WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

**ACTION PLAN TEAM WORKING DRAFT**

# Amendment X to the Fishery Ecosystem Plan for Pacific Pelagics Including a Draft Environmental Assessment

## Authorization of Electronic Monitoring as a Monitoring Mechanism in Hawaii and American Samoa Pelagic Longline Fisheries

**Regulatory Identification Number (RIN) 0648-XXXX**

**May 27, 2025**

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**Cover Page**

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**Abstract**

On-board observers have collected fishery-dependent data necessary for management from longline fisheries throughout the Western Pacific region since 2001, but funding constraints are now limiting their use. Observer coverage in the region's largest longline fishery, the Hawaii deep-set longline fishery, is 7% in 2025, down from 13% in 2024, 15% in 2023, and 20% in earlier years. Funding for the observer program in the future is uncertain. Electronic monitoring (EM), using a system of cameras viewing fish processing areas and sensors to measure gear activity on vessels while fishing with post-trip data processing, could be a cost effective way to collect much of the information now collected by human observers. This EM approach has been trialled in Western Pacific longline fisheries since 2009, and has been used as an experimental pilot on 20 vessels in Hawaii longline fisheries since 2017. EM is used operationally in fisheries around the nation and the world. The Western Pacific Fisheries Management Council is considering amending the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region to allow EM information to be used for fisheries management, and will consider alternatives addressing how EM is implemented in the fleet and how future costs are addressed. In total, there are six alternatives being considered, three related to implementation, which the Council will consider as final action at the 203rd meeting in June 2025:

Alternative 1: No action - EM would not be implemented in longline fisheries,
Alternative 2: Implement a mandatory EM program from 2025-2027
- 2.A. implement EM through random vessel selection
- 2.B. prioritize Hawaii shallow-set vessels for EM, then randomly select
- 2.C. prioritize vessels that volunteer, then randomly select

Alternative 3: Implement EM as an optional program from 2025-2027

And three alternatives related to cost allocation and future funding, if an EM program is recommended:

Alternative A: Implement EM with Federal funding from NMFS after 2027 (*preliminary preferred*)
Alternative B: Implement EM with industry partially covering sampling cost by assuming system replacement costs
Alternative C: Implement EM with industry covering all EM sampling costs

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# 1. INTRODUCTION

## 1.1. Background Information

The National Marine Fisheries Service (NMFS) and the Western Pacific Fishery Management Council (Council) manage fishing for pelagic management unit species (PMUS) in the Exclusive Economic Zone (EEZ or federal waters, generally 3-200 nautical miles or nm from shore) around American Samoa, Guam, the Commonwealth of the Northern Mariana Islands (CNMI) and Hawaii, and on the high seas through the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region (Pelagic FEP) as authorized by the Magnuson-Stevens Fishery Conservation and Management Act (MSA Magnuson-Stevens Act; 16 U.S.C. § 1801 *et seq.*).

The Council has promoted the use of electronic technologies (ET) for decades, and became the first in the nation to require vessel monitoring systems (VMS) in 1994. Trials for the electronic reporting (ER) of logbooks in the Hawaii longline fishery started in early 2000s, and ER became mandatory in the Hawaii and American Samoa longline fisheries in 2021. Electronic monitoring (EM) refers to the use of technology, such as cameras and sensors, which may be used to monitor fishing activity through the collection of catch data and/or compliance with regulations. Development of EM in the region started with a Council-funded project in 2009, and subsequent projects led by the Pacific Islands Fisheries Science Center (PIFSC). Several Hawaii longline vessels have voluntarily participated in the EM projects since 2009 with 20 actively participating vessels currently in Hawaii with none in the American Samoa fishery. To date, EM in the Western Pacific region has been a voluntary program dedicated to research and development, not for monitoring under statutory requirements.

In U.S. fisheries managed under the MSA, EM has been applied to improve catch and bycatch accounting through verification of self-reported logbook data. EM systems have used cameras to record the amount and type of fish caught, retained, and discarded. EM can also be used to record incidental encounters with protected species such as turtles, certain species of sharks, mobulids, seabirds, marine mammals, and other animals with statutory protections. EM data footage can be reviewed to confirm compliance, to help ensure that fishermen adhere to regulations, such as gear types, size limits, and seasonal closures. These data help to ensure that catch limits are not exceeded, monitor encounters with protected species, and provide insights into bycatch mitigation.

EM can play a role in satisfying monitoring requirements that apply under domestic and international law, including requirement of the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), the Tuna Conventions Act (IATTC), and the Western and Central Pacific Fisheries Convention Implementation Act (WCPFCIA). EM systems can record bycatch data to monitor the incidental catch of ESA-listed fish, sea turtles, seabirds, or marine mammals, which may be used to assess the impact of fishing practices on these populations.

Under regulations promulgated under the MSA, EM systems can help ensure that catch limits are adhered to by monitoring total catch and bycatch, thereby supporting sustainable fishery

management practices. By documenting adherence to regulations, such as the use of approved gear and methods, EM can help fisheries comply with the MSA's goals of rebuilding overfished stocks and ensuring sustainable practices, including bycatch reduction. By integrating electronic monitoring into the management of fisheries, agencies can better ensure compliance with the ESA, MMPA, MSA, and international requirements, ultimately promoting the conservation of marine ecosystems and the species that inhabit them.

In addition to monitoring statutory requirements, EM systems can collect valuable data on fish populations, habitat conditions, and fishing practices, contributing to better management and conservation efforts. Using EM can reduce the costs associated with deploying human observers, making it more feasible for fisheries to comply with monitoring requirements.

Other fishery management councils have taken action to implement EM and authorize the use of EM by NMFS. The New England Fishery Management Council (NEFMC), North Pacific Fishery Management Council (NPFMC), and the Pacific Fishery Management Council (PFMC) have taken action to authorize the use of EM for statutory monitoring and/or reporting. The NEFMC utilized EM as a provision in setting ACLs and in-season monitoring scheme in conjunction with human observer coverage throughout the fishery under its Groundfish FMP. The NEFMC later amended its Groundfish FMP to implement at-sea EM to complement dockside monitoring. The NPFMC authorized the use of EM as part of its Bering Sea/Aleutian Islands (BSAI) Groundfish FMP and Gulf of Alaska FMP. The NPMFC decision allowed the use of EM for catch estimation on vessels in the EM selection pool and EM as a monitoring tool when fishing individual fishing quotas in multiple areas. The PFMC authorized the use of EM as a replacement for 100% human observer coverage requirement under its Groundfish FMP. The PFMC would also authorize the use of EM to validate logbooks through audits in order to estimate discards at sea.

### 1.1.1. Existing Monitoring and Reporting Requirements for the Hawai‘i and American Samoa Longline Fisheries

Monitoring and reporting requirements in fisheries are essential to ensure the Council and NMFS have the data necessary to effectively manage the fishery and evaluate the impacts of current and potential management measures. This includes assessing whether regulations are meeting biological, ecological, and economic objectives under the Fishery Ecosystem Plans (FEPs).

At a broad level, fisher-dependent information provided by fishermen—paired with fisher-independent data collected by observers and tools like the VMS—forms the backbone of fisheries monitoring and management in the Hawaii and American Samoa Longline Fisheries. This combined dataset allows WPFMC and NMFS to:

- Determine whether changes in management are needed to sustain stock productivity,
- Minimize impacts on protected species,
- Address economic challenges in the fishery, and
- Evaluate the magnitude and distribution of regulatory impacts.

Without this combined information, it would be impossible to assess whether management measures are meeting the objectives of the FEPs or complying with the core requirement of the Magnuson-Stevens Act to prevent overfishing.

#### 1.1.1.1. Key Monitoring Tools in the Fisheries Management Framework

The Pelagics FEP outlines a set of key requirements or tools—permits, VMS, logbooks, dealer records, and at-set observers—which collectively form a monitoring system designed to track fishery activity, enforce compliance, and inform adaptive management. These methods work together for various purposes and management goals including cross referencing each other to ensure data validity. As indicated, these data are needed to monitor the fisheries, determine whether the current management measures are having the intended effects, and evaluate the benefits and costs of changes in management measures. These methods are described in more detail below.

Permits (§ 665.13): Permit information provides a means of assessing the size and characteristics of the fishery and identifying those who might be affected by management measures. This submission addresses information needed on actual fishing activities to determine how different participants might be affected and how stocks and other living marine resources might be affected by changes in regulations governing the fishery.

VMS (§ 665.19): VMS unit installation is also required on longline vessels in the Western Pacific and send periodic reports to NMFS on the position of the vessels. NMFS uses the reports to monitor the vessel's location and activities to enforce area closures. Vessel ID and location are sent passively about each hour but information can be sampled actively using the electronic logbook. Information is also collected from fishery participants who obtain fishing permits and experimental fishing permits from NMFS.

Logbooks (§ 665.14): Electronic logbooks are required for pelagic longline vessels. Operators must report daily catch and effort data within 24 hours, though paper forms may be used if technical issues occur. These data are critical for assessing stock health, as significant changes in catch per unit effort (CPUE) can signal shifts in stock size or structure and may prompt management adjustments. Logbook data are supplemented by dealer reports detailing total weight landed of catch by species. While full catch reporting is required—including bycatch and protected species—observer data remain the most complete and unbiased source for bycatch estimation.

Dealer Records (§ 665.14(g)(1)): Upon request, any fish dealer must immediately provide an authorized officer access to inspect and copy all records of purchases, sales, or other transactions involving western Pacific pelagic MUS taken or handled by longline vessels. Information may include: (i) The name of the vessel involved in each transaction and the owner and operator of the vessel; (ii) The weight, number, and size of each species of fish involved in each transaction; and (iii) Prices paid by the buyer and proceeds to the seller in each transaction.

Observers (§ 665.808): Longline fishing vessels may also be required to carry at-sea observers to collect detailed information on the fishery, including total catch and discards, detailed accounts on interactions with protected resources, compliance with protected species mitigation methods

and gear requirements, biological characteristics of the catch, and economic information such as trip costs. Observers are able to collect more detailed and impartial information than could be expected of fishermen and this information is used to better inform on the impact or effect the fishery is having on protected resources and ensure compliance with applicable laws (e.g. ESA, MMPA, NEPA, RFA).

Table 1. Summary of five key monitoring and management tools used in fisheries and the information they capture.

| Tool | Purpose/Information Captured | Data Type |
|---|---|---|
| **Permits** | Who is fishing and how many participants are authorized. | Fisher-Dependent |
| **VMS** | Where and when fishing activity occurs. | Fisher-Independent |
| **Logbooks** | Catch and effort data; used for quota monitoring. | Fisher-Dependent |
| **Dealer Records** | Retained catch validation and target quota verification. | Fisher-Dependent |
| **Observers** | Protected species and bycatch monitoring; enforcement and regulatory compliance monitoring; also used to audit other data sources. | Fisher-Independent |

Each of the above tools or resulting data sets has its limitations. For example, logbook data consist of fisher-reported data, which historically under-report bycatch, such as sharks and other protected species (Camhi et al. 2009). Dealer data only represent weights of retained species. At-sea observer data provide information on both discarded and retained catch, including subsamples of lengths. Due to cost constraints however, observers are only present on a subset of trips; whereas logbook and dealer data sets provide data from all fishing trips (Carnes et al. 2019). Observers also collect critical data on protected species, gear use, trip economics, and biological samples that are not cross referenced or collected by fishermen.

#### 1.1.1.2. History and Current Status of the PIR Observer Program

As outlined above, at-sea observers are a critical part of the management program in the FEP, collecting information required for fishery management and protected species conservation as required under the Magnuson-Stevens Act, the Endangered Species Act, the Marine Mammal Protection Act and other applicable laws. In addition, observers and the data they collect are required under international conservation and management measures developed by the WCPFC, of which the United States is a member.

The at-sea human observer program, NMFS Pacific Islands Regional Observer Program (PIROP), was originally established to monitor the protected species interactions in the Hawaii longline fishery. The Council in 1991 established a framework procedure for promulgating regulations to prevent harm to protected species under Amendment 3 to the Pelagic Fishery Management Plan (FMP) (Pelagic FMP Amendment 3, WPRFMC, 1991). The Council in 1993 developed a provision to authorize NMFS to implement a mandatory observer program under Amendment 7 to the Pelagic FMP; however, due to timing considerations associated with the 1993 Biological Opinion Incidental Take Statement, the mandatory observer program was implemented pursuant to the Pelagic FMP Amendment 3 framework procedure (58 FR 67699, Dec 22, 1993).

Since 2004, the PIR Observer Program, funded by NMFS, has maintained a target to deploy at-sea observers on 100% of Hawaii shallow-set pelagic longline trips (targeting swordfish) and 20% of longline trips in each the American Samoa and Hawaii deep-set longline fisheries (targeting tuna). These coverage rates were initially prescribed in NMFS ESA biological opinions for Pacific Island longline fisheries. Today, NMFS biological opinions require the agency to deploy observers on longline fishing trips "at levels reliable for estimating protected species interactions."

Starting in 2023, observer program costs increased to a level where PIRO was not able to provide the same level of coverage as it had in previous years, with its available funding allocation. As a result, the target observer coverage rate in the Hawai‘i deep-set longline fishery and the American Samoa longline fishery was reduced from 20 percent to 15 percent and 10 percent respectively. Coverage in the Hawai‘i shallow-set longline fishery was unaffected.

In 2024, continued funding challenges required PIRO to further reduce coverage in the Hawai‘i deep-set longline fishery from 15 to 13 percent. The Hawai‘i deep-set longline fishery was targeted for further reductions because it represents 80 percent of all longline trips and the majority of PIRO's observer costs.

In 2025, NOAA Fisheries' appropriations and budget allocations were insufficient to maintain a 13% observer coverage rate in the Hawai‘i deep-set longline fishery, resulting in a reduction to 7%. Coverage levels of 100% and 10% were maintained in the Hawai‘i shallow-set and American Samoa longline fisheries, respectively. Funding for the program is expected to decline further in 2026 and beyond, with the potential for complete discontinuation as early as 2027. It is imperative that this monitoring gap be addressed, and EM offers a potential solution to maintain oversight and data collection in the absence of adequate observer coverage.

#### 1.1.1.3. Impacts of Reduced Observer Coverage in PIR Longline Fisheries:

The information collected by NOAA Fisheries Pacific Island Region Observer Program has formed the cornerstone of NMFS science and scientific advice in the Pacific Islands Region. Reduced observer coverage will fundamentally change the information available from the fishery, and may no longer support current and future scientific data needs such as fishery impact and ecosystem analyses or provide the information required for management. Reduced precision in estimates of rare events - like interactions with protected species - will directly affect

management of this fishery. Reduced observer coverage levels could have far reaching impacts to data streams used for ecosystem and fisheries management, protected species impact analyses, and basic scientific inference. Examples of some impacts are described below.

Bycatch & Protected Species Catch Estimation: One of the most immediate effects of reduced observer coverage is a decline in the accuracy and precision of bycatch and protected species estimates, especially for rare species such as false killer whales and giant manta rays. At lower coverage levels (e.g., 7%), the likelihood of detecting rare interactions falls significantly, leading to potentially large errors in bycatch estimation. For example, a 30% coefficient of variation (CV) in estimates for rare species typically requires 36–47% observer coverage. Coverage below 10% introduces such high uncertainty that interactions with rare species may go undetected, undermining effective management and conservation efforts (Arhens and Crigler 2024).

Fisheries Stock Assessment: observer data are critical, particularly for non-target species such as sharks and billfish. These data are used by (RFMOs to inform international conservation and management decisions. U.S. observer data have historically exceeded RFMO requirements and are heavily relied upon in assessments. A reduction in this data would increase uncertainty in future assessments, potentially affecting the ability to determine stock status and leading to more precautionary management measures. Observers also gather biological and life history data through programs like the International Billfish Biological Sampling program, which helps improve stock assessment models.

Statutory requirements: Reduced observer coverage also has significant implications for compliance with statutes such as the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA). For example, the False Killer Whale Take Reduction Team (TRT) recently recommended increasing monitoring above 20% in response to take exceedances. Biological opinions issued by NMFS require sufficient monitoring to reliably estimate protected species interactions, and a failure to meet these requirements could invalidate incidental take permits. The reliability of estimates based on reduced annual coverage remains questionable.

Ecosystem Monitoring: Bycatch location, timing, and diet data contribute to understanding species' habitat preferences, the effect of changes in water temperatures, and broader ecosystem dynamics in the North Pacific. Satellite tagging and other special-use data collected by observers further support ecosystem modeling. Reduced coverage limits sample sizes, potentially rendering this information ineffective for long-term monitoring and research.

Economics: Observer-collected trip-level cost data form the basis of the region's only long-term fisheries economic monitoring programs (Hawai‘i since 2004, American Samoa since 2006). These data help track net revenue trends and support analyses related to regulatory impacts, gear restrictions, and fishing behavior. Lower data availability would hinder ongoing and future economic evaluations.

Observer Program Operational Efficiency: Operational challenges are also compounded by reduced coverage. Observer staffing is difficult to adjust in real-time due to variability in fishing effort and observer availability. The current sampling design allows for secondary sampling when needed, but this is not truly random, leading to potential bias. At reduced coverage levels,

only about 2% of effort may be randomly sampled at any time, which compromises data quality and representativeness, especially for species caught seasonally.

Regulatory Monitoring: Observers also serve a critical role in regulatory compliance monitoring. They ensure vessels follow regulations related to gear use, protected species handling, and safety standards. With only 7% coverage, it's possible that some vessels could go years without ever being observed. This diminishes regulatory oversight, slows the adoption of new rules, and could result in increased violations or safety risks at sea. Observers are also the primary means of monitoring compliance with requirements like vessel identification systems, seabird mitigation measures, marine mammal release guidelines, shark finning restrictions, and MARPOL regulations..

Summary of regulations currently monitored with observer data in the deep-set longline fishery:

- Presence of required vessel identification and monitoring system
- Seabird mitigation measures when north of 23º N latitude
- Presence of posted NMFS marine mammal release guidelines and captain notification placards
- Safe handling and release of sea turtles, marine mammals, certain elasmobranchs, and seabirds
- Shark finning and landing requirements
- Gear requirements and prohibitions
- Required vessel safety specifications
- MARPOL

#### 1.1.1.4. Regulatory Monitoring Requirements

Regulatory monitoring requirements include monitoring related to fishing regulations specified in the Code of Federal Regulations for Western Pacific Pelagic Fisheries (50 CFR 665 Chapter VI Subpart F) and International Fisheries and Related Activities (50 CFR 665 Chapter III Part 300). These fishing regulations are authorized under the Magnuson-Stevens Fisheries Conservation and Management Act (Magnuson-Stevens Act; 16 U.S.C. 1801), Tuna Conventions Act (16 U.S.C. 951), and Western and Central Pacific Fisheries Commission Implementation Act (16 U.S.C 6901).

As a fisher-independent data source, at-sea observers are also currently used to collect information to support the majority of regulatory monitoring requirements. Table 2 and 3 below, outline regulatory monitoring requirements critical to the statutory and sustainable management of the Hawaii and American Samoa longline fisheries. They highlight how various mandates under the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Magnuson-Stevens Act, and international agreements (e.g., WCPFC, IATTC) depend on observer data and other key monitoring tools and are used to verify catch, effort, protected species interactions, gear compliance, and quota adherence. Many of the requirements – especially those involving protected species and marine mammals – are non-discretionary and essential for take authorization and continued fishery access. The tables emphasize the

foundational role of observer data, while also identifying other key monitoring tools used to collect this information.

There are specific requirements for bycatch monitoring. Under Magnuson-Stevens Act Section 301(a)(9), or National Standards 9 (50 CFR 600.350), Councils shall develop: Conservation and management measures that, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch. Also, Magnuson-Stevens Act Section 303(a)(11), or standardized bycatch reporting methodologies (50 CFR 600 Subpart R) require any FEP prepared by the Council to establish Standardized Bycatch Reporting Methodologies (SBRMs) to assess the amount and type of bycatch occurring in the fishery. In order to accurately satisfy these requirements, proper monitoring that can verify logbook reporting must be implemented. EM could be incorporated into the FEPs as a SBRM. EM could also provide a mechanism to maintain compliance with monitoring requirements under the ESA and MMPA. Human observer coverage has been used to fulfill monitoring requirements under Reasonable and Prudent Measures emerging from non-jeopardy ESA Section 7 Biological Opinions of Hawaii and American Samoa longline fisheries. MMPA take reduction triggers are also monitored through the use of human observers. While 5% human observer coverage is required for participating longline fisheries within RFMOs, there have been adopted minimum standards for EM and the possibility for EM to satisfy monitoring requirements in the future.

