

Femte Dansk Havpattedyrsymposium, 29. februar 2008 Naturhistorisk Museum, Aarhus Universitet		
9:30	Registrering og kaffe	
9:55	Anders G Jørgensen	VELKOMST
10:00-10:45 Første session: Evolution og Stranding Ordstyrer: Ida Eskesen		
10:00	Mette E Steeman	KONFLIKTER MELLEM MOLEKYLÆRE OG MORFOLOGISKE HVALYLOGENIER
10:15	Anders G Jørgensen	PORPOISE AND DOLPHIN ONTOGENIES COMPARED: PORPOISE PAEDOMORPHOSIS FORMALIZED
10:30	Thyge Jensen	STRANDINGSTEORIER
10:45-11:40 Økologi Ordstyrer: Anders G Jørgensen		
10:45	Tenna K Boye, Malene J Simon, Peter T Madsen	SITE FIDELITY AND RESIDENCE TIME IN FORAGING HUMPBACK WHALES IN NUUK FJORD, WEST GREENLAND
11:00	Jens T Christensen, Kathrine Richardson	HVAD MARSVIN KAN FORTÆLLE OM NORDSØENS ØKOSYSTEM
11:15	Carl C Kinze	MARSVINEFANGSTEN I DET NORDLIGE LILLEBÆLT I NYT LYS
11:30	Signe Sveegaard, Jonas Teilmann, Rune Dietz	IDENTIFICATION OF HIGH DENSITY AREAS FOR HARBOUR PORPOISES. WILL SATELLITE TELEMETRY AND ACOUSTIC SURVEY GIVE SIMILAR RESULT?
11:45-11:55 Kaffepause		
11:55-12:35 Inviteret taler I		
11:55	Per Palsbøll	INDIVIDUAL-BASED GENETICS EXEMPLIFIED BY ANALYSES OF THE NORTH ATLANTIC HUMPBACK WHALE
12:35-13:35 Frokost		
13:35-14:15 Inviteret taler II		
13:35	Lee A Miller	MARIN BIOAKUSTISK FORSKNING: HVAD ER SKET OG HVAD MED FREMTIDEN?
14:15-15:00 Fjerde Session: Ekkolokalisering I Ordstyrer: Jonas Teilmann		
14:15	Frants H Jensen,	DOES TURSIOPS ADJUST SONAR

	Magnus Wahlberg, Lars Bejder, Peter T Madsen	SOURCE LEVELS WHEN APPROACHING TARGET?
14:30	Karin T Clausen, Peter T Madsen, Magnus Wahlberg	CLICK COMMUNICATION IN HARBOUR PORPOISES, PHOCOENA PHOCOENA
14:45-14:55 Kaffepause		
14:55-15:25 Fjerde Session fortsat: Ekkolokalisering II Ordstyrer: Jonas Teilmann		
14:55	Peter T Madsen	BIOMECHANICS OF AIR-DRIVEN SOUND PRODUCTION IN SPERM WHALES
15:10	Ida Eskesen, Magnus Wahlberg, Malene J Simon, Ole N Larsen	COMPARISON OF LONG-FINNED PILOT WHALE (<i>GLOBICEPHALA MELAS</i>) AND NORWEGIAN KILLER WHALE (<i>ORCINUS ORCA</i>) ECHOLOCATION CLICKS
15:25-16:05 Femte Session: Akustik og hørelse Ordstyrer: Nina Eriksen		
15:25	Jakob Tougaard, Jonas Teilmann	BRUG AF AKUSTISKE DATALOGGERE TIL BESTEMMELSE AF BESTANDSTÆTHEDER AF MARSVIN
15:40	LA Miller, MH Rasmussen, T Akamatsu, T Iwata, J Teilmann, PE Nachtigall, TA Mooney, A Pacini, AY Supin, GA Vikingsson	VÅGEHVALPROJEKT I ISLAND 2007
15:55-16:05 Kaffepause		
16:05-16:35 Sjette Session: Sæler Ordstyrer: Susi Edrén		
16:05	Signe M Andersen, Jonas Teilmann, Lee A Miller	EFFEKTEN AF MENNESKELIGE FORSTYRRELSER AF SPÆTTET SÆL
16:20	Jonas Teilmann, Frank Riget, Tero Härkönen, Svend Tougaard, Anton Linnet, Susi MC Edrén, Signe M Andersen	OPTIMISING SURVEY DESIGN IN SCANDINAVIAN HARBOUR SEALS
16:35-17:05 Syvende session: Populationsbiologi og Adfærd Ordstyrer: Anders G Jørgensen		

