Incidental Take and Interactions of Marine Mammals and Birds in the Kodiak Island Salmon Set Gillnet Fishery, 2002 and 2005

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Summary

- The Marine Mammal Protection Act directs the Secretary of Commerce to monitor marine mammal mortality and serious injury occurring incidentally to commercial fishing, and to monitor the progress of commercial fisheries in reducing these incidental takes to insignificant levels. The mechanism used by the National Marine Fisheries Service to obtain these outcomes is summarized.

- The Alaska Marine Mammal Observer Program (AMMOP) was set up in 1990 to obtain reliable estimates of the levels of serious injury and mortality of marine mammals and birds, assess the reliability of injury and mortality reports by vessel owners and operators, identify new methods and technology for reducing incidental takes, collect relevant biological samples, and record data on bycatch and discard levels of all species. The program for the rotational surveys of fisheries for the estimation of incidental take rates is described.

- The Kodiak Island set gillnet fishery consists of the Northwest District with about 100 permit holders, and the Alitak Bay District with about 70 permit holders. It is currently categorized as a Category II fishery by the National Marine Fisheries Service (occasional incidental mortality and serious injury to marine mammals), primarily because of fisher's reports of the incidental mortality of harbor porpoises, harbor seals sea otters and unidentified small cetaceans in the early 1990s. The status of the harbor porpoise, harbor seal, sea otter populations in the region is summarized, potential seabird interactions with the fishery are noted, and the nature of the fishery is described. In 2002 the Northwest District had low fishing effort when it first opened on June 9 because of a dispute over the price of salmon, and the Alitak Bay District never opened because of the absence of salmon. Both the Northwest District and the Alitak Bay District were open for normal fishing in 2005.

- In 2002 all the fishing permits in the Northwest District were subjected to a random selection every two weeks to determine which permits would be observed. Most (97%) of the sampled permits were chosen in this way, with the remainder (3%) being sampled opportunistically for safety or logistical reasons. U.S. Fish and Wildlife Service (USFWS) observers were present on about one third of sampled days to monitor seabirds. The original plan was for the AMMOP observers to sample approximately 5% of the fishing effort in both the Northwest District and the Alitak Bay District. With sampling restricted to the Northwest District only, the final coverage was 7.5% of the fishing permit days for the AMMOP observers and 2.5% of the fishing permit days for the USFWS observers.

- In 2005 the whole fishery was open. In this year each of the seven fisheries areas Kupreanof Straits and North Cape, Viekoda Bay, Uganic Bay, Uyak Bay, Olga Bay, Moser Bay and Alitak Bay was sampled separately by putting the list of permits in a random order and, as far as possible the AMMOP observers sampled the permits in

this order. When a permit from a joint venture was sampled an attempt was made to sample all of the permits in this joint venture on the same day. These other permits were then not sampled again until the list of permits was exhausted. A new random order was then generated for further sampling. In this way, any permit being fished should have been sampled by the time that each randomized list was fully sampled. As in 2002, fishers were contacted within 24 hours of the scheduled sampling if meeting arrangements were needed, and if a selected permit holder was not fishing at the required time then the next permit holder on the randomized list was selected instead. Overall, 420 sample days provided observations on either all or part of the fishing on those days. Only 3 of these days were sampled opportunistically. No USFWS observers were present to monitor seabirds in 2005.

- Taking into account net lengths, the fraction of nets that were observed during picking operations, and the fact that not all picks were observed, the final sample effort covered by the AMMOP observers in 2002 was 6.0% of the total fishing effort(the equivalent of 309.4 sampled permit days out of the total of 5,114.6 permit days of fishing). In 2005 the final sample effort covered was 4.9% (the equivalent of 534.6 sampled permit days out of the total of 10,835.2 permit days of fishing).

- In terms of weight, the catches of five species of salmon recorded by the AMMOP observers have a similar distribution to the catches recorded by the Alaska Department of Fish and Game. In 2002 6.7% of the total catch was recorded by the AMMOP observers, which is slightly more than the 6.0% expected based on the fishing effort that was observed. In 2005 4.6% of the total catch was recorded by the AMMOP observers, which is slightly less than the 4.9% expected based on the fishing effort that was observed.

- Ratio estimation was used to estimate the total take in the fishery for marine mammals and birds, with stratification in 2002 based on the four fishing areas sampled, and stratification in 2005 based on the seven fishing areas sampled.

- In 2002 the estimates of the takes of different species, with estimated standard errors in parentheses are: sea otters, 62.0 (36.4); harbor porpoises, 32.2 (21.7); pelagic cormorants, 14.1 (13.4); red-faced cormorants, 28.2 (18.9); harlequin ducks, 15.5 (14.9); pigeon guillemots, 75.9 (32.5); marbled murrelets, 56.4 (26.9); common murres, 185.4 (53.3); thick-billed murres, 14.1 (13.5); horned puffins, 14.1 (13.3); tufted puffins, 110.0 (78.0); sooty shearwaters, 14.1 (13.5); and all species of birds, 527,7 (109.6). The four sea otters observed to be taken were all released alive, apparently uninjured, while the two harbor porpoises observed to be taken were both released dead. All of the birds observed to be taken were released dead except for common murres and tufted puffins. A total of eleven common murre takes were observed, with two birds released alive. One of these two birds appeared uninjured, while the state of the other was unknown. A total of seven tufted puffin takes were observed, with one bird

released alive, apparently uninjured. Maps are provided to illustrate the areas with high and low take rates for the species most commonly taken in 2002.

- In 2005 the estimates of the takes of different species, with estimated standard errors in parentheses are: unknown otters, 27.8 (27.1); harbor porpoises, 39.4 (27.1); pelagic cormorants, 178.0 (62.5); harlequin ducks, 19.7 (19.0); pigeon guillemots, 117.6 (46.4); marbled murrelets, 142.6 (67.4); Kittlitz's murrelets, 18.1 (16.8), common murres, 483.5 (156.2); thick-billed murres, 19.7 (19.3); tufted puffins, 95.9 (41.4); white-winged scoters, 21.5 (21.1); and all species of birds, 1096.6 (195.4). The single unknown otter observed to be taken was released alive, apparently uninjured, while all four of the harbor porpoises observed to be taken were released dead. All of the birds observed to be taken were released dead. Maps are provided to illustrate the areas with high and low take rates for the species most commonly caught in 2005.

- The sightings of marine mammals by observers in 2002 are summarized, separately for set or soak watches and haul watches, in distance classes 0m, 1 - 10m, 11 - 100m, and > 100m from nets. The observers' comments on the behavior of the animals are recorded in full in Appendix E.

- In 2002 the USFWS observers made systematic net and horizon scans as part of their duties. The results obtained are summarized, separately for horizon scans and net scans, on and off the water, and less than 10m or more than 10m from nets. A figure is provided showing the sighting rates in different fishing areas for the bird species with the highest incidental take rates.

- The sightings of marine mammals by observers in 2005 are summarized in a similar way to the 2002 sightings. The observers' comments on the behavior of the animals are recorded in full in Appendix F.

- No USFWS observers were available to record bird sightings in 2005.

- In 2002 there were six reports of strandings of dead marine mammals during the time that the observer program was in operation. Details of these are provided. A horned puffin was also found dead by an observer. It was not counted as a fishery take but the carcass was saved.

- In 2005 observers encountered 13 mammal carcasses in situations unrelated to a fisheries take, eight during trips and six not during trips. In addition, an observer reported that the skiff that they were traveling in may have injured a sea otter. One of the animals was a brown bear. Details of the marine mammal carcasses are provided. An observed also found a dead common murre and noted this on a marine bird sample form.

- Seventeen variables were examined in terms of their relationships, if any, on the mammal and bird take rates in the fishery, using data from the individual hauls observed in 2002 and 2005. These variables are the fishing effort, the fishing region, the day in the fishing season, the mid-point of the time between setting a net and pulling a net (midnight to 6am, 6am to noon, etc.), the average water depth, the fishing zone (open water, a large bay, etc.), the state of the tide (ebb tide, flood tide, etc.), the type of land (mainland shoreline, peninsula or island, etc.), the hook shape (L-shaped, V-shaped, etc.), the air temperature while picking the net, the water temperature while picking the net, the average mesh size of the net, the type of net material (monofilament nylon, multifilament nylon, etc.), the net color (clear, white, etc.), the presence or absence of a pinger, the presence or absence of lights, and the presence or absence of a floatline. In addition, the possibility of a difference in the take rates for 2002 and 2005 was considered.

- The relationship between the variables and the take rates for all mammals, all birds, Alcidae birds, common murres, tufted puffins, pigeon guillemots, pelagic cormorants, and marbled murrelets are illustrated graphically, with the take numbers for mammals and birds plotted against each of the variables individually, with separate symbols for hauls in 2002 and 2005.

- Logistic regression was used to test for significant relationships between the variables and the presence and absence of takes for a haul. For each of the categories of take (all mammals, all birds, Alcidae birds, common murres, tufted puffins, pigeon guillemots, pelagic cormorants, and marbled murrelets) the significance of a logistic regression equation was considered first for individual variables. This was done to get an indication of the overall significance of variables for the whole fishery. The significance of the individual variables was then considered only using data for the fishing regions where take of the type being considered occurred. Still using only the data from the regions where take occurred, variables were added into the logistic regression in order of their individual significance, with variables that are not significant at the 5% level in the combined equation then removed. This resulted in an estimated logistic regression equation for each of the categories of take relating the probability of a take to one or more of the variables describing a haul. The significance of the final fitted equation was assessed by a randomization test as well as the standard chi-squared test method in case the chi-squared method was upset by the small number of takes for some take categories.

- The take of mammals only occurred in the northern fishing regions of Kupreanof Straits and North Cape, Viekoda Bay, Uganic Bay and Uganic Passage. Using data on the hauls from these regions, the final logistic regression equation just contained the water temperature variable. The equation is significant at the 5% level and indicates that the probability of a take reduces as the water temperature increases. There is some suggestion that the probability of a take is also related to the net material, but the evidence for this relationship is not clear.

- The logistic regression analysis gives similar results for all birds and Alcidae birds, because most of the birds observed to be taken in the fishery were in the Alcidae family. There was no bird take in fishing regions 5 and 6 (Olga Bay and Moser Bay) so data on hauls from these regions were not used for fitting the final logistic regression equation. All the other fishing regions had takes of birds and Alcidae birds. The final equation included effects for the fishing effort, the fishing region, the use of a pinger, and the day in the fishing season, both for all birds and Alcidae birds. The equations are very highly significant ($p < 0.001$) both for all birds and Alcidae birds. They indicate that the take rate increases with the fishing effort, varies with the fishing region, increases if a pinger is used, and is highest at the start and the end of the fishing season.

- There was no common murre take in fishing regions 1, 5 and 6 (Kupreanof Straits and North Cape, Olga Bay and Moser Bay) so data on hauls from these regions were not used for fitting the final logistic regression equation. The final equation included effects for the day in the fishing season, the water temperature, the use of a pinger, and the fishing zone. The equation is very highly significant ($p < 0.001$). The equation indicate that the probability of a common murre take decreases and then increases with the fishing day, decreases as the water temperature increases, and increases with the use of a pinger. Also, the estimated probability of a take is zero for zone 0 (unknown or other) and zone 5 (channel or canal), is significantly lower for zone 2 (inside large bay) than it is for zone 1 (open water), and the estimated probability of a take is also lower for zone 3 (inside sheltered bay) than it is for zone 1, although not significantly lower.

- There was no take of tufted puffins in regions 1, 5, 6 and 7 (Kupreanof Straits/North Cape, Olga Bay, Moser Bay and Alitak Bay) so data on hauls from these regions were not used for fitting the final logistic regression equation. This equation only included an effect for the fishing day, but is significant at the 5% level. Like the equations for all birds and Alcidae birds it indicates that the probability of a take was highest at the start and the end of the fishing season.

- There was no take of pigeon guillemots in regions 5 and 6 (Olga Bay and Moser Bay) so hauls from these regions were not used for fitting the final logistic regression equation. This equation only included an effect for the pinger variable, and it suggests that the probability of a take increases when a pinger is used. The pinger effect is significant using a conventional chi-squared test ($p = 0.048$), but not using a randomization test($p = 0.141$). Consequently, for pigeon guillemots the relationship between take and the use of pingers is not clearly established.

- There was no pelagic cormorant take in regions 4, 5 and 6 (Uyak Bay, Olga Bay, and Moser Bay) so hauls from these regions were not used for fitting the final logistic regression equation. This equation contains effects for the fishing effort and the fishing

day. It indicates that the probability of a take increases with the fishing effort and decreases as the fishing season progresses from June to September. The equation is very highly significant ($p < 0.001$).

- Marbled murrelet take only occurred in regions 1 and 3 (Kupreanof Straits and North Cape, and Uganic Bay and Uganic Passage). When the take was related to the individual variables with the data from hauls in these regions the final logistic regression equation included effects for the type of tide and the fishing day. According to this equation marbled murrelet take does not occur when there are high or low slack tides, the probability of a take is higher with an ebb tide than with a flood tide, and decreases as the fishing season progresses. The fit of the equation is very significant.

- A simulation method has been used to determine the likely accuracy of estimation that would be obtained by future observer programs with different amounts of effort for a fishery like the Kodiak Island fishery in 2005. The sample day data from 2002 and 2005 were combined to produce a model for all of the effort in this fishery in 2005, and this was then sampled with different levels of cover to determine the percentage coefficients of variation (CV) obtained for the estimation of the total take of different species. A figure is provided showing the CV as a function of the percentage of the fishery sampled. A different curve is provided for each of seven species because the CV for a species depends on the true total take of that species.

- Simulation has also been used to determine the power that different sample sizes provide for comparing the take rates of a species for two different fisheries, or the same fishery in two different years, assuming that these fisheries have about the same total fishing effort as at Kodiak Island in 2005. This was done for the sample sizes up to 100% of the total fishing effort for each of the two fisheries. The results obtained are summarized in four separate graphs for species with very high, high, medium and low take rates.

- There is some discussion of the level of take for different species of marine mammals and birds at Kodiak Island relative to the level in other fisheries, and in terms of the possible effect of the take on the populations of some species.

1. Introduction

The Marine Mammal Protection Act directs the Secretary of Commerce to monitor marine mammal mortality and serious injury occurring incidentally to commercial fishing, and to monitor the progress of commercial fisheries in reducing incidental takes to insignificant levels approaching a zero mortality rate goal (ZMRG). The National Marine Fishery Service (NMFS) currently uses a value of 10% of the stock's potential biological removal (PBR, Wade and Angliss, 1997) as a criterion to evaluate whether the incidental take of a stock is at an insignificant level approaching the ZMRG.

The PBR is defined to be

$$(N_{min})(0.5\ r_{max})(F_R),$$

where N_{min} is the minimum estimate of the population size for the stock, r_{max} is the maximum yearly rate of increase of the stock, and F_R is a recovery factor between 0.1 and 1.0. The PBR is considered to be the maximum number of animals (not including natural mortality) that may be removed from a stock while still allowing that stock to reach its optimum sustainable population size.

Under the Marine Mammal Protection Act, the NMFS classifies each U.S. commercial fishery (state and federal) in one of three categories, based on the level of incidental serious injury and mortality of marine mammals that occurs in the fishery. Each fishery is classified through a two-tiered analysis which assesses the potential impact of fisheries on each marine mammal stock by comparing serious injury and mortality levels to the stock's PBR.

The Tier 1 analysis proceeds as follows. For each marine mammal stock, serious injuries and mortalities from all commercial U.S. fisheries are totaled. If the total is less than or equal to 10% of the PBR of that stock, then all fisheries interacting with this stock are placed in Category III. This process is repeated for each stock. A fishery remains in Category III unless it interacts with a stock for which the serious injury or mortality rate exceeds 10% of the PBR. All fisheries that interact with a stock for which the serious injury or mortality rate exceeds 10% of the PBR are subject to a Tier 2 analysis. Fisheries with no serious injuries or mortalities to any marine mammal stock are placed in Category III.

If a Tier 2 analysis is required then this proceeds as follows. For each fishery, the annual mortality and serious injury for each marine mammal stock is evaluated relative to the PBR of that stock. The fishery is categorized as Category I if the serious injury and mortality exceeds 50% of the PBR, as Category II if the serious injury and mortality is greater than 1% and less than 50% of the PBR, and as Category III if the serious injury and mortality is less than or equal to 1% of the PBR.

The NMFS relies on observer data in the analyses, but also evaluates other factors such as fishing techniques, the gear, the methods used to deter marine mammals, the seasons and the areas fished.

The Alaska Scientific Review Group was set up in 1994 to review the science used as the basis for marine mammal management. This group reviews stock assessment reports on the marine mammals in the regions and advises the NMFS on the status and trends in each population, and on the research and management needs to reduce incidental fisheries mortality if this is necessary.

In Alaska logbook programs were used from 1990 to 1993, and fisher self-reporting programs from 1995 to 2001 in an attempt to estimate the fishing related mortality of marine mammals. However, this was unsuccessful as logbook data were found to under-estimate mortality rates in comparison to more reliable observer data (Credle *et al.*, 1994), and there were almost no self-reports of injuries or mortalities. As a result, the Alaska SRG directed the NMFS not to use self-reporting data for producing estimates of fishing related mortality (Alaska Scientific Review Group, 1998), leading to many Alaskan fisheries being categorized as II or III using a combination of data five to ten years old, stranding reports, and their similarity to other fisheries.

The Alaska Marine Mammal Observer Program

The Alaska Marine Mammal Observer Program (AMMOP) was set up in 1990 to:

(a) obtain reliable estimates of the level of incidental serious injury and mortality of marine mammals during fishing operations;

(b) determine the reliability of reports submitted by vessel owners and operators;

(c) identify changes in fishing methods or technology that may increase or decrease incidental serious injury and mortality;

(d) collect biological samples that may otherwise be unobtainable for scientific studies; and

(e) record data on incidental take and discard levels of all species.

Although the collection of data on the incidental injury and mortality of marine birds during fishing operations is not part of these goals, the collection of such data is fully supported and considered to be an important secondary benefit from the program.

As part of this program, the NMFS is currently placing observers in Alaskan fisheries on a rotational basis, to gather data to monitor the level and nature of incidental mortalities and serious injuries. These data are also used to place Alaska federal and state

commercial fisheries into the appropriate List of Fisheries category, as required under the Marine Mammal Protection Act. There are currently no Category I fisheries (frequent serious injuries and mortalities) in Alaska, and Category II fisheries (occasional serious injuries and mortalities) have priority for observer coverage. Category III fisheries are not required to accommodate observers and therefore unlikely to be covered by the AMMOP.

The AMMOP began observer coverage in 1991 and 1992 on the Prince William Sound setnet and driftnet fisheries, and the Aleutian Peninsula driftnet fisheries. It continued with the Cook Inlet salmon setnet and driftnet fisheries in 1999 and 2000, and covered the Kodiak Island setnet fishery in 2002 and 2005. This report covers the 2002 and 2005 surveys of the Kodiak Island salmon setnet fishery. An earlier report (Manly *et al*., 2003) described the results of the observer program in 2002. The present report updates this earlier report with the inclusion of results for 2005.

2. The Kodiak Island Set Gillnet Fishery

The Kodiak Island set gillnet fishery (Figure 2.1) comprises the Northwest District, which includes the area from South Point on Spruce Island to Rocky Point on the south side Uyak Bay, and the Alitak Bay District, located on the southwestern corner of the island, with fishing in Olga Bay, Moser Bay and Alitak Bay. Typically the Northwest District is fished by about 100 permit holders and constitutes about 60% of the annual fishing effort, while the Alitak Bay District has about 70 permit holders and about 40% of the annual fishing effort. For sampling and analysis purposes, the Northwest District is divided into a northern sector comprising the Kupreanof Straits and North Cape, Viekoda Bay and Uganik Bay areas, and a southern sector comprising the Uyak Bay area. Similarly, the Alitak District is divided into the Olga Bay, Moser Bay and Alitak Bay areas.

Interactions with Marine Mammals and Birds

The Kodiak Island set gillnet fishery is currently a Category II fishery, with potential interactions with the Gulf of Alaska stock of the harbor porpoise (*Phocoena phocoena*), the Gulf of Alaska stock of the harbor seal (*Phoca vitulina richardsi*), the Southwest Alaska stock of the sea otter (*Enhydra lutris*), and the Western U.S. stock of the Steller sea lion (*Eumetopias jubatus*), as listed in the Federal Register (2006).

The Gulf of Alaska stock of the harbor porpoise occurs from Unimak Pass in the west to Cape Suckling in the east. The estimated population size is 30,506 with a coefficient of variation (CV) of 21.4%, and a PBR of 255 animals per year. As the estimated level of human caused mortality and serious injury is 40.3 per year, which is greater than 10% of the PBR, this mortality is not considered to be insignificant and approaching zero (Angliss and Outlaw, 2005, p. 128). Prior to the 2002 survey of the Kodiak Island set gillnet fishery it was estimated that the mortality of harbor porpoise as a result of this fishery was greater than or equal to 3.2 animals per year. A survey in 1992 provided an estimate of 2,300 porpoise in the Kodiak area with a CV of 34% (Small and DeMaster, 1995).

The Gulf of Alaska stock of the harbor seal occurs from Unimak Pass to Cape Suckling with an estimated size of 29,175, with a CV of 5.2%, and a PBR of 868 animals per year. Several commercial fisheries may cause harbor seal mortalities, with the total mortality estimated to be more than 35 animals a year. As this is less than 10% of the PBR the stock is not classified as strategic, although the estimate of the yearly mortality is not considered to be reliable (Angliss and Outlaw, 2005, p. 37). Prior to the 2002 survey of the Kodiak Island set gillnet fishery the estimated mortality of harbor seals due to this fishery was estimated to be 0.75 or more animals per year. A survey in 1996 gave an estimate of 4,437 animals in the area with a CV of 3.5% (Angliss and Outlaw, 2005, p. 33).

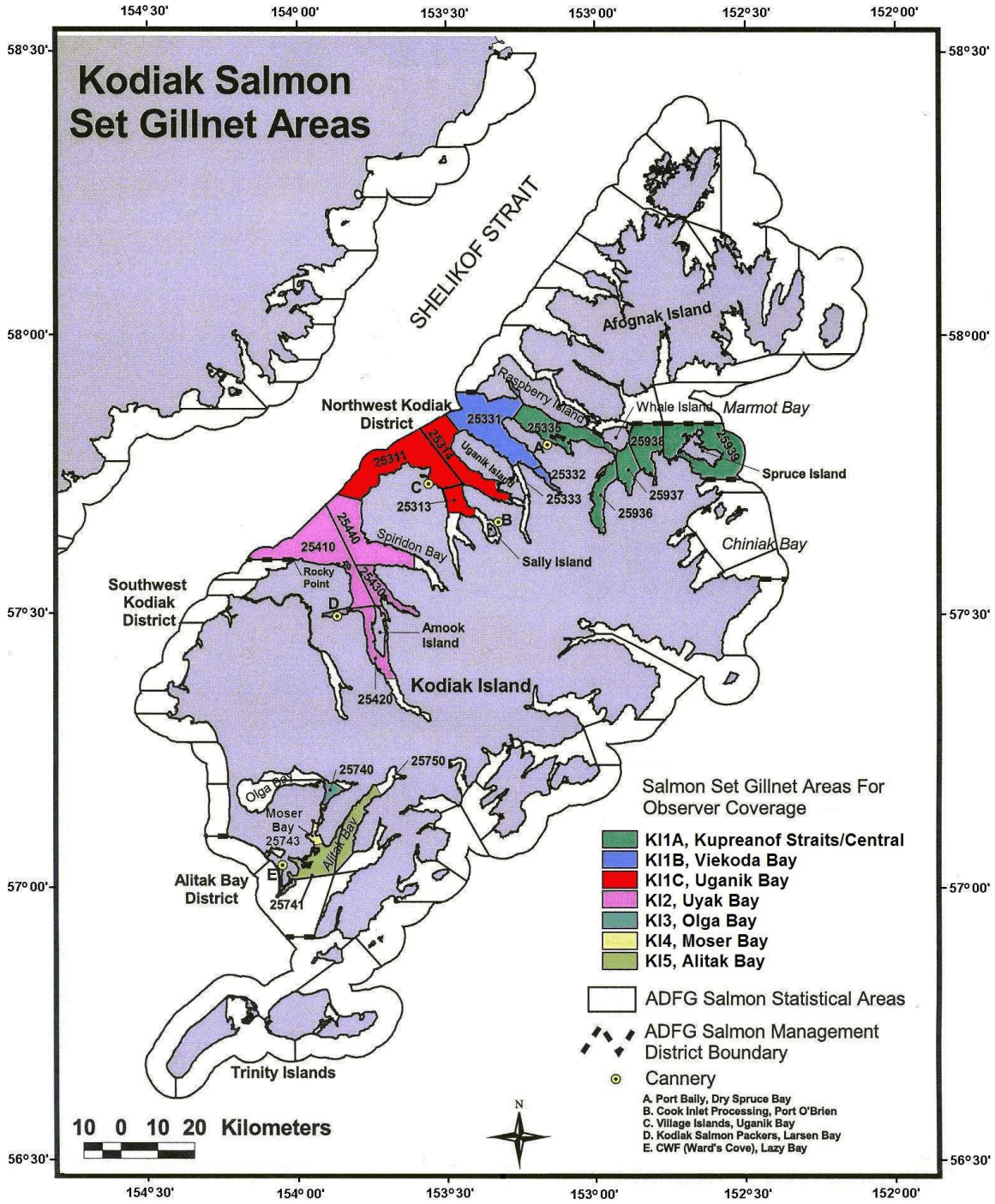


Figure 2.1 Locations for the Kodiak Island Set Gillnet Fishery. Salmon statistical areas are shown numbered from 25311 to 25939.

The southwest stock of the sea otter is considered to include animals from the Alaska Peninsula and Bristol Bay coasts, and the Aleutian, Barren, Kodiak and Pribilof Islands. The total size is estimated at 41,474 animals with a CV of 12.9% from surveys in the

period 2000 to 2002. The PBR is 830 animals per year, which is much higher than the estimated mortality and serious injury rate for all commercial fisheries of 0.2 animals per year (Angliss and Outlaw, 2005, p. 247). Prior to the 2002 survey of the Kodiak Island set gillnet fishery the estimated mortality rate for this fishery was 0.25 or more animals per year based on setnetter's reports for 1990 to 1993. A survey in 2001 gave an estimate of 5893 animals in the area with a CV of 22.8% (Angliss and Outlaw, 2005, p. 245).

The western U.S. stock of the Steller sea lion includes animals at and west of Cape Suckling. A minimum population size estimate is 38,513 based on counts of non-pups in 2004 and pups 2001 to 2004. Steller sea lions in Russia are currently part of the estern U.S. stock, but are not included in the minimum population estimate. The PBR is 231 animals per year. The current estimated level of incidental mortality from fisheries is 30.9, which exceeds 10% of the PBR. Also, the estimated level of human-caused mortality from fisheries and the subsistence harvest is 217.9, which is less than the PBR. The stock is currently listed as endangered under the Endangered Species Act and depleted under the MMPA. It is therefore considered to be a strategic stock (Angliss and Outlaw, 2005, p. 7).

Interaction of the fishery with seabirds is a potential concern because approximately 256,000 colonially nesting birds in 192 colonies have been documented on Kodiak Island, as summarized in Appendix A (USFWS, 2002b). The AMMOP supports the collection of data on the incidental injury and mortality of seabirds as well as marine mammals. However, the monitoring of the seabirds in the general area of nets requires more time, background information and expertise than is available with the standard program. As a result, the U.S. Fish and Wildlife Service (FWS) participated in the 2002 survey of the Kodiak Island set gillnet fishery to assist in seabird species identification, and the monitoring of the seabird abundance around the fishery. This was not possible for the 2005 survey.

Fishing Methods and Opening Times

There are many variations in the fishing techniques used in the set gillnet fishery but each permit holder may operate one or two nets with a combined length of 150 fathoms of multifilament gillnet. Often two permit holders will work together in a joint venture arrangement, or a cooperative unit may hold several permits. Most nets are attached to a shore lead up to 80 fathoms long in a straight line to a king buoy offshore, with numerous anchor lines and buoys holding the net in place. The last 25 fathoms is usually formed into a fish trap, which is also called a hook.

The Alaska Department of Fish and Game (ADF&G) manages salmon through the Kodiak Island Salmon Management Plan on a river system basis. They set escapement goals for salmon runs returning to rivers and streams and monitor returns using fish weirs, aerial surveys, gillnet test fisheries, and direct sampling. Based on this information the ADF&G estimates the number of fish returning to each system, and the Management Plan determines which run is used to dictate fishery opening and closing times.

Fish returning to rivers gather in bays and inlets before entering the waterways. Fishers position their nets perpendicular to the shore to channel fish into the webbing of the net and entangle the salmon. As runs progress more fish move into waterways, and a run is said to 'peak' when the highest number of fish gather to move up the river. Different species of salmon and different runs of the same species return during the season. Typically king (Chinook) salmon are the first to return, followed by red (sockeye) in June, humpy (pink) in mid-July, and silver (coho) in late August and September. There are also some chum (dog) salmon runs returning to Zachar Bay in August, and several areas have late runs of red salmon in August and September.

In a typical year the fishery begins on 9 June, when the Kodiak office of the Alaska Department of Fish and Game (ADF&G) opens it by emergency order, based on the Alitak Bay and Westside Kodiak Salmon Management Plans. Traditionally, the Northwest District is open for the majority of June and July, while the Alitak Bay District typically fishes from five to seven out of every ten days. As the runs progress, changing from sockeye to pink salmon in late July, the ADF&G often reduces the length of openers if escapement goals have not been met. Fishing effort begins to reduce in mid to late August as runs begin to decline, and although many areas are open until early October, most fishers have pulled their nets by early September.

In 2002 the Northwest District fisheries opened on June 9, but the fishing effort was very low because of a dispute over the price of salmon. The Alitak Bay District fisheries in the south never opened at all in that year because the salmon did not appear. In 2005 the Northwest District fisheries opened on June 1, with normal fishing. The Alitak Bay fisheries opened on June 5, again with normal fishing.

3. Sampling Methods

The original plan for the observation of the Kodiak Island set gillnet fishery involved random stratified sampling of seven fishery areas. For this purpose the Northwest District was divided into Kupreanof Straits and North Cape, Viekoda Bay, Uganic Bay, and Uyak Bay, while the Alitak District was divided into Olga Bay, Moser Bay and Alitak Bay, defined as follows (Figure 2.1):

KI1A: Kupreanof Straits and North Cape, including the permits in ADFG areas 259-35 to 259-39.

KI1B: Viekoda Bay, including the permits in ADFG area 253-31.

KI1C: Uganic Bay and Uganik Passage, including the permits from Cape Uganik to Cape Kuliuk, in ADFG areas 253-11 to 253-14.

KI2: Uyak Bay, including the permits from Cape Kuliuk to Rocky Point, in ADFG areas 254-10 to 254-40.

KI3: Olga Bay, including the permits in ADFG area 257-40.

KI4, Moser Bay, including permits in ADFG area 257-43, north of a line from the southernmost point of Moser Point west to the northernmost point of Amik Island, and west to the easternmost point of the Kodiak mainland, north of the Little Narrows.

KI5: Alitak Bay, including the permits in ADFG area 257-41.

The total sample effort was planned using Wade's (1999) method. This involved first determining the expected total fishing effort in terms of permit days (the product of the number of permits fished and the fishing time in days). Estimates of the take rates (the numbers of animals caught per permit day) were then produced for all marine mammal species of concern. Finally, the total sampling effort was chosen to ensure, for all of these species, that if the true take rate was equal to the estimate then the probability of observing zero take was small. This showed that a sampling coverage of 5% would be satisfactory for the fishery.

The Alitak District did not open in 2002 so that all of the sampling effort had to be concentrated in the Northwest District. In this district all of the fishing permits were subjected to random selections every two weeks through the fishing season. In effect, the list of permits was put in a random order and, as far as possible, the permit holders were sampled by the AMMOP observers in the order of this list in the two week period following the selection. Joint ventures (a pair of permits) were selected and observed as one unit. In addition, a new randomized list was selected for the last week of fishing to allow for the small number of permits still in use. Fishers were contacted within 24 hours of the

scheduled sampling if meeting arrangements were needed, and if a selected permit holder was not fishing at the required time then the next permit holder on the randomized list was selected instead. Overall, 387 (97%) of sample days were selected using the randomized lists. The other 11 (3%) days were sampled opportunistically because for safety or logistical reasons the randomly selected permit was unavailable and was replaced by a permit that was available to be sampled. Not all of the 398 sample days provided useful data. In some cases the trip was arrested (i.e., the observer was unable to collect data as originally planned because of the circumstances that arose). In all, 384 trips provided data that could be used.

In 2005 the Alitak District was open. In this year each of the fisheries areas Kupreanof Straits and North Cape, Viekoda Bay, Uganic Bay, Uyak Bay, Olga Bay, Moser Bay and Alitak Bay was sampled separately by putting the list of permits in a random order and, as far as possible the AMMOP observers sampled the permits in this order. When a permit from a joint venture was sampled an attempt was made to sample all of the permits in this joint venture on the same day. These other permits were then not sampled again until the list of permits was exhausted. A new random order was then generated for further sampling. In this way, any permit being fished should have been sampled by the time that each randomized list was fully sampled. As in 2002, fishers were contacted within 24 hours of the scheduled sampling if meeting arrangements were needed, and if a selected permit holder was not fishing at the required time then the next permit holder on the randomized list was selected instead. Overall, 420 sample days provided observations on either all or part of the fishing on those days. Only 3 of these days were sampled opportunistically.

The sample unit was a fishing day, with most AMMOP observations made by a single observer in a skiff with a separate operator. At a selected permit holder's site the observer attempted to record data for all picks during the sample day, where a 'pick' (also sometimes called a 'haul') is the process of examining a net and removing any captured fish. A note was made of any picks that could not be observed for any reason, such as bad weather. Set and soak observations were also made when the time and weather allowed, where this refers to watching the net in the water for any interactions with marine mammals and seabirds.

Throughout a trip AMMOP observers recorded all entanglements and deaths of marine mammals and birds related to the fishing gear. During the sample day they also recorded data on environmental variables such as the water depth and temperature, weather and tidal conditions, and gear characteristics such as the mesh size, the net length, the presence of mammal deterrents, soak times, and the net configuration. The Sampling Plan and Sampling Protocols for 2005 are provided in Appendix B, and a full list of the variables recorded by observers in 2002 is provided in Appendix C, with some minor changes in 2005 noted at the end of this appendix. Copies of the 2002 forms are provided in Appendix D.

As noted above, the original plan for the 2002 survey of the fishery was based on the AMMOP observers sampling approximately 5% of the fishing effort, under the management of three team leaders based in field offices in the Northwest District and Alitak Bay District. In addition, there were to be three FWS observers covering about 1-2% of the fishery to collect additional information on bird sightings around the nets and in the fisheries areas. The absence of the Alitak Bay District fishery in 2002 resulted in this plan having to be modified, with all of the observer effort going to the Northwest District fishery. The final outcome in that year was that the coverage in the Northwest District was 7.5% for the NMFS observers and 2.5% for the FWS observers, in terms of the fishing days sampled. The coverage was 6% when account is taken of unobserved fishing within these sample days, and the length of the fishing nets that were observed. It was originally intended that the FWS observers in 2002 would be randomly assigned to the sites being sampled by AMMOP on any given day, with about one third of these sites covered overall. Unfortunately, random assignments turned out to be impractical because of logistical and safety considerations. For example, the FWS observers could only go to sites where the skiff was large enough to safely hold three people.

In 2005 FWS observers were not present during the AMMOP survey, and in this year fishing took place in all fisheries areas. The final outcome was that the coverage was 6.0% overall in terms of the fishing days covered, and 4.9% when account is taken of unobserved fishing during these sampled days, and the length of the fishing nets that were observed.

4. Fishing Effort and Observer Coverage

Table 4.1 shows the estimated fishing effort and the observer coverage for each of the sampled regionss in 2002. Here the total fishing days was calculated by summing the number of fishing permits multiplied by the fraction of these that were in use over the days in open periods. The trips are the number of days sampled. Generally a trip represents the sampling of one permit on one day. However, with joint ventures the other permit or permits involved were sometimes sampled during the same trip. This produced data for more than one permit day.

A permit day is defined as one permit fishing for 24 hours with a net of length 150 fathoms. The number of permit days is less than the number of fishing days because the average length of a net observed for a single permit for trips where all nets were observed was 144.26 fathoms. For this reason, the permit days shown in Table 4.1 are the fishing days multiplied by 144.26/150.00 = 0.962, on the assumption that the average length of the nets fished in all areas was 144.26 fathoms.

The sample effort was calculated taking into account the length of the net being used, whether or not all picks were observed, and the percentage of the fishing nets that were observed during a pick. If all picks were observed on a trip then the formula used for estimating the fishing effort for this trip was

$$\text{Effort} = (\text{Net length in fathoms}/150) \times (\%\ \text{of net observed}/100), \qquad (4.1)$$

where 150 is the maximum net length in fathoms for a single permit. The first factor on the right hand side allows for whether the net length was less than 150 fathoms. This also allows for situations where two permits are sampled, in which case the effort will be approximately twice the usual effort. The second factor on the right hand side allows for the incomplete sampling of individual picks, with the % of net observed being the average for all picks observed on a trip.

Table 4.1 Observer coverage in 2002 based on fishing days sampled and permit days, which take into account net lengths and the proportion of picks observed.

Region[1]	Fishing Days[2]	Trips	Permit Days[2]	Cover	% Cover
1, KI1A	393.6	26	378.6	22.7	6.0
2, KI1B	985.9	72	948.1	61.2	6.5
3, KI1C	1174.8	94	1129.8	80.2	7.1
4, KI2	2560.4	192	2462.4	133.5	5.4
Total	5114.7	384	4919.0	297.6	6.0

[1]Regions are Kupreanof Straits and North Cape (KI1A), Viekoda Bay (KI1B), Uganic Bay (KI1C) , Uyak Bay (KI2), as defined in the text. Olga Bay, Moser Bay and Alitak Bay were not fished in 2002.
[2]See the text for definitions of fishing days, trips and permit days.

The formula for effort was modified for trips where observers did not record data for all of the picks. In these cases the formula used in 2002 was

Effort = 0.858 x (Net length in fathoms/150) x (% of net observed/100). (4.2)

Here the factor 0.858 = 3.453/4.024 reduces the effort to allow for the unobserved picks. This is the ratio of mean number of picks observed for all trips recorded as partially observed (3.453) to the mean number of picks for all trips recorded as fully observed (4.024).

In 2005 there was better information on the total fishing effort as records were kept of the times when individual permit holders were fishing and the length of the nets that they were using. Equations (4.1) and (4.2) were again used to estimate the sample effort in terms of permit days, but with the proportion of observed picks on partial trips re-estimated. Equation (4.1) was still used to calculate the sample effort for trips where all picks were observed. For these completely observed trips the average number of picks observed per permit is 3.24, while for partially observed trips this average is 2.86. The ratio is 2.86/3.24 = 0.881, and therefore for 2005 equation (4.2) for the effort on partially observed trips changed to

Effort = 0.881 x (Net length in fathoms/150) x (% of net observed/100). (4.3)

Table 4.2 shows the observer effort in 2005 in terms of the fishing days sampled, and permit days.

Table 4.2 Observer coverage in 2005 based on fishing days sampled and permit days, which take into account net lengths and the proportion of picks observed.

Region[1]	Fishing Days[2]	Trips	Permit Days[2]	Cover	% Cover
1, KI1A	913.8	42	844.6	30.3	3.6
2, KI1B	1331.1	88	1278.3	74.5	5.8
3, KI1C	1983.3	117	1936.6	98.3	5.1
4, KI2	3910.3	217	3818.2	177.7	4.7
5, KI3	606.9	44	570.2	26.6	4.7
6, KI4	1158.2	76	1158.2	59.1	5.1
7, KI5	1229.1	79	1229.1	68.0	5.5
Total	11132.6	663	10835.2	534.6	4.9

[1]Regions are Kupreanof Straits and North Cape (KI1A), Viekoda Bay (KI1B), Uganic Bay (KI1C) , Uyak Bay (KI2), Olga Bay (KI3), Moser Bay (KI4) and Alitak Bay (KI5), as defined in the text.
[2]See the text for definitions of fishing days, trips and permit days.

Observed Catches of Salmon

Table 4.3 shows the catches by weight of chinook, sockeye, coho, pink and chum salmon recorded by the Alaska Department of fish and Game for the four areas that were fished in 2005. Table 4.3 also shows the overall composition of the retained catches recorded by the AMMOP observers. For all regions and all time periods the Alaska Department of Fish and Game reported that, in terms of weight, the catch harvested using set gillnet gear was 0.2% chinook, 27.4% sockeye, 3.1% coho, 65.0% pink, and 4.3% chum. These percentages are in good agreement with the corresponding percentages of 0.2%, 26.7%, 3.4%, 66.0% and 3.7% for the AMMOP observers. Overall 292.3 tons (4.8% of the total catch) was identified to species by the AMMOP observers. An additional 115.1 tons was described as unknown or mixed salmon. Hence the catch recorded as observed and retained was 292.3 + 115.1 = 407.4 tons. This is 6.7% of the total catch recorded by the Alaska Department of Fish and Game, which is close to but slightly higher than the 6.0% of observer cover calculated on the basis of fishing effort (Table 4.1).

Table 4.3 Catches of five species of salmon in 2002, as recorded by the Alaska Department of Fish and Game and the AMMOP observers.

Region[1]	Chinook Tons[2]	% of Catch[3]	Sockeye Tons	% of Catch	Coho Tons	% of Catch	Pink Tons	% of Catch	Chum Tons	% of Catch	Total Tons
KI1A	0.1	0.1	56.7	23.2	5.8	2.4	168.0	68.8	13.5	5.5	244.0
KI1B	3.1	0.3	320.5	26.3	46.6	3.8	776.8	63.8	70.5	5.8	1217.5
KI1C	2.9	0.2	415.5	21.6	59.0	3.1	1367.7	71.0	82.3	4.3	1927.5
KI2	3.6	0.1	873.2	32.5	76.8	2.9	1637.9	60.9	98.0	3.6	2689.5
Total	9.8	0.2	1665.9	27.4	188.2	3.1	3950.5	65.0	264.3	4.3	6078.6
Observed[4]	0.6	0.2	77.9	26.7	9.9	3.4	193.0	66.0	10.9	3.7	292.3
%[5]	6.2		4.7		5.3		4.9		4.1		4.8

[1]The four regions are the Kupreanof Straits/Central section (KI1A), Viekoda Bay (KI1B), Uganik Bay (KI1C), and Uyak Bay (KI2).
[2]Net tons (2000 lbs).
[3]This column gives the catch for the species as a percentage of the total catch at the time.
[4]The tons of observed catch do not include any recorded as unknown or mixed salmon, and also does not include any discarded salmon.
[5]The % Observed is the percentage of the total catch for the species that was recorded by the AMMOP observers.

Table 4.4 is similar to Table 4.3, but shows the commercial salmon catches from set gillnet fishing for the seven areas sampled in 2005, together with the catches that were observed. For all regions and all time periods the Alaska Department of Fish and Game reported that, in terms of weight, the catch harvested using set gillnet gear was 0.2% chinook, 46.1% sockeye, 6.1% coho, 40.9% pink, and 6.7% chum. These percentages are in fair agreement with the corresponding percentages of 0.4%, 52.8%, 2.8%, 37.9% and 6.1% for the AMMOP observers. Overall 260.8 tons (3.3% of the total catch) was identified to species by the AMMOP observers. An additional 105.9 tons was described as unknown or mixed salmon. Hence the total catch recorded as observed and retained was 260.8 +

105.9 = 366.7 tons. This is 4.6% of the total catch recorded by the Alaska Department of Fish and Game, and is close to the 4.9% of observer cover calculated on the basis of fishing effort (Table 4.2).

Overall for 2002 and 2003 there is therefore reasonable agreement between the observer coverage levels and the salmon catch recorded by the observers.

Table 4.4 Catches of five species of salmon in 2005, as recorded by the Alaska Department of Fish and Game and the AMMOP observers.

Region[1]	Chinook Tons[2]	% of Catch[3]	Sockeye Tons	% of Catch	Coho Tons	% of Catch	Pink Tons	% of Catch	Chum Tons	% of Catch	Total Tons
KI1A	1.5	0.3	186.3	31.9	21.9	3.7	324.7	55.7	49.0	8.4	583.4
KI1B	7.1	0.5	503.3	32.8	135.8	8.8	757.9	49.3	132.0	8.6	1536.0
KI1C	4.1	0.3	508.7	33.6	132.4	8.7	696.7	46.0	171.9	11.4	1513.8
KI2	3.6	0.1	1222.7	45.1	182.3	6.7	1158.0	42.7	146.1	5.4	2712.8
KI3	0.1	0.1	159.8	80.6	3.9	2.0	22.4	11.3	11.9	6.0	198.1
KI4	0.2	0.0	433.0	74.7	7.0	1.2	128.5	22.2	11.2	1.9	579.9
KI5	0.0	0.0	666.4	77.0	5.6	0.6	179.1	20.7	14.5	1.7	865.7
Total	16.7	0.2	3680.2	46.1	488.8	6.1	3267.3	40.9	536.6	6.7	7989.7
Observed[4]	0.9	0.4	137.8	52.8	7.4	2.8	98.8	37.9	15.8	6.1	260.8
%[5]	5.5		3.7		1.5		3.0		3.0		3.3

[1]The seven regions are the Kupreanof Straits/Central section (KI1A), Viekoda Bay (KI1B), Uganik Bay (KI1C), Uyak Bay (KI2), Olga Bay (KI3), Moser Bay (KI4) and Alitak Bay (KI5).
[2]As for Table 4.3. [3]As for Table 4.3. [4]As for Table 4.3. [5]As for Table 4.3.

5. Self-Reporting of Takes

The MMPA's Marine Mammal Authorization Program allows commercial fishing even though takes of marine mammals may occur. However, commercial fishers should report all incidental mortalities or injuries to marine mammals within 48 hours after the end of the fishing trip, or, within 48 hours of the occurrence of a mortality or injury. The Mortality/Injury Reporting Forms were mailed to all Kodiak salmon setnet permit holders, handed out by the observers, and discussed at public meetings. It was also stressed that even when there was an observer on-board, the fisher still needs to report all incidental mortalities or injuries to marine mammals in the usual way.

Only one of the two observed mortalities of marine mammals in 2002 was reported by the fisher (the harbor porpoise on July 30) as it should have been. In addition to the observed takes, there were Mortality/Injury Reports for two dead porpoises (unidentified), and for one dead sea otter incidentally taken in Liganik Bay on July 1.

In 2005 there were three Mortality/Injury Reports from fishers. The two observed harbor porpoise mortalities were reported, and the other report was of a whale with an unknown species that got caught in a net in Uyak Bay on June 29. The fisher cut the net to release the whale, but was not sure about the condition of the whale after it was released.

As discussed in the following section of this report, it is estimated from the observer data that there were 32 harbor porpoises mortalities as a result of fishing in 2002, and 39 harbor porpoise mortalities as a result of fishing in 2005. There were, however, only five Mortality/Injury Reports received from fishers in both years. This strongly suggests that most marine mammal mortalities and injuries are not reported by fishers as they are supposed to be.

6. Ratio Estimation of Takes

The estimation of the total take of marine mammals and birds through interaction with the fishery is based on ratio estimation, with separate estimation for each of the seven regions described above (Kupreanof Straits and North Cape, Viekoda Bay, Uganik Bay, Uyak Bay, Olga Bay, Moser Bay and Alitak Bay). Basically the observer data for a region is used to calculate the take of a species per permit day of fishing. This take per day is then multiplied by the total number of permit days of fishing for the whole season to get the estimated total take.

To be specific, within each region the total fishing effort in permit days (one net of up to 150 fathoms used for one day) is known. This total is denoted by t_e, and is assumed to have a negligible error. Similarly, the total sample (observed) effort in permit days can be estimated. This involves taking into account any picks that were not observed on a sample day, and any parts of nets that were not observed during a pick, as explained in Section 4. The total sample effort in a region is denoted by t_s, and this is again assumed to have a negligible error. Also, within a region the total take (catch) of a marine mammal or bird species is denoted by t_c. The calculated values of t_e and t_s are shown in columns 4 and 5 of Tables 4.1 and 4.2.

Given this notation, the take rate for the species in question is estimated to be

$$r = t_c / t_s, \tag{6.1}$$

where this is a rate per permit day. Then

$$T = r.t_e. \tag{6.2}$$

is an estimate of the total take in the entire region that is equal to the estimated take per permit day times the total permit days of effort in the region.

Equation (6.2) is a ratio estimator. Standard theory (Sheaffer *et al.*, 1990, p. 155) provides an equation for estimating the variance of r, which is

$$Var(r) =[\sum (c_i - r\, e_i)^2 /(n - 1)] (1 / \bar{e}^2) (1 / n) (1 - n / N). \tag{6.3}$$

Here N is the total number of trips that could have been made in the region by the observers, n is the number of trips actually made, c_i is the observed take on the ith trip for the species being considered, e_i is the sampling effort on the ith trip, $\bar{e}$ is the mean sampling effort per trip, and the summation is over the n trips.

Because the total sampling effort T_e is assumed to be known with a negligible error the variance of the estimator of total take from equation (6.2) is simply

$$Var(T) = Var(r)\, t_e^2 \,. \quad (6.4)$$

Hence the estimated percentage coefficient of variation is

$$CV(T) = SE(T) / T, \quad (6.5)$$

where SE(T) is the standard error of T, which is the square root of Var(T). Finally, an approximate 95% confidence interval for the true total take is given by

$$T - 2\,SE(T) \text{ to } T + 2\,SE(T) \quad (6.6)$$

(Sheaffer *et al.*, 1990, p. 155). This interval may be very approximate when the take rate is low. Also, it is appropriate to replace the lower limit with the observed take in cases where the lower limit from equation (6.6) is less than the observed number.

The equations (6.1) to (6.6) apply to the take within one region. For all regions combined the estimated total take is the sum of the estimates for each of the regions. As the estimates for the regions are independent of each other, the variance of the estimated total number seriously injured or dead for all regions is the sum of the variances for the individual regions. Equations (6.5) and (6.6) can be applied with the estimated total for all regions.

Marine Mammal and Bird Take in 2002

Table 6.1 lists the marine mammal and bird takes recorded by the AMMOP observers in 2002. Two harbor porpoises were recorded and these were both released dead. Four sea otters were also recorded, but these were all released alive without serious injuries. A total of 35 birds were recorded, with 11 species (common murre, harlequin duck, horned puffin, least auklet, marbled murrelet, pelagic cormorant, pigeon guillemot, red-faced cormorant, sooty shearwater, thick-billed murre, and tufted puffin). Only three of the birds were released alive. The single least auklet showed moderate decomposition. It is therefore assumed that it died before getting entangled in a net and is not treated as a fisheries take.

Table 6.2 summarizes the results obtained for the estimation of the total take, species by species. For each of the four regions observed in 2002 the table shows the number of animals recorded by observers, the take rate per permit day, the estimated total take, the estimated standard error for the total take, and the CV. The same results are shown for all four regions combined. Also, the estimated total numbers released dead is shown.

For harbor porpoises the estimated take for the whole fishery is 32.2, all dead, with a CV of 67.5%. An approximate 95% confidence interval for the true total take based on equation (6.6) but with the lower limit replaced by the observed take is then from 2 to 76 animals. For sea otters the estimated take for the whole fishery is 62.0, all alive without

serious injuries, with a CV of 58.8%. The approximate 95% confidence interval for the true total take in this case is 4 to 135.

For birds the highest estimated take was for the common murre (estimate 185 with a confidence interval of from 79 to 292 birds, with 82% dead), tufted puffin (estimate 110, with an approximate 95% confidence interval of from 7 to 266 birds, with 86% dead), pigeon guillemot (estimate 76, with an approximate 95% confidence interval of from 11 to 141 birds, all dead), marbled murrelet (estimate 56, with an approximate 95% confidence interval of from 4 to 110 birds, all dead), and red-faced cormorant (estimate 28, with an approximate 95% confidence interval of from 2 to 66 birds, all dead). For the other bird species the estimated take was less than 20 birds (all dead), although because of the low numbers caught the estimates may have quite high sampling errors with estimated CVs are all about 95%. The estimated total take for all bird species is 528 with an approximate 95% confidence interval of from 309 to 747. Overall 91% of the birds were dead when released from nets.

When take occurred during a sampled permit day it was usually one individual of one species. The exceptions were (a) two days when three individuals from different bird species were taken, (b) one day when two individuals from different bird species were taken, (c) one day when two otters and a bird were taken, and (d) one pick in Viekoda Bay when five tufted puffins were taken.

Figure 6.1 illustrates the take rates for the sea otter and harbor porpoise in the four regions being considered, with an indication of whether the estimated take rate in a region was zero, at a low level (greater than zero but less than or equal to 0.04 animals per permit day), or a higher level (greater than 0.04 animals per permit day). For sea otters all interactions with the fishery were seen in Viekoda Bay. For harbor porpoises the higher level was seen in the Kupreanof Straits/Central region, and the lower level in Viekoda Bay.

Figure 6.2 illustrates the take rates for the common murre, tufted puffin, pigeon guillemot and marbled murrelet, which are the four species with the highest estimated take rates. The take rates are relatively high (more than 0.04 birds per permit day) for the common murre in Uganik Bay and Uyak Bay, for the tufted puffin in Viekoda Bay, for pigeon guillemot in the Kupreanof Straits/Central region, and for the marbled murrelet in Uganik Bay. Figure 6.2 also shows the take rates for all bird species in the different regions, with the highest take rate occurring in Uganik Bay.

Table 6.1 Marine mammal and bird takes observed in 2002. The regions are as defined in the text and Table 4.1.

Record	Species	Condition	Region	Disentanglement	Net location		Injury	Age Class*
					Horizontal	Vertical		
1	Sea otter	Alive	2	Removal by untangling	Middle third	Near top third of gear	No external injuries, responsive	Immature
2	Sea otter	Alive	2	Momentary snag with self release	First third	At water surface	No external injuries, responsive	Adult
3	Sea otter	Alive	2	Momentary snag with self release	First third	Near top third of gear	No external injuries, responsive	Immature
4	Sea otter	Alive	2	Removal by untangling	First third	Near top third of gear	No external injuries, responsive	Immature
5	Harbor porpoise	Dead	2	Removal by untangling	Middle third	Middle third of gear	Small lacerations	Adult
6	Harbor porpoise	Dead	1	Removal by untangling	Middle third	Middle third of gear	Small lacerations	Adult
7	Least auklet	Dead	4	Dislodged once out of water	First third	Unknown	Moderate decomposition	AHY
8	Pelagic cormorant	Dead	3	Removal by untangling	First third	Near bottom third of gear	No external injuries, unresponsive	Adult
9	Red-faced cormorant	Dead	3	Dislodged once out of water	Middle third	Middle third of gear	No external injuries, unresponsive	Adult
10	Red-faced cormorant	Dead	3	Removal by untangling	First third	Near bottom third of gear	No external injuries, unresponsive	Immature
11	Harlequin duck	Dead	2	Removal by untangling	First third	Middle third of gear	No external injuries, unresponsive	Adult
12	Pigeon guillemot	Dead	3	Removal by untangling	First third	At water surface	Saturated wet plumage or oiled	Adult
13	Pigeon guillemot	Dead	1	Removal by untangling	First third	Near top third of gear	No external injuries, unresponsive	Adult
14	Pigeon guillemot	Dead	2	Removal by untangling	First third	Near top third of gear	Saturated wet plumage or oiled	AHY
15	Pigeon guillemot	Dead	3	Removal by untangling	Middle third	Unknown	Saturated wet plumage or oiled	Juvenile
16	Pigeon guillemot	Dead	2	Removal by untangling	Middle third	Near top third of gear	No external injuries, unresponsive	Juvenile
17	Marbled murrelet	Dead	3	Removal by untangling	Middle third	Middle third of gear	Saturated wet plumage or oiled	AHY
18	Marbled murrelet	Dead	3	Dislodged once out of water	Middle third	At water surface	No external injuries, unresponsive	AHY
19	Marbled murrelet	Dead	3	Removal by untangling	Middle third	Near top third of gear	Large wounds & excessive bleeding	Adult
20	Marbled murrelet	Dead	3	Removal by untangling	Middle third	Unknown	No external injuries, unresponsive	Adult
21	Common murre	Alive	3	Removal by untangling	Final third	Near top third of gear	No external injuries, responsive	Unknown
22	Common murre	Alive	4	Removal by untangling	Final third	At water surface	Unknown	AHY
23	Common murre	Dead	4	Removal by untangling	Middle third	Unknown	Small lacerations, missing plumage	AHY
24	Common murre	Dead	4	Dislodged once out of water	Middle third	Middle third of gear	Saturated wet plumage or oiled	AHY
25	Common murre	Dead	4	Removal by untangling	Middle third	Unknown	No external injuries, unresponsive	AHY
26	Common murre	Dead	3	Removal by untangling	Middle third	Middle third of gear	Saturated wet plumage or oiled	AHY
27	Common murre	Dead	3	Removal by untangling	Middle third	Unknown	Saturated wet plumage or oiled	AHY
28	Common murre	Dead	4	Removal by untangling	First third	Unknown	Saturated wet plumage or oiled	Adult
29	Common murre	Dead	4	Removal by untangling	Middle third	Near top third of gear	No external injuries, unresponsive	AHY
30	Common murre	Dead	3	Unknown	Unknown	Unknown	Unknown	Unknown
31	Common murre	Dead	4	Removal by untangling	Middle third	Near bottom third of gear	Saturated wet plumage or oiled	AHY
32	Thick-billed murre	Dead	3	Removal by untangling	First third	Middle third of gear	Saturated wet plumage or oiled	AHY
33	Horned puffin	Dead	3	Removal by untangling	First third	Middle third of gear	Saturated wet plumage or oiled	AHY
34	Tufted puffin	Alive	3	Removal by untangling	First third	Near top third of gear	No external injuries, responsive	AHY
35	Tufted puffin	Dead	2	Removal by untangling	First third	Unknown	No external injuries, unresponsive	AHY
36	Tufted puffin	Dead	2	Removal by untangling	First third	Unknown	No external injuries, unresponsive	AHY
37	Tufted puffin	Dead	2	Removal by untangling	First third	Unknown	No external injuries, unresponsive	AHY
38	Tufted puffin	Dead	2	Removal by untangling	First third	Unknown	No external injuries, unresponsive	AHY
39	Tufted puffin	Dead	2	Removal by untangling	First third	Unknown	No external injuries, unresponsive	AHY
40	Tufted puffin	Dead	4	Removal by untangling	First third	At water surface	No external injuries, unresponsive	AHY
41	Sooty shearwater	Dead	3	Removal by untangling	First third	Near top third of gear	No external injuries, unresponsive	AHY

*AHY = after hatch year birds.

Table 6.2 Observed take rates (the number of animals divided by the fishing effort in permit days) and the estimated total takes, by fishing regions, with estimated standard errors and coefficients of variation for the total take estimates, for 2002.

Region*		Sea Otter	Harbor Porpoise	Pelagic Cormorant	Red-faced Cormorant	Harlequin Duck	Pigeon Guillemot	Marbled Murrelet	Common Murre	Thick-Billed Murre	Horned Puffin	Tufted Puffin	Sooty Shear-water	All Birds
KI1A	Take	0	1	0	0	0	1	0	0	0	0	0	0	1
	Take rate	0.000	0.042	0.000	0.000	0.000	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.042
	Est Take	0.0	16.7	0.0	0.0	0.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	16.7
	Est SE	0.0	15.8	0.0	0.0	0.0	16.1	0.0	0.0	0.0	0.0	0.0	0.0	16.1
	CV (%)		94.4				96.7							96.7
KI1B	Take	4	1	0	0	1	2	0	0	0	0	5	0	8
	Take rate	0.063	0.016	0.000	0.000	0.016	0.031	0.000	0.000	0.000	0.000	0.079	0.000	0.126
	Est Take	62.0	15.5	0.0	0.0	15.5	31.0	0.0	0.0	0.0	0.0	77.5	0.0	123.9
	Est SE	36.4	15.0	0.0	0.0	14.9	20.9	0.0	0.0	0.0	0.0	74.7	0.0	79.0
	CV (%)	58.8	96.6			96.4	67.3					96.5		63.7
KI1C	Take	0	0	1	2	0	2	4	4	1	1	1	1	17
	Take rate	0.000	0.000	0.012	0.024	0.000	0.024	0.048	0.048	0.012	0.012	0.012	0.012	0.204
	Est Take	0.0	0.0	14.1	28.2	0.0	28.2	56.4	56.4	14.1	14.1	14.1	14.1	239.6
	Est SE	0.0	0.0	13.4	18.9	0.0	19.0	26.9	26.4	13.5	13.3	13.5	13.5	55.2
	CV (%)			95.1	67.1		67.6	47.6	46.8	96.0	94.6	96.0	95.8	23.0
KI2	Take	0	0	0	0	0	0	0	7	0	0	1	0	8
	Take rate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.007	0.000	0.058
	Est Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	129.1	0.0	0.0	18.4	0.0	147.5
	Est SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.3	0.0	0.0	17.8	0.0	49.6
	CV (%)								35.9			96.4		33.6
All	Take	4	2	1	2	1	5	4	11	1	1	7	1	34
	Take rate	0.013	0.006	0.003	0.006	0.003	0.016	0.013	0.036	0.003	0.003	0.023	0.003	0.110
	Est Take	62.0	32.2	14.1	28.2	15.5	75.9	56.4	185.4	14.1	14.1	110.0	14.1	527.7
	Est SE	36.4	21.7	13.4	18.9	14.9	32.5	26.9	53.3	13.5	13.3	78.0	13.5	109.6
	CV (%)	58.8	67.5	95.1	67.1	96.4	42.9	47.6	28.8	96.0	94.6	70.9	95.8	20.8
Estimated number seriously injured or dead		None	All	All	All	All	All	All	151.7	All	All	94.3	All	478.3

* The regions are defined in Section 3 of this report.

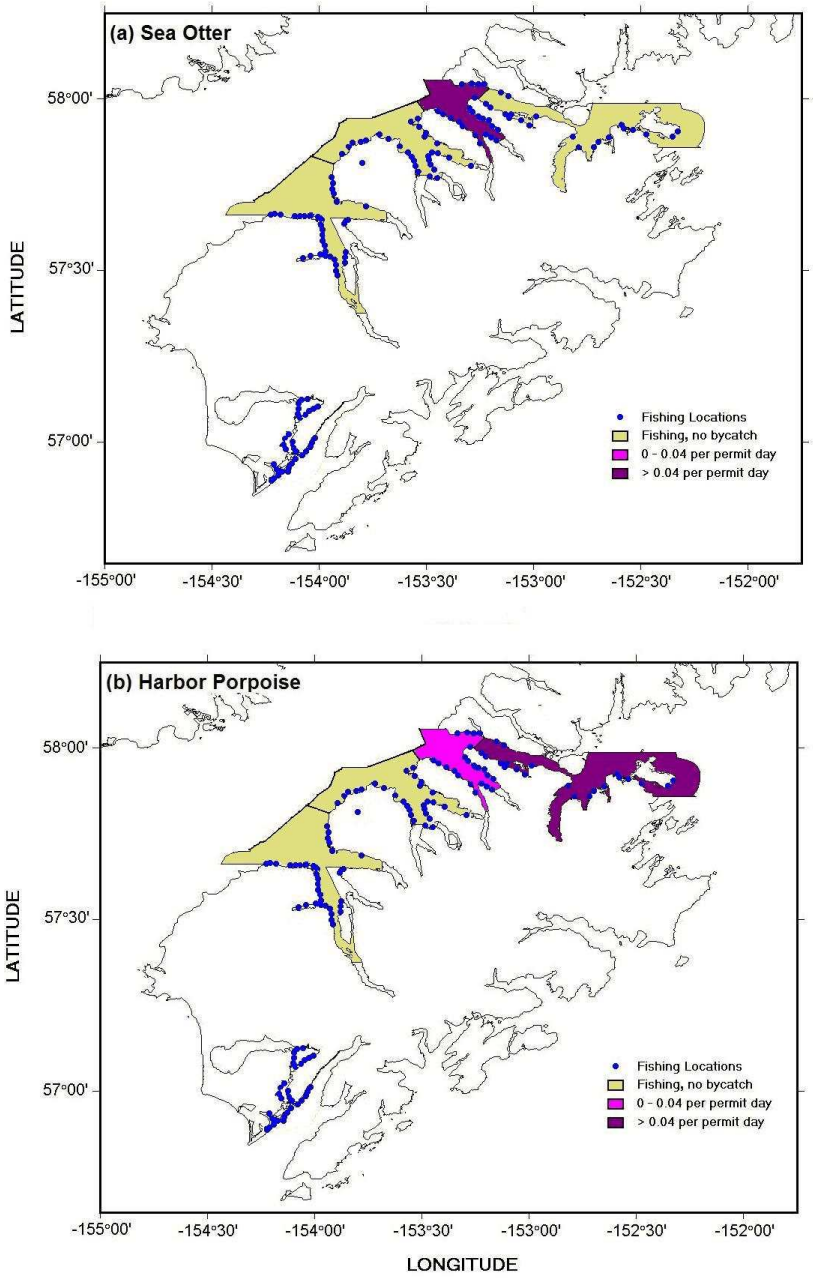


Figure 6.1 Take rates for sea otters and harbor porpoises in 2002 (classified as none, 0.00 to 0.04 per permit day, and more than 0.04 animals per permit day) in the four regions fished that year. The locations where setnet permits may be fished are also indicated. All sea otters were released alive and uninjured but all harbor porpoise were released dead.

