



Report of the

UNEP/CMS Thesis Award 2008

sponsored by

National Geographic Deutschland and Deutsche Lufthansa

Impressum:

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Poster:



National Geographic Deutschland and Lufthansa
herewith launch together with the
**Convention on the Conservation of Migratory Species
of Wild Animals (UNEP/CMS)¹**

the award for the most outstanding PhD thesis on the biology of
migratory species of wild animals.

Thesis Award on Migratory Species Conservation

The award, amounting to
10,000 EURO

will be awarded every three years at the Conference of the Parties to
CMS, and for this time at the 9th meeting of the CMS Conference
of the Parties in 2008, in affiliation with Museum Koenig, Bonn.²

Details on the application procedure have been published since
2005 on the CMS website, in the CMS Bulletin as well as in the National
Geographic Deutschland Magazine and Lufthansa publications.

(1) <http://www.cms.int>

(2) <http://www.zfmk.de>



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Preface

On the occasion of the 25th Anniversary of the Convention on the Conservation of Migratory Species of Wild Animals (UNEP/CMS or Bonn Convention) National Geographic Deutschland and Lufthansa donated an Award for the most outstanding PhD thesis on the biology of migratory species of wild animals amounting to 10,000 EURO. In 2008 CMS Award was made for a second time. V:_Thesis Award 2008

The UNEP/CMS-Thesis Award recognizes and supports exemplary work in the field of migratory species. Every 3 years CMS grants an earmarked or uncommitted Award to a doctoral thesis with direct relevance for migratory species or practical nature conservation measures and which serves to extend, modify or complete the Global Register on Migratory Species (GROMS). All dissertations have already been accepted and evaluated by a special selected Jury. Therefore, we can take it for granted that they are scientifically and methodologically sound. But the main focus of the review of a scientifically solid dissertation should be the potential value of the study for CMS and the conservation of migratory animals.

The granting of the Award will take place every 3 years simultaneously with the CMS Conference of the Parties. COP9 takes place in Rome, Italy 1-5 December 2008). The winner attends the COP, presents his/her work and mention his/her further plans. An outline of the importance for CMS should be clarified through a stateman.

For the UNEP/CMS Thesis Award 2008 32 applicants from 18 nations submitted theses. Most of the abstracts received were interesting and valuable contributions to the knowledge about migratory species.

Introduction

UNEP/CMS Thesis Award on Migratory Species Conservation

For the promotion of scientific co-operation (basic research) and applied nature protection the Secretariat of the Bonn Convention on Migratory Species has established a prize for the best thesis in the field of migratory species. The reason is that scientific results from the basic research often flow into nature protection practice with a delay of many years. Particularly the international nature conservation sector that is essential for the protection of migratory species has benefited over the past years from new methods such as satellite telemetry, DNA-fingerprinting etc. Migration routes can be mapped more exactly and the level of threat of individual populations can be measured better.

The Award should point out positive examples of co-operation between international nature protection organisations and scientists and help to intensify and improve collaboration. Work accepted includes finished doctoral theses with scientific results having direct effects on the protection of migratory animal species or results that can be implemented in nature conservation measures. An acknowledged educational institution must have accepted the work as a dissertation thesis; graduation should not be longer than 1 year in the past. A committee consisting of international experts will preselect the theses.

The applicant must register on an online database and provide an English translation of the title and an English summary as well as references to the candidate's articles reviewed by journals so far. Only after a preselection will the complete version of the doctoral thesis be requested for further examination.

The Award ceremony takes place every 3 years on the occasion of the Conference of Parties of the Bonn Convention (COP) at various locations and this time at the 9th meeting of the CMS COP in 2008. National Geographic Deutschland and Lufthansa donate the prize.

Table of the Top 10

Candidates in alphabetical order, title of the thesis and Country

Use of satellite and telemetry data for the identification of important habitats of migratory birds (<i>Ciconia ciconia</i> , <i>Aquila pomarina</i>)	Birgit GERKMANN	Germany
Feeding strategies in the time of the different social groups of long finned pilot whales (<i>Globicephala melas</i>) in the Strait of Gibraltar.	Renaud DE STEPHANIS	Spain
Simulated migration of the European eel (<i>Anguilla anguilla</i> L.)	Vincent VAN GINNEKEN	The Netherlands
Migration and Habitat Utilization in Lamnid Sharks	Kevin WENG	USA
The arctic pulse: timing of breeding in long-distance migrant shorebirds	Ingrid TULP	The Netherlands
At-Sea Biology and Movements of Leatherback Turtles, <i>Dermochelys coriacea</i> , in the Northwest Atlantic	Michael JAMES	Canada
Understanding and Mitigating Vulnerable Bycatch in southern African Trawl and Longline Fisheries	Samantha PETERSENS	South Africa
Impacts of the introduced house mouse on the seabirds of Gough Island	Ross WANLESS	South Africa
Conservation biology of the largest population of the Loggerhead Sea Turtle in the Mediterranean	Judith ZBINDEN	Switzerland
Traffic Disturbance to the Migration of Tibetan Antelopes (<i>Pantholops hodgsoni</i>) in Hoh-xil National Nature Reserve with Conservation Strategies	LIN Xia	China

The winner: Samantha Petersen



The jury selected as the first laureate Samantha Petersen for her work on '*Understanding and Mitigating Vulnerable Bycatch in southern African Trawl and Longline Fisheries*'. Her thesis on the impact of Bycatch in the Benguela Upwelling System clearly showed the danger of catching non-target species on the edge of extinction.

With her thesis Dr. Samantha Petersen has made a significant contribution to improving the understanding of affected species' conservation status under the Convention. The relevance to the vision and goals of UNEP/CMS to protect and improve the conservation status of migratory animals was the main factor in the Jury's choice.

Over the past decade there has been global concern about the bycatch of seabirds, turtles and sharks in fishing operations, in particular longline and trawl fisheries, which have been widely held responsible for their declining populations and threatened conservation status. The FAO estimated that 75% of the global stocks are unsustainably exploited, approximately 25% of marine resources landed are dumped. Ecosystems have been modified and catastrophic declines of vulnerable marine life reported, including the loss of up to 90% of the large predatory fish. Dr. Petersen's thesis addresses the issue of bycatch in a holistic manner, taking into account that species, be they target or non-target for fisheries, do not exist in isolation from each other and their environment

Dr. Samantha Petersen received her Ph.D. in Zoology with her thesis from the University of Cape Town. She was employed by BirdLife South Africa from May 2003 to August 2007. Her main goal there was the research on the impacts of and ways to reduce the bycatch of seabirds, turtles, cetaceans and sharks.

At the moment she is employed at the World Wildlife Fund – South Africa where she is developing and implementing a new fisheries project (Responsible Fisheries Programme). This programme aims at an appropriate implementation of the Ecosystem Approach to Fisheries (EAF) in South Africa and Namibia by 2010.

