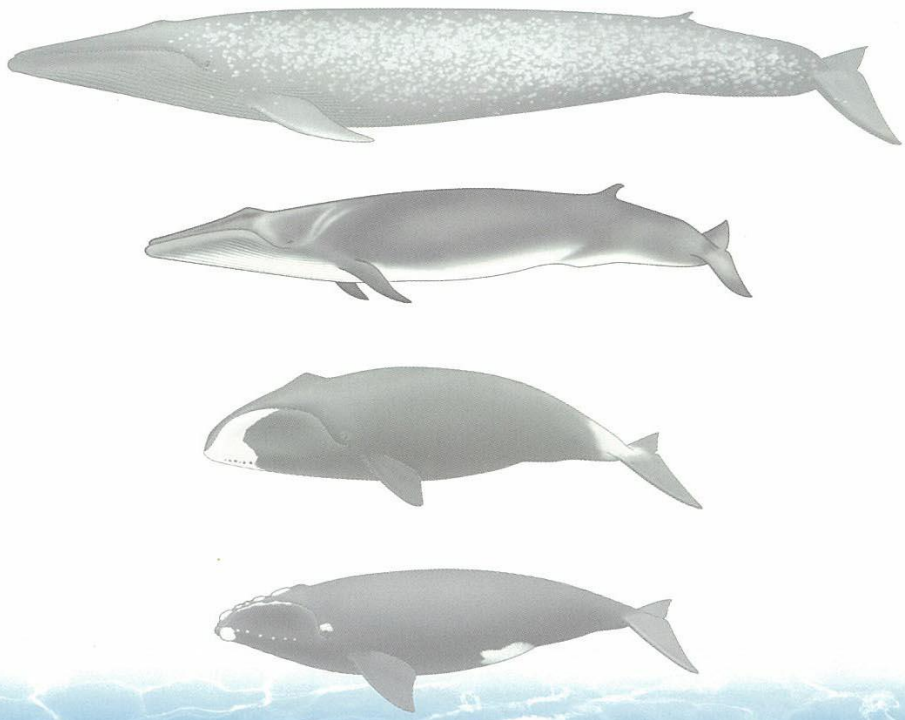
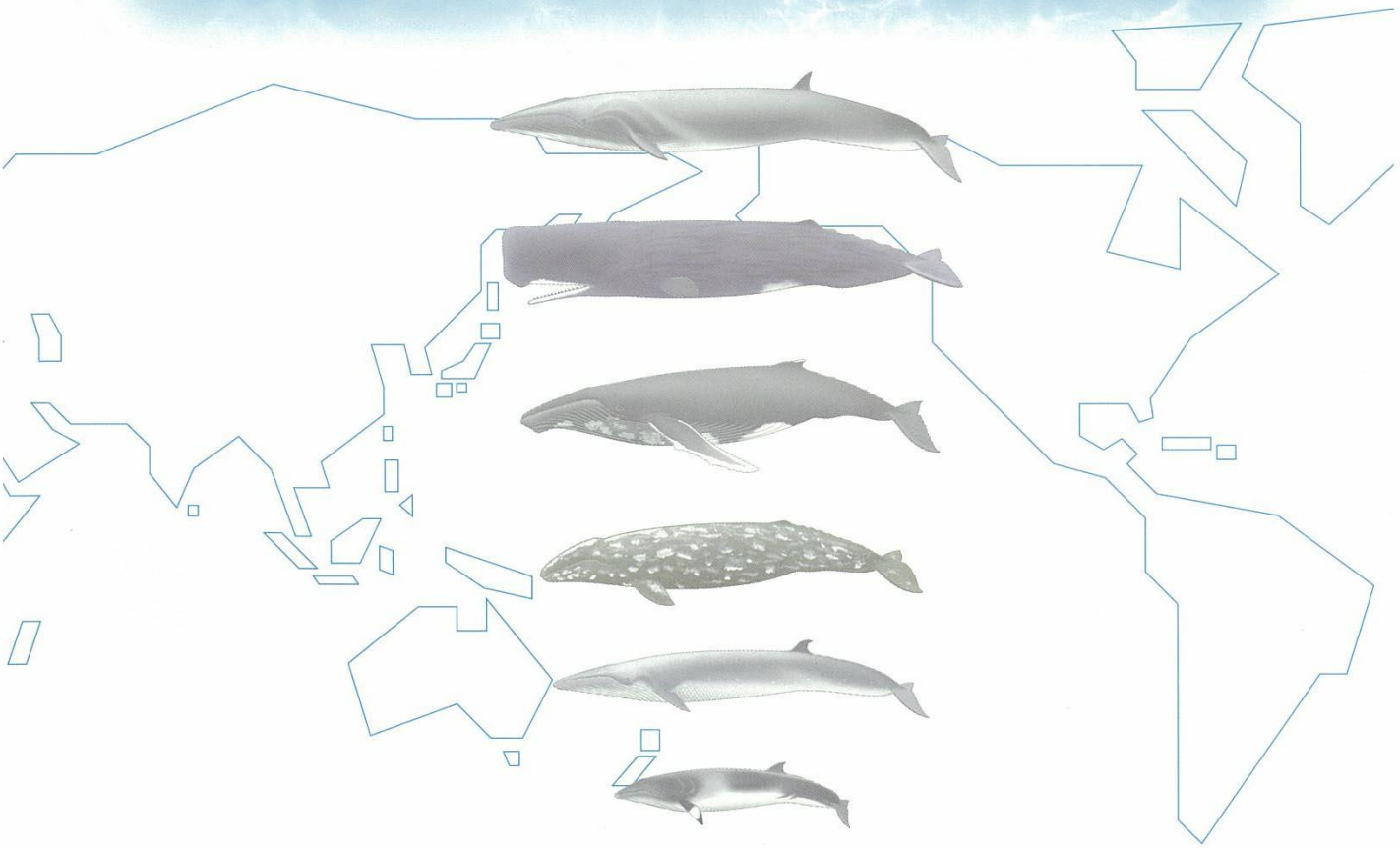


