Annex L

Report of the Sub-Committee on Small Cetaceans

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1. ELECTION OF CHAIR

Rogan was elected Chair.

2. ADOPTION OF AGENDA

The adopted Agenda is given in Appendix 1.

3. APPOINTMENT OF RAPPORTEURS

Reeves and Read acted as rapporteurs.

4. REVIEW OF AVAILABLE DOCUMENTS

Documents relevant to the work of the sub-committee were SC/59/SM1-29, SC/59/O16, SC/59/BC 2, 6, 8, 10 and Rojas-Bracho *et al*. (2006), Pitman *et al*. (2007), Joergensen (2007), Dalla Rosa and Secchi (2007), Bain *et al*. (in review), Caballero *et al*. (2007), Forney and Wade (2006), Matkin *et al*. (2007), Zerbini *et al*. (2007), McHugh *et al*. (in review), Krahn *et al*. (2007) and Herman *et al*. (2006).

5. POPULATION STRUCTURE, SYSTEMATICS AND STATUS OF KILLER WHALES

The sub-committee last reviewed the status of killer whales in 1983 (IWC 1984) and since that time a great deal of new information has become available on all aspects of their biology and status. Given the documentation available for this meeting, it was decided to organise the review on an ocean by ocean basis.

Killer whales in the North Pacific have been assigned to different ecotypes based on their foraging ecology, with three main ecotypes identified – residents (fish-eating), transients (marine mammal-eating) and offshores (prey type not known, but could include elasmobranchs). In the Antarctic, three ecotypes have also been described, based on morphometric characteristics from photographs and field observations (Pitman and Ensor, 2003). The ecotypes here were designated types A, B and C. Type A appears to feed mainly on Antarctic minke whales (Balaenoptera bonarensis), type B appears to specialise on pinnipeds while type C is thought to be mainly piscivorous and remain near the pack ice. More recently, it has been proposed that the Type C killer whale reported from the Ross Sea in eastern Antarctica is a dwarf form of killer whale (Pitman *et al*., 2007). Type C was found to be smaller that either of the other two forms, and, as had been hypothesised previously (e.g. Berzin and Vladimirov 1983), these authors suggest that multiple species of killer whale occur in the Southern Ocean.

5.1 Distribution and Abundance

The killer whale has the most extensive global distribution of any cetacean and occurs, or occurred historically, in all oceans and appended seas. In a worldwide review, Forney and Wade (2006) developed a table of the available information on killer whale density and abundance, by ocean basin and by regional sub-division within each basin. New information presented at this meeting was incorporated into an adapted version (Table 1). Forney and Wade were interested in identifying broad-scale patterns in density and abundance and they made no distinction among ecotypes or geographical/morphological forms.

Overall, the observed patterns of worldwide killer whale distribution are in general agreement with previous descriptions, which indicate that killer whales are more common at higher latitudes and in coastal areas. Killer whale occurrence also appears broadly tied to regions of higher ocean productivity, as indicated by remotely sensed chlorophyll levels, and the latitudinal and inshore/offshore patterns of abundance may simply be a reflection of the higher productivity in coastal and high-latitude areas (Forney and Wade, 2006). Regions of similar latitude exhibit differences in abundance that may be tied to patterns of productivity and prey availability; for example, killer whales are rare along the U. S. northeast coast although they are common along the coast of Oregon and Washington, at a similar latitude. Some of highest densities of killer whales in the world are in Alaska, Norway/Iceland and the Antarctic. Branch and Butterworth (2001) estimated that there were about 25,000 killer whales in the Southern Ocean south of 60ºS in the 1990s. Wade drew attention to the estimate of 8,500 (CV = 0.37) killer whales in the eastern tropical Pacific based on line transect surveys between 1986-90 (Wade and Gerrodette 1993). This high number indicates that even though densities in tropical waters may be generally low, the total number of whales can be substantial when the large size of the region is taken into account. Most tropical areas of world’s oceans have not been well surveyed.

Forney and Wade (2006) concluded that there was sufficient evidence for a minimum worldwide abundance estimate of about 50,000 killer whales but that the true number is likely “considerably higher, because estimates are not available for many high-latitude areas of the northern hemisphere and for large areas of the South Pacific, South Atlantic, and Indian Oceans.” In broad terms, it can be concluded that killer whales occur as different types and forms. High latitude and high productivity tend to define the presence of a fish-eating form whereas in lower latitudes where productivity tends to be less, it is hypothesised that killer whales tend to be generalists rather than specialists (e.g. Baird 2002).

North Pacific

Killer whales occur throughout the Russian Far East but have been little studied in most areas. During the Soviet whaling era, they were described as abundant in the entire Sea of Okhotsk but the first and only quantitative data for the region are from joint Russia-Japan ship surveys in the late 1990s and early 2000s. The sighting rate in the July-September 2003 survey was 0.73 groups (3.47 individuals) per 100nmi (SC/59/SM4). Several years of photo-identification work in Avacha Gulf, eastern Kamchatka, Russia, had resulted in the identification of 37 social units consisting of 277 different resident-type individuals through the summer of 2006 (SC/59/SM4). None of these whales have been observed with scars from bites of cookie-cutter sharks (Isistius brasiliensis) and therefore it is assumed that they do not migrate long distances to lower latitudes (e.g. Japan). Other whales bearing cookie-cutter shark bites, including transient- and resident-type animals, do appear in the Avacha Gulf area occasionally. Resident-type whales sampled in Kamchatka and the Kuril Islands had a Southern Resident haplotype shared with animals from south-western Alaska, the central Aleutians and inshore waters of British Columbia and Washington State. A male sampled near Sakhalin Island had the AT1 transient haplotype and its blubber had very high PCB and DDT levels (SC/59/SM4).

Zerbini summarised a recently published paper containing abundance estimates for killer whales in the nearshore waters of the Gulf of Alaska and Aleutian Islands in 2001-2003 (Zerbini *et al*., 2007). This area has some of the highest estimated densities of killer whales in the world. However, stock structure is poorly understood. The study by Zerbini *et al*. differed from previous killer whale line-transect ship surveys in that two estimates of group size were obtained. Once a sighting was made, observers went off-effort and the ship approached the group to collect biopsies, acoustic recordings, and photographic data. During the approach the observers and the data recorder made independent estimates of the number of whales in the group, which were averaged to produce an ‘initial group size’ (IGS) estimate. A ‘post-encounter group size’ (PEGS) estimate was obtained after time was spent making close approaches to photograph the whales. Separate estimates of abundance were calculated for the two categories of group size estimates. Also, separate abundance estimates were calculated for the two main ecotypes encountered – residents and transients, distinguished on the basis of morphological and genetic data. Abundance estimates of residents – 991 (95% CI = 379-2,585) [IGS] and 1,587 (95% CI = 608-4,140) [PEGS] – were at least four times higher than estimates of transients – 200 (95% CI= 81-488) [IGS] and 251 (95% CI = 97-644) [PEGS]. The authors concluded that the IGS estimate of abundance was better for resident killer whales though likely negatively biased, perhaps by ~20%. The PEGS estimate is more accurate for transients because the groups were smaller and after close approaches for photo-identification work, it was often possible to count marked individuals rather than just estimate a group size from the number of whales seen at the surface within a short period of time. In the case of the resident-type whales, the PEGS estimate may be positively biased to an unknown degree because resident whales commonly occurred in loose aggregations of numerous subgroups that often merged or split over time. Therefore, after several hours of photo-identification work it was not possible to be sure that all the whales counted were in visual range at the time of initial detection. This was not thought to be a problem for transient-type whales because their group size was, on average, smaller and they were usually seen in a single group that stayed in association throughout the period of observation.

In response to a question, Wade indicated that the same groups of resident-form individuals had been observed both east and west of Unimak Pass in the eastern Aleutians. Therefore the survey observations do not support the hypothesis of a stock boundary for residents in that vicinity. Wade also explained that analyses of the very large photo-identification catalogue of killer whales in the Aleutians are ongoing and that the initial focus was on transients rather than residents. It was noted that the estimates presented by Zerbini *et al.* (2007) were fairly imprecise (CVs > 0.40). Wade pointed out that though the line-transect estimates of abundance were relatively imprecise, a mark-recapture estimate for transients from photo-identification data from just those surveys would not have been much better. However, a larger dataset is currently being analyzed that will produce a much more precise mark-recapture estimate by combining those data with photo-identification data from a variety of other surveys. Initial results suggest that the new point estimates will be generally consistent with the findings of Zerbini *et al.* (2007).

A photographic catalogue of killer whales in the eastern tropical Pacific is being maintained at the Southwest Fisheries Science Center in La Jolla, California (SC/59/SM27). It presently includes 162 different individuals identified from photographs collected opportunistically during 14 surveys of cetacean abundance between 1977-2006. Only 11 of the 162 individuals have been re-sighted, with intervals between sightings ranging from 6 months to 14 years. The re-sightings indicate movement between the central outer coast of Baja California and the northern Gulf of California, and in one instance a group first seen in 1999 near the mainland coast of Mexico was resighted in 2006 far offshore in deep pelagic waters.

SC/59/SM15 summarised information on killer whales in the Gulf of California, Mexico, updating a previous review by Guerrero-Ruiz *et al.* (1998). The database includes 243 sightings from 1972-2006. A total of 236 different individuals have been photo-identified and 43 have been re-sighted at least once. The longest period between re-sightings was 16 years. The authors suggest that there are four communities of killer whales in the Gulf, with considerable movement into and out of the Gulf and some individuals being documented as far away as California to the north and Peru to the south. Although ecotypes and stock affinities of the whales in this region have not been studied, at least some animals are assumed to be transient types because they prey on marine mammals..

SC/59/SM1 presented information on 20 sightings of killer whales off the eastern and south-western coasts of Taiwan between 1996-2005. All observations were made between April – August, mainly from whale-watching boats. The infrequency of observations, small group sizes (2-10) and the fact that one individual was re-sighted in approximately the same location in successive years led the authors to conclude that only small numbers of killer whales occur around Taiwan. Although no genetic samples were available, it was inferred from external morphology that the animals around Taiwan most likely belong to the transient or offshore ecotype.

South Pacific

Research on killer whales in New Zealand has been ongoing since 1992 (SC/59/19). Photo-identification of individuals (n = 132) has been the basis for estimating abundance and making inferences concerning range and social structure. There is some evidence to suggest population structure, with North Island, South Island, and New Zealand-wide populations recognised provisionally. Also, both Type B and Type C Antarctic killer whales are observed to visit New Zealand waters. They bear wounds from cookie-cutter shark bites, which likely means they visit waters even farther north since New Zealand killer whales that remain in New Zealand waters do not get such bites.

SC/59/SM20 updated a published report on killer whales in Papua New Guinea (PNG) waters (Visser and Bonoccoso 2003). Surveys have been conducted only intermittently off West New Britain Province since 2002. Somewhat more than 100 sightings have been collated, most of them in the Kimbe Bay area. The data are biased towards areas where tourism facilities, especially dive resorts, are prevalent. Fourteen individual killer whales have been identified from photographs. Resightings were made of two animals, one of which was re-sighted after an interval of 16 months. The occurrence of calves appears to peak in April.

Miller provided a summary of records of killer whales in the Pacific Islands Region, defined in a recent CMS agreement as the marine areas under the jurisdiction of each State or Territory between the Tropic of Cancer and 60ºS latitude and between 130ºE and 120ºW longitude. Records of occurrence were found for 19 of the 22 Pacific Islands Countries and Territories (which does not include the Australian continent, the North and South Islands of New Zealand or Hawaii). Information on killer whales in the South Pacific is very patchy except for New Zealand.

Southern Ocean

Aerial photogrammetry was undertaken for 252 killer whales in the Ross Sea (Pitman *et al*. 2007). They were identified from the air as 'type C' whales by a distinctive cape and slanted eye patch. The length distribution of these whales (26 classified as calves, 33 as adult females, 64 as adult males and 97 as unknown) was at the low end of the broader distribution from Soviet Antarctic whaling data, and similar to the size distribution of killer whales in Norwegian coastal waters. The size distribution of the coastal Norwegian whales also was at the low end of the broader distribution from the North Atlantic and Norwegian waters that included offshore animals.

Gadamke presented SC/59/SM7, a compilation of information on killer whales in Australian territorial waters derived from Morrice (2004). In the absence of directed field studies of killer whales in Australia, most records have been opportunistic or incidental. Seventeen unpublished records of strandings, including two mass strandings involving 7-9 individuals, were collated from government agency databases. Although killer whales occur widely in Australia, 59% of the records came from Macquarie Island where the whales have been observed to prey on elephant seals and penguins.

De Stephanis summarised SC/59/SM23 on behalf of the authors. A long-term photo-identification database has been maintained for Possession Island, Crozet archipelago, since 1964, supplemented since 1998 by photographs obtained from longline fishing vessels working in the Crozet Exclusive Economic Zone. Preliminary analyses indicate that some whales exhibit strong site fidelity to near-shore waters while others seen offshore travel long distances as evidenced by one match between Crozet and the Kerguelen EEZ 1300 km distant. In discussion the sub-committee expressed interest in seeing the database expanded to include other sub-Antarctic island areas.

Kock pointed out that CCAMLR has observers on longline vessels who represent a potential source of data on killer whales in sub-Antarctic waters. The sub-committee recommends that CCAMLR compile data on killer whales from observer reports and supply those data for consideration by the IWC.

SC/59/SM8 reported the results of a pilot study of occurrence and distribution of cetaceans in Terra Nova Bay in the Ross Sea. The area is characterised by the Terra Nova polynya, which creates an area of enhanced productivity. Killer whales were the most common species of cetacean sighted during helicopter and vessel-based surveys of the region. A total of 39 sightings of killer whales were made; on 24 occasions it was possible to determine ecotype. In most (22) of these sightings, killer whales of Type C were present. On two occasions Type B killer whales were identified.

SC/59/SM10 presented the results of ship-based line transect surveys in the waters around the Antarctic Peninsula. Killer whales were the third most frequently encountered species of cetacean, after humpback and minke whales. A total of 70 killer whales sighting were recorded: nine sightings of Type A animals; 24 of Type B animals; and 37 sightings of undetermined killer whales. Type C killer whales were not observed during these surveys, supporting the conclusion of Pitman and Ensor (2003) that this ecotype does not occur in this region. The large number of undetermined sightings was due to the passing mode typically employed during these surveys. Preliminary analyses of photographs taken during these surveys have yielded 21 unique Type A killer whales and 52 Type B animals. Future work will compare these photographs with the Antarctic Killer Whale Identification Catalogue (AKWIC).

Given the paucity of information on the distribution and abundance of specific killer whale ecotypes in the Antarctic, the sub-committee welcomed these results and encouraged future dedicated surveys in this region.

The results of these dedicated surveys were augmented by a compilation of killer whale sightings made from eco-tour operations in Antarctic waters. SC/59/SM 21 described 108 killer whale sightings made from ecotourism vessels working in the Antarctic from 1981-2007. Eighty-seven of these sightings were documented in sufficient detail to assign animals to ecotype. Sightings of all three ecotypes were present: 36 sightings of Type A killer whales; 23 sightings of Type B killer whales; and 28 sightings of Type C killer whales. Photographs of distinctive individuals were contributed to the AKWIC and a small number (4) of matches have been made to date.

Ensor and Visser both noted records of an apparently different ecotype in Southern Ocean waters. These animals were black and white killer whales (similar to Type A), but they had extremely small eye-patches, smaller than those described for Type C killer whales (Pitman & Ensor, 2003), and more reminiscent of the small eye-patches seen on a group of killer whales which stranded on New Zealand shores in 1955 (Visser & Mäkeläinen, 2000; Visser, 2007).

Martin noted that very few killer whales have been observed in near-shore waters around South Georgia – despite the presence of abundant prey. Killer whales are more common further offshore in this area. As noted elsewhere, the distribution of killer whales in the Antarctic is patchy, but the factors responsible for this spatial variation in distribution are not understood.

Atlantic Ocean

SC/59/SM11 reviewed the available literature and presented new information on the occurrence, distribution and ecology of killer whales in Brazilian waters. The species has been recorded along the entire Brazilian coast, except for northern coastal waters. Most records are from the southern and south-eastern regions. A total of 118 sightings were recorded, distributed among all seasons. In the south-east, sightings occurred mainly during spring and summer months in coastal waters. In the south, however, most records were from winter and spring months and in offshore waters where killer whale interactions with longline fisheries are common. Twenty-two strandings of killer whales were registered, 16 of which occurred in Rio Grande do Sul State. The occurrence of killer whales in coastal waters of Rio de Janeiro, south-eastern Brazil, is seasonal (e.g. Siciliano *et al*., 1999). It was not possible to determine whether there is any degree of seasonality in their occurrence in southern Brazil since most sightings come from observers onboard fishing vessels and therefore there could be a bias associated with fishing effort. The higher proportion of sightings close to shore off Rio de Janeiro in comparison to other coastal areas is likely explained by the narrower continental shelf and the presence of seasonal upwelling. Dedicated studies are urged to determine the identity of killer whale populations in Brazilian waters, while broad surveys are required to estimate their abundance.

A dataset consisting of 3,787 killer whale sightings from across the north-eastern Atlantic between 1970-2007 was compared with the locations of 1,413 killer whale catches by Norwegian small-type whaling vessels between 1938-1967 (SC/59/SM5). The two datasets showed a similar overall distribution pattern despite the biases inherent in both of them and despite the fact that a large shift occurred during the late 1960s in the migration of the Norwegian spring spawning (NSS) herring (Clupea harengus) stock, a key prey population. This was interpreted by the authors of SC/59/SM5 to suggest that there are populations of killer whales in the north-eastern Atlantic that do not follow the NSS herring migration. Sightings from several large-scale line transect surveys (the North Atlantic Sighting Surveys, NASS) during the summer months in 1987, 1989, 1995 and 2001, which achieved fairly even coverage of the north-eastern Atlantic, suggested that killer whales were relatively evenly distributed across this range during this season. Estimates of total killer whale abundance from the NASS surveys ranged from 4,413 to 26,774. The variability in abundance estimates between surveys could be due to a number of factors, such as variation in platforms, sea states, observers and areas covered.

Foote called attention to the strong influence of herring spawning areas on killer whale distribution in the north-eastern Atlantic and also noted that some groups of killer whales associate with mackerel fisheries to feed on discards. Densities of killer whales in UK waters appear to be lower than farther north. Lyrholm pointed out that killer whales occur fairly regularly off the west coast of Sweden, coincident with mackerel migrations. Kock noted that killer whales occasionally enter the Baltic Sea; a group of about ten animals were seen recently near Bornholm.

In response to a question concerning possible biases in the abundance estimates summarised from the literature in SC/59/SM5, Foote acknowledged that no special adjustment had been made in the analyses to account for social factors – e.g. differences in group size between different ecotypes or populations. It was suggested that reanalyses using methods similar to those of Zerbini *et al.* (2007) might be worth considering.

SC/59/SM13 presented preliminary results of analyses of killer whale population dynamics off northern Norway. For at least 20 years, killer whales have been concentrating during October-January in northern Norwegian fjords, where their main prey – Norwegian spring spawning herring – has been overwintering. This has provided a unique opportunity to study killer whale behaviour and conduct long-term photo-identification work. The authors of SC/59/SM13 estimated the numbers and survival rates of identifiable animals in this population using photo-identification and mark-recapture techniques with data collected during 1986-1993 and 2002-2003. Population size was estimated using simple two-sample estimators on pairs of years and using closed capture models in program MARK within years. In the latter analyses, the best models were selected using AIC; how well the models fit the data was explored using Goodness of Fit tests in programs RELEASE and MARK. The highest annual estimate of the number of identifiable animals was obtained for 2003: 398 individuals (95% CI = 314-531). The proportion of identifiable individuals was estimated to be 0.556 (SE = 0.052) for 1992-1995 and 0.656 (SE = 0.041) for 2000-2003. Total population size for 2003 was estimated to be 606 individuals (95% CI = 460-800).

The sub-committee welcomed these preliminary results from the long-term study of killer whales in Norway. In response to a series of questions and suggestions from sub-committee members, Kuningas and Hammond stressed that the work presented in SC/59/SM13 was preliminary and that they planned to take into account a variety of recently developed methodological advances as they complete the work (e.g. incorporation of social structure into mark-recapture analyses as per Whitehead and Durban; use of robust designs; ways to account for differences in capture probability and estimation of proportions of identifiable individuals, etc.). Eventually it should be possible to do some modelling with these data in order to get an idea of population status. It was suggested that if these herring-eating killer whales were among those targeted by Norwegian whaling from 1938-81 (Øien 1988), that the population could have been much larger historically. The sub-committee encouraged completion of this valuable work and hoped the final results would be informed by the discussions at the present meeting.