Petersen, Samantha**E-Mail Address:** spetersen@wwf.org.za**Institution:** World Wildlife Fond**Street:** 204 Villa Della Fonte**City:** Arum, Blouberg, 7441**Country:** South Africa**Title:**

Understanding and Mitigating Vulnerable Bycatch in Southern African Longline and Trawl Fisheries

Subject / Field of Research: Zoology**Date of Graduation:** February 2008**Educational Institute / University:** University of Cape Town**Short Statement:**

Over the past decade there has been global concern about the bycatch of seabirds, turtles and sharks in fishing operations, in particular longline and trawl fisheries, which have been widely held responsible for their declining populations and threatened conservation status. This thesis addresses the issue of bycatch in a holistic manner, taking into account that species, whether they be target or non-target, do not exist in isolation from each other and their environment. South African fisheries incidentally catch approximately 21 000 seabirds, 165 turtles and 43 000 pelagic sharks per year, including 21 Endangered species. Decreasing CPUE and size-frequency data for Blue *Prionace glauca* and Shortfinned Mako Sharks *Isurus oxyrinchus* caught in the large pelagic longline fishery suggests exploitation of these species is unsustainable. A decreasing trend in the biomass index was also observed for the Yellow-spotted Catshark *Scyliorhinus capensis* and the Biscuit Skate *Raja. straeleni*. An argument for the likelihood of fisheries mortality contributing to the slower than expected turtle population recovery rates is presented, which is supported by results from satellite tracking of Leatherback Turtles *Dermochelys coriacea* indicating a high degree of overlap with fishing effort. Satellite tracking of Black-browed *Thalassarche melanophrys* and White-capped *T. steadi* Albatrosses reveal striking differences in their foraging patterns and presents evidence that Black-browed Albatrosses, in particular, forage to a large extent on natural prey, despite the availability of discards from fishing vessels in the Benguela. Therefore, given the high albatross mortality in the trawl fishery, the benefit of a management decision to limit discarding as a mitigation measure is likely to outweigh the disadvantage of reduced food supply. Reducing bycatch is dependent on the development of effective and relatively inexpensive methods which do not impact on target catches and/or other vulnerable species. In the demersal longline fishery, two methods of optimising line sink rates to reduce seabird bycatch were investigated: increasing mass of weights and decreasing the spacing between weights.

This study indicated that while the target species is unlikely to be affected by increased weighting, other vulnerable species of fish and sharks may be affected. Other mitigation experiments investigated line sinking rates and the use of circle hooks in pelagic longline fisheries. The implications of night setting on Swordfish *Xiphias gladius* catches, fishery closure during full moon and the appropriateness of the international standard 5% fin to trunk ratio for the South African fishery, were also investigated.

Lastly, the spatial and temporal overlap of catches of seabirds, turtles and sharks were investigated through a conservation planning exercise using MARXAN and potential areas for closure identified.

Publications:

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Xia Lin**E-Mail Address:** xial@ioz.ac.cn**Phone Number:** +86-10-64807225**Institution:** The Chinese Academy of Sciences**Street:** B5 Datun Road**City:** Beijing, 100101**Country:** People's Republic of China**Title:**

Traffic Disturbance to the Migration of Tibetan Antelopes (*Pantholops hodgsoni*) in Hoh-xil National Nature Reserve with Conservation Strategies

Original Title :

青藏高原藏羚羊迁徙过程中(*Pantholops hodgsoni*) 受到交通干扰的现状及保护策略

Subject / Field of Research: Zoology and conservation biology**Date of Graduation:** May 2008**Educational Institute / University:** Institute of Zoology, The Chinese Academy of Sciences**Supervisors:** Professor Lei Fumin and Professor Yang Qisen**Short Statement:**

The Tibetan antelope or chiru (*Pantholops hodgsoni*) is endemic to the Tibetan plateau and was once abundant over vast areas of high elevation grassland habitat. During the 20th century, however, the population declined greatly in numbers. Hunting used to be the main threat to this species but recent actions by the government and wildlife protection organizations have brought this under control. With the development of north-west China, conflicts between development of transportation facilities and conservation have become more acute. Hoh-xil is one of the main distribution areas of the chiru. Each year, flocks of the Tibetan antelopes will move to *Zhuonai Lake* and *Taiyang Lake* to give birth. The Qinghai-Tibet Highway and the newly built Qinghai-Tibet Railway are both on the migration corridor of one migrating population, which migrates between the winter range in Sanjiangyuan and calving ground in Hoh-xil. To ensure the safety of chiru passes, wildlife corridors were built along the railroad, but still no wildlife crossing structures over the highway. In order to assess the traffic disturbance to migration of the population, we monitored the chiru movements along the Qinghai-Tibet highway and the newly built railway, and recorded their passes through wildlife crossing structures. The fieldwork has continued for 4 years from the construction period in 2004 to the present.

In 2004, the main structure of wildlife corridors was finished, but the rail bed was still in construction, we recorded 1660 chiru passes through *Hoh-xil Wildlife Passage* on migration to the calving ground, but in return migration, only about 56% of the 2303 animals using crossing structures, the others over passed the rail bed. The human activities in construction of the railway and road traffic both had great impact on migration of Tibetan Antelopes. In 2005, all wildlife passages put into use, 1,509 chiru passes were detected at *Hoh-xil Passage*, and 2182 in return migration, among which 88.5% used wildlife corridors, 11.5% over passed the rail bed. From July 1st, 2006, the Qinghai-Tibet railway began trial operations, 2122 chiru moved from their winter ground to summer calving ground, all using wildlife corridors or other underpass rail bridges; in return migration only 1.83% of them overpass the rail bed. To ensure the safety of the rail line, the railway has been fenced since November, 2006. In 2007, all Tibetan antelopes went through wildlife corridors or other underpasses, 1,698 to calving ground and 2,512 back to the winter range.

Our results show that the disturbance to migration of Tibetan antelopes included transportation infrastructure, human activities, road traffic, construction of the railway and so on. During the main construction period the Tibetan antelopes were much disturbed but they soon adjusted their migrating routes to avoid most human activities. The antelopes readily adapted to wildlife corridors and other underpasses along the railway: the efficiency of wildlife passages have greatly improved from 56.06-100%, more crossing structures were used and the grouping size decreased. The use of wildlife corridors was affected by the structure of the passage, recovery of vegetation following damage during construction, and other factors. Monitoring results also indicated that chiru migration were greatly affected by the busy traffic on highway and the disturbance of hundreds of tourists, the successful chiru passes have a negative correlation with the traffic volume on the highway.

Based on four years of monitoring results, recommendations were submitted to Bureau of Forestry and transportation department on speed limit on highway, reduce human activities near underpass, public education, continuous monitoring of migration, habitat management and so on. They will be used to make a conservation plan for the future migration season. The impact of infrastructure, especially transportation development, on the habitat and migration of the Tibetan antelopes are the main factors that threaten this species now and in the future. Results from this study may diagnose any potential problems with transportation development at an early stage and provide solutions to reduce conflict between development and conservation.

Publications:

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Ross Wanless**E-Mail Address:** rosswanless@gmail.com**Phone Number:** +27 21 671 2967**Institution:** Percy FitzPatrick Institute, University of Cape Town**City:** Rondebosch, 7701**Country:** South Africa**Title:**

Impacts of the introduced house mouse on the seabirds of Gough Island

Subject / Field of Research: Zoology**Date of Graduation:** August 2007**Educational Institute / University:** Percy FitzPatrick Institute, Zoology Department, University of Cape Town**Short Statement:**

Introduced house mice *Mus musculus* on Gough Island were suspected of having caused widespread breeding failures of Atlantic Petrel *Pterodroma incerta* and Tristan Albatross *Diomedea dabbenena* chicks in 2000/01. However, prior to this study no unequivocal evidence existed for significant predation of seabird chicks by mice. This thesis reports another three years of breeding success data for both seabird species and defines the role of predation by mice in the observed patterns of failure.

