

Wintering aggregations of Steller sea lions in the Ishikari-Bay, Sea of Japan



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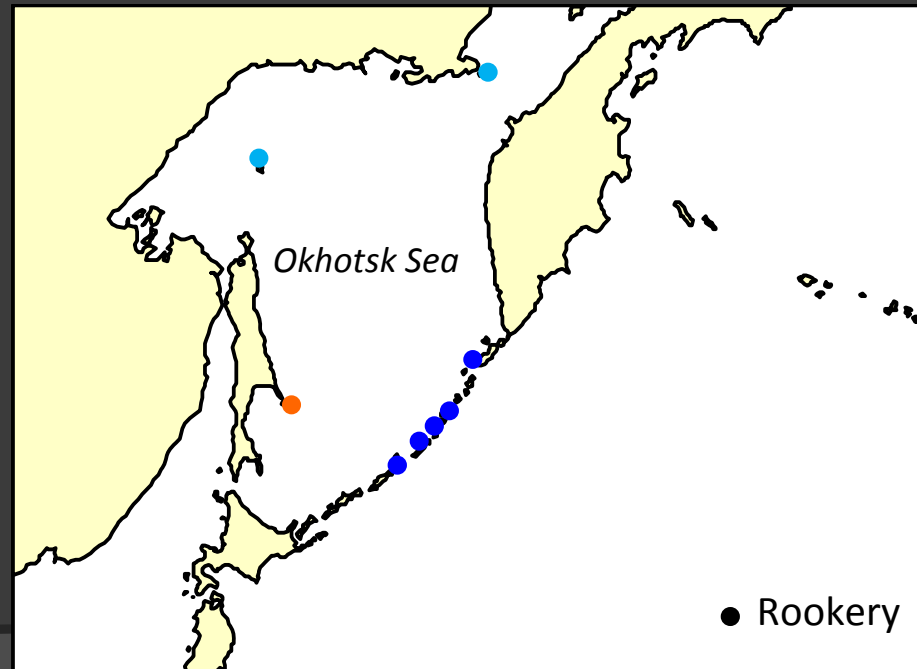
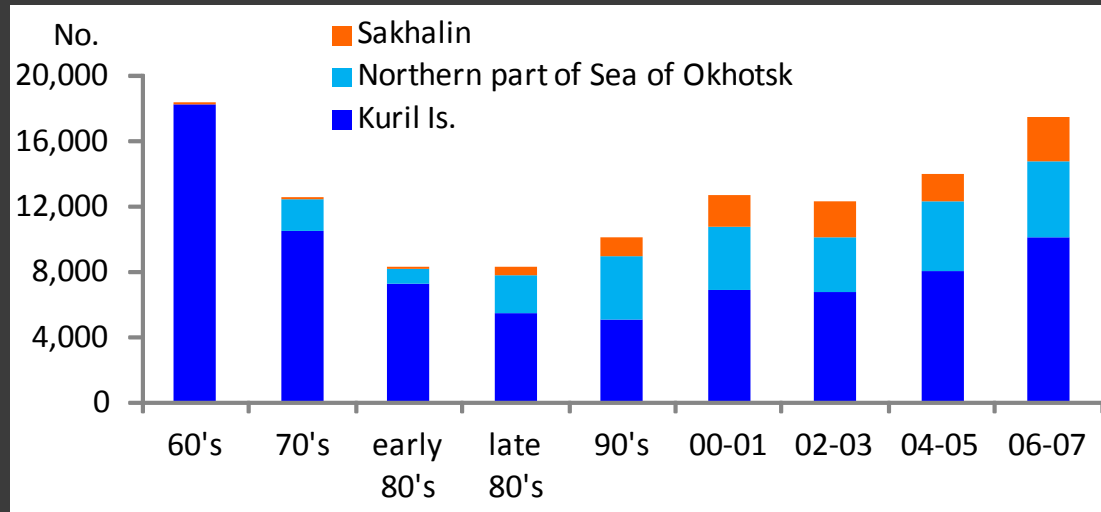
Steller sea lions (SSLs, *Eumetopias jubatus*)



- Piscivorous marine mammal
- Opportunistic feeder
- Distribution and feeding are affected by prey availability



SSLs in the Okhotsk Sea



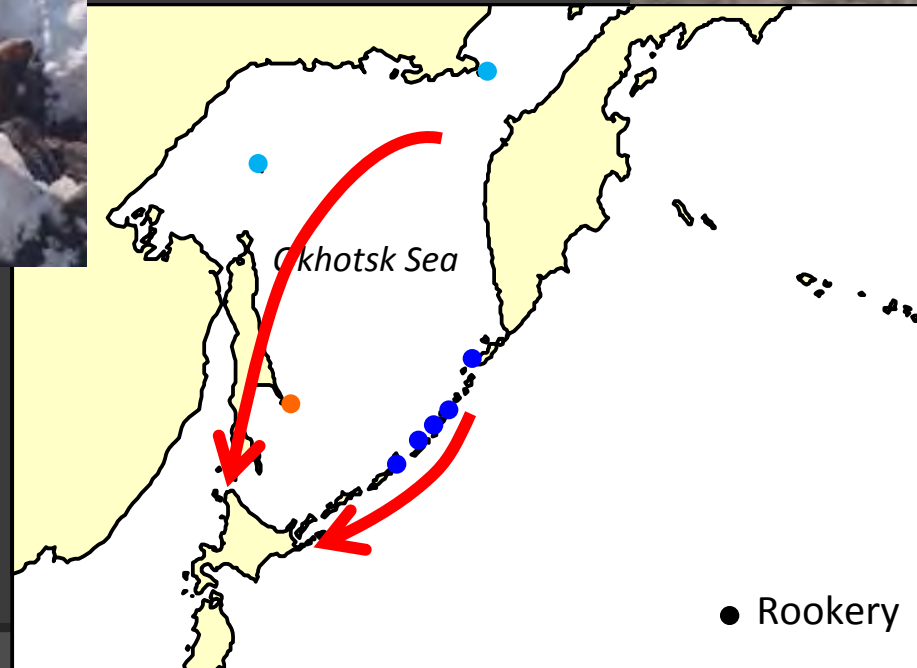
SSLs in the Okhotsk Sea

- ⦿ Growth
- ⦿ Nursing
- ⦿ Gestation

Breeding Season
(Jun.-Aug.)