16:35	Susi MC Edrén, Jonas Teilmann, Rune Dietz, Lee Miller, Finn Larsen, Geneviève Desportes	DYKKEADFÆRD HOS TO GEOGRAFISK ADSKILTE MARSVIN POPULATIONER
16:50	Marie-Anne Blanchet, Magnus Wahlberg, Jakob Kristensen, Sabina Hansen, Sarah Rømer, Ann-Louise Jensen, Niels Van Elk	FIRST BIRTH OF A HARBOUR PORPOISE (<i>PHOCOENA PHOCOENA</i>) UNDER HUMAN CARE
17:05-17:15 Pause		
17:15	Generalforsamling	
19:00	Spisning på Orientalsk Køkken, Vesterbrogade 1	

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ABSTRACTS

Inviteret taler I: Per Palsbøll

Stockholms Universitet

INDIVIDUAL-BASED GENETICS EXEMPLIFIED BY ANALYSES OF THE NORTH ATLANTIC HUMPBACK WHALE

The North Atlantic humpback whale has been subject to intensive study using photoidentification as well as genetics. Here I present some of the results that have emerged from the genetic analysis by use of genetic identification of individual humpback whales and their close relatives. The genetic analyses suggests that female humpback whales only spend a short period on the breeding grounds, compared to the males, and that individual females show temporal fidelity, i.e. they arrive at the same time in consecutive years. The genetic analyses also suggests a second much smaller breeding ground in the North Atlantic of approx. 2000 individuals, of currently unknown location.

KONFLIKTER MELLEM MOLEKYLÆRE OG MORFOLOGISKE HVAL-FYLOGENIER

Mette Elstrup Steeman

Københavns Universitet

Hvaler er højt specialiseret. Dels er de fuldt tilpasset til livet i vand, men de har også specialiseret sig yderligere i selve det akvatiske miljø. Dette afspejles tydeligt i deres morfologi og det har derfor også traditionelt været vanskeligt at udrede hvalernes fylogeni ud fra morfologien. Molekylære slægtskabsanalyser har i de seneste årtier givet evolutionsbiologer en ny tilgang til at studere slægtskabsforhold og givet mulighed for, at teste evolutionære scenarier på basis af uafhængigt datamateriale. Det var f.eks. molekylære slægtskabs analyser der først pegede på, at hvaler tilhører artiodactylerne, hvilket fossil evidens nu har bekræftet. Morfologer har tilgængæld holdt fast i, at tandhvalerne er en monofyletisk gruppe, hvilket nu også støttes af molekylære data. Der er imidlertid langt fra enighed om, hvordan hvalernes fylogeni ser ud og præcis hvorfra de har deres oprindelse. Der findes således en række vedvarende konflikter imellem fylogener lavet ud fra henholdsvis morfologisk og molekylære data. Indenfor bardehvalerne viser morfologiske analyser eksempelvis at pukkelhvalen er søstergruppe til finhvalerne, mens molekylære analyser oftest placerer pukkelhvalen midt inde i finhval-gruppen. Forskelle som denne har ikke alene en taxonomisk konsekvens, men også stor betydning for fortolkningen af hvordan evolutionen er forløbet.

