Report of the Workshop on Planning for an IWC co-ordinated North Pacific research cruise programme

Contents

The meeting was held in Tokyo from 28 September to 1 October 2010. The list of participants is given as Annex A (not all participants attended both components of the meeting).

1. OPENING REMARKS AND WELCOMING ADDRESS

Kato (as convenor) and Uoya (on behalf of the Fisheries Agency of Japan (FAJ)) welcomed participants to the meeting and to Tokyo.

2. ELECTION OF CHAIR AND APPOINTMENT OF RAPPORTEURS

Kato was elected Chair. Donovan and Clapham agreed to serve as rapporteurs.

3. ADOPTION OF AGENDA

The Agenda is given as Annex B.

4. ORGANISATION OF MEETING

Kato, Uoya and Pastene gave participants logistical details for the meeting, which was held at the Sanbancho Bunchosya (Ministry of Agriculture, Forestry and Fisheries), and also (for September 29th only) at the Minami Aoyama Kaikan. The meeting was divided into two components: Component A (Items 8-11) dealt with medium-long term planning (28-30 September 2010); and component B (remainder of the agenda) dealt with planning for the 2011 cruise (1 October).

5. REVIEW OF AVAILABLE DOCUMENTS

A list of documents available to the Workshop is given as Annex C.

6. REVIEW OF PLANNING DISCUSSIONS AT IWC 62

Donovan reiterated that in past discussions (International Whaling Commission, 2011), it had been stressed that for the North Pacific surveys to be of maximum value, they should be part of a well-designed medium-long-term programme, rather than a series of *ad hoc* cruises. Exemplars for successful programmes include the SOWER surveys, and more recently the two large-scale SCANS surveys in the eastern North Atlantic (North Sea and adjacent waters); the requisite planning (if not funding) for a large-scale survey programme in the Mediterranean also provided a good example. The Workshop **agreed** on the need for a coherent long-term plan and the development of mid- to long-term objectives.

7. OBJECTIVES

The objectives for the workshop were to:

(1) review the Scientific Committee's past discussions and identified research needs in the North Pacific;

(2) review the past and ongoing survey activities and available data from range states;

(3) use these to begin to develop a medium-long term programme for consideration by the Committee;

(4) finalise plans for the 2011 survey.

Component A: medium-long term planning

8. REVIEW OF AVAILABLE INFORMATION BY SPECIES

Matsuoka *et al.* (2010) reviewed past research needs identified by the Committee for large whales in the North Pacific. NP/10/WP 4 summarised available data for past and ongoing surveys in the North Pacific range states, from a variety of sources, and is available on the IWC website. The workshop thanked Matsuoka, Clapham and Miyashita for their work producing this very useful document. Donovan noted that the above documents along with the expertise available within the participants allows the development of summaries of what is known about the distribution and abundance of the different species in the North Pacific, and thus to identify major data gaps, assess the levels of effort required to obtain reasonably precise abundance estimates, frame the discussion on prioritising work and identify possible regional collaborators to assist with the programme.

The Workshop broke into working groups to develop the species summaries below. Note that the common minke whales in the western North Pacific are the subject of an ongoing RMP *Implementation Review* and have therefore not been covered here.

The information below represents the best efforts of the participants at the Workshop to summarise the available information but it is important to recognise that this was in the context of developing a broad overview to allow discussion of research needs and priorities for mid-long-term planning. It is not presented as an all-encompassing literature review and the Workshop did not review in detail the text of each species account or ensure that there was full consistency in the approaches of the various sub-groups.

The information presented provided the basis of the summary table presented under Item 9.

8.1 Fin whales

8.1.1 Distribution and stock structure

Fin whales are distributed across the entire North Pacific Ocean, from the tropics to the Arctic (Fig. 1).

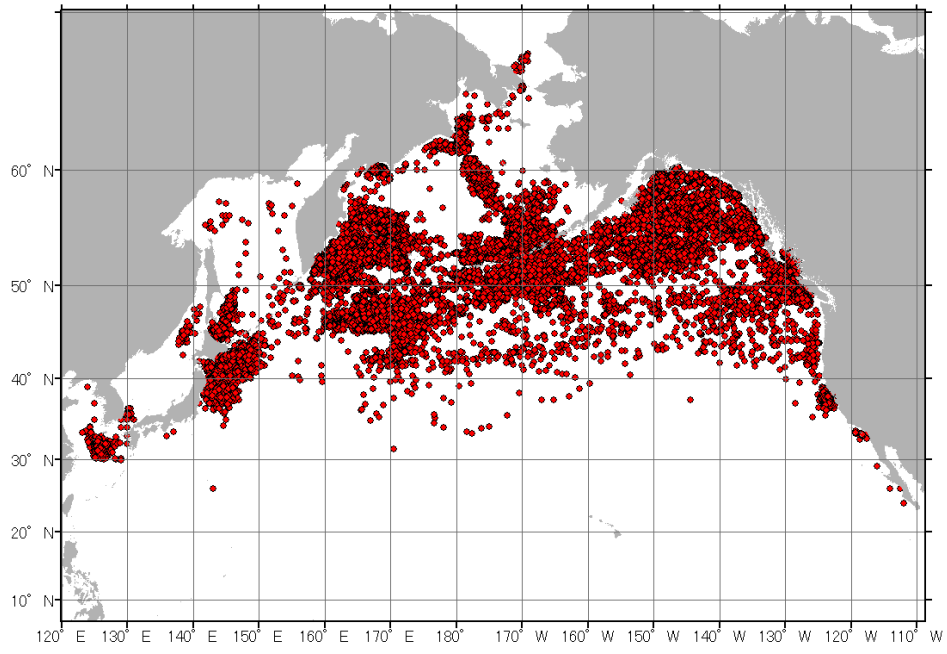

Fig. 2. Plot of North Pacific fin whale catches from the IWC database

The IWC had recognised two stocks of fin whales in the North Pacific, with one in the East China Sea and the other in the remainder of the North Pacific. However, Donovan (1991) noted that this was based on few data; there has been little attention given to North Pacific fin whales by the Scientific Committee in recent years. Fujino (1960) described an eastern and a western group, which he considered to be isolated but which might mix seasonally around the Aleutian Islands. In its annual Stock Assessment Reports (the U.S. National Marine

Fisheries Service (NMFS)[a] currently recognizes three populations of fin whales in the eastern North Pacific: a California-Oregon-Washington population, an eastern North Pacific population, and a Hawaii stock. Designation of the last appears to be based upon few sightings; given this uncertainty, and the fact that the latitude of this 'stock' lies well outside the likely range of the sighting survey discussed in the workshop, it is not considered further here.

A recent review of sightings, catches and Discovery mark data (Mizroch *et al.* 2009[b]) suggested that fin whales segregate into at least two demes with separate winter mating grounds: a western ground off the coast of Asia and an eastern one off the American coast. According to this interpretation, members of the two demes probably mingle in the Bering Sea/Aleutian Islands area. Prior research had suggested that there were at least two non-migratory stocks of fin whale: one in the East China Sea and another in the Gulf of California (Bérubé *et al.*, 1998). There is equivocal evidence for the existence of additional non-migratory groups in the Sanriku-Hokkaido area off Japan and possibly the northern Sea of Japan (Mizroch *et al.* 2009), but this is based on small sample sizes and must be considered speculative.

In summary, it is some time since there has been a formal review of the stock structure of North Pacific fin whales and there are a number of areas where samples sizes are insufficient.

8.1.2 Abundance

CALIFORNIA-OREGON-WASHINGTON: Recently 2,118 (CV=0.18) fin whales were estimated to be off California, Oregon and Washington based on ship surveys in summer/autumn of 2001 (Barlow and Forney, 2007). A 2005 ship survey of the same area resulted in an abundance estimate of 3,281 (CV=0.25) fin whales (Forney, 2007). According to the 2008 NMFS Stock Assessment Report, the best estimate of fin whale abundance in California, Oregon, and Washington waters out to 300 n.miles is the geometric mean of line transect estimates from summer/autumn ship surveys conducted in 2001 (Barlow and Forney 2007) and 2005 (Forney 2007), or 2,636 (CV = 0.15) whales. The authors considered this to be negatively biased.

EASTERN NORTH PACIFIC: A visual survey for cetaceans was conducted in the central-eastern Bering Sea in July-August 1999 and in the southeastern Bering Sea in June-July 2000 in cooperation with research on commercial fisheries (Moore *et al.*, 2002). The survey included 1,761 km and 2,194 km of effort in 1999 and 2000, respectively. Results of the surveys in 1999 and 2000 in the central-eastern Bering Sea and southeastern Bering Sea provided provisional estimates of 3,368 (CV = 0.29) and 683 (CV = 0.32), respectively (Moore *et al.* 2002).

Dedicated line transect cruises were conducted in coastal waters of western Alaska and the eastern and central Aleutian Islands in July-August 2001-2003 (Zerbini *et al.*, 2006). Over 9,000 km of tracklines were surveyed in coastal waters (as far as 85 km offshore) between the Kenai Peninsula (150°W) and Amchitka Pass (178°W). Fin whale sightings (n=276) were observed from east of Kodiak Island to Samalga Pass, with high aggregations recorded near the Semidi Islands. Zerbini *et al.* (2006) estimated that 1,652 (95% CI: 1,142-2,389) fin whales occurred in the area.

Since these surveys have covered only a portion of the fin whale's known range in the North Pacific, the above estimates will be underestimates of the true population size.

8.1.3 Outstanding issues for fin whales relative to new surveys

Overall, there is currently insufficient information with which to resolve the question of stock structure in North Pacific fin whales, and new data and samples from the North Pacific sighting survey programme (and elsewhere) are needed. Opportunistically collected samples (primarily biopsies) are known to exist from various parts of the North Pacific, notably in the cetacean tissue archive at the Southwest Fisheries Science Center in La Jolla, California. The North Pacific programme could thus contribute to both the collection of information and samples related to stock structure and abundance.

[a] http://www.nmfs.noaa.gov/pr/sars/species.htm#largewhales

[b] Mizroch, S. A., D. Rice, D. Zwiefelhofer, J. Waite and W. Perryman. 2009. Distribution and movements of fin whales in the North Pacific Ocean. *Mammal Review* 39(3):193-227

8.2 Right whales

8.2.1 Distribution and stock structure

Historically, right whales occurred across the entire North Pacific (Brownell *et al.*, 2001), with major concentrations occurring in the Gulf of Alaska, the Bering Sea and the Sea of Okhotsk (Fig. 2). Overexploitation has reduced the species' range considerably, including in the eastern North Pacific where illegal Soviet catches in the 1960s almost wiped out the population (Brownell *et al.*, 2001).