Wintering Season
(Oct.-May)



- ⦿ Pupping
- ⦿ Mating
- ⦿ Nursing

Sea of Japan;

important wintering ground for SSLs originating from the Okhotsk Sea

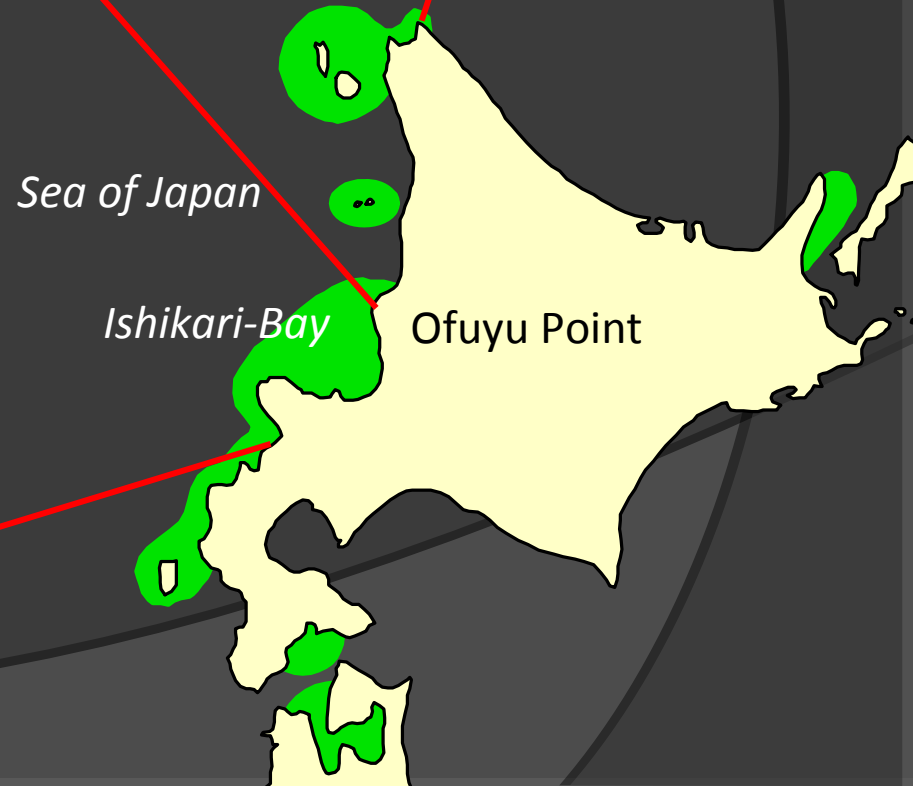
Information on SSLs distribution and abundance

- ◎ To their conservation and management
- ◎ To the study of “hot-spots”

We examined spatial distribution of SSLs in the Sea of Japan.

- 1) Observation of haul-out sites
- 2) Aerial surveys
- 3) Encounter with fishermen

Major haul-out sites



Sea of Japan

Ishikari-Bay

Ofuyu Point

Major haul-out sites



ID	04/05	05/06	06/07	07/08	08/09	Years
66						2
618						2
C541						2
190						4
234						3
304						3
322						2
86						2
112						2
139						2

Sea of Japan

Ishikari-Bay

Ofuyu Point



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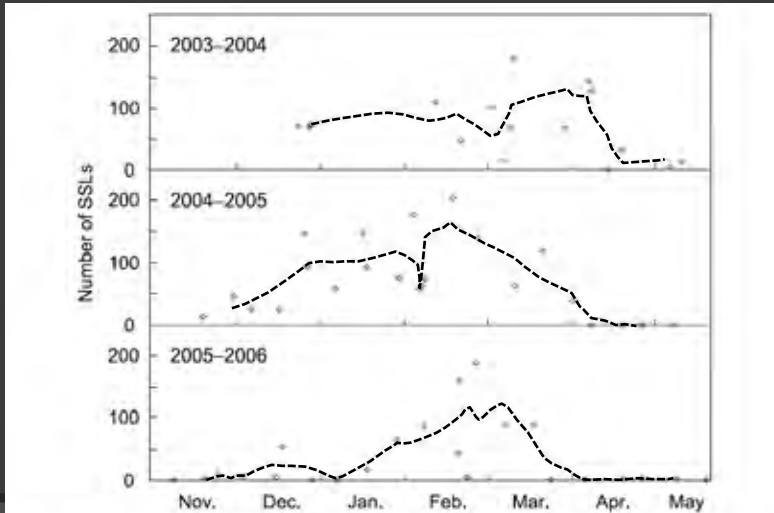
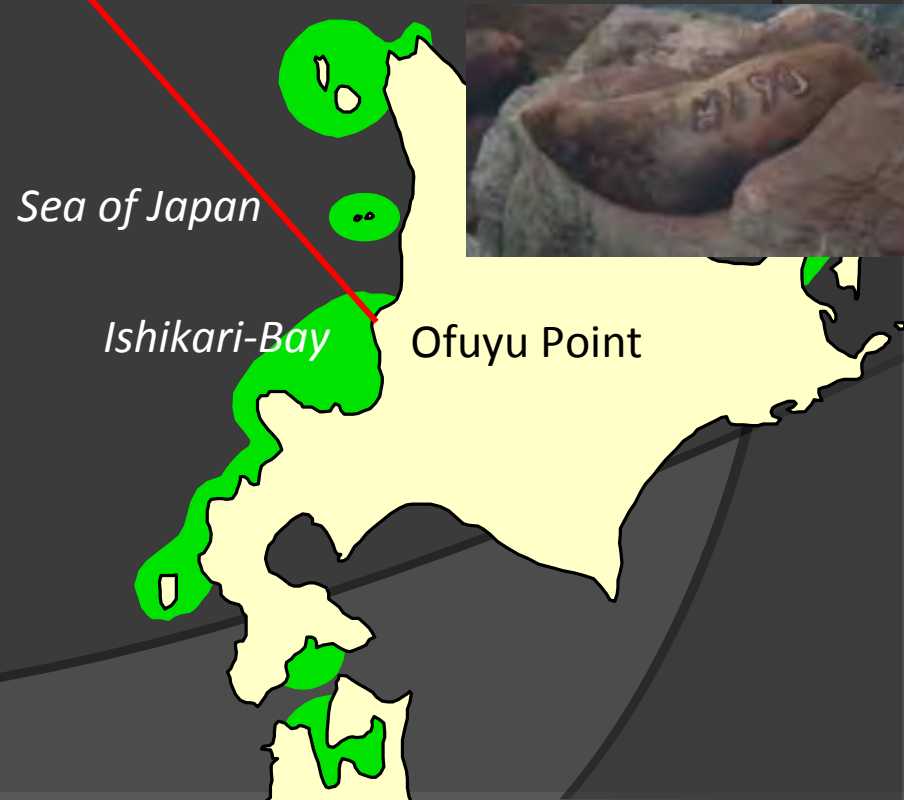
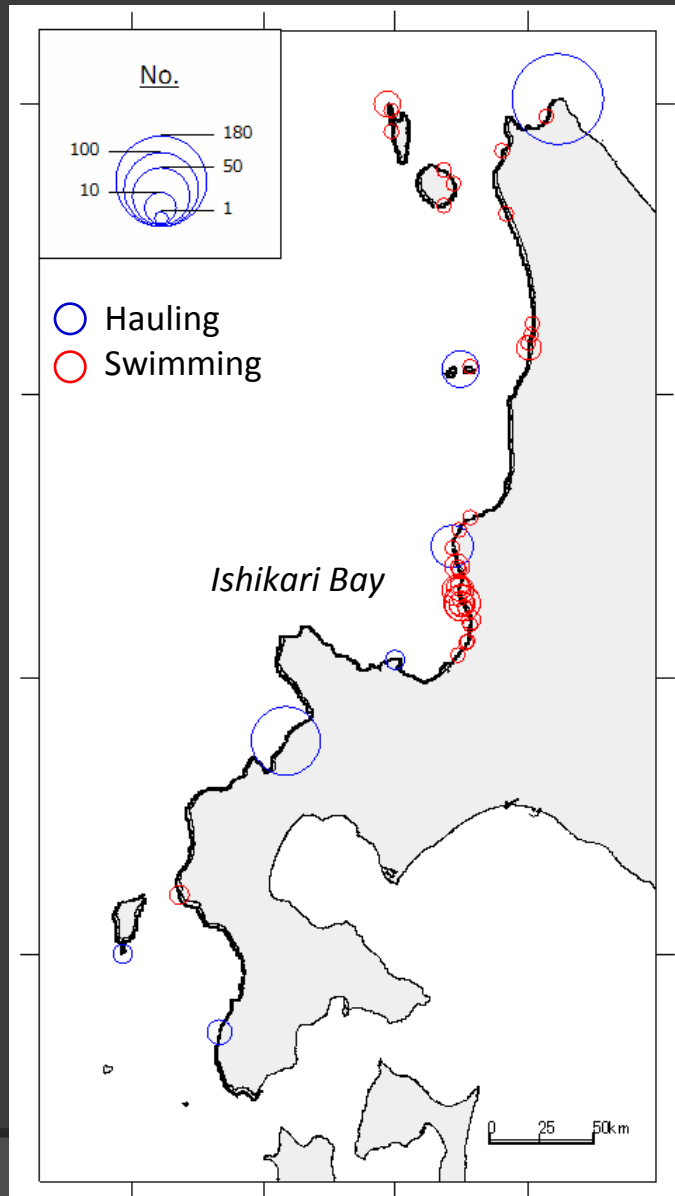


