Mass Mortality of Marine Mammals and Seabirds on Tuleny Island, Sakhalin, Russia, in 2023

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Andrey BUZUNA, Project VOZMOZHNO

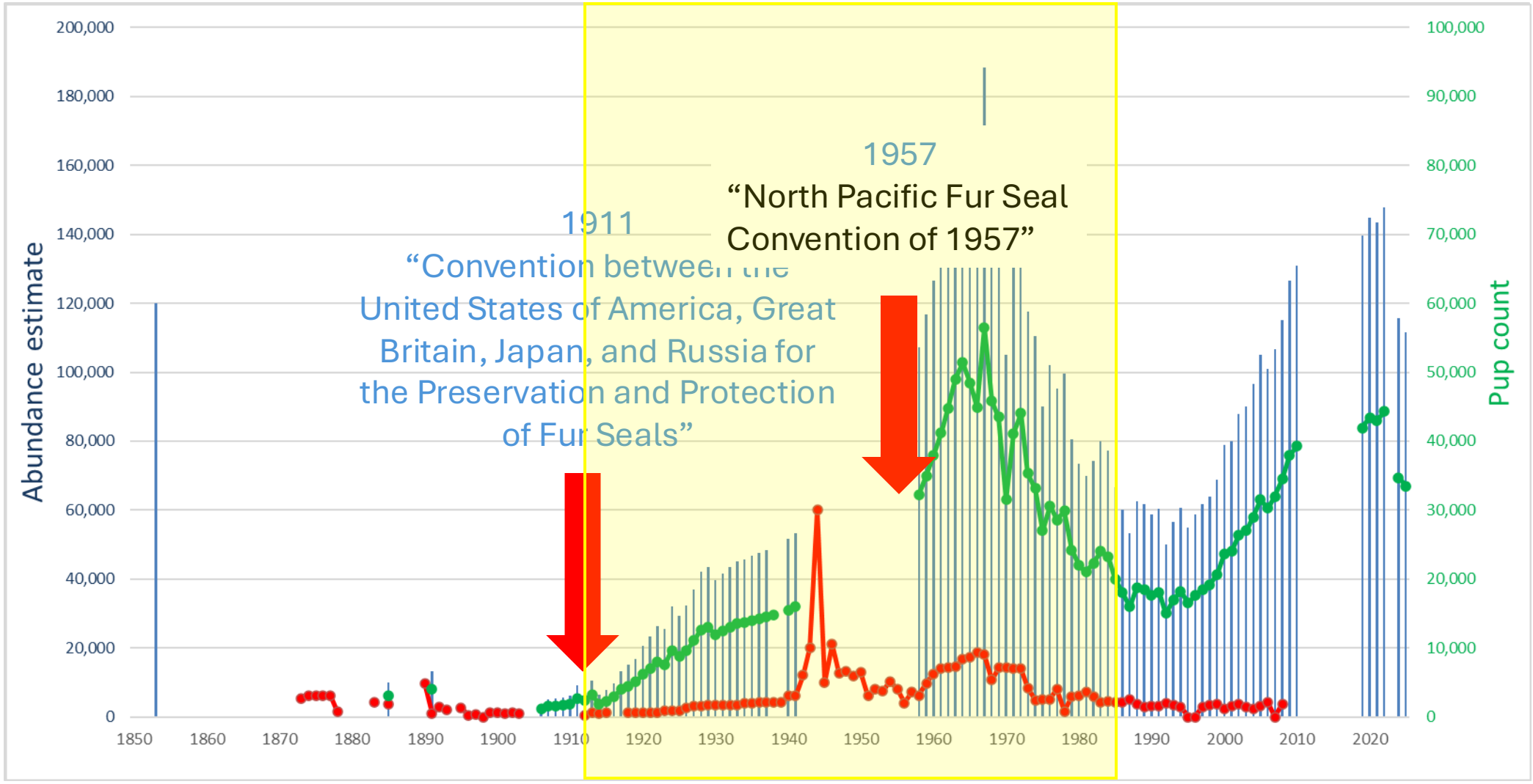
Альфа-Банк

NGO “Club Boomerang”

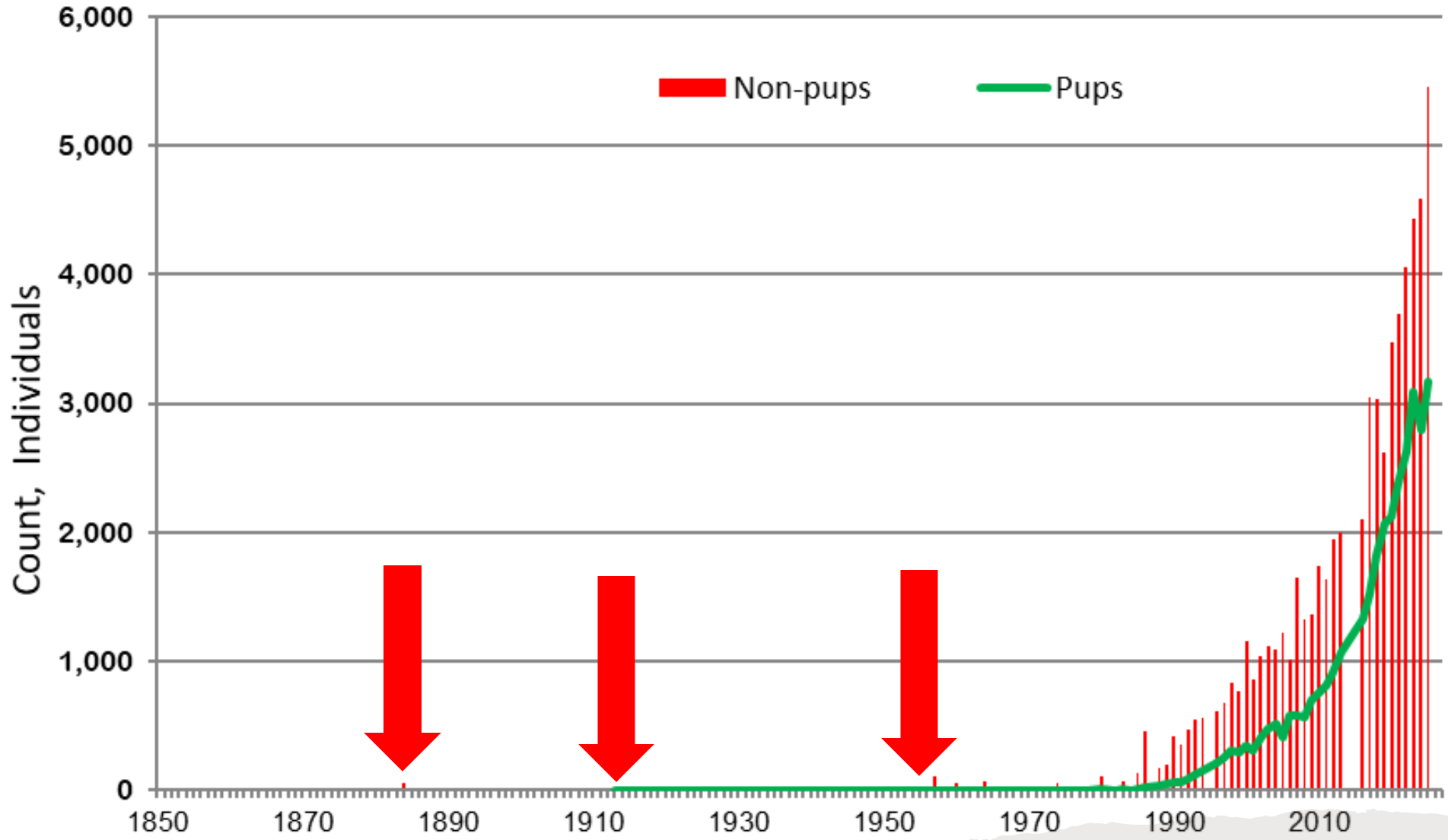

17 m

THE RESEARCH

Historical Northern Fur Seal Abundance on Tuleny I.



Historical Steller Sea Lion Abundance on Tuleny I.



Historical Common Murre Abundance on Tuleny I.

