

UK Regional Student Chapter of the Society for Marine Mammalogy

Scottish Association for Marine Science

January 27th – 29th 2013

ABSTRACT BOOK



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Oral presentations – 15 minute talks

Body slap: an innovative aggressive behaviour at Donna Nook, UK

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Aggressive interactions between male grey seals during the breeding season are characterized by pre-escalation threat displays. Typical grey seal threat behaviours involve cephalic displays of gape, head position or proximity. In fall of 2011, extensive research on an expanding grey seal breeding colony on the English mainland identified a unique behaviour of ‘body slapping’ utilized by males in the pre-fight displays. As the body slap has not been seen at any other colonies in the UK, the aims of this study were to describe the behaviour and begin to elucidate the signal’s meaning. To do this we first examined when and where it is performed. Furthermore, to test if the behaviour is one of submission or aggression we examined its association with subsequent winners or losers, if dominance influences rate of display, and how the behaviour is associated with other aggressive behaviours. Results indicate the body slap display at Donna Nook is pervasive in all forms of aggressive, male-male interactions and that rates of body slap displays in non-contact interactions are greater than rates during fights. Preliminary examination found no relationship between dominance and rate of display, but results demonstrated that median rates of display were greater for subsequent winners, winners initiated display bouts more than losers, and that the body slap shared a positive relationship with the aggressive approach behaviour. These findings suggest that the body slap is not a submissive display, and that it likely carries information regarding resource holding potential to be used in assessment.



Linking behavioural changes to vital rates in a capital breeding mysticete

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Human disturbances of wildlife, such as tourism, can alter the activities of targeted individuals. Repeated behavioural disruptions can have long-term consequences on individual's vital rates. To manage these sub-lethal impacts, we need to understand how short-term behavioural changes can be linked to individual's vital rates. We compared Minke whale *Balaenoptera acutorostrata* behaviour on a feeding ground in the presence and absence of whalewatching boats in Iceland, using individual focal follows. Activity states were inferred from movement metric data, using mixture models, and transitions between states were estimated using Markov chains. Activity budgets were then estimated using Monte Carlo simulations. Spatially explicit capture-recapture models were used to estimate the seasonal exposure of individual whales to whalewatching boats, so that the seasonal effect of whalewatching activities on the activity budget of minke whales could be estimated. This in turn was linked to body condition (blubber volume) using published bioenergetic data. Finally, changes in the body condition of pregnant females were linked to foetal growth, and hence reproduction. We found that although whalewatching boat interactions caused a decrease in feeding activity of minke whales, the seasonal exposure of individual whales to whalewatching boats was very low, meaning that the seasonal effect was non-significant. We estimated that a considerable increase in whalewatching exposure would be required to significantly alter the body condition of pregnant females, which in turn would have negative effects on foetus growth. Although our estimates come with considerable uncertainty, this is the first study to link short-term behavioural effects of whalewatching boats to long-term effects on individual vital rates.



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Is biotoxin exposure from harmful algae a reason for the decline in harbour seal populations in Scotland?

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Harmful algae are phytoplankton that produce toxins at certain times in their life cycle. These toxins are well recognized as causing severe impacts in humans and animals. Among marine mammals, domoic acid (DA), a neurotoxin produced by the diatom *Pseudo-nitzschia spp*, has caused mortality events since 1998 particularly in California sea lions (*Zalophus californianus*).

Since the late 1990's there has been a decline in harbour seal (*Phoca vitulina*) abundance around Scotland. The reason for these regional differences are unclear. A recent study found Scottish harbour seals are exposed to biotoxins from harmful algae, especially DA. This finding has led to the hypothesis that DA and potentially other biotoxins found in Scottish waters, such as saxitoxin (STX) and okadaic acid (OA), may be involved in the observed population decline. This study is at an early stage with much more data collection and analysis to be carried out. However, it appears that harbour seals continue to be exposed to DA in Scottish coastal waters, on the east coast as well as in Orkney. The outcome of this research will be critical to our understanding of the role of biotoxins in harbour seal health and survival.



