Cormorants and fish populations

Documentation of effects and management options

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DTU Aqua
National Institute of Aquatic Resources

EUROFISH meeting, Tallinn, June 2025

Main points:

1. Short overview of the development of the cormorant conflict

2. Predation studies; rivers, coast – what have we learned?

3. Management of the cormorant- fisheries conflict in EU-general.

LANDESFISCHEREIVERBAND BAYERN E.V.

Kormoran und Fischbestand– eine unendliche Geschichte?

Oktober 2009

EU-Parliament cormorant hearing October 2018

Short facts

Adult cormorants eat 300 – 600 gram fish per day

Cormorants eat almost any species of fish in sizes 5-50 cm

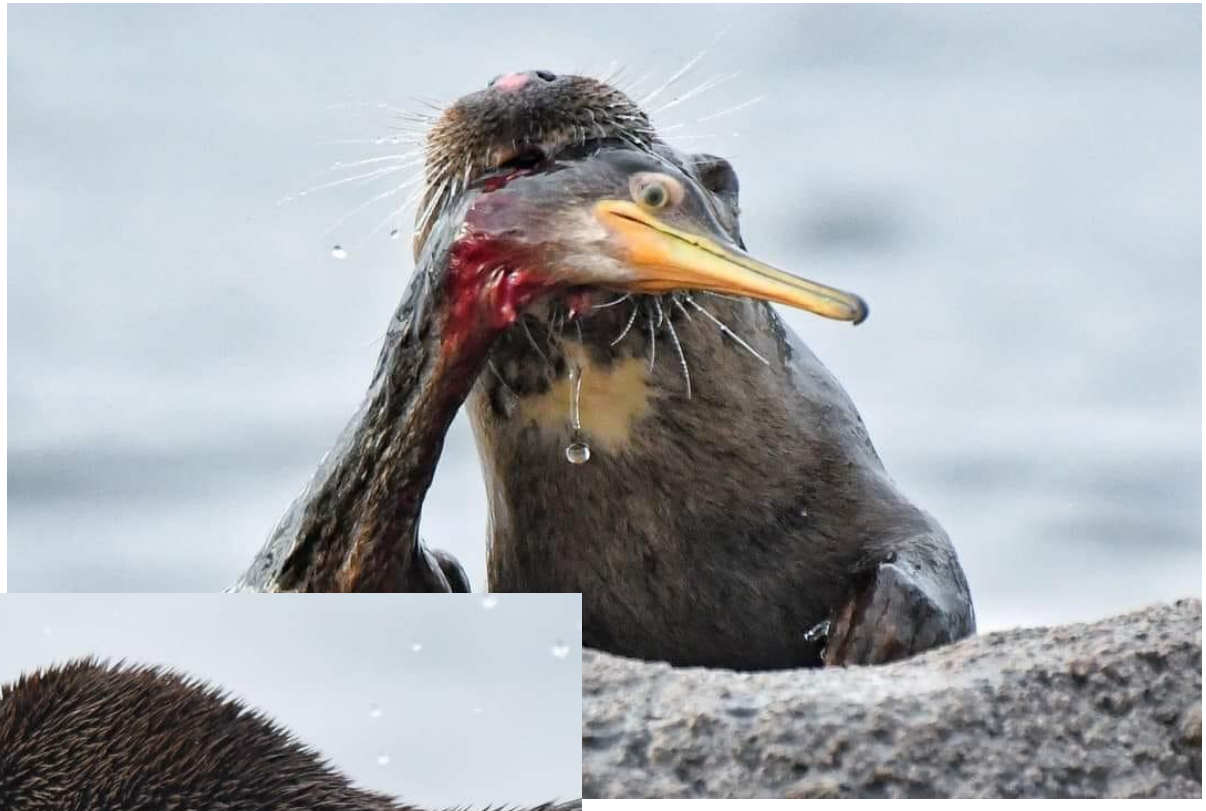
Breed in (large) colonies, before in trees, now also on ground

Can hunt fish in almost all habitats from 5cm – 30 m depth

Nesting birds fly up to 30 km from the colony to forage

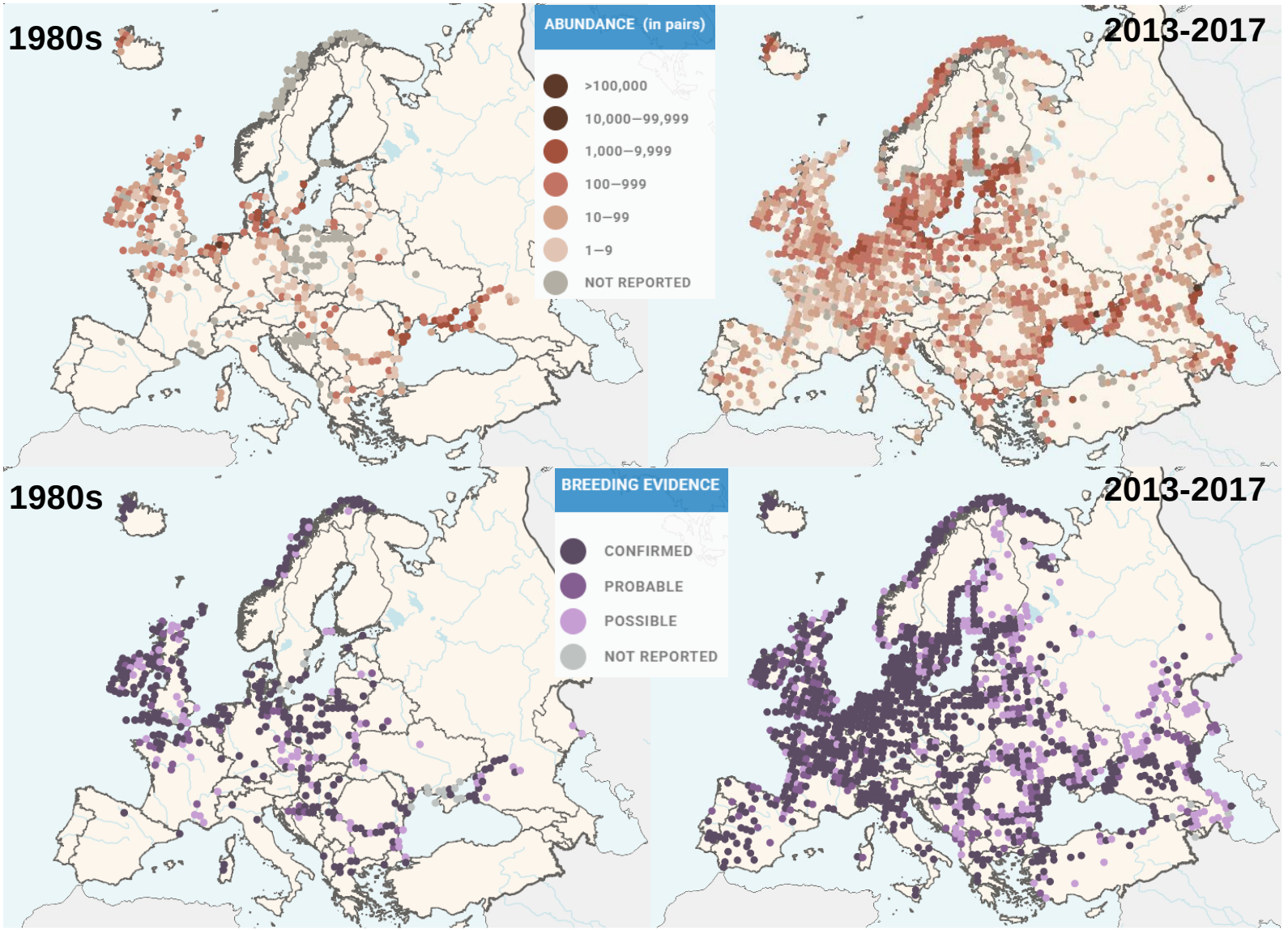
Natural enemies: Martins, fox, sea-eagles, otters

