Annex H
Report of the Sub-Committee on Small Cetaceans

Members: Amos, Anganuzzi, Aurioles, Balcomb, Bannister, Best, Bjørge, Broadhead, Brownell, Buckland, Cawthorn, Collet, da Silva, DeMaster, Goodall, Hall, Hammond, Heyning, Holt (R.), Holt (S.), Hoelzel, Horwood, Inagaki, Jones, Joyce, Kasuya, Kato, Leatherwood, Lens, Lockyer, Martin, Mate, Mead, Misaki, Miyashita, Moore, Morimoto, Nakamura (T.), Pallsbøl, Perrin (Convenor), Pitman, Puddicombe, Reilly, Sanpera, Scott (G.), Scott (M.), Smith, Swartz, Vidal, Vikingsson, Whitehead.

1. ELECTION OF CHAIRMAN

Perrin was elected Chairman.

2. APPOINTMENT OF RAPPORTEURS

Balcomb, Heyning and Mead acted as rapporteurs for the sessions on beaked whales. Buckland, Reilly, Collet and G. Scott also served as rapporteurs.

3. ADOPTION OF AGENDA

The Agenda adopted is given in Appendix 1.

4. REVIEW OF AVAILABLE DOCUMENTS AND REPORTS

The sub-committee considered documents SC/40/SM1–23 and the national progress reports. SC/40/O 9–13, 15, 16, 21, 22, 28–31, 37–39 and SC/40/Mi18 also contained information on small cetaceans.

5. REVIEW OF POPULATION BIOLOGY AND EXPLOITATION OF BEAKED WHALES, ZIPHIIDAE

5.1 Berardius bairdii

5.1.1 Distribution and stock identity

The overall distribution of Baird's beaked whale is limited to the North Pacific Ocean and adjacent seas. Kasuya (SC/40/SM8) reported on the distribution of Baird's beaked whales in the western North Pacific, Sea of Japan and the Sea of Okhotsk as determined from whale sighting cruises made during 1982–1987. Each of these areas is probably inhabited by a separate stock or population, as the whales occur concurrently in summer and autumn months along the Pacific coast of Japan (Jun-Sep: Omura *et al.*, 1955; SC/40/SM8), in the Sea of Japan (Jun-Aug: Omura *et al.*, 1955; Oct: Nishimura, 1970) and near ice floes in Soviet waters of the Okhotsk Sea (April/May, Dec: Fedoseev, 1985). The whales are not known to transit the relatively shallow straits between the regions or to enter the East China Sea (Yang, 1976; Zhou, 1986). The Pacific coast stock probably inhabits continental slope waters between the fronts of the Kuroshio and Oyashio Currents, north of about 34°N. The mid-winter distribution of the putative stocks is unknown.

There is no recent information available about Baird's beaked whales around the Kurile Islands, but Sleptsov (1955) reported the species from the Kamchatka Peninsula and the western Bering Sea along the ice edge as far north as Cape Navarin (65°N) in summer months. Strandings have been reported from the Commander Islands and St. Matthew Island in the Bering Sea as well as the Aleutian Islands and Siberia (SC/40/SM21). The whales from this region may represent yet another stock or population.

The eastern North Pacific stock (or stocks) of this species occurs in summer and autumn from Alaska (SC/40/SM21) and Vancouver Island to as far south as the tip of Baja California (23°N) (SC/40/SM13; SC/40/SM14).

Ohsumi (1983) mapped the distribution of Baird's beaked whales across the mid–latitudes of the entire North Pacific Ocean (with notable densities near the Emperor Seamount Chain and north of Hawaii) from sightings reports of Japanese whale scouting ships. However, accuracy of the identifications has been called into question and there is no way to confirm them. Kasuya reported that the Japan Fisheries Agency will send four vessels to the North Pacific for two months this summer (1988), to survey for all marine mammals between 3°N and 45°N across the entire ocean from Japan to North America. The sub–committee looks forward to seeing the report of these surveys, to resolve, in part, whether Baird's beaked whales are in fact distributed in oceanic waters far offshore.

The distributional evidence to date indicates that *Berardius bairdii* is a cold-water deep-diving species that has good potential for separate stocks and populations in the regions mentioned. Amos and Hoelzel noted that if so, recently developed molecular methods may shed light on stock identity.

5.1.2 Abundance

Miyashita (1985) calculated an abundance estimate of 4,220 for the western North Pacific population of Baird's beaked whale from sightings data. The CPUE data do not show a clear annual trend from 1947 to 1983 (SC/36/SM14), so it is not known if the population is diminishing or stable. Kasuya noted that in addition to the expanded general surveys for marine mammals mentioned in 5.1.1, there will be another vessel conducting dedicated surveys for Baird's beaked whales and pilot whales in Japanese coastal waters this summer (1988). The sub-committee looks forward to receiving the results of those surveys at its next meeting, to re-examine population size of the western North Pacific stock. There are insufficient data available for any of the other putative stocks to allow estimation of abundance.

5.1.3 Migration

SC/40/SM8 stated that the results of sightings cruises made during 1982–87 supported the conclusions of Omura *et al.* (1955) that Baird's beaked whales leave the Pacific coast of Japan in winter months. The Sea of Japan stock may possibly remain isolated there during all seasons. The Okhotsk Sea stock apparently inhabits waters near Hokkaido in late spring and fall and retreats to the north during the summer months. Its winter distribution is unknown, but Kasuya noted that some of these whales may migrate to the east of the Kuril Islands in winter when the southern Okhotsk Sea is filled with ice. As noted by Fedoseev (1985), others may remain in small open leads in the northwestern Okhotsk Sea in winter months. Dohl (1983) reported from aerial surveys along the California coast that Baird's beaked whales were present along the continental slope in summer and fall but absent in winter, a seasonal pattern which is similar to that found in the western Pacific.

5.1.4 Life history

SC/40/SM7 reported on the biological examinations of 135 Baird's beaked whales taken in 1975 and 1985–1987 in a fishery on the Pacific coast of Japan. As Omura *et al.* (1955) and Nishiwaki and Oguro (1971) had noted, the catches are primarily of sexually mature males. From examination of layers in the tooth cementum, it was determined that males attain sexual maturity at 6–10 GLGs (growth layer groups – Perrin and Myrick, 1980) at a length of about 9.1 to 9.7m, and females attain sexual maturity at 10–14 GLGs at a length of 9.8 to 10.6m. One GLG likely equals one year (Kasuya, 1977). The sex ratio of juvenile whales in the catch is approximately 1:1, but for whales with over 20 GLGs it is strongly biased toward males. There does not seem to be obvious differential catchability of males and females that could explain this imbalance in catch, although it could be due to behavioural factors, such as adult males swimming peripherally in the school. The oldest female had 54 GLGs and the oldest male 84, with a correspondingly unusual age distribution suggesting a significantly higher mortality rate in females. The sub-committee discussed the significance of a higher female mortality rate for this species and was unable to explain it, while noting that SC/40/SM22 reported a similar situation in *Ziphius cavirostris* from stranded specimens. Aurioles (1987) reported a similar distribution in a mass stranding of seven Baird's beaked whales near La Paz, B.C., Mexico. The annual pregnancy rate for adult females has been estimated at 0.30, and the ovulation rate at 0.47.