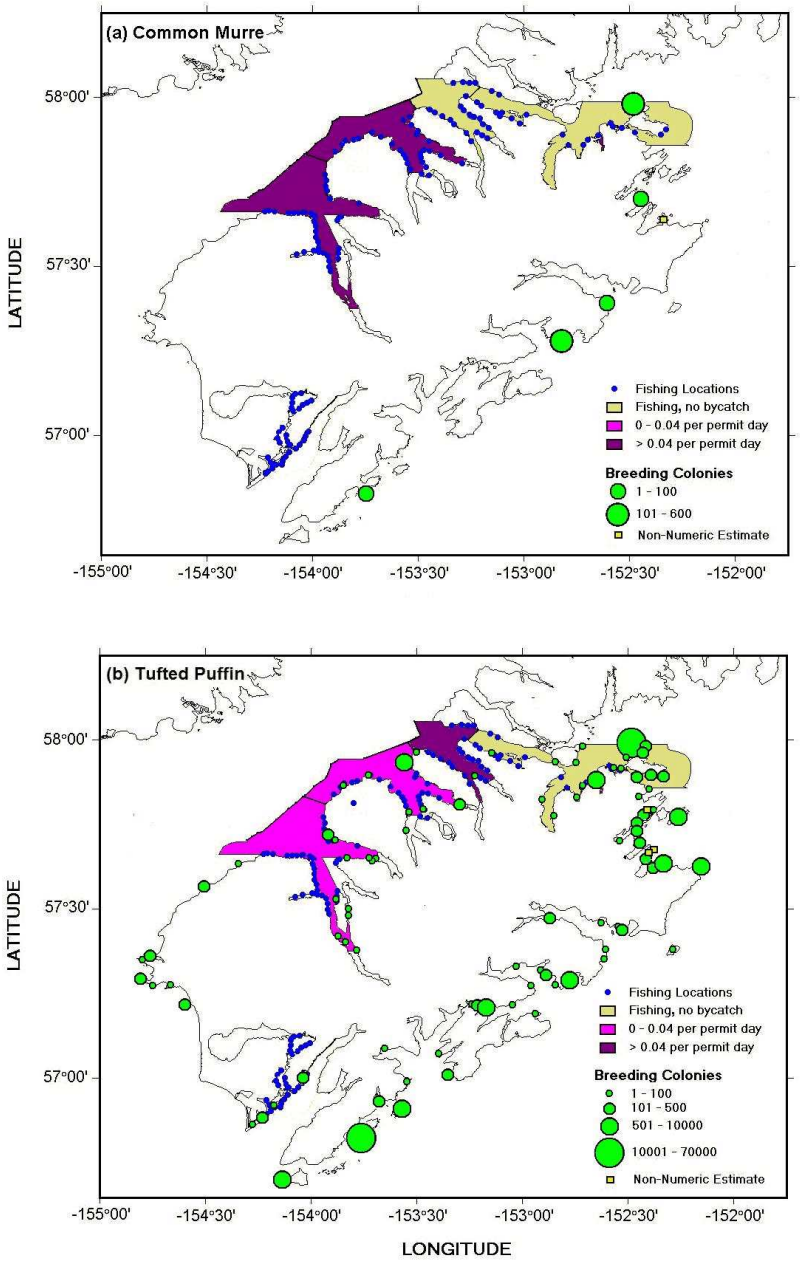
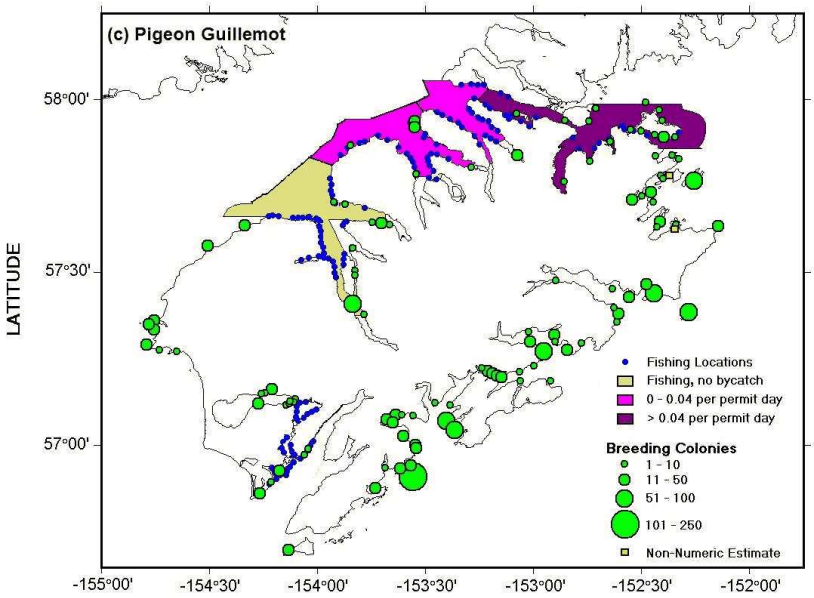


Figure 6.2 Take rates in 2002 (classified as none, 0.00 to 0.04 per permit day, and more than 0.04 animals per permit day for the individual species) in the four study regions for the common murre, tufted puffin, pigeon guillemot and marbled murrelet. The locations where setnet permits may be fished are also indicated, as are the locations and sizes of colonies for the first three species. Take rates for all birds are also shown in part (e) of the figure. Overall, 82% of common murres, 86% of tufted puffins, 100% of pigeon guillemots, 100% of marbled murrelets, and 91% of all birds are estimated to be dead on release.



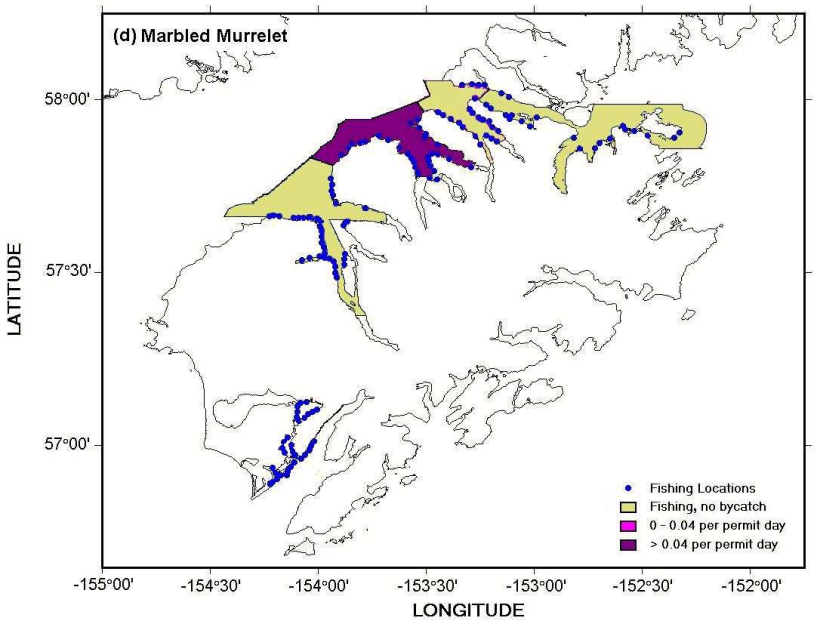


Figure 6.2, Continued

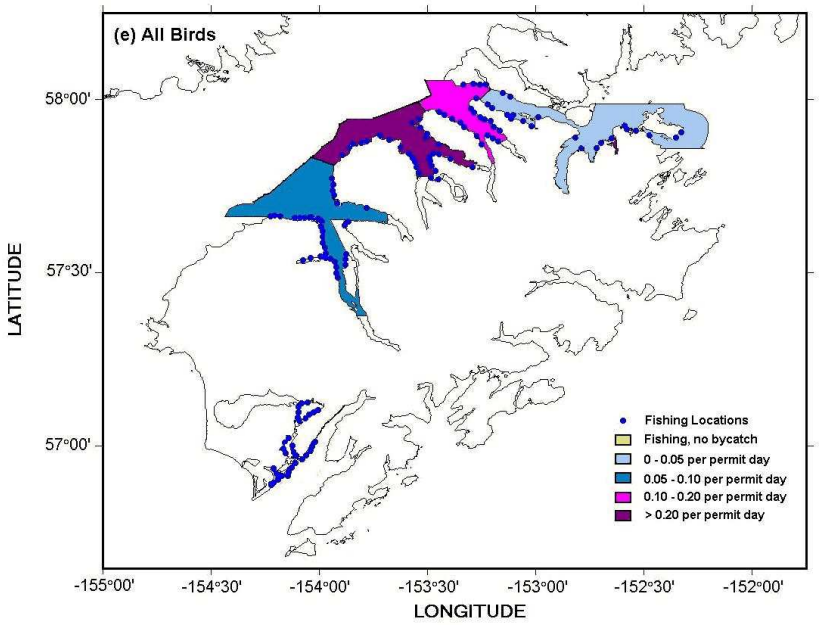


Figure 6.2, Continued.

Marine Mammal and Bird Take in 2005

Table 6.3 lists the marine mammal and bird take recorded by the AMMOP observers in 2005. Two harbor porpoises were recorded, but these were the only mammals that were observed with death or serious injury involved. An otter of an unknown species had a brief interaction with nets but was not injured. A total of 55 birds were recorded, with nine species (common murre, harlequin duck, Kittlitz's murrelet, marbled murrelet, pelagic cormorant, pigeon guillemot, thick-billed murre, tufted puffin, and white-winged scoter). All were released dead.

Table 6.4 summarizes the results obtained for the estimation of the total take, species by species. For each of the seven regions observed in 2005 the table shows the number of animals recorded as take, the take rate per permit day, the estimated total take, the estimated standard error for the total take, and the CV.

The estimated total take of dead harbor porpoises is 39, with an approximate 95% confidence interval from 2 to 94. No estimates are provided based on the otter shown in Table 6.3 because the species is unknown and is unknown and it was only snagged in a net briefly before it released itself.

Table 6.3 Marine mammal and bird takes observed in 2005. The regions are as defined in the text and Table 4.2.

Record	Species	Condition	Region	Disentanglement	Net Location		Injury
					Horizontal	Vertical	
1	Otter, Unknown	Alive	1	Momentary snag with self release	First third of gear	Near top third of gear	No external injuries, responsive
2	Harbor Porpoise	Dead	3	Dislodged once out of water	Final third of gear	Near top third of gear	No external injuries, unresponsive
3	Harbor Porpoise	Dead	3	Removal by untangling	First third of gear	Middle third of gear	Small lacerations, missing plumage (birds)
4	Pelagic Cormorant	Dead	7	Removal by untangling	First third of gear	Unknown	No external injuries, unresponsive
5	Pelagic Cormorant	Dead	3	Dislodged once out of water	First third of gear	Middle third of gear	No external injuries, unresponsive
6	Pelagic Cormorant	Dead	3	Removal by untangling	First third of gear	Near top third of gear	No external injuries, unresponsive
7	Pelagic Cormorant	Dead	7	Dislodged once out of water	Middle third of gear	Unknown	No external injuries, unresponsive
8	Pelagic Cormorant	Dead	7	Removal by untangling	Middle third of gear	Near bottom third of gear	Small lacerations, missing plumage (birds)
9	Pelagic Cormorant	Dead	2	Removal by untangling	Middle third of gear	Unknown	Saturated wet plumage (birds) or oiled
10	Pelagic Cormorant	Dead	3	Removal by untangling	First third of gear	Near top third of gear	No external injuries, unresponsive
11	Pelagic Cormorant	Dead	3	Removal by untangling	First third of gear	Near top third of gear	No external injuries, unresponsive
12	Pelagic Cormorant	Dead	1	Removal by untangling	First third of gear	Near top third of gear	No external injuries, unresponsive
13	Harlequin Duck	Dead	3	Removal by untangling	Middle third of gear	Near top third of gear	No external injuries, unresponsive
14	Pigeon Guillemot	Dead	7	Dislodged once out of water	Middle third of gear	Middle third of gear	No external injuries, unresponsive
15	Pigeon Guillemot	Dead	3	Removal by untangling	Final third of gear	Near top third of gear	No external injuries, unresponsive
16	Pigeon Guillemot	Dead	3	Removal by untangling	First third of gear	Near top third of gear	No external injuries, unresponsive
17	Pigeon Guillemot	Dead	4	Dislodged once out of water	Middle third of gear	Near top third of gear	No external injuries, unresponsive
18	Pigeon Guillemot	Dead	4	Released at a point unknown	First third of gear	Unknown	No external injuries, unresponsive
19	Pigeon Guillemot	Dead	2	Removal by untangling	Middle third of gear	Unknown	Saturated wet plumage (birds) or oiled
20	Common Murre	Dead	7	Removal by untangling	First third of gear	Unknown	No external injuries, unresponsive
21	Common Murre	Dead	3	Dislodged once out of water	Final third of gear	Near bottom third of gear	No external injuries, unresponsive
22	Common Murre	Dead	4	Removal by untangling	Unknown	Unknown	No external injuries, unresponsive
23	Common Murre	Dead	3	Dislodged once out of water	Final third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled
24	Common Murre	Dead	3	Dislodged once out of water	Final third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled
25	Common Murre	Dead	3	Dislodged once out of water	Final third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled
26	Common Murre	Dead	3	Dislodged once out of water	Final third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled
27	Common Murre	Dead	3	Dislodged once out of water	Final third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled
28	Common Murre	Dead	3	Dislodged once out of water	Final third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled
29	Common Murre	Dead	3	Dislodged once out of water	Final third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled
30	Common Murre	Dead	3	Dislodged once out of water	Middle third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled

Table 6.3 Continued

Record	Species	Condition	Region	Disentanglement	Net Location		Injury
					Horizontal	Vertical	
31	Common Murre	Dead	2	Removal by untangling	Final third of gear	Near top third of gear	No external injuries, unresponsive
32	Common Murre	Dead	3	Dislodged once out of water	Final third of gear	Middle third of gear	No external injuries, unresponsive
33	Common Murre	Dead	3	Removal by untangling	Final third of gear	Near top third of gear	No external injuries, unresponsive
34	Common Murre	Dead	2	Removal by untangling	Unknown	Unknown	Saturated wet plumage (birds) or oiled
35	Common Murre	Dead	2	Removal by untangling	Unknown	Unknown	Saturated wet plumage (birds) or oiled
36	Common Murre	Dead	3	Removal by untangling	Final third of gear	Near top third of gear	No external injuries, unresponsive
37	Common Murre	Dead	3	Removal by untangling	Final third of gear	Unknown	No external injuries, unresponsive
38	Common Murre	Dead	3	Removal by untangling	First third of gear	Unknown	No external injuries, unresponsive
39	Common Murre	Dead	4	Removal by untangling	Final third of gear	Unknown	No external injuries, unresponsive
40	Common Murre	Dead	4	Removal by untangling	First third of gear	Unknown	Saturated wet plumage (birds) or oiled
41	Common Murre	Dead	7	Removal by untangling	Final third of gear	Near top third of gear	No external injuries, unresponsive
42	Common Murre	Dead	2	Removal by untangling	Final third of gear	Near top third of gear	No external injuries, unresponsive
43	Common Murre	Dead	2	Removal by untangling	Middle third of gear	Near top third of gear	No external injuries, unresponsive
44	Common Murre	Dead	4	Dislodged once out of water	Final third of gear	Near top third of gear	Unknown
45	Thick-Billed Murre	Dead	3	Removal by untangling	First third of gear	Unknown	No external injuries, unresponsive
46	Kittlitz's Murrelet	Dead	7	Removal by untangling	Final third of gear	Near top third of gear	No external injuries, unresponsive
47	Marbled Murrelet	Dead	3	Removal by untangling	Final third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled
48	Marbled Murrelet	Dead	1	Removal with cutting animal	First third of gear	Middle third of gear	Unknown
49	Marbled Murrelet	Dead	1	Removal by untangling	First third of gear	Middle third of gear	No external injuries, unresponsive
50	Marbled Murrelet	Dead	1	Removal by untangling	First third of gear	Near bottom third of gear	No external injuries, unresponsive
51	Marbled Murrelet	Dead	3	Removal by untangling	First third of gear	Near top third of gear	No external injuries, unresponsive
52	Marbled Murrelet	Dead	3	Dislodged once out of water	First third of gear	Near top third of gear	No external injuries, unresponsive
53	Tufted Puffin	Dead	3	Dislodged once out of water	Final third of gear	Middle third of gear	Saturated wet plumage (birds) or oiled
54	Tufted Puffin	Dead	2	Removal by untangling	Middle third of gear	Middle third of gear	No external injuries, unresponsive
55	Tufted Puffin	Dead	3	Removal by untangling	Middle third of gear	Unknown	No external injuries, unresponsive
56	Tufted Puffin	Dead	3	Removal by untangling	First third of gear	Unknown	No external injuries, unresponsive
57	Tufted Puffin	Dead	3	Removal by untangling	Middle third of gear	Near top third of gear	No external injuries, unresponsive
58	White-Winged Scoter	Dead	4	Dislodged once out of water	Middle third of gear	Near top third of gear	Saturated wet plumage (birds) or oiled

Table 6.4 Observed take rates (the number of animals divided by the fishing effort in permit days) and the estimated total takes, by fishing regions, with estimated standard errors and coefficients of variation for the total take estimates, for 2005.

Region*		Harbor Porpoise	Unknown Otter	Pelagic Cormorant	Harlequin Duck	Pigeon Guillemot	Marbled Murrelet	Kittlitz's Murrelet	Common Murre	Thick-billed Murre	Tufted Puffin	White-winged Scoter	All Birds
KI1A	Take	0	1	1	0	0	3	0	0	0	0	0	4
	Take Rate	0	0.033	0.033	0.000	0.000	0.099	0	0	0.000	0.000	0.000	0.132
	Est. Take	0	27.8	27.8	0.0	0.0	83.5	0.0	0	0.0	0.0	0.0	111.4
	SE	0	27.1	27.0	0.0	0.0	59.2	0.0	0	0.0	0.0	0.0	65.1
	CV (%)		97.2	97.0			70.8						58.4
KI1B	Take	0	0	1	0	1	0	0	5	0	1	0	8
	Take Rate	0	0	0.013	0.000	0.013	0.000	0.000	0.067	0.000	0.013	0.000	0.107
	Est. Take	0	0	17.2	0.0	17.2	0.0	0.0	85.8	0.0	17.2	0.0	137.2
	SE	0	0	16.5	0.0	16.5	0.0	0.0	42.1	0.0	16.8	0.0	51
	CV (%)			96.3		96.3			49.2		97.7		37.2
KI1C	Take	2	0	4	1	2	3	0	14	1	4	0	29
	Take Rate	0.02	0	0.041	0.010	0.020	0.031	0.000	0.142	0.010	0.041	0.000	0.295
	Est. Take	39.4	0	78.8	19.7	39.4	59.1	0.0	275.7	19.7	78.8	0.0	571.1
	SE	27.1	0	46.5	19.0	26.8	32.2	0.0	142.8	19.3	37.9	0.0	162.7
	CV (%)	68.9		59.1	96.7	68.1	54.6		51.8	97.8	48.1		28.5
KI2	Take	0	0	0	0	2	0	0	4	0	0	1	7
	Take Rate	0	0	0.000	0.000	0.011	0.000	0.000	0.023	0.000	0.000	0.006	0.039
	Est. Take	0	0	0.0	0.0	43.0	0.0	0.0	85.9	0.0	0.0	21.5	150.4
	SE	0	0	0.0	0.0	29.8	0.0	0.0	41.4	0.0	0.0	21.1	55.2
	CV (%)					69.3			48.2			98.1	36.7
KI3	Take	0	0	0	0	0	0	0	0	0	0	0	0
	Take Rate	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	Est. Take	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	SE	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
	CV (%)												
KI4	Take	0	0	0	0	0	0	0	0	0	0	0	0
	Take Rate	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	Est. Take	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	SE	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	CV (%)												
KI5	Take	0	0	3	0	1	0	1	2	0	0	0	7
	Take Rate	0	0	0.044	0.000	0.015	0.000	0.015	0.029	0.000	0.000	0.000	0.103
	Est. Take	0	0	54.2	0.0	18.1	0.0	18.1	36.1	0.0	0.0	0.0	126.5
	SE	0	0	27.1	0.0	16.6	0.0	16.8	22.6	0.0	0.0	0.0	42.4
	CV (%)			53.1		97.3		98.4	66.2				33.5
All	Take	2	1	9	1	6	6	1	25	1	5	1	55
	Take Rate	0.004	0.002	0.017	0.002	0.011	0.011	0.002	0.047	0.002	0.009	0.002	0.103
	Est. Take	39.4	27.8	178.0	19.7	117.6	142.6	18.1	483.5	19.7	95.9	21.5	1096.6
	SE	27.1	27.1	62.5	19.0	46.4	67.4	16.8	156.2	19.3	41.4	21.1	195.4
	CV (%)	68.9	97.2	35.7	96.7	39.5	47.3	92.7	32.3	97.8	43.2	98.1	17.8

*The regions are defined on Section 3 of this report.

For birds the highest estimated mortality rate is for common murres (estimate 481, with an approximate 95% confidence interval of from 169 to 794), pelagic cormorants (estimate 175, with an approximate 95% confidence interval of from 50 to 300), marbled murrelets (estimate 143, with an approximate 95% confidence interval of from 8 to 277), pigeon guillemots (estimate 117, with an approximate 95% confidence interval of from 24 to 209), and tufted puffins (estimate 96, with an approximate 95% confidence interval of from 13 to 179). For the other bird species the estimated mortality rates are less than 25 birds, although because of the low numbers caught the estimates have quite high sampling errors with estimated CVs of 97% or more. For all birds the estimated mortality rate through interactions with the fishery is estimated to be 1089 with an approximate 95% confidence interval from 699 to 1480.

When take occurred during a sampled permit day it was usually one bird or mammal. The exceptions were (a) one day when four birds (three species) were taken, (b) six days when two birds (one or two species) were taken, and (c) one day when seven common murres were taken in Uganik Bay.

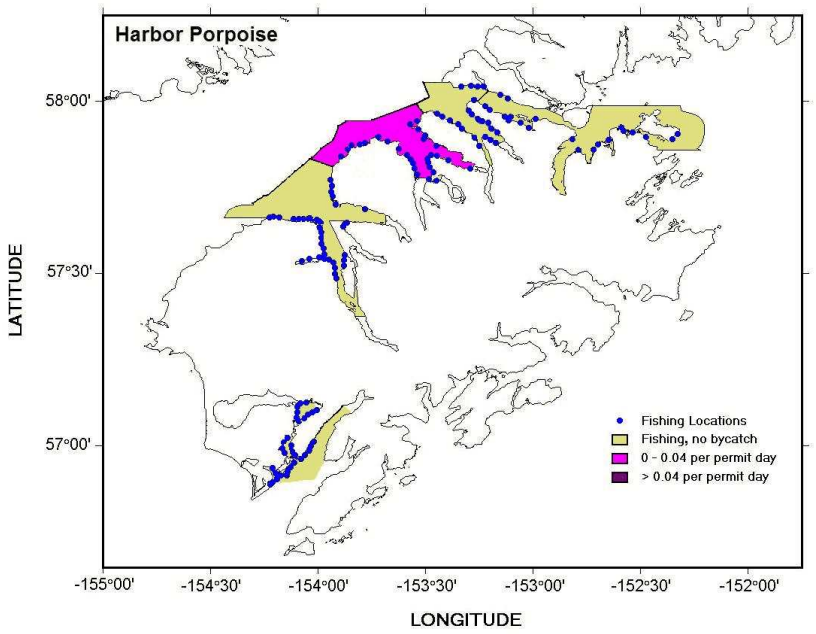


Figure 6.3 Harbor porpoise take rates in 2005 (classified as none, 0.00 to 0.04 per permit day, and more than 0.04 animals per permit day) in the seven regions. The locations where setnet permits may be fished are also indicated. All harbor porpoises were released dead.

Figure 6.3 illustrates the take rates for the harbor porpoise in the seven regions being considered. Figure 6.4 illustrates the take rates for the common murres, pelagic cormorants, marbled murrelets, pigeon guillemots, and tufted puffins, which are the five species with the highest estimated take rates. Figure 6.4 also illustrates the take rates in different regions for all bird species. The take rates are relatively high (more than 0.04 birds per permit day) for marbled murrelets in Kupreanof Straits, common murres in

Viekoda Bay, pelagic cormorants and common murres in Uganik Bay, and pelagic cormorants in Alitak Bay.

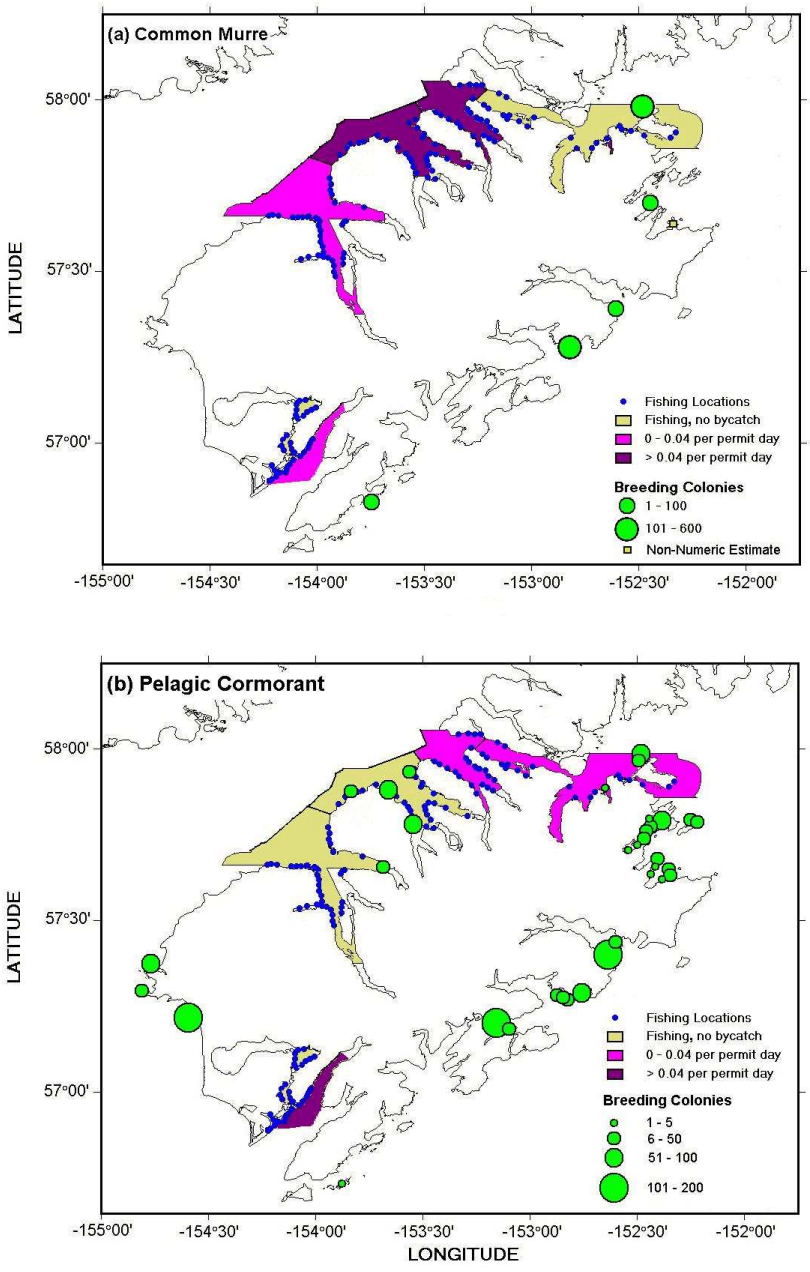
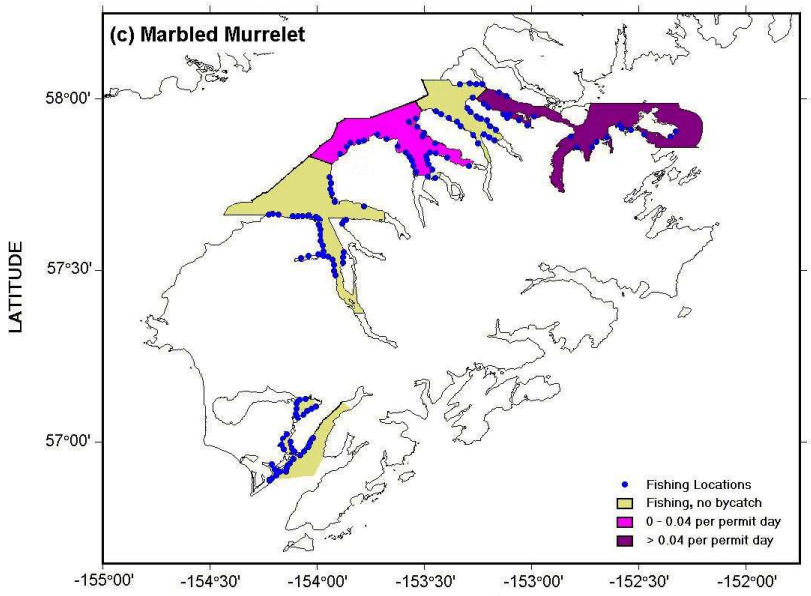


Figure 6.4 Take rates in 2005 in the seven study regions for common murres, pelagic cormorants, marbled murrelets, pigeon guillemots, tufted puffins, and all birds. All birds were released dead in 2005.



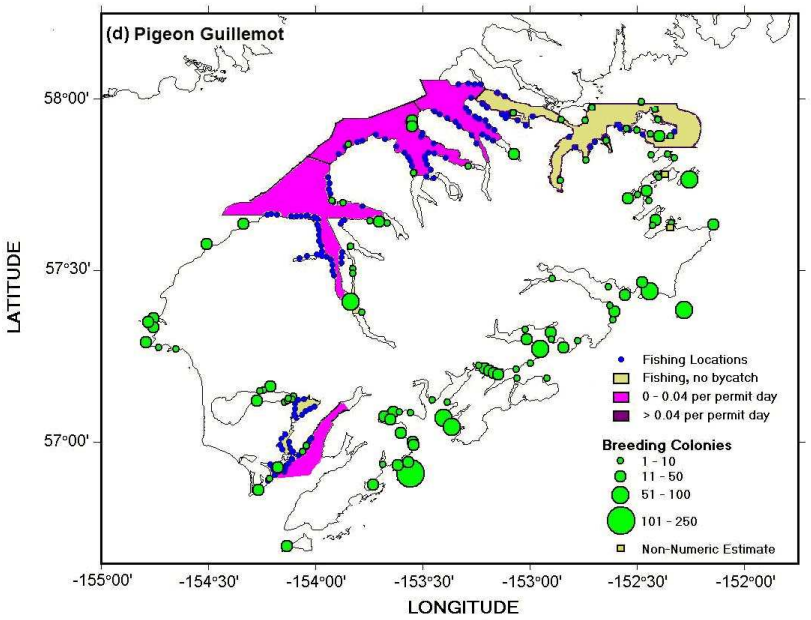


Figure 6.4, Continued

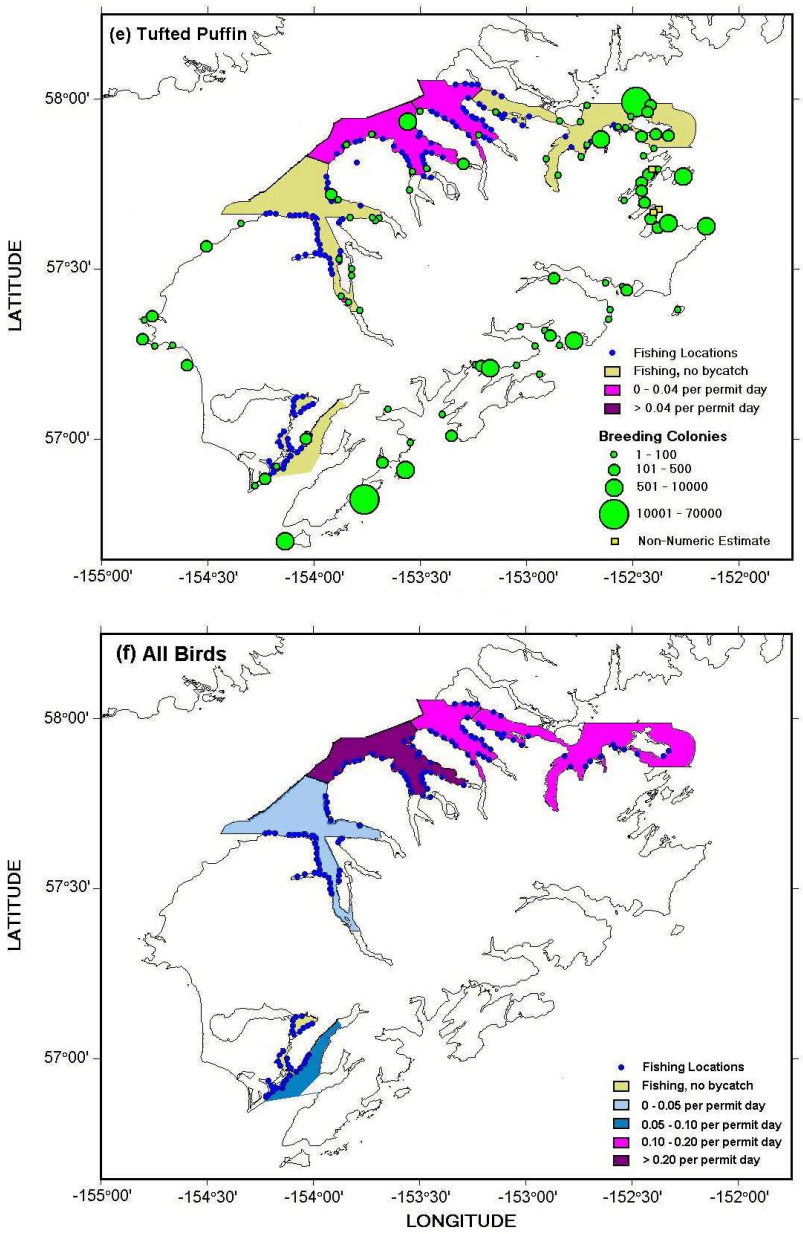


Figure 6.4, Continued

7. Marine Mammal and Bird Sightings

Marine Mammal Sightings in 2002

In 2002 observers recorded sightings of marine mammals both in the usual course of watching nets and also casually at other times. They also commented on the behavior of the animals. The observer's comments are recorded in Appendix E. The observers did not record resightings, so that if they saw the same animal again at a later time then this was not recorded. In cases where they were not sure whether it was a new animal they commented on this. The recorded distance of the mammals was for the initial sighting.

There are many comments on the behavior of sea otters, and a few comments on the behavior of river or unidentified otters. Although otters apparently often swim over or under the fishing nets, there are only three comments (on 1 July, 15 July and 11 August) indicating that the otters were eating fish in the nets. Two of these comments concerned river otters and the other was concerned with an unidentified otter. One further comment (on 29 July) concerns a sea otter getting entangled in the gear for about ten seconds.

There are a few comments on Dall's porpoises, more on harbor porpoises, and two comments on unidentified porpoises or dolphins. In most cases the animals were not close to the nets, and there are no records of interactions with the gear.

There are frequent comments on the behavior of Steller sea lions. Many of these indicate aggressive behavior by the animals, with them taking many fish from the nets, and throwing these around in the sea. Often fishers seem to have had considerable difficulties with these animals and sometimes sent them off with seal bombs. One observation (on 17 July at 1304) is of sea lions apparently herding fish into the net. Although they were eating the fish they may also have been increasing the catch by their behavior.

There are a few comments on unidentified seal or other sightings, and many more comments on harbor seal behavior. These animals were often seen quite close to nets, and sometimes swam under nets. There are only four records of harbor seals feeding on fish from the nets (two on 30 June and two on 25 July).

There are also a large number of comments on whale sightings. These were usually a considerable distance from nets, with no possibility of an interaction, and are not recorded in Appendix E. However, sightings 50m or less from nets were recorded (on 22 July, 25 July, 2 August and 17 August).

Table 7.1 shows a summary of the mammal sightings in four distance classes 0m (touching the gear), 1 to 10m, 11 to 100m, and greater than 100m. The results are shown separately for set/soak watches and haul watches, with the set and soak watches combined because there were only 35 set watches, compared with 966 soak watches and 1488 haul watches.

Table 7.1 Summary of mammal sightings with results shown separately for set or soak watches and haul watches, and also for for distance of the animal from the fishing gear. The counts are the total numbers of animals seen for all watches of the type stated, in the distance range stated. The per hour values are the counts divided by the total watch times.

Distance from Gear	0m		1 - 10m		11 - 100m		> 100m	
Sightings for 755.0 Hours of Set or Soak Watches								
	Count	Per Hour	Count	Per Hour	Count	Per Hour	Count	Per Hour
River Otter	10	0.013	11	0.015	4	0.005	0	0.000
Sea Otter	51	0.068	26	0.034	94	0.125	55	0.073
Dall's Porpoise	0	0.000	0	0.000	4	0.005	0	0.000
Harbor Porpoise	0	0.000	3	0.004	16	0.021	19	0.025
Steller Sea Lion	98	0.130	46	0.061	22	0.029	9	0.012
Harbor Seal	4	0.005	15	0.020	31	0.041	5	0.007
Small Mammal*	1	0.001	0	0.000	3	0.004	0	0.000
Baleen Whale	0	0.000	0	0.000	2	0.003	11	0.015
Fin Whale	0	0.000	0	0.000	1	0.001	37	0.049
Humpback Whale	0	0.000	0	0.000	0	0.000	9	0.012
Sei Whale	0	0.000	0	0.000	0	0.000	1	0.001
Whale*	0	0.000	0	0.000	3	0.004	35	0.046
Sightings From 991.8 Hours of Haul Watches								
	Count	Per Hour	Count	Per Hour	Count	Per Hour	Count	Per Hour
River Otter	2	0.002	0	0.000	0	0.000	0	0.000
Sea Otter	19	0.019	13	0.013	42	0.042	15	0.015
Dall's Porpoise	0	0.000	0	0.000	0	0.000	0	0.000
Harbor Porpoise	0	0.000	2	0.002	11	0.011	4	0.004
Steller Sea Lion	33	0.033	20	0.020	10	0.010	0	0.000
Harbor Seal	3	0.003	4	0.004	6	0.006	0	0.000
Small Mammal*	0	0.000	2	0.002	0	0.000	1	0.001
Baleen Whale	0	0.000	0	0.000	0	0.000	0	0.000
Fin Whale	0	0.000	0	0.000	0	0.000	13	0.013
Humpback Whale	0	0.000	1	0.001	0	0.000	1	0.001
Sei Whale	0	0.000	0	0.000	0	0.000	0	0.000
Whale*	0	0.000	0	0.000	0	0.000	5	0.005

*Unidentified sightings.

The most commonly seen animals were sea otters and Steller sea lions, with the sea otter sightings tending to be from 10 to 100m from the gear and the sea lion sightings tending to be very close to the gear or touching it. Other mammals sighted quite often were river otters (during set or soak watches), harbor porpoises (usually some distance from the gear), harbor seals (also usually some distance from the gear), and whales (far from the gear). These observations are consistent with the observer's comments about the behavior of the different species.

The counts in Table 7.1 were analyzed using log-linear models (McCullagh and Nelder, 1989), excluding the results for species with very low counts (Dall's porpoises and sei whales) and the unidentified small mammals and whales. The analyses were carried out using GenStat (Lawes Agricultural Trust, 2006). Log-linear models are designed for the

analysis of count data. It is assumed with these models that the expected value of a count can be accounted for by linear effects of the variables and factors associated with the count.

Other things being equal, the number of sightings of a species is expected to be proportional to the number of watch hours. This can be allowed for in an analysis through the use of an offset variable. The form of the model for a count N is then

$$N = (WH)Exp\{\beta_0 + \beta_1 X_1 + ... + \beta_p X_p\} + \varepsilon$$

where WH denotes the number of watch hours, the linear combination $\beta_0 + \beta_1 X_1 + ... + \beta_p X_p$ takes into account the effects of variables and factors as measured by X_1 to X_p, β_0 to β_p are parameters to be estimated, and ε denotes the sampling error in the count. This equation can be rewritten as

$$N = Exp\{Ln(WH) + \beta_0 + \beta_1 X_1 + ... + \beta_p X_p\} + \varepsilon, \quad (7.1)$$

where Ln(WH), the natural logarithm of WH, is called the offset variable.

In the present case there are three factors to be considered. The first is the species, the second is the distance from the net (0m, 1-10m, 11-100m and > 100m), and the third is the type of watch (set/soak or haul). It was found that to describe the data it is necessary to assume the existence of all factor effects and their two factor interactions. The interactions are the SpeciesxDistance interaction (the distribution of the sighting distance varies with the species), the SpeciesxWatch Type interaction (the relative abundance of species sightings is not the same for the two types of watch, and the DistancexWatch Type interaction (the distribution of sighting distances is not the same for the two types of watch).

As an example of the first type of interaction, it can be seen that river otters were usually sighted close to a net but humpback whales were always sighted more than 100m from a net. As an example of the second type of interaction it can be seen that river otters were seen 25 times during set/soak watches, but only twice during haul watches. Presumably this is because they tend to avoid nets when activity is taking place. As an example of the third type of interaction it can be seen that 99 whales were recorded 10m or more from nets during set/soak watches, but only 19 times during haul watches. Presumably this is because the observers were mainly watching the nets while hauls were taking place, rather than looking further away.

Marine Bird Sightings in 2002

In 2002 FWS observers made systematic net and horizon scans for birds as part of their duties while observing fishing. These scans were done while nets were soaking, with one hour being the basic unit of time. When associated with a pick observation, if allowed

by the conditions and logistics, soak watches were done during the hour before and the hour following the pick observation, and were done for up to four hours at the same net. During a watch hour scans were made approximately every 15 minutes and bird proximity to nets was recorded in the categories of 0 (touching the net), 1-10m, 11-100, and 100-300m. To obtain reasonably large counts the categories are reduced here to less than 10m from the net and 10m or more from the net. During haul watches, scans were made every five minutes to count birds within 10m of the net.

Table 7.2 shows a summary of the data. Black-legged kittiwakes and gulls were the most common birds sighted within 10m of nets, as well as in the general area of nets (within 300m), on air or in the water, although they were not present in the take. Murres had the lowest sighting rates of alcids and were rarely observed on water or in the air. However, they were the main take. Among colonially nesting alcids, guillemots were the most common on water less than 10m from nets, as were horned puffins, suggesting a greater risk of take. Tufted puffins were observed in lower numbers on the water near nets, but were the most common alcid observed flying in the vicinity. Pigeon guillemots, horned puffins and tufted puffins were all common in the area with some take. Among non-colonial birds the marbled murrelet was most commonly seen near nets and in the air in the area, but still in low numbers compared to the larger alcids and larids.

A log-linear model analysis was conducted on the counts in Table 7.2. This was similar to the analysis described above for the marine mammal counts in Table 7.1, except that two of the factors are not the same. The species factor is still present, with the species shown in Table 7.2. A second factor is the location of the first sighting. For this the four levels are less than 10m on the water, 10m or more on the water, less than 10m in the air, and 10m or more in the air. The third factor is the type of scan, which is either a horizon scan or a net scan. The different number of horizon and net scans was allowed for using an offset variable.

It was found that to describe the data the data the existence must be assumed for the three factor effects, the LocationxScan Type interaction, and the SpeciesxLocation interaction, while the SpeciesxScan Type interaction is not significant at the 5% level. The significant LocationxScan Type interaction indicates that the distribution of counts over the four location classes varied with the two types of scan. For example, the number of birds recorded in the air 10m or more from the net was much higher with horizon scans than with net scans, which is hardly surprising as the observers would have been concentrating on the nets. The significant SpeciesxLocation interaction indicates that different species tend to be seen in different locations. For example, gulls were often recorded in the water but terns were only recorded in the air. The lack of significance of the SpeciesxScan Type interaction implies that the differences in counts between the two scan types are similar for all of the species.

Figure 7.1 shows sighting rates in different regions of the fishery for the bird species most involved in the fisheries take (all cormorants, all murres, pigeon guillemot, tufted puffins, and all murrelets).

Table 7.2 Summary of bird sightings, with values shown separately for eight categories of observations depending upon whether birds were on the water or in the air, close (< 10m) or further from the gear, and seen during net or horizon scans. The total number of birds gives the birds sighted by all observers at all times. The mean sightings per hour are the mean per 12 scans, assuming each scan takes about 5 minutes.

Results From 1561 Horizon Scans

Position of Bird	On Water		On Water		In Air		In Air	
Distance to Gear	Less Than 10m		10m or More		Less Than 10m		10m or More	
	Total Birds	Per Hour	Total Birds	Per Hour	Total Birds	Per Hour	Total Birds	Per Hour
Colonial Species								
Cormorants	1	0.008	7	0.054	17	0.131	8	0.061
Black Legged Kittiwake	81	0.623	108	0.830	1120	8.610	1207	9.279
Gulls	59	0.454	48	0.369	165	1.268	232	1.783
Terns	0	0.000	0	0.000	62	0.477	24	0.184
Murres	1	0.008	3	0.023	1	0.008	2	0.015
Pigeon Guillemot	16	0.123	92	0.707	8	0.061	21	0.161
Tufted Puffin	2	0.015	32	0.246	40	0.307	107	0.823
Horned Puffin	19	0.146	34	0.261	8	0.061	14	0.108
Non-Colonial Species								
Marbled Murrelet	13	0.100	22	0.169	8	0.061	16	0.123
Harlequin Duck	1	0.008	21	0.161	3	0.023	10	0.077
Ducks and Scoters	0	0.000	0	0.000	0	0.000	17	0.131
Jeager	0	0.000	0	0.000	5	0.038	2	0.015
Other	8	0.061	60	0.461	39	0.300	56	0.430

Results From 2462 Net Scans

Position of Bird	On Water		On Water		In Air		In Air	
Distance to Gear	Less Than 10m		10m or More		Less Than 10m		10m or More	
	Total Birds	Per Hour	Total Birds	Per Hour	Total Birds	Per Hour	Total Birds	Per Hour
Colonial Species								
Cormorants	1	0.005	1	0.005	35	0.171	14	0.068
Black Legged Kittiwake	57	0.278	4	0.019	1415	6.897	150	0.731
Gulls	52	0.253	0	0.000	211	1.028	15	0.073
Terns	0	0.000	0	0.000	43	0.210	11	0.054
Murres	0	0.000	0	0.000	0	0.000	0	0.000
Pigeon Guillemot	17	0.083	11	0.054	30	0.146	0	0.000
Tufted Puffin	17	0.083	0	0.000	38	0.185	4	0.019
Horned Puffin	20	0.097	0	0.000	0	0.000	0	0.000
Non-Colonial Species								
Marbled Murrelet	3	0.015	6	0.029	2	0.010	13	0.063
Harlequin Duck	0	0.000	0	0.000	1	0.005	5	0.024
Ducks and Scoters	0	0.000	0	0.000	0	0.000	0	0.000
Jeager	0	0.000	0	0.000	7	0.034	0	0.000
Other	2	0.010	7	0.034	17	0.083	11	0.054

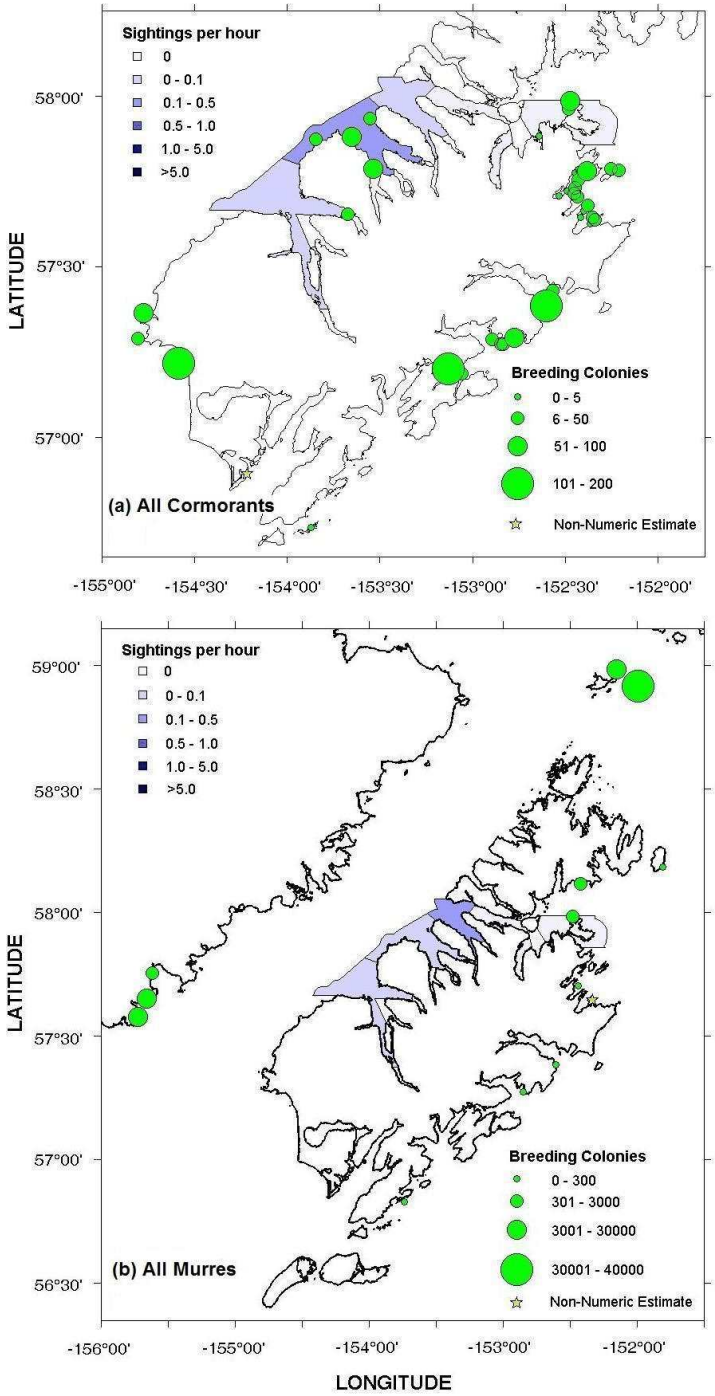


Figure 7.1 Sightings per hour for the four observed regions in 2002 for (a) all cormorants, (b) all murres, (c) pigeon guillemots, (d) tufted puffins, and (e) all murrelets.

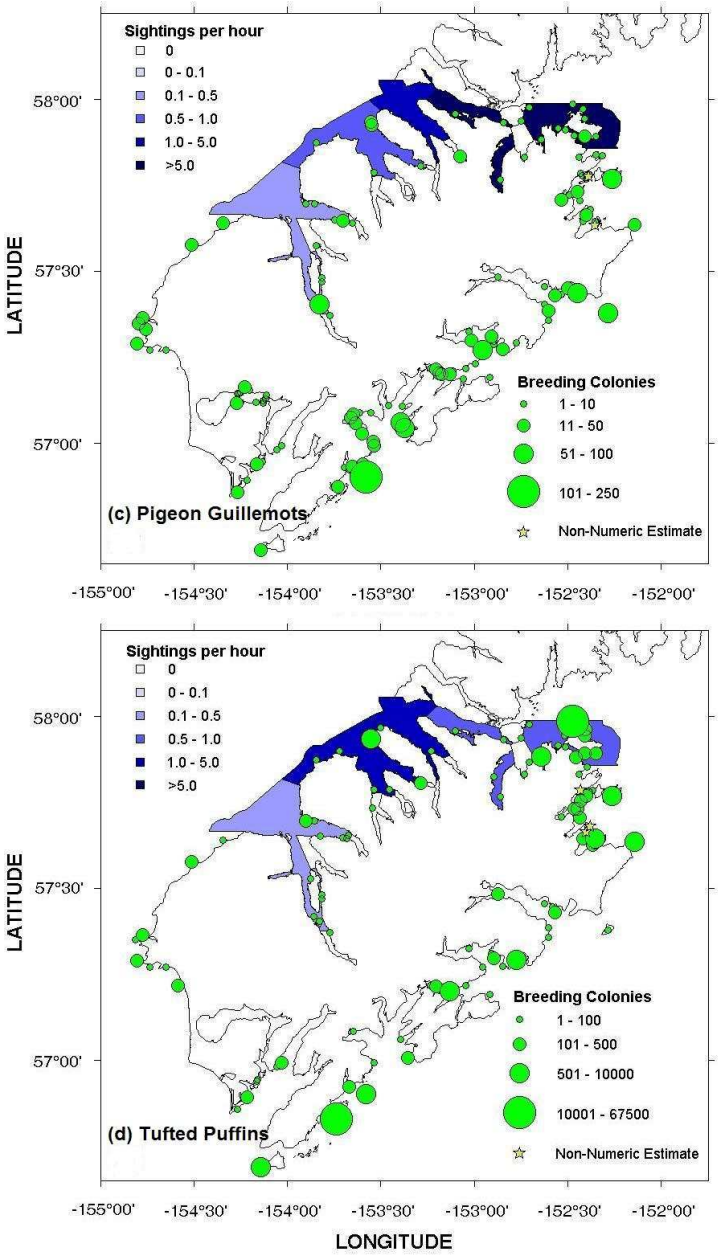


Figure 7.1 (Continued)

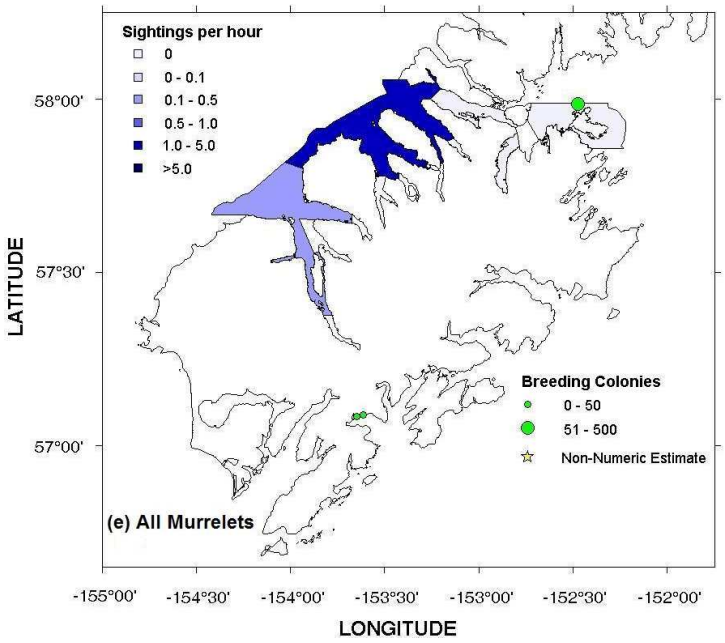


Figure 7.1 (Continued)

Marine Mammal Sightings in 2005

In 2005 the observers again recorded sightings of marine mammals both in the usual course of watching nets and also casually at other times. They also commented on the behavior of the animals. The procedures followed were the same as were used in 2002. The observer's comments are recorded in Appendix F.

There is one comment on an unidentified otter, a few comments on river otters, and many comments on sea otters. The river otters were often close to the net and feeding on the catch. By contrast, there were only four comments involving sea otters feeding on the catch (on June 1 and June 4). It seems unusual that these comments were so close in time, but possibly it was the same sea otter or otters involved. In 2002 no sea otters were recorded feeding on the catch. In both years river and sea otters were often seen swimming over or under nets.

There is one comment on an unidentified pinniped, and seven comments on unidentified porpoises or dolphins. These did not involve any interactions with nets. There were more sightings of Dall's porpoises, and many more sightings of harbor porpoises. Most of the porpoise sightings were not close to nets. No interactions with nets were reported, although in one case (on 4 August) a harbor porpoise seems to have swum under a net.

As for 2002, there are frequent comments on the behavior of Steller sea lions in 2005. Also, as in 2005, many of the comments indicate aggressive behavior by the animals, with

them taking many fish from the nets, and throwing these around in the sea. Often fishers seem to have had considerable difficulties with these animals and sometimes sent them off with seal bombs.

There are three comments on unidentified seals, and many more comments on harbor seals. These animals were often seen very close to nets, and sometimes swam under or over nets. There are many records of harbor seals feeding on fish from the nets.

As in 2002 there are also a large number of comments on whale sightings. These were usually a considerable distance from nets, with no possibility of an interaction, and are not recorded in Appendix F. However, sightings closer than 50m from nets were recorded (on 14 June, 14 July, and 10 August).

Table 7.3 shows a summary of the mammal sightings in four distance classes 0m (touching the gear), 1 to 10m, 11 to 100m, and greater than 100m. The results are shown separately for set/soak watches and haul watches, with the set and soak watches combined as in 2002 because of the small amount of time spent on set watches.

The most commonly seen animals were sea otters, Steller sea lions and harbor seals, with harbor seals being seen more often than they were in 2002. During set or soak watches these animals were seen at all distances from nets, but usually close to nets during haul watches. Other mammals sighted quite often were river otters (during set or soak watches), Dall's porpoises (more than 10m from nets), harbor porpoises (usually some distance from the gear), and whales (usually far from the gear).

As was done for the 2002 counts in Table 7.1, the counts in Table 7.3 were analyzed using log-linear models, excluding the results for species with very low counts (Minke and humpback whales) and the unidentified small mammals and whales. As for 2002 the three factors considered were the species, the distance from the net (0m, 1-10m, 11-100m and > 100m), and the type of watch (set/soak or haul). As was the case for the 2002 data it was found that to describe the data it is necessary to assume the existence of all factor effects and their two factor interactions. There is therefore evidence that the different species have different distributions of their sighting distance from nets (the SpeciesxDistance interaction), the relative abundance of species sightings is not the same for the two types of watch (the SpeciesxWatch type interaction), and the distribution of sighting distances is not the same for the two types of watch (the DistancexWatch Type interaction).

Table 7.3 Summary of mammal sightings with results shown separately for set or soak watches and haul watches, and also for for distance of the animal from the fishing gear. The counts are the total numbers of animals seen for all watches of the type stated, in the distance range stated. The per hour values are the counts divided by the total watch times.

Distance from Gear	0		1-10m		11-100m		> 100m	
	Sightings from 828.4 Hours of Set or Soak Watches							
	Count	Per Hour	Count	Per Hour	Count	Per Hour	Count	Per Hour
River Otter	14	0.017	0	0.000	10	0.012	1	0.001
Sea Otter	61	0.074	39	0.047	122	0.147	106	0.128
Dall's Porpoise	0	0.000	0	0.000	3	0.004	23	0.028
Harbor Porpoise	1	0.001	8	0.010	22	0.027	13	0.016
Steller Sea Lion	131	0.158	25	0.030	29	0.035	8	0.010
Harbor Seal	35	0.042	52	0.063	69	0.083	40	0.048
Small Mammal*	0	0.000	5	0.006	6	0.007	0	0.000
Baleen Whale	0	0.000	0	0.000	0	0.000	68	0.082
Fin Whale	0	0.000	0	0.000	0	0.000	33	0.040
Killer Whale	0	0.000	0	0.000	2	0.002	0	0.000
Minke Whale	0	0.000	1	0.001	0	0.000	0	0.000
Sei/Fin Whale	0	0.000	0	0.000	0	0.000	48	0.058
Whale*	0	0.000	0	0.000	0	0.000	109	0.132
	Sightings from 1222.2 Hours of Haul Watches							
	Count	Per Hour	Count	Per Hour	Count	Per Hour	Count	Per Hour
Sea Otter	6	0.005	11	0.009	39	0.032	16	0.013
Dall's Porpoise	0	0.000	0	0.000	5	0.004	0	0.000
Harbor Porpoise	0	0.000	1	0.001	8	0.007	3	0.002
Steller Sea Lion	28	0.023	3	0.002	4	0.003	0	0.000
Harbor Seal	11	0.009	29	0.024	12	0.010	0	0.000
Baleen Whale	0	0.000	0	0.000	0	0.000	14	0.011
Fin Whale	0	0.000	0	0.000	0	0.000	2	0.002
Humpback Whale	0	0.000	1	0.001	0	0.000	0	0.000
Killer Whale	0	0.000	0	0.000	0	0.000	25	0.020
Sei/Fin Whale	0	0.000	0	0.000	0	0.000	10	0.008
Whale*	0	0.000	0	0.000	2	0.002	33	0.027

*Unidentified sightings

Marine Bird Sightings in 2005

The FWS observers were not present in 2005 to report bird sightings. There are therefore no records for this year.

8. Marine Mammal and Bird Strandings

Marine Mammal Strandings in 2002

Six strandings of dead mammals were recorded during the 2002 observations in Kodiak. A stranding is considered to be a mammal that was found dead (either floating or ashore), with no known cause of death.

On July 22nd, 2002 an observer found a Steller sea lion washed on the beach in Ouzinkie Pass in statistical area 25939. The sea lion was moderately decomposed and was reported to the stranding network. The observer secured the carcass to shore for the stranding network to evaluate. The carcass, 321 cm long, was not relocated for further examination and cause of death is unknown.

On July 30th, 2002, on the northeast side of Uganik Bay in statistical area 25311, a Steller sea lion, moderately decomposed, was found floating about 100meters from a set net. Some nearby fishermen assisted the observer in towing it ashore for further study. The length was 225 cm and the head was collected for the stranding network. The observer saw no obvious cause of death and there were starfish feeding on the carcass.

On August 9th, 2002, a Steller sea lion, approximately 180 cm in length, was found floating off the northwest point of Cape Uganik in statistical area 25314. It was in advanced stages of decomposition and no cause of death could be determined. The head was collected for the stranding network.

On August 7th, 2002 a headless harbor seal was found floating 25 m from a set net in Larsen Bay, statistical area 25420. The seal was female, approximately 75 cm in length. The cause of death or signs of human interaction could not be determined. The carcass was collected for the stranding network.

On August 15, 2002 a harbor seal was found on shore, moderately decomposed, in the southern area of Uganik Bay, in statistical area 25313. Samples were collected and no signs of human interaction were noticeable.

On June 16, 2002 a floating, partially decomposed river otter was sighted in Alitak Bay in statistical area 25741.

Marine Bird Strandings in 2002

A horned puffin was found dead, floating near a set net off of Harvester Island in Larsen Bay by an observer on August 19. It was not counted as take, but the carcass was saved and processed. It was in summer plumage, with no molt or brood patch detected. It was not emaciated, and weighed 570 g (wet).

Marine Mammal Strandings in 2005

In 2005 observers encountered 13 mammal carcasses in situations unrelated to a fisheries take, eight during trips and six not during trips. In addition, an observer reported that the skiff that they were traveling in may have injured a sea otter. One of the animals was a brown bear.

On June 20 an observer encountered both a brown bear and a sea otter carcass about midway through a haul. The sea otter carcass was floating and touching the nest, but decomposed but no injury, unusual marks or missing hair was found. The fishers said that they had seen a dead sea otter floating around earlier.

On June 22 an observer encountered an unknown baleen whale. He was informed by the permit holder that a dead whale about 30 foot long had washed in close to the nets on June 12, and then drifted off in a southerly direction. The observed found the whale on a nearby beach and took skin samples.

On 25 June an observer not on a trip saw a dead humpback whale in Alitak Bay's Tanner Head, on the east side. This was a male sub-adult, 9.5 m in length, with net marks.

On 26 June an observer not on a trip saw a humpback whale in Alitak Bay at Cape Alitak. The head and front half of the body are missing. Blubber and skin samples were taken. According to some fishers the carcass was in the same place June 19.

On 29 June an observer encountered a river otter carcass.

On July 1 an observed not on a trip found a humpback whale carcass. It was found floating in Uyak Bay, with the ventral surface upwards. Fin clip and blubber samples were taken. The whale appeared to have fresh scrape marks on the right pectoral fin, that were possibly teeth marks, and had a hole through the right portion of fluke. There were also marks that could have beeen rope or line marks around the base of the tail and forward. The carcass had not been dead long according to texture and odor.

On 22 July an observer on a trip encountered a decomposed adult male Steller sea lion carcass. It was on a beach, near the high tide line, approximately 50 m from a net.

On 26 July an observer on a trip encountered a minke whale carcass on the beach in Alitak Bay. There were no signs of a human interaction.

On 29 July an observer on a trip encountered a freshly dead sub-adult male sea otter floating about 150 m from the set net. A skin sample was taken There was no evidence of any interaction between the otter and fishing gear, and the animal had no broken bones or lacerations.

On August 1 an observer not on a trip observed a dead beached humpback whale. Skin and blubber samples were taken. There were no signs of a human interaction.

On 12 August two dead humpback whales were recorded. The first was found at Cape Trinity. It was in the surf and difficult to get to so no samples were taken. It was an adult or maybe sub-adult whale, with moderate decomposition, but no obvious signs of the cause of death. The second whale was found floating in kelp in Russian Harbor. This was also difficult to get to but a skin/blubber sample was taken. This whale was definitely an adult. It was moderately decomposed, with no obvious signs of the cause of death.

Marine Bird Strandings in 2005

On 28 July an observer on a trip found a dead common murre. Limited notes were made on a marine bird sample form.

9. Analysis of Factors Affecting Take

The following variables have been investigated in terms of an association with the take of birds and mammals. The abbreviated variable names are used for the remainder of this section.

Effort — The observed fishing effort involved in a single haul. This is calculated as (net length in fathoms/150) x (soak duration in minutes/1440) x (% of the pick observed for the net/100). This is related to the fishing effort calculation described Section 4 for a full trip. The first factor takes into account the net length relative to the maximum allowed length of 150 fathoms. The second factor takes into account the soak duration in minutes as a fraction of the total number of minutes in a day (24 x 60 =1440). The third factor takes into account the fact that in some cases observers were only present for a part of the time when a pick took place. A total of 70 hauls are recorded with zero effort because of missing information on the net or soak duration, or because the soak duration was recorded as zero.