In 2003 mice killed at most one of 41 Atlantic Petrel chicks monitored. Breeding success (number of chicks fledged per nesting attempt) for the period of study in 2003 (part of chickrearing) was 93% and a crude estimate of annual success was 46.5%. Video recordings in August-September 2004 captured six fatal attacks by mice on live, healthy chicks. From June- September 2004, 40 of 60 monitored nests failed and from September-November 2006, 14 of 19 monitored chicks died; the majority of chick failures were ascribed to mouse attacks. Overall, breeding success estimates were ca 7% for both 2004 and 2006; incomplete seasons means actual success could have been higher (maximum 33% in 2004 and 26% in 2006). Roughly the same nest period was studied in 2003 and 2006, but 2006 experienced significantly lower success than 2003. Chick mortality in 2003 prior to October is unknown, however, and may have been higher than the breeding success estimate of 46.5% suggests. The 2004 and 2006 breeding success estimates are probably insufficient to maintain the Atlantic Petrel population.

Mice also attacked live, healthy Tristan Albatross chicks in 2004. Video showed mice attacking more-or-less constantly at night, with up to 10 mice at the nest simultaneously and 4-7 mice competing aggressively for access to an open wound. Breeding success from four seasons averaged at most 32%. Total failures were significantly related to total attempts but breeding success and the number of attempts were not correlated. One sub-colony experienced consistently low predation and high annual breeding success. There was little temporal consistency in total failures or breeding success in other sub-colonies, with sites varying in opposite directions within and between years. Despite strong and consistent differences in breeding success between sites, no environmental or biological variables examined explained the pattern. Nests that failed in a given month were significantly closer to the nearest nest that failed the previous month than predicted by chance, suggesting a localised effect possibly due to a few predatory individuals. Mean total fledglings have decreased by ca 1% per year since 1979-1982. A reassessment of the 1956 population estimate suggests a negative trend of ca 1% per year over 50 years. Annual adult survival is ca 91%. Population models and consecutive General Abstract annual incubator counts allow the first estimates of adult and total Tristan Albatross populations (5,400 and 11,300 individuals, respectively). Modelled population growth based on current

estimates of adult survival and breeding success was -2.85% per year and annual breeding attempts are likely to decrease to ca 500 in 30 years. Modelling additive (vs proportional) adult mortality and chick failures predicted a catastrophic decrease, with extinction occurring in ca 25 years. An historical account from the 1880s describes high levels of chick failures suggesting significant predation levels for >100 years. Reversing negative Tristan Albatross population trends requires mitigating both longline mortality and mouse predation, else breeding success must exceed 100% or adult survival must exceed 97%.

I used stomach content and stable isotope analyses to investigate the importance of seabirds to mice. Plant $\delta^{15}\text{N}$ values were significantly negatively correlated with altitude, reflecting altitudinal differences in marine nitrogen input due to higher seabird densities in the lowlands. Mouse isotope signatures differed significantly with altitude (for both $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$). GLMs showed a strong, significant enrichment of both isotopes for lowland mice in August-September, implying significant levels of seabird consumption. Seabird remains in lowland mouse stomachs were low through winter, but peaked in August, supporting the isotope findings. These changes coincided with the timing of Atlantic Petrel chick hatching and very high observed predation rates in 2004. Using $\delta^{13}\text{C}$ only, a rough estimate suggests seabird consumption contributes 40-60% to mouse diets at this time. Collectively these findings support the hypothesis that seabirds are an important part of mouse diets in late winter in the lowlands. In the highlands I compared a site with severe predation on albatross chicks (Green Hill) to one with minimal predation (Gonydale). GLMs revealed no effect of site on plant $\delta^{15}\text{N}$ or $\delta^{13}\text{C}$. Surprisingly, despite strong differences in albatross chick predation rates between sites, mice did not differ in $\delta^{13}\text{C}$ values, implying no differences in the relative importance of seabird consumption. Stomach content analysis from mice collected in May revealed virtually no seabird remains in Gonydale but a mean for Green Hill >30% by volume. Nevertheless, no seabird consumption in Gonydale, and no differences in seabird contribution to mouse stable isotope signatures between sites implies that seabird consumption is also a negligible component of mouse diets in Green Hill. The fertilizing effect of seabirds means that terrestrial productivity will decrease in tandem with seabird population decreases at all altitudes. This could drive down mouse numbers, ameliorating predation levels, or it could cause increased reliance on seabird predation by mice, setting up a positive feedback and exacerbating predation. This should be a conservation research priority.

Mice ended breeding in April 2000 vs February 2004 and proportions of reproductively active mice were lower in the latter season, suggesting density-dependent effects, possibly due to inter-annual fluctuations in winter survival rates and spring densities of mice. In 2004, lowland males weighed an average of 45% more ($p < 0.001$), had 9.5% longer tails ($p < 0.001$) and higher body condition ($p < 0.001$) than highland males. Average lowland tail length increased significantly at the end of winter, showing that survival during the critical late-winter period is biased towards larger individuals. Average body condition in lowland mice was low in February, increased in autumn after the cessation of breeding and decreased significantly from June-September. Monthly density estimates from a mark-recapture study in 2005/06 showed that apparent densities were relatively static from February-June and decreased from July- September. These congruent results suggest that June-August would be the most appropriate time of year for an attempted eradication, as mice were not breeding, showed the clearest signs of food-deprivation but densities had not yet equilibrated to their lowest levels. The highlands appear sub-optimal for mice and they should readily accept toxic bait.

The introduced house mice on Gough Island prey on seabird chicks at levels sufficient to drive population decreases. Mouse impacts elsewhere, while requiring verification, suggest that when mice are the only introduced mammal on islands, they can become significant predators of seabird chicks. From a global perspective, this research suggests that mouse impacts may have been overlooked or could evolve elsewhere. Further, it is highly desirable to eradicate mice from Gough and other islands, and mouse eradications should receive a high priority in island restoration projects.

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Birgitt Gerkmann**E-Mail Address:** birgit.gerkmann@gmx.de**Phone Number:** +49 (0)2232/ 213381**Street:** Lohrbergstraße 1**City:** 50321 Brühl**Country:** Germany**Title:**

Use of telemetry and remote sensing data to identify important habitats of migratory birds

Original Title:Nutzung von Telemetrie- und Satellitendaten zur Identifizierung wichtiger Habitate wandernder Vogelarten (*ciconia ciconia*, *Aquila pomarina*)**Subject / Field of Research:** Migration of the European White Stork**Date of Graduation:** 16.04.2007**Educational Institute / University:** Alexander Koenig Research Institute, Mathematisch-Naturwissenschaftliche Fakultät der Rheinischen Friedrich-Wilhelms-Universität-Bonn**Supervisor(s):** PD Dr. Klaus Riede und Prof. Dr. Wolfgang Wägele**Short Statement:**

Migration is an adaptation of animals to avoid seasonal fluctuations of resources by moving into regions with better conditions, especially sufficient food. During migration, animals might occupy different biomes, climate zones or habitats. Their routes cross political boundaries and often cover thousands of kilometres. But migration also exposes species to a number of threats including habitat destruction, persecution and hunting by man, and impacts of climate change. These potential dangers can make migration more difficult or even lead to decreases in population size. Hence, there is an urgent need for suitable conservation measures in order to minimize dangers during their migration, breeding, and wintering. The present study investigates the potential of applying modern technologies, such as remote sensing and satellite telemetry, to two migratory bird species, the White Stork *Ciconia ciconia* (Eastern population) and the Lesser Spotted Eagle *Aquila pomarina*. Telemetry data containing information about timing and spatial dimension of migration were obtained from previous studies. Additionally, remote sensing information was used to locate important staging areas, used habitats, and factors influencing migration. The huge set of telemetry data from an entire decade (1991 – 2003) and results of many years of investigations on White Storks helped to identify suitable methods and validate the results. For the Lesser Spotted Eagle, these methods could be applied to gain a better knowledge of migration of this species. These tools should be applicable to other telemetry datasets of other species. Validation of the telemetry datasets is the first step for the use of high quality data in further analyses. One important tool is a newly developed index, which helps to locate areas of tagging or wintering. This index relates directional movement and flown distances, thus differentiating between migration and staging data.