Prey items include benthic fishes (Moridae and Macrouridae) and cephalopods (Omura *et al.*, 1955; Nishiwaki and Oguro, 1971; and SC/40/SM16), which indicates deep-water feeding in the western Pacific. Rice (1963) reported macrourid fish from *B. bairdii* taken off central California. The diet of these whales in the shallow waters of the northwest Okhotsk Sea is not known. Baird's beaked whales are heavily parasitised internally in the stomach, liver, blubber and kidney with extensive tissue pathology noted in the latter due to the nematode *Crassicauda giliakiana* (SC/40/SM15).

5.1.5 Exploitation

See Table 1 for Japanese catches. Small numbers were also taken at various land stations along the US and Canadian coast in the eastern Pacific.

Table 1

Catches of Baird's beaked whales by small-type whaling off Japan (*Rep. int. Whal. Commn* 33: 633 and ProgReps Japan)

Year	Catch	Year	Catch	Year	Catch	Year	Catch
1948	76	1958	229	1968	117	1978	36
1949	95	1959	186	1969	138	1979	28
1950	197	1960	147	1970	113	1980	31
1951	242	1961	133	1971	118	1981	39
1952	322	1962	145	1972	86	1982	60
1953	270	1963	160	1973	32	1983	37
1954	230	1964	189	1974	32	1984	38
1955	258	1965	172	1975	46	1985	40
1956	297	1966	171	1976	13	1986	40
1957	186	1967	107	1977	44	1987	40

5.1.6 Status

The CPUE data for the Western Pacific do not show a clear annual trend from 1947 to 1983 (SC/36/SM14), so it is not known if that population is diminishing or stable. The Government of Japan sets an annual national quota on the harvest of this species of 40. The whaling industry has divided this into 35 in the western Pacific and 5 in the Okhotsk Sea.

5.2 Berardius arnuxii

5.2.1 Distribution and stock identity

Joyce reported on sightings of Arnoux's beaked whales during IDCR cruises in Antarctic waters from 1978/9–1987/8. This species was seen in Antarctic Areas II, IV, V and VI, but it was noted that in earlier cruises some sightings may have been simply logged as 'unidentified ziphiid' or not logged at all. Balcomb noted that he had plotted sightings in Southern Hemisphere waters from logbook entries of Japanese whale scouting ships before 1975 (kindly provided by Ohsumi); but, as with the sightings data for the species' North Pacific congener, there may be some question as to the accuracy of some of the identifications. Goodall and SC/40/SM23 provided data on strandings of Arnoux's beaked whale from all southern continents, noting that they have tended to cluster around New Zealand (perhaps reflecting effort). The conclusion from sightings and strandings is that the species is circumpolar in distribution, occurring throughout the Southern Hemisphere in cool temperate, sub-Antarctic and Antarctic waters. The northernmost stranding was at 34°S in South Africa, and the southernmost was at 64°S on the Antarctic Peninsula (Godoy and Goodall, pers. comm.). Sightings of these whales have been made very near the ice edge and amongst ice floes in the Antarctic pack. Some have been known to become entrapped in pack ice (Taylor, 1957).

The largest male reported was 960cm long and the largest female of confirmed length 885cm. Both were mature and smaller than typical specimens of mature *B. bairdii* (SC/40/SM23). It has been suggested that this species is conspecific with *B. bairdii* (McLachlan *et al.*, 1966; Ross, 1984).

5.2.2 Abundance

Nothing is known about the absolute abundance of Arnoux's beaked whales, but Kasamatsu *et al.* (1988) noted that they are significantly less common than southern bottlenose whales (*Hyperoodon planifrons*).

5.2.3 Migration
Nothing is known about migration.

5.2.4 Life history
Nothing is known about the life history of Arnoux's beaked whales. Kasamatsu *et al.* (1988) and Balcomb reported that the species is often gregarious and has been seen in groups numbering up to about 80 individuals. There was a mass stranding of four animals in Hawke's Bay, New Zealand. According to SC/40/SM23, most strandings have been in summer. The life history of this species is presumably similar to that of *B. bairdii*, taking into account its smaller size (Mead, 1984).

5.2.5 Exploitation
Arnoux's beaked whales are not presently commercially taken in any directed fisheries, nor have they ever been taken in any significant numbers (Brownell, 1974).

5.2.6 Status
No information.

5.3 Hyperoodon ampullatus
Unless otherwise referenced, the information below for *Hyperoodon* spp. is abstracted from Mead (in press).

5.3.1 Distribution
Northern bottlenose whales are distributed in the North Atlantic from Nova Scotia to about 70°N in Davis Strait, along the east coast of Greenland to 77°N and from England to the west coast of Spitzbergen. There is a single record from the White Sea. In the North Sea, strandings have been reported from Belgium, Denmark, France and England. There are a few records from the Mediterranean. In the western Atlantic, there are two main centres of distribution, one in the area called 'The Gully' just north of Sable Island, Nova Scotia and the other in Davis Strait off northern Labrador. Strandings have been reported from as far south as Rhode Island. This is a deep-water animal, usually inhabiting waters more than 2,000m deep.

Sightings from the North Atlantic are presented in SC/40/O 9, 11, 15 and 29.

5.3.2 Abundance
A recent line-transect survey yielded preliminary estimates of 3,142 bottlenose whales off Iceland and 287 off the Faroe Islands (SC/40/O 30). Vikingsson reported that allowance was not made in the survey for animals missed due to long dives.

5.3.3 Migration
There is evidence from the distribution of catches that a northward migration occurs in the eastern Atlantic in April-July. The southward migration begins in July and continues to September.

5.3.4 Life history
Length at birth is about 350cm. Asymptotic length in males of about 850–900cm is reached at about 20 GLGs and in females of about 750cm at about 12 GLGs. One GLG is assumed to correspond to one year in this species. Fifty-three females from Labrador ranged in age from 1 to 50 GLGs; 75 males ranged from 1 to 37 GLGs. Modal age in adults was 12 GLGs for females and 16 for males. Maximum recorded age is 27 (?) GLGs for females and 37 for males.

Minimum lengths of sexually mature animals (n=5,224) were 600cm for females and 730cm for males. Mean length at attainment of sexual maturity was 690cm in females and 750cm in males. Minimum age at sexual maturation has been estimated at 7 GLGs in both sexes, with the average at 11 GLGs in females and 7–11 GLGs in males. Average mature testis weight is about 600g; the maximum recorded was 2,600g for both testes combined.

Gestation is estimated at 12 months. Lactation is estimated to last at least one year. The mean calving interval is estimated to be two years. The largest recorded foetus was 360cm long and the smallest calf 350cm. Calving takes place in the spring.

The bottlenose whale feeds on deep-living squids and fishes; an extensive list of taxa recorded from stomach contents is given in Mead (in press).

5.3.5 Exploitation
The Norwegian fishery can be divided into two periods: 1882 to 1920s, and 1930s to 1973. The catches during the first period have been estimated at 72,000. When the modern period began, a government licence was required, and more exact records were kept; a total of 5,043 whales were taken during the period 1938–1969. The fishery closed in 1973 when only 3 whales were caught. The peak annual catch during the modern period was 700. A small fishery operated out of Nova Scotia and took 87 whales in 'The Gully' during the period 1962–67.

5.3.6 Status
The minimum initial population has been estimated at about 28,000. The consensus is that the aggregate North Atlantic population is depleted, but there is disagreement about the degree of depletion (Holt, 1977). The stock(s) were classified as a provisional Protected Stock in 1977. The species is currently classified as 'Vulnerable' by the IUCN.