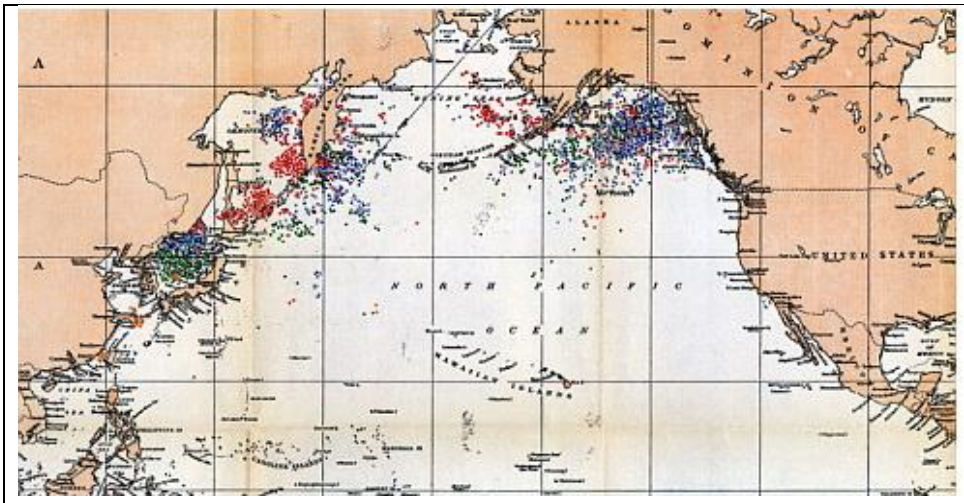

Fig. 2a. Distribution of North Pacific right whales (Townsend, 1935)

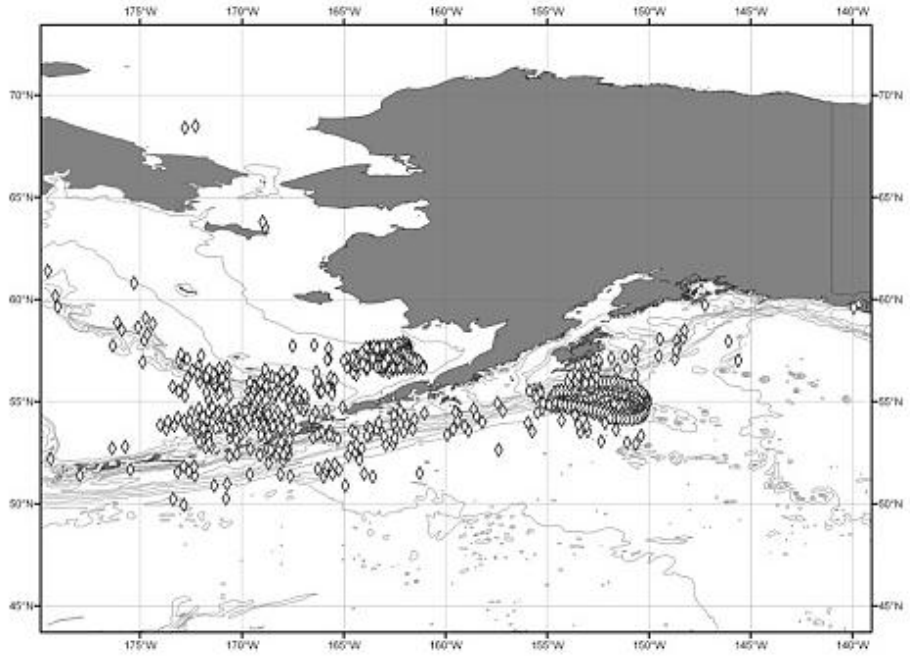

Fig. 2b. Twentieth century catches and sightings of right whales in the eastern North Pacific.

Today, the species is generally regarded as being divisible into two relatively discrete populations: a small remnant eastern stock which occurs in the Gulf of Alaska and eastern Bering Sea, and a western population that inhabits the northwestern North Pacific and Sea of Okhotsk. The eastern stock is extremely small (see below), and appears to be largely confined to the southeastern Bering Sea. Right whales today are rarely observed (or heard) in the Gulf of Alaska, although most of their extensive historical range there has not been surveyed. This includes a region south of Kodiak which was thought to be the site of large Soviet catches in the early 1960s (Doroshenko, 2000)), and which has not been the subject of any sighting effort since.

A few tissue samples exist for North Pacific right whales, primarily in the form of biopsies from the Bering Sea and Sea of Okhotsk, held in either the USA or Japan; some additional material may be available from museum specimens. The Workshop **agreed** that a coordinated or centralised genetic analysis of all samples would be valuable, as would comparison of existing catalogues of photographically identified individuals in the eastern and western North Pacific; material from Japanese special permit catches in the 1960s would be especially valuable since some of these were taken in the eastern North Pacific and could thus be compared with biopsy samples taken there in recent years.

8.2.2 Abundance

Using line-transect survey data, Miyashita and Kato (1998) estimated the abundance of right whales in the Okhotsk Sea at 900, with a large confidence interval (404-2,108). The only estimate for the eastern North Pacific is that of Wade *et al.* (2010), which used both genotypic and photo-identification data to estimate the population at about 30 animals; while this may represent a sub-population that feeds in the Bering Sea, and therefore be an underestimate of the entire stock, the extreme paucity of sightings elsewhere suggests that the total population size is not much greater than this.

8.2.3 Outstanding issues for right whales relative to new surveys

Given the endangered status of North Pacific right whales, research on this species is urgently needed, especially in the eastern portion of the ocean basin where the population is believed to be extremely small. Major outstanding issues for North Pacific right whales are: (1) the location of calving grounds for both populations (for which virtually nothing is known); (2) relationship between whales in the Bering Sea and those occurring in the Gulf of Alaska; (3) identification of habitats that may still be used in the Gulf of Alaska, notably in offshore waters; (4) refinement of abundance estimates for the western population.

It was noted that acoustic surveys (using sonobuoys or towed arrays) have often been successful in locating right whales when visual surveys cannot, and incorporation of this methodology into some future surveys would be valuable.

8.3 Humpback whales

8.3.1 Distribution and stock structure

Humpback whales are widely distributed across the North Pacific, and undertake long seasonal migrations between high-latitude summer feeding grounds and breeding and calving areas in tropical waters (Clapham and Mead, 1999). Catch positions from modern whaling held in the IWC database are shown in Fig. 3a. In recent years, the results of a large-scale ocean basin study called SPLASH, Structure of Populations, Levels of Abundance and Status of Humpback whales (Calambokidis *et al*., 2008) have greatly clarified the structure and status of North Pacific humpbacks; the primary analyses were based upon photo-identification and genetic analysis of skin biopsy samples collected across the entire ocean basin in an international coordinated effort. Field efforts for SPLASH (see Fig. 3b) were conducted on all known winter breeding regions during three seasons (2004-2006) and in all known summer feeding areas during two seasons (2004- 2005). A total of 18,469 good quality fluke identification photographs were taken; after reconciling all within and cross-regional matches, a total of 7,971 unique individuals were catalogued. A total of 6,178 tissue samples were also collected for genetic studies of population structure, with fairly even representation of wintering and feeding areas. This represents an invaluable archive, and one which would permit potentially useful comparisons of future biopsy samples.

Photo-identification matches made by SPLASH between high and low latitudes are shown in Fig. 3c. It appears that at least four breeding areas exist, with connections to differing high-latitude feeding areas. The breeding grounds include Mexico/Central America, the Revilagigedo Islands, Hawai'i, and western Asia (including Japan and the Philippines). Comparison of relative match rates from the feeding areas suggest that many of the animals summering in the Bering Sea are migrating in winter to an as-yet unidentified calving ground.

Major breeding-feeding connections can be broadly summarised as follows: mainland Mexico and Central America with the US west coast (California/Oregon/Washington); Hawai'i with Southeast Alaska; offshore Mexico (the Revillagigedo Islands) with the western Gulf of Alaska and Aleutians; Japan and the Philippines with Russia. As noted above, the data strongly suggest that many whales from the Bering Sea region breed in another, unidentified wintering ground.

The US Stock Assessment Reports currently recognise three subpopulations of humpback whales in the North Pacific: an eastern, central and western stock. However, given the recent availability of new information from

SPLASH, these designations will probably be revised when the SPLASH data are published. In addition, NMFS is currently conducting a worldwide review of the status of humpback whales, and as part of this process may propose new management units based upon the best currently available scientific data.

8.3.2 Abundance

Area-specific estimates of abundance derived from SPLASH data are shown in Figs 10 (wintering areas) and 11 (summering grounds); however, these figures are only provisional, and more refined final estimates will be submitted for publication in the near future. Barlow *et al.* (2011) used photo-identification data from SPLASH to estimate abundance at 21,808 (CV=0.04) for the entire North Pacific population.

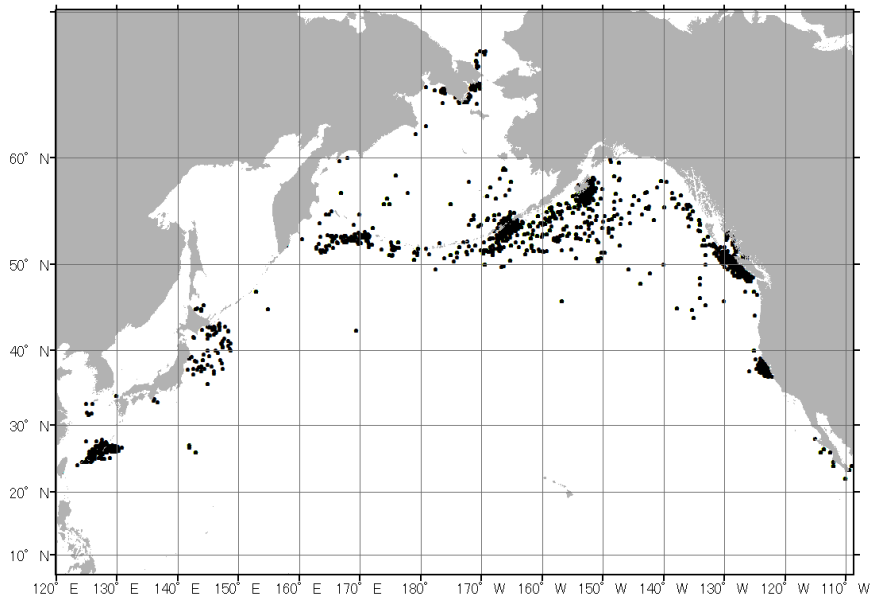

Fig. 3a. Catch positions of humpback whales from the IWC database.

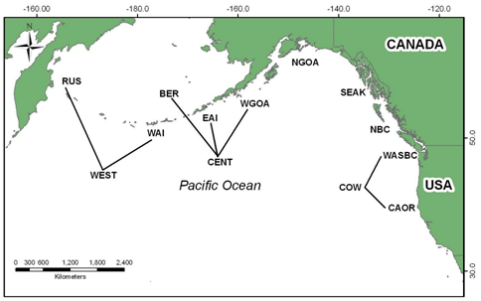

Fig. 3b. Main sampling sites for the SPLASH programme (taken from Calambokidis, ed. 2010).

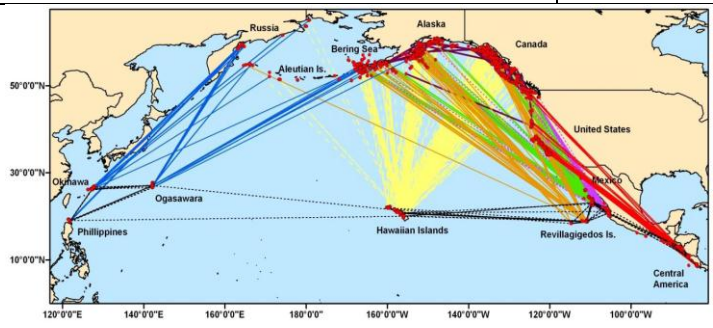

Fig. 3c. Matches found during the SPLASH programme (taken from Calambokidis, ed. 2010).

