



FIELD REPORT

Marketing title:

Songbirds of the Rocky Mountains

PI Names:

L. Embere Hall; Dr. Dale J Gentry

Country:

USA

Research site / region:

Jackson Hole, Wyoming

Date field report completed:

17 Dec 2010

Period covered:

4 Jun 2010 to 7 Aug 2010

Report completed by:

Embere Hall, Milu Karp and Jennifer McCabe

Dear Earthwatch Volunteers,

Thank you for joining us in the field on the Songbirds of the Rocky Mountains project! We enjoyed meeting you and could not have completed the season without your dedication to our research.

Thirty-six Earthwatch volunteers participated in our project this season, braving early mornings, field lunches, hours in rubber boots and sometimes snow. Collectively volunteers spent 950 hours in the field. In other words, you completed the equivalent of 6 months of field work in 38 field days. During your field time you located and monitored 108 nests of 4 species. Staff and volunteers also resighted 56 individual birds belonging to 5 different species. Yellow warblers were the most commonly resighted species (38) followed by Song sparrows (14) and Black-headed Grosbeaks (4). This season's resight data will be combined with 2008 and 2009 data to develop improved species-specific population models. These models will help researchers better understand long term population trends in the Jackson area and will highlight habitat conditions that may limit songbird populations.

Preliminary data analyses suggest lower nest success in sites surrounded by human development. This trend may be a result of increased nest predation or reduced habitat quality near development. Subsequent analysis of the nest predator community will help us to better understand these patterns. We caught a greater number of aspen obligate birds/net hour at the banding stations this season, relative to the past several years. This shift corresponds with region-wide improvements in the amount of aspen on the landscape and is valuable information for local land managers, developers and conservationists. Our least developed site located in Grand Teton National Park (Blacktail Ponds) was the most productive of all of the sites (ratio of hatch-year birds (HY) to after hatch-year birds (AHY)).

We continue to share our findings with local, regional and national audiences. This season Conservation Research Center (CRC) staff educated 485 students at the banding stations. In November, Embere Hall presented project results at two conferences: the annual Wildlife Society conference and the Wyoming Wildlife Society chapter conference. We also began a new partnership with a local citizen-science effort focused on documenting and maintaining viable wildlife populations in the Jackson area - including birds!

On a personal note, Milu Karp stayed on staff through the end of November to support our pika research efforts. Dale Gentry accepted a position as a professor of Biology at Northwestern College. Tshering Dema completed the Teton Science Schools' graduate program in August and continued her studies at the University of Wyoming. Jenny McCabe has begun her graduate studies at the University of Maine, and will be returning next summer to continue her work here at the Conservation Research Center. As for myself, I am looking forward to winter research projects and to an outstanding collaboration with Earthwatch in 2011. Thank you for the incredible contributions that you made to our research. You made our project possible.

Sincerely,

Embere Hall
Lead Earthwatch Scientist

SECTION ONE

Top highlight from the past field season

Preliminary analyses indicate that human development may reduce nest survival, though the mechanism responsible for decreased nest survival is not clear. Analysis of the 2008-2010 nesting data, combined, shows a strong inverse relationship between songbird productivity and housing development. While songbirds breed in sites surrounded by development, the likelihood of fledging young is reduced relative to sites in less disturbed landscapes. Nest survival probabilities are significantly higher in sites surrounded by fewer houses/ha. The 2010 data considered independently of the previous two years, however, show a different trend (Fig. 1). In 2010, nest survival rates were highest in two areas: the most- developed site (Karns Meadow) and the least developed sites (Blacktail Ponds). We hypothesize that changes in weather patterns during the spring and summer of 2010 may have contributed to this fluctuation. Data collected during 2011 will help to clarify patterns in success.

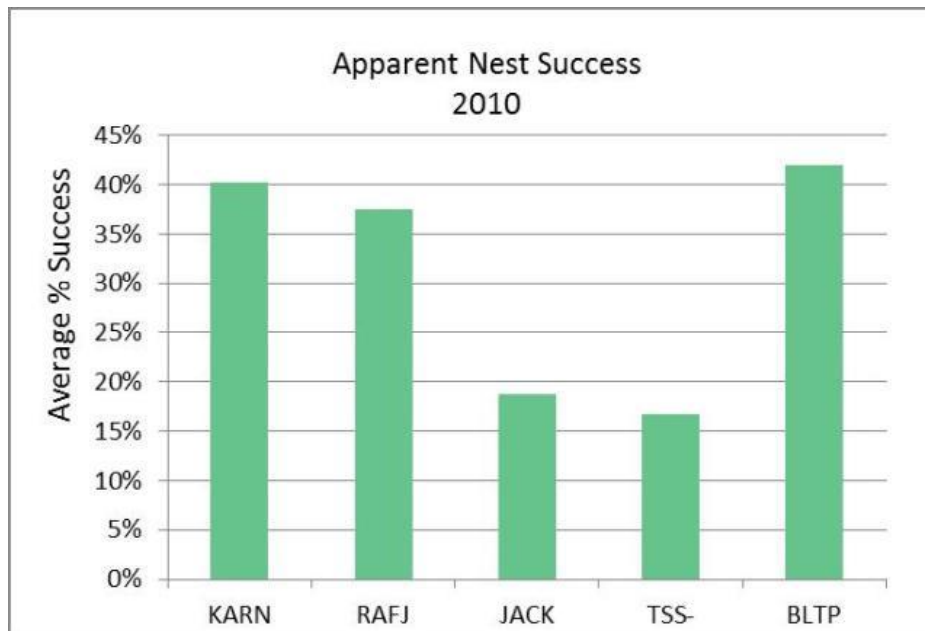


Figure 1: Estimated nest survival for four focal species examined during the 2010 field season. Focal species included American robin, Black-headed grosbeak, Song sparrow, and Yellow warbler

