2002 Shorebird Survey Results

As of 2002, three consecutive years of shorebird survey data have been collected on Sand Lake NWR. In 2002, shorebird surveys began on April 8 and extended through October 25. Primary goals were to attain information on shorebird migration patterns and their response to water level manipulation.

A total of 24,802 shorebirds were counted in 2002. Spring migration numbers were greatest for white-rumped sandpipers (1,838) and dunlins (1,089), while fall migration numbers were greatest for dowitchers (6,738), yellowlegs (2,655), pectoral sandpipers (2,235). However, since turnover rates of migrating shorebirds are usually much less than the intervals between surveys (many shorebirds only use a staging area for 2 to 3 days before continuing migration), the actual number using Sand Lake NWR during the migration is likely much higher. Therefore, the total number of shorebirds counted in 2002 is best used as an index of annual shorebird use. According to the index, shorebird use in 2002 was >6 times greater than in 2001 and almost 2 times greater than in 2000.

The high use by shorebirds during 2002 was most likely due to the low water levels in Sand Lake throughout the summer. The resultant shallow water areas and exposed mud flats drew in migrating shorebirds in search of foraging/staging areas. In contrast to the high numbers on Sand Lake, shorebirds numbers on Mud Lake were very low. Each survey site on Mud Lake averaged a total of 114 (95% C.I. = 0, 230) shorebirds per year, while each survey site on Sand Lake averaged a total of 2,525 (95% C.I. = 836, 4180) shorebirds per year. Mud Lake was maintained at normal pool levels throughout 2002, leaving very little habitat for shorebirds.

The greatest number of shorebirds was counted along the shoreline between Highway 10 and Hansen's. Large numbers were also counted north of Columbia Dam, in Columbia Marsh, and north and south of Highway 10 (Figure 1). However, the high numbers in these areas do not necessarily indicate that shorebirds select these areas over other areas under these water level conditions. Survey areas would need to be the same size or estimates of shorebird density by area would be necessary in order to make inferences about shorebird selection.

The 2002 spring migration of shorebirds peaked around May 30th. In general, the spring migration has occurred between May 6th and June 5th on Sand Lake NWR, with peak numbers sometime between May 20th and May 30th. The fall migration, which tends to be more protracted than the spring migration, occurred between July 19th and September 19th at Sand Lake NWR. This coincides well with Helmers (1992), who specified peak fall migrations generally occurring from July through September. Interestingly, fall shorebird counts were bimodal (Figure 2). We hypothesize that the two distinct peaks were influenced by water levels. Late summer rainfall increased water levels between July 29th and August 12th (Figure 3), while decreased shorebird numbers were counted between July 29th and August 8th.

There were also differences in seasonal use by survey site. For example, shorebird counts on survey sites near Columbia Dam differed markedly between seasons (Figure 4). It is likely that these differences between survey sites were highly tied to seasonal differences in water levels.

Columbia Marsh was low enough during the spring migration to provide ample shorebird foraging areas, but dried up quickly. The survey site north of Columbia Dam was also lower than in past years, but was not shallow enough for use until the fall migration. As a result, shorebird use of these sites switched between the spring and fall migrations. On the other hand, the survey site south of Columbia Dam was not used throughout the season despite low water levels. However, it lacked gentle slopes and was probably too vegetated for shorebird use.

Multiple-year Survey

The 2002 patterns in site-specific and seasonal use by shorebirds are not consistent from year to year and are probably highly reliant on year-specific water levels. More detailed analysis will be necessary to better understand the processes influencing shorebird use of survey sites. Several questions to be answered include the following:

1) Determine peak annual concentrations for all species combined, members of the scolopacidae family, calidrid sandpipers, dowitchers spp., yellowlegs spp., and pectoral sandpipers.

2) Determine response of shorebirds to drawdowns by comparing annual shorebird numbers with annual water levels.

Statistical analysis will be necessary to tweeze apart population changes that are related to water levels and those that simply represent changes in the local migrating population. These data will help evaluate the optimum conditions for shorebirds, allowing subsequent drawdowns to be modified to prolong the period of optimal conditions.

