



BIRD MONITORING AND VISITOR EDUCATION AT DEVILS POSTPILE NATIONAL MONUMENT

2005 Progress Report



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EXECUTIVE SUMMARY

In 2005, PRBO Conservation Science (PRBO) completed the fourth year of a bird monitoring and visitor education program in montane meadow and riparian habitats of Devils Postpile National Monument (referred to hereafter as DEPO or the monument). As in past years (2002 – 2004), we conducted point counts at 15 stations along the San Joaquin River and Red's Meadow Creek within monument boundaries. We also conducted mist netting and banding at Soda Springs meadow near the DEPO Ranger Station. In conjunction with the banding program, we provided interpretive and educational presentations to DEPO visitors.

We detected two new species at DEPO in 2005 (Bewick's Wren, Killdeer). In total, ninety-nine bird species have been documented within and in close vicinity to DEPO. Nine of these are special status species, with ranking on one or more regulatory or non-regulatory species conservation lists. We also detected 5 riparian, 8 coniferous forest, 1 sagebrush and 1 grassland California Partners In Flight (CalPIF) Bird Conservation Plan focal species and submitted breeding status of each to the online CalPIF focal species range map database. In addition, we submitted 94 records of California Department of Fish and Game's Special Animal bird species to the CDFG Natural Diversity Database.

Oregon Juncos were the most widely distributed species: we detected them at 87% of our point count stations. We detected Warbling Vireos, American Robins, Audubon's Warblers and Wilson's Warblers for at least 30% of our point count stations.

Breeding bird abundance, richness and diversity across the entire DEPO point count transect were lower in 2005 than in other years. In 2005, species richness and total bird abundance was over twice as high at point 8 (Red's Meadows Creek) than at any other point count location.

Because we were not able to operate mist nets until June 16 in 2005, we captured fewer birds than in any other year. However, once captures were standardized per 100 hours of netting effort, we found that capture rates were comparable in 2005 to other years.

High young (Hatch Year) to adult capture ratios for Nashville Warblers, Mountain White-crowned Sparrows and Song Sparrows indicated high productivity for those species in 2005. We captured no Warbling Vireo young, indicating very low productivity for this species. We found this in all other years as well, when we captured 0 – 2 Warbling Vireo young (but 4 - 13 times as many adults, Heath 2005).

We recaptured half as many individuals in 2005 as in 2004. Mountain White-crowned Sparrows, Oregon Juncos and American Robins were the most frequently recaptured species in 2005. We did not recapture any individuals in 2005 that were banded in 2004. In 2005, we recaptured one adult (Mountain White-crowned Sparrow) that had first been banded at DEPO as hatch year bird; otherwise all recaptures in 2005 were first banded as adults at DEPO.

We tallied 176 visitors at mist netting demonstrations over 7 days at the Soda Springs Meadow site.

BACKGROUND AND INTRODUCTION

PRBO Conservation Science (PRBO) began a bird monitoring and visitor education program in Devils Postpile National Monument in 2002. In 2004, we concluded there to be value in continuing the 2002 - 2004 bird monitoring and education strategy at DEPO (Heath 2005). 2005 marks our fourth consecutive year for this proposed long-term program.

The continuation of a long-term MAPS (Monitoring Avian Productivity and Survivorship, DeSante et al. 2005), education and point count program in riparian and meadow habitats of DEPO will allow us to:

1. Determine over-winter survivorship rates for select short and long distance migrants that breed at DEPO. Because capture rates at DEPO are relatively low, we will probably only be able to calculate an average survival rate for select species (as opposed to annual survival rates). However, the ability to do so increases with each year of data.
2. Determine annual productivity for select species that breed at DEPO.
3. Document post-fledgling and migration timing and movement of select species.
4. Determine bird species diversity, richness and abundance of birds utilizing meadow and riparian habitats at DEPO.
5. Monitor long-term trends in 1, 2, 3 and 4.
6. Provide a baseline with which to measure bird responses to stochastic events.
7. Educate up to 500 visitors per year on bird monitoring techniques, bird and habitat conservation issues and ecology, and the importance of National Park Service lands for the protection of healthy bird populations.
8. Contribute to regional and national bird monitoring and conservation efforts such as PRBO's eastern Sierra bird monitoring program, MAPS (DeSante et al. 2005), CalPIF Bird Conservation Plans, and CDFG Natural Diversity Database.

METHODS

Research permit

All bird monitoring and education work in 2005 was performed under National Park Service Scientific and Collecting Research Permit DEPO-2005-SCI-0004.

