INTER-AMERICAN TROPICAL TUNA COMMISSION

ECOSYSTEMS AND BYCATCH WORKING GROUP

2ND MEETING

La Jolla, California (USA)
06-07 June 2024

EB-02-03

WORKPLAN TOWARDS THE ADOPTION OF BEST HANDLING AND RELEASE PRACTICES FOR VULNERABLE SPECIES IN IATTC FISHERIES

Melanie Hutchinson and Jon Lopez

CONTENTS

EXECUTIVE SUMMARY

A straightforward conservation management strategy to reduce mortality among non-target vulnerable species is to ensure that fishers adopt best handling and release practices (BHRP) that safeguard the post-release survival of these species. Building upon EB-01-01, this document outlines a comprehensive work plan for creating and adopting a dynamic BHRP guidelines document for vulnerable species incidentally caught in IATTC fisheries. Additionally, this paper provides an operational framework and identifies research priorities to address data gaps necessary for informing and evaluating BHRP guidelines. Crucially, it also highlights practices to be avoided and recommends interim practices in the absence of data verifying the efficacy of the proposed guidelines.

1. BACKGROUND

Reducing the impacts of fishing on non-target vulnerable species is a guiding principle under the United Nations Law of the Sea and the Antigua Convention of the IATTC. One strategy that has been shown to reduce mortality and improve the post-release survival (PRS) of vulnerable species after incidental capture is the use of best handling and release methods that reduce injury (Hutchinson et al. 2021, Bigelow and Carvalho 2022). Multiple studies have demonstrated that some handling practices can lead to injury and mortality while other practices are non-injurious with measurable improvements to post release survival rates across taxa (e.g., Gianuca et al. 2020; Hutchinson et al. 2021). For vulnerable species, often endangered, ensuring that poor handling practices are avoided is increasingly imperative as some populations continue to decline due to fishing (e.g., Dias et al., 2019; Dulvy et al. 2021).

Across fishery management organizations, and within the IATTC in particular, there are several conservation and management measures in place (Resolutions C-04-05; C-11-02; C-11-10; C-15-04; C-19-04; C-19-06; C-23-07) that promote safe handling or direct fishers to release vulnerable species as quickly

as possible and with as little harm as possible (Table 1). Most of the existing IATTC Resolutions that require fishers to promptly release vulnerable species unharmed, may only allude to the use of best practices, or provide general common-sense recommendations but lack specific guidance that has been tested for efficacy and supported by measurable impacts on survival, while other Resolutions may only require updating with improved guidance (e.g., C-19-04). Thus, best handling and release practice (BHRP) guidelines still need to be developed and officially adopted for several vulnerable species and fishing gears in the IATTC.

To address these concerns, the IATTC staff is working towards the development of a compendium of BHRP guidelines for all vulnerable species captured in IATTC fisheries. This document provides the workplan that outlines the steps necessary for the development of effective and meaningful BHRP guidelines for vulnerable species, along with a proposed timeline from development to adoption and implementation by taxa (i.e., sharks, rays, seabirds, sea turtles, marine mammals). The workplan and guidelines developed by the staff have been prepared under the assumption that fishers should operate under a code of conduct or philosophy of 'do no harm' to vulnerable species that are incidentally captured during fishing operations and are destined to be discarded, and thus, there are several practices that should be avoided and practices that should be encouraged in the absence of data that points to the most effective and safest BHRP. To this end a framework for BHRP guidelines is also proposed by the staff, with recommendations on the content and elements that need to be considered and included in all official BHRP guidelines. Similarly, this document presents a list of research priorities that would support the adoption of effective and science based BHRPs for vulnerable taxa in IATTC fisheries.

2. WORKPLAN FOR BHRP GUIDELINE DEVELOPMENT

The workplan for the development and adoption of BHRP guidelines for vulnerable species outlined below has several phases, components, and activities (Figure 1, Table 2). The initial phase (Phase 1 – Review and Planning) of the BHRP development process began in 2023 with a literature, research and data review for information on post release survival rates of vulnerable species and an assessment of all IATTC conservation measures for vulnerable species (EB-01-01). The purpose of that exercise was to identify any data sets that may inform BHRP recommendations, detect data and research gaps that are preventing the progress of BHRPs, and to identify Resolutions that may need updating or amending to better reflect recommended BHRPs. The results of EB-01-01 helped to generate the plan described herein. The second phase (Phase 2 – Framework Development) of the workplan describes the need to establish a framework under which all BHRP guidelines will conform, and the activities and components required within the BHRP framework. The third phase (Phase 3 - Development and Adoption of BHRP Guidelines) describes the process and plan for the adoption of BHRP for all taxa under the current state of knowledge. Phase four (Phase 4 - Development of Materials for Training and Outreach) of the workplan outlines the need for training and the generation of outreach materials once BHRP guidelines have been adopted for each taxa. Phase five (Phase 5 – Filling Gaps) describes the plan for filling data gaps and the prioritization of research activities that would help with BHRP formulation. The final phase (Phase 6 – Performance Assessment) of the workplan is focused on performance assessment, at two levels, where i) the efficacy of the BHRP guidelines themselves are reviewed and ii) tools are developed and implemented to assess how individual vessels, companies or CPCs are performing against the adopted BHRPs. Below we describe the activities that need to be conducted during each phase along with the planned timeline for each activity. The workplan also incorporates the iterative nature of BHRP guidelines where, as new information becomes available, there is room and a process for updating the guidance as needed.

2.1. Phase 1 – Review and Planning

Phase 1 (Review and Planning) began in 2023 and is completed with the publication and presentation of this document. In this initial phase towards the development and adoption of BHRP guidelines our

objectives were to conduct a review of all available research and data that may inform BHRP guidance, identify where the gaps are and to review the IATTC conservation measures for vulnerable species to assess which Resolutions called for the use of BHRPs and those that may need to be updated. The results of these efforts were published in EB-01-01 last year and presented to both the first meeting of the Ecosystems and Bycatch Working Group (EBWG) and the 14th meeting of the Scientific Advisory Committee (SAC). The staff requested the Commission's support in collecting any additional information from the CPCs on existing BHRP guidelines, regulations, and or subject matter experts (SME) to assist with the development of BHRP guidelines for fleets fishing under the IATTC purview. The director sent a memorandum (Ref: 0473-410) to all CPCs in September of 2023 inviting CPCs to provide the secretariat with:

1. Existing guidelines and or regulations on best handling and release practices for marine mammals, seabirds, sea turtles, sharks and rays for fisheries under the purview of the IATTC;
2. Existing data that elucidates the post release fate of marine mammals, seabirds, sea turtles, sharks and rays captured and released in fisheries under the purview of the IATTC;
3. Identify and designate subject matter experts that could potentially assist with the development of the guidelines referred to above for each taxa and fishery.

