Annex 7.3.5

Report from the end-of-project conference

SAMBAH

End-of-project conference Report

Introduction

The SAMBAH End-of-Project conference was held in Kolmården, Sweden on 8-9 December 2014. Here, project results including abundance estimates and animal distribution were presented, and the use of the results in management was discussed. A total of 84 participants from ten countries around Europe attended the conference and took part in discussions about how SAMBAH results can be used in the management and conservation of the Baltic Sea harbour porpoise. Group discussions were held on the subject of threats and how to mitigate them, and participants were asked to write a X-mas wishlist on what issues they would find most important regarding the harbour porpoise in the Baltic region for the next five years.

This report contains all relevant documents from the conference, including the program, list of participants, presentations held during the conference and summaries of the group discussions and the “Baltic porpoise X-mas wishlist”.

For any enquiries, please contact info@sambah.org or visit the project website www.sambah.org.

SAMBAH conference

on the abundance and distribution of porpoises in the Baltic Sea

PROGRAM

8 December

12:00-13:00 Registration in the lobby

12:00 Lunch at Vildmarkshotellet

13:00 Welcome and Introduction; Kolmården Zoology director Mats Höggren and SAMBAH Project coordinator Mats Amundin, Kolmården Wildlife Park

13:15 Harbour porpoise ecology and bioacoustics; Mats Amundin, Kolmården Wildlife Park

13:30 Background to the SAMBAH project; Ida Carlén and Julia Carlström, AquaBiota Water Research

13:45 Harbour porpoise populations in the Baltic region; Jonas Teilmann, Aarhus University

14:15 Coffee break

14:45 SAMBAH data collection; Daniel Wennerberg, Kolmården Wildlife Park

15:05 Statistical methods and results from density estimation; Len Thomas, St Andrews University

15:55 Spatial distribution of porpoises in the SAMBAH area; Ida Carlén, AquaBiota Water Research

16:30 Implications of SAMBAH results on the management of Baltic Sea porpoises; Penina Blankett, Ministry of the Environment, Finland

17:00 Wrap-up of day 1; Mats Amundin

17:30 End of day 1

19:00 LIFE - the different dolphin show

20:00 Dinner at Vildmarkshotellet

9 December

8:30 Introduction to day 2

8:35 Threats and how to mitigate them

- Fisheries; Sara Königson, SLU Aqua
- Underwater noise; Jakob Tougaard, Aarhus University
- Habitat destruction and protected areas; Alexander Liebschner, Federal Agency for Nature Conservation

9:35 Discussion on threats and mitigations, 20 min per subject

Coffee during discussion in smaller groups

9:45-10:05	1st group discussion
10:05-10:25	2nd group discussion
10:25-10:45	3rd group discussion

10:45 SAMBAH break

11:00 Reports from discussion groups; group moderators

11:20 National status of harbour porpoise conservation – Short presentations from national authorities responsible for the implementation of the Habitats Directive

Sweden - Erland Lettevall, Swedish Agency for Marine and Water Management
Finland - Penina Blankett, Ministry of the environment, Finland
Estonia - Liina Vaher, Ministry of the environment, Estonia
Latvia - Anda Ikauniece, Latvian Institute of Aquatic Ecology
Poland - Jakub Milczarek, General Directorate for the Environmenal Protection
Germany - Alexander Liebschner, Federal Agency for Nature Conservation
Denmark - Jonas Teilmann, Aarhus University

12:05 Wrap-up of day 2; Penina Blankett, Ida Carlén and Julia Carlström

12:20 Closing remarks; Mats Amundin, Kolmården Wildlife Park

12:30 Lunch

Harbour porpoise ecology and bioacoustics

Mats Amundin

Short introduction to the ecology and biology of the harbour porpoise

Mats Amundin, Kolmårdens Djurpark

The harbour porpoise *(Phocoena phocoena)*

- Odontocete – toothed whale
- Adult size 1.4-1.7 m, 40-75 kg
- Generelly shy and difficult to spot
- Group size ~1.5 animals = mother + calf

Prey selection

Eats small, fat pelagic shoaling fish, but also bottom dwelling fish

Herring (*Clupea harengus*)

Whiting (*Merlangius merlangus*)

Sprat (*Sprattus sprattus*)

Gobies (*Gobiidae*)

Cod (*Gadus morhua*)

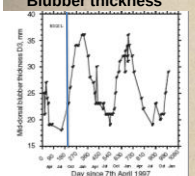
Sand eel (*Ammodytidae*)

Habitat preferences

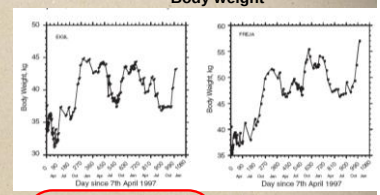
- Above the Continental shelf in 20-200m depth, primarily <100m
- Higher proportion of calves in certain shallow areas
- Small whale in cold water
  - ⇨Limited ability to store energy

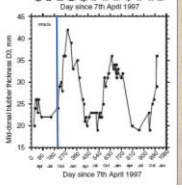
Energy turnover

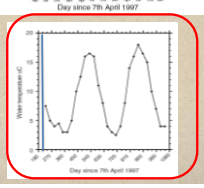
Blubber thickness



Body weight







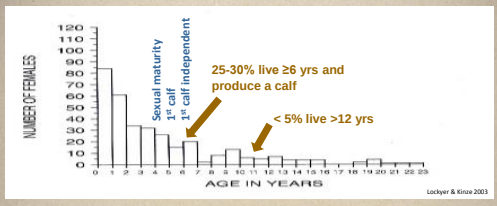
Lockyer et al. 2003

Water temperature

Habitat preferences

- Above the Continental shelf in 20-200m depths, primarily <100m
- Higher proportion of calves in certain shallow areas
- Small whale in cold water
  - ⇨Limited ability to store energy
  - ⇨Distribution closely linked to food availability in productive areas, e.g. offshore banks, upwellings, eddies, large tidal differences
  - ⇨Due to larger energy requirements in connection with pregnancy and suckling, adult females are more dependent than males on productive areas
  - ⇨Fetus very big re. to the mother: 65-75cm/4.5-6.7kg – half her body length and ~10% of body weight!

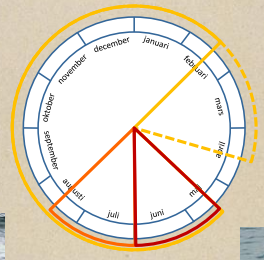
Demography and reproduction



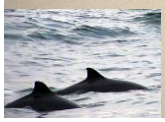
- On average 0,57-0,73 calves/year from 5 years of age
- In total 4-6 calves per female
- The population has a very low growth rate (<4-9,4%)
- Can only take a very low anthropogenic mortality (>1%=at risk, >2% unacceptable)

Annual life cycle in Kattegatt

Nursing

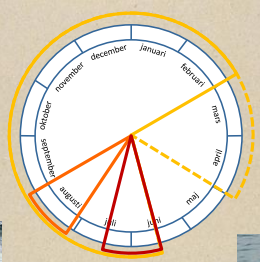


Mating Calving



Annual life cycle in the Baltic

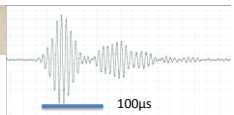
Nursing

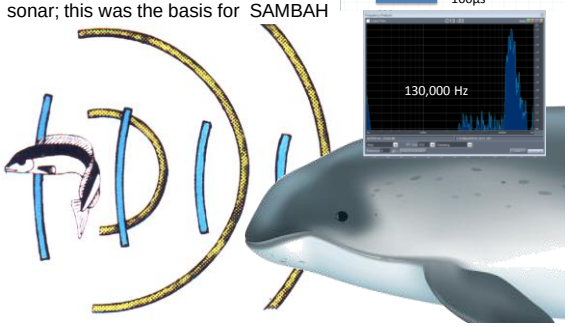


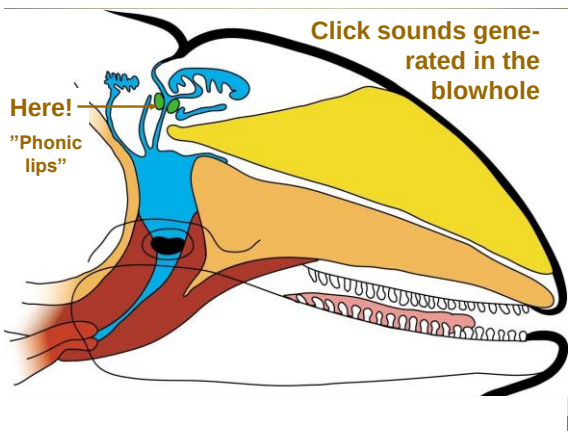
Mating Calving

Echolocation

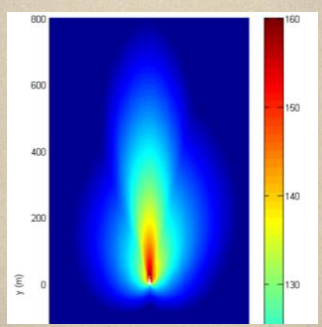
In murky water, at night and at depth the porpoise completely rely on its sonar; this was the basis for SAMBAH





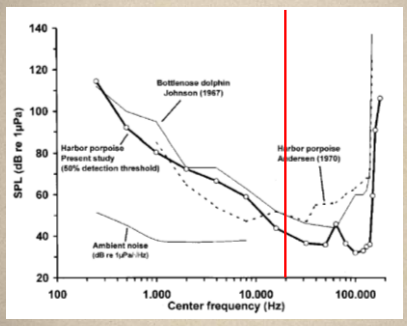


Sonar sounds focused in a narrow beam



Courtesy Jamie MacAulay

Best hearing in the Animal Kingdom



➡ **Sensitive to noise…**

4-day old calf using sonar.

Courtesy Fjord&Belt, Denmark

Photo Kickan Bylund

Thanks for your attention!

Background to the SAMBAH project

Julia Carlström

Background to the SAMBAH project

Overview of knowledge status before SAMBAH

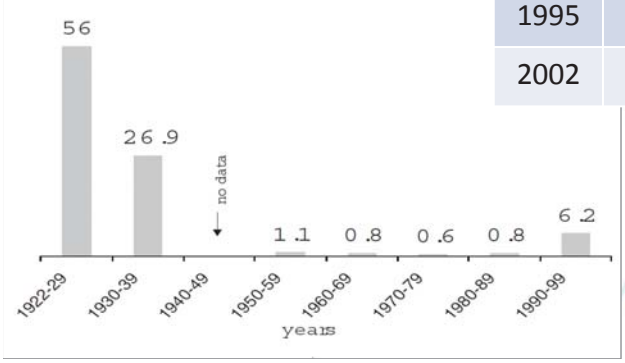
SAMBAH End of Project Conference
Kolmården Wildlife Park, Sweden
8-9 December 2014

Julia Carlström, AquaBiota Water Research, Sweden
julia.carlstrom@aquabiota.se, phone +46 (0)8 522 302 46

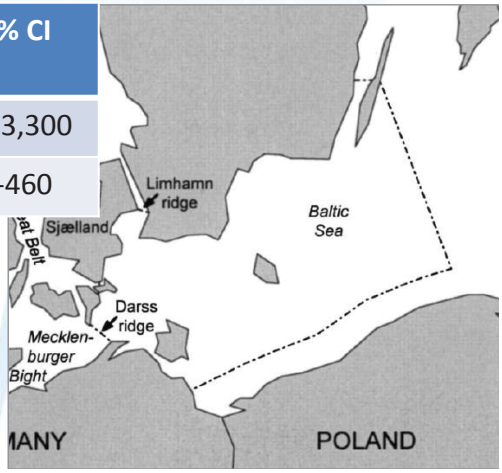
Trends and numbers

- Interview studies and carcass collections indicated a dramatic decline in numbers Berggren & Arrhenius 1995, Skóra & Kuklik 2003
- Visual abundance surveys showed low and uncertain abundance estimates Hiby & Lovell 1996, Berggren et al. 2004

Polish bycatches



Year	# obs	Point estimate	95% CI
1995	3	599	200-3,300
2002	2	93	10-460

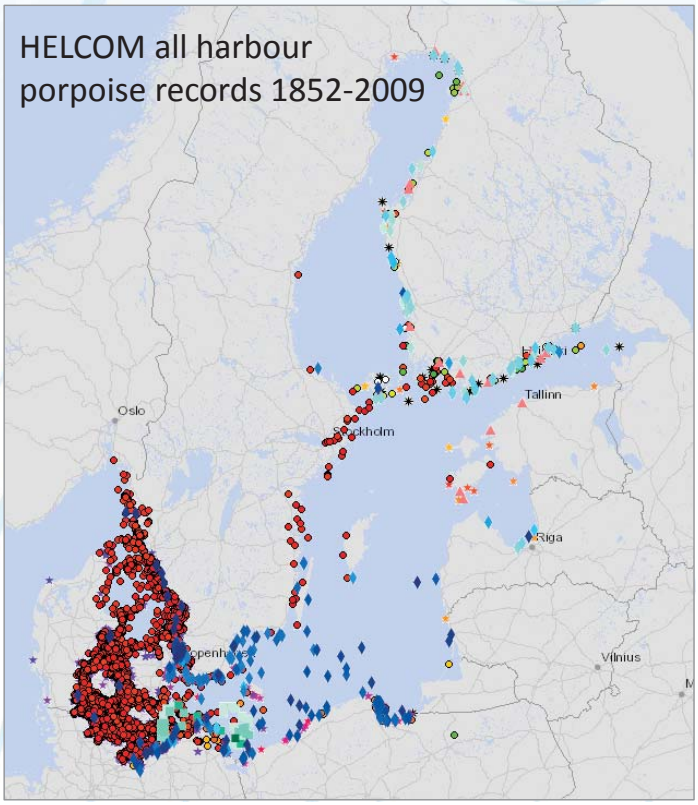


Distribution and population structure

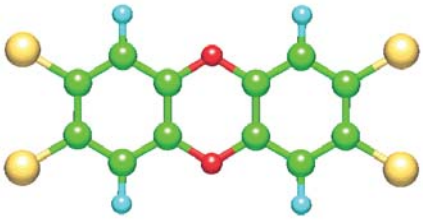
- Spatial distribution primarily known from opportunistic records

- Genetic and morphometric differences between Baltic Proper and Skagerrak-Kattegat Seas

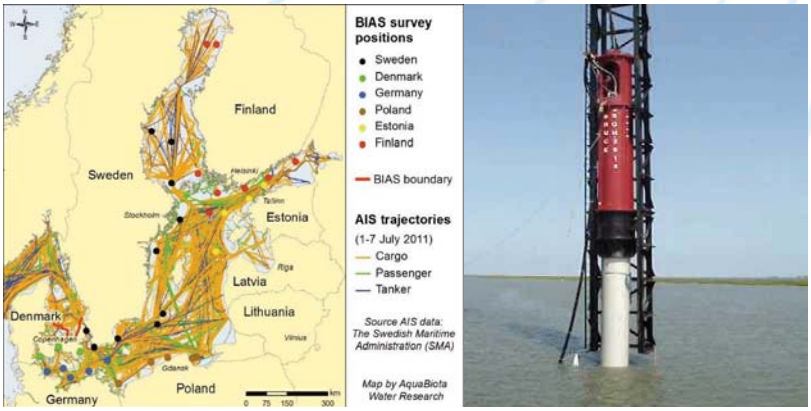
Wang & Berggren 1997
Börjesson et al. 1997

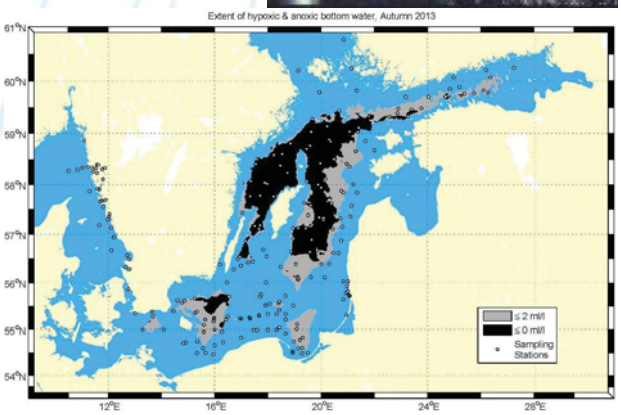


Threats



- Bycatches
- Environmental toxins
- Underwater noise and other disturbance
- Large-scale changes of the ecosystem





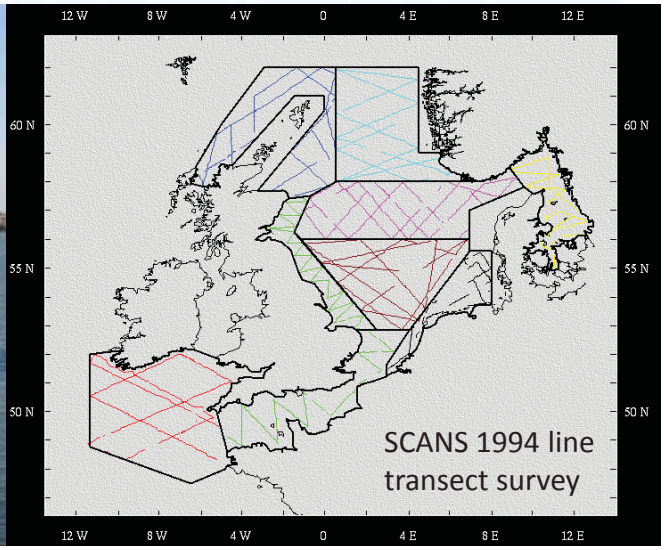
Conservation status

- IUCN: Critically Endangered
- EU Habitats Directive: Annex II and IV
- Protected areas only in German and Polish waters

Methodological development

- Porpoise click detectors + point transect methods = a way forward?


Chelonia C-POD



SAMBAH

- All EU countries around the Baltic Sea
- Funding: 50% EU LIFE+, 50% national + co-financers
- Germany separate funding
- Jan 2010 – Sept 2015
- Russia joined later with RUMBAH

Some of the SAMBAH team, Seili island, Finland, Oct 2013

SAMBAH organisation

Coordinating beneficiary

- Kolmården Wildlife park, SE

17 organisations in 9 countries!

Associated beneficiaries

- SE: Swedish Environmental Protection Agency
- FI: Turku University of Applied Sciences, Finnish Ministry of the Environment, Särkänniemi Adventure Park
- PL: University of Gdańsk, Institute of Meteorology and Water Management, Chief Inspectorate for Environmental Protection
- DK: National Environmental Research Institute, Danish Forest and Nature Agency

Collaborators

- AquaBiota Water Research (SE); CREEM, St Andrews University (UK); Chelonia Ltd (UK)
- Pro Mare (EE); Latvian Institute of Aquatic Ecology (LV); Klaipeda University Coastal Research and Planning Institute (LT)
- German Oceanographic Museum in Stralsund (DE)

SAMBAH aims

- Abundance estimates
  whole study area and per country
- Distribution maps
  important areas, risk of conflicts with human activities, habitat preferences
- Increase awareness
- Demonstrate best practice

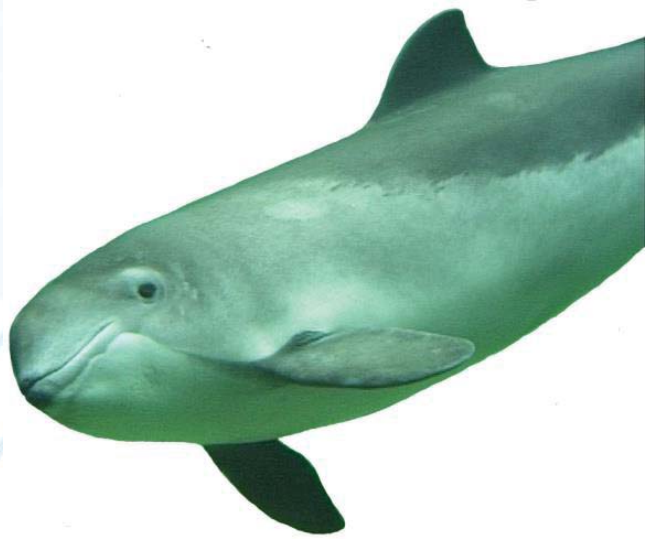


Photo: Florian Graner

Thank you!

Photo: Florian Graner

Kolmården

AquaBiota WATER RESEARCH

Life

NATURA 2000

Harbour porpoise populations in the Baltic region

Jonas Teilmann

INSTITUT FOR BIOSCIENCE
AARHUS UNIVERSITY

8.12.2014

Harbour porpoise populations in the Baltic region

JONAS TEILMANN

INSTITUT FOR BIOSCIENCE
AARHUS UNIVERSITY

8.12.2014

Population structure

1. Isolated groups of animals during mating season
2. Little or no interbreeding between groups
3. Adaptation to specific environments during evolution
4. Develop systematic differences in DNA and physical appearance
5. Important to be aware of in conservation
6. If population disappear genetic diversity-biodiversity is lost forever
7. Areas where populations disappear from may never be re-occupied by the same species even if the conditions are favourable.

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Genetic population structure

Microsatellite and Mitochondrial DNA in 500 samples

(Wiemann et al. 2010)

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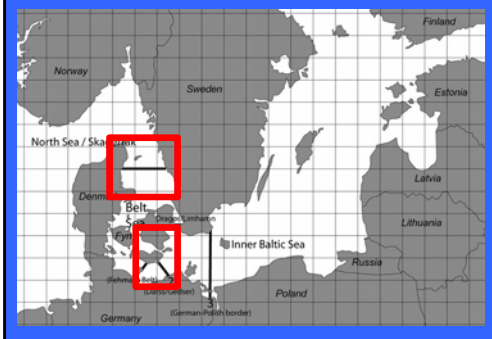
Morphometric population structure

3D measurements of 277 skulls (Galatius et al. 2010)



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Satellite tracking 1997-2014

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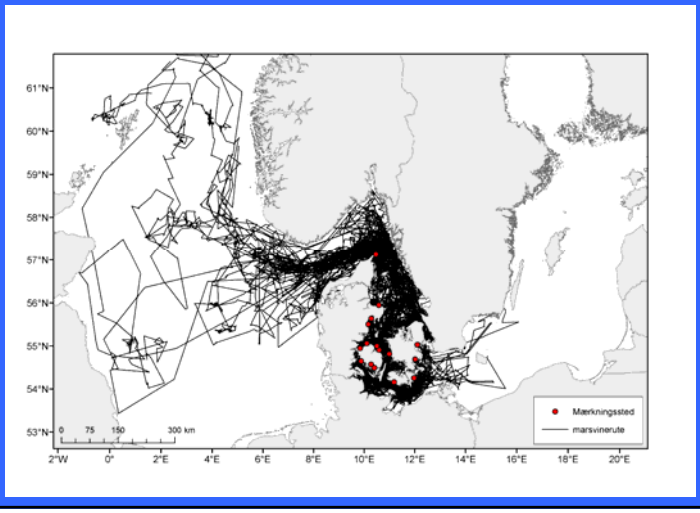
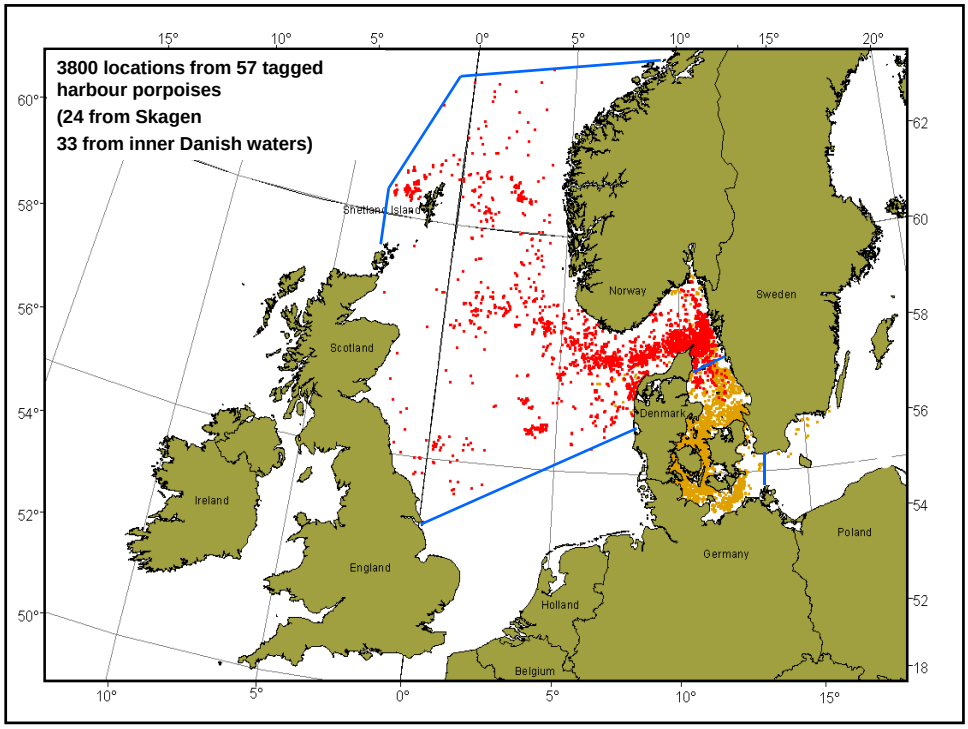
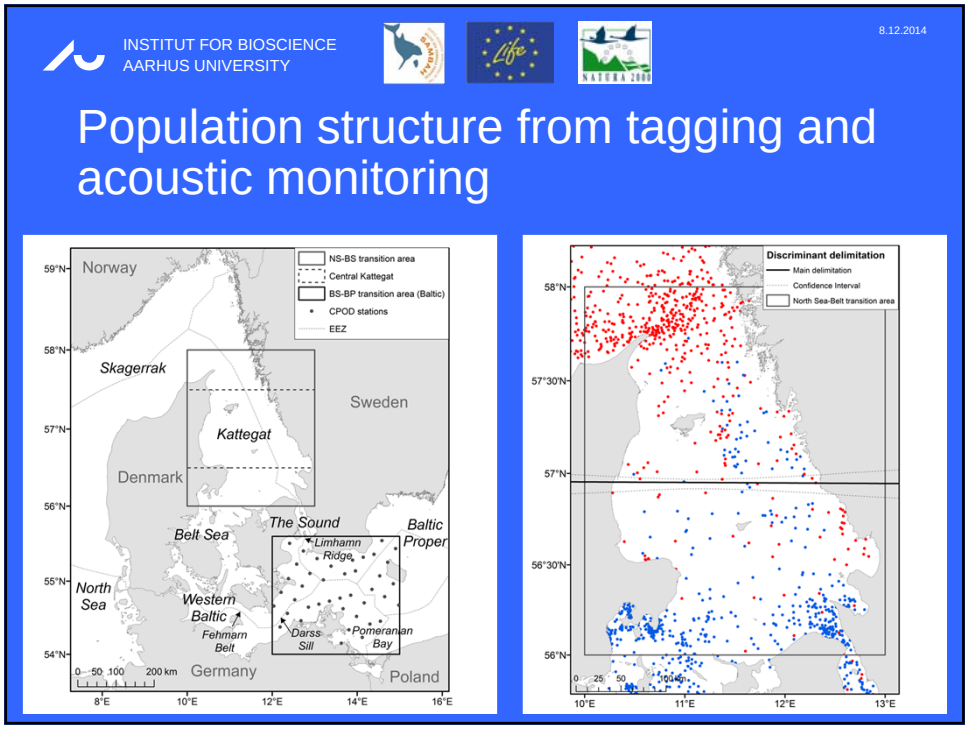
Tagging sites for 110 porpoises 1997-2014




3800 locations from 57 tagged harbour porpoises
(24 from Skagen
33 from inner Danish waters)
Shetland Island
Norway
Sweden
Scotland
Denmark
Ireland
England
Poland
Germany
Holland
Belgium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Population structure from tagging and acoustic monitoring
Norway
Skagerrak
Kattegat
Sweden
Denmark
Belt Sea
The Sound
Baltic Proper
Limhamn Ridge
North Sea
Western Baltic
Fehmarn Belt
Darss Sill
Pomeranian Bay
Germany
Poland
NS-BS transition area
Central Kattegat
BS-BP transition area (Baltic)
CPOD stations
EEZ
Discriminant delimitation
Main delimitation
Confidence Interval
North Sea-Belt transition area

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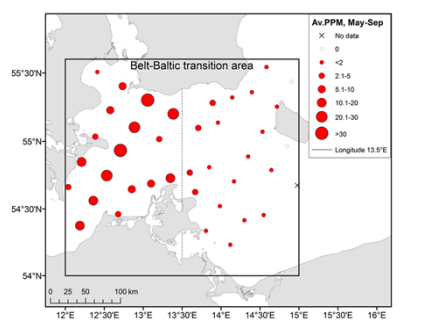
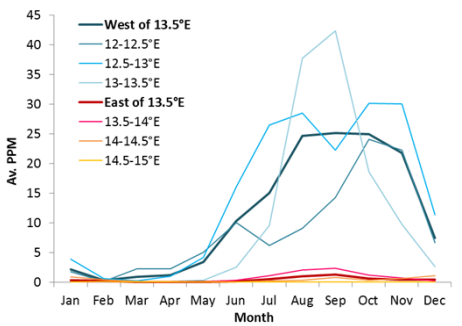
Population structure from SAMBAH





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Population structure conclusion

1. Harbour porpoises in the Baltic Sea has only been in the area for a maximum of 9000 years
2. Too short time to show clear differences?
3. Indications of adaptions to specific environments and little interest in movements between areas
4. Continuous distribution with overlap makes it difficult to establish clear borders necessary for effective management
5. Precautionary approach clearly suggest a separate population that is worth protecting if porpoises should still be living in the Baltic Sea in the future
6. More on this in next session by Ida Calén.