THE UNUSUAL MORTALITY EVENT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Workspace
Workspace (1 chunks, 336
Chunk 1 (3367 image
Images (3359/336
Components (1)
Shapes (66 Point)
DM (26 Point)
DF (38 Point)
DU (2 Point)
Tie Points (2,507,7
3D Model (78,659
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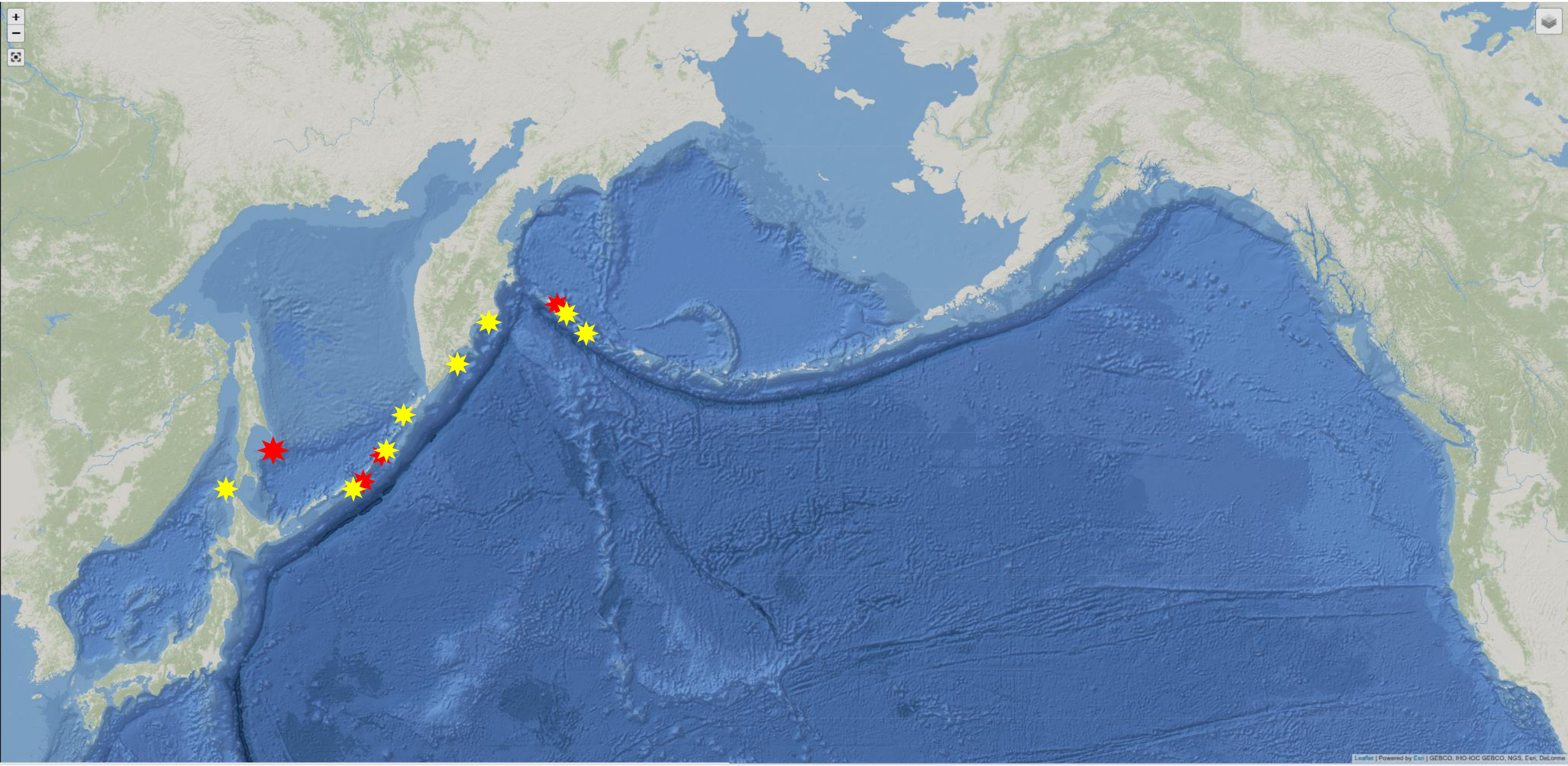
THE UNUSUAL MORTALITY EVENT

THE UNUSUAL MORTALITY EVENT

THE UNUSUAL MORTALITY EVENT



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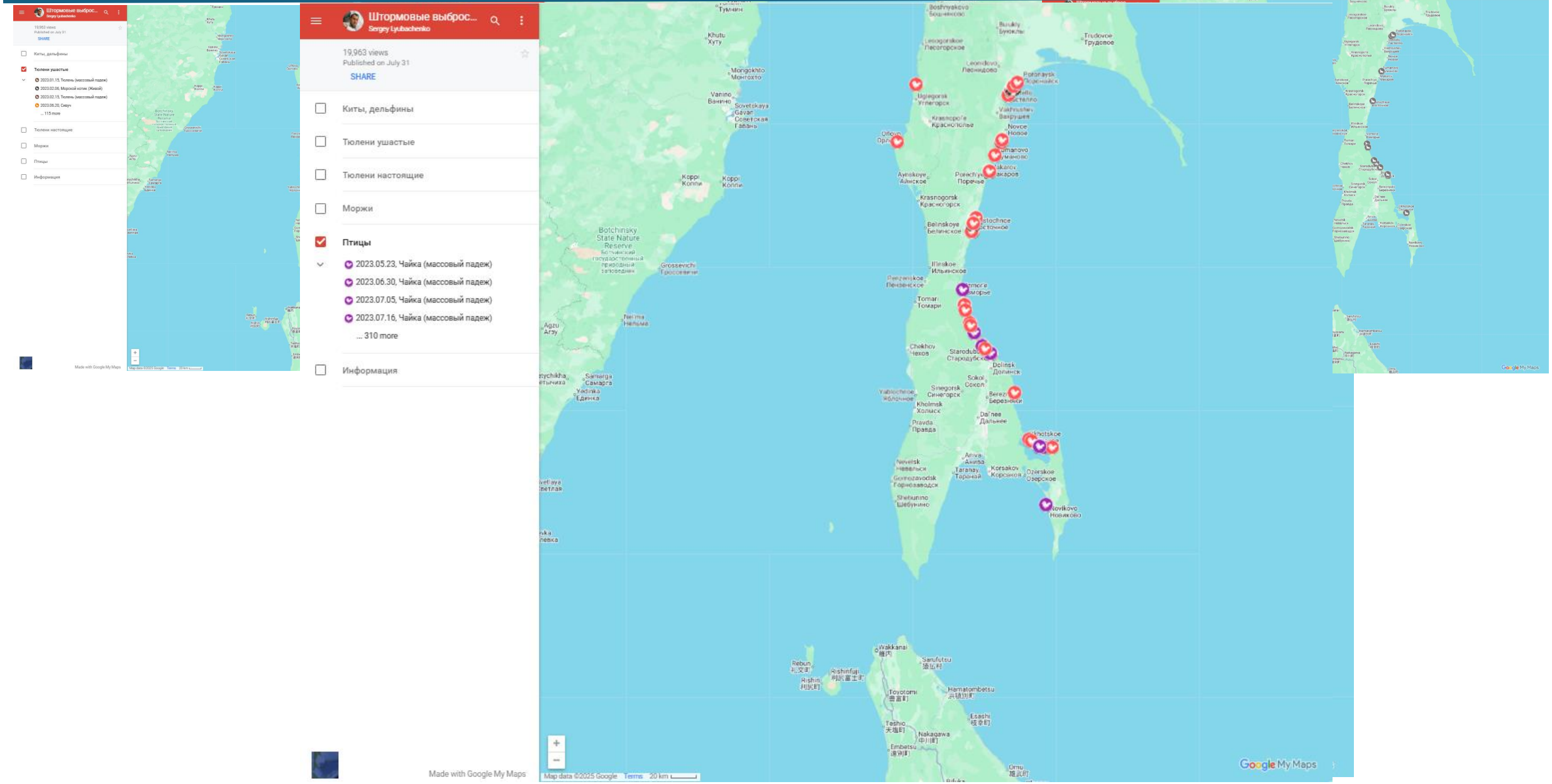

