Study of the spotted seal (*Phoca largha*) in Russia

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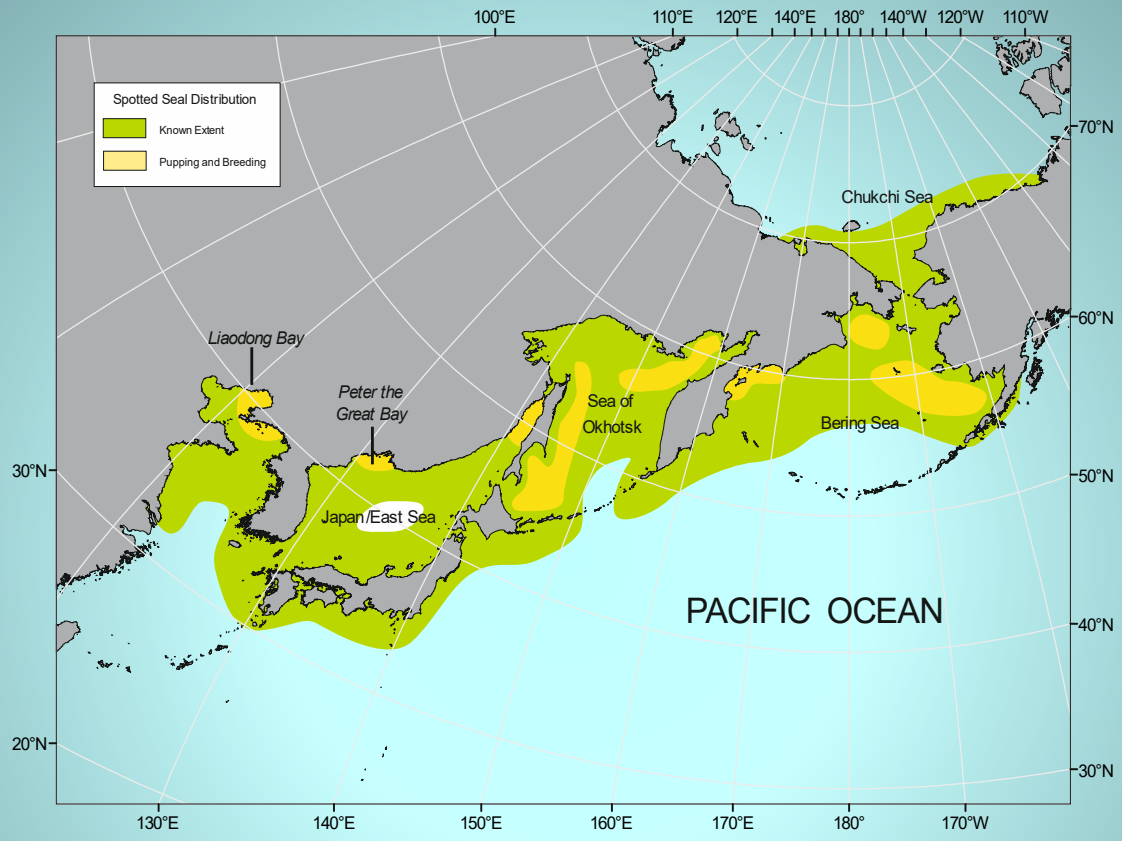
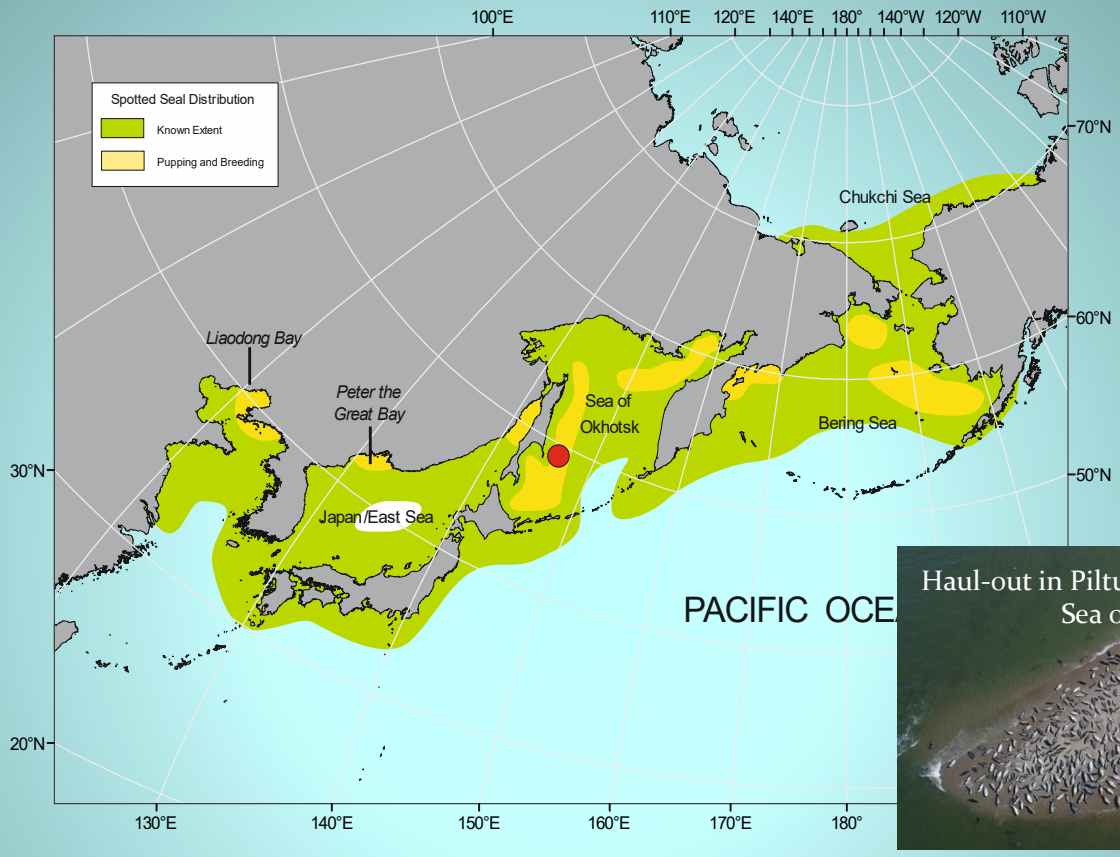
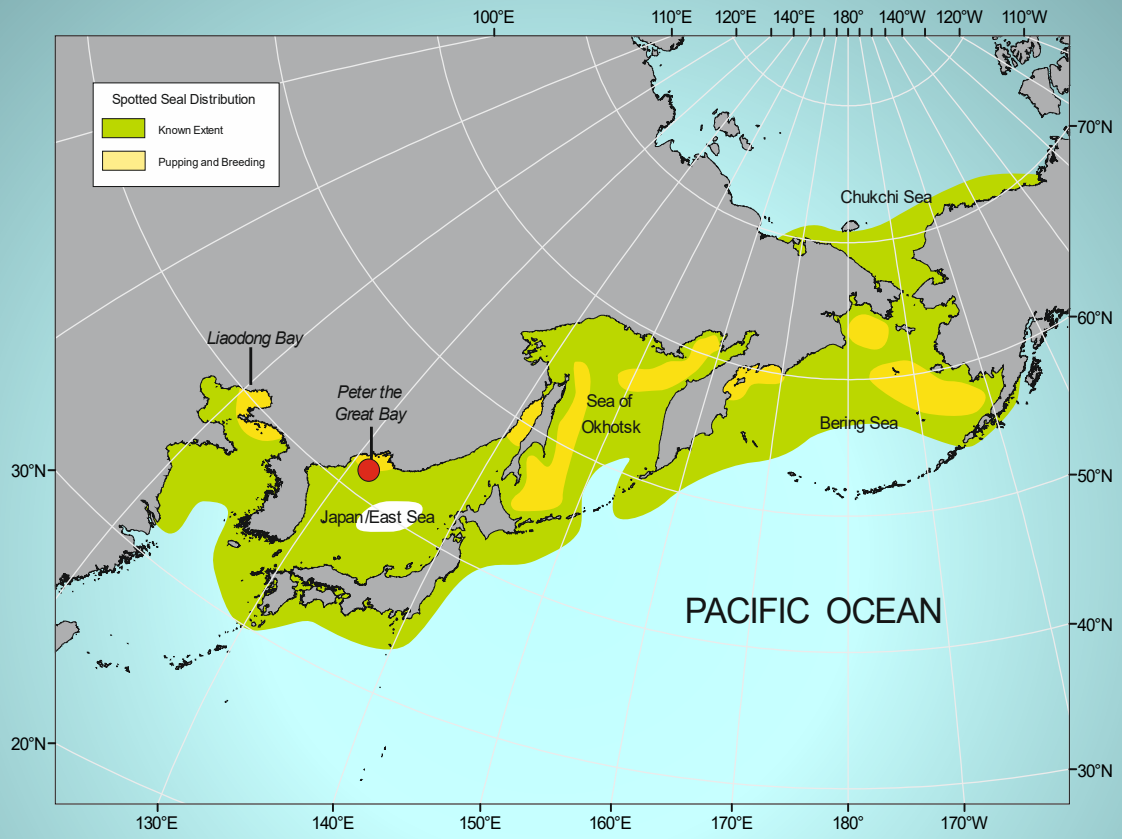


