Summary of Volunteer Shorebird and Waterfowl Monitoring 2000-2001 at Elkhorn Slough National Estuarine Research Reserve

S. Palacios & K. Wasson, April 2002

Overview and Objectives

The mudflats, shallow tidal lagoons and freshwater ponds of Elkhorn Slough, with their abundant invertebrate and fish communities, provide a rich resource for shorebirds and waterfowl. Birders have long admired the diversity and abundance of the Slough's avian fauna, and every day birdwatchers observe characteristic species along the trails of Elkhorn Slough National Estuarine Research Reserve (ESNERR). Over there years, there has been some quantitative data collected on the birds of Elkhorn Slough, including annual Christmas bird counts and occasional Moss Landing Marine Laboratory student theses. Long time birders in the area often note differences between years, but these observations, since not consistently recorded, remain anecdotal.

In 2000, ESNERR began coordinating the first regular, quantitative, consistent monitoring of the Slough's shorebirds and waterfowl over time. Each month at low tide, volunteers monitor shorebird abundance and species richness at five sites along the ESNERR South Marsh Loop trail. This program will provide valuable information about how ESNERR is used by resident and migratory shorebirds. This is the beginning of a long term monitoring program and the results presented here are from the first year and a half of the study (2000-2001).

Methods

Protocol development and coordination:

ESNERR Research Coordinator K. Wasson and ornithological experts T. Newberry and S. Connors developed the monitoring protocol. They choose appropriate species, sites, and monitoring periods and tested the protocol on volunteers. Once developed, T. Newberry and S. Connors trained a team of ESNERR volunteers already experienced in birding to consistently carry out the counts. ESNERR Coastal Training Institute Coordinator B. Inman now coordinates the program, ensuring censuses are carried out regularly and filling in when no volunteer has signed up.

Field censuses:

Once or twice each month volunteers carry out the monitoring protocol. The monitoring only occurs on tides less than or equal to +0.1 ft. Volunteers count birds at five census stations: Barn Pond (fresh water), Big Lagoon, Five Pans, Fresh Rookery (fresh water), and Tidal Rookery. At each station, all birds actively using the area (swimming, wading, hunting from above) are included; birds just passing by overhead are not counted. Upon arriving at a station, the volunteers first identify all birds present. They then begin a 10 min watch and count the maximum number of birds present in the area during this period. Birds are counted only within a defined area (boundaries are shown on a map carried by the volunteers on their clipboard). Regular volunteer participants include J. de la Torre, L. Jordan, S. Murphy, C. Rodgers, and R. Todd.

Data Analysis for this report:

Data were pooled into oceanographic season and bird group.

Oceanographic seasons: Upwelling (March – late August), Oceanic (September – October), and Davidson (November – February).

Bird groups: Loons (loons and grebes), Pelican, Cormorant, Egret (egrets and herons), Waterfowl (ducks, buffleheads, wigeons, and scoters), "Peeps" (killdeer, godwits, curlews, sandpipers, sanderlings, plovers, avocets, stilts, dowitchers, yellowlegs, and dunlins), Gulls, and Terns.

Median abundance and species richness (number of species) were compared across season and site.

Results

Bird abundances and species richness varied across site and season (Table 1). Bird species associated with fresh water habitats were more abundant at the Barn Pond, while brackish or marine associated species were found mostly at the Big Lagoon, Five Pans, and the Tidal Rookery. Both habitat groups were found in the Fresh Rookery (Table 2). The Barn Pond was dry during Upwelling and Oceanic 2000 (summer and fall 2000), so abundance and richness data for birds at this site were non-existent.

Abundance patterns

Loon abundance was greater starting in the fall of 2000 and extended into the summer of 2001 (Fig. 1). Pelicans were found at the Big Lagoon, Five Pans, and Tidal Rookery year round (Fig. 2). Cormorants were present strictly in the marine habitats and could be found there throughout the year (Fig. 3). Loons, Pelicans, and Cormorants were generally not found at the Barn Pond, a fresh water habitat. Egrets resided at all sites. During the Davidson 2000 (winter 2000-2001) season, Egrets were most abundant at the Five Pans site; however, they occupied all regions consistently through the seasons during the monitoring period (Fig. 4). Waterfowl were present at all sites, but were most abundant at the Barn Pond during Davidson 2000 and Upwelling 2001 (winter 2000-summer 2001), followed by the Fresh Rookery during Oceanic 2000 and Davidson 2000 (fall 2000- winter 2000-01) (Fig. 5). This group tended to occupy mainly fresh water habitats. The group known as the "Peeps" (small wading birds) occupied mostly marine habitats, with a few present at the Fresh Rookery (Fig. 6). This group was very abundant in the Big Lagoon, usually feeding on the mudflats. Gulls were generally found in marine habitats; Big Lagoon, Five Pans, and Tidal Rookery (Fig. 7). Terns were rare and were only found during the Upwelling 2001 season (spring – summer 2001) at the Five Pans site (Fig. 8).

Total bird abundance varied by season across the five stations (Fig. 9). Overall, total abundance was by far the highest in the Davidson season of 2000-2001 (Fig 10).

Species richness patterns

Species richness was greatest during the Davidson 2000 through Upwelling 2001 (winter 2000 – summer 2001) seasons (Fig. 11). The Big Lagoon and Five Pans stations consistently had the greatest species diversity of the stations (Fig. 11). Overall, the tidal stations had greater species richness in 2001 than in 2000 (Fig. 12).

Discussion

The results revealed that bird abundances vary by site and season at ESNERR. Site patterns were probably due to differences in foraging habits between the bird groups. Swimming and diving feeders (Loons, Pelicans, Cormorants, Gulls, and Terns) had low site fidelity. Pelicans, Cormorants, Gulls, and Terns were either resting or in transit to foraging sites, which may be the reason these groups do not occupy a specific site, but all of the marine habitat sites. The Loons were observed mostly swimming and feeding at all of the marine sites and occasionally in the Fresh Rookery. Marine wading feeders (Egrets and "Peeps") had higher site fidelity and were found in areas of exposed mudflat in the Tidal Rookery and in the shallower areas of the Big Lagoon and Five Pans. The Waterfowl had high site fidelity to fresh water habitats, though some were found in marine habitats. Waterfowl also showed a seasonal fidelity to the ESNERR. These birds were more abundant during the fall and winter of 2000-01, but then decreased in abundance, probably due to their fresh water habitat drying up. Wading birds were more abundant fall 2000 to winter 2001, than at other times of the year, probably due to the fact that some members of this group are year-round residents, and some are migratory and only in the ESNERR during these seasons. Species richness was variable, and tended to be greatest in the Big Lagoon and Five Pans regions probably because these survey areas are much larger than the others and embody a greater diversity of foraging habitat.

These preliminary analyses also revealed temporal differences. The program has not been carried out long enough to look for processes underlying these patterns, but eventually we hope to understand differences between seasons and years, within the context of broader climactic and bird population trends. We will also put our findings in the context of other studies along this coast, such as the investigation by Page et al. (1999). Our Elkhorn Slough data will thus help to contribute towards a greater understanding of Pacific Coast shorebird and waterfowl population dynamics.

Literature Cited

Page, G.W., L.E. Stenzel, and J.E. Kjelmyr. 1999. Overview of shorebird abundance and distribution in wetlands of the Pacific Coast of the contiguous United States. The Condor. 101:461-471.

Interested in participating in this project? Contact Beth Inman (728-5939 or bethinman@elkhornslough.org) to find out when the next census is taking place.