

# Cetacean habitat distribution in the eastern Bering Sea and Chukchi Sea

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# 1. Background I

## Why should we investigate Cetacean habitat??

- Key Species on the ECOSYSTEM
- Forage large amount of commercial fishes
- Conservation for endangered Species

## In the eastern Bering Sea and Chukchi

- Many Species of Cetacean  
(Regular visitors and  
Routinely migratory)
- Endangered Species migrate



# 1. Background II

To understand the effect on the

We need to understand that “When”, “Where” and “How many ” cetacean distribute.

To conserve the endangered species

We need to know where is Suitable Habitat (SH) for some species

It is effective to match-up sighting data by ship and satellite remote sensing data

# 1. Background III

## Research about Cetacean...

- Worldwide By catch of Cetacean  
(Young et al,2008)
- Range contraction in a beluga whale population.  
(Rugh et al., 2010)  
more...



**NOAA Fisheries  
Office of Protected Resources**

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**Programs**

- ☑ **Conservation, Protection, & Recovery**
  - ☑ Species of Concern
  - ☑ Listing of Species
  - ☑ Recovery of Species
  - ☑ Marine Mammal Conservation Plans
  - ☑ Cooperation with States
  - ☑ Interagency Consultation

**Marine Mammal Health and Stranding Response Program (MMHSRP)**

This program was formalized by the 1992 Amendments to the [Marine Mammal Protection Act](#), and NOAA's National Marine Fisheries Service (NMFS) was designated as the lead agency to coordinate related activities. The program has the following components: stranding networks, responses/investigations of mortality events, biomonitoring, tissue/serum banking, and analytical quality assurance.

**Oil Spill in the Gulf of Mexico**





# 1. Background IV



International  
Polar Year  
IPY 2007-2008



Graduate School of  
Fisheries Sciences  
& Faculty of Fisheries  
HOKKAIDO UNIVERSITY

Contact Us

<http://odyssey.fish.hokudai.ac.jp/IPY>

Marine Ecosystem Responses to Global Climate Change  
in the Bering and Chukchi Seas

## OSHORO-MARU IPY Research Cruise

This project is supported by Grant-In-Aid for Scientific Research  
No. 19405002 and the IARC-JAXA program.

### Contents

Global Change

Sea Ice and  
Marine Environment

Marine Ecosystem  
Questions



Marine Ecosystem  
Responses to Global  
Climate Change in  
the Bering and Chukchi Seas



### Information

[Nutrients data of 2008 cruise](#) is available (Authorization Required).  
<Feb 16 2009>

[CTD, chl-a and underway data of 2008 cruise](#) is available  
(Authorization Required). <Sep 29 2008>

[Reports of 2008 cruise](#) are available.  
Reports of each group are required authorization. <Aug 20 2008>

