Shared Birds and Migratory Connectivity –

Raptor Migration Project

A cooperative research project between the Desert Southwest Cooperative Ecosystem Studies Unit, Rocky Mountain National Park, and the Bird Conservancy of the Rockies

November 2015

Bird Conservancy of the Rockies

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BIRD CONSERVANCY OF THE ROCKIES

Mission*: To conserve birds and their habitats*

Vision*: Native bird populations are sustained in healthy ecosystems*

Core Values*: (Our goals for achieving our mission)*

1. ***Science*** *provides the foundation for effective bird conservation.*
2. ***Education*** *is critical to the success of bird conservation.*
3. ***Stewardship*** *of birds and their habitats is a shared responsibility.*

Bird Conservancy of the Rockies accomplishes its mission by:

Partnering *with state and federal natural resource agencies, private landowners, schools, and other nonprofits for conservation.*
Studying *bird responses to habitat conditions, ecological processes, and management actions to provide scientific information that guides bird conservation efforts.*
Monitoring *long-term trends in bird populations for our region.*
Providing *active, experiential, education programs that create an awareness and appreciation for birds.*
Sharing *the latest information in land management and bird conservation practices.*
Developing *voluntary, working partnerships with landowners to engage them in conservation.*
Working *across political and jurisdictional boundaries including, counties, states, regions, and national boundaries. Our conservation work emphasizes the Western United States, including the Great Plains, as well as Latin America.*
Creating *informed publics and building consensus for bird conservation needs.*

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Cover photo: Osprey being released by NPS biologist Mike Britten at Shadow Mountain Reservoir. Photo by Nancy Gobris.

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Executive Summary

In 2012, the Desert Southwest Cooperative Ecosystem Studies Unit, Bird Conservancy of the Rockies (formerly Rocky Mountain Bird Observatory) and the National Park Service initiated a project to investigate the migration patterns of ospreys and peregrine falcons at Rocky Mountain National Park. The goal of the project was to deploy satellite tracking units on each species to investigate migratory connectivity between Rocky Mountain National Park and protected areas in tropical and sub-tropical regions. Satellite tracking units were successfully deployed on two ospreys in 2013. We were unable to capture a peregrine falcon despite several attempts in 2013 and 2014. Both ospreys were tracked to Mexico along the Gulf of Mexico coast. One osprey over-wintered at Laguna Madre which is recognized as a site of international conservation importance and included in the Western Hemisphere Shorebird Reserve Network. The other osprey over-wintered near Tamuín in the Mexican state of San Luis Potosí. We report the pre-migratory movements in Colorado, migration routes, and wintering areas for both ospreys. The results of this project represent the only thorough documentation of Colorado osprey migration. Although the sample size is small, this information may be representative of the osprey population occupying the southern Rocky Mountain region.

Acknowledgements

We received funding for this project from the Desert Southwest Cooperative Ecosystem Studies Unit and the Rocky Mountain National Park Continental Divide Research Learning Center. We owe much of the success of this project to Mike Britten (NPS Program Manager at Rocky Mountain I&M Network) who devised the plan of how to capture the ospreys, made the harness which attached the tracking unit to the ospreys, and captured the ospreys. Without his involvement this project would have never got off the ground. Jeff Connor (former NPS Natural Resources Specialist; now retired) also contributed much time to planning and logistics for the project and we owe much of the success of the project to him. We thank Ben Baldwin, Ben Bobowski, and Paul McLaughlin of the NPS (at Rocky Mountain NP) for logistical assistance before, during, and after the field season. We thank Kristen Long of the NPS and Brittany Woiderski of the Bird Conservancy for creating maps. Nancy Gobris assisted with trapping birds and obtaining banding permits required to conduct this field work. Special thanks also goes to Mountain Parks Electric, Incorporated for providing bucket truck to capture ospreys. Without the use of this truck, trapping the ospreys would have been very difficult. We thank U. S. Forest Service biologists Brock McCormick and Doreen Sumerlin for logistical support when capturing ospreys near Grand Lake on lands managed by Arapaho National Forest. Steve King (U.S. Forest Service Biologist) is also to be thanked for logistical support, monitoring osprey populations near Grand Lake, and recommending sites for capturing ospreys.