8.3.3 Outstanding issues for humpback whales relative to new surveys

Overall, knowledge of humpback whale stock structure is good. Outstanding issues are: (1) location of the breeding grounds for many animals feeding in the Bering Sea; (2) refinement of connections between Asian breeding areas and Russia/western Bering Sea feeding grounds; (3) distribution and population identity of whales summering in offshore waters. With regard to the latter, it is worth noting that data from Soviet whaling catches (Ivashchenko, unpublished) and systematic surveys (Miyashita *et al.*, 1995) have indicated that some humpback whales occur far offshore in summer (e.g. in the central Gulf of Alaska). This is significant, because most of the recent survey effort has been concentrated in nearshore waters; thus, we may have an incomplete picture of the distribution of these whales, and stock structure may be more complicated than current data suggest.

8.4 Common minke whales (eastern North Pacific)

8.4.1 Distribution and stock structure

Minke whales are distributed from the tropics to high latitudes across the North Pacific, but in many areas our understanding of their movements and population structure is poor, particularly for the eastern North Pacific. Western North Pacific common minke whales are the subject of an ongoing *Implementation Review*. The US Stock Assessment Reports classify eastern minke whales into three populations: Alaska, California-Oregon-Washington, and Hawai'i. However, little is known regarding movements or connections between areas, and these designations must therefore be considered speculative.

8.4.2 Abundance

The U.S. Stock Assessment Reports notes that no estimates have been made for the number of minke whales in the entire North Pacific. However, some information is available on the numbers of minke whales in the Bering Sea (part of the putative 'Alaska stock'). As noted under Item 8.2, visual surveys for cetaceans occurred in the central-eastern Bering Sea in July-August 1999, and in the southeastern Bering Sea in 2000 and these led to provisional estimates of 810 (CV = 0.36) and 1,003 (CV = 0.26) common minke whales in the central-eastern and southeastern Bering Sea, respectively (Moore *et al.*, 2002). They cannot be used as an estimate of the entire Alaska stock of minke whales because only a portion of the stock's range was surveyed.

8.4.3 Outstanding issues for eastern North Pacific minke whales relative to new surveys

Since very little is known regarding the abundance and structure of minke whale populations in the eastern North Pacific, information from new surveys would be very helpful. Biopsy samples collected anywhere in the range of the species would allow an investigation of stock structure, and dedicated surveys could potentially refine estimates of abundance.

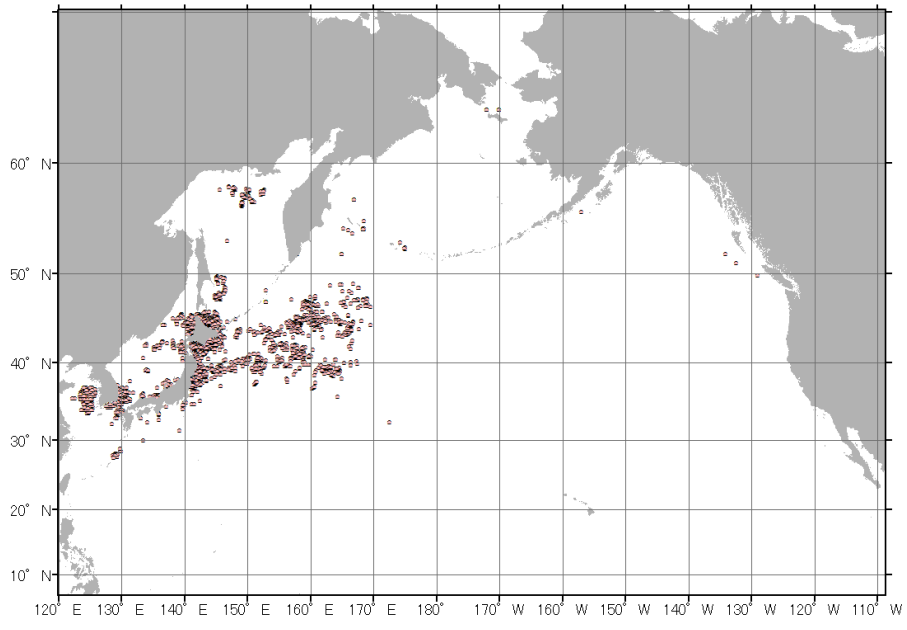

Fig. 4. Catch positions of common minke whales from the IWC database.

8.5 Bryde's whales

8.5.1 Stock structure

The Scientific Committee spent considerable time examining stock structure issues during the RMP *Implementation* process; two *Small Areas* were agreed during the RMP (IWC, 2007) after consideration of genetic and non-genetic data. These are shown in Fig. 5.

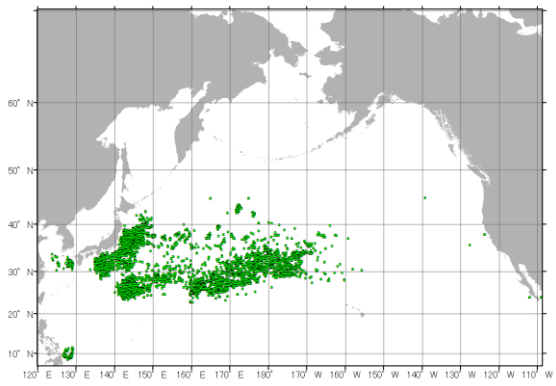

Fig. 5a. Catch positions of Bryde's whales in the IWC database.

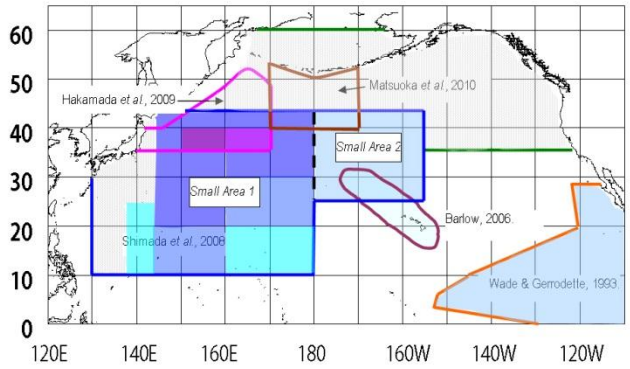

Fig. 5b. Map showing *Small Areas* for Bryde's whales from the RMP *Implementation* as well as areas that have been surveyed.

WESTERN NORTH PACIFIC (WNP)

JARPN II has collected genetic samples of Bryde's whales in offshore areas of the WNP. Sampling has covered a geographical sector approximately between 35-41ºN and between 141-170ºE. The most recent genetic analysis was based on the samples taken between 2000 and 2007 and microsatellite and mtDNA (SC/J09/JR31). Years and months when these analysed samples were taken are summarised in Table 1. JARPN II surveys have sampled 50 animals annually between 2008 and 2010 in the same area and similar months. To date these samples have not been analysed. There are no samples from *Small Area* 2. A few samples from bycatches in Korea are available.

Table 1

Summary of genetic samples analysed from the JARPN II surveys

Year	Month	Sample size (west, east of 155E)	Year	Month	Sample size (west, east of 155E)
2000	Aug-Sept	42, 0	2004	June-Sept	0, 50
2001	May-July	43, 0	2005	June-July	46, 4
2002	July-August	36, 14	2006	June-Aug	12, 38
2003	May-July	37, 13	2007	June-Aug	20, 30

In addition some historical genetic samples were also available from past commercial whaling operations:

(1) 102 around the Ogasawara Island, samples taken in April-June 1984;

(2) 113 from the Central North Pacific (between 22-27ºN and 159-169ºE), samples taken in April-May 1979.

Other information used in the discussions of stock structure related to catch distributions, sightings distributions and biological parameters (IWC, 2007). In addition to the above, (Nishiwaki *et al.*, 2009) provide some limited telemetry information (2 tags lasting up to 3 weeks in July 2006 and July/August 2008).

HAWAIIAN ISLANDS

Six genetic samples (biopsies) were collected by US scientists between August and October 1998. These samples were examined genetically in (Goto *et al.*, 2004) and considered in the RMP *Implementation*. The possibility that there may be additional samples collected since then is being investigated.

EASTERN NORTH PACIFIC

A total of 12 genetic samples (biopsies) were collected by US scientists between April 1989 and August 1996 in the Baja California Peninsula. These samples were also examined genetically in (Goto *et al.*, 2004) and considered in the RMP *Implementation*. The possibility that there may be additional samples collected since then is also being investigated.

8.5.2 Present distribution and abundance

Although there have been considerable catches of Bryde's whales since the mid-late 20th century, the levels of catches are not believed to have significantly reduced populations such that past and present distributions would be very different.

WESTERN NORTH PACIFIC

The western North Pacific has been extensively covered by dedicated cetacean surveys and by the JARPN and JARPN II programmes ((IWC, 2007; Shimada *et al.*, 2008)). This provides relatively good data on distribution and abundance of Bryde's whales in this region. The results confirm that Bryde's whales are rarely, if ever, seen north of 43ºN(and for the purposes of mid-long term planning may be assumed absent). This conclusion is supported by data from the 2010 IWC-Japan Joint Cetacean Sighting Survey in the North Pacific – during which no Bryde's whales were seen – and by earlier Japanese Scouting Vessel data (Miyashita *et al.*, 1995) where there was extensive effort in the north and northwest North Pacific, but no Bryde's whales were seen.

Two *Small Areas* were agreed during the RMP *Implementation* process (IWC, 2007). *Small Area* 1 from 130ºE to 155ºW have been surveyed more than once since 1988 and no survey gaps were observed (Shimada *et al*., 2008). Some relatively high densities were found, notably in the northern part of *Small Area* 1 (between about 35-43ºN, and to the west of 180ºE to about 145ºE (see Figure 1). An agreed estimate for the total abundance in *Small Areas* 1 and 2 was derived, based on the surveys with IWC-oversight in 1998-2002, for use in the *CLA* as 20,501 (CV=33.7%) with a time stamp of 2000 ((IWC, 2008; Kitakado *et al.*, 2008)). Also, the rate of annual increase was estimated as around 4% using information on surveys from 1988 to 2002 with total abundance of 25,231 (CV=33.8%) (Kitakado, 2009).

The southeast tropical region of the North Pacific was surveyed from 1986-90 during the NOAA ETP survey programme (Wade and Gerrodette, 1993). Bryde's whales were seen throughout their survey region (which extended beyond the North Pacific considered here). Estimated Bryde's whale density from these surveys was similar to that for *Small Area 2*, but for the region of overlap with the North Pacific area being considered at this workshop (i.e. north of 20°N), sighting locations suggest this average estimate is perhaps slightly high.

Barlow (2006) reported results from a shipboard survey around Hawaiian waters. Only a small number (13) Bryde's whales were sighted; results indicated the presence of Bryde's whales in these waters, but in very low densities.

8.6 Blue whales

8.6.1 Stock structure

For most areas of the North Pacific, there is little information on stock structure. Exploitation of blue whales had ceased before the Scientific Committee began to develop management boundaries (Donovan, 1991). Stafford (2003) used acoustic information to suggest eastern and western populations of blue whales in the North Pacific with some mixing in the Gulf of Alaska; blue whales off Hawaii are thought by Stafford to be part of the western population.

