Advances in ringed seal (Pusa hispida botnica)

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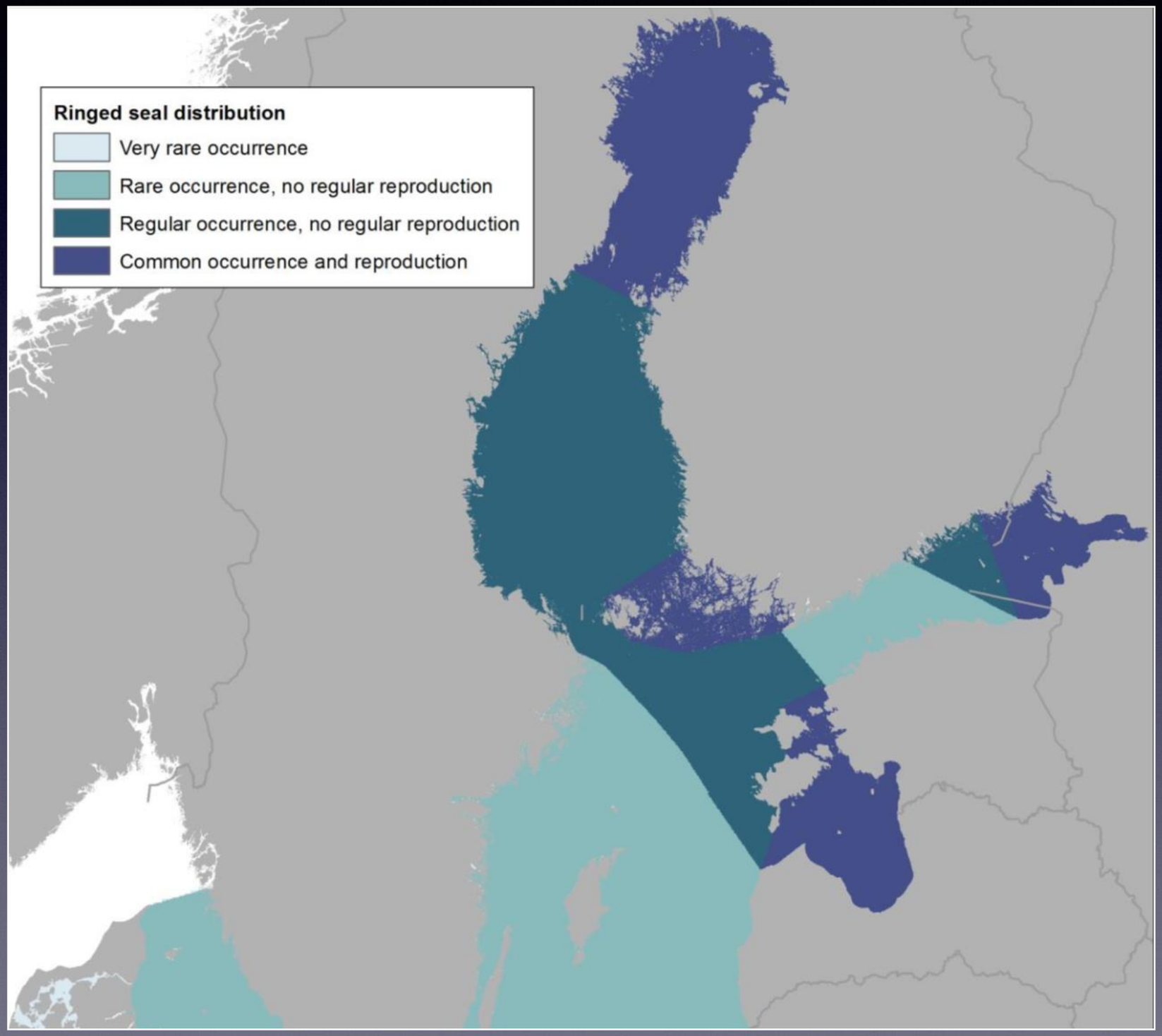
Background in brief

- The ringed seal in the Gulf of Finland has suffered a substantial population decline in numbers and distribution range over the past 50 years
- The current population is split into three (four) subpopulations: Gulf of Bothnia (10 000+), Gulf of Riga (1000) and of Gulf Finland (100+)
- All subpopulations are assessed to be sub GES (less than good, 2018)



Distribution of the Ringed Seals in the Gulf of Finland - why to use telemetry?

- Observational data provides evidence of locations of haul-outs and frequency of ringed seals on stones or ice.

- Seals spend over 80% of their total time-budget in an environment which is inhospitable for humans: they are diving deep in off-shore waters

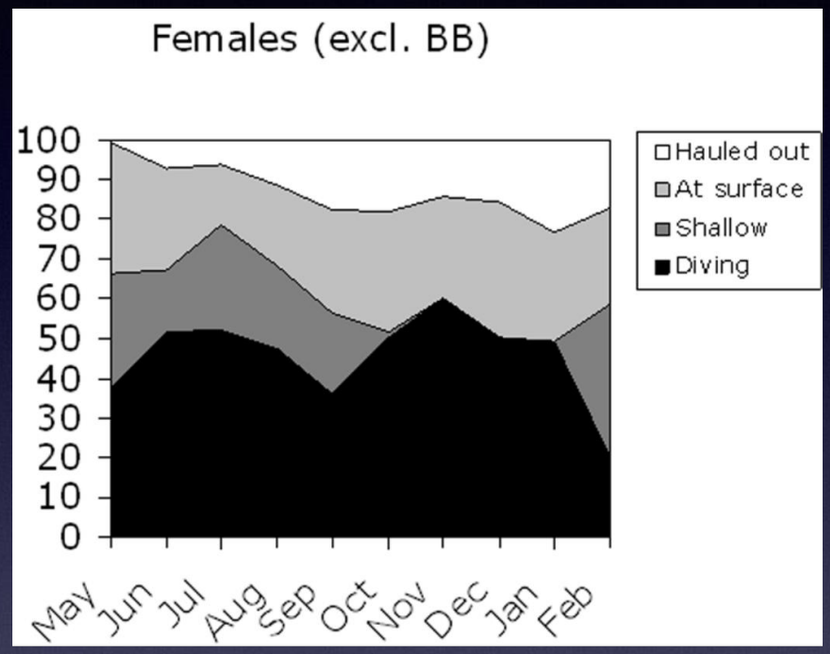
- Telemetry tags survive the deepest dives, gather and relay sensor data on geographical locations, ambient pressure (depth) and temperature