Statistical methods and results from density estimation

Len Thomas

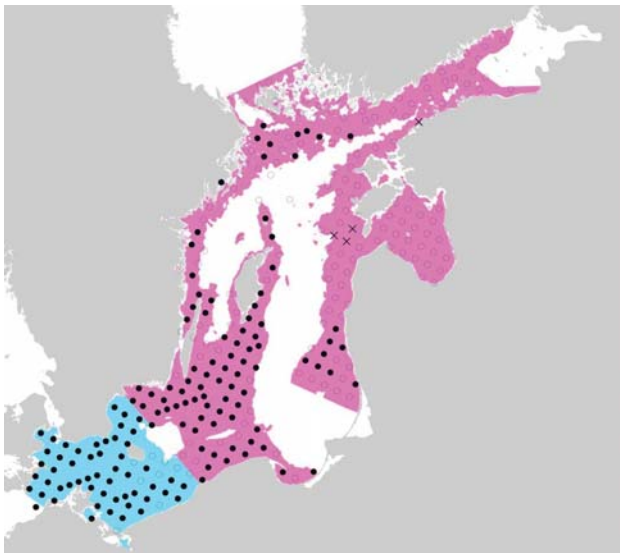
SAMBAH
Statistical methods and results

Len Thomas and Louise Burt
CREEM, University of St Andrews

SAMBAH Conference
Kolmården
8th December 2014

Goals

- Estimates of porpoise density and abundance
- Temporal scope:
  May 1 2011-April 30 2013
  - Estimates required
    - By season
    - By month
      (for habitat modelling)
- Geographic scope:
  (see map, right)
  - Estimates required
    - By region
    - By country
    - By point
      (for habitat modelling)



Methods overview

- Density calculated using a snapshot-based method on individuals

Number of porpoise-positive snapshots (assume max one animal per snapshot)

False positive proportion

$$\hat{D} = \frac{n(1-\hat{c})}{T\pi w^2 \hat{p}}$$

Average probability of detection for animal within distance w

Total number of snapshots (i.e., sum of number of snapshots over sites)

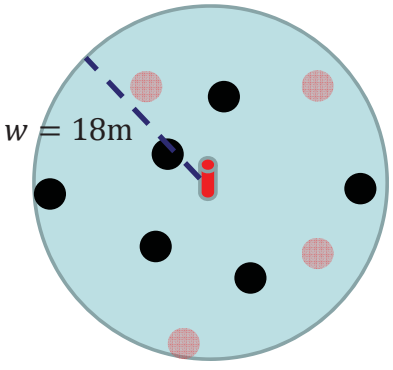
Truncation distance

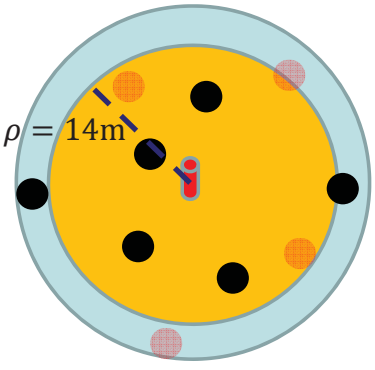
Effective detection area

$$\hat{D} = \frac{n(1-\hat{c})}{T\pi w^2 \hat{p}} = \frac{n(1-\hat{c})}{T\pi \rho^2} = \frac{n(1-\hat{c})}{T\hat{\nu}}$$

Effective detection radius

Effective detection area



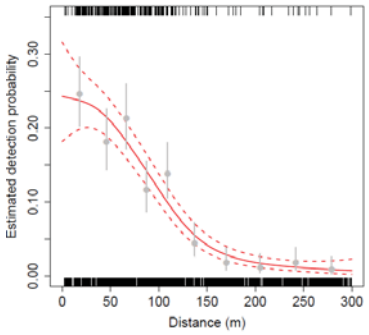


$\pi w^2 = 1000\text{m}^2$ $p = 0.6$

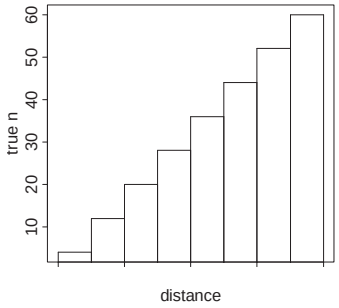
$\nu = 600\text{m}^2$

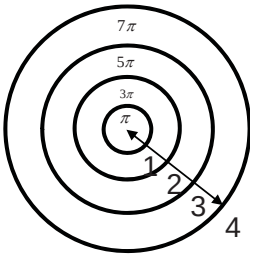
Estimating $\hat{p}$ or $\hat{v}$: A 3-step plan

1. Obtain a "detection function"
   $g(r)$
   (see later…)



2. Make an assumption about animal distribution around the sensors
   $\pi(r)$
   we assume a uniform distribution of animals



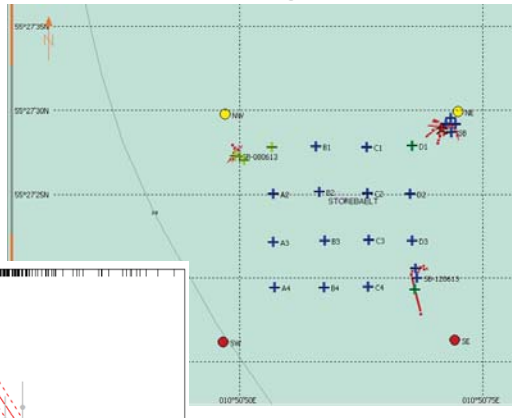


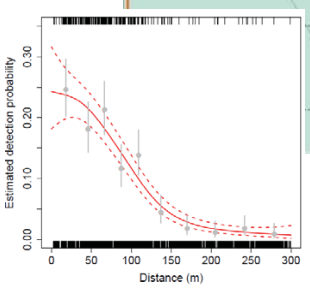
3. Combine 1 and 2 to get the average detection probability

$$p = \int_{r=0}^{w} \pi(r)g(r)dr$$

Obtaining a detection function

- Kerteminde tracking experiment
  - Use a ship-mounted acoustic tracking array to set up trials on free-swimming porpoise for a "garden" of CPODs moored nearby
  - Like an acoustics-only version of Line Kyhn's work at Fyns Hoved





Dealing with silent porpoises

- Acoustic tag studies
  - In the Kerteminde experiment, we can only track vocalizing animals.
  - Need to allow for non-vocalizing animals

$$p = p_v p_d$$

probability vocalizing

probability detected given vocalizing

  - Access to animals tagged in (non Baltic) Danish waters May 2010-July 2011 (thanks to Andrew Wright and Jonas Teilmann)

Applying the detection function to the SAMBAH positions

- Playback experiments
  - Detection probabilities developed at Kerteminde likely do not apply throughout the Baltic
  - Differences in sound propagation and animal behaviour
  - Idea: use playback experiments to address the former. Playback artificial clicks at a range of distances both at Kerteminde and at Baltic positions; determine which are detected on C-PODs (note no classification)

Applying the detection function to the SAMBAH positions II

- Playback experiments II
  - Model playback success/failure as a function of environmental covariates
  - For each location, *b*, and time (month), *t*, estimate average playback detection prob $p_{p[b,t]}$
  - Assume the ratio of playback detection probs at different locations is proportional to ratio of porpoise detection probs at those locations
  - Can estimate absolute detection prob as

$$p_{[b,t]} = p_v p_d \frac{p_{p[b,t]}}{p_k}$$

    where p_k is the playback detection prob for Kerteminde.

(Notation works better if using effective area.)

Summary

$$\widehat{D}_{[t,b]} = \frac{n_{[b,t]}(1-\hat{c})}{T\pi w^2} \frac{p_k}{p_v p_d p_{p[b,t]}}$$

- Easily adapted to yield estimates of density pooled over times/positions
- Abundance is density times area
- Variance comes from bootstrap method

Assumptions

1. Snapshot counts are at most one animal
2. No false positives
3. Positions are representative of study area (despite some secondary positions used)
4. Missing deployment data are missing at random (i.e., no relationship with density)
5. Tagged animals have vocal behaviour representative of average Baltic animal
6. Tags record all [one minute periods] (see later for 2m depth used – assumes >2m representative)
7. Kerteminde trial animals are representative of Baltic population in their behaviour; porpoise associations and locations in Kertiminde are accurate
8. Playback experiments using click detection accurately model detectability of click trains at Baltic positions, relative to detectability at Kerterminde
9. (Not strictly an assumption: Adequate sample sizes exist of encounter data, tags, Kerteminde trials and playbacks.)
10. Further assumptions required for variance estimation.

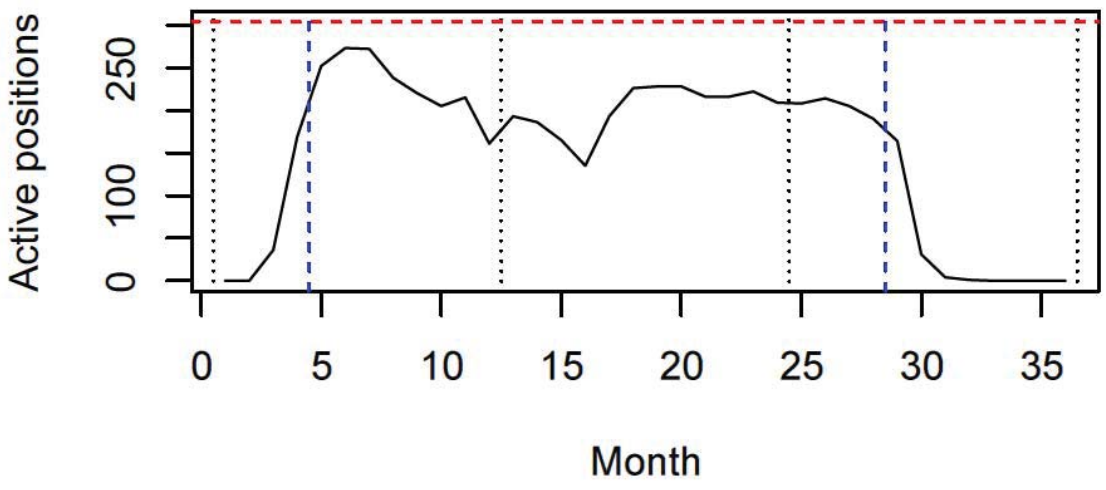
Some specifics

- n – 1 second snapshot
  - – assume we detect only one individual
  - – assume we know location (in Kerteminde)
  - – downside: small ν
- c – assume negligible (i.e., zero)

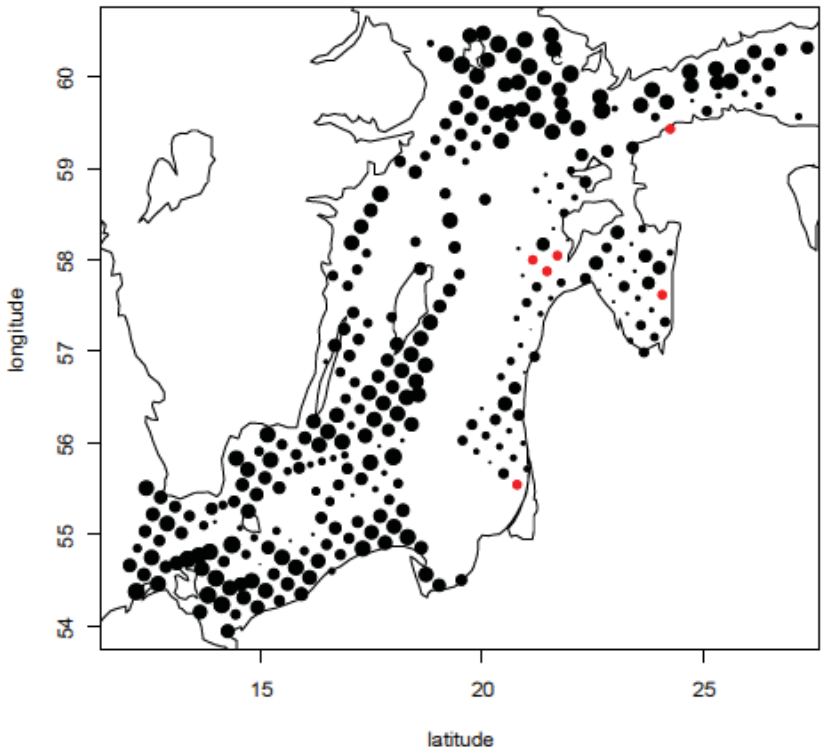
Results

Main survey - Survey effort

- 298 of 304 positions surveyed
- ~392 years of data before truncation
- 62% coverage during target period (1 May 2011 – 30 April 2013)

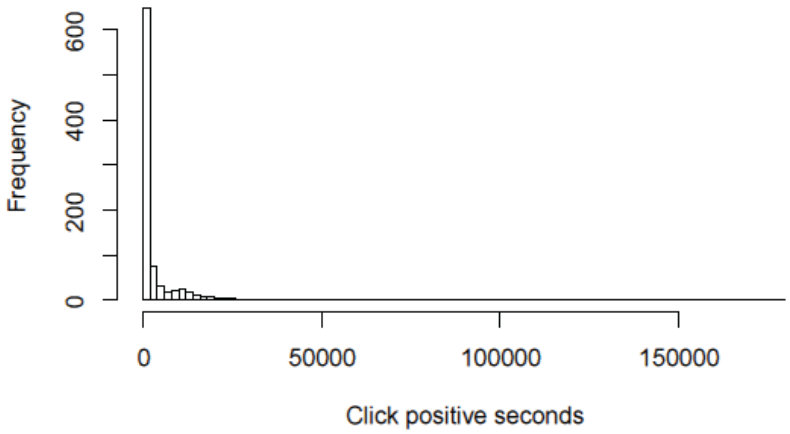


Main survey - Survey effort

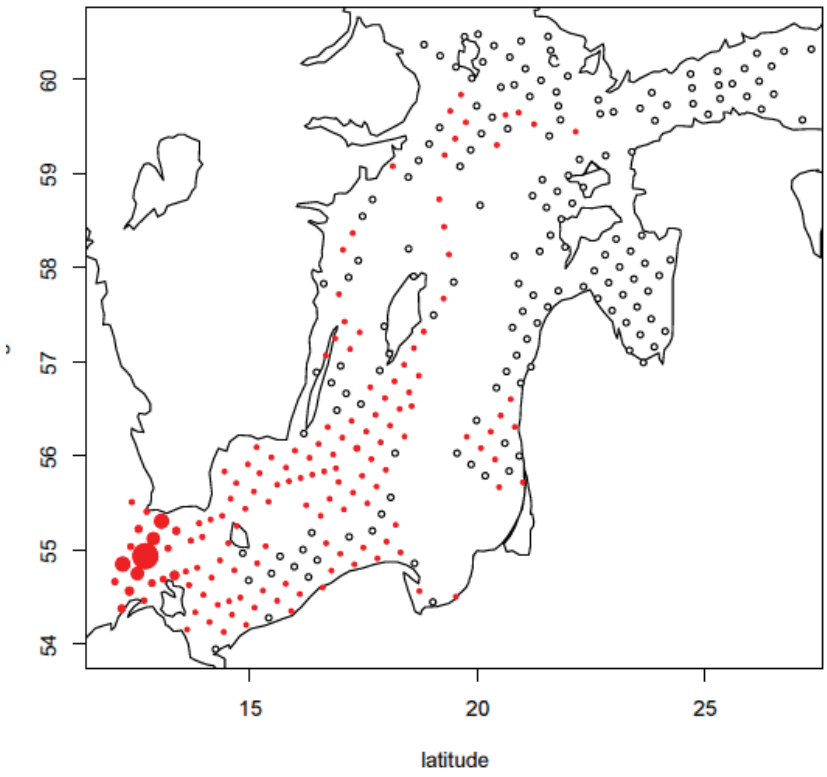


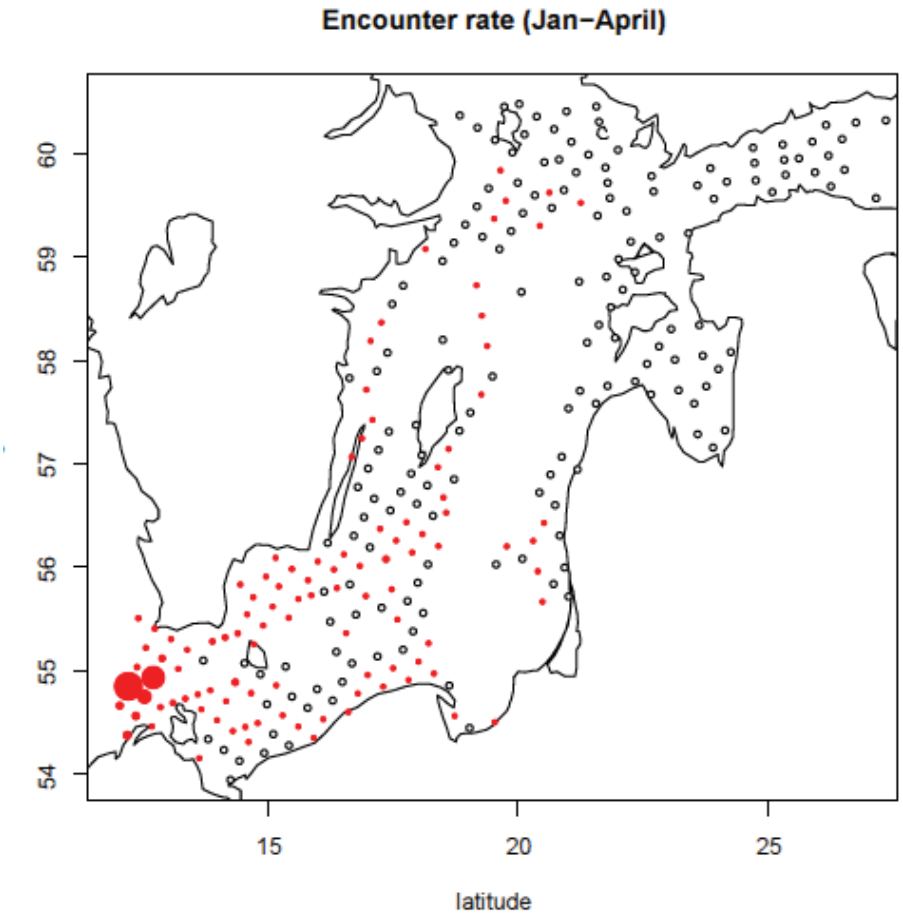
Click data

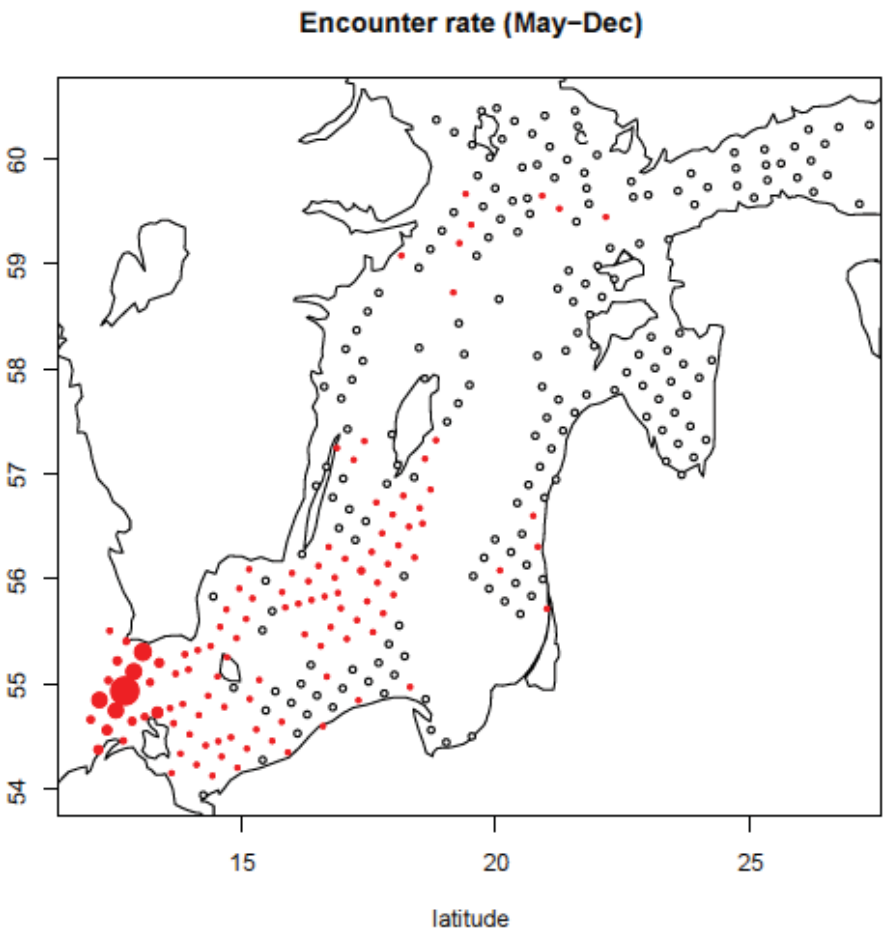
- ~5.9 million click positive seconds
- (N.B.~2.6 million seconds in a month)



Encounter rate







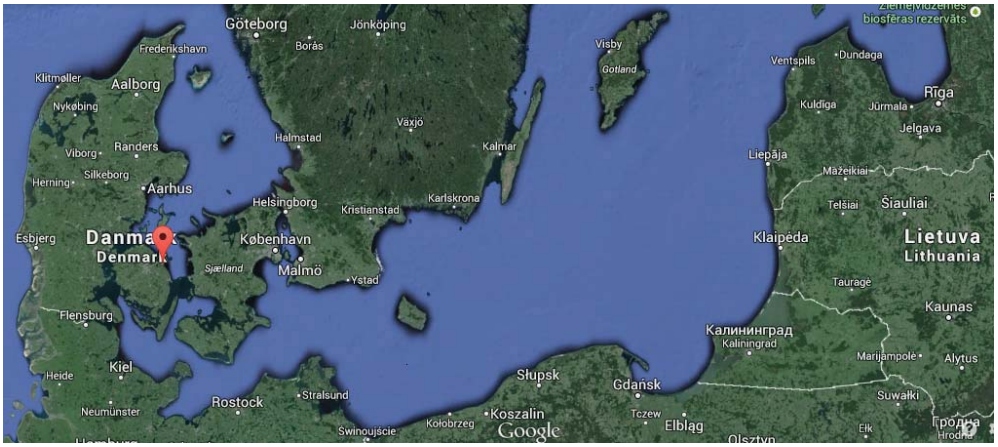
Diel pattern

Relative encounter rate

Morning	1.21	1.44
Day	1.00	1.00
Evening	1.07	1.21
Night	1.84	2.08

Kerteminde study

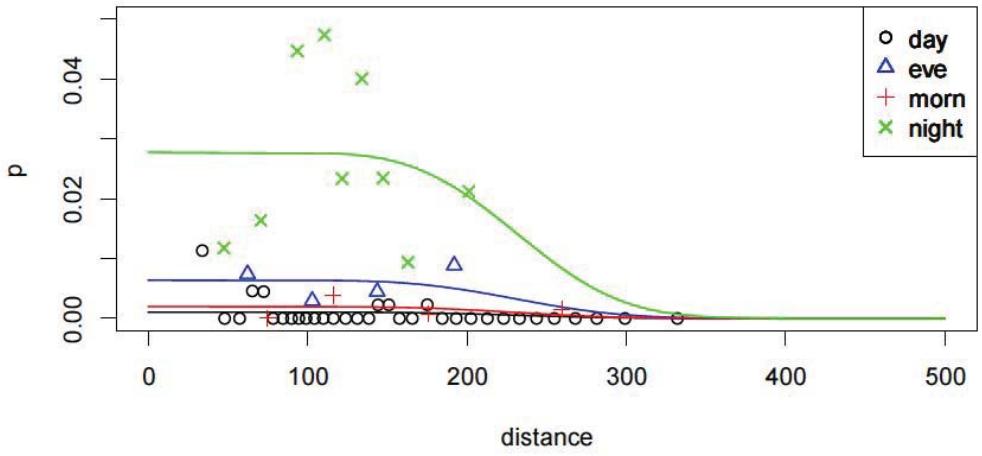
- Jens Kobliz, Jamie MacAulay, many others
- ~1 month fieldwork (27 May - 22June 2013),
  5 days with porpoises
- 16 C-PODs, depth ~20m + acoustic tracking array
- Visual observers to check only one porpoise present



Kerteminde results

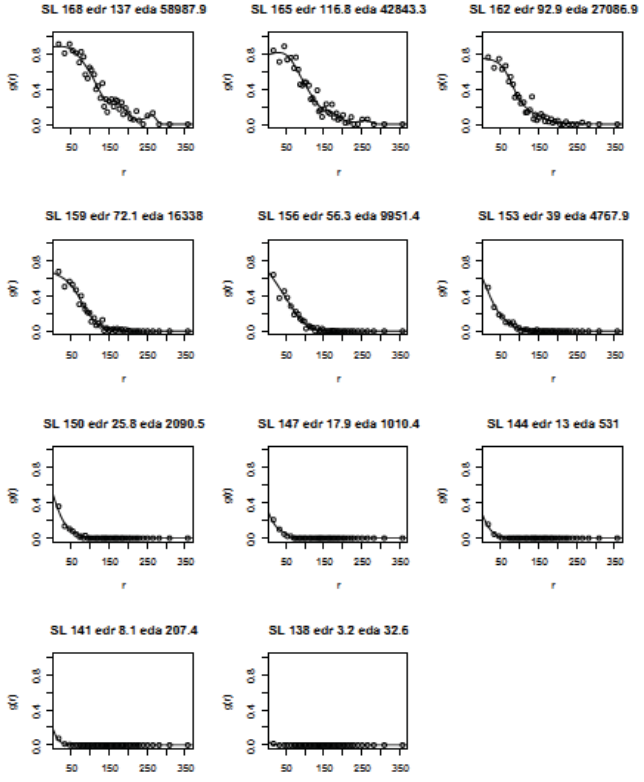
- 36 “encounters” 5-240 seconds, mean 63; 38 mins total
- ~7 hrs (~26,000 s) C-POD recordings during encounters
- 137 click-positive seconds
- 11 C-PODs detected clicks; 5 did not