Region — The fishing region as defined in Section 3, numbered from 1 to 7 as follows: (1) Kupreanof Straits and North Cape, (2) Viekoda Bay, (3) Uganic Bay and Uganic Passage, (4) Uyac Bay, (5) Olga Bay, (6) Moser Bay, and (7) Alitak Bay.

Day — The observation day number, with June 1 as day 1. In 2002 the maximum value for day was 90, while in 2005 the maximum was 106.

MTCode — This code represents the time of day half way between the start of the soak and the end of the pick, from 0 to 24 hours. Because values close to 0 and 24 represent similar mid-fishing times the variable was classified for analysis purposes into the four classes (1) midnight to 6 am, (2) 6 am to midday, (3) midday to 6 pm, and (4) 6 pm to midnight.

Depth — The average of the depth (fathoms) at the start and end of the pick. The depth were not recorded for about 10% of picks in 2002. These were replaced by the average depth recorded of all observed picks in that year (11.6 fathoms). In 2005 the depths were not recorded for about 20% of picks. These were replaced by the average depth recorded for all observed picks in that year (10.2 fathoms).

FzCode — The fishing zone code (1, open water; 2, inside large bay; 3, inside sheltered bay; 4, river; 5, channel or canal). Missing or other codes were replaced by 0.

TdCode — The tide code (1, ebb tide; 2, flood tide; 3, high slack; 4, low slack). Missing or other codes were replaced by 0.

LdCode The land code (1, mainland shoreline; 2, peninsula or island; 3, sand bar; 4, rocky reef; 5, submerged land; 6, not set from land). Missing and other codes were replaced by 0.

HSCode The hook shape code (1, L-shaped; 2, V-shaped; 3, J-shaped; 4, umbrella; 5, arrowhead; 6, flag; 7, diamond; 8, box; 9, zigzag; 10, none; 11, pennant). Missing and other codes were replaced by 0.

AirTemp The air temperature (°C). The air temperature was not recorded for 5% of the picks in 2002 and 3% of the picks in 2005, giving 121 missing values altogether. In cases where the water temperature was recorded the air temperature was predicted from a regression of this variable against the water temperature and the time of day coded from 1 (midnight to 4am), to 6 (8pm to midnight). This regression accounts for 44.1% of the variation in air temperature. Predicting the air temperature from the water temperature and the time of day in this way resulted in the number of missing values for the air temperature reducing to 50. These values were filled in by interpolating or extrapolating the temperatures from other picks taken on the same day.

WtrTemp Water temperature (°C). The water temperature was not recorded for 2% of the picks in 2002 and 10% of the picks in 2005, giving 224 missing values altogether. In cases where the air temperature was recorded the water temperature was predicted from a regression of this variable against the air temperature and the time of day coded from 1 (midnight to 4am), to 6 (8pm to midnight), with a different regression constant allowed for each year. This regression accounts for 41.7% of the variation in water temperature. Predicting the water temperature from the air temperature and the time of day in this way resulted in the number of missing values for the water temperature reducing to 50. These values were filled in by interpolating or extrapolating the temperatures from other picks taken on the same day.

MshSz The average of the minimum and maximum net mesh size (inches), which were usually the same. If one value was missing then the available value was used. There were four cases in 2002 where there was no minimum or maximum size recorded. The mesh size was then set equal to the overall mean of 5.1 for 2002. In 2005 there were 45 cases where there was no minimum or maximum size recorded. The mesh size was then set equal to the overall mean of 5.0 for 2005.

NMCode Net material code (1, monofilament nylon; 2, multifilament nylon; 3, six-strand mono; 4, multistrand-mono; 8, combination). Missing or other codes were replaced by 0.

NCCode Net color codes (1, clear; 2, white; 3, black; 4, grey; 5, green; 6, blue; 7, red; 8, pink; 9, orange; 10, yellow; 11, purple; 12, tan; 13, combo; 20.blue/green; 22, tan/blue/green/grey). Missing or other codes were replaced by 0. Codes 20 and 22 were only used in 2005.

Pinger Presence (1) or absence (0).

Lights Presence (1) or absence (0).

Floatline Presence (1) or absence (0).

Data on the above variables are available for 1421 hauls in 2002 and 2034 hauls in 2005. For these hauls Figure 9.1 shows the take numbers for marine mammals plotted against the values for the 17 variables listed above. Thus each point on the graph represents one haul, where the take was zero, one or two mammals. Figure 9.2 is similar but is for all birds, with the take ranging from zero to five birds on one haul. Figures 9.3 to 9.8 are similar again, but are for counts for birds of the family Alcidae (least aucklets, pigeon guillemots, common murres, thick-billed murres, marbled murrelets, horned puffins and tufted puffins), for common murres, for tufted puffins, for pigeon guillemots, for pelagic cormorants, and for marbled murrelets. Plots are provided for the individual bird species with an observed total take of nine or more birds for 2002 and 2005 combined.

When examining the plots in Figures 9.1 to 9.8 it should be kept in mind that take only occurred for a small fraction of hauls, and that an apparent relationship between a variable and take may really be due to many hauls having taken place when the variable was within a particular small range of values. In that case the probability of take may have been the same for all values of the variable, but still most of the take occurred with the variable within the small range. For example, considering the plot of mammal take against depth in Figure 9.1, it can be seen that all of the take occurred for low water depths. This is most likely due to the fact that almost all fishing was with low water depths.

Logistic regression (McCullagh and Nelder, 1989) was used to examine the relationships between the take and the variables describing the conditions for hauls that are described above. For each of the hauls eight 0-1 dependent variables were considered, relating to the take of mammals, all birds, Alcidae birds, common murres, tufted puffins, pigeon guillemots, pelagic cormorants, and marbled murrelets, respectively. For each of the dependent variables 0 indicates no take and 1 indicates some take of the birds or mammals concerned. Fitting logistic regression models with one of the dependent variables then allows the probability of a take of one or more animals to be modeled as a function of the characteristics of hauls. GenStat (Lawes Agricultural Trust, 2006) was used to do all the calculations. Only hauls with positive values for the effort variable were used for estimating the logistic regression equation (1356 hauls in 2002 and 2029 hauls in 2005).

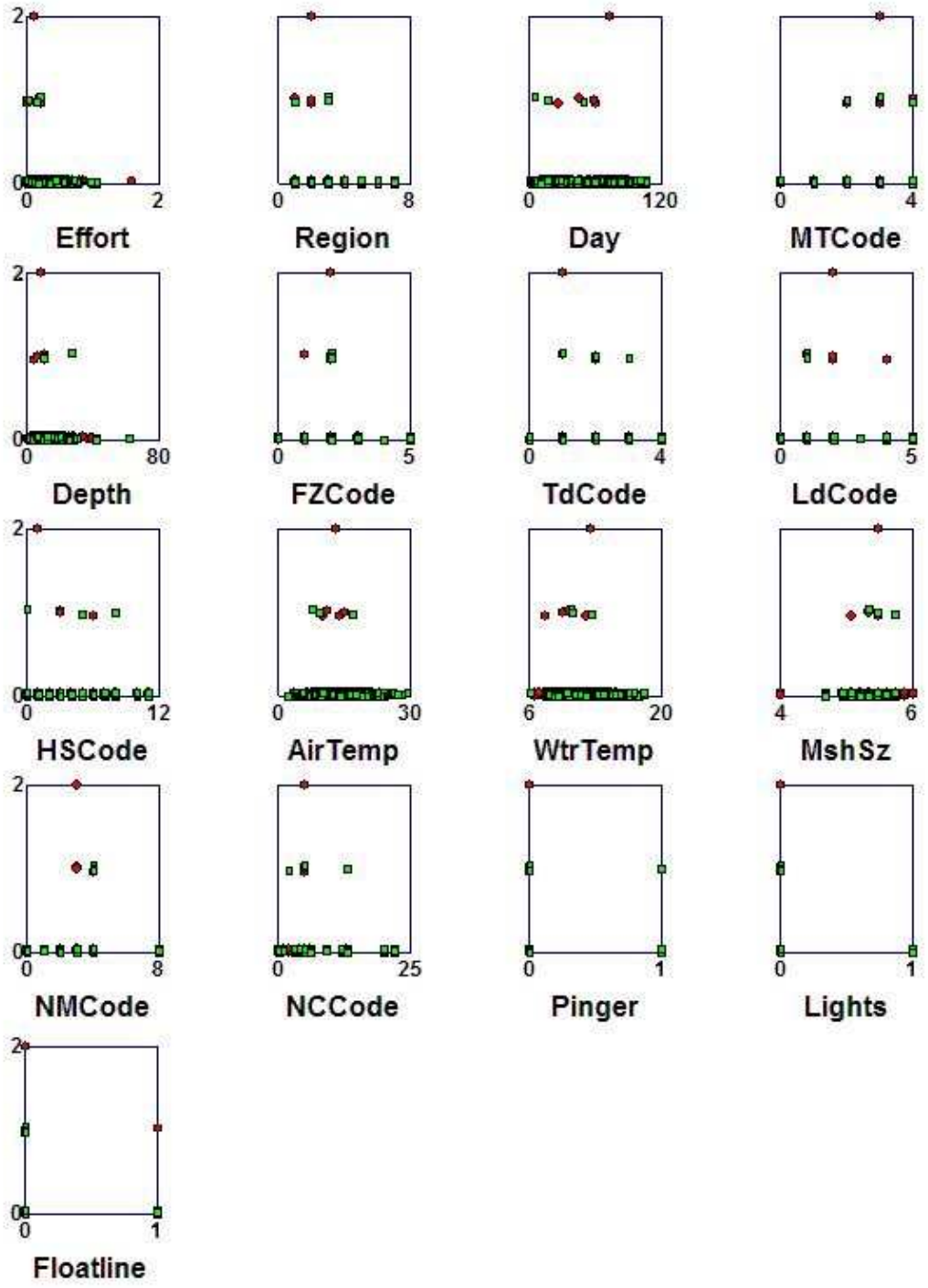


Figure 9.1 Take of mammals (the vertical scale) plotted against 17 variables describing the conditions for the haul involved, with different symbols for 2002 (●) and 2005 (■). The variables are described in the text. For all plots the vertical axis is the number of animals caught in nets and the horizontal axis is a variable describing the haul, with names beneath the plots. Points are vertically jiggered to separate them.

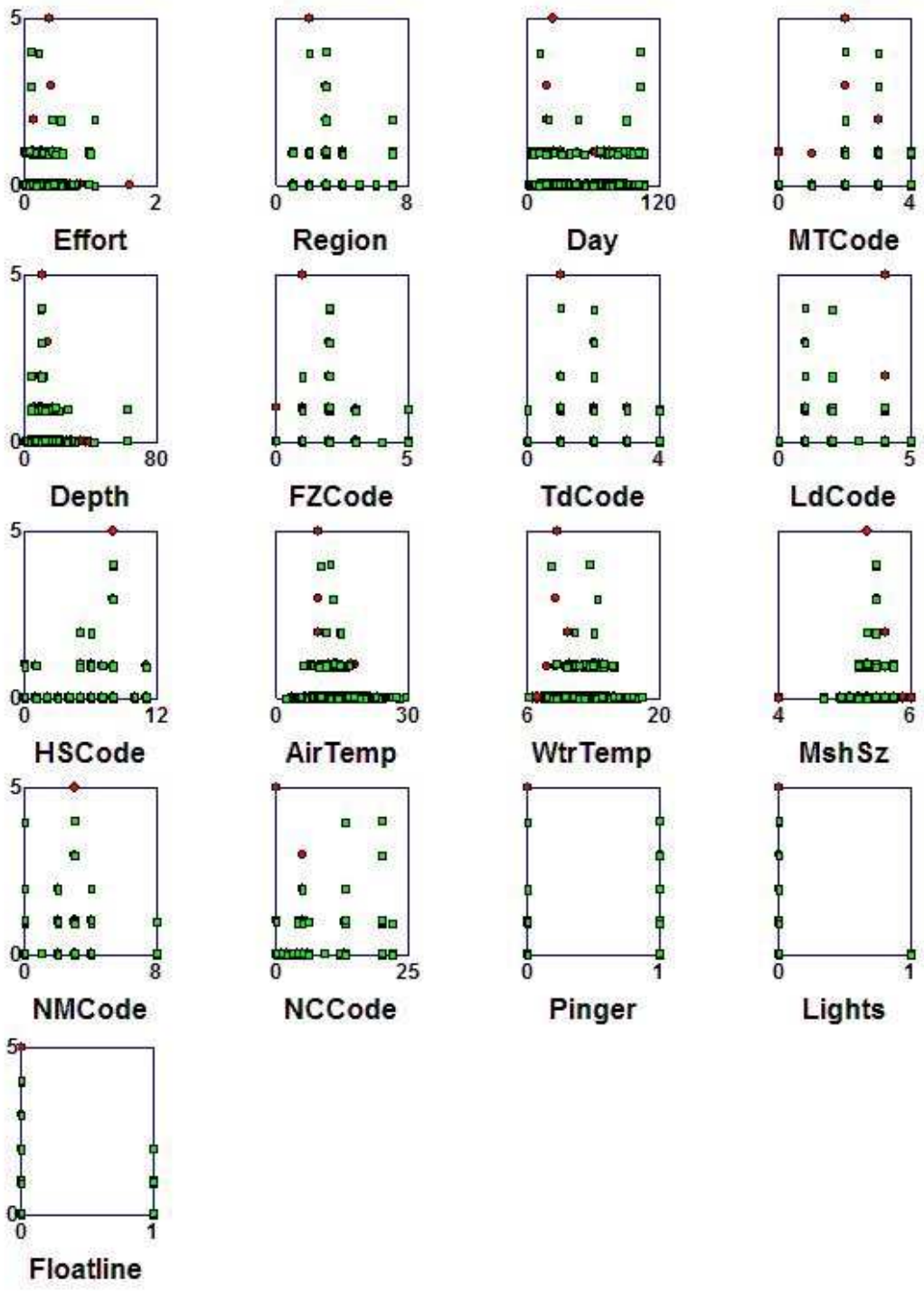


Figure 9.2 Take of all birds plotted against 17 variables describing the conditions for the haul involved, with different symbols for 2002 (●) and 2005 (■). The variables are described in the text. For all plots the vertical axis is the number of animals caught in nets and the horizontal axis is a variable describing the haul, with names beneath the plots. Points are vertically jiggered to separate them.

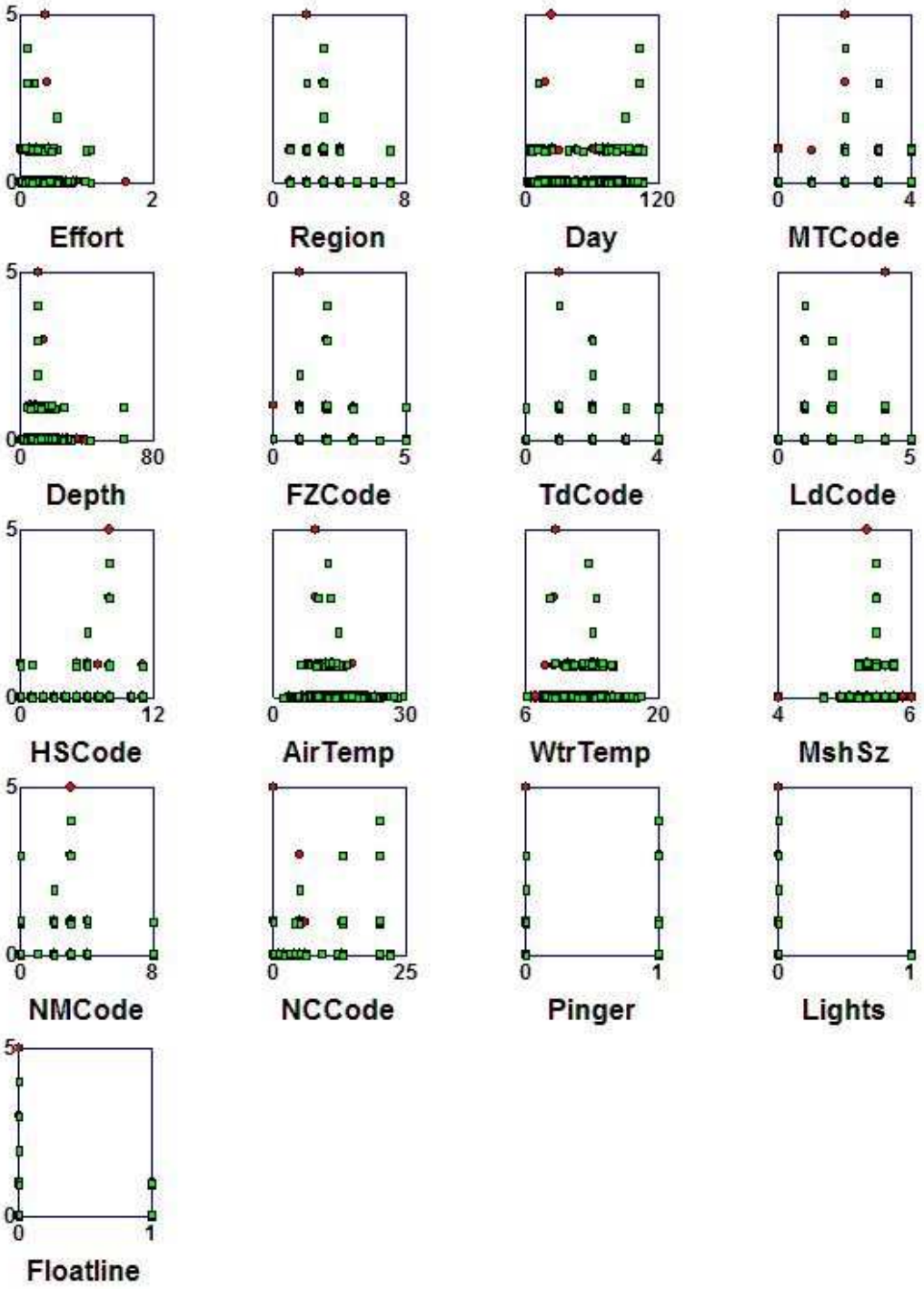


Figure 9.3 Take of birds of the family Alcidae plotted against 17 variables describing the conditions for the haul involved, with different symbols for 2002 (●) and 2005 (■). The variables are described in the text. For all plots the vertical axis is the number of animals caught in nets and the horizontal axis is a variable describing the haul, with names beneath the plots. Points are vertically jiggered to separate them.

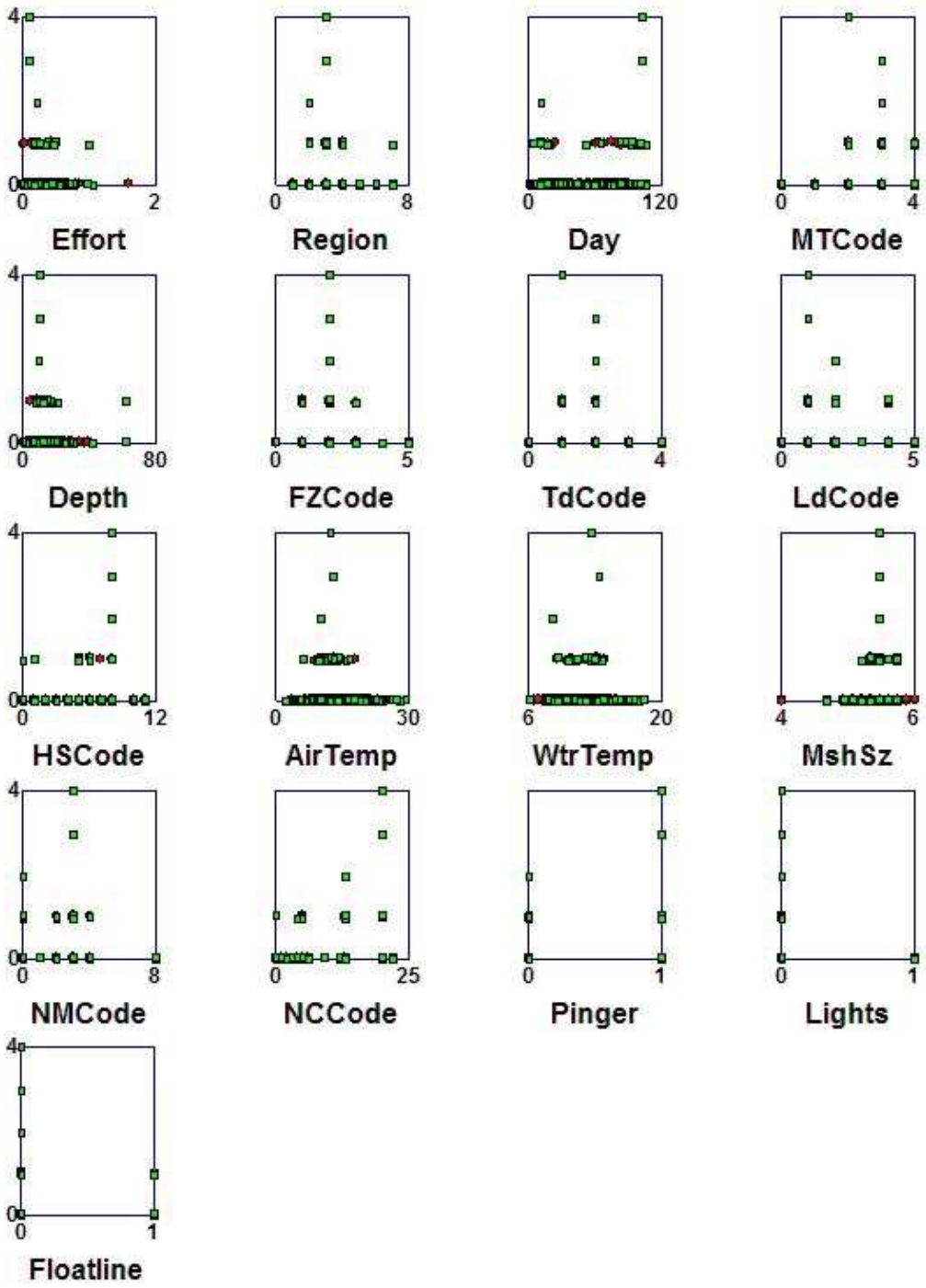


Figure 9.4 Take of common murres plotted against 17 variables describing the conditions for the haul involved, with different symbols for 2002 (●) and 2005 (■). The variables are described in the text. For all plots the vertical axis is the number of animals caught in nets and the horizontal axis is a variable describing the haul, with names beneath the plots. Points are vertically jiggered to separate them.

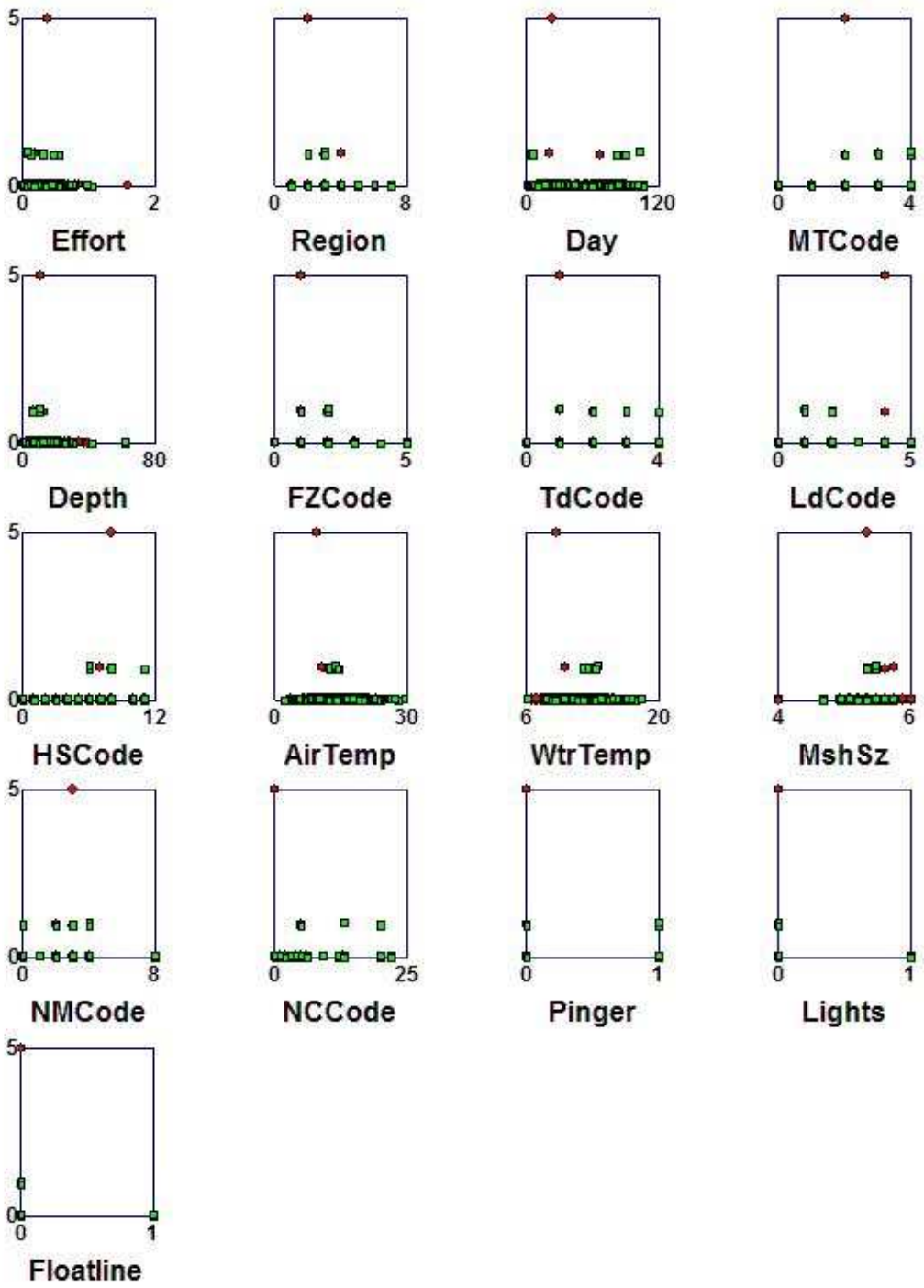


Figure 9.5 Take of tufted puffins plotted against 17 variables describing the conditions for the haul involved, with different symbols for 2002 (●) and 2005 (■). The variables are described in the text. For all plots the vertical axis is the number of animals caught in nets and the horizontal axis is a variable describing the haul, with names beneath the plots. Points are vertically jiggered to separate them.

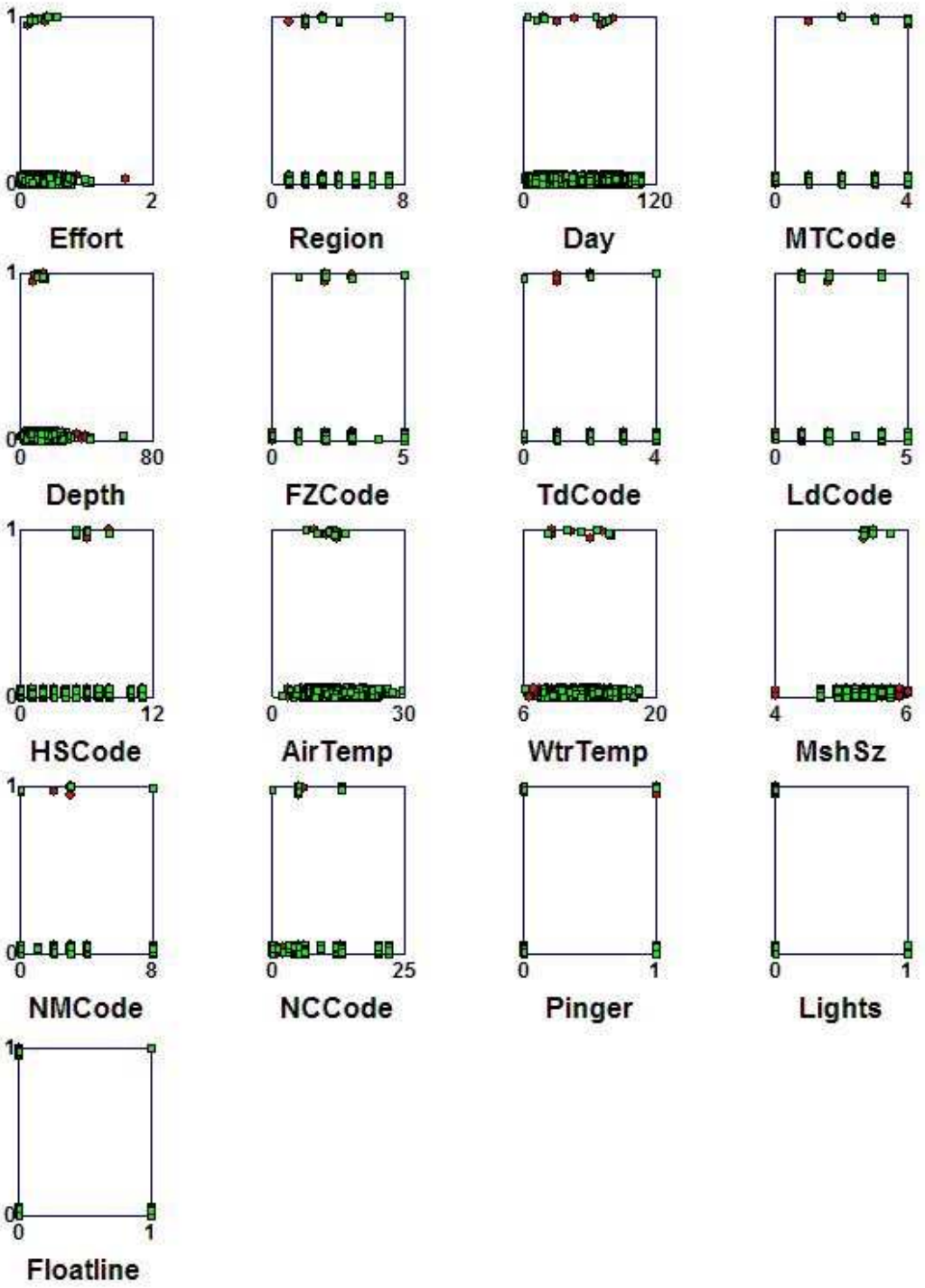


Figure 9.6 Take of pigeon guillemots plotted against 17 variables describing the conditions for the haul involved, with different symbols for 2002 (●) and 2005 (■). The variables are described in the text. For all plots the vertical axis is the number of animals caught in nets and the horizontal axis is a variable describing the haul, with names beneath the plots. Points are vertically jiggered to separate them.

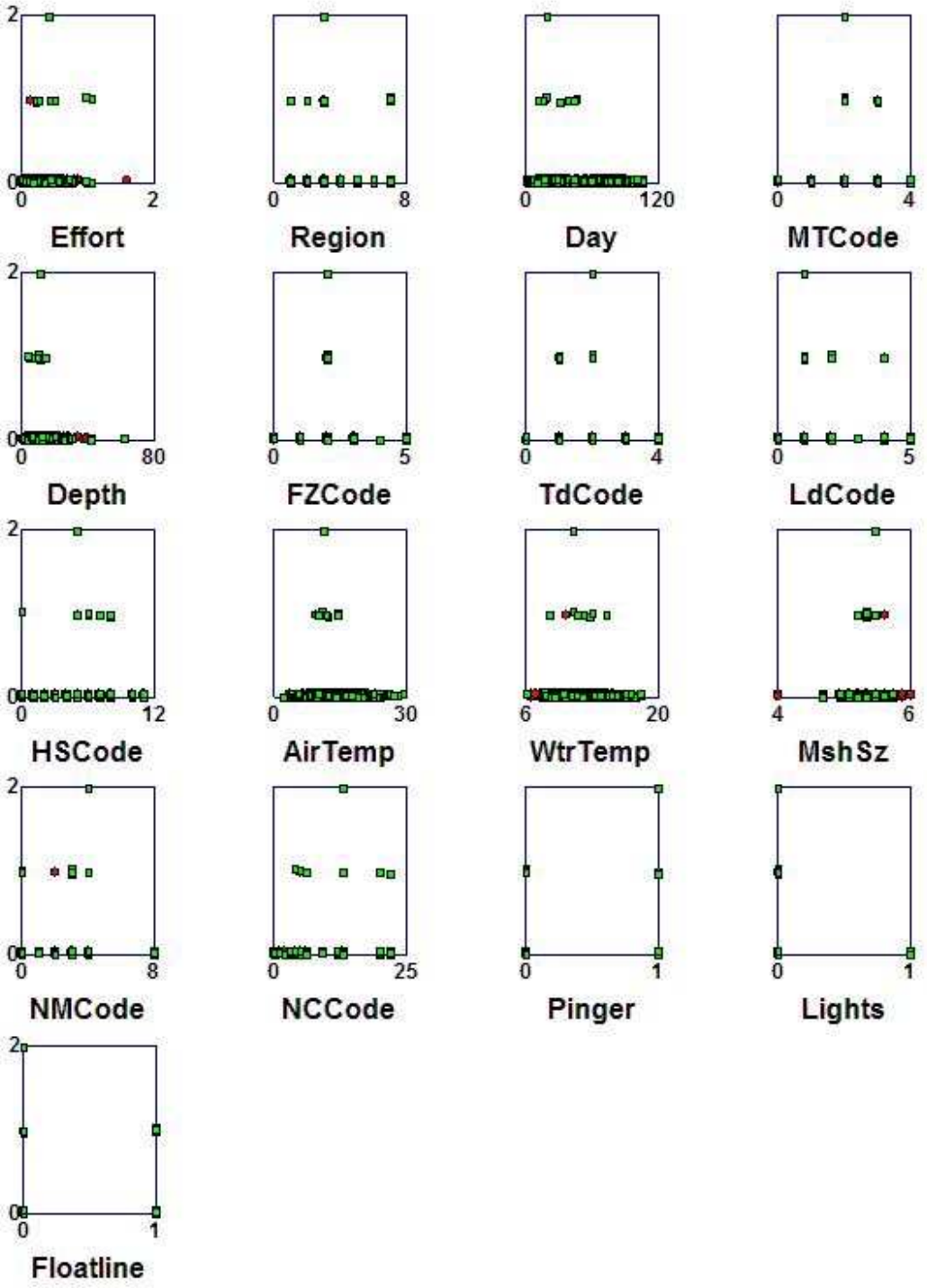


Figure 9.7 Take of pelagic cormorants plotted against 17 variables describing the conditions for the haul involved, with different symbols for 2002 (●) and 2005 (■). The variables are described in the text. For all plots the vertical axis is the number of animals caught in nets and the horizontal axis is a variable describing the haul, with names beneath the plots. Points are vertically jiggered to separate them.

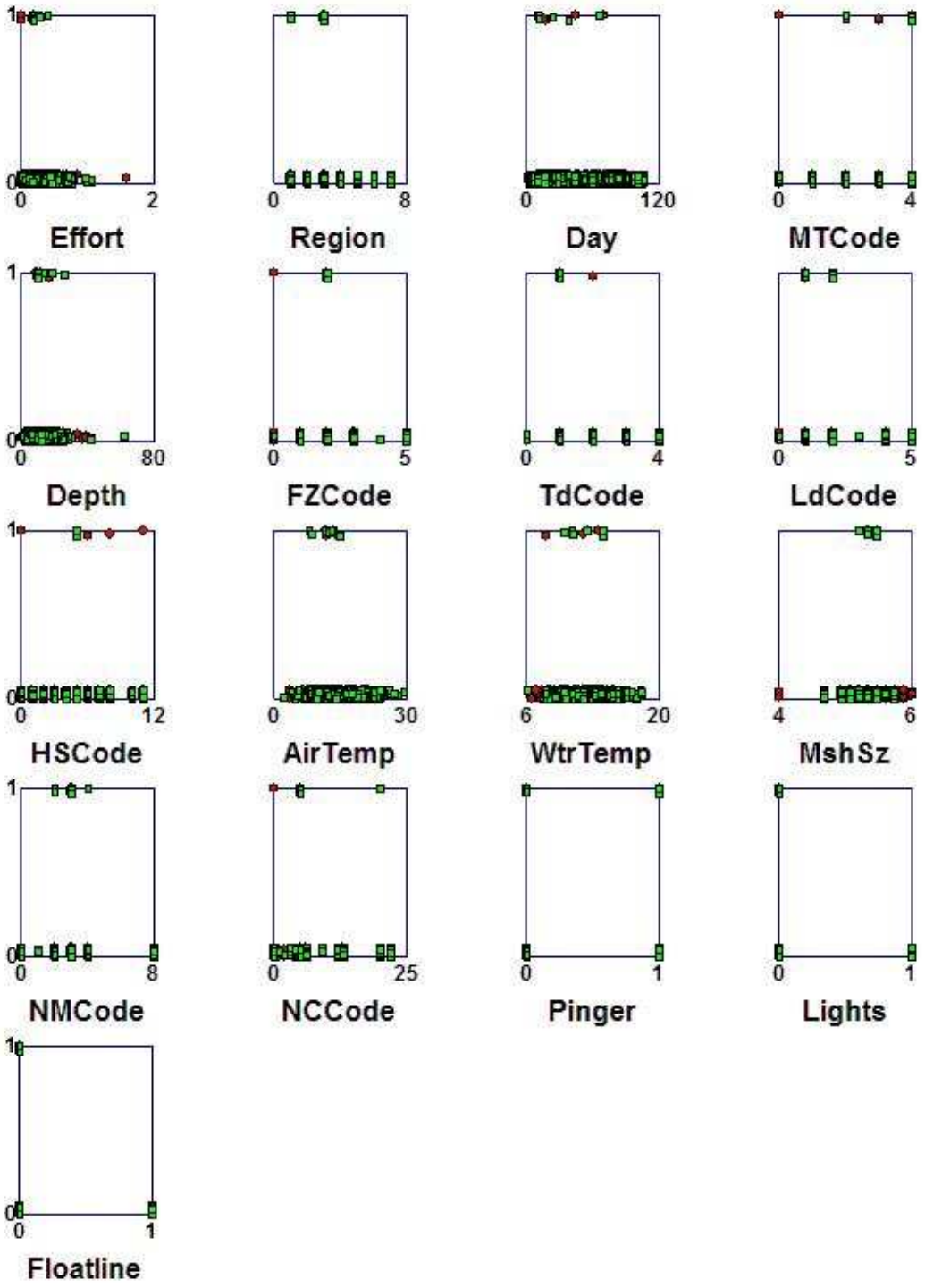


Figure 9.8 Take of marbled murrelets plotted against 17 variables describing the conditions for the haul involved, with different symbols for 2002 (●) and 2005 (■). The variables are described in the text. For all plots the vertical axis is the number of animals caught in nets and the horizontal axis is a variable describing the haul, with names beneath the plots. Points are vertically jiggered to separate them.

With logistic regression it is assumed that the probability of a take occurring is given by an equation like

$$P(\text{Take}) = \frac{\text{Exp}\{\beta_0 + \beta_1 X_1 + ... + \beta_p X_p\}}{1 + \text{Exp}\{\beta_0 + \beta_1 X_1 + ... + \beta_p X_p\}}, \quad (9.1)$$

where X_1 to X_p are variables describing the conditions during the haul being considered, and β_0 to β_p are regression coefficients to be estimated from the data.

Under certain conditions the effort may have a special role in this equation. In general the take probabilities are low and may be approximately proportional to the fishing effort. This occurs if equation (9.1) takes the form

$$P(\text{Take}) = \frac{(\text{Effort})\text{Exp}\{\beta_0 + \beta_1 X_1 + ... + \beta_p X_p\}}{1 + (\text{Effort})\text{Exp}\{\beta_0 + \beta_1 X_1 + ... + \beta_p X_p\}}$$

and the term $\text{Exp}(\beta_0 + \beta_1 X_1 + ... + \beta_p X_p)$ is close to zero. The equation can then be rewritten as

$$P(\text{Take}) = \frac{\text{Exp}\{\text{Ln}(\text{Effort}) + \beta_0 + \beta_1 X_1 + ... + \beta_p X_p\}}{1 + \text{Exp}\{\text{Ln}(\text{Effort}) + \beta_0 + \beta_1 X_1 + ... + \beta_p X_p)\}}, \quad (9.2)$$

where Ln(Effort) is the natural logarithm of the effort variable. In practice the equation can be made a little more flexible if necessary by treating Ln(Effort) as just another variable describing the conditions for a haul and estimating a regression coefficient for this variable in the same way as for the other variables.

There are some indications of non-linear relationships in Figures 9.1 to 9.8. For example, Figure 9.2 shows that the observed take of birds was highest when the air temperature was about 10°C and did not occur when the air temperature was very low or very high. For this reason the variables described above that are not codes were considered for inclusion in logistic regression equations both on their own and with their squares. For example, AirTemp and AirTemp^2 were both considered for inclusion in an equation.

The fitting procedure used was as follows for each of the dependent variables:

(a) The variables (Region, ..., Floatline) plus a year indicator variable was considered one at a time for inclusion in the logistic regression equation. This then gave some indication of which of the variables, if any, is related to the probability of a take. The variables such as AirTemp were represented by the variable and its square for

this purpose. The codes such as MTCode were represented as factors so that the probability of a take is allowed to be different for every level of the code. For example, the possible levels of MTCode are 0, 1, 2, 3, and 4. These five levels were therefore allowed to have different probabilities of a take. The variable Ln(Effort) was considered as a variable in the equation with an estimated coefficient to see whether this coefficient is close to one so that equation (9.2) applies.

(b) The model fitting procedure (a) was repeated only using hauls from the fishing regions where take occurred. For example, for mammals take only occurred in regions 1 to 3. The relationship between mammal take and the other variables was therefore only considered using hauls from these three regions. In this way the probability of a take occurring was estimated conditional on fishing taking place in an area where take has been recorded.

(c) The variables found to have significant effects were considered further. Starting with an equation containing the most significant variable, the other variables were added in the order of their significance. Non-significant terms were then removed from the equation. Squared variables like $AirTemp^2$ were only allowed in the final equation if their coefficients were significantly different from zero and the unsquared variable was also in the equation. If appropriate, equation (9.2) was used for fitting the models, otherwise equation (9.1) was used with Ln(Effort) included as a variable only if it was significant in step (a) of the fitting process.

(d) Because of the small number of hauls with take for some of the dependent variables, the significance of the final logistic regression equation was assessed using a randomization test (Manly, 2006a). This involved comparing the goodness of fit of the final regression equation, as measured by the deviance accounted for, with the distribution of the same statistic if the observed number of takes are randomly reallocated to the hauls. The null hypothesis is then that the probability of take is independent of the variables in the final equation, and the randomization test gives the estimated probability of getting a fitted equation as good as the one obtained from the real data by chance if this hypothesis is true. A total of 4999 randomizations were used for this purpose. If the null hypothesis is true then the observed data also gives a randomization, giving 5000 randomized sets of data altogether for estimating the probability of a fit as good as that observed by chance alone. The advantage of using a randomization test is the minimal assumptions that are required. The logistic regression model does not even have to be correct. A significant result from a randomization test indicates that the fit of the model is unlikely to have occurred by chance even if the model is not correct.

Mammals

For mammals the initial consideration of single variables in the logistic regression equation gave significant relationships between the probability of a mammal take and the

net material code (p = 0.013), the water temperature (p = 0.017), the fishing region (p = 0.030), and Ln(Effort) (p = 0.030). However, the estimated coefficient of Ln(Effort) is negative, implying that increasing effort reduces the probability of a mammal take, which is not realistic. The negative estimated effect of increasing effort is the result of very low effort values for three of the eight hauls where a mammal take occurred. These hauls had either a small percentage of the net pulled or a very small soak duration, and it appears likely that this was the result of the fishers reacting to the mammal take. The low effort or soak duration values would then be a result of the mammal, take rather vice versa. For this reason the effort variable was not considered further for the analysis of mammal takes.

The significant effect of the fishing region is the result of all of the mammal takes occurring in the northern fishing regions 1 to 3 (Kupreanof Straits and North Cape, Viekoda Bay, and Uganic Bay and Uganic Passage). For this reason, the examination of the effect of individual variables was repeated using data only from the 1602 hauls observed in regions 1 to 3.

For the reduced data only the water temperature has a significant relationship with the marine mammal take. The equation including WtrTemp and $WtrTemp^2$ is significant at the 5% level (p = 0.032), but the coefficient of the squared term is not significant. Removing $WtrTemp^2$ from the equation results in an insignificant change in the fit (p = 0.261), and the equation including just WtrTemp is still significant at the 5% level (p = 0.018). This equation is

$$P(\text{Take}) = \frac{\text{Exp}\{-0.559 - 0.413(\text{WtrTemp})\}}{1 + \text{Exp}\{-0.559 - 0.413(\text{WtrTemp})\}}, \qquad (9.3)$$

where the estimated standard error of the coefficient of WtrTemp is 0.173.

The temperatures recorded by observers in regions 1 to 3 for 2002 and 2005 ranged from 6.1°C to 17.0°C. The corresponding probabilities from equation (9.3) range from 0.044 to 0.0005. Therefore, according to this equation the probability of a mammal take is fairly high when the water temperature is low, but extremely low when the temperature is high.

Based on the standard logistic regression testing methods the fit of the equation to the data is significant at the 5% level (chi-squared = 5.61 with 1 df, p = 0.018). This is confirmed by a randomization test which gives a significance level of p = 0.021. Therefore, the estimated relationship between the probability of a marine mammal take and the water temperature is unlikely to have arisen by chance.

Although the net material code is not significantly related to the mammal take in regions 1 to 3 using logistic regression, it is worth noting that all the observed takes involved net materials 3 (six-strand mono) and 4 (multi-strand mono). Net material 2 (multi-filament

nylon) was the only other material to receive much use in regions 1 to 3, but no mammal take was observed with this material. Net material 2 was used for 300 hauls and the take rate per 100 hauls was 0.00, net material 3 was used for 867 hauls and the take rate per 100 hauls was 0.35, net material 4 was used for 323 hauls and the take rate per 100 hauls was 1.55, while other net materials were used for 112 hauls and the take rate per 100 hauls was 0.00. Although large, the take rate differences are only based on eight hauls with takes and a randomization test carried out using Resampling Stats for Excel (Blank, 2006) with a chi-squared test statistic and 10,000 randomizations did not give a significant result ($p = 0.101$). This confirms the conclusion that an association between the mammal takes and the net material is possible but the evidence for this association is not clear.

All Birds

For all bird species considered together the initial consideration of single variables in the logistic regression equation suggested that the probability of a take of one or more birds may be related to the use of a pinger, the fishing effort, the fishing day, the air temperature, the fishing region, the fishing zone, the mesh size, the water temperature, and the net material, where these variables are in the order of their significance (most significant, $p < 0.001$, to least significant, $p = 0.043$) as single variables in the logistic regression equation. The fishing effort was represented in the equation by Ln(Effort) but the coefficient was 0.533 and significantly less than one. Equation (9.2) is therefore not appropriate for the data and Ln(Effort) is considered the same as the other variables in accounting for the bird take.

There was no bird take in regions 5 and 6 (Olga Bay and Moser Bay), which is at least partly responsible for the very highly significant ($p < 0.001$) relationship between the bird take and the Region variable. When the bird take was related to the individual variables with the reduced data set of 3068 hauls from regions 1 to 4 and 7 significant relationships were found for the use of a pinger, the effort variable, the fishing day, the fishing region, the air temperature, the water temperature, and the mesh size. The tide code also gave a relationship that is nearly significant at the 5% level ($p = 0.052$), so this was also considered further.

Adding the variables into the logistic regression equation one at a time in order of their significance as individual variables and removing variables that are not significant at the 5% level resulted in a final equation including the variables for the fishing effort, the fishing region, the use of a pinger, the fishing day, and the tide code. However, the tide code effect is somewhat anomalous. The significance comes about because there were only five hauls with a tide code of 0 (other or missing) and one of these involved a bird take. This is unexpected because overall only 2.2% of hauls involved a bird take. When the haul with a tide code of 0 is included in the data the effect of the tide code is significant at the 5% level ($p = 0.041$). With this haul omitted the effect is not at all significant ($p = 0.245$). As a tide code of 0 is uninformative it was concluded that the tide code effect

should be removed from the logistic regression equation, resulting in the final estimated equation becoming

$$P(\text{Take}) = \text{Exp}(Z)/\{1 + \text{Exp}(Z)\} \quad (9.4)$$

where

$$Z = \text{Exp}\{-1.471 + 0.561(\text{Ln}(\text{Effort})) - 0.548(\text{Region2}) + 0.242(\text{Region3}) - 0.975(\text{Region4}) - 0.033(\text{Region7}) + 0.666(\text{Pinger}) - 0.0724(\text{Day}) + 0.000719(\text{Day}^2)\}.$$

The variables Region2 to Region7 in the equation allow the probability of a bird take to vary from fishing region to fishing region. These variables take the value 1 for a haul in the region specified, or otherwise 0. For example, the value of Region2 is 1 for hauls in region 2 but 0 for hauls in all other regions. There is no component for region 1 because this is taken as the standard region. There are also no components for regions 5 and 6 because no hauls in these regions are being considered due to the absence of mammal takes. The equation says, for example, that for a haul in region 2 the Z value is 0.548 less than it would be for a haul with the same characteristics in region 1.

The estimated standard errors associated with the coefficients of Ln(Effort) to Day^2 in order are 0.166, 0.573, 0.534, 0.533, 0.634, 0.318, 0.0161 and 0.000154, respectively, resulting in z-scores and significance levels of $z = 3.39$ and $p = 0.001$ for Ln(Effort), $z = -0.96$ and $p = 0.339$ for Region2, $z = 0.45$ and $p = 0.651$ for Region3, $z = -1.83$ and $p = 0.068$ for Region4, $z = -0.05$ and $p = 0.958$ for Region7, $z = 2.09$ and $p = 0.037$ for Pinger, $z = -4.49$ and $p < 0.001$ for Day, and $z = 4.65$ and $p < 0.001$ for Day^2. Hence the coefficients of Ln(Effort), Day and Day^2 are highly significantly different from zero, while the coefficient for Pinger is significantly different from zero at the 5% level. None of the coefficients for the region effects are significantly different from zero at the 5% level, but nevertheless the overall effect of the region variable is very highly significant ($p < 0.001$).

The estimated coefficients in the equation indicate that the probability of a bird take increases with the fishing effort, is higher in region 3 than in region 1, is lower in regions 2, 4 and 7 than in region 1, increases with the use of a pinger, and decreases and then increases with the fishing day. For all of the hauls in regions 1 to 4 and 7 the lowest estimated probability of a bird take is 0.00015 for a haul at the end of July 2002 in region 4 (Uyak Bay), without a pinger being used, with a fishing effort equivalent to only 0.0003 of a 150 fathom net fished for a day. For the same set of hauls the highest estimated probability of a bird take is 0.302 for a haul in early September 2005 in region 3 (Uganic Bay and Uganic Passage), with a pinger used, with a fishing effort equivalent to 0.59 of a 150 fathom net fished for a day.

The estimated effect of the time in the season and the use of a pinger are illustrated in Figure 9.9. These appear to be a strong real effects. Apparently for some reason the

probability of a bird take is much lower in the middle of summer than it is in early or late summer, and is increased appreciably if a pinger is used to deter mammals from approaching the net.

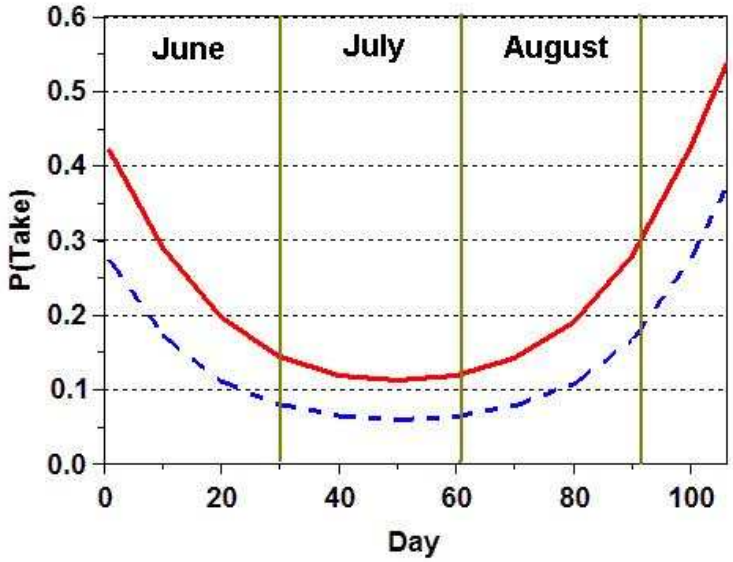


Figure 9.9 The estimated probability of a take of one or more birds as a function of the day in the season, with June 1 being day 1. The fishing effort is set equal to 1.0 (a 150 fathom net fished for 24 hours), and the fishing region is set to 1 (Kupreanof Straits and North Cape). The probability is estimated to be higher if a pinger is present (—) rather than absent (– –).

Based on the standard logistic regression testing methods the fit of the equation to the data is very highly significant (chi-squared = 64.00 with 8 df, $p < 0.001$). This is confirmed by a randomization test which also gives a p-value of less than 0.001.

Family Alcidae

For birds of the family Alcidae the initial consideration of single variables in the logistic regression equation suggested that the probability of a take of one or more birds may be related to the use of a pinger, the fishing day, the fishing region, the air temperature, the fishing effort, the mesh size, the hook shape, and the net material, where these variables are in the order of their significance (most significant, $p < 0.001$, to least significant, $p = 0.043$) as single variables in the logistic regression equation. The fishing effort was represented in the equation by Ln(Effort) but the coefficient was 0.414 and significantly less than one. Equation (9.2) is therefore not appropriate for the data and Ln(Effort) is considered the same as the other variables in accounting for the bird take.

There was no take of Alcidae birds in regions 5 and 6 (Olga Bay and Moser Bay), which is at least partly responsible foe the very highly significant ($p < 0.001$) relationship

between the Alcidae take and the Region variable. When the bird take was related to the individual variables with the reduced data set of 3068 hauls from regions 1 to 4 and 7 significant relationships were found for the fishing day, the use of a pinger, the air temperature, the fishing region, the fishing effort, the tide code, the hook shape, and the mesh size, in the order of their significance.

Adding the variables into the logistic regression equation one at a time in order of their significance as individual variables and removing variables that are not significant at the 5% level resulted in a final equation including the variables for the fishing effort, the fishing region, the use of a pinger, the fishing day, and the tide code. These are the same variables as were chosen for the take of all birds, and the tide code effect is still anomalous. The significance comes about because there were only five hauls with a tide code of 0 (other or missing) and one of these involved a Alcidae bird take, which is unexpected because overall only 1.9% of all hauls involved an Alcidae bird take. When the haul with a tide code of 0 is included in the data the effect of the tide code is significant at the 5% level ($p = 0.022$). With this haul omitted the effect is not at all significant ($p = 0.200$). As a tide code of 0 is uninformative it was concluded that the tide code effect should be removed from the logistic regression equation, resulting in the final estimated equation becoming

$$P(\text{Take}) = \text{Exp}(Z)/\{1 + \text{Exp}(Z)\} \qquad (9.5)$$

where

$$\begin{aligned} Z = \text{Exp}\{&-1.691 + 0.452(\text{Ln}(\text{Effort})) - 0.457(\text{Region2}) + 0.133(\text{Region3}) \\ &- 0.913(\text{Region4}) - 0.209(\text{Region7}) + 0.762(\text{Pinger}) - 0.0848(\text{Day}) \\ &+ 0.000844(\text{Day}^2)\}. \end{aligned}$$

This is rather similar to equation (9.4) for the probability of a take of any bird species because most birds taken were of the family Alcidae.

The estimated standard errors associated with the coefficients of Ln(Effort) to Day^2 in order are 0.173, 0.628, 0.600, 0.589, 0.737, 0.353, 0.0176 and 0.000168, respectively, resulting in z-scores and significance levels of $z = 2.61$ and $p = 0.009$ for Ln(Effort), $z = -0.73$ and $p = 0.467$ for Region2, $z = 0.22$ and $p = 0.824$ for Region3, $z = -1.55$ and $p = 0.121$ for Region4, $z = -0.28$ and $p = 0.777$ for Region7, $z = 2.16$ and $p = 0.031$ for Pinger, $z = -4.82$ and $p < 0.001$ for Day, and $z = 5.02$ and $p < 0.001$ for Day^2. Hence the coefficients of Ln(Effort), Day and Day^2 are highly significantly different from zero, while the coefficient for Pinger is significantly different from zero at the 5% level. None of the coefficients for the region effects are significantly different from zero at the 5% level, but nevertheless the overall effect of the region variable is very highly significant ($p < 0.001$).

The estimated coefficients in the equation indicate that the probability of an Alcidae bird take increases with the fishing effort, is higher in region 3 than in region 1, is lower in

regions 2, 4 and 7 than in region 1, increases with the use of a pinger, and decreases and then increases with the fishing day. For all of the hauls in regions 1 to 4 and 7 the lowest estimated probability of an Alcidae bird take is 0.00024 for a haul at the end of July 2002 in region 4 (Uyak Bay), without a pinger being used, with a fishing effort equivalent to only 0.0003 of a 150 fathom net fished for a day. For the same set of hauls the highest estimated probability of a bird take is 0.272 for a haul in early September 2005 in region 3 (Uganic Bay and Uganic Passage), with a pinger used, with a fishing effort equivalent to 0.59 of a 150 fathom net fished for a day. This haul also has the maximum probability of a take for all birds. The estimated effect of the time in the season and the use of a pinger are illustrated in Figure 9.10.

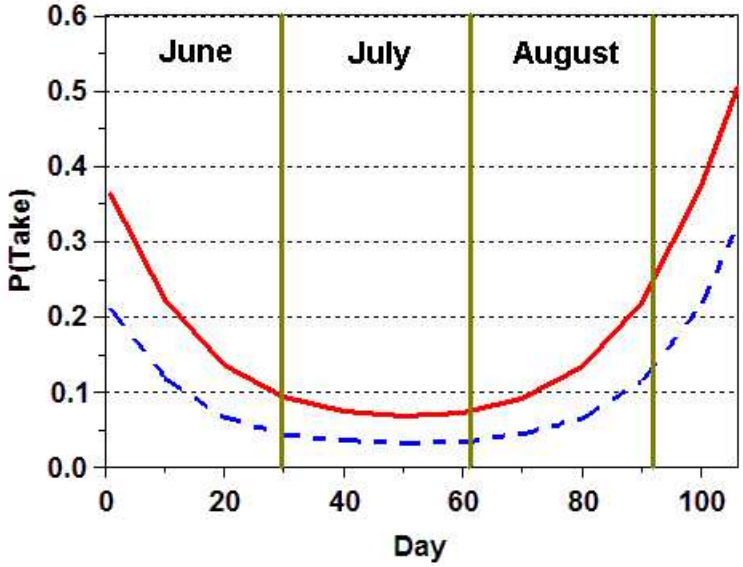


Figure 9.10 The estimated probability of a take of one or more Alcidae birds as a function of the day in the season, with June 1 being day 1. The fishing effort is set equal to 1.0 (a 150 fathom net fished for 24 hours), and the fishing region is set to 1 (Kupreanof Straits and North Cape). The probability is estimated to be higher if a pinger is present (—) rather than absent (– –).

Based on the standard logistic regression testing methods the fit of the equation to the data is very highly significant (chi-squared = 53.96 with 8 df, $p < 0.001$). This is confirmed by a randomization test which also gives a p-value of less than 0.001.

Common Murres

For common murres the initial consideration of single variables in the logistic regression equation suggested that the probability of a take of one or more birds may be related to the fishing day, the use of a pinger, the fishing zone, the air temperature, the water temperature, the fishing region, the the fishing effort, the water depth, and the tide code, where these variables are in the order of their significance (most significant, p <

0.001, to least significant, p = 0.051) as single variables in the logistic regression equation. The fishing effort was represented in the equation by Ln(Effort) but the coefficient was 0.471 and significantly less than one. Equation (9.2) is therefore not appropriate for the data and Ln(Effort) is considered the same as the other variables in accounting for the bird take.

There was no take of common murres in regions 1, 5 and 6 (Kupreanof Straits/North Cape, Olga Bay and Moser Bay), which is at least partly responsible for the significant (p = 0.023) relationship between the common murre take and the Region variable. When the common murre take was related to the individual variables with the reduced data set of 2815 hauls from regions 2 to 4 and 7 significant relationships were found for the fishing day, the water temperature, the use of a pinger, the air temperature, the fishing zone, the fishing effort, and the tide code, in the order of their significance.

Adding the variables into the logistic regression equation one at a time in order of their significance as individual variables and removing variables that are not significant at the 5% level resulted in a final equation including the variables for the fishing day, the water temperature, the use of a pinger, and the fishing zone. These are not the same variables as were chosen for the take of all birds and the take of Alcidae birds, with the final logistic regression equation for common murres being

$$P(\text{Take}) = \text{Exp}(Z)/\{1 + \text{Exp}(Z)\} \qquad (9.6)$$

where

$$Z = \text{Exp}\{0.432 - 0.0910(\text{Day}) + 0.00104(\text{Day}^2) - 0.296(\text{WtrTemp}) + 1.068(\text{Pinger}) - 6.475(\text{FZCode0}) - 1.235(\text{FZCode2}) - 0.547(\text{FZCode3}) - 5.446(\text{FZCode5})\}.$$

The estimated standard errors associated with the coefficients of Day to FZCode5 in order are 0.0283, 0.000247, 0.141, 0.395, 15.131, 0.397, 0.669 and 10.052, respectively, resulting in z-scores and significance levels of z = -3.21 and p = 0.001 for Day, z = 4.20 and p < 0.001 for Day^2, z = -2.10 and p = 0.035 for WtrTemp, z = 2.70 and p = 0.007 for Pinger, z = -0.43 and p = 0.669 for FZCode0, z = -3.11 and p = 0.002 for FZCode 2, z = -0.82 and p = 0.414 for FZCode3, and z = -0.54 and p = 0.588 for FZCode5. Hence the coefficients of Day, Day^2 and Pinger are highly significantly different from zero, while the coefficient for WtrTemp is significantly different from zero at the 5% level. Only one of the fishing zone coefficients is significant, but nevertheless the overall effect of this variable is significant (p = 0.041).

The fishing zone variables are equal to 1 for a haul in the fishing zone indicated, or are otherwise equal to zero. For example FZCode2 is 1 for a haul in fishing zone 2, but zero for hauls in the other zones. There is no variable for fishing zone 1 because this is the standard zone. There is also no variable for fishing code 4 (river) because this zone did

not occur in the fishing regions where common murre take occurred. The negative coefficient of FZCode2, for example, indicates that the estimated probability of a common murre take is lower in fishing zone 2 than it is in fishing zone 1. The large negative coefficients for fishing zones 0 and 5 occur because there was no common murre take in these zones. Effectively the large negative values make the estimated probability of a take zero in these zones.

The estimated coefficients in the equation indicate that the probability of a common murre take decreases and then increases with the fishing day, decreases as the water temperature increases, and increases with the use of a pinger. Regarding fishing zones, the estimated probability of a take is zero for zone 0 (unknown or other) and zone 5 (channel or canal) because no take was observed in these zones. However these zones only occurred with 67 hauls, so the lack of take is not surprising. The estimated probability of a take is significantly lower for zone 2 (inside large bay) than it is for zone 1 (open water), and the estimated probability of a take is also lower for zone 3 (inside sheltered bay) than it is for zone 1, although not significantly lower. There were 548 hauls in zone 1, and 13 with common murre takes, giving a take rate of 2.37 per 100 hauls. In zone 2 there were 1891 hauls and 14 with takes, giving a take rate of 0.74 per 100 hauls, while in zone 3 there were 309 hauls and 3 with takes, giving a take rate of 0.97 per 100 hauls. It does seem, therefore that the probability of a common murre take is higher in open water than it is inside bays.

Although the estimated probability of a common murre take is lower inside large bays than in open water it is interesting to note that takes of more than one common murre only occurred in fishing zone 2. There a total of 20 common murres were taken during 1891 hauls, giving a take rate of 1.06 birds per 100 hauls. The rate is still higher in zone 1 (2.37 birds per 100 hauls), but slightly lower in zone 3 (0.97 birds per 100 hauls).

For all of the hauls in regions 2 to 4 and 7 the estimated probability of a common murre take is effectively zero for hauls in fishing zones 0 or 5 (unknown or missing, channels or canals). The lowest estimated probability in other zones is 0.00047 for a haul in early July 2005 in region 2 (Viekoda Bay), without a pinger being used, in fishing zone 2, with a water temperature of 16.5°C. For the same set of hauls the highest estimated probability of a common murre take is 0.216 for a haul in early September 2005 in region 7 (Alitak Bay), without a pinger used, in fishing zone 1, with a water temperature of 12.2°C.

Based on the standard logistic regression testing methods the fit of the equation to the data is very highly significant (chi-squared = 44.65 with 8 df, $p < 0.001$). This is confirmed by a randomization test which also gives a p-value of less than 0.001.

Tufted Puffins

For tufted puffins the initial consideration of single variables in the logistic regression equation suggested that the probability of a take of one or more birds is related only to the

fishing day (p = 0.026). The fishing effort was represented in the equation by Ln(Effort) but the coefficient was 0.473 and not significantly different from zero (p = 0.239). Equation (9.2) is therefore not appropriate for the data and Ln(Effort) is considered the same as the other variables in accounting for the bird take.

