2022–2025 Annual Catch Limits and Accountability Measures for Hawaii Archipelago Deepwater Shrimp and Precious Coral Fisheries

Draft Environmental Assessment Including a Regulatory Impact Review

(RIN 0648-xxxx)

DRAFT March 4, 2022

Responsible Federal Agency: Pacific Islands Regional Office (PIRO)
National Marine Fisheries Service (NMFS)
National Oceanic & Atmospheric Administration (NOAA)

Responsible Official: Michael D. Tosatto
Regional Administrator, PIRO
1845 Wasp Blvd., Bldg. 176
Honolulu, HI 96818
Tel (808) 725-5000

Responsible Council: Kitty Simonds
Executive Director
Western Pacific Fishery Management Council (WPFMC)
1164 Bishop St., Ste. 1400
Honolulu, HI 96813
Tel (808) 522-8220

Abstract

The National Marine Fisheries Service (NMFS) proposes annual catch limits (ACL) and accountability measures (AM) for the deepwater shrimp and precious coral fisheries in the U.S. Exclusive Economic Zone around the Hawaii Archipelago, as recommended by the Western Pacific Regional Fishery Management Council (Council). The ACLs and AMs would apply to deepwater shrimp catch in fishing years 2022, 2023, 2024, and 2025 and to precious coral fishery harvests in fishing years 2022–23, 2023–24, and 2024–25. NMFS and the Council have managed the Hawaii deepwater shrimp and precious coral fisheries using ACLs and AMs since 2012, and the proposed ACLs and AMs are the same as those applied to the fisheries in each fishing year since then (except for 2018). As a post-season AM, after the end of each fishing year, if NMFS and the Council determine that the average catch from the most recent three-year period exceeds an implemented ACL, NMFS would reduce the ACL in the subsequent fishing year by the amount of the overage.

NMFS and the Council prepared this draft environmental assessment (EA), including a draft Regulatory Impact Review (RIR), to evaluate potential effects of the proposed action and alternatives, using the 2020 National Environmental Policy Act (NEPA) Regulations that became effective on September 14, 2020.

How to Comment

NMFS is seeking comments on the proposed regulations, and this EA and RIR. You may submit comments by either of the following methods:

- Electronic Submission: Submit all electronic comments via the Federal e-Rulemaking Portal. Go to http://www.regulations.gov and enter NOAA-NMFS-2022-xxxx in the Search box, click the "Comment" icon, complete the required fields, and enter or attach your comments.
- Mail: Send written comments to Michael D. Tosatto, Regional Administrator, NMFS Pacific Islands Region (PIR), 1845 Wasp Blvd. Bldg. 176, Honolulu, HI 96818.

If you need assistance with this document, please contact NMFS at 808-725-5000.

Abbreviations

ABC – Acceptable Biological Catch
ACL – Annual Catch Limit
AM – Accountability Measure
BiOp – Biological Opinion
CEQ – Council on Environmental Quality
CFR – Code of Federal Regulations
Council – Western Pacific Fishery Management Council (also WPFMC)
CML – Commercial Marine License
CPUE – Catch Per Unit of Effort
DLNR – Hawaii Department of Land and Natural Resources
DPS – Distinct Population Segment
EA – Environmental Assessment
EC – Ecosystem Component
EEZ – Exclusive Economic Zone
EFH – Essential Fish Habitat
EO – Executive Order
ESA – Endangered Species Act
FEP – Fishery Ecosystem Plan
FMP – Fishery Management Plan
FR – *Federal Register*
HAPC – Habitat Areas of Particular Concern
HDAR – Hawaii Division of Aquatic Resources
HMRFS – Hawaii Marine Recreational Fishing Survey
ITS – Incidental Take Statement
JEA – Joint Enforcement Agreement
LOF – List of Fisheries
MBTA – Migratory Bird Treaty Act
MHI – Main Hawaiian Islands
MFMT – Maximum Fishing Mortality Threshold
Magnuson-Stevens Act – Magnuson-Stevens Fishery Conservation and Management Act
MMPA – Marine Mammal Protection Act
MPA – Marine Protected Area
MRIP – NMFS Marine Recreational Information Program
MSST – Minimum Stock Size Threshold
MSY – Maximum Sustainable Yield
MUS – Management Unit Species
NAO – NOAA Administrative Order
NEPA – National Environmental Policy Act
NMFS – National Marine Fisheries Service
NOAA – National Oceanic and Atmospheric Administration
NWHI – Northwestern Hawaiian Islands
OFL – Overfishing Limit
OLE – NOAA Office of Law Enforcement
OY – Optimum Yield
PIFSC – NMFS Pacific Islands Fisheries Science Center

PIRO – NMFS Pacific Islands Regional Office
RA – NMFS Regional Administrator
SEEM – Social, Economic, Ecological, and Management Uncertainty
SSC – Scientific and Statistical Committee
USCG – U.S. Coast Guard
USFWS – U.S. Fish and Wildlife Service
WCPO – Western and Central Pacific Ocean
WPacFIN – Western Pacific Fisheries Information Network
WPFMC – Western Pacific Fishery Management Council (also Council)

Contents

Tables

Figures

1 INTRODUCTION

The National Marine Fisheries Service (NMFS) proposes to implement annual catch limits (ACL), and accountability measures (AM) for deepwater shrimp in the Hawaii Archipelago in fishing years 2022, 2023, 2024, and 2025 and for precious corals in the Hawaii Archipelago in fishing years 2022–23, 2023–24, and 2024–25. NMFS prepared this environmental assessment (EA) in accordance with the requirements of National Oceanographic and Atmospheric Administration's (NOAA) Administrative Order (NAO) Section 216-6A for "Compliance with the National Environmental Policy Act", Executive Orders 12114, Environmental Effects Abroad of Major Federal Actions; 11988 and 13690, Floodplain Management; and 11990, Protection of Wetlands" and the associated Companion Manual. NAO 216-6A requires review under the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and other related authorities including review of environmental consequences on the human environment prior to making a decision. Section 1 of this EA provides background information to understand the fisheries, the proposed alternatives, and the purpose and need for action. The proposed alternatives are described in Section 2. The affected environment and analyses of the potential impacts on the human environment are in Section 3. Compliance with other applicable laws and coordination with others is found in Section 4. References cited are listed in Section 5. Draft proposed regulations are included in Section 6.

1.1 Background Information

1.1.1 Overview of the Deepwater Shrimp and Crustacean Fisheries

As authorized by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), NMFS and the Western Pacific Regional Fishery Management Council (Council manage fisheries for crustaceans and precious corals in federal waters (the U.S. Exclusive Economic Zone, or EEZ, generally 3–200 nm from shore) around the Hawaii Archipelago, inclusive of both the main Hawaiian Islands (MHI) and Northwestern Hawaiian Islands (NWHI), in accordance with the Fishery Ecosystem Plan for the Hawaii Archipelago (FEP) and implementing regulations at Title 50 Code of Federal Regulations, Part 665 (50 CFR 665). The Hawaii deepwater shrimp and precious coral fisheries are considered together in this environmental assessment (EA) because both fisheries are sporadically-active with low levels of commercial fishing compared to other MUS fisheries in Hawaii and utilize the same Tier 4 control rule for the determination of appropriate ACLs (see Section 1.1.2). The Magnuson-Stevens Act and the FEP require that NMFS implement ACLs and AMs for all stocks and stock complexes of management unit species (MUS) included in each FEP, with the exception of species with short life cycles, those stocks managed through international agreements, or those that qualify as ecosystem component species (ECS). Additionally, general federal fishery regulations for crustacean and precious coral fisheries of the Western Pacific Region and other federally managed fisheries are found in 50 CFR 665 and include federal permit and reporting requirements, vessel identification and observer requirements, fishing seasons, and size restrictions. Precious coral fishing in Hawaii is further regulated through closed areas and harvest quotas. Currently, there are no active fisheries for crustaceans or precious corals in federal waters around Hawaii at present, and fishing for crustaceans or precious corals in this area typically occurs within waters under the jurisdiction of the State of Hawaii.

The crustacean MUS in Hawaii include the following stocks and stock complexes[1]: deepwater

[1] The Magnuson-Stevens Act defines the term "stock of fish" to mean a species, subspecies, geographic grouping, or

shrimps and Kona crab, of which only deepwater shrimp are covered by this action (see Appendix A). Precious coral MUS include the following groups: black corals, pink corals, bamboo corals, and gold corals (see Table 1 and Appendix B).

Table 1. Precious coral management unit species in the Hawaii Archipelago.

Common Name	Scientific Name
Black corals	*Antipathes griggi*, Antipathes grandis, Myriopathes ulex*[+]
Pink corals	*Pleurocorallium secundum*[§]*, Hemicorallium laauense*[¶]
Bamboo corals	*Acanella* spp.
Gold corals	*Kulamanamana haumeaae*[**]

* *Antipathes dichotoma* was recently reclassified as *Antipathes griggi* by the scientific community (Opresko 2009).

[+] *Antipathes ulex* was recently reclassified as *Myriopathes ulex* by the scientific community (Opresko 2001).

[§] *Corallium secundum* was recently reclassified as *Pleurocorallium secundum* in the Hawaii Archipelago FEP.

[¶] *Corallium laauense* was recently reclassified as *Hemicorallium laauense* in the Hawaii Archipelago FEP.

[**] *Gerardia* spp. was recently reclassified as *Kulamanamana haumeaae* by the scientific community (Sinniger et al. 2013).

Both crustacean and precious coral MUS previously had several additional species listed in the FEP, but, on February 8, 2019, Amendment 5 to the Hawaii Archipelago FEP reclassified these species as ECS (84 FR 2767, NMFS 2018). ECS remain in the FEP but are not subject to ACLs or AMs. For crustaceans, in 2019, consistent with Amendment 5, NMFS removed spiny lobster and slipper lobster as MUS through the rule, and for precious corals, NMFS renamed or removed several species of black, pink, and bamboo coral (NMFS 2018).

Deepwater shrimp managed under the Hawaii Archipelago FEP include all species of the genus *Heterocarpus* (see Appendix A), of which the most frequently harvested are *H. laevigatus* and *H. ensifer*, and occur primarily at depths of between 350 m and 1,200 m. Also referred to as "pandalid shrimp" or "smooth nylon shrimp," they are harvested by traps that are left out overnight to fish and collected the next day (King 1993). In the Hawaii Archipelago, deepwater shrimp fisheries have operated intermittently since the 1960s. In general, these operations have consisted of from one to four vessels and have been sporadic as gear loss, a short product shelf life, and a history of inconsistent product quality have led to fluctuating market demand (Polovina 1993, WPFMC 2009). Also, known fishing areas tend to be limited and subject to reduced catch rates following large initial harvests. Vessels generally leave the fishery for two to five years while the biomass increases enough to make the fishery profitable again (NMFS 2017). In accordance with federal regulations, any vessel used to fish for deepwater shrimp in the U.S. EEZ must obtain a federal permit and submit catch logbooks to NMFS within 72 hours of landing. More detail on these deepwater shrimp species and the fishery targeting them are provided in Sections 3.1.

As described in the Hawaii Archipelago FEP (WPFMC 2009), federally-managed precious corals managed under the FEP include three species of black coral belonging to either the genus *Antipathes* or *Myriopathes*, two species of pink coral, and one species each of gold and bamboo corals (see Table 1 and Appendix B). Pink, gold, and bamboo corals are typically found at depth ranges between 350 and 1,500 m, while black coral occurs at considerably shallower depths from 25 to 365 m (Parrish et al. 2020). All species are found on solid substrate and are slow growing, with low rates of mortality and recruitment (WPFMC 2009). The FEP and the implementing

other category of fish capable of management as a unit. Federal regulations at 50 CFR §660.310 (c) defines "stock complex" to mean a group of stocks that are sufficiently similar in geographic distribution, life history, and vulnerability to the fishery such that the impact of management actions on the stock is similar.

regulations treat precious coral beds as distinct management units. Classification of beds include Established (i.e., appraisal of the maximum sustainable yield, or MSY, are reasonably precise), Conditional (i.e., optimum yields estimated on the basis of bed characteristics relative to established beds), Refugia (i.e., set aside for baseline studies and possible reproductive reserves), or Exploratory (i.e., unexplored portions of the EEZ) (see Table 2). Federal regulations require permit and logbook reporting for each category of coral bed, allow only the use of selective gear methods to harvest precious corals, and further limit harvest through minimum size restrictions on pink coral and bamboo corals. Currently, a moratorium on gold coral harvest is in place throughout the Pacific Islands through June 30, 2023, due to uncertainty in estimates of age and growth parameters and to allow the Council additional time for further research and development of sustainable management measures for gold corals (83 FR 27716, June 14, 2018). Additionally, fishing is prohibited at the Westpac Bed due to its status as a refugium (WPFMC 2009). These prohibitions serve as the functional equivalent of an ACL of zero. Unlike deepwater shrimp, the fishing year for precious corals begins on July 1 and ends June 30 the following year. More detail on these precious coral species and the fisheries targeting them are provided in Section 3.2.

Table 2. Precious coral beds and permit areas within the EEZ around Hawaii.

Bed/Permit Area	Description
Established Beds	
Auau Channel (Maui)	Permit Area E-B-2, includes the area west and south of a point at 21°10′ N. lat., 156°40′ W. long., and east of a point at 21° N. lat., 157° W. long., and west and north of a point at 20°45′ N. lat., 156°40′ W. long.
Makapuu Bed (Oahu)	Permit Area E-B-1, includes the area within a radius of 2.0 nm of a point at 21°18.0′ N. lat., 157°32.5′ W. long.
Conditional Beds	
180 Fathom Bank	Permit Area C-B-4, N.W. of Kure Atoll, includes the area within a radius of 2.0 nm of a point at 28°50.2′ N. lat., 178°53.4′ W. long.
Brooks Bank	Permit Area C-B-3, includes the area within a radius of 2.0 nm of a point at 24°06.0′ N. lat., 166°48.0′ W. long.
Kaena Point (Oahu)	Permit Area C-B-2, includes the area within a radius of 0.5 nm of a point at 21°35.4′ N. lat., 158°22.9′ W. long.
Keahole Point (Hawaii)	Permit Area C-B-1, includes the area within a radius of 0.5 nm of a point at 19°46.0′ N. lat., 156°06.0′ W. long.
Refugia	
Westpac Bed	Permit Area R-1, includes the area within a radius of 2.0 nm of a point at 23°18′ N. lat., 162°35′ W. long.
Exploratory Areas	
Hawaii Precious Coral Exploratory Area	Permit Area X-P-H includes all coral beds, other than established beds, conditional beds, or refugia, in the EEZ seaward of the State of Hawaii.

1.1.2 Overview of the ACL and AM Implementation Process

NMFS is required to specify ACLs and AMs for all deepwater shrimp and precious coral stocks in fisheries of the Hawaii Archipelago, as recommended by the Council, and in consideration of the best available scientific, commercial, and other information about the fishery for that stock complex. This section provides an overview of the steps taken by the Council in developing its

recommendations.

In accordance with the Magnuson-Stevens Act and the FEP, there are three required elements in the development of an ACL specification. The first requires the Council's Scientific and Statistical Committee (SSC) to calculate an acceptable biological catch (ABC) that is set at or below the stock or stock complex's overfishing limit (OFL). The OFL is an estimate of the catch level above which overfishing is occurring. ABC is the level of catch that accounts for the scientific uncertainty in the estimate of OFL and other scientific uncertainty inherent in the estimate of fish stock status. In determining determine the appropriate ABC, the SSC follows the ACL mechanism described in the FEP, which includes a five-tiered system of "ABC control rules" that allows for different levels of scientific information to be considered. Tiers 1 and 2 involve data-rich to data-moderate situations and include levels of scientific uncertainty derived from model-based stock assessments. Tiers 3 through 5 involve data-poor situations and include levels of scientific uncertainty derived from ad-hoc procedures including simulations models or expert opinion.

When calculating an ABC for a stock or stock complex, the SSC must first evaluate the information available for the stock and assign the stock or stock complex into one of the five tiers. The SSC must then apply the control rule assigned to that tier to determine ABC.

For stocks like most precious corals and deepwater shrimp, which have estimates of MSY, but no current harvest, the ABC is to be calculated by the SSC based on the Tier 4 ABC control rule described in each FEP, which sets ABC as equal to 91% of the MSY estimate. As explained in the FEPs, the application of this control rule would result in a fishing mortality rate of 0.70 F_{MSY}, which would maximize yield while minimizing biomass impacts, and account for scientific uncertainty.

For data-poor stocks, for which only catch data are available and the OFL is unknown, ABC is to be calculated by the SSC based on the Tier 5 ABC control rule (Tier 5: Data poor, Ad-hoc Approach to Setting ABCs). Under this control rule the SSC is to multiply the average catch from a time period when there is no quantitative or qualitative evidence of declining abundance ("Recent Catch") by a factor based on a qualitative estimate of relative stock size or biomass (B) in the year of management. When it is not possible to analytically determine B relative to the biomass necessary to produce the MSY from the fishery, or B_{MSY}, the process allows for an approach based on informed judgment, including expert opinion and consensus-building methods.

The ACL process also allows the SSC to utilize any other information deemed useful to establish an ABC and allows the SSC to recommend an ABC that differs from the results of the default ABC control rule calculation based on factors such as data uncertainty, recruitment variability, declining trends in population variables, and other factors determined relevant by the SSC. When using an alternate method, the SSC must explain its rationale.

The second step requires the Council to determine an ACL that may not exceed the SSC recommended ABC. The process includes methods by which the ACL may be reduced from the ABC based on social, economic, and ecological considerations, or management uncertainty (SEEM). An ACL set below the ABC further reduces the probability that actual catch will exceed the OFL and result in overfishing.

The third and final step in the ACL process is the development of AMs. There are two categories of AMs; in-season AMs, and post-season AMs that make adjustments to an ACL if it is exceeded. In-season AMs prevent an ACL from being exceeded and may include, but are not limited to, closing the fishery, closing specific areas, changing bag limits, or other methods to reduce catch. If the Council determines that an ACL has been exceeded, the Council may recommend, as an AM, that

NMFS reduce the ACL in the subsequent fishing year by the amount of the overage. In determining whether an overage adjustment is necessary, the Council would consider the magnitude of the overage and its impact on the affected stock's status. Additionally, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process, and adjust the system, as necessary, to improve its performance and effectiveness. Figure 1 illustrates the relationship among the OFL, ABC, and ACL described in this section. For more details on the specific elements of the ACL specification mechanism and process, see Amendment 3 to the Hawaii Archipelago FEP, and the final implementing regulations at 50 CFR §665.4 (76 FR 37285, June 27, 2011).

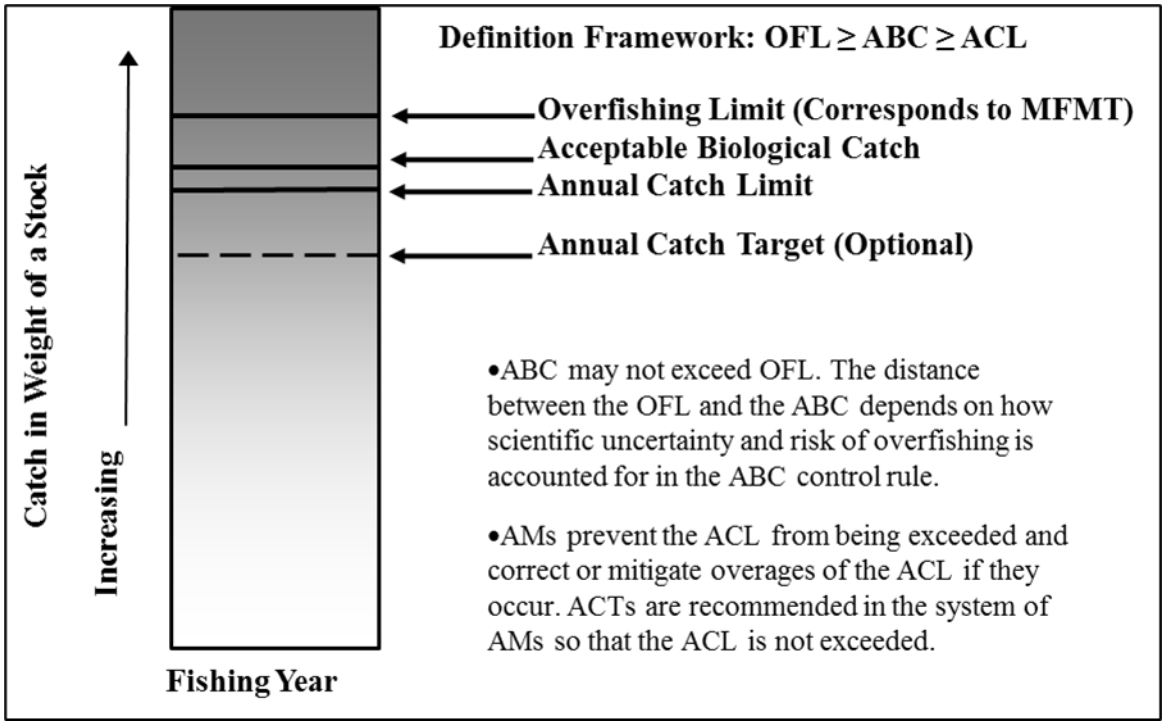

Figure 1. General relationship between OFL, ABC, and ACL.

1.2 Proposed Action

Based on recommendations by the Council, NMFS proposes to specify multi-year annual catch limits (ACLs) and implement accountability measures (AMs) for the deepwater shrimp and precious coral stock complexes managed under the FEP for the Hawaii Archipelago effective in fishing years 2022–2025. ACLs and AMs for kona crab are not included in the proposed action here, as the potential environmental effects of implementing ACLs and AMs for Hawaii Kona crab in fishing years 2020 through 2023 are included in a separate environmental review (NMFS 2020a)[2]. NMFS proposes to implement the ACLs and AMs in fishing years 2022, 2023, 2024, and 2025 for deepwater shrimp and in fishing years 2022–2023, 2023–2024, and 2024–2025 for precious corals. For deepwater shrimp, NMFS is proposing an ACL of 250,773 lb of *Heterocarpus* spp. each year. For precious corals, NMFS is proposing an ACL of 2,500 kg for Auau Channel black coral, 1,000 kg for Makapuu Bed pink coral, 250 kg for Makapuu Bed bamboo coral, 222 kg

[2] NMFS prepared a separate EA for the kona crab fishery of the Hawaii Archipelago because a new benchmark stock assessment for Hawaii kona crab (Kapur et al. 2019) was made available, prompting the implementation of new management.

for 180 Fathom Bank pink coral, 56 kg for 180 Fathom Bank bamboo coral, 444 kg for Brooks Bank pink coral, 111 kg for Brooks Bank bamboo coral, 67 kg for Kaena Point and Keahole Bed pink coral, 17 kg for Kaena Point and Keahole Bed bamboo coral, and 1,000 kg for precious coral harvested in the Hawaii Precious Coral Exploratory Area each year. Each fishing year, in each island area, catches would be counted towards the ACL for the stock or stock complex based on catch data collected by local resource management agencies through their respective fishery monitoring programs[3] and by NMFS through federal logbook reporting.

Pursuant to applicable fishery management regulations found at 50 CFR 665.4, when an ACL for any stock or stock complex is projected to be reached, based on best available information, NMFS will restrict fishing for that stock or stock complex in federal waters around the applicable U.S. EEZ to prevent the ACL from being exceeded. The restriction may include, but is not limited to closure of the fishery, closure of specific areas, or restriction in effort. However, in-season restrictions are not possible for any precious coral or deepwater shrimp fishery in the Hawaii Archipelago at this time because catch statistics are generally not available until at least six months after the data has been collected (see Section 2.3 for more details on data collection). For this reason, only a post-season AM is possible. Specifically, after the end of each fishing year, if NMFS and the Council determine that the average catch from the most recent three-year period exceeds the specified ACL, NMFS would reduce the ACL in the subsequent fishing years by the amount of the overage as described in Section 1.1.2. If a fishery exceeds an ACL more than once in a four-year period, the Council is required to re-evaluate the ACL process, and adjust the system, as necessary, to improve its performance and effectiveness.

1.3 Purpose and Need for Action

The purpose of this action is to comply with the requirements of the Magnuson-Stevens Act, the FEP and implementing regulations that require implementation of ACLs and AMs for deepwater shrimp and precious coral fisheries in the Hawaii Archipelago. The need for this action is to prevent overfishing and to provide for long-term sustainability of the fishery resources while allowing fishery participants to continue to benefit from their utilization. AMs are needed to reduce the potential of exceeding an ACL and are used to correct or mitigate overages of the ACL should they occur.

1.4 Action Area

The action area for this EA is where fishing for deepwater shrimp and precious corals occurs in State and federal waters around the Hawaii Archipelago. Harvest of deepwater shrimp occurs offshore at depths ranging from 350 m to 1,200 m in benthic environments. Harvest of black coral occurs at around 20 to 100 m depth, and sometimes deeper, on solid substrate, and while fishing for other precious coral MUS is not currently conducted in Hawaii, pink and bamboo corals tend to occur in deeper waters of 275 to 1,370 m depth on solid substrate. Waters around islands northwest of Niihau are not part of the Action Area because commercial fishing is prohibited in Papahānaumokuākea Marine National Monument (50 CFR 404.6).

1.5 Decision(s) to be Made

After considering public comments on the proposed action and alternatives considered, NMFS will implement ACLs, and AMs for deepwater shrimp and precious coral stock

[3] Catch data for deepwater shrimp and precious coral fisheries in each island area are collected at the lowest taxonomic level possible by state fishery management agencies in Hawaii. Total catch is based only on catch reported by the commercial fishing sector, as required under State law.

complexes in the Hawaii Archipelago for fishing years 2022 through 2025. This document will support a decision by the Regional Administrator (RA) of the NMFS Pacific Island Region, on behalf of the Secretary of Commerce, whether to approve, disapprove, or partially approve the Council's recommendation. The RA will use the information in this EA to make a determination about whether the proposed action would constitute a major federal action that has the potential to significantly affect the quality of the environment. If NMFS determines that the action would not significantly affect the quality of the environment, NMFS will prepare a Finding of No Significant Impact. If NMFS determines that the proposed action is a major federal action that would significantly affect the quality of the environment, NMFS would prepare an environmental impact statement before taking action.

1.6 List of Preparers and Reviewers

Preparers:

Marlowe Sabater – Marine Ecosystem Scientist, WPFMC
Thomas Remington – Fisheries Management Specialist, Lynker Technologies
David O'Brien – Position, PIRO SFD
Keith Kamikawa – Fishery Management Specialist, PIRO SFD

Reviewers:

Phyllis Ha – Position, PIRO SFD
Name – Position, Agency
Name – Position, Agency

1.7 NEPA Compliance

This environmental assessment (EA) is being prepared using the 2020 Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020, and reviews begun after this date are required to apply the 2020 regulations unless there is a clear and fundamental conflict with an applicable statute. 85 Fed. Reg. at 43372-73 (§§ 1506.13, 1507.3(a)). This EA began after September 14, 2020, and accordingly proceeds under the 2020 regulations.

On November 6, 2020, NOAA Senior Agency Official, RDML Tim Gallaudet (Assistant Secretary of Commerce for Conservation and Management), granted a blanket waiver for time and page limits for a one-year period for all environmental assessments and environmental impact statements initiated to support fishery management actions developed by the regional fishery management councils pursuant to the requirements of the Magnuson-Stevens Act. On October 21, 2021, NOAA Acting Assistant Secretary of Commerce for Conservation and Management Janet Coit extended that blanket waiver for an additional year until November 5, 2022. Because this EA was prepared to support a fishery management action developed by the Council and is expected to be completed before November 5, 2022, the page and time limits defined in CEQ regulations are waived. However, this draft EA was developed with the intention of adhering to the page limit defined in CEQ regulations by presenting a succinct analysis. Incorporation of additional information related to compliance with other applicable laws increased the page count beyond that prescribed by the 2020 CEQ regulations. Time limits were not exceeded by the EA for the proposed action.

1.8 Public Involvement

At its meeting in March 2022, the Council considered and discussed issues relevant to ACLs and AMs for deepwater shrimp and precious corals fisheries in the Hawaii Archipelago, including the ABC recommendations from the corresponding meetings of the SSC. These meetings were all

announced in the *Federal Register* and on the Council's website and were open to the public with time set aside on their agendas for public comment. The Council made their ACL and AM recommendations to NMFS at the conclusion of its 190th meeting in March 2022. See Section 1.8.1 below for a summary of the presentations, deliberations, and recommendations of the SSC and Council from these meetings.

Additionally, NMFS will seek public comment on this proposed action for a 30-day period following its publication in the *Federal Register*. The reader may find instructions on how to comment and obtain copies of this EA, its associated regulatory impact review, and the proposed management measures by searching for RIN 0648-xxxx at www.regulations.gov, or by contacting NMFS or the Council at the above addresses. Specific dates will be defined in the published rule. NMFS will consider comments received by the deadline that will be listed in the *Federal Register* when developing the final management measure.

1.8.1 Council and SSC Meetings

The development of the Council's recommendations for the current ACLs and AMs for Hawaii deepwater shrimp and precious coral fisheries took place during the following SSC and Council public meetings. Meetings where previous ACLs and AMs were recommended are also presented since the proposed ACLs and AMs are identical to those implemented for the fisheries since 2012.

- 108th SSC (October 17–19, 2011) and 152nd Council (October 19–22, 2011) meetings (76 FR 60004, September 28, 2011) – The SSC and Council received presentations on the specification of ABCs and ACLs for Hawaii crustacean and precious coral fisheries in Hawaii for 2012 and 2013. In the determination of an ABC, the SSC utilized the estimate of exploitable biomass for deepwater shrimp from Ralson and Tagami (1992), instead of the MSY estimate from Tagami and Ralston (1988), and the Council initially set this ABC equal to the ACL. However, consistent with the intent of the SSC recommendation, NMFS made a technical correction to the ABC calculation by applying the Tier 4 control rule to the MSY estimate from Tagami and Ralston (1988). The Council recommended ACLs for each MUS in Hawaii crustacean and precious coral fisheries based on the initial calculation of ABC by its SSC, but the Council's Executive Director and Chair subsequently reviewed and concurred that the NMFS-corrected ACL specifications were consistent with the Council's recommendation to establish ACLs for precious corals in Hawaii that are equal to current harvest quotas and to establish ACLs equal to the ABC for crustacean fisheries.
- 113th SSC (June 18–20, 2013) and 157th Council (June 26–28, 2013) meetings (78 FR 32624, May 31, 2013) – The SSC and Council received presentations on the methods for and specification of ABCs and ACLs for Hawaii crustacean and precious coral fisheries for fishing year 2014. The SSC endorsed the ABC values as corrected by NMFS and recommended rolling over the previous ABCs for deepwater shrimp and precious corals since there was no new scientific information for either fishery. The Council recommended ACLs for the fisheries consistent with the SSC's specification of ABCs.
- 116th SSC (June 17–19, 2014) and 160th Council (June 25–27, 2014) meetings (79 FR 31310, June 2, 2014) – The SSC and Council received presentations on the methods for and specification of ABCs and ACLs for crustacean and precious coral fisheries in Hawaii for 2015 through 2018. The SSC endorsed the ABC values as corrected by NMFS and recommended rolling over the previous ABCs for deepwater shrimp and precious corals since there was no new scientific information for the fisheries. The Council subsequently recommended ACLs for

the Hawaii crustacean and precious coral fisheries consistent with the SSC-recommended ABCs.

