Monitoring Breeding Birds on the MPG Ranch Floodplain & Birds'-eye View Education Program

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Annual Report

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EXECUTIVE SUMMARY

This report summarizes the results from the 2014 summer banding season on the northern floodplain at the MPG Ranch. This is our fourth year banding birds at the site. We began mist-netting efforts on 6 June and concluded 6 August with a total of seven banding events. We followed the MAPS (Monitoring Avian Productivity and Survivorship) protocol for all trapping, handling, and data collection. This season we captured 301 birds (290 in 2013, 280 in 2012, 376 in 2011), representing 33 species (39 species in 2013, 34 in 2012, 41 in 2011).

Among the three sites in our Birds'-eye View Education Program (BEVEP) banding program (including Rock Creek east of Missoula and Grant-Kohrs NHS in Deer Lodge), the MPG Ranch (MPGR) site on the northern floodplain once again supported the greatest species diversity (33 species) and accounted for the highest proportion of captures (55%). Our most frequently captured species, in order of greatest to least, were: House Wren, Gray Catbird, Yellow Warbler, Cedar Waxwing, and Red-naped Sapsucker. We also captured twelve species not captured at any of our other sites in western Montana. These species included: American Goldfinch, Black-chinned Hummingbird, Calliope Hummingbird, House Finch, Lazuli Bunting, Least Flycatcher, Northern Waterthrush, Orange-crowned Warbler, Rufous Hummingbird, Spotted Towhee, and Townsend's Warbler. Both species richness (number of different species) and the presence of unique species highlight the diverse habitat structure found on the MPG Ranch.

The season began with some difficulty. Flooding was extensive on the northern floodplain, making access to our nets challenging. A significant runoff event near the main banding station buried our stored equipment and changed the habitat at the bottom of the draw to a rocky alluvial fan. We observed changes in abundance of a few species, but we are uncertain if these changes are related to the flooding and/or habitat changes that occurred, or to other factors. Most strikingly, we observed dramatic increases in Red-naped Sapsucker, Willow Flycatcher, American Robin, and Song Sparrow.

Overall, over half of adult captures (68%) were in breeding condition and the sex ratio was biased toward females, differing from patterns observed in 2012 & 2013. We documented high productivity again this year, based on the ratio of adults to juveniles (31% hatch-year). We observed indications of earlier breeding in 2014 compared to other years.

We recaptured 24 individuals from previous seasons, most of which were Gray Catbirds (11). We also recaptured two House Wrens, two American Goldfinches, one Common Yellowthroat, one Spotted Towhee, one Northern Flicker, one Yellow Warbler, and one Western Wood-Pewee. Our overall recapture rate decreased to 26% in 2014 (30% in 2012, 35% in 2013).

Introduction

Young House Wren

Healthy riparian areas are critical for breeding birds in Montana. Conservation and restoration value of large, intact patches of riparian habitat, such as that found on the MPG Ranch, cannot be overstated. Our mist-netting and banding efforts supplement point count efforts conducted by MPG Ranch personnel by providing additional data on: species composition, reproductive condition, annual survival rates, and productivity.

The public outreach associated with this project highlights the commitment to conservation and the Bitterroot community. The MPG Ranch is one of three locations contributing to the Birds' Eye-View Education Program (BEVEP), where children and adults are invited to see birds, observe the data collection in the field, and learn about the importance of healthy riparian areas.

Methods

We operated seven bird-banding sessions approximately ten days apart (6 June, 16 June, 27 June, 9 July, 17 July, 24 July, and 6 August). We followed MAPS (Monitoring Avian Productivity and Survivorship) protocol for all trapping, handling, and data collection procedures (http://www.birdpop.org/).

Results and Discussion

SUMMARY OF CAPTURES

Summer mist-netting efforts for breeding birds began 6 June and ended 6 August, 2014. We captured a total of 301 birds, with 193 newly banded birds, 77 recaptures, and 31 unbanded birds (Appendix A). Our most productive days (defined as the greatest

number of captures in a session) were in the middle of the season (9 July) and on the last day of banding (6 Aug), with a total of 60 birds captured each session.

The 2014 breeding season showed both similarities and differences to previous years. The total number of birds captured at MPGR this season was slightly greater than total captures in the previous two years (Figure 1) (Appendix B). However, captures were lower than in 2011, during which we encountered a large late migration event in the early part of the season contributing significantly to our overall captures (Figure 1). We observed similar patterns in 2011, 2012, and 2013, with more captures the first banding session and fewer in the second banding session. This year, we observed the reverse pattern across the first and second banding sessions. Next, in three of four seasons of banding (including 2014), we see a dramatic increase in captures during the final session of the summer. This increase is most likely due to the increased number of young birds that fledge toward the end of the summer. Finally, during session six (24 July), we experienced the lowest number of captures at the station across all four years; on this day, we only operated the station for about three hours due to poor weather conditions. Typically, we open the station for six hours; however, three hours of mist-netting is sufficient to be considered a day's effort according to protocol. In previous years, we have rarely operated for less than six hours, creating a relatively standardized amount of effort per session and between years. With the exception of this day, we feel that comparing number of captures, rather than capture rates (# birds/amount of effort) is a valid comparison.