Figure 2. Variation in the number of Steller sea lions (SSLs) observed by month at the Ofuyu haul-out. Broken lines indicate the three-point moving average. Isono et al. 2010

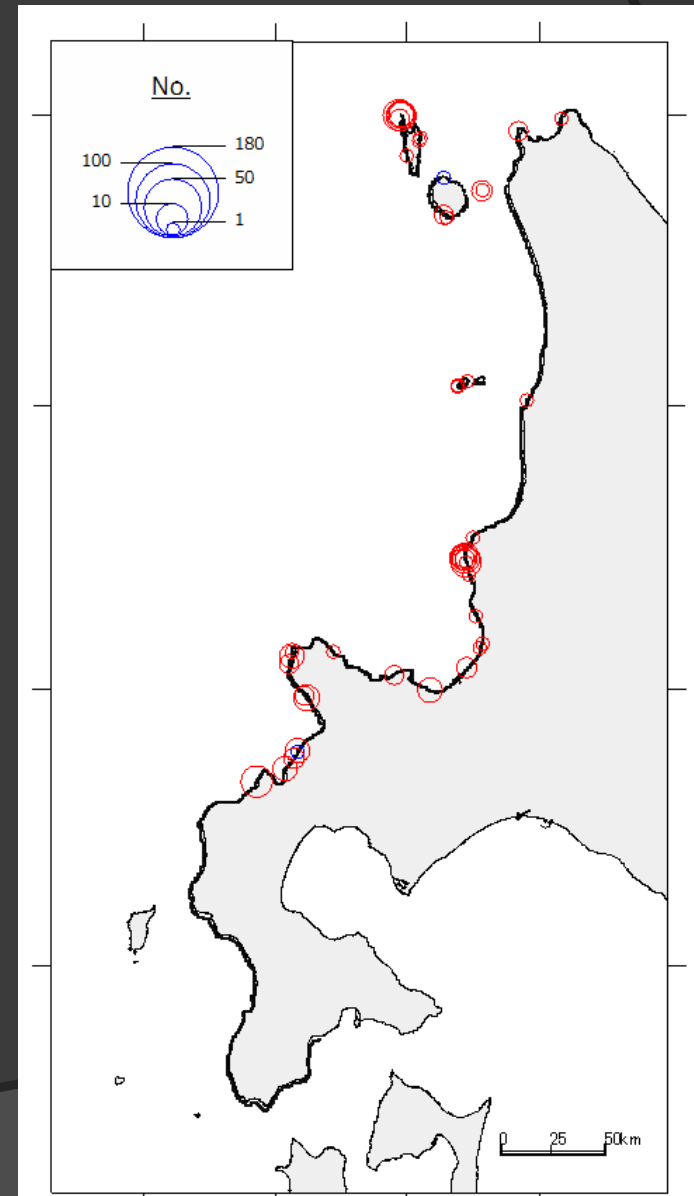


SSLs distribution along the coastal line during winter

Feb. 2011



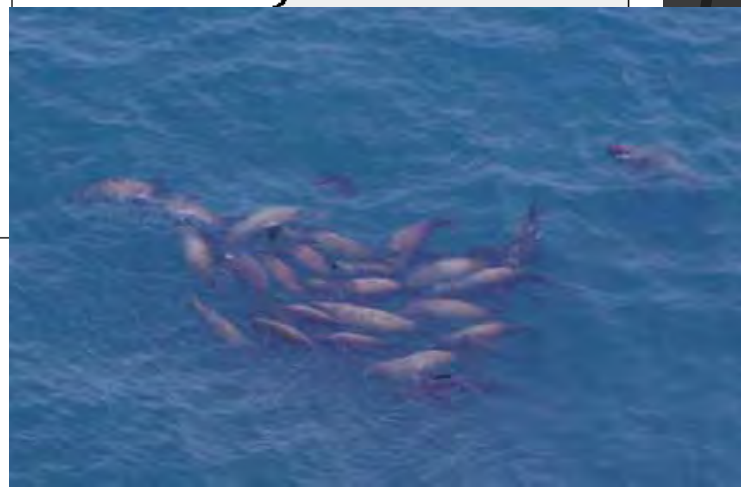
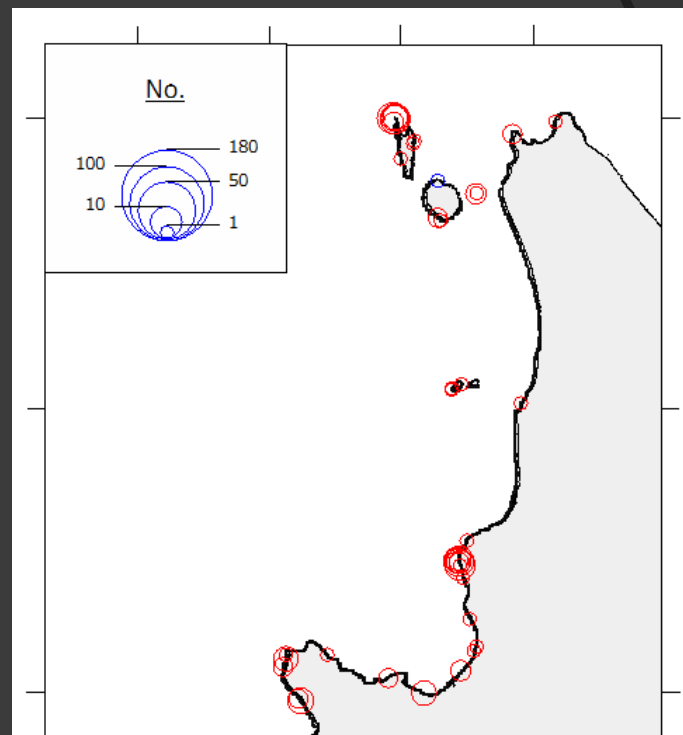
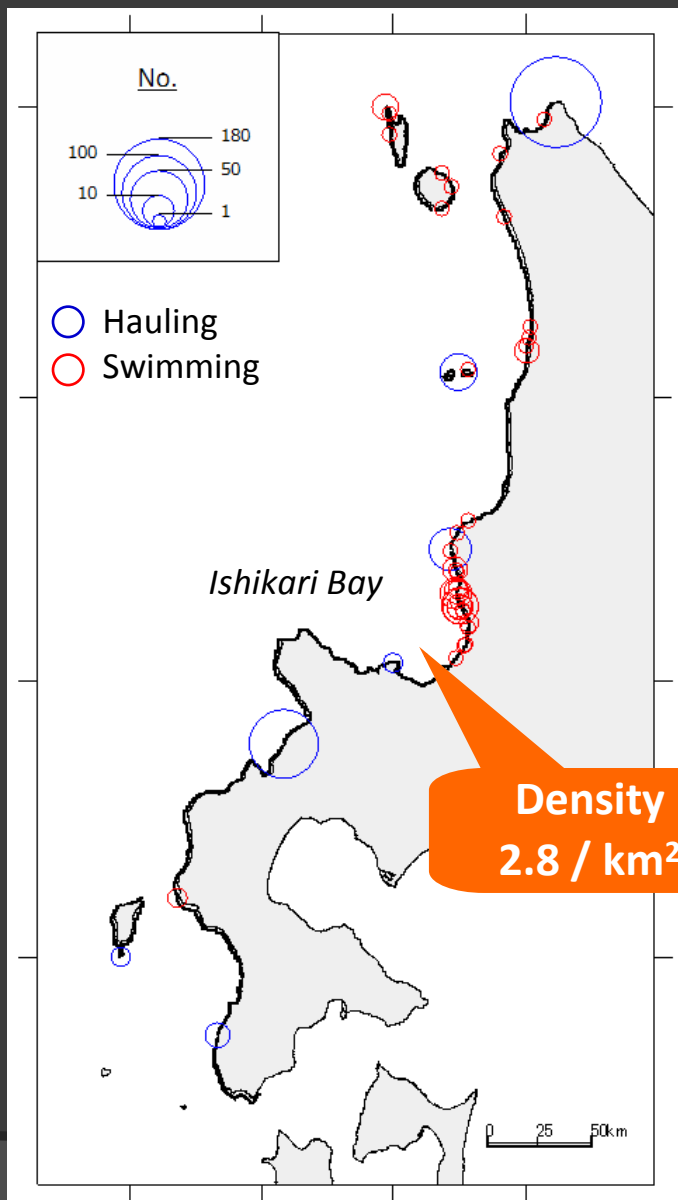
Mar. 2008