- 130th SSC (October 15–17, 2018) and 174th Council (October 23–26, 2018) meetings (83 FR 49364, October 1, 2018) – The SSC and Council received presentations on the specification of ABCs and ACLs for crustacean and precious coral fisheries in Hawaii for 2019 through 2021. Similar to the previous ACL specification, there was no new scientific information for the fisheries to prompt the determination of new ABCs. Thus, the SSC recommended rolling over the previous ABCs for deepwater shrimp and precious corals, and the Council recommended ACLs for the Hawaii deepwater shrimp and precious coral fisheries according to the ABCs as recommended by the SSC.
- 143rd SSC (March 15–17, 2022) and 190th Council (March 22–24, 2022) meetings (87 FR 9581, February 22, 2022) – The SSC and Council received presentations on the specification of ABCs and ACLs for deepwater shrimp and precious coral fisheries in Hawaii for 2022 through 2025…

2 ALTERNATIVES CONSIDERED

The Council and its SSC used the approved process, described previously (Section 1.1.2) and detailed in WPFMC and NMFS (2011), to develop its ACL and AM recommendations for the Hawaii deepwater shrimp and precious coral fisheries for fishing years 2022 through 2025. Although the estimate of the OFL and calculation of the ABC are part of the ACL mechanism, the establishment of these reference points is not part of the proposed federal action because the OFL is unknown and has not been determined for any deepwater shrimp or precious coral stock or stock complex. Additionally, the development of ABCs is not part of the federal action, but a summary of their development by the Council's SSC is described in this section for informational purposes. ABCs were previously endorsed by the Council's SSC at its 116th meeting, and reaffirmed by the Council at its 190th meeting, in accordance with the approved ACL mechanism described in the FEPs and implementing federal regulations at 50 CFR 665.4 and in consideration of the best available scientific, commercial, and other information. In accordance with the Magnuson-Stevens Act and the Hawaii Archipelago FEP, the Council's ACL recommendation may not exceed the ABC recommended by the Council's SSC. Thus, the action alternative under consideration is based upon the best available scientific information about the deepwater shrimp and precious coral fisheries and is in accordance with the FEP and federal regulations.

Table 2 summarizes the alternatives considered for the deepwater shrimp and precious coral fisheries in the Hawaii Archipelago, including the most recent landings data where available. Alternative 2 is the preferred alternative for each FEP fishery and would result in NMFS implementing ACLs that are equal to the fishing levels recommended by the Council, which are identical to the ACLs most recently implemented by NMFS for fishing years 2019 through 2021 (85 FR 26623, May 5, 2020).

Table 3. Summary of the alternatives for ACL implementation in the deepwater shrimp and precious coral fisheries of the Hawaii Archipelago.

Fishery	Alternative 1	Alternative 2	Most Recent Average Annual Landings (Years)[1]
	No Management	*Council-Recommended ACL*	
Deepwater Shrimp	No ACL	250,773 lb	8,819 lb (2019–2021)
Auau Channel Black Coral	No ACL	5,512 lb (2,500 kg)	697 lb (2011–2021)
Makapuu Bed Pink/Bamboo Coral	No ACL	2,205/551 lb (1,000/250 kg)	0 lb
180 Fathom Bank Pink/Bamboo Coral	No ACL	489/123 lb (222/56 kg)	0 lb
Brooks Bank Pink/Bamboo Coral	No ACL	979/245 lb (444/111 kg)	0 lb
Kaena Point Bed Pink/Bamboo Coral	No ACL	148/37 lb (67/17 kg)	0 lb
Keahole Bed Pink/Bamboo Coral	No ACL	148/ 37 lb (67/17 kg)	0 lb
Precious Coral Exploratory Area	No ACL	2,205 lb (1,000 kg)	0 lb

[1]Catch reported to HDAR through their data collection program.

2.1 Hawaii Archipelago Deepwater Shrimp

2.1.1 Overview of the Hawaii Deepwater Shrimp Fishery

In Hawaii, an intermittent deepwater shrimp fishery began in 1967 (Tagami and Ralston 1988) and continues to vary from year to year with an average of three vessels reporting the catch of deepwater shrimp to the State of Hawaii. Vessels ranged in size from 7.5 to 40 m in length, though the number of smaller vessels increased as larger vessels left the fishery (Tagami and Barrows 1988). Between 1982 and 2021, the cumulative (40-year) landings of *Heterocarpus* spp. amounted to over 1.8 million pounds, but the average annual catch began to notably decline in recent decades after its peak in 1998 (Figure 2). In 2020, there were no federal crustacean permits issued for deepwater shrimp harvest in the Hawaii Archipelago (WPFMC 2021, see Appendix C), but in 2021, there were three active federal permits for Hawaii deepwater shrimp[4].

Table 4 and Figure 2 summarize total landings and average annual landings for deepwater shrimp in the Hawaii Archipelago for 1982 through 2021. Landing information is grouped into multi-year bins to protect confidential fishery data as there may have been fewer than three participants in the fishery during certain years. Therefore, individual years in which fewer than three vessels participated in the fishery are not reported.

Comprehensive information on target, non-target stocks, bycatch, protected species, and conservation and management measures for deepwater shrimp fisheries can be found in the Hawaii Archipelago FEP (WPFMC 2009). Additionally, Amendment 13 to the Fishery Management Plan for Crustacean Fisheries of the Western Pacific provides detailed fishery descriptions including ecology and life history information for deepwater shrimp of the western Pacific (WPFMC 2008).

Table 4. Total and average annual landings of Hawaii deepwater shrimp and the number of associated CMLs in 1982 to 2021 from the HDAR Fisher Reporting System compared to the implemented ACL during that fishing year.

Years (Grouped)*	Total Landings (lb)	Average Annual Landings (lb)	Implemented ACLs (lb)
1982–1983 (2 years)	143,062	71,531	N/A
1984–1985 (2 years)	277,428	138,714	N/A
1986–1987 (2 years)	13,975	6,988	N/A
1988–1989 (2 years)	275,329	137,665	N/A
1990–1991 (2 years)	199,517	99,759	N/A
1992–1993 (2 years)	53,930	26,965	N/A
1994 (1 year)	96,079	96,079	N/A
1995 (1 year)	70,737	70,737	N/A
1996 (1 year)	34,973	34,973	N/A
1997 (1 year)	22,922	22,922	N/A
1998 (1 year)	181,912	181,912	N/A
1999 (1 year)	67,647	67,647	N/A
2000–2001 (2 years)	10,139	5,070	N/A
2002–2003 (2 years)	9,622	4,811	N/A

[4] The most recent information on active federal permits in the Hawaii deepwater shrimp fishery was obtained from the NMFS website for Pacific Islands Permit Holders at https://www.fisheries.noaa.gov/pacific-islands/resources-fishing/pacific-islands-permit-holders#western-pacific-crustaceans, last updated on December 10, 2021.

Years (Grouped)*	Total Landings (lb)	Average Annual Landings (lb)	Implemented ACLs (lb)
2004–2005 (2 years)	115,961	57,981	N/A
2006–2007 (2 years)	46,300	23,150	N/A
2008–2009 (2 years)	11,398	5,699	N/A
2010–2011 (2 years)	11,384	5,692	N/A
2012 (1 year)	11,894	11,894	250,773
2013 (1 year)	19,383	19,383	250,773
2014 (1 year)	48,707	48,707	250,773
2015 (1 year)	28,774	28,774	250,773
2016 (1 year)	17,203	17,203	250,773
2017 (1 year)	5,984	5,984	250,773
2018 (1 year)	11,598	11,598	N/A
2019–2021 (3 years)	26,457	8,819	250,773

*Landings information grouped to protect confidential fishery data.
Source: HDAR data request, January 25, 2022.

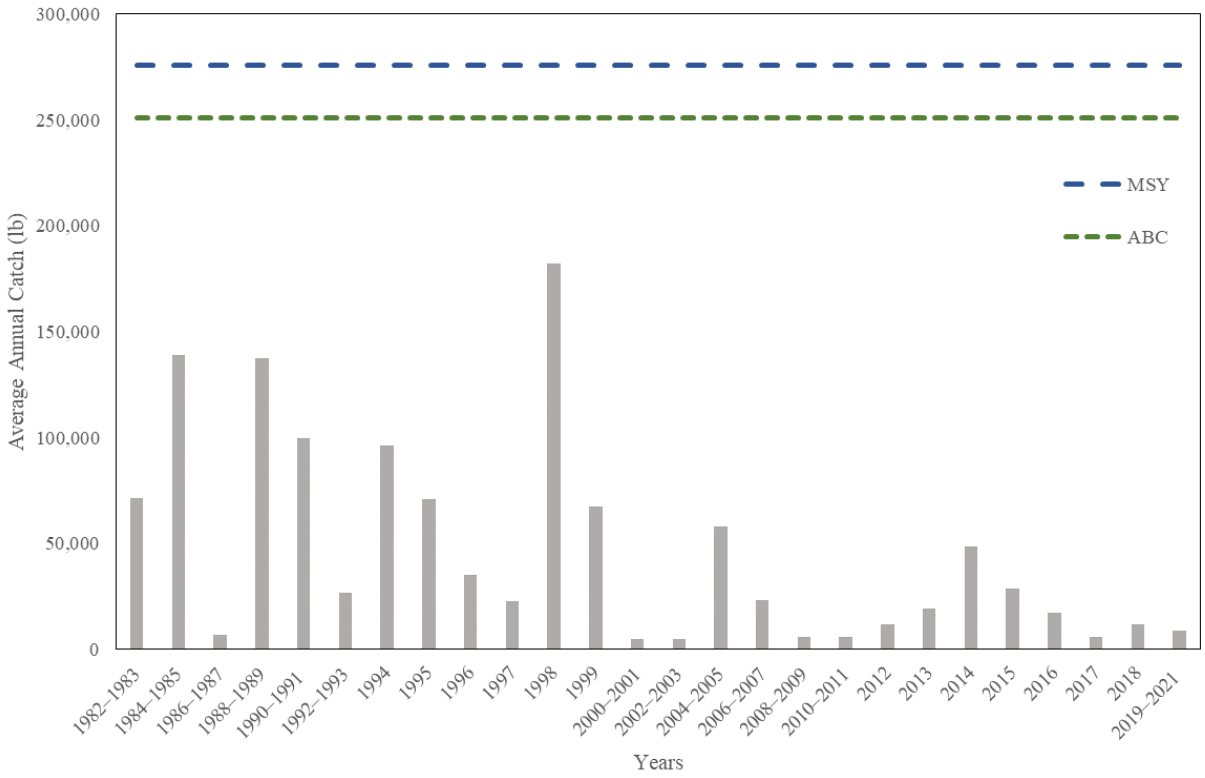

Figure 2. Average annual catch of deepwater shrimp in the Hawaii Archipelago from 1982 to 2021 compared to the MSY and SSC-recommended ABC for fishing years 2022 through 2025. Source: Tagami and Ralston (1988) and HDAR data request.

2.1.2 Development of the Action Alternative for Hawaii Deepwater Shrimp

The SSC and Council previously developed the ABC and ACL recommendations for deepwater shrimp MUS in accordance with the Magnuson-Stevens Act and federal regulations at 50 CFR §665.4 that implement the ACL specification mechanism of the FEPs described in Section 1.1.2.

The following section summarizes the data, methods, and procedures considered in SSC and Council deliberations as described more fully in the Council's first ACL and AM specification (WPFMC 2011) and reaffirmed by the Council in March 2022. A full report of the 108th SSC, 152nd Council, 116th SSC, 160th Council, and 190th Council meeting deliberations associated with this ACL can be found on the Council website at www.wpcouncil.org.

2.1.2.1 NMFS/Council Estimation of OFL for Hawaii Deepwater Shrimp

There is no OFL estimate for deepwater shrimp in Hawaii.

2.1.2.2 SSC's Calculation of ABC for Hawaii Deepwater Shrimp

As described in Section 1.1.2, the ABC is the level of catch that accounts for scientific uncertainty in the estimation of an OFL (i.e., the level of catch above which overfishing is occurring) and cannot be set below the OFL. For the Hawaii deepwater shrimp stock complex, which does not have a specified OFL (see Section 2.1.2.1), the MSY is used as a proxy for the OFL.

The most current estimate of MSY for the deepwater shrimp stock complex in Hawaii is 125 mt/yr or 275,575 lb/yr (Tagami and Ralston 1988). At the 108th SSC meeting on October 2011, the SSC determined that the Hawaii deepwater shrimp stock complex can be regarded as Tier 4 because MSY is known, but there was no substantial current harvest. Therefore, consistent with the Tier 4 ABC control rule described in the FEP of the Hawaiian Archipelago, the SSC recommended the ABC be set equal to 0.91*MSY during its 108th meeting. As explained in the FEP for the Hawaii Archipelago, the application of this control rule would result in a fishing mortality rate of $0.70*F_{MSY,}$ which would maximize yield while minimizing biomass impacts and account for scientific uncertainty.

In calculating the ABC at its 108th meeting, the Council's SSC applied the value for exploitable biomass (271.4 mt/yr, or 598,328 lb/yr) as estimated by Ralston and Tagami (1992) instead of the MSY estimated by Tagami and Ralston (1988), and the SSC calculated an ABC of 544,479 lb using the Tier 4 control rule that the SSC then rounded down to 544,000 lb. Because the SSC used the value for exploitable biomass in the Tier 4 ABC control rule calculation, the SSC-recommended an ABC of 544,000 lb, which exceeded the MSY estimate of 275,575 lb/yr from Tagami and Ralson (1988). Therefore, consistent with the intent of the SSC's recommendation, on January 3, 2012 (77 FR 66), NMFS made a technical correction to the ABC calculation by applying the correct MSY value of 275,575 lb/yr into the Tier 4 ABC control rule, which resulted in a corrected ABC of 250,773 lb. At its 116th meeting on June 17–19, 2014, the SSC reaffirmed the NMFS-corrected ABC values.

At its 143rd meeting in March 2022, the SSC recommended maintaining the ABC for Hawaii deepwater shrimp from fishing year 2019 through 2021, which was the same as recommended in each fishing year from 2012 through 2018, for fishing year 2022 through 2025 (see Table 3).

2.1.2.3 Council ACL Recommendations for Hawaii Deepwater Shrimp

At its 152nd meeting held October 17–19, 2011, the Council recommended setting the ACL for the Hawaii deepwater shrimp stock complex as equal to SSC-recommended ABC, which was 544,000 lb before being recalculated by NMFS as 250,773 lb. In recommending the previous ACL, the Council considered the average annual landings for the three approximately 10-year periods prior to 2011 as shown in Table 4. The Council did not recommend reducing the ACL from the ABC for social, economic, ecological considerations or management uncertainty as described in the FEP because average annual landings within each the 10-year periods are substantially lower than the MSY of 125 mt/yr (275,575 lb/yr) estimated by Ralston and Tagami (1988). Therefore, while

setting the ACL equal to the ABC did not provide for consideration of management uncertainty, at the time the previous ACL was developed, the Council found it highly unlikely that catch would ever approach ACL based on the historical performance of the Hawaii deepwater shrimp fishery. Furthermore, the Council found it unlikely that the Hawaii deepwater shrimp stock complex would experience overfishing during the fishing years 2012 and 2013. However, the technical correction to the SSC's ABC by NMFS utilized the MSY estimate from Tagami and Ralston (1988) and applied the Tier 4 control rule, reducing the ACL from 544,000 lb to 250,733 lb.

At its 160th meeting on June 17–19, 2014, the Council recommended rolling over the previously-recommended ACL for fishing years 2014 through 2018. Similarly, at its 174th meeting from October 23–26, 2018, the Council again recommended the same ACL specification for Hawaii deepwater shrimp for fishing years 2019 through 2021.

At its 190th meeting held March 22–24, 2022, for the current ACL recommendation in fishing years 2022 to 2025, the Council reaffirmed the previous ACL determinations and recommended the same ACL be rolled over again from the specifications for fishing year 2019 to 2021. We note that there is no new information on the MSY for Hawaii deepwater shrimp, and catch has never exceeded the ACL since NMFS began managing the fishery under ACLs in 2012.

2.1.3 Description of the Alternatives for Hawaii Deepwater Shrimp

2.1.3.1 Alternative 1: No Management Action

Under this alternative, NMFS would not specify an ACL for the Hawaii deepwater shrimp stock complex, and AMs would not be necessary. However, this alternative would not comply with the Magnuson-Stevens Act or provisions of the Hawaii Archipelago FEP that require ACLs to be implemented for all stocks and stock complexes listed in the FEP. Alternative 1 serves as the environmental baseline alternative against which effects on the human environment of the action alternative can be compared.

Expected Fishery Outcome

Under Alternative 1, NMFS expects that the lack of ACLs and AMs would not result in any change to fishery operations or performance relative to recent years. The Hawaii deepwater shrimp fishery has been managed under an ACL since 2012 and catches from the fishery have never attained the ACL (Table 4). Additionally, the fishery has not been functionally constrained by the implemented ACLs because management did not include an in-season AM to restrict the fishery in the event that the ACL was exceeded. Since the fishery has not been constrained in ways that impact operations or performance during previous years where ACLs were implemented, NMFS does not anticipate that the fishery would perform differently in the absence of an ACL or AMs.

If the fisheries were to expand in the near future to have greater participation with larger annual catches that exceed the ACL, there would be no management in place to ensure that the MUS are sustainably harvested. NMFS and the Council would continue to monitor the Hawaii deepwater shrimp fishery through data collected by HDAR, but no management measures would be implemented regarding changes in the fishery. Considering long-term implications, there would likely be reduced conservation and management benefit of this alternative in managing the Hawaii deepwater shrimp fishery since no management would be in place to evaluate harvests relative to a baseline or sustainable fishery reference points.

2.1.3.2 Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

Under this alternative, the ACL for Hawaii deepwater shrimp would be set equal to the ACL

recommended by the Council, or 250,773 lb. This ACL is equal to the ABC previously determined by the Council's SSC and is 91% of the estimated annual MSY of 275,575 lb/yr from Tagami and Ralston (1988). The ACL would be specified annually for fishing years 2022 to 2025.

Pursuant to 50 CFR 665.4, when an ACL for any stock or stock complex is projected to be reached under Alternative 2, based on best available information, NMFS would restrict fishing for that stock or stock complex in federal waters around the applicable U.S. EEZ to prevent the ACL from being exceeded. The restriction may include, but is not limited to closure of the fishery, closure of specific areas or restriction in effort (76 FR 37286, June 27, 2011). However, the Council is not recommending in-season restrictions for the deepwater shrimp at this time because catch statistics are generally not available until at least six months after the data has been collected (see Section 3.1 for more details on data collection for this fishery). For these reasons, NMFS would utilize a moving three-year average catch to evaluate fishery performance against the proposed ACLs as a post-season AM. For example, NMFS and the Council would use the average catch during fishing years 2020, 2021, and 2022 to evaluate fishery performance against the appropriate 2022 ACL for deepwater shrimp. At the end of each fishing year, the Council will review catches relative to each ACL. If NMFS and the Council determine the three-year average catch for the fishery exceeds the specified ACL, NMFS and the Council will reduce the ACL for that fishery by the amount of the overage in the subsequent year (80 FR 52415, August 31, 2015). Additionally, as a higher performance measure, as specified in the FEP, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process and adjust the system, as necessary, to improve its performance and effectiveness. This alternative also assumes continuation of all existing federal and local resource management laws and regulations.

Expected Fishery Outcome

Under Alternative 2, NMFS would roll over the most recently-implemented ACLs and AMs for the Hawaii deepwater shrimp fishery, subjecting the fishery to the same management it has experienced each year since 2012 (except for 2018, for which NMFS did not specify any ACLs or AMs for the fishery). NMFS does not expect any change in the fishery relative to recent years or Alternative 1 because the fishery was not functionally restricted by the implemented conservation and management measures due to the lack of an in-season AM to constrain the fishery in the event that the ACL was exceeded. Additionally, the ACL for this fishery was never attained in any fishing year from 2012 through 2017 or 2019 through 2021, which were identical to the proposed ACL, and the recent average annual catch (see Table 4) is just 3.5% of the proposed ACL. Thus, the fishery has never reached harvest amounts that surpasses the sustainable catch level implemented by the ACLs and based on recent fishery performance, is unlikely to do so even during years of relatively high fishing pressure. If the fishery was to expand in the near future, this alternative would further ensure that appropriate management is in place to promote fishery harvests in sustainable quantities. Going forward, this alternative would likely result in addition benefits to the fishery by evaluating annual harvests relative to the baseline

Thus, under Alternative 2, the Hawaii deepwater shrimp fishery is not expected to change in terms of location, area fished, seasonality, fishing participation, effort, or gear used (see Section 3.1 for more detail). Overall, the proposed action would provide enhanced management relative to the baseline to help ensure the sustainability of the fishery on a long-term basis.

2.2 Hawaii Archipelago Precious Corals

2.2.1 Overview of the Hawaii Precious Coral Fishery

The precious coral fishery around the Hawaii Archipelago began in the mid-20th century and grew

after the discovery of large beds of *Pleurocorallium secundum* by Japanese fishers (Grigg 2002). During peak harvests over the next 20 years, up to 440,000 lb of *P. secundum* was harvested annually from the Emperor Seamounts. The Council finalized its FMP for the precious coral fisheries of the Western Pacific region in 1983 (48 FR 39229, August 30, 1983), which enacted harvest quotas and size limits for the fisheries. Table 5 presents the most recent harvest quotas listed in the FEP, which may be taken on an annual or biennial basis, for the precious coral fisheries. In more recent decades, the harvest of precious corals in Hawaii has been limited to black coral species in the Auau channel, with landings peaking in the early 2000s before drastically decreasing in the most recent 10-year period (Table 6). There have typically been fewer than three participants active in the Hawaii black coral fishery[5] (WPFMC 2021, see Appendix D), and thus, fishery information is confidential and can only be reported in aggregate years. Fishing for other precious corals (i.e., pink, bamboo, and gold coral) is not currently conducted in Hawaii. One company used two one-man submersibles to survey and harvest pink and gold corals at depths between 400 and 500 m in Hawaii during 1999 and 2001; however, they did not continue their operations after that time and the actual harvests cannot be reported here to protect the confidentiality of the proprietary fishery information (WPFMC 2009). Additionally, a moratorium is in place on the harvest of gold corals throughout the Pacific Islands Region through June 30, 2023 (83 FR 27716, June 14, 2018).

Table 6 and Figure 3 summarize the available total landings and average annual landings for black corals harvested in the MHI for four decadal periods, 1982–1989, 1990–1999, 2000–2010, and 2011–2021. Landing information is summarized in roughly 10-year intervals to protect confidentiality as fewer than three vessels participated in the fishery during most years. The data present landings from both inshore and offshore areas. For the most recent 10-year period for which data is available and allowed to be reported, 2011–2021, approximately 697 lb of black coral were landed on average annually, a notable reduction from the average annual landings for the previous decadal period (2000–2010) of 5,371 lb. As of 2020, there were no federal permits issued for precious coral harvest in the Hawaii Archipelago (WPFMC 2021, see Appendix D), and there were no new issued precious coral permits in 2021[5]. While federal permits for precious corals to not distinguish among black, pink, bamboo, or gold corals as the fishers' target species, any issued federal precious coral permit can be assumed to be for the harvest of black coral since the fisheries for pink and bamboo corals in Hawaii are inactive and gold corals are under a moratorium.

Additional details about the recent precious coral fishery are available in the Council's 2020 Annual Stock Assessment and Fishery Evaluation (SAFE) for the Hawaii Archipelago (WPFMC 2021), however, fishery performance data are not presented in the report due to data confidentiality rules (i.e., less than three active fishers reporting catch). Further descriptions of the fishery can be found in the environmental effects analysis of this draft EA (see Section 3.1.1). Comprehensive information on target, non-target stocks, bycatch, protected species, and conservation and management measures for precious coral fisheries can be found in the FEP (WPFMC 2009).

[5] The most recent information on active federal permits in the Hawaii precious coral fishery was obtained from the NMFS website for Pacific Islands Permit Holders at https://www.fisheries.noaa.gov/pacific-islands/resources-fishing/pacific-islands-permit-holders#western-pacific-precious-coral, last updated on December 10, 2021.

Table 5. Current harvest quotas for precious coral permit areas.

Name of Bed	Type of Bed	Harvest Quota (kg)	Harvest Timeframe (Years)
Auau Channel (MHI)	Established	Black – 5,000	2
Makapuu bed (MHI)	Established	Pink – 2,000 Gold (zero) Bamboo – 500	2
180 Fathom Bank (NWHI)	Conditional	Pink – 222 Gold (zero) Bamboo – 56	1
Brooks Bank (NWHI)	Conditional	Pink – 444 Gold (zero) Bamboo – 111	1
Kaena Point	Conditional	Pink – 67 Gold (zero) Bamboo – 17	1
Keahole Point	Conditional	Pink – 67 Gold (zero) Bamboo – 17	1
Westpac	Refugia	All (zero)	1
U.S. EEZ around American Samoa, Guam, the CNMI and Hawaii other than Established, Conditional or Refugia beds	Exploratory Area	1,000 per area (all species combined, except black coral	1

Table 6. Total and average annual landings of black coral in Hawaii for 1982 to 2021 from the HDAR Fisher Reporting System compared to the implemented ACL during that fishing year.

Years (Grouped)*	Total Landings (lb)	Average Annual Landings (lb)	ACL (lb)
1982–1989 (8 years)	12,753	1,594	N/A
1990–1999 (10 years)	32,024	3,202	N/A
2000–2010 (11 years)	59,076	5,371	N/A
2011–2021 (11 years)	7,666	697	5,512**

*Landing information grouped to protect confidential fishery data.

** NMFS did not implement ACLs for the Hawaii black coral fishery in 2011 or 2018.

Source: HDAR data request, January 25, 2022.

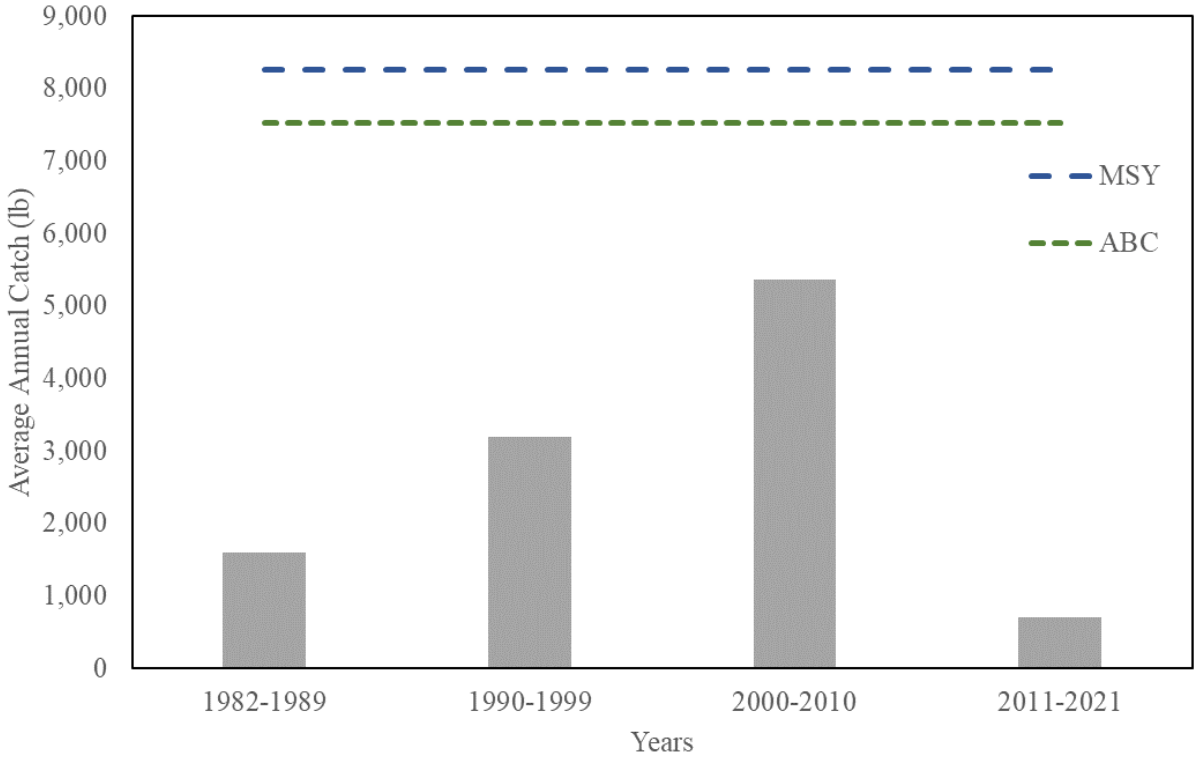

Figure 3. Average annual catch of black coral in the MHI from 1982 to 2020 compared to the MSY and SSC-recommended ABC for fishing years 2022 through 2025. Source: WPFMC (2011), Grigg (2004), and HDAR data request.

2.2.2 Development of the Action Alternative for Hawaii Precious Corals

The SSC and Council developed the ABC and ACL recommendations for precious corals in accordance with the Magnuson-Stevens Act and federal regulations at 50 CFR §665.4 that utilize the ACL implementation mechanism of the FEPs described in Section 1.1.1. The following section summarizes the data, methods, and procedures considered in SSC and Council deliberations as described in the Council's ACL specification document (WPFMC 2011) and reaffirmed by the Council in March 2022. A full report of the 108th SSC, 152nd Council, 116th SSC, 160th Council, and 190th Council meeting deliberations associated with this ACL can be found on the Council website at www.wpcouncil.org.

2.2.2.1 Black Coral – Proposed ACL for Auau Channel Established Bed

The ongoing collection of black coral from depths of 30 to 100 m by scuba divers has continued in Hawaii since black coral beds were discovered off of Lahaina, Maui, in the late 1950s, although harvest levels have fluctuated with changes in demand. Since 1980, virtually all of the black coral harvested around the Hawaiian Islands has been taken by hand from a bed located in the Auau Channel. Most of the harvest has come from State of Hawaii waters, however, a portion of the black coral bed in the Auau Channel is located in federal waters.

The ACL for black coral in the Auau Channel for fishing years 2019 through 2021 was 2,500 kg (5,512 lb). Landings, almost exclusively from State waters, have been reported for black coral between 1982 and 2021, but annual landings data cannot be reported because of the low number of active participants (i.e., fewer than three).

2.2.2.1.1 NMFS/Council Estimation of OFL

There is no estimate of OFL for black coral in the Hawaii Archipelago.

2.2.2.1.2 SSC's Calculation of ABC

The most current estimate of MSY for black coral in the Auau Channel is provided by Grigg (2004), which is 3,750 kg/yr (8,267 lb/yr). Based on this estimate, the current harvest quota in the FEP for black coral in the Auau Channel is 5,000 kg that may be taken during any part of a two-year fishing year period (see Table 5).

At its 108th meeting held on October 17–19, 2011, the Council's SSC considered the MSY estimate provided by Grigg (2004), including the participation in the fishery and average annual landings for 2000–2010 relative to the biennial harvest quota of 5,000 kg (11,000 lb) from the Hawaii Archipelago FEP. The SSC determined that the black coral fishery in the Hawaii Archipelago can be regarded as Tier 4 because MSY is known, but there is little-to-no harvest due to the sporadic nature of the fishery. Consistent with the Tier 4 ABC control rule described in the Hawaii Archipelago FEP, which requires the ABC be set equal to 0.91*MSY, at its 108th meeting, the SSC calculated the ABC to be 3,413 kg/yr (7,524 lb/yr) and rounded the ABC downward to 7,500 lb. As explained in the Hawaii Archipelago FEP, the application of this control rule would result in a fishing mortality rate of $0.70F_{MSY}$, which would maximize yield while minimizing biomass impacts, and account for scientific uncertainty.

At its 113th meeting held on June 18–20, 2013, the SSC recommended that the ABC derived from deliberations at the 108th meeting be maintained for fishing year 2014. At its 116th meeting held on June 17–19, 2014, the SSC again recommended that its previously-recommended ABC of 7,500 lb be rolled over from fishing year 2014 for fishing years 2015 through 2018, which was identical to the ABC specified at the SSC's 108th meeting. Similarly, at its 130th meeting held on October 15–17, 2018, the SSC noted the continued general underutilization of the Hawaii black coral fishery and recommended that the ABC for fishing years 2016 through 2018, which was the same as recommended during its 108th meeting, be maintained for fishing years 2022 through 2025.