Habitat preference and spatial usage of grey seal within the Parc Naturel Marin d'Iroise (France)

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The largest colony of grey seals in France is located in the *Parc Naturel Marin d'Iroise*. This area contains different fishery activities. Some seal-fisheries interactions have been reported. These interactions need to be quantified to inform future management plans. The objective of the study was to characterize the habitat preference and space use of grey seals in the marine park. Twelve grey seals were tracked by telemetry. Data collected were used as presence points, and pseudo-absence points were simulated. To model habitat and space use, presence-absence points were used as the response variable in GLM models with bathymetry, sea surface current, sea surface temperature, sediment and biological distance as covariates. The results show that within the study area, grey seals prefer shallow waters, south-east orientation slope, strong currents and low sand levels. These environmental conditions correspond to the distribution of wrasse, which is the principal prey of grey seals. Habitat usage and preference of grey seals are located around the Molene archipelago and the south of the marine park. Fisheries are located within these areas and so even though wrasse are not a commercial prey species, these results indicate potential interactions between seals and fisheries through spatial overlap.



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Acoustic sexual dimorphism in bottlenose dolphin (*Tursiops truncatus*) signature whistles

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Different degrees of sexual dimorphisms are present amongst odontocetes. Bottlenose dolphins are marginally dimorphic with males longer and heavier than females. However, a strong anatomical difference is not obligatory to show acoustic sexual dimorphism as it has been showed in other animal species. Within bottlenose dolphins' repertoire, signature whistles are individual sounds that remain stable for long periods and can be used for comparison. Measurements of ten parameters were obtained from a database with 69 males and 68 females recorded in the Sarasota Bay area. A Principal Components Analysis, Discriminate Function Analysis and a MANOVA test were performed. The results at the moment show that males produce signature whistles in an average higher frequency than females. However, there is no significant difference in any parameter measured. Spectra analysis show that males produce whistles in a wider frequency band than females, and the peak frequency for males is lower than the one for females, probably as a factor of the harmonic energy content. Further analysis will be implemented.



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Gait switches and fast twitches: biomechanical strategies for long diving in beaked whales

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Diving animals modulate their swimming gaits (i.e. steady stroking, stroke-and-glide, prolonged gliding), as well as the amplitude and rate of strokes to promote locomotor efficiency and so enable longer more productive dives. Beaked whales perform extremely long and deep foraging dives which for some species likely exceed their aerobic capacity, but little is known about their swimming behaviour during dives. Here, we use biomechanical data from suction cup DTags attached to beaked whales with a 2:1 range of body sizes (10 Blainville's, 9 Cuvier and 2 Northern Bottlenose beaked whales) to provide the first detailed analysis of swimming gaits and performance for this species. We describe a new method to identify and quantify fluking rotations using magnetometer data that, in combination with the accelerometer data, allow us to estimate specific acceleration. The appearance of a different stroke, dubbed type-B stroke, during the ascent phase of deep dives of all individuals; lead us to investigate its occurrence and characteristics. The greater heave acceleration and shorter duration of type-B strokes support the hypothesis that these fast high-thrust strokes are powered by fast-twitch-oxidative-glycolytic fibres. The occurrence of type-B strokes at a mean time close to the estimated ADL within the low pitch angle ascents of Cuvier and Blainville's beaked whale suggests that they may form part of a strategy to prolong dives using anaerobic metabolism. But these power strokes may also relate to the need for more power to combat tissue weight in ascents