Kerteminde detection function

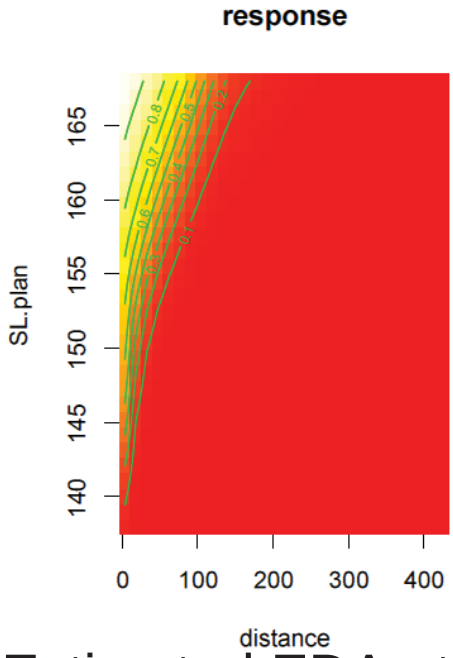


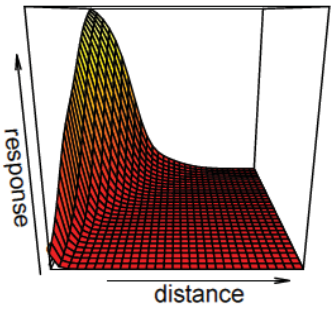
- Estimated Effective Detection Area
  EDA = 1101.7m^2

Kerteminde playback experiment



Kerteminde playback detection model

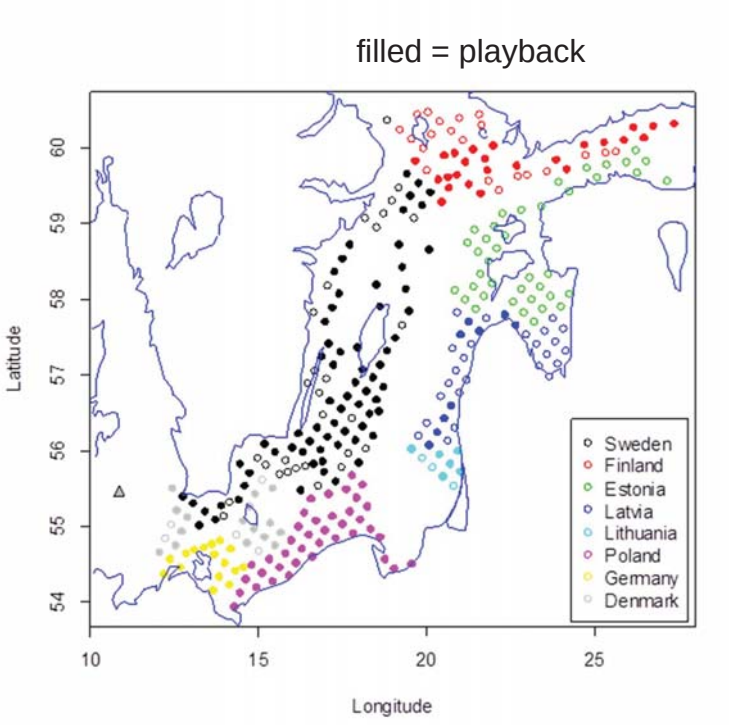




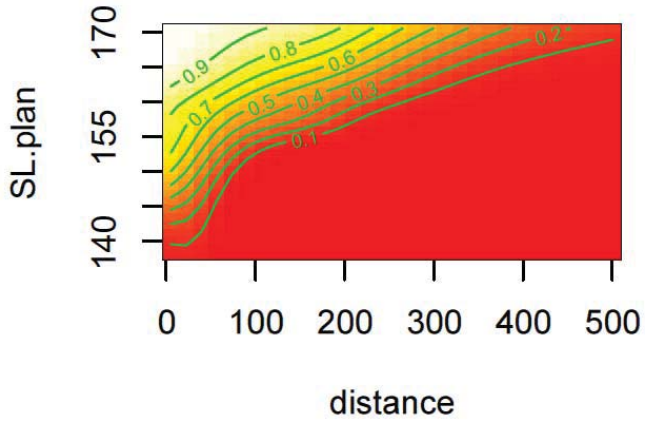
- Estimated EDA at source level 168dB
  EDA = 62,235 (CV 13%)

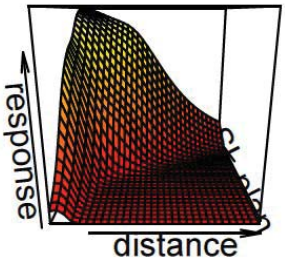
Baltic playback experiments

- Aim: 2 per station (winter/summer)
- Realized 46% (253)
- Equipment failure
- Some issues with playback distances



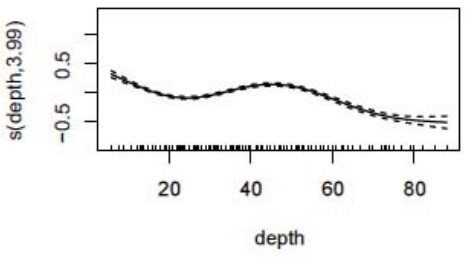
Baltic playback detection model

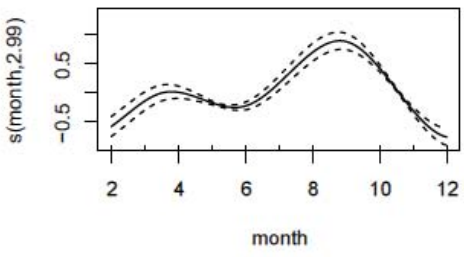


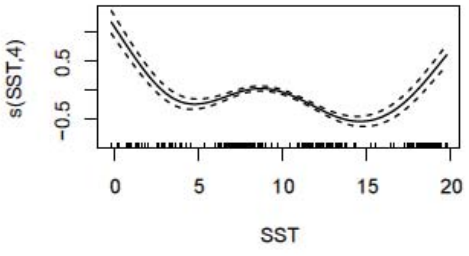


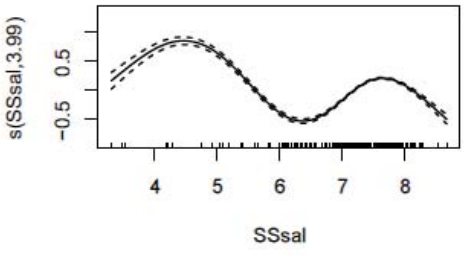
Baltic playback detection model

- “Environmental” covariates



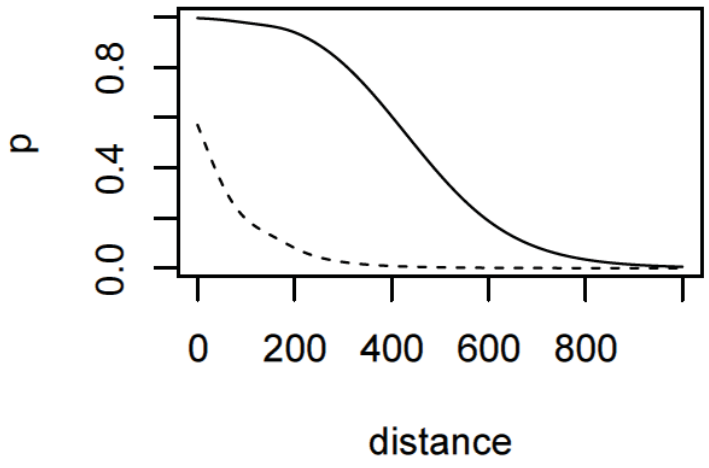






Baltic playback predicted EDA

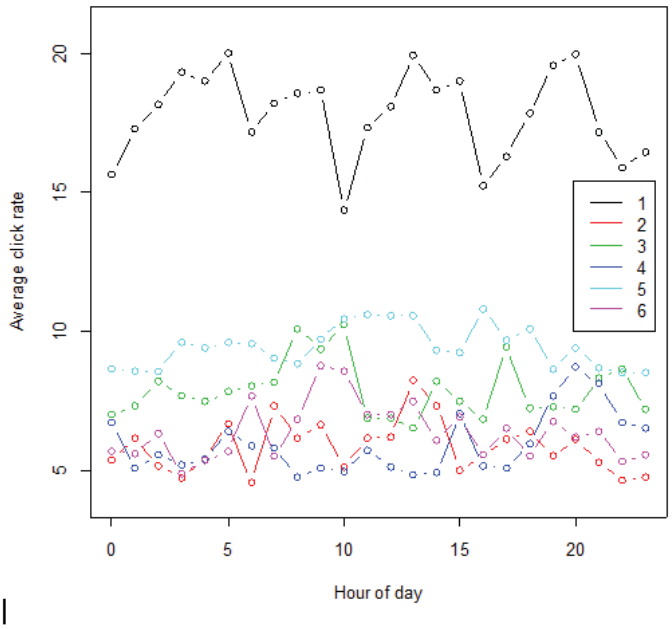
- EDA (for source level 168dB) predicted for each station and month, depending on environmental conditions



biggest and smallest detection function

Tagging study

- 6 animals; 94 days
- No strong dial pattern
- p = 0.84 (CV 9.5%)



Variance estimation

- Bootstrap
  - Encounter rate. Sample stations within countries/regions
  - Kerteminde detection function. Sample encounters.
  - Kerteminde playback. Parametric bootstrap.
  - Baltic playback. Sample stations within countries/regions.
  - Tag. Parametric – from beta distribution.

SAMBAH Results

Here we present estimates by season (Summer/Winter) and region (for summer) over the whole survey period

Season/ Region	D	95%LCL (D)	95%UCL (D)	N	95%LCL (N)	95%UCL (N)	CV %
Winter	0.017	0.0077	0.050	2,889	1,285	8,380	64%
Summer (NE)	0.0033	0.00068	0.0075	447	90	997	66%
Summer (SW)	0.63	0.40	1.14	21,512	13,724	38,612	29%

Spatial distribution of porpoises in the SAMBAH area

Ida Carlén

Distribution of porpoises in the SAMBAH area

Ida Carlén, AquaBiota

Aims of SAMBAH

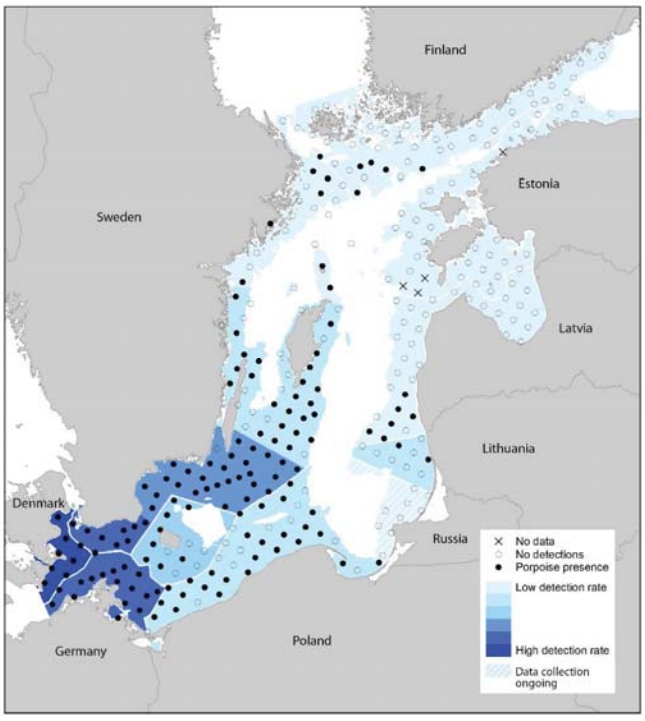
- Abundance
  The whole study area and per country
- Distribution maps
  Hotspots, conflicts, habitat preferences
- Demonstrate best practice
- Increase awareness

Photo: Signe Sveegaard

Detections of porpoises

Average detection rate and accumulated detections

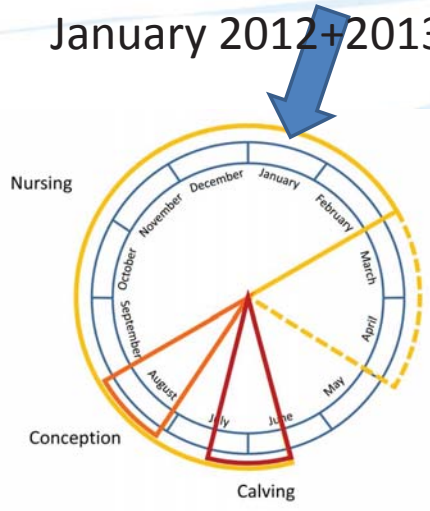
- Accumulated detections over the whole study period
- Overall average per country or large area
  Sweden divided into 4 areas, Denmark has 2 sub-areas
- Relative 6-grade scale

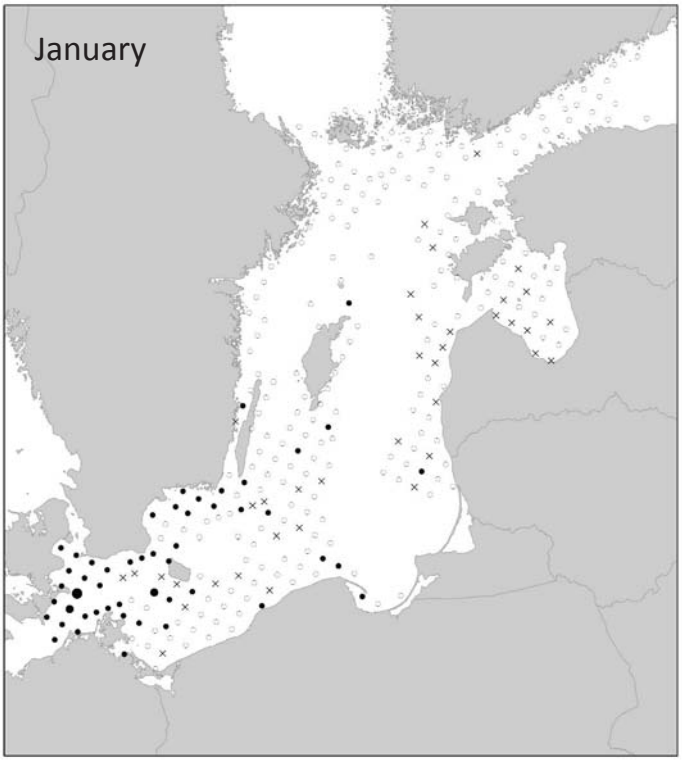


Monthly detections

Hel1 detection rate/station and month

January 2012+2013

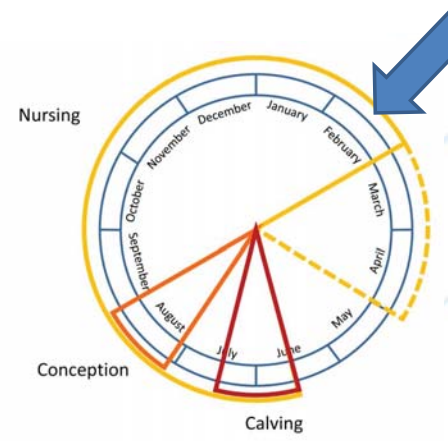


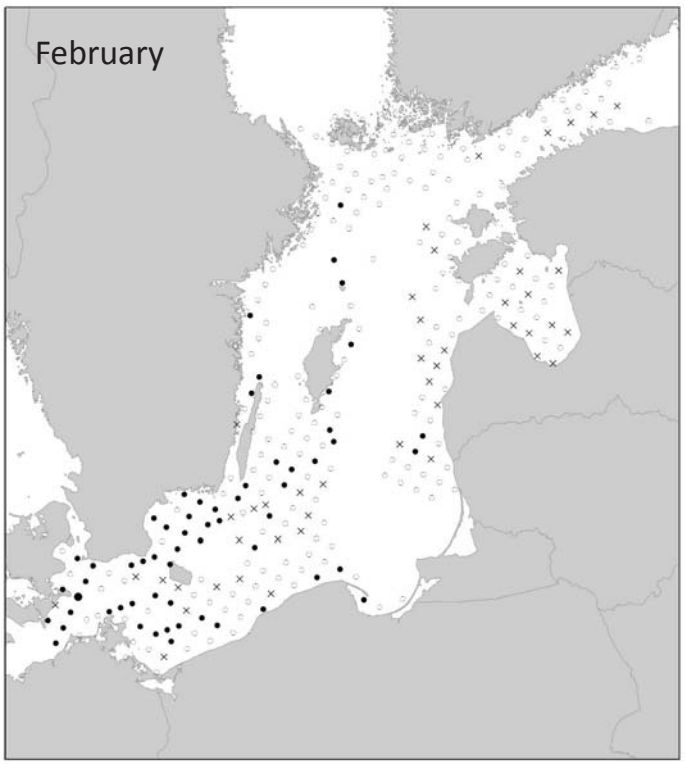


Sørenzen & Kinze 1994
Börjesson and Read 2003
Lockyer and Kinze 2003
Hasselmeier at al. 2004
Hedlund 2008

Hel1 detection rate/station and month

February 2012+2013





Sørenzen & Kinze 1994
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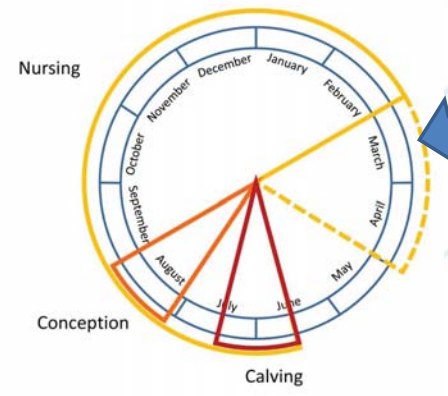
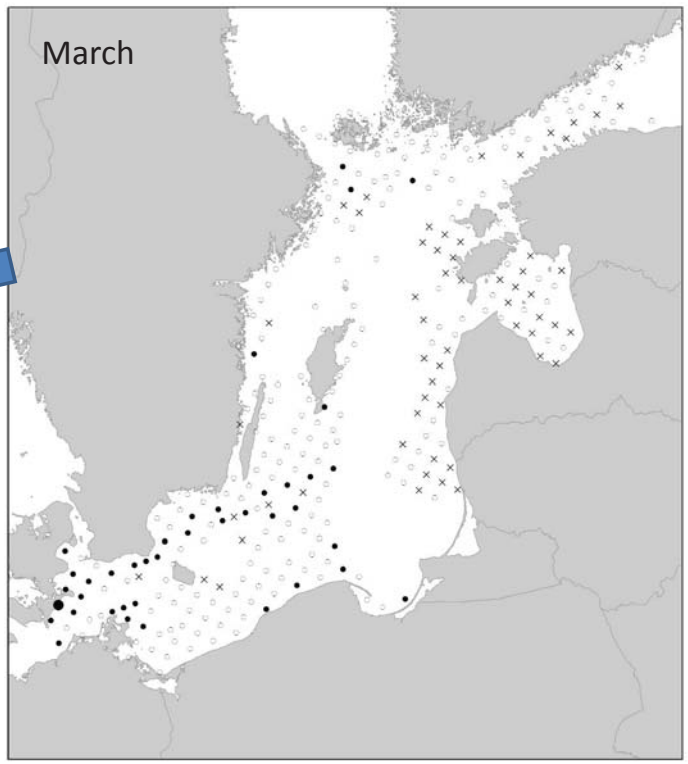
Hedlund 2008

Hel1 detection rate/station and month

March 2012+2013





Sørenzen & Kinze 1994
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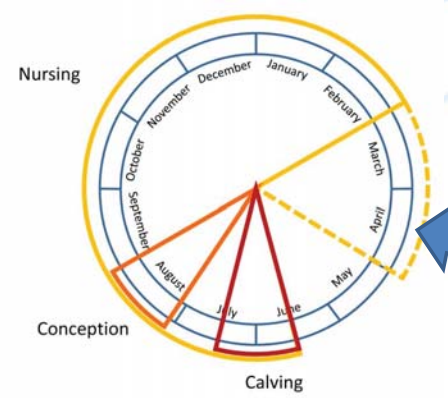
Hel1 detection rate/station and month

April 2012+2013



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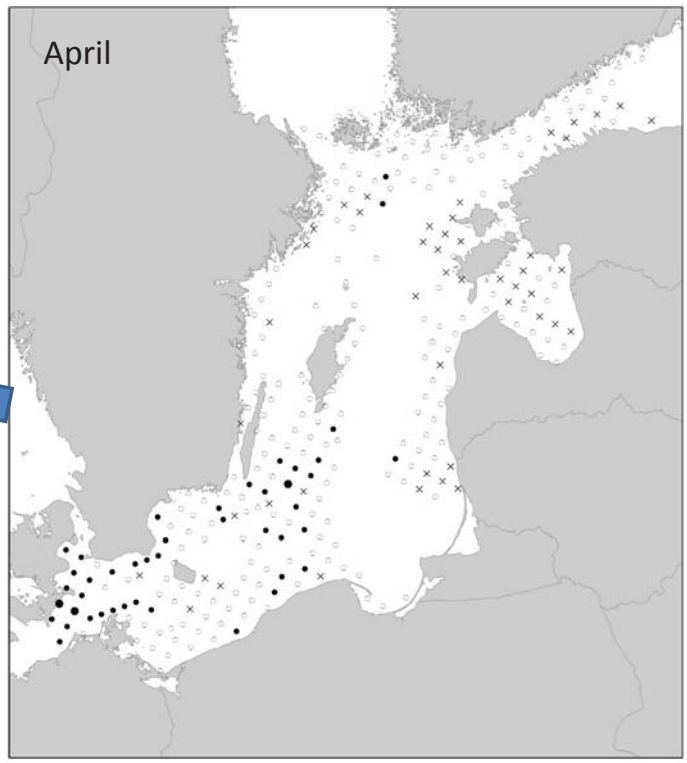
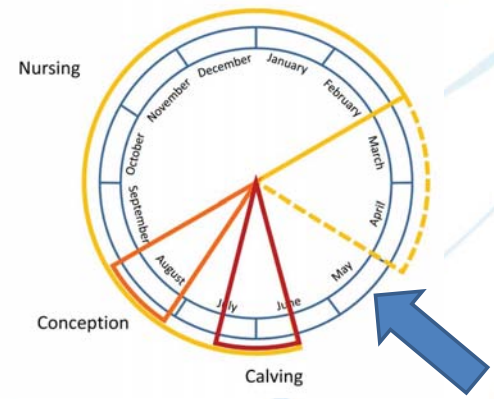


Hel1 detection rate/station and month

May 2011+2012



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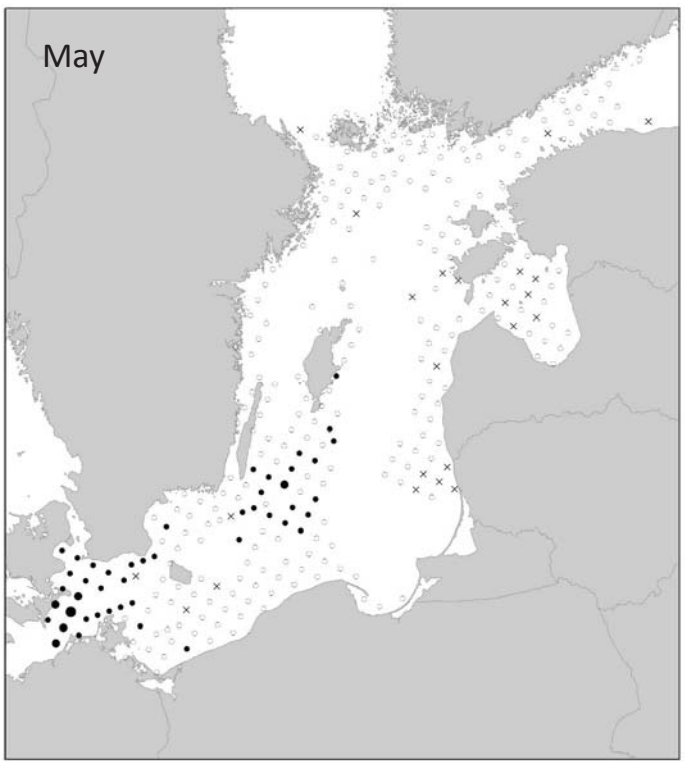
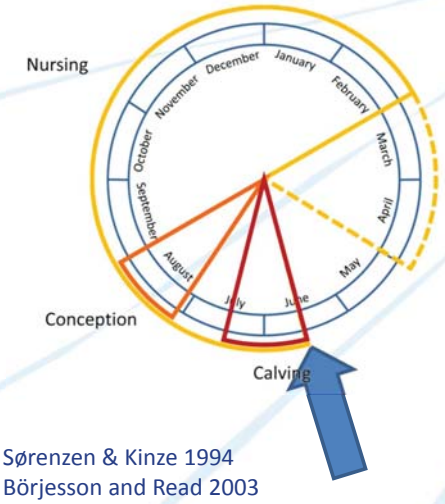


Hel1 detection rate/station and month

June 2011+2012



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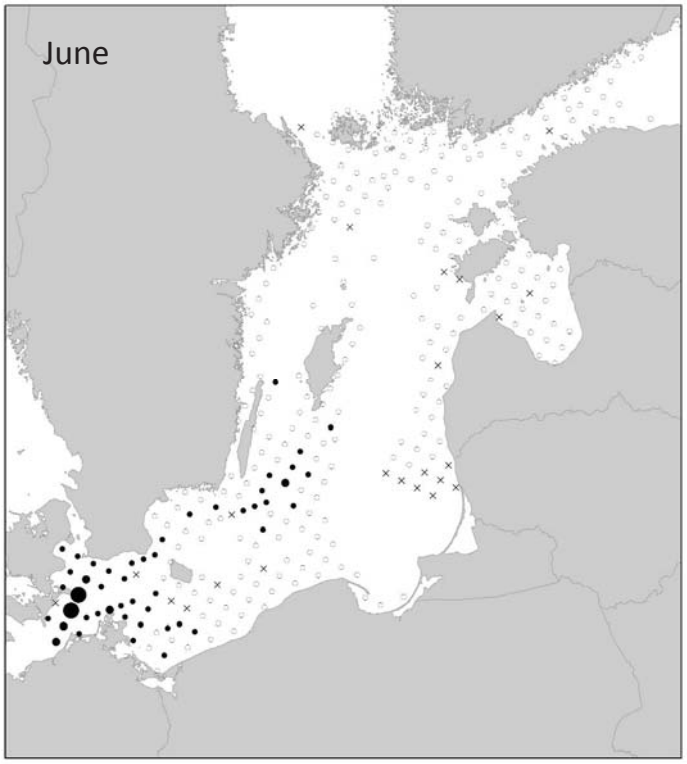
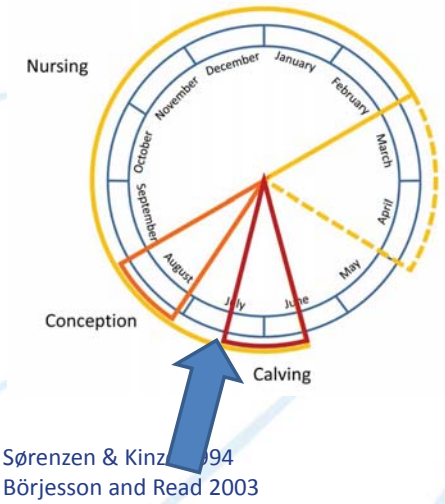
Hedlund 2008