5.4 Hyperoodon planifrons

5.4.1 Distribution
The southern bottlenose whale has a wider distribution than that of *H. ampullatus*; it occurs in the entire Southern Ocean and north to about 30° S. It is possible that some sighting records involve misidentifications, as it is difficult for non-experts to distinguish between this species and *Berardius arnuxii*. R. Best *et al.* (1986) recently reported a sighting in November of 5 animals which they referred to the species at 5°42'S and 34°1'W (off northeast Brazil). Due to the extremely low latitude of this sighting, particularly when compared to the next most northerly record (the type specimen, at 20°S), there is some doubt about the identification.

SC/40/O 22 reported 10 sightings of 35 individuals in the area bounded by 30-40°S and 70–100°E from February to March, 1988. Joyce presented a summary of 407 sightings from IDCR cruises in 1978–1987. Goodall reported several new stranding records for South America.

5.4.2 Abundance
There is no population estimate. Joyce reported that it was the ziphiid most often sighted during the IDCR cruises. It was sighted about as often as Gray's beaked whale, *Mesoplodon grayi*, in the Indian Ocean north of 40°N (SC/40/O 22).

5.4.3 Migration
No information.

5.4.4 Life history
The maximum size reported in the literature for males is 694cm and for females 745cm. Goodall reported larger specimens of both sexes: a 714cm male with 50+ GLGs and a female of 750cm. She also reported an age of 37 GLGs for a 576cm female. A 780cm female contained a 185cm fetus (Baker, 1983). A 570cm female was lactating (Zemskii and Budylenko, 1970). A calf of 291cm had fetal folds (Ross, 1984).

Stomach contents of nine specimens included remains of squid of several families (Clarke, 1986) and krill (which may have been eaten by the squid).

5.4.5 Exploitation
Although there has been no fishery for the southern bottlenose whale, a few have been taken by pelagic whalers for research purposes (Tomilin and Latyshev, 1967; Zemskii and Budylenko, 1970).

5.4.6 Status
No information.

5.5 ? Hyperoodon sp.
Evidence has grown concerning the existence in the tropical Pacific of a beaked whale of unknown identity that is likely to prove to be a species of *Hyperoodon* (Leatherwood *et al.*, 1982). Two papers presented at this meeting dealt with this problem: SC/40/SM9 and SC/40/SM14. The consensus of the members of the sub-committee is that the whale is *H. planifrons* or may prove to be a new species. The records of *H. planifrons* from northwestern Australia (Flower, 1882) and from Brazil (Gianuca and Castello, 1976) make it plausible that the unidentified whale in the tropical Pacific could be of this species. However, considering that this is either a most remarkable range extension for a reputedly antitropical genus or even possibly an undescribed species of ziphiid of a different group, the sub-committee **recommended** that an attempt be made to collect two adult specimens (a male and a female) in the western Pacific. The possibility of collecting biopsy materials for molecular studies was also raised, but there would likely be difficulty in collecting a sufficient number of samples from both the Antarctic and the western Pacific to resolve the identity of these whales. If such studies suggested differences, specimens would still be needed for taxonomic analysis and type material.

5.5.1 Distribution
SC/40/SM9 reported eight sightings of a total of about 280 individuals on the equator at 166°W (central tropical Pacific) and in the western North Pacific in the area bounded by 130–142°E and 20–34°N. SC/40/SM14 reported 7 sightings in the area bounded by 80–170°W and 5°N – 15°S, with a concentration in the area 90–120°W and 5–15°N during 1965–88.

5.5.2 Abundance
SC/40/SM9 did not give numerical relative abundance of this species but implied that it was relatively rare. SC/40/SM14 reported that the species is rare, being involved in only 7 of 946 sightings of ziphiids.

5.5.3 - 5.5.6
There is nothing known concerning migrations, life history, exploitation or status.

5.6 Ziphius cavirostris
5.6.1 Distribution and stock identity
Cuvier's beaked whale is known from strandings along most coasts and many oceanic islands within all ocean basins (Heyning, in press). Strandings occur from tropical to sub-polar waters. Sightings data from the eastern tropical Pacific (SC/40/SM14) indicate that the species is found offshore to beyond the continental slope in this region.

Due to the wide geographical range and extreme sexual dimorphism in the skulls of *Z. cavirostris*, there are numerous synonyms in the literature (Hershkovitz, 1966; Heyning, in press). Although most of the variation observed in skulls is regarded as sexual dimorphism and/or individual variation, no comprehensive study has been done. Mitchell (1968) examined skeletal material from the northeast Pacific and believed that there are no separate stocks in that region.

5.6.2 Abundance
There are no abundance estimates for any region. Stranding data from the Northern Hemisphere indicate that strandings of *Z. cavirostris* are about as frequent as the strandings of all other ziphiid species combined (SC/40/SM21). Data from the eastern tropical Pacific (SC/40/SM14) suggest that sightings of *Z. cavirostris* are about as frequent as sightings of all species of *Mesoplodon* combined in that region. *Z. cavirostris* is the most frequently sighted medium-size cetacean within this region.

5.6.3 Migration
There is no information on migration for this species. Stranding and sighting data should be further analysed for seasonal trends in geographical distribution.

5.6.4 Life history
Life history data for this species are discussed in SC/40/SM22 and SM23. The maximum lengths recorded from precisely measured specimens are a 660cm female (Nicol, 1987) and a 693cm male. Contrary to prior published reports (Omura *et al.*, 1955), there seems to be no significant sexual dimorphism in adult size for this species (Heyning, in press).

Based on limited data, males seem to become sexually mature at about 11 GLGs in the dentine. The shortest sexually mature specimen was 526cm long and was also physically mature. The testes of sexually mature males are about 20cm in length and weigh from 150 to 372g each. The testis weights reported by Omura *et al.* (1955) seem an order of magnitude too large when compared to other data from *Z. cavirostris* and other ziphiid species of similar size. There is less reproductive information for females. The shortest sexually mature female was 512cm long. Males reach an age of up to 47 GLGs, but females attain an age of only 28 GLGs. The difference is not due to readability of layers. This vast difference in age between males and females cannot be easily explained, but the phenomenon also occurs in *Hyperoodon ampullatus* (Benjaminsen and Christensen, 1979) and in *Berardius bairdii* (SC/40/SM7). Additional specimens of *Ziphius* need to be aged to determine if the great difference in ages of males and females is general.

In the eastern tropical Pacific, pods range in size from one to seven individuals, with most sightings of four or fewer individuals; there are two records of mass strandings for this species (Heyning, in press).

5.6.5 Exploitation

The Japanese formerly took *Z. cavirostris* in small-type whaling (Omura *et al.*, 1955; Nishiwaki and Oguro, 1972). This take has largely ceased, but Kasuya reported that an occasional animal may be taken. A few *Z. cavirostris* were taken in the former small cetacean fishery off the Lesser Antilles island of St Vincent (Caldwell *et al.*, 1971). There is no systematic direct take of *Z. cavirostris* at this time. Animals may be taken incidentally in offshore fisheries, but there are no data for this.

5.6.6 Status

No information.

5.7 Mesoplodon spp.

It was suggested that species within this group be discussed in a comparative manner because there are few data on any one species and because such factors as taxonomy and pigmentation (SC/40/SM6) are more usefully covered in an overall review. Review of most of the current knowledge regarding biology can be found in Mead (1984) and Ross (1984). The species *M. pacificus* is herein retained in the genus *Mesoplodon*, not separated into the monotypic genus *Indopacetus* Moore, 1968. It is felt that until the entire genus is reviewed, no single species should be removed.