Helmers, D. L. 1992. Shorebird Management Manual. Western Hemisphere Shorebird Reserve Network, Manomet, Massachusetts. 58 pages.

Figure 1. 2002 Annual Count of Shorebirds by Survey Site on Sand Lake NWR

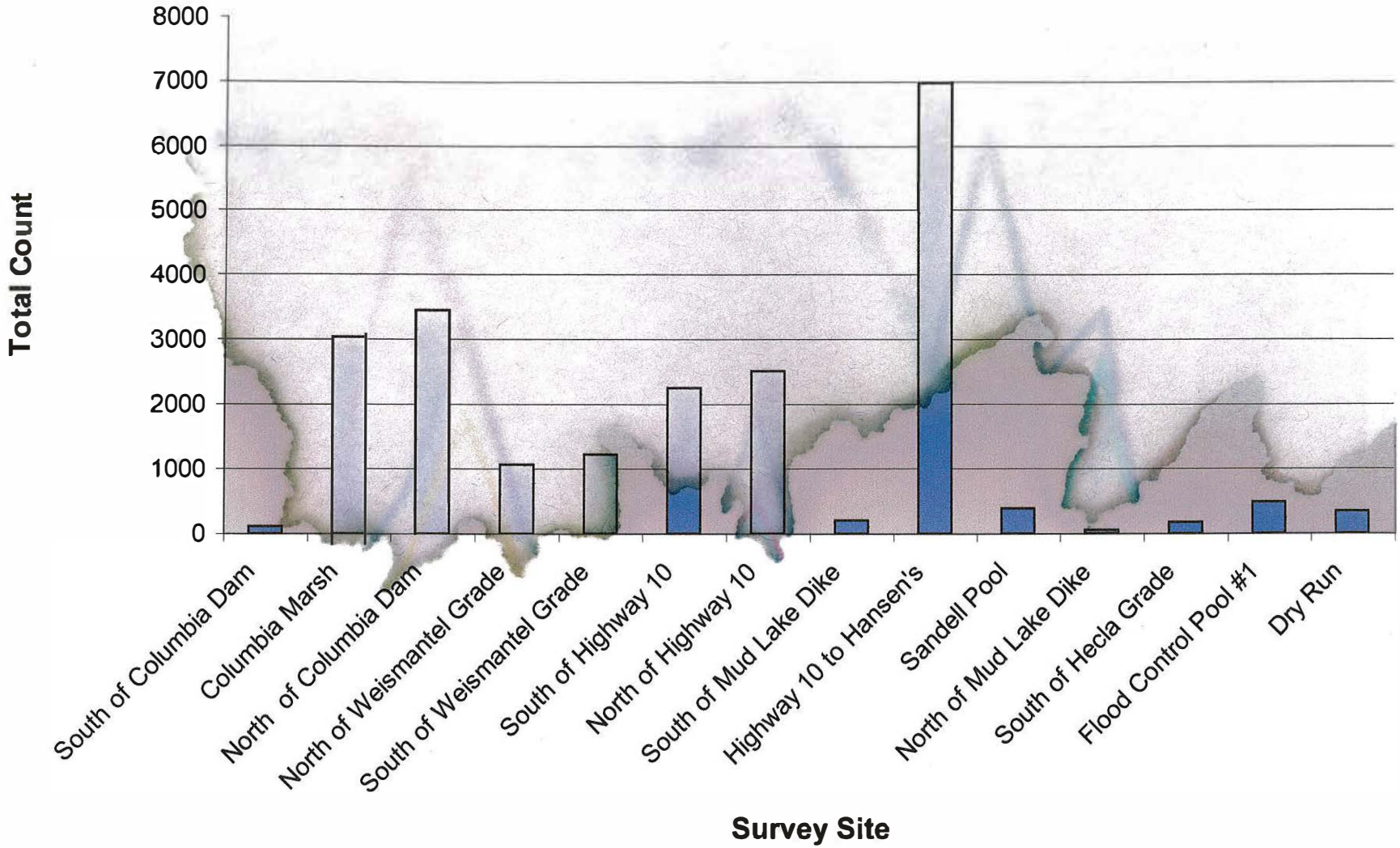

Figure 2. 2002 Migration Pattern of Shorebirds at Sand Lake National Wildlife Refuge

