than expected, and gave a total of 2,634 positions (4.8 positions/day). GPS transmitter 2 transmitted for 413 days, 37 shorter than expected, yielding 919 positions (2.2 positions/day). Calculating home range (100% minimum convex polygons) using the two different sampling regimes produced similar results. Data from transmitter 1 gave a home range of 94,758 km^2 for both sampling regimes, while data from transmitter 2 gave a home range of 115,831 km^2 using the GPS and 100,220 km^2 using conventional sampling. However, distance moved using the two different sampling regimes gave dramatically different results. Based on the conventional sampling regime the polar bears moved 5.5 km and 6.1 km daily, while the GPS sampling regime resulted in a daily distance traveled of 14.0 km and 11.3 km, respectively. Thus, the GPS sampling regime show that the polar bears move at least twice as long as one would predict from the conventional sampling regime. These were first generation GPS polar bear transmitters, and when their performance in terms of position per day is improved, it is likely that the distance these animals move on a daily basis will be even greater. These results further indicate that for studies of long-term movement patterns and home ranges, conventional, and thus lower cost transmitters, are still adequate alternatives.

Novel Transmitter and Antenna Designs and Surgical Techniques for Monitoring Pinnipeds with Satellite Telemetry

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One of the most common techniques for remotely monitoring pinnipeds is to glue a satellite transmitter to their fur. The duration of monitoring possible with this technique cannot exceed 12 months because of the annual molt, and in studies on Steller sea lions deployment durations have been unexpectedly short, rarely exceeding 6 months. Disappointing deployment durations in Steller sea lions have occurred because of early shedding of the transmitter package, due both to hair breakage and premature loss of hair follicles, and because of antenna breakage. In order to obtain a better long-term attachment method, we pursued two avenues of research and development. The first involved the design of a satellite transmitter with a traditional ¼-wave whip antenna and the surgical techniques to permit its subcutaneous implantation with a percutaneous antenna exit. Various mock transmitter designs were initially tested on multiple groups of sheep. A marsupialized subcutaneous pocket was created by lining the pocket with epithelial cells harvested either from skin or mucous membrane. In another group of sheep, only a 2.5 cm square epithelial sheet was placed at the location of the percutaneous antenna site. The best results were obtained (successful for up to 11 months) when low profile transmitters with very gradually sloping edges were implanted into completely epithelially-lined pockets. The second approach was to produce a satellite transmitter and antenna design that could be fully implanted subcutaneously, and therefore would be more suitable from a medical point of view, reducing the possibilities for infection and antenna breakage (even for externally mounted packages). Various low-profile antennas have been designed, and testing is proceeding on the most promising variations of flat patch antennas, in both linear and circular polarizations.

Barriers to Gene Flow in the Hawaiian Spinner Dolphin (*Stenella longirostris*)

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In many cetacean populations, reproductively isolated subgroups exist within populations even when these subgroups live in the same geographic range or are capable of traveling to other subgroups' ranges. The factors which lead to reproductive isolation of these subgroups are often complex and can include factors such as food type and distribution, feeding behavior, social structure, migration patterns, philopatry, and learned behaviors. In the Hawaiian spinner dolphin (*Stenella longirostris*) population, there is variability throughout the Hawaiian Archipelago in geographic distance between suitable habitat, prey distribution, habitat type, availability of habitat, and social structure. To investigate the hypotheses that these factors have led to reproductive isolation, and therefore genetic distinction, between subgroups, a comparison was made of genetic structure, movement patterns, and social structure of the Hawaiian spinner dolphin throughout the Hawaiian Archipelago using genetic analysis and available photographic identification data. Genetic samples were collected from 5 islands in the Hawaiian Archipelago: 30 samples from the Big Island, 40 from Maui, 40 from Oahu, 33 from Niihau, and 40 from Midway Atoll. Preliminary population genetic analysis of the mitochondrial D-loop region indicated the presence of statistically significant genetic structure within the Hawaiian Archipelago (FST=0.06, $p<0.001$). Dolphins at the Main Islands were genetically distinct from the Northwest Islands, likely due to the large geographic distance separating them. Genetic differentiation was also found between dolphins at different Main Hawaiian Islands, indicating the presence of restricted gene flow despite the relatively small geographic distance separating these islands. Genetic diversity was significantly lower at the Northwest Islands than at the Main Islands, likely due to smaller populations and more stable social groups at the Northwest Islands. These results suggest that geographic distance, habitat type, and social structure are factors which influence genetic structure and genetic diversity within the Hawaiian spinner dolphin population.

Second Year of Aerial Survey of Humpback Whale (*Megaptera novaeangliae*) in the Brazilian Breeding Ground, 2002. Preliminary Analysis

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In the Southern Hemisphere humpback whales were heavily exploited from both coastal and pelagic whaling stations in all major ocean basins. Our objective was to continue for the second year consecutively investigating humpback whale abundance in the Brazilian coastal breeding ground. Between 7th and 16th of September, 2002, a fixed wing aircraft adapted with a bubble window was used to survey transect lines along the north limit of Bahia State (12° 10'S) till the southern limit of Espírito Santo State (20° 42'S). Seventy-five parallel transects were established and flew from the coast till the 500m isobath. The total length on effort was 2030.47nm. All sightings were recorded following line-transects and abundance was estimated according to standard distance sampling methodology. A total of 176 sightings on effort were made. Group sizes ranged from 1 to 5 individuals, with a mean of 1.53 (±0.05). The model that best fitted the perpendicular distance data was the uniform key with a cosine adjustment based on a minimum AIC value of 2699.5. A population size estimate of 2663 individuals (CV=0.13) was obtained by assuming that $g(0)=1$. The implementation of bubble window plus the increase of observers experience resulted in a better data quality for the analysis when compared with the 2001 survey. This study provides an abundance estimate for humpback whales at the studied area. As part of a broad study this approach will be adding information for conservation of humpback whale in the Brazilian waters.

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Treating Stranded Mediterranean Monk Seal Pups in Greece

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