

MONITORING OF SEABIRD TIONS AND PRODUCTIV- WESTERN ALASKA, 1989

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In a joint project of the U.S. Fish and Wildlife Service and Minerals Management Service, we monitored populations and productivity of kittiwakes (*Rissa* spp.) and murre (*Uria* spp.) at six colonies in the Bering and Chukchi Seas: St. George Island, Cape Peince, St. Matthew Island, Bluff, Little Diomed Island, and Cape Thompson. Diets were also monitored at several sites. Methods were standardized to facilitate comparisons among colonies and years. Most populations have been stable since 1984 or earlier at colonies (5 of the 6) where we could analyze trends by comparison with earlier data. Exceptions were a long-term decline in red-legged kittiwakes at St. George and recent moderate declines in two species at St. Matthew. Productivity (particularly of kittiwakes) fluctuated during the study, probably in association with diet. Mean productivity differs greatly among colonies in western Alaska; causes appear to include food resources and possibly Predation. For meaningful interpretations of seabird trends, we need not only statistically sound monitoring studies, but also careful selection of sites (representative of larger populations), regular, frequent observations (at least every 3 years), and supporting data on resources and life history.

47 THE RELATIONSHIP OF MARBLED MURRELET ACTIVITY LEVELS AND BEHAVIORS WITH HABITAT CHARACTERISTICS OF FOREST STANDS IN CALIFORNIA.

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We compared relationships between stand size, structure and landscape characteristics with murrelet presence, activity levels and types of behaviors. Detection numbers were standardized for seasonal variation using three sites surveyed weekly

during the breeding season for 4-5 years. The density of the old-growth tree cover and presence of redwood trees were positively related to mean murrelet detection levels. Old-growth tree density was also a significant variable for predicting observations of occupied behaviors. To identify patterns of activity associated with landscape features and habitat characteristics, we surveyed stations placed at 400 m intervals within the large contiguous stands of old-growth redwood in state and federal parks in California. We found an effect of elevation and topography on the proportion of stations with observations of occupied behaviors highest in major drainages.

48 ISLAND FORMATION AND WHITE PELICAN NESTING HABI- TAT PROTECTION: A GEOGRAPHIC INFORMATION SYSTEMS AP- PROACH.

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In California, the American White Pelican (*Pelecanus erythrorhynchos*) breeds in Clearlake reservoir and Sheepy Lake both located in the Klamath Basin, along the California-Oregon border. During the early 1900's the Klamath Basin was "reclaimed" by the U.S. Bureau of Reclamation (USBR) for irrigation projects. Clearlake reservoir is one of the main sources of irrigation water in the area and thus its water levels vary along with water demand for agriculture and cattle ranching. In Clearlake the location of white pelican colonies varies with the availability of nesting islands, which in turn are formed by water level fluctuations. The timing of island formation and their availability is crucial for the success of breeding white pelicans especially during egg-laying and incubation, when the colony is most vulnerable to predation by coyotes or trampling by cattle. Water levels in Clearlake have been monitored by the USBR since 1910 and, in any given season projections for water levels for each month are available. In coordination with the USBR and the U.S. Fish and Wildlife Service (LJSFWS) digital maps of Clearlake have been developed using a Geographic Information System. By combining seasonal water level projections with the digital maps it is possible to predict where and when nesting islands may become connected to land, allowing die USFWS to plan in advance the use of predator deterrents.

49 BROWN NODDIES ON CAYO NOROESTE, CULEBRA, PUERTO RICO: WHAT HAPPENED IN 1990?

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In 1990, Brown Noddy (*Anousstolidus*) adults nesting on Cayo Noroeste, Culebra, Puerto Rico were delayed in their daytime arrival at the colony and in egg-laying. The head-bill length, body mass and condition of breeding birds that returned in 1990 were within the normal annual variation established for earlier years. However, whereas in earlier years about 90% of banded birds alive the previous year returned in the following year, in 1990 only 68% of birds present in 1989 did so. None of the noddies that failed to return in 1990 has been seen through June 1993. We considered several causes for the reduction in the proportion of previous breeders who returned in 1990 including a higher incidence of non-breeding, movement to other breeding sites, and death of the missing birds. We conclude that those failing to return were directly or indirectly killed by Hurricane Hugo during passage in September 1989. We report shifts in patterns of nest-site and mate fidelity as a direct result of this mortality and predict a long-term impact on age-structure of breeders at the colony.

50 POPULATION STATUS AND RE- PRODUCTIVE SUCCESS OF COM- MON MURRES AT BLUFF, ALASKA, 1975-1991.

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Numbers and reproduction of Common Murres (*Uria aalge*) at Bluff, Alaska were studied in 1975-1991, with daily observations of reproductive plots in 1987-1991. Annual means of mid-season counts of two large Census Plots varied markedly, ranging from 1166 (in 1984) to 2541 (in 1981), with no overall trend during the 17-year period. Reproductive success also varied considerably among years; for example, the total number of eggs hatching on the Reproductive Plots varied between 57 (in 1984) and 341 (in 1983). Mid-season counts of adults were highly positively correlated with reproductive success, indicating that interpretations of any changes in numbers trust consider concurrent changes in repro