SSLs distribution along the coastal line during winter

Feb. 2011

Mar. 2008

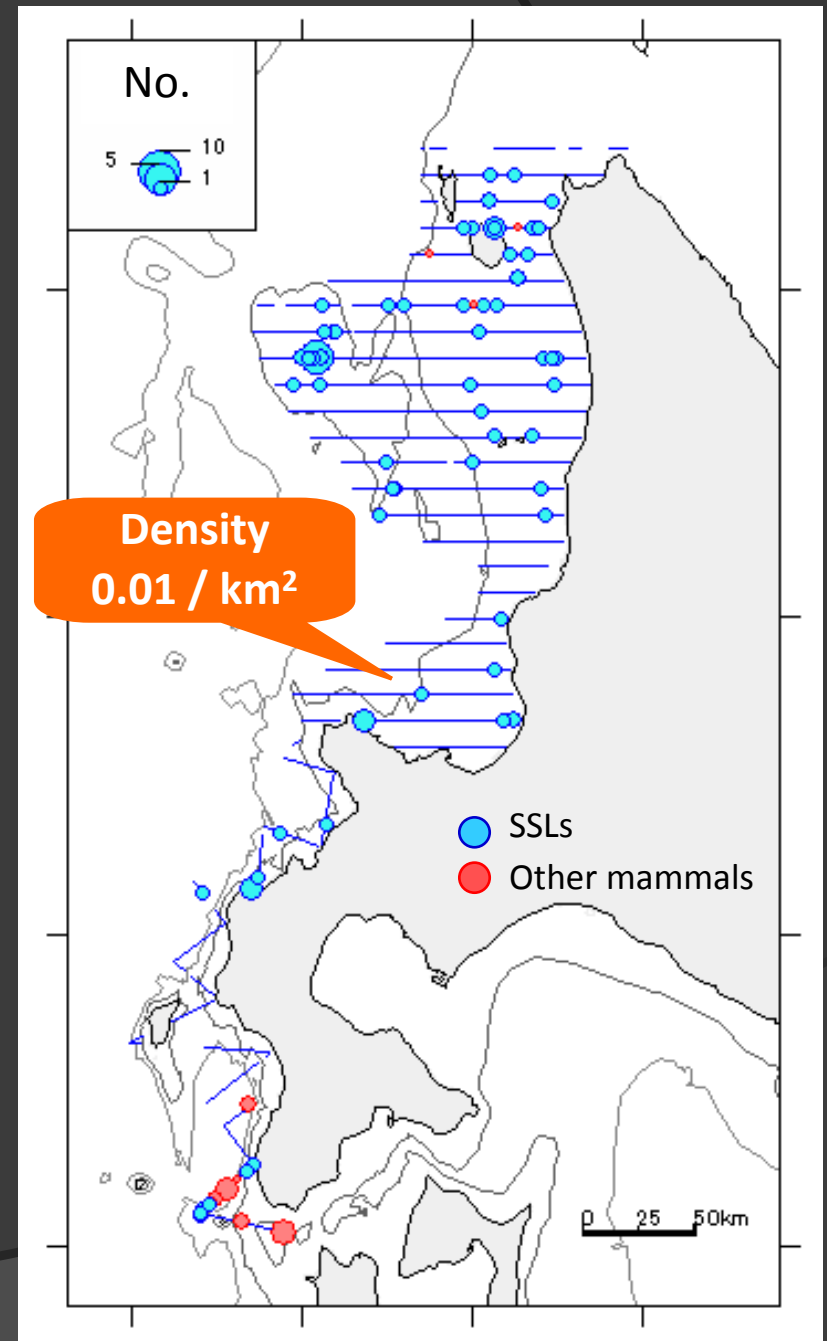


SSLs distribution on late April based on aerial surveys

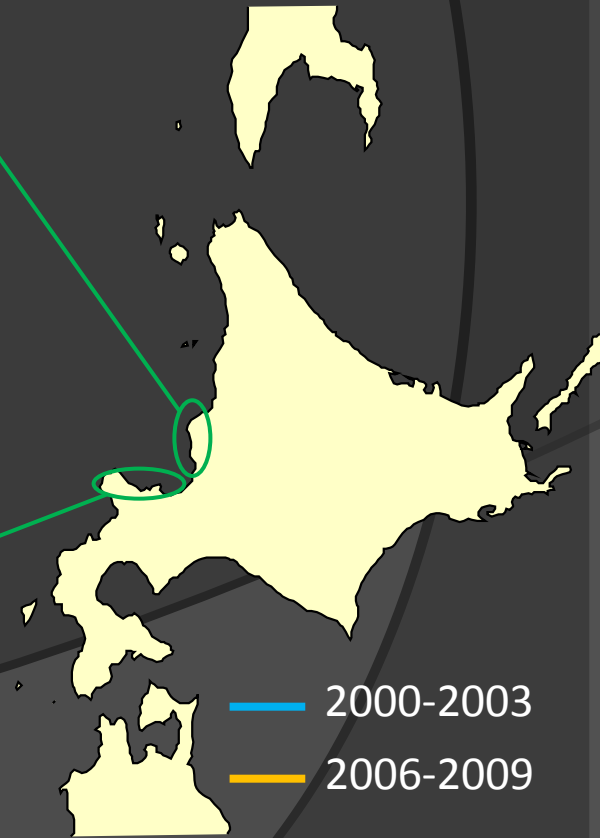
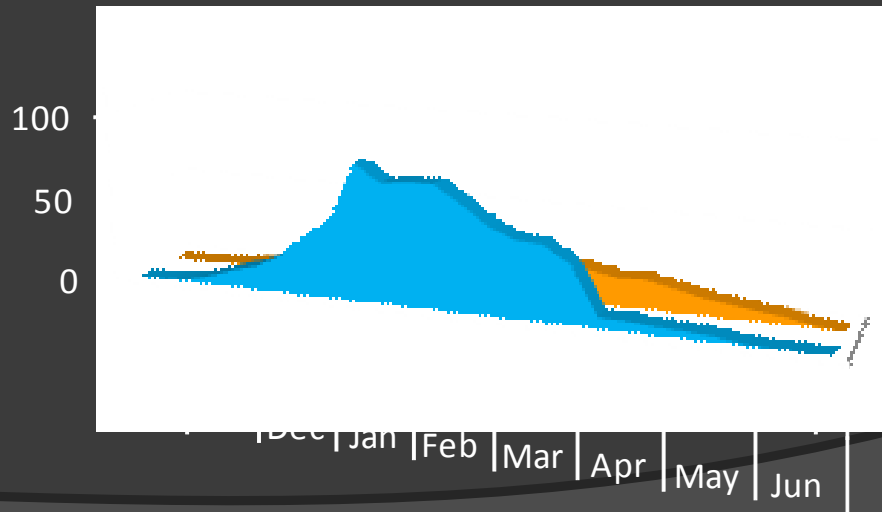
