0 | 511 |
| Pantropical spotted dolphin, HI Pelagic | 2017-2021 | N/A | N/A | 538 |
| Blainville's beaked whale, HI | 2014-2018 | 0 | 0 | 5.6 |
| False killer whale, HI Pelagic | 2017-2021 | 0 | 0.2 | 15 |
| Short-finned pilot whale, HI | 2017-2021 | 0 | 0 | 159 |
| *Kogia* spp. whale (Pygmy or dwarf sperm whale), HI | 2014-2018 | Pygmy = 0<br>Dwarf = 0 | Pygmy = 0<br>Dwarf = 0 | Pygmy = 257<br>Dwarf = undetermined |
| Humpback whale, HI | 2016-2020 | 0 | | 127[b] |
| Fin whale, HI | 2014-2018 | 0 | 0 | 0.2 |
| Guadalupe fur seal, CA | 2013-2017 | 0.4 | | 1,062[b] |

[a] PBR estimates are not available for portions of the stock outside of the U.S EEZ around Hawaii, except for the Central North Pacific stock of humpback whales for which PBR applies to the entire stock.
[b] PBR and M&SI for the Hawaii stock for humpback whales and Guadalupe fur seals apply to the entire stock.
[c] PBR estimates for Hawaii stocks are only available for portions of the stock within the U.S. EEZ around Hawaii.
Source: Final 2023 Marine Mammal SARs.

### 3.3.1.5 SEABIRD INTERACTIONS IN THE HAWAII SHALLOW-SET LONGLINE FISHERY

Table 58 summarizes the incidental take data of seabirds from 2004 to 2024 in the Hawaii shallow-set longline fishery. Since there is full observer coverage for this fishery, the interactions in Table 58 represent fishery-wide totals.

Interaction data provided here may vary slightly from other sources depending on how interactions were reported (date of trip departure or arrival, set date, or haul date in any given year). The incidental take data in this section were compiled from the PIRO Observer Program Annual Status Reports and are for monitoring purposes. Many of these interactions have been further examined by NMFS, and updated information necessary for any data analyses is available from NMFS.

NMFS annually publishes the report Seabird Interactions and Mitigation Efforts in Hawaii Longline Fisheries (Seabird Annual Report), which includes verified numbers of seabird interactions and information on fishing regulations and effort, interaction rates, and band recovery data for seabirds caught in the shallow-set and deep-set fisheries. Recent reports are available at: https://www.fisheries.noaa.gov/pacific-islands/bycatch/seabird-interactions-pelagic-longline-fishery.

The majority of observed interactions and all mortalities during this time period involved Laysan albatrosses and black-footed albatrosses. The fishery has also had a small number of

interactions with shearwaters and a northern fulmar, all of which were released injured, and one interaction with an unidentified gull that was released dead. NMFS identified the shearwaters as sooty shearwaters (NMFS 2016). There have been no observed takes of short-tailed albatrosses by this fishery.

Table 58 shows an increase in takes of black-footed albatrosses 2008 through 2017. Black-footed albatross takes from 2018 to 2020 were lower, which may be explained by temporal patterns in interactions. In typical years, the majority of black-footed albatross interactions occur in the second quarter (April-June), but there was lower than average or no fishing effort in that quarter in 2018 through 2020. The shallow-set longline fishery was closed May-December 2018 and March-December 2019 and had limited effort in the second quarter in 2020 due to the COVID-19 pandemic. Laysan albatross interactions were also low in 2017-2018. Interaction rate data for 2018-2020 are therefore not directly comparable to other years in which the fishery operated throughout the year. In 2024, Laysan and black-footed albatross interactions were within the range of historical levels but the numbers include a total of 24 interactions (19 Laysan and 4 black-footed albatrosses) captured during the experimental study (see additional information below).

In the process of developing a regulatory amendment to modify seabird mitigation measures in the Hawaii deep-set longline fishery (see Section 3.3.2.5), the Council at the 185$^{th}$ meeting in March 2021 considered options for modifying the shallow-set longline fishery seabird mitigation measures. Based on input from its advisory bodies and industry representatives and because conditions differ in the shallow-set longline fishery as compared to the deep-set longline fishery, the Council recommended additional research under an Experimental Fishing Permit (EFP) and development of an appropriate combination of mitigation measures for the shallow-set longline fishery. The Council placed high priority on identifying a combination of mitigation measures that maintain effectiveness of seabird deterrence during dusk compared to the existing night-setting suite of measures, to provide operational flexibility in starting the setting operations before sunset. During 2024, a pilot study was conducted to test the efficacy of paired tori lines set prior to local sunset compared to night setting while using blue-dyed bait. The study was conducted under an EFP issued by NMFS to the Hawaii Longline Associated in March 2022. The results showed that albatross captures were significantly more likely to occur on partial daylight tori line sets compared to night setting with blue-dyed bait (Chaloupka et al. 2024). The Council at the 200$^{th}$ meeting in September 2024 subsequently recommended further research to inform revision of seabird mitigation measures in the shallow-set longline fishery, including experimental trials evaluating: a) night setting with and without blue-dyed bait; and b) experimental trials to evaluate the efficacy of hook-shielding devices to enable partial daytime setting.

#### 3.3.1.5.1 Comparison of Interactions with ITS

The short-tailed albatross ITS in the USFWS 2012 Biological Opinion for the Hawaii longline fishery is 1 incidental take every 5 years in the shallow-set fishery. Exceeding this number will lead to reinitiating consultation of the impact of this fishery on the species. Since there have been no observed takes of short-tailed albatrosses in the fishery, the ITS has not been exceeded as of the end of 2024.

Table 58. Observed takes, mortalities (M), and takes per fishing effort (1,000 hooks) for seabirds in the Hawaii shallow-set longline fishery, 2004-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Laysan Albatross | | Black-footed Albatross | | Northern fulmar | | Unidentified shearwater | | Unidentified gull | | Short-tailed Albatross |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks | Takes (M) |
| 2004 | 100 | 135 | 115,718 | 1 | 0.009 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2005 | 100 | 1,646 | 1,358,247 | 62(18) | 0.046 | 7(4) | 0.005 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2006 | 100 | 850 | 676,716 | 8(3) | 0.0112 | 3(3) | 0.004 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2007[b] | 100 | 1,569 | 1,353,761 | 40(6) | 0.030 | 8(2) | 0.006 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2008 | 100 | 1,595 | 1,460,042 | 33(11) | 0.023 | 6(4) | 0.004 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2009 | 100 | 1,761 | 1,694,550 | 81(17) | 0.048 | 30(7) | 0.018 | 0 | 0.000 | 1[c] | 0.001 | 0 | 0.000 | 0 |
| 2010 | 100 | 1,872 | 1,835,182 | 40(7) | 0.022 | 38(11) | 0.021 | 1 | 0.001 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2011 | 100 | 1,474 | 1,505,467 | 49(10) | 0.033 | 19(5) | 0.013 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2012 | 100 | 1,364 | 1,476,969 | 62(11) | 0.042 | 37(10) | 0.025 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2013 | 100 | 962 | 1,074,909 | 45(10) | 0.042 | 28(17) | 0.026 | 0 | 0.000 | 2[c] | 0.002 | 0 | 0.000 | 0 |
| 2014 | 100 | 1,338 | 1,470,683 | 39(2) | 0.027 | 32(14) | 0.022 | 0 | 0.000 | 1[c] | 0.001 | 0 | 0.000 | 0 |
| 2015 | 100 | 1,156 | 1,274,805 | 43(6) | 0.034 | 38(10) | 0.030 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2016 | 100 | 727 | 796,165 | 25(3) | 0.031 | 40(12) | 0.050 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2017 | 100 | 1,005 | 1,083,216 | 6(1) | 0.006 | 53(20) | 0.049 | 0 | 0.000 | 0 | 0.000 | 1(1) | 0.001 | 0 |
| 2018 | 100 | 420 | 486,013 | 2 | 0.004 | 7(2) | 0.014 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2019 | 100 | 314 | 374,487 | 15(3) | 0.040 | 19(5) | 0.051 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2020 | 100 | 479 | 624,579 | 26 | 0.042 | 5 | 0.008 | 1 | 0.002 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2021 | 100 | 804 | 1,026,373 | 10(1) | 0.010 | 45(11) | 0.044 | 0 | 0.000 | 2 | 0.002 | 0 | 0.000 | 0 |
| 2022 | 100 | 971 | 1,242,997 | 38(5) | 0.031 | 72(20) | 0.057 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2023 | 100 | 909 | 1,139,864 | 15(2) | 0.011 | 23(4) | 0.018 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |
| 2024[d] | 100 | 875 | 1,170,372 | 54(23) | 0.046 | 37(14) | 0.032 | 0 | 0.000 | 0 | 0.000 | 0 | 0.000 | 0 |

[a] Take and effort data are based on haul begin dates. [b] Due to vessel confidentiality rules, data for the fourth quarter in 2007 are combined with data for 2008. Take data for 2007 reflect those from first, second and third quarters.[c] These birds were later identified as sooty shearwaters in the NMFS Seabird Annual Report.
[d] Observed interactions for 2024 include albatross interactions that occurred during EFP study.
Source: 2004-2020 PIRO Observer Program Annual and Quarterly Status Reports; PIRO Sustainable Fisheries Division unpublished data.

### 3.3.1.6 ELASMOBRANCH INTERACTIONS IN THE HAWAII SHALLOW-SET LONGLINE FISHERY

Table 59 summarizes the incidental take data of ESA-listed elasmobranchs from 2004 to 2024 in the Hawaii shallow-set longline fishery.

Oceanic whitetip sharks constitute the majority of the interactions. Observed oceanic whitetip shark interactions were substantially lower in 2004, 2006, 2018, and 2019 likely due to fishery closures. Spatial distribution of shallow-set fishing effort primarily overlaps with oceanic whitetip shark distribution (south of 30°N) in the summer months (May-June). Most of the oceanic whitetip sharks that are caught in the shallow-set fishery are released alive. Interactions in 2022 were the highest observed since 2011. Although it is premature to derive any theories on the factors driving the higher interaction rates, one possibility is the potential for increased spatial overlap of oceanic whitetip habitat with fishing effort due to warming oceans. Higher interaction rates may also be the result of potential increases in population density in the region because of international management measures prohibiting retention of the species through IATTC since 2011 and WCPFC since 2013 (WCPFC measure implemented under U.S. regulations in 2015), but these require further investigation.

Giant manta ray interactions with this fishery are rare. There were no observed interactions with scalloped hammerheads in the shallow-set fishery since 2004. Furthermore, there have been no recorded or observed take of scalloped hammerhead sharks in the range of the Eastern Pacific DPS in the shallow-set fishery. Based on the known range and likely occurrence for the Eastern Pacific DPS, it is unlikely that these sharks occur in the area where shallow-set fishing occurs.

Table 59. Observed and estimated interactions with elasmobranchs in the Hawaii shallow-set longline fishery, 2004-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Scalloped hammerhead shark | | Oceanic whitetip shark | | Giant manta ray | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Takes (M[b]) | Takes/ 1,000 hooks | Takes (M[b]) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks |
| 2004 | 100 | 135 | 115,718 | 0 | 0.0000 | 3 | 0.0259 | 0 | 0.0000 |
| 2005 | 100 | 1,646 | 1,358,247 | 0 | 0.0000 | 348(32) | 0.2562 | 0 | 0.0000 |
| 2006 | 100 | 850 | 676,716 | 0 | 0.0000 | 1 | 0.0015 | 0 | 0.0000 |
| 2007 | 100 | 1,569 | 1,353,761 | 0 | 0.0000 | 98(7) | 0.0724 | 5(2) | 0.0037 |
| 2008 | 100 | 1,595 | 1,460,042 | 0 | 0.0000 | 48(8) | 0.0329 | 0 | 0.0000 |
| 2009 | 100 | 1,761 | 1,694,550 | 1(1) | 0.0006 | 53(13) | 0.0313 | 0 | 0.0000 |
| 2010 | 100 | 1,872 | 1,835,182 | 0 | 0.0000 | 90(17) | 0.0490 | 6 | 0.0033 |
| 2011 | 100 | 1,474 | 1,505,467 | 0 | 0.0000 | 78(9) | 0.0518 | 3(2) | 0.0020 |
| 2012 | 100 | 1,364 | 1,476,969 | 1(1) | 0.0007 | 24(2) | 0.0162 | 0 | 0.0000 |
| 2013 | 100 | 962 | 1,074,909 | 0 | 0.0000 | 27(2) | 0.0251 | 0 | 0.0000 |
| 2014 | 100 | 1,338 | 1,470,683 | 0 | 0.0000 | 21(3) | 0.0143 | 1 | 0.0007 |
| 2015 | 100 | 1,156 | 1,274,805 | 0 | 0.0000 | 22(2) | 0.0173 | 0 | 0.0000 |
| 2016 | 100 | 727 | 796,165 | 0 | 0.0000 | 32(3) | 0.0402 | 0 | 0.0000 |

| Year | Obs. Cov. (%) | Sets | Hooks | Scalloped hammerhead shark | | Oceanic whitetip shark | | Giant manta ray | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Takes (M[b]) | Takes/ 1,000 hooks | Takes (M[b]) | Takes/ 1,000 hooks | Takes (M) | Takes/ 1,000 hooks |
| 2017 | 100 | 1,005 | 1,083,216 | 0 | 0.0000 | 29(1) | 0.0268 | 2 | 0.0018 |
| 2018 | 100 | 420 | 486,013 | 0 | 0.0000 | 1(1) | 0.0021 | 0 | 0.0000 |
| 2019 | 100 | 314 | 374,487 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| 2020 | 100 | 479 | 624,579 | 0 | 0.0000 | 13(1) | 0.0208 | 0 | 0.0000 |
| 2021 | 100 | 804 | 1,026,373 | 0 | 0.0000 | 45(6) | 0.0438 | 0 | 0.0000 |
| 2022 | 100 | 971 | 1,242,997 | 0 | 0.0000 | 54(7) | 0.0434 | 3 | 0.0024 |
| 2023 | 100 | 909 | 1,139,864 | 0 | 0.0000 | 13 | 0.0114 | 0 | 0.0000 |
| 2024 | 100 | 875 | 1,170,372 | 0 | 0.000 | 3 | 0.003 | 0 | 0.000 |

[a] Take and effort data are based on haul begin dates.
[b] Mortality numbers include sharks that were released dead or retained (prior to applicable prohibition on retention).
Source: PIRO Sustainable Fisheries Division unpublished data.

#### 3.3.1.6.1 Comparison of Interactions with ITS

An ITS is not required to provide protective coverage for oceanic whitetip sharks and giant manta rays because there are no take prohibitions under ESA section 4(d) for these species.[8] However, the 2019 Biological Opinion includes 1-year ITSs for oceanic whitetip sharks and giant manta rays to serve as a check on the no-jeopardy conclusion by providing a reinitiation trigger if the level of take analyzed in the Biological Opinion is exceeded.

NMFS will monitor the ITSs for the Hawaii shallow-set longline fishery annually starting in January 2020 to track incidental take. NMFS uses the date of the interaction (begin haul date) for tracking elasmobranch interactions against the ITS (Table 60) regardless of when the vessel returns to port. Prior to 2021, NMFS counted sea turtle interactions based on vessel arrival dates the PIRO Observer Program Quarterly and Annual Reports. For this reason, the number of annual interactions counted against an ITS may vary from those reported on the Observer Program's quarterly and annual reports. For the purpose of ITS tracking, NMFS uses the mortality rate estimates of 0.19 for oceanic whitetip sharks and 0.41 for large rays from the 2019 Biological Opinion to estimate mortalities.

Table 60. Observed interactions and estimated total mortalities (M) of oceanic whitetip shark and giant manta ray in the Hawaii shallow-set longline fishery compared to the 1-year ITS in the 2019 Biological Opinion[a]

| Species | 1-Year ITS Interactions (M) | Interactions (M[c]) | | | | |
|---|---|---|---|---|---|---|
| | | 2020 | 2021 | 2022 | 2023 | 2024 |
| Oceanic whitetip shark | 102(32) | 13(3) | 45(13) | 54(16) | 13(2) | 3(1) |
| Giant manta ray | 13(4) | 0(0) | 0(0) | 3(1) | 0 | 0 |

[8] On May 14, 2024, NMFS issued a proposed rule to issue protective regulations under section 4(d) which would apply to all of the prohibitions listed under sections 9(a)(1)(A) to 9(a)(1)(G) to oceanic whitetip sharks (89 FR 41917). The proposed rule has not been finalized.

| | | | | | | |
|---|---|---|---|---|---|---|
| *Manta/Mobula*[b] | | 1(0) | 4(2) | 0 | 1(0) | 0 |

[a] Takes are counted based on begin haul date.
[b] 24.6% of manta/mobula interactions are also tracked as the ITS for giant manta ray was based on interaction data that included rays classified as manta/mobula in the observer record that may have been giant manta rays.
[c] Mortality rates are from the 2019 Biological Opinion and are based on 2004-2018 interaction data.

### 3.3.2 HAWAII DEEP-SET LONGLINE FISHERY

#### 3.3.2.1 INDICATORS FOR MONITORING PROTECTED SPECIES INTERACTIONS AND EFFECTIVENESS OF MANAGEMENT MEASURES IN THE HAWAII DEEP-SET LONGLINE FISHERY

In this annual report, the Council monitors protected species interactions in the Hawaii deep-set longline fishery using the following indicators:

- General interaction trends over time
- Effectiveness of FEP conservation measures
- Take levels compared to the incidental take statement levels under ESA
- Take levels compared to marine mammal PBRs, where applicable

##### 3.3.2.1.1 Conservation Measures

The Pelagic FEP includes a number of conservation measures to mitigate seabird and sea turtle interactions in the deep-set longline fishery. These measures include the following:

- Longline vessel owners/operators are required to adhere to regulations for safe handling and release of sea turtles and seabirds.
- Longline vessel owners/operators must have on board the vessel all required turtle handling/dehooking gear specified in regulations.
- Longline vessel owners/operators are required to remove trailing gear from oceanic whitetip sharks and cut the line as close to the hook as possible.
- Deep-set fishing operations north of 23º N latitude are required to comply with seabird mitigation regulations, which include choosing between side-setting or stern-setting longline gear with additional regulatory specifications (e.g. weighted branch lines, using a tori line or bird scaring line, using a "bird curtain").
- Vessel owners and operators are required to annually attend a protected species workshop.
- When deep-set longline fishing, the use of wire leaders is prohibited.

The final rule for the following regulatory amendment to the Pelagic FEP that affect conservation measures for the Hawaii deep-set longline fishery was issued on March 1, 2024 (89 FR 15062) and took effect on April 1, 2024:

- Replace blue-dyed thawed bait and strategic offal discharge measures required for stern-setting deep-set longline vessels with a new tori line requirement (Council final action in December 2021; see Section 3.3.2.5 of this report for more information).

In 2024, the Council initiated development of a regulatory amendment to the Pelagic FEP that would implement a crew training requirement for Hawaii and American Samoa longline fisheries. PIRO Sustainable Fisheries Division, in coordination with the Hawaii Longline Association, PIRO Protected Resources Division, and the Council initiated a one-year pilot

crew training program in April 2024. The Council is scheduled to consider final action on the regulatory amendment at the 203rd Council in June 2025.

#### 3.3.2.1.2 ESA Consultations

A USFWS Biological Opinion dated January 6, 2012, concluded that the fishery is not likely to jeopardize short-tailed albatrosses (USFWS 2012). This Biological Opinion remains valid.

On May 18, 2023, NMFS issued a Biological Opinion covering all applicable ESA-listed species, which concluded that the fishery is not likely to jeopardize the following species: giant manta ray; Indo-West Pacific scalloped hammerhead shark; oceanic whitetip shark; Central North Pacific, East Indian-West Pacific, East Pacific, Southwest Pacific, Central West Pacific and Central South Pacific green sea turtles; leatherback sea turtles; North Pacific loggerhead sea turtles; olive ridley sea turtles, sperm whale, and main Hawaiian Islands insular false killer whale. The new ITSs took effect when the new Biological Opinion was signed. The new ITS has a 5-year term and all captures in 2023 will count towards the first year of the term, although captures prior to the date on the 2023 Biological Opinion signature are exempted under the previous biological opinion.

NMFS and USFWS have issued ITSs for species included in the Biological Opinions and determined these levels of take would not jeopardize the species (Table 62). Exceedance of the ITSs requires reinitiation of consultation on the fishery under the ESA.

Table 61. Summary of ESA consultations for the Hawaii deep-set longline fishery

| Species or DPS | Consultation Date | Consultation Type[a] | Outcome[b] |
|---|---|---|---|
| Loggerhead turtle, North Pacific DPS | 2023-05-18[c] | BiOp | LAA, non-jeopardy |
| Leatherback turtle | 2023-05-18[c] | BiOp | LAA, non-jeopardy |
| Olive ridley turtle (all species or DPS) | 2023-05-18[c] | BiOp | LAA, non-jeopardy |
| Green turtle (all species or DPS) | 2023-05-18[c] | BiOp | LAA, non-jeopardy |
| Giant manta ray | 2023-05-18[c] | BiOp | LAA, non-jeopardy |
| Oceanic whitetip shark | 2023-05-18[c] | BiOp | LAA, non-jeopardy |
| Scalloped hammerhead shark, Indo-West Pacific DPS | 2023-05-18[c] | BiOp | LAA, non-jeopardy |
| False killer whale, MHI insular DPS | 2023-05-18[c] | BiOp | LAA, non-jeopardy |
| Sperm whale | 2023-05-18[c] | BiOp | LAA, non-jeopardy |
| Fin whale | 2023-05-18[c] | BiOp | NLAA |
| Blue whale | 2023-05-18[c] | BiOp | NLAA |
| North Pacific right whale | 2023-05-18[c] | BiOp | NLAA |
| Sei whale | 2023-05-18[c] | BiOp | NLAA |
| Mexican humpback whale | 2023-05-18[c] | BiOp | NLAA |
| Southern Resident killer whale | 2023-05-18[c] | BiOp | NLAA |
| Hawaiian monk seal | 2023-05-18[c] | BiOp | NLAA |
| Scalloped hammerhead shark, Eastern Pacific DPS | 2023-05-18[c] | BiOp | NLAA |
| Hawksbill turtle | 2023-05-18[c] | BiOp | NLAA |
| Loggerhead turtle, south Pacific DPS | 2023-05-18[c] | BiOp | NLAA |

| Species or DPS | Consultation Date | Consultation Type[a] | Outcome[b] |
|---|---|---|---|
| Listed fishes and invertebrate species[d] | 2023-05-18[c] | BiOp | NLAA |
| Short-tailed albatross | 2012-01-06 | BiOp (FWS) | LAA, non-jeopardy |
| **Critical Habitat** | **Consultation Date** | **Consultation Type[a]** | **Outcome[b]** |
| Main Hawaiian Islands insular false killer whale | 2023-05-18[c] | BiOp | NLAA |
| Steller sea lion | 2023-05-18[c] | BiOp | NLAA |
| Hawaiian monk seal | 2023-05-18[c] | BiOp | NLAA |
| Leatherback sea turtle | 2023-05-18[c] | BiOp | NLAA |
| Listed fishes and invertebrate species[e] | 2023-05-18[c] | BiOp | NLAA |

[a] BiOp = Biological Opinion.
[b] LAA = likely to adversely affect; NLAA = not likely to adversely affect.
[c] With correction to the Incidental Take Statement Table in the Hawaii Deep-set Longline Fishery Biological Opinion on May 22, 2023.
[d] Listed fish and invertebrate species = Central Coast coho, Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, California coast steelhead, California Central Valley and southern California coast steelhead, Southern North American green sturgeon, Corals, Black and white abalone
[e] Critical habitat for listed fish and invertebrate species = Central Coast coho, Sacramento River winter-run Chinook salmon, California coast steelhead, Southern North American green sturgeon, Black abalone

Table 62. Summary of ITSs for the Hawaii deep-set longline fishery

| Species | ITS Time Period | Takes | Source BiOp |
|---|---|---|---|
| Loggerhead turtle, North Pacific DPS | 5-year running sum | 43 | NMFS 2023 |
| Leatherback turtle | 5-year running sum | 92 | NMFS 2023 |
| Olive ridley turtle (all species or DPS) | 5-year running sum | 592 | NMFS 2023 |
| Green turtle (all species or DPS) | 5-year running sum | 77 | NMFS 2023 |
| Sperm whale | 5-year running sum | 6 | NMFS 2023 |
| False killer whale (MHI insular DPS) | 5-year running sum | 0.427 or 1 observed | NMFS 2023 |
| Scalloped hammerhead shark (Indo-West Pacific DPS)[a] | 5-year running sum | 14 | NMFS 2023 |
| Oceanic whitetip shark [a] | 5-year running sum | 10,589 | NMFS 2023 |
| Giant manta ray [a] | 5-year running sum | 181 | NMFS 2023 |
| Short-tailed albatross | 5-year | 2 | USFWS 2012 |

[a] An ITS is not required due to the lack of take prohibition under ESA section 4(d), but NMFS included an ITS to serve as a check on the no-jeopardy conclusion by providing a reinitiation trigger.

#### 3.3.2.1.3 Non-ESA Marine Mammals

Fishery impacts to marine mammal stocks are primarily assessed and monitored through the SARs prepared pursuant to the MMPA. The SARs include detailed information on these species' geographic range, abundance, PBR estimates, bycatch estimates, and status. The most recent SARs are available online at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.

The Hawaii deep-set longline fishery is a Category I fishery under the MMPA 2024 LOF (89 FR 12257, February 16, 2024), meaning that NMFS has determined that this fishery has

frequent incidental mortality and serious injuries of marine mammals. The 2024 LOF lists the following marine mammal stocks that are incidentally killed or injured in this fishery:[9]

- Bottlenose dolphin, HI Pelagic stock
- False killer whale, MHI Insular stock (also ESA-listed)
- False killer whale, HI Pelagic stock
- False killer whale, NWHI stock
- *Kogia* spp. (Pygmy or dwarf sperm whale), HI stock
- Risso's dolphin, HI stock
- Rough-toothed dolphin, HI stock
- Short-finned pilot whale, HI stock

Most bycatch estimates in the SARs are based on the most recently available 5-year period, but there is a data lag of approximately 2 years due to the SAR review process. This annual report focuses on available long-term interaction trends and summarizes relevant information from the most recent SAR.

#### 3.3.2.2 DATA SOURCE FOR MONITORING PROTECTED SPECIES INTERACTIONS IN THE HAWAII DEEP-SET LONGLINE FISHERY

Protected species interactions in the Hawaii longline fishery have been monitored through mandatory observer coverage since 1994. Observer coverage in the Hawaii longline fishery was between 3 and 5 percent from 1994 through 1999, increased to 10 percent in 2000, then to 20 percent in 2001.

In response to the emerging COVID-19 crisis, and to ensure the safety and protect the health of fishermen, observers, and others, NMFS issued an emergency action on March 27, 2020 (85 FR 17285), to provide the authority, on a case-by-case basis, to waive observer coverage. This action was extended on September 21, 2020 (85 FR 59199) and again on March 29, 2021 (86 FR 16307). Under this emergency action, a NMFS Regional Administrator, Office Director, or Science Center Director had the ability to waive observer coverage requirements if:

- Local, state, or national governments, or private companies or organizations that deploy observers pursuant to NMFS regulations, restrict travel or otherwise issue COVID-19-related social control guidance, or requirement(s) addressing COVID-19-related concerns, such that it is inconsistent with the requirement(s) or not recommended to place an observer(s); or
- No qualified observer(s) are available for placement due to health, safety, or training issues related to COVID-19.

The PIRO Regional Administrator granted waivers on a case-by-case basis consistent with the emergency rule resulting in reduced annual coverage for the Hawaii deep-set longline fishery for 2020 and 2021 at 15.25% and 17.84% respectively. Observer coverage was also variable in 2020 ranging from 7.7% to 18.2% in a quarter. While 2021 saw an improved coverage rate and less coverage variability (14.3% to 21.1% in a quarter), fleet-wide interaction estimates for 2021 may still have greater uncertainty than usual. Annual observer

[9] This fishery is listed in the LOF under Commercial Fisheries in the Pacific Ocean and Commercial Fisheries on the High Seas. Stocks from both lists are included here.

coverage rate returned to 20.2% in 2022. NMFS reduced observer coverage in the Hawaii deep-set longline fishery from 20 to 15% in October of 2023 and again reduced coverage to 13% in April of 2024 due to increased program costs. NMFS is evaluating options to manage observer efforts moving forward, including assessing alternative long-term options such as electronic technologies to supplement monitoring and collecting fishery data. Annual coverage in 2024 was 13.4%.

This report summarizes protected species interactions in the Hawaii deep-set longline fishery since 2002, when separate reporting by deep-set and shallow-set components of the longline fishery began. Annual observed interactions are tallied based on vessel arrival date (rather than interaction date) for the purposes of this report for consistency with the methods used to estimate the annual total interactions. Comparison of annual incidental takes within a year to the ITSs are based on the interaction date rather than the vessel arrival date, consistent with the 2023 BiOp. Annual summary data presented in this report may differ from those in the PIRO Observer Program Quarterly and Annual Reports, which began summarizing interaction data by haul begin dates (proxy for interaction date) in 2021.

#### 3.3.2.3 SEA TURTLE INTERACTIONS IN THE HAWAII DEEP-SET LONGLINE FISHERY

Table 63 summarizes the incidental take data of sea turtles from 2002 to 2024 in the Hawaii deep-set longline fishery. The incidental take data in this section were compiled from the PIRO Observer Program Annual Status Reports through 2020 and from PIRO Sustainable Fisheries Division unpublished data beginning in 2021 and are for monitoring purposes. Many of these interactions have been further examined by NMFS, and updated information necessary for any data analyses is available from PIFSC. Observed take data are expanded to represent the estimated number of incidental takes for the entire fishery by PIFSC (referred to in this document as "McCracken estimates (ME)"). When ME are not available, a standard expansion factor estimate is used (EF Est. = 100 / % observer coverage * # takes).

Observed sea turtle takes year to year were variable. The most commonly observed sea turtle species being olive ridley sea turtles, whereas interactions with leatherbacks, greens, and loggerheads were much less frequent.

Preliminary results from an analysis conducted by PIFSC and presented to the Scientific and Statistical Committee at its 122$^{nd}$ Meeting in March 2016 showed that leatherback interactions in 2014 were significantly higher than levels expected from previous years (2007-2013). The higher level of interactions in 2014 was considered in the 2014 Biological Opinion, which concluded that the fishery is not likely to jeopardize leatherback turtles. Leatherback interactions, since the 2014 Biological Opinion, remain below the ITS. The Council at its 165$^{th}$ Meeting in March 2016 recommended continued monitoring of the interactions and further analysis to evaluate patterns of leatherback interactions in the Hawaii deep-set longline fishery. Leatherback turtle interactions in 2017-2019 were lower than 2014-2015. Observed interactions in 2024 were the same as 2014, but the estimated total interactions was the highest since 2002 due to the lower observer coverage rate and higher effort in 2024 compared to 2014. The higher leatherback turtle interactions in 2024 appear to be in part associated with the spatial distribution of fishing effort, with a higher proportion of overall effort occurring south of the MHI than in typical years. A Pelagic Plan Team Working Group is currently evaluating the factors affecting the decline in target catch

(bigeye tuna) CPUE over the last decade, which may provide further understanding of the spatial effort patterns in recent years.

The highest number of observed olive ridley interactions occurred in 2016 with 31 takes. This was followed by three years of high olive ridley interactions with 26, 18, and 29 interactions in 2017, 2018, and 2019, respectively. Interactions in 2020-2023 were within the range observed prior to 2016. Due to the depth of the deep-set longline gear, most of the interactions result in mortalities. The higher level of olive ridley turtle interactions was considered in the 2023 Biological Opinion, which concluded that the fishery is not likely to jeopardize olive ridley turtles after considering this higher level of interaction. The Council's Protected Species Advisory Committee at its March 2017 meeting discussed the olive ridley turtle interaction trend and recommended evaluation of the increasing trend in conjunction with the previously recommended effort to evaluate ecosystem factors influencing bycatch in the longline fishery. This recommendation led to a collaborative ecosystem-based fisheries management project between Council, PIFSC, PIRO and University of Florida to develop a protected species ensemble random forest (PSERF) model. Additional information on this effort is included in Section 4.1.

Top variables for defining olive ridley turtle interaction determined using the PSERF model indicate an influence of mean wind direction and shows that SW-W-NW winds seem to have higher probability of interactions than normal. Eddy-based features such as Okubo-Weiss (negative values indicate vorticity dominated regions e.g., eddies), eddy kinetic energy (positive values indicate high eddy activity) and current speed also seems to have higher than average probability of interactions. Together, these seem to indicate that features that result in higher turtle movement rates (wind, currents) or aggregate turtles (eddies) increase the probability of interactions with olive ridley turtles. Aggregate mean characteristics from the fishing sets indicate that for sets from 2015-2019, higher eddy activity, higher current speeds, and winds blowing from the west-southwest increased whereas these conditions waned after 2020.

Table 63. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for sea turtles in the Hawaii deep-set longline fishery, 2002-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Green | | | | Leatherback | | | | Loggerhead | | | | Olive ridley | | | | Unidentified hard shell | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME |
| | | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | |
| 2002 | 24.6 | 3,523 | 6,786,303 | 1(1) | 0.0001 | - | 3 | 2 | 0.0003 | - | 5 | 4(1) | 0.0006 | - | 17 | 7(7) | 0.0010 | - | 31 | 0 | 0.0000 | - | - |
| 2003 | 22.2 | 3,204 | 6,442,221 | 0 | 0.0000 | - | 0 | 1(1) | 0.0002 | - | 4 | 0 | 0.0000 | - | 0 | 3(3) | 0.0005 | - | 14 | 0 | 0.0000 | - | - |
| 2004 | 24.6 | 3,958 | 7,900,681 | 1(1) | 0.0001 | - | 5 | 3 | 0.0004 | - | 15 | 0 | 0.0000 | - | 0 | 13(13) | 0.0016 | - | 46 | 0 | 0.0000 | - | - |
| 2005 | 26.1 | 4,602 | 9,360,671 | 0 | 0.0000 | - | 0 | 1 | 0.0001 | - | 4 | 0 | 0.0000 | - | 0 | 4(4) | 0.0004 | - | 16 | 0 | 0.0000 | - | - |
| 2006 | 21.2 | 3,605 | 7,540,286 | 2(2) | 0.0003 | - | 6 | 2(2) | 0.0003 | - | 9 | 0 | 0.0000 | - | 0 | 11(10) | 0.0015 | - | 54 | 0 | 0.0000 | - | - |
| 2007 | 20.1 | 3,506 | 7,620,083 | 0 | 0.0000 | - | 0 | 2 | 0.0003 | - | 4 | 1(1) | 0.0001 | - | 7 | 7(7) | 0.0009 | - | 26 | 0 | 0.0000 | - | - |
| 2008 | 21.7 | 3,915 | 8,775,951 | 0 | 0.0000 | - | 0 | 1 | 0.0001 | - | 11 | 0 | 0.0000 | - | 0 | 3(3) | 0.0003 | - | 18 | 0 | 0.0000 | - | - |
| 2009 | 20.6 | 3,520 | 7,877,861 | 0 | 0.0000 | - | 0 | 1(1) | 0.0001 | - | 4 | 0 | 0.0000 | - | 0 | 4(4) | 0.0005 | - | 18 | 0 | 0.0000 | - | - |
| 2010 | 21.1 | 3,580 | 8,184,127 | 1(1) | 0.0001 | - | 1 | 1(1) | 0.0001 | - | 6 | 1(1) | 0.0001 | - | 6 | 4(3)[b] | 0.0005 | - | 10 | 0 | 0.0000 | - | - |
| 2011 | 20.3 | 3,540 | 8,260,092 | 1(1) | 0.0001 | - | 5 | 3 | 0.0004 | - | 14 | 0 | 0.0000 | - | 0 | 7(6) | 0.0008 | - | 36 | 0 | 0.0000 | - | - |
| 2012 | 20.4 | 3,659 | 8,768,728 | 0 | 0.0000 | - | 0 | 1(1) | 0.0001 | - | 6 | 0 | 0.0000 | - | 0 | 6(6) | 0.0007 | - | 34 | 0 | 0.0000 | - | - |
| 2013 | 20.4 | 3,830 | 9,278,133 | 1(1) | 0.0001 | - | 5 | 3 | 0.0003 | - | 15 | 2(2) | 0.0002 | - | 11 | 9(9) | 0.0010 | - | 42 | 0 | 0.0000 | - | - |
| 2014 | 20.8 | 3,831 | 9,608,244 | 3(3) | 0.0003 | - | 16 | 7(2) | 0.0007 | - | 38 | 0 | 0.0000 | - | 0 | 8(7) | 0.0008 | - | 50 | 0 | 0.0000 | - | - |
| 2015 | 20.6 | 3,728 | 9,393,234 | 1(1) | 0.0001 | - | 4 | 4(2) | 0.0004 | - | 18 | 2(2) | 0.0002 | - | 9 | 13(12) | 0.0014 | - | 69 | 0 | 0.0000 | - | - |
| 2016 | 20.1 | 3,880 | 9,872,439 | 1(1) | 0.0001 | - | 5 | 3(1) | 0.0003 | - | 15 | 2(1) | 0.0002 | - | 7 | 31(28) | 0.0031 | - | 162 | 1(1) | 0.0001 | - | 5 |
| 2017 | 20.4 | 3,832 | 10,148,195 | 3(1) | 0.0003 | - | 18 | 0 | 0.0000 | - | 0 | 3 | 0.0003 | - | 12 | 26(23) | 0.0026 | - | 119 | 0 | 0.0000 | - | - |
| 2018 | 20.4 | 4,332 | 11,751,144 | 3(3) | 0.0003 | - | 17 | 2 | 0.0002 | - | 12 | 1(1) | 0.0001 | - | 4 | 18(16) | 0.0015 | - | 96 | 0 | 0.0000 | - | - |
| 2019 | 20.5 | 4,697 | 12,948,077 | 2(2) | 0.0002 | - | 12 | 3 | 0.0002 | - | 14 | 0 | 0.0000 | - | 0 | 29(28) | 0.0022 | - | 138 | 0 | 0.0000 | - | - |
| 2020 | 15.25 | 3,131 | 8,738,011 | 2(2) | 0.0002 | - | 13 | 4 | 0.0005 | - | 31 | 3(1) | 0.0003 | - | 19 | 11(9) | 0.0013 | - | 79 | 0 | 0.0000 | - | - |
| 2021 | 17.84 | 3,972 | 11,454,331 | 3(3) | 0.0003 | - | 17 | 1 | 0.0001 | - | 8 | 1 | 0.0001 | - | 5 | 7(5) | 0.0006 | - | 46 | 0 | 0.0000 | - | - |
| 2022 | 20.22 | 4,314 | 12,473,293 | 1(1) | 0.0001 | - | 6 | 5 | 0.0004 | - | 24 | 3 | 0.0002 | - | 19 | 10(8) | 0.0008 | - | 49 | 0 | 0.0000 | - | - |
| 2023 | 17.41 | 3,807 | 10,988,431 | 2(2) | 0.0002 | - | 10 | 4 | 0.0004 | | 19 | 0 | 0.0000 | - | 0 | 12(11) | 0.0011 | - | 68 | 1(1) | 0.0001 | - | 7 |
| 2024 | 13.35 | 2,796 | 8,174,744 | 1(1) | 0.0001 | 7 | - | 7(4) | 0.0009 | 52 | - | 0 | 0.0000 | 0 | - | 12(12) | 0.0015 | 90 | - | 0 | 0.0000 | 0 | - |

[a] Take and effort data are based on vessel arrival dates. [b] One olive ridley turtle interaction (released injured) occurred inside the American Samoa EEZ. This interaction was included in the Observer Program Annual Report for the Hawaii deep-set fishery because the vessel departed Honolulu under the Hawaii longline permit. Sources: Take data—2002-2020 PIRO Observer Program Annual and Quarterly Status Reports, PIRO Sustainable Fisheries Division unpublished data. Expansion estimates for 2002-2003, NMFS 2005.ME—McCracken, 2005; McCracken, 2006; McCracken, 2007; McCracken, 2008; McCracken, 2009; McCracken, 2010; McCracken, 2011b; McCracken, 2012; McCracken, 2013; McCracken, 2014; McCracken 2017c, McCracken 2017d, McCracken 2019b, McCracken 2019d, McCracken and Cooper 2020a, McCracken and Cooper (in review).

#### 3.3.2.3.1 Comparison of Interactions with ITS

The 2023 Biological Opinion includes ITSs for sea turtle species based on the maximum 5-year running sum for each species (Table 64). The new ITS went into effect May 18, 2023. For the purposes of monitoring the ITS, all captures in 2023 will count towards the first year of the 5-year term. Exceeding the maximum 5-year running sum within any 5 or fewer consecutive years will lead to reinitiating consultation of the impact of this fishery on these species.

NMFS uses the interaction date for tracking sea turtle interactions against the ITS, regardless of vessel arrival date. Prior to 2021, NMFS in its PIRO Observer Program Quarterly and Annual Reports counted sea turtle interactions based on vessel arrival dates. For this reason, the number of quarterly or annual sea turtle interactions counted against an ITS may vary from those reported on the Observer Program's quarterly and annual reports.

Table 64. Estimated total interactions (extrapolated using quarterly observer coverage) of sea turtles in the Hawaii deep-set longline fishery compared to the 5-year running sum ITS in the 2024 Biological Opinion[a]

| Species | 5-year running sum ITS Interactions | Estimated Total Interactions and Mortalities | |
|---|---|---|---|
| | | 2023 | 2024 |
| Leatherback turtle | 92 | 23(8) | 51(22) |
| Green turtle | 77 | 10(10) | 8(8) |
| Loggerhead turtle | 43 | 0 | 0 |
| Olive ridley turtle (all species or DPS) | 592 | 63(60) | 89(84) |

[a] Takes are counted based on interaction date.

### 3.3.2.4 MARINE MAMMAL INTERACTIONS IN THE HAWAII DEEP-SET LONGLINE FISHERY

Table 65 through Table 68 summarize the incidental take data of marine mammals from 2002 to 2023 in the Hawaii deep-set longline fishery. The incidental take data in this section were compiled from the PIRO Observer Program Annual Status Reports and are for monitoring purposes. Reported interactions listed in these tables reflect all observed interactions, including mortalities, serious injuries, and non-serious injuries. Refer to the most recent SARs for mortality and serious injury estimates and stock-specific abundance estimates and geographic range. Many of these interactions have been further examined, and updated information necessary for any data analyses is available from PIFSC. Observed take data are expanded to represent the estimated number of annual incidental takes for the entire fishery by PIFSC (referred to in this document as "ME"). When ME are not available, a standard expansion factor estimate is listed in the table (EF Est. = 100 / % observer coverage * # takes).

The majority of observed interactions and all observed mortalities since 2002 involved dolphin and small whale species. False killer whales also had the highest interaction rate over the entire 2002-2024 period, with the highest number of observed interactions occurring in 2019 and 2021. Short-finned pilot whales, bottlenose dolphins, Risso's dolphins, and rough-toothed dolphins are also occasionally observed, but in 2024, only one Risso's dolphin and

no short-finned pilot whales or bottlenose dolphin interactions were observed. Similar to 2020, rough-toothed dolphin interactions were higher in 2024 compared to other years, which is notable given that observer coverage rate was the lowest in 2024. All 2024 rough-toothed dolphin observed interactions occurred in the second half of the year and north of the MHI along the EEZ boundary, with two pairs of interactions occurring one to three days apart. These patterns suggest a clustering of interactions in space and time. Very few interactions were observed with striped dolphins, pantropical spotted dolphins, Blainville's beaked whales, pygmy killer whales, and *Kogia* spp. whales. Interactions with marine mammals grouped as large whales were also rare, with observed interactions recorded with humpback whales and one sperm whale in 2011 (Table 67). Observed interactions with unidentified cetacean groups are shown in Table 68. In 2024, there were two observed unidentified cetacean interactions.

Table 65. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for dolphins in the Hawaii deep-set longline fishery, 2002-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Bottlenose dolphin | | | | Pantropical spotted dolphin | | | | Rough-toothed dolphin | | | | Risso's dolphin | | | | Striped dolphin | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME |
| | | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | |
| 2002 | 24.6 | 3,523 | 6,786,303 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2003 | 22.2 | 3,204 | 6,442,221 | 1(1) | 0.0002 | 5 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2004 | 24.6 | 3,958 | 7,900,681 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - |
| 2005 | 26.1 | 4,602 | 9,360,671 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - | 1 | 0.0001 | - | 3 | 0 | 0.0000 | 0 | - |
| 2006 | 21.2 | 3,605 | 7,540,286 | 1 | 0.0001 | - | 1 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - | 2 | 0.0003 | - | 5 | 1(1) | 0.0001 | - | 6 |
| 2007 | 20.1 | 3,506 | 7,620,083 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - | 1(1) | 0.0001 | - | 3 | 0 | 0.0000 | - | 0 |
| 2008 | 21.7 | 3,915 | 8,775,951 | 0 | 0.0000 | - | 0 | 1(1) | 0.0001 | - | 3 | 0 | 0.0000 | 0 | - | 1 | 0.0001 | - | 2 | 0 | 0.0000 | - | 0 |
| 2009 | 20.6 | 3,520 | 7,877,861 | 1 | 0.0001 | - | 5 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2010 | 21.1 | 3,580 | 8,184,127 | 1 | 0.0001 | - | 4 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 1 | 0.0001 | - | 3 | 0 | 0.0000 | - | 0 |
| 2011 | 20.3 | 3,540 | 8,260,092 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 1(1) | 0.0001 | - | 4 |
| 2012 | 20.4 | 3,659 | 8,768,728 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2013 | 20.4 | 3,830 | 9,278,133 | 2(1) | 0.0002 | - | 11 | 0 | 0.0000 | - | 0 | 1(1) | 0.0001 | - | 5 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2014 | 20.8 | 3,831 | 9,608,244 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2015 | 20.6 | 3,728 | 9,393,234 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 2(1) | 0.0002 | - | 10 | 0[b] | 0.0000 | - | 4[b] |
| 2016 | 20.1 | 3,880 | 9,872,439 | 1 | 0.0001 | - | 5 | 0 | 0.0000 | - | 0 | 1(1) | 0.0001 | - | 5 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2017 | 20.4 | 3,832 | 10,148,195 | 1 | 0.0001 | - | 7 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 1 | 0.0001 | - | 5 | 0 | 0.0000 | - | 0 |
| 2018 | 20.4 | 4,332 | 11,751,144 | 1 | 0.0001 | - | 3 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2019 | 20.5 | 4,697 | 12,948,077 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 1 | 0.0001 | - | 4 | 1(1) | 0.0001 | - | 7 | 0 | 0.0000 | - | 0 |
| 2020 | 15.25 | 3,131 | 8,738,011 | 1 | 0.0001 | - | 10 | 0 | 0.0000 | - | 0 | 5(2) | 0.0006 | - | 29 | 2 | 0.0002 | - | 16 | 0 | 0.0000 | - | 0 |
| 2021 | 17.84 | 3,972 | 11,454,331 | 3 | 0.0003 | 17 | - | 0 | 0.0000 | 0 | - | 2(1) | 0.0002 | 11 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2022 | 20.22 | 4,314 | 12,473,293 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 1 | 0.0001 | 5 | - | 0 | 0.0000 | 0 | - |
| 2023 | 17.41 | 3,807 | 10,988,431 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 2 | 0.0002 | 11 | - | 1 | 0.0001 | 6 | - | 0 | 0.0000 | 0 | - |
| 2024 | 13.35 | 2,796 | 8,174,744 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 6(1) | 0.0007 | 45 | - | 1 | 0.0001 | 7 | - | 0 | 0.0000 | 0 | - |

[a] Take and effort data are based on vessel arrival dates.
[b] One unidentified dolphin was later identified as a striped dolphin but is listed as an unidentified dolphin in the 2015 Annual Observer Report.
Source: Take data—2002-2020 PIRO Observer Program Annual and Quarterly Status Reports, PIRO Sustainable Fisheries Division unpublished data.
ME—(McCracken 2005, 2006, 2011a, 2016, 2017a, 2019b; McCracken and Cooper 2022a)

Table 66. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for small whales in the Hawaii deep-set longline fishery, 2002-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Blainville's beaked whale | | | | False killer whale | | | | *Kogia* spp. | | | | Pygmy killer whale | | | | Short-finned pilot whale | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME |
| | | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | |
| 2002 | 24.6 | 3,523 | 6,786,303 | 1(1) | 0.0001 | 4 | - | 5 | 0.0007 | 20 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2003 | 22.2 | 3,204 | 6,442,221 | 0 | 0.0000 | 0 | - | 2 | 0.0003 | 9 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2004 | 24.6 | 3,958 | 7,900,681 | 0 | 0.0000 | - | 0 | 6(1) | 0.0008 | - | 28 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 1 | 0.0001 | - | 3 |
| 2005 | 26.1 | 4,602 | 9,360,671 | 1 | 0.0001 | - | 6 | 2(1) | 0.0002 | - | 6 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 1 | 0.0001 | - | 6 |
| 2006 | 21.2 | 3,605 | 7,540,286 | 0 | 0.0000 | - | 0 | 4 | 0.0005 | - | 17 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 2 | 0.0003 | - | 6 |
| 2007 | 20.1 | 3,506 | 7,620,083 | 0 | 0.0000 | - | 0 | 4 | 0.0005 | - | 15 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 1 | 0.0001 | - | 2 |
| 2008 | 21.7 | 3,915 | 8,775,951 | 0 | 0.0000 | - | 0 | 3 | 0.0003 | - | 11 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 3 | 0.0003 | - | 5 |
| 2009 | 20.6 | 3,520 | 7,877,861 | 0 | 0.0000 | - | 0 | 10(1) | 0.0013 | - | 55 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 |
| 2010 | 21.1 | 3,580 | 8,184,127 | 0 | 0.0000 | - | 0 | 4 | 0.0005 | - | 19 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2011 | 20.3 | 3,540 | 8,260,092 | 0 | 0.0000 | - | 0 | 3 | 0.0004 | - | 10 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2012 | 20.4 | 3,659 | 8,768,728 | 0 | 0.0000 | - | 0 | 3 | 0.0003 | - | 15 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2013 | 20.4 | 3,830 | 9,278,133 | 0 | 0.0000 | - | 0 | 4 | 0.0004 | - | 22 | 0 | 0.0000 | - | 0 | 1(1) | 0.0001 | - | 5 | 1(1) | 0.0001 | - | 4 |
| 2014 | 20.8 | 3,831 | 9,608,244 | 0 | 0.0000 | - | 0 | 11 | 0.0011 | - | 55 | 1 | 0.0001 | - | 10 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2015 | 20.6 | 3,728 | 9,393,234 | 0 | 0.0000 | - | 0 | 5(1) | 0.0005 | - | 21 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 1 | 0.0001 | - | 4 |
| 2016 | 20.1 | 3,880 | 9,872,439 | 0 | 0.0000 | - | 0 | 7 | 0.0007 | - | 39 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2017 | 20.4 | 3,832 | 10,148,195 | 0 | 0.0000 | - | 0 | 8(2) | 0.0008 | - | 45 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2018 | 20.4 | 4,332 | 11,751,144 | 0 | 0.0000 | - | 0 | 12 | 0.0010 | - | 49 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2019 | 20.5 | 4,697 | 12,948,077 | 0 | 0.0000 | - | 0 | 15(3) | 0.0012 | - | 75 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2020 | 15.25 | 3,131 | 8,738,011 | 0 | 0.0000 | - | 0 | 4 | 0.0005 | - | 22 | 1 | 0.0001 | - | 4 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2021 | 17.84 | 3,972 | 11,454,331 | 0 | 0.0000 | 0 | - | 15(2) | 0.0013 | - | 81 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 1 | 0.0000 | 6 | - |
| 2022 | 20.22 | 4,314 | 12,473,293 | 0 | 0.0000 | 0 | - | 7 | 0.0006 | - | 45 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2023 | 17.41 | 3,807 | 10,988,431 | 0 | 0.0000 | 0 | - | 6 | 0.0006 | - | 35 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2024 | 13.35 | 2,796 | 8,174,744 | 0 | 0.0000 | 0 | - | 4 | 0.0005 | 30 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |

[a] Take and effort data are based on vessel arrival dates.
Source: Take data—2002-2020 PIRO Observer Program Annual and Quarterly Status Reports, PIRO Sustainable Fisheries Division unpublished data
ME—(McCracken 2005, 2006, 2011b, 2016, 2017a, 2019b; McCracken and Cooper 2022b; Cooper and McCracken 2025)

Table 67. Observed takes, takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for large whales in the Hawaii deep-set longline fishery, 2002-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Humpback whale | | | | Sperm whale | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME |
| | | | | Takes | Takes/1,000 hooks | | | Takes | Takes/1,000 hooks | | |
| 2002 | 24.6 | 3,523 | 6,786,303 | 1 | 0.0001 | 4 | - | 0 | 0.0000 | 0 | - |
| 2003 | 22.2 | 3,204 | 6,442,221 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2004 | 24.6 | 3,958 | 7,900,681 | 1 | 0.0001 | - | 6 | 0 | 0.0000 | - | 0 |
| 2005 | 26.1 | 4,602 | 9,360,671 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2006 | 21.2 | 3,605 | 7,540,286 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - |
| 2007 | 20.1 | 3,506 | 7,620,083 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - |
| 2008 | 21.7 | 3,915 | 8,775,951 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - |
| 2009 | 20.6 | 3,520 | 7,877,861 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - |
| 2010 | 21.1 | 3,580 | 8,184,127 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2011 | 20.3 | 3,540 | 8,260,092 | 0 | 0.0000 | - | 0 | 1 | 0.0001 | - | 6 |
| 2012 | 20.4 | 3,659 | 8,768,728 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2013 | 20.4 | 3,830 | 9,278,133 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2014 | 20.8 | 3,831 | 9,608,244 | 1 | 0.0001 | - | 5 | 0 | 0.0000 | - | 0 |
| 2015 | 20.6 | 3,728 | 9,393,234 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2016 | 20.1 | 3,880 | 9,872,439 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2017 | 20.4 | 3,832 | 10,148,195 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2018 | 20.4 | 4,332 | 11,751,144 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2019 | 20.5 | 4,697 | 12,948,077 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2020 | 15.25 | 3,131 | 8,738,011 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2021 | 17.84 | 3,972 | 11,454,331 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2022 | 20.22 | 4,314 | 12,473,293 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2023 | 17.41 | 3,807 | 10,988,431 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |
| 2024 | 13.35 | 2,795 | 8,174,744 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |

[a] Take and effort data are based on vessel arrival dates.

Source: Take data—2002-2020 PIRO Observer Program Annual and Quarterly Status Reports, PIRO Sustainable Fisheries Division unpublished data.

ME—(McCracken 2005, 2006, 2011a, 2016, 2017a, 2019b; McCracken and Cooper 2022b)

Table 68. Observed takes, takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates for unidentified species of cetaceans in the Hawaii deep-set longline fishery, 2002-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Unidentified cetacean[b] | | | Unidentified whale[b] | | | Unidentified dolphin[b] | | | Unidentified beaked whale[b] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | Observed | | EF Est. | Observed | | EF Est. | Observed | | EF Est. |
| | | | | Takes | Takes/ 1,000 hooks | | Takes | Takes/ 1,000 hooks | | Takes | Takes/ 1,000 hooks | | Takes | Takes/ 1,000 hooks | |
| 2002 | 24.6 | 3,523 | 6,786,303 | 2 | 0.0003 | 8 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2003 | 22.2 | 3,204 | 6,442,221 | 1 | 0.0002 | 5 | 1 | 0.0002 | 5 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2004 | 24.6 | 3,958 | 7,900,681 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2005 | 26.1 | 4,602 | 9,360,671 | 1 | 0.0001 | 4 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2006 | 21.2 | 3,605 | 7,540,286 | 0 | 0.0000 | 0 | 2 | 0.0003 | 9 | 2 | 0.0003 | 9 | 0 | 0.0000 | 0 |
| 2007 | 20.1 | 3,506 | 7,620,083 | 1 | 0.0001 | 5 | 0 | 0.0000 | 0 | 1 | 0.0001 | 5 | 0 | 0.0000 | 0 |
| 2008 | 21.7 | 3,915 | 8,775,951 | 2 | 0.0002 | 9 | 2 | 0.0002 | 9 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2009 | 20.6 | 3,520 | 7,877,861 | 0 | 0.0000 | 0 | 3 | 0.0004 | 15 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2010 | 21.1 | 3,580 | 8,184,127 | 0 | 0.0000 | 0 | 3 | 0.0004 | 14 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2011 | 20.3 | 3,540 | 8,260,092 | 2 | 0.0002 | 10 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2012 | 20.4 | 3,659 | 8,768,728 | 2 | 0.0002 | 10 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2013 | 20.4 | 3,830 | 9,278,133 | 2 | 0.0002 | 10 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2014 | 20.8 | 3,831 | 9,608,244 | 2 | 0.0002 | 10 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2015 | 20.6 | 3,728 | 9,393,234 | 1 | 0.0001 | 5 | 0 | 0.0000 | 0 | 1[c] | 0.0001 | 5 | 0 | 0.0000 | 0 |
| 2016 | 20.1 | 3,880 | 9,872,439 | 2 | 0.0002 | 10 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 1 | 0.0001 | 5 |
| 2017 | 20.4 | 3,832 | 10,148,195 | 4 | 0.0004 | 20 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2018 | 20.4 | 4,332 | 11,751,144 | 4 | 0.0003 | 20 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2019 | 20.5 | 4,697 | 12,948,077 | 3 | 0.0002 | 15 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 1 | 0.0001 | 5 |
| 2020 | 15.3 | 3,131 | 8,738,011 | 4 | 0.0005 | 26 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 1 | 0.0001 | 7 |
| 2021 | 17.8 | 3,972 | 11,454,331 | 4(1) | 0.0003 | 22 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2022 | 20.22 | 4,314 | 12,473,293 | 2 | 0.0002 | 10 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2023 | 17.41 | 3,807 | 10,988,431 | 4 | 0.0004 | 23 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |
| 2024 | 13.35 | 2,795 | 8,174,744 | 2 | 0.0002 | 15 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 |

[a] Take and effort data are based on vessel arrival dates.

[b] Unidentified species identification based on PIRO Observer Program classifications. Unidentified cetacean refers to a marine mammal not including pinnipeds (seal or sea lion); unidentified whale refers to a large whale; unidentified dolphin refers to a small cetacean with a visible beak; and unidentified beaked whale refers to an animal in the Ziphiidae family. Further classifications based on observer description, sketches, photos, and videos may be available from the Pacific Islands Fisheries Science Center.

[c] This dolphin was later identified as a striped dolphin but is listed as an unidentified dolphin in the 2015 Annual Observer Report.

Source: Take data—2002-2020 PIRO Observer Program Annual and Quarterly Status Reports, PIRO Sustainable Fisheries Division unpublished data.

#### 3.3.2.4.1 Comparison of Interactions with ITS

The 2023 Biological Opinion includes ITSs for marine mammal species protected under the ESA based on the maximum 5-year running sum for each species, which includes sperm whales and the MHI insular DPS of false killer whales (Table 69). The new ITS went into effect May 18, 2023. For the purposes of monitoring the ITS, all captures in 2023 will count towards the first year of the 5-year term. Exceeding the maximum 5-year running sum within any 5 consecutive years will lead to reinitiating consultation of the impact of this fishery on these species.

NMFS uses the interaction date for tracking marine mammal interactions against the ITS, regardless of vessel arrival date. Prior to 2021, NMFS in its PIRO Observer Program Quarterly and Annual Reports counted marine mammal interactions based on vessel arrival dates. For this reason, the number of quarterly or annual marine mammal interactions counted against an ITS may vary from those reported in the Observer Program's quarterly and annual reports.

Table 69. Estimated total interactions (extrapolated using quarterly observer coverage) of cetaceans in the Hawaii deep-set longline fishery compared to the 5–year running sum ITS in the 2024 Biological Opinion[a]

| Species | 5-year Running Sum ITS Interactions | Estimated Total Interactions | |
|---|---|---|---|
| | | 2023 | 2024 |
| Sperm whale | 6 | 0 | 0 |
| MHI insular false killer whale | 0.427 or 1 observed | Data not yet available. | Data not yet available. |

[a] Takes are counted based on interaction date.

#### 3.3.2.4.2 Comparison of Interactions with PBR under the MMPA

Marine mammal takes against the PBR are monitored through the SARs. A summary of the current mean estimated annual M&SI and the PBR for stocks relevant to the Hawaii deep-set longline fishery is presented in Table 70. The PBR of a stock reflects only marine mammals of that stock observed within the EEZ around Hawaii, with the exception of the Hawaii stock of humpback whales for which PBR applies to the entire stock. The mean estimated annual M&SI specified in the SARs includes only interactions determined as mortalities and serious injuries and not interactions classified as non-serious injuries.

For most marine mammal stocks where the PBR is available, the number of observed takes of marine mammal species in the deep-set longline fishery inside the EEZ around Hawaii is well below the PBR in the time period covered by the most current SAR (Table 70).

The M&SI interactions inside the Hawaii EEZ for the HI Pelagic stock of false killer whales previously exceeded the PBR for this stock. A False Killer Whale Take Reduction Team was formed in 2010 pursuant to the MMPA to address incidental takes of false killer whales in the Hawaii-permitted longline fisheries. NMFS implemented the False Killer Whale Take Reduction Plan in 2012. The objective of the plan is to reduce mortality and serious injury of false killer whales in the Hawaii-permitted longline fisheries.

Monitoring of false killer whale interactions in the MHI Insular and HI Pelagic stocks is ongoing under the False Killer Whale Take Reduction Plan. In the 2023 SAR, NMFS began using the pelagic stock assessment area defined using all genetic, telemetry, sighting and bycatch location known or assumed to be of pelagic stock animals. The M&SI interactions within this assessment

area for the 2017-2021 period was 47, which exceeds the PBR of 36 for the same area. PBR for inside the Hawaii EEZ is 15, and the corresponding MSI is 16.8 (Table 70).

On July 24, 2018, the Southern Exclusion Zone (SEZ) was closed pursuant to the False Killer Whale Take Reduction Plan following two false killer whale interactions within the EEZ resulting in a M&SI (83 FR 33848). The SEZ was closed for the remainder of the year and was reopened on January 1, 2019. On February 22, 2019, the SEZ closed from reaching the closure trigger (84 FR 5356), and was reopened on August 25, 2020, after at least one of the reopening criteria defined in the Take Reduction Plan implementing regulations was met (85 FR 50959). In 2021, the revised SEZ trigger of four M&SI was met, but SEZ did not close because the fourth interaction was not confirmed until January 2022 when the timeframe for closing the SEZ in 2021 had passed (87 FR 12941). The SEZ trigger was not met in 2022 and 2023.

On February 23, 2024, NMFS announced a revision to the SEZ trigger from four to three M&SI due to a change in observer coverage levels for the Hawaii deep-set longline fishery (89 FR 13694). The SEZ trigger was not met in 2024.

Table 70. Mean estimated annual M&SI and PBR by marine mammal stocks with observed interactions in the Hawaii deep-set longline fishery

| Stock | Years Included in 2023 SAR | Outside EEZ[a] | Inside EEZ[b] | |
|---|---|---|---|---|
| | | Mean Estimated Annual M&SI | Mean Estimated Annual M&SI | PBR (Inside EEZ only) |
| Bottlenose dolphin, HI Pelagic | 2017-2021 | 5.6 | 0 | 158 |
| Pantropical spotted dolphin, HI Pelagic | 2017-2021 | N/A | N/A | 538 |
| Rough-toothed dolphin, HI | 2017-2021 | 4.4 | 3.2 | 511 |
| Risso's dolphin, HI | 2017-2021 | 5.0 | 0 | 53 |
| Striped dolphin, HI | 2017-2021 | 0 | 0 | 511 |
| Blainville's beaked whale, HI | 2014-2018 | 0 | 0 | 5.6 |
| False killer whale, MHI Insular | 2017-2021 | N/A | 0.1 | 0.3 |
| False killer whale, HI Pelagic | 2017-2021 | 30.0 | 16.8 | 15 |
| False killer whale, NWHI | 2017-2021 | N/A | 0.2 | 1.43 |
| False killer whale, Palmyra Atoll | 2006-2010 | N/A | 0.3 | 6.4 |
| Kogia spp. whale (Pygmy or dwarf sperm whale), HI | 2014-2018 | Pygmy = 0<br>Dwarf = 0 | Pygmy = 0<br>Dwarf = 0 | Pygmy = 257<br>Dwarf = undetermined |
| Pygmy killer whale, HI | 2014-2018 | 0 | 0 | 59 |
| Short-finned pilot whale, HI | 2017-2021 | 0.3 | 0.9 | 87 |
| Humpback whale, HI | 2016-2020 | 0 | | 127[c] |
| Sperm whale, HI | 2014-2018 | 0 | 0 | 18 |

[a] PBR estimates are not available for portions of the stock outside of the U.S. EEZ around Hawaii, except for the Central North Pacific stock of humpback whales for which PBR applies to the entire stock.
[b] PBR estimates are only available for portions of the stock within the U.S. EEZ around Hawaii.
[c] PBR for the Hawaii stock for humpback whales apply to the entire stock.
Source: Final 2022 Marine Mammal SARs.

### 3.3.2.5 SEABIRD INTERACTIONS IN THE HAWAII DEEP-SET LONGLINE FISHERY

The incidental take data in this section were compiled from the PIRO Observer Program Annual Status Reports and are for monitoring purposes. Many of these interactions have been further examined by NMFS, and updated information necessary for any data analyses is available from NMFS. Observed take data are expanded to represent the estimated number of annual incidental takes for the entire fishery by PIFSC (hereafter "ME"). When ME are not available, a standard expansion factor estimate is listed in the table (EF Est. = 100 / % observer coverage * # takes).

Interaction data provided here may vary slightly from other sources depending on how interactions were reported (date of trip departure or arrival, set date, or haul date in a given year). NMFS annually publishes the report *Seabird Interactions and Mitigation Efforts in Hawaii Longline Fisheries* (Seabird Annual Report), which includes verified numbers of seabird interactions and information on fishing regulations and effort, interaction rates, and band recovery data for seabirds caught in the shallow-set and deep-set fisheries. Recent reports are available at: https://www.fisheries.noaa.gov/pacific-islands/bycatch/seabird-interactions-pelagic-longline-fishery.

Table 71 and Table 72 summarize the incidental take data of seabirds from 2002 to 2023 in the Hawaii deep-set longline fishery. The most common observed interactions during this time period involved black-footed albatrosses and Laysan albatrosses. Additional takes of unidentified shearwaters, sooty shearwaters, brown boobies, red-footed boobies, unidentified gulls, unidentified albatross, and unidentified seabirds have been observed. Most of the unidentified shearwaters have been identified as sooty shearwaters (NMFS 2016). There have been no observed takes of short-tailed albatrosses by this fishery. Interactions with sooty shearwaters and boobies are relatively infrequent.

Interactions with black-footed albatrosses beginning in 2015 were substantially higher compared to previous years with the highest number observed in 2018. From 2019 to 2023, the observed number of black-footed albatross interactions has declined every year returning to pre 2015 interaction rates in 2023. In 2024, black-footed and Laysan albatross interactions declined to low levels due to very little fishing effort north of the main Hawaiian Islands during the first and second quarters.

Black-footed albatross nests in the Northwestern Hawaiian Islands, and their main foraging habitat while nesting are the productive fronts to the north and east of the Hawaiian Islands. During a positive Pacific Decadal Oscillation (PDO), an intensification of the Westerlies displaces the frontal region to the south bringing with it cold productive waters, increasing the overlap between the albatross forage area and the deep-set longline fishing grounds, which in turn contribute to an increase in interactions with the longline fleet (Wren et al. 2019; Hyrenbach et al. 2021). During a negative PDO, the westerlies relax and the productive fronts the birds forage in are displaced northward reducing the overlap between the albatross foraging grounds and the deep-set longline fishing grounds, resulting in a reduction in interactions. The most recent positive PDO ended in 2016, and current conditions are in a negative PDO phase. PDO works in combination with El Niño Southern Oscillation (ENSO) where El Niño enhances (dampens) a positive (negative) PDO while a La Niña dampens (enhances) it. These large scale climate variabilities may in part explain why black-footed albatross interactions with the deep-set

longline fishery peaked in 2019, which was a negative PDO and El Niño year, and has been declining ever since (negative PDO and La Niña).

In response to the higher BFAL interactions in the DSLL fishery beginning in 2015, the Council convened two workshops in 2017 and 2018. The 2017 workshop explored the causes of higher BFAL interactions (Hyrenbach et al. 2021), and the 2018 workshop reviewed seabird mitigation requirements and the best scientific information available for the Hawaii longline fishery (Gilman and Ishizaki 2018). The 2018 workshop identified blue-dyed bait as a candidate for removal from the existing suite of seabird mitigation measures, and identified deterrents such as tori lines to be a high priority for further research as a potential alternative to blue-dyed bait. Two joint cooperative research projects by the Council, Hawaii Longline Association, PIFSC and PIRO were implemented between 2019 and 2021 to design and test tori lines for use in the Hawaii deep-set longline fishery as an alternative mitigation measure to blue-dyed bait. The results of the studies showed that tori lines are significantly more effective in deterring albatross attempts and contacts on fishing gear compared to blue-dyed bait (Chaloupka et al. 2021; Gilman et al. 2021). The Council at its 189th Meeting on December 7-9, 2021, took final action and recommended regulatory amendments under the Pelagic FEP to improve the overall operational practicality and mitigation efficacy of required measures for the Hawaii deep-set longline fishery. Specifically, the Council recommended replacing blue-dyed thawed bait and strategic offal discharge measures required for stern-setting deep-set longline vessels with a new tori line requirement. In lieu of a regulatory requirement for a strategic offal discharge measure, the Council recommended implementing best practices training on offal management as part of the annual protected species workshop, based on the best practices as presented, or any update thereof. The Council additionally recommended tori line regulatory specifications. NMFS published the proposed rule for this regulatory amendment on October 17, 2023 (88 FR 71523), and final rule on March 1, 2024 (89 FR 15062). The regulatory amendment took effect on April 1, 2024. Additional history on this regulatory change is described in the regulatory amendment (WPRFMC and NMFS 2023).

#### 3.3.2.5.1 Comparison of Interactions with ITS

The short-tailed albatross ITS in the USFWS 2012 Biological Opinion for the Hawaii longline fishery is two incidental takes every five years in the deep-set fishery. Exceeding this number will lead to reinitiating consultation of the impact of this fishery on the species. Since there have been no observed takes of short-tailed albatrosses in the fishery, the ITS has not been exceeded as of the end of 2023.

Table 71. Observed takes, mortalities (M), takes per fishing effort (sets and 1,000 hooks), and estimated annual takes using expansion factor estimates and ME for albatross species in the Hawaii deep-set longline fishery, 2002-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Laysan albatross | | | | Black-footed albatross | | | | Unidentified albatross | | | | Short-tailed albatross |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed |
| | | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/1,000 hooks | | | Takes (M) |
| 2002 | 24.6 | 3,523 | 6,786,303 | 16(13) | 0.0024 | 65 | - | 18(17) | 0.0027 | 73 | - | 0 | 0.0000 | 0 | - | 0 |
| 2003 | 22.2 | 3,204 | 6,442,221 | 44(44) | 0.0068 | 198 | - | 24(23) | 0.0037 | 108 | - | 0 | 0.0000 | 0 | - | 0 |
| 2004 | 24.6 | 3,958 | 7,900,681 | 2(2) | 0.0003 | - | 10 | 4(4) | 0.0005 | - | 16 | 0 | 0.0000 | 0 | - | 0 |
| 2005 | 26.1 | 4,602 | 9,360,671 | 6(6) | 0.0006 | - | 43 | 12(12) | 0.0013 | - | 82 | 0 | 0.0000 | 0 | - | 0 |
| 2006 | 21.2 | 3,605 | 7,540,286 | 1(1) | 0.0001 | - | 7 | 17(17) | 0.0023 | - | 70 | 0 | 0.0000 | 0 | - | 0 |
| 2007 | 20.1 | 3,506 | 7,620,083 | 7(7) | 0.0009 | - | 44 | 14(14) | 0.0018 | - | 77 | 0 | 0.0000 | 0 | - | 0 |
| 2008[d] | 21.7 | 3,915 | 8,775,951 | 14(13) | 0.0016 | - | 55 | 34(33) | 0.0039 | - | 118 | 0 | 0.0000 | 0 | - | 0 |
| 2009 | 20.6 | 3,520 | 7,877,861 | 18(18) | 0.0023 | - | 60 | 23(23) | 0.0029 | - | 110 | 0 | 0.0000 | 0 | - | 0 |
| 2010 | 21.1 | 3,580 | 8,184,127 | 39(38) | 0.0048 | - | 155 | 17(17) | 0.0021 | - | 65 | 0 | 0.0000 | 0 | - | 0 |
| 2011 | 20.3 | 3,540 | 8,260,092 | 32(31) | 0.0039 | - | 187 | 13(12) | 0.0016 | - | 73 | 0 | 0.0000 | 0 | - | 0 |
| 2012 | 20.4 | 3,659 | 8,768,728 | 30(25) | 0.0034 | - | 136 | 35(35) | 0.0040 | - | 167 | 0 | 0.0000 | 0 | - | 0 |
| 2013 | 20.4 | 3,830 | 9,278,133 | 48(46) | 0.0052 | - | 236 | 50(47) | 0.0054 | - | 257 | 0 | 0.0000 | 0 | - | 0 |
| 2014 | 20.8 | 3,831 | 9,608,244 | 13(10) | 0.0014 | - | 77 | 32(29) | 0.0033 | - | 175 | 0 | 0.0000 | 0 | - | 0 |
| 2015 | 20.6 | 3,728 | 9,393,234 | 24(22) | 0.0026 | - | 119 | 107(92) | 0.0114 | - | 541 | 0 | 0.0000 | 0 | - | 0 |
| 2016 | 20.1 | 3,880 | 9,872,439 | 34(32) | 0.0034 | - | 166 | 104(99) | 0.0105 | - | 485 | 1(1) | 0.0003 | - | 7 | 0 |
| 2017 | 20.4 | 3,832 | 10,148,195 | 38(38) | 0.0037 | - | 226 | 97(85) | 0.0096 | - | 471 | 0 | 0.0000 | 0 | - | 0 |
| 2018 | 20.4 | 4,332 | 11,751,144 | 33(29) | 0.0028 | - | 157 | 194(168) | 0.0165 | - | 931 | 0 | 0.0000 | 0 | - | 0 |
| 2019 | 20.5 | 4,697 | 12,948,077 | 45(44) | 0.0035 | - | 231 | 146(139) | 0.0113 | - | 767 | 0 | 0.0000 | 0 | - | 0 |
| 2020 | 15.25 | 3,131 | 8,738,011 | 59(55) | 0.0068 | - | 315 | 96(87) | 0.0110 | - | 590 | 0 | 0.0000 | 0 | - | 0 |
| 2021 | 17.84 | 3,972 | 11,454,331 | 38(35) | 0.0033 | - | 244 | 87(80) | 0.0076 | - | 536 | 0 | 0.0000 | 0 | - | 0 |
| 2022 | 20.22 | 4,314 | 12,473,293 | 56(56) | 0.0045 | - | 366 | 47(45) | 0.0038 | - | 269 | 0 | 0.0000 | 0 | - | 0 |
| 2023 | 17.41 | 3,807 | 10,988,431 | 11(11) | 0.0010 | - | 68 | 32(31) | 0.0029 | - | 208 | 0 | 0.0000 | 0 | - | 0 |
| 2024 | 13.35 | 2,795 | 8,174,744 | 3(3) | 0.0004 | 22 | - | 8(8) | 0.0010 | 60 | - | 0 | 0.0000 | 0 | - | 0 |

[a] Take and effort data are based on vessel arrival dates. Source: Take data—2002-2019 PIRO Observer Program Annual and Quarterly Status Reports, PIRO Sustainable Fisheries Division unpublished data.
ME—(McCracken 2005, 2006, 2017b, 2017c, 2019b, 2007, 2008, 2009, 2010, 2011b, 2012, 2013, 2014; McCracken and Cooper 2020, 2022d)

Table 72. Observed takes, mortalities (M), takes per fishing effort (sets and 1,000 hooks), and estimated annual takes using expansion factor estimates and ME for other seabird species in the Hawaii deep-set longline fishery, 2002-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Booby species | | | | Sooty shearwater | | | Unidentified shearwater | | | | Unidentified gull | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | Observed | | EF Est. | ME | Observed | | EF Est. | ME |
| | | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | |
| 2002 | 24.6 | 3,523 | 6,786,303 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | - |
| 2003 | 22.2 | 3,204 | 6,442,221 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | - |
| 2004 | 24.6 | 3,958 | 7,900,681 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 2(2) | 0.0003 | 8 | - | 0 | 0.0000 | - | - |
| 2005 | 26.1 | 4,602 | 9,360,671 | 1(1)[b] | 0.0001 | 4 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | - |
| 2006 | 21.2 | 3,605 | 7,540,286 | 0 | 0.0000 | 0 | - | 3(3) | 0.0004 | 14 | 2(2)[c] | 0.0003 | 9 | - | 0 | 0.0000 | - | - |
| 2007 | 20.1 | 3,506 | 7,620,083 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | - |
| 2008[d] | 21.7 | 3,915 | 8,775,951 | 1[e] | 0.0001 | - | 4 | 0 | 0.0000 | 0 | 14(14)[c] | 0.0016 | - | 62 | 0 | 0.0000 | - | - |
| 2009 | 20.6 | 3,520 | 7,877,861 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 4(4)[c] | 0.0005 | - | 24 | 0 | 0.0000 | - | - |
| 2010 | 21.1 | 3,580 | 8,184,127 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 1(1)[c] | 0.0001 | - | 0 | 0 | 0.0000 | - | - |
| 2011 | 20.3 | 3,540 | 8,260,092 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 3(3)[c] | 0.0004 | - | 19 | 0 | 0.0000 | - | - |
| 2012 | 20.4 | 3,659 | 8,768,728 | 0 | 0.0000 | - | 0 | 1(1) | 0.0001 | 5 | 6(6)[c] | 0.0007 | - | 36 | 0 | 0.0000 | - | - |
| 2013 | 20.4 | 3,830 | 9,278,133 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 8(8)[c] | 0.0009 | - | 43 | 0 | 0.0000 | - | - |
| 2014 | 20.8 | 3,831 | 9,608,244 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 1(1)[c] | 0.0001 | - | 7 | 0 | 0.0000 | - | - |
| 2015 | 20.6 | 3,728 | 9,393,234 | 1(1)[g] | 0.0001 | - | 6 | 5(4) | 0.0005 | 5 | 0 | 0.0000 | - | 21[f] | 0 | 0.0000 | - | - |
| 2016 | 20.1 | 3,880 | 9,872,439 | 2(1)[g] | 0.0002 | - | 12 | 4(4) | 0.0004 | 20 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | - |
| 2017 | 20.4 | 3,832 | 10,148,195 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | - | 0 | 1 | 0.0001 | - | 6 |
| 2018 | 20.4 | 4,332 | 11,751,144 | 2(2)[h] | 0.0002 | - | 11 | 0 | 0.0000 | 0 | 10(10) | 0.0009 | - | 40 | 0 | 0.0000 | - | 0 |
| 2019 | 20.5 | 4,697 | 12,948,077 | 1(1)[i] | 0.0001 | - | 4 | 0 | 0.0000 | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2020 | 15.25 | 3,131 | 8,738,011 | 1(1)[j] | 0.0001 | - | 5 | 1(1) | 0.0001 | 7 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2021 | 17.84 | 3,972 | 11,454,331 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 2 | 0.0000 | - | 9 | 0 | 0.0000 | - | 0 |
| 2022 | 20.22 | 4,314 | 12,473,293 | 1(1)[j] | 0.0001 | - | 6 | 0 | 0.0000 | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 |
| 2023 | 17.41 | 3,807 | 10,988,431 | 2(1) | 0.0002 | - | 12 | 1 | 0.0001 | 6 | 0 | 0.0000 | 0 | 0 | 0 | 0.0000 | - | 0 |
| 2024 | 13.35 | 2,795 | 8,174,744 | 1(1) | 0.0001 | 7 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - |

[a] Take and effort data are based on vessel arrival dates.
[b] This animal was identified as a brown booby on the 2005 PIRO Observer Program Annual and Quarterly Status reports.
[c] These were later identified as sooty shearwaters in NMFS Seabird Interactions and Mitigation Efforts in Hawaii Longline Fisheries (Seabird Annual Report).
[d] One *unidentified seabird* was released injured in the second quarter of 2008 (takes/1,000 hooks < 0.001, ME = 2).
[e] This animal was identified as a red-footed booby on the 2008 PIRO Observer Program Annual and Quarterly Status reports.
[f] These birds were identified as sooty shearwaters in the 2015 PIRO Observer Program Annual and Quarterly Status reports.
[g] These birds were identified as red-footed boobies in the 2015 and 2016 PIRO Observer Program Annual and Quarterly Status reports.
[h] One of the booby species was identified as a red-footed booby and one was identified as a brown booby on the 2018 PIRO Observer Program Annual and Quarterly Status reports.
[i] This animal was identified as a brown booby in the 2019 PIRO Observer Program Annual and Quarterly Status reports.
[j] This animal was identified as a brown booby in the unpublished observer data.
[k] One of the booby species was identified as a red-footed booby and one was identified as a masked booby in the unpublished observer data
Source: Take data—2002-2020 PIRO Observer Program Annual and Quarterly Status Reports, PIRO Sustainable Fisheries Division unpublished data.
ME—(McCracken 2005, 2006, 2017b, 2017c, 2019b, 2007, 2008, 2009, 2010, 2011b, 2012, 2013, 2014; McCracken and Cooper 2020, 2022d)

### 3.3.2.6 ELASMOBRANCH INTERACTIONS IN THE HAWAII DEEP-SET LONGLINE FISHERY

Table 73 summarizes the incidental take data for the Indo-West Pacific DPS of scalloped hammerhead sharks, oceanic whitetip sharks, and giant manta rays in the Hawaii deep-set longline fishery. The most common observed interactions from 2004 to 2023 were of oceanic whitetip sharks, with giant manta rays observed infrequently. Three observed interactions with the Indo-West Pacific DPS of scalloped hammerhead shark have been recorded since 2004. Observed take data are expanded to represent the estimated number of annual incidental takes for the entire fishery by PIFSC (referred to in this document as "ME"). When ME are not available, a standard expansion factor estimate is listed in the table (EF Est. = 100 / % observer coverage * # takes).

The scalloped hammerhead shark data only include interactions that occurred within the range of the Indo-West Pacific DPS of scalloped hammerhead sharks, and do not include interactions occurred within the range of the Central Pacific DPS, which is not listed under the ESA. Giant manta rays were listed under the ESA on January 22, 2018 (83 FR 2916), and oceanic whitetip sharks were listed on January 30, 2018 (83 FR 4153).

In an effort to reduce impacts to oceanic whitetip sharks in the Hawaii deep-set longline fishery, the Hawaii Longline Association (HLA) announced in late 2020 that its members, comprising more than 90% of the Hawaii deep-set longline fleet of approximately 146 active vessels, would voluntarily switch from wire to monofilament leaders. At the 186th meeting in June 2021, the Council recommended that wire leaders be prohibited in the Hawaii deep-set fishery, along with the requirement to remove trailing gear in all longline fisheries operating under the Pelagic FEP. The proposed rule for this regulatory amendment was published on January 19, 2022 (87 FR 2742) and the final rule published on April 28, 2022 (87 FR 25153) with an effective date of May 31, 2022.

Oceanic whitetip shark interactions in 2024 were significantly higher than in previous years, likely driven in part due to high effort south of the MHI and closer to equatorial waters, where there are higher densities of oceanic whitetip shark populations especially between 10˚N and 10˚S (NMFS 2024). The higher interactions may also be associated with potential increases in population density in the region because of international management measures prohibiting retention of the species through IATTC since 2011 and WCPFC since 2013 (WCPFC measure implemented under U.S. regulations in 2015), but these require further investigation. A new stock assessment for the oceanic whitetip shark in the WCPO is expected in 2025.

Table 73. Observed takes, mortalities (M), takes per fishing effort (sets and 1,000 hooks), and estimated annual takes using expansion factor estimates and ME for ESA-listed elasmobranch species in the Hawaii deep-set longline fishery, 2004-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Scalloped hammerhead shark | | | | Oceanic whitetip shark | | | | Giant manta ray | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME |
| | | | | Takes (M[b]) | Takes/ 1,000 hooks | | | Takes (M[b]) | Takes/ 1,000 hooks | | | Takes (M[b]) | Takes/ 1,000 hooks | | |
| 2004 | 24.6 | 3,958 | 7,900,681 | 2 | 0.0003 | - | 6 | 434(101) | 0.0549 | - | 2,938 | 1 | 0.0001 | - | 3 |
| 2005 | 26.1 | 4,602 | 9,360,671 | 0 | 0.0000 | - | 0 | 341(80) | 0.0364 | - | 1,282 | 2 | 0.0002 | - | 7 |
| 2006 | 21.2 | 3,605 | 7,540,286 | 0 | 0.0000 | - | 0 | 331(78) | 0.0439 | - | 1,346 | 2(1) | 0.0003 | - | 11 |
| 2007 | 20.1 | 3,506 | 7,620,083 | 1 | 0.0001 | - | 7 | 262(72) | 0.0344 | - | 1,341 | 2 | 0.0003 | - | 5 |
| 2008 | 21.7 | 3,915 | 8,775,951 | 0 | 0.0000 | - | 0 | 144(36) | 0.0164 | - | 741 | 2 | 0.0002 | - | 10 |
| 2009 | 20.6 | 3,520 | 7,877,861 | 0 | 0.0000 | - | 0 | 244(55) | 0.0310 | - | 1,236 | 4 | 0.0005 | - | 23 |
| 2010 | 21.1 | 3,580 | 8,184,127 | 0 | 0.0000 | - | 0 | 253(44) | 0.0309 | - | 1,198 | 17(1) | 0.0021 | - | 95 |
| 2011 | 20.3 | 3,540 | 8,260,092 | 0 | 0.0000 | - | 0 | 225(43) | 0.0272 | - | 1,176 | 1 | 0.0001 | - | 5 |
| 2012 | 20.4 | 3,659 | 8,768,728 | 0 | 0.0000 | - | 0 | 172(38) | 0.0196 | - | 878 | 2 | 0.0002 | - | 11 |
| 2013 | 20.4 | 3,830 | 9,278,133 | 0 | 0.0000 | - | 0 | 196(36) | 0.0211 | - | 973 | 1 | 0.0001 | - | 5 |
| 2014 | 20.8 | 3,831 | 9,608,244 | 0 | 0.0000 | - | 0 | 374(68) | 0.0389 | - | 1,670 | 3 | 0.0003 | - | 11 |
| 2015 | 20.6 | 3,728 | 9,393,234 | 0 | 0.0000 | - | 0 | 531(139) | 0.0565 | - | 2,654 | 2 | 0.0002 | - | 10 |
| 2016 | 20.1 | 3,880 | 9,872,439 | 0 | 0.0000 | - | 0 | 423(123) | 0.0428 | - | 2,188 | 4 | 0.0004 | - | 22 |
| 2017 | 20.4 | 3,832 | 10,148,195 | 0 | 0.0000 | - | 0 | 242(57) | 0.0238 | - | 1,257 | 0 | 0.0000 | - | 0 |
| 2018 | 20.4 | 4,332 | 11,751,144 | 0 | 0.0000 | - | 0 | 224(62) | 0.0191 | - | 1,092 | 1 | 0.0001 | - | 3 |
| 2019 | 20.5 | 4,697 | 12,948,077 | 0 | 0.0000 | - | 0 | 435(99) | 0.0336 | - | 2,125 | 0 | 0.0000 | - | 0 |
| 2020 | 15.25 | 3,131 | 8,738,011 | 0 | 0.0000 | 0 | - | 302(83) | 0.0346 | - | 1,959 | 1 | 0.0001 | - | 7 |
| 2021 | 17.84 | 3,972 | 11,454,331 | 0 | 0.0000 | - | 0 | 522(103) | 0.0456 | - | 3,084 | 2(2) | 0.0002 | - | 11 |
| 2022 | 20.22 | 4,314 | 12,473,293 | 0 | 0.0000 | - | 0 | 480(130) | 0.0385 | - | 2,362 | 0 | 0.0000 | - | 0 |
| 2023 | 17.41 | 3,807 | 10,988,431 | 0 | 0.0000 | - | 0 | 452(134) | 0.0411 | - | 2,593 | 2 | 0.0002 | - | 11 |
| 2024 | 13.35 | 2,795 | 8,174,744 | 0 | 0.0000 | 0 | - | 814(235) | 0.0996 | 6,097 | - | 4 | 0.0005 | 30 | - |

[a] Take and effort data are based on vessel arrival dates.
[b] Mortality numbers include animals that were released dead, finned (prior to passage of the Shark Conservation Act of 2010), and kept. Source: NMFS 2014 (2004-2013), PIRO Sustainable Fisheries Division unpublished data (2014-2018),(McCracken 2019a; McCracken and Cooper 2020, 2021, 2024).

