



Evaluation of Observer Coverage Levels to Detect Insular False Killer Whales in the ‘Overlap Area’ and Potential Implementation Pathways

Biological Opinion Reasonable and Prudent Measure Implementation Working Group

Report to the Pelagic Plan Team

May 2024

1. Introduction

The 2023 Hawaii deep-set longline (DSLL) Biological Opinion (BiOp), issued in May 2023, included a Reasonable and Prudent Measure (RPM) term and condition (T&C) requiring that NMFS, within one year of the BiOp publication, determine the minimum level of observer coverage reliable for estimating the main Hawaiian Islands (MHI) insular false killer whale (IFKW) interactions with the Hawaii deep-set longline (DSLL) vessels. If the current level of observer coverage is below this level, the T&C requires that within two years (after the first evaluation period) NMFS provide observer coverage at the level determined reliable. The stated purpose of this T&C is to improve NMFS' understanding of and estimates of interactions with MHI IFKW in the overlap area.

The Council at the 195th meeting in June 2023 requested NMFS to work with Council staff and industry representatives from the Hawaii and American Samoa longline fisheries in addressing the RPMs in the DSLL and American Samoa longline (ASLL) fisheries BiOps. Following the 196th meeting, PIRO staff requested that the Council form a working group to facilitate coordination on the RPM implementation. The Council at the 197th meeting in December 2023 directed staff to convene an interdisciplinary BiOp RPM Implementation Working Group (BiOp RPM WG) with appropriate participants from PIFSC, PIRO, Council staff, industry representatives, and other collaborative partners as necessary to facilitate coordination for implementing the 2023 Hawaii DSLL and ASLL fisheries BiOp RPMs. The BiOp RPM WG was tasked with initially focusing on crew training in the DSLL and ASLL fisheries and the DSLL insular false killer whale overlap area observer coverage evaluation, but may also address implementation of other RPMs in the 2023 BiOps as needs arise. The BiOp RPM WG was directed to report annually to the Pelagic Plan Team.

This report presents the evaluation of the level of observer coverage needed to reliably estimate the MHI IFKW interactions in the overlap area, potential pathways for implementing the RPM T&C, and considerations for the Pelagic Plan Team in recommending next steps to the Council at its June 2024 meeting.

2. Summary of Available Information on DSLL Fishery Interaction with FKWs in the Overlap Area

The MHI IFKW distinct population segment is listed under the ESA as endangered. This population occurs in nearshore waters around the MHI (Figure 1), and the current population estimate is 138 (95% CI = 120-160). Two other FKW populations that occur inside the U.S. EEZ around Hawaii (the Northwestern Hawaiian Islands and pelagic populations) are not listed under the ESA but are protected under the Marine Mammal Protection Act (MMPA). The MHI IFKW

boundary is based on a minimum convex polygon around available satellite tag data through 2013 with a 20-km buffer in part to account for the uncertainty in the spatial use of two of the three known social clusters at the time (Bradford et al. 2015). The MHI IFKW range is mostly within the 50-70nm MHI longline exclusion zone, which was implemented under the Pelagic Fishery Ecosystem Plan (FEP; formerly called the Pelagic Fishery Management Plan) in 1992 to reduce gear conflicts between the Hawaii longline fishery and the small boat fishery. A triangular area where the MHI IFKW range extends outside of the MHI longline exclusion zone is referred to as the “overlap area”.

False killer whales are incidentally hooked or entangled (actions collectively referred to here as interactions) in the DSLL fishery throughout the fishery’s range. No FKW interactions have been observed inside the MHI IFKW boundary since the start of the federal observer program in the early 1990s (Figure 1). The estimated number of interactions for the MHI IFKW population is derived annually based on the fishing effort (number of sets) within the range of each stock, the estimated density of each stock and the relative density of each stock in areas where they overlap. Based on the fishery data from 2013 to 2021, the 2023 DSLL BiOp estimated the anticipated annual average MHI IFKW interaction to be 0.043, or 1 capture in 23 years. The incidental take statement (ITS) for the MHI IFKW is based on a 5-year running sum of 0.427 captures, or 1 in 12 years.