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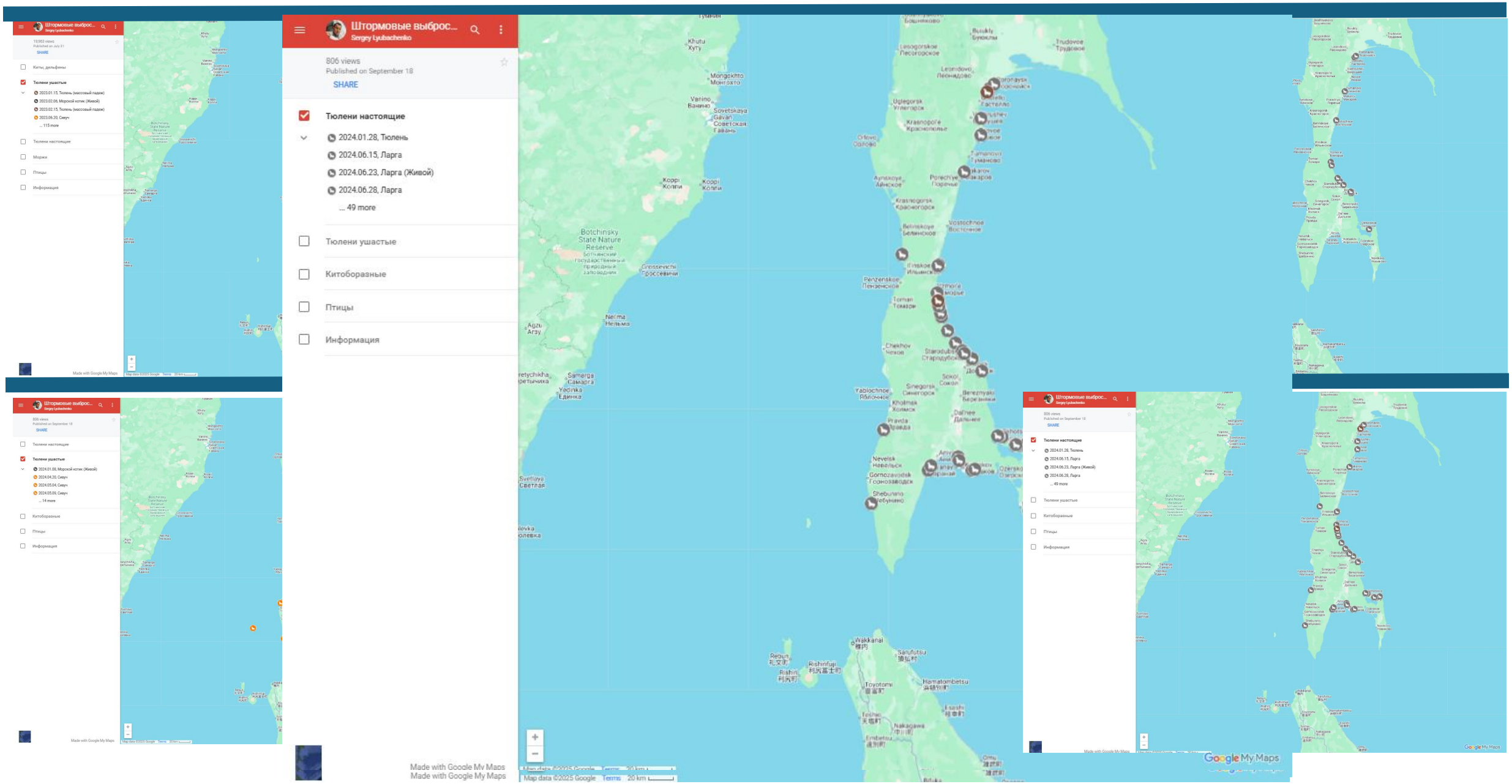
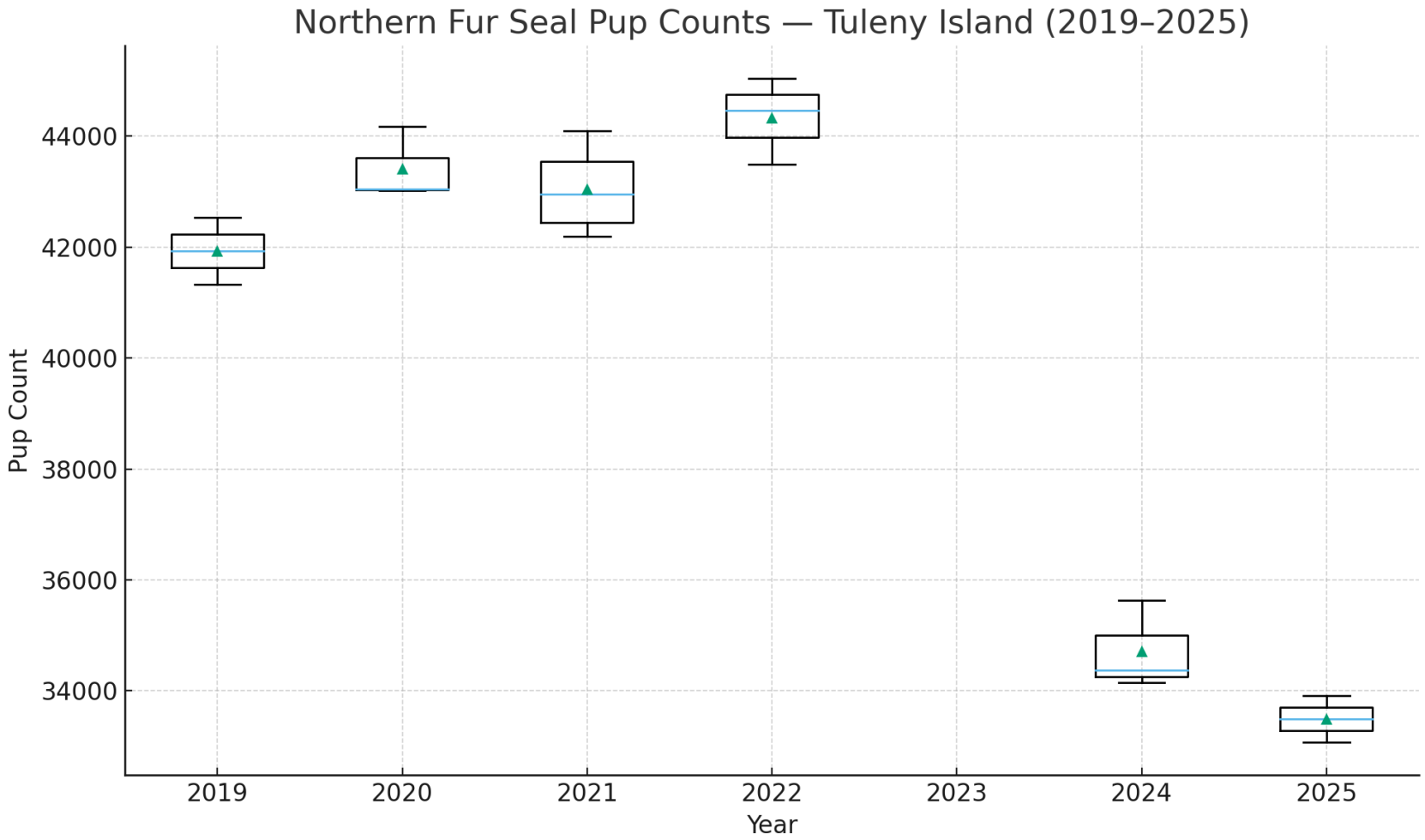


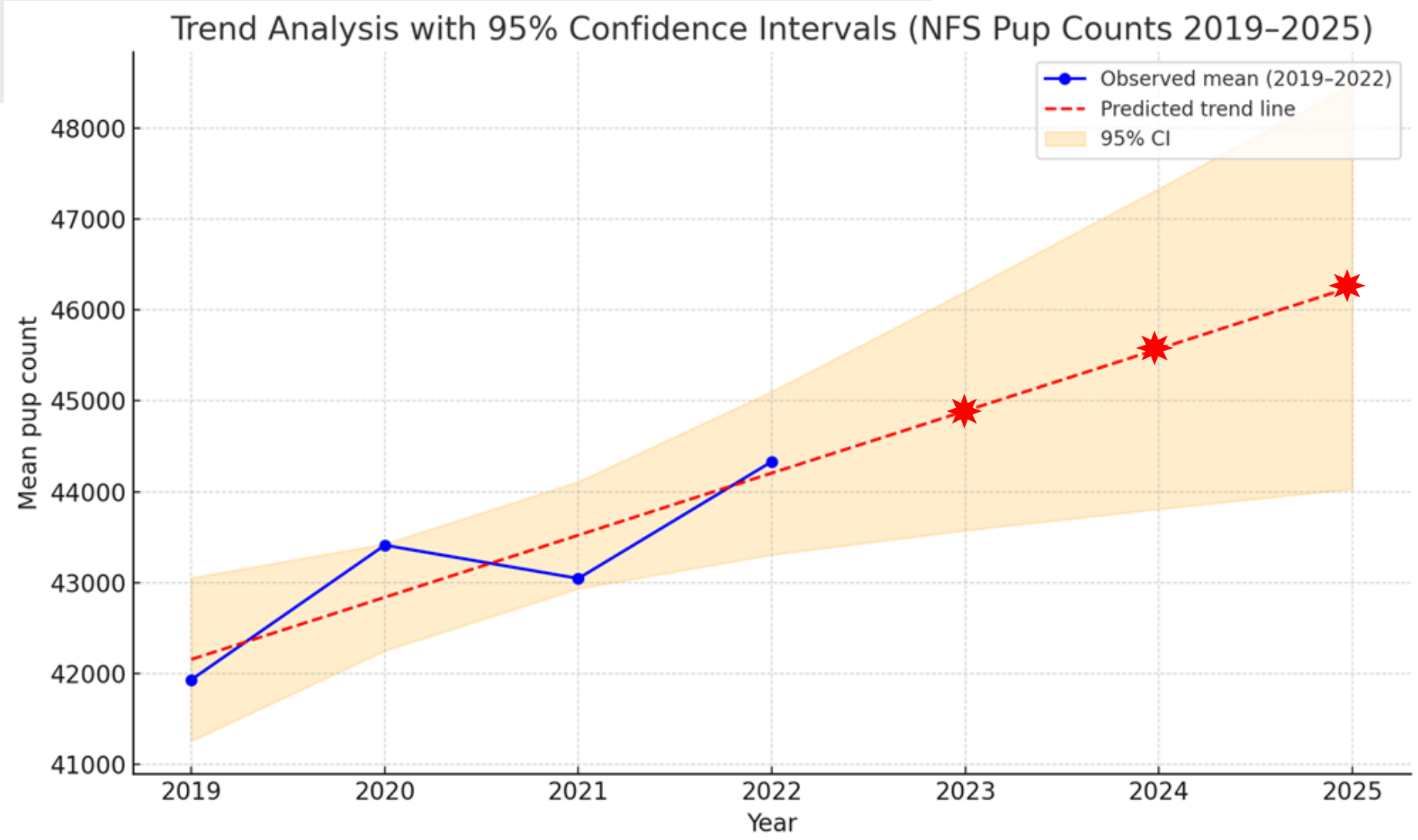
HOW MANY ANIMALS DIED?

HOW THE **UME** AFFECTED THE SEAL AND BIRD POPULATIONS?

