Muddied Waters –

The current status of harbour porpoise conservation in the Wadden Sea

Meike Scheidat
Wageningen Marine Research
meike.scheidat@wur.nl

Trilateral Symposium on Harbour porpoises in the Wadden Sea,
Thursday 11 April 2019, WHV UNESCO World Heritage Visitor Center
What is the conservation status of harbour porpoise in the Wadden Sea?
What is the conservation status of harbour porpoise in the Wadden Sea?

**Conservation status** ... indicates how likely it is that a group of organisms is going to become extinct* in the future.

How does one measure the likelihood of extinction in the future?

*extirpation

Extirpation (also known as 'local extinction') describes the situation in which a species or population no longer exists within a certain geographical location. Unlike extinction, whereby a species no longer exists anywhere, extirpation means that at least one other population of the species still persists in other areas.
How to measure extinction/extirpation risk:

Those are for example:

- increase/decrease of number of individuals of the group
- Increase/decrease of the population over time
- Breeding success
- Known threats
- Emerging threats
What is the conservation status of harbour porpoise in the Wadden Sea?

**Conservation status** ... indicates how likely it is that a **group of organisms** is going to **become extinct** in the future.

How does one **measure the likelihood of extinction** in the future?

What do we mean by **group of harbor porpoises**?

What do we mean by **Wadden Sea**?
How to define what unit to conserve.

**Species**: a specifically named taxonomic group of living organisms of the same kind which are capable of producing fertile offspring.

**Population**: a collection of individuals (same species) generally in the same area. Genetic variation within the population itself & with other populations. Can exist in isolation, or co-exist at times with conspecific populations in the same area.

**Ecological Unit**: the overall area frequented by a ‘population’ to reflect differences in spatial preferences of individuals with no consideration of management (Evans & Teilmann 2009; Evans 2012).

**Management Unit (MU)**: a geographical area in which the animals of a species are found and to which management of human activities is applied. An MU may be smaller than a ‘population’ or an ‘ecological unit’.

**Assessment Unit (AU)**: OSPAR term under the Marine Strategy Framework Directive. They reflect a geographical area occupied by a population and so are divisions based on biology/ecology rather than management. These areas vary by species, i.e. they are not the same within a regional sea for different species.

**Stock**: [viable stock used as term] Needs a clear definition

Source: adapted from : JNCC Report No: 547 Management Units for cetaceans in UK waters (January 2015) IAMMWG March 2015
Management Units can also be defined as a smaller unit such as:

**Management Units Harbour Porpoise European Atlantic Waters**

*Figure 1.3. Management units (MUs) for the Harbour porpoise (Phocoena phocoena) in European Atlantic waters (top) and UK waters (bottom) (from ICES, 2014a and IAMMWG, 2015a, respectively).*
Management Units can also be defined as a smaller unit such as:

Walschutzgebiet Sylt – Whale Sanctuary Sylt
North Sea Coastal Zone Natura2000 area
Management Units can also be defined as a smaller unit such as:

- National Park Wadden Sea Lower Saxony
Management Units can also be defined as a smaller unit such as

UN World Heritage Site Wadden Sea
What is World Heritage?

- World Heritage properties belong to all the people of the world.
- To be included on the World Heritage List, a site has to be of Outstanding Universal Value.
- ‘Outstanding Universal Value’ is defined as the “cultural and/or natural significance, which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity”.

[UNESCO logo]
World Heritage Patrimoine mondial

UNIVERSAL NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

ORGANISATION DES NATIONS UNIES

POUR L'ÉDUCATION, LA SCIENCE ET LA CULTURE

CONVENTION CONCERNING THE PROTECTION OF THE WORLD

CULTURAL AND NATURAL HERITAGE

CONVENTION CONCERNANT LA PROTECTION DU PATRIMOINE

MONDIAL, CULTUREL ET NATUREL

WORLD HERITAGE COMMITTEE / COMITE DU PATRIMOINE MONDIAL

Forty-first session / Quarante-et-unième session

Krakow, Poland / Cracovie, Pologne

2-12 July 2017 / 2-12 juillet 2017

Item 7 of the Provisional Agenda: State of conservation of properties inscribed on the World Heritage List and/or on the List of World Heritage in Danger