Hel1 detection rate/station and month

July 2011+2012



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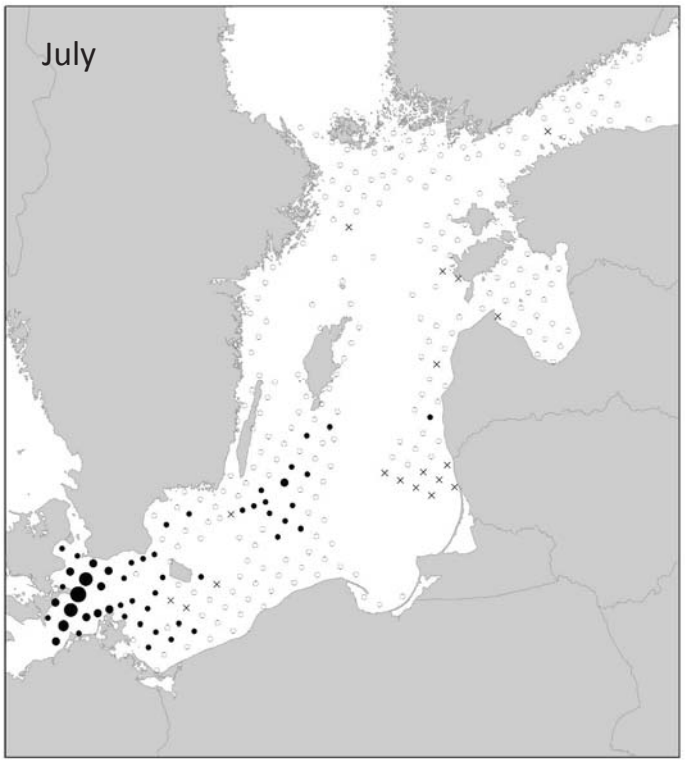
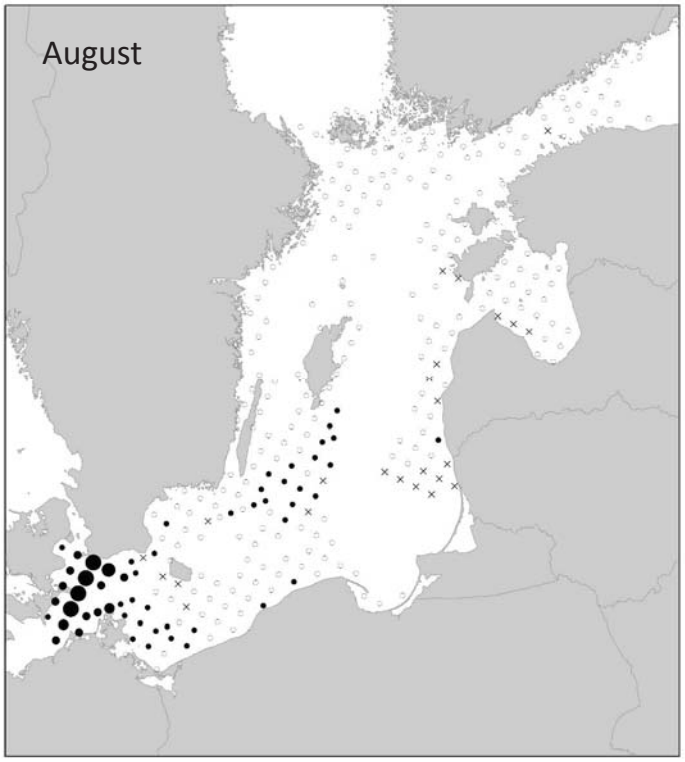
Hedlund 2008



Hel1 detection rate/station and month

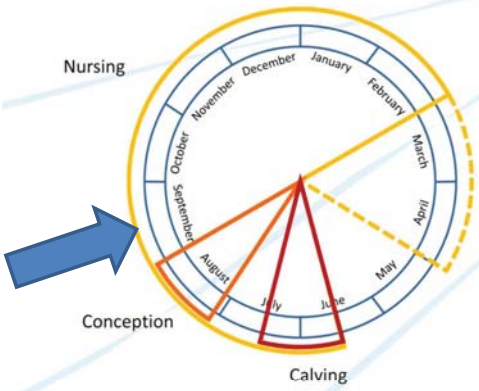
August 2011+2012

Sørenzen & Kinze 1994
Börjesson and Read 2003
Lockyer and Kinze 2003
Hasselmeier at al. 2004
Hedlund 2008



Hel1 detection rate/station and month

September 2011+2012



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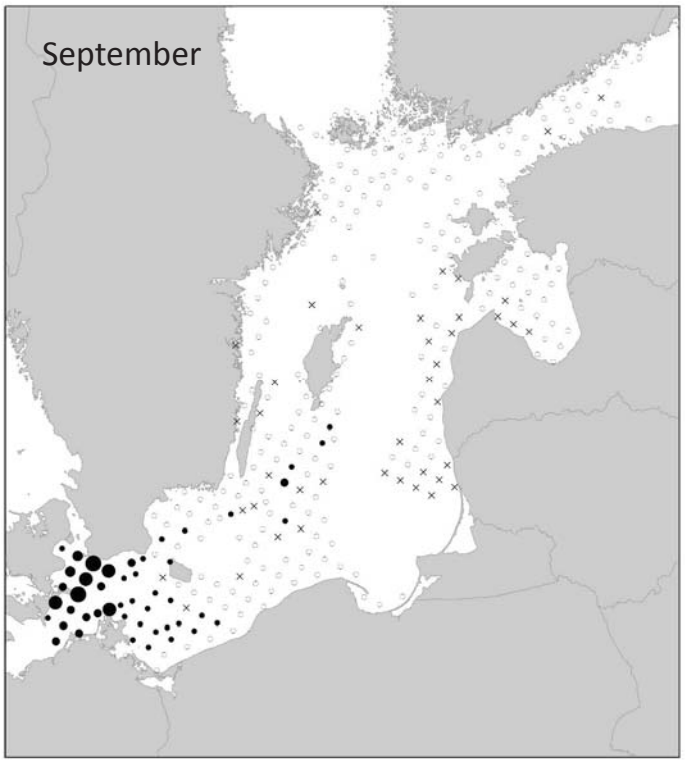
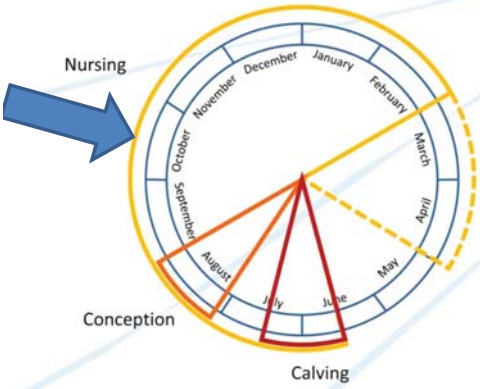


Hel1 detection rate/station and month

October 2011+2012



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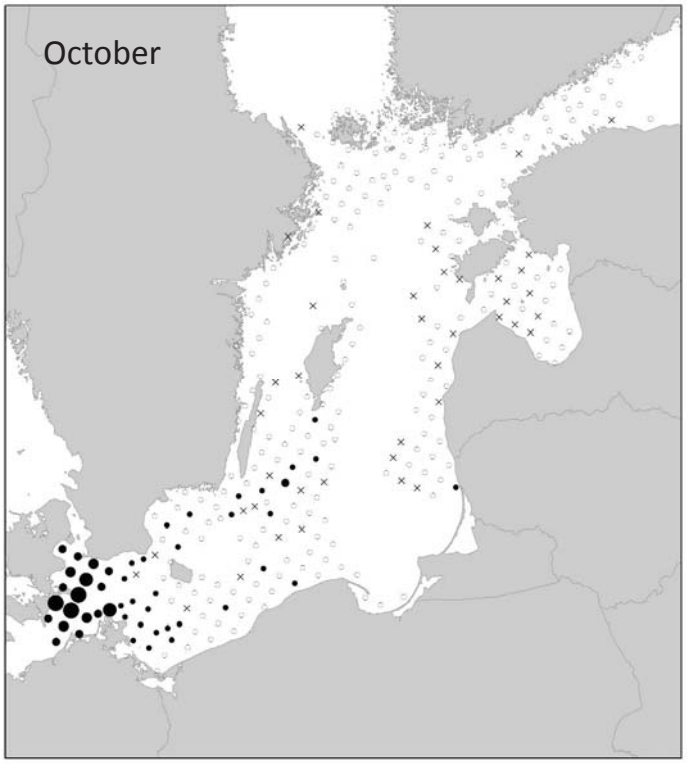
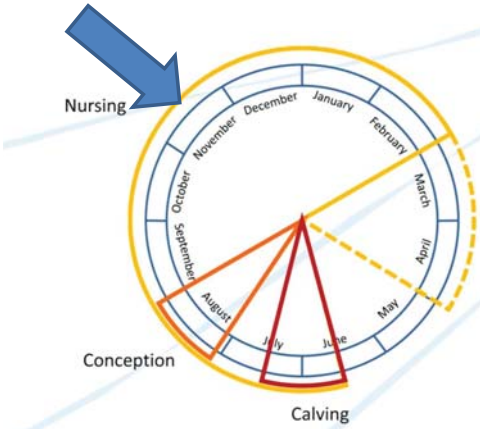


Hel1 detection rate/station and month

November 2011+2012



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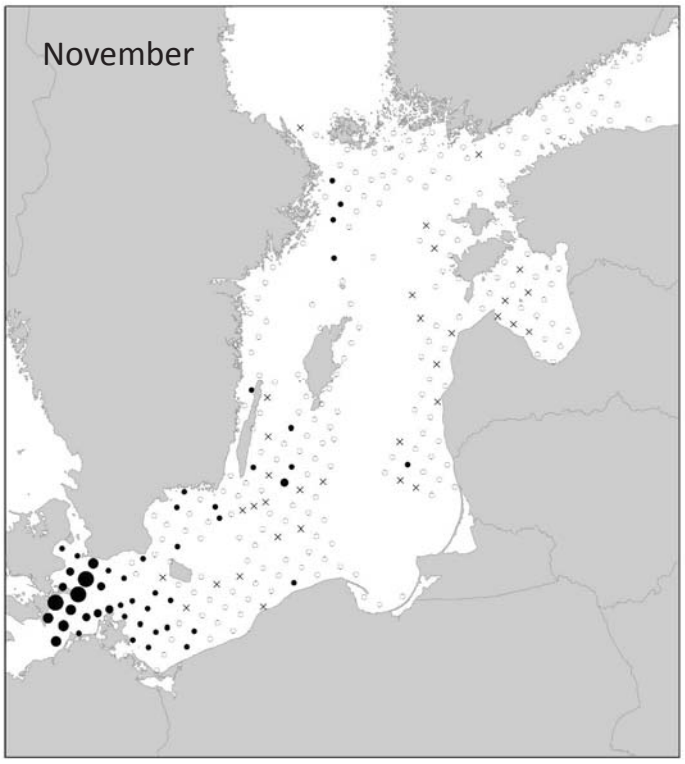
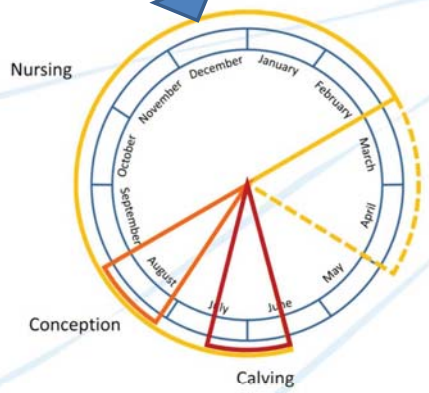
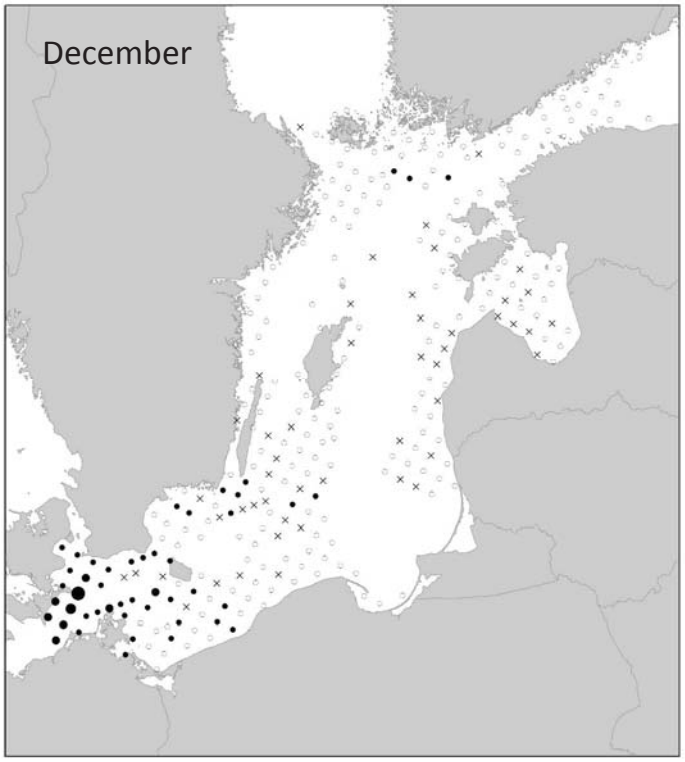


Hel1 detection rate/station and month

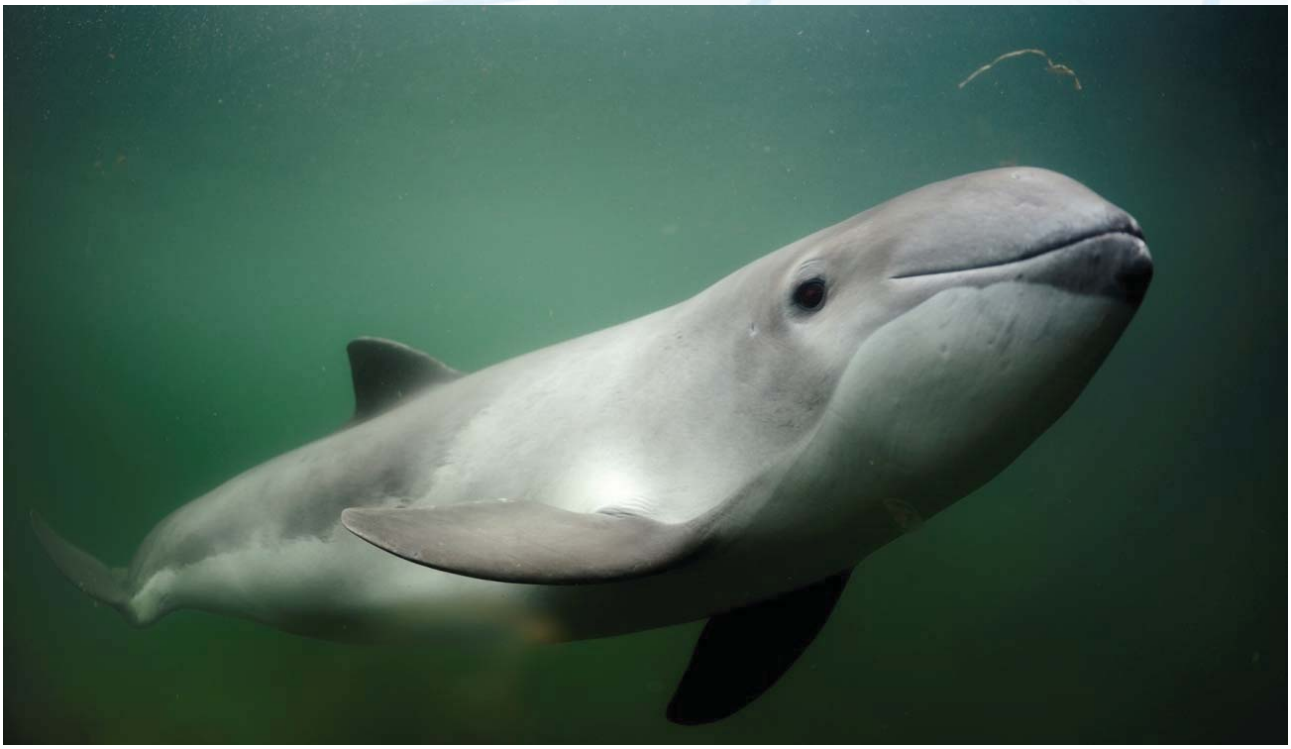
December 2011+2012



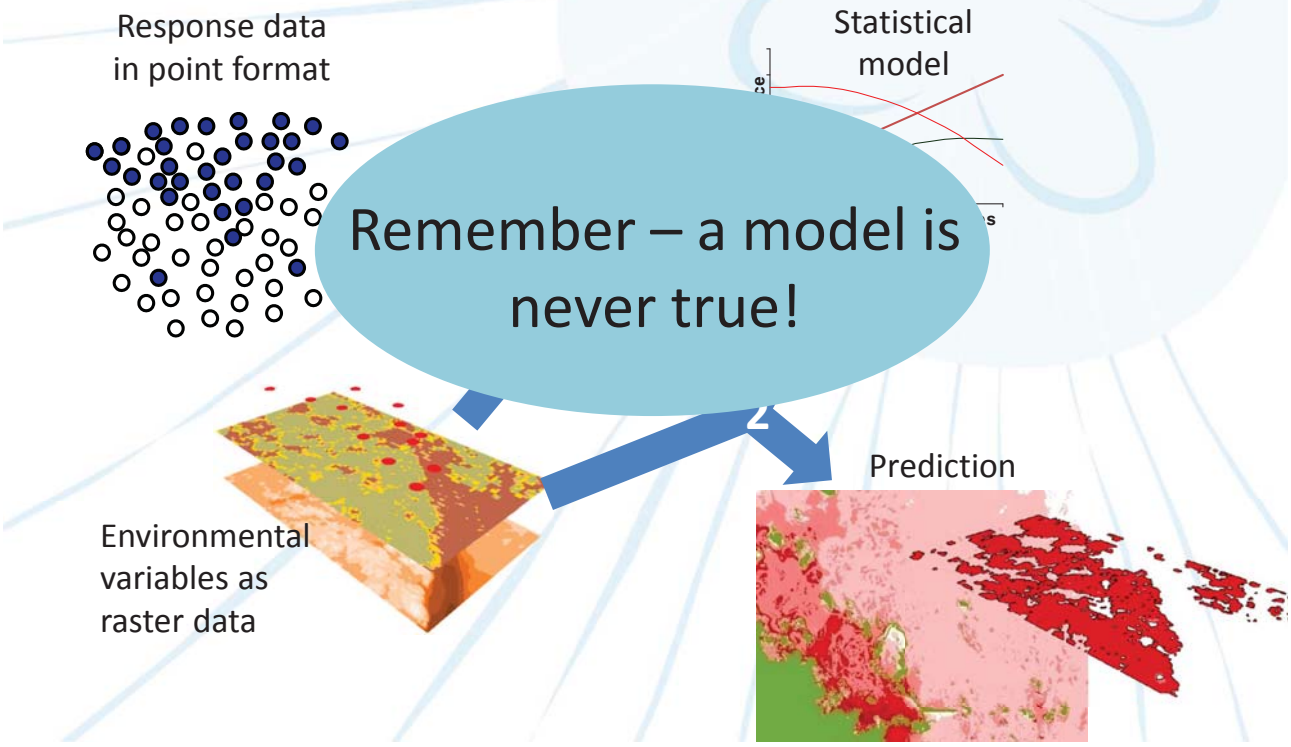
Sørenzen & Kinze 1994
Börjesson and Read 2003
Lockyer and Kinze 2003
Hasselmeier at al. 2004
Hedlund 2008