Whales and Whaling



Whale species

Whales are grouped as baleen whales (14 species) or toothed whales (70 species). Baleen whales have baleen plates in the upper jaws and two blowholes on the top of their heads. Toothed whales bear teeth and a single blowhole. Dolphins and porpoises are whales below 4 meters in length.

Baleen whale examples

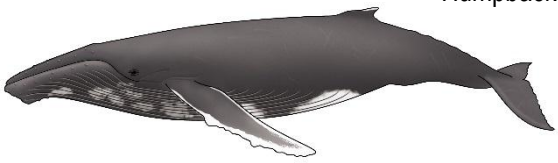
Blue whale

Bryde's whale

Fin whale

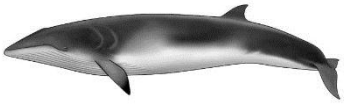
Sei whale

Humpback whale



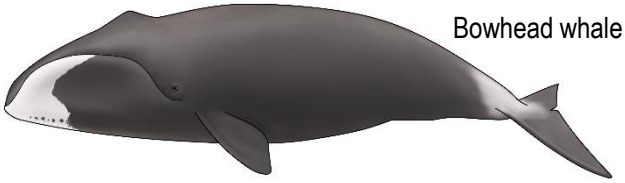
Minke whale

Antarctic minke whale



Gray whale

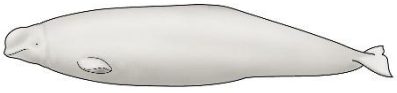
Bowhead whale



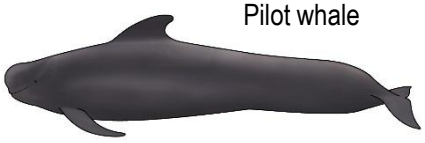
Toothed whale examples

Sperm whale

Beluga



Pilot whale



Killer whale

Bottlenose dolphin

Baird's beaked whale

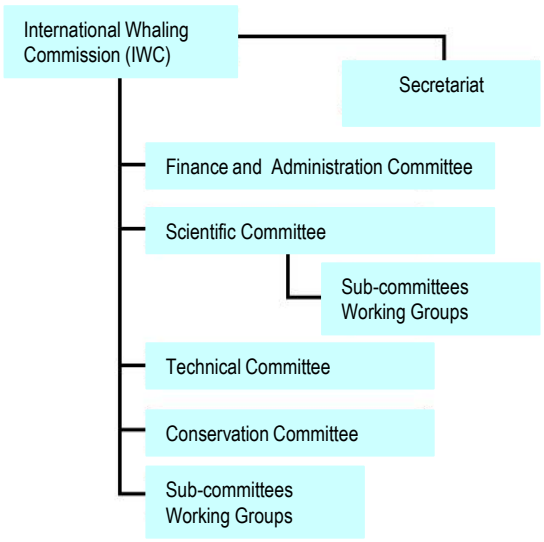
Origin of the term "kujira" (whale)

Although there is no definite etymology for the Japanese word for whale ("kujira"), according to one theory, since whales have big mouths, "kujira" was derived from the term "kuchihiro" (wide mouth). It is also said that in ancient Korean language, the particle "ku" meant big size, "shishi" indicated a beast or animal, and "ra" represented a postfix; the term "kushirara" shortened to "kujira". The kanji character representing "kujira" means big fish. Another term used in Japan for whale is "isana" and is usually written with the two kanji characters indicating "brave fish". In the Manyoshu, the oldest existing collection of Japanese poetry, the term "isanatori" (whale hunter) was used as a customary epithet in sea-related context. It is also said that the term "isana" has its origins in the ancient Korean language, meaning "big fish". Reference: Kujira to Nihon-jin (Seiji Ohsumi, Iwanami Shincho).

What is the IWC?

The International Convention for the Regulation of Whaling (ICRW) was concluded in 1946. Its purpose was the conservation and management of whale resources and ensuring the sustainable use of whales as valuable marine resources for future generations. To realize this purpose, the International Whaling Commission (IWC) was founded in 1948 with the 15 main whaling countries of the world as members. Japan adhered to the IWC in 1951.