Cormorants cause conflicts all over EU, but very little research is done

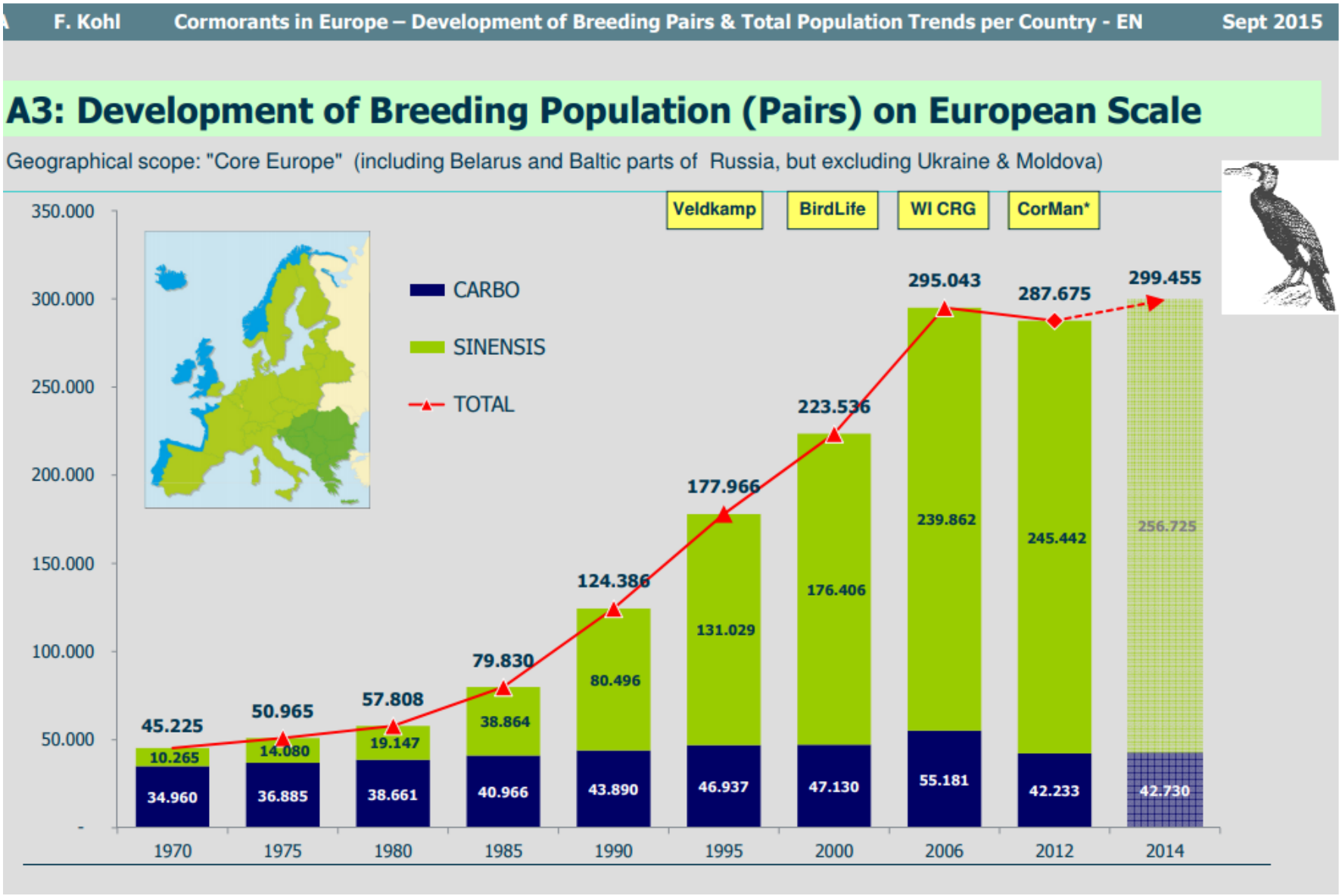


Conflict

Development of the western palearctic cormorant population



Population development



More than 1 million birds in Europe – *new data, but not available*

Conflict

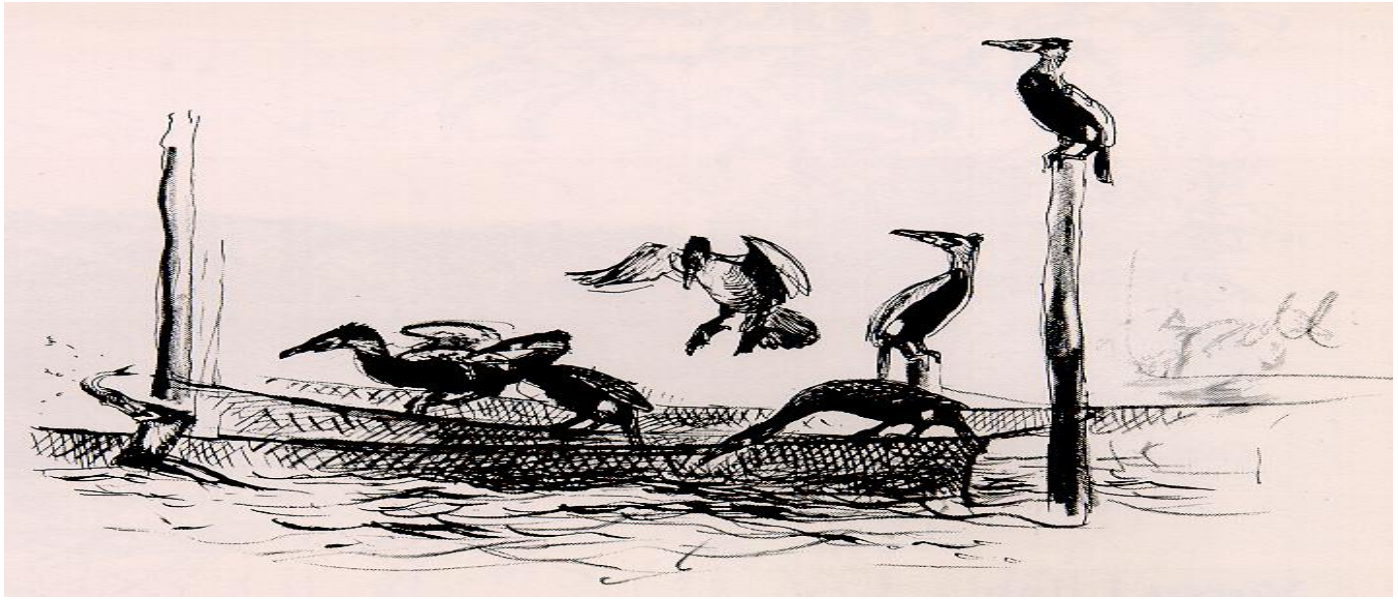
Hot-spots

Baltic area: Small scale coastal fish/fisheries

Central Europe: River fish being depleted

Central/Eastern EU: Pond aquaculture

North EU/UK: Predation (salmonids) in rivers and estuaries



Documenting the impact of predation:

- Proving things that have happened
- **Lack of fish to study**
- High variation from year to year
- Effect of capture, handling and tagging
- Statistical confidence in estimates

Funding for studies ??

Methods

PIT- Tags (Passive Integrated Transponder)

Acoustic tags

Radio-tags

Coded wire tags

Foto: Allan Guido Nielsen

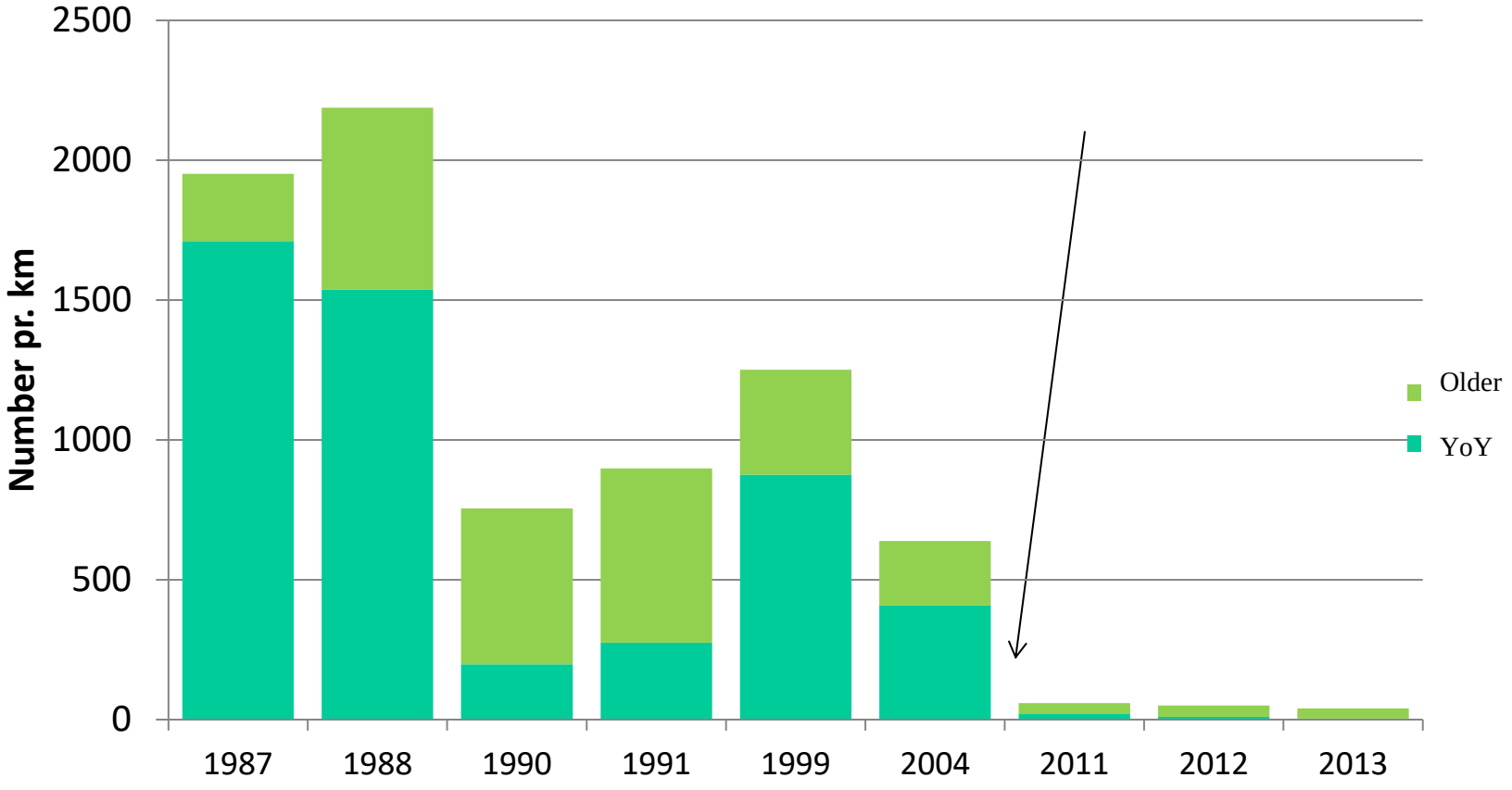
Two cold winters
2009-10
2010-11

Change of behavior

Foto: Michael Holm

Grayling

Grayling



Grayling density in 1,5 km stream.

25 grayling (32-36 cm) were radiotagged in October.

River with very few cormorants

Only two tagged grayling survived

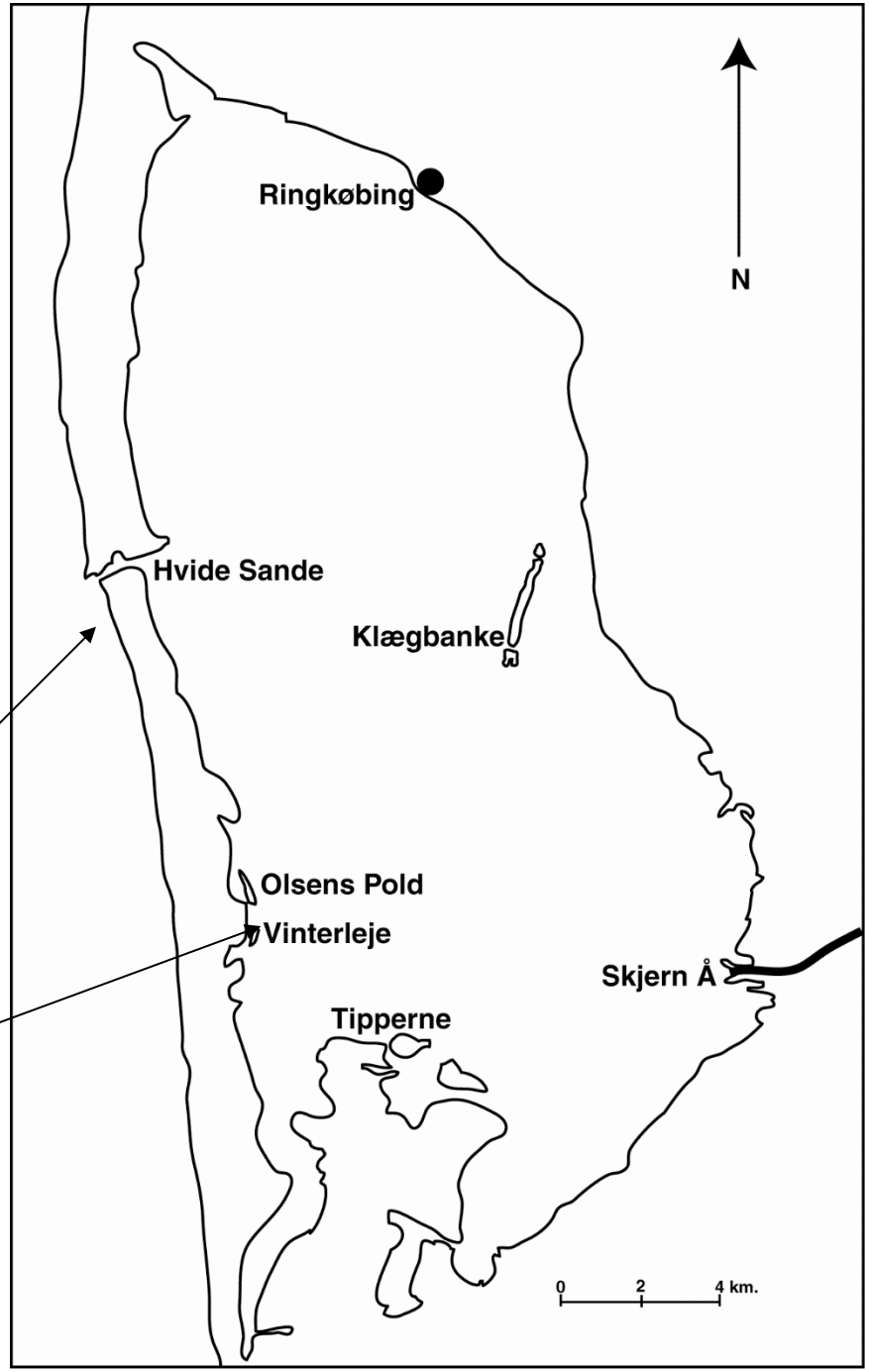
A loss of 80% of total fish biomass was estimated