At its 143rd meeting held on March 15–17, 2022, the SSC recommended that the ABC for fishing years 2019 through 2021, which was the same ABC that the SSC proposed at its 108th meeting, he maintained for fishing years 2022 through 2025 in the Hawaii black coral fishery.

2.2.2.1.3 Council ACL Recommendation

At its 152nd meeting held on October 19–22, 2011, the Council considered the SSC-recommended ABC of 7,500 lb/yr from deliberations at the 108th SSC meeting; however, the Council ultimately recommended maintaining the current harvest quota of 5,000 kg (11,000 lb) as the ACL (WPFMC 2013). The Council further noted that while the harvest quota may be taken over a two-year period, ACLs must be specified annually. Therefore, the Council previously recommended the ACL for the Hawaii black coral fishery in the Auau Channel Bed be set at 2,500 kg/yr or 5,512 lb/yr for fishing years 2015 through 2018. Thus, the ACL was nearly 2,000 lb lower than SSC-recommended ABC.

At its 174th meeting in October 2018, the Council reaffirmed these ACLs for black coral from the Auau Channel Bed for fishing years 2019 through 2021. At its 190th meeting held on March 22–24 2022, the Council again recommended that the ACL for black coral from the Auau Channel Bed of 2,500 kg/yr or 5,512 lb/yr in fishing years 2019 through 2021 be rolled over for fishing years 2022 through 2025. This ACL is approximately 4,800 lb higher than the average annual landings during the period from 2011 to 2021 as shown in Table 6.

2.2.2.2 Pink, Gold, and Bamboo Coral – Established and Conditional Beds

Fishing for other precious corals (i.e., pink, bamboo, and gold corals) is not currently conducted in Hawaii. One company used two one-man submersibles to survey and harvest pink and gold corals at depths between 400 and 500 meters in the MHI during 1999 and 2001; however, they did not continue their operations after that time and the actual harvests cannot be reported here in order to protect confidential information (WPFMC 2009).

Estimates of MSY, including a description of calculation methods, for pink, bamboo, and gold coral MUS at the Makapuu Established Bed are provided in the Hawaii Archipelago FEP (WPFMC 2009) and summarized in Table 8.

Table 7. MSY estimates for pink, gold, and bamboo precious corals in the Makapuu Bed.

Species (common name)*	MSY (kg/yr)	MSY (lb/yr)	Method of calculation
Pleurocorallium secundum (pink)	1,185	2,612	Beverton and Holt Cohort production model
Pleurocorallium secundum (pink)	1,148	2,530	Gulland model
Kulamanamana haumeaae (gold)	313	690	Gulland model
Acanella spp. (bamboo)	285	628	Gulland model

* These species reflect the new species names incorporated into the Hawaii Archipelago FEP after Amendment 5 that reclassified many MUS listed in the FEP as ECS (84 FR 2767, February 8, 2019).
Source: WPFMC (2009).

MSY estimates were reduced for ecological considerations, and, thus, the rounded down MSY estimates, or optimum yields (OY), for Makapuu Bed pink, gold, and bamboo coral were set at 1,000 kg/yr (2,205 lb/yr), 300 kg/yr (661 lb/yr), and 250 kg/yr (551 lb/yr), respectively (WPFMC 2009). Additionally, as stated previously, a moratorium on gold coral harvest is currently in place throughout the Pacific Islands through June 30, 2023 (83 FR 27716, June 14, 2018).

While OYs for pink and bamboo corals had been specified on an annual basis, the Makapuu Bed harvest quotas were expressed as a two-year quota because it was considered economically disadvantageous to utilize the expensive specialized equipment required for selective harvesting of precious coral for only part of each year on only one coral bed. The more flexible biennial schedule allowed the harvest quota to be taken during any part of a two year period to make it easier for harvesters to deploy in other areas once the two-year limit had been met (WPFMC 2009).

The Council extrapolated harvest quotas for pink, bamboo, and gold coral at Hawaii's four Conditional Beds based on bed size as compared with that of the Makapuu Established Bed using the following formula described in the Hawaii Archipelago FEP (WPFMC 2009).

$$\frac{\text{MSY for Makapuu Bed}}{\text{Area of Makapuu Bed}} = \frac{\text{MSY for Conditional Bed}}{\text{Area of Conditional Bed}}$$

Amendment 1 to the Precious Coral FMP estimated the area of the Makapuu Established Bed as 3.60 km² (WPFMC 2001). For the Conditional Beds, the area estimates are as follows: 180 Fathom Bank (0.8 km²), Brooks Bank (1.6 km²), and Kaena Point and Keahole Point (0.24 km²). Based on rounded down MSY (or OY) of 1,000 kg/yr for pink coral and 250 kg/yr for bamboo coral at the Makapuu bed, and applying the formula above, WPFMC (2001) estimated OY for all Conditional Beds as shown in Table 9, which are the harvest quotas listed in Table 5.

Table 8. Estimated area and OY for pink and bamboo coral in Established and Conditional Beds of the Hawaii Archipelago.

Bed	Pink Coral OY			Bamboo Coral OY		
Makapuu Established Bed	$\frac{1{,}000 \text{ kg}}{3.60 \text{ km}^2}$	x 3.60 km²	= 1,000 kg	$\frac{250 \text{ kg}}{3.60 \text{ km}^2}$	x 3.60 km²	= 250 kg
180 Fathom Conditional Bed	$\frac{1{,}000 \text{ kg}}{3.60 \text{ km}^2}$	x 0.8 km²	= 222 kg	$\frac{250 \text{ kg}}{3.60 \text{ km}^2}$	x 0.8 km²	= 56 kg
Brooks Bank Conditional Bed	$\frac{1{,}000 \text{ kg}}{3.60 \text{ km}^2}$	x 1.6 km²	= 444 kg	$\frac{250 \text{ kg}}{3.60 \text{ km}^2}$	x 1.6 km²	= 111 kg
Kaena Point Conditional Bed	$\frac{1{,}000 \text{ kg}}{3.60 \text{ km}^2}$	x 0.24 km²	= 67 kg	$\frac{250 \text{ kg}}{3.60 \text{ km}^2}$	x 0.24 km²	= 17 kg
Keahole Point Conditional Bed	$\frac{1{,}000 \text{ kg}}{3.60 \text{ km}^2}$	x 0.24 km²	= 67 kg	$\frac{250 \text{ kg}}{3.60 \text{ km}^2}$	x 0.24 km²	= 17 kg

2.2.2.2.1 NMFS/Council Estimation of OFL

There is no estimate of OFL for pink, bamboo, or gold coral in the Hawaii Archipelago.

2.2.2.2.2 SSC's Calculation of ABC

In calculating ABC for pink coral at the Makapuu Established Bed, at its 108th meeting in October 2011, the SSC relied on a revised estimate of MSY for pink coral reported in Grigg (2002). Specifically, Grigg (2002) estimated an MSY for pink coral at the Makapuu bed of 1,500 kg/yr, which is approximately 30% larger than the initial MSY shown in Table 8 and 50% higher than the current OY of 1,000 kg/yr (Table 9). In calculating ABC for bamboo coral at the Makapuu Established bed, the SSC relied on the initial MSY estimate of 285 kg/yr (see Table 8) and not the OY of 250 kg/yr, which was used to specify the existing harvest quota.

The SSC then applied these MSY values into the formula provided above to extrapolate an MSY proxy for pink coral and bamboo coral at the four Conditional Beds (i.e., 180 Fathom Bank, Brooks Bank, Kaena Point, and Keahole Point). However, the SSC did not use the true size of the bed areas to apply in this formula, as the SSC was unaware of these measurements at the time.

Instead, for each bed, the SSC used the estimated size of the permit area provided in 50 CFR 665. Specifically, the regulations define the permit areas for Makapuu Bed, 180 Fathom Bank, and Brooks Bank to include the area within 2 nm of a specified point. Based on the formula, Area = πr^2, the SSC determined the area for these three precious coral beds to be approximately 12.57 nm², whereas WPFMC (2001) defined the true area of these beds to be 3.60 km², 0.8 km², and 1.6 km², respectively. Additionally, the regulations define the size of the permit areas for the Kaena and Keahole Beds to include the area within 0.5 nm of a specified point. Applying the formula, Area = πr^2, the SSC determined the bed areas for Kaena and Keahole Beds to be 0.79 nm², whereas WPFMC (2001) defined the true area for both Keahole and Kaena as 0.24 km². Table 10 provides the results of the SSC's MSY proxy calculations.

Table 9. SSC MSY proxies for pink and bamboo coral at Established and Conditional Beds in

the Hawaii Archipelago.

Bed	Pink Coral			Bamboo Coral		
Makapuu Established Bed	1,500 kg / 12.57 nm²	x 12.57 nm²	= 1,500 kg	285 kg / 12.57 nm²	x 12.57 nm²	= 285 kg
180 Fathom Conditional Bed	1,500 kg / 12.57 nm²	x 12.57 nm²	= 1,500 kg	285 kg / 12.57 nm²	x 12.57 nm²	= 285 kg
Brooks Bank Conditional Bed	1,500 kg / 12.57 nm²	x 12.57 nm²	= 1,500 kg	285 kg / 12.57 nm²	x 12.57 nm²	= 285 kg
Kaena Point Conditional Bed	1,500 kg / 12.57 nm²	x 0.79 nm²	= 94 kg	285 kg / 12.57 nm²	x 0.79 nm²	= 18 kg
Keahole Point Conditional Bed	1,500 kg / 12.57 nm^2	x 0.79 nm^2	= 94 kg	285 kg / 12.57 nm^2	x 0.79 nm^2	= 18 kg

The SSC then determined that deepwater precious coral fishery for pink and bamboo corals in the Hawaii Archipelago can be regarded as Tier 4 because the MSY (or MSY proxy) is known, but there is little harvest. Therefore, consistent with the Tier 4 control rule described in the FEP of the Hawaii Archipelago which requires ABC be set equal to 0.91*MSY, the SSC calculated ABCs as shown in Table 11.

Table 10. SSC-recommended ABCs for pink and bamboo coral at Established and Conditional Beds in the Hawaii Archipelago.

Bed	Pink Coral		Bamboo Coral	
	MSY Proxy	ABC = *0.91*MSY*	*MSY Proxy*	ABC = *0.91*MSY*
Makapuu Established Bed	1,500 kg	1,400 kg	285 kg	260 kg
180 Fathom Conditional Bed	1,500 kg	1,400 kg	285 kg	260 kg
Brooks Bank Conditional Bed	1,500 kg	1,400 kg	285 kg	260 kg
Kaena Point Conditional Bed	94 kg	85 kg	18 kg	16 kg
Keahole Point Conditional Bed	94 kg	85 kg	18 kg	16 kg

However, because the SSC did not use the actual size of each bed in its calculation of MSY proxies, the values represented in Table 11 may not be the best available scientific information. For this reason, NMFS recalculated MSY proxies consistent with the intent of the SSC's recommendation using the actual size of each bed as described by WPFMC (2001). Table 12 provides the results of the corrected MSY proxy calculations conducted by the NMFS.

Table 11. NMFS-corrected MSY proxies for pink and bamboo coral at Established and Conditional Beds in the Hawaii Archipelago.

Bed	Pink Coral			Bamboo Coral		
Makapuu Established Bed	$\frac{1{,}500\ kg}{3.60\ km^2}$	x 3.60 km²	= 1,500 kg	$\frac{285\ kg}{3.60\ km^2}$	x 3.60 km²	= 285 kg
180 Fathom Conditional Bed	$\frac{1{,}500\ kg}{3.60\ km^2}$	x 0.8 km²	= 333 kg	$\frac{285\ kg}{3.60\ km^2}$	x 0.8 km²	= 63 kg
Brooks Bank Conditional Bed	$\frac{1{,}500\ kg}{3.60\ km^2}$	x 1.6 km²	667 kg	$\frac{285\ kg}{3.60\ km^2}$	x 1.6 km²	= 127 kg
Kaena Point Conditional Bed	$\frac{1{,}500\ kg}{3.60\ km^2}$	x 0.24 km²	= 100 kg	$\frac{285\ kg}{3.60\ km^2}$	x 0.24 km²	= 19 kg
Keahole Point Conditional Bed	$\frac{1{,}500\ kg}{3.60\ km^2}$	x 0.24 km²	= 100 kg	$\frac{285\ kg}{3.60\ km^2}$	x 0.24 km²	= 19 kg

Additionally, consistent with the SSC's recommendation, NMFS also reapplied the Tier 4 control rule to the corrected MSY proxy values shown in Table 12 and recalculated the ABCs for Hawaii pink and bamboo corals in Established and Conditional Beds as shown in Table 13.

Table 12. NMFS-recalculated ABCs for pink and bamboo coral at Established and Conditional Beds in the Hawaii Archipelago.

Bed	Pink Coral		Bamboo Coral	
	MSY Proxy	ABC = *0.91*MSY*	*MSY Proxy*	ABC =*0.91*MSY*
Makapuu Established Bed	1,500 kg	1,365 kg	285 kg	259 kg
180 Fathom Conditional Bed	333 kg	303 kg	63 kg	57 kg
Brooks Bank Conditional Bed	667 kg	607 kg	127 kg	116 kg
Kaena Point Conditional Bed	100 kg	91 kg	19 kg	17 kg
Keahole Point Conditional Bed	100 kg	91 kg	19 kg	17 kg

At its 143rd meeting held on March 15–17, 2022, the SSC received a presentation on new information regarding the Hawaii pink and bamboo coral fisheries, inclusive of recent fishery performance, and recommended that the ABCs for the fisheries on Established and Conditional Beds in fishing years 2019 through 2021 be rolled over for fishing years 2022 through 2025. These ABCs are identical to those specified at the SSC's 108th meeting and shown in Table 13.

2.2.2.2.3 Council ACL Recommendation

At its 152nd meeting held on October 19–22, 2014, the Council considered the SSC-recommended ABCs shown in Table 13 but recommended maintaining the current harvest quotas as provided in Table 5, as the Council did not see a need to increase catch limits given no fishery activity in recent years. The Council further noted that, while the current harvest quota of 2,000 kg of pink coral and 500 kg or bamboo coral at the Makapuu Bed may have been taken over a two-year timeframe at that time, ACLs must be specified annually. Therefore, the Council recommended the ACLs for pink coral and bamboo coral at the Makapuu Bed be set at one half of existing two-year quotas, and

the Council recommended ACLs for these species to be set at 1,000 kg/yr and 250 kg/yr, respectively. The harvest quotas for pink and bamboo coral at all other beds continued to be annual, and, thus, the recommended ACLs remain identical to the harvest quotas in Table 5. Table 14 provides the Council's recommended ACLs for pink and bamboo coral at Established and Conditional Beds in relation to the NMFS-corrected ABC. Currently, a moratorium on gold coral harvest is in place throughout the Pacific Islands through June 30, 2023 (83 FR 27716, June 14, 2018). Additionally, fishing is prohibited at Westpac Bed due to its status as a refugium. These prohibitions serve as functional equivalent of an ACL of zero. At its 174th meeting in October 2018, the Council reaffirmed these ACLs for pink and bamboo corals in Established and Conditional Beds around the Hawaii Archipelago for fishing years 2019 through 2021. At its 190th meeting in March 2022, the Council reaffirmed ACLs for fishing years 2022 through 2025, which are identical to those specified at the 152nd Council meeting in October 2014.

Table 13. NMFS-corrected ABC and Council recommended ACL for pink and bamboo coral at Established and Conditional Beds in the Hawaii Archipelago.

Bed	Pink Coral ABC *(0.91*MSY)*	Pink Coral Council-Recommended ACL	Bamboo Coral ABC *(0.91*MSY)*	Bamboo Coral Council-Recommended ACL
Makapuu Established Bed	1,365 kg	1,000 kg	259 kg	250 kg
180 Fathom Conditional Bed	303 kg	222 kg	57 kg	56 kg
Brooks Bank Conditional Bed	607 kg	444 kg	116 kg	111 kg
Kaena Point Conditional Bed	91 kg	67 kg	17 kg	17 kg
Keahole Point Conditional Bed	91 kg	67 kg	17 kg	17 kg

2.2.2.3 Pink, Gold, and Bamboo Corals in the Hawaii Exploratory Area

Hawaii Exploratory areas (denoted as X-P-H) include coral beds other than Established, Conditional, or Refugia Beds within the EEZ. Currently, there is a 1,000 kg harvest limit for all deep water precious corals combined (i.e., all species except black coral) in the Hawaii Exploratory Area. There was no statistical basis for determining the ACL, but, instead, NMFS implemented the ACL based on Council judgment that 1,000 kg/yr was a sufficient economic incentive for exploratory fishing while being conservative and limiting the risk of overfishing (WPFMC 1979). The 1,000 kg/yr ACL in Hawaii represents about one-third of the estimated MSY for the precious coral species in all Established and Conditional Beds. Two fishing expeditions for precious corals occurred in the Hawaii Exploratory Area in the mid- to late 1980s (WPFMC 2009), but fishers performed no other fishing expeditions for precious corals since then. In 2011, NMFS issued two federal permits for fishing in the Hawaii Exploratory Area (X-P-HI), however, no fishing trips were taken.

2.2.2.3.1 NMFS/Council Estimation of OFL

There is no estimate of OFL for precious corals in the Hawaii Exploratory Area.

2.2.2.3.2 SSC's Calculation of ABC

At its 108th meeting held on October 17–19, 2011, the SSC recommended the ABC for precious corals in the Hawaii Exploratory Area be maintained at current annual harvest quota (Table 5) of 1,000 kg/yr for fishing years 2012 and 2013 in the entire EEZ around the State of Hawaii. The SSC noted that none of the ABC control rules include a situation where there is no estimate of MSY, no catch, and only suspected occurrence, and the SSC retained the 1,000 kg/yr ABC to allow exploratory fishing that would provide additional information on occurrence and abundance while still providing incentive for exploratory fishing. At its 130th meeting in March 2018, the SSC recommended that the ABC be rolled over for fishing years 2019 through 2021. Similarly, at its 143rd meeting held on March 15–17, 2022, the SSC reaffirmed the ABC for precious corals in the Hawaii Exploratory Area identical to the SSC-recommended ABC from its 108th meeting.

2.2.2.3.3 Council ACL Recommendation

At its 152nd meeting held on October 19–22, 2011, the Council considered the SSC-recommended ABC, and the Council recommended maintaining the current harvest quota of 1,000 kg/yr for pink and bamboo corals in the Exploratory Area around Hawaii. At its 174th meeting in October 2018, the Council reaffirmed these ACLs for pink and bamboo corals in the Hawaii Exploratory Area for fishing years 2019 through 2021. At its 190th meeting in March 2022, the Council again recommended that the ACL for precious corals in the Hawaii Exploratory Area be rolled over for fishing years 2022 through 2025. Gold coral would continue to be subject to a fishing moratorium until June 30, 2023, and the Council did not recommend an ACL.

2.2.3 Description of the Alternatives for Hawaii Precious Corals

2.2.3.1 Black Coral – Auau Channel Established Bed

2.2.3.1.1 Alternative 1: No Management Action

Under this alternative, NMFS would not specify an ACL for the black coral fishery in the Auau Channel of the Hawaii Archipelago, and AMs would not be necessary. However, this alternative would not comply with the Magnuson-Stevens Act or provisions of the Hawaii Archipelago FEP that require ACLs to be specified for all stocks and stock complexes listed in the FEP. Under the baseline, gold coral would also continue to be subject to a fishing moratorium until June 30, 2023. Alternative 1 serves as the environmental baseline alternative against which effects on the human environment of the action alternative can be compared.

Expected Fishery Outcome

NMFS does not anticipate any change to the fishery with respect to location, areas fished, gear type, fishing participation, effort, or seasonality relative to recent years as a result of implementing Alternative 1. Additionally, we do not expect any change in fishery performance with respect to landings. The Hawaii black coral fishery has been managed under an ACL since 2012; however, the fishery was not functionally constrained by previous management (i.e., in the absence of an in-season AM) and fishery catch has never approached the ACLs since their initial implementation (Table 6). Since the fishery has not been constrained in ways that impact operations or performance during previous years where ACLs were implemented, NMFS does not anticipate that the fishery would perform differently in the absence of an ACL or AMs. If the fishery expanded in any fishing year from 2022 to 2025 in a manner that caused catch to increase above the MSY, this alternative could have adverse impacts to the black coral stock complex due to the lack of a sustainable harvest limit against which the fishery could be evaluated.

2.2.3.1.2 Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

Under this alternative, the ACL for the black coral fishery in the Auau Channel of the Hawaii Archipelago would be set equal to the ACL recommended by the Council, which is 2,500 kg (5,512 lb). This ACL would be roughly 2,000 lb lower than the SSC-recommended ABC of 7,500 lb (3,413 kg/yr) and approximately 4,800 lb higher than the average annual harvest from 2011 to 2021 (Table 6). NMFS expects to implement the same ACL for fishing years 2022 through 2025, unless the Council modifies its recommendation or new information is provided that would result in a change to the ACL.

Pursuant to 50 CFR 665.4, when an ACL for any stock or stock complex is projected to be reached, based on best available information, NMFS would restrict fishing for that stock or stock complex in federal waters around the applicable U.S. EEZ to prevent the ACL from being exceeded. The restriction may include, but is not limited to closure of the fishery, closure of specific areas or restriction in effort (76 FR 37286, June 27, 2011). However, the Council is not recommending in-season restrictions for any precious coral fishery at this time because catch statistics are generally not available until at least six months after the data has been collected (see Section 3.2 for more detail on data collection for these fisheries). For these reasons, NMFS would utilize a moving three-year average catch to evaluate fishery performance against the proposed ACLs as a post-season AM. For example, NMFS and the Council would use the average catch during fishing years 2020–2021, 2021–2022, and 2022–2023 to evaluate fishery performance against the appropriate 2022–2023 ACL for precious coral. At the end of each fishing year, the Council will review catches relative to each ACL. If NMFS and the Council determine the three-year average catch for the fishery exceeds the specified ACL, NMFS and the Council may reduce the ACL for that fishery by the amount of the overage in the subsequent year (80 FR 52415, August 31, 2015). Additionally, as a higher performance measure, as specified in the FEP, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process and adjust the system, as necessary, to improve its performance and effectiveness. This alternative also assumes continuation of all existing federal and local resource management laws and regulations.

Expected Fishery Outcome

For fishing years 2022 through 2025 under Alternative 2, NMFS would implement the same as ACLs and AMs for the Hawaii black coral fishery as was done for fishing years 2019 through 2021. The fishery would experience the same management it has been under each year since 2012 (except for 2018, for which NMFS did not specify any ACLs or AMs for the fishery). NMFS does not expect any change in the fishery in terms of location, area fished, seasonality, fishing participation, effort, or gear used (see Section 3.2 for more detail) relative to recent years or Alternative 1. The fishery was not functionally constrained by implementation of ACLs and AMs due to the lack of an in-season AM to restrict the fishery in the event that the ACL was exceeded, and the implementation of the same ACL is not likely to result in any notable change to the relatively inactive fishery. Additionally, because the Hawaii black coral fishery is sporadic with limited participation and catch, especially in the most recent decade (Table 6), NMFS does not expect that implementing identical management would promote increased catch or effort in the fishery. Previous ACLs for this fishery, which were identical to the proposed ACL, were never exceeded in any fishing year from 2012 through 2017 or 2019 through 2021, and the recent average annual catch (see Table 6) is just 1.3% of the proposed ACL. Therefore, the black coral fishery has never experienced fishing pressure that would cause it to attain the sustainable harvest levels associated with the ACLs, and NMFS does not expect that the fishery would approach the

ACL based on fishery performance from the most recent decade. If the fishery was to expand in the near future, this alternative would help ensure that NMFS has appropriate measures in place to evaluate fishery catch relative to the baseline. Thus, Alternative 2 would likely result in additional benefits to the fishery by providing management measures for NMFS to monitor catch against the proposed ACL and adjust the implemented management as needed to ensure long-term sustainability.

2.2.3.2 Pink, Gold, and Bamboo Coral – Established and Conditional Beds

2.2.3.2.1 Alternative 1: No Management Action

Under this alternative, NMFS would not implement an ACL for pink or bamboo coral in any Established or Conditional Bed, and AMs would not be necessary. While the implementing regulations of the Hawaii Archipelago FEP already provide for bank-specific harvest quotas, as listed in Table 5, this management system would not comply with the Magnuson- Stevens Act or the provisions of the FEP that require ACLs to be implemented for all stocks and stock complexes each year. Additionally, the moratorium on harvesting gold coral would remain in place through June 30, 2023. Alternative 1 serves as the environmental baseline alternative against which effects on the human environment of the action alternative can be compared.

Expected Fishery Outcome

NMFS does not anticipate any change to the fishery with respect to location, areas fished, gear type, fishing participation, effort, or seasonality relative to recent years as a result of implementing Alternative 1. The fisheries for pink and bamboo corals in Established and Conditional Beds around Hawaii are currently inactive with no landings being reported. Even in past years where there was slight effort in the fishery, catch data could not be reported because of data confidentiality rules since there were less than three active fishers. Due to the inactive nature of the fisheries, no ACL has been exceeded for any pink or bamboo coral on any Established or Conditional Bed since the initial implementation of ACLs for the fisheries in 2012. Thus, NMFS does not expect that the implementation of Alternative 1 would result in any change to the manner in which the fishery operates, and it is likely that the fishery will continue to remain in active in subsequent years in the absence of ACLs and AMs. If the fisheries were to reinitiate in the near future, this alterative may result in adverse impacts to the fisheries since no management would be in place to ensure that the pink and bamboo corals are harvested sustainably.

2.2.3.2.2 Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

Under this alternative, the ACLs for pink or bamboo coral in Established and Conditional Beds would be set equal to the ACLs recommended by the Council, which are equal to the current harvest quotas as shown in Table 5. As previously noted, the harvest quota for pink of 2,000 kg and the current harvest quota for bamboo coral of 500 kg at the Makapuu Bed may be taken over a two year timeframe. Therefore, to comply with the ACL requirement, the Council recommended the ACLs for pink coral and bamboo coral at the Makapuu Bed be set at one half of the current two year quota and recommended the ACL for these species be set at 1,000 kg/yr and 250 kg/yr, respectively. Similar to Alternative 1, the moratorium on harvesting gold coral would remain in place through June 30, 2023 and would serve as the functional equivalent of an ACL of zero. Each of the proposed ACLs is lower than the ABCs as recalculated by NMFS and shown in Table 14. NMFS expects to specify the same ACL for fishing years 2022 through 2025, unless the Council modifies its recommendation, or new information is provided that would result in a change to the ACL.

Pursuant to 50 CFR 665.4, when an ACL for any stock or stock complex is projected to be reached, based on best available information, NMFS would restrict fishing for that stock or stock complex in federal waters around the applicable U.S. EEZ to prevent the ACL from being exceeded. The restriction may include, but is not limited to closure of the fishery, closure of specific areas or restriction in effort (76 FR 37286, June 27, 2011). However, the Council is not recommending in-season restrictions for any precious coral fishery at this time because catch statistics are generally not available until at least six months after the data has been collected (see Section 3.2 for more detail on data collection for these fisheries). For these reasons, NMFS would utilize a moving three-year average catch to evaluate fishery performance against the proposed ACLs as a post-season AM. For example, NMFS and the Council would use the average catch during fishing years 2020–2021, 2021–2022, and 2022–2023 to evaluate fishery performance against the appropriate 2022–2023 ACL for precious coral. At the end of each fishing year, the Council will review catches relative to each ACL. If NMFS and the Council determine the three-year average catch for the fishery exceeds the specified ACL, NMFS and the Council may reduce the ACL for that fishery by the amount of the overage in the subsequent year (80 FR 52415, August 31, 2015). Additionally, as a higher performance measure, as specified in the FEP, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process and adjust the system, as necessary, to improve its performance and effectiveness. This alternative also assumes continuation of all existing federal and local resource management laws and regulations.

Expected Fishery Outcome

Under Alternative 2, NMFS would roll over the same ACLs and AMs for the Hawaii pink and bamboo coral fisheries on Established and Conditional Beds in fishing years 2022 through 2025 as implemented each year from 2019 to 2021. NMFS has managed these fisheries using ACLs since 2012 (except for 2018, for which NMFS did not specify any ACLs or AMs for these fisheries), and since that time, the fisheries have been inactive with no participation or catch. Thus, the ACLs for the fisheries have never been attained, and the ACLs and post-season AMs previously implemented for the fisheries did not functionally constrain them in the absence of an in-season AM. NMFS does not expect that the implementation of ACLs and AMs under Alternative 2 would any change in the fishery in terms of location, area fished, seasonality, fishing participation, effort, or gear used (see Section 3.2 for more detail) relative to recent years or Alternative 1 due to the inactive nature of the fishery, especially while managed under ACLs that did not functionally constrain landings. The implementation of the same management regime by NMFS is not likely to result in any notable change to the inactive fisheries, as the fisheries have never experienced fishing pressure that would cause them to surpass the sustainable harvest levels prescribed by the ACLs. If the fisheries were to begin harvesting precious corals in the near future, NMFS could utilize the management implemented by this alternative to ensure that the fishery landings would be evaluated relative to the baseline and implemented ACL such that sustainability could be ensured going forward. Thus, Alternative 2 would likely benefit the fisheries by providing management for the fisheries to promote sustainability if they were to become active in any fishing year from 2022 to 2025.

2.2.3.3 Pink, Gold, and Bamboo Corals in the Hawaii Exploratory Area

2.2.3.3.1 Alternative 1: No Management Action

Under this alternative, NMFS would not implement an ACL for pink, bamboo, and gold coral for the Exploratory Area around Hawaii, and AMs would not be necessary. While the implementing regulations of the Hawaii Archipelago FEP already provide for 1,000 kg/yr harvest quota for all precious corals (except black coral) in the Hawaii Exploratory Area, this management system

would not comply with the Magnuson-Stevens Act or the provisions of the FEP that require ACLs to be implemented for all stocks and stock complexes listed in the FEP. Additionally, under the baseline, gold coral would continue to be subject to a fishing moratorium until June 30, 2023. Alternative 1 serves as the environmental baseline alternative against which effects on the human environment of the action alternative can be compared.

Expected Fishery Outcome

NMFS does not expect that the implementation of Alternative 1 would change the precious coral fishery in the Hawaii Exploratory Area in any manner that would impact operations in terms of location, areas fished, gear type, fishing participation, effort, or seasonality compared to recent fishery performance. The fishery for pink and bamboo corals the Hawaii Exploratory Area is not active currently, with no federal permits issued and no landings being reported. Due to the inactive nature of the fishery, since 2012 when ACLs were first implemented, landings for the fishery have not been recorded and, thus, the fishery has never approached or exceeded the implemented ACL. Therefore, NMFS does not expect that lack of ACLs and AMs under Alternative 1 would cause an expansion of the fishery relative to recent years, as the ACL did not functionally constrain the fishery in the absence of an in-season AM. Since ACLs in previous years did not restrict fishery catch and there were still no landings, we do not anticipate that precluding management for the fishery would result in any change to fishery operations relative to their current state. If the fishery were to begin harvests in the near future, this alternative would not provide managers with a sustainable harvest level against which fishery performance could be monitored, potentially resulting in adverse impacts to the precious coral stocks in the Hawaii Exploratory Area.