Table of Contents

Introduction

Raptors are at the top of the food chain and, therefore, excellent indicators of local environmental health. Raptors are also fascinating creatures and people of all ages are easily attracted to and awed by their impressive size, speed, and beauty. Populations of many bird species, including raptors, are declining and in order to reverse this trend, a better understanding of their full annual cycle is necessary. Connections between breeding habitats in the United States and wintering habitats in tropical and sub-tropical regions in Mexico, Central and South America are largely unknown. However, this knowledge is needed to effectively conserve neotropical migratory bird populations.

Migratory pathways and wintering areas for the various populations of raptors that breed in Rocky Mountain National Park are not well understood. We do know ospreys breed on the west side of Rocky Mountain NP along the headwaters of the Colorado River and can migrate as far south as South America during winter (Poole et al. 2002). In addition, peregrine falcons spend winter months as far south as the southern tip of South America and some over-winter in Costa Rica and also in Colorado (White et al. 2002).

Recent advances in technology make demonstrating migratory connectivity between countries and even continents possible. With the goal of identifying conservation needs, we set out to track the migratory routes, stopover sites, and winter ranges of two species of raptors that breed in the Rocky Mountain region: ospreys and peregrine falcons. Using satellite tracking technology, we were also interested in testing the accuracy of light-level geolocators. This project identified where two Rocky Mountain NP ospreys go during winter months.

Estes Park, located at the entrance to Rocky Mountain National Park, is a part of the Sister Cities International Program which was formed in 1967 to establish connections between the U.S. and other countries. To strengthen this relationship the Estes Park Sister Cities Association Incorporated was founded in 2002 and formally entered into a Sister City agreement with Monteverde Costa Rica in 2004. Monteverde like Estes Park, is adjacent to several protected areas and one national park (Santa Elena Cloud Forest Reserve, Monteverde Cloud Forest Reserve, Children's Eternal Rainforest and Arenal Volcano NP). All of these protected areas are within the Agua Y Paz Biosphere Reserve and are designated Important Bird Areas. Rocky Mountain NP is also a Biosphere Reserve and a Global Important Bird Area. On August 24, 2012, the US National Park Service signed a Memorandum of Understanding with Sistema Nacional de Areas de Conservation, which is Costa Rica's National System of Protected Areas. This agreement promotes the exchange of information between the National Park Service and protected areas within Costa Rica and is a major reason this project was promoted by Rocky Mountain NP.

Study Locations

We trapped ospreys at the Arapaho National Recreation Area (in Arapaho National Forest) just west of Rocky Mountain NP on 19 June 2013. We selected the Grand Lake area (Lake Granby and Shadow Mountain Reservoir) as study location because of the abundance of ospreys that occupy the

area. At least 53 pairs of osprey breed in Grand County along the headwaters, lakes, and reservoirs of the upper Colorado River in Rocky Mountain NP and the Arapaho National Recreation Area (U. S. Forest Service, unpublished report). This large population is a relatively recent phenomenon, Bailey and Niedrach (1965) published only two confirmed breeding records in the state and Andrews and Righter (1992) list them as rare to uncommon local summer residents and noted only eight pairs in eastern Grand County in 1986. The population was apparently growing rapidly in the 1980s; there were 22 pairs in Grand County in 1989 and 25 in 1990 (Andrews and Righter 1992). We attempted to capture a peregrine falcon in 2013 and 2014 at the only known breeding site in Rocky Mountain NP.

Field Methods and Equipment

We used satellite tracking devices from North Star Science and Technology, LLC (Figure 1). For ospreys we used the Model 30GPS weighing 30 grams and for peregrine falcon we used Model 22GPS weighing 22 grams. All tracking units were solar powered models capable of charging independently with adequate exposure to sunlight. Geolocators attached to each device added two to three grams to tracking units.

Figure 1. Solar powered satellite tracking unit with harness deployed on ospreys from Rocky Mountain NP. Two geolocators are visible on right side on bottom just left of loop and under the base of the antennae.

To capture ospreys, we received assistance from a bucket truck from Mountain Parks Electric, Incorporated. The truck was able to raise its bucket near nests which were placed on power poles near roads (Figure 2). A weighted wire cage with nooses (Figure 3) was placed in the nest after parents were flushed from their nest. The bucket was then lowered and when an adult osprey returned to the nest it was captured around the leg by the nooses on the wire cage. The bucket was then raised again to grasp the adult osprey once it was captured by the noose cage. Once the osprey was captured it was banded, measured, the satellite transmitter was attached, and released.

Figure 2. Bucket truck at Shadow Mountain Reservoir osprey Nest near Rocky Mountain NP.