5.7.1 Distribution and stock identity

The distributions of various species of *Mesoplodon* are summarised for the Northern Hemisphere in SC/40/SM21 and for the Southern Hemisphere in SC/40/SM23. Identification of *Mesoplodon* to species at sea is difficult and seldom made, especially in the Northern Hemisphere, because the pigmentation patterns are less distinctive than for many Southern Hemisphere species. Therefore, the known distributions of the species are based almost exclusively on stranding records.

M. bidens – Sowerby's beaked whale is endemic to the North Atlantic, with the majority of strandings occurring around the British Isles. A few records are available from the northwestern Atlantic that might be records of strays, and one record from the Gulf of Mexico clearly is of a stray individual.

M. bowdoini – Andrew's beaked whale is known from about twenty specimens from the Southern Hemisphere, primarily from strandings in Australia and New Zealand. The species may be conspecific with *M. carlhubbsi*, which would give the species an antitropical distribution.

M. carlhubbsi – If Hubbs' beaked whale is distinct from *M. bowdoini*, then it is endemic to the North Pacific, with the majority of strandings occurring from British Columbia to southern California.

M. densirostris – Blainville's beaked whale seems to be distributed in tropical and warm temperate waters of all oceans. Strandings are most frequently recorded along the east coast of the United States, but stranding collection effort is also high in this region. *M. densirostris* is occasionally sighted in the eastern tropical Pacific (SC/40/SM14).

M. europaeus – Although the type specimen of Gervais' beaked whale was recorded from the English Channel, the overwhelming number of strandings are from the southeastern United States and the Caribbean region. There are records of three specimens from the Ascension Islands in the South Atlantic.

M. ginkgodens – This relatively rare species of *Mesoplodon* is known from nine strandings in the North Pacific in warm temperate and tropical waters and one stranding in the South Pacific in the Chatham Islands. Three specimens of the ginkgo-tooth beaked whale were also taken in Chinese waters (Nishiwaki *et al.*, 1972).

M. grayi – Gray's beaked whale has a circumpolar Southern Hemisphere distribution that ranges from 30° to at least 53°S. Approximately half of the recorded strandings were along the coast of New Zealand. There is one record of a *M. grayi* stranded on the coast of the Netherlands.

M. hectori – Most of the strandings of Hector's beaked whale have occurred in cold-water regions of the Southern Hemisphere (Mead and Baker, 1987), but four strandings occurred along southern California beaches in the late 1970s (Mead, 1981) and may represent a small stray group. Some additional information on recent strandings, including a mass stranding of four animals, was presented (SC/40/SM18).

M. layardii – The strap-toothed whale has a distribution in cooler waters of the Southern Hemisphere that resembles the distribution of *M. grayi*. It is the most commonly stranded species of *Mesoplodon* in the Southern Hemisphere and second only to *M. bidens* worldwide. In Tierra del Fuego, strandings of *M. layardii* consist primarily of adults, whereas strandings of *M. grayi* include young animals (SC/40/SM19).

M. mirus – True's beaked whale was previously believed to be endemic to the North Atlantic, but is now known from several strandings in the Southern Hemisphere. In the western North Atlantic, this species ranges from the Bahamas to Nova Scotia. In the northeast Atlantic most strandings occur along the British Isles and in the Bay of Biscay. Southern Hemisphere strandings include specimens from South Africa, Australia and New Zealand. Slight cranial and pigmentation differences between the North Atlantic and Southern Hemisphere specimens have been documented and discussed by Ross (1984). These differences suggest that the two groups are distinct breeding populations.

M. pacificus – Longman's beaked whale is known from two skulls, one from Australia and one from Somalia. Based on this, an Indopacific distribution is suggested.

M. stejnegeri – Stejneger's beaked whale is endemic to the North Pacific and is recorded from the Sea of Japan and along the Aleutian Islands to the coast of North America from Alaska south to southern California. The majority of strandings occur in the northern part of the range where it is not sympatric with *M. carlhubbsi*.

The unidentified species of *Mesoplodon* that has been sighted in the eastern tropical Pacific (Pitman *et al.*, 1987; SC/40/SM13 and 14) was discussed in detail. It was suggested that the basic colour pattern is similar to that of *M. layardii* (SC/40/SM21). Photographs of the unidentified species were compared with those of known *M. layardii* specimens from the Southern Hemisphere. It was concluded that although the basic pattern was similar, the differences are too great to consider the unidentified species to be *M. layardii*. The colour pattern of the unidentified species is not identical to that of any known species of ziphiid for which the colour pattern is known (the external appearance of *M. pacificus* is unknown).

5.7.2 Abundance
There are no data on absolute abundance for any species of *Mesoplodon*. The little relative abundance data available have been discussed in the above distribution section.

5.7.3 Migration
There is little or no good information to support or refute any migration pattern for any species of *Mesoplodon*.

5.7.4 Life history
There is very little life history information for any species of *Mesoplodon*. Most of the current information was summarised by Mead (1984) for all species and by Ross (1984) for those occurring in South African waters. The most information for any one species is for *M. carlhubbsi* (Mead *et al.*, 1982). Unless otherwise stated, all information in this section is from these papers.

M. bidens – Adult males may attain a length up to 550cm and females 505cm. The length at birth is about 240cm.

M. bowdoini – The largest specimens were a 457cm female and a 467cm adult male (SC/40/SM23).

M. carlhubbsi – The largest specimens of both sexes were 532cm in length. Calves are about 250cm long at birth, and the calving season is early summer (Mead *et al.*, 1982; Heyning, unpublished data). The mean testis weight of a 496cm sexually mature male was 250g.

M. densirostris – The maximum lengths recorded are for a 473cm male and a 471cm female. Calves are probably less than 240cm long at birth. The oldest physically immature male had 7 GLGs. The youngest physically mature female had 10 or 11 GLGs.

M. europaeus – The largest male was 520cm long and the largest female 456cm. Calves are about 210cm long at birth. The known maximum age for this species is 27 GLGs (Perrin and Myrick, 1980).

M. gingkodens – The maximum length reported for a female is 490cm and for a male 477cm. The maximum testis weight for a mature male was 140g (Nishiwaki *et al.*, 1972).

M. grayi – The largest female recorded was 533cm long and the largest male 564cm long. The shortest calf was 237cm long (Goodall and Baker, pers. comm.).

M. hectori – The largest male was 430cm long and the largest female 443cm. The shortest calf measured 210cm. The weight of a testis from a mature male was 116g. Two physically mature specimens (a male and a female) had nine GLGs in their teeth.

M. layardii – This is the largest known species of *Mesoplodon*. The males attain lengths up to 584cm and females 615cm. The shortest recorded calf was 250cm long (SC/40/SM20). McCann (1964) provided details on the reproductive tract of one female.

M. mirus – Females reach 510cm in length and males 533cm. Calves are about 233cm long at birth. The testis of a mature male weighed 170g. One South African female had 7 corpora in the right ovary and 6 in the left (Ross, 1984).

M. pacificus – This species is known from two skulls; thus there is no life history information available.

M. stejnegeri – The largest specimens of both sexes measured 525cm. The three known calves averaged about 245cm in length; they stranded at the southern edge of the range, two in California and one in Oregon (Heyning, unpublished data).

5.7.5 Exploitation
There are no known direct fisheries on any species of *Mesoplodon*. Rarely, some animals have been taken in small-type whaling (e.g. Nishiwaki and Oguro, 1972; Nishiwaki *et al.*, 1972). Some animals are incidentally taken in gillnet fisheries (Nishimura and Nishiwaki, 1964; Diamond *et al.*, 1987). The magnitude of this problem is unknown at this time.