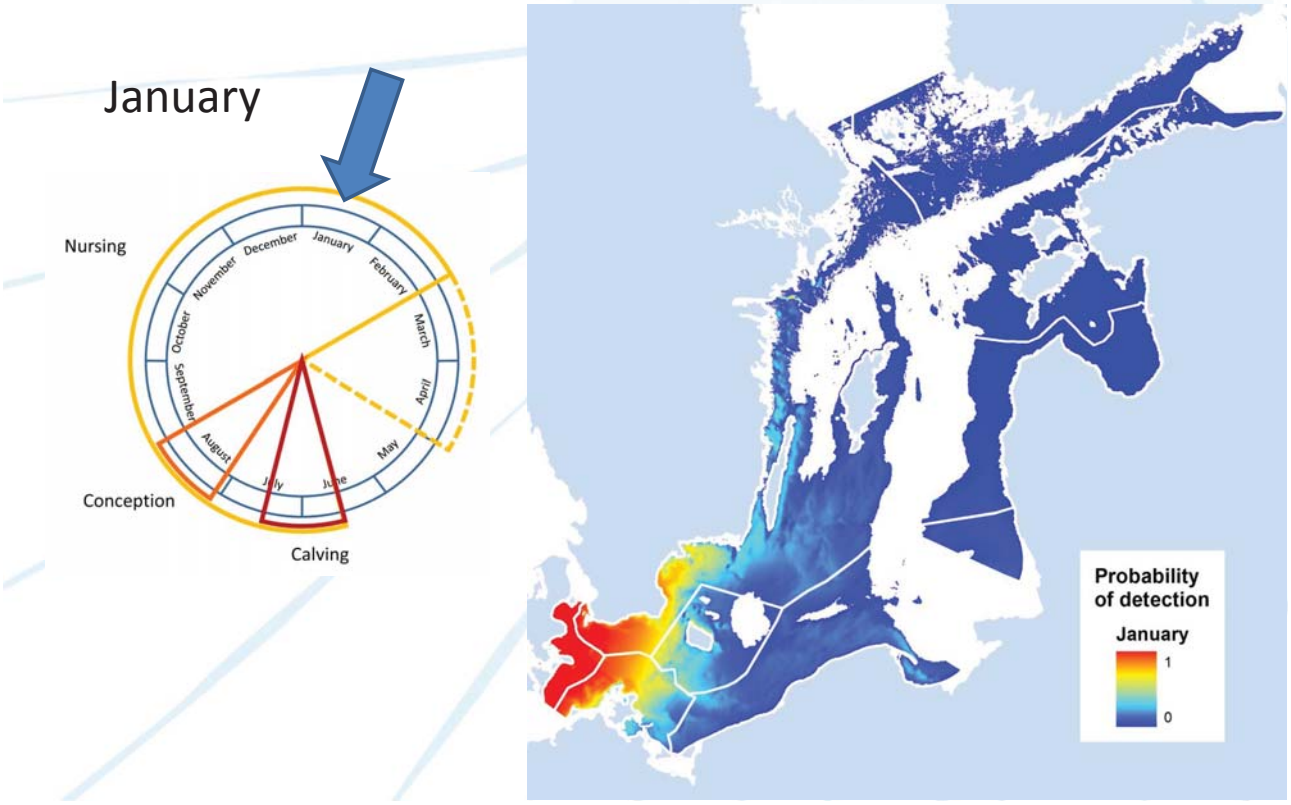
From detections to distribution



Species distribution modelling

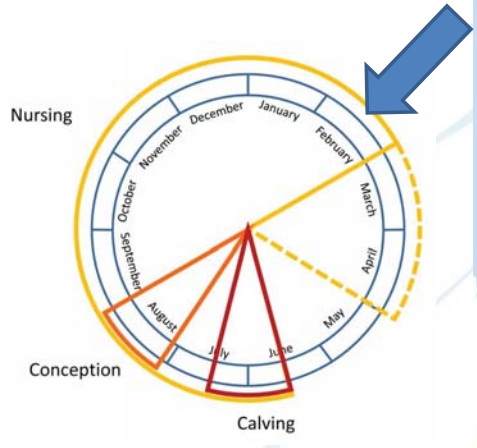


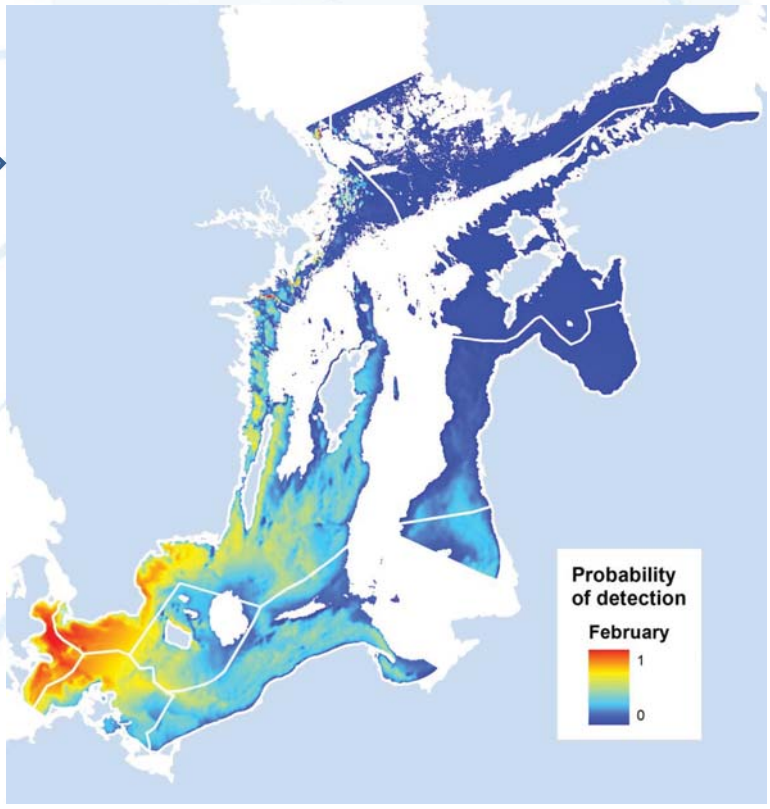
Porpoise distribution



Porpoise distribution

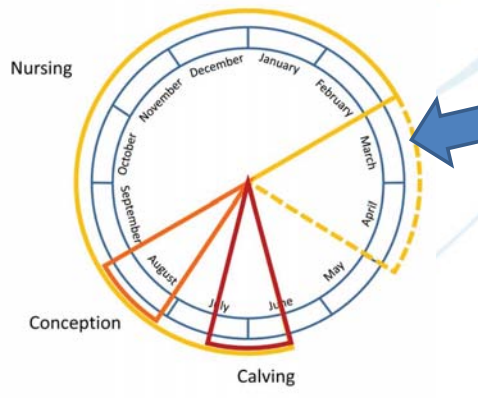
February

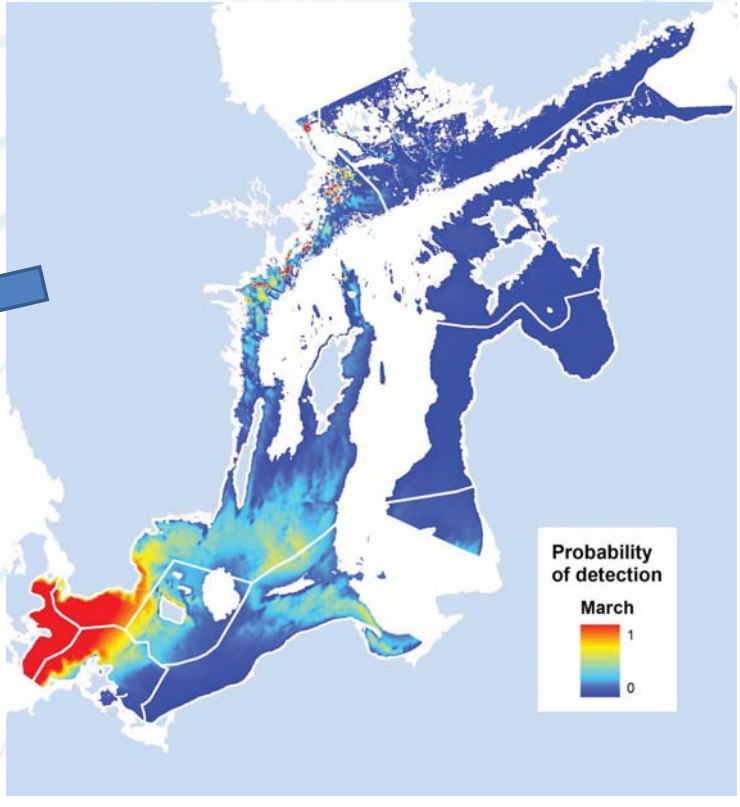




Porpoise distribution

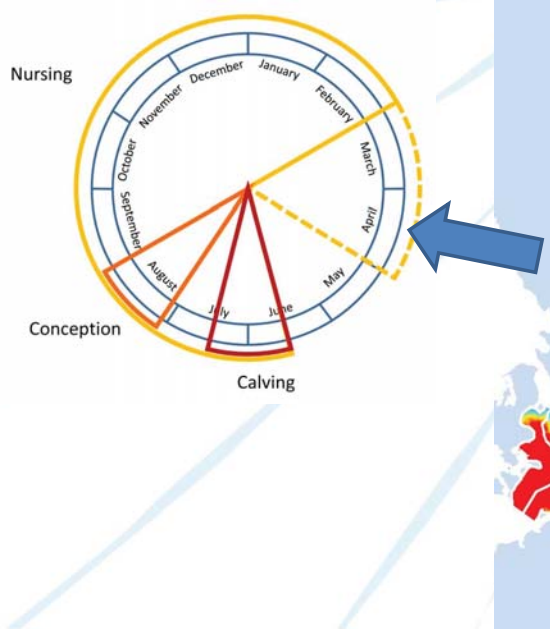
March

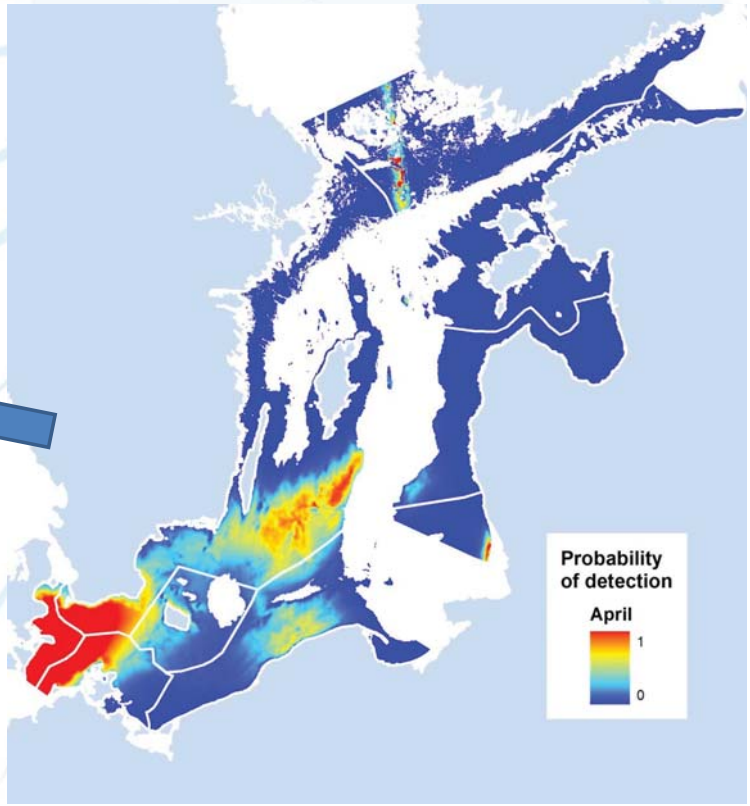




Porpoise distribution

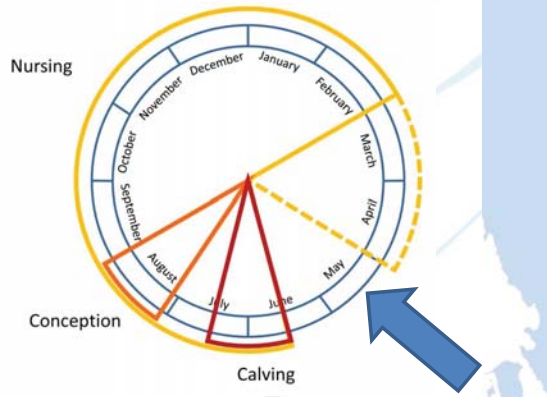
April

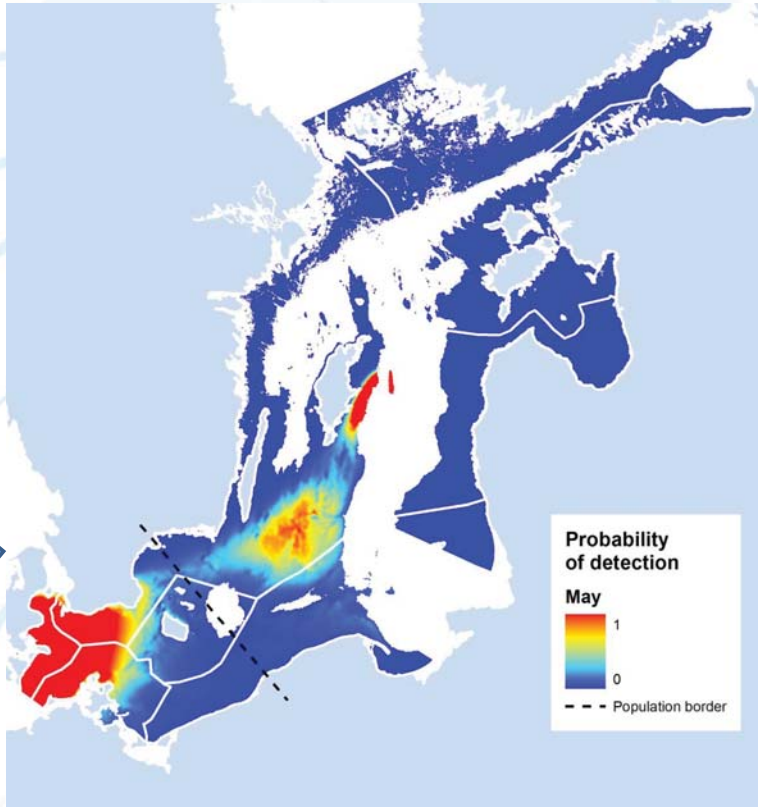




Porpoise distribution

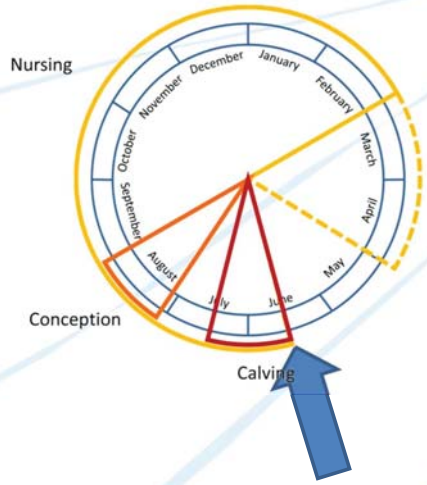
May

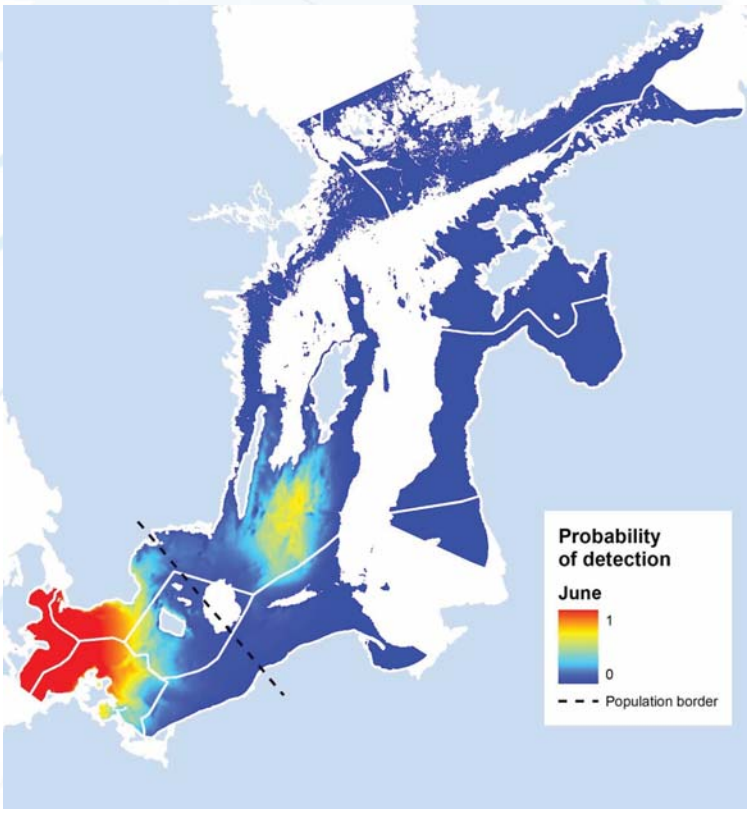




Porpoise distribution

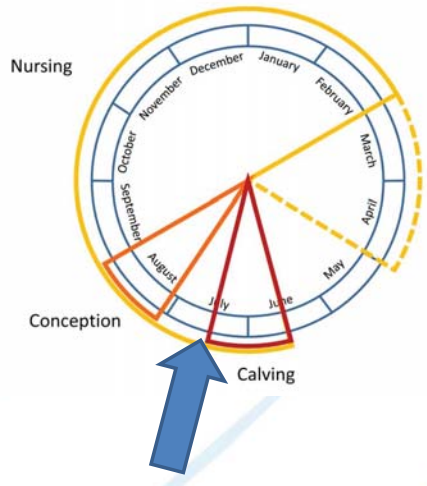
June

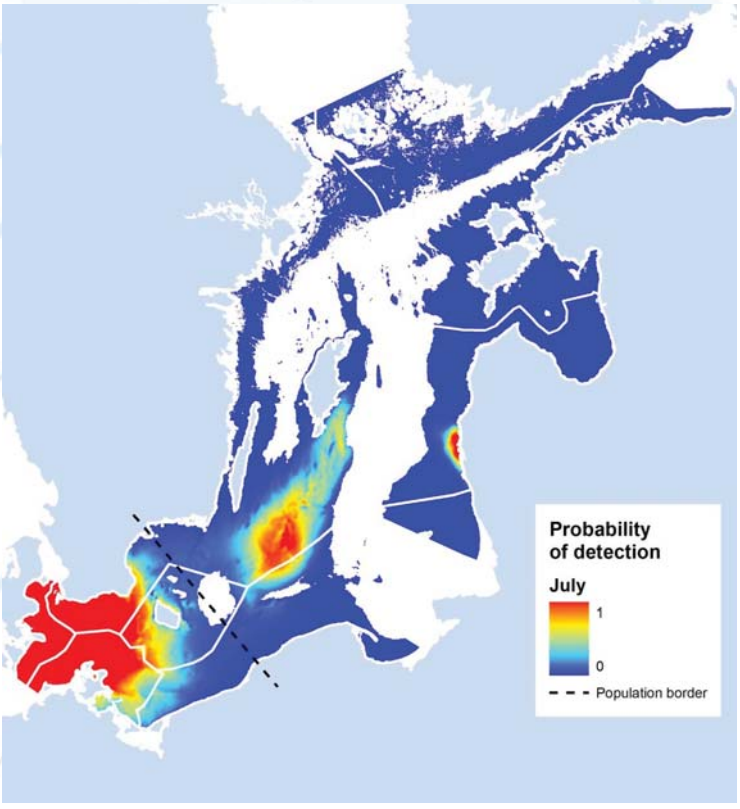




Porpoise distribution

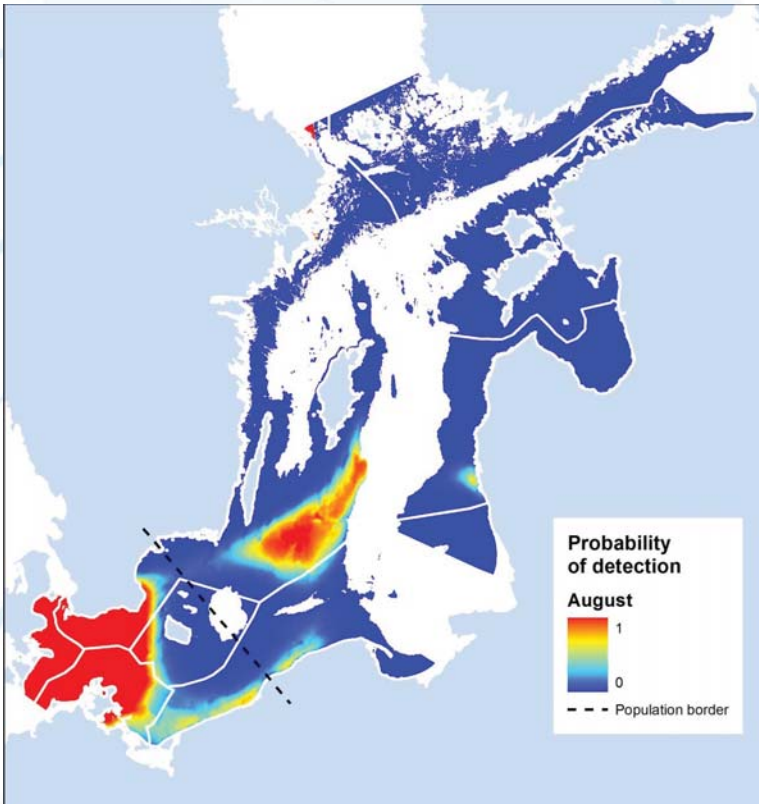
July





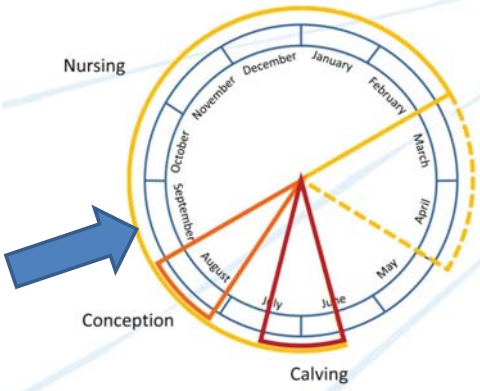
Porpoise distribution

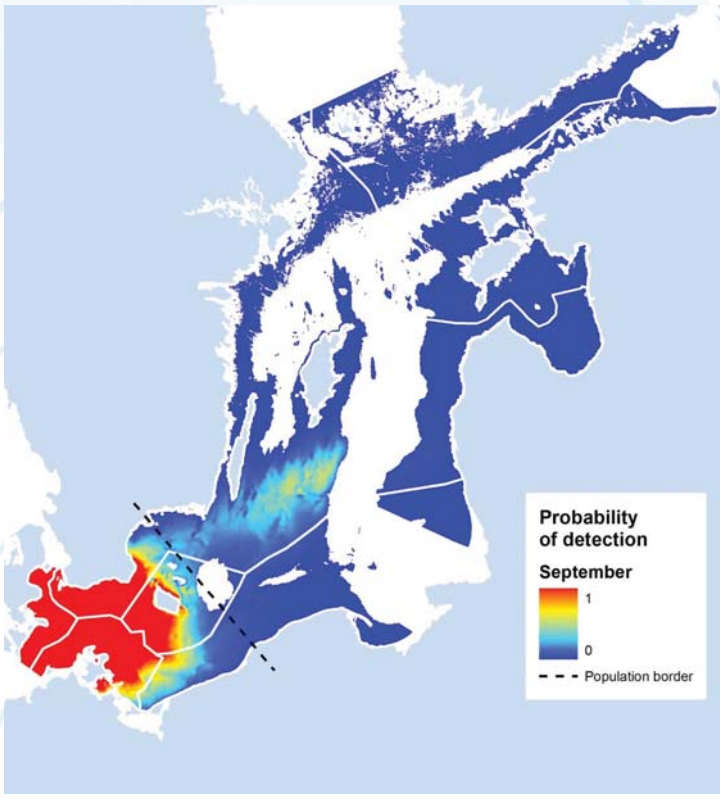
August



Porpoise distribution

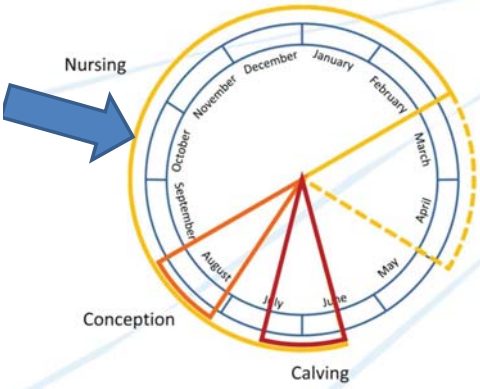
September

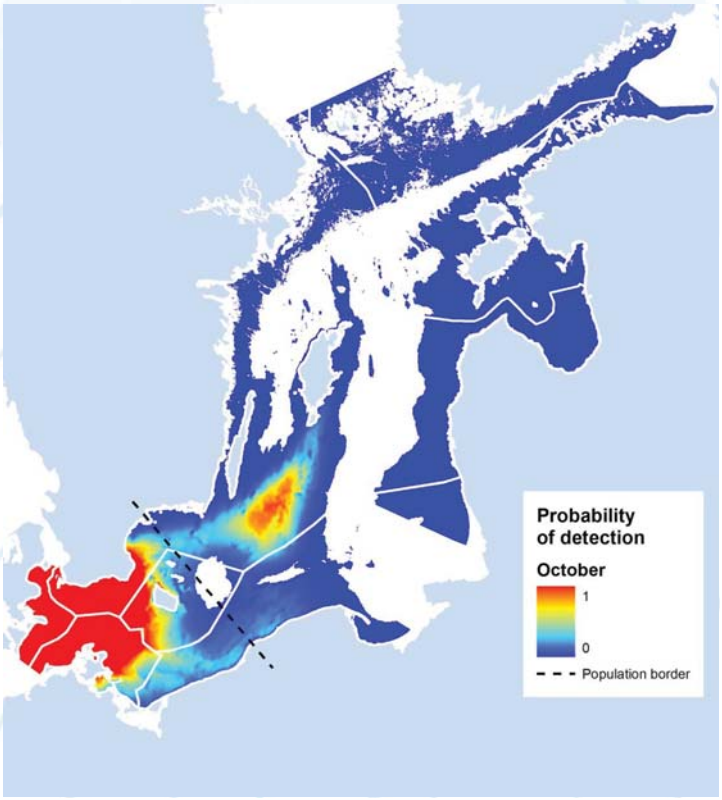




Porpoise distribution

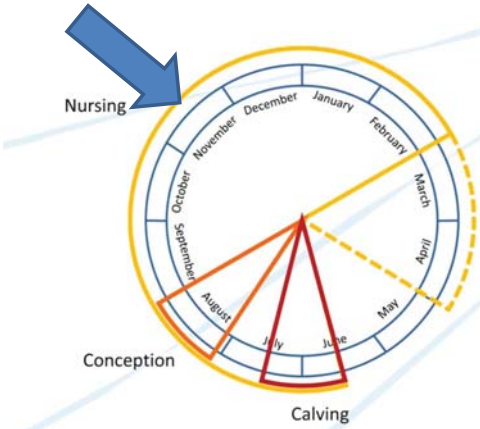
October

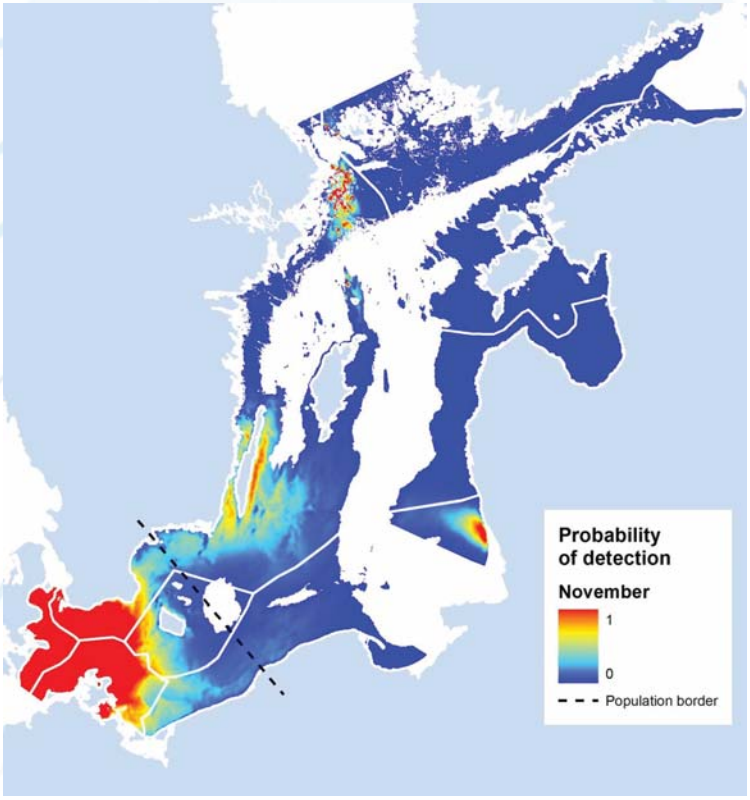




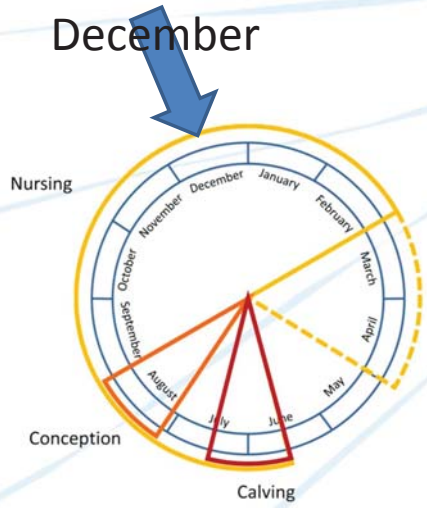
Porpoise distribution

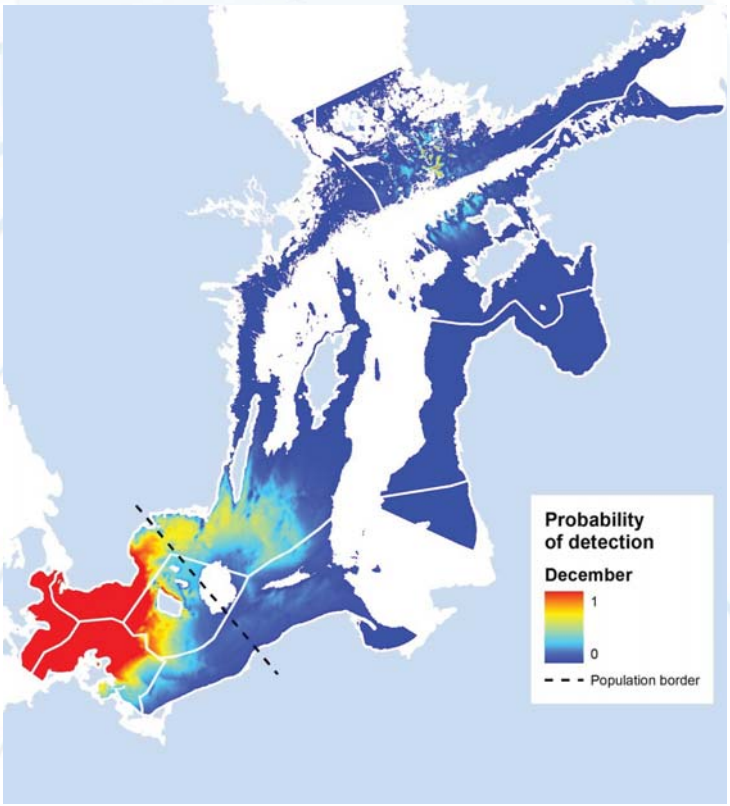
November



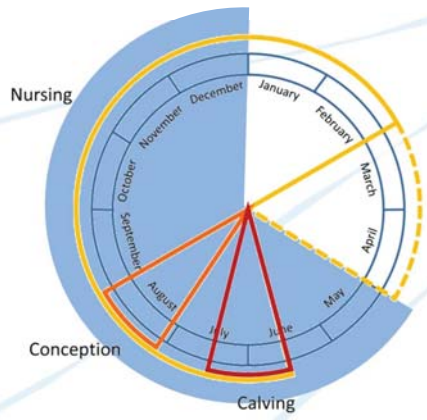


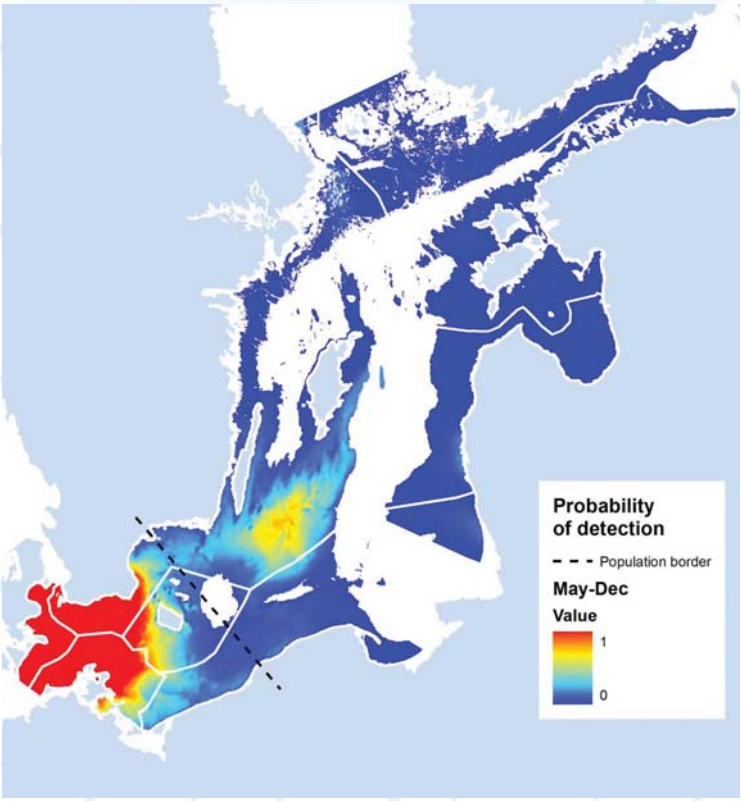
Porpoise distribution



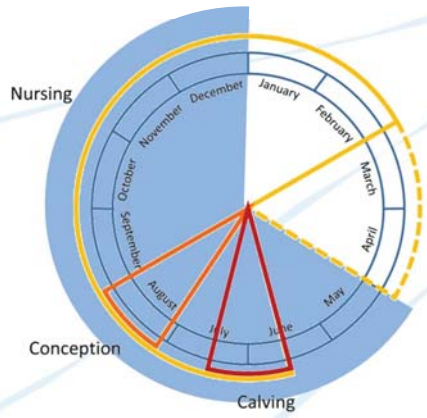


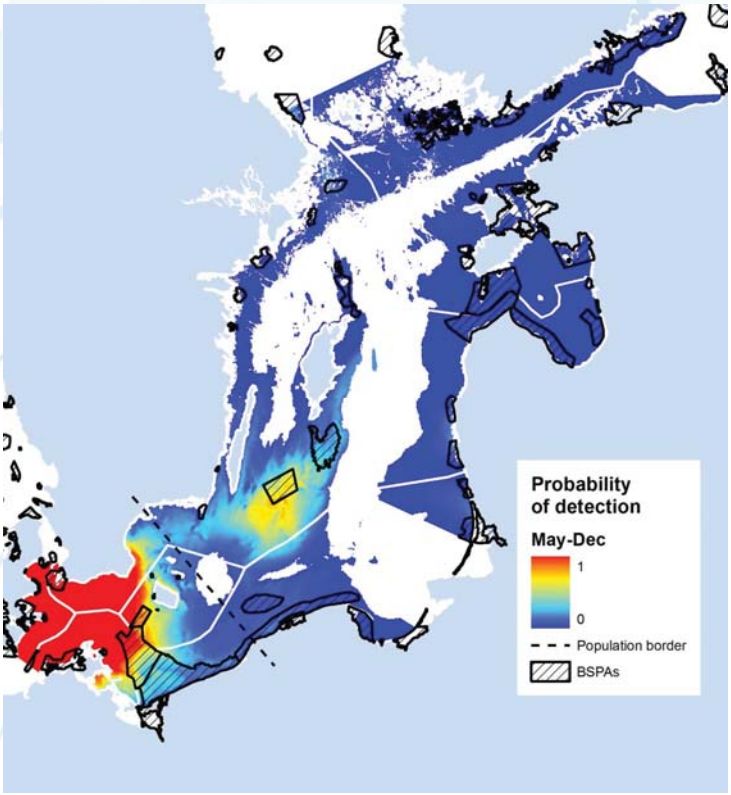
Porpoise distribution – seasonal



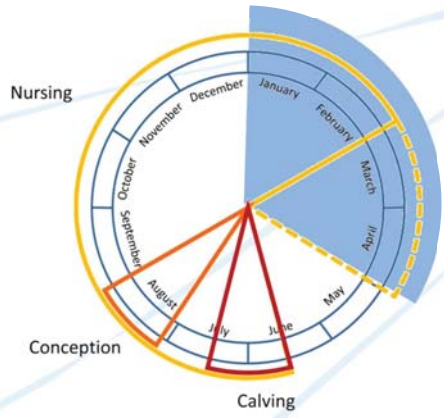


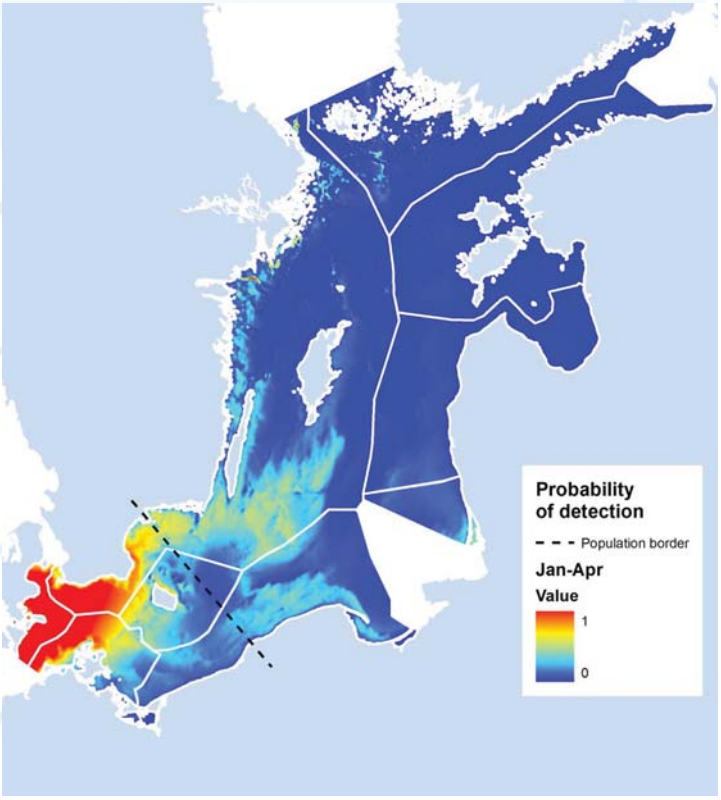
Porpoise distribution – seasonal



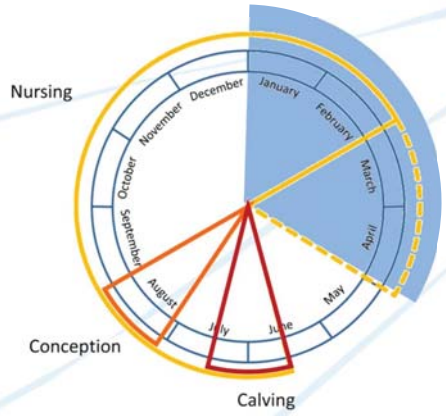


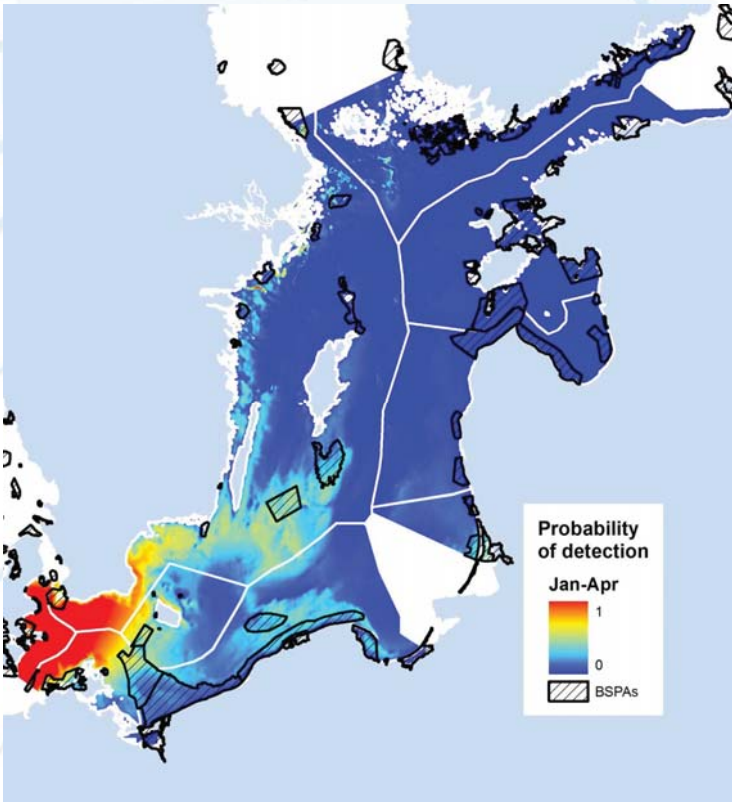
Porpoise distribution – seasonal





Porpoise distribution – seasonal





Thank you for listening!

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Implications of SAMBAH results on the management of Baltic Sea porpoises

Penina Blankett

Implications of SAMBAH results on the management of Baltic Sea porpoises

SAMBAH conference on the abundance and distribution of porpoises in the Baltic Sea 8-9 December 2014, Kolmården

Penina Blankett

Ministry of the Environment, Finland

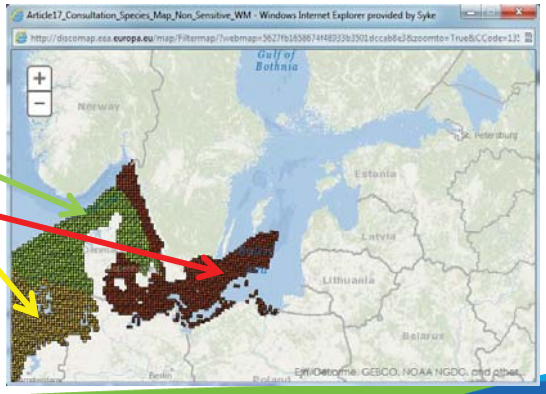
Harbour porpoise

IUCN assessment:

- Least Concerned (LC) in most areas where it occurs
- BUT two subspeceis are threatened:
  - Phocoena phocoena ssp. Relicta (Black Sea) -> EN
  - **Phocoena phocoena (Baltic Sea subpopulation) -> CR**

EU article 17 assessment 2013:

- FV Favourable
- U1 Unfavourable-Inadequate
- U2 **Unfavourable-Bad**
- XX Unknown



CBD (Convention on Biological Diversity) Specifically Aichi targets:

- **Target 6**
  By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, **fisheries have no significant adverse impacts on threatened species** and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.
- **Target 12**
  By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

EU Biodiversity Strategy to 2020

- In 2012 New strategy was adopted to halt the loss of biodiversity and ecosystem services in the EU by 2020.
- Six main targets, and 20 actions to help Europe reach its goal.
- The six targets cover:
  - Full implementation of EU nature legislation to protect biodiversity
  - Better protection for ecosystems, and more use of green infrastructure
  - More sustainable agriculture and forestry
  - Better management of fish stocks
  - Tighter controls on invasive alien species
  - A bigger EU contribution to averting global biodiversity loss
- This is in line with global commitments made in Nagoya in October 2010, in the context of the Convention on Biological Diversity, where world leaders adopted of a package of measures to address global biodiversity loss over the coming decade.

CMS → ASCOBANS → Jastarnia Plan

- **CMS** (*Convention on the Conservation of Migratory Species of Wild Animals*)
  - Global platform for the conservation and sustainable use of migratory animals and their habitats
  - Appendix II – Migratory Species requiring international cooperation
  - Migratory species that need or would significantly benefit from international co-operation are listed in Appendix II of the Convention. For this reason, the Convention encourages the Range States to conclude global or regional Agreements, one of which is
- **ASCOBANS** (*Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas*)
  - The aim of the Agreement is to promote close cooperation between countries with a view to achieving and maintaining a favourable conservation status for small cetaceans throughout the Agreement Area.

CMS → ASCOBANS → Jastarnia Plan

- **Jastarnia plan**
  - Under the aegis of the ASCOBANS Secretariat, a special working group composed of representatives of international conventions, government ministries, fishermen and environmental groups has **developed a recovery plan for the Baltic Harbour porpoise (the Jastarnia Plan**), which recommends
    - **a programme for bycatch reduction,**
    - **research and monitoring,**
    - **marine protected area establishment and**
    - **an increase of public awareness**.
  - The overall aim **is to restore the Baltic population of Harbour porpoises** to at least 80% of the Baltic's carrying capacity.
  - A change in fishing methods and a reduction of fishing effort could significantly contribute to a lower bycatch rate.

HELCOM

- **HELCOM recommendation 17/2 (adopted 1996, rev 2013)**
  PROTECTION OF HARBOUR PORPOISE IN THE BALTIC SEA AREA
  - a) give highest priority to avoiding by-catches of harbour porpoises, particularly following the recommendations of ASCOBANS and the ASCOBANS Jastarnia Plan, in order to achieve the ecological objective of the Baltic Sea Action Plan: "**By 2015 by-catch of harbour porpoise, seals, water birds and non-target fish species has been significantly reduced with the aim to reach by-catch rates close to zero**";
  - b) take action in close co-operation with ASCOBANS and ICES, for collection and analysis of **additional data on population distribution and abundance, stock identities, behavior** and threats such as by-catch mortality, underwater noise, pollutant levels, ship strikes, changes in food base, epizooties, climate changes, marine installations and construction;
  - c) consider the **establishment of marine protected areas for harbour porpoises** within the framework of the Baltic Sea Protected Areas (BSPAs), when documented information is available that an area hosts harbour porpoises;
- **HELCOM-ASCOBANS harbour porpoise database**

EU legislation: Habitats directive

- to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements
- Harbour porpoise listed in:
  - **Annex II:** Animal and plant species of Community interest whose conservation requires the **designation of special areas of conservation**
  - **Annex IV:** Animal and plant species of Community interest in need of **strict protection**

- Article 12. 4:
  - Member States shall establish a **system to monitor the incidential capture and killing of the animal species listed in Annex IV (a).** In the light of the information gathered, Member States shall take further research or **conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned**.

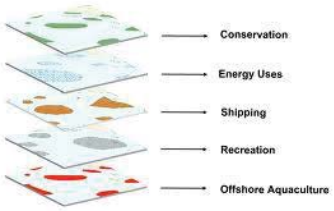
EU legislation: Marine Strategy Framework Directive 2008/56/EC, (MSFD)