Figure 3. Noose cage placed in nest to capture adult ospreys. Nooses made of monofilament are attached to the wires of the cage and slightly visible in the photo.

Tracking Data Collection

We entered into a contractual agreement with Argos CLS at the beginning of this project. Argos provided location information received via satellite from the tracking units. We received four location fixes per day from Argos every third day.

Accuracy Testing of Geolocators

Two geolocators were affixed to all three satellite tracking devices used for this project (Figure 1; six geolocators total). Migrate Technology provided the geolocators at no charge to conduct this research. North Star Science and Technology, LLC affixed the geolocators to the satellite tracking units at no charge. In order to test the accuracy of the location data gathered by the geolocator we intended to recapture both ospreys in 2014 to download data from the geolocators.

Results

We captured two female ospreys, one from Rainbow Bay of Grand Lake (named "Rainbow") and one from Shadow Mountain Reservoir (named "Shadow"). We were unable to capture a peregrine falcon. Both female ospreys spent time near their nesting sites before beginning their migration to Mexico (Figure 4). The osprey from Rainbow Bay stayed near the nesting site, Meadow Creek Reservoir, and near the town of Tabernash (adjacent to Fraser River) before beginning its migration. The osprey from Shadow Mountain Reservoir stayed near the nesting site but also spent time along the Colorado River near the town of Hot Sulphur Springs.

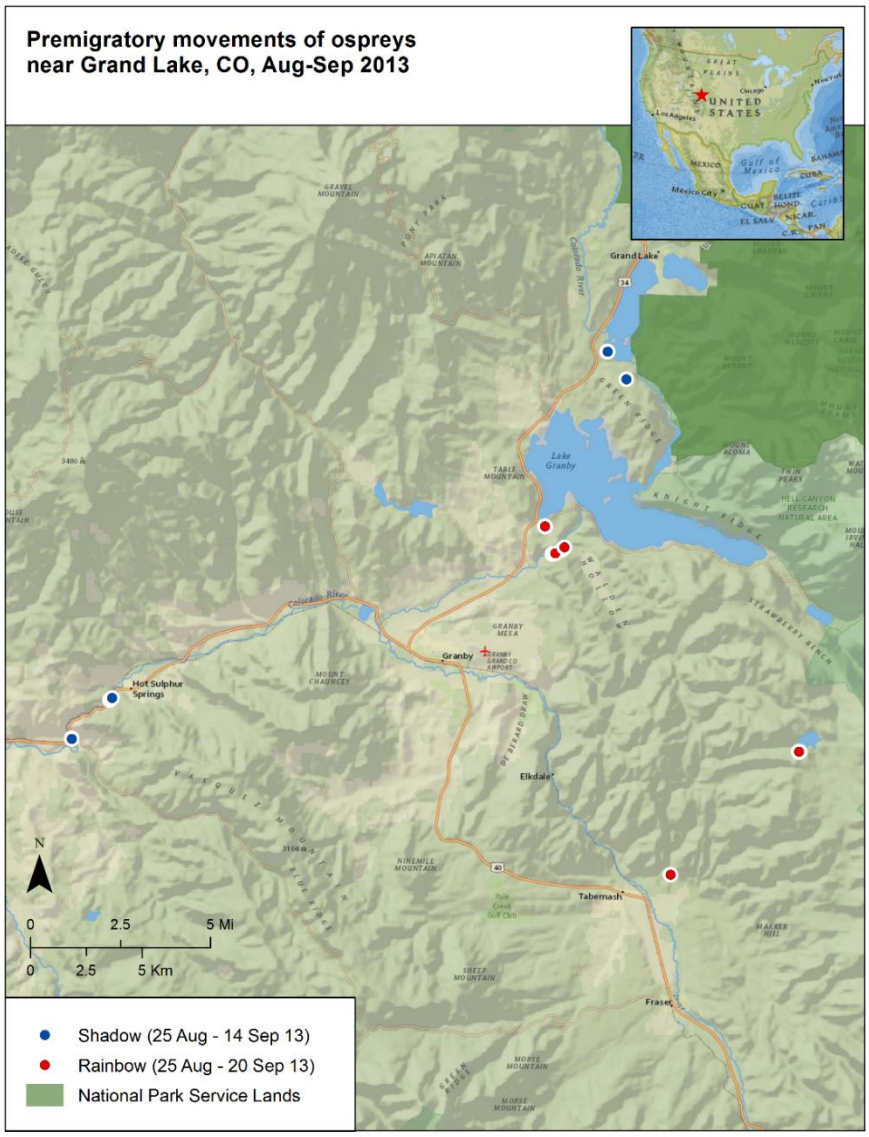

Figure 4. Pre-migratory movements of ospreys being tracked with satellite units from Rocky Mountain NP.