Non-technical overview of results

Constant-effort Mist Netting: We continued our work on long-term avian survivorship patterns during the 2010 summer field season. Consistent with previous years, we operated all stations in cooperation with the Institute for Bird Populations' (IBP) Monitoring Avian Productivity and Survivorship (MAPS) program. We added another season of data to our newest site to enhance sample sizes and to increase the rigor of our study. The site, Rafter J (RAFJ), is located in a housing development south of the town of Jackson, Wyoming. We are one year closer to our MAPS requirements at this particular site (the MAPS program is a continent-wide demographic monitoring program: www.birdpop.org). We captured 1,562 birds from over 58 different species at five sites from June 1st - August 18th 2010. Most commonly captured birds include Yellow warbler (*Dendroica petechia*; 360), Western Tanager (*Piranga ludoviciana*; 126), American robin (*Turdus migratorius*; 106), Song sparrow (*Melospiza melodia*; 72), and Cedar Waxwing (*Bombycilla cedrorum*; 64) (Table 1, Figure 2). Approximately 32% of birds captured had been previously captured. Productivity estimates (ratio of hatch-year: after hatch-year captures) from 1998-2010 indicate variability in population trends for all birds captured as well as our focal riparian-nesting species. Our banding data does not show a strong relationship between productivity and housing development. In addition, volunteers' nesting data has helped us to better understand both within and between season variability in productivity estimates.

BANDED BIRDS			
Site	New	Recaptured	Resighted
KARN	429	98	69
RAFJ	245	70	51
JACK	230	113	55
TSS-	217	86	23
BLTP	433	124	78

Table 1: Total number of birds banded and resighted at each study site during the 2010 field season.

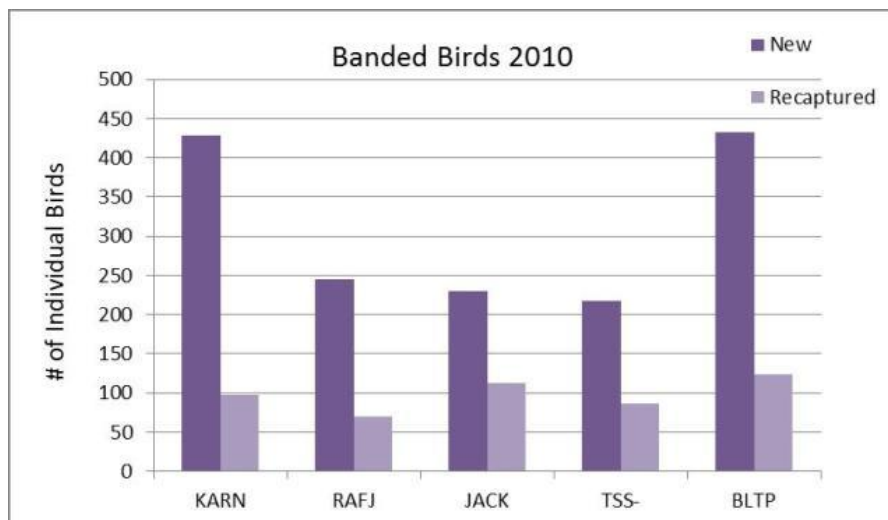


Figure 2: Total number of birds banded during the 2010 field season in Jackson Hole, Wyoming.

Color-band Resighting: This season we focused our color-band resighting on three riparian species; Black-headed grosbeak (*Pheucticus melanocephalus*; 4 resighted), Song sparrow (14 resighted) and Yellow warbler (38 resighted). Resighting data from 2010 will be combined with data collected in 2011 to improve population models for target species.

Nest Survival: Volunteers and staff located and monitored songbird nests on five sites from June 4 - August 7, 2010. Sites were arranged along a gradient of exurban housing densities, with two sites representing a low-development landscape, one site representing moderate development, and two sites representing high-density development. Staff and volunteers found 107 active nests of 4 different species. The most abundant nesting species were Yellow warblers (48), followed by American robins (43), Black-headed grosbeaks (13) and Song sparrows (3).

Overall nest survival in 2010 was 24%. A nest was considered successful if at least one nestling fledged. We were able to determine fates for 91 of the 107 nests sampled. Preliminary analyses indicated that human development may reduce nest survival; however, the mechanism responsible for decreased nest survival is not clear. Analysis of the 2008, 2009, and 2010 nesting data showed a strong inverse relationship between productivity and housing development. In 2008 and 2009, less developed sites showed higher success rates (TSS- and BLTP). This year the more developed sites, KARN and RAFJ, showed higher apparent nest survival rates, with the exception of BLTP (which had the highest success rate of all sites). Moderately developed sites, TSS- and JACK, showed lowest estimated nest survival (Fig. 3). This trend is a departure from the previous two years' data. The success at BLTP indicates that while songbirds breed in sites surrounded by development, the likelihood of fledging young is reduced relative to sites in less disturbed landscapes. Explanations for this year's success at a site like KARN could speak to dramatically different weather variables this year.