WESTERN NORTH PACIFIC

From 2001-2009, 22 genetic samples were collected by JARPN II in the western North Pacific in spring/summer months in the period (between the Japanese coast and 170ºE). No genetic analyses on these samples have been conducted yet. Some photo-identification data (n=40) are available that may be of value for future stock structure studies. A single biopsy sample was obtained during the recent central North Pacific cruise (NP/10/WP11).

EASTERN NORTH PACIFIC

More work has been undertaken on the eastern side of the Pacific. A recent paper by Calambokidis *et al.* (2009) examines stock structure on the eastern side of the Ocean. It reviews available information from acoustics and photo-identification to suggest that the animals thought to comprise a separate California feeding population are returning to its traditional migration route in the eastern North Pacific including British Columbia and the Gulf of Alaska where they have also been observed feeding.

Thus an extensive photo-identification catalogue (n=>900 individuals, primarily from Californian waters but with some from British Columbia and the Gulf of California) is of value for future stock structure studies as well as examining abundance and trend. A large number of biopsy samples are available from the same area ($n=ca$ 300).

8.6.2 Present distribution and abundance

Blue whales have been heavily reduced by commercial whaling throughout the North Pacific (both coastal and pelagic), although there are no reliable estimates of pre-exploitation abundance, total catches numbered over 10,000 (see below).

WESTERN NORTH PACIFIC

There are no abundance estimates of blue whales for the western North Pacific. Sightings of blue whales during regular systematic surveys by Japan and Korea are insufficient to allow for an abundance estimate to be obtained. As noted above, some photo-identification data are available (n=40). In principle, should sufficient photo-identification data become available, mark-recapture estimates could be obtained. Matsuoka *et al.* (2009) summarise the available information on distribution of blue whales from the JARPN and JARPN II programmes.

Blue whales thought to be part of the western North Pacific stock are occasionally seen in Hawaiian waters (NOAA stock assessment, 2004).

EASTERN NORTH PACIFIC

The major concentration of blue whales occurs off California. Animals are also regularly found off British Columbia and the Gulf of Alaska and they are seen along the coasts of Oregon and Washington, presumably on migration.

Although some line-transect surveys have been undertaken, the most comprehensive dataset is that from photo-identification studies. The best estimate of blue whale abundance is 2,842 (CV= 0.41) obtained from the mark-recapture analyses of Calambokidis (Calambokidis *et al.*, 2007)[c].

8.6.3 Past distribution

Based on catch data (Fig. 6), blue whales were found throughout the northern North Pacific in the summer. Reported commercial catches were around 9,500 between 1910 and 1965, although there is some uncertainty about species allocation for catches from 1910 to about 1936 (Ohsumi and Wada, 1972). About 3,000 of these were taken from the west coast of North America, from Mexico to British Columbia, Canada. Despite IWC protection in 1966, several hundred illegal takes occurred after that in the Gulf of Alaska, of the coasts of Washington and British Columbia and in the central North Pacific (Berzin, 2008; Doroshenko, 2000).

Information from the Japanese Scouting Vessels (JSV) data on blue whales (1964-1990) is for the period after the major catches (Miyashita *et al.*, 1995). It reveals low densities in all areas but suggests some 'concentrations' off the northwest Pacific in the June-August period, off Kamchatka in June and in the central Pacific (north of 40°N and between around 160°E and 160°W) from June-September.

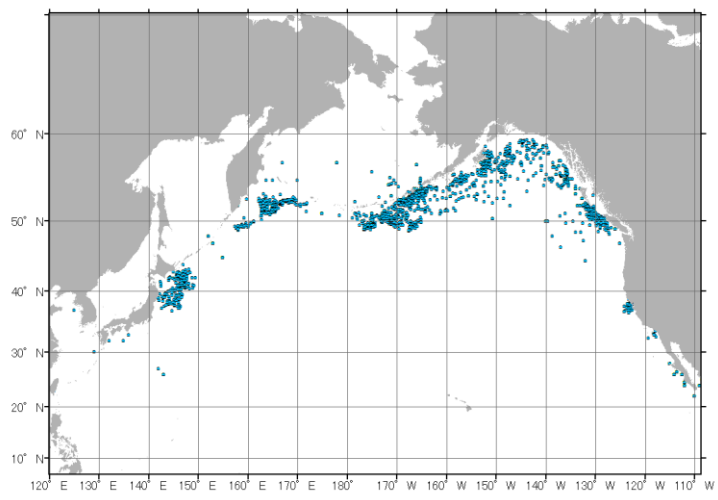

Fig. 6a. Catch positions of blue whales in the IWC database.

[c] Calambokidis, J., A. Douglas, E. Falcone, and L. Schlender. 2007. Abundance of blue whales off the US West Coast using photo identification. Contract Report AB133F06SE3906 to Southwest Fisheries Science Center, 8604 La Jolla Shores Drive, La Jolla, CA 92037. 13p.

8.7 Sei whale

The Committee is planning an in-depth assessment of the North Pacific sei whale and has identified a number of data sources (IWC, 2010b). A short summary follows.

8.7.1 Distribution, stock structure and catch history

Sei whales were widely distributed in the western, Central and Eastern North Pacific according to the Japanese catch data by Masaki (1976) and sightings data (Miyashita *et al.*, 1995). The previous studies of sei whale distribution were based on the Japanese commercial catch record (1952-1972), the Japanese Scouting Vessel (JSV) data (1965-1996), and the US sighting data (1986-2006) in the North Pacific. The most recent distribution study was based on JARPN and JARPNII sighting data (1994-2007) in the western North Pacific as well the British Columbia sighting data (2004-2005) in the inshore waters.

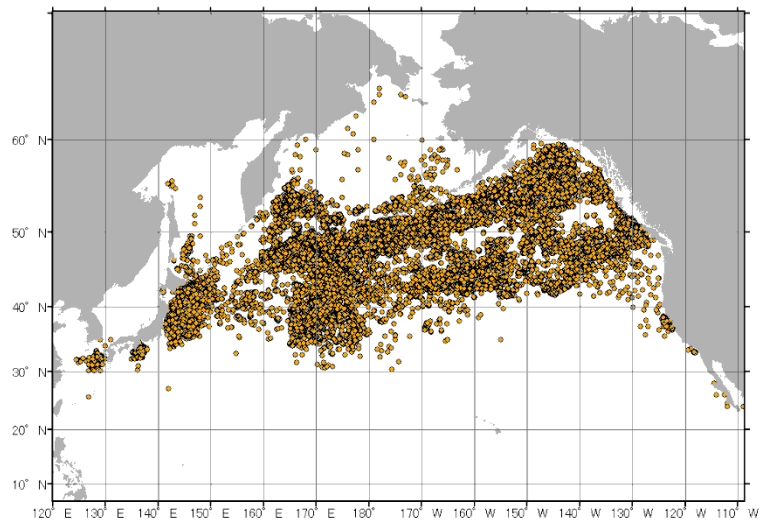

Fig. 7a. Catch positions of sei whales in the IWC database.

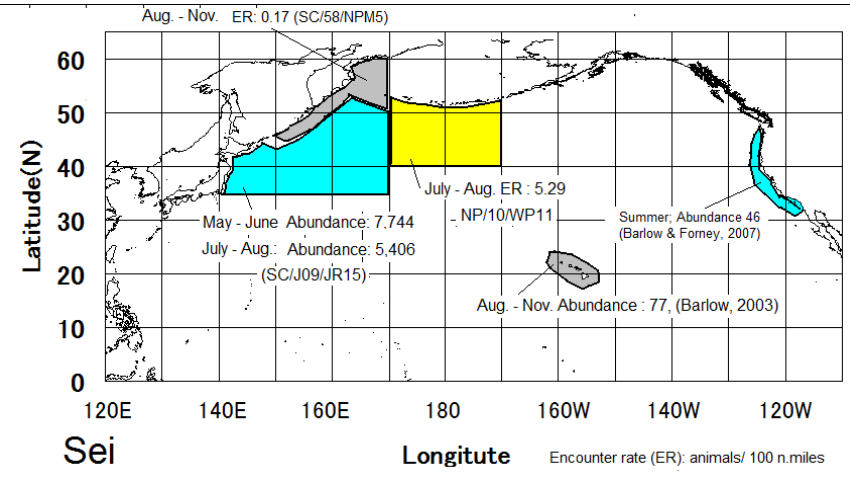

Fig. 7b. Map showing some recent surveys and abundance estimates for sei whales (and see text)

Genetic samples/analyses for stock structure are available from Japan's commercial (1972-73) and special permit (JARPN II) catches in the western North Pacific as summarised in Kanda *et al.* (2009). There are also believed to be some 184 (unanalysed) samples from Californian commercial whaling for the period 1959-70 (Rice, 1977). No samples are believed to be available from the Canadian commercial catches (Gregr *et al.*, 2000). In the JARPN II review, the Panel had noted that the available analyses from Kanda *et al.* suggested little stock structure but noted that further analyses were needed before firm conclusions could be drawn (IWC, 2010a).

The Committee has agreed a method to allocate past catches between sei and Bryde's whales. The Soviet catch data are still incomplete for the North Pacific but investigations are ongoing.

8.7.2 Abundance

Japanese data relevant to abundance and distribution are primarily: scouting vessel data from 1965-82; dedicated surveys from 1983 onwards and the JARPN II surveys from 2002 onwards (west of 170°E, and north of 35°N). The data to 1990 are summarised in Miyashita *et al.* (1995). Data from 1983 onwards are in principle suitable for absolute abundance estimation (as has been performed for the JARPN II data in Hakamada *et al.*, 2009), but the variable geographical and seasonal coverage over much of the period will probably necessitate the use of spatial models (see, for example, Konishi *et al.*, 2009), with the added complexity of modelling the shifts in distribution over time. This is discussed further in the JARPN II review (IWC, 2010a).

Since the regime shift in the mid-1970's, sei whales seem to have become rare in the USA continental EEZ and there have been few sightings in recent surveys (Barlow and Forney, 2007). Surveys of southwest Alaska and the Aleutians also failed to yield sufficient sei whale sightings for abundance estimation (Zerbini *et al.*, 2006). The coverage of USA surveys during 1986-2006 is available from NOAA SWFSC. Canadian inshore waters (out to the Queen Charlotte chain) were surveyed in 2004-05 but resulted only in a single sei whale sighting (Williams and Thomas, 2007).

The Committee has noted that new IWC-coordinated sightings surveys may extend the area for abundance estimation into the offshore region east of 170°E over the next few years. It has also suggested that any surveys undertaken should focus, at least initially on areas closest to recently surveyed areas (IWC, 2010b).

8.8 Sperm whales

8.8.1 Distribution

Sperm whales were widely distributed in the western, central and eastern North Pacific, including the Bering Sea based on Japanese catch data and Japanese and American sighting data (Barlow and Taylor, 2005; Kato and Miyashita, 1998; Miyashita *et al.*, 1995; Wade and Gerrodette, 1993).

