

SPECIES COMPOSITION, MIGRATION CHRONOLOGY, AND HABITAT USE
OF WATERBIRDS AT CAPE COD NATIONAL SEASHORE

BY

JENNIFER M. BROWN

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE
IN
NATURAL RESOURCES SCIENCE

UNIVERSITY OF RHODE ISLAND

1994

THESIS ABSTRACT

Waterbirds were studied at six stopover sites within Cape Cod National Seashore (CACO) from June to December 1990 and from May to November 1991. The main objectives of the study were to quantify seasonal distribution and abundance of waterbirds, determine seasonal and substrate differences in habitat preference of foraging shorebirds, and determine the influence of environmental features on the seasonal abundance of foraging shorebirds. Generally, three to five hourly censuses were conducted at each site one day/week during the stage in the tide cycle when the greatest number of birds was present. During each census, all shorebirds, terns, and waterfowl at a site were counted by habitat.

Fifty-one species of waterbirds were observed; 13 species were common or species of special concern. Few waterbirds used CACO sites during spring migration. During fall migration, numbers of all shorebird and tern species rose steadily, peaking in August. Significantly larger numbers of Semipalmated Plovers (*Charadrius semipalmatus*), Semipalmated Sandpipers (*Calidris pusilla*), and Short-billed Dowitchers (*Limnodromus griseus*) were observed in early fall than in other seasons. Migrating and wintering American Black Ducks (*Anas rubripes*) and Dunlins (*Calidris alpina*) began to arrive in mid-September. Significantly larger numbers of these species were not observed until late fall and winter.

Site differences in abundance were significant for eight of the 13 common species. American Black Ducks and Dunlins were observed in larger numbers at Salt Pond Bay than at the other sites. The greatest numbers of Black-bellied Plovers (*Pluvialis squatarola*) were observed at Wood End. More Sanderlings (*Calidris alba*) were seen at Wood End and Jeremy Point than at the other sites. Greater and Lesser Yellowlegs (*Tringa melanoleuca* and *T. flavipes*) were observed in greatest numbers at Nauset Bay and Salt Pond Bay. Short-billed Dowitchers were found

primarily at Nauset Bay, and Least Terns (*Sterna antillarum*) at Jeremy Point.

This baseline data on the distribution and abundance of waterbirds allows National Park Service managers to protect critical areas for the entire time that birds are present at Cape Cod National Seashore and identifies sites important to individual migratory species.

Effective management of critical areas also requires that resource managers understand the habitat requirements of migrating waterbirds. Black-bellied Plover was the only shorebird species which changed its habitat preference seasonally, preferring flooded flats in spring and early fall and exposed flats in late fall and winter. Sanderlings preferred exposed flats on mud substrates and flooded flats on sand, regardless of the season. Semipalmated Plovers and Semipalmated Sandpipers showed this same pattern of use in early fall. Explanations for these preferences probably relate to the availability of prey and the species' feeding strategy.

Environmental features explained 16-76% of the variation in shorebird abundance. Site and weather variables, particularly wind direction and the interaction of wind speed and wind direction, were significant predictors of abundance for all species in all seasons. The moderate variation that was explained suggests that other unmeasured variables, such as food and disturbance, or interactions among variables, were influencing abundance.