Several CPCs responded with content and the identification of SMEs to support this endeavor and informed the development of the shark BHRP guidelines (SAC-15-11) and the strategy underpinning this workplan for all taxa. With the present document, Phase 1 would be completed.

2.2. Phase 2 – BHRP Framework

The second phase in the process of developing and ultimately adopting BHRP guidelines is to agree on a framework with the components required for BHRPs and a continuous and cyclical process for reviewing new information as it is generated and for updating adopted guidelines and training materials with improved guidance based on new data.

The 14th SAC requested the staff generate a framework outlining the required components for BHRP guidelines for vulnerable species. A draft framework, continuous and cyclical, was proposed by the staff in EB-01-01 and is provided below.

I. Define and adopt general (high level) recommendations of good practices for each fishery (purse seine, longline including large and small scale, and other hook and line fisheries, and gillnet fisheries).

II. Identify and ban specific (or harmful) practices that shall be avoided for purse seine, longline (large and small scale, and other hook and line fisheries) and gillnet fisheries.

III. Define and adopt/promote specific practices that are considered safe for the animals and the crew for purse seine, longline (large and small scale, other hook and line fisheries) and gillnet fisheries. Including developing more specific BHRP guidelines with consideration of the effect of vessel configuration and structure that encourages individualized practices and training of crews.

    a. Create decision trees for when removing hooks is helpful and when it is harmful.

IV. Define and adopt the use of tools that are required for each vessel to carry for safe handling and release by fishery and vessel configuration.

V. Ensure that BHRP guidelines are legally binding with requirements for regular training, monitoring and enforcement.

VI. Produce dissemination/outreach material to accompany the adopted BHRP guidelines, including illustrations, infographics, and videos. Make dissemination material available to CPCs and fishing companies and require that they are posted in the galley or wherever crew members can view them.

VII. Establish requirements for continuous training of CPCs, vessel operators and their crews to ensure awareness of helpful practices and their correct methodologies and harmful practices that must be avoided.

VIII. Revise BHRPs as needed with updated information and make sure dissemination and training materials are current.

An important basis for the development of meaningful, safe, and effective BHRP guidelines is to ensure that all guidance is in alignment with a general 'do not harm' philosophical approach of prioritizing mitigating harm to incidental species that are not retained. Further, we must ensure that all BHRP guidelines are clear, concise, and include specific practices that can easily and safely be implemented into current fishing practices, and that the tools necessary for BHRPs are identified and required to be carried by fishers. From this perspective and in the absence of data driven BHRPs, we can suggest the avoidance of certain harmful practices (e.g., seabird bill mutilation, rolling animals through the power block in purse seine fisheries, leaving trailing gear on discarded species in longline fisheries).

For this reason and in accordance with the recommendation from the 14th SAC: *'Unless or until official BHRPs are adopted, implement methods that prevent injuries as a minimum, in purse seine fisheries and leaving as little trailing gear on discarded species as possible in longline fisheries'* all BHRP guidelines will identify harmful practices that must be avoided and those practices that are considered safe and do no further harm to vulnerable species.

Therefore, the IATTC staff believes that the adoption of a framework for BHRP as outlined above is desirable and should ensure that BHRP guidelines are harmonized with regional efforts to the extent possible, are feasible, and enforceable across all CPCs, as appropriate. The framework shall also allow for BHRP to be continuously improved and updated as new information becomes available. Specific vessel configurations must also be considered to encourage individualized BHRPs and training of crews. These operational requirements would be the subject of regular training, monitoring, and enforcement. Additionally, BHRP guidelines must also be accompanied by training materials to provide clear instructions for the crews, including illustrations and videos of the adopted practices and tool requirements.

2.3. Phase 3 – Development and Adoption of BHRP Guidelines for Each Taxa

In Phase 3, BHRP guidelines for each vulnerable species taxa and fishery (purse seine, large and small scale longline, gillnet if applicable) are developed under the current state of knowledge. The development of BHRPs is often an iterative process, requiring knowledge of: i) the fishery specific operational characteristics (e.g., vessel sizes and designs, including details on free board, gear composition, mitigation tool availability, handling practices used), ii) behavior and physiology of the bycatch species, iii) data that validates the efficacy of the practice (i.e., post release survival studies), and iv) the engagement of the fleet, and other relevant stakeholders, to assist with the development, testing and training of practices that are feasible, practical, and can be implemented operationally. At this stage we have identified several data and research gaps, compiled in EB-01-01, and as we work towards addressing these, there are harmful practices that should be prohibited and several practices that should be promoted under the current state of knowledge for all taxa in all fisheries. It is understood that the BHRPs will be compiled in a document separate from the Resolutions that the Commission has adopted or may adopt regarding vulnerable species. However, the Commission may also decide to make them legally binding through their

incorporation in one or several of these Resolutions, either through a cross-reference or the addition of an annex.

The work flow for each taxa begins with the identification of SMEs and the potential formation of an expert group that can collaborate with the IATTC staff and provide expert opinion and advice for handling and release practices that are known to harm animals (for the **'don't do'** component of the BHRP guidelines), practices that are considered safe, effective and practical in fishery settings (this is the **'do'** component of the BHRP guidelines), and the tools required. The Gannt chart (i.e., chronogram) available in Table 2 below provides the expected timeline for each taxa from identification and formation of SME groups, through consultation and BHRP development, to the presentation of the draft guidelines to the EBWG, the SAC and, ultimately, the Commission.

