Boulder County Parks and Open Space
Wildlife Program Annual Report 2014

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Accomplishment of Stated Goals for 2014

Goals 2014

1. The flood event of September, 2013 caused major changes in the direction of our department. Our goal is to remain flexible and adaptable to accommodate new priorities as they evolve. As such:
    - Continue to consult with USFWS on ESA issues with emergency actions and restoration planning.
        - Document actions taken to ensure conservation measures were/are implemented for all projects occurring within suitable habitat for T&E species.
    - Develop long-term monitoring to assess baseline status and then recovery of affected species within flood-damaged habitat areas.
    - Work towards providing Environmental information within Project Worksheets to expedite the FEMA review process.
    - Provide expertise towards informing Stream Master Planning efforts.
    - Assist department by providing information and effort towards grant application development as requested. As possible, wildlife staff will research grant opportunities.

    Results:

    In 2014, the majority of our time was spent in reaction to the September 2013 flooding event. We worked closely with the U.S. Fish and Wildlife Service (USFWS) on consultations, as well as documentation of Conservation Measures implemented during emergency actions.

    We established long-term monitoring programs for small mammals (focused on Preble's Meadow Jumping Mouse), as well as native fish and macro-invertebrates. (Refer to Flood-Long Term Monitoring section.)

    We provided information towards the development of Project Worksheets, including conducting consultations on behalf of EHP to expedite the Project Worksheet reviews (ex: 4-Mile Bridge). (Refer to Flood-Consultations section).

    Through active participation in all of the Stream Master Planning Efforts, we contributed information towards the development of those plans (St. Vrain, Left Hand, Little Thompson and Four-Mile). (Refer to Flood- Master Planning section.)

    We assisted in the completion of several grant applications, and prioritized these efforts on the typically tight timeframes required. (Refer to Flood-Grants section.) We also applied for grants independently.

2. Continue our long-term monitoring volunteer programs, at a minimum maintaining their current level of participation.

- Attempt to increase our long-term monitoring program despite the changes caused by the flooding event. Incorporate the macro-invertebrate sampling into our long-term monitoring program, as a pilot year.

Results:

We completed a successful pilot year of:

- Fish and macro-invertebrate sampling along stream reaches of the St. Vrain.

- Nocturnal owl surveys by volunteers under the leadership of a biologist. Following standard protocol, teams of volunteers met with a lead biologist at selected parks from February to April of 2014 and performed passive listening surveys for nocturnal owls. Betasso Preserve, Hall Ranch, Heil Valley Ranch, Rabbit Mountain, and one closed property under management review were surveyed, as well as two plains driving routes in the southern county.

We reviewed and restructured the waterfowl monitoring program initiated in early fall of 2014 with the goals of increased volunteer participation and organized, consistent coverage of survey sites. To meet these goals, we designated an experienced volunteer crew leader (Petrea Mah, BCNA) to assist with planning and coordination. Additionally, BCPOS wildlife staff conducted in-house training and local expert Bill Kaempfer provided field training guidance to volunteers in October.

3. Incorporate the newly updated Species of Special Concern (SSC) and Critical Wildlife Habitats (CWH) into our internal program of work. Draft guidelines on how the Wildlife group will approach management recommendations where SSC or CWH are factors.

Results:

We did not accomplish the goal of drafting guidelines on how our group will approach management recommendations where SSC or CWHs are factors. However, we utilized these designations during discussions and actions related to management decisions on several occasions (see examples in CWH section).

4. Continue to work towards the completion of the Wildlife Policy.
    - While the official process of developing Wildlife Policy has been officially delayed, Wildlife staff will continue to work on compiling information to develop our already created outline. We will conduct literature reviews, etc., to assist in drafting guidelines for each defined topic.

Results:

Staff continued work on topics and issues to be addressed in the upcoming Wildlife Policy. They developed issue statements, discussion parameters, methods, and/or Best Management Practices for: sensitive data, recreational climbing and scientific collecting. New topics and additional work on the existing topics continue to be developed in 2015. With staff focused on Flood-driven work and higher priorities, it is unknown when the Wildlife Policy team process will resume, however it is still listed as a short-term goal for commencement in the Planning Department's Schedule.