#### 3.3.2.6.1 Comparison of Interactions with ITS

An ITS is not required to provide protective coverage for the ESA listed elasmobranchs including the Indo-West Pacific scalloped hammerhead shark DPS, the oceanic whitetip shark, or the giant manta ray, because there are no take prohibitions under ESA section 4(d) for these species. However, ITS were included for these species in their relevant Biological Opinions to serve as a check on the no-jeopardy conclusions by providing a reinitiation trigger.

The 2023 Biological Opinion includes ITSs for ESA listed elasmobranchs based on a maximum 5-year running sum for each species (Table 74). The new ITS went into effect May 18, 2023. For the purposes of monitoring the ITS, all captures in 2023 will count towards the first year of the 5-year term. Exceeding the maximum 5-year running sum within any 5 consecutive years will lead to reinitiating consultation of the impact of this fishery on these species.

NMFS counts takes for the Indo-West Pacific DPS of scalloped hammerhead shark, oceanic whitetip shark, and giant manta ray based on the end of haul incidental take date.

Table 74. Estimated total interactions (extrapolated using quarterly observer coverage) of oceanic whitetip sharks and giant manta rays in the Hawaii deep-set longline fishery compared to the 5-year running sum ITS in the 2024 Biological Opinion[a]

| Species | 5-year Running Sum ITS | Estimated Total Interactions | |
|---|---|---|---|
| | | 2023 | 2024 |
| Scalloped hammerhead shark, Indo-West Pacific DPS | 14 | 0 | 0 |
| Oceanic whitetip shark | 10,589 | 2,568 | 6,474 |
| Giant manta ray | 181 | 12 | 59 |
| *Manta/Mobula*[b] | | 110 | 7 |

[a] Take data are based on haul begin dates.
[b] 12% of manta/mobula interactions are also tracked as the ITS for giant manta ray was based on interaction data that included rays classified as manta/mobula in the observer record that may have been giant manta rays.

#### 3.3.2.6.2 Effectiveness of FEP Conservation Measures

In June 2021, the Council recommended a regulatory amendment that would prohibit wire leaders in the Hawaii deep-set fishery and require removal of trailing gear for oceanic whitetip sharks in all longline fisheries operating under the Pelagic FEP. The rule change took effect in May 2022.

During 2021, the Hawaii deep-set longline fleet initiated the voluntary transition from wire to monofilament nylon leaders. Figure 158 shows the monthly proportion of leader material used for observed sets, with most of the vessels using monofilament nylon leaders by December 2021.

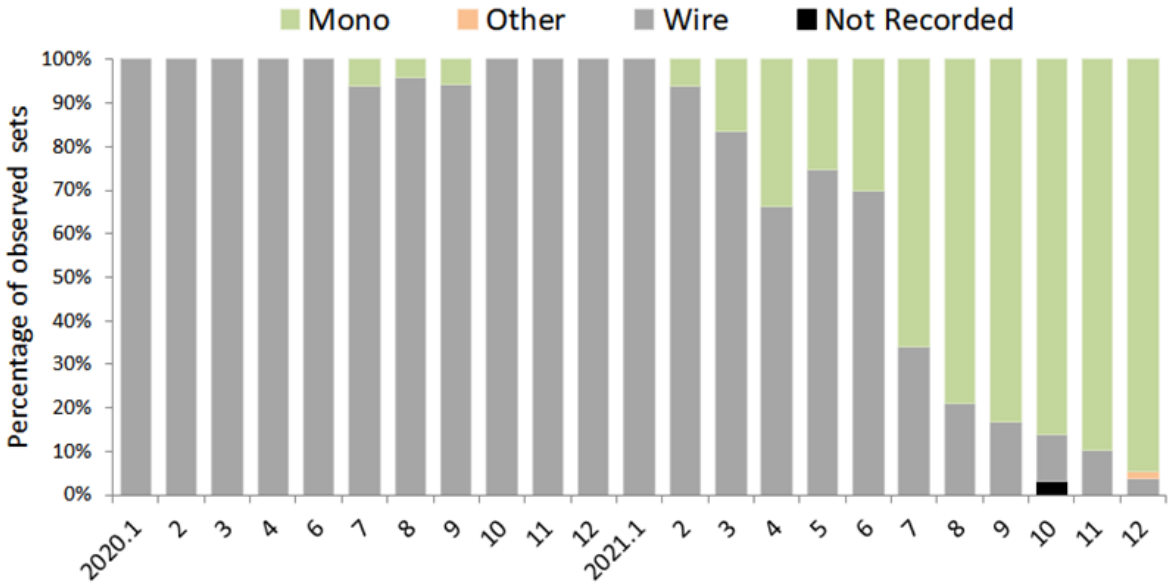



Figure 155. Leader material (based on observed sets) used in the Hawaii deep-set longline fishery by month before and during the voluntary transition period (2020–2021)

As part of the final action for the regulatory amendment, the Council recommended that observer data on leader material used in the Hawaii deep-set longline fishery be reported in the Annual Pelagic SAFE Report to track proportion of effort using leader material other than monofilament nylon. The annual proportion of leader material used for observed sets are shown in Table 76. In 2022, less than 6%, in 2023, less than 3%, and in 2024, 0% of observed sets used leader material other than monofilament nylon.

Table 75. Annual proportion of leader material used in the Hawaii deep-set longline fishery by month, 2020-2024[a]

| Year | Obs sets | Mono | | Wire | | Other | | Not Recorded | |
|---|---|---|---|---|---|---|---|---|---|
| | | n | % | n | % | n | % | n | % |
| 2020 | 3131 | 48 | 1.5% | 3083 | 98.5% | 0 | 0.0% | 0 | 0.0% |
| 2021 | 3972 | 2185 | 55.0% | 1775 | 44.7% | 0 | 0.0% | 12 | 0.3% |
| 2022[b] | 4314 | 4059 | 94.1% | 224 | 5.2% | 31 | 0.7% | 0 | 0.0% |
| 2023 | 3807 | 3703 | 97.3 | 84 | 2.2% | 20 | 0.5% | 0 | 0.0% |
| 2024 | 2796 | 2796 | 100% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |

[a] Based on leader material recorded for each observed set, by vessel arrival date.
[b] Wire leader prohibition went into effect in May 2022.

A new data collection form for the observer program was created in 2022 to track detailed information on protected elasmobranch interaction events and handling. The first shark recorded on this form was on April 29, 2022. Based on haul begin date, of the 327 oceanic whitetip shark events recorded on this new form in 2022, 29% were cut below the weight, 51% were estimated to have 1m or less line remaining, and the average length of branch line left on an oceanic whitetip shark after cutting the line was 2.8 m (Table 76). Of the 440 oceanic whitetip shark events recorded on this form in 2023, 30% were cut below the weight,

51% were estimated to have 1m or less line remaining and the average length of branch line left on an oceanic whitetip shark after cutting the line was 2.7 m. Of the 816 oceanic whitetip shark events recorded on this form in 2024, 46% were cut below the weight, 60% were estimated to have 1m or less line remaining, and the average length of branch line left on an oceanic whitetip shark after cutting the line was 2.5 m. Prior to the wire leader prohibition, the line was rarely cut below the weight due to difficulty of cutting through the wire from deck height, and the best available estimate of the average length of trailing gear remaining on an oceanic whitetip shark in the Hawaii deep-set longline fishery was 5.44 m (Hutchinson et al. 2021). The handling outcomes data from the new observer form indicate that the new rule on wire leader prohibition and handling requirements that went into effect in May 2022 has reduced the amount of trailing gear left on oceanic whitetip sharks. The additional improvements in 2024 may be reflective of the pilot crew training program initiated in April 2024 (see section 3.3.2.1.1).

Table 76. Summary of oceanic whitetip shark interaction events reported on the observer program's elasmobranch form, 2022-2024.

| Year | Total oceanic whitetip events recorded on form | % of events with line cut below weight | % of events with ≤1m line remaining | Average length of branch line left |
|---|---|---|---|---|
| 2022[a] | 327 | 29% | 51% | 2.8m |
| 2023 | 440 | 30% | 51% | 2.7m |
| 2024 | 816 | 46% | 60% | 2.5m |

[a] Partial year data; first record on form was on April 29, 2022.

## 3.3.3 AMERICAN SAMOA LONGLINE FISHERY

### 3.3.3.1 INDICATORS FOR MONITORING PROTECTED SPECIES INTERACTIONS AND EFFECTIVENESS OF MANAGEMENT MEASURES IN THE AMERICAN SAMOA LONGLINE FISHERY

In this annual report, the Council monitors protected species interactions in the American Samoa longline fishery using the following indicators:

- General interaction trends over time
- Effectiveness of FEP conservation measures
- Take levels compared to the incidental take statement levels under ESA
- Take levels compared to marine mammal PBRs, where applicable

Details of these indicators are discussed below.

#### 3.3.3.1.1 FEP Conservation Measures

The Pelagic FEP includes conservation measures to mitigate sea turtle interactions in the American Samoa longline fishery. These measures include the following:

- Longline vessel owners/operators are required to adhere to regulations for safe handling and release of sea turtles and seabirds.
- Longline vessel owners/operators must have on board the vessel all required turtle handling/dehooking gear specified in regulations.
- Longline vessel owners/operators are required to remove trailing gear from oceanic whitetip sharks and cut the line as close to the hook as possible.

- Longline vessel owners/operators are required to annually complete a protected species workshop.
- Owners and operators of vessels longer than 40 ft (12.2 m) must use longline gear that meet the following requirements:
    - Each float line must be at least 30 m long.
    - At least 15 branch lines must be attached to the mainline between any two float lines attached to the mainline.
    - Each branch line must be at least 10 m long.
    - No branch line may be attached to the mainline closer than 70 m to any float line.

Additionally, the American Samoa longline fishery has had observer coverage since 2006.

In 2024, the Council initiated development of a regulatory amendment to the Pelagic FEP that would implement a crew training requirement for Hawaii and American Samoa longline fisheries. PIRO Sustainable Fisheries Division, in coordination with the Hawaii Longline Association, PIRO Protected Resources Division, and the Council initiated a one-year pilot crew training program in April 2024. The Council is scheduled to consider final action on the regulatory amendment at the 203rd Council in June 2025.

#### 3.3.3.1.2 ESA Consultations

On May 15, 2023, NMFS issued a Biological Opinion covering all applicable ESA-listed species, which concluded that the fishery is not likely to jeopardize the following species: Leatherback sea turtle, green sea turtles in the East Pacific, East Indian-West Pacific, Southwest Pacific, Central West Pacific and Central South Pacific; olive ridley sea turtles; hawksbill sea turtles, oceanic whitetip sharks, Indo-West Pacific scalloped hammerhead sharks, and giant manta ray (Table 77). The 2023 Biological Opinion also concluded that the fishery is not likely to adversely affect South Pacific loggerhead turtles, sperm whales, or reef-building corals. The new ITSs took effect when the new Biological Opinion was signed. The new ITS has a 5-year term and all captures in 2023 will count towards the first year of the term, although captures prior to the date on the 2023 Biological Opinion signature are exempted under the previous biological opinion.

NMFS has issued ITSs for species with a non-jeopardy determination in the Biological Opinions (Table 78). Exceeding the ITSs requires reinitiation of consultation on the fishery under the ESA.

Additionally, an informal consultation conducted by USFWS in 2011 concluded that the fishery is not likely to adversely affect the Newell's shearwater. NMFS has also determined that the fishery has no effect on three marine mammal species (fin, blue, and sei whale) or three petrel species (Chatham, Fiji, and magenta petrel).

Table 77. Summary of ESA consultations for the American Samoa longline fishery

| Species | Consultation Date | Consultation Type[a] | Outcome[b] |
|---|---|---|---|
| Leatherback turtle | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Olive ridley turtle | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Green turtle, Central South Pacific DPS | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Green turtle, Southwest Pacific DPS | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Green turtle, East Pacific DPS | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Green turtle, Central West Pacific DPS | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Green turtle, East Indian-West Pacific DPS | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Hawksbill turtle | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Loggerhead turtle, South Pacific DPS | 2023-5-15 | BiOp | NLAA |
| Scalloped hammerhead shark, Indo-West Pacific DPS | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Oceanic whitetip shark | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Giant manta ray | 2023-5-15 | BiOp | LAA, non-jeopardy |
| Sperm whale | 2023-5-15 | LOC | NLAA |
| Reef-building corals | 2023-5-15 | BiOp | NLAA |
| Fin whale | 2010-05-12 | No Effects Memo | No effect |
| Blue whale | 2010-05-12 | No Effects Memo | No effect |
| Sei whale | 2010-05-12 | No Effects Memo | No effect |
| Newell's shearwater | 2011-05-19 | LOC (FWS) | NLAA |
| Chatham petrel | 2011-07-29 | No Effects Memo | No effect |
| Fiji petrel | 2011-07-29 | No Effects Memo | No effect |
| Magenta petrel | 2011-07-29 | No Effects Memo | No effect |

[a] BiOp = Biological Opinion; LOC = Letter of Concurrence.
[b] LAA = likely to adversely affect; NLAA = not likely to adversely affect.

Table 78. Summary of ITSs for the American Samoa longline fishery

| Species | ITS Time Period | Takes | Source BiOp |
|---|---|---|---|
| Green turtle | 5-year running sum | 96 | NMFS 2023 |
| Leatherback turtle | 5-year running sum | 48 | NMFS 2023 |
| Olive ridley turtle | 5-year running sum | 61 | NMFS 2023 |
| Hawksbill turtle | 5-year running sum | 30 | NMFS 2023 |
| Scalloped hammerhead shark, Indo-West Pacific DPS[a] | 5-year running sum | 45 | NMFS 2023 |
| Oceanic whitetip shark[a] | 5-year running sum | 3,520 | NMFS 2023 |
| Giant manta ray[a] | 5-year running sum | 57 | NMFS 2023 |

[a] An ITS is not required for the Indo-West Pacific DPS of scalloped hammerhead sharks, oceanic whitetip sharks and giant manta ray due to the lack of take prohibition under ESA section 4(d), but NMFS included an ITS to serve as a check on the no-jeopardy conclusion by providing a re-initiation trigger.

#### 3.3.3.1.3 Non-ESA Marine Mammals

Fishery impacts to marine mammal stocks are primarily assessed and monitored through the SARs prepared pursuant to the MMPA. The SARs include detailed information on these species' geographic range, abundance, PBR estimates, bycatch estimates, and status. The

most recent SARs are available online at https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.

The American Samoa longline fishery is a Category II under the MMPA 2024 LOF (89 FR 12257, February 16, 2024), meaning that this fishery has occasional incidental mortality and serious injuries of marine mammals. The 2024 LOF lists the following marine mammal stocks that are incidentally killed or injured in this fishery:

- False killer whale, American Samoa stock
- Rough-toothed dolphin, American Samoa stock
- Striped dolphin, unknown stock

Most bycatch estimates in the SARs are based on the most recently available 5-year period, but there is a data lag of approximately two years due to the SAR review process. This annual report focuses on available long-term interaction trends and summarizes relevant information from the most recent SAR.

#### 3.3.3.2 DATA SOURCE FOR MONITORING PROTECTED SPECIES INTERACTIONS IN THE AMERICAN SAMOA LONGLINE FISHERY

Protected species interactions in the American Samoa longline fishery have been monitored through mandatory observer coverage since 2006. Observer coverage in the fishery ranged between 6 and 8 percent from 2006-2009, increased to 25 percent in 2010 and 33 percent in 2011. Coverage ranged between 15-22 percent in 2012-2019.

In response to the emerging COVID-19 crisis, and to ensure the safety and protect the health of fishermen, observers, and others, NMFS issued an emergency action on March 27, 2020 (85 FR 17285), to provide the authority, on a case-by-case basis, to waive observer coverage. This action was extended on September 21, 2020 (85 FR 59199) and again on March 29, 2021 (86 FR 16307). Under this emergency action, a NMFS Regional Administrator, Office Director, or Science Center Director had the ability to waive observer coverage requirements if:

- Local, state, or national governments, or private companies or organizations that deploy observers pursuant to NMFS regulations, restrict travel or otherwise issue COVID-19-related social control guidance, or requirement(s) addressing COVID-19-related concerns, such that it is inconsistent with the requirement(s) or not recommended to place an observer(s); or
- No qualified observer(s) are available for placement due to health, safety, or training issues related to COVID-19.

The PIRO Regional Administrator granted waivers on a case-by-case basis consistent with the emergency rule resulting in reduced coverage for the American Samoa longline fishery for 2020 at 2.13%, for 2021 at 4.65%, for 2022 at 8.70%, for 2023 8.82%, and 2024 9.3%. Observer coverage remained below pre-COVID-19 rates in 2022 through 2024 for this fishery due to the logistics and costs of deploying observers in American Samoa. NMFS is looking into designing a program that would allow for easier hire of local observers to increase coverage rates.

This report summarizes protected species interactions in the American Samoa longline fishery since 2006. Data for 2020 and 2021 are not reported due to data confidentiality rules

associated with the low observer coverage. Annual observed interactions are tallied based on vessel arrival date (rather than interaction date) for the purposes of this report for consistency with the methods used to estimate the annual total interactions. Comparison of annual incidental takes within a year to the ITSs are based on the interaction date rather than the vessel arrival date, consistent with the 2015 Biological Opinion and associated supplements. Annual summary data presented in this report may differ from those in the PIRO Observer Program Quarterly and Annual Reports, which began summarizing interaction data by haul begin dates (proxy for interaction date) in 2021.

#### 3.3.3.3 SEA TURTLE INTERACTIONS IN THE AMERICAN SAMOA LONGLINE FISHERY

Table 79 summarizes the incidental take data of sea turtles from 2006 to 2024 in the American Samoa longline fishery. The incidental take data in this section were compiled from the PIRO Observer Program Annual Status Reports and are for monitoring purposes. Many of these interactions have been further examined by NMFS, and updated information necessary for any data analyses is available from PIFSC. Observed take data are expanded to represent the estimated number of incidental takes for the entire fishery by PIFSC (referred to in this document as "McCracken estimates (ME)"). When ME are not available, a standard expansion factor estimate is used (EF Est. = 100 / % observer coverage * # takes). PIFSC generated estimated number of interactions for 2020-2021 based on observer data from 2012-2020 (McCracken and Cooper 2022a, 2022e).

Between 2006 and 2019, the PIRO Observer Program reported interactions with green, leatherback, olive ridley, and hawksbill sea turtles, but no observed interactions were reported with loggerhead sea turtles. The highest observed interaction rate involved green sea turtles, whereas interactions with leatherbacks, olive ridleys, and hawksbills were less frequent. 2020 and 2021 data cannot be reported due to confidentiality rules.

Green sea turtle takes were variable year to year, ranging between 0-11 observed takes (0-50 expanded annual estimated takes). From 2016 to 2019, four annual interactions per year with green turtles were observed, all of which resulted in mortalities. The interaction rate in 2018 was the highest since 2006. At its 170$^{th}$ Meeting in June 2017, the Council recommended evaluation of the effectiveness of the 2011 green turtle measure that required gear configuration to set hooks below 100 meters in the American Samoa longline fishery. PIFSC in response indicated they do not recommend evaluation at that time due to the low statistical power. At its 173$^{rd}$ Meeting in June 2018, the Council recommended PIFSC conduct an economic cost-benefit analysis on the use of large circle hooks in the American Samoa longline fishery to determine whether modifying the green turtle mitigation measures in the fishery may contribute to further reductions in interactions in the fishery without significant negative impacts on fishery operations and revenue. In response, PIFSC conducted a feasibility assessment for conducting a cost-benefit analysis, which indicated that a detailed analysis is not likely to provide new information beyond what is known from the Council-funded large circle hook study (Curran and Beverly 2012) due to data limitations (Raynor 2018).

All leatherback, olive ridley, and hawksbill sea turtle interactions were observed after 2010, with hawksbill interactions first occurring in 2016. Observer coverage was relatively low in 2006-2009 when interactions with these species were not observed (average observer

coverage = 10.8%) compared to 2010-2019 (above 15%). Since leatherback, olive ridley, and hawksbill interactions with this fishery are relatively uncommon, it is possible the recent occurrence of interactions after 2010 is due to higher observer coverage as opposed to a true increase in interactions in the fishery.

Table 79. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), estimated annual takes using expansion factor estimates and ME for sea turtles in the American Samoa longline fishery, 2006-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Green | | | | Leatherback | | | | Olive ridley | | | | Hawksbill | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME |
| | | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | |
| 2006 | 8.1 | 287 | 797,221 | 3(3) | 0.0038 | 37 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | - |
| 2007 | 7.1 | 410 | 1,255,329 | 1(1) | 0.0008 | 14 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | - |
| 2008 | 6.4 | 379 | 1,194,096 | 1(1) | 0.0008 | 16 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | - |
| 2009 | 7.7 | 306 | 880,612 | 3(3) | 0.0034 | 39 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | - |
| 2010 | 25.0 | 798 | 2,301,396 | 6(5) | 0.0026 | - | 50 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | - |
| 2011 | 33.3 | 1,257 | 3,605,897 | 11(10) | 0.0031 | - | 32 | 2(1) | 0.0006 | - | 4 | 1 | 0.0003 | - | 4 | 0 | 0.0000 | - | - |
| 2012 | 19.8 | 662 | 1,880,525 | 0 | 0.0000 | - | 0 | 1 | 0.0005 | - | 6 | 1(1) | 0.0005 | - | 6 | 0 | 0.0000 | - | - |
| 2013 | 19.4 | 585 | 1,690,962 | 2(2) | 0.0012 | - | 19 | 2(1) | 0.0012 | - | 13 | 1 | 0.0006 | - | 4 | 0 | 0.0000 | - | - |
| 2014 | 19.4 | 565 | 1,490,416 | 2(2) | 0.0013 | - | 17 | 0 | 0.0000 | - | 4 | 2 | 0.0013 | - | 5 | 0 | 0.0000 | - | - |
| 2015 | 22.0 | 504 | 1,441,706 | 0 | 0.0000 | - | 0 | 3(3) | 0.0021 | - | 22 | 1 | 0.0007 | - | 6 | 0 | 0.0000 | - | - |
| 2016 | 19.4 | 424 | 1,179,532 | 4(4) | 0.0034 | - | 17 | 1(1) | 0.0008 | - | 3 | 3(3) | 0.0025 | - | 12 | 1(1) | 0.0008 | - | 4 |
| 2017 | 20.0 | 447 | 1,271,803 | 4(4) | 0.0031 | - | 22 | 1 | 0.0008 | - | 3 | 2(2) | 0.0016 | - | 12 | 0 | 0.0000 | - | 3 |
| 2018 | 17.5 | 276 | 732,476 | 4(4) | 0.0055 | - | 20 | 1 | 0.0014 | - | 5 | 2(2) | 0.0027 | - | 11 | 2(2) | 0.0027 | - | 5 |
| 2019 | 15.7 | 380 | 1,087,860 | 4(4) | 0.0037 | - | 26 | 1(1) | 0.0009 | - | 7 | 3(3) | 0.0028 | - | 29 | 0 | 0.0000 | - | 0 |
| 2020 | 2.13 | * | * | * | * | * | 11 | * | * | * | 7 | * | * | * | 6 | * | * | * | 2 |
| 2021 | 4.65 | * | * | * | * | * | 10 | * | * | * | 6 | * | * | * | 7 | * | * | * | 2 |
| 2022 | 8.70 | 90 | 260,768 | 0 | 0.0000 | - | 4 | 0 | 0.0000 | - | 2 | 1(1) | 0.0038 | - | 8 | 0 | 0.0000 | - | 0 |
| 2023 | 8.82 | 154 | 507,460 | 2(2) | 0.0039 | - | 23 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 0 |
| 2024 | 9.3 | 135 | 411,595 | 1(1) | 0.0024 | 11 | - | 1 | 0.0000 | 11 | - | 1(1) | 0.0024 | 11 | - | 0 | 0.0000 | 0 | - |

[a] Take and effort data are based on vessel arrival dates.
*2020 and 2021 data are not reported due to confidentiality rules.
Source: Take data—2006-2020 PIRO Observer Program Annual and Quarterly Status Reports
ME—(McCracken, 2015; McCracken, 2017a; McCracken 2019a; McCracken 2020b; McCracken and Cooper 2022a; McCracken and Cooper 2022e)

#### 3.3.3.3.1 Comparison of Interactions with ITS

The 2023 Biological Opinion includes ITSs for sea turtle species based on the maximum 5-year running sum for each species (Table 80). The new ITS went into effect May 15, 2023. For the purposes of monitoring the ITS, all captures in 2023 will count towards the first year of the 5-year term. Exceeding the maximum 5-year running sum within any 5 consecutive years will lead to reinitiating consultation of the impact of this fishery on these species.

NMFS uses the interaction date for tracking sea turtle interactions against the ITS, regardless of vessel arrival date. Prior to 2021, NMFS in its PIRO Observer Program Quarterly and Annual Reports counted sea turtle interactions based on vessel arrival dates. For this reason, the number of quarterly or annual sea turtle interactions counted against an ITS may vary from those reported on the Observer Program's quarterly and annual reports.

Table 80. Estimated total interactions[a] (extrapolated using quarterly observer coverage) of sea turtles in the American Samoa longline fishery compared to the 5-year running sum Incidental Take Statement (ITS) in the 2023 Biological Opinion

| Species | 5-year Running Sum ITS Interactions | Estimated Total Interactions and Mortalities | |
|---|---|---|---|
| | | 2023[b] | 2024 |
| Green turtle | 96 | 13(12) | 11(10) |
| Leatherback turtle | 48 | 0(0) | 11(7) |
| Olive ridley turtle | 61 | 0(0) | 11(9) |
| Hawksbill turtle | 30 | 0(0) | 0(0) |

[a] Takes are counted based on interaction date.
[b] Estimated total interactions for 2023 were calculated using the number of observed interactions multiplied by the expansion factor.

### 3.3.3.4 MARINE MAMMAL INTERACTIONS IN THE AMERICAN SAMOA LONGLINE FISHERY

Table 81 summarizes the incidental take data of marine mammals from 2006 to 2024 in the American Samoa longline fishery. Reported interactions listed in these tables reflect all observed interactions, including mortalities, serious injuries, and non-serious injuries. Refer to the most recent SARs for mortality and serious injury estimates and stock-specific abundance estimates and geographic range. Many of these interactions have been further examined by NMFS, and updated information necessary for any data analyses is available from PIFSC. Observed take data were expanded to represent the estimated number of incidental takes for the entire fishery using a standard expansion factor estimate (EF Est. = 100 / % observer coverage * # takes). PIFSC generated estimated number of interactions for 2020-2021 based on observer data from 2012-2020 (McCracken and Cooper 2022b; McCracken 2022) and the logbook and observer data were also used to derive the 2021 estimates (McCracken 2022).

Observed marine mammal interactions with the American Samoa longline fishery between 2006 and 2019 were relatively infrequent with only one striped dolphin interactions in 2019. False killer whales had the highest interaction rate over this period, followed by rough-toothed dolphins, Cuvier's beaked whales, short-finned pilot whales, and 2 unidentified cetaceans. Between 2006 and 2022, there were 7 years of no observed marine mammal interactions with this fishery (2006, 2007, 2009, 2010, 2012, 2022, 2023, and 2024).

#### 3.3.3.4.1 Comparison of Interactions with PBR under the MMPA

SARs are only available for four species of marine mammals for which stocks have been identified around American Samoa (humpback whale, false killer whale, rough-toothed dolphin, and spinner dolphin). PBR comparisons with estimates of mortality and serious

injury are not available for American Samoa stocks of marine mammals due to the lack of abundance estimates.

Table 81. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates for marine mammals in the American Samoa longline fishery, 2006-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Cuvier's beaked whale | | | False killer whale | | | | Rough-toothed dolphin | | | | Short-finned pilot whale | | | Striped dolphin | | | | Unidentified cetacean | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | Observed | | EF Est. | ME | Observed | | EF Est. |
| | | | | Takes (M) | Takes/ 1,000 hooks | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | |
| 2006 | 8.1 | 287 | 797,221 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 |
| 2007 | 7.1 | 410 | 1,255,329 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 |
| 2008 | 6.4 | 379 | 1,194,096 | 0 | 0.0000 | 0 | 2(1) | 0.0017 | 31 | - | 1 | 0.0008 | 16 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 |
| 2009 | 7.7 | 306 | 880,612 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 |
| 2010 | 25.0 | 798 | 2,301,396 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 |
| 2011 | 33.3 | 1,257 | 3,605,897 | 1(1) | 0.0003 | 3 | 3 | 0.0008 | 9 | - | 5 | 0.0014 | 15 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 2 | 0.0006 | 6 |
| 2012 | 19.8 | 662 | 1,880,525 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 |
| 2013 | 19.4 | 585 | 1,690,962 | 0 | 0.0000 | 0 | 1 | 0.0006 | 5 | - | 1(1) | 0.0006 | 5 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 |
| 2014 | 19.4 | 565 | 1,490,416 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 1 | 0.0007 | 5 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 |
| 2015 | 22.0 | 504 | 1,441,706 | 0 | 0.0000 | 0 | 2(1) | 0.0014 | - | 5 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 |
| 2016 | 19.4 | 424 | 1,179,532 | 0 | 0.0000 | 0 | 2 | 0.0017 | - | 10 | 2(2) | 0.0017 | - | 10 | 0 | 0.0000 | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 |
| 2017 | 20.0 | 447 | 1,271,803 | 0 | 0.0000 | 0 | 1 | 0.0008 | - | 6 | 1 | 0.0008 | - | 4 | 0 | 0.0000 | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 |
| 2018 | 17.5 | 276 | 732,476 | 0 | 0.0000 | 0 | 1 | 0.0014 | - | 5 | 1(1) | 0.0014 | - | 3 | 0 | 0.0000 | 0 | 0 | 0.0000 | - | 2 | 0 | 0.0000 | 0 |
| 2019 | 15.7 | 380 | 1,087,860 | 0 | 0.0000 | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | 1 | 0.0009 | - | 5 | 0 | 0.0000 | 0 |
| 2020 | 2.13 | * | * | * | * | * | 1 | * | - | 5 | 1 | * | - | 3 | 0 | * | - | 0 | 0 | * | - | 0 | * | * |
| 2021 | 4.65 | * | * | * | * | * | * | * | * | | * | * | * | | * | * | * | | * | * | * | | * | * |
| 2022 | 8.70 | 90 | 260,768 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0 | 0 | - | 0.0000 | 0 |
| 2023 | 8.82 | 154 | 507,460 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 |
| 2024 | 9.3 | 135 | 411,595 | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | | 0 | 0.0000 | 0 | | 0 | 0.0000 | 0 | 0 | 0.0000 | 0 | | 0 | 0.0000 | 0 |

[a] Take and effort data are based on vessel arrival dates.

*2020 and 2021 data are not reported due to confidentiality rules.

Source: 2006-2020 PIRO Observer Program Annual and Quarterly Status Reports and unpublished observer data; (McCracken 2020a; McCracken and Cooper 2022b; McCracken and Cooper 2022g).

### 3.3.3.5 SEABIRD INTERACTIONS IN THE AMERICAN SAMOA LONGLINE FISHERY

Table 82 summarizes the incidental take data of seabirds from 2006 to 2022 in the American Samoa longline fishery. Many of these interactions have been further examined by NMFS, and updated information necessary for any data analyses is available from PIFSC. Observed take data are expanded to represent the estimated number of annual incidental takes for the entire fishery by PIFSC (referred to in this document as McCracken Estimates, or "ME"). When ME are not available, a standard expansion factor estimate is listed in the table (EF Est. = 100 / % observer coverage * # takes). 2020-2021 data cannot be reported due to confidentiality rules. PIFSC generated estimated number of interactions for 2020-2021 based on observer data from 2012-2020 (McCracken and Cooper 2022a, 2022c).

Observed seabird interactions with the American Samoa longline fishery between 2006 and 2024 were uncommon, including interactions with two unidentified shearwaters and one frigatebird. Additionally, the observer program report for 2015 included 13 observed interactions with black-footed albatrosses that occurred in the North Pacific with vessels departing American Samoa and landing in California. There was one unidentified shearwater was observed in 2019, and no other observed seabird interactions from 2016-2024.

Table 82. Observed takes, mortalities (M), takes per fishing effort (1,000 hooks), and estimated annual takes using expansion factor estimates and ME for seabirds in the American Samoa longline fishery, 2006-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Black-footed Albatross | | | | Unidentified shearwater | | | | Unidentified frigatebird | | | | Brown booby |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | |
| | | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | |
| 2006 | 8.1 | 287 | 797,221 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | |
| 2007 | 7.1 | 410 | 1,255,329 | 0 | 0.0000 | 0 | - | 1(1) | 0.0008 | 14 | - | 0 | 0.0000 | 0 | - | |
| 2008 | 6.4 | 379 | 1,194,096 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | |
| 2009 | 7.7 | 306 | 880,612 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | |
| 2010 | 25.0 | 798 | 2,301,396 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | |
| 2011 | 33.3 | 1,257 | 3,605,897 | 0 | 0.0000 | 0 | - | 1(1) | 0.0003 | - | 2 | 0 | 0.0000 | - | 0 | |
| 2012 | 19.8 | 662 | 1,880,525 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | |
| 2013 | 19.4 | 585 | 1,690,962 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | 1(1) | 0.0006 | - | 5 | |
| 2014 | 19.4 | 565 | 1,490,416 | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | |
| 2015 | 22.0 | 504 | 1,441,706 | 13(13)[b] | 0.0090 | - | 13 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | |
| 2016 | 19.4 | 424 | 1,179,532 | 0 | 0.0000 | 0 | | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - | |
| 2017 | 20.0 | 447 | 1,271,803 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - | |
| 2018 | 17.5 | 276 | 732,476 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | 0 | 0.0000 | 0 | - | |
| 2019 | 15.7 | 380 | 1,087,860 | 0 | 0.0000 | 0 | - | 1(1) | 0.0009 | - | 7 | 0 | 0.0000 | 0 | - | |
| 2020 | 2.13 | * | * | * | * | * | 0 | * | * | * | 1 | * | * | * | 1 | |
| 2021 | 4.65 | * | * | * | * | * | 0 | * | * | * | 1 | * | * | * | 1 | |

| Year | Obs. Cov. (%) | Sets | Hooks | Black-footed Albatross | | | | Unidentified shearwater | | | | Unidentified frigatebird | | | | Brown booby |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME | |
| | | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | Takes (M) | Takes/ 1,000 hooks | | | |
| 2022 | 8.70 | 90 | 260,768 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | |
| 2023 | 8.82 | 154 | 507,460 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | - | 0 | 0 | 0.0000 | - | 0 | |
| 2024 | 9.3 | 135 | 411,595 | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 0 | 0.0000 | 0 | - | 1 |

[a] Take data are based on vessel arrival dates.
[b] These seabird interactions occurred in the North Pacific by vessels departing American Samoa and landing in California.
*2020 and 2021 data are not reported due to confidentiality rules.
Source: 2006-2019 PIRO Observer Program Annual and Quarterly Status Reports
ME—(McCracken 2015, 2017d, 2020, 2023; McCracken and Cooper 2022b, 2022d).

### 3.3.3.6 ELASMOBRANCH INTERACTIONS IN THE AMERICAN SAMOA LONGLINE FISHERY

Table 83 summarizes the incidental take data for the Indo-West Pacific DPS scalloped hammerhead sharks, oceanic whitetip sharks, and giant manta rays in the American Samoa longline fishery. Giant manta rays were listed under the ESA on January 22, 2018 (83 FR 2916), and oceanic whitetip sharks were listed on January 30, 2018 (83 FR 4153). On April 3, 2019, NMFS reinitiated consultation for the American Samoa longline fishery and determined that the conduct of the fishery during the period of consultation will not violate ESA Sections 7(a)(2) and 7(d). 2020 and 2021 data cannot be reported due to confidentiality rules. PIFSC generated estimated number of interactions for 2020-2021 based on observer data from 2012-2020 (McCracken and Cooper 2022a, 2022e).

Observed interactions with oceanic whitetip sharks are most common in the American Samoa longline fishery. In 2024, oceanic whitetip shark interactions were the highest since 2010. The higher interactions may be associated with potential increases in population density in the region because of international management measures prohibiting retention of the species through IATTC since 2011 and WCPFC since 2013 (WCPFC measure implemented under U.S. regulations in 2015), but further investigation is needed. A new stock assessment for the oceanic whitetip shark in the WCPO is expected in 2025. Scalloped hammerheads and giant manta rays are observed less frequently. There have been no observed takes of giant manta rays since 2014.

Table 83. Observed and estimated total elasmobranch interactions with the American Samoa longline fishery, 2006-2024[a]

| Year | Obs. Cov. (%) | Sets | Hooks | Scalloped hammerhead | | | | Oceanic whitetip | | | | Giant manta ray | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME |
| | | | | Takes (M[b]) | Takes/1,000 hooks | | | Takes (M[b]) | Takes/1,000 hooks | | | Takes (M) | Takes/1,000 hooks | | |
| 2006 | 8.1 | 287 | 797,221 | 1(1) | 0.0013 | 12 | - | 46(11) | 0.0577 | 568 | - | 0 | 0.0000 | 0 | - |
| 2007 | 7.1 | 410 | 1,255,329 | 1 | 0.0008 | 14 | - | 62(18) | 0.0494 | 873 | - | 0 | 0.0000 | 0 | - |
| 2008 | 6.4 | 379 | 1,194,096 | 0 | 0.0000 | 0 | - | 48(17) | 0.0402 | 750 | - | 0 | 0.0000 | 0 | - |
| 2009 | 7.7 | 306 | 880,612 | 0 | 0.0000 | 0 | - | 45(13) | 0.0511 | 584 | - | 1 | 0.0011 | 13 | - |
| 2010 | 25 | 798 | 2,301,396 | 4(1) | 0.0017 | - | 17 | 130(37) | 0.0565 | - | 1,176 | 3 | 0.0013 | - | 11 |
| 2011 | 33.3 | 1,257 | 3,605,897 | 2(1) | 0.0006 | - | 7 | 116(44) | 0.0322 | - | 319 | 3 | 0.0008 | - | 11 |

| Year | Obs. Cov. (%) | Sets | Hooks | Scalloped hammerhead | | | | Oceanic whitetip | | | | Giant manta ray | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Observed | | EF Est. | ME | Observed | | EF Est. | ME | Observed | | EF Est. | ME |
| | | | | Takes (M [b]) | Takes/1,000 hooks | | | Takes (M [b]) | Takes/1,000 hooks | | | Takes (M) | Takes/1,000 hooks | | |
| 2012 | 19.8 | 662 | 1,880,525 | 0 | 0.0000 | - | 0 | 71(26) | 0.0378 | - | 470 | 3 | 0.0016 | - | 29 |
| 2013 | 19.4 | 585 | 1,690,962 | 0 | 0.0000 | - | 0 | 88(15) | 0.0520 | - | 407 | 2 | 0.0012 | - | 8 |
| 2014 | 19.4 | 565 | 1,490,416 | 1 | 0.0007 | - | 6 | 104(37) | 0.0698 | - | 464 | 1 | 0.0007 | - | 2 |
| 2015 | 22.0 | 504 | 1,441,706 | 1(1) | 0.0007 | - | 3 | 168(59) | 0.1165 | - | 827 | 0 | 0.0000 | - | 3 |
| 2016 | 19.4 | 424 | 1,179,532 | 1 | 0.0008 | - | 8 | 197(70) | 0.1670 | - | 788 | 0 | 0.0000 | - | 0 |
| 2017 | 20.0 | 447 | 1,271,803 | 1 | 0.0008 | - | 7 | 63(22) | 0.0495 | - | 484 | 0 | 0.0000 | - | 0 |
| 2018 | 17.5 | 276 | 732,476 | 3 | 0.0041 | - | 8 | 108(39) | 0.1474 | - | 513 | 0 | 0.0000 | 0 | - |
| 2019 | 15.7 | 380 | 1,087,860 | 0 | 0.0000 | - | 0 | 140(51) | 0.1287 | - | 870 | 0 | 0.0000 | 0 | - |
| 2020 | 2.13 | * | * | * | * | * | 4 | * | * | * | 469 | * | * | * | 3 |
| 2021 | 4.65 | * | * | * | * | * | 3 | * | * | * | 467 | * | * | * | 3 |
| 2022 | 8.70 | 90 | 260,768 | 0 | 0.0000 | - | 2 | 25(8) | 0.0096 | - | 355 | 0 | 0.0000 | - | 3 |
| 2023 | 8.82 | 154 | 507,460 | 0 | 0.0000 | - | 0 | 58(18) | 0.0114 | - | 657 | 0 | 0.0000 | - | 0 |
| 2024 | 9.3 | 135 | 411,595 | 0 | 0.0000 | 0 | - | 96(48) | 0.2332 | 1,032 | - | 1 | 0.0024 | 11 | 0 |

[a] Take data are based on vessel arrival dates.
[b] Mortality numbers include sharks that were released dead, finned (prior to the passage of the Shark Conservation Act of 2010), and kept.
*2020 data are not reported due to confidentiality rules.
Source: 2006-2019 PIRO Observer Program Annual and Quarterly Status Reports and unpublished observer data; (McCracken 2015a; McCracken 2017a, McCracken 2019a; McCracken 2020b; McCracken and Cooper 2022a).

#### 3.3.3.6.1 Comparison of Interactions with ITS

An ITS is not required to provide protective coverage for the ESA listed elasmobranchs including the Indo-West Pacific scalloped hammerhead shark DPS, the oceanic whitetip shark, or the giant manta ray, because there are no take prohibitions under ESA section 4(d) for these species. However, ITS were included for these species in their relevant Biological Opinions to serve as a check on the no-jeopardy conclusions by providing a reinitiation trigger.

The 2023 Biological Opinion includes ITSs for ESA listed elasmobranchs based on a maximum 5-year running sum for each species (Table 85). The new ITS went into effect May 15, 2023. For the purposes of monitoring the ITS, all captures in 2023 will count towards the first year of the 5-year term. Exceeding the maximum 5-year running sum within any 5 consecutive years will lead to reinitiating consultation of the impact of this fishery on these species.

NMFS counts takes for the Indo-West Pacific DPS of scalloped hammerhead shark, oceanic whitetip shark, and giant manta ray based on the end of haul incidental take date.

Table 84. Estimated total interactions (extrapolated using quarterly observer coverage) of oceanic whitetip sharks and giant manta rays in the American Samoa longline fishery compared to the 5-year running sum ITS in the 2023 Biological Opinion[a]

| Species | 5-year running ITS | Estimated Total Interactions | |
|---|---|---|---|
| | | 2023 | 2024 |
| Scalloped hammerhead shark, Indo-West Pacific DPS | 45 | 7 | 0 |
| Oceanic whitetip shark | 3,520 | 386 | 878 |
| Giant manta ray | 57 | 0 | 9 |

| | | | |
|---|---|---|---|
| *Manta/Mobula*[b] | | 7 | 0 |

[a] Take data are based on haul dates.
[b] 28% of manta/mobula interactions are also tracked as the ITS for giant manta ray was based on interaction data that included rays classified as manta/mobula in the observer record that may have been giant manta rays.

### 3.3.4 HAWAII TROLL FISHERY

#### 3.3.4.1 INDICATORS FOR MONITORING PROTECTED SPECIES INTERACTIONS IN THE HAWAII TROLL FISHERY

In this report, the Council monitors protected species interactions in the Hawaii troll fishery using proxy indicators such as fishing effort and changes in gear types as this fishery does not have observer coverage.

##### 3.3.4.1.1 Conservation Measures

The Hawaii troll fishery has not had reported interactions with protected species, and no specific regulations are in place to mitigate protected species interactions. The Pacific Pelagic FEP requires any vessel fishing under the FEP to comply with sea turtle handling and release regulations.

##### 3.3.4.1.2 ESA Consultations

In a Biological Opinion completed on September 1, 2009 for the troll and handline fisheries in the western Pacific region, NMFS concluded that these fisheries are not likely to jeopardize the continued existence of green turtles and included an ITS of four animals killed per year from collisions with troll and handline fishing vessels (NMFS 2009). The Biological Opinion also concluded that the fisheries are not likely to adversely affect all other protected species in the region. NMFS also determined on October 6, 2014 that fisheries managed under the Pelagic FEP have no effects on ESA-listed reef-building corals.

##### 3.3.4.1.3 Non-ESA Marine Mammals

The MMPA requires NMFS to annually publish a LOF that classifies commercial fisheries in one of three categories based on the level of mortality and serious injury of marine mammals associated with that fishery. According to the 2024 LOF (89 FR 12257, February 16, 2024), the Hawaii troll fishery (HI troll) is classified as a Category III fishery (i.e., a remote likelihood of or no known incidental mortality and serious injury of marine mammals). The 2024 LOF lists the following marine mammal stock that may be incidentally killed or injured in this fishery:

- Pantropical spotted dolphin, HI stock

While NMFS lists Pantropical spotted dolphin as potentially interacting with the Hawaii troll fishery in the LOF, there is a lack of direct evidence of serious injury or mortality in this fishery (78 FR 23708, April 22, 2013).

#### 3.3.4.2 STATUS OF PROTECTED SPECIES INTERACTIONS IN THE HAWAII TROLL FISHERY

NMFS has determined that the Hawaii troll fishery operating under the Pacific Pelagic FEP is not likely to jeopardize green sea turtles and not likely to adversely affect other ESA-listed sea turtles, marine mammals, seabirds, scalloped hammerhead shark, and non ESA-listed marine mammals, and has no effects on ESA-listed reef-building corals. The Hawaii troll fishery has minimal interactions with these protected species.

The ITS in the 2009 Biological Opinion estimates four green turtle mortalities annually in the troll and handline fisheries in the western Pacific region. There have not been any reported or observed collisions of troll and handline vessels with green turtles, and data are not available to attribute stranded turtle mortality source to troll and handline vessels.

Based on fishing effort and other characteristics described in Chapter 2, no notable changes have been observed in the fishery. There is no other information to indicate that impacts to protected species from this fishery have changed in recent years.

### 3.3.5 MHI HANDLINE FISHERY

#### 3.3.5.1 INDICATORS FOR MONITORING PROTECTED SPECIES INTERACTIONS IN THE MHI HANDLINE FISHERY

In this report, the Council monitors protected species interactions in the MHI handline fishery using proxy indicators such as fishing effort and changes in gear types as this fishery does not have observer coverage.

##### 3.3.5.1.1 Conservation Measures

The MHI handline fishery has not had reported interactions with protected species, and no specific regulations are in place to mitigate protected species interactions. The Pacific Pelagic FEP requires any vessel fishing under the FEP to comply with sea turtle handling and release regulations.

##### 3.3.5.1.2 ESA Consultations

In a Biological Opinion completed on September 1, 2009 for the troll and handline fisheries in the western Pacific region, NMFS concluded that these fisheries are not likely to jeopardize the continued existence of green turtles and included an ITS of four animals killed per year from collisions with troll and handline fishing vessels (NMFS 2009). The Biological Opinion also concluded that the fisheries are not likely to adversely affect all other protected species in the region. NMFS also determined on October 16, 2014 that fisheries managed under the Pelagic FEP have no effects on ESA-listed reef-building corals.

##### 3.3.5.1.3 Non-ESA Marine Mammals

The MMPA requires NMFS to annually publish an LOF that classifies commercial fisheries in one of three categories based on the level of mortality and serious injury of marine mammals associated with that fishery. According to the 2024 LOF (89 FR 12257, February 16, 2024), the MHI handline (HI pelagic handline) fishery is classified as a Category III fishery (i.e., a remote likelihood of or no known incidental mortality and serious injury of marine mammals).

#### 3.3.5.2 STATUS OF PROTECTED SPECIES INTERACTIONS IN THE MHI HANDLINE FISHERY

NMFS has determined that the MHI handline fishery operating under the Pacific Pelagic FEP is not likely to jeopardize green sea turtles and not likely to adversely affect other ESA-listed sea turtles, marine mammals, seabirds, scalloped hammerhead shark, and non ESA-listed marine mammals, and has no effects on ESA-listed reef-building corals. The MHI handline fishery has minimal interactions with these protected species.

The ITS in the 2009 Biological Opinion estimates four green turtle mortalities annually in the troll and handline fisheries in the western Pacific region. There have not been any reported or

observed collisions of troll and handline vessels with green turtles, and data are not available to attribute stranded turtle mortality source to troll and handline vessels.

Based on fishing effort and other characteristics described in Chapter 2, no notable changes have been observed in the fishery. There is no other information to indicate that impacts to protected species from this fishery have changed in recent years.

### 3.3.6 HAWAII OFFSHORE HANDLINE FISHERY

#### 3.3.6.1 INDICATORS FOR MONITORING PROTECTED SPECIES INTERACTIONS IN THE HAWAII OFFSHORE HANDLINE FISHERY

In this report, the Council monitors protected species interactions in the Hawaii offshore handline fishery using proxy indicators such as fishing effort and changes in gear types as this fishery does not have observer coverage.

##### 3.3.6.1.1 Conservation Measures

The Hawaii offshore handline fishery has not had reported interactions with protected species, and no specific regulations are in place to mitigate protected species interactions. The Pacific Pelagic FEP requires any vessel fishing under the FEP to comply with sea turtle handling and release regulations.

##### 3.3.6.1.2 ESA Consultations

In a Biological Opinion completed on September 1, 2009 for the troll and handline fisheries in the Western Pacific region, NMFS concluded that these fisheries are not likely to jeopardize the continued existence of green turtles and included an ITS of four animals killed per year from collisions with troll and handline fishing vessels. The Biological Opinion also concluded that the fisheries are not likely to adversely affect all other protected species in the region. NMFS also determined on October 16, 2014 that fisheries managed under the Pelagic FEP have no effects on ESA-listed reef-building corals.

##### 3.3.6.1.3 Non-ESA Marine Mammals

The MMPA requires NMFS to annually publish an LOF that classifies commercial fisheries in one of three categories based on the level of mortality and serious injury of marine mammals associated with that fishery. According to the 2024 LOF (89 FR 12257, February 16, 2024), the Hawaii offshore handline (HI pelagic handline) fishery is classified as a Category III fishery (i.e., a remote likelihood of or no known incidental mortality and serious injury of marine mammals).

#### 3.3.6.2 STATUS OF PROTECTED SPECIES INTERACTIONS IN THE HAWAII OFFSHORE HANDLINE FISHERY

NMFS has determined that the Hawaii offshore handline fishery operating under the Pacific Pelagic FEP is not likely to jeopardize green sea turtles and not likely to adversely affect other ESA-listed sea turtles, marine mammals, seabirds, scalloped hammerhead shark, and non ESA-listed marine mammals, and have no effects on ESA-listed reef-building corals. The Hawaii offshore handline fishery has minimal interactions with these protected species.

The ITS in the 2009 Biological Opinion estimates four green turtle mortalities annually in the troll and handline fisheries in the western Pacific region. There have not been any reported or observed collisions of troll and handline vessels with green turtles, and data are not available to attribute stranded turtle mortality source to troll and handline vessels.

Based on fishing effort and other characteristics described in Chapter 2, no notable changes have been observed in the fishery. There is no other information to indicate that impacts to protected species from this fishery have changed in recent years.

### 3.3.7 AMERICAN SAMOA, GUAM, AND CNMI TROLL FISHERY

#### 3.3.7.1 INDICATORS FOR MONITORING PROTECTED SPECIES INTERACTIONS IN THE AMERICAN SAMOA, GUAM AND CNMI TROLL FISHERY

In this report, the Council monitors protected species interactions in the American Samoa, Guam, and CNMI troll fisheries using proxy indicators such as fishing effort and changes in gear types as these fisheries do not have observer coverage.

Details of these indicators are discussed in the sections below.

##### 3.3.7.1.1 Conservation Measures

The American Samoa, Guam, and CNMI fisheries have not had reported interactions with protected species, and no specific regulations are in place to mitigate protected species interactions. The Pacific Pelagic FEP requires any vessel fishing under the FEP to comply with sea turtle handling and release regulations.

##### 3.3.7.1.2 ESA Consultations

In a Biological Opinion completed on September 1, 2009 for the troll and handline fisheries in the Western Pacific region, NMFS concluded that these fisheries are not likely to jeopardize the continued existence of green turtles and included an ITS of four animals killed per year from collisions with troll and handline fishing vessels. The Biological Opinion also concluded that the fisheries are not likely to adversely affect all other protected species in the region. NMFS also determined on October 16, 2014 that fisheries managed under the Pelagic FEP have no effects on ESA-listed reef-building corals.

##### 3.3.7.1.3 Non-ESA Marine Mammals

The MMPA requires NMFS to annually publish an LOF that classifies commercial fisheries in one of three categories based on the level of mortality and serious injury of marine mammals associated with that fishery. According to the 2024 LOF (89 FR 12257, February 16, 2024), troll fisheries in American Samoa, Guam and CNMI are classified as Category III fisheries (i.e., a remote likelihood of or no known incidental mortality and serious injury of marine mammals).

#### 3.3.7.2 STATUS OF PROTECTED SPECIES INTERACTIONS IN THE AMERICAN SAMOA, GUAM AND CNMI TROLL FISHERY

NMFS has determined that the American Samoa, Guam, and CNMI fisheries operating under the Pacific Pelagic FEP are not likely to jeopardize green sea turtles and not likely to adversely affect other ESA-listed sea turtles, marine mammals, seabirds, scalloped hammerhead shark, and non ESA-listed marine mammals, and have no effects on ESA-listed reef-building corals. The American Samoa, Guam, and CNMI fisheries likely have minimal interactions with these protected species.

The ITS in the 2009 Biological Opinion estimates four green turtle mortalities annually in the troll and handline fisheries in the western Pacific region. There have not been any reported or

observed collisions of troll and handline vessels with green turtles, and data are not available to attribute stranded turtle mortality source to troll and handline vessels.

Based on fishing effort and other characteristics described in Chapter 2, no notable changes have been observed in the American Samoa, Guam, and CNMI troll fisheries. There is no other information to indicate that impacts to protected species from these fisheries have changed in recent years.

### 3.3.8 IDENTIFICATION OF EMERGING ISSUES

Oceanic whitetip sharks were listed under the ESA in 2018. This species is incidentally captured in the Hawaii and American Samoa longline fisheries. RFMO conservation measures implemented in the U.S. domestic fisheries have required non-retention of oceanic whitetip sharks since 2011 in the IATTC area and 2015 in the WCPFC area. Additionally, the Cooperative Institute for Marine and Atmospheric Research and the Hawaii Institute of Marine Biology conducted a study to assess the post-release survivorship of five species of sharks including the oceanic whitetip shark released alive in the Hawaii and American Samoa longline fishery.

In the study (Hutchinson et al. 2021), PIFSC researchers worked with observer programs and fishermen to quantify post release mortality rates of blue, bigeye thresher, shortfin mako, oceanic whitetip, and silky sharks that are incidentally captured in the Hawaii deep-set longline fishery and oceanic whitetip and silky sharks in the American Samoa longline fishery, using pop-off archival satellite tags (PAT). This study also assessed the effects that standard shark bycatch handling and discard practices utilized in these fisheries may have on the post release fate of discarded sharks that are alive at haul back of the longline gear. Observers trained in the project methods collected shark condition and handling data on all incidental elasmobranchs captured during the study. Tagging was not conducted on Hawaii shallow-set longline trips targeting swordfish. The handling and damage data recorded by trained observers indicated that most of the five species of sharks considered in this study were released by cutting the line. Followed by; gear removal with jaw damage, gear removal with no damage to the shark, gear removal with removal of part of the shark (e.g., lobe of tail on tail-hooked bigeye thresher). A small proportion of these sharks escaped the gear on their own. Other handling methods that were observed included the use of a dehooker and a drag line. The length and composition of the trailing gear was also recorded by observers and varied by fishery and by species. The Hawaii deep-set longline fishery left the greatest amount of trailing gear on sharks, where sharks were released with an average of 8.75 m, ranging in length from 1.0–25.0 m, typically composed of a stainless-steel hook, 0.5 m of braided wire leader, a 45-gram weighted swivel, and monofilament branchline. Sharks released by cutting the line in American Samoa were released with an average of 2.98 m of trailing gear which is composed of a stainless-steel hook to an all monofilament line ranging in length from 1.0–10.0 m.

A proportional hazard model was implemented in a Bayesian framework to understand the impacts of several factors (fishery, condition at the vessel, handling and discard methods, approximate fork length, length of trailing gear) associated with the fishery interaction on survival. The baseline hazard was assumed to vary by species and tag deployment period. Of the species caught and tagged in the Hawaii deep-set longline fishery, blue shark had the lowest survival rate, followed by bigeye thresher, oceanic whitetip, and shortfin mako at their mean interaction conditions. For the species caught in the American Samoa longline fishery, oceanic

whitetip shark had a lower survival rate than silky shark at their mean interaction conditions. The only species tagged in both fisheries, oceanic whitetip shark, had lower survival in the American Samoa longline fishery than the Hawaii deep-set longline fishery. The most influential factors reducing survival rates post release were; catch condition where injured animals had higher mortality rates, handling methods that either damaged the jaw or removed part of the tail (thresher sharks only), the amount of trailing gear left on an animal, tail hooking (thresher sharks only) and wire leader material. Additional details regarding the preliminary results of this study are available in Hutchinson et al. (2021). Currently, analysis is ongoing to incorporate data from tags deployed after 2019 and final results are forthcoming.

Currently, genetic samples are being taken from large Mobulids captured in the Hawaii longline fishery to help elucidate species identification issues, interaction rates, and eventually, population structure for the giant manta ray. To date, 42 samples have been collected and 37 of those samples have been analyzed for species identification. To date, species collected include *M. mobular/japanica*, *M. thurstoni*, *M. tarapacana*; and one confirmed *M. birostris/alfredi*. More samples are needed for a larger sample size.

Previous efforts to understand the spatial relationships of loggerhead turtles and the Hawaii shallow-set longline fishery have included data generated from satellite tags deployed on both captive-reared turtles, and turtles incidentally caught in the fishery. Given captive-reared turtles may not be representative of the size or locations of turtles interacting with the modern Hawaii shallow-set longline fishery, efforts have been underway since 2020 to increase the sample size of satellite tags deployed on incidentally caught turtles. A total of 61 satellite tags were deployed between February 2020 and April 2025 on post-hooked loggerheads. The 2025 season will likely represent the final year of the current satellite tagging effort, with focus subsequently shifting to data analysis and compiling end-products.

A power-assisted deployment device (ADD), tag anchor, and pole extension that will enable longline observers (on deck) to attach satellite tags to leatherback turtles is currently in development. The prototypes of the ADD and tag anchor were recently produced and will be tested on leatherback turtles in the Atlantic during the coming years to evaluate the tagging apparatus and tag retention. The prototype of the pole extension is currently under development. If proven effective, the new device will allow observers to deploy tags on leatherback turtles bycaught in longline fisheries, generating urgently needed spatial ecology and mortality rate information on the species that can inform models and management decision making. In 2024, research efforts to deploy the novel anchor tags on leatherbacks were undertaken off the coast of Massachusetts, which is typically a leatherback foraging hotspot. However, 2024 was an anomalous year with very few leatherbacks observed and no leatherbacks were captured during fieldwork. A second effort to deploy the anchor tags is currently planned for North Carolina in May 2025.

Potential interactions between Hawaii non-longline pelagic fisheries and cetaceans have been identified and are summarized in the most recent marine mammal SARs. Available information does not identify which type of fisheries may be causing injury to cetaceans nor the extent to which the cetacean populations may be impacted by such injuries. New information on this subject published in 2016 that are not included in the current SARs are summarized below.

Madge, L., 2016. Exploratory study of interactions between cetaceans and small-boat fishing operations in the Main Hawaiian Islands (MHI). Pacific Islands Fisheries Science Center, Administrative Report H-16-07, 37 p. doi:10.7289/V5/AR-PIFSC-H-16-07.

*Summary*: The exploratory study was aimed at improving the understanding of fishery-cetacean interactions in the main Hawaiian Islands through interviews with small-boat fishermen on Oahu and the Big Island. The study highlighted that there is considerable uncertainty in species identification by fishermen of false killer whales and other odontocetes categorized as blackfish, and respondents generally reported avoiding interactions by leaving the fishing area when a blackfish is observed. The results of this study cannot be used to estimate frequency or assess the distribution of interactions due to the small sample size and non-random sampling method.

Table 85 summarizes current candidate ESA species, recent listing status, and post-listing activity (critical habitat designation and recovery plan development). Impacts from FEP-managed fisheries on any new listings and critical habitat designations will be considered in future versions of this report.

Table 85. Status of ESA listing, status reviews, critical habitat and recovery plan for species occurring in the Pelagic FEP region

| Species | | Listing/Petition Response Process | | | Post-Listing Activity | |
|---|---|---|---|---|---|---|
| **Common Name** | **Scientific Name** | **90-day Finding** | **12-month Finding / Proposed Rule** | **Final Rule** | **Critical Habitat/Other** | **Recovery Plan** |
| Oceanic whitetip shark | *Carcharhinus longimanus* | Positive (81 FR 1376, 1/12/2016) | Warranted, threatened (81 FR 96304, 12/29/2016) | Listed as threatened (83 FR 4153, 1/30/18) | Critical habitat: Designation not prudent; no areas within US jurisdiction that meet definition of critical habitat (85 FR 12898, 3/5/2020) Other: Protective regulations under ESA 4(d) proposed (89 FR 41917, 5/14/2024) | Final Recovery Plan published July 11, 2024 (89 FR 56865) |
| Chambered nautilus | *Nautilus pompilius* | Positive (81 FR 58895, 8/26/2016) | Warranted, threatened (82 FR 48948, 10/23/17) | Listed as threatened (83 FR 48876, 09/28/2018) | Designation not prudent; no areas within US jurisdiction that meet definition of critical habitat (85 FR 5197, 01/29/2020) | TBA |
| Giant manta ray | *Manta birostris* | Positive (81 FR 8874, 2/23/2016) | Warranted, threatened (82 FR 3694, 1/12/2017) | Listed as threatened (83 FR 2916, 1/22/18) | Designation not prudent; no areas within US jurisdiction that meet definition of critical habitat (84 FR 66652, 12/5/2019) | Draft Recovery Plan published October 15, 2024 (89 FR 82991 |

| Species | | Listing/Petition Response Process | | | Post-Listing Activity | |
|---|---|---|---|---|---|---|
| **Common Name** | **Scientific Name** | **90-day Finding** | **12-month Finding / Proposed Rule** | **Final Rule** | **Critical Habitat/Other** | **Recovery Plan** |
| Corals | N/A | Positive for 82 species (75 FR 6616, 2/10/2010) | Warranted, threatened for 66 species (77 FR 73219, 12/7/2012) | 20 species listed as threatened (79 FR 53851, 9/10/2014) | Critical habitat proposed (85 FR 76262, 11/27/2021, withdrawn) Critical habitat proposed (88 FR 83644, November 30, 2023) | In development; interim recovery outline in place, recovery workshops convened in May 2021. |
| False killer whale (MHI Insular DPS) | *Pseudorca crassidens* | Positive (75 FR 316, 1/5/2010) | Warranted, endangered (75 FR 70169, 11/17/2010) | Listed as endangered (77 FR 70915, 11/28/2012) | Designated in waters from the 45 m depth contour to the 3,200 m depth contour around the MHI from Niihau east to Hawaii (83 FR 35062, 07/24/2018) | Final Recovery Plan published November 3, 2021 (85 FR 60615) |
| Green sea turtle | *Chelonia mydas* | Positive (77 FR 45571, 8/1/2012) | Identification of 11 DPSs, endangered and threatened (80 FR 15271, 3/23/2015) | 11 DPSs listed as endangered and threatened (81 FR 20057, 4/6/2016) | Critical habitat proposed (88 FR 46572, 07/19/2023) | TBA |
| Loggerhead sea turtle (North Pacific DPS) | *Caretta caretta* | Positive (72 FR 64585, 11/16/2007) | 9 DPSs listed as endangered and threatened (76 FR 15932, 03/22/2011) | 9 DPSs listed as endangered and threatened (76 FR 58867, 10/24/2011) | Designated for Atlantic Ocean and Gulf of Mexico DPSs (79 FR 39855, 08/11/2014) | In development; 5-year status review published on 4/7/2020 |

### 3.3.9 IDENTIFICATION OF RESEARCH, DATA, AND ASSESSMENT NEEDS

The following research, data and assessment needs for pelagic fisheries were identified by the Council's Plan Team:

- Maintain observer coverage in the longline fisheries to facilitate data collection to identify changes in ecosystem composition, including but not limited to, trophic cascades, spatial habitat partitioning, climate-driven variability and change, and fishery-induced changes;
- Identify zones to develop a regional look at environmental and oceanographic factors for area outside of the EEZ that may focus on areas of high-interactions. Develop metrics to characterize environmental data, effort, and bycatch rates at these regional scales (e.g. leatherback, olive ridley, albatrosses, elasmobranchs);
- Generate data on the spatial ecology, as well as post-hooking behaviors and survival rates for leatherback turtles interacting with the SSLL and DSLL fisheries;
- Ecosystem considerations on catch and bycatch in the DSLL fishery (e.g., bigeye tuna, albatrosses, leatherback, and olive ridley turtles) and SSLL fishery (e.g., black-footed

albatross) as they relate to environmental and ecological drivers of changing species distribution and aggregation;

- Improve data collection for oceanic whitetip shark capture data in non-longline pelagic fisheries;
- Conduct genetic and telemetry research to improve understanding of population structure and movement patterns for listed elasmobranchs;
- Estimates of post release survival for incidental protected species;
- Improve observer data collection for bite-offs; and
- Build species distribution models (SDM) for protected species using existing telemetry data to assess how a changing ocean may affect the availability of preferred habitat and how this might impact fishery vulnerability under future climate change projections.

## 3.4 CLIMATE AND OCEANIC INDICATORS

Over the past few years, the Council has incorporated climate change into the overall management of the fisheries over which it has jurisdiction. This 2024 annual SAFE report includes a now standard section on indicators of climate and oceanic conditions in the Western Pacific Region. These indicators reflect both global climate variability and change, as well as trends in local oceanographic conditions.

The section begins with a brief summary of the state of the ocean and climate in 2024. This is followed by a list of all selected indicators. These indicators are then examined through summaries focused on natural climate variability and on anthropogenic climate change. Information on the background of these indicators, their development over time, and ongoing research needs can be found at the end of this section.

### 3.4.1 INDICATORS AT A GLANCE

Based on the information provided by the indicators in this chapter, long-term climate trends persisted in the Western Pacific region in 2024. Modes of interannual climate variability were mixed with ENSO transitioning from El Niño to neutral conditions, the PDO remaining negative, and the NPGO being negative as well. Hurricane storm energy was below average in all Pacific basins. Storm counts were below average in the Eastern and Central Pacific and near average in the Western and Southern Pacific. The atmospheric concentration of carbon dioxide continued to increase, ocean acidification intensified, and sea surface temperatures continued to rise. Chlorophyll concentrations at the ocean's surface and the median size of phytoplankton has declined slightly over the past 27 years. The Subtropical Frontal Zone and the Transition Zone Chlorophyll Front were both near average across much of the longline fishing grounds. Temperatures at 200–300 m below the surface were average. Bigeye tuna were slightly larger than average and swordfish slightly smaller, though no long-term trend is evident. Neither bigeye tuna weight-per-unit-effort nor the bigeye tuna recruitment index suggest there will be a pulse of increased recruitment or catch rates in the next few years. The bigeye tuna catch rate forecast suggests that catch will be fairly steady over the next four years.

| Indicator | Trend | Current Status | Description and Rationale |
|---|---|---|---|
| Atmospheric Carbon Dioxide ($CO_2$) | Increasing | Record high | Atmospheric carbon dioxide is a measure of how human activity has already affected the climate system through burning fossil fuels. |
| Oceanic pH at Station ALOHA | Decreasing | Record low | Oceanic pH is a measure of how greenhouse gas emissions have already affected the ocean. |
| El Niño – Southern Oscillation (ENSO) | No trend | In historical range | The El Niño – Southern Oscillation (ENSO) cycle is known to affect Pacific fisheries, including tuna fisheries. |
| Pacific Decadal Oscillation (PDO) | No trend | In historical range | The Pacific Decadal Oscillation (PDO) changes phases over periods of 20–30 years, with secondary signatures for tropical fisheries. |
| North Pacific Gyre Oscillation (NPGO) | No trend | In historical range | The North Pacific Gyre Oscillation (NPGO) reflects natural basin-wide ocean change that can affect fish and fishery performance. |
| Tropical Cyclones | Mixed trends | In historical range | Storms disrupt fishing effort, endanger safety at sea, and can damage infrastructure on land. |
| Sea Surface Temperature (SST) | Increasing | Above average | SST varies naturally, is increasing due to climate change, and affects marine species. |
| 200–300 m Ocean Temperature | Decreasing | Near average | These temperatures reflect habitat targeted by bigeye tuna and the deep-set fishery. |
| Ocean Color | Decreasing | Near average | This indicator measures phytoplankton which are fishes' foundational food source. |
| Subtropical Front (STF) and Transition Zone Chlorophyll Front (TZCF) | Not measured | In historical range | The STF and TZCF are targed by the swordfish fishery, used as migration and foraging corridors by marine species, and will be displaced northwards by climate change. |
| Estimated Median Phytoplankton Size | Decreasing | Below average | Fish size and abundance can be affected by median phytoplankton size, which in turn may be affected by climate variability and change. |
| Fish Community Size Structure | No trend | In historical range | Fish community size structure can be affected by a number of factors, including the climate. |
| Bigeye Tuna Weight-per-Unit-Effort | Not measured | In historical range | Size classes are tracked as a strong indication of recruitment pulses. |
| Bigeye Tuna Recruitment Index | No trend | Record low | Catch rates of small bigeye tuna are used as an indicator of bigeye tuna recruitment. |
| Bigeye Tuna Catch Rate Forecast | Not measured | In historical range | Ocean conditions are used to forecast catch rates up to four years into the future. |

Figure 156. Summary of the trends and status of the ocean and climate indicators in 2024

### 3.4.2 SELECTED INDICATORS

The primary goal for selecting the indicators used in this report is to provide fisheries-related communities, resource managers, and businesses with a climate-related situational awareness. In this context, indictors were selected to:

- Be fisheries relevant and informative;
- Build intuition about current conditions in light of a changing climate;
- Provide historical context; and
- Allow for recognition of patterns and trends.

In this context, this section includes the following climate and oceanic indicators:

- Atmospheric concentration of carbon dioxide ($CO_2$)
- Oceanic pH at Station ALOHA;
- El Niño – Southern Oscillation (ENSO);
- Pacific Decadal Oscillation (PDO);
- North Pacific Gyre Oscillation (NPGO);
- Tropical cyclones;
- Sea surface temperature (SST);
- Ocean temperature at 200–300 m depth;
- Ocean color;
- North Pacific Subtropical Front (STF) and Transition Zone Chlorophyll Front (TZCF);
- Estimated median phytoplankton size
- Fish community size structure;
- Bigeye tuna weight-per-unit-effort;
- Bigeye tuna recruitment index; and
- Bigeye tuna catch rate forecast.

#### 3.4.2.1 NATURAL CLIMATE VARIABILITY SUMMARY

The ocean and climate indicators described here can be used to understand the effects of natural climate variability. The relationship between these indicators is illustrated in Figure 157.

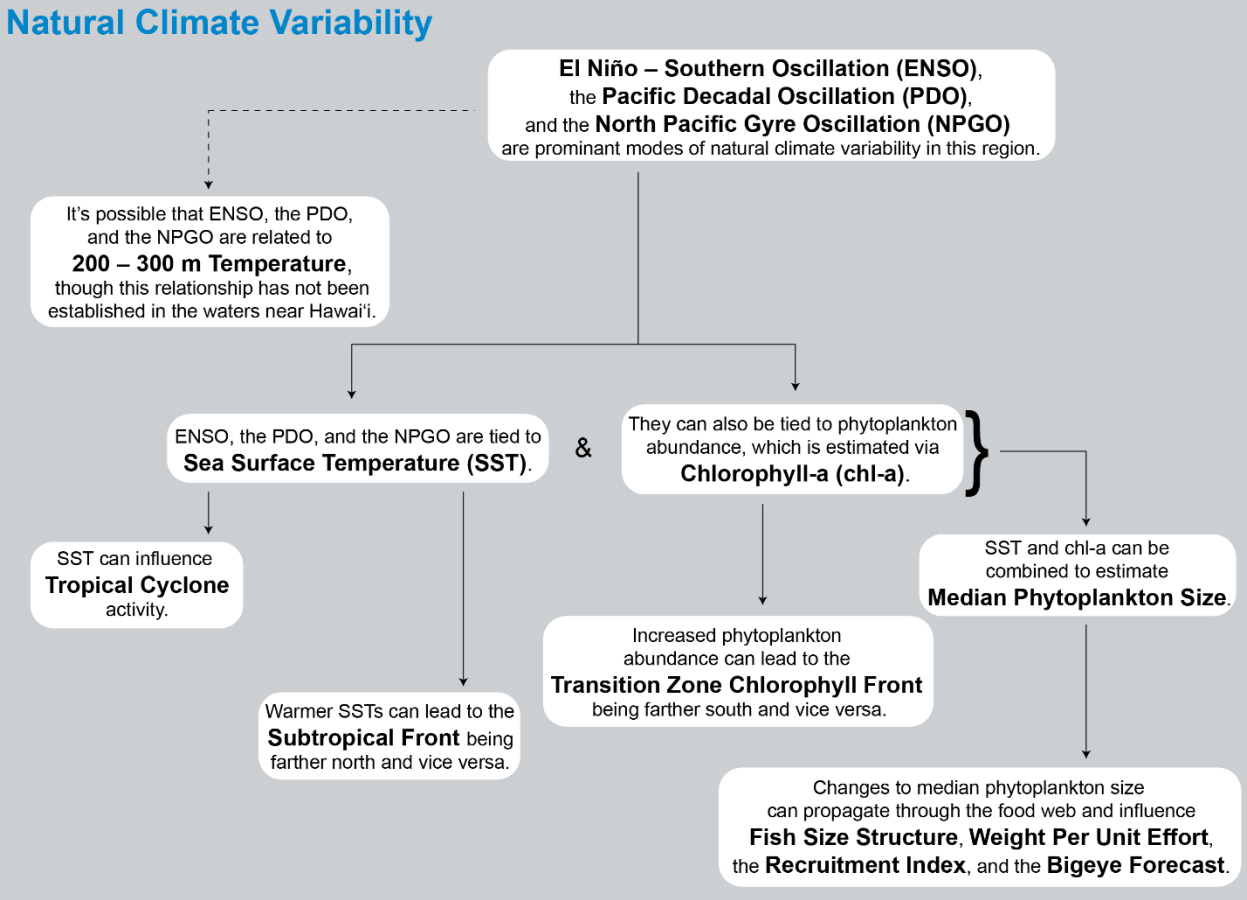



Figure 157. Schematic diagram illustrating the relationships between the ocean and climate indicators from the perspective of natural climate variability

The El Niño – Southern Oscillation (ENSO), the Pacific Decadal Oscillation (PDO), and the North Pacific Gyre Oscillation (NPGO) are prominent modes of natural climate variability in the North Pacific. ENSO cycles are known to impact Pacific fisheries including tuna fisheries. The Oceanic Niño Index (ONI) is a measure of ENSO phase that focuses on ocean temperature, which has the most direct effect on these fisheries.

ENSO, the PDO, and the NPGO are all associated with interannual changes in sea surface temperature (SST), which is one of the most directly observable existing measures for tracking ocean temperature. Natural variability in SST impacts the marine ecosystem and pelagic fisheries. For example, higher SSTs can lead to the subtropical front being farther north and vice versa, which in turn affects the distance fishers may need to travel to reach longline fishing grounds. Changes in SST can also influence the number, location, strength, and seasonal timing of tropical cyclones.

ENSO, the PDO, and the NPGO are also associated with interannual changes in phytoplankton abundance, which is observed through ocean color and estimated via chlorophyll-a (chl-a). Phytoplankton are the foundational food source for the species targeted by the region's longline fishery. Changes in phytoplankton abundance have the potential to impact fish abundance, size, and catch. Increased phytoplankton abundance can lead to the transition zone chlorophyll front

(TZCF) being farther south and vice versa, and changes in the location of this front particularly impact Hawai‘i’s swordfish fishery.

SST and chl-a can be combined to estimate median phytoplankton size. Changes to median phytoplankton can propagate through the food web and influence fish size structure, weight-per-unit-effort, and the bigeye tuna recruitment index. Furthermore, the recruitment index can be combined with median phytoplankton size to forecast bigeye tuna catch rates up to four years in advance.

It is possible that natural climate variability influences temperatures at 200–300 m below the surface where the bigeye fishery sets their hooks. However, this relationship has yet to be established.

Understanding the effects of natural climate variability, like ENSO, the PDO, and the NPGO, on the ocean, marine ecosystems, and regional fisheries is an active area of research.

### 3.4.2.2 ANTHROPOGENIC CLIMATE CHANGE SUMMARY

The ocean and climate indicators described in this chapter can be used to understand the effects of anthropogenic climate change. The relationship between these indicators is illustrated in Figure 158.

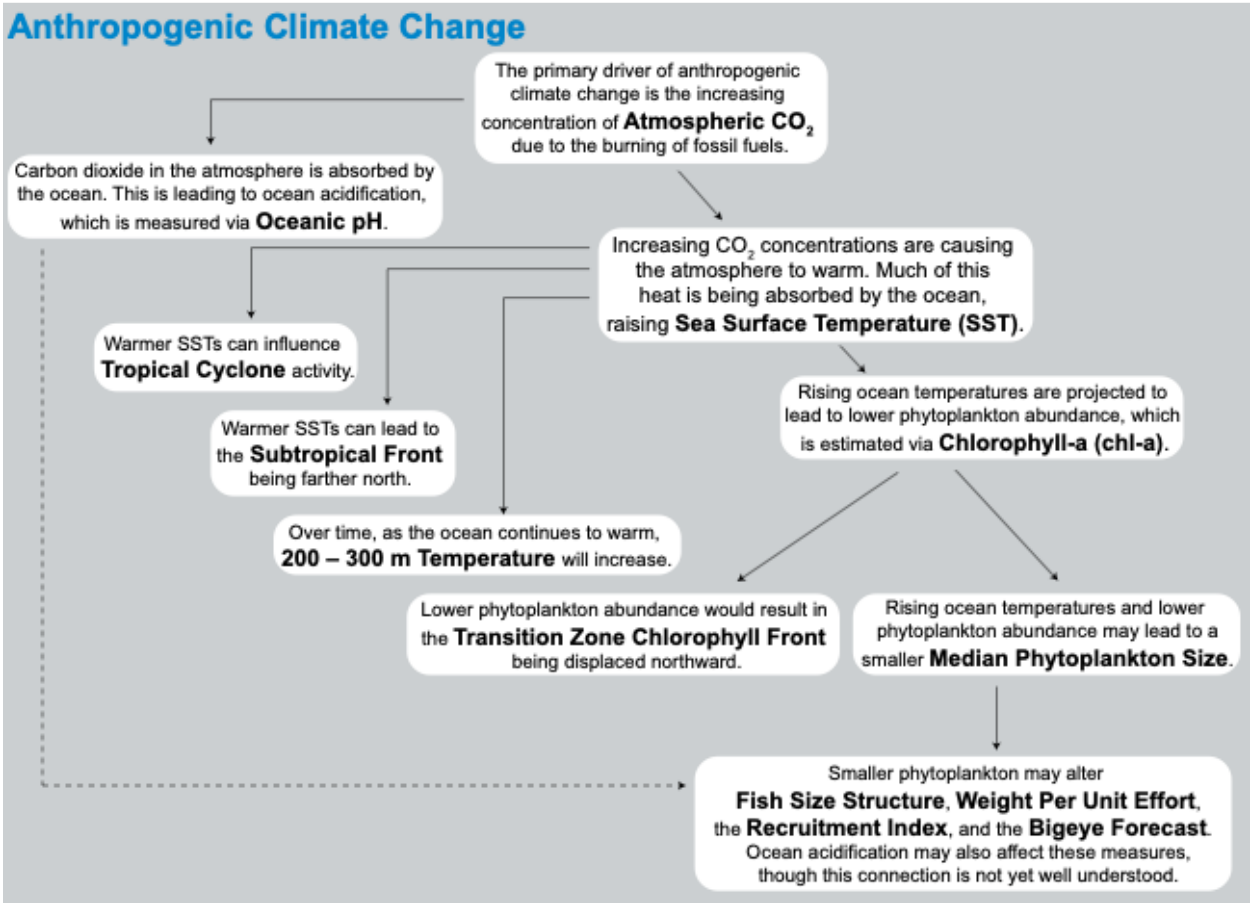



Figure 158. Schematic diagram illustrating the relationships between the ocean and climate indicators from the perspective of anthropogenic climate change

The primary driver of anthropogenic (human-caused) climate change is the increasing concentration of atmospheric carbon dioxide, $CO_2$, due to the burning of fossil fuels. Therefore, atmospheric $CO_2$ serves as a measure of what human activity has already done to affect the climate system through greenhouse gas emissions. The concentration of atmospheric $CO_2$, and, in turn, its warming influence, is increasing more quickly over time.

Carbon dioxide in the atmosphere is absorbed by the ocean. This leads to ocean acidification, which is measured via pH. Therefore, oceanic pH is a measure of how greenhouse gas emissions have already affected the ocean. Increasing ocean acidification limits the ability of marine organisms to build shells and other hard structures. Prey for commercially valuable fish are already being negatively affected by increasing ocean acidification.

Increasing carbon dioxide concentrations cause the atmosphere to warm. Much of this heat is then absorbed by the ocean, raising sea surface temperature (SST). SST is another measure of how greenhouse gas emissions are already affecting the ocean.

Rising sea surface temperatures may affect the number, strength, duration, track, and seasonal timing of tropical cyclones. The Accumulated Cyclone Energy index, or ACE Index, accounts for both the strength and duration of storms.

Over time, rising sea surface temperatures will warm deeper ocean waters. Changes in ocean temperature will affect tuna, and in turn, potentially their catchability. For example, fish may move to deeper waters or their habitat could be compressed geographically or vertically. Temperatures at 200–300 meters below the ocean's surface reflect those at the mid-range of depths targeted by the deep-set bigeye tuna fishery. Bigeye tuna have preferred thermal habitat, generally staying within waters between 8–14 ºC while they are at depth.

Rising ocean temperatures are projected to lead to lower phytoplankton abundance, which is observed through ocean color and estimated via chlorophyll-a (chl-a). Combined, rising ocean temperatures and lower phytoplankton abundance may lead to smaller median phytoplankton sizes. Smaller phytoplankton may alter fish size structure, weight-per-unit-effort, and the bigeye tuna recruitment index. Median phytoplankton size can be combined with the bigeye recruitment index to forecast catch rates.

Understanding the effects of anthropogenic climate change on the ocean, marine ecosystems, and regional fisheries is an active area of research.

### 3.4.2.3 ATMOSPHERIC CONCENTRATION OF CARBON DIOXIDE AT MAUNA LOA

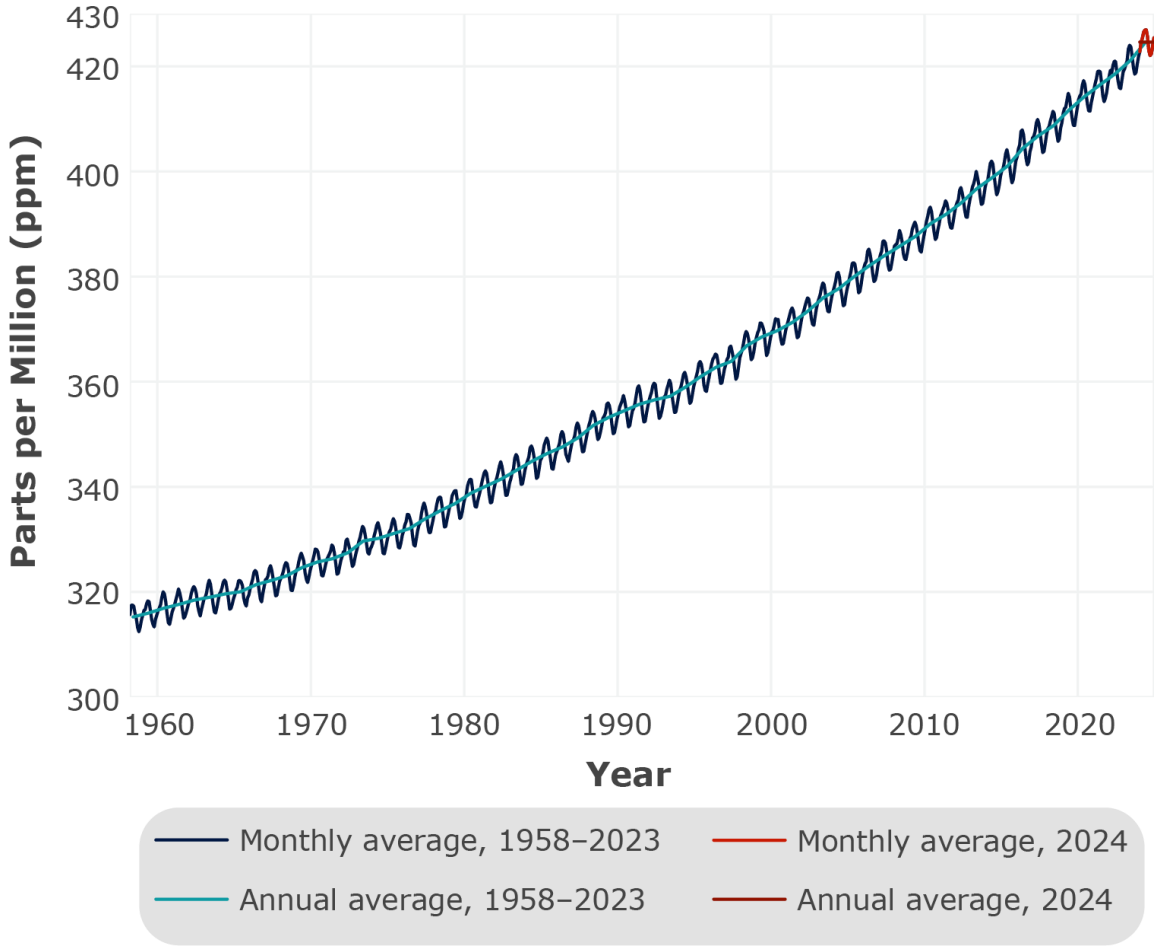



Figure 159. Concentration of atmospheric carbon dioxide at Mauna Loa Observatory on the island of Hawai‘i

**Rationale:** Atmospheric carbon dioxide ($CO_2$) is a measure of what human activity has already done to affect the climate system through greenhouse gas emissions. It provides quantitative information in a simplified, standardized format that decision makers can easily understand. This indicator demonstrates that the concentration (and, in turn, warming influence) of greenhouse gases in the atmosphere has increased substantially over the last several decades.

**Status:** Atmospheric $CO_2$ is increasing exponentially. This means that atmospheric $CO_2$ is increasing more quickly over time. In 2024, the annual mean concentration of $CO_2$ was 424.61 ppm. This is the highest annual value recorded. This year also saw the highest monthly value, which was 426.91 ppm. In 1959, the first year full of the time series, the atmospheric concentration of $CO_2$ was 316 ppm. The annual mean passed 350 ppm in 1988, and 400 ppm in 2015.

**Description:** Monthly mean atmospheric $CO_2$ at Mauna Loa Observatory, Hawai‘i in parts per million (ppm) from March 1958 to present. The observed increase in monthly average carbon dioxide concentration is primarily due to $CO_2$ emissions from fossil fuel burning. Carbon dioxide

remains in the atmosphere for a very long time, and emissions from any location mix throughout the atmosphere in approximately one year. The annual variations at Mauna Loa, Hawai‘i are due to the seasonal imbalance between the photosynthesis and respiration of terrestrial plants. During the summer growing season, photosynthesis exceeds respiration, and $CO_2$ is removed from the atmosphere. In the winter (outside the growing season), respiration exceeds photosynthesis, and $CO_2$ is returned to the atmosphere. The seasonal cycle is strongest in the northern hemisphere because of its larger land mass.

**Timeframe:** Annual, monthly.

**Region/Location:** Mauna Loa, Hawai‘i, but representative of global atmospheric carbon dioxide concentration. Note that due to the eruption of the Mauna Loa Volcano, measurements from Mauna Loa Observatory were suspended as of 29 November 2022. Observations from December 2022 to 4 July 2023 are from a site at the Maunakea Observatories, approximately 21 miles north of the Mauna Loa Observatory. Mauna Loa observations resumed in July 2023.

**Measurement Platform:** *In-situ* station.

Data available at: https://gml.noaa.gov/ccgg/trends/data.html.