SC/59/SM25 provided information of the status of killer whales around Spain using data from a 10-year research program. Two specific areas of regular occurrence were highlighted, one in the Gulf of Biscay and the other in the Strait of Gibraltar. Records of killer whales in the Gulf of Biscay, all in the south-eastern part, come mainly from reports by fishermen targeting bluefin tuna (Thunnus thynnus). In the Strait of Gibraltar, a population of 32 whales in three or four social groups is consistently present from March-October, and at least some individuals also have been recorded in the few surveys carried out in winter months. De Stephanis indicated that tuna fishing is carried out in many parts of the Gulf of Biscay and therefore he had no reason to believe that the apparent concentration of sightings in the south-eastern part was an artefact of sighting effort. Ridoux concurred, noting that there were fewer than ten records of killer whales stranding along the French coast over a period of 35 years and that no reports of sightings had been obtained from recent cetacean surveys conducted from 2003 to the present. The sub-committee encouraged continuation of this study, particularly concerning the killer whales in the Strait of Gibraltar.

5.2 Stock structure

North Pacific

Killer whales in the North Pacific have been assigned to putative populations based on their seasonal distribution (primarily summer) and foraging ecology, with three main ecotypes identified – residents (fish-eating), transients (marine mammal-eating) and offshores (prey type not known, but could include elasmobranchs). SC/59/SM6 presented the results of genetic analysis of seven putative populations in the North Pacific and one outgroup (40 samples from the south coast of Iceland). The North Pacific samples were from southern residents in Washington State waters, Southeast Alaskan residents, resident types from the Bering Sea/Aleutian Islands area, resident types from near the Kamchatka peninsula, 'offshores', transient types from Southeast Alaska and transient types from California.

Sixteen microsatellite loci and mtDNA sequence data for the complete mtDNA region were used in this study. These were analysed using the assignment method implemented in STRUCTURE as well as conventional F-statistics. A Mantel test was used to look for isolation by distance. Patterns of migration were investigated using methods assuming drift/migration equilibrium (private allele method, and the coalescent method implemented in MIGRATE) as well as a non-equilibrium assessment implemented in IM (isolation with migration). The latter method further enabled the assessment of effective population size, the time point at which putative populations began to diverge, and the ongoing rate of migration since then.

As reported previously, the authors of SC/59/SM6 found just four mtDNA haplotypes among the North Pacific sequences (six in total from 203 samples including the outgroup from Iceland), and these differed by 0.1% to 0.9% uncorrected difference. Whales within putative populations shared the same haplotype, and haplotypes also were shared between the Kamchatka and southern resident populations, between the Bering Sea and Alaskan resident populations, and between the Alaskan and Californian transients included in the study. All putative populations clustered as distinct groups using the assignment method implemented in STRUCTURE, except this method divided the Bering Sea sample between Kamchatka and Southeast Alaska resident population. F-statistics suggested significant differentiation between most pairwise comparisons, including between ecotypes in sympatry (e.g. Southeast Alaskan residents and transients). The Mantel test indicated a significant correlation between genetic and geographic distance within the resident ecotype. Measures of gene flow suggested similar, low rates among all putative populations, and the non-equilibrium assessment implemented in IM suggested ongoing gene flow among all putative populations, including between ecotypes. The effective sizes of resident populations were smaller than those of transient populations on average, and all division time-point estimates were more recent than the last glacial maximum.

The primary conclusions of SC/59/SM6 were as follows: Locally differentiated populations can be defined by both geographic distribution and ecotype.. Each of these populations shows a similar level of differentiation and should be considered separately for management and conservation measures. None of the data suggest the partitioning of populations into two groups defined by ecotypes, and instead suggest the need for multiple management units or stocks. MtDNA data are consistent with IM data suggesting the founding of regional populations along matrilines since the last glacial maximum.

Given the migration rates reported in SC/59/SM6 (relatively low numbers of migrants per generation), it was considered unlikely that exchange would be observed in demographic studies. The genetic data presented correspond well with, and thus can be viewed as reinforcing, the existing demographic/management unit designations. It was pointed out that much higher rates of gene flow are known to occur between populations of baleen whales yet they are treated as management stocks.

There was considerable discussion in the sub-committee of this paper, covering issues related to statistical analysis, models and software used. A question was raised regarding the consequences of relating the underlying assumption of IM that there are only two extant and one ancestral population in the model. These results should be interpreted cautiously until all populations can be incorporated into the analysis.

Nine carcasses were examined from a pod of 11-12 killer whales entrapped in sea ice off northern Japan in February 2005 (SC/59/SM 12). The nine examined whales consisted of one adult male, 5 adult females (3 of which were lactating) and 3 calves of which 2 were females. Based on mtDNA sequences, all the animals shared one mitochondrial sequence, which is clustered with the transient ecotype from the eastern North Pacific although the δ^{15} value given by stable isotope analyses placed them somewhere between the resident/offshore and transient ecotypes. Microsatellite analysis (7 loci) indicated that the adult male was not father of any of the other eight pod members sampled.

The sub-committee welcomed these new results and considered it likely that at least eight stocks occurred in the North Pacific, with more stocks likely to be determined.

Hoelzel summarised information on genetic studies of North Atlantic killer whales. His group has analysed 40 samples from Iceland (stranded and biopsied on the south coast – 10 from the south-eastern coast, all of which had one mtDNA haplotype; the rest from 100 km to the west near the island of Vestmannaeyjar, 80% of which had a second haplotype and 20% the same haplotype as the other 10 whales). Microsatellite data analysed using STRUCTURE showed just one population for the Iceland samples (see SC/59/SM6). Hoelzel cautioned against establishing populations on the basis of mtDNA alone for this species. Although some putative populations in the North Pacific apparently are defined by haplotype, others have multiple haplotypes, and some haplotypes are shared among distinct populations (e.g. including between samples from Iceland and New Zealand). Multiple haplotypes have been identified off Iceland, Norway and the UK, but analysis of nuclear DNA markers (such as microsatellites) will be required to define genetic stock structure among these samples. Hoelzel is collaborating with Lyrholm on a study of this kind. The sub-committee welcomed these results and encouraged more work on stock structure in this area.

Given the presence of at least three ecotypes in the Antarctic region, and the unresolved questions over the systematics of killer whales in this region, the sub-committee recommended that additional morphological and genetic studies be carried out in this region.

5.3 Life history

Pacific Ocean

Krahn presented SC/59/SM3 describing a non-lethal method for estimating ages of killer whales from measurements of specific fatty acids present in their outer blubber layer. Specific short-, branched-, and odd-chain fatty acids correlated moderately well with age for transient and resident killer whales of both sexes, but these single-parameter relationships were population-specific, moderately scattered and seemingly varied with long-term diet. In contrast, a simple multi-linear equation model derived from the combination of two specific fatty acid ratios enabled the ages of individual killer whales to be predicted with good precision ($\sigma = \pm 3.8$ years). This simple killer whale age/fatty acid ratio model appeared to be independent of individual diet and was therefore applicable to eastern North Pacific killer whale populations regardless of sex or ecotype. (In the absence of any known-age whales of the offshore ecotype, offshores were not included in the analysis). The authors were unable to offer a biological mechanism to explain the age/fatty acid ratio relationship. The model was applied to several less well-studied resident and transient killer whale populations to predict their age distributions from their blubber fatty acid compositions and these distributions were compared to a population of known age structure (i.e., West Coast Southern Residents). These results provide some evidence that adult male transient killer whales may have a lower life expectancy than their resident counterparts. Finally, the authors described the potential for extending this method to other cetacean species (e.g. humpback or bowhead whales), as well as for improving the precision of the age/fatty acid ratio model.

In discussion, Krahn suggested that the lower life expectancy of male transients might be explained by the fact that they are exposed to more risk of injury from interactions with large mammalian prey. Transients also carry much higher contaminant loads than residents and this may compromise their immune function and lead to earlier deaths from pathogens. In response to a question of whether male transients tend to be more solitary than male residents, and thus would have less chance of being biopsy-sampled, Wade noted that most transient groups are small (6 or fewer individuals) and the large adult male tends to be the first individual seen from a distance – sometimes from up to 5nmi away. In his view, even though fewer transients than residents are sampled, there should not be a bias against sampling adult male transients in a way that would affect the age distribution.

Krahn pointed out that Herman, the lead author of SC/59/SM3, was exploring the application of this technique not only to one or more baleen whale species, but also to the well-studied population of bottlenose dolphins in Sarasota Bay, Florida. He is also seeking to determine which part of the blubber gives the best signal. Based on work thus far, it appears that the portion nearest the skin is preferred, but limited access to fresh carcasses has meant that there are few opportunities to sample the deep blubber. Captive killer whales might offer opportunities to investigate turnover rates for different tissues and to carry out experimental studies of the mechanism underlying this new age-estimation method.

The sub-committee concluded that this paper has important implications for cetacean research and recommended that more effort be made to develop, test and, if appropriate, apply this non-lethal method in demographic studies to other cetacean species, including large whales.

Ages of the nine killer whales from northern Japan reported in SC/59/SM, estimated from GLGs in the dentine and cementum, ranged from 13 years (lactating female) to 59 years (‘resting’ female). The large male was estimated to be 34 years old. The calves had almost no dentine and were scored as zero age. Yamada noted that these animals possessed foetal folds and fringed tongues and that their dorsal fins and flukes were extended and that two of the three had milk in their stomachs. He guessed that they were all several months old. Corpora counts in the adult females increased linearly with age from 3-7 in whales 13-34 years old, which is generally consistent with what is known from elsewhere. The oldest female (59 years) had only eight corpora, suggesting that ovulation rate may decline with age.

In New Zealand the longest re-sighting period for a New Zealand female killer whale was 29 years (n = 27 re-sightings, 1977-2006) and this animal was still reproductively active at 40-42 years old (SC/59/SM19).

North Atlantic
In SC/59/SM13, survival was estimated for stage/sex-specific groups of killer whales in northern Norway – adult males, adult females, sub-adults, juveniles and calves – using Cormack-Jolly-Seber open recapture models in program MARK. Adult male and adult female survival were estimated as 0.958 (SE = 0.0096, 95% CI = 0.935-0.973) and 0.959 (SE = 0.0142, 95% CI = 0.929-0.980), respectively. Lowest survival was estimated for calves, 0.816 (SE = 0.167, 95% CI = 0.335-0.975). Calving intervals based on photo-identification data collected over a 14-year period (1989-2002) ranged from 3-14 years (mean = 5.93, SE = 3.087). So-called temporary emigration, when killer whales move relatively long distances inside and outside the fjords to keep track of their unpredictable prey source, can affect sighting probabilities and may introduce a downwards bias in estimates of some population parameters. The sub-committee welcomed these preliminary results from the long-term study of killer whales in Norway. It is the first time that demographic information has been available from outside the north-eastern Pacific. Although provisional, these life history parameters appear similar to those for north-eastern Pacific populations that have been studied over long timescales.

In general, little is known about the life history of killer whales and the sub-committee encourages the continuation, inter alia, of photo-identification programmes to obtain better demographic information from all regions.

5.4 Ecology

Information on feeding ecology has shown that killer whales forage on a wide variety of prey items throughout their range. Most information comes from direct observations of feeding activity, with less information from stranded or bycatch animals. More recently, information obtained from stable isotope analysis and fatty acid analysis has lead to an increase in our understanding of feeding strategies. Most of the information comes from the North East Pacific.

Pacific Ocean
SC/59/SM 12 reported on the stomach contents of all six adult killer whales off northern Japan that died as a result of ice entrapment, that had moderate to large quantities of material consisting mainly of seals (Phoca largha and Histriophoca fasciata) and squid. Claw counts were divided by 20 to estimate the minimum number of individual seals represented, with a maximum of 32 in the stomach of the adult male.

Resident-type killer whales off Kamchatka have been observed feeding on Atka mackerel (Pleurogrammus monopterygius), various salmon species (Oncorhynchus sp.) and cod (Gadus macrocephalus) (SC/59/SM4). There are also reports of killer whales hunting largha seals in the northern part of Avacha Gulf and northern fur seals on Medhny Island (SC/59/SM4).

Matkin summarised a recent paper on ecotypic variation and predatory behaviour of killer whales in the eastern Aleutian Islands, Alaska (Matkin *et al*. 2007). Killer whales were encountered 250 times during 421 days of surveys from 2001-2004. They were identified as transient, resident or offshore ecotype based on acoustic and genetic data. Residents were found 12 times more often than transients and offshores were encountered only once. Totals of photo-identified individuals were 165 mammal-eating transients and 901 residents. The transients were seen mainly in spring (May-June) when they were observed preying on gray whales (Eschrichtius robustus) migrating northward through Unimak Pass and later (late June to September) preying on northern fur seals (Callorhinus ursinus) west of Unimak Pass. In the three years of observations only one kill of a Steller sea lion (Eumetopias jubatus) was observed. Predation on minke whales (Balaenoptera acutorostrata) was seen more often than expected given the infrequency of minke sightings in the region. Killer whales were seen to harass a humpback whale (Megaptera novaeangliae) on one occasion but other humpbacks converged on the attackers and appeared to drive them away. Matkin noted that further observations since 2004 around Bogoslof Island, where there are rookeries of both fur seals and Steller sea lions, have confirmed that fur seals are taken much more often that sea lions. No observations have been made of predation on adult male fur seals.

From 1970 to 2006, West Coast Transient (WCT) killer whales in British Columbia and south-eastern Alaska were observed to make 208 kills of seven species of marine mammals (n=193) and five species of sea birds (n=15) (SC59/SM24). A kill was defined as an attack resulting in the death of an identified prey animal. All of the killer whales were individually photo-identified (n=184). The mammals killed were harbour seals (Phoca vitulina; 55% of the kills), harbour porpoises (Phocoena phocoena; 18%), Dall's porpoises (Phocoenoides dalli), Steller sea lions, California sea lions (Zalophus californianus), Pacific white-sided dolphins (Lagenorhynchus obliquidens) and common minke whales. No attempt was made to analyse the relationship between prey preference and prey availability in the area although it was suggested that sufficient survey data are available on marine mammal populations in the region to support such an analysis. In general, the more times an individual killer whale was observed making a successful kill, the greater was the cumulative number of different prey species that individual was known to have taken. This corroborated a similar trend found in an earlier study, which had included all predation data (kills and attacks), leading the author to conclude that most WCT killer whales are not prey specialists.

There was considerable discussion about the conclusiveness of the results in SC/59/SM24. It was suggested, for example, that some partitioning of foraging effort could occur without being detected in the observations and analysis. Also, individual whales might change their foraging behaviour with age, either broadening or narrowing their dietary emphasis. Little is known about foraging activity in winter and at night although tagging work has shown that killer whales do hunt seals at night as well as during the daytime. Straley acknowledged the difficulty of eliminating bias and stressed the provisional nature of the results presented. Matkin noted that in his experience, initial impressions of individual whales specialising on particular types of prey frequently fail to hold up over the long term. Killer whales appear to adapt to changes in prey availability and so he urged caution in jumping to conclusions on the generalist/specialist issue.

Nevertheless, results of stable isotope work in the Aleutians (by Peggy Krahn and colleagues) have been fairly consistent with what is inferred from observational studies.

It was noted that the killer whales that prey on pinnipeds along the beach at Punta Norte, Argentina, return year after year to the same place at the same time to prey on the same species, giving the impression that they are extremely specific in their predation behaviour and schedule. Visser noted that those same individuals prey on elephant seals and southern right whales (Eubalaena australis) at other times of the year. Straley noted that WCT killer whales from her study area travel as far as Hood Canal in Washington State where they continue to prey mainly on harbour seals for long periods.

Krahn summarised two recent papers (Herman *et al*. 2005; Krahn *et al*. 2007) that present information on chemical tracers that can be used to help establish trophic levels and point to areas where killer whales have been feeding. In this instance, fatty acid, stable isotope and organochlorine analyses of blubber biopsies represent a collaboration of laboratory chemists with field biologists because the results showed good concordance in assignment to the three recognised ecotypes of killer whales in the eastern North Pacific – residents, transients and offshores. The ecotype profiles exhibited broad similarity across geographical regions, suggesting that the dietary specialisation reported for resident and transient whales in the well-studied eastern North Pacific populations also extend to the less-studied whales in the western Gulf of Alaska and Aleutian Islands. Although the offshore population had blubber fatty acid profiles implicating fish as its primary prey, the contaminant and staple isotope results for these whales were equally congruent with predation on marine mammals.

Information on prey items of killer whales in the Gulf of California and along the Pacific coast of Mexico was summarised in SC/59/SM14. The database consisted of 274 records of observations from 1858-2006, 58 of which involved predatory interactions with other species including cetaceans, pinnipeds, sea turtles and fish. Based on observed feeding habits the authors inferred that killer whales in Mexican Pacific waters most likely are of the transient ecotype although no studies of morphology, acoustics or genetics have been carried out. Attacks on humpback whales in Banderas Bay were particularly noteworthy and Urbán-Ramirez indicated that these appear to have increased in frequency since the mid-1990s. Predation on elasmobranchs, turtles and a variety of fish species has also been documented (SC/59/SM 15)

Above-water and underwater observations of killer whale foraging in New Zealand (SC/59/SM19) have made it possible to identify 27 different prey species consisting of four main types: rays, sharks, fin-fish and cetaceans (pinnipeds have not been identified as killer whale prey in New Zealand). Based on observations of individual prey items caught, foraging appears to focus primarily on rays. On a single day one group of killer whales was observed to take 18 rays. Killer whales from Papua New Guinea waters have been observed feeding on four species of elasmobranchs and four species of fin-fish (SC/59/SM20).

Southern Ocean

SC/59/SM 8 reported foraging behaviour of killer whales in the Ross Sea. The Type C animals were observed exhaling under the ice, possibly to facilitate prey capture. Type B and C animals were observed harassing Adelie's penguins (Pygoscelis adeliae) (Ballard and Ainley 2005; Lauriano *et al*. 2007). In the Antarctic Peninsula, killer whales of both A and B ecotypes were observed harassing humpback and minke whales, but no confirmed incidences of predation were seen (SC/59/SM 20). Killer whales of both types were observed chasing and killing pinnipeds and Type B animals were observed killing gentoo penguins (Pygoscelis papua). Type B killer whales have been observed creating waves to wash pinnipeds off the ice (Smith *et al*., 2007).

Although killer whales occur widely in Australia, 59% of the records came from Macquarie Island where the whales have been observed to prey on elephant seals and penguins (SC/59/SM7). Along the southern and central coasts of mainland Australia killer whales have been seen preying on humpback whales, other large baleen whales, dugongs, dolphins, seals and pelagic fish (including caught fish on longlines).

Atlantic Ocean

Pitman *et al*. (2007) reviewed some of the morphological characteristics of north-eastern Atlantic killer whales based on whaling data and concluded: "It appears that in Norway there … is a smaller, fish-eating ecotype that frequents nearshore waters, and a larger, mammal-eating form that occurs offshore." Foote called attention to the strong influence of the herring migrations on the distribution of killer whales in the north-eastern Atlantic and he also noted that some groups of killer whales associate with mackerel fisheries to feed on discards. Foote speculated that animals feeding around mackerel vessels offshore in summer may be found preying on seals near the Shetlands at other seasons. With regard to the killer whales studied along the coast of Norway, it is likely that spring spawning herring stock are the main prey item at least for some of the year (SC/59/SM13). Kuningas explained that the herring are now wintering primarily in open waters outside the fjords. The spawning stock is currently estimated at 10 million tonnes and continues to increase (Toresen, 2007) and it is expected that by next winter most of the stock will be wintering in open waters. This may have implications for the autumn and winter distribution of killer whales in Norwegian fjords and coastal waters.

Rogan reported on a recent analysis carried out examining blubber contaminant levels (organochlorine compounds) and stable isotopes on a small number of killer whale samples from British and Irish waters (McHugh *et al*., in review). Elevated contaminant levels and enriched isotopic ratios were determined in one individual whale sampled in the Scottish Western Isles compared to the others suggesting marine mammal based dietary influences. These results are consistent with the hypothesis that at least two ecotypes exist in the North East Atlantic, one that feeds predominately on fish and a second on marine mammals.