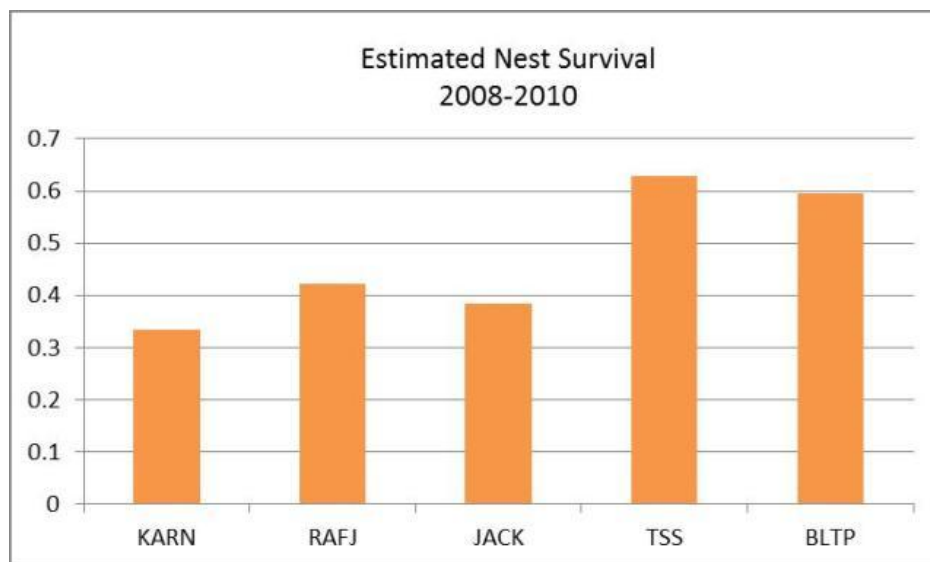


Figure 3: Estimated nest survival for 5 study sites 2008-2010, Jackson Hole, Wyoming. Species include American robin, Black-headed grosbeak, Song sparrow, and Yellow warbler

Acknowledgements: We thank Grand Teton National Park, Jackson Hole Land Trust, Rafter J Homeowner's Association and the Teton County Parks and Recreation Department for allowing us to study birds within their administrative boundaries. We also acknowledge the Wyoming Game and Fish Department and the US Geological Survey for permitting our research. Field staff contributions to this project cannot be overstated. Special thanks to Milu Karp, Colleen Borque, Danner Bradshaw, Jeff Roelke, and Sarah Walker.

SECTION TWO: TECHNICAL REPORT

REPORTING AGAINST RESEARCH OBJECTIVES

Objective 1: Population Demographic: Survivorship

Progress toward/against Objective 1:

Constant-effort Mist Netting: We continued our work on long-term avian survivorship patterns during the 2010 summer field season. Consistent with previous years, we operated all five stations in cooperation with the Institute for Bird Populations' (IBP) Monitoring Avian Productivity and Survivorship (MAPS) program (Fig. 4). This season we added another year of data to our newest site. The site, Rafter J (RAFJ), is located in a housing development south of the town of Jackson, Wyoming. The site was added to enhance sample sizes and to increase the rigor of our study. We operated mist nets on either side of a creek running through a willow riparian community surrounded by homes.

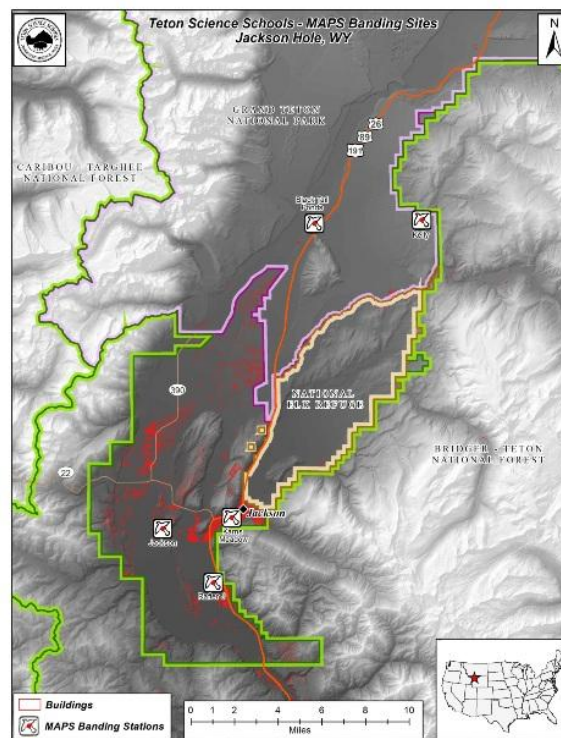


Figure 4: Study area and location of 5 research sites in Jackson Hole, Wyoming. Sites are marked with a bird image. Buildings appear as digitized red polygons.

We captured 1,562 birds from over 58 different species at five sites from June 1st - August 18th 2010. Most common captured birds include Yellow warbler (*Dendroica petechia*; 360), Western Tanager (*Piranga ludoviciana*; 126), American robin (*Turdus migratorius*; 106), Song sparrow (*Melospiza melodia*; 72), and Cedar Waxwing (*Bombycilla cedrorum*; 64; Table 1). Approximately 32% of birds captured had been previously captured.

Capture rates (number of adult birds captured/net hour) in 2010 were similar to previous years. Effort for all sites combined was 2,902 net hours.

Color-band Resighting: This season we focused our color-band resighting on three riparian species; Black-headed grosbeak (*Pheucticus melanocephalus*; 4 resighted), Song sparrow (14 resighted) and Yellow warbler (38 resighted). Throughout the field season staff and project volunteers recorded 277 resights of 154 individual birds (Table 1). During the 2010 field season, staff and volunteers spent 86 hours resighting color-banded birds. We calculated maximum-likelihood estimates and standard errors for annual adult apparent survival probabilities and recapture probabilities for all species captured at our Teton Science School site. The population estimates were calculated using Program MARK. These data are preliminary; more time will be spent this winter on population trend analyses that include data from all sites as well as species-specific models.

Objective 2: Population Demographic: Productivity and Recruitment

Progress toward/against Objective 2:

Constant-effort Mist Netting: Productivity (ratio of hatch-year: after hatch-year captures) estimates from 1998-2010 indicate variability in population trends for all birds captured as well as our focal riparian-nesting species. Our banding data do not show a strong relationship between productivity and housing development. Volunteers' nesting data has helped us to better understand both within and between season variability in productivity estimates. KARN, our highest housing density site, showed an increased productivity over the lower developed sites, BLTP and TSS-. Blacktail Ponds, the least developed site, had the highest productivity when all species captured were pooled (Fig. 5).