Jepsen et al. 2018

Coast

Coastal species

2002-2005



Depth: 0 - 10 m

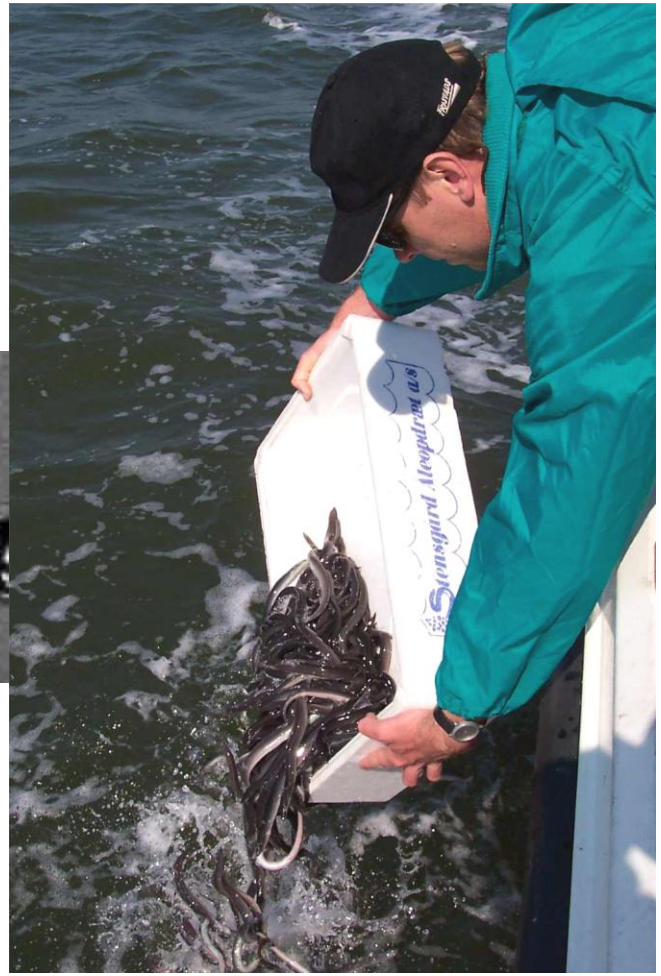
Area: 300 km ^{2}

Salinity: 5-25 ppm

Sluise

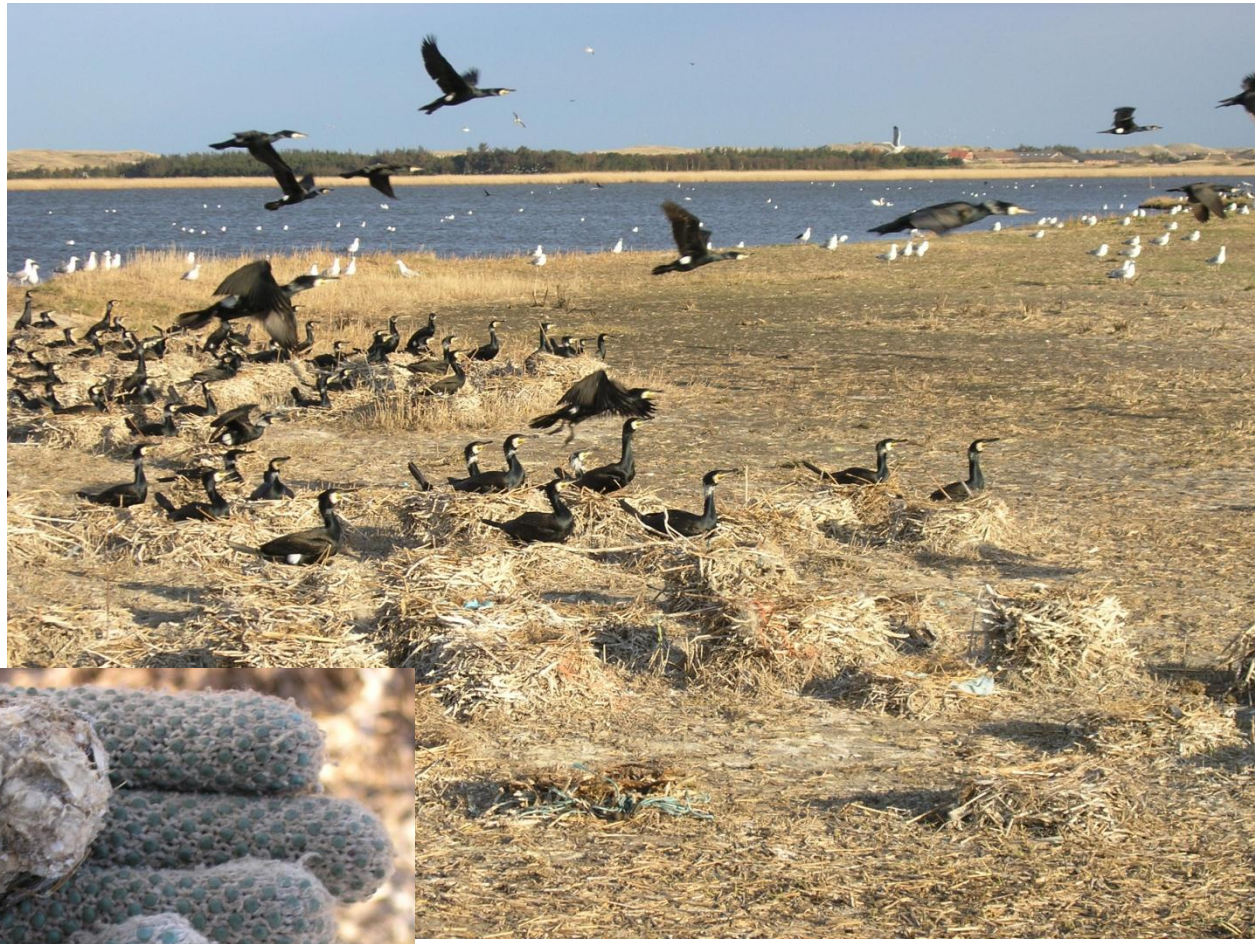
+2000 nests

Skjern Å



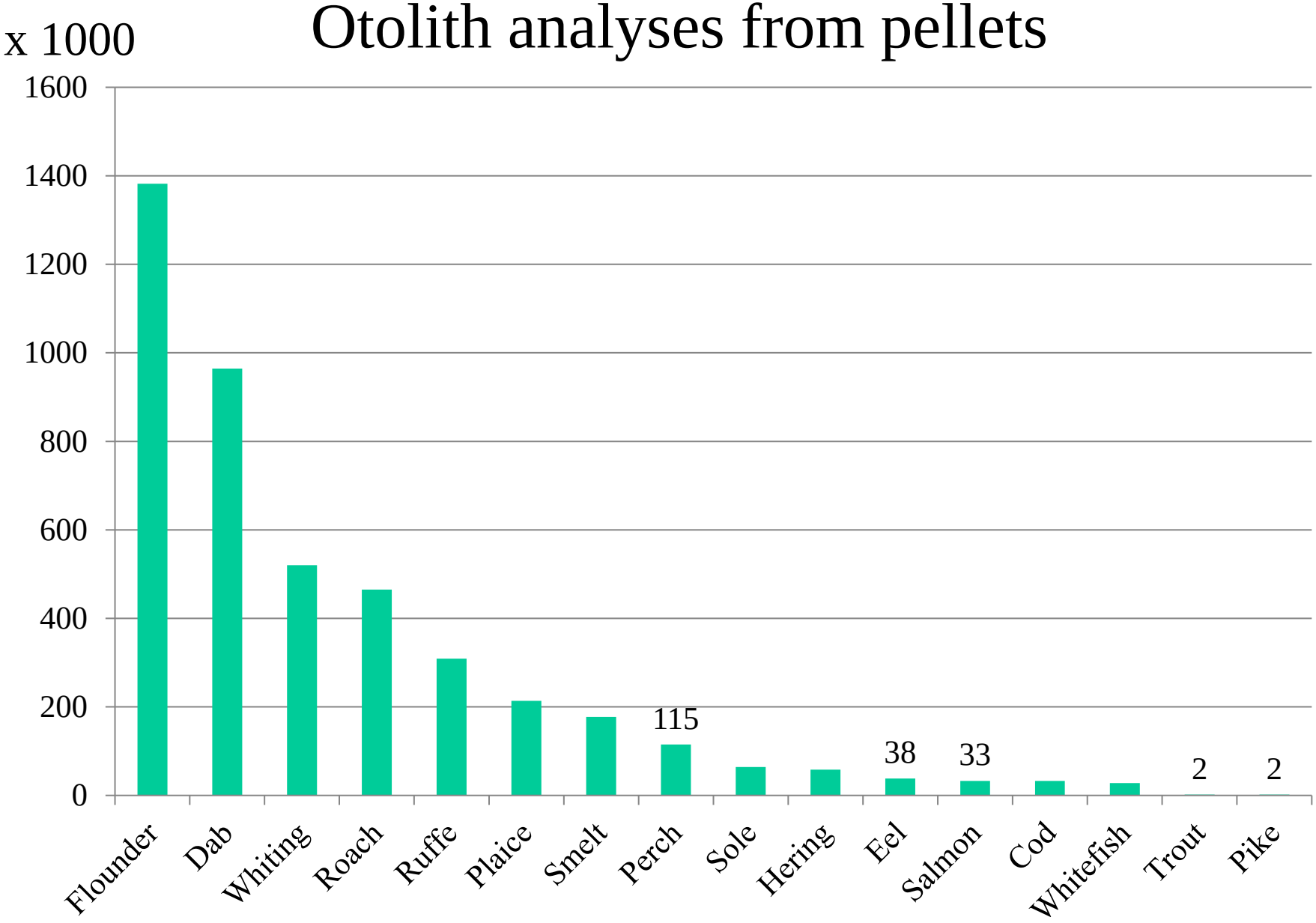
10.000 small eels cw-tagged and released

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 pellet sampling
in the local colony

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

Smolt predation by cormorants *from Jepsen et al. (2018)*

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!

Mouth of salmon river 2024


Storåen ved Bur mandag 14. september 2015 kl. 7.40!

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

Else Nielsen, DTU Aqua, Institut for Akvatiske Ressourcer
Josianne Støttrup, DTU Aqua, Institut for Akvatiske Ressourcer
Thomas Bregnballe, Aarhus Universitet, Danmarks Miljøundersøgelser, Afd. for Vildtbiologi og Biodiversitet
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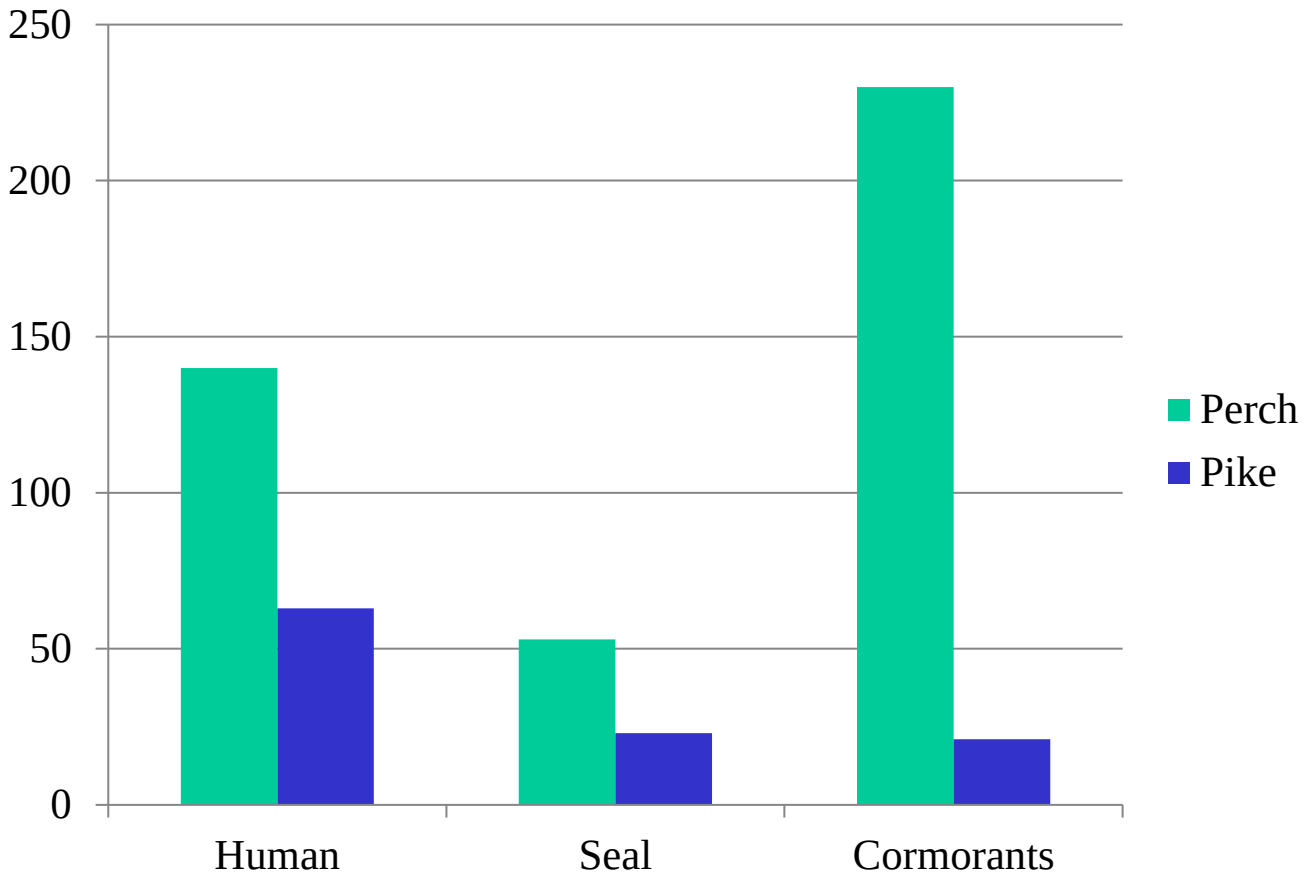
Consumption of fish from the Baltic Sea – kg/km^2/year