IWC Organization



History of the whaling dispute

Establishment (1948 to 1960)

When the IWC began its work, resource management science was in an early stage. There was limited scientific data available, and catch quotas were not established other than those for the Antarctic Ocean.

1960 to 1972

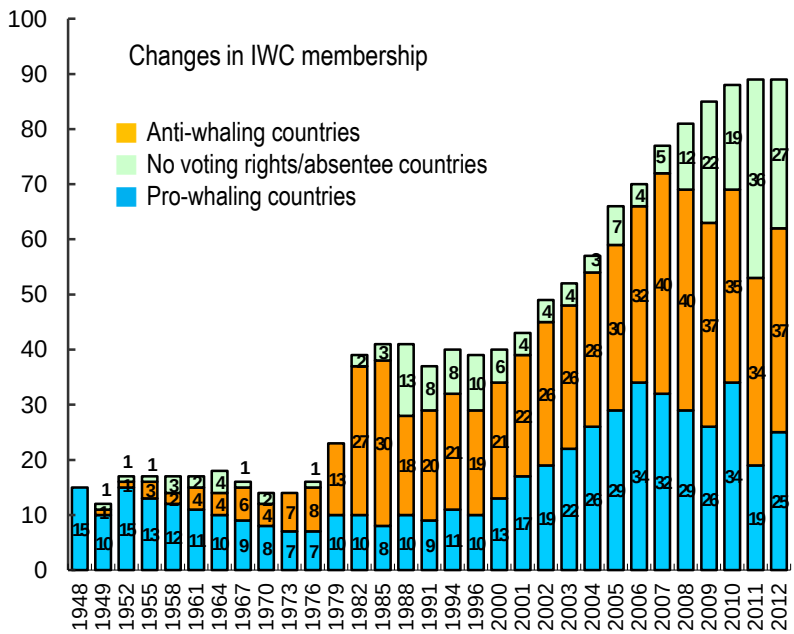
From 1960, resource management became strengthened with the establishment of catch quotas per country and capture prohibition of diminished species. As a result, major whaling countries, such as the US, UK, Netherlands and Australia, withdrew from their no longer profitable whaling industry. Instead, cries for animal protection and nature conservation began to be heard, and the anti-whaling movement increased in activity. A ten-year temporary suspension or moratorium on commercial whaling was adopted in 1972 at the United Nations Conference on the Human Environment, but it was rejected at the IWC as having insufficient scientific grounds.

1972 to 1982

1972 marked the beginning of serious antagonism between anti-whaling and pro-whaling countries. The anti-whaling countries contrived a strategy to obtain a majority of votes at the IWC, and by 1982, managed to convince 25 countries to join the IWC as anti-whaling members. As a result, they came to command a majority of more than 75%, and the IWC moratorium on commercial whaling was adopted that year.

1982 to today

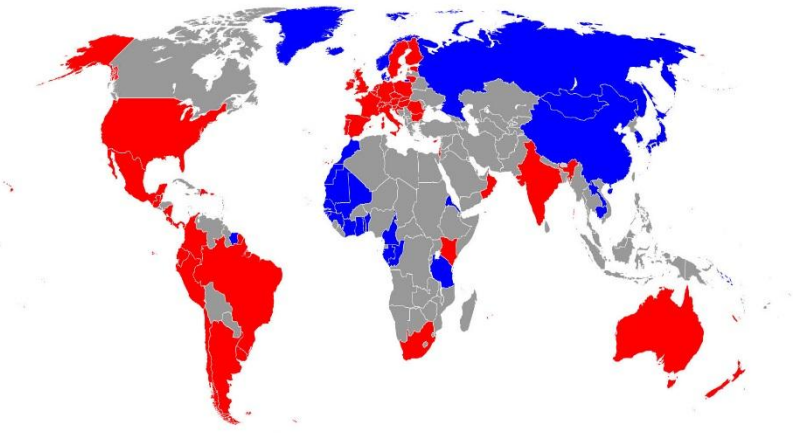
In 1982 ,the IWC adopted a moratorium on commercial whaling prohibiting the capture of great whales to take effect in March 1988. At present, the number of pro-sustainable use countries which includes Japan, and anti-whaling countries rival each other so that the three-quarter majority of votes necessary to abolish the moratorium has yet to be attained.



Present IWC membership is 88 countries*

While the mandate of the IWC as a organization devoted to the management of whale resources based on scientific evidence is clearly stipulated in the ICRW, a number of countries continue to oppose the resumption of commercial whaling even for species whose resource status has been scientifically proven to be at high levels of abundance. However, some of these countries are starting to change their positions, and new participation from countries which support sustainable whaling has been increasing.