Table 2. Hawaii and American Samoa Longline Regulatory Catch Monitoring Requirements Summary

| **Monitoring Need** | **Current Tool** | **Observer Coverage Needed or Required** | **Regulatory/Statutory Drivers** | **Compliance Notes** |
|---|---|---|---|---|
| **Protected Species (PS)** | At-sea Observers | Need 20% or higher for rare species (Arhens and Crigler 2024) | ESA BiOps, MMPA, MSA 303(a)(11), NS9, SBRM | Required for reliable estimates for take authorizations, permits and Incidental Take Statements (ITS), and M/SI estimates |
| **Bycatch (non-PS)** | At-sea Observers | At least 5% (international), higher domestically for reliability | MSA 303(a)(11), NS9, WCPFC 21 (Appendix 17), CMM 2018-05, CMM 2012-03, SBRM | 5% requirement applies to human observers; EM-only may not satisfy international compliance |
| **Target Catch** | Logbook, Auction Sales Receipt, At-sea Observers | At least 5% (international) | CMM 2018-05, CMM 2012-03 | Human observer requirement; EM-only may not satisfy international compliance |

| | | | | |
|---|---|---|---|---|
| **Total Catch** | Logbook, Sales Receipt, At-sea Observers | At least 5% (international) | CMM 2018-05, CMM 2012-03 | Human observer requirement; EM-only may not satisfy international compliance |
| **Fisheries Effort** | Logbook, VMS, At-sea Observers | Variable – sufficient to support reliable PS/bycatch estimates | MSA 303(a)(11), SBRM, NS9 | Needed to calculate % monitored and support catch estimates |

Table 3. Hawaii and American Samoa Longline Regulatory Management Monitoring Requirements Summary

| Monitoring Need | Current Tool | Coverage Requirement | Regulatory/Legal Drivers | Compliance Notes |
|---|---|---|---|---|
| **Swordfish Retention Limit (HI DSLL)** | Logbooks & Sales Receipts | Observer required for unlimited retention | 50 CFR §665.813(j) | Without observer, max 25 swordfish per trip; observer lifts limit |
| **SSLL Sea Turtle Trip Limits / Hard Caps** | At-sea Observers, (requires near real time reporting) | 100% monitored for cap and limit enforcement | 50 CFR §665.813 | If limit reached, trip ends or fishery closes for year |
| **Gear Compliance Monitoring** | At-sea Observers | Monitor use of required protected species mitigation gear | ESA, MMPA, Seabird regs, ongoing longline compliance development. e.g. 50 CFR §665.815 | Requirements include tori lines, hooks, floatline length, leader material, etc.; more analysis ongoing |
| **Fisheries Effort / % Monitoring** | Logbooks, At-sea Observers, Observer Contractor | Variable – to support PS/bycatch estimates | MSA 303(a)(11), SBRMs, internal guidelines | Used to assess coverage levels and fishery-wide monitoring effort |

| | | | | |
|---|---|---|---|---|
| **Trip Notifications** | Vessel calls to observer contractor | 72-hour advance notice | 50 CFR §665.803 | Ensures observer placement and coverage planning |
| **Permitting Requirements** | Federal permits (HSFCA, WCPFC Endorsement, MMAP Certificate) | Mandatory for legal operation | 50 CFR §665.801; MMPA | Enables legal access to high seas, international waters, and MMAP compliance; Permit holders must comply with international agreements. |
| **Listed Species ITS (Incidental Take Statement)** | At-sea Observers | Sufficient to confirm take not exceeded & effectiveness of T&Cs | ESA – 2012/2023/2024 BiOps (e.g., for Hawai‘i/AS longline). | Required to ensure take authorization and minimize take as required in BiOp |
| **Marine Mammal PBR and M/SI (Category I & II Fisheries)** | At-sea Observers | Sufficient for statistically reliable estimates | MMPA §229.7 | Needed to determine whether mortality exceeds PBR for SAR/TRP compliance |
| **False Killer Whale Take (in EEZ)** | At-sea Observers | Coverage to track EEZ takes | MMPA §229.37 | Needed to monitor interaction levels and enforce take thresholds |
| **Bigeye Tuna Quota** | Logbooks & Sales Receipts | Sufficient to track landings/quota | WCPFC, IATTC | International quota compliance; catch data must be verifiable |
| **Protected Species Handling Compliance Monitoring** | At-sea Observers | Monitor use of required handling techniques | ESA, MMPA, Seabird regs | Monitoring compliance scores inform post release mortality estimates used in protected species effect analysis |

| | | | | |
|---|---|---|---|---|
| **MARPOL** | At-Sea Observers | Monitor MARPOL violations | 33 CFR §151 Subpart A | Set of regulations designed to prevent and minimize pollution from vessels. |
| **Vessel Identification and Safety Requirements** | At-Sea Observers, OLE/Coastguard boardings | Safety equipment must align with coastguard requirements before an assigned observer can embark | 33 CFR § Subchapter S,<br><br>NS10 | The US Coast Guard's boat safety regulations. NS10 Safety of Life at Sea. |

## 1.2. Transition to EM for Core Monitoring Functions

EM is a more cost effective monitoring method that has the potential to fulfill many of the statutory monitoring requirements in Western Pacific longline fisheries, particularly as human observer coverage continues to decline in 2025 and beyond. Transitioning EM from the current experimental and research tool to an operational program may help fill data gaps in the Pacific Islands longline fisheries while reducing bias and maintaining compliance (Carnes et al. 2019).

### 1.2.1. Summary of Regional EM Initiatives

Interest in EM technologies initiated a pilot project in 2009 to evaluate the use of EM as a monitoring tool in PIR longline fisheries. This project was funded by the Council and was a collaboration with Archipelago Marine Research and the Hawaii Longline Association (HLA). Three EM systems were installed on Hawaii longline vessels with one of the vessels performing deep-set trips and two performing shallow-set trips. A total of 182 sets were compared between observer and EM data with some issues, such as variable detection rates (McElderry et al. 2010). Yet the project showed potential for EM in the region. As a result, in 2017 a larger EM project was developed by PIFSC using Fishery Information System Program (FIS) funds, which have supported the program since that time. This project was designed to improve issues in detection rates and species identification with better camera placement and utilization of a video reviewer with experience as an observer in the Hawaii longline fisheries. A total of 20 EM systems were installed on volunteer Hawaii longline vessels that conduct deep-set and/or shallow-set trips as a part of this project.

EM has since supported various research efforts, including assessing seabird mitigation with tori lines and developing new EM technologies through collaborations and grants. Ongoing research includes improvements to EM system components, approaches to maximizing collection of required information, and improvements to data review approaches including the use of image analysis and artificial intelligence to improve analysis efficiency. Fisher feedback indicates general support, though broader voluntary fleet adoption remains uncertain.

### 1.2.2. Efficacy of EM in collecting fishery monitoring data

Building on these efforts, several key studies have examined how well EM replicates or supplements data traditionally collected by at-sea observers in the Hawaii longline fleet. These studies provide critical insights into EM's strengths and limitations across different types of data, review conditions, and gear configurations:

- *Data Collectable Using EM vs. Observers* (Stahl et al., 2024)

  This report provides a detailed comparison of data fields collected by EM systems and at-sea observers, referencing forms used by the Pacific Islands Region Observer Program (PIROP). It highlights where EM provides accurate data, where supplemental sources (e.g., VMS, dealer reports) may be needed, and where observer-only data (e.g., fisher interviews, gear configuration during setting) remain essential.

- *Video Review Speed and Detection Accuracy* (Stahl & Carns, 2020)

  This study assessed EM data review speeds (4x, 8x, 16x) and found that 8x offered the best balance of detection accuracy and reviewer efficiency, particularly for identifying protected species interactions. Faster speeds risked missing critical events, while slower speeds reduced reviewer focus.

- *Post-Release Mortality of Protected Species* (Stahl et al., 2023)

  Reviewing EM footage, this study evaluated whether EM could be used to assess the likely post-release condition of protected species such as sea turtles and cetaceans. It showed that EM can support injury determinations but highlighted limitations in visibility (especially at night) and in assessing entanglement and trailing gear without specific camera angles.

- *EM Pre-Implementation Evaluation* (Carnes et al., 2019)

  In a broad evaluation involving 18 longline vessels, EM detected 89% of total catch (retained and bycatch) and 98–100% of retained catch across shallow- and deep-set fisheries. EM proved highly effective for broad taxonomic group identification but had limitations in species-level ID for certain sensitive or management-relevant species, such as bigeye tuna and hard shell sea turtles.

Using the result of these studies using EM data collected by from the Hawaii longline fleets, Table 4 summarizes current monitoring information collected by on-board human observers and whether those data are collectable using EM.

Table 4. Monitoring needs and an initial determination if EM can be used to collect those data.

| Monitoring Need | Collectable with EM? | Details |
|---|---|---|
| Species kept by vessel | Yes | High-accuracy data can validate logbook entries. |
| Bycatch (including protected species) | Yes | Accuracy varies; coefficients (developed via audits comparing EM and observer data) can improve estimates. Coefficients must be updated to remain reliable. Potential for logbook validation if reporting requirements are enforced. |
| Mortality (at vessel and release) | Yes | Provides first-level mortality estimation. |
| Protected species condition & handling | Yes | Useful for determining post-release mortality and serious injury. Tends to overestimate due to conservative assessment protocols. Important for ESA, MMPA, NEPA. |
| Date, time, location of fishing (start/end of set/haul) | Yes | Can be collected passively; useful for validating electronic logbooks. |
| Compliance monitoring during haul | Yes | Includes enforcement of rules like shark finning prohibitions. |
| Seabird information (if set-view camera is installed) | Yes | Can collect data on mitigation and species presence. |
| Specimen & biological sample collection | No | Includes measurements, sex, gear used. Examples: billfish, seabirds, turtles, DNA plugs, lancetfish stomachs & striped marlin collections under the International Billfish sampling project. |
| Tagging research | No | Observers have been used to conduct tagging studies, although fishermen could potentially fill this role? |
| Gear measurements/configuration | No | Important for regulatory compliance and protected species analysis. Difficult to assess with EM. |

| | | |
|---|---|---|
| Captain interviews | No | Observers have been used to collect economic, effort, and gear information. |
| Effort | No | Number of hooks set not reliably captured at high review rates. |
| Neal-time protected species interaction reporting | No | Supports current trip-based sea turtle interaction limits in the shallow-set fishery |
| Seabird mitigation compliance & bird presence/absense scans | No | Requires view of the stern of the vessel through the entire set |

In-outlining the regulatory considerations for implementing EM, the most important elements are those that the regulated fishing community must comply with. These may include, but are not limited to, the identification of EM system components and specifications, responsibilities for EM system installation and maintenance, requirements for data storage and submission and cost allocation. Many of these topics are discussed in the NMFS Electronic Technologies Policy Directive, Cost Allocation Procedure, and Implementation Plans. The Council and NMFS reconvened the electronic technologies steering committee in October 2022, which includes members from the industry that has provided advice relative to implementation of EM in the region.

### 1.2.3. Preliminary implementation plan

Since the Council's 201st Meeting in December 2024, NMFS has identified funding to begin operationalization of EM in the Hawaii and American Samoa longline fisheries, which will provide support for equipment and its maintenance, installation and training , data review and storage, and program administration. NMFS has also established a collaborative partnership with the Pacific States Marine Fisheries Commission (PSMFC) to help advance all aspects of EM including data collection, data storage, data review/analysis, data access (consistent with data confidentiality laws and policies) and technical support to fishing vessels.

While the Council works to develop an FEP amendment to authorize the use of EM in the longline fisheries, NMFS plans to work with PSFMC, Council, industry and other partners to expand the number of Hawaii longline vessels voluntarily carrying EM systems. NMFS' initial goal would be to review 20% of all deep-set longline and 100% of all shallow-set longline trips through EM, with review rate increasing as funding allows.

NMFS anticipates a three-year time period between 2025-2027 for operationalizing EM in Western Pacific longline fisheries, with the goal of EM being fully implemented by 2028. The current draft timeline, completed with NMFS funding, is as follows:

- 2025
    - Begin EM outreach engagements with the Hawaii longline fleet starting April 2025 to inform vessel owners and operators on the use of EM and transition from observers to EM
    - Starting in fall 2025, begin deployment of the first 50 EM systems
    - Establish the database and data management infrastructure.
- 2026
    - Begin EM data review
    - Continued deployment of another 50 EM systems
    - Initiate engagement with the American Samoa longline fleet
- 2027
    - Continue EM data review
    - Continued deployment of another 50 EM systems
    - Begin deployment of EM systems in the American Samoa longline fleet

This draft implementation plan would be modified based on the recommendations of the Council stemming from this action.

## 1.3. Proposed Action

The Council is considering a proposal to amend the Pelagic FEP to authorize the use of EM in longline vessels operating under Hawaii and American Samoa longline limited entry permits. The Council initially recommended that such a program be optional for vessels as resources are made available with federal funding, with a goal to develop a mandatory program. Since that recommendation was made in December 2024, NMFS has identified funding to implement EM in all Hawaii and American Samoa limited entry vessels from 2025 to 2027 and also cover administrative and sampling costs in the time. With costs secured for an implementation phase, the Council may consider Alternative and Sub-Alternatives to authorize EM as a mandatory program or as an optional program beyond the phase-in period.

This proposed action, if recommended by the Council through final action at the 203rd meeting in June 2025, would amend the Pelagics FEP to authorize the use of EM as a monitoring mechanism to provide reliable estimates of protected species interactions and satisfy associated requirements, with a secondary objective to serve as a Standardized Bycatch Reporting Methodology (SBRM)(see section 1.1). Any applicable vessel would have EM authorized if implementation from 2025 to 2027 is mandatory (Alternative 2) or optional (Alternative 3). Specifically the proposed action would amend the Pelagic FEP and corresponding regulations to implement an EM program for Western Pacific longline fisheries, use EM data to support management of the fishery and enforcement of regulatory requirements.

## 1.4. Purpose and Need for Action

Given the decline in the use of human observers to date and anticipated in the future due to increasing costs of the program and decreasing funding, there is a need to incorporate EM into a more efficient program to address monitoring needs of longline fisheries in the Western Pacific.

The implementation of an electronic monitoring program that can support monitoring requirements is currently the highest priority for management of the Pacific Island fisheries.

The purpose for Council action is to transition EM from a research tool to one authorized as a fishery monitoring approach that can provide statistically reliable catch and mortality estimates of protected species, discards/bycatch, and fulfill other associated regulatory monitoring needs as applicable in the Hawaii and American Samoa limited entry longline fisheries.

The need for Council action is to address reductions in current monitoring by developing a cost-effective monitoring program to ensure statutory requirements and management needs summarized in section 1.1 (above) are met while minimizing costs and disruptions to the fishery.

## 1.5. Action Area

The action area is all domestic and international waters considered under the Pelagics FEP and includes all waters where Western Pacific longline vessels operate, including all areas of the U.S. EEZ that are open to longline fishing and areas transited by vessels as they move from port to fishing areas. In general, longline fishing areas currently include portions of the U.S. EEZ around American Samoa, Johnston Atoll, Palmyra Atoll & Kingman Reef, and Hawaii and on the high seas around Hawaii and off the west coast of the continental United States.

## 1.6. Decision(s) to be Made

The Council, at its 203rd Meeting, will consider final action on a Pelagic FEP amendment to authorize EM as a monitoring mechanism for longline vessels operating under Hawaii and American Samoa longline limited entry permits. The Council may take no action, by not authorizing the use of EM and operate under the status quo monitoring regime (Alternative 1) The Council may also decide if EM, while phased into longline fisheries under the Pelagic FEP from 2025 to 2027, would be a mandatory (Alternative 2) or optional (Alternative 3) program. Sub-Alternatives under Alternative 2 may specify how vessels are prioritized in the implementation phase-in, but each ultimately result in a fully-mandatory program by 2028.

The Council may also recommend how EM would be financially supported, if it decides to take action to authorize EM. The Council's longstanding position has been that NMFS should assume costs for monitoring for the purpose of protected species monitoring, such as the human observer program. The NMFS Policy Directive 04-115-02 on *Cost Allocation in Electronic Monitoring Programs for Federally Managed U.S. Fisheries*, describes EM program costs as consisting of administrative and sampling costs. In general, the directive allocates administrative costs to public funding through NMFS and potential cost-sharing of sampling costs with industry. Under the policy, NMFS may assume EM program sampling costs for performance of monitoring that is necessary and appropriate to satisfy legal obligations such as monitoring required for ESA purposes . The Council may decide if NMFS should assume the financial responsibility for maintaining the EM program like it has for the human observer program for the Pacific Islands Region (Alternative A). In contrast, the Council may recommend that industry assume a portion

of cost-sharing for implementation of EM (Alternatives B and C). This document analyses scenarios of NMFS support and industry cost-sharing.

After the Council decision, 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 the action would *not* significantly affect the quality of the environment, NMFS will prepare a Finding of No Significant Impact (FONSI). If NMFS determines the proposed action is a major federal action that would significantly affect the quality of the environment, NMFS would prepare an environmental impact statement (EIS) before taking action.

## 1.7. List of Preparers

Authors:

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## 1.8. Public Involvement

### 1.8.1. Council and SSC Meetings

The Council, at its 193rd Meeting in December 2022, discussed the development of a future EM program and was provided an overview of regulatory and non-regulatory components of a potential EM program based on implementation in other regions. The Council recommended that the Electronic Technologies Steering Committee (ETSC) and Pelagic Plan Team (PPT) begin development of options and scenarios for the implementation of electronic monitoring in U.S. longline fisheries in the Western Pacific by September 2023.

In August and September 2023, the PPT reviewed a Pre-Implementation Plan for EM in Hawaii and American Samoa longline fisheries drafted by the ETSC. This plan investigated potential objectives and priorities for longline sectors and highlighted benefits and challenges for utilizing EM under each potential objective. The Scientific and Statistical Committee (SSC) at its 149th Meeting in September 2023, recommended that the Council and NMFS proceed with an EM Pre-Implementation Program. The SSC further recommended the focus remain on the Hawaii longline fishery, as a hybrid approach between fishery sectors, with a primary monitoring goal for protected species monitoring with secondary objective being for discard accounting.

At its 196th Meeting in September 2023, the Council directed staff to work with the Electronic Technologies Steering Committee to develop a Pre-Implementation Program for EM, in which: a) Pre-Implementation Program prioritizes EM in Hawaii Longline Fisheries, with; B) A

hybridized approach between the shallow-set and deep-set sectors, with; C) A primary objective of EM for protected species monitoring and estimation and a secondary objective for discard accounting. Further, the Council requested the ETSC provide a report on its progress to the Pelagic Plan Team at its next meeting. The Council also requested NMFS develop strategies to secure federal funding for EM. The Council shared its concerns that NMFS should assume costs of EM, particularly given the primary purpose of EM for protected species monitoring.

At its 152nd Meeting in June 2024, the SSC discussed progress on the EM Pre-Implementation Plan and was informed that human observer coverage would begin to decline from 20% to 13% in the deep-set sector of the Hawaii longline fishery. Further reductions in human observer coverage could be imminent and EM would potentially fulfill some of the capacity of human observer monitoring.

At its 199th Meeting in June 2024, the Council was informed on the future reduction in human observer coverage for 2025 and progress on the EM Pre-Implementation Plan. The Council directed staff to work with PIRO and advisory bodies to further explore regulatory considerations to utilize EM for management as a means to supplement and/or fulfill data collection requirements as currently implemented through federal observers, including the following: a) Objectives of observer and EM and levels of specificity; b) Benefits and Issues of EM; c) Approaches to implementing EM; d) Relationship between EM and human observer coverage; e) Relationship between EM and (electronic) logbooks; f) Costs; g) Regulatory review of existing observer and logbook programs; and h) Contingencies and processes for EM data review and appeals.

In December 2024, the SSC and Council were informed that human observer coverage is expected to drop to 7% by January 2025 for the Hawaii-based deep-set longline fishery and that potential further observer reductions could happen in the future. The fate of the human observer program was also uncertain due to budgetary constraints. However, NMFS indicated that funding was to be provided to outfit the entire Hawaii and American Samoa longline fleet, beginning in 2025 with a phase-in period through 2027. The SSC, at its 154th Meeting, recommended that EM be phased in by NMFS with the intent for a full mandatory program implemented by the end of 2027 to ensure the minimal obligatory annual observer coverage of 5%, with the primary objective for protected species monitoring and bycatch estimation, and secondary objective for discard accounting. The SSC recommended EM initially be limited to the following pelagic FEP fisheries: the Hawaii-based shallow-set longline swordfish fishery (at 100% coverage), the Hawaii-based deep-set longline tuna fishery, and the American Samoa longline fishery. The SSC recommended that EM coverage be used to replace the current observer program coverage and verify logbook data and be subject to the same expansion procedures applied currently to the observer coverage for the Hawaii longline fisheries.