5. Stabilize and make accessible all the documents, literature, and information used to inform the Update of the BCCP-ERE. This step is critical in assuring the long-term usability of these documents, and maintaining the continuity of knowledge towards the next update process.
   Results:

   We are currently archiving this information on a large-capacity backup drive with failsafe protection. This system will protect the large volume of high-quality information, recently located and compiled by ERE update staff, related to natural resources in Boulder County that include scientific and technical papers, local news and studies, rare maps and documents, Forest Service plans, and photos and interviews with regional experts.

Goals 2015

1. Continue our long-term monitoring volunteer programs, with a goal of maintaining the current level of participation. Each year since 2012, a selection of programs has been reviewed and updated to improve overall function.
   a. In 2015, with the increase in a need for raptor nest data, we will expand this program to acquire updated locations of plains nests of parks properties, including observations of Swainson's and Red-tail hawk nests in 2016.
   b. Continue incorporation of macro-invertebrate sampling into our long-term monitoring program following the 2014 pilot year.
2. Flood Response- Our goal is to remain flexible and adaptable to accommodate new priorities as they continually evolve. As such:
   - Continue to consult with USFWS on ESA issues with restoration planning.
   - Refine and continue to develop our long-term monitoring to assess baseline status and then recovery of affected species within flood-damaged habitat areas.
   - Assist department by providing information and effort towards grant application development as requested. As possible, wildlife staff will research grant opportunities.
   - Continue close coordination with our partner agencies on issues such as fish passage, ESA consultations and restoration planning.
3. Complete the process of stabilizing and allowing easy access to all the documents, literature, and information used to inform the Update of the BCCP-ERE. This step is critical in assuring the long-term usability of these documents, and maintaining the continuity of knowledge towards the next update process.
4. Establish a revised and complete list of topics for the Wildlife Policy.

September 2013 Flood Event-

This event almost completely altered our program of work. Tasks were re-prioritized to include emergency flood assessments, coordination and response. To assist with our increased workload, Tim Shafer was hired as a Full-Time Employee (Term), Wildlife Specialist. We also made contributions to Preble's Meadow Jumping Mouse (PMJM) Conservation Measures Documentation, including monitoring of debris removal projects. We contributed to Stream Teams and Master Planning, consulted with USFWS, and assisted in restoration planning and completion of grant applications. We initiated small mammal trapping and fish and macro-invertebrate sampling.

Emergency Flood Response Efforts and Documentation

Immediately following the flood, wildlife staff contacted the City of Fort Collins and Dr. Ellen Wohl at CSU as we learned they were collaborating on using trees in stream restoration. We were then invited to receive support from the CSU "Rapid Response Team" of faculty with expertise in river engineering, fluvial geomorphology, and fish and aquatic biota as it relates to large woody debris. In the team's experience, after floods, city and county governments remove all the wood that could provide habitat, without considering whether some of it could be anchored and not pose hazards for infrastructure and humans. The result was a CSU team visit with staff to walk the St. Vrain Creek and observe the situation, guidance from the CSU team as we conducted emergency debris removal, and the publication of a set of guidelines for wood management in rivers like those along the Front Range. Among other influences, it helped to guide the County's Community Debris Removal Program and BCPOS efforts to carefully remove "high hazard debris" from Open Space on St. Vrain, Boulder and Left Hand Creeks.

Also, as a result of knowing the value of whole trees with roots for stream restoration, wildlife staff and other BCPOS resource specialists coordinated the retention, transport and storage of trees and logs for future use. These materials are available for upcoming restoration projects which will naturally armor stream banks and provide high-quality in-stream habitat for fish and wildlife, which will result in a more resilient stream ecosystem.