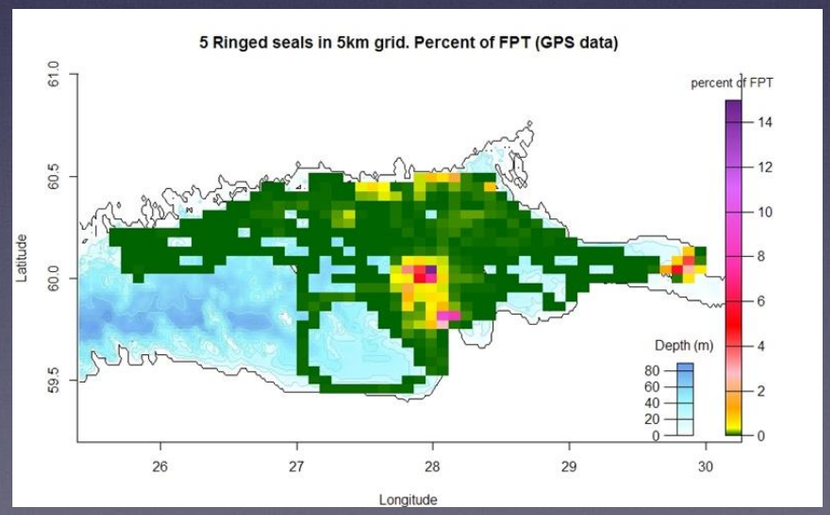
The previous efforts

- The first 4 telemetry tags were deployed to ringed seals in the Gulf of Finland during a pan-Baltic campaign to gather background data on population integrity. Low resolution tags were used as ARGOS satellite link had limitations of accuracy (min. 1.5 km) and data volumes. The data from the GoF was pooled with other areas to calculate activity budgets.

- The second survey was performed in the frames of the GoF Year 2014 when 5 seals were marked with modern GPS resolution instruments which used cellphone data calls for data transfer data without volume limits

- The outcome of the previous efforts was indicative of very high spatial conservatism of the seals but due to small sample size application of the results was limited.