Although the effect of the fishing region is not significant, there was no take of tufted puffins in regions 1, 5, 6 and 7 (Kupreanof Straits/North Cape, Olga Bay, Moser Bay and Alitak Bay). When the take was related to the individual variables with the reduced data set of 2635 hauls from regions 2 to 4 the only significant relationship was still only with the fishing day, and the estimated equation relating the probability of a tufted puffin take to the fishing day is

$$P(\text{Take}) = \frac{\text{Exp}\{-3.876 - 0.199(\text{Day}) + 0.00128(\text{Day}^2)\}}{1 + \text{Exp}\{-3.876 - 0.199(\text{Day}) + 0.00128(\text{Day}^2)\}}. \qquad (9.7)$$

The estimated standard error associated with the coefficient of Day is 0.047. This coefficient is therefore highly significantly different from zero (z = -2.75, p = 0.006). The estimated standard error associated with the coefficient of Day^2 so that this coefficient is also highly significant (z = 2.81, p = 0.005). Figure 9.11 shows how the estimated probability of a tufted puffin take varies over the fishing season.

Based on the standard logistic regression testing methods the fit of the equation to the data is very significant (chi-squared = 7.70 with 2 df, p = 0.021). This is confirmed by a randomization test which gives a p-value of 0.034.

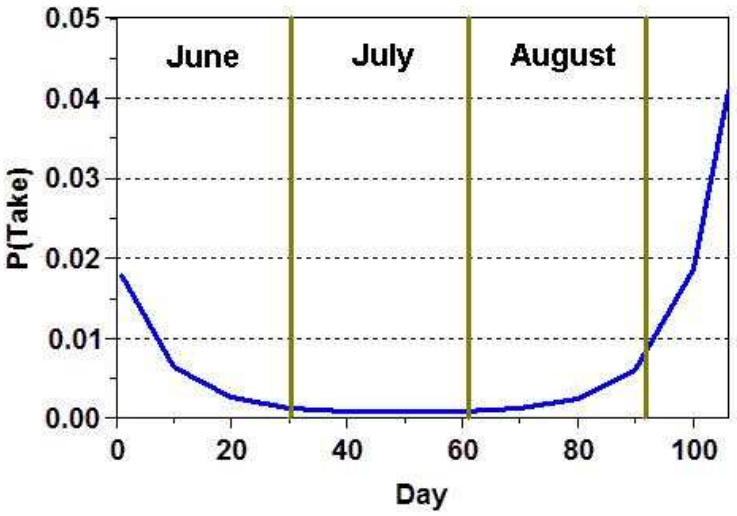


Figure 9.11 The estimated probability of a take of one or more tufted puffins as a function of the day in the season, with June 1 being day 1.

Pigeon Guillemots

For pigeon guillemots the initial consideration of single variables in the logistic regression equation suggested that the probability of a take of one or more birds is related only to the use of a pinger (p = 0031), and the tide code. The fishing effort was represented in the equation by Ln(Effort) but the coefficient was 0.668 and not significantly different from zero (p = 0.073). Equation (9.2) is therefore not appropriate for the data and Ln(Effort) is considered the same as the other variables in accounting for the bird take.

Although the effect of the fishing region is not significant, there was no take of pigeon guillemots in regions 5 and 6 (Olga Bay and Moser Bay). When the bird take was related to the individual variables with the reduced data set of 3068 hauls from regions 1 to 4 and 7 there were still significant relationships with the use of a pinger (p = 0.048) and the tide code (p = 0.030).

As happened for other categories of bird take, the tide code effect is due to a pigeon guillemot take occurring with a tide code of 0, although this tide code only occurred with five of the hauls in 2002 and 2005. A tide code of 0 means that it was either missing or other. This is therefore not informative. If the take with a tide code of 0 is removed from the data then the tide code effect becomes not at all significant (p = 0.531). It was therefore not considered appropriate to include the tide code effect in the final estimated equation.

The final estimated equation relating the probability of a pigeon guillemot take to the use of a pinger in regions 1 to 4 and 7 is

$$P(\text{Take}) = \frac{\text{Exp}\{-6.021 + 1.261(\text{Pinger})\}}{1 + \text{Exp}\{-6.021 + 1.261(\text{Pinger})\}}. \qquad (9.8)$$

The estimated standard error associated with the coefficient of Pinger is 0.604. This coefficient is therefore significantly different from zero (z = 2.09, p = 0.037). According to this equation the probability of a pigeon guillemot take without the use of a pinger is 0.0024, while with the use of a pinger this probability becomes 0.0085.

Based on the standard logistic regression testing methods the fit of the equation to the data is just significant at the 5% level (chi-squared = 3.20 with 1 df, p = 0.048). However, a randomization test gives a non-significant result (p = 0.141). Given the small number of pigeon guillemot takes the randomization test is more reliable than the approximate chi-squared test. Consequently, for pigeon guillemots the relationship between take and the use of pingers is not clearly established.

Pelagic Cormorants

For pelagic cormorants the initial consideration of single variables in the logistic regression equation suggested that the probability of a take of one or more birds is related to the fishing effort ($p < 0.001$), fishing day ($p = 0.009$), the fishing region ($p = 0.013$), and perhaps also to the fishing year ($p = 0.053$). The fishing effort was represented in the equation by Ln(Effort) but the coefficient was 2.076. Equation (9.2) is therefore not appropriate for the data and Ln(Effort) is considered the same as the other variables in accounting for the bird take.

There was no pelagic cormorant take in regions 4, 5 and 6 (Uyak Bay, Olga Bay, and Moser Bay). When the bird take is related to the individual variables with the reduced data set of 1782 hauls from regions 1 to 3 and 7 there are still significant relationships between the pelagic cormorant take and the fishing effort ($p < 0.001$), the fishing day ($p = 0.014$), and the fishing year ($p = 0.038$).

When variables were added into the logistic regression equation in order of their significance, with non-significant effects then removed, the final equation obtained only included the fishing effort and the fishing day. The estimated equation is

$$P(\text{Take}) = \frac{\text{Exp}\{-1.096 + 2.015(\text{LnEff}) - 0.0398(\text{Day})\}}{1 + \text{Exp}\{-1.096 + 2.015(\text{LnEff}) - 0.0398(\text{Day})\}}. \qquad (9.9)$$

The estimated standard error associated with the coefficient of LnEff is 0.613. This coefficient is therefore very highly significantly different from zero ($z = 3.29$, $p = 0.001$). The estimated standard error associated with the coefficient of Day is 0.0177. This coefficient is therefore also significantly different from zero ($z = -2.24$, $p = 0.025$). Figure 9.12 shows how the estimated probability of a pelagic cormorant take reduces from the start of June to early September.

Based on the standard logistic regression testing methods the fit of the equation to the data is very significant (chi-squared = 20.27 with 2 df, $p < 0.001$). This is confirmed by a randomization test which also gives $p < 0.001$.

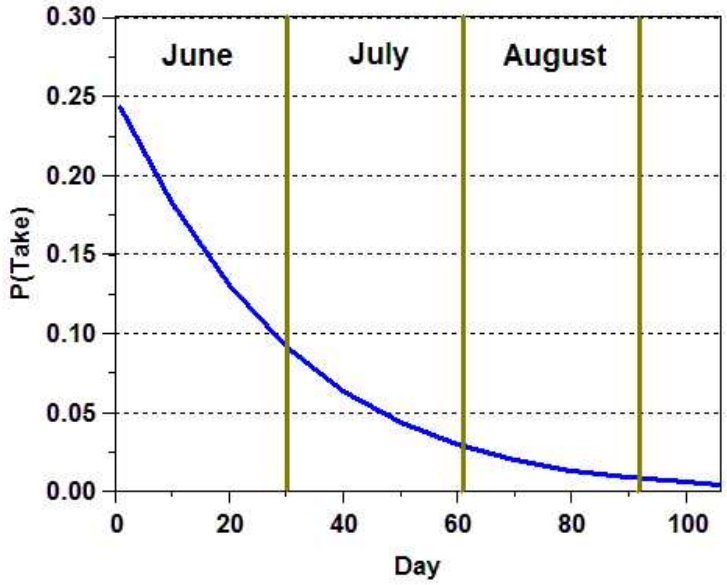


Figure 9.12 The estimated probability of a take of one or more pelagic cormorants as a function of the day in the season, with June 1 being day 1. The fishing effort is set to one (a 150 fathom net fished for 24 hours) for calculating the probabilities.

Marbled Murrelets

For marbled murrelets the initial consideration of single variables in the logistic regression equation suggested that the probability of a take of one or more birds is related to the fishing region ($p = < 0.001$) and the fishing day($p = 0.036$). The fishing effort was represented in the equation by Ln(Effort) but the coefficient was -0.035 and far from significant ($p = 0.898$). Equation (9.2) is therefore not appropriate for the data and Ln(Effort) is considered the same as the other variables in accounting for the bird take.

Marbled murrelet take only occurred in regions 1 and 3 (Kupreanof Straits and North Cape, and Uganic Bay and Uganic Passage). When the bird take was related to the individual variables with the reduced data set of 1040 hauls from regions 1 and 3 there was a significant relationships between the marbled murrelet take and the fishing day ($p = 0.043$), and the tide code($p = 0.030$).

When the two variables were added into the logistic regression equation in order of their significance, with non-significant effects removed, the final equation included the tide code and the fishing day without Day^2. The estimated equation is

$$P(Take) = Exp(Z)/\{1 + Exp(Z)\} \qquad (9.10)$$

where

$$Z = -2.463 - 2.182(TdCode2) - 7.522(TdCode3) - 7.652(TdCode4) - 0.0426(Day)$$

There are no terms for tide codes 0 (Other) and 1 (ebb tide) in this equation. This is because there were no hauls with tide code 0 in regions 1 and 3, while tide code 1 is taken as the standard code that others are compared to. The large negative coefficients for tide codes 3 (high slack) and 4 (low slack) occur because no marbled murrelet take was observed on hauls with these tide codes, and the coefficients effectively make the probability of a take equal to zero for these codes. The standard error of the coefficient for tide code 2 (flood tide) is 1.066. This coefficient is therefore significantly different from zero ($z = -2.05$, $p = 0.041$), so that the take on a flood tide (tide code 2) is significantly less than the take on an ebb tide (tide code 1). The standard error of the coefficient of Day is 0.0180. This coefficient is therefore significantly different from zero ($z = -2.36$, $p = 0.018$).

According to equation (9.10) marbled murrelet take does not occur when there are high or low slack tides, the probability of a take is higher with an ebb tide than with a flood tide, and decreases as the fishing season progresses. Figure 9.13 shows the estimated probabilities of a take when there is an ebb tide or flood tide at different times in the fishing season.

Based on the standard logistic regression testing methods, the fit of equation (9.10) to the data is very significant (chi-squared = 16.17 with 4 df, $p = 0.003$). This is confirmed by a randomization test which gives $p = 0.002$.

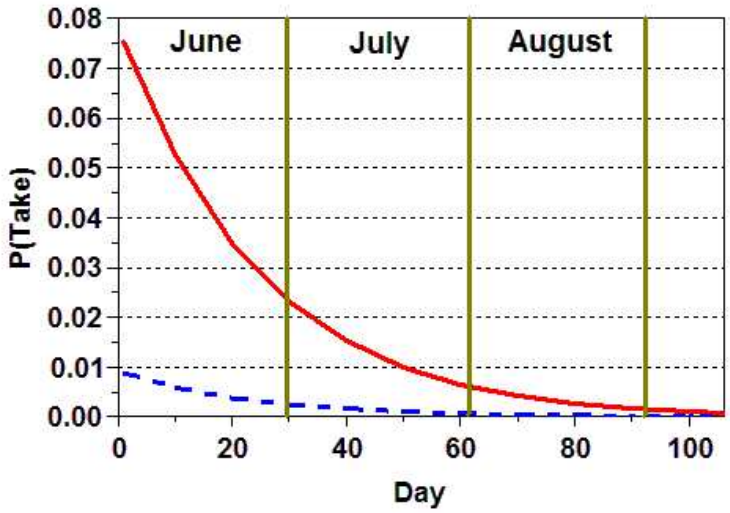


Figure 9.13 The estimated probability of a take of one or more marbled murrelets as a function of the day in the season, with June 1 being day 1, for an ebb tide (—) and a flood tide (– –).

Summary

The above analysis of the relationship between probabilities of bird and mammal takes and variables recorded by the observers does not give the same results as the analyses

of the 2002 data only, as reported by Manly *et al*. (2003), for three reasons. First, most of the haul data analyzed for the present report came from 2005 rather than 2002. As a result some of the significant or nearly significant effects have become definitely non-significant, and other effects have become clearly significant. Second, the analyses described above have considered more than one effect at a time whereas the early analyses just considered the variables one by one because of the small data set that was available. Finally, the analyses considered here only considered the estimation of the probability of a take in regions where take has been observed to occur.

For mammals the above analysis indicates that the probability of take is related to the water temperature and there is some suggestion that it also varies with the net material. This reflects the results shown in Figure 9.1 where it will be seen that there were no marine mammal takes at water temperatures above12.5°C, and the takes only occurred with net materials 3 (six-strand mono) and 4 (multi-strand mono).

It is possible that the apparent water temperature effect is an indirect effect of another variable. Figure 9.14 shows that the average water temperature was similar in all of the regions, increased with the fishing day in the season, has no clear relationship with the water depth, and tended to increase with the air temperature. This is reflected in the observation from Figure 9.1 that mammal did not occur late in the fishing season or when the air temperature was high.

A negative association between mammal take and the use of pingers might have been anticipated because other studies have provided some evidence for this for some marine mammal species (Cameron and Forney, 1999, 2000; Trippel *et al*., 1999; Barlow and Cameron, 2003). What was observed in Kodiak in 2002 and 2005 was that there were 589 hauls where a pinger was used. For one of these hauls a harbor porpoise take occurred, giving a mammal take rate of 0.17 per 100 hauls. There were also 2796 hauls with no pinger, with 7 of these involving mammal takes. This is a mammal take rate of 0.25 per 100 hauls, which is very close to the take rate with a pinger used. This is why no significant effect of the use of pingers has been found. A problem here (as with other variables not having significant relationship with take) is the lack of power to detect a significant relationship for species with a relatively low take rate. For example, Dawson *et al*. (1998, Figure 2) show that if the take rate is about 0.25% without pingers, then to obtain an 80% power of detecting a 50% reduction in this rate through the use of pingers requires many more than 10,000 hauls to be observed.

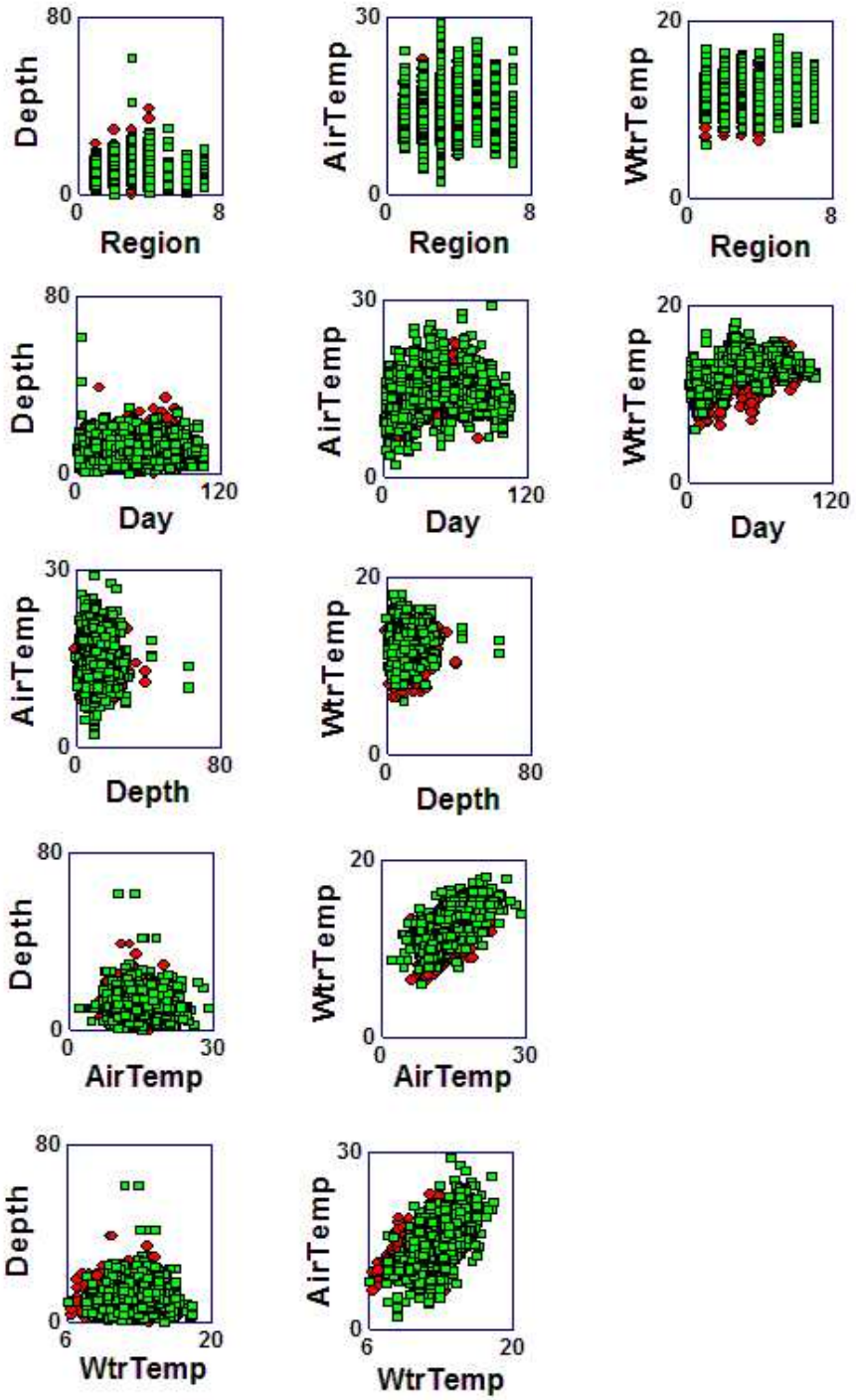


Figure 9.14 The relationship between the water depth, the air temperature and the water temperature and the fishing regions (1 to 8), the fishing day in the season, and each other for 2002 (●) and 2005 (■).

Most birds in the take were common murres in the family Alcidae. As a result the outcome of the analyses are rather similar for all birds, Alcidae birds and common murres. In each case the probability of a take has been found to be related to the use of a pinger, the day in the fishing season, and the fishing effort. An increase in the probability of a take is expected with increasing fishing effort, so that does not call for any special comment. The apparent effects of pingers and the day in the season were, however, not necessarily expected.

Apparently the use of a pinger increased the probability of a take, although this contradicts the finding by Melvin *et al*. (1999) that pingers significantly reduced common murre take in Puget Sound, Washington. It is not clear why the two studies differ but possibly this is related to other aspects of the fishing conditions. What is clear from the present study is that bird take often occurred when pingers were used. There were 2796 hauls without pingers, with 43 of these having a bird take. That gives a take rate of 1.5 per 100 hauls. There were 589 hauls with pingers used, with 26 of these having a bird take. That gives a take rate of 4.4 per 100 hauls, which is nearly three times the rate for hauls without pingers. This is the basis for finding that the probability of bycatch is very highly significantly related to the use of pingers.

A day in the season effect also seems quite clear for all birds, birds in the family Alcidae, and common murres. It is modeled as a non-linear relationship, with the highest probability of bycatch occurring at the start and end of the fishing season.

For the individual species other than common murres there are various significant effects. The fishing day effect is significant for tufted puffins, with the highest estimated probabilities of a take at the start and end of the fishing season. This effect is also significant for pelagic cormorants and marbled murrelets, but with the highest estimated probabilities of a take at the start of the fishing season. A pinger effect is estimated for pigeon guillemots. This is significant based on standard testing methods for logistic regression, but not based on a more reliable randomization test. For marbled murrelets there is a significant effect related to the tide code as well as the fishing day. Their were no takes with high or low slack tides, and the estimated probability of a take is higher with an ebb tide than it is with a flood tide.

10. Sample Size Determination for Future Studies

The data on trips collected by the observers can be used to determine the accuracy of estimation of total takes for different species that can be expected if the Kodiak fishery is sampled again in the future and it still has about the same level of fishing effort as was the case in 2005. The results will also give a good indication of the accuracy of estimation that would be obtained if another fishery with a similar level of fishing effort is sampled in the future. It is also possible to determine the power for detecting a difference in the bycatch rate for a mammal or bird species when two fisheries are sampled, or when the same fishery is sampled in two different years, providing that the fishery has a level of total fishing effort that is similar to the Kodiak effort in 2005.

A simulation approach was used, based on a model for the Kodiak fishing effort in 2005. The trip (sample day) data were combined from 2002 and 2005. This provided data for each of the seven fishing regions. The data from each region were then replicated as many times as necessary to produce a set of trips with approximately the same total fishing effort as for the Kodiak fishery in 2005. For example, in region 1 (KI1A, Kupreanof Straits and North Cape) data are available from 59 trips in 2002 or 2005 where some fishing effort was observed. The total fishing effort observed from these trips is 53.9 permit days, as defined in Section 4. In 2005 the total fishing effort recorded for region 1 was 844.6 permit days. The sample data therefore need to be replicated 844.6/53.9 = 15.7 times in order to give the same total effort as was recorded for region 1 in 2005. This was done by listing the data from the 59 sample trips 16 times and taking the first 15.7x59 = 925 records from the top of the list as the fishery data for region 1. These data then provide a model for the Kodiak fishery in 2005, in region 1. The total effort from the 925 trips in the model is 846.1 permit days, which is close to the 844.6 permit days recorded for region 1 in 2005.

Table 10.1 Calculations for producing a model population for Kodiak in 2005.

Region	Trips	Sample Effort	Total Effort	Model Sample Days	Factor	Model Effort
1	59	53.9	844.6	925	15.7	846.1
2	131	138.2	1278.3	1212	9.3	1274.1
3	193	181.7	1936.6	2057	10.7	1938.8
4	304	316.6	3818.2	3666	12.1	3825.6
5	32	26.6	570.2	685	21.4	570.3
6	45	59.0	1158.2	883	19.6	1157.4
7	40	68.0	1229.1	723	18.1	12272
Total	804	844.0	10835.2	10151		10839.4

Table 10.1 gives a summary of the calculations needed to produce the model population of sample days for Kodiak in 2005. The model population has a total fishing effort of 10,839.4 permit days, which is very close to the observed total effort of 10,835.2

fishing days. The expansion factors for the sample trips in regions 1 to 4 are lower than those for regions 5 to 7 because regions 5 to 7 were not sampled in 2002.

Each of the trips in the model population had take records for the mammals and birds observed to be taken in Kodiak in one or both of the years 2002 and 2005. Information on these takes is shown in Table 10.2. Some of the species codes in this table are used below to describe the simulation results. The total take numbers for the population are shown, together with the maximum number of animals taken on one sample day. For example, the model population has a total take of 38 sea otters, with a maximum of two of these taken on one sample day.

Table 10.2 The take of different species of mammals and birds in the model population for Kodiak 2005.

Species	Code	Total Take	Maximum Take[1]
Harbor Porpoise	HAPO	47	1
Sea Otter	SEOT	38	2
Unknown Otter	UNOT	15	1
Common Murre	COMU	401	7
Pelagic Cormorant	PECO	133	2
Pigeon Guillemot	PIGU	129	1
Marbled Murrelet	MAMU	122	2
Tufted Puffin	TUPU	118	5
Red-faced Cormorant	RFCO	21	1
Thick-billed Murre	TBMU	21	1
Harlequin Duck	HARD	20	1
Kittlitz's Murrelet	KIMU	18	1
White-winged Scoter	WWSC	12	1
Sooty Shearwater	SOSH	11	1
Horned Puffin	HOPU	10	1

[1]The maximum number of mammals or birds taken on a single sampled day.

Coefficients of Variation for Different Sample Sizes

The percentage coefficient of variation (CV) is a convenient parameter for describing the accuracy of estimation for the take of a mammal or bird species because it indicates the likely level of sampling errors in terms of a percentage of the estimated bycatch rate. In general in fisheries sampling and estimation a CV of up to about 25% is considered to provide reasonable accuracy. This is because an approximate 95% confidence interval for the true value of the parameter of interest (the estimate ± two standard errors) then runs from 50% of the estimated value up to 150% of the estimated value. In practice the amount of sampling that is required to obtain a CV of 25% may be more than is possible, given the resources available. It is then a matter of judgement as to what CV is reasonable under the circumstances.

The CVs obtained with levels of observer cover from 2.5% to 100% were determined by simulation, using the model population described above. For example, to determine the CVs obtained with a 2.5% sample of the fishery the following procedure was used.

(a) A random sample of 2.5% of the 10151 permit days in the model population was selected (234 sample days).

(b) For each of the species listed in Table 10.2 ratio estimation was used to estimate the total take for the whole fishery. Thus the take per permit day was estimated as $r = t_c / t_s$, where t_c is the total number of animals of the species taken and t_s is the total sampled effort in permit days. The total take for the whole model fishery was then estimated by $T = T_e\ r$, where $T_e = 10{,}839.4$ is the total effort in the model fishery.

(c) Steps (a) and (b) were repeated 5,000 times. The estimated CV for the species was then the standard deviation from the 5000 estimates of the total take expressed as a percentage of the true total take in the model population.

This process was carried out with coverage levels of 2.5%, 5.0%, 7.5%, 10%, 20%, 40%, 60%, 80%, 90% and 95%. In addition it is known that with 100% cover the CV is 0% because there are no sampling errors. The simulation was carried out using Resampling Stats for Excel (Blank, 2006).

Figure 10.1 gives a summary of the simulation results. The results were almost the same for some of the species shown in Table 10.2 so are only provided for a selection of seven of these species, ranging from the common murre with a total take of 401 and the lowest CV for all of the sample coverage levels up to 100%, to the horned puffin with a total take of 10 and the highest CV for all of the sample coverage levels up to 100%. In general the CV is expected to decrease as the total take increases. This rule does not apply, however, with the harbor porpoise and the tufted puffin which have the same CV curve in Figure 10.1 although the total take of the harbor porpoise is 47, which is much lower than the total take of the tufted puffin which is 118. In this case the CV values for the tufted puffin are larger than might be expected because up to five tufted puffins have been taken on a single sample day. This clustering of takes increases the sampling variation and hence leads to higher CV values.

It is clear from Figure 10.1 that getting good estimates of low take levels requires very high coverage levels for the model fishery. For example with the horned puffin about 70% of the total fishing effort is needed to get a CV of 25% for estimating the total take of ten birds.

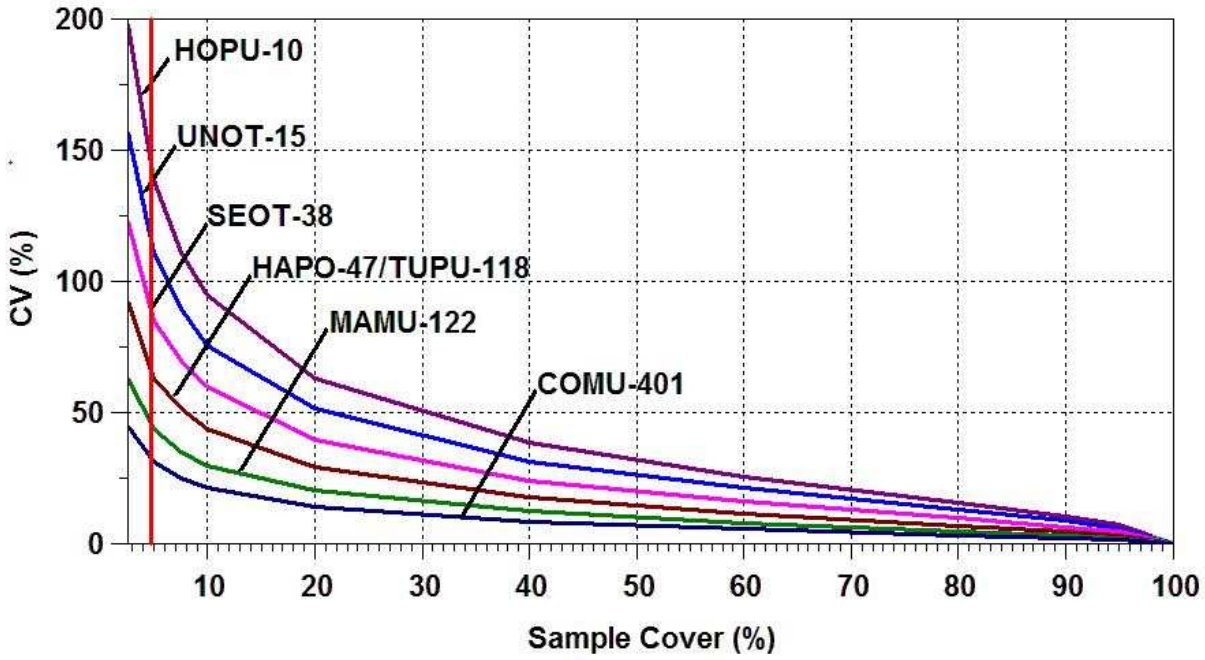


Figure 10.1 The percentage coefficients of variation (CV) obtained from 5000 simulated sets of data for different species (COMU-401 is the common murre with a take of 401 in the model population, MAMU-122 is the marbled murrelet with a take of 122 in the model population, HAPO-47/TUPU-118 is the harbor porpoise with a take of 47 in the model population and the tufted puffin with a take of 118 in the model population, SEOT-38 is the sea otter, with a take of 38 in the model population, UNOT-15 is unidentified otters with a take of 15 in the model population, and HOPU-10 is the horned puffin with a take of 10 in the model population. The vertical line at 4.9% of the sample cover shows the level used in 2005.

Sample Sizes for Comparing Bycatch Rates

Simulation was also used to examine the power to detect a difference in take rates for two fisheries, or the same fishery in two different years, where each fishery has about the same total fishing effort as the Kodiak Island gillnet fishery in 2005. For any mammal or bird species of concern, each fishery or year will provide an estimated take rate per permit day, and it is assumed that there is interest in whether these estimated rates are significantly different.

The model fishery for Kodiak in 2005 was used for the first fishery. Four species were chosen to be representative of all species in this model fishery. These were the common murre, with a very high take rate of 3.70 per 100 permit days, the pigeon guillemot with a high take rate of 1.19 per 100 permit days, the harbor porpoise with a medium take rate of 0.43 per 100 permit days, and the horned puffin with a low take rate of 0.09 per 100 permit days.

The model fishery for Kodiak in 2005 was modified to produce the second fishery. What was done was to increase the take rates for the common murre, pigeon guillemot, harbor porpoise and horned puffin by various amounts up to 200% of the rate in the first

fishery. For example, the second fishery had take rates for the common murre up to 11.11 per 100 permit days, which is 300% of the level for the model fishery in 2005.

Modified take rates were obtained by randomly adding take to the model fishery for Kodiak in 2005. For example, suppose that the take of a species is to be increased by 0.005 per permit day for a species, and that one of the permit days in the model fishery for Kodiak in 2005 has a fishing effort of 0.80. Then a random number can be generated between zero and one, and the take in the model population increased by one if this random number is less than 0.80x0.005 = 0.004. This process can be carried out for each of the permit days in the model population to obtain a model fishery with the increased take rate, and the whole process can be repeated a number of times until the increase in the take rate is exactly the desired 0.005 for the whole fishery.

When comparing take rates for two fisheries the null hypothesis should be that the take rate is the same for both fisheries so that the observed sample difference could have occurred by chance due to both random variation in the fishing process, and in the sampling of that process. This mean that even if the null hypothesis is true and all of the fishing in both fisheries was completely observed the take rates would probably not be quite the same due to the random variation inherent in the fishing process. This can be allowed for by regarding the sampled permit days from each of the fisheries as a random sample of days from an infinite population of sample days that could have occurred, and comparing the two sample estimate of the take rate on this basis. There are then no finite population corrections needed for the estimation of the variances of sample take rates, as was the case considered in Section 6 where the interest was in estimating the take rates and total takes that occurred for the finite populations of permit days that occurred in Kodiak Island in 2002 and 2005.

Bootstrapping was used to simulate sample data from the two fisheries. For the first fishery the permit days in the Kodiak 2005 model population were randomly sampled with replacement to obtain samples of permit days that might have occurred in this fishery. Similarly, the permit days in the model population with increased takes were independently randomly sampled with replacement to obtain samples that might have occurred in the second fishery. This process was repeated 2000 times with the take rates increased by 0%, 25%, 50%, 100% and 200% to estimate probabilities of detecting a change in the take rate for these different situations. For simplicity simple random sampling was simulated although the model populations were stratified into seven regions. Stratified sampling might give more power to detect a difference in take rates, but it is not likely that the power would be much greater than what is reported here. The sample sizes were always equal for the two model populations, consisting of 2.5%, 5%, 10%, 20%, 40%, 80%, 90%, 95% or 100% of the total fishing effort.

Let the observed take rate per permit day in a sample from one of the populations be

$$r = t_c / t_s, \qquad (10.1)$$

where t_c is the total observed take and t_s is the total effort in the sample. The estimated variance of r is then

$$Var(r) = [\sum (c_i - r\, e_i)^2 / (n - 1)] (1 / \bar{e}^2) (1 / n), \quad (10.2)$$

where the summation is over the n sample days, c_i is the take for the ith sample day which has an effort of e_i permit days, and $\bar{e}$ is the mean effort for the n sample days. A statistic for testing whether there is difference between the two fisheries is then

$$Z = |r_1 - r_2| / \{Var(r_1) + Var(r_2)\}^{½}, \quad (10.3)$$

where r_j is the estimated take rate for fishery j with variance $Var(r_j)$. This statistic is the absolute difference of the estimated bycatch rates divided by the estimated standard error of this difference. Assuming that the estimated bycatch rates are approximately normally distributed, the difference between the estimated bycatch rates is then significantly large at the 5% level if Z equals or exceeds 1.96.

Figure 10.2 shows the results obtained. It can be seen that with sample sizes of 5% of the total fishing effort, which is about what was used at Kodiak Island in 2005, there is a power of about 57% (i.e a probability of 0.57) for detecting a doubling of the bycatch rate (difference = 100%) in the second fishery, for a species like the common murre with a very high take rate in the first fishery. This power reduces to only about 12% for a species like the harbor porpoise with moderate take rate, and to less than 5% for a species like the horned puffin with a low take rate. Although a test at the 5% level is expected to give 5% significant results even when the null hypothesis is true the power is less than 5% for some of the simulations. This is a result of obtaining many samples with no bycatch at all. In these cases the estimated take rate is zero, with a zero standard error, and the Z value from equation (10.3) has been set equal to zero, giving a non-significant result.

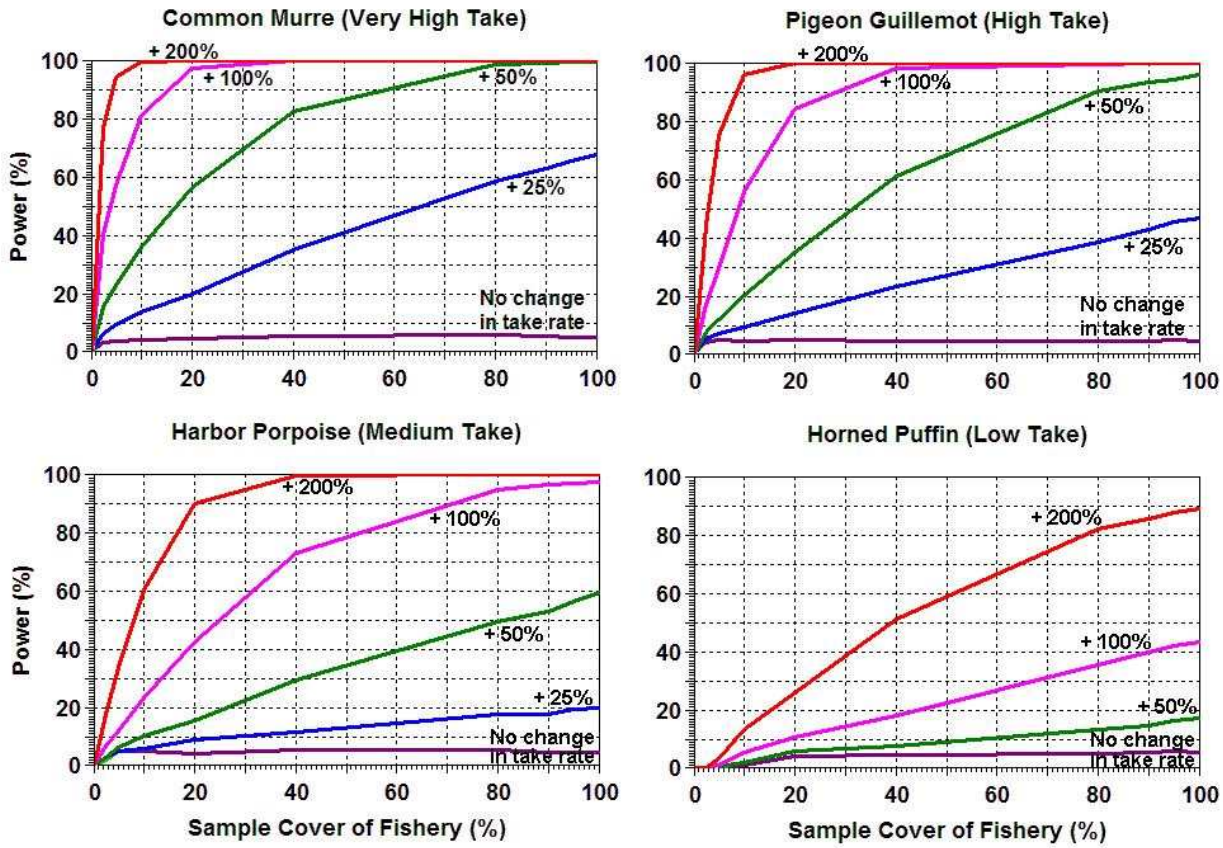


Figure 10.2 The power to detect a difference in take rates between two fisheries using a test at the 5% level of significance. The power is the percentage of significant results from 2,000 tests to compare estimated take rates. The horizontal axis is the expected difference in the bycatch rate for the two fisheries as a percentage of the rate in the first fishery. The four species considered are COMU (the common murre with a very high take rate of 3.70 per 100 permit days in fishery 1), PIGU (the pigeon guillemot with a high take rate of 1.19 per 100 permit days in fishery 1), HAPO (the harbor porpoise with a moderate take rate of 0.43 per 100 permit days in fishery 1), and HOPU (the horned puffin with a low take rate of 0.09 per 100 permit days in fishery 1).

11. Discussion

Marine Mammal Take

There were nine marine mammals observed as take in the Kodiak Island set gillnet fishery in 2002 and 2005. Of these, four were otters that either freed themselves from the net or were removed with human help. There were no external injuries and the animals were responsive (Tables 6.1 and 6.3). Hence the take problem for otters does not seem to be a major concern.

Harbor porpoises are of concern because the four individuals observed as take were all dead when they were released from nets. After allowing for the sampling effort and the total fishing effort, it is estimated that there were a total of 32.2 harbor porpoise mortalities caused by take in the fishery in 2002, with a CV of 67.5% (Table 6.2), and a total of 39.4 harbor porpoise mortalities in 2005, with a CV of 66.9% (Table 6.4).

Angliss and Outlaw (2005, Table 35) provide a summary of the estimated levels of incidental mortality for the Gulf of Alaska stock of harbor porpoise. The total minimum annual mortality that they report is 40.3. Replacing the Kodiak set gillnet mortality estimate of 3.2 based on log-books and self-reports with the mean take estimate of 35.8 for the Kodiak Island gillnet fishery in 2002 and 2005, increases this minimum mortality estimate to 72.9. This represents 29% of the potential biological removal (PBR) of 255 animals for the whole of the Gulf of Alaska stock of harbor porpoises.

The overall observed take rate for harbor porpoises in the Kodiak set gillnet fishery is 0.006 animals per permit day in 2002 and 0.004 per permit day in 2005 (Tables 6.2 and 6.4). This compares with observed take rates of 0.017, 0.013 and 0.170 harbor porpoises per effort day in 1997, 1998, and 1999, respectively, in the California set gillnet fishery for halibut and angel shark (Cameron and Forney, 1999, 2000).

Marine Bird Take

Table 11.1 shows the estimated take rates per fishing day observed for the bird species taken most often in the Kodiak Island fishery in 2002 and 2005, and how they compare with the estimated take rates for the Cook Inlet set gillnet fishery and the California set gillnet fishery for halibut and angel shark. The Kodiak Island take rates are considerably higher than the rates for Cook Inlet, but considerably lower than the rates in the California halibut and angel shark fishery.

Most of the birds observed in the Kodiak Island take are in the family Alcidae. This has been found with other studies as well (Evans and Nettleship, 1985). In British Columbia an estimated 7% of the population of marbled murrelets in Barkley Sound was taken annually in gillnets (Carter and Sealy, 1984; Carter *et al.*, 1995). In Prince William Sound, Alaska, murres and brachyramphus murrelets comprised most of the take (Wynne *et al.*

1991, 1992; Piatt and Naslund, 1995); in Puget Sound, Washington, common murres and rhinoceros auklets (*Cerorhinca monocerata*) were the main take (Melvin *et al*., 1999); and in California common murres were the main take. To reduce seabird take in California, particularly of murres, gillnet fishing has been subject to time and area closures (Takekawa *et al*., 1990; Wild, 1990). In the Atlantic thick-billed murres and common murres were the most common take (Piatt and Reddin, 1984; Evans and Nettleship, 1985; Piatt and Nettleship, 1987), and according to Osterblom *et al*. (2002) gillnet take of common murres may be the single most serious threat to the population in the Baltic Sea.

Table 11.1 Estimated take rates per fishing day for marine birds in the Kodiak Island set gillnet fishery compared with the estimated rates from two other set gillnet fisheries.

	Kodiak Island[1]		Cook Inlet[2]		California Halibut and Angel Shark Fishery[3]		
Species	2002	2005	1999	2000	1997	1998	1999
Common Murre	0.036	0.047	0.000	0.000	0.829	0.668	3.018
Tufted Puffin	0.023	0.009	0.000	0.000			
Pigeon Guillemot	0.016	0.011	0.000	0.000			
Marbled Murrelet	0.013	0.011	0.000	0.003			
Pelagic Cormorant	0.003	0.017	0.000	0.000			
All Birds	0.110	0.103	0.007	0.007	0.871	0.720	3.018

[1]Rates per permit day as defined in Section 6.
[2]Rates are for the Upper Cook Inlet and Lower Cook Inlet set gillnet fisheries, from Manly (2006b).
[3]Rates are for the set gillnet fishery from Cameron and Forney (1999, 2000).

In Kodiak Island in both 2002 and 2005, common murres were the most frequently taken birds. In both years, the majority of these appeared to be non-breeders, and in 2005, nearly all (23 out of 25) were male. Since the largest colonies of murres are on the Alaska Peninsula and Barren Islands, more than 100 km away from the areas where the birds were taken, it is possible that many of the murres feeding in Kodiak bays were not breeding. It is unclear why they were nearly all male, unless there is sex-specific habitat selection. It is possible that the breeding behavior and chronology of murres makes the males more susceptible to take in near-shore areas. Male murres raise the chicks at sea after a few weeks on the cliffs, and in the search for prime forage areas in which to raise their weaker young perhaps they favor the more protected waters of bays during this period (Ainley *et al*., 2002)

Over half of the common murres were taken in September, when most ‘jumplings' have left the colony with their male parent, to complete their final weeks (or months) of chick-rearing. Most of the birds caught in September were classified as being in transitional plumage, and thus could have been post-breeding and molting into basic (winter) plumage. Because the birds were molting it is likely that brood patches were no longer evident, and thus breeding birds could have been a larger proportion of of the taken birds than the records of brood patches indicated. Additionally, after a few weeks fledglings are difficult to distinguish from adults in basic plumage. Therefore, because of

plumage similarities and the degraded state of some specimens, some of the birds classified as ‘transitional' might have actually been juveniles, although the body masses of birds caught in September do not appear different from birds caught earlier in the season.

Based on the chronology of common murres for the colonies at Puale Bay on the Alaska Peninsula and East Amatuli Island as reported in Dragoo *et al*. (2004), the rest of the murres were primarily taken by the Kodiak Island fishery during pre-breeding (June) or peak chick rearing (August). Only one bird was taken in July, which would have been the peak incubation period.

The take of pigeon guillemots is a concern because of their relatively low numbers, their near-shore foraging habits, and their tendency to forage within a few kilometers of their nest sites, which are more widely scattered than the other colonial birds in the area. The total Kodiak Island population is about 2000 birds (Appendix A), and the estimated take in 2002 and 2005 suggests that about 4% of the population is killed annually. This level of bycatch has the potential to be detrimental to the population, and is almost certainly removing breeding adults from the colonies in the immediate area of fishing activity.

In 2002 and 2005 marbled murrelets were a commonly taken. These were all breeding birds, with about equal numbers of males and females. In 2005, the much more rare Kittlitz's murrelet was also taken, and this individual was a juvenile. Although Kittlitz's murrelets were not encountered on the water during the 2002 surveys and net watches, they are known to nest in the Kodiak area and a nest was found on Kodiak Island in 2006. Juvenile murrelets may be particularly susceptible to gillnet mortality, because they tend to feed close to shore and are weak divers (Carter *et al*., 1995). Kittlitz's murrelet is a candidate species for listing under the Endangered Species Act (USFWS, 1994), and as such could become a concern for gillnet fisheries if it is listed. Kittlitz's murrelets were also observed to be taken in the Prince William Sound /Copper River Delta gillnet fisheries in 1990 and 1991 (Wynne *et al*., 1991, 1992).

Puffins comprised a fairly large part of the take in 2002, but less in 2005. The majority were tufted puffins, and these were primarily breeding birds of both sexes. Puffins are the most abundant breeding seabird in the Kodiak area, and their diving foraging behavior makes them susceptible to gillnet bycatch.

Cormorants, made up more of the take in 2005 than in 2002. Those taken in 2005 were pelagic cormorants, with none of the rarer red-faced cormorants that were taken 2002. No definitive brood patch was found on any of the cormorants, indicating that they were non-breeding birds. Red-faced cormorants, because of their low numbers and large declines in population in recent years (Byrd *et al*., 2004; Byrd and Williams, 2004) are currently a species of concern for the U.S. Fish and Wildlife Service (USFWS, 2002a).

Six species of birds are occasionally at risk of being taken in the Kodiak Island set gillnet fishery. Birds that were taken in 2002 but not in 2005 are the red-faced cormorant, least auklet, horned puffin, and sooty shearwater. Birds taken in 2005 but not in 2002 were the Kittlitz's murrelet and white-winged scoter. Thick-billed murres and harlequin ducks were taken both years, but these were only takes of single birds.

Acknowledgments

I am very grateful for the assistance of Mary Sternfeld in data preparation and analysis, and Brian Fadely for assistance in the documentation of the sampling methods used in Kodiak Island in 2002 and 2005.

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Appendix A: Summary of Seabird Colonies on Kodiak Island

Summary of Seabirds Breeding at Colonies on Kodiak Island, Based on Censuses Done in 2000 - 2002[1]

Species	Common Name	Population	% of Total
Oceanodroma furcata	Fork-tailed storm-petrel[2]	38000	14.8
Oceanodroma leucorhoa	Leach's storm-petrel[2]	900	0.4
Phalacrocorax auritus	Double-crested	46	0
Phalacrocorax pelagicus	Pelagic cormorant	1,040	0.4
Phalacrocorax urile	Red-faced cormorant	364	0.1
Phalacrocorax spp.	Unidentified cormorant	150	0.1
Haematopus bachmani	Black oystercatcher	588	0.2
Larus canus	Mew gull	815	0.3
Glaucous-winged Gull	Glaucous-winged gull	11,631	4.5
Rissa tridactyla	Black-legged kittiwake	75,178	29.4
Sterna paradisaea	Arctic tern	324	0.1
Sterna aleutica	Aleutian tern	144	0.1
Sterna spp.	Unidentified tern	0	0
Uria aalge	Common murre	814	0.3
Uria lomvia	Thick-billed murre	0	0
Cepphus columba	Pigeon guillemot	1,960	0.8
Synthliboramphus antiquus	Ancient murrelet[2]	300	0.1
Aethia psittacula	Parakeet auklet	255	0.1
Cerorhinca monocerata	Rhinoceros auklet[2]	160	0.1
Fratercula cirrhata	Tufted puffin[3]	121,225	47.4
Fratercula corniculata	Horned puffin[3]	2035	0.8
	Total number of birds	255,975	100
	Total number of colonies	192	

[1]Details are available in the Beringian Seabird Colony Catalog, U. S. Fish and Wildlife Service, Anchorage, Alaska.
[2]No appropriate survey done in 2001-2002, nocturnal burrow nesters, numbers are from earlier surveys
[3]Difficult to survey; burrow and crevice nesters but active during day, new numbers entered.

Other species	Common Name
Aethia pusilla	Least Auklet
Brachyramphus marmoratus	Marbled Murrelet
Puffinus griseus	Sooty Shearwater

Appendix B: The Sampling Plan and Protocols for Kodiak in 2005

The goal of the Alaska Marine Mammal Observer Program (AMMOP) Kodiak study was to observe and document interactions between commercial set gillnet gear in and around Kodiak Island and marine mammals, during normal fishing operations. The intention was to use the data collected by the observers to extrapolate estimates of marine mammal interactions with fishing gear in order to assess the impact of the fishing operations on the affected marine mammal stocks. NOAA Fisheries determined that a coverage level of 5% of the total fishing effort is a minimum that will satisfy the statistical requirements for the reporting of incidental take in the fishery to be used for management purposes. To achieve the coverage target of 5% of overall fishing effort across the fishery, projected coverage needs in permit sampling days were developed before sampling began. However, these numbers were adjusted as the fishery progressed through the season and actual effort became known.

AMMOP Sampling Regions

The set gillnet fishing areas around Kodiak was stratified into regions to make the distribution of observer effort more feasible and to obtain results that are statistically more accurate. Regions were defined by geography, traditional fishing patterns and fish processor coverage. To allow observer coverage levels to be adjusted to most accurately reflect the actual fishing effort, the regions were also structured to encompass sites that start and stop fishing at similar times. This allowed transit between all sites within a region within a 12-hour period. The contractor was responsible for determining where and when fishing effort occurred.

ADF&G manages the fishery in two districts. The Northwest District includes Uyak, Uganik, and Viekoda Bays, Kupreanof Straits and the North Cape permits, while the Southwest District includes Alitak, Moser, and Olga Bays. The Northwest District typically is fished by about 100 permit holders and constitutes about 60% of the annual fishery effort. The Alitak District averages 70 participating permit holders and represents about 40% of the annual fishing effort.

The Northwest (NW) District was divided into the following four regions for the AMMOP study:

- The Northern NW region (KI1A) consists of the permits in the North Cape section and Kupreanof Straits, including ADF&G statistical areas 259-35 to 259-39. This covers a large area, however, traditionally only 15 to 20 permit holders are active in this region. These sites typically start fishing later and stop fishing earlier than sites in other areas.

- The Central NW region (KI1B) consists of Viekoda Bay. It includes all permits north of Cape Uganik and south of Kupreanof Straits and the ADF&G statistical area 253-31. There are 15 to 20 active permits with sites ranging from the exposed cape to sheltered

ones in the back of the bay. Although some permit holders leave earlier in August, the majority of the permits holders are active until late August when the processor stops buying fish.

- The Southern NW region (KI1C) consists of Uganik Bay and Uganik Passage. This region includes all permits south of Cape Uganik to Cape Kuliuk and the ADF&G statistical areas 253-11 to 253-14. The region consists of about 25 active permits with sites ranging from exposed cape to sheltered ones in Uganik Passage and Northeast Arm. Although some permit holders leave earlier in August, the majority of the permits holders are active until late August when the processor stops buying fish.

- The Uyak Region (KI2) consists of Uyak Bay. It includes all permits south of the ADF&G line at Cape Kuliuk to Rocky Point and ADF&G statistical areas 254-10, 254-20, 254-30, and 254-40. The region currently has 45 to 50 active permit holders, which concentrate on the southern shore of the bay and in the Larsen Bay area. A handful of permit holder operate sites on the north shore of Uyak Bay and in the back of the bay. Many of the sites in Uyak Bay are very productive and will fish as long as there is a market available, usually into September.

The Alitak District was divided into the following three regions for the AMMOP study:

- The Olga Bay Region (KI3), which includes the ADF&G statistical area 257-40 with approximately 20 regular permit holders.

- The Inner Moser Bay Region (KI4), which is north of a line from the southernmost point of Moser Point west to the northernmost point of Amik Island, and west to the easternmost point of the Kodiak mainland north of the Little Narrows, with about 22 permit holders.

- The Alitak Bay Region (KI5), which is south of the line defining the Inner Moser Bay Region, including the outer Moser Bay and parts of the Alitak Bay with about 30 permit holders.

Fishing gear in Inner Moser Bay can be placed in the water 12 hours after the scheduled fishery opener in Olga Bay. In Outer Moser Bay, fishing gear can be put in the water 24 hours after the Olga Bay opening. For example, if on the 14th of June Olga Bays opens at noon then Inner Moser Bay sites can begin fishing at midnight, and Outer Moser Bay sites can begin fishing at noon on the 15th. Some permit holders in Outer Moser Bay move their nets into Olga Bay for 24 hours to maximize their fishing effort. In recent years the Alitak District has had several poor salmon returns. It was not fished in 2002 and was restricted in 2003. The fishery is open for a maximum of four out of every seven days. It is typically closed by early to mid August.

Estimating Fishing Effort

To distribute observer coverage in a manner that accurately reflects the distribution of fishing effort over time and area, the contractor established the gross fishing effort through the determination of the total time permits can fish and the individual effort of each permit. A list of all permit holders was available from the Alaska Department of Fish and Game (ADF&G), the management entity for this fishery. Direct observations of sites were the primary means of determining the beginning of fishery effort. The contractor flew an aerial survey on the first full length opener to determine which sites were participating. The contractor then adjusted the preseason estimates of the observer coverage to match the actual fishing effort. The contractor obtained fishery opener announcements from ADF&G Kodiak area biologists to plan observer deployments and calculate fishing effort on an ongoing basis.

The contractor determined several measures of the in-season effort for each region. These were (1) the ADF&G fishery opener hours, (2) the number of active permits, (3) the date that each permit holder started fishing for the season, and (4) the date each permit holder completed the fishing season. Additionally, the fishing effort was determined on a daily basis during all openers. Once a permit holder begins fishing for the season, their nets typically remain in the water for every open period until the permit holder ceases fishing operations, except under some circumstances such as a general fishing stand down, a strike, a permit holder must leave the grounds for an emergency, or the net, though left in the water, is rolled up and not actively fishing. Therefore, some verification of actual fishing effort had to be made for each permit holder.

Verification of daily fishing effort at each site in each region was accomplished through two methods. The first method was in real time, although it was expected to cover only about 80-90% of the sites in a region. Observers on skiffs and research vessels transiting throughout each region recorded all sites that had deployed nets, noted the presence or absence of buoy sets, and indicated if weather or other circumstances have decreased effort at any sites. Identification of sites was made from a laminated, labeled site chart of the region. The second fishing effort verification method occurred periodically when a site was sampled. The observer asked the permit holder if he or she had full time during each opener since the last time the site was sampled. If not, the best estimate of the number of hours the net was not fishing during a given opener was obtained from the permit holder.

Observer effort was tracked by area on a real-time, weekly basis and compared to the best estimate of fishing effort to ensure the target coverage levels of 5% were met. Where discrepancies were noted, adjustments were made to the observer distribution to ensure that the monthly target levels of 5% per area were met.

Permit Sample

The permit sample is the basic unit of observation for the analysis of the data. This is defined as the observation of all picks on a standard length of gillnet (150 fathoms) in a 24 hour period, during which the net is submerged and fishing. If all picks in the 24-hour period could not be observed then reasons for this were documented in comments on the Trip Form, and the percentage of the total fishing effort observed within the 24-hour period for that permit was determined. Any permit sample that covered less than all the picks in a 24-hour period was considered to be a partial permit sample.

When and how often a permit holder picks the nets at their site is highly variable between sites and at the same site at different times in the season. Most permit holders will pick their nets several times during the day, starting early in the morning and ending late at night. Some permit holders pick their nets six or more times a day, while others pick it only once. However, the majority of the permit holders pick their nets three times during the day, in the morning, afternoon, and evening. Patterns are common and certain permit holders have tendencies to pick more often. The most common reason permit holders pick their net more frequently is an increased number of fish in the net. Fluctuations in salmon runs, weather and tidal action, and location all contribute to the amount of fish moving past the net.

The lead observers contacted selected permit holders the day prior to the expected observation to determine the estimated picking schedule for the sample day. Observers then deployed to the selected site on the designated sampling day in time to observe the initial pick. Observers collected data on the fishing operations, marine mammal incidental takes, and seabird and other bycatch from independent skiffs. Observer skiffs are operated by full time drivers and observers are not allowed to drive the skiffs during sampling periods. Observers watched all the picks at a selected permit during the 24 hour sampling period, unless unforeseen circumstances prevented this. They stayed at sites as long as possible allowing for sufficient light and reasonable weather for the trip back to base camp. This was more of an issue late in the season, but permit holders generally did not pick after dark. Operations were most often 5 or 6 am to about 9 pm or sometimes later. Observers took breaks during the day between picks as circumstances allowed, to limit the total sampling duty time to 12 hours. Observers stayed as late as possible at a site to observe all picks during the 24 hour period. This strategy was successful in obtaining full permit samples. Partial samples, when they occurred, were generally the result of factors other than observer sampling time constraints.

In some cases when the observer was not able to watch the last pick of the day at the sample site, the permit holder was contacted the following day to determine the final number of picks at the sample site. It was planned that if certain permit holder's pick strategies were such that an observer was consistently unable to observe all picks during the 24 hour sampling period then a random start time strategy would be employed by observers for observing that site. However, this strategy was never utilized.

The initial target coverage for the seven regions defined above is shown in Table B1. In the event the fishing effort was much higher than expected in 2005, resulting in the actual observer coverage being nearly twice the projected cover that is shown in this table.

Permit Sample Selection

One of the primary challenges of the sampling program was to distribute the observer coverage proportionately across the fishing effort as it occurred, in a way that allowed logistical flexibility and provided statistically valid samples of the overall fishing effort. Thus each permit should have an equal opportunity to be sampled and with no over-sampling of individual permits. To achieve this, the contractor generated lists of the permits in each of the sample regions in a random order. The lead or assistant lead observer then sampled the permits in a region in the order shown in the list.

Table B1 The projected permit sample totals by region that were initially assumed for sampling in 2005.

	Permit Samples (5%)				
Fishing Area	June	July	August	September	Total
Kupreanof Strait/North Cape (KI1A)	13	8	10	1	32
Viekoda Bay (KI1B)	19	16	14	4	53
Uganic Bay (KI1C)	24	20	23	4	71
Uyak Bay (KI2)	29	29	40	10	108
Olga Bay (KI3)	17	19	2	0	38
Inner Moser Bay (KI4)	19	21	2	0	42
Alitak Bay (KI5)	22	25	4	0	51
Total Sampled Permits	143	138	95	19	395

To generate the lists with permits in a random order, each active permit number in a region was written on a poker chip and placed in a bin. The permits were then placed on a sampling list in the order they were removed from the bin. Finally, the observers were assigned to permits in the order that the permits appeared on the list. Permits holders that began fishing after a sampling list was generated were added to the unsampled portion of the list in a random position. A new list was generated in the same manner as soon as all permits have been sampled from the previous list for that sampling region. If a permit on the top of the list was not able to be sampled on the day for which it was chosen (due to weather, mechanical failure, etc), the observer sampled the next name on the list. However, the original permit number stayed at the top of the list and was the top priority for observation on the next open fishing day. Such permits remained at the top of the list until they were sampled.

Lead observers monitored weather reports and compiled input from the field to determine weather projections in the vicinity of the sites to be observed. Based on these weather reports, lead observers assessed the probability of observations being able to be conducted in part or total. For safety and data quality reasons, permit were sampled according to the weather safety protocols that are outlined in the Beaufort Scale Sampling Reduction Plan that is shown below. Lead observers assigned coverage to the next permit on a list if observation of the permit selected could not occur.

Joint Ventures, Leased Nets, and Cooperatives

In some areas, permit holders join together to fish as cooperatives or joint ventures. Joint ventures, leased nets, and cooperatives required distinct sampling protocols to avoid biased sampling.

Joint ventures (JVs) occur when two or more permit holders combine permits and share sites. Typically two permit holders set three 100-fathom nets made out of the two 150-fathoms of gear allotted to each permit. Both permit holders pick the nets from a single skiff, working the gear like one large permit.

During the random selection process, each permit number was assigned a poker chip. Once a complete sampling list for the region was selected, the second of the two JV permit numbers was marked off and combined with the first one on the list. The JV permits were then sampled together by one observer in most cases. One set of trip forms was filled out, with both permit numbers included on the Trip Form. An Operation type of '2 - Joint Venture' was entered on the Trip Form. Two Permit Sample Days were considered to be achieved where two standard lengths of nets were observed.

Another form of combining gear is the use of leased nets, which occurs when a permit holder leases a section of gillnet to another permit holder. The most common example of this practice is for Permit holder A (the lessor) to lease permit holder B (the lessee) a 50 fathom section of gillnet. Permit holder A then fishes one 100 fathom net and permit holder B fishes two 100 fathom nets. Leased nets are often in separate bays, the lessor does not manage the leased net, and the lessee often does not distinguish the leased section of their fishing nets.

The leased portion was sampled with the lessee's nets when the lesee's permit number came up for sampling. In the example above, when the lessee was selected for observation, the observer watched all 200-fathoms of gear. The permit holders were selected separately for placement on the sampling list and observed separately, and each permit was counted as one Permit Sample Day for record-keeping purposes. When the lessee permit holder was sampled, observers recorded an operation type of '4 - Leased Nets' on the Trip Form and indicate the length of leased net. When a lessor permit holder was sampled, and less than 150 fathoms of net was being fished, the length of net not present because was leased to another permit holder was recorded on the Trip Form. The

observer also made notes in the comment section detailing the lease arrangement, including the length of the leased portion of net, the location of the site, and the permit number of the other party involved. If the information was available, the observer noted the leased section of gear in the notes on the Gear Characteristics Form.

Some permit holders operate several sites in cooperation with other permit holders, as a cooperative (co-op). These are family groups, friends, or business associates using one or multiple skiffs working together to pick all the members' nets. Skiffs might pick two to four permits before returning to camp. Difficulty in observing these operations arises when two or more skiffs pick a series of cooperative nets as a team as more than one observer platform is required to watch the multiple skiffs pick the gear.

At Kodiak the co-ops range from two permit holders working four 75-fathom nets to twelve permit holders fishing 20 to 24 nets of varying lengths. In most cases, the nets are clearly marked and the permit number is obvious. However, some co-ops are more lax than others. When multiple fishing skiffs are used, typically two skiffs begin at the middle and work towards the ends of the net. Often a team of two skiffs will pick two to four co-op permits in a day. One Co-op uses three sets of three skiffs to tend 12 permits. In that case, one set of the three skiffs goes to a set of three to four permits (six to eight nets), where one skiff picks the trap (or hook), and while the other two skiffs start in the middle of the net and work out to the ends. The skiffs move on to the next net when they have finished their section of the net. The other two sets of skiffs do the same on the other 8 or 9 permits.

In a more typical example of a Co-op, three permit holders work together with permit numbers A, B, and C. In this example, each permit holder fishes two 75-fathom nets for a total of six 75-fathom nets. They use two skiffs to pick the nets, typically starting a net A1 and picking in the following order B1, C1, A2, B2, and C2. This order may change, however, due to amount of fish, gear damage, weather, etc.

The contractor used cluster sampling to address the problems that arise due to multiple picking skiffs at co-op sites. During the random selection process each permit number in a co-op was assigned a poker chip. Each permit number in a region then had an equal opportunity to be sampled. Once a sampling list for the region was generated, observations began at the top of the list. When one permit in a co-op came to the top of the list, all co-op permits that were picked in conjunction with the selected permit on that day were sampled as well. The lead observer marked off the additional permits sampled from the list, and they were not sampled again until the sampling list was completed (i.e., all permits on the list sampled) and a new list generated.

For example, suppose that on the sampling list for a region, the 4th, 17th and 30th permit numbers were fishing together in a co-op. All three were then sampled on the day the 4th permit was at the top of the sampling list, and all three permits were removed from the list until list was re-randomized. The number of observers required to sample the three

permits was determined by the number of skiffs used by the fishermen to pick the nets, with one observer skiff assigned to each fishing skiff for the day. A total of three permit samples was then completed for the one trip. One trip form was completed by the observer assigned to the permit actually selected from the list, and included all the data from the permits sampled with the selected permit. An operation type of '3 - Co-op' was entered on the trip summary form, and the other observer or observers coordinated with the primary observer in completing all the required data forms.

Such cluster sampling of co-op nets achieved increased program efficiency. Using multiple observation skiffs at co-ops reduced the number of partial observations of such sites. It also improved relationships with co-op fishers because it greatly reduced the number of sampling days at the larger co-ops. In 2002, observers were at the co-op with 12 permits almost every day. Under the new protocol, the effort was concentrated into three or four sampling days in a rotation through a monthly sampling list.

Beaufort Scale Sampling Reduction Plan

Weather can potentially affect all observations and can bias observer coverage of more exposed sites. Many of the sites located on capes in Shelikof Strait receive extreme weather. The contractor ensured that observer coverage at exposed sites was in proportion to other sites in a region based on fishing effort. Bad weather also reduces the quality of observations during soak watches due to wave action and sampling platform movement. Fifteen-foot seas are not uncommon at cape sites. Moderate weather will reduce visibility and obscure interactions, while strong winds and heavy seas will cause serious safety concerns.