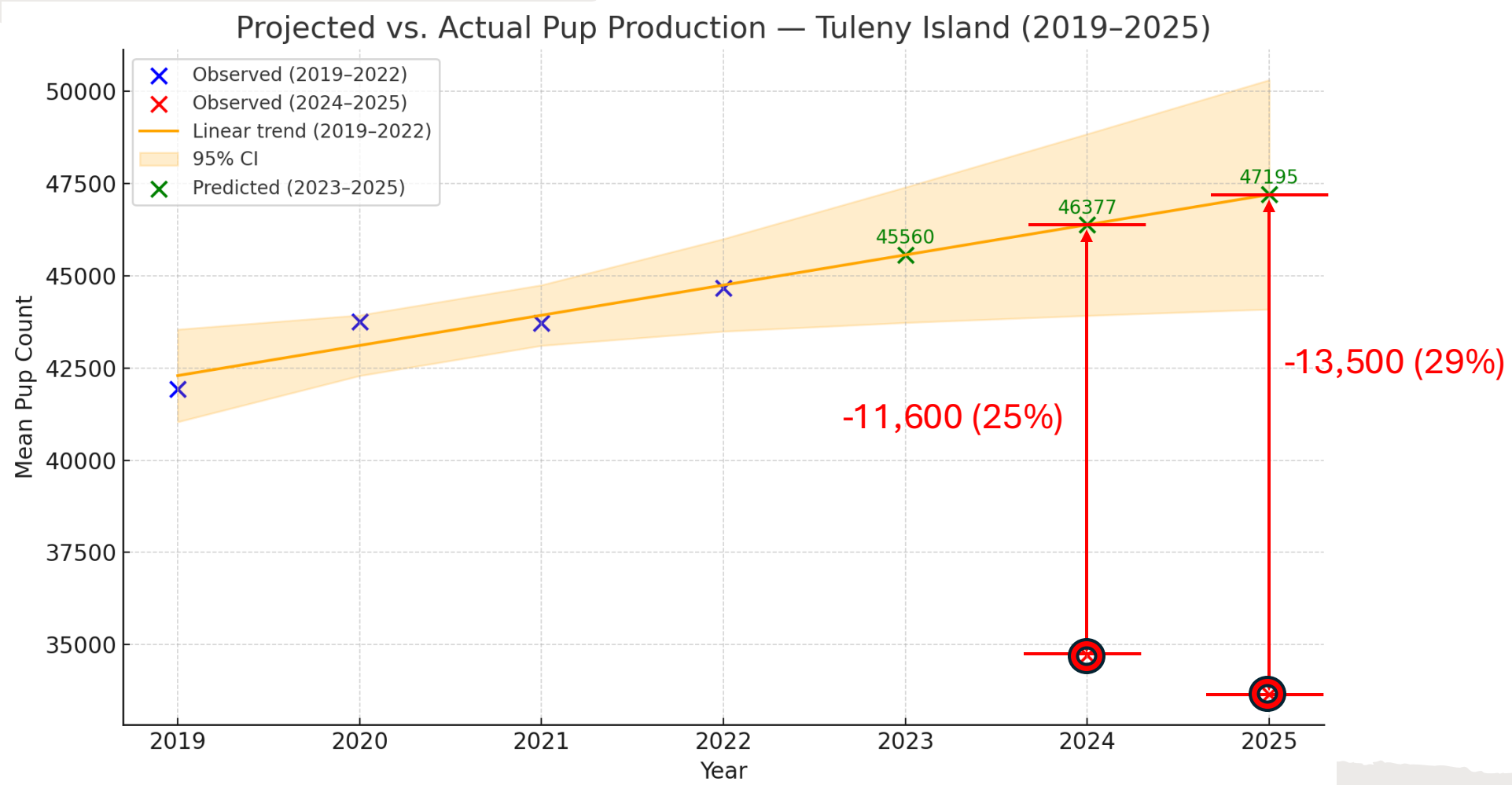
Northern Fur Seal pup production, 2019-2025



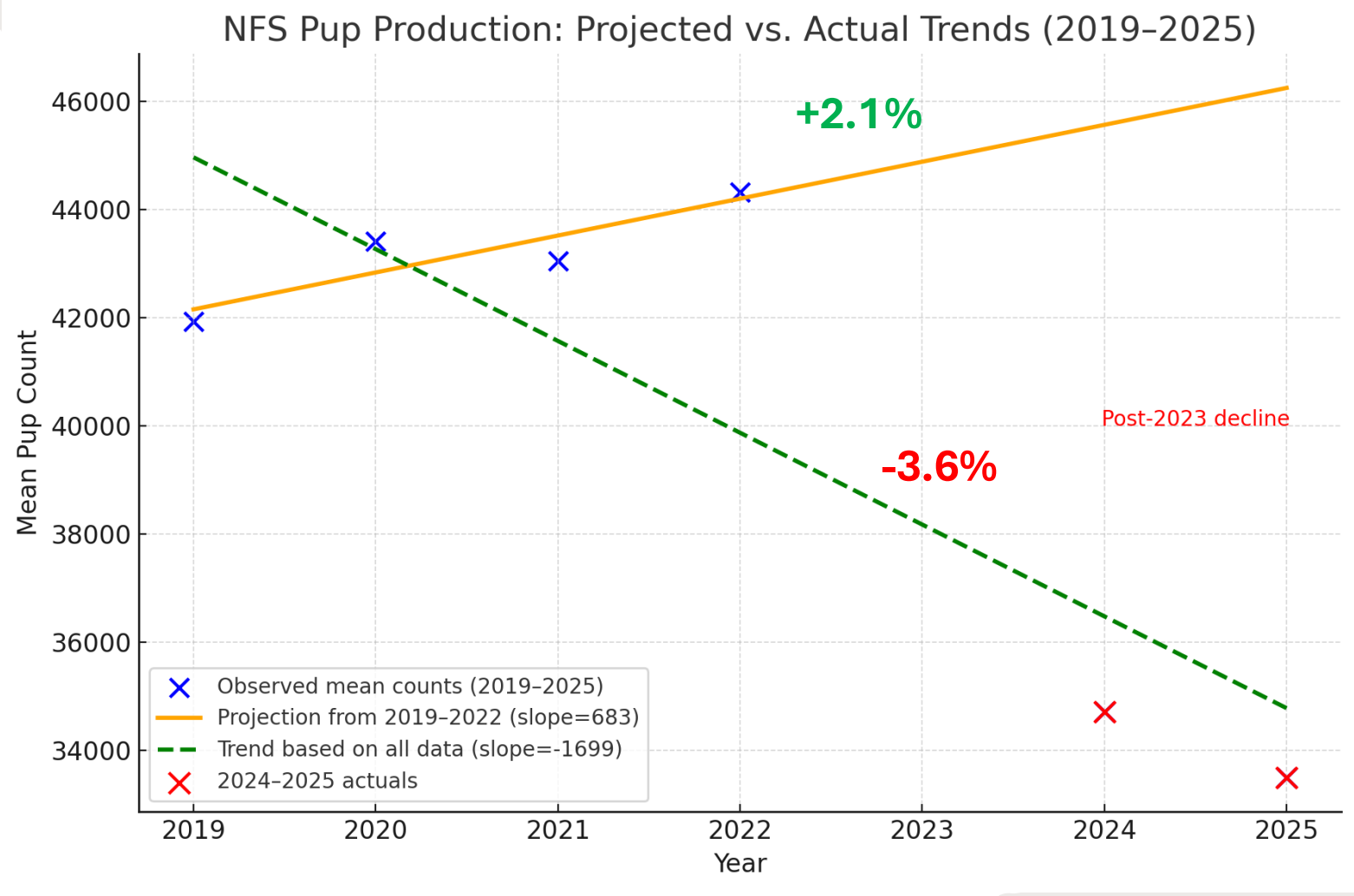
Northern Fur Seal pup production, 2019-2025



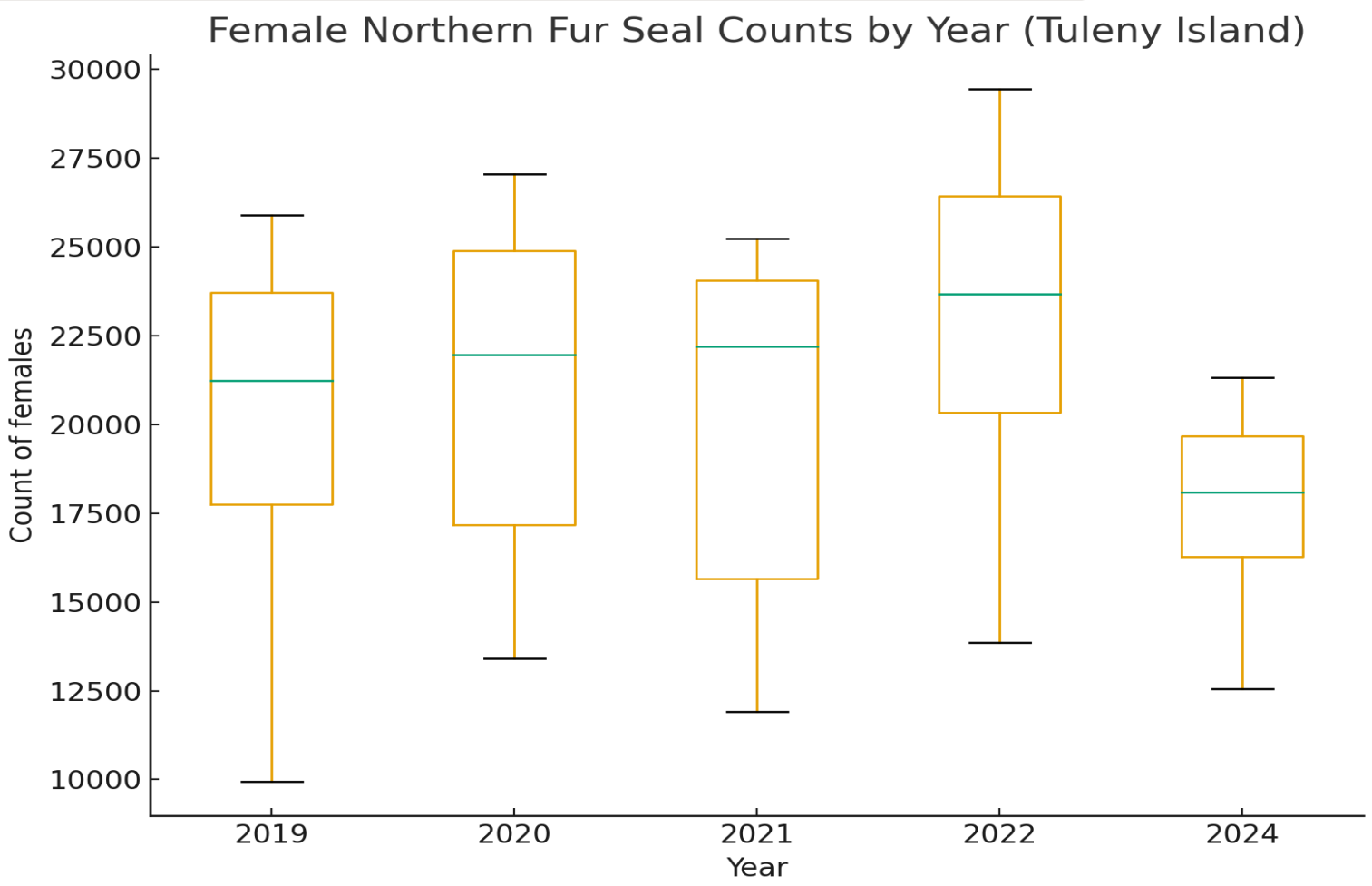
Northern Fur Seal pup production, 2019-2025



