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Managing Water in the West

Fall Migration Monitoring at the Cibola Nature Trail and Pratt Restoration Sites 2004



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**Bureau of Reclamation Lower Colorado Region
Multi-Species Conservation Program**



**U.S. Department of the Interior
Bureau of Reclamation
Lower Colorado Regional Office
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Abstract

The Bureau of Reclamation (Reclamation) initiated a fall migration constant-effort mist netting project in the fall of 2002 at two demonstration restoration sites along the lower Colorado River (LCR): the Cibola Nature Trail Restoration Site and the Pratt Restoration Site. The fall migration stations are part of a year round avian monitoring program at these two sites. Four 2-day periods of constant effort mist netting were conducted during the fall migration period (August-September) of 2004. One hundred and thirty-four birds per 100 net hours, comprising nine families and 27 species, were captured at the Cibola Nature Trail Restoration Site. Thirty-eight birds per 100 net hours comprising, 11 families and 27 species, were captured at the Pratt Restoration Site. Two species of interest were captured at these sites; the willow flycatcher (*Empidonax traillii*) and the yellow warbler (*Dendroica petechia*). Forty-eight species of birds have been detected at both restoration sites during this netting effort including nine species listed in the Partner's in Flight North American Landbird Conservation Plan.

Introduction

The lower Colorado River (LCR) travels from Lees Ferry, south of Glen Canyon Dam, to the Gulf of California in Mexico. Flowing through the Mohave and Sonoran deserts, the LCR provides a large expanse of riparian vegetation in an arid environment (American Bird Conservancy 2003). Riparian areas in the southwest support disproportionately high bird diversity and abundance yet form less than .5% of the land area (Powell and Stiedl 2000). The decline of size and quality of this habitat has negatively affected the riparian specialists that breed along the LCR (Szaro 1980, Rosenberg et al. 1991, Powell and Stiedl 2000). Much of this habitat had decreased due to habitat destruction and agricultural land conversion, urban development, mining, overgrazing, river regulation, and climate change (U.S Bureau of Reclamation 1996, Powell and Stiedl 2000). The LCR is part of the pacific flyway migration route for neotropical birds that migrate from wintering grounds in South America to breeding grounds in North America, providing crucial stopover habitat for migrating avian species.

The Multi-Species Conservation Plan (MSCP) is a cooperative Federal-Lower Basin States-Tribal-Private effort to conserve ESA (Endangered Species Act) listed and state sensitive species and to provide regulatory relief for the operation of the LCR. To fulfill its duties as lead implementing agency, Reclamation plans to establish large-scale habitat restoration projects. Reclamation's goal is to restore habitat for MSCP covered species. To accomplish this, Reclamation wishes to increase its understanding of restoration science through an adaptive management approach; therefore, monitoring of current restoration sites is crucial. Avian species are good indicators of ecosystem health due to their sensitivity to environmental change regarding a variety of physical and biological factors (Greg Elliot *et al.* 2004).



In the fall of 2002 Reclamation initiated a fall migration constant-effort mist netting operation at two vegetation restoration sites along the lower Colorado River. Fall migration data for the restoration projects will be used, in conjunction with data collected from other times of the year, as a guide to habitat requirements for specific species, particularly those listed as endangered and threatened. Avian species diversity and richness numbers collected from this project will be used as an indicator of what bird use may be expected in future restoration projects conducted along the LCR.

Study Area

Cibola Nature Trail Restoration Site

Cibola National Wildlife Refuge is located along the LCR south of Interstate 10, near Blythe, California, in Cibola, Arizona. The refuge was established in 1964 to provide habitat for wildlife. More than 200 species of birds can be seen at the refuge (U.S Fish and Wildlife Service). The Cibola Nature Trail restoration site contains 3 distinct areas: (1) 5.5 ha mixture of honey mesquite (*Prosopis glandulosa*) and screwbean mesquite (*Prosopis pubescens*), (2) 2.6 ha of Goodding willow (*Salix gooddingii*), and (3) 1 ha of Fremont cottonwood (*Populus fremontii*). Exotic Johnson grass (*Sorghum halepense*) invaded as an understory in each of the 3 areas, and serves as a ground cover reaching up to 2 m in height. Efforts are underway to eradicate the Johnson grass and replace it with a less invasive understory.

