The Ganges river dolphin (*Platanista gangetica*) belongs to small toothed whale (dolphin) family and inhabits the Ganges river system in India. Like other dolphin species, it uses bio-sonar clicks for echolocation. For understanding their echolocation strategies and underwater behavior over a long-term span, targeting 15-18 dolphins including calves, the annual long-term in-situ monitoring using the passive acoustic system (6-hydrophone array system) has been conducted for 5 consecutive seasons, i.e. five monitoring phases, since November 2008. Recorded data was automatically uploaded to the database every hour for further analysis. In addition, visual observations were periodically made by WWF-India through the five monitoring phases. During the monitoring phase 4, which was conducted from 11 November 2011 to 31 May 2012, it was visually confirmed that some calves having body length between 0.6m to 0.8m were accompanied by other dolphins, having body length over 0.8m within 50m range from the array. Based on the body length, the Ganges river dolphin was classified into three groups, i.e. group A (adult and young adult), group B (calf under one-year old) and group C (calf less than 6 months old). Acoustic characteristics of both dolphin calf groups were revealed by ICI (Inter-click Interval) based analysis. Similar to the adult/young adult dolphin, the ICI of group B calf varies between 10 to 100msecs. A click sequence of three echolocation phases is also observed. On the other hand, ICI of group C calf is always less than 10msec during its click train and has no sequential changes of three echolocation phases. Using the differences between ICI characteristics of group C calf and other groups, we succeeded in detecting each group C calf from data uploaded to the database using ICI histogram-based analysis. This would help in estimating the time of birth in long-term span and in their conservation.

Activation of systemic renin-angiotensin system is a causal factor of insulin resistance mediated by TNF-α upregulation & Acrp30 suppression in post-weaning fasted northern elephant seal pups?

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Northern elephant seal pups naturally come through 2-3 month post-weaning fast. For the maintenance of circulating glucose levels, they rely on lipid oxidation and efficient glucose recycling, coupled with insulin resistance (IR)-like conditions. These adapted mechanisms allow pups to meet their energetic burdens during fasting. Prolonged fasting in elephant seals is also characterized by activation of systemic renin-angiotensin system (RAS), decreased plasma adiponectin (Acrp30), and an increasing trend in plasma tumor necrosis factor-alpha (TNF-α). Angiotensin II (Ang II) and TNF-α are potential causal factors of IR by inhibiting proper phosphorylation of insulin receptor substrate, while Acrp30 may improve insulin signaling. However, the effects of prolonged fasting-induced activation of RAS on IR-like condition in seals are not well elucidated. To assess the effect of prolonged food deprivation on systemic and local RAS, and their potential contribution to TNF-α and Acrp30, the expressions of adipose and muscle RAS components and immuno-relevant molecules were measured along with plasma RAS components in northern elephant seal pups at Año Nuevo State Reserve, CA, during post-weaning fast. Mean plasma renin activity and Ang II concentrations increased, while plasma angiotensinogen (AGT) decreased over the fast, indicative of systemic RAS activation. Adipose and muscle AGT mRNA decreased corresponding with decreases in tissue protein content, suggesting suppression of local AGT production. Muscle TNF-α mRNA and protein increased, whereas those of adipose Acrp30 decreased. Collectively, this study suggests that prolonged fasting actives systemic RAS, which contributes to an increase in muscle TNF-α and suppression of adipose Acrp30. This targeted and tissue-specific regulation of TNF-α and Acrp30 are likely coordinated to synergistically contribute to the development of an IR-like condition, independent of local RAS activity. This study enhances our understanding of the adaptive mechanisms evolved by elephant seals to tolerate potentially detrimental conditions.

Integrating genetics, morphology, acoustics and satellite telemetry in population management of harbour porpoises (*Phocoena phocoena)*

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Based on studies of genetics and morphology, three distinct harbour porpoise populations have been recognized in the waters from the North Sea to the Baltic Sea. The three populations inhabit (1) North Sea and Skagerrak, (2) Kattegat, the Belt Sea, the Sound and the Western Baltic and (3) the Inner Baltic, respectively. Population (3) is categorized as critically endangered by the IUCN and large-scale visual surveys (SCANS, 1994 and 2005) have indicated a decline in abundance for porpoises inhabiting area (2) and the eastern part of area (1). Since the three populations thus have different conservation status and likely face different anthropogenic threats, it is important to manage them separately including separate abundance estimates. However, the populations are not divided by geographical barriers, and limited distribution overlaps are likely to occur. If management does not account for this, abundance estimates will be artificially inflated by including individuals from a neighbouring population. Consequently, the precise geographical borders representing minimum physical overlap between populations must be identified. In this study, we use satellite tracking data from 98 harbour porpoises (1997-2013) deriving from population (1) and (2) as well as acoustic data from a large-scale grid of passive acoustic dataloggers (2011-2013) covering the transition zone between population (2) and (3) to determine geographic delimitations between these three populations. By using this novel multidisciplinary approach, our study suggest that the eastern border separating population (2) and (3) is located further east than previously expected (between Longitude 13°E -14°E) and that the northern border separating (1) and (2) is best defined as a diagonal line from the Danish coast(Latitude 56.5°N) to the Swedish coast (Latitude 58°N). The areas within thesenew boundaries represent the population core areas and we strongly recommend that future conservation efforts regard these areas as individual management units.

