Cormorants and coastal fish

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Freshwater – biologist

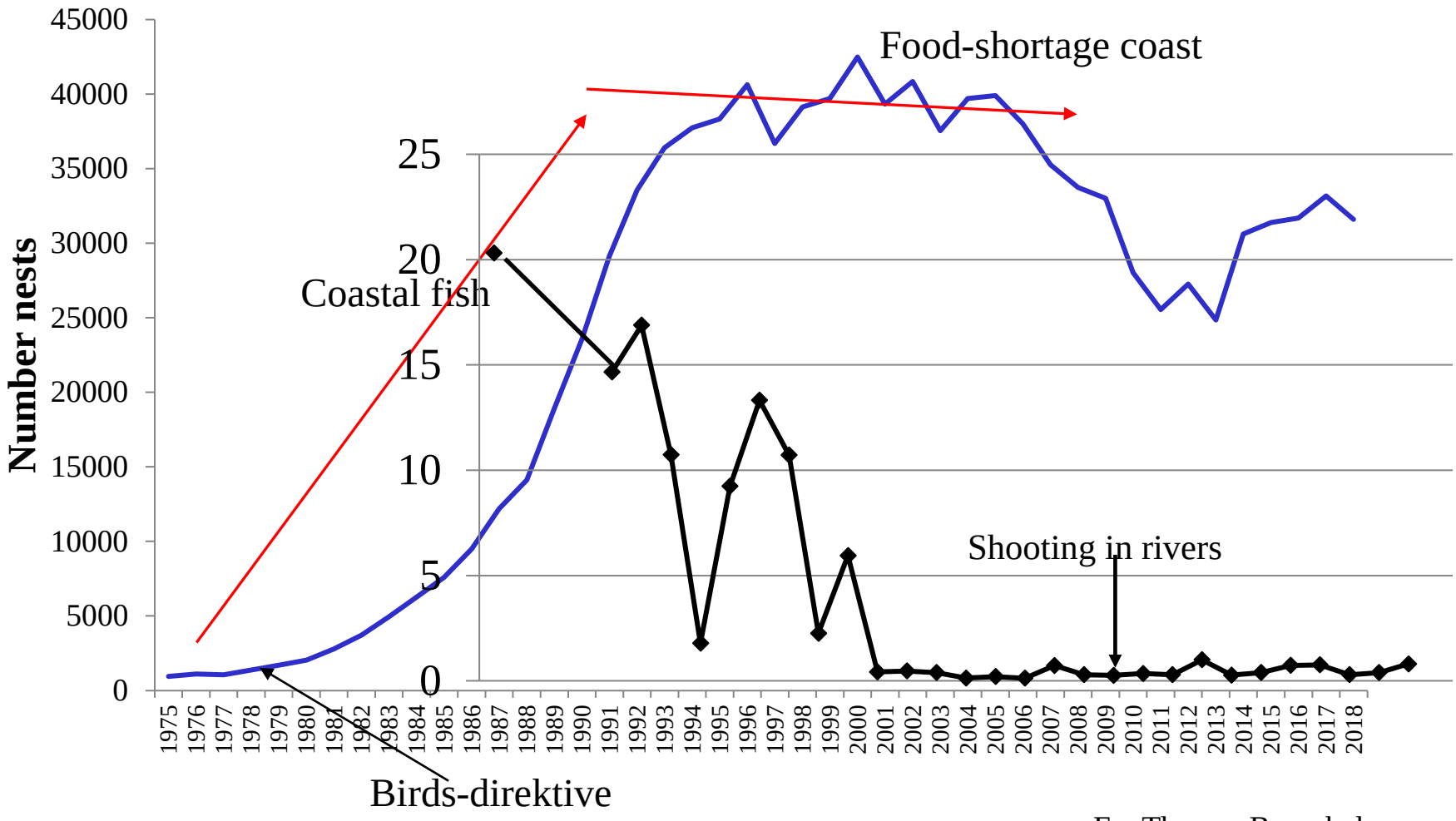
Most studies on salmon- and sea trout smolts