PORPOISE AND DOLPHIN ONTOGENIES COMPARED: PORPOISE PAEDOMORPHOSIS FORMALIZED

Anders Galatius

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Several skeletal traits in phocoenids have been described as paedomorphic relative to their delphinid relatives. These include skull shape and incomplete fusion of skull sutures and postcranial epiphyses. These traits have not been described in a comparative study, which would also be useful for evaluation of the hypothesis of porpoise progenesis, i.e. precocious sexual maturity causing truncation of somatic development. In this study, museum samples of 66 white-beaked dolphins and 130 harbour porpoises were compared in terms of vertebral epiphyseal fusion, cranial suture development and skull shape ontogeny. Full fusion of all vertebral epiphyses was rare among porpoises. The youngest specimen to attain this was six years old. 65 of 79 specimens aged six and older showed incomplete fusion. In dolphins, the youngest mature specimen was ten, while 6 of 31 specimens aged ten and older were immature. Porpoises reached asymptotic levels of a cranial maturity score based on development of five sutures at ages 5-7. Dolphins reached asymptotic levels at 7-9 years, with more developed sutures. Skull shape was captured by 29 three-dimensional landmarks. These configurations were run through Procrustes superimposition, removing variation in location, size and orientation, leaving only size variation. A common allometric vector describing direction of shape development was computed by pooled regression of the mean species covariance matrix of shape on size. Specimen positions along this vector were plotted against size and age for comparison. Dissociation of size and shape was evident, porpoises showing more mature shapes than dolphins of similar sizes. This may be a partial compensation for truncation of shape development around age 4-5, leaving adult porpoises much more paedomorphic than dolphins which continue development until around age 10. In conclusion, these results corroborate the hypothesis of porpoise progenesis; in all investigated traits porpoises terminate ontogeny earlier than dolphins at more paedomorphic stages.

STRANDINGSTEORIER

Thyge Jensen

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På baggrund af egne oplevelser og erfaringer fra strandinger af især kaskelothvaler opstilles en liste over de centrale overvejelser over mulige årsager og forklaringer, som fænomenet "massestranding" kan give anledning til. I præsentationen berøres endvidere hvalernes umiddelbare muligheder for anvendelse af forskellige sanser i forbindelse med terrestrisk og ikke-terrestrisk

navigation. Med udgangspunkt i observationer af hvalernes adfærd i forbindelse med en "tæt-på" stranding af to kaskelothvaler ud for Fanø i 1990 og en massestranding af 13 kaskelothvaler på Rømø dec. 1997, berøres endvidere muligheden for andre strandingsårsager end fejlnavigation alene.

Præsentationen har ingen hovedkonklusion.

SITE FIDELITY AND RESIDENCE TIME IN FORAGING HUMPBACK WHALES IN NUUK FJORD, WEST GREENLAND

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We used photo-identification to study residence time and site fidelity in humpback whales in Nuuk fjord, West Greenland. The study was carried out from mid-May to mid-October 2007. With an effort of 89 days of visual surveys and 45 days on the water, a total of 54 id-photos were taken leading to the identification of 20 individuals. To test for possible site fidelity, id-photos were compared to a catalogue of earlier id-photos. Most whales were present during June (31%). May and September had the lowest number of individuals (4%). On average the whales stayed in the fjord for 2 weeks (SD=1.8). One individual remained in the fjord throughout the entire season, whereas one individual was present in July and returned to the fjord in mid-October. Year to year site fidelity was verified in 20% of the identified individuals. Two individuals were matched to id-photos dating back to 1991 and 1992 in the same fjord. Two individuals were matched to id-photos taken in 2006. Positive id-matches of different years were also seen amongst photos in the catalogue. The humpback whales in Nuuk fjord are part of an open population, however the same individuals do annually return to this specific fjord system.

