INCIDENTAL MORTALITY OF SEABIRDS
IN SELECTED COMMERCIAL FISHERIES IN ALASKA

BY

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ABSTRACT

Fishery-seabird observers monitored the incidental mortality of seabirds between 1989 and 1993 in three groundfish longline, trawl, and pot fisheries in the Bering Sea and Gulf of Alaska. This observer program is continuing. Selected salmon gillnet fisheries in Alaska were monitored in 1990 and 1991, and monitoring of seabird mortality in the shellfishery in the Bering Sea/Aleutian Islands region was initiated in 1994. The estimated annual incidental mortality of seabirds in the Bering Sea/Aleutian Island and Gulf of Alaska longline, trawl, and pot groundfish from 1989 through 1993 was 9,600 birds, of which about 8,200 birds were killed in the Bering Sea and about 1,400 birds in the Gulf of Alaska. About 88% of the birds in all 6 fisheries were caught in the longline fishery. Northern Fulmars were 55% of the total mortality in the Bering Sea and 67% of the total mortality in the Gulf of Alaska in 1993. Laysan and Black-footed Albatrosses accounted for 7% and 14% of the total mortality in the Bering Sea and Gulf of Alaska, respectively. The two salmon gillnet fisheries monitored in Alaska accounted for a total estimated annual seabird mortality of about 1,567 birds. About 52% of the observed mortality in Prince William Sound was Marbled Murrelets, and 50% of the observed mortality in the South Unimak Pass salmon fishery was Common Murres.
ACKNOWLEDGEMENTS

This report is based on seabird mortality data provided by the National Marine Fisheries Service's Fisheries Observer Program. We want to thank William Karp, Alaska Fisheries Science Center, National Marine Fisheries Service, for supporting the collection of incidental seabird mortality data in what is otherwise a fishery observer program. We would especially like to thank the shipboard fisheries observers for their dedication to the goals of the observer program, their interest in seabirds, and their documentation of seabird mortality. The observer's duties are particularly difficult and challenging at best. We also want to thank Linda Campbell, Terri Nelson and Debbie Flint, U.S. Fish and Wildlife Service, for their support during the preparation of this report.
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      Hook and Line Gear in Gulf of Alaska and Bering 
      Sea/Aleutian Islands
INTRODUCTION

Seabird populations in Alaska are large and diverse owing to the extensive and nutrient-rich coastal estuaries and offshore areas, and the availability of large stocks of forage fish and other prey. Such areas in Alaska provide breeding, feeding, and migrating habitat for 66 species of seabirds of which 38 breed in Alaska at about 1,600 colonies. Alaska's breeding population of the 38 seabird species is estimated to be 50 million birds which is about 96% of all seabirds breeding in the continental United States. Another 50 million seabirds of 28 species migrate from breeding areas in the central and south Pacific to spend the summer offshore the coast of Alaska (U.S. Fish and Wildlife Service 1992). Seabird breeding populations in the Bering Sea and Gulf of Alaska are estimated at about 22,000,000 and 8,000,000 birds, respectively.

Mortality of seabirds in commercial fisheries in Alaska is a serious conservation issue and has been a concern to the U.S. Fish and Wildlife Service since the early 1970s. On an annual basis, more seabirds are killed incidental to commercial fishing operations than most other forms of human activities in Alaska combined. Seabirds are known to be incidentally taken in salmon gillnet and groundfish longline, trawl, and pot fisheries in Alaska. They are also probably killed in the shellfish pot fishery as a result of vessel-bird strikes.

A few studies have been conducted to document the magnitude of the incidental mortality of seabirds in commercial fisheries in Alaska and the North Pacific (DeGange et al. 1993, Byrd et al. 1992, Johnson et al. 1992, Wynne et al. 1991, 1992, DeGange and Day 1991, Jones and DeGange 1988, DeGange et al. 1985, Ogi 1984, and Ainley et al. 1981. Most of these studies have documented the seabird mortality in North Pacific pelagic salmon fisheries, large-mesh pelagic driftnet, billfish and tuna fisheries, and large-scale pelagic driftnet squid fishery, and Alaskan groundfish fisheries and selected nearshore salmon fisheries.

This report summarizes information on the incidental mortality of seabirds in the commercial groundfish fisheries and selected salmon fisheries in Alaska. This report is part of a larger effort to summarize the incidental mortality of seabirds in several commercial fisheries of the circumpolar arctic region including Canada, Finland, Greenland, Iceland, Norway, Russia, Sweden, and the United States. The circumpolar incidental seabird mortality project was completed under the auspices of the Circumpolar Seabird Working Group. This working group functions under the guidance of the Conservation of Arctic Flora and Fauna program, a component of the multilateral ministerial agreement called the Arctic Environmental Protection Strategy which was adopted in 1991.
Chapter 1
COMMERCIAL FISHERIES IN ALASKA
MONITORED FOR
INCIDENTAL MORTALITY OF SEABIRDS

Marine fisheries resources of Alaska are a very valuable heritage and
commercial fishing is a longstanding tradition. Alaska's marine ecosystems
are some of the most productive in the world's oceans supporting many of the
world's largest populations of groundfish, salmon, shellfish, marine birds and
mammals. There are eight Alaskan fisheries in which seabird mortality is
documented as part of an annual observer program including: Bering
Sea/Aleutian Islands groundfish longline, trawl, and pot fisheries; Gulf of
Alaska groundfish longline, trawl, and pot fisheries, and the Bering
Sea/Aleutian Island King and Tanner Crab pot fisheries (Figure 1).

Both the Bering Sea/Aleutian Islands and Gulf of Alaska groundfish fisheries
are managed under the auspices of each region's Federal fisheries management
plan prepared by the North Pacific Fisheries Management Council. The
shellfish fisheries in the Bering Sea/Aleutian Islands region is managed
primarily by the State of Alaska under the guidance of the Federal fisheries
management plan for that fishery.

The total average yield of groundfish (excluding halibut) between 1990 and
1992 in the Bering Sea/Aleutian Islands and the Gulf of Alaska regions were
about 1.7 and .23 million metric tons, respectively (National Marine Fisheries
Service 1993). In the Bering Sea/Aleutian Island region, Walleye Pollock
(Theragra chalcogramma) represented about 75% (1.3 million metric tons) of the
total yield while Pacific Cod (Gadus macrocephalus) was about 13% of the
total. Walleye Pollock and Pacific Cod represented about 36% (81,000 metric
tons) and 34% (77,000 metric tons), respectively, of the total yield in the
Gulf of Alaska. Alaskan shellfish fisheries harvest 3 species of King Crab
(Paralithodes camtschatica, P. platypus, and Lithodes aequispina) and 2
species of Tanner Crab (Chionoecetes beardi and C. opillio). The average
commercial yields between 1989 and 1991 off the Alaska coast were about
113,000 metric tons of King Crab and about 13,000 metric tons of Tanner Crab
(National Marine Fisheries Service 1993). About 99% of the Tanner Crab
harvest occurs in the Bering Sea/Aleutian Islands region while almost all the
King Crab are harvested in that same region. Five species of Oncophynchus
salmon (chinook, coho, sockeye, chum, and pink) occur in Alaska. The average
annual commercial harvest between 1990 and 1992 has been about 321,000 metric
tons.

Since the mid 1980s the groundfish fishery has been a major economic industry
in Alaska generating ex-vessel revenues of $658 million in 1992. The 1992 ex-
vessel revenue for the King and Tanner Crab fisheries was $305 million. The
ex-vessel value of the statewide harvest of salmon was $575 million in 1992.
The total value of fisheries in which the incidental mortality of seabirds
occurs was $1.538 billion in 1992.
Figure 1. Commercial fishing regions in Alaska
FISHERIES OBSERVER PROGRAM IN ALASKA

Legal Framework

The U.S. Congress recognized the need to assess the incidental mortality of non-target species in high seas fishery activities when it passed the Driftnet Impact Monitoring, Assessment, and Control Act of 1987 (Public Law 100-220) and in domestic fisheries when it enacted the Marine Mammal Protection Act of 1988 (Public Law 92-522) as amended, and the Magnuson Fishery Conservation and Management Act of 1976, as amended (especially the Fishery Conservation Amendments of 1990 [Public Law 101-627] which expanded upon provisions of the Driftnet Act of 1987.) The Driftnet Act required that the United States enter into fishery observer program agreements with Korea, Taiwan, Canada, and Japan because their fishermen engaged in driftnet fishing on the high seas of the North Pacific. The high seas driftnet observer programs were conducted by the National Marine Fisheries Service with assistance from the U.S. Fish and Wildlife Service and National Biological Service. The driftnet observer program assessed the catch and bycatch, including that of seabirds, in large-scale high seas squid and large-mesh (tuna and billfish) fisheries. Japan, Taiwan, and Korea agreed to United Nation's General Assembly resolutions in 1990 and 1991 that implemented a global moratorium on all large-scale pelagic driftnet fishing on the high seas by December 31, 1992 (Fitzgerald et al. 1993). The moratorium continues to be in effect. The reader is referred to the Alaska Seabird Management Plan (U.S. Fish and Wildlife Service 1992 for additional information on the issue of high seas incidental mortality of seabirds, and to the report of the Secretary of Commerce (National Marine Fisheries Service 1993) for additional discussion of the legal framework for high seas driftnet fisheries.