8.8.2 Stock structure

The Committee has not reviewed stock structure of sperm whales in the North Pacific since the early 1980s (Donovan, 1991). As part of the JARPN II review, for the western North Pacific, Kanda *et al.* (2009a) reported on microsatellite and mtDNA analyses from samples from 45 sperm whales collected during JARPN II from 2000 to 2007. They found no evidence of stock structure although the Panel noted that the small sample size precluded conclusions on stock structure being drawn (IWC, 2010a). For the eastern North Pacific, Mesnick *et al.* (submitted) analyzed 287 samples collected over 34 years and compared three strata in the temperate to tropical waters where females are found: California Current, Hawaii and the eastern tropical Pacific. Then they considered how males on sub-Arctic foraging grounds assign to these strata. The California Current sample was differentiated from both the other strata suggesting that the region supports a demographically independent population. Comparisons between the Hawaii samples and the eastern tropical Pacific samples were not conclusive. Gulf of Alaska males differed marginally from all three strata and individuals assigned to each of three potential source strata, indicating widespread origin of males on sub-Arctic feeding grounds. Alaska sperm whales are thought to be from a mixture of stocks to the south.

To better understand sperm whale stock structure requires larger sample sizes from a broader range. In addition to the potential IWC co-ordinate cruises, samples may become available from ongoing SWFSC and AFSC cruises around Hawaii and off Alaska, the Gulf of California (from *Odyssey* cruise) and historical materials.

8.8.3 Abundance

The difficulties in estimating the abundance of the long-diving sperm whales from traditional line transect sightings surveys are well known and there have been recent advances in using combined visual and acoustic approaches e.g. see Barlow and Taylor (2005). Most previous studies of abundance were based on sighting surveys alone (Barlow and Forney, 2007; Hakamada *et al.*, 2009; Kato and Miyashita, 1998; Wade and Gerrodette, 1993). The potential for incorporating acoustic methods into future North Pacific cruises has been noted elsewhere in this report.

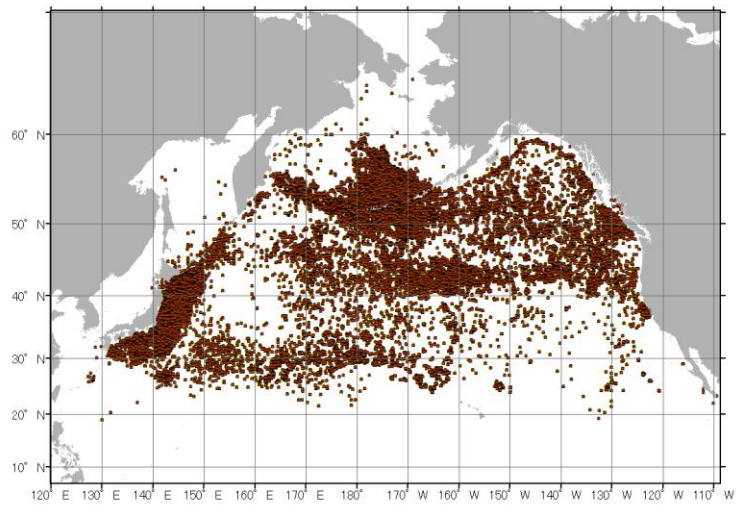

Fig. 8a. Catch positions of spermwhales in the IWC database.

9. OVERVIEW OF PAST AND ONGOING SURVEY ACTIVITIES AND AVAILABLE DATA

Fig. 9 summarises the recent survey effort in the North Pacific and highlights the areas with little or no recent coverage.

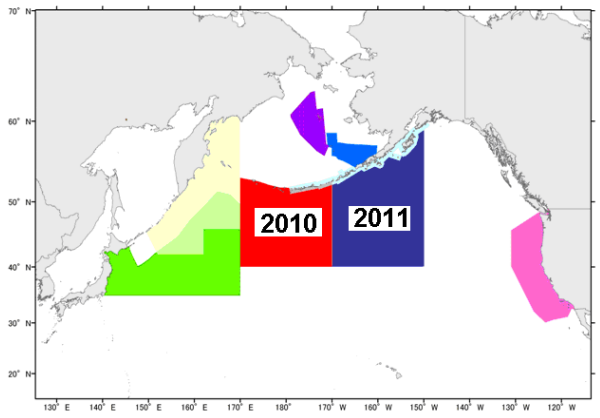

Fig. 9. Recent surveys in the North Pacific. The 2010 and 2011 IWC/Japan Joint Cetacean Sighting Survey research areas are shown in red and dark blue, respectively. These areas have not been surveyed previously. Other coloured areas represent surveys conducted in the North Pacific in recent years: in 1999 (purple) and 2000 (blue) by Moore et al. (2002), in 2001-2003 (sky blue) by Zerbini *et al.* (2007), in 2001 and 2005 (pink) by Barlow and Forney (2007), in 2005 (light yellow) by Miyashita (2006). Sighting surveys have been conducted in the green area since 1994 as a part of JARPN II (Pastene *et al.*, 2009).

Based on the discussions under Item 8, Table 2 overleaf summarises the available information in the context of identified research needs and the feasibility of meeting those as part of an international or national programme or programmes.

Species/ region	Knowledge: stock structure	Knowledge: Abundance	Knowledge: Distribution	Qualitative depletion	SC needs/other issues	Feasibility of study	Inter-national	National
Blue								
Eastern	Relatively poor apart from acoustics. Some biopsy samples available but not analysed from western North Pacific	Recent mark-recapture estimate available	Past: good from catches. Present: Moderate but some gaps	Possibly moderate-high	None specified; co-operative analysis of existing samples needed	High for photo-id; large-scale surveys for other species may suggest new study areas	Yes	Part
Western		Poor– some sightings but not sufficient for abundance estimation	Past: good from catches (tho' problems with species allocation in early years). Present: Moderate some gaps	High	None specified by SC; co-operative analysis of existing biopsy samples needed	Large-scale surveys will suffer from low densities – 'but piggy back' studies good; opportunistic biopsy and photo-id and acoustic - high	Yes	Part
Bryde's								
Eastern	Poor; a few biopsy samples available	Poor – some sightings but not sufficient for abundance estimation	Past: good from catches. Present: Available surveys suggest infrequent	Low	None specified by SC; co-operative analysis of new samples needed	Large-scale surveys unlikely, apparently low densities but 'piggy back' studies good. Open ocean biopsy samples	Yes	Part (ETP)
Western	Plausible hypotheses identified but work to confirm needed	Recent estimates available	Past: good from catches. Present: Reasonable	Low	RMP 'with research; variant' – Japanese programme being developed incl. possible telemetry studies	High – telemetry studies may be challenging	Part	Yes
Common minke								
Eastern	Poor; a few biopsy and stranding samples available; some local photo-id studies	Estimate from part of Bering Sea and Gulf of Alaska available. Also one from south of this along US coast	Past: poor but some catches. Present: Poor	Low	None specified by SC	High but permits for EEZs and CITES permits problematic. Also sightings surveys require better conditions than for larger whales	Yes	Part
Western	Three plausible hypotheses under discussion as part of RMP *Implementation review*.	Recent estimates available for some areas.	Past and present: Good but some gaps	Moderate to possibly high in some areas (e.g. J-stock(s)) depending on stock hypotheses	Stock structure main issue for RMP along with estimating abundance from multiple surveys. Biopsies from Okhotsk Sea, telemetry work to identify and obtain samples from breeding areas	High but permits for EEZs and CITES permits problematic. Telemetry is difficult.	Part	Yes

Species/ region	Knowledge: stock structure	Knowledge: Abundance	Knowledge: Distribution	Qualitative depletion	SC needs/other issues	Feasibility of study	Inter-national	National
Fin								
Eastern	Poor but major genetic study underway	Estimates available for limited areas	Past: good from catches. Present: Good in some areas but some major gaps	Unknown: Probably moderate-high	None identified by SC	Moderate to high but permits for EEZs and CITES permits problematic.	Yes	Part
Western	Poor but few biopsy samples awaiting analysis	Estimate available for Sea of Okhotsk	Past: good from catches. Present: Good in some areas but some gaps	Unknown: Probably moderate-high	None identified by SC	Moderate to high but permits for EEZs and CITES permits problematic.	Yes	Part
Humpback								
Eastern	Good some gaps	Good	Past: good from catches. Present: Good some gaps	Unknown: Moderate to possibly high in some areas	None identified by SC	High with photo-id; general surveys may identify other areas than SPLASH	Yes	Yes
Western	Moderate	Good	Past: good from catches. Present: Good some gaps	Moderate	None identified by SC	High with photo-id; general surveys may identify other areas than SPLASH	Yes	Yes
Right								
Eastern	Poor	Poor but rare – estimate for Bering Sea	Past: good from catches. Present: major gaps, rare	High	Intensified research as critically endangered	Low densities so dedicated surveys difficult, if done acoustics will assist; opportunistic biopsy samples and photo-id. CITES and EEZ	Yes	Part
Western	Poor	Poor but rare except Sea of Okhotsk	As above	High	As above	As above	Yes	Part
Sei								
Eastern	Poor	Poor	Past: moderate-good from catches. Present: poor	Unknown: perhaps Moderate	None identified apart from additional biopsy samples related to in depth assessment of western sei whales	High	Yes	Part
Western	Moderate/good	Moderate/good	Past: good from catches. Present: Moderate/good	Unknown: perhaps Low-Moderate	In-depth assessment apriority for SC. Especially biopsies and sightings towards east and 170E-170W	High except telemetry is more difficult	Yes	Yes

Species/ region	Knowledge: stock structure	Knowledge: Abundance	Knowledge: Distribution	Qualitative depletion	SC needs/other issues	Feasibility of study	Inter-national	National
Sperm								
Eastern	Poor but some genetic samples have been analysed	Some estimates (dependent on hard to address *g(0)* issue)	Past: good from catches (but lack of positions from Soviet catches) Present: moderate/poor	Unknown: possibly high	None identified by SC.	Abundance not easy – combine acoustics/visual if possible Biopsy samples and photo-id possible	Yes	Part
Western	Poor but some genetic samples have been analysed	Some estimates (dependent on hard to address *g(0)* issue)	Past: good from catches. Present: moderate	Unknown: moderate-high	None identified by SC	As above	Yes	Part

10. INITIAL CONSIDERATION OF MEDIUM- TO LONG-TERM OBJECTIVES AND PRIORITIES

Last year, the following broad objective had been proposed (International Whaling Commission, 2011):

> The programme will provide information to allow determination of the status of populations (and thus stock structure is inherently important) of large whales that are found in North Pacific waters and provide the necessary scientific background for appropriate conservation and management actions. The programme will primarily contribute information on abundance and trends in abundance of populations of large whales and try to identify the causes of any trends should these occur. The programme will learn from both the successes and weaknesses of past national and international programmes and cruises, including the IDCR/SOWER programme.

It had been noted that this broad objective would need to be expanded to include short-, medium- and long-term priorities and a specified programme.

Donovan suggested a number of factors to consider with regard to planning the design and scope of a multi-year survey aimed at producing priority information for conservation and management. These included obtaining data on stock structure and abundance (which could potentially be clarified with short- or medium-term work), trend (from longer-term study); prioritisation of species and areas, developed based on knowledge gaps together with needs for conservation and management; appropriate tools, which will vary by species (efficiency is important and survey design is crucial). He noted that basic line-transect surveys are not always appropriate, especially for rare species/populations, and that alternative methods (targeted at stock structure and movements) could or should be considered for some years. Furthermore, Donovan suggested that looking at existing data and using these to determine appropriate strata, coverage and methods would be a good approach.