* As of December 2013



Pro-whaling/sustainable use (blue) 36 countries
Anti-whaling (red) 52 countries

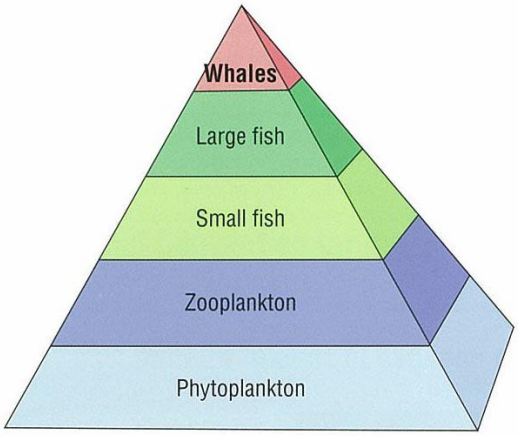
Note: Aboriginal subsistence whaling countries: United States of America, Russian Federation, Denmark, St. Vincent & the Grenadines
Commercial whaling countries: Norway, Iceland Research whaling country: Japan

Importance of the ecosystem approach

Marine ecosystem balance

The marine ecosystem food chain can be described in its simplest form as plankton eaten by fish and the fish eaten by whales. We can visualize this as a food pyramid in which the fewer top level organisms are supported by a larger number of food organisms. With the moratorium on commercial whaling protecting even abundant whale species, if their abundance continues to increase, the top layer alone of the food pyramid will expand, upsetting the balance of the marine ecosystem, since the fish available as food for so many whales would, by consequence, be reduced.
The sustainable utilization of a certain number of whales based on scientific evidence is therefore important in terms of maintaining the marine ecosystem balance.

Food pyramid conceptual diagram



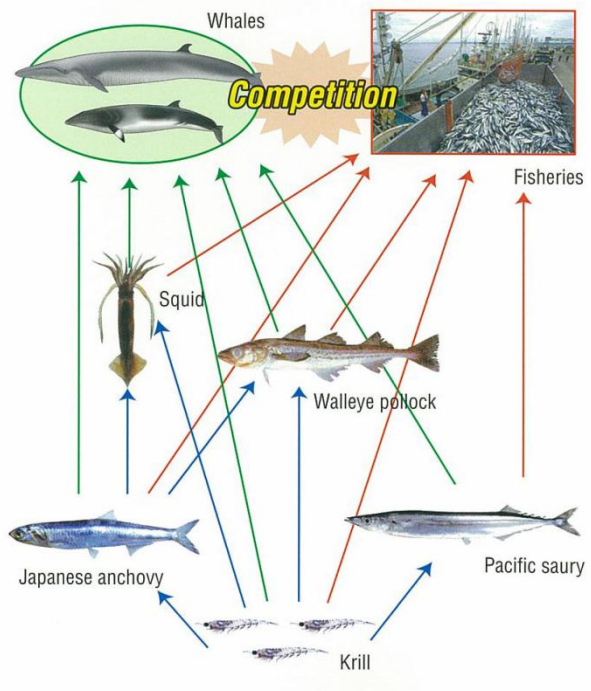
Competition between whales and fisheries

Elucidation of the possible competition between whales and fisheries

Whales are at the top of the food web

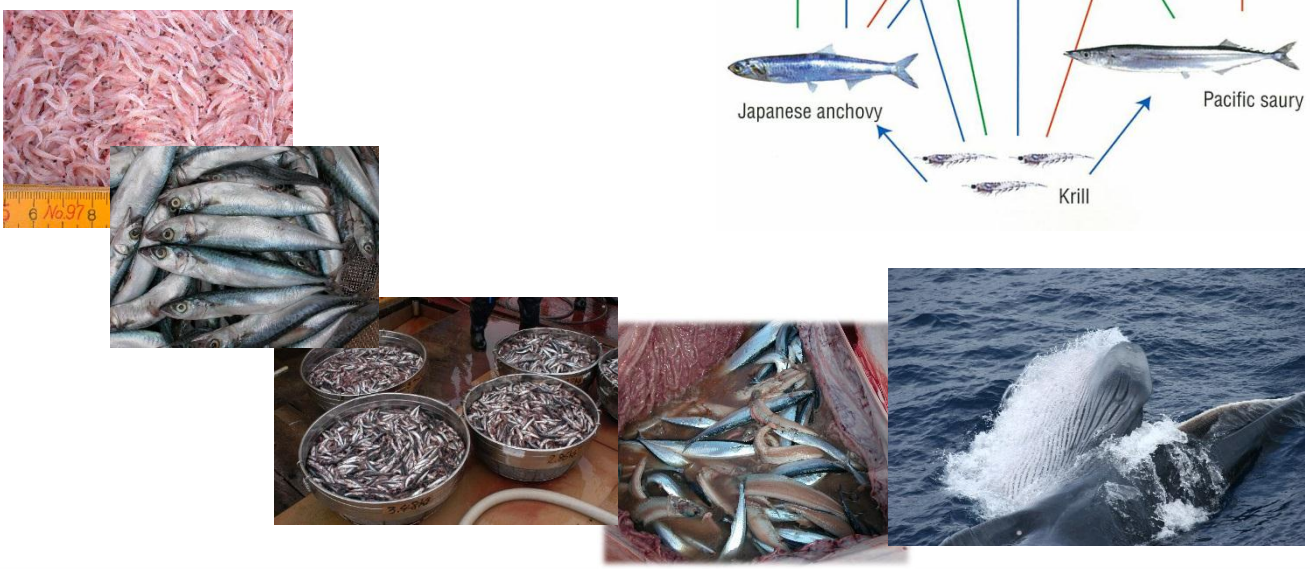
Whales are the largest marine mammals and are at the top of the food web in their ecosystem. The balance of the marine ecosystem will be affected if whales alone increase excessively in number.