The Marine Mammal Act requires the National Marine Fisheries Service to conduct an observer program to monitor the target and non-target fish catch and the incidental mortality of marine birds and mammals in selected domestic fisheries. The Magnuson Fisheries Conservation and Management Act of 1976, as amended, also authorizes fishery observer programs under the discretionary provisions of Federal Fishery Management Plans.

Observer Program

An observer program has been an important management tool in Alaskan fisheries for many years. In the 1970's, a special observer program to monitor the incidental mortality of marine birds and mammals in the Japanese mothership salmon gillnet fisheries was conducted in the United State’s exclusive economic zone in Alaska. Foreign joint venture groundfish fisheries were monitored in the early-to-mid 1980s. As the U.S. groundfish fleet replaced the foreign joint venture fleet, a domestic fisheries observer program was initiated in the late 1980s. High seas driftnet fisheries in the North

The Department of Commerce’s National Marine Fisheries Service coordinates the implementation of the domestic fisheries observer program. The National Marine Fisheries Service, U.S. Fish and Wildlife Service, and National Biological Service have collaborated to delineate data collection duties and protocols for collecting seabird mortality data (Appendices A, B, C). Under the groundfish observer program plan, vessels 125 feet or more in length are required to carry an observer at all times while fishing for groundfish. Vessels from 60 to 124 feet in length are required to carry observers during 30% of their days during fishing trips in each calendar quarter of the year in which they fish more than 10 days in the groundfish fishery. Processors (mothership or shoreside) that process 1,000 or more metric tons of groundfish during a calendar month are required to have an observer for at least 30% of the days groundfish are received or processed during that month. Processors which process 500 to 1,000 metric tons of fish must have an observer for at least 30% of the days groundfish are received or processed during that month. Observers are responsible for numerous data collection tasks while monitoring the fisheries catch on vessels or at processors. Although the principal duty of observers is to monitor catch of the target fish, they also monitor the incidental mortality of nontarget species like marine birds and mammals.

Observers record seabirds by number, weight, and taxon which occur in the catch sample. Sampling procedures include monitoring the entire haul (usually conducted only when the haul consists primarily of a single species); subsamples including partial haul sampling (i.e., monitoring a predetermined segment of the whole haul); or basket samples (i.e., periodically diverting a small part of the catch into special baskets). Sightings of species that are of special management concern (e.g., endangered and threatened species) opportunistic information relative to the occurrence of birds killed by striking the ship and all data on banded birds are also recorded.
Data on the incidental mortality of seabirds in Alaska groundfish and crab fisheries are maintained by the National Marine Fisheries Service. These data are currently being computerized and software programs and protocols are being developed to analyze the information. Statistically valid incidental mortality estimates are not yet available. For the purposes of this report, we have assembled a preliminary estimate of the incidental mortality of seabirds in Alaska groundfish and selected salmon fisheries between 1989 and 1993 (Table 1).

The total average annual incidental mortality of seabirds in the commercial fisheries monitored for this mortality is about 11,200 birds. This should be considered a minimum estimate of mortality in Alaska because all commercial fisheries, especially many salmon fisheries, are not monitored for the incidental mortality of seabirds.

The estimated average annual mortality of seabirds in groundfish longline, trawl, and pot fisheries in the Bering Sea/Aleutian Islands and Gulf of Alaska between 1990 and 1993 was about 9,600 birds. About 85% (8,170 birds) of the total average seabird mortality in all groundfish fisheries between 1989 and 1993 occurred in the Bering Sea/Aleutian Islands region. This possibly reflects the higher populations or concentrations of seabirds in the Bering Sea compared with the Gulf of Alaska. Although 88% of the groundfish in the two regions are harvested by trawlers, about 88% of the total seabird mortality occurred in the longline fishery. Northern Fulmars were a large percentage (55%) of the total estimated seabird mortality in the Bering Sea/Aleutian Islands region in 1993 (the only year when species were identified) while Laysan, Black-footed and unidentified albatrosses were a smaller percentage (11%) of the total mortality in the same region. Northern Fulmars and albatrosses (Laysan, Black-footed, and unidentified) were 67% and 17%, respectively, of the total estimated mortality in 1993 in the Gulf of Alaska. Other species incidentally taken in the Bering Sea longline fisheries in 1993 included Black-legged Kittiwakes, unidentified shearwaters/petrels and unidentified gulls. *Uria* murres and auklets were recorded taken in the Bering Sea only.

Although salmon fisheries in Alaska are widespread, the incidental mortality of seabirds has been monitored in two only: Prince William Sound (1990-91) drift and set gillnet and South Unimak Pass (1990) drift gillnet fisheries. The estimated average annual seabird mortality in the Prince William Sound gillnet fisheries during 1990-1991 was 1230 birds of which 52% were Marbled Murrelets and 27% Common Murres. The estimated mortality in the South Unimak Pass (eastern Aleutians) salmon gillnet fishery in 1990 was 337 birds of which 63% were *Uria* murres. Other species taken in the Unimak Pass fishery were puffins and auklets.
Chapter 4

MANAGEMENT RECOMMENDATIONS

As stated previously, the incidental mortality of seabirds is a serious conservation issue for the U.S. Fish and Wildlife Service. The National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the National Biological Service should continue to collaborate to improve the documentation of the seabird mortality and to standardize seabird training among the fishery observer programs. For example, improved training in seabird identification could improve the reporting of seabirds to species rather than "unidentified seabird". It is also suggested that seabird mortality is monitored in Alaska's drift gillnet fisheries, especially in Southeast Alaska and northern Gulf of Alaska salmon fisheries, and in the halibut fishery. The fact that groundfish longline fisheries provide the largest percentage (88%) of incidental seabird mortality would suggest that the other principal longline fishery in Alaska be monitored. Lastly, it is suggested that research concerning gear modifications and longline setting procedures should be pursued to develop nets and fishing techniques that reduced the mortality of seabirds.
Table 1. Estimated average annual incidental mortality of seabirds in selected Alaska's commercial fisheries, 1989-1993. Effort in days represent the number of days in which sampling occurred. The sampling may have been only a subset of the entire haul for a given day. The percent of catch monitored varied from year to year and only the range (minimum-maximum) is provided in the table.

<table>
<thead>
<tr>
<th>FISHERY</th>
<th>Observer Effort (Days)</th>
<th>Range of % of Catch monitored</th>
<th>Estimated Average Annual mortality</th>
</tr>
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<tr>
<td><strong>Bering Sea Groundfish</strong></td>
<td></td>
<td></td>
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<tr>
<td>Longline (1990-1993)</td>
<td>15,932</td>
<td>64-80</td>
<td>7,250</td>
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<td>Pot (1990-1993)</td>
<td>1,603</td>
<td>43-64</td>
<td>10</td>
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<td>Joint Venture Trawl (1989-1990)</td>
<td>6,114</td>
<td>43-56</td>
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<td><strong>Gulf of Alaska Groundfish</strong></td>
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<td></td>
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<tr>
<td>Longline (1990-1993)</td>
<td>3,704</td>
<td>13-27</td>
<td>1,420</td>
</tr>
<tr>
<td>Pot (1990-1993)</td>
<td>814</td>
<td>3-11</td>
<td>0</td>
</tr>
<tr>
<td>Trawl (1989-1993)</td>
<td>9,714</td>
<td>5-45</td>
<td>10</td>
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<td><strong>Prince William Sound Salmon</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drift and Set Gillnet (1990-1991)</td>
<td>-</td>
<td>-</td>
<td>1,230</td>
</tr>
<tr>
<td><strong>Unimak Pass Salmon</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drift Gillnet (1990)</td>
<td>-</td>
<td>-</td>
<td>340</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
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<td>9,600</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>11,170</td>
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LITERATURE CITED


APPENDIX A

UNITED STATES DEPT. OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
ALASKA FISHERIES SCIENCE CENTER
SEATTLE, WASHINGTON

Manual for Biologists
Aboard Domestic Groundfish Vessels

1994

[Revised December 1993]
BIRDS

INTRODUCTION

The National Marine Fisheries Service and U.S. Fish & Wildlife Service are cooperating to obtain accurate information on mortality of birds related to trawl, longline and pot vessels fishing groundfish in the U.S. Exclusive Economic Zone (EEZ) of the Gulf of Alaska and Bering Sea. Bird monitoring activities begun in 1990 are being expanded for the 1993 season. The major change is that we are asking observers to provide more detailed information on the identity of incidentally caught birds. Of special concern are a small number of species whose populations are currently at very low levels or declining.