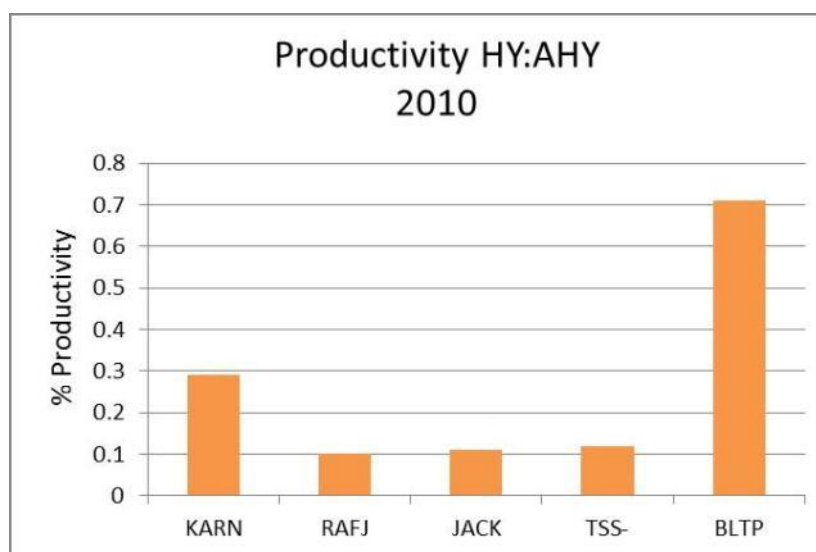


Figure 5: Songbird productivity estimates (HY:AHY) at 5 study sites during the 2010 field season in Jackson Hole, Wyoming.

Nest Survival: Volunteers and staff located and monitored songbird nests on five sites from June 4 - August 6, 2010. Sites were arranged along a gradient of exurban housing density, with two sites representing a low-development landscape, one site representing moderate development, and two sites representing high-density development. Staff and volunteers found 107 active nests of 4 species during the 2010 nesting season. The most abundant nesting species were Yellow warblers (38), followed by American robins (36) and Black-headed grosbeaks (10). Overall nest survival in 2010 was 24%, a 28% decrease from the previous year. A nest was considered successful if at least one nestling fledged. We were able to determine fates for 86 of the 107 nests sampled.

Preliminary analyses indicate that human development may reduce nest survival, though the mechanism responsible for decreased nest survival is not clear. Analysis of the 2008-2010 nesting data, combined, showed an inverse relationship between productivity and housing development. Although in the past two years less developed sites showed higher success rates, in 2010 more developed sites, KARN and RAFJ, showed higher apparent nest survival rates, with the exception of BLTP (which had the highest success rate of all sites). Our less developed sites, TSS- and JACK, showed lower nest survival this season (Fig. 3). This trend is a departure from the previous two years of data. The success at BLTP indicates that while songbirds breed in sites surrounded by development, the likelihood of fledging young is reduced relative to sites in less disturbed landscapes. Possible explanations for the 2010 nest success patterns include notably cooler and wetter weather conditions during the start of the nesting season (Fig. 6).

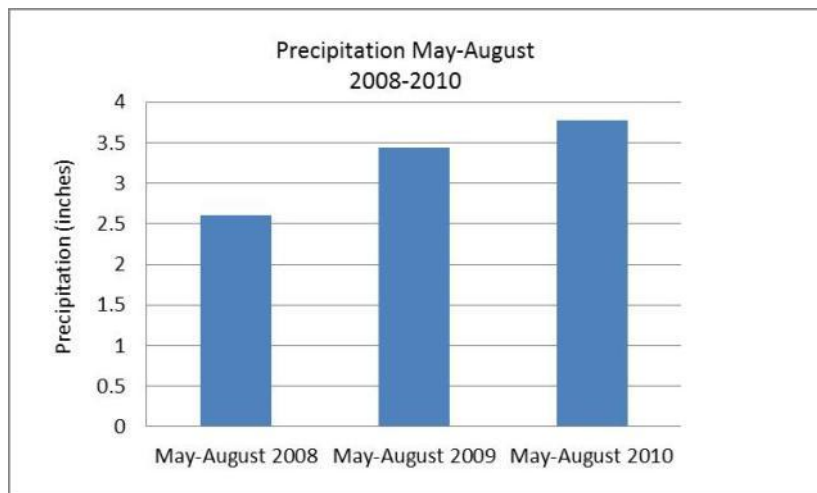


Figure 6: May - August precipitation 2008-2010, recorded in the NW region of Wyoming (www.noaa.gov).

The overall trend indicates that, while songbirds breed in sites surrounded by development, the likelihood of fledging young is reduced relative to sites in less disturbed landscapes. During winter 2010-2011 we will develop more advanced nest survival models that include time-specific covariates.

Objective 3: Habitat Use Patterns

Progress toward/against Objective 3:

During the 2010 season, staff and volunteers quantified nest vegetation to better understand connections between vegetation structure and composition and nesting locations. The vegetation data included multiple variables (nest height from ground, distance from vegetation edge, and proximity of nest shrub to surrounding vegetation).

Color band resighting - territory mapping: Staff attempted to map territories of banded birds early in the season. The difficulties associated with resighting color-banded birds, and the time needed to complete other field activities precluded meaningful progress on this sub-objective. During the field season we re-sighted 56 individuals (38 Yellow warblers, 14 Song sparrows, 4 Black-headed grosbeaks) that were not also recaptured. Despite prioritizing this sub-objective during the 2010 season, we were unable to generate sufficient data to support our research hypotheses. During our 2011 project renewal process, we will revisit this sub-objective to determine whether or not we can realistically accomplish these tasks without impinging on the data collection efforts for other aspects of the research.

Habitat quality: Volunteers and staff quantified vegetation structure and composition at each active-nest location (n = 107), and at 10 random points on each site. Staff also completed habitat structure analyses at four bird-banding stations. These data will be used to evaluate habitat quality at each site. They will also be incorporated in more in-depth nest survival analyses that examine the effects of vegetation structure on the likelihood of nest success during 2011.