Study area description

At 2,300 m in elevation, DEPO is located along the San Joaquin River, Madera County on the western slope of the Sierra Nevada, near the town of Mammoth Lakes, California. The study area is comprised of Soda Springs meadow adjacent to the monument Ranger Station and the riparian habitat associated with the San Joaquin River and Red's Meadow Creek within monument boundaries (37° 37' N, 119° 05' W to 37° 52' N, 119° 05' W).

Observer training

PRBO biologists trained in distance estimation and familiar with local bird songs and calls, conducted all point count censuses. Additionally, all biologists practiced and calibrated distance estimation and local bird identification prior to censuses. A Leica Range Finder™ was used to determine distances to each bird detected.

Mist Netting

Netting procedures conformed to the guidelines described in Ralph et al. (1993) and MAPS program protocol (DeSante et al. 2005). In summary, 10 mist nets were operated once every ten-day period, access to DEPO permitting. Due to a heavy spring snow melt, the San Joaquin River flooded Soda Springs Meadow and our mist netting locations. We were not able to access them until June 13 in 2005, and therefore only banded during 7 of the possible 11 census periods. Refer to Appendix 1 for 2005 census dates and Heath (2005) for maps and GPS coordinates of mist netting locations. Nets were unfurled 15 minutes after local sunrise, checked every 30 minutes (more often in cold weather) and were operated for five hours during each census period. Captured birds were carefully removed from the net and processed nearby. Each bird (except game birds) received a United States Fish and Wildlife Service (USFWS) band for permanent identification to enable estimates of survival from subsequent recaptures. Age, sex, wing length, breeding condition, weight, skull ossification, flight feather wear, molt and fat score of each bird were recorded as described by Pyle (1997). Nets and poles were taken down immediately after 5 hours of netting were concluded. PRBO biologists conducted all mist netting and banding under U.S. Department of the Interior, Bird Banding Lab permit # 09316-DZ.

Point Count Censuses

We censused all 15 points using the five-minute variable circular plot (VCP) point count method (Rosenstock et al. 2002) and followed general guidelines outlined in Ralph et al. (1993). We estimated the distance to each bird detected. We recorded all birds detected and type of initial detection (visual, song or call). We visited all stations two times during the peak of the songbird

breeding season (June) and spaced visit 2 at least 10 days apart from visit 1. To minimize observer bias, a different observer conducted each of the two censuses. Additionally, we conducted points in different order during each visit in order to minimize the effect of time of day on detection rates. We conducted censuses from within 30 minutes after local sunrise until approximately 4 hours later, and we did not conduct counts in excessively windy or rainy conditions. We also recorded all observations of breeding behavior. Refer to Heath (2005) for maps, written descriptions, and GPS coordinates for point count locations. Dates of 2005 censuses are presented in Appendix 1.

Statistical analysis, summary methods, and definitions

Breeding Bird Abundance, Breeding Species Richness, Breeding Species Diversity and By-species Relative Abundance. We summarized indices of abundance, species richness and species diversity for all breeding species detected during point counts. We excluded all non-breeding migrant or transient species. We further limited the species included in the summaries to those that we determined to be most reliably recorded with the point count protocol. Thus we also removed species whose territories are typically so large that we could not assure independence of individual observations among points (swallows [*Hirundinidae*], shorebirds [*Scolopacidae* and *Charadriidae*], ducks [*Anatidae*], hawks [*Accipitridae*], Clark's Nutcrackers [*Nucifraga columbiana*], Common Ravens [*Corvus corax*] and California Gulls [*Larus californicus*]).

Using PointCnt 2.79 (Ballard 2004), we summarized by-transect and by-point diversity, richness and total abundance for breeding species detected within 50m during point counts and summed over 2 visits in 2002 - 2005.

Breeding Species Diversity: The transformation of Shannon's diversity index (or H' , Krebs 1989) denoted N_1 (MacArthur 1965). The transformation expresses the data in terms of number of species and thus is more easily interpreted. Expressed mathematically:

$$N_1 = e^{H'} \text{ and } H' = \sum_{i=1}^{i=S} (p_i)(\ln p_i)(-1)$$

Where S = total breeding species richness and p_i is the proportion of the total numbers of individuals for each breeding species (Nur et al. 1999). High index scores indicate both high breeding species richness and more equal distribution of individuals among species.

Breeding Species Richness: Number of breeding species.

Breeding Bird Abundance: Number of individuals of all breeding species combined.