Pratt Restoration Site

The Pratt restoration site is located north of Interstate 8, near Yuma, AZ, on land administered by the Bureau of Land Management (BLM). The site is north of Laguna dam, south of Mittry Lake, and is surrounded by farm fields and *Tamarix sp.* In the fall of 2003, *Tamarix sp.* was removed and will be restored with native vegetation. A leaseholder farmed the 4.9 ha site since 1949. In 1999, Reclamation established six planting regimes with Fremont cottonwoods, Goodding willows, and coyote willows (*Salix exigua*) using potted plants, seeds and poles. Reclamation planted potted plants and poles, from 1 to 3 m apart. Seeded areas contained cottonwood and willow seeds collected locally and broadcast by hand over wet soils. One cottonwood plot contains a thick 4-5 m understory of *Baccharis sp.*, which was independently established after the initial plantings. *Tamarix* was also established in small numbers in the seeded areas, as well as new individual of coyote willow in the potted coyote willow population (U. S. Bureau of Reclamation 2003). BLM removed the *Tamarix* growing adjacent to the area and will plant the area with native vegetation.



Methods

Reclamation conducted two 4-day periods of constant effort mist netting at each site during the fall migration period (August-September). Both sites were operated with standard nylon mist nets sized: mesh 30 m/m, height 2.6 m, and length 12 or 6 m.

The Cibola site contained nine 12 m net lanes and two 6 m net lanes. Six 12 m nets are located in the Goodding willows, three 12 m nets in the Fremont cottonwoods and two 6 m nets in the mesquite habitat. Each net lane was chosen in order to sample the three distinct habitats and produce the maximum amount of captured birds.

The Pratt site contained ten 12 m nets scattered throughout the site in order to sample all areas and capture the maximum amount of birds.

The Institute for Bird Populations has established protocol for Monitoring Avian Productivity and Survivorship (MAPS) station operations, which Reclamation used at all times (DeSante *et al.* 2002). Nets were set up 1/2 hour before sunrise, and closed 5 hours later, or when the temperature exceeded 37.8° C. The nets were checked every 30 to 50 minutes depending on the temperature. All data were recorded on a standardized data sheet (DeSante *et al.* 2002). A metal, numbered USFWS leg band was placed on all captured birds, with the exception of game species and hummingbirds. Each bird was identified to species, aged, sexed, measured for wing chord and body fat, weighed and released. Time, date, and net location were recorded for each captured bird as well as total hours of net operations. Birds were identified to species using Pyle (1997) and National Geographic (1999). Birds were aged and sexed using Pyle (1997).

Results

Cibola Nature Trail Restoration Site 2004

Reclamation produced 253 net hours over two 4-day periods during the 2004 fall migration period at the Cibola Nature Trail Restoration Site. One hundred and thirty four birds per 100 net hours, comprising nine families and 27 species, were captured. The family *Parulidae* accounted for 80% of the total population. Approximately 70% of the population consisted of orange-crowned warblers (*Vermivora celata*), yellow warblers (*Dendroica petechia*), Wilson's warblers (*Wilsonia pusilla*), and common yellowthroats (*Geothlypis trichas*) (Figure 1). Species composition for the 2004 season appeared to differ from the 2002 and 2003 season (Figure 2). Capture rate for the 2004 season (134 birds per 100 net hours) was higher than the 2003 (77 birds per 100 net hours) and 2002 (91 birds per 100 net hours) seasons. Two species of interest were captured at this site; the willow flycatcher (*Empidonax traillii*) with a capture rate of 3 birds per 100 net hours and the yellow warbler (*Dendroica petechia*) with a capture rate of 22 birds per 100 net hours. Reclamation can not determine whether the individuals were southwestern willow flycatchers (*Empidonax trailli extimus*) or Sonoran yellow warblers (*Dendroica petechia sonora*).



Pratt Restoration Site 2004

Reclamation produced 271 net hours over two 4-day periods during the 2004 fall migration period at the Pratt Restoration Site. Thirty eight birds per 100 net hours, comprising 11 families and 27 species, were captured. The families *Parulidae* (45%), *Emberizidae* (19%), and *Tyrannidae* (16%) accounted for 80% of the total population (Figure 3). Species composition for the 2004 season appeared to differ from the 2002 and 2003 season (Figure 4). Capture rate for the 2004 (38 birds per 100 net hours) and 2003 (36 birds per 100 net hours) seasons were similar. The capture rate for the 2002 season was higher (120 birds per 100 net) than the capture rate for the 2003 and 2004 season. A species of interest was captured at this site; the willow flycatcher with a capture rate of .7 birds per 100 net hours. Reclamation can not determine whether the individuals were southwestern willow flycatchers.