De Stephanis reported that bluefin tuna are believed to be the principal prey of the small group of killer whales in the Strait of Gibraltar; they apparently catch tuna by using an endurance-exhaustion technique

(Guinet *et al*., in press). During the summer months, they also interact with the long-line fishery for tuna that began in the Strait in 1995.

In the South Atlantic, a variety of prey items have been recorded, mostly from analysis of stomach contents, including bony fishes, stingrays, cetaceans, cephalopods and salps (SC/59/SM11). The available data are insufficient to speculate on whether killer whales in Brazilian waters exhibit any dietary specialisation. Both marine mammals and fish were recorded in the digestive tract of a stranded killer whale in southern Brazil (Dalla Rosa, 1995). This is consistent with reports from other areas of the Southern Hemisphere.

Dalla Rosa and Secchi (2007) evaluated depredation by killer whales on longline-caught tuna (Thunnus spp.) and swordfish (Xiphias gladius) in waters off southern and south-eastern Brazil and compared it to depredation by sharks. Data were obtained mainly from data sheets distributed to the captains of tuna vessels sailing from Santos, south-eastern Brazil, between 1993 and 1995. Data on the catch-per-unit-effort of tuna and swordfish and some records of interactions were obtained from fishing vessel logbooks. Dockside interviews with fishermen and with researchers who had been onboard tuna vessels provided additional information. Killer whale and shark interactions were analysed per longline set and per trip. Killer whale interactions occurred from June to February, mainly between June and October, while shark interactions occurred all the year round. The number of sets and trips involving shark interactions was significantly higher than the number of sets and trips involving killer whale interactions. However, when depredation occurred, the proportion of fish damaged by killer whales was significantly higher than that damaged by sharks. Furthermore, killer whales removed or damaged significantly more hooked swordfish than hooked tuna, whereas sharks damaged significantly more hooked tuna than swordfish.

Dalla Rosa commented that an ongoing project in Brazil to monitor cetacean interactions with the longline fishery includes onboard observers. Preliminary analyses suggest that only about 0.5% of the target fish species caught is lost to killer whale depredation and about 1% to shark depredation (Montero *et al*. 2006). It was noted that depredation rates can be difficult to interpret and compare since there is no standardisation of reporting units etc. Fishing effort in the longline fishery in Brazil varies seasonally within the study region and Dalla Rosa suspects that killer whale occurrence may not be seasonal in these offshore waters, which would mean that that they may simply be taking advantage of the facilitated foraging that is available seasonally due to the presence of the fishing operations.

5.5 Habitat

Habitat degradation or exclusion was viewed by Visser as the most important threat to killer whales around New Zealand (SC/59/SM 19). Their tendency to prey on rays brings them into estuaries and harbours, which puts them in direct conflict with certain kinds of development and the mariculture industry. Rays use structures in harbours as refuge from killer whales. There is an increasing number of proposals for marine turbines, including one that would place as many as 200 turbines in a narrow harbour entrance in 30 m of water. Killer whales already need to navigate large sand bars to enter and exit this harbour, and Visser anticipates that the presence of the turbines could make it almost impossible for the whales to carry on their normal foraging routine there. Concerns raised with the developers about the potential effects of electromagnetic fields on elasmobranchs led to a plan to sheathe and bury the cables in order to mitigate any such adverse effects.

Visser regards both marine renewable energy and increased marine tourism targeting killer whales as looming issues for killer whale conservation and management in New Zealand. Until recently, the PNG marine environment was under minimal stress from a small human population. Now, however, there are increasing signs of habitat degradation due to land-based activities and over-harvesting, particularly of sedentary marine resources (SC/59/SM 20)

5.6 Directed takes and incidental mortality

Live-captures for a dolphinarium in the Black Sea were attempted in the Russian Far East off Sakhalin Island and Kamchatka beginning in 2002 (SC/59/SM4). It is uncertain whether any whales were killed during capture efforts that year but in September 2003, a group of 32-37 resident-type whales was encircled by seine nets in Zhirovaya Bay, Avacha Gulf, eastern Kamchatka. At least one of two whales that became entangled in the netting died, and a third young female was transported to the Black Sea dolphinarium where she died after 3 weeks in captivity.

Burdin reported that an annual quota of 6-8 live-captured killer whales had been established by the Russian Federation over the last several years but he did not know the outcome of further capture attempts made in 2004, 2005 and 2006. No population assessment has been made to justify the removal quotas and therefore the sub-committee recommends that a scientifically valid assessment be conducted before further captures off Kamchatka are authorised. The implications of removals on the social behaviour of killer whales must be taken into account in any such assessment (Williams and Lusseau, 2006).

Depredation by killer whales on longlines in the Sea of Okhotsk is an increasingly serious problem. Burdin noted that fishing pressure in this sea is expanding rapidly and that many European as well as Asian countries are involved. There is concern about retaliatory efforts by fishermen, depletion of prey resources and the potential for incidental hooking or entanglement of the killer whales. Depredation is also reported from Brazil (Dalla Rosa and Secchi 2007) and although the impact of these interactions on the killer whales is uncertain, some cetacean by-catch is known to occur in the tuna and swordfish longline fishery in Brazilian waters.

As mentioned previously, during the summer months, killer whales in the Strait of Gibraltar also interact with the long-line fishery for tuna that began in the strait in 1995. Reportedly, two killer whales were killed in Morocco in 2004 and six more in September 2006, but this information has not been confirmed. It has been suggested that these mortalities may have been the result of fisheries interactions.

In discussion, Straley drew the sub-committee's attention to a recent workshop on cetacean interactions with longline fisheries hosted by the Vancouver Public Aquarium. Proceedings of the workshop are not yet available but are expected soon.

A neonate that live-stranded at San Blas, Nayarit, Mexico, in April 2007 (SC/59/SM15) may have been involved in a fishery interaction of some kind but this could not confirmed (or discounted) by photographs (Rojas-Bracho, pers. comm.). At the time of the meeting the calf was being rehabilitated at an oceanarium in Nuevo Vallarta.

Between 2000 and 2005, the annual reported take of killer whales in West Greenland ranged from 15 – 34 individuals (Anon., 2006). Further information is required on the population structure and abundance estimation of killer whales in this region.

5.7 Other

Bain *et al.* (submitted) studied the influence of whale watching vessels on southern resident killer whales off San Juan Island, Washington, from 2003 to 2005. The authors observed activity states of killer whale schools using scan sampling and collected information on the number of vessels present at various distances from the schools. Transitions between activity states were significantly affected by vessel traffic, indicating a reduction in time spent foraging as had been observed in Northern Resident killer whales in a previous study. The size of this vessel effect decreased as the distance between vessels and whales increased during interactions. There was no significant difference in the ways vessel interactions disrupted the behaviour of the three pods in this community. Each school was within 400m of a vessel most of the time during daylight hours from May through September. The high proportion of time spent by Southern Resident killer whales in proximity to vessels raises the possibility that the short-term changes in behaviour documented in this paper could have biologically significant consequences.

Rowles presented SC/59/SM18 on behalf of the authors. This was a retrospective global analysis of killer whale strandings with a focus on the North Pacific. Data were obtained on 222 stranded individuals from all continents except Africa and Antarctica, spanning the period 1944-2003. Most of the reports were from the North Pacific and especially Alaska and British Columbia. Fewer than 3% of the strandings were investigated with a complete post-mortem examination, and for more than 85% even the most basic gross necropsy was either not conducted or not reported. A crude analysis combining numbers of strandings reported from 1973-2003 and numbers of individuals 'known to have died' based on photo-identification data suggested carcass recover rates of 12% for southern residents and 3% for northern residents. Applying a 12% recovery rate to the annual global carcass reporting rate implied in SC/59/SM18 was interpreted by the authors as suggesting that at least 58 killer whales strand each year.

A recent case of a juvenile killer whale that died from laryngeal perforation by a halibut fishing hook was described in SC/59/DW10. To facilitate better use of opportunities to sample carcasses of stranded killer whales, the authors of SC/59/SM18 a standardised killer whale necropsy and disease testing protocol. This protocol can be downloaded free from [give website].

In discussion, it was pointed out that strandings in Mexico had not been included in the compilation of North Pacific records (but see SC/59/SM15). Straley suggested that, based on her experience using the protocol, a condensed version would be useful for situations where use of the full protocol is impractical.

Gallego called the sub-committee's attention to the recent deaths of several long-finned pilot whales in southern Spain with suspected morbillivirus infection. He cited disease as another potential threat to the Gibraltar population of killer whales.

Nematodes (all identified as Anisakis simplex) were found in the stomachs of the six adult killer whales stranded as part of a larger group, sampled off northern Japan (SC/59/SM 12). Some data on tissue concentrations of trace elements and organohalogen and organotin compounds were also provided in SC/59/SM12. It was noted that the body mass data accompanying the body length and other data in SC/59/SM12 were especially welcome.

Photographs in SC/59/SM1 showed killer whales off Taiwan with a missing dorsal fin and with numerous cut marks on the dorsal fin. This was interpretated as likely caused by contact with a boat propeller in one instance and some kind of fishery interaction in another. Kuningas reported that the number of marks on killer whales in Norway had increased a lot in Norway over the last few years, presumably because of the increasing number of interactions with fishing operations. This increased fishery interaction is a result of the resumption of the fishery of the recovered herring stock in the mid-1990s after 25 years of protection. A few individuals are observed with clear damage from propellers.

In general, mass strandings of killer whales (defined here as strandings of three or more animals) are quite rare. SC/59/SM22 described 22 mass-strandings of killer whales, augmented by four other records contributed during the meeting. Twelve of these events have occurred since 1984. A large proportion of these mass strandings occurred in New Zealand, where the foraging behaviour of killer whales in shallow water may be responsible, at least in part, for these events.

5.9 Consideration of Status

The sub-committee noted that the population structure of killer whales was complex and, except for a few areas of the North Pacific, very poorly understood. Furthermore, in many areas (such as most of the tropical oceans) there is very little information available on any aspect of killer whale biology. Such limitations hinder any assessment of the status of killer whales.

Several ecotypes of killer whales exist, sometimes in sympatry. These ecotypes vary in their patterns of social behaviour and foraging specialisations. Population structure exists within ecotypes, although the amount of gene flow between populations and ecotypes is poorly understood. Nevertheless, it is clear that some populations of killer whales are small, demographically closed and thus vulnerable to anthropogenic perturbation. Adverse human influences can impact these demographically independent populations in many ways, including direct removals, prey depletion, environmental contaminants, habitat degradation, disturbance and other factors.

Due to limitations of time and the absence from the meeting of a number of experts, the sub-committee was unable to fully review the status of all stocks of killer whales for which information exists. Nevertheless, the sub-committee drew attention to several stocks of killer whales for which there is clear reason for concern regarding status, including: (1) the southern resident killer whale population from the coasts of Washington State and British Columbia; (2) killer whales in Greenland; (3) killer whales found near the Strait of Gibraltar; and (4) killer whales of the Oyashio Current ecosystem.

The first of these is perhaps the best known; the small, demographically closed population of piscivorous southern residents that inhabit the inshore trans-boundary waters of Washington State and British Columbia. These killer whales have been studied continuously since 1974. As a result of long-term studies in both the U.S. and Canada there is an extraordinarily rich body of information on the abundance and demography of this population.

Between 48 and 58 animals were taken for public display from the southern resident population between 1962 and 1973. Since that time population size has fluctuated between 71 and 97 individuals. Southern resident killer whales feed primarily on Chinook salmon (Oncorhynchus tshawytscha) during the spring and summer months and on chum salmon (Oncorhynchus keta) during the fall. Current potential threats to the population include: declines in prey availability; high levels of environmental contaminants; disease; and then impacts of vessel traffic, particularly whale watching boats. Concerns regarding the status of this small population have led to its listing as endangered under the US Endangered Species Act and the Canadian Species at Risk Act.

Wade presented preliminary results of models that examined temporal variation in crude survival rates for the population as a whole and survival of the three component pods. In addition, covariates were used to examine the contribution of variation in prey availability, oceanography and vessel traffic to the observed variation in survival rates. Several methods were used to assess temporal variation in survival, including: constant survival over time; a single trend in survival over the 27-year period; different survival rates for each year; survival rates that remained constant for a period of four to seven years.

Crude survival rates for the entire population fluctuated throughout time in a roughly cyclical pattern that reflected changes in abundance. Periods of population decline were synchronous with periods of poor survival. All three pods exhibited cyclical variation in survival, although not necessarily in abundance. Models that include environmental covariates (particularly measures of prey abundance) consistently outperformed simple survival models. In particular, models that included measures of the at-sea abundance of Chinook salmon explained a high degree of variation in the survival of southern resident killer whales. None of the oceanographic indices performed well at predicting survival, but future research will re-assess the potential utility of these measures once appropriate time lags have been included. The number of commercial whale watching vessels in Haro Strait was not well correlated with temporal variation in survival and models including this covariate performed poorly. Wade concluded that the survival of southern resident killer whales has fluctuated dramatically through time and these fluctuations appear to be driven primarily by the abundance of their salmonid prey.

Wade speculated that declines in salmon abundance (many salmon runs within the range of southern residents are also listed endangered) may have made killer whales in this population more vulnerable and less resilient to normal variation in prey abundance. It is also possible that contaminants affect the health and survival of killer whales if individuals mobilise energy reserves (and contaminants) during periods of nutritional stress. Ross *et al.* (2000) suggest that levels of PCB concentrations in southern resident killer whales are high enough to cause immune suppression.

In discussion, Wade noted that there do not appear to be any lingering direct effects of the live capture removals in the recent demography of this population, although it is possible that there are effects mediated through the social behaviour of these long-lived animals. The sub-committee welcomed these preliminary results and encouraged Wade to complete this analysis.

The sub-committee also noted the takes of killer whales from West Greenland, including a recent take of 15 animals in 2005 (Anon., 2006). Further information is required on the population structure and abundance estimation of killer whales in this region. The sub-committee recommended that every effort should be made to obtain information and samples from killer whales hunted in Greenland.

The sub-committee drew attention to the status of killer whales near the Strait of Gibraltar, where approximately 30 animals feed on bluefin tuna (Thunnus thynnus). As noted in SC/59/SM25, these killer whales are threatened by depletion of their primary prey source, and from harassment and culling attempts by tuna fishermen in Morocco. Further information is required on the population structure of these killer whales, particularly to determine whether or not this is a demographically closed population. Nevertheless, there is reason for concern regarding the direct and indirect effects of fisheries activities on these animals. The sub-committee expressed concern about the status of the killer whales in the Strait of Gibraltar and urged that the relevant local and national agencies in Spain and Morocco cooperate to monitor their status and assess the need for conservation action. It further recommended that population structure be investigated on an urgent basis to determine this small group of whales' degree of isolation.

The sub-committee considered the potential effects of the past harvest of killer whales in the coastal waters of Japan, where more than 1,500 individuals were removed since 1948 (Ohsumi 1975). Removals of this number of killer whales would have caused major depletions and could have caused local or regional extirpation of killer whales in this ecosystem. Brownell drew the sub-committee's attention to the relatively low densities of killer whales in the Oyashio Current ecosystem, compared to the number in other productive, cold-water ecosystems, such as the Gulf of Alaska and California Current (Forney and Wade 2006). The sub-committee agreed that surveys and population assessments should be conducted to better understand the present status of killer whales in this region.

6. INFECTIOUS AND NON-INFECTIOUS DISEASES OF MARINE MAMMALS AND IMPACT ON CETACEANS

A pre-meeting workshop was held jointly with the Standing Working Group on Environmental Concerns on the topic of infectious and non-infectious diseases of marine mammals. Scientists from many disciplines presented information during the workshop, which covered topics such as epizootics, harmful algal blooms and parasitism and how these impacted on cetaceans. Much of the information currently available pertains to small cetaceans. It was agreed that an intersessional working group on Cetacean Emerging and Resurging Diseases (CERD) be established, co-chaired by Rowles and Van Bressem. The full report from the workshop, including the recommendations is presented as Appendix 2 of Annex K.

7. REVIEW UPDATES TO THE LIST OF RECOGNISED SPECIES OF CETACEANS

The sub-committee reviewed proposals to add two species of small cetaceans to the Scientific Committee's List of Recognised Species of Cetaceans (SC/59/O15).

Beasley *et al*. (2005) documented morphological and genetic discontinuities between the form of the Irrawaddy dolphin (Orcaella brevirostris) in the coastal waters of New Guinea and Australia and animals in the remainder of the species' range. The two forms differ significantly in several morphological features and are separated by 17 diagnostic sites in a 403 base-pair region of the mtDNA control region. This latter distinction is greater than the genetic distance between other pairs of recognised species, such as Stenella coeruleoalba and Delphinus delphis. Beasley *et al*. (2005) described the new Australasian form as the snubfin dolphin Orcaella heinsohni. The sub-committee endorsed this description and recommended that the Australian snubfin dolphin Orcaella heinsohni be added to the Scientific Committee's List of Recognised Species of Cetaceans.

The status of the nominal species in Sotalia has been debated for some time. In particular, there has been disagreement as to whether the marine and riverine forms are distinct at the species or sub-species level. In recent papers Monteiro-Filho *et al*. (2002), Cunha *et al*. (2005) and Caballero *et al*. (2007) recommended separation of these two forms into discrete species: the riverine Sotalia fluviatilis and the coastal Sotalia guianensis. The two forms differ in morphological characters, and mtDNA and nuclear sequences. The sub-committee endorsed this classification and recommended that Sotalia guianensis be added to the Scientific Committee's List of Recognised Species of Cetaceans. The sub-committee further recommended that the common name not be assigned to this species until scientists in South America have reached a consensus.

8. Progress on previous recommendations

IWC Resolution 2001-13 (IWC, 2002, p.60) directs the Scientific Committee to review progress on previous recommendations relating to critically endangered stocks of small cetaceans on a regular basis.

8.1 Baiji

In recent years the sub-committee has expressed repeated concern over the dire conservation status of the baiji (Lipotes vexillifer). At this year's meeting Taylor reported the results of a recent survey (Turvey *et al*., submitted) that indicate that the baiji is likely extinct. This represents the first human-caused extinction of a cetacean species. A systematic visual and acoustic survey was conducted for baiji from Yichang to Shanghai between 6 November and 13 December 2006. Independent teams of expert observers worked aboard two survey vessels travelling at 15 km/hr and covered the in-channel distance from Yichang to

Shanghai (1660 km) twice. Dongting and Poyang lakes were not covered because these lakes are regularly surveyed for finless porpoise and baiji have not been seen in the lakes since the 1970s. Survey participants concluded that the lack of any baiji sightings or acoustic recordings during this survey means that the species is now likely extinct. The sub-committee endorsed the methods used in this survey and agreed fully with the conclusions of the scientists who conducted the survey. The baiji is likely extinct.

The sub-committee noted that, despite extensive scientific discourse for more than two decades, little effort was made to implement any real conservation measures for this species. In hindsight, the extinction of this species is not surprising; species cannot be expected to save themselves. The extinction of this species also underscores the risk to other endangered species of small cetaceans and particularly to the vaquita (see below). Such highly endangered species require swift and decisive intervention before they are forever lost.

8.2 Vaquita

The sub-committee also reviewed the current status of the highly endangered vaquita (Phocoena sinus). In a recent paper Rojas-Bracho *et al.* (2006) provided a comprehensive review of the status of this species. The paper also reviews the recent (2005) establishment of a Vaquita Refuge in the northern Gulf of California by the Mexican Ministry of the Environment, an area that contains within its borders approximately 80% of all verified sightings of this species. In addition, the Government of Mexico established the Programme for the Protection of the Vaquita, also in 2005, in which $1 million is to be transferred to the state governments of Baja California and Sonora to support implementation. The authors of this paper conclude that the vaquita's survival does not depend on more science but on improved management and conservation efforts.

Taylor presented the results of a simple modelling exercise designed to estimate the likely current abundance of vaquitas and explore the time remaining until this species will reach a critically low level of abundance. The intent of this exercise was to underscore the immediate need to remove all entangling nets from the current range of the vaquita. This conservation measure has been recommended by CIRVA, the international recovery team for the vaquita convened by the Government of Mexico (Rojas-Bracho *et al.* 2006).