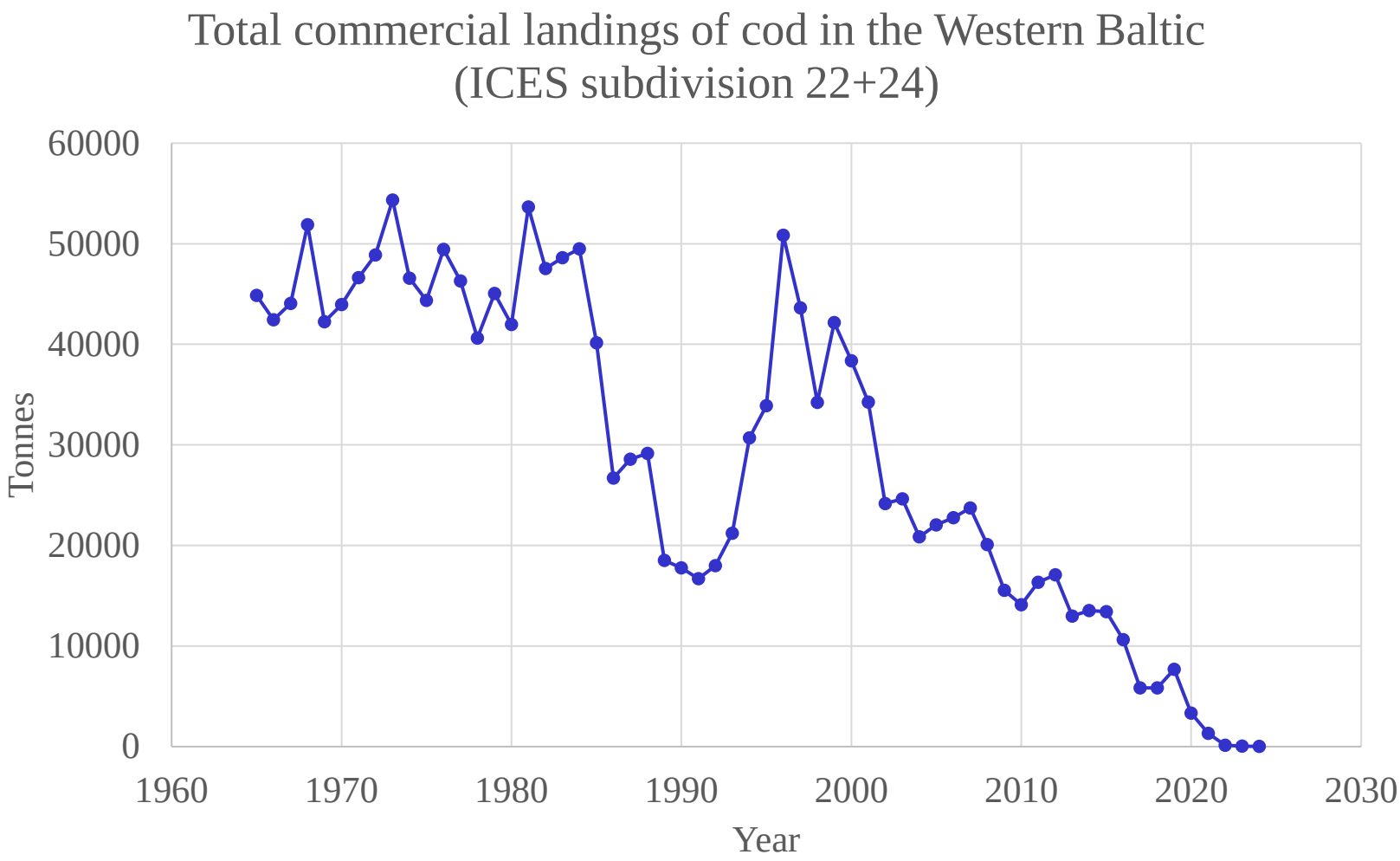
From *Hansson et al. 2017*

What happens in the Baltic?

1987

2020

Western Baltic Cod



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

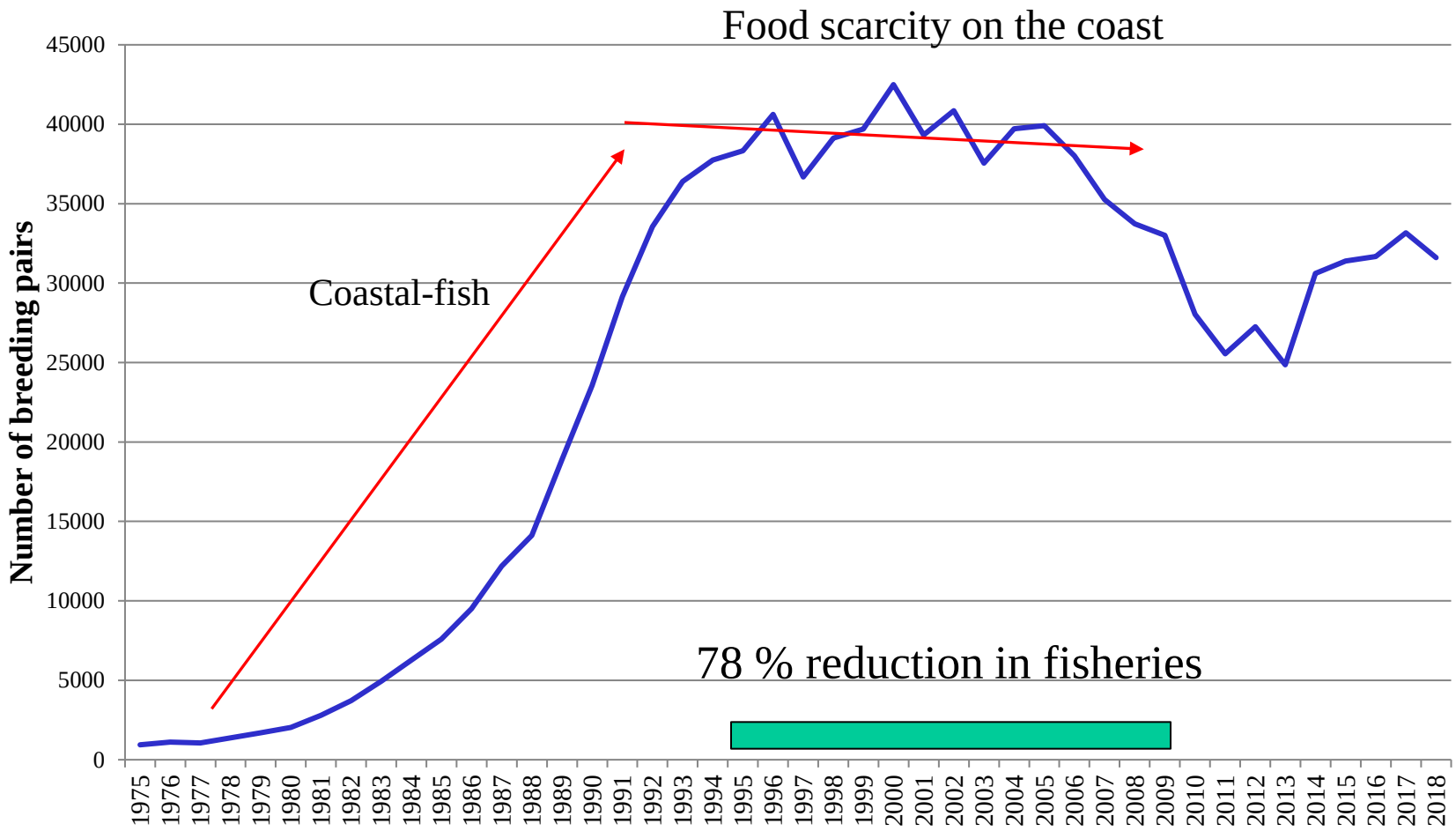
An estimated **15 million cod** are eaten annually by cormorants in the Danish part of Western Baltic.

Total cod recruitment is estimated to 4-17 million cod/year (ICES)

2013-2024	Fishers	Cormorants
Cod/ind	12.4 mill (3 kg)	250 mill (50g)