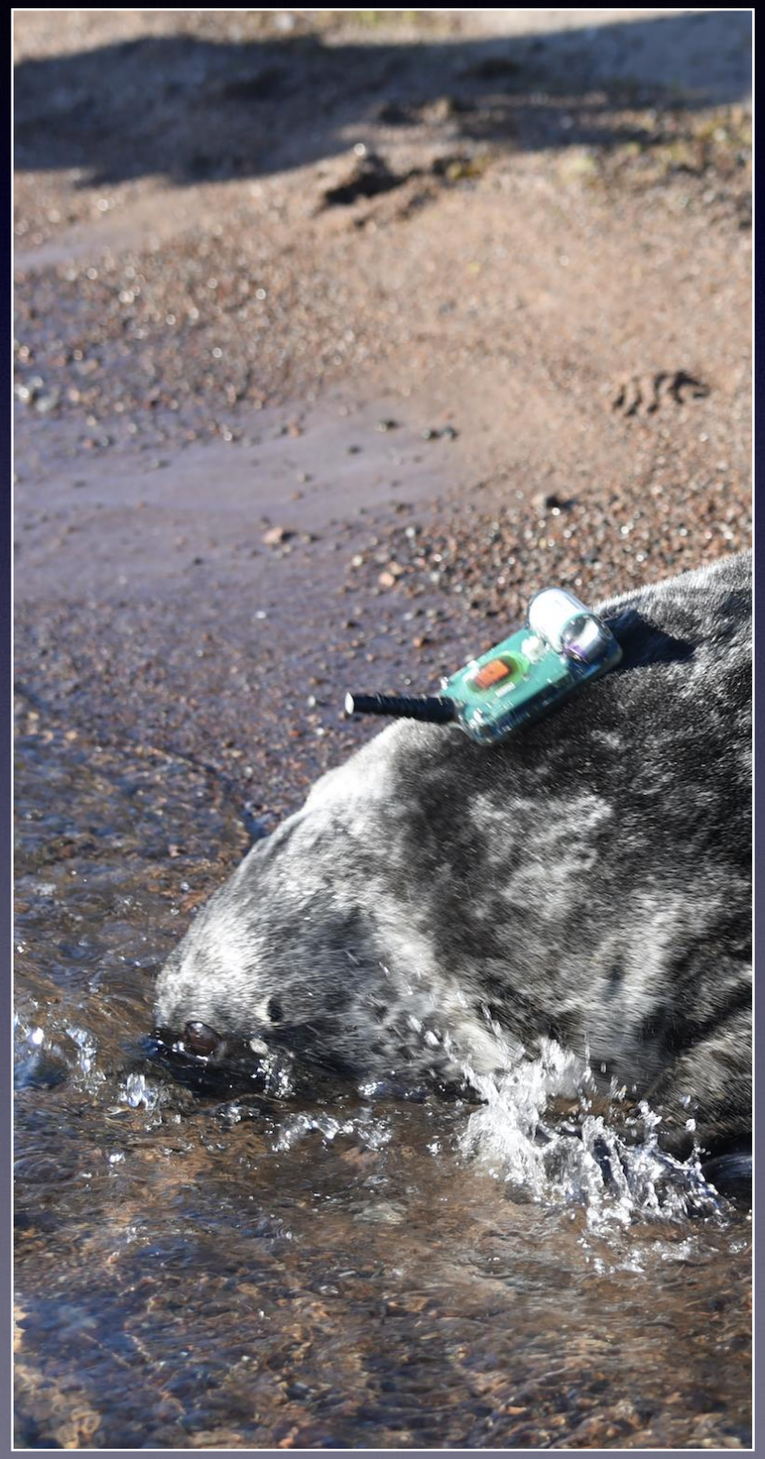


The 2017-2019 telemetry study of ringed seals in the Gulf of Finland

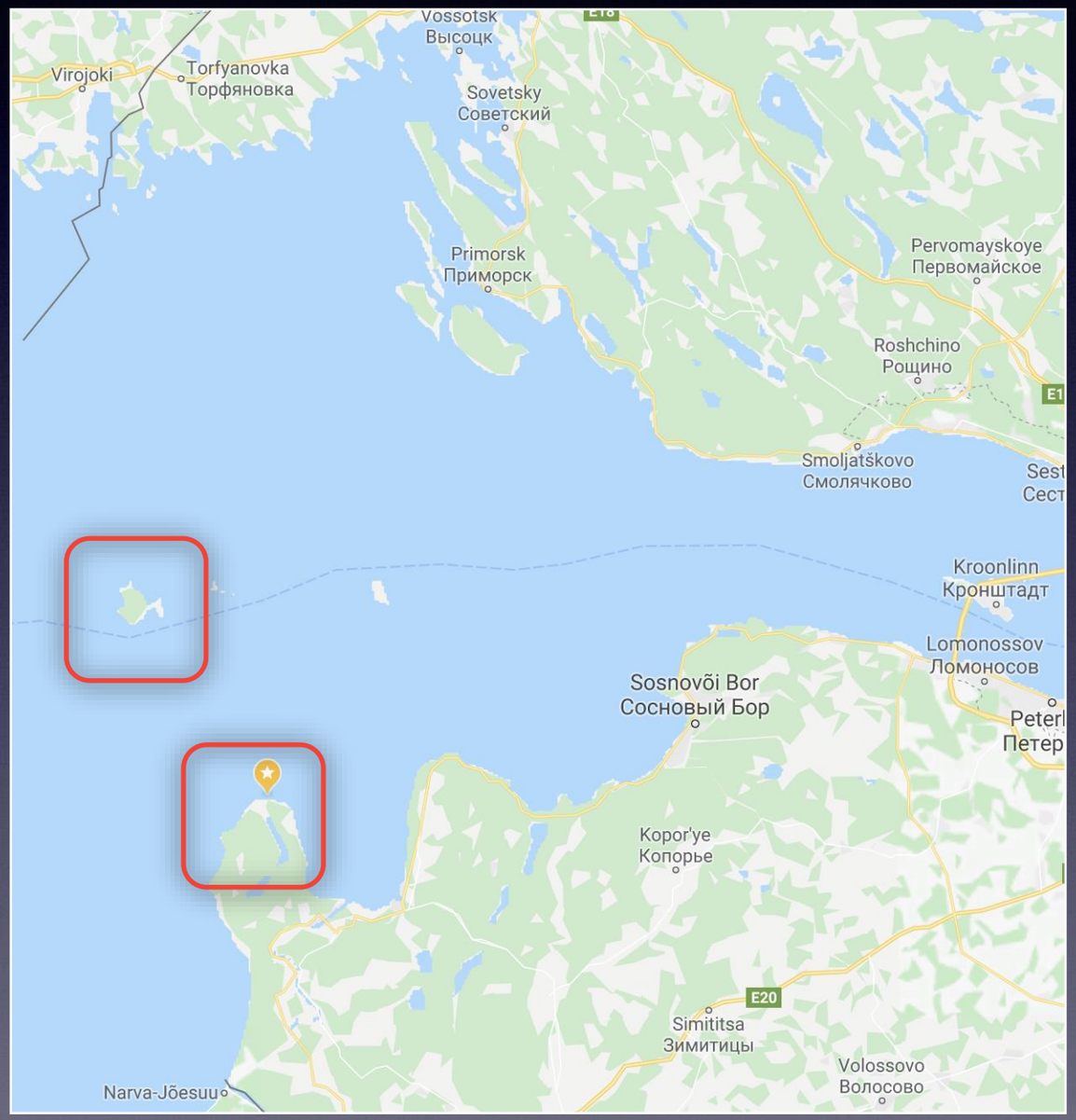
- The existing knowledge from seal counts and distribution studies raised concern: the ringed seals in the GoF are in a **critical condition**

- For interpretation and application of the results **sample size** needed to be increased

- A study with deployment of min. **20 tags over 2-3 seasons** was commenced in 2017