Relative Abundance: We summarized the number of individuals detected for each breeding species by transect over 2 visits in 2002 - 2005. We used all detections within 50m. Because few species are 100% detectable, detections underestimate true density. Therefore results should be considered an index of abundance (relative abundance).

Breeding Status

We determined breeding status for all species encountered from our surveys between late May and mid August 2002 - 2005, during censuses performed by Parker and Parker (2001) and during censuses performed by the Institute for Bird Populations (Siegel and Wilkerson 2004). We ranked species using the following four criteria of the Riparian Habitat Joint Venture breeding scale, modified from breeding bird atlas criteria (<http://www.prbo.org/calpif/criteria.html>):

No evidence of breeding: Species not detected during breeding season, or species known to not breed within the general study area.

Possible breeding: Species encountered singing or acting territorial only once during the breeding season (in suitable habitat).

Probable breeding: Singing individual encountered on 2 or more different days of standardized censuses (at least one week apart); territorial behavior noted more than once at the same location; pair observed in courtship behavior; female with brood patch (males with cloacal protuberances not used as evidence of breeding locally).

Confirmed breeding: distraction display; nest building (except woodpeckers and wrens); nesting material or fecal sack being carried by adult; captured female with eggs in oviduct; dependent juveniles with adults; active territory observed on at least three days (at least one week apart); active nest observed.

Data dictionary and electronic copies of data

A detailed explanation of all data bases derived from this project was provided to the National Park Service and DEPO along with the submission of this report. Electronic versions of all DEPO databases derived from this project were also submitted in Excel format.

RESULTS AND DISCUSSION

Bird species composition, distribution and breeding status

We detected two new species at DEPO in 2005 (Bewick's Wren, Killdeer). In total, ninety-nine bird species have been documented within and in close vicinity to DEPO since 2001; five of those were detected only by Parker and Parker (2001), seven only by the Institute for Bird Population (IBP) surveys (Siegel and Wilkerson 2004), and the remainder by PRBO 2002 – 2005 (Appendix 2).

Sensitive Species

In 2005, we detected 9 species that occur on one or more of the following lists: California Department of Fish and Game Special Animals (CDFG SA), California Species of Special Concern, USFS Region 5 Inyo National Forest Sensitive Species or USFWS Birds of Conservation Concern for the Sierra Nevada Bird Conservation Region (Table 1). We submitted all CDFG SA species detected during 2002 - 2004 (94 records) to CDFG's Natural Diversity Database and will submit 2005 records in the winter of 2005.

Table 1. Listed species detected at Devils Postpile National Monument, 2005.

Common name	Latin name	CDFG SA	CA BSSC	USFS R5 INF SS	USFWS BCC BCR 15
Northern Goshawk	<i>Accipiter gentiles</i>	x	2 nd	x	
Black Swift	<i>Cypseloides niger</i>	x	3 rd		x
Rufous Hummingbird	<i>Selasphorus rufus</i>				x
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>				x
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	x			
White-headed Woodpecker	<i>Picoides albolarvatus</i>	x			x
Olive-sided Flycatcher	<i>Contopus cooperi</i>	x	2 nd		
Yellow Warbler	<i>Dendroica petechia</i>	x	2 nd		
Chipping Sparrow	<i>Spizella passerina</i>	x			

CDFG SA = California Department of Fish and Game Special Animals list (CDFG 2005); CA BSSC = California Bird Species of Special Concern draft list, 2003 and priority # (CDFG & PRBO 2005); USFS R5 INF SS = USDA Forest Service Region 5 Inyo National Forest Sensitive Species (USFS 2001), USFWS BCC BCR 15 = United States Fish and Wildlife Service Birds of Conservation Concern, Sierra Nevada Bird Conservation Region (BCR 15) (USFWS 2002).

Northern Goshawk. We detected this conifer-dwelling hawk on August 3 and August 13, 2005 in the forested area downstream of the Postpile and soaring downstream along the San Joaquin River near Soda Springs Meadow, respectively. The later observation was an adult male.

Black Swift. We detected Black Swifts foraging above Rainbow Falls on the morning of June 30, 2005. We have confirmed this species to breed in the cliffs behind Rainbow Falls in previous years (Heath 2005). It is likely that they were also breeding in 2005.

Rufous Hummingbird. Rufous Hummingbirds use DEPO as a migratory stop-over area during their migratory journey from northern breeding grounds (northern California to Alaska) to southern

wintering grounds in California and Mexico (Calder 1993). This hummingbird represented 7% of our hatch-year captures in 2005, but our first captures were later in the season compared to previous years (July 8, 2005 versus June 5, 2004 and June 24 2002, 2003). Interestingly, we captured no adults in 2005 while we have captured adults in all previous years (Heath 2005). This same pattern was also observed in the area of Lassen National Park and National Forest in 2005 (PRBO data).