Public comment at the 154th SSC meeting was provided by the Hawaii Longline Association (HLA). HLA indicated that it supports the implementation of EM and that costs for EM should not be borne on industry, noting that it would impede voluntary participation. Vessels would volunteer for EM if it served as a replacement for having an onboard observer required. Other concerns by industry include data confidentiality.

The Council took initial action at its 201th Meeting in December 2024 to create an Action Team to develop a proposal for the Pelagic FEP to authorize the use of EM in pelagic longline fisheries with the objective to: a) Authorize the use of EM to monitor and provide reliable estimates of protected species interactions with the Hawaii and American Samoa longline fisheries.: and b) Phase in the use of NMFS-approved EM systems over a three year period (2025-2027) with NMFS funding, as an optional program to supplement the human observer program until permanent resources are available to fully implement a mandatory program. The Council also requested that NMFS and Council advisory groups, during the phase-in of EM work on: a) Establish regional standards for NMFS-approved EM systems; b) Develop a statistically-robust and cost-effective EM data review process to improve precision of protected species interactions using EM data that could be reviewed by the SSC and Plan Teams, c) Develop a checklist for tasks and timeline needed to implement a fully-mandatory EM program; d) Provide regular status reports to the Council on the progress of EM development and implementation in the longline fisheries; and e) Develop elements needed for a vessel monitoring plan, which would describe camera configurations and catch handling requirements to ensure the EM systems are able to capture the necessary data images. The Council further requested NMFS and directed staff to engage the Hawaii and American Samoa Longline vessel owners to provide information on the impacts of this action to their continued operation.

HLA provided public comment at the 201st Meeting, supporting EM and noting incentives to preclude onboard observers on vessels with EM would garner fleetwide support. HLA noted EM is a cost-savings for the government and that fishing industry does not have subsidies.

In March 2025, the SSC and Council were informed that the fate of human observer coverage in longline fisheries is unknown beyond 2026 due to further funding constraints and coverage will be 5% in the Hawaii deep-set longline fishery. The SSC and Council reviewed potential Alternatives for the June 2025 final action and discussed cost-sharing and cost allocation policies, including a NMFS proposed scenario of industry covering EM system replacement costs. At its 155th SSC meeting, the SSC recommended that the Council provide analyses on how proposed alternatives to implement EM can minimize regulatory and financial burden to the longline fisheries, and how these compare to the current observer program.

HLA provided public comment at the 155th SSC stating industry support for EM implementation. HLA stated that NMFS should continue to cover the costs for protected species monitoring as is the case with the current observer program. HLA also noted the low profit margins in the longline fishery and unnecessary hardship of covering EM costs.

At the 202nd Council meeting in March, the Council endorsed the SSC recommendation. The Council also requested that NMFS cover the cost of EM, including administrative and sampling costs, noting the purpose of EM is to monitor protected species interactions in longline fisheries, in lieu of sufficient future human observer coverage.

HLA provided public comment at the 202nd Council meeting, reiterating its support for EM expressed at the 155th SSC. HLA questions the applicability of the NMFS cost allocation policy given the use of EM would be for protected species monitoring and the Supreme Court ruling on the *Loper Bright* case.

The Council at its 203rd meeting on June 9-11, 2025, will consider final action.

# 2. DESCRIPTION OF THE ALTERNATIVES CONSIDERED

## 2.1. Development of the Alternatives

In December 2024, Council formed an Action Team to consider options for a proposed FEP amendment to authorize the use of EM-data for protected species interactions and other fishery aspects in regional longline fisheries. In March 2025 Council further recommended that NMFS continue to cover the cost of EM given the purpose to monitor protected species interactions. In developing potential alternatives for Council action at its June 2025 (203rd) meeting, the Action Team considered the recommendations of the SSC and Council, and:

- The phasing in of EM systems from 2025 to 2027, supported by NMFS funding.
- The condition and uncertain future of the human observer program
- NMFS Policy directives on cost allocation for EM in U.S. fisheries
- Socioeconomic impacts to affected longline fisheries
- The quality of monitoring in a phase-in period (2025-2027) and beyond
- Fulfillment of the stated purpose and need

This decision document presents two categories of alternatives in this chapter. First, alternatives related to implementing an EM program in the near term for longline vessels in the Pacific Islands Region (section 2.2), which include the Hawaii-based deep-set and shallow-set longline fisheries, and the American Samoa longline fishery. Features of implementing EM that are common to all action alternatives are described in section 2.2.4. Secondly, alternatives related to the ongoing funding of EM in these fisheries are presented in section 2.3, should Council recommend an EM program alternative. The relationship between these two categories of alternatives are described in Figure 1.

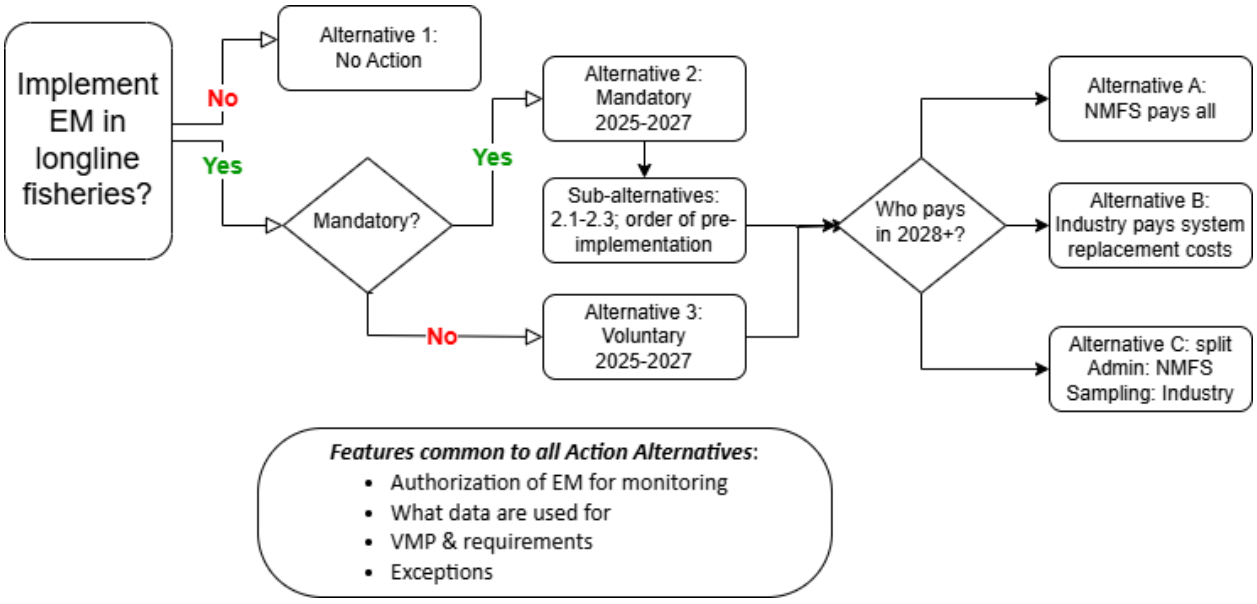


Figure 1. A flow chart illustrating the relationship between the two categories of alternatives (implementation alternatives 1 through 3 - Section 2.2; costing alternatives A through B - Section 2.3) and the steps Council may consider in their deliberation of implementing an EM program for longline fisheries in the Pacific Islands. Features of implementing EM that are common to all action alternatives are highlighted in the box below the flowchart, and further described in section 2.2.4.

## 2.2. Description of EM Implementation Alternatives

### 2.2.1. Alternative 1: No Action (Status Quo/Current Management)

Under Alternative 1, the Hawaii and American Samoa longline fisheries would not have an option to install and implement EM systems beginning in 2025. The Council would take no action and NMFS would not authorize existing or further voluntary participation of EM to be used to monitor longline fisheries under statutory requirements. Under Alternative 1, there is a risk of non-compliance fleetwide with respect to domestic and international monitoring requirements in regulation, under the Pelagic FEP, and under international conservation and management measures (section 1.1.1.4) should on-board observer coverage remain at 7% or be further degraded.

Expected Fishery Outcomes

Under Alternative 1, there would be no response to continuing reductions in the number of longline trips with on-board observers. Reduced observer coverage would reduce the monitoring of regulatory requirements under the Pelagic FEP, and could lead to increased non-compliance with those requirements. The monitoring of interactions with protected species would also be degraded with reduced observer coverage. The precision of estimates of the number of protected species interactions would drop, particularly for the most rarely encountered species (Ahrens and Crigler, 2024). The potential for non-compliance with requirements of the Pelagic FEP and

reduced precision of protected species interaction estimates could lead to legal challenges of NMFS authorization of the fishery.

### 2.2.2. Alternative 2: Implement a Mandatory EM Program, 2025 to 2027

Under Alternative 2, the Council would recommend a mandatory EM program to be implemented for the Hawaii and American Samoa longline fisheries by 2027 and authorize the use of EM to meet the monitoring requirements in these fisheries described in section 1.1.1.4 including providing reliable estimates of protected species interactions for these fisheries. All vessels operating under the Hawaii (currently 151 active vessels) and American Samoa (currently 11 active vessels) longline limited entry permits would be required to carry and maintain EM systems by 2027. If regulations are implemented before 2027, vessels that have received an EM system prior to 2027 may be required to use EM after an EM system is installed. Fleetwide participation in EM would be mandatory beyond 2027 for any new, existing, or returning entrants to the longline limited entry fisheries. EM systems would be deployed in a step-wise fashion through 2025, 2026, and 2027 following the preliminary implementation plan described in section 1.2.3. Specifics of the prioritization of vessels for EM system installation would be defined American Samoa longline limited entry permit holders would likely not be required to use an EM system until outreach to the fleet has been completed in 2026. Alternative 2 would likely mitigate risk of individual and fleetwide non-compliance with domestic and international requirements.

Vessels implementing EM as an authorized monitoring mechanism would be required to maintain a VMP (details provided in 2.2.4 of this document and Appendix A) and maintain EM systems under provisions outlined in the VMP. Exemptions for the use of EM include situations where vessels are not deploying longline gear defined in CFR § 665.800. Exceptions may also be provided for vessels where operators of applicable vessels have provided appropriate notification of malfunction or damage, as provided in the VMP, and have not had a resolution provided within 72 hours of that notification, have been provided an exemption by the Regional Administrator or have a human observer onboard.

Further details on the specific requirements associated with this Pelagic FEP amendment are described in section 2.2.4.

Under Alternative 2, the Council may consider providing direction on the priority for rolling out EM systems during the transition period prior to EM being fully operational. The prioritization options are described as sub-alternatives below.

#### 2.2.2.1. Sub-Alternative 2A: Random Selection of all Longline Vessels for Implementation

Under sub-Alternative 2A, all vessels operating under a Hawaii or American Samoa longline limited entry permit would be eligible for random selection from 2025-2027, with American Samoa vessels incorporated by 2027. Such an approach likely ensures adequate representations of all longline vessels during the phase-in period.

Expected Fishery Outcomes

The potential outcome of random selection of vessels for EM system installation would include full fleet-wide implementation of EM by 2027 and authorized use of EM for monitoring without prejudice or preference for vessels during the interim phase-in period. However this approach may be perceived as a top-down approach without any incentivization (e.g. guarantee that participating vessels would be exempt from carrying an observer or exempt from any other regulation). Outreach to vessel owners and operators would be imperative and needed with immediacy to ensure that vessels are comfortable and adequately informed about the use of EM and to ensure minimal inconveniences. Under sub-alternative 2A, there would be no prioritization of vessels, either those with a perceived more monitoring urgency (i.e., shallow-set sector) or vessels whose owners or operators wish to implement EM

#### 2.2.2.2. Sub-Alternative 2B: Prioritization of Shallow-Set Vessels, Random Selection of Remaining Longline Vessels

Under potential sub-Alternative 2B, vessels engaging in shallow-set longline fishing would be prioritized for EM program implementation first, including installation of EM systems and authorizing the use of EM data for monitoring. Up to 24 vessels have engaged in shallow-set fishing in a fishing year, in which future participation may vary. On an annual basis from 2025 to 2027, NMFS plans to procure and install 50 EM systems per year. Vessels that will not engage in shallow-set fishing would be randomly selected in order to fulfill the targeted installation of 50 new vessels per year until 2027.

Expected Fishery Outcomes

Possible outcomes could range from 0 to 50 vessels engaging in shallow-set fishing and having EM systems procured and installed for authorized monitoring. The likely outcome would be 10 to 20 vessels engaging in shallow-set fishing in the first year of the phase-in process with fewer additional vessels each year thereafter until 2027. These vessels would have EM installed and authorized for monitoring as a priority, which may not reflect equal representation of the longline fishery until the conclusion of the phase-in period. This may require some incentivization (e.g. omission from vessel pool to accept a human observer) and will require outreach. Outcomes under sub-alternative 2B could reduce agency burdens on the human observer program if participating EM vessels on shallow-setting vessels could be omitted from observer placement. The Council would need to decide and determine if monitoring requirements required for shallow-set vessels that require human observers could be replaced by monitoring using EM.

#### 2.2.2.3. Sub-Alternative 2C: Prioritization of Voluntary Vessels, Random Selection of Remaining Longline Vessels

Under potential sub-Alternative 2C, vessels whose owners and operators wish to volunteer and elect to install EM systems would be prioritized for placement and installation of EM systems. Any remaining non-participating vessels among 50 available EM systems each year would be selected randomly.

Expected Fishery Outcomes

Possible outcomes could range from 0 to 50 vessels volunteering each year to install and implement EM and to authorize for monitoring. A likely range of vessels annually that would volunteer during the phase-in period is unknown. Similar to outcomes under 2B, this approach may bias representation of the fleet during the phase-in period until full implementation. Vessels that are more informed with Council and NMFS activities, do not have language barriers among owners and operators, or who have had proper outreach may be more inclined to volunteer for participation in implementing EM. This may lead to less adequate representation of the fleet in monitoring the fishery fleetwide, as compared to 2A. Incentives may be needed to garner support for vessels to volunteer. Such an approach would likely have less negative perception among fishing vessel owners and operators as a top-down approach from the Council and the agency as compared to 2A and likely 2B.

### 2.2.3. Alternative 3: Implement EM as an Optional Program

Under Alternative 3, the Council would recommend an optional EM program, which would give vessel owners the opportunity to elect to install and implement EM as participating vessels. EM would then be authorized for use in monitoring statutory requirements in those participating vessels. While full implementation of all longline vessels is a goal of NMFS from 2025 to 2027, implementation would remain elective until a fully mandatory program is developed through a separate Council decision to implement EM as mandatory at a later time. This Alternative would not guarantee full participation of EM among Hawaii and American Samoa longline fisheries, in contrast all outcomes under Alternative 2.

Alternative 3 is consistent with the Council recommendation at its 201st meeting; however, the situation regarding the human observer program has changed which may affect the Council's decision at final action. Alternative 3 has some similarity to the implementation of electronic reporting (ER) logbooks as an optional program in 2007 until the Council took action in 2021 to implement ER as a mandatory reporting requirement replacing paper logbooks.

Expected Fishery Outcomes

Possible outcomes under this Alternative may range from 0 to full participation (151 Hawaii longline vessels, 11 American Samoa vessels) in an EM program by 2027, with 0 to 50 possible participants electing to participate each year. The participation of an EM program could also remain with the existing 20 participating vessels. Similar to the outcomes under 2C, this alternative may bias representation of the fleet. Vessels that are more informed with Council and NMFS activities, do not have language barriers among owners and operators, or who have had proper outreach may be more inclined to volunteer for participation in implementing. Participating vessels would need or request incentivization (e.g. exemption from observer placement). While Alternative 3 would likely have no perceived negative top-down mandate among participating vessels, possible outcomes could leave longline fleets and possibly a significant portion of longline vessels vulnerable to non-compliance. Non-compliance may cause interruptions to fleetwide or individual fishing operations.

### 2.2.4. Features of an EM-Implementation consistent with all Action Alternatives

Under Alternative 2 and 3, the Council would recommend amending the Pelagic FEP to authorize the use of EM data to monitor and provide reliable estimates of protected species interactions with the Hawaii and American Samoa longline fisheries. Specifically, the owners and/or operators of a large (≥ 50ft) vessel subject to the requirements of an American Samoa longline limited access permit or a vessel subject to the requirements of a Hawaii longline limited access permit would be required to carry NMFS-certified EM systems on vessel when fishing under the permit.

NMFS or its EM service provider will install EM systems on vessels in priority order dependent on the recommendation from Council through 2025, 2026, and 2027. NMFS-certified EM systems will generally consist of two cameras, drum rotation and hydraulic system operation sensors, a global positioning system receiver, a ruggedized computer running the monitoring system software, and two or more storage devices (most often solid state drives) recording output from cameras and sensors. All of the EM system components are networked together with direct, wired connections and powered by a power supply connected to the vessel's DC electrical system.

NMFS will pay for initial EM system setup, including installation of EM systems on longline vessels, troubleshooting operation, and collection and processing of EM data from 2025-2027. Long-term funding for an EM program is uncertain. Council may make recommendations for how long term funding should be addressed. Alternatives relative to future funding of a Western Pacific Longline EM program are presented in section 2.3, below.

**Authorizing EM in the FEP**

If EM was implemented for Western Pacific longline fisheries under Alternatives 2 or 3, the Pelagic FEP would need to be amended to authorize the use of EM data for monitoring. Current monitoring with on-board observers collects monitoring information that is required under statute (section 1.1.1.4) as well as information that is used to improve our understanding of fish life history and ecosystem function (section 1.1 & 1.2), but not required. EM data has been collected in the fishery on an experimental basis in 2009 and consistently since 2017, but has not been used for fishery monitoring. The specific uses considered for EM data across all Action Alternatives have been reviewed relative to the information currently collected by on-board observers in section 1.2.2.

At the most basic level, the FEP will be amended to clarify that EM data can be used to meet required and other monitoring requirements in Western Pacific Longline fisheries. Specifically, this means that still and video imagery from cameras and sensor data collected from the EM systems, including hydraulic pressure sensor and drum rotation sensor data, position data, and summarized data collected from those sources can be used to monitor fishing activity. Summarized data would include information summarized by computer algorithm or human reviewer and could include data on catch of target and non-target species, including bycatch (see below) and protected species catch. The summarized data could also include the disposition of

any catch, including locations of hooking or entanglements to aid in determining or estimating outcomes of catch interactions.

**Adding EM as a Standardized Bycatch Reporting Methodology**

This proposed Amendment to the Pelagics FEP would also add EM as a Standardized Bycatch Reporting Methodology (SBRM) under both Action Alternatives. SBRM are described in 50 CFR§ 600.1600 as *an established, consistent procedure or procedures used to collect, record, and report bycatch data in a fishery, which may vary from one fishery to another*. Amendment 12 to the Pelagic FEP (as an Omnibus Amendment to FEPs, April 22, 2024), addresses FEP requirements under MSA §303(a)(11) to establish SBRM and provisions to identify SBRM consistent with § 600.1610. Specifically, this action amends the Pelagics FEP § 8.2.1.8 'Bycatch Reporting' to include Electronic Monitoring as an SBRM for American Samoa and Hawaii longline fisheries.

By adding EM as an SBRM to the Pelagics FEP, this amendment considers the requirements provided in § 600.1610(a)(2)(i-iv):

- *Information about the characteristics of bycatch* in the fishery is provided in Amendment 12 to the Pelagics FEP. EM can, with logbook reporting, verify catch of retained MUS and bycatch. EM data can fulfill reporting of bycatch in lieu of human observers. EM has provided effective identification of MUS and non-MUS species, including those ESA listed species and marine mammals under the auspices of the MMPA.
- *Feasibility* - EM, along with human observers and logbook reporting requirements, are implemented at reduced burden to fishers with an estimable administrative and sampling cost currently assumed by NMFS. In the future, EM could fulfill monitoring requirements addressed by human observers, partially or in full. Estimated costs are provided in the 2021-2025 Pacific Islands Regional Electronic Implementation Plan (*ETIP*, NMFS, 2021). EM system rate of replacement is every three years at an estimated unit cost of $10,000 (NMFS, 2021). From 2025-2027, NMFS is expected to transition to EM implementation at a total cost estimated at under $2.5 million per year. Under a model sampling rate of 25% of longline sets reviewed, annual sampling costs are estimated at $1.93 million and administrative costs estimated at $519,000 per year (NMFS, 2021). EM can be utilized on fishing trips for monitoring when an observer is absent, including unforeseen circumstances, such as the COVID-19 pandemic, that could limit human resources at sea.
- *Uncertainty of data resulting from SBRM* - EM aims to collect data comparable to human observers. Human observer data records 100% of catch and bycatch, retained or discarded. EM can provide species code identification, disposition, and hooking location under most scenarios for sea turtles, marine mammals, elasmobranchs, and seabirds achieved with a high degree of accuracy compared to human observers (Stahl et al, 2024). Total comparison of EM catch and bycatch detection accuracy compared to human observers was 89% with 97% of retained catch (Carnes et al., 2019) with accuracy expected to improve over time. Under an EM sampling model provided by the Pacific Islands ETIP (NMFS, 2021), 20 to 25% of longline sets targeted to be reviewed, consistent with target human observer sampling to optimize estimation of catch, bycatch, and protected species interactions.