The distribution of the spotted seal is extensive, with eight geographically isolated breeding populations described within its range (Shaughnessy & Fay 1977). Six of them are lives in the Russian waters.



The spotted seal is a numerous species in the Sea of Okhotsk.
The largest reproductive group is located in the southwestern part of the Sea of Okhotsk
The number of spotted seals here increased by 10-20% between 1999 and 2017 (Trukhin and Permyakov, 2019).



One of the smallest populations is confined to the southern border of the range. This is Peter the Great Bay, Japan/East Sea ●

Currently, this population of spotted seals is the object of increased attention in Russia.

The area of reproduction of spotted seals in Peter the Great Bay is small. This is the Rimsky-Korsakov Archipelago in the western part of the Bay. The archipelago consists of 11 small and extra small islands.

The area of the archipelago's water area is 60 square kilometers. Such a limited area of the reproductive area makes the population extremely vulnerable. In case of force majeure situations in the Bay, the population will be in great danger.

Seals from the population of Peter the Great Bay have a number of morphological and ecological differences.

The main ecological feature is coastal breeding. Mass birth of pups on the Rimsky-Korsakov Islands occurred on pebble or pebble-boulder beaches and began middle January.

Reproductive group of the spotted seals on the Gildebrandt Island (Rimsky-Korsakov Archipelago)

Over the past 40 years, the number of spotted seals in Peter the Great Bay has increased 4-fold. In the mid-1980s, the number of seals was about 1,000 (Trukhin and Kosygin, 1988). Currently, the number of seals before the start of the breeding season is 4,000, and the number of newborns has exceeded 1,000 (Trukhin, 2024).

The increase in the number of seals on the islands of the Rimsky-Korsakov Archipelago led to the settlement of seals on other islands of Peter the Great Bay. This process began in the 2000s.