2.2.3.3.2 Alternative 2: Implement Council-Recommended ACL and AMs (Status Quo/Preferred)

Under this alternative, the pink and bamboo coral ACLs in the Hawaii Exploratory Area would be set equal to the 1,000 kg/yr ACL recommended by the Council. This ACL would be equal to the current harvest quotas and is equal to the SSC-recommended ABC. Gold coral would continue to be subject to a fishing moratorium until June 30, 2023 with an ACL functionally equivalent to zero. NMFS expects to implement the same ACL for all fishing years from 2022 through 2025 unless the Council modifies its recommendation or new information is provided that would result in a change to the ACL. As an AM, the Council would determine whether the ACL for the stock complex had been exceeded as soon as possible after the fishing year.

Pursuant to 50 CFR 665.4, when an ACL for any stock or stock complex is projected to be reached, based on best available information, NMFS would restrict fishing for that stock or stock complex in federal waters around the applicable U.S. EEZ to prevent the ACL from being exceeded. The restriction may include, but is not limited to closure of the fishery, closure of specific areas or restriction in effort (76 FR 37286, June 27, 2011). However, the Council is not recommending in-season restrictions for any precious coral fishery at this time because catch statistics are generally not available until at least six months after the data has been collected (see Section 3.2 for more detail on data collection for these fisheries). For these reasons, NMFS would utilize a moving three-year average catch to evaluate fishery performance against the proposed ACLs as a post-season AM. For example, NMFS and the Council would use the average catch during fishing years 2020–2021, 2021–2022, and 2022–2023 to evaluate fishery performance against the appropriate 2022–2023 ACL for precious coral. At the end of each fishing year, the Council will review catches relative to each ACL. If NMFS and the Council determine the three-year average catch for the fishery exceeds the specified ACL, NMFS and the Council may reduce the ACL for that fishery by

the amount of the overage in the subsequent year (80 FR 52415, August 31, 2015). Additionally, as a higher performance measure, as specified in the FEP, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process and adjust the system, as necessary, to improve its performance and effectiveness. This alternative also assumes continuation of all existing federal and local resource management laws and regulations.

Expected Fishery Outcome

Under this alternative, NMFS would roll over the same ACL and AMs from 2019 to 2021 for precious corals harvested in the Hawaii Exploratory Area around the Hawaii Archipelago in fishing years 2022 through 2025. NMFS has implemented ACLs and AMs for this fishery since 2012 (except for 2018, for which NMFS did not specify any ACLs or AMs for these fisheries), and the fishery has been inactive with no participation or catch since that time. The ACL of 1,000 kg/yr has never been approached or attained, and the post-season AMs implemented for this fishery since 2012 did not functionally constrain the fishery in the absence of an in-season AM. Because the fishery has been inactive under a non-restrictive management regime, NMFS does not anticipate that the implementation of ACLs or AMs under this alternative would result in any change to the fishery with respect to location, areas fished, gear type (see Section 3.2 for more detail), fishing participation, effort, or seasonality compared to recent years or Alternative 1. The implementation of identical management by NMFS is not likely to result in any notable change to the inactive fishery, as it is likely that factors other than management under ACLs have precluded additional fishery activity through the present day. If the fishery was to begin harvesting precious corals from the Hawaii Exploratory Area in the near future, Alternative 2 may have beneficial impacts to the precious coral stocks in the permit area since the management would help ensure that NMFS can evaluate fishery performance against the sustainable harvest level implemented by the ACL. Thus, Alternative 2 would not be likely to result in adverse impacts to the inactive fishery from the implementation of an ACL and AMs but may provide conservation and management benefits by providing management to ensure sustainability if catches were to increase in any fishing year from 2022 to 2025.

2.3 Alternatives Considered, but Rejected from Further Analysis

2.3.1 Implementation of ACLs for Gold Coral in Hawaii Established and Conditional Beds

Currently, a moratorium on gold coral harvest is in effect throughout the Pacific Islands through June 30, 2023, due to uncertainty in estimates of the age and growth and to allow the Council additional time for further research and development of sustainable management measures for gold corals (83 FR 27716, June 14, 2018). Therefore, the Council did not consider recommending ACLs for gold coral in any established or conditional bed in Hawaii, as the current moratorium serves as a functional equivalent of an ACL of zero. While the proposed action would specify a limit of 1,000 kg for all deepwater precious corals combined (except black coral) in the exploratory areas around Hawaii, the current moratorium would preclude the harvest of gold coral in the exploratory areas through June 30, 2023. If the moratorium on gold coral harvested is lifted as scheduled, NMFS and the Council would conduct a separate environmental review to implement ACLs and AMs for the Hawaii gold coral fishery at that time.

2.3.2 Implementation of ACLs for Precious Coral Harvested in Refugia

According to federal regulations (50 CFR 662.263(b)(2)), it is unlawful to fish for, take, or retain any species of Hawaii precious coral MUS in refugia. Due to its status as a refugium, the harvest of all precious corals is prohibited at Westpac Bed. Thus, NMFS does not propose to implement ACLs

or AMs for precious coral within the Westpac Bed because the existing prohibitions serve as a functional equivalent of an ACL of zero.

2.3.3 Implementation of In-Season AMs

To prevent ACLs from being exceeded, federal regulations implementing the Western Pacific FEPs (50 CFR 665.4) state that when any ACL is projected to be reached, NMFS will restrict fishing for the stock in federal waters. Restrictions may include, but are not limited to, closing the fishery, closing specific areas, changing bag limits, or otherwise restricting effort or catch. However, near-real time processing of catch information is not possible in Hawaii deepwater shrimp or precious coral fisheries. Therefore, in-season AMs to prevent an ACL from being exceeded are not feasible at this time.

While federal permit and reporting requirements have been implemented for deepwater shrimp and precious coral fisheries in federal waters around Hawaii, there have been few permitted vessels for these fisheries in the past decade. When permits were issued, little or no fishing was conducted, and catch that is reported from these fisheries comes primarily from non-federal waters. Therefore, NMFS will continue to rely on the fishery data collection programs administered by HDAR to obtain fisheries data. However, HDAR presently does not have the personnel or resources to process data for the deepwater shrimp or precious coral fisheries in near-real time, so fisheries statistics are generally not available until several months after the data has been collected. While the State of Hawaii has the capability to track the catch of seven preferentially-targeted bottomfish species (i.e., the Deep 7 bottomfish) in near-real time towards their ACLs, additional resources would be required to extend these capabilities to the deepwater shrimp and precious coral fisheries. Until resources are made available, only AMs that consist of post-season management measures are being recommended at this time for Hawaii deepwater shrimp and precious coral fisheries.

Table 14. Comparison of the proposed fishery management features and expected outcomes for this action.

Topic	Alt. 1 – No Management Action	Alt. 2 – Implement Council-Recommended ACLs
Also referred to as:	Baseline.	Status Quo, the Preferred Alternative.
Active fisheries affected	Hawaii deepwater shrimp and precious coral.	No change from baseline.
Affected fisheries gear	Deepwater shrimp: Baited traps. Black corals: Hand harvest with deep diving gear. Other precious corals: Submersible.	No change from baseline.
Affected fisheries participation	Deepwater shrimp: Sporadic, six issued permits in 2017 and 2018, two issued permits in 2019, zero issued permits in 2020, and three issued permits in 2021. Black corals: Relatively inactive, fewer than three issued permits each year over the past decade. Other precious corals: Inactive, no fishery participation since the early 2000s.	No change from baseline.
Affected fishing locations	Deepwater shrimp: Harvest occurs near outer reef slops at depths between 300 and 800 m on relatively flat and smooth-bottom benthic habitats. Precious coral established beds: Auau Channel – the area west and south of a point at 21°10′ N. lat., 156°40′ W. long., and east of a point at 21° N. lat., 157° W. long., and west and north of a point at 20°45′ N. lat., 156°40′ W. long. Makapuu Bed – the area within a radius of 2.0 nm of a point at 21°18.0′ N. lat., 157°32.5′ W. long. Precious coral conditional beds: 180 Fathom Bank – the area within a radius of 2.0 nm of a point at 28°50.2′ N. lat., 178°53.4′ W. long. Brooks Bank – the area within a radius of 2.0 nm of a point at 24°06.0′ N. lat., 166°48.0′ W. long. Kaena Point Bed – the area within a radius of 0.5 nm of a point	No change from baseline.

Topic	Alt. 1 – No Management Action	Alt. 2 – Implement Council-Recommended ACLs
	at 21°35.4′ N. lat., 158°22.9′ W. long. Keahole Point Bed – the area within a radius of 0.5 nm of a point at 19°46.0′ N. lat., 156°06.0′ W. long.	
Active fisheries indirectly affected	N/A.	N/A.
Monitored by:	HDAR Fisher Reporting System and federal permits.	No change from baseline.
Complies with Magnuson-Stevens Act	No.	Yes.
Annual Catch Limits	N/A.	Deepwater Shrimp: 250,733 lb. Auau Channel Black Coral: 5,512 lb (2,500 kg). Makapuu Bed Pink/Bamboo Coral: 2,205/551 lb (1,000/250 kg). 180 Fathom Bank Pink/Bamboo Coral: 489/123 lb (222/56 kg). Brooks Bank Pink/Bamboo Coral: 979/245 lb (444/111 kg). Kaena Point Bed Pink/Bamboo Coral: 148/37 lb (67/17 kg). Keahole Bed Pink/Bamboo Coral: 148/37 lb (67/17 kg). Precious Coral Exploratory Area: 2,205 lb (1,000 kg).
Accountability Measures	N/A.	As a post-season AM the Council will review catches relative to each ACL at the end of each fishing year. If NMFS and the Council determine the three-year average catch for the fishery exceeds the ACL, NMFS will reduce the ACL for that fishery in the subsequent year by the amount of the overage. As specified in each FEP as a higher performance measure, if an ACL is exceeded more than once in a four-year period, the Council will re-evaluate the ACL process and adjust the system, as necessary, to improve its effectiveness.
Possibility of	None.	No change from baseline.

Topic	Alt. 1 – No Management Action	Alt. 2 – Implement Council-Recommended ACLs
fishery closure in Federal waters?		
Expected annual catch of Hawaii deepwater shrimp and precious corals	Expected to be consistent with recent annual average catches for both fisheries since they have no previously been functionally constrained by an in-season AM and annual fishery harvests never approached the ACL.	No change from baseline.
ACL likely to be exceeded in a given year (based on recent average catch)?	N/A.	Deepwater shrimp: Low. The recent average annual catch is just 3.8% of the proposed ACL. Auau Channel black corals: Low. The recent average annual catch is just 1.3% of the proposed ACL. All other precious corals: Very low. There has been no recent activity in these fisheries.
Expected fishery outcomes	No ACLs or AMs would be implemented for the fisheries, but catches would continue to be monitored through HDAR. NMFS does not expect any change in fishery operations from recent years because the fisheries were not functionally restricted in previous years and never attained the proposed ACLs. If the fisheries were to expand in the near future, there would be no management in place to ensure that the MUS are sustainably harvested. Long-term, there would likely be reduced benefit of this alternative in managing the Hawaii deepwater shrimp and precious coral fisheries since no management would be in place to evaluate harvests relative to sustainable fishery reference points.	NMFS would roll over the most recently implemented ACLs and AMs for each of the fisheries. NMFS does not expect any change in fishery operations from recent years because the fisheries were not functionally restricted in previous years and never attained the implemented ACLs, which are the same as the proposed ACLs. If the fisheries were to expand in the near future, there would be management in place to ensure that the fisheries continue harvesting the MUS sustainably. Long-term, there would likely be additional benefits in evaluating harvests relative to the baseline to ensure the continuing sustainability of the marine resources.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND POTENTIAL EFFECTS OF THE ALTERNATIVES

This section describes the affected fisheries and fishery resources, biological and socioeconomic resources, and other features of the environment that could be affected by the fishery, and potential effects that implementing the alternatives would have on these resources. Among the factors discussed are target and non-target species, bycatch, protected species, the fishing community and associated revenues, essential fish habitat (EFH) and habitat areas of particular concern (HAPC), marine protected areas (MPAs), and other vulnerable ecosystems. Climate change and environmental justice are also considered, along with fishery administration and enforcement.

3.1 Overview of Existing Fishery Monitoring

Overview of relevant fishery data collection systems in Hawaii

In Hawaii, the majority of fisheries information is collected from the commercial fishing sector through a mandatory license and monthly reporting system administered by the State of Hawaii. Under State law, anyone who takes marine life for commercial purposes is required to obtain a commercial marine license (CML) and submit a catch report (popularly known as a "C3" form) on a monthly basis. Data collected include day fished, area fished, fishing method used, hours fished per method, and species caught (i.e., number/pounds caught and released).

Recreational catch information for finfish is also opportunistically collected through the Hawaii Marine Recreational Fishing Survey (HMRFS) and annual catch amounts are reported through the Marine Recreational Information Program (MRIP). Because this survey only includes finfish, no information on deepwater shrimp or precious corals is captured by HMRFS. Except for HMRFS data, NMFS obtains all deepwater and precious coral fisheries information in the Hawaii Archipelago, where available, in accordance with cooperative agreements with HDAR and provides access to this data through the Western Pacific Fisheries Information Network (WPacFIN). Generally, complete data for catches during a calendar year are not available until at least six months after the year has ended.

3.1.1 Federal Permit and Reporting Requirements

Hawaii Deepwater Shrimp Fisheries

Any vessel used to fish for deepwater shrimp in Federal waters around Hawaii must obtain a federal permit and submit catch logbooks to NMFS within 72 hours of landing. Crustacean Permit Area 1 includes the EEZ around the NWHI, and Crustacean Permit Area 2 includes the EEZ around the MHI.

Hawaii Precious Coral Fisheries

Any vessel used to fish for black, bamboo, pink, or gold corals in federal waters around Hawaii must obtain a federal permit and submit catch logbooks to NMFS within 72 hours of landing. In Hawaii, there are three categories of beds: Established, Conditional, and Exploratory. Permits are required for harvesting black coral at the Established Auau Channel Bed. Permits are also required to harvest pink and bamboo coral at the Established Makapuu Bed. A permit is required to fish for pink and bamboo corals at each of the following Conditional Beds: 180 Fathom, Brooks Bank, Keahole Point, and Kaena Point. A permit is also required to fish for pink and bamboo coral in the Hawaii Exploratory Area (X-P-HI), which includes all coral beds other than Established, Conditional, and Refugia in the EEZ around Hawaii. A moratorium on gold coral harvest is

currently in place throughout the western Pacific through June 30, 2023 (83 FR 27716, June 14, 2018), and due to its status as a Refugium, fishing for coral on the WestPac Bed is not allowed (50 CFR 662.263(b)(2)).

Recreational Fisheries

In 2008, NMFS established the National Saltwater Angler Registry Program as part of MRIP to improve recreational fisheries information nationwide (73 FR 79705, December 30, 2008). The program requires all recreational fishers in federal waters that are not otherwise permitted (e.g., through a Hawaii CML license) to obtain a permit and report catches to NMFS.

3.2 Deepwater Shrimp Fisheries

Adult deepwater shrimp species of the genus *Heterocarpus* have been reported to occur in the waters surrounding the Hawaii Archipelago (Clark 1972; Struhsaker and Aasted 1974; Dailey and Ralston 1986; Gooding et al. 1988; Tagami and Barrows 1988; Moffitt and Parrish 1992; Ralston and Tagami 1992; Polovina 1993). The species are generally found in benthic, deepwater habitats between 200 and 900 m in depth, primarily on the steep outer reef slopes that surround the islands and deepwater banks. However, because they are found at such deep depths, accurate descriptions and characterization of preferred habitats are difficult to obtain and scarce in the scientific literature.

The distribution of these species tends to be stratified by depth with each species occupying different but often overlapping depths (Ralston 1986). Eight species belonging to the genus *Heterocarpus* (*Heterocarpus ensifer, H. laevigatus, H. sibogae, H. gibbosus, H. lepidus, H. dorsalis, H. tricarinatus and H. longirostris*) have been reported from the Western Pacific region, although *H. ensifer* and *H. laevigatus* have been the primary focus of fishery operations and research surveys in the Pacific Islands.

Unlike shallow-water penaeid shrimps, *Heterocarpus* shrimps have a lifespan in excess of a year, and some species such as *H. laevigatus* may have life spans of up to eight years (King 1993). The natural mortality rate of *H. laevigatus* is about 50% per year, and *H. laevigatus* matures at about 75% of its maximum size, or between four and five years old (King 1993). *Heterocarpus* shrimps may be semelparous in that they reproduce only once in their lifetime before dying (Dailey and Ralston 1986). The semelparity, relatively long life span, and delayed maturity of some species suggest that *Heterocarpus* shrimps are vulnerable to overexploitation. Known fishing areas tend to be limited and subject to reduced catch rates following initially high harvests (WPFMC 2009).

Fishers harvest deepwater shrimp using traps made from steel, wire, and/or plastic with conical entrances that allow the shrimp to get into the trap, but not out. In Hawaii, shrimp trapping vessels have employed large pyramidal traps of about 2 m^3 in volume, setting up to 50 traps per day (Polovina 1993). A gear loss rate of 3.35% was estimated from fishing log data in Hawaii (Tagami and Barrows 1998). There is little information available on the impacts of the lost shrimp fishery traps on habitat and other species. Potential impacts of the traps could include snagging and ghost fishing, though lost traps could also provide habitat for other organisms. The Council and NMFS are aware of the issue of lost traps and continue to monitor the fishery. As data availability allows in the future, NMFS and the Council will evaluate whether the impacts from lost traps are substantial and need to be addressed through additional management measures.

In Hawaii, deepwater shrimp fisheries have been sporadic in nature for many reasons (King 1993, Tagami and Ralston 1988. WPFMC 2009). Gear loss is a common problem and has made many past ventures unprofitable (Ralson and Tagami 1992, WPFMC 2009). A second difficulty is the

short product shelf life and a history of inconsistent product quality, leading to fluctuating market demand for deepwater shrimp (King 1993, WPFMC 2009). Additionally, these fisheries generally experience local depletion on known fishing grounds, which leads to lower catch rates over time; however, localized depletion appears to be short-term, and the fishery typically returns after the resource rebounds (WPFMC 2009).

3.2.1 Hawaii Deepwater Shrimp Fishery, Affected Resources, and Potential Effects

3.2.1.1 Effects of the Proposed Action on the Hawaii Deepwater Shrimp Fishery

Under either the baseline or the proposed action alternative, NMFS expects the potential effects of this action on the Hawaii deepwater shrimp fishery to be minimal because the fishery is not expected to change as a result of the proposed ACL or AMs.

Alternative 1: No Management Action

Under the baseline, the Hawaii deepwater shrimp fishery would not be subject to an ACL or AMs in any fishing year from 2022 through 2025. NMFS expects that the fishery would continue its recent trends of low participation and sporadic harvests averaging 8,819 lb/yr based on fishery performance from recent years (see Table 4). The fishery is not expected to expand under this alternative. Over time, if the fishery were to expand, catches could, potentially exceed sustainable levels. This alternative is not consistent with National Standard 1 of the Magnuson-Stevens Act or the FEP and does not provide the level of harvest oversight provided under Alternative 2.

Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

When compared against recent fishing harvests (i.e., the baseline trend), the proposed ACL would be much higher than recent catches (see Table 4). The ACL is considered an acceptable level of catch that would prevent overfishing and provide for long-term sustainability of the stock. The Council developed the ACL using the best available scientific information in a manner that accords with the fishery regulations after considering catches, participation trends, and estimates of the status of the fishery resources. Based on recent fishery performance, NMFS concludes that it is unlikely that fishery would attain the proposed ACL, the AM would be unlikely to be triggered, and an overage adjustment would not be expected for the deepwater shrimp fishery in any of the fishing years from 2022 through 2025 (see Section 2.1.3). If the most recent three year average total catch exceeds the ACL more than once during 2022 through 2025, it would trigger a re-evaluation of the management of the fishery, thereby addressing unexpected catch increases over time and ensuring long-term sustainability. Thus, overall, the proposed action would provide more management oversight and help ensure the long-term sustainability of the deepwater shrimp resource in the Hawaii Archipelago and, therefore, this alternative would promote fishery sustainability to a greater extent than the no-action alternative if the fishery were to expand.

3.2.1.2 Effects of the Proposed Action on Physical Resources

Alternative 1: No Management Action

Fishing for deepwater shrimp in the Hawaii Archipelago is not known to be adversely affecting air quality, noise, water quality, view planes, or terrestrial resources. This is a small-scale, sporadic fishery that generally fishes in deeper waters offshore, and the fishery is not expected to change the way it operates in any way that would result in impacts to physical resources. The fishery does not have adverse effects on unique features of the geographic environment, and the lack of ACLs and AMs under this alternative would not result in adverse effects on such resources as marine protected areas (see Section 3.2.1.3.3). Because the fishery is not expected to change under

Alternative 1 relative to past fishery performance, NMFS does not expect this alternative to result in adverse impacts to physical resources.

Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

Under Alterative 2, current fishing behavior and effort (see Section 3.2.1.3.1) are not expected to change in a manner that would result in impacts to physical resources because typical fishery performance under the proposed ACLs and AMs is known from recent data. The fishery does not have adverse effects on unique features of the geographic environment, and the action alternative would not result in adverse effects on such resources as marine protected areas (see Section 3.2.1.3.3).

3.2.1.3 Effects of the Proposed Action on Biological Resources

3.2.1.3.1 Target, Non-Target, and Bycatch Species

Within the Hawaii Archipelago, there are numerous banks and seamounts, of which a majority are located in the NWHI, that provide depth ranges suitable for the occurrence of deepwater shrimp. *Heterocarpus laevigatus* and *H. ensifer* have been reported in both the MHI and the NWHI (Gooding 1984; Dailey and Ralston 1986; Ralston and Tagami 1992; Moffitt and Parrish 1992). *H. ensifer* is believed to be the most abundant species (Struhsaker and Aasted 1974).

In the MHI, the largest bank in federal waters is Penguin Bank, which is located to the southeast of Oahu. Trapping surveys in the MHI reported that the exploitable biomass of *H. laevigatus* was greatest at depths between 460 and 640 meters and negligible amounts occurred shallower than 350 meters or deeper than 830 meters (Ralston and Tagami 1992). In the NWHI, the highest catch rates for *H. laevigatus* were made between 500 and 800 meters while the highest catch rates for *H. ensifer* occurred between 350 and 600 meters (Gooding 1984).

Deepwater shrimp resources around Hawaii are thought sufficient only to support a limited local fishery or perhaps periodic heavy pulse fishing (Polovina 1993). Initially high catch rates appear to drop rapidly, trapping depths result in costly gear loss, and markets have not historically been large (WPFMC 2009). The MSY for deepwater shrimp in the Hawaiian Islands was estimated to be 125 mt/yr or 275,575 lb/yr (Tagami and Ralston 1988).

3.2.1.3.1.1 Current Impacts of the Fishery

Based on recent performance of the fishery between years 2019 and 2021, as shown in Table 4, the Hawaii deepwater shrimp fishery had an average annual landing of 8,819 lb of shrimp, representing approximately 3.2% of the estimated MSY of 275,575 lb/yr. Currently, there is little information about bycatch associated with this fishery, and what is known comes primarily from research sampling in other Pacific Island areas such as the Mariana Archipelago, where species such as deepwater eels (*Synaphobranchus* sp.), dogfish sharks, and geryonoid crabs have been reportedly caught and discarded (WPFMC 2008); however, research findings did not report whether the bycatch was released alive or dead. Because the fishery is sporadic, NMFS is not aware of concerns about the sustainability of bycatch species in this fishery.

3.2.1.3.1.2 Effects of the Proposed Action on Target, Non-Target, and Bycatch Species

Alternative 1: No Management Action

Under the no-action alternative, an ACL would not be specified for the Hawaii deepwater shrimp fishery, and AMs would not be necessary. NMFS expects that the fishery would continue to perform at a level comparable to recent years with respect to the amount of landings of deepwater shrimp, and catches would continue to be monitored through fisheries monitoring programs

administered by HDAR. The average level of catch under this alternative is expected to continue as it currently has in recent years with average annual catches between 2019 and 2021 estimated to be 8,819 lb. This level of catch is approximately 3.2% of the MSY (275,575 lb) and is sustainable. NMFS does not have information on any bycatch in the Hawaii deepwater shrimp fishery or to indicate bycatch in the fishery is not sustainable or having a negative impact on biodiversity. The status of Hawaii deepwater shrimp fishery bycatch would continue to be monitored by NMFS and the Council. If the fishery was to expand in the near future, there would be no management in place for NMFS or the Council to evaluate the fishery against a sustainable level of harvest and, and the fishery may cause adverse impacts to the target stocks in the absence of management despite being unlikely. Overall, the implementation of the no-action alternative would be expected to have negligible to minor impacts to the deepwater shrimp stock complex.

Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

Under Alternative 2, NMFS would implement an ACL of 250,773 lb for deepwater shrimp caught in the Hawaii EEZ in fishing years 2022 through 2025. The ACL would be equal to the ABC recommended by the Council's SSC and is 91% of MSY. Based on past fishery performance in recent years (i.e., recent average annual catches of 8,819 lb, see Table 4), fishers are not likely to attain the ACL. Given the low catches relative to the MSY and ACL, the fishery is considered sustainable based on the best available information, so the continued operation of the fishery at this level would be unlikely to cause significant impacts. Monitoring by NMFS and the Council would continue, and all commercial catches would be reported through HDAR. Given catch levels relative to ACLs, the MHI deepwater shrimp fishery is not constrained by implementation of catch limits or AMs. It is, therefore, highly unlikely that implementation of the same ACL that has been in place from 2012 through 2021 would result in changes to the fishery in 2022 through 2025 that would have the potential to result in impacts to deepwater shrimp or a change in how fishing is conducted. Thus, NMFS concludes the implementation of the proposed ACL and AM would result in no or negligible effects to target or non-target stocks or to bycatch species, including the scenario in which the ACL and AM is implemented in each of the subsequent fishing years through 2025.

Under either alternative, no new monitoring would be implemented, but a post-season review of the catch data would be conducted under Alternative 2 as soon as possible after the fishing year to determine whether the ACL was exceeded. If the ACL is exceeded, NMFS would take action to correct the operational issue that caused the ACL overage, as recommended by the Council, which could include a downward adjustment to the ACL in the subsequent fishing year. The proposed action would not result in a fishery closure under either alternative. The ACL and post-season review of catch relative to the ACL would help prevent deepwater shrimp stocks from becoming overfished. The post-season review of catch relative to the ACL would also provide an enhanced level of management review of the fishery that would provide an opportunity for the Council to refine ACL and AM implementations in the future, should changes be necessary.

3.2.1.3.2 Protected Species

Several protected species occur in the waters around the Hawaiian Islands, including sea turtles, marine mammals, sharks, and seabirds. Potential exists for the deepwater shrimp fishery of the Hawaii Archipelago to interact with these species. Because of the benthic trapping nature of the fishery, interactions with protected species are low. NMFS has previously evaluated the impacts of the Hawaii deepwater shrimp fishery on protected resources, and NMFS manages the fishery in compliance with the requirements of the Magnuson-Stevens Act, the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), and

other applicable statutes.

3.2.1.3.2.1 ESA-Listed Species and ESA Review of the Hawaii Deepwater Shrimp Fishery

The purpose of the ESA (16 U.S.C. § 1531 et seq.) is to protect and recover imperiled species and the ecosystems upon which they depend. Section 7(a)(2) of the ESA requires each federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. "Jeopardize" means to reduce appreciably the likelihood of survival and recovery of a species in the wild by reducing its numbers, reproduction, or distribution. When a federal agency's action "may affect" an ESA-listed species, that agency is required to consult formally with NMFS for marine species, some anadromous species, and their designated critical habitats, or with the U.S. Fish and Wildlife Service (USFWS) for terrestrial and freshwater species or their designated critical habitat. The product of formal consultation is the relevant service's biological opinion (BiOp).

The ESA also prohibits the taking of listed species without a special exemption. Taking that is incidental to and not intended as part of a federal action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the reasonable and prudent measures and terms and conditions of an incidental take statement (ITS). The reasonable and prudent measures are nondiscretionary and must be undertaken by the federal agency for the take exemption to apply. For BiOps reaching a jeopardy or adverse modification conclusion, NMFS develops reasonable and prudent alternatives that would avoid the likelihood of jeopardy or adverse modification of critical habitat. Western Pacific fisheries authorized under the FEP operate in accordance with ITSs set by ESA consultations, including applicable reasonable and prudent measures, and their associated terms and conditions, intended to minimize the potential effects of incidental take.

Table 15 lists endangered or threatened species occurring in the waters around Hawaii, including five sea turtles, the Hawaiian monk seal, five whales, four seabirds, and two fishes.

Table 15. Endangered and threatened marine species and seabirds occurring in the waters of the Hawaiian Archipelago.

Common name (*Scientific name*)	ESA listing status in Hawaii	Occurrence in Hawaii
Listed Sea Turtles		
Central North Pacific Green Sea turtle (*Chelonia mydas*)	Threatened Distinct Population Segment (DPS) in Hawaii	Most common turtle in the Hawaiian Islands. Most nesting occurs in the northwestern Hawaiian Islands. Foraging and hauling out in the MHI.
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered	Small population foraging around Hawaii and low level nesting on Maui and Hawaii Islands.
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	No nesting or foraging grounds in Hawaii. Rarely sighted while traveling between nesting and foraging habitats.

Common name (*Scientific name*)	ESA listing status in Hawaii	Occurrence in Hawaii
Olive riddle sea turtle (*Lepidochelys olivacea*)	Threatened	No nesting or foraging grounds in Hawaii. Infrequently sighted while traveling between nesting and foraging habitats.
North Pacific loggerhead (*Caretta caretta*)	Endangered DPS in Hawaii	No nesting or foraging grounds in Hawaii. Infrequently sighted while traveling between nesting and foraging habitats.
Listed Marine Mammals		
Hawaiian monk seal (*Neomonachus schauinslandi*)	Endangered	Endemic tropical seal. Occurs throughout the archipelago. Population trend uncertain; no mortality or serious injuries attributed to MHI bottomfish fishery (Carretta et al. 2017).
Blue whale (*Balaenoptera musculus*)	Endangered	No sightings or strandings reported in Hawaii but acoustically recorded off Oahu and Midway Atoll. No record of interactions with the MHI Bottomfish Fishery.
Fin whale (*B. physalus*)	Endangered	Infrequent sightings in Hawaii waters.
Sei whale (*B. borealis*)	Endangered	Worldwide distribution. Primarily found in cold temperate to subpolar latitudes. Rare in Hawaii.
Sperm whale (*Physeter macrocephalus*)	Endangered	Found in tropical to polar waters worldwide. Sighted off the NWHI and the MHI.
MHI insular false killer whale (*Pseudorca crassidens*)	Endangered DPS in Hawaii	Found in waters within 140 km (60 nm) of the MHI.
Listed Sea Birds		
Newell's shearwater (*Puffinus auricularis newelli*)	Threatened	Rare. Breeds only in colonies on the MHI where it is threatened by predators and urban development.
Hawaiian petrel (*Pterodroma phaeopygia*)	Endangered	Rare.
Band-rumped storm-petrel (*Oceanodroma castro*)	Endangered DPS in Hawaii	Rare.
Short-tailed albatross (*Phoebastria albatrus*)	Endangered	Nest in small numbers on Midway Atoll in the NWHI.
Listed Fish		

Common name (*Scientific name*)	ESA listing status in Hawaii	Occurrence in Hawaii
Giant manta ray (*Manta birostris*)	Threatened	Found worldwide in tropical, subtropical, and temperate bodies of water and is commonly found offshore, in oceanic waters, and near productive coastlines.
Oceanic whitetip shark (*Carcharhinus longimanus*)	Threatened	Found worldwide in tropical and sub-tropical waters. They live from the surface of the water to at least 498 feet deep.
Critical Habitat		
Monk seal critical habitat	Endangered	Includes the seafloor and marine habitat to 10 m above the seafloor from the 200 m depth contour through the shoreline and extending into terrestrial habitat 5 m inland from the shoreline between identified boundary points around all islands in the MHI.
MHI insular false killer whale critical habitat	Endangered DPS in Hawaii	Extends from the 45-m depth contour to the 3,200-m depth contour around the MHI from Niihau east to Hawaii.