Course of work



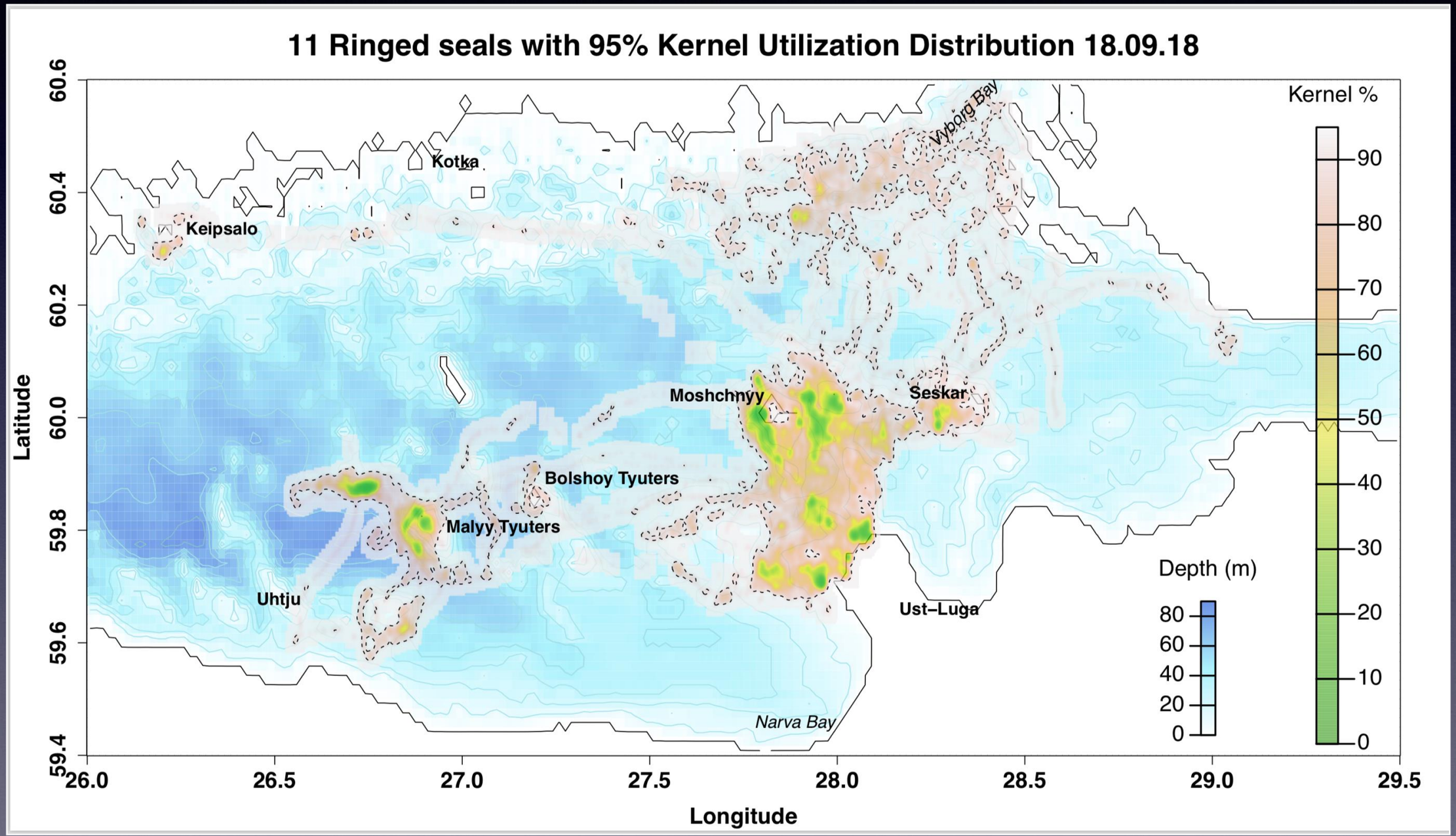
Seals involved in the study

2017

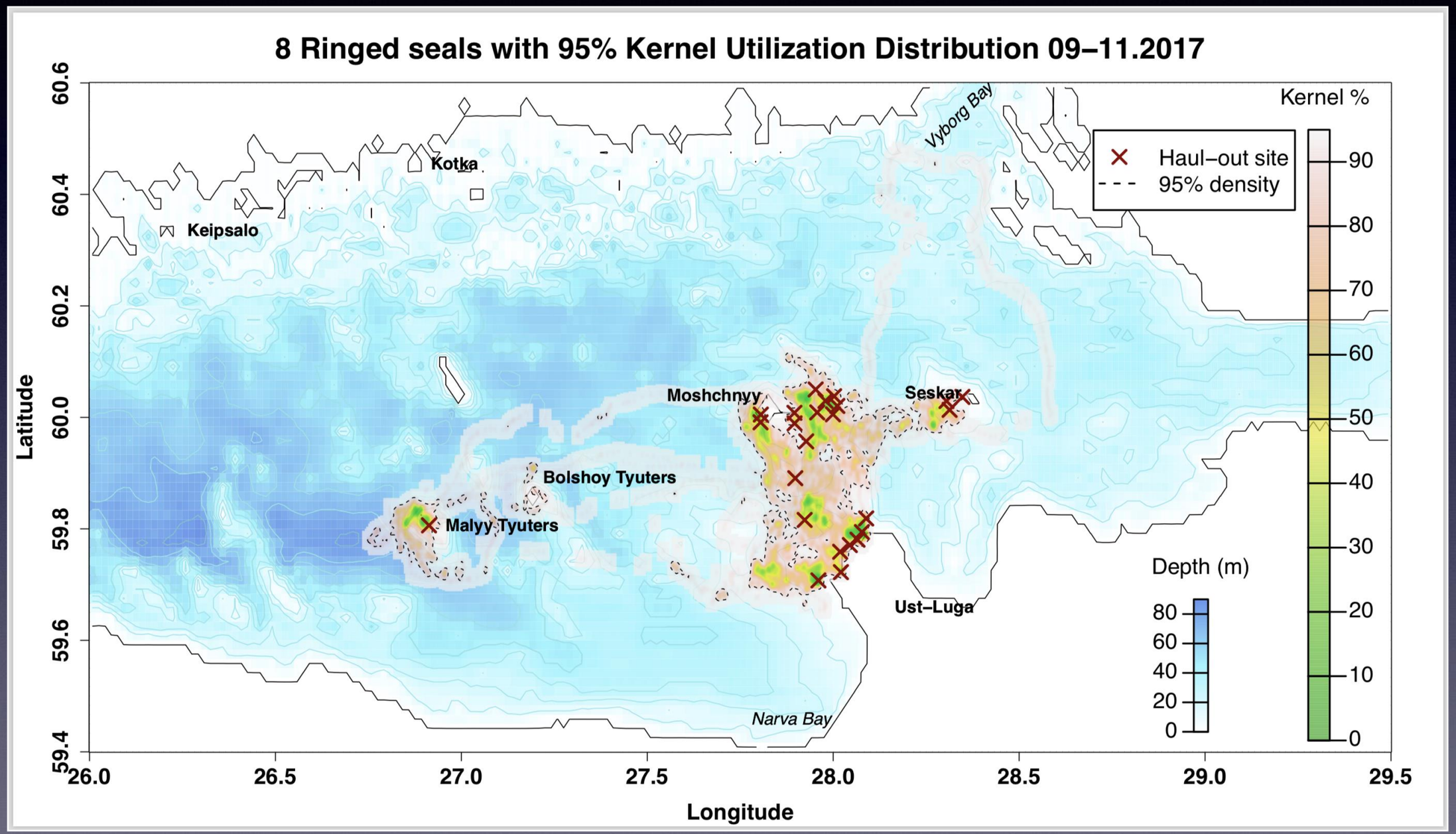
Ref	Release site	Sex	Start of transmission	End of transmission	Age class	Weight kg	Length cm	Girth cm	No. of days tracked	No. of locations	No. of temperatures	No. of dives
hg40-29-13	Kaibalovo	M	13.09.2017	20.03.2018	adult	81	124	130	188	6184	6187	39135
hg40-31-13	Moshchnyy	F	9.09.2017	18.01.2018	adult	56	98	110	131	5997	3175	34592
rs30-01-17	Kaibalovo	M	24.09.2017	12.11.2017	adult	71	134	116	49	1480	515	7637
rs30-02-17	Moshchnyy	M	20.06.2017	28.08.2017	adult	80	148	131	69	369	251	930
rs30-04-17	Moshchnyy	M	9.09.2017	10.01.2018	adult	63	116	NA	123	4329	1710	13021
rs30-05-17	Kaibalovo	F	29.08.2017	24.11.2017	adult	85	130	125	87	1697	553	12312
rs30-06-17	Kaibalovo	F	24.09.2017	8.01.2018	adult	70	127	120	106	4352	2518	21700
rs30-07-17	Kaibalovo	M	3.09.2017	4.09.2017	adult	84	124	128	1	80	579	3008
rs30-10-17	Kaibalovo	M	8.09.2017	22.11.2017	adult	87	126	126	75	2390	1519	12714