Schematic diagram of competition in the western north Pacific



Competition between whales and fisheries

The issue of competition between whales and fisheries (in the western north Pacific) implies the consumption by whales of important seafood species, such as Japanese anchovy, Pacific saury, walleye pollock, salmon and squid. As whales are increasing in number, their feeding behavior could severely affect fisheries, which poses a grave problem.



Why does Japan conduct whale research?

Starting background

Japan withdrew from commercial whaling in 1987 after the IWC moratorium adoption. The moratorium however was adopted with the provisory clause that "by 1990 at the latest, the Commission will undertake a 'comprehensive assessment' of the effects of this decision on whale stocks and consider modification of this provision and the establishment of other catch limits". From 1987/1988, Japan initiated the whale research program in the Antarctic and to this day, continues collecting the scientific data necessary for in-depth analyses of the IWC comprehensive assessment, aiming for its future application on the sustainable utilization of whale resources.

The purpose

Japan's whale research has two main components lethal and non-lethal. The non-lethal component includes sighting surveys with the objective of collecting scientific data for abundance estimation, and the lethal component implies the capture and taking of whales with the objective of collecting biological data. In order for the IWC to undertake its "comprehensive assessment of whale stocks", in addition to the estimation of resource abundance based on sighting surveys, the collection of scientific data that can be obtained only through whale capture, such as resource age composition and breeding stocks, is also essential. The constant accumulation of this biological data will make it possible to forecast resource fluctuations with high accuracy, thus leading to the sustainable utilization of whale resources.

The content

To achieve Japan's whale research objectives, we are studying whale resources from different angles such as the following.

Non-lethal research examples:
- Resource abundance (population estimate by visual observation)
- Stock distribution (tissue sampling and genetic analysis)

Lethal research examples:
- Stock structure (age composition by ear-plug analysis, etc.)
- Stock distribution (genetic analysis of tissue samples)
- Feeding ecology (stomach contents)

Examples of appraisals using resource data:
- Effect of water habitat environmental variation on resources
- Resource variation simulation using ecosystem models

Japan's whale research is a legal right under international law

Under Article VIII of the International Convention for the Regulation of Whaling, IWC member countries have the right to conduct research programs involving the capture of whales for scientific purposes. Even if commercial whaling is banned by the moratorium, IWC member countries are legally allowed to carry out research whaling. Article VIII also stipulates that the research by-products (whale meat) must be used as much as practicable.

Article VIII, International Convention for the Regulation of Whaling

1. Notwithstanding anything contained in this Convention, any Contracting Government may grant to any of its nationals a special permit authorizing that national to kill, take, and treat whales for purposes of scientific research subject to such restrictions as to number and subject to such other conditions as the Contracting Government thinks fit, and the killing, taking, and treating of whales in accordance with the provisions of this Article shall be exempt from the operation of this Convention. Each Contracting Government shall report at once to the Commission all such authorizations which it has granted. Each Contracting Government may at any time revoke any such special permit which it has granted.
2. Any whales taken under these special permits shall so far as practicable be processed, and the proceeds shall be dealt with in accordance with the directions issued by the Government by which the permit was granted.

To read the full text of the ICRW visit: http://iwc.int/convention

How is decided what research method is best?

Lethal and non-lethal research method choice

There are two kinds of methods employed in whale research. One implies the killing of whales (lethal method) while the other (non-lethal method) does not. Data collection effectiveness and suitability with respect to each research objective as well as the possibilities to obtain sufficient data are carefully considered to decide which method is best to apply.
The table below shows a comparison between the lethal and non-lethal methods' data collection effectiveness.

Suitability of lethal and non-lethal research methods according to research item and objective

Research item (Research objective)	Lethal method / Non-lethal method	Allows collection of data?	Allows collection of plenty enough data?
Age determination (To understand age composition, age at maturity, recruitment rate)	Earplug analysis	✔	✔
	Negative	No	No
Blubber thickness and other biological condition indicators (To understand feeding ecology)	Blubber thickness analysis	✔	✔
	Negative	No	No
Stomach content qualitative analysis (To understand feeding ecology)	Stomach content analysis	✔	✔
	Fecal matter	✔	**No**
Stomach content quantitative analysis (To understand feeding ecology)	Stomach content analysis	✔	✔
	Negative	No	No
Genetic analysis (To understand stock structure and mixing degree)	Tissue analysis	✔	✔
	Biopsy (skin sample)	✔	**No**
Pollutant and internal organ observation (To understand effects of environmental pollution)	Internal organ/tissue analysis	✔	✔
	Biopsy (skin sample)	✔	**No**
Number of individuals (To estimate resource abundance)	Negative	No	No
	Visual counting	✔	✔
Migration, behavior, habitat preference (To understand behavioral ecology))	Tag recovery	✔	**No**
	Satellite tagging	✔	**No**