HVAD MARSVIN KAN FORTÆLLE OM NORDSØENS ØKOSYSTEM

Jens Tang Christensen¹ og Katherine Richardson²

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Virkingen af intensivt fiskeri på økosystemer har været et varmt debattemne gennem mange år. Daniel Pauly og medarbejdere påviste i en artikel i Science i 1998, at et kraftigt fiskeritryk i mange egne af verden havde ført til en stigende repræsentation af lavere trofiske niveauer i landingerne, hvilket kunne tages som

et tegn på en general forkortning af fødekæderne. Andre forskere har vist lignende resultater fra forskellige havområder herunder Nordsøen, der som bekendt er et produktivt men også kraftigt befisket og relativt lavvandet havområde. Studier baseret på fiskeri lider imidlertid under, at fiskere er underlagt markeds kræfter og fiskerireguleringer.

Man kan betragte marsvin (*Phocoena phocoena*) som fiskere, der er uafhængige af markeds kræfter og fiskerireguleringer. Vi antog, at disse generalistiske rovdyr ville reagere på ændringer i sammensætningen af fiskebestandene ved at ændre deres føde. En eventuel forkortning af fødekæderne ville derfor vise sig som en forskydning mod et relativt lavere trofisk niveau for marsvinene. Som en proxy for trofisk niveau benyttede vi forholdet mellem de stabile kvælstof-isotoper $^{15}\text{N}/^{14}\text{N}$, konventionelt rapporteret som $\delta^{15}\text{N}$ i promille relativt til atmosfærisk kvælstof. Dyrs væv er beriget med den tunge isotop i forhold til deres føde og afspejler derfor deres trofiske niveau. Da omsætningen af kollagen i knoglerne er relativt langsom, giver isotopforholdet heri et tidsintegreret mål for dyrets trofiske niveau. Vi analyserede skeletmateriale fra 88 marsvin strandet på den hollandske Nordsøkyst over perioden fra 1848 til 2002. På trods af betragtelig støj i data kunne vi påvise en signifikant faldende tendens i $\delta^{15}\text{N}$, som antydede, at marsvinenes gennemsnitlige trofisk niveau har været faldende siden 1950'erne. Holdbarheden af denne konklusion diskuteres i forhold til mulige faldgruber.

MARSVINEFANGSTEN I DET NORDLIGE LILLEBÆLT I NYT LYS

Carl C Kinze

I Gøteborg Fjord nær Middelfart og Kolding Fjord nær Skærbæk blev der mellem 1819 og 1897 fanget tusinder af marsvin og under begge verdenskrige genoptoges fangsten i en kortere årrække i hhv. 1916-19 og 1941-44 med et forholdvist ringe udbytte. Traditionelt, men baseret på inkomplette data, er det blevet antaget at 1) fangsttallene "påviste" marsvinets vandringer ud af Østersøen om vinteren og 2) at Østersøens bestand over de seneste fangstperioder var gået markant tilbage.

Da en rekonstruktion af samtlige fangsttal nu foreligger, er det muligt at belyse disse to hypoteser påny.

Der kunne ikke spores en direkte sammenhæng mellem fangstens størrelse og islagets udstrækning (isvinterens hårdhedsgrad) i den indre Østersø.

Fangstsæsonen kan fyldestgørende forklares alene ud fra en optimering af spækudbyttet, da dyrenes spæklag om vinteren er tykke. En direkte sammenligning af de gennemsnitlige fangsttal fra 1800-tallet og de to verdenskrige er problematisk, dels fordi stikprøvestørrelserne er meget forskellige og dels fordi fangstindsatsen under de to verdenskrige var præget af manglende erfaring.

Nedgangen i fangsten kan fyldestgørende forklares ved dalende tranpriser samt dårlige vejforhold. Det gennemsnitlige spækudbytte pr. dyr lå i 1883-1892 mere end 5 kg højere end i 1940'erne, hvilket tyder gennemsnitligt større dyr i 1800-tallet. Forklaringen kunne være langtidssvingninger inden for samme bestand eller at forskellige marsvinpopulationer blev udnyttet i de forskellige perioder.