Observers are not expected to have to devote much time to duties pertaining to birds. Birds will rarely be encountered during species composition sampling because incidental take is low. Low take rates do not, of course, diminish the importance of collecting accurate and reliable information. In addition to recording incidental take, some very valuable information can be collected by observers aboard fishing vessels, such as documentation of sightings of endangered species or recovering leg bands from birds incidentally taken during fishing operations. Again, these will be rare events and most observers will not encounter such opportunities.

INCIDENTAL TAKE

Millions of birds, including some eighty-plus species, occur over waters of the EEZ in Alaska. The presence of "free" food in the form of offal and bait attract many of these to fishing operations. In the process of feeding, birds sometimes come into contact with fishing gear and are accidentally killed. For example, most birds taken during longline operations are attracted to the baited hooks when the gear is being set. These birds become hooked, and are then dragged underwater where they drown. The probability of a bird being caught is a function of many interrelated factors including: type of fishing operation and gear used; length of time fishing gear is in the water; behavior of the bird (feeding and foraging techniques); water and weather conditions (e.g., sea state); size of the bird; availability of food (including bait and offal); and physical condition of the bird (molt, migration, health). Almost any species which occurs in these waters is susceptible to interactions with fishing gear.

In 1990-1992, observers recorded the number and total weight of birds in their sample. All birds were recorded as "unidentified bird". These data indicate the take rate of birds during commercial fishing operations has been relatively low. For example, in 1990 the number of operations with birds ranged from 0% of (groundfish) pot sets and bottom trawl hauls to 5% of longline sets. However, with these data it was not possible to determine which species or species groups were involved. Anecdotal information indicates that the species most likely to be trapped by longline gear in Alaskan waters are: black-footed and Laysan albatrosses; northern fulmars; short-tailed and sooty shearwaters; black-legged kittiwakes; and glaucous-winged and herring gulls. Common and thick-billed murres, and marbled and Kittlitz's murrelets are the species most likely to be taken in nets and pots.
These data will enable scientists to 1) determine the extent of the problem, 2) in conjunction with incidental take data, allow an assessment of total mortality, by taxa, and 3) potentially provide information leading to methods in reducing mortality due to collisions with vessels. Effective management requires accurate and complete baseline data.

When you observe cases where birds fly into, or strike, the vessel, record the incident and associated data in your logbook section on birds. To fulfill the objectives outlined above, you should record:

1. **Species identification:** Use the materials provided in your identification manual and the codes established for the different taxa to record the species or species group involved. Provide verification by listing the characters used to make the identification.

2. **Magnitude:** Record the number of individuals involved, and the percent mortality. Note if you counted them directly or estimated the numbers. If an estimate was used, note how this estimate was made. If two or more species are involved, counts or estimates by taxa should be provided.

3. **Circumstances:** A variety of factors may contribute to these instances. Record the vessel type (trawler, longline, or pot), size, and activity (running, fishing, etc.); time and duration of event; if at night were vessel lights on, how many lights, and relative brightness (illuminating the deck or just running lights); vessel location; and weather (clear, fog, or rain; wind speed and direction).

**OTHER ITEMS OF CONCERN**

**Banded Birds:** The U.S. Fish and Wildlife Service maintains a database on all banded birds. Recoveries of these bands provides valuable data on distribution, movements, survival rates, and other information. Please use your observer logbook to record information on banded birds. If birds are recovered alive, handle with care, record as much information as possible taking care not to harm the bird, do not remove the leg-band, and release the bird. If the bird is recovered dead, record all pertinent data and ask for permission from the vessel personnel for freezer space in order to return the specimen to Seattle. If permission is given, notify an observer office that you are returning with a bird specimen so we can arrange a permit for you. Double-bag the bird, include a tag with collection data and freeze it. If you cannot keep the specimen, please remove and save the legband. It is important to turn in the legband, especially ones that are worn and the numbers faded, so that the number can be verified. Please do not let the fishermen keep the legband, although if they provide an address, the band can be returned.

Record in your logbook the following information: species, date, location, sea surface temperature, legband information (band number, type, and location), and if the specimen was saved. To assist with observations of banded birds, colored plastic bands are sometimes used, either singly or in conjunction with other bands, colored or numbered. These bands are placed on the bird in a certain sequence to identify sex, year, colony, or other information. If a
<table>
<thead>
<tr>
<th>Taxa group</th>
<th>Species Code</th>
</tr>
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<tbody>
<tr>
<td>Loon unident (Gaviformes)</td>
<td>844</td>
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<tr>
<td>Grebe unident (Podicipedformes)</td>
<td>846</td>
</tr>
<tr>
<td>Tubenoses unid (Procellariformes)</td>
<td>848</td>
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<tr>
<td>Albatross unident (Diomedeidae)</td>
<td>849</td>
</tr>
<tr>
<td>*Short-tailed albatross</td>
<td>850</td>
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<tr>
<td>Laysan albatross</td>
<td>851</td>
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<tr>
<td>Black-footed albatross</td>
<td>852</td>
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<tr>
<td>Shearwater/petrel unident</td>
<td>853</td>
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<tr>
<td>Northern Fulmar</td>
<td>854</td>
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<tr>
<td>Storm-petrel unident</td>
<td>858</td>
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<tr>
<td>Cormorant</td>
<td>861</td>
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<tr>
<td>Waterfowl unident (Anseriformes)</td>
<td>863</td>
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<tr>
<td>**Spectacled eider</td>
<td>864</td>
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<tr>
<td>**Steller's eider</td>
<td>865</td>
</tr>
<tr>
<td>Shorebird unident</td>
<td>867</td>
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<tr>
<td>Phalarope unident</td>
<td>868</td>
</tr>
<tr>
<td>Jaeger/skua unident</td>
<td>871</td>
</tr>
<tr>
<td>Gull unident (Larinae)</td>
<td>874</td>
</tr>
<tr>
<td>*Red-legged kittiwake</td>
<td>875</td>
</tr>
<tr>
<td>*Black-legged kittiwake</td>
<td>876</td>
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<tr>
<td>Tern unident (Sterninae)</td>
<td>880</td>
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<tr>
<td>Alcid unident (Alcidae)</td>
<td>883</td>
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<td>Guillemot unident (Cephus sp.)</td>
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<td>Murre unident (Uria sp.)</td>
<td>887</td>
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<tr>
<td>Puffin unident (Fratercula sp.)</td>
<td>890</td>
</tr>
<tr>
<td>Auklet/murrelet unident</td>
<td>893</td>
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<tr>
<td>Marbled murrelet</td>
<td>894</td>
</tr>
<tr>
<td>Seabird unident</td>
<td>897</td>
</tr>
<tr>
<td>Land bird unident</td>
<td>898</td>
</tr>
</tbody>
</table>

* Record also as adult = A, sub-adult = S, immature = I, or unknown = U.

** Record also as male = M, female = F, or unknown = U.
IDENTIFICATION OF BIRDS

GROUNDFISH OBSERVER PROGRAM

INTRODUCTION/BACKGROUND

The National Marine Fisheries Service and the U.S. Fish and Wildlife Service are cooperating to record and assess bird mortality associated with commercial fishing operations in the North Pacific groundfish fleet. Observers will be asked to determine which major species group (taxon) an incidentally taken bird belongs to, such as "murre" or "gull". Observers will also need to determine whether or not a bird is one of five species in the North Pacific which the U.S. Fish & Wildlife Service lists, or is considering listing, as endangered or threatened.

There are three major types of bird mortality associated with marine fisheries: entrapment in actively fishing gear; entrapment in discarded or lost gear; and collision with the boat or its equipment. Birds killed in the first two categories will be species which actively feed in oceanic waters (including many species of seaducks). Because land-adapted species frequently fly over the ocean, you may expect any species of land or water bird to fly into the ship or its equipment.

Identifying marine birds: what to look for. You will use external structural characters of the body, wings, feet, bill and plumage to identify specimens, or at least categorize them to major taxa. Some of these terms may be new to you. Refer to the following schematic if you need to determine which morphological character a term refers to.
Because you will often be able to examine specimens closely, it is not necessary to base identification solely on plumage characteristics. By carefully noting characteristics of the bill, feet, legs, and eyes, a reliable and accurate identification can be determined.

Bill characteristics to look for include (a) shape -- rounded or compressed in cross-section (laterally or dorsoventrally); (b) profile from triangular, to long and slender, (c) tip is either hooked or pointed, (d) presence or absence of a terminal nail, and (e) presence or absence of tubular nostrils. It is also important to note the bill color.
2. Legs and Feet: (a) number and length of toes, (b) toes webbed, partially webbed, lobed, or non-webbed, (c) tarsi short or long, rounded or compressed, (d) It also may be important to note whether the legs located at mid-body or far-back. Loons, for example, are highly aquatic. Their legs are set so far back that they are unable to stand upright on land. On the other hand, gulls spend much time standing or walking and their legs are located at mid-body to support their weight.