Twenty years of Scottish strandings

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Since 1992, SRUC have managed the Scottish Marine Animal Strandings Scheme. The scheme monitors and collates marine animal stranding data with the aim of assessing the health of, and threats to, many of Scotland's marine animal species. Investigation of a stranded animal can yield substantial information about the health of the individual and, with careful inference, the population as a whole. Analysis of trends in the number and location of marine strandings can assist in identifying new or emerging threats to species'. Examination of animals at post-mortem can provide useful data on the health and ecology of these often little understood species while also helping to highlight some of the conservation issues they may face. Working as part of the UK Cetacean Stranding Investigation Programme (CSIP), and in collaboration with a range of research scientists, conservation and welfare organisations and local communities, the scheme has recorded around 7000 strandings of 30 different species and has undertaken over 1,700 full necropsies. These have fed into over 100 publications and reports on a number of issues, including population genetics, global climate change, life history, diet, contaminant burden and pathology of marine vertebrates.



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The importance of being dead: the role of seal pup carrion for the scavenging community of the Isle of May

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Pinniped colonies represent for scavengers a significant source of carrion during pupping season when mortality is at its highest. The Isle of May (Scotland), where this study has been carried out, is one of the largest single island colonies of grey seals (*Halichoerus grypus*) in the UK, contributing approximately 4.5% to the annual UK pup production. The overall pup mortality, that has been evaluated 12.5%, provides carrion to the scavenging community of the island. The most abundant scavengers are seabirds, which feed on pup carcasses, but also on placenta at pup birth. The relationship between carcass occurrence and scavenger activity was observed in two areas in the Isle of May during the pupping season (October-December 2012). Moreover the total biomass deriving from pup mortality was calculated to understand what is the contribution of carrion input available to the scavenging community.



A retrospective study of the prevalence of presenting conditions in grey seal pups (*Halichoerus grypus*) admitted for rehabilitation

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A survey was performed on 205 live grey seal pups (*Halichoerus grypus*) presented for rehabilitation at the Cornish Seal Sanctuary in Gweek, United Kingdom between August 2005 and November 2010. The purpose of the survey was to update the last published data on the prevalence of various presenting signs at the sanctuary. The presenting signs were classified into nine non-mutually exclusive categories: ocular disorders, nasal disorders, oral disorders, respiratory disorders, skeletal disorders, puncture wounds, abrasions, netting injuries, and onychia. The main reasons for presentation for rehabilitation were malnourishment (34.15%) and injuries/wounds (20.00%). The sex ratio of seal pups in this study was 1.35 males per female. Of the 205 examined for rehabilitation, 22 (10.73%) did not survive to release. 68.78% of grey seal pups were presented with puncture wounds, 47.80% with respiratory disorders, 46.34% with ocular disorders, 36.59% with abrasions, 25.37% with oral disorders, 23.90% with nasal disorders, 11.71% with skeletal disorders, 9.27% with onychia, and 3.41% presented with netting injuries. Associations between sex, outcome of rehabilitation, hospitalization time and presenting disorders were examined. The results of this study will aid in future preparation of grey seal rehabilitation facilities.



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Vocal production learning in grey (*Halichoerus grypus*) and harbour (*Phoca vitulina*) seals

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Many mammalian species are capable of contextual vocal learning, the ability to understand when to use specific sounds (Janik & Slater, 1997). For example, several primate species produce specific alarm calls to alert other animals of the presence of predators (Seyfarth et al. 1980). Comparatively fewer species are capable of production vocal learning, the ability to change the structure of a sound after hearing other sounds (e.g. imitation). One striking example of production learning was observed in a captive harbor seal, 'Hoover', who spontaneously emitted sounds remarkably similar to human speech (Ralls et al., 1985). Some evidence suggests that vocal learning may also occur naturally in wild seal populations (Sanvito et al. 2008).

This study is a work in progress to further investigate the vocal production learning abilities of pinnipeds. Two species, grey (*Halichoerus grypus*) and harbour (*Phoca vitulina*) seals, were examined both in captivity and in the wild. In captivity, four grey seals and four harbour seals were trained to imitate computer generated sounds. The animals matched variables including call type, duration, number, frequency, modulations, and formant changes. To examine if production learning occurs in wild populations, untrained playbacks of digitally altered calls were presented to wild grey seal pups while monitoring their repertoire for changes. This presentation will present initial results and future plans to continue work.