IDENTIFICATION OF HIGH DENSITY AREAS FOR HARBOUR PORPOISES. WILL SATELLITE TELEMETRY AND ACOUSTIC SURVEY GIVE SIMILAR RESULT?

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In order designate Marine Protected Areas for harbour porpoises, the key habitats i.e. high density areas of this species must be identified. This study analysed the movement of 63 satellite tracked porpoises in order to make this identification in Danish waters. The distribution of high and low density was compared with acoustic surveys using towed hydrophones. The surveys was conducted every second month for a year and followed line transects that penetrated the key areas identified by the satellite tracked porpoises. The two methods displayed great resemblance in density distribution and seasonal variation. This confirmed that it is possible to identify key habitats using satellite telemetry. The highest densities were found around the tip of Jylland, in southern Samsø Belt, Great Belt, Little Belt, Flensborg Fjord, Fehmern Belt and Northern Øresund (Tragten). The distribution of harbour porpoises varied seasonally but were found to be consistent between years. Porpoises from IDW moved south in the winter while the porpoises from Skagen moved further out into the North Sea.

MARIN BIOAKUSTISK FORSKNING: HVAD ER SKET OG HVAD MED FREMTIDEN?

Inviteret taler II: Lee A Miller

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Formålet er at give et kort personlig indtryk af bioakustisk forskning inden for marine pattedyr. Der berøres især den teknologiske udvikling og anvendelsen af denne med henblik på biosonar, lyd kommunikation og hørelse.

DOES TURSIOPS ADJUST SONAR SOURCE LEVELS WHEN APPROACHING TARGET?

Frants Havmand Jensen, Magnus Wahlberg, Lars Bejder, Peter T. Madsen

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Animal biosonar has been studied extensively in bats and captive toothed whales, but knowledge on echolocation in free-ranging toothed whales is very limited. Four

species of toothed whales have been shown to decrease their source level when they approach a target as a hypothesized consequence of reducing their interclick interval to the two way travel time to the target. However, this does not match the acoustic behavior of other free-ranging toothed whales echolocating for fish, and it is not clear if the observed range-dependent gain control may be artefacts from the recording or analysis process. This study set out to investigate whether wild Bottlenose dolphins (*Tursiops sp.*) exhibit time-varying gain control of the sound source and whether the methods chosen to investigate this might influence the results. We demonstrate that a rigorous on-axis criterion showed no time-varying gain in this delphinid species whereas more relaxed criteria indicated some form of time-varying gain. In conclusion, the chosen on-axis criterion was found to be essential to the analysis and conclusions drawn and extra care must be given to make sure that analyses of echolocation signals in the wild are indeed on-axis.

CLICK COMMUNICATION IN HARBOUR PORPOISES, PHOCOENA PHOCOENA

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Acoustic communication is playing an important role for toothed whales. However, little is known about acoustic communication in toothed whales that only produce clicks e.g. the harbour porpoise, *Phocoena phocoena*. To study the acoustic behaviour and to quantify the source parameters of communication clicks we recorded the acoustic and swimming behaviour of a porpoise mom-calf pair at the Fjord and Baelt Centre, Denmark. The sounds were recorded using an array of four calibrated Reson 4014 hydrophones. The behaviour was recorded on a video camera along with the output from a porpoise click detector (100 kHz to 160 kHz envelope detector). To test whether mother and calf porpoises communicate through acoustic signalling we analysed the clicks produced by the mother and the calf during defined social interactions. High repetition rate buzzes could be linked to aggressive behaviour and grooming. We found that a porpoise mother and calf produce different click patterns during specific behaviours and that the communication sounds are made up of normal echolocation clicks produced in specific patterns with estimated source levels of 150-170 dB re 1uPa (pp). We conclude that the porpoise mother-calf pair communicated acoustically using specific patterns of clicks with source properties comparable to normal echolocation clicks.