3. Wings: (a) size and shape, especially in relation to body size, (b) color pattern of wings.
4. **Body size:** Large, medium, or small; long and slender, stocky, or plump. Birds such as the albatrosses, loons and cormorants are considered large; gulls, shearwaters, and ducks are medium; and taxa such as storm-petrels, murrelets, and phalaropes are small. Within each of these general size groupings some species will be slender, others stocky or plump. It is difficult to illustrate these terms. Within the medium group, most waterfowl and alcids such as murres and puffins are stocky and plump, whereas the shearwaters are have bodies which are long and slender.

5. **Culmen length** is measured along the exposed culmen, which is the distance along the top of the upper mandible; in other word from the tip of the bill to where the skin or feathers begin.

6. **Wing length:** the wing length is measured from the tip of the primary feathers to the end of the joint. Do not confuse with wingspan, which is the total distance from wing tip to wing tip across the dorsal surface of the bird. Because "wing length is measured from the joint to the wing tip, rather than from the midback, the windspan is greater than twice the wing length.
MAJOR TAXA (SPECIES GROUPS)

In the following accounts, size range values are only approximate and are provided for relative comparisons. In addition, the characteristics listed, including size ranges, are only for those species normally occurring in the North Pacific Ocean and Bering Sea. Lengths refer to the total body length, from tip of the extended neck and bill to the end of the tail. Wingspan is measured from wing tip to wing tip across the dorsal surface of the bird.

A. GAVIIFORMES (Loons) - Large birds (length 25-35") with relatively short and somewhat pointed wings (wingspan 40-55"). Bill long, pointed, laterally compressed. Tail short with stiff feathers. Feet set far back on the body; four toes, front three toes fully-webbed. Tarsi are compressed. Sexes alike.

B. PODICEPEDIIFORMES (Grebes) - Medium birds (length 10-25") with short and somewhat pointed wings (wingspan 10-25"). Bill long, laterally compressed and pointed (one exception). Tail rudimentary, appears to be absent. Feet set far back on the body; four toes, all lobed. Nails on claws flat, not curved. Tarsi are compressed. Sexes alike.

C. PROCELLARIIFORMES (Tubenoses) - Small to large birds (length 7-40"), typically with long slender wings (wingspan 16-84"). Bill hooked; nostrils tubular. Tail short to moderately long. Four toes; front three toes joined in web. Sexes alike. Includes the three groups:

1. Diomedeidae (Albatrosses) - Large birds (length 30-40") with very long wings (wingspan 6-7"). Nostrils as independent tubes opening on each side of the large hooked bill (the nostril tubes are difficult to see). Fourth toe rudimentary and not visible.
2. Procellariidae (Shearwaters, Petrels, Fulmars) - Medium to large birds (length = 13-20") with long pointed wings (wingspan 29-42"). Nostril tubes separated by thin septum on top of hooked bill.
3. Hydrobatidae (Storm-Petrels) - Small birds (length 7-9") with short, somewhat pointed wings (wingspan 16-18"). Nostrils on top of hooked bill united in one tube.

D. CHARADRIIFORMES (Gulls, Terns, Jaegers, Phalaropes, Shorebirds, and Alcids) - Group has a wide range of characteristics. Generally they are small to medium birds (length 7-28") with pointed wings (wingspan 10-60"). Nostrils not tubular. Three to four toes. includes the three groups:

1. Laridae (Gulls and Terns) - Medium birds (length 14-28") with long pointed wings (wingspan 30-62"). Four toes; front three toes more or less completely webbed. Bill either straight or hooked, but never with a nail. Sexes alike.
2. Stercorariidae (Skua and Jaegers) - Medium to large birds (length 18-22") with long pointed wings (wingspan 44-50"). Four toes; front three more or less completely webbed. Bill with a nail.
4. Alcidae (Auks, Murre, Puffins, Auklets, and Murrelets) - Small to medium birds (length 8-18") with short to moderate, pointed wings (wingspan 10-30"). Three toes; more or less completely webbed. Bill highly variable.

E. PELECANIFORMES (Pelicans, Cormorants and allies) - Large birds (length 27-33") with long wings (wingspan 38-53"). Nostrils not tubular. All 4 toes joined in web. Bill straight or hooked.

1. Phalacrocoracidae (Cormorants) - Large birds (length 27-33") with relatively short, rounded wings (wingspan 38-53"). Tarsi not feathered. Bill hooked, less than 4 inches long.

F. ANSERIFORMES (Swans, Geese, and Ducks) - Medium to large birds (length 12-72") usually with pointed wings. Four toes; front three completely webbed. Bill with nail, broad and compressed vertically in some species, or laterally compressed in others.
IDENTIFICATION OF BIRDS

Lost field guides are written with the idea of helping you to identify live birds seen flying past, or sitting on the water. Accurate species identifications depend on plumage characteristics and overall appearance of body and wing size and shape. Your task will be difficult, in that specimens will often be in poor condition, having been underwater for some time. Plumage patterns will mostly be obscured. This key was developed to assist the identification to major species group of a dead, sodden bird in the hand. In this key, characteristics of the bill and feet are the primary features used to separate taxons. Once a bird is identified to a taxon such as "unidentified albatross", turn to the species accounts to attempt a precise identification.

KEY TO SPECIES OR SPECIES GROUPS

1A Feet with 3 or 4 toes; toes neither webbed, partially webbed, nor lobed.
UNIDENTIFIED LANDBIRD - CODE 898. Do not proceed any further in key.

1B Feet with 3 or 4 toes; some or all toes webbed, partially webbed, or lobed. Specimen can be considered an UNIDENTIFIED SEABIRD - CODE 897 at this point; Continue in key to determine species group. Go to .............................................................. 2

2A(1) Feet with 3 toes, all fully webbed. No fourth hind toe.
Go to 3

2B Feet with four toes, Go to .............................................................. 4

3A(2) Tubular nostrils present along either side of upper mandible. Culmen length greater than 90 mm.
Wingspan approximately 6 feet, wings long and narrow. ALBATROSSES - CODE 849. (note: albatrosses are TUBENOSES.) Codes are provided for the 3 species which occur in the Bering Sea and Gulf of Alaska: short-tailed, Laysan, and black-footed. Refer to species accounts to identify to species, and note the age group if it is a short-tailed albatross.

3B Notrils not tubular. Culmen length less than 50 mm. Wingspan less than three feet, wings short and stubby. ALCIDS - CODE 883. Includes murres, puffins, guillomots, auklets, and murrelets. Refer to species accounts and examples of bill shapes.
4A(2) Fourth toe is long, all four toes fully webbed.
CORMORANTS - CODE 861 It is unnecessary to determine species.

4B Hind (fourth) toe small and not webbed, forward 3 toes webbed, partially webbed, or lobed.
Go to .............................................................................................................. 5

5A(4) Three forward toes lobed; not webbed or partially webbed. Bills are long and pointed.
GREBES - CODE 846. It is unnecessary to determine species.

5B Three forward toes fully or partially webbed. Go to ................................................... 6

6A(5) Bill is flattened dorso-ventrally. Other features: Wings are broad and stubby. Bodies are stocky, plump.
WATERFOWL - CODE 863. Determine if the specimen is either a spectacled or Steller’s eider; if not, leave as code 863.

6B Bill is round or flattened laterally in cross-section. This characteristic is exhibited by loons, tubenoses, jeagers/skuas, gulls, and terns.
Go to .............................................................................................................. 7
7A(6) Bill with terminal nail; tubenoses and jeagers/skuas.
Go to 8

7B Bill without terminal nail; loons, gulls, and terns.
Go to 11

8A(7) Bill has a nail, but lacks tubular nostrils. Culmen length is less than 50 mm. JEAGERS/SKUAS - CODE 871. Includes the species south polar skua and long-tailed, parasitic, and pomarine jeagers. Note that the terms jeager and skua are considered by some to be synonymous. It is unnecessary to determine species.

8B Bill has a nail, tubular nostrils are evident either atop or along either side of upper mandible. TUBENOSES (in part) - CODE 848. Group includes the albatrosses, shearwaters, fulmars, petrels, and storm-petrels. Go to 9

9A (8) Culmen length less than 18mm. Wing length less than 180mm. Tarsi decidedly longer than middle toe with claw. STORM PETRELS - CODE 858. It is unnecessary to determine species.

9B Culmen length greater than 25mm. Wing length greater than 200mm. Tarsi not longer than middle toe with claw. ................................................................................................ Go to 10
10A(9) Bill large and thick, nasal tube prominent, about 40% of culmen length. Lower mandible not decidedly hooked at tip. Body stocky. Tarsi rounded in cross-section. NORTHERN FULMAR - CODE 854

10B Bill slender (especially when viewed from above). Nasal tube about 25% of culmen length. Lower mandible hooked. Body slender, torpedo-shaped. Tarsi flattened laterally when viewed in cross-section. SHEARWATERS - CODE 853 It is unnecessary to determine species.