Japan's whale research in the Antarctic

JARPA (1987/88 - 2004/05)

Japan's Whale Research Program under Special Permit in the Antarctic (JARPA)

The IWC moratorium on commercial whaling was introduced because of the uncertainty surrounding the scientific data then available. Japan's Whale Research Program under Special Permit in the Antarctic was started in order to address this matter, and to accumulate scientific data on the abundant Antarctic minke whale resources.

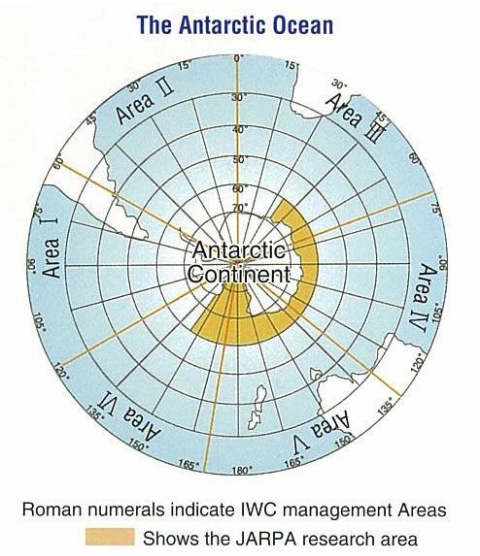
JARPA II (2005/06-)

The Second Phase of Japan's Whale Research Program under Special Permit in the Antarctic (JARPA II)

To be able to conduct future resource estimates, first, it is necessary to understand the population dynamics of baleen whales in a specific sea area. To do so, resource analysis of individual whale species is not only necessary, but we need at the same time to take into account the whale inter-species relationship in the ecosystem of said sea area.

The JARPAII program started in 2005 with the Antarctic minke whale, the fin whale and the humpback whale as research target species. The results will be reviewed every six years, and the first review meeting by the IWC Scientific Committee was held on February 2014 in Tokyo.

Concerning the humpback whale, in 2007 the United States, which at the time was the IWC Chair, made a request for the suspension of sampling of this species. Japan, in the interest of bringing about a more forward atmosphere in negotiations with an aim to put an end to the deadlock situation reigning at the IWC (the "Future of the IWC" process), decided to put off for the time being the sampling of this species.



Objectives

1) Monitoring of the Antarctic ecosystem
2) Modeling whale inter-species competition
3) Elucidation of temporal and spatial changes in stock structure
4) Improving the management procedure for the Antarctic minke whale stocks

Research area

Of the six IWC Antarctic management areas, the eastern part of Area III, Area IV, Area V and a part of western part of Area VI (South of 60 S, 35 E - 145 E) are used for research. Cruises are conducted alternately on each half so two years are required to survey the whole

Planned number of samples

850 ±10% Antarctic minke whale
50 fin whales
50 humpback whales

Main research organization

The Institute of Cetacean Research

Safety at Sea Legal Action against Sea Shepherd and Paul Watson

On December 2011, the Institute of Cetacean Research and Kyodo Senpaku filed their original complaint to the U.S. District of Washington Federal Court seeking preliminary injunctive relief to protect their research vessels and crews against violent and unlawful attacks by Sea Shepherd and Paul Watson. On March 2012, the District court issued a ruling that rejected the preliminary injunction requested by the Institute of Cetacean Research and Kyodo Senpaku. After appealing to the U.S. 9th Circuit Court of Appeals, in February 2013, the 9th Circuit reversed the Washington District Court's original ruling on all counts and issued an Order enjoining Sea Shepherd, Paul Watson and anyone acting in concert with them from physically attacking the Japanese research vessels and ordered an appointment of another judge by the District Court for the case. At present, the case is pending in court..

Japan's whale research in the Western North Pacific

JARPN (1994 - 1999)

Japan's Whale Research Program under Special Permit in the Western North Pacific (JARPN)
In the IWC discussions to establish catch quotas of minke whales in the seas off Japan, the anti-whaling countries claimed that there were numerous stocks (small breeding groups within the same whale species) of minke whales in the Western North Pacific, aiming to complicate the calculations in a way that would produce lower quotas. The JARPN research program was created to disprove this theory.