Documentation and Implementation of Emergency Conservation Measures for Preble's Meadow Jumping Mouse, Ute ladies-tresses (ULTR) and Colorado Butterfly Plant (COBP) during Debris Removal

BCPOS owns and manages several miles of Preble's Meadow Jumping Mouse (PMJM) habitat along creeks and ditches. To protect this threatened species and its habitat, BCPOS cooperated with the U.S. Fish and Wildlife Service (USFWS) to implement Emergency Conservation Measures (CMs), which included monitoring and managing the Emergency Debris Removal operations. Staff collaborated with Boulder County Transportation, FEMA, USFWS and private contractors to implement these conservation measures and guide the removal of flood debris in a manner that minimized impacts to valuable habitat.

This monitoring was critical to ensure the protection of FEMA funding because a Federally threatened species cannot be adversely affected by FEMA-funded activities. Part of our efforts included modifying the USFWS reporting forms so our monitoring information could be easily recorded, and creating a standard documentation process that was adopted throughout the County. Our staff spent several months in the field implementing the CM's during debris operations, such as mapping and flagging sensitive habitat, directing heavy machinery in and around the creeks and holding frequent update and direction meetings with contractors and staff.

Master Planning, Stream Teams and Internal Coordination

In response to the flood, a number of new coalitions, teams, and collaborations emerged to tackle the challenges of flood recovery. Wildlife staff participated in the BCPOS Stream Teams for our major creeks during most of 2014, which were composed of a variety of staff from different working groups. These teams participated in the selection of the Master Plan consultants and master plan production, while also actively working with all the related issues of flood recovery and stakeholder interaction on the creeks – such as St. Vrain, Left Hand and Boulder Creek. Wildlife staff provided critical

information and planning support about wildlife and habitat preservation needs to the stream teams during the entire Master Planning process.

We instituted bi-weekly meetings with Plant Ecology and Invasive Plants staff members to keep each other appraised of work, progress, and projects, primarily related to flood damage and repair but also for general coordination of effort.

Grants

A key step in our flood recovery efforts has been, and continues to be finding funding to pay for necessary restoration work. Wildlife staff has assisted the department with the development of several grant applications toward this end. To date, four out of five grant applications that the Wildlife staff contributed to in 2014 have been awarded. These funds will be used for the design and/or implementation of flood recovery projects on BCPOS properties. The Wildlife staff contributed to the development of the following grants:

i. Colorado Parks and Wildlife, Wetlands for Wildlife program, Wetland and Riparian Restoration, Enhancement, and Creation – St Vrain Creek Riparian Restoration at Western Mobile. ($45,000) **DENIED**

ii. Colorado Parks and Wildlife, Wetlands for Wildlife program, Wetland and Riparian Restoration, Enhancement, and Creation – Webster Pond Wetland Creation Project. This grant will create an emergent wetland that will provide habitat for three fishes listed as State concern. ($42,750) **AWARDED**

iii. Colorado Water Conservation Board, Water Supply Reserve Account – Meadows and South Ledge Diversion Reconstruction and Fish Passage Demonstration Project. ($170,000) **AWARDED**

iv. U.S. Fish and Wildlife Service, Cooperative Agreement Award – Meadows and South Ledge Ditch Diversion and Fish Passage Project. ($120,000). **AWARDED**

v. Colorado Water Conservation Board, Stream Restoration Grant – South St. Vrain Creek Restoration at Hall Ranch Project. ($110,000) **AWARDED** (Requested amount: $439,070)

vi. CBDG Breaches 5-9 Rebuild and Reconnect (**In Process**)

vii. CDOT Research Grant- Rock Creek Underpass at Highway 128. (**In Process)**

viii. Colorado Parks and Wildlife, Wetlands for Wildlife program, Wetland and Riparian Restoration, Enhancement, and Creation –Clough and True Ditch Rebuild (**Not submitted**)

Consultations Related to Federally Designated T&E Species

As required under the ESA, staff consulted with USFWS on projects (post-emergency, FEMA funded, and non-FEMA funded). These consultations occurred to ensure minimal impacts to suitable, known or potential PMJM habitat. Listed below are examples of consultations that occurred in 2014.