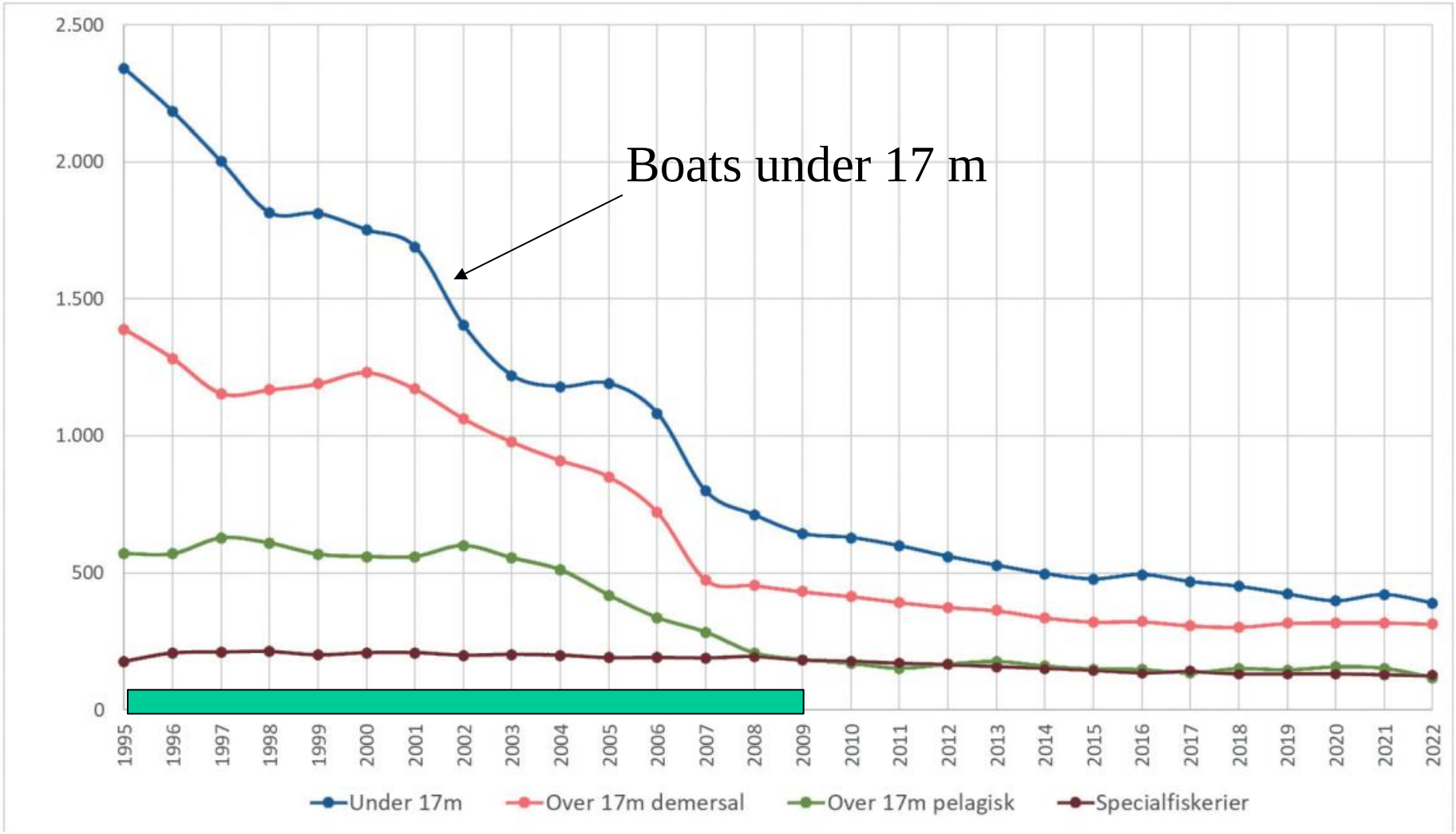
Numbers of breeding pairs 1975-2018

Denmark

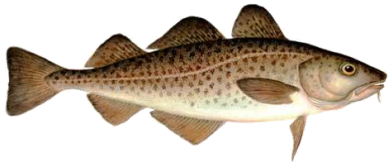


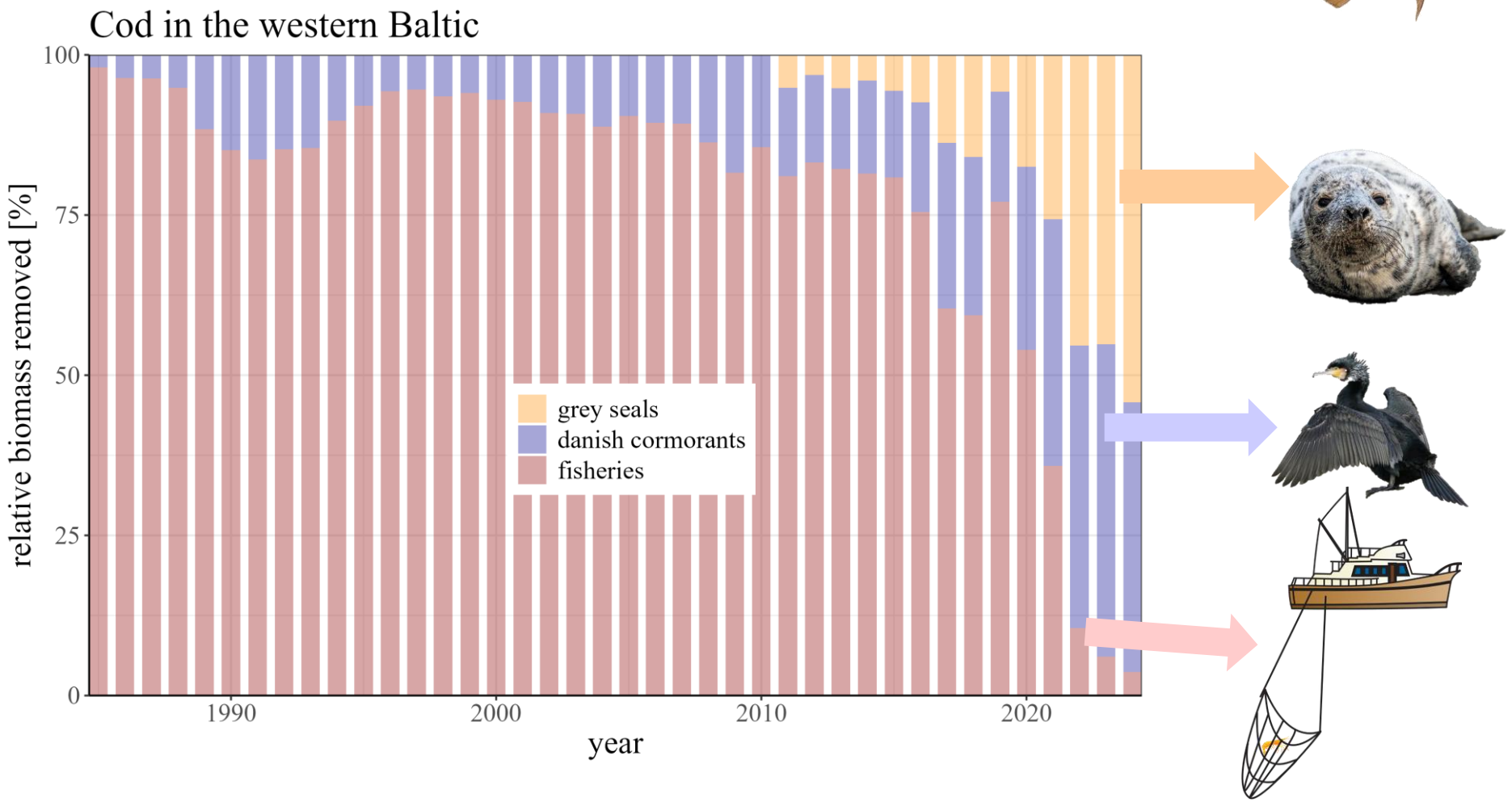
Despite decrease in breeding pairs, we may have more “cormorant-days”

Development of coastal fishing



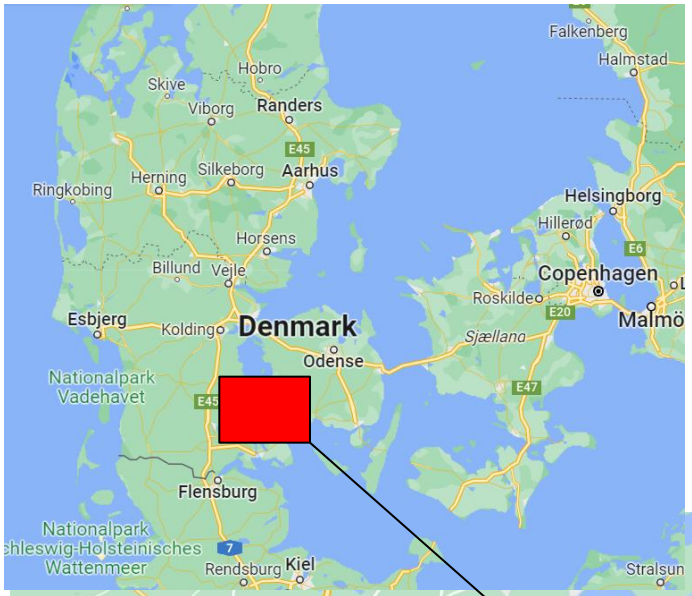
Who eats the western Baltic cod?