- In 2018 two more female ringed seals were marked in Moshnyi, **increasing the current sample to 11** and balancing the sex ratio of the sample 6:5 (M:F)

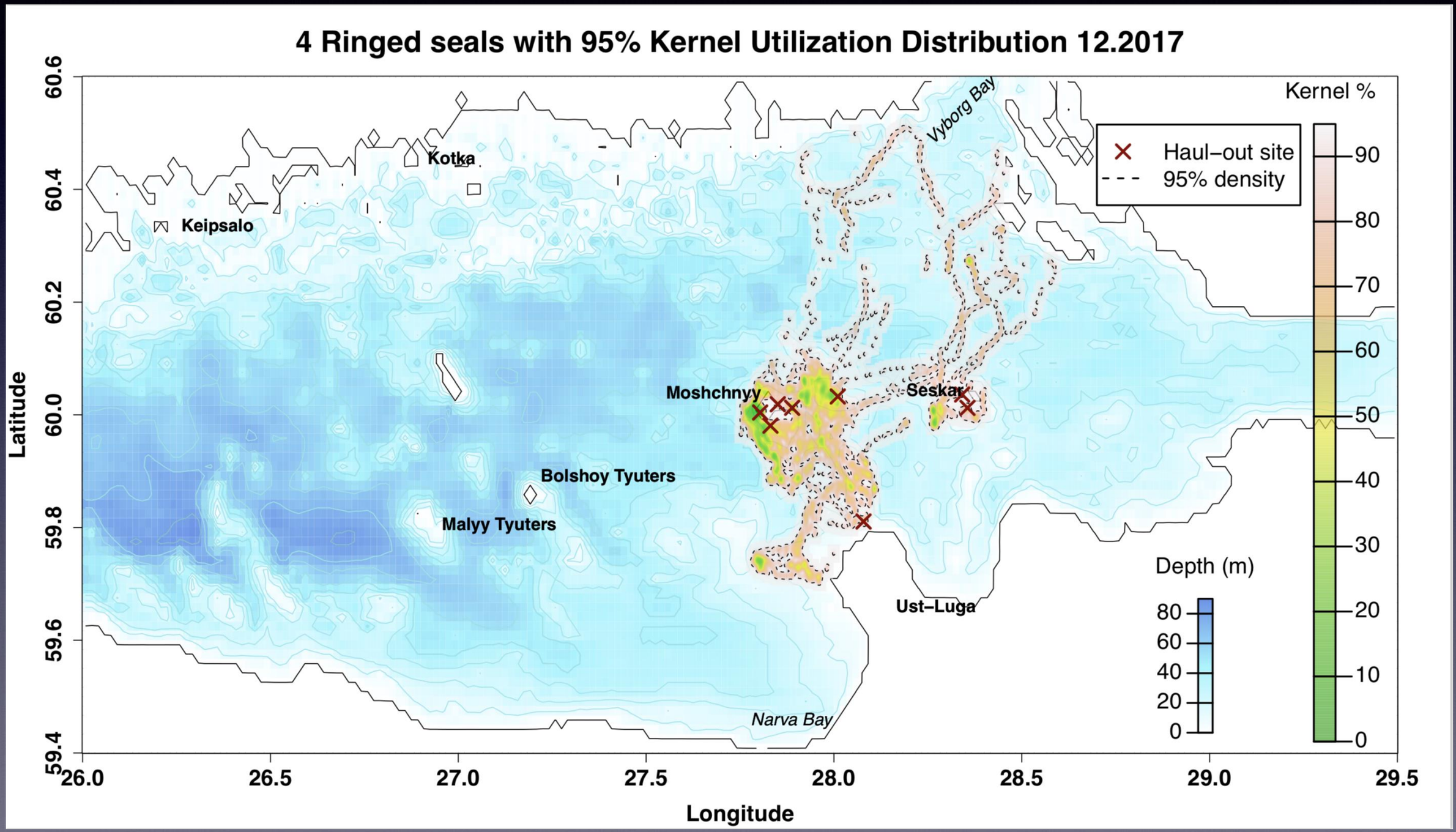
Sea area use by the marked seals in 2017-2018