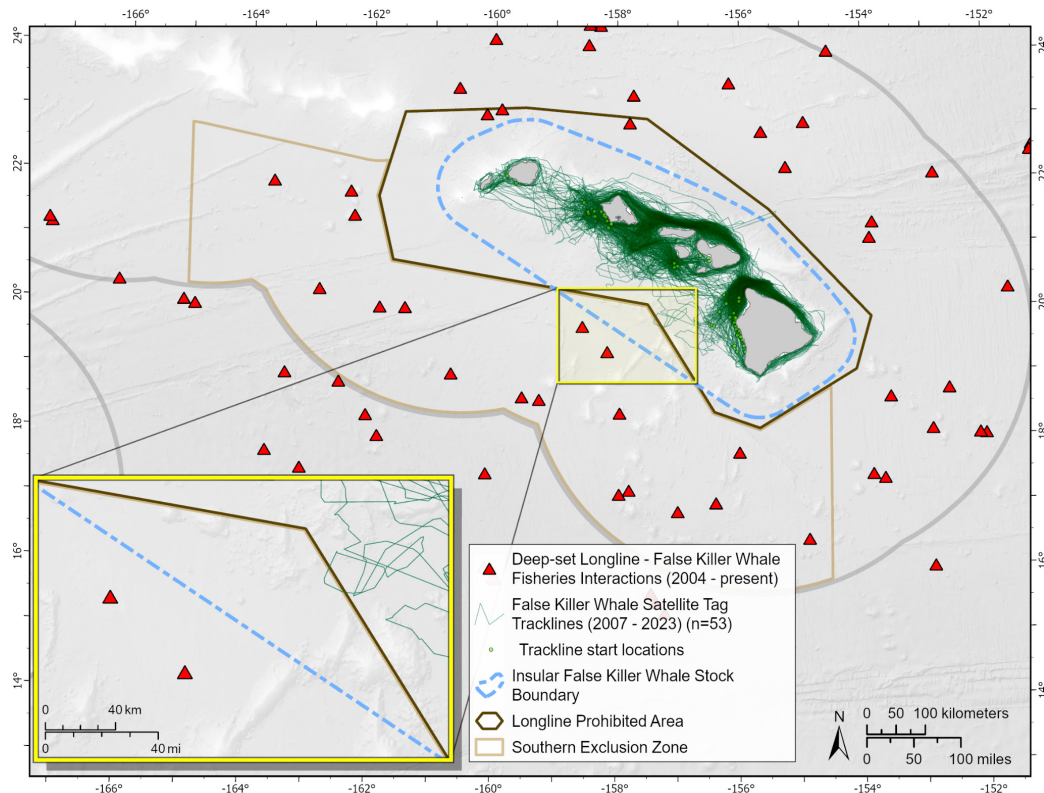


Figure 1. Map of the Hawaiian Islands with available insular false killer whale telemetry information (2007-2023; Baird et al. 2023), deep-set longline false killer whale interaction locations (2004-2023), and the triangular area where the insular false killer whale stock boundary comes outside the main Hawaiian Islands longline exclusion area where longline fishing is prohibited.

3. Reliable Observer Coverage Level Analysis

3.1. Defining ‘Reliable’

There is no established definition of ‘reliable’ when establishing the precision on take estimates. A value of 20%-30% in the CV of estimates has been recommended for marine mammals and protected species (NMFS 2004). A value of 30% was used when establishing metrics for the marine mammal potential biological removal framework. Given these recommendations, 30% has been used as a reference point for defining ‘reliable’. Given the interaction rates with FKW, which is approximately 1 in 600 sets, a set level coverage rate of > 31% is needed to achieve a CV of 30%, 80% of the time (Ahrens and Crigler 2024).