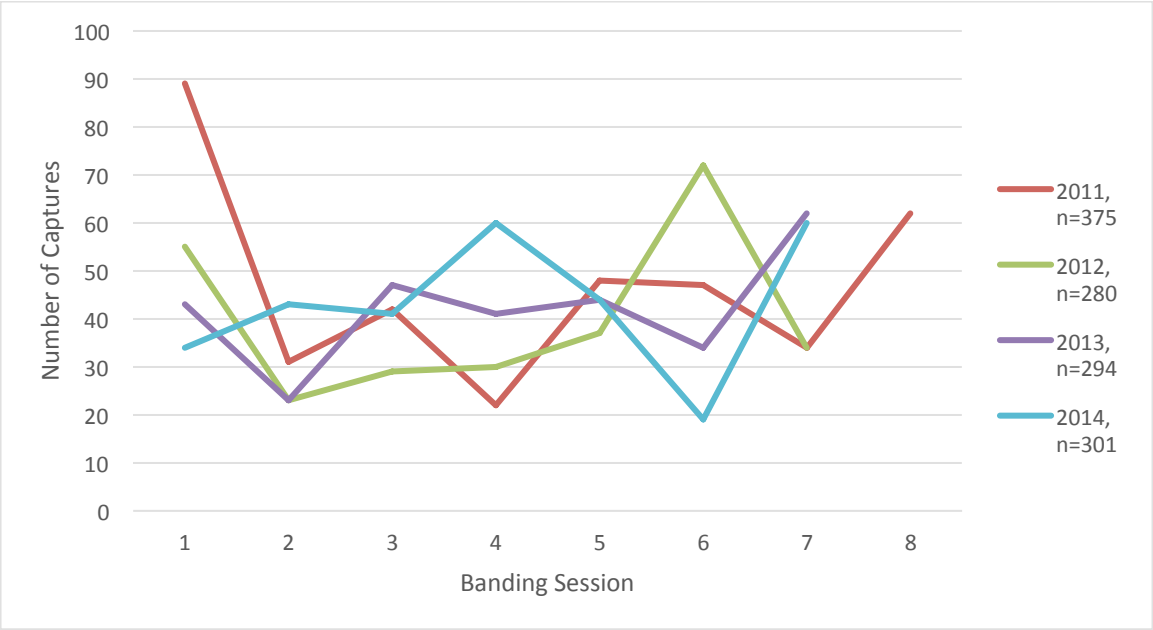

Figure 1. Number of birds captured at MPG Floodplain Banding Station from 2011-2014. Banding sessions relate to standard 10-day MAPS Periods.

Overall, the similarity in number of captures over the past four years (with the exception of the migration event in 2011) suggests that there were not any major changes in the avian or vegetative community on the floodplain. However, we did observe some small changes in species composition (presence/absence) and abundance (capture numbers of individual species) which could indicate micro-scale changes that affect a particular species or could simply be attributed to annual variation. In general, our most frequently captured species remained relatively similar to past years, with House Wrens, Gray Catbirds, Cedar Waxwings, and Yellow Warblers at the top of the list (Table 1). Conversely, several species that we captured frequently in the past were caught infrequently this year. American Goldfinches have been a top-10 capture for the last two years (17 individuals in 2013, 27 individuals in 2012), but in 2014 only five individuals were captured. Lazuli Buntings were a top capture in 2011 and 2012 (25 and 20 individuals, respectively) but numbers dropped in 2013 and remained low in 2014 (2 individuals in each season).

Black-chinned Hummingbird

Table 1. Top 10 species captured at MPGR during the 2014 breeding season and the number of captures for each species in 2011-13.

Species	Total # Captures 2014	Total # Captures 2013	Total # Captures 2012	Total # Captures 2011
House Wren	55	58	43	51
Gray Catbird	50	44	27	34
Yellow Warbler	41	31	40	42
Cedar Waxwing	20	34	18	49
Red-naped Sapsucker	15	4	6	3
Willow Flycatcher	14	1	9	4
American Robin	13	4	3	7
Calliope Hummingbird	11	9	11	4
Black-capped Chickadee	10	11	11	8
Song Sparrow	10	1	4	0

We saw dramatic increases in several species: Red-naped Sapsucker, Willow Flycatcher, American Robin, and Song Sparrow. We caught more Willow Flycatchers than in any previous breeding season. Willow Flycatchers were in the top 10 for 2012, but low numbers in 2013 kept them off the top 10 list for that year.

SPECIES RICHNESS

We captured 33 species in 2014. This is a lower species richness (defined as the number of different species) compared to previous years (39 species in 2013, 34 species in 2012, 41 species in 2011). High species richness in 2011 and 2013 were attributed to early-season captures of migratory and transient species.

MacGillivray's Warbler

We captured no fewer than 12 species in a banding session, with a median diversity of 13 species across the banding season. The first and last banding sessions (June 6th and August 6th) provided us with our most diverse species list with 15 and 16 species respectively. In the first session, we captured three species that were not captured during any other session, including: Brown-headed Cowbird, MacGillivray's Warbler, and Wilson's Warbler. On the final day of

banding, we captured five species that we captured during no other session including: American Redstart, Dusky Flycatcher, Least Flycatcher, Orange-crowned Warbler, and Rufous Hummingbird. This increase in species diversity toward the end of the season probably coincides with the timing of post-breeding dispersal, when birds leave breeding territories.

COMPARISON OF CAPTURES AND RICHNESS TO OTHER SITES

House Finch

In 2014, we ran 3 stations located throughout western Montana. The stations include MPG Ranch in Florence, Grant-Kohrs National Park in Deer Lodge, and Valley of the Moon at Rock Creek. In 2012 and 2013 we also operated a station at Mt. Haggin Wildlfe Management Area in Anaconda, MT. In 2014 FWP staff operated the station and will continue to run the site in future seasons. Because we are running fewer stations in 2014, we expect a correlated decrease in overall captures for the season. Across all stations we tallied 543 captures, compared to 773 captures in 2013, 817 in 2012, and 728 in 2011. MPGR was once again the most productive and diverse site in 2014, yielding 55% of all captures and 33 of 44 species encountered.

Similar to other years, in 2014 we captured several species at MPGR that we did not encounter at our other two sites. These species included: American Goldfinch, Black-chinned Hummingbird, Calliope Hummingbird, House Finch, Lazuli Bunting, Least Flycatcher, Northern Waterthrush, Orange-crowned Warbler, Rufous Hummingbird, Spotted Towhee, and Townsend's Warbler. This unique assemblage of species requires a variety of habitat niches and key vegetative components, including a cottonwood overstory, dry shrublands, wet shrublands, and open habitats. The overall species richness and the presence of unique species highlight the diverse habitats and structural elements on the floodplain relative to our other riparian sites in western Montana.