- The aim of MSFD is to protect the marine environment across Europe.
- The directive sets a target of "Good Environmental Status" which must be achieved in EU marine waters by 2020
- The marine strategies to be developed by each Member State must contain a detailed assessment of the state of the environment, a definition of "good environmental status" at regional level and the establishment of clear environmental targets and monitoring programmes.
- 11 descriptors of Good Environmental Status
  - **Descriptor 1: Biodiversity: The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions**
    → to ensure that biodiversity is "maintained", that is, kept in line with the natural state appropriate to the area in question, and also corresponding to the large-scale, on going climatic changes, which we are unable to regulate.

EU legislation: Directive for Maritime Spatial Planning (2014/89/EU)

The aim is

- to better coordinate the various activities that take place at sea, ensuring they are as efficient and sustainable as possible.
- to avoid potential conflicts between such diverse uses and create a stable environment attractive to investors, thereby contributing to sustainable growth.
- to a more efficient implementation of EU environmental legislation in marine waters -> to reach good environmental status of MS waters by 2020.
- To help establish coherent networks of Marine Protected Areas, for which cooperation on planning across borders is essential, and ensure the participation of all stakeholders in planning processes.



EU legislation: Common Fisheries Policy (CFP)

- The aim of the CFP is **to ensure that fishing and aquaculture are environmentally**, economically and socially sustainable and that they provide a source of healthy food for EU citizens.
- CFP adopts a cautious approach which recognises the impact of human activity on all components of the **ecosystem**.
- **REGULATION (EU) No 1380/2013 Common Fisheries Policy**
  - *Article 7* **Types of conservation measures**
    - (b) targets for the conservation and sustainable exploitation of stocks and **related measures to minimise the impact of fishing on the marine environment;**
    - (d) incentives, including those of an economic nature, such as fishing opportunities, **to promote fishing methods that contribute to more selective fishing, to the avoidance and reduction, as far as possible, of unwanted catches, and to fishing with low impact on the marine ecosystem and fishery resources;**
    - (h) **pilot projects on alternative types of fishing management techniques and on gears that increase selectivity or that minimise the negative impact of fishing activities on the marine environment;**
    - (i) **measures necessary for compliance with obligations under Union environmental legislation adopted pursuant to Article 11**;

EU legislation: Common Fisheries Policy (CFP)

PART III

MEASURES FOR THE CONSERVATION AND SUSTAINABLE EXPLOITATION OF MARINE BIOLOGICAL RESOURCES

TITLE I ***Conservation measures***

- *Article 11* **Conservation measures necessary for compliance with obligations under Union environmental legislation**
- *Article 14* **Avoidance and minimisation of unwanted catches**
- *Article 18* **Regional cooperation on conservation measures**

Council Regulation (EC) No 812/2004 of 26 April 2004 laying down measures concerning incidental catches of cetaceans in fisheries and amending Regulation (EC) No 88/98

- This Regulation pursues a double objective.
  - Firstly, it introduces technical measures concerning gill nets and trawls in specified areas (Annex 1).
  - Secondly, it creates a monitoring system on board fishing vessels to obtain information on by-catches of cetaceans in “at risk” fisheries (Annex III).

- **Restrictions on the use of nets in the Baltic Sea**
- **The use of acoustic deterrent devices**
- **Monitoring schemes for incidental catches**
- **Annual reports**

Still the situation is unfavourable and the porpoise critically endandered. Why?

- Data defiency in:
  - **abundance**
  - **distribution**
  - **migration routes and seasonal movements**
  - **feeding areas**
  - **reproduction areas**
  - **by-catch numbers and areas**

SAMBAH results:

New data/information on:

- Distribution
- Presence during different times of the year
- Reproduction areas
- Preferred habitats
- Total abundance in the study area
- The average abundance in each country
- Densites

How to use SAMBAH results?

- To implement requirements from international agreements (ASCOBANS, Jastarnia Plan) and EU legislation (HD, MSFD, CFP)
  - By combining these results with available data on anthropogenic activities (e.g. fishing, tourism, shipping) it will be possible to pinpoint any areas with higher risk of conflict -> Develop **fishing measures to decrease the harbour porpoise by-catch to numbers close to zero. (CBD, EUBS, HD, Jastarnia Plan, HELCOM BSAP, MSFD, MSPD, CFP)**
  - **Can be used also for measures to mitigate other anthropogenic pressures/threats (for example underwater noise)**
  - New method (Static acoustic monitoring, SAM) available to use for monitoring harbour porpoise → **trends, effectiveness of mitigation measures (MSFD, HD, Jastarnia Plan, HELCOM Rec)**
  - Distribution maps describing Baltic harbour porpoise presence will make it possible to determine possible hotspots→ **establish MPAs (Natura 2000 site or/and HELCOM MPAs) as spatial protection measure (CBD, EUBS, HD, MSFD, MSPD, HELCOM, ASCOBANS)**
  - **Develop the harbor porpoise candidate indicator " harbour porpoise distribution" at the HELCOM CORESET II work (MSFD, HELCOM BSAP).**

Next step?

- Use existing cooperation and networks in the Baltic Sea e.g. :
  - to plan joint monitoring programme for harbour porpoises by using SAM devices
  - To look for areas for specific fisheries management measures in hot spot areas
  - To develop core indicator and to keep in mind that the GES (Good Environment Status) boundary is the key to the indicator
  - To inform other areas with low density whale populations on how to use SAM technique when estimating the population status

The future of harbour porpoise in the Baltic Sea should look like this?!

Thank you for your attention!

Threats - Fisheries

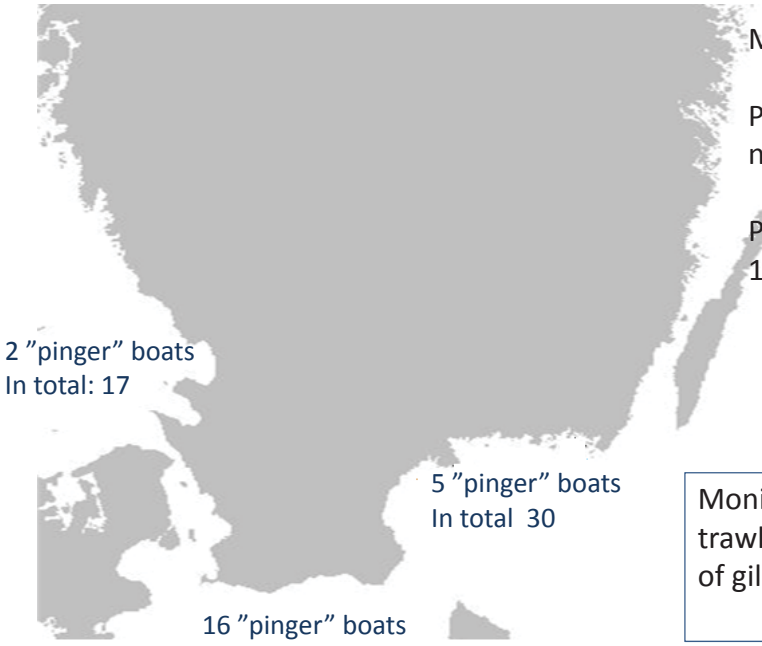
Sara Königson

Fisheries, Bycatch and Harbour porpoise

Sara Königson, Swedish University of Agriculture Science

- Ascobans - Conservation Plan for Harbour Porpoises in the North Sea
  - Recovery Plan for Baltic Harbour Porpoises
  - Conservation Plan for the Harbour Porpoise Population in the Western Baltic, the Belt Sea and the Kattegat
- Helcom Baltic Sea Action Plan
- Habitats directive
- National Management plans
- Eu regulation 812/2004

Implementation of existing regulations on bycatch of cetaceans



Monitoring in certain areas

Pingers in certain areas and on certain nets

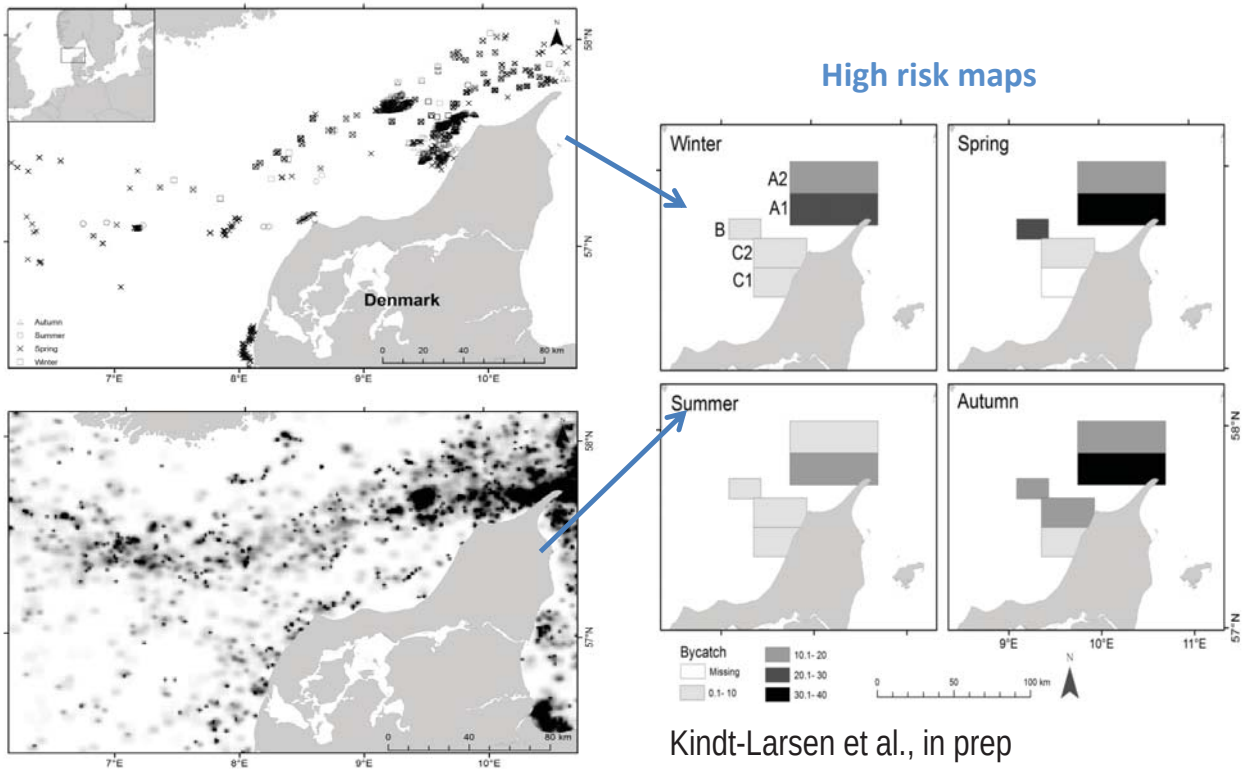
Pilotstudies for monitoring boats below 15 m

Monitor 5% of total effort of pelagic trawl fisheries and 5% of total effort of gillnet fisheries

Monitoring bycatch

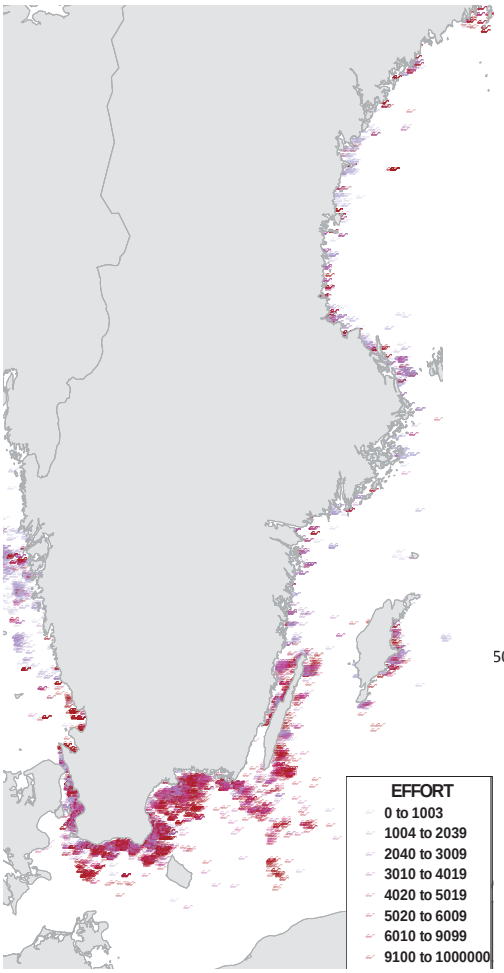
- Observers
- REM
- Fishermen reports
- Strandings
- Interviews

REM and porpoise density



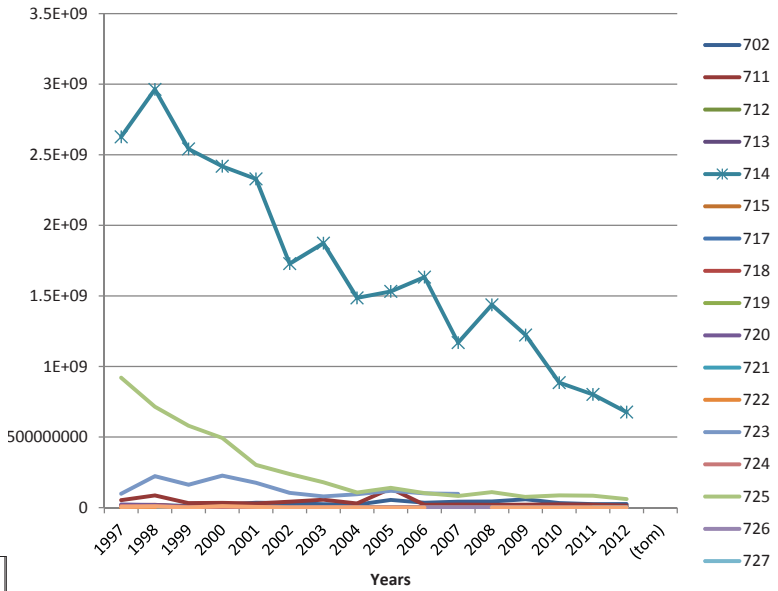
Kindt-Larsen et al., in prep

Is there any use to monitor bycatch in the Baltic??