In a Geographic Information System (GIS) migration and staging data of the birds were overlaid with different geographic information including land cover maps, climate data, conservation areas, and vegetation indices to determine influencing parameters for migration and staging. This enabled important staging areas of the White Stork and the Lesser Spotted Eagle to be located. Due to the high number of telemetry data available for the White Stork, additional criteria such as duration of resting and number of individuals was used to further improve this location information. Important staging areas of the White Stork were identified in detail for Chad and Sudan, in Kenya, Tanzania, Zimbabwe,

Botswana and South Africa. Results confirm the relevance of the Sahelian regions (Chad and Sudan) and lead to the identification of additional important staging areas, as in Botswana. Staging areas of the Lesser Spotted Eagle are located in southern Africa, particularly in Zambia, Zimbabwe, and South Africa. These findings could be validated with only few previous telemetry studies, which demonstrate the need for further research.

With the help of the “Global Land Cover Map 2000”, the preferred habitats of both species were identified. During migration and staging, White Storks prefer croplands (40 % of all staging data) and open grasslands or bushland (42 % of staging data). Lesser Spotted Eagles seem to avoid such open habitats except for croplands, where 34 % of the staging data were located. Most of the data were located in bush and open forest habitats (65 %). The preference of both species for wetlands was tested using the “Global Lakes and Wetlands Database”. This overlay showed, that around 10 203 % of the staging data of both species were mainly located in freshwater marshes, floodplains, and intermittent wetlands.

To test the influence of biomass on the choice of staging areas, satellite data of the NOAA platform with a high temporal resolution were used. The NOAA Normalized Difference Vegetation Index (NDVI) was used for getting information about density of green vegetation, which correlates with biomass and precipitation in the staging areas. Migration and staging data of every month since 1991 (beginning of satellite telemetry with White Stork) were overlayed with the corresponding NDVI to test the potential influence of biomass on staging. Because of the good temporal accordance of the data, significant results were obtained. Comparing staging data with random points clearly indicated a preference of White Storks and Lesser Spotted Eagles for regions with a higher NDVI. In White Storks, length of staging in regions with higher NDVI was significantly longer. This relationship was strongest for the Sahelian staging areas.

Staging data were overlayed with other parameters such as precipitation, mean temperature, elevation, and anthropogenic influence (Human Footprint). In comparison with random points, White Storks significantly prefer lower regions, and both species rest in regions with a higher human influence as a consequence of the use of agricultural landscapes. Lesser Spotted Eagles prefer regions with a significantly higher precipitation, while White Storks rest in regions with significantly lower precipitation, this being an effect of their arrival in the Sahel at the end of the rainy season. Significance of all these parameters was also tested by a generalized linear model (GLM) which showed similar results. The results for the White Stork were verified during a six-week field study in Botswana and South Africa. In most of the staging areas identified by means of satellite telemetry, White Storks were observed, but the relevance of one Botswanan region seems to have been overestimated. This is due to the strong effect of temporal change in conditions and the variability of the storks' migration. Furthermore, the field studies led to the identification of one more important staging region in central South Africa, where none of the tagged storks rested between 1991 and 2003. In this agricultural region hundreds of storks were observed in peanut fields.

Besides this, field studies did allow a comparison between the observed land cover at several control points and the classified land cover of the Global Land Cover Map 2000. This comparison showed accordance in 60 % of all control points. In further 12 % accordance was unsure, for the rest there was a clear discrepancy between map and actual landcover. This relative low accordance shows the limitation of the use of the land cover dataset, which originated from year 2000. Nevertheless, results of the habitat analysis based on Global Land Cover 2000 are coincident with field observations: White Storks were mostly seen on agricultural lands or natural grassland. In summary, the obtained results of the telemetry data analyses in White Storks show high accordance to previous knowledge. In the case of the Lesser Spotted Eagle, that knowledge was extended. The newly developed distance index is a useful instrument to analyse telemetry data automatically and to identify important staging areas. Satellite data served to identify preferred habitats of birds; NDVI with its high temporal resolution was able to show the influence of yearly and seasonal fluctuations on migration of White Storks. This influence was also found in the Lesser Spotted Eagle but should be verified with telemetry data of more individuals.

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Title:

Ecology of the long finned pilot whales in the Strait of Gibraltar. Implications for the Conservation.

Original Title:

Estrategias de alimentación, en función del tiempo, de los diferentes grupos de Calderón común (*Globicephala melas*) en el Estrecho de Gibraltar en primavera-verano

Subject / Field of Research: Zoology and Conservation

Date of Graduation: Septiembre 2007

Educational Institute / University: DEPARTAMENTO DE BIOLOGÍA, Universidad de Cadiz

Supervisor(s): Dr. José Luís Cueto and Dr. Christophe Guinet

Short Statement:

While humans have been navigating the Strait of Gibraltar for centuries, much of the basic biology of the top predators that also use these waters is new to scientific inquiry. For example, very little is known about the feeding ecology of the long-finned pilot whales (*Globicephala melas*) that are present in the Strait. Similarly, very little is known regarding the spatial distribution of the other species of cetaceans that are present in the Strait, the study of which is an essential first step toward assessing how animals may cope with intra- and inter-specific competition for available resources. From a management perspective, the Strait of Gibraltar represents an interesting case study, in part because it is subject to a long list of legislation, international agreements, and protective measures that could affect the different species of cetaceans of the Strait, particularly the long-finned pilot whales. The Strait is the only natural channel between the Atlantic and the Mediterranean, and holds a highly strategic location for maritime traffic, fishing activities, and marine wildlife tourism, such as whale watching. From an ecological perspective, it is highly productive, and represents a geographic bottleneck for migratory and mobile species. Nevertheless, this study represents the first attempt to assess the possible impacts of these anthropogenic activities on the cetaceans of the Strait. The purpose of this thesis was to address questions on the following themes:

1. Distribution and abundance. What degree of site fidelity is found in the long-finned pilot whales that use the Strait of Gibraltar? Is there seasonal variability in their distribution throughout the year? What is the absolute abundance of the population of long-finned pilot whales in the region during the year?
- 2: Social structure. Is there well-defined social structure in the community of long-finned pilot whales of the Strait of Gibraltar? If so, how persistent is it through time?
- 3: Habitat. How are the pilot whales distributed spatially throughout the study area during the year? Is this spatial distribution related to any oceanographic parameters? Is there a relationship between the whales' distribution and diet throughout the year?
- 4: Intra- and inter-specific competition. Is there evidence for competition for resources within this species? Is there evidence for competition for resources with other cetacean species in the Strait of Gibraltar?
- 5: Conservation and management. How can this new information be applied to ongoing efforts to promote conservation of the cetacean species in the Strait of Gibraltar?

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The objective of this study was to elucidate this oceanic phase of migration for the European eel (*Anguilla anguilla* L.) in the laboratory.

In order to investigate this we simulated the migration of spawners in the laboratory by building 22 large swim tunnels of 127 litres specially developed for long term migration. Therefore the title of this thesis is: 'Simulated migration of European eel'.

What matters is how much energy is required for the crossing of the Atlantic Ocean.

The second aims of the investigations were to study environmental factors that may have impact on the migration capacity like viruses and pollutants (PCB's). The third aims of the investigations were to test whether endurance swimming induces sexual maturation and development of the gonads.

This thesis consist of four major parts:

- A) Preparation to migration
- B) Simulated migration
- C) Effect of environmental factors (viruses and PCB's) on the migration
- D) Effect of swimming on maturation.