Orange-crowned Warbler

NET COMPARISONS

In a natural environment, disturbances are an expected influence; while only time will determine the effects of each disturbance event, there can be desirable results in terms of habitat restoration. MPGR has experienced flooding and prescribed fire treatments over the past three years. In 2011 and 2014, the floodplain experienced high water levels throughout the early summer months of May and June. The entire banding station experienced the effects of these flooding events with the most affected nets being 5, 6, 9, and 10 (see Figure 2 for net locations). Previous to the 2012 season, a prescribed fire treatment burned the area surrounding Nets 1, 2 and 3. We expect there is potential to be differences in number of captures by net in response to these disturbance events. While Net 1 has experienced a decrease in captures since the prescribed burn (Figure 3), Net 2 has experienced an overall increase in captures. Net 3 experienced a dip in captures following the burn, but in comparison to the 2012 numbers, captures have increased in 2013 and 2014. In 2011, our first season of station operation, we see the highest number of captures at all nets except Net 2. Unpublished data show significantly elevated capture rates in the first season of constant-effort mist-netting due to the fact that breeding birds can show strong site fidelity, and they learn where the nets are located and then avoid them (C.J. Ralph, pers. comm).

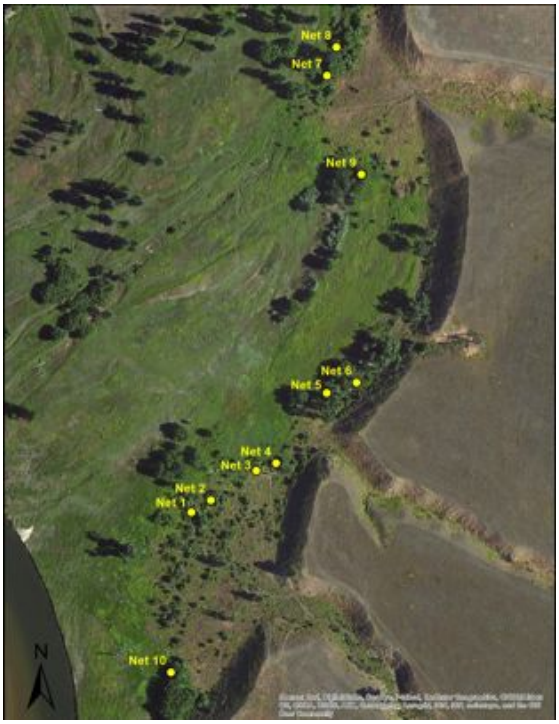

Figure 2. Map of net locations at the northern floodplain banding site (MPGR).

Therefore, it is difficult to say what the impact of flooding was in 2011, or if we experienced the natural "bump" in capture rates due to initiation of mist-netting efforts, or perhaps a combination of the two. However, in 2014 we can speak more definitively about the response to flooding; we find relatively no effect or a slight positive effect in terms of capture rates. Nets 6 and 9 show relatively little difference to the number of captures in the previous two years, but Nets 5 and 10 captured more birds than in 2012 and 2013. All of these observations are anecdotal and without sophisticated data analyses, we don't know the effect site-level habitat disturbances have on capture rates by net.

For total captures in 2014, Net 2 was our best-placed net – it is located within dense shrubs and most likely not visible to birds. Overall, the most productive nets were also the nets with the highest species richness (Nets 2, 3, and 8). While most nets captured relatively similar numbers to the previous three seasons, we saw a decrease in the number of captures at Net 1, and an increase in captures at Net 8.

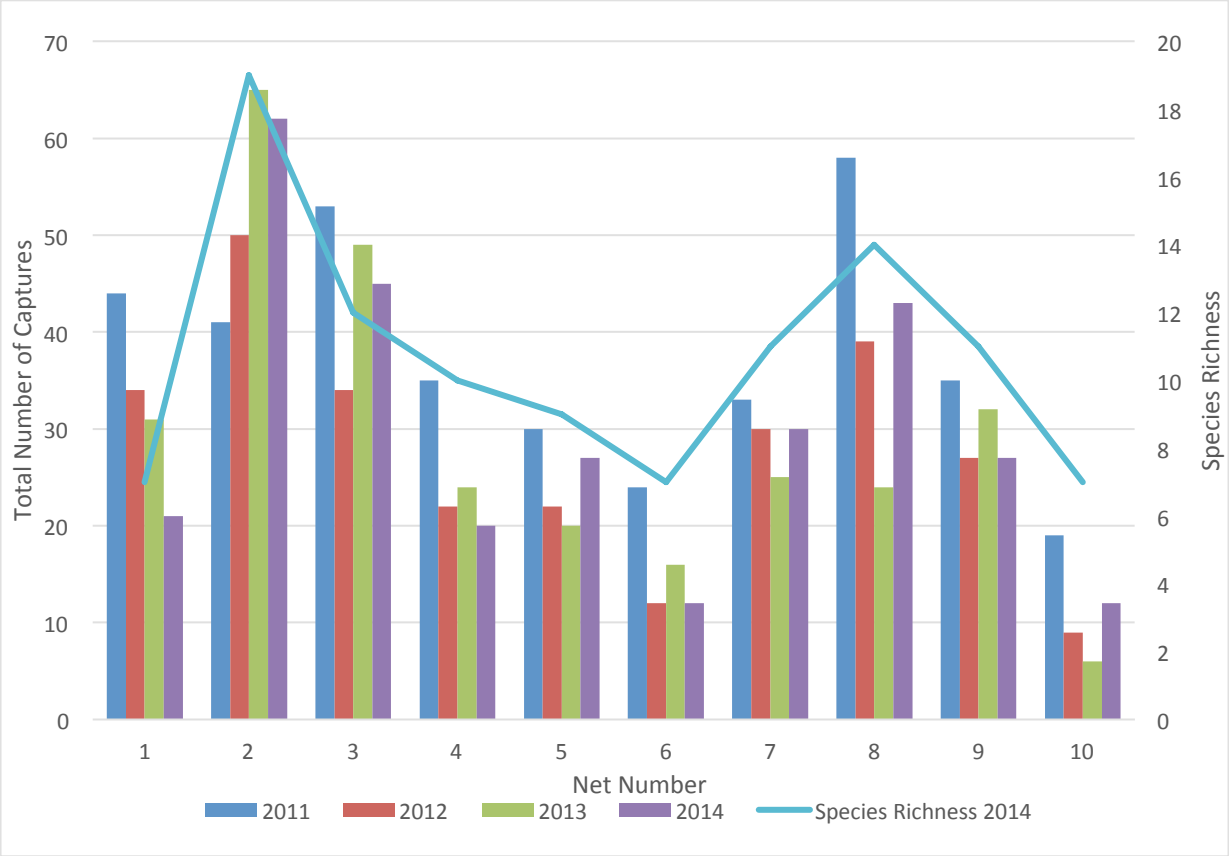

Figure 3. Number of birds captured in each net at MPGR in 2011-2014 (y-axis on left), with species richness for each net in 2014 (y-axis on right).

