Data Collection Protocols for Reporting Seabird Bycatch in IATTC Industrial Longline Fisheries

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ABSTRACT

The IATTC resolution C-05-01[1] calls for Parties to implement the FAO International Plan of Action for Reducing Incidental Catches of Seabirds in Longline Fisheries[2] and collate data on incidental seabird bycatches within all fisheries operating under the purview of the IATTC. Meanwhile, the Stock Assessment Working Group was asked to provide an assessment of the impacts of bycatches on seabird populations and identify areas of potential interaction. Hence, the urgent need to develop effective mechanisms whereby data on seabird interactions can be recorded and exchanged within IATTC fisheries. Independent observer data is recognised as the only effective means of collecting this information. Observer coverage is currently comprehensive (observers on 100% of vessels) in IATTC large purse-seine fisheries stemming from historically high levels of cetacean bycatch. The Agreement on the International Dolphin Conservation Programme (AIDCP), which came into force in February 1999, uses a combination of mortality limits, operational requirements, and incentives to lower incidental dolphin mortality. However, levels of observer coverage among IATTC industrial longline fisheries are mixed and/or absent. There is a real need for a longline specific observer programme, as demonstrated

[1] http://www.iattc.org/PDFFiles2/C-05-01-Seabirds.pdf
[2] http://www.fao.org/fishery/ipoa-seabirds

by the few seabird bycatch records available within various IATTC industrial longline fisheries (BirdLife International 2009). Several examples exist worldwide of effective longline observer schemes in other RFMOs (e.g. CCAMLR[3]) as well at the national level (e.g. the US pelagic longline observer programme in Hawaii). This paper draws on experience gained from these two examples and highlights objectives of observer programmes, details data requirements and recommends a way forward for IATTC.

1. Main Objectives for Recording Seabird Bycatch in Observer Programmes

1. To document and quantify seabird bycatch within a fishery;
2. To understand what factors (e.g. spatial, temporal, gear and operational) contribute to observed seabird bycatch rates recorded;
3. To scale up reliably observed information to that of the fishery;
4. To assess the effectiveness of mitigation measures aimed at reducing the incidental mortality of seabirds.

The most efficient data collection protocol is likely to follow a multi-species (including turtle, shark and marine mammals) approach, thus minimising repeated effort and expense in observer time. This should be incorporated into any data collection protocols. However, observers cannot be expected to collect detailed information on all species concurrently. It has been shown experimentally that as much as 95% of seabird bycatch returned to a vessel can go unrecorded when an observer's primary role is fish sampling, for example (Gales et a. 1998). Therefore, to obtain accurate seabird bycatch data requires a dedicated observer, or at least dedicated time-periods within the observer schedule. It may be possible for a longline observer programme to be implemented along similar lines to that now currently operating in IATTC purse seine fisheries, given that there is already a well-established infrastructure in place to hire, train, place, and de-brief observers in these fisheries.

2. Observer scheme characteristics

Experience gained from CCAMLR has demonstrated the importance of a centralised observer programme using independent, appropriately trained observers and the need for high observer coverage to assess bycatch levels adequately (for details see Sabourenkov & Appleyard 2005).

[3] http://www.ccamlr.org/pu/e/e_pubs/om/toc.htm

Key components of this programme include independence of observers and high levels of coverage (100% in longline fisheries). Such high levels of coverage may not be practicable in all IATTC industrial longline fisheries. However, scientific studies have demonstrated a minimum level of observer coverage (20%) below which there is an exponential increase in the coefficients of variation associated with estimating bycatch, i.e. before significant error is introduced to estimates of incidental mortality associated with a particular fishery (e.g. Lawson 2006). Ashford (2002) predicted that 25% coverage was sufficient to record seabird bycatch rates in the region of 0.2 birds/1,000 hooks, although to record seabird bycatch at the species level would require yet higher levels of coverage. At a national level, the US maintains high levels of coverage in both its shallow-set (100%) and deep-set (>20%) pelagic longline fisheries operating out of Hawaii along with high standards of data collection (see Case Study inset); thus demonstrating the feasibility of significant levels of coverage at both national and regional levels.

Within the IATTC area, data should be collected which is:

- Spatially and temporally representative of each fishery operating in this area
- Cover a minimum 20% of vessels/trips over a two year period
- Ensure at least 70-80% of hooks are monitored specifically for seabird bycatch

Case Study: The Hawaii Pelagic Longline Observer Programme

Following a period of shore sampling and bycatch monitoring through logbooks, it was decided that bycatch in the Hawaiian pelagic longline fleet of non-target species was unacceptably high and observers were required to monitor the situation at-sea. In 1994, the mandatory acceptance of an observer was written into the licence requirements. Initially, the focus of the observer programme was turtle bycatch, with the introduction of seabird bycatch monitoring in 2000. Interactions with marine mammals are also monitored in line with the Marine Mammal Protection Act. Observer data has led to better estimates of the interactions between longline fishing and species considered to be at risk.

The Pacific Islands Regional Office in Honolulu is responsible for monitoring vessel activity and deploying observers on the 164 vessels licensed to fish. They aim for 100% coverage on all Hawaiian-based longline trips targeting swordfish (*Xiphias gladius*) and 20% coverage on deep-set longline trips targeting bigeye tuna (*Thunnus obesus*). The responsibilities of observers are described in the NOAA Hawaii Longline Observer Program Field Manual (http://ias.pifsc.noaa.gov/lds/docs/currentobservermanual.pdf).

Observers collect data regarding the vessel's fishing gear characteristics and operation (including the time, position, depth, environmental conditions, seabird assemblage and mitigation measures during setting). While hauling, the observer is expected to observe every hook recording the species composition of the catch, interactions with protected species, and biological (life history) data. Observers are required to measure (or at least estimate) the length of every third fish caught regardless of whether it is a target or non-target species. Data recording forms used within this fishery can be found on the NOAA website (http://ias.pifsc.noaa.gov/lds/lods_forms.html).