2.3.1. Sharks

The development of BHRP guidelines for sharks began with the adoption of Resolution C-23-07 which stipulates in its paragraph 12 that: "*The IATTC scientific staff, in collaboration with the IATTC SAC and EBWG, shall develop and recommend to the Commission a set of best handling guidelines for the safe* ***release of sharks for inclusion in this measure in 2024****."*

In accordance with that provision, the development of the shark BHRP guidelines began in 2023 with the request for information and the identification of SMEs from CPCs (Memorandum Ref: 0473-410 detailed above). The existing data and practices were reviewed, compiled, and drafted in a document by IATTC staff and circulated to a group of SMEs from the CPCs and other global experts. After a period of review and open comments the resultant guidelines that also include content and background information for each recommendation are provided in SAC-15-11. The proposed shark BHRP guidelines will be presented to the second meeting of the EBWG and to the 15th meeting of the SAC. Comments will be compiled and put forward for the Commission's consideration at the 102nd annual meeting in September of 2024. This exercise will help create a working model or a method applicable to the development of BHRP guidelines for the other vulnerable species.

2.3.2. Seabirds

BHRP guidelines for seabirds captured in IATTC longline and other hook and line fisheries were developed in 2023 (EB-01-01 Annex 1) and are available as an Annex of this document for convenience. These BHRP guidelines, recommended by the staff to be used to revise Resolution C-11-02 in 2023, were based on adopted guidance from the Agreement on the Conservation of Albatrosses and Petrels (ACAP), NOAA Fisheries, and New Zealand Fisheries and have been reviewed by ACAP staff. In the absence of BHRP guidelines for seabirds in the IATTC convention area the approval of these interim BHRP guidelines is warranted and timely. Alternatively, these draft guidelines can be deferred to 2025 so that they may undergo the same process of review by a larger expert group as demonstrated for sharks and placed up for adoption during the Commission meeting in 2025.

2.3.3. Rays

The proposed plan for BHRP guidance development and adoption for rays is deferred to 2025 to await the results of several ongoing post release survival studies in both purse seine and longline fisheries in the region (Murua et al. 2024; Stewart et al. 2024). BHRP guideline development will begin with the identification and formation of an expert group during the last half of 2024 and the beginning quarter of 2025. Consultation with the expert group and the composition of draft guidelines would then occur through the first half of 2025. Draft BHRP guidelines for rays should be available for review by the third meeting of the EBWG, the 16th meeting of the SAC and then up for consideration during the annual meeting of the Commission in the third quarter of 2025.

2.3.4. Sea Turtles

BHRP guidance for sea turtles in longline and other hook and line fisheries depends on vessel and gear configurations (i.e., free-board, hook sizes, shapes, and materials). Thus, the proposed plan for BHRP guidance development for sea turtles is to allow some data gaps to be filled through 2025 and for a second expert workshop on circle hooks to take place during 2025 where decisions can be made on hook shape and size requirements. The process of BHRP guideline development would then begin with the identification and formation of an expert group during the second half of 2025. Consultation with the expert group (i.e., SMEs) and the composition of draft guidelines would occur during the last quarter of 2025 through the first half of 2026. Draft guidelines for sea turtles will be available for review by the fourth meeting of the EBWG, the 17th meeting of the SAC and then up for consideration during the annual meeting of the Commission in the third quarter of 2026.

2.3.5. Marine Mammals

These guidelines will be specific to marine mammals that are incidentally captured in large and small-scale longline fisheries, as well as marine mammals that are incidentally encircled in purse seine fisheries. These guidelines are excluding those marine mammals of the family Delphinidae that are encircled by purse seine fisheries operating under the AIDCP. The proposed timeline for BHRP guidance development for marine mammals is set to begin with the identification of SMEs and formation of the expert group during the latter half of 2025. Consultation and BHRP development will occur during the latter half of 2025 through the first half of 2026. Presentation of the draft guidelines to the fourth meeting of the EBWG and the 17th SAC are slated for the second quarter of 2026 with review and consideration for adoption by the Commission during the annual meeting of 2026.

2.4. Phase 4 – Development of Training and Education Materials

For BHRPs to be an effective vulnerable species mortality mitigation tool they must be integrated into normal fishing operations. Thus, it is imperative that fishers are made aware of the preferred practices and trained in their correct implementation and usage. Accordingly, fishers must also be made aware of practices that are banned and or practices that must be avoided. Several IATTC Resolutions (C-04-05 Rev 2, C-04-07 [C], C-19-04) call for training of fishers on BHRPs. Resolution C-04-05 Rev 2 [8.b. & c.] requests the IATTC staff to '*educate fishermen through information dissemination activities, including distributing informational materials and organizing seminars on, inter alia, reducing bycatches of sea turtles and safe handling of incidentally caught sea turtles to improve their survivability*'. To address these requirements for all vulnerable taxa we propose that the IATTC staff generate outreach, education, and training materials. This will include the creation of infographics to accompany adopted practices and the formulation of BHRP guideline 'posters' that can be posted visibly on all vessels in areas where crew are able to review them for all vulnerable taxa in all fisheries (where appropriate). The timeline for development of these materials is provided in Table 2 and is proposed to begin immediately after the adoption of BHRP guidelines for each taxa. The timeframe for content creation is estimated to be one year from BHRP guideline adoption to posting and circulation. Training of the fishing crew will need to be continuous, with updated training material created as needed. IATTC staff can support CPCs with fisher training by creating training materials and by supporting, coordinating, (co)organizing and participating in training workshops, as required. These workshops are also an excellent opportunity to learn from fishers on potential techniques and strategies for either mitigating interactions or devising new BHRPs.

2.5. Phase 5 – Filling Data and Research Gaps

Developing BHRPs requires a comprehensive understanding of various fisheries operational characteristics, such as vessel sizes and designs, freeboard, gear configurations and materials, fishing strategies, handling techniques, and tools available for safe release. However, the review conducted during Phase 1 (EB-01-01) found major research, data and information gaps for vulnerable species interactions, fishery characteristics, and PRS studies for several fishing gears or segments, such as class 1-5 purse seine vessels, industrial longline, small-scale longline, and other artisanal fisheries (i.e., gillnets). Unfortunately, many of the operational characteristics of these fisheries are frequently missing, unmonitored, unreported, or unknown. This creates an obstacle to developing fishery specific BHRP guidelines and other conservation and management efforts for vulnerable species and needs to be addressed. To this end the IATTC staff plans to review existing IATTC and external (under C-03-05) data collection processes to ensure that relevant data for BHRP determination and evaluation is collected.