5.7.6 Status
There are no data on the status of any species of *Mesoplodon*.

5.8 Tasmacetus shepherdi

5.8.1 Distribution and stock identity
Shepherd's beaked whale is found only in the Southern Hemisphere and seems to be associated with cooler waters from 33° to 50°S (SC/40/SM19 and 23). Best reported that there are now some specimens in South African museums.

5.8.2 Abundance
There is no information on abundance. However, because this species is only known from about twenty strandings and a few sightings (SC/40/SM23), it may be less abundant than some species of *Mesoplodon*.

5.8.3 Migration
There are no data on migration.

5.8.4 Life history
The largest female was 660cm long and the largest male 700cm (Mead, 1984). The female was sexually mature.

5.8.5 Exploitation
There are no records of direct or incidental takes.

5.8.6 Status
No information.

5.9 General recommendations

1. *Non-lethal research*. The sub-committee **recommended** that the new techniques for studying living cetaceans, such as individual indentification using natural marks, which have proven successful for larger whales, be encouraged for application to the beaked whales, particularly where there are reasonably consistent concentrations of a well-marked species for which concern exists about population size and stock identity (e.g. the northern bottlenose whale, *Hyperoodon ampullatus* in the North Atlantic). Whitehead reported that such studies of the species will begin soon in 'The Gully' off Nova Scotia.
2. *Effects of gillnets*. The sub-committee **recommended** that offshore gillnet fisheries should be monitored to determine the nature and extent of impact on beaked whales.
3. *Sampling catches*. The sub-committee **recommended** that, when possible, beaked whales taken in direct fisheries be examined thoroughly by biologists to collect data and samples that can be used to estimate life history parameters.
4. *Strandings*. Because information on life history is so sparse for most of the beaked whales, the sub-committee **recommended** that efforts be made to collect full suites of data and specimens for all stranded animals.

6. NEW INFORMATION ON OTHER STOCKS

6.1 Dolphins associated with tuna in the eastern tropical Pacific (ETP)

The Committee last year noted recent increases in levels of incidental mortality in the international tuna purse-seine fishery in the eastern Pacific and expressed concern over estimated substantial decline in stocks of three species that may have occurred in the period 1975 to the early 1980s (*Rep. int. Whal. Commn* 38: 51). The sub-committee recommended that detailed analyses of possible sources of bias in the abundance estimates based on data collected aboard commercial seiners be carried out and that indices of abundance based on US research-vessel surveys be reported to the Committee this year (*Rep. int. Whal. Commn* 38: 121). The sub-committee noted that documents submitted this year do address these questions and wishes to thank the members involved for this response. The sub-committee received the documents and discussed them briefly but did not conduct a substantive review of the issue. It **recommended** that such a review be carried out at a future meeting.

6.1.1 Estimates of mortality

SC/40/SM2 gave estimates of total incidental kill of dolphins for 1987. The total estimate based on kill-per-ton was 115,000. These levels are high, although they represent a 12–20% reduction over the previous year (*Rep. int. Whal. Commn* 38: 51). The number of sets on dolphins was 35% higher than in 1986, so that the kill-per-set declined. Reasons for this reduction are (1) there were lower average catches of tuna per dolphin set in 1987; (2) sets were slightly shorter on average; (3) the proportion of sets on common dolphins was smaller; (4) the percentage of night sets was down; (5) the proportion of sets with zero mortality was higher; (6) the average number of animals left in the net after backdown was smaller; and (7) the average group size encircled by the net was smaller.

It was noted that international participation in the observer programme operated by the IATTC has increased markedly. Observers were placed on board 45% of trips by fleets of all flags in 1987. The US policy was to attempt coverage of all US trips in 1987. The coverage of the US trips in the analysis was 86%; the final figure will be about 95%. The next highest was Mexico at 28%. During the first few months of 1988, observers were placed on 43% of both Mexican and US trips.

Hall suggested that mortality might be reduced substantially through better application of existing rescue gear and techniques. Further reduction of the kill would probably require development of new technology, and he expressed the hope that such research initiatives would be launched. The sub-committee **recommended** that such research be undertaken.

Concern was expressed about the comparability of mortality estimates over years. Estimates in recent years have been generated by three different methods, dictated by the data available. As coverage of the international fleet has improved, it has been possible to use more sophisticated methods. R. Holt reported plans to examine the different methods by subsampling the 1987 database, which covers almost all of the US trips.

It was also noted that kill estimates would be most useful for purposes of comparisons with estimates of abundance if they were calculated on a stock-by-stock basis. For example, the IATTC estimates for the offshore spotted dolphin are not stratified into estimates for the northern and southern stock units used in management and in estimation of abundance. The sub-committee **recommended** that the estimates be stratified by stock.

SC/40/SM1 tabulated the sex, length and reproductive condition of the dolphins examined by observers aboard the seiners. Only about one quarter of the observed kill was sampled. It was noted that several kills of over 50 animals occurred in single sets and that complete suites of life history from such large series would be extremely valuable in population analysis. The authors explained the logistical difficulties involved in dealing with such large samples. The sub-committee **recommended** that the level of biological sampling be increased, possibly by allocation of funds for returning the carcasses from large-kill sets to research facilities and for subsequent processing.

6.1.3 US sightings surveys

SC/40/SM12 presented relative abundance indices by stock based on a 1987 survey. R. Holt also provided a table of estimates from 1986.

The estimates were generated under a number of options. Some of these are expected to result in biased estimates of absolute abundance but may yield more reliable estimates of trends. Large differences were noted between estimates for the two years (e.g., under one set of assumptions, 1,257,300 offshore spotted dolphins in 1986 and 2,070,000 in 1987, a change much larger than could be accounted for by biological increase). R. Holt suggested possible explanations but considered them to be unsatisfactory. The group noted a reciprocal relationship between the estimates for spotted dolphins (given above) and those for common dolphins: 1.8 million in 1986 and 0.6 million in 1987. This may indicate that sampling offshore-spotted-dolphin habitat changed relative to the sampling of common-dolphin habitat in 1987. The tracklines were nearly the same in the two years, but the habitats may have shifted.

Pooled estimates, as defined in SC/40/SM12, appeared more stable than weighted estimates. The large differences noted may be a result of variances being underestimated, for example if dolphin schools occur in concentrations. It is possible that survey tracklines tend to hit or miss ridges of density, leading to correspondingly high or low estimates. It is also possible that many animals that are within the survey region in one season are outside in another, since in some years the tropical habitat is larger than in others due to temporary global climatic shifts.

If problems with the estimates are a result of forming of local concentrations of schools, greater sighting effort should solve the difficulty. For example, the southern region might be ignored, and more effort distributed over the northern region. However, the argument that animals may move between south and north seasonally would not then be adequately considered. Stratification by oceanographic features was discussed, but it was not considered feasible at present, especially on the micro-scale that may be required. Another possibility might be to have larger surveys in alternate years. A possible source of bias might be the use of better observers, on average, with more experience available in the second survey relative to the first. R. Holt noted that further investigative analysis would be carried out to assess the impact of factors such as this, sea state, etc. on the abundance estimates.

6.1.4 Indices of abundance from data collected on tuna seiners

SC/40/SM3 is a revision and update of Buckland and Anganuzzi (1988) which was reviewed last year. The study differs from the previous paper in that stratification procedures were introduced in the estimation of two additional parameters: average school size and f(0). In a manner similar to stratification of encounter rates (which was not changed from last year), school size estimates were computed for 1° squares and pooled into strata of similar magnitude. The overall estimates of average school size were made as weighted averages of the within-strata estimates.