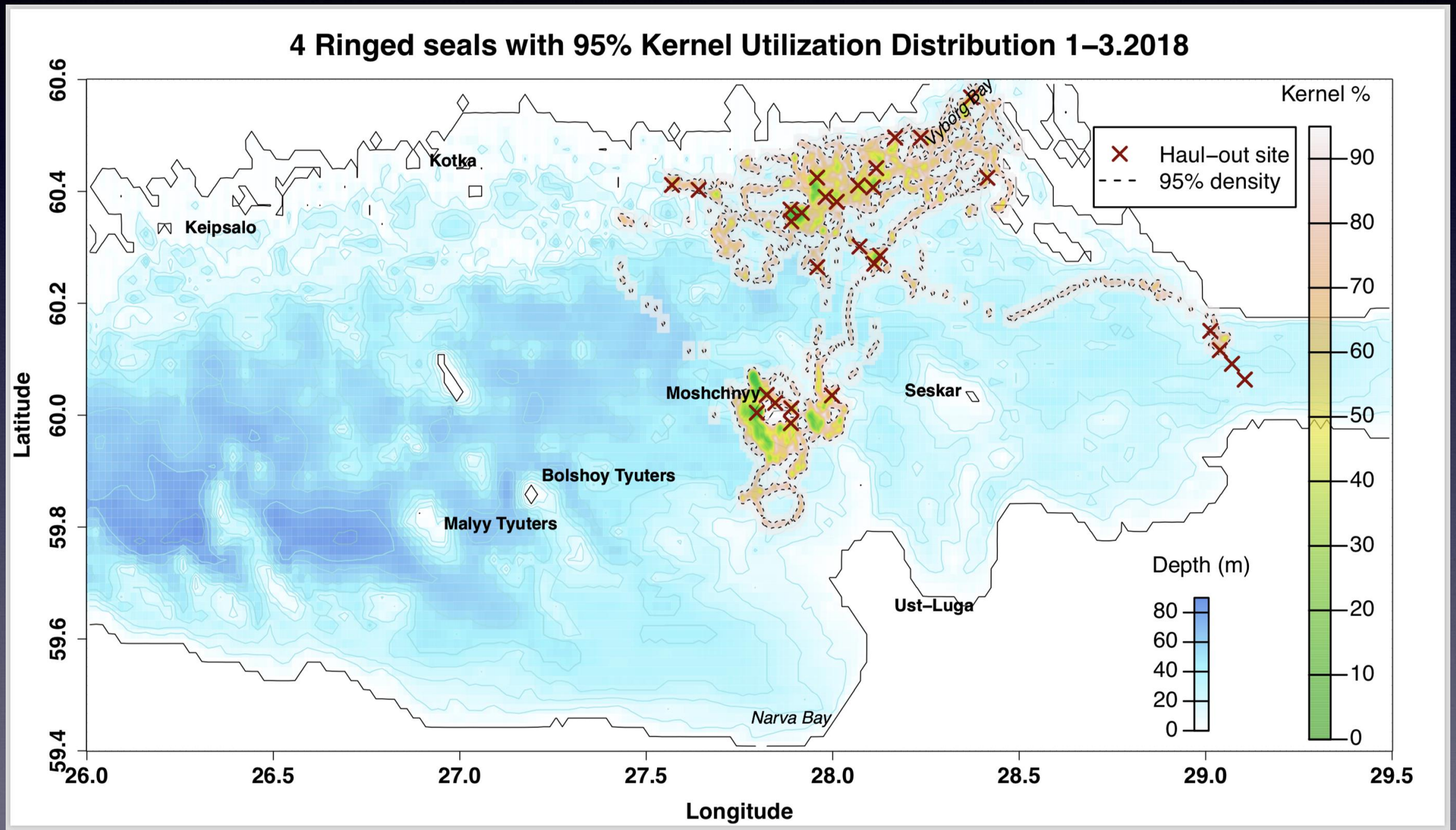
Autumn (feeding)



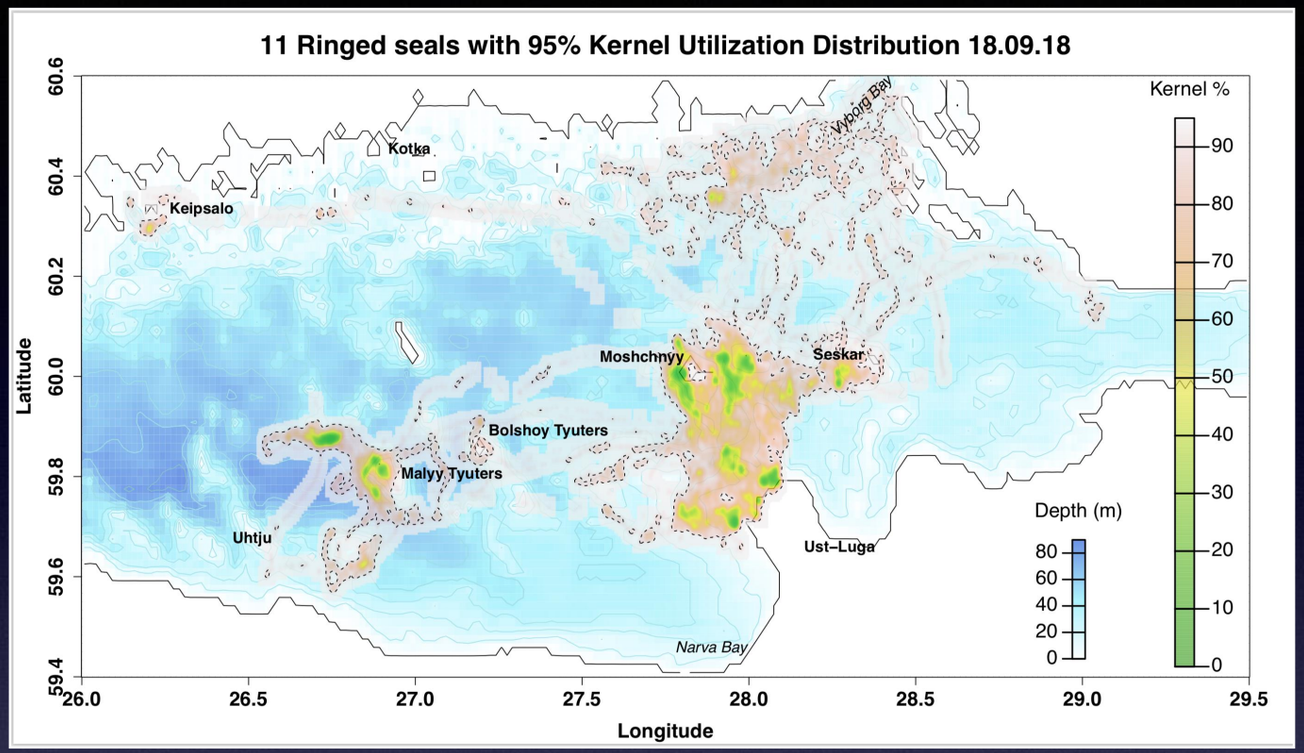
Winter (energy maintenance)