The Workshop concurred with these views and developed a list of initial priority species and areas for study in the North Pacific (Table 3) based on discussions under items 8 and 9. Overall, the Workshop **agreed** that the high initial priority species should include fin whales, sei whales and sperm whales. Right whales were considered moderate-high priority, but the small size of the population (notably in the east) probably makes this species an opportunistic target species rather than the subject of directed surveys. It agreed that efforts to cover area gaps to obtain necessary baseline data may be appropriate for the initial years of the programme. Further work was delegated to an intersessional group consisting of Kitikado (convener), Matsuoko, Miyashita, Pastene, Hedley, Brownell, Donovan and Clapham); the group will aim report to the next annual SC meeting. Terms of Reference are given below:

Discuss short, mid-long term objectives for the program to provide overall strategy and more detailed 5 year plans for the North Pacific programme, with a focus on the three aspects below:

(1) the overall long-term general objectives (stock structure, abundance, trends) and the priorities agreed in Table 3
(2) integration over (1) over in a pragmatic way, for the short (<5), medium (5-10), and long-term (10+)
(3) examine existing data plus environmental data to develop better options (including methods with visual, acoustics, biopsy etc.) for strata coverage and likely power to detect trends[d].

Table 3

Suggested priorities for the medium-long term North Pacific programme

Species	Initial Priority	Rationale
Blue	Low direct, high opportunistic	Depletion level suggests high priority, but feasibility of addressing outstanding issues in short term is low. Continued photo-id work part of US national programme.
Bryde's	Low, direct, high opportunistic	Depletion levels suggest low priority. Management on western side already dealt with under RMP where a national programme exists. Telemetry not well served given available vessel. Suggest separate study.
Common minke	Low direct, high opportunistic	Depletion levels suggest low priority on east. Management on western side already dealt with under RMP where a national programme exists. However, if Okhotsk Sea covered for other priority species (e.g. right whales) then would provide valuable information incl. biopsy. Telemetry studies priority for stock structure but not part of this programme with this vessel. Suggest separate study. Weather/g(0) a problem if multi-species surveys
Fin	High direct, moderate opportunistic	Depletion levels suggest high priority. Given major genetic analysis on east then biopsy sampling on offshore east and west high priority to improve overall understanding of stock structure. Co-ordination with US national work in Bering Sea. Examination of existing data and coverage of uncovered areas needed to determine survey strategies.
Humpback	Low direct, high opportunistic	Good information already available from SPLASH. Existing programmes sufficient. Opportunistic sightings during cruises may identify new 'SPLASH' areas. Feasibility of collecting biopsy and photo-id data opportunistically high.
Right	Moderate-high direct, high opportunistic	Depletion level suggests high priority, but feasibility of addressing outstanding issues in short term is low. Continued photo-id work part of US national programme. Feasibility of collecting biopsy and photo-id data opportunistically high. New survey in Sea of Okhotsk has high feasibility to get good abundance data provided appropriate permits can be obtained from the Russian Federation. Targeted surveys required.
Sei	High direct, high opportunistic	High priority for in-depth assessment. High feasibility of obtaining abundance estimates and biopsy samples in well-designed surveys. Cover new areas based on available information.
Sperm	High direct, moderate opportunistic	High priority given lack of good information on status but high historic catches. Obtaining abundance estimates for sperm whales can be problematic due to g(0) issues but combined acoustic/visual surveys have been successful. Feasibility depends on equipment.

11. OTHER MATTERS

11.1 Generic problems for future survey design

Matsuoka reported on general issues that had arisen during the 2010 North Pacific sighting survey cruise, as they might inform and help refine planning for future cruises. Because of the frequent bad weather encountered in the study area in 2010, numerous days were lost to fog or high wind, and this loss of survey time should be factored into plans for future cruises. In addition, some of the species encountered (e.g. sei whales and blue whales) were more difficult to observe and biopsy sample than some animals studied on SOWER cruises in the

[d] [d] Note that it did not prove possible for the intersessional group established under Item 10 to complete its work, especially with respect to the quantitative items under (3). To facilitate discussion at the 2011 Annual Meeting, Annex D was drafted by the Japanese scientists as a contribution for future discussions at the Annual Meeting. It is included here for convenience but was not discussed by the Workshop.

Antarctic. He suggested that because of the lack of information for many areas of the North Pacific, it might be better to consider basic survey coverage for such areas in the first years of the survey program, with smaller-scale surveys to be refined in later years. Other issues raised by workshop members included the way in which closing mode was conducted, the use of IO mode and the way in which the topmen operated. It was **agreed** that these issues should be considered in the context of planning the series of cruises after receiving the report of the intersessional group noted under Item 10.

11.2 CITES institutional permits and the exchange of biopsy samples

The absence of appropriate CITES permits/certificates has created problems for surveys using a Japan-flagged research vessel in both Russian and U.S. waters, and has essentially resulted in cessation of biopsy sampling in foreign waters. At the 2010 Scientific Committee meeting, the Committee had recognised the importance of the CITES issue and agreed that it should be resolved among parties concerned expeditiously. It had recommended that the investigations regarding the use of 'institutional permits' as a potential solution to facilitate the exchange of biopsy samples proceed as soon as possible, with the results of the investigations being reported to the present planning workshop.

Uoya reported on progress on the issue of using the CITES institutional permit scheme (under Article VII, paragraph 6 of the CITES convention), which would exempt transfer of biopsy samples and other material between "registered" scientific institutions from CITES regulations. He examined the basis and regulations governing institutional permits, and noted that recognizing it would require the establishment of a legal mechanism (domestic rules and procedures) to put this provision into practice in Japan (i.e. Japan had not established a legal mechanism to use this provision yet.). Of the six types of specimens covered by institutional permits only 'museum specimens' could be considered to cover cetacean samples, but he questioned whether this was applicable since the Institute of Cetacean Research (ICR) (or other related institusions such as FAJ, National Research Institute of Far Seas Fisheries (NRIFSF), and Tokyo University of Marine Science and Technology (TUMSAT)) is not a museum. Others noted that institutional permits had been established for various organisations that were not museums in the strict sense of the term, but that in many countries, any institution that preserves specimens for the purpose of scientific research falls under this category (e.g. the Southwest Fisheries Science Center in La Jolla, California). No problems had been encountered with this in the international exchange of samples between such institutions.

While explaining that the issue of 'institutional permit' is beyond FAJ's mandate, Uoya stated that the FAJ will continue to discuss this issue in an effort to resolve this issue as soon as it could. The Workshop thanked Uoya for his efforts to resolve the situation; noting the great importance of biopsy sampling to resolution of stock structure and other management questions, the Workshop **recommended** that a solution be pursued expeditiously so that biopsy sampling in foreign waters could take place during the next survey.

11.3 Name of the programme

The Workshop agreed that it would be valuable to develop an acronym for the programme. One option to consider, based on the work in the Antarctic, could be the IWC-POWER programme (Pacific Ocean Whale and Ecosystem Research). Other suggestions are welcome.

11.4 International co-operation

The Workshop welcomed the generous offer of Japan to provide a vessel for this programme but noted that this may change given the financial climate. It also welcomed the collaborative planning effort so far and the IWC contributions to planning and provision of researchers and some equipment. It **strongly encourages** other nations and institutions with an interest in the North Pacific to collaborate with the programme, making it truly international.

Component B: 2011 Planning

12. REVIEW OF PLANNING DISCUSSIONS FOR THE 2010 AND 2011 CRUISES AT IWC 62

The Scientific Committee's discussions in Agadir regarding the 2010 and 2011 cruises was briefly reviewed, with a focus on the report of the small working group set up to help plan the 2011 IWC/Japan North Pacific research cruise.

13. AVAILABILITY OF RESEARCH VESSELS

13.1 Research vessels offered by Japan

The expectation was that 60 days of time on a single vessel would be available, including transit to and from Japan, although the meeting recognised that this would depend upon whether the budget proposal (funding request) was accepted by the Ministry of Finance of Japan and then approved by the Japanese Diet.

13.2 Other possibilities

No other vessels were available for a dedicated survey in 2011, although data collected from the U.S. national surveys in Alaskan waters might be available to supplement the results of the present survey and informal co-ordination may be possible.

14. PRIORITIES FOR THE 2011 RESEARCH CRUISE

Matsuoka presented a draft research plan for the 2011 cruise (NP/10/WP12). After discussion, and bearing mind the initial priorities agreed at the mid- to long-term planning meeting (see Component A), the following primary objectives were **agreed**:

(1) estimation of abundance of sei whales in the research area (and other species, where possible, especially fin whales);

(2) collection of information on stock structure, particularly biopsy samples, with priority given to sei, fin and sperm whales;

(3) collection of photo-identification data and biopsy samples for rare species encountered, especially North Pacific right whales and blue whales.

In addition, the cruise will collect data on distribution, abundance and biopsy samples for other cetacean species.

In discussion, Clapham noted that the use of acoustic monitoring on research cruises has added considerably to the results and ability to detect whales, and that given the expense of mounting a cruise of this nature it would be very useful if an acoustic component were included. He further noted that the U.S. might be interested in assisting with this, given their strong interest in the 2011 Gulf of Alaska survey area. The workshop **agreed** in principle that this option should be kept open for 2011, but recognised the logistical and funding problems. The intersessional sightings survey group (ISSG) established under Kitakado (see Component A) will consider this intersessionally.

15. REVIEW OF BUDGET

The workshop welcomed the fact that the Commission adopted the proposed budget at the 2011 Annual Meeting. In discussing the budget, the workshop **agreed** that IWC funds should not be used to pay salaries for already-salaried national government employees, beyond travel expenses and subsistence costs. There was some discussion as to the value in modifying the Japanese data entry system to adapt to the IWC format for data entry. Donovan suggested that, rather than continuing to use or spend funds modifying an existing system, the design of a data entry system should be reconsidered after there has been agreement on the mid- to long-term plans for the North Pacific survey. However, it was noted that the contract to modify the Japanese data entry programme had already been granted and thus the option to modify the IWC data forms to fit the Japanese system for the forthcoming cruise would not save money.

The question of direct data entry is further considered under Item B11.7.

Uoya indicated that a budget proposal for the 2011 cruise had been submitted to the Ministry of Finance, and that the same level of funding as was available in 2010 had been requested.

16. CRUISE PLAN

16.1 Priorities and allocation of research effort

Priorities for species were discussed and established under Item 8, above. The primary research mode will be line-transect survey. In response to a question regarding allowance for bad weather, Matsuoka noted that if the number of bad weather days was similar to that in 2010, the expected miles covered on transect per day would be somewhat less than the 85 n.miles target distance given in the draft proposal. Noting that the 2011 study area is actually larger than that surveyed in 2010, it was suggested that the area to be covered be reduced to compensate for this, so as to increase the chances of successful completion of the coverage, as well as allowing for ample time for biopsy sampling and other important activities.

After considerable discussion, it was **agreed** that a more reasonable target for daily coverage was 65 n. miles per day. To achieve this, it was **agreed** while the western boundary of the study area must be fixed so as to be adjacent to the 2010 research area, the intersessional working group to work would be assigned the task of the final research area and cruise track design, based on the expected number of miles per day and information on other factors including past whale distribution and oceanography. This task was assigned to the ISSG.

16.2 Itinerary

The research vessel is scheduled to leave port on 11 July, with an estimated arrival in the research area on 18 July. The survey will be conducted until 31 August, and the ship will return to port on 8 September. This allows a total of 45 research days. A minor adjustment may occur when the budget is finalised.

16.3 Research area

The final research area will be determined by the ISSG.