Corridor usage by bottlenose dolphins on the west coast of Scotland – a case study in the Sound of Mull

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The west coast of Scotland is occupied by two seemingly isolated resident bottlenose dolphin communities. Whereas one group inhabits the Sound of Barra and adjacent waters, the other shows a wide ranging character throughout the waters of the Inner Hebrides and mainland coast. Little is known about their mobility in these complex and dynamic waters. Nevertheless, movement patterns are affected by the presence of numerous islands and by the species' preference for coastal distribution, together significantly reducing the possibilities of routes when moving through the area. In order to assess bottlenose dolphin corridor usage and the potential for static acoustic recorders to monitor dolphin movement through gateways, C-PODs were deployed in the Sound of Mull for a period of 5,5months. Simultaneously, visual sightings were collected and compared to timing and number of acoustic detections. Initial results show very limited acoustic detections of dolphins, especially compared to expected values based on visual sightings. Here, I will discuss problems encountered during this experiment, possible reasons which might explain obtained results and potential implications for monitoring the presence and movements of dolphins.



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Making a splash: A land-based investigation into the surface behaviour of resident, coastal bottlenose dolphin (*Tursiops truncatus*) populations of Scotland

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The bottlenose dolphin (*Tursiops truncatus*), the ‘white rat of cetology’, has received large amounts of attention with regards to its behaviour in captivity, but only recently have leaps been made in understanding surface behaviour *in situ*. Often, behavioural studies are weakened by pre-classification of behavioural states without analytical justification. This investigation aimed to take a step back and look at individual surfacing events, the proportions in which each occurred and any groupings evident between these. This represents an objective and repeatable methodology, useful for comparing bottlenose dolphin populations in future investigations to improve our understanding, including geographical variation. The two relatively small, resident, coastal populations under investigation included the ~15 individuals found in the Sound of Barra, Outer Hebrides, East Scotland, and the ~195 individuals associated with the Moray Firth, West Scotland. Data for the Moray Firth was collected using land-based video recordings between 1997 and 1999, with Sound of Barra data collected during June 2012. Results show a significant difference between the proportions of different surface events at each location, with more flukes up, lunges and logging characteristic of the Moray Firth and leaps and slaps more often observed in the Sound of Barra. Visually, events were consistently shown to cluster into 3 groups: 1 - porpoising, lunge, half leap and full leap; 2 - spy hop, flukes up, tail slap and logging; and 3 - full slap and half slap. This project represents a pilot study, providing an excellent baseline for further extension of our understanding of bottlenose dolphin surface behaviour in different populations, not only in the United Kingdom but throughout the globe. With increased interest in the dolphin-watching industry, alongside other coastal human impacts, this is of vital importance to maximize the efficiency of conservation and management strategies associated with bottlenose dolphins in the future.



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Association patterns of Humpback whales (*Megaptera novaeangliae*) at Jeffreys Ledge, Gulf of Maine (USA)

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In the past, associations between humpback whales have been considered as brief and the only stable groups were thought to be mother calf pairs. Just recently long-term associations between individual whales have been discovered, for example in Alaska (Prince William Sound) and Canada (Gulf of St. Lawrence). The aim of my study is to determine whether long-term associations exist in humpback whales feeding at Jeffreys Ledge, Gulf of Maine (USA). During the years 2002 and 2012, opportunistic humpback whale sightings were recorded at Jeffreys Ledge from four whale watching vessels in New Hampshire and Massachusetts and associations between individual whales were documented. Whales were considered associated when they were within two body lengths to each other and animals showed coordinated surface and diving behaviours. Analysis of the social structure of humpback whales was conducted with the programme SocProg 2.4 (Whitehead 2009). To compare social associations between classes, individuals were divided into 4 different age-sex classes: juveniles (J), lactating females (LF), non-lactating females (NF) and mature males (M). A total of 427 individuals were identified in the study period, including 60 calves. Calves in the year of birth were excluded from analysis. The average group size was 1.39 with a median of 1 (SD \pm 0.63). Single individuals were observed most often with 68% (n = 1468), followed by pairs with 26% (n = 562) and trios (5%, n = 103). Therefore a total of 99% of observed groups included 1 to 3 individuals. Data indicated long-term associations among non-lactating females and between males and non-lactating females. This study shows that long-term associations are not an exception but seem to be common in various humpback whale populations.