Data for this analysis came from two primary sources. D'Agrosa *et al.* (2000) monitored fishing activities and vaquita by-catch in three fishing villages in the Upper Gulf –Puerto Peñasco, San Felipe and El Golfo de Santa Clara from January 1993 to January 1995. A minimum of 39 vaquitas were killed per year in El Golfo de Santa Clara alone which, extrapolated to the Upper Gulf, yields 78 vaquita deaths annually. From a dedicated line transect survey conducted in 1997 Jaramillo *et al.* (1999) estimated that 567 CV = 0.51) vaquitas were present in the Upper Gulf at that time. There are no more recent estimates of the magnitude of either by-catch or abundance for the vaquita.

The likely rate of decline for the vaquita was estimated by assuming that the rate of animals killed in entangling nets has remained constant since the documentation of D'Agrosa *et al.* (2000) in the mid-1990s. The best estimate of the number of vaquitas killed divided by the best estimate of vaquita abundance in that same time period results in a removal rate of 13.8% per year (78/567). Assuming that the vaquita population is growing at its maximal rate of 4%/year (see Rojas-Bracho *et al.* 2006), the population is declining at an annual rate of 9.8%. Using this rate, and assuming no density depensation, the current population size of the vaquita is estimated as 213 animals. This exercise also suggests that the time remaining to a critical threshold, below which more extreme conservation actions would be necessary, is approximately 8 years.

Taylor also presented the results of analysis of the statistical power required to detect a 10% per annum decline. The precision of abundance estimates for this species is poor because of the small size of the animals, their inconspicuous surfacing behaviour, small group size (between 1 and 2 individuals) and their habit of avoiding boats. The results of this exercise indicate that future line-transect surveys will not be effective on any time-scale that might be useful for vaquita conservation. This reinforces the conclusions of Taylor and Gerrodette (1996), who estimated that by the time any decline in abundance could be detected, the vaquita could well be extinct. No new methodology has been developed since that paper was published to change this conclusion. In addition, the costs are high and would significantly reduce funds needed for direct conservation action.

The sub-committee concludes that the current number of vaquitas is likely in the low hundreds and that there is very little time remaining until the population becomes so small that it is vulnerable to depensation and ecological, genetic and demographic stochasticity. It is important to emphasise that conservation measures typically applied to other very small populations, such as captive breeding, are not a viable option for this species. The sub-committee further concludes that another survey cannot provide any information needed for the conservation of this critically endangered species. More science is not required to conserve this species. Instead, the sub-committee strongly recommended that resources be found to design and implement a comprehensive programme to eliminate entangling nets from the range of the vaquita through a buy-out programme or other system of compensation to affected fishing communities.

The extinction of the baiji serves as an urgent warning regarding the vulnerability of extremely small populations of cetaceans. The baiji was the first cetacean species driven to extinction by humans in modern times. If we do not act quickly and decisively, the vaquita, which was just described fifty years ago, will soon join the baiji.

8.3 Harbour Porpoise

SC/59/SM26 described a framework for estimating the growth rate of harbour porpoise populations (Phocoena phocoena) in the North Sea and European Atlantic using a population model. The model was simultaneously fit to data on abundance, life history (age at sexual maturity, pregnancy rate and mortality age structure) and by-catch rate (per unit fishing effort) with data on total fishing effort as input. The model fitting was accomplished in a Bayesian statistical framework, allowing explicit consideration of uncertainty. The performance of the framework was illustrated using data on harbour porpoise from the United Kingdom. The population model provided a useful method for assessing the consistency of information from different datasets. The framework will be further developed to consider population structure of harbour porpoises in the North Sea and data on by-catch and life history from other countries in the region.

Read briefly summarised SC/59/BC6, which presented a Bayesian approach for estimating demographic rates and impacts of by-catch on the population of harbour porpoises in the Gulf of Maine and Bay of Fundy. The approach combines mortality risk functions to estimate parameters that describe rates of both natural and by-catch mortality throughout life. The approach allows estimation of potential population growth rate and the rate realised under by-catch mortality. Furthermore, the approach takes into account multiple sources of uncertainty in data and process, and provides posterior distributions for a rich set of demographic rate parameters that are unknown for most cetaceans. Further refinement of the model is planned in the near future.

SC/59/SM2 presented the results of a trial using acoustic alarms (pingers) conducted in the Danish North Sea hake gill net fishery in July-September 2006. The goal of the trial was to determine whether the spacing of the Aquatec AQUAmark 100 pinger could be increased without reducing its effectiveness in reducing harbour porpoise by-catch. The trial was designed as a controlled experiment with complete observer coverage, where nets without pingers formed the control group and nets with pingers spaced at 455 m and 585 m, respectively, formed the two experimental groups. Control nets without pingers had a by-catch rate of 0.54, nets with pingers spaced at 455 m had a by-catch rate of 0.00 and nets with pingers spaced at 585 m had a by-catch rate of 0.12. The by-catch rates for the two experimental groups were both significantly different from that of the control group ($p < 0.0001$; 1 d.f.; $\alpha = 0.95$). The results of this experiment showed that pinger spacing can be increased considerably in this fishery, relative to current guidelines and regulation, without any loss of efficacy. The paper discussed factors influencing the general applicability of these results and recommended that further trials of pinger spacing be conducted in other gill net fisheries and with other pingers. Larsen noted that Denmark has now introduced a two-year trial period in which pingers may be spaced at distances greater than that required by EU Council Regulation 812/2004. Read noted that it would be useful to map the sound field produced by these pingers in situ and Larsen replied that some work had been undertaken in this regard and that more research was planned. The sub-committee welcomed the results of this experiment and looked forward to receiving updates of future work in this area.

SC/59/SM28 presented the results of a trial conducted to determine the efficacy of a new type of pinger in reducing harbour porpoise by-catch. It has been hypothesised that alerting sounds might stimulate porpoises to echolocate, which would enhance detection of the net. This concept was tested by deploying custom made alarms, called PAS (Porpoise Alerting Sound) pingers, in the Danish hake gill net fishery during July-August 2006. Alerting sounds were artificial porpoise-like click trains that simulated the clicks porpoises use when investigating targets. The PAS pingers produced a series of 110 kHz clicks, with a source level of 125-138 dB p-p re 1µPa @ 1 m, at 50-2500 clicks per second. Conventional gill nets were used with a mesh size of 130 mm, twine size of 0.57mm, 40.5 meshes high, an 8-mm head rope equipped with 100-mm elliptical floats, and a total length of 2000 knots. Half of the nets were equipped with PAS pingers and the other half with dummy (silent) pingers, all attached at intervals of 180 m. Observers collected data on fishing activity, fish catches and porpoise by-catch. There was a by-catch of 17 porpoises in the PAS nets and 15 in control nets. There was no significant difference in by-catch rates between the experimental and control nets ($p = 0.06$; 1 d.f.). These results indicate that the alerting sounds emitted by the PAS pingers do not reduce the by-catch of harbour porpoises.

Members of the sub-committee asked whether an artificial click train with a different center frequency (e.g. 140 kHz vs. 110 kHz) might produce a different result. Larsen replied that the signal used in the PAS pinger has been shown to stimulate echolocation in trials with captive porpoises. There were also questions regarding the use of this type of pingers with acoustically reflective gill nets. Larsen noted that detection of nets may not be a problem for free-swimming porpoises that should be able to detect nets at a range of 3 - 5m and perhaps at much greater distances. The sub-committee welcomed this work and noted that the causes of entanglement of harbour porpoises (and other small odontocetes) are still poorly understood.

The sub-committee also received a report of the first photographed observation of a harbour porpoise in Svalbard, Norway (Joergensen 2007). This sighting (and one made in the same area in 2004) is approximately 1000 km north of the typical distributional limit of the species in Norway.

At its meeting in 2003, the sub-committee highlighted the endangered status of the population of Baltic harbour porpoises, especially in the 'Baltic proper' and the urgent need for immediate actions to prevent further anthropogenic mortality in this region. In addition, the sub-committee reiterated its strong endorsement of the measures outlined in the ASCOBANS recovery plan for porpoises in the Baltic (the 'Jastarnia Plan'). Since then, the sub-committee has reviewed the results of a 2002 aerial survey that produced two sightings of single porpoises, yielding an estimate of 93 groups (95% CI=10-460 groups) (SC/56/SM7), together with the results of aerial surveys in the German portion of the western Baltic in 2003 - 2006 that produced abundance estimates of 0 - 4,793 (SC/58/SM19). At the present meeting, some new information was presented from the Baltic. SC/59/ProgRep Germany referred to the deployment of porpoise detectors in the German sector from Kiel Bight to the Pomeranian Bay in 2006 (ongoing since 2003 fide Dinter) as part of the implementation of the Jastarnia Plan. SC/59/ProgRep Sweden reported that detectors were also deployed along the Swedish Baltic coast, with expected future expansion to Finland. The sub-committee was informed about an European Union Regulation on Fisheries (EU Regulation 812/2004) requiring the use of pingers on gill nets set by vessels 12m and longer and a ban on drift nets that will be effective in 2008. The sub-committee welcomed this new information and requested that it be informed at its next annual meeting of any other progress made towards implementation of the EU Regulation 812/2004 and the Jastarnia Plan, especially in regard to animals in the Baltic proper. The sub-committee also requested that ASCOBANS provides a written report describing what has (and has not) been accomplished in terms of plan implementation.

8.4 Sotalia

SM/59/29 reviewed the status of Sotalia guianensis in Venezuela. Throughout its range the main threats to this species are by-catch and habitat degradation. This is also true in Venezuela, where populations may be impacted by petroleum extraction activities, shipping traffic and fisheries by-catch. By-caught animals in Venezuela may be subject to some level of consumptive use. Recent efforts have focused on designing and implementing a plan to evaluate the status of this and other cetaceans in the Maracaibo system, including examination of the causes of stranding events (including by-catch). The sub-committee welcomed this news and encouraged further research assessing the level and impact of by-catch of this species, in particular in the Maracaibo system and Orinoco river.

8.5 Other

Reeves informed the sub-committee of catches of small cetaceans in Greenland. As reported in IWC/59/4 Appendix E, the NAMMCO Scientific Committee met in November 2006 and reviewed recent research, together with catches and management of narwhals and belugas in Greenland. Aerial surveys and studies of stock structure are underway for both species in Greenland. The NAMMCO Scientific Committee expressed concern about the narwhal quotas set for West Greenland (260 animals in 2006/7) and Melville

Bay (115 animals in 2006/7). The West Greenland quota exceeds the recommended level of 135 and the quota for Melville Bay 'might not be sustainable.' Beluga quotas have been reduced since their introduction in 2004 (140 animals for West Greenland and 20 for Qaanaaq in 2006/7), but the NAMMCO Scientific Committee 'remained concerned that the total removals for West Greenland were still above the recommended level of 100.' Noting this, the sub-committee reiterated is earlier recommendations that stocks of narwhals and belugas in West Greenland should remain the focus of major conservation concerns.

Reeves also provided information on the magnitude of harvests of other small cetaceans in Greenland for which no quotas exist. In 2005, the Greenland hunting statistics (Anon, 2006) reported harvests of 2,568 harbour porpoises, 15 killer whales (noted above) and 291 long-finned pilot whales (Globicephala melas). The sub-committee expressed concern regarding these harvests, particularly of the large numbers of harbour porpoises reportedly taken, as no assessment has been made of their sustainability, and recommended that formal assessments be made of these stocks.

The sub-committee received information from da Silva (INPA, Manaus, Brazil) on the large and growing illegal catch of botos (Inia geoffrensis) for use as bait in the central Brazilian Amazon (IWC, 2007, p. 317). Botos are captured by harpoon after tributaries or small lakes are blocked by nets. Some individuals are kept alive after capture, and live botos have been observed with both harpoon wounds and line around their peduncle, presumably after escaping. This illegal killing continues at levels that are very likely to be unsustainable. The effects of the hunt are shown by declining densities of botos in standardised visual surveys and the disappearance of marked individuals from the population. Martin and other sub-committee members noted that this practice likely originated elsewhere in the Amazon Basin (e.g. Columbia) and may continue in these areas today. There are no current attempts by local or national authorities to stem this illegal hunt and, as a result, it is likely to continue until either the boto or the target fish species are driven to such low levels that the fishery is no longer economically sustainable. The sub-committee expressed great concern regarding these illegal takes and recommended that the Government of Brazil make every effort to determine the number of individuals killed and the geographic extent of the hunt, and conduct an assessment of the impact of these removals on the dolphin population.

Wade, Bass, and Kasuya returned attention of the sub-committee to the hand-harpoon hunt for Dall's porpoise populations in the western North Pacific near Japan that targets a population of truei-type porpoise as well as a population of dalli-type porpoise found in the Sea of Japan and the southern Okhotsk Sea. The sub-committee has previously expressed concern for the status of these populations, for example, in IWC (1992), IWC (1993), and most recently in IWC (2002). Wade noted one development, referring to a summary of information about the hunt available on the website of the National Research Institute of Far Seas Fisheries (Iwasaki 2006, http://kokushi.job.affrc.go.jp), where it is stated that "in order to promote further rational and scientific resource management, it is sought to build a resource control model considering the species' ecology and the amount of the resources, and that if conditions are set carefully, it may be possible to apply the idea of PBR from Wade (1998)". The sub-committee encouraged the consideration of alternative methods to evaluate catch levels of these Dall's porpoise stocks. Therefore, Wade briefly reviewed alternative methods used for scientific evaluation of levels of catches of marine mammals, especially of small cetaceans, including methods of the sub-committee (IWC 2002), ASCOBANS (2000, 2006), PBR (Wade 1998), and the New Zealand MALFIRM (Gales 1995). He applied them for comparison to the populations of Dall's porpoise targeted in the hunts. For the southern Okhotsk Sea population (dalli-type), the alternative thresholds range from 596 to 4,520. For the truei-type population, the alternative thresholds range from 539 to 4,340. The subcommittee noted that catch levels remain high –for 2001-2005 it averaged 7,169 for dalli-type porpoise and 8,226 for truei-type porpoise (http://kokushi.job.affrc.go.jp). Wade noted this catch level was above the lowest alternative threshold by nearly a factor of 2, and was higher than some of the other alternative thresholds by a factor of 4 or more. He also noted that if the maximum annual population growth rate of Dall's porpoise is truly 4%, under the assumptions of a density-dependent model it should be understood that a catch of 4% will cause the population to decline to levels approaching zero, and will prevent future recovery.

The sub-committee reiterated its extreme concern for these stocks and repeated its previous recommendation that catches be reduced as soon as possible to sustainable levels. Given that the existing abundance estimates for these stocks are now 17 years old, the sub-committee strongly recommended that new abundance estimates be generated for Dall's porpoise stocks in the region and encouraged adjacent member states to facilitate such a survey. Such estimates should address potential biases from vessel avoidance or vessel attraction. The subcommittee repeated its recommendation for research on quantification of by-catches, investigation into the accuracy of estimates of catch, and research into population structure of Dall's porpoise in the Okhotsk Sea, further details of which can be found in IWC (2002). Finally, the sub-committee noted that a full assessment of the status of these stocks, as recommended in 2002, has not been undertaken, and the subcommittee repeated its recommendation that a full assessment of the status of each population be conducted as soon as possible.

9. TAKES OF SMALL CETACEANS

The sub-committee reviewed a table of incidental captures of small cetaceans (Appendix 1) and thanked the Secretariat for compiling these records. The sub-committee welcomed the information submitted by some member countries and encouraged others to contribute these data.

Several members of the sub-committee noted that live captures were planned in several parts of the world (e.g. Panama, Turkey and the Solomon Islands) for a variety of small cetaceans (killer whales, bottlenose dolphins, etc.) for display purposes. The sub-committee reiterated its long-standing recommendation that no removals (live capture or directed harvest) should be authorised until a full and complete assessment had been made of their sustainability.

10. OTHER

SC/59/BC3 compiled and reviewed existing information on the interactions between cetaceans and fishing operations in the Archipelago of the Azores. Information presented included unpublished data collected by two fisheries observer programmes as well as data collected opportunistically during short-term research projects. In addition, the paper included a brief synopsis of these fisheries and a presentation of past or ongoing monitoring projects. Over a nine-year period, the tuna fishing observer programme reported 57 dolphins incidentally hooked on the fishing line; all were released alive. Between 1998 and 2000, annual estimates of incidental capture of dolphins for the whole tuna fleet were <50 individuals. Capture rates declined in the following years. There was only one record of cetacean mortality associated with other fishing operations. Cetacean interference occurred in up to 15% and 2% of the observed sets for demersal and swordfish fisheries, respectively. The cost of this interference is difficult to assess but detectable losses occurred in only a small fraction of these cases. Overall, results suggested a low level of interaction between cetaceans and fisheries in the Azores and that the economic impact of cetacean interference was probably small. However, observer coverage of some fisheries was low and degree of interaction may be underestimated. The authors recommended that existing observer programmes be expanded to increase observer coverage of some fisheries and allow monitoring of other fisheries.

The sub-committee noted two papers that reported on by-catch mitigation research in the Mediterranean (SC/59/BC 8 and 10). Both papers were preliminary in nature and the sub-committee looked forward to receiving full reports of this research at next year's meeting. SC/59/SM16 summarised pathology in the skeletons of Peale's dolphins (Lagenorhynchus australis) from southern South America. The sub-committee welcomed this paper, but did not have time to review it in detail.

11. WORK PLAN

The sub-committee reviewed its schedule of priority topics. Those currently held by the sub-committee (IWC, 2007, p. 317) are as follows:

Systematics and population structure of Tursiops

Status of ziphiids in the Southern Ocean

Status of common dolphin (Delphinus spp.)

Status of small cetaceans of the eastern tropical Atlantic

Given that next year's meeting will be held in Santiago, Chile, the sub-committee agreed to adopt a review of conservation issues regarding small cetaceans in the south-eastern Pacific. The sub-committee also agreed to add another item to its list of future priority topics: fishery depredation by small cetaceans.

12. ADOPTION OF REPORT

The report was adopted at 12:39 on May 14th, 2007. On behalf of the sub-committee, Rogan thanked the invited participants for their contribution to the global review of status of killer whales and the rapporteurs for their assistance with the report.

Table 1. Global overview of killer whale distribution and density. Adapted from Forney and Wade (2006) with information presented at this meeting added.