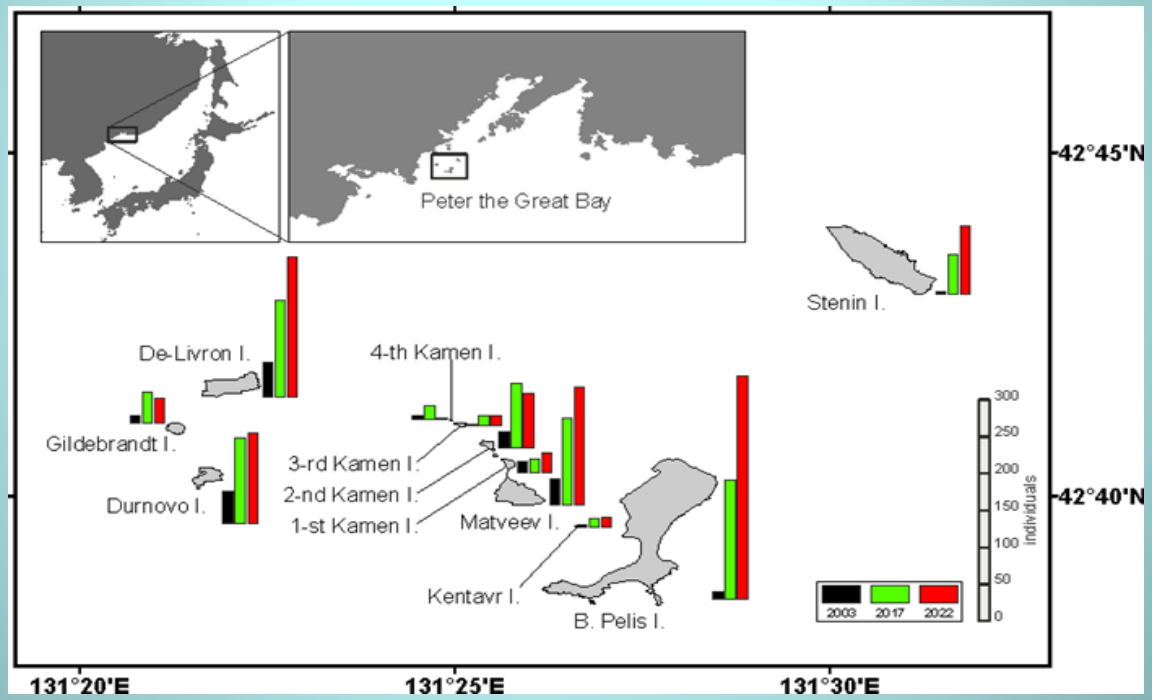
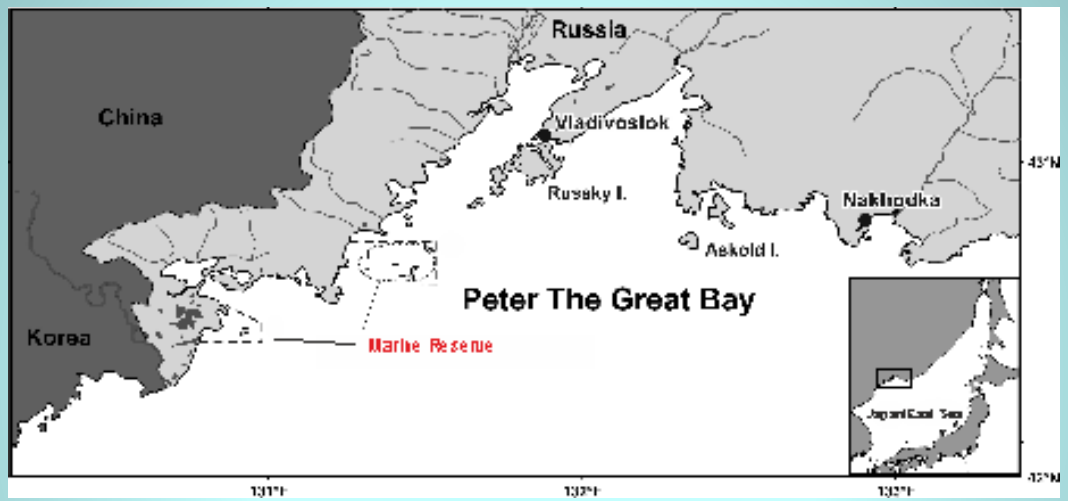


Figure. The change in the number of newborns spotted seals on the Rimsky-Korsakov Islands in 2003-2022

Currently, the welfare of the spotted seal population in Peter the Great Bay is determined by the presence of the Far Eastern Marine Reserve in Peter the Great Bay. This Reserve was established in 1978, and since 2003 it has the status of a Biosphere Reserve.



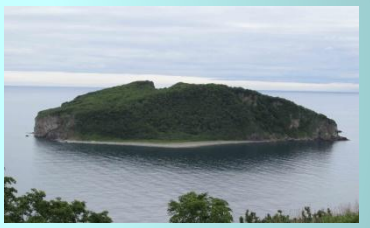
The Marine Reserve Inspectorate has several security posts on the islands and coast, and speedboats to patrol the reserve's waters.

Guard post in the Marine Reserve

The State Inspectorate
in the service of the Reserve

Daily patrolling of the Marine Reserve
by security group

A cooperation agreement has been signed between the Marine Reserve and the Pacific Oceanological Institute of the Russian Academy of Sciences. Within the framework of this agreement, the staff of the Pacific Oceanological Institute carry out long-term continuous monitoring of the spotted seal population on the Rimsky-Korsakov Archipelago.



The research of spotted seals in Peter the Great Bay has recently assumed the character of international cooperation. These are several agreements concluded at the government level. One of them is an agreement between the Pacific Oceanological Institute and colleagues from the Republic of Korea.

Cooperative Project under the Korea-Russia Joint Committee
on the Environmental Cooperation

Project: K-R-10-2 "Korea-Russia Bilateral Cooperation
on the Conservation of Pinnipeds"

The purpose of the project is to study migrations of cross-border pinnipeds.