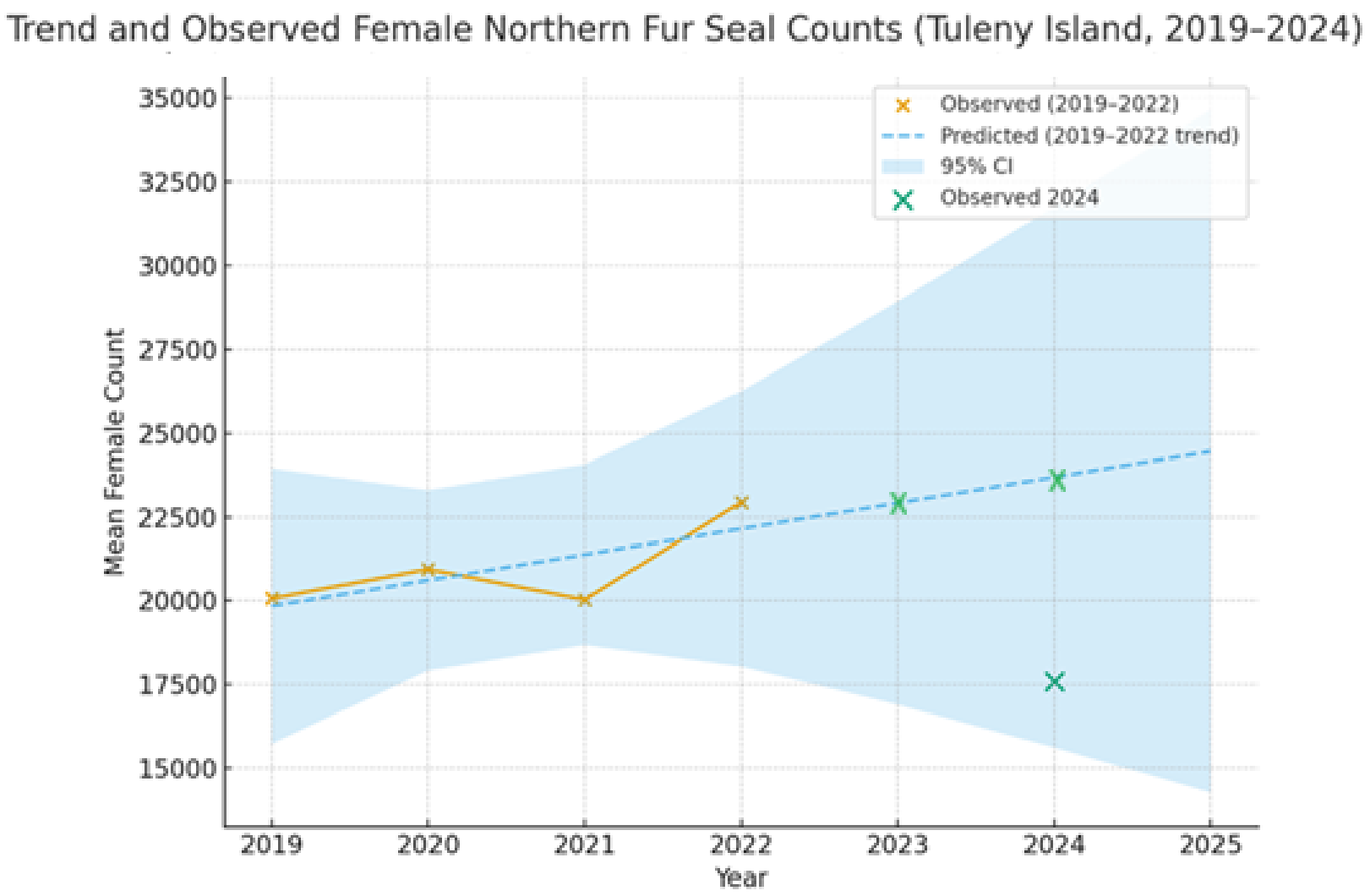
Northern Fur Seal pup production, 2019-2025



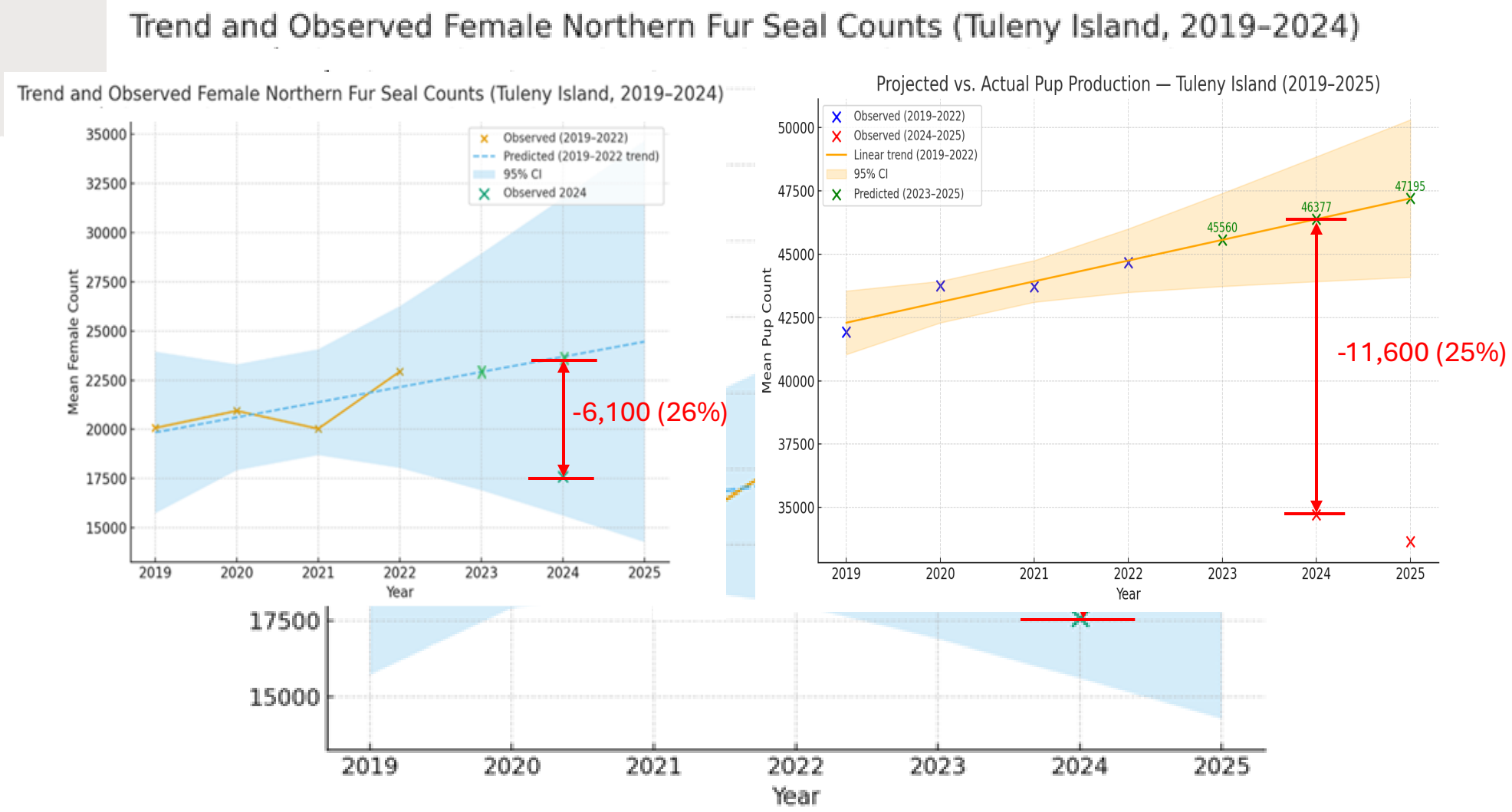
Northern Fur Seal female counts, 2019-2025