Region	Source of abundance information	Data Type	Years	Area size (km^2)	Effort (km)	No. Si	No. Ani	Si / 1000 km	Abund. Estimate	CV	Density (Animals per 100 km^2)	Catalog or Minimum count
ATLANTIC OCEAN AND ADJACENT SEAS												
Norwegian Sea	Øien 1990	LTR	1988	477,727	5,742	7	67	1.22	3,100	0.63	0.65	
Northern Norway - coastal	Similä *et al*. 1996	CAT	1990-1993	*67,000*								408
	SC/59/SM/13	CAT	1986-93 + 2002-2003						614		0.61	
Iceland & Faroe Islands	Gunnlaugsson and Sigurjónsson 1990; Sigurjónsson *et al*. 1989	LTR	1987	2,281,630	21,827	25	199	1.15	6,618	0.32	0.29	
NW Scotland	MacLeod *et al*. 2003	LTR	1998	104,000	2,157	0	0	0.00	0		0.00	
North Sea/West of Great Britain	Stone 1997	SURV	1996		7100 hrs	17	120					
North East Atlantic	SC/59/SM5	LTR	1987	2,285,353	26,545	21	88	0.79	8,260	0.45	0.36	
		LTR	1989	3,011,133	17,226	23	89	1.34	26,774	0.63	0.89	
		LTR	1995	2,428,812	12,648	5	33	0.40	4,413	1.21	0.18	
		LTR	2001	2,728,383	15,891	42	44	2.64	15,014	0.42	0.55	
Newfoundland/Labrador	Lien *et al* 1988	SURV	1979-1986		85,273	58		0.68				
Southeastern U.S. shelf/slope	Garrison *et al*. 2003	LTR	2002	263,564	3,744	0	0	0.00	0		0.00	
Western North Atlantic (SE U.S.)	Mullin and Fulling 2003	LTR	1998	573,000	4,163	0	0	0.00	0		0.00	
Gulf of Mexico (Oceanic Northern Gulf)	Derived from Mullin and Hoggard 2000	LTR	1991-1997	398,960					246	0.39	0.06	
Gulf of Mexico (Oceanic Northern Gulf)	Mullin and Fulling 2004	LTR	1996-2001	380,432	12,162	5	12	0.41	133	0.49	0.03	
Gulf of Mexico (GulfCet I area)	Derived from Mullin and Hoggard 2000	LTR	1991-1997	154,621					92	0.48	0.06	
Gulf of Mexico (aerial surveys)	Mullin and Hoggard 2000	LTR	1996-1998	82,796	4,101	0	0	0.00	0		0.00	
Gulf of Mexico (shelf waters)	Fulling *et al*. 2003	LTR	1998-2001	245,800	2,196	0	0	0.00	0		0.00	

Region	Source of abundance information	Data Type	Years	Area size (km^2)	Effort (km)	No. Si	No. Ani	Si / 1000 km	Abund. Estimate	CV	Density (Animals per 100 km^2)	Catalog or Minimum count
Northern Spain	López *et al*. 2004	SURV	1998-1999	9,842	8,128	0	0	0.00	0		0.00	
Spain (Gibraltar area)	SC/59/SM25	CAT	1999-2006									32
Spain (Biscay area)	SC/59/SM25											
Mediterranean	Notarbartolo-di-Sciara 1987	OBS	1985									
Brazil	SC/59/SM11	OBS				118						
Southern Brazil	Pinedo *et al*. 2002	SURV			3,324	5	15	1.50				
Patagonia, Argentina	López and López 1985, Iñíguez 2001	CAT	1985-1997	*20,002*		408						30
			SOUTHERN OCEAN									
Area II	Hammond 1984	LTR	1981-1982	1,830,660	11,810	13	301	1.10	12,367	0.69	0.68	
Area III	Hammond 1984	LTR	1979-1980	1,795,778	12,812	22	1,608	1.72	38,278	0.63	2.13	
Area IV	Hammond 1984	LTR	1978-1979	1,431,045	12,792	24	946	1.88	16,399	0.55	1.15	
Area V	Hammond 1984	LTR	1980-1981	1,868,464	10,014	24	6,014	2.40	136,500	0.69	7.31	
S of 60°S	Branch and Butterworth 2001	LTR	1978-1983	9,935,989	65,979	117	2,002	1.77	91,310	0.34	0.92	
S of 60°S	Branch and Butterworth 2001	LTR	1985-1990	11,655,723	67,550	114	817	1.69	27,168	0.26	0.23	
S of 60°S	Branch and Butterworth 2001	LTR	1991-1997	10,922,924	52,334	68	836	1.30	24,790	0.23	0.23	
Southern Ocean	Kasamatsu & Joyce 1995	LTR	1976-1988	28,765,576	130,036	129	1,135	0.99	80,400	0.15	0.28	
Terra Nova Bay, Ross Sea	SC/59/SM8	SURV	Jan-Feb 2004	400	5,342	39		0.008			0.069	5
Antarctic Peninsula	SC/59/SM10	SURV	1997-2006			70					0.13 / NM	73
Antarctica	SC/59/SM21	OBS	1981-2007			108						87
Marion Island, Southern Ocean	Keith *et al*. 2001, Pistorius *et al*. 2002	OBS	1973-2000		5m							25-30
			PACIFIC OCEAN AND ADJACENT ARCTIC WATERS									
Central Bering Sea	derived from Waite *et al*. 2002	LTR	1999	196,885	1,761	2	10	1.14	121		0.06	
SE Bering Sea	Waite *et al*. 2002	LTR	2000	158,561	2,194	11	50	5.01	391	0.43	0.25	

Region	Source of abundance information	Data Type	Years	Area size (km^2)	Effort (km)	No. Si	No. Ani	Si / 1000 km	Abund. Estimate	CV	Density (Animals per 100 km^2)	Catalog or Minimum count
Aleutian Islands	Forney (unpublished data)	LTR	1994	634,042	2,780	14	75	5.04	2,594	0.44	0.41	
Aleutian Islands, west of Unimak	Zerbini *et al*. 2006	LTR	2001-2003	109,933	3,560	16	113	4.49	584	0.51	0.54	
Gulf of Alaska, east of Unimak	Zerbini *et al*. 2006	LTR	2001-2003	107,680	5,494	14	192	2.55	655	0.54	0.61	
G of AK *transients*	Matkin *et al*. 1999	CAT		*214,307*					32		0.01	32
Western AK (excluding Kodiak)	Dahlheim 1997; Waite, personal communication	CAT		*94,998*					180		0.19	180
BC/Washington *residents*, summer	Ford *et al*. 2000; Carretta *et al*. 2002	CAT	1970-2003	129,889					295		0.23	295
Alaska Southeast to Kodiak *residents*	Matkin *et al* 1999; Dahlheim, personal communication, Angliss & Lodge 2002	CAT		150,515					440		0.29	440
U.S. West coast *transients*	Matkin *et al* 1999; Matkin, personal communication, Angliss & Lodge 2002	CAT		400,904					344		0.09	344
Oregon/Washington	Barlow 2003	LTR	1996-2001	325,018	7,482	7	52	0.94	898	0.35	0.28	
California	Barlow 2003	LTR	1991-2001	817,549	33,327	11	64	0.33	511	0.35	0.06	
California (aerial surveys)	Forney *et al*. 1995	LTR	1991-1992	264,270	13,042	2	2	0.15	65	0.69	0.02	
Mexico (Gulf of California)	Guerrero-Ruiz *et al*. 1998	CAT	1972-1997	*210,000*		156	843				0.04	86
Gulf of California	SC/59/SM15	CAT	1972-2006			243	1365					236
Eastern Tropical Pacific	Wade and Gerrodette 1993	LTR	1986-1990	19,148,000	135,300	57	308	0.42	8,500	0.37	0.04	
	SC/59/SM27	SURV	1977-2006									162
Mexico (Gulf of California)	Gerrodette and Palacios 1996	LTR	1986-1993	262,125	4,377	3	13	0.12	146		0.06	
Mexico (Pacific Coast EEZ)	Gerrodette and Palacios 1996	LTR	1986-1993	2,054,192	25,356	15	56	0.59	852		0.04	
Central America EEZ	Gerrodette and Palacios 1996	LTR	1986-1993	323,013	5,251	3	12	0.57	143		0.04	
Costa Rica EEZ	Gerrodette and Palacios 1996	LTR	1986-1993	475,737	8,465	4	14	0.47	153		0.03	
Panama EEZ	Gerrodette and Palacios 1996	LTR	1986-1993	188,045	3,692	1	1	0.27	10		0.01	
Columbia EEZ	Gerrodette and Palacios 1996	LTR	1986-1993	329,492	5,856	1	6	0.17	64		0.02	

Region	Source of abundance information	Data Type	Years	Area size (km^2)	Effort (km)	No. Si	No. Ani	Si / 1000 km	Abund. Estimate	CV	Density (Animals per 100 km^2)	Catalog or Minimum count
Ecuador EEZ	Gerrodette and Palacios 1996	LTR	1986-1993	229,863	1,164	1	2	0.86	75		0.03	
Galapagos	Merlen 1999	OBS	1948-1997									
Eastern Temperate Pacific	NMFS, 1997 Sperm Whale Abundance and Population Structure Cruise, unpublished	LTR	1997	7,786,000	8,100	4	31	0.49				
Hawaii	Barlow 2006	LTR	2002	2,452,916	17,050	2	13	0.12	349	0.98	0.01	
Sea of Okhotsk	Berzin and Vladimirov 1989	OBS	1979-1984									
Kamchatka and Commander Islands	Miranova *et al*. 2002	OBS	1992-200			274	1,619					700-800
Russian Far East,	SC/59/SM4 Burdin *et al* 2006	CAT	1996-2006		13,000, 213 days	188	789					450
Sakhalin Island Area, Russian Far East	SC/59/SM4	OBS			5 years	9						
	Razlivalov (2004) in SM4	OBS	2003		2 months	13	70					
Chukotka	SC/59/SM4	OBS	2005			1	68					
	Grachev *et al* (2002) in SM4	OBS	1983-2001				45-50					
	Melnikov & Zagrebin (2005) in SM4	OBS	1990-2000				788					
Sea of Okhotsk	SC/59/SM4	SURV	2003								3.47 per 100 NM	
	Valdimirov *et al* (2004) in SM4	SURV	1998-1999								1.87 per 100 NM	
Primorsky Krai	SC/59/SM4	OBS	2006		1 week	1						
Japan (aerial Surveys)	Kasuya 1971	SURV	1959-1970		318,190	26	151	0.08				
Western North Pacific	Miyashita *et al*. 1996	SURV	1993-1995		20,179	7	31	0.35				
Taiwan	SC/59/SM1	OBS	1996-2005			20						
Marquesas Islands/French Polynesia	Laran & Gannier 2001	SURV	1998-2000		4,896	1	-	0.20	0		0.00	
Society Islands/French Polynesia	Gannier 2000	SURV	1996-1999		6,452	0	-	0.00	0		0.00	

Region	Source of abundance information	Data Type	Years	Area size (km^2)	Effort (km)	No. Si	No. Ani	Si / 1000 km	Abund. Estimate	CV	Density (Animals per 100 km^2)	Catalog or Minimum count
New Zealand	Visser 2000	CAT	1992-1997			3,269			119	0.20		115
	SC/59/SM19		1998-2006									132
Solomon Islands	Shimada & Pastene 1995	SURV	1993		3,704	1	5	0.27				
Pacific Islands Countries and Territories	SC/59/SM WP2	OBS										
Papua New Guinea	Visser & Bonaccorso (2003)	OBS + CAT				94	14					14
	SC/59/SM20					8						
Eastern South Pacific (Chile to Easter Island)	Aguayo *et al*. 1998	OBS	1993-1995		*581 hrs*	3	8					
INDIAN OCEAN AND ADJACENT SEAS												
Indian Ocean	Eyre 1995	SURV	1993		23,030	1	2	0.04				
Maldives	Ballance *et al*. 2001	SURV	1998		1,700	0	-	0.00	0		0.00	
South Australia	Ling 1991	OBS	1982-1990			26						
Australia	SC/59/SM7	OBS				933						
Komodos Island, Indonesia	Kahn and Pet 2003	SURV	1999-2001		8,716	2	-	0.23				
Crozet Archipelago	Poncelet *et al*. 2002	M-R	1977-2000									43-93
	SC/59/SM23	CAT	1987-2006									195

REFERENCES

Anon. 2006. Piniarneq 2007: Jagtinformation og Fangstregistering. Published by Grønlands Hjemmestryre Direktoratet for Fiskeri, Fangst og Landbrug, Nuuk, 36pp.

ASCOBANS. 2000. Resolution No. 3 Incidental Take of Small Cetaceans, 3rd Session of the Meeting of Parties to ASCOBANS, Bristol, United Kingdom, 26 – 28 July 2000 (http://www.service-board.de/ascobans_neu/files/2000-6.pdf)

ASCOBANS. 2006. Resolution No. 5 Incidental Take of Small Cetaceans, 5th Session of the Meeting of Parties to ASCOBANS, The Netherlands, 18 - 20 September and 12 December 2006 (http://www.service-board.de/ascobans_neu/files/mop5-final-5.pdf)

Ballard G, Ainley DG (2005) Killer whale harassment of Adelie penguins at Ross Island. Antarctic Sci 17(3):385-386

Bain, D.E., Lusseau, D., Williams, R. and Smith, J.C. Vessel traffic disrupts the foraging behaviour of southern resident killer whales (*Orcinus* spp.). *Marine Ecology Progress Series*. Submitted. 26pp

Baird, R.W. 2002. Killer whales of the world: natural history and conservation. Voyageur Press, Stillwater, Minnesota, USA.

Beasley, I., Robertson, K. M. and Arnold, P. 2005. Description of a new dolphin, the Australian snubfin dolphin *Orcaella heinsohni* sp. n. (Cetacea, Delphinidae). *Mar. Mamm. Sci.* 21:365—400.

Berzin, A.A. and Vladimirov, V.L. 19883. A new species of killer whale (Cetacea, Delphinidae) from Antarctic waters. Zoologicheskii Zhurnal 62:287-295 (in Russian).

Branch, T. A. and D. S. Butterworth. 2001. Estimates of abundance south of 60 degrees S for cetacean species sighted frequently on the 1978/79 to 1997/98 IWC/IDCR-SOWER sighting surveys. *Journal of Cetacean Research and Management* 3: 251–270.

Caballero, S., Trujillo, F., Vianna, J.A., Barrios-Garrido, H., Montiel, M.G., Beltran-Pederos, S., Marmontel, M., Santos, M.C., Rossi-Santos, M., Santos, F.R. and Baker, C.S. 2007. Taxonomic status of the genus *Sotalia*: species level ranking for 'tucuxi' (*Sotalia fluviatilis*) and 'Costero' (*Sotalia guianensis*) dolphins. *Mar. Mamm. Sci.* 23:358—386

Cunha, H.A., da Silva, V.M.F., LailsonBrito, J., Santos, M.C.O., Flores, P.A.C., Martin, A.R., Azevedo, A.F., Fragaso, A.B.L., Zanelatto, R.C. and Solé-Cava, A.M. 2005. Riverine and marine ecotypes of *Sotalia* dolphins are different species. *Mar. Biol*. 148:449-457.

D'Agrosa, C., Lennert-Cody, C.E. and Vidal, O. 2000. Vaquita by-catch in Mexico's artisanal gillnet fisheries: driving a small population to extinction. Conservation Biology 14: 1110 – 1119.

Dalla Rosa, L. 1995. Interações com a pesca de espinhel e informações sobre a dieta alimentar de orca, *Orcinus orca* Linnaeus 1758 (Cetacea, Delphinidae), no sul e sudeste do Brasil. Rio Grande, 40p.(Bachelor thesis)

Dalla Rosa and Secchi, E. Killer whale (*Orcinus orca*) interactions with the tuna and swordfish longline fishery off southern and south-eastern Brazil: a comparison with shark interactions. *J. Mar. Biol. Ass. U.K.* (2007), 87, 135–140.

Forney, K.A. and Wade, P. Worldwide distribution and abundance of killer whales. 2006. In *Whales, whaling and ocean ecosystems*, Estes, J.A., Brownell, Jr., R.L., DeMaster, D.P., Doak, D.F. and Williams, T.M. (eds). University of California Press Pp. 145-162

Gales, N. J. 1995. Hooker's sea lion (*Phocarctos hookeri*) recovery plan. Department of Conservation Threatened Species Recovery Plan Series No. 17.

Iwasaki, T., *et al.* 2006. Current status of international fishing resource. Number 46 Ishi Iruka in the Pacific Ocean & Sea of Japan & Okhotsk sea. 6pp. (translated from Japanese)

IWC. 1991. Report of the Sub-committee on Small Cetaceans. *Rep. Int. Whal. Commn*. 41.

IWC. 1992. Report of the Sub-committee on Small Cetaceans. *Rep. Int. Whal. Commn*. 42:178–234.

IWC. 2002. Report of the Standing Sub-Committee on Small Cetaceans. *J. Cet. Res. Manage*. 4 (Suppl.) 325–338.

Guinet, , C., Domenici, P., de Stephanis, R., Barrett-Lennard, L., Ford, J.K.B. and Verborgh, P. In press. Killer whale predation on bluefin tuna: exploring the hypothesis of the endurance-exhaustion hypothesis. *Marine Ecology Progress Series*.

Herman, D.P., Burrows, D.G., Wade, P.R., Durban, J.W., Matkin, C.O., LeDuc, R.G., Barrett-Lennard, L.G. and Krahn, M.M. Feeding ecology of eastern North Pacific killer whales *Orcinus orca* from fatty acid, stable isotope, and organochlorine analyses of blubber biopsies. *Marine Ecology Progress Series* 302: 275-291

Joergensen, M. First photographed observation of the harbour porpoise (*Phocoena phocoena*) in Svalbard. 2pp

Krahn, M.M., Herman, D.P., Matkin, C.O., Durban, J.W., Barrett-Lennard, L., Burrows, D.G., Dahlbeim, M.E., Black, N., LeDuc, R.G. and Wade, P.R. 2006. Use of chemical tracers in assessing the diet and foraging regions of eastern North Pacific killer whales. *Marine Environmental Research* 63: 91

Lauriano G, Fortuna CM, Vacchi M (2007) Observation of killer whale (*Orcinus orca*) possibly eating penguins in Terra Nova Bay, Antarctica. Antarctic Sci 19(1):95-96

Matkin, C.O., Barrett-Lennard, L.G., Yurk, H., Ellifrit, D. and Trites, A.W. 2007. Ecotypic variation and predatory behavior among killer whales (*Orcinus orca*) off the eastern Aleutian Islands, Alaska. *Fish. Bull*. 105:74-87.

McHugh, B., Law, R.J., Allchin, C.R., Rogan, E., Murphy, S., Foley, M.B., Glynn, D. and McGovern, E. (in review) Bioaccumulation and enantiomeric profiling of organochlorine pesticides and persistent organic pollutants in the killer whale (*Orcinus orca*) from British and Irish waters. Marine Pollution Bulletin

Monteiro-Filho, E.L.A., Monteiro, L.R. and Reis, S.F. 2002. Skull shape and size divergence in dolphins of the genus *Sotalia*: a tridimensional morphometric analysis. ***J. Mamm***. 83:125-134.

Morrice, M.G. 2004. Killer whales (*Orcinus orca*) in Australian territorial waters. Technical Paper, Deakin University, Warrnambool, Victoria, Australia. 50 pp.

Ohsumi, S. 1975. Review of Japanese small-type whaling. *Journal of the Fisheries Research Board of Canada* 32(7): 1111–1121.

Øien, N. 1988. The distribution of killer whales (*Orcinus orca*) in the North Atlantic based on Norwegian catches, 1938-1981, and incidental sightings, 1967-1987. pp. 5-77. In: J. Sigurjónsson and S. Leatherwood (Ed.) *Rit Fiskideildar*, Vol XI**.** Reykjavík.

Pitman, R.L., and Ensor, P. 2003. Three forms of killer whales (*Orcinus orca*) in Antarctic waters. *Journal of Cetacean Research and Management*, 5(2), 131-139.

Pitman, R.L., Perryman, W.L., LeRoi, D. and Eilers, E. 2007. A dwarf form of killer whale in Antarctica. *Journal of Mammology*. 88(1) 43-48. 6pp

Smith, T.G., Visser, I.N., Bullock, I.D., Green, G., Carlsson, O.G.L., and Imberti, S. 2007. Antarctic Peninsula killer whales (*Orcinus orca*) hunt seals and a penguin on floating ice *Marine Mammal Science* In Press.

Rojas-Bracho, L., Reeves, R.R. and Jaramillo-Legorreta, A. Conservation of the vaquita *Phocoena sinus*. 2006. *Mammal Review* 36(3):179-216. 38pp.

Ross, P. S., G. M. Ellis, M. G. Ikonomou, L. G. Barrett-Lennard, and R. F. Addison. 2000. High PCB concentrations in free-ranging Pacific killer whales, *Orcinus orca*: Effects of age, sex ,and dietary preference. Mar. Pollut. Bull. 40(6):504–15.

Siciliano, S., Lailson Brito Jr., J. and Azevedo, A.F. 1999. Seasonal occurrence of killer whales (*Orcinus orca*) in waters of Rio de Janeiro, Brazil. Z. Säugetierkunde 64: 251-255.

Taylor, B.L. and Gerrodette, T., 1993. The uses of statistical power in conservation biology: the vaquita and the Northern spotted owl. Conservation Biology, 7: 489 – 500.

Toresen, R. 2007. Norsk vargytende sild [Norwegian spring spawning herring]. *Havets ressurser og miljo* 2007:80-81.

Visser, I.N. and Bonoccoso, F. 2003. New observations and a review of killer whale (*Orcinus orca*) sightings in Papua New Guinea waters. *Aquatic Mammals* 29(1):150-172.

Visser, I.N., and Mäkeläinen, P. 2000. Variation in eye-patch shape of killer whales (*Orcinus orca*) in New Zealand waters. *Marine Mammal Science*, 16: 459-469.

Wade, P.R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. ***Mar. Mamm. Sci***. 14:1-37.

Wade, P.R. and T. Gerrodette. 1993. Estimates of cetacean abundance and distribution in the eastern tropical Pacific. *Report of the International Whaling Commission* 43: 477–493.

Williams, R. and Lusseau, D. 2006. A killer whale social network is vulnerable to targeted removals. *Biology Letters* 2(4): 497-500.

Zerbini, A.N., Waite, J.M., Durban, J., LeDuc, R., Dahlheim, M. E. and Wade, P.R. Estimating abundance of killer whales in the nearshore waters of the Gulf of Alaska and Aleutian Islands using line-transect sampling. ***Mar. Biol.*** 150: 1,033-1,045.