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Diet of harbour seals around Scotland and competition with grey seals

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To accurately estimate the size or quantity of prey consumed from measurements and counts of fish otoliths and cephalopod beaks recovered from seal scats digestion correction factors must be applied. We carried out 126 feeding trials with 6 harbour seals and 20 prey species to derive estimates of digestion coefficients (to account for partial digestion), recovery rates (to account for complete digestion), and passage rates (to estimate the time between consumption and excretion of an item).



Oral presentations – 5 minute talks

Maths and marine mammals: developing models to forecast where marine mammals struck by tidal-turbines might strand

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The possibility of injurious collisions between marine mammals and tidal turbines is an issue for the tidal-stream energy sector; whether marine mammals are likely to collide with turbines is unknown as this mode of energy extraction is new and establishing a good understanding of the magnitude of this problem has important welfare and conservation implications. A significant indicator of mammals colliding with turbines will be injured or dead animals washing ashore however because of the complexities of tidal-flows, the beaches where carcasses may strand and need monitoring are unknown. This is where the development and application of tailored hydrodynamic and stochastic models can help. They should be able to allow focused monitoring effort and give an indication of the significance of strandings data. This PhD is only just started so it will be an overview of the topic and future research plans.



Call duration discrimination capabilities of a grey seal

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Vocal learning, the modification of sound generation as a result of experience, has to date only been described in birds and mammals. Nevertheless, the evidence for vocal learning, particularly in mammals, remains lacking, a vast contrast to the importance of vocal learning in humans. The different mechanisms controlling sound generation make some types of modifications easier to achieve than others. Duration, for example, can be easily altered by exhalation alone (Janik & Slater, 1997). Although limited in evidence, vocal learning in pinnipeds is particularly interesting to study due to their amphibious lifestyle which requires them, not only to have advanced breath control for diving but, to heavily rely on acoustic communication and to modify their vocal signals for the different mediums (Schusterman, 2008). Thus providing anecdotal evidence for vocal learning. Here I present preliminary results on the ability of a captive male grey seal yearling (*Halichoerus grypus*) to copy a stimulus of varying duration in an auditory feedback experiment, providing potential evidence for vocal learning in its simplest form.



The importance of salmonids in grey seal (*Halichoerus grypus*) diet during Spring in southwest Ireland

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Seals and humans are top predators in many marine ecosystems, often targeting the same food resource. With global declines in fish stocks, competition between these top predators is of increasing interest to scientists and resource managers. To understand and quantify the competition, robust data on the diet of seals are necessary. To date there is relatively little known on the diet of grey seals in Ireland. We present new information on the diet of grey seals from a nationally important colony at the Great Blasket Island, Co. Kerry, with particular reference to commercially important species such as salmonids. Both within-season and inter-annual variation in grey seal diet was investigated based on the recovery and identification of sagittal fish otoliths, bones and cephalopod beaks from 136 faecal samples, collected between 2009 and 2010. A total of 939 prey items were recovered, representing a minimum of 42 individual prey species. The diet was dominated by Gadiformes, particularly *Trisopterus* species. While no within-season variation in the seals diet was detected, inter-annual variation in sandeel (Ammodytidae) and blue whiting (*Micromesistius poutassou*) abundance was apparent. These variations may be attributed to differences in yearly recruitment levels or changes in fish migration timings. Other families such as Salmonidae, Callionymidae, Pleuronectidae and Cephalopod species were also present in the diet in varying quantities. Almost 25% by mass of the diet comprised salmonids. This is the first study in Ireland to identify salmonids in substantial numbers in the diet of grey seals. Over the course of my PhD, I plan on investigating further regional differences in grey seal diet and will estimate the total removal of prey biomass from the southwest using a bio-energetics modeling approach.