**Sourced from:** (Keeling et al. 1976; Thoning et al. 1989; NOAA 2025a). Graphics produced in part using Stawitz and Li (2025).

### 3.4.2.4 OCEANIC PH

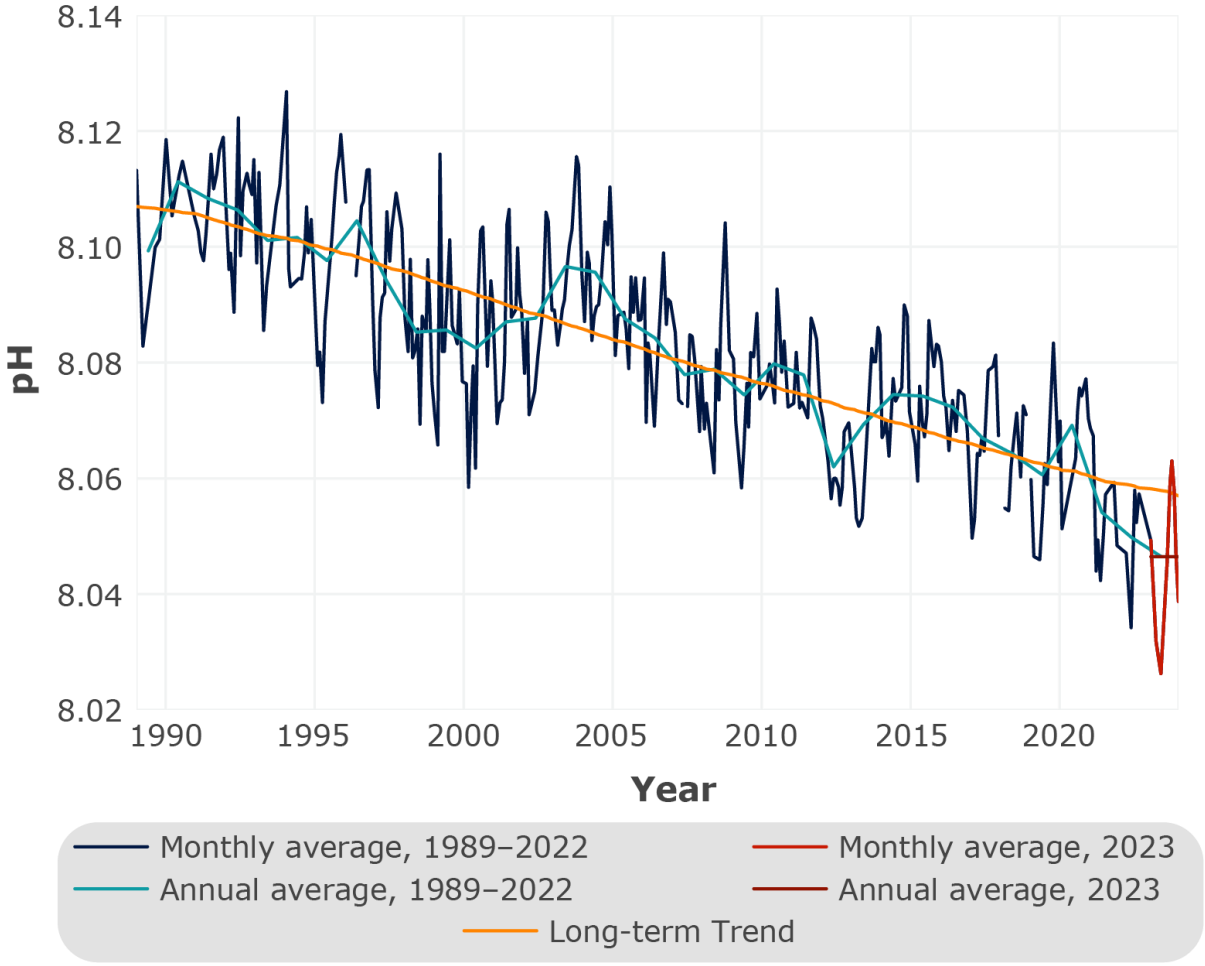



Figure 160. Time series and long-term trend of oceanic pH measured at Station ALOHA

**Rationale:** Oceanic pH is a measure of how greenhouse gas emissions have already affected the ocean. This indicator demonstrates that oceanic pH has decreased significantly over the past several decades (i.e., the ocean has become more acidic). Increasing ocean acidification limits the ability of marine organisms to build shells and other calcareous structures. Recent research has shown that pelagic organisms such as pteropods and other prey for commercially valuable fish species are already being negatively impacted by increasing acidification (Feely et al. 2016). The full impact of ocean acidification on the pelagic food web is an area of active research (e.g., Fabry et al. 2008).

**Status:** The ocean is roughly 12.2% more acidic than it was over 30 years ago at the start of this time series. Over this time, pH has declined by 0.05 at a constant rate. In 2023, the most recent year for which data are available, the average pH was 8.05. This year also saw a time series minimum of 8.026. Additionally, for the 8th year, small variations seen over the course of the year are outside the range seen in the first year of the time series. The highest pH value reported for the most recent year (8.063) is lower than the lowest pH value reported in the first year of the time series (8.083).

**Description:** Trends in surface (5 m) pH at Station ALOHA, north of Oahu (22.75°N, 158°W), are collected by the Hawai‘i Ocean Time-Series (HOT) from October 1988 to 2023 (2024 data are not yet available). Oceanic pH is a measure of ocean acidity, which increases as the ocean absorbs carbon dioxide from the atmosphere. Lower pH values represent greater acidity. Oceanic pH is calculated from total alkalinity (TA) and dissolved inorganic carbon (DIC). Total alkalinity represents the ocean's capacity to resist acidification as it absorbs $CO_2$ and the amount of $CO_2$ absorbed is captured through measurements of DIC. The multi-decadal time series at Station ALOHA represents the best available documentation of the significant downward trend in oceanic pH since the time series began in 1988. Oceanic pH varies over both time and space, though the conditions at Station ALOHA are considered broadly representative of those across the Western and Central Pacific's pelagic fishing grounds.

**Timeframe:** Monthly.

**Region/Location:** Station ALOHA: 22.75°N, 158°W.

**Measurement Platform:** *In-situ* station.

**Data available at**: https://hahana.soest.hawaii.edu/hot/hot-dogs/bseries.html.

**Sourced from:** (Karl and Lukas 1996; Zeebe and Wolf-Gladrow 2001; Fabry et al. 2008; Feely et al. 2016; HOT 2025). Graphics produced in part using Stawitz and Li (2025).

### 3.4.2.5 EL NIÑO – SOUTHERN OSCILLATION

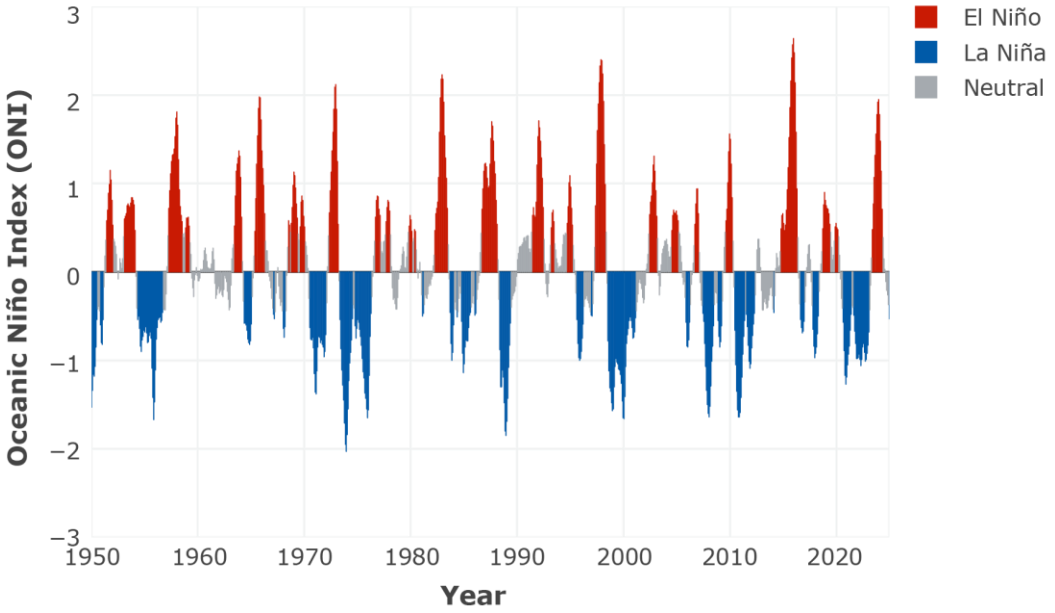



Figure 161. Oceanic Niño Index from 1950–2024 El Niño periods in red, La Niña periods in blue, and neutral periods in grey

**Rationale:** The El Niño – Southern Oscillation (ENSO) cycle is known to have impacts on Pacific fisheries including tuna fisheries. The Oceanic Niño Index (ONI) focuses on ocean temperature, which has the most direct effect on these fisheries.

**Status:** The Oceanic Niño Index (ONI) indicated a transition from El Niño to neutral conditions in 2024. In 2024, the ONI ranged from -0.53 to 1.78. This is within the range of values previously observed in the time series.

**Description:** The three-month running mean (referred to as a season) of satellite remotely-sensed sea surface temperature (SST) anomalies in the Niño 3.4 region (5°S – 5°N, 120° – 170°W). The ONI is a measure of the ENSO phase. Warm and cool phases, termed El Niño and La Niña respectively, are based in part on an ONI threshold of ± 0.5 °C being met for a minimum of five consecutive overlapping seasons. Additional atmospheric indices are needed to confirm an El Niño or La Niña event, as the ENSO is a coupled ocean-atmosphere phenomenon. The atmospheric half of ENSO is measured using the Southern Oscillation Index.

**Timeframe:** Three-month running mean.

**Region/Location:** Niño 3.4 region, 5°S – 5°N, 120° – 170°W.

**Measurement Platform:** *In-situ* station, satellite, model.

**Data available at:** https://www.cpc.ncep.noaa.gov/data/indices/oni.ascii.txt.

**Sourced from:** (NOAA Climate Prediction Center (CPC) 2025). Graphics produced in part using Stawitz and Li (2025).

### 3.4.2.6 PACIFIC DECADAL OSCILLATION

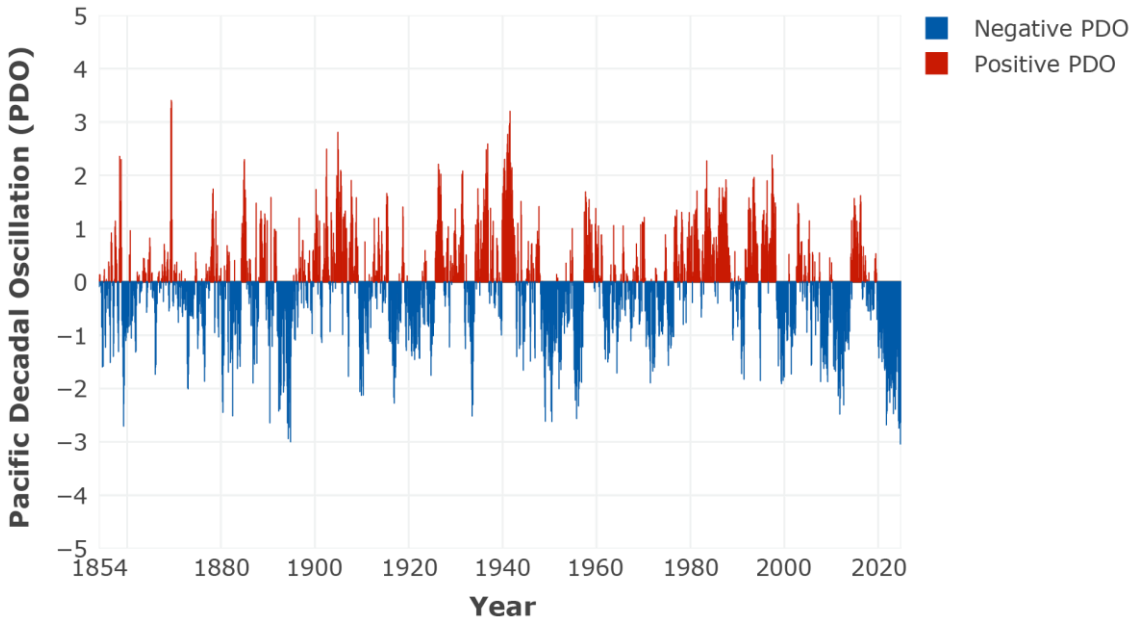



Figure 162. Pacific Decadal Oscillation from 1854–2024 with positive warm periods in red and negative cool periods in blue

**Rationale:** The Pacific Decadal Oscillation (PDO) was initially named by fisheries scientist Steven Hare in 1996 while researching connections between Alaska salmon production cycles and Pacific climate. Like ENSO, the PDO reflects changes between periods of persistently warm or persistently cool ocean temperatures, but over a period of 20 to 30 years (versus six to 18 months for ENSO events). The climatic fingerprints of the PDO are most visible in the Northeastern Pacific, but secondary signatures exist in the tropics. Research has shown that

during positive phases of the PDO, the Hawai‘i-based deep-set longline fishery has a greater likelihood of black-footed albatross sightings and interactions (Wren et al. 2019).

**Status:** The PDO was negative in 2024. The index ranged from -3.04 to -1.07 over the course of the year. This is within the range of values previously observed in the time series.

**Description:** The PDO is often described as a long-lived El Niño-like pattern of Pacific climate variability. As seen with the better-known ENSO, extremes in the PDO pattern are marked by widespread variations in the Pacific Basin and the North American climate. In parallel with the ENSO phenomenon, the extreme cases of the PDO have been classified as either warm or cool, as defined by ocean temperature anomalies in the northeast and tropical Pacific Ocean. When SST is below average in the [central] North Pacific and warm along the North American coast, and when sea level pressures are below average in the North Pacific, the PDO has a positive value. When the climate patterns are reversed, with warm SST anomalies in the interior and cool SST anomalies along the North American coast, or above average sea level pressures over the North Pacific, the PDO has a negative value. Description inserted from NOAA (2025b).

**Timeframe:** Monthly.

**Region/Location:** Pacific Basin north of 20°N.

**Measurement Platform:** *In-situ* station, satellite, model.

**Data available at:** https://psl.noaa.gov/pdo/.

**Sourced from:** (Mantua et al. 1997; Newman et al. 2016; Wren et al. 2019; NOAA 2025b). Graphics produced in part using Stawitz and Li (2025).

### 3.4.2.7 NORTH PACIFIC GYRE OSCILLATION

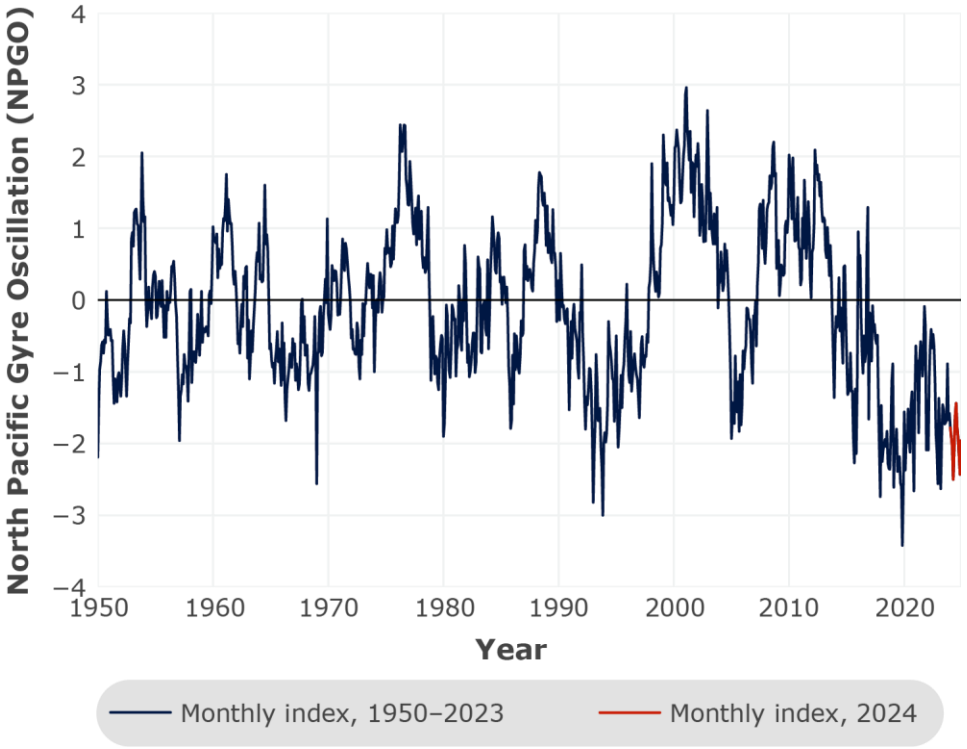



Figure 163 North Pacific Gyre Oscillation from 1950–2024

**Rationale**: The North Pacific Gyre Oscillation (NPGO) is related to, but distinct from, the Pacific Decadal Oscillation. It captures basin-scale processes, making it well suited to capture change across the Hawai‘i-based longline fishing grounds.

**Status:** The NPGO was negative in 2024. The index ranged from -2.5 to -1.44 over the course of the year. This is within the range of values previously observed in the time series.

**Description:** The NPGO is driven by regional and basin-scale changes in wind patterns. Changes to the wind field drive changes in ocean circulation that affect nutrients and, in turn, phytoplankton. Because phytoplankton are the foundational food source for marine ecosystems, the NPGO offers insight into potential ecosystem change. Description paraphrased from Di Lorenzo et al. (2008).

**Timeframe:** Monthly.

**Region/Location:** 180°–110°W; 25°N–62°N.

**Measurement Platform:** Satellite, model.

**Data available at:** https://www.o3d.org/npgo/data/NPGO.txt.

**Sourced from:** (Di Lorenzo et al. 2008). Graphics produced in part using Stawitz and Li (2025).

### 3.4.2.8 TROPICAL CYCLONES

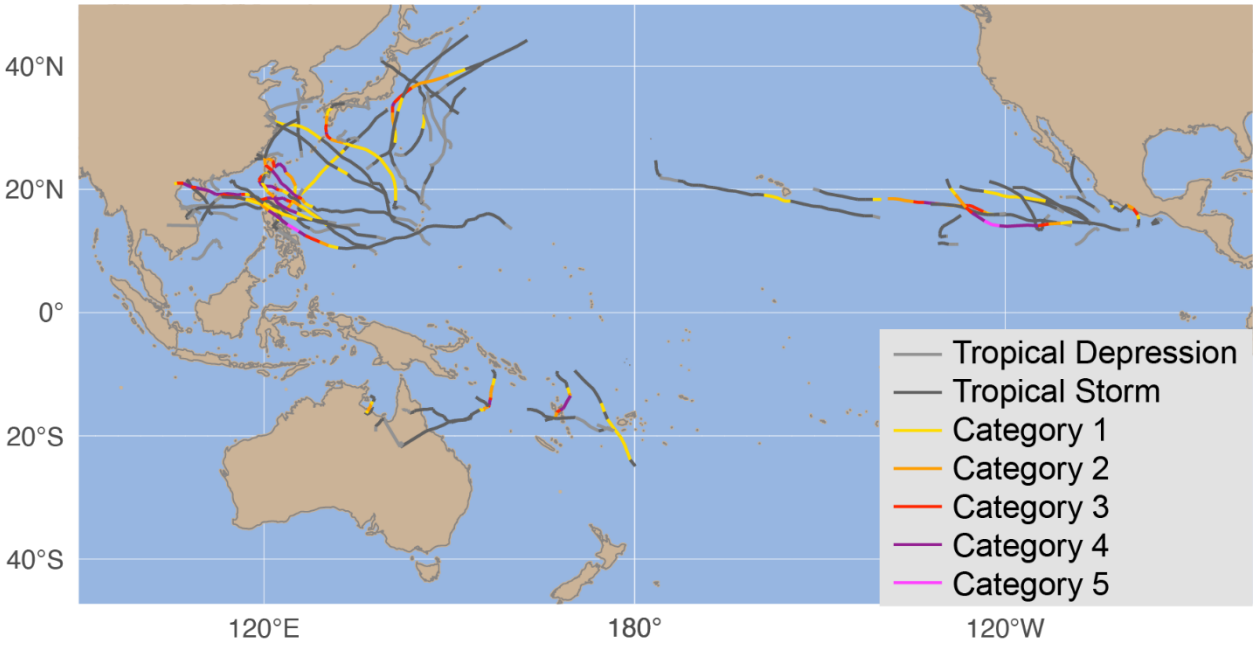



Figure 164. 2024 Pacific basin tropical cyclone tracks

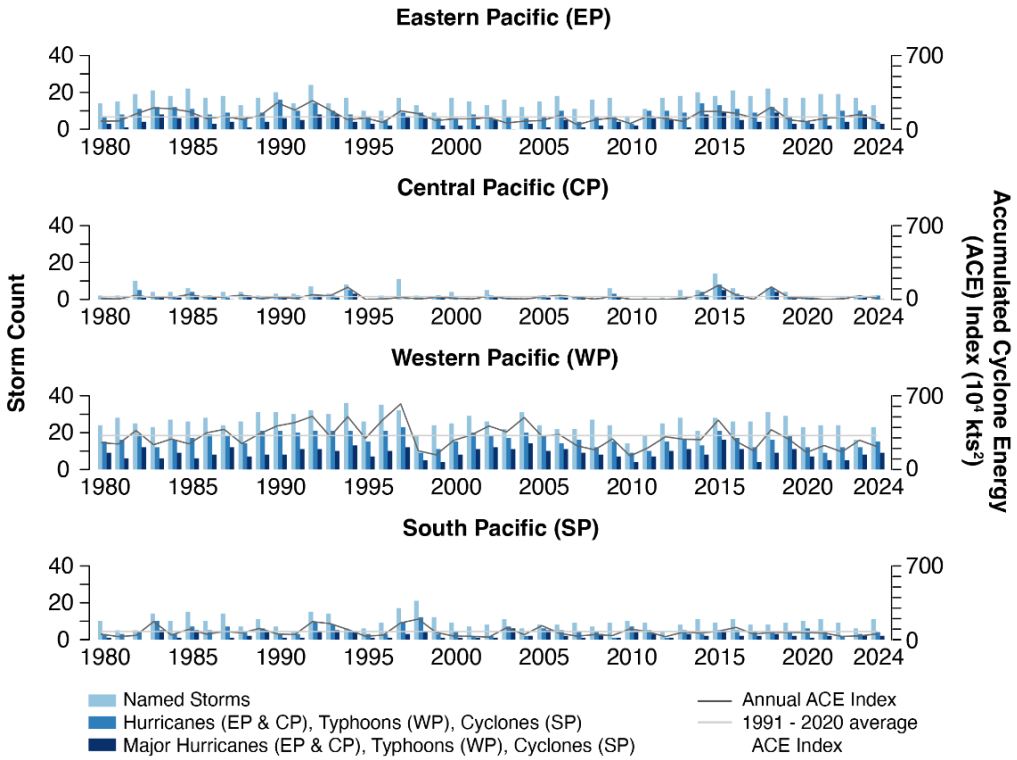



Figure 165. Storm counts (bars) and Accumulated Cyclone Energy (ACE) index values (lines) in each region of the Pacific. Both annual ACE index (black lines) and 1991–2020 average ACE index (grey lines) are shown

**Rationale:** The effects of tropical cyclones are numerous and well known. At sea, storms disrupt and endanger shipping traffic as well as fishing effort and safety. The Hawai‘i longline fishery, for example, has had serious problems with vessels dodging storms at sea, delayed departures, and inability to make it safely back to Honolulu because of bad weather. When cyclones encounter land, their intense rains and high winds can cause severe property damage, loss of life, soil erosion, and flooding. Associated storm surge, the large volume of ocean water pushed toward shore by cyclones' strong winds, can cause severe flooding and destruction.

**Status:**

*Eastern North Pacific.* Tropical cyclone activity was below the 1991–2020 average in the Eastern Pacific in 2024. There were 13 named storms, 4 of which were hurricanes. There were 3 major hurricanes (category 3 or higher). Accumulated Cyclone Energy (ACE) was about 67% the 1991–2020 average in the Eastern North Pacific. In addition to season totals, early season tropical cyclone activity and ACE were at a record low in 2024, with this being only the second year in this time series with no activity in June. Portions of this summary inserted from https://www.ncei.noaa.gov/access/monitoring/monthly-report/tropical-cyclones/202406 and https://www.ncei.noaa.gov/access/monitoring/monthly-report/tropical-cyclones/202413.

*Central North Pacific.* Early season tropical cyclone activity and ACE were at a record low in 2024 in the Central North Pacific, with this being only the second year in this time series with no activity in June. On August 19th, Hurricane Hone formed in the Central Pacific and peaked as a Category 1 hurricane with winds of 85 mph. Hone brought gusty winds and flooding rains to the Island of Hawai‘i as it passed south of the island chain. Overall, Central Pacific tropical cyclone activity was below the 1991–2020 average in 2024. There were 2 named storms, both hurricanes, though neither became a major hurricane. On average (1991–2020), the central Pacific sees four named storms, two hurricanes, and one major hurricane each year. The 2024 ACE index was well below the 1991–2020 average. Portions of this summary inserted from https://www.ncei.noaa.gov/access/monitoring/monthly-report/tropical-cyclones/202406, https://www.ncei.noaa.gov/access/monitoring/monthly-report/tropical-cyclones/202407, and https://www.ncei.noaa.gov/access/monitoring/monthly-report/tropical-cyclones/202408.

*Western North Pacific.* Early season tropical cyclone activity and ACE were at a record low in 2024. However, this changed in November, when four named storms were simultaneously active. This was the first instance of four simultaneous named storms in the West Pacific during the month of November. Overall, though, storm activity was near average. The Western Pacific saw 23 named storms in 2024. Of these storms, 15 were typhoons, and 9 became major typhoons. These counts were all close to average (1991–2020), although ACE was only about 67% the long-term average. Since 1980, the number of named storms and typhoons has decreased slightly at a rate of about 1 storm per decade and the total number of storms has decreased at a rate of about 2 storms per decade. Portions of the summary inserted from https://www.ncei.noaa.gov/access/monitoring/monthly-report/tropical-cyclones/202406 and https://www.ncei.noaa.gov/access/monitoring/monthly-report/tropical-cyclones/202411.

*South Pacific.* South Pacific tropical cyclone activity was roughly average in 2024. There were 11 named storms, 4 of which became cyclones and 2 major cyclones. The 2024 ACE was less than the 1991–2020 average.

**Description:** This indicator uses historical data from the NOAA National Climate Data Center (NCDC) International Best Track Archive for Climate Stewardship to track the number of

tropical cyclones in the western, central, eastern, and southern Pacific basins. This indicator also monitors the Accumulated Cyclone Energy (ACE) Index which is a way of monitoring the frequency, strength, and duration of tropical cyclones based on wind speed measurements.

The annual frequency of storms passing through each basin is tracked and Figure 165 shows the representative breakdown of Saffir-Simpson hurricane categories.

Every cyclone has an ACE Index value, which is a number based on the maximum wind speed measured at six-hourly intervals over the entire time that the cyclone is classified as at least a tropical storm (wind speed of at least 34 knots; 39 mph). Therefore, a storm's ACE Index value accounts for both strength and duration. Figure 165 shows the ACE values for each hurricane/typhoon season and has a horizontal line representing the average annual ACE value.

**Timeframe:** Annual.

**Region/Location:**

Eastern North Pacific: east of 140° W, north of the equator.
Central North Pacific: 180° - 140° W, north of the equator.
Western North Pacific: west of 180°, north of the equator.
South Pacific: south of the equator.

**Measurement Platform:** Satellite.

**Data available at:** https://www.ncei.noaa.gov/data/international-best-track-archive-for-climate-stewardship-ibtracs/v04r01/access/csv/.

**Sourced from:** (Knapp et al. 2010, 2018; NOAA 2025c)

### 3.4.2.9 SEA SURFACE TEMPERATURE (SST)

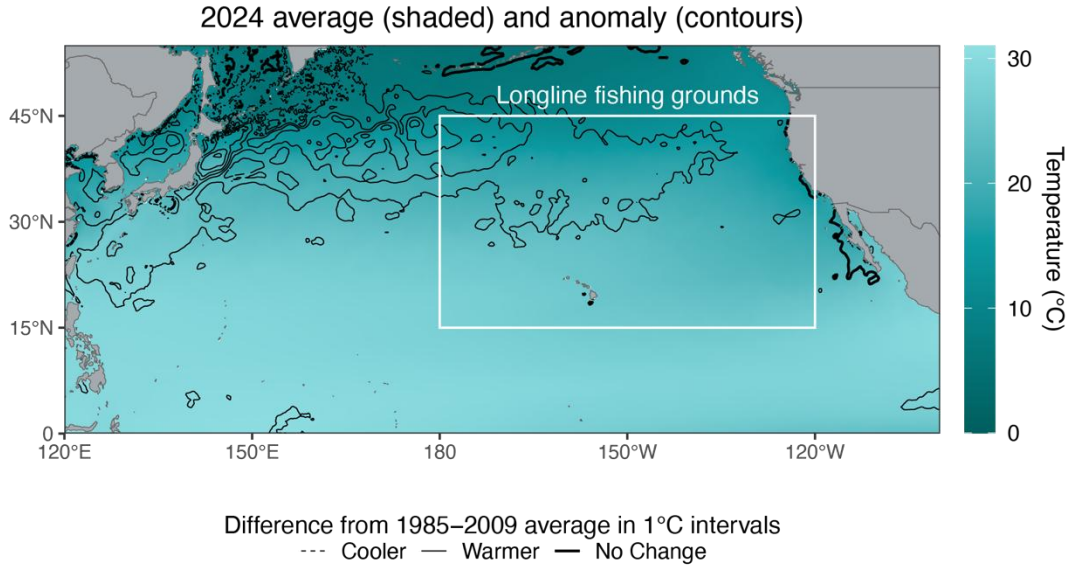



Figure 166. Average 2024 sea surface temperature (shaded) and the difference from the 1985–2009 average (contoured). The white rectangle identifies the area targeted by Hawai‘i’s longline fisheries. SST is averaged over this area for the time series shown in Figure 167 and Figure 168

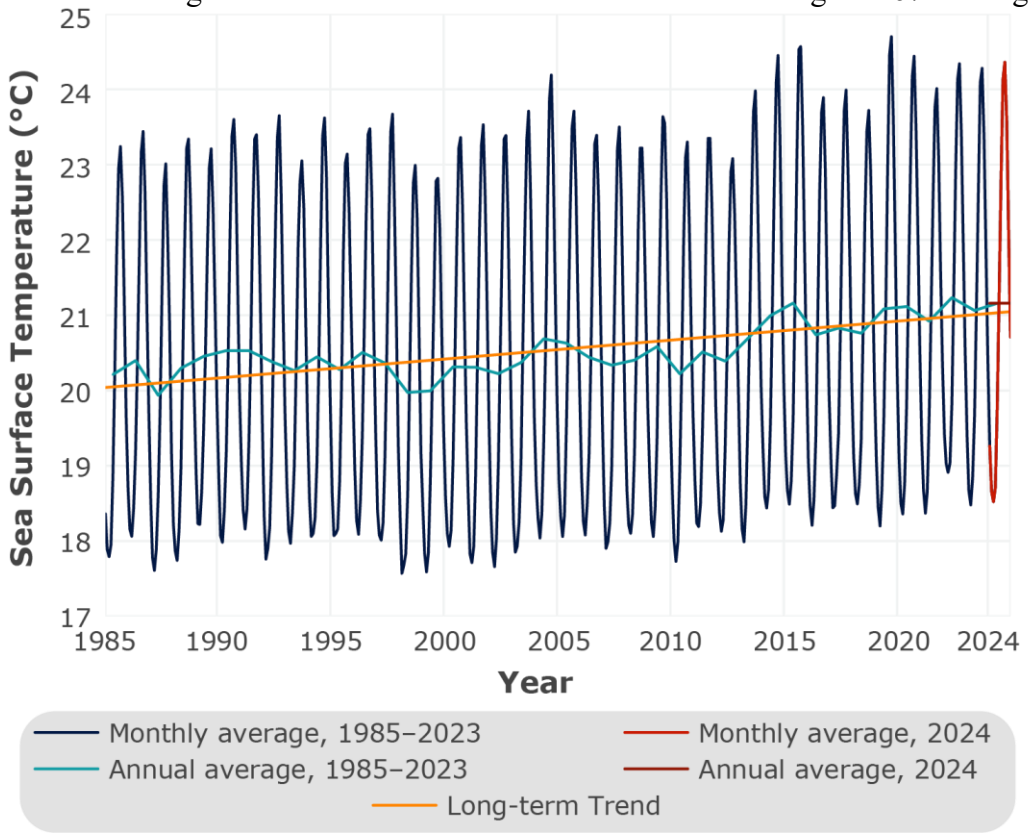



Figure 167. Time series of monthly average sea surface temperature over the longline fishing grounds outlined in Figure 166

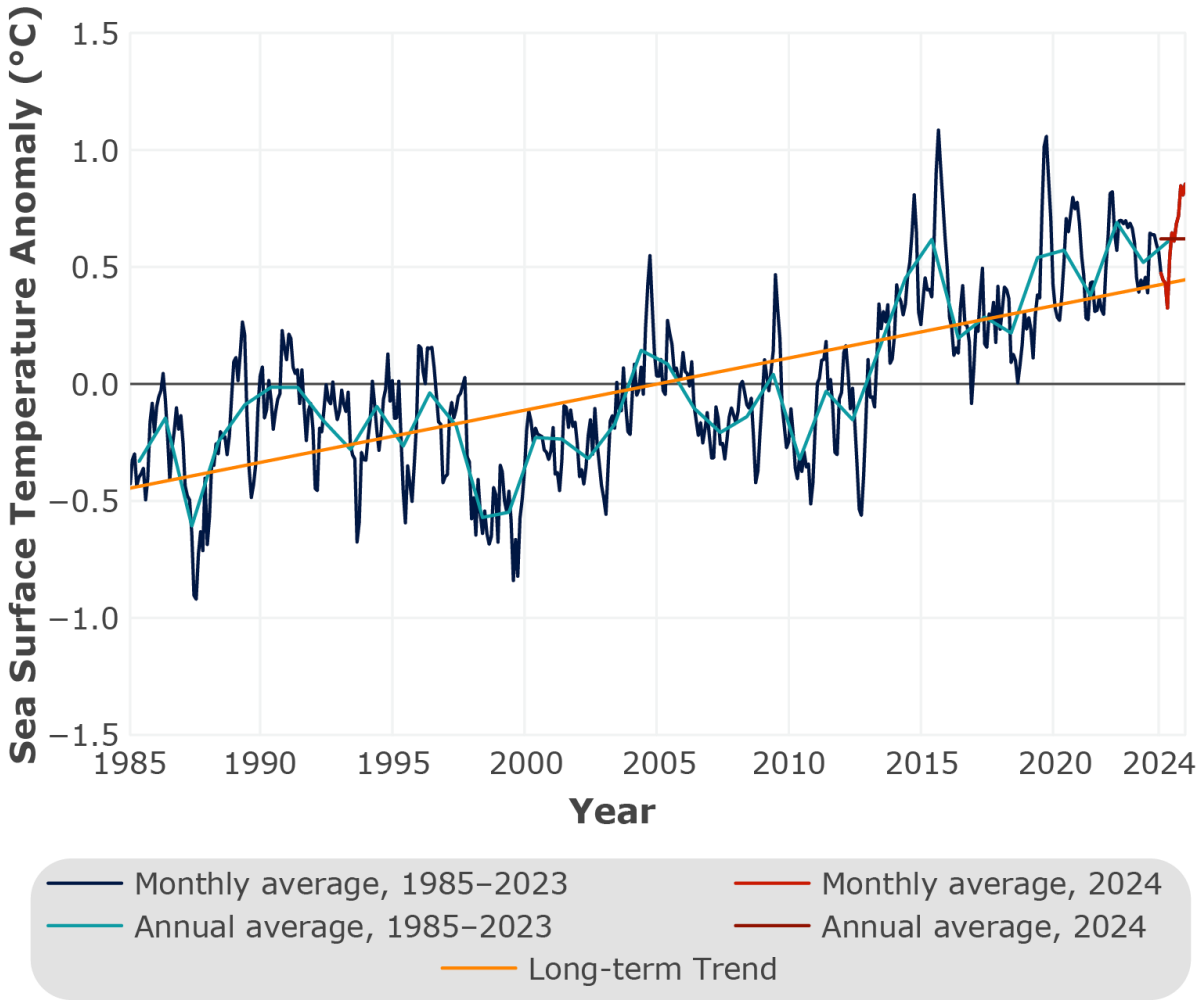



Figure 168. Time series of monthly average sea surface temperature anomaly over the longline fishing grounds outlined in Figure 166

**Rationale:** Sea surface temperature (SST) is one of the most directly observable existing measures for tracking increasing ocean temperatures. SST varies in response to natural climate cycles such as the El Niño – Southern Oscillation (ENSO) and is rising as a result of anthropogenic climate change. Both short-term variability and long-term trends in SST impact the marine ecosystem. Understanding the mechanisms through which organisms are impacted and the time scales of these impacts is an area of active research.

**Status:** Annual mean SST was 21.2 ºC in 2024. Over the period of record, SST across the longline fishing grounds has increased by 1 ºC and the monthly SST anomaly increased by 0.9 ºC, both at a rate of roughly 0.025 ºC $yr^{-1}$. Monthly SST values in 2024 ranged from 18.5–24.4 ºC, within the range of temperatures experienced over the past several decades (17.6–24.7 ºC). Overall, SST was above the long-term average across the Hawai‘i longline region in 2024.

**Description:** Satellite remotely sensed monthly sea surface temperature (SST) is averaged across the Hawai‘i-based longline fishing grounds (15° – 45°N, 180° – 120°W). A time series of monthly mean SST averaged over the Hawai‘i longline region is presented. Additionally, spatial climatologies and anomalies are shown. CoralTemp data are used to calculate this indicator.

**Timeframe:** Annual, monthly.

**Region/Location:** Hawai‘i longline region: 15° – 45°N, 180° – 120°W.

**Measurement Platform:** Satellite.

**Data available at:** https://oceanwatch.pifsc.noaa.gov/erddap/griddap/CRW_sst_v3_1_monthly, https://oceanwatch.pifsc.noaa.gov/erddap/griddap/CRW_sst_v3_1_1985-2009-clim, and https://oceanwatch.pifsc.noaa.gov/erddap/griddap/CRW_sst_v3_1_2024-clim.

**Sourced from:** (NOAA OceanWatch 2025a). Graphics produced in part using Stawitz and Li (2025).

### 3.4.2.10 TEMPERATURE AT 200–300 M DEPTH

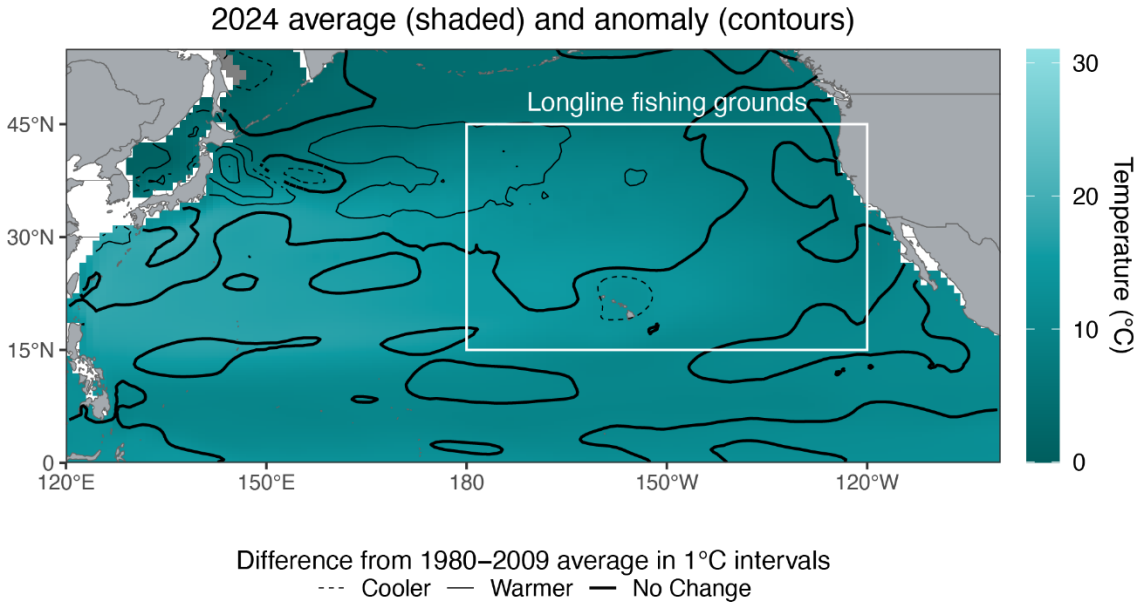



Figure 169. Average temperatures at 200–300 m depth in 2024 (shaded) and the difference from the 1980–2009 average (contoured). The white rectangle identifies the area targeted by Hawai‘i’s longline fisheries. Temperatures is averaged over this area for the time series shown in Figure 170

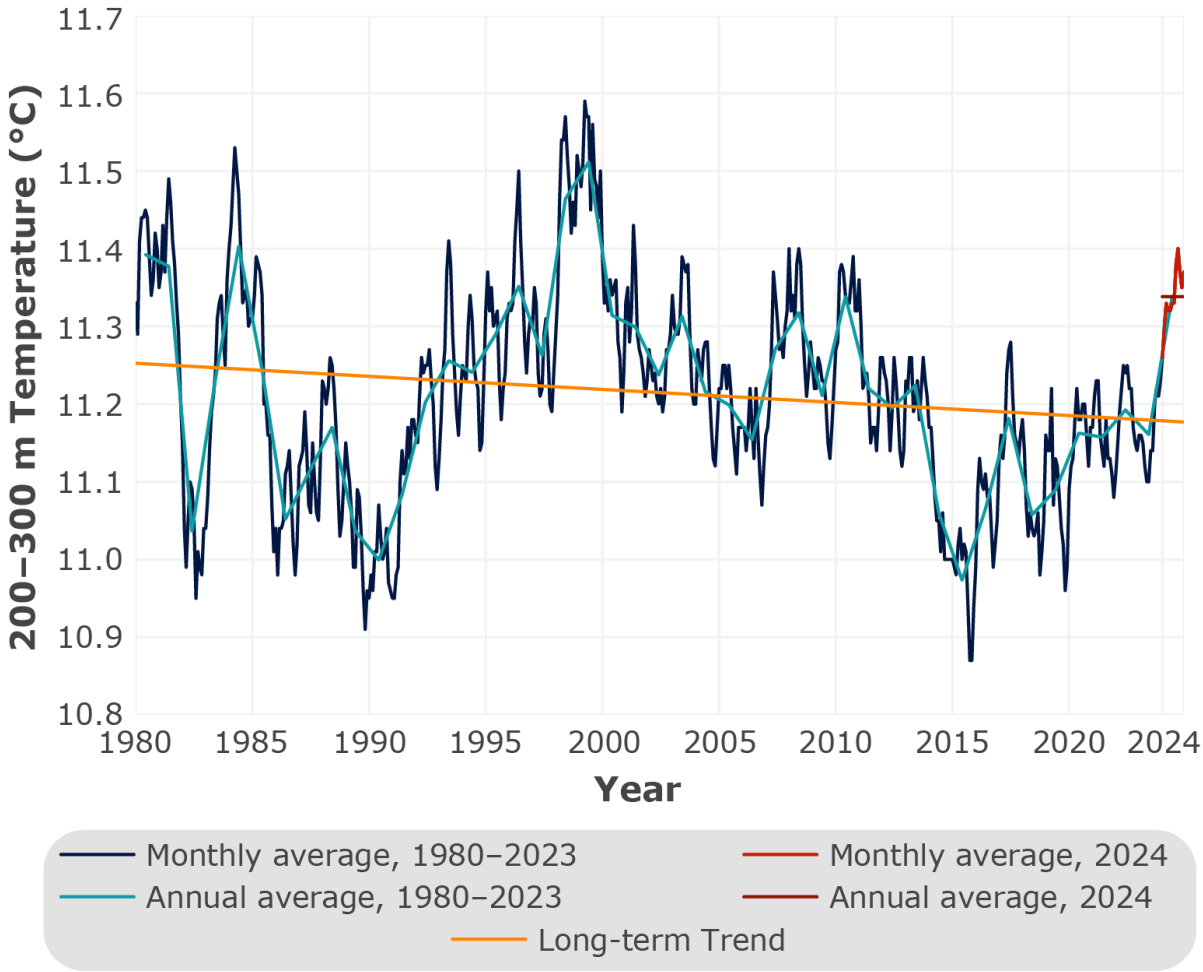



Figure 170. Time series of monthly 200–300 m temperatures over the longline fishing grounds outlined in Figure 169

**Rationale:** The temperature at 200–300 m reflects the temperature in the mid-range of depths targeted by the deep-set bigeye tuna fishery. Bigeye have preferred thermal habitat, generally staying within temperatures ranging from 8–14 °C while they are at depth (Howell et al. 2010). Changes in ocean temperature at depth will impact tuna, and in turn, potentially impact their catchability. Understanding the drivers of sub-surface temperature trends and their ecosystem impacts is an area of active research.

**Status:** In 2024, 200–300 m temperatures ranged from 11.26–11.4 °C with an average value of 11.34 °C. These temperatures are within the range of temperatures experienced over the past several decades (10.87–11.59 °C) and are within the bounds of bigeye tuna's preferred deep daytime thermal habitat (8–14 °C). Over the period of record (1980–2024), 200–300 m temperatures have declined by 0.08 °C. The spatial pattern of temperature anomalies was mixed with temperatures at depth around the main Hawaiian Islands roughly 0.5–1.5 °C below average, and temperatures north and west of the Hawaiian Islands 0.5–1 °C above average.

**Description:** Ocean temperature at 200–300 m depth is averaged across the Hawai‘i-based longline fishing grounds (15° – 45°N, 180° – 120°W). Global Ocean Data Assimilation System

(GODAS) data are used. GODAS incorporates global ocean data from moorings, expendable bathythermographs (XBTs), and Argo floats.

**Timeframe:** Annual, monthly.

**Region/Location:** Hawai‘i longline region: 15° – 45°N, 180° – 120°W.

**Measurement Platform:** *In-situ* sensors, model.

**Sourced from:** (APDRC 2025; NOAA 2025d). Graphics produced in part using Stawitz and Li (2025).

### 3.4.2.11 OCEAN COLOR

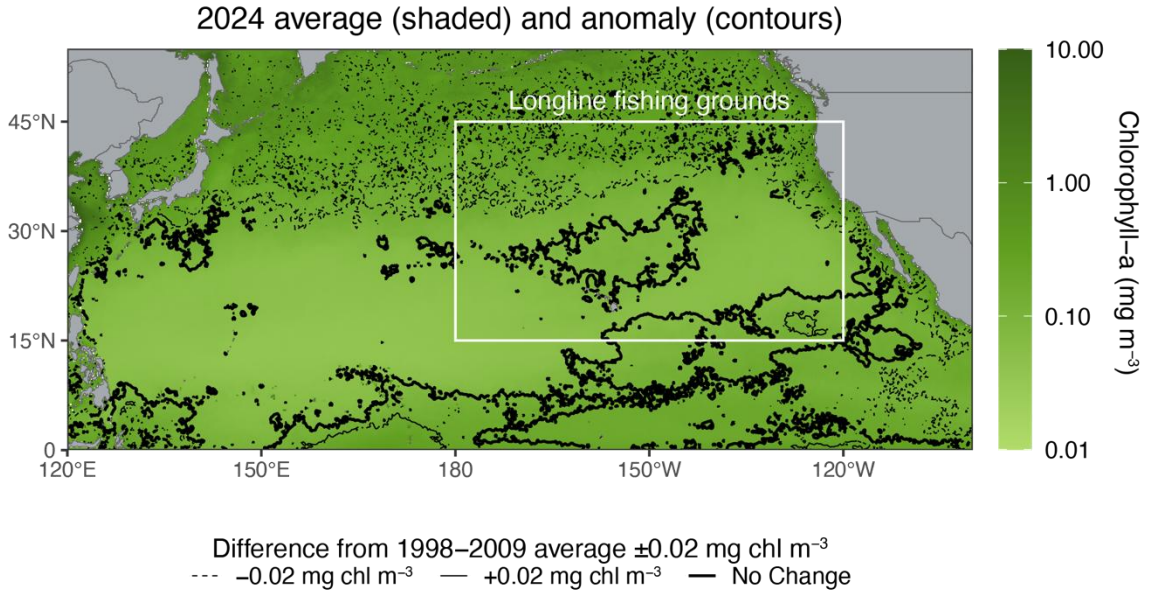



Figure 171. Average chlorophyll-a concentration in 2024 (shaded) and the difference from the 1998–2009 average (contoured). The white rectangle identifies the area targeted by Hawai‘i’s longline fisheries. Chlorophyll-a is averaged over this area for the time series shown in Figure 172 and Figure 173

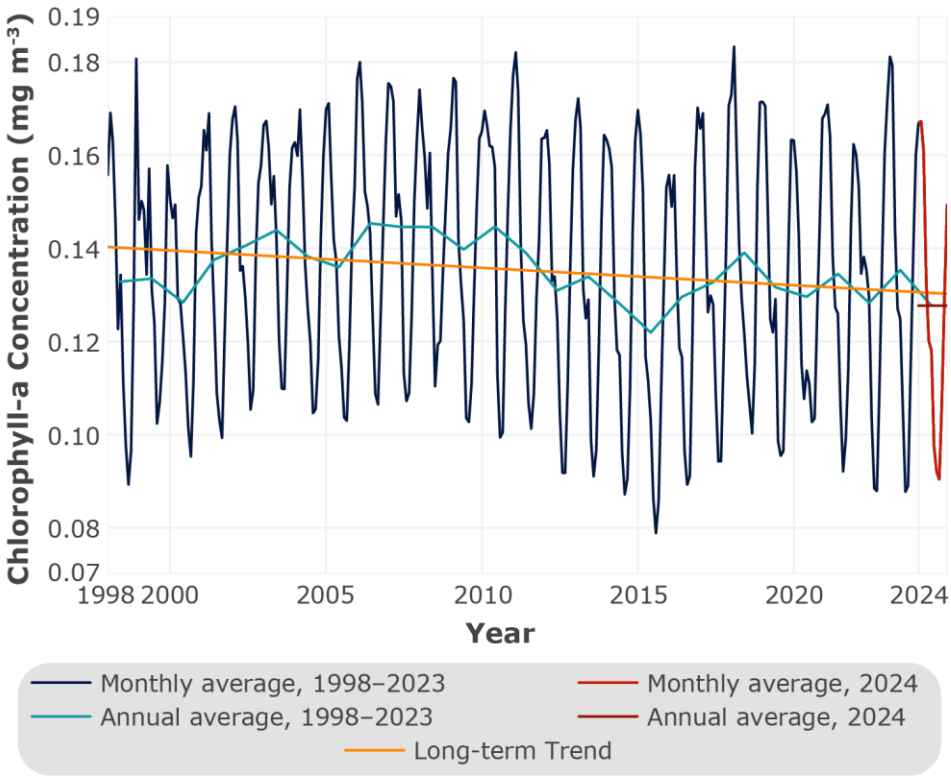



Figure 172. Time series of monthly average chlorophyll concentration over the longline fishing grounds outlined in Figure 173

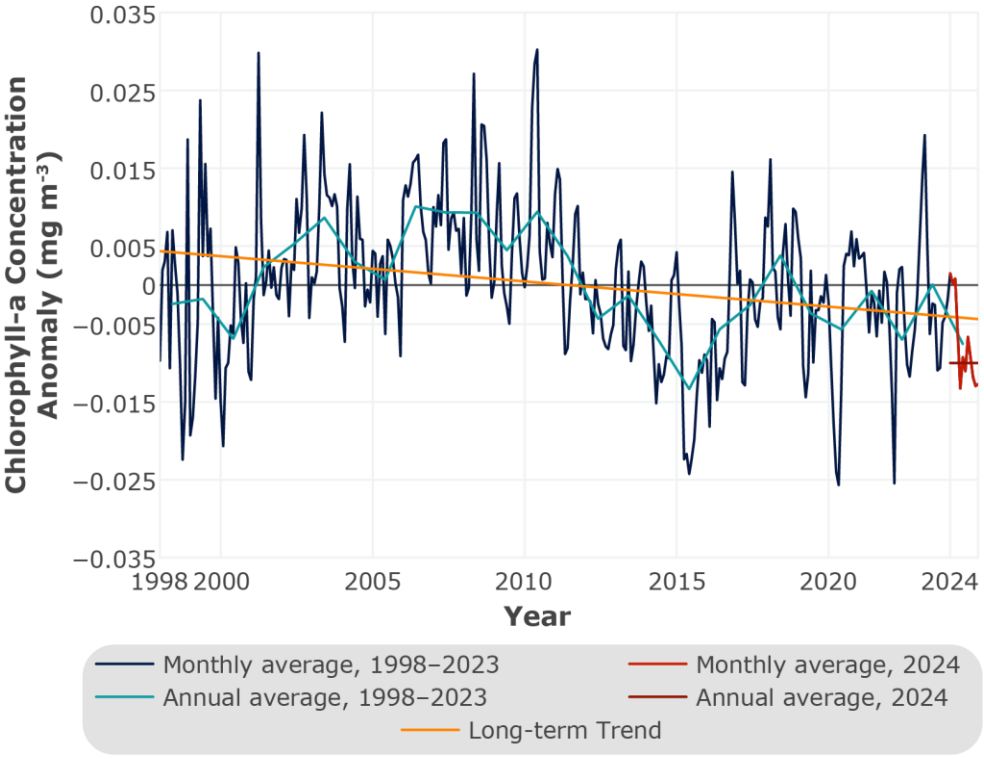



Figure 173. Time series of monthly average chlorophyll concentration anomaly over the longline fishing grounds outlined in Figure 172

**Rationale:** Phytoplankton are the foundational food source for the fishery. Changes in phytoplankton abundance have been linked to both natural climate variability and anthropogenic climate change. These changes have the potential to affect fish abundance, size, and catch.

**Status:** The mean monthly chlorophyll concentration was 0.13 mg chl $m^{-3}$ in 2024. Monthly mean chlorophyll concentrations ranged from 0.09–0.17 mg chl $m^{-3}$, which was within the range of values observed during the previous years of the time series (0.079–0.18 mg chl $m^{-3}$). Both monthly average chlorophyll concentration and chlorophyll anomalies have declined by about 0.009 mg chl $m^{-3}$ over the period of record. Chlorophyll concentrations were fairly average across the Hawai‘i-based longline fishing grounds in 2024.

**Description:** Satellite remotely sensed ocean color is used to determine chlorophyll concentrations in the pelagic surface ocean. A time series of mean monthly chlorophyll-a concentrations averaged over the Hawai‘i longline region is presented. Additionally, spatial climatologies and anomalies are shown. European Space Agency (ESA) Climate Change Initiative (CCI) data are used for this indicator (Sathyendranath et al. 2018).

**Timeframe:** Annual, monthly

**Region/Location:** Hawai‘i longline region: 5° – 45°N, 180° – 120°W

**Measurement Platform:** Satellite

**Data available at:** https://oceanwatch.pifsc.noaa.gov/erddap/griddap/esa-cci-chla-monthly-v6-0, https://oceanwatch.pifsc.noaa.gov/erddap/griddap/esa-cci-chla-1998-2009-clim-v6-0, and https://oceanwatch.pifsc.noaa.gov/erddap/griddap/esa-cci-chla-2024-clim_v6-0.

**Sourced from:** (Sathyendranath et al. 2018; NOAA OceanWatch 2025b). Graphics produced in part using Stawitz and Li (2025).

### 3.4.2.12 NORTH PACIFIC SUBTROPICAL FRONT (STF) AND TRANSITION ZONE CHLOROPHYLL FRONT (TZCF)

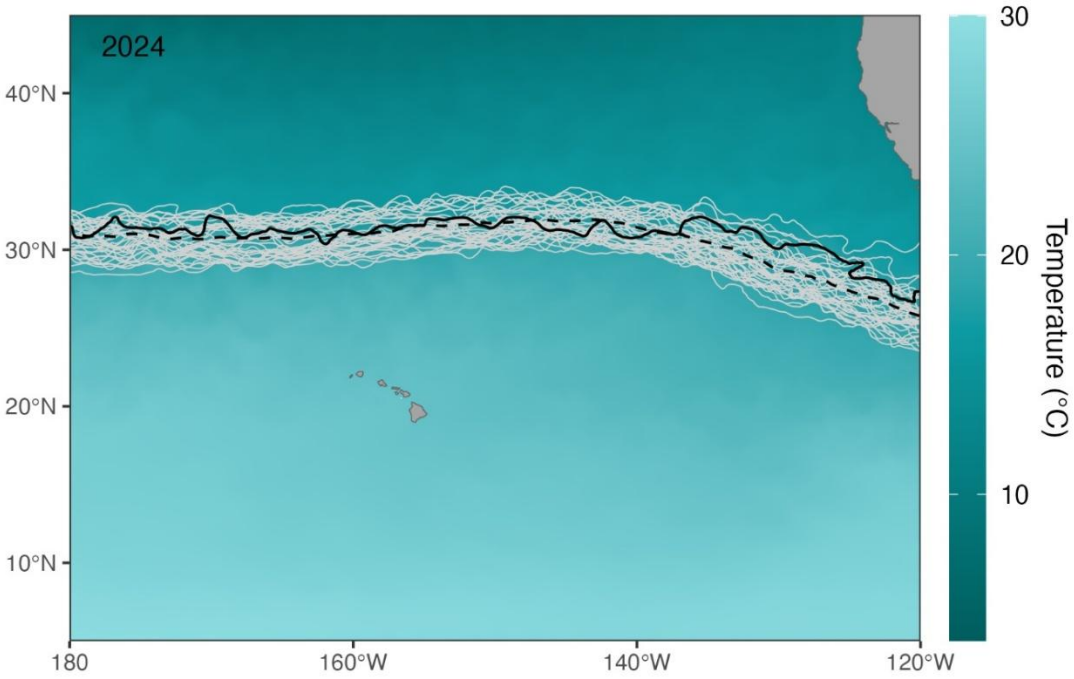



Figure 174. Average position of the subtropical front (STF) in 2024 (solid black line), over the 1985–2009 average (dotted line), locations from previous years (1985–2023; solid grey lines), and ocean temperatures for the first quarter of 2024 (shaded)

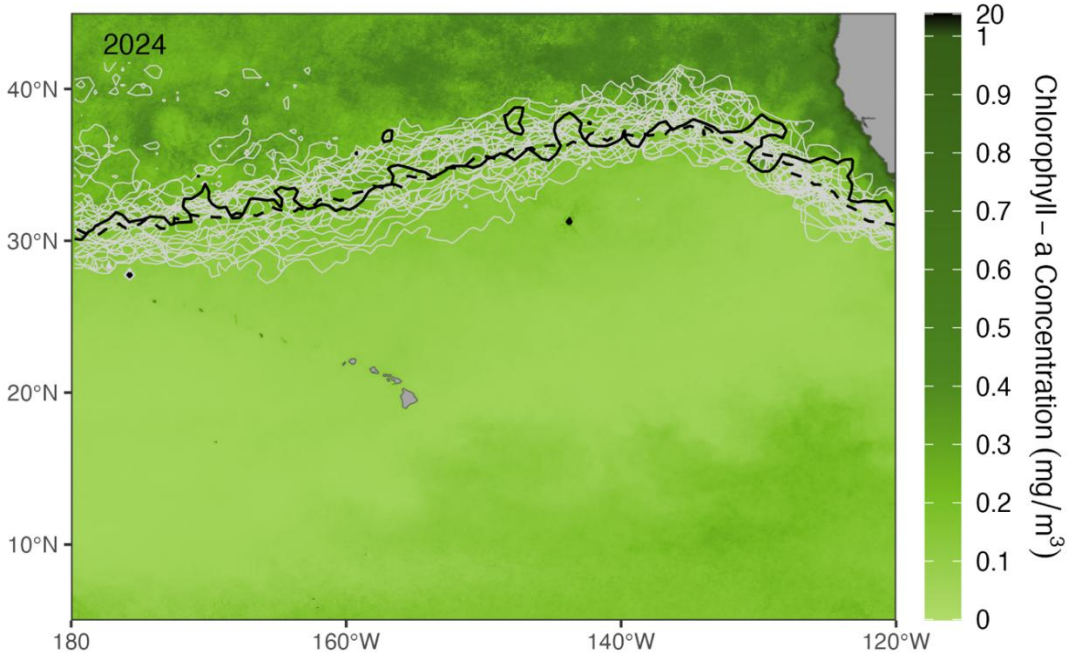



Figure 175. Average position of the transition zone chlorophyll front (TZCF) in 2024 (solid black line) over the 1998–2009 average (dotted black line), locations from previous years (1985–2023; solid grey lines), and ocean color for the first quarter of 2024 (shaded)

**Rationale:** The STF is targeted by the swordfish fishery. Additionally, both the STF and TZCF are used as migration and foraging corridors by both commercially valuable and protected species. Northward displacement of the frontal zone can increase the distance fishing vessels must travel to set their gear. This can, in turn, increase operational expenses. The positions of the fronts vary in response to natural climate variations. Long-term northward displacement of the frontal zone may also result from anthropogenic climate change.

**Status:** During the first quarter of 2023, the STF was near its 1998–2009 average location across much of the region, though slightly north of average east of 140°W. The TZCF location was bear average across much of the fishing grounds.

**Description:** The subtropical front (STF) is marked by the 18 °C sea surface temperature (SST) isotherm and the transition zone chlorophyll front (TZCF) by the 0.2 mg chl-a $m^{-3}$ isopleth (Polovina et al. 2001; Bograd et al. 2004). They roughly mark the northern boundary of the North Pacific subtropical gyre as well as the northern extent of the Hawai‘i-based longline fishery. Both fronts migrate meridionally on a seasonal basis and their positions are affected by the phase of the El Niño – Southern Oscillation (ENSO). Due to significant seasonal variation, the climatology and anomaly (2024) are presented for the first quarter of the year only. The STF is determined from CoralTemp data (see SST indicator) and the TZCF is determined from ESA CCI data (see Sections 3.4.2.9 and 3.4.2.11).

**Timeframe:** Annual, seasonal

**Region:** Hawai‘i longline region: 5° – 45°N, 180° – 120°W

**Measurement Platform:** Satellite

**Data available at:** https://oceanwatch.pifsc.noaa.gov/erddap/griddap/CRW_sst_v3_1_monthly and https://oceanwatch.pifsc.noaa.gov/erddap/griddap/esa-cci-chla-monthly-v6-0.

**Sourced from:** (Polovina et al. 2001; Bograd et al. 2004; NOAA OceanWatch 2025b, 2025a).

### 3.4.2.13 ESTIMATED MEDIAN PHYTOPLANKTON SIZE

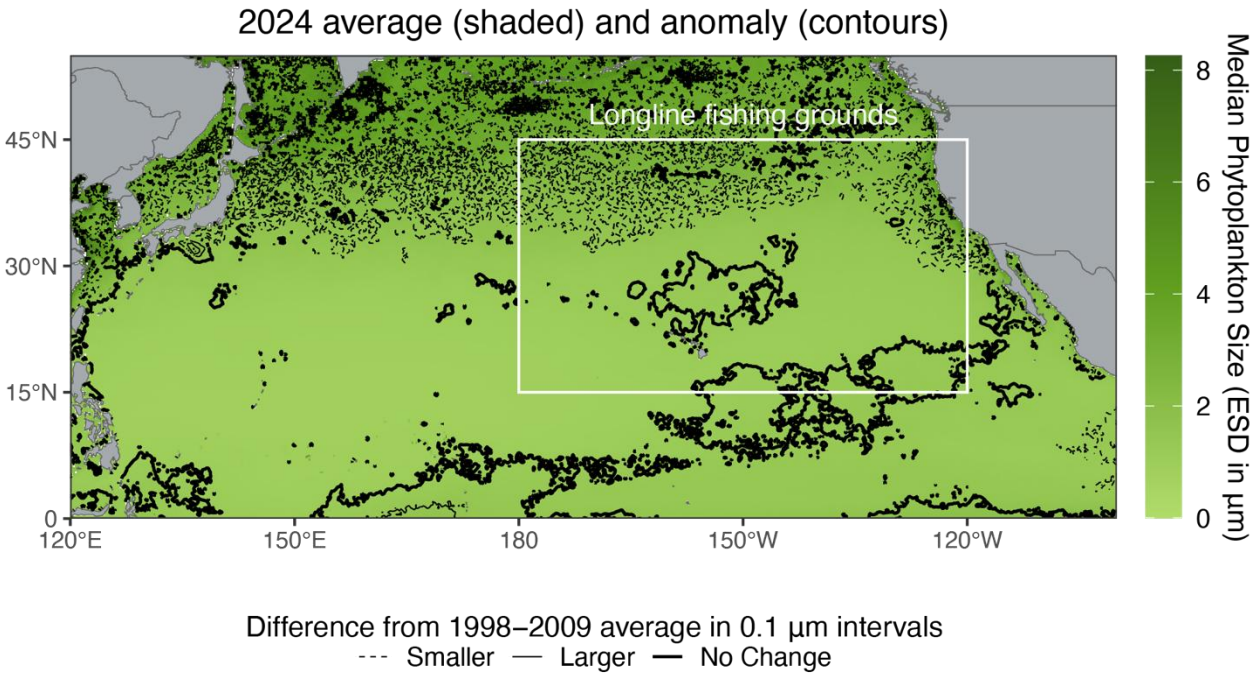



Figure 176. Average estimated median phytoplankton size in 2024 (shaded) and the difference from the 1998–2009 average (contoured) across the area targeted by Hawai‘i’s longline fisheries

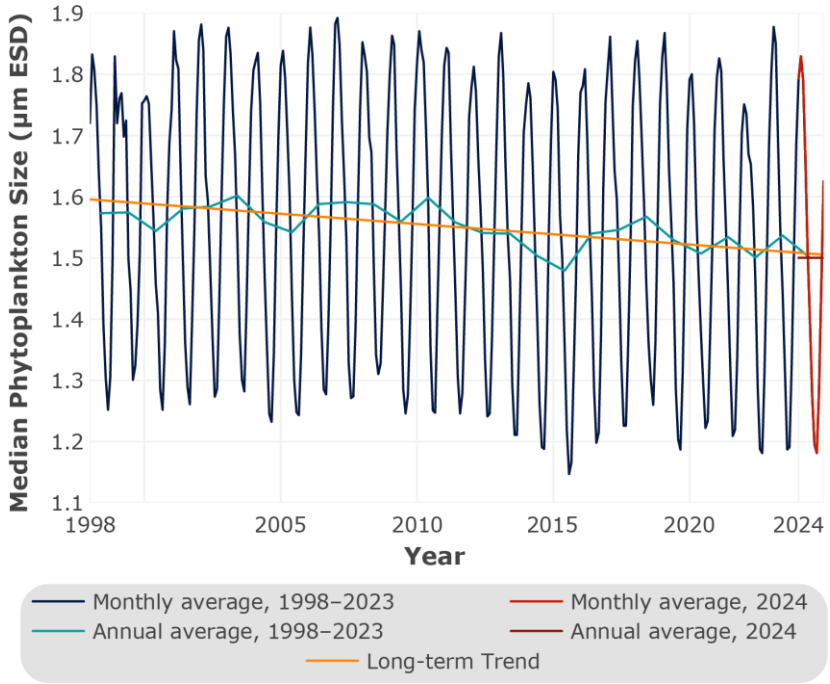



Figure 177. Time series of monthly median phytoplankton size over the longline fishing grounds shown in Figure 176

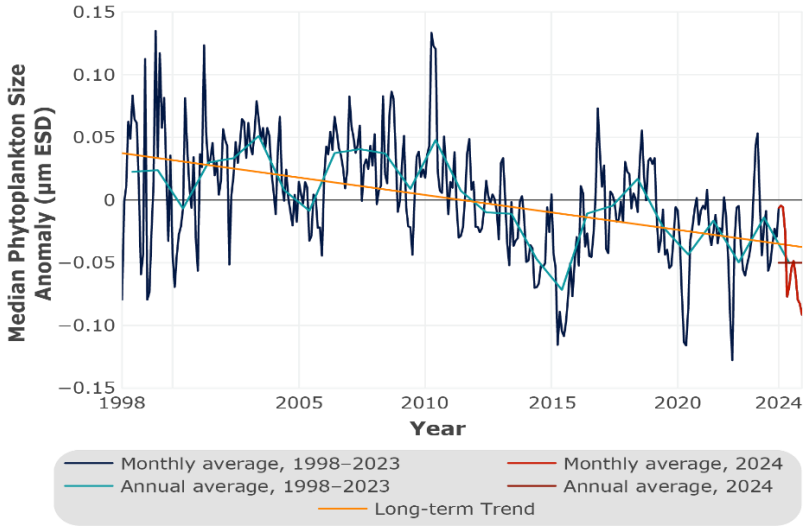



Figure 178. Time series of monthly median phytoplankton size anomaly over the longline fishing grounds shown in Figure 176

**Rationale:** Phytoplankton are the base of the food web and their abundance influences the food available to all higher trophic levels from zooplankton through tuna and billfish. Some studies project that climate change will result in both fewer and smaller phytoplankton. This would reduce the food available to all members of the food web. Understanding trends in phytoplankton abundance and size structure, how they are influenced by oceanographic conditions, and how they influence fish abundance and size structure are areas of active research.

**Status:** The mean monthly phytoplankton cell size was 1.50 µm Equivalent Spherical Diameter (ESD) in 2024. Monthly mean cell size ranged from 1.18–1.83 µm ESD during the year, within the range of values observed over the period of record (1.15–1.89 µm ESD). Over the period of record, there has been weakly significant decline in monthly median phytoplankton size. Over the time series, median phytoplankton size has declined by 0.09 µm ESD, or by 5.7%. The monthly anomaly has declined as well, by 0.075 µm ESD. Average estimated median phytoplankton size was below average across much of the fishing grounds, particularly north of about 30°N.

**Description:** Median phytoplankton cell size can be estimated from satellite remotely sensed SST and ocean color (Barnes et al. 2011). A time series of monthly median phytoplankton cell size averaged over the Hawai‘i longline region is presented, as well as a time series of anomalies. NOAA CoralTemp (see SST indicator) and ESA CCI data (see ocean color indicator) are used to calculate median phytoplankton cell size.

**Timeframe:** Monthly, annual

**Region:** Hawai‘i-based longline region: 15° – 45°N, 180° – 120°W

**Measurement Platform**: Satellite

**Data available at:** https://oceanwatch.pifsc.noaa.gov/erddap/griddap/md50_exp, https://oceanwatch.pifsc.noaa.gov/erddap/griddap/md50_exp-1998-2009-clim, and https://oceanwatch.pifsc.noaa.gov/erddap/griddap/md50_exp-2024-clim.

**Sourced from:** (Barnes et al. 2011; NOAA OceanWatch 2025c). Graphics produced in part using Stawitz and Li (2025).

### 3.4.2.14 FISH COMMUNITY SIZE STRUCTURE

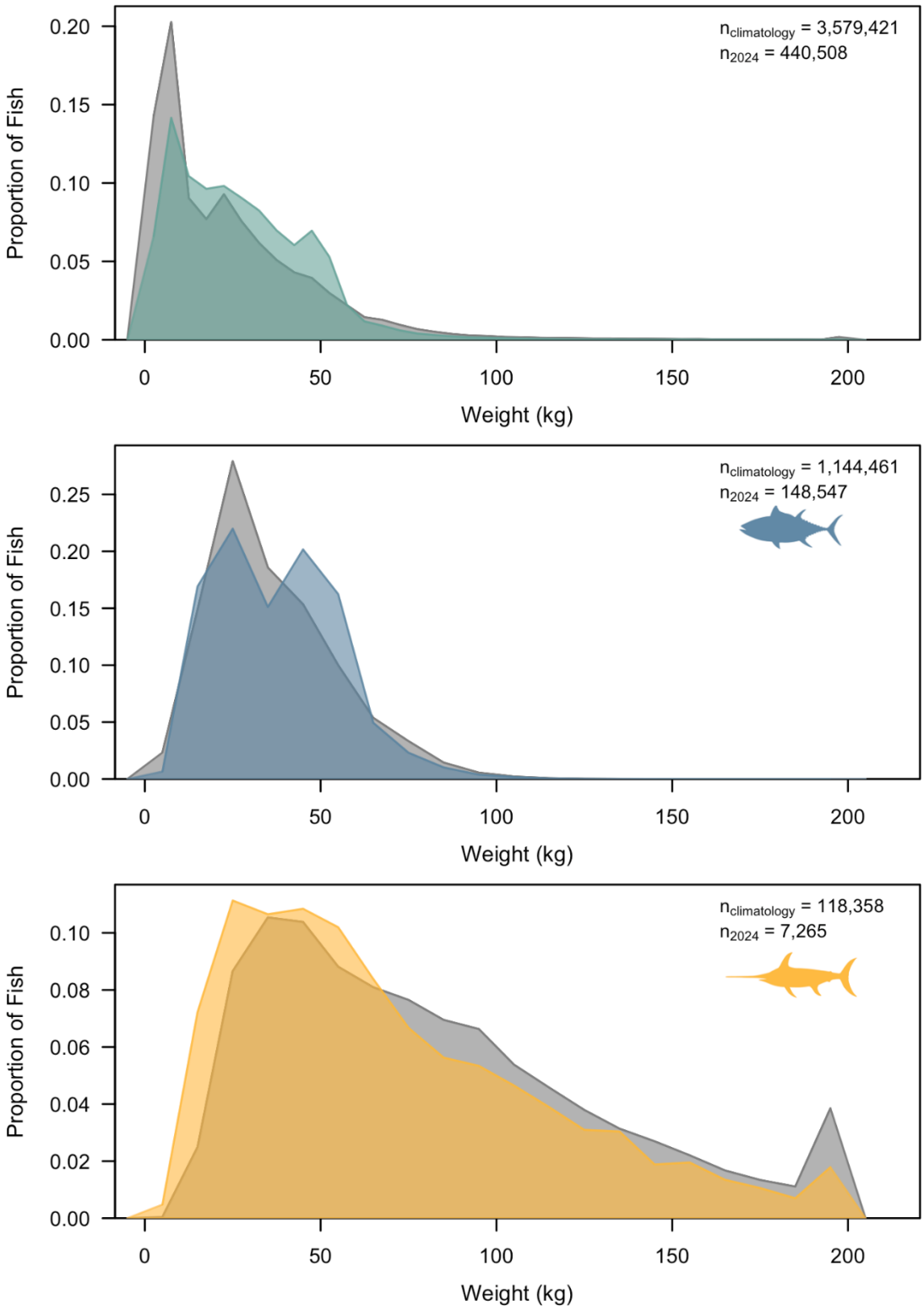



Figure 179. The climatological (2000–2009; grey) and 2024 (color) distribution of weights for all fish (top), bigeye tuna from deep sets (middle), and swordfish from shallow sets (bottom)

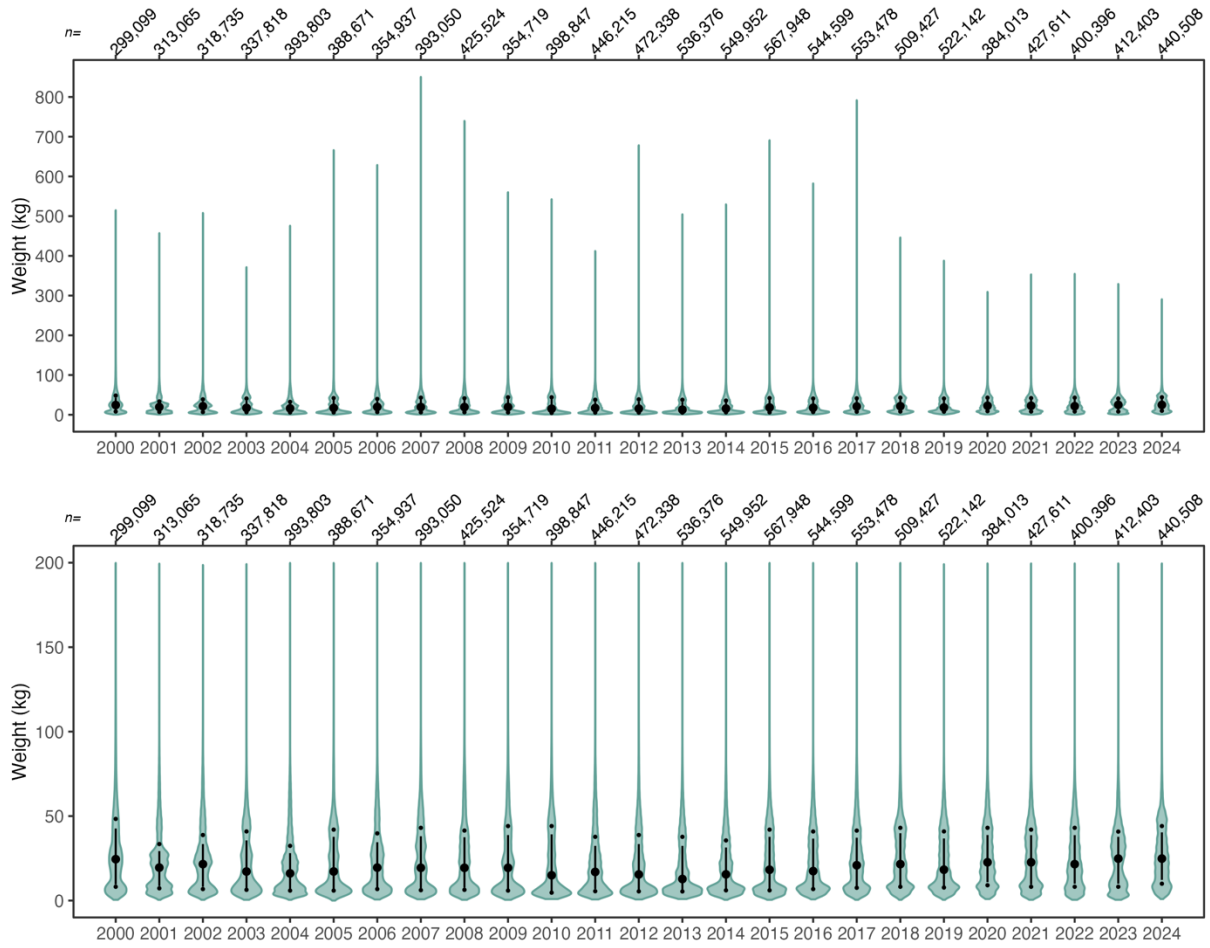



Figure 180. The annual distribution of weights of all fish, showing the full range of weights (top) and truncated to better demonstrate the distribution of the majority of weights (bottom) with large circles denoting median weight, black lines showing the range of the middle 50% of fish, small circles denoting the 20$^{th}$ and 80$^{th}$ percentiles of the weight distributions, and width of shading proportional to the number of fish of a given weight

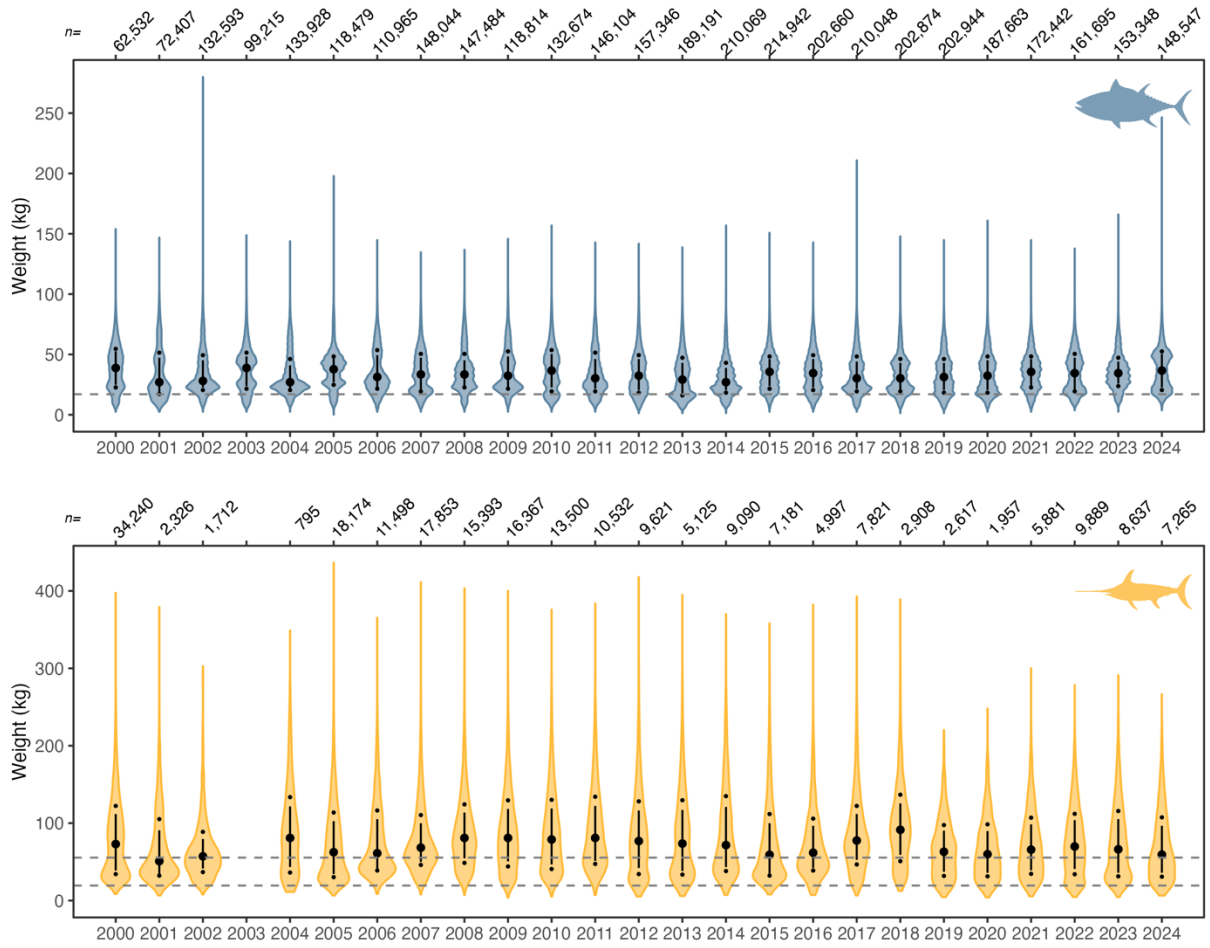



Figure 181. The annual distribution of weights of bigeye tuna from deep sets (top) and swordfish from shallow sets (bottom), with large circles denoting median weight, black lines showing the range of the middle 50% of fish, small circles denoting the 20$^{th}$ and 80$^{th}$ percentiles of the weight distributions, and width of shading proportional to the number of fish of a given weight. Horizontal dashed lines denote the weight corresponding to $L_{50}$ for bigeye tuna (17 kg; (Farley et al. 2018)), female swordfish (55.5 kg; (Kapur et al. 2017)), and male swordfish (19.4 kg, (Kapur et al. 2017))

**Rationale:** Fish size can be impacted by a number of factors, including climate. Currently, the degree to which the fishery's target species are affected by climate, and the scale at which these impacts may occur, is largely unknown. Ongoing collection of size structure data is necessary for detecting trends in community size structure and attributing causes of these trends. Understanding trends in fish size structure and how oceanographic conditions influence these trends is an area of active research.

**Status:** For the longline fishery as a whole, fish were slightly larger than the 2000–2009 average in 2024, with a lower proportion of fish smaller than about 15 kg. Bigeye tuna were a bit larger than average in 2024 and swordfish were slightly smaller than the previous year on average, with a greater proportion of small swordfish.

**Description:** The weight of individual fish moving through the Honolulu auction is available from 2000 through the present. Using these weights, community size structure is presented. A standardized pooled climatological distribution (2000–2009) is presented, as is the 2024 distribution. Similar distributions for target species (bigeye tuna and swordfish) are also presented. Annual time series of pooled target species weights are presented as violin plots. Bigeye weights are from deep sets (≥ 15 hooks per float) only. Swordfish weights are from shallow sets (< 15 hooks per float) only. The Honolulu auction reports weights for gilled and gutted fish. A conversion factor is used to calculate the whole fish weights used for this indicator (Langley et al. 2006).

**Timeframe:** Annual.

**Region**: Hawai‘i-based longline fishing grounds.

**Measurement Platform:** *In-situ* measurement.

**Sourced from:** (Langley et al. 2006; Kapur et al. 2017; Farley et al. 2018; PIFSC 2025a, 2025b)PIFSC (2025a), PIFSC (2025b) and the Hawai‘i Division of Aquatic Resources.

### 3.4.2.15 BIGEYE WEIGHT-PER-UNIT-EFFORT

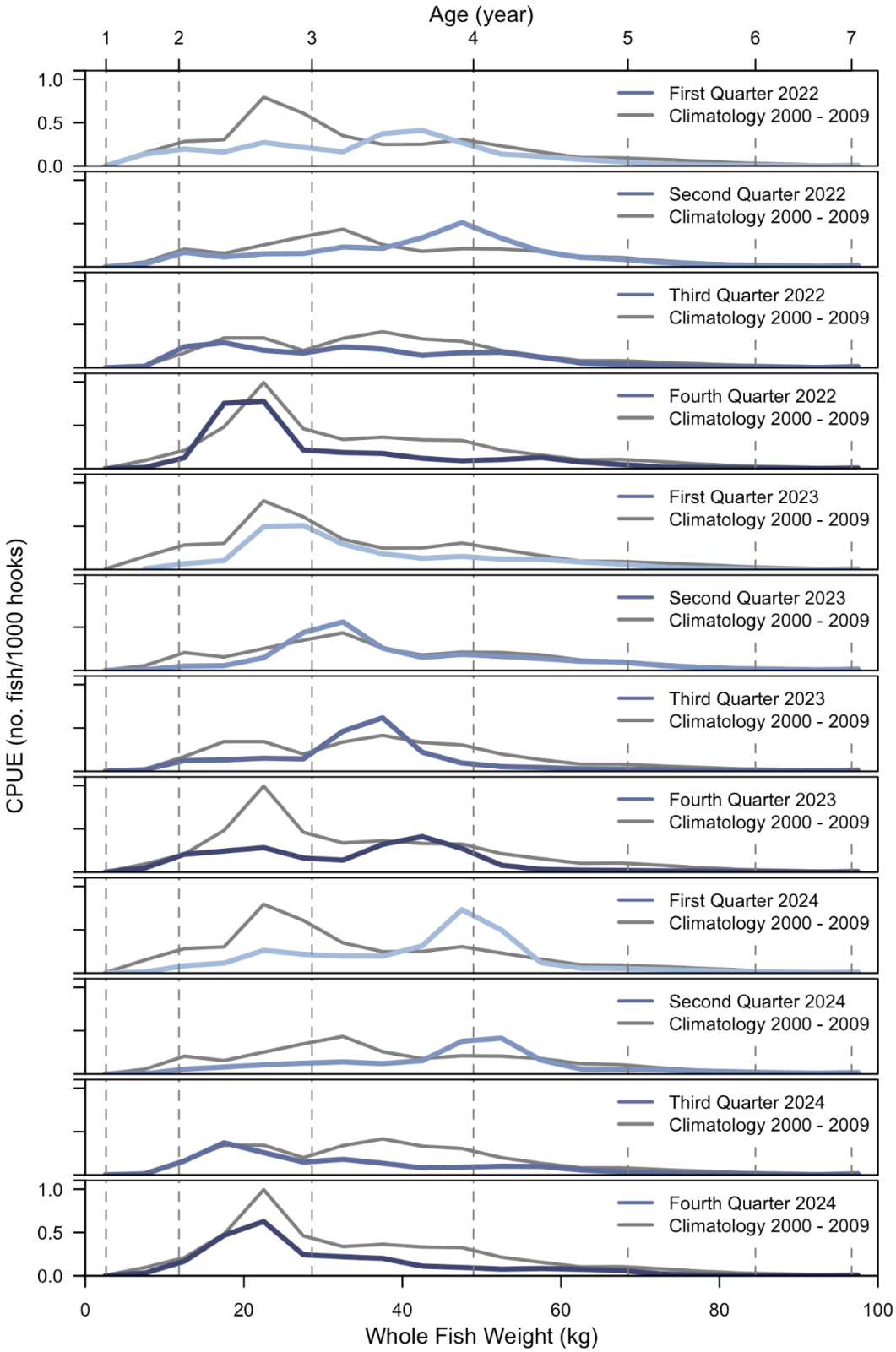



Figure 182. Quarterly deep-set bigeye tuna weight per unit effort for 2022–2024 (color) and the climatological average (2000–2009)

**Rationale:** Tracking the progression of growing size classes through time can provide a strong indication of recruitment pulses. The timing of these pulses is not yet well understood, particularly in terms of how they relate to climatic influences such as interannual variability. Improving this understanding could lead to the ability to project future yields and is an area of active research.