Resident river fish – grayling and brown trout

The Danish coastal fish stocks are at a historical low

Focus is beginning to change from fisheries to predation

Danish cormorant population (number of nests) 1975-2018



Fra Thomas Bregnbale

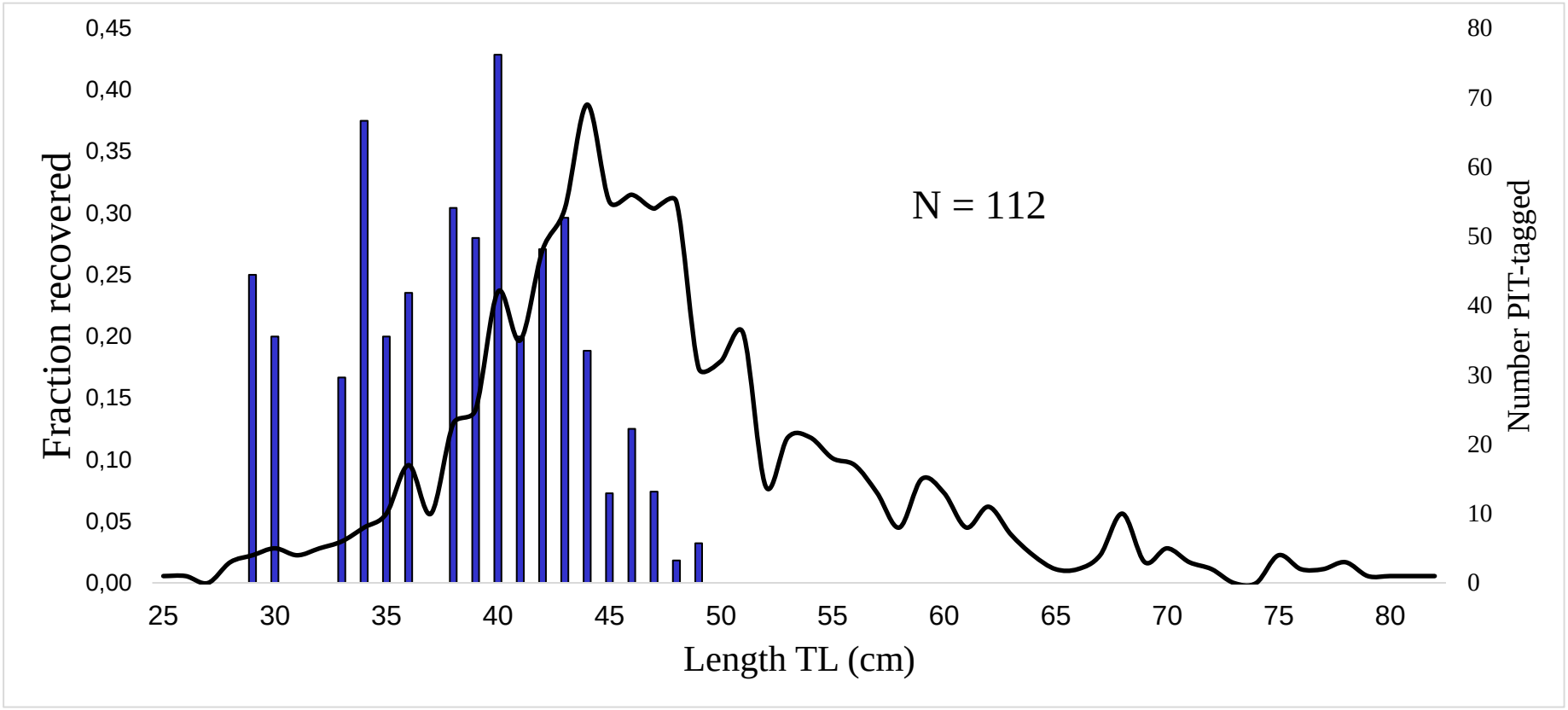
Smolt predation by cormorants *from Jepsen et al. (2019)*

Year	Number tagged	Species	Mortality by cormorants (%)	Method	Source
1997	50	Wild trout	55	Radio-telemetry	Dieprink et al. 2001
1997	50	Hatchery trout	67	Radio-telemetry	Dieprink et al. 2001
2000	17	Wild trout	24	Radio-telemetry	Dieprink et al. 2002
2000	51	Wild salmon	48	Radio-telemetry	Dieprink et al. 2002
2002	51	Salmon (mix)	40	Radio-telemetry	Baktoft 2003
2001					
2003	64,500	Hatchery salmon	23	CW-tagging	Jepsen et al 2010
2003	-	Salmon (mix)	> 60*	Pellet analyses	Sonnesen 2007
2005	10,000	Hatchery salmon	31	CW-tagging	Jepsen et al 2010
2005	58	Salmon (mix)	53**	Acoustic telemetry	Koed 2006
2005	42	Trout (mix)	88**	Acoustic telemetry	Koed 2006
2008	4363	Wild trout	45***	PIT-tagging	Jepsen et al. 2014
2008	5009	Wild trout	42***	PIT-tagging	Jepsen et al. 2014
2010	5900	Hatchery trout	72***	PIT-tagging	Thomsen 2013
2014	1400	Wild trout	22***	PIT-tagging	Jepsen et al. 2014
2016	74	Salmon (mix)	42	Radio-telemetry	Unpublished
Mean			**47**		

47% fewer smolts = 47% fewer salmon coming back!