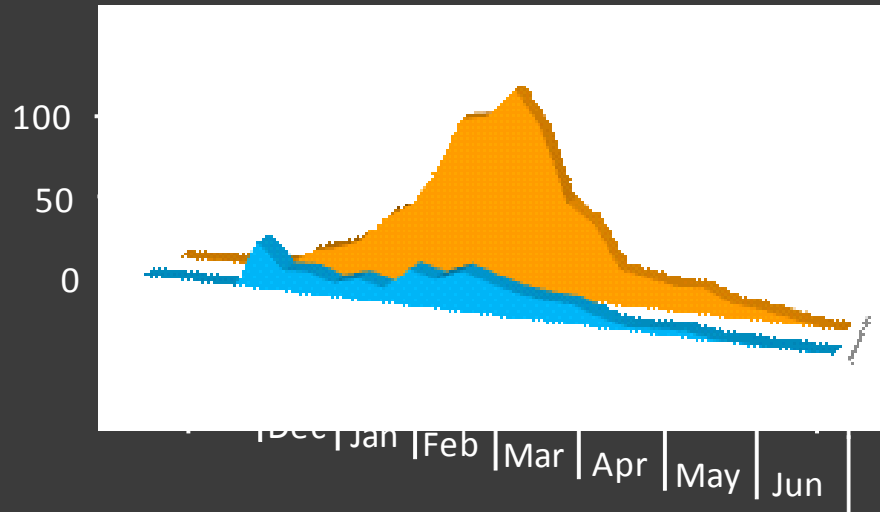
- Line-transect sampling
- Covered the continental shelf part



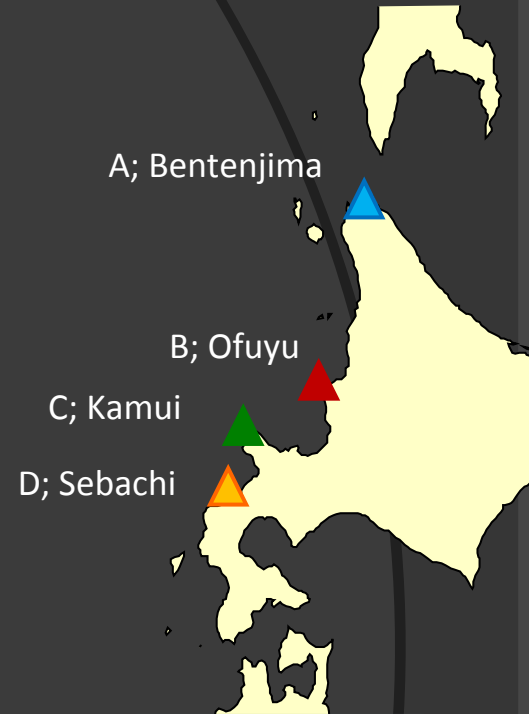
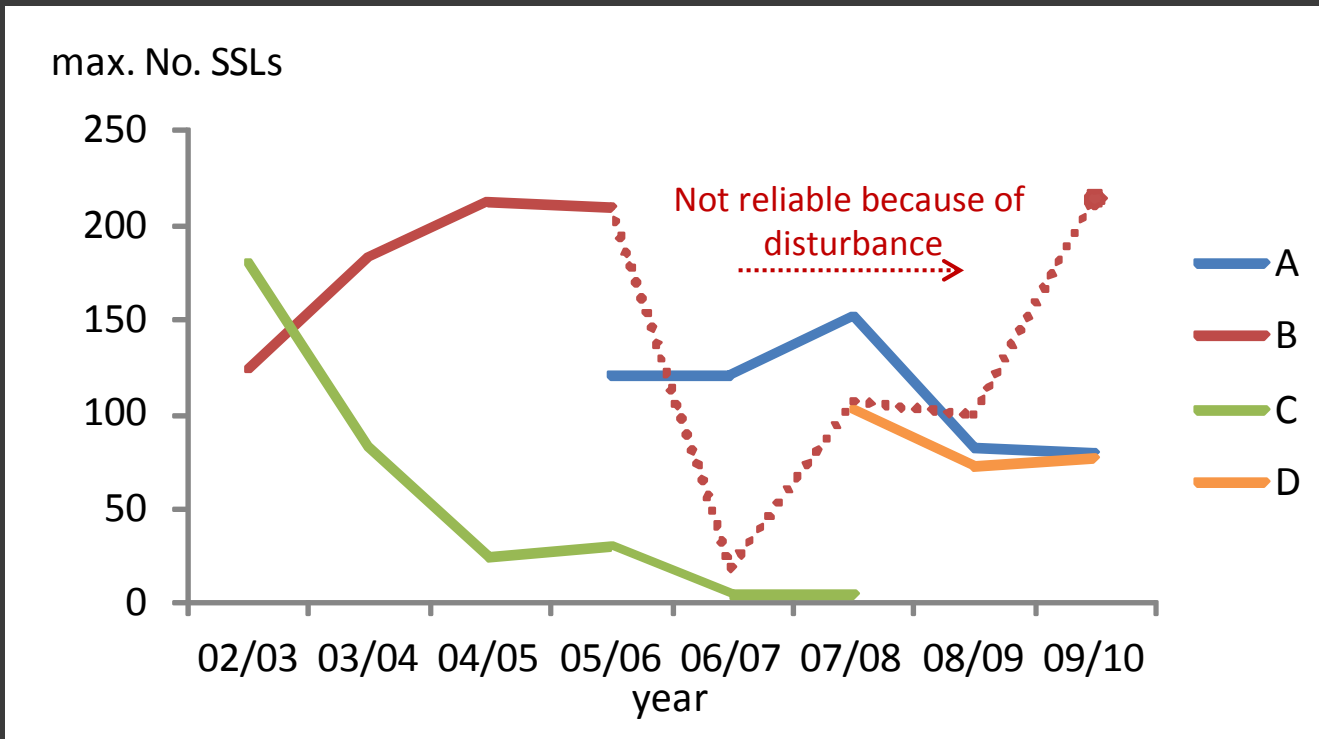
- Offshore distribution
 - ✓ low density
- Rare in the coastal region