**Status:** No above-average peaks in two-year-old bigeye CPUE were observed in 2022–2024, suggesting that there will not be a peak in the CPUE of four- and five-year-old bigeye in 2025 or 2026.

**Description:** Quarterly time series of bigeye weight-per-unit-effort (WPUE) in hooks set is presented for the previous two years. Fish weights are those of bigeye tuna received at the Honolulu auction. The Honolulu auction reports weights for gilled and gutted fish. A conversion factor is used to calculate the whole fish weights used for this indicator (Langley et al. 2006). Note the quarterly (colored) and climatological (2000–2009; grey) distributions of bigeye tuna weight-per-unit-effort in Figure 182. Bigeye weights are from sets using ≥ 15 hooks per float.

**Timeframe:** Quarterly.

**Region:** Hawai‘i-based longline fishing grounds.

**Measurement Platform:** *In-situ* measurement.

**Sourced from:** (Langley et al. 2006; Aires-da-Silva et al. 2015; PIFSC 2025a, 2025b) and the Hawai‘i Division of Aquatic Resources.

### 3.4.2.16 BIGEYE RECRUITMENT INDEX

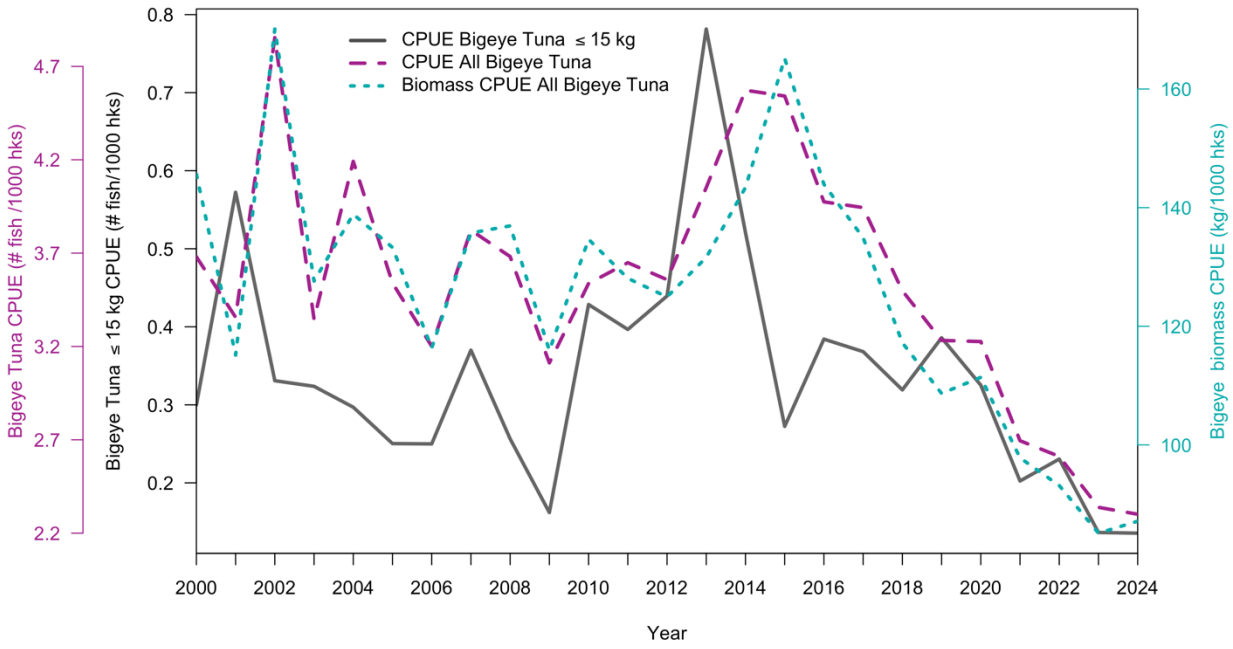



Figure 183. Annual CPUE of bigeye tuna ≤ 15 kg (grey solid line), CPUE of all bigeye tuna (pink dashed line), and biomass CPUE (blue dotted line) from 2000–2024, all from deep sets

Rationale: Catch rates of small bigeye tuna (≤ 15 kg) peak two years prior to peaks in total bigeye catch rates (CPUE) and biomass (weight-per-unit-effort), indicating a recruitment pulse

and allowing for predictions regarding increases in total catch rates of the fishery. The timing of these pulses is not yet well understood, particularly in terms of how they relate to climate impacts such as interannual variability. Improving this understanding could lead to the ability to project future yields and is an area of active research.

**Status:** In 2024, the CPUE of bigeye ≤ 15 kg was 0.14 fish per 1,000 hooks set. This is the tied with last year as the lowest value observed over the past 23 years and at this time does not appear indicative of a strong recruitment pulse such as was seen in 2001 or 2013.

**Description:** Time series of small (≤ 15 kg) and total bigeye tuna catch-per-unit-effort (hooks set) and weight-per-unit-effort (hooks set) for all deep-set-caught bigeye tuna is presented. Fish weights are those of bigeye tuna received at the Honolulu auction. The Honolulu auction reports weights for gilled and gutted fish. A conversion factor is used to calculate the whole fish weights used for this indicator (Langley et al. 2006).

**Timeframe:** Annual.

**Region:** Hawai‘i-based longline fishing grounds.

**Measurement Platform:** Model-derived from *in situ* data.

**Sourced from:** (Langley et al. 2006; PIFSC 2025a, 2025b) and the Hawai‘i Division of Aquatic Resources.

### 3.4.2.17 BIGEYE TUNA CATCH RATE FORECAST

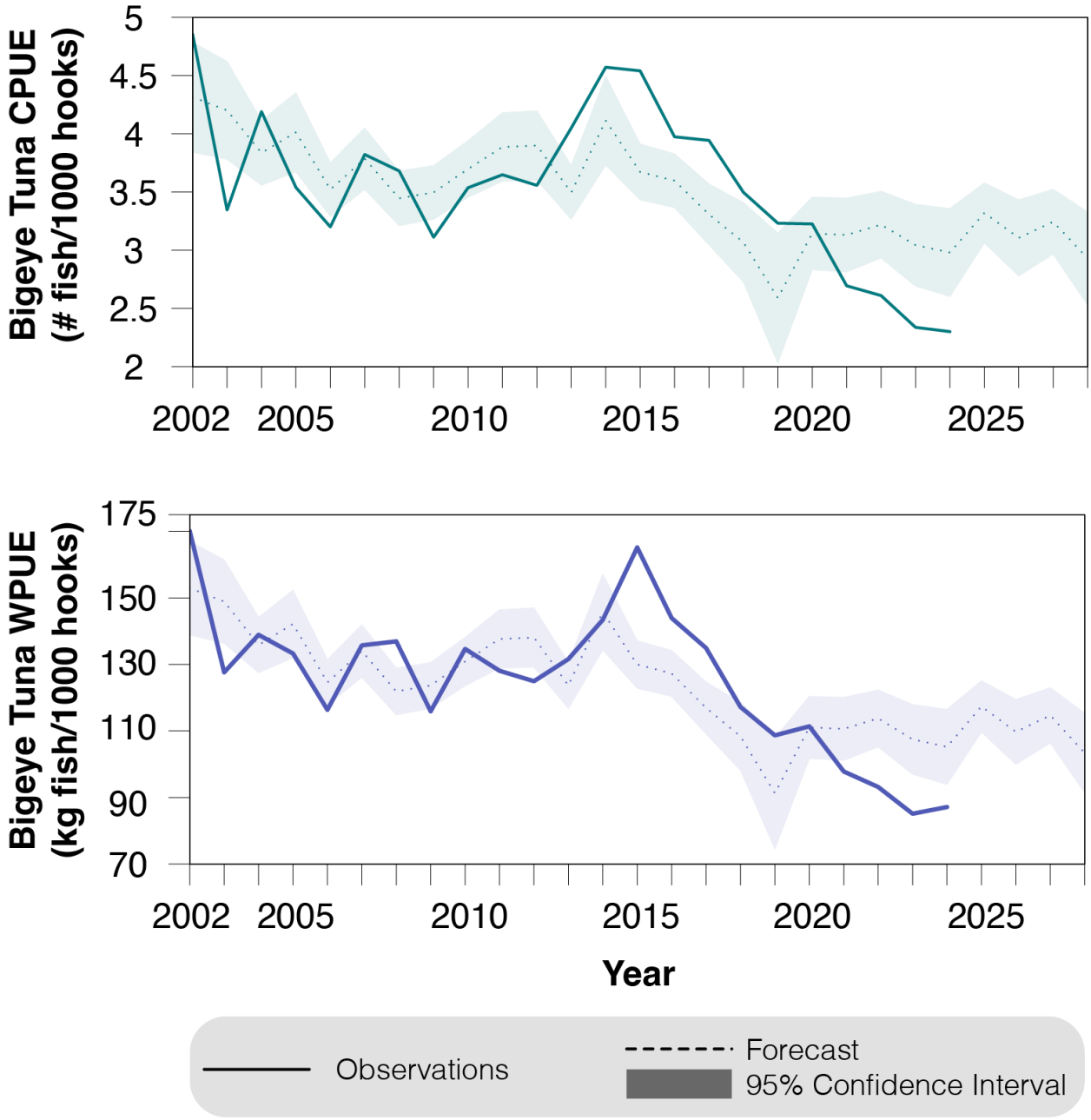



Figure 184. Annual observed (solid lines) and forecast (dotted lines) CPUE (upper panel; green) and WPUE (lower panel; purple) of bigeye tuna from deep sets. The forecasts' 95% confidence intervals are shaded

**Rationale:** Recent work has shown that average phytoplankton size can be used to predict bigeye tuna catch rates up to four years in advance (Woodworth-Jefcoats and Wren 2020). The hypothesized mechanism behind this relationship is that larger phytoplankton are indicative of higher quality food for the zooplankton upon which larval and juvenile bigeye tuna prey. With higher quality prey available, more bigeye tuna survive into adulthood and recruit to the fishery.

**Status:** The catch rate forecasts suggest that catch rates will be fairly steady over the next four years.

**Description:** Time series of observed bigeye tuna CPUE and WPUE are presented together with the annual forecast values and their associated 95% confidence interval. The forecast is based on a linear regression between four-year-lagged median phytoplankton size and both CPUE and WPUE (individual).

**Timeframe:** Annual.

**Region:** Hawai‘i-based longline fishing grounds (0° – 40°N, 180° – 150°W and 15° – 36°N, 150° – 125°W).

**Measurement Platform:** Model-derived from satellite remotely sensed and *in situ* data.

**Sourced from:** (Langley et al. 2006; Woodworth-Jefcoats and Wren 2020; NOAA OceanWatch 2025c). Graphics produced in part using Stawitz and Li (2025).

### 3.4.3 RESPONSE TO PREVIOUS COUNCIL RECOMMENDATIONS

There were no Council recommendations specific to the Climate and Oceanic Indicators module of this annual SAFE report.

### 3.4.4 OBSERVATIONAL AND RESEARCH NEEDS

Through preparation of this and previous pelagic annual SAFE reports, the Council has identified a number of observational and research needs that, if addressed, could improve the information content of future Climate and Oceanic Indicators section. This information could provide fishery managers, the fishing industry, and the community with better understanding and predictive capacity that is vital to sustaining a resilient and vibrant fishery in the Western Pacific. These observational and research needs are to:

- Emphasize the importance of continuing the climate and ocean indicators used in this report so that a consistent, long-term record can be maintained and interpreted;
- Develop agreements among constituents and research partners to ensure the sustainability, availability, and accessibility of climate and ocean indicators, associated datasets, and analytical methods used in this and future reports;
- Improve monitoring and understanding of the impacts of changes in ocean temperature, pH and ocean acidity, ocean oxygen content and hypoxia, and sea level rise through active collaboration by all fishery constituents and research partners;
- Develop, test, and provide access to additional climate and ocean indicators;
- Investigate the connections between climate variables and indicators to improve understanding of changes in physical, chemical, biological, and socio-economic processes and their interactions in the regional ecosystem;
- Develop predictive models that can be used for scenario planning to account for unexpected changes and uncertainties in the regional ecosystem and fisheries;
- Foster applied research in ecosystem modeling to better describe current conditions and to better anticipate the future under alternative projections of climate and ocean change including changes in expected human benefits and their variability;
- Improve understanding of the connections between the PDO and fisheries ecosystems beyond the North Pacific;

- Improve understanding of mahimahi and swordfish size in relation to the location and orientation of the TZCF;
- Explore the connections between sea surface conditions, stratification, and mixing;
- Identify the biological implications of tropical cyclones;
- Research cultural knowledge and practices for adapting to past climate changes and investigate how they might contribute to future climate adaptation; and
- Explore additional and/or alternative climate and ocean indicators that may have important effects of pelagic fisheries systems including:
  - Ocean currents and anomalies;
  - Eddy kinetic energy (EKE);
  - Near-surface wind velocity and anomalies;
  - Wave forcing and anomalies;
  - Oceanic nutrient concentration;
  - South Pacific convergence zones targeted by swordfish;
  - Standardized fish community size structure data for gear types, including the troll fishery for yellowfin and blue marlin;
  - Additional spatial coverage for the international purse seine fishery;
  - Time series of species richness and diversity from catch data that could provide insight into how the ecosystem is responding to physical climate influences; and
  - Socioeconomic indicators of climate impacts on fishing communities and businesses.

### 3.4.5 ACKNOWLEDGEMENTS

Phoebe Woodworth-Jefcoats led the production and compilation of this chapter. Johanna Wren contributed figures, code, and text. Emily Conklin contributed code. Hui Daisy Shi contributed data products. The NOAA Fisheries Northeast Fisheries Science Center contributed the template used for the *Indicators at a Glance* figure.

## 3.5 ESSENTIAL FISH HABITAT

### 3.5.1 INTRODUCTION

Per requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 50 CFR § 600.815), Essential Fish Habitat (EFH) information for all Pelagic Management Unit Species (MUS) is found in the Pelagic Fishery Ecosystem Plan (FEP). The EFH Final Rule requires that the Council review and revise EFH provisions periodically and report on this review as part of the annual Stock Assessment and Fishery Evaluation (SAFE) report, with a complete review conducted as recommended by the Secretary, but at least once every five years.
The habitat objective of the FEP is to refine EFH and minimize impacts to EFH, with the following sub-objectives:

- Review EFH and Habitat Areas of Particular Concern (HAPC) designations every five years and update such designations based on the best available scientific information, when available.
- Identify and prioritize research to assess adverse impacts to EFH and HAPC from fishing (including aquaculture) and non-fishing activities, including, but not limited to, activities that introduce land-based pollution into the coastal environment.

Pelagic EFH information was not updated during preparation of 2022 SAFE report, except for Section 3.5.5. Non-fishing impacts to pelagic EFH were reviewed in the past as part of the Council's omnibus review of non-fishing effects on EFH. The Council's support of non-fishing activities research is monitored through the program plan and five-year research priorities, not the annual SAFE report.

### 3.5.2 RESPONSE TO PREVIOUS COUNCIL RECOMMENDATIONS

At its 200th meeting in 2024, the Council received updates on environmental compliance processes related to offshore wind development in the Pacific, during which NMFS confirmed that EFH consultations would be conducted for pelagic management unit species (PMUS). These consultations are intended to assess and mitigate potential impacts on pelagic habitats, particularly for migratory species that may interact with wind energy infrastructure in the U.S. Pacific EEZ. The Council emphasized the importance of incorporating updated oceanographic and fisheries interaction data in these reviews to ensure EFH protections for highly migratory pelagic species reflect the best available science.

### 3.5.3 HABITAT USE BY MUS AND TRENDS IN HABITAT CONDITION

The geographic extent of EFH for PMUS in the Western Pacific region is the shoreline to the edge of the exclusive economic zone (EEZ; 64 FR 19067, April 19, 1999). Egg/larval PMUS EFH is the water column to a depth of 200 m, while juvenile/adult PMUS EFH is designated to 1000 m. HAPC is designated to a depth of 1,000 m above seamounts and banks with summits shallower than 2,000 m.

Because the habitat is the water column, the Climate and Oceanic Indicators section (Section 3.4) provides data and trends relevant to pelagic EFH, including oceanic pH, the ONI PDO, tropical cyclones, North Pacific oligotrophic area, ocean color, and subtropical front/transition zone chlorophyll front indicators. Future SAFE reports may provide further interpretation of these indicators as they relate to EFH.

### 3.5.4 REPORT ON REVIEW OF EFH INFORMATION

As of 2024, no new formal EFH reviews for pelagic management unit species (PMUS) have been completed; however, EFH considerations for pelagic species have been incorporated into broader environmental compliance processes, including ongoing consultations related to offshore wind development. These efforts are expected to inform future EFH reviews by identifying potential habitat interactions and data gaps relevant to migratory pelagic species in the Western Pacific region.

### 3.5.5 NEW EFH-RELEVANT DATA STREAM: LARVAL FISH SURVEYS AND ICHTHYOPLANKTON MONITORING

A new and expanding data stream relevant to essential fish habitat (EFH) for pelagic management unit species (PMUS) comes from ongoing ichthyoplankton surveys across the Pacific Islands Region. The overarching goal of this effort is to better understand the spatial distribution, habitat use, and early life history of managed species during their larval stages. Using a 6′ IKMT net system deployed during nighttime hours aboard NOAA Ship Oscar Elton Sette, the PIFSC Ecosystem Sciences Division has sampled larval stages of pelagic, reef, and bottomfish species from the upper water column. In 2023, 88 ichthyoplankton tows were conducted throughout the Hawai‘i EEZ as part of the Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), spanning a broad geographic area from west of Hōlanikū (Kure

Atoll) to South Point, Hawai‘i Island—making it the most extensive ichthyoplankton survey of its kind in the region to date. These samples coincided with peak spawning periods for multiple BMUS and PMUS, including uku, tunas, marlins, ono, and deep-7 snappers. In spring 2024, an additional 24 tows were completed around Maui Nui during the BFISH R&D cruise, followed by 70 tows conducted throughout the Papahānaumokuākea Marine National Monument during the 2024 National Coral Reef Monitoring Program (NCRMP) summer survey. These efforts are expected to enhance understanding of larval dispersal, connectivity between island systems, and early habitat use, ultimately supporting EFH refinement and informing future stock assessment models for pelagic species.

### 3.5.6 RESEARCH NEEDS AND ONGOING PROJECTS

The Council previously identified pelagic scientific data needs to address the EFH provisions more effectively in the FEP. This section includes active research and data collection initiatives to address these needs.

Research continues at PIFSC to enhance understanding of open-ocean habitats and ecosystem processes through improved utility of climate and oceanographic information. Specific research efforts continue on determining the distribution of feeding and spawning habitats and their response to anthropogenic climate change, as well as the influence of natural climate variability (e.g., ENSO) on the distribution of suitable habitat for bigeye tuna (BET).

The BET Initiative is a collection of projects that looks to utilize telemetry data to describe BET thermal and spatial habitat, identify imminent spawners among longline catch to shed light on where in the Hawaii longline fishery spawning occurs, explore the distribution of feeding and spawning habitat and responses to anthropogenic climate change, and examine the effect of large-scale climate variability to better understand shifts in catch rates and locations.

Currently, BET research almost exclusively uses satellite and/or modeled data (with much less frequent use of sparse *in situ* observations for environmental data). Additional telemetry data would improve the models, especially with respect to species distribution. At present, commercial catch data is used exclusively for fish distribution models. There is a need for better models, and the furtherance of dynamic habitat delineation is dependent on more *in situ* data and regular scientific sampling.

PIFSC is also researching the effect of large-scale variability on longline and purse seine tuna species CPUE in the Equatorial Pacific. Results of this research would tie into the BET Initiative, as it can provide information on possible links between the North Pacific and the Equatorial Pacific CPUE and BET population structure. One of the main management questions is whether the North Pacific stock is a separate stock or individuals that spawn in the equatorial region and migrate north.

At Cross Seamount, PIFSC scientists are looking at the distribution and relative abundance of micronekton (i.e., BET forage) in the seamount environment (Domokos 2022), and the distribution and relative biomass of juvenile BET in the seamount environment. This research can lead to an assessment of how juvenile BET abundance is reflected in the North Pacific pelagic environment (i.e., fishing grounds), possibly providing a route to fisheries independent data for stock assessments. PIFSC is also characterizing micronekton at the Transition Zone Chlorophyl Front (TZCF), a critical migratory route and foraging ground for top predators (e.g., tunas, billfish, and protected species) that feed on micronekton.

PIFSC has recently developed the Protected Species Ensemble Random Forest (PSERF) model (Siders et al. 2020)**,** which is a habitat-based framework to describe Hawaii- and American Samoa-based longline interactions with protected species, utilizing olive ridley sea turtles (*Lepidochelys olivacea*) as a case study. Ongoing work includes updating Hawaii deep-set and shallow-set longline fishery data sets for the most recent years and adding oceanographic features derived from weekly products, including eddy kinetic energy, Okubo-Weiss parameters, and Ekman pumping to define mesoscale features. Distribution models are being developed for all species in the Hawaii deep-set, Hawaii shallow-set, and American Samoa longline fisheries, and will be rerun with more recent data and features. More robust habitat delineation and possible dynamic ocean management based on models using weekly products could facilitate timely updates for areas of high protected species encounter probabilities.

Similar work is ongoing focused on understanding environmental drivers of the catch rates of the full suite of species caught in the Hawai‘i shallow- and deep-set longline fisheries. These models are made with the intent of climate projections and short-term predictions covering the broadest area over which the fisheries operate. These differ from PSERF models in their generalizability for said predictions, identification of environmental sensitivities, and inclusion of catch rates for the species caught in these fisheries (compared to solely interaction probabilities).

PIFSC has collected fish larvae while piggybacking on other survey efforts throughout the Hawaiian Archipelago, totaling 112 stations ranging from west of Hōlanikū to Hawai‘i Island. These data can be used to identify the spawning locations and timing for a range of management unit species, spanning from uku and *Pristipomoides* snappers (deep-7 members) to a large suite of pelagic management unit species (mahimahi, ono, marlins, and tunas). This information will be paired with the environmental characteristics during the individual tows to better refine larval and inferred spawning habitat for a number of these species.

PIFSC scientists have used recent developments in the understanding of uku early life history to parameterize a model simulating the larval dispersal of this species from Penguin Bank, their presumed primary spawning location within the main Hawaiian islands. Results have indicated that simulated uku larvae (treated as particles concentrated at the depth uku larvae have been observed in samples) released from Penguin Bank largely remain with the Maui Nui and O‘ahu area, with rare connections to Hawai‘i Island, Kaua‘i, and Ni‘ihau. Wind patterns related both to the fraction of particles reaching potential settlement areas in the model runs and to the recruitment residuals from the 2020 benchmark stock assessment for uku. The results suggest wind-forced variability in larval dispersal may influence the recruitment of this stock (Suca et al. 2025).

PIFSC scientists have been identifying the environmental and operational associations of cookie cutter bite occurrences for both the shallow- and deep-set Hawai‘i longline fisheries. Preliminary results indicate soak time, lunar phase, and temperature play notable roles in the occurrence of cookie cutter shark bites on fish caught on an individual set. Further work will assess if fishing effort in both fisheries is increasingly overlapping with predicted cookie cutter shark bite occurrence throughout the fishing domain.

## 3.6 MARINE PLANNING

### 3.6.1 INTRODUCTION

Marine planning is a science-based management tool being utilized regionally, nationally, and globally to identify and address issues of multiple human uses, ecosystem health and cumulative impacts in the coastal and ocean environment. The Council's efforts to formalize incorporation of marine planning in its actions began in response to Executive Order 13547, Stewardship of the Ocean, Our Coasts, and the Great Lakes. Executive Order 13158, Marine Protected Areas (MPAs), proposes that agencies strengthen the management, protection, and conservation of existing MPAs, develop a national system of MPAs representing diverse ecosystems, and avoid causing harm to MPAs through federal activities. MPAs, or marine managed areas (MMAs) are one tool used in fisheries management and marine planning.

At its 165th meeting in March 2016, in Honolulu, Hawaii, the Council approved the following objective for the FEPs: Consider the Implications of Spatial Management Arrangements in Council Decision-making. The following sub-objectives apply:

a. Identify and prioritize research that examines the positive and negative consequences of areas that restrict or prohibit fishing to fisheries, fishery ecosystems, and fishermen, such as the Bottomfish Fishing Restricted Areas, military installations, NWHI restrictions, and Marine Life Conservation Districts.
b. Establish effective spatially-based fishing zones.
c. Consider modifying or removing spatial-based fishing restrictions that are no longer necessary or effective in meeting their management objectives.
d. As needed, periodically evaluate the management effectiveness of existing spatial-based fishing zones in federal waters.

In order to monitor implementation of this objective, this annual report includes the Council's spatially-based fishing restrictions or MMAs, the goals associated with those, and the most recent evaluation. Council research needs are identified and prioritized through the 5 Year Research Priorities and other processes and are not tracked in this report.

To meet the EFH and National Environmental Policy Act (NEPA) mandates, this annual SAFE report tracks activities that occur in the ocean that are of interest to the Council and incidents or facilities that may contribute to cumulative impact. While the Council is not responsible for NEPA compliance, monitoring the environmental effects of ocean activities for the FEP's EFH cumulative impacts section is duplicative of the agency's NEPA requirement, and therefore, this report can provide material or suggest resources to meet both mandates.

### 3.6.2 RESPONSE TO PREVIOUS COUNCIL RECOMMENDATIONS

There are no standing Council recommendations indicating review deadlines for Pelagic MMAs.

At its 147th meeting in March 2010, the Council recommended a no-take area from 0–12 nm around Rose Atoll Marine National Monument (MNM) with the Council to review the no-take regulations after three years. The most recent review took place in 2013, with the subsequent review previously scheduled for 2016. PIRO received no requests for non-commercial permits to fish within the Rose Atoll MNM. Further, inquiries in American Samoa showed that there was

no indication that the 12 nm closure around Rose Atoll MNM has been limiting fishing. The Pelagic Plan Team deferred decision on Rose Atoll in May 2017. At its 172nd meeting in March 2018, the Council requested that NOAA and USFWS provide a report to the Council at its following meeting to review resultant benefits to fish populations, protected species, and coral reef, deep-slope, and pelagic ecosystems from the establishment of the Rose MNM. USFWS presented this report to the Council at its 173rd meeting in June 2018, from which no Council recommendations were generated.

At its 162nd meeting in March 2015, the Council recommended a regulatory amendment for the temporary exemption to the Large Vessel Protected Area (LVPA) by American Samoa longline limited entry permitted vessels greater than 50 ft in length. The Council would review the LVPA exemption on an annual basis. In 2016, NMFS published a final rule that allowed large, federally-permitted U.S. longline vessels to fish in specific areas of the LVPA (81 FR 5619, February 3, 2016). In July 2016, American Samoa sued NMFS and the Council in the Hawaii Federal District Court, claiming that NMFS did not consider the 1900 and 1904 Deeds of Cession with respect to the protection of the cultural fishing rights of the people of American Samoa. In 2017, the Hawaii Federal District Court deemed the final rule invalid and ordered NMFS to vacate the LVPA exemption rule (82 FR 43908, September 20, 2017).

At its 173rd meeting in June 2018, regarding the LVPA applicable to the American Samoa limited entry vessels, the Council recognized the LVPA rule has led to disagreement within the American Samoa fishing community and was the subject of litigation. The Council noted that the court decision requires the consideration and protection of American Samoa cultural fishing. To this end, the Council requested PIFSC conduct research on American Samoa cultural fishing practices to facilitate understanding and potential impacts of opening some restricted fishing areas within the U.S. EEZ for American Samoa vessels that primarily target albacore. PIFSC presented the results of this research at the Council's 172nd meeting in March 2018, which indicated that all fishing in American Samoa has cultural importance because catch from all locally-based fishing sectors flows into the American Samoa community for cultural purposes. The Council also recommended a regulatory amendment to provide a four-year exemption for vessels permitted under the American Samoa longline limited entry program to fish within the LVPA seaward of 12 nm around Tutuila, 12 nm around Manua, 12 nm around Swains, and 2 nm around the offshore banks, and recommended annual monitoring of the American Samoa longline and troll catch rates, small vessel participation, and local fisheries development.

NMFS appealed Hawaii Federal District Court's 2017 decision that invalidated the 2016 LVPA reduction to the U.S. Ninth Circuit Court of Appeals. Oral arguments were in February 2020 in Honolulu, Hawaii, and the decision was reversed in a September 2020 ruling.

At its 184th meeting in December 2020, the Council directed staff to monitor the fishing operation and fishery performance of the American Samoa longline and alia fisheries and report back to the Council at its September 2021 meeting. Council staff provided this presentation to the Council as scheduled. On July 9, 2021, NMFS published a final rule reimplementing the 2016 regulations that the Council submitted to NMFS (86 FR 36239).

At its 194th meeting in March 2023, regarding the process to designate a National Marine Sanctuary in the Pacific Remote Island Areas (PRIA), the Council requested NOAA and all other involved agencies to consult with the U.S. Pacific Territories beyond the public comment opportunity on the proposed sanctuary. The Council also directed staff to invite the National

Ocean Service (NOS) to provide a presentation on the proposed Pacific Remote Island Sanctuary to get a better understanding of the Council's responsibilities and role in the process. At the same meeting, the Council also directed staff to raft a letter to NOAA requesting NMFS and NOS meet with the Governors and staff of the Territories of American Samoa, Guam, and the CNMI and that NOS describe in detail the process that will be followed for President Biden's request for a National Marine Sanctuary in the PRIA, and a review of the process with the Council as soon as possible.

At its 195th meeting in June 2023, the Council directed staff to review the Council's current fishing regulations for the PRIA and Pacific Pelagics FEPs and other applicable laws to provide the Council with a determination of whether existing regulations meet the goals and objectives, proclamations, and National Marine Sanctuaries Act. The Council further directed staff to develop a range of options for fishing regulations in the proposed sanctuary including extending existing Pacific Remote Islands Marine National Monument (PRIMNM) regulations to the full spatial extent of the EEZ for Council consideration at its next meeting.

The Council requested NOAA, in its evaluation of the proposed PRI sanctuary, evaluate the holistic impacts of prohibiting tuna fishing 50 to 200 nm of the island areas, that that sector of the U.S. purse seine fleet and possibly the Hawaii Longline fleet that has historically fished in the PRIA EEZ around Howland and Baker and Palmyra and Kingman reef be considered a "community of practice" and be given prominence as an "affected community" along with the whole larger fishing community of American Samoa, and that resuming sustainable fishing be made an objective in the designation.

The Council requested NOAA conduct an economic study that considers the individual and cumulative effects, including multiplier effects, to American Samoa-based fishery on the proposed ELAPS rulemaking, lack of acknowledgement of a distinct American Samoa fleet in international management, and effects of a proposed National Marine Sanctuary that may prohibit purse seine-based commercial fishing in the entire U.S. EEZ of the PRI.

The Council noted that, for the NWHI Monument Expansion Area (MEA), the ONMS' letter of May 31, 2023, rejecting the Council's cost-recovery provision in the permitting process simply referred to its February 22, 2023 letter for disapproval rationale. However, the latter is unclear on exactly how the Council's recommendation is inconsistent with Goal 4 and Objectives 3, 5, and 6 because sale can be denied by NMFS after consultation with monument management partners. The Council directed staff to respond to ONMS requesting they provide a more detailed explanation of how the recommendation is inconsistent with each goal and objective.

The Council directed staff to prepare a letter to the President of the United States of America (POTUS), conveying its concerns about the proposed sanctuary in the Pacific Remote Islands and potential negative consequences to U.S. Pacific Territories, and to request that ONMS and the Office of the White House respond to letters from U.S. Pacific Territorial governors on the matter.

At its 196th meeting in September 2023, regarding fishing regulations for the proposed PRIA Sanctuary, the Council recognized that a goal of the proposed sanctuary is to support cultural heritage and fishing is central to the culture of Pacific Island communities. Data presented to the Council by NMFS PIFSC showed that the impacts of the existing fisheries as managed under current fisheries regulations are well below measurable and objective thresholds established by NOAA pursuant to requirements set forth under the Magnuson Stevens Fishery Conservation and

Management Act (MSA) (i.e., no fish stocks are overfished or subject to overfishing, and no essential fish habitats are being adversely affected), Endangered Species Act (ESA) (i.e., no fisheries are jeopardizing species or destroying/adversely modifying critical habitat listed under the ESA) and other applicable laws. Further, the data also showed the importance of fishing to the culture of American Samoa and a reduction of fishing would represent a disproportionate socioeconomic burden to the Territory of American Samoa and the US longline and purse seine fleets. Therefore, the Council preliminarily found that the existing fishing regulations under the current structure may already meet the goals and objectives of the proposed sanctuary and directs staff to continue discussing the issue with NMFS and Office of National Marine Sanctuaries (ONMS) to determine if additional regulations may be necessary. The Council requested ONMS provide an opportunity for the Council to review a pre-draft Environmental Impact Statement (EIS) for the proposed Pacific Remote Islands (PRI) National Marine Sanctuary to ensure that the alternatives are aligned with the Council's fishing regulations.

The Council also directed staff to send a letter to the President to request modifying the Pacific Remote Islands Marine National Monument to allow for US commercial longline and purse seine fishing around Jarvis Island and Johnston Atoll. The Council noted that Jarvis and Johnston have been historically more important for both US longline and US purse seine fisheries and can help the US mitigate climate change while providing equity and environmental justice to US fishing communities in the Western Pacific.

At its 197th meeting in December 2023, reiterated its findings of the options paper that show that the Council's existing regulations have established comprehensive protection since the 1980s and continues to provide for long-lasting conservation and management for the PRI fishery ecosystem and resources. The Council stressed the importance of the current pelagic fisheries in the PRI to the economy and culture of American Samoa and recognized that impacts to those fisheries would be devastating to *fa'a Samoa*. The fisheries provide millions of dollars and thousands of jobs through direct and indirect contributions. The current pelagic fisheries in the PRI are conserved and managed pursuant to an adaptive, ecosystem-based approach both domestically and internationally and are neither overfished nor experiencing overfishing. Pelagic fishing occurs at or near the open ocean's surface and does not interact with benthic communities, so these activities do not jeopardize the benthic ecosystem or biodiversity. Should fishing for bottomfish, crustacean, precious coral or a coral reef ecosystem species be conducted in the PRI, Council regulations implementing the Pacific Remote Islands Fishery Ecosystem Plan would apply and continue to comprehensively conserve and manage these fisheries, the marine biodiversity, and ecosystem services they provide. This management plan has been in place for over 13 years to prevent negative impacts to fish stocks, habitat, bycatch, and protected species. Therefore, the Council determined that the existing fishing regulations under the current structure already meet the goals and objectives of the proposed sanctuary and recommends to ONMS that additional fishing regulations are not necessary to meet the proposed PRI National Marine Sanctuary goals and objectives. Further, the Council directed staff to provide the Council's recommendation to ONMS by December 20, 2023 and to include the rationale and justification for the Council's determination to ONMS by January 19, 2024.

### 3.6.3 MARINE MANAGED AREAS

Council-established MMAs are shown in Figure 185, and are compiled in Table 86.

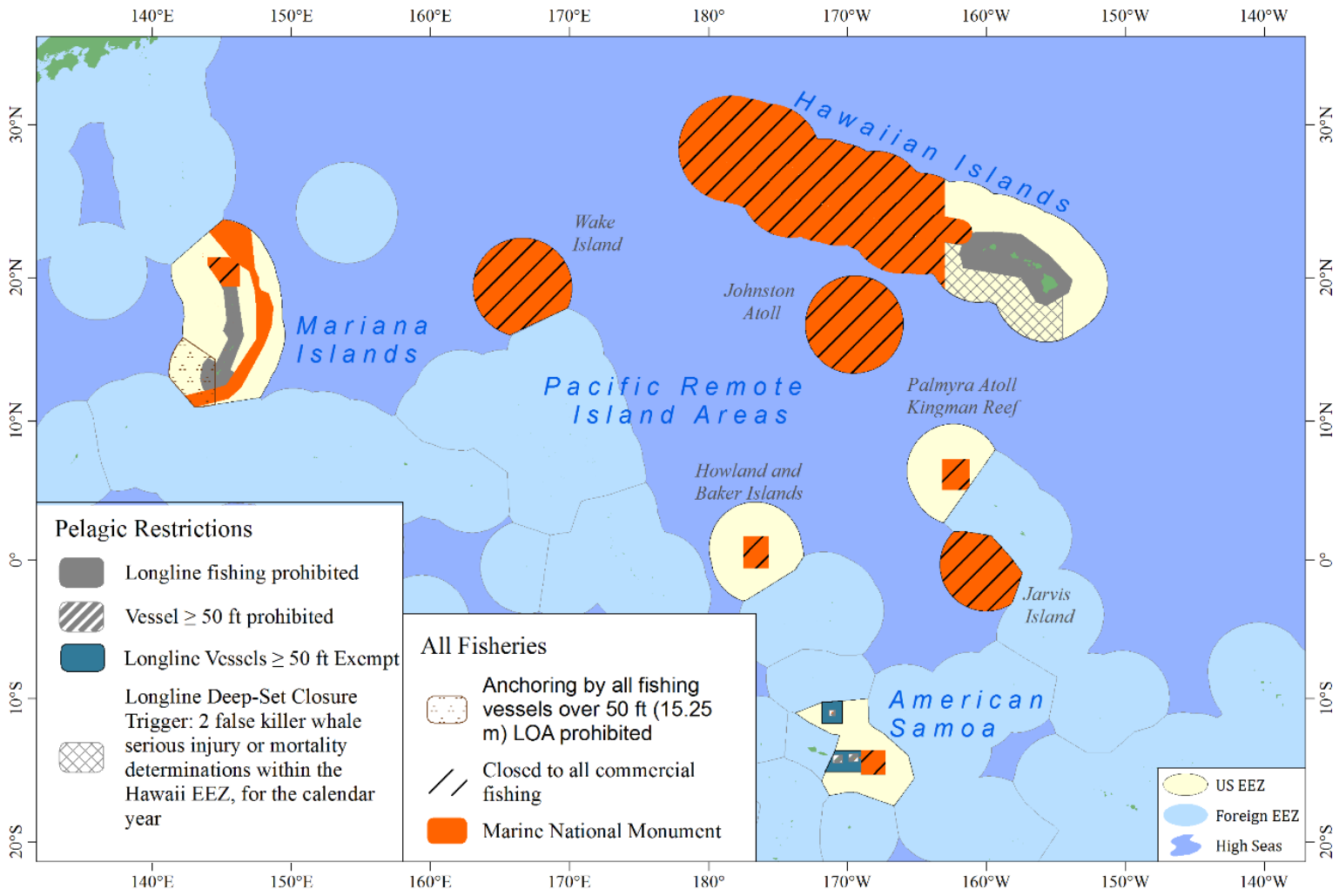



Figure 185. Regulated Fishing Areas of the Western Pacific Region

Table 86. MMAs established under FEPs from 50 CFR § 665

| Name | FEP | Island(s) | 50 CFR /FR /Amendment Reference | Marine Area (km²) | Fishing Restriction | Goals | Most Recent Evaluation | Review Deadline |
|---|---|---|---|---|---|---|---|---|
| Pelagic Restrictions | | | | | | | | |
| NWHI Longline Protected Species Zone | Pelagic (Hawaii) | NWHI | 665.806(a)(1)<br>56 FR 52214<br>76 FR 37287<br>Pelagic FMP Am. 3 | 351,514.00 | Longline fishing prohibited | Prevent longline interaction with monk seals. | 1991 | - |
| MHI Longline Prohibited Area | Pelagic (Hawaii) | MHI | 665.806(a)(2)<br>57 FR 7661<br>77 FR 71286<br>Pelagic FMP Am. 5 | 248,682.38 | Longline fishing prohibited | Prevent gear conflicts between longline vessels and troll/handline vessels. | 1992 | - |
| Guam Longline Prohibited Area | Pelagic (Marianas) | Guam | 665.806(a)(3)<br>57 FR 7661<br>Pelagic FMP Am. 5 | 50,192.88 | Longline fishing prohibited | Prevent gear conflicts between longline vessels and troll/handline vessels. | 1992 | - |
| CNMI Longline Prohibited Area | Pelagic (Marianas) | Mariana Archipelago | 665.806(a)(4)<br>76 FR 37287<br>Pelagic FEP Am. 3 | 88,112.68 | Longline fishing prohibited | Reduce potential for nearshore localized fish depletion from longline fishing, and to limit catch competition and gear conflicts between the CNMI-based longline and trolling fleets. | 2011 | - |

| Name | FEP | Island(s) | 50 CFR /FR /Amendment Reference | Marine Area (km²) | Fishing Restriction | Goals | Most Recent Evaluation | Review Deadline |
|---|---|---|---|---|---|---|---|---|
| Large Vessel Prohibited Area | Pelagic (American Samoa) | Tutuila, Manu'a, and Rose Atoll | 665.806 (b)(1)<br>81 FR 5619<br>82 FR 43908 | 74,857.32 | Vessels ≥ 50 ft. prohibited | Prevent gear conflict with smaller alia vessels; longline vessels >50 ft. exempted from 12 to 50 nm to improve the viability of the American Samoa longline fishery and achieve optimum yield from the fishery while preventing overfishing. | Jan 29, 2016 | - |
| Large Vessel Prohibited Area | Pelagic (American Samoa) | Swains Island | 665.806 (b)(1)<br>81 FR 5619<br>82 FR 43908<br>Pelagic FEP | 28,352.17 | Vessels ≥ 50 ft. prohibited | Prevent gear conflict with smaller alia vessels; longline vessels over 50 ft. exempted between 12 and 50 nm due to improve the viability of the American Samoa longline fishery and achieve optimum yield from the fishery while preventing overfishing. | Jan 29, 2016 | - |
| Other Restrictions | | | | | | | | |
| Howland Island No-Take Marine Protected Area (MPA)/PRI Marine National Monument | PRIA/ Pelagic | Howland Island | 665.599 and 665.799(a)(1)<br>69 FR 8336<br>Coral Reef Ecosystem Fishery Management Plan (FMP)<br>78 FR 32996<br>PRIA FEP Am. 2 | - | All Take Prohibited | Minimize adverse human impacts on coral reef resources; commercial fishing prohibited within 12 nautical miles (nm). | 2013 | - |

| Name | FEP | Island(s) | 50 CFR /FR /Amendment Reference | Marine Area (km²) | Fishing Restriction | Goals | Most Recent Evaluation | Review Deadline |
|---|---|---|---|---|---|---|---|---|
| Jarvis Island No-Take MPA/PRI Marine National Monument | PRIA/ Pelagic | Jarvis Island | 665.599 and 665.799(a)(1) 69 FR 8336 Coral Reef Ecosystem FMP 78 FR 32996 PRIA FEP Am. 2 | - | All Take Prohibited | Minimize adverse human impacts on coral reef resources; commercial fishing prohibited within 12 nmi. | 2013 | - |
| Baker Island No-Take MPA/PRI Marine National Monument | PRIA/ Pelagic | Baker Island | 665.599 and 665.799(a)(1) 69 FR 8336 Coral Reef Ecosystem FMP 78 FR 32996 PRIA FEP Am. 2 | - | All Take Prohibited | Minimize adverse human impacts on coral reef resources; commercial fishing prohibited within 12 nmi. | 2013 | - |
| Rose Atoll No-Take MPA/Rose Atoll Marine National Monument | American Samoa Archipelago/ Pelagic | Rose Atoll | 665.99 and 665.799(a)(2) 69 FR 8336 Coral Reef Ecosystem FMP 78 FR 32996 American Samoa FEP Am. 3 | - | All Take Prohibited | Minimize adverse human impacts on coral reef resources; commercial fishing prohibited within 12 nmi. | June 3, 2013 | June 3, 2016 |
| Kingman Reef No-Take MPA/PRI Marine National Monument | PRIA/Pelagic | Kingman Reef | 665.599 and 665.799(a)(1) 69 FR 8336 Coral Reef Ecosystem FMP 78 FR 32996 PRIA FEP Am. 2 | - | All Take Prohibited | Minimize adverse human impacts on coral reef resources; all fishing prohibited within 12 nmi. | 2013 | - |

| Name | FEP | Island(s) | 50 CFR /FR /Amendment Reference | Marine Area (km²) | Fishing Restriction | Goals | Most Recent Evaluation | Review Deadline |
|---|---|---|---|---|---|---|---|---|
| Guam No Anchor Zone | Mariana Archipelago | Guam | 665.399<br>69 FR 8336<br>Coral Reef Ecosystem FMP | 138,992.51 | Anchoring by all fishing vessels ≥ 50 ft. prohibited on the offshore southern banks located in the U.S. EEZ off Guam | Minimize adverse human impacts on coral reef resources. | 2004 | - |
| Johnston Atoll Low-Use MPA/PRI Marine National Monument | PRIA/ Pelagic | Johnston Atoll | 69 FR 8336<br>Coral Reef Ecosystem FMP<br>78 FR 32996<br>PRIA FEP Am. 2 | - | Special Permit Only | Minimize adverse human impacts on coral reef resources; superseded by prohibiting fishing within 12 nm in Am. 2. | 2013 | - |
| Palmyra Atoll Low-Use MPAs/PRI Marine National Monument | PRIA/ Pelagic | Palmyra Atoll | 69 FR 8336<br>Coral Reef Ecosystem FMP<br>78 FR 32996<br>PRIA FEP Am. 2 | - | Special Permit Only | Minimize adverse human impacts on coral reef resources; superseded by prohibiting fishing within 12 nm in Am. 2. | 2013 | - |
| Wake Island Low-Use MPA/PRI Marine National Monument | PRIA/Pelagic | Wake Island | 69 FR 8336<br>Coral Reef Ecosystem FMP<br>78 FR 32996<br>PRIA FEP Am. 2 | - | Special Permit Only | Minimize adverse human impacts on coral reef resources; superseded by prohibiting fishing within 12 nm in Am. 2. | 2013 | - |

### 3.6.4 ACTIVITIES AND FACILITIES OCCURRING IN THE WESTERN PACIFIC REGION

In the Western Pacific Region, fisheries compete with other activities for access to and use of fishing grounds. These activities include, but are not limited to, military bases and training activities, commercial shipping, recreational activities, and off-shore energy projects. Between the Bureau of Ocean Energy Management (BOEM), the U.S. Army Corps of Engineers (USACE), and NMFS, most permits for offshore energy and aquaculture development, dredging, or mooring projects that occur in the waters of the U.S. are captured. Department of Defense (DOD) activities are assessed in environmental impact statements (EIS) on a five-year cycle and are available through the *Federal Register*. Due to the sheer volume of ocean activities and the annual frequency of this report, only major activities on multi-year planning cycles or those permitted by NMFS Sustainable Fisheries Division are tracked in this report. Activities which are no longer reasonably foreseeable or have been replaced with another planning activity are removed from the report, though they may occur in previous reports.

#### 3.6.4.1 AQUACULTURE FACILITIES

Hawaii had one offshore aquaculture facility recently operating in federal waters that was owned by Kampachi Farms (now known as Ocean Era) in 2016, but the associated Special Coral Reef Ecosystem Fishing Permit (SCREFP) was transferred to Forever Oceans in 2017 (see Table 87). This permit is no longer active. Additionally, the Final Programmatic Environmental Impact Statement (PEIS) for an aquaculture management program in the Pacific Islands was published in 2022. Relatedly, the State of Hawaii is interested in developing a pre-permitted demonstration/pilot area for offshore aquaculture technologies at their NELHA facility.

Table 87. Offshore aquaculture facilities near Hawaii

| Name | Size | Location | Species | Status |
|---|---|---|---|---|
| Forever Oceans, transferred from Kampachi Farms (now known as Ocean Era) | Shape: Cylindrical<br>Height: 33 ft.<br>Diameter: 39 ft.<br>Volume: 36,600 $ft^3$ | 5.5 nautical miles (nm) west of Keauhou Bay and 7 nm south-southwest of Kailua Bay, off the west coast of Hawaii Island (19°33' N, 156° 04' W).<br>Mooring scope is 10,400-foot radius. | *Seriola rivoliana* | On July 6, 2016, NMFS authorized SCREFP for culture and harvest of 30,000 kampachi over two years on July 6, 2016.<br>Array broke loose from mooring and empty net pen sank in 12,000 feet of water on Dec. 12, 2016. The mooring was redeployed under guidance from the U.S. Army Corps of Engineers (USACE) in late 2018 and stocked with the first cohort of 10,000 fish in early 2019.<br>On March 30, 2017, NMFS authorized transfer of the two-year SCREFP from Ocean Era to Forever Oceans and the permit was renewed in 2019.<br>Forever Oceans' most recent SCREFP expired in December 2021, and there are currently no ongoing, in-water operations. |

### 3.6.4.2 ALTERNATIVE ENERGY FACILITIES

There are no alternative energy facilities in territorial or federal waters, proposed or existing, in American Samoa, Guam, the CNMI, or the PRIA.

Hawaii previously had four proposed wind energy facilities in federal waters through BOEM. On June 24, 2016, BOEM published a "Call for Information and Nominations" to seek additional nominations from companies interested in commercial wind energy leases within the Call Area offshore Hawaii, and pursued public comment on site conditions, resources, and existing uses of the area associated with BOEM's wind energy development authorization process (BOEM 2017). However, these projects were disengaged in 2018. In December 2020, BOEM put out a new call for recommendations on environmental studies regarding offshore wind facilities, and the Hawaii State Energy Office is facilitating and providing input on studies that could be conducted to mitigate impacts on various resources, including aquatic. In October 2021, the National Renewable Energy Laboratory published a study providing estimates of the Levelized Cost of Energy of offshore wind in the region surrounding Oahu and investigates related topics relevant to planning for offshore wind (Shields et al. 2021). In December 2022, the Pacific Northwest National Laboratory deployed a floating scientific research buoy stationed approximately 15 miles east of Oahu to collect accurate offshore wind resource, meteorological, and oceanographic data in Hawaii. There are several alternative energy projects also being tracked in this report (Table 88).

Table 88. Alternative Energy Facilities and Development in the Western Pacific region

| Name | Type | Location | Impact to Fisheries | Stage of Development | Source |
|---|---|---|---|---|---|
| Makai Ocean Engineering, Inc., Natural Energy Laboratory of Hawaii Authority (NELHA) | 120 kW Ocean Thermal Energy Conversion (OTEC) Test Site/ 1 MW OTEC Test Site | Ke'ahole, North Kona, West Hawaii | Intake | 120 kW OTEC operational; Final EA for 1 MW OTEC Site using existing infrastructure submitted July 2012 and lease negotiations being finalized; HEPA Exemption List memo Dec. 27, 2016. | NELHA Energy Projects<br><br>Final Environmental Assessment, NELHA, July 2012 |
| Honolulu Sea Water Air Conditioning (SWAC) | SWAC | 4 miles S of Kaka'ako, Oahu | Benthic impacts; intake | USACE Record of Decision (ROD) signed in 2015. In 2018, HSWAC and the State of Hawaii finalized an agreement to provide seawater air conditioning for eight State buildings. Construction was planned to start in late | Honolulu SWAC Press Room<br><br>Final Environmental Assessment, June 2014 |

| Name | Type | Location | Impact to Fisheries | Stage of Development | Source |
|---|---|---|---|---|---|
| | | | | 2019 or, but the operation was shut down in late 2020 due to increasing costs. | |
| Marine Corps Base Hawaii Wave Energy Test Site (WETS) | Shallow- and Deep-Water Wave Energy | 1, 2 and 2.5 km N of Mokapu, Oahu | Hazard to navigation | Shallow and deepwater wave energy units operational in mid-2015. In 2021, deployments were planned for the C-Power 2 kW SeaRay, the Oscilla Triton-C, and the Ocean Energy 500 kW OE35. | Final Environmental Assessment, NAVFAC PAC, January 2014<br>Tethys<br>The Maritime Executive |

### 3.6.4.3 MILITARY TRAINING AND TESTING ACTIVITIES AND IMPACTS

Major activities occurring in waters of the Western Pacific region by the DOD are summarized in Table 89.

Table 89. DOD major activities in the Western Pacific region

| Action | Description | Phase | Impacts |
|---|---|---|---|
| Guam and CNMI Military Relocation SEIS | Relocate Marines to Guam and build a cantonment/family housing unit on Finegayan/Andersen Air Force Base, a live-fire individual training range complex at the Ritidian Unit of the Guam National Wildlife Refuge. | Record of Decision (ROD) published August 29, 2015 after release of Final SEIS on July 18, 2015 (80 FR 55838).<br>Lawsuit filed for segmentation and range of reasonable alternatives under NEPA. The case was lost in 2018 when a judge from the District Court of CNMI stated that the Guam buildup and proposed training in the CNMI are not connected actions. The case was appealed, and the US Court of Appeals for the Ninth Circuit affirmed the District Court's dismissal in 2020.<br>Marine Corps Base Camp Blaz was activated on October 1, 2020. The US Army Corps of Engineers published a final rule on Oct. 8, 2021, amending regulations to establish a danger zone in the Pacific Ocean adjacent to the Mason Live-Fire Training Range Complex at Camp Blaz. | Surface danger zone established at Ritidian – access restricted during training.<br>Northern District Wastewater Treatment Plant will significantly impact nearshore water quality until it is upgraded. |
| Mariana Islands Training and Testing – Supplemental | The supplement to the 2015 Final EIS/OEIS was prepared to support ongoing and future activities conducted at sea and on Farallon de Medinilla (FDM) beyond 2020. New information, including an updated acoustic effects model, updated marine mammal density data, and evolving and emergent BSIA, were used to update the MITT. | The MITT Final Supplemental EIS/OEIS was released in June 2020. ROD published on August 7, 2020 to continue training and testing activities in the study area (85 FR 47952).<br>Meetings are ongoing to discuss FDM research activities and exercises. Meetings were previously held to discuss the | Access and habitat impact similar to previously analyzed activities in the 2015 EIS/OEIS (80 FR 46525). |

| Action | Description | Phase | Impacts |
|---|---|---|---|
| | | Integrated Natural Resources Management Plan and plans for future surveys around FDM.<br><br>In July 2020, NMFS implemented regulations regarding to the incidental take of marine mammals in the MITT area (85 FR 46302). | |
| Rim of the Pacific (RIMPAC) Exercise | Multinational, sea control/power projection fleet exercise that has been performed biennially for currently headquartered in Pearl Harbor, Hawaii. RIMPAC exercise locations are present throughout the State of Hawaii. | RIMPAC Programmatic EA developed in 2002 and a Supplemental Programmatic EA was finalized in 2006 (71 FR 31170). Biennial exercises continue through the present, with the most recent occurring in August 2020 as an at-sea-only event. RIMPAC occurred again in Summer 2022 more traditionally. | Programmatic Environmental Assessment, June 2002<br><br>U.S. Pacific Fleet |
| Hawaii-Southern California Training and Testing (HSTT) | Increase naval testing and training activities, including the use of active sonar and explosives. | Record of Decision available in December 2018 to conduct training and testing activities as identified in Alternative 1 of the HSTT Final EIS/OEIS published in October 2018 (83 FR 66255). NMFS implemented regulations regarding to the incidental take of marine mammals in the HSTT area in July 2020 (85 FR 41780). | The 2018 HSTT EIS/OEIS predicts impacts to access and habitat impact similar to previous analysis in the 2013 HSTT EIS/OEIS. |
| Long Range Strike Weapon Systems Evaluation Program (WSEP) | Conduct operational evaluations of Long Range Strike weapons and other munitions as part of Long Range Strike WSEP operations at the Pacific Missile Range Facility at Kauai, Hawaii. | Comment period closed Feb. 6, 2017, and final rule on Aug. 22, 2017, for NMFS authorization to take marine mammals incidental to conducting munitions testing for their Long-Range Strike Weapons Systems Evaluation Program (LRS WSEP) over the course of five years, from August 21, 2017 through August 22, 2022 (82 FR 1702; 82 FR 39684). | Access – closures during training.<br><br>Final Environmental Assessment, October 2016<br><br>NMFS Biological Opinion, August 2017 |
| Naval Special Operations Training in the State of Hawaii | Small-unit maritime training activities for naval special operations personnel. | Draft EA released in October 2018. Public comment period through Dec. 10, 2018 was extended to Jan. 7, 2019.<br>Final EA released May 2021. | Access.<br>Draft Environmental Assessment, 2018 |
| CNMI Joint Military Training | Establish unit and combined level training ranges on Tinian and Pagan. | Revised Draft EIS was expected in late 2018 or early 2019, but there is no new information on the EIS status.<br><br>Lawsuit filed for segmentation and range of reasonable alternatives under NEPA. DOJ asked U.S. District Court for the NMI to dismiss the plaintiff's complaint with prejudice to prevent refiling. The case was lost in 2018 after a judge from the district court of CNMI agreed with the military that the Guam buildup and proposed training in the CNMI are not connected actions. The case was appealed, and the U.S. Court of Appeals for the Ninth Circuit affirmed the District Court's dismissal in 2020.<br><br>Several meetings have been held with DFW and military officials to discuss relevant natural resource, land use, and social concerns regarding the proposed activities and prompted the reconsideration of proposed alternatives. | Significant access and habitat impacts around Tinian and Pagan. |

| Action | Description | Phase | Impacts |
|---|---|---|---|
| Garapan Anchorage | Military Pre-Positioned Ships anchor and transit. | Expired Memorandum of Understanding with the CNMI Government. As of 2021, a new MOU had not been signed. | Access, invasive species, unmitigated damage to reefs. |
| Farallon de Medinilla | Restricted airspace covering the island to 12 nm radius to conduct military training scenarios using air-to-ground ordnance delivery, naval gunfire, lasers, and special operations training. | Final rule published March 13, 2017, effective June 22, 2017, designating a new area, R-2701A, that surrounds existing R-2701, encompassing airspace between a 3 nm radius and 12 nm radius of FDM (82 FR 13389).<br>Proposed surface danger zone to 12 nmi. Meetings with military officials established that the 12 nm radius is closed when exercises are being conducted, but a 3 nm closure would instead be in effect year-round when exercises are not being conducted.<br>Damage to submerged lands and fisheries to be included within consultation establishing continued US interest in the island and compensation to the CNMI (Report to the President on 902 Consultations 2017) | Access – to fishing grounds and transit to fishing grounds – and damage to submerged lands. |
| Tinian Divert Infrastructure Improvements, Marianas | Improvements to airport and seaport (improving roads, installing fuel line) in CNMI for expanding mission requirements in Western Pacific. | ROD for Tinian Divert Infrastructure Improvements published in 2016 (81 FR 92791). The USAF has published a NOI to prepare a SEIS for the proposed Tinian Divert Infrastructure Improvements. The NOI began the public scoping process for the SEIS, which ended on May 31, 2018. Substantive comments received during the public scoping period were taken into consideration during preparation of the Draft SEIS.<br>The USAF published a Notice of Availability (NOA) for the Draft SEIS on May 17, 2019. The NOA began the public review period for the Draft SEIS, which ended on July 1, 2019. Substantive comments received during the public review period were taken into consideration during preparation of the Final SEIS, which had an NOA published in July 2020 (85 FR 43580).<br>Ground was broken on the Tinian Divert airfield on Feb. 22, 2022, which is expected to be completed by Oct. 9, 2025. | Adverse impacts to EFH minimal; access near Port of Tinian fuel transfer facility affected.<br>Access and transit to fishing grounds. |

In addition to the DOD activities detailed in Table 89, the U.S. military proposed the development of a small arms firing range near the shoreline in northwest Tinian. Several concerns were brought to the military regarding the proposed firing range, including issues with fishing access in the associated spatial closure area, issues with access to dive sites in the area, issues with the increased distance that boaters would have to travel to transit between Tinian and Saipan, and issues regarding boater safety due to having to travel further west from Tinian and losing access to the calmer waters nearshore (Tenorio, pers. comm., April 4, 2022).

In early 2010, the U.S. military began exercises in an area south and southeast of Guam designated W-517. W-517 is a special use airspace (approximately 14,000 $nm^2$) that overlays deep open ocean approximately 50 miles south-southwest of Guam. Exercises in W-517 generally involve live fire and/or pyrotechnics. When an offshore area such as W-517 is in use for training or testing exercises by the U.S. military, a notice to mariners (NTM) is issued, and vessels attempting to use the area are advised to be cautious of objects in the water and other small vessels. This discourages access to virtually all banks south of Guam, including Galvez, Santa Rosa, White Tuna, and other popular fishing areas. NTMs from the military regarding these exercises and the number of days affected for Guam and the CNMI are included in Table 90. The warning areas for which NTMs are issued are presented in Figure 186.

Table 90. Notices to mariners for military exercises in the Mariana Archipelago from 2013-2024

| Year | Location | Number of Notices to Mariners Issued | Number of Days Affected |
|---|---|---|---|
| 2013 | FDM | 45 | 159 |
| | W-517 | 24 | 54 |
| 2014 | FDM | 38 | 145 |
| | W-517 | 24 | 49 |
| 2015 | FDM | 37 | 164 |
| | W-517 | 33 | 87 |
| 2016 | FDM | 35 | 142 |
| | W-517 | 50 | 139 |
| | W-11 | N/A | N/A |
| | W-12 | N/A | N/A |
| 2017 | FDM | 56 | 191 |
| | W-517 | 46 | 119 |
| | W-12 | 2 | 5 |
| | W-11 | N/A | N/A |
| 2018 | FDM | 38 | 150 |
| | W-517 | 49 | 107 |
| | W-12 | 6 | 13 |
| | W-11 | 1 | 1 |
| 2019 | FDM | 39 | 165 |
| | W-517 | 27 | 65 |
| | W-12 | 3 | 22 |
| | W-11 | 6 | 27 |
| | W-13 | 15 | 37 |
| 2020 | FDM | 27 | 87 |
| | W-517 | 26 | 60 |
| | W-12 | 2 | 3 |

| Year | Location | Number of Notices to Mariners Issued | Number of Days Affected |
|---|---|---|---|
| | W-11 | 4 | 5 |
| | W-13 | 31 | 106 |
| 2021 | FDM | 22 | 76 |
| | W-517 | 26 | 72 |
| | W-12 | 9 | 16 |
| | W-11 | 6 | 24 |
| | W-13 | 28 | 109 |
| 2022 | FDM | 14 | 49 |
| | W-517 | 31 | 71 |
| | W-12 | 9 | 26 |
| | W-11 | 4 | 14 |
| | W-13 | 23 | 65 |
| | OROTE | 73 | 266 |
| 2023 | FDM | 33 | 134 |
| | W-517 | 34 | 72 |
| | W-12 | 13 | 26 |
| | W-11 | 6 | 24 |
| | W-13 | 35 | 105 |
| | OROTE | 74 | 301 |
| | MASON | 11 | 44 |
| | FINEGAYAN | 2 | 16 |
| 2024 | FDM | 20 | 61 |
| | W-517 | 33 | 52 |
| | W-12 | 6 | 17 |
| | W-13 | 5 | 16 |
| | OROTE | 64 | 245 |
| | MASON | 10 | 32 |

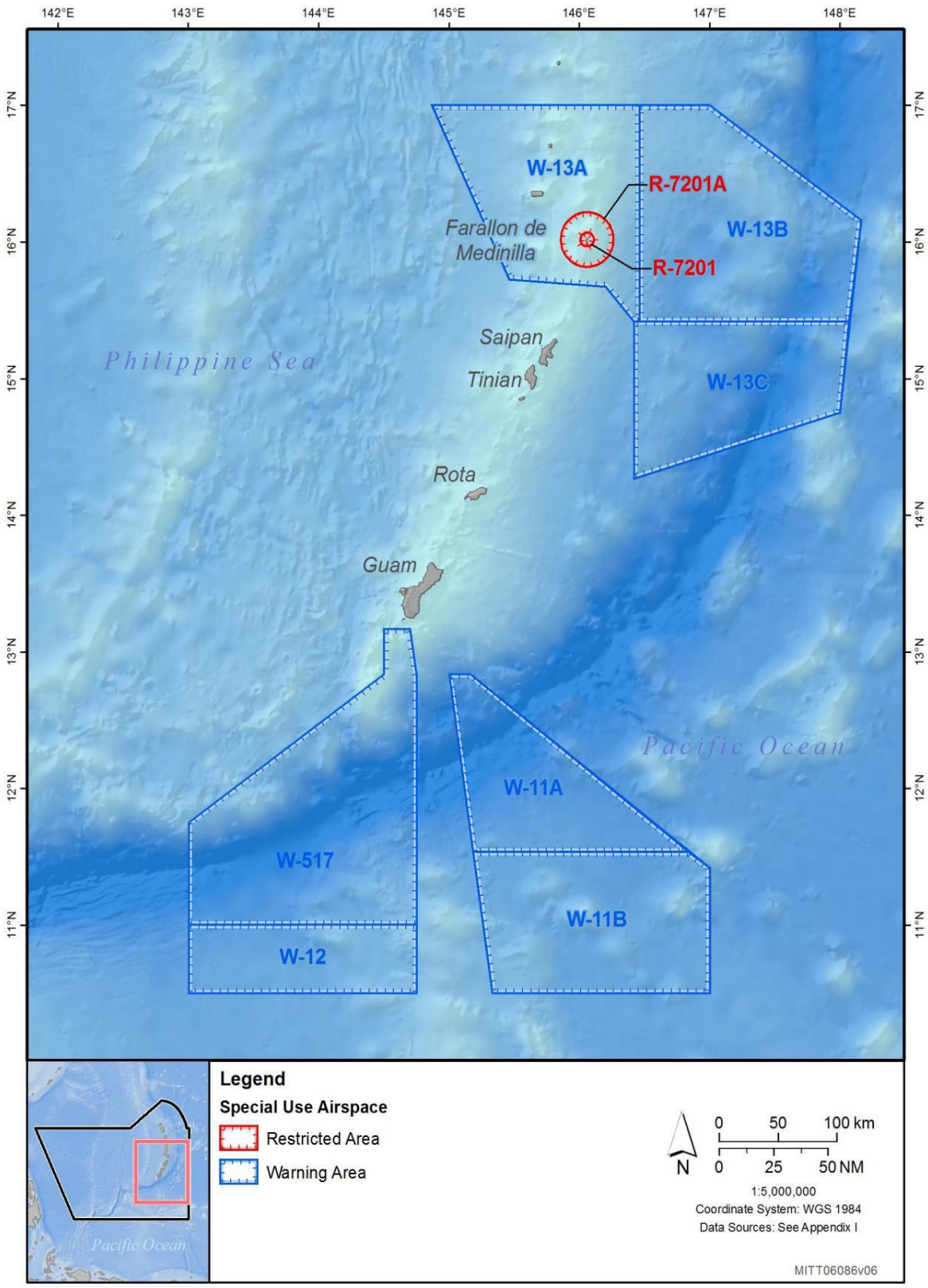



Figure 186. Map showing Warning Areas around the Mariana Archipelago

### 3.6.5 ADDITIONAL CONSIDERATIONS

#### 3.6.5.1 AMERICAN SAMOA

##### 3.6.5.1.1 Spatial planning Tools

In June 2018, President Trump signed the EO 13840 *Regarding the Ocean Policy to Advance Economic, Security, and Environmental Interests of the United States*, which established a policy focused on public access to marine data and information and requires federal agencies to 1) coordinate activities regarding ocean-related matters and 2) facilitate the coordination and collaboration of ocean-related matters with governments and ocean stakeholders. To that end, the American Samoa Coastal and Marine Spatial Planning Data Portal was created by Marine Cadastre to share information and data for coastal and marine spatial planning in American Samoa.

##### 3.6.5.1.2 Fish Aggregating Devices (FADs)

There are usually five FADs active in the waters around American Samoa in recent years: four around Tutuila and one near Manua. In 2024, all five fish aggregating devices (FADs) were active, FADs A, B, C, D, and E (Figure 187).

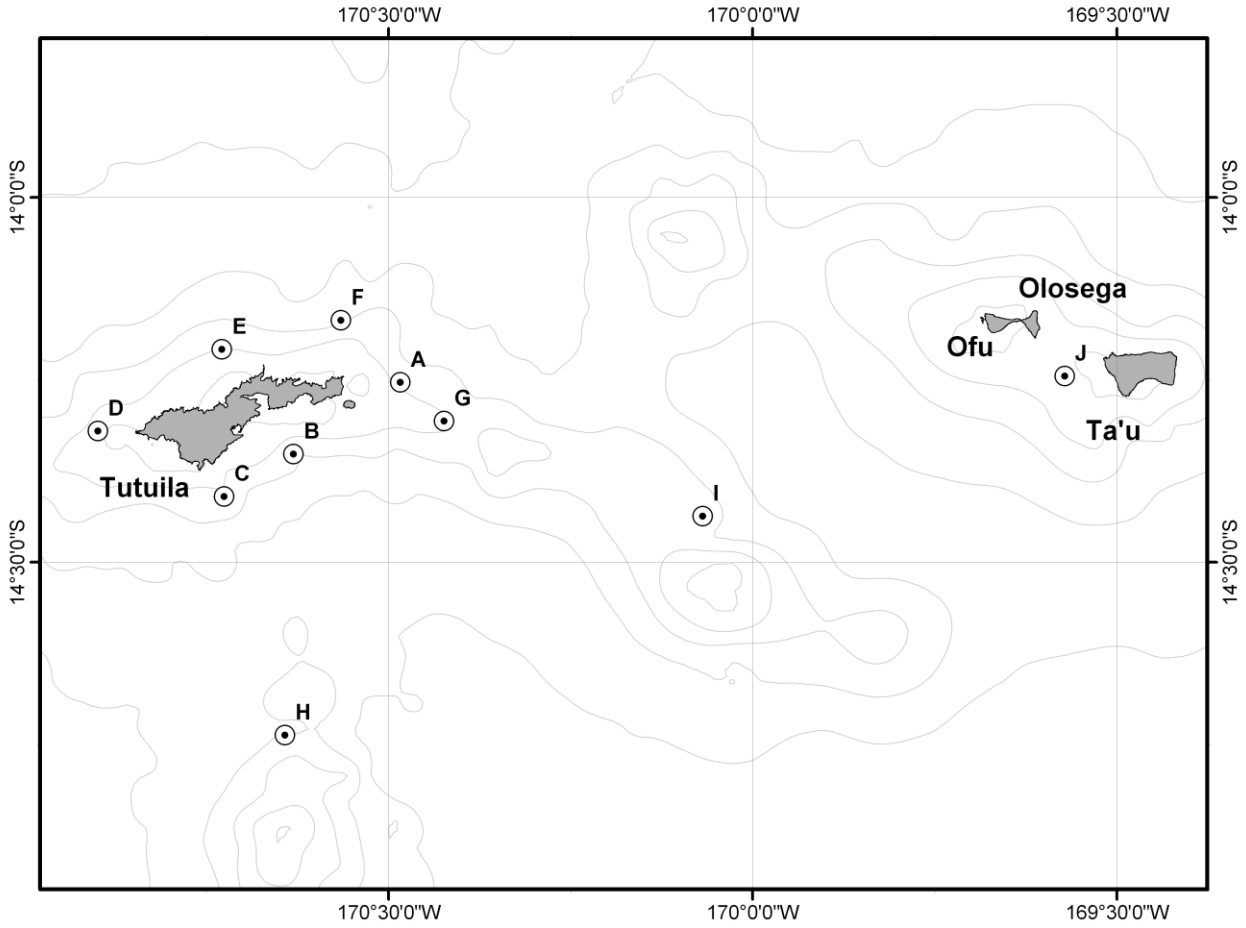



Figure 187. Present or planned locations of FADs in deep water around American Samoa in 2020 (Source: DMWR)

There are plans to deploy FADs C, G, and J in the near future. The American Samoa DMWR also resurveyed three potential FAD sites around Tutuila, noting some discrepancies in the depth.

### 3.6.5.2 CNMI

#### 3.6.5.2.1 Spatial Planning Initiatives

Spatial planning has occurred in CNMI in Saipan Lagoon. CNMI Division of Coastal Resources Management developed the Saipan Lagoon Use Management Plan, which was updated in 2017 and has an associated mapping tool.

#### 3.6.5.2.2 FADs

As of May 2025, there are three active FAD systems within waters of the CNMI:GG, KK and LL. The CNMI DFW is planning on conducting additional FAD deployments in the near future around the islands of Tinian and Rota. Additionally, DFW plans to acquire materials including ropes, shackles, swivels, chains, anchors, navigational lights and buoys. Once the materials have been obtained, staff will begin rigging the new systems in preparation for future deployment. The DFW FAD program is working to improve FAD capabilities with the installation of a smart buoy onto one of our FAD systems. This will enable users to track the position of the FAD as well as obtain fish presences information beneath the buoy. A map of the FADs is provided in Figure 188.

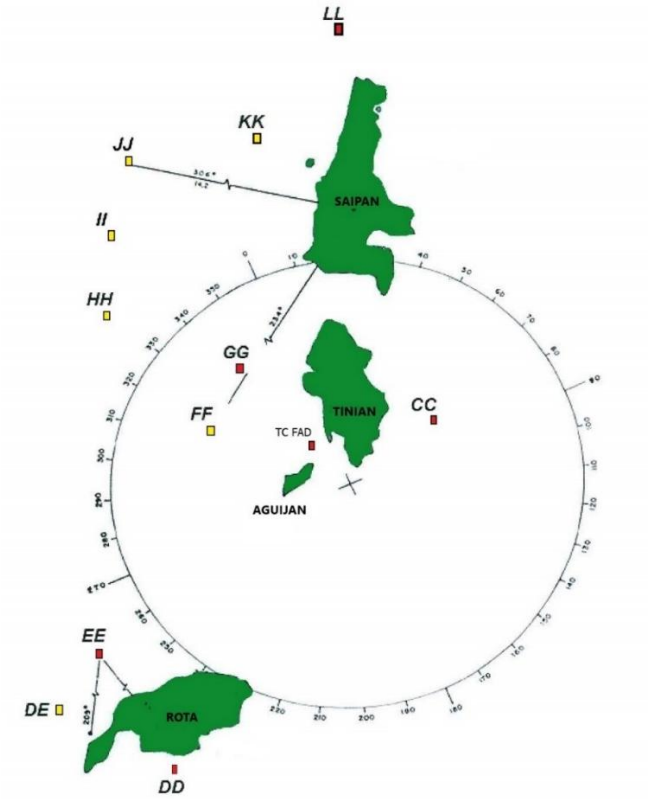



Figure 188. Map of FAD locations around the CNMI. Yellow depicts present FADs, and red depicts missing FADs as of the beginning of April 2022 (Source: DFW)

#### 3.6.5.2.3 Mariana Trench National Marine Sanctuary Nomination – Five-Year Review

On January 21, 2022, the NOAA Office of National Marine Sanctuaries (ONMS) began facilitation of a review of the nomination for the Mariana Trench National Marine Sanctuary (NMS) at the five-year interval by requesting written and oral comments (87 FR 3284). On March 10, 2022, the NOAA OMNS extended the public comment period by an additional 45 days through April 25, 2022 (87 FR13709). ONMS will review information to its 11 evaluation criteria for inclusion in the inventory of nominations, emphasizing any new information about the significance of the area's natural or cultural resources, changes to any threats to these resources, and any updates to the management framework of the area. The original nominating parties for the NMS were Pew Charitable Trusts and Friends of the Marianas Trench, which will also have an opportunity to provide input on relevant information. Following information gathering and internal analysis, NOAA will make a final determination on whether or not the Mariana Trench NMS nomination will remain in the inventory for another five-year period.

The potential development of an NMS for the Mariana Trench is an issue of debate for residents of the Mariana Archipelago. The Marianas Trench Marine National Monument (MTMNM) already exists in the area, and the creation of an NMS would have the potential to further restrict fishing access or limit the potential for fisheries development within the EEZ around the CNMI. Regarding the nomination of the Mariana Trench NMS, concerns have been raised about the potential to expand the NMS beyond the boundaries of the MTMNM, the expansion of fishing restrictions to the water column within the Trench Unit of the MTMNM, and the current lack of community support and public confusion surrounding the nomination letter submitted by Friends of the Marianas Trench (Tenorio, pers. comm., April 4, 2022).

On August 21, 2023, the Friends of the Mariana Trench withdrew their nomination for a Mariana Trench national marine sanctuary and requested NOAA remove the Mariana Trench from the sanctuary inventory. Due to circumstances in their community, they have changed their stance and saw the need for more dialogue and education to protect ocean resources.

### 3.6.5.3 GUAM

#### 3.6.5.3.1 FADs

In Guam, as of December 2024, there were five active FADs: Number 3, Ledge, Agat, 9 Mile, and Cocos (Figure 189). DAWR is also in possession of three other FADs to be deployed in the near future in addition to a community-based FAD via the GFCA. These FADs will be deployed once the deployment contract is finalized. DAWR is also planning to experiment with two new FAD designs as well as procure three FADs under the existing design pending a purchase order from the Guam Department of Agriculture.

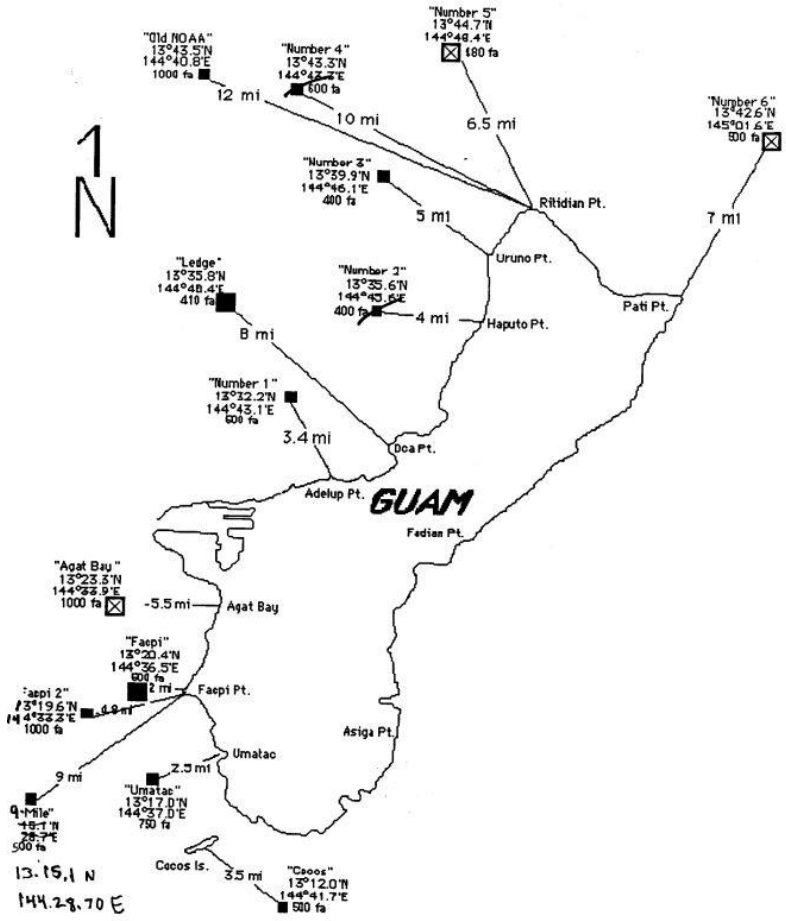



Figure 189. Map of FAD locations around Guam (Source: DAWR)

### 3.6.5.4 HAWAII

#### 3.6.5.4.1 Spatial Planning Initiatives

The State of Hawaii has several initiatives ongoing, including its 30x30 Initiative and its Ocean Resource Management Plan, which was most recently updated in 2020 (Hawaii Office of Planning 2020). Interested parties are encouraged to provide input to and track the progress of these plans.

#### 3.6.5.4.2 Bottomfish Restricted Fishing Areas (BRFAs)

In 1997, in response to a federal stock assessment indicating that certain species of the MHI bottomfish stock complex were in danger of being overfished, DAR developed a bottomfish management plan, which included the creation of 19 bottomfish restricted fishing areas (BRFAs) where bottomfish fishing was prohibited. These BRFAs were enacted in 1998. The MHI BRFAs are situated in both State and federal waters. Upon review in 2005, it was determined that the BRFA system did not protect an adequate amount of preferred habitat for bottomfish, so a new system was created in 2007 with 12 BRFAs (Figure 190) with the objective of reducing fishing mortality of MHI bottomfish stocks, rebuilding bottomfish populations on habitats within the BRFAs, and improving bottomfish populations in adjacent fishing areas (Drazen et al. 2014). In

2019, four of the 12 BRFAs were opened: BRFA C (Poipu, Kauai), BRFA F (Penguin Banks), BRFA J (Hana, Maui), and BRFA L (Leleiwi, Hawaii Island) (Figure 190).

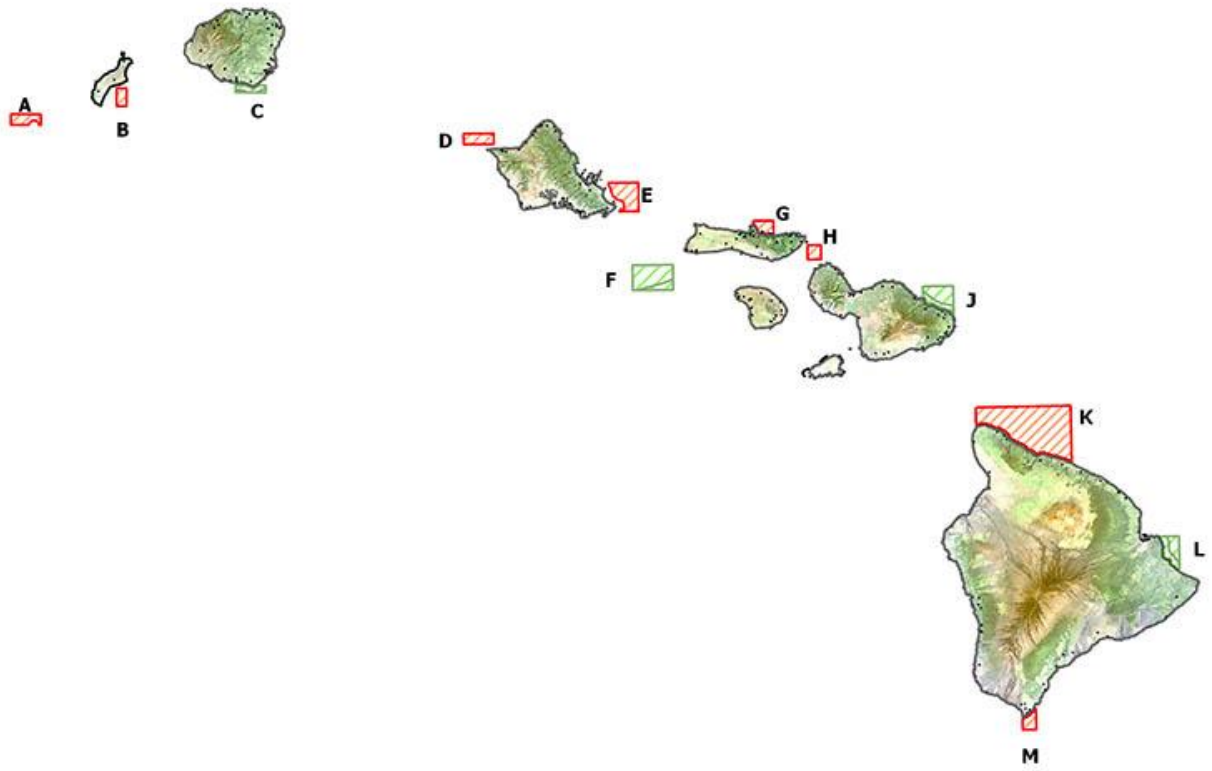



Figure 190. Map of the 12 BRFAs around the MHI; green boxes indicate those areas were opened to bottomfish fishing in 2019 and red boxes indicate areas that remained closed to bottomfish fishing at this time. All BRFAs are now open (DAR 2021).

On February 25, 2022, the Hawaii Board of Land and Natural Resources (BLNR) approved the reopening of all BRFAs such that registered bottomfish vessels are now allowed to fish for Deep-7 bottomfish in all previously closed BRFAs. During deliberations, representatives from DAR suggested that, because the Deep-7 bottomfish complex is being fished at sustainable levels according to the 2021 stock assessment update (Syslo et al. 2021), DAR is comfortable in taking an adaptive management approach to co-management of the Hawaii bottomfish fishery by opening the BRFAs and relying on other existing conservation and management measures to sustain the fishery.

#### 3.6.5.4.3 NWHI National Marine Sanctuary Nomination

On November 19, 2021, NOAA published a Notice of Intent (NOI) to initiate the sanctuary designation process for the Northwestern Hawaiian Island National Marine Sanctuary. On December 8, 2021, the State of Hawaii published its EIS preparation notice. In November 2022, the Council held public meetings on the islands of Kaua'i, Maui, Hawaii (Hilo and Kona), Moloka'i, and Oahu to solicit input from the community on alternatives for allowing non-commercial fishing and Native Hawaiian practices in the MEA, including a definition for subsistence fishing and options for including customary exchange. In general, participants commented that fishing should be allowed in the NWHI and that the opportunity for Native

Hawaiians to fish should be provided. Participants commented that due to the distance and expense that fishing in the MEA would entail, the only person likely to fish in that area would be rich people with large boards that could afford to go there. There was support to allow for commercial fishing, non-commercial fishing, and Native Hawaiian subsistence fishing. Cost recovery was also support by most participants as a means for providing the ability for fishermen to access the area.

At its March 2023 meeting, the Council finalized its recommended fishing regulations for the Monument Expansion Area from 50-200 miles around the NWHI. The regulations would allow for federal permitting and reporting of non-commercial fishing and Native Hawaiian subsistence fishing practices and prohibit commercial fishing. The Council stressed the importance of allowing limited cost recovery for Native Hawaiian subsistence fishing practices in the MEA in order for the community to participate in regulated fishing practices under Proclamation 9478.

On March 1, 2024, NOAA published a request for public comment on the proposed rule, notification of availability of the draft environmental impact statement (EIS) and draft management plan for the proposed Papahanumokuakea Marine National Sanctuary (89 FR 42, March 1, 2024). The alternatives analyzed in the EIS include 1) No Action do not establish a sanctuary; 2) non-commercial fishing would be permitted under NMFS and the sanctuary boundary would extend to 200 nm; 3) Sanctuary boundary would be limited to the existing monument, non-commercial fishing is permitted if it meets the scope of the sanctuary; and 4) the sanctuary boundary is extended from 0-200 nm but does not include the USFWS National Wildlife Refuges; noncommercial fishing would be permitted under NMFS. In April 2024, NOAA held public meetings virtually and in-person on O'ahu (Honolulu, Kaneohe, and Waianae), Kaua'i (Waimea and Hanalei), Hawai'i Island (Hilo and Kona), Maui, and Moloka'i to solicit comments on the draft EIS. In response to the request for public comment, the Council provided that the No Action alternative for the proposed rule was appropriate for the area and that the designation of a national marine sanctuary is unwarranted.

#### 3.6.5.4.4 FADs

The State of Hawaii FAD program is run by the Hawaii Institute of Marine Biology, SOEST, University of Hawaii in cooperation with DAR. FADs attract schools of tuna, mahimahi, ono, billfish, and other pelagic fishes so that fisher can easily locate and catch these species, as it is known that pelagic fish tend to aggregate around floating objects (Hawaii Sea Grant). The FADs utilized around the MHI are typically surface FADs anchored using a catenary mooring method and have an average life expectancy of three to four years (Figure 191; Hawaii Sea Grant). There are currently 54 FADs monitored and maintained throughout the MHI, with 17 around the Big Island (Figure 192), 14 around Maui (Figure 193), 14 around Oahu (Figure 194), and nine around Kauai (Figure 195). Over the course 2024, there were 15 FADs reported as missing, three FADs recovered, and 19 deployed. As of January 9, 2025, six of the 17 FADs around the Big Island, three of the 14 FADs around Maui, none of the 14 FADs around Oahu, and none of the nine FADs around Kauai were not active (Figure 192 through Figure 195). Additionally, there were two FADs, one near Maui and the other near the Big Island, that were discontinued.