Sex Ratios, Breeding Condition, and Breeding Phenology

Many avian passerines exhibit sexual dimorphism, and the sex of the bird is easily determinable solely based on plumage characteristics, coloration, or measurements. However, males and females of some species (e.g. most sparrows) are similar in appearance and can only be sexed when they are in breeding condition; during this time, they develop distinctive physical breeding characteristics. The presence of a brood patch (BP) or cloacal protuberance (CP) helps to identify the sex of a bird, and because we categorically score CPs and BPs, it also aids in our understanding of breeding phenology. However, some birds are not in breeding condition when we capture them, and no other criteria exist to determine sex; these birds are listed as "Unknown" sex with no evidence of breeding. In 2014, we were able to determine the sex of 57% of our captures and we captured slightly more females than males (Table 2). In previous years, the male-female ratio was also close to equal, but it was slightly biased toward males. Of these birds that we could verify sex, 68% of captures were in breeding condition). This proportion was slightly higher in 2014 compared to previous years, with 84% of males and 75% of females showing evidence of breeding.

Table 2. Sex ratio of adult birds and breeding status in known-sex adult birds captured at MPGR during the 2011-2014 breeding seasons.

Number captured 2014		% in 2014	% in 2013	% in 2012	% in 2011
Males	78	27%	28%	34%	43%
Females	85	30%	23%	30%	35%
Unknown	121	43%	49%	36%	22%
Evidence of breeding[a] 2014		% in 2014	% in 2013	% in 2012	% in 2011
Males	66	84%	81%	76%	85%
Females	64	75%	70%	61%	50%
No evidence[b]	62	-	-	-	-

[a] Calculated as the proportion of known males with CP and/or BP and known females with BP

[b] No evidence represents the number of adult captures (i.e., excludes juveniles), n = 192

Regarding phenology of breeding condition in 2014, we found evidence of earlier breeding than in prior years, and this timing shift may have allowed birds to double brood. Previously, the majority of adult captures in the first banding period were not in breeding condition, whereas in 2014, we found nearly 90% of males and 70% of females in breeding condition during the first banding session (Figures 4, 5).

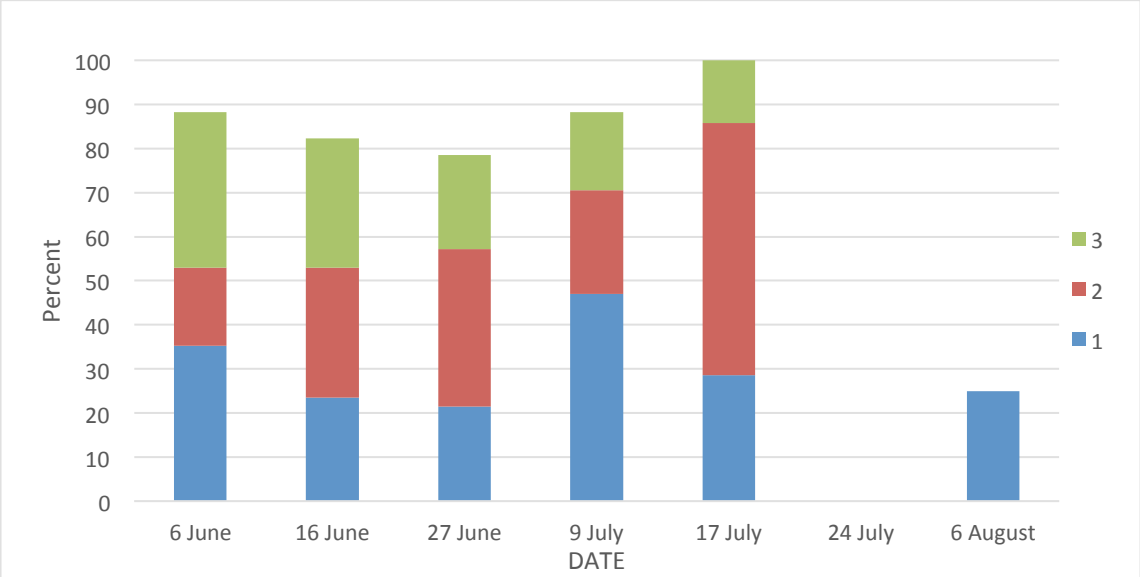

Figure 4. Percent of known adult male birds with the presence of a cloacal protuberance (CP) from June 6 – August 6, 2014. CP: 1=small, 2=medium, 3=large.