16.4 Research vessel

The research vessel will be *Yushin-Maru No. 3*; details of the vessel were provided to the meeting and it was noted that the vessel would have an Independent Observer platform.

16.5 Other matters

Clapham noted that a satellite tagging study of fin whales might be conducted off Kodiak in the Gulf of Alaska in 2011; although this was far from certain, and would depend in part upon the availability of funding, if the project went forward the National Marine Mammal Laboratory would attempt to coordinate the timing of the work with the IWC/Japan sighting survey to provide real-time data on fin whale movements. The workshop **welcomed** this information.

16.6 Survey mode and research hours

Hedley expressed the wish that sightings be recorded directly by the observer rather than relayed to a recorder on the bridge, which resulted in delays and introduced complications into subsequent analyses. She also raised the issue of the proportion of time spent in IO versus closing mode, but there was insufficient time at the meeting to discuss this fully. Miyashita expressed the view that IO mode was unnecessary for large whales, which had a very high detection rate; Hedley felt that this needed to be confirmed by observation, and that the North Pacific survey would present a good opportunity to test this. Donovan agreed, noting that g(0) for at least sei whales, was not 1. This issue was also referred to the ISSG.

17. DETAILS OF THE CRUISE

17.1 Cruise track design, 17.2 Survey mode and research hours

After initial discussion, these items were referred to the ISSG. Research hours during the cruise will be the same as on the 2010 cruise. As in the SOWER programme, for biopsy sampling/photo-identification work on priority species (North Pacific right, blue, sei, humpback[e], common minke, fin) there may be occasions when it is beneficial to extend research outside the normal research hours. The basis for such special extension of research hours should again involve mutual agreement between the Captain and Cruise Leader and an allocation of equivalent time-off the following morning or evening.

[e] Brownell will liaise with the organisers of the SPLASH programme to ascertain whether priority should be given to humpback whales

The research day in transits will begin 30 minutes after sunrise and end 30 minutes before sunset, with a maximum of a 12-hour research day. Time-zone changes will be in 30-minute intervals, coming into effect at midnight.

Other aspects of this Item, especially cruise track design and research mode will be decided upon by the ISSG.

17.3 Number of crew on effort
It was **agreed** that this should remain as for the 2010 cruise i.e.

- two crewmembers will be in the barrel whenever full searching effort is conducted;
- one crewmember will be at the helm on the Upper Bridge, regardless of the research mode - also present on the Upper Bridge, whenever the sighting survey is conducted, will normally be the captain and chief engineer (or an alternate);
- during survey, the number of researchers searching from the Upper Bridge should be standardised normally at three.

The ISSG will consider the allocation of crewmembers and researchers as part of its discussions of research mode.

17.4 Navigation and research speeds
It was **agreed** that these should remain as for the 2010 cruise.

17.5 Acceptable conditions
Matsuoka noted the differences in weather conditions between the Antarctic and North Pacific, and suggested that this be considered by the ISSG, taking into account priority species.

17.6 Estimated angle and distance experiment
It was **agreed** that this experiment is important and that possible revisions to it should be considered by the ISSG.

17.7 Data format
Following discussion under Item B9, it was **agreed** that the data format will be based on previous cruises and will use the data entry software updated by the Institute of Cetacean Research (ICR) under contract from the IWC.

17.8 Biopsy sampling
17.8.1 Priority of species
It was **agreed** to follow the general approach of previous IWC SOWER cruises, i.e. decisions regarding whether and when particular animals will be biopsy sampled will be made by the Cruise Leader, in conjunction with the captain of the research vessel. Priority should be given to sei, fin, right, sperm, blue and minke whales. Other species (e.g. humpback whales and killer whales) will be biopsied on an opportunistic basis as time allows.

17.8.2 Equipment
The Larsen gun will be the primary sampling tool. It was **agreed** that one or more crossbows be purchased and kept in Japan. Ammunition for the Larsen gun will be purchased in Japan. IWC equipment including 500 ammunition was still stored in Bali.

17.8.3 Handling and preservation of samples
As in past years, samples will be divided into two, with one half remaining in Japan and the other (the IWC sample) being sent to the NOAA/NMFS Southwest Fisheries Science Center (SWFSC). Samples will be frozen. Access to IWC samples will be subject to the usual rules[f].

17.9 Photo-id/videotaping studies
17.9.1 Priority of species
Priority for photo-identification will be given to right, blue and humpback whales, with other species (e.g. killer whales) photographed on an opportunistic basis. Video and photographs will be used with blue whales to

[f] (http://www.iwcoffice.org/sci_com/handbook.htm#six)

document behaviour and other features for comparison with studies on subspecies differentiation undertaken in the Antarctic.

17.9.2 Equipment
The available digital cameras from previous cruises will be used.

17.9.3 Handling of samples
Copies of photographs taken in the US EEZ will be shared with SWFSC. Copies of all photographs will be sent to the IWC and Japan for archiving; as noted above, access will be subject to the usual rules.

17.10 Acoustic studies
See discussion in Item B8.3.

17.11 Oceanographic studies
No oceanographic work is planned under this item, but requests for oceanographic sampling will be considered on a case by case basis, and work conducted if logistically practicable.

18. INTERNATIONAL RESEARCHERS AND ALLOCATION OF RESEARCH PERSONNEL

18.1 Number of researchers
The meeting was informed that there is space for four scientists, of which one will be from Japan (probably Matsuoka), one will be from Korea and one from the USA. A fourth scientist has not yet been chosen. It was emphasised that all scientists should have extensive experience with cetacean observation and identification.

18.2 Nomination and allocation of researchers
This should be the responsibility of the Steering Group.

19. GENERAL PREPARATIONS FOR THE 2011 CRUISE

19.1 Identification of home port organiser
The home port will be Shimonoseki and Nishiwaki **agreed** to act as the home port organiser.

19.2 Entry and other permits
The Embassy of Japan in the US and the US State Department were very helpful in obtaining the necessary entry permit in 2010; this procedure will be followed again in 2011. The US will supply the appropriate marine mammal research permit for work in US waters under the Marine Mammal Protection Act and the Endangered Species Act; Clapham and Brownell will arrange this. The situation related to CITES import/export permit for biopsy samples was reported and discussed in the session for middle- to long- term planning (see Component A). Should other permits be required, Japan will be responsible.

19.3 Review of recommendations from the 2010 cruise
The recommendations from the 2010 cruise were summarised in document (NP/10/WP11), and these have been covered in various other agenda items, above.

20. TRANSIT SURVEY

20.1 Home port to research area and back
A passing mode sighting survey will be conducted *en route* to the study area and from the study area back to Hakodate.

21. TRANSPORTATION OF DATA, SAMPLES AND EQUIPMENT

21.1 Equipment
An equipment list was provided to and discussed by the workshop. Matsuoka and Murase will ensure that an updated list is made available.

21.2 Data and samples and 21.3 Necessary permits
These have been dealt with under earlier Items

21.4 Responsible persons
The cruise leader, with appropriate liaison with US scientists, will be responsible for ensuring shipment of data and samples.

22. COMMUNICATIONS

It was **agreed** that in general, the items below should be handled as during the 2010 cruise.

22.1 Safety aspects (daily reports)
This will be the responsibility of the Captain, in liaison with the relevant Japanese and US authorities. Daily reports will be sent from the Captain to Japan.

22.2 Between cruise leader and IWC
The Cruise Leader will send a weekly progress report to the IWC Secretariat and to the Steering Group. The members of the group are (Kato (Chair), An, Brownell, Clapham, Donovan, Ensor, Matsuoka, Miyashita, Murase, Pastene and Wade). A report will also be sent after the completion of each phase of research as appropriate. Matsuoka will forward copies of those reports to the ICR, the FAJ, the NRIFSF and owner company of the research vessel (Kyodo Senpaku Co. Ltd. in case of *Yushin-Maru No. 3*).

22.3 Fog and sea temperature information
The Japanese and US scientists will liaise on this issue.

22.4 Other official communications
Email, telephone and facsimile will be available. The vessel's email address will be made available at a later date.

All official communications by the Cruise Leader will be paid for by the IWC. Communications can be by radio, telephone, email, or fax.

22.5 Private communications
Researchers and crew may send and receive private communications, including email, at their own expense.

22.6 Terms of payment of communication cost
Accounts must be paid by researchers before leaving the vessel at the home port. Payment is required in Japanese yen. The researchers are requested to make payment if possible on the day prior to port entry.

23. MEETINGS

23.1 Pre-cruise meeting
As in 2010, a pre-cruise meeting will be arranged on board the vessel in Shimonoseki to clarify procedures and other matters for the survey. The cruise leader will be the responsible person for the arrangement.

23.2 Post-cruise meeting
In 2010, this occurred during the transit back to port, and the report was completed just prior to arrival. The same procedure will be followed in 2011.

23.3 Home port arrangements
This will be coordinated by Nishiwaki as home port organiser.

23.4 Responsible persons
The Cruise Leader and home port organizer will be responsible.

24. REPORTS

24.1 Planning workshop report
The draft report was prepared by Clapham and Donovan and circulated to the participants for comments, and then finalised.

24.2 Cruise report
The cruise report for the 2011 survey will be sent to the steering group, and to the 2012 annual Scientific Committee meeting. Donovan will provide the new guideline of the simple cruise report for the SC.

25. OTHER LOGISTICS

25.1 Press release

For various reasons, no press release was issued for 2010. The Fisheries Agency of Japan and other relevant parties will consider whether to write a press release following the 2011 cruise. The IWC will post information about the cruise on its website.

25.2 Security

Security arrangements will be considered and developed if needed in the home port. In terms of entering US waters, it is not necessary to contact the US Coast Guard or to fly the IWC flag.

25.3 Accommodation and food costs

The IWC will cover accommodation and food costs for the scientists involved; they remain unchanged from 2010.

26. CONCLUDING REMARKS

Donovan thanked all those who had taken part in the meeting, in particular the Chair, Kato, and the interpreters, who had performed their difficult task with their customary efficiency and cheerfulness and the Government of Japan for providing the excellent facilities. Kato thanked everyone for their cooperation and hard work.