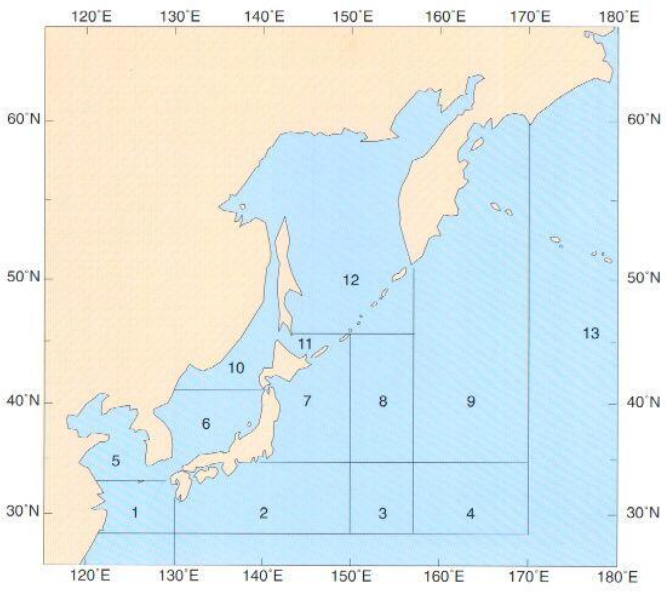
JARPN II (2000 -)

The Second Phase of Japan's Whale Research Program under Special Permit in the Western North Pacific (JARPN II)
The first phase of the program demonstrated that the theory of the Japanese scientists which stated that "in the western north Pacific, there are only two minke whale stocks" was correct. JARPN also revealed that minke whales consume huge amounts of fishery resources. Thus, JARPN II was planned to further elucidate the feeding ecology of the various whale species aiming for the comprehensive management of the marine ecosytem.

Objectives

1) Feeding ecology and role of whales in the ecosystem
2) Monitoring pollutants in whales and the marine ecosystem
3) Elucidation of whale stock structure

JARPN II research area



Research area

Of the thirteen Sub-areas established by the IWC Scientific Committee, Sub-areas 7, 8 and 9 are used for research.

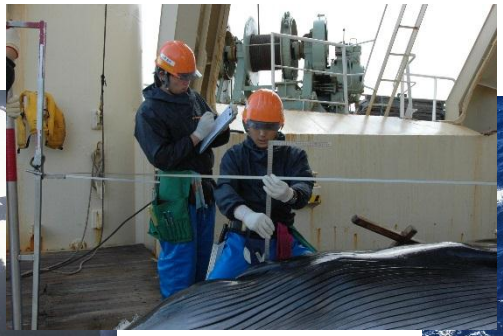
Planned number of samples

220 minke whales
100 sei whales
50 Bryde's whales
10 sperm whales

Main research organizations

The Institute of Cetacean Research
National Research Institute of Far Seas Fisheries, Fisheries Research Agency
Association for Community-Based Whaling

Sighting survey



Whale body measurements

A sperm whale pod

IWC/Japan joint Pacific Ocean whale and ecosystem research program

The IWC/Japan joint Pacific Ocean whale and ecosystem research program (IWC -POWER) is a cetacean sighting survey program being carried out collaboratively by the IWC and Japan since 2010. IWC-POWER applies the know-how and expertise acquired during the International Whaling Commission-Southern Ocean Whale and Ecosystem Research (IWC-SOWER) program executed from 1996, ending in 2010. The IWC-POWER content reflects the major research agenda of the IWC Scientific Committee. During the first three cruises, a large number of fin, sei and humpback whales were observed in the research area, where a large scale sighting survey had not been conducted for more than half a century.

The IWC-SOWER program made a huge contribution to elucidating abundance trends of whale stocks, including the Antarctic minke whale. It is recognized as the most successful international collaborative research effort conducted under the auspices of the IWC. Japan has made and continues to make a substantive contribution to conducting and operating these international whale research programs by providing research vessels and crew members from beginning to end.

Objectives

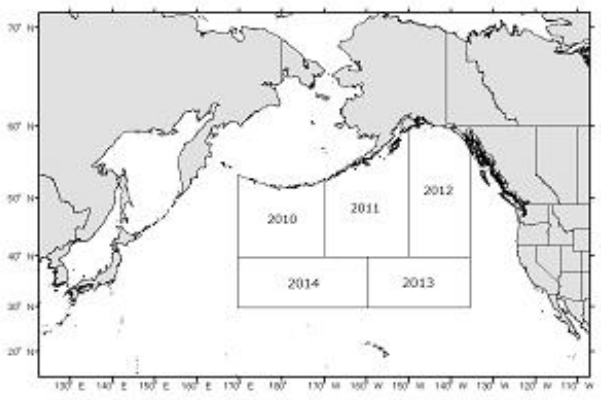
1) Estimation of sei whale abundance (and other species where possible, especially fin whales)

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

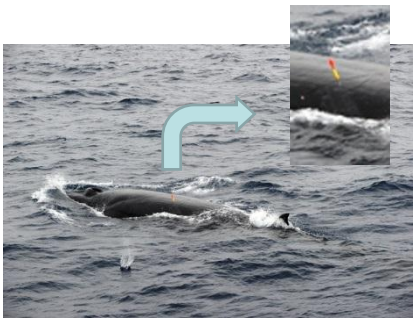
International researchers

Year	Cruise leader	Researchers
2010	1 (Japan)	3 (USA, South Korea, Japan)
2011	1 (Japan)	1 (USA)
2012	1 (Japan)	3 (USA, South Korea, Japan)
2013	1 (Japan)	3 (Mexico, South Korea, Japan)



IWC-POWER research area


Blue whale


Sei whale biopsy sample collection


Killer whale biopsy sample collection


Fin whale cow and calf. The white right side jaw is characteristic of the species.