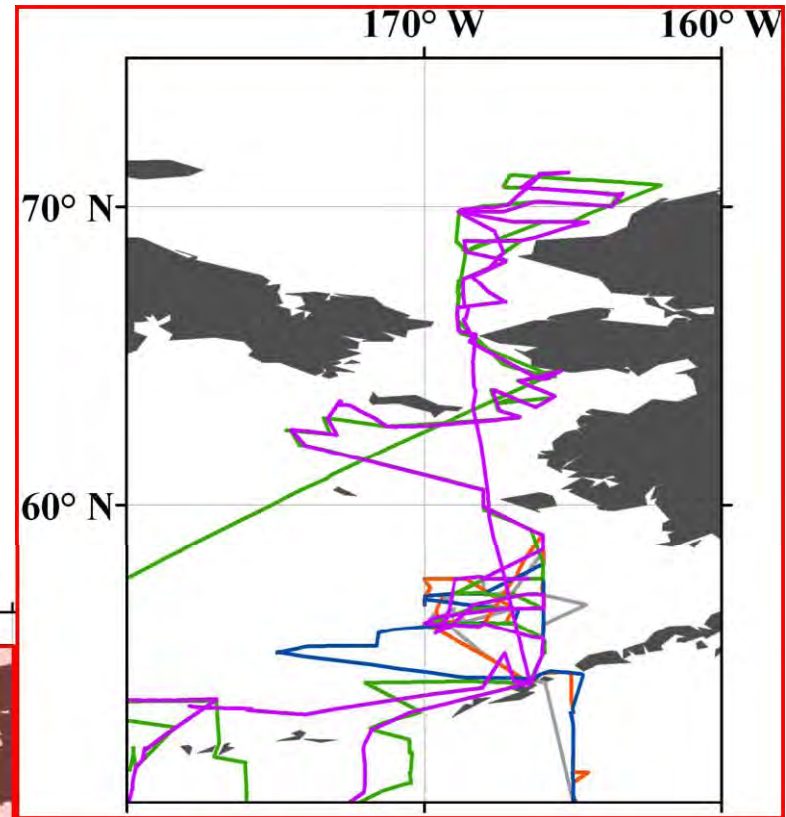
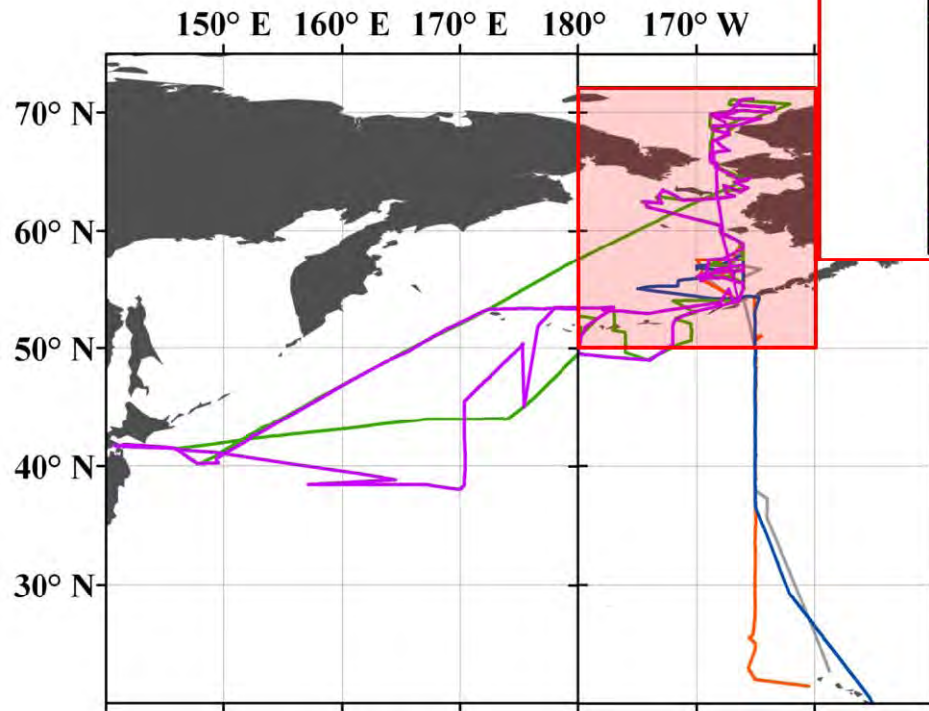
## 2. Objectives

To clarify the distribution and the oceanographic condition of cetaceans in the eastern Bering Sea and Chukchi Sea.