Figure 1: Species composition at the Cibola Nature Trail Restoration Site, migration 2004

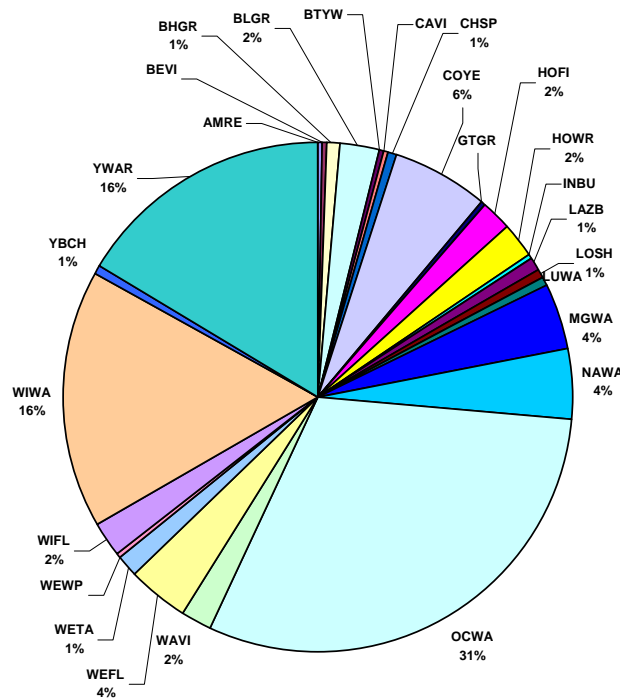


Figure 2: Capture rate of the most abundant species captured at the Cibola Nature Trail Restoration Site per year, migration, 2002-2004