USFWS consultations:

1. Golden-Fredstrom (unauthorized action)
2. 4-Mile bridge (EHP requested as collaborative assistance)
3. Heron Swale (Partner Project with City of Longmont)
4. Parrots Beak ponds (No Effects Determination for Documentation)
5. West Pond (No Effects Determination for Documentation)
6. South Branch at W. Mobile (Non-FEMA)
7. Boulder Creek Breach between US287 & 109th St. (Post documentation of Urban Drainage work).
8. Boulder Creek Breach on Alexander Dawson. (Non-FEMA-Emergency Breach Repair)
9. Clough and True Ditch (post-flood consultation on altered maintenance plan)

Long-Term Monitoring-Flood Impacts and Wildlife Response

The flood event of 2013 affected every drainage in Boulder County. Stream channel morphology was altered by the flood event and also by instream activities related to flood recovery efforts (e.g. heavy machinery working in the creek to restore capacity or historic alignment to the creek channel), resulting in both the loss and creation of beneficial habitat for aquatic and riparian species. Riparian vegetation in many areas has been scoured away or is buried under flood deposited sediment; in some cases 3-4 feet deep. Additionally, bank erosion and channel incision will continue to affect existing riparian vegetation due to unstable soils on creek banks and inaccessibility of ground water to plant roots.

The wildlife group recognized the need to establish a long-term monitoring program to monitor and assess the response of wildlife inhabiting ecosystems impacted by the flood. The State recognizes riparian areas as areas of highest natural resource value, supporting a vast majority of our regional biodiversity. Riparian ecosystems in the semi-arid west harbor more than 80% of the regional biodiversity and provide essential habitat for a number of Boulder County Species of Special Concern, including the federally Threatened Preble's meadow jumping mouse. Similarly, the cold-to-warm water transition zone streams of the Front Range (primarily St. Vrain Creek) are of State importance to fish conservation and serve as a last stronghold for a suite of native fishes that have conservation status at the state level (State Concern, State Threatened, State Endangered). Wildlife staff developed three long-term monitoring programs to assess wildlife responses to flood impacts: 1) Riparian Breeding Bird Survey, 2) Small Mammal Trapping, and 3) Aquatic monitoring.

The agency will use the information accumulated through these long-term monitoring efforts in their role as land stewards in the following ways: 1) measure and predict the status of habitat and species of county concern, 2) guide wise resource management and land use decisions, 3) provide BCPOS staff with information needed to make decisions about long-term recovery of our riparian and aquatic ecosystems.

Fish and Aquatic Insects

The St. Vrain is a valuable waterway to the State for rare native Colorado fish and therefore habitat restoration is critical to maintain the species. We prepared the monitoring plan in cooperation with Colorado Parks and Wildlife (CPW), and identified subject matter experts at State agencies and local universities who agreed to provide technical assistance. BCPOS water resource staff was also very helpful in planning our efforts in and around the County water infrastructure, and in preliminary planning for water quality monitoring. Based on these consultations and other planning, we then secured all of the equipment and supplies needed to initiate the monitoring effort. We purchased electro-fishers and water quality instruments in 2013.

We completed sampling at Hall II, Hall Meadows, Montgomery and Golden-Fredstrom. These first efforts indicated that fish populations were generally good based on the number and types of fish species (small natives and trout), and the aquatic insects were dominated by the presence of large stoneflies – a strong indicator of clean water and good forage base for fish. Additionally, water quality measurements in these upstream reaches of St. Vrain Creek, such as oxygen and temperature, were also in the positive range. However, stream habitat condition was highly variable due to extensive bank erosion and loss of tree cover, simplification of fish habitat in the stream and other natural and man-made impacts due to the flood.

We will refine the biomonitoring effort during 2015 with the help of volunteers, and present water quality and habitat value scores for different stream segments based on our insect identification and other monitoring. We also anticipate further cooperation with other groups who are coordinating stream water quality monitoring efforts, such as Keep It Clean and the Creek Coalitions.