Local abundance index; Encounter rate with fishermen and SSLs



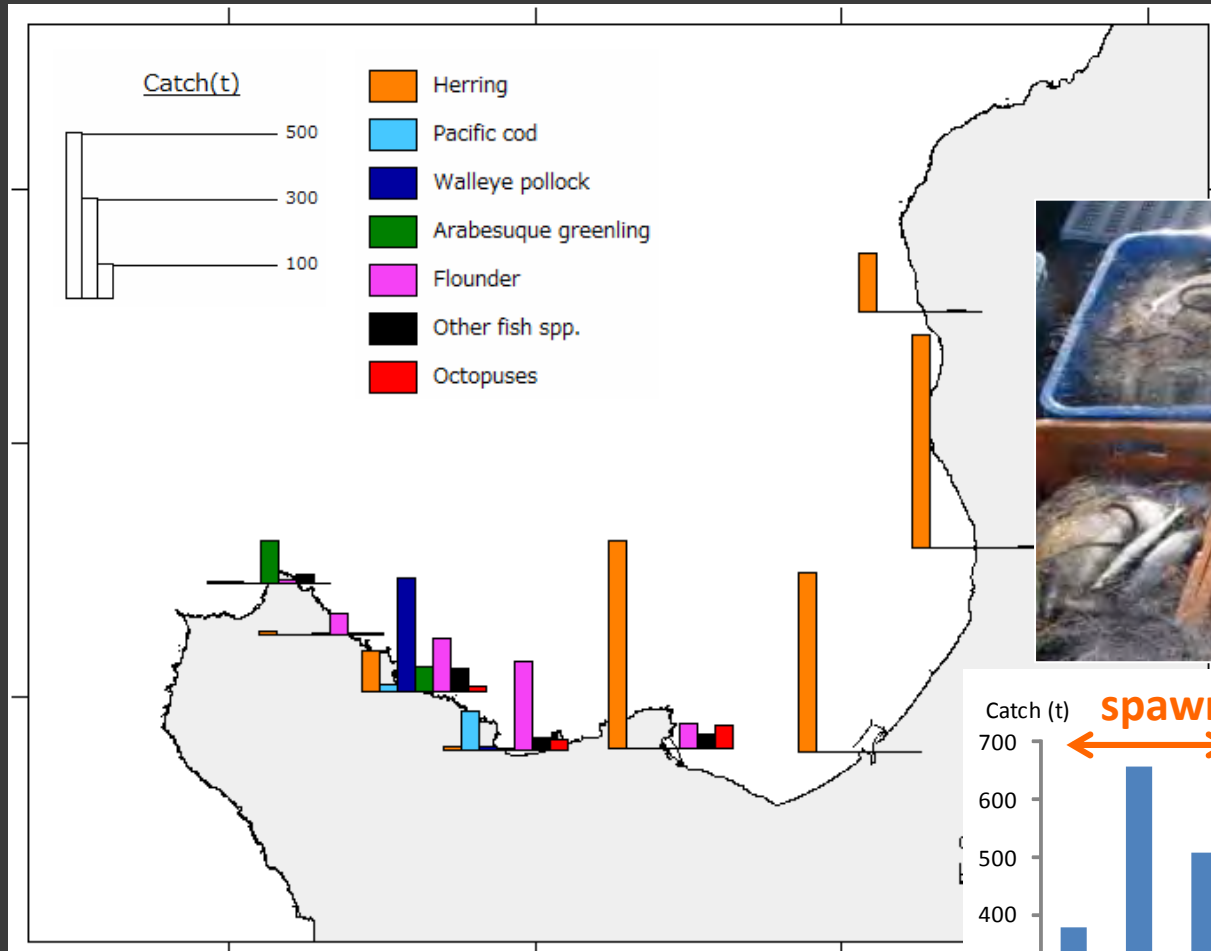
Monitoring of haul-out sites



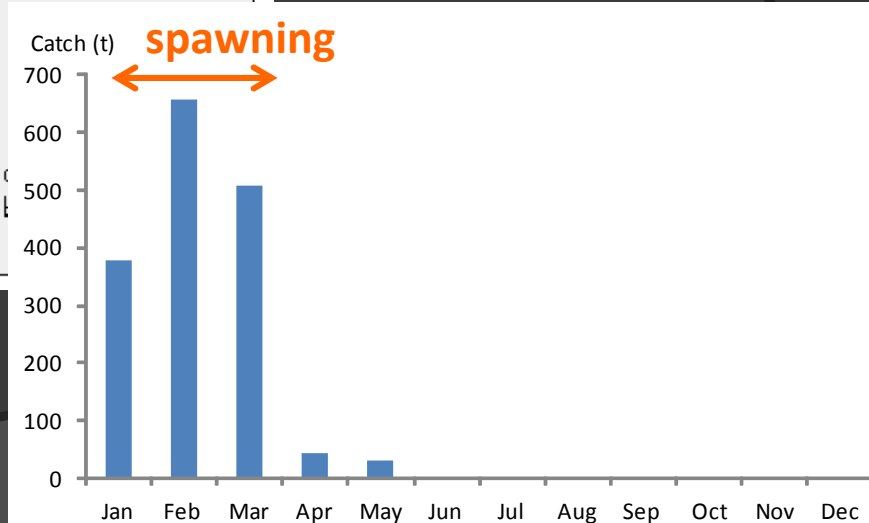
“sea lions year in Japan”
from October 2003
to June 2004

- Ofuyu point become the major sites since 2003/04.
- Cape Kamui has not been used as a haul-out site, recently.