- *Data use in determining amount and type of bycatch* - data generated by EM would be used in a similar fashion as data collected by human observers, as described in Amendment 12 to the Pelagics FEP. EM data would be used for protected species interaction and bycatch estimation in the annual SAFE report. The SSC and Pelagics FEP Plan Team would have the opportunity to review data generated by EM and on methodologies used to extrapolate these estimates for the fishery as a whole. The SSC and Plan Team could make recommendations to the Council on modifying or developing estimation methodologies as EM is implemented and improves over time

**Vessel monitoring plans**

A key feature of any EM implementation and consistent with both Action Alternatives is the requirement for vessels using EM systems for monitoring to have an approved VMP before embarking on a fishing trip. VMPs would be developed as an EM system is installed on a vessel, would be unique to that vessel, and would outline how each vessel's EM system is installed and operated. The VMP would detail equipment configuration, data collection protocols, and responsibilities of the vessel owner and crew. The VMP would include provisions to which NMFS or their EM contractor and the vessel permit holder, owner, and operator would be required to follow and would be authorized by NMFS before EM was used by that vessel to monitor fishing activity. The purpose of the VMP is to ensure that the EM system is able to collect the information needed for monitoring. Noncompliance with the VPM, such as improper or inconsistent catch handling or obstructed camera views, may affect a vessel's eligibility to participate further in the EM program. The owner and operator of a fishing vessel would be required to keep a copy of the vessel-specific VMP on board and accessible at all times.

An EM program established under recommendations based on either of the Action Alternatives would not result in a change to the current regulatory requirements for the existing human-observer program coverage (50 CFR 665.808) and associated notification requirements at this time,even though funding for on-board observer program is expected to be reduced further in the future. Longline vessels will continue to be required to provide 72-hour notification for observer placement; however, vessels that receive EM systems from NMFS are expected to be excluded from human observer placement.

<u>VMP Contents and Requirements</u>

Once NMFS installs an EM system, NMFS or its contractor/EM service provider will provide the vessel owners and operators with a vessel monitoring plan. The vessel owners and operators would be required to have on board the vessel a valid VMP at all times. The VMP would include:

1. General Information

- VMP Date & Version
- Vessel Summary Table: Name, ID, gear type, ports, owner and contact information.

2. Provider & NMFS Contacts

- EM Provider Contacts: Support staff, techs, manager, emergency/weekend contact.
- NMFS Contacts: VMS, trip notification, data request, EM program leads.

3. EM System Overview

- Describes components: cameras, sensors, GPS, control unit.
- System records during hauling; includes specifications in Appendix.

4. Vessel Owner/Operator Responsibilities

Operators must:

- Power on the system 24 hrs before departure.
- Operate EM on 100% of declared trips.
- Conduct system function tests and keep the VMP onboard.
- Comply with catch handling and camera maintenance rules to ensure all activity is visible to cameras.
- Submit hard drives after trips and report malfunctions.

5. Burn-In Trips and/or Audits

- Could be required before EM approval to test equipment and crew adherence.
- Could be required if data issues found
- NMFS reviews data to validate system performance and catch handling.

6. System Specifications & Installation Summary

Includes:

- Vessel diagram(s) showing all EM components (cameras, sensors, discard points).
- Camera Table: Location, resolution, FPS, view, triggers.
- Sensor Table: Ping rates, data collection frequency.
- Still Images of camera views required for VMP approval.

7. Troubleshooting Guide

- Step-by-step diagnostics for power, camera, sensor, and recording issues.
- Contact info for technical support; Appendix provides specific instructions.

8. Signature Page

- Must be signed by:
    - Vessel owner/operator (trained in EM system use)
    - EM service provider
    - NOAA representative
- Digital signatures with audit trail required.
- Signed VMP must be onboard during trips.

Additional Requirements

- System Uptime: Must record full trip; no leaving port for fishing allowed without functioning EM unless a waiver is granted. Trips that are already underway may be able to complete their trip.
- Hard Drive Submission: Within a set number of business days (TBD); must include return address and metadata.
  Modifications: Any changes (gear, camera setup, ownership) require resubmission and NMFS re-approval.
- Equipment Malfunctions:
  - Critical: Must be repaired before next trip or NMFS waiver obtained.
  - Non-Critical: May fish if it doesn't affect core data capture.

A guidance document with more detailed information on these elements, which would be included in a regional VMP, can be found in Appendix A.

Modifications to VMPs

VMPs may be revised in the future in a timely manner to avoid administrative delays and burdens to fisheries consistent with 50 CFR § 600.335, National Standard 6 'Variations and Contingencies'. A VMP may be revised as the Regional Administrator and Council decides as necessary, under circumstances including, but not limited to: change in fishing vessel configuration, new gear requirements, new operational requirements, new monitoring requirements (for MUS, bycatch, or protected species interactions), EM technical issues, changes in fishery behavior, to improve efficacy of EM, or to reduce burden to fisheries or burden related to sampling and administration. A process to revise a VMP or VMPs entails:

- A proposal by NMFS, Council advisory bodies, applicable permit holders, or a representative of applicable permit holder(s).
- A written proposal to amend or revise a VMP or VMP requirements is provided to NMFS with specific components of the VMP(s) to revise, omit, or amend. Unless the proposal is provided by the applicable permit holder(s) or a representative, proposals are to be provided to affected permit holders.
- Revisions, omissions, or amendments to VMP requirements are to be presented for Council decision to endorse a proposal and recommend necessary changes.
- The Regional Administrator, may make changes to VMP requirements, consistent with Council recommendations
- The Regional Administrator may make changes to a VMP, consistent with a proposal to modify a VMP that does not change VMP requirements or affect more than one applicable permit holder.
- Modification of a VMP(s) are to be effective immediately upon signature of applicable permit holder, NMFS, and any other parties included in affected VMP(s)

**Vessel availability for EM system installation, data retrieval, and maintenance**

In order to facilitate the installation and maintenance of EM systems on a vessel, requirements NMFS technicians will require vessel access while in port. Based on the current EM pilot, installation would required three concurrent days of daytime access to the vessel to allow time for system component installation, wiring, and troubleshooting of system function. In addition, access to the vessel for one or two days after the return [timing for installation and maintenance, access areas, provide power].

**Exceptions**

Exemptions for the use of EM include situations where vessels are not deploying longline gear as defined in CFR § 665.800. Exceptions may also be provided for vessels where operators of applicable vessels have provided appropriate notification of malfunction or damage, as provided in the VMP, and have not had a resolution provided within 72 hours of that notification, have been provided an exemption by the Regional Administrator or have a human observer onboard.

## 2.3. Description of Cost Alternatives

Should the Council recommend to implement EM in Hawaii and American Samoa fisheries under Alternatives 2 or 3, the Council may consider how cost allocation will be assumed. The NMFS Procedural Directive (PD) 04-115-02 on *Cost Allocation in Electronic Monitoring Programs for Federally Managed U.S. Fisheries*, there are instances in which the agency assumes the cost and when industry assumes a share of costs (NMFS, 2019). PD 04-115-02 identifies costs as administrative and sampling. For all EM program scenarios, NOAA Fisheries would be responsible for the administrative costs, including the costs of setting standards for such programs, monitoring program performance, and providing administrative support to address science, enforcement, and management needs, except where the MSA specifically authorizes the collection of fees for these costs. Sampling costs include costs of EM systems, installation and maintenance, and other hardware/software/other costs needed to collect, review, store and transmit EM data.

PD 04-115-02 states that if the Council takes action to initiate an EM program and *to provide greater operational flexibility to industry participants or an exemption from otherwise applicable requirements, industry will be responsible for the sampling costs of such programs*. Conversely, PD 04-115-02 states that NMFS will assume sampling costs if EM is *necessary and appropriate to meet legal obligations (e.g., requirements of the Endangered Species Act), and sufficient appropriated funds are available*. The Council's policy has been that federal agencies should cover cost of monitoring programs that are for monitoring protected and rare species. This has also been the basis of NMFS covering the cost of the Pacific Islands Regional Observer Program.

PD 04-115-02 is not a legally binding document and guidance has not been provided on how NMFS will adhere to this policy following recent Executive Orders in 2025 and Supreme Court Ruling of *Loper Bright Enterprises v. Raimondo.* That case stemmed from a dispute over the NMFS requirement for fishermen to fund at-sea monitoring programs in the Atlantic herring fishery, components of which were successfully challenged in court by commercial fishing companies.

At its 201st Council Meeting, the Council took initial action to recommend NMFS phase in the use of NMFS-approved EM systems over a three year period (2025-2027) with NMFS funding, as an optional program to supplement the human observer program until permanent resources are available to fully implement a mandatory program. At its 202nd Meeting, the Council further recommended that NMFS cover the costs of EM beyond 2027, including both administrative and sampling costs, noting the primary purpose of EM is to monitor protected species interactions in longline fisheries, in lieu of sufficient future human observer coverage.

This document analyses cost allocation scenarios based on uncertainty in future funding and policies on cost allocation. The Council may recommend that NMFS should assume all financial responsibility for maintaining the EM program immediately and in the foreseeable future, like it has for the human observer program for the Pacific Islands Region (Alternative A, *preliminary preferred*). In contrast, the Council may recommend that industry assume a portion of cost-sharing for implementation of EM (Alternative B), or - for impact analysis purposes - that industry would have to cover all of the costs associated with implementing an EM program after 2027 (Alternative C). For a more detailed analysis of the cost allocation scenario, see Sections 4.1.1, 4.2.1, and 4.3.1.

### 2.3.1. Alternative A: Implement EM with public Federal (NMFS) funding (preferred)

At the 202nd Council meeting, the Council recommended that NMFS assume all EM program costs in the future, including both administrative and sampling, due to the primary purpose of EM for protected species monitoring under the auspices of the ESA. Under Alternative A, NMFS would cover all initial and ongoing costs of this longline EM program. This alternative is consistent with NMFS current and past funding all monitoring using on-board human observers, and is consistent with policy (NMFS 2019) given that both on-board observers and the proposed EM programs focus on monitoring interactions with protected species. The total cost of implementing this EM program is estimated at just under $2.5 million per year (NMFS, 2021).

### 2.3.2. Alternative B: Implement EM with public-private cost-sharing, industry partially covering sampling costs (EM camera replacement)

At the 202nd Council meeting, NMFS proposed future cost sharing of EM with fishermen to initiate Council consideration of potential cost-sharing alternatives given uncertainty in future NMFS budgets. The proposal was that fishermen be responsible for future on-board EM system replacement costs. These costs are estimated to be about $10,000 per EM system over the estimated three year life-cycle of the equipment used in the EM-systems, particularly the cameras (NMFS 2021). Alternative B is this NMFS proposed approach: an EM program with cost-sharing and industry responsible for only a portion of overall EM sampling costs related to system replacement; $10,000 per vessel every three years, $3,333 per year per EM system, or about $0.5 million annually across 162 longline vessels.

### 2.3.3. Alternative C: Implement EM with private (industry) funding covering sampling costs

Alternative C is included to illustrate the most extreme possible financial impact of implementing EM on longline fishermen in the Pacific Island Region. Current funding uncertainty suggests that a future with no public funding available for fisheries monitoring is plausible, and thus should be considered. Consistent with NMFS policy (NMFS 2019), Industry could be responsible for the total sampling costs of an EM program. Under Alternative C, industry would cover all sampling costs, estimated to be $1.9 million per year among all participating vessels. Administrative costs, estimated at $0.5 million per year, would continue to be funded by NMFS, per its directive on cost allocation (NMFS, 2019) under Alternative C.

## 3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section describes the baseline condition of resources in the action area under recent fishery conditions. This section also describes the socioeconomic and management setting, as well resources eliminated from detailed analysis. NMFS and the Council derive the information in this section primarily from the 2023 Pelagic FEP Stock Assessment and Fishery Ecosystem (SAFE) Report (WPRFMC 2024), the FEP (WPRFMC 2009a), the NMFS species directory, the NMFS Stock SMART webpage (summaries of NMFS approved stock assessment reports), and other available information cited below.

### 3.1. Target and Non-Target Stocks

Pelagic management unit species (MUS) managed under the FEP that the Hawaii and American Samoa longline fisheries harvest include several species of tuna, billfish, and sharks shown in Table 4. Tables 6-8 summarize catches of the most commonly caught species in these fisheries. These and other catch statistics are presented in the 2023 SAFE report (WPRFMC 2024).

Action alternatives discussed in this document focus entirely on required and other monitoring and would not affect fishing in terms of gear use or fishing operations associated with catching or avoiding target and non-target fish species. Therefore, much of the detailed information regarding these species is incorporated here by reference. For a comprehensive discussion of the biology, life history, factors that affect distribution and abundance of pelagic MUS, and other information, see the FEP (WPRFMC 2009a) or search the NMFS species directory for a summary of species-specific information. Recent target and non-target catch data for the Hawaii and American Samoa longline fisheries is available in the 2023 Annual SAFE Report, along with a detailed summary of the environment affected by this action (WPRFMC 2024).

### 3.2. Status of the MUS in the Hawaii and American Samoa Longline fisheries

The FEP (WPFMC 2009) includes status determination criteria (SDC) for quantifying if overfishing is occurring or a MUS is overfished. Specifically, overfishing occurs when the fishing mortality rate (F) for one or more years is greater than the maximum fishing mortality threshold (MFMT), which is the fishing mortality rate (F) that produces maximum sustainable yield ($F_{MSY}$). Thus, if the $F/F_{MSY}$ ratio is greater than 1.0, overfishing is occurring. A stock is considered overfished when its biomass (B) has declined below the minimum stock size threshold (MSST), or the level that jeopardizes the capacity of the stock to produce maximum

sustainable yield (MSY) on a continuing basis ($B_{MSY}$). Specifically, the $B_{MSST} = (1\text{-}M)B_{MSY}$, where M is the natural mortality rate of the stock, or one half of $B_{MSY}$, whichever is greater. For example, if the natural mortality rate of a stock is 0.35, $B_{MSST} = 0.65*B_{MSY}$. Thus, if the $B/B_{MSY}$ ratio for the stock falls below 0.65, the stock is overfished. If a stock has a natural mortality rate greater than 0.6, MSST is set at the default of $0.5*B_{MSY}$ (because 1- 0.6 = 0.4, and 0.5 is greater than 0.4). For such a stock, the stock is overfished when the $B/B_{MSY}$ ratio falls below 0.5. National Standard 1 guidelines at 50 CFR 600.310(e)(1)(i)(C) define $B_{MSY}$ as the long-term average size of the stock measured in terms of spawning stock biomass (SSB) or other appropriate measure of the stock's reproductive potential that would be achieved by fishing at $F_{MSY}$. Thus, whenever available, NMFS will use estimates of SSB in determining the status of a stock. When estimates of SSB are not available, NMFS may use estimates of total biomass or other reasonable proxies for determining stock status.

For some MUS, the SDC specified in the FEP differs from the SDC or limit reference points (LRPs) adopted by international management organizations like the WCPFC and IATTC. Additionally, in some cases, the LRPs adopted by the WCPFC for a particular stock of fish differs from the LRPs adopted by the IATTC. Finally, in other instances, no stock assessments are available and fishery management organizations must infer stock status from other indicators or not at all. For the purposes of stock status determinations, NMFS uses the SDCs specified in the FEP. For a comprehensive discussion of the biology and life history of MUS, see the FEP.

Many of the MUS, or fish managed under the FEP are also managed under the international agreements to which the United States is a party. Both the WCPFC and IATTC have adopted criteria for 'overfishing' and 'overfished' designations for certain species that differ from those under the FEP. For the purposes of stock status determinations, NMFS determines stock status of pelagic MUS using the Status Determination Criteria (SDC) also known as limit reference points (LRPs) for overfishing and overfished conditions described in detail in the FEP and briefly below (WPRFMC 2009a).

Table 5 shows the stock status of pelagic MUS measured against the SDCs of the FEP using data from the most recent stock assessment. The current status of the stock represents the best scientific information available regarding the effects of past and present actions on MUS and non-target stocks.

Table 5. Stock status of pelagic management unit species under the FEP.

| Stock | Is overfishing occurring? | Is the stock overfished? | Assessment results |
|---|---|---|---|
| Skipjack Tuna; Western and Central Pacific Ocean (WCPO) | No | No | Castillo Jordan et al. (2022) |
| Skipjack Tuna; Eastern Pacific Ocean (EPO) | No | No | Maunder (2022) |
| Yellowfin Tuna (WCPO) | No | No | Magnusson, et al (2023) |
| Yellowfin Tuna (EPO) | No | No | Minte-Vera et al. (2020) |
| Albacore (S. Pacific) | No | No | Tremblay-Boyer et al. (2022) |
| Albacore (N. Pacific) | No | No | ISC (2023) |
| Bigeye Tuna (WCPO) | No | No | Day et al (2023) |
| Bigeye Tuna (EPO) | No | No | Xu et al. (2024) |
| Pacific Bluefin Tuna | No | No | ISC (2024) |
| Blue Marlin (Pacific) | No | No | ISC (2021) |
| Swordfish (N. Pacific) | No | No | ISC (2023b) |
| Striped Marlin WC (N. Pacific) | Yes | No | ISC (2023a) |
| Striped Marlin; NE. Pacific Ocean | No | No | Hinton et al (2010) |
| Blue Shark (N. Pacific) | No | No | ISC (2022) |
| Oceanic white-tip shark (WCPO) | Yes | Yes | Tremblay-Boyer et al. (2019) |
| Silky shark (WCPO) | Yes | No | Clarke et al. (2018) |
| Silky Shark (EPO) | Yes | No | Lennert-Cody et al. (2022) |
| Shortfin mako shark (N. Pacific) | No | No | ISC (2024a) |
| Common thresher shark (N. Pacific) | No | No | Teo et al. (2018) |
| Other Billfishes[1] | Unknown | Unknown | -- |
| Other Pelagic Sharks[2] | Unknown | Unknown | -- |
| Other PMUS[3] | Unknown | Unknown | -- |

[1]Black Marlin (Pacific), Shortbill Spearfish (Pacific), Sailfish (Pacific)
[2]Longfin Mako Shark (N. Pacific), Bigeye Thresher Shark (N. Pacific), Pelagic Thresher Shark (N. Pacific), Salmon Shark (N. Pacific)
[3]Dolphinfish (Pacific), Wahoo (Pacific), Opah (Pacific), Pomfret (family *Bramidae*, W. Pacific), Kawakawa (Pacific), Oilfish (family *Gempylidae*, Pacific), other tuna relatives *(Auxis* spp., *Allothunnus* spp., and *Scomber* spp, Pacific), Squids (Pacific)

For summary information on individual stock assessment results, as reported to the NOAA Fisheries Office of Science and Technology through the Species Information System, see the Stock SMART webpage. This webpage summarizes the best scientific information available and provides links to stock assessment reports for each species. More information on the status, life history, biology, and management for each species can be found by searching the NMFS species directory or from links in Table 4.

### 3.3. Bycatch in the Hawaii and American Samoa Longline fisheries

The estimated released catch, or bycatch, for the 10 most commonly by-caught species of fish in the Hawaii and American Samoa longline fisheries in 2016-2022 are summarized in Table 6 through 8. The information in these tables are based on on-board Observer Program data from these fisheries. These and other catch statistics for these longline fisheries can be found in the 2023 SAFE report (WPRFMC 2024).