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Novel methods for estimating body condition in free-ranging cetaceans: the relationship between body condition and reproductive success

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Body condition has been shown to be a good predictor of offspring survival and reproductive success in pinnipeds, but this has not yet been investigated in cetaceans. Body condition also influences how animals trade-off foraging and anti-predator behaviours, and modulates responses to human disturbance. Thus, behavioural ecology studies of how body condition relates to the risk and consequences of acoustic disturbance in cetaceans in terms of reduced fecundity and survival should be a high priority. However, current methods for estimating body condition in cetaceans are descriptive or do not measure full-body fat stores. In this study, we will cross-validate and establish novel methods to estimate the body condition of free-ranging cetaceans. Independent measurements of total lipid content in blubber biopsy samples and concentrations of the adipocytokine hormones in blubber and blow expirate will be determined. These hormones including leptin, adiponectin and visfatin are related to long-term energy balance in a wide variety of mammalian species, and will be used as indicators of total body fat stores. The body condition of individual Northern bottlenose (*Hyperoodon ampullatus*) and humpback (*Megaptera novaeangliae*) whales will be investigated as a model odontocete and mysticete species. For females of both species, body condition will be related to reproductive status (pregnant, resting, nursing) by measuring reproductive hormones in the blow expirate and in the blubber. For the humpback whales, body condition will be related to fecundity and survival of the individual, as well as offspring survival as part of a long-term photo-ID study of a well-known population.



Activities, motivations and disturbance: fitting a state-space model to bottlenose dolphin behavioral data in Doubtful Sound, New Zealand

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Animal behavioral processes can be analyzed with state-space models. Such models are used to describe the temporal variation of an individual's hidden motivational states, the way in which these states interact to determine its activity, and the feedback influence of the individual's activity on its motivations and health. In addition, they can account for observer error in recording behavior. This analytical approach can be used to predict the effects of anthropogenic disturbance on individual behavior and health, which may lead to alterations in vital rates and, ultimately, long-term population change. We applied a state-space modeling framework to assess the consequences of tourism interactions on the population of bottlenose dolphins in Doubtful Sound (New Zealand). In addition to tourism effects, we accounted for the spatial heterogeneity in both dolphin activities and shark predation risk. Finally, we developed an independent model of tour boat behavior, which incorporates the influence of key geographical features attracting tourists. The simulation platform underpinning the model generated a realistic representation of the social and behavioral dynamics of the dolphin and boat populations, as well as observed patterns of disturbance. We then tested our ability to parameterize the model in a Bayesian framework. First, we assessed the feasibility of the approach by fitting increasingly complicated versions of the model to data simulated from our platform. Next, we fitted the model to group follow data collected in Doubtful Sound from 2000 to 2002. We obtained good convergence for the temporal changes in motivations and most of the parameters. However, when these parameter estimates were used in the simulation platform, biologically sound representations of the population were not generated. Our results suggest that visual data from group follows are not sufficient to inform such individual-based models. Despite these limitations, boat interactions were consistently estimated to detrimentally affect dolphin activity budget.



Bio-economic modelling of seal impacts on West of Scotland fisheries

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Seals are well-known predators of fish around the UK. Previous studies have shown that UK fish stocks have decreased in the last fifty years, while the seal population has increased. These observations are responsible for debates between conservationists and fishermen about the role seals would have played in the decrease of fish stocks. Currently, opinions are still divided, and it seems that further studies need to be done to measure the impact of seals on fisheries and to propose future fishery management.