Lead observers used a combination of National Weather Service forecasts, USCG weather reports, RV captains' and skiff operators' evaluations, and information provided by area radio contacts. Lead observers attempted to establish the weather at sites before deploying observers. If the weather began to worsen, observers relayed this information to the RV, lead observer, or other appropriate parties and a determination to change sampling protocols appropriately was made. Avoidance of placing observers and skiff operators in danger during severe weather conditions was paramount. For these reasons, the contractor deployed observers based on the sea state and implemented a Beaufort Scale Sampling Reduction Plan as follows:

- Beaufort 0-3 (wind 0-10 kts, seas 0 - 3.5 ft): All sampling occurred as scheduled.

- Beaufort 4 (wind 11 to 16 kts, seas 3.5-5 ft): All soak watches (for the marine mammal sighting form, which does not include the essential pick observation data) was suspended. At Beaufort 4, frequent white caps and small waves begin to limit visibility, affecting the dependability of soak watch data. Anchoring a skiff to a buoy becomes quite dangerous in four-foot seas. Observer effort focused on observing picks.

- Beaufort 5 (wind 17-21 kts, seas 6-8 ft): Lead observers could direct observers and skiff operators to use alternate sites. R/V captains restricted the deployment of skiffs during Beaufort 5 weather. R/Vs that would normally deploy two skiffs at two locations would select one of the two locations and determine if a single skiff could safely be deployed during picks only. The R/V remained in position nearby to respond in case the skiff encountered trouble. Sampling distances from the R/V in rough weather was no greater than 30meters.

- Beaufort 6 and higher (wind 22+ kts; seas 9.5 ft +): All observations were suspended. Ten-foot white-capped waves with scattered spray reduced visibility beyond acceptable observation levels. Some remote observations of sites from R/Vs was allowed for verification of fishing effort only. R/Vs established whether the net was fishing and tried to contact the permit holder to determine if the site would be picked that day.

Appendix C: Variables Recorded by Observers in 2002

Gillnet Gear Characteristics Form

- Lead length, depth, twine size, lead material, minimum and maximum mesh size, and color.
- Net length, depth, twine size, net material, number of strands, minimum and maximum mesh size, and color.
- Hang ratio, dropline use, dropline height, floatline use, floatline material, weedline use, weedline material, leadline use, leadline weight, number of floats, float type, float color, float distance, float length, number of anchors, anchor type, hook shape, and number of buoys.
- Pinger use, brand, number, percent operating, and frequency.
- Light use and number, alarm use and number.

Set Gillnet Haul Form

- Zone, land, tide, statistical area, pressure washer use.
- Water temperature, water clarity, and air temperature.
- Minimum and maximum distance to shore.
- Begin and end haul time, location and bottom depth.
- Fish and soak durations, and primary species sought.
- Percent net run, pulled and observed.
- Gear damaged, observation quality, and occurrence of incidental take.
- Skiff size, number of skiffs used, and number of crew per skiff.
- Weight and number of individuals and type for weight and numbers caught by species, disposition (kept or discarded), condition (alive or dead), and disposition reason.

Fish/Shark Sample Form

- Trip, haul, species, tag number, tag type, tag status, animal condition, injury, sex, total length, fork length, girth, weight, weight type, and if samples were collected.

Incidental Take Form (Mammal and Bird Bycatch)

- Trip, haul, photos, disentanglement description, horizontal location, vertical location, animal condition, injury description, age class, sex, and whether it was sampled.

Marine Mammal Sample Form

- Trip, haul, species, tag number, standard length, girth, flipper length, flipper width, dorsal fin height, fluke width, blubber thickness, samples taken.

Marine Bird Sample Form

- Trip, haul, species, tag number, plumage description (phase and feather condition), weight, head-bill length, culmen length, tarsus length, wing chord, brood patch description, fat index, samples taken.

Sighting Form

- Trip and/or day, observer code, event type (watch type, scan type, sighting, other), platform, time, latitude and longitude, weather, beaufort, wave height.

- Sighting species or vessel type, number, animal behavior, distance to gear, distance to vessel.

Changes Made for 2005

- On the Gillnet Gear Characteristics Form extra information was required on the lead use, the hang ratio of nets, the float shape instead of the float type, and the anchor use.

- On the Set Gillnet Haul Form water clarity was not collected in 2005.

- On the Incidental Take Form (Mammal and Bird Bycatch) extra information was required on the species, tag number, tag type and tag status.

- On the Marine Mammal Sample Form extra information was required on whether the skin was collected, the animal was collected whole, the jaw or teeth were collected, and the stomach collected.

- On the Marine Bird Sample Form extra information was required on whether the bird was retained whole, the head or feet collected, and the stomach collected.

- On the Sighting Form the vessel type was not required.

Appendix D: Forms Used by Observers in 2002

Data Collection Organization Chart

Trip Information Form

NMFS Alaska Marine Mammal Observer Program

Page Number _____ of _____

TRIP INFORMATION FORM

Tracking	*Date*	*Initials*
Received		
Reviewed		
Debriefed		
Entered		

Year	Month	Trip Identification Number	Fishery Name (& code)

Vessel Name	Vessel Number

Home Town (& code)	Home State (& code)	Fishing Permit Number

Port Town (& code)	Port State (& code)	Geographical Region (& code)

Selection Method
- ☐ 1 = Random
- ☐ 2 = Systematic
- ☐ 3 = Voluntary
- ☐ 4 = Secondary
- ☐ 5 = Opportunistic
- ☐ 9 = Other (comment)

Additional Trip Research
- ☐ 1 = None
- ☐ 2 = Marine bird sampling
- ☐ 3 = Shark tagging
- ☐ 4 = Fish sampling
- ☐ 5 = Stranding recovery
- ☐ 9 = Other (comment)

Expected # Hauls

Trip Begin Date (mmddyy)

Nets Fishing

Trip Begin Time (24h hhmm)

Trip Type
- ☐ 1 = Fully observed
- ☐ 2 = Partially observed
- ☐ 3 = Arrested
- ☐ 9 = Other (comment)

Operation Type
- ☐ 1 = Single operator/own
- ☐ 2 = Joint venture
- ☐ 3 = Co-op
- ☐ 4 = Temp transfer
- ☐ 5 = Permanent transfer
- ☐ 9 = Other (comment)

Skiffs Used

Trip End Date (mmddyy)

Capt's Experience

Trip End Time (24h hhmm)

Primary Species Landed (& code)	# Landed	Steam Time (hrs)	

Dealer Name (& code)	Dealer Location

# Marine Mammals Taken	# Marine Birds Taken	# Nets Observed	# Hauls/Picks Observed

Comments (Continued on Back: Y ___ N ___)

2002

Set Gillnet Gear Characteristics Form

NMFS Alaska Marine Mammal Observer Program Page Number _____ of _____

SET GILLNET GEAR CHARACTERISTICS FORM

Year	Month	Trip Identification Number	Net Id Number(s)	# Nets/Net Configs

Lead Used?
- Y = Yes
- N = No

Net Combo?
- Y = Yes
- N = No

Hang Ratio

Strands

Leadline Used?
- Y = Yes
- N = No

Lead Length (fa)

Net Length (fa)

Dropline Used?
- Y = Yes
- N = No

Leadline Wgt (lbs/100fa)

Lead Depth (mesh count)

Net Depth (mesh count)

Dropline Height (")

Floatline Used?
- Y = Yes
- N = No

Lead Twine Size #

Net Twine Size #

Weedline Used?
- Y = Yes
- N = No

Floatline Material
- 1 = Floating (w/poly core)
- 2 = Twisted poly
- 3 = Braided nylon
- 9 = Other (comment)
- 0 = Unknown

Lead Material
- 1 = Poly (seine webbing)
- 2 = Nylon
- 8 = Combination
- 9 = Other (comment)
- 0 = Unknown

Net Material
- 1 = Monofilament nylon
- 2 = Multi-filament nylon
- 3 = Six-strand mono
- 4 = Multi-strand mono (mt)
- 8 = Combination
- 9 = Other (comment)

Weedline Material
- 1 = Twisted poly
- 2 = Braided poly
- 9 = Other (comment)
- 0 = Unknown

Buoys

Lead Mesh Size Min (".0)

Net Mesh Size Min (".0)

Float Combo?
- Y = Yes
- N = No

Float Length (")

Anchors Used?
- Y = Yes
- N = No

Lead Mesh Size Max (".0)

Net Mesh Size Max (".0)

Floats

Float Distance (")

Anchors

Lead Color
- 1 = Clear
- 2 = White
- 3 = Black
- 4 = Gray
- 5 = Green
- 6 = Blue
- 7 = Red
- 8 = Pink
- 9 = Orange
- 10 = Yellow
- 11 = Purple
- 12 = Tan
- 13 = Combo
- 99 = Other (cmt)

Net Color
- 1 = Clear
- 2 = White
- 3 = Black
- 4 = Gray
- 5 = Green
- 6 = Blue
- 7 = Red
- 8 = Pink
- 9 = Orange
- 10 = Yellow
- 11 = Purple
- 12 = Tan
- 13 = Combo
- 99 = Other (cmt)

Float Color
- 1 = Clear
- 2 = White
- 3 = Black
- 4 = Gray
- 5 = Green
- 6 = Blue
- 7 = Red
- 8 = Pink
- 9 = Orange
- 10 = Yellow
- 11 = Purple
- 12 = Tan
- 13 = Combo
- 99 = Other (cmt)

Float Shape
- 1 = Round
- 2 = Disk
- 3 = Oval
- 4 = Rectangular
- 5 = Square
- 8 = Combination
- 9 = Other (cmt)

Hook Shape
- 1 = L-shaped
- 2 = V-shaped
- 3 = J-shaped
- 4 = Umbrella
- 5 = Arrowhead
- 6 = Flag
- 7 = Diamond
- 8 = Box
- 9 = Zigzag
- 10 = None
- 99 = Other (cmt)

Anchor Type
- 1 = Dansforth
- 2 = Kedge
- 3 = Manta
- 4 = Bruce
- 5 = Claw
- 6 = Grapnel
- 7 = Mushroom
- 8 = Quick set
- 9 = Screw
- 10 = Scrap debris
- 11 = Tied to vessel
- 99 = Other (cmt)
- 0 = Unknown

Lights Used?
- Y = Yes
- N = No

Lights

Pingers Used?
- Y = Yes
- N = No

Pinger Brand
- 1 = Dukane
- 9 = Other (cmt)
- 0 = Unknown

Alarms Used?
- Y = Yes
- N = No

Pingers

Alarms

Pingers Operating (%)

Pinger Frequency (kHz)

Comments (Continued on Back: Y ___ N ___)

2002

Set Gillnet Haul Form

NMFS Alaska Marine Mammal Observer Program Page Number _____ of _____

SET GILLNET HAUL FORM

Year	Month	Trip Identification Number	Haul Number	Net Id Number

Zone	Land	Tide	Statistical Area	Water Temp c.0
☐ 1 = Open water	☐ 1 = Mainland shoreline	☐ 1 = Ebb tide		
☐ 2 = Inside large bay	☐ 2 = Peninsula or island	☐ 2 = Flood tide		
☐ 3 = Inside sheltered bay	☐ 3 = Sand bar	☐ 3 = High slack		
☐ 4 = River	☐ 4 = Rocky reef	☐ 4 = Low slack	Water Clarity (m.0)	Air Temp c.0
☐ 5 = Channel or canal	☐ 5 = Submerged land	☐ 9 = Other (comment)		
☐ 9 = Other (comment)	☐ 8 = Not set from land			
	☐ 9 = Other (comment)			

Min Shore Distance (m)	Max Shore Distance (m)	Hydraulic Pump Used?	# Skiffs	# Crew Per Skiff
		☐ Y = Yes ☐ N = No		

Skiff Size (ft)	Fish Duration (hh.mm)	Soak Duration (hh.mm)	Primary Species Sought (& code)

	Date (mmddyyyy)	Time (24 hr)	Latitude (ddhh.m)	Longitude (ddhh.m)	Depth (fa)
BEGIN HAUL					
END HAUL					

Gear Damage	% Net Ran	% Net Pulled	% Net Observed	Incidental Take
☐ 1 = No gear damage ☐ 2 = Less than 5% of the net torn ☐ 3 = Between 5% and 25% of the net torn ☐ 4 = Between 25% and 50% of the net torn ☐ 5 = Greater than 50% of the net torn ☐ 6 = Obstructed by debris, affecting less than 50% of net ☐ 7 = Obstructed by debris, affecting 50% or more of net ☐ 8 = Net totally balled up ☐ 9 = Other (comments)				☐ Y = Yes ☐ N = No

Observation Quality	# / Wt Type Codes	Disposition Codes
☐ 1 = Excellent ☐ 2 = Good ☐ 3 = Fair ☐ 4 = Poor ☐ 9 = Other (comment)	A = Actual E = Estimated F = Fishermen's L = Landing ticket	K = Kept D = Discarded
	Animal Condition Codes A = Alive D = Dead R = Recovering tank; comatose U = Unknown	

Species Code	Number	# Type	Weight (kg.0)	Wt Type	Disposition	Animal Condition	Reason (code list)

Comments (Continued on Back: Y___ N ___)

2002

NMFS Alaska Marine Mammal Observer Program Page Number _____ of _____

SET GILLNET HAUL FORM (BACK)

Additional Species Records

Species Code	Number	# Type	Weight (kg.0)	Wt Type	Disposition	Animal Condition	Reason (code list)

Additional Comments

2002

Sighting Form

Year	Month	Trip Identification Number	Obs Id	Date (dd/mm/yy)

NMFS Alaska Marine Mammal Observer Program

SIGHTING FORM

Page Number _____ of _____

Event Type	Platform	Time (hh:mm) 24 hr	Latitude (ddhh.m)	Longitude (ddhh.m)	Weather	Beaufort	Wave Height (m.0)	Species (& code)	Number	Animal Behavior	Distance to Gear (m) *	Distance to Vessel (m) **

Event Type Codes
1 = Begin haul watch
2 = End haul watch
3 = Begin transit watch
4 = End transit watch
5 = Begin set watch
6 = End set watch
7 = Begin soak watch
8 = End soak watch
9 = Horizon scan
10 = Net scan
11 = Sighting,on-watch
12 = Sighting,off-watch
99 = Other (comment)

Platform Codes
1 = Observer skiff
2 = Fishing skiff/vessel
3 = Research vessel
4 = Shore, beach
5 = Shore, elevated cliff
6 = Shore, dock
7 = Aerial
9 = Other (comment)

Beaufort Codes
0 = Wind speed < 1kt;sea like mirror
1 = 1-3 kt;ripples;no foam crests
2 = 4-6 kt;small wavelets;crests glassy,not breaking
3 = 7-10 kt;large wavelets;breaking crests;scattered whitecaps
4 = 11-16 kt;small waves;numerous whitecaps
5 = 17-21 kt;moderate waves;many whitecaps;some spray
6 = 22-27 kt;large waves;whitecaps everywhere
7 = 28-33 kt;sea heaps up;streaks of foam
8 = 34-40 kt;moderate high waves;spindrifts;blowing foam

Weather Codes
1 = Clear (<10% cloud cover)
2 = Partly cloudy (10-50% cloud cover)
3 = Cloudy (51-90% cloud cover)
4 = Overcast (>90% cloud cover)
5 = Drizzle
6 = Rain
7 = Fog
8 = Sleet or snow
0 = Unknown

Animal Behavior Codes
1 = Swimming
2 = Milling/circling
3 = Sounding
4 = Porpoising
5 = Bow riding
6 = Breaching
7 = Thrashing
8 = In flight
9 = Taking flight
10 = Landing on water
11 = Feeding on catch
12 = Foraging on other prey
13 = Floating on surface
14 = Vessel avoidance
15 = Bird avoidance
16 = On land
99 = Other (comment)

* For scans: 0, 1-10m, 11-100m, >100m
** Do not record during scans

Comments (include the time of the referenced event)
(Continued on Back: Y___ N ___)

2002

Year		Month	Trip Identification Number		Obs Id	Date (dd/mm/yy)		*NMFS Alaska Marine Mammal Observer Program* **SIGHTING FORM (BACK)** Page Number ____ of ____				
Event Type	Platform	Time (hh:mm) 24 hr	Latitude (ddhh.m)	Longitude (ddhh.m)	Weather	Beaufort	Wave Height (m.0)	Species (& code)	Number	Animal Behavior	Distance to Gear (m) *	Distance to Vessel (m) **
Additional Comments (include the time of the referenced event)												

2002

Fisher Comment Form

NMFS Alaska Marine Mammal Observer Program Page Number _____ of _____

FISHER'S COMMENT FORM

Year	Month	Trip Identification Number	Fishery Name (& code)
Vessel Name		Vessel Number	Fishing Permit Number
Today's Date		Fisher's First Name	Fisher's Last Name
Comments (Continued on Back: Y ___ N ___)			

2002

Incidental Take Form

Year	Month	Trip Identification Number	Haul Number

NMFS Alaska Marine Mammal Observer Program

INCIDENTAL TAKE FORM

Page Number ____ of ____

Id #	Species (& code)	Tag Number	Tag Type	Tag Status	Disentan-glement	Horizontal Location	Vertical Location	Animal Condition	Injury	Age Class	Sex (M:F:U)	Photos (Y:N)	Sample (Y:N)
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											

Tag Type Codes
1 = Cattle ear tag
2 = Brand
3 = Bleach, die, or ink
4 = Flipper tag
5 = Dorsal fin tag
6 = Metal leg band
7 = Plastic color leg band
8 = Nasal tag
9 = Spaghetti tag
10 = Coded wire tag
11 = Stomach tag
99 = Other (comment)
0 = No tag

Tag Status Codes
1 = Applied by observer
2 = Already on and left on
3 = Already on and removed
9 = Other (comment)
0 = No tag

Disentanglement Codes
1 = Momentary snag, self release
2 = Released at a point unknown
3 = Dislodged under water
4 = Dislodged once out of water
5 = Removal with gear damage
6 = Removal with cutting animal
7 = Removal by untangling
9 = Other (comment)
0 = Unknown

Horizontal Location Codes
1 = Found in first third of gear
2 = Found in middle third of gear
3 = Found in final third of gear
0 = Unknown

Vertical Location Codes
1 = At water surface
2 = Near top third of gear
3 = Middle third of gear
4 = Near bottom third of gear
0 = Unknown

Animal Condition Codes
A = Alive
D = Dead
R = Recovering tank; comatose
U = Unknown

Injury Codes
1 = No external injury, responsive
2 = No external injuries, unresponsive
3 = Wet plumage or oiled
4 = Small lacerations; missing plumage
5 = Large wounds; excessive bleeding
6 = Broken appendage(s)
7 = Ingested gear
8 = Gear left on
9 = Moderate decomposition
10 = Severe decomposition
0 = Unknown

Age Class Codes
1 = Calf; pup; juvenile (hatch-year)
2 = Immature
3 = Adult
0 = Unknown

Comments (include the id# of the animal)
(Continued on Back: Y___ N___)

2002

Year	Month	Trip Identification Number	Haul Number

NMFS Alaska Marine Mammal Observer Program

INCIDENTAL TAKE FORM (BACK)

Page Number____ of ____

Id #	Species (& code)	Tag Number	Tag Type	Tag Status	Disentan-glement	Horizontal Location	Vertical Location	Animal Condition	Injury	Age Class	Sex (M;F;U)	Photos (Y;N)	Sample (Y;N)
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											

Additional Comments (include the id# of the animal)

2002

Marine Mammal Sample Form

Year	Month	Trip Identification Number	Haul Number

NMFS Alaska Marine Mammal Observer Program

MARINE MAMMAL SAMPLE FORM

Page Number ____ of ____

Tag Number	Species (& code)	Standard Length (cm)	Girth (cm)	Flipper Length (cm)	*Flipper Width (cm)*	*Dorsal Fin Height (cm)*	*Fluke Width (cm)*	Blubber Thickness (mm)	Skin (Y;N)	Retained Whole (Y;N)	Jaw or Teeth (Y;N)	Stomach (Y;N)	# Other Samples

Comments (include the tag number of the referenced animal)
(Continued on Back: Y ___ N ___)

2002

Marine Bird Sample Form

Year	Month	Trip Identification Number	Haul Number

NMFS Alaska Marine Mammal Observer Program

MARINE BIRD SAMPLE FORM

Page Number ____ of

Tag Number (or Id #)	Species (& code)	Plumage		Body Measurements					Condition		Retained Samples			
		Phase	Feather	Weight (g)	Head-Bill (mm)	Culmen Length (mm)	Tarsus Length (mm)	Wing Chord (cm)	Brood Patch	Fat Index	Whole (Y;N)	Head Feet (Y;N)	Stomach (Y;N)	# Other Samples

Phase Codes

S = Summer (breeding) plumage
T = Transitional (molt in progress)
W = Winter (basic) plumage
J = Juvenile plumage
U = Unknown / can't tell

Feather Codes

1 = No missing feathers
2 = One or more primary flight feathers missing
3 = One or more secondary flight feathers missing
4 = One or more tail feathers missing
5 = Missing feathers in wings and tail
6 = Other missing feathers (body, head)
0 = Not checked, or can't tell

Brood Patch Codes

1 = No defeathering
2 = Loss of down and some contour feathers
3 = Loss of down & most contour feathers; vasc. beginning
4 = Loss of feathers & heavy vascularization
5 = Regression beginning, down appearing
6 = Downy, feathers beginning to break sheath
7 = Partial or near-complete regression
0 = Didn't check, or carcass too degraded

Fat Index Codes

1 = Skin very thin; feather ends obvious; no fat along keel or around heart; emaciated
2 = Skin moderately smooth with fat; little fat along keel but none around heart; not emaciated
3 = Skin has moderate fat; fat evident along keel, with some traces around heart
4 = Skin smooth with fat; fat deposits along keel and around heart
5 = Skin thick with fat, feather points barely visible; heavy fat along keel and heart, and spots of fat in interstitials
0 = Unknown or unable to check

Comments (include the tag number of the referenced animal)
(Continued on Back: Y ___ N ___)

2002

Fish/Shark Sample Form

Year	Month	Trip Identification Number	Haul Number

NMFS Alaska Marine Mammal Observer Program

FISH/SHARK SAMPLE FORM

Page Number____ of____

Id #	Species (& code)	Tag Number	Tag Type	Tag Status	Animal Condition	Injury	Sex (M;F;U)	Total Lgth (cm)	Fork Lgth (cm)	Girth (cm)	Weight (kg.0)	Weight Type	Sample (Y;N)
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											

Tag Type Codes

1 = Cattle ear tag
2 = Brand
3 = Bleach, die, or ink
4 = Flipper tag
5 = Dorsal fin tag
6 = Metal leg band
7 = Plastic color leg band
8 = Nasal tag
9 = Spaghetti tag
10 = Coded wire tag
11 = Stomach tag
99 = Other (comment)
0 = No tag

Tag Status Codes

1 = Applied by observer
2 = Already on and left on
3 = Already on and removed
9 = Other (comment)
0 = No tag

Weight Type Codes

A = Actual
E = Estimated
F = Fishermen's
L = Landing ticket

Animal Condition Codes

A = Alive
D = Dead
R = Recovering tank; comatose
U = Unknown

Injury Codes

1 = No external injury, responsive
2 = No external injuries, unresponsive
3 = Wet plumage or oiled
4 = Small lacerations; missing plumage
5 = Large wounds; excessive bleeding
6 = Broken appendage(s)
7 = Ingested gear
8 = Gear left on
9 = Moderate decomposition
10 = Severe decomposition
0 = Unknown

Comments (Continued on Back: Y___ N___)

2002

Year	Month	Trip Identification Number	Haul Number

NMFS Alaska Marine Mammal Observer Program

FISH/SHARK SAMPLE FORM (BACK)

Page Number ____ of ____

Id #	Species (& code)	Tag Number	Tag Type	Tag Status	Animal Condition	Injury	Sex (M;F;U)	Total Lgth (cm)	Fork Lgth (cm)	Girth (cm)	Weight (kg.0)	Weight Type	Sample (Y;N)
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											
		1											
		2											

Additional Comments

2002

Appendix E: Observer Comments on Marine Mammal Sightings in 2002

The comments are given in time order. Comments are provided for whales only if the sightings were within 100m of the gear.

Date	Time		Animal	Number	Behavior	Distance to Gear (m)	Comments
6-Jun	1015	Off-watch	Steller Sea Lion	100		100	A comment originally from a haulout count: Sighting from 53' seiner - the animal did not move.
9-Jun	1614	On-watch	Steller Sea Lion	1	Feeding on catch	0	Sea lion popped up next to the net. They dove, and the corks moved.
9-Jun	1630	Off-watch	Harbor Seal	1	Foraging on other prey	-	A harbor seal was swimming near the surface, presumably going after fish. Ripples and a back could be seen. A minute later a round spotted head popped up 15m away, looked at us, then dove under.
9-Jun	1645	Off-watch	Harbor Seal	1	Swimming or blowing at surface	-	A harbor seal, smaller than the seal than 1630.
9-Jun	1723	Off-watch	Harbor Seal	1	Swimming or blowing at surface	-	
9-Jun	1933	Off-watch	Dall's Porpoise	1	Swimming or blowing at surface	100	
9-Jun	2019	Off-watch	Dall's Porpoise	3	Swimming or blowing at surface	150	
10-Jun	1012	On-watch	Sea Otter	3	Floating on surface	150	Two adult sea otters and one juvenile.
10-Jun	1513	On-watch	Sea Otter	1	Swimming or blowing at surface	2	The sea otter approached the net near shore, swam along it, dove under the net and swam towards the skiff.
10-Jun	1600	On-watch	Steller Sea Lion	1	Milling or circling	50	A sea lion was potentially approaching the net during pick. I cannot be sure. It was resighted at 1605 and 1608 first 20m then 2 m from the gear.
10-Jun	1604	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	A harbor seal head popped up. It was light grey and spotted. It looked at the skiff driver, the crew on the research vessel, and me, and then sounded.
10-Jun	1652	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	150	There were two or three harbor porpoises, gray in color, and small in size, with triangular dorsal fins.
10-Jun	1709	On-watch	Sea Otter	1	Swimming or blowing at surface	35	The sea otter swam along the net.
10-Jun	1713	On-watch	Harbor Seal	1	Milling or circling	1	The harbor seal surface next to the net, looked around, submerged.
10-Jun	1801	On-watch	Harbor Seal	1	Milling or circling	2	The harbor seal surfaced near the net, swam towards the skiff, then dove.

10-Jun	1931	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter was first spotted a good 50m to the east of the net. It sounded, and was next spotted at the net, swam over net, and then drifted west.
11-Jun	727	On-watch	Harbor Seal	1	Milling or circling	1	A harbor seal was milling in the end of the net.
11-Jun	746	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A Steller sea lion was swimming along the net behind the fishers' skiff.
11-Jun	747	On-watch	Steller Sea Lion	1	Thrashing	10	A Steller sea lion was splashing near the shoreline.
11-Jun	802	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	2	A Steller sea lion was swimming along the net behind the fishers' skiff.
11-Jun	810	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	2	A Steller sea lion was swimming/splashing along the net 10m behind the fishers' skiff
11-Jun	820	On-watch	Steller Sea Lion	2	Milling or circling	0	A Steller sea lion was swiming around the hook in the net.
11-Jun	959	On-watch	Steller Sea Lion	3	Feeding on catch	0	Steller sea lions were seen with fish in their mouths, next the to net. They dove under the net and went across the top.
11-Jun	1010	On-watch	Steller Sea Lion	3	Swimming or blowing at surface	300	Steller sea lions surfaced and watched the pick for 5 minutes.
11-Jun	1142	On-watch	Steller Sea Lion	3	Swimming or blowing at surface	0	A Steller sea lion was swimming along and over the net.
11-Jun	1152	On-watch	Steller Sea Lion	1	Thrashing	2	A Steller sea lion was thrashing mid-net.
11-Jun	1630	Off-watch	Sea Otter	1	Swimming or blowing at surface	91	A sea otter was spotted 100 yards from the net.
11-Jun	1650	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter was swimming along the shore towards the net. It dove and resurfaced on the other side. It continued swimming along.
11-Jun	1709	Off-watch	Harbor Seal	12		-	Originally from a colony status record. Several harbor seals were seen right around the island. There were about 12 seals. The local skiff driver said seals use this site as a haulout spot.
11-Jun	1722	On-watch	Steller Sea Lion	1	Thrashing	0	A Steller sea lion was right on the net with salmon in its mouth. It swam over net and dove.
11-Jun	1732	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion was swimming over and along the middle of the net, towards the shore
11-Jun	1745	On-watch	Steller Sea Lion	1	Thrashing	0	A Steller sea lion was mid-net, flopping and splashing around with a salmon in its mouth.
11-Jun	1745	Off-watch	Harbor Seal	2	Swimming or blowing at surface	-	Originally from a colony status record. Two harbor seals were swimming around this site.
11-Jun	1752	On-watch	Steller Sea Lion	1	Milling or circling	1	A Steller sea lion was swimming around in the hook of the net. It threw a fish, and threw a fish again. The fish had red meat.
11-Jun	1756	On-watch	Steller Sea Lion	1	Milling or circling	0	A Steller sea lion flinging salmon in the hook of the net.

11-Jun	1855	On-watch	Steller Sea Lion	2	Swimming or blowing at surface	1	A Steller swimming along the net.
11-Jun	1930	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A Steller in the hook.
12-Jun	844	Off-watch	Steller Sea Lion	1	Milling or circling	1	The same sea lion appeared in the same location five minutes later (849) during the pick.
12-Jun	850	On-watch	Steller Sea Lion	1	Milling or circling	1	
13-Jun	1329	Off-watch	Harbor Seal	5		-	Originally from a colony status record. Several harbor seals were along the SW rocky shore of the island. There was a sSteady breeze 5-10 mph SW, and a small chop on the water, about 5'.
14-Jun	907	On-watch	Unknown Sea Lion or Fur Seal	1	Swimming or blowing at surface	145	I was unsure whether this was a Steller sea lion or a California sea lion, mostly because of the very strong lump on the head.
14-Jun	946	Off-watch	Sea Otter	2		-	Originally from a colony status record. There were two sea otters. One came out on a rock at the base of a cliff. One swam within a few feet of the sand at the base of a cliff.
14-Jun	1018	On-watch	Steller Sea Lion	1	Feeding on catch	2	A sea lion was feeding on salmon near the inshore portion of the net, tossing the fish up in the air and thrashing about with it, while the fisherman were picking the hook at the other end of the net.
14-Jun	1039	Off-watch	Steller Sea Lion	4		1	Steller sea lions appeared 2' from the middle of the gear. I saw them throwing fish twice in the air. They kept on diving and resurfacing, and finally dove and resurfaced on the other side of the net and swam away. I am not sure if they were feeding from the net.
14-Jun	1130	Off-watch	Steller Sea Lion	177		-	Originally from a haulout count. No branded animals noted.
14-Jun	1154	Off-watch	River Otter	1	Swimming or blowing at surface	0	I spotted an otter during a soak watch at the wrong net.
14-Jun	1422	Off-watch	Sea Otter	4		-	Originally from a colony status record. There were four sea otters, one with an octopus in it's mouth.
14-Jun	1524	On-watch	Steller Sea Lion	1	Feeding on catch	1	A Steller sea lion was swimming from the mid-length of the net to the anchor end. It was seen surfacing 5-8 times right next to the net. It was not apparent if it was feeding off the net. At 1555 it was still swimming along the net from the anchor end to the shore and then back. Floats were bobbing and he occasionally came up thrashing, once with a fish.
14-Jun	1642	On-watch	Steller Sea Lion	1	Feeding on catch	1	It swam from mid-section of the net towards and under the viewing skiff/platform, then swimming and resurfacing along the side of the net.

15-Jun	912	Off-watch	Humpback Whale	1	Swimming or blowing at surface	75	A humpback whale was seen first 50m from the R/V. Blows were seen two times, then it resurfaced near the top end of an unobserved net/permit. It made shallow dives, showing the fin but not fluking.
15-Jun	930	Off-watch	Sea Otter	150	Floating on surface	-	Originally from a colony status record. Approximately 150 sea otters were floating in kelp all in one group on the east side of the island.
15-Jun	950	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	1000	A harbor porpoise was seen swimming away from the island.
15-Jun	1104	On-watch	Steller Sea Lion	3		1	Three Steller sea lions, females, were swimming along the side of the net from the shore end to the trap end. After one minute, they swam under net and appeared on the other side of the net (mid-net). There was no apparent evidence of feeding on the net.
15-Jun	1426	On-watch	Harbor Seal	14	Hauled out on land	-	Harbor seals hauled out, one swimming.
15-Jun	1426	On-watch	Harbor Seal	1	Swimming or blowing at surface	-	Harbor seals hauled out, one swimming.
15-Jun	1602	On-watch	Harbor Seal	1	Hauled out on land	-	Harbor seals hauled out, one swimming.
15-Jun	1602	On-watch	Harbor Seal	4	Swimming or blowing at surface	-	Harbor seals hauled out, one swimming.
15-Jun	2151	Off-watch	Sea Otter	1	Swimming or blowing at surface	50	A sea otter was swimming on it's back in kelp.
16-Jun	648	On-watch	Sea Otter	1	Swimming or blowing at surface	20	A sea otter was first sighted during the set watch. It was positioned 20m from the hook end.
16-Jun	731	On-watch	Sei or Fin Whale	1	Swimming or blowing at surface	100	A whale had two blows at the surface, then a down-blow/head first, then the head disappeared. The back was followed by the dorsal, with no tail raise. It seemed small, not with a particularly high blow.
16-Jun	751	On-watch	Steller Sea Lion	2	Feeding on catch	0.5	Two Steller sea lions were stealing many salmon from the net, near the land. I saw them dive, corks sink, and then they surfaced with a fish in their mouth.
16-Jun	1011	On-watch	Harbor Seal	2	Swimming or blowing at surface	-	I spotted two harbor seal heads pop up about 200m away near some rocks. About 5 seconds later they disappeared.
16-Jun	1012	On-watch	Unknown Porpoise or Dolphin	1	Swimming or blowing at surface	-	I saw a fin and small body that was a porpoise or unknown dolphin. I only caught a flash glimpse of it and then never saw it again. Thus, I could not make a more conclusive identification.
16-Jun	1027	On-watch	Steller Sea Lion	1	Feeding on catch	5	A sea lion appeared to catch fish. At 1030 it was milling/circling 1m from the net, 20m from the skiff.
16-Jun	1034	Off-watch	River Otter	1	Dead	-	I saw a floating dead river otter. The river otter was partially decomposed and had only a section of fur left on it's body. It had no marks on it's body that were visible.

16-Jun	1100	Off-watch	Harbor Seal	38	Hauled out on land	-	During permit observations I managed to see a harbor seal haulout on the south end of Island. They were sitting on the rocky outcrop resting in the sun.
16-Jun	1104	On-watch	Sea Otter	1	Swimming or blowing at surface	5	
16-Jun	1201	Off-watch	Unknown Seal, Sea Lion or Walrus	1	Swimming or blowing at surface	5	I saw a pinniped out of the corner of my eye, between the skiff and the rocks.
16-Jun	1303	On-watch	Steller Sea Lion	1	Milling or circling	1	
16-Jun	1325	On-watch	Harbor Seal	1	Hauled out on land	-	A harbor seal was observed resting in the sun on a rocky outlet. The seal watched us and dove into the water soon after we passed by the observation point.
16-Jun	1412	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was at the shoreline in the water, moving away from net when it was first spotted and it continued moving further away.
16-Jun	1438	On-watch	River Otter	1	Foraging on other prey	10	A land otter, small, with a triangular dark head and long thin tail, was diving in water off the gear for 10 minutes.
17-Jun	732	Off-watch	Steller Sea Lion	1	Milling or circling	0	An animal was diving on the net.
17-Jun	1031	On-watch	Harbor Seal	1	Swimming or blowing at surface	4	The harbor seal was seen poking it's little bald head out of the water surface and staring at us. It continued sounding and surfacing.
17-Jun	1031	On-watch	Harbor Seal	1	Milling or circling	70	
17-Jun	1037	On-watch	Harbor Seal	1	Milling or circling	50	
17-Jun	1039	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	The harbor seal was seen swimming on the other side of the net.
17-Jun	1044	On-watch	Steller Sea Lion	1	Feeding on catch	0	An animal diving on the net. At 1058 the same animal surfaced with a piece of a fish and thrashed around for about 5 min, eating it. At 1114 the same animal swam to the other net, then returned.
17-Jun	1128	On-watch	Steller Sea Lion	4	Milling or circling	0	Three more individuals came and they all congregated in the hook. One ot two of them looked a little smaller (pups?).
17-Jun	1135	On-watch	Steller Sea Lion	7	Porpoising	0	The sea lions were porpoising in a group down the length of the net, then they disappeared around the point.
17-Jun	1151	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	3	A big bull came up to the lead, swam under and disappeared around the point.
17-Jun	1154	On-watch	Steller Sea Lion	6	Milling or circling	5	The sea lions came around the point, swam down the net, porpoised back, and then disappeared around point. The bull came around again for a couple of minutes.
17-Jun	1213	On-watch	Steller Sea Lion	3	Milling or circling	0	
17-Jun	1224	On-watch	Sea Otter	1	Swimming or blowing at surface	10	

17-Jun	1543	On-watch	Steller Sea Lion	4	Porpoising	0	
17-Jun	1548	On-watch	Steller Sea Lion	2	Milling or circling	0	
17-Jun	1607	On-watch	Steller Sea Lion	2	Milling or circling	0	The Stellers stayed on the net for the entire watch.
17-Jun	1701	On-watch	Steller Sea Lion	3	Feeding on catch	0	The Stellers milled around for 15 minutes, then ate a sockeye out of the net. They stayed around until the end of the watch.
17-Jun	1730	On-watch	Sea Otter	1	Swimming or blowing at surface	20	
18-Jun	1055	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	15	A sea lion swimming away.
18-Jun	1311	On-watch	Steller Sea Lion	2	Feeding on catch	0	Sea lions were running the net sometimes approaching it and diving. The floats bobbed. They also dove and went under the net repeatedly and were seen with fish. They stayed at the gear until the pick.
18-Jun	1315	On-watch	River Otter	1	Swimming or blowing at surface	10	An otter was seen with what appeared to be a stick in its mouth. It went into a cave where the shore lead was attached.
18-Jun	1445	Off-watch	Steller Sea Lion	1	Feeding on catch	0	We arrived at the net and there was a sea lion near the lead with a fish. The fisher approached to 25m and threw a seal bomb. The sea lion porpoised away.
18-Jun	1456	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was attempting to pick a fish from the net 10m away from the fishing skiff. The fisher threw a seal bomb. The sea lion did not reappear.
19-Jun	648	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	100	I saw a small splash just behind the small gray, triangular dorsal finned porpoise that was out by an anchor buoy, maybe two animals.
19-Jun	727	On-watch	Harbor Seal	1	Swimming or blowing at surface	2	The skiff operator pointed out the seal. It was looking out of the water towards us. It was near the middle of the lead.
19-Jun	809	Off-watch	Sea Otter	1	Milling or circling	80	This sea otter stayed around the net for the entire watch.
19-Jun	811	On-watch	Steller Sea Lion	1	Feeding on catch	2	
19-Jun	824	On-watch	Steller Sea Lion	1	Feeding on catch	2	
19-Jun	836	On-watch	Steller Sea Lion	1	Feeding on catch	1	Inside the hook I observed sea lions eating more fish than was picked by the fishers in their skiff.
19-Jun	837	Off-watch	Dall's Porpoise	2	Swimming or blowing at surface	300	Dall's porpoises were swimming past the R/V.
19-Jun	840	On-watch	Steller Sea Lion	2	Feeding on catch	1	
19-Jun	1138	Off-watch	Steller Sea Lion	2	Feeding on catch	1	Two female Steller sea lions were thrashing near the trap end of the net. Salmon was thrown in the air twice.
19-Jun	1229	On-watch	Sea Otter	1	Floating on surface	100	A sea otter floated away from the gear.

19-Jun	1232	On-watch	Steller Sea Lion	1	Milling or circling	0	A Steller sea lion was swimming along the net lead closest to shore. It looked smaller than most sea lions- like a juvenile. It continued swimming/milling about. Then it swam over the top of the lead.
19-Jun	1247	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	20	A harbor porpoise came up out by the trap end. I saw its triangular dorsal fin and small grey body.
19-Jun	1322	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	10	A Steller sea lion surfaced near the lead. It looks like and it's most likely the same one seen earlier.
19-Jun	1344	On-watch	Steller Sea Lion	1	Thrashing	2	A Steller sea lion was thrashing a salmon around.
19-Jun	1400	Off-watch	Harbor Seal	88		-	Originally from a haulout count form.
19-Jun	1401	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A Sea otter swam over the net, and continued on its way.
19-Jun	1509	Off-watch	Steller Sea Lion	5	Swimming or blowing at surface	50	Five female Steller sea lions were swimming along the shore towards the net. They paused within 2 m of the skiff, surfaced, and looked towards the skiff a few times, before diving under and disappearing.
19-Jun	1542	On-watch	Steller Sea Lion	2	Feeding on catch	1	Two Steller sea lions were swimming around, alongside the net and in the trap. One fish was seen thrown in the air.
19-Jun	1605	On-watch	Steller Sea Lion	1	Milling or circling	1	A Steller sea lion was milling about the middle of the lead.
19-Jun	1612	On-watch	Steller Sea Lion	1	Thrashing	1	A Steller was eating/chomping on salmon next to the net. It looked like the same one from earlier.
19-Jun	1619	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	40	A harbor porpoise surfaced in line with the middle of the net.
19-Jun	1632	Off-watch	Sea Otter	1	Swimming or blowing at surface	1	A sea otter was rolling on it's back and stomach along the length of the net.
19-Jun	1737	On-watch	Sea Otter	1	Floating on surface	20	A sea otter floated by the trap end of the net, seemingly undisturbed.
19-Jun	1805	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	A harbor seal was peeking out of the water for a moment then dove.
19-Jun	1843	On-watch	Steller Sea Lion	1	Milling or circling	10	A Steller sea lion was staying within the area surrounding the lead. It did not appear to be doing anything other than hanging out.
19-Jun	1848	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	700	Two hHarbor porpoises swam across the bow of the R/V.
19-Jun	1902	On-watch	Steller Sea Lion	1	Thrashing	1	A steller in the trap flinging fish.
19-Jun	1904	On-watch	Steller Sea Lion	1	Milling or circling	2	A Steller was near the lead with fish in it's mouth. I only saw one animal surface at once but considered the possibility of two because two minutes is not much time to get from the trap to the lead.
19-Jun	1915	Off-watch	River Otter	1	Hauled out on land	150	An otter was seen on a gravel beach, rolling in the gravel. It saw us, then ran around a rock.
19-Jun	1923	On-watch	Sea Otter	1	Milling or circling	100	

19-Jun	1953	On-watch	Harbor Seal	1	Swimming or blowing at surface	175	A harbor seal head seen bobbing up and down along the shoreline.
19-Jun	2042	On-watch	Steller Sea Lion	1	Thrashing	2	A Steller sea lion flinging fish near the lead in the net.
19-Jun	2054	On-watch	Steller Sea Lion	1	Thrashing	60	
19-Jun	2103	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	
19-Jun	2116	On-watch	Steller Sea Lion	1	Thrashing	15	
19-Jun	2121	On-watch	Harbor Seal	1	Swimming or blowing at surface	60	The harbor seal looked on then dove.
20-Jun	650	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	300	I saw a porpoise as we arrived on site.
20-Jun	714	Off-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter swam alongside the net for 10m. It dove and was not seen again.
20-Jun	1015	On-watch	Harbor Seal	2	Swimming or blowing at surface	200	The harbor seal looked as if it was just passing through the area.
20-Jun	1019	On-watch	Unknown Baleen Whale	1	Swimming or blowing at surface	100	A whale appeared two times with no blows. It just surfaced and showed its back and prominent falcate dorsal fin. It was a smaller whale possibly a sei or a minke.
20-Jun	1022	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	The Steller sea lion looked as if it was just passing through the area.
20-Jun	1126	On-watch	Harbor Seal	1	Swimming or blowing at surface	40	
20-Jun	1149	On-watch	Steller Sea Lion	3	Feeding on catch	0	Three Steller sea lions came to the net and started feeding on the catch. On two different occasions I witnessed a sea lion with a salmon, but never noticed a lot of movement in the net. I believe they were just picking fish from the net and not interfering with the net itself.
20-Jun	1308	Off-watch	Harbor Seal	12	Swimming or blowing at surface	-	
20-Jun	1308	Off-watch	Sea Otter	1	Swimming or blowing at surface	-	
20-Jun	1400	On-watch	Unknown Otter	1	Hauled out on land	30	An unknown otter, foraging on rocks at the high tide line.
20-Jun	1415	On-watch	Sea Otter	1	Swimming or blowing at surface	250	A sea otter swam off the net.
20-Jun	1638	On-watch	Steller Sea Lion	1	Milling or circling	1	A sea lion appeared at the cork line when the boat approached the net, then dove.
20-Jun	1639	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	5	

20-Jun	1647	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	2	
20-Jun	1759	On-watch	Sea Otter	1	Swimming or blowing at surface	70	A sea otter came up away from the net and kept swimming further.
20-Jun	1835	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	1000	A porpoise was seen on the way to the net.
21-Jun	545	Off-watch	Harbor Porpoise	1	Milling or circling	400	
21-Jun	626	Off-watch	Harbor Porpoise	1	Milling or circling	400	This was probably the same individual as before.
21-Jun	850	On-watch	Unknown Seal, Sea Lion or Walrus	1		1	An unknown pinniped with a dark round head was seen briefly. I could not tell if it had ears.
21-Jun	917	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A Steller sea lion seen swimming mid-net down the length of the net.
21-Jun	933	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	800	The harbor porpoiser was just swimming through what looked like a current in the middle of the bay. It surfaced 3-6 times. The porpoise was spotted again at 945 and 955.
21-Jun	1130	On-watch	Steller Sea Lion	1	Feeding on catch	1	A Steller sea lion was seen swimming down length of the net from the trap to the shore end. Four salmon were seen in it's mouth after resurfacing.
21-Jun	1132	On-watch	Harbor Seal	1	Swimming or blowing at surface	310	I spotted a harbor seal in the flag of the net. It was swimming around in there for a few minutes before it disappeared. This seal was sighted again approximately 150m from shore at 1224, and 75m from the net and shore at 1232.
21-Jun	1258	On-watch	Steller Sea Lion	1	Feeding on catch	1	A Steller sea lion was seen swimming mid-net. At 1300 corks were bobbing down mid-net.
21-Jun	1330	On-watch	Steller Sea Lion	1	Feeding on catch	5	The Steller was eating a salmon right next to the net.
21-Jun	1418	On-watch	Sea Otter	2	Milling or circling	15	This was probably a mother and pup. The smaller one was lighter in color, and rode on the belly of the other.
21-Jun	1507	Off-watch	Harbor Seal	97	Hauled out on land	-	A harbor seal haulout recorded on a haulout count form. The original was sent to NMML. There were no brands.
21-Jun	1547	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	80	A Steller sea lion was seen swimming between the lead buoy and the shore.
21-Jun	1550	Off-watch	River Otter	1	Hauled out on land	10	The river otter was spotted on shore. It immediately jumped off the rocks and swam into the water back towards the rock.
21-Jun	1622	On-watch	Sea Otter	1	Swimming or blowing at surface	10	The sea otter hung around the net swimming back and for approximately 1/2 hour.
21-Jun	1644	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	500	The harbor porpoises surfaced a few times while heading away from the net towards the Strait.

21-Jun	1703	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	A harbor seal appeared about 20m from the flag and stayed within 150m of the net until the end of the watch at 1720. The harbor seal appeared at 1833 about 200m from the middle of the net.
21-Jun	1713	Off-watch	Steller Sea Lion	1	Feeding on catch	1	A Steller sea lion was in the trap, and the floats were going underwater.
21-Jun	1740	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	40	
21-Jun	1754	Off-watch	Steller Sea Lion	1		1	A Steller sea lion was seen swimming down the length of the net from the shore end to the trap end, and resurfacing in the trap.
21-Jun	1816	On-watch	Sea Otter	1	Milling or circling	1	A sea otter was first seen at the net. It surfaced, swam along it for 5m, and then went under. It was next seen 50m off the net and swimming further away.
21-Jun	1835	On-watch	Sea Otter	1	Milling or circling	20	
21-Jun	1944	On-watch	Sea Otter	1	Swimming or blowing at surface	60	The sea otter was swimming/ floating away from the net.
21-Jun	2022	On-watch	Sea Otter	1	Swimming or blowing at surface	300	
22-Jun	1040	On-watch	Harbor Seal	3	Swimming or blowing at surface	-	
22-Jun	1041	On-watch	Sea Otter	1	Swimming or blowing at surface	-	
22-Jun	1259	On-watch	Harbor Seal	5	Swimming or blowing at surface	-	Four adult seals were observed, along with a small young pup.
22-Jun	1349	On-watch	Dall's Porpoise	1	Swimming or blowing at surface	-	A lone Dall's porpoise surfaced next to the vessel. It slowly rolled. There was no rooster tail, a black body, white on the lower side, small.
22-Jun	1350	On-watch	Harbor Seal	1	Swimming or blowing at surface	-	
22-Jun	1357	On-watch	Steller Sea Lion	18	Hauled out on land	-	I passed inside of the haulout. The count is a minimum. I saw a brand. The record is on a haulout form.
22-Jun	1410	On-watch	Harbor Seal	9	Swimming or blowing at surface	-	
22-Jun	1413	On-watch	Harbor Seal	2	Hauled out on land	-	
22-Jun	1442	On-watch	Harbor Seal	2	Swimming or blowing at surface	-	
22-Jun	1446	On-watch	Sea Otter	1	Floating on surface	-	
22-Jun	1907	On-watch	Harbor Seal	1	Floating on surface	90	
22-Jun	1920	On-watch	Harbor Seal	1	Floating on surface	1	

22-Jun	1928	On-watch	Sea Otter	1	Swimming or blowing at surface	40	
22-Jun	1938	On-watch	Harbor Seal	1	Floating on surface	0	
22-Jun	1948	On-watch	Harbor Seal	1	Floating on surface	0	
23-Jun	1056	On-watch	Sea Otter	1	Foraging on other prey	0	A sea otter swam to the net, dove just before net and surfaced again on the other side, eating a piece of food. I was unable to determine what was being fed on.
23-Jun	1059	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	
23-Jun	1738	On-watch	Sea Otter	1	Foraging on other prey	0	An otter swam slowly towards the net, stopping periodically to dive for food, then spent about minutes at the net, diving three times for food. Then it popped over the net and swam away. I was unable to determine what was being fed on.
24-Jun	1437	On-watch	Sea Otter	4	Floating on surface	-	
24-Jun	2021	On-watch	Sea Otter	2	Floating on surface	-	
25-Jun	813	On-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter surfaced and then swam toward the net. The otter rolled over the net and swam away.
25-Jun	835	On-watch	River Otter	1	Swimming or blowing at surface	0	
25-Jun	922	On-watch	Sea Otter	1	Swimming or blowing at surface	100	The sea otter was sighted approximately 100m from the king buoy, and swam to within 15m from king buoy on its way by.
25-Jun	1316	Off-watch	Harbor Seal	2	Swimming or blowing at surface	-	Originally from a colony status record. Two harbor seals were seen swimming abou 20 m from the island shoreline.
25-Jun	1400	Off-watch	Harbor Seal	1	Floating on surface	-	
25-Jun	1415	Off-watch	Harbor Seal	1	Floating on surface	-	
25-Jun	1445	Off-watch	Harbor Seal	4	Floating on surface	-	I noticed three adult harbor seals and one pup bobbing up and down at the surface. They remained present until we departed the location.
25-Jun	1448	Off-watch	Harbor Seal	6	Floating on surface	-	I observed all adult harbor seals (different individuals) nearby.
25-Jun	1631	On-watch	Steller Sea Lion	14	Hauled out on land	-	A sea lion haulout.
25-Jun	1637	On-watch	Steller Sea Lion	37	Hauled out on land	-	A sea lion haulout.
25-Jun	1705	Off-watch	Harbor Porpoise	3	Swimming or blowing at surface	-	
25-Jun	1940	On-watch	Sea Otter	1	Swimming or blowing at surface	20	A sea otter floating, diving, and swimming in one direction.
25-Jun	1945	Off-watch	Sea Otter	1	Swimming or blowing at surface	-	

25-Jun	2001	On-watch	Sea Otter	1	Swimming or blowing at surface	20	A sea otter was swimming on the surface, then dove.
25-Jun	2005	On-watch	Sea Otter	2	Swimming or blowing at surface	0	
25-Jun	2022	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter was paddling toward the net, then dove. It surfaced, swam over the net, and continued swimming away.
26-Jun	642	Off-watch	Dall's Porpoise	4	Swimming or blowing at surface	200	The skiff driver said, "hey look". I looked over and saw rooster tail splashes. There were probably more than four. I will say a minimum of three. The splashes from their swimming happened for several more seconds then they were done.
26-Jun	759	On-watch	Harbor Seal	1	Milling or circling	35	
26-Jun	1221	On-watch	Sea Otter	1	Swimming or blowing at surface	-	
26-Jun	1223	On-watch	Sea Otter	1	Swimming or blowing at surface	-	
26-Jun	1227	On-watch	Sea Otter	1	Swimming or blowing at surface	-	
26-Jun	1935	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion started feeding on fish right next to or on top of the net. It started in the middle, ate a salmon, went to the arrowhead, ate one, came back to the first part of the net, and ate three.
26-Jun	2050	Off-watch	Sea Otter	2	Hauled out on land	600	The sea otters were sitting on a rock out in the middle of the water
27-Jun	604	Off-watch	Dall's Porpoise	6	Swimming or blowing at surface	-	
27-Jun	733	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	A harbor seal was swimming just off shore and near the lead.
27-Jun	750	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	-	
27-Jun	850	On-watch	Harbor Seal	1	Swimming or blowing at surface	25	A harbor seal near the net again, possibly the same one as the first sighting.
27-Jun	929	Off-watch	Sea Otter	2	Swimming or blowing at surface	300	Sea otters were swimming near the shore, swimming on their backs and playing with something on their chests.
27-Jun	947	On-watch	Sea Otter	1	Floating on surface	50	
27-Jun	1014	Off-watch	Sea Otter	3	Swimming or blowing at surface	100	
27-Jun	1039	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	A harbor seal near the net again, probably the same one.
27-Jun	1123	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was reportedly feeding on catch by the fisherman.

27-Jun	1124	On-watch	Sea Otter	1	Swimming or blowing at surface	75	A sea otter swam from one side of the net then jumped over the net and kept on going.
27-Jun	1128	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was reportedly feeding on catch by the fisherman.
27-Jun	1211	On-watch	Steller Sea Lion	1	Feeding on catch	20	A sea lion was feeding around the lead, not the gillnet.
27-Jun	1432	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was feeding around the lead, not the gillnet
27-Jun	1432	On-watch	Sea Otter	2	Swimming or blowing at surface	150	Two sea otters were swimming in the current side by side. At 1447 the two sea otters swam towards the net and one jumped over while the other swam under and passed through.
27-Jun	1442	On-watch	Steller Sea Lion	1	Milling or circling	1	The same sea lion possibly was feeding on catch from the gear. It was identified by the head and body only.
27-Jun	1507	On-watch	Sea Otter	1	Milling or circling	2	A sea otter was swimming in the hook, in the middle, not messing with the gear.
27-Jun	1626	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	A small harbor seal surfaced about 3m from our skiff, in between us and the fisher's skiff. It just popped up to look at us for about 10 seconds and then sank back down. A moment later it surfaced about 5m from the fisher's skiff, looked at them, and sank down.
27-Jun	2030	Off-watch	Sea Otter	2	Swimming or blowing at surface	100	A sea otter was swimming outside of the gear. It surfaced, got spooked and dove.
27-Jun	2030	On-watch	Sea Otter	1	Swimming or blowing at surface	70	A lone sea otter was swimming parallel with the net while the crew were picking.
27-Jun	2108	Off-watch	Unknown Seal, Sea Lion or Walrus	1	Milling or circling	5	An unidentified pinniped surfaced briefly at the shore lead.
27-Jun	2136	Off-watch	Sea Otter	1		50	A sea otter remained at that location for about 20 minutes, playing in the kelp, milling or possibly foraging.
27-Jun	2229	On-watch	Sea Otter	1	Swimming or blowing at surface	30	At the end of the day the fisher ran the net but did not pick it. I was still on soak watch and spotted the sea otter.
28-Jun	726	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	150	A harbor porpoise surfaced once and swam toward the net. It was never seen again.
28-Jun	737	On-watch	Sea Otter	1	Swimming or blowing at surface	100	
28-Jun	745	On-watch	River Otter	1	Swimming or blowing at surface	1	A river otter surfaced near the net and dove when I pointed at it. The otters head was all black and much smaller than a sea otter head. It swam on it's belly only, with the head only exposed while swimming. The dive was a forward roll that showed the dorsal surface and tail.
28-Jun	959	On-watch	Harbor Seal	1	Swimming or blowing at surface	-	A harbor seal head surfaced near the boat, then disappeared.

28-Jun	1234	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter swimming back and forth about 100m from the net. At 1240 it crossed the net.
28-Jun	1559	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter swam from the end of the net parallel to the skiff before leaving. It stayed about 100m from the net at the closest approach.
28-Jun	1604	On-watch	Sea Otter	1	Swimming or blowing at surface	500	A different sea otter was sighted swimming out in the middle section of the bay. It was seen again at 1623 about 75m from the net and at 1633 the sea otter was swimming where the lead attaches to the land.
28-Jun	1614	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	A harbor seal surfaced between the vessel and the net, and did this again at 1628 in about the same position.
28-Jun	1649	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam over net, then dove.
28-Jun	1907	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	40	A harbor porpoise surfaced once, swimming toward the net. It dove and never reappeared.
28-Jun	1941	Off-watch	Sea Otter	3	Swimming or blowing at surface	500	Three sea otters swimming on their backs, one with a juvenile on it's stomach.
29-Jun	700	On-watch	Sea Otter	1	Milling or circling	100	An otter was milling around the anchor buoy on it's back for several minutes.
29-Jun	801	On-watch	Sea Otter	2	Porpoising	300	Two otters surfaced for several minutes and then disappeared.
29-Jun	824	On-watch	Sea Otter	1	Swimming or blowing at surface	50	An otter surfaced and swam parallel to the net heading offshore.
29-Jun	1135	Off-watch	Sea Otter	2	Swimming or blowing at surface	50	Two sea otters were sighted approximately 50m from the net at 1135, before the second soak watch began.
29-Jun	1154	On-watch	Sea Otter	1	Swimming or blowing at surface	150	A sea otter was swimming seaward. At 1218 the sea otter was swimming about 75m off the end of the king buoy, probably the same as the otter sighted at 1154.
29-Jun	1215	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	250	A harbor porpoise swam by just outside the anchor buoy. I got a range on the buoy.
29-Jun	1712	On-watch	Sea Otter	1	Swimming or blowing at surface	150	A sea otter was swimming up the bay in the opposite direction to the net. At 1728 it was sighted swimming in the same spot towards the net. He dove and kept on going. This individual is recognized by its light colored head.
29-Jun	1815	Off-watch	Sea Otter	1	Swimming or blowing at surface	20	
29-Jun	1839	On-watch	Sea Otter	1	Swimming or blowing at surface	175	A sea otter was eating some type of shellfish on the surface. At 1849 this otter came within about 15m of the net before it dove.
30-Jun	552	Off-watch	Sea Otter	2	Floating on surface	10	An offwatch sighting of sea otters, observed on the way out to the permit site, swimming on their backs.

30-Jun	554	Off-watch	Sea Otter	5	Floating on surface	10	An offwatch sighting of sea otters, observed on the way out to the permit site, swimming on their backs.
30-Jun	645	Off-watch	Harbor Seal	1	Feeding on catch	0	A harbor seal was identified. It had no pinnae, a small head, the head shape was horizontal on the water surface and light dark in color - adult size. It appeared to be feeding on fish in the net, thrashing the food about, and then swam away after 5 minutes.
30-Jun	858	On-watch	Steller Sea Lion	4	Thrashing	0	Two Steller sea lions were at the shore-side end of the net, eating salmon - flinging them around. Two more sea lions joined in, four total. All were at the net, snorting and tossing fish around. The sea lions continued tossing fish around for a good half hour, then their activity diminished.
30-Jun	1031	Off-watch	Harbor Seal	1	Swimming or blowing at surface	100	
30-Jun	1225	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	80	A harbor porpoise fin was seen surfacing three times.
30-Jun	1316	On-watch	Harbor Seal	1	Feeding on catch	0	A harbor seal was observed feeding on the catch from the net. The seal was seen feeding on fish for about 3 minutes before it left the area. It was identified by the round, horizontally pointed head/snout. It had no pinnae and a dark coat.
30-Jun	1326	Off-watch	Sea Otter	1	Swimming or blowing at surface	100	
30-Jun	1908	On-watch	Harbor Seal	1	Swimming or blowing at surface	60	A harbor seal was seen popping it's head out of the water. It looked around for 30 seconds, disappeared, and then reappeared on the opposite side of the net. At 1910 the seal popped it's head up about 40m from the opposite side of the net. It was about 90m from our vessel. The harbor seal disappeared from sight about 10 seconds later.
1-Jul	658	Off-watch	Harbor Seal	1	Swimming or blowing at surface	15	Just before the first pick I observed a harbor seal identified by the horizontal head/nose shape sticking out along the surface of the waters No pinnae was present and it was dark in color. It appeared to be an adult that was cruising along the net for food. He took off as we approached the net for a pick.
1-Jul	744	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam by, dove, resurfaced next to the net, went over the net, and kept swimming.
1-Jul	755	On-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter was floating and swimming out by the hook end of the net. It seemed to be aware of our presence. It continued to float/sit up and look our way. It dove out of sight 5 minutes later.
1-Jul	1120	Off-watch	Sea Otter	1	Swimming or blowing at surface	-	I saw a sea otter near the shore, not in the vicinity of the gear, swimming along on it's back near the beach.

1-Jul	1210	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter was observed swimming by and over the gillnet and it then dove into the water.
1-Jul	1210	On-watch	Sea Otter	2	Swimming or blowing at surface	100	Two sea otters were swimming towards the shore away from the net. They were seen again at 1228.
1-Jul	1228	On-watch	Sea Otter	2	Swimming or blowing at surface	100	Two more sea otters joined the 1210 otters and were all swimming near each other by some rocks where the lead began.
1-Jul	1302	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter swam by our skiff on its back.
1-Jul	1416	On-watch	Sea Otter	1	Swimming or blowing at surface	0	An otter was swimming on back by the net, then dove, surfaced and swam over the net.
1-Jul	1643	On-watch	Sea Otter	1	Swimming or blowing at surface	15	I sighted a sea otter swimming just off the king buoy.
1-Jul	1825	Off-watch	Sea Otter	1	Swimming or blowing at surface	-	
1-Jul	2033	On-watch	Sea Otter	1	Milling or circling	40	A sea otter did the back float.
1-Jul	2135	Off-watch	Sea Otter	1	Swimming or blowing at surface	5	
1-Jul	2138	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter approached the net near the shore. It was doing the back float, hit the corks, and porpoised over the corkline. It then continued swimming on it's original course and dove as it came close to my skiff.
2-Jul	739	Off-watch	Steller Sea Lion	2	Swimming or blowing at surface	300	I saw two sea lions about 300m from net 1, swimming together. After I looked down to record the sighting, they were gone.
2-Jul	754	On-watch	Harbor Seal	1	Hauled out on land	80	I saw a harbor seal laying on a rock out of the water at the shore edge. It disappeared at 841.
2-Jul	833	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	300	I saw a porpoise surface for a breath once, then it disappeared.
2-Jul	1205	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter passing by king buoy.
2-Jul	1457	On-watch	Unknown Seal, Sea Lion or Walrus	1	Swimming or blowing at surface	40	I saw an unknown pinniped about 40m off of the trap. I just caught a glimpse of it going under. It was a dark brown shade, solid color, body smallish. It was not seen again. It had hind flippers that I saw in the air as it went down.
2-Jul	1627	On-watch	Harbor Seal	1	Swimming or blowing at surface	25	A harbor seal was watching us while swimming around. I lost track of it after it dove.
2-Jul	1810	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter swimming towards the net. At 1814 it swam around the shoreside of the net.