BIOMECHANICS OF AIR-DRIVEN SOUND PRODUCTION IN SPERM WHALES

Peter T. Madsen

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The sperm whale (*Physeter macrocephalus*) carries a large nasal complex that may take up 1/3 of the body length and reach a weight of more than 10 tons in old males. A number of theories have been advanced to account for the function and evolutionary driving forces behind this hypertrophied structure that is homologous with the much smaller sound producing nasal complex of delphinids. The bent horn model proposes that the sperm whale nose is a giant sound generator that produces powerful mono-pulsed sonar clicks for long range echolocation of prey and multi-pulsed coda clicks for communication. To test the bent horn model for sperm whale sound production we placed non-invasive Dtags on different, photo-documented parts of the nasal complexes of 6 free-ranging sperm whales. The Dtags sample sound at 96 kHz and 3-axis accelerometers at 50 Hz with 16 bit resolution, allowing for synchronized, high resolution measurements of tissue acceleration and sound propagation in the soft structures of the sperm whale nose. We demonstrate that sperm whale clicks are generated when the monkey lips are accelerated apart by pneumatic action. By analysing the reverberation patterns from tags placed between the reflective air sacs of the nose, we show that the sperm whale multi-pulsed clicks are generated by multiple reflections of a single sound pulse from the monkey lips. Recycled air from the right nasal passage is used to drive the sound generator at less than 0.1 liter of air per click, limiting the length of click trains, but not the output or properties of individual clicks with increasing hydrostatic pressure. These experimental data from free-ranging sperm whales confirm the bent horn model, and show that the sperm whale nasal complex is a giant sound generator producing sound by air driven acceleration of a single pair of phonic lips.

COMPARISON OF LONG-FINNED PILOT WHALE (*GLOBICEPHALA MELAS*) AND NORWEGIAN KILLER WHALE (*ORCINUS ORCA*) ECHOLOCATION CLICKS

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The source characteristics of biosonar signals were compared from two sympatric species of odontocetes, killer whales and long-finned pilot whales. A total of 137

pilot whale and 2000 killer whale echolocation clicks were recorded in Norway 2006, using a four-hydrophone linear array. From these 20 pilot whale clicks and 28 killer whale clicks were categorised as being on-axis from a set of criteria. The pilot whale clicks had a mean apparent source level of 196 dB re $1 \mu\text{Pa}_{pp}$ and the killer whales had a mean apparent source level of 203 dB re $1 \mu\text{Pa}_{pp}$. The duration of pilot whale clicks was significantly shorter than the duration of the killer whale clicks. The centre frequency was significantly higher for pilot whale clicks than for killer whale clicks. The results show that the clicks emitted by long-finned pilot whales and Norwegian killer whales are significantly different. The accumulation of energy over time for the clicks of the two species also differed, with the pilot whales having a more rapid increase in energy over time, than the killer whale. This trait may make it possible to discern pilot and killer whales in automated detection routines and may have large practical implications.

BRUG AF AKUSTISKE DATALOGGERE TIL BESTEMMELSE AF BESTANDSTÆTHEDER AF MARSVIN

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En grundlæggende forudsætning for effektiv forvaltning af en dyreart er muligheden for at vurdere om de tiltag, der gøres for at beskytte arten eller dens levested er effektive. Den mest direkte metode er at opgøre bestandsstørrelsen eller individtætheden med regelmæssige mellemrum. Det er imidlertid ikke altid nemt og en art som marsvin byder på store udfordringer i den retning. Hidtil har den eneste mulighed for overvågning af marsvin været optælling langs linietransekter, enten fra fly eller skib. Optællinger er imidlertid kostbare og kan kun udføres om dagen og i godt vejr.

Et godt supplement til optællingerne er at bruge akustiske dataloggere. Disse er indstillet til at registrere marsvins ekkolokaliseringsslyde og kan derfor bruges til at bestemme hvornår der har været marsvin i nærheden af dataloggeren.