Appendix 1

AGENDA

1 Convenor’s opening remarks
2 Election of Chair and appointment of rapporteurs
3 Adoption of Agenda
4 Review of available documents
5 Population structure, systematics and status of killer whales
    5.1 Distribution
    5.2 Abundance
    5.3 Stock structure
    5.4 Life history
    5.5 Ecology
    5.6 Habitat use
    5.7 Directed takes and incidental mortality
    5.8 Other consideration of status
6 Infectious and non-infectious diseases of marine mammals and impact on cetaceans (joint session (part) with E)
7 Review updates to list of recognised species of cetaceans
8 Review of previous recommendations
    8.1 baiji
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    8.5 other
9 Takes of small cetaceans
10 Other
11 Work plan
12 Adoption of report

Appendix 2

SMALL CETACEAN CATCHES

DIRECT CATCHES OF SMALL CETACEANS FOR THE CALENDAR YEAR 2005

Data provided by Kathy Frost, ABWC (Alaska Beluga Whale Committee)

Species	Type of catch	Area/stock	Males	Females	Total landed	Struck and lost
White whale	Aboriginal	Beaufort Sea	-	-	20	-
White whale	Aboriginal	Chukchi Sea	-	-	43	-
White whale	Aboriginal	Eastern Bering Sea	-	-	132	-
White whale	Aboriginal	Kuskokwim	-	-	2	-
White whale	Aboriginal	Bristol Bay	-	-	19	-

Data from Alaska Marine Mammals Stock Assessments - 2006 (Angliss and Outlaw, 2007)

Species	Type of catch	Area/stock	Males	Females	Total landed	Struck and lost
White whale	Aboriginal	Cook Inlet			2	0

FISHERY BYCATCH OF SMALL CETACEANS FOR THE CALENDAR YEAR 2006

Dolphin species	Sex	No.	Year	Location	Cause	Det.	Source or contact
Argentina - AMMA							
Commerson’s dolphin	1F, 10U	14	2006-07	North coast TF	Shore-based nets	RNP, LGB	RNP, LGB
Spectacled porpoise	1M, 1F	6	2006-07	North coast TF	Shore-based nets?	RNP, LGB	RNP, LGB
Burmeister’s porpoise	U	1	2006-07	North coast TF	Shore-based nets?	RNP	RNP

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Argentina - AQUAMARINA									
Franciscana dolphin	F	49	Aug 06 to Feb 07	Bahia Samborombon, Cabo San Antonio	D	White croacker, weak fish	GN	F	P. Bordino, AquaMarina CECIM
Franciscana dolphin	M	31	Aug 06 to Feb 07	Bahia Samborombon, Cabo San Antonio	D	White croacker, weak fish	GN	F	P. Bordino/AquaMarina CECIM
Argentina - MACN - CONICET									
Franciscana	6 F, 3 M, 37 U		Oct. 06 – Mar. 07	Southern Buenos Aires Coast, Argentina	-	Shrimp, sharks, some fish species	GNS, TM	Reported	L. Cappozzo; M. F. Negri; M. V. Panebianco/MACN
Common dolphin	M			Southern Buenos Aires Coast, Argentina.	-	Sharks, some fish species	GNS	Reported	L. Cappozzo/MACN
Australia									
Australian snubfin dolphin	U	1	13 Oct. 06 (*1)	19°06.570’S, 146°50.593’E	R	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Australian snubfin dolphin	M &F	2	19 Nov. 06	-19.2550’S 146.8483’E	D	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Bottlenose dolphin	M	1	14 Sep. 06 (*2)	26^{0}48.46’S 153^{0}08.74’E	R	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Bottlenose dolphin	M	1	23 May 2006	-26.3939’S 153.0657’E	D	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Bottlenose dolphin	F	1	13 Jan. 2006	Noosa Beach shark net, Sunshine Coast	D	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Bottlenose dolphin	M	1	14 May 2006	-25.8987’S 153.0977’E	D	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Bottlenose dolphin	U	1	24 May 2006	-25.8941’S 153.0970’	D	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Bottlenose dolphin	U	1	24 Aug. 2006	North Stradbroke Island drum line, Moreton Bay	A	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Bottlenose dolphin	M	1	26 Jan. 2006	Noosa shark net, Sunshine Coast	D	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Bottlenose dolphin	U	1	4/01/06	32°03’S; 115°45’E	R	Unknown	RG	F	Doug Coughran, DEC

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
			(*3)						
Bottlenose dolphin	U	1	10/06	151 19’ 45” E 33 38’ 58” S	D	Sharks	NSC	F	Dennis Reid, NSW DPI
Bottlenose dolphin	F	1	11/06	151 19’ 45” E 33 38’ 58” S	D	Sharks	NSC	F	Dennis Reid, NSW DPI
Bottlenose dolphin	U	1	30/10	Evans Head	D			Stranded dead (*4)	Christine Fury, SCUWRC
Bottlenose dolphin	7M/ 2F, 14U	23	01-06/06	~19-20°S, ~116-119°E	21D , 2A	Multiple	TX	F/DA	Commercial Fisheries Program Dept. of Fisheries (WA) 168-170 St Georges Terrace, Perth, WA, 6000
(Bottlenose dolphin: 1st 2 quarters of 2006. 3rd & 4th quarters will be reported in next year’s report)									
Common dolphin	F	1	3 Oct. 2006	Alexandra Headland, Sunshine Coast shark net	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	U	1	1 Nov. 2006(*5)	Surfair Resort, Sunshine Coast shark drum line	R	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	F	2	11 Oct. 2006	28^{0}8.067’S 153^{0}30.602’E	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	F + U	2	7 Feb. 2006	-28.1583’S 153.5381’E	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	U	1	8 Apr. 2006	27^{0}58.406’S 153^{0}26.161’E	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	U	1	24 May 2006	-25.8941’ 153.0970’E	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	F	1	28 Mar. 2006	Wurtulla shark net, Sunshine Coast	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	U	1	8 Apr. 2006	Wurtulla shark net, Sunshine Coast	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	F	1	29 May 2006	-26.3939’S 153.0657’E	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	M	1	4 Jun. 2006	-26.3939’S 153.0657’E	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	F	1	25 Jul. 2006	Bribie Island shark drumline	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	M	1	11 Dec. 2006	Noosa shark net, Sunshine Coast	D	Shark	NSC	F -Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Common dolphin	U	1	10/06	151 17’ 53” E 33 43’ 11” S	D	Shark	NSC	F	Dennis Reid, NSW DPI
Common dolphin	U	1	26/3/06	Whale Beach-NSW	D	Shark	NSC		ORRCA
Indo-Pacific bottlenose dolphin	U	1	8/7/06	34 47 15 S 138 32 00 E	R	Unknown	MIS	M	C. Kemper/S.A. Museum
Indo-Pacific bottlenose dolphin	F	1	Found 10/9/06	32 59 40 S 137 46 30 E	K	Unknown	NK	S.A. Museum post mortem	C. Kemper/S.A. Museum
Pilot whale		1	6/06/2006	28°E 160°S	R	Large tuna and billfish species	LLD	V	T. Smith/AFMA PO Box 7051, Canberra Business Centre ACT 2610 (02) 6225 5322 *Tim.Smith@afma.gov.au*
Short-beaked common dolphin	U	5	2005/ 2006 (*6)	Spencer Gulf/Investigator Strait	D	Pilchard	PS1/PS2	M	SARDI Aquatic Sciences
Short-beaked common dolphin	U	1	Reported 15/6/06	32 56 17 S 137 45 54 E	D	Finfish	MIS (aqua-culture cage)	A	C. Kemper/S.A. Museum
Spinner dolphin	M	1	15 Mar. 2006	Kurrawa Beach shark net, Gold Coast -28.0265’S; 153.4411’E	D	Shark	NSC	F Shark contractor	B. Lane/DPI&F baden.lane@dpi.qld.gov.au
Striped dolphin		1	17/03/2006	27°E 154°S	R	Large tuna and billfish species	LLD	V	AFMA PO Box 7051, Canberra Business Centre
Unid. dolphin		1	13/10/2006	14°S 137°S	D	Prawns	TBS	V	ACT 2610 (02) 6225 5322
Unid. toothed whale		1	12/01/2006	29°E 160°S	R	Large tuna and billfish species	LLD	V	Tim.Smith@afma.gov.au
Unid. dolphin	U	1	Reported 4/9/06	32 56 12 S 137 45 54 E	D	*Kingfish*	MIS (aqua-culture cage)	A	C. Kemper/S.A. Museum

Belgium

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Harbour porpoise	_	3+	2005	IVc ICES area	D	Mixed fishery: sole, plaice, other species	Rec. beach fisheries, prob. gillnets; 1 animal ret. alive	Indirect & direct	J. Haelters
Harbour porpoise	_	3+	2005	IVc ICES area	D	Mixed fishery, predominantly Dover sole	Professional gillnet fisheries	Indirect	J. Haelters
Harbour porpoise	_	1	2005	IVc ICES area	D	Mixed fishery for demersal species	Bottom trawl (TBB)	Indirect	J. Haelters
Harbour porpoise	_	11-15+	2005	IVc ICES area	D	Unknown	Unk.	Indirect	J. Haelters
White-beaked dolphin	-	1	2005	IVc ICES area	D	Unknown	Unk.	Indirect	J. Haelters
Harbour porpoise	-	27-31 (+)	2006	IVc ICES area	D	Mixed fishery; bottom - demersal species	Both recreational and commercial fishermen mostly gillnets	Indirect	J. Haelters
White-beaked dolphin	-	1 (+)	2006	IVc ICES area	D	unknown	Unk.	Indirect	J. Haelters
Brazil									
Franciscana		235		Southern Brazil		croakers	GNS	Logbooks	LMM/FURG
Marine Tucuxi	F	1		São Paulo			gillnet		IPeC
Marine Tucuxi	M	1		São Paulo			gillnet		IPeC
Marine Tucuxi	M	1		São Paulo			gillnet		IPeC
Marine Tucuxi	M	1	Jul. 1st 2006	Rio de Janeiro				Fisherman called the Lab.	MAQUA
Marine Tucuxi	U	2		Praia deDiogo Lopes – RN (5°05’11’’S; 36°35’05’’W)				Entangled	Flávio J. Lima Silva *flaviogolfinho@yahoo.com.br*
Marine tucuxi	M	1		Bahia				Necropsy	IMA
Marine tucuxi	3M, 1F	4		Sergipe				Necropsy	IMA
Pantropical spotted dolphin	F	1		Bahia				Necropsy	IMA
Clymene dolphin			1	Bahia				Necropsy	IMA
Clymene dolphin			1	Sergipe				Necropsy	IMA
France									
Common dolphin	-	48	Feb/06	Bay of Biscay	D	*Dicentrarchus labrax*	PTM	M	O. Van Canneyt/ CRMM/ULR
Common dolphin	-	4	Jan-Feb-Mar/06	Bay of Biscay	D	Flat fish	GTR	V	O. Van Canneyt/ CRMM/ULR
Harbour porpoise	-	21	Jan-Feb-Mar/06	Bay of Biscay	D	Flat fish	GTR	V	O. Van Canneyt/ CRMM/ULR

		Incidental Mortality			
Species	Area/stock	Reported	Estim. total	Source	Live capture
Germany					
Harbour porpoise	North Sea	0	Unknown		
Harbour porpoise	Baltic Sea Schleswig-Holstein	3	Unknown	Gillnet	None
Harbour porpoise	Baltic Sea Mecklenburg-Prepomerania	6	Unknown	Gillnet	None