2-Jul	1831	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A harbor seal popped its head up and looked directly at me then went under. It was seen again about 1m from the net at 1837. This seal was seen multiple times about 1m from the net on both sides. At 1919 this seal was seen heading away from the net.
2-Jul	2015	On-watch	Steller Sea Lion	1		2	A Steller sea lion was seen at the trap of the net. It disappeared for 3 minutes and then was seen at mid-net about 5m from the gear.
2-Jul	2244	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	-	
2-Jul	2258	Off-watch	Sea Otter	1	Swimming or blowing at surface	-	
3-Jul	731	Off-watch	Sea Otter	1	Swimming or blowing at surface	600	While on the beach waiting for the pick to commence I saw a sea otter swimming on its back, close to the shore line, eating while lying on its back swimming along. Swimming was the dominant behavior.
3-Jul	1336	On-watch	Harbor Seal	1	Swimming or blowing at surface	75	A harbor seal was swimming between the net and the anchor buoys. It was spotted again at 1346 about 1m away from the opposite side of the net, and at 1413 it was seen again in the same spot as the initial sighting.
3-Jul	1417	On-watch	Sea Otter	1	Milling or circling	10	A sea otter swam towards the net, dove and surfaced on the opposite side of the net.
3-Jul	1419	On-watch	Sea Otter	1	Milling or circling	5	
3-Jul	1958	On-watch	Sea Otter	1	Swimming or blowing at surface	25	A sea otter was drifting out by the net. It dove and I did not see it again.
4-Jul	1405	On-watch	Sea Otter	1	Swimming or blowing at surface	13	A sea otter was sleeping, and almost run over, knocked over by the bow wake.
4-Jul	1408	On-watch	Sea Otter	2	Floating on surface	-	
4-Jul	1615	On-watch	Sea Otter	5	Milling or circling	-	
5-Jul	715	On-watch	Sea Otter	1	Foraging on other prey	80	The sea otter had a small octopus on its belly which it was feeding on.
5-Jul	826	On-watch	Sea Otter	1	Floating on surface	300	
5-Jul	945	Off-watch	Steller Sea Lion	1	Feeding on catch	10	A sea lion was observed feeding on fish from the net. It came within 10-15m of our skiff, throwing it's salmon around in the sea near the keg buoy. At 1034 and 1052 the same sea lion (it had remained in the area constantly swimming around) was seen first at 30m from the shoreline beginning of the net along the shore, then again 25m down along the net (at 5-10m from net itself).
5-Jul	950	Off-watch	Steller Sea Lion	2	Feeding on catch	30	Near the shore line end of the net two different sea lions were observed swimming and feeding on salmon around 30m from the net.

5-Jul	957	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	80	During my soak watch a sea lion came swimming alongside our skiff, milling around in small circles.
5-Jul	1006	On-watch	Sea Otter	3	Floating on surface	-	From 1006 to 1023 I counted sea otters. Several had pups.
5-Jul	1010	On-watch	Sea Otter	2	Floating on surface	-	
5-Jul	1014	On-watch	Sea Otter	5	Floating on surface	-	
5-Jul	1023	On-watch	Sea Otter	1	Floating on surface	5	
5-Jul	1038	Off-watch	Sea Otter	1	Swimming or blowing at surface	1000	A sea otter was swimming on it's back, away from the bow of our skiff.
5-Jul	1041	Off-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was seen at the net. I watched it rip a salmon from the net then thrash around. It dove and I did not see it again.
5-Jul	1317	On-watch	Sea Otter	6	Floating on surface	0	The sea otters were seeking the calmness behind a rock island and using the lead part of the net for an anchor. They moved when we came in with our skiff. Two hung out near hook end of the net.
5-Jul	1702	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	-	
5-Jul	1938	On-watch	Sea Otter	1	Floating on surface	8	
5-Jul	2016	On-watch	Steller Sea Lion	1	Feeding on catch	2	I heard a big splash at shore end of the net and there was a sea lion with a fish out of the net. He took it and ran.
5-Jul	2041	On-watch	Sea Otter	5	Floating on surface	-	The sea otters were floating around in the bay near the net. The closest sea otter to the net was 30m away, the farthest was 200m.
6-Jul	832	On-watch	Sea Otter	1	Floating on surface	50	
6-Jul	859	On-watch	Harbor Seal	2	Swimming or blowing at surface	75	Two harbor seals were swimming near the trap end of the net.
6-Jul	1023	On-watch	Sea Otter	1	Swimming or blowing at surface	40	A sea otter was seen swimming on it's back 40m away from gear. It was observed for less than 30 seconds, and it was in sight in my vision of the net, as it was being hauled/picked.
6-Jul	1029	On-watch	Sea Otter	1	Milling or circling	10	A sea otter was eating and floating on it's back.
6-Jul	1039	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	A harbor seal was swimming near the net. It was spotted again at 1051 about 10m on the opposite side of net.
6-Jul	1133	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	5	A Steller sea lion was observed swimming along, surfacing for air every few minutes. It came to 5m distance of the net and 15m distance from the skiff. The sea lion saw me in the skiff and began swimming over to the skiff. Then it dove under the skiff and away. It was last seen at 1148 and 1154.
6-Jul	1236	On-watch	Sea Otter	1	Swimming or blowing at surface	3	An otter came around the rock headland towards the net, up to the lead mesh, then turned around and swam away.
6-Jul	1835	On-watch	Harbor Seal	1	Swimming or blowing at surface	40	The harbor seal was seen at 1919 8m from the net on one side. It disappeared, and then popped up 8m on the other side. It came up right next to the net.

6-Jul	1843	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter drifted over the lead.
6-Jul	1930	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	50	
6-Jul	2002	On-watch	Sea Otter	1	Swimming or blowing at surface	1	A sea otter swam over the leadline on it's belly.
6-Jul	2122	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	5	A Steller sea lion was observed just prior to the third pick. It was observed swimming by the net at 5m distance, diving and coming up for air several times (10m away from skiff). After about 2 minutes it dove under the water and under the other side of the net along the shoreline side of this net. It came up for air on the other side once more before heading around the north west-west side of the island.
6-Jul	2202	On-watch	Harbor Seal	1	Swimming or blowing at surface	15	A harbor seal swimming near the net.
7-Jul	654	On-watch	Harbor Seal	1	Swimming or blowing at surface	0.5	A harbor seal popped up by the net then disappeared.
7-Jul	732	On-watch	Sea Otter	1	Floating on surface	20	
7-Jul	849	On-watch	Sea Otter	1	Swimming or blowing at surface	70	
7-Jul	1425	On-watch	River Otter	1	Swimming or blowing at surface	50	A river otter swimming about 30m on the opposite side at the net. It swam over the top of the net at 1442.
7-Jul	1444	On-watch	Sea Otter	1	Swimming or blowing at surface	8	The sea otter was just floating around.
7-Jul	1528	On-watch	Sea Otter	2	Swimming or blowing at surface	75	Sea otters just floating around.
7-Jul	1753	On-watch	Sea Otter	1	Floating on surface	10	
7-Jul	2202	On-watch	Sea Otter	1	Milling or circling	4	A sea otter did the back float near the gear.
8-Jul	630	Off-watch	Dall's Porpoise	4	Bow riding	-	The Dall's porpoise were riding the bow wake in front of the boat.
8-Jul	812	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	25	A Steller sea lion was observed swimming along in the water near the net. He eventually saw us and came over to where we were sitting to check us out (5m distance from the skiff). After approaching us he came to the surface, then swam off.
8-Jul	816	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	100	A sea lion swam to the net at the middle and swam parallel to the net looking for fish, 25m from net.

8-Jul	836	On-watch	Steller Sea Lion	2	Feeding on catch	0	There were two sea lions, one larger than the other, each with a fish. One sea lion was in the trap of the net, the other was just outside the trap. The big one slaped his salmon around, and ripped it in two. Kittiwakes were diving on the guts. Both sea lions cruised the entire net until 858.
8-Jul	904	On-watch	Steller Sea Lion	1	Feeding on catch	0	A huge bull sea lion was in the trap of the net with fish.
8-Jul	936	On-watch	Steller Sea Lion	2	Feeding on catch	0	A sea lion was swimming up and down the length of the net. Corks bobbed, and the sea lion emerged with fish.
8-Jul	943	Off-watch	Steller Sea Lion	2	Feeding on catch	0	I walked to my viewing spot and noticed two small sea lions feeding on the hook of the net. The sea lions disappeared after about 10 minutes. The fisher ran the net to scare the sea lions just in case they were still close.
8-Jul	947	On-watch	Steller Sea Lion	3	Swimming or blowing at surface	0	There were two sea lions that approached us. After swimming around our skiff they departed back to the net and then swam off. A total of 5 photos of the incident were taken.
8-Jul	955	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	700	A sea lion surfaced behind me and then swam away.
8-Jul	1004	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	300	A sea lion was swimming away from the net.
8-Jul	1223	On-watch	Steller Sea Lion	1	Feeding on catch	0	While guys are picking mid-net the sea lion pulled a fish out of the trap end, bit the head off and threw it around, flopping it 10 feet away then lunging for it. He threw the fish around until the fisherman reached the trap, then he dove and disappeared. The fisher prepared a seal bomb.
8-Jul	1223	Off-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	
8-Jul	1226	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	A harbor seal was swimming on the opposite side of the net, and spotted again at 1233 heading away from net.
8-Jul	1246	On-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter passing by parallel to the net.
8-Jul	1257	Off-watch	Harbor Seal	1	Hauled out on land	300	A seal pup crawled on the beach. The pup swam away when the skiff got close to shore.
8-Jul	1300	Off-watch	Steller Sea Lion	3	Thrashing	100	A branded seal.
8-Jul	1304	On-watch	Steller Sea Lion	2	Swimming or blowing at surface	50	
8-Jul	1331	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	
8-Jul	1453	Off-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	

8-Jul	1633	On-watch	Sea Otter	1	Swimming or blowing at surface	400	I saw a sea otter floating on its back about 400m from the gear. It floated around that area the rest of my soak watch. I stopped watching him at 1705 when I ended my watch.
8-Jul	1806	On-watch	Sea Otter	1	Floating on surface	150	
8-Jul	1815	On-watch	Sea Otter	1	Swimming or blowing at surface	75	A sea otter was swimming/resting.
8-Jul	1837	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A sea lion popped up. The fisher threw a seal bomb into the water, and the sea lion went away.
8-Jul	2032	Off-watch	Steller Sea Lion	1	Feeding on catch	0	I pulled up to the net and saw a Steller sea lion feeding in the trap and one 200m from the net feeding in kelp.
8-Jul	2038	On-watch	Steller Sea Lion	3	Feeding on catch	0	Three Steller sea lions were feeding in and around the trap. Individuals were porposing over the net. There was a lot of movement and splashing at the trap.
8-Jul	2109	On-watch	Steller Sea Lion	1	Feeding on catch	1	
8-Jul	2128	Off-watch	Steller Sea Lion	3	Swimming or blowing at surface	1	Sea lions were swimming up and down the net. Thet swam under it once.
9-Jul	546	Off-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion was seen swimming at the trap, then seen swimming up and down the length of the net from the shore end to the trap. It was seen feeding and throwing fish in the trap at 554.
9-Jul	622	On-watch	Steller Sea Lion	3	Swimming or blowing at surface	0	Three more Steller sea lions were seen 100 fathoms from the net, then made their way to the net and were swimming up and down the length.
9-Jul	714	On-watch	Sea Otter	1	Floating on surface	60	A sea otter drifted to 10m of the net and dove.
9-Jul	738	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	100	A Steller sea lion was swimming near the shore.
9-Jul	806	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was in the trap eating and throwing fish in the air. As the picking skiff reached the trap the sea lion was swimming near the shore.
9-Jul	820	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller was mid-net.
9-Jul	1050	On-watch	Steller Sea Lion	3	Feeding on catch	0	A sea lion was mid-net feeding, and swimming the length of the net, especially from the shore and to mid-net. At 1144 two were sea lions near the shore end surfacing (the same seals previously observed). At 1227 a sea lion was near the shore end, eating fish.
9-Jul	1402	On-watch	Sea Otter	1	Swimming or blowing at surface	0	An otter swam over the net.
9-Jul	1516	On-watch	Steller Sea Lion	1	Feeding on catch	100	A Steller sea lion was seen between the shore end of the gear and the shore. Then it moved down the length of the net feeding.

9-Jul	1615	On-watch	Sea Otter	1	Swimming or blowing at surface	0	Sea otters swam over the lead end of the net, and kept swimming until out of sight.
9-Jul	1648	On-watch	Sea Otter	1	Floating on surface	50	
9-Jul	1947	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was in the trap feeding on fish (fish throwing in air). Then it appeared 20m in front of the picking skiff with fish in it's mouth.
14-Jul	1212	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	30	An unknown pinniped surfaced for air while swimming, At 1213 I was able to identifu it as a sea lion as it surfaced again, looked around and went under (150m from the gear, 120m from the vessel).
14-Jul	1237	On-watch	River Otter	1	Swimming or blowing at surface	5	A land otter swimming along the shore popped up 10m from the lead swam to 5m and then disappeared.
14-Jul	1500	Off-watch	Harbor Seal	1	Swimming or blowing at surface	-	While the vessel was anchored up near the permit site a harbor seal was observed swimming and observing our vessel. It was 15m away from us and kept circling our vessel. It had no pinnae and could be seen with it's head clearly out of the water, horizontal with the water surface.
14-Jul	1547	Off-watch	Sea Otter	2	Swimming or blowing at surface	15	Two sea otters were observed swimming on their backs near the gear. They were observed several times throughout the soak watch, swimming around the net (at 1614, 1638, 1652 etc.).
14-Jul	1939	On-watch	River Otter	1	Swimming or blowing at surface	0	A land otter popped up 5m from the lead, dove, popped up right up on the corkline, rested a moment and looked at us then dove, swam by us checking us out, swam to the shore, got out on the rock and disappeared.
14-Jul	1948	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam directly for the net and parallel to it for 5m, swam over it and kept going until out of sight.
14-Jul	2012	On-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter was observed swimming on it's back away from the net.
14-Jul	2037	On-watch	Sea Otter	1	Floating on surface	70	A sea otter was just drifting. At 2113 the sea otter was still in the same spot.
14-Jul	2048	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was seen swimming in the distance, sticking his head out of the water at 100m behind the gear. It could be observed as the gear was being hauled.
15-Jul	902	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	A harbor seal was seen swimming at the surface near the net. As soon as we approached, it disappeared back beneath the surface. It was identified by the absence of pinnae. It had the head shape of a harbor seal (horizontal with the water) and was very shy.

15-Jul	1231	On-watch	Unknown Otter	1	Feeding on catch	0	I spotted an unknown otter at the net (not far from the shore end of the net after the lead ends). It was dark colored, small and had an otter tail. It popped it's head up every 50 second or so. It's mouth appeared to be chewing (and thus feeding on the net). It did a few flips in the water. The last I saw it was at 1242.
15-Jul	1324	Off-watch	River Otter	1	Swimming or blowing at surface	0	I was getting ready to move to another net when I saw a small river otter next to the net near the shore end of the net. It appeared to be headed toward the shore. I only saw it for about 45 seconds and then I had to leave. It is possibly the unknown otter that I saw earlier (1231). However, time had passed and it was in a different spot along the net. Thus, I could not be sure if was the same or another otter.
16-Jul	710	On-watch	Sea Otter	1	Swimming or blowing at surface	25	A sea otter did the back float.
16-Jul	826	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion came up right next to the net. It would swim along the net, dive and come back up with a fish. It spent a lot of time where the net and shore lead meet. At 833 we started our two cycle engine thinking that the pick would begin but shut it off at 838. I did not see the sea lion from 833 to 843. One the pick began I did not see it again.
16-Jul	929	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	5	A Steller sea lion appeared 5m from the net between the shore end and shore, swimming towards the lead.
16-Jul	1244	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	-	A Steller sea lion was swimming between the shore end of the net and the shore. At 1255 a sea lion was 0.5m from the hook, probably the same sea lion as from the first net. It was swimming around the hook. A seal bomb was used as a deterrent.
16-Jul	1350	Off-watch	Steller Sea Lion	97		-	Originally from a haulout count and Steller sea lion brand resight form. It includes two branded animals.
16-Jul	1615	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	-	A sea lion was swimming from the shore end to mid-net.
16-Jul	1727	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A river otter was trying to get fish from the net, swimming back and forth over the net and down the length, keeping 25m from and in front of the picking skiff. At 1748 it was swimming around the hook, with fish in it's mouth.
16-Jul	1738	On-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter was milling on it's back very far from the net. It had to have been very large. The identification was confirmed by the silhouette and behavior.
16-Jul	1801	Off-watch	Sea Otter	1	Foraging on other prey	-	I saw a sea otter swimming on it's back and eating something. I did not collect the latitude and longitude.

16-Jul	2032	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	60	A Steller sea lion swimming, and splashing a little near the lead of the net.
16-Jul	2053	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was next to the shoreline rocky reef, just bobbing there, then dove.
16-Jul	2055	On-watch	Steller Sea Lion	1	Thrashing	75	A Steller sea lion was tossing a salmon around. It looked like a young one, not very large in size.
17-Jul	502	On-watch	Unknown Seal	1	Milling or circling	1	A seal surfaced next to the net and the skiff driver pointed it out. The light level was to low for positive identification. It had a seal head shape.
17-Jul	629	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	A harbor seal surfaced between the net and the skiff. At 640 it was sighted swimming about 75m from the net.
17-Jul	642	On-watch	Steller Sea Lion	1	Feeding on catch	1	The animal put it's nose only into air and sniffed. The sighting cue was the sound. It did this three times - it was a big nose! At 745-749 the Steller was in the box portion of net, thrashing at the net. The tail was in the air for 3-5 seconds. It was definitely pulling fish, then throwing and eating the fish outside of the net. Gulls were trying to get some fish and the Steller came out of the water, scaring off the birds.
17-Jul	711	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A Steller was in the box portion of the net. I saw corks move, the Steller came up with a fish, threw it around a while and then ate it. At 745-749 the Steller was in the box portion of the net, thrashing at the net with it's tail in the air for 3-5 seconds, definitely pulling fish, then throwing and eating the fish outside of the net. Gulls were trying to get some fish and the Steller came out of the water scaring off the birds.
17-Jul	740	On-watch	Fin Whale	2	Swimming or blowing at surface	-	Two fin whales were seen 80m away from skiff. The species were identified as fin whales because of the dorsal fin which could only be observed long after the blow. Also the whales would blow 4-5 times before they would dive.
17-Jul	813	On-watch	Sea Otter	2	Swimming or blowing at surface	500	
17-Jul	943	On-watch	Harbor Seal	1	Milling or circling	100	A seal surfaced for a minute and then dove. I was on an elevated cliff. The seal was 150m from the cliff.
17-Jul	1030	On-watch	Sea Otter	1	Swimming or blowing at surface	365	A sea otter was swimming around in the bay all day.
17-Jul	1139	Off-watch	Sea Otter	30	Milling or circling	-	
17-Jul	1216	Off-watch	Steller Sea Lion	36	Hauled out on land	-	A Steller sea lion haulout count: 36 individuals on rock, 25-35 estimated to be in the water. The individuals in the water were playing, porpoising, and milling. One was branded. One animal on rock looked like it's rear left flank had the hide torn off but the animal is alive.

17-Jul	1216	Off-watch	Steller Sea Lion	30		-	
17-Jul	1245	Off-watch	Harbor Porpoise	3	Swimming or blowing at surface	400	Three harbor porpoises were observed swimming and surfacing.
17-Jul	1247	On-watch	Steller Sea Lion	8	Feeding on catch	0	Sea lions were feeding on the net when we arrived. They scared off for 5 minutes then they were back feeding again.
17-Jul	1253	On-watch	Steller Sea Lion	3	Feeding on catch	0	I saw three Steller sea lions feeding on the net near the shore end. They swam along the net tossing fish in the air and eating them. At about 1300, I did not see them anymore.
17-Jul	1304	On-watch	Steller Sea Lion	2	Feeding on catch	0	Most Stellers are in the box portion of net. A few (2-3) were seen working the straight portion. At times I could see 2-3 Stellers catching and eating salmon in the open water area. I can see an area of corks pulled under the water, then surface, and a Steller follows with fish. The Stellers swim/porpoise/jump right over the corkline. At 1337 the Steller left the net heading towards the point. At 1340 they chased as a group porpoising/surfacing 10m from net. They went over the corkline into the hook. They stayed in the hook, surfacing for a minute then went back to the spot of the net that they jumped over and dove at the net. (The 1337 activity looked like a group effort to herd fish into net. They did this 4-5 times and always the same way, towards the same spot of the net each time.) At 1446 the group resurfaced 200m from net towards the cove with fish. At 1448 the group resurfaced at the hook with fish. Corks were bobbing- they were pulling fish from net.
17-Jul	1310	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	A harbor seal was swimming between the net and towards the shore. It was seen again at 1332.
17-Jul	1317	On-watch	Sea Otter	1	Swimming or blowing at surface	300	A sea otter was swimming away from the net.
17-Jul	1341	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A different sea otter was swimming on the opposite side of the net, and again at 1400 in the same location. It swam over the net at 1403.
17-Jul	1408	Off-watch	Sea Otter	1	Swimming or blowing at surface	5	An otter swam under the net.
17-Jul	1418	Off-watch	Sea Otter	2	Swimming or blowing at surface	110	I was leaving the net and saw two sea otters floating about 110m from the net. One sea otter looked like a pup (small, light colored) and was floating on a larger sea otter's belly. I left the area after the sighting.
17-Jul	1426	On-watch	Sea Otter	1	Swimming or blowing at surface	200	
17-Jul	1532	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller appeared near the net on and off.

17-Jul	1550	Off-watch	Steller Sea Lion	1	Swimming or blowing at surface	500	I saw a Steller sea lion swimming in the water about 500m away from the gear. The sea lion was swimming away from the gear. I was traveling past and only saw him for about 30 seconds.
17-Jul	1555	Off-watch	Steller Sea Lion	1	Feeding on catch	0	I saw a Steller sea lion in the net hook feeding on the catch and swimming up and over the net several times. This sea lion was seen every 10 minutes or sooner in the hook until the pick at 1857. However, I had some break times from watching for a few minutes. I cannot say for sure that it was the same sea lion. I usually looked at the hook every few minutes during my break, though, and saw the sea lion.
17-Jul	1607	On-watch	Steller Sea Lion	1	Feeding on catch	0	
17-Jul	1607	On-watch	Sea Otter	2	Swimming or blowing at surface	100	I saw two sea otters floating about 100m from the net. They disappeared after about 15 minutes.
17-Jul	1610	On-watch	Steller Sea Lion	3	Feeding on catch	0	I saw three sea lions along the net near the shore end. They were feeding on the catch. I saw them every few minutes until about 1730.
17-Jul	1757	On-watch	Steller Sea Lion	1	Feeding on catch	0	I saw a sea lion feeding on the catch of the net near the shore end. It is possible that it was one of the three seen earlier.
17-Jul	1827	On-watch	Steller Sea Lion	3	Feeding on catch	30	Three Steller came to the net and were feeding. They were not as active as the earlier individuals. They stayed in the area through the haul.
17-Jul	1838	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A harbor seal was swimming near the skiff, and passed under the net a couple of minutes later, then returned and was swimming right along the net at 1850.
17-Jul	1842	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter was swimming between the skiff and the net and then it swam away from the net. It then came back and swam over the net at 1853.
17-Jul	1844	On-watch	Steller Sea Lion	1	Feeding on catch	0	Stellers came to the net and were feeding. They were not as active as the earlier individuals. They stayed in the area through the haul.
17-Jul	1849	On-watch	Harbor Porpoise	6	Porpoising	500	A pod of porpoises swam parallel to the net and off shore of the net.
17-Jul	1908	On-watch	Harbor Porpoise	2	Porpoising	50	The porpoises swam near to the net, circling for several minutes and then dove and disappeared.
17-Jul	1922	On-watch	Harbor Porpoise	3	Porpoising	10	A porpoise dove on one side of the net and reappeared on other side of the net.
17-Jul	2040	On-watch	Harbor Porpoise	2	Porpoising	20	The harbor porpoises swam to 20m behind the skiff hauling the net. The two harbor porpoises swam through the area where the net had been just a few minutes before.
18-Jul	1800	Off-watch	Steller Sea Lion	47		-	A sea lion haulout count. No brands or tags were seen. It is not certain how many individuals were on land or in the water.
21-Jul	1128	On-watch	Steller Sea Lion	70	Hauled out on land	-	A sea lion haulout.

22-Jul	727	On-watch	Harbor Seal	97	Hauled out on land	-	Harbor seals were hauled out on rocks on way to the Bay. It was hard to get an exact count from the distance I was at.
22-Jul	728	On-watch	Harbor Seal	3	Swimming or blowing at surface	-	Harbor seals were hauled out on rocks on way to the Bay. It was hard to get an exact count from the distance I was at.
22-Jul	729	On-watch	Sea Otter	8	Swimming or blowing at surface	-	Sea otters were hauled out on rocks. An exact count was difficult since they were bunched up and I was a fair distance away.
22-Jul	729	On-watch	Sea Otter	32	Hauled out on land	-	Sea otters were hauled out on rocks. An exact count was difficult since they were bunched up and I was a fair distance away.
22-Jul	742	On-watch	Harbor Seal	3	Swimming or blowing at surface	-	A harbor seal was half on a rock, half in the water, flopping around.
22-Jul	749	On-watch	Sea Otter	1	Floating on surface	-	Sea otters were just floating on their backs as we drove by.
22-Jul	753	On-watch	Sea Otter	8	Swimming or blowing at surface	-	One sea otter with a large pup still hanging on, and one sea otter floating away.
22-Jul	803	On-watch	Sea Otter	2	Floating on surface	-	Sea otters floating/rolling over.
22-Jul	903	Off-watch	Sea Otter	5	Hauled out on land	-	Five sea otters were hauled out on small rocks. Four were floating around the rocks.
22-Jul	903	Off-watch	Sea Otter	4	Floating on surface	-	Five sea otters were hauled out on small rocks. Four were floating around the rocks.
22-Jul	1329	Off-watch	Sea Otter	1		-	An otter surfaced one time and then dove. I never saw it again.
22-Jul	1702	On-watch	Unknown Baleen Whale	1	Swimming or blowing at surface	40	A small whale surfaced just past the end of the net. It had a short blow (about 4.5 ft), a gray back, and a small dorsal fin. It only surfaced once. It was probably a minke.
22-Jul	1835	Off-watch	Unknown Seal	1	Hauled out on land	100	An unknown seal (From the drawing, it looks like a harbor) was hauled out on rock just at water level. It was a robust animal with a ringed pattern on side and behind the head. Thick neck and claws were not noticeable through binoculars. I watched the animal for 20 minutes. The seal would haul out then slip back into the water, remaining hauled out for several minutes and remain in the water for several minutes. When hauled out the seal would keep it's rear flippers and rear end of the body elevated. The flippers extended out straight.
22-Jul	2020	Off-watch	Steller Sea Lion	1	Dead	-	A ea lion stranding. See the stranding report for more information.
23-Jul	951	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam by the skiff and then over the net. It just floated away on it's back until it was out of sight about 5 minutes later.
23-Jul	1005	On-watch	Sea Otter	1	Foraging on other prey	15	A sea otter was swimming away from the net on it's back, foraging on something unknown. It was 10m from the shore, 15m from the lead. It continued swimming back and forth along the shoreline, scavenging at 1040.
23-Jul	1014	On-watch	Sea Otter	4	Floating on surface	400	Sea otters just floating nearshore.

23-Jul	1056	On-watch	Sea Otter	2	Floating on surface	250	Sea otters just floating around.
23-Jul	1402	On-watch	Sea Otter	1	Swimming or blowing at surface	250	A sea otter was floating around in the bay.
23-Jul	1752	Off-watch	Fin Whale	1	Swimming or blowing at surface	100	The whale surfaced in between the offshore anchor buoys and the hook of the net. The whale dove and swam north. It surfaced two other times still swimming in the same direction.
23-Jul	1800	Off-watch	Harbor Porpoise	1	Milling or circling	-	A harbor porpoise was circling around in the vicinity of our vessel for 15 minutes or more. I saw the porpoise earlier in the day in the same spot.
23-Jul	1802	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	A harbor seal popped up 5m from shore for about 30 seconds, then submerged and re-emerged 5m from gear and still 5m from shore for about 30 more seconds. At 806 there was no sighting. At 1820 it was moving still further away.
23-Jul	1808	On-watch	Sea Otter	1	Swimming or blowing at surface	5	A sea otter was mid-net, swimming closer to the net, and then disappeared. At 1811 it reappeared on the other side of the net. It seemed to be foraging on something (200m away from the net).
23-Jul	1818	On-watch	Sea Otter	2	Milling or circling	400	Two sea otters were milling around, playing with each other.
23-Jul	1838	On-watch	Sea Otter	2	Swimming or blowing at surface	0	Two sea otters popped up 50m from the lead of the net and swam over the lead on their backs. They keep going untile out of sight. At 1940 the same two sea otters swam back across the main net near the lead.
23-Jul	1843	On-watch	River Otter	1	Swimming or blowing at surface	0	A river otter was swimming towards the net near the shore end. It dived under and resurfaced on the other side of the net.
23-Jul	1849	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	30	A harbor porpoise popped up in front of us, 60m or so from the net and swimming toward it. It surfaced again about 30m from it. We watched in suspense. The air was still. All was quiet for a couple of minutes. Then a "whoosh" and the harbor porpoise surfaced 20m on the other side of the lead where the lead meets the net (it was mid-net). It surfaced again 50m on the other side of the net, swimming away.
23-Jul	1901	On-watch	Harbor Seal	2	Milling or circling	5	Two seals were milling around the net between the mid-net buoys and the hook. One was spotted moving closer to the shore, swimming.
23-Jul	1907	On-watch	Sea Otter	1	Swimming or blowing at surface	20	A sea otter (maybe one of the other two) swam to within 20m of the other side of the lead, dove, and disappeared.
23-Jul	1924	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	50	A harbor porpoise swam east-west through the channel, 50m from the end of the net.
23-Jul	1928	Off-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter was swimming away from the net, eating something unknown (100m from the shore).

23-Jul	1930	On-watch	Sea Otter	1	Floating on surface	200	A sea otter floating around in the channel
23-Jul	1951	On-watch	Sea Otter	2	Swimming or blowing at surface	70	Two sea otters swam from the channel toward the net then veered away as they saw the fishers picking.
23-Jul	2047	Off-watch	Sea Otter	1	Swimming or blowing at surface	20	An otter was eating and swimming towards the shore lead. It was spooked by the skiff.
24-Jul	717	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	-	A harbor porpoise surfaced near the boat as we crossed the bay.
24-Jul	856	On-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter appeared 40m from mid-net, swam to 10m from the net, dives, then popped up 10m from other side of the net near the lead and swam on it's back away from the net.
24-Jul	911	On-watch	Harbor Seal	1	Swimming or blowing at surface	30	A harbor seal was observed swimming in the water at the shoreside end near the lead. It would move from one side of the net to the other, and would poke it's head up every few minutes on either side of the net to check out its surroundings above the sea surface. The same harbor seal was observed at 1144, 1152 and 1202, constantly cruising along shoreline end of net. At 1209 a second harbor seal was seen in close vicinity to the first harbor seal, also swimming along the net. I observed them both again at 1221, 1236, 1243 and 1338.
24-Jul	939	On-watch	Harbor Seal	1		45	A harbor seal surfaced close to shore, looked around and slowly lowered it's head. It surfaced and dove.
24-Jul	1209	On-watch	Harbor Seal	1	Swimming or blowing at surface	2	A second harbor seal was seen in close vicinity to the first harbor seal, also swimming along the net. I observed them both again at 1221, 1236, 1243 and 1338. At 1754 one harbor seal seen in the previous haul was observed at the same net position (i.e., the shoreline end of the gear near the beginning of the gillnet).
24-Jul	1332	On-watch	Sea Otter	2	Swimming or blowing at surface	0	Two sea otters were seen swimming along on their backs along the shoreline side on the net (on top of the gear).
24-Jul	1343	On-watch	Sea Otter	1	Swimming or blowing at surface	15	A sea otter was sighted near the end of the net and swam or drifted away from it.
24-Jul	1634	On-watch	Sea Otter	2	Floating on surface	60	
25-Jul	604	On-watch	River Otter	7	Swimming or blowing at surface	0	Seven otters swam over the net and continued along the shore.
25-Jul	610	On-watch	Harbor Seal	1	Swimming or blowing at surface	60	A seal was swimming by, looking at us on the beach.
25-Jul	655	On-watch	Sea Otter	1	Swimming or blowing at surface	80	A sea otter was swimming near the shore end of the net.

25-Jul	743	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam over the net and continued on it's way. It was probably the same otter sighted again at 812 heading back to where it originally started.
25-Jul	753	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A harbor seal was observed swimming on the waters surface and then on top of gillnet itself. At 945 the same harbor seal appeared to be tugging on fish in the net and feeding on them.
25-Jul	834	Off-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter was swimming near the hook. It left as the fisher arrived.
25-Jul	904	On-watch	Sea Otter	1	Swimming or blowing at surface	125	The first sea otter sighting. At 905 and 915 there were also sightings of this otter.
25-Jul	921	On-watch	Sea Otter	1	Swimming or blowing at surface	5	An otter was spotted 250 yards from the original sighting. It was recorded as a separate mammal.
25-Jul	1005	Off-watch	Sea Otter	3	Floating on surface	-	The sea otters were floating in kelp. One sea otter had a large pup who clung to her belly. They dove at the sight of me.
25-Jul	1055	Off-watch	Sea Otter	1	Floating on surface	-	A sea otter, floating near the shore.
25-Jul	1107	Off-watch	Harbor Seal	1	Swimming or blowing at surface	-	A harbor seal, just offshore of the Island, popped his head up checking me out.
25-Jul	1230	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam under the lead heading into the bay.
25-Jul	1244	On-watch	Sea Otter	1	Swimming or blowing at surface	15	Another sea otter swam to within 15m of the net, dove and brought a piece of kelp which it tore apart. Then it swam under the net into the bay.
25-Jul	1341	Off-watch	Sea Otter	2	Swimming or blowing at surface	300	I saw two sea otters about 300m from the net. I was traveling and saw the otters floating near the rocks. I kept traveling and did not see if they ever floated to the net.
25-Jul	1401	On-watch	Sea Otter	1	Floating on surface	0	A sea otter was floating/eating about 5m from an anchor buoy, 100m from the net. At 1455 the sea otter drifted over the lead.
25-Jul	1407	On-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter not close to the net.
25-Jul	1410	On-watch	Sea Otter	1	Swimming or blowing at surface	5	A sea otter at the net.
25-Jul	1525	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	During the second pick a harbor seal was observed on the net, taking fish out and feeding on the fish.
25-Jul	1526	Off-watch	Sea Otter	1	Swimming or blowing at surface	100	I spotted a sea otter moving from one net to another.
25-Jul	1536	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	During the second pick a different seal at the shore line end of the net was observed swimming near the net.

25-Jul	1537	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam by the skiff and then under the net to the opposite side.
25-Jul	1558	On-watch	Sea Otter	1	Swimming or blowing at surface	40	An otter swimming away from the net.
25-Jul	1624	On-watch	Humpback Whale	1	Swimming or blowing at surface	5	At the start of haul 2 a humpback whale traveled toward the keg buoy. It blew four times, traveled within 1m of the keg buoy, passed it and did a deep dive a few meters past the hook. The closest approach to the hook/pot was 5m. No buoys moved, and there was no gear damage.
25-Jul	1644	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was swimming near the shore, between the net (parallel to the shore) and the shore.
25-Jul	1731	On-watch	Sea Otter	1	Swimming or blowing at surface	50	An otter swam past the net, offshore of the net.
25-Jul	1853	Off-watch	Unknown Baleen Whale	1	Swimming or blowing at surface	100	A whale surfaced twice. It was a small whale and a blow was not visible when it surfaced. It would only break the surface, hump it's back somewhat and dive very quickly. It may be a minke whale.
25-Jul	1973	On-watch	Sea Otter	1	Floating on surface	50	A sea otter drifted past where fishers pulled the net.
29-Jul	844	Off-watch	Dall's Porpoise	4	Swimming or blowing at surface	-	I was traveling from Bay to Kupreanof Strait and saw four or five Dall's porpoise rooster tailing in the waves.
29-Jul	915	Off-watch	Dall's Porpoise	4	Swimming or blowing at surface	-	I was still traveling, and saw four or so Dall's porpoise rooster tailing in the waves.
29-Jul	1153	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	300	As we were checking out permit numbers on buoys, I saw a harbor porpoise swimming 300m away from the gear out toward the entrance of the Bay. A good identification was made before the porpoise headed out to sea.
29-Jul	1203	On-watch	Sea Otter	3	Floating on surface	90	Sea otters just floating and eating by the island where the net is set.
29-Jul	1312	On-watch	Fin Whale	1	Swimming or blowing at surface	100	A fin whale surfaced three times before heading into middle of the bay.
29-Jul	1317	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	600	A harbor porpoise was swimming toward net 2, but closer to net 1 (about 100m).
29-Jul	1404	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam towards the net then ran into the lead where it became entangled for approximately 10 seconds. It then worked its way out of the lead and retreated in the same direction it came from. At 1454 it was sighted again, at the same net.
29-Jul	1805	On-watch	Sea Otter	2	Milling or circling	35	
29-Jul	1817	On-watch	Sea Otter	2	Swimming or blowing at surface	125	Two sea otters were swimming off the end of the net.

29-Jul	1818	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A single sea otter was swimming near the shore side of the net. At 1924 it swam around the end of the net towards the opposite shore.
29-Jul	1855	Off-watch	Sea Otter	1	Swimming or blowing at surface	200	I saw a sea otter swimming about 200m off the net. I only saw it for about 5 minutes.
29-Jul	1859	Off-watch	Sea Otter	1	Swimming or blowing at surface	0	I saw a sea otter near the shore end at the net. It moved away from the net and kept traveling.
29-Jul	2141	On-watch	Sea Otter	1	Floating on surface	30	A sea otter was floating near the net while fishers were picking. The otter was there when I arrived. Eventually drifted toward the rock island.
29-Jul	2148	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	250	A harbor porpoise blew and surfaced a few times, heading away from the net.
30-Jul	720	On-watch	Steller Sea Lion	2	Feeding on catch	0	A single sea lion swam the length of the net and stole several fish near the hook. At 726 we went to the king buoy to get a latitude and longitude reading. The sea lion swam along the net towards the shore and stole at least five more fish. At 809 a second sea lion joined the original one.
30-Jul	735	Off-watch	Sea Otter	2	Swimming or blowing at surface	200	I saw two sea otters floating about 200m from the net. I got off the skiff to do a soak watch and then did not see them.
30-Jul	742	On-watch	Steller Sea Lion	1	Feeding on catch	0	The skiff driver saw a sea lion thrashing with a fish approximately where the net starts.
30-Jul	747	On-watch	Sea Otter	2		0	I saw two sea otters biting each other and rolling around about 40m from the net. I am not sure if it was the same two that I had seen earlier or two new ones. The sea otters continued wrestling right over the net. Then about 5 minutes later the two separated and went away in opposite directions.
30-Jul	804	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller was 15 fathoms from the hook, splashing right next to the net.
30-Jul	810	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter floated over the net. He was on his back with a shell in his paws. I did not see him after about 10 minutes.
30-Jul	828	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter floated over the net and kept floating away until I did not see it.
30-Jul	835	On-watch	Sea Otter	1	Milling or circling	75	An otter was floating on its back eating in a small kelp bed.
30-Jul	839	On-watch	Sea Otter	3	Milling or circling	270	Three sea otters were floating in one area about 270m off the net. They floated in the same area until I left.
30-Jul	914	On-watch	Sea Otter	1	Swimming or blowing at surface	5	A sea otter floated near the net. He put his head up, looked at our skiff, and then left.
30-Jul	1038	Off-watch	Steller Sea Lion	1	Dead	100	A dead, floating sea lion with some scavenger damage. The head was kept for sampling. It was recorded on a stranding record.

30-Jul	1053	On-watch	Sea Otter	1	Swimming or blowing at surface	70	A sea otter swam parallel to the net 70m away from it, near the anchor buoys.
30-Jul	1115	On-watch	Sea Otter	1	Milling or circling	1000	An otter was floating on its back moving with the tide, drifting north.
30-Jul	1135	On-watch	River Otter	1	Swimming or blowing at surface	10	A river otter popped up 60m from the lead and swam toward it. It then popped up 10m on the other side of the lead and kept swimming.
30-Jul	1237	Off-watch	River Otter	1	Swimming or blowing at surface	100	A river otter was swimming away from the net, near the hook end.
30-Jul	1253	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller was swimming near the shore end, away from the net.
30-Jul	1450	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion arrived and began to steal fish.
30-Jul	1522	On-watch	Steller Sea Lion	1	Feeding on catch	0	A second sea lion arrived to feed on fish.
30-Jul	1546	On-watch	Steller Sea Lion	1	Feeding on catch	0	This was probably the same sea lion feeding on fish where the net and lead meet. Also, at 1650 this sea lion was again sighted feeding on catch in the same location, and at 2005 the sea lion was at the net again, but this time I did not see it take a fish.
30-Jul	1840	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A sea lion surfaced near the shore end of the net, swam up and down the net and stole salmon. It left at 1852.
30-Jul	1842	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion arrived, joining the 1840 sea lion. Both animals swam up and down the net and stole salmon. They left at 1852.
30-Jul	1900	On-watch	Steller Sea Lion	5	Swimming or blowing at surface	20	Five sea lions (possibly including the two recently recorded animals) surfaced next to the rocks due south of the net. Two of them proceeded to swim from the shore along 70m of net, and then returned to the group. Two of them swam along the net at 1910.
30-Jul	2000	On-watch	Sea Otter	2	Swimming or blowing at surface	40	I saw a sea otter about 40m from the net, swimming. I was watching the pick and never checked on him again to determine how long he stayed.
30-Jul	2120	On-watch	Steller Sea Lion	1	Foraging on other prey	1	A Steller surfaced in the hook, 20 feet from fisher's skiff with many fish in his mouth.
31-Jul	1550	On-watch	Sea Otter	1	Floating on surface	500	I saw a sea otter floating on its back about 500m off the end of the net.
31-Jul	1848	On-watch	Sea Otter	1	Swimming or blowing at surface	300	A sea otter was swimming near the shore and away from the net, in a kelp bed.
31-Jul	2048	Off-watch	River Otter	1	Swimming or blowing at surface	0	A river otter swam over the net, and continued along the island shore.
1-Aug	748	Off-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	The fishers ran the net and banged poles on their hull when they came across a Steller's sea lion under the water.

1-Aug	849	On-watch	Harbor Seal	1	Swimming or blowing at surface	100	A seal surfaced for a minute and then dove. It never surfaced again.
1-Aug	850	On-watch	Sea Otter	1	Swimming or blowing at surface	20	A sea otter swam by on its back.
1-Aug	1002	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	5	A Steller sea lion was sighted at the shore line end of the net swimming along and then diving below. At 1036 the same sea lion (color/behavior) was sighted.
1-Aug	1255	On-watch	Sea Otter	1	Swimming or blowing at surface	5	A sea otter was seen swimming on it's back along the shore line end of the gear.
1-Aug	1811	On-watch	Harbor Seal	1	Swimming or blowing at surface	100	A harbor seal was seen some distance away, looking at something then diving.
1-Aug	1931	On-watch	Sea Otter	1	Swimming or blowing at surface	2	A sea otter was seen swimming by the shore end of the net. It kept going away from the net until out of sight.
2-Aug	1128	Off-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter jumped over net 2. I saw it splash as it went over. It continued swimming away from the net towards the direction of net 1.
2-Aug	1225	On-watch	Sei or Fin Whale	1	Swimming or blowing at surface	75	A fin/sei whale was swimming by the hook, four times.
2-Aug	1226	On-watch	Unknown Porpoise or Dolphin	1	Swimming or blowing at surface	20	An unidentified porpoise twice surfaced.
2-Aug	1228	On-watch	Sei or Fin Whale	1	Swimming or blowing at surface	50	A second fin/sei whale in the other direction, smaller, moving slowly toward the west.
2-Aug	1245	On-watch	Sea Otter	1	Swimming or blowing at surface	800	A sea otter was floating in the vicinity for 20 minutes.
2-Aug	1319	On-watch	Steller Sea Lion	3	Feeding on catch	0	Three sea lions were swimming around in a sheltered cove by the lead and the holding skiff. They splashed and raised a head to the surface occasionally. At 1325 one went to the net and started gobbling fish. The fishers weree nearing the trap end, and when fishers were in the trap the sea lions ran to pick fish out of the main net, sometimes diving over the corkline. At 1656 the fishers headed over to pick. They let off a seal bomb. A couple of minutes later the three sea lions came from the beach and headed toward the net. During the pick they slinked around the rocks.
2-Aug	1340	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A spotted a sea otter, near the hook. It may have been same one seen at 1128, but I was not positive on that. It was seen near the net for a minute, and then continued swimming away from the net.
2-Aug	1355	On-watch	Harbor Porpoise	2	Milling or circling	40	Two harbor porpoises popped up and down several times, then disappeared.

2-Aug	1411	On-watch	Sea Otter	1	Swimming or blowing at surface	250	A sea otter was swimming between the observed net and the next net cast on the shoreline.
2-Aug	1537	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter surfaced, then disappeared.
2-Aug	1654	On-watch	Harbor Seal	1	Milling or circling	10	A seal popped it'd head up near the hook during a pick. I looked briefly and got a positive identofication during a pause in picking action. I lost sight after that because of concentrating on the pick.
3-Aug	1659	On-watch	Dall's Porpoise	1	Bow riding	-	One Dall's porpoise came up and was bow riding with the vessel for about three minutes.
4-Aug	625	On-watch	Sea Otter	1	Swimming or blowing at surface	400	A sea otter was swimming near the anchor buoy.
4-Aug	819	On-watch	Harbor Porpoise	3	Swimming or blowing at surface	175	Three harbor porpoises surfaced twice while swimming by the NE anchor buoys, heading into the bay.
4-Aug	924	Off-watch	River Otter	4	Hauled out on land	42	Four river otters were swimming to shore. All four raised their heads and necks out of the water and looked in the skiff's direction. They climbed around a rock and raised their necks and heads at me again. Then slipped back into the water and swam away.
4-Aug	1303	On-watch	River Otter	1	Swimming or blowing at surface	5	An otter swam to shore next to the net. The otter swam with it's back up and was approximately 3' long.
4-Aug	1509	On-watch	Sea Otter	1	Swimming or blowing at surface	80	A sea otter was swimming parallel to the net then drifted towards the middle of the bay.
4-Aug	1510	On-watch	Sea Otter	1	Swimming or blowing at surface	1	A sea otter was swimming on it's back between the shore and the shore end of the net, and then went over the net/corks.
4-Aug	1849	On-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter swam next to the net. The otter was 50m from my shore location.
4-Aug	1910	On-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter was swimming on it's back towards the net. At 1914 it swam over the corks near the shore end and was swimming away from the net. At 1924 the same otter probably was swimming away from the net on the previous side. At 1935 it was swimming along the net to the hook. At 2031 the same otter was swimming/milling near the hook, approximately 50m from the net.
4-Aug	1927	On-watch	Sea Otter	1	Swimming or blowing at surface	15	1927- Sea otter pops up 15 m from net, swims on back away from it rolling over occasionally + scratching belly.
4-Aug	2127	Off-watch	Steller Sea Lion	1	Feeding on catch	0	While we waited on the beach for our picking skiff to come back from offloading, a sea lion grabbed a salmon right by the lead and swam next to the lead flipping the fish around.
5-Aug	629	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam along the net, crossed the net then dove for a total of two minutes.

5-Aug	656	On-watch	Sea Otter	1	Floating on surface	10	A sea otter was floating near the trap end of the net, and drifted away from the net.
5-Aug	704	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam over the net on it's back, and continued along the shore.
5-Aug	731	On-watch	River Otter	4	Swimming or blowing at surface	5	One adult and three juvenile river otters swam along the net to the shore where they ran up the beach into the rocks.
5-Aug	739	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	20	I heard a soft whoosh and turned my head to see a harbor porpoise just off the bow of our skiff, swimming toward the net near where the fishers were picking. He surfaced again, 20m from the net. He disappeared for a minute then I saw him surface about 75m away from the net on the other side.
5-Aug	748	On-watch	Sea Otter	2	Feeding on catch	100	Twp sea otters floating eating octopus. One left shortly thereafter while the other remained at the surface eating for 15 minutes.
5-Aug	840	On-watch	Sea Otter	1	Swimming or blowing at surface	50	
5-Aug	1339	On-watch	Sea Otter	1	Milling or circling	0	A single sea otter was near the net watching us, then diving.
5-Aug	1709	On-watch	Dall's Porpoise	4	Porpoising	23	The porpoises passed the hook traveling out of the bay. The front-facing rooster tails were diagnostic.
5-Aug	1845	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was swimming toward the net slowly, diving then reappearing in the same general location, then 10 minutes later slowly swimming away from net, occasionally diving until the soak watch ended.
5-Aug	1900	On-watch	River Otter	1	Swimming or blowing at surface	0	As the watch began a river otter entered the water at the lead, swam along the lead and 5 fathoms of net, turned around, swam back and came out of the water. It exited the water at 1904.
5-Aug	1917	On-watch	River Otter	1	Swimming or blowing at surface	1	A river otter, probably the same one as before, swam down the beach along the shore under the lead attachment line, exited the water just as he passed us, and came on the shore. Then it tried to sneak up on me from behind.
5-Aug	2055	On-watch	Harbor Porpoise	5	Porpoising	100	Five porpoises surfaced and then disappeared.
5-Aug	2212	On-watch	Sea Otter	1	Swimming or blowing at surface	100	An otter swam past the net.
6-Aug	630	On-watch	Sea Otter	1	Swimming or blowing at surface	0	An otter floated over the net and continued swimming along the bay.
6-Aug	644	On-watch	Sea Otter	2	Swimming or blowing at surface	0	A sea otter and her pup popped up near the lead of the net, swam right to the floatline and dove. The popped up 5m from the lead on the other side. They dove again, came up right by the lead, dove, popped back up on the other side of the lead, and went floating off together.

6-Aug	730	Off-watch	Sea Otter	25	Floating on surface	500	The otters were loitering among kelp in the bay and swimming around. During 745-830 seven otters continually swam by, over the net, towards the outer bay.
6-Aug	750	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
6-Aug	1147	On-watch	Harbor Porpoise	2	Porpoising	120	Two harbor porpoises porpoised past the end of the net, one larger/one smaller. At 1745 the same two harbor porpoises (most likely) were seen porpoising in the bay.
6-Aug	1220	On-watch	Steller Sea Lion	1	Feeding on catch	3	A Steller sea lion surfaced barely enough for me to see the salmon in his mouth, then he dove.
6-Aug	1554	On-watch	Sea Otter	1	Swimming or blowing at surface	20	An otter swam next to the net and then turned away from net.
6-Aug	1612	On-watch	Sea Otter	1	Swimming or blowing at surface	800	An otter floated offshore of the net.
6-Aug	2003	On-watch	Sea Otter	2	Swimming or blowing at surface	0.5	Two sea otters (mom with a pup, probably the same two as in the morning) popped up 10m from the lead, swam right to it and dove.
6-Aug	2029	On-watch	Sea Otter	1	Milling or circling	400	An otter floated offshore.
6-Aug	2030	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	5	A harbor porpoise was 5m away swimming right for the net. We waited in suspense but saw no bobbing corks. We never saw him surface again. The entire net wa on the surface due to the current so he probably swam past.
6-Aug	2112	On-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter raised his head out near the anchor buoy, swam on it's belly to within 10m of the trap and dove. It popped up again two minutes later on the other side of the net system.
6-Aug	2117	On-watch	Sea Otter	1	Floating on surface	1	A sea otter was floating on its belly, drifting toward the net. It dove when he was 64m away. It popped up a couple of minutes later only 1m from the net (mid-net). He swam right next to the net, paralleling it until he was 10m from the picking skiff then he dove.
6-Aug	2156	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	7	A harbor porpoise surfaced near our skiff, heading towards the gear. There was no evidence that it hit the gear.
7-Aug	833	Off-watch	Harbor Seal	1	Dead	25	A floating dead seal. See the stranding report.
7-Aug	1040	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	15	A Steller surfaced between our skiff and the lead.
7-Aug	1054	On-watch	Sea Otter	1	Milling or circling	25	A sea otter in kelp against rocks.
7-Aug	1144	On-watch	Steller Sea Lion	1	Thrashing	15	A sea lion was thrashing a fish around about 150m from shore and 15m from the net.

7-Aug	2011	Off-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter was surfacing and splashing next to the skiff when I noticed him, and swam away. At 2014 I saw an otter 3m from net that dove near the hook, the same otter as before.
7-Aug	2027	On-watch	Sea Otter	3	Milling or circling	100	Three sea otters were hanging onto the bull kelp, stationary.
8-Aug	804	On-watch	Sea Otter	2	Swimming or blowing at surface	5	Two sea otters were swimming around the mainline and hook from 0804 to 0945.
8-Aug	1014	On-watch	Sea Otter	1	Milling or circling	0	Upon arriving at the the net sea otter was in the kelp at the beginning of the lead feeding on something. After 3 minutes it pushed itself off the kelp and swam away.
8-Aug	1048	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter 150m from the net was swimming and porpoising towards the net, dove near the place that the net meets the lead, came up on other side of net and kept going. The sea otter was moving fast, it had places to go.
8-Aug	1406	Off-watch	Sea Otter	3	Swimming or blowing at surface	80	Three sea otters were observed swimming on their backs toward the net. Once they reached the net they swam under and were not seen again.
8-Aug	1620	Off-watch	Dall's Porpoise	3	Porpoising	50	Three Dall's porpoises were on the north side of the net, and swam south past the net.
9-Aug	640	Off-watch	Unknown Sea Lion or Fur Seal	1	Dead	-	An unknown sea lion was recorded on a stranding report. There was advanced decomposition. The head was collected. No time was recorded for the strand, I used the trip begin time.
9-Aug	1221	Off-watch	Dall's Porpoise	2	Swimming or blowing at surface	-	Dall's porpoises swimming near the shore.
9-Aug	1423	Off-watch	Sea Otter	1	Swimming or blowing at surface	275	A sea otter was swimming on it's back. It kept swimming in the direction of the net when the skiff went by and did not panic.
9-Aug	1530	On-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter was seen swimming by on it's back at the shoreline end of the net.
9-Aug	1536	Off-watch	Dall's Porpoise	2	Swimming or blowing at surface	500	Two Dall's porpoise swimming away from the shore.
9-Aug	1724	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A otter was swimming next to the lead, then swam away from the net.
9-Aug	2251	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter was swimming in the middle of the pass.
9-Aug	2253	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter was swimming in the middle of the pass.
10-Aug	719	On-watch	Sea Otter	1	Swimming or blowing at surface	25	A sea otter was observed swimming on its back at shoreline end of the gear, maintaining its position in the water throughout the entire time it was observed.

10-Aug	749	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	A harbor seal was on the stream side of the net. It popped up three times and was never seen again.
10-Aug	957	On-watch	Harbor Porpoise	4	Swimming or blowing at surface	400	Four harbor porpoises were swimming into the NE Arm.
10-Aug	1220	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	20	A Steller sea lion was swimming near the net. It did not appear to be feeding on the catch.
10-Aug	1610	On-watch	Harbor Seal	1	Milling or circling	30	A hHarbor seal was swimming and milling near the shore, approximately 10m from the shore.
10-Aug	1930	On-watch	Sea Otter	1	Swimming or blowing at surface	12	A sea otter swam past the hook, on it's back.
11-Aug	644	On-watch	Sea Otter	1	Floating on surface	60	A sea otter was floating near the lead, drifting away from it.
11-Aug	645	On-watch	Sea Otter	1	Swimming or blowing at surface	115	An otter was swimming leisurely by, supine, towards the bay.
11-Aug	915	On-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter popped up 50m from our boat, with head and neck craned out of the water checking us out. It swam toward the net on it's belly, keeping an eye on us, dove, popped up 30m on other side of the net, and swam away.
11-Aug	937	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	60	Two harbor porpoises swam past the trap end of the net, 60m away from it. (All of the harbor porpoises I saw today swam from the point to the NE.)
11-Aug	1100	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	30	A bird observer said she saw three porpoises swimming 200m away on the outside of the net. At 1100 two harbor porpoises were observed swimming past the gear at the hook end. They were seen again at 1110 and 1115 swimming past the hook end, as if swimming in a pattern back and forth past the gear. The harbor porpoises were identified by their small triangular dorsal fins. No acrobatic or unique behavior was observed. They appeared shy and gently moving through water. Blow were not seen but heard. The size was fairly small, less than 5 ft.
11-Aug	1129	On-watch	Sea Otter	1	Swimming or blowing at surface	-	
11-Aug	1130	On-watch	Harbor Porpoise	3	Swimming or blowing at surface	-	
11-Aug	1200	Off-watch	Steller Sea Lion	2	Porpoising	700	The sea lions were swimming east, 100m offshore, away from the net.
11-Aug	1554	On-watch	Sea Otter	1	Swimming or blowing at surface	32	A lutris was languidly floating about in the bay in front of the cabin.

11-Aug	1559	On-watch	Harbor Seal	1		10	A harbor seal popped up as I arrived and started my soak watch. He peered around, went under with a splash and popped up again 10m from the net on the other side. It went down and disappeared.
11-Aug	1608	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	50	Two harbor porpoises swam past the end of the net, 50m from it. (All of the harbor porpoises I saw today swam from the point to the NE.)
11-Aug	1654	On-watch	River Otter	3	Swimming or blowing at surface	40	Three river otters were swimming together along the shore at the cliff, followed the shoreline around the point and then disappeared in the direction away from the net.
11-Aug	1710	On-watch	Sea Otter	1	Swimming or blowing at surface	100	Just after the soak watch began I observed a sea otter at the shoreline end of the gear swimming on it's back.
11-Aug	1808	On-watch	River Otter	1	Swimming or blowing at surface	0	A river otter was observed eating fish caught in the net.
11-Aug	1932	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	300	Two harbor porpoises were swimming around the outside of the net. (All of the harbor porpoises I saw today swam from the point to the NE.)
11-Aug	2018	Off-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter was seen swimming on it's back as we passed by.
12-Aug	657	On-watch	Sea Otter	5	Swimming or blowing at surface	98	An otter was swimming about the bay, not really moving anywhere.
12-Aug	752	On-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter surface between the shore buoy and the beach.
12-Aug	756	On-watch	Sea Otter	1	Swimming or blowing at surface	5	A sea otter swam north just offshore of the net.
12-Aug	800	On-watch	Sea Otter	1	Swimming or blowing at surface	50	A Sea otter was swimming near (10m) the shore, away from the net. At 804 it was swimming towards the lead, swam over the corks, and swam away from the net.
12-Aug	815	On-watch	Sea Otter	1	Swimming or blowing at surface	1	A sea otter swam south, and dove under the net.
12-Aug	948	On-watch	Harbor Seal	1	Swimming or blowing at surface	25	A seal was swimming away from the net, headed north.
12-Aug	1438	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was swimming away from the net, 50m from shore.
12-Aug	1616	On-watch	Sea Otter	3	Swimming or blowing at surface	50	Three sea otters were swimming towards the net and then swam over the net near the hook. There were two adults, one with a juvenile on its stomach and the other eating some food (reddish-octopus? Starfish?).

12-Aug	1719	On-watch	Sea Otter	1	Swimming or blowing at surface	25	An otter swam toward the net and then turned away.
12-Aug	1728	On-watch	Sea Otter	1	Swimming or blowing at surface	0	An otter swam over the net, touching the float line when swimming over the net.
12-Aug	1735	On-watch	Sea Otter	1	Swimming or blowing at surface	0	An otter swam toward the net then paralled to the net for approximately 50 fathoms. Then it dove under the net.
12-Aug	1743	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	A seal popped up and then disappeared.
13-Aug	1208	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was feeding on the catch and thrashing fish around inside the net.
13-Aug	1237	Off-watch	Harbor Seal	1	Swimming or blowing at surface	50	A harbor seal head popped up.
13-Aug	1248	Off-watch	Sea Otter	1		50	An otter floated past the net on it's back, offshore of the net.
13-Aug	1502	On-watch	Sea Otter	1	Floating on surface	60	A sea otter drifting toward the net with wad of kelp on it's belly.
14-Aug	641	On-watch	Sea Otter	1	Floating on surface	40	A sea otter floating on it's back past the trap end of the net.
14-Aug	931	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	50	A harbor porpoise was swimming, surfaced three times, and was not seen again.
14-Aug	1015	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	300	The harbor porpoises were sighted en route to our net. These were an estimated 300m from another net, heading towards the point.
14-Aug	1300	Off-watch	Harbor Seal	1	Dead	-	The harbor seal was found dead, stranded on the beach. A stranding record was completed and turned in. The time was unknown so a filler was used.
14-Aug	1903	Off-watch	Sea Otter	1	Swimming or blowing at surface	1	A sea otter checked us out then was seen again near the lead. At 1917 the sea otter was still near the lead.
14-Aug	1959	On-watch	Harbor Seal	1	Swimming or blowing at surface	150	A harbor seal surfaced near the lead end of the net. The observer skiff was between the seal and the net.
14-Aug	2029	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A sea lion swam by the skiff and started to swim parallel to the lead. At 2030 it was seen swimming on the other side of the net. It did not appear to be feeding on catch at this time.
14-Aug	2108	On-watch	Sea Otter	1	Swimming or blowing at surface	5	A sea otter was swimming towards the net at the shore end. It dove within 3m of the net and reappeared 10m on the other side of the net, swimming away from the net.
14-Aug	2225	On-watch	Steller Sea Lion	1	Milling or circling	1	A sea lion was seen twice at the net in a 20 second span, surfacing, then diving. The crew tossed a seal bomb in the direction of the sea lion, which never surfaced again.
15-Aug	1905	On-watch	Sea Otter	1		400	An otter was floating on back offshore of the net.

16-Aug	825	On-watch	Steller Sea Lion	1	Feeding on catch	40	A sea lion was near the net then swam 5m away from the net and ate catch, tossing and catching it in the air. At 900 the same sea lion was swimming next to the net, mid-net.
17-Aug	657	Off-watch	Sei or Fin Whale	1	Sounding	45	A fin/sei whale was observed while in transit sounding next to a net not being sampled. Birds were diving in the vicinity and a forage fish concentration was probably nearby.
17-Aug	903	Off-watch	Sea Otter	1	Swimming or blowing at surface	300	A sea otter was swimming as we skiffed to the soak watch.
17-Aug	952	Off-watch	Sea Otter	1	Swimming or blowing at surface	1	A sea otter was seen swimming by the hook, going away from the net.
17-Aug	1320	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was swimming away from the net, along the shore at a steady pace. It was observed for 5 minutes.
17-Aug	1705	Off-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter was swimming. It was observed for 10 minutes. The distance to the gear was unknown but more than 1 mile.
17-Aug	1925	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter floated over the net near the shore end of the net during the haul and kept floating out of sight.
17-Aug	2030	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	110	A Steller sea lion was seen swimming beside our skiff. The sea lion didn't stay around for too long before it took off in the direction of the lead along the shore line. It was not seen again.
18-Aug	943	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	A harbor seal was seen in between the rocky reef and the shoreline. I never saw it near the net during the soak watch.
18-Aug	2202	Off-watch	Sea Otter	1	Floating on surface	-	The captain made this sighting while steaming to the Bay from the set net site. The animal was sleeping on it's back.
19-Aug	638	On-watch	Harbor Seal	1	Milling or circling	12	A harbor seal popped up briefly near the lead, looked around, and then dove. It was a small sized seal. At 658 a small (juvenile) harbor seal surfaced mid-net 5m from the gear. I think it was the same animal sighted earlier. At 707 the same seal surfaced on the opposite side of the net, 3m from the gear.
19-Aug	740	Off-watch	Sea Otter	1	Swimming or blowing at surface	100	I saw a sea otter floating away from net.
19-Aug	800	On-watch	Sea Otter	2	Swimming or blowing at surface	0	I saw a mother and baby sea otter swimming near the lead for about 25 minutes, then they went away.
19-Aug	800	On-watch	Sea Otter	2	Swimming or blowing at surface	0	Two sea otters swam towards middle of the net, stopped, and then swam over the net and kept going.
19-Aug	811	On-watch	Sea Otter	2	Swimming or blowing at surface	0	I saw two sea otters swimming about 25m off the net, then they went over the net and kept traveling out of sight.
19-Aug	822	On-watch	Sea Otter	1	Swimming or blowing at surface	180	A sea otter was floating about 180m off the hook and drifted away out of sight.

19-Aug	1100	Off-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was seen floating about 100m off the side of the net as we were leaving.
19-Aug	1135	Off-watch	Sea Otter	4	Swimming or blowing at surface	10	When I was leaving the net I saw four sea otters floating about 10m off the net.
19-Aug	1408	On-watch	Sea Otter	2	Swimming or blowing at surface	10	Two sea otters were swimming on their backs next to the end of the lead, floating with the current and drifted over the sunk lead.
19-Aug	1411	On-watch	Sea Otter	1	Swimming or blowing at surface	2	A harbor seal popped it's head up near the lead. At 1416 it resurfaced near the anchor buoy, 50m from the net.
19-Aug	1607	On-watch	Sea Otter	1	Swimming or blowing at surface	75	A sea otter was swimming parallel to the net.
19-Aug	1910	Off-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter floated by the hook of the net and floated out of sight.
19-Aug	1915	Off-watch	Sea Otter	2	Swimming or blowing at surface	2	A mother and baby sea otter were swimming along the net toward the hook but then floated away from net about 3 minutes later.
19-Aug	1947	On-watch	Sea Otter	1	Milling or circling	60	A sea otter was rolling around in some kelp about 60m from the lead. It stayed about 15 minutes.
19-Aug	1948	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	800	Two harbor porpoises cruised by the observer boat.
19-Aug	1956	On-watch	Sea Otter	1	Swimming or blowing at surface	35	A sea otter was swimming about 35m off of the lead and went away.
19-Aug	2004	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter floated over the net and floated away out of sight.
19-Aug	2010	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter floated over the lead and kept floating away from the area.
19-Aug	2017	On-watch	Sea Otter	1	Swimming or blowing at surface	25	A sea otter was swimming and hanging around off the end of the hook.
20-Aug	1320	On-watch	Sea Otter	1	Floating on surface	115	A sea otter was floating about 115m off the lead away from the net. The otter floated out of my visual area while cracking something on it's front flippers.
20-Aug	1404	On-watch	Sea Otter	1	Swimming or blowing at surface	2	A sea otter was swimming near the straight part of the net toward the hook, but disappeared two minutes later.
20-Aug	1430	Off-watch	Sea Otter	1		30	A sea otter swam near the hook and then disappeared.
20-Aug	1810	Off-watch	Sea Otter	1	Swimming or blowing at surface	700	As we were heading towards the third net I saw a sea otter swimming amongst some kelp. We went over to have a look, but the sea otter didn't stay around very long and dove back below the surface.
20-Aug	1829	On-watch	Sea Otter	1	Floating on surface	75	A sea otter hanging out in kelp near the rocky shore.
21-Aug	744	On-watch	Sea Otter	1	Floating on surface	250	A sea otter floating on it's back on kelp by rock.