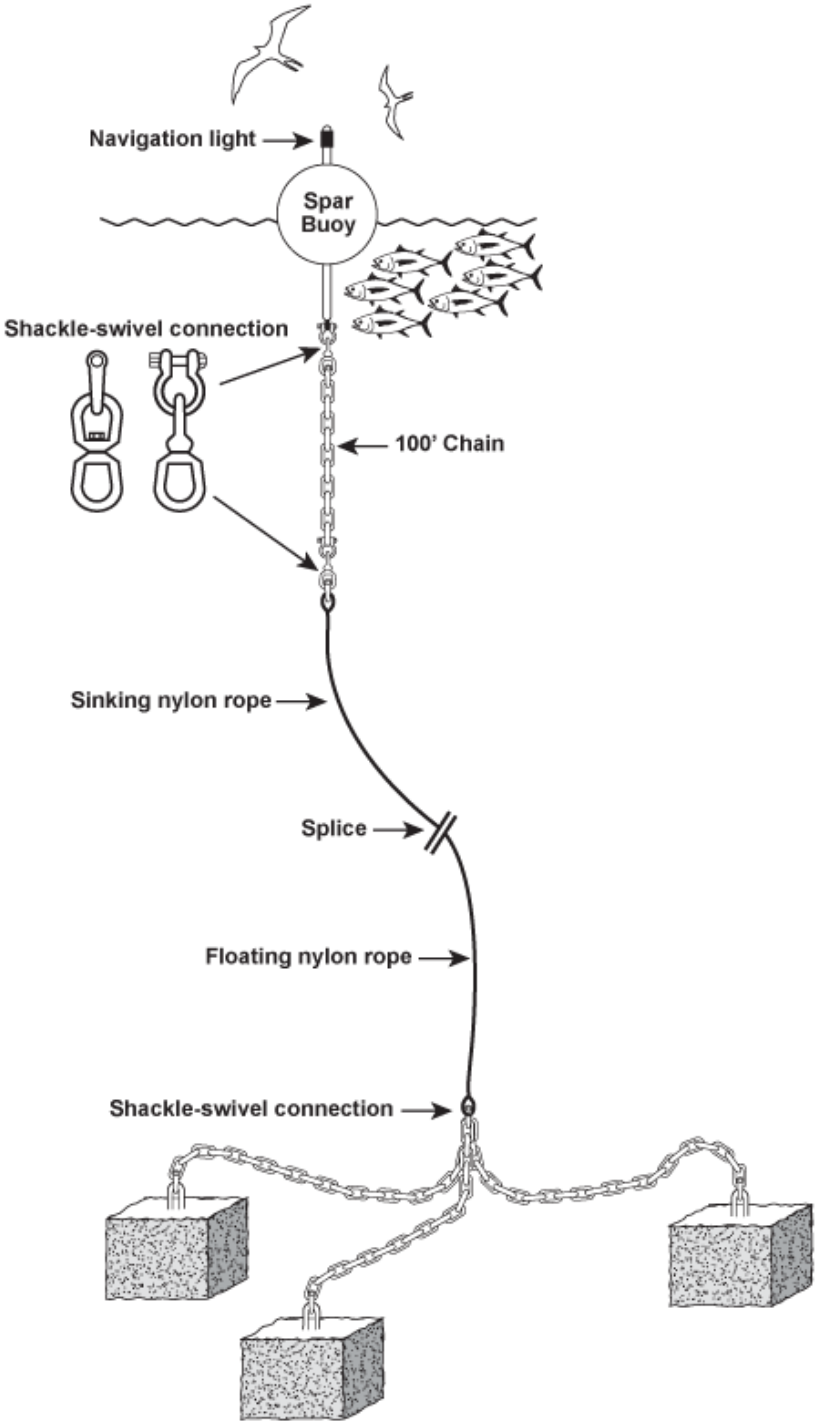



Figure 191. Diagram of the typical arrangement of FADs around the MHI (from Hawaii Sea Grant)

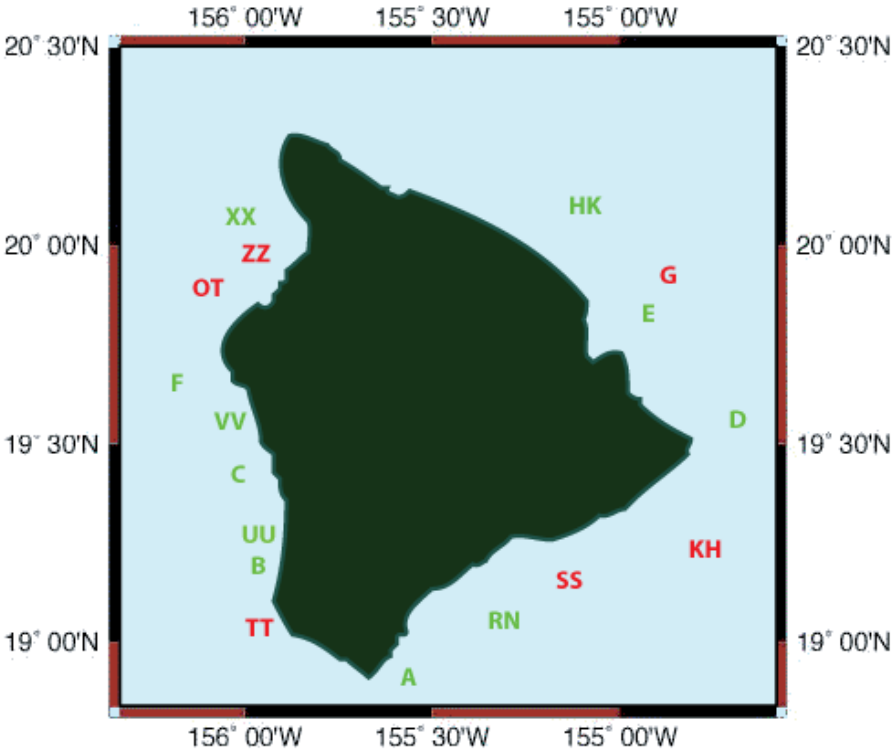



Figure 192. Map of FADs in the waters around the Big Island; red letters indicate a FAD that is known to be missing, and green letters indicate an active FAD (as of January 9, 2025, from Hawaii Sea Grant)

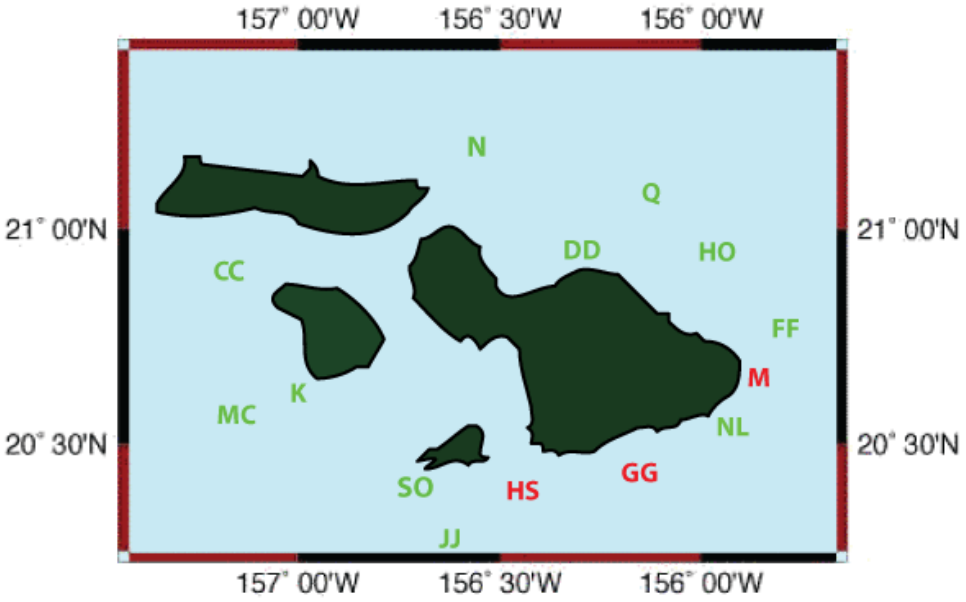



Figure 193. Map of FADs in the waters around Maui; red letters indicate a FAD that is known to be missing, and green letters indicate an active FAD (as of January 9, 2025, from Hawaii Sea Grant)

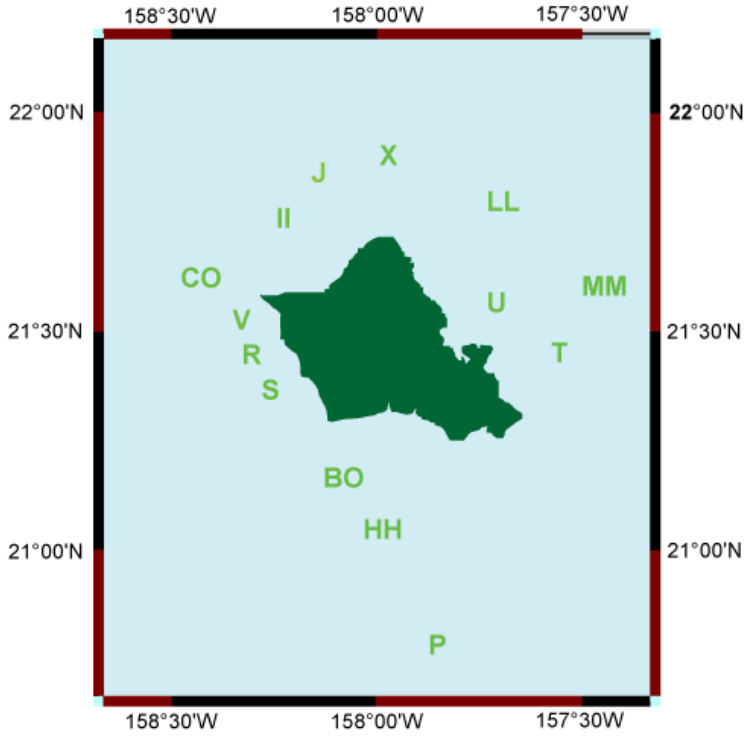



Figure 194. Map of FADs in the waters around Oahu; red letters indicate a FAD that is known to be missing, and green letters indicate an active FAD (as of January 9, 2025, from Hawaii Sea Grant)

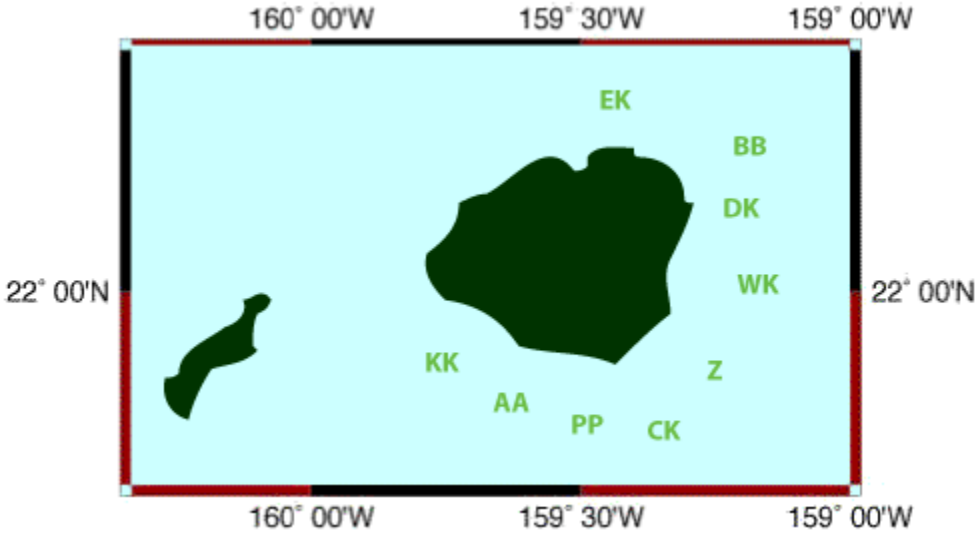



Figure 195. Map of FADs in the waters around Kauai; red letters indicate a FAD that is known to be missing, and green letters indicate an active FAD that has been recently deployed (as of January 9, 2025, from Hawaii Sea Grant)

# 4 DATA INTEGRATION

This chapter intends to advance ecosystem-based fishery management of Western Pacific pelagic fisheries by examining the fisheries in the context of marine ecosystems. The Council convened a two-day workshop on November 30 to December 1, 2016, to identify content for this chapter. The pelagic fisheries group suggested this chapter focus on three topical issues: 1) bycatch (with a focus on protected species factors that may influence interaction rates; 2) a socioeconomics section examining fishery performance in two areas: attrition in American Samoa longline fleet and the decline of shallow-set longline swordfish fishery; and 3) the projected decrease in oceanic productivity with implications for management issues, including a discussion of factors influencing significant changes in the CPUE of target species. The chapter used to include a section on influences of black-footed albatross interaction rates in the Hawaii longline fishery, but this has since been moved to the Protected Species section of the report and replaced with a summary of the Ecosystem-Based Fisheries Management project for impact assessments of protected species. As of the 2019 report, abstracts from recent publications relevant to data integration for pelagic fisheries are included in this chapter.

In 2019, the Pelagic Fishery Ecosystem Plan Team recommended work items for this chapter, such as directing Council staff and PIRO Sustainable Fisheries Division (SFD) to update the SAFE report data integration section with regularity and to include notable changes or issues pertinent to the FEP as a guide for adaptive management. The Plan Team also noted that Council staff should work with PIRO SFD to review thematic priorities that were previously identified in the Data Integration Workshop going forward. These work items were briefly discussed at the 2020 Pelagic Fishery Ecosystem Plan Team meeting to better determine a path forward, but at the 2021 Plan Team meeting, the efforts were discontinued. This section will continue to be updated by Council staff as resources and information allow.

## 4.1 ECOSYSTEM-BASED FISHERIES MANAGEMENT PROJECT FOR PORTECTED SPECIES IMPACTS ASSESSMENT FOR HAWAII AND AMERICAN SAMOA LONGLINE FISHERIES

In response to olive ridley turtle interaction trends observed in the Hawaii deep-set longline fishery (see Section 3.3.2.3) the Council's Protected Species Advisory Committee at its March 2017 meeting recommended evaluation of the increasing trend in conjunction with the previously recommended effort to evaluate ecosystem factors influencing bycatch in the longline fishery. Following this recommendation, the Council and NMFS implemented the ecosystem-based fisheries management (EBFM) project for protected species impacts assessment for the Hawaii and American Samoa longline fishery. The project is a collaboration between PIFSC, Council, PIRO and University of Florida.

In the first year of the initiative, the team developed methodologies to associate the spatiotemporal patterns of olive ridley turtle interactions with the Hawaii deep-set fishery primarily targeting bigeye tuna with static and dynamic environmental characteristics. However, the project quickly expanded looking not only across marine turtle species within the fisheries but across taxa as well. The project resulted in the development of a data compilation workflow linking the observer dataset with NOAA and other related oceanographic data products for the Hawaii deep-set observer data set as well as the shallow-set observer data. The resulting data sets were used to develop an Ensemble Random Forest model (Siders et al. 2020) to (i) predict the

probability of fishery interactions with protected species including target and non-target catch; (ii) defining critical areas of interaction using quantile contouring over a range of temporal time frames; (iii) assessed the number of sets and interactions within the contours; and (iv) developing covariate response curves using Accumulated Local Effects.

The team summarized the first year's effort into a publication in the Endangered Species Research journal. The primary purposes of this publication were to test the model performance of the developed Ensemble Random Forests model against other existing approaches to handle rare events (e.g., bycatch), to demonstrate its performance on case studies of ESA-listed and protected species, and to Ensemble Random Forests as an intuitive extension of the Random Forest algorithm to handle rare event bias. Through simulation, the team showed Ensemble Random Forests outperforms Random Forest with and without down-sampling as well as the synthetic minority over-sampling technique from highly class imbalanced to balanced datasets. The team found spatial covariance greatly impacts Ensemble Random Forests perceived performance as shown through simulation and case studies. For cases studies from the Hawaii deep-set longline fishery, giant manta ray (*Mobula birostris* syn. *Manta birostris*) and scalloped hammerhead (*Sphyrna lewini*) had high spatial covariance in their presences and high model test performance while false killer whale (*Pseudorca crassidens*) had low spatial covariance and low model test performance. Overall, the team found Ensemble Random Forests have four advantages: 1) reduced successive partitioning effects; 2) prediction uncertainty propagation; 3) better accounting of interacting variables through balancing; and 4) minimization of false positives as the majority of Random Forest within the ensemble vote correctly. Regarding the ESA-listed and protected species case studies, the team found the giant manta ray's highest probability of interaction with the Hawaii deep-set fishery was concentrated around the main Hawaiian islands as well as between 170-160ºW and 10-15ºN, the scalloped hammerhead's probability of interaction was more diffuse but still concentrated around the main Hawaiian islands as well as throughout 170-155ºW and 10-17ºN, and the false killer whale's probability of interaction was the most diffuse but highest northeast of the main Hawaiian islands.

In 2020, the team conducted an evaluation of the experimental oceanographic TurtleWatch product (Siders et al. 2023). The team focused on the 1ºC band originally set by Howell et al. (2008) and five aspects of the TurtleWatch product: (i) does the TurtleWatch 17.5-18.5ºC band hold up with additional satellite telemetry information on loggerhead sea turtle locations; (ii) when are loggerhead sea turtles in the TurtleWatch 17.5-18.5ºC band over the course of a year; (iii) when do the Hawaii shallow-set longline fishery (SSLL) locations and the loggerhead sea turtle locations overlap; (iv) do fisher avoid the band as the hard cap of loggerhead sea turtle fishery interactions is approached. To answer these questions, the team used an expanded set of the satellite telemetry locations of tagged loggerhead sea turtles from the original analysis and PIRO Observer Program fisheries-dependent monitoring SSLL set locations. Using the oceanographic extraction subroutine developed in previous EBFM activities, the team matched sea surface temperature (SST) with the tag and fishery locations.

The team found that the original band holds up well with additional data for locations of fishery interactions in quarter 1 (January–March) and quarter 4 (October–December) (Figure 196). In quarter 1, tagged turtles were in colder water than the TurtleWatch band (SST < 17.5ºC). In quarter 2, tagged turtles were in the TurtleWatch band while quarter 3 they were warmer than the band (SST > 18.5ºC). In quarter 4, the tagged turtles, fishing locations, and interactions all strongly overlapped with the TurtleWatch band (Figure 196).

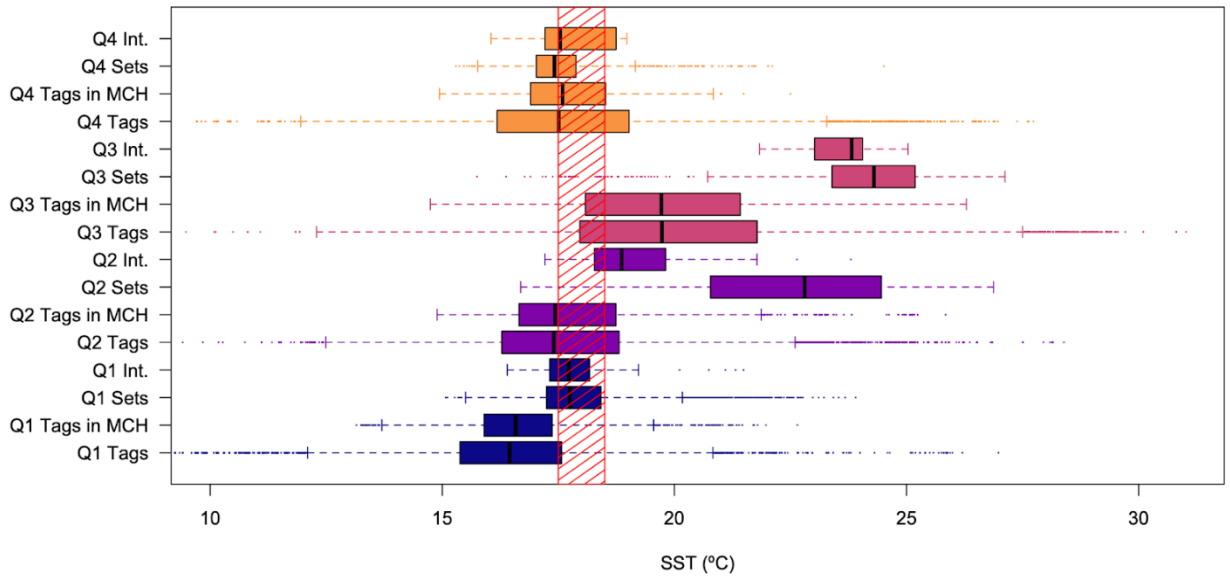



Figure 196. Quarterly sea surface temperature distribution of telemetered sea turtles (Tags), of telemetered sea turtles in the minimum convex hull of the Hawaii shallow-set longline sets (Tags in MCH), the shallow-set fishery sets (Sets), and the interactions between loggerheads and the shallow-set fishery (Interactions) relative to the 1º TurtleWatch band (17.5-18.5ºC), the red hash.

(iii) As the vast majority of these turtles were released in the western Pacific, the number of telemetry locations in the area of the shallow-set fishery peaked at about a third of all locations in a given quarter. For each quarter, we visualized and calculated the overlap between the turtle location for each quarter (Figure 196). The team showed that in the quarters with more loggerhead interactions (quarters 1 and 4), there is little avoidance of the TurtleWatch band and many of the interactions come from within the band. Interestingly, sets in quarter 4 are likely to get more turtles per set than quarter 1. Sets with interactions in quarter 2 come from early in the quarter before the fishery has pushed to warmer SST. Overall, the team found that the overlap between the fishery and the turtles is driven by changing in latitudes over the course of the year (Figure 197). In quarter 1 and quarter 4, both the turtles and the fishery are in the same latitudinal band. In quarter 2, the fishery moves farther south (lower latitudes) while the turtles move farther north over quarter 2 and 3. In quarter 3, the fishery pushes north again and by quarter 4 ends up overlapping with the turtle locations again.

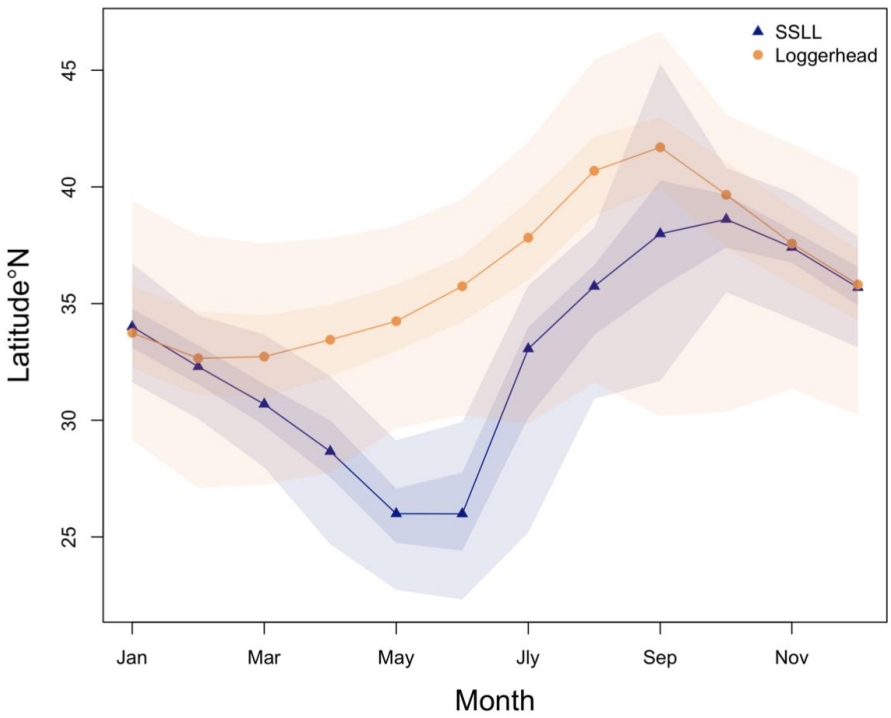



Figure 197. Latitudinal overlap between the Hawaii shallow-set longline fishery (blue triangles) and the loggerhead locations (orange circles). The line is the mean, the darker shading is the 50%, and the lighter shading is the 95%.

(iv) The team evaluated some aspects of fisher behavior garnered from the fishery locations only. The mean distance to the TurtleWatch band was calculated and whether fishers were avoiding the band as the percent of the loggerhead hard cap was filled was assessed. The team saw no indication of avoidance behavior except in 2018, when the hard cap was reached in early quarter 2, rather than in late quarter 1 as in other years, and the majority of the fishery had moved to warmer SSTs than the turtles frequent.

Overall, the team concluded that the TurtleWatch experimental product was still valid for quarters 1 and 4 for the location of shallow-set fishery interactions with loggerhead sea turtles. The location of tagged sea turtles in quarter 1 suggests that if fishers were to set in cooler waters than they do now, more interactions could occur as the overlap with the distribution of loggerhead sea turtles increases. Additionally, quarter 4 had the highest interaction rates but some of the lowest fishing effort. The team noted that if effort were to increase in quarter 4, there is likely to be an increase in loggerhead sea turtle interactions. Quarter 2 and 3 offer the least chance of encountering loggerhead sea turtles. From the historic fishing location information, fishers did not appear to use the TurtleWatch product to avoid loggerhead sea turtle interactions. Further analysis following the 2019 regulatory change from the fishery hard cap to trip interaction limits (see Section 3.3.1.3.2) will offer an opportunity to explore the change in fisher behavior.

In November 2022, the Council, PIFSC and the University of Florida convened a workshop with representatives from the Hawaii Longline Association (HLA), Hawaii SSLL fishery, and PIRO to discuss a case study evaluating the effects of spatial decision making by fishery participants

on the protected species interactions and catch of target species.[10] The case study focused on scenarios of SSLL fishers avoiding loggerhead sea turtles in the first or fourth quarter of the year either by using the TurtleWatch product (based on 17.5–18.5ºC sea surface temperature band) or areas identified by the Protected Species Ensemble Random Forests (PSERF) model based on the probability of loggerhead interactions. The workshop provided an overview of the spatial tool developed to do the evaluation, highlighted where industry feedback from an initial session with HLA/SSLL participants was used in the model, and presented the evaluation results.

The spatial tool consisted of four submodels: 1) PSERF models of the probability of interactions with loggerhead and leatherback sea turtles with the SSLL fishery; 2) a spatiotemporal model of fishery effort; 3) a spatiotemporal model of fishery Swordfish catch-per-unit-effort (CPUE); 4) an avoidance area design model using the TurtleWatch product or the PSERF models' outputs. These were then used to predict the fishery effort, CPUE, protected species interaction distribution, and avoidance areas for the months in quarters 1 and 4 in 2019–2021. A fifth submodel redistributed fishing effort out of avoidance areas.

The model results were summarized as the amount of effort that would need to avoid one of the spatial avoidance areas, the percent change in swordfish catch, the change in the number of loggerhead sea turtle interactions, and the change in the number of leatherback sea turtle interactions from avoidance. The tool identified that no matter how the avoidance area was defined, there was a strong chance that avoiding loggerhead interactions by the SSLL fishery would result in increasing the leatherback interactions in at least one of the months in quarters 1 and 4. The TurtleWatch-defined avoidance area resulted in the highest increase in leatherback interactions per loggerhead interaction avoided.

Workshop participants discussed the results of the submodels of the spatial tool and concluded that most of the submodels did a decent job of capturing the environmental covariates important for determining where fishing effort, CPUE, and protected species interactions occurred. As the models did not account for size of swordfish in the catch and other market drivers (secondary species, spatial variation in catch quality, competition), participants discussed at length how market forces influence the decision making of SSLL fishers. As the spatial tool identified a strong inverse tradeoff between avoiding loggerhead interactions and increasing leatherback interactions, participants discussed alternative solutions to avoiding protected species interactions. These encompassed discussions on vessel-to-vessel communication and information sharing amongst the fleet on interaction hotspots, training of new fishery participants on best practices to avoid protected species, and dissemination of avoidance areas or model-generated protected species hotspots to vessels at sea. Further discussions centered on what incentivizes fishers with a focus on how the market and market forces interact with swordfish behavior to constrain fishers' spatial and temporal decision making. The rest of the discussions considered applications of the spatial tool to the Hawaii deep-set longline (DSLL) fishery, the time and information needed to apply the tool, and potential species or spatial scenarios to test.

[10] Report of the Ecosystem Based Fishery Management Workshop: Exploring the effect of spatial decision making by fishers in the Hawaii shallow-set longline fishery. Available online at: https://www.wpcouncil.org/wp-content/uploads/2021/10/09.A1-EBFM-SSLL-Turtle-Model-Workshop-Report.pdf.

## 4.2 ATTRITION IN LONGLINE FLEETS

### 4.2.1 AMERICAN SAMOA LONGLINE

A downward trend of economic returns to the American Samoa longline fishery for the period of 2007 to 2013 has been observed in a recent economic study (Pan et al. 2017). This decline continues based on results from ongoing Pacific Islands Fisheries Science Center (PIFSC) Socioeconomics Program economic data collection and performance indicator monitoring programs. Based on data from a 2009 cost-earnings study on the fishery researchers found that the economic performance of the American Samoa longline fleet is highly sensitive to changes in albacore price, fuel prices, and the CPUE of albacore (Pan et al. 2017). The fishery was hit hard in 2013, when all three of these elements trended in the wrong direction, resulting in negative impacts to profit (Pan 2015). In early 2014, the majority of vessels in the American Samoa longline fleet were tied up at the docks in Pago Pago, and according to the *Samoa News*, "For Sale" signs had been posted on close to 20 (of the 22) active vessels[11].

Based on the analyses, the situation in 2013 was clearly associated with poor economic performance resulting from: (a) a continuous decline in albacore CPUE, (b) increasing fuel price, (c) a sharp drop in market prices for albacore, and (d) a baseline of limited profit margins resulting from a long term downward trend of net return since 2007 (Pan 2015). The previous cost-earnings study indicated that the fleet in 2009 operations was barely profitable where the albacore CPUE was at 14.8 fish per 1,000 hooks, the fuel price was at $2.53 (adjusted to 2013 value), and the market price for the albacore species was $1.00/lb. ($2,200 per mt). However, in 2013, the CPUE for albacore fell to 11.9 fish per 1,000 hooks (versus 14.8 in 2009) and the fuel price increased to $3.20 per gallon (versus $2.53 in 2009, adjusted to 2013 value). The albacore price in 2013 was similar to the 2009 level but it was a sharp drop compared to the price of $1.47/lb. in the previous year (2012). Thus, these changes yielded extensive losses across the fleet in 2013.

It is worth noting that the continuing decline of the American Samoa longline fishery during this period was not an isolated event but was a part of a region-wide economic collapse of the South Pacific albacore fishery. According to a report of the SPC Fisheries Newsletter #142 (September to December 2013), domestic fishing fleets targeting primarily albacore in Pacific Island Countries and Territories (PICTs) had reported difficulties in maintaining profitability in recent years, probably facing the challenges in fuel price rise, and albacore CPUE and price decline[12]. Ongoing PIFSC Socioeconomics Program economic monitoring programs will allow researchers to provide timely updates on future changes in economic performance for the American Samoa longline fishery.

### 4.2.2 HAWAII LONGLINE: SHALLOW-SET FISHERY

Gear configuration for Hawaii longline vessels is rather flexible as operations can easily be adjusted to change target species between swordfish or tuna fishing trips. Tuna fishing (deep-set fishery) has shown steady increases in both effort (hooks) and catch over the past two decades, while swordfish fishing (shallow-set fishery) has experienced a steady downward trend during

[11] http://www.samoanews.com/tri-marine-says-local-longline-fleet-vital-economy

[12] http://www.spc.int/coastfish/publications/bulletins/419-spc-fisheries-newsletter-142.html

the same period (Pan 2014). Since its closure and reopening in the early 2000s, the shallow set fishery has yet to recover even halfway to levels during its historical peak in the early 1990s.

Diminishing economic performance of shallow-set fishing may have contributed to the overall decline of the shallow set fishery, in addition to regulatory measures in controlling sea turtle interactions within the fishery. The Pacific Islands Fisheries Science Center (PIFSC) Socioeconomics Program economic data collection has documented declining net returns to the fishery during the period of 2005-2016, while the average net revenue for tuna trips has generally increased over the same period of time (Pan 2018).

Trends in swordfish and tuna trip costs have been similar over the years; however, swordfish trip revenues have fluctuated widely over the years unlike the relatively steady increase in tuna trip revenue over time (see Chapter 2). As a result, the average net revenue of swordfish trips moved up and down during 2005 to 2014. Prior to 2008, the average net revenue of a tuna trip was less than 50% of the average net revenue of a swordfish trip. In 2014, the level of the average tuna trip net revenue, $32,100, was much closer to the level of the average swordfish trip net revenue, $33,446. Yet, a swordfish trip usually lasts longer than a tuna trip, so the average net returns per day at sea for a swordfish trip are lower than for a tuna trip. Thus, tuna fishing seems to have an increasing comparative advantage over swordfish fishing in terms of trip-level economic returns. Without improved economic performance for swordfish fishing, there may not be much economic incentive to increase fishing effort for swordfish in the future.

Economic performance of longline fishing is the combined effect of many factors, but the key factors that determine the net revenue of Hawaii longline fishing may include: a) prices of target species, b) CPUE of the target species, c) fuel prices, and d) regulatory effects.

#### 4.2.2.1 WEAKENED SWORDFISH MARKET

The weakened swordfish market has been a disincentive for Hawaii fishermen to re-engage in the swordfish fishery in recent years. Unlike bigeye tuna, which is mainly consumed in Hawaii's local market, the majority of the swordfish landed in Hawaii and used to be exported to the U.S. mainland where it competed with imports from other nations and the Atlantic. Concern over mercury contamination could have possibly contributed to decreased demand as well. In early 1990, bigeye and swordfish ex-vessel prices in the Hawaii market were similar at around $4.50 per pound. From 1994 to 2009, swordfish prices declined while bigeye prices have held relatively stable. In recent years, the price differential between these two species has increased. For example, in 2008 the ex-vessel price of bigeye tuna was $4.12 per pound while the ex-vessel price of swordfish was only $2.08 per pound.

#### 4.2.2.2 CPUE DECLINES FOR SWORDFISH TRIPS

Swordfish CPUE was high at the beginning of the time series, being above 15 fish per 1,000 hooks in the years of 2005, 2006, and 2007. It has decreased since 2007, dropping to its lowest in 2010 with only 10 fish per 1,000 hooks. The swordfish CPUE has slightly increased and then remained unchanged in recent years. Bigeye CPUE, on the other hand, shows a different trend; it was quite steady from 2005 to 2012, and has increased continuously in the last four years from 3.8 fish per 1,000 hooks in 2012 to approximately 4.5 fish per 1,000 hooks in 2015.

#### 4.2.2.3 FUEL PRICES

While the two types of fisheries face the same fuel market, trip costs, revenues, and subsequent net revenues can vary across the deep-set and shallow-set fisheries. As previously stated, PIFSC

Socioeconomics Program economic data collection programs have documented declining net returns to the swordfish fishery during the period from 2005 to 2014, while the average net revenue for tuna trips has generally increased over the same period of time (Pan 2018).

#### 4.2.2.4 SUDDEN CLOSURES DURING FISHING SEASON

Due to hitting the sea turtle caps, the fishery experienced closures in 2006 and 2011, respectively. The sudden closures had interrupted the normal fishing trip cycle and might have resulted in economic loss to the fishermen as a fishing trip had to be ended no matter if the catch was fully loaded as planned. In the case of 2006, the closure brought back all the swordfish fishing vessels to port, flooding the swordfish market, which in turn constrained air shipping capacity and limited local consumption.

### 4.2.3 FACTORS AFFECTING CPUE OF TARGET SPECIES

The work of PIFSC researchers in spatial and temporal changes in Hawaii longline fishery catch and their potential for forecasting future fishery performance are excerpted below from the briefing document provided for the 124th meeting of the Council's Scientific and Statistical Committee (SSC). Authors include Phoebe Woodworth-Jefcoats, Johanna Wren, Jeff Drazen and Jeff Polovina[13]. Additional explanatory text was provided by Phoebe Woodworth-Jefcoats (pers. comm.)

A comprehensive examination of the spatial and temporal trends in the Hawaii-based longline fishery over the past 20 years was conducted using three fisheries-dependent data sets: logbook (1995-2016), observer (2006-2016), and dealer (2000-2016) data. Logbook data completed by fishermen provides catch, effort, and catch location data of landed species for all vessels in the fleet, while observer data provides lengths of every third fish caught, including discards, but only ~20% of vessels have an observer on board. Dealer data provides weight of all fish sold at the Honolulu Fish Auction and can be matched with logbook data for each vessel trip.

[13] Factors behind the recent rise in bigeye CPUE in the Hawaii longline fishery. Documented submitted for Western Pacific Fishery Regional Management Council 124th Scientific and Statistical Committee Meeting, October 4 to October 6, 2016, Honolulu, Hawaii, 4 p.

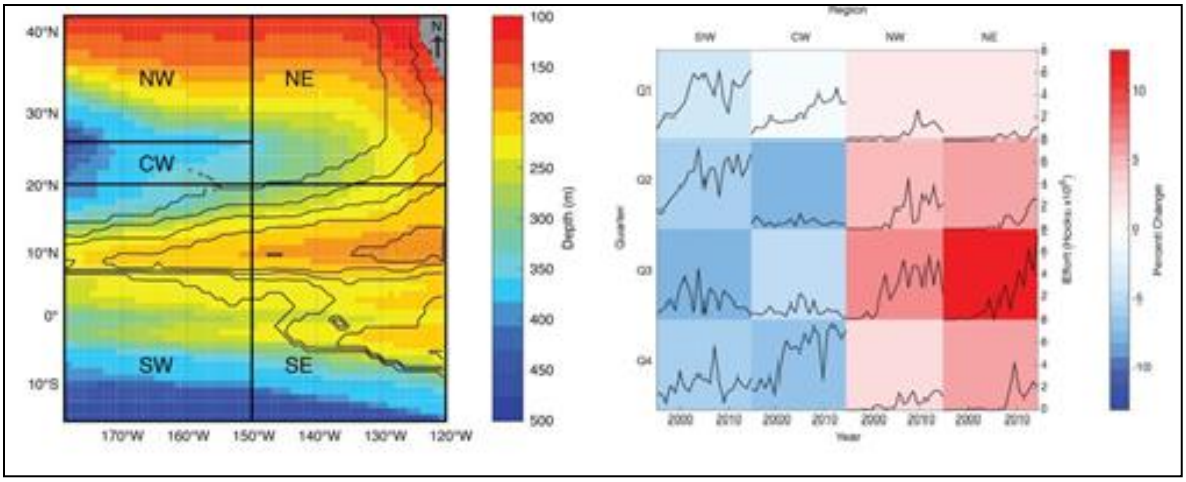



Figure 198. Left: Map depicting the five regions by which the fishery is examined overlaid on the climatological (1995-2015) median depth of preferred thermal habitat

Note: (8 – 14 °C, shaded) and the depth of the 1 mL/L oxygen threshold (contoured every 100 m from 100 to 500 m, with stippling where the depth is less than 100 m). Right: The difference between the proportion of total annual effort set in each region and quarter from the beginning (1995 – 1997 mean) to the end (2013 – 2015 mean) of the time series is shaded. Total annual effort in each region and quarter is plotted in black. Note: nearly no effort is deployed in the SE region.

The deep-set longline fishery, which targets bigeye tuna, has expanded considerably over the past two decades. Not only has total effort increased from nearly 8.4 million hooks set in 1995 to over 47 million hooks set in 2015, but the spatial footprint of the fishery has expanded as well. At the beginning of the time series, nearly all (97%) of Hawaii's deep-set effort was set in the fishery's core operating area south of 26°N and west of 150°W, whereas in 2015 over 40% of the deep-set effort was set either north or east of these bounds. This expansion is most prominent in the third quarter of the year (Figure 198).

The marked northeastward expansion of the fishery appears to have several drivers. First, it is possible that waters closer to Hawaii were unable to support an increase in effort due to both Hawaii-based and international effort. Waters northeast of Hawaii had little to no international competition. Second, bigeye catch rates within the fishery's core operating area are lowest in the third quarter of the year. However, during this quarter catch rates are still high in waters to the northeast of Hawaii. Finally, preferred bigeye thermal habitat and oxygen levels overlap most completely with deep-set gear in waters to the northeast of Hawaii (Figure 198). This overlap could act to increase bigeye's catchability, and in turn catch rates, in northeastern waters. The fishery expanded spatially in the third quarter in response to low target catch rates. In waters to the northeast of Hawaii the fleet faced little competition and found a particularly efficient fishing ground due to its local oceanography.

One consequence of the fishery's spatiotemporal expansion has been an increase in the amount of lancetfish caught. Lancetfish have no commercial value and all catches are discarded. Lancetfish catch rates are highest north of 26°N and in the third quarter. Thus, the fishery is deploying more effort both in the region where lancetfish are most commonly caught and at the time when catch rates are highest. This has resulted in lancetfish catches exceeding bigeye catches for the past decade (Figure 199).

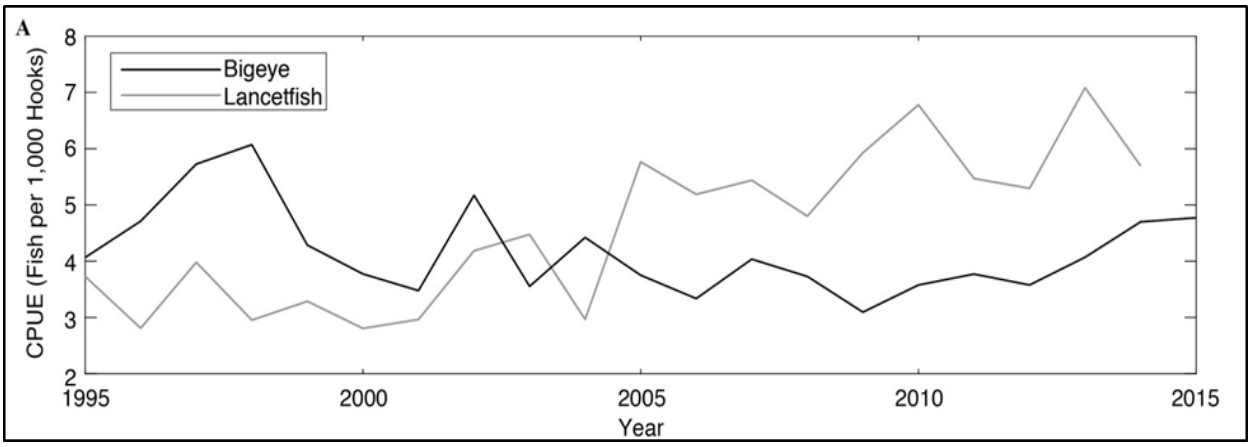



Figure 199. Annual deep-set bigeye tuna (black) and lancetfish (gray) CPUE

Trends in productivity and catch rates in the fishery over the past decades may be caused by spatiotemporal changes in the fishery itself, changes in the stock, or both. In order to better understand these trends A General Additive Models (GAM) was built to analyze time series of mean weight, catch per unit effort (CPUE, in number of fish caught per 1000 hooks) and weight per unit effort (WPUE, in kg caught per 1000 hooks). The GAM allowed researchers to tease apart trends caused by changes in the stock from those caused by changes in seasonality and geographic location of the fishery. Over the past 16 years, mean weights of commercially important fish in the Hawaii- based longline fishery have declined 10%.

This is in part due to a decline in mean weight by five out of the eleven most commonly caught species, and partly due to a change in species composition of the catch. Smaller fishes, such as pomfrets and walu, are becoming more common while larger fishes, such as opah and striped marlin, make up a lesser proportion of the total catch (Figure 200A). Because more small fish, and more small fish species are caught, the productivity of the fishery (WPUE) declined by 53% since 2000, but the shift in area and seasonality of fishing effort helped maintain productivity in the fishery (Figure 200C).

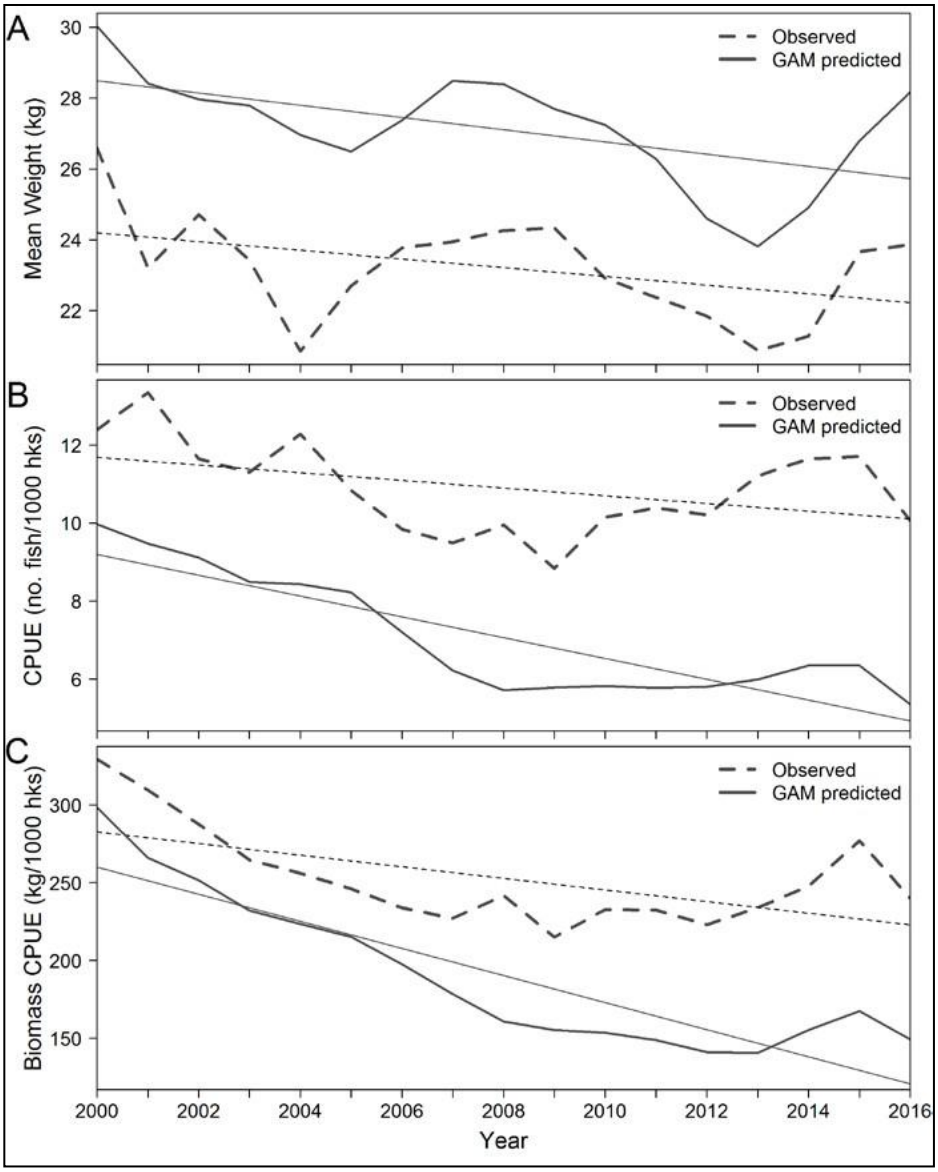



Figure 200. Mean weight (A), catch per unit effort (B), and weight per unit effort (WPUE) for all fish in the Hawaii-based longline fishery from dealer provided data.

Note: The dashed lines show the annual values from the dealer data with a linear trend line, and the solid line shows the GAM predicted annual values with linear trend lines.

CPUE has increased slowly since 2008, but when accounting for the increase in effort and geographic shift of the fishery, CPUE has remained stable. The recent peaks in both CPUE and WPUE are largely due to a strong recruitment pulse of bigeye tuna entering the fishery in the third quarter of 2013. This recruitment pulse in the fishery can be followed through 2016, where it provides an increase in first CPUE then WPUE. A recruitment index could be generated for bigeye tuna that provides a forecast of fishery performance. A peak in small bigeye tuna (<=15kg) is an indication that there will be an increase in CPUE and WPUE in the following two years (Figure 201).

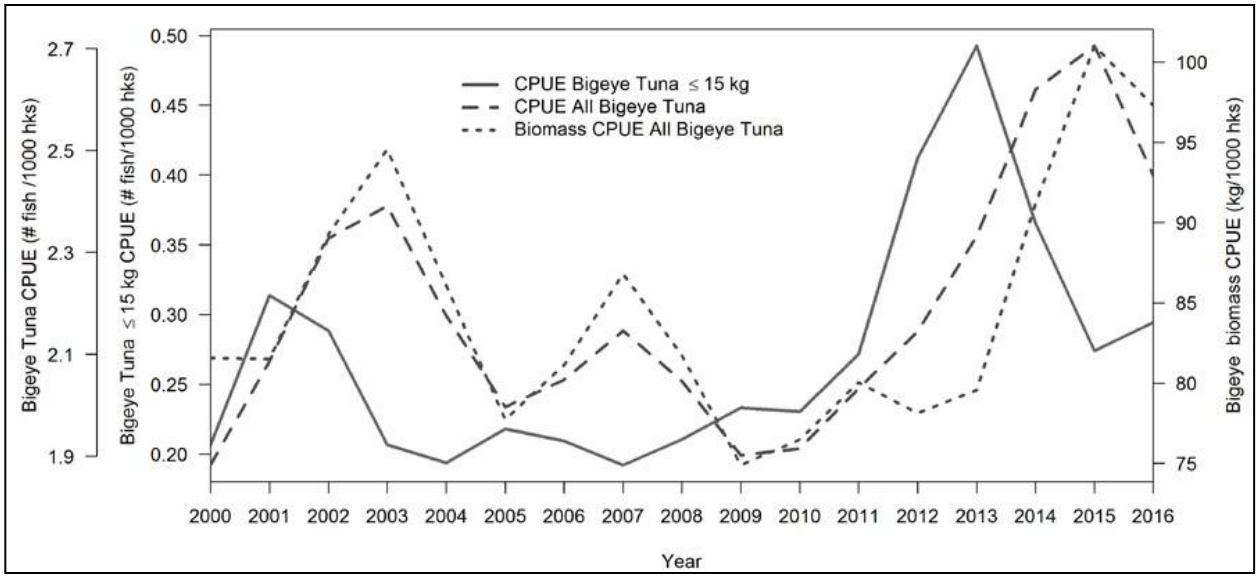



Figure 201. Temporally- and spatially-adjusted annual catch per 1000 hooks

Note: (CPUE; dashed line), and biomass per 1000 hooks (WPUE) for all bigeye tuna and bigeye tuna 15 kg or less (solid line) from the GAM from 2000-2016.

Additional reading on the influence of environmental impacts on tuna populations can be found in Lehodey et al. (2010) and Lehodey et al. (2013).

# 5 REFERENCES

Aires-da-Silva, A., M. Maunder, K. Schaefer, and D. Fuller. 2015. Improved Growth Estimates from Integrated Analysis of Direct Aging and Tag–Recapture Data: An Illustration with Bigeye Tuna (Thunnus Obesus) of the Eastern Pacific Ocean with Implications for Management. Fisheries Research 163(March):119–126.

Allen, M. ., C. . Fleming, B. . Zito, S. . Gonyo, S. . Regan, and E. . Towle. 2022. National Coral Reef Monitoring Program Socioeconomic Monitoring Component: Summary Findings for Hawai'i, 2020. Page U.S. Dep. Commerce, NOAA Technical Memorandum CRCP.

Allen, S., and J. Amesbury. 2012. Commonwealth of the Northern Mariana Islands As a Fishing Community. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Island Fisheries Science Center, ATM-NMFSPIFSC-36.

Allen, S., and P. Bartram. 2008. Guam as a fishing community. Page Pacific Islands Fisheries Science Center, PIFSC Administrative Report. H-08-01.

Allen, S. D., and N. J. Bartlett. 2008. Hawaii Marine Recreational Fisheries Survey: How Analysis of Raw Data Can Benefit Regional Fisheries Management and How Catch Estimates are Developed, An Example Using 2003 Data. H-08-04.

Allen, S. D., and A. Gough. 2006. A sociocultural assessment of Filipino crew members working in the Hawaii -based longline fleet. ATM-NMFS-PIFSC-6.

Allen, S. D., and A. Gough. 2007. Hawaii longline fishermen's experiences with the observer Program. Page U. S. Dep. Commer., NOAA Tech. Memo., NOAAPPENDIX. NOAAPPENDIX ATM-NMFS-PIFSC-6,.

Amador-Capitanachi, M. J., X. G. Moreno-Sánchez, P. D. Ventura-Domínguez, A. Juárez-Ruiz, E. González-Rodríguez, C. Gálvez, T. Norris, and F. R. Elorriaga-Verplancken. 2020. Ecological implications of unprecedented warm water anomalies on interannual prey preferences and foraging areas of Guadalupe fur seals. Marine Mammal Science 36:1254–1270.

American Samoa Government. 2023. American Samoa Statistical Yearbook 2022. .

APDRC. 2025. Monthly GODAS Potential temperature. Asia-Pacific Data Research Center, International Pacific Research Center at the University of Hawai'i at Mānoa. http://apdrc.soest.hawaii.edu:80/dods/public_data/Reanalysis_Data/GODAS/monthly/potmp.

Arita, S., and M. Pan. 2013. Cost-Earnings Study of the American Samoa Longline Fishery Based on Vessel Operations in 2009. WP-13-009.

Arita, S., M. Pan, J. Hospital, and P. S. Leung. 2011. Contribution, linkages, and impacts of the fisheries sector to Hawaii's economy: a social accounting matrix analysis. . SOEST Publication 11-01, JIMAR Contribution 11-373.

Armstrong, K., D. J. Herdrich, and A. Levine. 2011. Historic fishing methods in American Samoa. NOAAPPENDIX ATM-NMFS-PIFSC-24.

Ayers, A. L. 2018. The Commonwealth of the Northern Mariana Islands Fishing Community Profile: 2017 Update (January).

Ayers, A., and K. Leong. 2020. Stories of Conservation Success: Results of Interviews with Hawaii Longline Fishers. H-20-11.

Ayers, A., K. Leong, J. Hospital, C. Tam, and C. Morioka. 2023. 2022 American Samoa Fisher Observations Data Summary and Analysis . DR-23-14.

Ayers, A., K. Leong, J. Hospital, C. Tam, and R. Morioka. 2024a. 2023 Guam and CNMI Fisher

Observations Data Summary and Analysis. DR-24-12.
Ayers, A., K. Leong, J. Hospital, C. Tam, and R. Morioka. 2024b. 2023 Hawai`i fisher observations data summary and analysis. DR-24-09.
Ayers, A., K. Leong, J. Hospital, C. Tam, and R. Morioka. 2024c. 2023 American Samoa fisher observations data summary and analysis. DR-24-13.
Barnes-Mauthe, M., S. Arita, S. D. Allen, A. Gray, and P. S. Leung. 2013. The influence of ethnic diversity on social network structure in a common-pool resource system: implications for collaborative management. Ecology and Society 18(1).
Barnes, C., X. Irigoien, J. A. A. De Oliveira, D. Maxwell, and S. Jennings. 2011. Predicting marine phytoplankton community size structure form empirical relationships with remotely sensed variables. Journal of Plankton Research 33(1):13–24.
BOEM. 2017. Hawaii Activities. https://www.boem.gov/renewable-energy/state-activities/hawaii-activities.
Boggs, C., P. Dalzell, T. Essington, M. Labelle, D. Mason, R. Skillman, and J. Wetherall. 2000. Recommended overfishing definitions and control rules for the Western Pacific Regional Fishery Management Council's pelagic fishery management plan. H-00-05.
Bograd, S. J., D. G. Foley, F. B. Schwing, C. Wilson, R. M. Laurs, J. J. Polovina, E. A. Howell, and R. E. Brainard. 2004. On the seasonal and interannual migrations of the transition zone chlorophyll front. Geophysical Research Letters 31:L17204.
Brainard, R., J. Maragos, R. Schroeder, J. Kenyon, P. Vroom, S. Godwin, R. Hoeke, G. Aeby, R. Moffitt, M. Lammers, J. Gove, M. Timmers, S. Holzwarth, and S. Kolinski. 2005. The State of Coral Reef Ecosystems of the U.S. Pacific Remote Island Areas. Honolulu.
Brinson, A. A., E. M. Thunberg, and K. Farrow. 2015. The Economic Performance of U. S. NonCatch Share Programs. NMFS-F/SPO-150.
Brock, V. E. 1947. Report of the Director, Division of Fish and Game. Report of the Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii. Honolulu.
Calhoun, S., K. Leong, and J. Hospital. 2020. Hawai'i bottomfish heritage project: traditions and fishery development. NMFS-PIFSC-97.
Castillo-Jordan, C., J. Hampton, and P. Hamer. 2022. Stock assessment of skipjack tuna in the western and central Pacific Ocean. WCPFC-SC18-2022/SA-WP-01.
Chaloupka, M., E. Gilman, M. Carnes, A. Ishizaki, C. Brady, Y. Swimmer, J. Wang, S. Ellgen, and E. Kingma. 2021. Could tori lines replace blue-dyed bait to reduce seabird bycatch risk in the Hawaii deep-set longline fishery? Page Western Pacific Regional Fishery Management Council, editor. Honolulu, Hawaii.
Chaloupka, M., E. Gilman, A. Ishizaki, C. Smith, E. Kingma, Y. Swimmer, and L. Rassel. 2024. Relative efficacy of paired tori-lines and night-setting with blue-dyed bait as seabird bycatch mitigation measures deployed in the Hawaii-based shallow-set longline fishery. Honolulu, HI.
Chan, H. L. 2002. Economic impacts of Papahānaumokuākea Marine National Monument expansion on the Hawaii longline fishery. Marine Policy 115:103869.
Chan, H. L. 2022. Hawai'i Small Boat Survey 2021 Summary. NOAA Fisheries Science Blog.
Chan, H. L. 2023. Economic Contributions of U. S. Commercial Fisheries in American Samoa. NOAA-TM-NMFS-PIFSC-151.
Chan, H. L., and M. Pan. 2017. Economic and Social Characteristics of the Hawaii Small Boat Fishery 2014. NOAA-TM-NMFS-PIFSC-63.
Chan, H. L., and M. Pan. 2019a. Tracking economic performance indicators for small boat

fisheries in America Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. NOAA-TM-NMFS-PIFSC-79.

Chan, H., and M. Pan. 2019b. Vessel level annual cost-earnings study of the Hawaii offshore handline fishery and the Hawaii small boat commercial fishery, 2014. NOAA-TM-NMFS-PIFSC-80.

Clarke, S., A. Langley, C. Lennert-Cody, A. Aires-da-Silva, and M. N. Maunder. 2018. Pacific-wide Silky Shark (Carcharhinus falciformis) Stock Status Assessment. WCPFC-SC14-2018/SA-WP-08, Busan, Korea.

Cooper, B., and M. McCracken. 2025. Assessment of incidental interactions with False Killer Whales in the Hawai‘i longline deep- and shallow-set fisheries from 2019 through 2023. DR-25-02.

Craig, P., B. Ponwith, F. Aitaoto, and D. Hamm. 1993. The commercial, subsistence, and recreational fisheries of American Samoa. Marine Fisheries Review 55(2).

Curran, D., and S. Beverly. 2012. Effects of 16/0 circle hooks on pelagic fish catches in three south pacific albacore longline fisheries. Bulletin of Marine Science 88(3):485–497.

D’Agnese, E., D. Lambourn, J. Rice, D. Duffield, J. Huggins, T. Spraker, S. Raverty, T. Kuzmina, M. E. Grigg, K. Wilkinson, S. Jeffries, and W. Smith. 2020. Reemergence of Guadalupe fur seals in the U.S. Pacific Northwest: The epidemiology of stranding events during 2005–2016. Marine Mammal Science 36:828–845.

DAR. 2021. Bottom Fishing. Honolulu.

Davidson, K., M. Pan, W. Hu, and D. Poerwanto. 2012. Consumers’ willingness to pay for aquaculture fish products vs. wild-caught seafood - a case study in Hawaii. Aquaculture Economics and Management 16(2):136–154.

Dombrow, C., and J. Hospital. 2023. Economic and Social Characteristics of the American Samoa Small Boat Fishery 2021. . H-23-05.

Dombrow, C., E. Rollins, L. Ayers, Adam, and J. Hospital. 2025a. Economic and Social Characteristics of Guam’s Small Boat Fisheries, 2018. H25-01.

Dombrow, C., E. Rollins, A. L. Ayers, and J. Hospital. 2025b. Economic and Social Characteristics of Small Boat Fishing in the Commonwealth of the Northern Mariana Islands, 2018. NMFS-PIFSC 25-03.

Dombrow, C., E. Rollins, J. Sweeney, and J. Hospital. 2022. Hawai’i Pelagic Fisheries Market Analysis. . NOAA-TM-NMFS-PIFSC-127.

Domokos, R. 2022. Seamount Effects on Micronekton at a Subtropical Central Pacific Seamount. Deep Sea Research Part I: Oceanographic Research Papers 186(103829).

Drazen, J. C., V. Moriwake, D. Sackett, and C. Demarke. 2014. Evaluating the effectiveness of restricted fishing areas for improving the bottomfish fishery in the Main Hawaiian Islands. State of Hawaii, Department of Land and Natural Resources, Division of Aquatic Resources, Honolulu.

Fabry, V. J., B. A. Seibel, R. A. Feely, and J. C. Orr. 2008. Impacts of ocean acidification on marine fauna and ecosystem processes. ICES Journal of Marine Science 65(3):414–432.

Farley, J., P. Eveson, K. Krusic-Golub, C. Sanchez, F. Roupsard, S. McKechnie, S. Nicol, B. Leroy, N. Smith, and S. K. Chang. 2018. Project 35: Age, growth and maturity of bigeye tuna in the western and central Pacific Ocean. Page WCPFC-SC13-2017/SA-WP-01. WCPFC-SC13-2017/SA-WP-01, Rarotonga, Cook Islands.

Feely, R. A., S. R. Alin, B. Carter, N. Bednarsek, B. Hales, F. Chan, T. M. Hill, B. Gaylord, E. Sanford, R. H. Byrne, C. L. Sabine, D. Greeley, and L. Juranek. 2016. Chemical and

biological impacts of ocean acidification along the west coast of North America. Estuarine, Coastal and Shelf Science 183:260–270.
Fisk, J., N. Matagi, and D. Kleiber. 2023. Gleaning the expanse: Gender and invisibilised dimensions of fisheries in American Samoa. Women in Fisheries Information Bulletin 37:7–10.
Geslani, C., M. Loke, B. Takenaka, and P. S. Leung. 2012. Hawaii′s seafood consumption and its supply sources. . SOEST Publication 12-01, JIMAR Contribution 12-0379.
Gilman, E., and A. Ishizaki. 2018. Report of the Workshop to Review Seabird Bycatch Mitigation Measures for Hawaii's Pelagic Longline Fisheries. Honolulu, Hawaii.
Gilman, E., D. Kobayashi, T. Swenarton, N. Brothers, P. Dalzell, and I. Kinan-Kelly. 2007. Reducing sea turtle interactions in the Hawaii-based longline swordfish fishery. Biological Conservation 139(1):19–28.
Gilman, E., H. A. Naholowaa, A. Ishizaki, M. Chaloupka, C. Brady, M. Carnes, S. Ellgen, J. Wang, and E. Kingma. 2021. Practicality and Efficacy of Tori Lines to Mitigate Albatross Interactions in the Hawaii Deep-set Longline Fishery. Honolulu, Hawaii.
Glazier, E. W. 1999. Social aspects of Hawaii's small vessel troll fishery. Phase II of the Social Aspects of Pacific Pelagic Fisheries Program. Univ. Hawaii.
Gough, A. 2016. Rapid assessment of foreign crew on Hawaii longline vessels: Assessing vulnerabilities of foreign crew to forced labor and human trafficking. Prepared for the Hawaii Longline Association.
Grace-McCaskey, C. A. 2014. Examining the potential of using secondary data to better understand human-reef relationships across the Pacific. . H-14-01.
Grace-McCaskey, C. A. 2015. American Samoa Fishing Community Profile: 2013 Update. . H-15-04.
Hamilton, M. S., and S. W. Huffman. 1997. Cost-earnings study of Hawaii's small boat fishery. SOEST Publication 97-06, JIMAR Contribution 97-314.
Hinton, M. G., and M. N. Maunder. 2011. Status and trends of striped marlin in the Northeast Pacific Ocean in 2009. La Jolla, California.
Hospital, J., and C. Beavers. 2012. Economic and social characteristics of Guam's small boat fisheries. Page Pacific Islands Fisheries Science Center, PIFSC Administrative Report. H-12-06.
Hospital, J., and C. Beavers. 2014. Economic and Social Characteristics of Small Boat Fishing in the Commonwealth of the Northern Mariana Islands. Page Pacific Islands Fisheries Science Center, PIFSC Administrative Report. H-14-02.
Hospital, J., S. S. Bruce, and M. Pan. 2011. Economic and social characteristics of the Hawaii small boat pelagic fishery. H-11-01.
Hospital, J., and K. Leong. 2021. Community Participation in Hawai'i Commercial Fisheries. NOAA-TM-NMFS-PIFSC-119.
HOT. 2025. Hawaii Ocean Time Series Data Organization & Graphical System (HOT-DOGS). https://hahana.soest.hawaii.edu/hot/hot-dogs/bseries.html.
Howell, E. A., D. R. Hawn, and J. J. Polovina. 2010. Spatiotemporal variability in bigeye tuna (Thunnus obesus) dive behavior in the central North Pacific Ocean. Progress in Oceanography 86:81–93.
Howell, E. A., D. R. Kobayashi, D. M. Parker, G. H. Balazs, and J. J. Polovina. 2008. TurtleWatch: a tool to aid in the bycatch reduction of loggerhead turtles Caretta caretta in the Hawaii-based pelagic longline fishery. Endangered Species Research 5(2–3):267–278.

Hutchinson, M., Z. Siders, J. Stahl, and K. Bigelow. 2021. Quantitative estimates of post-release survival rates of sharks captured in Pacific tuna longline fisheries reveal handling and discard practices that improve survivorship. Page PIFSC Data Report. DR-21-001.

Hyrenbach, K., A. Ishizaki, J. Polovina, and S. Ellgen. 2021. The factors influencing albatross interactions in the Hawaii longline fishery: towards identifying drivers and quantifying impacts: Report of a workshop in Honolulu, Hawaii, 7-9 November. Page 2017. U. S. Dept. of Commerce, NOAA Technical Memorandum. NOAA-TM-NMFS-PIFSC122.

IATTC. 2022. Status of the tuna and billfish stocks in 2021. Page Inter-American Tropical Tuna Commission. Stock Assessment Report.

ISC. 2021. Stock Assessment Report for Pacific Blue Marline (Makaira nigricans) through 2019. ISC/21/ANNEX/10, Virtual.

ISC. 2022a. Report of the Bluefin Tuna Working Group Intersessional Workshop. ISC/22/ANNEX/06, Kona, Hawaii.

ISC. 2022b. Stock assessment and future projections of blue sharks in the North Pacific Ocean through 2020. ISC/22/ANNEX/12, Kona, Hawaii.

Iwane, M., E. Cruz, and M. Sabater. 2023. 2023 Guam Bottomfish Management Unit Species Data Workshops. Page U. S. Dept. of Commerce, NOAA Administrative Report. H-23-07.

Iwane, M., and A. Levine. 2023. 2009-2010 CNMI Elder Fisher Perceptions of nearshore marine resource use, change, and management. Page DR-23-20. DR-23-20.

Jepson, M., and L. Colburn. 2013. Development of Social Indicators of Fishing Community Vulnerability and Resilience in the U.S. Southeast and Northeast Regions. NMFS-F/SPO-129.

Kahaulelio, D. A. 2006. Hawaii Fishing Traditions. Bishop Museum Press, University of Chicago.

Kalberg, K. O., and M. Pan. 2016. 2012 Economic cost earnings of pelagic longline fishing in Hawaii. Page U. S. Dep. Commer., NOAA Tech. Memo., NOAAPPENDIX. NOAAPPENDIX ATM-NMFS-PIFSC-56.

Kapur, M., J. Brodziak, E. Fletcher, and A. Yau. 2017. Summary of life history and stock status for Pacific blue marlin, western and central North Pacific Ocean striped marlin, and North Pacific swordfish. Page ISC17-BILLWG1-WP2. ISC17-BILLWG1-WP2.

Karl, D. M., and R. Lukas. 1996. The Hawaii Ocean Time-series program: Background, rationale and field implementation. Deep-Sea Research Part II: Topical Studies in Oceanography 43:129–156.

Keeling, C. D., R. B. Bacastow, A. E. Bainbridge, C. A. Ekdahl, P. R. Guenther, and L. S. Waterman. 1976. Atmospheric carbon dioxide variations at Mauna Loa Observatory, Hawaii. Tellus 28:538–551.

Kilarski, S., D. Klaus, J. Lipscomb, K. Matsoukas, R. Newton, and A. Nugent. 2006. Decision support for coral reef fisheries management: community input as a means of informing policy in American Samoa – Project Plan for American Samoa's Department of Marine and Wildlife Resources. Santa Barbara.

Kleiber, D., M. Iwane, K. Kamikawa, K. Leong, and J. Hospital. 2022. Pacific Islands Region Fisheries and COVID-19: Impacts and adaptations. NOAA-TM-NMFS-PIFSC-130.

Kleiber, D., D. Kotowicz, and J. Hospital. 2018. Applying national community social vulnerability indicators to fishing communities in the Pacific Island region. Page U. S. Dep. of Commer., NOAA Tech. Memo. NOAA-TM-NMFS-PIFSC-65.

Kleiber, D., and K. Leong. 2018. Cultural fishing in American Samoa. H-18-03.

Knapp, K. R., H. J. Diamond, J. P. Kossin, M. C. Kruk, and C. J. Schreck. 2018. International Best Track Archive for Climate Stewardship (IBTrACS) Project, Version 4.

Knapp, K. R., M. C. Kruk, D. H. Levinson, H. J. Diamond, and C. J. Neumann. 2010. The International Best Track Archive for Climate Stewardship (IBTrACS): Unifying tropical cyclone best track data. Bulletin of the American Meteorological Society 91:363–376.

Kotowicz, D. M., and S. D. Allen. 2015. Results of a survey of CNMI and Guam residents on the Marianas Trench Marine National Monument. Page Pacific Islands Fisheries Science Center, PIFSC Data Report. DR-13-009.

Kotowicz, D. M., and L. Richmond. 2013. Traditional Fishing Patterns in the Marianas Trench Marine National Monument. Page Pacific Islands Fisheries Science Center, PIFSC Administrative Report. H-13-05.

Kotowicz, D. M., L. Richmond, and J. Hospital. 2017. Exploring public knowledge, attitudes, and perceptions of the Marianas Trench Marine National Monument. Coastal Management 45(6):452–469.

Langley, A., H. Okamoto, P. Williams, N. Miyabe, and K. Bigelow. 2006. A summary of the data available for the estimation of conversion factors (processed to whole fish weights) for yellowfin and bigeye tuna. Page 2nd Regular Session of the WCPFC. WCPFC-SC2-2006/ME IP-3, Manila, Philippines.

Lehodey, P., I. Senina, B. Calmettes, J. Hampton, and S. Nicol. 2013. Modelling the impact of climate change on Pacific skipjack tuna population and fisheries. Climatic Change 119:95–109.

Lehodey, P., I. Senina, J. Sibert, L. Bopp, B. Calmettes, J. Hampton, and R. Murtugudde. 2010. Preliminary forecasts of Pacific bigeye tuna population trends under the A2 IPCC scenario. Progress in Oceanography 86:302–315.

Leong, K. M., R. J. Ingram, D. Kleiber, S. H. Long, A. Mastitski, K. Norman, C. Weng, and S. Wise. 2024. Aligning fisheries terminology with diverse social benefits. Marine Policy 170:106377.

Levine, A., and S. D. Allen. 2009. American Samoa as a fishing community. Page U. S. Dep. Commer., NOAA Tech. Memo., NOAAPPENDIX. NOAAPPENDIX ATM-NMFS-PIFSC-19.

Levine, A. S., M. K. Dillard, J. Loerzel, and P. E. T. Edwards. 2016. National Coral Reef Monitoring Program Socioeconomic Monitoring Component. Summary Findings for American Samoa, 2014. . CRCP 24.

Di Lorenzo, E., N. Schneider, K. M. Cobb, P. J. S. Franks, K. Chhak, A. J. Miller, J. C. McWilliams, S. J. Bograd, H. Arango, E. Curchitser, T. M. Powell, and P. Rivière. 2008. North Pacific Gyre Oscillation links ocean climate and ecosystem change. Geophysical Research Letters 35(8).

Lynham, J., A. Nikolaev, J. Raynor, T. Vilela, and J. C. Villaseñor-Derbez. 2020. Impact of two of the world's largest protected areas on longline fishery catch rates. Nature Communications 11.–9:1.

Ma, H., and T. K. Ogawa. 2016. Hawaii Marine Recreational Fishing Survey: A Summary of Current Sampling, Estimation, and Data Analyses. NOAAPPENDIX ATMNMFS-PIFSC-55.

Madge, L., J. Hospital, and E. T. Williams. 2016. Attitudes and Preferences of Hawaii Non-commercial Fishers: Report from the 2015 Hawaii Saltwater Angler Survey. U. S. Dep. Commer., NOAA Tech. Memo., NOAAPPENDIX ATM-NMFS-PIFSC-58.

Mantua, N. J., S. R. Hare, Y. Zhang, J. M. Wallace, and R. C. R. C. Francis. 1997. A Pacific Interdecadal Climate Oscillation with Impacts on Salmon Production. Bulletin of the American Meteorological Society 78:1069–1079.

Markrich, M., and C. Hawkins. 2016. Fishing Fleets and Fishery Profiles: Management – Vessels – Gear – Economics. Page Pacific Islands Fishery Monographs No. 5. Western Pacific Regional Fishery Management Council, Honolulu.

Maunder, M. N. 2018. Updated indicators of stock status for skipjack tuna in the eastern Pacific Ocean. Page SAC-09-07. SAC-09-07, La Jolla, California.

McCracken, M. . 2022. Assessment of Incidental Interactions with Marine Mammals in the American Samoa Permitted Longline Fishery from 2017 through 2021. . DR-22-031.

McCracken, M., and B. Cooper. 2024. Estimation of bycatch with bony fish, sharks, and rays in the 2023 Hawai‘i permitted deep-set longline fishery. . DR-24-11.

McCracken, M. L. 2005. Estimation of Year 2004 Incidental Takes of Sea Turtles, Seabirds, and Marine Mammals in the Hawaii Longline Deep Set Fishery. Page 3. IR-05-001.

McCracken, M. L. 2006. Estimation of Incidental Interactions with Sea Turtles, Seabirds, and Marine Mammals in the 2005 Hawaii Longline Deep Set Fishery. Page 3. IR-06-006.

McCracken, M. L. 2007. Estimation of Incidental Interactions with Sea Turtles, Seabirds, and Marine Mammals in the 2006 Hawaii Longline Deep Set Fishery. Page 4. IR-07-006.

McCracken, M. L. 2008. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2007 Hawaii Longline Deep Set Fishery. Page 3. IR-08-007.

McCracken, M. L. 2009. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2008 Hawaii Longline Deep Set Fishery. Page 4. IR-09-011.

McCracken, M. L. 2010. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2009 Hawaii Longline Deep Set Fishery. Page 3. IR-10-009.

McCracken, M. L. 2011a. Assessment of incidental interactions with marine mammals in the Hawaii longline deep and shallow set fisheries from 2006 through 2010. WP-11-012.

McCracken, M. L. 2011b. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2010 Hawaii Deep-set Longline Fishery. Page 3. IR-11-005.

McCracken, M. L. 2012. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2011 Hawaii Deep-set Longline Fishery. Page 3. IR-12-012.

McCracken, M. L. 2013. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2012 Hawaii Deep-set Longline Fishery. Page 6. IR-13-014.

McCracken, M. L. 2014. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2013 Hawaii Deep-set Longline Fishery. Page 4. IR-14-022.

McCracken, M. L. 2015. American Samoa Longline Fishery Protected Species Takes and Cetaceans Takes Resulting in a Classification of Dead or Serious Injury for Years 2010 through 2013. Page PIFSC Internal Report. IR-15-10.

McCracken, M. L. 2016. Assessment of Incidental Interactions with Marine Mammals in the Hawaii Longline Deep and Shallow-set Fisheries from 2010 through 2014. Page 2. IR-16-008.

McCracken, M. L. 2017a. Assessment of Incidental Interactions with Marine Mammals in the Hawaii Longline Deep and Shallow Set Fisheries from 2011 through 2015. Page 2. IR-17-003.

McCracken, M. L. 2017b. Estimation of Bycatch with Sea Turtles, Seabirds, and Fish in the 2014 and 2015 Hawaii Permitted Deep-Set Longline Fishery. Page 14. IR-17-010.

McCracken, M. L. 2017c. Estimation of Bycatch with Sea Turtles, Seabirds, and Fish in the 2016

Hawaii Permitted Deep-Set Longline Fishery. Page 17. DR-17-015.
McCracken, M. L. 2017d. American Samoa Longline Fishery Marine Mammal, Seabirds, Sea Turtles, and Fish Bycatch for Years 2014 and 2015. Page 16. DR-17-027.
McCracken, M. L. 2018. Hawaii Permitted Shallow-set Longline Fishery Estimated Anticipated Take Level for Endangered Species Act Listed Species. Page PIFSC Data Report. DR-18-014.
McCracken, M. L. 2019a. Hawaii Longline Fishery Seabird and Sea Turtle Bycatch for the Entire Fishing Grounds and Within the IATTC Convention Area. Page 6. DR-19-027.
McCracken, M. L. 2019b. Assessment of Incidental Interactions with Marine Mammals in the Hawaii Longline Deep and Shallow Set Fisheries from 2014 through 2018. Page 1. DR-19-031.
McCracken, M. L. 2020. Assessment of Incidental Interactions with Marine Mammals in the American Samoa Permitted Longline Fishery from 2015 through 2019. Page 1. DR-20-022.
McCracken, M. L. 2023. Estimation of Bycatch with Seabirds, Sea Turtles, Bony Fish, Sharks, and Rays in the 2022 Permitted American Samoa Longline Fishery. Page 1. DR-23-06.
McCracken, M. L., and B. Cooper. 2020. Estimation of Bycatch with Bony Fish, Sharks, and Rays in the 2017, 2018, and 2019 Hawaii Permitted Deep-Set Longline Fishery. Page 1. DR-20-020.
McCracken, M. L., and B. Cooper. 2021. Estimation of Bycatch with Bony Fish, Sharks, and Rays in the 2020 Hawaii Permitted Deep-set Longline Fishery. Page 4. DR-21-11.
McCracken, M. L., and B. Cooper. 2022a. Estimation of Bycatch with Seabirds, Sea Turtles, Bony Fish, Sharks, and Rays in the 2020 Permitted American Samoa Longline Fishery. Page 2. DR-22-001.
McCracken, M. L., and B. Cooper. 2022b. Assessment of Incidental Interactions with Marine Mammals in the American Samoa Permitted Longline Fishery from 2016 through 2020. Page 2. DR-22-016.
McCracken, M. L., and B. Cooper. 2022c. Estimation of Bycatch with Bony Fish, Sharks, and Rays in the 2021 Hawaii Permitted Deep-set Longline Fishery. Page 1p. DR-22-025.
McCracken, M. L., and B. Cooper. 2022d. Estimation of Bycatch with Seabirds, Sea Turtles, Bony Fish, Sharks, and Rays in the 2021 Permitted American Samoa Longline Fishery. Page 1p. DR-22-028.
McCracken, M. L., and B. Cooper. 2022e. Hawaii Longline Fishery 2021 Seabird and Sea Turtle Bycatch for the Entire Fishing Grounds, Within the IATTC Convention Area, and Seabird Bycatch to the north of 23°N and 23°N–30°S. Page 4p. DR-22-029.
Minte-Vera, C., A. Aires-Da-Silva, and M. Maunder. 2018. Status of yellowfin tuna in the eastern Pacific Ocean in 2017 and outlook for the future. Page SAC-09-06. SAC-09-06, La Jolla, California.
Minton, D. 2017. Non-fishing effects that may adversely affect essential fish habitat in the Pacific Islands region, Final Report. Contract AB-133F-15-CQ-0014.
NCRMP. 2016a. Guam Infographic: Connections between Coral Reefs and Communities. National Coral Reef Monitoring Program.
NCRMP. 2016b. Socioeconomic Monitoring for Hawaii. Page Updated.
Newman, M., M. A. Alexander, T. R. Ault, K. M. Cobb, C. Deser, E. Di Lorenzo, N. J. Mantua, A. J. Miller, S. Minobe, H. Nakamura, N. Schneider, D. J. Vimont, A. S. Phillips, J. D. Scott, and C. A. Smith. 2016. The Pacific Decadal Oscillation, Revisited. Journal of Climate 29(12):4399–4427.

NMFS. 2009. Biological Opinion: Continued Authorization of Pelagic Troll and Handline Fisheries of the Western Pacific Region. Page as Managed under the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region.
NMFS. 2012. Biological Opinion: Continued operation of the Hawaii-based Shallow-set Longline Swordfish Fishery – under Amendment 18 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region (modified May 29, 2012 for technical corrections). Page Protected Resources Division.
NMFS. 2016. Annual Report on Seabird Interactions and Mitigation Efforts in the Hawaii Longline Fisheries for 2014. NMFS Pacific Islands Regional Office. Page Honolulu, HI. January. Honolulu, HI.
NMFS. 2019. Biological Opinion: Continued Authorization of the Hawaii Pelagic Shallow-set Longline Fishery. Page Protected Resources Division.
NMFS. 2021a. Fisheries Economics of the United States, 2017. Page 2017. U. S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-219.
NMFS. 2021b. Fisheries Economics of the United States, 2018. NMFS-F/SPO-225.
NMFS. 2022. Fisheries Economics of the United States, 2019. Page 2019. U. S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-229.
NMFS. 2023. Fisheries Economics of the United States 2020. NMFS-F/SPO-236.
NMFS. 2024. Endangered Species Act Recovery Status Review for the Ocenaic Whitetip Shark (Carcharhinus longimanus).
NOAA. 2017. Pacific Island Pelagic Fisheries; Exemption for Large U. S. Longline Vessels To Fish in Portions of the American Samoa Large Vessel Prohibited Area; Court Order; Final Rule. 50 CFR Part 665. Federal Register 82(181):43908–43909.
NOAA. 2025a. Trends in Atmospheric Carbon Dioxide. https://gml.noaa.gov/ccgg/trends/data.html.
NOAA. 2025b. Pacific Decadal Oscillation. https://psl.noaa.gov/pdo/.
NOAA. 2025c. NOAA's International Best Track Archive for Climate Stewardship (IBTrACS) data. . https://www.ncei.noaa.gov/data/international-best-track-archive-for-climate-stewardship-ibtracs/v04r00/access/csv/.
NOAA. 2025d. NCEP Global Ocean Data Assimilation System (GODAS).
NOAA Climate Prediction Center (CPC). 2025. Oceanic Niño Index. https://www.cpc.ncep.noaa.gov/data/indices/oni.ascii.txt.
NOAA OceanWatch. 2025a. Sea Surface Temperature, Coral Reef Watch, CoralTemp, v3.1 - Monthly, 1985-present. . https://oceanwatch.pifsc.noaa.gov/erddap/griddap/CRW_sst_v3_1_monthly.html.
NOAA OceanWatch. 2025b. Chlorophyll a concentration, ESA OC CCI - Monthly, 1997-2023 v6.0. https://oceanwatch.pifsc.noaa.gov/erddap/griddap/esa-cci-chla-monthly-v6-0.html.
NOAA OceanWatch. 2025c. EXPERIMENTAL-Median Phytoplankton Size, North Pacific. Monthly, 1998-present. https://oceanwatch.pifsc.noaa.gov/erddap/griddap/md50_exp.
O'Malley, J. M., and S. G. Pooley. 2002. Economic and operational characteristics of the Hawaii-based longline fleet in 2000. SOEST Publication 03-01, JIMAR Contribution 03-348, Honolulu, HI.
Pacific Islands Report. 2016. American Samoa Cannery to Scale Back Operations Due To Fish Shortages.
Pacific Islands Report. 2017. Tri Marine Has "No Plans" To Reopen Tuna Cannery In American Samoa.

Pan, M. 2014. Economic characteristics and management challenges of the Hawaii pelagic longline fisheries: Will a catch share program help? Marine Policy 44:18–26.
Pan, M. 2015. Economic performance and status of American Samoa longline fishery, 2014. Page 2014. Pacific Islands Fisheries Science Center, PIFSC Internal Report. IR-15-015.
Pan, M. 2018. Tracking changes on fisheries economic performance – continuous economic data collection programs for the Hawaii and American Samoa longline fisheries 2005-2016. Page U. S. Dep. Commer., NOAA Tech. Memo. NMFS-PIFSC-73.
Pan, M. 2019. Cost-earnings study and economic performance analysis of the American Samoa longline pelagic fishery - 2016 operation and recent trends. Page U. S. Dep. Commer., NOAA Tech. Memo. NMFS-PIFSC-85.
Pan, M., S. Arita, and K. Bigelow. 2017. Cost-earnings study of the American Samoa longline fishery based on vessel operations in 2009 and recent trend of economic performance. Page Pacific Islands Fisheries Science Center, PIFSC Administrative Report. H-17-01.
PIFSC. 2025a. Hawaii Longline Logbook. https://www.fisheries.noaa.gov/inport/item/2721.
PIFSC. 2025b. UFA Auction Sampling Data. https://www.fisheries.noaa.gov/ inport/item/6349.
Poblete, J. 2020. Balancing the Tides: Marine Practices in American Sāmoa. University of Hawai'i Press.
Polovina, J. J., E. A. Howell, D. R. Kobayashi, and M. E. Seki. 2001. The transition zone chlorophyll front, a dynamic global feature defining migration and forage habitat for marine resources. Progress in Oceanography 49:469–483.
Raynor, J. 2018. Measuring the Net Economic Benefits of a Large Circle Hook Policy in American Samoa. Page PIFSC Internal Report. IR-18-017.
Richmond, L., D. Kotowicz, and J. Hospital. 2015. Monitoring socioeconomic impacts of Hawai'i's 2010 bigeye tuna closure: Complexities of local management in a global fishery. Ocean and Coastal Management 106:87–96.
Richmond, L., and D. M. Kotowicz. 2015. Equity and access in marine protected areas: The history and future of "traditional indigenous fishing" in the Marianas Trench Marine National Monument. Applied Geography 59:117–124.
Richmond, L., and A. Levine. 2012a. Institutional analysis of community-based marine resource management initiatives in Hawaii and American Samoa. NOAAPPENDIX ATM-NMFS-PIFSC-35.
Richmond, L., and A. Levine. 2012b. Institutional analysis of community-based marine resource management initiatives in Hawai'i and American Samoa. NMFS-PIFSC-35, Honolulu.
Ryder, C. E., T. A. Conant, and B. A. Schroeder. 2006. Report of the Workshop on Marine Turtle Longline Post-Interaction Mortality. Page U. S. Dep. Commer., NOAA Tech. Memo. NMFS-F/OPR-29.
Samoa News Staff. 2023. StarKist employees submit petition and comments opposing PIRA expansion | American Samoa | Samoa News. https://www.samoanews.com/local-news/starkist-employees-submit-petition-and-comments-opposing-pira-expansion.
Sathyendranath et al. 2018, July 4. ESA Ocean Colour Climate Change Initiative (Ocean_Colour_cci): Version 3.1 Data. http://www.esa-oceancolour-cci.org/.
Scott, M., E. Cardona, K. Scidmore-Rossing, M. Royer, J. Stahl, and M. Hutchinson. 2022. What's the catch? Examining optimal longline fishing gear configurations to minimize negative impacts on non-target species. Marine Policy 143(105186).
Shields, M., P. Duffy, W. Musial, M. Laurienti, D. Heimiller, R. Spencer, and M. Optis. 2021. The Cost and Feasibility of Floating Offshore Wind Energy in the O`ahu Region. . National

Renewable Energy Laboratory, Golden, CO.
Siders, Z. A., R. N. Ahrens, S. Martin, E. V Camp, A. R. Gaos, J. H. Wang, J. Marchetti, and T. T. Jones. 2023. Evaluation of a long-term information tool reveals continued suitability for identifying bycatch hotspots but little effect on fisher location choice. Biological Conservation 279:109912.
Siders, Z., N. Ducharme-Barth, F. Carvalho, D. Kobayashi, S. Martin, J. Raynor, T. Jones, and R. Ahrens. 2020. Ensemble Random Forests as a Tool for Modeling Rare Occurrences. Endangered Species Research 43(October):183–97.
Smith, S. L., S. Cook, A. Golden, M. A. Iwane, D. Kleiber, K. M. Leong, A. Mastitski, L. Richmond, M. Szymkowiak, and S. Wise. 2022. Review of adaptations of U. S. Commercial Fisheries in response to the COVID-19 pandemic using the Resist-Accept-Direct (RAD) framework. Fisheries Management and Ecology 29:439–455.
SPC. 2022. Western and Central Pacific Fisheries Commission Tuna Fishery Yearbook 2021. Noumea, Noumea, New Caledonia.
Stawitz, C., and B. Li. 2025. nmfspalette: A Color Palette for NOAA Fisheries. R package.
Suca, J., J. Wren, G. Mukai, D. Kobayashi, K. Tanaka, A. Schmidt, J. Whitney, and R. Rykaczewski. 2025. The Role of Wind on the Simulated Dispersal and Recruitment of a Commercially Important Hawai‘i Bottomfish.
Swimmer, Y., A. Gutierrez, K. Bigelow, C. Barceló, B. Schroeder, K. Keene, K. Shattenkirk, and D. G. Foster. 2017. Sea Turtle Bycatch Mitigation in US Longline Fisheries. Frontiers in Marine Science 4:260.
Syslo, J., J. Brodziak, and F. Carvalho. 2021. Stock assessment update for the main Hawaiian Islands deep 7 bottomfish complex in 2021, with catch projections through 2025. NMFS-PIFSC-118.
Teo, S. L. H., E. G. Garcia Rodriguez, and O. Sosa-Nishizaki. 2018. Status of Common Thresher Sharks, Alopias vulpinus, Along the West Coast of North America: Updated Stock Assessment Based on Alternative Life History. Page U. S. Dep. Commer., NOAA Tech. Memo. NMFS-SWFSC-595.
Thoning, K. W., P. P. Tans, and W. D. Komhyr. 1989. Atmospheric carbon dioxide at Mauna Loa Observatory 2. Analysis of the NOAA GMCC data 1974-1985. Journal of Geophysical Research 94:8549–8565.
Tremblay-Boyer, L., F. Carvalho, P. Neubauer, and G. Pilling. 2019. Stock assessment for oceanic whitetip shark in the Western and Central Pacific Ocean. WCPFC-SC15-2019/SA-WP-06, Pohnpei, Federated States of Micronesia.
Tulafono, R. 2001. Gamefishing and tournaments in American Samoa. Page Proceedings of the 1998 Pacific Island Gamefish Symposium: Facing the Challenges of Resource Conservation, Sustainable Development, and the Sportfishing Ethic. Western Pacific Regional Fishery Management Council, Kailua-Kona, Hawaii.
USFWS. 2012. Biological Opinion of the U. S. Fish and Wildlife Service for the Operation of Hawaii-based Pelagic Longline Fisheries, Shallow Set and Deep Set, Hawaii. Page Hawaii. United States Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office. 2011-F-0436.
Woodworth-Jefcoats, P., and J. Wren. 2020. Toward an environmental predictor of tuna recruitment. Fish Oceanogr 29(5):436–441.
World Factbook. (n.d.). American Samoa Factsheet - The World Factbook. https://www.cia.gov/the-world-factbook/countries/american-samoa/factsheets/.

