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Monitoring Avian Productivity and Survivorship at Lake Mead National Recreation Area

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The Monitoring Avian Productivity and Survivorship (MAPS) Program was created by the Institute for Bird Populations (IBP) in 1989 to gather long-term data on landbird populations throughout North America. Roughly 500 banding stations participate in the program, which uses constant-effort mist netting and banding during the breeding season to estimate survivorship and productivity of different species at multiple spatial scales. This approach makes it possible to determine at which stage in the life cycle population changes are occurring and what management actions may be necessary to reverse declines and maintain stable population sizes. In addition, the program can serve as a tool for evaluating the effectiveness of conservation efforts, an increasingly important endeavor as birds continue to face a growing number of environmental threats (DeSante et al. 2001).

Lake Mead National Recreation Area, a unit of the National Park Service, joined the MAPS Program in 1999 and established a banding station at the northern tip of the park approximately 3 miles (5 km) southeast of Overton, Nevada, near the area where the Muddy River flows into the Overton Arm of Lake Mead. The station sits on a portion of the park leased to the Nevada Division of Wildlife (NDOW) and managed by the state as the Overton Wildlife Management Area (OWMA). OWMA is rich with bird life, offering a variety of habitats ranging from lacustrine to wet meadow to desert scrub. The banding station is located in a dense shrubland bordering riparian habitat, with most nets situated in patches of saltcedar or willow. Cottonwood, mesquite, and arrowweed are also found within the station boundary.

Ten mist nets were used to sample the area, and the banding schedule followed MAPS protocol, beginning in mid-May and occurring on average once every 10 days through the first week of August. Nets were open for 6 hours on each day, usually from 5:30 to 11:30 a.m. Results for each of the three years of banding—1999, 2000, and 2001—show both striking similarities and notable differences (Tables 1 and 2). Lucy's Warblers, Common Yellowthroats, and Yellow-breasted Chats were the most abundant breeding residents for all three years of banding. Lucy's Warblers were the most numerous species in 1999 but lagged behind the yellowthroats and chats in 2000 and 2001. In all three years, Wilson's Warblers were one of the five most captured species, even though they do not breed at the site and were typically only captured as migrants during the first two weeks of operation. Several species that do not normally occur in southern Nevada were captured at the station, including Gray Catbird, Ovenbird, American Redstart, Northern Parula, and White-eyed Vireo. The

White-eyed Vireo, captured in 2000, was only the third Nevada record for that species, and the other two reports were made earlier the same year (Ted Floyd, pers. comm.). In three years of banding, there were 49 species captured; of these, only 17 species were captured in all three years while 26 species were captured in one year only. The total number of captures varied considerably among years, ranging from 559 in 1999 to 192 in 2001.

Recaptures provide valuable survivorship data and are an essential part of the MAPS Program. The percentage of recaptures increased gradually with each year of operation. This trend is somewhat expected. Even neotropical migrants are extremely faithful to their breeding grounds, returning to the same area each year to nest. Thus, as more and more individuals were banded each year, the likelihood of capturing a previously banded individual increased. Several yellowthroats and chats, as well as a Bewick's Wren and a Crissal Thrasher, were banded as adults in 1999 and were recaptured every year. Six other individuals, representing five different species, were banded in 1999 but not captured again until 2001. Most likely these individuals were present on the site in 2000 but eluded capture. Over the three years of banding, one Common Yellowthroat was captured six times, and three chats were captured five times. With a recapture rate approaching 20%, and with many birds being captured multiple times, the avian population seemed to be well sampled, which is important for a monitoring program to work.

Probably the most striking aspect of the capture summary is the decline in the number of birds caught in each successive year. From 1999 to 2000, the number of captures declined by nearly 30%, and from 2000 to 2001 there was a decline of over 50%. Several factors may have contributed to these declines. The year 1999 was dry in Nevada, and many MAPS stations reported below-average capture rates. The OWMA site, however, is supported by controlled water management, and habitat quality is less impacted by a lack of precipitation. Thus, the site may have been particularly attractive to birds that year, and what was a below-average year for many areas could have been above average for the OWMA site. Near the end of 1999, habitat disturbance involving the removal of several tamarisk trees occurred on the site, and while no net sites were directly impacted, the number of territories in the vicinity may have been reduced, lowering captures the following year. Mid-way through the 2000 season, a large pond adjacent to the banding site was drained by NDOW for management purposes, and it remained dry throughout 2001. The lack of water dramatically reduced the abundance of mosquitoes and other insects and probably further reduced the number of birds using the area.