Adult sea trout

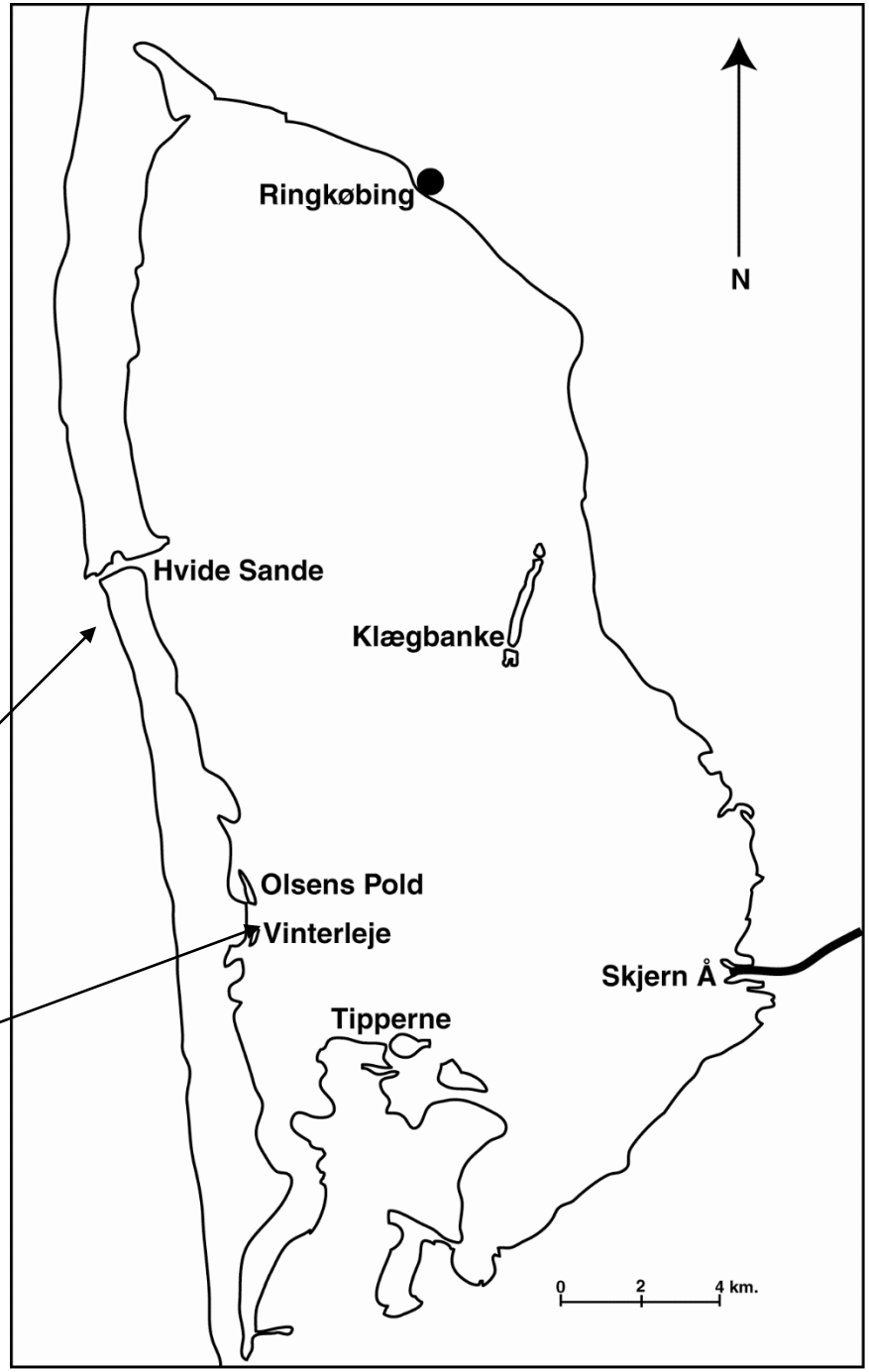
Villestrup River 2015, 810 adult sea-trout PIT-tagged



Based on tag recovery, cormorants ate ap. 40% of Sea trout under 50 cm *(Kallö et al. 2023)*