Fishery in the Ishikari Bay during winter

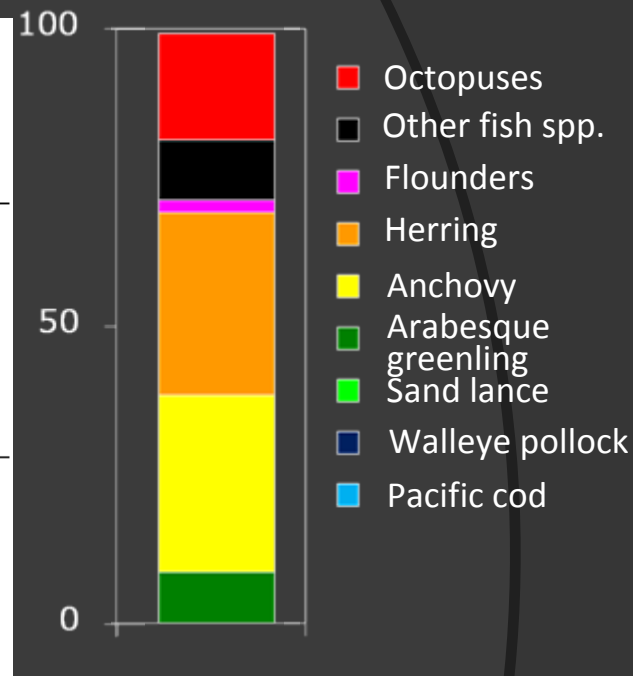
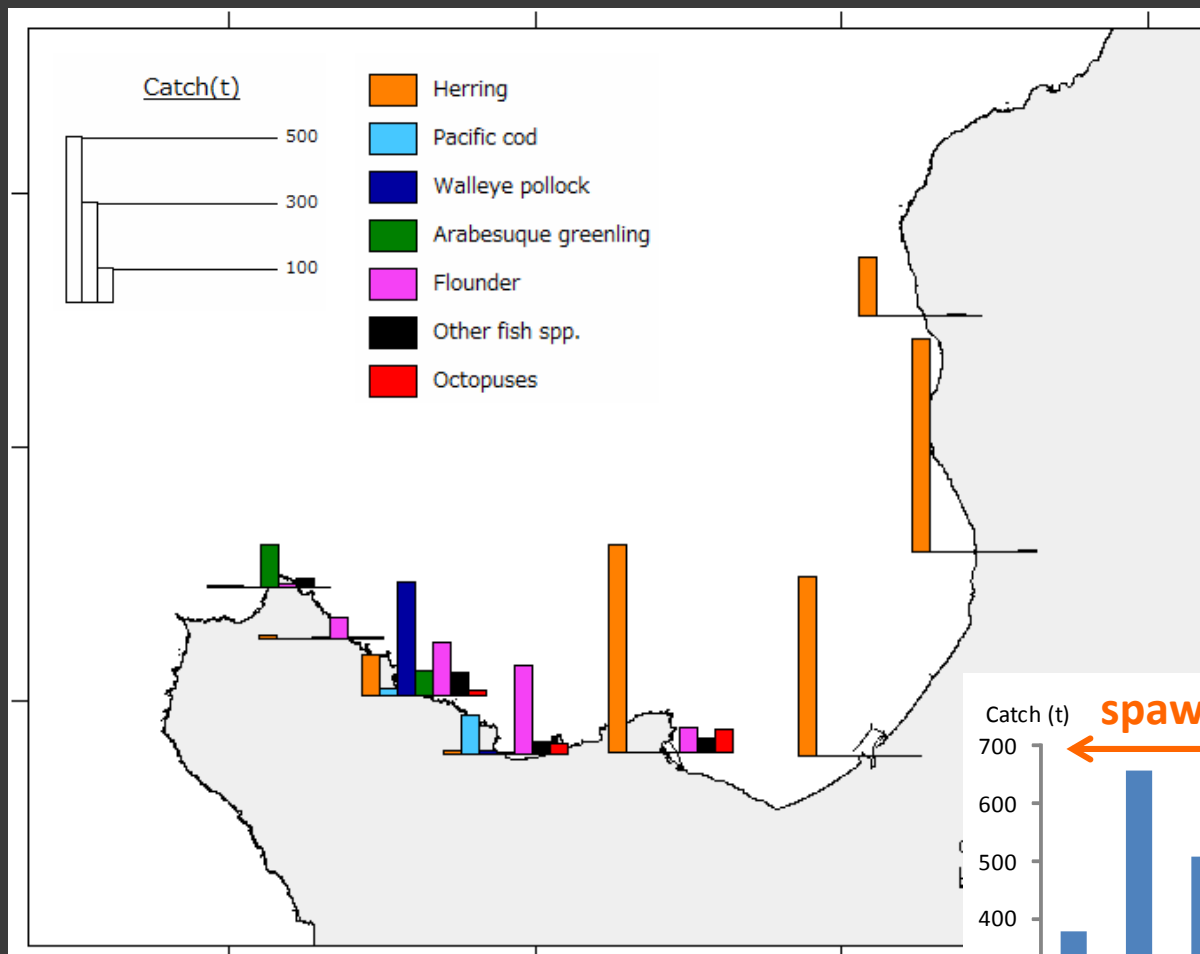