Table 6. Total estimated bycatch in number of fish for the 10 most commonly by-caught species from the Pacific Islands Region Observer Program for the Hawaii deep-set longline fishery

| Species | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Average | SD |
|---|---|---|---|---|---|---|---|---|---|
| Lancetfish, Longnose | 229,791 | 230,048 | 309,551 | 275,802 | 288,339 | 217,244 | 153,865 | 243,520 | 52,455.4 |
| Shark, Blue | 102,250 | 123,166 | 119,306 | 134,067 | 139,284 | 124,209 | 87,911 | 118,599 | 17,930.4 |
| Snake Mackerel | 110,655 | 120,432 | 79,308 | 49,481 | 43,862 | 67,877 | 59,556 | 75,882 | 29,604.4 |
| Escolar | 37,860 | 35,052 | 44,873 | 47,973 | 50,556 | 53,089 | 45,225 | 44,947 | 6,520.9 |
| Shark, Bigeye Thresher | 11,639 | 9,551 | 6,519 | 10,399 | 9,754 | 13,313 | 11,746 | 10,417 | 2,161.4 |
| Stingray, Pelagic | 6,958 | 6,608 | 7,234 | 10,949 | 9,357 | 8,526 | 9,533 | 8,452 | 1,599.2 |
| Pomfret, Dagger | 6,464 | 7,443 | 8,188 | 8,929 | 5,667 | 9,450 | 5,936 | 7,440 | 1,481.8 |
| Tuna, Bigeye | 20,723 | 20,800 | 24,053 | 19,481 | 20,596 | 12,360 | 5,773 | 17,684 | 6,343.4 |
| Tuna, Yellowfin | 5,615 | 9,455 | 5,201 | 7,434 | 6,138 | 10,804 | 5,064 | 7,102 | 2,245.7 |
| Tuna, Unidentified | 5,731 | 6,337 | 5,164 | 6,855 | 4,097 | 5,052 | 4,899 | 5,448 | 932.2 |

Note: The top 10 species comprised 91.5% of total bycatch in 2022.

Table 7. Total estimated bycatch in number of fish for the 10 most commonly by-caught species from the Pacific Islands Region Observer Program for the Hawaii shallow-set longline fishery

| Species | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Average | SD |
|---|---|---|---|---|---|---|---|---|---|
| Shark, Blue | 11,853 | 10,102 | 4,115 | 4,225 | 6,949 | 6,446 | 8,252 | 7,420 | 2,882.1 |
| Lancetfish, Longnose | 1,784 | 2,728 | 1,211 | 1,232 | 1,268 | 2,480 | 3,150 | 1,979 | 803.6 |
| Shark, Shortfin Mako | 968 | 1,085 | 537 | 298 | 1,151 | 808 | 1,224 | 867 | 342.0 |
| Escolar | 459 | 765 | 150 | 122 | 152 | 521 | 557 | 389 | 250.5 |
| Swordfish | 1,049 | 1,419 | 735 | 254 | 251 | 499 | 541 | 678 | 428.7 |
| Oilfish | 171 | 327 | 114 | 57 | 248 | 219 | 359 | 214 | 109.1 |
| Snake Mackerel | 315 | 638 | 62 | 16 | 31 | 98 | 151 | 187 | 222.9 |
| Stingray, Pelagic | 245 | 284 | 440 | 82 | 328 | 171 | 123 | 239 | 124.6 |
| Tuna, Albacore | 5 | 28 | 6 | 1 | 51 | 63 | 82 | 34 | 32.1 |
| Dolphinfish | 1 | 0 | 34 | 18 | 20 | 75 | 69 | 31 | 30.4 |

Note: The top 10 species comprised 96.8% of total bycatch in 2022.

Table 8. Total estimated bycatch in number of fish for the 10 most commonly by-caught species from the Pacific Islands Region Observer Program for the American Samoa longline fishery

| Species | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Average | SD |
|---|---|---|---|---|---|---|---|---|---|
| Stingray, Pelagic | 19,459 | 16,306 | 8,156 | 11,908 | 8,395 | 8,259 | 6,487 | 11,282 | 4,877.5 |
| Escolar, Longfin | 8,820 | 9,652 | 5,605 | 6,609 | 5,037 | 4,788 | 3,706 | 6,317 | 2,189.9 |
| Escolar | 7,756 | 7,773 | 5,567 | 5,094 | 5,540 | 5,517 | 3,111 | 5,765 | 1,614.7 |
| Lancetfish, Longnose | 6,228 | 5,881 | 5,482 | 4,991 | 4,063 | 3,913 | 2,749 | 4,758 | 1,240.5 |
| Tuna, Yellowfin | 1,873 | 1,702 | 1,345 | 1,180 | 1,476 | 1,363 | 1,755 | 1,528 | 253.5 |
| Shark, Blue | 4,490 | 4,224 | 3,359 | 2,681 | 2,958 | 2,721 | 1,752 | 3,169 | 947.4 |
| Tuna, Albacore | 1,078 | 1,520 | 1,630 | 1,584 | 1,136 | 1,077 | 1,258 | 1,326 | 245.2 |
| Snake Mackerel | 1,049 | 1,026 | 1,183 | 1,689 | 1,568 | 1,502 | 1,221 | 1,320 | 264.3 |
| Shark, Silky | 1,874 | 1,695 | 1,212 | 1,840 | 1,227 | 1,238 | 949 | 1,434 | 363.4 |

Note: The top 10 species comprised 81.2% of total bycatch in 2022.

## 3.4. Protected Species

The Hawaii and American Samoa longline fisheries have the potential to interact with a range of protected species (such as sea turtles, marine mammals, sharks and rays, and seabirds). This section provides background on the status of these species, the recent annual estimated or observed interactions in longline fisheries, and a summary of the effects of the standard operation of the longline fisheries with a comparison to incidental take statements (ITS) where relevant. We will consider trends in species status and recent interaction levels to be the baseline condition for comparison of environmental effects of the alternatives in section 4.

For a comprehensive discussion of the biology, life history, factors that affect distribution and abundance of protected species, and other information, see the current NMFS BiOp for each species, the FEP (WPRFMC 2009), or search the NMFS species directory for a summary of species specific information. More detailed information on protected species interactions in longline fisheries, see the 2023 Annual SAFE Report (WPRFMC 2024), incorporated here by reference.

### 3.4.1. Endangered Species Act

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 insure 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 BiOp.

The ESA also prohibits the taking of listed species without a special exemption. Taking that is incidental to a Federal action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the RPMs and T&Cs of an ITS. The RPMs 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 (RPAs) 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 through ESA consultations, including applicable RMPs, and their associated T&Cs, intended to minimize the potential effects of incidental take.

The following list identifies the BiOps under which western Pacific longline fisheries currently operate. This section summarizes much of the information contained in these documents to describe baseline conditions. For further information, refer to the following documents on the NMFS website or by contacting NMFS using the contact information at the beginning of the document.

- USFWS 2012, Biological Opinion of the U.S. Fish and Wildlife Service for the Operation of Hawaii-based Pelagic Longline Fisheries, Shallow-Set and Deep-Set, Hawaii.
- NMFS. 2019. Biological Opinion on the Continued Authorization of the Hawaii Pelagic Shallow-set Longline Fishery.
- NMFS. 2023a. Biological Opinion for the Authorization of the American Samoa Longline Fishery.
- NMFS. 2023b. Biological Opinion for the Authorization of the Hawaii Deep-Set Longline Fishery.
- NMFS. 2024. Supplemental Biological Opinion on Continued Authorization of Hawai‘i Shallow-Set Longline Fishery.

Ongoing fishing activities may adversely affect listed marine turtle and elasmobranch species. However, the activities are not likely to jeopardize the continued existence of these species. Two RPMs were included to minimize the impacts (i.e., amount or extent) of incidental take of these species associated with the fishery.

In addition to the BiOps listed above, more detailed information, including the range, abundance, status, and threats of the listed species can be found in reports such as status reviews, 5-year reviews, and recovery plans for each species found on the NMFS species website pages, the NMFS species directory, the FWS environmental conservation online system (ECOS) or by clicking on the hyperlink for each species.. For additional information, please see Section 3.3 of the annual FEP SAFE Report. Direct links for recent biological opinions are provided below where available.

### 3.4.2. Marine Mammal Protection Act

NMFS monitors the effects of the fisheries on non-ESA listed marine mammals through comparison of the average level of interactions that result in mortalities or serious injuries (M&SI) to a stock's potential biological removal (PBR). For most marine mammal stocks where

the PBR is available, the number of observed takes of marine mammal species in the deep-set longline fishery inside the U.S. EEZ around Hawaii and American Samoa are well below the PBR in the period covered by the most current stock assessment report. For more information, including current observed interactions by fishery, please see Section 3.4 of the annual FEP SAFE Report.

The Marine Mammal Protection Act (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 assessment reports (see 16 U.S.C. § 1361, et seq.). These reports categorize stocks as either strategic or not strategic. Strategic stocks are either ESA-listed stocks, depleted stocks under the MMPA, or stocks with estimated human-caused mortality that exceeds its PBR level.

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 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. Annual mortality and serious injury of a stock in a given fishery is by itself responsible for the annual removal of greater than or equal to 50 percent or more of any stock's PBR level (i.e., frequent incidental mortality and serious injuries of marine mammals).

Category II designates fisheries with occasional serious injuries and mortalities incidental to commercial fishing. Annual mortality and serious injury of a stock in a given fishery is, collectively with other fisheries, responsible for the annual removal of greater than 10 percent of any stock's PBR level, and is by itself responsible for the annual removal of between 1 and less than 50 percent, exclusive, of any stock's PBR level (i.e., occasional incidental mortality and serious injuries of marine mammals).

Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities. A Category III fishery is, collectively with other fisheries, responsible for the annual removal of 10 percent or less of any stock's PBR level; or collectively with other fisheries, more than 10 percent of any stock's PBR level, but is by itself responsible for the annual removal of 1 percent or less of PBR level (i.e., a remote likelihood or no known incidental mortality and serious injuries of marine mammals).

According to the 2024 List of Fisheries (89 FR 12257, February 16, 2024), the Hawaii deep-set longline fishery is a Category I fishery, and the Hawaii shallow-set longline fishery, the Hawaii Troll fishery, and the American Samoa longline fishery are Category II fisheries. Among other requirements, owners of vessels or gear engaging in a Category I or II fishery are required under 50 CFR 229.4 to obtain a marine mammal authorization to lawfully take incidentally, non-ESA listed marine mammals by registering with NMFS' marine mammal authorization program.

Section 118 of the MMPA requires NMFS to prepare a take reduction plan for each strategic marine mammal stock that interacts with a Category I or Category II fishery. NMFS established

the False Killer Whale Take Reduction Team in 2010 (75 FR 2853) and implemented the False Killer Whale Take Reduction Plan (FKWTRP) in 2012 (72 FR 71259) to reduce M&SI of false killer whales in the Hawaii longline fishery.

Section 101(a)(5)(E) of the MMPA requires the Secretary of Commerce to allow the incidental, but not intentional, taking of individuals from marine mammal stocks that are designated as depleted because of a listing as threatened or endangered under the ESA in the course of commercial fishing operations if it is determined that three criteria are met:

1. Incidental (M&SI) will have a negligible impact on the affected species or stock;
2. A recovery plan has been developed or is being developed; and
3. Where required under section 118 of the MMPA, a monitoring program has been established, vessels engaged in such fisheries are registered in accordance with Section 118 of the MMPA, and a take reduction plan has been developed or is being developed for such species or stock.

On June 13, 2024, NMFS issued a permit under the MMPA section 101(a)(5)(E), addressing the Hawaii deep-set fishery's interactions with ESA-listed species or depleted stocks of marine mammals (89 FR 50270). The permit authorizes the incidental, but not intentional, taking of ESA-listed humpback whales (Central North Pacific or CNP stock) and MHI insular false killer whales to vessels registered in the Hawaii deep-set fishery. In issuing the permit, NMFS determined that incidental taking by the deep-set fishery will have a negligible impact on the affected stocks of marine mammals. The humpback whale CNP stock delineation under the MMPA includes both ESA-listed and non-ESA-listed distinct population segments. For management purposes, NMFS treats such stocks as ESA-listed if a component of that stock is listed under the ESA and has been incidentally killed or seriously injured incidental to the analyzed commercial fishery.

Additional information on the marine mammals that interact with FEP fisheries, including geographic range, abundance, and status, are described in Section 3.3 of the annual FEP SAFE Report.

### 3.4.3. Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) makes it illegal to intentionally take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid Federal permit. In 2012, the FWS issued a special permit for the shallow-set fishery under the MBTA authorizing incidental take of certain seabirds in the Hawaii shallow-set fishery over a period of three years (USFWS 2012). On December 27, 2017, the U.S. Ninth Circuit Court of Appeals issued a split decision that reversed a lower district court decision upholding the MBTA permit. *Turtle Island Restoration Network v. NMFS & FWS*, 13-17123 (9th Cir. 2017). The Ninth Circuit Court majority opinion found that FWS improperly relied upon the special use permit to authorize the incidental take of sea birds by a commercial fishery. The permit expired on its own terms in March 2018 and NMFS determined that it would not reapply for the permit. On January 7, 2021, the FWS published a final rule (effective February 8, 2021) defining the scope of the MBTA as it applies to conduct resulting in the injury or death of migratory birds protected by the MBTA (86

FR 1134). In that January 2021 rule, FWS determined that the MBTA's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same, apply only to actions directed at migratory birds, their nests, or their eggs. On October 4, 2021, FWS published a final rule (effective December 3, 2021) revoking the January 2021 rule, and returning the implementation of the MBTA as prohibiting incidental take and applying enforcement discretion consistent with judicial precedent and FWS practice prior to 2017 (86 FR 54642). NMFS and the Council continue to monitor interactions with seabirds and have implemented take mitigation measures.

Additional information on the seabirds that interact with FEP fisheries are described in in Section 3.3 of the annual FEP SAFE Report.

### 3.4.4. Analysis and Monitoring Approach

NMFS monitors fishery interactions with protected species using at-sea observers, among other means described in the Section 1.1 above. The NMFS Observer Program monitors interactions on 100 percent of shallow-set fishing trips and on approximately 7 percent of all Hawaii and American Samoa deep-set longline trips, although past coverage in the Hawaii and American Samoa deep-set longline trips was closer to 20%. PIFSC generates fleet-wide estimates of interactions for the deep-set longline fisheries using methods described by McCracken et al. (see WPFMC 2024), when available. When these data are not available, NMFS estimates fleet-wide interactions by expanding observed takes using an expansion factor based on the observer coverage rate. For example, because the Hawaii deep-set longline fishery was observed at a 20.4 percent coverage rate in 2017, NMFS multiplied each observed interaction by 4.9 to estimate interactions at a 100 percent coverage rate.

## 3.5. Marine Habitats, Critical Habitat, and Essential Fish Habitat

Under the baseline, FEP longline fisheries are not known to have adverse effects on marine habitats. Additionally longline fishing activity is prohibited throughout the coastal zone of the action area. Longline fishing may occur in areas designated as critical habitat for Main Hawaiian Islands IFKW DPS, Hawaiian monk seals, and leatherback sea turtles. All potential areas of overlap have been reviewed in Biological Opinions. Longline fishing does not occur in marine protected areas (MPA), marine sanctuaries, or marine monuments so those areas would not be affected.

Longline fishing involves suspending baited hooks in the upper surface layers of the water column, which does not materially affect benthic marine habitat under typical operations. Derelict longline gear may impact marine benthic habitats, especially substrate such as corals if carried by currents to shallow depths. When fishing, all longliners occasionally lose hooks, mainline, floats, float lines, and branch lines, which include lead weights in the deep-set fishery.

## 3.6. Fishery and Socio-economic Setting

The socioeconomic setting for the Hawaii and American Samoa longline fisheries are described below. A more detailed description of the fisheries and the latest socio-economic statistics, including revenue trends, can be found in the FEP Annual SAFE Reports at: http://www.wpcouncil.org/annual-reports/.

U.S. and territorial longline fisheries comprise the Hawaii deep-set tuna longline fleet (including several vessels based on the U.S. West Coast), the Hawaii shallow-set swordfish longline fleet, and the American Samoa albacore longline fleet. In the past, several deep-set tuna longline vessels were based in Guam and the CNMI, but there has been no longline fishing in these locations since 2011.

### 3.6.1. Hawaii Longline Fisheries

Domestic longline fishing around Hawaii consists of the shallow-set sector and the deep-set sector, subject to separate mitigation measures based on the characteristics of the fishing activity. The deep-set fishery targets bigeye tuna in the EEZ around Hawaii and on the high seas at an average target depth of 167 m (WPFMC 2009). The shallow-set fishery targets swordfish to the north of the Hawaiian Islands. NMFS and the Council manage the fisheries under a single limited-access permit program. Some Hawaii-permitted vessels also hold American Samoa longline permits. The number of dual-permitted vessels has ranged between 14 and 26 over the last five years (NMFS unpublished data). Dual-permitted vessels land their catch in Hawaii or American Samoa. For the most recent fishery performance information, please see the 2023 SAFE report.

Fishing locations may vary seasonally based on oceanographic conditions, catch rates of target species, and management measures, among others. The deep-set fishery operates in the deep, pelagic waters around the Hawaiian archipelago and on the high seas throughout the year, mostly within 300-400 nm (556-741 km) of the main Hawaiian Islands (MHI). The shallow-set fishery operates almost entirely north of Hawaii, depending on seawater temperature. There is some overlap between the two longline fisheries between 20ºN and 30ºN. However, Federal regulations and other applicable laws prohibit longline fishing inside the 200 nm U.S. EEZ around the Northwestern Hawaiian Islands. Longline fishing within 50 to 75 nm from the shoreline in the MHI is prohibited to minimize the potential for gear conflicts with small boat fisheries and interactions with protected species.

Federal regulations may temporarily prohibit longline fishing in the Southern Exclusion Zone (SEZ), an area in the EEZ south of Hawaii (84 FR 5356, February 21, 2019). An SEZ closure is triggered under regulations implementing the False Killer Whale Take Reduction Plan if there are two or more observed serious injuries or mortalities of false killer whales in the EEZ around Hawaii in a given year.

In general, deep-set longline vessels operate out of Hawaii ports, with the vast majority based in Honolulu. Infrequently, deep-set trips originate from other ports such as Long Beach or San Francisco, California, or Pago Pago, American Samoa, and then fishermen land their catches in Hawaii. Fishermen departing from California begin fishing on the high seas, outside the EEZ. Fishermen departing from American Samoa usually begin fishing near the equator or farther north where they expect higher catch rates of bigeye tuna. The shallow-set (swordfish-targeting) longline fishery operates in the U.S. EEZ around Hawaii and on the high seas to the north and northeast of the MHI seasonally.

Fishing effort in the Hawaii deep-set longline fishery has increased over the years. From 2004-2012, the annual number of vessels that participated in the deep-set fishery remained relatively stable, ranging from 124 to 129. The number of active vessels has increased since 2012, with an average of 141 vessels operating over the last ten years (2012-2021). In 2021, 146 deep-set longline vessels made 1,690 trips with 22,192 sets and deployed 65.4 million hooks (Figure 2 andFigure 3). In 2021, the deep-set longline revenue was $108.5 million and represented 87% of the total revenue from Hawaii-based longline fisheries.

The number of vessels participating in the Hawaii shallow-set fishery has declined over time from a high of 35 vessels in 2006 to a low of 11 vessels in 2018 with 17 participants in 2021. The numbers of trips and hooks have been more variable, although well below amounts in years prior (Figure 4 andFigure 5). The shallow-set longline fishery is subject to an annual hard cap for the numbers of interactions with leatherback sea turtles. If the fishery reaches the hard cap, under current regulations, the fishery is subject to closure. The shallow-set fishery generated $4.7 million in 2021 and accounted for 4% of the total revenue.

### 3.6.2. American Samoa Longline Fishery

The longline fishery based in American Samoa is a limited access fishery with a maximum of 60 vessels under the Federal permit program. Vessels with a valid permit in this fishery may also apply for a Hawaii longline permit (see Section 3.5.1). This action only applies to those vessels with dual permits, and not those vessels holding only an American Samoa longline permit. Vessels range in size from under 40 to over 70 ft long. The fishery primarily targets albacore for canning in the local Pago Pago cannery, although the fishery also catches and retains other tunas (e.g., bigeye, yellowfin, and skipjack), and other pelagic MUS (e.g., billfish, mahimahi, wahoo, oilfish, moonfish (opah), and sharks) for sale and home consumption. The target depth for albacore tuna is approximately 100-300 m (WPFMC 2009). Troll and handline fishing also occur on a commercial and non-commercial basis in American Samoa, representing relatively small annual catches of yellowfin and skipjack tunas, and other pelagic MUS.