Coastal species

2002-2005



Depth: 0 - 10 m

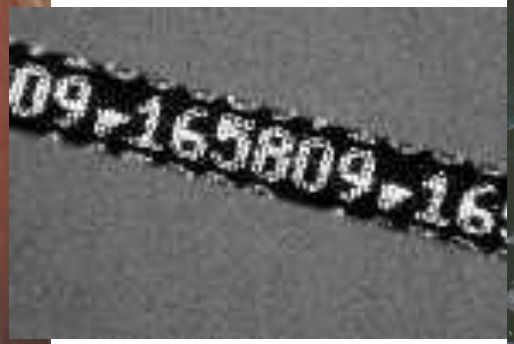
Area: 300 km ^{2}

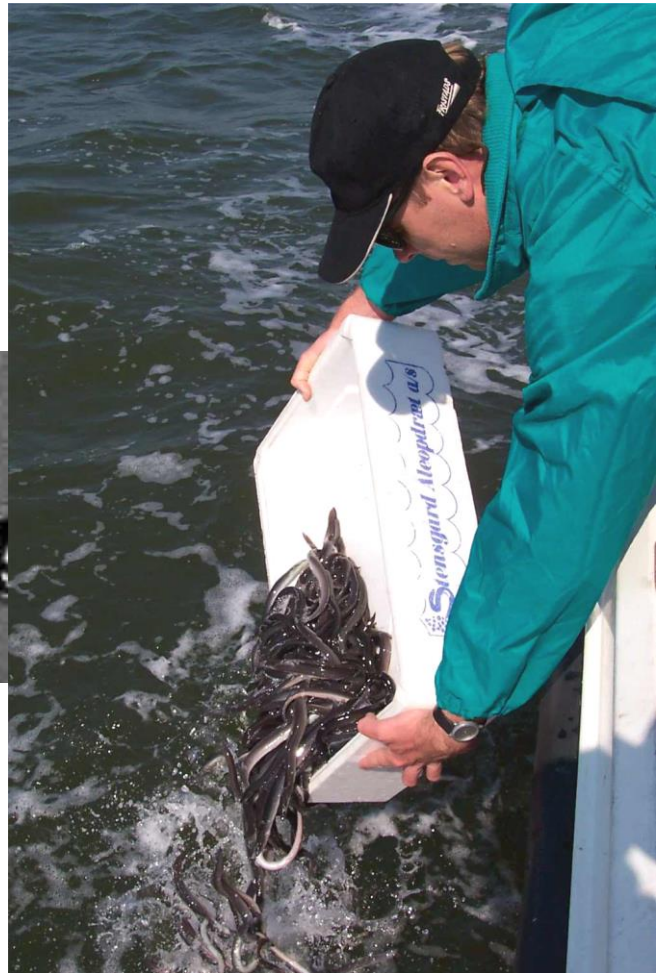
Salinity: 5-25 ppm

Sluise

+2000 nests

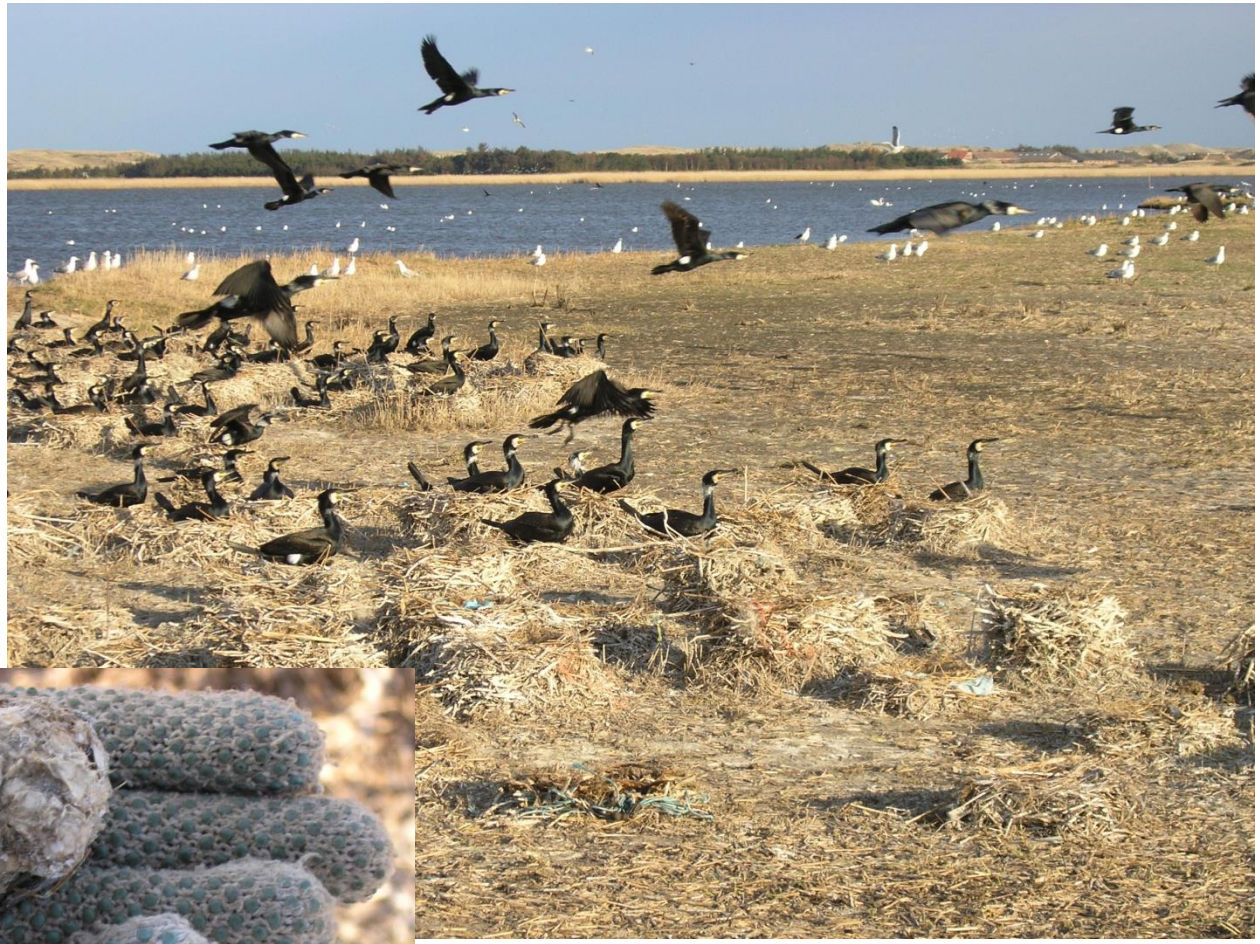