Source: NOAA Fisheries endangered species website.

Applicable ESA Coordination – Hawaii Deepwater Shrimp Fishery

Section 4.2 lists the applicable ESA consultations and other reviews that are briefly described here.

NMFS evaluated Hawaii crustacean fisheries (including the deepwater shrimp fishery) for potential impacts to ESA-listed marine species under NMFS jurisdiction and documented its conclusions in a BiOp dated March 13, 2008. The BiOp concluded that Hawaii crustacean fisheries are not likely to adversely affect ESA-listed species (NMFS 2008, see Table 21).

In a letter of concurrence covering the FMP for the Crustacean Fisheries of the Western Pacific, dated April 4, 2008, NMFS determined crustacean fisheries of Hawaii that operate in accordance with regulations implementing the FMP, inclusive of the deepwater shrimp fisheries, were not likely to adversely affect ESA-listed species or habitats.

In 2009, the Council recommended, and NMFS approved, the development of five archipelagic-based FEPs, including the Hawaii Archipelago FEP. The FEP incorporated and reorganized elements of the Council's species-based FMPs, including the Crustacean FMP, into spatially-oriented management plans (75 FR 2198, January 14, 2010). All applicable regulations concerning crustacean fishing were retained through the development and implementation of the FEP for the Hawaii Archipelago. No substantial changes to the deepwater shrimp fishery around Hawaii have occurred since the FEP was implemented that have required further consultation.

On September 22, 2011, NMFS and the USFWS determined that the loggerhead sea turtle population (*Caretta caretta*) is composed of nine distinct population segments (DPS) that constitute ''species'' that may be listed as threatened or endangered under the ESA (76 FR

58868). Specifically, NMFS and USFWS determined that the loggerhead sea turtles in the North Pacific Ocean, which includes waters around the Hawaii Archipelago, are a DPS that is endangered and at risk of extinction. The breeding populations of Mexico's olive ridley sea turtles (*Lepidochelys olivacea*) are currently listed as endangered, while all other olive ridley populations are listed as threatened. Leatherback sea turtles (*Dermochelys coriacea*) and hawksbill turtles (*Eretmochelys imbricata*) are also classified as endangered. Additionally, the loggerhead and green sea turtles (Chelonia mydas) in the North Pacific Ocean were recently identified as a DPS listed as endangered.

The green turtle is most commonly seen in the EEZ waters, and hawksbill turtles are known to nest on the Islands of Hawaii and Maui. While the North Pacific DPS of loggerheads may be found in federal waters in the MHI, their occurrence in federal waters where the deepwater shrimp fishery operates is rare. Additionally, there have been no reported or observed incidental take of this species in the history of the fishery. Because neither of the alternatives would modify operations of the Hawaii deepwater shrimp fishery in any way, there is no additional information that would change the conclusions of the 2008 consultation that determined this fishery was not likely to adversely affect ESA-listed species or their habitats.

In 2013, NMFS re-initiated ESA consultation for Hawaii crustacean fisheries in response to the listing of the MHI insular false killer whale DPS as an endangered species under the ESA. The consultation evaluated the effects of all Hawaii crustacean fisheries on all ESA-listed species and designated critical habitat. In a letter of concurrence dated December 5, 2013, NMFS determined that the continued authorization of crustacean fisheries in the Hawaiian Archipelago may affect, but is not likely to adversely affect, endangered or threatened species or designated critical habitat. Specifically, NMFS concluded that effects of the Hawaii crustacean fisheries, inclusive of the deepwater shrimp fishery, are expected to be insignificant, discountable, or beneficial.

On August 21, 2015, NMFS designated critical habitat for the endangered Hawaiian monk seal (80 FR 50926). Specific areas designated include sixteen occupied areas within the range of the species: ten areas in the NWHI and six in the 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. Specific areas designated as monk seal critical habitat in the MHI include marine habitat from the 200 m depth contour line, including the seafloor and all subsurface waters and marine habitat within 10 m of the seafloor, through the water's edge 5 m into the terrestrial environment from the shoreline between identified boundary points on the Islands of: Kaula, Niihau, Kauai, Oahu, Maui Nui (including Kahoolawe, Lanai, Maui, and Molokai), and Hawaii. In areas where critical habitat does not extend inland, the designation ends at a line that marks mean lower low water. The August 21, 2015, final rule designating monk seal critical habitat in the MHI, triggered consultation on the continuation of crustacean fisheries in the Hawaii Archipelago (NMFS 2016a). Given the generalist foraging habits of monk seals, the small number of participants in crustacean fisheries, and the small area fished, potential effects to monk seals were expected to be insignificant. In a memo dated March 1, 2016, the consultation concluded with NMFS' finding that crustacean fisheries are not likely to adversely affect the newly designated Hawaiian monk seal critical habitat because the effects of the fisheries are expected to be discountable or insignificant.

On April 6, 2016, NMFS published a final rule (81 FR 20058) to list 11 DPS of the green sea turtle under the ESA. Based on the best available scientific and commercial data, and after considering comments on the proposed rule, NMFS determined that three DPS are endangered and eight DPS, including the Hawaiian green sea turtle (Central North Pacific DPS), are

threatened. NMFS does not expect the number of green sea turtles taken in the Hawaii deepwater shrimp fishery to change based on the designation of the DPS. The 2016 rule supersedes the 1978 final listing rule for green turtles and applies the existing protective regulations to the DPS. Critical habitat will be considered in future rulemaking. Because the 2008 BiOp analyzed this same population and its ESA status did not change, NMFS did not re-initiate consultation and the conclusions of the 2008 BiOp remain valid with respect to the green turtle DPS.

On September 30, 2016, the USFWS listed the Hawaii DPS of the band-rumped storm-petrel (*Oceanodroma castro*) as an endangered seabird (81 FR 67786). The deepwater shrimp fishery has never reported interactions with this species and interactions are unlikely.

On July 24, 2018, NMFS published a final rule (83 FR 35062) in accordance with the ESA to designate critical habitat for the main Hawaiian Islands insular false killer whale distinct population segment in waters from 45 m to 3,200 m surrounding the MHI. This area encompasses the geographic and depth ranges of the deepwater shrimp fishery in the Hawaii Archipelago. NMFS considered whether the operation of the deepwater shrimp fishery might result in adverse modification of critical habitat by removing potential prey in the immediate vicinity of false killer whales or by contributing to the long-term reduction of prey biomass over the range of the fish stocks that these whales encounter. However, NMFS' review found that the deepwater shrimp fishery does not target prey species for the MHI insular false killer whale distinct DPS. NMFS considered whether the fishery has the potential to interact with bottom habitats or pelagic waters included in the critical habitat designation, but NMFS found that the fishery deploys fishing gear on benthic substrates and is spatially distinct from the critical habitat.

On January 30, 2018, NMFS published a final rule (83 FR 4153) listing oceanic whitetip sharks as threatened species under the ESA. Information for the oceanic whitetip shark is summarized primarily from the 2016 Status Review (Young et al. 2016), the final listing rule, and other sources cited below. Oceanic whitetip sharks are distributed worldwide in epipelagic tropical and subtropical waters between 30° N and 35° S. The species is highly migratory and typically found offshore in deep waters. NMFS has determined that protective regulations under ESA section 4(d) are not necessary or appropriate for the conservation of the species at this time. Accordingly, incidental take of the oceanic whitetip is not prohibited under the ESA section 9. The most recent stock assessment by Tremblay-Boyer et al. (2019) estimated the median current spawning biomass of oceanic whitetip sharks in the western and central Pacific Ocean (WCPO) to be 393 metric tons (t), about 4% of the unfished biomass, and current catch at 2,464 t annually. Based on the most recent assessment, the median estimate of the total size of the oceanic whitetip shark population in the WCPO stock is about 775,000 individuals (NMFS 2020b). The deepwater shrimp fishery operates in areas that are spatially distinct from the oceanic whitetip shark, and NMFS concluded that there is sufficient spatial separation between the subject fishery and shark such that the management and operation of the fishery would have no effect on the species.

On January 22, 2018, NMFS published a final rule (83 FR 2916) listing giant manta rays as threatened species under the ESA. Information for the giant manta ray is summarized primarily from the 2016 Status Review (Miller and Klimovich 2017), the final listing rule, and other sources cited below. NMFS has determined that protective regulations under ESA section 4(d) are not necessary or appropriate for the conservation of the species at this time. Accordingly, incidental take of the manta ray is not prohibited under the ESA section 9. The giant manta ray is found worldwide in tropical, subtropical, and temperate bodies of water. It is commonly found offshore, in oceanic waters, and near productive coastlines. The giant manta ray is considered a migratory species, with estimated distances travelled of up to 1,500 km. There are no current or historical

estimates of the global abundance of giant manta ray. Hawaii deepwater shrimp fisheries do not target giant manta rays for meat or gill rakers, and there are no records of giant manta ray incidental captures or entanglements. Giant manta rays feed on plankton (Miller and Klimovich 2017), making it highly improbable that the rays would attempt to prey on the traps used in this fishery, or become entangled in fishing gear. NMFS found no evidence to suggest the potential for interactions between the fishery and giant manta rays because the fishing gear used in this fishery is deployed near or on benthic substrates, and not in pelagic habitat of this ray. Additionally, there are no reported or observed incidental interactions with these rays in the fishery.

In letters of concurrence issued in 2008, 2013, 2016, and 2018, NMFS determined that the Hawaii crustaceans fisheries, inclusive of deepwater shrimp, are not likely to adversely affect any ESA-listed species or result in the adverse modification of critical habitat. In a memorandum to the record dated January 8, 2020, NMFS concluded that the proposed action to implement ACLs and AMs for the Hawaii deepwater shrimp fishery for fishing years 2019 through 2021 would not modify fishery operations in a manner that would be expected to cause an effect on any ESA-listed species or critical habitat that was not considered in prior consultations.

On April 15, 2021, NMFS announced a 90-day finding on a petition to list the shortfin mako shark (*Isurus oxyrinchus*) as threatened or endangered under the ESA and to designate critical habitat concurrent with the listing, so NMFS is initiating a status review of the species to determine whether listing under the ESA is warranted (86 FR 19863). The shortfin mako is a large pelagic shark that occurs across all temperate and tropical ocean waters. Previously, NMFS determined that the shortfin mako shark in the North Pacific Ocean was not overfished or experiencing overfishing based on a 2018 stock assessment (ISC 2018). As a pelagic shark, the shortfin mako is not known to interact with the Hawaii deepwater shrimp fishery. The alternatives under consideration are not expected to change the way the fishery is operated and would not be expected to change the level of interactions with the shortfin mako shark (86 FR 19863) in response to a petition. If the short fin mako shark is listed, NMFS would consult as required under section 7 of the ESA to determine the effects of the fishery on this species.

3.2.1.3.2.2 MMPA-Listed Species

The MMPA prohibits, with certain exceptions, the take of marine mammals in the U.S. EEZ and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. The MMPA authorizes the Secretary of Commerce to protect and conserve all cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals and sea lions, except walruses). The MMPA requires NMFS to prepare and periodically review marine mammal stock assessments. See 16 U.S.C. § 1361, et seq.

Pursuant to the MMPA, NMFS has promulgated specific regulations that govern the incidental take of marine mammals during fishing operations (50 CFR 229). Under Section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries (LOF) that classifies U.S. commercial fisheries into three categories, based on relative frequency of incidental mortality and serious injury to marine mammals in each fishery:

- Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing.
- Category II designates fisheries with occasional serious injuries and mortalities incidental to commercial fishing.
- Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities.

According to the 2022 List of Fisheries (86 FR 43491, August 9, 2021), the Hawaii deepwater shrimp fishery is a Category III fishery. All fisheries, regardless of Category, are required to report every incidental death or injury of a marine mammal that results from commercial operations (50 CFR 229.6). Additional actions are not required for Class III fisheries.

Several non-ESA listed whales, dolphins, and porpoises occur in waters around Hawaii and are protected under provisions of the MMPA. Table 16 provides a list of marine mammals known to occur or reasonably expected to occur in waters around the Hawaiian Archipelago that have the potential to interact with the Hawaii deepwater shrimp fisheries. See Section 4.3 for more information on the MMPA determination.

The deepwater shrimp fishery is not known to have the potential for a large and adverse effect on endangered insular false killer whale DPS. Although these species occur in the area the fishery operates, no reported or observed interactions have occurred. No cetacean entanglements in deepwater shrimp trap lines have been reported or observed to date around Hawaii.

Table 16. Non-ESA-listed marine mammals occurring in waters around Hawaii

Common Name	Scientific Name	Interactions with MHI deepwater shrimp fishery
Blainville's beaked whale	*Mesoplodon densirostris*	No interactions observed or reported.
Bottlenose dolphin	*Tursiops truncatus*	No interactions observed or reported.
Bryde's whale	*Balaenoptera edeni*	No interactions observed or reported.
Common dolphin	*Delphinus delphis*	No interactions observed or reported.
Cuvier's beaked whale	*Ziphius cavirostris*	No interactions observed or reported.
Dall's porpoise	*Phocoenoides dalli*	No interactions observed or reported.
Dwarf sperm whale	*Kogia sima*	No interactions observed or reported.
False killer whale (other than MHI Insular DPS)	*Pseudorca crassidens*	No interactions observed or reported.
Fraser's dolphin	*Lagenodelphis hosei*	No interactions observed or reported.
Humpback whale (other than the western north Pacific DPS)	*Megaptera novaeangliae*	No interactions observed or reported.
Killer whale	*Orcinus orca*	No interactions observed or reported.
Longman's beaked whale	*Indopacetus pacificus*	No interactions observed or reported.
Melon-headed whale	*Peponocephala electra*	No interactions observed or reported.
Minke whale	*B. acutorostrata*	No interactions observed or reported.
Pantropical spotted dolphin	*Stenella attenuate*	No interactions observed or reported.
Pygmy killer whale	*Feresa attenuata*	No interactions observed or reported.
Pygmy sperm whale	*K. breviceps*	No interactions observed or reported.
Risso's dolphin	*Grampus griseus*	No interactions observed or reported.

Common Name	Scientific Name	Interactions with MHI deepwater shrimp fishery
Rough-toothed dolphin	*Steno bredanensis*	No interactions observed or reported.
Short-finned pilot whale	*Globicephala macrorhynchus*	No interactions observed or reported.
Spinner dolphin	*Stenella longirostris*	No interactions observed or reported.
Spotted dolphin	*Stenella attenuata*	No interactions observed or reported.
Striped dolphin	*Stenella coeruleoalba*	No interactions observed or reported.

Source: WPFMC (2021).

On November 28, 2012, NMFS published a final rule (77 FR 70915). to list the Hawaiian insular false killer whale as an endangered DPS under the ESA. On August 7, 2013, NMFS modified the BiOp from March 13, 2008, to address the listing of the MHI insular false killer whale DPS as an endangered species under the ESA and concluded that Hawaii crustacean fisheries are not likely to adversely affect this species.

All Hawaii crustacean fisheries, including the Hawaii deepwater shrimp fishery, are listed as a Category III fisher under Section 118 of the MMPA (86 FR 43491, August 9, 2021). A Category III fishery is one with a low likelihood or no known incidental takings of marine mammals. Participants in Category III fisheries are not required to register in the Marine Mammal Authorization Program prior to engaging in commercial fishing. The proposed action would not change the conduct of the deepwater shrimp fishery in any way and therefore would not introduce impacts not previously considered in prior MMPA determinations and the LOF classification. After reviewing the Hawaii deepwater shrimp fishery in the 2022 LOF, NMFS concluded that all Hawaii Archipelago commercial crustacean fisheries, including the deepwater shrimp fishery, as currently conducted will not affect marine mammals in any manner not considered or authorized by the commercial fishing take exemption under the MMPA.

3.2.1.3.2.3 Seabirds of the Hawaii Archipelago

The MBTA (16 U.S.C. § 703, et seq.) protects a list of nearly 1,100 migratory birds from intentional take. Under the MBTA, it is illegal to intentionally take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any listed migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid federal permit.

Seabirds forage in both State and federal waters, but are not known, and are unlikely to interact with the Hawaii deepwater shrimp fishery. Interactions with the deepwater shrimp fishery are unlikely because of the methods used to deploy and retrieve traps. Deepwater shrimp fishers utilize a drop-line connected to one or more buoys, a bottom-line along which the traps are attached, a brightly colored marker with a counterweight at the surface, and a 10 kg weight attached the join between the drop-line and bottom-line (King 1993). The weighted traps quickly sink beyond the depth of a diving seabird, and traps are rapidly retrieved using the drop-line. The time that bait is within the range of a diving seabird is limited, and the nature of the traps themselves prevent seabirds from accessing the bait or becoming entrapped themselves. There have been no reports of interactions between the Hawaii deepwater shrimp fishery and seabirds.

Seabirds found on and around Hawaii that could potentially interact with local fisheries are listed in Table 17. The endangered short-tailed albatross is a migratory seabird that has nested in the

NWHI and could be present in the waters of the Hawaii Archipelago. Other listed seabirds found in the region are the endangered Hawaiian dark-rumped petrel (*Pterodroma phaeopygia*), the threatened Newell's shearwater (*Puffinus auricularis newelli*), and the endangered band-rumped storm-petrel Hawaii DPS (*Oceanodroma castro*). Non-listed seabirds known to be present in Hawaii and commonly seen in offshore waters include the black-footed albatross (*Phoebastria nigripes*), Laysan albatross (*P. immutabilis*), wedge-tailed (*Puffinus pacificus*), sooty (*P. griseus*) and fleshfooted (*P. carneipes*) shearwaters, as well as the masked (*Sula dactylatra*), brown (*Sula leucogaster*), and red-footed (*Sula sula*) boobies (or gannets). Seabirds forage in both State and federal waters, but they are not known to and are unlikely to interact with the Hawaii deepwater shrimp fishery. There have been no reports of adverse interactions between the Hawaii deepwater shrimp fishery and migratory seabirds.

Table 17. Seabirds occurring in the Hawaii Archipelago.

R/V	Common name	Scientific name
R	Hawaiian petrel	*Pterodroma phaeopygia* (ESA: Endangered)
R	Band-rumped storm-petrel	*Oceanodroma castro* (ESA: Endangered DPS)
R	Newell's shearwater	*Puffinus auricularis newelli* (ESA: Threatened)
V	Short-tailed albatross	*Phoebastria albatrus* (ESA: Endangered)
R	Black-footed albatross	*Ph. nigripes*
R	Laysan albatross	*Ph. immutabilis*
R	Wedge-tailed shearwater	*Puffinus pacificus*
V	Short-tailed shearwater	*Pu. tenuirostris*
R	Christmas shearwater	*Pu. nativitatis*
V	Leach's storm-petrel	*Oceanodroma leucorhoa*
R	Red-footed booby	*Sula*
R	Brown booby	*S. leucogaster*
R	Masked booby	*S. dactylatra*
R	White-tailed tropicbird	*Phaethon lepturus*
R	Red-tailed tropicbird	*P. rubricauda*
R	Great frigatebird	*Fregata minor*
R	Sooty tern	*Onychoprion fuscatus*, formerly *Sterna fuscata*
R	Brown noddy	*Anous stolidus pileatus*
R	Black noddy	*A. minutus melanogenys*
R	White tern / Common fairy-tern	*Gygis alba rothschildi*

Source: Pyle and Pyle (2017).

3.2.1.3.2.4 Effects of the Proposed Action on Protected Species

None of the alternatives proposed are expected to change the conduct of the deepwater shrimp fishery in any manner that would result in interactions with endangered or threatened species or critical habitat in any manner not previously considered in applicable ESA or MMPA consultations.

Alternative 1: No Management Action

In the absence of ACLs and AMs under Alternative 1, NMFS does not expect the Hawaii deepwater shrimp fishery to change in any way that would result in interactions with endangered or threatened species or critical habitat in any manner not previously considered in applicable ESA or MMPA consultations. The fishery was not functionally constrained by the implementation of previous ACLs and catches never approached this limit, so NMFS anticipates that the fishery would continue performing as it has in recent years in the absence of this management.

Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

While Alternative 2 would implement ACLs and a post-season accounting of the catch relative to the ACL, managing the deepwater shrimp fishery using an ACL and AM would not represent a change to fishery management that has been in place since 2012. ACLs and AMs are intended to promote long term sustainability of the fishery stock. The current inability of in-season tracking of catch towards an ACL resulted in the Council not considering an in-season closure. Therefore, regardless of which action alternative is selected, participants in the Hawaii deepwater shrimp fishery would continue to fish as they have in recent years. However, because this fishery is currently sustainably managed and subject to conservation measures in accordance with various resource conservation and management laws, and because no change would occur in the way fishing is conducted, Alternative 2 would not be likely to result in a change to distribution, abundance, reproduction, or survival of ESA-listed species or increase interactions with protected resources. For the same reasons, the action alternative would not result in a change to effects on monk seal critical habitat. If at any time the fishery, environment, or status of a listed species or marine mammal species were to change substantially, or if the fishery were found to be occurring in or near areas that were designated as critical habitat, NMFS would undertake additional consultation as required to comply with requirements of the ESA and the MMPA.

3.2.1.3.3 Habitats and Vulnerable Ecosystems

3.2.1.3.3.1 Effects of the Proposed Action on Essential Fish Habitat and Habitat Areas of Particular Concern

The Magnuson-Stevens Act defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (Magnuson-Stevens Act § 3(10)). This includes the marine areas and their chemical and biological properties that organisms use. Substrate includes sediment, hard bottom, and other structural relief underlying the water column along with their associated biological communities. NMFS approved EFH definitions for deepwater shrimp (Table 18) through an amendment to the Crustaceans FMP in 2008 (73 FR 70603, November 21, 2008). EFH definitions and related provisions for all FMP fishery resources were subsequently carried forward into the respective FEPs.

In addition to and as a subset of EFH, the Council described habitat areas of particular concern (HAPC) based on the following criteria: ecological function of the habitat is important, habitat is sensitive to anthropogenic degradation, development activities are or would stress the habitat, and/or the habitat type is rare. However, there is no HAPC designated for Hawaii deepwater shrimp (Table 18). In considering the potential impacts of a proposed fishery management action on EFH, all designated EFH must be considered.

Table 18. EFH and HAPC for Hawaii Deepwater Shrimp.

Species	EFH	HAPC

Species	EFH	HAPC
Deepwater shrimp (all FEP areas): (*Heterocarpus* spp.)	**Eggs and larvae:** the water column and associated outer reef slopes between 550–700 m. **Juvenile/adults:** the outer reef slopes at depths between 300–700 m.	No HAPC designated for deepwater shrimp.

NMFS does not expect fishing activity under either of the proposed alternatives to change from recent years with respect to gear types used, level of catch or effort, or impacts to target and non-target stocks. Based on previous reviews of the Hawaii deepwater shrimp fishery by NMFS, the fishery is not having an adverse effect on EFH or HAPC. The effect of the proposed management would promote sustainable fishing.

3.2.1.3.3.2 Effects of the Proposed Action on Marine Protected Areas

Harvest of deepwater shrimp is prohibited in Kahoolawe Island Reserve, Papahānaumokuākea Marine National Monument, and in State of Hawaii marine protected areas (MPAs) where and/or when fishing is prohibited. Other areas considered to have sensitive habitat value include areas designated by NMFS and the Council as EFH and HAPC (see above, Section 3.2.1.3.3.1). None of the proposed alternatives would change the way deepwater shrimp fishing is conducted with respect to these MPAs, so continued operation of the fishery under the baseline or action alternatives would not have the potential for adverse effects on any MPAs.

3.2.1.3.3.3 Effects of the Proposed Action on Vulnerable Marine or Coastal Ecosystems

There are several species of precious corals found in Hawaii. These corals occur from relatively shallow water into the mesophotic zone, where light levels are too low to support growth a reef-building corals. These corals are typically grouped into shallow (10-50 fm) and deep (150-750 fm) groups. Black corals in the *Antipathes* and *Myriopathes* genera comprise the shallow group; while pink (*Corallium*), gold (*Callogorgia*, *Calyptrophora*, *Gerardia*, *Kulamanamana*, and *Narella*), and bamboo (*Acanella* and *Lepidisis*) corals make up the deep group. Studies have found that some of the deepwater species may live in the range of two to four thousand years (Roark et al. 2009), which makes them highly susceptible to accidental damage or exploitation. Recent research has also determined that some black coral beds act as habitat for Hawaiian fish, harboring high levels of diversity and abundance (Pyle et al. 2016).

Known precious coral beds in the action area in the MHI are located off the southern shore of Kauai, Oahu (Makapuu and Kaena point), Maui (Auau Channel), Hawaii Island (Keahole point and between Milolii and South Point) (NMFS 2013). The beds off southern Kauai and in the Auau channel are black coral beds, and generally shallower than the depth zone where fishing for deepwater shrimp is conducted.

Neither the no-action nor preferred alternative is expected to change the way in which the Hawaii deepwater shrimp fishery is conducted or its impacts on habitats. Also, the action alternative under consideration would not change regulations that are in place to prevent and minimize adverse effects from fishing, inclusive of deepwater shrimp harvest, on fish habitat. For these reasons, none of the alternatives considered is expected to lead to substantial physical, chemical, or biological alterations to ocean, coral or coastal habitats; or result in impacts to the marine habitat, including areas designated as EFH, HAPC, or unique areas such as MPAs or deep coral ecosystems.

3.2.1.4 Effects of the Proposed Action on the Socio-economic Setting

3.2.1.4.1 Fishing Communities

The Magnuson-Stevens Act defines a fishing community as "a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and fish processors that are based in such communities" (16 U.S.C. § 1802(16)). NMFS further specifies in the National Standard guidelines that a fishing community is "a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and industries (for example, boatyards, ice suppliers, tackle shops)." Magnuson-Stevens Act National Standard 8 requires that conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens Act (including the prevention of overfishing and the rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (a) provide for the sustained participation of such communities and (b) to the extent practicable, minimize adverse economic impacts on such communities.

In 2002, the Council identified each of the islands of Kauai, Niihau, Oahu, Maui, Molokai, Lanai, and Hawaii as a fishing community for the purposes of assessing the effects of fishery conservation and management measures on fishing communities, providing for the sustained participation of such communities, minimizing adverse economic impacts on such communities, and for other purposes under the Magnuson-Stevens Act (WPFMC 2009). The Secretary of Commerce subsequently approved these definitions on August 5, 2003 (68 FR 46112). As a result, for the current proposed action, the fishing communities are each of the seven populated areas. The fishers from these areas who fish for deepwater shrimp could be affected by the management measure, and the related community members that rely on deepwater shrimp would also be indirectly affected through the availability of shrimp species in the short and long-term for sale or consumption. In general, the Hawaii deepwater fishery is considered sustainable, and provides a local source of fresh fish for distribution and consumption. Shrimp fishing activities and consumption are not known be related to public health or safety issues.

3.2.1.4.1.1 Socio-economic Overview

In Hawaii, an intermittent deepwater shrimp fishery began in 1967 (Tagami and Ralston 1988) and continues to vary from year to year with an average of three vessels reporting the catch of deepwater shrimp to the State of Hawaii. Table 4 provides the total and average annual reported commercial landings of deepwater shrimp in Hawaii between 1982 and 2021. Landing information is sometimes summarized in multi-year groupings to protect confidential fishery information, as there have been less than three participants in the fishery during certain years. Individual years in which less than three vessels participated in the fishery cannot be reported.

Any person taking any marine life for commercial purposes in Hawaii is required to obtain a CML from the State of Hawaii and submit monthly reports of all catch to the State Department of Land and Natural Resources, Division of Aquatic Resources. The collection of commercial fishing reports comes through two sources: paper reports received by mail, fax, or PDF copy via e-mail, and reports filed online through the Online Fishing Report system. These data are shared with NMFS and the Council for tracking catches relative to the ACL. In general, the fishery is a pulse fishery in which many years see little to no participation. Within the past 10 years, the Hawaii deepwater shrimp fishery has had seven or fewer issued permits in any given year (see Appendix B). In 2020, there were no federal crustacean permits issued for deepwater shrimp fishing in

Hawaii; however, there were three issued permits for deepwater shrimp fishing in 2021.

While relatively small catches of shrimp have been common in recent years, the fishery has seen more impressive harvests in the past. For example, landings in 1984 and 1989 were approximately 275,000 lb and 270,000 lb, respectively (WPFMC 2008), and represent the highest recorded landings in any given year for which data exist on the fishery. The estimated annual ex-vessel value associated with those totals was more than $1 million each year. NMFS is not aware of any substantial non-commercial activity, inclusive of subsistence, recreational, and cultural fishing, to harvest deepwater shrimp around the Hawaii Archipelago.

According to WPacFIN, the commercial price per pound for deepwater shrimp in Hawaii was $6.32 in 2020, and the average price per pound from 2011 to 2020 was approximately $7.88. The WPacFIN commercial price per pound of deepwater shrimp tracks closely with the price per pound from according to HDAR, whose data show that the average price per pound from 2012 to 2021 was $7.78 (HDAR data request, January 25, 2022, see Appendix E). Based on the recent average annual landings of 8,819 lb from 2019 through 2021 (see Table 4), the annual commercial value of the fishery could be $68,612 or $69,494 based on the average prices per pound from HDAR or WPacFIN, respectively. The 2022 LOF estimates that there are anywhere from three to 10 active fishers in the fishery (86 FR 43491, August 9, 2021), and these fishers could realize anywhere from roughly $6,900 to $23,000 each in average revenue depending on the number of fishers in a given year and the market price for deepwater shrimp.

3.2.1.4.1.2 Effects of the Proposed Action on the Fishing Community

Alternative 1: No Management Action

Under Alternative 1, which is the baseline alternative, the Hawaii deepwater shrimp fishery would not be managed using ACLs, and AMs would not be needed. In the absence of ACL and AMs, NMFS expects that fishing would continue as it has in recent years because previous ACLs never functionally constrained the fishery and catches of the fishery never attained any implemented ACL (see Table 4). Fishers would continue earning roughly the same revenue as in previous years, which could be anywhere from $6,900 to $23,000 depending on the number of active fishers and the price per pound for the species. The fishery would continue to be monitored by HDAR, NMFS, and the Council, with fisheries statistics becoming available approximately six months or longer after the data have been initially collected. A low level of fishery participation would likely continue occurring on an intermittent basis, as observed in recent years.

Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

Under this alternative, NMFS would specify a Hawaii deepwater shrimp ACL of 250,773 lb, on an annual basis for fishing years 2022 through 2025. This ACL is equal to the ABC previously recommended by the Council's SSC. Between 2019 and 2021, the average annual landing of deepwater shrimp was 8,891 lb, which is 3.5% of the proposed ACL. Thus, the proposed ACL is substantially higher than recent landings. Catch would not likely exceed the proposed ACL, and therefore, would not result in a race to fish. Fishery performance would be likely to continue as it has in recent years, and participants of the fishery and the fishing community would not be likely to experience adverse impacts from the proposed action. Fishers would be likely to continue earning roughly the same revenue as in previous years, which could be anywhere from about $6,900 to $23,000 depending on the number of active fishers and the price per pound for the species. Because in-season monitoring, and therefore in-season closure is not possible at this time, the proposed ACL and AM are not expected to change the conduct of the fishery, including types of gear, areas fished, effort, or participation.

If the action alternative is implemented, the AM for the Hawaii deepwater shrimp fishery would require a post-season review of the catch data to determine whether the ACL was exceeded. If the ACL is exceeded and adversely affected deepwater shrimp stocks, NMFS, as recommended by the Council would take action to correct the operational issue that caused the ACL overage. This could include a downward adjustment to the ACL in the subsequent fishing year. Under the current AMs, there is no in-season management measure possible (such as a fishery closure), so fishery participants are not expected to be affected by the management in the event of an ACL overage, even if an ACL were to be adjusted downward. If management changes are needed, NMFS would evaluate the potential environmental impacts of such actions once details become available.