11A(7) Bill is long and pointed; long, heavy bodied bird with legs set far back on body. The webbed toes are very long, and the tarsus (see diagram) is flattened laterally, giving "flat sides". Mostly with dark backs and light undersides. Tail feathers are very short, 16-20 in number. LOONS - CODE 844. It is unnecessary to determine species.

11B Bills long and slender or thick-set; tarsi not laterally flattened, but round in cross section. Tail feathers long, usually 12 in number. Usually white undersides with white or light gray back. Go to ................................................................. 12
12A(11) Slender, sharply pointed bill, short legs, long tail which is usually forked, and long, narrow, pointed wings. Feet webbed or partially webbed. Toes much longer than tarsi. Color patterns are similar to some of the gulls; white below and white or light grey backs. Terns - Code 880. It is unnecessary to determine species.

12B Thick-set bills without a nail or saddle, curved at end of upper mandible. Tail are not usually forked. Tarsi and toes about equal in length. Gulls - Code 874. Refer to the detailed notes on gulls to determine if it is a Kittiwake.
Identification of the Sensitive or Most Common Species

Weights are for dry birds, if the specimen has become soaked they will be heavier. Bill length is measured along the exposed culmen. The wing length is measured from the tip of the primary to the end of the joint. In the following accounts **"Denotes most important, or diagnostic, features for each species.

SPECIES ACCOUNTS

ALBATROSES

Laysan Albatross (Diomedea immutabilis) - species code 851.

This albatross will probably be one of the more common species to be caught in the domestic fisheries. It may be confused with adult short-tailed albatross or with vagrant species from the south Pacific. The white head, dark back, and yellow bill distinguish these from black-footed and short-tailed albatrosses.

- Large sized marine bird with tube-shaped nostrils
- Body white below and dark above
- **White head, dark back
- **Large bill yellow with dark tip in adult, grayish with dark tip in immature
- Underwings white with dark border and central patches
- Legs and feet flesh colored
- Body length = 31"
- Wingspan = 82"
- Bill length = 99-114 mm
- Wing length = 470-510 mm
- Weight = 1,800-3,000 gms.

Bills of both sexes are provided for comparison, it is only necessary to identify a specimen to species.
Black-footed Albatross (Diomedea nigripes) - species code 852.

This albatross will probably be one of the more common species to be caught in the domestic fisheries. It can be confused with immature short-tailed albatross.

- Large sized marine bird with tube-shaped nostrils
- **Body** solid dark frequently with white around bill and base of tail
- **Large** dark bill
- **Underwings** dark
- **Legs and Feet** black

Bill length = 94-113 mm
Body length = 32" 
Wing length = 485-533 mm
Wingspan = 89"
Weight = 2,000-4,000 gms

Bills of both sexes are provided for comparison, it is only necessary to identify a specimen to species.
Short-tailed Albatross (*Diomedea albatrus*) - species code 850.

Note, if possible, whether the specimen is an Adult, Subadult, or Immature.

This albatross is extremely rare (Endangered Species status) and thus will not likely be caught in the domestic fisheries. Any that are caught will quite likely be banded. Plumage color and pattern varies with age. Immature birds will be difficult to distinguish from black-footed albatross. The bill size and pink coloration are diagnostic. This feature alone will distinguish short-tailed albatrosses from all other birds.

The only other species with which it might be confused (except for vagrant south Pacific albatross) is the Laysan albatross.

**ADULT**
- Large sized marine bird with tube-shaped nostrils
- Body white below and dark and white above
- **White head, white back**
- **Large pink bill with bluish tip**
- Underwings white with thin dark border
- **Feet pale**
- Legs bluish white
- Bill length = 120-145 mm
- Body length = 35"
- Wing length = 518-555 mm
- Wingspan = 83"
- Weight = 2,000-4,000 gms.

**SUBADULT**
Intermediate between immature and adult, may have dark back and dark on head and back of neck. Dark body of immature develops more white and two white patches become distinctive on the dorsal surface of wings.

**IMMATURE**
Plumage is solid dark color. The bill may be tan to pinkish color. The feet are pale in coloration.
FULMAR SPECIES

Northern Fulmar (Fulmarus glacialis) - species code 854

This stocky seabird is commonly entangled in nets set in northern waters, and will probably be the most commonly caught bird on longline gear. It’s plumage pattern is extremely variable. Closeup it is not likely to be confused with any other seabird but at a distance dark phase birds could be confused with sooty, short-tailed, and pale-footed shearwaters, and light phase birds could be confused with pink-footed shearwaters or gulls. The bill is a diagnostic feature of this species, making it easy to separate from all other seabirds encountered.

Medium sized seabird with tube-shaped nostrils
Body varies from all dark to all white
**Stocky body with short thick neck
**Bill short, thick and yellowish
Legs and feet bluish to flesh colored
Upperwing usually has a white triangular area in primaries
Bill length = 33-41 mm
Body length = 19"
Wing length = 280-325 mm
Wingspan = 42"
Weight = 580-780 gms

Other Species

Several other seabird species/groups may, at first glance, be confused with fulmars.

Other petrels and shearwaters,
especially sooty and short-tailed shearwaters, are similar in size and appearance to fulmars. Note that the bills are long and slender, and often dark (as in the two pictured) in coloration.

Jaegers and skuas
Species code 871.

This group has the horny "nail" at the end of the bill, but do not have the tubular nostrils.

Gulls
Species code 874.

Fulmars may appear similar to gulls. However, bills of gulls (and terns) have neither the terminal nail nor the tubular nostrils.
GULLS SPECIES
Species codes

Black-legged Kittiwake (Rissa tridactyla) - species code 876

This medium sized seabird may be caught in either the long-line or driftnet fishery. First year birds differ from adults in having a conspicuous black “M” mark across the back and wings, a blackish cervical collar across lower hindneck, and a black subterminal band on the tail. This species is most easily confused with the red-legged kittiwake.

- Medium sized seabird without tube-shaped nostrils
- Body white with grey back
- **Wings tipped with solid black
- **Bill pointed and yellowish green
- **Feet & legs black
- Bill length = 31-39 mm
- Body length = 16”
- Wing length = 280-325 mm
- Wingspan = 36”
- Weight = 220-600 gms

Red-legged Kittiwake (Rissa brevirostris) - species code 875

This medium sized seabird may be caught in either the long-line or driftnet fisheries in the Bering sea (rare south of the Aleutians and in the Gulf of Alaska). First year birds differ from adults in having a conspicuous black “M” mark across the back and wings, a blackish cervical collar across lower hindneck, and a black subterminal band on the tail. This species is most easily confused with the black-legged kittiwake.

- Medium sized seabird without tube-shaped nostrils
- Body white with dark grey back
- **Wings tipped with solid black
- **Bill pointed and yellowish green
- **Feet & legs red
- Bill length = 26-30 mm
- Body length = 15”
- Wing length = 280-335 mm
- Wingspan = 33”
- Weight = 220-525 gms
Marbled Murrelet (*Brachyramphus marmoratus*) - species code 894

This small seabird is commonly entangled in driftnets. It is very difficult to distinguish from the Kittlitz’s murrelet. Winter (nonbreeding) plumage differs from summer (breeding) plumage.

**BREEDING**
Head mostly dark brown with paler chin and throat

**Body mostly brown with red-brown barring above and pale olive-brown mottled with buff and white below-darkest on breast forming an indistinct breast band

**Bill small and blackish
Feet flesh color with blackish webs
Bill length = 13.2-17.6 mm
Body length = 10”
Wing length = 120-140 mm
Weight = approximately 250 gms

**NONBREEDING**
Body blackish grey above and white below
Wings with white scapulars
**Head with black cap extending below eye

Kittlitz’s Murrelet (*Brachyramphus brevirostris*)

This small seabird is commonly entangled in driftnets. It is very difficult to distinguish from the marbled murrelet. Winter (nonbreeding) plumage differs from summer (breeding) plumage.

**BREEDING**
Head mostly mottled brown without suggestion of dark cap
Body mostly mottled brown with white belly and no suggestion of breast band
** Bill very small and brownish tipped with white
Feet brownish
Bill length = 9.5-10.5 mm
Body length = 9”
Wing length = 127-141 mm
Weight = approximately 250 gms

**NONBREEDING**
Body blackish grey above and white below
Wings with white scapulars
**Head with black cap extending above eye
WATERFOWL

Spectacled Eider (Somateria fischeri) - species code 864

This large seaduck breeds only on the Arctic coast of Alaska. Individuals may occur south to the Aleutian Islands in winter. The population of this species is in precipitous decline and the U.S. Fish and Wildlife Service is currently proposing to list it as threatened. Adult males are distinctive. Birds molt into eclipse plumage beginning in June. In eclipse plumage the male loses the bright head and neck colors, the spectacles become grayish mottled with buff and the rest of the head and neck becomes variegated with various shades of grey, buff, and dusky. The white upperparts become plain brownish or dark grayish, and the white flank-spots disappear.