The development of meaningful BHRP guidelines also requires data on PRS rates per species, size, and fishery to validate efficacy. PRS data is available for several shark species captured in some fisheries, but nearly absent for other vulnerable species across the fishing gears used in the IATTC. Obtaining PRS data can be challenging, as it often requires the use of expensive satellite linked or other telemetry technologies for marine species and conducting telemetry studies in fishery settings can be logistically difficult, time consuming, and expensive. Due to these challenges and because meta-analyses that use data from several studies with small sample sizes have proven informative in understanding the impact of handling methods on survivorship (e.g., Ellis et al., 2017; Musyl et al. 2019), the IATTC staff recommends the development of a shared regional data repository for tag data, similar to those established by the Ocean Tracking Network (https://oceantrackingnetwork.org/what-we-do/) and Animal Telemetry Network (https://ioos.noaa.gov/project/atn/). For species where telemetry techniques may not be feasible such as marine mammals and seabirds, other strategies for assessing fishery impacts and survival estimation must be explored (i.e., photo identification, stranding data). A regional repository where these data are stored could reduce redundancy and assist with effective allocation of resources towards filling data gaps that are preventing the implementation of meaningful conservation measures. This could also improve the capacities of CPCs and the IATTC for study design and funding agencies' abilities to identify proposals that can generate information for regional research priorities.

The IATTC staff have compiled the data gaps that need to be addressed along with a list of studies ranked by perceived priority from a BHRP perspective (Table 3). Prioritizing research efforts in collaboration with CPCs, other scientific organizations, industry, and NGOs to fill these data gaps is desirable. Therefore, the IATTC staff has been reaching out to research agencies and institutions across the region to identify available data sets, planned activities and compiling lists of contacts with relevant data. The staff plans to continue to assist and conduct, in collaboration with relevant stakeholders, research on PRS by species across life-history stages, fishery and handling or release methods to identify and validate BHRPs.

2.6. Phase 6 – Performance assessment

As noted above, developing BHRP guidelines is an iterative process. As new information emerges and data gaps are filled, the guidance may need to be updated, and the efficacy of the adopted BHRPs, as well as individual adherence to them must be continually assessed. In the final Phase (6), the workplan focuses on performance assessment, at two levels: i) evaluating the overall effectiveness of the BHRP guidelines themselves and ii) developing tools to assess the performance of individual vessels, companies, or CPCs performance against the adopted BHRPs.

The performance assessment of adopted BHRPs will be ongoing, with updated data reviewed by the IATTC staff and discussed with the EBWG and the SAC in perpetuity, as needed. For the second level of assessment, we will develop a secure, password-protected online platform to generate reports evaluating individual vessels, companies, or CPCs performance against the recommended BHRPs. This platform will enable automated analyses of fishing strategies, bycatch mitigation tools, and handling and release practices. It will identify behavioral anomalies, such as 'gold-star' fishers who maintain high target catch rates while minimizing bycatch of vulnerable species, have lower rates of dead discards, and higher post-release survival rates. Conversely, it will also support the determination of 'poor performers' with higher impacts on vulnerable species.

This secure online platform will house vessel-company-and/or CPC-specific reports facilitating the the detection of anomalies at various levels and offering tools to address potential poor performance. The focus and intent of these performance assessments is not on compliance but to provide constructive feedback and support for fishers to improve their practices. For instance, the tool could identify cases where a vessel lacks the appropriate tools, resources, or training and could support the development of incentives if an incentive-based conservation and management framework is favored in the future by the IATTC. The tool could just as easily identify the operational characteristics, tools or techniques being used by some vessels that could help to improve BHRP guidelines for the region. By providing automated, consistent, and ongoing feedback to CPCs, vessels, and owners, fishing mortality of vulnerable species could be significantly reduced.

3. CONCLUSIONS AND RECOMMENDATIONS

This workplan provides a comprehensive guide, framework, and timeline for adopting BHRP guidelines for all vulnerable species captured by the various fleets under the IATTC. The process is divided into six phases, allowing for the continuous review, assessment, and updating of the BHRP guidelines as new information becomes available.

In Phase 1, several data gaps were identified (EB-01-01) that need to be addressed to develop the most effective methods and guidance for releasing and handling incidental species. These gaps are compiled in Appendix 1 – Table 3 to prioritize research efforts and facilitate the necessary studies (Phase 5).

During Phase 2, IATTC staff generated a framework and structure for the development and adoption of BHRPs. At this stage, IATTC staff is seeking guidance from the Commission on the adoption and amendment process for BHRP guidelines. Specifically, the Commission needs to decide whether these guidelines will be integrated as updates to existing Resolutions or a general resolution or compendium of BHRP guidelines with annexes for vulnerable taxa captured in IATTC fisheries.

Staff recommendation for the Commission:

1. The Commission, in addition to endorsing the development of the guidelines and adopting them, should consider making their content legally binding, in part or in whole, through their incorporation in appropriate instruments, such as, among others, a general resolution with annexes covering all BHRPs, or individual resolutions on specific BHRPs.

In Phase 3 of the workplan the steps towards the adoption of interim BHRP guidelines under the current state of knowledge are identified along with a proposed timeline for each taxa. To reduce the impacts that fishing has on vulnerable species and in the absence of perfect data it is prudent to adopt guidelines that prevent injury. The IATTC staff are requesting the Commission to adopt and endorse the components and timeline illustrated in the workplan. Additionally, and in accordance with the Commission's request in C-23-07, draft BHRP guidelines for sharks (and seabirds) have been prepared for review.

Staff recommendations for the Commission:

2. Endorse the BHRP guideline development work plan, framework and timeline for each taxa.
3. Consider adopting the shark BHRP guidelines described in SAC-15-11.
4. Consider adopting the seabird BHRP guidelines from EB-01-01 (Annexed to this document for convenience).

As BHRP guidelines are adopted it is necessary that outreach, education, and training materials are created to ensure that fishers are aware of the adopted 'good' practices and those practices that must be avoided. In Phase 4 the IATTC staff address this need and suggest creating these materials to support CPCs with the implementation of training programs.