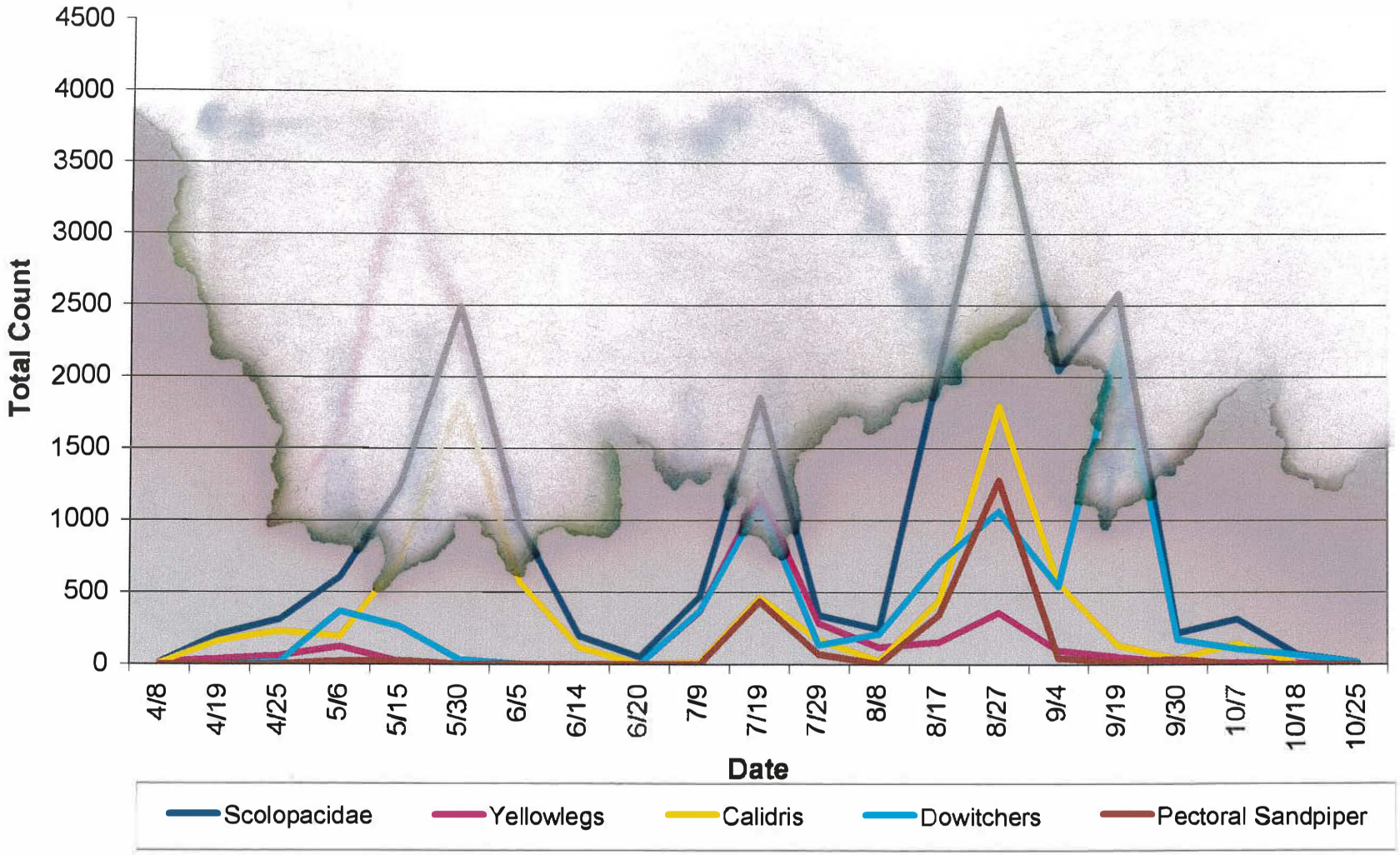

Figure 3. 2002 Sand Lake Pool Elevations