Skjern Å



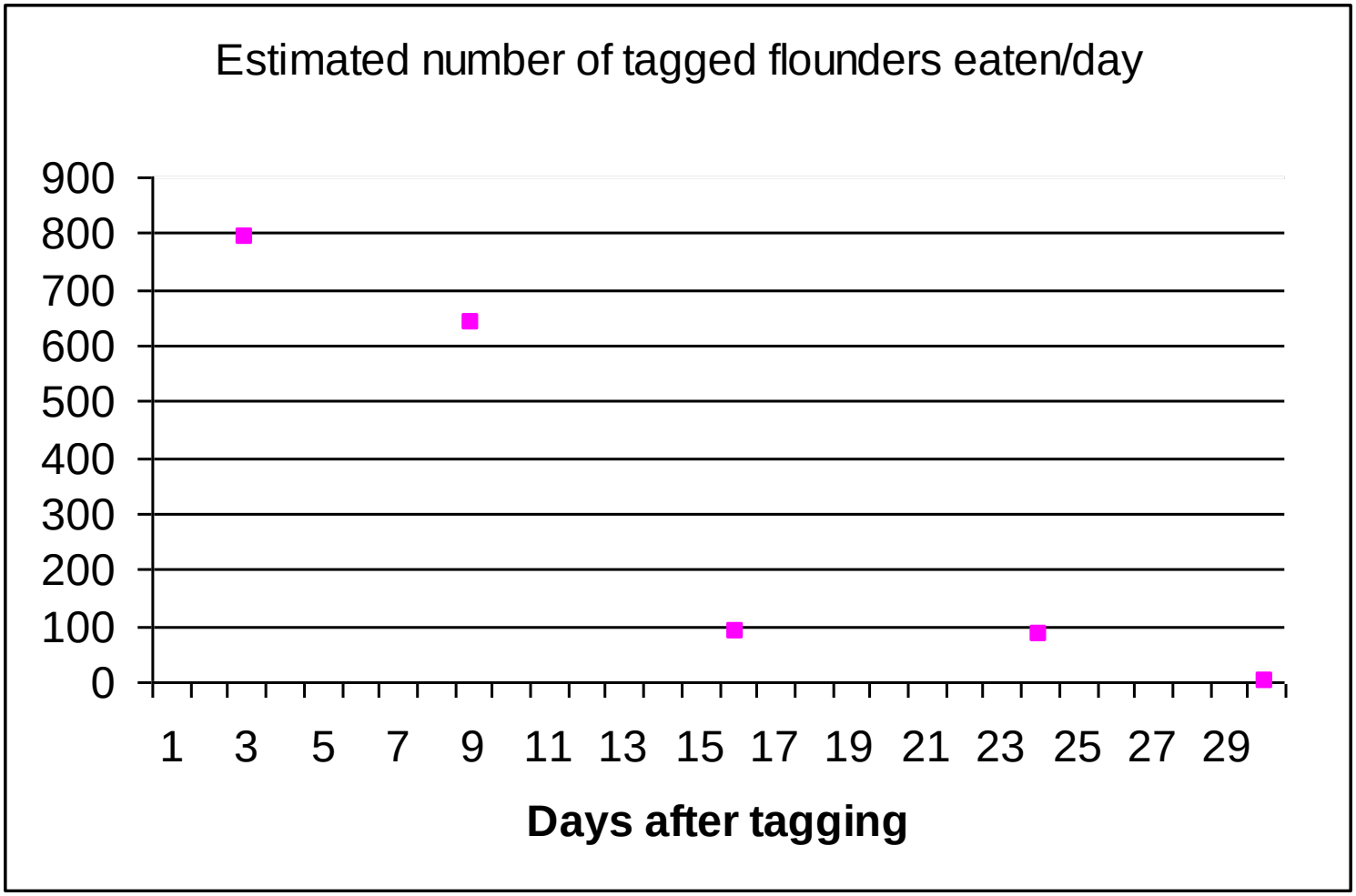


10.000 small eels cw-tagged and released

4000 wild flounders (7 – 20 cm) were CW-tagged in 2004
65.000 1-year salmon were cw-tagged and released in Skjern Å