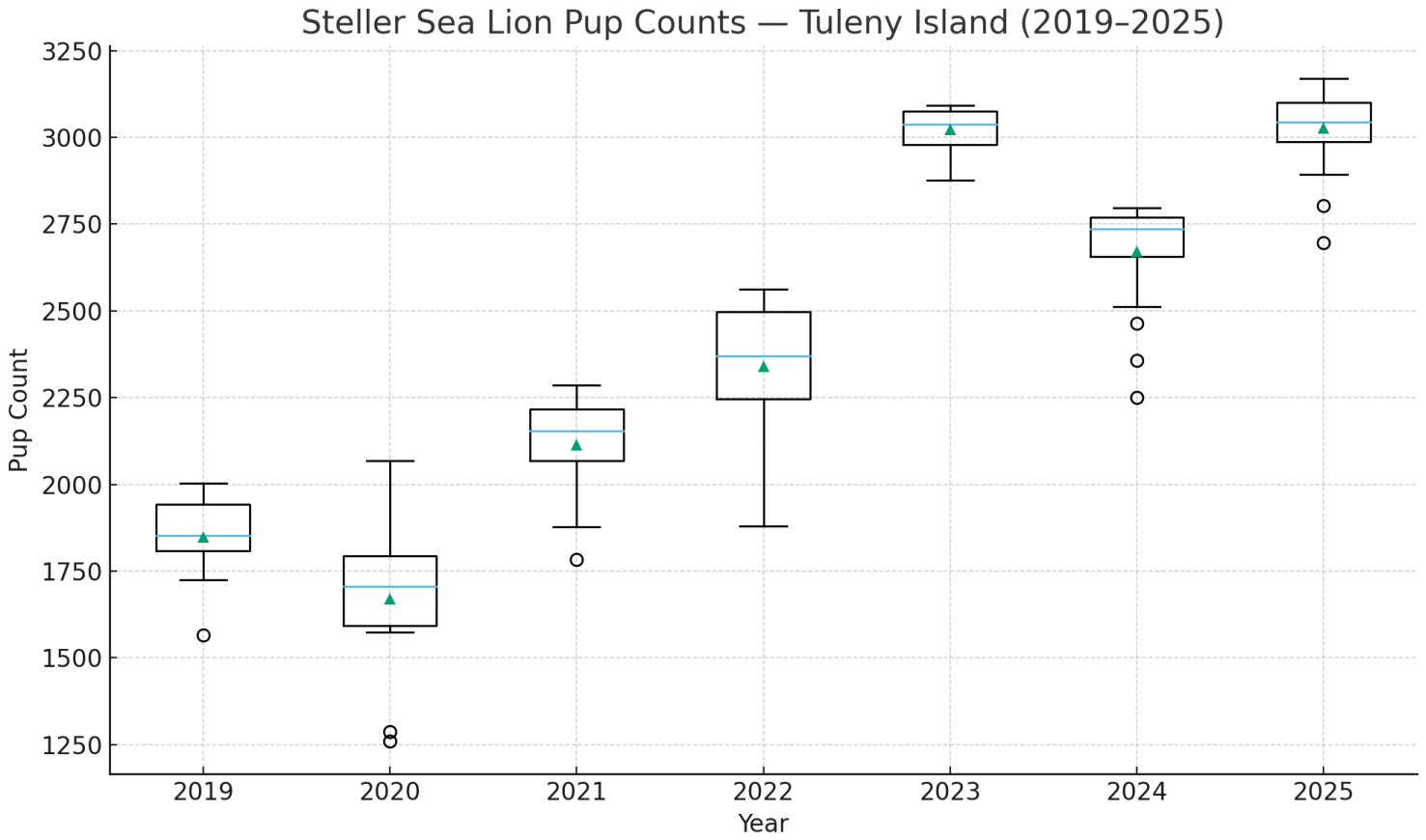
Northern Fur Seal female counts, 2019-2025



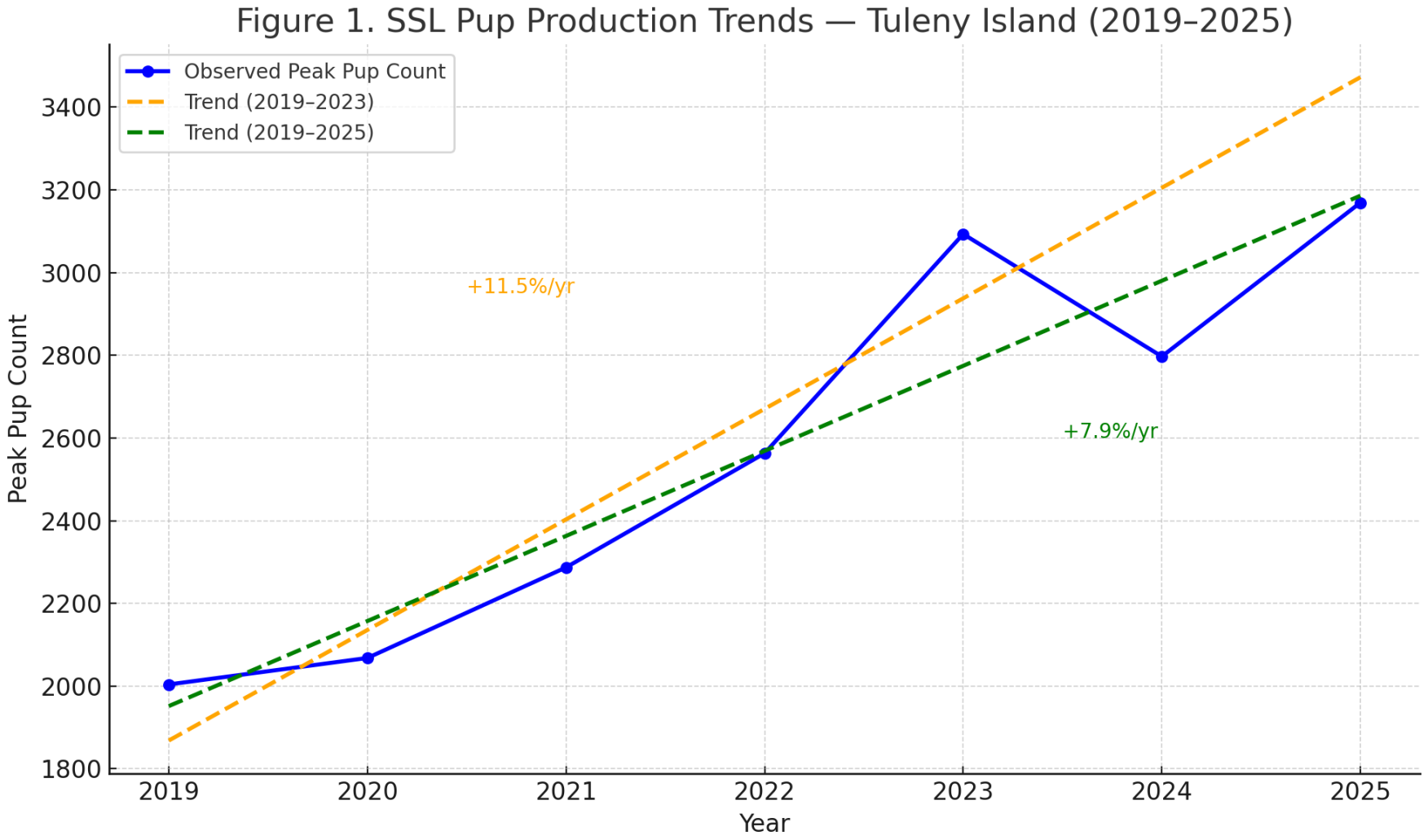
Northern Fur Seal female counts, 2019-2025



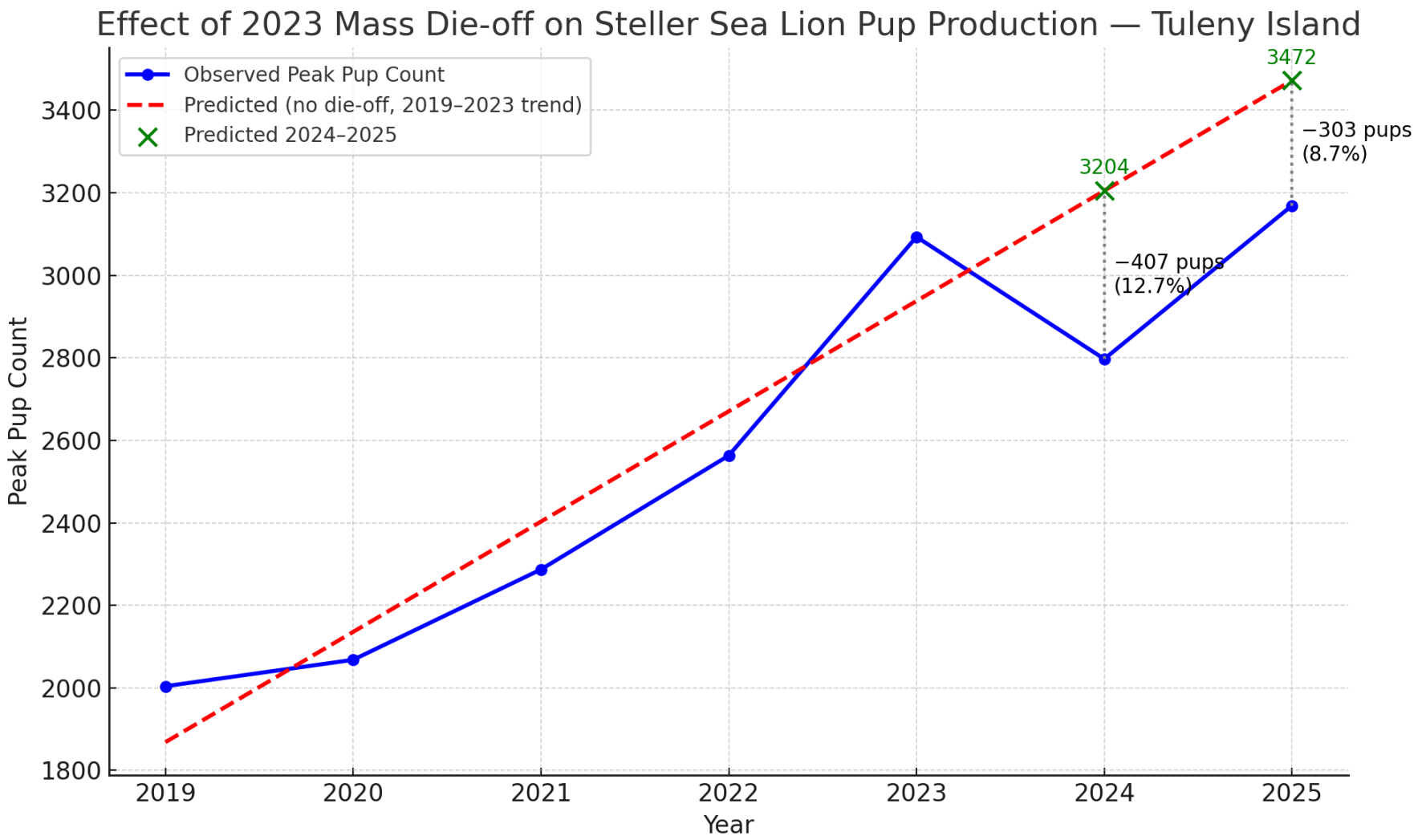
Steller sea lion pup production, 2019-2025