In chapter 1 we will give an introduction to the thesis and a general introduction to the investigations. In chapter 2 we studied the circadian and monthly activity, the distribution patterns, and orientation to the earth's magnetic field, of yellow (non-migratory) female eels in a freshwater pond by means of microchips injected into their muscles. Detectors for microchips mounted in tubes were placed in the pond to detect if eels oriented themselves with respect to earth's magnetic field. We tested the hypothesis whether there is a preference for tubes oriented in a south-southwest direction (the direction of the Sargasso Sea) in the fall suggesting an orientation to the earth's magnetic field. Based on these observations we decided to position the 22 Blazka swim tunnels in the direction of the Sargasso Sea (figure 1).

In chapter 3 we described morphological and metabolic parameters and in chapter 4 endocrine profiles of European eel during the process of 'silvering' the transformation of yellow (non-migratory) into silver eel (migratory), prior to migration. We tested the hypothesis whether yellow and silver are two clear separated transition forms or that this transition is gradual and that eels go through several development stages. Because we observed in chapter 4 that 'silvering' is accompanied with hormonal surges of

testosterone (T) and estradiol (E2) but not with thyroid hormones (TH) which have a maximum activity in spring and a minimum activity in summer and autumn we studied in chapter 5, the overall heat production in free moving eel with different thyroid status by direct calorimetry. We wanted to test whether the action of this hormone is calorogenic and involved in the control of metabolic rate. In chapter 6 we described the development and calibration with the Laser- Doppler technique of the 127 liter Blazka swim-tunnels for simulated migration in the laboratory. In chapter 7 we tested the hypothesis whether substrates (FFA, glucose), the stress hormone cortisol, parameters from the ionic balance (sodium, potassium, chloride) and lactic acid were affected by different swimming speeds up to 3.0 Body Lengths per second. We wanted to investigate if a swimming eel remains in homeostasis for physiological and endocrinological parameters in the blood plasma at different swimming speeds. In chapter 8 we gave an estimation of the energy required to cover the 6,000km distance. This corresponds to 120 g per kg (12%) or 40% of the initial fat reserves. In chapter 9 we tested the efficiency of anguilliform swimming in comparison with (sub)carangiform.

Until recently it was assumed that anguilliform swimming was less efficiently than (sub) carangiform swimming. Our results give new insights in this matter and demonstrate that anguilliform swimming was 4 to 6 times more efficient than non eel-like fish. In chapter 10 we wanted to test the hypothesis that eels infected with the rhabdovirus EVEV (Eel Virus European X)-virus, developed hemorrhage and anemia during simulated migration in large swim tunnels, and died after 1,000-1,500 km. In contrast, virus-negative animals swam 5,500 km, the estimated distance to the spawning ground of the European eel in the Sargasso Sea. In chapter 11 we wanted to test the hypothesis if eel viruses in eel species from various geographic regions are widespread. We isolated from three eel species from various regions several viruses and demonstrate that eel viruses are worldwide widespread among the eel populations.

In chapter 12 we studied the effect of PCB's on oxygen consumption, weight decline, plasma-pH, ions (sodium, potassium), lactic acid, hemoglobin and hematocrit during a simulated migration over 750-km. We wanted to test the hypothesis whether there was a weight loss, reduced oxygen consumption and lowered glucose and cortisol levels due to PCB exposure. In chapter 13 we wanted to test whether a swim trial of 5,500-km over a six month period induced gonad maturation.

Finally in chapter 14 we give recommendations for protection of eel populations and suggestions for future research.

In Annex 1 we give an overview of the literature on the lifecycle, evolution and reproduction of the European eel and discuss if the Sargasso Sea is the only spawning area of the European eel.

In Annex 2 we studied the reproduction process of eels without using swim tunnels. Gonadal development and spawning behavior of artificially-matured European eel (*Anguilla anguilla* L.) was studied by giving animals hormone injections. This is the first time group spawning behaviour has ever been observed and recorded in eels.

The research described in this thesis was carried out in two postdoctoral projects: by a grant of the Technology Foundation (STW), project no. LB166.4199 and by the European commission (Project QLRT-2000-01836, EELREP). Smaller grants were given by EUROCHLOR for PCB-work, Gratama-LUF (grant. No. 9815) for pond experiments and Organization for Improvement of Inland Fisheries (OVV) and LNV for maturation experiments by treating animals with hormones.

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 - 35. Palstra, A.P., Curiel, D., Fekkes, M., de Bakker, M., van Ginneken, V.J.T., van den Thillart, G.E.E.J.M (2007). Swimming stimulates oocyte development in European eel *Aquaculture*,270: 321-332.
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 - Vincent van Ginneken, Arjan Palstra, Patrick Niemantsverdriet, Guido van den Thillart. Change in sex ratio of European eel population confirms its dramatic decline. In preparation.

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Migration and habitat utilization in Lamnid Sharks

Subject / Field of Research: zoology and conservation**Date of Graduation:** May 2007**Educational Institute / University:** Department of biological sciences and the Committee on graduate studies of Stanford University**Supervisor(s):** Barbara A. Block, George N Somero, Fiorenza Micheli and Mark W. Denny**Short Statement:**

Understanding the movements, habitat utilization, and life history of high trophic level animals is essential to understanding how ecosystems function. Furthermore, large pelagic vertebrates, including sharks, are declining globally, yet the movements and habitats of most species are unknown. A variety of satellite telemetry techniques are used to elucidate the movements and habitat utilization of two species of lamnid shark. Salmon sharks used a subarctic to subtropical niche, and undertook long distance seasonal migrations between subarctic and subtropical regions of the eastern North Pacific, exhibiting the greatest focal area behavior in the rich neritic waters off Alaska and California, and showing more transitory behaviors in pelagic waters where productivity is lower. The timing of salmon shark aggregations in both Alaska and California waters appears to correspond with life history events of an important group of prey species, Pacific salmon. The enhanced expression of excitation-contraction coupling proteins in salmon shark hearts likely underlies its ability to maintain heart function at cold temperatures and their niche expansion into subarctic seas. Adult white sharks undertake long distance seasonal migrations from the coast of California to an offshore focal area 2500 km west of the Baja Peninsula, as well as Hawaii. A full migration cycle from the coast to the offshore focal area and back was documented. During the offshore migration, white sharks frequently swam at the surface. Sharks remained in the offshore focal area for up to 167 d, where they exhibited a broad depth distribution with intensive oscillatory behavior, possibly associated with feeding or mating. Young-of-the-year sharks remained south of Point Conception whereas one three-year-old shark moved north to Point Reyes, California. All juvenile white sharks displayed a diel change in behavior, with deeper mean positions during dawn, day and dusk than during night. Juvenile white sharks are captured as bycatch in both US and Mexican waters, suggesting that management of fishing mortality should be of increased concern. The ability of lamnid sharks to undertake rapid long distance migrations is essential in enabling them to integrate the productivity of distant regions.

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Tulp, Ingrid**E-Mail Address:** Ingrid.Tulp@wur.nl**Country:** The Netherlands**Title:***The arctic pulse - Timing of breeding in long-distance migrant shorebirds***Subject / Field of Research:** Zoology and behaviour research**Date of Graduation:** October 2007**Educational Institute / University:** Rijksuniversiteit Groningen**Supervisor(s):** Prof. Dr. T. Piersma and Prof. Dr. G. H. Visser †**Short Statement:****Approach**

The original approach of this study was to measure reproductive success in shorebirds in relation to arrival date and condition. We wanted to capture birds upon arrival to have accurate measures of both arrival date and arrival condition and follow their breeding performances. In practice, this did not work. Only few of the birds captured upon arrival stayed within the study area, predation rates were high and estimating fledging success in most species was not feasible. In a more indirect approach we did measure the seasonal pattern of food availability and compared this with energetic demands and performance of parents and young (energy expenditure, condition, growth, time available for foraging). The rationale behind this is that if we can pin down energetically stressful periods, it may be possible to identify selection pressures on the timing of breeding. Additional insight can then be gained by comparing the findings among species that have different reproductive strategies.