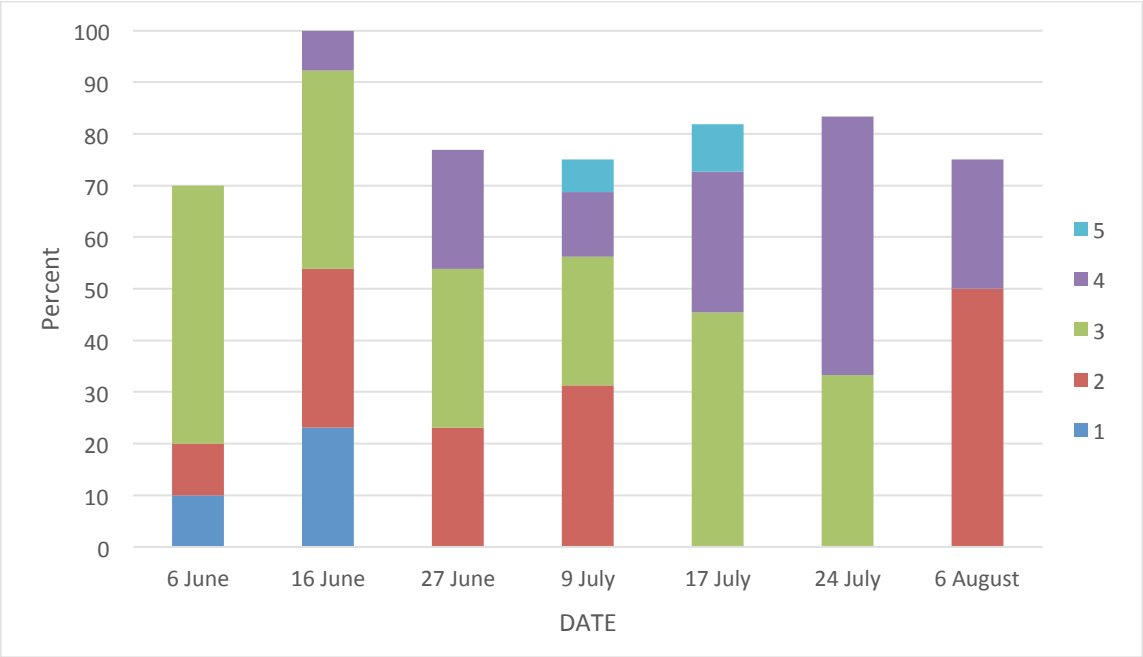

Figure 5. Percent of known adult female birds with the presence of a brood patch (BP) from June 6 – August 6, 2014. BP: 1=smooth, 2=vascularized, 3=heavily vascularized, 4=wrinkled, 5=molting.

Example of a "3" CP.
Photo: Vancouver Avian Research Centre

With adult males we generally regard a CP with a score of "3" to correspond with peak fertility. Typically, a cloacal protuberance of this size also corresponds with clutch initiation (Sax and Hoi 1998). At MPG Ranch in 2014, the greatest proportion of "3" CPs was on 6 June, at which time we also observed approximately 50% of females in breeding condition with a "3" brood patch (heavily vascularized).

Example of a "3" BP.
Photo: Portland Bird Observatory

The presence of a heavily vascularized brood patch suggests that females are incubating eggs and/or brooding nestlings. Later in the season, we found another peak breeding period for males; in mid-July, 100% of adult males had a CP score of "1" or higher (Figure 4). On 17 July, nearly half of females (45%) had "3" BPs, which aligned with the timing of the highest proportion of males in breeding condition (Figure 5).

This pattern suggests birds were breeding earlier in 2014 than in previous seasons. Based on the second peak in breeding evidence on 17 July, in addition to earlier breeding and clutch initiation observed early this summer, this potentially meant that species made a second nesting attempt (i.e., double brood). We can only hypothesize about the factors that influenced this phenology. Multiple sources have documented shifts toward earlier breeding caused by climate change (Both 2004, Brown 1999, Crick 2004), but the pattern we see could also be affected by annual variation in weather and/or availability of food resources. Earlier clutches are often beneficial because they tend to be larger and typically more successful (Martin 1987). In addition, earlier breeding may allow some individuals to double brood.

PRODUCTIVITY AND AGE-CLASS DISTRIBUTION

Of our 301 total captures, 31% were juvenile birds born this year (Table 3). As anticipated, the ratio of juvenile to adult birds captured increased toward the end of the season. We first encountered juvenile birds during the 2nd banding session on 16 June (Figure 6), approximately ten days earlier than our first juvenile captures in 2013, about two weeks earlier than in 2012, and about two and a half weeks earlier than in 2011. This supports our conclusion that birds were breeding earlier in 2014 than in previous seasons. Though our methods do not document productivity at individual nests, the

high number of juvenile birds towards the end of the season and the high percentage of juvenile capture rates over four years of sampling suggest that habitat on the floodplain provides the resources necessary for both successful breeding attempts and survival immediately after fledging.

Table 3. Proportions of captures of adult, juvenile, and unknown age birds.

	# captures in 2014	% in 2014	% in 2013	% in 2012	% in 2011
Adult	192	63.79%	67.0%	72.7%	78.49%
Juvenile	93	30.90%	28.3%	25.9%	19.89%
Unknown	16	5.32%	0.3%	1.4%	1.61%

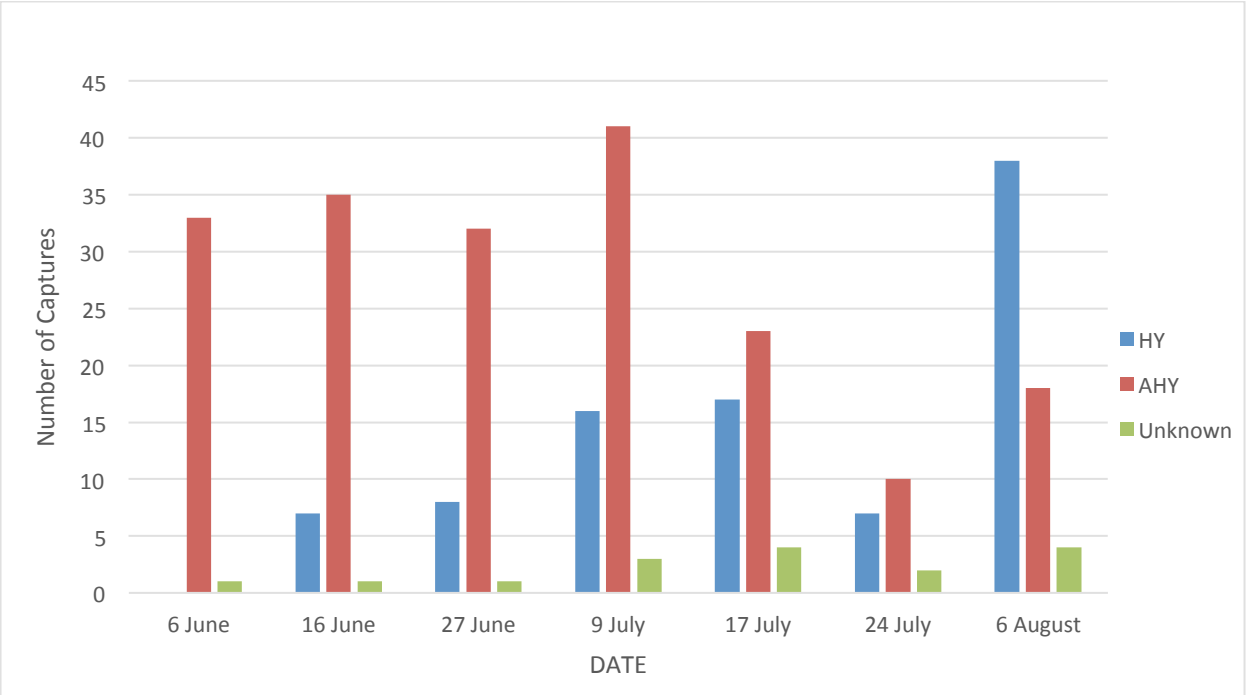

Figure 6. Age-class distribution of birds captured at MPGR from 6 June to 6 August 2014. HY= Hatch-year bird, AHY= After hatch-year bird.