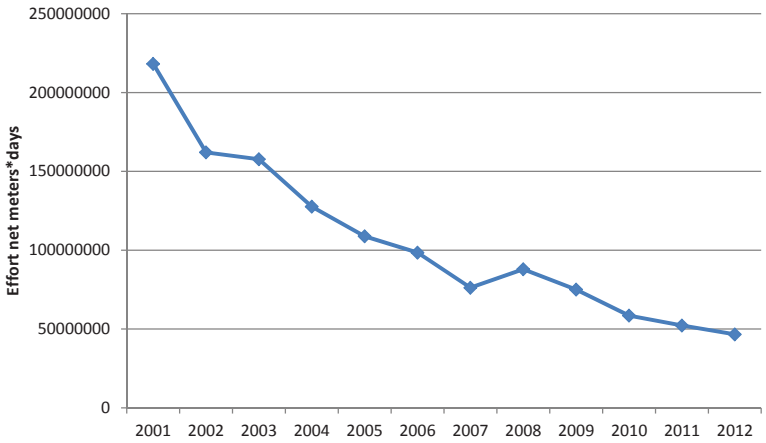
Mitigation methods

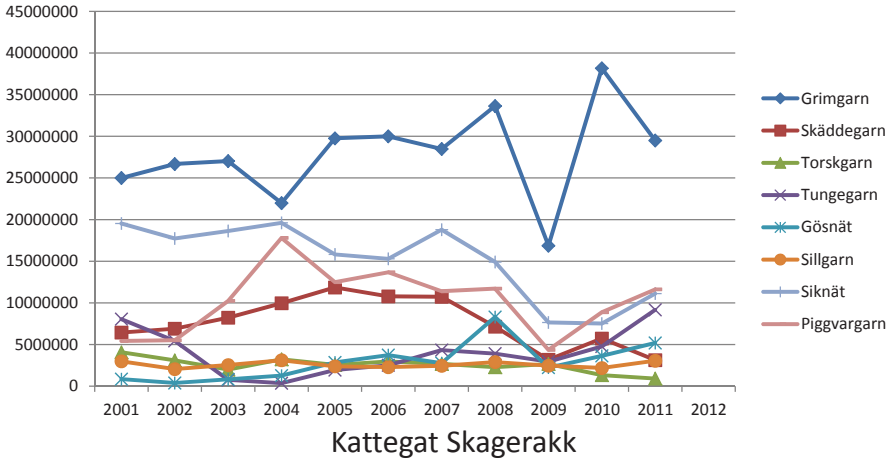
Decrease gillnet effort



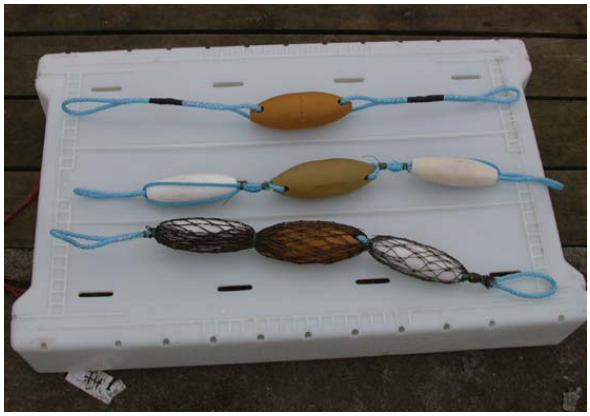
South Baltic

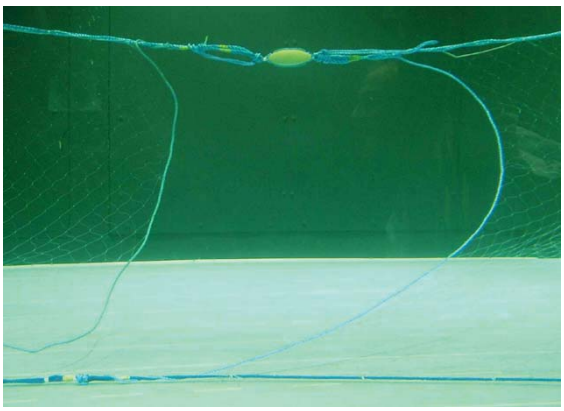
SLU

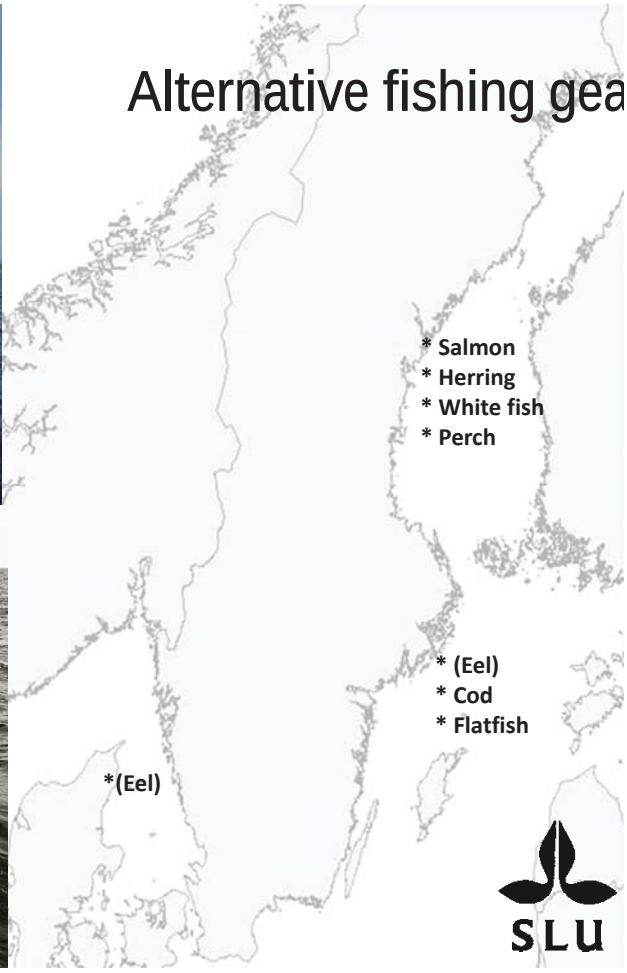




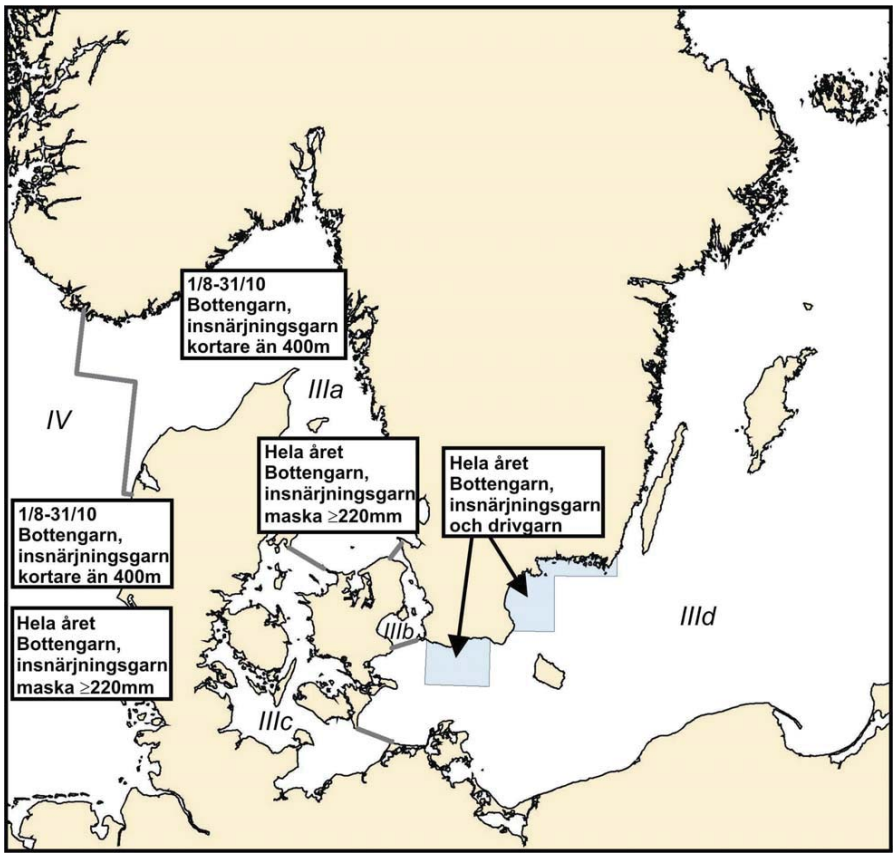
Use of pingers







Alternative fishing gear



- Change fishing gears

Threats – Underwater noise

Jakob Tougaard

Pressures on Porpoises in the Baltic: Underwater Noise

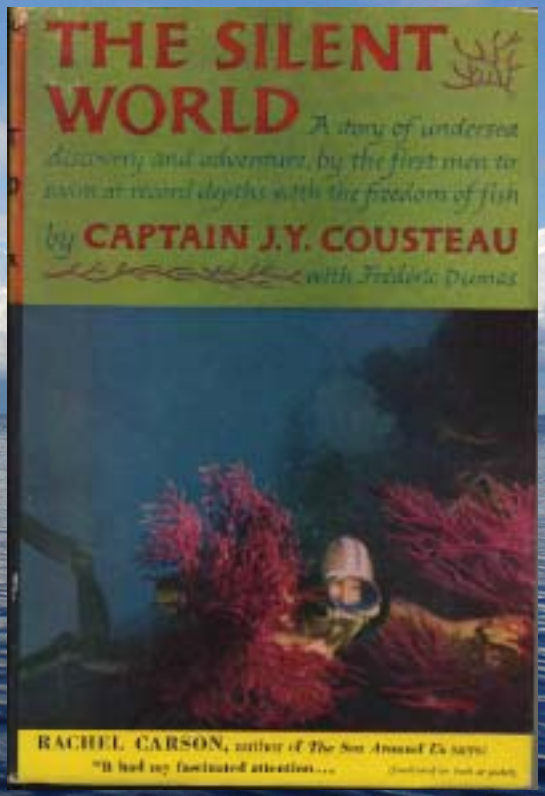
Jakob Tougaard
Aarhus Universitet
Bioscience, Roskilde

SAMBAH — Static Acoustic Monitoring of the Baltic Sea Harbour Porpoise
BIAS — Baltic Sea Information on the Acoustic Soundscape
NATURA 2000
Life

Noise sources – Antropogenic

SAMBAH — BIAS — Baltic Sea Information on the Acoustic Soundscape — NATURA 2000 — Life

The ocean - the silent world?



Jaques Cousteau 1953

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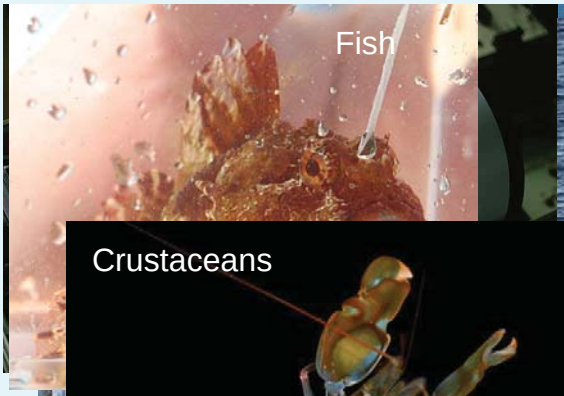
9-12-2014

Noise sources – natural



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Issues with Noise

- **Injury**
  - **Explosions, seismic surveys, powerful sonars**
  - **Effects always local**
- **Behavioural effects**
  - **All sorts of noise sources**
  - **Effects can be local or regional**
  - **Small, subtle effects may accumulate and significantly affect vital parameters**
- **Masking**
  - **Continuous noise from ships main source**
  - **Reduce communication distances**
- **Other effects (stress hormones, vestibular effects etc.)**

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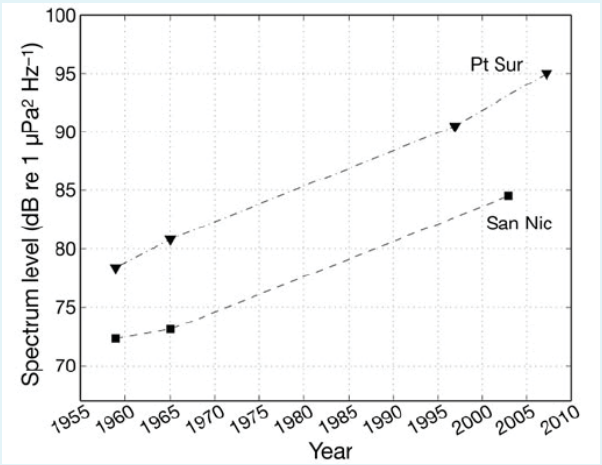
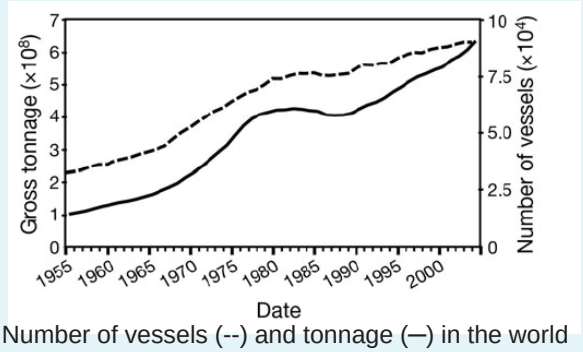
Is there reason for concern?



Ambient noise at 40 Hz in the Pacific



Number of vessels (--) and tonnage (—) in the world

Hildebrandt (2009)

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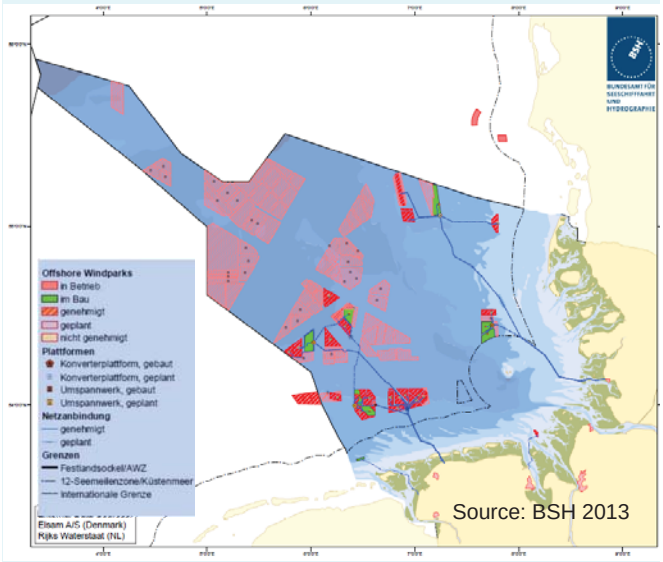
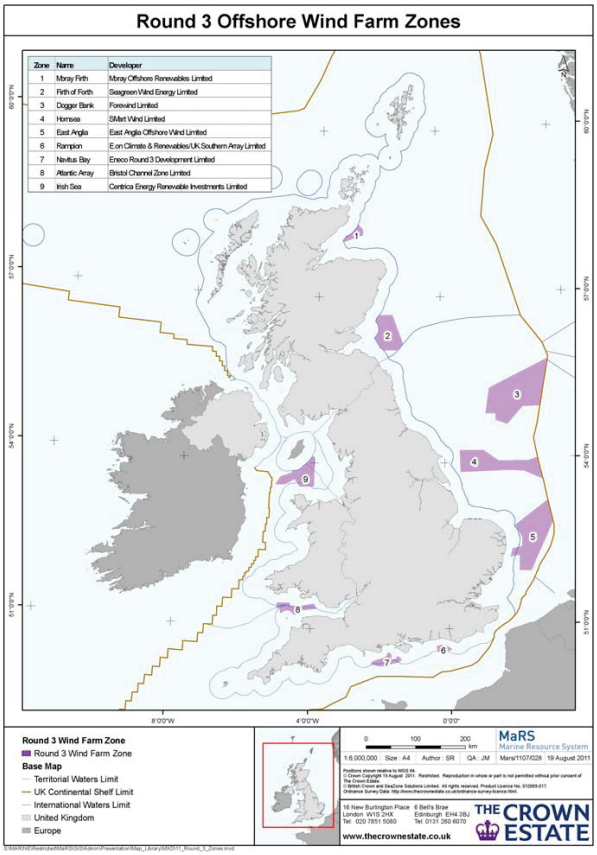
Offshore wind farms





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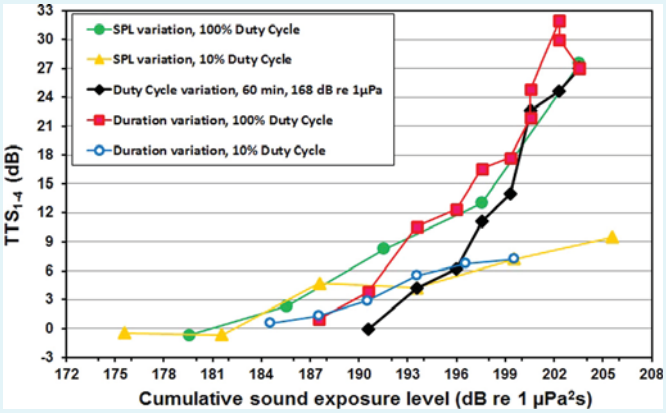
Anti-submarine sonar is known to cause strandings

Injury – TTS as a proxy

- **TTS: temporary hearing loss (rock concert effect)**
- **Commonly recognised as first sign of risk of damage**
- **Short-term and long-term effects of TTS are unknown!**
- **Can be measured experimentally**
- **Issue for pile driving, seismic surveys, navy sonars, explosions**



Kastelein et al. (2014)

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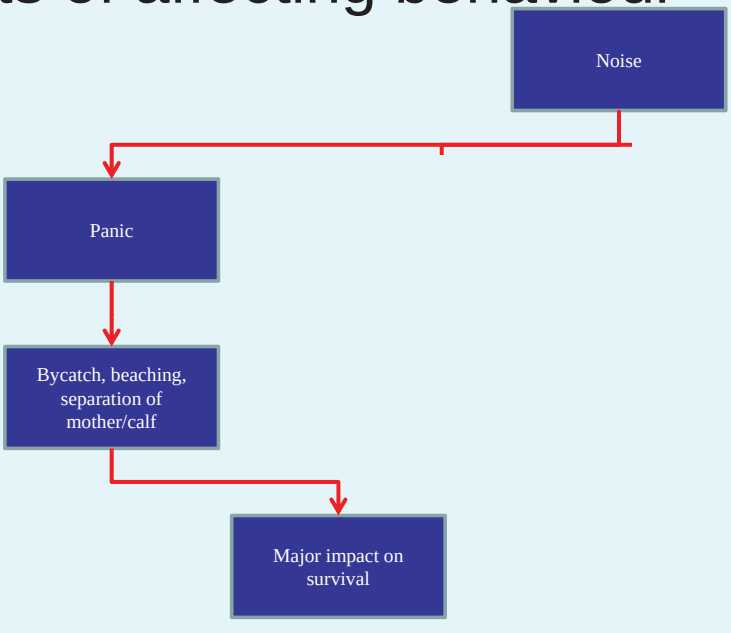
Cause of strandings likely linked to behaviour

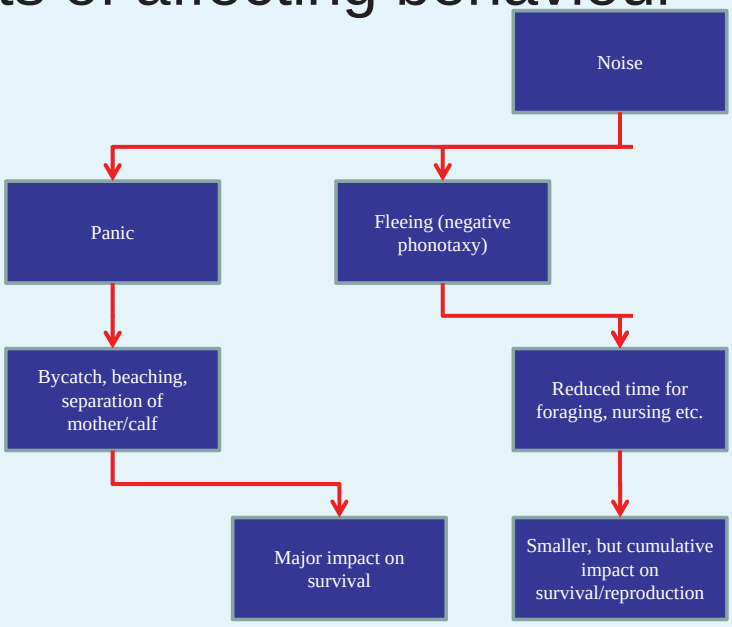
Effects of affecting behaviour

Noise

Effects of affecting behaviour



Effects of affecting behaviour



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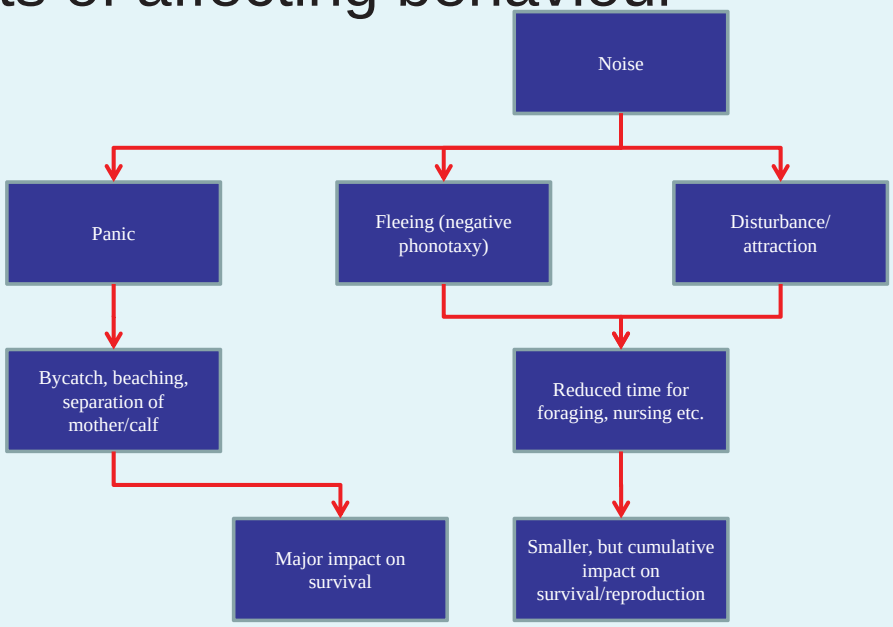
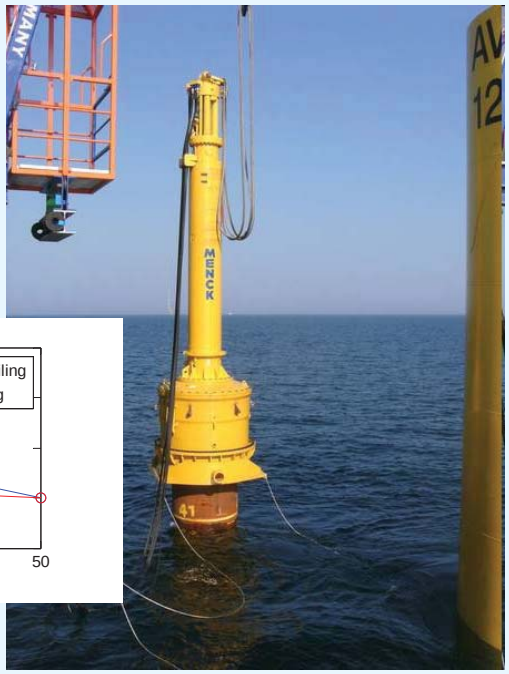
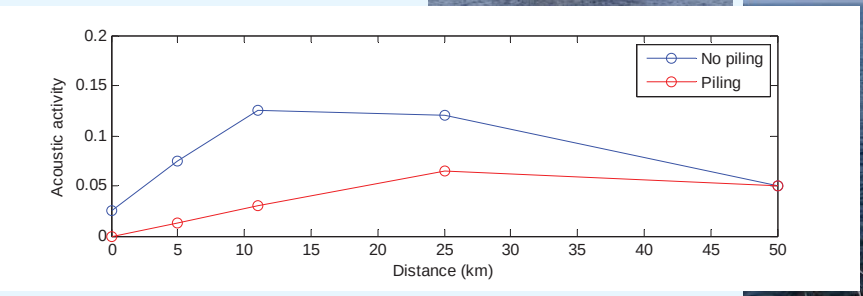
Effects of affecting behaviour



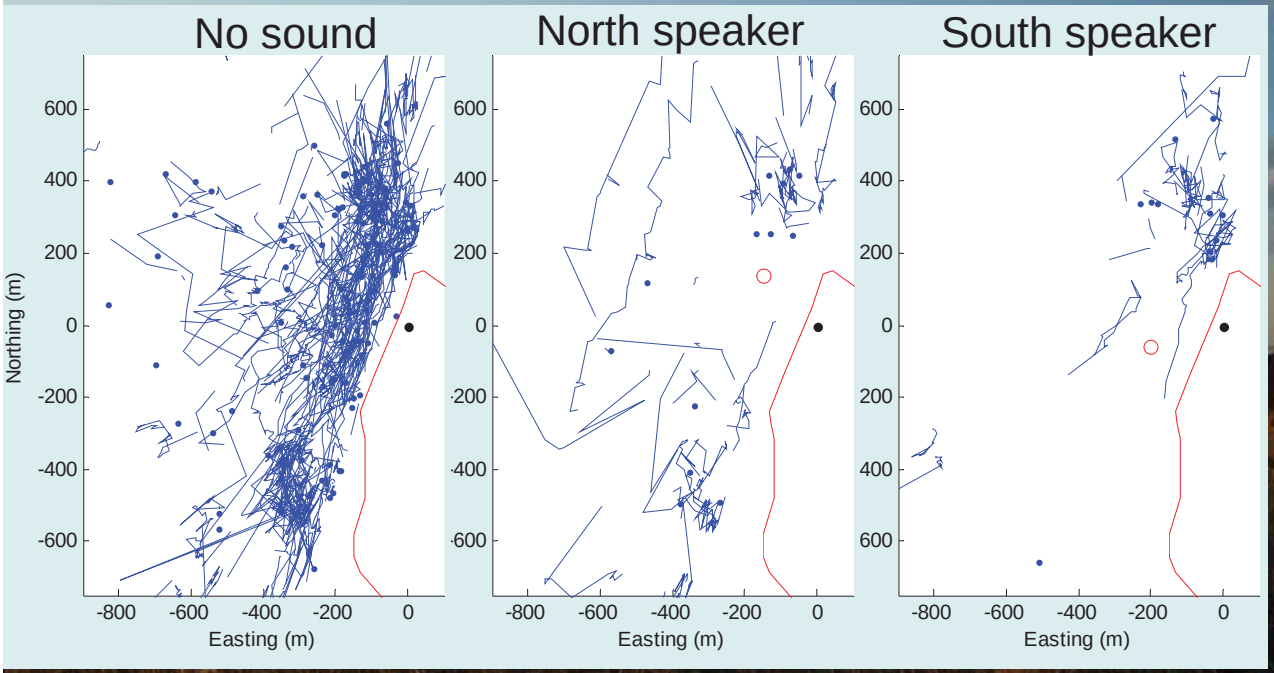
Pile driving





Dähne et al. (2013)

Playback of pile driving noise



Masking

- **Noise may mask other sounds**
- **Requires overlap in:**
  - **Time**
  - **Frequency**
- **Noise must be of comparable intensity or louder than the signals**
- **Effect of raising background noise is reduced communication distances**
- **Short-term and long-term effects of masking unknown!**

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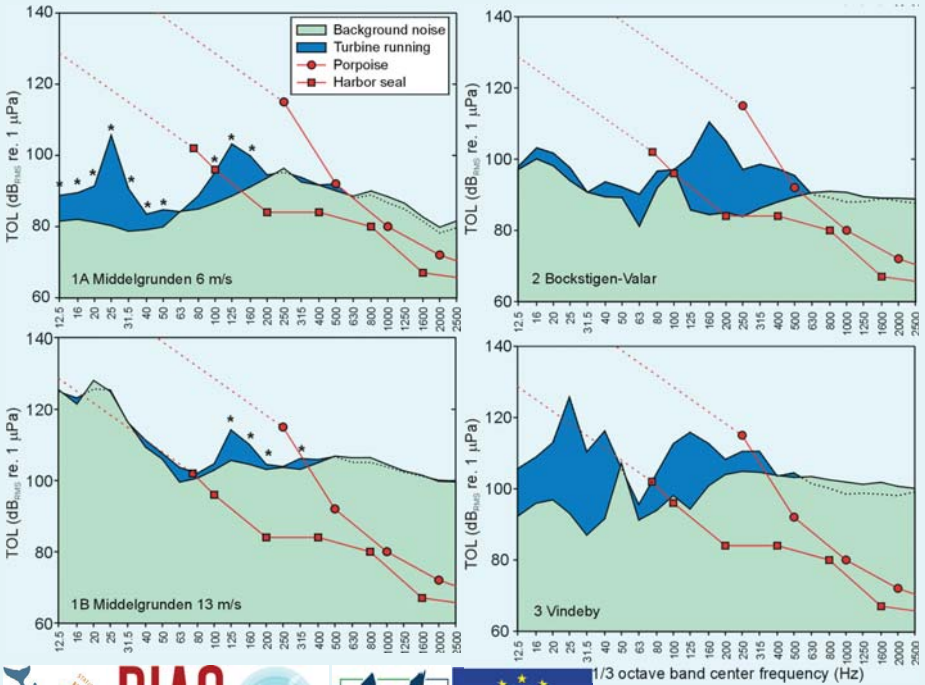
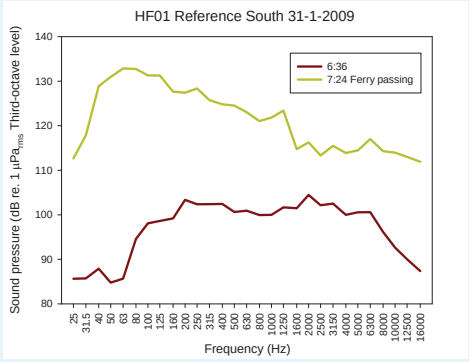
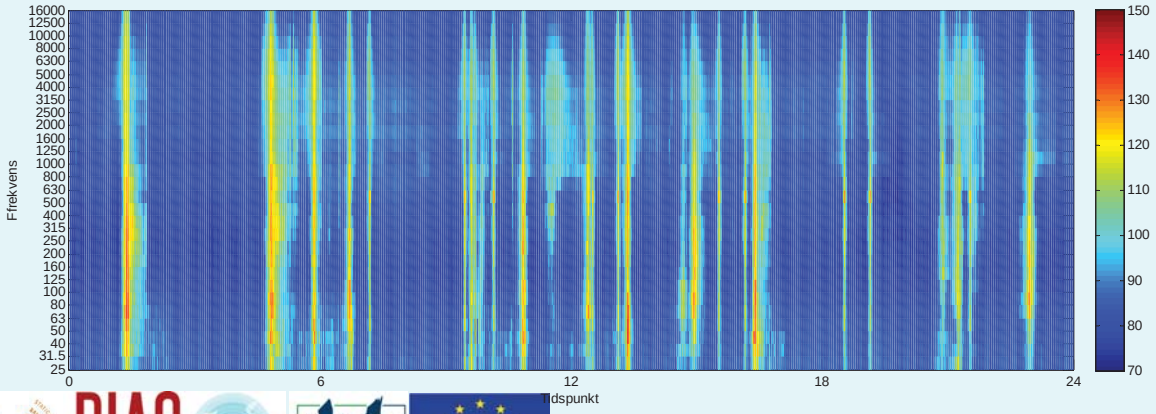
Turbine noise