American Samoa longline fishing vessels operate in the EEZ around American Samoa, on the high seas in international waters, and occasionally in the EEZs of countries adjacent to American Samoa. Additionally, between14 and 26 American Samoa longline limited access permit holders also hold Hawaii longline limited access permits, the latter of which allows them to fish in the EEZ around Hawaii and land fish in Hawaii. As previously noted, vessels possessing both an American Samoa and a Hawaii longline limited access permit have an exception to fishery restrictions on the retention on bigeye tuna in the WCPO and may continue to retain bigeye on the high seas and land fish in Hawaii if NMFS prohibits catch and retention of bigeye tuna in the WCPO when the fishery reaches the U.S. WCPO limit.

Federal regulations prohibit commercial fishing within marine national monuments. Fishing within the Large Vessel Prohibited Area (LVPA) for vessels greater than 50 feet in length (generally within 50 nm of emergent lands) has been prohibited. Since July 6, 2021 (86 FR 36239), U.S. large longline vessels that hold a Federal American Samoa longline limited entry permit may fish within the LVPA to approximately 12-17 nm from the shoreline around Swains Island, Tutuila, and the Manua Islands. Figure 6 shows the distribution of fishing effort by the American Samoa deep-set longline fleet in millions of hooks in years 2008-2017.

Effort in the American Samoa deep-set longline fishery peaked in 2007, when 29 vessels participated and deployed 5,920 sets with approximately 17,554,000 hooks (NMFS 2015). Since that time, fishery statistics across all categories have generally declined; in 2021, 11 vessels made 40 trips and deployed 1,484 sets with 4.2 million hooks (WPFMC 2022). Total longline fleet revenue is estimated at $2.55 million in 2021.

## 3.7. Administrative and Regulatory Process

NMFS determines the status of internationally managed stocks through stock assessments produced by various scientific bodies. These bodies provide advice to the WCPFC in the WCPO and IATTC in the EPO. NMFS reviews the assessments and notifies the appropriate Council if overfishing is occurring and/or a stock is overfished. If a stock is overfished, under the Magnuson-Stevens Act Section 304(i), the Council has one year to develop recommendations for domestic regulations to address the relative impact of fishing vessels of the United States on the stock, as well as developing recommendations to the Secretary of State and Congress for international actions that will end overfishing and rebuild the stock. This action represents the domestic regulations component of this requirement and the Council has previously provided recommendations to the Secretary of State and Congress (see Section 1.3), including recommendations for international management to the WCPFC. The WCPFC has not advanced those recommendations to date.

PIFSC will ensure the efficacy of an in-season accountability measure by forecasting and monitoring striped marlin catches landed by U.S. vessels inside the WCPFC Convention Area north of the equator. PIFSC has performed in-season catch monitoring throughout the year since 2011.

Regarding enforcement, the NOAA Office of Law Enforcement and U.S. Coast Guard monitor vessel compliance with applicable regulations and laws, including territorial catch/effort or allocation limits, through vessel monitoring systems and vessel boarding at sea.

NMFS also conducts management activities relevant to managing the longline fisheries as a whole. These include the ESA listing and consultation process, conducting status reviews and recovery planning under the ESA, observer placements on vessels, and protected species workshops. These management processes would continue under the proposed action without change

## 3.8. Resources Eliminated from Detailed Study

The proposed action and potential alternatives would not affect resources of scientific, historic, cultural, or ecological importance in the PIR, other than those described above. Longline fishing activities are not known to result in adverse effects to scientific, historic, archeological or cultural resources because the majority of fishing activities covered by this action occur generally more than 50 nm offshore.

NMFS is not aware of studies that show effects from pelagic longline fisheries to species fecundity or negative predator/prey relationships that result in adverse changes to food web dynamics. Without management to ensure fishing is sustainable, the removal of top predator

pelagic species such as bigeye tuna, yellowfin tuna, and billfish has the potential to cause wide-ranging change to ecosystem functions, biodiversity, and habitats. However, both international and domestic catches are managed throughout the Pacific. NMFS expects such management to improve stock status and prevent changes to ecosystem function. Therefore, NMFS does not analyze effects on biodiversity and/or ecosystem function in this assessment.

## 4. EFFECTS OF THE ALTERNATIVES

This section describes the potential effects of each alternative on the affected environment, focussing primarily on effects to the socio-economic and management setting. Socio-economic setting focuses on the variable costs of EM implementation on primarily fishermen. Management setting includes such concerns as regulatory monitoring requirements and requirements under the ESA and MMPA.

Potential effects, or impacts , of the Alternatives considered in this decision document are classified in terms of scale, duration, magnitude, and whether the effects are beneficial or adverse. Scale refers to the geographic extent of the proposed action, and will be classed as either small-scale, minor, or major. The duration of the effects will be either short-term, long-term, or permanent. Effect magnitude is classed as one of: no effect, negligible, minor, moderate, or major. For adverse effects, the three dimensions (scale, duration, and magnitude) will be considered to determine if the effect is significant. For an effect to be generally considered to meaningfully contribute to a significant impact, the scale would be major, the duration would be long-term or permanent, and the magnitude would be major.

*No effects on Physical & Biological Resources anticipated across any alternatives*

The no action alternative (Alternative 1) to not implement an EM program for longline fisheries would make no changes to the fishery in terms of effort, operations, areas fished, species targeted or affect other fishery resources managed under the Pelagic FEP or other fishery ecosystem plans, and thus we would expect no impact to physical or biological resources of this action. Implementing an EM requirement under any of the action alternatives (Alternatives 2 & 3) would similarly not be expected to directly affect fishing effort, operations, areas fished, species targeted, or other fishery resources managed under the Pelagic FEP. For this reason, we assume there will be no effects of the action on physical or biological resources in the short or long term, and they will not be discussed further.

*Effects on Socio-economic and Management settings*

Effects of the action on socio-economic and management setting are expected across all alternatives, and the specifics of those potential effects are discussed relative to the three EM program implementation alternatives below.

## 4.1. Potential effects of Alternative 1

### 4.1.1. Effects on Socio-economic Setting

If the Council decides to select Alternative 1, no action, the Hawaii and American Samoa limited entry fisheries would be operating under the status quo and both industry and NMFS not incurring costs beyond 2027. This section describes the profitability outlook under the status quo that the Alternatives 2 and 3 are compared against. These status quo economic outlooks are also consistent with selection of Alternative A, if EM is implemented under Alternative 2 or 3.

Hawaii Longline Fishery Profitability Outlook

The Hawaii longline fishery's most recent cost-earnings study was conducted using data from 2022 (PIFSC, 2023). The average vessel generated approximately $807,700 in gross revenue, but after factoring in trip costs (like food, ice, and bait, accounting for 26% of revenue), fuel costs (29% of revenue), and labor (22% of revenue), sales/auction fees (9%), and other fixed costs (9%), the profit margin was significantly reduced to 5% of total revenue. A notable 38% of surveyed vessels experienced profit losses in 2022. Inflation and the economic impact of the COVID-19 pandemic contributed to increased trip costs (WPRFMFC, 2004)

2022 vessel-level profitability varied across the fleet, with 38% of surveyed vessels operating at a negative profit. Based on the 2022 cost-earnings survey (measured by 2022 dollar value), the profit per vessel range was -$324,000 to $423,000 per year (average figure by 3 vessels), with the average vessel profit at $44,000.

American Samoa Longline Fishery Profitability Outlook

The American Samoa longline fishery's most recent cost-earning survey was completed in 2019 using data up to 2016 (Pan, 2019). The average American Samoa longline vessel generated $258,975 in revenue on average, with variable costs attributing to approximately 54% of revenue, labor costs 21% of revenue, fixed cost 13% of revenue, and a profit margin of 11% cash return (Pan, 2019). Average profit per vessel was estimated to be $26,340 per year. Based on Pan (2019) analyses, the likely profit per vessel range was -$23,000 to $73,000 per year.

Pan (2019) showed that the American Samoa fleet has a dichotomy of vessels that made positive cash returns (N=7) and negative cash returns (N=3) among participating vessels. The average revenue and profits for those vessels making a negative cash return were $182,052 and -$23,156, respectively. Those vessels generating a positive profit had revenue and cash returns of $291,942 and $47,553, respectively.

Since Pan (2019) estimates for the American Samoa longline fishery were conducted, fishery performance for the American Samoa longline fishery has improved, with respect to CPUE, from 12 fish per 1000 hooks in 2016 (Pan, 2019) to over 13.5 fish per 1000 hooks in 2024 (PIFSC, unpublished report). However, average fish price from the American Samoa longline fishery declined by 26% in 2024 compared to 2023, the lowest it has been in 20 years for the fishery, while net revenue per set decreased 6% in 2024 compared to 2023 (PIFSC, unpublished report). For the analyses presented in this section on economic impacts, estimates for the American

Samoa fishery are like under more optimistic scenarios.

### 4.1.2. Effects on Management Setting

As described previously, none of the alternatives, including this no action Alternative, are anticipated to adversely impact marine habitats, particularly critical habitat, essential fish habitat, habitat areas of particular concern, marine protected areas, marine sanctuaries, or marine monuments. The Hawaii and American Samoa pelagic longline fishery is not known to have large adverse impacts to habitats, thus none of the alternatives are likely to lead to substantial physical, chemical, or biological alterations to the habitat. Fishing activity would not occur in identified critical habitat, so no critical habitat would be impacted by the alternatives considered. Longline fishing does not occur in marine protected areas, marine sanctuaries or marine monuments. As a result, we do not expect indirect impacts to other managed species due to changes in habitats resulting from this action.

Under Alternative 1, EM would not be authorized as a tool for monitoring and the Hawaii and American Samoa longline fisheries would not be required or have an option to install and implement EM systems to satisfy compliance requirement which is expected to affect management setting, including the ability to comply with various management requirements.

To satisfy domestic compliance with longline fishing requirements under the MSA, ESA, and MMPA, NMFS and the council currently use logbook reporting validated by proper monitoring of the fishery. For example, MSA Section 301(a)(9), or National Standards 9 (50 CFR 600.350), indicated that Council should develop conservation and management measures that, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch. Also, MSA Section 303(a)(11), or standardized bycatch reporting methodologies (50 CFR 600 Subpart R) require any FEP prepared by the Council to establish Standardized Bycatch Reporting Methodologies (SBRMs) to assess the amount and type of bycatch occurring in the fishery. Human observer coverage has been used to fulfill monitoring requirements under Reasonable and Prudent Measures emerging from non-jeopardy ESA Section 7 Biological Opinions of Hawaii and American Samoa longline fisheries. MMPA take reduction triggers are also monitored through the use of human observers. See section 1.1.1.3 for Effects of Reduced Observer Coverage for a more comprehensive description of the effects of reduced observer coverage.

The human observer program has operated at a budget of approximately $7 million per year, with targeted 20% fleetwide coverage for the Hawaii deep-set fishery and 5-19% variable fleetwide coverage for the American Samoa longline fishery. The shallow-set sector has been operating at 100% human observer coverage. EM is a cost-effective monitoring tool that minimizes monitoring costs. According to the 2021-2025 Pacific Islands Electronic Technologies Implementation Plan, annual cost for an EM program for Western Pacific longline fisheries would be approximately $2.44 million per year (NMFS 2023).

Under Alternative 1, if the Council takes no action and does not authorize EM as a tool to monitor longline fisheries NMFS would continue to experience administrative burdens associated with managing the current human observer program. However, with observer

coverage continuing to decline in 2025 and beyond, the coverage rate is expected to drop below 7% in the Hawaii deep-set fishery. This raises the risk of fleetwide non-compliance with domestic and international monitoring requirements (section 1.1.1.4).

Under Alternative 1, there would be no transition to an EM program and thus there could be issues meeting domestic monitoring requirements under the MSA, ESA, and MMPA for these longline fishery. Additionally, not implementing an EM program may hinder our ability to meet international monitoring requirements, such as the current 5% human observer coverage rate requirement by the WCPFC.

Taken together, these expected effects of Alternative 1 would not address the purpose and need (section 1.4) defined for this action.

## 4.2. Potential Effects of Alternative 2

### 4.2.1. Effects on Socio-economic Setting

The 2021-2025 Pacific Islands Region Electronic Technologies Implementation Plan (NMFS, 2021) describes costs of implementing EM onboard 150 Hawaii and 10 American Samoa longline vessels. Costs are separated as sampling costs and administrative costs. Total estimated annual sampling and administrative cost would be $2,447,241 to run an EM program in both fisheries.

Sampling costs include itemized equipment purchases and installation, maintenance/repairs, data transmission, and actual EM footage review (~25% of longline sets reviewed) and data processing. Replacement costs of purchasing/leasing and installing EM systems on each vessel would be assumed to be incurred every three years per vessel at an estimated $10,000 per EM system or at an average rate of $3,333 per vessel per year, or $533,280 per year across 160 vessels. Annual total sampling costs for the two fisheries is estimated to be $1,928,491 per year, and if assumed by industry would be $12,053 per vessel per year.

Administrative costs are assumed to be subsumed by the Federal government under any scenario per NMFS Procedural Directive (PD) 04-115-02 (NMFS, 2019) on *Cost Allocation in Electronic Monitoring Programs for Federally Managed U.S. Fisheries*. Administrative costs include program support (Council rulemaking/support, staff time to review equipment and vessel monitoring plan, outreach, and video selection), certification of EM providers (i.e. contracts and reporting), EM performance monitoring, and video data and storage. Administrative costs are estimated to be $518,750 annually for an EM program, but are not part of cost allocation Alternatives analyzed in this document.

Status quo economic outlooks for Hawaii and American Samoa longline vessels for which cost-sharing scenarios under Alternative 2 are compared against are described in detail in Section 4.1.3.

Under Alternative 2 and its sub-Alternatives, 160 Hawaii and American Samoa longline vessels are participating in the implementation of EM as a mandatory monitoring program. Under Alternative 2 for a mandatory program, for 160 Hawaii and American Samoa longline vessels,

impacts of cost-sharing under Alternatives B and C (Tables 9 and 10) show significant impacts on profit. An average annual $3,333 cost sharing requirement for the replacement of EM systems every three years reduces average profits for Hawaii longline vessels by 7.6% and by 12.7% for American Samoa vessels. An annual $12,053 per-vessel cost sharing requirement for industry to cover all sampling costs reduces average profits for Hawaii longline vessels by 27.4% and by 45.8% for American Samoa longline vessels. For American Samoa, requiring industry to cover all sampling costs could reduce the estimated percentage could place 40% of vessels into profit losses, whereas the status quo has approximately 30% operating at a loss.

Implementation of EM introduces responsibilities and potential burdens that contrast with those vessel operators are subjected to under operating with a human observer. A summary of those responsibilities, tasks, and potential burdens are summarized in Table 11. However, with reduction of human observers, many of the responsibilities and burdens associated with maintaining a human observer onboard are removed. Those include maintaining livable space, responsibility for safety of a non-crew member, and provisioning the observer at sea. In contrast, EM operations require tasks associated with maintaining EM systems, as outlined in VMP (Appendix A).

Table 9. Impacts to Hawaii longline fishery economic performance, profit, profit margin, and range of fleetwide profits under cost-sharing allocation scenarios, based on 2022 PIFSC cost-earnings surveys.

| | **Alternative A:** Implement EM with public Federal (NMFS) funding (no industry cost) | **Alternative B:** Implement EM with public-private cost-sharing, with industry funding hardware replacement | **Alternative C:** Implement EM with all sampling costs funded by industry |
|---|---|---|---|
| Annual average cost per vessel | $0 | $3,333 | $12,053 |
| Average vessel profit and % reduction of profit margin | $44,000<br>5% profit margin | $40,667<br>(-7.6%) | $31,947<br>(-27.4%)<br><4% profit margin |
| Range of estimated fleetwide vessel profits | -$324,000 to $423,000 | -327,000 to $419,667 | -336,052 to $410,947 |
| Estimated % vessels operating at profit loss | 38% | 38% | 38% |

Table 10. Impacts to American Samoa longline fishery economic performance, profit, profit margin, and range of fleetwide profits under cost-sharing allocation scenarios, based on adjusted 2016 PIFSC cost-earnings surveys.

| | **Alternative A:** Implement EM with public Federal (NMFS) funding (no industry cost) | **Alternative B:** Implement EM with public-private cost-sharing, with industry funding hardware replacement | **Alternative C:** Implement EM with all sampling costs funded by industry |
|---|---|---|---|
| Annual average cost per vessel | $0 | $3,333 | $12,053 |
| Average vessel profit and % reduction of profit margin | $26,340<br>10% profit margin | $23,007<br>(-12.7%)<br>8% profit margin | $14,287<br>(-45.8%)<br>5% profit margin |
| Range of estimated fleetwide vessel profits | -$23,000 to $73,00 | -26,333 to $69,667 | -35,053 to $60,947 |
| Estimated % vessels operating at profit loss | 30% | 30% | 40% |

Table 11. Responsibilities and burdens on fishing operators at sea under monitoring by human observers versus responsibilities of fishing operators when implementing EM.

| | **Operating under human observer monitoring** | **Operating under EM (VMP in Appendix A)** |
|---|---|---|
| **Summary of responsibilities, tasks, and burdens to fishers at-sea** | ● Providing living accommodations and livable space on vessel for non-crew<br>● Providing food and consumables for observer<br>● 72 hour notification of observer prior to trip departure<br>● Waiting on observer arrival and departure<br>● Accommodating space for observer on deck during set and haul; other needs for observer sampling<br>● Ensuring safe arrival and egress of observer<br>● Reduction in crew privacy and individual personal space | ● Maintaining VMP and contact list<br>● Report malfunctions to contacts listed in VMP<br>● Before trip: turning on EM system 24 hours prior to departure<br>● Verifying EM system operation and sufficient hard drive space, maintaining operational power<br>● Prevent tampering of EM system<br>● Providing NMFS access to EM data and EM systems after trip and mailing hard drives after each trip<br>● Each haul: verify EM cameras operational and in clear view (details in VMP)<br>○ Use monitor to make sure cameras are in proper orientation<br>○ Keep EM system lens clean/wiped<br>○ Catch is handled in view of camera |

### 4.2.2. Effects on Management Setting

None of the alternatives, including Alternative 2, are anticipated to adversely impact the marine habitat, particularly critical habitat, essential fish habitat, habitat areas of particular concern, marine protected areas, marine sanctuaries, or marine monuments. The Hawaii and American Samoa pelagic longline fishery is not known to have large adverse impacts to habitats, thus none of the alternatives are likely to lead to substantial physical, chemical, or biological alterations to the habitat. Fishing activity would not occur in identified critical habitat, so no critical habitat would be impacted by the alternatives considered. Longline fishing does not occur in marine protected areas, marine sanctuaries, or marine monuments where fishing is prohibited.

Under Alternative 2, a mandatory EM program would be authorized as a monitoring mechanism to satisfy all regularity monitoring requirements. Initial implementation of the program would involve NMFS funded EM system installations on about 50 vessels per year, 2025-2027, and a fully implemented mandatory program by late 2027 or 2028. Once EM regulations are implemented, all vessels operating under the Hawaii (currently 150 active vessels) and American Samoa (currently 11 active vessels) longline limited entry permits vessels would be required to carry and maintain EM systems. The prioritization of vessels for EM system installation would proceed as recommended by Council as described by sub-alteranatives 2.A. (random selection), 2.B. (shallow-set then random), or 2.C. (voluntary then random) as described in section 2.2.2.

To satisfy domestic compliance of Hawaii and American limited entry longline fisheries with requirements under the MSA, ESA, MMPA, and other statutes (section 1.1.1.4), NMFS and the council must verify logbook reporting by proper monitoring of the fishery. For example, under MSA Section 301(a)(9), or National Standards 9 (50 CFR 600.350), Councils shall develop: conservation and management measures that, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch. Also, MSA Section 303(a)(11), or standardized bycatch reporting methodologies (50 CFR 600 Subpart R) require any FEP prepared by the Council to establish Standardized Bycatch Reporting Methodologies (SBRMs) to assess the amount and type of bycatch occurring in the fishery. Human observer coverage has been used to fulfill monitoring requirements under Reasonable and Prudent Measures emerging from non-jeopardy ESA Section 7 Biological Opinions of Hawaii and American Samoa longline fisheries. MMPA take reduction triggers are also monitored through the use of human observers. See Tables 2 & 3 in section 1.1.1.4 for a more comprehensive list of monitoring requirements. In some cases EM data can be used to replace human observers, but EM data may not be a direct replacement in all cases (Table 4).