In Phase 5 the workplan is focused on filling important data gaps identified during Phase 1 (i.e., fishery characteristics, fishing strategies, PRS rates). Across the various fleets fishing under the IATTC convention, gear configurations can vary within fishery segments but also regionally and temporally. Because guidance will often depend on vessel size and structure (i.e., freeboard, the availability of a second winch on purse seiners, hook sizes and composition in line fisheries) and the tools that the fishers have available to them, understanding the fleet characterization across the region in time and space is important. Thus, the staff is requesting assistance with generating fleet characteristic data in addition to the staff's ongoing efforts to improve data collections.

Another important data gap is the validation of some handling practices on PRS rates. Generating PRS data is logistically challenging and resource intensive typically involving expensive telemetry technologies. The IATTC staff is working to develop a regional database for telemetry data with fisheries survival implications for vulnerable species to enhance mortality estimation and the identification of BHRP. These methods are particularly challenging for some vulnerable species (i.e., marine mammals and seabirds). Therefore, alternative strategies (e.g., photo-identification of marine mammals, seabird banding network) for identifying fate of the individuals interacting with IATTC fisheries should be explored, along with the development of a regional network for reports on strandings and injured animals with evidence of fishing interactions.

Staff recommendation for the Commission:

5. The Commission should request the Secretariat to gather from CPCs and other sources all relevant information on, among others, vessel and gear configuration details by target species and fishing gear, ongoing PRS studies, stranding networks, or other relevant activity, and urge CPCs and other relevant stakeholders to ensure the necessary support and collaboration.

4. REFERENCES

Bigelow, K. and Carvalho, F., 2022. Review of potential mitigation measures to reduce fishing-related mortality on silky and oceanic whitetip sharks (Project 101). United States. National Marine Fisheries Service; Pacific Islands Fisheries Science Center (U.S.). PIFSC Working Paper: WP-22-002. DOI: https://doi.org/10.25923/10gt-as86

Dias, M.P., Martin, R., Pearmain, E.J., Burfield, I.J., Small, C., Phillips, R.A., Yates, O., Lascelles, B., Borboroglu, P.G. and Croxall, J.P., 2019. Threats to seabirds: a global assessment. Biological Conservation, 237, pp. 525-537.

Dulvy, Nicholas K., Nathan Pacoureau, Cassandra L. Rigby, Riley A. Pollom, Rima W. Jabado, David A. Ebert, Brittany Finucci et al. "Overfishing drives over one-third of all sharks and rays toward a global extinction crisis." Current Biology 31, no. 21 (2021): 4773-4787.

Ellis, J.R., McCully Phillips, S.R. and Poisson, F., 2017. A review of capture and post-release mortality of elasmobranchs. Journal of Fish Biology, 90(3), pp.653-722.

Hutchinson M., Siders Z., Stahl J., Bigelow K. 2021. Quantitative estimates of post-release survival rates of sharks captured in Pacific tuna longline fisheries reveal handling and discard practices that improve survivorship. United States. National Marine Fisheries Service; Pacific Islands Fisheries Science Center (U.S.). PIFSC data report; DR-21-001. DOI : https://doi.org/10.25923/0m3c-2577

Gianuca, D., Bugoni, L., Jiménez, S., Daudt, N.W., Miller, P., Canani, G., Silva-Costa, A., Faria, F.A., Bastida, J., Pon, J.P.S. and Yates, O., 2020. Intentional killing and extensive aggressive handling of albatrosses and petrels at sea in the southwestern Atlantic Ocean. Biological conservation, 252, p.108817.

Murua, J., Ferarios, J.M., Maitane, M., Moreno, G., Cronin, M.R., Murua, H., Stewart, J.D., Cuevas, N., Santiago, J. 2024. Selective sorting grids for improved best handling and release practices of large mobulid rays in tropical tuna purse seiners. Presented during the 2nd meeting of the Permanent Working Group on Ecosystems and Bycatch to the IATTC. La Jolla, Ca. USA

Musyl, M.K. and Gilman, E.L., 2019. Meta-analysis of post-release fishing mortality in apex predatory pelagic sharks and white marlin. Fish and Fisheries, 20(3), pp.466-500.

Stewart, J., M Cronin, E Largacha, N Lezama-Ochoa, J Lopez, M Hall, D Croll, S Rojas, M Hutchinson, E Jones, M Francis, M Grande, J Murua, S Jorgensen. 2024. Get them back in the water: Straightforward interventions increase post-release survival rates of manta and devil rays in purse seine fisheries. Presented during the 2nd Meeting of the Permanent Working Group on Bycatch and Ecosystems to the IATTC. La Jolla, Ca. USA

TABLE 1. Active IATTC and AIDCP resolutions for vulnerable species that require no retention and or the use of best practices for release. PS = Purse seine fishery.
TABLA 1. Resoluciones activas de la CIAT y el APICD para especies vulnerables que requieren la no retención y/o el uso de mejores prácticas de liberación. PS = Pesquería de cerco.

Species	**Active Resolutions Requiring, 'no retention' and or 'best practices'**	**Are BHRP Guidelines provided?**	**Recommendations to improve existing measures**
Consolidated Resolution on Bycatch (all taxa)	C-04-05 (Rev 2)	Yes, only for Sea turtles	Update with requirements for use of adopted BHRPs, update with practices that must be avoided (e.g., rolling animals through the power block in purse seine fisheries, mutilation of seabird bills, discarding animals with trailing gear).
Cetaceans (Associated PS)	AIDCP Annexes II, III, IV, VII, and VIII	Yes, for members of the family Delphinidae in PS fishery only	Develop BHRP guidelines for marine mammals not in the Delphinidae family accidentally encircled in the PS fishery and all marine mammals captured in longline and artisanal fisheries.
Marine mammals (other than cetaceans under the AIDCP)	None	NA	
Seabirds	C-11-02	No	Update with guidelines available in Annex 1 (EB-01-01) for longline and artisanal fisheries
Sea Turtles	C-19-04	Yes	Update some practices, add tools required
Sharks	C-23-07	Yes (Interim)	Update with adopted guidelines from SAC-15-11
Whale Shark	C-19-06	No	Update with requirements to adhere to adopted BHRP guidelines from SAC-15-11
Oceanic Whitetip	C-11-10	No	Update with requirements to adhere to adopted BHRP guidelines
Conservation of Mobulid Rays	C-15-04	Yes Annex 1 (PS only)	Develop BHRP guidelines for longline and update for PS.