Seasonal change of herring catch
in the Ishikari-Bay

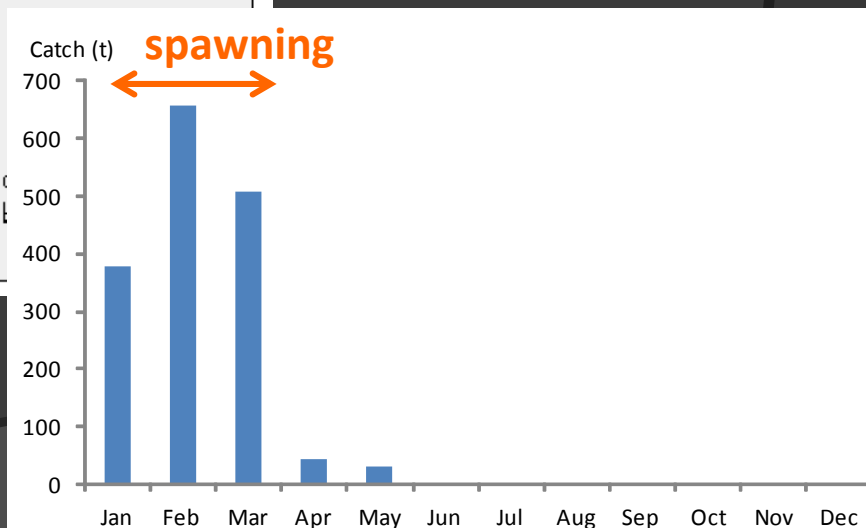


Fishery in the Ishikari Bay during winter

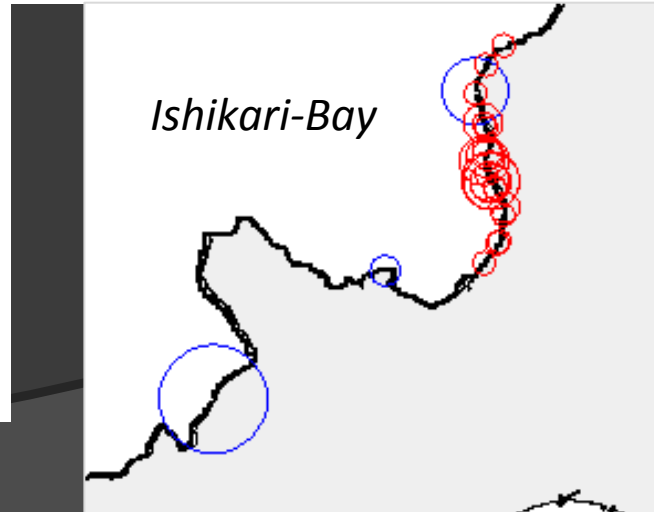
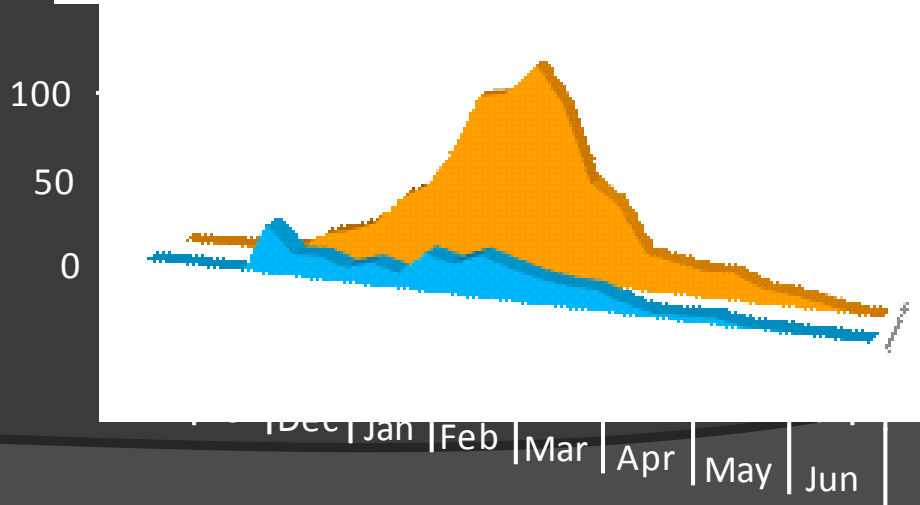
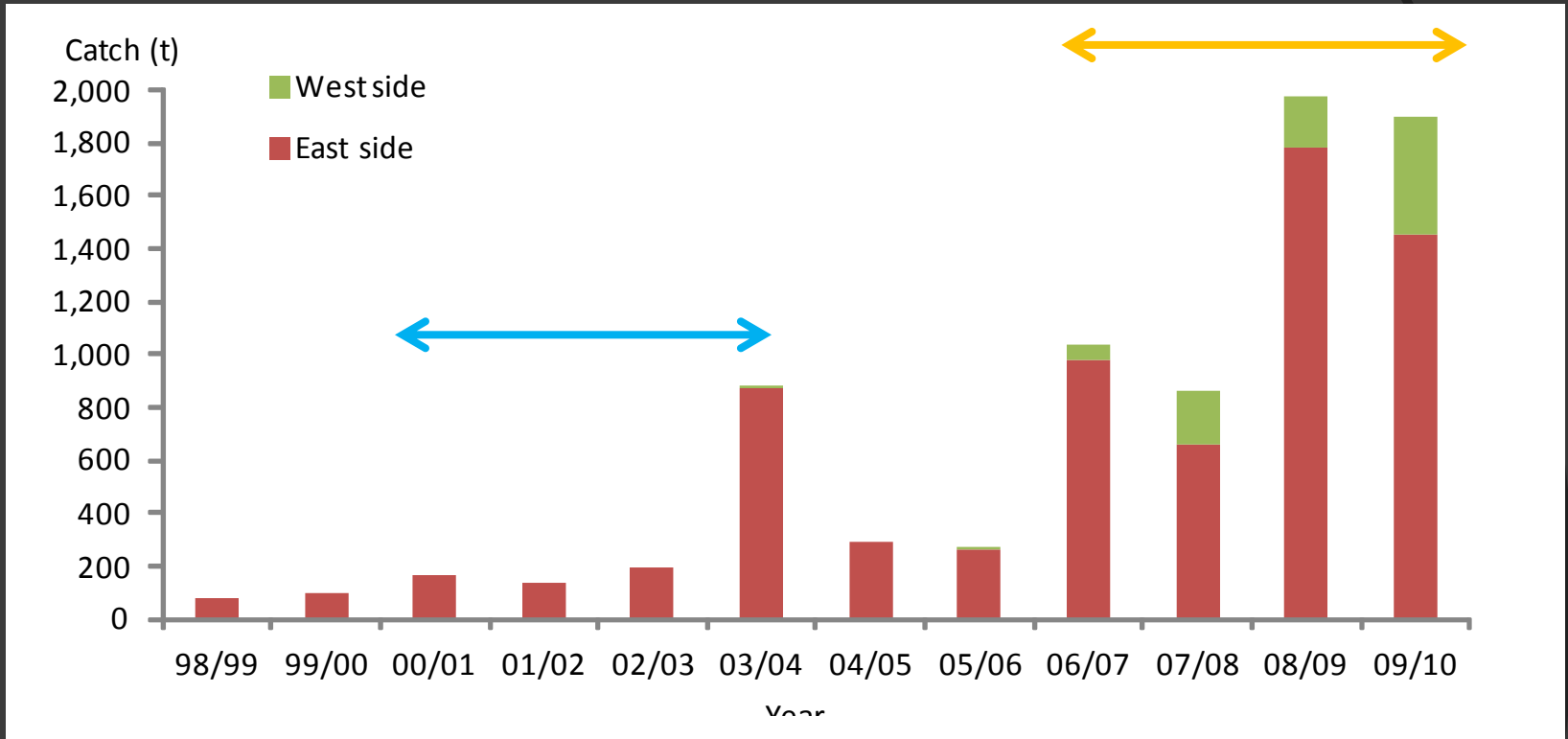
Diets of SSLs (Goto, unpublished)



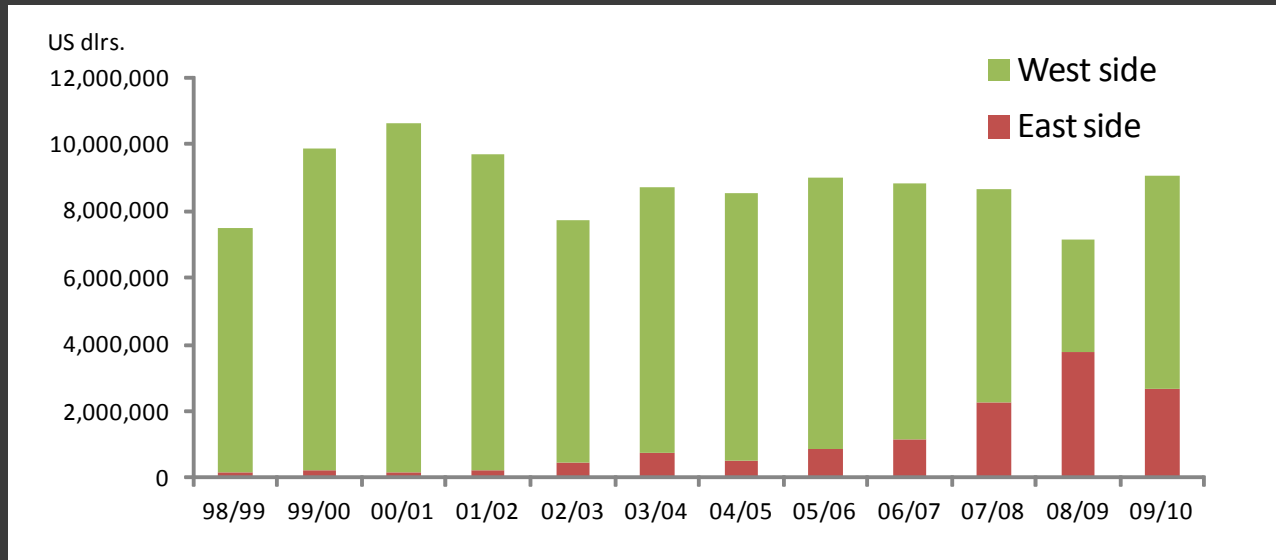
Seasonal change of herring catch
in the Ishikari-Bay



Change of herring



Fishery damage by SSLs in the Ishikari-Bay



Amount of fishery damage



Summary

- The high concentration of SSLs in the Ishikari-Bay was observed during winter season, especially eastern area.
- The abundance of SSLs increased as herring gathered in the Bay for spawning.
- SSLs were probably attracted to this spawning aggregation of herring.
- Herring is also important target of commercial fishery during winter in the Bay.
- The competition between SSLs and fishery for herring is a serious problem
- During winter season, the Ishikari-Bay is one of hot-spots for SSLs and human activity