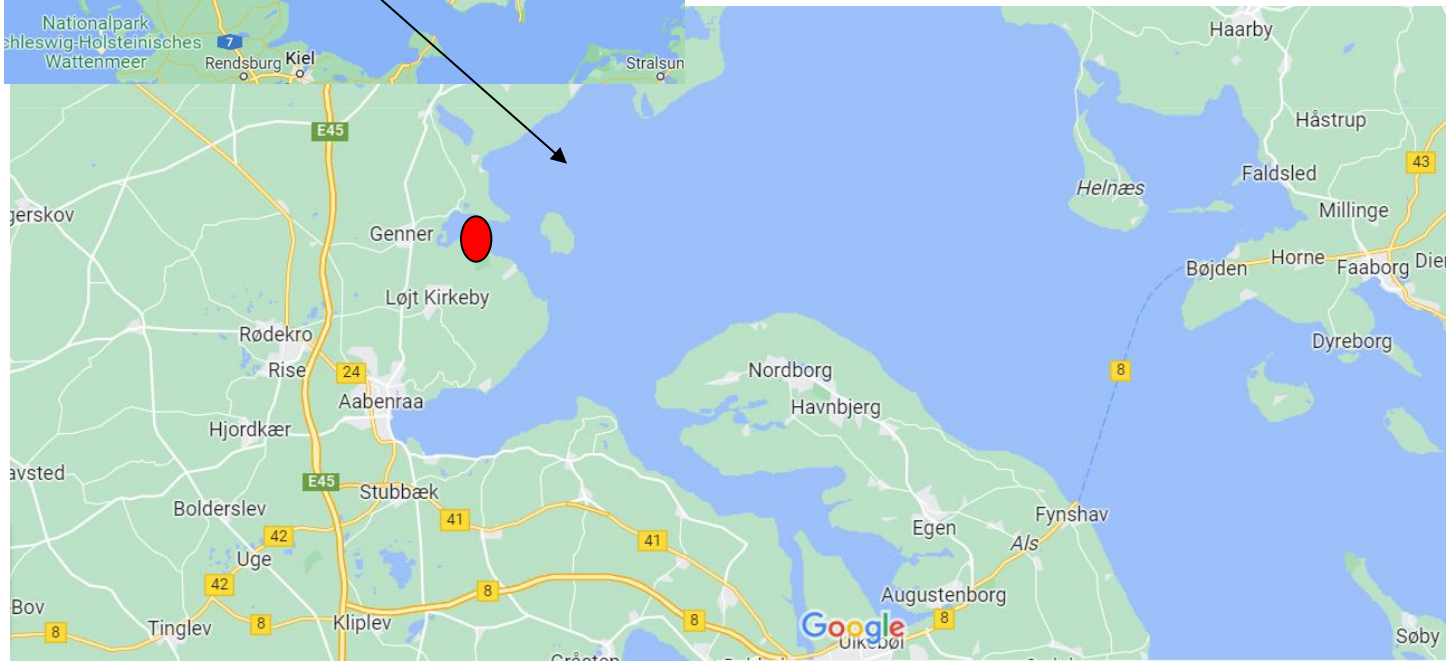


From: Markus Strange, 2025

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



2022 and 2024



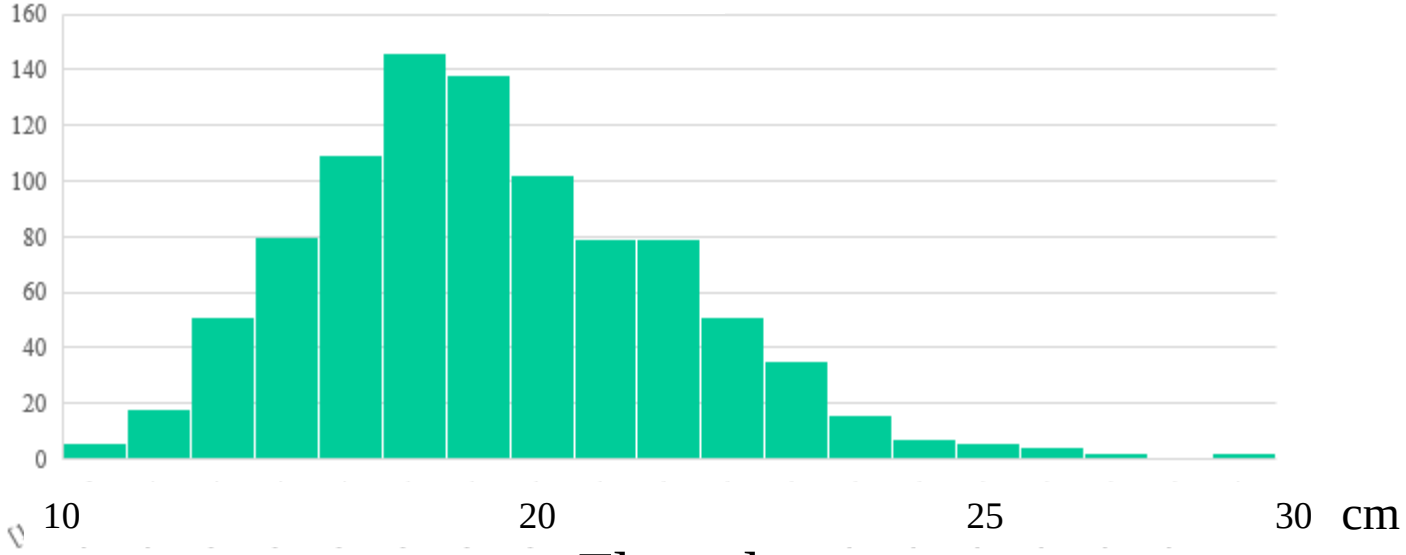
Tagging station at Kalvø

Most fish were tagged here and most were released by Kalvø

PIT-Tagged at Kalvø

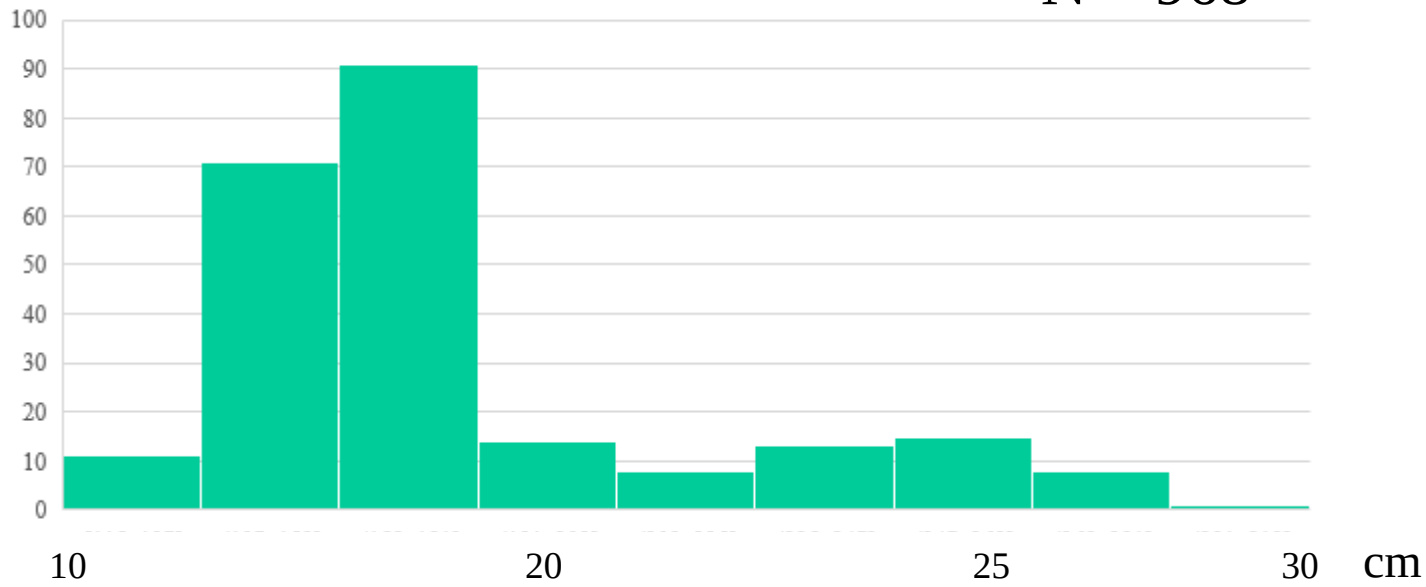
COD

N = 2243



Flounder

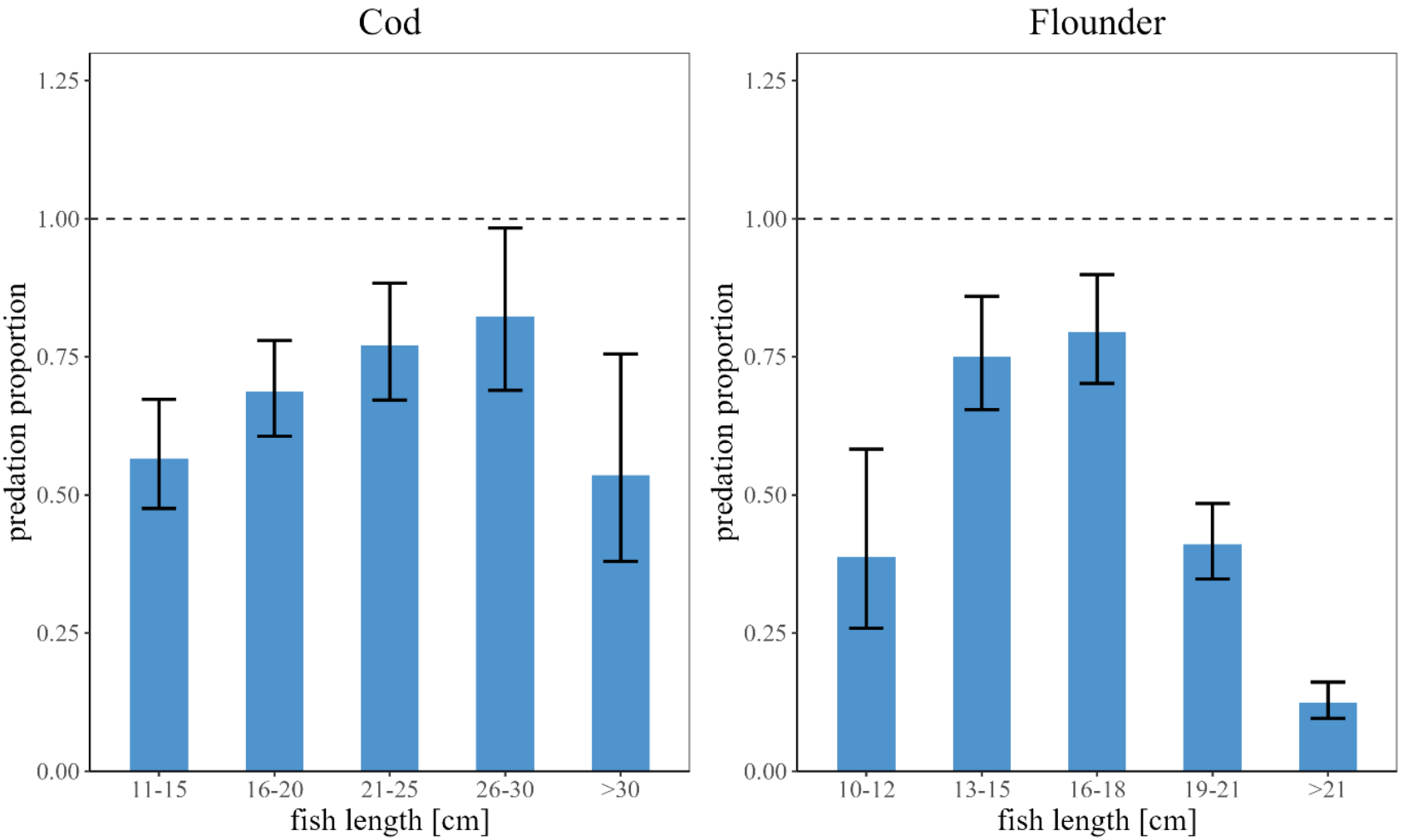
N = 968



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

Tests showed that we find 53% of 23 mm tags and 28% of 14 mm

Coastal cormorant predation during 2-7 months



PIT-tagged fish in the Western Baltic

Conclusion:

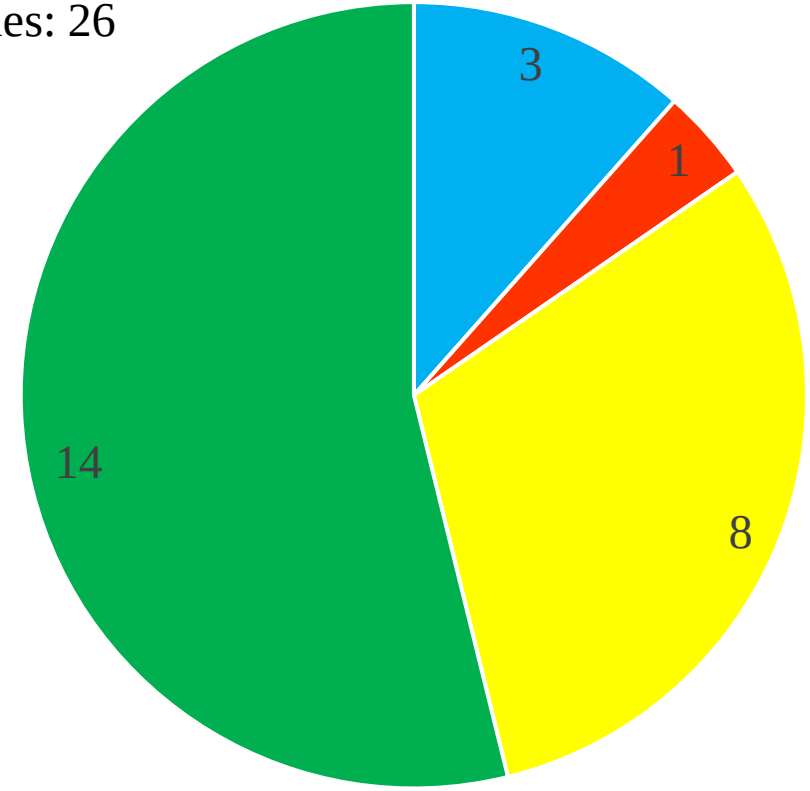
Documented high impact on migrating salmonids
Documented high impact on flounders
Documented impact on eels
Documented **high impact** on cod.

SOS-Fisk

A new 3-year study (PhD) started in July-24 to better model the overall impact of **cormorants** and **seals** in cooperation with DE and SE.

Is predation by cormorants on fish populations an important problem for coastal, inland fisheries and aquaculture management in your country?