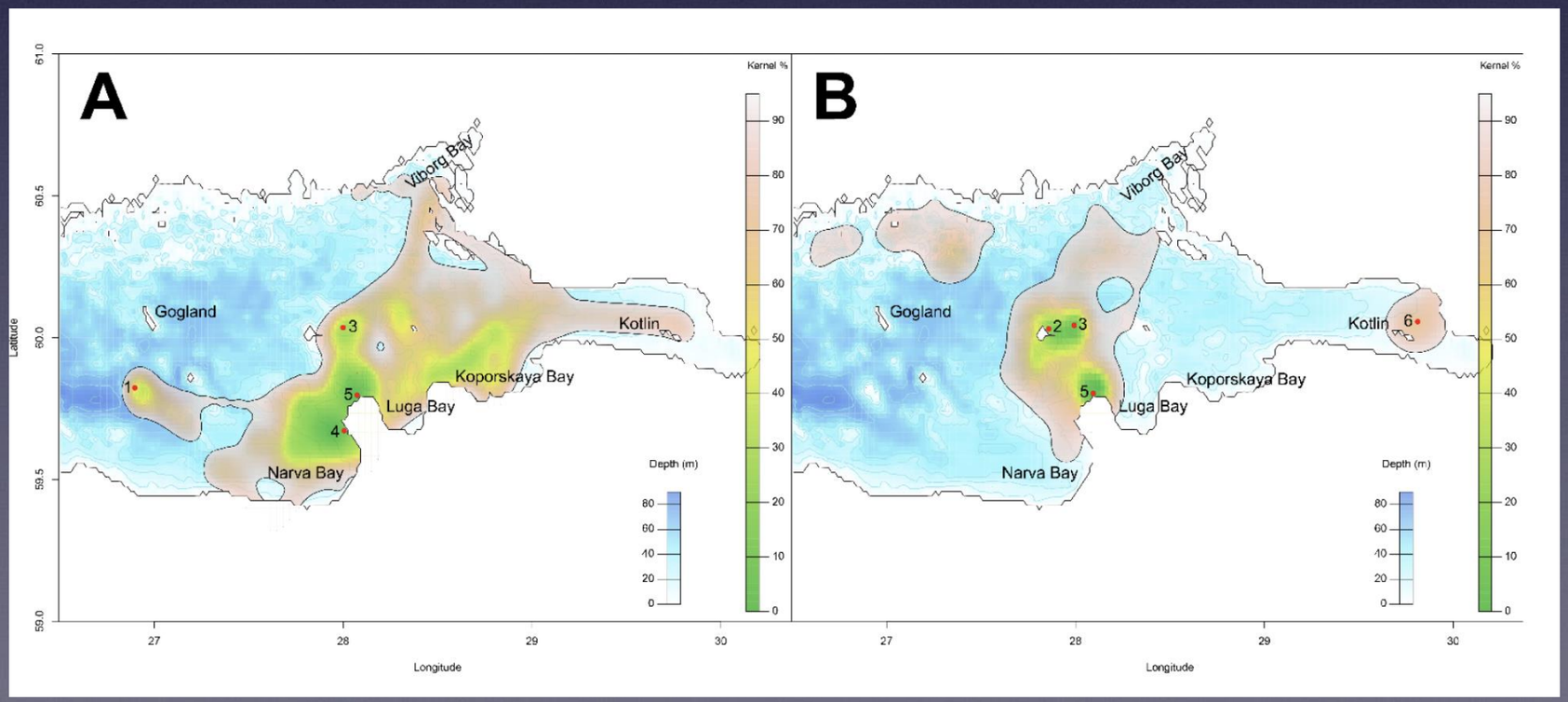


Winter/Spring (breeding)