3.2. Preliminary investigation of FKW detection as a function of observer coverage in the overlap area

Fishing effort and observed interaction rate data were drawn from the Pacific Islands Region Observer Program (PIROP) observer database and the logbook database for the period August 26, 2016 to December 31, 2022, after the expansion of the Papahānaumokuākea Marine National Monument that extended the longline fishery closure in the Northwestern Hawaiian Islands to 200 nm. This time period was used to account for potential differences in interaction rates as a result of the redistribution of fishing effort out of the monument. For the purpose of this analysis, a longline set was determined to have occurred in the overlap area if any of the begin or end points on set or haul was inside the overlap area or the centroid of the polygon these points make. This approach differs slightly from the 2023 DSLL BiOp, which did not use the centroid. . Using the begin/end/centroid points of the set with an interaction accounts for the possibility that the interaction may have initially occurred inside the overlap area even if it was recorded by the observer outside of the overlap area. A summary of the available logbook and PIROP data included in the analysis are presented in Table 1. There has been no observed false killer whale interactions recorded in the overlap area based on the observer report of the location of the interaction when the animal was seen during the haul. Based on the approach used for this analysis, one set in the overlap area had a false killer whale interaction.

Table 1. Summary of annual number of reported sets within the overlap area based on logbook and observed data sets based on PIROP data, 2016-2022.

| Year | Total sets in overlap area (logbook) | Observed sets in overlap area (PIROP) |
|----------------------|--------------------------------------|---------------------------------------|
| 2016 (Aug 26-Dec 31) | 5 | 1 |
| 2017 | 57 | 13 |
| 2018 | 92 | 25 |
| 2019 | 2 | 1 |
| 2020 | 15 | 4 |
| 2021 | 91 | 15 |
| 2022 | 35 | 7 |

Statistically there is no difference between the interaction rate in the overlap area and for the broader area of deep-set longline operations (Table 2). The point estimates are however notably different.

Since 2016 the highest number of sets in the overlap areas has been 92 with a corresponding highest number of observed sets of 25 in 2018 (Table 1). Given the low number of sets within the overlap area and the low interaction rate with FKW (Table 2), an observed FKW interaction within the overlap is not expected to occur in any given year even if the higher interaction rate of 1 in 66 sets is used.

Table 2. PIROP database based estimates of interaction rate with false killer whales post monument expansion in the deep-set longline fishery. Confidence intervals are calculated using a binomial distribution.

| Area | Observed FKW | Total sets | Interaction Rate (IR) | IR Lower 95% | IR Upper 95% |
|-----------|--------------|------------|-----------------------|--------------|--------------|
| All areas | 65 | 25601 | 0.0025 | 0.00195 | 0.0032 |
| Overlap | 1 | 66 | 0.015 | 0 | 0.0455 |

To meet the RPM and estimate MHI FKW interactions in the overlap area with a CV of 30%, observer coverage within the overlap needs to be greater than 90% and an interaction would need to be observed. Assuming 92 sets occur within the overlap area, Figure 1 shows how the CV of a positive estimate of FKW interactions declines as a function of observer coverage. If no interactions are observed an estimate of CV is not possible and would need to be imputed. This required coverage level changes little if the average of 43 sets (2016-2022 average effort in overlap area) is used.

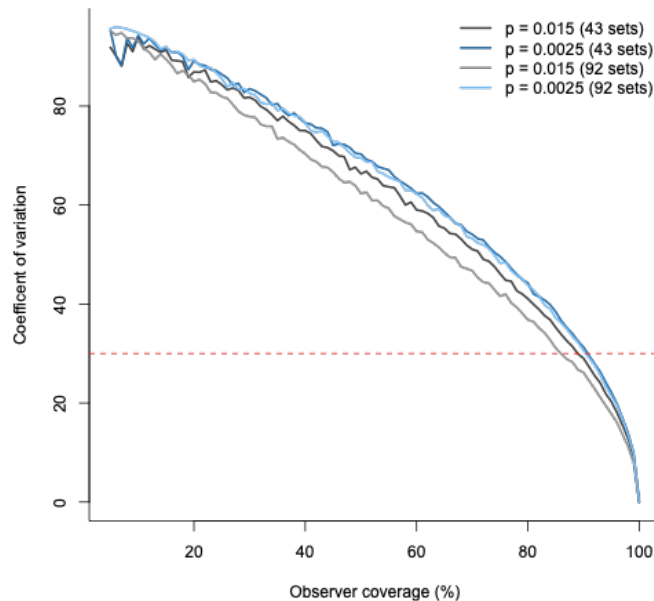


Figure 1. Coefficient of variation on estimates of interactions as a function of observer coverage under assumed interaction rates (p) and the number of sets occurring in the overlap area.