3.3 Precious Coral Fisheries

In general, Pacific Island precious corals share several ecological characteristics in that they lack symbiotic algae in tissues (i.e., ahermatypic), most are found in deep water below the euphotic zone, they are suspension feeders (i.e., they require external water motion to bring them food), and many are fan-shaped to maximize contact surfaces with particles or microplankton.

All precious corals are slow-growing and characterized by low rates of mortality and recruitment. Natural populations are relatively stable, and a wide range of age classes is generally present. These life history characteristics have two important consequences with respect to exploitation. First, the response of the population to exploitation is drawn out over many years. Second, because of the great longevity of individuals and the associated slow rates of turnover in the populations, a long period of reduced fishing effort is required to restore the ability of the stock to produce at the MSY if a stock has been over exploited for several years.

Precious corals MUS are taxonomically classified as members of the phylum Cnidaria, which includes all of the corals, hydroids, jellyfish, and sea anemones. Within the Cnidaria, precious corals are placed in the class Anthozoa, which includes the corals, soft corals, and sea anemones, which are all characterized by having a relatively complicated gut compared with other cnidarians. Living tissues are composed of polyps, each with a mouth surrounded by tentacles. Some species are composed of a single polyp while others are colonies of many polyps.

Within the Anthozoa, precious corals are members of three orders in two subclasses: 1) subclass Octocorallia (or Alcyonaria), order Gorgonacea and 2) subclass Hexacorallia (or Zoantharia), and orders Zoanthidae and Antipathidae. Members of the subclass Octocorallia are characterized by their eight tentacles. All octocorals are colonial, with each colony consisting of numerous polyps growing out of, and constituting the body of, the animal. Octocoral include the pink corals of the genus *Corallium* and the bamboo corals of the genera *Lepidisis* and *Acanella*. Other anthozoans have their tentacles in multiples of six and are thus termed the Hexacorallia, or hexacorals. Hexacorals include gold corals of the order Zoanthidea and black corals of the order Antipathidae.

Red, pink, and bamboo octocorals are of the Order *Gorgonacea*. They are commonly called fan corals because their growth resembles that of a plant, with a main trunk fastened to the substrate, and lateral branching stems which may be in the same plane. Gorgonian colonies are all derived from one another, and they are all one gender. The age at reproductive maturity is 12 to 13 years for *Pleurocorallium secundum* (WPFMC 2008).

Adult pink, bamboo, and gold corals are found in deep water (100–1,500 m) on solid substrate where bottom currents are strong. In contrast, black corals, which also typically occur on solid substrate, generally occur at depths between 9 and 127 m, with *M. ulex* being found even deeper at 326 m (Wagner 2015a). Recent research has indicated that Sites where the substrate was fossil

carbonate were dominated by the slowest-growing corals (including Antipatharia and *K. haumeaae*) as opposed to other species of precious corals (i.e., Corallidae) occurring on historical lava flows (Putts et al. 2019).

Zoanthidea are a small group of hearty, solitary, sometimes colonial, anemone-like anthozoans that lack a skeleton. Gold corals (*Gerardia* sp., *Narella* sp., *Calyptrophora* sp., *Kulamanamana haumeaae*, and *Callogoria gilberti*) are Zoantharian corals that belong to the family Parazoanthus. Many are parasitic species that commonly overgrow other gorgonian corals. *Gerardia* sp. seem to prefer overgrowing the bamboo corals (*Acanella* spp.), but there has been recent documentation of gold coral subsuming black corals (Parrish and Oliver 2020).

The Pacific Islands Region's gold coral fishery is currently dormant. Recent research suggests that the growth rates and age estimates for pink and gold are significantly slower and older than those used in estimating MSY (Roark et al. 2006). Therefore, in 2008, the Council recommended and NMFS implemented a five-year moratorium on the harvest of gold coral in the Western Pacific Region (73 FR 47098, August 13, 2008). On May 29, 2013, the moratorium was extended an additional five years, through June 30, 2018 (78 FR 32181), and the moratorium was extended for five more years on June 14, 2018, through June 30, 2023 (83 FR 27716).

3.3.1 Hawaii Black Coral Fishery, Affected Resources, and Potential Effects

3.3.1.1 Effects of the Proposed Action on the Hawaii Black Coral Fishery

Under either the baseline or the proposed action alternative, NMFS expects the potential effects of this action on the Hawaii black coral fishery to be negligible because the fishery is not expected to change as a result of the proposed ACL or AMs.

Alternative 1: No Management Action

Under this Alternative, the Hawaii fishery for black corals would not be subject to an ACL or AMs in any fishing year from 2022 through 2025. NMFS expects that the fishery would continue its recent trends of low participation and relatively small harvests averaging 697 lb/yr based on fishery performance from recent years (see Table 6). The fishery is not expected to expand under this alternative because ACLs previously implemented for the fishery did not functionally constrain fishers in the absence of an in-season AM and harvests did not increase. Over time, if the fishery were to expand, catches could potentially exceed sustainable levels. This alternative is not consistent with National Standard 1 of the Magnuson-Stevens Act or the FEP and does not provide the level of harvest oversight provided under Alternative 2.

Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

When compared against recent fishing harvests (i.e., the baseline trend), the proposed ACL would be much higher than recent catches (see Table 4). The ACL is considered an acceptable level of catch that would prevent overfishing and provide for long-term sustainability of the stock. The Council developed the ACL using the best available scientific information in a manner that accords with the fishery regulations after considering catches, participation trends, and estimates of the status of the fishery resources. When compared against recent fishing harvests, the proposed ACL would be much higher than recent catches (see Table 3). Based on recent fishery performance, NMFS concludes that it is unlikely that fishery would attain the proposed ACL, the AM would be unlikely to be triggered, and an overage adjustment would not be expected for the deepwater shrimp fishery in any of the fishing years from 2022 through 2025 (see Section 2.2.3). If the most recent three year average total catch exceeds the ACL more than once during 2022 through 2025, it would trigger a re-evaluation of the management of the fishery, thereby

addressing unexpected catch increases over time and ensuring long-term sustainability. Thus, overall, the proposed action would provide more management oversight and help ensure the long-term sustainability of the black coral resource in the Hawaii Archipelago and, therefore, this alternative would promote fishery sustainability to a greater extent than the no-action alternative if the fishery were to expand.

3.3.1.2 Effects of the Proposed Action on Physical Resources

Alternative 1: No Management Action

Fishing for black corals in the Hawaii Archipelago is not known to be adversely affecting air quality, noise, water quality, view planes, or terrestrial resources. This is a small-scale, highly selective fishery that fishes in specific areas designated as black coral beds, and the fishery is not expected to change the way it operates in any way that would result in impacts to physical resources. The fishery does not have adverse effects on unique features of the geographic environment, and the lack of ACLs and AMs under this alternative would not result in adverse effects on such resources as marine protected areas. Because the fishery is not expected to change under Alternative 1 relative to past fishery performance, NMFS does not expect this alternative to result in adverse impacts to physical resources.

Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

Under Alterative 2, current fishing behavior and effort are not expected to change in a manner that would result in impacts to physical resources because typical fishery performance under the proposed ACLs and AMs is known from recent data. Harvest of black corals from the Auau Channel is not known to significantly impact air quality, noise, water quality, view planes, or other terrestrial resources. The fishery does not have adverse effects on unique features of the geographic environment, and the action alternative would not result in adverse effects on such resources as marine protected areas (see Section 3.2.1.3.3).

3.3.1.3 Biological Resources

3.3.1.3.1 Effects of the Proposed Action on Target, Non-Target, and Bycatch Species

Grigg and Opresko (1977) reported 14 species of black coral known to occur in Hawaiian waters. However, commercial fishermen have historically harvested only three species. *Antipathes dichotoma* (recently renamed *A. griggi*) is the most commonly harvested species accounting for almost 90% of commercial harvest, followed by *A. grandis* (10%), and *A. ulex* (recently renamed *Myriopathes ulex*; 1%). The two major species (*A. griggi* and *A. grandis*) are found in coastal waters from Hawaii to Niihau, and their range may extend into the NWHI. Black corals are less abundant in the NWHI, but the majority of coral ecosystems of the NWHI have yet to be explored and additional diversity unique to the NWHI is likely to be discovered (Spalding et al. 2019). *A. griggi* is found at depths from 9 to 110 m, *A. grandis* occurs at depths from 27 to 127 m, and *M. ulex* occurs at depts from 25 to 364 m (Parrish et al. 2020). Within their depth ranges, both species *Antipathes* species can be found highly aggregated on, or under, vertical drop-offs, terraces, or undercut notches. These species coexist on hard substrates within similar geographic, depth, and temperature ranges (Wagner 2015b). Previous estimates of growth rates for *A. dichotoma* and *A. grandis* were 6.42 cm per year and 6.12 cm per year, respectively (Grigg 1976), and moore recent research determined a similar growth rate of 6.61 cm per year for *A. griggi* (Parke et al. 2021). The estimated the size of reproductively mature *A. griggi* colonies to range from 64 to 80 cm, which implies an age at reproduction of 10 to 12.5 years, and reproduction may occur annually (Grigg 1976). A large, six-foot (1.8 m) tall coral tree is estimated to be between 30 and 40 years

old. The oldest black corals observed in the Maui Auau Channel Bed are thought to be 75 years old, and it is believed that black corals may live even longer. Recruitment to the Auau Channel Bed is believed to be relatively consistent, perhaps due to deeper portions of the bed that experience less fishing pressure (Grigg 2001). More recently, concerns have grown regarding decline of recruitment, dwindling population size, and diminishing of larger individuals of black coral; however, recent measurements indicate that more large black corals are being observed, potentially due to less harvest pressure from the fishery in recent years (Parke 2018; Parke et al. 2021).

There are two known major beds of black coral in Hawaii, the Auau Channel Bed located near Maui, Lanai and Molokai, and the bed off of Kauai. A majority of these beds is located in the State waters of Hawaii. However, the larger of the two (i.e., the Auau Channel Bed) extends into the EEZ. Since 1980, virtually all of the black coral harvested around the Hawaii Archipelago has been taken from the Auau Channel Bed, and most of this harvest has been confined to State waters. The Hawaii Department of Land and Natural Resources (DLNR) estimates that about 85% of the black coral harvested is hand-harvested by scuba divers within three miles of the shoreline (WPFMC 2008), perhaps because gear constraints have restricted divers for black coral to relatively shallow waters of 75 m or less (Grigg 2002).

Black coral harvesters employ selective methods when harvesting black corals, including the use of SCUBA gear. Handheld tools are used to remove the black coral from its base rock, and float bags are used to bring the harvested black coral to the surface. Therefore, there is virtually no bycatch in this fishery except species that may be attached to the base of a coral tree.

The current biennial harvest quota for black coral in the Auau Channel is 5,000 kg (11,023 lb), which is associated with the proposed ACL of 2,500 kg (5,512 lb). For the most recent time period (2011-2020), approximately 697 lb of black coral were landed annually (Table 6).

3.3.1.3.1.1 Effects of the Proposed Action on Target, Non-Target, and Bycatch Species

Precious coral fisheries are highly target-specific, and there are no known issues related to non-target or bycatch species.

Alternative 1: No Management Action

Under the no-action alternative, an ACL would not be specified for black coral in Hawaii, and AMs would not be necessary. However, the current harvest quota of 5,000 kg (11,000 lb) for the Auau Channel Established Bed would remain, and regulations that allow for this quota to be harvested over two consecutive fishing years would also remain in place. The average level of black coral harvest under this alternative is expected to continue as it has in recent years, where the average annual catch between 2011 and 2020 is estimated to be 697 lb/yr as shown in Table 6. This level of catch is approximately 8.5% of the MSY (8,250 lb or 3,750 kg) and is sustainable. Thus, NMFS does not expect the fishery to change in any manner that would result in additional impacts to target species since the fishery has not been functionally constrained by the previous ACLs and catch never approached this threshold. Additionally, due to the highly selective nature of the fishery, no impacts to non-target or bycatch species. Catches would continue to be monitored through fisheries monitoring programs administered by HDAR and federal permit programs, and the status of Hawaii black coral would continue to be tracked by the Council and NMFS.

Alternative 2: Implement Council-Recommended ACL (Status Quo/Preferred)

Under this alternative, NMFS would specify an ACL of 2,500 kg (5,512 lb) for black coral in the

Auau Channel Established Bed for fishing years 2022 through 2025. This ACL would be equal to the current harvest quota if it was applied on an annual basis and is 8.5% of the estimated MSY. An ACL set at this level would also be nearly 2,000 lb lower than the SSC-established ABC of 7,500 lb (3,413 kg/yr). Because the ACL would be much higher than recent catches (i.e., 697 lb/yr, see Table 6), NMFS does not expect fishers would attain the ACL in any fishing year from 2022 to 2025. Even if landings exceed the ACL, landings are expected remain below ABC of 7,500 lb and not exceed MSY of 8,250 lb. For this reason, harvests of black coral are expected to remain sustainable under Alternative 2.

The impacts of the implementation of an ACL and AM are expected to be beneficial because it would continue to provide limits to the amount of black coral that may be harvested in Hawaii annually. The inability to conduct in-season monitoring of harvests precludes implementation of in-season measures (such as a fishery closure) to prevent the ACL from being exceeded. The post-season review of catch relative to the proposed ACL is part of the management of the fishery that is intended to prevent black coral stocks from becoming overfished. The additional level of post-season review of black coral harvest provided under the action alternative would grant an enhanced level of management review of the fishery and an opportunity for the Council to refine ACL and AM specifications, as needed. Without an in-season management measure under Alternative 2, fishing for black coral would not change from fishing that would occur under the no-action baseline. Thus, considered alongside the above information, NMFS concludes that there would be no change to effects on biological resources from either alternative.

3.3.1.3.2 Protected Species

As described in Section 3.2.1.3.2, a number of protected species occur in the waters around the Hawaiian Islands, including sea turtles, marine mammals, sharks, and seabirds that are managed under requirements of the Magnuson-Stevens Act, MMPA, ESA, MBTA, and other applicable statutes. The following section describes protected resources that have the potential to interact with the Hawaii black coral fishery. Potential exists for the black coral fishery of the Hawaii Archipelago to interact with these species, but, because of the selective nature of the fishery, interactions with protected species are low. Lists of protected species occurring in the waters surrounding the Hawaii Archipelago are provided in Table 15, Table 16, and Table 17.

3.3.1.3.2.1 Applicable ESA and MMPA Coordination – Hawaii precious coral fisheries

In an informal consultation covering the Western Pacific Precious Corals FMP, dated December 20, 2000, NMFS determined precious coral fisheries of Hawaii that operate in accordance with regulations implementing the FMP were not likely to adversely affect ESA-listed species or their habitats. More recently, a letter of concurrence dated February 4, 2008, stated that the approval and implementation of Amendment 7 to the Precious Corals FMP did not modify fishery operations in a manner that warranted reinitiating consultation.

In 2009, the Council recommended and NMFS approved the development of five archipelagic-based FEPs including the Hawaii Archipelago FEP. The FEP incorporated and reorganized elements of the Council's species-based FMPs, including the Precious Corals FMP, into a spatially-oriented management plan (75 FR 2198, January 14, 2010). All applicable regulations concerning precious coral fishing were retained through the development and implementation of the FEP for the Hawaii Archipelago. No substantial changes to the precious coral fisheries around Hawaii have occurred since the FEP was implemented that have required further consultation.

On September 22, 2011, NMFS and the USFWS determined that the loggerhead sea turtle

population is composed of nine DPS that constitute ‘‘species’’ that may be listed as threatened or endangered under the ESA (76 FR 58868). Specifically, NMFS and USFWS determined that the loggerhead sea turtles in the North Pacific Ocean, which includes waters around the Hawaii Archipelago, are a DPS that is endangered and at risk of extinction.

The North Pacific DPS of loggerheads may be found in Federal waters in the MHI. However, given the low level of participation and selective nature in precious coral fisheries, there have been no reported or observed incidental take of this species in the history of the fishery. Because the proposed action alternative would not modify operations of the Hawaii precious coral fisheries in any way, there is no additional information that would change the conclusions of the 2008 consultation that determined this fishery was not likely to adversely affect ESA-listed species or their habitats.

In 2013, NMFS re-initiated ESA consultation for Hawaii crustacean fisheries in response to the listing of the MHI insular false killer whale DPS as an endangered species under the ESA. The consultation evaluated the effects of all Hawaii precious coral fisheries on all ESA-listed species and designated critical habitat. In a letter of concurrence dated December 5, 2013, NMFS determined that the continued authorization of precious coral fisheries in the Hawaiian Archipelago may affect, but is not likely to adversely affect, endangered or threatened species or designated critical habitat. Specifically, NMFS concluded that effects of the Hawaii precious coral fisheries are expected to be insignificant, discountable, or beneficial.

On August 21, 2015, NMFS designated critical habitat for the endangered Hawaiian monk seal in areas where the Hawaii precious coral fisheries fishes (80 FR 50926). Specific areas designated include sixteen occupied areas within the range of the species: ten areas in the Northwestern Hawaiian Islands and six in the MHI (see Section 3.2.1.3.2). The August 21, 2015, final rule designating monk seal critical habitat in the MHI triggered consultation on the continuation of precious coral fisheries in the Hawaiian Islands Archipelago. Given the generalist foraging habits of monk seals, the small number of participants in precious coral fisheries and the small area fished, potential effects to monk seals were expected to be insignificant. In a memo dated March 1, 2016, the consultation concluded with NMFS’ finding that precious coral fisheries are not likely to adversely affect the newly designated Hawaiian monk seal critical habitat, because the effects of the fisheries are expected to be discountable or insignificant.

On April 6, 2016, (81 FR 20058) NMFS published a final rule to list 11 DPS of the green sea turtle under the ESA. Based on the best available scientific and commercial data, and after considering comments on the proposed rule, NMFS determined that three DPS are endangered and eight DPS, including the Hawaiian green sea turtle (Central North Pacific DPS), are threatened. NMFS does not expect the number of green sea turtles taken in the Hawaii precious coral fisheries to change based on the designation of the DPS. The 2016 rule supersedes the 1978 final listing rule for green turtles and applies the existing protective regulations to the DPS.

On September 30, 2016, the USFWS listed the Hawaii DPS of the band-rumped storm-petrel as an endangered seabird (81 FR 67786). However, due to harvesting techniques, precious coral fisheries do not interact with seabirds.

On July 24, 2018, NMFS designated critical habitat for insular false killer whales from the 45-m depth contour to the 3,200-m depth contour around the MHI from Niihau east to Hawaii (83 FR 35062). This area encompasses the geographic and depth ranges of the precious coral fisheries in the Hawaii Archipelago. NMFS considered whether the operation of the MHI precious coral fisheries might result in adverse modification of critical habitat. NMFS determined that this

fishery might affect prey resources in two ways by removing potential prey in the immediate vicinity of false killer whales and by contributing to the long-term reduction of prey biomass over the range of the fish stocks that these whales encounter. However, NMFS' review found that the precious coral fisheries do not target MHI insular false killer whale prey species. NMFS considered whether the fisheries have the potential to interact with bottom habitats or pelagic waters included in the critical habitat designation. NMFS' review found that the fisheries collect corals on benthic substrates and is spatially distinct from the critical habitat of the MHI insular false killer whale (i.e., waters from 45 to 3,200 m deep around the MHI). NMFS considered whether vessels engaged in the fisheries have the potential to cause an adverse modification to critical habitat. The agency's review concluded that vessels fishing for precious corals that transit to the EEZ would not interact with critical habitat. Based on these findings, on September 18, 2018, NMFS issued a memo for the record that stated that there is no potential for interactions between the precious coral fisheries and critical habitat of the MHI insular false killer whale DPS because of the spatial separation and lack of prey species overlap, so the management and operation of this fishery would have no effect on the critical habitat of this protected species.

On January 30, 2018, NMFS published a final rule listing oceanic whitetip sharks as threatened species under the ESA (83 FR 4153). NMFS issued a memo for the record, dated September 18, 2018, noting that the precious coral fisheries operate in areas that are spatially distinct from the oceanic whitetip shark. Oceanic whitetip sharks live generally in open ocean pelagic waters deeper than 184 m and swim at depths from the surface to 152 m. In contrast, the precious coral fisheries use selective hand harvest methods or submersibles to collect precious corals off the seafloor at depths ranging from 30 to 1,500 m. There are no reports or observed incidental interactions with this shark in the fisheries, and the manner and location in which precious corals are harvested make it highly improbable that oceanic whitetip sharks would be incidentally captured or entangled by fishing operations. NMFS concluded that there is sufficient spatial separation between the fisheries and shark, so the management and operation of the fisheries would have no effect on oceanic whitetip sharks.

On January 22, 2018, NMFS published a final rule listing giant manta rays as threatened species under the ESA (83 FR 2916). NMFS issued a memo for the record, dated September 18, 2018, indicating that, although giant manta rays may occur in the pelagic habitat of the precious coral fishery, this fishery does not target these rays for meat or gill rakers, or incidentally hook or entangle giant manta rays. Further, NMFS found no evidence to suggest the potential for interactions because the fishing gear used in the Hawaii precious coral fishery is deployed near or on benthic substrates, and not in pelagic habitat of this ray. Finally, there are no reported or observed incidental interactions with these rays in the Hawaii precious coral fisheries. For these reasons, NMFS concluded that there is no potential for interactions between the subject fishery and the giant manta ray because their habitat utilization and feeding preferences do not overlap with the fishery, and the agency concluded the management and operation of this fishery would have no effect on the giant manta ray.

In letters of concurrence issued in 2008, 2013, 2016, and 2018, NMFS determined that the Hawaii precious coral fisheries are not likely to adversely affect any ESA-listed species or result in the adverse modification of critical habitat. In a memorandum to the record dated January 8, 2020, NMFS concluded that the proposed action to implement ACLs and AMs for the Hawaii precious coral fisheries for fishing years 2019 through 2021 would not modify fishery operations in a manner that would be expected to cause an effect on any ESA-listed species or critical habitat that was not considered in prior consultations. No substantial changes to the precious coral fisheries around Hawaii have occurred since the memorandum to the record that have required further

consultation.

On April 15, 2021, NMFS announced a 90-day finding on a petition to list the shortfin mako shark as threatened or endangered under the ESA and to designate critical habitat concurrent with the listing, so NMFS is initiating a status review of the species to determine whether listing under the ESA is warranted (86 FR 19863). As a pelagic shark, the shortfin mako is not known to interact with the Hawaii precious coral fisheries. The alternatives under consideration are not expected to change the way the fisheries are operated and would not be expected to change the level of interactions with the shortfin mako shark in response to a petition. If the short fin mako shark is listed, NMFS would consult as required under section 7 of the ESA to determine the effects of the fishery on this species.

On August 9, 2021, NMFS published the final LOF for 2022 (86 FR 43491), which classifies commercial fisheries of the United States into one of three categories based upon the level of serious injury and mortality of marine mammals that occurs incidental to each fishery (see Section 3.2.1.3.2.2). Hawaii precious coral fisheries are listed as a Category III fishery, with a low likelihood or no known incidental takings of marine mammals. The 2022 LOF states that the Hawaii black coral fishery has zero to three active participants, but no participants were recorded in the most recent year of data. NMFS concluded that the Hawaii Archipelago precious coral fisheries, as currently conducted, will not affect marine mammals in any manner not considered or authorized by the commercial fishing take exemption under section 118 of the MMPA.

3.3.1.3.2.2 Effects of the Proposed Action on Protected Species

Neither the no-action nor preferred alternative would modify operations of the Hawaii black coral fishery in a way that would be expected to affect endangered or threatened species or critical habitat in any manner not previously considered in previous ESA or MMPA consultations.

Alternative 1: No Management Action

In the absence of ACLs and AMs under Alternative 1, NMFS does not expect the Hawaii black coral fishery to change in any way that would result in interactions with endangered or threatened species or critical habitat in any manner not previously considered in applicable ESA or MMPA consultations. The fishery was not functionally constrained by the implementation of previous ACLs and catches never approached this limit, so NMFS anticipates that the fishery would continue performing as it has in recent years in the absence of this management.

Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

While Alternative 2 would implement ACLs and a post-season accounting of the catch relative to the ACL, managing the black coral fishery using an ACL and AM would not represent a change to fishery management that has been in place since 2012. ACLs and AMs are intended to promote long term sustainability of the fishery stock. The current inability of in-season tracking of catch towards an ACL resulted in the Council not considering an in-season closure. Therefore, under the action alternative, NMFS expects that participants in the Hawaii deepwater shrimp fishery would continue to fish as they have in recent years. However, because this fishery is currently sustainably managed and subject to conservation measures in accordance with various resource conservation and management laws, and because no change would occur in the way fishing is conducted, Alternative 2 would not be likely to result in a change to distribution, abundance, reproduction, or survival of ESA-listed species or increase interactions with protected resources. For the same reasons, the action alternative would not result in a change to effects on monk seal critical habitat. If at any time the fishery, environment, or status of a listed species or marine

mammal species were to change substantially, or if the fishery were found to be occurring in or near areas that were designated as critical habitat, NMFS would undertake additional consultation as required to comply with requirements of the ESA and the MMPA.

3.3.1.3.3 Habitats and Vulnerable Ecosystems

3.3.1.3.3.1 Essential Fish Habitat and Habitat Areas of Particular Concern

As stated in Section 3.2.1.3.3.1, EFH is defined in the Magnuson-Stevens Act as those waters and substrate that are necessary for fish spawning, breeding, feeding, and growth to maturity. This includes marine areas and their chemical and biological properties that are utilized by inhabiting organisms. Substrate includes sediment, hard bottom, and other structural relief underlying the water column as well as their associated biological communities. In 1999, the Council developed and NMFS approved EFH definitions for MUS of the Precious Corals FMP (Amendment 4) (74 FR 19067, April 19, 1999). EFH definitions and related provisions for all FMP fishery resources were subsequently carried forward into the respective FEPs.

In addition to and as a subset of EFH, the Council described HAPC based on the criteria detailed in Section 3.1.1.3.3.1. For Hawaii black coral, the Auau Channel Established Bed is designated as HAPC (Table 19). In considering the potential impacts of a proposed fishery management action on EFH, all designated EFH must be considered.

Table 19. EFH and HAPC for Hawaii Precious Corals.

MUS	Species Complex	EFH	HAPC
Precious Corals MUS	**Shallow-water precious corals (10-50 fm)**: black coral (*Antipathes griggi*), black coral (*A. grandis*), black coral (*Myriopathes ulex*) **Deep-water precious corals (150–750 fm):** Pink coral (*Pleurocorallium secundum*), pink coral (*Hemicorallium laauense*), gold coral (*Kulamanamana haumeaae*), bamboo coral (*Acanella* spp.)	EFH for precious corals is confined to six known precious coral beds located off Keahole Point, Makapuu, Kaena Point, Wespac bed, Brooks Bank, and 180 Fathom Bank. EFH has also been designated for three beds known for black corals in the MHI between Milolii and South Point on the Big Island, the Auau Channel, and the southern border of Kauai.	For black corals, the Auau Channel has been identified as a HAPC. For deep-water corals, includes the Makapuu bed, Wespac bed, Brooks Banks bed.

NMFS does not expect fishing activity under either the no-action or action alternatives to change from recent years with respect to gear types used, level of catch or effort, or target and non-target stocks. Based on previous reviews of the Hawaii black coral fishery, the fishery is not having an adverse effect on EFH or HAPC. The effect of the proposed management would promote

sustainable fishing.

The Council is currently developing a recommendation that would revise EFH for precious corals in the Hawaii Archipelago by designating several new areas as EFH and precious coral beds. If approved, the outcome of the Council recommendation would require that NMFS implement ACLs and AMs for any newly designated precious coral bed. The specification of management for any precious coral bed not considered in this EA would be subject to a separate environmental review, if necessary, when the changes are recommended by the Council.

3.3.1.3.3.2 Marine Protected Areas

Harvest of black coral is prohibited in Kahoolawe Island Reserve, Papahānaumokuākea Marine National Monument, and in State of Hawaii marine protected areas (MPAs) where and/or when precious coral fishing is prohibited. Other areas considered to have sensitive habitat value include areas designated by NMFS and the Council as EFH and HAPC (see above, Section 3.3.1.3.3.1). The proposed action would not change the way black coral harvest on the Auau Channel Bed is conducted with respect to these MPAs, so continued operation of the fishery under the baseline or action alternatives would not have the potential for adverse effects on any MPAs.

3.3.1.3.3.3 Vulnerable Marine or Coastal Ecosystems

As stated in Section 3.2.1.3.3.3, precious corals themselves represent a vulnerable marine ecosystem. Because NMFS does not expect the proposed action to change the way in which this fishery is conducted or its impacts on habitats, there are no anticipated impacts to precious corals in Hawaii relative to the baseline. Also, the alternative under consideration would not change regulations that are in place to prevent and minimize adverse effects from fishing, inclusive of precious coral harvest, on fish habitat. For these reasons, NMFS does not expect the proposed action to lead to substantial physical, chemical, or biological alterations to ocean, coral or coastal habitats; or result in impacts to the marine habitat, including areas designated as EFH, HAPC, or unique areas such as MPAs or deep coral ecosystems.

3.3.1.4 Socio-economic Setting

3.3.1.4.1 Fishing Communities

As stated in Section 3.2.1.4.1, the Magnuson-Stevens Act defines a fishing community as “a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and fish processors that are based in such communities” (16 U.S.C. § 1802(16)). NMFS further specifies in the National Standard guidelines that a fishing community is “a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and industries (e.g., boatyards, ice suppliers, tackle shops).” Magnuson-Stevens Act National Standard 8 requires that conservation and management measures shall, consistent with the conservation requirements of the Act (including the prevention of overfishing and the rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (a) provide for the sustained participation of such communities and (b) to the extent practicable, minimize adverse economic impacts on such communities.

In 2002, the Council identified each of the islands of Kauai, Niihau, Oahu, Maui, Molokai, Lanai, and Hawaii as a fishing community for the purposes of assessing the effects of fishery conservation and management measures on fishing communities, providing for the sustained participation of such communities, minimizing adverse economic impacts on such communities,

and for other purposes under the Magnuson-Stevens Act (WPFMC 2009). The Secretary of Commerce subsequently approved these definitions on August 5, 2003 (68 FR 46112). As a result, for the current proposed action, the fishing communities are each of the seven populated areas. The fishers from these areas who harvest precious could be affected by the proposed management, and the related community members that utilize precious coral harvests would also be indirectly affected through the availability of black corals. In general, the Hawaii black coral fishery is considered sustainable and is not known be related to public health or safety issues.

3.3.1.4.1.1 Socio-economic Overview

The harvest of black coral from the Auau Channel Bed is highly selective in accordance with federal law (50 CFR 665.264), with fishers primarily using SCUBA gear and handheld tools to gather the resource. Any vessel fishing for Hawaii precious coral MUS in any Hawaii Archipelago precious coral permit area must obtain a permit to do so (50 CFR 665.262). Additionally, there are size restrictions in place for the harvest of black coral (50 CFR 665.265) such that any live black coral harvested from any precious coral permit area must have attained either a minimum stem diameter of 1 inch (2.54 cm), or a minimum height of 48 inches (122 cm). Fishing for coral on the WestPac Bed is not allowed due to its status as refugia.

Recent landings of black coral (i.e., an annual average of 697 lb from 2011 to 2020) have waned from historical harvests (e.g., an annual average of 5,371 lb from 2000 to 2010). Data cannot be reported annually because of the low number of active participants (fewer than three). In every year since 2011, NMFS has only issued one or two Federal permits for fishing precious corals in Hawaii (see Appendix D) except for 2020 and 2021[6]. Therefore, to protect confidential fishery information, landing information is summarized in approximately 10-year intervals and shown in Table 6.