Williamson's Sapsucker. We detected this species on June 16, 2005 and captured a hatching year bird in our mist nets on July 25, 2005.

Red-breasted Sapsucker. We detected this species throughout the breeding season: both during point counts and during mist netting when we captured 4 adults and 3 young. We also located an active nest cavity for this species in a live Lodgepole Pine (*Pinus contorta*), 750 cm from the ground.

White-headed Woodpecker. We detected this species in the burn area downstream from Rainbow Falls on June 17, 2005 and again on August 3, 2005.

Olive-sided Flycatcher. We detected this species on June 31, 2005 in a forested area west of the San Joaquin River, downstream of Rainbow Falls.

Yellow Warbler. This warbler is at the edge of its high-elevational breeding limit at DEPO, as it typically nests below 1,981 m on the west slope of the Sierra Nevada (Gaines 1992). We captured a hatch-year bird on August 13, 2005 and detected singing individuals in Soda Springs Meadow on June 16, 23, 30 and July 25, 2005. It is highly likely that a Yellow Warbler held a territory in Soda Springs Meadow in 2005. The hatching year bird had no skull ossification, indicating that it probably fledged from or in close proximity to Soda Springs Meadow.

Chipping Sparrow. We detected a singing individual of this species on June 17, 2005.

CalPIF Bird Conservation Plan focal species

We detected 5 riparian, 8 coniferous forest, 1 sagebrush and 1 grassland CalPIF Bird Conservation Plan focal species within the study area (Table 2). Focal species are not necessarily sensitive or of concern, but are listed under the assumption that if a landscape is managed to meet the focal species' needs, other species will benefit. Several of the focal species are also relatively common enough in California to provide adequate sample sizes for trend monitoring, determining habitat relationships or estimating demographic parameters – all factors that can assist in the management of healthy bird populations (RHJV 2004, Chase and Geupel 2005, CalPIF 2000, CalPIF 2002, CalPIF 2005).

Breeding status of the focal species was submitted for inclusion into the CalPIF statewide database to assist in documenting the most current California breeding distribution for these species. Distribution maps for the focal species are periodically updated by CalPIF in order to incorporate the most current data. See <http://www.prbo.org/calpif/livemaps.html> for the most current and interactive California distribution maps for all CalPIF riparian and coniferous focal species and <http://cain.nbii.gov/prbo/calpifmap/> for the study site database in which DEPO has been included.

Table 2. California Partners in Flight riparian, coniferous forest, sagebrush or grassland Bird Conservation Plan focal species detected at Devils Postpile National Monument by PRBO in 2005. See Appendix 2 for breeding status by site.

Common name	Latin name	CalPIF Bird Conservation Plan Focal Species ¹			
		Riparian	Coniferous Forest	Sagebrush	Grassland
Spotted Sandpiper	<i>Actitis macularia</i>	x			
Olive-sided Flycatcher	<i>Contopus cooperi</i>		x		
Warbling Vireo	<i>Vireo gilvus</i>		x		
Brown Creeper	<i>Certhia americana</i>		x		
Golden-crowned Kinglet	<i>Regulus satrapa</i>		x		
Yellow Warbler	<i>Dendroica petechia</i>	x			
MacGillivray's Warbler	<i>Oporornis tolmiei</i>		x		
Common Yellowthroat	<i>Geothlypis trichas</i>	x			
Wilson's Warbler	<i>Wilsonia pusilla</i>	x			
Western Tanager	<i>Piranga ludoviciana</i>		x		
Green-tailed Towhee	<i>Pipilo chlorurus</i>			x	
Savannah Sparrow	<i>Passerculus sandwichensis</i>				x
Fox Sparrow	<i>Passerella iliaca</i>		x		
Song Sparrow	<i>Melospiza melodia</i>	x			
Oregon Junco	<i>Junco hyemalis thurberi</i>		x		

¹ RHJV 2004, Chase and Geupel 2005, CalPIF 2000, CalPIF 2002, CalPIF 2005

Breeding species abundance and frequency of occurrence

As in other years, Oregon Juncos were the most widely distributed species: we detected them at 87% of our point count stations (Table 3). We detected Warbling Vireos, American Robins, Audubon's Warblers and Wilson's Warblers on at least 30% of our point count stations. These 3 species were also detected in highest numbers. The number of detections varied between years.