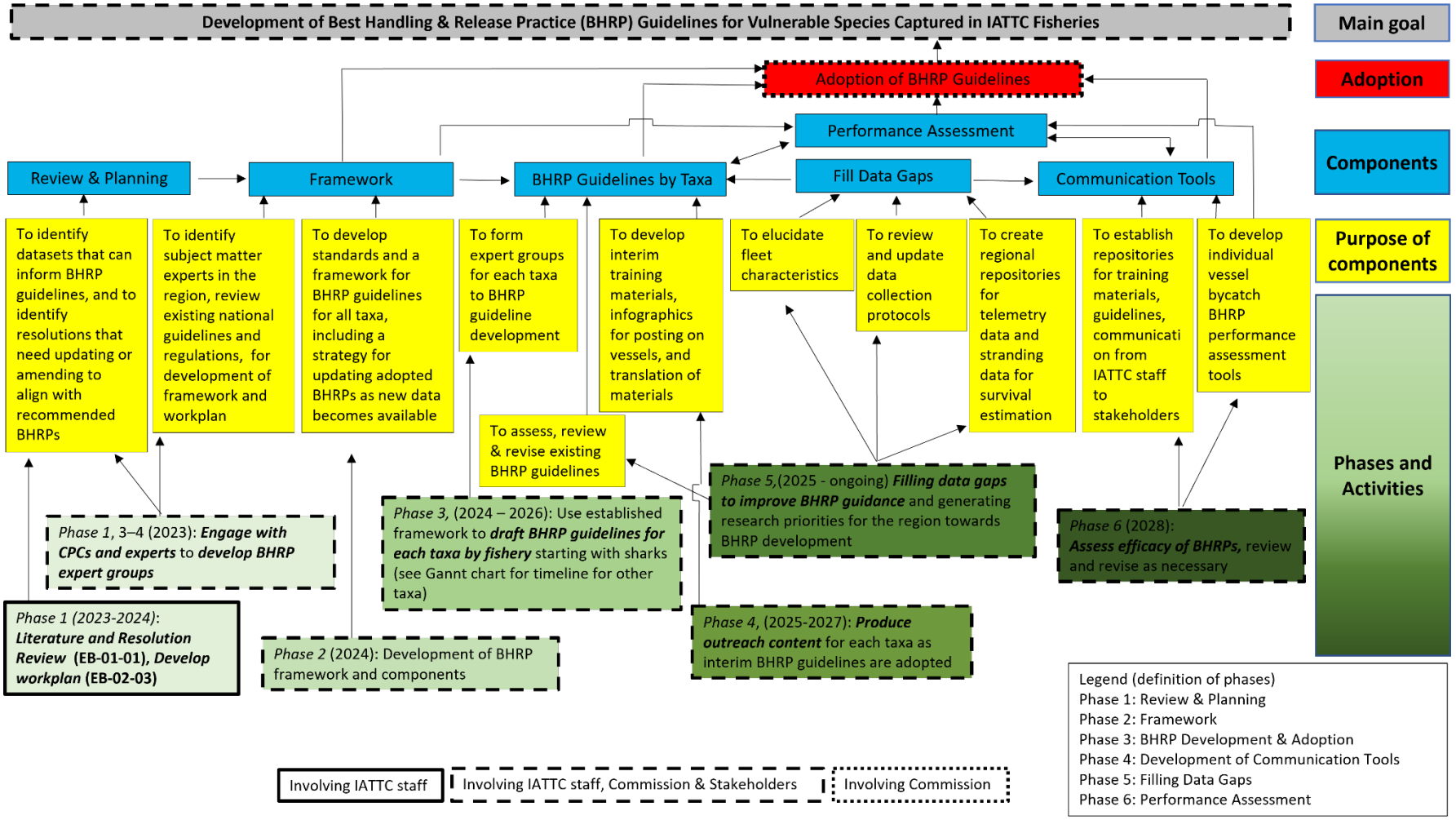

FIGURE 1. Overview of the workplan for the development of BHRP guidelines for vulnerable species captured in IATTC fisheries. The workplan is color coded to show levels and the flow of the workplan phases (from Phase 1 in light green to Phase 6 in dark green). The outline of each box also depicts who is responsible for the phase and or activity. The arrows indicate the linkages between phases, activities, components, and goals.
FIGURA 1. Visión general del plan de trabajo para el desarrollo de directrices de MPML para especies vulnerables capturadas en pesquerías de la CIAT. El plan de trabajo está codificado por colores para mostrar los niveles y el flujo de las fases del plan de trabajo (de la Fase 1 en verde claro a la Fase 6 en verde oscuro). El borde de cada recuadro indica también quién es responsable de la fase y/o actividad. Las flechas indican los vínculos entre fases, actividades, componentes y objetivos.

TABLE 2. Gantt Chart outlining the BHRP workplan phases, activities, and proposed timelines.
TABLA 2. Diagrama de Gantt con las fases, actividades y plazos propuestos del plan de trabajo de MPML.

Phase	Activities	2023				2024				2025				2026			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1) Review & Planning (COMPLETED)	Review of data availability and gaps for all vulnerable species (EB-01-01)																
	Review of Resolutions for all vulnerable species (EB-01-01)																
	SAC/Commission Meeting: Request support for development of BHRP																
	Request BHRP guidelines, regulations, identification of SMEs from CPCs (Memorandum 0473-410)																
	Develop workplan proposal (EB-02-03)																
2) Framework	Develop a framework for BHRP																
	Develop strategy for updating adopted BHRP																
	SAC/Commission Meeting: Share/adopt - BHRP framework																
3) Adoption of BHRP under current state of knowledge	Identification of subject matter experts (SME) for each taxa & formation of SME groups				Shark												
								Seabird									
								Rays									
												Sea turtle					
											Marine Mammals						
	Consultation with SME groups for BHRP development							Seabird									
										Rays							
													Sea turtle (ST)				
											Marine Mammals (MM)						
	Commission Meeting: Adoption of interim BHRPs for each taxa and fishery							Shark									
								Seabird									
												Rays					
																ST	
																MM	

TABLE 2 cont. Gantt chart with BHRP phase 4-6 components, activities, and proposed timelines.
TABLA 2 cont. Diagrama de Gantt con los componentes, actividades y plazos propuestos para las fases 4-6 de MPML.

