Annotated Bibliography: Seabird Interactions with Trawl Fishing Operations and Cooperative Research

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Seabird mortality occurs most often from interactions with cables running from the vessel to the net (net sonde and warps) and with the net itself. Mortality can also occur during vessel collisions. The latter are not included in this bibliography.

Seabird-Trawler Interactions
(mortality and mitigation; ‡ PDF available)

Bartle, J. A. 1991. Incidental capture of seabirds in the New Zealand subantarctic squid trawl fishery, 1990. Bird Conserv. Int. 1:351-359.

Observers recorded seabird mortalities in a squid trawl fishery. 83% (of 279 birds) were recovered from the net sonde cable; remainder entangled in various parts of the net. Average catch rate was 0.263 birds/haul. Proposed that weather and seabird abundance in area may have an effect on interaction rates but very little data was collected on interactions while fishing. Suggested that hull-mounted transducers or towed aquaplanes could replace the towed transducer.

Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). 2003. Summary of observations aboard trawlers operating in the CCAMLR Convention area during 2002/03 season. WG-FSA-03/64, CCAMLR, Hobart.

Vessels fishing in CCAMLR area utilized a number of mitigation measures including streamer lines, acoustic devices, water jets, net weights, and net cleaning. Streamer lines appeared effective at preventing warp strikes, whereas acoustic devices and water jets appeared ineffective.

‡Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). 2003. CONSERVATION MEASURE 25-03: Minimisation of the Incidental Mortality of Seabirds and Marine Mammals in the Course of Trawl Fishing in the Convention Area. CCAMLR, Hobart.

Prohibits the use of net sonde cables and offal discharge during setting/hauling while fishing in Antarctic Convention area. Recommends minimum lighting, net cleaning prior to each deployment, and minimization of time gear is at surface. *www.ccamlr.org/pu/e/pubs/cm/03-04/25-03.pdf*

Crysell, S. 2002. Baffling Birds Brings Benefits. Seafood New Zealand Magazine.

Good description (drawings/photos) of Brady bird baffler, a seabird deterrent for trawl vessels.

Duhamel, G. 1991. Incidental mortality arising from fisheries activities around Keruguelen Island (Division 58.5.1). SC-CCAMLR X:BG/14, Tenth meeting of the Scientific Committee, CCAMLR, Hobart.

Characterizes commercial bottom trawl fishery targeting *Champsocephalus gunnari, Notothenia rossi, N. squamifrons*, and *Dissostichus eleginoides*. Highest trawl mortality in *C.gunnari* fishery. Notes differences in seabird behavior based on size of bird and size of discards. Most mortality caused by net sonde cable. Mortality estimates varied from 1 to 3 birds/haul in early 1980s but observations on scientific cruises showed rates ranging from 0.00 to 0.03 birds/haul. Recommended ban of net sonde cable.

Hooper, J., D. Agnew, and I. Everson. 2003. Incidental mortality of birds on trawl vessels fishing for icefish in Subarea 48.3. WG-FSA-03/79, CCAMLR, Hobart.

Interaction and mortality data were collected during gear deployment and retrieval on three mackerel icefish (C. gunnari) trawl vessels in 2002/03. Net entanglement was the predominant form of mortality. Potential factors influencing seabird catch were day/night, mesh size, net weighting, and a cleaned net. Only the weighting regime and day/night period were significant predictors of the probability of catching a bird during gear deployment, and no variables were significant for gear retrieval. Recommended the following to reduce seabird interactions:

- All fish be removed from net meshes before re-deploying gear.
- All repairs to net/equipment be done while net is on deck. One large catch event (15 birds) occurred while net was at surface as crew replaced battery in acoustic netsounder.
- No offal discharge during gear deployment or haulback.
- Minimize surface time.
- Deploy paired streamer lines.

Labunski, E., and K. Kuletz. 2003. Observations of seabird interactions with the 'Third-wire' during trawl observations. US FWS, Anchorage, Alaska. Unpublished Report.

