



NORTH AMERICAN SECTION No. 4

Editor

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ANNOUNCEMENTS

Colour marking

Currently and recently active colour marking projects were listed in the last issue of the Bulletin (no 26, p 36).

Persons observing a colour marked bird are asked to send details of the sighting to the bander who marked the bird if possible and to the U.S. Banding Laboratory, U.S. Fish & Wildlife Service, Office of Migratory Bird Management, Laurel, Maryland 20811, U.S.A.

Shorebird Surveys

The International Shorebird Survey and Maritimes Shorebird Survey schemes (see previous Bulletins) were continued in 1979: any participants who may be able to count wintering populations of shorebirds in North or South America are asked to contact one of the following: for areas in Canada - Dr. R.I.G. Morrison, Canadian Wildlife Service, 1725 Woodward Drive, Ottawa, Ontario, Canada K1G 3Z7; for all other areas - B.A. Harrington, Manomet Bird Observatory, Manomet, Massachusetts 02345, U.S.A.

Publication of Shorebirds in Marine Environments

The collected papers resulting from the shorebird symposium sponsored by the Pacific Seabird Group and held at Pacific Grove, California, in January 1977, were published in June 1979 under the title 'Shorebirds in Marine Environments' as part of the series 'Studies in Avian Biology' (No. 2, publication of the Cooper Ornithological Society). The volume is edited by Frank A. Pitelka, and consists of a collection of 25 papers written by 39 authors: the papers include an introduction by the editor, a group of 15 dealing with the distribution, migration and conservation of shorebirds, and a group of 9 dealing with their ecology. The geographical area covered is mainly the Pacific Coast, from Alaska to California, but there are also reports from Peru, Costa Rica, the Northeast American coast and three from Britain. The volume is reviewed elsewhere in this Bulletin.

WSG Subscriptions for 1980 are now due and a renewal form is enclosed with this issue. See also the general notices section for details of the new subscription rates.

STATUS AND BREEDING BIOLOGY OF THE SNOWY PLOVER *Charadrius alexandrinus* IN CALIFORNIA

by Gary W. Page and Lynne E. Stenzel

During 1977 and 1978, we studied several aspects of the breeding of Snowy Plovers *Charadrius alexandrinus nivosus* in California. A major stimulus for working with this species was a concern expressed by many people that the number of Snowy Plovers breeding on the state's heavily used beaches was declining owing to increased use of these areas for recreation. We suspected that this was the case but found little published information on the Snowy Plover from which we could definitely establish evidence of a decline. Very little was known about the past and present breeding numbers in the state.

Survey of California's Breeding Population

In 1977, with financial support from the California Department of Fish and Game, the Union Oil Company Foundation, and some members of the Point Reyes Bird Observatory, Gary Page and Susan Peaslee began a state-wide survey of breeding Snowy Plovers by covering all the beaches on the northern coast of California. This survey was conducted in May and June, a period during which the plovers exhibit a minimal amount of migrational activity. We tried to cover all beach habitat, count all adult birds and locate nests and broods. When nests, which are shallow depressions in the sand containing three eggs, were found, descriptions of their sites were made to obtain information on nesting requirements.

In 1978, Lynne Stenzel and Susan Peaslee covered the central and southern California coast and Phil Henderson and Gary Page the interior of the state. In the interior, Snowy Plovers nest around dry, unvegetated margins of alkaline lakes. Nancy Spear obtained estimates of the number of Snowy Plovers breeding on the Channel Islands off Southern California, thus completing an inventory of the state.

An estimated 956 plovers were found on the mainland coast, 218 on the Channel Islands and 2194 in the state's interior, giving a total of 3368 Snowy Plovers for California. We obtained data showing that it was possible to find on any one census an average of 72% of the birds found by all censuses at one coastal area, under reasonably difficult census conditions. We have no similar information on detection rate for the interior, but feel that the majority of the birds were found both on the coast and in the interior.

The most surprising finding of the survey was that the majority of birds were found in the interior rather than on the coast. The interior breeding areas were generally less disturbed by people than those on the coast and there was some evidence that breeding numbers on coastal beaches may be reduced by heavy recreational use. Through a comparison of records of eggs collected mostly during the first four decades of this century with the survey data, we found evidence that development of beaches and nearby harbour facilities has resulted in the extirpation of Snowy Plovers from some sections of the coast, particularly in Orange, Los Angeles and southern Santa Barbara counties. Future surveys should allow us to determine whether a decline in the plovers' use of the coast is still occurring.