Objective 4: Exurban development parameters and abiotic stressors

Progress toward/against Objective 4:

Abiotic stressors: We compiled temperature and precipitation data from regional data archives maintained by the National Oceanic and Atmospheric Administration: Satellite and Information Center (<http://www.ncdc.noaa.gov>). Using data collected in the northwest region of Wyoming, we were able to identify trends during the spring and summer climate for the past three years (2008-2010; Table 2). During the beginning of the 2010 nesting season, increased precipitation and cooler temperatures predominated which may have contributed to the unusual nest survival trends we observed relative to the 2008-2009 seasons.

PRECIP. (in)	May	June	July	August
2008	1.54	1.26	0.27	1.07
2009	2.24	2.09	0.43	0.92
2010	2.82	2.84	0.37	0.56
TEMPERATURE (F)	May	June	July	August
2008	53.3	58.3	67.3	66.1
2009	54	60.5	68.7	66.4
2010	49	58.2	66.2	64.8

Table 2: Temperature and precipitation measurements May-August 2008-2010 recorded in the NW region of Wyoming (www.noaa.gov).

Objective 5: Promote responsible stewardship and natural resource management through educating local, national, and international groups about avian population ecology and associated monitoring methods

Progress toward/against Objective 5:

Conservation Research Center staff continued to teach about avian natural history, population sampling and conservation through hands-on bird banding demonstrations starting the 1st of June and ending the 18th of August, 2010.

During the 2010 bird banding season we educated 485 participants at two educational sites. Our education programs engage groups of all ages in hands-on field research. The banding demonstrations allow students to learn about the scientific method through direct participation in field research.

In July 2009, we launched a new partnership with the Meg and Bert Raynes Wildlife Fund (www.rayneswildlifefund.org), a local citizen-science group focused on maintaining viable wildlife populations into the future. This season we continued to assist the group with volunteer training, data management and study design. During the 2010-2011 winter we will upload our banding data to the Raynes Wildlife Fund-Nature Mapping website (www.naturemappingjh.org). The Jackson Hole Nature Mapping program is an affiliate organization of the North American Nature Mapping network. The online forum will make our data available to the public in a query-based format.

Objective 6: Provide a model to improve current continent-wide avian population monitoring methods through citizen science and methodology expansion

Progress toward/against Objective 6:

We were interested in whether the productivity trends modeled at our sites were the same in other riparian systems in Wyoming. We calculated Yellow warbler productivity at three riparian MAPS stations around Wyoming and compared it to our Yellow warbler productivity estimates (Fig. 7). Interestingly, all sites showed a significant decline in Yellow warbler productivity during 2005. We initiated discussions about these findings with local non-game biologists, local birders and academic partners to gain a better understanding of the mechanisms that could drive the observed trend.

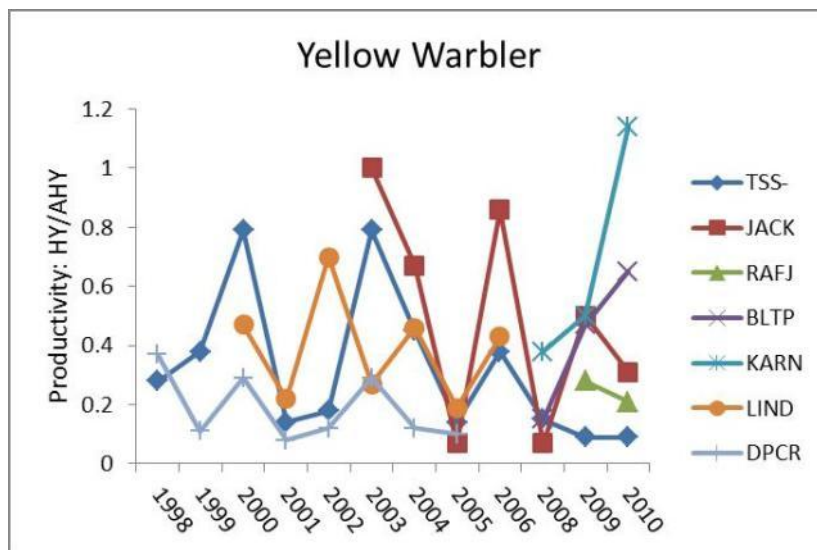


Figure 7: Estimated Yellow warbler productivity (HY:AHY) for two sites (TSS- and JACK) in Jackson Hole, Wyoming and three other sites elsewhere in the state: Albany Co, WY; DPCR:Fremont Co, WY; MCCU: Sweetwater Co, WY

During summer 2010 we enhanced our collaboration with Nature Mapping Jackson Hole, a local citizen science group dedicated to “keeping common wildlife common”. We trained 24 project volunteers in bird identification, color-band reading and basic ornithology. Trained Nature Mapping volunteers may report marked birds through the organization's website (www.naturemappingjh.org).

Updates to objectives

Nest-predator surveys

In 2010 we attempted to quantify the songbird nest predator community at each nest-searching site (n = 5) by documenting the relative abundance of corvid species at each site. Corvidae is the family of birds that includes jays, crows, ravens, and magpies. The most abundant species at all sites was the Black-billed magpie (*Pica hudsonia*), followed by the Common raven (*Corvus corax*). Preliminary songbird nest survival analyses indicate lower nest success in developed landscapes. Variation in the predator community may explain this trend and provide insight into the cascading effects of human development on natural systems. Black-billed magpies are known songbird nest predators, and include both eggs and nestlings in their diets. We conducted fixed-radius point counts at all five study sites. As human development increased at our sites, the number of Black-billed magpies and Common ravens observed also increased (Fig. 8). Research has shown that the behavior and demography of various corvids (specifically crows, ravens, and jays) are correlated to varying degrees with proximity to human development. Crows and magpies have smaller home ranges and higher reproductive rates near human settlements (Marzluff et al. 2005). Given the success of these preliminary corvid surveys, we would like to continue this work during the 2011 field season.