We examined productivity for our four most commonly captured species since 2011 (minimum n=18 in any season): House Wren, Gray Catbird, Yellow Warbler, and Cedar Waxwing. We calculated a reproductive index value for each species by dividing the total number of young birds captured by the number of adult birds captured (Figure 7). Three of these species (House Wren, Gray Catbird, Yellow Warbler) show a high proportion of juveniles in their overall captures, suggesting that the floodplain provides

adequate nest sites and resources for breeding even though these species occupy different habitat niches. The remaining species, Cedar Waxwing, is an excellent example of the importance of integrating natural history knowledge into data analysis. Cedar Waxwings are late-season breeders, and rarely are hatch-year waxwings captured before mid-August. The reproductive index for Cedar Waxwing was zero in 2012 and 2014, and very close to zero in 2011 and 2013. However, many juveniles are captured during the fall season.

There is some annual variation for each species in terms of productivity, the most noticeable being the sharp decline in Yellow Warblers from 2011 to 2012 (Figure 7). Otherwise, the variation between years is fairly small.

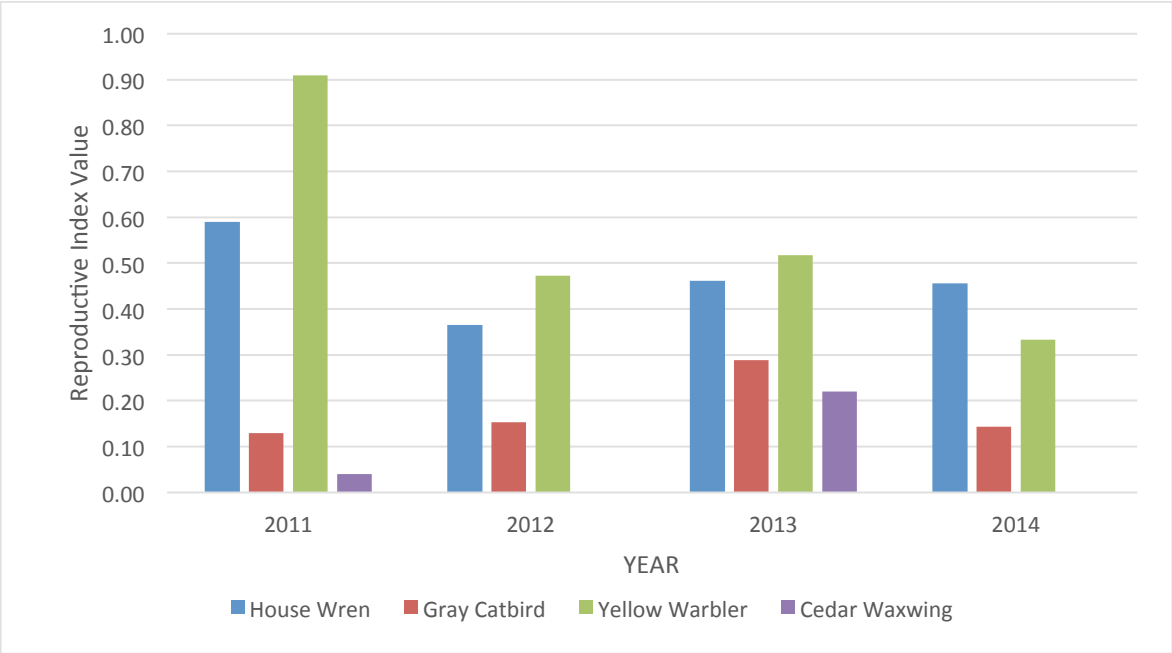

Figure 7. Reproductive Indices for Gray Catbirds, House Wrens, Yellow Warblers, & Cedar Waxwings from 2011-2014.

In 2009, the Institute for Bird Populations (IBP), which administers the MAPS demographic monitoring network, calculated reproductive indices for individual species across the continent, as well as by region, for the years 2004-2006 (DeSante 2009). Ideally, more recent estimates would provide better basis for comparison, but at the time of this writing, these were the most relevant results in the literature. Montana falls into the "Northwest" region, and the average reproductive index reported for all species in the Northwest region ranges from 0.528 to 0.549. This translates roughly to an age ratio of one juvenile bird to two adult birds captured. The average reproductive index for all species captured in 2014 at MPGR was 0.47, lower than the regional average. For individual species, there are some similarities and some differences between indices at

MPGR and Northwest regional data. For example, DeSante reports Yellow Warbler indices range from 0.37 to 0.46, similar to 0.33 to 0.52 at MPGR (aside from 2011 which is an outlier). Another similarity are the indices for Cedar Waxwings, whose IBP regional range is 0.03 to 0.05. Finally, the reproductive index for Gray Catbirds in the Northwest region of 0.23 to 0.34 with rates of 0.13 up to 0.28 at MPGR. While the values differ, there is overlap. In contrast, we observed index values for House Wrens at MPGR ranging from 0.37 to 0.59, whereas the regional values are significantly greater; indices for House Wrens in the Northwest range from 0.80 to 1.3. Because so much annual and geographic variation exists, we recommend continuing to examine these indices. In future years, we hope to use reproductive indices to provide an estimate of actual productivity, and this measure, along with survivorship estimates, can aid in our understanding of population demography and trends.