Small Mammals with Emphasis on Preble's Meadow Jumping Mouse (PMJM)

Although BCPOS has conducted small mammal trapping for PMJM in the past, the trapping program started in the summer of 2014 is a new study that is part of the post-flood long-term monitoring effort. We collaborated with local experts to successfully fledge a new small mammal study with a robust and modern study design that will allow documentation of status and trends for PMJM populations in the years following the 2013 flood event. We collaborated with CPW wildlife biologists Lance Carpenter and Mike Sherman who provided invaluable guidance on study design and field logistics and mentored BCPOS staff in the field on species identification and trapping/handling methods. Additionally, we also coordinated the hiring of Carron Meaney, senior ecologist with Walsh Environmental and PMJM expert, to assist with field work, study design, and field methods training. This collaboration was essential to getting this program off the ground in the first year following the flood.

PMJM Introduction

The Preble's meadow jumping mouse (PMJM) is a riparian obligate and carries the Threatened status under the Endangered Species Act. This subspecies is endemic to and dependent upon the riparian areas of the Front Range. Impacts to riparian habitat from the flood event of 2013 have likely altered the abundance and distribution of many small mammal populations dependent upon that habitat. Thus, the current post-flood status and distribution of PMJM populations, and populations of other riparian small mammals, is unknown in Boulder County. Our primary objective is to monitor small mammal populations in riparian ecosystems over consecutive years following the flood to document the post-

flood distribution and population status of small mammals in Boulder County, with a special focus on PMJM. This ongoing study will help us to gain a better understanding of how local populations of riparian adapted small mammal species are responding to a major flood event and document the distribution, status, and recovery of PMJM.

Methods for Long-Term Monitoring

In the summer of 2014 BCPOS biologists surveyed 14 properties. These sample sites were distributed across each of the major drainages in the county; seven sites on St. Vrain Creek, two sites on Boulder Creek, two sites on Left Hand Creek, two sites on Rock Creek, one site on Coal Creek, and one site on an intermittent stream at the Caribou Springs Ranch Conservation Easement.

Study Design: We are employing a presence-absence (occupancy) study design for this long-term monitoring effort in order to assess the post-flood distribution of small mammal species in flood affected riparian areas. We are using a three-year rotating panel design, where a subset of sites will be sampled each year, with sites being resampled every three years.

Sample Site Selection: Similar to our Breeding Bird Surveys, we randomly selected sites using a spatially balanced sampling design (Generalized Random Tessellation Stratified - GRTS). From the 100 randomly generated points, we selected 13 sites to be sampled during the summer of 2014 based on pertinence to flood recovery objectives, and site independence. One additional site, Carlson Lastoka, was subjectively selected for sampling to assess PMJM occupancy of a stream restoration site along Rock Creek, and is not included as part of the random sample.