The estimation of f(0) included consideration of three variables likely to have an effect on the detection function: fishing mode (dolphin or non-dolphin fishing); use of birds as cues; and use of helicopters to make initial sighting. These variables were combined by computing principal components from data pooled by 1° squares; component scores were assigned to each square. The stratification scheme was then applied to the component scores.

Two alternative area specifications were used: the areas defined in Buckland and Anganuzzi (1988) and somewhat smaller areas proposed by Au, Perryman and Perrin (1979 – also used in SC/40/SM12).

In general, the results are similar to those presented in Buckland and Anganuzzi (1988). Estimates for most stocks were slightly lower, with fewer significant trends indicated. The estimates were presented as provisional by the authors, pending computation of complete bootstrap standard errors and inclusion of additional data for 1987.

It was noted that inclusion of information regarding fishing mode, use of helicopters in searching and birds as sighting cues resulted in a marginal improvement in the reliability of the estimates and alleviated some of the concerns about bias expressed by the sub-committee last year.

There was discussion about relative differences and similarities between the results of this study and those of SC/40/SM12. It was noted that estimates for all stocks except northern offshore spotted dolphins were comparable, and in the tuna vessel estimates it is this stock for which the 1983 (El Niño) estimate is anomalously low. Estimates for eastern spinner dolphins, whose range is entirely contained within the survey areas in all analyses in all years, were least variable and showed no anomalous dip in 1983. There was consensus that environmental variation was the likely cause of the variation in estimates. Pitman noted that the 1983 El Niño resulted in the death of 15 million sea birds in the ETP and that birds of these species are frequently used as sighting cues. This could explain in part the lower sighting rate of 1983.

It was also suggested that redistribution of dolphins could be responsible for part of the inter-annual variation observed, both in the estimates in this study and the research vessel estimates reported in SC/40/SM12. Redistribution within the ETP was considered more likely than major shifts to areas outside of the known historical range.

6.1.5 Recommendation

The sub-committee was concerned that the mortality of dolphins of the three major species remains high when compared with the most recent estimates of absolute abundance (Holt and Powers, 1982) and **recommended** that every effort be made to bring it down and to assess its impacts on the stocks. An attempt should be made to produce updated estimates of absolute abundance.

6.1.6 UNEP/IATTC courses in Latin America

Hall reported that courses in marine mammal biology and assessment have been given in several countries in Latin America. The courses were directed at graduate students and others involved or likely to be involved in future in marine mammal research and management, including acting as scientific observers aboard commercial seiners in the tuna fishery. The IATTC organised the courses; funding was provided by UNEP. Several members of the sub-committee were involved as instructors or students; they stressed the high quality of the educational programme and its potential value to future conservation and management of dolphins and other marine mammals. The sub-committee endorses the effort and hopes that it will continue.

6.2 Other cetacean/fishery interactions

Da Silva reported that the Brazilian Foundation for the Conservation of Nature (FBCN) with funding from WWF-US carried out a survey of incidental catches in an artisanal gillnet fishery in Atafona in northern Rio de Janeiro State. The fishing grounds extend for some 80km along the coast in waters usually less than 16km from shore. The fleet comprises 91 boats crewed by 280 fishermen and fishes gillnets 4–13m deep × 110–2740m long with 14cm mesh. From June 1987 to April 1988, 55 dolphins of 5 species were caught: *Sotalia fluviatilis*, *Pontoporia blainvillei*, *Steno bredanensis*, *Delphinus delphis* and *Stenella* sp. The dolphins were used as bait in a longline fishery. The research was carried out by L. Lodi and L. Capistrano of FBCN.

6.3 Putative occurrence of Burmeister's porpoise in the Indian Ocean

A specimen of *Phocoena spinipinnis* reported from Heard Island in the subantarctic Indian Ocean is actually a specimen of the spectacled porpoise, *Australophocaena dioptrica* (SC/40/SM17); several members of the sub-committee have examined large series of both species, and the revised identification is certain. Thus *P. spinipinnis* remains a species endemic to coastal waters of southern South America (Brazil [SC/40/ProgRep Brazil], Argentina, Uruguay, Peru and Chile). The occurrence of *A. dioptrica* at Heard Island fits in well with its previously known broad distribution in sub-Antarctic and southern cold temperate waters.

6.4 Harbour porpoise

SC/40/SM5 reported the results of experimental line-transect surveys of harbour porpoises in an area of high density in the Bay of Fundy. Simultaneous surveys conducted by teams of observers on top of the pilot house and in the crow's nest yielded different results. Some possible causes are the greater area searched from the crow's nest, avoidance of the vessel by the porpoises, better sightability of porpoises viewed from the higher elevation, and differential distribution of sighting effort relative to the vessel's course. Hohn noted that harbour porpoises in the eastern North Pacific did not avoid survey vessels except at very close range. Suggestions from the group for improving survey methods included larger observer teams and assigned sighting sectors. The point was made that the situation in the Bay of Fundy offers a good opportunity for experimental development of line-transect methodology because of the very high density of harbour porpoises, which allows fitting of a density function to the data from a relatively short survey or survey leg. The sub-committee **recommended** that the possibilities for such work be considered by those involved in development and design of the IDCR minke whale surveys.

Bjørge reported that a programme of research on the harbour porpoise has been initiated in Norway this year. The three-year research programme is in cooperation with scientists from Sweden (SC/40/ProgRep Sweden), Denmark and the Federal Republic of Germany (SC/40/ProgRep FRG). The primary objectives of the Norwegian programme are to study reproduction and feeding habits. Stock identity will also be investigated. Samples will be collected from incidental gillnet kills and from strandings. A similar programme is under way in the Netherlands (SC/40/ProgRep Netherlands). Sightings of harbour porpoises in the North Atlantic were reported in SC/40/O 9 and 10, SC/40/O 29 and SC/40/ProgRep Netherlands. A pilot survey of harbour porpoises was conducted along the English North Sea coast in 1988 (SC/40/ProgRep UK).

6.5 White whales and narwhals

SC/40/SM10 dealt primarily with line-transect theory. While the group believes that the paper does not contain information on line-transect methodology that is not available elsewhere, they believe that the data on duration of dive in the white whale contained in the paper are new and valuable.

SC/40/SM4 discusses recent harvests of white whales in Alaska and contains data and assessments that the Committee has repeatedly recommended be provided (e.g. *Rep. int. Whal. Commn* 32: 59, 31: 67). The sub-committee concurred with the recommendation of the authors' that the estimates of abundance and harvests be refined and further work carried out on stock identity; the estimated removals of up to 6.7% are large enough to cause concern about their sustainability.

Sightings of white whales in the North Atlantic were reported in SC/40/O 9.

6.6 Pilot whales

SC/40/O 42 reported on the satellite tracking of a pilot whale re-introduced into the wild. The whale was located 479 times over a period of 95 days during which it travelled over 7,500km; time and depth data were collected for over 192,000 dives. The very large quantity of data collected provide an opportunity for modelling experimental design for tracking other small cetaceans and the large whales.

Sightings of pilot whales in the North Atlantic were reported in SC/40/O 9, 10, 11, 15, 29 and 39 and in SC/40/ProgRep Denmark.

