Developing protocols to reduce the risk of collisions between ships and whales is a complex process influenced by biological and socio-economic parameters. Ship-strikes are the primary cause of anthropogenic mortality in several whale populations including a population of Bryde's whales found year-round in the Hauraki Gulf, New Zealand; a harbour handling 1500 ships per year. We identified a serious collision risk: 16 of 19 whales for which cause of mortality was analysed (out of 42 whale fatality records from 1989 to 2012) sustained injuries consistent with vessel-strike. This mortality rate is likely unsustainable. To determine the viability of different mitigation actions we studied the distribution and behaviour of Bryde's whales using visual sightings (n=83) and suction-cup attached DTAGs (n=7; 63 recording hours). Tagged whales spent 91% of their time within 9m of the sea-surface where they are vulnerable to collision with large vessels. Whales use most of the Gulf waters and have unpredictable movement patterns making ship avoidance difficult. Comparison of ship-tracks from Automatic Identification System data and whale distributions was used to investigate the potential for re-routing traffic in the Gulf, but the broad overlap limits this mitigation option. Whale avoidance using visual monitoring is difficult from ships and not applicable at night, when whales tended to rest closer to the surface than during the day. Finally, the low vocal rate of the tagged whales indicates that acoustic monitoring would not be an effective mitigation tool either. Our research sparked the creation of a forum with stakeholders engaged in a science-based discussion of mitigation measures. The forum concluded that speed restrictions are the most effective method to reduce the rate of lethal ship-strikes but this comes with economic implications. The current development of a conservation action plan shows the value of including biology early in the social process.

Rhythm perception and motoric entrainment in a California sea lion

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Sensation, perception, cognition, and action may be interconnected within a given sensory modality. Beat keeping, or the ability to synchronize motor behavior to rhythmic auditory stimuli, is a clear example of this in the acoustic domain. This capability was once considered a specialization unique to humans. Recently, it has been identified in a few other species, most notably parrots. Because the most convincing demonstrations have come from animals that demonstrate vocal mimicry, it has been suggested that beat keeping is a byproduct of brain adaptations supporting vocal mimicry. Further, anecdotal evidence suggests that, when present, this ability may be innate rather than acquired through experience. To further explore 1) whether an animal without specialization for vocal learning could demonstrate rhythmic entrainment, 2) whether entrainment to specific auditory tempos could be acquired through explicit training, and 3) whether such an ability would generalize to novel tempos and complex music, we studied an easily trained but vocally stereotypic mammal, the California sea lion. Using operant conditioning with positive reinforcement, we first showed that a sea lion could learn to entrain head bobbing to an auditory rhythm. Once the behavior was acquired, we then tested the sea lion to determine if and how the behavior would transfer to other auditory stimuli. The performance observed met several key criteria previously demonstrated only by humans and birds: the behavioral response was expressed in an action pattern that differed from the stimulus, the response was entrained to the tempo of the stimulus, the response generalized to a range of novel tempos and simple sounds, and the entrainment capability extended to complex, musical stimuli. These findings with a sea lion show that the capacity for entrainment of movement to rhythmic sounds does not depend on a capacity for vocal mimicry.

Use of pedigree analysis to infer breeding strategy of a cryptic secretive marine mammal, the dugong.

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Knowledge of mating strategies and social organisation in wildlife populations allows accurate predictions of the resilience of a population to environmental change. Different mammalian mating strategies influence the effective number of breeders and the degree of inbreeding, and hence the genetic diversity of a population. Many fully-marine mammals spend their lives underwater, and so the use of direct observations to understand mating strategies is impractical. In these species, limited observations combined with genetic identification of parents and offspring provide a predictive framework calibrated on more accessible taxa. For example, breeding strategy of the dugong has been interpreted as promiscuous based on limited surface observations, and on behaviour of its distant relative, the Florida manatee. It is theoretically possible to draw conclusions more directly regarding breeding strategy, including mate selection, through a pedigree in which parent-offspring relationships in a population are known. In this study, we demonstrate the use of a genetic marker-based pedigree reconstruction system, *PR-genie,* to determine mating strategies for live wild dugongs in a single population. Genetic and biological data (sex, size/maturity class) for 630 dugongs from Moreton Bay, Queensland, were collected as part of a mark-recapture study, and used to reconstruct a pedigree. A series of reference populations were simulated, with mate selection algorithms mimicking a broad range of mammalian strategies, including monogamy, polygamy and promiscuity. Summary statistics of the reconstructed wild pedigree were compared to those of simulated populations using supervised learning classifiers. The wild pedigree was complex, with most individuals interrelated. Monogamy was not observed. Similarities between pedigree characteristics of the wild and reference populations, including distribution of number of assigned offspring per individual and genetic relatedness of mating pairs, will be discussed. Pedigree analysis has broad utility for examining reproductive and genetic variability in vulnerable species for which mating behaviours cannot be observed.

The effect of pingers on Chilean dolphins (*Cephalorhynchus eutropia*): first trials with C-PODs in southern Chile

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The Chilean dolphin (*Cephalorhynchus eutropia*) is a small cetacean endemic to the coast of Chile. The total population is thought to be low (< 10,000) and likely to be decreasing. Despite an IUCN conservation status of 'near threatened' very little is known about the species and the threats it faces. Fisheries bycatch is thought to be a potentially important source of mortality, though the scale of the threat is not known. Trials of a high-frequency (40-110 kHz) acoustic