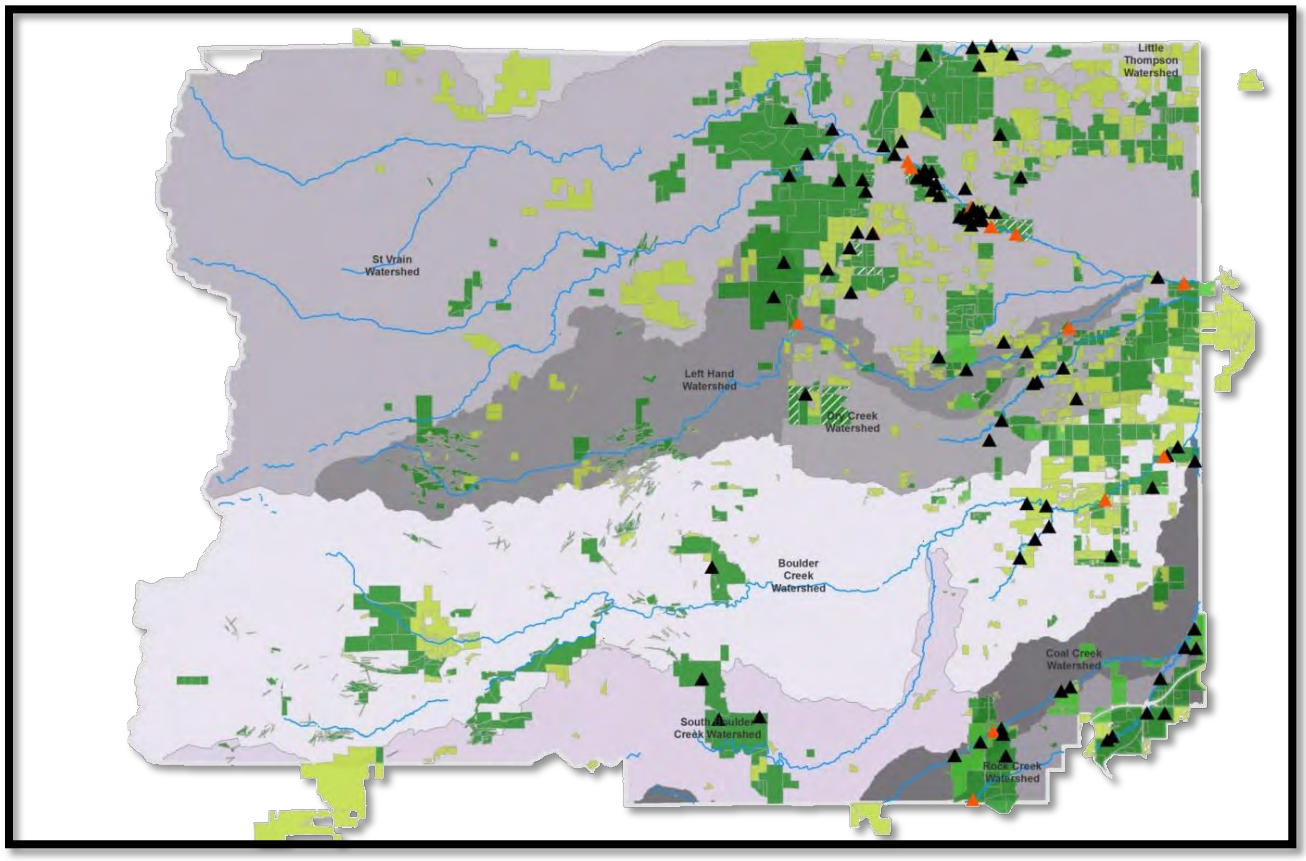


Figure 1: Sample sites generated using spatially balanced sampling scheme (GRTS) for small mammal study. Orange triangles = sites sampled summer 2014.

Trapping Methods: Trapping occurred each week from the second week of June through the end of the second week in September. We adopted the U.S. Fish and Wildlife Service's "Preble's meadow jumping mouse (*Zapus hudsonius preblei*) Survey Guidelines (2004)" for our trapping protocol. We trapped for 2-3 days at each site, with the goal of 3 consecutive trapping nights, unless delayed by severe weather.