Patterns of residency of three species of odontocetes along the shelf break of the U.S. east coast

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Our understanding of the movements and patterns of residency of pelagic cetaceans is limited because it is difficult to obtain repeated samples from animals that live their entire lives far from shore. Surveys of such populations typically occur at broad spatial scales, interspersed by long time periods and often do not allow for identification of individual animals. We used dedicated photo-identification techniques as part of the U.S. Navy's Atlantic Fleet Testing and Training program to identify patterns of residency of odontocetes at three sites along the shelf break of the U.S. east coast ranging from 50 to 150 km from shore. Our surveys began in Onslow Bay, NC in 2007, and Jacksonville, FL and Cape Hatteras, NC in 2009. In Onslow

Bay, we have re-sighted 7 of 139 (5%) *Tursiops truncatus* and 3 of 78 (4%) *Stenella frontalis*. It is likely that these *T. truncatus* include both offshore and coastal ecotypes; we are currently analyzing biopsy samples obtained during these surveys to address this proposition. We have not matched any of the *T. truncatus* to other catalogs from coastal waters, but the *S. frontalis* appear to range widely over the shelf. For example, one *S. frontalis* photographed at the offshore site in September 2011 was observed in June 2001 and June 2002 in the near-shore waters of Onslow Bay. In Jacksonville, we have catalogued 41 *T. truncatus* and 60 *S. frontalis* and have resighted 2 of 60 (3%) *S. frontalis*. We have identified 117 individual *Globicephala macrorhynchus* off Cape Hatteras and have matched 14 of 117 (12%) individuals. To date we have found no matches among the three sites. The re-sightings of these species within the three study areas occurred over multiple seasons and years, and suggest a surprising degree of residency by individual odontocetes in these offshore waters.

A model of optimal diving for bottlenose dolphins under humandisturbance

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Short-term behavioral responses to human disturbance are well documented in cetaceans, including responses similar to those observed under natural predation risk. However, to understand potential long-term consequences of human disturbance at the population level, we need to first link these short-term responses to bioenergetics effects. Here we developed a theoretical optimal dive model for bottlenose dolphins diving under three potential types of perceived surface predation risks representing human interaction (decreasing instantaneous risk, increasing instantaneous risk, and no predation risk). We then tested the predictions from these models about the effect these interactions would have on net energetic gain at each foraging bout using individual focal follow data. Individual inter-breath interval and boat presence were recorded during foraging bouts observed between December 1999 and February 2002 in the Doubtful Sound, New Zealand, bottlenosedolphin population. We used mixture models to distinguish the different phasesof the U-shaped dives performed by individual dolphins. We found that males significantly increased bottom times and performed fewer bottom dives when boats were present, matching predictions of our model for a perceived decreasing instantaneous risk. In contrast, females significantly decreased bottom times and increased the frequency of bottom dives, matching predictions from the model for a perceived increasing instantaneous risk. Therefore, our results suggest differences in the perception of risk between sexes. From our theoretical model we can conclude that the observed integration of this perceived risk in the way dolphins managed their dives would lead to a decrease in net energy gain when boats interact with dolphins when they are foraging. This is of particular concern as the population is currently listed as critically endangered.

Seasonal changes in the abundance and distribution of humpback whales and their prey in Frederick Sound and Stephens Passage, Southeast Alaska

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North Pacific humpback whales (*Megaptera novaeangliae*) have shown a remarkable population recovery since the cessation of industrial whaling. This has raised concerns regarding their impact on marine communities and prompted investigations into humpback foraging ecology and habitat use. The goal of this study was to examine the abundance and distribution of humpback whales in Frederick Sound and Stephens Passage (a traditional foraging area within Southeast Alaska) relative to the availability of euphausiids, their principal prey in the area. Stratified-random hydroacoustic surveys were conducted approximately every 20 days from late May through early September 2008 to characterize euphausiid distribution and abundance. During each survey, whale locations were recorded by dedicated observers. Distance analysis revealed that whale abundance increased significantly in late June; however, this was not associated with an increase in prey. As the summer progressed, whale abundance plateaued and individuals clustered increasingly around comparatively fewer prey. The results suggest that the arrival of whales in the study site was driven by changes in prey availability outside of, rather than within, Frederick Sound and local prey availability may be limiting. Our findings are consistent with the view of Southeast Alaska as a network of local foraging areas and suggest that some traditionally important foraging areas, such as Frederick Sound and Stephens Passage, may be limited in their capacity to support a growing whale population.

Bottlenose Dolphins Return to San Francisco Bay

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Although two bottlenose dolphin skulls have been dredged from San Francisco Bay (SF Bay), and their bones discovered in bayshore middens, this species has not been part of the SF Bay marine fauna in recent history. The presumed northern range limit of Pt. Conception was surpassed by a range extension into Central California, including a northernmost sighting off Pescadero Point, San Mateo County (37° 14' N), coincident with the 1982-83 El Niño event. Bottlenose dolphins have continued to move north along the coast to SF Bay (37° 49' N), where they now occur regularly, and we have compiled 199 sightings north of Pescadero Point. Since 2010, our shore-based research efforts in SF Bay and nearby coastal waters resulted in photo-identification of 41 uniquely marked individuals. These dolphins, together with the portion of unmarked individuals observed, comprise about 10% of the estimated coastal stock. Comparisons with photo-identification catalogs from Monterey Bay and other locations in the Southern California Bight from 1981-2013 show that 93% (n = 38) of these dolphins have been matched to other study areas, including Monterey Bay, Santa Barbara, Santa Monica Bay, Orange County, San Diego, and Ensenada, Baja California Mexico. Of the 28 SF Bay dolphins of known sex, 19 were females and 9 were males. The longest travel distance observed was by "Smootch," a dolphin seen off Ensenada in 2000 and in Bodega Bay, California (85 km north of SF Bay) in 2012. This represents a new longshore movement record of approximately 1000 km, and confirms previous research suggesting high mobility of the stock. Ecological effects of the northward range extension include re-occupation