Diet composition and food consumption rate of harbor porpoises (Phocoena phocoena) in the western Baltic Sea

Stomach content composition and prey-specific consumption rates of juvenile and adult harbor porpoises (Phocoena phocoena) were estimated from a data set including 339 stomachs collected over a 32 yr period (1980–2011) in the western Baltic Sea. The stomach contents were mainly hard parts of fish prey and in particular otoliths. The bias originating from differential residence time of otoliths in the stomachs was addressed by use of a recently developed approach. Atlantic cod and herring were the main prey of adults, constituting on average 70% of the diet mass. Juvenile porpoises also frequently consumed gobies. Here, the mass contribution by gobies was on average 25%, which was as much as cod. Other species such as whiting, sprat, eelpout, and sandeels were of minor importance for both juveniles and adults. The diet composition differed between years, quarters, and porpoise acquisition method. Yearly consumption rates for porpoises in the western Baltic Sea were obtained in three scenarios on the daily energy requirements of a porpoise in combination with an estimate including the 95% CLs of the porpoise population size. Cod of age groups 1 and 2 and intermediate-sized herring suffered the highest predation from porpoises.
An important step towards accurate estimation of diet composition and consumption rates for the harbor porpoise (Phocoena phocoena)

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Correlation between the seasonal distribution of harbour porpoises and their prey in the Sound, Baltic Sea

Low densities of harbour porpoises in winter (November–March) and high densities in summer (April–October) were found in the Sound, connecting the Baltic Sea and Kattegat. Due to their high energy requirements, it is hypothesized that the density of harbour porpoises is related to local prey abundance. This was tested by examining the stomach content of 53 harbour porpoises collected between 1987 and 2010 in the Sound (high season, 34 porpoises; low season, 19 porpoises). A total of 1,442 individual Wsh specimens from thirteen species were identiWed. Twelve of these were present in the high-porpoise density season and seven in the low-density season. The distribution of occurrence and the distribution of number of Wsh species were diVerent between seasons, indicating a shift in prey intake between seasons. Furthermore, during the high-density season, the mean and total prey weight per stomach as well as the prey species diversity was higher. However, no diVerence was found in the number of prey species
between the two seasons, indicating a higher quality of prey in the high-density season. Atlantic cod was found to be the main prey species in terms of weight in the high-density season while Atlantic herring and Atlantic cod were equally important during the low-density season. Prey availability and predictability are suggested as the main drivers for harbour porpoise distribution, and this could be caused by the formation of frontal zones in spring in the northern part of the Sound, leading to prey concentrations in predictable areas.

**General information**

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Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources  
Authors: Sveegaard, S. (Ekstern), Andreasen, H. (Intern), Mouritsen, K. N. (Ekstern), Jeppesen, J. P. (Ekstern), Teilmann, J. (Ekstern), Kinze, C. C. (Ekstern)  
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Diet of harbour porpoise (Phocoena phocoena) in Danish waters

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Authors: Lockyer, C. (Ekstern), Andreasen, H. (Intern)
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Projects:

Marine litter in Nordic waters (MANOFA) (39104)
"Marine litter in the Nordic waters" was a project funded by The Marine Group (HAV) under The Nordic Council of Ministers in 2013-2014. The main aim of the project was to establish a Nordic forum for collaboration and exchange of knowledge on status for methodologies and available data for marine litter between Nordic experts, environmental managers and stakeholders, due to the common environmental concerns in our shared seas. Among other activities, the project compiled information that can be used as a contribution to facilitate the framing of this environmental problem in a Nordic perspective. Two workshops were held about I) Common knowledge status on marine litter in the Nordic countries, and indicators relevant for EU Marine Strategy Framework Directive (14 November 2013 in Gothenburg, Sweden) and II) Status for monitoring and Future actions (6-7 November 2014 in Oslo, Norway).

The project was coordinated by Aarhus University.

The project was funded by Nordforsk, Nordic Council of Ministers.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Study on stomach content of fish to support the assessment of good environmental status of marine food webs and the prediction of MSY after stock restoration (Open call for tenders No MARE/2012/02) (39036)

In support of policies for sustainable management strategies of living marine resources, demands for integrated ecosystem advice are growing and more extensive use of long-term management plans, which are consistent with the ecosystem approach to fisheries management, is anticipated. However, long-term management plan evaluations of fish are particularly sensitive to changes in the proportion of fish removed by natural predators (natural mortality). A prerequisite for estimating this correctly is accurate knowledge of species interactions: Who is eating whom when, where and in which quantity?

Existing stomach content data are currently used in multispecies models using historic stomach content data from before 1995. Since this period, there have been considerable changes in the predator and prey stocks of both the Baltic and the North Sea. Thus, updated information on stomach contents of the essential predators in these two areas is urgently needed.

In order to update and improve the quality and quantity of the available back ground data for the above mentioned multispecies models and management plans, the aim of this project is to:
- conduct new stomach content analyses of Baltic cod to support our knowledge of the spatial and temporal stability of cod preferences
- conduct new stomach content analyses of Baltic whiting as well as grey gurnard, mackerel and hake collected in the North Sea to support our knowledge of potentially important predators for which the diet is presently poorly known or is expected to have changed significantly since the last sampling efforts
- compile historical data, which are existing in several institutes around the Baltic and North Sea, and convert them from paper or outdated electronic format into the necessary standard format
- incorporate the new as well as all appropriate historical stomach content information into the Baltic and North Sea stomach content databases

The end product will be updated stomach content databases for the Baltic and North Sea, which include all available information up to 2013. In the Baltic, the project will increase the number of stomachs available for modeling by more than 170%. In the North Sea, the project will increase the number of years where data are available for grey gurnard from 2 to 8, for mackerel from 2 to 6 and for hake from 0 to 1, hence substantially increasing the confidence in the temporal stability of the modeling results.

The databases will be made freely available to the scientific community and will form the basis for new estimates of natural mortality and improved long-term management plans in the Baltic and North Sea.

The project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
Johann Heinrich von Thünen-Institute
National Marine Fisheries Research Institute
Lund University
Institute of Food Safety, Animal Health and Environment
University of Hamburg
Wageningen IMARES

Cefas
Period: 27/11/2012 → 27/11/2014
Number of participants: 7
Research area: Marine Populations and Ecosystem Dynamics

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Project