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Ireland									
Common dolphin	-	1	26/9/06	51.37N 8.01W	D	*Merluccius merluccius*	GNS	Scientific observer	BIM
Common dolphin	-	1	13/10/06	50.81N 8.63W	D	*Merluccius merluccius*	GNS	Scientific observer	BIM
Common dolphin	-	1	19/10/06	52.82N 10.50W	D	*Merluccius merluccius*	GNS	Scientific observer	BIM
Common dolphin	-	2	Oct. 06	NA	D	*Clupea harengus*	TM	Scientific observer	MI
Common dolphin	-	2	Oct. 06	NA	D	*Clupea harengus*	TM	Scientific observer	MI
Harbour porpoise	-	1	24/7/06	51.04N 8.94W	D	*Merluccius merluccius*	GNS	Scientific observer	BIM
Harbour porpoise	-	1	26/9/06	51.23N 8.24W	D	*Merluccius merluccius*	GNS	Scientific observer	BIM
Harbour porpoise	-	1	26/9/06	51.25N 8.36W	D	*Merluccius merluccius*	GNS	Scientific observer	BIM
Striped dolphin	-	1	26/9/06	51.27N 8.23W	D	*Merluccius merluccius*	GNS	Scientific observer	BIM
Italy									
Cuvier's beaked whale	F	1	21/4/05	Manduria (Taranto)	D	NK	TBB	DA	Michela Podestà, CSC – MSNMI
Common bottlenose dolphin	M	1	17/12/05	(40°59N, 009°37E)	D	-	NSC*	M	B. Diaz Lopez, BDRI
Common bottlenose dolphin	M	1	21/12/05	(40°59N, 009°37E)	D	-	NSC*	Floating	*Same as above*
Common bottlenose dolphin	U	1	Jan. 06	(40°59N, 009°37E)	D	-	NSC*	DA	*Same as above*
Common bottlenose dolphin	F	1	15/2/05	Punta Ala (Groseto)	D	NK	TBB	DA	Michela Podestà, CSC – MSNMI
Common bottlenose dolphin	F	1	27/4/05	Chioggia (Venezia)	D	NK	NK	DA	*Same as above*
Common bottlenose dolphin	M	1	6/9/05	Pineto (Teramo)	D	NK	NK	DA	*Same as above*
Common bottlenose dolphin	M	1	26/9/05	Ortona (Chieti)	D	NK	GN	DA	*Same as above*
Common bottlenose dolphin	M	1	17/12/05	Golfo Aranci (Sassari)	D	NK	NK	DA	*Same as above*
Striped dolphin	?	1	29/5/07	Ischia (Napoli)	D	NK	NK	DA	*Same as above*
Striped dolphin	M	1	9/7/05	Castelvolturno (Caserta)	D	*NK*	NK	DA	*Same as above*
Striped dolphin	M	1	30/7/05	Castiadas (Cagliari)	D	NK	GND	DA	*Same as above*
Striped dolphin	M	1	30/8/05	Ischia (Napoli)	D	NK	NK	DA	*Same as above*
Korea									
False killer whale	U	1	1/9	N34 43.700; E128.35.181	D	Mullet, anchovy, shad	FYK	F	CRI/NFRDI
Common dolphin	M	1	5/1	N36.20.702 E129.24.286	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	5/1	N36.20.540 E129.24.185	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	8/1	N36.20.562 E129.30.032	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	8/1	N36.15.517 E129.24.466	D	Squid	LL	F	CRI/NFRDI
Common dolphin	M	1	9/1	N36.06.904 E129.45.353	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	11/1	N36.23.451 E129.25.123	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	12/1	N35.49.211 E129.33.664	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	12/1	N36.05.012 E129.37.181	D	mackerel, jack mackerel	TX	F	CRI/NFRDI
Common dolphin	U	1	24/1	N36.20.120 E129.24.357	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	25/1	N36.19.311 E129.26.893	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	6/2	N35.53.235 E129.33.094	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	14/2	N36.28.862 E129.27.078	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	18/2	N35.51.769 E129.33.633	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	18/2	N35.53.343 E129.35.526	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	19/2	N36.04.705 E129.35.740	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	20/2	N36.04.624 E129.36.780	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	22/2	N35.54.097 E129.35.259	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	24/2	N35.49.478 E129.35.126	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Common dolphin	U	1	28/2	N35.53.257 E129.32.548	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	2/3	N35.52.523 E129.34.777	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	2/3	N35.53.332 E129.35.366	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	3/3	N35.47.419 E129.30.554	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	3/3	N36.19.796 E129.24.083	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	3/3	N35.53.278 E129.33.587	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	4/3	N35.47.969 E129.32.101	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	5/3	N35.48.044 E129.31.010	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	5/3	N36.04.640 E129.35.620	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	5/3	N35.52.394 E129.33.703	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	6/3	N35.48.082 E129.33.078	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	U	1	6/3	N35.47.856 E129.32.938	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	U	1	6/3	N35.48.120 E129.33.032	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	F	1	6/3	N35.52.545 E129.33.330	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	6/3	N35.52.513 E129.33.197	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	6/3	N35.52.459 E129.33.716	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	6/3	N35.52.351 E129.33.796	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	7/3	N36.21.753 E129.24.059	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	8/3	N36.17.333 E129.26.588	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	9/3	N36.11.997 E129.29.498	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	10/3	N35.47.239 E129.30.065	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	10/3	N36.10.687 E129.30.289	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	11/3	N35.51.834 E129.33.114	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	11/3	N35.54.960 E129.34.102	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	15/3	N36.06.499 E129.31.039	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	16/3	N36.22.168 E129.25.227	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	18/3	N36.04.543 E129.39.221	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	20/3	N36.20.001 E129.28.813	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	20/3	N36.26.835 E129.27.148	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	20/3	N36.04.656 E129.39.861	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	20/3	N36.14.913 E129.24.065	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	21/3	N35.47.969 E129.31.123	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	F	1	21/3	N35.48.044 E129.30.983	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	F	1	21/3	N35.59.158 E129.34.152	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	21/3	N36.06.063 E129.37.461	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	21/3	N35.51.780 E129.32.555	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	23/3	N36.22.028 E129.25.200	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	23/3	N35.54.248 E129.33.676	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	24/3	N36.19.408 E129.25.100	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	24/3	N36.00.209 E129.35.231	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	25/3	N36.21.564 E129.24.661	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	25/3	N36.21.537 E129.24.661	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	25/3	N36.23.688 E129.25.440	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	28/3	N36.20.702 E129.24.520	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	28/3	N36.20.675 E129.24.453	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	28/3	N36.20.621 E129.24.420	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Common dolphin	M	1	28/3	N36.20.621 E129.24.386	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	28/3	N36.20.648 E129.24.587	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	28/3	N36.20.702 E129.24.554	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	28/3	N36.10.914 E129.26.063	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	31/3	N36.21.537 E129.24.561	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	31/3	N36.20.621 E129.24.386	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	31/3	N35.59.142 E129.36.510	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	31/3	N36.09.394 E129.26.359	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	1/4	N36.22.130 E129.24.594	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	1/4	N36.22.103 E129.26.218	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	1/4	N36.19.883 E129.30.459	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	1/4	N36.03.799 E129.27.648	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	1/4	N36.09.890 E129.27.043	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	1/4	N36.08.531 E129.28.782	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	2/4	N35.48.007 E129.30.611	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	2/4	N35.57.962 E129.33.552	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	4/4	N36.20.001 E129.30.218	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	4/4	N36.10.105 E129.29.006	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	6/4	N35.48.724 E129.32.613	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	6/4	N36.05.416 E129.27.748	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	6/4	N36.08.456 E129.24.607	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	9/4	N36.06.128 E129.27.588	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	10/4	N36.12.304 E129.34.347	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	10/4	N36.11.819 E129.34.487	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	15/4	N36.19.990 E129.26.900	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	15/4	N36.19.441 E129.26.050	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	15/4	N36.19.505 E129.25.983	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	15/4	N36.51.694 E129.26.996	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/4	N36.12.240 E129.26.433	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	17/4	N36.28.797 E129.36.015	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	17/4	N36.02.991 E129.37.049	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	17/4	N36.04.333 E129.36.160	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	17/4	N36.12.563 E129.27.111	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	17/4	N36.12.595 E129.27.044	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	18/4	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	18/4	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	18/4	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	18/4	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	18/4	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	18/4	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	18/4	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	18/4	N36.20.130 E129.26.886	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	19/4	N35.47.969 E129.30.963	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	22/4	N36.03.104 E129.37.729	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	22/4	N36.04.996 E129.35.900	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	22/4	N35.52.556 E129.32.772	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.20.675 E129.24.453	D	Amberjack, herring,	FYK	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
						squid			
Common dolphin	F	1	23/4	N36.20.594 E129.24.554	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	23/4	N36.20.648 E129.24.353	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	23/4	N36.20.621 E129.24.386	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.20.729 E129.24.386	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.19.376 E129.26.947	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	23/4	N36.04.656 E129.35.780	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.04.656 E129.35.800	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.04.769 E129.35.680	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.04.915 E129.35.760	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	F	1	23/4	N36.04.866 E129.35.740	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	F	1	23/4	N36.04.866 E129.35.760	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.04.931 E129.35.800	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.04.996 E129.35.740	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	F	1	23/4	N36.04.721 E129.35.600	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.05.028 E129.35.840	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	F	1	23/4	N36.04.996 E129.35.660	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	M	1	23/4	N36.04.899 E129.35.720	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	F	1	23/4	N36.12.078 E129.27.455	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	24/4	N36.19.538 E129.25.916	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	25/4	N36.21.591 E129.28.376	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	25/4	N36.22.130 E129.24.528	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	25/4	N36.21.968 E129.24.494	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	25/4	N36.21.807 E129.24.293	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	25/4	N36.21.834 E129.24.561	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	25/4	N36.21.888 E129.24.561	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	25/4	N36.22.022 E129.24.494	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	25/4	N36.19.150 E129.25.782	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	25/4	N36.04.785 E129.37.661	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	M	1	25/4	N36.04.737 E129.35.040	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	25/4	N36.13.889 E129.23.905	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	25/4	N36.13.867 E129.23.919	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	25/4	N36.13.911 E129.23.865	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	25/4	N36.21.968 E129.24.327	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	26/4	N36.28.161 E129.27.423	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	26/4	N36.28.194 E129.27.423	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	26/4	N36.28.161 E129.27.531	D	Amberjack, herring,	FYK	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
						squid			
Common dolphin	U	1	26/4	N35.54.248 E129.33.090	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	26/4	N36.12.224 E129.29.358	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	27/4	N35.55.380 E129.36.643	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	28/4	N36.02.991 E129.36.709	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	28/4	N36.03.945 E129.26.548	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	29/4	N36.05.319 E129.40.232	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	3/5	N36.20.621 E129.24.420	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	4/5	N36.51.586 E129.27.063	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	4/5	N36.51.618 E129.27.036	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	4/5	N36.51.144 E129.26.120	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	8/5	N36.53.516 E129.26.584	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	8/5	N35.59.191 E129.35.571	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	9/5	N38.24.303 E128.30.429	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	9/5	N38.24.303 E128.30.429	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	9/5	N38.24.303 E128.30.429	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	9/5	N36.28.905 E129.27.001	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	9/5	N36.28.911 E129.27.149	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	9/5	N36.28.903 E129.27.028	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	9/5	N36.28.894 E129.27.018	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	9/5	N36.28.894 E129.27.169	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	10/5	N37.20.413 E129.16.419	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	10/5	N36.28.894 E129.27.189	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	10/5	N36.28.854 E129.27.008	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	10/5	N36.04.317 E129.39.881	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	10/5	N36.04.462 E129.39.741	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	U	1	10/5	N36.04.608 E129.39.761	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	M	1	10/5	N36.04.705 E129.39.821	D	Mackerel, jack mackerel	SX	F	CRI/NFRDI
Common dolphin	U	1	11/5	N36.19.106 E129.25.903	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	12/5	N37.20.413 E129.16.419	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	12/5	N36.17.387 E129.25.184	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	12/5	N36.19.688 E129.25.869	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	12/5	N36.03.704 E129.25.706	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	13/5	N36.28.097 E129.27.490	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	13/5	N36.28.194 E129.27.410	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	14/5	N36.28.129 E129.27.477	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	14/5	N36.28.172 E129.27.531	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	14/5	N36.25.095 E130.30.695	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Common dolphin	M	1	15/5	N35.53.267 E129.32.668	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	16/5	N36.19.484 E129.24.859	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/5	N36.19.473 E129.24.873	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/5	N36.19.624 E129.24.873	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/5	N36.19.462 E129.24.832	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	16/5	N36.19.527 E129.24.873	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/5	N36.19.764 E129.23.882	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/5	N36.19.807 E129.23.789	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/5	N36.19.796 E129.23.909	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	16/5	N36.19.861 E129.23.856	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	16/5	N36.19.829 E129.23.842	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	16/5	N36.19.936 E129.23.856	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	16/5	N36.19.807 E129.23.842	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/5	N36.19.839 E129.23.896	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	17/5	N36.19.085 E129.24.789	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	17/5	N36.28.108 E129.27.464	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	17/5	N36.28.129 E129.27.490	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	17/5	N35.53.310 E129.32.495	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	17/5	N35.55.165 E129.35.579	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	18/5	N36.28.870 E129.27.088	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	18/5	N36.53.472 E129.26.564	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	18/5	N36.08.957 E129.24.547	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	18/5	N35.54.270 E129.34.701	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	18/5	N36.10.930 E129.26.103	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	18/5	N36.09.318 E129.29.003	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	20/5	N36.34.500 E129.38.239	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	20/5	N36.26.943 E129.26.786	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	21/5	N36.20.044 E129.23.889	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	21/5	N36.03.831 E129.26.668	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	22/5	N36.05.853 E129.37.901	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	23/5	N36.03.233 E129.35.670	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	25/5	N36.07.098 E129.40.562	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	25/5	N36.15.980 E129.26.184	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	1/6	N36.28.108 E129.27.531	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	1/6	N36.28.129 E129.27.397	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	4/6	N36.09.351 E129.28.055	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	5/6	N36.19.516 E129.23.909	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	5/6	N36.00.705 E129.28.046	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	6/6	N36.17.285 E129.28.548	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	9/6	N35.48.044 E129.31.170	D	Mackerel, jack mackerel	TX	F	CRI/NFRDI
Common dolphin	U	1	9/6	N36.04.349 E129.24.548	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	12/6	N36.03.993 E129.35.520	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	13/6	N36.05.853 E129.40.869	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Common dolphin	M	1	16/6	N36.10.898 E129.27.225	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	20/6	N36.07.082 E129.40.402	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	20/6	N36.07.162 E129.40.282	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	20/6	N36.09.308 E129.30.031	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	22/6	N36.14.945 E129.24.720	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	7/7	N36.15.290 E129.24.292	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	12/7	N36.11.108 E129.26.263	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	21/7	N36.12.455 E129.27.554	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	8/8	N36.02.991 E129.36.769	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	9/8	N35.53.580 E129.33.144	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	10/8	N36.13.727 E129.24.587	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	12/8	N36.19.839 E129.29.870	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	21/8	N36.03.185 E129.35.030	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	23/8	N36.04.090 E129.41.722	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	23/8	N35.52.513 E129.33.051	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	25/8	N36.12.520 E129.28.086	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	3/9	N36.53.710 E129.26.153	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	3/9	N36.00.193 E129.35.491	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	3/9	N36.00.209 E129.35.371	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	4/9	N35.59.223 E129.36.510	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	7/9	N36.13.889 E129.28.863	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	8/9	N37.38.631 E129.04.975	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	10/9	N36.28.690 E129.33.972	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	15/9	N37.38.477 E129.08.196	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	16/9	N37.38.623 E129.07.947	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	21/9	N37.19.751 E129.15.509	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	22/9	N38.13.580 E128.36.051	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	23/9	N37.26.242 E129.13.178	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	26/9	N37.47.028 E128.57.562	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	26/9	N37.26.266 E129.14.626	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	28/9	N36.24.442 E129.28.897	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	29/9	N37.26.304 E129.14.086	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	2/10	N37.38.615 E129.05.128	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	3/10	N37.43.762 E128.59.566	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	3/10	N37.41.791 E129.02.309	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	3/10	N37.41.791 E129.02.309	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	3/10	N37.41.791 E129.02.309	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	4/10	N37.58.872 E128.48.534	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	4/10	N36.40.658 E129.30.109	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	8/10	N36.53.526 E129.27.204	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	8/10	N36.53.526 E129.27.110	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	10/10	N37.06.333 E129.24.587	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	10/10	N37.06.322 E129.24.492	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	10/10	N37.06.365 E129.24.465	D	Amberjack, herring,	FYK	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
						squid			
Common dolphin	U	1	11/10	N37.41.921 E129.01.968	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	11/10	N37.41.921 E129.01.968	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	11/10	N37.19.114 E129.16.990	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	14/10	N37.44.170 E129.00.014	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	14/10	N36.21.564 E129.28.309	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	15/10	N38.12.527 E128.38.271	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	15/10	N36.15.075 E129.28.530	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	16/10	N36.22.028 E129.28.762	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	17/10	N37.11.062 E129.22.064	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	17/10	N36.53.472 E129.26.631	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	20/10	N36.28.894 E129.29.080	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	20/10	N36.28.814 E129.29.100	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	21/10	N36.20.023 E129.27.529	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	23/10	N36.05.982 E129.37.421	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	25/10	N36.55.084 E129.27.130	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	27/10	N36.54.912 E129.28.006	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	30/10	N36.14.892 E129.26.552	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	U	1	2/11	N37.26.255 E129.12.639	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	2/11	N37.26.221 E129.12.620	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	2/11	N36.06.435 E129.38.681	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	3/11	N36.19.936 E129.28.920	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	3/11	N36.04.042 E129.36.801	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	8/11	N36.05.356 E129.29.764	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	10/11	N36.08.505 E129.26.047	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	10/11	N36.02.807 E129.28.902	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	13/11	N37.22.920 E129.16.114	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	13/11	N37.19.443 E129.17.588	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	13/11	N36.26.749 E129.27.550	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	13/11	N36.05.060 E129.28.188	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	14/11	N36.09.308 E129.30.286	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	16/11	N37.20.607 E129.16.517	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	18/11	N36.22.092 E129.25.281	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	21/11	N37.19.443 E129.17.588	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	22/11	N37.57.905 E128.52.197	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	22/11	N37.19.443 E129.17.588	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	22/11	N37.00.124 E129.26.552	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	25/11	N37.21.173 E129.19.466	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	29/11	N37.20.446 E129.19.466	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	29/11	N36.21.737 E129.24.879	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	13/12	N37.19.443 E129.17.588	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	15/12	N37.23.706 E129.18.127	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	16/12	N37.03.282 E129.28.621	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/12	N37.03.325 E129.28.594	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	16/12	N37.03.282 E129.28.594	D	Amberjack, herring,	FYK	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
						squid			
Common dolphin	M	1	17/12	N37.23.485 E129.17.386	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	F	1	17/12	N36.51.543 E129.27.090	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	17/12	N36.51.532 E129.27.090	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	17/12	N37.00.188 E129.26.552	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	19/12	N37.23.485 E129.17.386	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	19/12	N37.21.254 E129.18.653	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	19/12	N36.20.023 E129.27.810	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	20/12	N37.47.285 E128.57.963	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	20/12	N37.23.814 E129.17.178	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	22/12	N36.21.510 E129.26.335	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	F	1	23/12	N36.29.013 E129.27.511	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	24/12	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	24/12	N37.24.569 E129.17.314	D	As above	FYK	F	CRI/NFRDI
Common dolphin	M	1	24/12	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	24/12	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	24/12	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	24/12	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	24/12	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	24/12	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	24/12	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	24/12	N37.24.569 E129.17.314	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	U	1	25/12	N37.19.443 E129.17.588	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	25/12	N37.22.413 E129.16.229	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	25/12	N37.22.413 E129.16.229	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	F	1	25/12	N37.22.413 E129.16.229	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Common dolphin	M	1	26/12	N37.22.548 E129.23.533	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	M	1	26/12	N37.23.706 E129.18.127	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	26/12	N36.15.851 E129.25.596	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Common dolphin	M	1	31/12	N37.34.093 E129.07.784	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Common dolphin	U	1	31/12	N36.20.087 E129.25.910	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	M	1	1/1	N37.21.060 E129.17.182	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	F	1	1/1	N37.21.060 E129.17.182	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	M	1	2/1	N36.25.100 E129.26.331	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	U	1	5/1	N36.35.740 E129.25.632	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	F	1	8/1	N36.14.989 E129.23.116	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	M	1	15/3	N36.04.802 E129.34.560	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	F	1	26/3	N38.10.436 E128.38.217	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	M	1	7/6	N36.33.778 E129.28.752	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
P. w-s. dolphin	F	1	30/6	N36.40.860 E129.30.099	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
P. w-s. dolphin	U	1	3/7	N36.40.806 E129.43.042	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
P. w-s. dolphin	U	1	8/7	N36.41.458 E129.40.241	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	F	1	12/8	N38.10.252 E128.38.408	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	U	1	28/9	N38.12.648 E128.37.968	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	M	1	11/12	N35.20.703 E129.36.700	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
P. w-s. dolphin	M	1	14/12	N38.11.438 E128.37.355	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	F	1	14/12	N35.34.673 E129.37.133	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	F	1	16/12	N38.15.278 E128.35.522	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	F	1	19/12	N37.53.184 E128.52.556	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
P. w-s. dolphin	M	1	19/12	N35.15.688 E129.23.060	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	M	1	22/12	N37.22.548 E129.23.533	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	M	1	23/12	N38.20.376 E128.32.200	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	U	1	27/12	N38.04.747 E128.41.347	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	F	1	30/12	N37.22.891 E129.14.859	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	U	1	30/12	N37.22.891 E129.14.859	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
P. w-s. dolphin	F	1	30/12	N36.20.066 E129.29.937	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	M	1	31/12	N36.20.152 E129.25.321	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	M	1	31/12	N36.20.023 E129.25.803	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	U	1	31/12	N36.20.206 E129.31.001	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
P. w-s. dolphin	U	1	31/12	N36.20.152 E129.31.028	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	4/1	N35.52.588 E129.33.752	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	18/1	N35.47.931 E129.31.170	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	25/2	N35.47.425 E129.30.268	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	1/3	N35.47.462 E129.30.275	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	1/3	N36.21.510 E129.24.059	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Finless porpoise	U	1	8/3	N35.47.457 E129.30.643	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	8/3	N35.53.731 E129.34.701	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	F	1	9/3	N35.48.082 E129.31.149	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	F	1	13/3	N35.47.392 E129.31.710	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	21/3	N34 58.080 E129.17.780	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	24/3	N35.47.433 E129.30.843	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	F	1	27/3	N34 46.289 E128.23.230	D	Mullet, anchovy, shad	FYK	F	CRI/NFRDI
Finless porpoise	M	1	4/4	N35.15.534 E129.17.258	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	F	1	11/4	N34 49.415 E128.21.130	D	Mullet, anchovy, shad	FYK	F	CRI/NFRDI
Finless porpoise	U	1	16/4	N35.47.481 E129.30.623	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	24/4	N35.43.016 E129.30.243	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	18/5	N34 34.226 E125.55.553	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	M	1	31/5	N35.51.780 E129.32.662	D	Conger eel, crab, octopus	FPO	F	CRI/NFRDI
Finless porpoise	U	1	12/6	N35.43.010 E129.29.765	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	F	1	18/6	N34 58.026 E128.44.356	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	23/6	N34 39.775 E128.23.339	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	F	1	1/7	N34 47.090 E128.44.094	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	1/7	N34 47.090 E128.44.094	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	6/7	N34 45.427 E128.28.056	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	F	1	21/7	N35.38.085 E129.31.743	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	13/11	N35.02.861 E128.42.254	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	F	1	19/11	N36.00.662 E129.36.170	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	5/12	N36.07.356 E129.26.508	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	16/12	N36.08.553 E129.26.794	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Finless porpoise	U	1	30/12	N36.06.160 E129.38.621	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	6/1	N38.23.304 E128.30.001	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Harbour porpoise	U	1	6/1	N38.23.309 E128.32.307	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	M	1	9/1	N38.30.549 E128.28.379	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	14/1	N38.30.001 E128.29.998	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	14/1	N38.09.350 E128.39.749	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	15/1	N38.28.002 E128.29.957	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	18/1	N38.30.002 E128.29.998	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	19/1	N38.24.401 E128.31.452	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	19/1	N38.24.353 E128.31.457	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Harbour porpoise	U	1	20/1	N38.24.401 E128.31.452	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	23/1	N38.22.202 E128.31.453	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	23/1	N38.28.362 E128.32.102	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	23/1	N37.25.975 E129.13.589	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	24/1	N38.29.567 E128.26.260	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	25/1	N38.24.006 E128.31.311	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	27/1	N38.30.039 E128.30.053	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	2/2	N37.43.703 E129.01.505	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	2/2	N38.29.004 E128.29.999	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	2/2	N38.23.270 E128.31.300	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	5/2	N37.43.687 E129.00.495	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	5/2	N38.24.289 E128.30.405	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	5/2	N38.24.302 E128.31.450	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	7/2	N38.24.303 E128.30.429	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	7/2	N38.24.353 E128.30.395	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	9/2	N38.27.005 E128.28.306	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Harbour porpoise	U	1	9/2	N38.24.303 E128.30.429	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	9/2	N38.24.303 E128.30.429	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	9/2	N38.24.303 E128.30.429	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	9/2	N38.20.723 E128.32.489	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	10/2	N38.24.303 E128.30.429	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	10/2	N38.24.337 E128.30.427	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	10/2	N38.20.302 E128.32.348	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	10/2	N38.20.712 E128.32.324	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	10/2	N38.32.288 E128.32.283	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	10/2	N38.30.288 E128.32.705	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	11/2	N38.21.155 E128.32.308	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	11/2	N38.21.102 E128.32.400	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	M	1	13/2	N38.10.423 E128.37.905	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Harbour porpoise	M	1	15/2	N38.23.300 E128.31.209	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	M	1	15/2	N38.23.300 E128.31.209	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	M	1	15/2	N38.32.102 E128.27.200	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	M	1	16/2	N38.25.302 E128.32.006	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	18/2	N38.24.303 E128.30.429	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	M	1	19/2	N38.23.005 E128.32.005	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	20/2	N38.24.304 E128.31.006	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	M	1	21/2	N38.22.455 E128.31.454	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	M	1	24/2	N38.25.302 E128.32.006	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	3/3	N38.32.106 E128.30.208	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	M	1	10/3	N38.35.503 E128.29.303	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	11/3	N38.32.454 E128.28.509	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	F	1	20/3	N38.32.239 E128.28.304	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	27/3	N38.20.305 E128.33.305	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	1/4	N38.10.258 E128.39.003	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Harbour porpoise	U	1	23/4	N38.24.008 E128.30.397	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Harbour porpoise	U	1	26/4	N38.30.589 E128.25.868	D	Amberjack, herring, squid	FYK	F	CRI/NFRDI
Unidentified	U	1	1/3	N35.47.446 E129.30.149	D	Flounder, plaice, porgy	GN	F	CRI/NFRDI
Netherlands									
Harbour porpoise*	F+M		2006	Dutch North Sea coast	D		GN	Found dead and autopsied	IMARES
Atlantic white-sided dolphin	M		2006	49.°40N; 11°05W	D	Scad; Mackerel	Pelagic trawl	Observer	IMARES
Common dolphin	M		2006	53°13N; 11°21W	D	Scad; Mackerel	Pelagic trawl	Reported by crew	IMARES
New Zealand									
Common dolphin	U	3	??/10/06	Taranaki	D	*Trachurus*	TM	F	S. Rowe/ DOC
Dusky dolphin	F	1	??/03/06	Banks Penla	D	*Trachurus*	TM	F	S. Baird/NIWA
Dusky dolphin	U	1	??/11/06	Marlborough	D	U	GNS	F	S. Rowe/ DOC
Hector's dolphin	M	1	06/12/06	Marlborough	D	U	GNS	F	H. McConnell/ DOC
Hector's dolphin	U	3	03/04/06	Marlborough	D	U	TBB/ TM	F	H. McConnell/ DOC