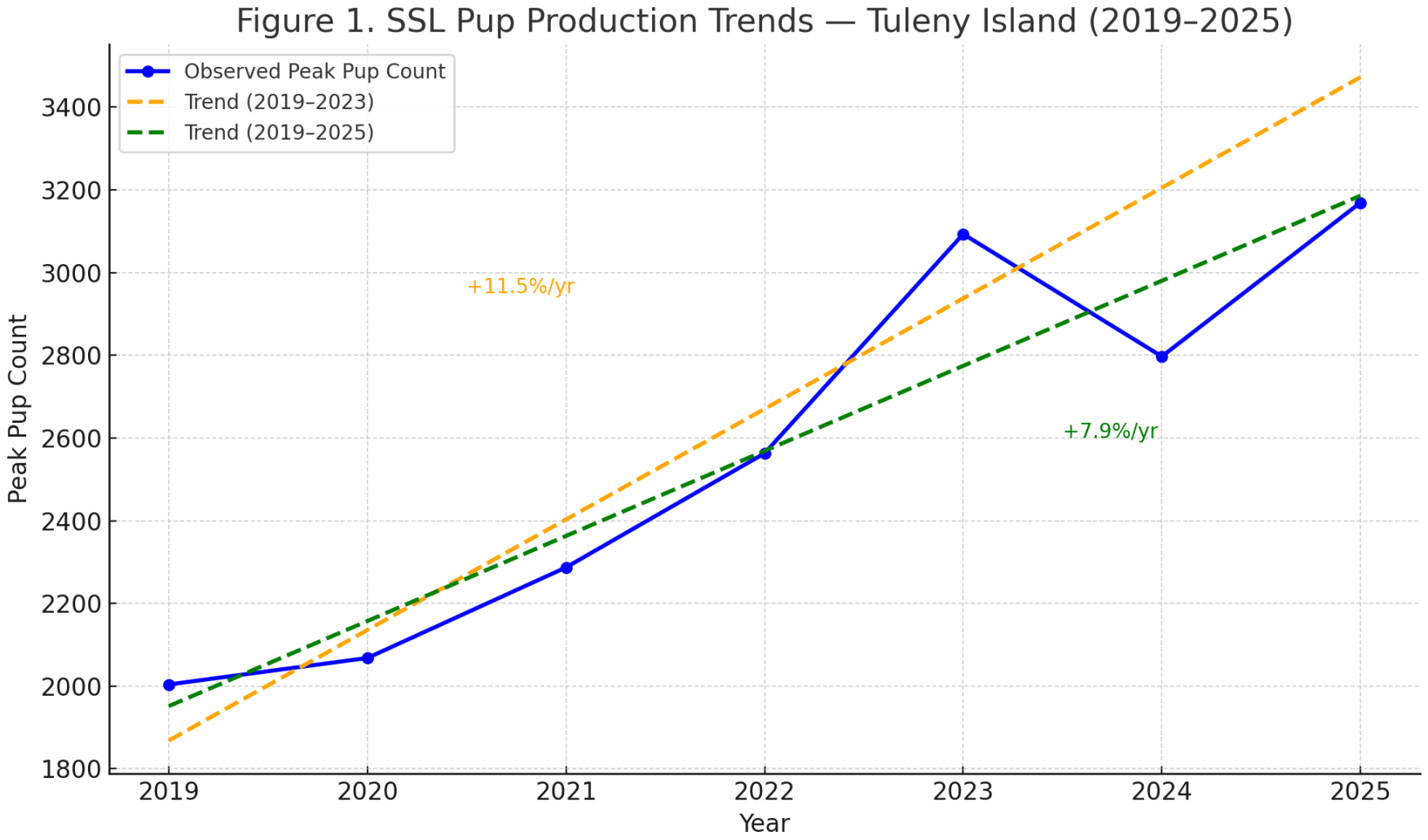
Steller sea lion pup production, 2019-2025



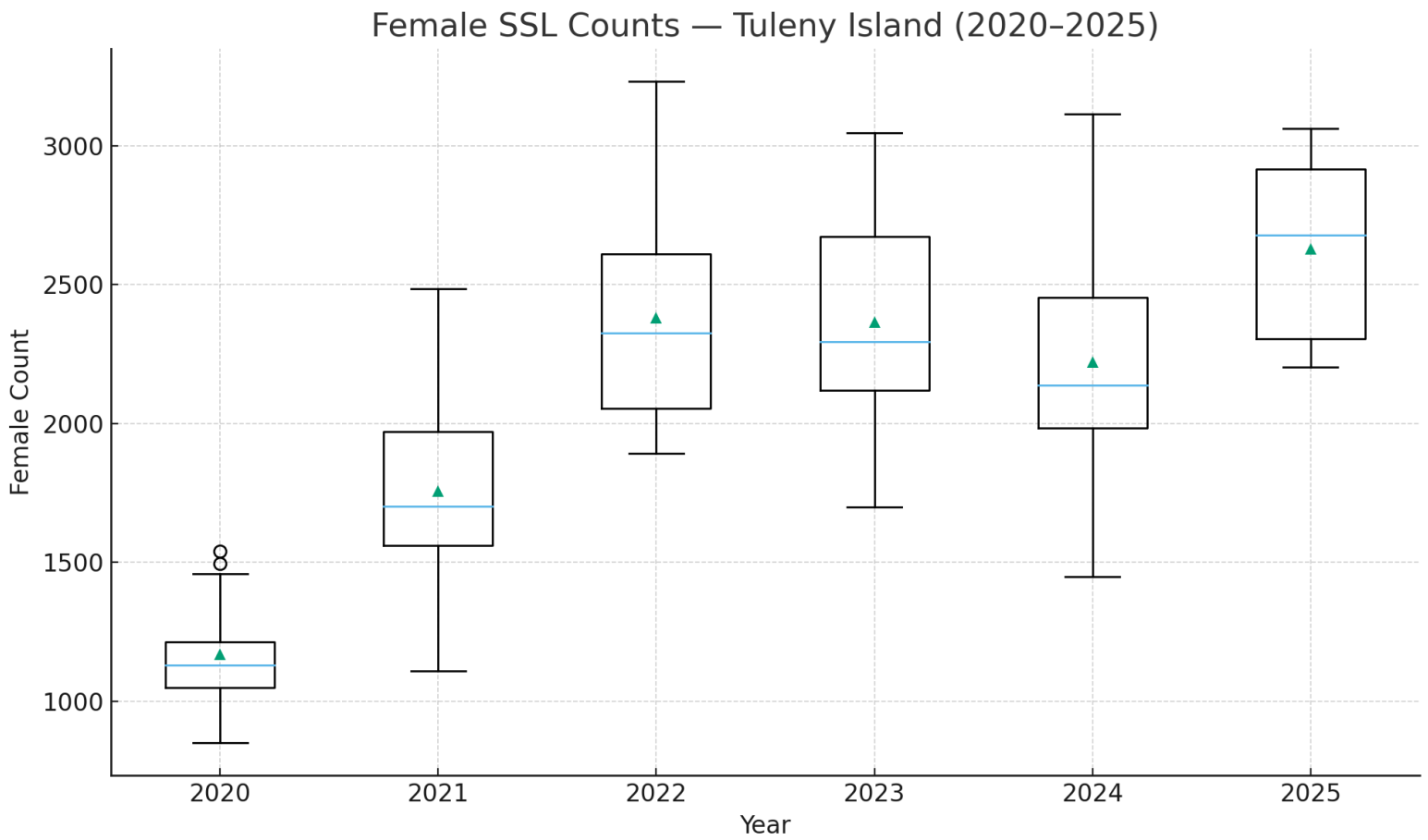
Steller sea lion pup production, 2019-2025



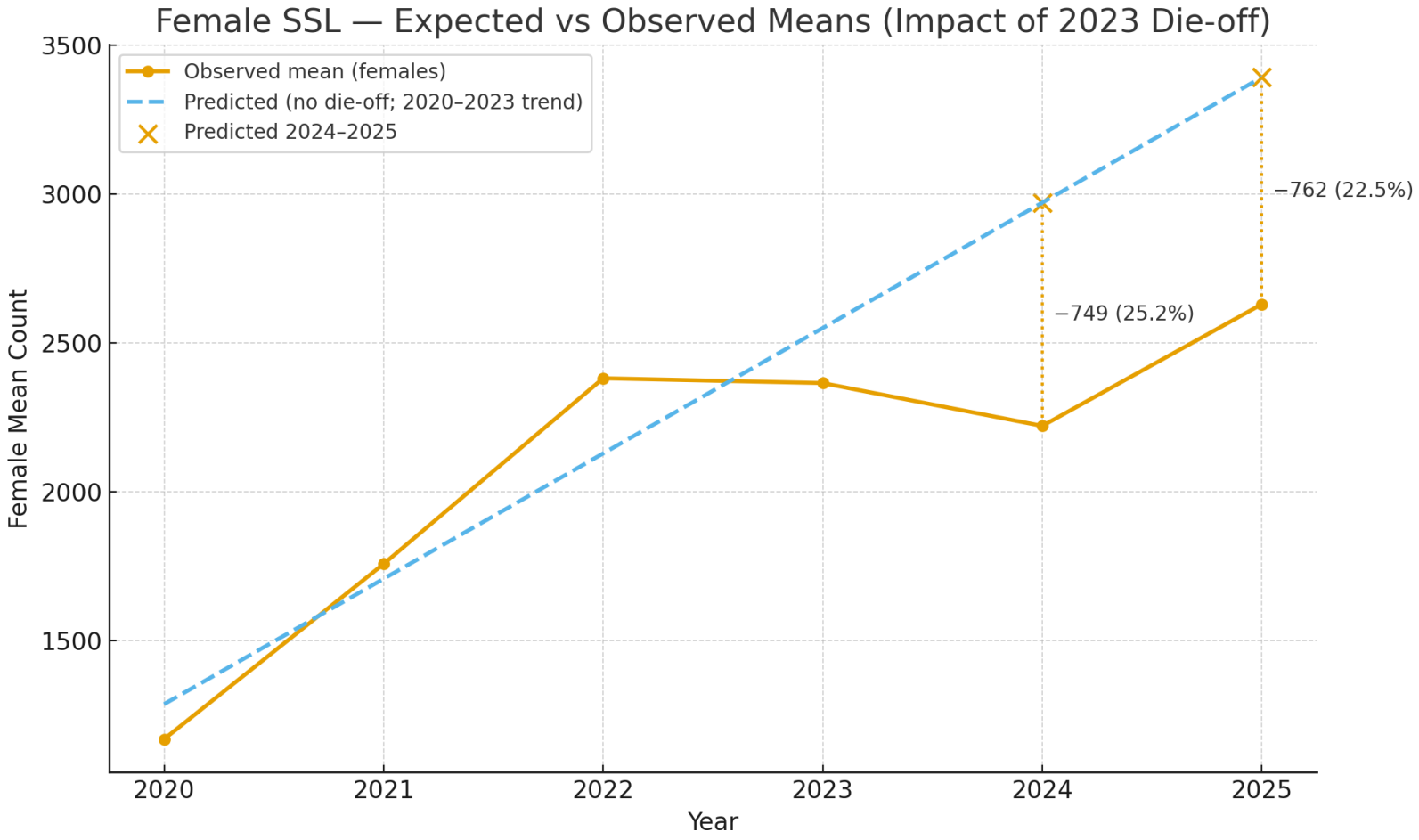
Steller sea lion pup production, 2019-2025