The aim of the PhD project is to quantify the economic impact of seal predation on West of Scotland cod, whiting and haddock fisheries. The study will use seal diet data from the Sea Mammal Research Unit to develop the Strathclyde FishSUMS model. Including seals in this multispecies model as one of the predators would enable us to obtain a better assessment of the fish natural mortality due to seal predation. In addition, the model will be linked to an economic model to estimate the effect of seals on fisheries taking into account market prices.



Poster presentations

Geographic variation in the whistle characteristics of bottlenose dolphins (*Tursiops truncatus*) between four locations in the North Atlantic Ocean.

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The whistles of bottlenose dolphins (*Tursiops truncatus*) can differ between geographic locations, but the reasons behind these variations remain unclear. They could be reflective of cultural or genetic differences between populations. In this study, the characteristics of bottlenose dolphin whistles were compared between four locations in the North Atlantic Ocean (Cardigan Bay, Wales; the Shannon Estuary, Ireland; the Molène archipelago, France; and the Sado Estuary, Portugal). It was predicted that variation between populations would be greater than that within populations, due to the believed genetic distinction between the four populations, as well as probable differences between environmental variables. Recordings from the four locations were collected using either hydrophones or bottom-moored autonomous recorders between 2001 and 2012. Whistles were extracted from the recordings, and nine whistle characteristics were measured from each whistle. One-way ANOVAs and Kruskal- Wallis tests were undertaken on each of the nine whistle characteristics to determine the ways in which whistles varied between locations. The frequency and intensity variables of whistles from the Sado Estuary were significantly higher than the whistles from other areas. This variation could be due to differences in background noise levels, genetic differences, the openness of populations, or differences in body size. However, it seems most likely that differences in background noise levels between populations would explain the variation due to the high levels of large vessel traffic in the Sado Estuary. Future studies should focus on the full range of potential environmental correlates behind the existing variation between these four populations of bottlenose dolphins.



Investigating the links between 'personality' and mate choice in a polygynous pinniped

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Behavioural types or 'personalities' have now been shown in both male and female grey seals, *Halichoerus grypus*, with recent work showing that females exhibit a continuum of behavioural types along a proactive-reactive axis. Proactive females tend to show little behavioural flexibility across situations, readily form routines and often exhibit high levels of aggression. In contrast, reactive individuals show more behavioural plasticity across situations, are better able to react to environmental stimuli and are generally less aggressive. Recently analysed data suggests that proactive females spend more time in aggression with other adult females, while reactive females show more aggression towards males. High levels of aggression shown towards males by reactive females may be a result of their tendency to be found in low density areas of the colony where they are subject to transient male incursions and harassment; alternatively it may indicate a greater degree of choosiness of potential mating partners. In contrast, proactive females may be able to secure preferred pupping sites in high density areas of the colony which tend to be occupied by more dominant males. Since proactive females have access to dominant males by default they have little need to be choosy about their mating partners and so show lower levels of aggression towards males. This situation suggests that female grey seals do express mate choice and that there are consistent individual differences in their levels of choosiness. Here we outline our current research into the link between the behavioural type of female grey seals and their choosiness of mating partners.



Preliminary characterisation of respiratory microorganisms in the long-finned pilot whale, *Globicephala melas*, from the Strait of Gibraltar, Spain.

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Cetacean epizootic outbreaks are increasingly being observed. Regrettably, information on pathogen loads of free-living cetaceans' remains limited with most data from captive or stranded animals. These preliminary investigations were conducted with twin aims: to characterise the common respiratory microorganisms of free-living, long-finned pilot whale, *Globicephala melas* in the Strait of Gibraltar and to test a novel non-invasive blow sampling technique in small cetaceans. Using an extendable pole, blow was sampled from 20 pilot whales during June 2008 with environment samples (n = 11) collected as controls. The presence of eubacterial, fungal and metazoan DNA was investigated by PCR using universal primers for each taxonomic group. Positive samples were analysed for 11 respiratory microorganisms previously isolated from stranded marine mammals. All samples amplified eubacterial DNA. Fungal and metazoan DNA were detected in 100% of whale-blow samples and in 54% of the environment samples. Of the specific microorganisms selected, mycobacteria, *Streptococcus equi*, *Staphylococcus* spp., *Streptococcus phocae*, unclassified streptococci and *Brucella* spp. were detected in whale-blow samples. The proportion of whale-blow samples with at least one type of respiratory bacteria was significantly higher than in the environment samples ($\chi^2 = 6.64$, $df = 1$, $p = 0.01$).