Factors that may be important for timing of breeding*Conditions at arrival and in the pre-laying phase.*

The risk of starvation upon arrival is probably the greatest potential cost of being early. On the other hand, early arrival may bring several benefits. Early birds may obtain the better territories with respect to food supply or safety. Arrival date may also affect the options to choose a mate, including the chance to remate with a known partner, as in the black turnstone *Arenaria melanocephala*, where reunited pairs fledged more young than newly formed pairs (Handel and Gill 2001). Early arrival may also translate to an early laying date, although variation in the time needed to accumulate nutrients for egg production may modify this relationship. Early arriving birds may be able to prepare their body for breeding faster if they have access to better feeding sites (Morrison et al. 2005), though arctic waders often feed outside their breeding territory. However, laying date can also be constrained by a late snowmelt. Because nests in small snow-free patches incur a high predation risk (Byrkjedal 1980), eggs can only be laid once suitable nesting ground is exposed (Green et al. 1977).

Food availability for chicks.

Abundance of surface-active arthropods that form the main food of arctic wader chicks, generally peaks during a short period in (most often) July, the timing of which varies under the influence of weather conditions. A hatching date well-timed to the insect peak will increase chick growth rate and survival (Schekkerman et al. 1998a). Although some early authors identified hatching as the phase to be matched

with the insect peak (e.g. Nettleship 1973), this may not be the whole story, as required foraging intake rates are higher for older chicks with their greater energy requirements (Schekkerman et al. 2003).

Food availability for adults during incubation.

Although adult waders may utilise a wider food spectrum than chicks (e.g. also buried larvae), food availability for them may also be highest during the peak of surface arthropod activity. This may lead to a conflict of interest between adults (which could alleviate energetic problems by incubating during the insect peak) and chicks (which should have hatched by then).

Energy needs throughout the breeding season.

Mean air temperature varies from below the freezing point when shorebirds arrive, to as high as 25°C in mid summer. But weather can be highly variable from day to day. Even in mid summer, days with low temperatures and snow or rain showers occur. Walking around on the windswept tundra generally costs more energy than sitting tight in a nestcup sheltered from the wind (Piersma et al. 2003). Most shorebirds are precocial: they have self-feeding chicks. Unlike adult birds, young chicks are incapable of maintaining their body temperature (Visser and Ricklefs 1993; Krijgsveld et al. 2001). Therefore young chicks require regular brooding by their parents to enable their body temperatures to increase. As a result, the time budget of the parents is limited by the time needed for brooding. The organisation of the breeding cycle – what activity takes place in which period – will define the energy needs throughout the season and may affect the optimal timing of breeding. Also in this respect the interests of parents and chicks may differ with regard to timing of hatching.

Competition during autumn migration.

In many shorebird species, one parent deserts the breeding area well before the chicks have fledged, and even the remaining parent usually migrates away before the young (Cramp and Simmons 1983). This may reflect a declining food supply in the tundra, but may also point to some advantage of arriving early at autumn staging or moulting sites. An indication for such an advantage is the study of Boates and Smith (1989), who found that in response to the influx of migrant semipalmated sandpipers *Calidris pusilla* into the Bay of Fundy in late July, the larger male amphipods *Corophium volutator* did not show up at the surface anymore due to a behavioural shift and depletion by sandpipers. Thus only the early-arriving birds can take advantage of the most profitable prey. There are several other examples of prey depletion at autumn staging sites (Schneider and Harrington 1981; Szekely and Bamberger 1992; Zwarts et al. 1992).

Parental care systems

Many systems of parental care exist in shorebirds. Apart from the biparental system in which both parents share incubation and chick-rearing duties, a variety of systems occur with unbalanced parental roles (Reynolds and Szekely 1997). At the extreme of these, the contribution of one sex is reduced to fertilization only (as for example in ruff *Philomachus pugnax*, van Rhijn 1991). This might even take place already during a stopover on northward migration. Shorebirds are also known for the occurrence of reversed sex roles. In that case the contribution of the female is reduced to egg laying but she leaves the remaining the parental duties to the male, as is the case in phalaropes (Schamel 2000). The consequence of both these examples is that one bird carries out all parental duties alone ('uniparental'). However, also within biparental systems variations occur. Some species take care of eggs and chicks together until the chicks fledge, while in others the male or the female leaves when the eggs hatch or shortly after that. The different parental care systems have great consequences for the energy and time budgets of parents. For instance, birds that share incubation and chick-rearing duties will have more time available for feeding than birds that fulfill all parental duties alone. In the Arctic, species representing several of this array of parental care systems co-occur. This provides a unique opportunity to investigate constraints on breeding as the different systems affect time-energy budgets differently.

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Title:

At-sea biology and movements of leatherback turtles, *Dermochelys coriacea*, in the Northwest Atlantic

Subject / Field of Research: Zoology

Date of Graduation: October 2005

Educational Institute / University: Dalhousie University

Supervisor: Dr. Ransom A. Myers

Short Statement:

The endangered leatherback turtle, *Dermochelys coriacea*, has the broadest distribution of any sea turtle; however, research on this species has principally been limited to studies of the biology of nesting females, their internesting behaviour, and more recently, their post-nesting movements. To hasten this species' recovery, research on the biology of leatherbacks and the threats they face in other areas of their range is needed. In collaboration with the fishing industry, I developed a field research program to study leatherbacks in waters off eastern Canada, where turtles aggregate seasonally to forage on gelatinous plankton. In this thesis, I report on the degree to which leatherbacks maintain body temperature above ambient in northern waters, and discuss the implications of endothermy for leatherbacks in temperate and tropical areas. To study the local and long-distance movements of leatherbacks, I equipped 42 subadult and adult turtles with satellite tags in Canadian waters, the largest satellite telemetry study of this species in the Atlantic. I use movement data from this sample and morphometrics from foraging animals to identify previously unrecognized high-use habitat for leatherbacks in temperate shelf and slope waters of the northwest Atlantic, where entanglement data demonstrates turtles are at risk of interacting with both mobile and fixed-gear fisheries. I present tracklines that confirm annual return migrations to feeding areas, and describe patterns in turtle movement during these migratory cycles. I identify diel patterns in diving and surfacing behaviour both in northern foraging areas and during southward migration, and explore the potential biological significance of these patterns. Finally, I report on the first deployments of satellite tags on male leatherbacks, which provide new information on the location and timing of mating activity and suggest male fidelity for breeding areas. Collectively, this work presents new information on the life history of the leatherback and demonstrates the importance of northern latitudes, and especially waters off Canada and the northeastern United States, to this species.