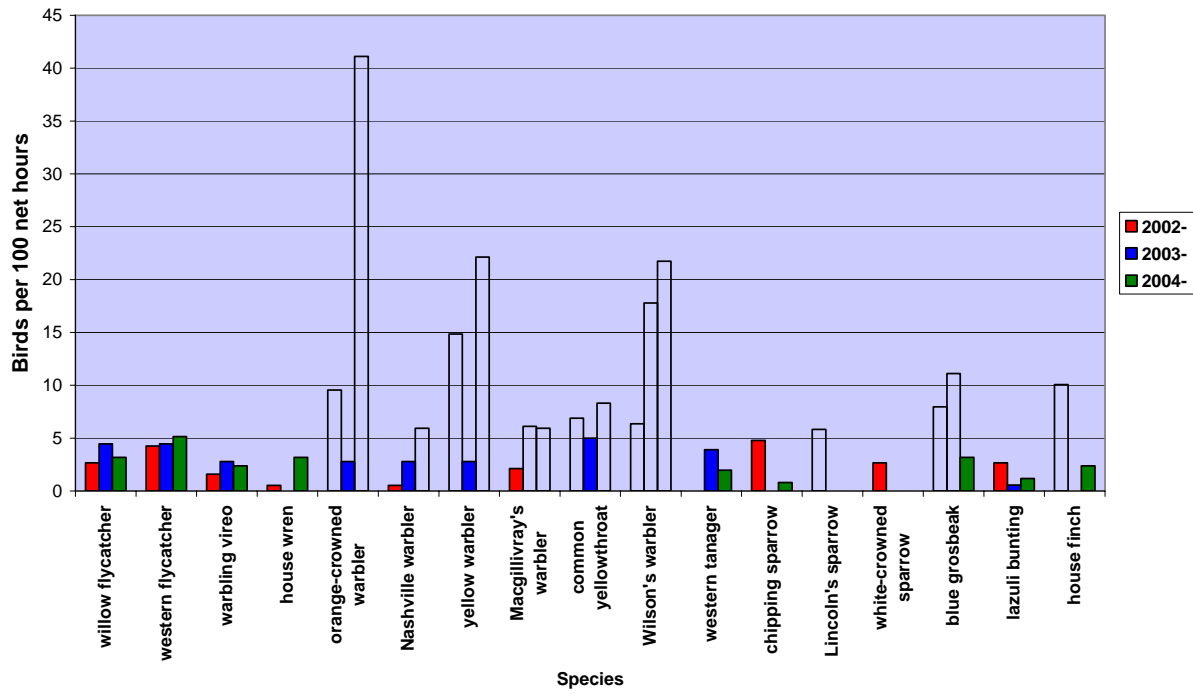


Figure 3: Species composition at the Pratt Restoration Site, migration 2004

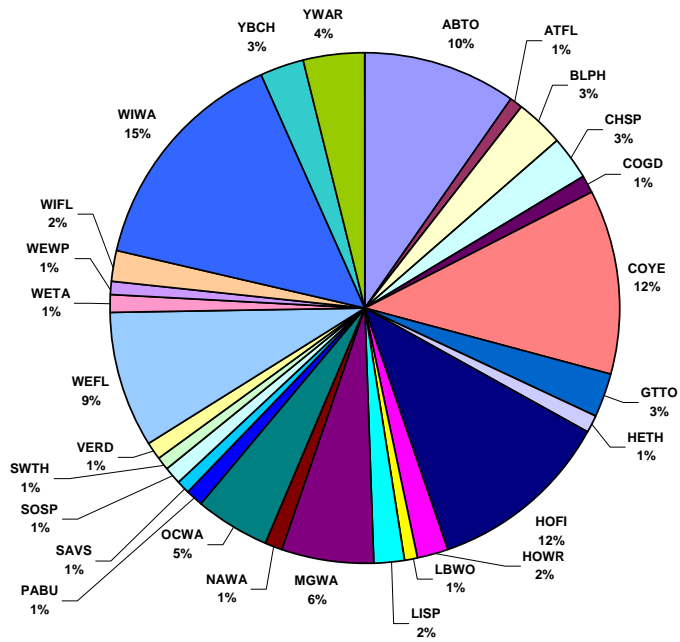
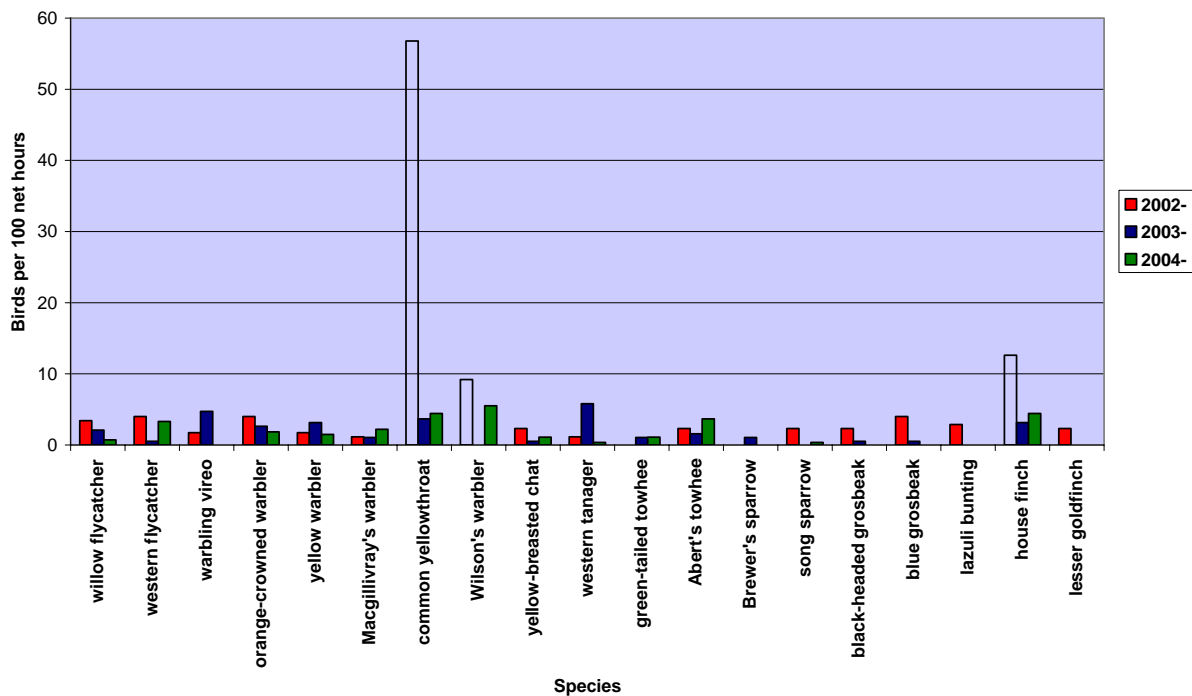