To construct suitable habitat (SH) area

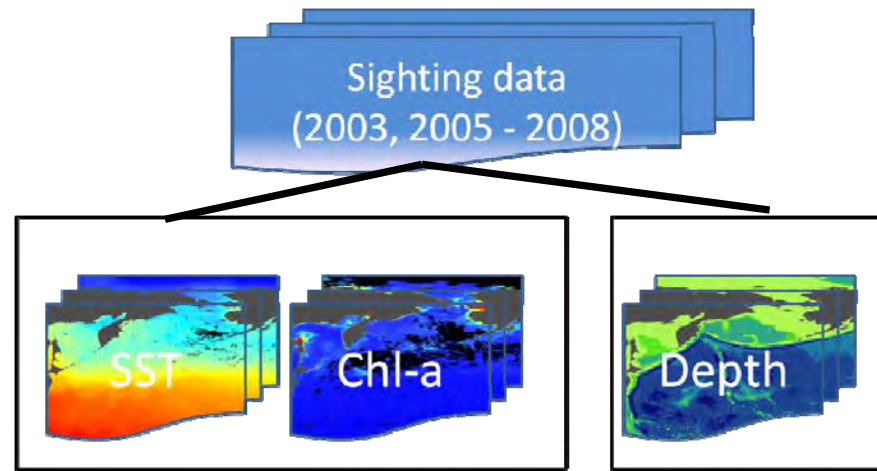
# 3. Data and Method - Data -

Study area:  
Eastern Bering Sea  
and Chukchi Sea



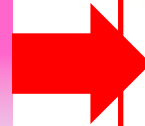
Study period:  
2003, 2005 - 2008

# 3. Data and Method - Methods -

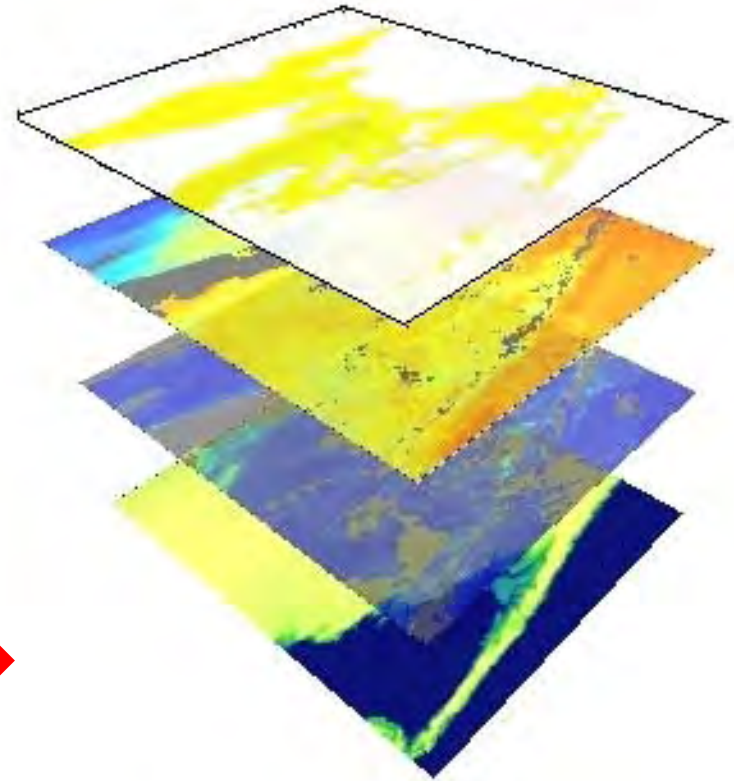


Statistical Analysis  
(Boxplot)