WPRFMC. 2009a. Fishery Ecosystem Plan for Pacific Pelagic Fisheries. Western Pacific Regional Fishery Management Council, Honolulu.
WPRFMC. 2009b. Fishery Ecosystem Plan for the American Samoan Archipelago. Western Pacific Regional Fishery Management Council, Honolulu.
WPRFMC. 2009c. Fishery Ecosystem Plan for the Mariana Archipelago. Western Pacific Regional Fishery Management Council, Honolulu.
WPRFMC. 2009d. Fishery Ecosystem Plan for the Hawaii Archipelago. Western Pacific Regional Fishery Management Council, Honolulu.
WPRFMC, and NMFS. 2023. Modification of Seabird Interaction Mitigation Measures in the Hawaii Deep-set Longline Fishery; Regulatory Amendment under the Fishery Ecosystem Plan for the Pelagic Fisheries of the Western Pacific Region.
Wren, J. L. K., S. A. Shaffer, and J. J. Polovina. 2019. Variations in black-footed albatross sightings in a North Pacific transitional area due to changes in fleet dynamics and oceanography 2006–2017. Deep Sea Res. Part 2 Top. Stud. Oceanogr:169–170.
Zeebe, R. E., and D. A. Wolf-Gladrow. 2001. CO2 in Seawater Systems: Equilibrium, Kinetics, Isotopes. https://www.soest.hawaii.edu/oceanography/ faculty/zeebe_files/CO2_System_in_Seawater/csys.html.

# APPENDIX A: SUPPORTING DATA TABLES FOR FIGURES IN CHAPTER 2 AND SECTION 3.1

**Table** **Page**

Table A-1. Summary of creel survey boat-based sampling effort ..... A-4
Table A-2. Supporting Data for Figure 2 ..... A-4
Table A-3. Supporting Data for Figure 3 ..... A-5
Table A-4. Supporting Data for Figure 4 ..... A-5
Table A-5. Supporting Data for Figure 5 ..... A-6
Table A-6. Supporting Data for Figure 6 ..... A-6
Table A-7. Supporting Data for Figure 7 ..... A-7
Table A-8. Supporting Data for Figure 8 ..... A-7
Table A-9. Supporting Data for Figure 9 ..... A-8
Table A-10. Supporting Data for Figure 10 ..... A-8
Table A-11. Supporting Data for Figure 11 ..... A-9
Table A-12. Supporting Data for Figure 13 ..... A-9
Table A-13. Supporting Data for Figure 14 ..... A-10
Table A-14. Supporting Data for Figure 15 ..... A-10
Table A-15. Supporting Data for Figure 16 ..... A-11
Table A-16. Supporting Data for Figure 17 ..... A-11
Table A-17. Supporting Data for Figure 18 ..... A-12
Table A-18. Supporting Data for Figure 19 ..... A-12
Table A-19. Supporting Data for Figure 20 ..... A-13
Table A-20. Supporting Data for Figure 21 ..... A-13
Table A-21. Boat-Based Survey Statistics (raw data), CNMI ..... A-14
Table A-22. Supporting Data for Figure 22 ..... A-14
Table A-23. Supporting Data for Figure 23 ..... A-15
Table A-24. Supporting Data for Figure 24 ..... A-15
Table A-25. Supporting Data for Figure 25 ..... A-16
Table A-26. Supporting Data for Figure 26 ..... A-16
Table A-27. Supporting Data for Figure 27 ..... A-17
Table A-28. Supporting Data for Figure 28 ..... A-17
Table A-29. Supporting Data for Figure 29 ..... A-18
Table A-30. Supporting Data for Figure 30 ..... A-18
Table A-31. Supporting Data for Figure 31 ..... A-19
Table A-32. Supporting Data for Figure 32 ..... A-19
Table A-33. Supporting Data for Figure 33 ..... A-20
Table A-34. Supporting Data for Figure 34 ..... A-20
Table A-35. Supporting Data for Figure 35 ..... A-21
Table A-36. Supporting Data for Figure 36 ..... A-21
Table A-37. Supporting Data for Figure 37 ..... A-22
Table A-38. Supporting Data for Figure 38 ..... A-22
Table A-39. Supporting Data for Figure 39 ..... A-23
Table A-40. Supporting Data for Figure 40 ..... A-23
Table A-41. Supporting Data for Figure 41 ..... A-24
Table A-42. Supporting Data for Figure 42 ..... A-24

Table A-43. Supporting Data for Figure 43 ..... A-25
Table A-44. Supporting Data for Figure 44 ..... A-25
Table A-45. Supporting Data for Figure 45 ..... A-26
Table A-46. Supporting Data for Figure 46 ..... A-26
Table A-47. Numbers of Trips and Interviews for Creel Trolling Method, Guam ..... A-27
Table A-48. Supporting Data for Figure 47 ..... A-27
Table A-49. Supporting Data for Figure 48 ..... A-28
Table A-50. Supporting Data for Figure 49 ..... A-28
Table A-51. Supporting Data for Figure 50 ..... A-29
Table A-52. Supporting Data for Figure 51 ..... A-29
Table A-53. Supporting Data for Figure 52 ..... A-30
Table A-54. Supporting Data for Figure 53 ..... A-30
Table A-55. Supporting Data for Figure 54 ..... A-31
Table A-56. Supporting Data for Figure 55 ..... A-31
Table A-57. Supporting Data for Figure 56 ..... A-32
Table A-58. Supporting Data for Figure 57 ..... A-32
Table A-59. Supporting Data for Figure 58 ..... A-33
Table A-60. Supporting Data for Figure 59 ..... A-33
Table A-61. Supporting Data for Figure 60 ..... A-34
Table A-62. Supporting Data for Figure 61 ..... A-34
Table A-63. Supporting Data for Figure 62 ..... A-35
Table A-64. Supporting Data for Figure 63 ..... A-35
Table A-65. Supporting Data for Figure 64 ..... A-36
Table A-66. Supporting Data for Figure 65 ..... A-36
Table A-67. Supporting Data for Figure 66 ..... A-37
Table A-68. Supporting Data for Figure 67 ..... A-38
Table A-69. Supporting Data for Figure 68 ..... A-38
Table A-70. Supporting Data for Figure 69 ..... A-39
Table A-71. Supporting Data for Figure 70 ..... A-39
Table A-72. Supporting Data for Figure 71 ..... A-40
Table A-73. Supporting Data for Figure 72 ..... A-40
Table A-74. Supporting Data for Figure 73 ..... A-41
Table A-75. Supporting Data for Figure 74 ..... A-41
Table A-76. Supporting Data for Figure 75 ..... A-42
Table A-77. Supporting Data for Figure 76 ..... A-42
Table A-78. Supporting Data for Figure 77 ..... A-43
Table A-79. Supporting Data for Figure 78 ..... A-43
Table A-80. Supporting Data for Figure 79 ..... A-44
Table A-81. Supporting Data for Figure 80 ..... A-44
Table A-82. Supporting Data for Figure 81 ..... A-45
Table A-83. Supporting Data for Figure 82 ..... A-45
Table A-84. Supporting Data for Figure 83 ..... A-46
Table A-85. Supporting Data for Figure 84 ..... A-46
Table A-86. Supporting Data for Figure 85 ..... A-47
Table A-87. Supporting Data for Figure 86 ..... A-47
Table A-88. Supporting Data for Figure 87 ..... A-48

Table A-89. Supporting Data for Figure 88 ..... A-48
Table A-90. Supporting Data for Figure 89 ..... A-49
A-Table A-91. Supporting Data for Figure 90 ..... A-49
Table A-92. Supporting Data for Figure 91 ..... A-50
Table A-93. Supporting Data for Figure 92 ..... A-50
Table A-94. Supporting Data for Figure 93 ..... A-51
Table A-95. Supporting Data for Figure 94 ..... A-51
Table A-96. Supporting Data for Figure 95 ..... A-52
Table A-97. Supporting Data for Figure 96 ..... A-52
Table A-98. Supporting Data for Figure 97 ..... A-53
Table A-99. Supporting Data for Figure 98 ..... A-53
Table A-100. Supporting Data for Figure 99 ..... A-54
Table A-101. Supporting Data for Figure 100 ..... A-54
Table A-102. Supporting Data for Figure 101 ..... A-55
Table A-103. Supporting Data for Figure 102 ..... A-55
Table A-104. Supporting Data for Figure 103 ..... A-56
Table A-105. Supporting Data for Figure 104 ..... A-56
Table A-106. Supporting Data for Figure 105 ..... A-57
Table A-107. Supporting Data for Figure 106 ..... A-57
Table A-108. Supporting Data for Figure 107 ..... A-58
Table A-109. Supporting Data for Figure 108 ..... A-58
Table A-110. Supporting Data for Figure 109 ..... A-59
Table A-111. Supporting Data for Figure 121 ..... A-59
Table A-112. Data for Figure 122 ..... A-59
Table A-113. Supporting Data for Figure 123 ..... A-60
Table A-114. Supporting Data for Figure 124, Figure 125, and Figure 126 ..... A-60
Table A-115. Supporting Data for Figure 127 and Figure 128 ..... A-61
Table A-116. Supporting Data for Figure 129 and Figure 130 ..... A-61
Table A-117. Supporting Data for Figure 131 ..... A-62
Table A-118. Supporting Data for Figure 132 and Figure 133 ..... A-62
Table A-119. Supporting Data for Figure 134 ..... A-62
Table A-120. Supporting Data for Figure 135 and Figure 136 ..... A-63
Table A-121. Supporting Data for Figure 137 ..... A-63
Table A-122. Supporting Data for Figure 138 ..... A-64
Table A-123. Supporting Data for Figure 139 ..... A-64
Table A-124. Supporting Data for Figure 140 ..... A-65
Table A-125. Supporting Data for Figure 143 ..... A-65
Table A-126. Supporting Data for Figure 144 ..... A-66
Table A-127. Supporting Data for Figure 145 ..... A-66
Table A-128. Supporting Data for Figure 146 ..... A-66
Table A-129. Supporting Data for Figure 147 and Figure 148 ..... A-67
Table A-130. Supporting Data for Figure 149, Figure 150, Figure 154, Figure 155, Figure 156, and Figure 157 ..... A-68
Table A-131. Supporting Data for Figure 151, Figure 154, Figure 155, Figure 156, and Figure 157 ..... A-68
Table A-132. Supporting Data for Figure 152 ..... A-68

## TABLES FOR SECTION 2.1: AMERICAN SAMOA

Table A-1. Summary of creel survey boat-based sampling effort

| Year | Sample Days | Trolling Interviews | Troll Trips Sampled | Expanded # of Trips | Percent of Trolling Trips Surveyed |
|---|---|---|---|---|---|
| 2015 | 220 | 51 | 53 | 103 | 51.5 |
| 2016 | 196 | 46 | 82 | 87 | 94.3 |
| 2017 | 199 | 41 | 43 | 132 | 32.6 |
| 2018 | 207 | 59 | 59 | 162 | 36.4 |
| 2019 | 211 | 49 | 98 | 133 | 73.7 |
| 2020 | 228 | 43 | 43 | 79 | 54.4 |
| 2021 | 201 | 27 | 53 | 138 | 38.4 |
| 2022 | 167 | 15 | 23 | 103 | 22.3 |
| 2023 | 182 | 10 | 16 | 30 | 53.3 |
| 2024 | 159 | 11 | 21 | 43 | 48.8 |

Table A-2. Supporting Data for Figure 2

| Year | Boats Landing Pelagics (All Methods) | Boats Landing Pelagics (Longline) | Boats Landing Pelagics (Troll) |
|---|---|---|---|
| 2015 | 40 | 21 | 10 |
| 2016 | 38 | 20 | 12 |
| 2017 | 27 | 15 | 8 |
| 2018 | 25 | 14 | 7 |
| 2019 | 29 | 18 | 5 |
| 2020 | 22 | 11 | 8 |
| 2021 | 19 | 12 | 5 |
| 2022 | 20 | 11 | 9 |
| 2023 | 23 | 10 | 9 |
| 2024 | 22 | 9 | 10 |
| **Average** | **27** | **14** | **8** |
| **Standard Deviation** | **7** | **4** | **2** |

Table A-3. Supporting Data for Figure 3

| Year | All Pelagic Species Troll Trips | All Pelagic Species Longline Sets |
|---|---|---|
| 2015 | 162 | 2,786 |
| 2016 | 129 | 2,451 |
| 2017 | 166 | 2,488 |
| 2018 | 194 | 2,213 |
| 2019 | 160 | 1,882 |
| 2020 | 132 | 1,322 |
| 2021 | 155 | 1,552 |
| 2022 | 105 | 1,336 |
| 2023 | 339 | 1,224 |
| 2024 | 72 | 1,359 |
| **Average** | **161** | **1,861** |
| **Standard Deviation** | **71** | **581** |

Table A-4. Supporting Data for Figure 4

| Year | Total Pounds Landed - Tuna | Total Pounds Landed - Non-Tuna PMUS |
|---|---|---|
| 2015 | 5,418,306 | 229,237 |
| 2016 | 4,603,031 | 217,274 |
| 2017 | 4,852,460 | 269,620 |
| 2018 | 4,279,764 | 185,005 |
| 2019 | 2,969,511 | 135,216 |
| 2020 | 1,916,301 | 125,657 |
| 2021 | 2,515,538 | 133,326 |
| 2022 | 3,007,508 | 174,124 |
| 2023 | 2,622,416 | 131,923 |
| 2024 | 3,189,533 | 211,896 |
| **Average** | **3,537,437** | **181,328** |
| **Standard Deviation** | **1,163,688** | **49,837** |

Table A-5. Supporting Data for Figure 5

| Year | Commercial Landings (lb) - Tuna | Commercial Landings (lb) - Non-Tuna PMUS |
|---|---|---|
| 2015 | 5,396,948 | 114,576 |
| 2016 | 4,595,374 | 96,818 |
| 2017 | 4,843,753 | 104,755 |
| 2018 | 4,273,424 | 63,680 |
| 2019 | 2,966,396 | 39,094 |
| 2020 | 1,912,848 | 36,557 |
| 2021 | 2,512,376 | 33,820 |
| 2022 | 3,005,556 | 24,131 |
| 2023 | 2,618,759 | 23,651 |
| 2024 | 3,183,070 | 34,887 |
| **Average** | **3,530,850** | **57,197** |
| **Standard Deviation** | **1,159,180** | **35,249** |

Table A-6. Supporting Data for Figure 6

| Year | Estimated Yellowfin Longline Landings (lb) | Estimated Yellowfin Trolling Landings (lb) |
|---|---|---|
| 2015 | 1,015,725 | 4,189 |
| 2016 | 848,926 | 9,287 |
| 2017 | 1,233,124 | 14,993 |
| 2018 | 575,768 | 8,439 |
| 2019 | 417,429 | 2,878 |
| 2020 | 494,579 | 3,482 |
| 2021 | 470,671 | 6,013 |
| 2022 | 340,719 | 127 |
| 2023 | 487,350 | 237 |
| 2024 | 458,942 | 1,249 |
| **Average** | **634,323** | **5,089** |
| **Standard Deviation** | **295,415** | **4,702** |

Table A-7. Supporting Data for Figure 7

| Year | Estimated Skipjack Longline Landings (lb) | Estimated Skipjack Trolling Landings (lb) |
|---|---|---|
| 2015 | 251,276 | 7,543 |
| 2016 | 210,451 | 9,542 |
| 2017 | 155,788 | 7,294 |
| 2018 | 168,457 | 7,134 |
| 2019 | 151,417 | 11,975 |
| 2020 | 143,434 | 6,379 |
| 2021 | 116,410 | 21,025 |
| 2022 | 99,624 | 8,053 |
| 2023 | 105,395 | 3,887 |
| 2024 | 352,044 | 2,414 |
| **Average** | **175,430** | **8,525** |
| **Standard Deviation** | **77,704** | **5,135** |

Table A-8. Supporting Data for Figure 8

| Year | Estimated Wahoo Longline Landings (lb) | Estimated Wahoo Trolling Landings (lb) |
|---|---|---|
| 2015 | 119,783 | 567 |
| 2016 | 101,693 | 1,781 |
| 2017 | 110,322 | 1,065 |
| 2018 | 67,510 | 688 |
| 2019 | 40,116 | 638 |
| 2020 | 38,480 | 105 |
| 2021 | 35,291 | 431 |
| 2022 | 25,278 | 0 |
| 2023 | 25,987 | 160 |
| 2024 | 38,356 | 213 |
| **Average** | **60,282** | **565** |
| **Standard Deviation** | **36,818** | **536** |

Table A-9. Supporting Data for Figure 9

| Year | Estimated Mahimahi Longline Landings (lb) | Estimated Mahimahi Trolling Landings (lb) |
|---|---|---|
| 2015 | 11,822 | 430 |
| 2016 | 8,969 | 1,103 |
| 2017 | 30,883 | 1,692 |
| 2018 | 10,007 | 829 |
| 2019 | 4,163 | 663 |
| 2020 | 10,494 | 995 |
| 2021 | 1,819 | 639 |
| 2022 | 12,824 | 1,174 |
| 2023 | 3,023 | 81 |
| 2024 | 2,597 | 0 |
| **Average** | **9,660** | **761** |
| **Standard Deviation** | **8,512** | **515** |

Table A-10. Supporting Data for Figure 10

| Year | Blue Marlin Longline Landings (lb) | Blue Marlin Trolling Landings (lb) |
|---|---|---|
| 2015 | 55,836 | 1,561 |
| 2016 | 66,073 | 449 |
| 2017 | 87,684 | 847 |
| 2018 | 70,536 | 1,026 |
| 2019 | 64,672 | 755 |
| 2020 | 62,800 | 0 |
| 2021 | 76,001 | 0 |
| 2022 | 117,517 | 0 |
| 2023 | 86,555 | 0 |
| 2024 | 147,574 | 0 |
| **Average** | **83,525** | **464** |
| **Standard Deviation** | **28,608** | **560** |

Table A-11. Supporting Data for Figure 11

| Year | Sailfish Longline Landings (lb) | Sailfish Trolling Landings (lb) |
|---|---|---|
| 2015 | 5,106 | 57 |
| 2016 | 5,106 | 0 |
| 2017 | 3,262 | 0 |
| 2018 | 1,702 | 0 |
| 2019 | 4,184 | 164 |
| 2020 | 1,276 | 286 |
| 2021 | 1,915 | 0 |
| 2022 | 1,702 | 124 |
| 2023 | 3,049 | 330 |
| 2024 | 7,516 | 0 |
| **Average** | **3,482** | **96** |
| **Standard Deviation** | **1,998** | **126** |

Table A-12. Supporting Data for Figure 13

| Year | Longline Hooks Set |
|---|---|
| 2015 | 7,806 |
| 2016 | 6,909 |
| 2017 | 7,009 |
| 2018 | 6,010 |
| 2019 | 5,104 |
| 2020 | 3,646 |
| 2021 | 4,474 |
| 2022 | 3,997 |
| 2023 | 3,793 |
| 2024 | 4,063 |
| **Average** | **5,281** |
| **Standard Deviation** | **1,536** |

Table A-13. Supporting Data for Figure 14

| Year | Bigeye Tuna Longline Landings (lb) |
|---|---|
| 2015 | 184,586 |
| 2016 | 155,842 |
| 2017 | 139,424 |
| 2018 | 117,516 |
| 2019 | 68,420 |
| 2020 | 52,989 |
| 2021 | 66,147 |
| 2022 | 47,916 |
| 2023 | 82,624 |
| 2024 | 116,332 |
| **Average** | **103,180** |
| **Standard Deviation** | **46,747** |

Table A-14. Supporting Data for Figure 15

| Year | Albacore Longline Landings (lb) |
|---|---|
| 2015 | 3,941,321 |
| 2016 | 3,367,685 |
| 2017 | 3,296,463 |
| 2018 | 3,400,628 |
| 2019 | 2,316,642 |
| 2020 | 1,214,747 |
| 2021 | 1,834,637 |
| 2022 | 2,511,041 |
| 2023 | 1,942,582 |
| 2024 | 2,258,160 |
| **Average** | **2,608,391** |
| **Standard Deviation** | **859,962** |

Table A-15. Supporting Data for Figure 16

| Year | Swordfish Longline Landings (lb) |
|---|---|
| 2015 | 14,615 |
| 2016 | 12,194 |
| 2017 | 13,438 |
| 2018 | 13,561 |
| 2019 | 8,210 |
| 2020 | 5,529 |
| 2021 | 6,127 |
| 2022 | 7,062 |
| 2023 | 6,965 |
| 2024 | 9,054 |
| **Average** | **9,676** |
| **Standard Deviation** | **3,440** |

Table A-16. Supporting Data for Figure 17

| Year | Releases - Tunas | Releases - Non-Tuna PMUS | Releases - Other Pelagics | Releases - Sharks |
|---|---|---|---|---|
| 2015 | 1,722 | 8,025 | 156 | 6,043 |
| 2016 | 996 | 5,116 | 33 | 5,131 |
| 2017 | 767 | 3,170 | 49 | 4,282 |
| 2018 | 910 | 2,120 | 5 | 4,642 |
| 2019 | 962 | 1,893 | 16 | 3,234 |
| 2020 | 727 | 1,541 | 27 | 2,077 |
| 2021 | 577 | 1,544 | 4 | 2,718 |
| 2022 | 608 | 1,148 | 1 | 1,511 |
| 2023 | 2,567 | 2,338 | 83 | 2,112 |
| 2024 | 1,987 | 2,215 | 257 | 2,585 |
| **Average** | **1,182** | **2,911** | **63** | **3,434** |
| **Standard Deviation** | **674** | **2,119** | **83** | **1,506** |

Table A-17. Supporting Data for Figure 18

| Year | Alia Catch (Individuals) per 1,000 Hooks | Monohull Catch (Individuals) per 1,000 Hooks |
|---|---|---|
| 2015 | 3.8 | 12.7 |
| 2016 | 0.0 | 11.9 |
| 2017 | 0.0 | 11.6 |
| 2018 | 0.0 | 13.5 |
| 2019 | 8.1 | 11.3 |
| 2020 | 0.0 | 8.5 |
| 2021 | 0.0 | 9.3 |
| 2022 | 0.0 | 14.6 |
| 2023 | 0.0 | 12.6 |
| 2024 | 0.0 | 13.0 |
| **Average** | **1.2** | **11.9** |
| **Standard Deviation** | **2.7** | **1.9** |

Table A-18. Supporting Data for Figure 19

| Year | Troll Catch (lb) Per Hour | Effective Troll Hours |
|---|---|---|
| 2015 | 18 | 976 |
| 2016 | 45 | 602 |
| 2017 | 16 | 1,999 |
| 2018 | 19 | 1,124 |
| 2019 | 25 | 761 |
| 2020 | 22 | 592 |
| 2021 | 34 | 863 |
| 2022 | 23 | 433 |
| 2023 | 3 | 1,577 |
| 2024 | 22 | 247 |
| **Average** | **23** | **917** |
| **Standard Deviation** | **11** | **534** |

Table A-19. Supporting Data for Figure 20

| Year | Troll Catch Rate (lb/hr) - Skipjack | Troll Catch Rate (lb/hr) - Yellowfin |
|---|---|---|
| 2015 | 8.08 | 5.79 |
| 2016 | 17.92 | 17.46 |
| 2017 | 4.00 | 8.12 |
| 2018 | 6.35 | 8.18 |
| 2019 | 16.87 | 4.49 |
| 2020 | 12.46 | 6.65 |
| 2021 | 26.28 | 6.04 |
| 2022 | 18.81 | 0.05 |
| 2023 | 0.44 | 1.33 |
| 2024 | 13.65 | 6.13 |
| **Average** | **12.49** | **6.42** |
| **Standard Deviation** | **7.85** | **4.70** |

Table A-20. Supporting Data for Figure 21

| Year | Troll Catch Rate (lb/hr) – Blue Marlin | Troll Catch Rate (lb/hr) - Mahimahi | Troll Catch Rate (lb/hr) - Wahoo |
|---|---|---|---|
| 2015 | 2.52 | 0.47 | 0.39 |
| 2016 | 1.11 | 1.94 | 3.89 |
| 2017 | 0.53 | 0.91 | 0.28 |
| 2018 | 1.10 | 0.72 | 0.73 |
| 2019 | 1.19 | 0.94 | 0.51 |
| 2020 | 0.00 | 1.43 | 0.05 |
| 2021 | 0.00 | 0.16 | 0.56 |
| 2022 | 0.00 | 2.67 | 0.00 |
| 2023 | 0.00 | 0.58 | 0.14 |
| 2024 | 0.00 | 0.00 | 0.72 |
| **Average** | **0.65** | **0.98** | **0.73** |
| **Standard Deviation** | **0.84** | **0.82** | **1.14** |

## TABLES FOR SECTION 2.2: COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS

Table A-21. Boat-based Survey Statistics (raw data), CNMI

| Year | Survey Days | Boat Log Total Trips | Charter Trips | Non-Charter Trips | Total Interviews | Charter Interviews | Non-Charter Interviews |
|---|---|---|---|---|---|---|---|
| 2015 | 57 | 110 | 1 | 109 | 102 | 2 | 100 |
| 2016 | 65 | 115 | 4 | 111 | 100 | 4 | 96 |
| 2017 | 66 | 116 | 6 | 110 | 104 | 5 | 99 |
| 2018 | 54 | 124 | 3 | 121 | 108 | 4 | 104 |
| 2019 | 33 | 65 | 1 | 64 | 58 | 4 | 54 |
| 2020 | 58 | 112 | 1 | 111 | 119 | 5 | 114 |
| 2021 | 71 | 145 | 0 | 145 | 135 | 0 | 135 |
| 2022 | 52 | 109 | 0 | 109 | 84 | 0 | 84 |
| 2023 | 42 | 80 | 0 | 80 | 63 | 0 | 63 |
| 2024 | 18 | 18 | 0 | 18 | 15 | 0 | 15 |

Table A-22. Supporting Data for Figure 22

| Year | Number of Fishers Landing Pelagic Species from Commercial Receipt Invoices |
|---|---|
| 2015 | 13 |
| 2016 | 74 |
| 2017 | 48 |
| 2018 | 56 |
| 2019 | 53 |
| 2020 | 76 |
| 2021 | 85 |
| 2022 | 95 |
| 2023 | 87 |
| 2024 | 34 |
| **Average** | **62** |
| **Standard Deviation** | **26** |

Table A-23. Supporting Data for Figure 23

| Year | Number of Trips Catching Pelagic Fish from Commercial Receipt Invoices |
|---|---|
| 2015 | 583 |
| 2016 | 1,205 |
| 2017 | 1,540 |
| 2018 | 2,173 |
| 2019 | 2,422 |
| 2020 | 1,332 |
| 2021 | 2,138 |
| 2022 | 1,781 |
| 2023 | 1,444 |
| 2024 | 873 |
| **Average** | **1,549** |
| **Standard Deviation** | **589** |

Table A-24. Supporting Data for Figure 24

| Year | Estimated Total Troll Trips | Estimated Troll Trips - Non- Charter | Estimated Troll Trips - Charter |
|---|---|---|---|
| 2015 | 3,369 | 3,352 | 17 |
| 2016 | 4,787 | 4,768 | 18 |
| 2017 | 3,904 | 3,904 | 0 |
| 2018 | 4,821 | 4,801 | 20 |
| 2019 | 3,462 | 3,417 | 44 |
| 2020 | 4,265 | 4,265 | 0 |
| 2021 | 3,348 | 3,348 | 0 |
| 2022 | 3,253 | 3,253 | 0 |
| 2023 | 2,369 | 2,369 | 0 |
| 2024 | 1,668 | 1,668 | 0 |
| **Average** | **3,525** | **3,515** | **10** |
| **Standard Deviation** | **993** | **989** | **15** |

Table A-25. Supporting Data for Figure 25

| Year | Estimated Troll Hours - Total | Estimated Troll Hours - Non-Charter | Estimated Troll Hours -Charter |
|---|---|---|---|
| 2015 | 17,083 | 17,038 | 44 |
| 2016 | 25,679 | 25,591 | 88 |
| 2017 | 22,338 | 22,338 | 0 |
| 2018 | 24,549 | 24,468 | 80 |
| 2019 | 18,214 | 18,026 | 188 |
| 2020 | 20,851 | 20,851 | 0 |
| 2021 | 18,850 | 18,850 | 0 |
| 2022 | 15,824 | 15,824 | 0 |
| 2023 | 12,323 | 12,323 | 0 |
| 2024 | 6,898 | 6,898 | 0 |
| **Average** | **18,261** | **18,221** | **40** |
| **Standard Deviation** | **5,676** | **5,655** | **63** |

Table A-26. Supporting Data for Figure 26

| Year | Estimated Troll Hours per Trip | Estimated Troll Hours per Trip - Non- Charter | Estimated Troll Hours per Trip - Charter |
|---|---|---|---|
| 2015 | 5.1 | 5.1 | 2.6 |
| 2016 | 5.4 | 5.4 | 4.9 |
| 2017 | 5.7 | 5.7 | 0.0 |
| 2018 | 5.1 | 5.1 | 4.0 |
| 2019 | 5.3 | 5.3 | 4.3 |
| 2020 | 4.9 | 4.9 | 0.0 |
| 2021 | 5.6 | 5.6 | 0.0 |
| 2022 | 4.9 | 4.9 | 0.0 |
| 2023 | 5.2 | 5.2 | 0.0 |
| 2024 | 4.1 | 4.1 | 0.0 |
| **Average** | **5.1** | **5.1** | **1.6** |
| **Standard Deviation** | **0.4** | **0.4** | **2.1** |

Table A-27. Supporting Data for Figure 27

| Year | Estimated Total Landings (lb) - All Pelagics | Estimated Total Landings (lb) - Tuna PMUS | Estimated Total Landings (lb) - Non-Tuna PMUS |
|---|---|---|---|
| 2015 | 537,652 | 437,849 | 98,282 |
| 2016 | 457,502 | 311,403 | 132,833 |
| 2017 | 572,558 | 481,012 | 87,236 |
| 2018 | 539,037 | 455,315 | 82,129 |
| 2019 | 498,381 | 406,979 | 84,483 |
| 2020 | 309,445 | 266,563 | 34,916 |
| 2021 | 407,993 | 350,480 | 44,611 |
| 2022 | 261,952 | 164,462 | 90,736 |
| 2023 | 126,557 | 98,355 | 25,314 |
| 2024 | 84,333 | 41,996 | 39,950 |
| **Average** | **379,541** | **301,441** | **72,049** |
| **Standard Deviation** | **175,940** | **155,173** | **34,262** |

Table A-28. Supporting Data for Figure 28

| Year | Estimated Total Landings (lb) - All Pelagics | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 537,652 | 537,182 | 471 |
| 2016 | 457,502 | 455,945 | 1,557 |
| 2017 | 572,558 | 572,558 | 0 |
| 2018 | 539,037 | 537,570 | 1,468 |
| 2019 | 498,381 | 495,014 | 3,368 |
| 2020 | 309,445 | 309,445 | 0 |
| 2021 | 407,993 | 407,993 | 0 |
| 2022 | 261,952 | 261,952 | 0 |
| 2023 | 126,557 | 126,557 | 0 |
| 2024 | 84,333 | 84,333 | 0 |
| **Average** | **379,541** | **378,855** | **686** |
| **Standard Deviation** | **175,940** | **175,419** | **1,127** |

Table A-29. Supporting Data for Figure 29

| Year | Estimated Landings (lb) - Tuna PMUS | Estimated Landings (lb) - Non-Charter | Estimated Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 437,849 | 437,731 | 119 |
| 2016 | 311,403 | 309,846 | 1,557 |
| 2017 | 481,012 | 481,012 | 0 |
| 2018 | 455,315 | 454,326 | 989 |
| 2019 | 406,979 | 404,026 | 2,954 |
| 2020 | 266,563 | 266,563 | 0 |
| 2021 | 350,480 | 350,480 | 0 |
| 2022 | 164,462 | 164,462 | 0 |
| 2023 | 98,355 | 98,355 | 0 |
| 2024 | 41,996 | 41,996 | 0 |
| **Average** | **301,441** | **300,880** | **562** |
| **Standard Deviation** | **155,173** | **154,821** | **999** |

Table A-30. Supporting Data for Figure 30

| Year | Estimated Landings (lb) - Non-Tuna PMUS | Estimated Landings (lb) - Non-Charter | Estimated Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 98,282 | 97,930 | 352 |
| 2016 | 132,833 | 132,833 | 0 |
| 2017 | 87,236 | 87,236 | 0 |
| 2018 | 82,129 | 81,670 | 459 |
| 2019 | 84,483 | 84,483 | 0 |
| 2020 | 34,916 | 34,916 | 0 |
| 2021 | 44,611 | 44,611 | 0 |
| 2022 | 90,736 | 90,736 | 0 |
| 2023 | 25,314 | 25,314 | 0 |
| 2024 | 39,950 | 39,950 | 0 |
| **Average** | **72,049** | **71,968** | **81** |
| **Standard Deviation** | **34,262** | **34,218** | **173** |

Table A-31. Supporting Data for Figure 31

| Year | Estimated Total Landings (lb) - Skipjack | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 416,000 | 415,882 | 119 |
| 2016 | 280,388 | 278,831 | 1,557 |
| 2017 | 394,618 | 394,618 | 0 |
| 2018 | 438,328 | 437,339 | 989 |
| 2019 | 367,606 | 364,653 | 2,954 |
| 2020 | 241,438 | 241,438 | 0 |
| 2021 | 320,366 | 320,366 | 0 |
| 2022 | 145,854 | 145,854 | 0 |
| 2023 | 76,218 | 76,218 | 0 |
| 2024 | 39,853 | 39,853 | 0 |
| **Average** | **272,067** | **271,505** | **562** |
| **Standard Deviation** | **143,006** | **142,639** | **999** |

Table A-32. Supporting Data for Figure 32

| Year | Estimated Total Landings (lb) - Yellowfin | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 21,618 | 21,618 | 0 |
| 2016 | 28,404 | 28,404 | 0 |
| 2017 | 45,818 | 45,818 | 0 |
| 2018 | 13,207 | 13,207 | 0 |
| 2019 | 39,373 | 39,373 | 0 |
| 2020 | 25,064 | 25,064 | 0 |
| 2021 | 27,299 | 27,299 | 0 |
| 2022 | 15,739 | 15,739 | 0 |
| 2023 | 19,393 | 19,393 | 0 |
| 2024 | 2,143 | 2,143 | 0 |
| **Average** | **23,806** | **23,806** | **0** |
| **Standard Deviation** | **12,617** | **12,617** | **0** |

Table A-33. Supporting Data for Figure 33

| Year | Estimated Total Landings (lb) - Mahimahi | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 93,809 | 93,457 | 352 |
| 2016 | 108,270 | 108,270 | 0 |
| 2017 | 68,311 | 68,311 | 0 |
| 2018 | 72,238 | 72,074 | 164 |
| 2019 | 77,545 | 77,545 | 0 |
| 2020 | 31,578 | 31,578 | 0 |
| 2021 | 31,313 | 31,313 | 0 |
| 2022 | 64,180 | 64,180 | 0 |
| 2023 | 11,427 | 11,427 | 0 |
| 2024 | 0 | 0 | 0 |
| **Average** | **55,867** | **55,816** | **52** |
| **Standard Deviation** | **35,647** | **35,597** | **117** |

Table A-34. Supporting Data for Figure 34

| Year | Estimated Total Landings (lb) - Wahoo | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 4,350 | 4,350 | 0 |
| 2016 | 24,491 | 24,491 | 0 |
| 2017 | 10,949 | 10,949 | 0 |
| 2018 | 7,002 | 6,707 | 295 |
| 2019 | 2,642 | 2,642 | 0 |
| 2020 | 3,338 | 3,338 | 0 |
| 2021 | 7,735 | 7,735 | 0 |
| 2022 | 22,743 | 22,743 | 0 |
| 2023 | 13,887 | 13,887 | 0 |
| 2024 | 875 | 875 | 0 |
| **Average** | **9,801** | **9,772** | **30** |
| **Standard Deviation** | **8,272** | **8,283** | **93** |

Table A-35. Supporting Data for Figure 35

| Year | Estimated Total Landings (lb) - Blue Marlin | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 0 | 0 | 0 |
| 2016 | 0 | 0 | 0 |
| 2017 | 7,976 | 7,976 | 0 |
| 2018 | 2,889 | 2,889 | 0 |
| 2019 | 4,160 | 4,160 | 0 |
| 2020 | 0 | 0 | 0 |
| 2021 | 4,493 | 4,493 | 0 |
| 2022 | 0 | 0 | 0 |
| 2023 | 0 | 0 | 0 |
| 2024 | 39,075 | 39,075 | 0 |
| **Average** | **5,859** | **5,859** | **0** |
| **Standard Deviation** | **11,986** | **11,986** | **0** |

Table A-36. Supporting Data for Figure 36

| Year | Estimated Total Landings (lb) - All Pelagics | Estimated Total Landings (lb) - Tuna PMUS | Estimated Total Landings (lb) - Non-Tuna PMUS |
|---|---|---|---|
| 2015 | 188,623 | 154,982 | 30,893 |
| 2016 | 223,004 | 199,620 | 17,387 |
| 2017 | 224,531 | 201,111 | 18,392 |
| 2018 | 221,341 | 193,130 | 18,294 |
| 2019 | 176,633 | 138,795 | 22,655 |
| 2020 | 153,606 | 134,259 | 14,841 |
| 2021 | 307,079 | 263,884 | 35,755 |
| 2022 | 234,141 | 185,980 | 42,857 |
| 2023 | 148,682 | 116,781 | 19,060 |
| 2024 | 99,423 | 77,967 | 8,732 |
| **Average** | **197,706** | **166,651** | **22,887** |
| **Standard Deviation** | **57,487** | **52,827** | **10,434** |

Table A-37. Supporting Data for Figure 37

| Year | Commercial Purchase Landings (lb) - Skipjack | Commercial Purchase Landings (lb) - Yellowfin |
|---|---|---|
| 2015 | 139,873 | 14,959 |
| 2016 | 178,815 | 18,725 |
| 2017 | 164,196 | 36,500 |
| 2018 | 171,856 | 16,345 |
| 2019 | 125,879 | 12,509 |
| 2020 | 119,710 | 14,534 |
| 2021 | 238,376 | 25,033 |
| 2022 | 172,059 | 11,217 |
| 2023 | 97,691 | 18,961 |
| 2024 | 65,076 | 12,394 |
| **Average** | **147,353** | **18,118** |
| **Standard Deviation** | **48,633** | **7,635** |

Table A-38. Supporting Data for Figure 38

| Year | Commercial Purchase Landings (lb) - Mahimahi | Commercial Purchase Landings (lb) - Wahoo | Commercial Purchase Landings (lb) - Blue Marlin |
|---|---|---|---|
| 2015 | 30,465 | 428 | 0 |
| 2016 | 12,582 | 1,603 | 2,198 |
| 2017 | 14,715 | 2,894 | 440 |
| 2018 | 16,839 | 943 | 374 |
| 2019 | 21,216 | 336 | 724 |
| 2020 | 12,627 | 1,114 | 94 |
| 2021 | 26,526 | 2,869 | 4,071 |
| 2022 | 33,151 | 7,356 | 1,638 |
| 2023 | 13,953 | 3,776 | 774 |
| 2024 | 7,566 | 573 | 446 |
| **Average** | **18,964** | **2,189** | **1,076** |
| **Standard Deviation** | **8,526** | **2,170** | **1,255** |

Table A-39. Supporting Data for Figure 39

| Year | Troll Overall Average Catch Rate (lb/hr) | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 31.3 | 31.3 | 10.7 |
| 2016 | 17.8 | 17.8 | 17.7 |
| 2017 | 25.5 | 25.5 | 0.0 |
| 2018 | 22.0 | 22.0 | 18.3 |
| 2019 | 27.6 | 27.7 | 17.9 |
| 2020 | 14.6 | 14.6 | 0.0 |
| 2021 | 21.4 | 21.4 | 0.0 |
| 2022 | 16.0 | 16.0 | 0.0 |
| 2023 | 10.3 | 10.3 | 0.0 |
| 2024 | 12.3 | 12.3 | 0.0 |
| **Average** | **19.9** | **19.9** | **6.5** |
| **Standard Deviation** | **6.9** | **6.9** | **8.6** |

Table A-40. Supporting Data for Figure 40

| Year | Troll Overall Average Catch Rate (lb/hr) - Skipjack | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 24.4 | 24.4 | 2.7 |
| 2016 | 10.9 | 10.8 | 17.7 |
| 2017 | 17.7 | 17.7 | 0.0 |
| 2018 | 17.8 | 17.8 | 12.4 |
| 2019 | 20.2 | 20.2 | 15.7 |
| 2020 | 11.5 | 11.5 | 0.0 |
| 2021 | 16.9 | 16.9 | 0.0 |
| 2022 | 9.2 | 9.2 | 0.0 |
| 2023 | 6.2 | 6.2 | 0.0 |
| 2024 | 5.8 | 5.8 | 0.0 |
| **Average** | **14.1** | **14.1** | **4.9** |
| **Standard Deviation** | **6.2** | **6.2** | **7.3** |

Table A-41. Supporting Data for Figure 41

| Year | Troll Overall Average Catch Rate (lb/hr) - Yellowfin | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 1.3 | 1.3 | 0.0 |
| 2016 | 1.1 | 1.1 | 0.0 |
| 2017 | 2.1 | 2.1 | 0.0 |
| 2018 | 0.5 | 0.5 | 0.0 |
| 2019 | 2.2 | 2.2 | 0.0 |
| 2020 | 1.2 | 1.2 | 0.0 |
| 2021 | 1.4 | 1.4 | 0.0 |
| 2022 | 1.0 | 1.0 | 0.0 |
| 2023 | 1.5 | 1.5 | 0.0 |
| 2024 | 0.3 | 0.3 | 0.0 |
| **Average** | **1.3** | **1.3** | **0.0** |
| **Standard Deviation** | **0.6** | **0.6** | **0.0** |

Table A-42. Supporting Data for Figure 42

| Year | Troll Overall Average Catch Rate (lb/hr) - Mahimahi | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 5.3 | 5.3 | 8.0 |
| 2016 | 4.2 | 4.2 | 0.0 |
| 2017 | 2.9 | 2.9 | 0.0 |
| 2018 | 2.9 | 2.9 | 2.1 |
| 2019 | 4.2 | 4.2 | 0.0 |
| 2020 | 1.5 | 1.5 | 0.0 |
| 2021 | 1.6 | 1.6 | 0.0 |
| 2022 | 4.0 | 4.0 | 0.0 |
| 2023 | 0.9 | 0.9 | 0.0 |
| 2024 | 0.0 | 0.0 | 0.0 |
| **Average** | **3.1** | **3.1** | **1.1** |
| **Standard Deviation** | **1.5** | **1.5** | **2.7** |

Table A-43. Supporting Data for Figure 43

| Year | Troll Overall Average Catch Rate (lb/hr) - Wahoo | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 0.3 | 0.3 | 0.0 |
| 2016 | 1.0 | 1.0 | 0.0 |
| 2017 | 0.5 | 0.5 | 0.0 |
| 2018 | 0.3 | 0.3 | 3.7 |
| 2019 | 0.1 | 0.1 | 0.0 |
| 2020 | 0.2 | 0.2 | 0.0 |
| 2021 | 0.4 | 0.4 | 0.0 |
| 2022 | 1.2 | 1.2 | 0.0 |
| 2023 | 1.1 | 1.1 | 0.0 |
| 2024 | 0.1 | 0.1 | 0.0 |
| **Average** | **0.5** | **0.5** | **0.4** |
| **Standard Deviation** | **0.4** | **0.4** | **1.2** |

Table A-44. Supporting Data for Figure 44

| Year | Troll Overall Average Catch Rate (lb/hr) – Blue Marlin | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 0.0 | 0.0 | 0.0 |
| 2016 | 0.0 | 0.0 | 0.0 |
| 2017 | 0.4 | 0.4 | 0.0 |
| 2018 | 0.1 | 0.1 | 0.0 |
| 2019 | 0.2 | 0.2 | 0.0 |
| 2020 | 0.0 | 0.0 | 0.0 |
| 2021 | 0.2 | 0.2 | 0.0 |
| 2022 | 0.0 | 0.0 | 0.0 |
| 2023 | 0.0 | 0.0 | 0.0 |
| 2024 | 5.7 | 5.7 | 0.0 |
| **Average** | **0.7** | **0.7** | **0.0** |
| **Standard Deviation** | **1.8** | **1.8** | **0.0** |

Table A-45. Supporting Data for Figure 45

| Year | Troll Catch Rate (lb/trip) - Mahimahi | Troll Catch Rate (lb/trip) -Wahoo | Troll Catch Rate (lb/trip) - Blue Marlin |
|---|---|---|---|
| 2015 | 52.3 | 0.7 | 0.0 |
| 2016 | 10.4 | 1.3 | 1.8 |
| 2017 | 9.6 | 1.9 | 0.3 |
| 2018 | 7.8 | 0.4 | 0.2 |
| 2019 | 8.8 | 0.1 | 0.3 |
| 2020 | 9.5 | 0.8 | 0.1 |
| 2021 | 12.4 | 1.3 | 1.9 |
| 2022 | 18.6 | 4.1 | 0.9 |
| 2023 | 9.7 | 2.6 | 0.5 |
| 2024 | 8.7 | 0.7 | 0.5 |
| **Average** | **14.8** | **1.4** | **0.7** |
| **Standard Deviation** | **13.5** | **1.2** | **0.7** |

Table A-46. Supporting Data for Figure 46

| Year | Troll Catch Rate (lb/trip) -Skipjack | Troll Catch Rate (lb/trip) - Yellowfin | Troll Catch Rate (lb/trip) -Skipjack (Creel) |
|---|---|---|---|
| 2015 | 240 | 26 | 118 |
| 2016 | 148 | 16 | 57 |
| 2017 | 107 | 24 | 104 |
| 2018 | 79 | 8 | 89 |
| 2019 | 52 | 5 | 106 |
| 2020 | 90 | 11 | 54 |
| 2021 | 112 | 12 | 94 |
| 2022 | 97 | 6 | 47 |
| 2023 | 68 | 13 | 30 |
| 2024 | 75 | 14 | 24 |
| **Average** | **107** | **13** | **72** |
| **Standard Deviation** | **54** | **7** | **34** |

## TABLES FOR SECTION 2.3: GUAM

Table A-47. Numbers of Trips and Interviews for Creel Trolling Method, Guam

| Year | Survey Days | Trips in Boat Log | Interviews |
|---|---|---|---|
| 2015 | 97 | 906 | 540 |
| 2016 | 93 | 1,147 | 728 |
| 2017 | 92 | 1,018 | 643 |
| 2018 | 89 | 979 | 653 |
| 2019 | 93 | 930 | 620 |
| 2020 | 96 | 981 | 244 |
| 2021 | 96 | 1,101 | 676 |
| 2022 | 97 | 949 | 571 |
| 2023 | 96 | 837 | 457 |
| 2024 | 96 | 813 | 506 |

Table A-48. Supporting Data for Figure 47

| Year | Estimated Trolling Boats | Upper 95 Percent | Lower 95 Percent |
|---|---|---|---|
| 2015 | 372 | 460.0 | 326.0 |
| 2016 | 428 | 505.0 | 386.0 |
| 2017 | 408 | 473.0 | 366.0 |
| 2018 | 398 | 495.0 | 349.0 |
| 2019 | 465 | 624.0 | 392.0 |
| 2020 | 459 | 685.0 | 382.0 |
| 2021 | 546 | 635.0 | 493.0 |
| 2022 | 449 | 513.0 | 410.0 |
| 2023 | 466 | 553.0 | 416.0 |
| 2024 | 447 | 529.0 | 398.0 |
| **Average** | **444** | **547** | **392** |
| **Standard Deviation** | **48** | **76** | **45** |

Table A-49. Supporting Data for Figure 48

| Year | Estimated Total Landings (lb) All Pelagic | Estimated Total Landings (lb) Tuna PMUS | Estimated Total Landings (lb) Non Tuna PMUS |
|---|---|---|---|
| 2015 | 968,471 | 718,736 | 227,489 |
| 2016 | 890,936 | 604,957 | 267,230 |
| 2017 | 597,842 | 460,153 | 123,093 |
| 2018 | 857,135 | 637,391 | 206,328 |
| 2019 | 808,549 | 570,445 | 224,464 |
| 2020 | 624,254 | 407,805 | 198,934 |
| 2021 | 858,357 | 758,639 | 88,534 |
| 2022 | 623,888 | 452,110 | 161,569 |
| 2023 | 714,028 | 586,062 | 114,684 |
| 2024 | 699,120 | 456,156 | 237,048 |
| **Average** | **764,258** | **565,245** | **184,937** |
| **Standard Deviation** | **129,511** | **119,599** | **59,735** |

Table A-50. Supporting Data for Figure 49

| Year | Estimated Total Landings Pelagic | Estimated Total Landings Non Charter | Estimated Total Landings Charter |
|---|---|---|---|
| 2015 | 968,471 | 908,487 | 59,983 |
| 2016 | 890,936 | 851,572 | 39,362 |
| 2017 | 597,842 | 568,673 | 29,169 |
| 2018 | 857,135 | 807,813 | 49,323 |
| 2019 | 808,549 | 766,628 | 41,925 |
| 2020 | 624,254 | 620,599 | 3,655 |
| 2021 | 858,357 | 837,396 | 20,961 |
| 2022 | 623,888 | 606,491 | 17,399 |
| 2023 | 714,028 | 700,316 | 13,710 |
| 2024 | 699,120 | 671,741 | 27,378 |
| **Average** | **764,258** | **733,972** | **30,287** |
| **Standard Deviation** | **129,511** | **116,873** | **17,349** |

Table A-51. Supporting Data for Figure 50

| Year | Estimated Landings Tuna PMUS | Estimated Landings Non Charter | Estimated Landings Charter |
|---|---|---|---|
| 2015 | 718,736 | 713,353 | 5,382 |
| 2016 | 604,957 | 595,894 | 9,063 |
| 2017 | 460,153 | 453,027 | 7,126 |
| 2018 | 637,391 | 629,288 | 8,103 |
| 2019 | 570,445 | 558,851 | 11,594 |
| 2020 | 407,805 | 407,063 | 742 |
| 2021 | 758,639 | 751,561 | 7,077 |
| 2022 | 452,110 | 447,473 | 4,637 |
| 2023 | 586,062 | 581,193 | 4,868 |
| 2024 | 456,156 | 453,493 | 2,662 |
| **Average** | **565,245** | **559,120** | **6,125** |
| **Standard Deviation** | **119,599** | **118,126** | **3,157** |

Table A-52. Supporting Data for Figure 51

| Year | Estimated Total Landings Skipjack | Estimated Total Landings Non Charter | Estimated Total Landings Charter |
|---|---|---|---|
| 2015 | 607,246 | 602,666 | 4,580 |
| 2016 | 468,429 | 462,796 | 5,632 |
| 2017 | 399,994 | 394,044 | 5,950 |
| 2018 | 585,489 | 578,468 | 7,022 |
| 2019 | 500,960 | 490,919 | 10,041 |
| 2020 | 349,733 | 349,292 | 441 |
| 2021 | 665,439 | 660,090 | 5,348 |
| 2022 | 418,351 | 413,856 | 4,496 |
| 2023 | 488,775 | 484,979 | 3,796 |
| 2024 | 407,346 | 404,785 | 2,560 |
| **Average** | **489,176** | **484,190** | **4,987** |
| **Standard Deviation** | **102,179** | **101,075** | **2,572** |

Table A-53. Supporting Data for Figure 52

| Year | Estimated Total Landings (lb) - Yellowfin | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 110,979 | 110,190 | 789 |
| 2016 | 136,457 | 133,098 | 3,360 |
| 2017 | 60,011 | 58,862 | 1,149 |
| 2018 | 51,369 | 50,294 | 1,075 |
| 2019 | 69,436 | 67,883 | 1,553 |
| 2020 | 58,060 | 57,771 | 289 |
| 2021 | 93,110 | 91,381 | 1,729 |
| 2022 | 33,371 | 33,229 | 141 |
| 2023 | 96,832 | 95,759 | 1,072 |
| 2024 | 48,700 | 48,598 | 102 |
| **Average** | **75,833** | **74,707** | **1,126** |
| **Standard Deviation** | **32,309** | **31,574** | **965** |

Table A-54. Supporting Data for Figure 53

| Year | Estimated Total Landings Non-Tuna (lb) - PMUS | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 227,489 | 173,436 | 54,052 |
| 2016 | 267,230 | 237,471 | 29,758 |
| 2017 | 123,093 | 101,692 | 21,401 |
| 2018 | 206,328 | 165,692 | 40,636 |
| 2019 | 224,464 | 194,364 | 30,103 |
| 2020 | 198,934 | 196,033 | 2,900 |
| 2021 | 88,534 | 74,922 | 13,612 |
| 2022 | 161,569 | 149,914 | 11,655 |
| 2023 | 114,684 | 106,007 | 8,676 |
| 2024 | 237,048 | 212,440 | 24,608 |
| **Average** | **184,937** | **161,197** | **23,740** |
| **Standard Deviation** | **59,735** | **52,794** | **15,624** |

Table A-55. Supporting Data for Figure 54

| Year | Estimated Total Landings (lb) - Mahimahi | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 157,174 | 121,246 | 35,927 |
| 2016 | 184,351 | 167,566 | 16,785 |
| 2017 | 44,421 | 34,356 | 10,065 |
| 2018 | 86,043 | 75,021 | 11,022 |
| 2019 | 145,563 | 126,797 | 18,767 |
| 2020 | 98,794 | 96,696 | 2,097 |
| 2021 | 31,229 | 29,111 | 2,118 |
| 2022 | 93,981 | 86,141 | 7,840 |
| 2023 | 52,410 | 51,334 | 1,075 |
| 2024 | 168,668 | 150,631 | 18,037 |
| **Average** | **106,263** | **93,890** | **12,373** |
| **Standard Deviation** | **54,872** | **47,673** | **10,611** |

Table A-56. Supporting Data for Figure 55

| Year | Estimated Total Landings (lb) - Wahoo | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 157,174 | 121,246 | 35,927 |
| 2016 | 184,351 | 167,566 | 16,785 |
| 2017 | 44,421 | 34,356 | 10,065 |
| 2018 | 86,043 | 75,021 | 11,022 |
| 2019 | 145,563 | 126,797 | 18,767 |
| 2020 | 98,794 | 96,696 | 2,097 |
| 2021 | 31,229 | 29,111 | 2,118 |
| 2022 | 93,981 | 86,141 | 7,840 |
| 2023 | 52,410 | 51,334 | 1,075 |
| 2024 | 168,668 | 150,631 | 18,037 |
| **Average** | **106,263** | **93,890** | **12,373** |
| **Standard Deviation** | **54,872** | **47,673** | **10,611** |

Table A-57. Supporting Data for Figure 56

| Year | Estimated Total Landings (lb) - Blue Marlin | Estimated Total Landings (lb) - Non-Charter | Estimated Total Landings (lb) - Charter |
|---|---|---|---|
| 2015 | 36,849 | 26,869 | 9,980 |
| 2016 | 45,686 | 37,824 | 7,862 |
| 2017 | 31,024 | 23,991 | 7,033 |
| 2018 | 23,741 | 12,484 | 11,257 |
| 2019 | 52,533 | 43,727 | 8,807 |
| 2020 | 50,698 | 50,698 | 0 |
| 2021 | 30,967 | 22,896 | 8,071 |
| 2022 | 8,645 | 6,763 | 1,882 |
| 2023 | 14,163 | 10,971 | 3,192 |
| 2024 | 40,279 | 38,671 | 1,608 |
| **Average** | **33,459** | **27,489** | **5,969** |
| **Standard Deviation** | **14,769** | **14,890** | **3,948** |

Table A-58. Supporting Data for Figure 57

| Year | Estimated Commercial Landings (lb) - All Pelagic | Estimated Commercial Landings (lb) - Tuna PMUS | Estimated Commercial Landings (lb) Non-Tuna PMUS |
|---|---|---|---|
| 2015 | 109,403 | 63,685 | 42,794 |
| 2016 | 100,551 | 37,560 | 58,031 |
| 2017 | 118,457 | 56,455 | 55,434 |
| 2018 | 97,019 | 54,112 | 38,655 |
| 2019 | 141,756 | 52,020 | 82,100 |
| 2020 | 74,756 | 23,355 | 46,382 |
| 2021 | 51,033 | 25,997 | 22,905 |
| 2022 | n.d. | n.d. | n.d. |
| 2023 | n.d. | n.d. | n.d. |
| 2024 | n.d. | n.d. | n.d. |
| **Average** | **98,996** | **44,741** | **49,472** |
| **Standard Deviation** | **29,467** | **15,796** | **18,486** |

Table A-59. Supporting Data for Figure 58

| Year | Estimated Troll Trips | Estimated Troll Trips - Non-Charter | Estimated Troll Trips - Charter |
|---|---|---|---|
| 2015 | 9,167 | 7,954 | 1,213 |
| 2016 | 11,942 | 10,574 | 1,368 |
| 2017 | 10,267 | 9,005 | 1,262 |
| 2018 | 10,489 | 9,111 | 1,377 |
| 2019 | 9,936 | 8,601 | 1,335 |
| 2020 | 9,631 | 9,402 | 230 |
| 2021 | 10,719 | 10,106 | 614 |
| 2022 | 9,758 | 8,970 | 788 |
| 2023 | 8,347 | 7,804 | 543 |
| 2024 | 8,386 | 7,699 | 687 |
| **Average** | **9,864** | **8,923** | **942** |
| **Standard Deviation** | **1,088** | **954** | **417** |

Table A-60. Supporting Data for Figure 59

| Year | Estimated Troll Hours - Total | Estimated Troll Hours - Non-Charter | Estimated Troll Hours -Charter |
|---|---|---|---|
| 2015 | 50,464 | 45,836 | 4,628 |
| 2016 | 65,158 | 60,479 | 4,679 |
| 2017 | 49,588 | 45,085 | 4,503 |
| 2018 | 52,623 | 48,477 | 4,146 |
| 2019 | 50,055 | 45,704 | 4,351 |
| 2020 | 49,350 | 48,509 | 841 |
| 2021 | 56,373 | 54,125 | 2,248 |
| 2022 | 47,962 | 45,126 | 2,836 |
| 2023 | 38,270 | 36,755 | 1,515 |
| 2024 | 38,655 | 36,389 | 2,266 |
| **Average** | **49,850** | **46,649** | **3,201** |
| **Standard Deviation** | **7,805** | **7,176** | **1,432** |

Table A-61. Supporting Data for Figure 60

| Year | Estimated Troll Hours per Trip – Overall Average | Estimated Troll Hours per Trip - Non-Charter | Estimated Troll Hours per Trip - Charter |
|---|---|---|---|
| 2015 | 5.5 | 5.8 | 3.8 |
| 2016 | 5.5 | 5.7 | 3.4 |
| 2017 | 4.8 | 5.0 | 3.6 |
| 2018 | 5.0 | 5.3 | 3.0 |
| 2019 | 5.0 | 5.3 | 3.3 |
| 2020 | 5.1 | 5.2 | 3.7 |
| 2021 | 5.3 | 5.4 | 3.7 |
| 2022 | 4.9 | 5.0 | 3.6 |
| 2023 | 4.6 | 4.7 | 2.8 |
| 2024 | 4.6 | 4.7 | 3.3 |
| **Average** | **5.0** | **5.2** | **3.4** |
| **Standard Deviation** | **0.3** | **0.4** | **0.3** |

Table A-62. Supporting Data for Figure 61

| Year | Troll Catch Rate (lb/hr) - Overall Average | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 19.2 | 19.8 | 12.9 |
| 2016 | 13.6 | 14.0 | 8.4 |
| 2017 | 12.0 | 12.6 | 6.3 |
| 2018 | 16.2 | 16.6 | 11.9 |
| 2019 | 16.0 | 16.7 | 9.6 |
| 2020 | 12.6 | 12.7 | 4.3 |
| 2021 | 15.1 | 15.3 | 9.0 |
| 2022 | 12.9 | 13.3 | 6.1 |
| 2023 | 18.5 | 18.9 | 9.0 |
| 2024 | 18.0 | 18.4 | 12.0 |
| **Average** | **15.4** | **15.8** | **9.0** |
| **Standard Deviation** | **2.6** | **2.7** | **2.8** |

Table A-63. Supporting Data for Figure 62

| Year | Troll Catch Rate (lb/hr) - Skipjack | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 12.0 | 13.1 | 1.0 |
| 2016 | 7.2 | 7.6 | 1.2 |
| 2017 | 8.1 | 8.7 | 1.3 |
| 2018 | 11.1 | 11.9 | 1.7 |
| 2019 | 10.0 | 10.7 | 2.3 |
| 2020 | 7.1 | 7.2 | 0.5 |
| 2021 | 11.8 | 12.2 | 2.4 |
| 2022 | 8.7 | 9.2 | 1.6 |
| 2023 | 12.8 | 13.2 | 2.5 |
| 2024 | 10.5 | 11.1 | 1.1 |
| **Average** | **9.9** | **10.5** | **1.6** |
| **Standard Deviation** | **2.1** | **2.2** | **0.7** |

Table A-64. Supporting Data for Figure 63

| Year | Troll Catch Rate (lb/hr) - Yellowfin Tuna | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 2.2 | 2.4 | 0.2 |
| 2016 | 2.1 | 2.2 | 0.7 |
| 2017 | 1.2 | 1.3 | 0.3 |
| 2018 | 1.0 | 1.0 | 0.3 |
| 2019 | 1.4 | 1.5 | 0.4 |
| 2020 | 1.2 | 1.2 | 0.3 |
| 2021 | 1.7 | 1.7 | 0.8 |
| 2022 | 0.7 | 0.7 | 0.0 |
| 2023 | 2.5 | 2.6 | 0.7 |
| 2024 | 1.3 | 1.3 | 0.0 |
| **Average** | **1.5** | **1.6** | **0.4** |
| **Standard Deviation** | **0.6** | **0.6** | **0.3** |

Table A-65. Supporting Data for Figure 64

| Year | Troll Catch Rate (lb/hr) - Mahimahi | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 3.1 | 2.6 | 7.8 |
| 2016 | 2.8 | 2.8 | 3.6 |
| 2017 | 0.9 | 0.8 | 2.2 |
| 2018 | 1.6 | 1.5 | 2.7 |
| 2019 | 2.9 | 2.8 | 4.3 |
| 2020 | 2.0 | 2.0 | 2.5 |
| 2021 | 0.6 | 0.5 | 0.9 |
| 2022 | 2.0 | 1.9 | 2.8 |
| 2023 | 1.4 | 1.4 | 0.7 |
| 2024 | 4.4 | 4.1 | 8.0 |
| **Average** | **2.2** | **2.0** | **3.6** |
| **Standard Deviation** | **1.1** | **1.1** | **2.5** |

Table A-66. Supporting Data for Figure 65

| Year | Troll Catch Rate (lb/hr) - Wahoo | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 0.6 | 0.5 | 1.6 |
| 2016 | 0.5 | 0.5 | 1.1 |
| 2017 | 0.9 | 1.0 | 0.8 |
| 2018 | 1.7 | 1.6 | 3.4 |
| 2019 | 0.5 | 0.5 | 0.5 |
| 2020 | 0.9 | 0.9 | 0.9 |
| 2021 | 0.4 | 0.3 | 1.2 |
| 2022 | 1.2 | 1.2 | 0.6 |
| 2023 | 1.1 | 1.1 | 2.4 |
| 2024 | 0.6 | 0.5 | 2.2 |
| **Average** | **0.8** | **0.8** | **1.5** |
| **Standard Deviation** | **0.4** | **0.4** | **0.9** |

Table A-67. Supporting Data for Figure 66

| Year | Troll Catch Rate (lb/hr) - Blue Marlin | Troll Catch Rate (lb/hr) - Non-Charter | Troll Catch Rate (lb/hr) - Charter |
|---|---|---|---|
| 2015 | 0.7 | 0.6 | 2.2 |
| 2016 | 0.7 | 0.6 | 1.7 |
| 2017 | 0.6 | 0.5 | 1.6 |
| 2018 | 0.5 | 0.3 | 2.7 |
| 2019 | 1.0 | 1.0 | 2.0 |
| 2020 | 1.0 | 1.0 | 0.0 |
| 2021 | 0.5 | 0.4 | 3.6 |
| 2022 | 0.2 | 0.1 | 0.7 |
| 2023 | 0.4 | 0.3 | 2.1 |
| 2024 | 1.0 | 1.1 | 0.7 |
| **Average** | **0.7** | **0.6** | **1.7** |
| **Standard Deviation** | **0.3** | **0.3** | **1.1** |

## 5.1 TABLES FOR SECTION 2.4: HAWAIʻI

Table A-68. Supporting Data for Figure 67. Hawaii commercial tuna, billfish, other PMUS and PMUS shark catch

| | Hawaii pelagic catch (1,000 pounds) | | | | | |
|---|---|---|---|---|---|---|
| Year | Tunas | Billfish | Other PMUS | PMUS Sharks | non-PMUS | Total |
| **2015** | 25,431 | 6,910 | 7,195 | 149 | 24 | 39,710 |
| **2016** | 25,102 | 5,708 | 6,172 | 168 | 25 | 37,174 |
| **2017** | 26,618 | 7,063 | 5,549 | 167 | 12 | 39,408 |
| **2018** | 25,436 | 5,735 | 6,526 | 139 | 13 | 37,850 |
| **2019** | 24,778 | 5,713 | 6,015 | 114 | 6 | 36,627 |
| **2020** | 22,700 | 4,327 | 3,774 | 43 | 5 | 30,849 |
| **2021** | 23,857 | 4,388 | 3,361 | 17 | 6 | 31,629 |
| **2022** | 22,896 | 5,348 | 2,587 | 10 | 4 | 30,844 |
| **2023** | 23,415 | 4,759 | 2,802 | 8 | 3 | 30,988 |
| **2024** | 25,059 | 5,965 | 2,588 | 5 | 3 | 33,621 |
| **Average** | **24,529.3** | **5,591.5** | **4,656.9** | **82.0** | **10.2** | **34,869.9** |
| **SD** | **1,263.8** | **936.4** | **1,805.6** | **71.2** | **8.2** | **3,663.7** |

Table A-69. Supporting Data for Figure 68. Total commercial pelagic catch by gear type

| | Hawaii pelagic total catch (1,000 pounds) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 32,045 | 2,777 | 3,098 | 1,199 | 407 | 183 | 39,710 |
| **2016** | 31,476 | 1,850 | 2,599 | 796 | 386 | 67 | 37,174 |
| **2017** | 32,759 | 3,009 | 2,234 | 990 | 324 | 91 | 39,408 |
| **2018** | 32,407 | 1,438 | 2,765 | 787 | 350 | 104 | 37,850 |
| **2019** | 32,018 | 834 | 2,481 | 686 | 477 | 131 | 36,627 |
| **2020** | 27,255 | 1,070 | 1,500 | 583 | 328 | 113 | 30,849 |
| **2021** | 26,941 | 1,736 | 1,830 | 685 | 257 | 180 | 31,629 |
| **2022** | 24,685 | 2,537 | 1,774 | 967 | 571 | 311 | 30,844 |
| **2023** | 26,057 | 2,215 | 1,603 | 573 | 348 | 191 | 30,988 |
| **2024** | 29,400 | 1,979 | 1,323 | 508 | 180 | 230 | 33,621 |
| **Average** | **29,504.4** | **1,944.4** | **2,120.8** | **777.3** | **362.9** | **160.1** | **34,869.9** |
| **SD** | **3,026.5** | **711.7** | **599.6** | **218.1** | **108.8** | **73.9** | **3,663.7** |

Table A-70. Supporting Data for Figure 69. Hawai'i commercial tuna catch by gear type, 2015-2024.

| | Hawaii tuna catch by gear type (1,000 pounds) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 22,168 | 122 | 1,482 | 1,105 | 399 | 156 | 25,431 |
| **2016** | 22,473 | 107 | 1,379 | 713 | 382 | 48 | 25,102 |
| **2017** | 23,767 | 276 | 1,270 | 913 | 310 | 82 | 26,618 |
| **2018** | 22,584 | 188 | 1,502 | 725 | 342 | 94 | 25,436 |
| **2019** | 22,249 | 93 | 1,223 | 624 | 469 | 120 | 24,778 |
| **2020** | 20,717 | 140 | 865 | 552 | 324 | 102 | 22,700 |
| **2021** | 21,649 | 225 | 915 | 650 | 252 | 166 | 23,857 |
| **2022** | 19,858 | 237 | 1,022 | 933 | 564 | 283 | 22,896 |
| **2023** | 21,373 | 170 | 826 | 537 | 334 | 174 | 23,415 |
| **2024** | 23,411 | 212 | 579 | 476 | 176 | 206 | 25,059 |
| **Average** | **22,024.9** | **177.0** | **1,106.4** | **722.8** | **355.3** | **143.1** | **24,529.3** |
| **SD** | **1,179.1** | **60.9** | **311.1** | **201.7** | **108.4** | **68.8** | **1,263.8** |

Table A-71. Supporting Data for Figure 70. Species composition of tuna catch

| | Hawaii tuna catch (1,000 pounds) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Bigeye tuna | Yellowfin tuna | Skipjack tuna | Albacore | Bluefin tuna | Other tunas | Total |
| **2015** | 19,922 | 4,069 | 728 | 676 | 0 | 36 | 25,431 |
| **2016** | 18,694 | 4,988 | 802 | 602 | 1 | 14 | 25,102 |
| **2017** | 17,964 | 7,619 | 732 | 288 | 3 | 11 | 26,618 |
| **2018** | 17,073 | 7,583 | 531 | 238 | 1 | 10 | 25,436 |
| **2019** | 17,685 | 5,990 | 834 | 256 | 4 | 10 | 24,778 |
| **2020** | 16,834 | 4,971 | 555 | 332 | 3 | 5 | 22,700 |
| **2021** | 15,916 | 6,922 | 499 | 513 | 2 | 5 | 23,857 |
| **2022** | 14,784 | 7,189 | 460 | 457 | 3 | 3 | 22,896 |
| **2023** | 14,526 | 7,358 | 396 | 1,127 | 4 | 4 | 23,415 |
| **2024** | 13,776 | 10,117 | 548 | 608 | 6 | 4 | 25,059 |
| **Average** | **16,717.4** | **6,680.7** | **608.5** | **509.6** | **2.9** | **10.3** | **24,529.0** |
| **SD** | **1,962.0** | **1,743.7** | **152.6** | **268.4** | **1.8** | **9.8** | **1,264.0** |

Table A-72. Supporting Data for Figure 71. Hawaii bigeye tuna catch by gear type

| | Hawaii bigeye tuna catch (1,000 pounds) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 19,162 | 98 | 129 | 74 | 371 | 87 | 19,922 |
| **2016** | 18,085 | 75 | 75 | 93 | 325 | 40 | 18,694 |
| **2017** | 17,497 | 128 | 88 | 49 | 185 | 17 | 17,964 |
| **2018** | 16,630 | 108 | 60 | 31 | 227 | 17 | 17,073 |
| **2019** | 16,989 | 60 | 77 | 63 | 435 | 62 | 17,685 |
| **2020** | 16,318 | 95 | 41 | 40 | 279 | 61 | 16,834 |
| **2021** | 15,440 | 88 | 28 | 31 | 240 | 89 | 15,916 |
| **2022** | 13,966 | 100 | 28 | 46 | 481 | 163 | 14,784 |
| **2023** | 14,059 | 61 | 11 | 18 | 273 | 105 | 14,526 |
| **2024** | 13,440 | 75 | 14 | 22 | 144 | 80 | 13,776 |
| **Average** | **16,158.6** | **89.0** | **54.9** | **46.7** | **296.1** | **72.0** | **16,717.4** |
| **SD** | **1,902.9** | **21.6** | **37.6** | **24.0** | **107.5** | **43.7** | **1,962.0** |

Table A-73. Supporting Data for Figure 72. Hawaii yellowfin tuna catch by gear type

| | Hawaii yellowfin tuna catch (1,000 pounds) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 2,008 | 16 | 1,103 | 877 | 25 | 40 | 4,069 |
| **2016** | 3,313 | 29 | 1,034 | 551 | 56 | 5 | 4,988 |
| **2017** | 5,582 | 137 | 960 | 770 | 124 | 46 | 7,619 |
| **2018** | 5,438 | 75 | 1,247 | 636 | 114 | 73 | 7,583 |
| **2019** | 4,453 | 30 | 903 | 516 | 32 | 56 | 5,990 |
| **2020** | 3,711 | 35 | 648 | 492 | 44 | 41 | 4,971 |
| **2021** | 5,390 | 114 | 731 | 599 | 11 | 77 | 6,922 |
| **2022** | 5,257 | 97 | 768 | 865 | 82 | 119 | 7,189 |
| **2023** | 6,087 | 81 | 571 | 490 | 61 | 69 | 7,358 |
| **2024** | 9,113 | 123 | 346 | 379 | 31 | 125 | 10,117 |
| **Average** | **5,035.1** | **73.8** | **831.1** | **617.5** | **58.1** | **65.1** | **6,680.7** |
| **SD** | **1,903.2** | **44.0** | **270.9** | **168.6** | **38.0** | **36.5** | **1,743.7** |

Table A-74. Supporting Data for Figure 73. Hawaii skipjack tuna catch by gear type

| | Hawaii skipjack tuna catch (1,000 pounds) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 472 | 1 | 214 | 11 | 2 | 28 | 728 |
| **2016** | 530 | 0 | 258 | 11 | 0 | 3 | 802 |
| **2017** | 485 | 1 | 215 | 13 | 0 | 18 | 732 |
| **2018** | 329 | 0 | 186 | 11 | 0 | 4 | 531 |
| **2019** | 577 | 0 | 234 | 19 | 2 | 1 | 834 |
| **2020** | 370 | 0 | 172 | 11 | 1 | 0 | 555 |
| **2021** | 337 | 1 | 152 | 8 | 0 | 1 | 499 |
| **2022** | 226 | 1 | 222 | 9 | 1 | 0 | 460 |
| **2023** | 137 | 0 | 242 | 17 | 1 | 0 | 396 |
| **2024** | 325 | 1 | 211 | 9 | 0 | 1 | 548 |
| **Average** | **378.8** | **0.6** | **210.6** | **11.9** | **0.8** | **5.6** | **608.5** |
| **SD** | **137.9** | **0.5** | **32.5** | **3.4** | **0.7** | **9.6** | **152.6** |

Table A-75. Supporting Data for Figure 74. Hawaii albacore catch by gear type

| | Hawaii albacore catch (1,000 pounds) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 525 | 6 | 4 | 139 | 0 | 0 | 676 |
| **2016** | 545 | 2 | 2 | 53 | 0 | 0 | 602 |
| **2017** | 200 | 9 | 1 | 77 | 1 | 0 | 288 |
| **2018** | 186 | 5 | 3 | 44 | 0 | 0 | 238 |
| **2019** | 227 | 3 | 2 | 22 | 1 | 0 | 256 |
| **2020** | 316 | 9 | 1 | 7 | 0 | 0 | 332 |
| **2021** | 480 | 20 | 2 | 11 | 0 | 0 | 513 |
| **2022** | 406 | 38 | 2 | 11 | 0 | 0 | 457 |
| **2023** | 1,088 | 27 | 1 | 11 | 0 | 0 | 1,127 |
| **2024** | 531 | 8 | 5 | 64 | 0 | 1 | 608 |
| **Average** | **450.3** | **12.7** | **2.1** | **44.0** | **0.2** | **0.2** | **509.6** |
| **SD** | **264.6** | **11.9** | **1.5** | **41.9** | **0.4** | **0.2** | **268.4** |

Table A-76. Supporting Data for Figure 75. Hawaii commercial billfish catch by gear type

| | Hawaii billfish catch (1,000 lbs) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 3,885 | 2,539 | 457 | 16 | 4 | 9 | 6,910 |
| **2016** | 3,627 | 1,677 | 385 | 16 | 1 | 3 | 5,708 |
| **2017** | 4,059 | 2,625 | 351 | 20 | 4 | 3 | 7,063 |
| **2018** | 4,106 | 1,216 | 396 | 13 | 1 | 4 | 5,735 |
| **2019** | 4,585 | 719 | 385 | 15 | 3 | 6 | 5,713 |
| **2020** | 3,217 | 870 | 225 | 9 | 2 | 4 | 4,327 |
| **2021** | 2,602 | 1,487 | 282 | 7 | 3 | 6 | 4,388 |
| **2022** | 2,766 | 2,279 | 284 | 8 | 2 | 9 | 5,348 |
| **2023** | 2,495 | 2,020 | 226 | 6 | 3 | 9 | 4,759 |
| **2024** | 3,894 | 1,734 | 311 | 11 | 1 | 14 | 5,965 |
| **Average** | **3,523.7** | **1,716.4** | **330.1** | **12.3** | **2.3** | **6.7** | **5,591.5** |
| **SD** | **715.4** | **660.6** | **77.3** | **4.4** | **1.1** | **3.4** | **936.4** |

Table A-77. Supporting Data for Figure 76. Species composition of billfish catch

| | Hawaii billfish catch (1,000 lbs) | | | | | |
|---|---|---|---|---|---|---|
| Year | Swordfish | Blue marlin | Striped marlin | Spearfish | Other marlins | Total |
| **2015** | 3,356 | 1,794 | 1,105 | 605 | 51 | 6,910 |
| **2016** | 2,418 | 1,563 | 888 | 784 | 55 | 5,708 |
| **2017** | 3,582 | 1,835 | 910 | 689 | 47 | 7,063 |
| **2018** | 2,329 | 1,813 | 1,051 | 504 | 39 | 5,735 |
| **2019** | 1,613 | 2,353 | 1,239 | 455 | 53 | 5,713 |
| **2020** | 1,610 | 1,565 | 860 | 264 | 28 | 4,327 |
| **2021** | 2,167 | 1,236 | 634 | 306 | 43 | 4,388 |
| **2022** | 2,885 | 1,403 | 728 | 298 | 33 | 5,348 |
| **2023** | 2,691 | 1,069 | 503 | 445 | 50 | 4,759 |
| **2024** | 2,248 | 1,839 | 1,420 | 400 | 58 | 5,965 |
| **Average** | **2,489.9** | **1,647.0** | **933.9** | **475.1** | **45.7** | **5,591.5** |
| **SD** | **656.4** | **364.5** | **278.6** | **173.1** | **9.8** | **936.4** |

Table A-78. Supporting Data for Figure 77. Hawaii swordfish catch by gear type

| | Swordfish catch (1,000 lbs) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 842 | 2,500 | 2 | 11 | 0 | 1 | 3,356 |
| **2016** | 794 | 1,615 | 0 | 9 | 0 | 1 | 2,418 |
| **2017** | 998 | 2,570 | 1 | 13 | 1 | 0 | 3,582 |
| **2018** | 1,110 | 1,210 | 1 | 6 | 0 | 1 | 2,329 |
| **2019** | 888 | 717 | 1 | 7 | 0 | 1 | 1,613 |
| **2020** | 741 | 864 | 0 | 4 | 0 | 1 | 1,610 |
| **2021** | 711 | 1,452 | 1 | 3 | 0 | 1 | 2,167 |
| **2022** | 645 | 2,236 | 1 | 2 | 0 | 1 | 2,885 |
| **2023** | 689 | 1,998 | 0 | 2 | 0 | 1 | 2,691 |
| **2024** | 531 | 1,714 | 0 | 2 | 0 | 1 | 2,248 |
| **Average** | **794.9** | **1,687.4** | **0.7** | **5.8** | **0.3** | **0.7** | **2,489.9** |
| **SD** | **171.5** | **645.2** | **0.5** | **4.0** | **0.3** | **0.3** | **656.4** |

Table A-79. Supporting Data for Figure 78. Hawaii blue marlin catch by gear type

| | Blue marlin catch (1,000 lbs) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 1,375 | 12 | 394 | 5 | 3 | 6 | 1,794 |
| **2016** | 1,212 | 28 | 315 | 5 | 1 | 2 | 1,563 |
| **2017** | 1,502 | 14 | 308 | 6 | 2 | 3 | 1,835 |
| **2018** | 1,464 | 1 | 339 | 6 | 0 | 2 | 1,813 |
| **2019** | 2,003 | 0 | 334 | 8 | 2 | 5 | 2,353 |
| **2020** | 1,359 | 4 | 194 | 4 | 2 | 2 | 1,565 |
| **2021** | 961 | 17 | 247 | 5 | 2 | 4 | 1,236 |
| **2022** | 1,130 | 11 | 249 | 6 | 1 | 7 | 1,403 |
| **2023** | 858 | 6 | 193 | 3 | 2 | 7 | 1,069 |
| **2024** | 1,566 | 5 | 251 | 8 | 1 | 8 | 1,839 |
| **Average** | **1,343.0** | **9.6** | **282.4** | **5.7** | **1.8** | **4.6** | **1,647.0** |
| **SD** | **328.3** | **8.5** | **66.0** | **1.6** | **0.9** | **2.2** | **364.5** |

Table A-80. Supporting Data for Figure 79. Hawaii striped marlin catch by gear type

| | Striped marlin catch (1,000 lbs) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 1,056 | 24 | 23 | 0 | 0 | 1 | 1,105 |
| **2016** | 831 | 29 | 27 | 1 | 0 | 0 | 888 |
| **2017** | 861 | 34 | 14 | 0 | 0 | 0 | 910 |
| **2018** | 1,021 | 4 | 26 | 0 | 0 | 1 | 1,051 |
| **2019** | 1,208 | 1 | 29 | 0 | 0 | 1 | 1,239 |
| **2020** | 836 | 2 | 21 | 0 | 0 | 1 | 860 |
| **2021** | 599 | 16 | 19 | 0 | 0 | 1 | 634 |
| **2022** | 677 | 30 | 20 | 0 | 0 | 1 | 728 |
| **2023** | 473 | 15 | 14 | 0 | 0 | 1 | 503 |
| **2024** | 1,368 | 12 | 36 | 1 | 0 | 4 | 1,420 |
| **Average** | **893.1** | **16.6** | **22.8** | **0.2** | **0.1** | **1.0** | **933.9** |
| **SD** | **275.9** | **12.1** | **6.9** | **0.3** | **0.1** | **1.2** | **278.6** |

Table A-81. Supporting Data for Figure 80. Hawaii commercial catch of other PMUS by gear type

| | Catch of other PMUS by gear type (1,000 lbs) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 5,973 | 116 | 1,155 | 78 | 4 | 18 | 7,345 |
| **2016** | 5,356 | 67 | 831 | 67 | 3 | 16 | 6,339 |
| **2017** | 4,926 | 107 | 609 | 57 | 10 | 7 | 5,716 |
| **2018** | 5,706 | 34 | 864 | 49 | 7 | 6 | 6,665 |
| **2019** | 5,179 | 22 | 872 | 46 | 5 | 5 | 6,129 |
| **2020** | 3,318 | 60 | 409 | 21 | 2 | 7 | 3,817 |
| **2021** | 2,684 | 24 | 632 | 27 | 2 | 8 | 3,378 |
| **2022** | 2,058 | 21 | 469 | 25 | 5 | 19 | 2,597 |
| **2023** | 2,186 | 25 | 551 | 29 | 11 | 8 | 2,810 |
| **2024** | 2,093 | 34 | 432 | 21 | 3 | 10 | 2,593 |
| **Average** | **3,947.9** | **51.0** | **682.5** | **42.0** | **5.3** | **10.3** | **4,738.9** |
| **SD** | **1,624.8** | **35.8** | **241.0** | **20.4** | **3.0** | **5.3** | **1,872.8** |

Table A-82. Supporting Data for Figure 81. Species composition of other PMUS catch

| | Catch of other PMUS by species (1,000 lbs) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Mahimahi | Moonfish | Oilfish | Ono | Pomfret | PMUS shark | Total |
| **2015** | 1,502 | 2,670 | 528 | 1,217 | 1,278 | 149 | 7,345 |
| **2016** | 1,234 | 2,166 | 481 | 1,206 | 1,084 | 168 | 6,339 |
| **2017** | 1,007 | 2,293 | 338 | 986 | 925 | 167 | 5,716 |
| **2018** | 1,085 | 3,071 | 315 | 1,176 | 879 | 139 | 6,665 |
| **2019** | 1,005 | 2,341 | 309 | 1,610 | 750 | 114 | 6,129 |
| **2020** | 583 | 1,648 | 184 | 851 | 509 | 43 | 3,817 |
| **2021** | 749 | 863 | 164 | 1,177 | 408 | 17 | 3,378 |
| **2022** | 782 | 541 | 165 | 671 | 429 | 10 | 2,597 |
| **2023** | 897 | 505 | 131 | 903 | 366 | 8 | 2,810 |
| **2024** | 571 | 290 | 104 | 1,276 | 346 | 5 | 2,593 |
| **Average** | **941.5** | **1,638.9** | **271.7** | **1,107.4** | **697.5** | **82.0** | **4,738.9** |
| **SD** | **290.7** | **1,012.3** | **147.5** | **263.7** | **333.1** | **71.2** | **1,872.8** |

Table A-83. Supporting Data for Figure 82. Hawaii moonfish catch by gear type

| | Moonfish catch (1,000 lbs) | | | |
|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | Other gear | Total |
| **2015** | 2,630 | 39 | 1 | 2,670 |
| **2016** | 2,148 | 19 | 0 | 2,166 |
| **2017** | 2,261 | 32 | 0 | 2,293 |
| **2018** | 3,058 | 13 | 0 | 3,071 |
| **2019** | 2,338 | 3 | 0 | 2,341 |
| **2020** | 1,624 | 23 | 0 | 1,648 |
| **2021** | 861 | 2 | 0 | 863 |
| **2022** | 539 | 2 | 0 | 541 |
| **2023** | 504 | 1 | 0 | 505 |
| **2024** | 288 | 2 | 0 | 290 |
| **Average** | **1,625.2** | **13.6** | **0.1** | **1,638.9** |
| **SD** | **1,003.1** | **14.1** | **0.2** | **1,012.3** |

Figure 83. Hawaii mahimahi catch by gear type

| | Mahimahi catch (1,000 lbs) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 698 | 31 | 735 | 27 | 2 | 9 | 1,502 |
| **2016** | 635 | 16 | 560 | 19 | 1 | 3 | 1,234 |
| **2017** | 548 | 15 | 420 | 19 | 1 | 3 | 1,007 |
| **2018** | 495 | 6 | 561 | 18 | 1 | 3 | 1,085 |
| **2019** | 434 | 2 | 549 | 17 | 2 | 1 | 1,005 |
| **2020** | 260 | 3 | 305 | 12 | 1 | 2 | 583 |
| **2021** | 354 | 12 | 365 | 14 | 1 | 3 | 749 |
| **2022** | 380 | 13 | 358 | 16 | 4 | 10 | 782 |
| **2023** | 473 | 21 | 370 | 19 | 9 | 4 | 897 |
| **2024** | 298 | 28 | 230 | 7 | 2 | 6 | 571 |
| **Average** | **457.4** | **14.7** | **445.3** | **17.0** | **2.5** | **4.5** | **941.5** |
| **SD** | **142.0** | **9.7** | **151.9** | **5.1** | **2.5** | **3.0** | **290.7** |