CCAMLR remains the 'gold standard' among RFMOs with respect to both bycatch mitigation measures and its centralised and independent observer programme. However, attaining this 'gold standard' is not always immediately practicable among other RFMOs. Should CPC-run observer programmes be instigated prior to a centralised observer scheme, it is important that these programmes are required to follow pre-established protocols on data collection (Long & Schroeder 2004). This will ensure that data are collected appropriately and comparably between CPCs. Finally, there is a strong case for harmonising data collection protocols across RFMOs, particularly as many CPCs operate in both IATTC and WCPFC regions. Through a consistent approach to data collection by observer programmes between countries and between RFMOs, the likelihood of collecting robust and instructive data on bycatch is vastly increased.

Data collection protocols to ensure objectives are met are listed in Appendix 1, but in summary these include:

- Gear, e.g. branch-line length, light-sticks, bait type
- Operational, e.g. time of set, position
- Seabird catch, e.g. number and species caught
- Seabird abundance estimate e.g. number of birds around the boat
- Mitigation, e.g. use of a tori or bird-scaring line

In addition, data sheets will need to be updated in order to record fishery-wide effort expressed by gear configuration and target species.

3. RECOMMENDATIONS

Clearly, initiating new data collection protocols and observer programmes is a major undertaking, but such steps are essential if we are to address bycatch of vulnerable species, e.g. seabirds, turtles and sharks, as well as collect data on target species. Following the precautionary principle, it is essential that observer programmes be implemented as a matter of urgency, given that current bycatch rates are so little understood within IATTC longline fisheries. In order to meet recommendation 2, of resolution C-05-01, we propose the following steps be considered:

1. Agree a timeline for development and implementation of observer programme
2. Agree minimum observer standards for collecting bycatch data
    a. Establish a minimum coverage (temporal and spatial considerations)
    b. Establish minimum data requirements

3. Set up a central database
4. Implement
   a. Train observers
   b. Deploy observers
   c. Submit data to the central database
5. Assess total bycatch at the scale of the fishery

4. REFERENCES

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Appendix 1: Best practices recommended minimum variables to be collected in all longline fisheries (adapted from Dietrich et al 2007, executive summary)

Gear Type Fished	**Category**	**Variables**
All	Temporal	Date gear was deployed Start time of gear deployment End time of gear deployment Date gear was retrieved Start time of gear retrieval End time of gear retrieval
Pelagic	Spatial	Latitude at beginning of gear deployment Longitude at beginning of gear deployment Latitude at end of gear deployment Longitude at end of gear deployment Latitude at beginning of gear retrieval Longitude at beginning of gear retrieval Latitude at end of gear retrieval Longitude at end of gear retrieval
Demersal[a]		Latitude at beginning of either gear deployment or retrieval Longitude at beginning of either gear deployment or retrieval Latitude at end of either gear deployment or retrieval Longitude at end of either gear deployment or retrieval
Pelagic	Physical and Environmental	Sea surface temperature Sea state (Beaufort scale) Moon phase Depth fished at beginning of gear deployment[b] Depth fished at end of gear deployment[b] Depth of bottom at beginning of gear deployment Depth of bottom at end of gear deployment

Demersal		Sea surface temperature Sea state (Beaufort scale) Moon phase Depth fished at beginning of gear deployment[b,c] Depth fished at end of gear deployment[b,c] Depth of bottom at beginning of gear deployment Depth of bottom at end of gear deployment
Gear Type Fished	**Category**	**Variables**
All	Vessel and Fishing	Unique vessel identifier Unique observer identifier Vessel length Total number of hooks deployed Target species[d] Bait species Bait condition (live/fresh/frozen/thawed, whole/cut) Autobaiter used? (if used, also record bait efficiency) Weight of added weight (if used) Direction of gear retrieval
Pelagic	Gear[e]	Groundline/mainline length[f] Branchline/gangion length Distance between weight and hook on gangion (when used) Distance between branchlines Hook size[g] Hook type
Demersal	Gear[e]	Groundline/mainline length[f] Branchline/gangion length Distance between weights Distance between branchlines Hook size[g] Hook type
All	Catch	Total catch, actual or estimated (number and/or weight) Catch by species (number and/or weight) Observed effort (total number of hooks observed during retrieval)
All	Mitigation Measure/ Deterrent Device	Presence of any type of deterrent used or required to be used, and how it was used

All	Bycatch	Species identification Number of each species captured Type of interaction (hooking/entanglement) Disposition (dead/alive) Description of condition/viability of the animal upon release (if released alive)

[a]Demersal gear fished on the bottom is stationary, thus collecting data on either where gear is deployed or retrieved is sufficient.
[b]In some observer programs, fishing depth is derived from the sum of the floatline/dropline length and the branchline/gangion length.
[c]For demersal gear, depth fished should also be collected it if is different than bottom depth.
[d]Target species may be derived in some programs from the catch composition.
[e]Although >50% data users responding to the pre-workshop survey identified these 5 gear variables as critical or preferred, workshop attendees were reluctant to identify specific gear variables for inclusion as best practices, instead noting these will vary by fishery depending on bycatch species and regulatory measures in place. Emphasis was instead placed on standardized definitions of terms and data collection methods.
[f]Groundline/mainline length is rarely an exact measurement, due to the length of the line. Instead it is either derived (by multiplying distance between floats by number of floats), estimated by the observer, or reported by the vessel.
[g]Hook size is often reported by the vessel or provided by the manufacturer rather than measured by the observer.