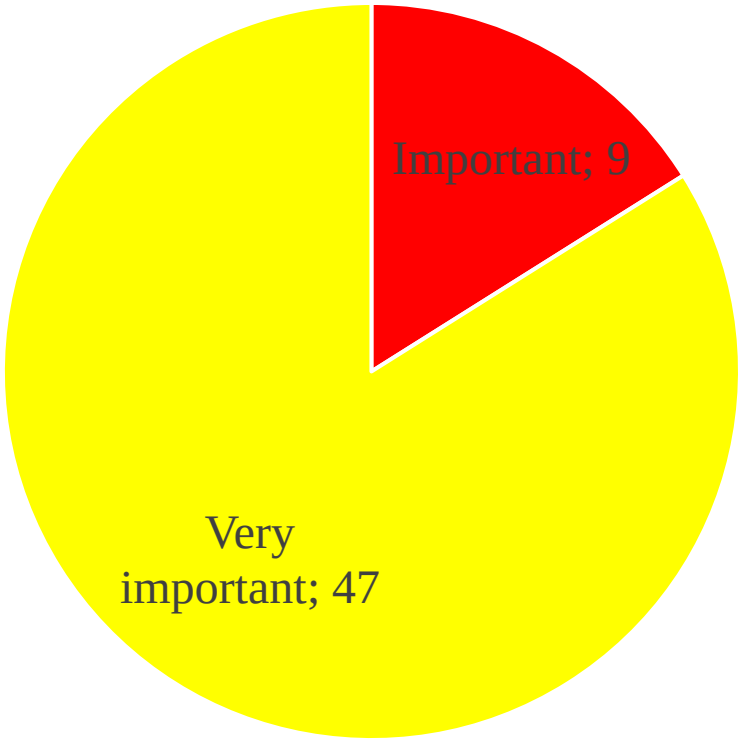
Number of responding countries: 26

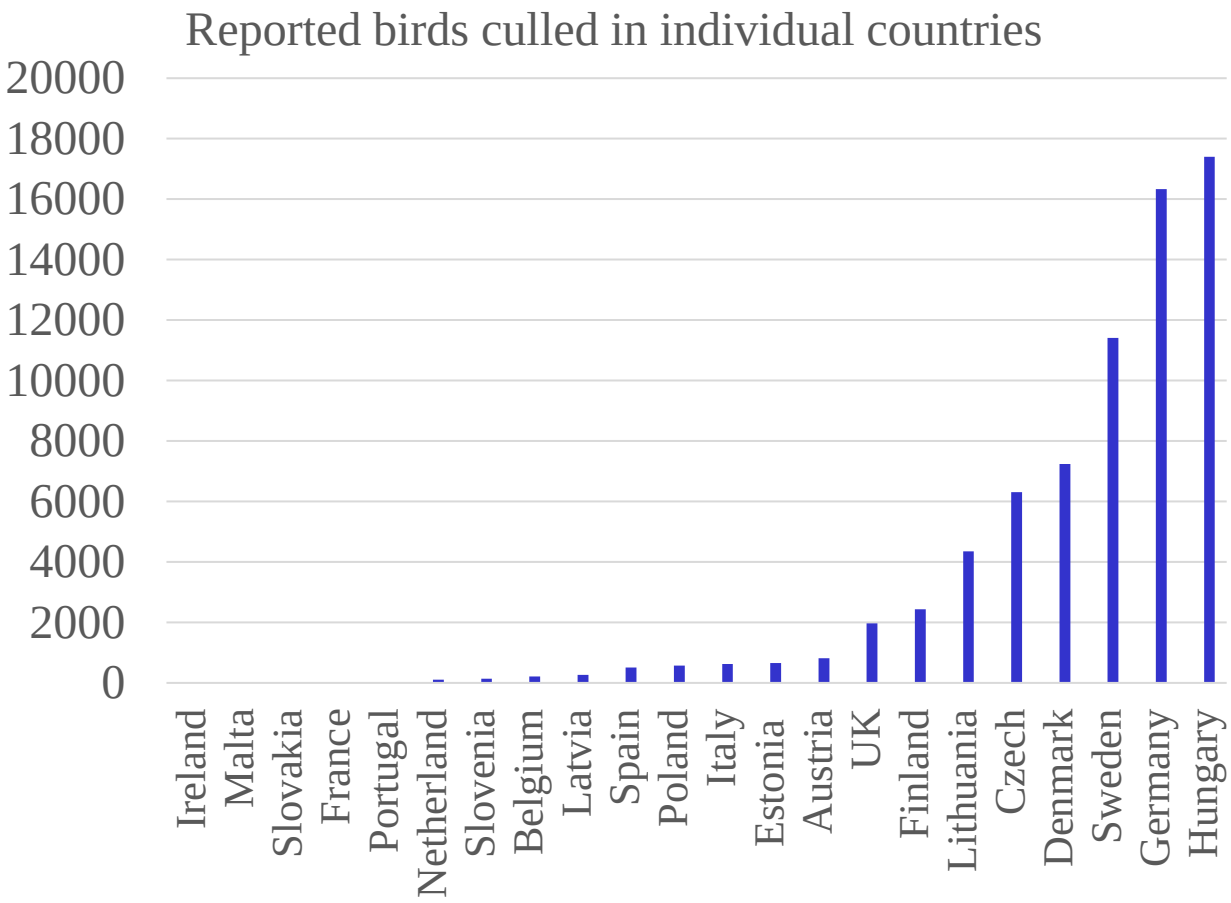


Responses to the 2024 EIFAAC experts' survey on cormorants predation of fish

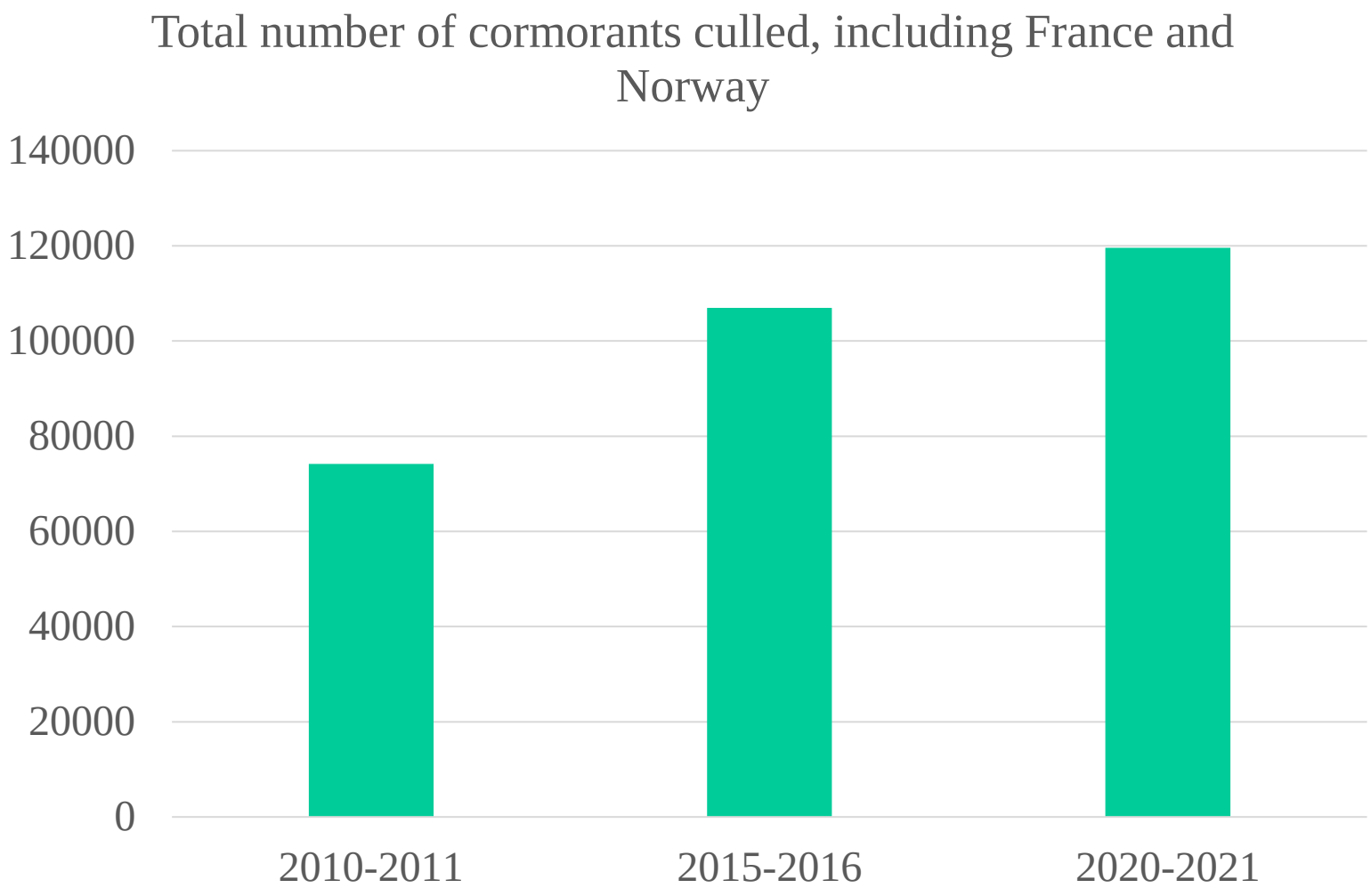
Results from 56 "experts" answering the questionaire

1) Is predation by cormorants on fish populations an important problem for coastal and inland fisheries and aquaculture management in your country?





NB: France 45.000


Total number of cormorants culled, including France and Norway
140000
120000
100000
80000
60000
40000
20000
0
2010-2011
2015-2016
2020-2021

If we assume that the EU-cormorant population is now app 1.5 million birds, the 120,000 birds culled is less than 10% of the population and likely less than 25% of the annual young production.

Unreported regulation ?

Regulation outside EU ?

Natural predators (White tailed eagles) ?

Diseases (birds-flu) ?

Management

Ministry of Environment

Cormorant-group: Stakeholders, managers, experts

National cormorant management-plan since 1997:

- Egg oiling
- Prevention of new settlements
- Protective Shooting (fishers and hunters)
- Regulation outside breeding season in rivers
- Regulation in winter roosting sites

The cormorant group meets regularly and consists of:

Ministry of the environment (Naturstyrelsen)
Anglers (DSF)
Commercial fishers
Recreative net fishers (Fritidsfiskere)
Animal protection (Dyrenes Beskyttelse)
Hunters (DJF)
Ornithologists (DOF)
Minstry of agriculture and fisheries
Bird expert (T. Bregnballe, ÅU)
Fish expert (N. Jepsen, DTU)

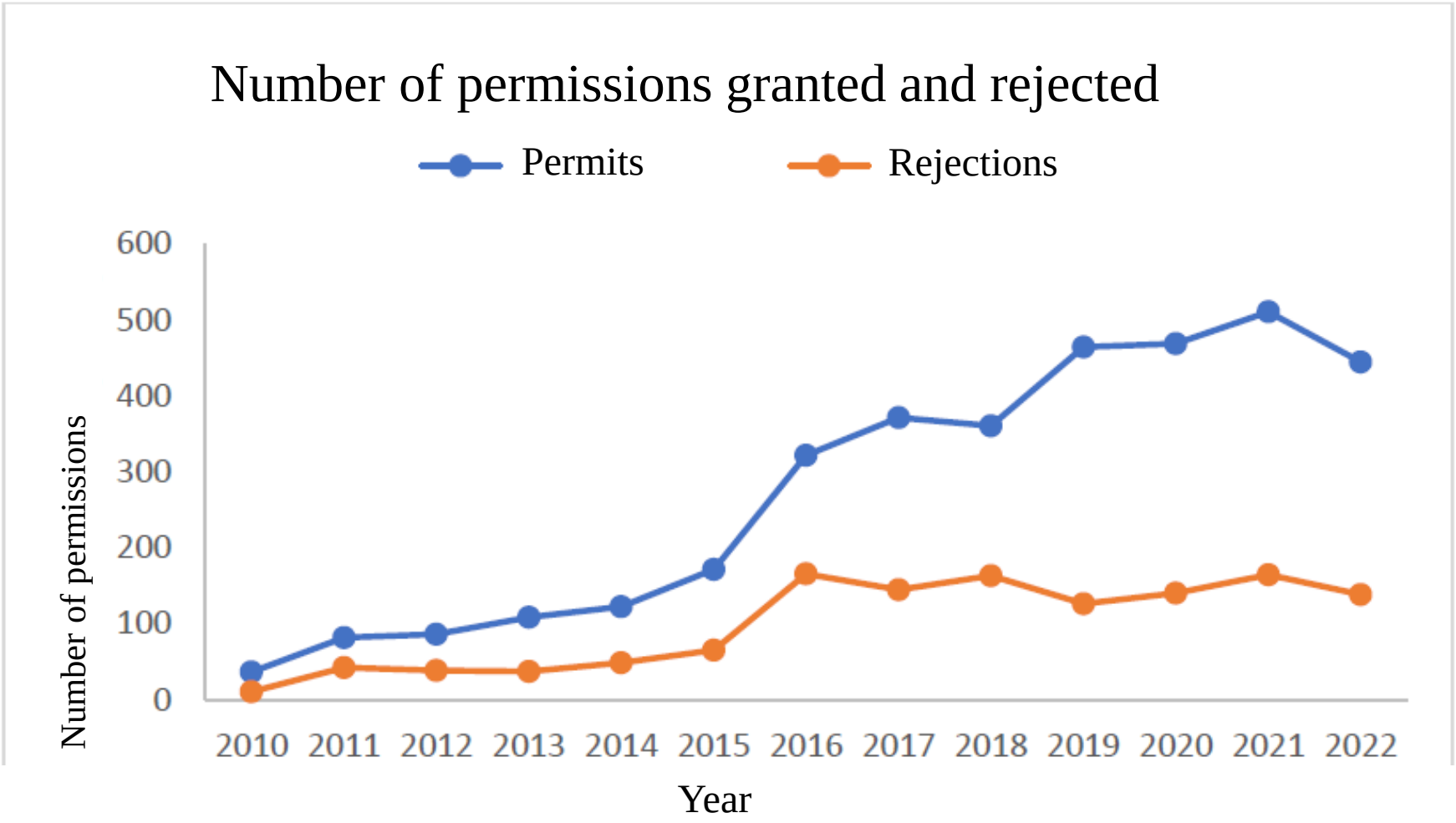
Management plan

From 1997, revised with 5 year intervals

A decent report, including historical info, Scientific info and experience with management measures.

Adaptive management

- MP provides the framework
- Loss in poundnets – fishermen were permitted to shoot cormorants at nets (1000 m)
- Loss of smolts – anglers were permitted to shoot cormorants during smolt migration
- Cormorants foraging in the rivers – protective shooting was initiated
- Continued problems in rivers - permission to shoot at night roosting sites