Ved at bestemme den såkaldte detektionsfunktion, som beskriver sandsynligheden for at et marsvin registreres i forskellig afstand fra loggeren, er det muligt at omregne fra registreringsrater (registreringer per time) til tætheder (dyr/km^2), idet man fra detektionsfunktionen kan beregne det effektive areal som dataloggeren optager fra. Ved at sammenholde visuelle observationer af marsvin med registreringer på en datalogger (T-POD) kunne den effektive detektionsafstand bestemmes til mellem 100 og 150 m, afhængig af model og indstillinger.

VÅGEHVALPROJEKT I ISLAND 2007

Miller, LA¹, Rasmussen, MH², Akamatsu, T³, Iwata, T⁴, Teilmann, J⁵, Nachtigall, PE⁶, Mooney, TA⁶, Pacini, A⁶, Supin, AY⁷, Vikingsson, GA⁸

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⁷ *Russian Academy of Sciences, Moscow, Russia*

⁸ *Marine Research Institute, Reykjavik, Iceland*

Hovedformålet med projektet var at måle et audiogram på en vågehval. En mindre hval skulle indfanges i et net, placeres på en bære, lydstimuli afspilles og audiogramet måles vha. elektroder over hjernen og ved dorsalfinnen. Desuden var det planlagt at påmontere en særlig datalogger til at registrere egen lyd, dykkedybde, tre-dimensionale bevægelser, temperatur og kompasretningen, samt en satellitsender for at måle hvalens positioner over længere tid. Til formålet var der samlet et international hold af forskere, en professional fanger, og en dyrlæge med speciale i havpattedyr. Projektet blev udført i farvandet omkring Sandgerdi og Grindavik, Island, i juli 2007. Under 92 timers sejlads blev 81 vågehvaler observeret. Hvalernes dykketid var fra 2 til 5 min, og når hvalerne var ved overfladen var der 2 til 4 respirationer med 10 til 20 sek. mellemrum inden neddykning. Vi havde mulighed for at indfange tre hvaler. Imidlertid viste det sig, at nettet ikke var egnet til formålet: alle slap fri fordi nettet ikke kunne lukkes hurtigt nok. Med sorg så vi en svømme ud igennem netåbningen. Foredraget vil illustreres med PowerPoint og video. Projektet blev støttet af den International Association of Oil & Gas Producers (OGP).

EFFEKTEN AF MENNESKELIGE FORSTYRRELSER AF SPÆTTET SÆL

Signe M. Andersen^{1,2}, Jonas Teilmann² og Lee A. Miller¹

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² *Afd. for Arktisk Miljø, Danmarks Miljøundersøgelser*

Sæler er afhængige af gunstige forhold i det marine miljø såvel som tilgængelige landgangspladser, hvor de kan finde hvile, kan føde og opfostre deres unger og opholde sig under pelsskiftet, hvilket gør dem sårbare overfor påvirkninger og trusler i begge miljøer.

Ved kontrollerede forstyrrelser, som efterligner de normaltforekommende forstyrrelser omkring landgangspladserne, undersøges effekten af menneskelige

påvirkninger af sælerne på land og i vand, for at afgøre om reservaterne yder sælerne den fornødne beskyttelse i løbet af deres årscyklus. I dette studie har vi begrænset os til forstyrrelsestyper som gående mennesker i reservatet og sejlads udenfor og indenfor reservatgrænserne.

Effekten af forstyrrelserne undersøges både tidsmæssigt og geografisk. Korttidseffekten observeres fra et skjul i nærheden. For at kunne følge sælernes reaktion på en forstyrrelse i vandet, bruges VHF-sendere til at belyse hvornår sælerne returnerer efter en forstyrrelse og satellitsendere hjælper til at afklare hvor sælerne opholder sig i mellemtiden. Endvidere registreres sælernes uforstyrrede adfærd vha. fjernbetjente videokameraer.