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Norway									
Harbour porpoise		1		ICES area Ia	D	Angler fish, gadoids	GN	F	IMR (Arne Bjørge)
Harbour porpoise		134		ICES area IIia$_2$	D	Angler fish, gadoids	GN	F	IMR (Arne Bjørge)
Harbour porpoise		10		ICES area IIIa	D	Angler fish, gadoids	GN	F	IMR (Arne Bjørge)
Harbour porpoise		4		ICES area IVa	D	Angler fish, gadoids	GN	F	IMR (Arne Bjørge)
Portugal									
Harbour porpoise	F	1	24 Feb 2003	40°19'N; 8°51'W	D	*Trachurus trachurus*	SB	M	M. Ferreira, SPVS marisa.ferreira@socpvs.org
Harbour porpoise	M	1	13 Jun 2003	40°27'N; 8°48'W	D	*Trachurus trachurus*	SB	M	M. Ferreira, SPVS marisa.ferreira@socpvs.org
Common dolphin	M/F	1 M 1 F 23 ?	5 Aug 2003	40°33'N; 9°46'W	2 D 23 R	*Trachurus trachurus*	SB	M	M. Ferreira, SPVS marisa.ferreira@socpvs.org
Comments: At least 25 animals captured in a beach purse-seine net. 2 died and the others were released.									
Harbour porpoise	F	1	13 Jul 2004	40°03'N; 8°54'W	D	*Trachurus trachurus*	SB	M	M. Ferreira, SPVS marisa.ferreira@socpvs.org
Common dolphin	M/F	3 M 2 F 10 ?	16 Aug 2004	40°29'N; 8°48'W	5 D 10 R	*Trachurus trachurus*	SB	M	M. Ferreira, SPVS marisa.ferreira@socpvs.org
Comments: 15 animals captured in a beach purse-seine net. 10 released; 5 dead									
Common dolphin	?	8	26 Aug 2004	40°26'N; 8°53'W	R	*Sardina pilchardus*	SV	F	M. Ferreira, SPVS marisa.ferreira@socpvs.org
Harbour porpoise	F	2	14 Jun 2005	40°27'N; 8°48'W	D	*Trachurus trachurus*	SB	M	M. Ferreira, SPVS marisa.ferreira@socpvs.org
Harbour porpoise	F	1	25 Jul 2005	40°27'N; 8°48'W	D	*Trachurus trachurus*	SB	M	M. Ferreira, SPVS marisa.ferreira@socpvs.org
Spain									
Bottlenose dolphin	--	1	02/05/06	Mahon (39º52´N-4º18´E)	D		NK	DA	Cons. M. Ambiente
Common dolphin		1	21-7-06	36,44N-3,53W	D		NK	M	J. L. Mons, CREMA
Common dolphin		1	21-7-06	36,44N-3,53W	D		NK	M	J. L. Mons, CREMA
Common dolphin		1	28-6-06	36,30N-4,54W	D		NK	M	J. L. Mons, CREMA
Common dolphin		1	28-6-06	36,30N-4,54W	D		NK	M	J. L. Mons, CREMA
Common dolphin		1	21-3-06	36,43N-4,25W	D		NK	M	J. L. Mons, CREMA
Common dolphin		1	1-3-06	3,66N-4,63W	D		NK	M	J. L. Mons, CREMA
Common dolphin		1	28-2-06	36,30N-4,54W	D		NK	M	J. L. Mons, CREMA
Common dolphin		1	27-2-06	36,30N-4,54W	D		NK	M	J. L. Mons, CREMA
Common dolphin		1	12-2-06	36,43N-4,25W	D		NK	M	J. L. Mons, CREMA
Botlenose dolphin		1	25-6-06	36,32N-6,18W	D		NK	M	J. L. Mons, CREMA
Unid. dolphin		1	25-3-06	36,32N-6,18W	D		NK	M	J. L. Mons, CREMA
Unid. dolphin		1	9-3-06	36,32N-6,18W	D		NK	M	J. L. Mons, CREMA
Striped dolphin		1	4-2-06	36,43N-4,25W	D		NK	M	J. L. Mons, CREMA
White beaked dolphin	F	1	30-1-06	45,00N-5,00W	D	*Various*	TX	F	S. Lens/IEO
Cuvier's beaked whale		1	28/5/07	36,72948N -4,10257W	D	Gear not knowon	NK	M	J. L. Mons, CREMA
Sweden									
Harbour porpoise		1	3/2	Prob. Skagerrak	D				anders.m.nilsson@vgregion.se
Harbour porpoise	F	1	16/1	Väderöarna islands, Skagerrak	D	Shrimp	TM		As above
UK									
Harbour porpoise	-	20	2006	SW UK	D	*Various*	GEN	M	SMRU
Common dolphin	-	25	2006	SW UK	D	*Sea Bass*	PTM	M	SMRU
Common dolphin	-	7	2006	SW UK	D	*Various*	GEN	M	SMRU

Notes:

Argentina AMMA: These numbers and those in former years represent specimens collected by us; the actual number of animals that died is much higher. In 2006-07 there were only two expeditions to the fishing areas.

France: Only data from observer programme coordinated by Ifremer are given; stranded animals with unequivocal by-catch marks are not included. The projects PETRACET and PROCET were aimed at estimating the removal of small cetaceans by EU pelagic trawl fisheries and testing the effect of several commercial pingers (Ifremer, CRMM/ULR). In the PETRACET project pelagic trawl fisheries of the UK, Denmark, Ireland, the Netherland and France were observed. A total of 89 common dolphins, 3 striped dolphins and 1 Risso's dophin were caught in 21 among the 952 observed hauls. Extrapolated to all the fisheries, this suggests that the total removal should be 1760-1930 dolphins per year according to the type of stratification that was tested (Northridge *et al.*, 2006). The impact of such a catch on the population will be analysed in the project NECESSITY due in 2007. In the PROCET project, available pingers tested in commercial operation failed to show any effect on the frequency of by-catch events or the number of dolphins caught (Fossecave *et al.*, 2006). Other by-catch events were opportunistically reported and included 21 harbour porpoises and 4 short-beaked common dolphins caught in bottom-set trammel net fisheries operating off Arcachon, Bay of Biscay in 2006.

FISHERY BYCATCH OF SMALL CETACEANS 2004

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
USA – NEFSC									
Harbour porpoise	U	1	1/3/04	42.40°N, -70.35°W	D	Monkfish	GNS	F	NEFSC, 166 Water Street, Woods Hole, MA 02543. Dana Belden, 508-495-2136 *dbelden@whsun1.wh.whoi.edu*
Harbour porpoise	U	1	1/3/04	42.45°N, -70.35°W	D	Monkfish	GNS	F	See above
Harbour porpoise	U	1	1/29/04	42.42°N, -70.35°W	D	Cod	GNS	F	See above
White-sided dolphin	M	1	2/4/04	42.48°N, -69.91°W	D	American plaice flounder	OTB	F	See above
Harbour porpoise	F	1	2/9/04	42.45°N, -70.40°W	D	Cod	GNS	F	See above
White-sided dolphin	U	1	2/13/04	41.87°N, -68.32°W	D	Monkfish	OTB	F	See above
Harbour porpoise	U	1	2/20/04	42.44°N, -70.38°W	R	Cod	GNS	F	See above
White-sided dolphin	M	1	2/25/04	42.59°N, -69.68°W	D	White hake	OTB	F	See above
White-sided dolphin	M	1	2/27/04	39.77°N, -72.48°W	D	Atlantic mackerel	PTM	F	See above
Harbour porpoise	U	1	2/27/04	42.48°N, -70.46°W	D	Cod	GNS	F	See above
Unknown dolphin	U	1	3/5/04	38.38°N, -74.25°W	D	Atlantic mackerel	TM	F	See above
White-sided dolphin	U	1	3/13/04	41.64°N, -69.12°W	D	Cod	OTB	F	See above
White-sided dolphin	M	1	3/16/04	42.84°N, -69.90°W	D	Unknown flounder	OTB	F	See above
White-sided dolphin	F	1	3/17/04	42.49°N, -69.47°W	D	Unknown groundfish	OTB	F	See above
White-sided dolphin	M	1	3/19/04	42.55°N, -69.66°W	R	Unknown groundfish	OTB	F	See above
White-sided dolphin	M	1	3/20/04	42.63°N, -69.53°W	D	Unknown groundfish	OTB	F	See above
White-sided dolphin	M	1	3/23/04	42.52°N, -69.60°W	D	Unknown groundfish	OTB	F	See above
White-sided dolphin	U	1	3/25/04	42.75°N, -69.35°W	D	White hake	OTB	F	See above
White-sided dolphin	U	1	3/25/04	41.80°N, -68.35°W	D	Witch flounder	OTB	F	See above
White-sided dolphin	F	1	3/27/04	41.79°N, -68.25°W	D	Winter skate	OTB	F	See above
White-sided dolphin	F	1	4/5/04	41.54°N, -68.69°W	D	Witch flounder	OTB	F	See above
White-sided dolphin	M	1	4/6/04	41.72°N, -68.61°W	D	Monkfish	OTB	F	See above
White-sided dolphin	M	1	4/6/04	41.32°N, -69.24°W	D	Haddock	OTB	F	See above
Harbour porpoise	F	1	4/7/04	40.34°N, -71.00°W	D	Monkfish	GNS	F	See above
Harbour porpoise	F	1	4/7/04	40.34°N, -70.97°W	D	Monkfish	GNS	F	See above
Harbour porpoise	M	1	4/7/04	40.34°N, -70.93°W	D	Monkfish	GNS	F	See above
Harbour porpoise	M	1	4/7/04	40.36°N, -70.92°W	D	Monkfish	GNS	F	See above
Harbour porpoise	F	1	4/7/04	40.36°N, -70.92°W	D	Monkfish	GNS	F	See above
White-sided dolphin	U	1	4/7/04	41.98°N, -67.94°W	D	Monkfish	OTB	F	See above
White-sided dolphin	U	1	4/9/04	42.08°N, -67.63°W	D	Winter flounder	OTB	F	See above
White-sided dolphin	F	1	4/10/04	42.10°N, -67.71°W	D	Cod	OTB	F	See above
Unknown dolphin	U	1	4/18/04	39.94°N, -69.50°W	D	Monkfish	GNS	F	See above
Harbour porpoise	F	1	4/21/04	40.05°N, -70.06°W	D	Monkfish	GNS	F	See above
Harbour porpoise	M	1	4/21/04	39.65°N, -72.90°W	D	Sea scallop	DRB	F	See above
Harbour porpoise	F	1	4/25/04	40.58°N, -71.16°W	D	Monkfish	GNS	F	See above
Bottlenose dolphin	M	1	4/25/04	40.12°N, -70.22°W	D	Monkfish	GNS	F	See above
Unknown	F	1	4/25/04	40.62°N, -71.17°W	U	Monkfish	GNS	F	See above

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
porpoise/dolphin									
Harbour porpoise	M	1	4/27/04	37.95°N, -75.03°W	D	Monkfish	GNS	F	See above
Harbour porpoise	U	1	4/27/04		D	Monkfish	GNS	F	See above
Harbour porpoise	U	1	4/27/04		D	Monkfish	GNS	F	See above
Harbour porpoise	M	1	4/27/04	37.97°N, -75.03°W	D	Monkfish	GNS	F	See above
Unknown porpoise/dolphin	U	1	5/5/04	41.07°N, -71.34°W	D	Monkfish	GNS	F	See above
Unknown porpoise/dolphin	U	1	5/5/04	41.06°N, -71.39°W	D	Monkfish	GNS	F	See above
Unknown dolphin	U	1	5/11/04	37.75°N, -74.56°W	D	Sea scallop	DRB	F	See above
Harbour porpoise	U	1	5/22/04	40.71°N, -71.13°W	D	Monkfish	GNS	F	See above
Harbour porpoise	U	1	5/22/04	40.70°N, -71.10°W	D	Monkfish	GNS	F	See above
Common dolphin	F	1	7/3/04	38.23°N, -71.67°W	D	Short-fin squid	OTB	F	See above
Common dolphin	M	1	7/7/04	40.79°N, -66.86°W	D	Silver hake	OTB	F	See above
Common dolphin	F	1	7/8/04	40.46°N, -68.18°W	D	Silver hake	OTB	F	See above
Unknown porpoise/dolphin	U	1	7/14/04	41.81°N, -68.28°W	D	Monkfish	OTB	F	See above
Harbour porpoise	U	1	7/19/04	41.73°N, -68.38°W	D	Unknown flounder	OTB	F	See above
Minke whale	U	1	8/24/04	41.37°N, -67.32°W	D	Yellowtail flounder	OTB	F	See above
Long-fin pilot whale	F	1	9/17/04	41.70°N, -68.44°W	D	American lobster	OTB	F	See above
Long-fin pilot whale	U	1	9/24/04	41.72°N, -68.38°W	U	Atlantic herring	PTM	F	See above
Common dolphin	M	1	9/27/04	40.75°N, -66.99°W	D	Silver hake	OTB	F	See above
Harbour porpoise	M	1	10/6/04	42.72°N, -70.47°W	D	Cod	GNS	F	See above
White-sided dolphin	U	1	10/13/04	42.93°N, -70.38°W	D	Cod	GND	F	See above
Harbour porpoise	M	1	10/13/04	42.75°N, -70.29°W	D	Cod	GNS	F	See above
Harbour porpoise	M	1	10/13/04	42.76°N, -70.33°W	D	Cod	GNS	F	See above
Harbour porpoise	M	1	10/13/04	42.76°N, -70.33°W	D	Cod	GNS	F	See above
White-sided dolphin	U	1	10/29/04	39.95°N, -69.70°W	R	Long-fin squid	OTB	F	See above
Unknown baleen whale	U	1	10/29/04	41.73°N, -68.39°W	D	Monkfish	OTB	F	See above
Unknown whale	U	1	10/30/04	41.73°N, -68.38°W	D	Witch flounder	OTB	F	See above
Unknown whale	U	1	11/2/04	41.72°N, -68.38°W	D	Witch flounder	OTB	F	See above
Common dolphin	F	1	11/3/04	38.15°N, -73.78°W	D	Long-fin squid	OTB	F	See above
Common dolphin	F	1	11/3/04	38.15°N, -73.78°W	D	Long-fin squid	OTB	F	See above
Common dolphin	F	1	11/3/04	38.15°N, -73.78°W	D	Long-fin squid	OTB	F	See above
Harbour porpoise	U	1	11/7/04	42.522°N, -70.61°W	D	Cod	GNS	F	See above
White-sided dolphin	U	1	11/7/04	43.19°N, -70.27°W	D	Unknown groundfish	OTB	F	See above
Common dolphin	F	1	12/2/04	38.31°N, -73.62°W	D	Long-fin squid	OTB	F	See above
Unknown porpoise/ dolphin	U	1	12/3/04	41.04°N, -70.94°W	D	Monkfish	GNS	F	See above
Harbour porpoise	U	1	12/3/04	42.72°N, -70.47°W	D	Cod	GNS	F	See above
Common dolphin	F	1	12/4/04	38.38°N, -73.47°W	D	Long-fin squid	OTB	F	See above
Unknown whale	U	1	12/9/04	43.30°N, -70.06°W	D	Monkfish	OTB	F	See above
Unknown baleen whale	U	1	12/9/04	41.74°N, -68.37°W	R	Unknown flounder	OTB	F	See above
Unknown porpoise/ dolphin	U	1	12/16/04	40.84°N, -71.72°W	D	Monkfish	GNS	F	See above
Common dolphin	U	1	12/16/04	38.52°N, -73.28°W	D	Long-fin squid	OTB	F	See above
Common dolphin	U	1	12/16/04	38.52°N, -73.28°W	D	Long-fin squid	OTB	F	See above
Common dolphin	U	1	12/16/04	38.61°N, -73.24°W	D	Long-fin squid	OTB	F	See above
Long-fin pilot whale	M	1	12/17/04	41.91°N, -68.04°W	U	Monkfish	OTB	F	See above
Harbour porpoise	F	1	12/19/04	42.84°N, -70.25°W	D	Pollock	GNS	F	See above
Harbour porpoise	U	1	12/22/04	41.71°N, -69.82°W	D	Monkfish	GNS	F	See above
Harbour porpoise	U	1	12/30/04	40.78°N, -70.83°W	D	Monkfish	GNS	F	See above
USA - SEFSC									
Common dolphin	U	1	07/2004	44°49’N; 44°38’W	R	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	01/2004	35°56’N; 74°43’W	D	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	02/2004	20°30’N; 74°00’W	D	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	2/2004	20°25’N; 73°49’W	D	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	07/2004	35°42’N; 74°43’W	R	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	07/2004	35°42’N; 74°43’W	R	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Pilot whale	U	1	09/2004	39°43'N; 71°43'W	D	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	10/2004	39°41'N; 71°41'W	D	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	10/2004	39°48'N; 71°00'W	D	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Risso's dolphin	U	1	7/2004	39°55'N; 69°25'W	R	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Risso's dolphin	U	1	10/2004	39°42'N; 71°43'W	D	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Risso's dolphin	U	1	11/2004	38°14'N; 73°33'W	D	Swordfish/ tuna	LLD	F	L. Garrison, SEFSC
Afsc[1]									
Killer whale	U	2	2004	Bering Sea	D	Flatfish	TBB	F	M. Perez (AFSC)
Killer whale	U	1	2004	Bering Sea	R	Flatfish	TBB	F	M. Perez (AFSC)
Dall's porpoise	M	1	2004	Bering Sea	D	Pollock	TM	F	M. Perez (AFSC)
USA - SWFSC									
Northern right whale dolphin	F	1	16-Jan-2004	33° 09'N; 118° 15'W	D	*Swordfish*	GND	F	Jim.Carretta@noaa.gov NMFS SWFSC 858.546.7171
Short-beaked common dolphin	M	1	7-Nov-2004	32°30'N; 117°56'W	D	*Swordfish*	GND	F	As above
Short-beaked common dolphin	F	1	5-Jan-2004	32°37'N; 117°49'W	D	*Swordfish*	GND	F	As above
Short-beaked common dolphin	M	1	5-Jan-2004	32°37'N; 117°49'W	D	*Swordfish*	GND	F	As above
Short-beaked common dolphin	M	1	18-Nov-2004	32°29'N; 117°57'W	D	*Swordfish*	GND	F	As above
Short-beaked common dolphin	M	1	15-Jan-2004	33°00'N 118°08'W	D	*Swordfish*	GND	F	As above
Short-beaked common dolphin	M	1	7-Jan-2004	32°32'N 117°58'W	D	*Swordfish*	GND	F	As above
Short-beaked common dolphin	F	1	26-Oct-2004	32°44'N 117°45'W	D	*Swordfish*	GND	F	As above
Short-beaked common dolphin	F	1	16-Jan-2004	32°49'N 117°58'W	D	*Swordfish*	GND	F	As above
Long-beaked common dolphin	M	1	1-Aug-2004	34°17'N 119°28'W	D	*Swordfish*	GND	F	As above
USA - PIFSC									
False killer whale	U	1	25/1/04	Outside EEZ	R	Tuna	LL	F	NMFS/PIRO Observer Program
False killer whale	U	1	17/2/04	Inside EEZ	R	Tuna	LL	F	As above
False killer whale	U	1	22/3/04	Outside EEZ	R	Tuna	LL	F	As above
False killer whale	U	1	4/4/04	Outside EEZ	R	Tuna	LL	F	As above
False killer whale	U	1	9/9/04	Inside EEZ	D	Tuna	LL	F	As above
False killer whale	U	1	18/9/04	Inside EEZ	R	Tuna	LL	F	As above
Short-finned pilot whale	U	1	2/5/04	U	R	Tuna	LL	F	As above

Notes:

Argentina AQUAMARINA: Entangled in gear, cut off and sank. **MACN:** Entangled in gear.

Australia: (*1) The dolphin was released alive. The dolphin was not hooked, but had rope around the tail. The rope was removed without injury to the dolphin. (*2) Dolphin caught in the net by it's pectoral fin. It was released and sent to Sea World for rehabilitation. (*3) Entangled in fishing line. Disentangled. (*4) Fluke cut off by knife or sharp item. (*5) The dolphin was released alive. The hook was embedded in the pectoral fin. (*6) May have occurred in 2005.

Belgium: One of the bycaught porpoises in 2005 was voluntarily delivered to MUMM for research purposes. In order to continue the established cooperation with fishermen, reports of bycatches are not made available on MUMM's website. Stranded bycaught animals however, are reported as such in the online database.

Netherlands: *Estimated number minimally 250.

Italy: *Incidental capture in aquaculture antipredator nets (NSC).(Díaz López & Shirai 2007)

New Zealand: These bycatch reports represent only those individuals that were reported to DOC or the Ministry of Fisheries and were confirmed as fisheries bycatch from Government observers in fisheries or from autopsies of beach cast specimens. There is no estimate of total bycatch in NZ and the individuals reported here represent a minimum.

Spain: Entangled in gear.

Sweden: First porpoise was found in fish market.

USA: In addition to the fishery observer records above, a number of dead-stranded animals in the Southwest Region (California coast) were attributed to fishery interactions during 2004-2005: 1 bottlenose dolphin, 10 long-beaked common dolphin, 1 sperm whale, 1 Pacific white-sided dolphin, 1 short-beaked common dolphin, and 5 Harbour porpoise. Reference: Garrison (2005). [1] Data from Perez (2006)