Publications:

- Sherrill-Mix, S. A., James, M. C., and R. A. Myers. 2008. Migration cues and timing in leatherback sea turtles. Behavioral Ecology, doi:10.1093/beheco/arm104.
- Sherrill-Mix, S. A., and M. C. James. 2008. Evaluating potential tagging effects on leatherback sea turtles. Endangered Species Research, doi: 10.3354/esr00070

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- Hays, G. C., Bradshaw, C. J. A., James, M. C., Lovell, P., and D. W. Sims. 2007. Why do Argos satellite tags deployed on marine animals stop transmitting? *Journal of Experimental Marine Biology and Ecology* 349: 52-60.
 - James, M. C., Sherrill-Mix, S. A., and R. A. Myers. 2007. Population characteristics and seasonal migrations of leatherback sea turtles at high latitudes. *Marine Ecology Progress Series* 337: 245-254.
 - Jonsen, I. D., Myers, R. A., and M. C. James. 2007. Identifying leatherback turtle foraging behaviour from satellite telemetry using a switching state-space model. *Marine Ecology Progress Series* 337: 255-264.

Judith Zbinden

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Country: Switzerland



Title:

Conservation biology of the Loggerhead sea turtle (*Caretta Caretta*) in the Mediterranean

Subject / Field of Research: Conservation Biology

Date of Graduation: June 2006

Educational Institute / University: Zoological Institute, University of Bern

Supervisor(s): Prof. Dr Raphaël Arlettaz

Short Statement:

Human activities are affecting and in many cases threatening literally all ecosystems nowadays. Whilst the ecology of many terrestrial and freshwater vertebrates is relatively well-studied, our knowledge of marine species generally lags behind. Many marine organisms suffer from overexploitation by fisheries, whilst others are indirectly affected by fishery bycatch. Populations of large marine charismatic vertebrates, such as whales, dolphins, seals, seabirds and sea turtles, are especially vulnerable to accidental catch (Lewison et al., 2004). Species which furthermore have to go to land for reproduction, for example marine turtles, face additional threats as their coastal breeding habitat is progressively deteriorated or disturbed.

Loggerhead sea turtles (*Caretta caretta*) are nowadays threatened in most parts of the world. Knowledge of their complex life cycle, which includes a number of ecologically distinct phases during ontogenetic development, is essential to identify their conservation needs (Meylan & Meylan, 1999). Upon emergence from their nests and leaving the beach, hatchlings enter an oceanic phase that is believed to last at least several years. During the early oceanic phase, turtles are passively drifting with large currents, which may span entire ocean basins. When having reached a certain size, loggerhead sea turtles perform a dramatic habitat shift to neritic waters (waters above the continental shelf), where they forage on benthic prey. They may inhabit various neritic habitats until they reach maturity, probably at an age of 30 or more years. It has been hypothesized that they adhere to the habitat where they reached maturity as adults. Females typically reproduce every few years, while males may reproduce annually. Both sexes migrate to the nesting areas to mate. Nesting areas are usually situated several hundred or thousand kilometers from the foraging areas. Females (and probably to a lesser extent males) show a high degree of philopatry to their natal area for reproduction. Female natal homing leads to strong population structure, with isolation of individual nesting colonies. The exact mechanisms of imprinting and navigation remain only partly understood, but are likely to involve orientation according to the earth magnetic field. Females deposit several large clutches of eggs in nests excavated about half a meter deep in the sand at intervals of roughly two weeks. During this internesting period, they stay at sea in the vicinity of the nesting beach. Incubation of clutches takes between 40 and 80 days, depending on sand temperature. Incubation temperature also determines the sex of hatchling sea turtles. In sea turtles in general, natural mortality is very high early in life and low in later life stages. This is reflected in a high sensitivity of population growth rate to subadult and adult mortality rates compared to fecundity or mortality in the earlier life stages.

Loggerhead sea turtles occur in all temperate and tropical oceans. While the other six extant sea turtle species nest mostly on tropical beaches, the distribution of nesting habitat of the loggerhead sea turtle

reaches well into temperate zones. The loggerhead sea turtle is listed as an endangered species by the IUCN. Compared to that of other sea turtle species, commercial exploitation of loggerhead sea turtles has never played an important role in most areas. However, because many of the species nesting areas occur in regions with dense human populations, coastal development might be a particularly critical issue for this species. Reduction in the survival rates of immature and adult turtles caused by fishery bycatch is often responsible for sea turtle population declines. Juveniles in their oceanic phase are heavily affected by longlines. Individuals having shifted to the neritic zone suffer from being accidentally caught in trawling and gill nets. The bycatch problem has long been ignored due to past research and conservation focusing primarily on the terrestrial life stages. Hence, even basic knowledge on distribution and ecology of turtles at sea remains sparse.

Sea turtles appeared very early on Earth, with the oldest fossil records dating from the Cretaceous period. Sea turtles have thus been confronted with profound ecological challenges in the past. Although their worldwide distribution might prevent them from biological extinction, 5 loggerhead sea turtles might go regionally extinct if the present conditions persist or further deteriorate.

Loggerhead sea turtles in the Mediterranean represent a distinct management unit with a rather uncertain future. This meta-population is relatively small with an average of roughly 5 000 clutches deposited yearly on the known nesting beaches of Greece, Turkey and Cyprus. Various sources of information suggest that juveniles frequent the western Mediterranean basin while subadults and adults, i.e. individuals which have switched to a neritic habitat, are mostly found in the eastern basin (Margaritoulis et al., 2003). Casual information indicates a large population decline before systematic monitoring started in the 1970ies (Margaritoulis, 1982). As the Mediterranean is one of the world's tourism hotspots, many nesting beaches are affected by human encroachment. Although no quantitative population dynamics model exists, the current levels of fishery bycatch are thought to be incompatible with the longterm protection of Mediterranean sea turtles.

This situation, together with a scarcity of basic scientific knowledge about the biology of Mediterranean loggerhead sea turtles which could lead to tailored, efficient conservation actions, elicited the development of the present PhD study. Our investigations were carried out on the largest known population of loggerhead sea turtles in the Mediterranean, in the Bay of Laganas on the Ionian Island of Zakynthos (Greece). Here, nesting activity has been monitored for over two decades by the Greek NGO ARCHELON, The Sea Turtle Protection Society of Greece.

Publications:

- Zbinden J.A., Aebischer A., Margaritoulis D. and Arlettaz R. 2008: Important areas at sea for adult loggerhead sea turtles in the Mediterranean Sea: satellite tracking corroborates findings from potentially biased sources. *Marine Biology* 153: 899-906
- Zbinden J.A., Davy C., Margaritoulis D. and Arlettaz R. 2007: Large spatial variation and female bias in the estimated sex ratio of loggerhead sea turtle hatchlings of a Mediterranean rookery. *Endangered Species Research* 3: 305-312
- Zbinden J.A., Largiadèr C.R., Leippert F., Margaritoulis D. and Arlettaz R. 2007: High frequency of multiple paternity in the largest rookery of Mediterranean loggerhead sea turtles. *Molecular Ecology* 16: 3703-3711
- Zbinden J.A., Aebischer A., Margaritoulis D. and Arlettaz R. 2007: Insights into the management of sea turtle interesting area through satellite telemetry. *Biological Conservation* 137: 157-162

Protocol of the second Thesis-Award-Meeting, Bonn Germany September 05, 2008**Participants of the meeting**

1. Dr. Roseline Beudels-Jamar, Scientific Council *CMS*
2. Dr. Pierre Devillers, IRSNB, Scientific Council *CMS*
3. Dr. Marie-Christine Grillo-Compulsione, Executive Secretary *ACCOBAMS*
4. Mr. Robert Hepworth, Executive Secretary *CMS*
5. Dr. Borja Heredia, *Ministry of Environment of Spain*
6. Mr. Lutz Lämmerhold, *Lufthansa* represented by Mr. Liedtke
7. Mr. Klaus Liedtke, representative of *National Geographic Germany*
and *Lufthansa Deutschland*
8. Prof. Dr. Manfred Niekisch, Director *Frankfurt Zoological Garden*
9. PD Dr. Eugeniusz Nowak, CMS invited jury
10. Dr. Francisco Rilla Manta, ICB Officer *CMS*
11. Dr. Carlos Sanchez Oses, coordinator of the Thesis Award
12. Prof. Dr. Wolfgang Wägele, Director *ZFMK*
13. Muriel Mannert-Maschke, CMS
14. Philipp Gies, CMS

Chair: Prof. Dr. Wolfgang Wägele

9.40 – 9:50 Beginning

Welcome by Prof. Dr. Wolfgang Wägele, introduction of the Jury members and a brief note on the difficulties and importance of the selected process. He expressed the importance of the Thesis Award to make the work of CMS more visible.