The Rainbow Bay osprey initiated migration on 21 September (Figure 5). This osprey left the Grand Lake area and immediately flew over the Front Range of the Rocky Mountains and went to southeast Colorado. This osprey eventually followed the Arkansas River through eastern Colorado to central Kansas before going straight south through Oklahoma and Texas into Mexico. In total, approximately 1,300 miles were traveled to wintering site. The largest one-day distance was approximately 310 miles across Oklahoma on 24 September. It took Rainbow 14 days total to arrive at her wintering site for an average rate of travel of 92.9 miles per day.

The Shadow Mountain osprey initiated migration on 15 September. This osprey left the Grand Lake area and also crossed over the Front Range heading south traveling to the location where Colorado,

Oklahoma, and New Mexico come together then slightly north into central Kansas and the Arkansas River before heading south through Oklahoma and Texas into Mexico. The Shadow Mountain osprey traveled a total of approximately 1,100 miles to wintering site and the largest single day of travel was approximately 305 miles across Texas on 21 September. It took Shadow nine days to arrive at her wintering site for an average rate of travel of 122.2 miles per day.

Figure 5. Migration path of two ospreys from Rocky Mountain NP to wintering sites in Mexico.

Once the ospreys reached their wintering areas some movements were observed (Figure 6). We witnessed more movement from the Shadow Mountain osprey after it arrived south of Texas at its wintering site. It ventured up the Rio Grande at the U.S.-Mexico border after it arrived at the location where it eventually spent the winter. The Rainbow Bay osprey traveled directly to its wintering area near Tamuin along the Rio Tampaón and remained in that general vicinity for the duration of the winter.

We stopped receiving signals from the Rainbow Bay osprey on 20 March, 2014. We continued to receive signals for the Shadow Mountain osprey until June of 2014; however, all final location information revealed no movements for approximately two months. An effort was made by Arapaho National Forest biologists to look for both osprey at breeding sites and in the Grand Lake area in 2014 after they should have returned to breed; however, neither was located. It was not possible to inspect every osprey breeding in the area for a leg band due to the large breeding population in the area and the difficulty of determining if leg bands were present.

Accuracy Testing of Geolocators

We were unable to test the accuracy of the geolocators because we lost contact with the two tracked ospreys and, thus, were unable to retrieve the geolocators.