Table 3. Frequency of occurrence in 2005 (% points present, n = 15) and number of detections for all breeding bird species detected during 5-minute, 50m radius point counts at Devils Postpile National Monument, 2002 – 2005. Total number of individuals detected per transect, summed over 2 visits in each year. Latin names provided in Appendix 2.

Species	Frequency of occurrence in				
	2005 (%)	2002	2003	2004	2005
Belted Kingfisher	0	0	1	0	0
Williamson's Sapsucker	0	0	2	1	0
Red-breasted Sapsucker	27	0	2	1	4
Hairy Woodpecker	7	0	2	3	1
Black-backed Woodpecker	0	0	0	2	0
Red-shafted Flicker	7	0	0	0	1

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Species	Frequency of occurrence in 2005 (%)	2002	2003	2004	2005
Olive-sided Flycatcher	0	1	0	0	0
Western Wood-Pewee	7	6	5	7	1
Dusky Flycatcher	0	1	1	0	0
Warbling Vireo	40	13	5	6	6
Steller's Jay	20	4	14	4	3
Mountain Chickadee	27	5	3	4	4
Red-breasted Nuthatch	0	0	0	1	0
White-breasted Nuthatch	0	0	1	0	0
Brown Creeper	20	2	5	7	3
American Dipper	0	2	0	7	0
Golden-crowned Kinglet	7	1	0	0	1
Mountain Bluebird	0	0	1	0	0
American Robin	53	18	8	4	8
Townsend's Solitaire	13	1	3	1	2
Yellow Warbler	0	3	1	0	0
Audubon's Warbler	40	7	7	3	6
MacGillivray's Warbler	27	3	5	9	4
Wilson's Warbler	60	7	3	9	9
Western Tanager	0	2	2	1	0
Song Sparrow	27	9	5	6	4
Lincoln's Sparrow	13	0	0	0	2
Mountain White-crowned Sparrow	0	1	0	0	0
Oregon Junco	87	19	15	7	13
Black-headed Grosbeak	7	0	0	0	1
Brewer's Blackbird	0	9	6	0	0
Brown-headed Cowbird	7	5	0	0	1
Cassin's Finch	0	0	1	3	0
Pine Siskin	0	9	0	1	0

Breeding species abundance, richness and diversity

Bird indices varied between points as they have in other years (Table 4). Species richness and total bird abundance was over twice as high at point 8 (Red's Meadows Creek) than at any other location. We detected the following species at this location: American Robin, Brown-headed Cowbird, Brown Creeper, Oregon Junco, Lincoln's Sparrow, MacGillivray's Warbler, Mountain Chickadee, Red-breasted Sapsucker, Song Sparrow, Western Wood-Pewee, and Wilson's Warbler. The combination of White Alder (*Alnus rhombifolia*), both burned and alive Lodgepole Pines and a wet sedge and rush

meadow at this location provided a diversity of nesting niches that supported a rich breeding bird community.

Table 4. Indices of total abundance, species richness, and Shannon-Weiner index of species diversity at Devils Postpile National Monument riparian point count transect along the San Joaquin River, for breeding species detected within 50m during 5-minute point counts, summed over two visits, 2005.

Point	Total Abundance	Species Richness	Species Diversity
1	4	4	4.00
2	4	3	2.83
3	6	5	4.76
4	8	5	4.76
5	2	2	2.00
6	2	2	2.00
7	7	5	4.71
8	16	11	9.72
9	2	2	2.00
10	1	1	1.00
11	3	3	3.00
12	3	3	3.00
13	7	3	2.73
14	7	5	4.71

Breeding bird abundance, richness and diversity across the entire point count transect was lower in 2005 than in other years (Table 5).

Table 5. Total individuals, species richness and Shannon-Weiner index of species diversity at Devils Postpile National Monument riparian point count transect along the San Joaquin River, for breeding species detected within 50m during 5-minute point counts, summed over two visits, 2002 – 2005.

	Total Abundance	Species Richness	Species Diversity
2002	128	22	15.40
2003	98	23	16.56
2004	87	21	16.68
2005	74	19	14.07

Because we were not able to operate mist nets until June 16 in 2005, we captured fewer birds than in any other year (Table 6). However, once captures were standardized per 100 hours of netting effort, we found that capture rates were comparatively higher in 2005 than in other years.

Table 6. Summary of mist netting effort during the breeding season at Soda Springs Meadow, Devils Postpile National Monument, 2002 - 2005.