Some current management measures would be difficult to evaluate or implement with only EM data. Although Alternative 2 implements a mandatory EM program by 2028 and does not specifically recommend continuing to reduce on-board observer coverage, when all vessels have an EM system, there may be less incentive to maintain high levels of observer coverage. Trip and annual limits for leatherback sea turtles and trip limits for loggerhead sea turtles in the Hawaii shallow-set longline fishery currently depend on real-time reporting by observers. If only EM data were available for monitoring of the shallow-set fishery, alternative management measures for sea turtles would have to be considered. For at least the shallow-set fishery, a shift to EM

would represent a notable change to the management setting. This management setting impact for the shallow-set fishery would be largely independent of the prioritization sub-alternatives to Alternative 2, except that this issue would presumably happen soonest if shallow-set vessels were prioritized for EM system installation under sub-alternative 2.B. and observer coverage was reduced as a result. The needed changes in sea turtle management measures resulting from a mandatory EM program under Alternative 2 will affect the fishery eventually, so sea turtle management measures should be reviewed in the short term.

Other management measures that depend on real-time reporting include interactions with false killer whales triggering closure of the Southern Exclusion zone to longline fishing South West of Hawaii (50 CFR 229.37(e)). If a mandatory EM program is implemented under Alternative 2 and on-board observer coverage continues to decline, additional work to update management measures that currently depend on observers will be required as described in section 1.1.1.

Alternative 2 would begin to shift the administrative burden of managing the human observer program to an EM program. While human observers would continue to be deployed at sea, the observer provider contract would continue to require oversight and management. As vessels voluntarily opt into using EM under sub-Alternative 2C, they would be removed from the human observer selection pool, gradually reducing the need for human observer deployments.

The EM provider contract would also require oversight and management; however, the phased implementation approach would allow NMFS to roll out EM at a manageable and adaptive pace. As part of this transition, the development of a Vessel Monitoring Plan (VMP) and other features of an EM program as described in section 2.2.4 would be necessary. As described in section 2.2.4 and Appendix A, the VMP outlines the roles and responsibilities of all involved parties, including the vessel operator, EM service provider, and regulatory agencies. Adherence to the VMP would require NMFS to experience administrative burdens associated with compliance and would require staff resources and time to track and provide information on potential violations to NOAA OLE.

Once EM regulations are codified as outlined in Alternative 2, and the program becomes fully operational, NMFS could see a reduction in administrative burden. For example, EM could eliminate the need to process several types of reports that stem from human observers including those related to non-U.S. masters (paper captains), no-wheel watch incidents, illegal, unreported, and unregulated (IUU) fishing, observer harassment, and non-compliance with U.S. Coast Guard vessel safety checklists.

Alternative 2 would also reduce the administrative and regulatory burden on captains and crew. Captains may no longer be required to host onboard observers—removing the need to provide accommodations, meals, or ensure their safety. Captains won't have to meet with observers or their providers to review safety checklists, nor ensure that observers receive crew-equivalent accommodations. In tight quarters, this means crew members won't have to give up their bunks.

A mandatory EM program under Alternative 2 could potentially result in changes to the management setting in the future, although not part of the current action. If all longline vessels had mandatory EM systems on board, observer coverage would likely be reduced. Vessel

operators would be less likely to carry and be responsible for an onboard observer. With the uncertainty of the human observer program in the future, the requirement for vessel operators to give 72 hour prior notification from a fishing trip to coordinate with an observer placement is also uncertain. If anything, fishermen would need to coordinate with the EM equipment provider to allow video data collection and system maintenance after returning from a trip. Under this Alternative captains would be responsible for performing several EM system checks prior to departure, to ensure proper functionality and accurate data recording. These checks include confirming system operation, verifying clear camera views, and completing a function test. Vessel operators must keep the VMP onboard and report any EM system issues to the equipment provider.

EM systems also provide valuable benefits to captains by delivering real-time data on vessel speed, hydraulic pressure, and reel activity to the wheelhouse—enhancing operational awareness. With live video feeds of the deck during hauls, captains in the wheelhouse can more effectively manage fishing operations and improve both navigation and monitor efficiency.

Alternative 2 supports our stated goal of transitioning the current EM initiative from a research and experimental tool to a mandatory program that fulfills monitoring requirements in Pacific Island fisheries.

## 4.3. Potential Effects of Alternative 3

### 4.3.1. Effects on Socio-economic Setting

Possible participation outcomes under an optional program (Alternative 3) can range from 0 participating vessels to all 160 vessels in Hawaii and American Samoa. Fewer participating vessels presumably increases cost per vessel in cost-sharing of sampling costs under Alternative C. Under full participation, economic impacts could be assumed to be the same as those under a mandatory EM program (Tables 1 and 2). For analyzing impacts of cost-sharing scenarios (Alternatives A, B and C) under an optional program (Alternative 3), we analyze costs and impacts to profits if there were 20, 50, and 100 vessels participating in an optional EM program.

Sampling costs analyzed for implementation of Alternative 3 are derived from the 2021-2025 Pacific Islands Region Electronic Technologies Implementation Plan (NMFS, 2021) and are scaled to 20, 50, and 100 vessels participating. Procurement and installation for replacement EM systems remains $3,333 per vessel per year on average ($10,000 every three years) under cost-sharing in Alternative B, regardless of the number of vessels participating, with NMFS assuming remaining sampling costs.

For cost-sharing Alternative C, sampling costs covered by industry would also include EM sampling infrastructure and personnel costs scaled by vessel participation, in addition to individual vessel costs for EM system replacement. For example, sampling costs *excluding* costs associated with equipment purchase/leasing and installation, for an EM program is estimated to be $1,395,158. This total amount includes human resources and sampling infrastructure needed to sustain an EM sampling program and is assumed to remain the same in total, regardless of vessel participation. However, the per vessel cost would be assumed to be $1,395,150 divided by the number of participants. This annual per-vessel cost would then be $69,758 per vessel for 20

vessels, $27,903 per vessel for 50 vessels, $13,952 per vessel for 100 vessels. Cost sharing under Alternative C would then render per vessel annual sampling costs to equate to fixed sampling costs (contingent on total vessel participation) plus average per vessel EM system replacement cost ($3,333). Total annual per-vessel sampling costs under cost-sharing Alternative C would then equate to $73,091 per vessel for 20 participating vessels, $31,236 per vessel for 50 participating vessels, and $17,285 per vessel for 100 participating vessels. If all 160 vessels are participating, that cost is $12,053 per vessel per year, the same as analyzed under implementation Alternative 2 and cost-sharing Alternative C, as described in Section 4.2.1.

Status quo economic outlooks for Hawaii and American Samoa longline vessels for which cost-sharing scenarios under Alternative 3 are compared against are described in detail in Section 4.1.1. Baseline per vessel profits and range of profits are assumed to remain the same for these analyses Alternative 3, regardless of vessel participation, and are adjusted based on increase in EM costs that industry would cover. Per vessel sampling costs under Alternative C, if only 20 vessels are participating ($73,091), exceeds average annual profits for both Hawaii and American Samoa longline fisheries. The per vessel costs under participation of 50 vessels ($31,236) in an optional program exceeds the average annual profit of American Samoa longline vessels.

Table 12. Impacts to Hawaii longline fishery economic performance, profit, profit margin, and range of fleetwide profits under cost-sharing allocation scenarios, assuming participation of only 50 vessels in an optional program, Estimates based on 2022 PIFSC cost-earnings surveys.

| ***50 Participating Hawaii and American Samoa Vessels*** | **Alternative A:** Implement EM with public Federal (NMFS) funding (no industry cost) | **Alternative B:** Implement EM with public-private cost-sharing, with industry funding hardware replacement | **Alternative C:** Implement EM with all sampling costs funded by industry |
|---|---|---|---|
| Annual average cost per vessel | $0 | $3,333 | $27,903 |
| Average vessel profit and % reduction of profit margin | $44,000<br>5% profit margin | $40,667<br>(-7.6%) | $16,097<br>(-63.4%)<br>2% profit margin |
| Range of estimated fleetwide vessel profits | -$324,000 to $423,000 | -327,000 to $419,667 | -351,903 to $395,097 |
| Estimated % vessels operating at profit loss | 38% | 38% | 40% |

Table 13. Impacts to American Samoa longline fishery economic performance, profit, profit margin, and range of fleetwide profits under cost-sharing allocation scenarios, assuming participation of only 50 vessels in an optional program, Estimates based on 2016 PIFSC cost-earnings surveys.

| ***50 Participating Hawaii and American Samoa Vessels*** | **Alternative A:** Implement EM with public Federal (NMFS) funding (no industry cost) | **Alternative B:** Implement EM with public-private cost-sharing, with industry funding hardware replacement | **Alternative C:** Implement EM with all sampling costs funded by industry |
|---|---|---|---|
| Annual average cost per vessel | $0 | $3,333 | $27,903 |
| Average vessel profit and % reduction of profit margin | $26,340<br>10% profit margin | $23,007<br>(-12.7%)<br>8% profit margin | $-1,563<br>(-105.9%)<br>Negative profit |
| Range of estimated fleetwide vessel profits | -$23,000 to $73,00 | -26,333 to $69,667 | -50,903 to $45,097 |
| Estimated % vessels operating at profit loss | 30% | 30% | 50% |

Table 14. Impacts to Hawaii longline fishery economic performance, profit, profit margin, and range of fleetwide profits under cost-sharing allocation scenarios, assuming participation of only 100 vessels in an optional program, Estimates based on 2022 PIFSC cost-earnings surveys.

| ***100 Participating Hawaii and American Samoa Vessels*** | **Alternative A:** Implement EM with public Federal (NMFS) funding (no industry cost) | **Alternative B:** Implement EM with public-private cost-sharing, with industry funding hardware replacement | **Alternative C:** Implement EM with all sampling costs funded by industry |
|---|---|---|---|
| Annual average cost per vessel | $0 | $3,333 | $17,285 |
| Average vessel profit and % reduction of profit margin | $44,000<br>5% profit margin | $40,667<br>(-7.6%) | $26,715<br>(-39.3%)<br>3% profit margin |
| Range of estimated fleetwide vessel profits | -$324,000 to $423,000 | -$327,000 to $419,667 | -$341,285 to $405,715 |
| Estimated % vessels operating at profit loss | 38% | 38% | 38% |

Table 15. Impacts to American Samoa longline fishery economic performance, profit, profit margin, and range of fleetwide profits under cost-sharing allocation scenarios, assuming participation of only 100 vessels in an optional program, Estimates based on 2016 PIFSC cost-earnings surveys.

| ***100 Participating Hawaii and American Samoa Vessels*** | **Alternative A:** Implement EM with public Federal (NMFS) funding (no industry cost) | **Alternative B:** Implement EM with public-private cost-sharing, with industry funding hardware replacement | **Alternative C:** Implement EM with all sampling costs funded by industry |
|---|---|---|---|
| Annual average cost per vessel | $0 | $3,333 | $17,285 |
| Average vessel profit and % reduction of profit margin | $26,340<br>10% profit margin | $23,007<br>(-12.7%)<br>8% profit margin | $9,055<br>(-65.5%)<br>3% profit margin |
| Range of estimated fleetwide vessel profits | -$23,000 to $73,00 | -26,333 to $69,667 | -40.385 to $45,097 |
| Estimated % vessels operating at profit loss | 30% | 30% | 50% |

Under Alternative 3, responsibilities and burdens on fishers at sea during fishing operations to maintain an EM system are assumed to be the same described in section 4.2.1 and Table 11. These responsibilities and burdens related to EM would only be assumed for those vessels participating in an optional EM program.

However, non-participating vessels would be subject to potential non-compliance with monitoring requirements under the MSA, ESA, MMPA, and other applicable laws if they are no longer subject to at-sea monitoring, either under the human observer program or through the use of EM. This could lead those vessels to be disqualified from fishing without proper monitoring if the fishery is legally challenged for non-compliance.

### 4.3.2. Effects on Management Setting

In general, implementing an optional EM program under Alternative 3 would be expected to have similar effects to management setting as Alternative 2 (section 4.2.2), with some minor differences related to the presumed lower number of EM participants than under a mandatory program.

An optional EM program under Alternative 3 would be authorized as a monitoring mechanism to satisfy the monitoring requirements summarized in section 1.1.1.4 and like Alternative 2, a data source for SBRMs. Satisfying current domestic and international monitoring requirements with

only a percentage of vessels volunteering to carry EM systems may be challenging, particularly if on-board observer coverage continues to decline. Like in the case of a mandatory EM program, there are currently domestic management measures that depend on real-time reporting by observers (e.g. sea turtle trip limits in the Hawaii shallow-set longline fishery) that would not be addressed via EM. Less than complete EM coverage would also make inferences from EM data suspect; as EM data from only volunteer vessels could not be considered a random sample from the fleet and so would not be representative.

From an administrative burden perspective, a voluntary EM program with incomplete vessel coverage would have most of the same administrative requirements of a mandatory program. It seems likely that there would be additional need to maintain some level of on-board observer program with only partial EM deployment to the fleet to meet monitoring objectives, although it is unclear if there will be resources available for an observer program in the future. If both an EM and observer program are running concurrently, administrative burden would be maximized. A summary of the administrative requirements of both types of programs is included in section 4.2.2 for Alternative 2.

**Table 16. Summary of Effects of the Alternatives**

| Resource | Alternative 1 (Status quo) | Alternative 2 | Alternative 3 |
|---|---|---|---|
| Physical resources: | No effects | same as Alt 1 | same as Alt 1 |
| Biological resources: | No effects | same as Alt 1 | same as Alt 1 |
| Socio-economic setting: | No effect | from no effect to large scale, long term negative effects revenue depending on costing approach recommended | same as Alt 2 |
| Management setting: | If observer coverage continues to decline, large scale, short term adverse effects on required monitoring x | mandatory EM would provide data to support some, but not all, required monitoring | voluntary EM would provide less information useful for required monitoring |

## 5. DRAFT PROPOSED REGULATIONS

This section contains the proposed regulations the Council deems necessary or appropriate to implement the conservation and management measures described in the FEP amendment document, based on the preferred alternative.

**Subpart F—Western Pacific Pelagic Fisheries**

§ 665.800 Definitions

*Electronic Monitoring (EM)* means the use of a network of hardware, but not limited to, cameras, recording devices, and/or sensors, with appropriate software, to monitor fishing activity at sea during fishing operations

*Electronic Monitoring System (EM System)* means the network of devices, but not limited to, cameras, recording devices, and/or sensors, with appropriate software, implemented for EM

*Electronic Monitoring Data (EM Data)* means the data generated by EM

*Vessel Monitoring Plan (VMP)* means the document that describes how fishing operations on the vessel will be conducted and how the EM system and associated equipment will be configured to meet the data collection objectives and purpose of the EM program. Components of VMP are contained in the relevant FEP for applicable fisheries.

§ 665.805 Electronic Monitoring in American Samoa and Hawaii longline fisheries

(a) Applicability – Owners and/or operators of a vessel subjected to the requirements of a large American Samoa longline limited access permit § 665.816(c)(2) or a Hawaii longline limited access permit § 665.801(b)
(b) After the Regional Administrator has notified a permit holder subject to § 665.805(a) of the requirement to carry on board an EM system, permit holders have 90 days to make the vessel available for EM system installation by an NMFS-approved service provider.
(c) After necessary NMFS-certified equipment has been installed on the vessel under paragraph (b) of this part, the vessel operator must:
    (1) At all times have onboard an individually assigned NMFS-approved VMP for use with the EM system, specific to that vessel and consistent with necessary components in the Pelagics FEP
        (i) The VMP and VMP requirements may be amended by the Regional Administrator, consistent with Council recommendation.
        (ii) The VMP may be modified by the Regional Administrator, if changes do not affect requirements of VMPs or affect more than one applicable permit holder.
    (2) Comply with requirements provided in the VMP.
(d) Exemptions – applicable vessels in § 665.821(a) may be exempt from carrying an operational NMFS-approved EM system:
    (1) Not deploying longline gear defined in § 665.800
    (2) Operators of applicable vessels have provided appropriate notification of malfunction or damage, as provided in the VMP:
        (i) have not had a resolution provided within 72 hours of that notification
        (ii) have been provided an exemption by the Regional Administrator
        (iii) have a human observer onboard

# Appendix A: DRAFT Pacific Islands Region Longline Electronic Monitoring Program; Vessel Monitoring Plan Guidance

## Vessel Monitoring Plan

A vessel monitoring plan (VMP) describes how an electronic EM system is configured on individual vessels and how fishing operations must be conducted to effectively monitor catch and discards including bycatch of fish and protected species. The VMP provides clear objectives and outlines EM program requirements and documents specifics of EM installation on individual vessels. Specifically the VMP would include information on the hardware that makes up the system, the EM system operations, and the operators responsibilities for operation, maintenance, reporting, and data retrieval.

The EM equipment identified in the VMP would be reviewed by NMFS for adherence to minimal standards and the VMP would be reviewed and approved by NMFS as part of the vessel's EM approval process. A vessel electing or required to use EM as part of the Pacific Islands longline EM program may work with a selected or approved service provider to develop a VMP for NMFS approval. This document includes guidance for selected EM service providers on what needs to be included in an individual vessel VMP in the region and the NMFS approval process and timeline.

## VMP Submission and Approval Timelines

It is expected that vessel owners/operators would work directly with NOAA approved EM service providers to develop VMPs that satisfy regulatory reporting requirements and establish vessel-specific catch handling procedures that meet program objectives. The service provider would submit VMPs on behalf of vessel owners for agency approval.

If modifications are made to a vessel with an approved VMP, a revised VMP may be required to be submitted to the agency and approved prior to fishing. Modifications requiring agency approval could include: changes to deck configuration, repositioning cameras, addition/removal of a camera, changes to catch handling, discard control point adjustments, new vessel owner, system replacement, etc. New or revised VMPs would be submitted to NMFS for approval prior to a vessel’s intended departure date. Vessel owners or their contracted service providers should consider the approval timeline and the vessel’s anticipated fishing start date when submitting VMPs to ensure the required time for approval is provided.

## Burn-In Trips

A vessel would need to have a NMFS-approved VMP to meet monitoring requirements. As part of the VMP approval process, vessels may need to complete a “burn-in trip” to demonstrate the EM system is functioning properly, camera views are sufficient, and to ensure the crew understands catch handling requirements. A burn-in trip is where a vessel runs their EM system and follows catch handling protocols outlined in the VMP to allow NMFS to determine if the VMP is suitable for approval. A burn-in trip may be required upon the initial VMP application submission or for certain VMP system modifications. A burn-in trip may be waived if no testing is necessary to ensure the EM system is functioning properly. Once a draft VMP is submitted, the agency will determine if a burn-in trip is required and will communicate the requirement to the vessel owner or service provider.

If a VMP approval requires a burn-in trip, NMFS would coordinate with the provider and vessel to determine eligible trips. Burn-in trips may be eligible for Pacific Islands Regional Observer Program (PIROPS) or human At-Sea Monitor coverage and, if selected, the vessel is required to carry the observer. NMFS or the provider would conduct an evaluation of the burn-in trip and complete an evaluation form (see Table 1).

## Vessels Evaluation

The vessel operator and crew would need to comply with all catch handling protocols and other requirements described in the VMP, including pulling unboarded catch, including protected species, alongside the vessel and processing any boarded discards within view of the cameras and consistent with the vessel monitoring plan. The VMP would be required to be onboard the vessel at all times. EM could be used to audit operator completed logbooks for catch  including catch of, and interactions with, protected species..

**Table 1. Sample Burn-In Trip Evaluation Form**

| ***Assessment*** | | |
|---|---|---|
| **System Operations and Functionality** | Pass | Fail |
| System check completed prior to departure (*cameras recording prior to departure*) | | |
| System was not manually shut-down prior to the end of the trip | | |
| GPS/Sensor Data intact and properly logged | | |
| Camera array captures all activity, meets requirements for specific gear category | | |
| Cameras are securely mounted | | |
| Camera views remained operational throughout trip | | |
| There were minimal concerns with system impairment | | |

| **On Deck Operations and Catch Handling** | Pass | Fail |
|---|---|---|
| Vessel's overall adherence to their VMP catch handling protocols | | |
| Crew pulled species that were not brought onboard alongside the vessel in the view of the camera before release | | |
| Crew complied with usage of discard control points of boarded species (All discarding events took place in camera view at established discard control points) | | |
| Crew did not intentionally or unintentionally obstruct camera views during fishing operations | | |
| Cameras were maintained (cleaned when necessary) throughout the trip | | |

# Example VMP Outline

VMPs would include information similar to the information outlined below. Outlined are the basic components of a Pacific Islands longline VMP and are likely necessary for the successful operation of the EM Program. The information in below **bold** is an example of information that would likely be included in a Pacific Islands longline VMP.