6.7 Other species

New information was also received on a mass stranding of melon-headed whales, *Peponocephala electra*, in Brazil (SC/40/SM11); on sightings of North Atlantic killer whales (SC/40/O 9, 10, 15, 29, 30), whitebeaked dolphins (SC/40/O 9, 10), white-sided dolphins (SC/40/O 10, 29), common dolphins (SC/40/O 15, 29, 39), bottlenose dolphins (SC/40/O 15, 29, 39), Risso's dolphins and false killer whales (SC/40/O 39), and *Stenella spp.* (SC/40/O 15, 29, 39); on eastern North Pacific killer whales (SC/40/O 31); on sightings of Dall's porpoise (SC/40/O 37; on molecular genetics of several small cetaceans (SC/40/O 40); on the possible causes of mass strandings (SC/40/O 13); on sightings, strandings and exploitation of several small cetaceans in South America (SC/40/ProgReps Argentina and Brazil). Much additional information on sightings and strandings of small cetaceans and on national research programmes was included in the various national progress reports (see Item 4). A great increase (two-or threefold) in the incidence of strandings, mostly of common dolphins, was reported for the French coast (SC/40/ProgRep France). The causes of this are unknown. An unexplained mass mortality of over 700 bottlenose dolphins occurred along the US east coast (SC/40/ProgRep US); the cause is under study.

7. OTHER BUSINESS

7.1 Takes of small cetaceans in 1987

Takes are summarised in Appendix 3.

7.2 UNEP meeting on small cetaceans

A small working group was set up to consider the UNEP meeting. The sub–committee received the group's report (Appendix 2) and **recommended** that the IWC cooperate in organising and conducting the meeting.

7.3 Nomenclature

The sub-committee notes the general acceptance in the taxonomic community of the change from *Globicephala melaena* to *Globicephala melas* (*Rep. int. Whal. Commn* 39: 117) and the placement of *Phocoena dioptrica* in a new genus *Australophocaena* (*Rep. int. Whal. Commn* 39: 122) and **recommended** that the Committee's 'List of Recognised Species and Common Names' be amended accordingly.

7.4 ICES

Bjørge reported that the ICES Marine Mammals Committee recently discussed the benefits of all member nations collecting and reporting data on strandings and incidental takes of small cetaceans.

7.5 Publication of documents

The following documents are recommended for possible publication in a special volume on beaked whales: SC/40/SM6, 7, 8, 9, 13 (possibly partially combined with 14 and/or 21), 14, 15, 16, 18 (in part), 19, 20, 21, 22 and 23. Other papers developed from working papers of the meeting will be included in the volume. Additional papers on life history, status and exploitation of the northern bottlenose whale will be solicited from I. Christensen, E.D. Mitchell and R. Reeves. A list of other papers recommended for publication in *Rep. int. Whal. Commn* 39 was submitted to the Editorial Board.

7.6 Priority topics for 1989 meeting

The sub-committee proposed to review the biology and status of phocoenid populations in 1989. The group will also note and discuss briefly new information on other exploited stocks and species.

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Appendix 1

AGENDA

1. Election of Chairman
2. Appointment of rapporteurs
3. Adoption of agenda
4. Review of available documents
5. Review of population biology and exploitation of beaked whales, Ziphiidae
   - 5.1 *Berardius bairdii* (sub-items repeated for each species below)
     - 5.1.1 Distribution and stock identity
     - 5.1.2 Abundance
     - 5.1.3 Migration
     - 5.1.4 Life history
     - 5.1.5 Exploitation
     - 5.1.6 Status
   - 5.2 *Berardius arnuxii*
   - 5.3 *Hyperoodon ampullatus*
   - 5.4 *Hyperoodon planifrons*
   - 5.5 *?Hyperoodon* sp.
   - 5.6 *Ziphius cavirostris*
   - 5.7 *Mesoplodon* spp.
   - 5.8 *Tasmacetus shepherdi*
6. New information on other stocks
7. Other business
   - 7.1 Takes of small cetaceans in 1971
   - 7.2 UNEP meeting on small cetaceans
   - 7.3 Nomenclature
   - 7.4 ICES
   - 7.5 Publication of documents
   - 7.6 Priority topics for 1989 meeting

Appendix 2

RECOMMENDATIONS ON ORGANISATIONAL ASPECTS OF UNEP'S PROPOSED MEETING ON THE STATUS AND PROBLEMS OF SMALL CETACEANS

A small group of participants in the small cetaceans sub-committee reviewed the proposal for this meeting (IWC/40/10 D) to determine the importance of its goals and the suitability of the proposed approach. It was agreed that the topics proposed to be addressed were both important and timely; the scope of the proposed topics was very broad, but that the breadth appeared to be important to meet the goal of providing a basis for developing an action plan that is global in scope.

There are several documents that address many aspects of the topics proposed for this meeting, but many are in need of updating. A useful approach for this meeting might be to have consultants prepare updated material for several of these existing documents, perhaps on a regional basis, in advance of the meeting. Such updates could be finalised during the meeting, especially with any additional information that participants might bring.

The identification of institutions that would be able to provide training opportunities for scientists from developing countries would be be met by identifying individuals in potential institutions early in preparation for the meeting, and inviting their participation. Participants from areas where problems have been identified, or where they are anticipated, should be identified so that the most current information is available, and so interest in these problems is developed.

Several of the fisheries where small cetaceans are taken incidentally may be subject to technological improvements to reduce kill levels. Other fisheries may require management. The meeting should attempt to identify technical and management approaches, and those problems that appear to require additional technical expertise.

The meeting should schedule sufficient time to determine priorities for actions on small cetacean problems on a global basis, and within the regional scopes used in reviewing the status of the populations.

The proposed meeting appears to be an important step towards improving our understanding of small cetacean problems, and toward developing approaches to their solution. The group noted that scientists involved in the IWC have considerable expertise in the topics proposed to be addressed, and in the problems involved in convening such a meeting, and recommends that the IWC cooperate in planning and conducting the meeting.

Based on this discussion, the group recommends the following agenda to be considered:

1. Review status of small cetacean populations globally
   — Develop regional status reports in advance

1.1 Evaluate effect of habitat degradation
— Review ICES IOC Unit organochlorides report and other reports
— Review information on other factors
— Add information from participants

1.2 Directed fisheries
— Review Reeves and Brownell report on harvested marine mammals not under international control
— Add information from participants

1.3 Incidental kill in fisheries
— Update Northridge FAO/UNEP report on fishery/marine mammal interactions
— Review results of proposed IWC gillnet workshop
— Add information from participants

2. Review technological and management needs

2.1 Review outlook for technological solutions
2.2 Review effectiveness of different management approaches

3. Develop global action plan to address identified problem

3.1 Identify priorities for regional problems
3.2 Identify priorities that relate to global problems
3.3 Identify approaches for training needed
— Institutions to provide training
— Methods to identify individuals who would benefit from training