MALE
Medium sized bird
Body with white upperparts and dark underparts
**White "spectacle" outlined in black around eye
**Feathering on mandible extends past nostril
**Hind toe with lobe
Feet dull yellowish to olive brown
Bill length = 25-28 mm
Body length = 21"
Wingspread = 34"
Weight = 1500-1900 gms
Bill dull orange, nail paler

FEMALE
A very large, rich-brown, heavily-barred duck with a large, pale area around the eye and feathering on mandible extending past the nostril.

Steller’s Eider (Somateria stelleri) - species code 865

A medium sized duck. The population of this species has been in a long-term decline. The U.S. Fish and Wildlife service believes that this species may warrant listing as threatened, but the listing is on hold while higher priority species are dealt with.

MALE
Medium sized bird
Black and white back, chestnut-brown underbelly
Hind toe with lobe
White head and side of upper neck, with black throat, lower neck, and black ring around eye
White wing coverts
Feet dark blue grey with dusky webs
Bill dull grayish blue, lighter at tip
Bill length = 24-30"
Body length = 18"
Wingspan = 30"
Weight = 700-1,000 gms

FEMALE
A medium sized duck with rich, dark-brown coloration. Chief distinguishing features are a lobe on the hind toe and a blue-black speculum (brightly colored area of secondary wing feathers) bordered in front and behind with white bars.


APPENDIX B

SEABIRD OBSERVATION MANUAL

BERING SEA/ALEUTIAN ISLANDS CRAB FISHERIES

1994/95

A Joint Project of

Alaska Department of Fish and Game
National Marine Fisheries Service
U.S. Fish and Wildlife Service

RETURN THIS MANUAL TO:

ADF&G Crab Fishery Observer Program Coordinator

(for submission to:)
National Marine Fisheries Service
Alaska Region, Protected Resources Division
SEABIRD OBSERVATION MANUAL

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Color Plates of Eider Species
Copy of Fish and Wildlife Service Biological Opinion on Bering Sea Crab Fisheries
TAB: Blank Forms
may be threatened, but either they have not yet been formally listed (category 1) or data are incomplete for determining whether listing under the ESA is appropriate (category 2). Candidate species are not protected under the ESA, but they are "sensitive" species for which distribution and mortality information are needed.

Observers can serve a very valuable role by providing information whenever one of these species is sighted. Materials are provided in this manual under "Species Identification" to enable accurate species identification. Field guides may also be provided to you. Most of the sensitive species exhibit characters that are diagnostic, enabling accurate identification even from a distance. Note, however, that marbled and Kittlitz's murrelets are extremely difficult to differentiate. The species of greatest concern in the opilio fishery is the spectacled eider. To assist in evaluating whether spectacled eiders are present in the fishery area, you are requested to identify all eider specimens to species (this may be difficult for females and juvenile birds). A color plate illustrating the four eider species--spectacled, Steller's, king, and common eiders--is included for your reference.

Use the "Sightings of Endangered, Threatened, or Candidate Species" form to record sightings of these species. You should record the species, what characters you observed to identify the species, numbers of birds by sex and age (if determinable), behavior of the birds, associations with other species, associations with vessel or gear, date, location, weather, sea conditions, and whether or not photographs were taken (note frame and roll number on the "Log of Seabird Photographs" or in your seabird logbook). If it is helpful, use your seabird logbook as a temporary data log and a place to record more extensive daily or occasional notes on seabird observations.

Banded Birds:

The U.S. Fish and Wildlife Service (FWS) maintains a database of all banded birds. Recoveries of these bands provide valuable data on distribution, movements, survival rates, and other information. Please use the "Sightings" form to record information on banded birds. If the birds are recovered alive, handle with care, record as much information as possible taking care not to harm the bird, do not remove the leg band, and release the bird. If the bird is recovered dead, record all pertinent data and ask for permission from the vessel personnel for freezer space to return the specimen to the FWS in Anchorage. Note that your name has been added to the FWS permit authorizing you to salvage specimens. Attach a tag filled out with complete collection data to the bird's leg, double bag the carcass and freeze it.

Tag information: Species, sex, age, date and location collected, collector's (your) name, vessel name, cause and circumstances of death.
INTRODUCTION

The Alaska Department of Fish and Game, National Marine Fisheries Service and U.S. Fish and Wildlife Service are cooperating to obtain accurate information on mortality of birds related to crab fishery vessels in the U.S. Exclusive Economic Zone (EEZ) of the Bering Sea and Aleutian Islands. Bird monitoring activities will begin in the 1994-1995 season. Of special concern are a small number of bird species whose populations are currently at low levels or declining, particularly spectacled eiders.

Observers are not expected to have to devote much time to duties pertaining to birds. Take of birds will rarely be encountered during fishing because incidental take is low. Low rates do not, of course, diminish the importance of collecting accurate and reliable information. In addition to recording incidental take, some very valuable information can be collected by observers aboard fishing vessels, such as documentation of sightings of endangered species or recovering leg bands from birds incidentally taken during fishing operations. Again, these will be rare events and most observers will not encounter such opportunities.

INCIDENTAL TAKE

Millions of birds, including some eighty-plus species, occur over waters of the EEZ in Alaska. The presence of "free" food in the form of offal and bait attract many birds to these fishing operations. In the process of feeding, birds sometimes come into contact with fishing gear and are accidentally killed. Behavior of the bird (feeding and foraging techniques), water and weather conditions, availability of food (including bait and offal), and size and physical condition of the bird, all affect whether a bird will be caught. Most cases of entanglement in gear occur in trawl and longline fisheries, entanglement in nets is less common, and in crab pots, quite rare. Common and thick-billed murres, and marbled and Kittlitz's murrelets, are the species most likely to be taken in nets and pots.

Another source of incidental mortality, known to occur in crab fisheries, is birds flying into vessels. These bird "strikes" range from the occasional bird found on deck to reports of massive flocks of birds flying into vessels, also referred to as "bird storms." A number of factors may contribute to birds accidentally flying into a vessel, including inclement weather, the species involved, vessels running or working at night and using bright lights (which may serve as an attractant, or cause disorientation), and locality. Whatever the cause, mortality due to collisions with vessels may actually be higher than that from gear interactions.
There are several objectives in gathering data on bird strikes. The immediate goals are to define:

1. Species involved.
3. Frequency of occurrence and locale.

These data will enable scientists to: (1) determine the extent of the problem; (2) allow an assessment of total mortality, by taxa; and (3) potentially provide information leading to methods in reducing mortality due to collisions with vessels. Effective management requires accurate and complete baseline data.

**SPECIES IDENTIFICATION AND CODES**

Identification of bird species found in the marine environment of the Bering Sea and Aleutian Islands is a difficult task. Many species that are closely related are nearly indistinguishable. Most field guides are written to identify birds on the wing, not dead (and often in poor condition) in the hand. When a specimen is wet many of the plumage characteristics used in guides are no longer evident. To assess bird mortality associated with commercial fishing operations, however, specimens need to at least be categorized by species group (plural = taxa; singular = taxon), such as murre, gull, shearwater, etc. For those species that are more "sensitive" (endangered, threatened, depleted) identification to species is the goal.

Codes have been established to record specimens to selected taxa (see list of codes attached to this manual). Some of the codes represent very broad categories, and a few such as those relating to "sensitive species" are quite narrow. Note also that in some cases the age or sex of a specimen can be determined easily, and this information can be recorded.

**RECORDING DATA**

When you observe cases where birds fly into, or strike, the vessel, or birds taken in pots, record the incident and associated data on the "Seabird Incidental Take -- Crab Fisheries" form; if you need additional space, use the back of the form. You may also use the seabird logbook to record any miscellaneous or highly-detailed observations of seabirds during your time as an observer. To fulfill the objectives outlined above, you should record:

1. **Species identification:** Use the materials provided in your identification manual and the codes established for the different taxa (see below) to record the species or species group(s) involved on the "seabird incidental take" form. You should be as specific as you can for species names even if the species code is less precise; e.g., if you can identify a common murre, put this name in the "species name"
column and code 887 (murre unident.) in the species code column. Provide verification by listing the characters you used to make the identification in the comments section or in your seabird logbook.

2. Magnitude and Composition: On the "# of birds" column on the seabird incidental take form, record the number of individuals involved in the strike or caught in pots, including the: (1) number killed or injured; (2) number apparently uninjured (flew away); and (3) number of specimens saved. Note in the comments section whether any injured specimens were kept for observation or shipment to a treatment facility and whether any dead specimens were saved (frozen). In the "composition" column record the estimated proportion of total take by sex and age. When you cannot count the composition directly, estimate the proportion (%) of the total take; e.g., 50% adults, 25% juveniles, 25% immatures. The sex and age codes are: M = male, F = female, U = unknown, I = immature, J = juvenile, A = adult. If you estimated numbers or proportions, describe how you did this in the comments section.