Point 7 de l'Ordre du jour provisoire: Etat de conservation de biens inscrits sur la Liste du patrimoine mondial et/ou sur la Liste du patrimoine mondial en péril

MISSION REPORT / RAPPORT DE MISSION

Islands and Protected Areas of the Gulf of California (Mexico) (1182ter)

9 - 15 April 2017
So, what’s up with porpoises in the Wadden Sea?
Aerial surveys
Long-term Trends in Harbour Porpoise Distribution

Phocoena phocoena

88-97

98-07

08-17

Courtesy Peter Evans, MERP project
Gilles, A., et al. 016. Seasonal habitat-based density models for a marine top predator, the harbor porpoise, in a dynamic environment. Ecosphere 7(6):e01367. 10.1002/ecs2.1367
Limited aerial survey effort in the Wadden Sea area
Why are aerial surveys not an adequate method to assess porpoise abundance and distribution for (inner) Wadden Sea waters?

I. Tides
Why are aerial surveys not an adequate method to assess porpoise abundance and distribution for (inner) Wadden Sea waters?

I. Turbidity
Why are aerial surveys not an adequate method to assess porpoise abundance and distribution for (inner) Wadden Sea waters?

I. Multi-Use
Shore-based & opportunistic counts
1990 to 1994
1995 to 1999
2000 to 2004
2005 to 2009
2010 to 2014
2015 to 2018

https://waarneming.nl/species/380/maps/?start_date=1990-01-01&interval=2592000&end_date=1995-12-31&map_type=grid5k
The Eems – following fatty fish
Figure 1. Location of C-PODs (stars; GSP01 to GSP10) in the study area in the Ems-Dollard estuary. The fish sampling stations are represented as dots. The roman numbers (I-IV), indicate the areas used for comparing acoustic and fish sampling data.
Figure 3. Feeding buzz ratio (FBR) determined for all C-PODs during 1-21 September (orange line) and 17-28 March (yellow line) in 2010 and detection positive hours (DPH) determined for all C-PODs during 1-21 September (blue bar) and 17-28 March 2010 (grey bar).
Why is this attractive???
Figure 5. Average fish density for five taxa for all stations per area (expressed as n/ha on a logarithmic scale) and average DPH per area (black line) and FBR (red line, shown as FBR*10) for the period 1-23 September 2010.
PAM shows porpoise patterns
Month

Increase late winter early spring

Time of day

Slight increase at night

Tidal phase

Maximum at high and low tides

Year

Upward trend after 2016

Video compilation harbor porpoise in the Marsdiep: courtesy Jeroen Hoekendijk

Figure 4. Oblique view of the ebb-tidal delta of Texel Inlet (Marsdiep), red scale in the inlet is 2 km, based on 2004 depth soundings; colours indicate depths (blue deepest) (source: RWS).
What drives the behaviour of porpoises?

- High metabolic rate
- High need for energy
- Constant need for...

FOOD
Why might the Wadden Sea be a good place to hunt for prey?

- Other top predators go here too
- Tides aggregate prey
- High productivity in the area
- Fish nursery
- Migratory “fat” fish
- Advantage of hunting in turbid waters (lower chance of predator avoidance)
Fish can avoid predators visually
Fish can avoid predators visually, in the Wadden Sea porpoises might have an advantage using their sonar to detect them while being “invisible” themselves.
What is the conservation status of harbour porpoise in the Wadden Sea?

- We are lacking information on abundance, distribution, habitat use and impact of threats.

- However, we do know:
  - Increase in the last decade(s) of porpoises
  - Potential link to prey occurrence
  - That the Wadden Sea has the potential to be an important habitat for harbor porpoises occurring here.
Marinus Adrianus Koekkoek II (1873 – 1944) (fotocollectie Naturalis Biodiversity Center)
the ‘Big Five’ of the Wadden Sea