North Pacific groundfish observer logbook notes were summarized for 1993-2001. Seabird–trawl interaction observations were opportunistic. 10 of 26 observations (including ~100 individual birds) were interactions with the net sonde cable (or third-wire).

‡National Marine Fisheries Services (NMFS). 2003. Biological Opinion on the Effects of the Total Allowable Catch (TAC)-Setting Process for the Gulf of Alaska (GOA) and Bering Sea/Aleutian Islands (BSAI) Groundfish Fisheries to the Endangered Short-tailed Albatross (*Phoebastria albatrus*) and Threatened Steller's Eider (*Polysticta stelleri*). NMFS, Juneau, Alaska.

Stipulates required management agency action in Alaska fisheries, pages 15-19. *www.fakr.noaa.gov/protectedresources/seabirds/section7/biop0903/esaseabirds.pdf*

‡National Marine Fisheries Service (NMFS). 2003. Ecosystem Considerations for 2004. Ecosystem Considerations for the Stock Assessment and Fishery Evaluation (SAFE) prepared for the North Pacific Fishery Management Council. Anchorage, Alaska.

Mean annual estimates (1998–2002) for catch in trawl gear range from 1,754 to 11,955 seabirds. Estimates mix several demersal and pelagic trawl fisheries. Text on incidental catch of seabirds on pages 218–228 (with specific reference to trawl on pp. 226 & 228). *www.fakr.noaa.gov/npfmc/SAFE/SAFE.htm*

Sullivan, B. J., and T. Reid. 2002. Seabird interactions/mortality with longliners and trawlers in Falkland Island waters 2001/2002. CCAMLR WG-FSA-02/36, Seabirds at Sea Team, Falkland Conservation. Stanley, Falkland Islands.

Seabird interaction and mortality data were collected on five trawlers targeting Loligo squid and finfish. The majority of contacts were with the warps when seabirds were on the water and most resulted in no apparent injury. Mortality rates were highly variable by trip (0.12–1.0 birds/day) with a total of 16 seabird deaths recorded. The highest rate occurred on a trip with dense aggregations (1000-2000) of seabirds around the vessel for most of the trip. Net sonde cables are not allowed in these fisheries.

Sullivan, B. J., T. A. Reid, L. Bugoni, and A. D. Black. 2003. Seabird mortality and the Falkland Islands trawling fleet. WG-FSA-03/91, CCAMLR, Hobart.

Seabird interaction and mortality data were collected on seven finfish and squid trawl vessels during 2002/03 season. More than 46,000 contacts were recorded with the warp cable and while birds were on the water (87%). Most resulted in no apparent injury. Few contacts occurred during gear retrieval. A total of 73 mortalities were documented (70 from warp cable and 3 by paravane cable). Annual estimate of total mortality for 2002/03 was 1,500 seabirds (CV 0.15), >1,400 of which were black-browed albatrosses.

Mortality rates were highest during the pre-breeding period and lowest during the egg laying period. Very high mortality rates (6.71 birds/day) were also recorded over a short-time period in international waters immediately north of local waters. Factors influencing interactions included time, area fished, and offal discharge.

‡Sullivan, B., and T. Reid. 2003. Seabird mortality and trawlers in Falkland Island waters 2002/2003. Annual report of the Seabirds at Sea Team, Falkland Conservation, Stanley, Falkland Islands. 58 p.

As above with more detail and initial information on the performance of several deterrents (discharge management, modified streamer). Cable contacts (a correlate of mortality) were influenced by amount and duration of offal discharge, time of year, wind speed and direction relative to towing, and sea state as it impacts the vessel pitch.

‡**Sullivan, B. J., P. Brickle, T. A. Reid, and D. G. Bone.** 2004. Experimental trials to investigate emerging mitigation measures to reduce seabird mortality caused by warp cable strike on factory trawlers. Seabirds at Sea Team, Falklands Conservation, Stanley, Falkland Islands.