Suitable Habitat  
Range



Overlay / Clustering





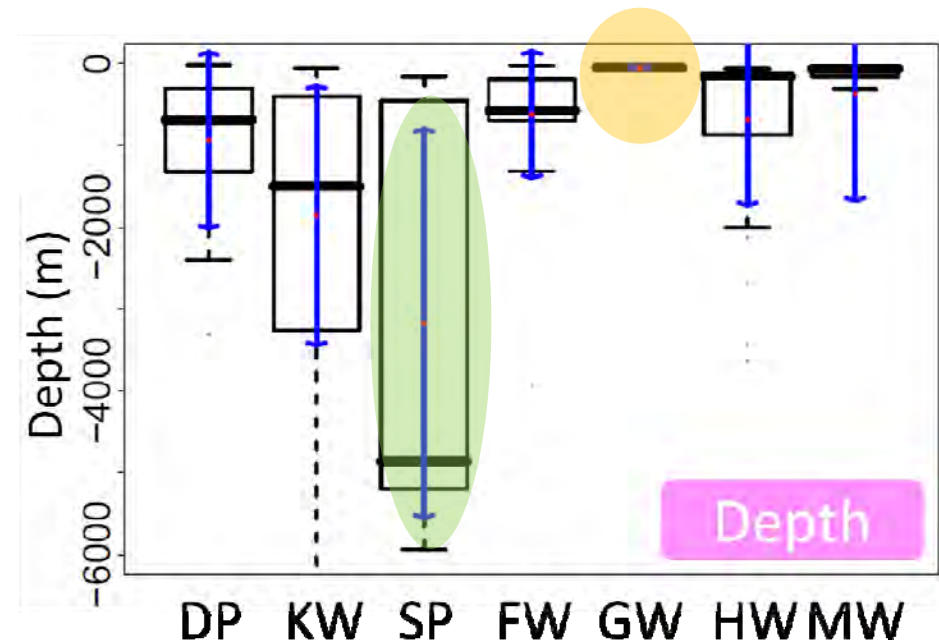
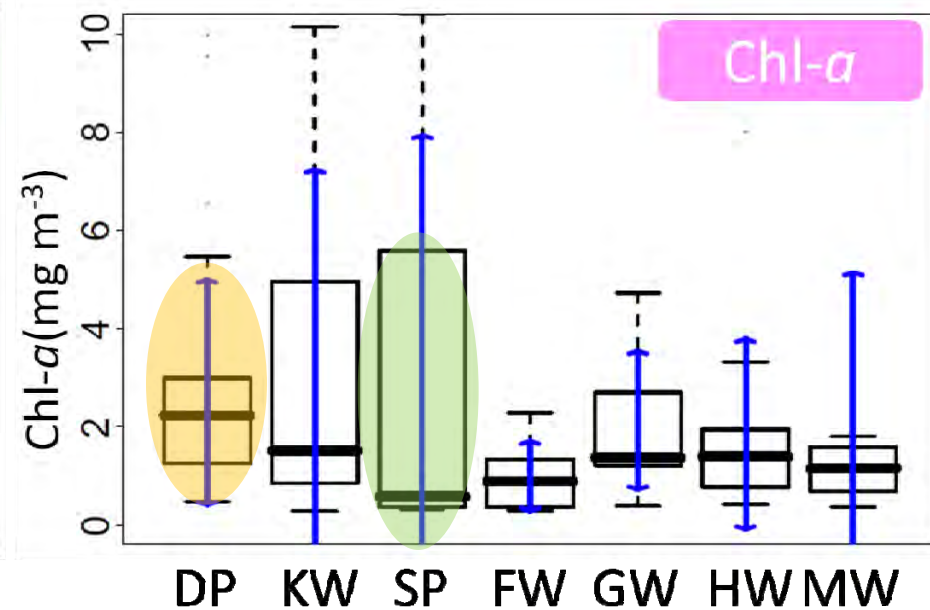
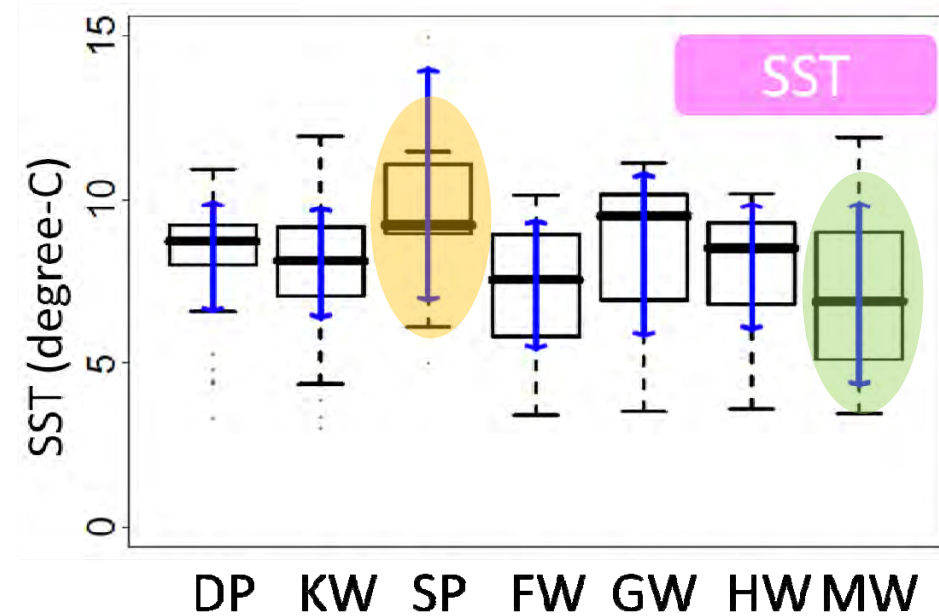
# 4. Result and Discussion - 1