Phase	Activities	2025				2026				2027				2028			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
4) Development of BHRP training materials (manuals, videos, infographics for posting, translations).	Sharks	Shark															
	Seabird	Seabird															
	Rays					Rays											
	Sea turtles									Sea turtles							
	Marine Mammals									Marine Mammals							
5) Filling Data Gaps	Generate fleet characteristic data																
	Review existing IATTC and external (under C-03-05) data collection processes to ensure relevant data for BHRP & PRS determination is collected																
	Update observer data collection protocols, forms, databases																
	Develop regional telemetry database that houses relevant PRS data																
	Generate regional repository for stranding information																
	Prioritize research – (Completed)																
6) Performance Assessment	Assess efficacy of BHRP guidelines																
	Review and revise as necessary																
	Develop communication tools (e.g., repositories for training materials & performance assessment results)																
	Develop individual vessel bycatch BHRP performance assessment tools																

5. APPENDIX 1 – DATA GAPS & RESEARCH PRIORITIES

5.1. Sharks

TABLE 3a. Data gaps relevant to BHRP for sharks, research needs, priorities, feasibility, potential financial costs and overall rank by fishery. Adopted from Table 3 in EB-01-01.
TABLA 3a. Deficiencias de datos pertinentes para las MPML para tiburones, necesidades de investigación, prioridades, viabilidad, posibles costos financieros y clasificación general por pesquería. Adaptada de la Tabla 3 en EB-01-01.

Taxa	Fishery	Data Gaps	Research Needs	Priority	Feasibility	Cost	Rank
Sharks	*PS*	Species specific interaction data by size, sex, at vessel condition, landing stage (e.g., entangled, brail number, wet deck, fish deck) handling and release practices used, release condition, PRS data	Test BRD technologies, Size, sex, and species-specific interaction data for class 1-5 vessels, PRS rates across species, size classes, landing stages, handling methods	High	Difficult	High	High
	LL>20 m	Species specific interaction data by size, sex, at vessel condition, handling and release practices used, release condition, PRS data, fleet characterization	Improved data collections	High	Easy – EM, > observer coverage	High	High
	Artisanal		*Longline (< 20 m):* Interaction data collections, fleet survey	High	Easy - EM, ABNJ2	Low	High
			Gill net: Interaction data collections (EM), fleet survey	High	Easy - EM, ABNJ2	Low	High
Whale shark	*PS*	Interaction rates, at vessel condition, handling and release practices used, release condition, PRS rates	Improved data collections for all vessel classes	High	Easy	Low	High
			PRS across size classes and orientations at the vessel	High	Easy	Med	High
	Artisanal	Interaction rates	Entanglement in gill nets may be an issue	Low	Easy – data collections	Low	Low

5.2. Seabirds

TABLE 3b. Data gaps relevant to BHRP for seabirds, research needs, priorities, feasibility, potential financial costs and overall rank by fishery. Adopted from Table 3 in EB-01-01.
TABLA 3b. Deficiencias de datos pertinentes para las MPML para aves marinas, necesidades de investigación, prioridades, viabilidad, posibles costos financieros y clasificación general por pesquería. Adaptada de la Tabla 3 en EB-01-01.

Taxa	Fishery	Data Gaps	Research Needs	Priority	Feasibility	Cost	Rank
Seabirds	*PS*	Species specific interaction rates, at vessel condition, handling and release practices used, release condition, PRS rates	Continue data collections (Interaction rates are not perceived as an issue), Bird Banding Network and PRS	Med	Easy	Low	Med
	LL > 20m	Species specific interaction rates, at vessel condition, handling and release practices used, hooking location, resuscitation techniques, release condition, PRS rates, fleet characterization (e.g., gear configuration, bait types, vessel free-board, bycatch mitigation tools on-board).	Interaction data collections (EM), > Observer coverage, survey for fleet characterization.	High	Medium	Med	High
			PRS study, Stranding/Bird Banding Network Data	High	Medium	High	High
	Artisanal		*Longline (< 20 m):* Interaction data collections (EM), fleet survey, Stranding/Bird Banding Network Data	High	Easy - data collections, EM, ABNJ2, survey CPCs for existing datasets & research programs	Low	High
			Gill net: Interaction data collections (EM), fleet survey, Stranding Network Data	High		Low	High

5.3. Sea turtles

TABLE 3c. Data gaps relevant to BHRP for sea turtles, research needs, priorities, feasibility, potential financial costs and overall rank by fishery. Adopted from Table 3 in EB-01-01.
TABLA 3c. Deficiencias de datos pertinentes para las MPML para tortugas marinas, necesidades de investigación, prioridades, viabilidad, posibles costos financieros y clasificación general por pesquería. Adaptada de la Tabla 3 en EB-01-01.

Taxa	Fishery	Data Gaps	Research Needs	Priority	Feasibility	Cost	Rank
Sea turtles	*PS*	Species specific interaction rates, improved at vessel and release condition indices, resuscitation, handling, and release practices used, effects of release from high vessels, PRS rates	Improved data collections for class 1-5 vessels (EM), Stranding Network Data	High	Difficult - data collections, EM	Low	High`
			PRS data	High	Easy - Telemetry	Med	High
	LL >20m	Fleet characterization (e.g., hook size, shape and material, leader material, bait type, mitigation tools onboard), species specific interaction rates, improved at vessel and release condition indices, handling and release practices used, hooking/entanglement location, resuscitation techniques, trailing gear composition, PRS rates.	Improved data collections, Stranding Network Data	High	Easy - data collections, EM	Low	High`
			PRS data	High	Easy - Telemetry	Med	High
	Artisanal	Fleet characterization (e.g., hook size, shape and material by target, gillnet mesh sizes and materials, leader material, bait type, mitigation tools onboard), species specific interaction rates, improved at vessel and release condition indices, handling and release practices used, hooking/entanglement location, resuscitation techniques, trailing gear composition, PRS rates.	*Longline (< 20 m):* Interaction data collections (EM), Stranding Network Data	High	Easy - data collections, EM, ABNJ2	Low	High
			PRS data	High	Difficult without observers	High	Low
			Gill net: Interaction data collections (EM), Effects of soak times on at vessel condition, Stranding Network Data	High	Easy - data collections, EM, ABNJ2	Low	High

5.4. Rays

TABLE 3d. Data gaps relevant to BHRP for rays, research needs, feasibility, potential financial costs, and overall rank by fishery. Adopted from Table 3 in EB-01-01.
TABLA 3d. Deficiencias de datos pertinentes para las MPML para rayas, necesidades de investigación, prioridades, viabilidad, posibles costos financieros y clasificación general por pesquería. Adaptada de la Tabla 3 en EB-01-01.