Productivity

We studied the Snowy Plover's breeding biology at two coastal and one interior site to obtain information on the birds' productivity and mating system. At Pajaro Dunes, a coastal site on Monterey Bay in central California, John and Jane Warriner collected productivity data in 1977 and 1978. We collected additional data in 1977 from the coast at Point Reyes and in 1978 with Dave Winkler, Chris Swarth and several others at Mono Lake in the interior. There was considerable variability in the number of young fledged per female from area to area and from year to year (Table 1). Hatching success of eggs may be quite variable from location to location (Table 1). At Point Reyes, Common Ravens *Corvus corax* were an important nest predator; high tides and strong winds were also responsible for some nest loss. At Mono Lake, the California Gull *Larus californicus* was responsible for most nest loss, although dogs, coyotes *Canis latrans* and ravens also took a few nests. Nest predators were largely absent at Pajaro Dunes. Here high water, strong winds and people accounted for most nest loss. Chick loss also varied considerably between locations and years but the cause was not determined.

Table 1. Aspects of productivity of breeding Snowy Plovers on the coast and in the interior of California.
Pajaro Dunes is on Monterey Bay in Santa Cruz County; Point Reyes is near San Francisco in Marin County.

	No. of nests studied	Percent Nests Hatching	Percent Eggs Hatched	Percent Broods Fledging Young	Percent Chicks Fledged	Young Fledged Per Successful Brood	Young Fledged Per Female
Point Reyes 1977	35	40	37	79	61	2.0	1.4
Pajaro Dunes loc. 1 1977	27	85	74	96-100	77-92	2.1-2.4	1.8-2.2
Pajaro Dunes loc. 1 1978	16	63	58	60	24-32	1.0-1.3	0.50-0.67
Pajaro Dunes loc. 2 1978	8	63	58	25	7-14	0.5-1.0	0.13-0.25
Mono Lake 1978	74	59	52	48-70	31-46	1.64	0.49-0.72

The productivity studies were made through observation of colour marked young and in many instances colour marked adults. We are now using these marked birds to gain information on the juvenile and adult mortality rates of the Snowy Plover so we may determine the necessary recruitment rate for the species.

Mating System

The colour banded birds at Pajaro Dunes have enabled the Warriners to study the mating system of the Snowy Plover. Most birds were monogamous, although some engaged in polygamous relationships. Polygamy has been observed in cases where males nest with two females at the same time and where both males and females nest with different mates in successive nesting attempts after either failure or success of the first attempt. In some instances a second nesting attempt may be initiated by one parent before the first nesting attempt has been completed.

During daylight hours, the female takes 90% or more of the incubation duty at most nests. The male may incubate much more at night, although this remains to be proven. Both parents may attend the young, but in many instances the female deserts the brood long before the young fledge, leaving the male in sole attendance. Sometimes the female deserts the brood shortly after the chicks hatch.

Incubation and Fledging Periods

The incubation period of the Snowy Plover is quite variable, from 25 to 32 days. Twenty-seven days is a typical incubation period for plovers on the coast; that for the interior may vary with the time of the year. The fledging period, defined as from the hatching of the last egg to the first flight of the young, varied between 29 and 33 days with 30 to 32 days being usual. One non-flying chick was last seen when 38 days old; it was not known whether this chick subsequently died or eventually fledged.

Other Information

We have also gathered considerable information on the displays and vocalisations of the Snowy Plover during the course of the studies, as well as information on territories and feeding range. To date all publications are in the form of government reports which are listed below. The studies are being continued and will eventually be published in the scientific literature.

Publications

Status of the Snowy Plover on the Northern California Coast.

- Part 1. Reproductive timing and success. By G.W. Page, J.S. Warriner, J.C. Warriner and R.M. Halbeisen.
- Part 2. Numbers and habitat description. By G.W. Page and S.C. Peaslee. Non-game Wildlife Investigation Report, California Department of Fish and Game, 1977.

Breeding Success of Snowy Plovers at Mono Lake, California. By G.W. Page, D.W. Winkler and C.W. Swarth. Refuges and Wildlife Resources Report, U.S. Fish and Wildlife Service, 1979.

The Breeding Status of the Snowy Plover in California. G.W. Page and L.E. Stenzel, eds.

- Part 1. The Channel Islands. By N.L. Spear.
- Part 2. The California mainland coast. By L.E. Stenzel and S.C. Peaslee.
- Part 3. The California interior. By R.P. Henderson and G.W. Page.
- Part 4. Numbers, mating system and productivity of Snowy Plovers at Pajaro Dunes. By J.S. Warriner and J.S. Warriner. Non-game Wildlife Investigation Report, California Department of Fish and Game, 1979.

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