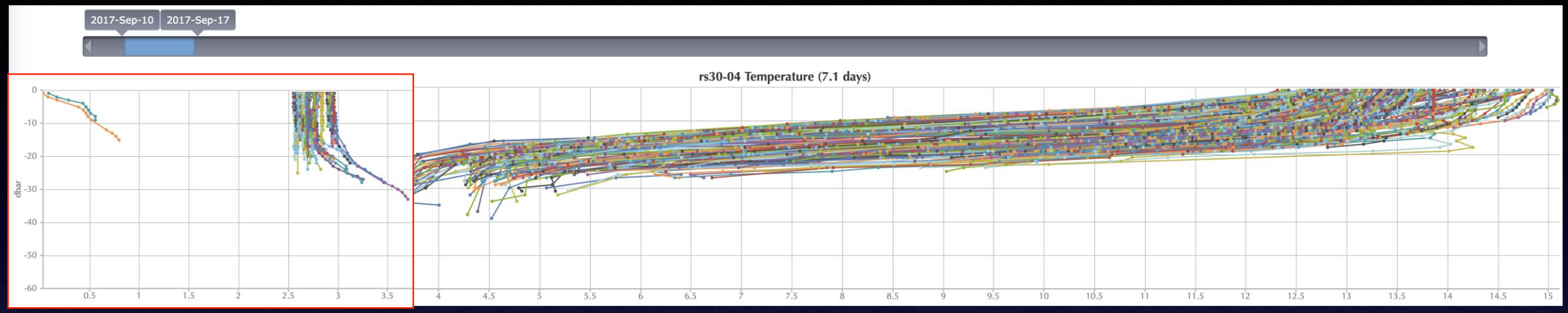


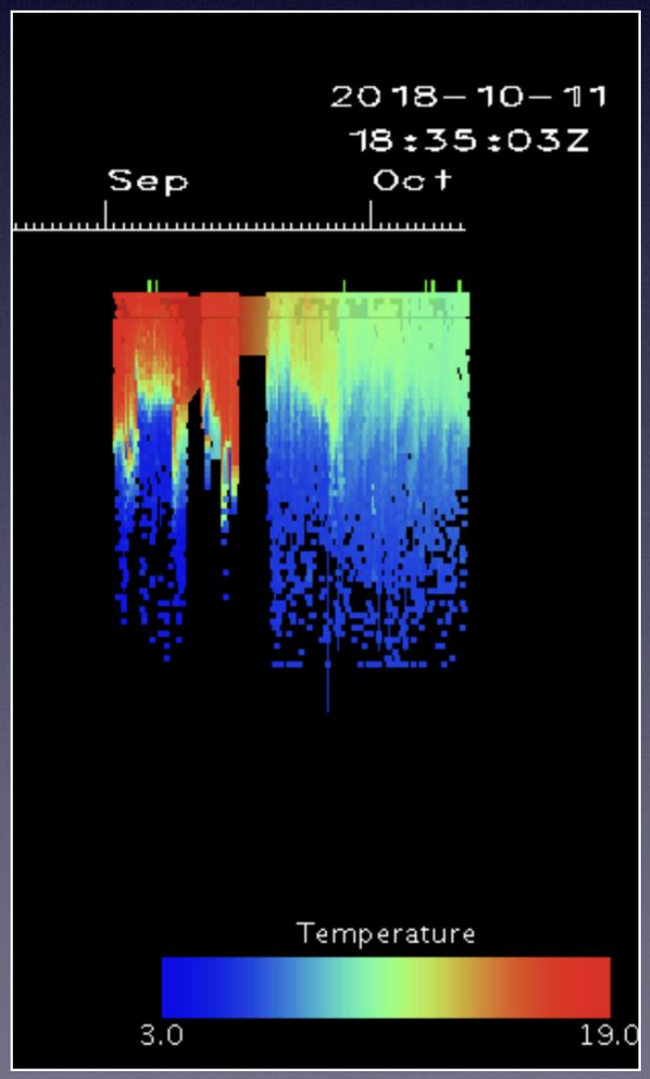
Comparison of the tree studies



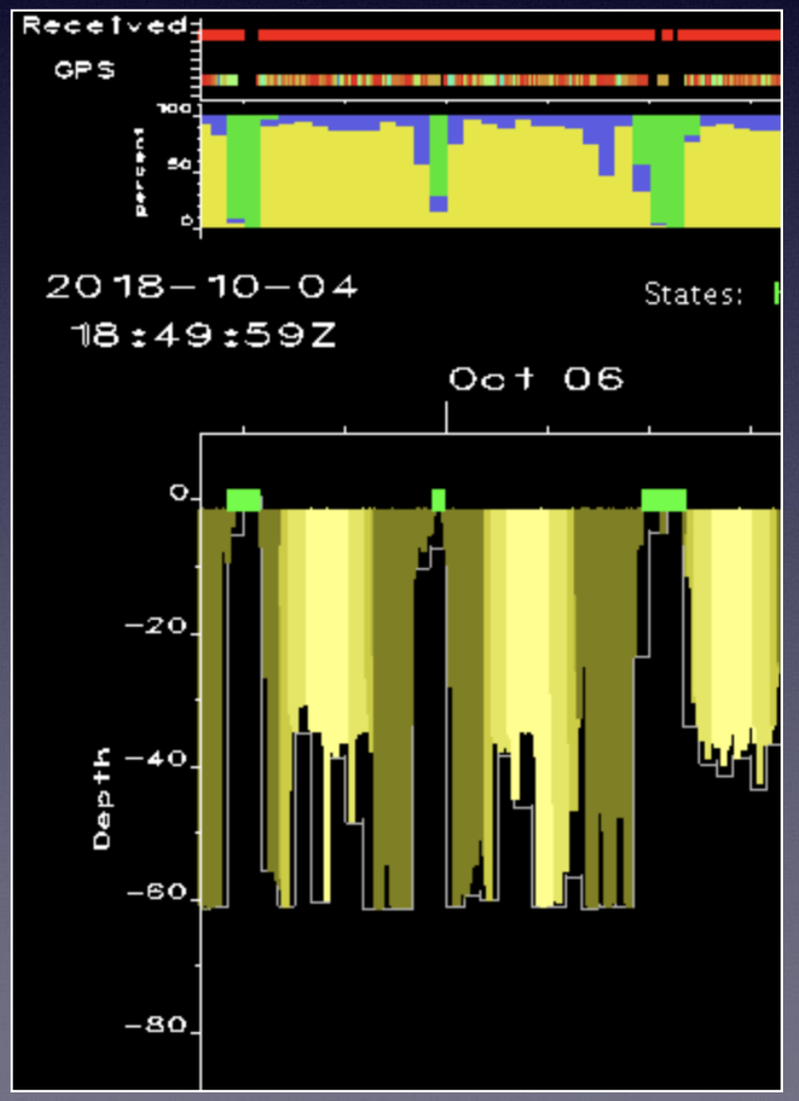


Dive and temperature data



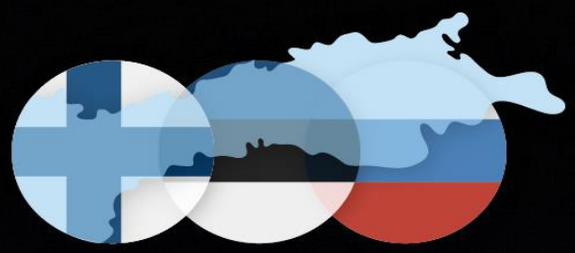


Tens of thousands of dives and temperature profiles over years can be used in other studies of the Gulf



Conclusions

- The seals stay in the Eastern part of the Gulf (East of 26º E), there is no registered immigration
- The core distribution is related to Kurgalskii/Moshnyy reef complex with satellite areas near Malyi Tyuters, seals breed in the NE part of the Gulf
- Underwarter slopes, reefs and channels are used for foraging
- As sentinel species the seal telemetry can be used in other contexts like pollution, climate change, Marine Spatial Planning and anthropogenic pressure factor detection



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The field work was carried out by Mart Jüssi, Mikhail Verevkin, Vyacheslav Alexeev, Elena Andrievskaya, Andrey Bublichenko, Ivar Jüssi, Maxim Kuznetsov, Andrey Kuznetsov, Sergey Pechenev, Tatiana Verevkina. Data analysis is performed by Martin Silts

Thank You!

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