Our results demonstrate that it is possible to collect blow non-invasively from free-living small cetaceans for subsequent molecular investigations for respiratory microorganisms. This technique could be used to establish essential baseline references and thus to monitor respiratory health of wild cetacean populations. The significance of β -haemolytic streptococci and mycobacteria in an apparently healthy, free-living population warrants assessment and as all of the pathogens detected are potentially zoonotic, human health risks should be determined.



UKRSC Conference 2013

Spatial and temporal group size patterns of bottlenose dolphins (*Tursiops truncatus*) on the west coast of Scotland, UK

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Using a public sightings data set from 1989 - 2011, the spatial and temporal group size patterns of a resident bottlenose dolphin (*Tursiops truncatus*) population off the west coast of Scotland was investigated. Bottlenose dolphins were present in the study area throughout the year, with a peak in sightings during the months June to August (57%, n = 681) which also represents the tourist season. Group sizes (n = 1262) ranged from 1 to 50 with a mean of 7.3 ± 6.1 animals (median = 6) and varied significantly between years, months and seasons. In autumn (October – December), group sizes were larger compared to spring (April – June). Bottlenose dolphins were distributed widely over the study area, however sighting density was highest around the Isle of Mull (n = 490, 39%). Larger groups (>20 individuals) were mostly seen off the northwest coast and around the Isle of Arran. In the future, dedicated photo-identification surveys are needed to get unbiased data on group composition, feeding behaviour, calving and mating season and to assess whether larger groups comprise resident individuals or animals from offshore or other coastal populations.



List of attendees

Name	University
Alexis Levensgood	St Andrews
Alyssa Butters	St Andrews
Amanda Bishop	Durham
Amanda Stansbury	St Andrews
Anna Bird	Bangor
Annamaria Izzi	St Andrews
Barry McGovern	SRUC Inverness
Braulio Leon-Lopez	St Andrews
Charlotte Altass	Chester
Christopher Patrick Kromm	St Andrews
Dominique Weilermann	SAMS, UHI
Donald Malone	St Andrews
Enrico Pirotta	Aberdeen
Fredrik Christiansen	Aberdeen
Helen Hiley	St Andrews
Iosu Paradinas Aranjuelo	Valencia
Iris Thomsen	St Andrews
Janie Steele	Royal Vet. College/Inst. of Zoology
Joanna Kershaw	St Andrews
Linda Rudin	St Andrews
Lindsay Wilson	St Andrews
Lucia Martin Lopez	St Andrews
Luke O'Connor	St Andrews
Mafalda de Freitas	St Andrews
Marc Silpa	Edinburgh (vet)
Maria Martina Quaggiotto	Glasgow



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Martha Gosch	Cork
Mathilde Huon	La Rochelle/SMRU
Michael Bedington	SAMS
Nienke van Geel	SAMS
Rebeccas Weeks	St Andrews
Rute Portugal	St Andrews
Sahar Izadi	St Andrews
Sally Tapp	St Andrews
Sam Fowler	St Andrews
Sam Hardman	Durham
Sarah Lavin	Nottingham Trent/ Clearwater Aq
Silje-Kristin Jensen	St Andrews
Stephen Gaughran	St Andrews
Teresa Filipa Costa	St Andrews
Vanessa Trijoulet	Strathclyde