Appendix 3

REPORTED CATCHES OF SMALL CETACEANS IN 1987

		Argentina[1]	Australia[2]	Canada[3]	Denmark[4]	France[5]	Iceland[6]	Japan[7]	Netherlands[8]	New Zealand[9]	Norway[10]	Sweden[11]	UK[12]	USA[13]	USSR[14]	Other	Total[15]
Baird's beaked whale, *Berardius bairdii*	D	–	–	–	–	–	–	40	–	–	–	–	–	–	–	–	40
Narwhal, *Monodon monoceros*	D	–	–	x	x	–	–	–	–	–	–	–	–	–	–	–	x
White whale, *Delphinapterus leucas*	D	–	–	–	x	–	–	–	–	–	–	–	–	–	34	–	34+x
False killer whale, *Pseudorca crassidens*	D	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	2
Killer whale, *Orcinus orca*	D	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	3
	L	1	–	–	–	–	4	–	–	–	–	–	–	–	–	–	5
Pygmy or dwarf sperm whale, *Kogia* spp.	I	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1
Long-finned pilot whale, *Globicephalus melas*	D	–	–	–	1,422	–	–	–	–	–	–	–	–	–	–	–	1,422
	I	–	–	–	–	1	–	–	–	–	–	–	2	x	–	–	3+x
Short-finned pilot whale, *G. macrorhynchus*	D	–	–	–	–	–	–	386	–	–	–	–	–	–	–	–	386
	I	–	–	–	–	–	–	9+x	–	–	–	–	–	–	–	–	9+x
Dusky dolphin, *Lagenorhynchus obscurus*	D	–	–	–	–	–	–	–	–	–	–	–	–	–	–	x[16,17]	x
	I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	x[16,17]	x
Pacific white-sided d. *L. obliquidens*	D	–	–	–	–	–	–	16	–	–	–	–	–	–	–	–	16
	I	–	–	–	–	–	–	189+x	–	–	–	–	–	5+x	–	–	194+x
Atlantic white-sided dolphin, *L. acutus*	D	–	–	–	76	–	–	–	–	–	–	–	–	–	–	–	76
White-beaked dolphin, *L. albirostris*	I	–	–	–	–	–	–	–	–	–	–	–	2+x	–	–	–	2+x
Peale's dolphin, *L. australis*	D	–	–	–	–	–	–	–	–	–	–	–	–	–	–	x[16]	x
	I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3+x[16]	3+x
Bottlenose dolphin, *Tursiops truncatus*	D	–	–	–	1	–	–	1,812	–	–	–	–	–	–	–	–	1,813
	I	–	3	–	–	–	–	4+x	–	–	–	–	–	38–52+x	–	–	44–59+x
	L	–	–	–	–	–	–	–	–	–	–	–	–	24	–	–	24
Spotted dolphin, *Stenella attenuata*	I	–	–	–	–	–	–	–	–	–	–	–	–	5,031–8,598+x	–	57,544–63,510[18]	57,544–63,510
Spinner dolphin, *S. longirostris*	I	–	–	–	–	–	–	–	–	–	–	–	–	2,226–3,546+x	–	22,135–25,072[18]	22,135–25,072
Striped dolphin, *S. coeruleoalba*	D	–	–	–	–	3	–	2,173	–	–	–	–	–	–	–	–	2,176
	I	–	–	–	–	–	–	76+x	–	–	–	–	–	3–8+x	–	3,401–3,789[18]	3,477–3,865+x
	L	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Stenella spp.	I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	x[19]	x
Common dolphin, *Delphinus delphis*	D	–	1	–	–	2	–	6	–	–	–	–	–	–	–	–	9
	I	–	–	–	–	1+x	–	34+x	–	1+x	–	–	–	246–1,525+x	–	19,324–22,463+x[18,19]	19,360–22,499+x
Northern right whale d. *Lissodelphis borealis*	I	–	–	–	–	–	–	261+x	–	–	–	–	–	–	–	–	261+x
Hector's dolphin, *Cephalorhynchus hectori*	I	–	–	–	–	–	–	–	–	8+x	–	–	–	–	–	–	8+x
Commerson's dolphin, *C. commersonii*	I	20+x	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20+x
Black dolphin, *C. eutropia*	D	–	–	–	–	–	–	–	–	–	–	–	–	–	–	x[16]	x
	I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	x[16]	x
Risso's dolphin, *Grampus griseus*	D	–	–	–	–	1	–	3	–	–	–	–	–	–	–	–	4
Franciscana, *Pontoporia blainvillei*	I	x	–	–	–	–	–	–	–	–	–	–	–	–	–	x[19]	x
Tucuxi, *Sotalia fluviatilis*	I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	x[19]	x
Rough-toothed dolphin, *Steno bredanensis*	D	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1
	I	–	–	–	–	–	–	–	–	–	–	–	–	8–24+x	–	x[19]	8–24+x
Harbour porpoise, *Phocoena phocoena*	D	–	–	–	1	–	–	8	–	–	–	–	–	–	–	–	9
	I	–	–	–	x	–	–	21	7+x	–	3	17–140	85+x	200–300	–	13+x[20]	346–569+x
Burmeister's porpoise, *P. spinipinnis*	D	–	–	–	–	–	–	–	–	–	–	–	–	–	–	x[16]	x
	I	3+x	–	–	–	–	–	–	–	–	–	–	–	–	–	x[16]	3+x
Spectacled porpoise, *Australophocoena dioptrica*	I	3+x	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3+x
Dall's porpoise, *Phocoenoides dalli*	D	–	–	–	–	–	–	13,406	–	–	–	–	–	–	–	–	13,406
	I	–	–	–	–	–	–	816+x	–	–	–	–	–	–	–	–	816+x
Unidentified species	D	–	–	–	–	–	–	667	–	–	–	–	–	–	–	–	667
	I	x	15+x	–	–	–	–	294+x	–	–	–	–	2+x	319–392+x	–	x[19]	630–730+x
Sub-total	D	x	1	x	1,500+x	6	–	18,523	–	–	–	–	–	–	34	x[19]	20,064+x
	I	26+x	18+x	–	x	2+x	–	1,705+x	7+x	9+x	3	17–140	91+x	8,076–14,450+x	–	102,417–114,847	104,297–116,850+x
	L	1	–	–	–	1	4	–	–	–	–	–	–	24	–	–	30
Total		27+x	19+x	x	1,500+x	9+x	4	20,228+x	7+x	9+x	3	17–140	91+x	8,100–14,474+x	34	102,417–114,847	124,391–136,944+x

Notes to the Table

* Official statistics have been taken to be those provided in National Progress Reports or official catch records submitted to the Secretariat. Values given in scientific papers to the Committee are provided for information only and their sources indicated; these are given under the heading 'Other'. Catches have been presented by nation, rather than ocean area, except in the case of the data submitted by the IATTC for the eastern Tropical Pacific. *In this case, the submitted estimated catches are not* broken down by country but a summed total incidental catch for the following countries is given: Costa Rica, Ecuador, El Salvador, Mexico, Panama, Spain, USA, Vanuatu and Venezuela.

Key: D = direct take; I = incidental capture; L = live capture; x = catches known to occur but no current information available on levels.

Footnotes: (1) SC/40/ProgRep Argentina. (2) SC/40/ProgRep Australia. (3) SC/40/O 31. (4) SC/40/ProgRep Denmark, SC/40/O 31 and SC/40/BIWS. (5) SC/39/ProgRep France, SC/40/ProgRep France and Collet (pers. comm.). (6) SC/40/ProgRep Iceland. (7) SC/40/ProgRep Japan and SC/40/BIWS. (8) SC/40/ProgRep Netherlands. (9) SC/40/ProgRep New Zealand. (10) SC/40/ProgRep Norway. (11) SC/40/ProgRep Sweden: 17 reported and estimation of 75 to 140 per year. (12) SC/40/ProgRep UK. (13) SC/40/ProgRep USA and SC/40/SM1. (14) SC/40/ProgRep USSR and SC/40/BIWS. (15) The totals do not take into account the USA catches in the ETP for *S. attenuata, S. longirostris, S. coeruleoalba and D. delphis*, as those are included in the estimates for the whole ETP. (16) Goodall (pers. comm.). (17) Progress Report to IUCN by Gaskin *et al.*, 1987. (18) SC/40/SM2. (19) Da Silva (pers. comm.). (20) Deimer (pers. comm.).