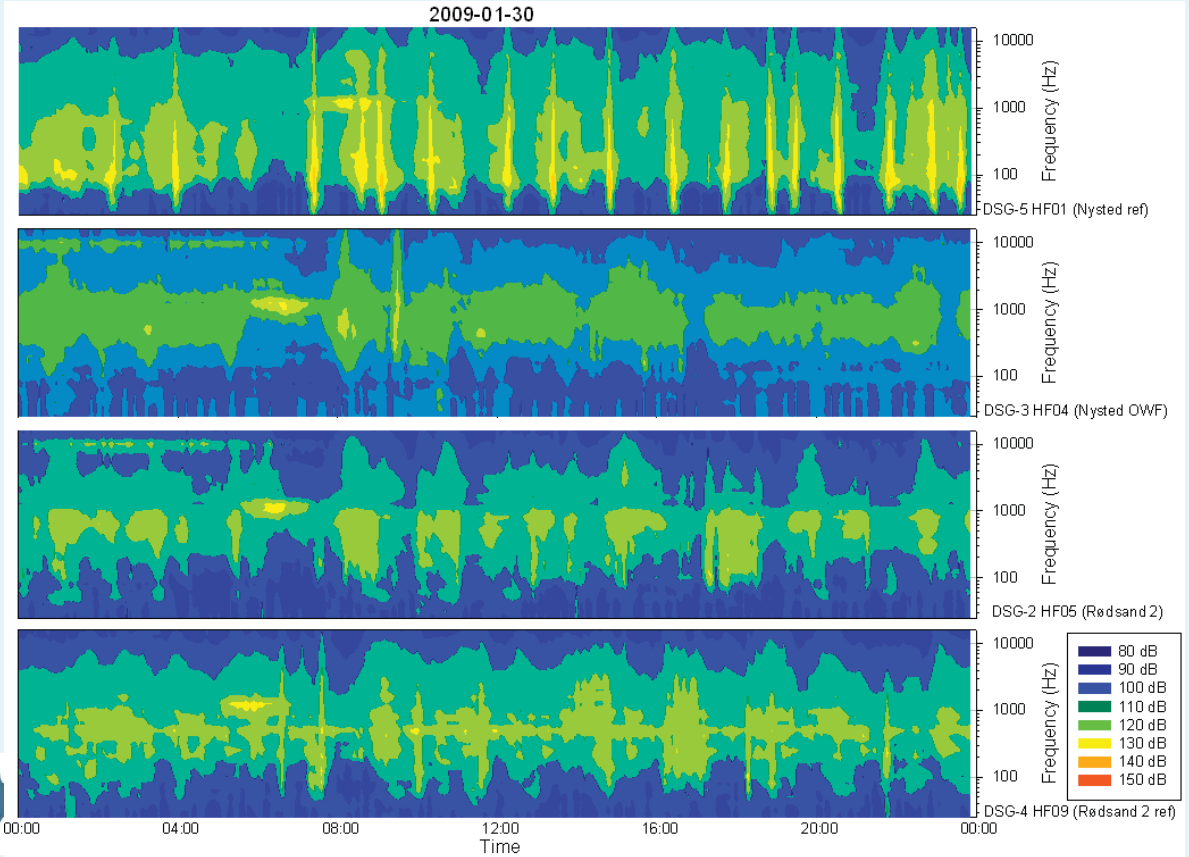


Ship noise

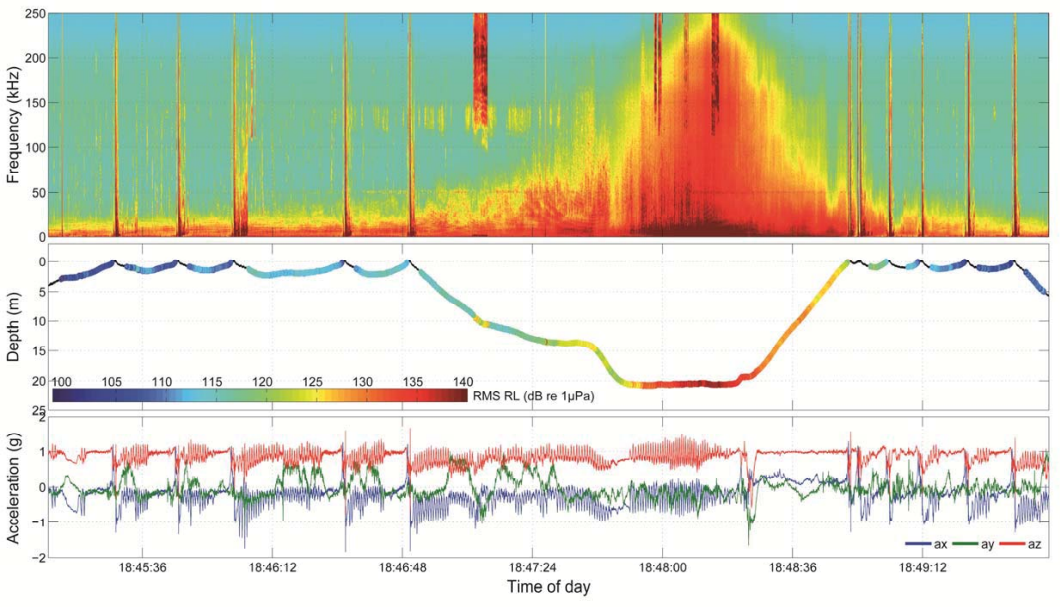

Scandlines


HF01 Reference South 31-1-2009
Sound pressure (dB re. 1 µPa$_{rms}$ Third-octave level)
Frequency (Hz)
6:36
7:24 Ferry passing


Frekvens
Tidspunkt


2009-01-30
DSG-5 HF01 (Nysted ref)
DSG-3 HF04 (Nysted OWF)
DSG-2 HF05 (Rødsand 2)
DSG-4 HF09 (Rødsand 2 ref)
Frequency (Hz)
80 dB
90 dB
100 dB
110 dB
120 dB
130 dB
140 dB
150 dB
Time

Reaction to fast ferry



Wisniewska et al. (in prep)

Mitigation

1. **Reduce produced noise**
   - **Modify construction method, ship construction etc.**
   - **Best way to reduce impact**
2. **Reduce radiated noise**
   - **Shielding by bubble curtains, kofferdams etc.**
   - **Effective only as long as the shielding works**
3. **Reduce received noise**
   - **Operate only when animals are not observed by observers**
     - **Only effective if animals can be seen/heard reliably**
     - **Not possible for continuous noise sources**
   - **Remove animals beforehand (soft start etc.)**
     - **Only protects agains injury, not disturbance**
   - **Operate only at times of day/year when animals are absent**

Thank you for your attention

SAMBAH
STATIC ACOUSTIC MONITORING OF THE BALTIC SEA HARBOUR PORPOISE

BIAS
Baltic Sea Information on the Acoustic Soundscape

NATURA 2000

Life

Threats – Habitat destruction and protected areas

Alexander Liebschner

Threats and how to mitigate them

– Habitat destruction and protected areas –

SAMBAH Conference 08./ 09.12.2014
Abundance and distribution of porpoises in the Baltic Sea

Alexander Liebschner; Federal Agency of Nature Conservation
Isle Vilm; Germany





Definition

Habitat (after Habitat Directive):

"…habitat of a species means an environment defined by specific abiotic and biotic factors, in which the species lives at any stage of its biological cycle;"

For Harbour Porpoise the key factors for habitat quality is most likely food availability (energy budget)

but also mating partners are important.

Migration of H.P. between habitats follows migration of prey species as well as the concept of being "at the right place a the right time" (reproduction areas).

Definition

Habitat destruction - change in the specific abiotic and biotic factors, which leads to:

- Degradation of habitat quality
- Fragmentation of habitat
- Destruction of habitat

Definition

Changes are caused by (human) activities, which generate certain pressures:

1. Physical damage
2. Noise
3. Eutrophication and Pollution
4. Food competition
5. Barriers

Depending on the type and the amount of the change in space and time the habitat can be partly or in total be loss for the species.

Pressure

1. Physical damage

Activities which directly impact on habitat:

- Bottom fishing – impacts on benthic community (fish larvae as prey of sand eels – effects on food chain – Harbour porpoise)
- Dredging activities (mining; shipping lines) – direct impact biomass of benthic community and indirectly through turbidity (less sun, less biomass)
- Wind energy constructions (like artificial riffs unclear if positive or negative for H.P. always in combination with other)

Pressure

2. Noise input

Activities effecting the information availability (masking), behavior and health of Harbour porpoises and can lead to death, displacement and reduction of fitness (reproduction success etc.):

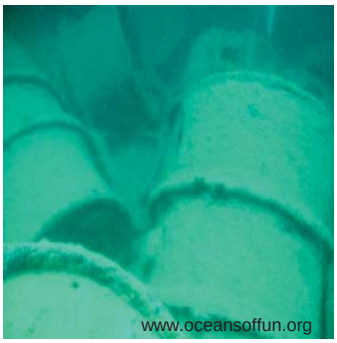
- Fishery (e.g. pinger)
- Shipping (e.g. ferries)
- Wind energy construction (displacement strategy, pile driving, operational noise)
- Exploration and extraction of resources
- Military activities

Pressure

3. Eutrophication and Pollution

Activities impact on health of porpoises themselves and their prey; (creation of anaerobic zones through higher primary and secondary production):

- Shipping (ferries, container shipping)
- Extraction of resources (mining, oil & gas)
- Emission from land by agriculture and transportation (traffic Nox by cars)
- Litter (ghost nets, plastic)



Pressure

4. Food competition

Activities reducing the prey availability and it‘s quality and can lead to reduced fitness of Harbour porpoise

- Fishing (indirect effects of bottom trawling; direct takes for potential prey)

Pressure

5. Barriers

Activities which lead to habitat fragmentation and hinder H.P. to use to all of their habitats (migrate between different habitat types):

Physical barriers

- Gillnets
- Constructions (pipelines; tunnels, bridges)

Acoustical barriers

- Pinger, wind energy constructions, shipping

Mitigation Measures

Marine Protected Areas for Harbour Porpoise (as Annex II Species of Habitat Directive)

• approach to asses plans and projects and ascertained that they will not adversely affect the integrity of the site (§ 6)

✓ Criteria of the delineation of MPAs

- ANNEX III –

CRITERIA FOR SELECTING SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE AND DESIGNATION AS SPECIAL AREAS OF CONSERVATION

Mitigation Measures

B. Site assessment criteria for a given species in Annex II

(a) Size and density of the population of the species present on the site in relation to the populations present within national territory.

(b) Degree of conservation of the features of the habitat which are important for the species concerned and restoration possibilities.

(c) Degree of isolation of the population present on the site in relation to the natural range of the species.

(d) Global assessment of the value of the site for conservation of the species concerned.

Mitigation Measures

COMMISSION IMPLEMENTING DECISION
of 11 July 2011
concerning a site information format for Natura 2000 sites
(notified under document C(2011) 4892)

3.2. Species referred to in Article 4 of Directive 2009/147/EC and species listed in Annex II to Directive 92/43/EEC and site evaluation for them

➢Management plan for the protected areas which reflect on the pressures

Mitigation Measures

But as Annex IV Species - for H.P. additional measures (outside MPA) necessary…

§12 HD: "…Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range…"

➢Management plan outside the protected areas which reflect on the pressures (species management plan)

(it's easy to do for most of the activities - bit more complex for fishing because for CFP - common fisheries policy)

Thank you very much for your attention!


(S. Koschinski/Fjord & Baelt, Kerteminde Denmark)





SAMBAH conference

on the abundance and distribution of porpoises in the Baltic Sea

Group discussions, day 2

During the second day of the conference there will be group discussions on the subject of threats and mitigations. For these discussions, three topics have been selected, and participants will be circulating to attend one discussion session per topic, i.e. three sessions à 20 minutes.

The topics are:

- Fisheries
- Shipping and leisure crafts
- Offshore construction

To facilitate productive discussion a set of questions have been prepared:

- Under this topic, what are the most problematic activities from a porpoise perspective?
- How to identify where and when the most negative impact occurs?
- How to mitigate negative impact of these activities?
- What are the relevant stakeholders?
- How to communicate among different stakeholders?
- What legislative frameworks should or could be used, should mitigation measures be mandatory?
- How can measures and their efficiency be monitored?
- What incentives can be offered?

For smooth transfer between topics, all participants have been assigned a group number from 1-6 at registration. Based on this number you will be assigned a table at the start of the first session and will then move from one table to the next to participate in discussions on each of the three topics. The time schedule for group discussions is as follows:

9:35	Introduction to group discussions and practical details
9:40	Get coffee and bring to your first discussion session
9:45-10:05	1st session
10:05-10:25	2nd session
10:25-10:45	3rd session

Group moderators will then present a summary of discussions in plenum.

SAMBAH end-of-project conference discussions

9 December 2014

Transcribed by Julia Carlström, AquaBiota Water Research, Sweden

During the second day of the SAMBAH end-of-project conference, group discussions were arranged on the subject of threats and mitigation measures. For these discussions, three themes had been selected and the participants circulated so every participant attended a 20 min session on every theme. Parallel sessions were held and each was led by a moderator and a co-moderator.

The themes were:

- Fisheries
- Shipping and leisure crafts
- Offshore construction

To facilitate productive discussions a set of questions had been prepared, however the discussions were not restricted to these:

- Under this theme, what are the most problematic activities from a porpoise perspective?
- How to identify where and when the most negative impact occurs?
- How to mitigate negative impact of these activities?
- What are the relevant stakeholders?
- How to communicate among different stakeholders?
- What legislative frameworks should or could be used, should mitigation measures be mandatory?
- How can measures and their efficiency be monitored?
- What incentives can be offered?

Theme 1: Commercial shipping and leisure boats

Moderators and co-moderators: Mats Amundin, Jakob Tougaard, Julia Carlström, Jens Koblitz

(Main) problems

Commercial shipping

- Noise likely to pose a greater threat than collisions
- Higher noise levels by pod propulsion (where the propeller is mounted on a pod below the ship) that is common on cruise ships and fast ferries
- Higher risk of deadly ship strikes if thrusters are used
- Disposal of black/grey water, chemical pollution, plastics
- Indirect effects due to habitat destruction by strong currents down to approximately 30 m

Leisure boats

- Noise and unpredictable behaviour
- Extra problematic: jet skis and speed boats, in shallow waters forward looking echosounders ensonify a larger volume of water than down facing
- Highest densities in summer when calving and mating takes place

- Ship strikes do occur! About three records in Sweden during the last decade, some had propeller cuts on their back. In Germany 3 of >400 stranded harbour porpoises from 1991 – 1997 were likely to have been struck by speed boats, this was judged from the cuts on the dorsal part of the animal. German report by Pfander, Benke, Koschinnski (2008).

Mitigation measures

Commercial shipping

- Possible to move shipping lanes
- Feedback on noise emission to captains
- Implementation of IMO recommendation on avoidance of shipping particularly sensitive areas (PSSA)
- Implementation of IMO guidelines for commercial shipping
- Cooperation with HELCOM Maritime Group
- Include information on underwater noise and marine mammals in courses for marine officers and captains

Leisure boats

- Eco-labelling of noise emission from engines
- Feedback on noise emission to drivers
- Speed limits: may both reduce noise source levels (depending on optimal speed for engines, propeller and boat type, some boats need to plane) and risk of collision
- Development of leisure boat/whale watching guidelines specifically for harbour porpoises
- Repeated information campaigns on how to minimise impact: ecologically important areas, timing, boat handling, sonar use and engine maintenance. Inform through boating magazines, NGOs (boating, environmental, industrial), marinas etc. Recommendations better than regulations?
- Include information on underwater noise and marine mammals in courses for yacht master diplomas
- Mandatory AIS transponders?

Sonars/echosounders

- Avoid use of sonars that are audible to harbour porpoises – local restrictions of audible frequencies possible?
- Information to sonar manufacturers to not produce noise below 200 kHz and that the sonars should be possible to turn off
- Eco-labelling of sonars

Data gaps

- A clear link between pressure and impact is necessary, both to achieve the desired impact and because mitigation is costly and should be long-term
- Investigate potential impact of echosounders and vessels on harbour porpoises. Studies on potential impact of energy consumption etc should be carried out, c.f. studies on impacts of whale watching. Do long avoidance dives imply a higher energy demand?
- Further data on noise properties from different vessels is needed as frequency and sound source level affects sound propagation and porpoise reactions. However relevant data collection and noise mapping is currently ongoing in the BIAS project (www.bias-project.eu).

- Spatial and temporal distribution of vessels without AIS or VMS transponder is missing, which means practically all leisure boats => data for calculating overlap and potential impact of leisure boats on harbour porpoises is missing. Fine-scale noise mapping in coastal areas is possible to do with noise sensors as in the BIAS project, however the soundscape cannot be modelled without AIS data (or equivalent) on boat ID and track data.
- The noise beams of various sonars, including forward looking, should be modelled on frequencies audible for harbour porpoises
- Can intense vessel traffic act as an (acoustic) barrier to harbour porpoises?

Additional thoughts

- There are areas with high densities of harbour porpoises and intense shipping, such as in the Great Belt. Do porpoises stay because it is still a good habitat taking all aspects into account (prey availability, conspecifics during time for mating, ice-free during winter…)?
- The industry should pay for research in the effects of sonars on harbour porpoises
- There is a clear diel pattern in leisure boat activity (daytime only)
- Fishing vessels and recreational fishermen use echosounders a lot

Theme 2: Fisheries

Moderators and co-moderators: Sara Königson, Finn Larsen, Ida Carlén, Sally Clink

Main problems

- Bycatch, primarily in gillnets, but also in ghost nets and drift nets
- Possible indirect impact, such as depletion of resources and habitat
- Small boats, including part time fisheries and recreational fishing, also cause bycatch but are least monitored
- Social problem/ lack of communication and trust among fisheries, scientists and managers

Additional thoughts

- Shall focus be on gathering further information on the problem, or trying to solve it based on available information?
- Porpoises can detect nets at about 80 m distance => something else is the problem
- Continuous monitoring needed to detect changes in porpoise distribution

Mitigation measures

- Cooperation!
    - Bottom up
    - Regional approach
    - Endorsement by the government
    - Involve all parties in the decisions: fishermen, NGOs, public, managers, scientists, recreational fisheries
    - Build trust
- Identify overlap between porpoises and fisheries in space and time and focus mitigation efforts there
    - Present the results of this and get input from all parties on how to solve it

- Communication channels:
  - BSRAC
  - HELCOM BALTFISH
  - Scientific community
  - Involve local groups?
- Awareness campaign, the problem is partially educational
- Mitigation measures should *not* be related to vessel size
- Incentives for carrying EMS cameras
- Effort reduction with problematic gear types
- National authorities need to implement existing regulations
- Local adaptations (areas, countries, fisheries) of mitigation measures may be needed
- Pingers is not suitable in "high density" areas but may be useful outside
- Bycatch monitoring should be included in the data collection regulated by Regulation on the Common Fisheries Policy (EU No 1380/2013)
- Apply for funding for bycatch monitoring from EMFF – European Maritime and Fisheries Fund

Theme 3: Offshore Constructions

Moderators and co-moderators: Alexander Liebschner, Jonas Teilmann, Line Kyhn, Olli Loisa

Constructions and specific thoughts about these

Windfarms

- Location: There is an economic preference to place wind farms in offshore shallow areas. However offshore banks are rare marine habitats that are preferred by many animals (birds and aquatic species) and many banks are designated Natura 2000 sites or candidates for this. Why not designate parts of the most common marine habitats or already destroyed habitats?
- Important to update the species lists with the harbour porpoise for existing Natura 2000 sites in accordance with the SAMBAH results.
- Windfarms do pose a threat especially during construction.
- We do not know if there are any benefits.

Oil platforms

- Study shows attraction to existing platforms in the North Sea.

Pre-construction exploring of the seabed, such as multibeam sonar and seismic activities

- May have a large behavioural impact (habitat exclusion/ loss of feeding opportunities), but it is difficult to study.

Gravel extraction

- Change the habitat and may result in loss of important shallow habitat.

Artificial reefs

- May not be a benefit to harbour porpoises since it changes the food chain.

Pipelines

- The North Steam pipeline goes through the middle of the Baltic Sea, does it have an impact?

Harbours

- May be of less concern as it is only in very coastal areas.

Tidal/wave energy

Bridges/tunnels

General thoughts on impact

Major impacts

- Explosions and pile driving during constructions.
- Although the short term impact of a construction can be very high, the long term impact of operation of a wind farm or oil rig may be larger.

Barrier effect

- Barrier effect from offshore constructions (wind farms, bridges) may not only affect the porpoises, but also the water flow and the prey of porpoises.

Mitigation and management measures

Mitigation

- Mitigation is important and international standard procedures should be developed and implemented for all noisy construction activities. Make sure the mitigation is not more disturbing than the construction itself.
- Promising results on reduction of construction noise (e.g. pile driving noise) from Germany. Noise mitigation methods may be very expensive, but could be mandatory to avoid negative impact on e.g. Natura 2000 sites. All countries should look into implementation of this technology.

Monitoring

- A single project may not have a dramatic impact over short time, but the cumulative effect of several construction activities may be considerable.

Legislation - Marine Spatial Planning Directive

- Important directive! Under this directive it is important to predict the cumulative effect.
- Construction in different countries should be coordinated.

Stakeholder cooperation

- Works fine within some countries, but is lacking across sectors in other countries. Not always working well internationally, nice words, but little action!

SAMBAH conference

on the abundance and distribution of porpoises in the Baltic Sea

Baltic porpoise X-mas wish list

If you would get an international research/management team to work for about five years on the issue that you find most important regarding the harbour porpoise in the Baltic Region...

- What research question should be addressed?
- What management actions should be taken?
- What key players should be involved?

All suggestions are most welcome!

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Please make sure to bring this note to the SAMBAH break at 10:45 on day 2

Baltic porpoise X-mas wish list – summary

Transcribed by Ida Carlén

At the SAMBAH end-of-project conference on 8-9 Dec 2014, participants were asked to write down what issues they would find most important regarding the harbour porpoise in the Baltic region if they had a dedicated international research/management team to work for approximately five years. The questions asked were:

- What research question should be addressed?
- What management actions should be taken?
- What key players should be involved?

In total 41 wish lists were handed in to the organizers and below is a summary of the thoughts and ideas from these. For simplification issues have been organized in themes.

What research questions should be addressed?

This question generated a wide array of answers, the most common theme being gathering more detailed information on abundance and distribution of animals. In general, the themes below are organised in order of importance in the anwers.

Abundance and distribution

- Monitoring of hotspot areas
- More detailed information on abundance, distribution, habitat, feeding areas and migration routes
- Identify mating and calving areas
- Monitoring population trends, regionally and locally

Pressures

- Significantly improve data on bycatch
- Procedures and practices for bycatch monitoring
- Alternative fishing gear to eliminate bycatch
- Studies targeting the effects of noise on harbour porpoise behaviour and physiology

Management

- What are the threats and how do they affect porpoises? Which threats are the worst?
- Where do the threats occur; where is the overlap between porpoises and anthropogenic impacts?
- Effective and sustainable mitigation measures. Does mitigation affect other species?
- Case study on the effectiveness of MPAs on the protection of porpoises.
- Develop international monitoring program to track population trends, population movements and change in the geographical distribution of important areas.
- What indicators to set to assess management effectiveness? What is the most appropriate way to monitor the indicators?

- How to address the idea of green/blue infrastructure or MSP concerning these migratory species?

Populations

- Research into geographical separation of subpopulations
- Research on the possibility to identify the two populations based on their echolocation clicks
- Measure reproductive rate of Baltic porpoises

Other

- Research on dead specimens: Age, sex, prey species, health issues and contaminant monitoring
- Research on the possibility of identifying calves vs adults using acoustics
- Continued work on the detection function from SAMBAH
- Ammunition, especially toxins from WWI and WWII – research on how to handle this

2. What management actions should be taken?

Under this question, the most common action to be taken was to mitigate bycatch in fisheries in different ways. Also improving the monitoring of bycatch received a lot of support, followed by other suggestions in order of importance.

- Action to mitigate bycatch, within and outside MPAs.
  - Mitigation can mean pinger use or change of gear or reduction of effort
  - Regardless of boat size
  - Based on voluntary or obligatory measures
  - Certification of fisheries may be a way forward
  - Reward for bringing in bycatch
  - Fishery closed (Red light) if there is a bycatch or a lot of sightings
  - Involve stakeholders in developing methods
  - Give fisheries choices; either report effort data, or reduce effort, or take observer, etc.
- Improve reporting and monitoring of bycatch
- Designate MPAs for porpoises in important areas
  - possible seasonal variation
  - mitigation measures in site management plans
- Increase awareness (dialogue) of the general public, fishermen (what to do if you get a porpoise in your net etc), windfarm companies and echosounder manufacturers
- Handle protection of porpoises in relation to relevant directives, regulations and international agreements to achieve international coordination
  - Marine Spatial Planning Directive (2014/89/EU)
  - Habitats Directive (92/43/EEC)
  - Marine Strategy Framework Directive (2008/56/EC)
  - Regulation on the Common Fisheries Policy (EU No 1380/2013)
  - Regulation on Incidental Catches of Cetaceans in Fisheries (EC No 812/2004), if improved
  - HELCOM

  - OSPAR
  - ASCOBANS
- Mitigation measures to minimize noise impact
  - set noise levels and guidelines for the whole region
- Reduce pollution
- Monitor O_2
- Deal with dumped ammunition through international cooperation
- Decrease impact from boat traffic
  - Speed limit for boat traffic 20 knots, ban of jet skis
  - Try to influence IMO on shipping lanes

What key players should be involved?

- Scientists
- Governments
- National administration responsible for relevant EU directives
  - Habitats Directive
  - Marine Spatial Planning Directive
  - Marine Strategy Framework Directive
  - Common Fisheries Policy
- Managers
- Authorities
- Politicians
- Environmental Protection Agencies
- EU Commission
- Industry
- Fishermen
- Fishermen's associations
- Regional Advisory Councils
- Offshore industry, especially windfarm companies
- Shipping
- IMO
- Leisure boat associations
- Public
- Teachers
- NGOs

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