We could sight about 20 species of cetacean

NAME		Number
Dall's porpoise ( <i>Phocoenoides dalli</i> )	Toothed whale	178
Killer whale ( <i>Orcinus Orca</i> )		24
Sperm whale ( <i>Physeter macrocephalus</i> )		25
Fin whale ( <i>Balaenoptera physalus</i> )	Baleen whale	57
Gray whale ( <i>Eschrichtius robustus</i> )		15
Humpback whale ( <i>Megaptera novaeangliae</i> )		66
Minke whale ( <i>Balaenoptera acutorostrata</i> )		31
Harbor porpoise ( <i>Phocoena Phocoena</i> )		6
Pacific white-sided dolphin ( <i>Lageonorhynchus obliquidens</i> )		6
...		

We selected 3 toothed whale species  
and 4 baleen whale species.

# 4. Result and Discussion - 2



DP: Dall's porpoise  
KW: Killer whale  
SP: Sperm whale  
FW: Fin whale  
GW: Gray whale  
HW: Humpback whale  
MW: Minke whale

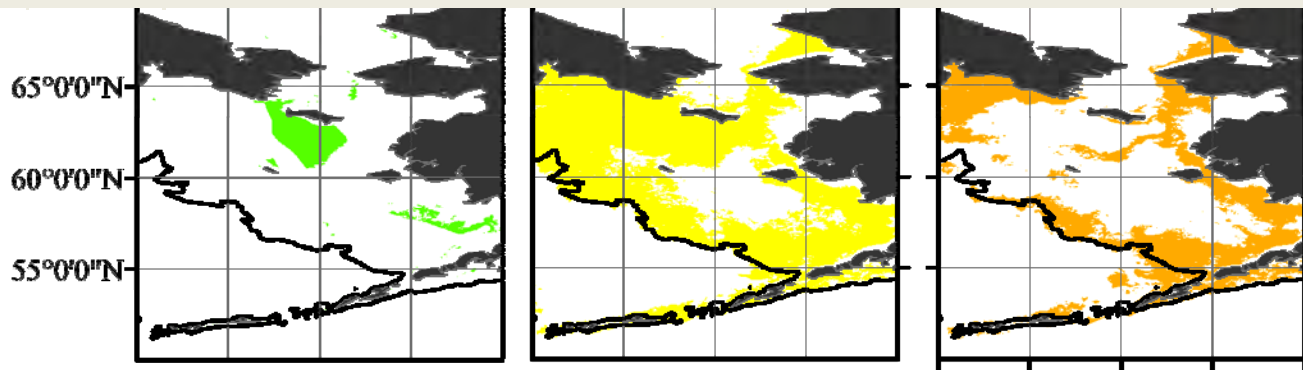
# 4. Result and Discussion - 3

For each parameters

HSR  $\rightarrow$  average  $\pm$  1 standard deviation

## HSR on each type of data

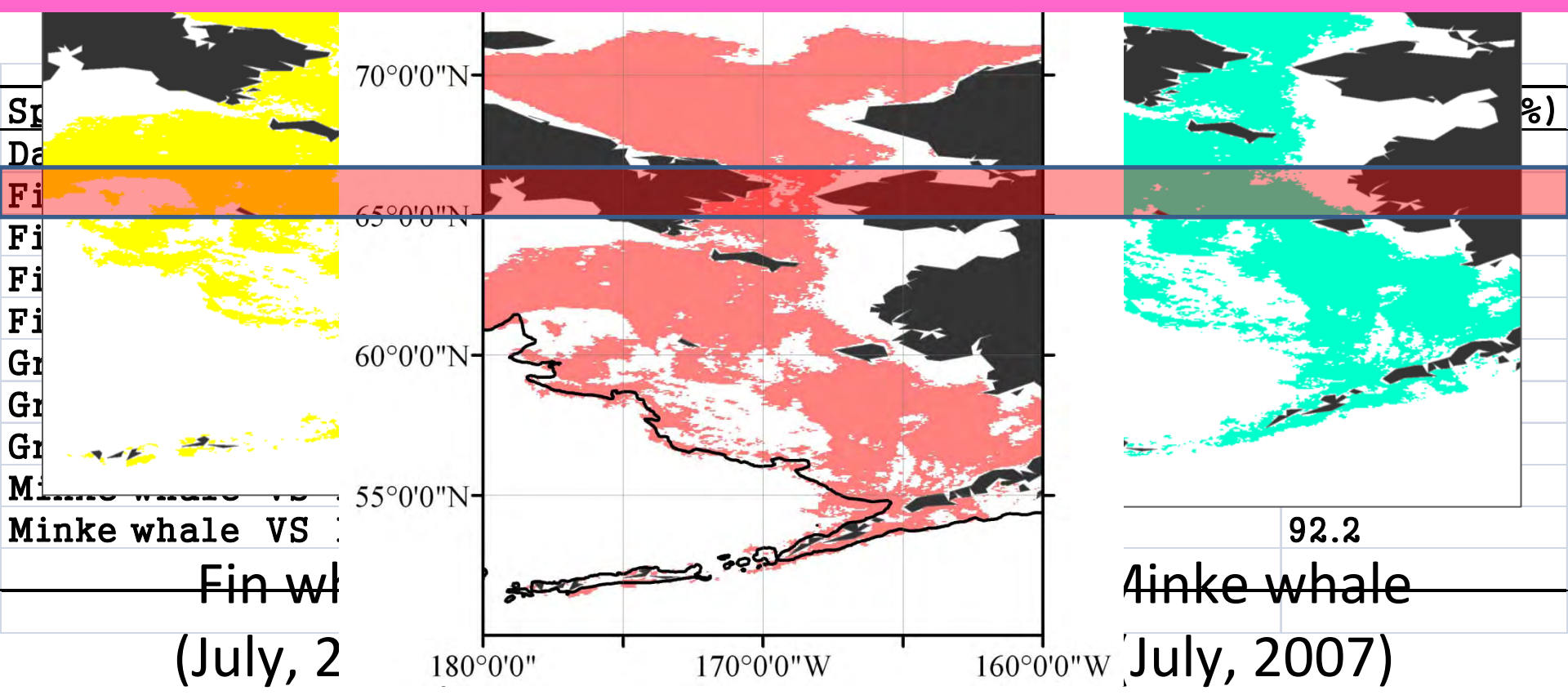
	Sea Surface Temperature	Chlorophyll-a	Bathymetry
FW	6.04–9.86	0–3.79	–1997 – 0
MW	4.34–9.87	0–5.14	–1441 – 0
HW	6.61–9.90	0.42–4.99	–2011 – 0
GW	5.86–10.78	0.73–3.54	–58 – –33
DP	6.41–9.74	0–7.23	–3446 – –275
KW	5.46–9.35	0.30–1.71	–1399 – 0
SP	6.94–13.98	0 – 7.93	–5549 – –804



July, 2008

# 4. Result and Discussion - 3

100% overlapped ; simillar prey species  
(Nemoto,1959)



Overlapped Fin whale and Minke whale  
(July, 2007)

# 5. Conclusion

- Sperm whale tends to distribute over higher SST and Minke whale tends to distribute over low SST
- Sperm whale tends to distribute over lower chl. Dall's porpoise tends to distribute over higher chl concentration.
- Gray whale tends to distribute at shallow area and sperm whale tends to distribute over various depth area
- We can indicate availability for detecting Cetacean Suitable habitat.



# 6. Future work

We should understand

more detail of Cetaceans Habitat...

- Reveal **the probability of their distribution** by using geo-statistical models
- Predict their habitat in each season.
- Make **database** of cetacean habitat.  
for providing habitat information of cetacean for other users (researcher, decision maker etc.)



Thank you for your attention !



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