Table A-85. Supporting Data for Figure 84. Hawaii ono (wahoo) catch by gear type

| | Ono catch (1,000 lbs) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI troll | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 775 | 1 | 420 | 17 | 1 | 3 | 1,217 |
| **2016** | 921 | 1 | 270 | 11 | 0 | 2 | 1,206 |
| **2017** | 784 | 3 | 188 | 9 | 1 | 2 | 986 |
| **2018** | 858 | 1 | 302 | 13 | 0 | 1 | 1,176 |
| **2019** | 1,270 | 0 | 323 | 14 | 2 | 2 | 1,610 |
| **2020** | 739 | 0 | 104 | 7 | 1 | 1 | 851 |
| **2021** | 897 | 2 | 267 | 8 | 1 | 2 | 1,177 |
| **2022** | 552 | 1 | 110 | 5 | 0 | 1 | 671 |
| **2023** | 710 | 1 | 181 | 8 | 1 | 2 | 903 |
| **2024** | 1,057 | 1 | 203 | 11 | 1 | 3 | 1,276 |
| **Average** | **856.3** | **1.2** | **236.8** | **10.3** | **0.8** | **1.9** | **1,107.4** |
| **SD** | **199.0** | **0.7** | **98.6** | **3.7** | **0.5** | **0.7** | **263.7** |

Table A-86. Supporting Data for Figure 85. Hawaii pomfret catch by gear type

| | Pomfret catch (1,000 lbs) | | | | | |
|---|---|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | MHI handline | Offshore handline | Other gear | Total |
| **2015** | 1,242 | 1 | 31 | 1 | 4 | 1,278 |
| **2016** | 1,038 | 0 | 34 | 2 | 10 | 1,084 |
| **2017** | 888 | 0 | 28 | 7 | 1 | 925 |
| **2018** | 857 | 0 | 16 | 5 | 1 | 879 |
| **2019** | 731 | 0 | 15 | 2 | 1 | 750 |
| **2020** | 502 | 0 | 3 | 0 | 4 | 509 |
| **2021** | 400 | 1 | 5 | 0 | 3 | 408 |
| **2022** | 417 | 0 | 3 | 1 | 7 | 429 |
| **2023** | 362 | 0 | 2 | 1 | 2 | 366 |
| **2024** | 342 | 0 | 2 | 0 | 1 | 346 |
| **Average** | **677.9** | **0.3** | **14.0** | **1.8** | **3.4** | **697.5** |
| **SD** | **319.0** | **0.3** | **13.0** | **2.4** | **2.9** | **333.1** |

Table A-87. Supporting Data for Figure 86. Hawaii PMUS shark catch by gear type

| | PMUS shark catch (1,000 lbs) | | | |
|---|---|---|---|---|
| Year | Deep-set longline | Shallow-set longline | Non-longline | Total |
| **2015** | 120 | 25 | 4 | 149 |
| **2016** | 140 | 24 | 4 | 168 |
| **2017** | 115 | 49 | 2 | 167 |
| **2018** | 126 | 12 | 1 | 139 |
| **2019** | 98 | 16 | 0 | 114 |
| **2020** | 11 | 31 | 0 | 43 |
| **2021** | 12 | 5 | 0 | 17 |
| **2022** | 9 | 1 | 0 | 10 |
| **2023** | 8 | 0 | 0 | 8 |
| **2024** | 5 | 0 | 0 | 5 |
| **Average** | **64.5** | **16.2** | **1.2** | **82.0** |
| **SD** | **59.1** | **16.1** | **629.6** | **71.2** |

Table A-88. Supporting Data for Figure 87. Number of Hawaii-permitted deep-set longline vessels and trips

| | Deep-set longline | | |
|---|---|---|---|
| Year | Vessels | Trips | Sets |
| **2015** | 143 | 1,452 | 18,519 |
| **2016** | 142 | 1,480 | 19,391 |
| **2017** | 145 | 1,539 | 19,674 |
| **2018** | 143 | 1,643 | 21,012 |
| **2019** | 149 | 1,727 | 22,318 |
| **2020** | 146 | 1,643 | 20,766 |
| **2021** | 146 | 1,689 | 22,175 |
| **2022** | 147 | 1,534 | 21,327 |
| **2023** | 150 | 1,594 | 22,114 |
| **2024** | 150 | 1,635 | 21,832 |
| **Average** | **146.1** | **1,593.6** | **20,912.8** |
| **SD** | **2.9** | **90.0** | **1318.2** |

Table A-89. Supporting Data for Figure 88. Number of hooks set by the Hawaii-permitted deep-set longline fishery

| | Number of deep-set hooks by area (millions) | | | |
|---|---|---|---|---|
| Year | Outside EEZ | Hawaii EEZ | PRIA EEZ | Total |
| **2015** | 33.0 | 14.3 | 0.3 | 47.6 |
| **2016** | 38.6 | 12.5 | 0.1 | 51.1 |
| **2017** | 40.5 | 13.0 | 0.0 | 53.6 |
| **2018** | 43.1 | 15.4 | 0.0 | 58.6 |
| **2019** | 49.1 | 14.3 | 0.0 | 63.4 |
| **2020** | 44.8 | 14.9 | 0.0 | 59.7 |
| **2021** | 41.6 | 23.8 | 0.0 | 65.4 |
| **2022** | 46.8 | 16.6 | 0.0 | 63.4 |
| **2023** | 52.3 | 14.0 | 0.0 | 66.4 |
| **2024** | 49.5 | 16.5 | 0.0 | 65.9 |
| **Average** | **43.94** | **15.53** | **0.05** | **59.51** |
| **SD** | **5.80** | **3.19** | **0.10** | **6.67** |

Table A-90. Supporting Data for Figure 89. Catch and revenue for the Hawai`i-permitted deep-set longline fishery, 2015-2024.

| Year | Catch (1,000 lbs) | Nominal revenue ($1,000) |
|---|---|---|
| **2015** | 32,045 | $91,329 |
| **2016** | 31,476 | $99,191 |
| **2017** | 32,759 | $96,230 |
| **2018** | 32,407 | $101,343 |
| **2019** | 32,018 | $92,430 |
| **2020** | 27,255 | $71,442 |
| **2021** | 26,941 | $109,358 |
| **2022** | 24,685 | $105,608 |
| **2023** | 26,057 | $101,310 |
| **2024** | 29,400 | $98,379 |
| **Average** | **29,504.4** | **$96,661.9** |
| **SD** | **3,026.5** | **$10,417.2** |

Table A-91. Supporting Data for Figure 90. Tuna CPUE for the Hawaii-permitted deep-set longline fishery

| | Deep-set longline CPUE (fish per 1,000 hooks) | | |
|---|---|---|---|
| Year | Bigeye tuna | Yellowfin tuna | Albacore |
| **2015** | 4.8 | 0.6 | 0.2 |
| **2016** | 4.3 | 0.9 | 0.2 |
| **2017** | 4.2 | 1.5 | 0.1 |
| **2018** | 3.7 | 1.1 | 0.1 |
| **2019** | 3.5 | 1.0 | 0.1 |
| **2020** | 3.5 | 0.9 | 0.1 |
| **2021** | 2.9 | 1.2 | 0.2 |
| **2022** | 2.7 | 1.3 | 0.2 |
| **2023** | 2.5 | 1.3 | 0.5 |
| **2024** | 2.3 | 1.9 | 0.2 |
| **Average** | **3.45** | **1.16** | **0.18** |
| **SD** | **0.84** | **0.36** | **0.12** |

Table A-92. Supporting Data for Figure 91. Billfish CPUE for the Hawai`i-permitted deep-set longline fishery, 2015-2024.

| | Deep-set longline CPUE (fish per 1,000 hooks) | | |
|---|---|---|---|
| Year | Swordfish | Striped marlin | Blue marlin |
| **2015** | 0.1 | 0.3 | 0.2 |
| **2016** | 0.1 | 0.2 | 0.1 |
| **2017** | 0.1 | 0.2 | 0.1 |
| **2018** | 0.1 | 0.3 | 0.1 |
| **2019** | 0.1 | 0.3 | 0.2 |
| **2020** | 0.1 | 0.2 | 0.1 |
| **2021** | 0.1 | 0.1 | 0.1 |
| **2022** | 0.1 | 0.2 | 0.1 |
| **2023** | 0.1 | 0.1 | 0.1 |
| **2024** | 0.1 | 0.4 | 0.2 |
| **Average** | **0.08** | **0.24** | **0.14** |
| **SD** | **0.02** | **0.08** | **0.04** |

Table A-93. Supporting Data for Figure 92. Blue shark CPUE for the Hawaii-permitted deep-set longline fishery

| | Deep-set CPUE (fish per 1000 hooks) |
|---|---|
| Year | Blue shark |
| **2015** | 1.4 |
| **2016** | 1.4 |
| **2017** | 1.6 |
| **2018** | 1.6 |
| **2019** | 1.8 |
| **2020** | 1.7 |
| **2021** | 1.5 |
| **2022** | 1.2 |
| **2023** | 1.1 |
| **2024** | 1.2 |
| **Average** | 1.46 |
| **SD** | 0.22 |

Table A-94. Supporting Data for Figure 93. Number of Hawaii-permitted shallow-set longline vessels and trips

| | Shallow-set longline | | |
|---|---|---|---|
| **Year** | **Vessels** | **Trips** | **Sets** |
| **2015** | 22 | 69 | 1,130 |
| **2016** | 13 | 46 | 727 |
| **2017** | 20 | 70 | 994 |
| **2018** | 11 | 30 | 420 |
| **2019** | 14 | 25 | 284 |
| **2020** | 14 | 36 | 461 |
| **2021** | 17 | 57 | 703 |
| **2022** | 22 | 69 | 857 |
| **2023** | 23 | 71 | 853 |
| **2024** | 21 | 54 | 874 |
| **Average** | **17.7** | **52.7** | **730.3** |
| **SD** | **4.4** | **17.6** | **268.7** |

Table A-95. Supporting Data for Figure 94. Number of hooks set by the Hawai`i-permitted shallow-set longline fishery, 2015-2024.

| | Number of hooks set by area (milions) | | | |
|---|---|---|---|---|
| **Year** | **Outside EEZ** | **Hawaii EEZ** | **PRIA EEZ** | **Total** |
| **2015** | 1.1 | 0.1 | 0.0 | 1.3 |
| **2016** | 0.7 | 0.0 | 0.0 | 0.8 |
| **2017** | 1.0 | 0.1 | 0.0 | 1.1 |
| **2018** | 0.5 | 0.0 | 0.0 | 0.5 |
| **2019** | 0.4 | 0.0 | 0.0 | 0.4 |
| **2020** | 0.5 | 0.0 | 0.0 | 0.6 |
| **2021** | 0.8 | 0.1 | 0.0 | 0.9 |
| **2022** | 1.0 | 0.0 | 0.0 | 1.1 |
| **2023** | 1.1 | 0.0 | 0.0 | 1.1 |
| **2024** | 1.2 | 0.0 | 0.0 | 1.2 |
| **Average** | **0.82** | **0.04** | **0.00** | **0.88** |
| **SD** | **0.29** | **0.04** | **0.00** | **0.31** |

Table A-96. Supporting Data for Figure 95. Catch and revenue for the Hawaii-permitted shallow-set longline fishery

| Year | Catch (1,000 lbs) | Nominal revenue ($1,000) |
|---|---|---|
| **2015** | 2,777 | $2,810 |
| **2016** | 1,850 | $2,486 |
| **2017** | 3,009 | $4,230 |
| **2018** | 1,438 | $1,538 |
| **2019** | 834 | $1,941 |
| **2020** | 1,070 | $1,294 |
| **2021** | 1,736 | $4,818 |
| **2022** | 2,537 | $9,851 |
| **2023** | 2,215 | $6,834 |
| **2024** | 1,979 | $4,536 |
| **Average** | **1,944.4** | **$4,033.8** |
| **SD** | **711.7** | **$2,679.2** |

Table A-97. Supporting Data for Figure 96. Tuna CPUE for the Hawaii-permitted shallow-set longline fishery

| | Shallow-set longline CPUE (fish per 1,000 hooks) | | |
|---|---|---|---|
| Year | Bigeye tuna | Yellowfin tuna | Albacore |
| **2015** | 1.1 | 0.1 | 0.2 |
| **2016** | 1.2 | 0.4 | 0.1 |
| **2017** | 1.4 | 1.4 | 0.3 |
| **2018** | 2.6 | 1.6 | 0.3 |
| **2019** | 2.5 | 0.9 | 0.2 |
| **2020** | 1.9 | 0.9 | 0.6 |
| **2021** | 1.1 | 1.3 | 0.7 |
| **2022** | 0.9 | 1.0 | 1.3 |
| **2023** | 0.6 | 0.8 | 0.8 |
| **2024** | 0.7 | 1.5 | 0.3 |
| **Average** | **1.40** | **0.99** | **0.48** |
| **SD** | **0.70** | **0.47** | **0.37** |

Table A-98. Supporting Data for Figure 97. Billfish CPUE for the Hawaii-permitted shallow-set longline fishery

| | Shallow-set longline CPUE (fish per 1,000 hooks) | | |
|---|---|---|---|
| Year | Swordfish | Striped marlin | Blue marlin |
| **2015** | 11.9 | 0.2 | 0.0 |
| **2016** | 12.4 | 0.4 | 0.1 |
| **2017** | 12.9 | 0.4 | 0.1 |
| **2018** | 12.2 | 0.1 | 0.0 |
| **2019** | 9.8 | 0.0 | 0.0 |
| **2020** | 7.9 | 0.1 | 0.0 |
| **2021** | 7.1 | 0.2 | 0.1 |
| **2022** | 8.9 | 0.4 | 0.0 |
| **2023** | 7.9 | 0.2 | 0.0 |
| **2024** | 7.2 | 0.1 | 0.0 |
| **Average** | **9.83** | **0.21** | **0.05** |
| **SD** | **2.32** | **0.14** | **0.04** |

Table A-99. Supporting Data for Figure 98. Blue shark CPUE for the Hawaii-permitted shallow-set longline fishery

| | Shallow-set CPUE (fish per 1000 hooks) |
|---|---|
| Year | Blue shark |
| **2015** | 10.0 |
| **2016** | 13.8 |
| **2017** | 9.0 |
| **2018** | 5.1 |
| **2019** | 8.5 |
| **2020** | 10.4 |
| **2021** | 5.9 |
| **2022** | 5.9 |
| **2023** | 6.3 |
| **2024** | 8.1 |
| **Average** | **8.30** |
| **SD** | **2.67** |

Table A-100. Supporting Data for Figure 99. Number of MHI troll fishers and days fished

| Year | Fishers | Days fished |
|---|---|---|
| **2015** | 1,624 | 26,070 |
| **2016** | 1,485 | 23,299 |
| **2017** | 1,418 | 21,507 |
| **2018** | 1,387 | 22,014 |
| **2019** | 1,294 | 20,489 |
| **2020** | 1,126 | 12,201 |
| **2021** | 1,187 | 16,409 |
| **2022** | 1,171 | 15,574 |
| **2023** | 1,156 | 14,579 |
| **2024** | 1,042 | 12,396 |
| **Average** | **1,289.0** | **18,453.8** |
| **SD** | **184.5** | **4,840.9** |

Table A-101. Supporting Data for Figure 100. Catch and revenue for the MHI troll fishery, 2015-2024

| Year | Catch (1,000 lbs) | Nominal revenue ($1,000) |
|---|---|---|
| **2015** | 3,099 | $7,703 |
| **2016** | 2,599 | $7,551 |
| **2017** | 2,234 | $6,371 |
| **2018** | 2,765 | $7,994 |
| **2019** | 2,482 | $7,363 |
| **2020** | 1,500 | $4,261 |
| **2021** | 1,830 | $6,633 |
| **2022** | 1,774 | $7,012 |
| **2023** | 1,603 | $6,093 |
| **2024** | 1,323 | $4,263 |
| **Average** | **2,121.0** | **$6,524.4** |
| **SD** | **599.7** | **$1,333.4** |

Table A-102. Supporting Data for Figure 101. Tuna CPUE for the MHI troll fishery

| MHI troll tuna CPUE (pounds per day fished) | | | | |
|---|---|---|---|---|
| **Year** | **Albacore** | **Bigeye tuna** | **Skipjack tuna** | **Yellowfin tuna** |
| **2015** | 0.2 | 4.9 | 8.2 | 42.3 |
| **2016** | 0.1 | 3.2 | 11.1 | 44.4 |
| **2017** | 0.1 | 4.1 | 10.0 | 44.6 |
| **2018** | 0.1 | 2.7 | 8.4 | 56.7 |
| **2019** | 0.1 | 3.8 | 11.4 | 44.1 |
| **2020** | 0.1 | 3.3 | 14.1 | 53.1 |
| **2021** | 0.1 | 1.7 | 9.3 | 44.5 |
| **2022** | 0.1 | 1.8 | 14.3 | 49.3 |
| **2023** | 0.0 | 0.7 | 16.6 | 39.2 |
| **2024** | 0.4 | 1.1 | 17.1 | 27.9 |
| **Average** | **0.12** | **2.74** | **12.04** | **44.61** |
| **SD** | **0.11** | **1.37** | **3.27** | **7.85** |

Figure 102. Marlin CPUE for the MHI troll fishery

| MHI troll marlin CPUE (pounds per day fished) | | |
|---|---|---|
| **Year** | **Blue marlin** | **Striped marlin** |
| **2015** | 15.1 | 0.9 |
| **2016** | 13.5 | 1.2 |
| **2017** | 14.3 | 0.6 |
| **2018** | 15.4 | 1.2 |
| **2019** | 16.3 | 1.4 |
| **2020** | 15.9 | 1.7 |
| **2021** | 15.1 | 1.1 |
| **2022** | 16.0 | 1.3 |
| **2023** | 13.2 | 0.9 |
| **2024** | 20.3 | 2.9 |
| **Average** | **15.51** | **1.32** |
| **SD** | **1.96** | **0.62** |

Table A-104. Supporting Data for Figure 103. Mahimahi and Ono CPUE for the MHI troll fishery

| MHI troll mahimahi and ono CPUE (pounds per day fished) | | |
|---|---|---|
| Year | Mahimahi | Ono (wahoo) |
| **2015** | 28.2 | 16.1 |
| **2016** | 24.1 | 11.6 |
| **2017** | 19.5 | 8.8 |
| **2018** | 25.5 | 13.7 |
| **2019** | 26.8 | 15.8 |
| **2020** | 25.0 | 8.5 |
| **2021** | 22.2 | 16.3 |
| **2022** | 23.0 | 7.1 |
| **2023** | 25.4 | 12.4 |
| **2024** | 18.5 | 16.3 |
| **Average** | **23.82** | **12.66** |
| **SD** | **3.06** | **3.56** |

Table A-105. Supporting Data for Figure 104. Number of MHI handline fishers and days fished

| Year | Fishers | Days fished |
|---|---|---|
| **2015** | 528 | 4,859 |
| **2016** | 470 | 3,996 |
| **2017** | 491 | 4,735 |
| **2018** | 426 | 4,047 |
| **2019** | 439 | 3,677 |
| **2020** | 396 | 3,053 |
| **2021** | 383 | 3,388 |
| **2022** | 430 | 3,815 |
| **2023** | 371 | 2,847 |
| **2024** | 327 | 2,632 |
| **Average** | **426.1** | **3,704.9** |
| **SD** | **59.9** | **746.9** |

Table A-106. Supporting Data for Figure 105. Catch and revenue for the MHI handline fishery

| Year | Catch (1,000 lbs) | Nominal revenue ($1,000) |
|---|---|---|
| **2015** | 1,202 | $2,910 |
| **2016** | 797 | $2,367 |
| **2017** | 992 | $2,897 |
| **2018** | 788 | $2,404 |
| **2019** | 686 | $2,292 |
| **2020** | 584 | $1,886 |
| **2021** | 686 | $2,837 |
| **2022** | 967 | $4,200 |
| **2023** | 573 | $2,713 |
| **2024** | 508 | $2,187 |
| **Average** | **778.3** | **$2,669.2** |
| **SD** | **218.8** | **$635.3** |

Table A-107. Supporting Data for Figure 106. Tuna CPUE for the MHI handline fishery

| | MHI handline CPUE (pounds per day fished) | | | |
|---|---|---|---|---|
| Year | Albacore | Bigeye tuna | Skipjack tuna | Yellowfin tuna |
| **2015** | 28.7 | 15.3 | 2.3 | 180.4 |
| **2016** | 13.3 | 23.4 | 2.7 | 137.8 |
| **2017** | 16.3 | 10.3 | 2.7 | 162.6 |
| **2018** | 11.0 | 7.5 | 2.8 | 157.2 |
| **2019** | 6.0 | 17.2 | 5.2 | 140.4 |
| **2020** | 2.2 | 13.1 | 3.6 | 161.2 |
| **2021** | 3.3 | 9.0 | 2.3 | 176.7 |
| **2022** | 3.0 | 12.1 | 2.5 | 226.7 |
| **2023** | 3.8 | 6.3 | 5.9 | 172.3 |
| **2024** | 24.2 | 8.5 | 3.6 | 144.0 |
| **Average** | **11.18** | **12.28** | **3.35** | **165.93** |
| **SD** | **9.42** | **5.20** | **1.25** | **26.01** |

Table A-108. Supporting Data for Figure 107. Number of offshore handline fishers and days fished

| Year | Fishers | Days fished |
|---|---|---|
| **2015** | 9 | 255 |
| **2016** | 6 | 182 |
| **2017** | 6 | 230 |
| **2018** | 5 | 217 |
| **2019** | 7 | 274 |
| **2020** | 5 | 258 |
| **2021** | 7 | 196 |
| **2022** | 6 | 255 |
| **2023** | 6 | 252 |
| **2024** | 5 | 140 |
| **Average** | **6.2** | **225.9** |
| **SD** | **1.2** | **42.2** |

Table A-109. Supporting Data for Figure 108. Catch and revenue for the offshore tuna handline fishery

| Year | Catch (1,000 lbs) | Nominal revenue ($1,000) |
|---|---|---|
| **2015** | 407 | $792 |
| **2016** | 386 | $956 |
| **2017** | 324 | $873 |
| **2018** | 350 | $941 |
| **2019** | 477 | $1,131 |
| **2020** | 328 | $970 |
| **2021** | 257 | $833 |
| **2022** | 571 | $2,149 |
| **2023** | 348 | $1,573 |
| **2024** | 180 | $517 |
| **Average** | **362.9** | **$1,073.5** |
| **SD** | **108.8** | **$464.2** |

Table A-110. Supporting Data for Figure 109. Tuna CPUE for the offshore tuna handline fishery

| | Offshore handline CPUE (pounds per day fished) | | | |
|---|---|---|---|---|
| Year | Bigeye tuna | Yellowfin tuna | Mahimahi | Total |
| **2015** | 1,457 | 99 | 9 | 1,564 |
| **2016** | 1,788 | 309 | 3 | 2,100 |
| **2017** | 805 | 540 | 6 | 1,351 |
| **2018** | 1,048 | 527 | 7 | 1,582 |
| **2019** | 1,586 | 116 | 6 | 1,708 |
| **2020** | 1,083 | 170 | 5 | 1,257 |
| **2021** | 1,225 | 57 | 4 | 1,286 |
| **2022** | 1,886 | 321 | 16 | 2,224 |
| **2023** | 1,082 | 241 | 36 | 1,360 |
| **2024** | 1,031 | 222 | 14 | 1,267 |
| **Average** | **1,299.0** | **260.3** | **10.7** | **15,698.9** |
| **SD** | **360.5** | **167.9** | **9.9** | **348.1** |

## TABLES FOR SECTION 3.3: SOCIOECONOMICS

Table A-72. Supporting Data for Figure 118

| Labor force status | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Employment | 14,806 | 16,089 | 17,565 | 17,853 | 17,930 | 16,408 | 16,472 | 16,783 | 16,399 | 17,018 | 16,925 |
| Total Government | 5,258 | 6,198 | 6,556 | 6,804 | 6,585 | 5,849 | 5,498 | 6,195 | 6,614 | 6,877 | 7,224 |
| Canneries | 1,827 | 2,108 | 2,500 | 2,759 | 2,843 | 2,312 | 2,573 | 2,533 | 2,361 | 2,631 | 2,275 |
| Other/Private Sector | 7,721 | 7,783 | 8,509 | 8,290 | 8,502 | 8,247 | 8,401 | 8,055 | 7,424 | 7,510 | 7,426 |

Table A-**73**. Data for Figure 119

| Year | Estimated total landings (million lb) | Estimated total value (million lb) | Revenue adjusted (millions) | Price-all species ($/lb.) | Price-all species adjusted ($/lb.) | CPI adjustor |
|---|---|---|---|---|---|---|
| 2005 | 8.9 | 8.7 | 15.7 | 0.98 | 1.77 | 1.81 |
| 2006 | 12.7 | 12.2 | 21.4 | 0.96 | 1.68 | 1.76 |
| 2007 | 15.7 | 15.1 | 25.6 | 0.96 | 1.63 | 1.70 |
| 2008 | 10.0 | 9.6 | 14.7 | 0.96 | 1.47 | 1.54 |

| Year | Estimated total landings (million lb) | Estimated total value (million lb) | Revenue adjusted (millions) | Price-all species ($/lb.) | Price-all species adjusted ($/lb.) | CPI adjustor |
|---|---|---|---|---|---|---|
| 2009 | 11.5 | 10.9 | 16.3 | 0.96 | 1.42 | 1.49 |
| 2010 | 11.3 | 11.0 | 15.6 | 0.97 | 1.38 | 1.42 |
| 2011 | 7.9 | 9.0 | 11.7 | 1.13 | 1.49 | 1.31 |
| 2012 | 9.8 | 10.2 | 13.0 | 1.05 | 1.33 | 1.27 |
| 2013 | 6.1 | 6.4 | 8.0 | 1.04 | 1.30 | 1.25 |
| 2014 | 5.2 | 5.2 | 6.5 | 1.01 | 1.25 | 1.24 |
| 2015 | 5.6 | 5.7 | 7.1 | 1.02 | 1.27 | 1.25 |
| 2016 | 4.8 | 4.8 | 6.0 | 1.00 | 1.24 | 1.25 |
| 2017 | 5.1 | 5.4 | 6.6 | 1.06 | 1.29 | 1.22 |
| 2018 | 4.4 | 5.6 | 6.7 | 1.25 | 1.51 | 1.20 |
| 2019 | 3.1 | 4.2 | 5.0 | 1.35 | 1.62 | 1.20 |
| 2020 | 2.0 | 2.3 | 2.8 | 1.14 | 1.37 | 1.20 |
| 2021 | 2.6 | 3.2 | 3.5 | 1.21 | 1.33 | 1.10 |
| 2022 | 3.2 | 4.2 | 4.2 | 1.31 | 1.31 | 1.00 |
| 2023 | 2.8 | 3.2 | 3.2 | 1.17 | 1.17 | 1.00 |
| 2024 | 3.4 | 2.9 | 2.9 | 0.86 | 0.86 | 1.00 |

Data source: PIFSC Fishery Economic Performance Measures (Tier 1 indicators).

Table A-74. Supporting Data for Figure 120

| Year | Albacore Price ($/MT) | Albacore Price ($/lb) | Yellowfin Price ($/lb) | Wahoo Price ($/lb) | Bigeye Price ($/lb) | Skipjack Price ($/lb) | Albacore Price ($/MT adj) | Albacore Price ($/lb adj) | CPI Adj. |
|---|---|---|---|---|---|---|---|---|---|
| 2012 | 3,193 | 1.45 | 0.80 | 0.36 | 0.79 | 0.76 | 4,051 | 1.84 | 1.27 |
| 2013 | 2,254 | 1.02 | 0.88 | 0.43 | 0.74 | 0.81 | 2,806 | 1.27 | 1.25 |
| 2014 | 2,707 | 1.23 | 0.60 | 0.53 | 0.51 | 0.51 | 3,345 | 1.52 | 1.24 |
| 2015 | 2,651 | 1.20 | 0.62 | 0.54 | 0.57 | 0.53 | 3,306 | 1.50 | 1.25 |
| 2016 | 2,498 | 1.13 | 0.66 | 0.55 | 0.57 | 0.55 | 3,118 | 1.41 | 1.25 |
| 2017 | 2,559 | 1.16 | 0.88 | 0.80 | 0.79 | 0.79 | 3,130 | 1.42 | 1.22 |
| 2018 | 3,086 | 1.40 | 0.72 | 0.82 | 0.63 | 0.63 | 3,712 | 1.68 | 1.20 |
| 2019 | 3,542 | 1.61 | 0.61 | 0.53 | 0.52 | 1.09 | 4,254 | 1.93 | 1.20 |
| 2020 | 3,306 | 1.50 | 0.59 | 0.50 | 0.50 | 1.36 | 3,977 | 1.80 | 1.20 |
| 2021 | 3,212 | 1.46 | 0.64 | 0.54 | 0.54 | 1.36 | 3,524 | 1.60 | 1.10 |
| 2022 | 3,305 | 1.50 | 0.73 | 0.64 | 0.64 | 1.36 | 3,305 | 1.50 | 1.00 |
| 2023 | 3,057 | 1.39 | 0.80 | 0.71 | 0.71 | 1.36 | 3,057 | 1.39 | 1.00 |
| 2024 | 2,534 | 1.15 | 0.67 | 0.59 | 0.59 | 1.62 | 2,534 | 1.15 | 1 |

Table A-75. Supporting Data for Figure 121, Figure 122, and Figure 123

| Year | Total Cost per Trip ($) | Cost per Set ($) | Cost per Set ($ adj) | Rev. per set ($) | Rev. per set ($ adj) | Net rev. per set ($) | Net rev. per set ($ adj) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2006 | 31,468 | 1,353 | 2,379 | 2,442 | 4,293 | 1,088 | 1,913 | 1.76 |
| 2007 | 45,253 | 963 | 1,633 | 2,564 | 4,348 | 1,601 | 2,716 | 1.70 |
| 2008 | 43,881 | 1,138 | 1,747 | 2,065 | 3,170 | 927 | 1,423 | 1.54 |
| 2009 | 32,942 | 848 | 1,260 | 2,325 | 3,455 | 1,477 | 2,195 | 1.49 |
| 2010 | 29,815 | 1,065 | 1,510 | 2,429 | 3,444 | 1,364 | 1,934 | 1.42 |
| 2011 | 30,916 | 1,189 | 1,559 | 2,388 | 3,131 | 1,199 | 1,572 | 1.31 |
| 2012 | 46,832 | 1,403 | 1,780 | 2,442 | 3,098 | 1,039 | 1,318 | 1.27 |
| 2013 | 50,792 | 1,448 | 1,801 | 1,999 | 2,486 | 551 | 685 | 1.24 |
| 2014 | 43,106 | 1,181 | 1,460 | 1,882 | 2,326 | 701 | 866 | 1.24 |
| 2015 | 42,468 | 1,034 | 1,289 | 2,148 | 2,678 | 1,114 | 1,389 | 1.25 |
| 2016 | 34,148 | 967 | 1,207 | 2,090 | 2,609 | 1,123 | 1,402 | 1.25 |
| 2017 | 34,223 | 913 | 1,116 | 2,195 | 2,684 | 1,282 | 1,568 | 1.22 |
| 2018 | 30,515 | 1,034 | 1,244 | 2,547 | 3,064 | 1,512 | 1,819 | 1.20 |
| 2019 | 44,728 | 1,246 | 1,496 | 2,482 | 2,981 | 1,236 | 1,484 | 1.20 |
| 2020 | 35,944 | 1,112 | 1,337 | 1,813 | 2,181 | 701 | 844 | 1.20 |
| 2021 | 38,803 | 964 | 1,058 | 2,092 | 2,295 | 1,128 | 1,237 | 1.10 |
| 2022 | 45,879 | 1,942 | 1,942 | 3,329 | 3,329 | 1,387 | 1,387 | 1.00 |
| 2023 | 45,341 | 1,719 | 1,719 | 2,838 | 2,838 | 1,119 | 1,119 | 1.00 |
| 2024 | 44,460 | 1,514 | 1,514 | 2,561 | 2,561 | 1,047 | 1,047 | 1.00 |

Table A-76. Supporting Data for Figure 124 and Figure 125

| Year | Total Revenue per Day at Sea ($/day) | Total Revenue per Day at Sea ($/day adj) | Total Revenue per Vessel ($/vessel) | Total Revenue per Vessel ($/vessel adj) | Gini Coefficient | CPI Adjuster |
|---|---|---|---|---|---|---|
| 2005 | 1,260 | 2,282 | 241,076 | 436,589 | 0.47 | 1.81 |
| 2006 | 1,768 | 3,107 | 434,627 | 764,074 | 0.29 | 1.76 |
| 2007 | 1,833 | 3,108 | 521,282 | 884,095 | 0.23 | 1.70 |
| 2008 | 1,325 | 2,034 | 329,312 | 505,494 | 0.35 | 1.54 |
| 2009 | 1,579 | 2,346 | 420,715 | 625,183 | 0.26 | 1.49 |
| 2010 | 1,691 | 2,397 | 423,488 | 600,505 | 0.28 | 1.42 |
| 2011 | 1,483 | 1,944 | 373,219 | 489,290 | 0.29 | 1.31 |
| 2012 | 1,671 | 2,120 | 392,702 | 498,339 | 0.34 | 1.27 |
| 2013 | 1,283 | 1,597 | 290,555 | 361,741 | 0.27 | 1.25 |
| 2014 | 1,283 | 1,585 | 227,031 | 280,611 | 0.42 | 1.24 |
| 2015 | 1,317 | 1,642 | 272,441 | 339,734 | 0.42 | 1.25 |
| 2016 | 1,309 | 1,634 | 239,035 | 298,316 | 0.49 | 1.25 |

| Year | Total Revenue per Day at Sea ($/day) | Total Revenue per Day at Sea ($/day adj) | Total Revenue per Vessel ($/vessel) | Total Revenue per Vessel ($/vessel adj) | Gini Coefficient | CPI Adjuster |
|---|---|---|---|---|---|---|
| 2017 | 1,501 | 1,835 | 358,431 | 438,361 | 0.33 | 1.22 |
| 2018 | 1,749 | 2,104 | 398,418 | 479,297 | 0.33 | 1.20 |
| 2019 | 1,329 | 1,596 | 232,018 | 278,653 | 0.60 | 1.20 |
| 2020 | 1,057 | 1,271 | 209,788 | 252,375 | 0.43 | 1.20 |
| 2021 | 1,520 | 1,668 | 264,664 | 290,337 | 0.41 | 1.10 |
| 2022 | 2,179 | 2,179 | 378,126 | 378,126 | 0.37 | 1.00 |
| 2023 | 1,682 | 1,682 | 323,164 | 323,164 | 0.51 | 1.00 |
| 2024 | 1,414 | 1,414 | 326,199 | 326,199 | 0.36 | 1.00 |

Table A-**77**. Supporting Data for Figure 126 and Figure 127

| Year | Est. Pounds Caught (lb) | Est. Pounds Sold (lb) | % Sold | Est. Revenue ($) | Est. Revenue ($ adj) | Fish Price ($/lb) | Fish Price ($/lb adj) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2005 | 43,134 | 850 | 2% | 991 | 1,795 | 1.17 | 2.11 | 1.81 |
| 2006 | 58,095 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.76 |
| 2007 | 44,644 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.70 |
| 2008 | 84,262 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.54 |
| 2009 | 25,685 | 3,044 | 12% | 3,069 | 4,561 | 1.01 | 1.50 | 1.49 |
| 2010 | 17,293 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.42 |
| 2011 | 76,961 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.31 |
| 2012 | 54,051 | 9,800 | 18% | 13,294 | 16,870 | 1.36 | 1.73 | 1.27 |
| 2013 | 47,251 | 6,827 | 14% | 9,936 | 12,360 | 1.46 | 1.82 | 1.24 |
| 2014 | 60,067 | 6,946 | 12% | 10,128 | 12,518 | 1.46 | 1.80 | 1.24 |
| 2015 | 34,827 | 6,240 | 18% | 12,577 | 15,684 | 2.02 | 2.52 | 1.25 |
| 2016 | 44,932 | 2,919 | 6% | 6,670 | 8,324 | 2.29 | 2.86 | 1.25 |
| 2017 | 36,658 | 9,098 | 25% | 25,047 | 30,632 | 2.75 | 3.36 | 1.22 |
| 2018 | 21,214 | 16,314 | 77% | 49,597 | 59,665 | 3.04 | 3.66 | 1.20 |
| 2019 | 20,928 | 13,892 | 66% | 38,246 | 45,933 | 2.75 | 3.30 | 1.20 |
| 2020 | 21,521 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.20 |
| 2021 | 29,106 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.10 |
| 2022 | 14,345 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.00 |
| 2023 | 5,695 | 5,010 | 88% | n.d. | 10,469 | 2.09 | 2.09 | 1.00 |
| 2024 | 5,530 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.00 |

Table A-78. Supporting Data for Figure 128

| Year | Total Trip Cost ($) | Total Trip Cost ($ adj) | Fuel Cost ($ adj) | Ice Cost ($ adj) | Bait Cost ($ adj) | Gear Lost ($ adj) | Fuel Price adj. ($/gal) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2011 | 85 | 112 | 106 | - | 0 | 5.74 | 5.63 | 1.311 |
| 2012 | 91 | 116 | 88 | 15 | 0 | 13.05 | 5.43 | 1.269 |
| 2013 | 86 | 107 | 82 | 17 | 0 | 7.54 | 5.26 | 1.245 |
| 2014 | 68 | 84 | 73 | 6 | 2 | 2.75 | 2.65 | 1.236 |
| 2015 | 78 | 98 | 78 | 17 | 0 | 2.70 | 2.73 | 1.247 |
| 2016 | 75 | 94 | 60 | 23 | 1 | 9.95 | 2.88 | 1.248 |
| 2017 | 98 | 120 | 91 | 25 | 1 | 3.26 | 2.87 | 1.223 |
| 2018 | 115 | 138 | 113 | 19 | 1 | 5.82 | 3.64 | 1.203 |
| 2019 | 120 | 144 | 103 | 26 | 1 | 13.78 | 3.67 | 1.201 |
| 2020 | 99 | 120 | 98 | 18 | 0 | 4.14 | 3.77 | 1.203 |
| 2021 | 140 | 154 | 127 | 20 | 0 | 6.97 | 3.78 | 1.097 |
| 2022 | 84 | 84 | 73 | 11 | 0 | 0.00 | 4.15 | 1 |
| 2023 | 39 | 39 | 32 | 5 | 0 | 3.20 | 4.35 | 1 |
| 2024 | 107 | 107 | 84 | 14 | 1.67 | 6.67 | 4.36 | 1 |

Table A-79. Supporting Data for Figure 129 and Figure 130

| Year | Est. Pounds Caught (lb) | Est. Pounds Sold (lb) | Est. Revenue ($) | Est. Revenue ($ adj) | % of Pounds Sold | Fish Price ($) | Fish Price ($ adj) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2005 | 538,419 | 372,375 | 678,773 | 1,052,098 | 69% | 1.82 | 2.83 | 1.55 |
| 2006 | 596,369 | 356,706 | 568,872 | 777,648 | 60% | 1.59 | 2.18 | 1.367 |
| 2007 | 656,501 | 312,554 | 439,953 | 582,498 | 48% | 1.41 | 1.86 | 1.324 |
| 2008 | 609,075 | 219,187 | 359,427 | 470,130 | 36% | 1.64 | 2.14 | 1.308 |
| 2009 | 405,750 | 190,796 | 323,778 | 397,600 | 47% | 1.7 | 2.08 | 1.228 |
| 2010 | 587,427 | 188,906 | 335,518 | 388,530 | 32% | 1.78 | 2.06 | 1.158 |
| 2011 | 385,737 | 121,118 | 234,444 | 262,343 | 31% | 1.94 | 2.17 | 1.119 |
| 2012 | 489,687 | 160,883 | 324,934 | 348,654 | 33% | 2.02 | 2.17 | 1.073 |
| 2013 | 484,318 | 263,556 | 555,803 | 599,711 | 54% | 2.11 | 2.28 | 1.079 |
| 2014 | 421,812 | 235,104 | 542,205 | 590,461 | 56% | 2.31 | 2.51 | 1.089 |
| 2015 | 537,652 | 188,623 | 431,847 | 484,532 | 35% | 2.29 | 2.57 | 1.122 |
| 2016 | 457,501 | 223,004 | 497,524 | 560,212 | 49% | 2.23 | 2.51 | 1.126 |
| 2017 | 572,556 | 224,531 | 524,317 | 561,543 | 39% | 2.34 | 2.5 | 1.071 |
| 2018 | 539,037 | 221,341 | 534,415 | 584,116 | 41% | 2.41 | 2.64 | 1.093 |
| 2019 | 498,379 | 176,633 | 460,324 | 489,324 | 35% | 2.61 | 2.77 | 1.063 |

| Year | Est. Pounds Caught (lb) | Est. Pounds Sold (lb) | Est. Revenue ($) | Est. Revenue ($ adj) | % of Pounds Sold | Fish Price ($) | Fish Price ($ adj) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2020 | 309,444 | 153,547 | 354,815 | 381,781 | 50% | 2.31 | 2.49 | 1.076 |
| 2021 | 407,990 | 306,952 | 748,886 | 805,801 | 75% | 2.44 | 2.63 | 1.076 |
| 2022 | 261,952 | 234,105 | 721,584 | 753,334 | 89% | 3.08 | 3.22 | 1.044 |
| 2023 | 126,556 | 148,664 | 448,968 | 448,968 | 117% | 3.02 | 3.02 | 1 |
| 2024 | 84,333 | 99,415 | 267,191 | 267,191 | 118% | 2.69 | 2.69 | 1 |

Table A-80. Supporting Data for Figure 131

| Year | Total Trip Cost ($) | Total Trip Cost ($ adj) | Fuel Cost ($ adj) | Ice Cost ($ adj) | Bait Cost ($ adj) | Gear Lost ($ adj) | Fuel Price adj. ($/gal) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2009 | 73 | 80 | 70 | 9 | - | 0.85 | 3.66 | 1.095 |
| 2010 | 73 | 76 | 67 | 9 | 0.00 | 0.00 | 3.99 | 1.038 |
| 2011 | 81 | 82 | 74 | 7 | 0.00 | 1.19 | 4.68 | 1.014 |
| 2012 | 91 | 92 | 82 | 8 | 0.00 | 2.32 | 5.03 | 1.003 |
| 2013 | 96 | 99 | 91 | 8 | 0.08 | 0.00 | 5.13 | 1.029 |
| 2014 | 94 | 95 | 86 | 10 | 0.06 | 0.00 | 5.04 | 1.018 |
| 2015 | 79 | 84 | 74 | 10 | 0.00 | 0.00 | 4.31 | 1.061 |
| 2016 | 69 | 72 | 63 | 9 | 0.00 | 0.00 | 3.71 | 1.040 |
| 2017 | 73 | 74 | 65 | 8 | 0.00 | 0.19 | 3.98 | 1.010 |
| 2018 | 77 | 77 | 67 | 10 | 0.00 | 0.00 | 4.11 | 0.992 |
| 2019 | 76 | 76 | 66 | 9 | 0.00 | 0.00 | 3.95 | 1.002 |
| 2020 | 73 | 74 | 67 | 8 | 0.00 | 0.00 | 3.70 | 1.011 |
| 2021 | 94 | 95 | 84 | 11 | 0.00 | 0.00 | 4.71 | 1.001 |
| 2022 | 101 | 97 | 88 | 9 | 0.00 | 0.00 | 5.29 | 0.963 |
| 2023 | 88 | 88 | 79 | 8 | 0.00 | 0.00 | 5.41 | 1 |

*no update for 2024

Table A-81. Supporting Data for Figure 132 and Figure 133

| Year | Est. Pounds Caught (lb) | Est. Pounds Sold (lb) | Est. Revenue ($) | Est. Revenue ($ adj) | % of Pounds Sold | Fish Price ($) | Fish Price ($ adj) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2005 | 304,245 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 2.05 |
| 2006 | 520,866 | 199,352 | 310,625 | 571,238 | 0.38 | 1.56 | 2.87 | 1.84 |
| 2007 | 557,842 | 261,063 | 422,143 | 726,931 | 0.47 | 1.62 | 2.78 | 1.72 |
| 2008 | 512,266 | 139,670 | 246,769 | 400,012 | 0.27 | 1.77 | 2.86 | 1.62 |
| 2009 | 720,495 | 134,044 | 273,618 | 436,147 | 0.19 | 2.04 | 3.25 | 1.59 |

| Year | Est. Pounds Caught (lb) | Est. Pounds Sold (lb) | Est. Revenue ($) | Est. Revenue ($ adj) | % of Pounds Sold | Fish Price ($) | Fish Price ($ adj) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2010 | 743,415 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.55 |
| 2011 | 593,059 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.50 |
| 2012 | 502,306 | 118,038 | 244,382 | 355,087 | 0.23 | 2.07 | 3.01 | 1.45 |
| 2013 | 793,689 | 176,108 | 398,716 | 579,334 | 0.22 | 2.26 | 3.29 | 1.45 |
| 2014 | 807,936 | 121,632 | 242,719 | 350,001 | 0.15 | 2.00 | 2.88 | 1.44 |
| 2015 | 968,468 | 109,403 | 214,560 | 312,185 | 0.11 | 1.96 | 2.85 | 1.46 |
| 2016 | 890,934 | 100,551 | 216,029 | 296,392 | 0.11 | 2.15 | 2.95 | 1.37 |
| 2017 | 597,842 | 118,457 | 265,559 | 355,583 | 0.20 | 2.24 | 3.00 | 1.34 |
| 2018 | 857,132 | 97,019 | 231,632 | 302,279 | 0.11 | 2.39 | 3.12 | 1.31 |
| 2019 | 808,549 | 141,756 | 318,008 | 407,686 | 0.18 | 2.24 | 2.88 | 1.28 |
| 2020 | 624,253 | 74,756 | 180,840 | 227,858 | 0.12 | 2.42 | 3.05 | 1.26 |
| 2021 | 858,356 | 51,033 | 120,945 | 146,827 | 0.06 | 2.37 | 2.88 | 1.21 |
| 2022 | 623,889 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.13 |
| 2023 | 714,026 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.04 |
| 2024 | 699,118 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1.00 |

Table A-82. Supporting Data for Figure 134

| Year | Total Trip Cost ($) | Total Trip Cost ($ adj) | Fuel Cost ($ adj) | Ice Cost ($ adj) | Bait Cost ($ adj) | Gear Lost ($ adj) | Fuel Price adj. ($/gal) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2011 | 96 | 143 | 107 | 15 | 6 | 15 | 6.84 | 1.496 |
| 2012 | 112 | 163 | 104 | 16 | 7 | 36 | 6.97 | 1.451 |
| 2013 | 92 | 134 | 92 | 17 | 1 | 25 | 6.93 | 1.451 |
| 2014 | 100 | 144 | 91 | 16 | 5 | 32 | 6.73 | 1.440 |
| 2015 | 91 | 133 | 69 | 16 | 10 | 38 | 5.56 | 1.454 |
| 2016 | 76 | 105 | 58 | 14 | 5 | 28 | 4.89 | 1.372 |
| 2017 | 99 | 133 | 62 | 27 | 13 | 31 | 5.12 | 1.339 |
| 2018 | 109 | 143 | 79 | 24 | 16 | 23 | 5.38 | 1.305 |
| 2019 | 94 | 121 | 68 | 21 | 2 | 30 | 5.24 | 1.283 |
| 2020 | 83 | 105 | 64 | 17 | 1 | 24 | 4.71 | 1.261 |
| 2021 | 101 | 123 | 79 | 20 | 1 | 22 | 5.32 | 1.214 |
| 2022 | 92 | 104 | 93 | 11 | 0 | 0 | 5.78 | 1.126 |
| 2023 | 77 | 80 | 69 | 7 | 0 | 3 | 5.39 | 1.036 |
| 2024 | 79 | 79 | 73 | 6 | 0 | 0 | 5.12 | 1 |

Table A-83. Supporting Data for Figure 135

| Year | Estimated total landings (million lb) | Estimated total value ($ million) | Pounds sold in Hawaii markets (million lb) | Revenue from Hawaii markets ($ million) | Revenue from Hawaii markets ($ million adj) | Price ($/lb) | Price adjusted ($/lb) | CPI Adjuster |
|---|---|---|---|---|---|---|---|---|
| 2005 | 23.4 | 60.6 | 19.0 | 58.4 | 100.4 | 3.08 | 5.29 | 1.72 |
| 2006 | 21.5 | 55.9 | 17.6 | 53.8 | 87.4 | 3.06 | 4.98 | 1.625 |
| 2007 | 24.7 | 65.8 | 20.3 | 64.1 | 99.4 | 3.16 | 4.90 | 1.55 |
| 2008 | 26.9 | 74.5 | 21.8 | 72.0 | 107.0 | 3.31 | 4.92 | 1.486 |
| 2009 | 22.1 | 59.1 | 18.4 | 58.1 | 85.9 | 3.16 | 4.67 | 1.479 |
| 2010 | 23.8 | 72.1 | 19.5 | 69.6 | 100.7 | 3.57 | 5.17 | 1.448 |
| 2011 | 26.5 | 83.3 | 21.2 | 78.5 | 109.6 | 3.71 | 5.18 | 1.396 |
| 2012 | 26.1 | 96.5 | 21.3 | 92.4 | 126.1 | 4.33 | 5.91 | 1.364 |
| 2013 | 27.3 | 92.6 | 22.7 | 88.4 | 118.5 | 3.90 | 5.23 | 1.34 |
| 2014 | 29.8 | 87.3 | 23.9 | 82.8 | 109.4 | 3.46 | 4.57 | 1.321 |
| 2015 | 34.4 | 102.4 | 27.1 | 94.0 | 123.0 | 3.47 | 4.53 | 1.308 |
| 2016 | 33.1 | 110.7 | 26.3 | 102.1 | 130.9 | 3.88 | 4.98 | 1.282 |
| 2017 | 35.6 | 108.5 | 28.4 | 101.0 | 126.4 | 3.56 | 4.46 | 1.251 |
| 2018 | 33.6 | 109.5 | 26.6 | 101.5 | 124.6 | 3.81 | 4.68 | 1.228 |
| 2019 | 32.3 | 99.0 | 26.0 | 93.3 | 112.7 | 3.59 | 4.33 | 1.208 |
| 2020 | 27.5 | 80.1 | 21.1 | 72.2 | 85.9 | 3.42 | 4.07 | 1.189 |
| 2021 | 28.0 | 119.8 | 22.8 | 114.9 | 131.6 | 5.03 | 5.77 | 1.146 |
| 2022 | 26.6 | 117.9 | 21.6 | 113.8 | 122.5 | 5.26 | 5.66 | 1.076 |
| 2023 | 27.5 | 109.7 | 22.3 | 106.6 | 111.3 | 4.77 | 4.98 | 1.044 |
| 2024 | 31.0 | 104.5 | 25.3 | 102.9 | 102.9 | 4.07 | 4.07 | 1 |

Data source: PIFSC Fishery Economic Performance Measures (Tier 1 indicators).

Table A-84. Supporting Data for Figure 136

| Year | Bigeye Price ($/lb) | Bigeye Price ($/lb adj) | Yellowfin Price ($/lb) | Yellowfin Price ($/lb adj) | Swordfish Price ($/lb) | Swordfish Price ($/lb adj) |
|---|---|---|---|---|---|---|
| 2005 | 3.36 | 5.78 | 2.58 | 4.44 | 2.24 | 3.84 |
| 2006 | 3.48 | 5.65 | 2.74 | 4.46 | 1.97 | 3.21 |
| 2007 | 3.32 | 5.15 | 2.28 | 3.54 | 2.17 | 3.36 |
| 2008 | 3.82 | 5.67 | 2.83 | 4.21 | 1.78 | 2.64 |
| 2009 | 3.75 | 5.55 | 2.85 | 4.22 | 1.95 | 2.88 |
| 2010 | 4.08 | 5.91 | 3.21 | 4.65 | 2.43 | 3.51 |
| 2011 | 4.26 | 5.94 | 3.03 | 4.23 | 2.63 | 3.68 |
| 2012 | 4.82 | 6.57 | 3.96 | 5.41 | 2.89 | 3.94 |

| Year | Bigeye Price ($/lb) | Bigeye Price ($/lb adj) | Yellowfin Price ($/lb) | Yellowfin Price ($/lb adj) | Swordfish Price ($/lb) | Swordfish Price ($/lb adj) |
|---|---|---|---|---|---|---|
| 2013 | 4.43 | 5.93 | 4.25 | 5.70 | 3.07 | 4.11 |
| 2014 | 3.85 | 5.09 | 3.76 | 4.97 | 2.12 | 2.81 |
| 2015 | 3.85 | 5.03 | 2.99 | 3.91 | 2.46 | 3.22 |
| 2016 | 4.18 | 5.36 | 2.92 | 3.74 | 2.96 | 3.79 |
| 2017 | 3.86 | 4.83 | 2.79 | 3.49 | 2.38 | 2.97 |
| 2018 | 4.20 | 5.15 | 3.63 | 4.45 | 2.09 | 2.57 |
| 2019 | 3.89 | 4.69 | 3.43 | 4.14 | 2.65 | 3.21 |
| 2020 | 3.43 | 4.08 | 3.05 | 3.63 | 2.55 | 3.04 |
| 2021 | 5.08 | 5.82 | 4.11 | 4.71 | 2.93 | 3.36 |
| 2022 | 5.24 | 5.64 | 4.19 | 4.50 | 3.41 | 3.67 |
| 2023 | 4.95 | 5.17 | 3.78 | 3.94 | 2.92 | 3.05 |
| 2024 | 4.18 | 4.18 | 3.65 | 3.65 | 2.42 | 2.42 |

Table A-85. Supporting Data for Figure 137

| Year | Est. Kept Value ($) | Est. Bigeye Kept Value ($) | Est. Yellowfin Kept Value ($) | Est. Swordfish Kept Value ($) | Est. Others Kept Value ($) | % bigeye | % yellowfin | % swordfish | % others |
|---|---|---|---|---|---|---|---|---|---|
| 2005 | 60,624,497 | 37,166,905 | 4,120,645 | 7,877,437 | 11,459,510 | 61% | 7% | 13% | 19% |
| 2006 | 55,853,762 | 33,857,353 | 5,731,074 | 5,084,768 | 11,180,568 | 61% | 10% | 9% | 20% |
| 2007 | 65,836,040 | 42,208,056 | 4,272,917 | 8,298,317 | 11,056,750 | 64% | 6% | 13% | 17% |
| 2008 | 74,537,597 | 49,877,959 | 5,479,032 | 7,792,301 | 11,388,305 | 67% | 7% | 10% | 15% |
| 2009 | 59,096,104 | 38,515,167 | 3,001,797 | 7,840,792 | 9,738,348 | 65% | 5% | 13% | 16% |
| 2010 | 72,122,962 | 48,635,042 | 3,923,402 | 8,948,693 | 10,615,825 | 67% | 5% | 12% | 15% |
| 2011 | 83,338,231 | 53,366,379 | 6,271,548 | 9,265,500 | 14,434,805 | 64% | 8% | 11% | 17% |
| 2012 | 96,463,778 | 62,223,867 | 7,731,132 | 9,049,944 | 17,458,836 | 65% | 8% | 9% | 18% |
| 2013 | 92,600,987 | 62,979,020 | 6,793,581 | 8,574,965 | 14,253,421 | 68% | 7% | 9% | 15% |
| 2014 | 87,317,440 | 60,271,041 | 5,388,558 | 7,796,655 | 13,861,186 | 69% | 6% | 9% | 16% |
| 2015 | 102,444,972 | 73,242,543 | 5,850,355 | 8,216,373 | 15,135,701 | 71% | 6% | 8% | 15% |
| 2016 | 110,681,078 | 75,641,255 | 9,542,693 | 7,118,299 | 18,378,831 | 68% | 9% | 6% | 17% |
| 2017 | 108,485,554 | 67,678,779 | 15,901,494 | 8,476,775 | 16,428,506 | 62% | 15% | 8% | 15% |
| 2018 | 109,466,804 | 69,552,302 | 19,835,293 | 4,856,715 | 15,222,494 | 64% | 18% | 4% | 14% |
| 2019 | 98,979,629 | 65,041,301 | 15,237,151 | 4,235,261 | 14,465,916 | 66% | 15% | 4% | 15% |
| 2020 | 80,072,024 | 55,092,012 | 11,023,903 | 4,060,707 | 9,895,404 | 69% | 14% | 5% | 12% |
| 2021 | 119,811,233 | 76,824,245 | 22,259,726 | 6,253,326 | 14,473,936 | 64% | 19% | 5% | 12% |
| 2022 | 117,910,116 | 72,175,969 | 21,683,156 | 9,804,036 | 14,246,956 | 61% | 18% | 8% | 12% |
| 2023 | 109,695,062 | 67,533,059 | 22,708,083 | 7,840,216 | 11,613,704 | 62% | 21% | 7% | 11% |
| 2024 | 104,489,590 | 56,001,838 | 33,275,251 | 5,418,096 | 9,794,405 | 54% | 32% | 5% | 9% |

Table A-86. Supporting Data for Figure 140

| Year | Total Trip Cost ($ adj) | Fuel Cost ($ adj) | Other Costs ($ adj) | Trip Days | CPI Adjuster |
|---|---|---|---|---|---|
| 2005 | 14,330 | 14,259 | 28,589 | 18.5 | 210 |
| 2006 | 15,703 | 14,418 | 30,121 | 20.3 | 189 |
| 2007 | 16,077 | 13,943 | 30,020 | 20.5 | 182 |
| 2008 | 23,616 | 14,480 | 38,097 | 21.6 | 174 |
| 2009 | 15,462 | 15,711 | 31,202 | 23.6 | 141 |
| 2010 | 18,092 | 15,262 | 33,691 | 23.5 | 134 |
| 2011 | 22,880 | 16,424 | 39,315 | 23.2 | 148 |
| 2012 | 23,878 | 17,050 | 40,928 | 23.2 | 148 |
| 2013 | 22,088 | 17,006 | 39,214 | 22.9 | 149 |
| 2014 | 22,000 | 17,398 | 39,398 | 23.4 | 162 |
| 2015 | 16,208 | 17,558 | 33,841 | 21.7 | 147 |
| 2016 | 13,804 | 17,365 | 31,170 | 22.3 | 141 |
| 2017 | 13,202 | 16,559 | 29,762 | 20.9 | 152 |
| 2018 | 15,796 | 15,914 | 31,709 | 20.8 | 165 |
| 2019 | 16,527 | 16,367 | 32,894 | 21.5 | 182 |
| 2020 | 12,777 | 17,159 | 29,951 | 20.8 | 120 |
| 2021 | 15,955 | 16,232 | 28,843 | 21 | 145 |
| 2022 | 21,245 | 16,156 | 37,401 | 23.3 | 144 |
| 2023 | 19,098 | 15,924 | 35,022 | 22.6 | 116 |
| 2024 | 17,576 | 14,785 | 32,361 | 21.8 | 110 |

Table A-87. Supporting Data for Figure 141

| Year | Total Trip Cost ($ adj) | Fuel Cost ($ adj) | Other Costs ($ adj) | Trip Days | CPI Adjuster |
|---|---|---|---|---|---|
| 2005 | 28,626 | 30,832 | 59,459 | 28 | 57 |
| 2006 | 29,754 | 30,483 | 60,237 | 31 | 44 |
| 2007 | 32,472 | 29,498 | 61,970 | 33 | 62 |
| 2008 | 45,404 | 30,037 | 75,441 | 33 | 67 |
| 2009 | 27,373 | 28,814 | 56,187 | 32 | 68 |
| 2010 | 33,828 | 26,654 | 60,483 | 33 | 85 |
| 2011 | 49,631 | 29,326 | 78,957 | 33 | 65 |
| 2012 | 48,220 | 30,403 | 78,623 | 35 | 51 |
| 2013 | 38,619 | 28,031 | 66,650 | 31 | 35 |
| 2014 | 39,394 | 29,136 | 68,530 | 32 | 53 |
| 2015 | 27,088 | 27,785 | 54,872 | 33 | 55 |

| Year | Total Trip Cost ($ adj) | Fuel Cost ($ adj) | Other Costs ($ adj) | Trip Days | CPI Adjuster |
|---|---|---|---|---|---|
| 2016 | 21,962 | 29,309 | 51,271 | 31 | 21 |
| 2017 | 21,592 | 25,638 | 47,230 | 27 | 34 |
| 2018 | 26,912 | 28,851 | 55,763 | 33 | 19 |
| 2019 | 21,853 | 21,752 | 43,605 | 27 | 17 |
| 2020 | 25,740 | 25,366 | 51,106 | 28 | 15 |
| 2021 | 20,639 | 21,533 | 42,172 | 25 | 30 |
| 2022 | 28,230 | 21,576 | 49,807 | 26 | 42 |
| 2023 | 28,651 | 22,907 | 51,558 | 28 | 37 |
| 2024 | 29,638 | 24,734 | 54,371 | 31 | 31 |

Table A-88. Supporting Data for Figure 142

| Year | Trip Cost ($) | Trip Revenue ($) | Trip Revenue ($ adj) | Trip Net Revenue ($) | Trip Net Revenue ($ adj) | CPI Adjuster |
|---|---|---|---|---|---|---|
| 2005 | 16,621 | 28,589 | 38,162 | 65,638 | 21,540 | 37,050 |
| 2006 | 18,536 | 30,121 | 38,443 | 62,470 | 19,907 | 32,349 |
| 2007 | 19,368 | 30,020 | 41,099 | 63,704 | 21,732 | 33,684 |
| 2008 | 25,637 | 38,097 | 51,084 | 75,910 | 25,446 | 37,813 |
| 2009 | 21,077 | 31,173 | 43,216 | 63,917 | 22,139 | 32,714 |
| 2010 | 23,034 | 33,354 | 56,194 | 81,369 | 33,159 | 47,677 |
| 2011 | 28,142 | 39,315 | 58,598 | 81,861 | 30,455 | 42,546 |
| 2012 | 30,006 | 40,928 | 68,629 | 93,610 | 38,623 | 52,681 |
| 2013 | 29,175 | 39,094 | 64,165 | 85,981 | 34,990 | 46,767 |
| 2014 | 29,824 | 39,398 | 61,565 | 81,327 | 31,741 | 41,929 |
| 2015 | 25,824 | 33,753 | 67,022 | 87,598 | 41,198 | 53,757 |
| 2016 | 24,313 | 31,170 | 77,368 | 99,186 | 53,055 | 68,016 |
| 2017 | 23,790 | 29,762 | 67,065 | 83,898 | 43,274 | 54,136 |
| 2018 | 25,822 | 31,709 | 66,676 | 81,878 | 40,854 | 50,168 |
| 2019 | 27,230 | 32,894 | 58,959 | 71,223 | 31,729 | 38,329 |
| 2020 | 25,169 | 29,951 | 50,190 | 59,726 | 25,021 | 29,775 |
| 2021 | 28,093 | 32,195 | 71,297 | 81,706 | 43,204 | 44,569 |
| 2022 | 34,759 | 37,401 | 75,416 | 81,148 | 40,657 | 43,747 |
| 2023 | 33,546 | 35,022 | 68,841 | 71,870 | 35,295 | 36,848 |
| 2024 | 32,361 | 32,361 | 63,810 | 63,810 | 31,449 | 31,449 |

Table A-89. Supporting Data for Figure 143

| Year | Trip costs ($) | Total trip rev | Trip costs adjusted ($) | Revenue adjusted ($) | Net revenue adjusted ($) | CPI Adjustor |
|---|---|---|---|---|---|---|
| 2005 | 34,569 | 76,272 | 59,459 | 131,188 | 71,729 | 1.72 |
| 2006 | 37,069 | 78,840 | 60,237 | 128,115 | 67,878 | 1.625 |
| 2007 | 39,980 | 88,847 | 61,970 | 137,713 | 75,743 | 1.55 |
| 2008 | 50,768 | 86,709 | 75,441 | 128,849 | 53,408 | 1.486 |
| 2009 | 37,990 | 69,182 | 56,187 | 102,320 | 46,133 | 1.479 |
| 2010 | 41,770 | 72,601 | 60,483 | 105,126 | 44,643 | 1.448 |
| 2011 | 56,519 | 103,466 | 78,957 | 144,542 | 65,585 | 1.397 |
| 2012 | 57,641 | 102,568 | 78,623 | 139,903 | 61,280 | 1.364 |
| 2013 | 49,739 | 106,305 | 66,650 | 142,448 | 75,798 | 1.34 |
| 2014 | 51,878 | 86,970 | 68,530 | 114,888 | 46,357 | 1.321 |
| 2015 | 41,983 | 78,048 | 54,872 | 102,008 | 47,136 | 1.307 |
| 2016 | 39,993 | 112,978 | 51,271 | 144,837 | 93,566 | 1.282 |
| 2017 | 37,754 | 108,788 | 47,230 | 136,093 | 88,864 | 1.251 |
| 2018 | 45,409 | 109,863 | 55,763 | 134,912 | 79,150 | 1.228 |
| 2019 | 36,097 | 107,843 | 43,605 | 130,274 | 86,669 | 1.208 |
| 2020 | 42,946 | 86,264 | 51,106 | 102,654 | 51,548 | 1.19 |
| 2021 | 36,799 | 96,623 | 42,172 | 110,730 | 68,558 | 1.146 |
| 2022 | 46,289 | 168,059 | 49,807 | 180,832 | 131,025 | 1.076 |
| 2023 | 49,385 | 105,327 | 51,558 | 109,962 | 58,403 | 1.044 |
| 2024 | 54,371 | 91,041 | 54,371 | 91,041 | 36,670 | 1 |

Table A-90. Supporting Data for Figure 144 and Figure 145

| Year | Revenue per-trip ($/trip) | Revenue per-trip adjusted ($/trip) | Revenue per-day ($/day) | Revenue per-day adjusted ($/day) | Annual revenue per vessel ($) | Annual revenue per vessel adjusted ($) | Gini coeeficient | CPI adjustor |
|---|---|---|---|---|---|---|---|---|
| 2005 | 39,062 | 67,187 | 2,096 | 3,604 | 484,996 | 834,193 | 0.218 | 1.720 |
| 2006 | 38,680 | 62,855 | 1,964 | 3,191 | 439,793 | 714,664 | 0.235 | 1.625 |
| 2007 | 43,456 | 67,357 | 2,045 | 3,170 | 510,357 | 791,053 | 0.202 | 1.550 |
| 2008 | 50,568 | 75,144 | 2,313 | 3,437 | 577,811 | 858,627 | 0.215 | 1.486 |
| 2009 | 43,294 | 64,032 | 1,866 | 2,760 | 465,324 | 688,214 | 0.226 | 1.479 |
| 2010 | 54,597 | 79,057 | 2,287 | 3,311 | 581,637 | 842,210 | 0.221 | 1.448 |
| 2011 | 59,956 | 83,698 | 2,652 | 3,702 | 646,033 | 901,862 | 0.218 | 1.396 |
| 2012 | 66,849 | 91,183 | 2,943 | 4,015 | 747,781 | 1,019,974 | 0.193 | 1.364 |
| 2013 | 64,262 | 86,111 | 2,792 | 3,741 | 685,933 | 919,151 | 0.220 | 1.340 |
| 2014 | 61,018 | 80,605 | 2,624 | 3,466 | 623,696 | 823,902 | 0.225 | 1.321 |
| 2015 | 67,710 | 88,564 | 3,056 | 3,997 | 726,560 | 950,341 | 0.219 | 1.308 |

| Year | Revenue per-trip ($/trip) | Revenue per-trip adjusted ($/trip) | Revenue per-day ($/day) | Revenue per-day adjusted ($/day) | Annual revenue per vessel ($) | Annual revenue per vessel adjusted ($) | Gini coeeficient | CPI adjustor |
|---|---|---|---|---|---|---|---|---|
| 2016 | 72,721 | 93,228 | 3,269 | 4,191 | 784,972 | 1,006,334 | 0.211 | 1.282 |
| 2017 | 67,634 | 84,611 | 3,147 | 3,937 | 753,372 | 942,468 | 0.200 | 1.251 |
| 2018 | 65,706 | 80,687 | 3,092 | 3,798 | 770,893 | 946,657 | 0.199 | 1.228 |
| 2019 | 57,148 | 69,034 | 2,678 | 3,234 | 677,943 | 818,955 | 0.180 | 1.208 |
| 2020 | 48,440 | 57,596 | 2,321 | 2,759 | 556,056 | 661,150 | 0.219 | 1.189 |
| 2021 | 69,658 | 79,828 | 3,342 | 3,830 | 837,841 | 960,166 | 0.203 | 1.146 |
| 2022 | 74,769 | 80,451 | 3,385 | 3,643 | 818,820 | 881,051 | 0.215 | 1.076 |
| 2023 | 66,887 | 69,830 | 2,949 | 3,079 | 746,225 | 779,059 | 0.167 | 1.044 |
| 2024 | 62,531 | 62,531 | 2,843 | 2,843 | 710,814 | 710,814 | 0.171 | 1 |

Table A-91. Supporting Data for Figure 146, Figure 147, Figure 151, Figure 152, Figure 153, and Figure 154

| Year | Troll lb Kept | MHI Handline lb Kept | Offshore Handline lb Kept | Others lb Kept | Aku Boat lb Kept | Troll lb Sold | MHI Handline lb Sold | Offshore Handline lb Sold | Others lb Sold | Aku Boat lb Sold |
|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | 2,605,415 | 1,223,122 | 424,210 | 189,940 | 904,729 | 2,041,832 | 1,122,405 | 222,738 | 115,143 | 921,759 |
| 2006 | 2,590,949 | 801,476 | 502,765 | 273,090 | 630,590 | 1,942,636 | 660,135 | 280,554 | 173,778 | 655,735 |
| 2007 | 2,838,518 | 949,837 | 598,687 | 279,449 | 643,029 | 2,003,353 | 740,916 | 331,025 | 179,696 | 640,107 |
| 2008 | 2,976,988 | 686,237 | 325,433 | 293,628 | 702,193 | 2,037,864 | 522,670 | 232,856 | 222,178 | 696,977 |
| 2009 | 2,962,381 | 1,063,594 | 306,922 | 156,145 | 506,695 | 2,032,030 | 801,006 | 221,498 | 114,848 | 509,769 |
| 2010 | 2,857,486 | 929,717 | 615,316 | 235,169 | 114,320 | 1,985,285 | 738,725 | 537,959 | 201,618 | 113,525 |
| 2011 | 2,984,978 | 1,119,883 | 614,733 | 247,663 | 358,187 | 2,017,973 | 841,634 | 461,697 | 187,089 | 369,687 |
| 2012 | 3,671,896 | 1,609,266 | 590,123 | 322,838 | 109,563 | 2,612,737 | 1,320,317 | 472,479 | 257,354 | 109,364 |
| 2013 | 3,201,290 | 1,309,552 | 835,410 | 308,294 | 233,275 | 2,395,280 | 1,081,399 | 743,874 | 272,190 | 233,292 |
| 2014 | 3,490,512 | 1,167,585 | 417,010 | 132,028 | 47,648 | 2,720,280 | 981,747 | 327,058 | 108,530 | 56,390 |
| 2015 | 3,094,132 | 1,198,665 | 407,075 | 151,028 | 31,517 | 2,394,176 | 1,004,297 | 328,964 | 122,208 | 25,607 |
| 2016 | 2,594,727 | 795,355 | 386,290 | 65,349 | 1,521 | 2,125,350 | 707,698 | 361,983 | 61,195 | 478 |
| 2017 | 2,230,479 | 989,701 | 323,700 | 74,969 | 16,434 | 1,799,828 | 858,984 | 286,686 | 64,174 | 15,593 |
| 2018 | 2,762,223 | 786,965 | 349,723 | 99,810 | 4,019 | 2,204,570 | 666,786 | 295,634 | 83,337 | 3,922 |
| 2019 | 2,480,164 | 685,164 | 476,898 | 130,650 | NULL | 2,029,026 | 622,607 | 397,623 | 112,548 | NULL |
| 2020 | 1,498,570 | 582,749 | 328,425 | 112,691 | NULL | 1,208,821 | 524,232 | 344,679 | 112,443 | NULL |
| 2021 | 1,829,638 | 684,962 | 256,969 | 179,848 | NULL | 1,497,223 | 639,340 | 267,994 | 176,631 | NULL |
| 2022 | 1,773,911 | 966,318 | 571,035 | 310,765 | NULL | 1,505,832 | 897,297 | 599,949 | 314,482 | NULL |
| 2023 | 1,602,922 | 572,820 | 347,945 | 191,298 | NULL | 1,290,519 | 529,693 | 378,862 | 197,301 | NULL |
| 2024 | 1,322,627 | 508,007 | 180,289 | 230,390 | NULL | 986,529 | 474,329 | 142,899 | 196,377 | NULL |

Table A-92. Supporting Data for Figure 148, Figure 151, Figure 152, Figure 153, and Figure 154

| Year | Troll Revenue | MHI Handline Revenue | Offshore Handline Revenue | Others Revenue | Aku Boat Revenue | Troll Adjusted Revenue | MHI Handline Adjusted Revenue | Offshore Handline Adjusted Revenue | Others Adjusted Revenue | Aku Boat Adjusted Revenue | CPI adjustor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | 4,942,069 | 2,111,779 | 481,306 | 249,625 | 1,073,828 | 8,465,765 | 3,617,477 | 824,477 | 427,607 | 1,839,468 | 1.713 |
| 2006 | 4,995,694 | 1,425,268 | 539,240 | 383,182 | 878,864 | 8,282,861 | 2,363,095 | 894,060 | 635,315 | 1,457,157 | 1.658 |
| 2007 | 5,310,730 | 1,506,553 | 630,916 | 371,466 | 671,832 | 8,486,547 | 2,407,471 | 1,008,203 | 593,603 | 1,073,588 | 1.598 |
| 2008 | 5,234,010 | 1,348,929 | 527,932 | 518,735 | 866,873 | 7,898,122 | 2,035,533 | 796,649 | 782,771 | 1,308,112 | 1.509 |
| 2009 | 5,023,406 | 1,714,376 | 424,674 | 241,325 | 681,289 | 7,233,705 | 2,468,702 | 611,530 | 347,508 | 981,057 | 1.44 |
| 2010 | 5,465,395 | 1,876,576 | 1,191,546 | 464,922 | 210,682 | 7,547,710 | 2,591,551 | 1,645,524 | 642,058 | 290,951 | 1.381 |
| 2011 | 6,063,878 | 2,189,553 | 1,167,044 | 493,311 | 607,295 | 8,331,768 | 3,008,446 | 1,603,519 | 677,810 | 834,424 | 1.374 |
| 2012 | 9,000,654 | 3,510,982 | 1,441,714 | 802,119 | 230,235 | 12,114,881 | 4,725,782 | 1,940,546 | 1,079,653 | 309,897 | 1.346 |
| 2013 | 7,423,961 | 3,241,943 | 1,816,264 | 692,705 | 456,267 | 9,628,877 | 4,204,800 | 2,355,695 | 898,438 | 591,778 | 1.297 |
| 2014 | 8,342,685 | 2,950,764 | 826,835 | 298,684 | 102,352 | 10,570,182 | 3,738,618 | 1,047,599 | 378,432 | 129,680 | 1.267 |
| 2015 | 7,701,217 | 2,904,962 | 791,461 | 329,319 | 71,569 | 9,588,015 | 3,616,678 | 985,369 | 410,003 | 89,103 | 1.245 |
| 2016 | 7,550,275 | 2,364,724 | 956,080 | 181,293 | 1,035 | 9,264,188 | 2,901,517 | 1,173,111 | 222,446 | 1,270 | 1.227 |
| 2017 | 6,369,541 | 2,893,301 | 873,230 | 215,332 | 32,035 | 7,738,993 | 3,515,361 | 1,060,974 | 261,628 | 38,923 | 1.215 |
| 2018 | 7,993,273 | 2,403,032 | 940,736 | 298,207 | 12,768 | 9,519,989 | 2,862,011 | 1,120,417 | 355,165 | 15,207 | 1.191 |
| 2019 | 7,362,112 | 2,290,337 | 1,130,572 | 368,598 | n.d. | 8,554,775 | 2,661,372 | 1,313,724 | 428,311 | n.d. | 1.162 |
| 2020 | 4,260,295 | 1,882,455 | 970,035 | 348,794 | n.d. | 4,860,996 | 2,147,881 | 1,106,810 | 397,974 | n.d. | 1.141 |
| 2021 | 6,633,070 | 2,835,354 | 833,273 | 658,091 | n.d. | 7,442,305 | 3,181,267 | 934,932 | 738,378 | n.d. | 1.122 |
| 2022 | 7,011,499 | 4,197,905 | 2,149,380 | 1,274,318 | n.d. | 7,747,706 | 4,638,685 | 2,375,065 | 1,408,122 | n.d. | 1.105 |
| 2023 | 6,092,718 | 2,712,202 | 1,573,219 | 869,586 | n.d. | 6,488,744 | 2,888,496 | 1,675,478 | 926,109 | n.d. | 1.065 |
| 2024 | 4,262,465 | 2,186,376 | 517,066 | 869,392 | n.d. | 4,262,465 | 2,186,376 | 517,066 | 869,392 | n.d. | 1 |

Table A-93. Supporting Data for Figure 149

| Year | MHI troll price ($/lb), adjusted | MHI handline price ($/lb), adjusted | Offshore price ($/lb), adjusted | Other gears price ($/lb), adjusted |
|---|---|---|---|---|
| 2004 | 3.70 | 3.11 | 3.01 | 3.02 |
| 2005 | 3.99 | 3.10 | 3.56 | 3.57 |
| 2006 | 4.00 | 3.36 | 2.99 | 3.43 |
| 2007 | 3.94 | 3.02 | 2.83 | 3.07 |
| 2008 | 3.66 | 3.68 | 3.23 | 3.32 |
| 2009 | 3.50 | 3.03 | 2.72 | 2.98 |
| 2010 | 3.82 | 3.53 | 3.07 | 3.20 |
| 2011 | 4.02 | 3.48 | 3.38 | 3.53 |
| 2012 | 4.50 | 3.48 | 3.99 | 4.07 |
| 2013 | 3.98 | 3.85 | 3.14 | 3.27 |
| 2014 | 3.88 | 3.80 | 3.20 | 3.48 |

| Year | MHI troll price ($/lb), adjusted | MHI handline price ($/lb), adjusted | Offshore price ($/lb), adjusted | Other gears price ($/lb), adjusted |
|---|---|---|---|---|
| 2015 | 4.03 | 3.62 | 3.01 | 3.38 |
| 2016 | 4.37 | 4.11 | 3.25 | 3.64 |
| 2017 | 4.24 | 4.04 | 3.65 | 4.02 |
| 2018 | 4.26 | 4.24 | 3.74 | 4.21 |
| 2019 | 4.22 | 4.26 | 3.15 | 3.74 |
| 2020 | 4.02 | 4.09 | 3.21 | 3.54 |
| 2021 | 4.86 | 4.87 | 3.41 | 4.09 |
| 2022 | 4.83 | 4.81 | 3.31 | 3.94 |
| 2023 | 4.74 | 5.14 | 3.87 | 4.23 |

*no update for 2024

# APPENDIX B: LIST OF PROTECTED SPECIES AND DESIGNATED CRITICAL HABITAT

Table B-1. Protected species found or reasonably believed to be found near or in Hawaii shallow-set longline waters

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| **Seabirds** | | | | | |
| Laysan Albatross | *Phoebastria immutabilis* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Black-Footed Albatross | *Phoebastria nigripes* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Short-Tailed Albatross | *Phoebastria albatrus* | Endangered | N/A | Breeding visitor in the NWHI | 35 FR 8495, 65 FR 46643, Pyle & Pyle 2009 |
| Northern Fulmar | *Fulmarus glacialis* | Not Listed | N/A | Winter resident | Pyle & Pyle 2009 |
| Kermadec Petrel | *Pterodroma neglecta* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Herald Petrel | *Pterodroma arminjoniana* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Murphy's Petrel | *Pterodroma ultima* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Mottled Petrel | *Pterodroma inexpectata* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Juan Fernandez Petrel | *Pterodroma externa* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Hawaiian Petrel | *Pterodroma sandwichensis (Pterodroma phaeopygia sandwichensis)* | Endangered | N/A | Breeding visitor in the MHI | 32 FR 4001, Pyle & Pyle 2009 |
| White-Necked Petrel | *Pterodroma cervicalis* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Bonin Petrel | *Pterodroma hypoleuca* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| Black-Winged Petrel | *Pterodroma nigripennis* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Cook Petrel | *Pterodroma cookii* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Stejneger Petrel | *Pterodroma longirostris* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Pycroft Petrel | *Pterodroma pycrofti* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Bulwer Petrel | *Bulweria bulwerii* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Flesh-Footed Shearwater | *Ardenna carneipes* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Wedge-Tailed Shearwater | *Ardenna pacifica* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Buller's Shearwater | *Ardenna bulleri* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Sooty Shearwater | *Ardenna grisea* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Short-Tailed Shearwater | *Ardenna tenuirostris* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Christmas Shearwater | *Puffinus nativitatis* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Newell's Shearwater | *Puffinus newelli (Puffinus auricularis newelli)* | Threatened | N/A | Breeding visitor | 40 FR 44149, Pyle & Pyle 2009 |
| Wilson's Storm-Petrel | *Oceanites oceanicus* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Leach's Storm-Petrel | *Oceanodroma leucorhoa* | Not Listed | N/A | Winter resident | Pyle & Pyle 2009 |
| Band-Rumped Storm-Petrel | *Oceanodroma castro* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Tristram Storm-Petrel | *Oceanodroma tristrami* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| White-Tailed Tropicbird | *Phaethon lepturus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Red-Tailed Tropicbird | *Phaethon rubricauda* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Masked Booby | *Sula dactylatra* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Brown Booby | *Sula leucogaster* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Red-Footed Booby | *Sula sula* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Great Frigatebird | *Fregata minor* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Lesser Frigatebird | *Fregata ariel* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Laughing Gull | *Leucophaeus atricilla* | Not Listed | N/A | Winter resident in the MHI | Pyle & Pyle 2009 |
| Franklin Gull | *Leucophaeus pipixcan* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Ring-Billed Gull | *Larus delawarensis* | Not Listed | N/A | Winter resident in the MHI | Pyle & Pyle 2009 |
| Herring Gull | *Larus argentatus* | Not Listed | N/A | Winter resident in the NWHI | Pyle & Pyle 2009 |
| Slaty-Backed Gull | *Larus schistisagus* | Not Listed | N/A | Winter resident in the NWHI | Pyle & Pyle 2009 |
| Glaucous-Winged Gull | *Larus glaucescens* | Not Listed | N/A | Winter resident | Pyle & Pyle 2009 |
| Brown Noddy | *Anous stolidus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Black Noddy | *Anous minutus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Blue-Gray Noddy | *Procelsterna cerulea* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| White Tern | *Gygis alba* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Sooty Tern | *Onychoprion fuscatus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Gray-Backed Tern | *Onychoprion lunatus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Little Tern | *Sternula albifrons* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| Least Tern | *Sternula antillarum* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| Arctic Tern | *Sterna paradisaea* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| South Polar Skua | *Stercorarius maccormicki* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Pomarine Jaeger | *Stercorarius pomarinus* | Not Listed | N/A | Winter resident in the MHI | Pyle & Pyle 2009 |
| Parasitic Jaeger | *Stercorarius parasiticus* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Long-Tailed Jaeger | *Stercorarius longicaudus* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| **Sea turtles** | | | | | |
| Green Sea Turtle | *Chelonia mydas* | Threatened (Central North Pacific DPS) | N/A | Most common turtle in the Hawaiian Islands, much more common in nearshore State waters (foraging grounds) than offshore federal waters. Most nesting occurs on French Frigate Shoals in the NWHI. Foraging and haul out in the MHI. | 43 FR 32800, 81 FR 20057, Balazs et al. 1992, Kolinski et al. 2001 |
| Green Sea Turtle | *Chelonia mydas* | Threatened (East Pacific DPS) | N/A | Nest primarily in Mexico and the Galapagos Islands. Little known about their pelagic range west of 90°W but may range as far as the Marshall Islands. Genetic testing confirmed that they are incidentally taken in the HI DSLL fishery. | 43 FR 32800, 81 FR 20057, WPRFMC 2009, Cliffton et al. 1982, Karl & Bowen 1999 |
| Hawksbill Sea Turtle | *Eretmochelys imbricata* | Endangered[a] | N/A | Small population foraging around Hawaii and low level nesting on Maui and Hawaii Islands. Occur worldwide in tropical and subtropical waters. | 35 FR 8491, NMFS & USFWS 2007, Balazs et al. 1992, Katahira et al. 1994 |
| Leatherback Sea Turtle | *Dermochelys coriacea* | Endangered[a] | N/A | Regularly sighted in offshore waters, especially at the southeastern end of the archipelago. | 35 FR 8491, NMFS & USFWS 1997 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Loggerhead Sea Turtle | *Caretta caretta* | Endangered (North Pacific DPS) | N/A | Rare in Hawaii. Found worldwide along continental shelves, bays, estuaries, and lagoons of tropical, subtropical, and temperate waters. | 43 FR 32800, 76 FR 58868, Dodd 1990, Balazs 1979 |
| Olive Ridley Sea Turtle | *Lepidochelys olivacea* | Threatened (Entire species, except for the breeding population on the Pacific coast of Mexico, which is listed as endangered) | N/A | Rare in Hawaii. Occurs worldwide in tropical and warm temperate ocean waters. | 43 FR 32800, Pitman 1990, Balacz 1982 |
| **Marine mammals** | | | | | |
| Blainville's Beaked Whale | *Mesoplodon densirostris* | Not Listed | Non-strategic | Found worldwide in tropical and temperate waters | Mead 1989 |
| Blue Whale | *Balaenoptera musculus* | Endangered | Strategic | Acoustically recorded off of Oahu and Midway Atoll, small number of sightings around Hawaii. Considered extremely rare, generally occur in winter and summer. | 35 FR 18319, Bradford et al. 2013, Northrop et al. 1971, Thompson & Friedl 1982, Stafford et al. 2001 |
| Bottlenose Dolphin | *Tursiops truncatus* | Not Listed | Non-strategic | Distributed worldwide in tropical and warm-temperate waters. Pelagic stock distinct from island-associated stocks. | Perrin et al. 2009, Martien et al. 2012 |
| Bryde's Whale | *Balaenoptera edeni* | Not Listed | Unknown | Distributed widely across tropical and warm-temperate Pacific Ocean. | Leatherwood et al. 1982 |
| Common Dolphin | *Delphinus delphis* | Not Listed | N/A | Found worldwide in temperate and subtropical seas. | Perrin et al. 2009 |
| Cuvier's Beaked Whale | *Ziphius cavirostris* | Not Listed | Non-strategic | Occur year round in Hawaiian waters. | McSweeney et al. 2007 |
| Dall's Porpoise | *Phocoenoides dalli* | Not Listed | Non-strategic | Range across the entire north Pacific Ocean. | Hall 1979 |
| Dwarf Sperm Whale | *Kogia sima* | Not Listed | Non-strategic | Most common in waters between 500 m and 1,000 m in depth. Found worldwide in tropical and warm-temperate waters. | Nagorsen 1985, Baird et al. 2013 |
| False Killer Whale | *Pseudorca crassidens* | Not Listed | Non-strategic | Found worldwide in tropical and warm-temperate waters. Pelagic stock tracked to within 11 km of Hawaiian Islands. | Stacey et al. 1994, Baird et al. 2012, Bradford et al. 2015 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Fin Whale | *Balaenoptera physalus* | Endangered | Strategic | Infrequent sightings in Hawaii waters. Considered rare in Hawaii, though may migrate into Hawaiian waters during fall/winter based on acoustic recordings. | 35 FR 18319, Hamilton et al. 2009, Thompson & Friedl 1982 |
| Fraser's Dolphin | *Lagenodelphis hosei* | Not Listed | Non-strategic | Found worldwide in tropical waters. | Perrin et al. 2009 |
| Guadalupe Fur Seal | *Arctocephalus townsendi* | Threatened | Strategic | Extremely rare sightings. Little known about their pelagic distribution. Breed mainly on Isla Guadalupe, Mexico. | 50 FR 51252, Gallo-Reynoso et al. 2008, Fleischer 1987 |
| Hawaiian Monk Seal | *Neomonachus schauinslandi* | Endangered[a] | Strategic | Endemic tropical seal. Occurs throughout the archipelago. MHI population spends some time foraging in federal waters during the day. | 41 FR 51611, Baker at al. 2011 |
| Humpback Whale | *Megaptera novaeangliae* | Delisted Due to Recovery (Hawaii DPS) | Strategic | Migrate through the archipelago and breed during the winter. Common during winter months when they are generally found within the 100 m isobath. | 35 FR 18319, 81 FR 62259, Childerhouse et al. 2008, Wolman & Jurasz 1976, Herman & Antinoja 1977, Rice & Wolman 1978 |
| Killer Whale | *Orcinus orca* | Not Listed | Non-strategic | Rare in Hawaii. Prefer colder waters within 800 km of continents. | Mitchell 1975, Baird et al. 2006 |
| Longman's Beaked Whale | *Indopacetus pacificus* | Not Listed | Non-strategic | Found in tropical waters from the eastern Pacific westward through the Indian Ocean to the eastern coast of Africa. Rare in Hawaii. | Dalebout 2003, Baird et al. 2013 |
| Melon-Headed Whale | *Peponocephala electra* | Not Listed | Non-strategic | Found in tropical and warm-temperate waters worldwide, found primarily in equatorial waters. Uncommon in Hawaii. | Perryman et al. 1994, Barlow 2006, Bradford et al. 2013 |
| Minke Whale | *Balaenoptera acutorostrata* | Not Listed | Non-strategic | Occur seasonally around Hawaii | Barlow 2003, Rankin & Barlow 2005 |
| North Pacific Right Whale | *Eubalaena japonica* | Endangered[a] | Strategic | Extremely rare in Hawaii waters | 35 FR 18319, 73 FR 12024, Rowntree et al. 1980, Herman et al. 1980 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Northern Elephant Seal | *Mirounga angustirostris* | Not Listed | Non-strategic | Females migrate to central North Pacific to feed on pelagic prey. | Le Beouf et al. 2000 |
| Northern Fur Seal | *Callorhinus ursinus* | Not Listed | Non-strategic | Occur throughout the North Pacific Ocean. | Gelatt et al. 2015 |
| Pacific White-Sided Dolphin | *Lagenorhynchus obliquidens* | Not Listed | Non-strategic | Endemic to temperate waters of North Pacific Ocean. Occur both on the high seas and along continental margins. | Brownell et al. 1999 |
| Pantropical Spotted Dolphin | *Stenella attenuata* | Not Listed | Non-strategic | Common and abundant throughout the Hawaiian archipelago. Pelagic stock occurs outside of insular stock areas (20 km for Oahu and 4-island stocks, 65 km for Hawaii Island stock). | Baird et al. 2013, Oleson et al. 2013 |
| Pygmy Killer Whale | *Feresa attenuata* | Not Listed | Non-strategic | Small resident population in Hawaiian waters. Found worldwide in tropical and subtropical waters. | McSweeney et al. 2009, Ross & Leatherwood 1994 |
| Pygmy Sperm Whale | *Kogia breviceps* | Not Listed | Non-strategic | Found worldwide in tropical and warm-temperate waters. | Caldwell & Caldwell 1989 |
| Risso's Dolphin | *Grampus griseus* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters worldwide. | Perrin et al. 2009 |
| Rough-Toothed Dolphin | *Steno bredanensis* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters worldwide. Occasionally found offshore of Hawaii. | Perrin et al. 2009, Baird et al. 2013, Barlow 2006, Bradford et al. 2013 |
| Sei Whale | *Balaenoptera borealis* | Endangered | Strategic | Rare in Hawaii. Generally found in offshore temperate waters. | 35 FR 18319, Barlow 2003, Bradford et al. 2013 |
| Short-Finned Pilot Whale | *Globicephala macrorhynchus* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters worldwide. Commonly observed around MHI and present around NWHI. | Shallenberger 1981, Baird et al. 2013, Bradford et al. 2013 |
| Sperm Whale | *Physeter macrocephalus* | Endangered | Strategic | Found in tropical to polar waters worldwide, most abundant cetaceans in the region. Sighted off the NWHI and the MHI. | 35 FR 18319, Rice 1960, Lee 1993, Barlow 2006, Mobley et al. 2000, Shallenberger 1981 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Spinner Dolphin | *Stenella longirostris* | Not Listed | Non-strategic | Found worldwide in tropical and warm-temperate waters. Pelagic stock found outside of island-associated boundaries (10 nm). | Perrin et al. 2009 |
| Striped Dolphin | *Stenella coeruleoalba* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters throughout the world. | Perrin et al. 2009 |
| **Elasmobranchs** | | | | | |
| Giant manta ray | *Manta birostris* | Threatened | N/A | Found worldwide in tropical, subtropical, and temperate waters. Commonly found in upwelling zones, oceanic island groups, offshore pinnacles and seamounts, and on shallow reefs. | Dewar et al. 2008, Marshall et al. 2009, Marshall et al. 2011. |
| Oceanic whitetip shark | *Carcharhinus longimanus* | Threatened | N/A | Found worldwide in open ocean waters from the surface to 152 m depth. It is most commonly found in waters > 20°C | Bonfil et al. 2008, Backus et al, 1956, Strasburg 1958, Compagno 1984 |
| Scalloped hammerhead shark | *Sphyrna lewini* | Endangered (Eastern Pacific DPS) | N/A | Found in coastal areas from southern California to Peru. | Compagno 1984, Baum et al. 2007, Bester 2011 |
| Scalloped hammerhead | *Sphyrna lewini* | Threatened (Indo-West Pacific DPS) | N/A | Occur over continental and insular shelves, and adjacent deep waters, but rarely found in waters < 22°C. Range from the intertidal and surface to depths up to 450–512 m. | Compagno 1984, Schulze-Haugen & Kohler 2003, Sanches 1991, Klimley 1993 |
| **Corals** | | | | | |
| N/A | *Acropora globiceps* | Threatened | N/A | Not confirmed in Hawaii waters. Occur on upper reef slopes, reef flats, and adjacent habitats in depths ranging from 0 to 8 m | Veron 2014 |
| N/A | *Acropora jacquelineae* | Threatened | N/A | Not confirmed in Hawaii waters. Found in numerous subtidal reef slope and back-reef habitats, including but not limited to, lower reef slopes, walls and ledges, mid-slopes, and upper reef slopes protected from wave action, and depth range is 10 to 35 m. | Veron 2014 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| N/A | *Acropora retusa* | Threatened | N/A | Not confirmed in Hawaii waters. Occur in shallow reef slope and back-reef areas, such as upper reef slopes, reef flats, and shallow lagoons, and depth range is 1 to 5 m. | Veron 2014 |
| N/A | *Acropora speciosa* | Threatened | N/A | Not confirmed in Hawaii waters. Found in protected environments with clear water and high diversity of *Acropora* and steep slopes or deep, shaded waters. Depth range is 12 to 40 meters and have been found in mesophotic habitat (40-150 m). | Veron 2014 |
| N/A | *Euphyllia paradivisa* | Threatened | N/A | Not confirmed in Hawaii waters. Found in environments protected from wave action on at least upper reef slopes, mid-slope terraces, and lagoons in depths ranging from 2 to 25 m depth. | Veron 2014 |
| N/A | *Isopora crateriformis* | Threatened | N/A | Not confirmed in Hawaii waters. Found in shallow, high-wave energy environments, from low tide to at least 12 meters deep, and have been reported from mesophotic depths (less than 50 m depth). | Veron 2014 |
| N/A | *Seriatopora aculeata* | Threatened | N/A | Not confirmed in Hawaii waters. Found in broad range of habitats including, but not limited to, upper reef slopes, mid-slope terraces, lower reef slopes, reef flats, and lagoons, and depth ranges from 3 to 40 m. | Veron 2014 |
| **Invertebrates** | | | | | |
| Chambered nautilus | *Nautilus pompilius* | Threatened | N/A | Found in small, isolated populations throughout the Indo-Pacific on steep-sloped forereefs with sandy, silty, or muddy bottom substrates from depths of 100 m to 500 m. | 83 FR 48948, CITES 2016 |

[a] These species have critical habitat designated under the ESA. See Table B-4.