Recently hatched Yellow Warbler

Between-Season Recaptures

Of 301 total captures in 2014, 77 were recaptures. Of those 77 recaptures, 24 were originally captured and banded in previous seasons, for an annual recapture rate of approximately 8% (Table 4). This is a slightly higher rate than in 2013, when we observed an annual recapture rate of about 6%. Four of these birds were first captured in 2011, 7 in 2012, and 11 in 2013. The remaining two birds were banded in fall 2013. In order to calculate an annual survival rate from a naïve estimate of the rate of recapture, there are a number of factors to consider which are beyond the scope of this study at this time. These include calculating species-specific recapture probabilities, ensuring that capture events fall only within the breeding period to minimize capture of individuals not on a breeding territory, and careful consideration of the sampling intensity in both space and time. Researchers at the Institute of Bird Populations have designed the MAPS Program survey protocol with these issues in mind, but rely on a large sample of stations with a minimum of five years of data in order to derive a robust estimate of annual

Recaptured Yellow Warbler

survival from recapture rates. These seasons represent the earliest data points in a long-term monitoring effort. In the future, we plan to study and calculate annual survivorship based on recapture rates. However, we have not gathered the minimum data requirement of five years necessary for such estimates. We can, however, examine our recapture data to look for interesting patterns.

Table 4. Birds recaptured in 2014 which were originally captured in previous years.

Species	# Recaptured	Original Capture Date (# Individuals)
Gray Catbird	11	1 Jun 2011 (2), 11 Jul 2011, 4 Jun 2012 (2), 18 Jul 2012, 12 Sept 2012, 10 Jul 2013 19 Jul 2013, 8 Aug 2013 (2)
House Wren	4	4 Jun 2012, 3 Jun 2013(2), 26 Jul 2013
American Goldfinch	2	11 Aug 2011, 15 Aug 2012
Common Yellowthroat	1	26 Jun 2013
Spotted Towhee	1	12 Sept 2013
Northern Flicker	1	6 Sept 2012
Yellow Warbler	3	23 Jun 2012, 10 Jul 2013, 19 Jul 2013
Western Wood-Pewee	1	18 Jul 2012
Total	**24**	

First, Gray Catbirds were the most commonly recaptured species, with a recapture rate of 64%. This dramatically higher rate than in previous two years (24% and 32%, respectively) was due to increased efforts to capture Gray Catbirds by Sharon Fuller and her team. They target-netted and banded 15 Gray Catbirds at the floodplain independently of the constant-effort mist-netting sessions. When we exclude these 15 birds, the recapture rate is ~34%, which aligns more closely with historical numbers.

Recaptured Gray Catbird with color bands

Second, we recaptured slightly more House Wrens in 2014 than 2013. This trend is encouraging, assuaging apprehensions about the lack of House Wren recaptures in 2012. House wrens have been confirmed breeders at the site since 2011, with the banding crew observing multiple active nest cavities, as well as adults carrying food to nestlings and fledglings. The lack of recaptured House Wrens in past seasons was somewhat alarming since we

have been aware of this relatively large breeding population near our net locations over multiple seasons. In addition, we expected their probability of recapture to be high given their behavior of darting about low in the understory. Therefore, the lack of between-season recaptures created concerns that our banding efforts may be having detrimental effects on the House Wren population or that there are unknown conservation concerns on their wintering grounds or during stopover. We are happy to report that in 2014 we recaptured 4 House Wrens (8.3% recaptures) from prior seasons. This is a slight increase from 7.5% in 2013. While the rate is still somewhat low, these captures provide a preliminary sense of relief where bird safety and survivorship is concerned. In future seasons, we will continue to closely monitor the captures of House Wrens in order to learn more about their survivorship, site fidelity, and response to banding efforts. As an interesting side note, one of this year's recaptured House Wrens has been captured nine times since its initial capture in June 2012, more than any other bird at the site. In 2012, the bird was captured in nets 1, 4, and 6. In 2013 and 2014, this bird was caught in nets 5 and 6. Given our initial concerns about the species at this site, it is encouraging to see this instance of site fidelity for this individual. If there are House Wrens returning to their natal areas, they may be establishing territories outside the purview of our net lanes, crowded out by older individuals with established territories.

House Wrens

Finally, between-season recaptures provide fascinating information on longevity and fidelity that are otherwise unattainable. For example, of the 11 birds captured this year that were initially banded in 2013, four were born last year. For birds caught this year that were originally banded in 2012, all were at least one year old at the time of their initial capture. The four birds recaptured this year that were originally banded in 2011 were also at least one

After-Third Year Downy Woodpecker

year old at the time of their initial banding. Three of the four birds were Gray Catbirds that were at least two years old when first banded. While we are unable to determine the exact age of these birds, we *can* say that they are at least their fifth year of life. According to the Bird Banding Lab/USGS Pautuxent Research Center, the longevity record for Gray Catbirds is nearly 18 years, but the average life expectancy of most neotropical migratory songbirds is just a few years (Terres 1995). It is encouraging to see birds returning year-to-year, especially birds like our 2013 hatch year birds that were likely born in the area.

Outreach & Education

Riparian areas within the Bitterroot Valley and other river ways serve as an invaluable outdoor laboratory, where citizens within the basin can observe and learn about the ecological processes and benefits of riparian areas and the bird communities that inhabit them. The bird banding station at the MPG Ranch is part of a larger Bird's Eye-View Education Program which provides a window through which children and adults can observe the value of riparian areas and the importance of them for maintaining healthy bird populations. We had a total of 45 visitors to the MPG Ranch station throughout the breeding season, including groups from Ecology Project International and Youth Conservation Corps from the Watershed Education Network, as well as MPG Ranch Staff & private guests.

Future Directions

Since the inception of constant-effort mist netting at MPG Ranch in 2011, we have captured a total of 1,247 birds of 51 species. It is with great enthusiasm that we hope to continue collecting data on breeding birds to add to our long-term data set. With each passing year, we've strengthened our ability to look for meaningful patterns in annual productivity, age and sex ratios, relative abundance for different species, etc. There is

Male Bullock's Oriole

value in the breeding season data we collect for the MAPS program with each successive year, as well as potential for pooling with other MAPS stations in Montana to investigate breeding, productivity, survival and phenological patterns.

