When Should One Measure Sea Surface Temperature to Predict Its Time-Lagged Effect on Seabird Breeding? Rashida S. Smith, Lynelle M. Weldon, James L. Hayward, and Shandelle M. Henson, Andrews University

The effect of sea surface temperature (SST) on seabird reproduction includes a time lag. In this study we tested a variety of time intervals in order to determine which interval provides the best measurement of average SST as a predictor for hatching success and egg cannibalism in Glaucous-winged Gulls (*Larus glaucescens*) at a colony in Washington State, USA. We downloaded hourly SST data for 2005–2011 from the National Oceanographic and Atmospheric Association's (NOAA) Port Townsend, Washington Buoy and conducted a model selection analysis for egg cannibalism and hatching success. Cannibalism and hatching success were best predicted by the average SST computed from September–October prior to the late May–June egg-laying season. Early autumn sea surface temperatures prior to the breeding season appeared to be particularly crucial to breeding success. The results are likely species and location specific.

The Evolution of Form and Function in the Hips and Hind Limbs of Early Cetaceans. Alexandra N. Kuipers and Ryan M. Bebej, Calvin College

Extant cetaceans, including whales, dolphins, and porpoises, are descendants of terrestrial mammals. The earliest cetaceans, or archaeocetes, are approximately 50 million years old. They possessed some adaptations for aquatic life, but many remained quadrupedal with the ability to locomote on land. As cetaceans became increasingly adapted for life in water, their swimming changed from limb-based to tail-based swimming. During this transition, the hips and hind limbs underwent substantial changes. While early archaeocetes had fully functional, stabilized hip joints, those of fully aquatic cetaceans are greatly reduced or lost. Discovery of archaeocete specimens with well-preserved postcranial material permits quantitative comparative analyses that allow inferences about locomotor capabilities to be made. Principle component analyses were performed using nineteen innominate and nine femoral measurements comparing species from four archaeocete families to approximately 53 modern mammal species. The analyses reveal that derived protocetid archaeocetes have relatively longer ilia and more open acetabula when compared to more basal archaeocetes. The femoral analyses indicated that remingtonocetids have more specialized femora than those of any other archaeocete group. These findings provide insights into differential use of the hind limbs during the evolution of aquatic locomotion in the earliest cetaceans.