Humpback whale breaching at the upper Gulf of Alaska.

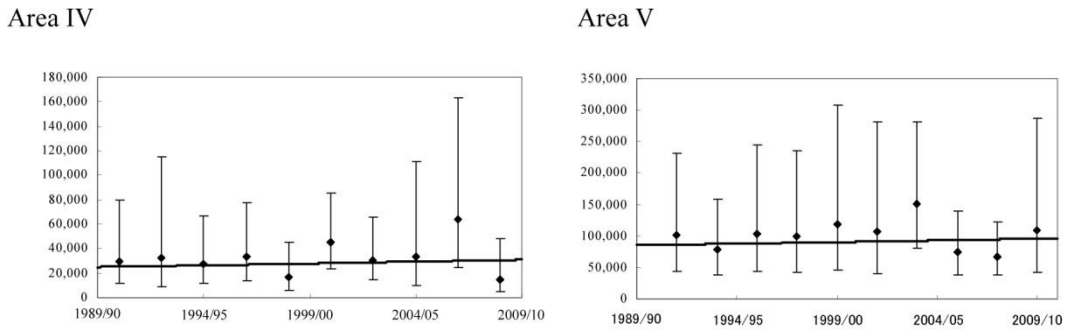

North Pacific right whale observed off Kodiak Island

Things revealed by Japan's whale research in the Antarctic

Antarctic ecosystem changes made clear by research whaling

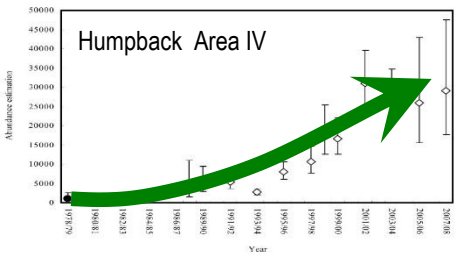
1. Baleen whales reduced by early 20th century commercial whaling are recovering

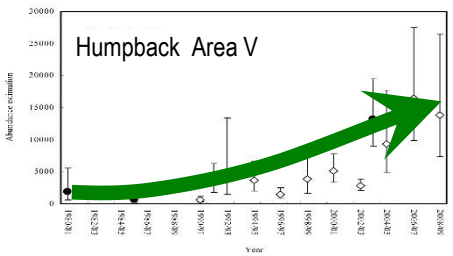
The abundance of the Antarctic minke whale, the main target species of whale research, largely increased from the 1940s to the 1970s. Results from 1992 to 2004 Japan's whale research made possible for the IWC to estimate Antarctic minke whale abundance as 515,000. Further, no big variation in abundance has been observed during the research period. In other words, the Antarctic minke whale abundance is consistently high.



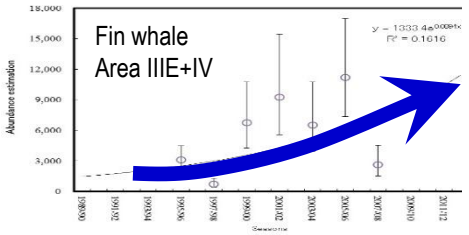
The figure above shows the Antarctic minke whale abundance trend in research Areas IV and V. The vertical lines indicate abundance estimate 95% confidence interval.

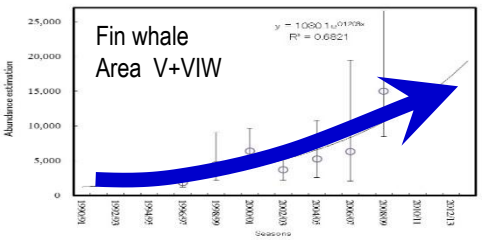
Humpback and fin whale resources deteriorated due to commercial whaling but since 1990 they are showing an increasing recovery trend. On the other hand, Japan's whale research results show that, owing to the humpback and fin whale recovery, the Antarctic minke whale distribution is shifting southward.





Humpback whale:
The left figure shows yearly research abundance estimates for humpback whale. Vertical lines indicate abundance estimation 95% confidence interval. Estimated abundance trend is rising to the right in both research Areas IV and V. From 1989 to 2009 the estimated abundance annual increase rate was 13.6% in Area IV and 14.5% in Area V.





Fin whale:
The left figure shows yearly research abundance estimates for fin whale. Vertical lines indicate abundance estimation 95% confidence interval. Estimated abundance trend is rising to the right in both research Areas IIIE+IV and V+VIW. From 1995 to 2009 the estimated abundance annual increase rate was 8.9% in Area IIIE+IV and 12.0% in Area V+VIW.