Co-performers:

Russian Academy of Science,
V.I.Il'ichev Pacific Oceanoligical Institute

National Institute of Fisheries Science,
Cetacean Research Institute

The K-R-10-2 Project provides for the study of spotted seal migrations using satellite tagging

Satellite tag

Russia, Peter the Great Bay, 2018

Photo: The Scientific Team :

Kim Hyun Woo

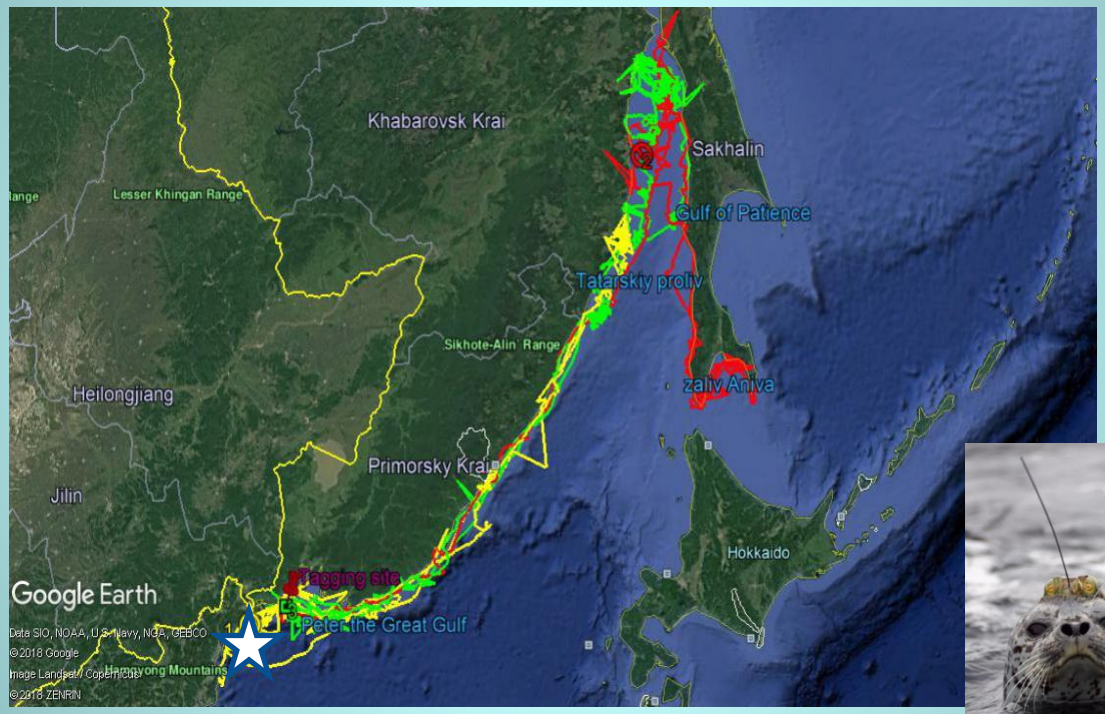
Trukhin A.

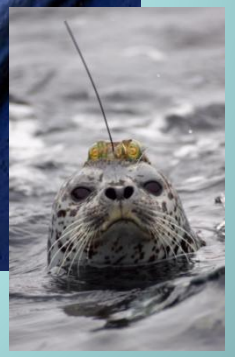
Choi Young Min

Ryazanov S.

Permyakov P.

The tagging of spotted seals with satellite tags was performed in Peter the Great Bay. As a result of tracking the locations of the tagged animals, it was possible to obtain a large amount of valuable information about the timing and routes of seal migrations.





- Tagged site

The 1st stage of research

Another partner of the Pacific Oceanological Institute is Hanyang University, Republic of Korea

The work is carried out within the framework of an agreement concluded between the Governments of the Russian Federation and the Republic of Korea :

Cooperative Project under the Korea-Russia Joint Committee on the Environmental Cooperation

Project: K-R-11-2 "Tracking emerging contaminants in marine mammals from Korea and Russia using non-target screening analysis"

Co-performers:

Russian Academy of Science, V.I.Il'ichev Pacific Oceanoligical Institute (Trukhin A.M.)

Hanyang University, Republic of Korea (Hyo-Bang Moon)

Study purpose:

Analysis of biological samples (hair, fat) from spotted seals from Japan/East Sea (determination of the concentration of persistent organic pollutants)

Sample of fat

Samples of hair

The first results of joint studies of seal pollution with persistent organic pollutants have been obtained and published (2025).