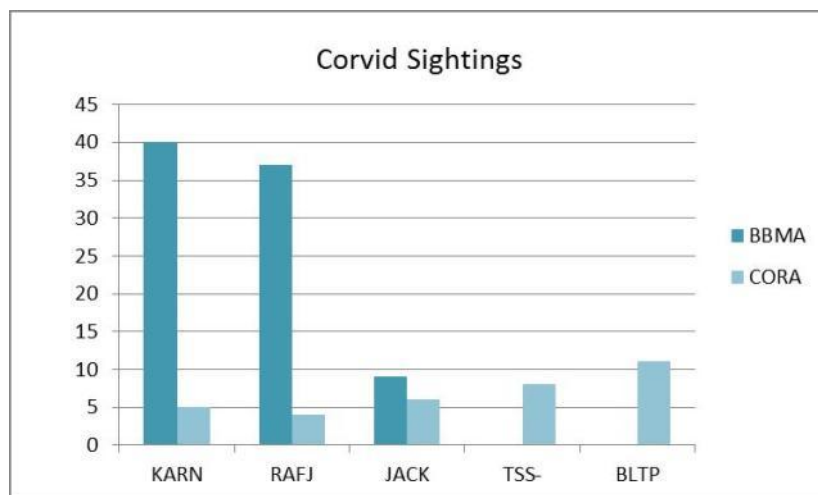


Figure 8: Corvid point count individual sightings 2010; Corvids include BBMA (Black-billed magpies) and CORA (Common ravens).

Partnerships

We continue to build capacity through productive partnerships with several collaborators.

Primary project partners include:

- Grand Teton National Park - permits research on 2 sites; receives annual project updates that are available to the public through the National Park Service Investigator Annual Reporting database <http://science.nature.nps.gov/research>
- Institute of Bird Populations - approves banding stations; receives banding data each year; verifies data; includes data in large-scale analyses of avian population trends; makes data available to other scientists and researchers around the globe
- Jackson Hole Land Trust - permits research on 2 sites; receives annual project updates
- Rafter J Homeowners Association - permits research on 1 site; receives annual project updates
- Teton County Parks and Recreation Department - permits research on 1 site; receives annual project updates
- USGS Bird-Banding Lab - approves and manages federal bird banding permit
- Wyoming Game & Fish Department - permits research on 5 sites; receives annual project updates; recipient of project data; inputs data into wildlife observational system
- Nature Mapping Jackson Hole - supports local citizen-scientists and facilitates online database where trained project volunteers can submit sightings of color-banded birds; recipient of bird banding data

Contributions to conventions, agendas, policies, management plans

International

Each season, we share our bird-banding data with the Institute for Bird Populations (IBP). IBP facilitates dissemination of our data to international avian researchers upon request. IBP also includes our data in continent-wide population models for migratory bird species. Often these models are included in avian management recommendations generated from organizations such as Partners in Flight.

National or regional

Statewide: Many songbird species in Wyoming are listed as low-priority conservation targets because of limited information on population trends; lack of information is the principal problem for nearly 85% of Wyoming's species of greatest conservation need (WGFD 2005). The most important conservation action over the next five years is accurate data collection on species distribution, habitat use and population trends (WGFD 2005). Wyoming's State Wildlife Action Plan (SWAP) is currently under review and our data will be incorporated in the final document (S. Patla pers. comm. 2010). Wyoming Partners in Flight (PIF) Bird Conservation Plan 2.0, identified population monitoring as the foundation of avian conservation, acknowledging a dearth of information in the state (Nicholoff 2003). As a member of the WY-PIF working group, TSS is integral in the improvement of monitoring, research, and education initiatives for native, nongame landbirds.

Regional: The Intermountain West Joint Venture (IWJV) Coordinated Implementation Plan ranks riparian habitat as a Priority A conservation target. Priority A habitats show high threat, high opportunity and high value to birds statewide. Our study sites are located in montane riparian areas which are particularly vulnerable to development pressures. We operate along the Snake River Riparian Corridor, which is a Bird Habitat Conservation Area (IWJV 2005). NMS density, abundance and habitat relationships will help refine IWJV's HABPOPS database, which is designed to predict the relationship between habitat management efforts and avian population trends. Population trend information relative to habitat and development gradients will be essential as the IWJV moves forward in ecoregional planning and prioritization of conservation activities at multiple spatial scales. NMS diversity, abundance and population trends also will be useful to IWJV partners to support funding efforts for on-the-

ground habitat conservation projects, and to quantify the efficacy of habitat enhancement efforts.

National: PIF strives to document and reverse apparent declines in avian species requiring terrestrial habitats. Our Avian Research Program accomplishes both data collection and analysis of declining population trends, which may best be reversed by identifying causal mechanisms on local scales. We monitor over 25 neotropical migratory species, including species listed on the USFWS Birds of Conservation Concern (USFWS BCC; USFWS 2008), PIF Species of Continental Importance (Rich et al. 2005), IWJV priority species list, Audubon Watchlist (Audubon 2007), WY Bird Conservation Plan 2.0 (WY BCP; Nicholoff 2003), and WY Species of Greatest Conservation Need (WY SGCN; WGFD 2005):

Local

We facilitate local use of our data through collaboration with planners from the Town of Jackson and from the Teton County Planning Department. Teton County is revising the current Comprehensive Plan, which is the long-range planning document that guides policy, investment, program, and land use decisions for both the Town of Jackson and the County. While the plan is not yet complete, it includes a clause that allows for future revisions based on the results of ongoing ecological research. We expect that staff planners will consider our avian research data as it relates to development opportunities in riparian zones, and specifically on the KARN research site. In June, Embere Hall and Jenny McCabe met with representatives of the Town government to discuss the possible effects of an ongoing wetland restoration project at KARN on the local songbird populations. After reviewing preliminary project results, the Town representatives agreed to defer construction activities until the end of the songbird nesting season in late July.