21-Aug	1608	Off-watch	Sea Otter	1	Milling or circling	300	A sea otter was swimming/milling near the shore. We passed by on the way to the net.
21-Aug	1653	On-watch	Sea Otter	3	Foraging on other prey	200	Twp se aooers were near a beach, foraging, in a little cove near the net. At 1726 one otter was swimming seaward from the shore, parallel to the net. Most likely this was one of the three spotted at 1653. At 1730 it popped up again away from the net. At 1729 two otters from the 1653 sighting were still near the beach/cove, foraging.
22-Aug	730	Off-watch	Sea Otter	1	Swimming or blowing at surface	4	A sea otter swam away from the hook and kept going away. When I saw it, it appeared to probably just swim over the net on the route it was traveling, I saw it about 4m from net, though I did not see it touch the net.
22-Aug	839	On-watch	Sea Otter	1	Milling or circling	0	A sea otter was floating near the lead end. It crossed over top of the gear at 843.
22-Aug	856	On-watch	Dall's Porpoise	2	Swimming or blowing at surface	500	Two Dall's porpoises were swimming near the shore, towards the shore.
22-Aug	1327	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam towards the net. Its final dive before the net was the last time I saw it. It was sighted again at 1348 on the opposite side of the net.
22-Aug	1719	Off-watch	Sea Otter	1	Swimming or blowing at surface	400	A sea otter was swimming 400m from trap of the net, away from the shore.
22-Aug	1808	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter floated over the mid-net and kept going out of sight.
22-Aug	1811	On-watch	Sea Otter	1	Swimming or blowing at surface	50	A sea otter was swimming near rocks near the shore, 50m from the net lead.
22-Aug	1819	On-watch	Sea Otter	1	Milling or circling	100	A sea otter was milling around the area about 100m away from the shore end of the net. I watched the haul and then did not see the otter any more.
22-Aug	2022	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter swimming in the bay near a river opening.
22-Aug	2033	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea was otter swimming in the pass.
23-Aug	655	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	-	We cruised past a harbor porpoise on our way to the beach. The porpoise was swimming in our direction but we passed it.
23-Aug	1001	On-watch	Sea Otter	3	Swimming or blowing at surface	150	Three sea otters were observed swimming close to the shore among the kelp in between two permit nets. They were observed swimming on their backs alongside each other. The otters were still present after the second soak watch.
24-Aug	855	On-watch	Sea Otter	3	Swimming or blowing at surface	-	Three sea otters were seen swimming on their backs in the water near the island.

24-Aug	952	On-watch	Steller Sea Lion	6	Swimming or blowing at surface	0	I noticed six Steller sea lions swimming over the lead. They kept swimming out of sight.
24-Aug	1202	On-watch	Sea Otter	9	Milling or circling	300	I saw a raft of 9 sea otters milling around.
24-Aug	1249	On-watch	Sea Otter	1	Milling or circling	0	A sea otter did the back-float at the shallow end.
24-Aug	1914	On-watch	Sea Otter	1	Milling or circling	15	A sea otter did the back-float at the shallow end.
25-Aug	654	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter was seen drifting near a rock island.
25-Aug	655	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter was seen drifting in middle of the cove, 100' from the shore.
25-Aug	655	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter was seen drifting in middle of the cove, 100' from the shore.
25-Aug	656	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter was seen drifting near a rock island, 2' from rocks.
25-Aug	657	On-watch	Sea Otter	1	Swimming or blowing at surface	60	A sea otter was seen drifting approximately 60' from the buoy set up, but no net at a site en route.
25-Aug	925	On-watch	Sea Otter	1	Swimming or blowing at surface	40	A sea otter was drifting near the shore end of the net.
25-Aug	944	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion was swimming alongside the net, 1' from the net. Corks were seen bobbing, but no fish seen when it resurfaced. The fisher was running the net, the sea lion dove and then disappeared.
25-Aug	1211	On-watch	Sea Otter	2	Swimming or blowing at surface	-	A sea otter mother with pups on her stomach was drifting near a rocky island.
25-Aug	1213	On-watch	Sea Otter	2	Swimming or blowing at surface	-	Two sea otter adults drifted next to each other.
25-Aug	1230	On-watch	Steller Sea Lion	4	Swimming or blowing at surface	0	Four Steller sea lion were seen 1' from the net, swimming alongside. They dove under and then appeared on the other side of the net, and put their heads and necks out of the water to look at us. At 1239- they were swimming near the shore, towards the net.
25-Aug	1244	On-watch	Steller Sea Lion	2	Feeding on catch	0	Two Steller sea lions, one a large tan male and the other a female, appeared mid-net. The male surfaced with a fish thrown in the air and both then swam to the hook. At 1259 the sea lions were feeding on fish in the hook.
25-Aug	1927	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion was in the hook.
25-Aug	1945	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	Another sea lion seen swimming with the first sea lion next to the shore end.

26-Aug	653	Off-watch	Sea Otter	1	Swimming or blowing at surface	30	An otter surfaced first, swimming on it's belly. Then it dove headed in the direction of the net. At 658 it resurfaced on the opposite side of net from before, looking at us. It headed away from the net, towards the beach.
27-Aug	837	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	One large Steller bull dove and surfaced repeatedly where the lead meets the net, 1m from the gear.
27-Aug	944	On-watch	Sea Otter	2	Floating on surface	75	Sea otters anchored to kelp.
27-Aug	1526	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	500	Harbor porpoises ere swimming about 500m from the nearest net.
27-Aug	1537	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A large Steller bull (possibly the same one as before) surfaced near where the net meets the lead.
27-Aug	1549	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	5	A sea lion was swimming near the net. It surfaced a couple times then swam towards the shore when I observed him at approximately 50m, thrashing a fish.
27-Aug	1555	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam up to the middle of the net, then continued swimming over it on it's way.
27-Aug	1834	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface	-	I sighted two harbor porpoises swimming through the bay. There were no nets in the vicinity.
28-Aug	717	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter swimming near the lead.
28-Aug	733	On-watch	Sea Otter	4	Swimming or blowing at surface	25	An adult sea otter and three pups were swimming near the lead.
28-Aug	800	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A sea lion surfaced on one side of the lead, and then the other when it surfaced again. It did not appear to be feeding on catch at this point.
28-Aug	806	On-watch	Steller Sea Lion	2	Swimming or blowing at surface	100	Two sea lions surfaced aft of the boat.
28-Aug	938	On-watch	Sea Otter	1	Swimming or blowing at surface	60	A sea otter was swimming towards the net. It dove and resurfaced one minute later, swimming near the net at the hook.
28-Aug	1139	On-watch	Sea Otter	1	Swimming or blowing at surface	75	A sea otter was swimming away from the net.
28-Aug	1740	On-watch	Sea Otter	1	Swimming or blowing at surface	50	A sea otter was swimming near the shore end of the net. It dove then appeared 1m from the net, then dove again and appeared on the other side of the net swimming away.
28-Aug	1742	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	60	A sea lion swam along the shoreline between the shore end of the net and the beach. It was small, probably a juvenile or female. It swam on it's belly, surfacing occasionally, blowing spray as it breathed.

28-Aug	1752	On-watch	Steller Sea Lion	3	Swimming or blowing at surface	300	Three sea lions were swimming, splashing and rolling over, and waving their flippers near the beach. There was one large male, and one of the sea lions could be one from 1742.
28-Aug	1941	On-watch	Sea Otter	1	Swimming or blowing at surface	75	A sa otter was swimming near the net at the hook - hanging out.
29-Aug	625	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A sea otter was seen swimming on its back just outside our field camp, as we were heading out for the day.
29-Aug	627	On-watch	Sea Otter	1	Swimming or blowing at surface	-	A second sea otter swimming on its back was observed.
29-Aug	756	Off-watch	Sea Otter	1	Swimming or blowing at surface	10	When we were approaching the permit site, a sea otter was seen swimming on it's back as we passed by.
29-Aug	803	On-watch	Sea Otter	1	Swimming or blowing at surface	125	A sea otter was swimming towards the shore.
29-Aug	830	On-watch	Sea Otter	2	Swimming or blowing at surface	20	During the soak watch two sea otters were constantly observed swimming around the permit site on their backs. They were seen again at 0845 and 0850.
29-Aug	1732	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	-	A harbor porpoise was seen to briefly rise out of the water along the shoreline side of the Bay. It was identified by it's short acute dorsal fin. It was a grey-blue color. It appeared very shy and was seen very briefly. It did not approach the skiff.
29-Aug	1734	On-watch	Sea Otter	7	Swimming or blowing at surface	-	Seven sea otters were seen swimming on their backs as we drove by.
29-Aug	1736	On-watch	Sea Otter	3	Swimming or blowing at surface	-	Three sea otters were seen swimming on their backs in a group as we drove by.
29-Aug	1751	On-watch	Sea Otter	8	Swimming or blowing at surface	-	Eight sea otters were seen floating and swimming on their backs as we drove by.
29-Aug	1759	On-watch	Sea Otter	6	Swimming or blowing at surface	-	Six sea otters were seen swimming on their back. They dove as we approached them in the skiff.

Appendix F: Observer Comments on Marine Mammal Sightings in 2005

The comments are given in time order. Comments are provided for whales only if the sightings were within 100m of the gear.

Date	Time		Animal	Number	Behavior	Distance to Gear (m)	Comments
1-Jun	1215	On-watch	Sea Otter	1	Swimming or blowing at surface	5	
1-Jun	1340	On-watch	Sea Otter	2	Swimming or blowing at surface	8	Two sea otters, mother and pup.
1-Jun	1340	On-watch	Steller Sea Lion	1	Milling/circling	0	
1-Jun	1349	On-watch	Sea Otter	1	Feeding on catch	0	There were 6-8 sea otters in the area during the soak watch (including a mother and pup pair). All sea otters were heading WNW. I did not see any animals cross the net in the opposite direction.
1-Jun	1349	On-watch	Sea Otter	1	Swimming or blowing at surface	0	There were 6-8 sea otters in the area during the soak watch (including a mother and pup pair). All sea otters were heading WNW. I did not see any animals cross the net in the opposite direction.
1-Jun	1352	On-watch	Sea Otter	3	Swimming or blowing at surface	16	The three otters above swam over the top of the lead (with one juvenile).
1-Jun	1404	On-watch	Sea Otter	1		0	A sea otter playing with and chewing on floats at the lead.
1-Jun	1413	On-watch	Sea Otter	1	Feeding on catch	0	There were 6-8 sea otters in the area during the soak watch (including a mother and pup pair). All sea otters were heading WNW. I did not see any animals cross the net in the opposite direction.
1-Jun	1414	On-watch	Sea Otter	2	Feeding on catch	0	There were 6-8 sea otters in the area during the soak watch (including a mother and pup pair). All sea otters were heading WNW. I did not see any animals cross the net in the opposite direction.
1-Jun	1445	Off-watch	Harbor Porpoise	2	Breaching		
1-Jun	1452	Off-watch	Harbor Porpoise	1	Breaching		
1-Jun	1526	On-watch	Sea Otter	1	Floating on surface	10	
1-Jun	1545	On-watch	Sea Otter	1	Floating on surface	8	One of the first two otters on this page were at the lead and one was by the hook.
1-Jun	1545	On-watch	Sea Otter	1	Floating on surface	8	One of the first two otters on this page were at the lead and one was by the hook.
1-Jun	1730	On-watch	Sea Otter	1	Floating on surface	10	
2-Jun	655	On-watch	Sea Otter	1	Swimming or blowing at surface	30	

2-Jun	705	Off-watch	Harbor Seal	1	Swimming or blowing at surface	0	
2-Jun	709	On-watch	Harbor Porpoise	1	Milling/circling	0	A harbor porpoise was seen blowing next to the net. The animal blew about four times then disappeared.
2-Jun	730	On-watch	Harbor Seal	1	Swimming or blowing at surface	35	This could be the same individual seal. The seal was seen once from the shore at about 20m.
2-Jun	830	Off-watch	Sea Otter	1	Swimming or blowing at surface	10	
2-Jun	930	On-watch	Sea Otter	1	Swimming or blowing at surface	0	The otter swam up to the net, dove over it and kept swimming.
2-Jun	1315	Off-watch	Sea Otter	1	Swimming or blowing at surface		
2-Jun	1320	On-watch	Sea Otter	1	Swimming or blowing at surface	400	
2-Jun	1326	On-watch	Steller Sea Lion	2	Feeding on catch	0	Sea lions were eating salmon out of the net at the shore end. Both were female.
2-Jun	1356	On-watch	Harbor Seal	1	Swimming or blowing at surface	100	
2-Jun	2141	Off-watch	Sea Otter	1	Swimming or blowing at surface		
2-Jun	2245	Off-watch	Sea Otter	2	Swimming or blowing at surface		
3-Jun	538	Off-watch	Harbor Porpoise	1	Breaching	100	
3-Jun	617	On-watch	Steller Sea Lion	1	Milling/circling	0	A minimum of one Steller, and maximum of five Stellers. Event number three was disrupted by the fisher pulling the net to repair a small part of it.
3-Jun	705	On-watch	Steller Sea Lion	1	Milling/circling	30	
3-Jun	753	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	20	
3-Jun	930	On-watch	Harbor Seal	1	Foraging on other prey	20	A harbor seal, with a small head and large eyes, popped its head up. Immediately it went back under water.
3-Jun	1037	On-watch	Harbor Porpoise	1	Milling/circling	100	A harbor porpoise swimming back and forth off the end of setnet 2. There was no interaction.
3-Jun	1050	On-watch	Harbor Seal	1	Milling/circling	30	A harbor seal was observed on surface about 30m from the setnet. No interaction was observed.
3-Jun	1051	On-watch	Steller Sea Lion	1	Milling/circling	0	
3-Jun	1155	On-watch	Harbor Seal	1	Feeding on catch	0	A harbor seal was observed eating a salmon from net 1. There was no apparent entanglement and no incidental take.
3-Jun	1240	Off-watch	Steller Sea Lion	1	Floating on surface	0	
3-Jun	1335	On-watch	Steller Sea Lion	1	Floating on surface	0	

3-Jun	1406	Off-watch	Steller Sea Lion	1	Floating on surface	0	At least three stellar sea lions were working this net during this period of time. They were seen at both ends of the net.
3-Jun	1536	On-watch	Sea Otter	1	Swimming or blowing at surface	25	A sea otter was also feeding on the catch and floating at the surface.
3-Jun	1640	On-watch	Sea Otter	1	Floating on surface	30	
3-Jun	1640	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	At least three stellar sea lions were working this net during this period of time. They were seen at both ends of the net.
3-Jun	1706	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	At least three stellar sea lions were working this net during this period of time. They were seen at both ends of the net.
3-Jun	1712	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	At least three stellar sea lions were working this net during this period of time. They were seen at both ends of the net.
3-Jun	1712	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	At least three stellar sea lions were working this net during this period of time. They were seen at both ends of the net.
3-Jun	1725	On-watch	Sea Otter	1	Floating on surface	0	
3-Jun	1735	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	15	
3-Jun	1735	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	20	
3-Jun	1745	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	20	
3-Jun	1745	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	30	
3-Jun	1915	On-watch	Harbor Seal	2	Milling/circling	20	
3-Jun	2015	Off-watch	Sea Otter	2	Swimming or blowing at surface	45	
3-Jun	2020	Off-watch	Steller Sea Lion	1	Swimming or blowing at surface	5	
4-Jun	930	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam parallel to the beach and went over the net 1/3 the way out. It continued on its way down the beach 150m offshore. Wave heights were 0.8m from old swell with 0.1m or less from wind waves.
4-Jun	1010	On-watch	Sea Otter	1	Feeding on catch	0	A lone sea otter was observed eating salmon from the net. The otter did not become entangled in the net, and subsequently came out of the water, onto the rocks very near the observer. The otter then returned to the water, and continued to gnaw on fish that were caught in the net.
4-Jun	1101	On-watch	Sea Otter	1	Swimming or blowing at surface	30	
4-Jun	2029	Off-watch	Sea Otter	1	Swimming or blowing at surface	200	
4-Jun	2145	On-watch	Sea Otter	1	Swimming or blowing at surface	0	The sea otter in event 7 had same behavior as the sea otter in event 1.

5-Jun	640	On-watch	Harbor Porpoise	2	Breaching	10	
5-Jun	740	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	It sat on the top of the net for a while.
5-Jun	822	Off-watch	Unknown Whale	1	Breaching	100	An unidentified whale, small, was swimming towards the gear.
5-Jun	950	On-watch	Harbor Seal	1	Floating on surface	20	It was approximately 50m from the cliff.
5-Jun	956	On-watch	Harbor Seal	1	Floating on surface	1	Possibly the same seal as at 950.
5-Jun	1040	On-watch	Harbor Seal	2	Swimming or blowing at surface	1	One of them may have been a juvenile - it was smaller and following closely.
5-Jun	1045	On-watch	Harbor Porpoise	1	Breaching	250	Could have been the same porpoise - it was equidistance on other side of the net swimming in the same direction.
5-Jun	1055	On-watch	Harbor Porpoise	1	Breaching	250	
5-Jun	1110	On-watch	Harbor Seal	2	Swimming or blowing at surface	1	
5-Jun	1126	On-watch	Harbor Seal	2	Feeding on catch	40	Possibly the same two seals as at 1110. Clearly had entire salmon in mouths, dragging it under water - seems to be playing with it.
5-Jun	1152	Off-watch	Harbor Seal	2	Feeding on catch	1	It was laying it's body on the weedline, resting - then went under the water, and corks bobbed.
5-Jun	1231	On-watch	Harbor Seal	1	Feeding on catch	1	A harbor seal surfaced eating a salmon, then disappeared and reappeared without the salmon. The entire sequence was inside the pot.
5-Jun	1302	On-watch	Harbor Seal	1	Swimming or blowing at surface	40	A harbor seal was swimming, then disappeared.
5-Jun	1307	Off-watch	Harbor Seal	1	Swimming or blowing at surface	50	A harbor seal looking at the net.
5-Jun	1535	On-watch	Sea Otter	1	Swimming or blowing at surface	1	It was swimming past along the coast, swam over the gear, and kept going.
5-Jun	1633	Off-watch	Sea Otter	1	Foraging on other prey		Running to the R/V I saw an otter floating on its back, with light brown fur.
5-Jun	1732	On-watch	Harbor Seal	1	Swimming or blowing at surface	4	A harbor seal popped up 3m from the net, looking at me sitting on shore. Then it went down.
5-Jun	1826	On-watch	Sea Otter	1		0	A sea otter was swimming from net 1 and 2 (SSE), eating. At 1849 I saw it again swimming/eating from net 1 to net 2. It ducked under for about one minute, popped up eating, and swam away in the same direction from net 2 to net 3, NNW. It swam over net 2.
5-Jun	2006	Off-watch	Unknown Porpoise or Dolphin	2	Swimming or blowing at surface	300	I saw a rooster tail spray, but there was a 13 knot wind. I was not close enough to see the animal.
6-Jun	630	On-watch	Sea Otter	3	Milling/circling		The otters in both event 1 sightings were milling around.
6-Jun	700	On-watch	Sea Otter	6	Milling/circling		The otters in both event 1 sightings were milling around.

6-Jun	720	On-watch	Dall's Porpoise	2	Porpoising		The Dall's porpoise in event 1 porpoised 50m from the vessel then swam directly under the vessel in clear water.
6-Jun	1046	On-watch	Sea Otter	2	Swimming or blowing at surface	1	
6-Jun	1120	Off-watch	Sea Otter	2	Swimming or blowing at surface		A mother and pup were swimming together. No transit watch was attempted due to an obstructed view on the deck.
6-Jun	1405	On-watch	Sea Otter	2	Swimming or blowing at surface	0	Two sea otters swam under the mooring line on the shoreside end of the net.
7-Jun	833	Off-watch	Harbor Seal	1	Swimming or blowing at surface	60	A harbor seal surfaced 50m from our skiff as we approached the hook. It looked at us then dove.
7-Jun	844	On-watch	Harbor Seal	1	Feeding on catch	2	A seal popped up near the net, went down, and came up with a nice looking salmon.
7-Jun	1017	On-watch	Harbor Seal	2	Swimming or blowing at surface	10	There were two harbor seals, one further away from the net.
7-Jun	1132	Off-watch	Harbor Seal	1	Swimming or blowing at surface	5	A harbor seal surfaced three times momentarily on the west side of the net.
7-Jun	1158	Off-watch	Harbor Seal	1	Swimming or blowing at surface	15	A harbor seal was watching fishers waiting to set the net, off the end of the king buoy.
7-Jun	1213	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A harbor seal was near the hook end of the net while the fishers tied the net to the lead.
7-Jun	1215	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A harbor seal in the hook of the net, popped his head up and then went down.
7-Jun	1218	On-watch	Harbor Seal	1	Feeding on catch	0	A seal was swimming the length of the net, about 1m from the net. It swan over the net trying to get a freshly caught fish. The fishers buzzed by, and the seal disappeared. It Popped up with another 20m away.
7-Jun	1234	On-watch	Harbor Seal	1	Swimming or blowing at surface	60	A harbor seal appeared, then a second one less than a minute later.
7-Jun	1235	On-watch	Harbor Seal	1	Milling/circling	1	A harbor seal appeared, then a second one less than a minute later.
7-Jun	1405	On-watch	Harbor Seal	2	Feeding on catch	0	Two seals next to the net came up together, over the hook. They went down, one came up in the middle, picking out a fish from the net. The net was jiggling. Both went down, and one popped up 50m from the net.
7-Jun	1507	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	A harbor seal popped up near the shore looking at the net.
7-Jun	1508	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A harbor seal popped up near the hook end of the net right by the net.
7-Jun	1512	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	A seal popped up 40m from the net and swam to within 20m of it, then went down.

7-Jun	1519	On-watch	Harbor Seal	2	Swimming or blowing at surface	40	Two seals surfaced 10m apart looking at me, 40m from the net. At 1523 both surface together 1m from the net, and went down together, near the hook end of the main net. At 1525 both surfaced again on opposite sides of the net, swimming toward it.
7-Jun	1528	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A seal popped up 10m from the net, swam toward it, went down ,and the net jiggled.
7-Jun	1530	On-watch	Harbor Seal	3	Swimming or blowing at surface	40	Three seals surfaced close together. Two touched noses.
7-Jun	1533	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A seal surfaced by the net. Hanged out right by it, with it's head touching the float line.
7-Jun	1539	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A seal popped up beside the net near the hook end.
7-Jun	1542	On-watch	Harbor Seal	1	Feeding on catch	0	A seal popped up on the other side of the net by the hook, went down, and the net shook. The head appeared with a fish, and then went down.
7-Jun	1546	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A seal popped up in the hook. It went down, and came up outside of the hook with a fish in its mouth. At 1549 it popped up again in the same spot, with no fish. At 1551 it was up again, craning its head, looking around. At 1551 there were three quick ups and downs. At 1553 there were ups and downs two more times, in the same spot.
8-Jun	635	On-watch	Sea Otter	2	Floating on surface		Sea otters were seen floating on their backs. There was no unusual activity.
8-Jun	655	On-watch	Sea Otter	1	Swimming or blowing at surface		
8-Jun	720	Off-watch	Sea Otter	2	Swimming or blowing at surface	25	
8-Jun	728	On-watch	Harbor Seal	1	Sounding	2	A harbor seal surfaced several times near the gear.
8-Jun	820	On-watch	Sea Otter	2	Swimming or blowing at surface		
8-Jun	903	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A harbor seal surfaced several times near the gear. At 912 it swam over top of the circle line. It left at 946.
8-Jun	956	On-watch	Sea Otter	2	Floating on surface		Sea otters were seen floating on their backs. There was no unusual activity.
8-Jun	1109	On-watch	Harbor Seal	1	Swimming or blowing at surface		A harbor seal appeared for 30 seconds before disappearing.
8-Jun	1119	On-watch	Sea Otter	5	Floating on surface		Sea otters floating on their backs near rocks.
8-Jun	1120	On-watch	Sea Otter	1	Floating on surface		Sea otters floating on their backs near rocks.
8-Jun	1121	On-watch	Sea Otter	1	Floating on surface		Sea otters floating on their backs near rocks.

8-Jun	1152	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A harbor seal was swimming inside the arrowhead. It went down, came up outside the trap, went down, popped up at mid-net, went down, and popped up in the arrowhead. It popped up there again at 1156. At 1158 it popped up near the first 1/4 of the net near us, went down, and came up 10m from us, checking us out. Then it went down and started swimming towards the arrowhead.
8-Jun	1350	On-watch	Sea Otter	15	Swimming or blowing at surface		I saw 15 sea otters, including two mother and pup pairs, as I was crossing the bay.
8-Jun	1700	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A harbor seal popped up 1m from the net near the hook.
8-Jun	1705	Off-watch	Harbor Seal	1	Sounding	1	A harbor seal surfaced at the hook.
8-Jun	1717	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A seal popped up by the hook, looking towards the shore.
8-Jun	1725	On-watch	Harbor Porpoise	1	Swimming or blowing at surface		
8-Jun	1738	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A harbor seal was swimming along the net, diving on the net throughout the soak watch.
8-Jun	1801	On-watch	Sea Otter	1	Foraging on other prey	10	A sea otter was floating over the net, eating shellfish.
9-Jun	642	On-watch	Harbor Porpoise	1			Porpoise took 2 breathes at surface, no where near net.
9-Jun	906	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	60	Porpoise swam by net parallel to shore, surfacing 4 times before disappearing.
9-Jun	1156	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	10	A harbor porpoise was cruising along, passed the hook end of the net and turned away. I didn't see itagain.
9-Jun	1233	On-watch	Harbor Porpoise	4	Swimming or blowing at surface	10	Four harbor porpoises were first seen in the middle of the bay heading south. Two surfaced close together, the other two were by themselves further away. They surfaced every 10-20 seconds as they traveled along. They traveled a steady course past the end of the net passing within 10m of it. One made a tight circle before continuing on the same course. Sometimes they would skim the surface for 10-20 seconds, their dorsal fins and backs showing.
10-Jun	521	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	400	
10-Jun	658	Off-watch	Sea Otter	2	Floating on surface		They were seen traveling to the site, not close to any gear.
10-Jun	702	Off-watch	Sea Otter	1	Floating on surface		It was seen traveling to the site, not close to any gear.
10-Jun	740	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	4	At least two harbor porpoise swam toward the deep end of the body of net. They dove for the last time about 4m north of the gear.

10-Jun	743	On-watch	Harbor Seal	3	Sounding	1	Three harbor seals arrived and surfaced many times next to the body and trap.
10-Jun	803	Off-watch	Harbor Seal	1		0	A harbor seal appeared right at the net, it's head resting on floatlines, hanging out. It went down slowly.
10-Jun	925	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A harbor seal swam between the floats on the shoreward end of the net.
10-Jun	1039	On-watch	Harbor Seal	2	Swimming or blowing at surface	10	Seal were swimming around the rocky reef that the shoe end of net was attached to. At 1045 they were still swimming around, joined by another.
10-Jun	1056	On-watch	Harbor Seal	2	Swimming or blowing at surface	0	A harbor seal was swimming by the rocks. Another one was hanging out, reclining against the net.
10-Jun	1357	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	250	Harbor porpoise were swimming and floating past, far from the net.
10-Jun	1400	On-watch	Harbor Seal	3	Sounding	5	Three harbor seals surfaced near the lead and then dove.
10-Jun	1500	Off-watch	Harbor Seal	1	Swimming or blowing at surface	0	
10-Jun	1500	Off-watch	Sea Otter	1	Swimming or blowing at surface		
10-Jun	1535	On-watch	Sea Otter	2	Swimming or blowing at surface	40	The otters swam over the top of the net and kept traveling.
10-Jun	1545	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A harbor seal popped up midnet looking at the net. At 1548 it popped up nearer the hook, looking at us. At 1553 it was back to mid-net.
10-Jun	1545	On-watch	Sea Otter	1	Swimming or blowing at surface	20	
10-Jun	1550	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	
10-Jun	1556	On-watch	Harbor Seal	3	Swimming or blowing at surface	1	Three seals were swimming around the shore end of the net.
10-Jun	1611	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	A harbor seal was swimming next to the net and floating with it's head on the surface. There were no obvious interactions with the gear.
10-Jun	1613	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	A harbor seal was watching the fishers pick the trap. The seal was swimming around the shore end of the net for the whole pick. It backed off as the fisher got closer.
10-Jun	1616	On-watch	Harbor Seal	2	Swimming or blowing at surface	0	One harbor seal was on each side of the net, hanging out beside it. At 1621 they were together on one side, at the shore end of the net. The seals were swimming around the shore end of the net for the whole pick. They backed off as the fisher got closer.
10-Jun	1935	On-watch	Sea Otter	1	Swimming or blowing at surface	5	A lone sea otter was observed swimming near the net. No interaction was observed.

10-Jun	1957	On-watch	Harbor Seal	1	Hauled out on land		
10-Jun	2025	On-watch	Sea Otter	1	Floating on surface	10	A sea otter was floating past the inshore part of the net.
10-Jun	2025	On-watch	Sea Otter	2	Swimming or blowing at surface	40	
10-Jun	2046	On-watch	Harbor Seal	1	Floating on surface	100	A harbor seal was bobbing on the surface about 100m offshore of the king buoy.
10-Jun	2110	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	
10-Jun	2127	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface		
11-Jun	641	On-watch	Sea Otter	16	Floating on surface	5	Sixteen sea otters were floating near the shore end of the net, on the reef. At least two otters had pups.
11-Jun	719	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A harbor seal was swimming along the shore end of the net.
11-Jun	735	On-watch	Sea Otter	1	Swimming or blowing at surface	2	One sea otter was swimming by the king buoy.
11-Jun	839	On-watch	Harbor Seal	18	Hauled out on land	275	I was interrupted when the fisher arrived. A colony of harbor seals was spotted on a reef about 300 yards from the net. Later I counted 18 seals.
11-Jun	930	On-watch	Sea Otter	1	Floating on surface	100	The sea otter in event 4 was just being a sea otter.
11-Jun	1452	Off-watch	Sea Otter	1	Swimming or blowing at surface		
11-Jun	1543	On-watch	Sea Otter	1	Swimming or blowing at surface	50	
11-Jun	1806	Off-watch	River Otter	1	Swimming or blowing at surface	1	A river otter was swimming along the body of the net. Two reds had otter damage (throat bites).
11-Jun	1821	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A harbor seal popped up in the hook.
12-Jun	1027	On-watch	Harbor Seal	1	Feeding on catch	0	A harbor was seal feeding on catch at the open end of the flag hook. The seal was tearing at a salmon caught near the surface, in the gillnet. The animal was also diving repeatedly on the net.
12-Jun	1903	On-watch	Steller Sea Lion	3		150	Two sea lions popped their heads out of a kelp bed near the shore. A third was 50m farther than the two. They peered around and popped under. They were not seen again.
13-Jun	640	On-watch	Sea Otter	1	Swimming or blowing at surface	100	
13-Jun	710	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	50	
13-Jun	721	On-watch	Harbor Seal	1	Floating on surface	0	A harbor seal was floating at the net with its head above the surface, watching the picking skiff as it approached.

13-Jun	825	On-watch	Sea Otter	3	Swimming or blowing at surface	50	Two adult and one juvenile sea otter were swimming around and playing between the island and the reef where the lead was anchored.
13-Jun	915	On-watch	Sea Otter	1	Swimming or blowing at surface	300	
13-Jun	1035	On-watch	Steller Sea Lion	1	Feeding on catch	0	A small Steller sea lion swam underneath the lead line, then circled around, and ate at least one salmon from the net.
13-Jun	1204	Off-watch	Harbor Porpoise	4	Swimming or blowing at surface		
13-Jun	1310	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A sea lion was swimming around the net during the pick, in spite of seal bombs. No entanglement of the sea lion was observed.
13-Jun	1430	On-watch	Sea Otter	1	Swimming or blowing at surface	70	A sea otter was swimming between the island and the reef at start of the net lead.
13-Jun	1441	On-watch	River Otter	1	Hauled out on land	50	A river otter was walking on the rocky reef where the lead was tied
13-Jun	1454	On-watch	Sea Otter	3	Floating on surface	100	
13-Jun	1457	On-watch	Harbor Seal	1	Swimming or blowing at surface	75	
13-Jun	1640	On-watch	Steller Sea Lion	2	Feeding on catch	0	Two Steller sea lions were observed feeding on salmon caught in the setnet. No entanglement of the sea lions was observed.
13-Jun	1725	Off-watch	Sea Otter	1	Swimming or blowing at surface		
13-Jun	1730	Off-watch	Sea Otter	10	Swimming or blowing at surface		There were many young in the group of otters. Ten is an estimated number, because as soon as we approached they scattered. We only approached to within 30m.
13-Jun	2010	Off-watch	Sea Otter	1	Swimming or blowing at surface	10	
13-Jun	2030	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A stellar sea lion was observed swimming adjacent to the setnet. No entanglement of the sea lion was observed.
13-Jun	2127	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface		
14-Jun	720	Off-watch	Steller Sea Lion	40	Hauled out on land		Approximately 40 Steller sea lions were at a haul out site. Branded animals were present at the haulout but the brands could not be read.
14-Jun	826	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	10	A harbor porpoise swam by the end of the net.
14-Jun	835	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion was observed swimming along the setnet, crossing the floatline several times.
14-Jun	849	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	10	A harbor porpoise swam by the end of the net.

14-Jun	915	Off-watch	Steller Sea Lion	1	Milling/circling	5	
14-Jun	930	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface		
14-Jun	930	Off-watch	Sea Otter	1	Swimming or blowing at surface		
14-Jun	940	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed feeding on the catch during the haul.
14-Jun	941	Off-watch	Sea Otter	1	Swimming or blowing at surface		
14-Jun	941	On-watch	Steller Sea Lion	1	Feeding on catch	0	
14-Jun	1010	On-watch	Unknown Whale	1	Swimming or blowing at surface	20	A large whale was heading towards shore off of a net.
14-Jun	1035	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed feeding on salmon and frolicking adjacent to the net. There was no entanglement.
14-Jun	1145	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion was observed swimming around and across the net. The sea lion was not entangled.
14-Jun	1345	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
14-Jun	1423	On-watch	Steller Sea Lion	1	Milling/circling	0	A Steller sea lion was at the net. The Fisherman threw a seal bomb. Due to the proximity to Steller sea lion haul out, the fisherman took turns in the skiff tied to the anchor line buoy, monitoring the net for Steller sea lions. The wind was increasing so it was difficult to observe Steller sea lion behavior near the net.
14-Jun	1435	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed feeding on the catch. The sea lion was not entangled in the net.
14-Jun	1620	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was feeding on the catch. There was no entanglement observed.
14-Jun	1839	On-watch	Harbor Seal	2	Swimming or blowing at surface	600	
14-Jun	1930	On-watch	Unknown otter	1	Swimming or blowing at surface	0	
14-Jun	2020	Off-watch	Steller Sea Lion	2	Feeding on catch	0	At least 2 Steller sea lions were observed eating salmon and frolicking in the hook end of the net. No entanglement of the sea lions was observed.
14-Jun	2025	Off-watch	Steller Sea Lion	1	Swimming or blowing at surface		
14-Jun	2040	Off-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A sea lion was observed adjacent to the setnet. No entanglement of the sea lion was observed.
15-Jun	448	On-watch	Sea Otter	1	Swimming or blowing at surface		
15-Jun	452	On-watch	Sea Otter	4	Floating on surface		

15-Jun	456	On-watch	Sea Otter	1	Floating on surface		
15-Jun	500	On-watch	Sea Otter	1	Floating on surface		
15-Jun	503	On-watch	Sea Otter	2	Floating on surface		
15-Jun	509	On-watch	Sea Otter	1	Floating on surface		
15-Jun	800	On-watch	Harbor Seal	1	Sounding	1	A harbor seal surfaced next to the corkline inside the hook.
15-Jun	915	On-watch	Sea Otter	1	Swimming or blowing at surface	100	
15-Jun	915	On-watch	Sea Otter	2	Swimming or blowing at surface	500	One of the otters was a juvenile, riding on the stomach of the other.
15-Jun	925	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	200	
15-Jun	1005	Off-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was shaking the net, and surfaced with fish in it's mouth, flung it around, and submerged. It was a very large male.
15-Jun	1557	On-watch	Sea Otter	1	Swimming or blowing at surface	300	
15-Jun	1720	On-watch	Sea Otter	1	Swimming or blowing at surface	500	
15-Jun	1732	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
15-Jun	1732	On-watch	Sea Otter	1	Swimming or blowing at surface	200	
15-Jun	1808	On-watch	Harbor Seal	1	Sounding	1	A harbor seal surfaced next to the corkline near the lead, then dove.
15-Jun	1810	On-watch	Sea Otter	1	Swimming or blowing at surface	15	
16-Jun	649	On-watch	Unknown Porpoise or Dolphin	1	Swimming or blowing at surface	70	An unidentified porpoise was swimming around near offshore the anchors. Sun glare prevented a positive identification.
16-Jun	711	On-watch	Sea Otter	1	Swimming or blowing at surface		
16-Jun	745	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	15	A harbor porpoise was spotted swimming away from the gear, mid-net. It surfaced four times and was gone.
16-Jun	812	On-watch	Sea Otter	1	Swimming or blowing at surface	5	It dove under net. It appeared to be just passing through.
16-Jun	927	On-watch	Sea Otter	1	Swimming or blowing at surface	0	It popped up on the west side of the net at about 5m, ducked under, came out on the east side at about 4m from net and skiff, and continued east following the shoreline. I saw it about one minute later near the outside buoy, then the haul watch began and it was not within range.
16-Jun	1226	On-watch	Harbor Porpoise	2	Milling/circling	50	A harbor porpoise swimming by the offshore anchors.

16-Jun	1230	Off-watch	Sea Otter	2	Floating on surface		A saw two sea otters during the transit from the fishing grounds, inside a protected channel. They did not react. They were floating on their backs, eating. They were large, and brown/tan.
16-Jun	1335	On-watch	River Otter	1	Swimming or blowing at surface	0	It was 20m from the platform.
16-Jun	1650	On-watch	River Otter	1	Feeding on catch	0	It was 10m away from the platform, and swam directly up to me with fish.
17-Jun	515	Off-watch	Sea Otter	1	Swimming or blowing at surface		
17-Jun	655	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed feeding on the catch during the haul. There was no entanglement.
17-Jun	749	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	25	
17-Jun	752	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface		A harbor porpoise dorsal fin surfaced twice, while we were in transit (but only 15 minutes to the net so this was no official transit watch). It was not near any gear, out in bay.
17-Jun	845	On-watch	Harbor Porpoise	1	Swimming or blowing at surface		
17-Jun	910	On-watch	Sea Otter	45	Swimming or blowing at surface		Sea otters were resighted at 0957, but at that time the original 45 were down to 12.
17-Jun	1042	Off-watch	Harbor Seal	1	Sounding	1	1042: A single harbor seal popped up next to the net as we attempted to count corks.
17-Jun	1045	On-watch	Steller Sea Lion	1	Feeding on catch	0	
17-Jun	1100	On-watch	Steller Sea Lion	1		0	
17-Jun	1110	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion was observed swimming adjacent to the net during the haul, with no entanglement.
17-Jun	1117	Off-watch	Steller Sea Lion	3	Swimming or blowing at surface	0	They were all swimming together. One was young (smaller than the juvenile age class) and one was branded.
17-Jun	1118	On-watch	Harbor Seal	2	Swimming or blowing at surface	0	Two harbor seals surfaced together by the lead mesh. They dove down and surfaced further away. At 1120 they popped up closer to the shore amidst the sea weed, looking at the shore and looking underwater. At 1122 they surfaced together right on the lead. At 1124 they resurfaced on my side of the lead looking at me. At 1139 they popped up continuously near the lead and near shore, looking around, looking at me, and looking at each other hanging out.
17-Jun	1150	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed feeding on the catch from the setnet, with no entanglement.

17-Jun	1225	On-watch	Steller Sea Lion	4	Feeding on catch	0	At least four Steller sea lions were observed feeding on fish caught in the setnet. The sea lions did not become entangled in the net.
17-Jun	1400	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion swam under the mooring line, then swam parallel to the net. The sea lion did not become entangled in the net.
17-Jun	1407	Off-watch	Sea Otter	3	Milling/circling		
17-Jun	1408	Off-watch	Harbor Seal	1	Milling/circling		This was likely the same harbor seal (viewed from beach). The fisher reported that one harbor seal stays nearby.
17-Jun	1425	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
17-Jun	1432	Off-watch	Harbor Seal	1	Milling/circling		This was likely the same harbor seal (viewed from beach). The fisher reported that one harbor seal stays nearby.
17-Jun	1437	Off-watch	Sea Otter	1	Foraging on other prey		A sea otter was feeding on octopus.
17-Jun	1545	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion was observed adjacent to the setnet. The fishers yelled at the sea lion as an acoustic deterrent.
17-Jun	1650	Off-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed eating fish from the setnet.
17-Jun	1741	On-watch	Steller Sea Lion	3	Feeding on catch	0	Three Steller sea lions were cruising up and down the net, one on one side, two on the other. They would stop and pick out fish then eat the fish. I saw them eat four salmon. When the fishers picked they caught no salmon.
17-Jun	1904	Off-watch	Sea Otter	3	Foraging on other prey	600	
17-Jun	1905	Off-watch	Harbor Seal	1	Milling/circling	500	
17-Jun	2206	Off-watch	Sea Otter	5	Swimming or blowing at surface		
18-Jun	738	On-watch	Sea Otter	11	Milling/circling		
18-Jun	830	On-watch	Sea Otter	1	Floating on surface	100	
18-Jun	844	On-watch	Harbor Seal				
18-Jun	945	On-watch	Harbor Seal	60	Hauled out on land		A harbor seal haul-out on an island.
18-Jun	945	On-watch	Harbor Seal	20	Milling/circling		
18-Jun	945	On-watch	Sea Otter	9	Milling/circling		
18-Jun	953	On-watch	Sea Otter	1	Swimming or blowing at surface		
18-Jun	1309	On-watch	Sea Otter	1	Swimming or blowing at surface		
18-Jun	1329	On-watch	Sea Otter	1	Swimming or blowing at surface		
18-Jun	1340	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion was swimming adjacent to the net. The sea lion did not feed from the net, or become entangled in the net.

18-Jun	1600	On-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter swam within 10m of the net, then turned and swam parallel to the net.
18-Jun	1604	Off-watch	Harbor Seal	1	Swimming or blowing at surface	100	A harbor seal was swimming around the rocky shoreline.
18-Jun	1905	Off-watch	Harbor Seal				
18-Jun	2030	On-watch	Harbor Seal	1	Milling/circling		
19-Jun	1225	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam under the mooring line, and continued swimming perpendicular to the net.
19-Jun	1415	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam towards the net and over the floatline, then continued swimming away from the net. The otter did not become entangled in the net.
20-Jun	1050	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface		
20-Jun	1125	Off-watch	Harbor Seal	20	Hauled out on land		There was a minimum of 20 individuals, and a maximum of 30 individuals. We did not want to get too close with the boat. Last time we were here we drove in close so that they scattered into the water.
20-Jun	1125	Off-watch	Sea Otter	4	Swimming or blowing at surface		
20-Jun	1600	On-watch	Sea Otter	2	Floating on surface	250	
20-Jun	1605	On-watch	Harbor Seal	1	Swimming or blowing at surface	25	
20-Jun	1630	On-watch	Sea Otter	1	Hauled out on land	30	The two otters from 1600 (one of which is a juvenile) joined this one so they all climbed up on a rock out in the water.
20-Jun	1824	Off-watch	Harbor Seal	1	Floating on surface	10	A harbor seal popped his head up and looked around near the inside of the net (halfway along the lead), about 10m away from the net, and 15m away from the observer.
21-Jun	540	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
21-Jun	702	On-watch	Sea Otter	1	Swimming or blowing at surface		A sea otter was swimming near the permit that was pulled out, not near any net.
21-Jun	715	On-watch	Sea Otter	1	Floating on surface		
21-Jun	741	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	
21-Jun	805	On-watch	Steller Sea Lion	75			A sea lion haul out with two rocks. I counted at least 75 individuals, lounging on the haul out rock.
21-Jun	830	On-watch	Sea Otter	2	Swimming or blowing at surface		A sea otter female and pup were swimming with the pup on her belly near the sea lion haul out.
21-Jun	1026	On-watch	River Otter	1	Feeding on catch	0	A river otter seen diving on the net and eating salmon out of the net.

21-Jun	1808	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A sea lion surfaced and made an explosive exhale right by the net, two minutes in front of the picking skiff. The fisher yelled.
21-Jun	2000	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter was swimming along the length of the net. It was deep to shallow, weaving among the floats, ducked under and was gone.
21-Jun	2000	On-watch	Steller Sea Lion	2	Swimming or blowing at surface	0	Sea lions were seen swimming near the shore end of the net, both sides only, for about 30 seconds.
21-Jun	2107	On-watch	Harbor Porpoise	1			A harbor porpoise was two times at the surface breathing, and heading into the bay.
22-Jun	1026	On-watch	Steller Sea Lion	1	Feeding on catch	0	On the first sighting of the sea lion it came up from the net with a salmon and ate it then dove down. About 10 minutes later I spotted it again swimming along the net looking for fish. It stopped and picked out a couple fish and ate them, then disappeared.
22-Jun	1103	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	This was most likely the same sea lion. At 1116 the sea lion was observed pulling a fish out of the net and eating it.
22-Jun	1116	On-watch	Steller Sea Lion	1	Feeding on catch	0	This was most likely the same sea lion. At 1116 the sea lion was observed pulling a fish out of the net and eating it.
22-Jun	1601	On-watch	Steller Sea Lion	4	Milling/circling	15	
22-Jun	1611	On-watch	Steller Sea Lion	1	Milling/circling	0	
22-Jun	1931	On-watch	Harbor Seal	1	Floating on surface	2	When they started picking the second net a harbor seal popped it's head up right beside the lead, then disappeared.
22-Jun	2028	On-watch	Harbor Seal	1	Swimming or blowing at surface		
22-Jun	2030	On-watch	Harbor Porpoise	1	Swimming or blowing at surface		
23-Jun	733	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	70	A harbor porpoise swimming near the end of the net continued on down the bay.
23-Jun	750	On-watch	Sea Otter	1	Swimming or blowing at surface	50	
23-Jun	1211	On-watch	Unknown Porpoise or Dolphin	2	Swimming or blowing at surface		
23-Jun	1833	On-watch	Sea Otter	1	Floating on surface	0	A sea otter was floating about 200m from net, drifted to the net, and swam backward away again.
24-Jun	437	On-watch	Sea Otter	1	Floating on surface		
24-Jun	439	On-watch	Sea Otter	1	Floating on surface		
24-Jun	454	On-watch	Sea Otter	1	Floating on surface		
24-Jun	459	On-watch	Sea Otter	1	Floating on surface		
24-Jun	502	On-watch	Sea Otter	1	Floating on surface		

24-Jun	503	On-watch	Sea Otter	7	Floating on surface		
24-Jun	509	On-watch	Sea Otter	6	Floating on surface		
24-Jun	820	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller sea lion swam over the weedline, entered the hook area, then swam away from the setnet. The sea lion did not become entangled in the net.
24-Jun	1002	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	15	A harbor seal swam by the end of the net.
24-Jun	1016	On-watch	Sea Otter	1	Swimming or blowing at surface	40	
24-Jun	1123	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
24-Jun	1128	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
24-Jun	1325	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	300	A harbor porpoise was observed swimming past the end of the setnet. The porpoise did not interact with the setnet.
24-Jun	1440	On-watch	Steller Sea Lion	2	Swimming or blowing at surface	50	Two Steller sea lions were observed swimming away from the setnet.
24-Jun	1445	On-watch	Sea Otter	2	Swimming or blowing at surface	0	Two Steller sea lions were observed swimming away from the setnet.
24-Jun	1825	On-watch	Sea Otter	1	Swimming or blowing at surface	5	A sea otter just popped up by the net once, then disappeared. It appeared again about 10 minutes later by the opposite (hook) end of the net.
24-Jun	1918	On-watch	Sea Otter	1	Foraging on other prey	0	These (1918 and 1925) were likely the same otter.
24-Jun	1925	On-watch	Sea Otter	1	Floating on surface	0	These (1918 and 1925) were likely the same otter.
24-Jun	1926	On-watch	Sea Otter	1	Swimming or blowing at surface	150	This was a different sea otter and huge.
24-Jun	1941	On-watch	Sea Otter	2	Foraging on other prey	60	A mother and pup were foraging.
24-Jun	1945	On-watch	Sea Otter	1	Foraging on other prey	40	
24-Jun	2024	On-watch	Steller Sea Lion	1	Feeding on catch	1	Sea lion popped its head out along 1/3 of the net. One time I saw it with a salmon head in it's mouth. it was there until we left after the haul watch.
24-Jun	2030	On-watch	Steller Sea Lion	3	Feeding on catch	0	Three sea lions were observed eating fish from the net. The sea lions dispersed when the haul began.
24-Jun	2123	On-watch	Sea Otter	3	Foraging on other prey		
24-Jun	2125	On-watch	Sea Otter	1	Swimming or blowing at surface		
25-Jun	645	Off-watch	Sea Otter	3	Swimming or blowing at surface	0	
25-Jun	705	On-watch	Sea Otter	1	Swimming or blowing at surface	50	A sea otter swam past the net and continued swimming.
25-Jun	738	On-watch	Sea Otter	1	Swimming or blowing at surface	300	Sea otter was near the other site. There was no net in the water there, only buoys and line.

25-Jun	803	Off-watch	Steller Sea Lion	75	Hauled out on land		A Steller sea lion haul out.
25-Jun	806	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A sea lion was seen on the left side of the net. It swam into the hook, surfaced several times and disappeared. It had a large head, eyes, and earflaps, and was tan. It was probably a young/female Steller sea lion.
25-Jun	912	On-watch	Harbor Seal	1	Swimming or blowing at surface	4	
25-Jun	931	On-watch	Harbor Seal	1	Swimming or blowing at surface	15	A harbor seal popped up looking in the direction of the net.
25-Jun	945	On-watch	Harbor Seal	1	Swimming or blowing at surface	60	In all events, only one harbor seal was spotted on the surface at one given time. The observer suspected that it was the same seal in all recorded events.
25-Jun	1005	On-watch	Harbor Seal	1	Swimming or blowing at surface	100	
25-Jun	1020	On-watch	Harbor Seal	1	Swimming or blowing at surface	60	In all events, only one harbor seal was spotted on the surface at one given time. The observer suspected that it was the same seal in all recorded events.
25-Jun	1224	On-watch	Steller Sea Lion	3	Feeding on catch	0	Sea lions were jumping over the net, fighting over the fish, and eating salmon.
25-Jun	1235	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was observed eating salmon from the net.
25-Jun	1355	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	In all events, only one harbor seal was spotted on the surface at one given time. The observer suspected that it was the same seal in all recorded events.
25-Jun	1401	On-watch	Harbor Seal	1	Swimming or blowing at surface	30	A harbor seal was swimming back and forth under net 50m from the shore end of the net. Twice the net seemed to be shaken vigorously from beneath the water surface. I never saw more than one harbor seal surface at once. The seal would surface and dive or surface and swim, staying within 30m of the net.
25-Jun	1404	On-watch	Harbor Seal	1	Swimming or blowing at surface	30	A harbor seal was swimming back and forth under net 50m from the shore end of the net. Twice the net seemed to be shaken vigorously from beneath the water surface. I never saw more than one harbor seal surface at once. The seal would surface and dive or surface and swim, staying within 30m of the net.
25-Jun	1420	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was observed eating a fish from the shoreside end of the setnet.

25-Jun	1436	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	Harbor seal swimming back and forth under net 50 meters from shore end of net; twice the net seemed to be shaken vigorously from beneath water surface. Never saw more than 1 harbor seal surface at once. Seal would surface and dive or surface and swim, staying within 30 meters of net.
25-Jun	1525	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed eating fish from the setnet.
25-Jun	1552	On-watch	Harbor Seal	1	Milling/circling	1	A harbor seal in net was looking at the observing skiff for 30 seconds, then diving.
25-Jun	1620	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed eating fish from the setnet.
25-Jun	1834	Off-watch	Sea Otter	1	Floating on surface		We passed by a floating sea otter in transit.
25-Jun	1851	Off-watch	Steller Sea Lion	3	Feeding on catch	0	A sea lion was eating salmon, splashing, jumping in the hook.
25-Jun	1900	On-watch	Sea Otter	1	Swimming or blowing at surface	15	
25-Jun	1940	On-watch	Steller Sea Lion	1		1	A tan sea lion, large, was seen around the net. It was seen mid-net and near the hook. At 1948 a Steller sea lion was seen near net, probably same individual. At 2017 it was seen next to the net, probably same individual. It ate fish at surface.
25-Jun	2035	On-watch	Steller Sea Lion	1	Feeding on catch	0	
25-Jun	2114	Off-watch	Steller Sea Lion	4		20	Steaming back to R/V we saw several skinny (probably female or juvenile) Steller sea lions. One surfaced and looked around, then three more (total) surfaced and looked around, 20m away from a non-observed net.
26-Jun	535	On-watch	Sea Otter	1	Milling/circling		
26-Jun	535	On-watch	Steller Sea Lion	2	Feeding on catch	0	
26-Jun	606	On-watch	Sea Otter	1	Swimming or blowing at surface		
26-Jun	648	On-watch	Steller Sea Lion	1	Swimming or blowing at surface		
26-Jun	650	On-watch	Sea Otter	1	Swimming or blowing at surface		
26-Jun	708	On-watch	Sea Otter	1	Milling/circling		
26-Jun	710	On-watch	Steller Sea Lion	7	Feeding on catch	0	This set of sea lions were at the net for more than half an hour. They were playing with fish, had fish in their mouths, etc. There were at least 7 individuals. At least one was branded, but was moving around too quickly to read brand. A fresh wound?

26-Jun	718	On-watch	Steller Sea Lion	1	Feeding on catch	30	A sea lion was feeding off the catch starting from mid-net and finishing in the trap before departing.
26-Jun	724	On-watch	Steller Sea Lion	35	Hauled out on land	650	I counted the sea lions hauled out SE of the net.
26-Jun	754	On-watch	Steller Sea Lion	2	Swimming or blowing at surface	10	Two sea lions were swimming parallel to the net. At 801 the same previously recorded sea lions began feeding on the catch from all areas of the net.
26-Jun	800	On-watch	Sea Otter	1	Swimming or blowing at surface	7	A sea otter popped up about 7m from the net, shoreside, and swam about 10m towards the deep end and then swam away further into the bay.
26-Jun	820	Off-watch	Dall's Porpoise	10	Swimming or blowing at surface	4000	
26-Jun	820	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	10	A Steller sea lion swam past the end of the setnet and continued to swim away. The sea lion did not interact with the setnet.
26-Jun	840	On-watch	Steller Sea Lion	12	Feeding on catch	0	This was possibly same group from event 2. There was a minimum of 12 individuals around for the entire soak watch.
26-Jun	1148	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface		
26-Jun	1155	Off-watch	Sea Otter	1	Swimming or blowing at surface		
26-Jun	1232	On-watch	Harbor Seal	1	Swimming or blowing at surface	2	
26-Jun	1255	On-watch	Sea Otter	1	Swimming or blowing at surface	5	
26-Jun	1301	On-watch	Steller Sea Lion	2	Feeding on catch	75	Sea lions were feeding on the catch mid-net.
26-Jun	1312	On-watch	Steller Sea Lion	15	Hauled out on land	800	A sea lion hauled out with only one side of the haulout visible from my position. Therefore the counts may vary.
26-Jun	1315	On-watch	Steller Sea Lion	1	Feeding on catch	100	Another sea lion began feeding off the net. Then three were feeding vigorously.
26-Jun	1400	On-watch	Harbor Seal	1	Swimming or blowing at surface	100	A harbor seal was swimming along the shore.
26-Jun	1430	On-watch	Harbor Porpoise	3	Swimming or blowing at surface		
26-Jun	1430	On-watch	Sea Otter	1	Swimming or blowing at surface		
26-Jun	1433	On-watch	Harbor Porpoise	1	Swimming or blowing at surface		
26-Jun	1433	On-watch	Sea Otter	1	Swimming or blowing at surface		
26-Jun	1436	On-watch	Sea Otter	3	Swimming or blowing at surface		

26-Jun	1440	On-watch	Sea Otter	5	Swimming or blowing at surface		
26-Jun	1442	On-watch	Sea Otter	2	Swimming or blowing at surface		
26-Jun	1445	On-watch	Sea Otter	1	Swimming or blowing at surface		
26-Jun	1715	On-watch	Sea Otter	1	Swimming or blowing at surface	30	
26-Jun	1746	Off-watch	Steller Sea Lion	70	Hauled out on land		
26-Jun	2020	Off-watch	Dall's Porpoise	5	Bow riding		About five Dall's porpoise were observed in the bay, bow riding on the observer skiff.
26-Jun	2050	On-watch	Sea Otter	2	Swimming or blowing at surface	0	Two sea otters were observed swimming around and over the lead section of the net. No entanglement occurred.
26-Jun	2100	On-watch	Steller Sea Lion	3	Feeding on catch	0	
26-Jun	2150	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	These were two different individuals.
26-Jun	2200	On-watch	Sea Otter	1	Swimming or blowing at surface	40	
26-Jun	2200	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	These were two different individuals.
27-Jun	700	On-watch	Steller Sea Lion	2	Feeding on catch	0	
27-Jun	1210	On-watch	Steller Sea Lion	3	Feeding on catch	0	
27-Jun	1636	On-watch	Sea Otter	1	Foraging on other prey		
27-Jun	1638	On-watch	Sea Otter	1	Swimming or blowing at surface		
27-Jun	1706	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A sea lion popped up right by the net near our skiff which was tied to a sway buoy, 1/2 way up the net. It hanged at the surface taking a couple of breaths, swam between our boat and the net, right along the net out to the pot. It swam into the pot, looked around, swam a little ways back out along the net. Then I did not see him again. The net had just got pulled so there were no fish for him. It looked like a juvenile.
27-Jun	1709	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	50	A harbor porpoise was swimming out of the cove at an angle past the net toward the middle of the bay.
27-Jun	1901	Off-watch	Harbor Seal	1	Swimming or blowing at surface	60	A lone harbor seal was hauled out on the rock that the net is attached to. As we drove by it limped toward the water (the front right flipper might have beeen injured). Then it got into the water and swam.
28-Jun	854	On-watch	Harbor Seal	1	Milling/circling	1	A harbor seal appeared in the hook for 20 seconds, then disappeared.
28-Jun	1400	On-watch	Sea Otter	1	Floating on surface	100	A sea otter was just floating on its back.

28-Jun	1551	On-watch	Sea Otter	1	Swimming or blowing at surface		
28-Jun	1636	Off-watch	Sea Otter	1	Swimming or blowing at surface		
28-Jun	1650	Off-watch	Sea Otter	1	Swimming or blowing at surface		
28-Jun	1945	Off-watch	Sea Otter				
28-Jun	1950	On-watch	Sea Otter	1	Floating on surface	200	A sea otter was floating on its back being a sea otter.
29-Jun	518	On-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was at the net when we arrived. It ate several fish over a 5 minute period. All the fish appeared to be taken from the hook.
29-Jun	536	On-watch	Sea Otter	1	Foraging on other prey	15	This was likely the same individual seen twice. This time it was swimming at 0m to the net.
29-Jun	725	Off-watch	Sea Otter	1	Swimming or blowing at surface		A sea otter dove in front of the skiff as we drove by.
29-Jun	727	On-watch	Dall's Porpoise	3	Swimming or blowing at surface	30	Two or three porpoises surfaced and breathed three times, and then were gone.
29-Jun	742	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller was in the hook eating salmon, repeatedly. At 749 the Steller was eating salmon in the middle of the net. At 756 the Steller swam the length of the net.
29-Jun	829	Off-watch	Steller Sea Lion	2		1	I went to count corks and saw two sea lions swimming and eating salmon (?) next to the net. They stayed several minutes and then left. They were large with tan coloration, and earflaps.
29-Jun	831	Off-watch	Sea Otter	1	Swimming or blowing at surface		A sea otter was swimming about 200m near the net.
29-Jun	835	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	This was possibly all the same individual. It may be feeding on catch although I never saw fish in it's mouth.
29-Jun	852	On-watch	Dall's Porpoise	1	Swimming or blowing at surface	15	While they were picking net 2 there was a splash near the hook. It was a Dall's porpoise. It splashed a couple of times and I saw its back, then it disappeared.
29-Jun	907	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	This was possibly all the same individual. It may be feeding on catch although I never saw fish in it's mouth.
29-Jun	920	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	
29-Jun	930	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	
29-Jun	1203	On-watch	Harbor Porpoise	1	Swimming or blowing at surface		
29-Jun	1418	On-watch	Sea Otter	1	Swimming or blowing at surface	0	

29-Jun	1455	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
29-Jun	1701	Off-watch	River Otter	1	Swimming or blowing at surface		
29-Jun	1920	On-watch	Sea Otter	1	Floating on surface	200	A sea otter drifted on its back to within 100m of the net, then drifted around the corner into another bay.
29-Jun	1937	On-watch	Steller Sea Lion	2	Swimming or blowing at surface	15	During my soak watch, two (maybe three) sea lions swam under the lead and kept swimming away. They didn't stop at the net.
29-Jun	1950	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	This was possibly feeding on the catch, but I saw no fish in it's mouth.
29-Jun	1952	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller was eating salmon in the hook, repeatedly (1955-2001).
29-Jun	2000	Off-watch	Harbor Seal	1	Feeding on catch	0	
29-Jun	2041	On-watch	Steller Sea Lion	2	Feeding on catch	0	Two Stellers were eating salmon in the hook.
29-Jun	2055	Off-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller was in the hook and the fisher threw a seal bomb.
29-Jun	2121	Off-watch	Sea Otter	1	Floating on surface	50	While I was waiting for them to move to the next sampled net there was a sea otter hanging out between me and the net.
29-Jun	2206	On-watch	Steller Sea Lion	1	Feeding on catch	1	When the last pick was nearly done a sea lion came and was trying to pick fish out of the hook just where their skiff was. They banged on the boat to scare it away.
30-Jun	1250	On-watch	Sea Otter	2	Floating on surface	150	The sea otters in event 3 drifted in kelp off the point near the net.
30-Jun	1340	On-watch	Sea Otter	1	Floating on surface	100	The sea otters in event 3 drifted in kelp off point near the net. The third sea otter came into view around the point late in the soak watch.
30-Jun	1345	On-watch	Sea Otter	1	Floating on surface	100	A sea otter floated at the surface 100m from the shore and 100m from the net while the fishers picked.
1-Jul	742	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	A harbor seal swam from the middle of the bay over to the hook. It went down, popped up in the hook, went down, popped up on main net side of the hook, and went down again.
1-Jul	807	On-watch	Harbor Seal	1	Sounding	80	A harbor seal surfaced to look at me then dove.
1-Jul	824	On-watch	Harbor Seal	1	Milling/circling	0	A harbor seal surfaced next to and in the hook. It jug- handled one time.
1-Jul	912	On-watch	Harbor Seal	1	Floating on surface	100	
1-Jul	1820	On-watch	Sea Otter	1	Feeding on catch	0	A sea otter was observed eating fish from hook of the net. The sea otter did not become entangled on the net.
2-Jul	730	Off-watch	Harbor Seal	10	Hauled out on land	100	The gear was tied to a rock which is a haul out.

2-Jul	730	Off-watch	Harbor Seal	50	Swimming or blowing at surface	120	
2-Jul	735	Off-watch	Sea Otter	3	Swimming or blowing at surface		Transiting back to the boat I saw one very small pup.
2-Jul	757	On-watch	Harbor Seal	1	Foraging on other prey	0	A harbor seal could be observed chasing fish under water. The seal was also frequently floating at the water surface, with it's head, 1/2 dorsal surface and hind flippers out of the water. The seal stayed in the area throughout the soak watch.
2-Jul	844	On-watch	Sea Otter	1	Floating on surface		
2-Jul	850	On-watch	Sea Otter	1	Swimming or blowing at surface		
2-Jul	851	On-watch	Harbor Seal	1	Swimming or blowing at surface		
2-Jul	855	On-watch	Harbor Seal	1	Sounding	0	A harbor seal surfaced at the corkline near the shore end.
2-Jul	916	On-watch	Sea Otter	1			A sea otter was floating on it's back, grooming.
2-Jul	1102	On-watch	Sea Otter	1	Swimming or blowing at surface		
2-Jul	1105	On-watch	Sea Otter	1	Swimming or blowing at surface		
2-Jul	1115	On-watch	Harbor Seal	12	Swimming or blowing at surface	120	This group of seals was around for the entire watch.
2-Jul	1116	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	200	
2-Jul	1120	On-watch	Harbor Seal	18	Hauled out on land	100	The adult harbor seals were hauled out on rocks near net 1. The setline was tied to the haulout rocks, and the net started about 100m away from these rocks.
2-Jul	1125	On-watch	River Otter	1	Swimming or blowing at surface	120	
2-Jul	1130	On-watch	Sea Otter	2	Swimming or blowing at surface	100	It was swimming by, traveling.
2-Jul	1135	On-watch	Sea Otter	3	Swimming or blowing at surface	100	It was swimming by, traveling.
2-Jul	1214	On-watch	Sea Otter	2		250	Two otters were playing or mating in the water.
2-Jul	1230	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	
2-Jul	1246	Off-watch	Sea Otter	1	Floating on surface	700	
2-Jul	1520	On-watch	Sea Otter	2	Swimming or blowing at surface		
2-Jul	1824	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was eating salmon within the first 1/3 of the net.