Operating a MAPS station is a valuable and rewarding experience, but it is not without its challenges. In southern Nevada, the biggest challenge is the heat. Nets must be strategically located so that they stay as shaded as possible throughout the morning to prevent trapped birds from overheating. This means taking advantage of patches of tall, dense vegetation, which are rare across most of the area's landscape. Birds must be removed from nets quickly, and on high-capture days, typically in May when migrants are still present and in July when

young birds have fledged, there is no time to waste. Occasionally, flocks of birds would become trapped at once; some of these birds were released unbanded so that they would not have to be held too long in the hot weather.

Near the end of the 2001 season, a significant portion of the banding station was destroyed by fire. Much of the habitat was lost, and the site no longer is suitable for banding. In other habitat types, such as forest, continued banding after a fire can provide information on how avian communities respond to such events. In the desert, however, the loss of vegetation makes the area unsuitable for bird use and unsafe for bird banding. The loss is regrettable, but the three years of data have been submitted to IBP, where they will be pooled with other data from the region for use in productivity analyses; unfortunately, survivorship analyses require a minimum of four years of data. In spite of the setback, Lake Mead remains committed to the mission and goals of the MAPS Program, and another banding station at a new location is being established and will begin operation in May of 2002.

LITERATURE CITED

DeSante, D.F., K.M. Burton, P. Velez, and D. Froehlich. 2001. **MAPS Manual 2001 Protocol**. The Institute for Bird Populations, Point Reyes Station, CA.

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Table 1. Summary of species captured during each year of operation and for all three years combined. Numbers reflect total number of captures of each species and include newly banded birds, recaptures, and birds released unbanded.

Species	1999	2000	2001	Total
Gambel's Quail	2	3	0	5
Lesser Nighthawk	1	0	0	1
Black-chinned Hummingbird	0	4	4	8
Costa's Hummingbird	0	2	1	3
Ladder-backed Woodpecker	2	0	0	2
Olive-sided Flycatcher	1	0	0	1
Willow Flycatcher	5	2	3	10
Western Flycatcher	5	0	0	5
Black Phoebe	0	1	0	1
Say's Phoebe	0	1	0	1
Brown-crested Flycatcher	2	1	0	3
Ash-throated Flycatcher	1	0	0	1
Western Kingbird	1	0	0	1
White-eyed Vireo	0	1	0	1
Bell's Vireo	12	11	8	31
Warbling Vireo	7	1	2	10
Northern Rough-winged Swallow	0	1	0	1
Verdin	11	19	13	43
Bewick's Wren	25	24	17	66

Table 1. (cont.)

Species	1999	2000	2001	Total
Marsh Wren	0	1	0	1
Blue-gray Gnatcatcher	0	0	1	1
Black-tailed Gnatcatcher	4	9	5	18
Swainson's Thrush	2	3	0	5
Gray Catbird	1	0	0	1
Northern Mockingbird	0	1	0	1
Crissal Thrasher	6	2	3	11
Virginia's Warbler	0	1	0	1
Lucy's Warbler	120	52	20	192
Northern Parula	0	1	0	1
Audubon's Warbler	1	0	0	1
Black-throated Gray Warbler	0	1	0	1
Townsend's Warbler	0	1	0	1
Yellow Warbler	95	37	13	145
MacGillivray's Warbler	20	17	4	41
Wilson's Warbler	36	51	16	103
Ovenbird	1	0	0	1
Common Yellowthroat	84	63	30	177
Yellow-breasted Chat	65	53	27	145
American Redstart	0	1	0	1
Western Tanager	0	0	1	1
Green-tailed Towhee	2	0	1	3
Abert's Towhee	12	12	9	33
Brewer's Sparrow	0	1	0	1
Song Sparrow	22	13	4	39
Black-headed Grosbeak	0	1	0	1
Blue Grosbeak	2	2	4	8
Brown-headed Cowbird	10	1	5	16
Bullock's Oriole	1	0	0	1
House Sparrow	0	0	1	1

Table 2. A summary of capture information for each year of operation and for all three years combined.

	1999	2000	2001	1999-2001
Total Captures	559	395	192	1146
New Bands	463	305	143	911
Recaptures	43 (8%)	59 (15%)	35 (18%)	137 (12%)
Unbanded	53	31	14	98
No. of Species	31	35	23	49
Juveniles	21%	28%	28%	24%