Welcome by Robert Hepworth, short introduction on the Thesis Award and the role of CMS, the importance of the sponsors Lufthansa and National Geographic Deutschland, thanks to Museum Koenig (ZFMK) for the friendly welcome and especially to Dr. Carlos Sánchez Oses for making the whole event possible.

Welcome by the Sponsors by Klaus Liedtke who remarked on the use of the knowledge of the Theses.

9.50 – 10:20 Introduction of the Jury, information of the members of the Jury and Information about the procedure

All members of the jury shortly introduced themselves.

Thanks to all reviewers for their support and delivery of clear statements by Dr. Carlos Sánchez Oses and short briefing about the rules and criteria for the decision-making

Rules and criteria:

Dissertations should be useful to the CMS conservation goals

In case of multi-authorships, the candidate's contribution should be clearly recognizable

General information:

- Mr. Laemmerhold will be represented by Mr. Liedtke, so Mr Liedtke has two votes.
- 32 candidates from 18 countries submitted their dissertation abstract online, which shows that the scientific community takes interest in the work of CMS
- Out of 32 candidates 10 were selected to be considered by the final Jury, and are now “CMS Laureates”. All these candidates are allowed to use the nomination for example in applications as a reference.

10.20 – 12:00 Presentation of the top 10 theses and presentation of the preliminary evaluations

The top 10 were introduced by Dr. Carlos Sánchez Oses in a brief PowerPoint Presentation, summarizing the salient features of each dissertation. After each Thesis a short discussion of the positive and negative aspects followed:

Use of satellite and telemetry data for the identification of important habitats of migratory birds (<i>Ciconia ciconia</i> , <i>Aquila pomarina</i>)	Birgit GERKMANN	Germany
Feeding strategies in the time of the different social groups of long finned pilot whales (<i>Globicephala melas</i>) in the Strait of Gibraltar. <i>Addition: Dr. Borja Heredia did not take part in the short discussion as he was already a member of the jury at the university of de Stephanis.</i>	Renaud DE STEPHANIS	Spain
Simulated migration of the European eel (<i>Anguilla anguilla</i> L.)	Vincent VAN GINNEKEN	The Netherlands
Migration and Habitat Utilization in Lamnid Sharks	Kevin WENG	USA
The arctic pulse: timing of breeding in long-distance migrant shorebirds	Ingrid TULP	The Netherlands
At-Sea Biology and Movements of Leatherback Turtles, <i>Dermochelys coriacea</i> , in the Northwest Atlantic	Michael JAMES	Canada
Understanding and Mitigating Vulnerable Bycatch in southern African Trawl and Longline Fisheries	Samantha PETERSENS	South Africa

Impacts of the introduced house mouse on the seabirds of Gough Island	Ross WANLESS	South Africa
Conservation biology of the largest population of the Loggerhead Sea Turtle in the Mediterranean	Judith ZBINDEN	Switzerland
Traffic Disturbance to the Migration of Tibetan Antelopes (<i>Pantholops hodgsoni</i>) in Hoh-xil National Nature Reserve with Conservation Strategies	LIN Xia	China

For further information please check Dr. Carlos Sánchez Osés's summary "Top candidates for the CMS Thesis Award 2008"

After the last thesis a general discussion was held about all theses, which ended in the election.

12:00 Election

Candidates ID:

ID	Title
1	Use of satellite and telemetry data for the identification of important habitats of migratory birds (<i>Ciconia ciconia</i> , <i>Aquila pomarina</i>) Birgit GERKMANN
2	Feeding strategies in the time of the different social groups of long finned pilot whales (<i>Globicephala melas</i>) in the Strait of Gibraltar. Renaud DE STEPHANIS
3	Simulated migration of the European eel (<i>Anguilla anguilla</i> L.) Vincent VAN GINNEKEN
4	Migration and Habitat Utilization in Lamnid Sharks Kevin WENG
5	The arctic pulse: timing of breeding in long-distance migrant shorebirds Ingrid TULP
6	At-Sea Biology and Movements of Leatherback Turtles, <i>Dermochelys coriacea</i> , in the Northwest Atlantic Michael JAMES
7	Understanding and Mitigating Vulnerable Bycatch in southern African Trawl and Longline Fisheries Samantha L. PETERSENS
8	Impacts of the introduced house mouse on the seabirds of Gough Island Ross WANLESS
9	Conservation biology of the largest population of the Loggerhead Sea Turtle in the Mediterranean Judith ZBINDEN
10	Traffic Disturbance to the Migration of Tibetan Antelopes (<i>Pantholops hodgsoni</i>) in Hoh-xil National Nature Reserve with Conservation Strategies LIN Xia

Results of votes:

ID	1	2	3	4	5	6	7	8	9	10
Points	/	2	/	4	/	4	30	9	4	19

12:15 Announcement of the winner**The three finalists:**

1. ID 7: Samantha L. Petersen
2. ID 10: Lin Xia
3. ID 8: Ross Wanless

Reading of the declaration: Prof. Dr. Wägele

All jury members signed the declaration.

Robert Hepworth reported on the next steps regarding the winner of the Thesis Award. The winner will be introduced and honored during the Conference of the Parties 9 of CMS in Rome, Italy, 1-5 December 2008. The candidate will come to Rome.

1st, 2nd, 3rd winner will be announced on the web.

All were satisfied with the decision of the Jury.

12:25 Picture of the Jury**12:30 End of Session**

Résumé:

CMS is pleased that the donors fully endorse the work of CMS and its objectives now being promoted by the Award that they confirmed their support for the future. The sponsors also promised to further publicize the Award and the work of CMS whenever possible.

It was proposed that for the next Thesis Award the candidates have to fill in a questionnaire which shall give the opportunity to outline the recommendations of conservation in their thesis. For the next thesis award only the thesis of every candidate shall be evaluated but no additional papers or publications

Acknowledgments

We would like to thank National Geographic Deutschland and Deutsche Lufthansa AG for funding the UNEP/CMS Thesis Award.

We thank all participants of the Thesis Award who helped with their numerous applications to make a go of the UNEP/CMS Thesis Award.

Also, we would like to thank Dr. Carlos Sanchez Oses (Forschungsmuseum Alexander Koenig) for coordinating the operation of the Thesis Award. He organized the online application, the online database, coordination of the reviewers and the meeting of the final jury in September 2008 in the Forschungsmuseum Koenig, Bonn/Germany.

We also want to thank the Forschungsmuseum Koenig, Bonn/Germany (<http://www.museumkoenig.de>) for the support during the meeting of the Final Jury on 05th September 2008.

Our special thanks go to all reviewers, who all wholeheartedly agree to participate in verify all received applications: Annette Broderick, Barry Baker, Borja Heredia, Colin Limpus, Eugeniusz Nowak, Gerard Boere, Klaus Riede, Prof. Manfred Niekisch, Markus Niepkow, Renate van den Elzen, Roberto Schlatter, Roseline Beudels-Jamar, Swen Renner, William Perrin, Zeb Hogan