2-Jul	1830	On-watch	Harbor Seal	4	Swimming or blowing at surface	25	This group around for the entire event.
2-Jul	1840	On-watch	Sea Otter	6	Hauled out on land	500	This was six sea otters, including one mother-pup pair.
2-Jul	1849	On-watch	Harbor Seal	11	Hauled out on land	100	
2-Jul	1924	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
2-Jul	1950	On-watch	Harbor Seal	1	Swimming or blowing at surface	100	
2-Jul	1950	On-watch	Sea Otter	2	Swimming or blowing at surface	75	
2-Jul	2010	On-watch	Harbor Seal	1	Swimming or blowing at surface	100	
3-Jul	633	On-watch	Harbor Seal	1	Swimming or blowing at surface		A harbor seal surfaced and dove in front of our skiff during transit. The distance to gear was several miles.
3-Jul	711	On-watch	Sea Otter	7	Foraging on other prey		
3-Jul	713	On-watch	Sea Otter	2	Swimming or blowing at surface		
3-Jul	720	On-watch	Sea Otter	1	Floating on surface		
3-Jul	721	On-watch	Sea Otter	1	Swimming or blowing at surface		
3-Jul	800	On-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter swam past the end of the setnet. The otter did not interact with the net.
3-Jul	803	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	A Steller sea lion (brown/tan, large, ear flaps, characteristic profile) was spotted next to the net 1/3 from the shore end. I observed three sea lions swimming around the net and eating fish periodically until 0950. It seemed to be two adults teaching a pup.
3-Jul	805	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	120	A harbor porpoise swam past the end of the setnet. The porpoise did not interact with the net.
3-Jul	819	On-watch	River Otter	1	Swimming or blowing at surface	20	A river otter was seen swimming near the deep end of the net, and not seen again.
3-Jul	830	On-watch	Steller Sea Lion	2	Swimming or blowing at surface	1	Two more Stellers were spotted at the surface. On the other side of net, iImmediately after, I saw another (total - three) on the near side of net surface with fish. I observed the three sea lions swimming around the net and eating fish periodically until 0950. It seemed to be two adults teaching a pup.
3-Jul	943	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A Steller was running the net. It may have been resight.
3-Jul	955	On-watch	Sea Otter	1	Swimming or blowing at surface	40	
3-Jul	959	Off-watch	Dall's Porpoise	6	Porpoising		A porpoise was out in the bay, not near the nets.

3-Jul	1010	On-watch	River Otter	1	Swimming or blowing at surface	20	
3-Jul	1115	Off-watch	Harbor Porpoise	3	Swimming or blowing at surface		Saw several harbor porpoise were swimming and breathing at the surface. They were small and fast, with no distinguishing color or splash characteristics.
3-Jul	1227	On-watch	Harbor Seal	2	Sounding	0	Two harbor seals surfaced about 40m from the hook, dove and resurfaced in the hook. They disappeared at 1237.
3-Jul	1346	On-watch	Sea Otter	1	Swimming or blowing at surface	50	A sea otter swam under the line that attaches the lead to the shore.
3-Jul	1511	Off-watch	Harbor Seal	1	Sounding	40	A single harbor seal surfaced, looked at the hook then dove.
3-Jul	2000	On-watch	Sea Otter	1	Swimming or blowing at surface	50	A sea otter swam past the end of the setnet. The otter did not interact with the net.
4-Jul	718	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	100	The harbor porpoise was swimming along the middle of the bay.
4-Jul	800	On-watch	Sea Otter	1	Swimming or blowing at surface	100	
4-Jul	817	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was mid-net (length) feeding off salmon, thrashing around with salmon in it's mouth right next to the net.
4-Jul	820	On-watch	Sea Otter	2	Swimming or blowing at surface	30	A mother-pup pair.
4-Jul	824	On-watch	Harbor Seal	1	Swimming or blowing at surface	400	A seal popped head out and looked around, but was not seen again.
4-Jul	922	On-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter swimming on it's back as close as 75m and then swam back into the bay.
4-Jul	924	Off-watch	Sea Otter		Floating on surface	2	At the end of the pick an otter popped up near the end of the net. It then dove and swam away.
4-Jul	950	Off-watch	Steller Sea Lion	2	Feeding on catch	0	
4-Jul	952	Off-watch	Sea Otter	1			I spotted a sea otter directly in front of the boat in open water on the way back to the R/V. It surfaced then dove suddenly as the bow got to its position. It was dark tan with large eyes and a triangle head.
4-Jul	1025	On-watch	Sea Otter	1	Swimming or blowing at surface	75	
4-Jul	1209	On-watch	Harbor Seal	2	Milling/circling	5	There were numerous spottings from a telescope of harbor seals next to the net. The observer was unable to determine the total number of harbor seals. Possibly multiple sightings of the same seal were reported.

4-Jul	1216	On-watch	Harbor Seal	3	Milling/circling	1	There were numerous spottings from a telescope of harbor seals next to the net. The observer was unable to determine the total number of harbor seals. Possibly multiple sightings of the same seal were reported.
4-Jul	1225	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	There were numerous spottings from a telescope of harbor seals next to the net. The observer was unable to determine the total number of harbor seals. Possibly multiple sightings of the same seal were reported.
4-Jul	1331	Off-watch	Steller Sea Lion	3	Feeding on catch	0	Three Stellers were eating salmon shoreside of the bay.
4-Jul	1345	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller was in the hook eating salmon.
4-Jul	1406	On-watch	Steller Sea Lion	2	Feeding on catch	0	Two Stellers (different) were running the net.
4-Jul	1911	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	5	A sea lion appeared near the net, and then by the observer skiff. At 1946 the same sea lion was feeding off the catch. It was observed with a fish from the net.
4-Jul	1917	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	A harbor seal surfaced between the net and the skiff.
5-Jul	1450	On-watch	Steller Sea Lion	1	Feeding on catch	2	A Steller sea lion, female, swam to the net, then along the net, from the lead outward. It ate salmon out of the net near the hook end, and ate another salmon near the shore end of the lead at 1530, then another midway down the net at 1538.
5-Jul	1513	On-watch	Sea Otter	2	Swimming or blowing at surface	0	Two sea otters (an adult and a juvenile) were swimming near the net. The juvenile pulled kelp out of the net, then dragged it around.
5-Jul	2018	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	20	One sea lion was swimming towards the shore end of the net.
6-Jul	520	On-watch	Sea Otter	1	Swimming or blowing at surface		
6-Jul	523	On-watch	Sea Otter	1	Swimming or blowing at surface		
6-Jul	705	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was in the vicinity of the gear for the duration of the soak watch (i.e. at least 55 minutes). It would take a fish from the net and play with it for an extended period of time. The individual appeared to be a juvenile Steller sea lion. It would continually toss the fish into the air, let it fall back into the water, and submerge to retrieve it, slowly shredding it into pieces. Eventually the fish would be consumed. At least five fish were eaten in this manner. The Steller sea lion stayed within 25m of the gear throughout this watch.
6-Jul	816	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	10	This was likely the same Steller sea lion as at 0705.

6-Jul	848	On-watch	Steller Sea Lion	4	Feeding on catch	0	These four Steller sea lions were diving on the net but moved out of the area within about 5 minutes once the observer skiff motored into view (i.e., about 150m from the net).
6-Jul	855	On-watch	River Otter	4	Foraging on other prey	15	I did not observe the river otters diving on the gear but did see at least two animals eating something within about 15m of the net.
6-Jul	903	On-watch	Steller Sea Lion	3	Feeding on catch	11	These four Steller sea lions may have been the same ones as at 848 but I don't know for sure since they moved out of view for about 10 minutes. However, these four Steller sea lions stayed on the gear for the next 12 minutes (until my soak watch ended).
6-Jul	907	On-watch	River Otter	1	Swimming or blowing at surface	0	A river otter popped its head up beside net, swam for a few feet, and then disappeared again.
6-Jul	1008	Off-watch	Sea Otter	6	Floating on surface	300	The sea otters were in kelp, not near the net being observed. A pup was included with the brood.
6-Jul	1105	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	
6-Jul	1240	On-watch	Sea Otter	8	Floating on surface		
6-Jul	1253	On-watch	Sea Otter	1	Swimming or blowing at surface		
6-Jul	1520	On-watch	Sea Otter	2	Swimming or blowing at surface		
6-Jul	1523	On-watch	Sea Otter	1	Floating on surface		
6-Jul	1556	On-watch	Steller Sea Lion	1	Feeding on catch	3	
6-Jul	2100	On-watch	Sea Otter	1			I saw a sea otter floating. A 2117 we departed and the sea otter was still floating on its back.
7-Jul	639	On-watch	Sea Otter	1	Floating on surface	50	A juvenile sea otter was floating near the shore end of the net.
7-Jul	1928	On-watch	Harbor Seal	1	Milling/circling	70	A harbor seal appeared above the water surface for less than 30 seconds.
7-Jul	2054	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam over the lead and away.
7-Jul	2142	On-watch	Sea Otter	3	Swimming or blowing at surface	150	
8-Jul	736	Off-watch	Sea Otter	10	Floating on surface	0	Many sea otters were floating on the shore end of the net. Some were juveniles.
8-Jul	809	Off-watch	Steller Sea Lion	1	Feeding on catch	0	When traveling to the assigned net, I observed a sea lion eating salmon 1/2 way down a net.

8-Jul	825	On-watch	Steller Sea Lion	3	Swimming or blowing at surface	0 Three sea lions swam up to the net and under the lead. They lounged 10m away for a couple of minutes, then swam the entire length of the net looking for fish. They found none, then left.
8-Jul	826	On-watch	Sea Otter	1	Floating on surface	40 A sea otter was floating past the net, inshore of the reef to which the lead was tied.
8-Jul	833	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1 A big male sea lion was swimming toward the net. It swam right for i, dove, and disappeared around mid-net, 1m away. At 835 it popped up in the pot with a fish, flung it around, chewed on it, and swam around the pot. It pulled another fish out. It was floating around the pot, the back showed, and sometimes a flipper came out. It picked another fish, and swam down the length of the net with the fish. At 842 a smaller sea lion appeared with the big guy, with a fish too. It popped up near our skiff, flung the fish in the air, and gobbled it down. At 844 both sea lions swam back to the hook and then swam back along the main net. At 847 both sea lions popped up with fish and milled around the net for a while. At 853 they were swimming in the pot. At 850 a different sea lion was hanging out around kelp. At 852 it swam toward the net and then along it. At 854 all three sea lions were together. The big guy had a fish. The other two surfaced together. The big guy played with his fish then ate it. All 3 s
8-Jul	834	On-watch	Sea Otter	2	Floating on surface	200 The sea otters were floating past the net, on the shore side of the lead (inshore of the reef to which the lead was tied).

8-Jul	842	On-watch	Steller Sea Lion	1 Feeding on catch	0	A big male sea lion was swimming toward the net. It swam right for i, dove, and disappeared around mid-net, 1m away. At 835 it popped up in the pot with a fish, flung it around, chewed on it, and swam around the pot. It pulled another fish out. It was floating around the pot, the back showed, and sometimes a flipper came out. It picked another fish, and swam down the length of the net with the fish. At 842 a smaller sea lion appeared with the big guy, with a fish too. It popped up near our skiff, flung the fish in the air, and gobbled it down. At 844 both sea lions swam back to the hook and then swam back along the main net. At 847 both sea lions popped up with fish and milled around the net for a while. At 853 they were swimming in the pot. At 850 a different sea lion was hanging out around kelp. At 852 it swam toward the net and then along it. At 854 all three sea lions were together. The big guy had a fish. The other two surfaced together. The big guy played with his fish then ate it. All 3 s
8-Jul	844	On-watch	Sea Otter	2 Floating on surface	200	Sea otters floating past net, on shore side of lead (inshore of reef to which lead is tied).
8-Jul	850	On-watch	Steller Sea Lion	1 Milling/circling	100	A big male sea lion was swimming toward the net. It swam right for i, dove, and disappeared around mid-net, 1m away. At 835 it popped up in the pot with a fish, flung it around, chewed on it, and swam around the pot. It pulled another fish out. It was floating around the pot, the back showed, and sometimes a flipper came out. It picked another fish, and swam down the length of the net with the fish. At 842 a smaller sea lion appeared with the big guy, with a fish too. It popped up near our skiff, flung the fish in the air, and gobbled it down. At 844 both sea lions swam back to the hook and then swam back along the main net. At 847 both sea lions popped up with fish and milled around the net for a while. At 853 they were swimming in the pot. At 850 a different sea lion was hanging out around kelp. At 852 it swam toward the net and then along it. At 854 all three sea lions were together. The big guy had a fish. The other two surfaced together. The big guy played with his fish then ate it. All 3 s
8-Jul	939	On-watch	Steller Sea Lion	3 Swimming or blowing at surface	0	Three sea lions came back towards us, swam under the net about half way up, then swam along and under it for 6-7 minutes before leaving. There were two adults and one little one.

8-Jul	958	Off-watch	Steller Sea Lion	1	Feeding on catch	0	There were Stellers eating salmon in the hook.
8-Jul	1026	Off-watch	Sea Otter	6	Floating on surface	120	
8-Jul	1026	On-watch	Steller Sea Lion	1	Swimming or blowing at surface		A sea lion was swimming toward the net. It dove down, popped up on other side, and kept swimming.
8-Jul	1113	On-watch	Sea Otter	14	Floating on surface		This included at least two mother and pup pairs.
8-Jul	1119	On-watch	Sea Otter	1	Floating on surface		
8-Jul	1144	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	40	A sea lion was swimming towards the net.
8-Jul	1214	On-watch	Sea Otter	2		0	The sea otters were seen together about 40m from the net at the shore end. At 1306 these two otters swam towards the observer skiff while mating. They swam over the shore end of lead and away at 1308.
8-Jul	1300	On-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter swam under the shore lead of the net.
8-Jul	1621	On-watch	Sea Otter	1	Swimming or blowing at surface	0	The sea otter in event 7 swam parallel to the shoreline and crossed over the net.
8-Jul	1815	On-watch	Harbor Seal	1	Milling/circling	2	A harbor seal was milling along the main body of the net. It appeared at the water surface for 20 seconds, then disappeared. It reappeared again for 15 seconds before disappearing, and was not spotted again.
8-Jul	2038	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	40	A sea lion popped up between net and us, looking at us. It Popped up several times looking at us.
8-Jul	2044	On-watch	Sea Otter	1	Swimming or blowing at surface	50	
9-Jul	643	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A sea lion was swimming along the net hear us, swam over the net and dove. At 649 it surfaced with a fish, flipping it around at the shore end of the net. At 708 a sea otter was hanging out floating on it's back. At 713 the sea otter was hanging out near the end of the net.
9-Jul	708	On-watch	Sea Otter	1	Floating on surface	200	
9-Jul	713	On-watch	Sea Otter	2	Floating on surface	60	
9-Jul	720	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	100	
9-Jul	740	On-watch	Steller Sea Lion	1	Foraging on other prey	150	
9-Jul	750	On-watch	River Otter	4	Feeding on catch	0	A group of four river otters were observed eating salmon from the setnet. After 10 minutes of feeding on the catch, at least three of the otters swam away, unentangled.
9-Jul	810	Off-watch	Steller Sea Lion	1	Feeding on catch	0	A sea lion was swimming along the net, flipping a fish along ahead of him. The fishers were hanging out watching.
9-Jul	840	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	250	

9-Jul	845	On-watch	Unknown Porpoise or Dolphin	1	Swimming or blowing at surface		This was possibly a harbor porpoise.
9-Jul	855	On-watch	Steller Sea Lion	3	Swimming or blowing at surface	250	
9-Jul	905	On-watch	Steller Sea Lion	6	Swimming or blowing at surface	50	
9-Jul	1055	On-watch	Sea Otter	2	Swimming or blowing at surface	100	The sea otters (large, light brown/tan) swam from one side of the net to the other, 80m from the shore. They were seen constantly within 200m vicinity of the net.
9-Jul	1123	Off-watch	Harbor Porpoise	3	Swimming or blowing at surface	100	
9-Jul	1133	On-watch	Sea Otter	29	Floating on surface	500	I noticed 29 sea otters (in silhouette) up bay of the net with binoculars.
9-Jul	1235	On-watch	River Otter	1	Swimming or blowing at surface	0	
9-Jul	1755	On-watch	Unknown pinniped	1	Swimming or blowing at surface	5	An unidentified pinniped was briefly glimpsed near the setnet. The animal was swimming away from the net.
9-Jul	1848	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	40	The sea lion surfaced parallel from the net to the skiff [see the illustration]. At 1853 it was observed next to the net, and then on the other side without catch.
9-Jul	1938	Off-watch	Dall's Porpoise	4	Swimming or blowing at surface		Dall's porpoise were bow-riding the NOAA skiff.
9-Jul	2007	Off-watch	Steller Sea Lion	1	Floating on surface	40	A sea lion popped it's head up for about 25 seconds.
9-Jul	2010	On-watch	Harbor Seal	2	Swimming or blowing at surface	25	
9-Jul	2025	On-watch	Harbor Seal	1	Swimming or blowing at surface	40	This was possibly one of the two from 2010.
10-Jul	612	On-watch	Harbor Porpoise	2	Swimming or blowing at surface		Two harbor porpoises were swimming through the waves.
10-Jul	617	On-watch	Harbor Porpoise	1	Swimming or blowing at surface		
10-Jul	618	On-watch	Sea Otter	1	Floating on surface		
10-Jul	621	On-watch	Sea Otter	1	Floating on surface		
10-Jul	659	On-watch	Sea Otter	1	Floating on surface	70	A sea otter was floating near the net.
10-Jul	715	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	70	
10-Jul	718	On-watch	Sea Otter	1	Floating on surface	500	
10-Jul	719	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	500	

10-Jul	856	Off-watch	Steller Sea Lion	90	Hauled out on land		The minimum number of sea lions hauled out was 90. Most were juveniles. There was one really big bull and one big female. Most were on land, with about ten in the water.
10-Jul	903	On-watch	Harbor Seal	1		60	The seal was motionless as it periscoped in the water. See the illustration.
10-Jul	913	Off-watch	Harbor Seal	19	Hauled out on land		The seals were hauled out but jumped into the water after I counted them.
10-Jul	1524	On-watch	Sea Otter	1	Swimming or blowing at surface	10	
10-Jul	1646	Off-watch	Harbor Seal	1	Swimming or blowing at surface	50	
10-Jul	1930	On-watch	Sea Otter	1	Swimming or blowing at surface	0	The sea otter swam parallel to the shoreline about 50m from the shore, hopped over the gear, and continued on its way.
12-Jul	1405	On-watch	Steller Sea Lion	2	Feeding on catch	0	A sea lion swam up to the net and grabbed a fish. The other one was milling around. They were small sea lions, one smaller than the other. They milled around the shore end of the net, not far from the lead, and then swam up to and over the net. They were then splashing around the net. At 1416 the bigger one was flipping a fish around. At 1421 one sea lion was swimming by the hook.
13-Jul	835	On-watch	River Otter	2	Milling/circling	40	Two sea otters were observed milling and circling in the surf adjacent to the net. The otters did not interact with the fishing gear.
13-Jul	900	On-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter popped his head up a couple of times and then disappeared.
13-Jul	1050	On-watch	Harbor Seal	1	Swimming or blowing at surface	150	
13-Jul	1720	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	
13-Jul	1844	On-watch	Sea Otter	1	Floating on surface		
13-Jul	1850	On-watch	Sea Otter	1	Swimming or blowing at surface		
13-Jul	1945	On-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter popped up, checked us out and then departed.
14-Jul	920	On-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter popped up 30m off the hook, checked us out and then departed.
14-Jul	950	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam parallel to the shore, crossed the lead, and continued on its way.
14-Jul	1230	Off-watch	Harbor Seal	1	Swimming or blowing at surface		

14-Jul	1405	On-watch	River Otter	1	Feeding on catch	0	A river otter was observed feeding on salmon from the setnet. The otter did not become entangled.
14-Jul	1415	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	A harbor seal was swimming and floating around the shore end of the net throughout the duration of the soak watch.
14-Jul	1437	On-watch	Sea Otter	1	Swimming or blowing at surface	100	
14-Jul	1507	On-watch	Minke Whale	1	Foraging on other prey	7	The minke whale was in close proximity to the shore and the net. The whale made a series of 5-6 shallow dives in a span of 6-8 minutes, then swam away.
14-Jul	1848	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A single harbor seal surfaced next to the gear, close to the king buoy. It looked at me and then dove.
14-Jul	1928	On-watch	Sea Otter	2	Swimming or blowing at surface	20	The sea otters swam parallel to shore in the opposite direction and crossed inshore of the lead.
14-Jul	1939	On-watch	Sea Otter	1	Floating on surface		
14-Jul	2030	Off-watch	Harbor Seal	1	Swimming or blowing at surface		
15-Jul	708	On-watch	Sea Otter	1	Swimming or blowing at surface	3	
15-Jul	740	Off-watch	Sea Otter	3	Floating on surface		Three sea otters were floating on the surface.
15-Jul	743	On-watch	Harbor Seal	1	Sounding	0	A single harbor seal surfaced at the king buoy.
15-Jul	752	On-watch	Harbor Seal	2	Sounding	1	Two harbor seals surfaced at the net.
15-Jul	759	On-watch	Harbor Seal	1	Sounding	0	A harbor seal surfaced and dove.
15-Jul	1152	On-watch	Sea Otter	2	Floating on surface	200	Two sea otters were spotted floating on their backs quite far from the net and drifting further.
15-Jul	1154	On-watch	Steller Sea Lion	1	Feeding on catch	1	A sea lion appeared right next to the net, and swam along it looking for fish. It got one and ate it, shaking it in the air, and then swam on.
15-Jul	1235	On-watch	Sea Otter	1	Milling/circling	200	A sea otter was milling around the point 200 yards from the net. He disappeared around the point after about 5 minutes.
15-Jul	1445	Off-watch	Steller Sea Lion	70	Hauled out on land		During a break we went for a tour of the bay and checked out a big sea lion haul out. There were at least 60 that I counted but there were probably more like 80 lounging on the rock or swimming around it.
15-Jul	1556	On-watch	Sea Otter	1	Floating on surface	300	During the soak watch an otter was floating quite far away.
15-Jul	1622	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	A harbor seal pup surfaced near the observer skiff.
15-Jul	1711	On-watch	Harbor Seal	1	Swimming or blowing at surface	30	A young harbor seal popped up near us, looking sneaky.

15-Jul	1719	On-watch	Harbor Seal	1	Sounding	8	A harbor seal surfaced near the shore, about 8m from gear, and then dove.
15-Jul	1739	On-watch	Steller Sea Lion	1	Feeding on catch	0	During the last pick I watched a sea lion come and pick a fish out of the net and eat it. The fishers lit a seal bomb and threw it in the water, but it was a dud. The sea lion disappeared after that.
15-Jul	1953	On-watch	Harbor Seal	2			Two harbor seals surfaced near the shore end, and then dove.
15-Jul	2039	Off-watch	Sea Otter	1	Floating on surface		I saw a sea otter (on it's back, eating shellfish, light tan, black nose, characteristic look) on a steam between hauls.
15-Jul	2114	On-watch	Sea Otter	1	Floating on surface	40	
16-Jul	1650	On-watch	Harbor Seal	1	Swimming or blowing at surface	70	
18-Jul	845	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	There was a 15 knot wind, with many whitecaps.
19-Jul	1740	On-watch	Sea Otter	1	Swimming or blowing at surface	20	A sea otter popped up near the lead, milled around a bit, then disappeared around the point.
20-Jul	1055	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed eating a fish from the net near the hook. The sea lion did not become entangled in the net. Seal bombs were used by the crew.
20-Jul	1100	On-watch	Harbor Seal	1	Swimming or blowing at surface	100	
20-Jul	1109	On-watch	Steller Sea Lion	2	Feeding on catch	0	The sea lions appeared at shore end of the net, and ate fish out of net for about 3 minutes, working along the length of the net to the far end.
20-Jul	1112	On-watch	Sea Otter	1	Floating on surface	10	
20-Jul	1125	On-watch	Harbor Seal	2	Swimming or blowing at surface	0	Two seals were sighted 30m east of the lead next to the shore. Then they swam across the lead and were last seen 30m west of the lead. They did not appear to stop to pick the net.
20-Jul	1132	On-watch	Harbor Seal	1		20	A seal popped its head up for 5 seconds then went back underwater, on the west side.
20-Jul	1137	On-watch	Harbor Seal	1		20	A seal popped its head up for 5 seconds then went back underwater, on the east side. It then swam along the king buoy.
20-Jul	1137	On-watch	Steller Sea Lion	1	Feeding on catch	0	The sea lion ate fish out of the net, tossing fish into the air.
20-Jul	1143	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	
20-Jul	1145	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	

20-Jul	1149	On-watch	Harbor Seal	1	Swimming or blowing at surface	30	They were swimming off the king buoy. All the seals maintained a watchful eye on me. I was in the skiff tied off to the west anchor buoy.
20-Jul	1152	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	It swam along the west side of the net. All seals maintained a watchful eye on me. I was in the skiff tied off to the west anchor buoy.
20-Jul	1155	On-watch	Harbor Seal	2	Swimming or blowing at surface	1	They swam up to outside of the hook, over the corkline, and then swam along the west side of the net towards the beach. The same two were resighted at 1200. All seals maintained a watchful eye on me. I was in the skiff tied off to the west anchor buoy.
20-Jul	1203	On-watch	Harbor Seal	1	Swimming or blowing at surface	15	A seal was chasing something at a fast pace 15m on the east side of hook. All seals maintained a watchful eye on me. I was in the skiff tied off to the west anchor buoy.
20-Jul	1207	On-watch	Harbor Seal	1	Swimming or blowing at surface	1	
20-Jul	1208	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	It popped up just off the bow in the hook. All seals maintained a watchful eye on me. I was in the skiff tied off to the west anchor buoy.
20-Jul	1210	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	
20-Jul	1212	On-watch	Harbor Seal	2	In flight	0	One of two seals leapt up and dove back down at the net. All seals maintained a watchful eye on me. I was in the skiff tied off to the west anchor buoy.
20-Jul	1215	On-watch	Harbor Seal	1	Feeding on catch	0	A seal lay atop the net then shook its head with something in its mouth. All seals maintained a watchful eye on me. I was in the skiff tied off to the west anchor buoy.
20-Jul	1219	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A seal crossed the corkline twice in the hook. All seals maintained a watchful eye on me. I was in the skiff tied off to the west anchor buoy.
20-Jul	1220	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	This harbor seal hung around for about 20 minutes.
20-Jul	1325	On-watch	River Otter	1	Feeding on catch	0	The otter was diving in the hook. A headless salmon was in hook when fishers picked at about 1350.
20-Jul	1430	On-watch	River Otter	1	Swimming or blowing at surface	0	A river otter swam over the floatline at the lead-section of the net. The otter did not become entangled in the net.
20-Jul	1755	On-watch	Sea Otter	1	Floating on surface	120	A sea otter seen for several minutes floating on it's back. It dove and swam away. It had a large head, and a light tan large body.
20-Jul	1900	Off-watch	Steller Sea Lion	2	Feeding on catch	0	The sea lions threw salmon into the air multiple times.
21-Jul	632	On-watch	Harbor Porpoise	1	Porpoising	30	A harbor porpoise surfaced, blew, and dove as it traveled toward the king buoy.

21-Jul	701	On-watch	Harbor Seal	1	Sounding	70	A harbor seal surfaced, looked around for 2 minutes, then dove.
21-Jul	1000	On-watch	Harbor Seal	1	Milling/circling	75	A seal was spotted several times in a three minute time period, milling. Then another sighting was made ten minutes later, possibly the same harbor seal.
21-Jul	1012	On-watch	Harbor Seal	1	Milling/circling	1	
21-Jul	1712	On-watch	Harbor Seal	1	Milling/circling	10	A harbor seal was near the net, went below the surface and resurfaced at least two times.
21-Jul	1842	On-watch	Harbor Seal	1	Milling/circling	5	A harbor seal was close to the net, but stayed in the same place as long as it was sighted, for two minutes.
22-Jul	535	On-watch	Sea Otter	1	Swimming or blowing at surface		
22-Jul	711	On-watch	Harbor Porpoise	3	Swimming or blowing at surface	55	I saw three harbor porpoises (small, quick splash, only dorsal region seen) swimming further out into the bay.
22-Jul	735	On-watch	Steller Sea Lion	3	Feeding on catch	0	Three Steller sea lions were observed swimming parallel to the net and eating fish from the net. The sea lions did not become entangled in the net.
22-Jul	815	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	70	A Steller sea lion approached the observer skiff to within 5m, then circled the observer skiff and swam towards the net.
22-Jul	905	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was feeding on the catch.
22-Jul	1235	On-watch	Harbor Seal	2	Swimming or blowing at surface	50	
22-Jul	1250	On-watch	Harbor Seal	1	Swimming or blowing at surface	75	
22-Jul	1405	Off-watch	Harbor Seal	6	Swimming or blowing at surface	0	
22-Jul	1435	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	
22-Jul	1515	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	
22-Jul	1620	On-watch	Harbor Seal	1	Swimming or blowing at surface	40	
22-Jul	1825	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed feeding on salmon caught in the hook section of the net during the haul. Seal bombs were used by the crew to scare the sea lion away from the net. The sea lion did not become entangled in the net.
22-Jul	1937	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter floated over hook end of net and floated on.
23-Jul	741	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter went up to the net, went underneath and continued swimming away. It came back 5 minutes later and did something.

23-Jul	803	On-watch	Sea Otter	1	Swimming or blowing at surface	50	A sea otter popped up off the hook and then dove.
23-Jul	1056	Off-watch	Harbor Porpoise	2	Porpoising		Two harbor porpoises were spotted porpoising SE of the island but the location was not recorded. The observer in bow was watching for rocks to prevent propeller damage to the skiff at the low minus tide.
24-Jul	654	Off-watch	Steller Sea Lion	1		0	A sea lion was on the net when we arrived at the site. I did not see Steller sea lion feeding on the catch but it was diving on the gear.
24-Jul	722	Off-watch	Steller Sea Lion	1		0	The sea lion was still on the gear when the fishers arrived and set off a seal bomb. The Steller sea lion then left.
24-Jul	818	Off-watch	Steller Sea Lion	1		0	The Steller sea lion was on the gear when we arrived at net 2. The fishers set off a seal bomb and the Steller sea lion left the area.
24-Jul	1130	Off-watch	River Otter	1	Swimming or blowing at surface	100	A river otter was swimming near the beach when we approached with the skiff in order to land. The otter then dove below the water surface.
24-Jul	1555	Off-watch	Sea Otter	18	Floating on surface		These otters were not rafted together but were all within the cove. At least 3 mother-pup pairs were present.
24-Jul	1656	Off-watch	Sea Otter	4	Foraging on other prey		Includes one mother-pup pair.
24-Jul	1715	Off-watch	Steller Sea Lion	80	Hauled out on land		
24-Jul	1736	Off-watch	Dall's Porpoise	2			Two Dall's porpoises were bow-riding for about 3 minutes.
25-Jul	922	On-watch	Sea Otter	1	Swimming or blowing at surface	40	A big sea otter was swimming on it's belly off the end of the net, doing log rolls. It dove down and disappeared.
25-Jul	1315	Off-watch	Harbor Seal	1	Swimming or blowing at surface	25	A harbor seal surfaced about 30m from the net, swam towards the net and dove.
25-Jul	1426	On-watch	Sea Otter	1	Swimming or blowing at surface	200	A Sea otter popped up several times 200m off the hook, then disappeared in the swell and chop.
25-Jul	1835	On-watch	Sea Otter	1	Milling/circling	50	A sea otter was observed milling around rocks, approximately 50m from the setnet mooring lines. The sea otter did not interact with the net.
25-Jul	1950	On-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter was observed swimming near the hook section of the net. The otter did not interact with the net.
25-Jul	2112	On-watch	Sea Otter	1	Swimming or blowing at surface	10	A sea otter surfaced near the junction of the net and the lead. It dove a couple of times, then I lost sight of it in the seas.
26-Jul	612	On-watch	Sea Otter	1	Floating on surface	150	
26-Jul	705	On-watch	Sea Otter	1	Floating on surface		A sea otter was floating, and dove when we passed by.
26-Jul	709	On-watch	Sea Otter	1	Floating on surface		A sea otter floating, and just looked at us as we passed.
26-Jul	721	On-watch	Steller Sea Lion	2	Swimming or blowing at surface	1	Two sea lions (small, young) were swimming along mid-net. At 727 they were swimming away from the net.

26-Jul	724	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	A harbor seal was swimming near the net. At 802 the harbor seal was swimming toward the net. At 5m from the net it dove.
26-Jul	746	On-watch	Steller Sea Lion	1	Milling/circling	0	There were sudden ripples in the hook. Then a sea lion head popped up. It was circling the hook inside, dove, and came up outside of it. At 750 I saw him swimming near a harbor seal by the beach. At 752 it was back in the hook.
26-Jul	752	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	The sea lion was swimming towards the shore end of the net. At 755 it was swimming parallel to it. At 805 it was diving over the net in the hook, and got a fish.
26-Jul	807	On-watch	Steller Sea Lion	1	Feeding on catch	80	A sea lion near the beach surfaced with a big salmon. Maybe this was the same one as at 752. It was back in the hook at 814.
26-Jul	812	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface		
26-Jul	820	On-watch	Sea Otter	1	Floating on surface	60	A sea otter was swimming away near the shore, away from the net. At 845 it was still floating there. It looks like a pup on it's belly.
26-Jul	910	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	50	
26-Jul	936	Off-watch	Sea Otter	1	Foraging on other prey	500	A sea otter was feeding on prey.
26-Jul	1145	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	60	A sea lion swimming along the rocky shoreline.
26-Jul	1437	On-watch	Harbor Seal	1	Swimming or blowing at surface	250	A harbor seal swam at the surface for 30 seconds, then disappeared.
26-Jul	1523	On-watch	Harbor Seal	2	Milling/circling	1	Two harbor seals were in the hook milling, looking at each other and the skiffs, and bobbing.
26-Jul	1548	On-watch	Harbor Seal	2	Milling/circling	2	Two harbor seals (the same two possibly) were on the main body of the net on either side of the net, milling face to face as if playing a game.
26-Jul	1619	On-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was swimming past the net craning its head, looking at us.
26-Jul	1622	On-watch	Sea Otter	3	Floating on surface	100	Three sea otters were floating near the net. One of them swam toward the net, within 5m and dove. At 1634 I saw him floating around 50m from the net on the other side. One of the three sea otters from 1622 floated past the end of the net (3m away) at the same time (1640).
26-Jul	1637	On-watch	Steller Sea Lion	1	Feeding on catch	0	I saw a jumper (fish) in the hook, then a sea lion was seen diving over the net near the fish. At 1640 the sea lion has a fish in the hook.
26-Jul	1740	On-watch	Steller Sea Lion	3	Feeding on catch	0	Three sea lions were thrashing around in the hook having a feeding frenzy, flipping fish in the air.

26-Jul	1822	On-watch	Sea Otter	1	Swimming or blowing at surface	0	
26-Jul	1900	On-watch	Harbor Seal	1	Feeding on catch	0	
26-Jul	1910	On-watch	Harbor Seal	1	Feeding on catch	0	
26-Jul	1915	On-watch	Harbor Seal	1	Swimming or blowing at surface	30	This and 1917 may be the same individual.
26-Jul	1917	On-watch	Harbor Seal	1	Feeding on catch	0	This and 1915 may be the same individual.
26-Jul	1925	On-watch	Harbor Seal	1	Swimming or blowing at surface	20	
26-Jul	1934	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	300	A harbor porpoises was swimming and surfacing two times before disappearing beneath the surface.
26-Jul	1945	Off-watch	Harbor Seal	1	Swimming or blowing at surface		
27-Jul	720	On-watch	Sea Otter	1	Floating on surface	1000	
27-Jul	730	On-watch	Sea Otter	2	Floating on surface	40	
27-Jul	804	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	10	The Steller sea lion popped up near the junction of the net and the lead.
27-Jul	1443	On-watch	Sea Otter	1	Swimming or blowing at surface	30	
27-Jul	1544	On-watch	Sea Otter	1	Swimming or blowing at surface	70	
27-Jul	2029	On-watch	Unknown Porpoise or Dolphin	3	Porpoising	10	Three porpoises were sighted just off the gear. They surfaced a few times and then disappeared in the chop.
28-Jul	830	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea lion swam over the floatline and continued swimming, away from the setnet.
28-Jul	1119	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A sea lion popped up with an explosive breath behind the picking skiff, swams along the net and disappeared. At 1121 it popped up in the hook looking around, and swam back along the net, exhaling explosively behind our skiff.
28-Jul	1752	On-watch	Sea Otter	1	Floating on surface	50	A sea otter was floating on its back near lead end of the net.
28-Jul	1855	On-watch	Sea Otter	1	Swimming or blowing at surface	50	A sea otter swam past the end of the setnet. The otter did not interact with the net.
28-Jul	2020	Off-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter swam past the end of the setnet. The otter did not interact with the net.
29-Jul	703	On-watch	Harbor Seal	1	Swimming or blowing at surface	10	A harbor seal (small head, large eyes, dark grey) was seen swimming near the lead. It seemed to go under the net, cruising along the coast.
29-Jul	720	On-watch	Sea Otter	2	Swimming or blowing at surface	400	Two sea otters were observed swimming past the end of the net. The otters did not interact with the fishing gear.

29-Jul	732	On-watch	Harbor Seal	1	Milling/circling	20	A harbor seal was milling, watching the crew and picking skiff. It disappeared then reappeared for one minute.
29-Jul	1245	On-watch	Sea Otter	20	Floating on surface	50	Twenty sea otters were observed floating and lounging in the area between two setnets. No interactions between the otters and the gear was observed.
29-Jul	1509	Off-watch	Harbor Seal	40	Hauled out on land		This was an observed haulout of harbor seals. They were not frightened by us, nor near the gear, and stayed sunning on the rocks.
29-Jul	1856	On-watch	Harbor Seal	1	Milling/circling	1	A harbor seal was in the hook milling with fish in it's mouth. It disappeared and reappeared several times. Then it was with a second fish in the pot. Seagull were in the pot with the seal, appearing to feed off of the fish that harbor seal was eating. The harbor seal continued to feed in the hook, reappearing with salmon in mouth. A second seagull landed in the pot, and on the harbor seal's head, attempting to eat fish in the seal's mouth. The seal eventually allowed some of the fish to the glaucous (winged seagull). The harbor seal and the seagull ran the entire main body of net before disappearing.
29-Jul	1947	On-watch	Harbor Seal	1	Milling/circling	1	A harbor seal was milling at the net 25m ahead of the picking skiff. The harbor seal maintained the distance, disappearing and reappearing for the remainder of the pick.
29-Jul	2025	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	175	Two harbor porpoises were observed swimming and blowing, about 175m past the end of the setnet. The porpoises did not interact with the fishing gear.
29-Jul	2041	On-watch	Harbor Seal	1	Feeding on catch	1	A harbor seal was at the net with fish in front of the picking skiff for the remainder of the pick, milling, even when the second skiff came and picked the hook.
29-Jul	2120	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam over the floatline, and continued swimming away from the setnet.
29-Jul	2125	On-watch	Sea Otter	2	Swimming or blowing at surface	100	Two sea otters were observed swimming , about 100m from the net. The otters did not interact with the net.
29-Jul	2130	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	200	The two porpoises sighted at 2025 returned to the area, and again swam past the end of the net. The porpoises did not interact with the fishing gear.
29-Jul	2140	Off-watch	Sea Otter	1	Swimming or blowing at surface	40	A sea otter was observed swimming past the end of the setnet. The otter did not interact with the fishing gear.
30-Jul	913	On-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter was swimming around the anchor buoy. All five sea otters from event 4 congregated near the holding skiff at 1005.

30-Jul	924	On-watch	Sea Otter	1	Foraging on other prey	0	A sea otter swam under the lead and popped up on the other side, eating a starfish. All five sea otters from event 4 congregated near the holding skiff at 1005.
30-Jul	933	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter swam over lead, paused, looked down into water and dove at the lead. It resurfaced shortly thereafter and swam away. All five sea otters from event 4 congregated near the holding skiff at 1005.
30-Jul	958	On-watch	Sea Otter	2	Foraging on other prey	0	Two sea otters swam over the net lead with an octopus they had been carrying and eating before approaching net. The otters were swimming quickly while eating, and they occasionally dove with their catch. All five sea otters from event 4 congregated near the holding skiff at 1005.
30-Jul	1325	On-watch	Sea Otter	1	Swimming or blowing at surface	300	A sea otter swam outside the net with no interaction with the fishing gear..
30-Jul	1445	On-watch	Sea Otter	1	Swimming or blowing at surface	200	A sea otter swam by 200m off the net. It had no interaction with the gear.
3-Aug	1340	On-watch	Harbor Seal	1	Milling/circling	1	A harbor seal was on the main body of the net, swimming and milling, then disappeared below the surface after 20 seconds.
3-Aug	1355	On-watch	Harbor Seal	1	Milling/circling	1	Along the main body of net, a harbor seal appeared at the float line milling and swimming for 3-4 minutes, then disappeared.
3-Aug	1414	On-watch	Harbor Seal	1	Milling/circling	5	Harbor seal, presumably the same aforementioned, appeared near the floatline and hook end of the gillnet, milling and swimming, with no sign of foraging.
4-Aug	620	On-watch	Sea Otter	1	Swimming or blowing at surface	150	A sea otter was observed swimming parallel to the setnet.
4-Aug	733	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	3	A harbor porpoise was swimming towards the net during a pick. The blow and dorsal fin were last seen at 3m from the net, and then again on the opposite side of the net (at 10m from the net). The porpoise most likely swam below the gear.
4-Aug	735	On-watch	Sea Otter	1	Swimming or blowing at surface	300	The sea otter swam parallel to the net and out into the bay with no interaction with the gear.
4-Aug	802	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	400	A single harbor porpoise was swimming in the area of the nets.
4-Aug	803	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	700	A harbor porpoise surfaced three times as it swam near our starboard bow as we traveled between two nets.
4-Aug	1145	On-watch	Sea Otter	18	Floating on surface	300	A raft of 18 sea otters was observed floating about 300m from the end of the setnet.
4-Aug	1150	On-watch	Sea Otter	2	Swimming or blowing at surface	50	Three sea otters were observed about 50m from the setnet, swimming parallel to the net.

4-Aug	1200	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	80	A harbor porpoise was observed swimming about 80m from the setnet.
4-Aug	1203	On-watch	Sea Otter	1	Floating on surface	200	The sea otter was floating on the surface 200m from the gear, with no interactions with us or the gear.
4-Aug	1235	On-watch	Unknown Porpoise or Dolphin	1	Porpoising	100	At least one porpoise was spotted 100m off the hook. I observed no interaction with the gear, and only saw the animal once.
4-Aug	1350	Off-watch	Harbor Porpoise	2	Swimming or blowing at surface		Two harbor porpoises were observed within 30m of the vessel. The porpoises did not interact with the fishing gear.
4-Aug	1825	On-watch	Sea Otter	3	Floating on surface	10	Three sea otters were observed floating near the net. The otters did not interact with the net.
4-Aug	1830	On-watch	Harbor Seal	1	Swimming or blowing at surface	40	A harbor seal was observed swimming about 40m from the lead section of the net. The seal did not interact with the net.
4-Aug	1953	Off-watch	Dall's Porpoise	6	Porpoising		Dall's porpoises (at least 6 individuals) porpoised to and around the R/V as we were pulling anchor.
5-Aug	649	On-watch	Sea Otter	1	Swimming or blowing at surface	0	An otter swam over net and away.
5-Aug	1156	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	
5-Aug	1205	On-watch	Harbor Seal	1	Swimming or blowing at surface	5	
5-Aug	1225	On-watch	Harbor Seal	1	Feeding on catch	15	
5-Aug	1240	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	
5-Aug	1245	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	
5-Aug	1420	On-watch	Sea Otter	1	Swimming or blowing at surface	0	A sea otter was observed swimming parallel, and close, to the net.
5-Aug	1435	On-watch	Sea Otter	1	Swimming or blowing at surface	0	Two sea otters swam over the floatline, and continued swimming over the net.
5-Aug	1740	On-watch	Sea Otter	1	Swimming or blowing at surface	75	A sea otter swam past the end of the setnet. The otter did not interact with the net.
5-Aug	2041	On-watch	Unknown Seal	3	Swimming or blowing at surface	30	The seals popped up near the lead and checked us out. They surfaced and disappeared several times.
5-Aug	2042	On-watch	Sea Otter	1	Swimming or blowing at surface	40	The sea otter was swimming 40m offshore. I lost track of him trying to watch the seals and whales and the sea otter at same time. Neither the seals nor the sea otter had any observable interaction with the gear.

5-Aug	2133	On-watch	Sea Otter	1	Swimming or blowing at surface	20	While maneuvering at high speed near the hook, we startled a sea otter that surfaced near the skiff. It quickly dove and we never saw it again.
6-Aug	842	On-watch	Sea Otter	1	Swimming or blowing at surface	15	A sea otter surfaced and then swam away from us and the net.
6-Aug	908	Off-watch	Sea Otter	1	Floating on surface		
6-Aug	910	Off-watch	Harbor Seal	2	Hauled out on land		
6-Aug	911	Off-watch	Sea Otter	2	Floating on surface		
9-Aug	830	On-watch	Sea Otter	1	Swimming or blowing at surface	30	
9-Aug	1218	On-watch	Sea Otter	1	Swimming or blowing at surface	20	A sea otter (large, dark, tan) was swimming along the net from the hook to the shore 20m away from the net, then went over the net and away.
9-Aug	1332	On-watch	Harbor Porpoise	1	Milling/circling	200	A harbor porpoise was cruising around, circling the area between the net I'm watching and a neighboring net about 100m from the shore. At 1345 it was the end of soak watch, and the harbor porpoise was still circling around in the general area, maybe a little closer to the shore.
9-Aug	1934	On-watch	Unknown Seal	1	Swimming or blowing at surface	20	The seal in event 4 surfaced once for a few seconds near the lead and the end of the net.
10-Aug	721	On-watch	Unknown Whale	1	Swimming or blowing at surface	100	The whale surfaced inshore of the gear 30m from the net and 100m from the anchor buoy.
10-Aug	1755	On-watch	Sea Otter	1	Swimming or blowing at surface	0	The sea otter swam parallel to the shoreline until it reached the lead. It then rested its paws on the weedline, pondered its options, paralleled the lead towards shore, dove under the lead, and continued on its way.
11-Aug	645	On-watch	Sea Otter	3	Foraging on other prey		A single otter was foraging on prey. A mother-pup pair were floating nearby.
11-Aug	646	On-watch	Sea Otter	14	Floating on surface		About 14 sea otters were floating at the surface in close proximity to one another.
11-Aug	711	Off-watch	Sea Otter	8	Swimming or blowing at surface		Three groups of sea otters were swimming and milling within 180m of each other.
11-Aug	713	Off-watch	Sea Otter	10	Floating on surface		Three groups of sea otters swimming and milling within 180m of each other. There were ten sea otters in the group. At 713 they were floating in subgroups of 1-5.
11-Aug	715	Off-watch	Sea Otter	2	Swimming or blowing at surface		Ten sea otters were in the group. At 0713 they were floating in subgroups of 1-5.
11-Aug	738	Off-watch	Sea Otter	2	Floating on surface	40	
11-Aug	810	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface	150	
11-Aug	950	On-watch	Orca Whale	2	Swimming or blowing at surface	50	

11-Aug	1156	On-watch	Sea Otter	7	Milling/circling	150	A raft of sea otters were floating with at least two pups in the group.
11-Aug	1351	On-watch	Sea Otter	1	Swimming or blowing at surface	1	A sea otter swam towards the net, popped its head up and looked around for about 30 seconds before diving below the surface near the net.
11-Aug	1425	Off-watch	Sea Otter	8	Floating on surface	1000	Eight sea otters were observed floating and lounging between the two nets. None of the otters interacted with the fishing gear.
11-Aug	1435	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	100	A Steller sea lion was observed swimming along the shore, approximately 100m from the setnet mooring line. The sea lion did not interact with the fishing gear.
11-Aug	2015	On-watch	Steller Sea Lion	3	Feeding on catch	0	Three Steller sea lions were observed eating salmon from the hook section of the net. None of the sea lions became entangled in the net.
11-Aug	2035	On-watch	Steller Sea Lion	1	Feeding on catch	0	A Steller sea lion was observed eating fish from the setnet. No entanglement occurred.
11-Aug	2038	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	50	A harbor porpoise traveled out of the cove, between this fisher's two nets.
11-Aug	2100	On-watch	Steller Sea Lion	1	Feeding on catch	0	Another Steller sea lion was observed eating fish from the setnet. No entanglement occurred.
11-Aug	2120	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	10	A Steller sea lion was observed swimming along the shore near the setnet. The sea lion did not interact with the net.
11-Aug	2123	On-watch	Sea Otter	1	Floating on surface	75	
11-Aug	2130	On-watch	Sea Otter	1	Floating on surface	100	A sea otter was floating on the surface near the anchor buoy.
12-Aug	928	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	100	Harbor porpoise cruised by end of the net where they had pulled already.
12-Aug	1217	On-watch	Harbor Porpoise	2	Swimming or blowing at surface	100	Two harbor porpoises were cruising out of the bay past the end of the net.
12-Aug	1335	Off-watch	Steller Sea Lion	1	Thrashing	0	A sea lion (large, tan, earflaps) startled when we approached. It jumped over the net and disappeared.
12-Aug	1430	On-watch	River Otter	2	Swimming or blowing at surface	0	The river otters were swimming and possibly foraging within 5m of the shore. They paralleled the shore for 10 minutes before they spotted us, dove, and continued on around the shoreline out of sight. The otters crossed under the lead while I was observing them, but they had no other interaction with the gear.
12-Aug	1430	On-watch	Sea Otter	2	Floating on surface	50	I noticed the sea otters while I was observing the land otters. The sea otters were floating on their backs and swimming and had no interaction with the fishing gear.
12-Aug	1523	On-watch	Steller Sea Lion	1	Feeding on catch	0	Sea lion (large, tan, earflaps) was feeding on the catch. It was impossible to tell if it was the same animal as at 1335.

13-Aug	735	Off-watch	Orca Whale	6	Swimming or blowing at surface	100	Orcas were swimming past the net, headed into the passage. Four to eight individuals were counted, at least one of which was male and one of which was juvenile.
13-Aug	1217	On-watch	Harbor Seal	1	Swimming or blowing at surface	0	A harbor seal swam over the net.
14-Aug	814	On-watch	Unknown Seal	1	Swimming or blowing at surface	10	The seal surfaced about half of the way out of the lead. It checked us out for about 20 seconds, then submerged and disappeared.
14-Aug	1133	On-watch	Sea Otter	1	Swimming or blowing at surface	250	The sea otter was swimming on it's back away from the net, about mid-net from the shore.
14-Aug	1145	On-watch	Sea Otter	1	Swimming or blowing at surface	30	Probably the same otter, swimming parallel to the net from the trap to mid-net before disappearing. It then reappeared to mill around the net/midnet.
14-Aug	1303	On-watch	Sea Otter	1	Milling/circling	30	
14-Aug	1821	On-watch	Sea Otter	1	Floating on surface	0	The sea otter was initially spotted 500m from the net, floating on its back and swimming in the general direction of the net parallel to the shore. It crossed over the lead at 1840, and continued on its way.
14-Aug	1901	On-watch	Sea Otter	1	Swimming or blowing at surface	0	The sea otter swam parallel to shoreline approximately 200m from the shore. It crossed under the net and continued down the shoreline.
16-Aug	1223	Off-watch	Sea Otter	2	Floating on surface		
16-Aug	1231	Off-watch	Sea Otter	1	Floating on surface		
17-Aug	705	On-watch	Sea Otter	1	Floating on surface	100	The sea otter was floating on its back just off a point about 100m from the lead. It had no interaction with the gear.
17-Aug	819	On-watch	Steller Sea Lion	1	Feeding on catch	2	The Steller sea lion surfaced two times with fish on the main body of the net, then reappeared 2 minutes later in the hook with another fish. It appeared and disappeared until 0837, sometimes with fish, along the gill net.
17-Aug	822	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	1	
17-Aug	1026	Off-watch	Sea Otter	6	Floating on surface		The sea otters were in a cove within 200m of each other.
17-Aug	1522	On-watch	Sea Otter	1	Floating on surface	100	A sea otter appeared briefly one time at the bow of the skiff.
17-Aug	1741	Off-watch	Sea Otter	2	Floating on surface	600	
17-Aug	1916	On-watch	Sea Otter	1	Swimming or blowing at surface		
17-Aug	1924	On-watch	Sea Otter	1	Swimming or blowing at surface	50	
17-Aug	2008	On-watch	Dall's Porpoise	2	Bow riding	20	Two Dall's porpoises near the gear were bow riding with picking skiff, and then the observer skiff from 2008 to 2012 before disappearing.

17-Aug	2107	On-watch	Sea Otter	1	Floating on surface	300	A sea otter surfaced about 300m from the net, floated for a bit, then submerged. I never saw it again.
18-Aug	1015	On-watch	Sea Otter	1	Swimming or blowing at surface	40	
18-Aug	1017	On-watch	Sea Otter	1	Swimming or blowing at surface	50	A sea otter was observed swimming parallel to the setnet. The otter did not interact with the net.
18-Aug	1034	On-watch	Sea Otter	2	Floating on surface	50	A sea otter mother was calling to her pup near the net. The pup returned to the mother and they floated away together.
18-Aug	1100	On-watch	Sea Otter	2	Swimming or blowing at surface	0	
18-Aug	1515	On-watch	Sea Otter	1	Swimming or blowing at surface	5	A sea otter was observed swimming parallel to the setnet. The otter did not interact with the net.
18-Aug	1532	On-watch	Sea Otter	1	Floating on surface	75	It was floating towards a kelp bed on the edge of the island, then disappeared.
18-Aug	1550	On-watch	Harbor Porpoise	3	Swimming or blowing at surface	20	Three harbor porpoises were observed swimming and circling, adjacent to the shoreward end of the setnet. The porpoises did not seem to interact with the fishing gear.
18-Aug	1730	Off-watch	Sea Otter	1	Swimming or blowing at surface		
19-Aug	1910	On-watch	Sea Otter	1	Swimming or blowing at surface	75	The sea otter was observed swimming parallel to the net, approximately 75 feet from the net. The otter did not interact with the fishing gear.
20-Aug	731	On-watch	Sea Otter	1	Floating on surface	400	The sea otter was floating on its back about 400m from us and the net.
20-Aug	815	On-watch	Harbor Seal	1	Swimming or blowing at surface	50	
20-Aug	921	On-watch	Harbor Seal	5	Hauled out on land	150	Five harbor seals were hauled out on a rock near the net. Two entered the water as we approached the net but soon returned to the rock. All four seals remained close to each other and vocalized often. Two seals were smaller than average, possibly juveniles. One of these was much whiter in color than the others.
20-Aug	1123	Off-watch	Sea Otter	1	Swimming or blowing at surface	100	A sea otter was observed swimming parallel to the shore, about 100m from the setnet. The otter did not interact with the net.
20-Aug	1950	On-watch	Sea Otter	1	Swimming or blowing at surface	75	
20-Aug	1952	On-watch	Sea Otter	1	Swimming or blowing at surface	300	A sea otter was seen swimming 300m from the gear, 150 m offshore. There was no interaction with the gear.
21-Aug	910	On-watch	Steller Sea Lion	1	Feeding on catch	0	It ate about three fish.

22-Aug	753	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A sea lion was cruising down the lead.
22-Aug	756	On-watch	Sea Otter	1	Floating on surface	20	A sea otter was floating in kelp by the lead.
22-Aug	1141	On-watch	Sea Otter	1	Floating on surface	50	A sea otter was floating in the vicinity of the net hook.
22-Aug	1158	On-watch	Steller Sea Lion	3	Feeding on catch	0	A sea lion was eating salmon out of the net near the lead. Two more individuals arrived in short succession to eat fish from the net. All three sea lions continued to eat fish out of net for about half an hour, then two disappeared and the third swam alongside the lead to the shore end. She crossed over to the other side of the net by swimming through the gap between the lead and the shore, then swam along the shore and returned to the rookery of the cape.
22-Aug	1357	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	
22-Aug	1608	On-watch	Sea Otter	1	Swimming or blowing at surface	230	A Steller sea lion was observed swimming and foraging, approximately 230m off the hook end of the net. The otter did not interact with the net.
22-Aug	1730	Off-watch	Harbor Seal	1	Swimming or blowing at surface	150	
22-Aug	1932	On-watch	Steller Sea Lion	1	Feeding on catch	0	
23-Aug	1740	Off-watch	Dall's Porpoise	2	Swimming or blowing at surface		Two Dall's porpoises were swimming out of the bay.
25-Aug	1922	Off-watch	Sea Otter	1	Swimming or blowing at surface	400	A sea otter was seen swimming as the skiff approached, then disappeared as the skiff came within 30m.
26-Aug	710	On-watch	Sea Otter	1	Floating on surface	50	
26-Aug	1605	On-watch	Steller Sea Lion	1	Feeding on catch	0	The 1605 and 1610 may be the same animal.
26-Aug	1610	On-watch	Steller Sea Lion	1	Feeding on catch	0	The 1605 and 1610 may be the same animal.
27-Aug	1303	On-watch	Sea Otter	3	Floating on surface	120	Three sea otters (2 adult and 2 juvenile) were floating very close together near the shore end of the lead.
27-Aug	1320	On-watch	Sea Otter	2	Floating on surface	200	
27-Aug	1730	On-watch	Sea Otter	1	Floating on surface	200	
30-Aug	911	On-watch	Sea Otter	1	Milling/circling	20	A sea otter was floating between the buoys at the trap end.
30-Aug	937	On-watch	Sea Otter	1	Swimming or blowing at surface	20	A sea otter was swimming towards the net at the shore end.
30-Aug	939	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	A female adult sea otter on it's back with a baby sea otter floating on the female's stomach.
30-Aug	1211	Off-watch	Sea Otter	2	Swimming or blowing at surface	100	
30-Aug	2000	Off-watch	Sea Otter	7	Milling/circling	1000	

31-Aug	1400	On-watch	Sea Otter	1	Swimming or blowing at surface	30	
1-Sep	723	On-watch	Sea Otter	8	Milling/circling		
1-Sep	836	On-watch	Dall's Porpoise	3	Swimming or blowing at surface		The Dall's porpoises were swimming near the shore, at approximately 500m.
1-Sep	840	On-watch	Sea Otter	6	Milling/circling		
2-Sep	804	On-watch	Dall's Porpoise	4	Swimming or blowing at surface	1100	A pod of at least four Dall's porpoises was observed swimming and bow-riding in the middle of the bay. The porpoises did not interact with the fishing gear.
2-Sep	810	On-watch	Dall's Porpoise	3	Swimming or blowing at surface	2000	At least three Dall's porpoises were rooster-tailing at the mouth of the bay.
2-Sep	934	Off-watch	Steller Sea Lion	9	Hauled out on land		There was one pup and maybe two young bulls, immature. The rest were cows.
2-Sep	1012	On-watch	Sea Otter	2	Floating on surface	40	Two sea otters were floating near the shore end of the lead, amongst the kelp.
2-Sep	1020	Off-watch	Harbor Porpoise	3	Swimming or blowing at surface		
2-Sep	1123	Off-watch	Harbor Porpoise	1	Swimming or blowing at surface		
2-Sep	1126	Off-watch	Sea Otter	1	Milling/circling		
2-Sep	1720	On-watch	Sea Otter	4	Floating on surface	40	A group of four sea otters was observed floating near the net. The otters did not interact with the net.
3-Sep	1410	On-watch	Sea Otter	1	Swimming or blowing at surface	100	
4-Sep	810	On-watch	Sea Otter	1	Swimming or blowing at surface	0	One sea otter swam over the top of the lead section of the net and continued swimming.
4-Sep	857	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	One female sea lion came around the island and swam along net from lead to hook. The animal entered the hook and swam around inside for a minute. It reappeared momentarily at the shore end of the net 10 minutes later. No feeding was observed.
4-Sep	934	On-watch	Sea Otter	1	Swimming or blowing at surface	8	
4-Sep	1138	Off-watch	Harbor Seal	19	Hauled out on land		At least 19 seals were observed lounging on the rocks. The seals did not interact with the fishing gear.
4-Sep	1500	On-watch	Sea Otter	1	Floating on surface	200	
4-Sep	1619	On-watch	Dall's Porpoise	3	Milling/circling	30	A pod of three Dall's porpoises whizzed around the hook of the setnet just before the conclusion of the pick. The porpoises did not come into contact with the net.
4-Sep	1700	On-watch	Sea Otter	1	Foraging on other prey	200	The sea otter in event 5. At 1700 it was foraging on numerous small crabs.

4-Sep	1732	On-watch	Steller Sea Lion	1	Feeding on catch	0	The Steller surfaced mid-net at 2m from the corks with a salmon in its mouth. It then swam along the net towards the trap and proceeded to feed two times on salmon. Then it swam back again along the net and fed again on a salmon. Then it dove and came up again away from the net, only this time with a small halibut in its mouth. This observation lasted from 1732 to 1740. The Steller was an adult bull. At 1744 the same Steller approached from same direction and stopped at same position mid-net only this time it swam across the top of the net, then toward the trap where it ate one salmon. Then it left again the way it came at 1754, but came right back.
4-Sep	1745	On-watch	Sea Otter	1	Swimming or blowing at surface	35	The sea otter did not approach the net.
4-Sep	1846	On-watch	Steller Sea Lion	1	Swimming or blowing at surface	0	This was a younger and/or female Steller feeding aggressively in the trap.
4-Sep	1957	On-watch	Harbor Seal	2	Swimming or blowing at surface	20	Two harbor seals werw at the shore end of the net, 15m from Rocky Bluff. They surfaced a couple times and then swam away from the net as a vessel approached.
4-Sep	2104	On-watch	Sea Otter	2	Floating on surface	50	
5-Sep	728	On-watch	Sea Otter	1	Swimming or blowing at surface	50	
5-Sep	735	On-watch	Sea Otter	1	Swimming or blowing at surface	20	
5-Sep	747	On-watch	Sea Otter	2	Porpoising	30	
5-Sep	840	On-watch	Sea Otter	1	Swimming or blowing at surface	20	A sea otter swimming away from the net.
5-Sep	848	Off-watch	Sea Otter	8	Floating on surface		The sea otters were floating around near rocks.
5-Sep	928	On-watch	Sea Otter	1	Swimming or blowing at surface	5	
5-Sep	948	On-watch	Sea Otter	1	Swimming or blowing at surface	100	
5-Sep	1554	On-watch	Sea Otter	4	Swimming or blowing at surface	500	
5-Sep	1646	On-watch	Sea Otter	1	Swimming or blowing at surface	300	
5-Sep	1924	On-watch	Dall's Porpoise	2	Swimming or blowing at surface	600	At least two Dall's porpoises were sighting riding on the bow wave of a passing seiner. The porpoises did not interact with the fishing gear.
5-Sep	1924	On-watch	Sea Otter	4	Floating on surface	300	

5-Sep	2358	Off-watch	Steller Sea Lion	1	Milling/circling		A large Steller sea lion approached the R/V to within 2m. The sea lion lingered for about 3 minutes, then dove under the vessel and disappeared.
8-Sep	1733	On-watch	Sea Otter	1	Floating on surface	30	A sea otter was floating on the surface of the water, about 30m from the setnet. The otter did not interact with the fishing gear.
8-Sep	1932	On-watch	Sea Otter	1	Floating on surface	150	One sea otter was observed floating on the surface of the water, about 150m from the setnet. The otter did not interact with the fishing gear. This otter was also observed by C08.
9-Sep	1324	On-watch	Sea Otter	2	Floating on surface	0	The sea otters were floating together over the net.
9-Sep	1725	On-watch	Sea Otter	1	Swimming or blowing at surface	30	A sea otter was observed swimming approximately 30m away from the net. The otter did not interact with the fishing gear.
10-Sep	824	Off-watch	Sea Otter	1	Swimming or blowing at surface	150	One sea otter was observed approximately 50m from the setnet. The otter did not interact with the fishing gear.
10-Sep	1014	On-watch	Sea Otter	1	Swimming or blowing at surface	75	One sea otter was observed swimming, about 75m from the net. The otter did not interact with the net.
12-Sep	1230	Off-watch	Harbor Seal	1	Swimming or blowing at surface	5	The harbor seal popped its head out above water near the lead a few times before the pick.
13-Sep	1704	On-watch	Harbor Seal	3	Milling/circling	5	Three harbor seals were lurking around the rocks at the lead end of the net. The seals did not appear to interact with the net.
13-Sep	1830	On-watch	Harbor Seal	3	Milling/circling	20	Three harbor seals were circling and milling around the lead end of the net. The seals did not interact with the net.
14-Sep	829	On-watch	Harbor Seal	3	Swimming or blowing at surface	20	Three seals swam together along the net from the shore to the hook, diving on the net from time to time (possibly eating catch?).
14-Sep	1725	On-watch	Harbor Porpoise	1	Swimming or blowing at surface	200	One harbor porpoise was observed swimming, about 200m from the setnet. The porpoise did not appear to interact with the net.