Figure 4: Capture rate of the most abundant species captured at the Pratt Restoration Site per year, migration, 2002-2004



Discussion

Approximately 70% of North American migratory bird species have occurred along the LCR; one third of these species are found utilizing the habitat of the LCR only in the migration period (Rosenberg *et al.* 1991). Reclamation’s fall migration monitoring has shown to be a valuable component in efforts to measure the success of each restored site. Reclamation has detected 48 species at both restorations sites over the three year period mist netting has been conducted; including two MSCP covered species (yellow warbler and willow flycatcher). Nine species listed in the Partner’s in Flight North American Landbird Conservation Plan were detected at the sites including: willow flycatcher, Bell’s vireo, Brewer’s sparrow, Lucy’s warbler, Abert’s towhee, Nashville warbler, black-throated gray warbler, green-tailed towhee and the indigo bunting.

Species composition at each site varied between years. This is to be expected since species composition during migration tends to be more variable than in the breeding season. Reclamation does not have the funds or manpower to obtain a true migration count, which involves censusing bird populations daily during the fall migration period (Hussell and Ralph 1998). Reclamation conducts mist netting from four to eight days during fall migration to obtain a snapshot of avian use during migration. Due to the low number of days mist netting is



conducted, only a small number of migrants who use our sites are detected each year, which causes greater variation in the data from year to year.

Capture rates of all species differed between sites and years. The reasons for this are not known, as comparing data from year to year is difficult. The difference in capture rates can be due to site specific factors (i.e. vegetation characteristics, site irrigation) or other factors (i.e. weather, days mist netting is conducted during fall migration). Furthermore, avian surveys conducted during the breeding season at the Pratt Restoration Site have not shown a decrease in avian activity over the years.

Reclamation goals in conducting mist netting during the fall migration period were to: 1) obtain a list of avian species utilizing the two restorations sites during this period; 2) determine species use throughout the year by determining persistence of individuals at a site; and 3) determine condition of birds during migration. Reclamation has worked toward achieving these goals and has gathered information on endangered and declining species. This data can be used in the development of future restoration sites.

Recommendations

For the year 2004, two 4-day periods of mist netting occurred at each site during the fall migration period. Since mist netting efforts that occur in adjacent days often yield similar results, mist netting days should be spaced apart. For example if Reclamation conducts eight days of mist netting, they should be equally spaced across the whole fall migration period. This will yield more representative data of the whole fall migration period.



Literature Cited

American Bird Conservancy. "Sonoran and Mohave Deserts. Retrieved August 19th, 2003. [Http://www.abcbirds.org.nabci/deserts.htm](http://www.abcbirds.org.nabci/deserts.htm).

DeSante, David F., Kenneth M. Burton, Pilar Velaz, and Dan Froehlich. 2002. Maps Manual 2002 Protocol instructions for the establishment and operation of constant-effort bird-banding stations as part of the monitoring avian productivity and survivorship (MAPS) program. The Institute for Bird Populations. Point Reyes Bird Observatory Bolinas, CA.

Hussell, J.T. and Ralph C. John. 1998. Recommended Methods for Monitoring Bird Populations By Counting and Capture of Migrants. Ontario Ministry of Natural Resources, P.O Box 5000, Maple, Ontario.

National Geographic Society. 1999. Field guide to the birds of North America, Third edition. National Geographic Society, Washington D.C. 457 pp.

Nur, N., S.L. Jones, and G.R Geupel. 1999. A statistical guide to data analysis of avian monitoring programs. U. S Department of the Interior, Fish and Wildlife Service, BTP-R6001-1999, Washington, D.C.

Powell, Brian F., and Robert J. Stiedl. 2000. Nesting habitat and reproductive success of southwestern riparian birds. *The Condor* 102:823-831.

Pyle, Peter. 1997. Identification guide to North American birds. Slate Creek Press, Bolinas, CA.

Ralph, C. John.; Geupel, Geoffrey R.; Pyle, Peter.; Martin, Thomas E.; DeSante, David F.1993. Handbook of field methods for monitoring landbirds. U.S Department of Agriculture; Gen. Tech. Rep Report PSW-GTR-144. Pacific Southwest Research Station, Albany, CA.

