

18°N 109° 13'W) in the eastern Pacific Ocean, the Masked Booby (*Sula dactylatra*) population there numbered an estimated 150 individuals. Using aerial photography we determined that there were 50,543 individual Masked Boobies at Clipperton in 1987 including 23,959 breeding pairs, and in 1990 there were 61,489 boobies associated with the island, including 30,564 breeding pairs. These results indicate that Clipperton Island is by far the largest Masked Booby colony in the world. Two readily identifiable races of Masked Booby currently breed at Clipperton: a yellow-billed form, *S. d. californica*, comprising >99% of the population, and an orange-billed form, *S. d. granti*, with an estimated population of 150 individuals (0.2% of the population). Mating between these two forms appears to be assortative at Clipperton Island and at other colonies in the eastern Pacific Ocean where they nest sympatrically, suggesting that speciation may have already occurred. Potential isolating mechanisms between these two forms include bill color, nesting and roosting habitat preferences, and differences in at-sea distribution.

HERON STEATITIS IN SOUTHERN CALIFORNIA

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Steatitis, or yellow fat disease, was first seen in both Great Blue Herons and Black-crowned Night-Herons in San Diego in 1979 (1 heron). More than 11 herons had it in 1980; from 1981 through 1990 steatitis was sporadic and low in number of cases. A continuing epizootic began in 1991 (4 herons), then continued into 1992 (15 herons), 1993 (43 herons), 1994 (105 herons), and 1995 (133+ herons). Most of these herons had severe steatitis which is fatal in the wild. Necropsies have been done, and blood and tissue samples are being analyzed for contaminants. Vitamin E values appear normal.

PERIODIC NESTING OF STELLER'S EIDERS (*POLYSTICTA STELLERI*) NEAR BARROW, ALASKA: 1991-1995
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Steller's Eiders nested near Barrow, Alaska in 1991, 1993, and 1995, but not in 1992 or 1994. Available anecdotal information indicates that this pattern was similar on the Siberian nesting grounds from 1991-1994. Aerial surveys conducted by the U.S. Fish and Wildlife Service throughout possible nesting habitat elsewhere in Alaska did not locate nesting Steller's Eiders. In 1994, at least 68 Steller's Eiders were present near Barrow, however, they remained in flocks throughout the nesting season. Possible causes of periodic nesting at Barrow include the variability of the onset of spring, inadequate food on the wintering or nesting grounds, and variation in the numbers and species of predators present on the nesting grounds. Nesting in Barrow coincided with years in which brown lemming densities were high, which attracted nesting Pomarine Jaegers and Snowy Owls. While it is not known with certainty whether Steller's Eiders nest elsewhere when they do not nest in Barrow, the indication is they do not. Steller's Eiders may live to be 20 years old or older and may maximize their individual life-time reproductive success by not attempting to breed in years when nest survival would be low.

POPULATION DISTRIBUTION OF THE MARBLED MURRELET IN SOUTHEASTERN ALASKA, BASED ON A NATURALIST'S LOG

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There has been an urgent need for determining this species' population in Alaska. McAllister's notes, taken during fishing expeditions throughout Alaska from 1981-1993, provide an index to the number seen. More than 7,500 km of

transects were transferred onto a GIS environment, and analyzed on a 10-km grid. We corrected the different intensities of effort during his surveys. Recently on a similar boat, under similar conditions, we compared his ability to see murrelets with that of trained observers. We found that his data varied between total agreement in his intensive mode of survey, to 0.8:1 in what we termed casual observations. We plotted the number of observations per cell, the number of kilometers of transect per cell, the proportion of each cell in water, and the resulting density of birds per cell. We found high densities in Icy Strait, north of Chichigof Island, and Auke Bay. These confirm previous estimates of others. We plan to integrate these data with more offshore work that others have done, and compare the surveys over the past ten years to determine any population trends. While we realize the limitations of these types of data, we conclude that they provide a unique data base, capable of providing information in areas previously unsurveyed, and over a long-time period.

BETWEEN YEAR VARIATION IN DETECTIONS OF MARBLED MURRELETS AT THREE INLAND SITES IN CALIFORNIA, 1989-1995

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The yearly variation in forest detection levels of the Marbled Murrelet can influence the effectiveness of survey methods. For the past seven years, we have collected data at three inland sites with a range of activity levels. Each site was surveyed a minimum of once per week during the breeding season. Our objective was to determine if there were significant differences in mean detection levels between years. At Lost Man Creek for May through August (28 survey months), no years had mean detections significantly different from other years. At James Irvine Trail and Redwood Experimental Forest, none of the months surveyed showed significantly higher or lower detections over the seven years of surveys. There was no consistent pattern of increase or decrease over all stands in any one year. Because, for individual sites, we found no significant differences

between years and no consistent year effect (for example, all years down in the same year, up in the next), one survey year would be representative of murrelet use of these stands. However, at sites with only one or a few detections per morning, where more surveys have zero detections, more than one year of surveys may be required to adequately determine murrelet use.