	Number of birds			
	2002	2003	2004	2005
Captures total	255	243	317	186
Captures / 100 net hours	57.63	63.47	66.79	75.30
New captures	199	165	207	146
Captured but unbanded	5	7	9	1
Recaptures – total	51	71	101	39
Individuals recaptured	27	44	56	32
Total number of species captured	30	23	37	29

Estimates of productivity

High young (Hatch Year) to adult capture ratios for Nashville Warblers, Mountain White-crowned Sparrows and Song Sparrows indicated high productivity for those species in 2005 (Table 7). We captured no Warbling Vireo young, indicating very low productivity for this species. We found this in all other years as well, when we captured 0 – 2 Warbling Vireo young (but 4 - 13 times as many adults, Heath 2005). We have documented low Warbling Vireo nest success at other Eastern Sierra locations (Heath et al. 2004).

Table 7. Species and age class of all individuals banded at Soda Springs meadow, Devils Postpile National Monument during constant effort mist netting, 2005. Solely migrant, transient and dispersing species in *italics*. Total = all birds captured combined, Adjusted Total = breeding species only. Latin names provided in Appendix 2.

Common Name	2005		
	Adult	Hatch Year	ratio
Spotted Sandpiper	2	0	0.00
<i>Anna's Hummingbird</i>	0	1	--
Calliope Hummingbird	0	1	--
<i>Rufous Hummingbird</i>	0	6	--
Red-breasted Sapsucker	4	3	0.75
Williamson's Sapsucker	0	2	--
Western Wood-Pewee	1	0	0.00
Dusky Flycatcher	1	0	0.00
Warbling Vireo	10	0	0.00
Steller's Jay	1	1	1.00
Mountain Chickadee	1	0	0.00
Bewick's Wren	0	1	--
House Wren	0	2	--
American Robin	12	2	0.17
<i>Orange-crowned Warbler</i>	2	39	19.50
Nashville Warbler	1	7	7.00
Yellow Warbler	0	1	--

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Common Name	Adult	Hatch Year	ratio
Audubon's Warbler	6	0	0.00
MacGillivray's Warbler	2	3	1.50
Wilson's Warbler	8	4	0.50
Common Yellowthroat	0	2	--
<i>Savannah Sparrow</i>	0	1	--
Fox Sparrow	0	1	--
Song Sparrow	2	6	3.00
Mtn. White-crowned Sparrow	2	7	3.50
Oregon Junco	2	0	0.00
Brewer's Blackbird	1	0	0.00
Lazuli Bunting	2	2	1.00
Brown-headed Cowbird	1	0	0.00
Total	61	92	1.51
Adjusted Total	59	45	0.76

Site fidelity and recruitment

We recaptured half as many individuals in 2005 as in 2004 (Table 8). Mountain White-crowned Sparrows, Oregon Juncos and American Robins were the most frequently recaptured species in 2005.

Table 8. Number of individuals recaptured in years subsequent to the year of their original capture at Devils Postpile National Monument, 2002 – 2005.

Species	Year of first capture	Year of recapture		
		2003	2004	2005
American Robin	2002	1	2	3
	2003	--	1	--
Audubon's Warbler	2002	1	1	--
	2003	--	2	--
MacGillivray's Warbler	2003	--	1	1
Mountain White-crowned Sparrow	2002	2	2	2
Orange-crowned Warbler	2003	--	3	--
Oregon Junco	2002	2	3	--
	2003	--	5	2
Red-breasted Sapsucker	2002	1	1	--
	2003	--	1	--
Song Sparrow	2002	3	2	1
	2003	--	2	--
Warbling Vireo	2003	--	--	1
Wilson's Warbler	2003	--	--	1

We did not recapture any individuals in 2005 that were banded in 2004 (Table 9). In 2005, we recaptured one adult (Mountain White-crowned Sparrow) that had first been banded at DEPO as

hatch year bird; otherwise all recaptures in 2005 were first banded as adults at DEPO. We have captured this individual during every year of mist netting at DEPO.

Table 9. Individuals first banded as hatching year birds that were recaptured in subsequent years as adults, Devils Postpile National Monument, 2002 – 2005.

Individuals by species	Year of original capture	Year(s) of subsequent captures
Mountain White-crowned Sparrow	2002	2003, 2004, 2005
Orange-crowned Warbler	2003	2004
Orange-crowned Warbler	2003	2004
Orange-crowned Warbler	2003	2004
Oregon Junco	2002	2003, 2004

Visitor Education

We tallied 176 visitors during 7 days of mist netting demonstrations at the Soda Springs Meadow site (Table 10). The decrease in visitor numbers in 2005 was probably due to the fact that we operated nets on fewer days than in previous years. Mist netting demonstrations were either attended voluntarily by visitors, NPS work groups (such as the California Conservation Corps) or were incorporated into ranger walks led by DEPO Park Rangers. Avian ecology and identification, meadow restoration and management, bird and habitat conservation and avian monitoring methods were interpreted to visitors during the 5 hour mist netting sessions. Visitors of all ages viewed live birds in the hand and witnessed the biological monitoring method first hand.