Studiet udføres i Anholt sælreservat, som er et af de største og vigtigste tilholdssteder og yngleområder for spættet sæl i Europa.

OPTIMISING SURVEY DESIGN IN SCANDINAVIAN HARBOUR SEALS

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We estimate trends in abundance of harbour seals (*Phoca vitulina*) in seven geographically distinct sub-populations in southern Scandinavia. Systematic aerial surveys were conducted in the Skagerrak, Kattegat and the Wadden Sea since 1979, in the Limfjorden since 1988 and in the western Baltic Sea since 1990.

The European harbour seal population was affected by a phocine distemper virus (PDV) in 1988 and 2002. Mortalities of 17-56% was observed depending of sub-population. Before, between and after the two epidemics all except one of the sub-populations of harbour seals increased with an annual growth rate of 2 to 19%.

Statistical power analysis may be helpful in designing or optimising seal surveys. Our analyses show that much more power is gained by surveying every year rather than several surveys every other year. In addition trying to reduce the variation between surveys will have a great effect in some areas. Our recommendation to obtain the most precise abundance index estimate is to survey every year during the moult in late August with at least three surveys performed per year.

DYKKEADFÆRD HOS TO GEOGRAFISK ADSKILTE MARSVINE-POPULATIONER

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Ved hjælp af satellitesporing, har vi undersøgt og sammenlignet udbredelsen og dykkeadfærden hos marsvin (*Phocoena phocoena*) i Nordsøen, Skagerrak, samt i de indre danske farvande. I alt blev 63 marsvin mærket med satellitsendere fra 1997 til 2007. Marsvin mærket ved Skagen udnytter det nordlige Kattegat, Skagerrak samt Nordsøen, områder med vanddybder ned til 700m, mens marsvin mærket i indre danske farvande mest benytter farvandet omkring de danske bæltter med vanddybder ned til 50m. Marsvin fra disse to områder viser en klar forskel i geografisk udbredelse og dykkeadfærd. Marsvin i de indre danske farvande dykker dybere om vinteren (23,8m) end om sommeren (9,8m), med en gennemsnitlig dykkesid på 0,9 min. I Skagerrak/Nordsøen foretager marsvinene ligeledes dybere dyk om vinteren (27,5m) end om sommeren (18,2m). Her er deres gennemsnitlige dykkesid er 1,4 min. Selv i områder med samme dybdeprofil (0-40m) dykker marsvin i Skagerrak/Nordsøen dybere end marsvin i indre danske farvand, mens marsvinene i de indre danske farvande har flere dyk til bunden (39%) end marsvinene i Skagerrak/Nordsøen (24%). Vores resultater viser, at sæson- og dybdeudnyttelse med fordel kan inddrages i forvaltningen der skal nedsætte bifangsten af marsvin i nedgarnsfiskeriet.

FIRST BIRTH OF A HARBOUR PORPOISE (*Phocoena phocoena*) UNDER HUMAN CARE

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Very little is known about the reproduction of harbour porpoises since most of the data are collected from by-caught or stranded animals and only represent partial information. In particular very few data on pregnancy, parturition and early development of calves are available.

The Fjord&Baelt in Denmark hosts 1 adult male and 2 adult female harbour porpoises on a permanent basis. The 11 years old Freja became pregnant for the

second time between September 9th and October 13th 2006. She gave birth to a live female on August 8th 2007 at 2am.

We followed the pregnancy, the parturition and the early development of the calf. Freja's morphometry, food intake and blood parameters were monitored as routine during the pregnancy through voluntary behaviours. During the parturition evolution of visible contractions, breathing rate and remarkable events were recorded as were acoustic data.

We will present a comparison of both pregnancies, an overview of the delivery and the early development of the calf.

Such data are very difficult to obtain in the wild; therefore animals kept under human care represent an incredible opportunity to gather valuable information on this poorly known species at a critical point of their life cycle.