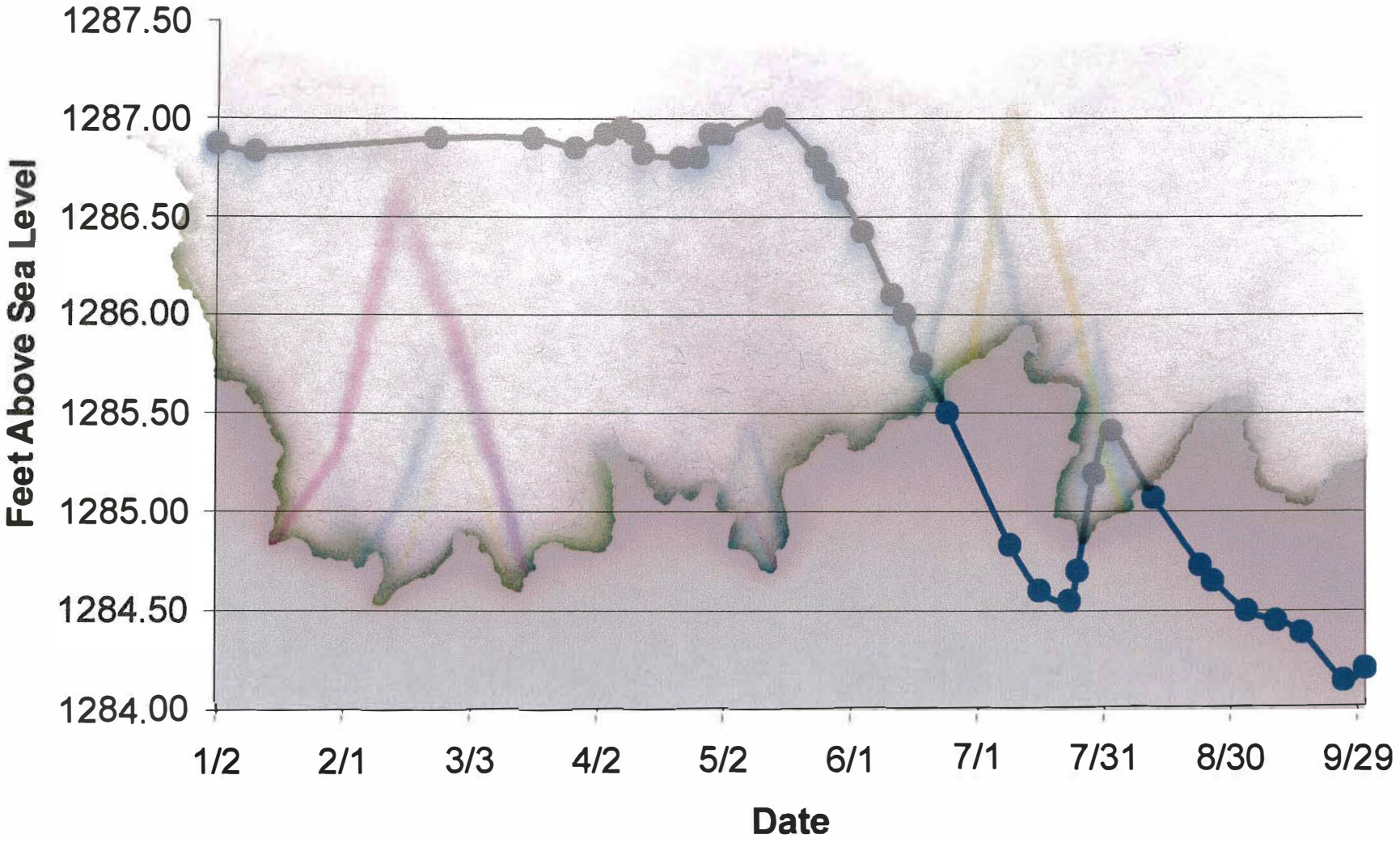

Figure 4. 2002 Shorebird Counts Near Columbia Dam by Season