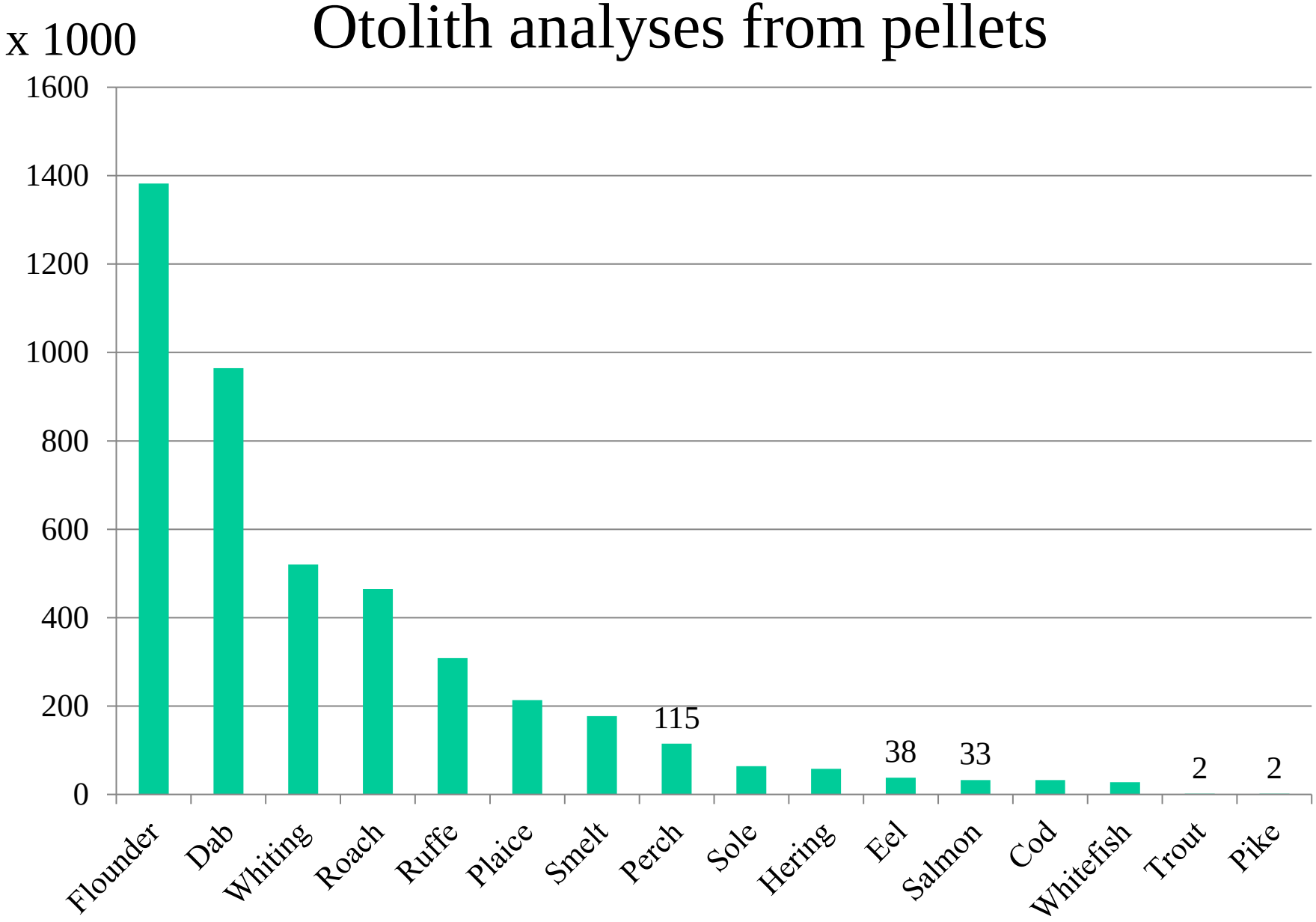


Intensive gylp indsamlinger i kolonien



Estimated daily predation of 4000 tagged flounder
Based on recovery of cw-tags from pellets.

Otolith analyses from pellets



Results from Ringkøbing Fjord 2000 – 2004

Telemetry (2000, 2002): Salmon smolts, 40 – 50 % of tags were recovered from one colony.

CW-tagging (2003, 2004): 40 – 50 % of tagged eel were eaten in one year. All (100%) of tagged flounders eaten in 15 days

Pellet analyses (2003, 2004): 30,000 salmon smolts, 1.4 million flounders, 38,000 eel were eaten annually.

Jepsen et al. 2010

Reduction in flounder survival in the vicinity of a cormorant colony

Undersøgelse af sammenhængen mellem udviklingen af skarvkolonien ved Toftesø og forekomsten af fladfiskeyngel i Ålborg Bugt.

Januar 2008

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What happens in the Baltic?

1987

2020

Western Baltic Cod Case

Based on:

- The number of cormorants present in the area
- Information on the time the birds forage in the area
- Information on the proportion of cod in the diet (2 studies)
- The size distribution of cod eaten by cormorants

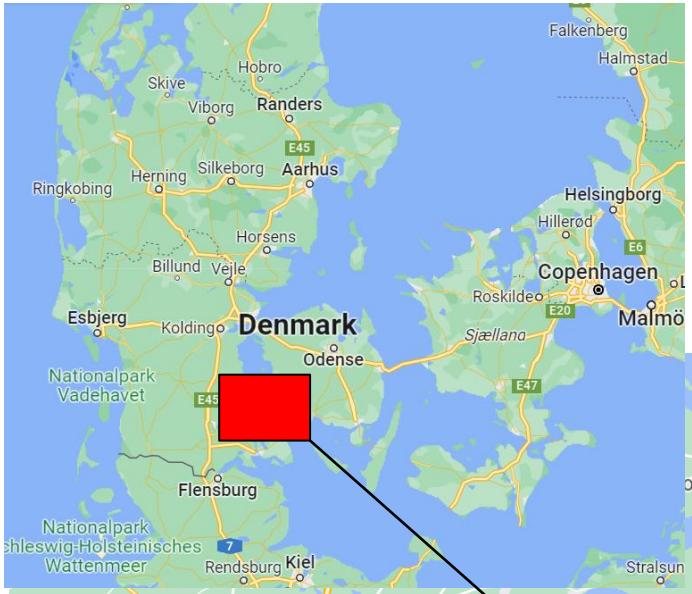
Assuming that 20% of food (weight) is cod, ap. 24 million cod are eaten annually by cormorants in the Danish part.