Rosenberg k., Ohmart R., Hunter W., and Anderson B. "Birds of the Lower Colorado River Valley" The University of Arizona Press, Tucson Arizona 1991.

Sogge, K. Mark; Marshal, M. Robert; Sferra, J. Susan; Tibbitts, J. Timothy; ASouthwestern Willow Flycatcher Summary and Survey Protocol 1997. US Department of Interior, National Park Service, Colorado Plateau Research Station, Northern Arizona University, Flagstaff, AZ 3pp.

Szaro, R. C. 1980. Factors influencing bird populations in southwestern riparian forests. Management of western forests and grasslands for nongame birds. USDA Forest Service general technical report. Ogden, UT.



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U.S Bureau of Reclamation 1996. Description and assessment of operations, maintenance, and sensitive species of the lower Colorado River. Biological assessment prepared by U.S Bureau of Reclamation, Lower Colorado Region, Boulder City, NV 89006.

U. S. Bureau of Reclamation 2001. Yearly report for the 2001 MAPS field season. (Unpublished Report) Boulder City, NV 89006.

U. S. Bureau of Reclamation 2003. Habitat Restoration on the Lower Colorado River Demonstration Projects: 1995-2002. U. S. Department of the Interior, Lower Colorado Regional Office, Bureau of Reclamation. Boulder City, NV.

U. S. Fish and Wildlife Service 1997. Biological and conference opinion on lower Colorado operations and maintenance- Lake Mead to southerly international border. Biological opinion issued to the Bureau of Reclamation.

U. S. Fish and Wildlife Service. 2003. Cibola National Wildlife Refuge. <http://southwest.fws.gov/refuges/arizona/cibola.html>. Accessed Sept. 2003.



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Appendix 1

Common names, scientific names, standard AOU (American Ornithological Union) codes for all species detected during fall migration at the Cibola Nature Trail and Pratt Restoration Sites.

<u>Code</u>	<u>Common Name</u>	<u>Scientific Name</u>
COGD	common ground-dove	Columbina passerine
ANHU	Anna's hummingbird	Calypte anna
LBWO	ladder-backed woodpecker	Picoides scalaris
WWPE	western wood pee-wee	Contopus sordidulus
WIFL	willow flycatcher	Empidonax trailii
WEFL	western flycatcher	Empidonax difficilis /occidentalis
BLPH	black phoebe	Sayornis nigricans
ATFL	ash-throated flycatcher	Myiarchus cinerascens
WEKI	western kingbird	Tyrannus verticalis
LOSH	loggerhead shrike	Lanius ludovicianus
BEVI	Bell's vireo	Vireo belli
CAVI	Cassin's vireo	Vireo cassinii
WAVI	warbling vireo	Vireo gilvus
VERD	verdin	Auriparus flaviceps
HOWR	house wren	Troglodytes aedon
SWTH	Swainson's thrush	Catharus ustulatus
HETH	hermit thrush	Catharus guttatus
OCWA	orange-crowned warbler	Vermivora celata
NAWA	Nashville warbler	Vermivora ruficapilla
LUWA	Lucy's warbler	Vermivora luciae
YWAR	yellow warbler	Dendroica petechia
BTYW	black-throated gray warbler	Dendroica nigrescens
AMRE	American redstart	Setophaga ruticilla
MGWA	Macgillivray's warbler	Oporornis tolmiei
COYE	common yellowthroat	Geothypis trichas
WIWA	Wilson's warbler	Wilsonia pusilla
YBCH	yellow-breasted chat	Icteria virens
WETA	western tanager	Piranga ludoviciana
GTTO	green-tailed towhee	Pipilo chlorurus
ABTO	Abert's towhee	Pipilo aberti
CHSP	chipping sparrow	Spizella passerine
BRSP	Brewer's sparrow	Spizella breweri
SOSP	song sparrow	Melospiza melodia
LISP	Lincoln's sparrow	Melospiza lincolni
WCSP	white-crowned sparrow	Zonotrichia leucophrys
BHGR	black-headed grosbeak	Phueciticus melanocephalus
BLGR	blue grosbeak	Guiraca caerulea
LAZB	lazuli bunting	Passerina amoena
INBU	indigo bunting	Passerina cyanea
GTGR	great-tailed grackle	Quiscalus mexicanus
HOFI	house finch	Carpodacus mexicanus
LEGO	lesser goldfinch	Carduelis psaltria