Data summarized from WPacFIN indicate that the Hawaii black coral fishery on the Auau Channel Bed is primarily commercial, with available records showing that anywhere from 83% to 99% of estimated catches being sold. Information on average price per pound for black corals is not available from WPacFIN. However, utilizing estimated commercial catch and estimated commercial value data from WPacFIN in years 1987, 1990-1993, and 1999, black coral may have been sold for anywhere from $15.00 to $25.04 per pound. The data summary suggests that, at that time, the black coral fishery may have had a commercial value ranging from over $15,000 to nearly $144,000 annually. Summarized data provided from an HDAR data request indicate that the average price per pound from 2000 to 2020 was $36.30 with an average annual value of over $86,000 (see Appendix F). Using the recent average catch data from HDAR of 697 lb (Table 6), total fishery revenue could range anywhere from $10,455 to $25,301 annually, depending on the price per pound of deepwater shrimp.

3.3.1.4.1.2 Effects of the Proposed Action on the Fishing Community

Alternative 1: No Management Action

Under the no-action alternative, an ACL would not be specified for black coral in Hawaii. However, the current harvested quota of 5,000 kg (11,023 lb) for the Auau Channel Established Bed would remain. Regulations that allow for this quota to be taken over two consecutive fishing years would also remain in place. Fishery performance under this alternative is expected to remain

[6] The most recent information on active federal permits in the Hawaii precious coral fishery was obtained from the NMFS website for Pacific Islands Permit Holders at https://www.fisheries.noaa.gov/pacific-islands/resources-fishing/pacific-islands-permit-holders#western-pacific-precious-coral, last updated on December 10, 2021.

consistent with recent years since the fishery has never approached the implemented ACL, with an average annual catch between 2011 and 2020 of 697 lb as shown in Table 6. This level of catch is approximately 8.5% of MSY (8,250 lb or 3,750 kg) and is sustainable. Harvest occurs predominantly in State waters, and NMFS has issued up to two or fewer permits in a given year for the fishery from 2011 to 2020 (see Appendix D) and none in 2021. Fishing would continue to be monitored by HDAR and through the federal permitting program, with fisheries statistics becoming available approximately six months or longer after the data has been initially collected.

Alternative 2: Implement Council-Recommended ACL (Status Quo/Preferred)

Under this alternative, NMFS would specify an ACL of 2,500 kg (5,512 lb) for black coral in the Auau Channel Established Bed for fishing years 2022 through 2025 with a post-season AM. This ACL would be equal to the current harvest quota if it was applied on an annual basis and is 67% of the estimated MSY. An ACL set at this level would also be roughly 2,000 lb lower than the SSC-recommended ABC of 7,500 lb (3,413 kg/yr) and over 4,800 lb higher than the recent annual average catch as shown in Table 6. Thus, fishers would continue to realize average revenues from the fishery between $15,000 and $144,000 annually (see Section 3.3.1.4.1.1), Additionally, the fishery had not been functionally constrained by previous ACLs and AMs that lacked the ability to restrict catch in-season. Thus, NMFS expects that the fishery would change its operations in any way, would not attain the ACL, and that the proposed action would have no adverse effects on the fishing community associated with the black coral fishery in the Auau Channel Bed. While recent fishery harvests have been low relative to the proposed ACL, it remains possible, but not highly likely, that the fishery could attain the ACL in fishing years 2022 through 2025. If the fishery does expand in the near future this alternative would provide more benefit to the black corals than Alternative 1 because management would already be in place to help ensure the sustainability of the stock complex.

The AM for Hawaii's black coral fishery would require a post-season review of the catch data to determine whether the ACL was exceeded. If the ACL is exceeded, NMFS, as recommended by the Council would take action to correct the operational issue that caused the ACL overage. This could include a downward adjustment to the ACL in the subsequent fishing year. NMFS cannot speculate on operational measures or the magnitude of the overage adjustment that might be taken since data indicate that the average annual harvest for the fishery has never exceeded the proposed ACL. Therefore, the fishery and environmental impacts of future actions such as changes to the ACL or AM would be evaluated separately.

3.3.2 Hawaii Pink and Bamboo Fishery, Affected Resources, and Potential Effects

3.3.2.1 Effects of the Proposed Action on the Pink and Bamboo Coral Fishery

Fishing for pink and bamboo corals is not currently conducted in the Hawaii Archipelago. Thus, NMFS expects there to be no effects on the Hawaii fishery for pink and bamboo corals from the implementation of the proposed ACLs and AMs under this action. If the fishery does expand while the proposed management is in place, then the implemented ACLs and AMs would help ensure that the fishery remains sustainable.

3.3.2.2 Effects of the Proposed Action on Physical Resources

Harvest of pink and bamboo corals is not known to significantly impact air quality, noise, water quality, view planes, or other terrestrial resources. Fisheries for pink and bamboo corals are not currently active in the Hawaii Archipelago, and NMFS does not expect this to change under any alternative in a manner that would result in impacts to physical resources. The fishery does not

have adverse effects on unique features of the geographic environment or MPAs since the fishery is not currently operational.

3.3.2.3 Effects of the Proposed Action on Biological Resources

3.3.2.3.1 Target, Non-Target, and Bycatch Species

To date, beds of pink and/or bamboo corals have been found in eight locations in the EEZ around Hawaii. This number includes the two most recently discovered beds, one near French Frigate Shoals in the NWHI, and a second on Cross Seamount, approximately 150 nm south of Oahu. Six of the beds have been classified as Established, Conditional, or Refugia beds and have bank-specific harvest quotas assigned (Table 5). The remaining area of the EEZ around Hawaii has been classified as the Hawaii Exploratory Area and is subject to a 1,000 kg/yr harvest quota for all precious corals except black corals, which are subject to a separate quota.

Fishing for pink and bamboo coral is not currently conducted in Hawaii. One company used two one-man submersibles to survey and harvest pink and gold corals at depths between 400 and 500 meters in the MHI during 1999 and 2001, but they did not continue their operations after that time and the actual harvests cannot be reported here because of data confidentiality (WPFMC 2009). In every year since 2011, NMFS has only issued zero to two federal permits for precious coral harvest in Hawaii (see Appendix D), which are assumed to be for the black coral fishery in the Auau Channel.

Currently, a moratorium on gold coral harvest is in place throughout the western Pacific through June 30, 2023 due to uncertainty in estimates the age and growth (83 FR 27716, June 14, 2018). Additionally, fishing is prohibited at Westpac Bed due to its status as a refugium. These prohibitions are functionally equivalent to an ACL of zero.

3.3.2.3.1.1 Effects of the Proposed Action on Target, Non-Target, and Bycatch Species

Alternative 1: No Management Action

Under the no-action alternative, an ACL would not be specified for pink or bamboo precious corals on Established Beds, Conditional Beds, or in the Exploratory Area in Hawaii. However, the current harvest quotas for all Established, Conditional, and Refugia beds, and the quota of 1,000 kg/yr for the Hawaii exploratory area as listed in Table 5 would remain. NMFS expects that the fishery would remain dormant but recognizes that harvests could reinitiate. Additionally, the moratorium prohibiting the harvest of gold coral until June 30, 2023 would also remain in place. Since there has not been a fishery for pink or bamboo corals in Hawaii for over a decade, this alternative would have no effect on any marine resource. Catches, in federal waters, if they were to occur, would be documented through federal fisheries monitoring programs administered by NMFS. While federal permits for precious coral fishing in Hawaii have been issued over the past decade, no fishing has been conducted, and most are assumed to be relevant to the black coral fishery.

Alternative 2: Specify Council recommended ACLs and AMs (Status Quo/Preferred)

Under this alternative, NMFS would specify ACLs for pink and bamboo corals for each Exploratory and Conditional Bed, and in the Hawaii Exploratory Area as shown in Table 3. The ACLs would be identical to the current harvest quotas listed in Table 5 except at the Makapuu Established Bed, where the ACL would be specified at one half of the current two year quota and would be set at 1,000 kg/yr and 250 kg/yr for pink and bamboo coral, respectively. ACLs set at this level would not exceed the estimated MSYs and ABCs shown in Table 11 and Table 12, respectively, and would be sustainable. Additionally, the moratorium prohibiting the harvest of

gold coral until June 30, 2023, and the zero harvest quotas for Westpac bed would also remain in place, serving as a functional equivalent of an ACL of zero.

Under the action alternative, no new monitoring would be implemented. However, a post-season review of the catch data would be conducted as soon as possible after the fishing year to determine whether the ACL was exceeded. If the ACL were to be exceeded, NMFS would take action to correct the operational issue that caused the ACL overage, as recommended by the Council, which could include a downward adjustment to the ACL in the subsequent fishing year. Any change to the management regime from the post-season AM would be subject to a separate environmental review as necessary.

The impacts of implementing these ACLs and AMs are expected to be beneficial even if the fisheries remain inactive because it would continue to impose a limit on the amount of coral that may be harvested annually. While federal permit and reporting requirements are currently in place, and permits have been issued for the Hawaii Exploratory Area, no fishing has been conducted in recent years. If fishing were to occur, NMFS does not anticipate the ACL would be reached, as selective harvesting requirements provide for precision in the amounts harvested. However, the post-season review of catch relative to the proposed ACL is part of fishery management measures intended to prevent precious corals from becoming overfished. The additional level of post-season review of the catch would provide an enhanced level of management review of the fishery compared to Alternative 1 and would provide an opportunity for the Council to refine the implemented ACLs and AMs, as needed.

3.3.2.3.2 Protected Species

Section 3.3.1.3.2 previously described protected resources that have the potential to interact with the Hawaii pink and bamboo coral fisheries and describes applicable ESA and MMPA consultations for the precious coral fisheries of Hawaii. Lists of protected species occurring in the waters surrounding the Hawaii Archipelago are provided in Table 15, Table 16, and Table 17.

3.3.2.3.2.1 Effects of the Proposed Action on Protected Species

Neither alternative considered would modify operations of the Hawaii pink and bamboo coral fisheries in any way that would be expected to affect endangered or threatened species or critical habitat in any manner not previously considered in previous ESA or MMPA consultations.

Alternative 1: No Management Action

Under Alternative 1, NMFS does not expect the Hawaii black coral fishery to change in any way that would result in interactions with endangered or threatened species or critical habitat in any manner not previously considered in applicable ESA or MMPA consultations due to the lack of ACLs and AMs. The fishery was not functionally constrained by the implementation of previous ACLs and catches never approached the ACLs, so NMFS anticipates that the fishery would continue performing as it has in recent years in the absence of this management.

Alternative 2: Implement Council-Recommended ACLs and AMs (Status Quo/Preferred)

While Alternative 2 would implement ACLs and a post-season review of the catch relative to the ACL, the fisheries are currently inactive. Managing the pink and bamboo coral fishery in Hawaii using ACLs and AMs would be an addition to the current fishery management regime of harvest quotas and regulations that is intended to promote long term sustainability of the fishery stocks. Without an in-season fishery closure, participants in the Hawaii pink and bamboo fishery could harvest corals in an unrestricted manner, similar to the baseline. However, because the pink and

bamboo coral fisheries are subject to conservation measures in accordance with various resource conservation and management laws, and because no change would occur resulting from the proposed action to the way fishing is conducted, none of the alternatives, including the preferred alternative, would result in a change to distribution, abundance, reproduction, or survival of ESA-listed species or increase interactions with protected resources. If at any time the fishery, environment, or status of a listed species or marine mammal species were to change substantially, or if the fishery is found to be occurring in or near areas that were designated as critical habitat, NMFS would undertake additional consultation, as required, to comply with requirements of the ESA and the MMPA.

3.3.2.3.3 Habitats and Vulnerable Ecosystems

3.3.2.3.3.1 Essential Fish Habitat and Habitat Areas of Particular Concern

A description of Hawaii precious coral EFH and HAPC is provided in Section 3.3.1.3.3.1 (see Table 19). For Hawaii pink and bamboo coral, EFH is confined to six known precious coral beds located off Keahole Point, Makapuu, Kaena Point, Wespac bed, Brooks Bank, and 180 Fathom Bank. For these deep-water corals, HAPC includes the Makapuu Bed, Wespac Bed, and Brooks Banks Bed (Table 19). NMFS does not expect fishing activity under the proposed action to change from recent years with respect to gear types used, level of catch or effort, or target and non-target stocks. Based on previous reviews of the Hawaii deep-water precious coral fisheries, they are not having an adverse effect on EFH or HAPC. The effect of the proposed management would promote sustainable fishing. As stated previously, if the forthcoming Council recommendation for new precious coral EFH and beds in the Hawaii Archipelago is approved, ACLs and AMs for these areas would be subject to a separate environmental review at such time that the management is recommended by the Council.

Currently, precious coral fisheries only occur in Hawaii, for which the only active fishery is for black coral from the Auau Channel Established Bed. The proposed ACLs and AMs for pink and bamboo coral would not have a direct effect on EFH or HAPC in any of the subject areas because regulations require precious coral fisheries to use only selective gears, such as hand harvest or submersibles or remotely operated vehicle technologies, which are not known to have large adverse effects on EFH or HAPC for any MUS. The proposed action is not expected to result in substantial changes to the way the precious coral fisheries in Hawaii are conducted.

3.3.2.3.3.2 Marine Protected Areas

Harvest of pink and bamboo coral is prohibited in Kahoolawe Island Reserve, Papahānaumokuākea Marine National Monument, and in State of Hawaii marine protected areas (MPAs) where and/or when fishing is prohibited. Other areas considered to have sensitive habitat value include areas designated by NMFS and the Council as EFH and HAPC (see Section 3.2.1.3.3.1). NMFS does not expect the proposed action to change the way pink and bamboo coral harvest is conducted with respect to these MPAs, and these fisheries in Hawaii are currently inactive, so continued operation of the fishery under the baseline or action alternatives would not have the potential for adverse effects on any MPAs.

3.3.2.3.3.3 Vulnerable Marine or Coastal Habitats

As reiterated in Section 3.3.1.3.3.3, precious corals themselves represent a vulnerable marine ecosystem. However, because the fisheries for pink and bamboo corals in the Hawaii Archipelago are currently inactive, and because NMFS does not expect either alternative to change the way in which these fisheries are conducted or its impacts on habitats, there are no anticipated impacts to

precious corals in Hawaii relative to the baseline. Also, the alternatives under consideration would not change regulations that are in place to prevent and minimize adverse effects from fishing, inclusive of precious coral harvest, on fish habitat. For these reasons, neither of the alternatives considered is expected to lead to substantial physical, chemical, or biological alterations to ocean, coral or coastal habitats; or result in impacts to the marine habitat, including areas designated as EFH, HAPC, or unique areas such as MPAs or deep coral ecosystems.

3.3.2.4 Effects of the Proposed Action on Socio-economic Setting

3.3.2.4.1 Fishing Communities

3.3.2.4.1.1 Socio-economic Overview

Harvest operations for Hawaii pink and bamboo coral have not occurred since 2000. In every year since 2011, NMFS has issued zero to two federal permits for fishing precious corals in Hawaii (see Appendix D), and most, if not all, of these permits are assumed to be for the black coral fishery. There are no available landings, revenue, or price data available for pink or bamboo corals in Hawaii, regardless of if they are caught from Established Beds, Conditional Beds, or in the Hawaii Exploratory Area.

3.3.2.4.1.2 Potential Effects of the Proposed Action on the Fishing Community

Alternative 1: No Management Action

Under the no-action alternative, an ACL would not be specified for pink or bamboo precious corals in Hawaii. However, the current harvest quotas for all Established, Conditional and Refugia beds, and the quota of 1,000 kg/yr for the Hawaii exploratory area as listed in Table 5 would remain. Additionally, the moratorium prohibiting the harvest of gold coral until June 30, 2023 would also remain in place. Under this alternative, catches would still be reported under Federal permits reported to NMFS within 72 hours of fishing. In every year since 2011, NMFS has only issued zero to two Federal permits for fishing precious corals in Hawaii (see Appendix D). NMFS concludes that it is possible, but unlikely, for fishing to occur for pink and bamboo coral. Even if the harvest of pink or bamboo corals in the Hawaii Archipelago does resume, fishing is likely to remain at low levels and a federal permit and logbook reports would be required.

Alternative 2: Specify Council recommended ACLs and AMs (Status Quo/Preferred)

Under this alternative, NMFS would implement ACLs and AMs for pink and bamboo corals for each Exploratory and Conditional bed, and the Hawaii Exploratory Area as shown in Table 3. The ACLs would be identical to the current harvest quotas listed in Table 5 except at the Makapuu Established Bed, where the ACL would be implemented at one half of the current two year quota and would be set at 1,000 kg/yr and 250 kg/yr for pink and bamboo coral, respectively. Additionally, the moratorium prohibiting the harvest of gold coral until June 30, 2023 and the zero harvest quotas for Westpac bed would also remain in place, functionally equivalent of an ACL of zero. In every year since 2011, NMFS has only issued one or two Federal permits for fishing precious corals in Hawaii (see Appendix D). Since the ACL would be identical to the harvest quotas under the no action alternative, the effects on fishery participants would be identical to the no action alternative and is not expected to result in a change to the conduct of the fishery including gear types, areas fished, effort, or participation.

The AM for the Hawaii precious coral fishery would require a post-season review of the catch data to determine whether the ACL was exceeded. If the ACL is exceeded, NMFS, as recommended by the Council would take action to correct the operational issue that caused the ACL overage. This could include a downward adjustment to the ACL in the subsequent fishing

year. NMFS cannot speculate on operational measures or the magnitude of the overage adjustment that might be taken. Therefore, the fishery and environmental impacts of future actions such as changes to the ACL or AM would be evaluated separately, once details are available.

3.4 Fishery Administration and Enforcement

3.4.1 Federal Agencies and the Council

The Council, in accordance with the FEPs, currently manages fisheries in federal waters, and the NMFS Pacific Islands Regional Office (PIRO) is responsible for implementing and enforcing fishery regulations that implement the FEPs. NMFS PIFSC conducts research and reviews fishery data provided through logbooks and fishery monitoring systems administered by state and territorial resource management agencies. The Council, PIRO, and PIFSC collaborate with local agencies in the administration of fisheries of the Western Pacific region through other activities, including coordinating meetings, conducting research, developing information, processing fishery management actions, training fishery participants, and conducting educational and outreach activities for the benefit of fishery communities. The NOAA Office of Law Enforcement (OLE) and the U.S. Coast Guard (USCG) enforce Federal fisheries rules. They may conduct enforcement activities through patrols both on and off the water, and they also conduct criminal and civil investigations. The Enforcement Section of the NOAA Office of General Counsel provides legal support to OLE and other NOAA offices and prosecutes cases.

The proposed ACLs and AMs for the Hawaii deepwater shrimp and precious coral fisheries would not require a change to monitoring or the collection of fishery data. However, monitoring of catch data towards an ACL would be conducted by PIFSC in collaboration with HDAR, which NMFS expects to result in improved timeliness in processing species-specific catch reporting on an annual basis. No changes to the role of law enforcement agents or the USCG would be required in association with implementing the proposed action. Costs associated with the management of these fisheries under the proposed action would be similar to management from recent years. The implementation of ACLs and AMs would not result in any change to the fisheries that would require additional administrative action or enforcement. Additionally, federal law requires the Council-appointed FEP plan team to prepare an annual report (i.e., the annual stock assessment and fishery evaluation, or SAFE, report; e.g., WPFMC 2021) on the performance of all federal fisheries, including Hawaii deepwater shrimp and precious coral fisheries, by June 30 of each year. The report must contain, among other things, recommendations for Council action and an assessment of the urgency and effects of such actions. The SAFE report would continue to be developed with details on fishery performance regardless of the implementation of this action.

3.4.2 Local Agencies

Currently, HDAR is responsible for the conservation and management of fishery resources around the Hawaii Archipelago. HDAR monitors catches through licenses and fishery data collection programs, conducts surveys of fishers and scientific surveys of fish stocks, establishes and manages MPAs, provides outreach and educational services, serves on technical committees, and enforces local and federal resource laws through Joint Enforcement Agreements (JEAs), among other responsibilities. The implementation of ACLs and AMs for the deepwater shrimp and precious coral fisheries of Hawaii is not expected to result in changes to fishery monitoring by HDAR. Monitoring of catch data for ACL purposes would continue to be conducted by PIFSC in collaboration with HDAR, and the requirements to conduct a post-season review of catches relative to the ACLs are expected to result in improved timeliness in processing species specific catch reporting on an annual basis. No change to enforcement activities would be required in

association with implementing these ACLs and AMs because there is no in-season AM or fishery closure recommended for any of the areas. Additionally, implementation of the ACLs and AMs would not result in any change to any fishery and therefore, the proposed action would not result in additional responsibilities for HDAR.

3.4.3 Other Related Management Actions in Hawaii

In addition to the ACLs and AMs for the Hawaii deepwater shrimp and precious coral fisheries, NMFS intends to implement the Council's ACL and AM recommendations for all other Hawaii fisheries in the FEP including Deep 7 bottomfish, non-Deep 7 bottomfish, and Kona crab. These fisheries have been managed using ACLs and AMs since 2012; these specifications do not have unknown or uncertain impacts, and do not interact with the deepwater shrimp or precious coral fisheries in any way. These fisheries do not overlap to a large extent such that ACLs and AMs in the subject fishery would result in more fishing in other fisheries (NMFS 2015; NMFS 2016b; NMFS 2017). For these reasons, the effects of the proposed action (i.e., implementing the ACLs and AMs for Hawaii deepwater shrimp fisheries) can be considered separately from the implementation of ACLs and AMs for other FEP fisheries in the Hawaii Archipelago.

3.5 Additional Considerations

3.5.1 Potential for Controversy

The Council developed the proposed action for implementation by NMFS via a public process in accordance with the Magnuson-Stevens Act, implementing regulations, the Hawaii Archipelago FEP, and other applicable statutes. NMFS and the Council's SSC determined the most recent calculations of the ABC for deepwater shrimp and precious coral to be the best scientific information available, which allows the values to be used in the setting of ACLs for each stock and stock complex consistent with National Standard 2 and the Hawaii Archipelago FEP. The Council worked towards this proposed action, as required by the Magnuson-Stevens Act, in consultation with its advisory bodies, NMFS fishery scientists and managers, and HDAR. The Council used the best scientific information available in the development of this proposed action alongside input from the public during publicly-noticed Council meetings. This public coordination has not revealed significant controversy regarding impacts to the quality of the human environment from this action (Section 3.2.1.4.1 and 3.3.1.4.1). The preferred alternative satisfies regulatory requirements to prevent overfishing while considering the needs of the deepwater shrimp and precious coral fisheries and associated fishing communities by providing an amount of catch that would allow for continued operation of the fisheries as they have in recent years. The Council and NMFS will solicit additional public comments on the potential effects of the proposed action over a 30-day public comment period on the draft EA and associated with this rulemaking.

3.5.2 Public Health and Safety at Sea

Considering the past and current operation of the Hawaii deepwater shrimp and precious coral fisheries, there have been no noted adverse effects on public health and no significant concerns with safety at sea. The fisheries have not typically fostered a "race to fish" since no fishery has ever attained its implemented ACL. NMFS expects this to remain consistent under the preferred alternative for each fishery. Neither the no-action nor preferred alternative is expected to change the fisheries in any manner. Under Alternative 2, the fisheries would not be subject to an in-season closure and no race to fish would occur. Because the proposed action is not expected to result in drastic changes to fishery operations as they are currently, NMFS does not expect the action to result in an increased likelihood for impacts to public health, issues associated with safety at sea,

or a race to fish for deepwater shrimp or precious coral fishers in Hawaii.

3.5.3 Scientific, Historic, Cultural and Archaeological Resources

A number of historical and archaeological resources are found in Federal waters around the Hawaii Archipelago, but there are no known districts, sites, highways, structures, or objects that are listed in or eligible for listing in the National Register of Historic Places in areas where the deepwater shrimp or the precious coral fisheries operate. Shipwrecks may exist in areas where the fisheries operate, but neither fishery is known to adversely affect shipwrecks due to the nature of the trapping gear used for deepwater shrimp fishing and selective gear used for precious coral harvest. While fishing may occur in areas of potential scientific, cultural, or historical interest, the fisheries are not currently known to cause loss or destruction to any such resources, and fishing operations are not expected to significantly change under the implementation either of the alternatives for the proposed action (Sections 3.2.1.3.1 and 3.3.1.3.1). Because the proposed management is not expected to result in changes to the conduct of the fishery that would affect resources of scientific, historic, cultural, or archaeological importance, neither of the alternatives are expected to result in large adverse impacts to these resources.

There are no known fishing koa (traditional fishing grounds) in federal waters where the fisheries operate. Unique scientific resources may occur in MPAs in Hawaii, where fishing activity is restricted by State laws. Fishing is generally restricted in these areas, including fishing for deepwater shrimp and precious corals, so these fisheries would not affect MPAs.

3.5.4 Biodiversity and Ecosystem Function

The action under consideration would have the potential to change any of the fisheries being considered, but changes to the fisheries are not likely and NMFS expects the fisheries to operate and perform as they have in recent years. The Hawaii deepwater shrimp and precious coral fisheries are not currently adversely affecting either biodiversity or ecosystem function, as the stocks continue to be minimally exploited and do not have large and adverse effects on habitats or populations of other fishes as discussed previously (see Section 3.2.1.3). None of the fisheries have known, indirect effects on biodiversity (e.g., through impacts on predator-prey relationships or ecosystem productivity) or ecosystem function. Deepwater shrimp fishing and precious coral harvest are not known to be a vector for introducing or spreading alien species, as and none of the vessels fish outside of the EEZ around Hawaii. The proposed ACLs and AMs would, by promoting sustainability of the fisheries, likely have minor positive short-term and long-term effects on maintaining the stocks and perpetuating their roles in ecosystem function. NMFS and the Council would continue to monitor catch and would adapt management accordingly should new management needs become apparent. Therefore, there would be no potential for the action alternative to result in the introduction of or spread of invasive species, and the continuation of the fisheries under the proposed action would not result in concerns regarding predator-prey relationships or biodiversity.

3.5.5 Highly Uncertain Effects, Unique or Unknown Risks

As authorized by the Magnuson-Stevens Act, the Council and NMFS have managed the deepwater shrimp fishery in Hawaii since 2008 (WPFMC 2008) and the precious coral fisheries since 1979 (WPFMC 1979), and fishery managers and scientists involved in developing the proposed action are highly experienced in terms of understanding the way the fishery operates and the likely outcomes of the proposed measure. The same ACL as proposed under this action was implemented for fishing years 2012 through 2021 with the exception of 2018, so fishery performance is known under the status quo. The proposed action is part of continued management

of the fishery under a system of ACLs and AMs that was first used in 2012. Effects on the human environment of operation and management of the fishery under these management measures are generally known and have been considered in the development and recommendation of the preferred alternative.

Analysis of the proposed management action includes consideration of the best scientific information available and authorized and expected levels of catch. Because catches for each fishery have not approached the previously-implemented ACLs, which are identical to the proposed ACLs, in recent years, uncertainty surrounding the impacts of the action is minimal. The effects of continued fishing for deepwater shrimp and precious corals in Hawaii under the proposed management are understood based on past fishery performance, assessments, and management, and are not highly risky. Risks associated with proposed management are therefore not unique or unknown, and potential outcomes are informed by available scientific information.

3.5.6 Environmental Justice

NMFS considered the effect of the proposed action on environmental justice communities that include members of minority and low-income groups. Overall, the Hawaii deepwater shrimp and precious coral fisheries are not having a large adverse effect on subsistence harvests of marine resources or on the environment or human health in a way that disproportionately affects members of environmental justice communities. NMFS is not aware of subsistence harvests occurring in the deepwater shrimp or precious coral fisheries of the Hawaii Archipelago. The fisheries do not significantly pollute marine waters and, thus, do not have adverse effects to human health or on marine life. The proposed management would apply to everyone that catches deepwater shrimp or precious corals, so it would not disproportionately affect any particular subset of these fisheries. The environmental review in this EA shows that the fisheries would continue to be conducted in the same way that they have in recent years under the baseline and status quo alternatives. Because the fisheries are not expected to change their conduct substantially under the action alternative, implementation of these management measures is not anticipated to result in substantial changes to the fisheries.

Under the no-action alternative, the continued management of deepwater shrimp and precious coral fisheries without ACLs or AMs is not expected to have large adverse environmental effects because, even in the absence of ACLs and AMs, the fisheries of the Western Pacific region are subject to ongoing regulations that help ensure fishing is sustainable. Under the action alternative, the proposed ACLs and AMs would apply to all catches of deepwater shrimp and precious corals by any individual. Fisheries management programs that are currently in place, and management under the action alternative, are intended to provide for sustainability of deepwater shrimp and precious corals. Sustainable fisheries management helps ensure that marine seafood resources and the human communities that rely on their harvest, are properly managed over the short and long-term. Ultimately, the proposed management is not likely result in any large adverse impacts to the environment that could have disproportionately large or adverse effects on members of environmental justice communities in Hawaii. None of the alternatives would have an adverse effect on sustenance harvests if they occur for any fishery.

3.5.7 Potential for Future Precedent

Implementing management under the proposed action would not establish a precedent for future actions with significant effects or represent a decision in principle about future consideration. NMFS is required under the Magnuson-Stevens Act to set ACLs for each fishery using the best scientific information available. NMFS is able to adjust ACLs through subsequent rulemaking, so

implementation of any of these alternatives does not narrow future options for management. In addition, these fisheries have been managed under ACLs and AMs since 2012 by NMFS and the Council except for fishing year 2018. The proposed ACLs and AMs would not result in changes to the way any of the fisheries are conducted. Furthermore, because the proposed action is intended to and will support ongoing management in fisheries that are considered sustainable, and because the specifications would not result in effects to resources that are having high and adverse effects on stocks, the proposed action would not affect the Council or NMFS' ability to establish effective ACLs or AMs in the future. Similarly, neither alternative has the potential to result in an irretrievable or irreversible effect on the environment. Thus, the proposed action would not establish a precedent with potential for significant adverse effect or represent a decision in principle about a future consideration.

3.5.8 Climate Change

Changes in the environment from global climate change have the potential to affect deepwater shrimp and precious coral fisheries. Effects of climate change may include sea level rise, increased intensity or frequency of coastal storms and storm surges, changes in rainfall (more or less) that can affect salinity nearshore or increase storm runoff and pollutant discharges into the marine environment, increased temperatures resulting in coral bleaching, and hypothermic responses in some marine species (IPCC 2007). The effects from climate change may occur slowly and be difficult to discern from other effects. Climate change has the potential to adversely affect some organisms, while others could benefit from changes in the environment. Increased carbon dioxide uptake can increase ocean acidity, which can disrupt calcium uptake processes in corals, crustaceans, mollusk, reef-building algae, and plankton, among other organisms (Houghton et al. 2001; The Royal Society 2005; Caldeira and Wickett 2005; Doney 2006; Kleypas et al. 2006). Climate change can also lead to changes in ocean circulation patterns which can affect the availability of prey, migration, survival, and dispersal (Buddemeier et al. 2004). Damage to coastal areas due to storm surge or sea level rises as well as changes to catch rates, migratory patterns, or visible changes to habitats are among the most likely changes. Climate change has the potential to adversely affect some organisms, while others could benefit from changes in the environment. The impacts from climate change may be difficult to discern from other impacts; however, monitoring of physical conditions and biological resources by a number of agencies would continue to occur and would allow fishery managers to continually adjust fishery management regimes in response to changes in the environment.