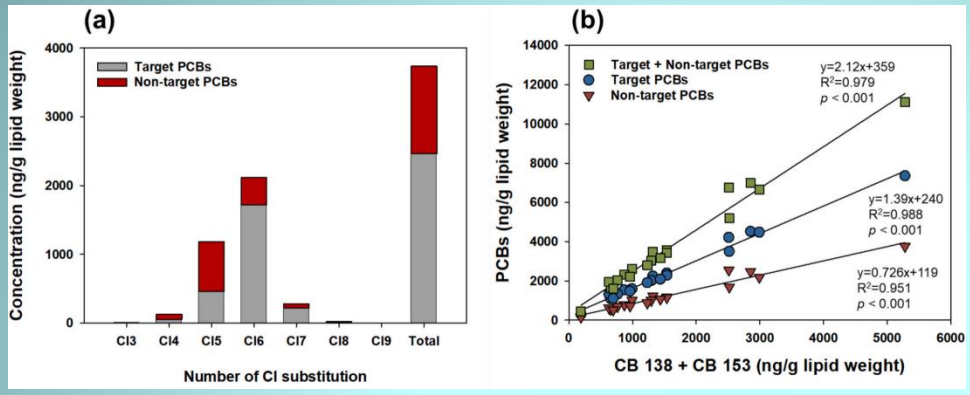


Figure. (a) Concentration and contribution of target and non-target PCBs based on the number of Cl substitution. (b) Scatter plot and regression of the sum of CB 138 and CB 153 against total PCBs (target and non-target), target PCBs, and non-target PCBs for blubber samples from spotted seals of Peter the Great Bay

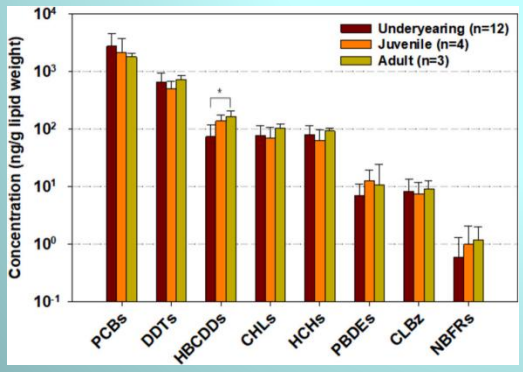


Figure. Accumulation levels of each compound group of halogenated organic pollutants (HOPs) depending on the age of spotted seals of Peter the Great Bay

Currently, the reproductive group of the spotted seal in Peter the Great Bay (Japanese/The Eastern Sea) is in good condition. The main role in the conservation of this population belongs to the Far Eastern Marine Biosphere Reserve. However, the welfare of seals is unstable, and the population is exposed to various factors, the main of which is anthropogenic influence. The reproductive range of spotted seals in Peter the Great Bay is limited to the islands of the Rimsky-Korsakov Archipelago. There is intensive shipping and commercial fishing in the bay throughout the year. Maritime tourism is actively developing. The waters of the bay are heavily polluted by human products. The occurrence of any man-made disasters in the Gulf may put the existence of the spotted seal population in a critical position. In such conditions, constant scientific monitoring of the seal grouping and their habitat is necessary. The role of the Marine Biosphere Reserve should remain the main one in solving this problem. Many seals spend a significant part of the year outside the reserve, where they often die in fishing gear.

The main limiting factors and risks:

Four seals who died in one fishing trap, 18/04/2017

---The death of seals outside the Marine Reserve. Seals are especially often killed in fishing gear.

Oil pollution of a pup

---Pollution of the environment by toxic substances of organic and inorganic nature.

The objectives of the upcoming research, the purpose of which is to preserve spotted seals in Peter the Great Bay

- Continuation of regular monitoring of spotted seals in breeding grounds – in the Rimsky-Korsakov Archipelago in Peter the Great Bay (Japanese/East Sea) in order to detect negative trends in the population in a timely manner.

- Continuing to study the pollution of spotted seals and their habitat with persistent organic pollutants and toxic metals.

- It is advisable to combine the efforts of neighboring countries to study spotted seals and develop a proper strategy for the conservation of this species in the ecosystem of the Japan/East Sea.

Very thanks for
your attention

Incheon, September, 11,2025.