With the operation of the banding station in 2015, we will have five years of data at the MPG Ranch floodplain site. We hope to secure funding to conduct important data analyses using our mark-recapture data, including survival estimates, productivity, and population trends. The Avian Science Center is networked in and among graduate students, post-doctoral scholars, and professionals, all of whom we can draw from for advice on our approach with the data analyses.

We hope to continue to use the Bird's Eye-View Education program to bring guests to the MPG Ranch, as we strongly believe that education and outreach about birds and their important place on the landscape, along with the need for healthy riparian areas and knowledgeable management decisions, must be communicated to the public in a fun environment. Our UM student interns also gain experience through assisting in our banding program, and take with them skills into the professional world after they graduate. The Ranch has been open to hosting and bringing groups and students and we hope to continue to use banding as a forum for education and outreach.

Townsend's Warbler

The MPG Ranch is a large unpopulated stretch of land located near a major river system and in an Important Bird Area (as designated by Montana Audubon). The Ranch is also located along an important migratory corridor. More specific to the site level, the northern floodplain along the Bitterroot River is a great example of a place with high species diversity and high overall captures, and is an important place for us to continue conducting the kinds of research that we believe can inform landowners and agencies. In the future, we will continue to investigate the bird communities that are present on the Ranch to help explain the influence from habitat diversity and effects of the restoration the Ranch has completed. Additionally, we want to continue to foster open communication with the staff at the Ranch to cultivate new research ideas and we welcome any suggestions to the existing programs we implement.

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Appendix A. Total number of birds captured (by species) at MPGR floodplain site in 2014, with totals for Newly banded, Recaptured, and Unbanded birds.

Common Name	New	Recaptures	Unbanded	Total
American Goldfinch	3	2	0	5
American Redstart	1	0	0	1
American Robin	12	1	0	13
Black-capped Chickadee	10	0	0	10
Black-chinned Hummingbird	0	0	4	4
Brown-headed Cowbird	3	0	0	3
Black-headed Grosbeak	5	1	0	6
Calliope Hummingbird	0	0	11	11
Cedar Waxwing	20	0	0	20
Common Yellowthroat	2	2	0	4
Downy Woodpecker	3	1	0	4
Dusky Flycatcher	2	0	0	2
European Starling	2	0	0	2
Gray Catbird	17	32	1	50
House Finch	5	0	0	5
House Wren	35	12	8	55
Lazuli Bunting	2	0	0	2
Least Flycatcher	1	0	0	1
MacGillivray's Warbler	2	0	0	2
Northern Waterthrush	1	0	0	1
Orange-crowned Warbler	1	0	0	1
Red-naped Sapsucker	11	3	1	15
Red-shafted Flicker	0	1	0	1
Rufous Hummingbird	0	0	1	1
Red-winged Blackbird	1	0	1	2
Song Sparrow	9	0	1	10
Spotted Towhee	0	2	0	2
Townsend's Warbler	1	0	0	1
Unknown hummingbird spp.	0	0	3	3
Warbling Vireo	2	0	0	2
Western Wood-Pewee	5	1	0	6
Willow Flycatcher	8	6	0	14
Wilson's Warbler	1	0	0	1
Yellow Warbler	28	13	0	41
Grand Total	**193**	**77**	**31**	**301**

Appendix B. Total number of birds captured at MPGR Floodplain site, by species, from 2011-2014.

Common Name	Total # Captures (MPGR 2014)	Total # Captures (MPGR 2013)	Total # Captures (MPGR 2012)	Total # Captures (MPGR 2011)
American Goldfinch	5	17	27	6
American Redstart	1	0	1	0
American Robin	13	6	3	7
Audubon's (Yellow-rumped) Warbler	0	0	0	17
Black-capped Chickadee	10	11	11	8
Black-chinned Hummingbird	4	2	1	1
Black-headed Grosbeak	6	8	5	13
Brown-headed Cowbird	3	1	3	2
Bullock's Oriole	0	6	6	10
Calliope Hummingbird	11	9	11	4
Cassin's Vireo	0	0	1	0
Cedar Waxwing	20	34	18	49
Chipping Sparrow	0	2	1	9
Common Yellowthroat	4	4	0	1
Cooper's Hawk	0	1	0	0
Cordilleran Flycatcher	0	0	0	0
Downy Woodpecker	4	3	2	7
Dusky Flycatcher	2	1	1	5
Eastern Kingbird	0	2	2	0
European Starling	2	1	1	0
Gray Catbird	50	44	27	34
Hairy Woodpecker	0	0	1	1
Hermit Thrush	0	1	0	4
House Finch	5	4	2	0
House Wren	55	58	43	51
Lazuli Bunting	2	2	20	25
Least Flycatcher	1	0	3	0
MacGillivray's Warbler	2	9	7	20
Nashville Warbler	0	1	0	2
Northern Waterthrush	1	0	0	0
Orange-crowned Warbler	1	1	0	2
Pine Siskin	0	0	0	1
Red-breasted Nuthatch	0	0	1	0
Red-naped Sapsucker	15	4	6	3
Red-shafted Flicker	1	4	0	1
Red-winged Blackbird	2	0	0	2

Common Name	Total # Captures (MPGR 2014)	Total # Captures (MPGR 2013)	Total # Captures (MPGR 2012)	Total # Captures (MPGR 2011)
Ruby-crowned Kinglet	0	0	0	1
Rufous Hummingbird	1	0	2	0
Song Sparrow	10	1	4	0
Spotted Towhee	2	3	3	7
Swainson's Thrush	0	4	2	8
Yellow-breasted Chat	0	0	0	5
Townsend's Warbler	1	0	0	2
Tree Swallow	0	0	0	2
Unknown Empidonax Flycatcher	0	0	0	2
Unknown Finch spp.	0	2	0	0
Unknown Hummingbird spp.	3	1	0	0
Vesper Sparrow	0	1	6	2
Warbling Vireo	2	1	0	2
Western Tanager	0	1	0	3
Western Wood-Pewee	6	5	7	3
White-crowned Sparrow	0	0	0	1
Willow Flycatcher	14	1	9	4
Wilson's Warbler	1	3	3	7
Yellow Warbler	41	31	40	42
Total	**301**	**290**	**280**	**376**