The Conservation Research Center is also an active member of a local group designed to improve the dialogue between planners and scientists. This group provides an arena for planners and researchers to discuss how to best incorporate science in local planning efforts and how to best use available ecological data. In November 2008 the group submitted a document outlining suggestions for helping better integrate environmental science into the land use planning and policy making process. The document was submitted to The Teton County Board of County Commissioners, the County Planning Director, the mayor of Jackson, Wyoming, the Town Council and the Town Planning Director. During the summer 2010 field season, the Teton County government approved the formation of a natural resources board that will work to better interface ecology with the development planning process. The board was one of the primary recommendations included in the document submitted to Town and County officials. Teton Science Schools is represented on the board.

Ultimately, our data helps prioritize habitat management, targeted restoration projects, conservation planning and education efforts. Over the past decade, the Jackson Hole Land Trust “has used information derived from TSS’ avian research to complete the natural resource baseline inventories required to implement many of our conservation easements on private land.” The Town of Jackson will use our data to better understand the effects of a storm water wetland development project in Karns Meadow, one of our banding sites. The WGFD includes our data into the State Wildlife Observation System, a database which is “queried by department staff state-wide to obtain information for environmental review of proposed projects, to answer data requests from the public and other agencies, for preparing grants and developing management action plans.” Specifically, our data has been incorporated into comments on various development proposals in Teton County and will be referenced in feedback for the Teton County Comprehensive Plan and the SWAP, both of which are undergoing updates. Nationally, IBP utilizes our data to estimate survival rates, recruitment and population change. IBP considers our stations “as an integral part of a regional monitoring program...and hopes to include TSS’ MAPS data in regional analyses on the Northern Rockies region.”

Dissemination

Printed:

Teton Science Schools' avian research program was featured in a weekly column in the Jackson Hole News and Guide. The News and Guide is a local newspaper that serves the Jackson Hole area, with select content available online. Earthwatch support was mentioned during the interview, but was not included in the column.

We produced several printed project summaries during the reporting year. Earthwatch was acknowledged wherever possible.

- Scientific poster – Annual conference of The Wildlife Society
- Annual Project Report – National Park Service - Grand Teton National Park
- Annual Project Report – Teton County Parks and Recreation Department
- Annual Project Report – Rafter J Homeowner's Association
- Annual Project Report – Jackson Hole Land Trust
- Project Update – Indian Springs Homeowner's Association
- Research program marketing brochure – 2-page research profile designed for marketing purposes (January 2011)
- Annual Project Report – Wyoming Game and Fish Department

Visual:

Research staff compiled a series of photographs of birds in hand to assist the local bird club with bird identification. The slides emphasized common wintering birds and were presented in advance of the group's annual Christmas Bird Count. Earthwatch support was acknowledged during the training but was not explicitly included in the images as the slides were part of a larger presentation that only featured bird images.

We presented results of our research at the National Wildlife Society Conference in October of 2010. Our presentation showcased results from 19 years of MAPS banding data and 3 years of Earthwatch volunteers' nest searching data.

- REFERENCE: E. Hall, J. McCabe and C. Smith. 2010. The effects of human development on songbird populations along a riparian corridor in Jackson Hole, Wyoming. Poster presentation. Annual conference of The Wildlife Society.

Digital:

Teton Science Schools revised the organization's website and pages detailing our conservation and research work. The second phase of the revisions, now complete, features a summary of each research project. Each project page includes a description of research needs, methods, data collected, preliminary findings and project partners. Earthwatch contributions to the avian research program are acknowledged.

During the winter 2010-2011, we will be uploading our banding data to the Nature Mapping Jackson Hole website (www.naturemappingjh.org). The online forum will make project data available to the public in a query-based format. Earthwatch support will be acknowledged as part of the online project description.

Mass media:

Last season Embere Hall and Jenny McCabe participated in the filming of a children's PBS television show, FETCH with Ruff Ruffman. This program provides education to children focusing on real world science. FETCH is funded primarily by the National Science Foundation. The episode, "Songbirds of the Tetons," featured the two children helping Jenny and Embere at the banding station and with nest monitoring. During the filming the actors learned about songbird population sampling. They also learned that some songbird populations are declining and that it is important to understand the factors that contribute to observed declines. Earthwatch was acknowledged during the filming. The episode aired in October of 2010 (<http://pbskids.org/fetch/>).

This season the Teton Science Schools was a camp destination of Operation Purple, a program created in 2004 by the National Military Family Association. As part of our research outreach efforts, visiting children and parents were invited to participate in banding activities in two of the sites. Children and adults learned about mist netting, banding, and identification of local songbirds, as well as gained a better understanding of local songbird population trends and natural history of the area surrounding Jackson, Wyoming. The banding program and Operation Purple were featured on NBC Nightly News in October 2010.

Meetings and conferences:

We presented our results at the Wildlife Society Wyoming Chapter Annual Meeting this November, as well as displayed findings at the National Wildlife Society Conference in October of 2010. Our presentation at the Wyoming Chapter Meeting showcased results from 19 years of MAPS banding, as well as two years of Earthwatch Volunteers' nest searching data.

- REFERENCE:
 - E. Hall, J. McCabe and C. Smith. 2010. The effects of human development on songbird populations along a riparian corridor in Jackson Hole, Wyoming. Poster presentation. Annual conference of The Wildlife Society.
 - E. Hall, J. McCabe, M. Karp, C. Smith and D. Wachob. 2010. The effects of human development on avian populations along riparian corridors in Jackson Hole, Wyoming. Oral presentation, The Wildlife Society Wyoming Chapter.