### I. General Information

Information on the VMP submission date and version number must be included.

**Table 2. VMP Date and Version**

| | |
|---|---|
| **VMP Submission Date:** | |
| **VMP version number:** | |

The following vessel identification items would likely be included: vessel name, vessel ID, home port, primary landing port(s), gear type(s) to be used (e.g. shallow and/or deep), name of vessel owner and their contact information, and primary point of contact if different from owner.

**Table 3. Vessel Summary**

| | |
|---|---|
| **Vessel Name:** | |
| **Vessel ID:** | |
| **Home port:** | |
| **Primary landing port(s):** | |
| **Gear type(s) to be used:** | |
| **Vessel Owner name:** | |
| **Owner Address:** | |

| | |
|---|---|
| **Owner Email:** | |
| **Owner Phone number(s):** | |
| **Vessel Primary Point of Contact: (if different from owner)** | |
| **Vessel contact Address:** | |
| **Vessel contact Email:** | |
| **Vessel contact Phone number(s):** | |

## II. Provider Support and NMFS Contact Information

All VMPs would include a list of EM provider and agency contact information for vessel operators. Vessels participating in the Pacific Islands longline EM program must maintain current federal permits and continue to meet standard vessel reporting requirements including trip notification requirements at 50 CFR 665.803 (Notify RA of trip departure date and trip type 72 hrs before departing). If the vessel is longer than 50 ft (15.2 m), it must also carry an operational NOAA Enforcement-owned and installed VMS unit onboard whenever the vessel is at sea. Contact numbers for trip notification and for the NOAA Office of Law Enforcement would also be included as seen in Table 5. below.

### Table 4. EM Provider Contacts

| TITLE (NAME) | CONTACT # | EMAIL |
|---|---|---|
| **EM Provider 24-hr Technical Support** | | |
| **Technician Assigned to Vessel** | | |
| **EM Program Manager** | | |
| **Provider Weekend or Alternate Contact** | | |
| **Software Support Staff** | | |

| | | |
|---|---|---|
| **Contact** | | |

**Table 5. NMFS EM Contacts**

| TITLE (NAME) | CONTACT # | EMAIL |
|---|---|---|
| **VMS Support** | | |
| **Trip Notification** | | |
| **Data Request Information** | | |
| **PIRO EM Lead** | | |
| **PIFSC EM Lead** | | |
| **American Samoa** | | |
| **NOAA Office of Law Enforcement** | | |

## III. EM System Overview

The VMP should include the following overview of EM equipment:

- **Your vessel is equipped with an electronic monitoring system consisting of cameras, GPS, gear sensors, user interface, and a control center.**
- **The system will record GPS, pressure sensor, and rotation sensor data while powered.**
- **Video will be collected from rail and deck view cameras during hauling.**
- **The system will record high-definition video during fishing events.**
- **More specific information about your EM system is provided in *Section V – System Specifications and Installation Summary.***

## IV. Vessel Owner/Operator Responsibilities

This section would outline the likely vessel owner/operator responsibilities in the EM program. The VMP, at a minimum, would likely include the following vessel requirements:

**Please turn your EM system on and confirm function 24 hours prior to leaving the dock. The EM system shall remain powered on for the duration of each trip, even if an observer is present. Click end trip and turn the system off when you return to the dock. System operation details are included in this section.**

**EM Requirements**

- **Carry on board the vessel's approved VMP and make the VMP available for review at all times. The vessel is prohibited from fishing in an EM program without a NMFS-approved VMP.**

- **Comply with requirements outlined in the VMP.**
- **Comply with the requirement to carry a fisheries observer when selected for coverage. *Vessels are required to run the EM system and submit a hard drive when an observer is onboard.**
- **Ensure that no person tampers with, disconnects, or destroys any part of the electronic monitoring system, associated equipment, or recorded data.**
- **Provide NMFS immediate access to all EM data (raw, video, sensor, GPS, summarized, etc.).**
- **Contact the EM service provider if there has been a lapse of 30 days or more between trips, to review protocols and verify the system is functioning before departing on the next trip.**

**Each Trip**

- **The EM system must operate on all applicable declared trips from the vessel's time of departure from a port until its return to a port.**
- **Confirm Hard Drive Storage Space: The vessel operator should ensure that the system has adequate storage to record the entire trip. The vessel operator should carry one or more spare hard drives, sufficient to record the entire trip, as a back-up. If you are out of hard drives or are concerned you might run out of hard drives, contact your regional technician for assistance.**
- **Power: Maintain uninterrupted electrical power to the EM unit for the duration of the trip.**
- **Function Test: Prior to leaving port, the vessel operator should turn the system on and conduct a system function test following the instructions provided in *Section VI – System Testing and Troubleshooting.* If the function test identifies a malfunction, the vessel operator should follow the troubleshooting guidelines listed in *Section VI – System Testing and Troubleshooting.***

**Each Haul**

- **Prior to each haul, the vessel operator should:**
    - **Verify that all cameras are operational, and all sensors and other EM system components are functioning as instructed in *Section VI – System Testing and Troubleshooting.***
    - **Check the monitor and verify that the camera views are consistent with the images provided in *Section V – System Specifications and Installation Summary*.**
    - **Clean camera lenses to maintain video quality. Video quality will be reported in the trip summary report.**
    - **Ensure camera views are unobstructed and clear, including ensuring lighting is sufficient in all circumstances to illuminate catch, so that catch and discards are visible to the video cameras and may be identified and quantified as required.**

- **Catch Handling:**
    - **To effectively meet the goals of the program, we require the following catch handling procedures:**
        - **The vessel operator is responsible for ensuring all catch is handled within view of the cameras as defined in the camera descriptions and images in *Section V – System Specifications and Installation Summary.***
        - **Retained catch should be brought aboard within view of the cameras before being moved for processing.**
        - **All discards removed from the line at the rail or catch that is not boarded should be discarded within view of the cameras if possible. This means they should be brought fully to the surface and hauled alongside the vessel before**

**cutting the line or removing gear. (e.g. sharks and whales)**

- **All discarded catch and protected species that were brought on board (including non-target catch) should be placed in view of the deck camera before being discarded from the vessel's designated Discard Control Point.**

### Table 6. Discard Control Point Location

| |
|---|
| ***Define and describe the location of the vessel's discard control point(s) where catch may be discarded here.** |

**Trip End**

- **Within a determined number of business days after each trip, ensure that the hard drive is mailed to the service provider.**
  - **Provider Address**
- **Along with the hard drive, include vessel name, the mailing address where replacement hard drives should be mailed, trip dates, and prepaid return envelope.**
- **Report any malfunctions to the appropriate regional technician.**

**Equipment Malfunctions**

The EM provider would outline a comprehensive action plan to address system errors or malfunctions pre and mid-trip and include 24-hour technical support contact information for the vessel operator. An operational EM system is defined as the following: the EM system must be functional and in use, meaning that the system is recording fishing operations, including the video, images, and other sensor data, as well as the metadata that provides information (e.g., trip departure date, vessel information) onto a hard drive or other suitable video storage device.

**Pre-trip malfunctions**

**If the system function test identifies a malfunction, the vessel operator should follow the troubleshooting guidelines listed in *Section VI – System Testing and Troubleshooting.* If this does not resolve the issue, the vessel operator should contact the EM service provider immediately. The EM service provider will determine if the malfunction is critical or non-critical:**

- **<u>Non-Critical Malfunction</u>: If the malfunction cannot be repaired in a timely fashion, the vessel operator may depart on the scheduled trip, but should follow the service provider's instructions. Please call the service provider and make arrangements for them to service the vessel upon return from this trip.**
- **<u>Critical Malfunction</u>: A critical malfunction prevents the data collection objectives from being achieved. A service provider technician should be available to service the vessel within a determined number of hours of notification of the malfunction. The system must be repaired prior to the vessel leaving on a trip. If the system cannot be repaired in a timely manner, written permission must be obtained from NMFS in order for the vessel to fish with a system experiencing partial or complete failure. If the vessel is running a trip with a waiver for a partial system failure, the vessel must run the remaining components of the system unless otherwise instructed by the provider.**
- **If the vessel has been selected for human observer coverage, an EM waiver is still required for critical equipment issues, regardless of observer coverage. The waiver issued is not a**

**waiver from observer coverage, only EM coverage due to the critical system issue.**

**Mid-trip malfunctions**

- **If the system passed the function test prior to leaving port, and remains continuously powered during the trip, follow the instructions provided in *Section VI – System Testing and Troubleshooting.***
- **If the malfunction cannot be resolved following the troubleshooting guide and/or with remote support, the vessel operator should continue the trip, run the system with all functional parts, and contact the service provider immediately (from sea if possible) to assist with scheduling service at the time of landing.**
- **Any malfunctions must be fixed prior to departing on subsequent trips.**

## V. System Specifications and Installation Summary

This section of the VMP would describe and illustrate each component of the system. A vessel diagram featuring the layout and location of all components (cameras, sensors, GPS, power source, control box, keyboard, and all monitors) would be included (Figure 1). The diagram would illustrate the work deck during fishing activity and include the following items: gear bins, fish doors, deck houses, designated discard control points, fish hold, mainline reels, catch processing area, float storage including radio buoys, and mechanical equipment such as winches, hauling devices, or cranes (Figure 2). These items could be on a single diagram or separate diagrams. If the vessel would use EM with multiple gear categories (shallow-set or deep-set gear), the service provider could create gear specific diagrams that illustrate the layout of the work deck if deemed necessary.

Camera specifications would be provided, and could include, the location and materials used to mount the camera, frame rate settings, advanced video coding capabilities, if the camera records in color or will record in greyscale under low light conditions, lens size, manufacturer, general description of focal point, and its primary purpose (i.e., rail camera, deck camera, etc.) (Tables 8a and b). Additionally, sensor specifications could be listed, including the sensor type and frequency or ping rate that data is broadcasted. Still images of each camera in the system would be included. Still images selected for a VMP would be representative of how the work deck would appear when the vessel is fishing. Camera images would come from either a data drive or the EM review platform and cannot include images taken with handheld cameras.

NMFS staff would assess the proposed location and evaluate images based on concerns such as camera blocking and the crew's ability to clean camera lenses in advance of approving a VMP. If primary views are reliant on cameras installed in rigging or on top of the wheelhouse, the service provider should develop a camera maintenance plan and offer alternate solutions to vessels to keep cameras clean that are not readily accessible or pose safety concerns to the crew.

**Data Collection Process**

**The EM system installed is set to record sensor data every x seconds for the duration of the trip. Video recording is triggered by the hydraulic pressure sensor when pressure is equal to or greater than a predetermined threshold and/or the rotation sensor detects reel movement in the hauling direction. All cameras will record during hauling events and up to x hours after the last triggering event. Cameras will record at x p at x frames per second during fishing events.**

**Table 7. Hardware and Equipment Installed**

| | |
|---|---|
| **GPS Model:** | |
| **GPS Location:** | |
| **Rotation Sensor:** | |
| **Rotation Sensor Location:** | |
| **Hydraulic Sensor:** | |
| **Hydraulic Sensor Location:** | |
| **Sensor Processing Unit Location:** | |
| **Control Box Location:** | |
| **Monitor and Keyboard Location:** | |
| **Software Version:** | |
| **Power Type:** | |
| **Power Location:** | |
| **Power Configuration:** | |
| **Power Hardware:** | |

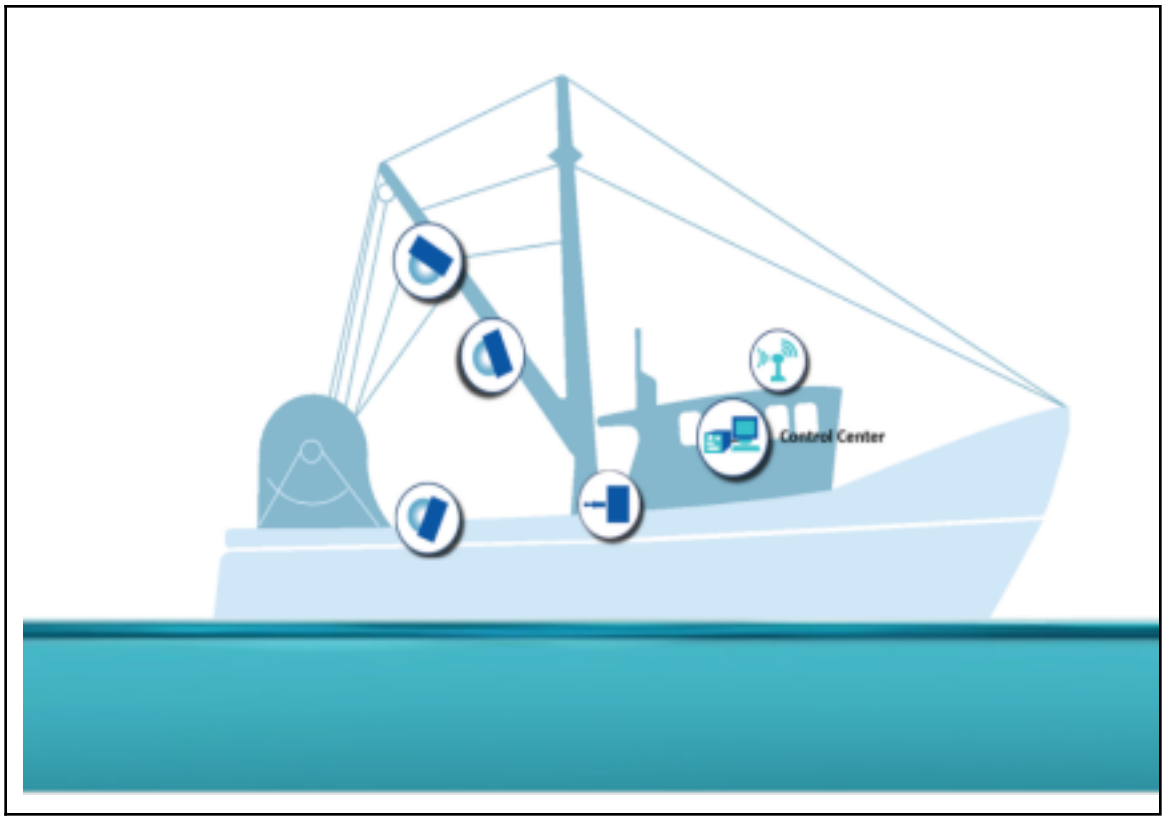


**Figure 1. Vessel diagram example of system component placement**

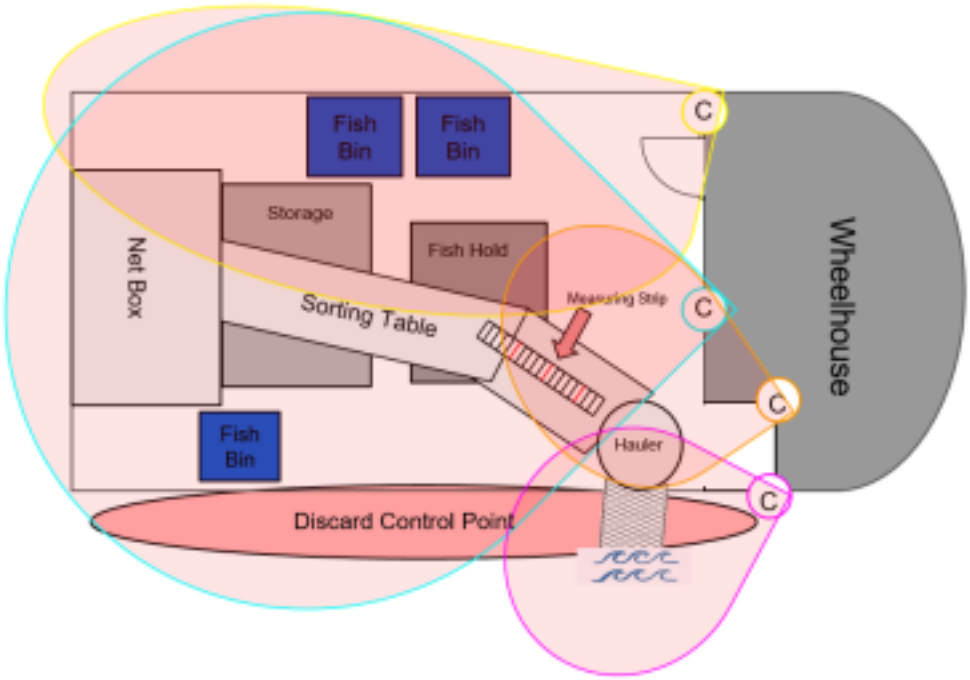


**Figure 2. Vessel diagram example of work deck during fishing activities**

**Table 8a. Camera Installation**

| | | |
|---|---|---|
| **Camera Name:** | | **\\\SAMPLE STILL IMAGE: CAMERA #///** |
| **Location:** | | |
| **View:** | | |
| **Aim:** | | |
| **Hardware:** | | |
| **Resolution/FPS:** | | |
| **Recording Trigger:** | | |
| **Run On Time (if applicable)** | | |
| **Recording Exceptions (if applicable):** | | |

*complete this table for each camera

**Table 8b. Camera Installation (example from Alaska fisheries EM program)**

| | | |
|---|---|---|
| Camera Name: | Camera 1 | |
| Location: | Mounted on inner side of wheelhouse looking aft at hauler | |
| View: | View of the hauler, line exiting the water and the port rail |  https://i.ytimg.com/vi/BoSt2c7-omE/maxresdefault.jpg |
| Aim: | Downward and facing aft (towards the stern) | |
| Hardware: | Lorex PTZ | |
| Resolution: | 2560p (2K) | |
| Frames per Second | 30 | |
| Recording Trigger: | Hauler pressure > 250 PSI | |

| | | |
|---|---|---|
| Run On Time: | n/a | |
| Recording Exceptions: | Records until vessel returns to port (manual shut-off) | |

## VI. System Testing and Troubleshooting

This section would be highly detailed and organized by common EM system issues (power, monitor/keyboard, cameras, control box, activity sensors, etc.) to assist a vessel operator with testing system components as well as readily diagnosing and rectifying problems. Technical diagrams are recommended and components should be clearly referenced and labeled. The provider shall also train vessel operators in diagnosing common system issues.

**Many problems can be solved by turning the system off and then restarting it. If that does not resolve the issue, use the guide provided in this section to troubleshoot the problem. If the problem persists, call the Service provider Support Line.**

## VII. Signature Page

The signature page acknowledges the intent to be bound to the terms of the contract and would be signed by the EM provider, the vessel owner, the vessel operators that have been fully briefed/trained to operate the vessel, and a NOAA Fisheries representative upon plan approval. The signatures certify that the vessel owner and the vessel operator have been briefed/trained on EM operations and catch handling, and program requirements and understand the requirement to comply with the components of the VMP. In addition, the signatures document that NOAA Fisheries has approved the Service Provides VMP. A signed copy (hand written or digital signature) of the VMP must be onboard at all times**.** Each time a VMP is modified and sent to the agency for approval, the VMP would require a new signature and date.

**The list below demonstrates a vessel's understanding of the EM system and Pacific Islands longline EM program. It also documents the system has been fully installed and is operational. The technician and vessel representative(s) should place their initials next to each bullet point and sign/date the bottom of this page. A copy of this document will be scanned and provided to the vessel.**

- **I understand how and when to turn on my EM system. I know how to complete the pre-trip check. I know how to view the status of my cameras, GPS, pressure sensor, and remaining hard drive space.**
- **I know where the mouse/trackball is that controls the EM system.**
- **I understand how to swap hard drives, who to mail them to, and the frequency that I should mail them.**
- **I have been shown where all EM system components are mounted. I understand the field of view and purpose of each camera.**
- **I have been given an example Vessel Monitoring Plan (VMP). I understand I will need to keep an approved, signed, and current copy onboard.**
- **I am aware of the 24-hour support line and know who to contact if there are EM system issues or if I have questions.**
- **I will clean the camera before and during EM trips. I will keep the deck well-lit**

**during fishing operations.**

- **I understand the program requirements and will call the 24-Hour support line if I have any questions.**

**This certifies that the vessel owner/operator has been trained in the function and operation of the EM system installed on the vessel and that the vessel owner/operator must comply with the components of this Vessel Monitoring Plan. A signed copy of this VMP must be aboard at all times when the vessel is participating in this Electronic Monitoring Program. Digital signatures are acceptable.**

**Vessel permit holder signature: _____ Date: _____**

**Vessel Operator signature: _____ Date: _____**

**Service provider representative signature: _____ Date: _____**

**NOAA fisheries VMP approval signature: _____ Date: _____**