3. Circumstances: A variety of factors may contribute to these instances. In the "comments" section of the seabird incidental take form, record: (1) the vessel type, size, and activity (running, fishing, etc.); (2) date, time and duration of events; (3) vessel location (from GPS or Loran); and water depth, if known. For bird strikes also record: (A) whether vessel lights were on: how many lights and relative brightness (illuminating the deck or just running lights); (B) sea and weather conditions (clear, fog, rain, sleet, or snow; wind speed and direction, etc.); and (C) bird behavior before and during event (did species differ?). For take in pots, record the depth where pots were set.

OTHER ITEMS OF CONCERN

Sightings of Sensitive Species:

In the course of fulfilling your duties you will see many birds gathered around the vessel. Observers are not required to conduct bird sighting surveys. Most species you will encounter, such as northern fulmar and glaucous gull, are quite numerous, especially around fishing vessels where they feed on offal as the catch is processed. It is unnecessary, and in fact burdensome, for observers to record sightings of these species. There are, however, five species of special concern that may occur in marine areas used by commercial fishing fleets for which sighting information is highly valuable. These species are the spectacled eider, Steller's eider, short-tailed albatross, red-legged kittiwake, and marbled murrelet.

Under the Endangered Species Act (ESA), a species or population can be listed as endangered or threatened. Further, a species or population can be a candidate for listing. Candidates are species that have declined or
If you cannot keep the specimen, remove and save the legband. It is important to turn in the legband, especially ones that are worn and the numbers faded, so that the number can be verified. Please do not let vessel personnel keep the legband, although the band can be returned to them later if they provide an address.

Record the following information for banded birds on the sightings form: species, date, location, sea and weather conditions, legband information (band number, type and location on the bird). and if the specimen was saved. Color leg bands and nasal markers are sometimes used either singly or in combination with other bands to assist with observations. These bands may be placed on the bird in a certain sequence to identify sex, year, colony, or other information. In such a case, be sure to note the type and color of all bands, the location (right, left, or both legs), and if several bands are on one leg note the sequence, i.e., blue plastic band upper, silver numbered band lower. Color bands and nasal markers may be numbered differently from other bands; all numbers are important.

**Injured or Dead Eiders:**

To comply with the incidental take permit conditions for the fishery, you must attempt to notify the FWS within 48 hours if you observe the incidental take of **10 or more spectacled eiders**. You should request permission from the vessel captain to use the radio to phone Anchorage; show him a copy of the attached letter to National Marine Fisheries Service, if necessary. If you are not able to contact FWS, try to reach the Alaska Department of Fish and Game office in Dutch Harbor.

U.S. Fish and Wildlife Service, Anchorage Field Office
(800) 272-4174 toll free or (907) 271-2786 fax

If you find an injured or dead spectacled or Steller’s eider (or a short-tailed albatross, although this is very unlikely) you should attempt to save the specimen. Injured birds may recover and be released, or they may not be able to survive without veterinary treatment or rehabilitation. You should ask vessel personnel for permission to keep an injured spectacled or Steller’s eider at least temporary to see if they can recover. If the bird has an obviously broken wing or leg, or is unable to fly, you can attempt to hold onto it until you return to Dutch Harbor, where air transport to Anchorage can be arranged. Follow the protocol below for handling injured birds.

**Protocol for handling injured eiders:** Because of logistical constraints on fishing vessels, you may not be able to provide adequate care for an injured bird. Also vessel personnel may not allow you to keep the bird (try reminding them of its protected status, but don’t force the issue). The FWS understands these constraints and only requests that you do the best you can under the circumstances. Your highest priority should be to release any bird that appears to have a chance of surviving on its own. Birds that appear stunned but without apparent injuries such as broken
bones can be kept in a box for a short while (no more than 2 days) to let them recover before release. Follow these steps if you try to save an injured eider:

1. Call the FWS in Anchorage to report the bird and receive guidance on its care. You may also call the Dr. Dan Mulcahy or the Bird Treatment and Learning Center in Anchorage directly for consultation.

   - **FWS, Anchorage Field Office**: 800-272-4174
   - **Dr. Dan Mulcahy, DVM**: 907-786-3451, or 907-333-0421 (home)
   - **Bird TLC/Arctic Anim. Hosp.**: 907-563-3945
   - **Bird TLC, Barbara Doak**: 907-277-6778

2. Note recovery location, time and circumstances.

3. Assess severity of bird's condition. If no injuries are apparent (bird is alert and can stand and flap its wings) or if injuries are minor (small lacerations, foot web tears, minor stunning), release the bird.

4. If bird's wing or leg is broken or it cannot fly, keep it in a box or cage with adequate ventilation and access to a small bowl of fresh water. Keep it warm but not hot.

5. Offer food if the bird is alert. Try scraps of fish, shellfish, or even boiled eggs. Note they can be messy eaters and will put the food (and themselves) in the water, so try to clean up daily. If the bird's feathers get messy they will not remain waterproof and the bird cannot survive at sea.

6. Keep records of whether the bird eats and drinks.

7. Minimize handling of the bird. Wear clean gloves if you have any when you handle the bird (again, to preserve feather waterproofing).

8. Reassess the bird's condition. If you think it can be released, don't delay. The condition of its feathers will worsen in captivity.

9. Birds that cannot be released may survive alright for up to 10 days. Once you get them to port (either on your vessel or potentially by transfer to another vessel that is heading to port sooner), ask the observer coordinator to contact the airlines immediately about shipping to Anchorage and call the FWS or Bird TLC to coordinate pickup.

If you salvage a dead bird, record complete information including the species, date, location, cause of injury, and details of its treatment, if any, in your seabird logbook. Salvaged dead birds should be tagged and frozen as described for banded birds, above.
SUMMARY OF OBSERVER DUTIES REGARDING BIRDS

A. Birds Striking the Vessel - (1) record your estimate of total numbers and how you made this estimate; (2) identify the species involved, including sex and age if determinable, list the identification characteristics used and note if photographs were taken; (3) record the bird behavior, associated environmental conditions, and vessel location and activity during the occurrence.

B. Birds Taken in Pots - (1) record species, sex and age (if determinable); list the identification characteristics used; (2) record vessel location and depth of pot set.

C. Injured and Dead Eiders - follow the protocol for handling injured spectacled or Steller's eiders. If you observe 10 or more dead spectacled eiders you must attempt to call the FWS in Anchorage within 48 hours. If you can not reach FWS, try to relay the message to the Alaska Department of Fish and Game in Dutch Harbor.

D. Sightings - record sightings of any "sensitive" species as noted above.

E. Banded Seabirds - record all pertinent data and save the specimen when possible.
The following is a list of requested information upon witnessing or learning of a possible violation:

Name of vessel:
Name of captain:
U.S. Coast Guard vessel number:
Alaska Dept. of Fish and Game (ADF&G) number:
Date of each incident:
Location of each incident (GPS or Loran reading):
Full names of persons involved:
Species of birds killed or injured:
Quantity of each species killed or injured:
Method of killing or injury (pole gaff, type of firearm, club):
Statements or comments by the violator(s) heard by witness(es) pertaining the violation:
Violator’s knowledge of the illegal activity (i.e. warning given by observer or captain):
Detailed narrative of each incident:
Name, home address, and telephone number of observer:
Name(s) of other witness(es):