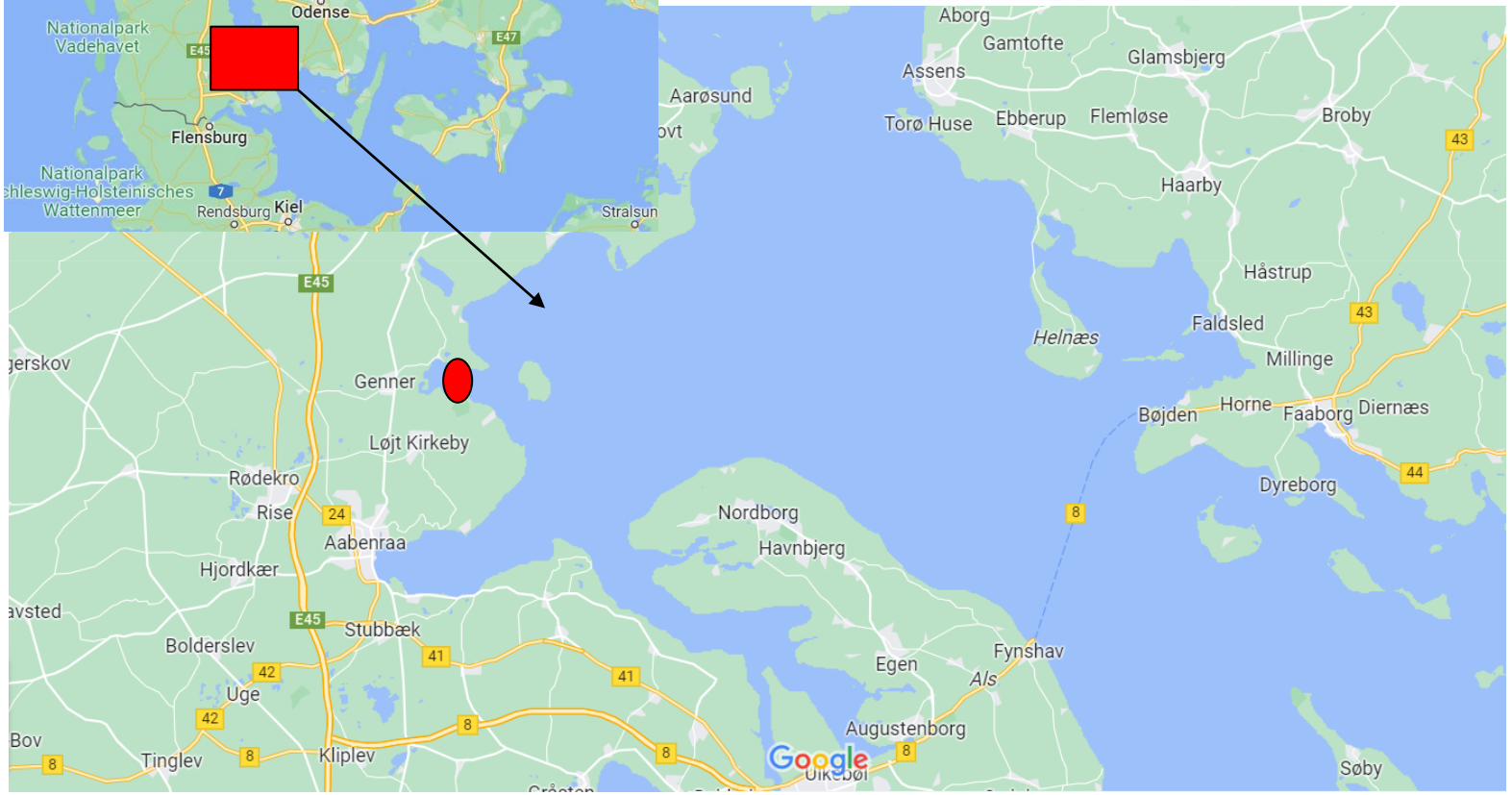
Does that impact the population?
ICES estimate the recruitment of cod in Western Baltic to:
(YoY, 3 last years) *4.1, 10.2 and 17.4 mill cod/year*.

NB: *Loss to birds from Polish, German and Baltic countrys is not included*

Common catch from a pound net

A pilot PIT-tagging study was carried out, cod, eel and flounder.