4. Implications for Management

The DSLL fishery was observed at approximately 20% annual coverage from 2002-2019. Since 2020, the coverage level has varied due to COVID-19 limitations, followed by a reduction in coverage due to increased observer cost. The annual coverage rate is expected to be 13.5% in 2024, with coverage after 2025 contingent upon funding availability. Observer coverage for the DSLL fishery is sampled to generate a bycatch estimate throughout the fishery area, and thus the proportion of effort with observer coverage inside the small overlap area varies significantly by year (Table 1).

The analysis presented here indicates that the minimum level of observer coverage needed for estimating MHI FKW interactions in the overlap area is greater than 90%, far higher than the current coverage. With this circumstance, the RPM T&C requires that within two years (after the first evaluation period) NMFS provide observer coverage at the level determined to produce a reliable estimate.

The BiOp RPM WG discussed potential approaches for achieving the T&C's stated objective of improving understanding of and estimates of interactions with the MHI IFKW in the overlap area. These include increasing human observer coverage, implementing coverage through electronic monitoring (EM), research, and spatial management. The following sections review considerations for each of these potential implementation pathways.

5. Potential Implementation Pathways

5.1. Increase Human Observer Coverage

Increasing human observer coverage in the overlap area could be achieved by increasing coverage throughout the fishery area, or increasing coverage only in the overlap area. Increasing costs of observer coverage has resulted in NMFS reducing coverage in the DSLL fishery in 2024, and thus increasing observer coverage throughout the fishery area is not achievable without substantial increase in funding.

Current regulations for observer coverage in the Hawaii longline fishery (50 CFR 665.803; 665.808) requires permit holders (or designated agent) to provide a 72-hour notice before departure for observer placement and declare trip type (DSLL or SSLL). The observer coverage rate differs by trip type - all SSLL trips currently receive an observer placement (i.e. 100% coverage), whereas DSLL trips are sampled to achieve a predetermined coverage level (13.5% for 2024).

To provide a higher observer coverage rate in the overlap area, the Council may consider a modification to the observer placement process through a regulatory amendment under the Pelagic FEP. A modified observer placement process could include a third category of trip type and a requirement for permit holders on a deep-set trip to declare their intent to fish in the overlap area to allow for a higher rate of observer coverage in the overlap area. This would also require definition of the overlap area in regulations. The Council may consider other alternative procedures to achieve a higher level of coverage within the overlap area, but any procedure will likely need to include a regulatory definition of the overlap area and an associated process that

would allow a differential coverage level for the area of interest relative to the overall deep-set fishery.

Increasing human observer coverage in the overlap area to implement the RPM T&C would provide a species identification mechanism consistent with the rest of the fishery area, as well as the potential for genetic sample collection to determine whether the animal belongs to the IFKW population. However, genetic sampling has been deprioritized since the implementation of the False Killer Whale Take Reduction Plan (FKWTRP) to allow crew to focus on creating tension on the line to attempt to straighten the hook.

A requirement for permit holders on deep-set trips to declare their intent to fish in the overlap area at the time of observer placement may disincentive fishing in the overlap area, as the vessel will have a higher likelihood they will be required to carry an observer. As such, a requirement for a higher observer coverage in the overlap area may significantly reduce or eliminate effort in the area, contrary to the stated objective of the RPM T&C to improve understanding of and estimates of interactions with the MHI IFKW in the overlap area.

Conversely, if the additional observer coverage does not deter fishing in the overlap area, a requirement for a high observer coverage rate in the overlap area may take away coverage from the remainder of the fishery area. With the already reduced observer coverage rate in the DSLL fishery (reduced from 20% to 13.5%), this could increase uncertainty of bycatch estimates for the DSLL, especially for less common species, such as protected species.

5.2. *Electronic Monitoring*

An alternative to increasing human observer coverage to implement the RPM T&C is to increase coverage in the overlap area through electronic monitoring (EM). The Council in coordination with NMFS and the Hawaii longline industry through the Electronic Technologies Steering Committee (ETSC) is currently considering EM implementation for the Hawaii longline fishery. The Council at the September 2023 meeting recommended development of a pre-implementation program with a primary objective for protected species monitoring. The timeline for full EM implementation is dependent on funding availability, and while significant progress is expected in the coming years, full implementation in the Hawaii longline fishery is unlikely within the T&C timeline (3 years from BiOp publication).