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Annex A
List of Participants

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Takashi Hakamada	The Institute of Cetacean Research, Japan
Sharon Hedley	Invited Participant
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Hidehiro Kato	Tokyo University of Marine Science and Technology, Japan
Toshihide Kitakado	Tokyo University of Marine Science and Technology, Japan
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Koji Matsuoka	The Institute of Cetacean Research, Japan
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Yoko Yamakage	Interpreter, Japan

Annex B

Agenda

1-4. Introductory items

5. Review of available documents

6. Review of planning discussions at IWC 62

Component A: Medium-long term planning

7. Objectives

8. Review of available information by species

9. Overview of past and ongoing survey activities and available data

10. Initial consideration of medium- to long-term objectives and priorities

11. Other matters

11.1 Generic problems for future survey design

11.2 CITES institutional permits and the exchange of biopsy samples

11.3 Name of the programme

11.4 International co-operation

Component B: 2011 planning

12. Review of planning discussions for the 2010 and 2011 cruises at IWC 62

13. Availability of research vessels

14. Priorities for the 2011 Research cruise

15. Review of budget

16. Cruise plan

17. Details of the cruise

18. International researchers and allocation of research personnel

19. General preparations for the 2011 cruise

20. Transit survey

21. Transportation of data, samples and equipment

22. Communications

23. Meetings

24. Reports

25. Other logistics

26. Concluding remarks

Annex C

NP/10/WP

1. Report of the intersessional meeting on the North Pacific Survey Programme (SC/62/Rep3).
2. IWC/SC/61, 62 report (SC report extracts and SC62/Annex G).
3. Brief review of the Scientific Committee's issue in the North Pacific (SC/62/IA15).
4. Review of the past and ongoing survey activities and available data (NOAA, NRIFSF, ICR).
5. Encounter rate of large whales in NP (By Miyashita).
6. Report of the Workshop on obtaining baseline cetacean abundance information for the ACCOBAMS area (Contents).
7. Progress report: study on application of so-called "institutional permit" to biopsy samples of CITES-listed whale species (FAJ). [not available]
8. Research plan for the 2010 IWC/Japan Joint Cetacean Sighting Survey in the North pacific (SC/62/IA10).
9. Report of the pre-cruise meeting for the 2010 IWC/Japan Joint Cetacean Sighting Survey Cruise in the North Pacific.
10. Information for Researchers for the 2010 IWC/Japan Joint Cetacean Sighting Survey Cruise in the North Pacific.
11. (Cruise report) 2010 IWC/Japan Joint Cetacean Sighting Survey Cruise in the North Pacific.
12. Research plan for the 2011 IWC/Japan Joint Cetacean Sighting Survey Cruise in the North Pacific (SC/62/IA10, revised)
13. Contact details for the 2011 cruise (port organizer, ship agents)
14. Required equipments for the 2011 IWC/Japan NP Sighting Cruise.

Annex D[g]

Suggestions for the research programme 2012 to 2015

MATSUOKA, MIYASHITA, PASTENE, AND KITAKADO

BACKGROUND

The 1st joint IWC-Japan North Pacific survey was conducted from 2 July to 31 August, 2010, in the central North Pacific (from north of 40°N to south of the Aleutian Islands, between 170°E-170°W) using *Kaiko-Maru* (Matsuoka *et al*., 2011). The 2011 survey is planned to the east of the survey area in 2010 (from north of 40°N to south of the Aleutian Islands, between 170°W-150°W, see Matsuoka *et al.*, 2010 and Fig. 1).

The planning meeting to which this suggestion is appended established a small group to work intersessionally with the two terms of reference (see Item 10) as itemised below.

(A) Finalise the research plan and protocol for the 2011 cruise (this was completed and the planning report was submitted to the US Government in January 2011).

(B) Discuss short, mid-long term objectives for the programme to provide overall strategy and more detailed 5 year plans for the North Pacific programme, with a focus on the three aspects below:

(1) the overall long-term general objectives (stock structure, abundance, trends) and the priorities agreed in Table 3
(2) integration over (1) over in a pragmatic way, for the short (<5), medium (5-10), and long-term (10+)
(3) examine existing data plus environmental data to develop better options (including methods with visual, acoustics, biopsy etc.) for strata coverage and likely power to detect trends.

There had not been time for the group to complete its work under (B), especially the quantitative aspects of sub-item (3), and so we have provided these suggestions to facilitate discussion at the 2011 Annual Meeting

RECENT SURVEYS IN THE NORTH PACIFIC

Fig. 1 show the areas in the North Pacific, which have been covered by cetacean scientific surveys in recent years between 1999 and 2011.

The Central and Eastern North Pacific area has been poorly covered by previous surveys and not at all in recent decades thus representing an important information gap for several large whale species.

One short term objective is to understand current distribution (sighting rate of each species, school size, stock structure information from biopsy sampling etc.) of whales in the North Pacific. To achieve this we suggest that it is important to cover the North Pacific once broadly and widely during the short term period (<5 years). The suggested work for the first 4 years after 2012 cruise assumes a similar level of funding from the IWC and Government of Japan to the present level.

We suggest that these cruises should focus on the collection of line transect data to estimate abundance and biopsy/photo-identification data to assist *inter alia* with stock structure (and perhaps movements). Such work would make a valuable contribution to the work of the Scientific Committee on the management and conservation of populations of large whales in the North Pacific in a number of ways, including:

(a) providing information for the proposed future in-depth assessment of sei whales in terms of both abundance and stock structure;

(b) providing information relevant to *Implementation Reviews* of whales (e.g. common minke whales) in terms of both abundance and stock structure;

[g] Note that this was completed after the Workshop. It had not proved possible for the intersessional group established under Item X to complete its work and so this Annex was drafted by the above scientists as a contribution for future discussions at the Annual Meeting.

(c) providing baseline information on distribution and abundance for a poorly known area for several large whale species/populations, including those that were known to have been depleted in the past but whose status is unclear;

(d) providing biopsy samples and photo-identification photos to contribute to discussions of stock structure for several large whale species/populations, including those that were known to have been depleted in the past but whose status is unclear;

(e) providing essential information for a medium-long term international programme in the North Pacific.

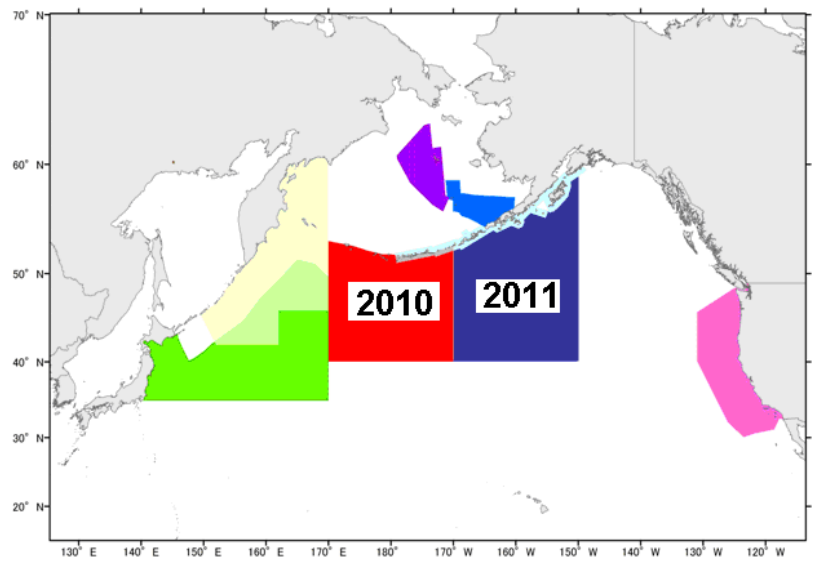

Fig.1. Recent surveys in the North Pacific. The 2010 and 2011 IWC/Japan Joint Cetacean sighting survey research areas are shown in red and dark blue, respectively. These areas have not been surveyed previously. Other coloured areas represent surveys conducted in the North Pacific in recent years: in 1999 (purple) and 2000 (blue) by Moore et al. (2002), in 2001-2003 (sky blue) by Zerbini *et al.* (2007), in 2001 and 2005 (pink) by Barlow and Forney (2007), in 2005 (light yellow) by Miyashita (2006). Sighting surveys have been conducted in the green area since 1994 as a part of JARPN II (Pastene *et al*., 2009).

SHORT TERM OBJECTIVES AND PROPOSED RESEARCH PLAN (2012-2015)

Proposition of survey areas and timing with its rational

One research vessel provided by Japan is a precondition for the short term cruises, a total cruise of 60 days (i.e. including transit time) represents the maximum operation period of the vessel without refuelling/resupplying. Based on past JSV data and catch data, the survey will be conducted during summer season (mainly July to August) in the North Pacific which month is expected of blue, fin, sei, common minke and Bryde's whale sightings (Miyashita *et al*., 1995).

Proposed research areas of each year are below;

2012: North of 40°N, south of the Aleutian Islands, between 140°W and 135°W.

2013: North of 20°N, south of 40°N between 170°E and 170°W.

2014: North of 20°N, south of 40°N between 170°W and 140°W.

2015: North of 20°N, south of 40°N between 140°W and 135°W.

As recent scientific surveys were conducted to the west of 170°E and the east of 135°W, that region has been excluded from the short term research areas (see Fig.1 of this paper). It is a subject for future consideration that surveys are conducted the south of 20°N in the North Pacific in the summer season.

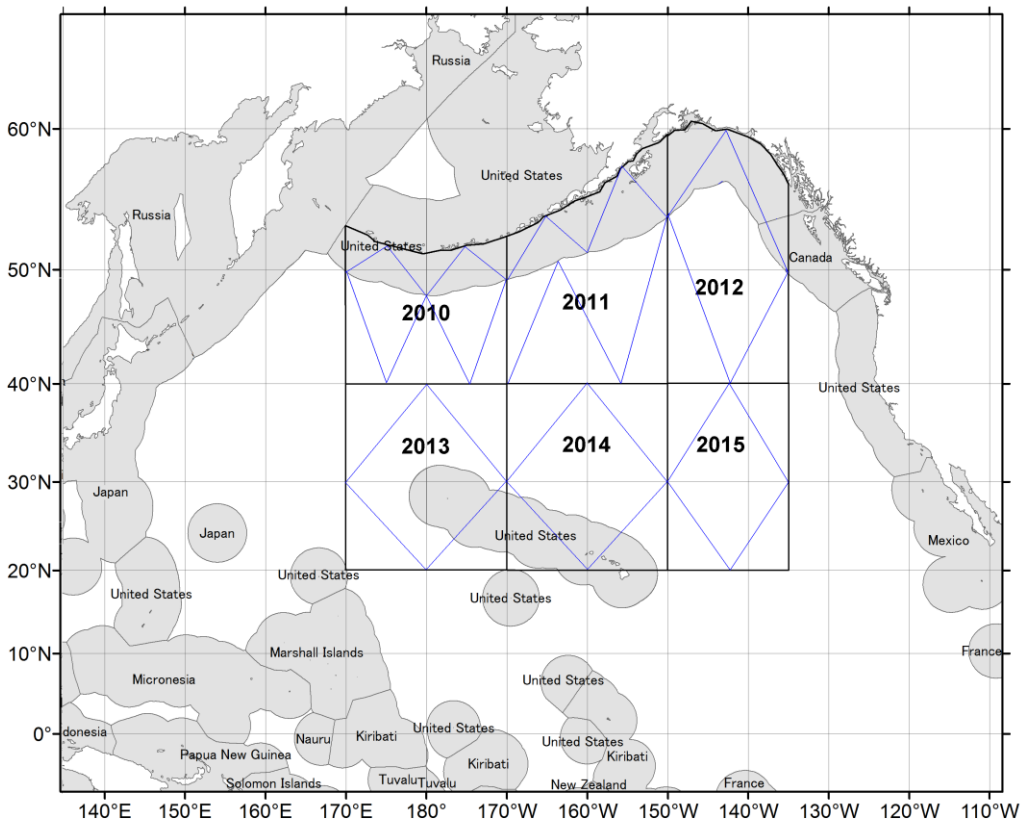

Fig. 2. Proposed short term cruises in the Central and Eastern North Pacific during 2012-2015 with pre-determined trackline for each year with the outer limit of each foreign EEZ.

MID-LONG TERM OBJECTIVES (After 2016)

Based on the short term essential information (stock structure information from biopsy sampling, sighting rate, school size and abundance of each species from sighting survey etc.), the priority for species and research areas need to be developed based on knowledge gaps, need for conservation and management for a medium-long term programme. Further, the most appropriate survey methods for each agreed priority species will be selected. Details of the agreed summary of information on selected North Pacific Whales were reported to (IWC, 2011).

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