Table B-2. Protected species found or reasonably believed to be found near or in Hawaii deep-set longline waters

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| **Seabirds** | | | | | |
| Laysan Albatross | *Phoebastria immutabilis* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Black-Footed Albatross | *Phoebastria nigripes* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Short-Tailed Albatross | *Phoebastria albatrus* | Endangered | N/A | Breeding visitor in the NWHI | 35 FR 8495, 65 FR 46643, Pyle & Pyle 2009 |
| Northern Fulmar | *Fulmarus glacialis* | Not Listed | N/A | Winter resident | Pyle & Pyle 2009 |
| Kermadec Petrel | *Pterodroma neglecta* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Herald Petrel | *Pterodroma arminjoniana* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Murphy's Petrel | *Pterodroma ultima* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Mottled Petrel | *Pterodroma inexpectata* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Juan Fernandez Petrel | *Pterodroma externa* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Hawaiian Petrel | *Pterodroma sandwichensis (Pterodroma phaeopygia sandwichensis)* | Endangered | N/A | Breeding visitor in the MHI | 32 FR 4001, Pyle & Pyle 2009 |
| White-Necked Petrel | *Pterodroma cervicalis* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Bonin Petrel | *Pterodroma hypoleuca* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| Black-Winged Petrel | *Pterodroma nigripennis* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Cook Petrel | *Pterodroma cookii* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Stejneger Petrel | *Pterodroma longirostris* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Pycroft Petrel | *Pterodroma pycrofti* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Bulwer Petrel | *Bulweria bulwerii* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Wedge-Tailed Shearwater | *Ardenna pacifica* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Buller's Shearwater | *Ardenna bulleri* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Sooty Shearwater | *Ardenna grisea* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Short-Tailed Shearwater | *Ardenna tenuirostris* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Christmas Shearwater | *Puffinus nativitatis* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Newell's Shearwater | *Puffinus newelli (Puffinus auricularis newelli)* | Threatened | N/A | Breeding visitor | 40 FR 44149, Pyle & Pyle 2009 |
| Wilson's Storm-Petrel | *Oceanites oceanicus* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Leach's Storm-Petrel | *Oceanodroma leucorhoa* | Not Listed | N/A | Winter resident | Pyle & Pyle 2009 |
| Band-Rumped Storm-Petrel | *Oceanodroma castro* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Tristram Storm-Petrel | *Oceanodroma tristrami* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| White-Tailed Tropicbird | *Phaethon lepturus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Red-Tailed Tropicbird | *Phaethon rubricauda* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Masked Booby | *Sula dactylatra* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Nazca Booby | *Sula granti* | Not Listed | N/A | Vagrant | Pyle & Pyle 2009 |
| Brown Booby | *Sula leucogaster* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Red-Footed Booby | *Sula* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Great Frigatebird | *Fregata minor* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Lesser Frigatebird | *Fregata ariel* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Laughing Gull | *Leucophaeus atricilla* | Not Listed | N/A | Winter resident in the MHI | Pyle & Pyle 2009 |
| Franklin Gull | *Leucophaeus pipixcan* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Ring-Billed Gull | *Larus delawarensis* | Not Listed | N/A | Winter resident in the MHI | Pyle & Pyle 2009 |
| Herring Gull | *Larus argentatus* | Not Listed | N/A | Winter resident in the NWHI | Pyle & Pyle 2009 |
| Slaty-Backed Gull | *Larus schistisagus* | Not Listed | N/A | Winter resident in the NWHI | Pyle & Pyle 2009 |
| Glaucous-Winged Gull | *Larus glaucescens* | Not Listed | N/A | Winter resident | Pyle & Pyle 2009 |
| Brown Noddy | *Anous stolidus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Black Noddy | *Anous minutus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Blue-Gray Noddy | *Procelsterna cerulea* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| White Tern | *Gygis alba* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Sooty Tern | *Onychoprion fuscatus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |
| Gray-Backed Tern | *Onychoprion lunatus* | Not Listed | N/A | Breeding visitor | Pyle & Pyle 2009 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Little Tern | *Sternula albifrons* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| Least Tern | *Sternula antillarum* | Not Listed | N/A | Breeding visitor in the NWHI | Pyle & Pyle 2009 |
| Arctic Tern | *Sterna paradisaea* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| South Polar Skua | *Stercorarius maccormicki* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Pomarine Jaeger | *Stercorarius pomarinus* | Not Listed | N/A | Winter resident in the MHI | Pyle & Pyle 2009 |
| Parasitic Jaeger | *Stercorarius parasiticus* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| Long-Tailed Jaeger | *Stercorarius longicaudus* | Not Listed | N/A | Migrant | Pyle & Pyle 2009 |
| **Sea turtles** | | | | | |
| Green Sea Turtle | *Chelonia mydas* | Threatened (Central North Pacific DPS) | N/A | Most common turtle in the Hawaiian Islands, much more common in nearshore State waters (foraging grounds) than offshore federal waters. Most nesting occurs on French Frigate Shoals in the NWHI. Foraging and haulout in the MHI. | 43 FR 32800, 81 FR 20057, Balazs et al. 1992, Kolinski et al. 2001 |
| Green Sea Turtle | *Chelonia mydas* | Threatened (East Pacific DPS) | N/A | Nest primarily in Mexico and the Galapagos Islands. Little known about their pelagic range west of 90°W but may range as far as the Marshall Islands. Genetic testing confirmed that they are incidentally taken in the HI DSLL fishery. | 43 FR 32800, 81 FR 20057, WPRFMC 2009, Cliffton et al. 1982, Karl & Bowen 1999 |
| Hawksbill Sea Turtle | *Eretmochelys imbricata* | Endangered[a] | N/A | Small population foraging around Hawaii and low level nesting on Maui and Hawaii Islands. Occur worldwide in tropical and subtropical waters. | 35 FR 8491, NMFS & USFWS 2007, Balazs et al. 1992, Katahira et al. 1994 |
| Leatherback Sea Turtle | *Dermochelys coriacea* | Endangered[a] | N/A | Regularly sighted in offshore waters, especially at the southeastern end of the archipelago. | 35 FR 8491, NMFS & USFWS 1997 |
| Loggerhead Sea Turtle | *Caretta* | Endangered (North Pacific DPS) | N/A | Rare in Hawaii. Found worldwide along continental shelves, bays, estuaries, and lagoons of tropical, subtropical, and temperate waters. | 43 FR 32800, 76 FR 58868, Dodd 1990, Balazs 1979 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Olive Ridley Sea Turtle | *Lepidochelys olivacea* | Threatened (Entire species, except for the breeding population on the Pacific coast of Mexico, which is listed as endangered) | N/A | Rare in Hawaii. Occurs worldwide in tropical and warm temperate ocean waters. | 43 FR 32800, Pitman 1990, Balacz 1982 |
| **Marine mammals** | | | | | |
| Blainville's Beaked Whale | *Mesoplodon densirostris* | Not Listed | Non-strategic | Found worldwide in tropical and temperate waters | Mead 1989 |
| Blue Whale | *Balaenoptera musculus* | Endangered | Strategic | Acoustically recorded off of Oahu and Midway Atoll, small number of sightings around Hawaii. Considered extremely rare, generally occur in winter and summer. | 35 FR 18319, Bradford et al. 2013, Northrop et al. 1971, Thompson & Friedl 1982, Stafford et al. 2001 |
| Bottlenose Dolphin | *Tursiops truncatus* | Not Listed | Non-strategic | Distributed worldwide in tropical and warm-temperate waters. Pelagic stock distinct from island-associated stocks. | Perrin et al. 2009, Martien et al. 2012 |
| Bryde's Whale | *Balaenoptera edeni* | Not Listed | Unknown | Distributed widely across tropical and warm-temperate Pacific Ocean. | Leatherwood et al. 1982 |
| Common Dolphin | *Delphinus delphis* | Not Listed | N/A | Found worldwide in temperate and subtropical seas. | Perrin et al. 2009 |
| Cuvier's Beaked Whale | *Ziphius cavirostris* | Not Listed | Non-strategic | Occur year round in Hawaiian waters. | McSweeney et al. 2007 |
| Dall's Porpoise | *Phocoenoides dalli* | Not Listed | Non-strategic | Range across the entire north Pacific Ocean. | Hall 1979 |
| Dwarf Sperm Whale | *Kogia sima* | Not Listed | Non-strategic | Most common in waters between 500 m and 1,000 m in depth. Found worldwide in tropical and warm-temperate waters. | Nagorsen 1985, Baird et al. 2013 |
| False Killer Whale | *Pseudorca crassidens* | Not Listed | Non-strategic | Found worldwide in tropical and warm-temperate waters. Pelagic stock tracked to within 11 km of Hawaiian Islands. | Stacey et al. 1994, Baird et al. 2012, Bradford et al. 2015 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Fin Whale | *Balaenoptera physalus* | Endangered | Strategic | Infrequent sightings in Hawaii waters. Considered rare in Hawaii, though may migrate into Hawaiian waters during fall/winter based on acoustic recordings. | 35 FR 18319, Hamilton et al. 2009, Thompson & Friedl 1982 |
| Fraser's Dolphin | *Lagenodelphis hosei* | Not Listed | Non-strategic | Found worldwide in tropical waters. | Perrin et al. 2009 |
| Guadalupe Fur Seal | *Arctocephalus townsendi* | Threatened | Strategic | Rare sightings. Little known about their pelagic distribution. Breed mainly on Isla Guadalupe, Mexico. | 50 FR 51252, Gallo-Reynoso et al. 2008, Fleischer 1987 |
| Hawaiian Monk Seal | *Neomonachus schauinslandi* | Endangered[a] | Strategic | Endemic tropical seal. Occurs throughout the archipelago. MHI population spends some time foraging in federal waters during the day. | 41 FR 51611, Baker at al. 2011 |
| Humpback Whale | *Megaptera novaeangliae* | Delisted Due to Recovery (Hawaii DPS) | Strategic | Migrate through the archipelago and breed during the winter. Common during winter months when they are generally found within the 100 m isobath. | 35 FR 18319, 81 FR 62259, Childerhouse et al. 2008, Wolman & Jurasz 1976, Herman & Antinoja 1977, Rice & Wolman 1978 |
| Killer Whale | *Orcinus orca* | Not Listed | Non-strategic | Rare in Hawaii. Prefer colder waters within 800 km of continents. | Mitchell 1975, Baird et al. 2006 |
| Longman's Beaked Whale | *Indopacetus pacificus* | Not Listed | Non-strategic | Found in tropical waters from the eastern Pacific westward through the Indian Ocean to the eastern coast of Africa. Rare in Hawaii. | Dalebout 2003, Baird et al. 2013 |
| Melon-Headed Whale | *Peponocephala electra* | Not Listed | Non-strategic | Found in tropical and warm-temperate waters worldwide, found primarily in equatorial waters. Uncommon in Hawaii. | Perryman et al. 1994, Barlow 2006, Bradford et al. 2013 |
| Minke Whale | *Balaenoptera acutorostrata* | Not Listed | Non-strategic | Occur seasonally around Hawaii | Barlow 2003, Rankin & Barlow 2005 |
| North Pacific Right Whale | *Eubalaena japonica* | Endangered[a] | Strategic | Extremely rare in Hawaii waters | 35 FR 18319, 73 FR 12024, Rowntree et al. 1980, Herman et al. 1980 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Northern Elephant Seal | *Mirounga angustirostris* | Not Listed | Non-strategic | Females migrate to central North Pacific to feed on pelagic prey | Le Beouf et al. 2000 |
| Northern Fur Seal | *Callorhinus ursinus* | Not Listed | Non-strategic | Range across the north Pacific Ocean. | Gelatt et al. 2015 |
| Pacific White-Sided Dolphin | *Lagenorhynchus obliquidens* | Not Listed | Non-strategic | Endemic to temperate waters of North Pacific Ocean. Occur both on the high seas and along continental margins. | Brownell et al. 1999 |
| Pantropical Spotted Dolphin | *Stenella attenuata* | Not Listed | Non-strategic | Common and abundant throughout the Hawaiian archipelago. Pelagic stock occurs outside of insular stock areas (20 km for Oahu and 4-island stocks, 65 km for Hawaii Island stock) | Baird et al. 2013, Oleson et al. 2013 |
| Pygmy Killer Whale | *Feresa attenuata* | Not Listed | Non-strategic | Small resident population in Hawaiian waters. Found worldwide in tropical and subtropical waters. | McSweeney et al. 2009, Ross & Leatherwood 1994 |
| Pygmy Sperm Whale | *Kogia breviceps* | Not Listed | Non-strategic | Found worldwide in tropical and warm-temperate waters. | Caldwell & Caldwell 1989 |
| Risso's Dolphin | *Grampus griseus* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters worldwide. | Perrin et al. 2009 |
| Rough-Toothed Dolphin | *Steno bredanensis* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters worldwide. Occasionally found offshore of Hawaii. | Perrin et al. 2009, Bradford et al. 2013, Barlow 2006, Baird et al. 2013 |
| Sei Whale | *Balaenoptera borealis* | Endangered | Strategic | Rare in Hawaii. Generally found in offshore temperate waters. | 35 FR 18319, Barlow 2003, Bradford et al. 2013 |
| Short-Finned Pilot Whale | *Globicephala macrorhynchus* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters worldwide. Commonly observed around MHI and present around NWHI. | Shallenberger 1981, Baird et al. 2013, Bradford et al. 2013 |
| Sperm Whale | *Physeter macrocephalus* | Endangered | Strategic | Found in tropical to polar waters worldwide, most abundant cetaceans in the region. Sighted off the NWHI and the MHI. | 35 FR 18319, Rice 1960, Lee 1993, Barlow 2006, Mobley et al. 2000, Shallenberger 1981 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Spinner Dolphin | *Stenella longirostris* | Not Listed | Non-strategic | Found worldwide in tropical and warm-temperate waters. Pelagic stock found outside of island-associated boundaries (10 nm) | Perrin et al. 2009 |
| Striped Dolphin | *Stenella coeruleoalba* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters throughout the world | Perrin et al. 2009 |
| **Elasmobranchs** | | | | | |
| Giant manta ray | *Manta birostris* | Threatened | N/A | Found worldwide in tropical, subtropical, and temperate waters. Commonly found in upwelling zones, oceanic island groups, offshore pinnacles and seamounts, and on shallow reefs. | Dewar et al. 2008, Marshall et al. 2009, Marshall et al. 2011. |
| Oceanic whitetip shark | *Carcharhinus longimanus* | Threatened | N/A | Found worldwide in open ocean waters from the surface to 152 m depth. It is most commonly found in waters > 20°C | Bonfil et al. 2008, Backus et al, 1956, Strasburg 1958, Compagno 1984 |
| Scalloped hammerhead shark | *Sphyrna lewini* | Endangered (Eastern Pacific DPS) | N/A | Found in coastal areas from southern California to Peru. | Compagno 1984, Baum et al. 2007, Bester 2011 |
| Scalloped hammerhead shark | *Sphyrna lewini* | Threatened (Indo-West Pacific DPS) | N/A | Occur over continental and insular shelves, and adjacent deep waters, but rarely found in waters < 22°C. Range from the intertidal and surface to depths up to 450–512 m. | Compagno 1984, Schulze-Haugen & Kohler 2003, Sanches 1991, Klimley 1993 |
| **Corals** | | | | | |
| N/A | *Acropora globiceps* | Threatened | N/A | Occur on upper reef slopes, reef flats, and adjacent habitats in depths ranging from 0 to 8 m. | Veron 2014 |
| N/A | *Acropora jacquelineae* | Threatened | N/A | Found in numerous subtidal reef slope and back-reef habitats, including but not limited to, lower reef slopes, walls and ledges, mid-slopes, and upper reef slopes protected from wave action, and depth range is 10 to 35 m. | Veron 2014 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| N/A | *Acropora retusa* | Threatened | N/A | Occur in shallow reef slope and back-reef areas, such as upper reef slopes, reef flats, and shallow lagoons, and depth range is 1 to 5 m. | Veron 2014 |
| N/A | *Acropora speciosa* | Threatened | N/A | Found in protected environments with clear water and high diversity of *Acropora* and steep slopes or deep, shaded waters. Depth range is 12 to 40 meters, and it has been found in mesophotic habitat (40-150 m). | Veron 2014 |
| N/A | *Euphyllia paradivisa* | Threatened | N/A | Found in environments protected from wave action on at least upper reef slopes, mid-slope terraces, and lagoons in depths ranging from 2 to 25 m depth. | Veron 2014 |
| N/A | *Isopora crateriformis* | Threatened | N/A | Found in shallow, high-wave energy environments, from low tide to at least 12 m deep, and have been reported from mesophotic depths (less than 50 m depth). | Veron 2014 |
| N/A | *Seriatopora aculeata* | Threatened | N/A | Found in broad range of habitats including, but not limited to, upper reef slopes, mid-slope terraces, lower reef slopes, reef flats, and lagoons, and depth ranges from 3 to 40 m. | Veron 2014 |
| **Invertebrates** | | | | | |
| Chambered nautilus | *Nautilus pompilius* | Threatened | N/A | Found in small, isolated populations throughout the Indo-Pacific on steep-sloped forereefs with sandy, silty, or muddy bottom substrates from depths of 100 m to 500 m. | 83 FR 48948, CITES 2016 |

[a] These species have critical habitat designated under the ESA. See Table B-4.

Table B-3. Protected species found or reasonably believed to be found near or in American Samoa longline waters

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| **Seabirds** | | | | | |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Audubon's Shearwater | *Puffinus lherminieri* | Not Listed | N/A | Resident | Craig 2005 |
| Black Noddy | *Anous minutus* | Not Listed | N/A | Resident | Craig 2005 |
| Black-Naped Tern | *Sterna sumatrana* | Not Listed | N/A | Visitor | Craig 2005 |
| Blue-Gray Noddy | *Procelsterna cerulea* | Not Listed | N/A | Resident | Craig 2005 |
| Bridled Tern | *Onychoprion anaethetus* | Not Listed | N/A | Visitor | Craig 2005 |
| Brown Booby | *Sula leucogaster* | Not Listed | N/A | Resident | Craig 2005 |
| Brown Noddy | *Anous stolidus* | Not Listed | N/A | Resident | Craig 2005 |
| Christmas Shearwater | *Puffinus nativitatis* | Not Listed | N/A | Resident? | Craig 2005 |
| Collared Petrel | *Pterodroma brevipes* | Not Listed | N/A | Resident? | Craig 2005 |
| White Tern | *Gygis alba* | Not Listed | N/A | Resident | Craig 2005 |
| Greater Crested Tern | *Thalasseus bergii* | Not Listed | N/A | Visitor | Craig 2005 |
| Gray-Backed Tern | *Onychoprion lunatus* | Not Listed | N/A | Resident | Craig 2005 |
| Great Frigatebird | *Fregata minor* | Not Listed | N/A | Resident | Craig 2005 |
| Herald Petrel | *Pterodroma heraldica* | Not Listed | N/A | Resident | Craig 2005 |
| Laughing Gull | *Leucophaeus atricilla* | Not Listed | N/A | Visitor | Craig 2005 |
| Lesser Frigatebird | *Fregata ariel* | Not Listed | N/A | Resident | Craig 2005 |
| Masked Booby | *Sula dactylatra* | Not Listed | N/A | Resident | Craig 2005 |
| Newell's Shearwater | *Puffinus auricularis newelli* | Threatened | N/A | Visitor | 40 FR 44149, Craig 2005 |
| Red-Footed Booby | *Sula* | Not Listed | N/A | Resident | Craig 2005 |
| Red-Tailed Tropicbird | *Phaethon rubricauda* | Not Listed | N/A | Resident | Craig 2005 |
| Short-Tailed Shearwater | *Ardenna tenuirostris* | Not Listed | N/A | Visitor | Craig 2005 |
| Sooty Shearwater | *Ardenna grisea* | Not Listed | N/A | Visitor | Craig 2005 |
| Sooty Tern | *Sterna fuscata* | Not Listed | N/A | Resident | Craig 2005 |
| Tahiti Petrel | *Pterodroma rostrata* | Not Listed | N/A | Resident | Craig 2005 |
| Wedge-Tailed Shearwater | *Ardenna pacifica* | Not Listed | N/A | Resident? | Craig 2005 |
| White-Necked Petrel | *Pterodroma cervicalis* | Not Listed | N/A | Visitor | Craig 2005 |
| White-Faced Storm-Petrel | *Pelagodroma marina* | Not Listed | N/A | Visitor | Craig 2005 |
| White-Tailed Tropicbird | *Phaethon lepturus* | Not Listed | N/A | Resident | Craig 2005 |
| White-Throated Storm-Petrel | *Nesofregetta fuliginosa* | Not Listed | N/A | Resident? | Craig 2005 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Laysan Albatross | *Phoebastria immutabilis* | Not Listed | N/A | Breed mainly in Hawaii, and range across the North Pacific Ocean. | Causey 2008 |
| Hawaiian Petrel | *Pterodroma sandwichensis (Pterodroma phaeopygia sandwichensis)* | Endangered | N/A | Breed in MHI, and range across the central Pacific Ocean. | 32 FR 4001, Simons & Hodges 1998 |
| Laysan Albatross | *Phoebastria immutabilis* | Not Listed | N/A | Breed mainly in Hawaii, and range across the North Pacific Ocean. | Causey 2009 |
| Northern Fulmar | *Fulmarus glacialis* | Not Listed | N/A | Breed and range across North Pacific Ocean. | Hatch & Nettleship 2012 |
| Short-Tailed Albatross | *Phoebastria albatrus* | Endangered | N/A | Breed in Japan and NWHI, and range across the North Pacific Ocean. | 35 FR 8495, 65 FR 46643, BirdLife International 2017 |
| **Sea turtles** | | | | | |
| Green Sea Turtle | *Chelonia mydas* | Endangered (Central South Pacific DPS) | N/A | Frequently seen. Nest at Rose Atoll in small numbers. | 43 FR 32800, 81 FR 20057, Balacz 1994 |
| Hawksbill Sea Turtle | *Eretmochelys imbricata* | Endangered[a] | N/A | Frequently seen. Nest at Rose Atoll, Swain's Island, and Tutuila. | 35 FR 8491, NMFS & USFWS 2013, Tuato'o-Bartley et al. 1993 |
| Leatherback Sea Turtle | *Dermochelys coriacea* | Endangered[a] | N/A | Very rare. One juvenile recovered dead in experimental longline fishing. | 35 FR 8491, Grant 1994 |
| Loggerhead Sea Turtle | *Caretta caretta* | Endangered (South Pacific DPS) | N/A | No known sightings. Found worldwide along continental shelves, bays, estuaries, and lagoons of tropical, subtropical, and temperate waters. | 43 FR 32800, 76 FR 58868, Utzurrum 2002, Dodd 1990 |
| Olive Ridley Sea Turtle | *Lepidochelys olivacea* | Threatened (Entire species, except for the endangered breeding population on the Pacific coast of Mexico) | N/A | Rare. Three known sightings. | 43 FR 32800, Utzurrum 2002 |
| **Marine mammals** | | | | | |
| Blainville's Beaked Whale | *Mesoplodon densirostris* | Not Listed | Non-strategic | Found worldwide in tropical and temperate waters | Mead 1989 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Blue Whale | *Balaenoptera musculus* | Endangered | Strategic | No known sightings. Occur worldwide and are known to be found in the western South Pacific. | 35 FR 18319, Olson et al. 2015 |
| Bottlenose Dolphin | *Tursiops truncatus* | Not Listed | Non-strategic | Distributed worldwide in tropical and warm-temperate waters. Pelagic stock distinct from island-associated stocks. | Perrin et al. 2009, Martien et al. 2012 |
| Bryde's Whale | *Balaenoptera edeni* | Not Listed | Unknown | Distributed widely across tropical and warm-temperate Pacific Ocean. | Leatherwood et al. 1982 |
| Common Dolphin | *Delphinus delphis* | Not Listed | N/A | Found worldwide in temperate and subtropical seas. | Perrin et al. 2009 |
| Cuvier's Beaked Whale | *Ziphius cavirostris* | Not Listed | Non-strategic | Occur worldwide. | Heyning 1989 |
| Dwarf Sperm Whale | *Kogia sima* | Not Listed | Non-strategic | Found worldwide in tropical and warm-temperate waters. | Nagorsen 1985 |
| False Killer Whale | *Pseudorca crassidens* | Not Listed | Unknown | Found in waters within the U.S. EEZ of A. Samoa | Bradford et al. 2015 |
| Fin Whale | *Balaenoptera physalus* | Endangered | Strategic | No known sightings but reasonably expected to occur in A. Samoa. Found worldwide. | 35 FR 18319, Hamilton et al. 2009 |
| Fraser's Dolphin | *Lagenodelphis hosei* | Not Listed | Non-strategic | Found worldwide in tropical waters. | Perrin et al. 2009 |
| Guadalupe Fur Seal | *Arctocephalus townsendi* | Threatened | Strategic | No known sightings. Little known about their pelagic distribution. Breed mainly on Isla Guadalupe, Mexico. | 50 FR 51252, Gallo-Reynoso et al. 2008, Fleischer 1987 |
| Humpback Whale | *Megaptera novaeangliae* | Delisted Due to Recovery (Oceania DPS) | Strategic | Migrate through the archipelago and breed during the winter in American Samoan waters. | 35 FR 18319, 81 FR 62259, Garrigue et al. 2007, SPWRC 2008 |
| Killer Whale | *Orcinus orca* | Not Listed | Non-strategic | Found worldwide. Prefer colder waters within 800 km of continents. | Leatherwood & Dalheim 1978, Mitchell 1975, Baird et al. 2006 |
| Longman's Beaked Whale | *Indopacetus pacificus* | Not Listed | Non-strategic | Found in tropical waters from the eastern Pacific westward through the Indian Ocean to the eastern coast of Africa. | Dalebout 2003 |
| Melon-Headed Whale | *Peponocephala electra* | Not Listed | Non-strategic | Found in tropical and warm-temperate waters worldwide, primarily found in equatorial waters. | Perryman et al. 1994 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Minke Whale | *Balaenoptera acutorostrata* | Not Listed | Non-strategic | Uncommon in this region, usually seen over continental shelves in the Pacific Ocean. | Brueggeman et al. 1990 |
| North Pacific Right Whale | *Eubalaena japonica* | Endangered[a] | Strategic | Extremely rare. | 35 FR 18319, 73 FR 12024, Childerhouse et al. 2008, Wolman & Jurasz 1976, Herman & Antinoja 1977, Rice & Wolman 1978 |
| Northern Elephant Seal | *Mirounga angustirostris* | Not Listed | Non-strategic | Females migrate to central North Pacific to feed on pelagic prey | Le Beouf et al. 2000 |
| Pantropical Spotted Dolphin | *Stenella attenuata* | Not Listed | Non-strategic | Found in tropical and subtropical waters worldwide. | Perrin et al. 2009 |
| Pygmy Killer Whale | *Feresa attenuata* | Not Listed | Non-strategic | Found in tropical and subtropical waters worldwide. | Ross & Leatherwood 1994 |
| Pygmy Sperm Whale | *Kogia breviceps* | Not Listed | Non-strategic | Found worldwide in tropical and warm-temperate waters. | Caldwell & Caldwell 1989 |
| Risso's Dolphin | *Grampus griseus* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters worldwide. | Perrin et al. 2009 |
| Rough-Toothed Dolphin | *Steno bredanensis* | Not Listed | Unknown | Found in tropical to warm-temperate waters worldwide. Common in A. Samoa waters. | Perrin et al. 2009, Craig 2005 |
| Sei Whale | *Balaenoptera borealis* | Endangered | Strategic | Generally found in offshore temperate waters. | 35 FR 18319, Barlow 2003, Bradford et al. 2013 |
| Short-Finned Pilot Whale | *Globicephala macrorhynchus* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters worldwide | Shallenberger 1981, Baird et al. 2013, Bradford et al. 2013 |
| Sperm Whale | *Physeter macrocephalus* | Endangered | Strategic | Found in tropical to polar waters worldwide, most abundant cetaceans in the region. | 35 FR 18319, Rice 1960, Barlow 2006, Lee 1993, Mobley et al. 2000, Shallenberger 1981 |
| Spinner Dolphin | *Stenella longirostris* | Not Listed | Unknown | Common in American Samoa, found in waters with mean depth of 44 m. | Reeves et al. 1999, Johnston et al. 2008 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| Striped Dolphin | *Stenella coeruleoalba* | Not Listed | Non-strategic | Found in tropical to warm-temperate waters throughout the world | Perrin et al. 2009 |
| **Elasmobranchs** | | | | | |
| Giant manta ray | *Manta birostris* | Threatened | N/A | Found worldwide in tropical, subtropical, and temperate waters. Commonly found in upwelling zones, oceanic island groups, offshore pinnacles and seamounts, and on shallow reefs. | Dewar et al. 2008, Marshall et al. 2009, Marshall et al. 2011. |
| Oceanic whitetip shark | *Carcharhinus longimanus* | Threatened | N/A | Found worldwide in open ocean waters from the surface to 152 m depth. It is most commonly found in waters > 20°C. | Bonfil et al. 2008, Backus et al, 1956, Strasburg 1958, Compagno 1984 |
| Scalloped hammerhead shark | *Sphyrna lewini* | Threatened (Indo-West Pacific DPS) | N/A | Occur over continental and insular shelves, and adjacent deep waters, but rarely found in waters < 22°C. Range from the intertidal and surface to depths up to 450–512 m. | Compagno 1984, Schulze-Haugen & Kohler 2003, Sanches 1991, Klimley 1993 |
| **Corals** | | | | | |
| N/A | *Acropora globiceps* | Threatened | N/A | Occur on upper reef slopes, reef flats, and adjacent habitats in depths from 0 to 8 m | Veron 2014 |
| N/A | *Acropora jacquelineae* | Threatened | N/A | Found in numerous subtidal reef slope and back-reef habitats, including but not limited to, lower reef slopes, walls and ledges, mid-slopes, and upper reef slopes protected from wave action, and its depth range is 10 to 35 m. | Veron 2014 |
| N/A | *Acropora retusa* | Threatened | N/A | Occur in shallow reef slope and back-reef areas, such as upper reef slopes, reef flats, and shallow lagoons. Depth range is 1 to 5 m. | Veron 2014 |
| N/A | *Acropora speciosa* | Threatened | N/A | Found in protected environments with clear water and high diversity of Acropora and steep slopes or deep, shaded waters. Depth range is 12 to 40 meters and have been found in mesophotic habitat (40-150 m). | Veron 2014 |

| Common Name | Scientific Name | ESA Listing Status | MMPA Status | Occurrence | References |
|---|---|---|---|---|---|
| N/A | *Euphyllia paradivisa* | Threatened | N/A | Found in environments protected from wave action on at least upper reef slopes, mid-slope terraces, and lagoons in depths ranging from 2 to 25 m depth. | Veron 2014 |
| N/A | *Isopora crateriformis* | Threatened | N/A | Found in shallow, high-wave energy environments, from low tide to at least 12 meters deep, and have been reported from mesophotic depths (less than 50 m depth). | Veron 2014 |
| **Invertebrates** | | | | | |
| Chambered nautilus | *Nautilus pompilius* | Threatened | N/A | Found in small, isolated populations throughout the Indo-Pacific on steep-sloped forereefs with sandy, silty, or muddy bottom substrates from depths of 100 m to 500 m. | 83 FR 48948, CITES 2016 |

[a] These species have critical habitat designated under the ESA. See Table B-4.

Table B-4. ESA-listed species' critical habitat in the Pacific Ocean[a]

| Common Name | Scientific Name | ESA Listing Status | Critical Habitat | References |
|---|---|---|---|---|
| Hawksbill Sea Turtle | *Eretmochelys imbricata* | Endangered | None in the Pacific Ocean. | 63 FR 46693 |
| Leatherback Sea Turtle | *Dermochelys coriacea* | Endangered | Approximately 16,910 square miles (43,798 square km) stretching along the California coast from Point Arena to Point Arguello east of the 3,000 meter depth contour; and 25,004 square miles (64,760 square km) stretching from Cape Flattery, Washington to Cape Blanco, Oregon east of the 2,000 meter depth contour. | 77 FR 4170 |
| Hawaiian Monk Seal | *Neomonachus schauinslandi* | Endangered | Ten areas in the Northwestern Hawaiian Islands (NWHI) and six in the main Hawaiian Islands (MHI). These areas contain one or a combination of habitat types: Preferred pupping and nursing areas, significant haul-out areas, and/or marine foraging areas, that will support conservation for the species. | 53 FR 18988, 51 FR 16047, 80 FR 50925 |
| North Pacific Right Whale | *Eubalaena japonica* | Endangered | Two specific areas are designated, one in the Gulf of Alaska and another in the Bering Sea, comprising a total of approximately 95,200 square kilometers (36,750 square miles) of marine habitat. | 73 FR 19000, 71 FR 38277 |

[a] For maps of critical habitat, see https://www.fisheries.noaa.gov/national/endangered-species-conservation/critical-habitat.

**REFERENCES**

Andrews KR, Karczmarski L, Au WWL, Rickards SH, Vanderlip CA, Bowen BW, Grau EG, Toonen RJ. 2010. Rolling stones and stable homes: social structure, habitat diversity and population genetics of the Hawaiian spinner dolphin (*Stenella longirostris*). *Molecular Ecology*, *19*, pp. 732-748.

Awkerman JA, Anderson DJ, Whittow GC. 2009. Laysan Albatross (*Phoebastria immutabilis*). *In*: Rodewald PG [ed.]. The Birds of North America. Ithaca: Cornell Lab of Ornithology. Retrieved from the Birds of North America at https://birdsna.org/Species-Account/bna/species/layalb.

Backus RH, Springer S, Arnold EL. 1956. A contribution to the natural history of the white tip shark, *Pferdumiops kmgimunus* (Poey). *Deep-Sea Research*, *3*, pp. 178-188.

Baird RW, McSweeney DJ, Bane C, Barlow J, Salden DR, Antoine LRK, LeDuc RG, Webster DL. 2006. Killer Whales in Hawaiian Waters: Information on Population Identity and Feeding Habits. *Pacific Science*, *60*(4), pp. 523-530.

Baird RW, Gorgone AM, McSweeney DJ, Ligon AD, Deakos MH, Webster DL, Schorr GS, Martien KK, Salden DR, Mahaffy SD. 2009. Population structure of island-associated dolphins: Evidence from photo-identification of common bottlenose dolphins (*Tursiops truncatus*) in the main Hawaiian Islands. *Marine Mammal Science*, *25*, pp. 251-274.

Baird RW, Webster DL, Aschettino JM, Schorr GS, McSweeney DJ. 2013. Odontocete cetaceans around the main Hawaiian Islands: Habitat use and relative abundance from small-boat sighting surveys. *Aquatic Mammals*, *39*(3), 253 pp.

Baker J.D., Harting, A.L., Wurth, T.A., and Johanos, T.C., 2011. Dramatic shifts in Hawaiian monk seal distribution predicted from divergent regional trends. *Marine Mammal Science*, *27*(1), pp. 78–93.

Balazs GH. 1979. Loggerhead turtle recovered from a tiger shark at Kure Atoll. *'Elepaio*, *39*(12), pp. 45-47.

Balazs GH. 1982. Status of sea turtles in the central Pacific Ocean. *In:* Bjorndal, K.A. [ed.]. Biology and Conservation of Sea Turtles. *Smithsonian Institution Scholarly Press*, Washington, D.C., 583 pp.

Balazs GH, Craig P, Winton BR, Miya RK. 1994. Satellite telemetry of green turtles nesting at French Frigate Shoals, Hawaii, and Rose Atoll, American Samoa. *In:* Bjorndal KA, Bolten AB, Johnson DA, Eliazar PJ [eds.]. Proceedings of the fourteenth annual symposium on sea turtle biology and conservation.

Balazs GH, Hirth H, Kawamoto P, Nitta E, Ogren L, Wass R, Wetherall J. 1992. Interim Recovery Plan for Hawaiian Sea Turtles. Honolulu Lab, Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96822-2396. Southwest Fisheries Science Center Administrative Report H-92-01. 76 pp.

Barlow J. 2003. Preliminary Estimates of the Abundance of Cetaceans along the U.S. West Coast, 1991-2001. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Barlow J. 2006. Cetacean abundance in Hawaiian waters estimated from a summer/fall survey in 2002. *Marine Mammal Science*, *22*(2), pp. 446-464.

Baum J, Clarke S, Domingo A, Ducrocq M, Lamónaca AF, Gaibor N, Graham R, Jorgensen S, Kotas JE, Medina E, Martinez-Ortiz J, Monzini Taccone di Sitizano J, Morales MR, Navarro SS, Pérez-Jiménez JC, Ruiz C, Smith W, Valenti SV, Vooren CM. 2007. *Sphyrna lewini*. The IUCN Red List of Threatened Species 2007: e.T39385A10190088. Downloaded on 21 Feb 2017.

Baum JK, Medina E, Musick JA, Smale M. 2006. *Carcharhinus longimanus*. *In*: IUCN 2007. 2007 IUCN Red List of Threatened Species.

Bester C. 2011. Species Profile: Scalloped Hammerhead. Florida Museum of Natural History. http://www.flmnh.ufl.edu/fish/Gallery/Descript/Schammer/ScallopedHammerhead.html.

BirdLife International. 2017. Species factsheet: *Phoebastria albatrus*. Downloaded from http://datazone.birdlife.org/species/factsheet/22698335.

Bonfil R, Clarke S, Nakano H, Camhi MD, Pikitch EK, Babcock EA. 2008. The biology and ecology of the oceanic whitetip shark, *Carcharhinus longimanus*. *In*: Camhi MD, Pikitch EK, Babcock EA [eds.]. Sharks of the Open Ocean: Biology, Fisheries, and Conservation, pp.128-139.

Bradford AL, Oleson EM, Baird RW, Boggs CH, Forney KA, Young NC. 2015. Revised stock boundaries for false killer whales (*Pseudorca crassidens*) in Hawaiian waters. NOAA Tech. Memo. NMFS-PIFSC-47.

Bradford AL, Forney KA, Oleson EM, Barlow J. 2013. Line-transect abundance estimates of cetaceans in the Hawaiian EEZ. PIFSC Working Paper WP-13-004.

Brownell JRL, Walker WA, Forney KA. 1999. Pacific white-sided dolphin, *Lagenorhynchus obliquidens* Gill, 1865. *In*: Ridgeway SH, Harrison R [eds.]. Handbook of marine mammals: the second book of dolphins and the porpoises. *Academic Press*, San Diego, CA.

Brueggeman JJ, Green GA, Balcomb KC, Bowlby CE, Grotefendt RA, Briggs KT, Bonnell ML, Ford RG, Varoujean DH, Heinemann D, Chapman DG. 1990. Oregon-Washington Marine Mammal and Seabird Survey: Information synthesis and hypothesis formulation. U.S. Department of the Interior, OCS Study MMS 89-0030.

Caldwell DK, Caldwell MC. 1989. Pygmy sperm whale *Kogia breviceps* (de Blainville, 1838)/dwarf sperm whale *Kogia simus* (Owen, 1866). Handbook of marine mammals, *4*, pp. 235-260.

Childerhouse S, Jackson J, Baker CS, Gales N, Clapham PJ, Brownell RL Jr. 2008. *Megaptera novaeangliae*, Oceania subpopulation. IUCN Red List of Threatened Species http://www.iucnredlist.org/details/132832.

CITES. 2016. Consideration of proposals for amendment of Appendices I and II: Nautilidae Convention on International Trade in Endangered Species of Wild Fauna and Flora; Seventeenth meeting of the Conference of the Parties; 24 September – 5 October 2016, Johannesburg, South Africa

Cliffton K, Cornejo DO, Felger RS. 1982. Sea turtles of the Pacific coast of Mexico. *In:* Bjorndal KA [ed.]. Biology and Conservation of Sea Turtles. Smithsonian Inst. Press, Washington, D.C., 583 pp.

Compagno LJV. 1984. FAO Species Catalogue. Vol. 4. Sharks of the World. An Annotated and Illustrated Catalogue of Shark Species Known to Date. Carcharhiniformes. FAO Fish Synop 124, Vol. 4, Part 2.

Craig P. 2005. Natural history guide to American Samoa. National Park of American Samoa, Department of Marine and Wildlife Resources, American Samoa Community College.

Dalebout, ML, Baker CS, Anderson RC, Best PB, Cockcroft VG, Hinsz HL, Peddemors V, Pitman RL. 2003. Appearance, distribution, and genetic distinctiveness of Longman's beaked whale, *Indopacetus pacificus*. *Marine Mammal Science*, *19*(3), pp. 421-461.

Dewar H, Mous P, Domeier M, Muljadi A, Pet J, Whitty J. 2008. Movements and site fidelity of the giant manta ray, *Manta birostris*, in the Komodo Marine Park, Indonesia. *Marine Biology*, *155*, pp. 121-133.

Dodd CK. 1990. *Caretta* (Linnaeus) Loggerhead Sea Turtle. Catalogue of American *Amphibians and Reptiles*, pp. 483.1-483.7.

Eckert KL, Wallace BP, Frazier JG, Eckert SA, Pritchard PCH. 2012. Synopsis of the biological data on the leatherback sea turtle (*Dermochelys coriacea*). U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication BTP-R4015-2012, Washington, D.C.

Fleischer LA. 1987. Guadalupe fur seal, *Arctocephalus townsendi*. *In*: Croxall JP, Gentry RL [eds.]. Status, biology, and ecology of fur seals. National Oceanic and Atmospheric Association, Technical Report, National Marine Fisheries Service 51, pp. 1-212.

Gallo-Reynoso JP, Figueroa-Carranza AL, Le Boeuf BJ. 2008. Foraging behavior of lactating Guadalupe fur seal females. *In*: Lorenzo C, Espinoza E, Ortega J [eds.]. Avances en el Estudio de los Mamíferos de México. *Publicaciones Especiales*, *2*, pp. 595-614.

Garrigue C, Franklin T, Russell K, Burns D, Poole M, Paton D, Hauser N, Oremus M, Constantine R, Childerhouse S, Mattila D, Gibbs N, Franklin W, Robbins J, Clapham P, Baker CS. 2007. First assessment of interchange of humpback whales between Oceania and the east coast of Australia. International Whaling Commission, Anchorage, Alaska. SC/59/SH15.

Gelatt T, Ream R, Johnson D. 2015. *Callorhinus ursinus*. The IUCN Red List of Threatened Species 2015:e.T3590A45224953. Available at http://www.iucnredlist.org/details/3590/0.

Grant GS. 1994. Juvenile leatherback turtle caught by longline fishing in American Samoa. *Marine Turtle Newsletter*, *66*, pp. 3-5.

Hall J. 1979. A survey of cetaceans of Prince William Sound and adjacent waters - their numbers and seasonal movements. Unpubl. rep. to Alaska Outer Continental Shelf Environmental Assessment Programs. NOAA OCSEAP Juneau Project Office, Juneau, AK. 37 pp.

Hamilton TA, Redfern JV, Barlow J, Balance LT, Gerrodette T, Holt RS, Forney KA, Taylor BL. 2009. Atlas of cetacean sightings for Southwest Fisheries Science Center Cetacean

and Ecosystem Surveys: 1986-2005. U.S. Dept. Commer., NOAA Tech. Memo., NOAA-TM-NMFSSWFSC-440. 70 pp.

Herman LM, Antinoja RC. 1977. Humpback whales in the Hawaiian breeding waters: Population and pod characteristics. *Scientific Reports of the Whales Research Institute*, *29*, pp. 59-85.

Herman LM, Baker CS, Forestell PH, Antinoja RC. 1980. Right whale, *Balaena glacialis*, sightings near Hawaii: a clue to the wintering grounds? *Marine Ecology Progress Series*, *2*, pp. 271-275.

Heyning JE. 1989. Cuvier's beaked whale, *Ziphius cavirostris* (Cuvier, 1823). pp. 289-308. *In*: Ridgway SH, Harrison R (eds.) Handbook of Marine Mammals. Vol. 4. River Dolphins and the Larger Toothed Whales. *Academic Press*, London and San Diego. 442 pp.

Hill MC, Oleson EM, Andrews KR. 2010. New island-associated stocks for Hawaiian spinner dolphins (*Stenella longirostris longirostris*): Rationale and new stock boundaries. Pacific Islands Fisheries Science Center Admin. Report H-10-04, 12 pp.

Johnston DW, Robbins J, Chapla ME, Mattila DK, Andrews KR. 2008. Diversity, habitat associations and stock structure of odontocete cetaceans in the waters of American Samoa, 2003-2006. *Journal of Cetacean Research and Management*, *10*(1), pp. 59-66.

Karczmarski L, Würsig B, Gailey G, Larson KW, Vanderlip C. 2005. Spinner dolphins in a remote Hawaiian atoll: social grouping and population structure. *Behavioral Ecology*, *16*, pp. 675-685.

Karl SA, Bowen BW. 1999. Evolutionary significant units versus geopolitical taxonomy: molecular systematics of an endangered sea turtle (genus *Chelonia*). *Conservation Biology*, *13*, pp. 990–999.

Katahira LK, Forbes CM, Kikuta AH, Balazs GH, Bingham M. 1994. Recent findings and management of hawksbill turtle nesting beaches in Hawaii. *In:* Bjorndal, K.A, Bolton, A.B., Johnson, D.A., and Eliazar, P.J. [eds.], Proc. of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Tech. Memo. NMFS-SEFSC-351, 323 pp.

Klimley AP. 1993. Highly directional swimming by scalloped hammerhead sharks, *Sphyrna lewini*, and subsurface irradiance, temperature, bathymetry, and geomagnetic field. *Marine Biology*, *117*(1), pp. 1-22.

Kolinski SP, Parker DM, Ilo LI, Ruak JK. 2001. An assessment of sea turtles and their marine and terrestrial habitats at Saipan, Commonwealth of the Northern Mariana Islands. *Micronesica*, *34*, pp. 55-72.

Le Boeuf BJ, Crocker DE, Costa DP, Blackwell SB, Webb PM, Houser DS. 2000. Foraging ecology of northern elephant seals. *Ecological Monographs*, *70*(3), pp. 353-382.

Lee T. 1993. Summary of cetacean survey data collected between the years of 1974 and 1985. NOAA Tech. Memo. NMFS 181, 184 pp.

Leatherwood JS, Dahlheim ME. 1978. Worldwide distribution of pilot whales and killer whales. Naval Ocean System Center Technical Report 443, pp. 1-39.

Leatherwood S, Reeves RR, Perrin WF, Evans WE. 1982. Whales, dolphins, and porpoises of the North Pacific and adjacent arctic waters. NOAA Tech. Rep. NMFS Circ. No. 444.

Mallory ML, Hatch SA, Nettleship DN. 2012. Northern Fulmar (*Fulmarus glacialis*). *In*: Rodewald PG [ed.]. The Birds of North America. Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America at https://birdsna.org/Species-Account/bna/species/norful.

Marshall A, Compagno LJV, Bennett MB. 2009. Redescription of the genus Manta with resurrection of *Manta alfredi* (Krefft, 1868) (Chondrichthyes; Myliobatoidei; Mobulidae). *Zootaxa*, *2301*, pp. 1-28.

Marshall A, Bennett MB, Kodja G, Hinojosa-Alvarez S, Galvan-Magana F, Harding M, Stevens G, Kashiwagi T. 2011. *Manta birostris*. The IUCN Red List of Threatened Species 2011: e.T198921A9108067.

Martien KK, Baird RW, Hedrick NM, Gorgone AM, Thieleking JL, McSweeney DJ, Robertson KM, Webster DL. 2012. Population structure of island‐associated dolphins: Evidence from mitochondrial and microsatellite markers for common bottlenose dolphins (*Tursiops truncatus*) around the main Hawaiian Islands. *Marine Mammal Science*, 25(3), pp. 208-232.

McSweeney DJ, Baird RW, Mahaffy SD. 2007. Site fidelity, associations and movements of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales off the island of Hawaii. *Marine Mammal Science*, 23, pp. 666-687.

McSweeney DJ, Baird RW, Mahaffy SD, Webster DL, Schorr GS. 2009. Site fidelity and association patterns of a rare species: Pygmy killer whales (*Feresa attenuata*) in the main Hawaiian Islands. *Marine Mammal Science*, 25, pp. 557-572.

Mead JG. 1989. Beaked whales of the genus *Mesoplodon*. *In*: Ridgeway, S.H. & Harrison, R. [eds.]. Handbook of marine mammals. Volume 4. River dolphins and the larger toothed whales. Academic Press Ltd: London, 452 pp.

Mitchell E. 1975. Report on the meeting on smaller cetaceans, Montreal, April 1-11, 1974. *Journal of the Fisheries Research Board of Canada*, *32*(7), pp. 914-916

Mobley JR Jr, Spitz SS, Forney KA, Grotenfendt R, Forestell PH. 2000. Distribution and abundance of odontocete species in Hawaiian waters: preliminary results of 1993-98 aerial surveys. Southwest Fisheries Science Center Administrative Report LJ-00–14C. La Jolla, CA 92037. 26 pp.

Nagorsen D. 1985. *Kogia simus*. *Mammalian Species*, *239*, pp. 1-6.

NMFS and USFWS. 1998. Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle (*Dermochelys coriacea*). National Marine Fisheries Service, Silver Spring, MD. 77 pp.

NMFS and USFWS. 2007. Hawksbill Sea Turtle (*Eretmochelys imbricata*) 5-Year Review: Summary and Evaluation. National Marine Fisheries Service, Silver Spring, Maryland, and U.S. Fish and Wildlife Service Jacksonville, Florida. 90 pp.

Norris KS, Dohl TP. 1980. Behavior of the Hawaiian spinner dolphin, *Stenella longirostris*. *Fisheries Bulletin*, *77*, pp. 821-849.

Norris KS, Würsig B, Wells RS, Würsig M. 1994. The Hawaiian Spinner Dolphin. *University of California Press,* 408 pp.

Northrop J, Cummings WC, Morrison MF. 1971. Underwater 20-Hz signals recorded near Midway Island. *Journal of the Acoustical Society of America*, 49, pp. 1909-1910.

Oleson EM, Boggs CH, Forney KA, Hanson MB, Kobayashi DR, Taylor BL, Wade PR, Ylitalo GM. 2010. Status Review of Hawaiian Insular False Killer Whales (*Pseudorca crassidens*) under the Endangered Species Act. U.S. Dep. Commer. NOAA Tech Memo., NOAA-TM-NMFS-PIFSC-22. 140 pp.

Oleson EM, Baird RW, Martien KK, Taylor BL. 2013. Island-associated stocks of odontocetes in the main Hawaiian Islands: A synthesis of available information to facilitate evaluation of stock structure. PIFSC Working Paper WP-13-003. 41 pp.

Olson PA, Ensor P, Olavarria C, Bott N, Constantine R, Weir J, Childerhouse S, van der Linde M, Schmitt N, Miller BS, Double MC. 2015. New Zealand Blue Whales: Residency, Morphology, and Feeding Behavior of a Little-Known Population. *Pacific Science*, *69*(4), pp. 477-485.

Perrin WF, Wursig B, Thewissen JGM [eds.]. 2009. Encyclopedia of marine mammals. *Academic Press*.

Perryman WL, Au DWK, Leatherwood S, Jefferson TA. 1994. Melon-headed whale *Peponocephala electra* Gray, 1846. *In*: Ridgway, S.H. and Harrison, R. [eds.]. Handbook of Marine Mammals, Vol. 5. The first book of dolphins. *Academic Press*, London, U.K.

Pitman RL. 1990. Pelagic distribution and biology of sea turtles in the eastern tropical Pacific. *In*: Richardson, T.H., Richardson, J.I., and Donnelly, M. [eds.]. Proc. of the Tenth Annual Workshop on Sea Turtle Biology and Conservation. U.S. Dep. of Comm., NOAA Tech. Memo. NMFS-SEFC-278. 286 pp.

Pyle RL, Pyle P. 2009. The Birds of the Hawaiian Islands: Occurrence, History, Distribution, and Status. B.P. Bishop Museum, Honolulu, Hawaii. Version 1 (31 December 2009). Accessed from http://hbs.bishopmuseum.org/birds/rlp-monograph.

Rankin S, Barlow J. 2005. Source of the North Pacific "boing" sound attributed to minke whales. *Journal of the Acoustical Society of America*, *118*(5), pp. 3346-3335

Reeves RR, Leatherwood S, Stone GS, Eldredge LG, 1999. Marine Mammals in the Area Served by the South Pacific Regional Environment Program. Report of the South Pacific Regional Environment Program (P.O. Box 240, Apia, Samoa). 48 pp.

Reeves RR, Leatherwood S, Baird RW. 2009. Evidence of a possible decline since 1989 in false killer whales (*Pseudorca crassidens*) around the main Hawaiian Islands. *Pacific Science*, *63*(2), pp. 253–261.

Rice DW. 1960. Distribution of the bottle-nosed dolphin in the leeward Hawaiian Islands. *Journal of Mammalogy*, *41*(3), pp. 407-408.

Rice DW, Wolman AA. 1978. Humpback whale census in Hawaiian waters—February 1977. *In:* Norris, K.S., and Reeves, R.R. (eds.). Report on a workshop on problems related to humpback whales (*Megaptera novaeangliae*) in Hawaii. Final report to the Marine Mammal Commission, U.S. Department of Commerce, NTIS PB-280-794.

Ross GJB, Leatherwood S. 1994. Pygmy killer whale *Feresa attenuata* (Gray, 1874). Handbook of Marine Mammals, Volume 5, pp. 387-404.

Rowntree V, Darling J, Silber G, Ferrari M. 1980. Rare sighting of a right whale (*Eubalaena glacialis*) in Hawaii. *Canadian Journal of Zoology*, *58*, pp. 308-312.

Sanches JG. 1991. Catálogo dos principais peixes marinhos da República de Guiné-Bissau. Publicações avulsas do I.N.I.P. No. 16. 429 pp. as cited in Froese, R., and D. Pauly, Editors. 2000. FishBase 2000: concepts, design and data sources. ICLARM, Los Baños, Laguna, Philippines. 344 pp.

Schorr GS, Baird RW, Hanson MB, Webster DL, McSweeney DJ, Andrews RD. 2009. Movements of satellite-tagged Blainville's beaked whales off the island of Hawaii. *Endangered Species Research*, *10*, pp. 203-213.

Schulze-Haugen M, Kohler NE [eds.]. 2003. Guide to Sharks, Tunas, & Billfishes of the U.S. Atlantic and Gulf of Mexico. RI Sea Grant/National Marine Fisheries Service.

Shallenberger EW. 1981. The status of Hawaiian cetaceans. Marine Mammal Commission Report No. MMC–77/23 (NTIS PB82–109398).

Stafford KM, Nieukirk SL, Fox CG. 2001. Geographic and seasonal variation of blue whale calls in the North Pacific. *Journal of Cetacean Research and Management*, *3*, pp. 65-76.

Strasburg DW. 1958. Distribution, abundance, and habits of pelagic sharks in the central Pacific Ocean. *Fishery Bulletin*, *138*(58), pp. 335-361.

Thompson PO, Friedl WA. 1982. A long-term study of low frequency sounds from several species of whales off Oahu, Hawaii. *Cetology*, *45*, pp. 1-19.

Tuato'o-Bartley N, Morrell TE, Craig P. 1993. Status of sea turtles in American Samoa in 1991. *Pacific Science*, *47*(3), pp. 215-221.

Utzurrum R. 2002. Sea turtle conservation in American Samoa. *In:* Kinan I. (ed.). Proceedings of the western Pacific sea turtle cooperative research and management workshop.

Veron JE. 2014. Results of an update of the Corals of the World Information Base for the Listing Determination of 66 Coral Species under the Endangered Species Act. Report to the Western Pacific Regional Fishery Management Council, Honolulu, Hawaii.

Wolman AA, Jurasz CM. 1977. Humpback whales in Hawaii: Vessel Census, 1976. *Marine Fisheries Review*, *39*(7), pp. 1-5.

# APPENDIX C: OBSERVER PROGRAM BYCATCH DATA

**Table C-1. Total estimated bycatch in number of fish from the Pacific Islands Region Observer Program for the Hawaii deep-set longline fishery**

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Lancetfish, Longnose | 275,802 | 288,339 | 217,244 | 153,865 | 199,574 |
| Snake Mackerel | 49,481 | 43,862 | 67,877 | 59,556 | 98,779 |
| Shark, Blue | 134,067 | 139,284 | 124,209 | 87,911 | 88,965 |
| Escolar | 47,973 | 50,556 | 53,089 | 45,225 | 45,246 |
| Stingray, Pelagic | 10,949 | 9,357 | 8,526 | 9,533 | 10,646 |
| Shark, Bigeye Thresher | 10,399 | 9,754 | 13,313 | 11,746 | 9,219 |
| Tuna, Albacore | 145 | 80 | 790 | 881 | 8,689 |
| Tuna, Bigeye | 19,481 | 20,596 | 12,360 | 5,773 | 5,913 |
| Swordfish | 2,228 | 2,495 | 1,485 | 1,314 | 5,654 |
| Dolphinfish | 4,896 | 2,505 | 3,092 | 4,568 | 5,037 |
| Pomfret, Dagger | 8,929 | 5,667 | 9,450 | 5,936 | 4,948 |
| Tuna, Unidentified | 6,855 | 4,097 | 5,052 | 4,899 | 4,585 |
| Tuna, Yellowfin | 7,434 | 6,138 | 10,804 | 5,064 | 3,904 |
| Pomfret, Brama spp. | 5,038 | 4,961 | 3,288 | 2,908 | 3,515 |
| Shark, Oceanic White-Tip | 2,125 | 1,959 | 3,084 | 2,362 | 2,593 |
| Dogfish, Velvet | 2,216 | 2,639 | 1,629 | 636 | 2,568 |
| Shark, Shortfin Mako | 7,362 | 7,052 | 4,678 | 2,597 | 2,364 |
| Escolar, Longfin | 4,570 | 5,370 | 3,430 | 2,956 | 2,237 |
| Oilfish | 2,717 | 2,457 | 2,063 | 2,987 | 2,074 |
| Wahoo | 3,404 | 1,784 | 2,080 | 1,191 | 1,556 |
| Spearfish, Shortbill | 2,663 | 2,126 | 2,073 | 962 | 1,429 |
| Pomfret, Sickle | 1,510 | 1,337 | 1,525 | 1,121 | 1,189 |
| Shark, Silky | 1,831 | 959 | 1,419 | 1,316 | 1,094 |
| Tuna, Skipjack | 4,366 | 2,833 | 3,074 | 1,472 | 1,035 |
| Shark, Unidentified | 1,066 | 454 | 1,131 | 1,408 | 982 |
| Puffer, Pelagic | 267 | 526 | 538 | 394 | 525 |
| Shark, Unid. Thresher | 659 | 400 | 485 | 945 | 454 |
| Pomfret, Rough | 597 | 286 | 430 | 307 | 394 |
| Marlin, Striped | 2,781 | 1,186 | 536 | 759 | 392 |
| Mobula (Devil Ray) | 218 | 76 | 251 | 298 | 335 |
| Shark, Crocodile | 3,206 | 1,994 | 1,704 | 861 | 317 |
| Mola, Common | 183 | 114 | 165 | 212 | 274 |
| Billfish, Unidentified | 1,298 | 454 | 275 | 235 | 251 |
| Dolphinfish, Pompano | 82 | 59 | 288 | 196 | 241 |
| Mola, Sharptail | 59 | 55 | 33 | 61 | 225 |
| Bony Fish, Unidentified | 368 | 60 | 1,104 | 549 | 182 |

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Marlin, Blue | 817 | 476 | 224 | 168 | 179 |
| Ribbonfish, Tapertail | 207 | 164 | 215 | 180 | 137 |
| Marlin, Unidentified | NC | 82 | 137 | 152 | 131 |
| Escolar, Roudi's | 510 | 253 | 268 | 191 | 116 |
| Gemfish, Black | 147 | 268 | 111 | 101 | 115 |
| Shark, Longfin Mako | 212 | 340 | 193 | 210 | 113 |
| Pomfret, Unidentified | 294 | 113 | 165 | 149 | 108 |
| Shark, Pelagic Thresher | 212 | 132 | 158 | 208 | 107 |
| Manta/Mobula | 82 | 43 | 66 | 146 | 106 |
| Fanfishes | 32 | 57 | 46 | 36 | 90 |
| Opah | 1,315 | 932 | 144 | 91 | 86 |
| Shark, Smooth Hammerhead | 184 | 195 | 215 | 141 | 61 |
| Shark, Galapagos | 41 | 37 | 39 | 25 | 53 |
| Crestfish | 82 | 72 | 45 | 33 | 46 |
| Barracuda, Great | 204 | 433 | 233 | 46 | 42 |
| Mola, Slender | 196 | 226 | 19 | 13 | 39 |
| Puffer, Unidentified | 51 | 101 | 63 | 34 | 39 |
| Shark, Sandbar | 28 | 17 | 39 | 32 | 36 |
| Hammerjaw | 468 | 420 | 71 | 29 | 29 |
| Shark, Cookie Cutter | 5 | 21 | 15 | 0 | 24 |
| Bony Fish, Other Identified | 54 | 29 | 27 | 24 | 21 |
| Pomfret, Lustrous | 115 | 66 | 225 | 81 | 20 |
| Cigarfishes | 80 | 48 | 54 | 66 | 17 |
| Ribbonfish, Scalloped | 29 | 7 | 31 | 16 | 16 |
| Swallowers | 336 | 258 | 67 | 68 | 15 |
| Rainbow Runner | 5 | 0 | 5 | 10 | 12 |
| Sailfish | 331 | 63 | 21 | 20 | 11 |
| Crestfish, Unicorn | NC | 8 | 8 | 0 | 11 |
| Manta Ray, Giant | 0 | 7 | 11 | 0 | 11 |
| Shark, Tiger | 20 | 36 | 26 | 22 | 11 |
| Shark, Unid. Hammerhead | 32 | 43 | 49 | 17 | 11 |
| Shark, Unid. Mako | 171 | 82 | 36 | 22 | 10 |
| Shark, Other Identified | 0 | 0 | 5 | 13 | 8 |
| Pufferfish, Porcupine | NC | 30 | 5 | 11 | 7 |
| Ray, Unidentified | 0 | 6 | 26 | 9 | 7 |
| Needle Fish, Gaping | 0 | 0 | 0 | 0 | 5 |
| Pomfret, Pacific | 0 | 0 | 0 | 0 | 5 |
| Jack, Cottonmouth | 0 | 14 | 5 | 0 | 5 |
| Snake Mackerel, Unidentified | 148 | 55 | 38 | 237 | 5 |
| Molas | NC | 16 | 0 | 0 | 5 |
| Shark, Common Thresher | 6 | 23 | 29 | 28 | 4 |
| Lancetfish, Shortnose | 9 | 9 | 5 | 21 | 0 |

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Triggerfish, Rough | 3 | 0 | 8 | 0 | 0 |
| Triggerfish, Unidentified | 0 | 0 | 0 | 0 | 0 |
| Pomfret, Bigtooth | 0 | 0 | 0 | 0 | 0 |
| Jack, Unidentified | 0 | 0 | 0 | 0 | 0 |
| Kahala, Unspecified (Amberjacks) | 0 | 0 | 0 | 0 | 0 |
| Pilotfish | NC | 6 | 0 | 0 | 0 |
| Yellowtail | 0 | 0 | 0 | 0 | 0 |
| Gurnards, Flying | NC | 0 | 0 | 6 | 0 |
| Flyingfish | 0 | 0 | 0 | 0 | 0 |
| Mackerel, Black Snake | NC | 0 | 0 | 3 | 0 |
| Marlin, Black | 0 | 0 | 0 | 0 | 0 |
| Louvar | 0 | 0 | 0 | 0 | 0 |
| Oarfish | 0 | 6 | 0 | 11 | 0 |
| Mackerel (incl. Chub, Spotted Chub) | 0 | 0 | 0 | 0 | 0 |
| Mackerel, Bullet | 0 | 0 | 0 | 0 | 0 |
| Tuna, Bluefin | 0 | 0 | 0 | 0 | 0 |
| Tuna, Dogtooth | NC | 4 | 0 | 0 | 0 |
| Tuna, Kawakawa | 0 | 0 | 0 | 0 | 0 |
| Tuna, Southern Bluefin | NC | 0 | 0 | 0 | 0 |
| Ribbonfishes | NC | 0 | 8 | 0 | 0 |
| Scabbardfish, Razorback | 20 | 16 | 5 | 26 | 0 |
| Scabbardfish, Unidentified | 0 | 0 | 7 | 0 | 0 |
| Ray, Torpedo | NC | 0 | 0 | 4 | 0 |
| Ray, Other Identified | 0 | 0 | 0 | 0 | 0 |
| Shark, Blacktip | 0 | 0 | 0 | 0 | 0 |
| Shark, Gray Reef | 0 | 0 | 0 | 0 | 0 |
| Shark, Bignose | 0 | 0 | 0 | 0 | 0 |
| Shark, Blacktip Reef | 0 | 0 | 0 | 9 | 0 |
| Shark, Salmon | 6 | 0 | 8 | 36 | 0 |
| Shark, White | 0 | 0 | 0 | 0 | 0 |
| Bigeye Sand Tiger Shark | 22 | 31 | 18 | 10 | 0 |
| Shark, Scalloped Hammerhead | 0 | 0 | 0 | 0 | 0 |

Note: Species that did not have a unique species code prior to 2020 are listed as "NC" for each year from 2016 to 2019.

**Table C-2. Total estimated bycatch in number of fish from the Pacific Islands Region Observer Program for the Hawaii shallow-set longline fishery**

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Shark, Blue | 4,225 | 6,949 | 6,446 | 8,252 | 7,214 |
| Lancetfish, Longnose | 1,232 | 1,268 | 2,480 | 3,150 | 3,121 |
| Shark, Shortfin Mako | 298 | 1,151 | 808 | 1,224 | 1,007 |

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Escolar | 122 | 152 | 521 | 557 | 686 |
| Swordfish | 254 | 251 | 499 | 541 | 646 |
| Oilfish | 57 | 248 | 219 | 359 | 217 |
| Pomfret, Brama spp. | 27 | 45 | 21 | 28 | 143 |
| Stingray, Pelagic | 82 | 328 | 171 | 123 | 143 |
| Snake Mackerel | 16 | 31 | 98 | 151 | 104 |
| Tuna, Albacore | 1 | 51 | 63 | 82 | 104 |
| Dolphinfish | 18 | 20 | 75 | 69 | 86 |
| Tuna, Yellowfin | 8 | 46 | 71 | 24 | 62 |
| Shark, Bigeye Thresher | 3 | 21 | 58 | 67 | 60 |
| Tuna, Bigeye | 55 | 77 | 79 | 35 | 50 |
| Shark, Unidentified | 44 | 32 | 42 | 51 | 48 |
| Mola, Common | 5 | 41 | 9 | 24 | 32 |
| Tuna, Unidentified | 12 | 16 | 28 | 15 | 18 |
| Shark, Oceanic White-Tip | 0 | 13 | 37 | 54 | 13 |
| Shark, Longfin Mako | 1 | 2 | 1 | 4 | 10 |
| Marlin, Striped | 6 | 31 | 55 | 28 | 9 |
| Spearfish, Shortbill | 3 | 12 | 12 | 7 | 8 |
| Wahoo | 0 | 0 | 2 | 1 | 7 |
| Shark, Pelagic Thresher | 0 | 0 | 0 | 1 | 7 |
| Ribbonfish, Tapertail | 0 | 5 | 0 | 8 | 6 |
| Shark, Unid. Mako | 2 | 1 | 0 | 3 | 6 |
| Billfish, Unidentified | 2 | 3 | 10 | 2 | 5 |
| Puffer, Pelagic | 0 | 3 | 9 | 6 | 5 |
| Pomfret, Dagger | 2 | 3 | 21 | 23 | 4 |
| Shark, Common Thresher | 2 | 2 | 0 | 5 | 4 |
| Shark, Salmon | 5 | 3 | 2 | 1 | 4 |
| Pomfret, Sickle | 1 | 0 | 0 | 5 | 3 |
| Opah | 7 | 22 | 0 | 6 | 3 |
| Tuna, Skipjack | 4 | 0 | 9 | 1 | 3 |
| Shark, Unid. Thresher | 1 | 7 | 7 | 7 | 3 |
| Marlin, Unidentified | NC | 0 | 2 | 1 | 2 |
| Mola, Sharptail | 0 | 0 | 0 | 0 | 2 |
| Bony Fish, Unidentified | 1 | 3 | 30 | 31 | 2 |
| Shark, Cookie Cutter | 2 | 2 | 2 | 1 | 2 |
| Shark, Smooth Hammerhead | 0 | 1 | 3 | 6 | 2 |
| Lancetfish, Shortnose | 0 | 0 | 0 | 0 | 1 |
| Dolphinfish, Pompano | 0 | 0 | 1 | 0 | 1 |
| Gurnards, Flying | NC | | | | 1 |
| Escolar, Longfin | 0 | 0 | 2 | 1 | 1 |
| Escolar, Roudi's | 0 | 0 | 0 | 0 | 1 |
| Gemfish, Black | 0 | 0 | 1 | 0 | 1 |

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Marlin, Blue | 0 | 7 | 7 | 5 | 1 |
| Driftfish | NC | | | | 1 |
| Manta/Mobula | 0 | 1 | 4 | 0 | 1 |
| Mobula (Devil Ray) | 0 | 0 | 2 | 2 | 1 |
| Shark, Blacktip Reef | 0 | 0 | 0 | 0 | 1 |
| Shark, White | 0 | 0 | 0 | 0 | 1 |
| Shark, Crocodile | 0 | 0 | 2 | 4 | 1 |
| Dogfish, Velvet | 0 | 0 | 0 | 0 | 1 |
| Triggerfish, Rough | 0 | 0 | 0 | 2 | 0 |
| Triggerfish, Unidentified | 0 | 0 | 0 | 0 | 0 |
| Needle Fish, Gaping | 0 | 0 | 0 | 0 | 0 |
| Fanfishes | 0 | 1 | 0 | 1 | 0 |
| Pomfret, Bigtooth | 0 | 0 | 0 | 0 | 0 |
| Pomfret, Lustrous | 0 | 1 | 0 | 0 | 0 |
| Pomfret, Pacific | 0 | 0 | 0 | 0 | 0 |
| Pomfret, Rough | 0 | 0 | 0 | 0 | 0 |
| Pomfret, Unidentified | 4 | 0 | 0 | 0 | 0 |
| Jack, Cottonmouth | 0 | 0 | 0 | 0 | 0 |
| Kahala, Unspecified (Amberjacks) | 0 | 0 | 0 | 0 | 0 |
| Rainbow Runner | 0 | 0 | 0 | 0 | 0 |
| Yellowtail | 0 | 0 | 0 | 0 | 0 |
| Swallowers | 0 | 0 | 0 | 0 | 0 |
| Flyingfish | 0 | 0 | 0 | 0 | 0 |
| Mackerel, Black Snake | NC | | | | 0 |
| Snake Mackerel, Unidentified | 3 | 0 | 0 | 0 | 0 |
| Marlin, Black | 0 | 0 | 0 | 0 | 0 |
| Sailfish | 0 | 0 | 0 | 0 | 0 |
| Crestfish | 0 | 0 | 0 | 0 | 0 |
| Crestfish, Unicorn | NC | 0 | 0 | 0 | 0 |
| Louvar | 0 | 0 | 0 | 0 | 0 |
| Mola, Slender | 0 | 0 | 1 | 0 | 0 |
| Molas | NC | 0 | 0 | 0 | 0 |
| Cigarfishes | 0 | 0 | 0 | 1 | 0 |
| Hammerjaw | 0 | 0 | 0 | 0 | 0 |
| Mackerel (incl. Chub, Spotted Chub) | 0 | 0 | 0 | 0 | 0 |
| Mackerel, Bullet | 0 | 0 | 0 | 0 | 0 |
| Tuna, Bluefin | 0 | 0 | 0 | 0 | 0 |
| Tuna, Dogtooth | NC | 0 | 0 | 0 | 0 |
| Tuna, Kawakawa | 0 | 0 | 0 | 0 | 0 |
| Barracuda, Great | 0 | 0 | 0 | 1 | 0 |
| Puffer, Unidentified | 0 | 0 | 7 | 0 | 0 |
| Pufferfish, Porcupine | NC | 0 | 0 | 0 | 0 |

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Ribbonfish, Scalloped | 0 | 0 | 1 | 0 | 0 |
| Ribbonfishes | NC | 0 | 0 | 0 | 0 |
| Scabbardfish, Razorback | 0 | 0 | 0 | 0 | 0 |
| Scabbardfish, Unidentified | 0 | 0 | 0 | 0 | 0 |
| Bony Fish, Other Identified | 1 | 0 | 0 | 0 | 0 |
| Manta Ray, Giant | 0 | 0 | 0 | 3 | 0 |
| Ray, Torpedo | NC | | | | 0 |
| Ray, Other Identified | 0 | 0 | 0 | 0 | 0 |
| Ray, Unidentified | 0 | 0 | 0 | 1 | 0 |
| Shark, Bignose | 0 | 0 | 0 | 0 | 0 |
| Shark, Galapagos | 0 | 1 | 0 | 0 | 0 |
| Shark, Sandbar | 0 | 0 | 0 | 0 | 0 |
| Shark, Silky | 0 | 1 | 8 | 11 | 0 |
| Shark, Tiger | 0 | 0 | 0 | 1 | 0 |

Note: Species that did not have a unique species code prior to 2020 are listed as "NC" for each year from 2016 to 2019.

**Table C-3. Total estimated bycatch in number of fish from the Pacific Islands Region Observer Program for the American Samoa longline fishery**

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Stingray, Pelagic | 11,908 | 8,395 | 8,259 | 6,487 | 13,056 |
| Lancetfish, Longnose | 4,991 | 4,063 | 3,913 | 2,749 | 6,199 |
| Escolar, Longfin | 6,609 | 5,037 | 4,788 | 3,706 | 5,859 |
| Escolar | 5,094 | 5,540 | 5,517 | 3,111 | 3,989 |
| Tuna, Albacore | 1,584 | 1,136 | 1,077 | 1,258 | 2,131 |
| Tuna, Yellowfin | 1,180 | 1,476 | 1,363 | 1,755 | 1,893 |
| Shark, Silky | 1,840 | 1,227 | 1,238 | 949 | 1,734 |
| Shark, Blue | 2,681 | 2,958 | 2,721 | 1,752 | 1,451 |
| Snake Mackerel, Unidentified | 0 | 3 | 2 | 1 | 873 |
| Pomfret, Sickle | 535 | 407 | 425 | 515 | 782 |
| Tuna, Bigeye | 564 | 830 | 778 | 615 | 691 |
| Tuna, Unidentified | 824 | 1,473 | 1,313 | 519 | 669 |
| Shark, Oceanic White-Tip | 870 | 469 | 467 | 355 | 657 |
| Swordfish | 706 | 211 | 260 | 177 | 612 |
| Barracuda, Great | 747 | 442 | 434 | 477 | 589 |
| Tuna, Skipjack | 1,196 | 1,510 | 1,366 | 571 | 521 |
| Crestfish | 129 | 124 | 122 | 69 | 521 |
| Oilfish | 718 | 485 | 498 | 358 | 442 |
| Spearfish, Shortbill | 447 | 423 | 390 | 350 | 408 |
| Escolar, Roudi's | 521 | 417 | 406 | 184 | 261 |
| Wahoo | 326 | 728 | 690 | 185 | 249 |
| Shark, Bigeye Thresher | 148 | 159 | 158 | 115 | 227 |
| Marlin, Blue | 144 | 294 | 289 | 190 | 215 |

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Pomfret, Brama spp. | 232 | 145 | 135 | 71 | 181 |
| Shark, Shortfin Mako | 169 | 234 | 232 | 89 | 159 |
| Pomfret, Dagger | 344 | 85 | 85 | 95 | 125 |
| Sailfish | 163 | 98 | 97 | 63 | 79 |
| Cigarfishes | 9 | 8 | 10 | 21 | 79 |
| Marlin, Striped | 279 | 131 | 121 | 82 | 68 |
| Hammerjaw | 13 | 28 | 26 | 19 | 57 |
| Mola, Slender | 193 | 2,210 | 2,074 | 317 | 45 |
| Pomfret, Lustrous | 20 | 28 | 27 | 11 | 34 |
| Opah | 109 | 68 | 66 | 56 | 34 |
| Ribbonfish, Tapertail | 27 | 33 | 31 | 18 | 34 |
| Turtle, Green/Black | 26 | 11 | 10 | 4 | 23 |
| Puffer, Pelagic | 27 | 12 | 11 | 17 | 23 |
| Shark, Longfin Mako | 47 | 24 | 20 | 12 | 11 |
| Shark, Smooth Hammerhead | 9 | 2 | 2 | 2 | 11 |
| Triggerfish, Rough | 0 | 0 | 0 | 0 | 11 |
| Fanfishes | 0 | 1 | 1 | 2 | 11 |
| Jack, Cottonmouth | 0 | 5 | 5 | 2 | 11 |
| Rainbow Runner | 0 | 3 | 2 | 0 | 11 |
| Swallowers | 0 | 0 | 0 | 0 | 11 |
| Dolphinfish | 18 | 163 | 147 | 318 | 11 |
| Gurnards, Flying | NC | #N/A | N/A | N/A | 11 |
| Mola, Common | 0 | 9 | 8 | 9 | 11 |
| Soapfish, Goldenstripe | 34 | 7 | 10 | 1 | 11 |
| Puffer, Unidentified | 5 | 1 | 1 | 0 | 11 |
| Scabbardfish, Razorback | 16 | 14 | 13 | 10 | 11 |
| Bony Fish, Unidentified | 58 | 31 | 34 | 3 | 11 |
| Manta/Mobula | 24 | 4 | 5 | 7 | 11 |
| Billfish, Unidentified | 43 | 40 | 32 | 25 | 0 |
| Marlin, Unidentified | NC | N/A | N/A | 6 | 0 |
| Shark, Pelagic Thresher | 0 | 3 | 3 | 1 | 0 |
| Shark, Unid. Thresher | 27 | 25 | 25 | 22 | 0 |
| Shark, Galapagos | 11 | 7 | 4 | 2 | 0 |
| Shark, Unid. Mako | 13 | 6 | 5 | 2 | 0 |
| Shark, Crocodile | 5 | 5 | 8 | 10 | 0 |
| Shark, Scalloped Hammerhead | 0 | 4 | 3 | 2 | 0 |
| Shark, Unid. Hammerhead | 0 | 2 | 2 | 1 | 0 |
| Dogfish, Velvet | 0 | 4 | 4 | 0 | 0 |
| Shark, Unidentified | 96 | 62 | 57 | 76 | 0 |
| Cardinalfish, Blackmouth | NC | 1 | N/A | 0 | 0 |
| Lancetfish, Shortnose | 13 | 3 | 4 | 1 | 0 |
| Yellowtail | 0 | 1 | 1 | 0 | 0 |

| Species | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Dolphinfish, Pompano | 5 | 1 | 1 | 0 | 0 |
| Gemfish, Black | 31 | 57 | 54 | 16 | 0 |
| Snake Mackerel | 1,689 | 1,568 | 1,502 | 1,221 | 0 |
| Mola, Sharptail | 0 | 2 | 2 | 7 | 0 |
| Bony Fish, Other Identified | 24 | 34 | 34 | 8 | 0 |
| Manta Ray, Giant | 0 | 3 | 3 | 2 | 0 |

Note: Species that did not have a unique species code prior to 2020 are listed as "NC" for each year from 2016 to 2019.

# APPENDIX D: LIST OF PLAN TEAM MEMBERS

| Member; Title | Plan Team Role |
|---|---|
| Donald Koybayashi; NMFS PIFSC | Habitat and Living Marine Resources |
| Jason Philibotte; NMFS PIRO | International Fisheries |
| Jennifer Stahl; NMFS PIFSC | Pelagics |
| Ashley Tomita; NMFS PIFSC | Pelagics |
| Danika Kleiber; NMFS PIFSC | Human Dimensions |
| Emily Crigler; NMFS PIRO | Chair; Fisheries Policy |
| Michael Kinney; NMFS PIFSC | Life History |
| Minling Pan; NMFS PIFSC | Economics |
| T. Todd Jones; NMFS PIFSC | Protected Resources |
| Phoebe Woodworth-Jefcoats; NMFS PIFSC | Oceanography |
| Robert Ahrens; NMFS PIFSC | Management Strategy Evaluation |
| Michelle Scully; NMFS PIRO | International Fisheries |
| Chelsea Young; NMFS PIRO | Protected Resources |
| Melissa Snover; NMFS PIRO | Protected Resources |
| Jenny Suter; NMFS PIFSC | Fisheries Research & Monitoring |
| Lynn Rassel, NMFS PIFSC | Observer Program |
| Jason Helyer; Hawaii DAR | Hawaii |
| Sean Felise; American Samoa DMWR | American Samoa |
| Domingo Ochavillo; American Samoa DMWR | American Samoa |
| Jude Lizama; CNMI DFW | CNMI |
| Brent Tibbatts; Guam DAWR | Guam |
| Frank Roberto; Guam DAWR | Guam |
| Bryan Ishida; Hawaii DAR | Ex-Officio |
| Felipe Carvalho; NMFS PIFSC | Ex-Officio |

# APPENDIX E: PELAGIC PLAN TEAM REPORT – MAY 2025

Consistent with direction from the Council's Pelagic Plan Team at its regular meeting in May 2025, the Pelagic Plan Team's meeting report is appended to this annual SAFE report to provide readers with important context regarding fishery performance trends that are not otherwise provided in the annual SAFE report. The Pelagic Plan Team report begins on the following page.