Once EM is implemented in the Hawaii longline fishery, it is likely that all vessels in the fishery will be required to carry an EM system onboard, with a sampling or audit process to achieve monitoring objectives. Under this scenario, any trip that fished in the overlap area could be reviewed post-hoc and at a higher review rate than the rest of the fishery area to meet the RPM T&C objectives without a requirement to declare intent to fish in the overlap area in advance. Specific trip sampling or audit protocol would need to be developed as part of the larger EM regulatory framework. EM may provide a more efficient implementation of this RPM T&C compared to establishing a regulatory mechanism for placing a higher coverage rate in the overlap area with human observers.

However, additional EM development may be needed to improve camera resolution and/or reduce uncertainty with FKW identification when compared to a human observer. Genetic

sample collection would also not be possible unless a vessel is assigned a human observer, and thus any FKW interactions observed through EM would not be positively identified to stock.

5.3. Research

In addition to improving monitoring through observers or EM, the BiOp RPM WG identified research needs to reduce the uncertainties associated with estimating interactions between the DSLL fishery and MHI IFKWs in the overlap area. Two key areas were identified: 1) improving estimation of interaction rates; and 2) improving data used for stock attribution and identification inside the overlap area.

Improving estimation of interaction rates is the primary focus of the RPM T&C. The overlap area however includes the distribution of the IFKW as well as the non-ESA listed pelagic FKW stocks. Unless stock-specific identification is available for a given interaction, FKW interactions are attributed to stock based on the location of the interaction. Because straightening the hook is generally inconsistent with collecting tissue samples, stock attribution has not been possible for interactions since the FKWTRP. For areas where IFKW and pelagic FKW stocks overlap inside the US EEZ around Hawaii, interactions are estimated using the fishery effort in that area and prorated by the relative density of each stock. The density of each stock is assumed to be constant throughout the range for the purpose of this estimation method. Under increased observer coverage or EM monitoring of the overlap area, uncertainties associated with stock identification and attribution will remain. Alternatively, specific stock identification data could be collected whenever an interaction occurred.

The BiOp RPM WG discussed the following research and data collection needs:

- *Genetic sample collection in the DSLL fishery at the time of interaction* - WG noted the existing limitations associated with the priority to straighten hooks, but also noted that the use of the industry-developed fighting line device may help to bring FKWs closer to the vessel to allow genetic or photographic sampling in the future.
- *Improve quality of photographs taken by observers and EM systems in the overlap area to allow photo identification to IFKW stock* - the IFKW stock has been extensively photographed through near-shore small boat surveys, with nearly all animals in the stock represented in the photo-identification catalog. However, the quality of photographs taken by observers, and current image quality of EM systems may be insufficient to facilitate stock identification through photo-ID. Better quality cameras issued to observers may be required to facilitate obtaining adequate photographs for individual animal identification.
- *Focused surveys in and around the overlap area* - to date, there have been no observed FKW interactions or survey sightings in the overlap area, and a small incursion by a single telemetry tagged animal. Increasing survey efforts in and around the overlap area would improve the underlying distribution data for insular and pelagic FKW stocks used to partition interactions between stocks.

5.4. Spatial Management

The BiOp RPM WG also considered spatial management as an alternative to increasing observer coverage in the IFKW overlap area, but determined these approaches are beyond the scope and intent of the RPM T&C. Considerations included the following:

- *Modifications to the MHI longline exclusion zone* - The BiOp RPM WG noted that a potential approach for reducing impacts to the IFKW population while maintaining fishing areas for the DSLL fishery would be to modify the MHI longline exclusion zone to expand the southern end to include the overlap area, while reopening the northern side to longline fishing where there is no overlap with the IFKW population. Prior to the implementation of the FKWTRP, the MH longline exclusion zone implemented under the Pelagic FEP included a seasonal contraction in the closure area on the north side of the MHI to account for a seasonal ahi run during the winter months. This seasonal contraction was eliminated under the FKWTRP to reduce potential overlap of the DSLL with the IFKW population. However, additional tagging done since the FKWTRP implementation in 2012 suggests that a portion of the MHI longline exclusion zone on the north side of the islands does not overlap with the known IFKW range (Figure 1). The original MHI longline exclusion zone was established to reduce gear conflicts between the Hawaii longline fishery and the small boat fishery, and thus any change in the longline exclusion zone would warrant a review through the Council process.
- *Dynamic spatial management* - Available logbook data indicate that most of the past DSLL fishing effort inside the overlap area were in June and July. If the effort patterns are related to eddies or other oceanographic features, then dynamic management could be considered to avoid the overlap area when those features are present. Further evaluation is needed to determine whether oceanographic features are driving effort in the overlap area. The Council also previously determined (during its consideration of Pelagic FEP Amendment 10 to revise sea turtle measures in the SLL fishery) that real-time spatial management measures were not practical or feasible to implement as a regulatory measure.

Table 3. Summary of the pros and cons associated with the potential implementation pathways considered in this report.

| Potential implementation pathway | Pros | Cons |
|----------------------------------|---|---|
| Observer requirement | <ul style="list-style-type: none"> ● More reliable species ID ● Sample collection possible | <ul style="list-style-type: none"> ● Requiring notice may essentially “close” the area ● May negatively affect overall observer coverage and random sample ● Likely will not detect interaction unless 100% coverage |
| EM requirement | <ul style="list-style-type: none"> ● Higher review rate in the overlap area possible without pre-trip notice to fish in the overlap area ● Less likely to deter fishermen from fishing in area ● Cost may be lower than human observer requirement | <ul style="list-style-type: none"> ● Species and stock ID may be unreliable, and sampling not possible on EM-only trips ● Timeline to full EM implementation is likely longer than the T&C implementation timeline ● May still require notice of intent to |

| | | |
|---------------------------|--|---|
| | <ul style="list-style-type: none"> ● Could negate notice requirement | fish in area |
| Research | <ul style="list-style-type: none"> ● Resolve uncertainty around stock identification and relative density of IFKW and pelagic FKW in the overlap area | <ul style="list-style-type: none"> ● Would not meet the requirement of the T&C as a stand-alone option |
| Spatial Management | <ul style="list-style-type: none"> ● May provide an alternative to increasing monitoring in the overlap area | <ul style="list-style-type: none"> ● Beyond the scope and stated intent of the T&C |

6. Plan Team and Council Considerations

The Council tasked the BiOp RPM WG to facilitate coordination for implementing the 2023 Hawaii DSLL and ASLL fisheries BiOp RPMs, and to report annually to the Pelagic Plan Team. For the DSLL false killer whale overlap area T&C, the BiOp RPM WG conducted an evaluation to determine the minimum level of observer coverage reliable for estimating the MHI IFKW interactions in the DSLL fishery.

The BiOp RPM WG determined that 90% coverage would be needed to estimate interactions with a CV > 30%, and the current coverage rate is below this level. The WG considered potential implementation pathways for increasing observer coverage either through human observers or EM, as well as additional considerations for research needs and spatial management.

Based on this evaluation, the BiOp RPM WG requests that the Pelagic Plan Team, SSC, and other advisory groups as appropriate, consider recommendations for the Council regarding next steps for implementing the RPM T&C for IFKWs. Specifically, the WG requests:

- The **Pelagic PT** to review the WG report, provide input on the analysis as well as potential implementation pathways, and make recommendations to Council on next steps
- The **SSC** to review observer coverage analysis and provide input on its implications for implementation pathways
- The **Council** to review WG report, consider recommendations from Pelagic PT, SSC, and other advisory groups as appropriate, and provide direction to staff and WG on next steps for RPM T&C implementation and regulatory process timeline if applicable.

7. Working Group Members

- Lynn Rassel, PIRO SFD (*co-chair*)
- David O'Brien, PIRO SFD
- Jason Mehlinger, PIRO SFD
- Melissa Snover, PIRO PRD
- Emily Crigler, PIFSC
- Rob Ahrens, PIFSC
- Erin Oleson, PIFSC
- Eric Kingma, HLA; FIAC Member
- Stuart Chikami, American Samoa longline fishery representative; FIAC Member
- Asuka Ishizaki, WPRFMC staff (*co-chair*)

8. References

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