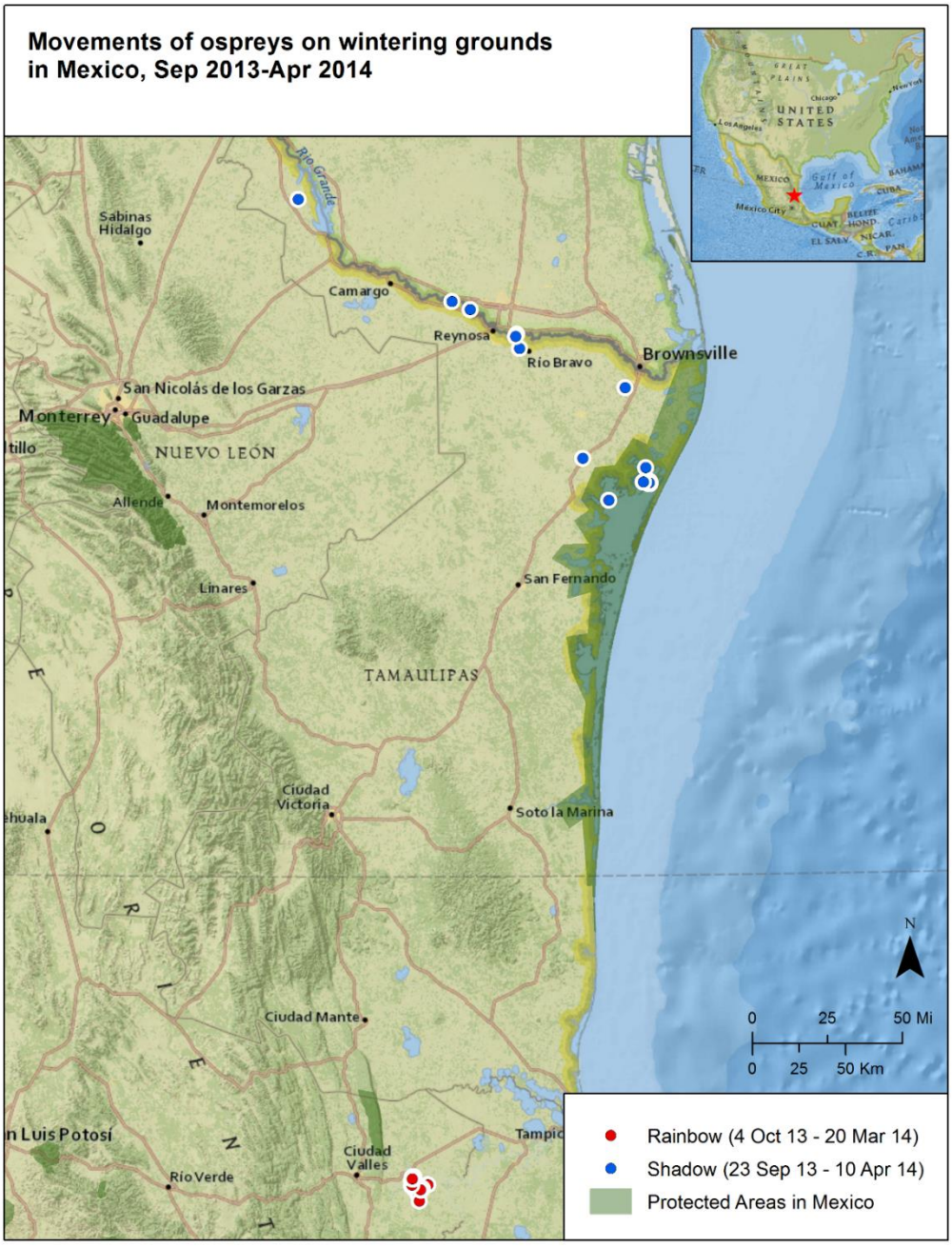

Figure 6. Movements of two ospreys tracked from Rocky Mountain NP at their wintering site in Mexico.

Discussion

Conservation of a migratory species requires detailed information about the annual cycle of that species. This research provides new knowledge about the migration patterns of Colorado ospreys. One of the ospreys overwintered at Laguna Madre which is recognized as a site of international conservation importance and included in the Western Hemisphere Shorebird Reserve Network.

Ospreys have been tracked using satellite telemetry units from other locations in the Rocky Mountain region (R. Bierregard pers. comm.) but this is the first time ospreys from Colorado have been tracked using satellite telemetry. Similar to what we found, ospreys from Montana have been tracked to areas near the Gulf of Mexico in Texas and Mexico (R. Bierregard pers. comm.). Our research adds to existing information about osprey migration and shows that the coastal Gulf of Mexico area may be where to focus conservation efforts for ospreys inhabiting the Rocky Mountain region.

Our trapping efforts did not interfere with the breeding success at osprey nests in the study area. Both nests where adult ospreys were captured had young nestlings at the time of capture on 19 June, 2013. Following the capture of the females and placement of the satellite tracking devices, the Rainbow Bay nest produced two fledglings and the Shadow Mountain Reservoir nest produced three. We do not know the dates of fledgling for either nest; however, both adult female ospreys began perching away from the nest sites on 25 August, 2013.

We were unable to retrieve the geolocators from either osprey. We believe that Shadow perished at the location where last signals were received or the transmitter fell off at this location and continued to be charged and communicate with satellites. We have no way of determining the fate of either osprey. We communicated with Bird Conservancy employees working in Mexico and made contacts with Mexican biologists in an effort to locate the Shadow Mountain osprey after it was evident that something had happened to the bird or the satellite transmitter had fallen off the bird. Unfortunately, Mexican biologists were reluctant to travel into the area because of illegal gang activity in the area and we were unable to make an effort to try and locate the osprey or the tracking unit on the ground. While we were unable to test the accuracy of the geolocators on the two ospreys, there are plans to use the remaining satellite tracking device with geolocators attached to a Swainson's hawk in 2016 in eastern Colorado. We are concerned about the battery life of the geolocators and receiving useable information from those devices since they will have aged three years before being deployed in 2016. We have turned the geolocators on and off each time we attempted to deploy the units on peregrine falcons but the battery life has been reduced. We are hoping that we will receive at least one to several months of data from the geolocators if the Swainson's hawk returns to 2016 breeding site and can be recaptured in 2017.

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