Tested three mitigation devices against a control of no deterrent on a single warp on one vessel. Selected peak fishing and seabird density period for experiment. Seabird mortalities caused by warps were higher in the control (0.7 birds/haul) compared with all treatments: Brady bird baffler (0.14 birds/haul), Falkland Islands warp scarer (0.06 birds/haul), and tori lines (0 birds/haul). Heavy contact rates per hour were 17.46 (control), 9.71 (baffler), 0.93 (warp scarer), and 0.29 (tori lines). Warp scarer and tori line contact rates were significantly lower than the control or bird baffler.

‡**Weimerskirch, H., D. Capdeville, and G. Duhamel.** 2000. Factors affecting the number and mortality of seabirds attending trawlers and long-liners in the Kerguelen area. Polar Biol. 23:236-249.

Seabird abundance and mortality were monitored on five trawl vessels targeting toothfish (Dissostichus eliginoides) or mackerel icefish (C.gunnari). Total number of birds attending trawlers was a function of overcast conditions and time of year. The presence of offal had no significant influence on the number of birds attending the trawlers. More birds were observed during overcast conditions. Mean mortality rate was 0.48 birds/day but much higher on vessels using net sonde cable and targeting the smaller icefish. Petrels were caught mostly in the upper meshes during setting and hauling. Approximately 1/3 of mortality (17 birds) caused by net sonde cable. Sample size too small to model factors affecting trawl catch rates. www.springerlink.com/media/egepulqryhe18clrrvv3/Contributions/U/J/G/L/UJGL1U0FRP6FPLBP.pdf

‡**Wienecke, B., and G. Robertson.** 2002. Seabird and seal-fisheries interactions in the Australian Patagonian toothfish *Dissostichus eleginoides* trawl fishery. Fish. Res. 54:252-265.

One of the first studies quantifying seabird-trawl interactions. Observations were made on two trawlers over 4 years. Differentiated between light and heavy contacts at multiple points on the gear. Mortality on warps and in upper mesh of net were observed. Mortality not reported in the context of a rate per hour or day although a total of 6 mortalities were documented. Most contacts (98%) resulted in no apparent injury. Authors hypothesize that mortality was low due to specific permit conditions such as (1) no net sonde cable, (2) the need for lights to be dim, (3) no discharge except for 'stick water', and (4) requiring warps to be spliced to minimize injury to seabirds.

‡**Wilson, B., K. Rivera, S. Fitzgerald, and C. Rose.** 2004. Discussion paper on seabird interactions with trawl vessel gear. North Pacific Fishery Management Council, Protected Resources Report No.2, Anchorage, Alaska. 14 p.

Provides more extensive review of relevant seabird–trawl interaction literature.

Yorio, P., and G. Caille. 1999. Seabird interactions with coastal fisheries in Northern Patagonia: Use of discards and incidental captures in nets. Waterbirds 22:207-216.

Described interactions between seabirds and coastal demersal trawlers in Patagonia including species composition of birds attending, description of foraging behavior and quantifying mortality. Observations occurred in 1994-1996 on board 17 trawlers in 5 coastal fisheries (within 15 nmi. from shore). Kelp gulls were predominant species attending trawlers followed by black-browed albatrosses, shearwater species and white-chinned petrels. Fishing region appeared to have the greatest influence on attendance. Two (2) birds, a Magellanic penguin and Imperial cormorant, were killed in 394 hauls (net mortality). There is no mention of interaction with the trawl warps. Implies the use of discards (and other artificial food sources) may be having a positive effect on Kelp gull populations in Argentina.

Cooperative/Collaborative Research

‡**Melvin, E. F., and J. K. Parrish.** 2003. Focusing and testing fisher know-how to solve conservation problems: A common sense approach. Pages 224-226 in N. Haggan, C. Brignall, and L. Wood, editors. Putting Fishers' Knowledge to Work: Conference Proceedings. University of British Columbia, Vancouver. *www.fisheries.ubc.ca/publications/reports/11-1/24_Melvin_Parrish.pdf*

National Research Council. 2004. Cooperative Research in the National Marine Fisheries Service. The National Academies Press, Washington D.C.

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