All violations should be reported to the Senior Resident Agent, Division of Law Enforcement, in Anchorage, AK, (907) 271-2828, [FAX 271-2827].
<table>
<thead>
<tr>
<th>Taxa group</th>
<th>Species Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loon unident (Gaviiformes)</td>
<td>844</td>
</tr>
<tr>
<td>Grebe unident (Podicipediformes)</td>
<td>846</td>
</tr>
<tr>
<td>Tubenoses unident (Procellariformes)</td>
<td>848</td>
</tr>
<tr>
<td>Albatross unident (Diomedeidae)</td>
<td>849</td>
</tr>
<tr>
<td>*Short-tailed albatross</td>
<td>850</td>
</tr>
<tr>
<td>Laysan albatross</td>
<td>851</td>
</tr>
<tr>
<td>Black-footed albatross</td>
<td>852</td>
</tr>
<tr>
<td>Shearwater/petrel unident</td>
<td>853</td>
</tr>
<tr>
<td>Northern Fulmar</td>
<td>854</td>
</tr>
<tr>
<td>Storm-petrel unident</td>
<td>858</td>
</tr>
<tr>
<td>Cormorant</td>
<td>861</td>
</tr>
<tr>
<td>Waterfowl unident (Anseriformes)</td>
<td>862</td>
</tr>
<tr>
<td>**Spectacled eider</td>
<td>864</td>
</tr>
<tr>
<td>**Steller's eider</td>
<td>865</td>
</tr>
<tr>
<td>Shorebird unident</td>
<td>867</td>
</tr>
<tr>
<td>Phalarope unident</td>
<td>868</td>
</tr>
<tr>
<td>Jaeger/skua unident</td>
<td>871</td>
</tr>
<tr>
<td>Gull unident (Larinae)</td>
<td>874</td>
</tr>
<tr>
<td>*Red-legged kittiwake</td>
<td>873</td>
</tr>
<tr>
<td>*Black-legged kittiwake</td>
<td>876</td>
</tr>
<tr>
<td>Tern unident (Sterninae)</td>
<td>880</td>
</tr>
<tr>
<td>Alcid unident (Alcidae)</td>
<td>883</td>
</tr>
<tr>
<td>Guillemot unident (Cepphus sp.)</td>
<td>884</td>
</tr>
<tr>
<td>Murre unident (Uria sp.)</td>
<td>887</td>
</tr>
<tr>
<td>Puffin unident (Fratercula sp.)</td>
<td>890</td>
</tr>
<tr>
<td>Auklet/murrelet unident</td>
<td>893</td>
</tr>
<tr>
<td>Marbled murrelet</td>
<td>894</td>
</tr>
<tr>
<td>Seabird unident</td>
<td>897</td>
</tr>
<tr>
<td>Land bird unident</td>
<td>898</td>
</tr>
</tbody>
</table>

* Record also as adult = A, sub-adult = S, immature = I, or unknown = U.

** Record also as male = M, female = F, or unknown = U.
SEABIRDS

Please use this section to record requested comments and observations of seabirds. Refer to the manual for what is requested. Copies of your comments will be provided to the U.S. Fish & Wildlife Service (USF&WS). This section is to be used by all observers, including those with seabird special projects.

In addition to the specific information requested on sightings of endangered, threatened, category 1 or 2 species and banded birds, there are pages to record other important seabird information related to vessel type. There is also a page to record seabird photos taken.

SIGHTINGS OF ENDANGERED, THREATENED, OR CATEGORY 1 OR 2 SPECIES
Record information associated with sightings of short-tailed albatross, spectacled eider, Steller's eider, red-legged kittiwake, or marbled murrelet. Under "comments" list the characters used to make the identification, numbers of birds sighted, age and sex when obvious, etc. Also note if photos were taken (list roll and frame number). Refer to the Identification Manual to confirm your identification.

EXAMPLES:

<table>
<thead>
<tr>
<th>Species</th>
<th>Date</th>
<th>Location</th>
<th>SST(°C)</th>
<th>Vessel Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-tailed albatross</td>
<td>7/9/91</td>
<td>54°49'N 168°04'W</td>
<td>8.0°</td>
<td>King Fisher</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 adult 2 immatures seen,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>along edge of group of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laysan albatross. Vessel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>was retrieving the net. ID</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>adult by tan head, dark</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wings, white back, and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>large pink bill. Immatures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>were completely dark (no</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>white around bill or on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rump) and also had large</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pink bills. Photos on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>personal camera, roll 2,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>frames 11-18.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* SST(°C) - Sea Surface Temperature, °Celsius

BANDED SEABIRDS It is very important to provide leg-band returns to USF&WS. Refer to the manual for information regarding banded birds, and record the following data.

<table>
<thead>
<tr>
<th>Species</th>
<th>Date</th>
<th>Location</th>
<th>SST(°C)</th>
<th>Number</th>
<th>Type</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Fulmar</td>
<td>7/23/91</td>
<td>56°09'N 169°15'W</td>
<td>6.0°</td>
<td>10266</td>
<td>Metal</td>
<td>right</td>
</tr>
<tr>
<td>Specimen saved?</td>
<td>Yes</td>
<td>Vessel Name: King Fisher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td>Crew member found bird on deck this morning. It must have flown into vessel last night.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Leg band
LOG OF SEABIRD PHOTOGRAPHS. Observers assigned the seabird special project may be provided with cameras to verify species identifications and document other aspects of their work. It would be useful for observers using their personal cameras to also record seabird related photos here. Under "comments" include species, subject, etc.

<table>
<thead>
<tr>
<th>Roll/Frame#</th>
<th>Date</th>
<th>Set/Haul</th>
<th>Vessel Name</th>
<th>Subject/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/19:00-11:18</td>
<td>7/1/91</td>
<td>King Fisher</td>
<td>Short-tailed Albatross</td>
<td>54°49'N 163°44'W</td>
</tr>
<tr>
<td>2/19-24</td>
<td>7/2/91</td>
<td>King Fisher</td>
<td>Birds wrecked on deck</td>
<td>See note</td>
</tr>
<tr>
<td>7/24-7</td>
<td>12/26/91</td>
<td>&quot;</td>
<td>Eider flocks flying near vessel</td>
<td></td>
</tr>
</tbody>
</table>

Please refer to logbook page(s) _________ for additional photo records.
**SEABIRD INCIDENTAL TAKE -- CRAB FISHERIES**

**Vessel Name:** King Fisher  
**Vessel Type/Size:** 200' Catch/Processor

**Date:** 9/12/20 (YR/MO/DAY)  
**Time and Duration of Event:** 2p.m. - 24°C

**Vessel Location:** 54°49'N 161°04'W

<table>
<thead>
<tr>
<th>Species Code</th>
<th>Species Name</th>
<th># of Birds Involved</th>
<th>Composition of Birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>887</td>
<td>Common Murre</td>
<td>8</td>
<td>Injured or killed</td>
</tr>
<tr>
<td>893</td>
<td>Aukslets</td>
<td>2C</td>
<td>Uninjured Kept</td>
</tr>
<tr>
<td>863</td>
<td>King Eider</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Sex</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>U</td>
</tr>
<tr>
<td>Injured or killed</td>
<td>12</td>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>Uninjured Kept</td>
<td>12C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kept</td>
<td>1**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 1 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Specimens saved in freezer; be sure to tag with complete information.*

**Comments** (sea and weather conditions; vessel activity; number and relative brightness of lights; bird behavior (did species differ?); other contributing factors to bird strike; if taken in pot, depth of set; See Manual):

* Crew member reported about 100 Aukslets hit the vessel but flew off
** Female king eider kept to confirm identification. Common murre id: black back, white neck, belly, long slender bill, dark stripe from eye across white cheek; juvenile: white snip, bill unmarked. Aukslets by size, mostly grey, lighter on belly, orange breast bill. King eider: by bill color, & by v-shaped feather markings. Vessel was traveling west on calm seas and fog/furries with full running and on deck headlights. Birds were flying... Continue on reverse side...
Steve Pennoyer, Director, Alaska Region, National Marine Fisheries Service (NMFS) requests the cooperation of the fishing industry in protecting the Short-tailed Albatross in the Gulf of Alaska (GOA) and Bering Sea (BS). The Short-tailed Albatross is a very large pelagic seabird that nests colonially on two small islands along the Japanese chain. Historically, this species was a common forager from the Bering Sea to waters as far south as Baja California. Years of commercial harvests of birds on the nesting islands reduced their numbers to fewer than 100 birds by the 1930’s. Under its protected status in Japan, the population has slowly increased to about 700 birds. However, the population is still considered to be detrimentally affected by commercial fishing activities due to lethal entanglements with hooks, nets, and other gear. The species is protected under the United States Endangered Species Act.

The foraging range for the Short-tailed Albatross, and for the very similar, Laysan, and Black-footed albatrosses includes the GOA and the BS. Fishermen are encouraged to take steps that will reduce the likelihood of entangling these and other marine birds. These steps include:

* When possible, deploy gear in darkness.
* Avoid disposal of fish offal immediately before or during deployment of gear, and avoid disposal near or forward of set and retrieval stations.
* Bait and deploy line quickly and efficiently, minimizing the duration that bait may be near the surface.
* Increase weights on hooks and lines to sink gear quickly.
* Distract albatross away from baited hooks when birds are present and gear deployment cannot be delayed (“scare” streamers on superstructures and a large ball towed beyond the stern and gear lines may be effective).

NMFS requests that Short-tailed Albatross sightings and other interactions be reported to the U. S. Fish and Wildlife Service 1 800 272 4174. This species has a wingspan of 6-7 feet.

It is the only all-white bodied adult albatross in the North Pacific, and is distinguished from the Laysan Albatross which has a dark mantle and the Black-footed Albatross which is mostly dark. The back inner halves of the Short-tailed Albatross’s wings are mostly white, while the Laysan’s wing backs are entirely dark. Young Short-tailed Albatrosses may be dark, but all ages have a distinctive heavy pink bill. Wings are much longer and proportionately narrower than those of gulls, and feet protrude beyond the tail.

Further assistance may be obtained by contacting Andrew Grossman, Protected Resources Management Division, NMFS, 907-586-7283.