Educational resources:

This season the Education Specialist on the banding crew built on a packet of materials to help facilitate learning at the banding station, in cooperation with the Teton Science Schools' graduate program. These materials were extremely useful in keeping groups engaged on days when capture rates were low. The materials include: a journal, laminated sheets with bird anatomy and instructions for games to play with the younger-age groups and a video created for visitors to the various stations. The video outlines the protocols of what to expect at a banding site. The journal is given to every participant at the beginning of the demonstration session. Inside the journal are games to help participants remember important bird terminology, a place to list species observed at the station and a brief description of the MAPS program and reasons why banding is so important in avian research.

This winter we will continue to work with the Teton Science Schools' Stewardship and Education Coordinator to develop an avian research-focused classroom curriculum. The new curriculum will help to make our data accessible for high school aged students. The curriculum will teach students about the importance of long-term monitoring data and conservation concerns in their hometown. The curriculum will be included in Teton Science Schools' high school science classes in the 2010-2011 school year.

Other.

Recent analyses of long-term, large scale avian monitoring data demonstrate that many landbird species have experienced pronounced population declines during the past 30 years. Given global human population growth and the rate of land conversion from undeveloped to developed, a thorough understanding of avian population dynamics in human-dominated landscapes is crucial to the conservation of important breeding habitats. Our work generates a better understanding of the mechanisms driving population change in developing landscapes. Declining global population trends can best be reversed by identifying causal mechanisms on local scales. Our banding stations and associated projects will be used as a model for individual station operators in the MAPS network to ask relevant research questions of local interest, while simultaneously participating in continent-wide avian monitoring.

Data from our five MAPS stations are submitted to the Institute for Bird Populations (IBP) annually. IBP combines data from 500 stations around the United States to calculate landbird population trends and to provide important information for management and future research directed towards conservation of birds and their habitats.

Conservation Research Center MAPS data were included in IBP's most recent peer-reviewed publication, cited below.

- REFERENCE: DeSante, D.F. and D. R. Kaschube. 2009. The monitoring avian productivity and survivorship (MAPS) program 2004, 2005, and 2006 report. Bird Populations. 9:86-169.

Developing Environmental Leaders

We continued to provide educational programming and professional development opportunities to student groups and individuals associated with the project this season.

- *Banding demonstrations* - During the 2010 bird banding season we educated 485 student participants and 50 Teton Science Schools' Educational Programs employees. Our banding demonstrations engage groups of all ages in hands-on field research. The banding demonstrations allow students to learn about the scientific method through direct participation in field research.
- *Local Bird Identification Classes* - In March and July of 2010, Jennifer McCabe led courses in local bird identification. The classes were located at the Rafter J site, and helped local residents of the Jackson Hole area develop the skills necessary to gain a better understanding of local bird populations.
- Graduate student capstone experience- This season the bird-banding crew included a graduate student enrolled in Teton Science Schools' Graduate Program. The student enhanced his interpretive skills, field research skills, curriculum development experience and understanding of avian ecology during the 12-week capstone program. He is now completing his graduate degree at Antioch University. A second graduate student participated in field research along with the field crew leader as part of her graduate capstone experience. She is now completing her graduate degree at the University of Wyoming.
- Avian research project staff- This season we were fortunate to hire an exceptional crew of 4 early-career ecology professionals and one volunteer. Each employee was involved to varying degrees with the Earthwatch project. During their tenure, employees enhanced their avian research field skills, educational programming abilities and data management abilities.

Long term impact of project

Taxa of conservation significance enhanced, restored or maintained

At our two sites located in Grand Teton National Park, BLTP and TSS-, we captured several species that are listed under Wyoming Game and Fish Department's Species of Greatest Conservation Need. Data on these species are shared with both the Department and the National Park Service.

We monitor over 25 Neotropical migratory songbird species, including species listed on the USFWS Birds of Conservation Concern (USFWS BCC; USFWS 2008), PIF Species of Continental Importance (Rich et al. 2005), IWJV priority species list, Audubon Watchlist (Audubon 2007), WY Bird Conservation Plan 2.0 (WY BCP; Nicholoff 2003), and WY Species of Greatest Conservation Need (WY SGCN; WGFD 2005; Table 4).

Our research focuses on the effects of human development on songbird populations in riparian corridors. Data from our work provide insight into the conservation of these ecologically sensitive and valuable habitats. Riparian systems cover a fraction of the landscape in arid parts of the West yet more species of breeding birds are found in this limited habitat than in the extensive surrounding uplands.

Habitats enhanced, restored or maintained

As indicated in the previous section, our work examines the effects of human development on songbirds in riparian corridors. Birds are excellent ecological indicators of habitat quality. Our monitoring and research data provide important baseline information on the status of riparian habitat condition, integrity and function.

Ecosystem services enhanced, restored or maintained

While our work does not enhance ecosystem services directly, long-term avian monitoring data provide insight into habitat conditions and associated ecosystem function. Insectivorous birds, for example, are often dependent on clean water resources that sustain healthy populations of macro invertebrates. Degradation of aquatic systems can result in decreased numbers of birds and in reduced seasonal productivity. Monitoring data provide important information on annual population trends and can reflect changes in habitat quality. Birds are an especially relevant ecological class to monitor as they are an indicator of ecosystem health.

Livelihood assets enhanced, restored or maintained

We enhanced the livelihood of 4 avian research summer staff by providing them with well-paying field jobs. While earning a competitive wage, our staff was given the opportunity to teach students and Earthwatch volunteers about songbird ecology and conservation in Jackson Hole, Wyoming.

Our 485 participants enhanced their lives through hands-on educational experience while at the banding station. Many participants were able to release birds once they had been banded. Releasing a bird instills a sense of wonder and appreciation for the natural world that is truly transformative. A number of the Earthwatch volunteers continue to report on their ongoing pursuits to improve their birding skills and to build on the skills taught while working on the field research crew.