Steller sea lion female trend, 2019-2025

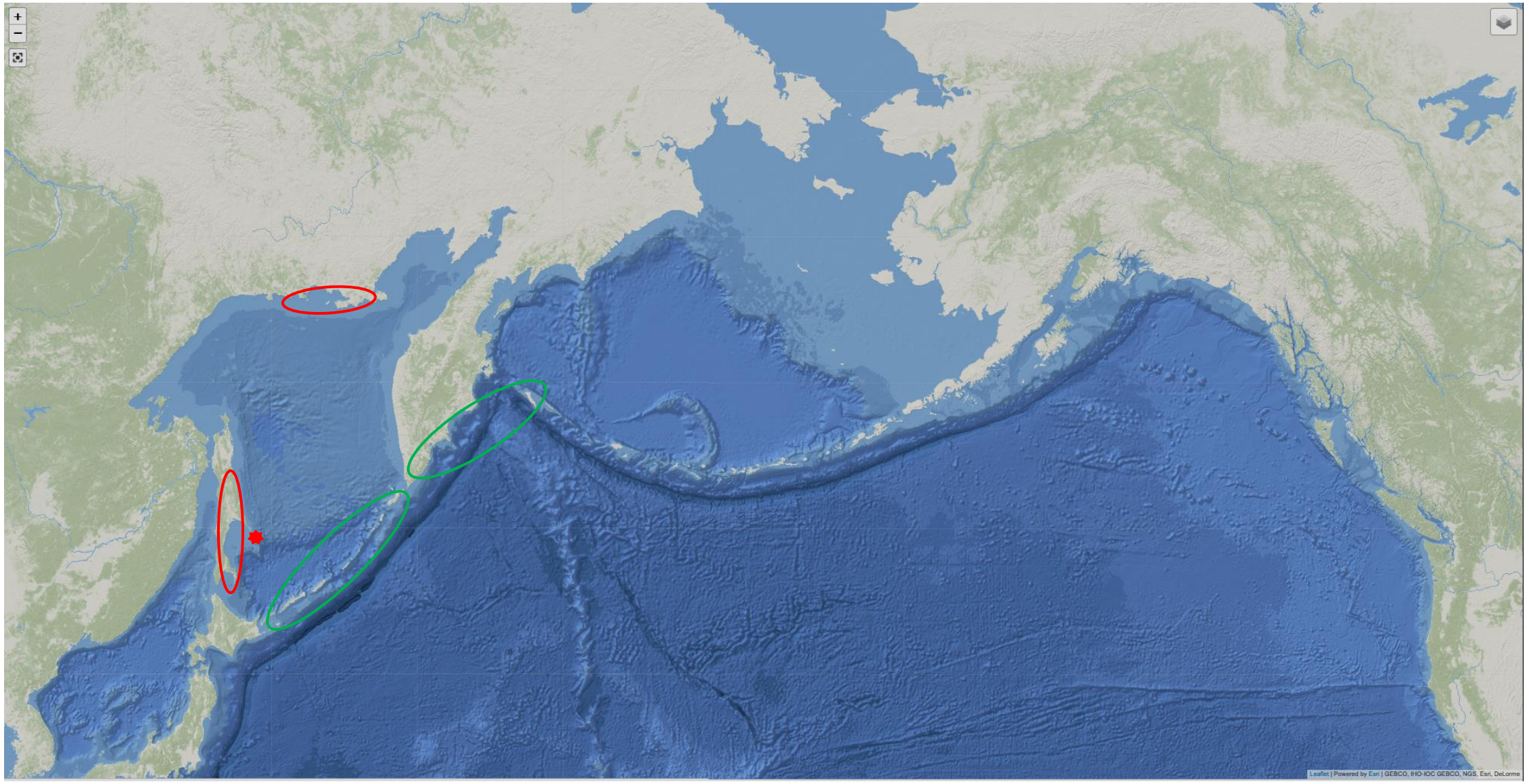


Steller sea lion female trend, 2019-2025



THE BIRDS

THE BIRDS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THE CAUSE

DISPATCHES

Highly Pathogenic Avian Influenza A(H5N1) Virus Clade 2.3.4.4b Infections in Seals, Russia, 2023

Ivan Sobolev, Alexander Alekseev, Kirill Sharshov, Maria Chistyaeva, Alexander Ivanov, Olga Kurskaya, Olesia Ohlopkova, Alexey Moshkin, Anastasiya Derko, Arina Loginova, Mariya Solomatina, Alimurad Gadzhiev, Yuhai Bi, Alexander Shestopalov

Highly pathogenic avian influenza A(H5N1) virus was detected in dead seals on Tyuleniy Island in eastern Russia, in the Sea of Okhotsk. Viruses isolated from dead northern fur seals belong to clade 2.3.4.4b and are closely related to viruses detected predominantly in the Russian Far East and Japan in 2022–2023.

In July 2023, the deaths of northern fur seals (*Callorhinus ursinus*) and Steller sea lions (*Eumetopias jubatus*) were noted in the Far East region of the Russian Federation on Tyuleniy Island (Figure 1). The island is situated in the southwestern part of the Sea of Okhotsk, the northern part of the Pacific Ocean, close to Sakhalin Island. Tyuleniy Island has an area of 0.054 km² and is devoid of water, woody vegetation, terrestrial predators, and permanent human settlements. Its unique environment enables marine mammals to form extensive rookeries and seabirds to establish nesting colonies (*1*), reaching extremely high densities of animals of different ages (Appendix 1 Figures 1–3, https://wwwnc.cdc.gov/EID/article/30/10/23-1728-App1.pdf). The population size of the northern fur seal on Tyuleniy Island in 2022 was ≈55,221 (2).

The Study

We detected the first seal death on July 15, 2023, and a mass death of seals during July 15–August 15, 2023; a total of 3,500 northern fur seals and 1 Steller sea lion died. Many adult animals died in the surf or water; thus, it is likely that the actual number of animal deaths exceeds the number we counted. We found dead pups (1–5 weeks old) on August 4; pup deaths became widespread. In observing diseased animals, we identified 2 stages of disease progression from the onset of symptoms. In stage 1, lasting 6–8 hours, animals experienced fever, lethargy, confusion, and disorientation, and in stage 2, lasting 2–4 hours, they experienced convulsions and death.

We took samples from the lungs, small intestine, and liver of 2 deceased northern fur seals. We detected influenza A virus (IAV) of the H5 subtype in the lungs and small intestine of 1 animal and in the lungs and liver of the other animal by real-time PCR. We isolated IAV from the PCR-positive organs in embryonated chicken eggs. We sequenced whole genomes of 3 viruses isolated from the small intestine and lungs of the first animal and from the lungs of the second animal (Table) using Illumina MiSeq (https://www.illumina.com). We identified all isolates as highly pathogenic avian influenza (HPAI) viruses on the basis of the amino acid sequence of the hemagglutinin (HA) polybasic proteolytic cleavage site (PLREKRRKR/G) and intravenous pathogenicity index values of 2.90 in chickens. We determined the subtype of the HPAI virus neuraminidase (NA) through NA sequence analysis as N1.

Phylogenetic analysis of the HA segment revealed that the strains isolated from northern fur seals on Tyuleniy Island belonged to HPAI H5N1 virus clade 2.3.4.4.b of the A/goose/Guangdong/1/96-like (Gs/GD) lineage (Figure 2). We found the HA segments of the viruses isolated from northern fur seals on Tyuleniy Island belonged to G2 group of clade 2.3.4.4b (Figure 2). Clade 2.3.4.4.b was divided into groups G1 and G2. Subsequently, several subgroups were identified in group G2: G2a–G2e (*3*,*4*). The G2 group comprises

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CONCLUSIONS

- The 2023 marine mammal UME occurred on Tuleny I. only
- UME affected two MM species – the Northern Fur Seal and the Steller Sea Lion
- The UME in birds had occurred in several locations in Sakhalin and the Northern Sea of Okhotsk
- The UME in birds was not monitored or evaluated in details

The Non-P
Promotion
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VOZMOZ