Table 10. Number of visitors attending PRBO's mist netting at Devils Postpile National Monument, 2002 – 2005.

Year	Number of Visitors
2002	220
2003	362
2004	539
2005	176
Total	1,297

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Appendix 1. Mist netting and point count census dates at Devils Postpile National Monument, 2005.

Mist netting census dates at Devils Postpile National Monument, 2005. Net locations were not accessible during census periods 1 - 3 in 2005.

	Census Periods										
	1	2	3	4	5	6	7	8	9	10	11
2005	--	--	--	--	June 16	June 23	July 8	July 15	July 25	Aug 3	Aug 13

Point count transect, 4-letter code, year, number of points and census dates in 2005.

Site	Code	Year	# points	Visit 1	Visit 2
Devils Postpile National Monument	DEPO	2005	15	June 17	June 30

Appendix 2. Breeding status of all bird species observed at and within close vicinity to Devils Postpile National Monument, May 20 – August 13, 2002 – 2005, including Parker and Parker (2001), and Institute for Bird Populations surveys (Siegel and Wilkerson 2004).

Common name	Latin name	Breeding status	Common name	Latin name	Breeding status
Turkey Vulture	<i>Cathartes aura</i>	0	Belted Kingfisher	<i>Ceryle alcyon</i>	2
Mallard	<i>Anas platyrhynchos</i>	1	Lewis' Woodpecker	<i>Melanerpes lewis</i>	0*
Bufflehead	<i>Bucephala albeola</i>	2***	Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	1
Common Merganser	<i>Mergus merganser</i>	1	Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	1
Bald Eagle	<i>Haliaeetus leucocephalus</i>	0	Downy Woodpecker	<i>Picoides pubescens</i>	2
Cooper's Hawk	<i>Accipiter cooperii</i>	2	Hairy Woodpecker	<i>Picoides villosus</i>	1
Northern Goshawk	<i>Accipiter gentilis</i>	2	White-headed Woodpecker	<i>Picoides albolarvatus</i>	2
Red-tailed Hawk	<i>Buteo jamaicensis</i>	2	Black-backed Woodpecker	<i>Picoides arcticus</i>	3
Golden Eagle	<i>Aquila chrysaetos</i>	0	Red-shafted Flicker	<i>Colaptes auratus</i>	1
American Kestrel	<i>Falco sparverius</i>	2**	Olive-sided Flycatcher	<i>Contopus cooperi</i>	3
Mountain Quail	<i>Oreortyx pictus</i>	2	Western Wood-Pewee	<i>Contopus sordidulus</i>	1
Virginia Rail	<i>Rallus limicola</i>	2**	Willow Flycatcher	<i>Empidonax traillii</i>	0
Spotted Sandpiper	<i>Actitis macularia</i>	1	Hammond's Flycatcher	<i>Empidonax hammondi</i>	2
Killdeer	<i>Charadrius vociferus</i>	2	Gray Flycatcher	<i>Empidonax wrightii</i>	0*
Wilson's Snipe	<i>Gallinago delicata</i>	2	Dusky Flycatcher	<i>Empidonax oberholseri</i>	3
California Gull	<i>Larus californicus</i>	0	Cassin's Vireo	<i>Vireo cassinii</i>	2
Mourning Dove	<i>Zenaida macroura</i>	2	Warbling Vireo	<i>Vireo gilvus</i>	1
Great Horned Owl	<i>Bubo virginianus</i>	0	Steller's Jay	<i>Cyanocitta stelleri</i>	1
Common Nighthawk	<i>Chordeiles minor</i>	0	Clark's Nutcracker	<i>Nucifraga columbiana</i>	2
Black Swift	<i>Cypseloides niger</i>	1	Common Raven	<i>Corvus corax</i>	1
Vaux's Swift	<i>Chaetura vauxi</i>	0**	Tree Swallow	<i>Tachycineta bicolor</i>	2
White-throated Swift	<i>Aeronautes saxatalis</i>	2**	Violet-green Swallow	<i>Tachycineta thalassina</i>	2
Anna's Hummingbird	<i>Calypte anna</i>	2	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	2
Calliope Hummingbird	<i>Stellula calliope</i>	1	Mountain Chickadee	<i>Poecile gambeli</i>	3
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	0	Red-breasted Nuthatch	<i>Sitta canadensis</i>	2
Rufous Hummingbird	<i>Selasphorus rufus</i>	0	White-breasted Nuthatch	<i>Sitta carolinensis</i>	2