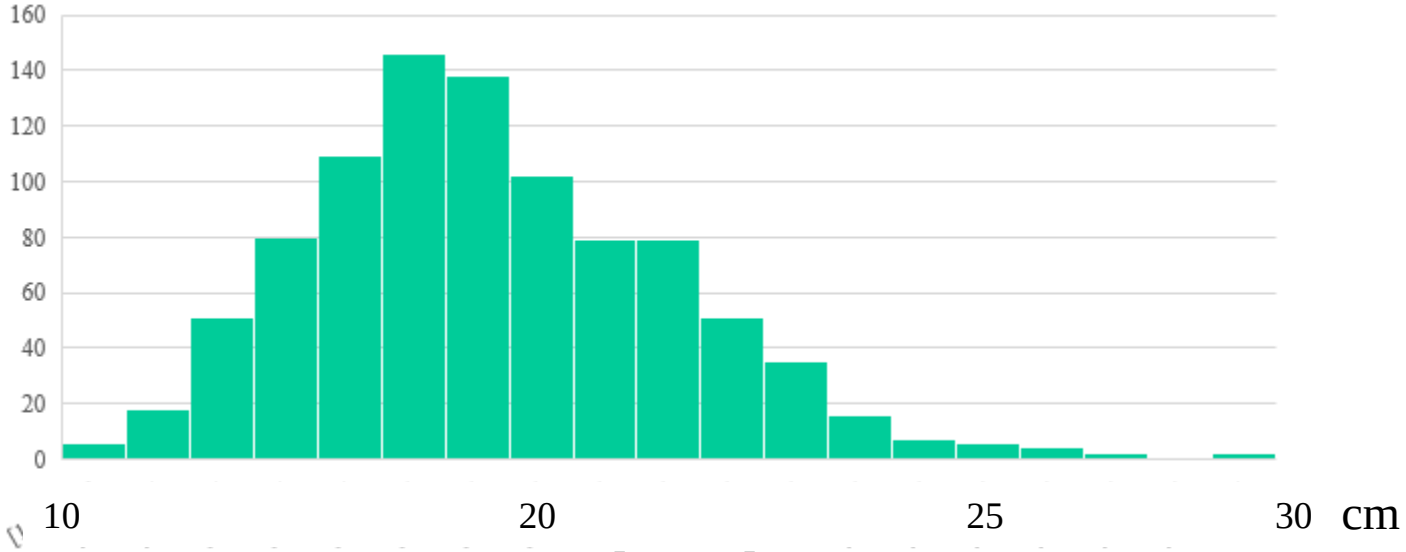
Tagging station at Kalvø

Most fish were tagged here and most were released by Kalvø

PIT-Tagged at Kalvø

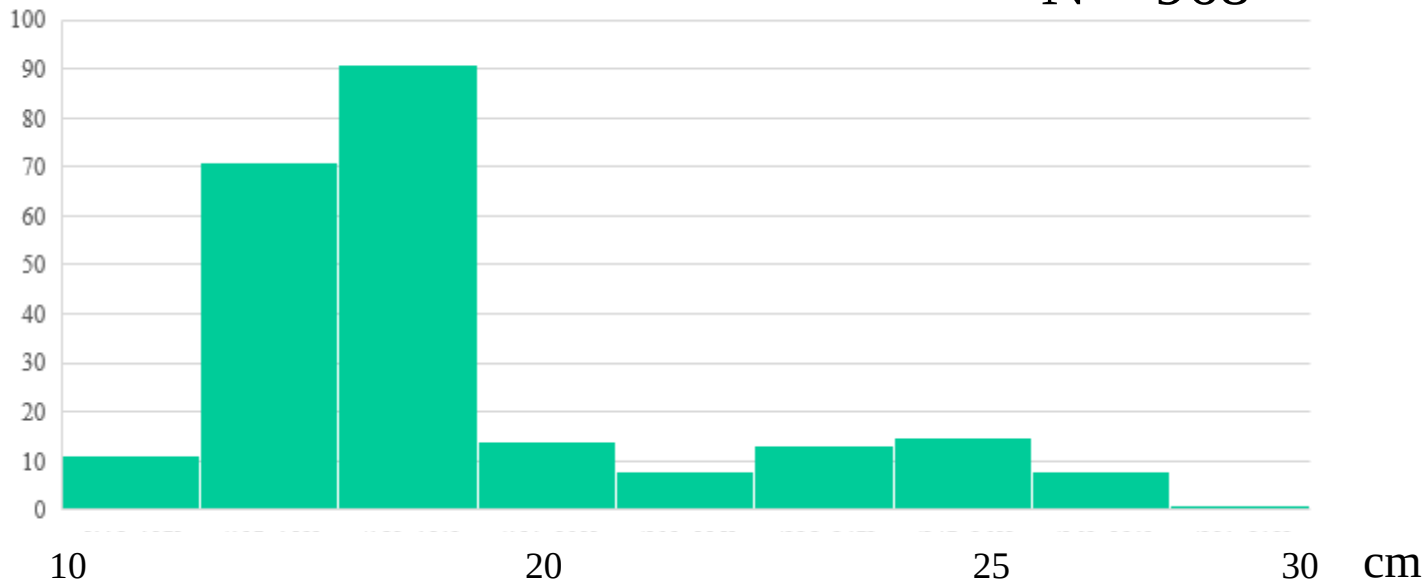
COD

N = 2243



Flounder

N = 968



Scanning is really difficult with a range of only 40-60 cm.

Under ideal conditions, with 23 mm tags, we assume that we can find 40% of the tags from fish eaten by cormorants.

With 14 mm tags and these conditions we may be at 25%

Over 2200 small cod and almost 1000 small flounders tagged with 14-mm and 23 mm PIT tags and released in South Little Belt

Scanning of a nearby colony recovered 798 tags, so far

We have found 26% of all cod-tags and 23% of flounder-tags

The recovered tags equals a predation of 65% of the cod and 58 % of the flounders in the period since tagging (7-11 months), when we use the ”normal” probability of deposit x scann efficiency = 0.4.
In this case we may likely have to use lower than 0.4, due to low scanning efficiency.

Conclusion:

Documented impact on migrating salmonids
Documented impact on flounders
Documented impact on eels
Potential high impact on cod.

A new 3-year study (PhD) is underway to better model the overall impact of cormorants and seals in cooperation with DE/Potsdam.

Thank you

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