Taxa	Fishery	Data Gaps	Research Needs	Priority	Feasibility	Cost	Rank
Rays	*PS*	Species specific interaction rates, at vessel condition, handling and release practices used, release condition, PRS rates	Test BRDs across vessel classes with PRS data	High	Easy	Med	High
			Improved data collections	High	Easy - EM	Low	High
			Test strategies for avoidance (ie when helicopter pilot or spotters have seen them)	Med	Easy	Low	High
	LL >20m	Species specific interaction rates, size, and sex catch data, at vessel condition, handling and release practices used, release condition, PRS rates.	Improved data collections	High	Easy – EM, > observer coverage	Low	High
			PRS data, test avoidance strategies	High	Easy - telemetry	Med	High
	Artisanal		*Longline (< 20 m):* Interaction data collections (EM) & PRS, test avoidance strategies	High	Easy – ABNJ2, EM	Med	High
			Gill net: Effects of soak times on at vessel condition & PRS, test avoidance strategies	High (*M. munkiana)*		Med	High

5.5. Marine mammals

TABLE 3e. Data gaps relevant to BHRP for marine mammals, research needs, priority, feasibility, potential financial costs and overall rank by fishery. Adopted from Table 3 in EB-01-01.
TABLA 3e. Deficiencias de datos pertinentes para las MPML para mamíferos marinos, necesidades de investigación, prioridades, viabilidad, posibles costos financieros y clasificación general por pesquería. Adaptada de la Tabla 3 en EB-01-01.

Taxa	Fishery	Data Gaps	Research Needs	Priority	Feasibility	Cost	Rank
Marine Mammals	*PS (class 1-6)*	Post release survival (PRS) rates for large and small cetaceans by release method	Handling data collections, test BRD devices, test other methods for rapid release (e.g., weighting corks to release large cetaceans, feasibility study for abandoning set), Does encirclement impact survival for large and small cetaceans, Stranding Network Data	High	Easy - Data collections	Low	High
			PRS data	High	Difficult	High	Med
	LL >20m	Species specific interaction rates, at vessel condition, handling and release practices used, trailing gear, mitigation tools available, release condition, PRS rates	Interaction data collections (EM), survey for fleet characterization (e.g., gear configuration, bait types, vessel free-board, bycatch mitigation tools on-board), Stranding Network Data	High	Easy	Low	High
			PRS data	High	Difficult	High	Low
	Artisanal	Species specific interaction rates, at vessel condition, handling and release practices used, release condition, PRS rates	*Longline (< 20 m):* Interaction data collections (EM), survey for fleet characterization (e.g., gear configuration, bait types, vessel free-board, bycatch mitigation tools on-board), Stranding Network Data	High	Easy - data collections, EM, ABNJ2, survey CPCs for existing datasets and research programs	Low	High
			Gill net: Data is needed to determine if this fishing modality is impacting cetaceans, Stranding Network Data	High		Low	High

6. ANNEX 1 - DRAFT BEST HANDLING AND RELEASE PRACTICE GUIDELINES FOR SEABIRDS

(Text adopted from NOAA Fisheries, New Zealand Fisheries and ACAP guidance).

Illustrated guide available via: www.ACAP.aq https://www.acap.aq/resources/bycatch-mitigation/hook-removal-from-seabirds-guide/3536-acap-hook-removal-guide-a3-print/file

Tools required: Dipnet, Towel or blanket, Pliers & bolt cutters, box or bin and gloves.

1. Bring seabird aboard

Do:

If a seabird is noticed on a line, stop the vessel to reduce drag on the line.

When the bird is within reach, gently bring it on board by hand (if the animal can be reached from the vessel) or preferably using a net.

Do not:

Pull the bird up on the line as this may cause further injury.

Do not handle birds by wingtips as it can break the wing.

2. Restrain bird and hold securely

Do:

Once a seabird is on board, carefully fold the wings into the bird's body. Wrap the bird in a towel/blanket (not too tightly). Cover the bird's eyes and head with a loose cloth to help calm it, making sure to keep nostrils exposed. For gannets, which do not have nostrils, allow the bill to stay slightly open. If the bird vomits, loosen hold on bill so the bird does not suffocate.

Make sure the bird doesn't come into contact with oil or grease on deck.

Keep the bird's bill away from your face to avoid injury.

With one crew member holding the bird, another crew member can detach the fishing gear from the animal.

Do not:

Restrict the bill or legs with tape or bands.

Allow the bird to come into contact with oil or grease on deck.

3. How to remove a hook:

If the hook is visible

Do:

Use pliers or bolt cutters to cut through the hook shaft and pull hook back out of the bird. Flatten the barbs with pliers or cut off barbs with bolt cutters if it is necessary to pull the hook back through the tissue to remove it.

If the hook is swallowed and removal is possible

If you can find the hook position in the neck and it is possible, push the hook tip through the skin and remove it.

If hook removal is not possible

Cut the line as close to the mouth as possible.

Untangle and cut away any line caught around the bird's wings, body or legs.

Do not:

Never try to extract the hook backwards.

Do not try and pull hook out from inside the bird.

4. Resuscitation (Applies to seabirds entangled in purse seine gear as well as hook and line fisheries):

Do:

If birds are wet and exhausted, place them in a ventilated box with airholes or a clean, dry, safe area to recover.

Make sure the bird does not come into contact with oil or grease on deck. Seabirds cannot fly when waterlogged.

Do not:

Try to feed them or give them water during resuscitation.

5. Release

Bird can be released to sea surface when:

• Feathers are dry. (Approximately 1/2 to 4 hours)

• Bird is alert and head is erect.

• Breathes without noise.

• Wings can flap and retract onto back.

• Stands on both feet with toes forward.

Do:

Slow or stop vessel.

Set the bird on the deck railing and when wings open allow it to fly off.

If it does not fly off on its own, gently lower it over the side of the vessel by hand if you can reach the water surface or with a net.