Confirmed Breeding - 1 Probable Breeding - 3 Possible Breeding - 2 No Evidence of Breeding, Migrant, Transient, or Disperser - 0 (see methods for further explanation of codes)

* observed only by Parker and Parker (2001), **observed only by IBP (Siegel and Wilkerson 2004), *** observed only by Parker and Parker (2001) outside of DEPO boundaries

Appendix 2. continued. Breeding status of all bird species observed at and within close vicinity of Devils Postpile National Monument, May 20 – August 13, 2002 - 2005, including Parker and Parker (2001), and Institute of Bird Populations surveys (Siegel and Wilkerson 2004).

Common name	Latin name	Breeding status	Common name	Latin name	Breeding status
Brown Creeper	<i>Certhia americana</i>	1	Spotted Towhee	<i>Pipilo maculatus</i>	3
Rock Wren	<i>Salpinctes obsoletus</i>	2**	Chipping Sparrow	<i>Spizella passerina</i>	2
Bewick's Wren	<i>Thryomanes bewickii</i>	2	Brewer's Sparrow	<i>Spizella breweri</i>	2
House Wren	<i>Troglodytes aedon</i>	1	Black-throated Sparrow	<i>Amphispiza bilineata</i>	0
Marsh Wren	<i>Cistothorus palustris</i>	0	Savannah Sparrow	<i>Passerculus sandwichensis</i>	0
American Dipper	<i>Cinclus mexicanus</i>	1	Fox Sparrow	<i>Passerella iliaca</i>	3
Golden-crowned Kinglet	<i>Regulus satrapa</i>	3	Song Sparrow	<i>Melospiza melodia</i>	1
Ruby-crowned Kinglet	<i>Regulus calendula</i>	2***	Lincoln's Sparrow	<i>Melospiza lincolnii</i>	3
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	2	Mtn. White-crowned Sparrow	<i>Zonotrichia leucophrys oriantha</i>	1
Mountain Bluebird	<i>Sialia currucoides</i>	2	Oregon Junco	<i>Junco hyemalis thurberi</i>	1
Townsend's Solitaire	<i>Myadestes townsendii</i>	1	Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	2
Swainson's Thrush	<i>Catharus ustulatus</i>	0	Lazuli Bunting	<i>Passerina amoena</i>	1
Hermit Thrush	<i>Catharus guttatus</i>	3	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0**
American Robin	<i>Turdus migratorius</i>	1	Western Meadowlark	<i>Sturnella neglecta</i>	2***
Orange-crowned Warbler	<i>Vermivora celata</i>	0	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	1
Nashville Warbler	<i>Vermivora ruficapilla</i>	3	Brown-headed Cowbird	<i>Molothrus ater</i>	3
Yellow Warbler	<i>Dendroica petechia</i>	3	Pine Grosbeak	<i>Pinicola enucleator</i>	3
Audubon's Warbler	<i>Dendroica coronata auduboni</i>	1	Purple Finch	<i>Carpodacus purpureus</i>	0
Hermit Warbler	<i>Dendroica occidentalis</i>	2	Cassin's Finch	<i>Carpodacus cassinii</i>	1
Mac Gillivray's Warbler	<i>Oporornis tolmei</i>	1	Red Crossbill	<i>Loxia curvirostra</i>	2
Common Yellowthroat	<i>Geothlypis trichas</i>	2	Pine Siskin	<i>Carduelis pinus</i>	3
Wilson's Warbler	<i>Wilsonia pusilla</i>	1	Lesser Goldfinch	<i>Carduelis psaltria</i>	2
Western Tanager	<i>Piranga ludoviciana</i>	1	Evening Grosbeak	<i>Coccothraustes vespertinus</i>	2
Green-tailed Towhee	<i>Pipilo chlorurus</i>	3			

Confirmed Breeding - 1 Probable Breeding - 3 Possible Breeding - 2 No Evidence of Breeding, Migrant, Transient, or Disperser - 0 (see methods for further explanation of codes)

* observed only by Parker and Parker (2001), **observed only by IBP (Siegel and Wilkerson 2004), *** observed only by Parker and Parker (2001) outside of DEPO boundaries