Number of permissions granted and rejected
Permits
Rejections
600
500
400
300
200
100
0
Number of permissions
2010
2011
2012
2013
2014
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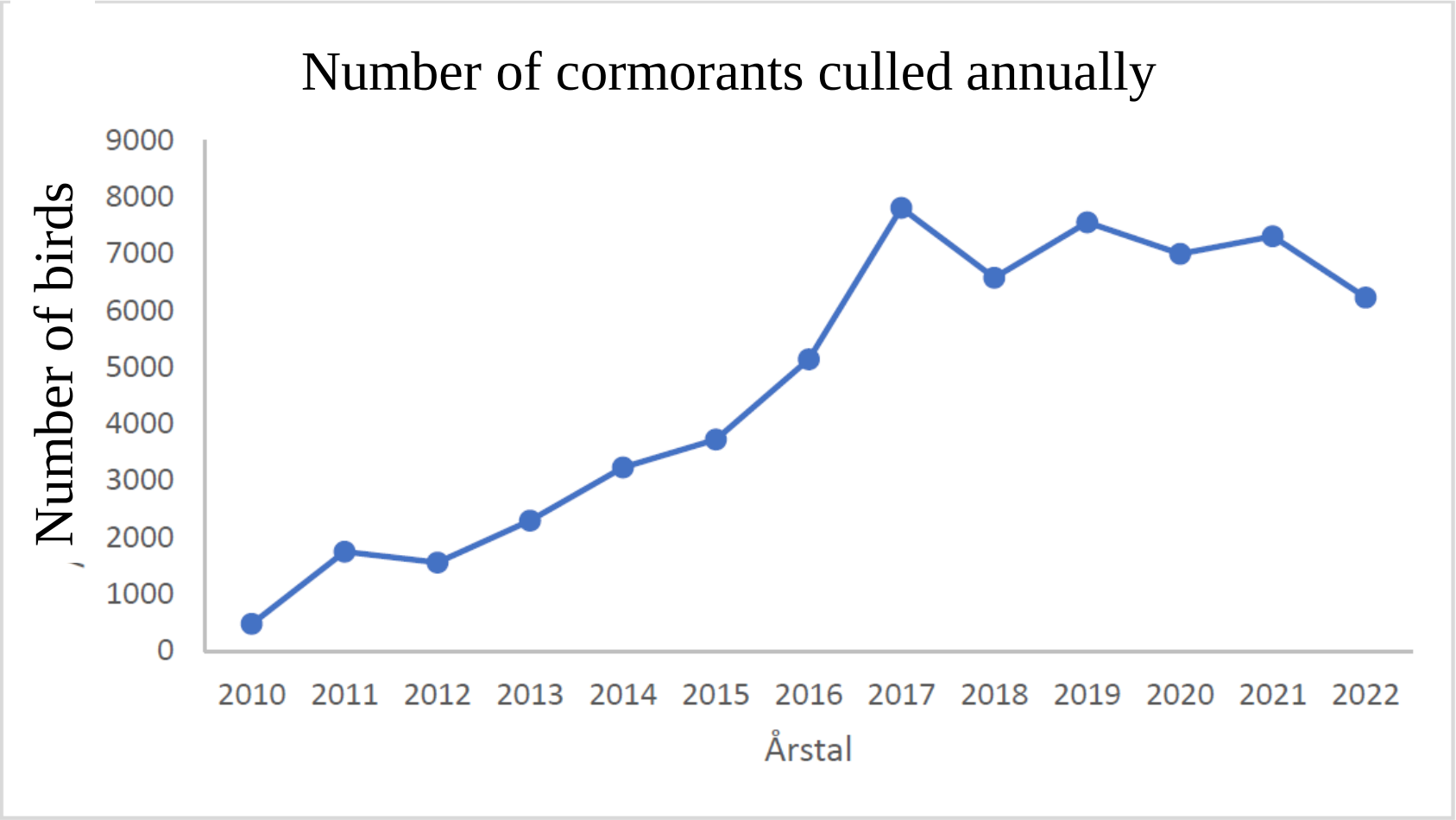
2016
2017
2018
2019
2020
2021
2022
Year



Only 2000 – 8000 officially shot annually

EU- management

Parliament wants action – Commission not so much

Some MS are really trying to reduce numbers (HU, DE, SE, DK)

Some MS are still very protective to Cormorants (NL, PT, SLO)

The Baltic (EE, LT, LV) all consider cormorant conflict important.

Birds directive – §9-derogations ?

Moving of cormorant to become a huntable species?

EU-cormorant management plan?

Presentation of the CMP-framework 3 June, Bruxelles

European Management Plan

Overall Goal:

To achieve a fair balance between pan-European conservation of the great cormorant, with the sustainable use and protection of fish populations, fisheries and aquaculture interests, including the socio-economic well-being of communities dependent on fisheries and aquaculture.



EIFAAC asked DG-Mare for money and got funded for:

- EU survey about the conflict
- EU survey regarding numbers of cormorants culled
- A draft of an EU-cormorant Management Plan

The plan (48 pp) has overview of biology, damage and conflict.

There is a whole framework with elements to include

A way forward is described, but need support from MS

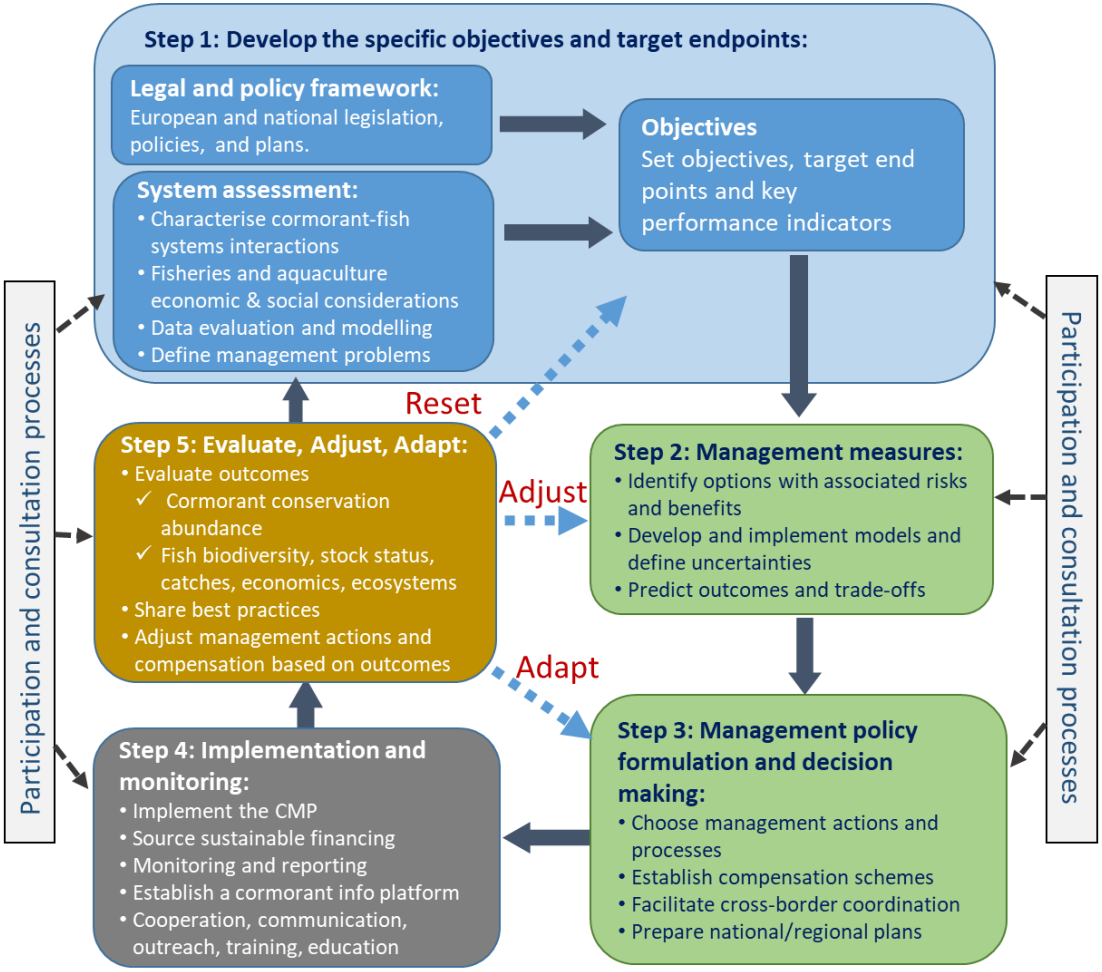
Components for a European Management Plan: Guiding Principles

Sustainability	Ensure long-term coexistence of cormorants, fish populations and livelihoods.
Evidence-based management	Base decisions on robust scientific data.
Adaptive management	Use flexible and dynamic approaches to address evolving challenges, incorporating regular monitoring and stakeholder feedback.
Collaboration and coordination	Promote cooperation and continuous dialogue among European country agencies, NGOs and CSOs
Compliance with legal frameworks	Align management actions with EU directives and international treaties.
Minimize conflicts	Balance needs of birds, fisheries, aquaculture, biodiversity conservation.
Precautionary approach	Address potential risks proactively, avoiding unintended ecological or economic harm.
Environmental stewardship	Conduct management interventions in a responsible manner with care for the environment

Components for a European Management Plan: OBJECTIVES

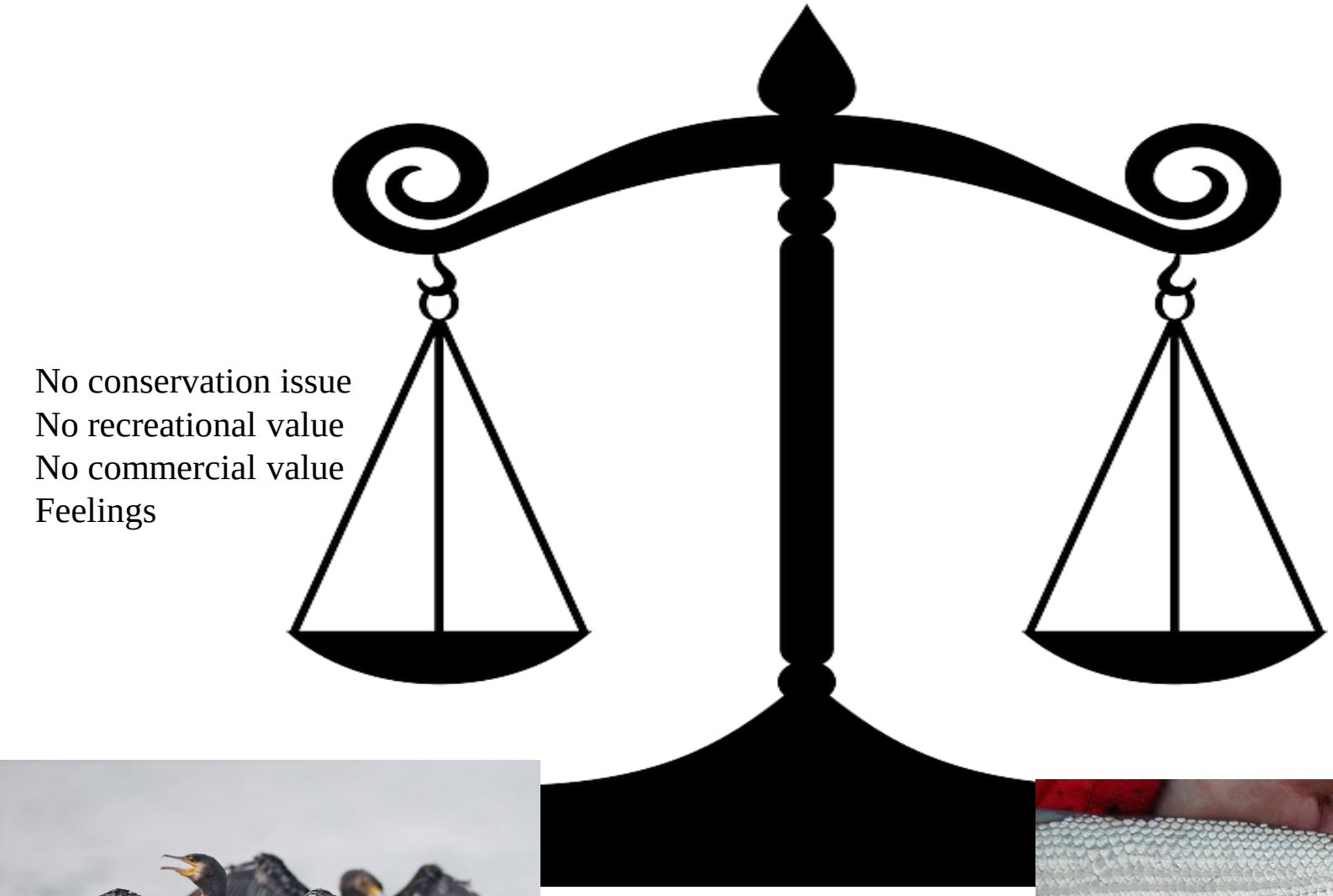
1. Maintain **up-to-date status and trend data** on cormorants, inland and coastal fisheries and aquaculture.
2. Improve understanding, documentation and **quantification of ecological, economic and social impacts of cormorants** on inland and coastal waters
3. Provide a plan of action to **protect vulnerable fish species against predation** by cormorants, contributing to achievement of WFD, HD, Birds Directive and Bern Convention targets
4. Adapt, update and **provide framework to implement measures to reduce and mitigate impact of cormorant predation on fisheries and aquaculture**.
5. Provide **framework to facilitate use of Article 9 derogations to authorise controlled culling of cormorants** whilst maintaining favourable conservation status.
6. Promote **cross-border collaboration** and harmonisation of monitoring, management, policy and legal frameworks.
7. Provide a central, **open-access, fully moderated platform** for engagement with all key stakeholders.

Pan-European cormorant–fish management plan: Framework



- Adopts the project management cycle
- Process driven based on best available information
- Balance needs of birds, fisheries, aquaculture and biodiversity
- Adaptive, based on **Evaluate, Adjust and Adapt** procedure
- Stakeholder participation and consultation at all stages

No conservation issue
No recreational value
No commercial value
Feelings



Conservation
Biodiversity
Recreational value
Commercial value
Cultural history
Feelings

Thank you