The efficacy of the proposed management provisions in providing for sustainable levels of fishing for Hawaii deepwater shrimp and precious corals is not expected to be adversely affected by climate change. Under either alternative, fishing would occur as it has been in the recent past. Alternative 1 would implement no ACLs or AMs, and Alternative 2 would implement an ACL for which recent average catch comprises just 3.8% of the proposed limit. As shown in the EA effects analyses above, the ACLs and AMs would not result in a change to any fishery including target species, gear used, areas fished, or effort. This is primarily because there is no in-season management measure (such as a fishery closure) to ensure a fishery does not exceed an ACL. Monitoring of deepwater shrimp and precious coral catches would continue, regardless of which alternative is selected, and if environmental factors were found to be affecting the stocks, management could be adjusted in the future

3.5.8.1 Consideration of Greenhouse Gas Emissions

The Hawaii deepwater shrimp and precious coral fisheries utilizes vessels that are powered by fossil fuels and emit greenhouse gases from fossil fuel combustion. However, because the

proposed management is not expected to result in a change to the manner in which any of the affected fisheries are conducted, this action would not result in a change in greenhouse gas emissions from fishing vessels.

Table 20. Environmental effects of the alternatives for the proposed action.

Topic/Section	Alternative 1: No Management Action (Baseline)	Alternative 2: Implement the Council-Recommended ACLs and AMs (Status Quo/Preferred)
Overview of the Alternative:	NMFS would not implement ACLs or AMs for the deepwater shrimp or precious coral fisheries of the Hawaii Archipelago.	NMFS would implement ACLs and AMs for fishing years 2022-2025 equivalent to those recommended by the Council and determined from the SSC's previously-calculated ABCs.
Expected Fishery Outcome of Alternative:	NMFS expects that the fisheries would continue operating as they have in recent years, and catches would continue to be monitored through HDAR.	Based on available fishery performance data, none of the fisheries are expected to attain the proposed ACLs and AMs, and NMFS expects the fisheries to continue operating as they have in recent years. If the fisheries expand in the near future, the proposed ACLs and AMs would help NMFS monitor the fisheries and evaluate harvest relative to the baseline.
3.2.1.1, 3.3.1.1, and 3.3.2.1 Effects on the Fisheries (See also Effects on the Socio-economic Setting, Sections 3.2.1.4, 3.3.1.4, and 3.3.2.4)		
Location, gear, participation, effort, seasonality	The deepwater shrimp fishery harvests its catch from benthic deepwater habitats around the Hawaiian Islands. The precious coral fisheries tend to focus on specific areas designated as precious coral beds in nearshore deep waters of the main Hawaiian Islands. Distribution of harvest of these species in federal waters versus state waters is unknown, but most catch is assumed to be sourced from state waters, especially in the precious coral fishery where most of the area designated as coral beds are situated in state waters. There is no available information on seasonality in the fisheries, but each fishery is relatively inactive. Alt. 1 would not result in a change to the fishery with respect to location, gear, participation, effort, or seasonality.	The proposed ACLs are less than MSY but much higher than recent average catch for the Hawaii deepwater shrimp and precious coral fisheries. The implementation of the proposed ACLs and AMs, which are identical to the most recently implemented ACLs and AMs for the fisheries, are likely to continue operating as they have in recent years since the fisheries are not functionally constrained by the management in their current state. Because there are no expected changes to the fisheries or their operations under this alternative, NMFS does not expect any difference in impacts from Alt. 1. If the fisheries were to notably expand in the future, the proposed ACLs and AMs would ensure that the harvest of these species continues sustainably. Overall, NMFS does not expect any effects on location, gear, participation, effort, or seasonality as a result of the proposed ACLs and AMs under Alt. 2.
3.2.1.2, 3.3.1.2, and 3.3.2.2 Effects on Physical Resources		

Topic/Section	Alternative 1: No Management Action (Baseline)	Alternative 2: Implement the Council-Recommended ACLs and AMs (Status Quo/Preferred)
Effects on air and water quality, noise, and view planes	The deepwater shrimp and precious coral fisheries of the Hawaii Archipelago are not known to significantly impact air quality, noise, water quality, view planes, or other terrestrial resources.	No change from baseline.
Effects on unique features of the geographic environment	The fisheries do not have adverse effects on unique features of the geographic environment, and neither of the alternatives would result in adverse effects on such resources as marine protected areas.	No change from baseline.
3.2.1.3, 3.3.1.3, and 3.3.2.3 Effects on Biological Resources		
Target stocks	Each stock would not be managed under an ACL or AM for 2022 through 2025. Despite the lack of ACLs, NMFS does not expect catches to increase under Alt. 1 because the previous ACLs were not functionally restricting the fisheries and average annual catch has remained just a fraction of those previous ACLs. Thus, there would be no expected increase in impacts to deepwater shrimp or precious coral stocks around Hawaii under this alternative. If the fisheries were to expand, overfishing would not be restricted in years of high catch.	Each stock would be managed under the same ACLs and AMs as previously specified for 2019 through 2021. There would not be functional constraints to catch to promote sustainability due to the lack of an in-season AM. Additionally, recent average annual catches for the fisheries have not approached the proposed ACLs. If the fisheries were to expand, the ACLs and AMs would help NMFS monitor the fisheries to determine if more appropriate management measures are necessary.
Non-target and bycatch	Under this alternative, fishery effects on non-target stocks are expected to continue at low levels because fishing for shrimp uses specialized traps and fishing for precious corals is very target-specific, and there has been extremely low recorded bycatch in the fisheries in recent years.	No change from baseline.
Protected species	The fisheries are known to have limited level of interactions with protected species and operates within existing ESA and MMPA authorizations. The Hawaii deepwater shrimp and precious coral fisheries are Category III fisheries under the MMPA (remote likelihood or no known incidental mortality and serious injury of marine mammals). The fishery is not adversely interacting with seabirds.	No change from baseline.

Topic/Section	Alternative 1: No Management Action (Baseline)	Alternative 2: Implement the Council-Recommended ACLs and AMs (Status Quo/Preferred)
Critical habitat	NMFS has designated critical habitat for several species in the waters around the Hawaii Archipelago. NMFS previously determined that MHI crustacean and precious coral fisheries may affect but are not likely to adversely affect designated critical habitat. This determination was re-affirmed in a 2018 Letter of Concurrence that determined that neither fishery is likely to result in the adverse modification of critical habitat not considered in prior consultations.	No change from baseline.
EFH/HAPC	The Hawaii deepwater shrimp fishery uses specialized traps, and the Hawaii precious coral fisheries uses selective gear such as hand picking or submersibles. Neither fishery is known to have adverse effects on habitats including EFH or HAPC, and the fisheries are not expected to change under Alt. 1. The fisheries do not operate in areas closed to fishing.	No change from baseline.
Effects on other vulnerable marine or coastal ecosystems including deep coral ecosystems	There are several species of precious corals found around the MHI. In the absence of ACLs and AMs being implemented by NMFS, the fisheries are not expected to change how they are conducted or their impacts on coral habitat. Alt. 1 would not change regulations that are in place to prevent and minimize adverse effects from fishing on habitat. Thus, there are no anticipated impacts to precious corals in Hawaii relative to the affects from recent years. The fisheries are not otherwise known to be adversely affecting other vulnerable coastal ecosystems.	No change from baseline.
3.1.1.4, 3.2.1.4, and 3.2.2.4 Effects on the Socio-economic Setting		
Fishery revenue	NMFS expects fishing levels to continue similar to recent years, and commercial fishers would realize $68,612 to $69,494 in total revenue from the deepwater shrimp fishery, from $10,455 to $25,301 in total revenue from the black coral fishery, and $0 from the pink and bamboo coral fishery and precious coral fisheries in the Hawaii Exploratory Area if catch remains consistent with recent average annual fishery performance.	No change from baseline. If the fisheries expand in any fishing year from 2022-2025, there may be a commensurate increase in revenue. The lack of an in-season AM would preclude the fisheries from being constrained by the proposed ACLs.

Topic/Section	Alternative 1: No Management Action (Baseline)	Alternative 2: Implement the Council-Recommended ACLs and AMs (Status Quo/Preferred)
Fishing community	The affected fishing community is comprised of people from the main Hawaiian Islands, which includes fishers, vendors/dealers, and consumers. Neither deepwater shrimp nor precious corals are important for recreational or subsistence uses, but the fisheries do support jobs and provide revenue for participating fishers. NMFS expects no potential change from recent management under Alt 1.	No change from baseline. If the fisheries expand in any fishing year from 2022-2025, the implementation of ACLs and AMs may help the NMFS, the Council, and the State monitor the fisheries and evaluate harvests.
3.4 Fishery Administration and Enforcement		
NMFS management	NMFS would not implement ACLs or AMs for the fisheries but would continue to participate in annual fishery monitoring with the Council. NMFS would continue managing the fishery consistent with the Magnuson-Stevens Act and Hawaii Archipelago FEP requirements.	NMFS would implement the same ACLs and AMs as implemented previously and would continue to participate in annual fishery monitoring with the Council. NMFS would continue managing the fishery consistent with Magnuson-Stevens Act and Hawaii Archipelago FEP requirements. Additional administrative costs may be required to implement a post-season overage adjustment.
Council management	The Council would continue to review and report annual deepwater shrimp and precious coral catches in the annual SAFE report for the Hawaii Archipelago.	The Council would continue to review and report annual deepwater shrimp and precious coral catches against the proposed ACL in the annual SAFE report for the Hawaii Archipelago.
State management	HDAR would continue to administer the commercial fish reporting and HMRFS programs and would continue to enforce fishery related laws in state waters and on-shore.	No change from baseline.
Enforcement	NOAA OLE, USCG, and HDAR would continue to enforce fishery regulations around Hawaii.	No change from baseline.
Other related management actions	NMFS implementing ACLs and AMs for Hawaii deepwater shrimp and precious coral fisheries would not impact the implementation of ACLs and AMs for other Hawaii Archipelago FEP fisheries.	No change from baseline.
Fishers' compliance	Fishers would continue to comply with closed fishing areas, state laws, and federal rules regarding destructive fishing practices.	No change from baseline.
3.5 Additional Considerations		
Likelihood effects would be highly controversial	There is no potential for controversy from fishers due to management not being implemented to restrict the fisheries.	There is no potential for controversy from fishermen due the same management being implement as previously for 2019 through 2021.

Topic/Section	Alternative 1: No Management Action (Baseline)	Alternative 2: Implement the Council-Recommended ACLs and AMs (Status Quo/Preferred)
Effects on public health or safety at sea	Considering the past and current operation of the Hawaii deepwater shrimp and precious coral fisheries, there have been no noted adverse effects on public health and no significant concerns with safety at sea since the fisheries do not typically foster a "race to fish." Because Alt. 1 is not expected to change the fisheries in any manner, NMFS does not expect it to result in an increased likelihood for impacts to public health or issues associated with safety at sea.	No change from baseline.
Scientific, historic, archaeological, or cultural resources	The fisheries are not known to have an adverse effect on historic, archaeological, or cultural resources.	No change from baseline.
Biodiversity and ecosystem function	Other than effects on deepwater shrimp and precious coral stocks, the fisheries are not known to have large adverse effects on biodiversity or ecosystem function. Fishery managers are not aware of imbalances to ecosystem function from the fisheries.	No change from baseline.
Likelihood the effects on the human environment would be highly uncertain or involve unique or unknown risks	Unlikely. Catches are monitored, and the characteristics of the relatively inactive fisheries are known from previous analyses. The effects of continued fishing for deepwater shrimp and precious corals in Hawaii under an ACL and post-season AM are understood and are not highly risky.	No change from baseline.
Environmental Justice	NMFS is not aware of subsistence harvests occurring in the deepwater shrimp or precious coral fisheries of the Hawaii Archipelago. The fisheries are not having a large adverse effect on subsistence harvests of marine resources or on the environment or human health in a way that disproportionately affects members of environmental justice communities.	No change from baseline.
Would the action under each alternative be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?	No. NMFS would not implement management any management action as required under the Magnuson-Stevens Act, but this would not narrow future choices having to do with either fishery.	No. The Magnuson-Stevens Act and the Hawaii Archipelago FEP require that NMFS implement ACLs and AMs for all MUS on an annual basis. Implementing status quo management would not change this requirement going forward, and this limited-duration management action is intended to benefit deepwater shrimp and precious coral stocks by ensuring sustainable harvest. This alternative would not narrow future choices having to do with the fisheries.

Topic/Section	Alternative 1: No Management Action (Baseline)	Alternative 2: Implement the Council-Recommended ACLs and AMs (Status Quo/Preferred)
Climate change	The fisheries require the use of vessels that are powered by fossil fuels. NMFS does not control the amount of vessel use, but the fisheries are not expected to change their operations in any manner under Alt. 1.	No change from baseline.

5 REFERENCES

Buddemeier, R.W., J.A. Kleypas, and R.B. Aronson. 2004. Coral Reefs and Global Climate Change: Potential Contributions of Climate Change to Stresses on Coral Reef Ecosystems. Pew Center on Global Climate Change, Arlington, VA. 56 pp.

Caldeira, K. and M.E. Wickett. 2005: Ocean model predictions of chemistry changes from carbon dioxide emissions to the atmosphere and ocean. *Journal of Geophysical Research*, 110(C09S04).

Clark, T.A. 1972. Exploration for deep benthic fish and crustacean resources in Hawaii. Hawaii Institute of Marine Biology Technical report, University of Hawaii 29:1-18.

Dailey, M.D. and S. Ralston. 1986. Aspects of the reproductive biology, spatial distribution, growth, and mortality of the deepwater caridean shrimp, *Heterocarpus laevigatus*, in Hawaii. *Fish. Bull. (U.S.) 84*:915-925.

Doney, S.C., 2006: The dangers of ocean acidification. *Scientific American*, 294(3), 58-65.
Eldredge, L.G. 2003. The marine reptiles and mammals of Guam. Micronesica, 35-36:653-60.

Gooding R.M. 1984. Trapping surveys for the deepwater caridean shrimps, *Heterocarpus laevigatus* and *H. ensifer*, in the Northwestern Hawaiian Islands. *Mar. Fish Rev. 46*(2):18-26.

Gooding, R.M., J.J. Polovina and M.D. Dailey. 1988. Observations of deepwater shrimp, *Heterocarpus ensifer*, from a submersible off the Island of Hawaii. *Mar. Fish. Rev., 50*(1):32-39.

Grigg, R.W. 1976. Fishery management of precious and stony corals in Hawaii. UNIHI-SEAGRANT-TR77-03. 48 pp.

Grigg, R.W. 2001. Status of the black coral fishery in Hawaii, 1998. *Pacific Science, 55*:291- 299.

Grigg, R.W. 2002. Precious Corals in Hawaii: Discovery of a New Bed and Revised Management Measures for Existing Beds. *Mar. Fish. Rev. 64*(1):13-20.

Grigg, R.W., 2004. Harvesting impacts and invasion by an alien species decrease estimates of black coral yield off Maui, Hawaii. *Pacific Science, 58*(1), pp.1-6.

Grigg, R. and D. Opresko. 1977. "Order Antipatharia: black corals." Reef and Shore Fauna of Hawaii, B.P. *Bishop Mus. Spec. Pub. 64*(1):242-261.

Houghton, J.T., Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, and D. Xiaosu (Eds.) 2001. *IPCC Third Assessment Report: Climate Change 2001: The Scientific Basis.* Cambridge University Press, Cambridge, UK, 944 pp. [http://www.grida.no/climate/ipcc_tar/wg1/index.htm] [Also see: Summary for Policymakers and Technical Summary, 98 pp.]

IPCC. 2007. Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis.*

Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (Eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

ISC. 2018. Stock Assessment of Shortfin Mako Shark in the North Pacific Ocean Through 2016. International Scientific Committee for Tuna and tuna-like Species in the North Pacific Ocean. 18th Meeting of the ISC, ISC SHARK Working Group. Yeosu, Republic of Korea. 11-16 July, 2018. ISC/18/ANNEX/15. 120pp.

King, M.G. 1993. Deepwater shrimps. pp: 513-538 *In*: A. Wright and L. Hill (Eds). Nearshore Marine Resources of the South Pacific, Suva: Institute of Pacific Studies, Honiara: Forum Fisheries Agency and Halifax: International Centre for Ocean Development.

Kleypas, J.A., R.A. Feely, V.J. Fabry, C. Langdon, C.L. Sabine, and L.L. Robbins, 2006: *Effects of Ocean Acidification on Coral Reefs and Other Marine Calcifiers: a Guide for Future Research*. Workshop Report, National Science Foundation, National Oceanic and Atmospheric Administration, and the U.S. Geological Survey.

Miller, M.H., and C. Klimovich. 2017. Endangered Species Act Status Review Report: Giant Manta Ray (*Manta birostris*) and Reef Manta Ray (*Manta alfredi*). Silver Spring, MD: National Marine Fisheries Service, Office of Protected Resources, 128 pp.

Moffitt, R.B. and F.A. Parrish.1992. Comparison of submersible observed shrimp densities with trap catches of *Heterocarpus laevigatus* in Hawaii. *Fish. Bull., U.S. 90*(3): 476-482.

National Marine Fisheries Service (NMFS). 2008. Biological Opinion under Section 7 of the Endangered Species Act on the effects of implementation of new bottomfishing regulations in Federal waters of the Main Hawaiian Islands (Amendment 14) on listed marine species. Protected Species Division, NMFS PIRO, Honolulu, HI.

NMFS. 2011. Environmental Assessment for Annual Catch Limit Specifications and Accountability Measures for Pacific Islands Crustacean and Precious Coral Fisheries in 2012 and 2013. National Marine Fisheries Service, Pacific Islands Regional Office. December 16, 2011. 182 pp.

NMFS. 2013. Essential Fish Habitat and Consultation. Factsheet, NMFS PIRO, Honolulu, HI. https://www.fpir.noaa.gov/Library/HCD/EFH_and_Consultation_factsheet_FINAL_05-08-2013_lo.pdf.

NMFS. 2015. Environmental Assessment for Specification of an Annual Catch Limit and Accountability Measures for Main Hawaiian Islands Non-Deep 7 Bottomfish Fisheries in Fishing Years 2015 through 2018. NMFS PIRO, Honolulu, HI. 86 pp.

NMFS. 2016a. Potential Impacts of Hawaii Bottomfish, Coral Reef Ecosystem, Crustacean, and Precious Coral Fisheries on the Revised Critical Habitat for the Hawaiian Monk Seal. Biological Evaluation, Protected Resources Division, NMFS PIRO, Honolulu, HI.

NMFS. 2016b. Final Environmental Assessment for Specification of Annual Catch Limits and

Accountability Measures for Main Hawaiian Islands Deep 7 Bottomfish Fisheries in Fishing Years 2015-16, 2016-17, and 2017-18. Pacific Islands Regional Office, Honolulu, HI. 80 pp.

NMFS. 2017. Specification of 2016-2018 Annual Catch Limits and Accountability Measures for Pacific Islands Crustacean and Precious Coral Fisheries (RIN 0648-XE587).

NMFS. 2018. Final Environmental Assessment for Ecosystem Components. Amendment 4 to the Fishery Ecosystem Plan for American Samoa, Amendment 5 to the Fishery Ecosystem Plan for the Mariana Archipelago, Amendment 5 to the Fishery Ecosystem Plan for the Hawaii Archipelago (RIN 0648-BH63).

NMFS. 2020a. Environmental Assessment for Annual Catch Limits and Accountability Measures for Main Hawaiian Islands Kona Crab 2020-2023 (RIN 0648-BJ84).

NMFS. 2020b. ESA Section 7 Consultation on the Continued Operation of the Hawaii Deep-set Longline Fishery Section 7(a)(2) and 7(d) Determinations; Likelihood of Jeopardy and Commitment of Resources during Consultation - Extension. Memo to the Record from M. Tosatto, PIRO Regional Administrator. April 15, 2020. Pacific Islands Regional Office, Honolulu, HI. 12 pp.

Opresko, D.M. 2001. Revision of the antipatharia (Cnidaria: Anthozoa). Part I. Establishment of a new family, Myriopathidae. *Zoologische Mededelingen 75*: 343-370.

Opresko, D.M. 2009. A New Name for the Hawaiian Antipatharian Coral Formerly Known as *Antipathes dichotoma* (Cnidaria: Anthozoa: Antipatharia). *Pacific Science 63*(2): 277-291.

Parrish, F.A., A.R. Baco, C.D. Kelley, S.D. Cairns, and T.F. Hourigan. 2020. Deep-Sea Coral Taxa in the Hawaiian Archipelago and Johnston Atoll: Depth and Geographical Distribution (v. 2020). https://deepseacoraldata.noaa.gov/library/2020-regional-deep-sea-coral-species-list.

Parrish. F.A. and T.A. Oliver. 2020. Comparative observations of current flow, tidal spectra, and scattering strength in and around Hawaiian deep-sea coral patches. *Front. Mar. Sci. 7*: 310.

Parke, M. 2018. Deep Sea Coral Research and Technology Program: Pacific Islands deep-sea coral and sponge 3-year research wrap-up workshop May 23-24, 2018. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-78, 36 p.

Parke, M., C.D. Kelley, M. Putts, V. Moriwaki, S. Bingo, K. Elliot, J. Smith, A. Montgomery, F.A. Parrish, S.E. Khang, A.B. Taylor, B. Roark, and D. Wagner. 2021. Deep-Sea Coral Research and Technology Program: Pacific Islands Deep-Sea Coral and Sponge Initiative Final Report. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-117, 123 p.

Polovina, J. 1993. The lobster and shrimp fisheries in Hawaii. *Mar. Fish. Rev*., *55*(2): 28-33.

Putts, M.R., F.A. Parrish, F.A. Trusdell, and S.E. Kahng. 2019. Structure and development of

Hawaiian deep-water coral communities on Mauna Loa lava flows. *Marine Ecology Progress Series 630*: 69-82.

Pyle, R.L., R. Boland, H. Bolick, B.W. Bowen, C.J. Bradley, C. Kane, R.K. Kosaki, R. Langston, K. Longenecker, A. Montgomery, F.A. Parrish, B.N. Popp, J. Rooney, C.M. Smith, D. Wagner, and H.L. Spalding. 2016. A comprehensive investigation of mesophotic coral ecosystems in the Hawaiian Archipelago. *PeerJ 4*: e2475.

Pyle, R.L. and P. Pyle. 2017. The Birds of the Hawaiian Islands: Occurrence, History, Distribution, and Status. Version 2. Honolulu: B. P. Bishop Museum. http://hbs.bishopmuseum.org/birds/rlp-monograph/.

Ralston, S. 1986. An intensive fishing experiment for the caridean shrimp, *Heterocarpus laevigatus* at Alamagan Island in the Mariana Archipelago. *Fish Bull., U.S. 84*:927-934.

Ralston, S. and D.T. Tagami. 1992. An assessment of the exploitable biomass of *Heterocarpus laevigatus* in the main Hawaiian Islands. Part 1: trapping surveys, depletion experiment, and length structure. *Fish. Bull. 90*(3): 494-504.

Roark, E.B., T.P. Guilderson, R.B. Dunbar, and B.L. Ingram. 2006. Radiocarbon-based ages and growth rates of Hawaiian deep-sea corals. *Marine Ecology Progress Series 327*:1-14.

Roark, E.B., T.P. Guilderson, R.B. Dunbar, S.J. Fallon, and D.A. Mucciarone. 2009. Extreme longevity in proteinaceous deep-sea corals. *Proceedings of the National Academy of Sciences, 106*(13): 5204-5208.

The Royal Society, 2005: *Ocean Acidification Due to Increasing Atmospheric Carbon Dioxide*. The Royal Society, London, 60 pp.

Saunders, W.B. and L.C. Hastie. 1992. Remote camera and trapping survey of the deep-water shrimps *Heterocarpus laevigatus* and *H. ensifer* and the Geryonid Crab *Chaceon granulatus* in Palau. *Mar. Fish, Rev., 54* (1):15–25.

Sinniger, F., O.V. Ocaña, and A.R. Baco. 2013 Diversity of Zoanthids (Anthozoa: Hexacorallia) on Hawaiian Seamounts: Description of the Hawaiian Gold Coral and Additional Zoanthids. *PLOS ONE 8*(1): e52607. https://doi.org/10.1371/journal.pone.0052607.

Struhsaker, P. and D.C. Aasted. 1974. Deepwater shrimp trapping in the Hawaiian Islands. *Mar. Fish. Rev. 36*(10): 24-30.

Tagami, D.T. and S. Barrows. 1988. Deep-sea shrimp trapping for *Heterocarpus laevigatus* in the Hawaiian Archipelago by a commercial fishing vessel. NOAA Technical Memorandum, NOAA-TM-NMFS-SWFC-103, NMFS, 14 pp.

Tagami, D.T. and S. Ralston. 1988. An assessment of exploitable biomass and projection of maximum sustainable yield for *Heterocarpus laevigatus* in the Hawaiian Islands. Southwest Fisheries Center Administration Report H-88-14, 22 pp.

Wagner, D. 2015a. A taxonomic survey of the shallow-water (< 150 m) black corals (Cnidaria: Antipatharia) of the Hawaiian Islands. *Front. Mar. Sci. 2*:24.

Wagner, D. 2015b. The spatial distribution of shallow-water (< 150 m) black corals (Cnidaria: Antipatharia) in the Hawaiian Archipelago. *Mar. Biodivers. Rec. 8*:e54.

Western Pacific Fishery Management Council (WPFMC). 1979. Fishery Management Plan for the Precious Coral Fisheries (and Associated Non Precious Corals) of the Western Pacific Region. Western Pacific Regional Fishery Management Council, Honolulu, Hawaii. 79 pp.

WPFMC. 1983. Final Combined Fishery Management Plan Amendment 1 and Environmental Assessment for the Spiny Lobster Fisheries of the Western Pacific Region. Western Pacific Regional Fishery Management Council, Honolulu, Hawaii. 95 pp.

WPFMC. 2001. A Framework Adjustment to Measures in the Fishery Management Plan for the Precious Coral Fisheries of the Western Pacific Region Regarding Harvest Quotas, Definitions, Size Limits, Gear Restrictions and Bed Classifications, Including an Environmental Assessment and Regulatory Impact Review/Final Regulatory Flexibility Analysis. Western Pacific Regional Fishery Management Council. Honolulu, Hawaii. March 15, 2001.

WPFMC. 2008. Amendment 13 to the Fishery Management Plan for the Crustacean Fisheries of the Western Pacific Region, Management of *Heterocarpus* spp. Fisheries, Including Federal Permit and Reporting Requirements. Western Pacific Regional Fishery Management Council. Honolulu, Hawaii. October 23, 2008.

WPFMC. 2009. Fishery Ecosystem Plan for the Hawaii Archipelago. Western Pacific Regional Fishery Management Council. Honolulu, Hawaii.

WPFMC. 2011. Acceptable Biological Catches, Annual Catch Limits, and Accountability Measures for Miscellaneous Insular Species. Western Pacific Regional Fishery Management Council. Honolulu, Hawaii. October 31, 2011.

WPFMC. 2013. Action Memo for the 152nd Council Meeting. Western Pacific Regional Fishery Management Council, Honolulu, Hawaii.

WPFMC. 2021. Annual Stock Assessment and Fishery Evaluation Report for the Hawaii Archipelago Fishery Ecosystem Plan 2020. Remington, T., Sabater, M., Ishizaki, A. (Eds.), Western Pacific Regional Fishery Management Council. Honolulu, Hawaii. 208 pp.

Young, C.N., J. Carlson, C. Hutt, D. Kobayashi, C.T. McCandless, and J. Wraith. 2016. Status Review report: oceanic whitetip shark (*Carcharhinius longimanus*). Status Review Report, Honolulu, HI: NMFS, Office of Protected Resources. 169 p.

6 DRAFT PROPOSED REGULATIONS (TO BE UPDATED)

7 REGULATORY IMPACT REVIEW (TO BE UPDATED)

APPENDIX A

Hawaii Archipelago Deepwater Shrimp Management Unit Species.

Scientific Name	English Common Name	Local Name
Heterocarpus spp.	deepwater shrimp	NA

APPENDIX B

Hawaii Archipelago Precious Coral Management Unit Species.

Scientific Name	English Common Name	Local Name
Pleurocorallium secundum	pink coral (also called red coral)	NA
Hemicorallium laauense	pink coral (also called red coral)	NA
Kulamanamana haumeaae	gold coral	NA
Acanella spp.	bamboo coral	NA
Antipathes griggi	black coral	NA
Antipathes grandis	black coral	NA
Myriopathes ulex	black coral	NA

APPENDIX C

Summary of available federal logbook data for the deepwater shrimp fishery in Hawaii from 2011 to 2020.

Year	No. of Federal Shrimp Permits Issued[1]	No. of Federal Shrimp Permits Reporting Catch[2]	No. of Trips in MHI EEZ	Total Reported Logbook Shrimp MUS Catch (lb)	Total Reported Logbook Shrimp MUS Release/Discard (lb)
2011	0	0	0	0	0
2012	2	n.d.	n.d.	n.d.	n.d.
2013	7	6	80	10,520	113
2014	6	6	61	11,676	212
2015	5	3	24	13,020	261
2016	5	3	123	39,781	7,257
2017	6	4	27	5,529	74
2018	6	n.d.	n.d.	n.d.	n.d.
2019	2	3	192	23,939	0
2020	0	n.d.	n.d.	n.d.	n.d.

[1] Permit numbers acquired from PIRO SFD unpublished data.
[2] Permits are valid for one year from the date issued, so, for example, permits issued in 2018 may be valid for a

part of 2019. The number of permits reporting catch can therefore be greater than the number issued that year. Source: Annual Stock Assessment and Fishery Evaluation (SAFE) Report for the Hawaii Archipelago FEP 2020 (WPFMC 2021).
Notes: Federal permit and reporting requirements for deepwater shrimp fisheries became effective on June 29, 2009 (74 FR 25650, May 29, 2009); "n.d." = Not disclosed due to data confidentiality rules; "Shrimp MUS" = *Heterocarpus* spp.; "No. of trips in MHI EEZ" used permit number, gear set date to determine unique trips. Total catch and discard statistics include both harvest from trips within the MHI EEZ and outside of the EEZ.

APPENDIX D

Summary of available federal permit data for the precious coral fishery in Hawaii from 2011 to 2020.

Year	Precious Coral Federal Permits
2011	2
2012	2
2013	1
2014	1
2015	1
2016	1
2017	1
2018	1
2019	1
2020	0

APPENDIX E

Summary of available CML revenue data for the deepwater shrimp fishery in Hawaii from 1982 to 2021. Source: HDAR data request, January 25, 2022.

Year(s)	Amount bought (lb)	Value ($)	Average Price ($/lb)
1982–1983	143,021	140,766	$0.98
1984–1985	277,196	424,002	$1.53
1986–1987	12,248	57,336	$4.68
1988–1989	274,027	1,130,522	$4.13
1990–1991	199,374	925,357	$4.64
1992–1993	50,643	248,279	$4.90
1994	77,364	397,362	$5.14
1995	63,777	318,150	$4.99
1996	34,487	170,056	$4.93
1997	22,450	123,402	$5.50
1998	176,324	773,417	$4.39
1999	48,484	240,547	$4.96
2000–2001	10,050	81,118	$8.07
2002–2003	12,036	95,793	$7.96

Year(s)	Amount bought (lb)	Value ($)	Average Price ($/lb)
2004–2005	6,132	44,470	$7.25
2006–2007	422	2,363	$5.60
2008–2011	1,789	9,373	$5.24
2012–2013	12,596	102,397	$8.13
2014–2015	30,541	202,509	$6.63
2016–2017	5,380	41,626	$7.74
2018–2021	10,683	92,164	$8.63

APPENDIX F

Summary of available CML revenue data for the precious coral fishery in Hawaii from 1982 to 2021. Source: HDAR data request, January 25, 2022.

Years (Grouped)	Amount Bought (lb)	Value ($)	Average Amount Bought (lb/yr)	Average Value ($/yr)	Average Price ($/lb)
1982–1989	5,890	87,543	736	10,943	$14.86
1990–1999	28,936	619,295	2,894	61,930	$21.40
2000–2020	50,023	1,815,752	2,382	86,464	$36.30