PATTERNS OF VARIATION IN THE DISTRIBUTION OF MARBLED MURRELETS OFFSHORE OF THE SAN JUAN ISLANDS, WASHINGTON

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During the summers of 1994 and 1995, we surveyed for Marbled Murrelets from small boats in the San Juan Islands of Washington. Surveys were conducted approximately once every 10-day period. In areas of murrelet concentrations, we conducted intensive surveys at 100, 300, 500, and 800 m from shore to determine the distribution of murrelets. We analyzed variations in distribution relative to time of day, tide cycles, distance from shore, between years, and between islands. In 1994, we found that, overall, murrelets were much closer to shore than we had found along more exposed coasts of California, most were within 500 m from shore, with a peak at 300 m. However, we found that along some islands in the same year this peak was at 100 m. This peak also changed between years on the same transect. In 1995, we also conducted some all-day surveys, finding a considerable variation in the number of birds through the day at one site, but little change at another site. We discuss the potential impact of these results, including the need for preliminary studies for adequate survey design.

HAWAIIAN STILTS RESPONSE TO HABITAT RESTORATION

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The endangered Hawaiian subspecies of the Black-necked Stilt (*Himantopus mexicanus knudseni*) is found in the Nu'upia Ponds of the Marine Corps Base Hawaii, Kaneohe Bay located on O'ahu. Eight ancient Hawaiian fishponds are bordered by introduced vegetation composed almost entirely of Pickleweed and Red Mangrove. Mangrove and Pickleweed management has been ongoing for many years. Since 1982, the military has used Amphibious Assault Vehicles (AAVs) to break up pickleweed and expose mud surfaces, where stilts nest and feed. In 1987, stilt counts finally exceed those made in 1947 (127 birds). By the 1995, stilt numbers climbed to the highest counts ever recorded in the ponds (150). The stilts using the ponds represents around 10% of the entire Hawaiian population. The recent Legacy Program-funded projects to eradicate mangroves has significantly increased stilt habitat. From December, 1993 to March, 1995 approximately 12.5 acres of mangroves were removed from the Nu'upia Ponds. Stilts quickly exploited modified habitat. In 1995, at least four nests were placed on newly-cleared mangroves shorelines and four nests on artificial nesting islands. In 1996, additional areas will be modified to increase stilt nesting sites.

DISTRIBUTION, ABUNDANCE, AND STRUCTURE OF HARLEQUIN DUCK POPULATIONS IN PRINCE WILLIAM SOUND, ALASKA

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In response to mortality from the 1989 T/V Exxon Valdez oil spill, Harlequin Duck (*Histrionicus histrionicus*) populations were surveyed in Prince William Sound (PWS) in 1995 to assess the extent of recovery of ducks inhabiting oiled areas and determine if low reproductive success resulted in changes in age and sex structure of the population. Shoreline surveys monitored abundance, distribution,

population structure, and productivity in oiled and unoiled areas. Surveys conducted from early May to mid-June compare temporal changes in abundance and population structure (number of breeding pairs, subadult males, unpaired adult males, and unpaired females), within and between oiled and unoiled areas. Breeding pairs were used to evaluate breeding chronology and estimate size of the local breeding population. Plumage patterns in spring were used to age males to 1 of 3 classes (1 yr, 2 yr, adult). Surveys conducted from mid-July through mid-September identify molt chronology and compare changes in sex ratios and abundance. Brood surveys compare productivity. Seasonal changes in population structure throughout the two survey periods provide insight into harlequin duck movements to and from the study area.

HOW COSTLY IS CLUTCH FORMATION IN THE AUDOIN'S GULL?

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To assess female daily and total energy investment in clutch formation for the Audouin's Gull (*Larus audouinii*), we studied the rapid yolk deposition (RYD) period in 24 recently laid eggs belonging to 8 three-egg clutches collected at the Ebro Delta colony. RYD was estimated following the potassium dichromate yolk-staining method of Grau (1976). Stained yolks were photographed and their images were computerized. The number of dark-light bands and their respective volumes were obtained using image processing. RYD lasted 8 days in the Audouin's Gull; the mean volume of dry yolk deposited daily was 1.93 ml, although the rate of deposition was not constant, being higher during the second half of RYD. Total volume of yolk deposited per follicle was 15.24 ml. The maturation of the three follicles lasted from 11 to 14 days, and daily energy investment peaked on day 7 when, on average, up to 8 ml of yolk was