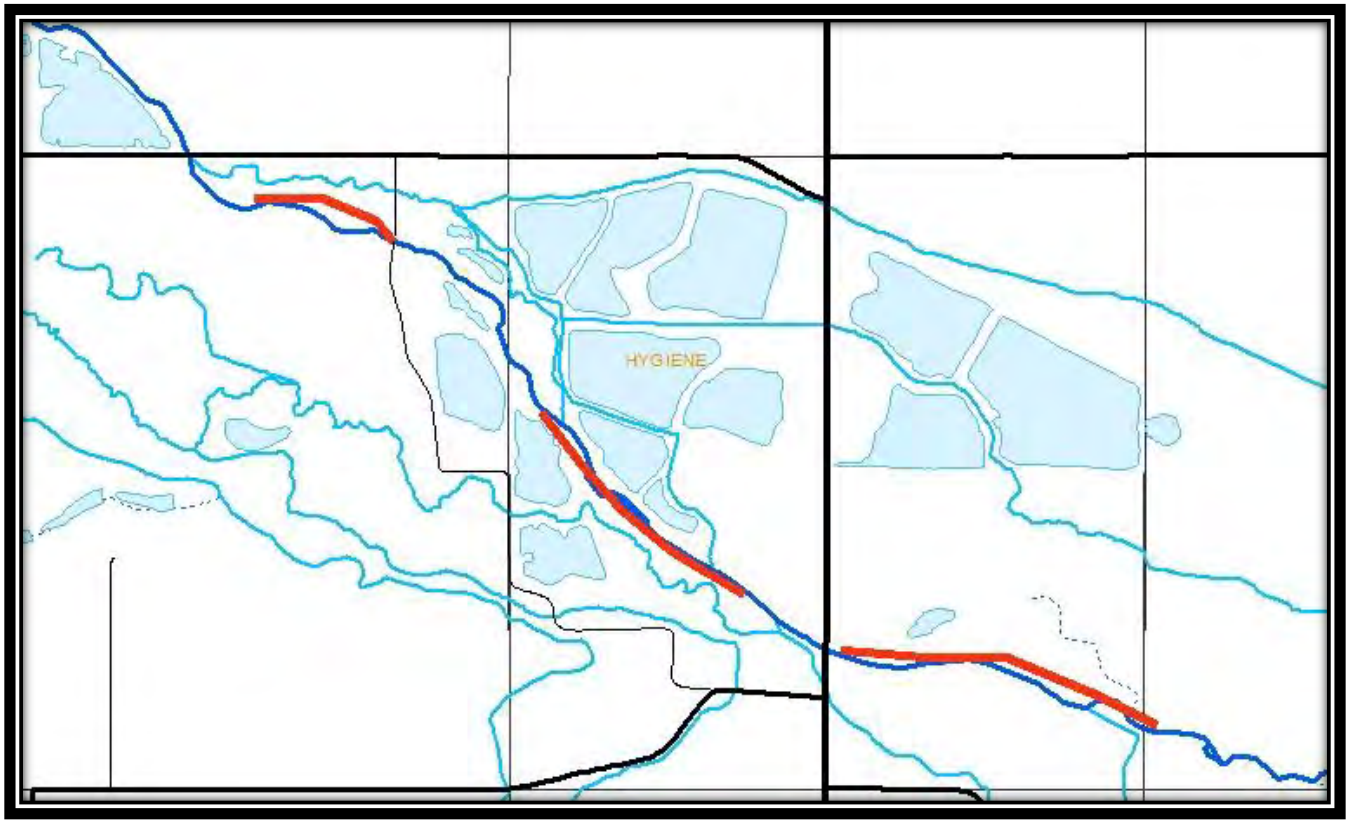
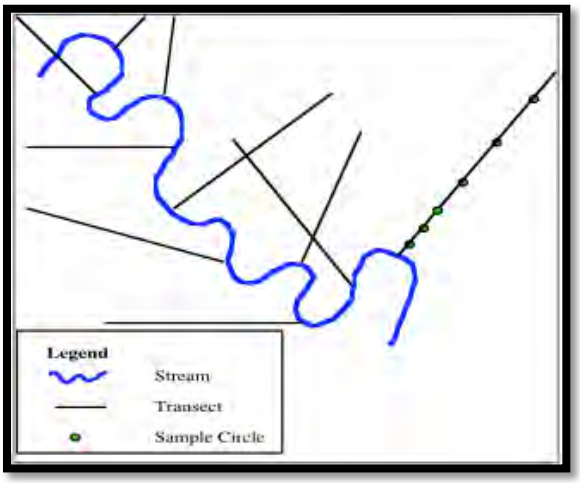


Figure 2: Trapping transects along St. Vrain Creek for small mammal study.

All captured animals were identified to species and the sex, reproductive status, and age were recorded. For PMJM, all captured individuals were photographed and all morphometric measurements (i.e. total length, tail length, ear length, right hind foot length, weight) were recorded for new captures. The location of the trap was also recorded using a GPS unit.

Habitat Monitoring: We monitored the vegetation in order to relate PMJM occupancy of a site to post-flood restoration and regeneration of the riparian habitat. The habitat monitoring protocol we used was adapted from the "Preble's meadow jumping mouse Habitat Monitoring Protocol" developed by Bear Canyon Consulting, LLC for the United States Air Force Academy, Colorado Springs, Colorado (Ruggles et al. 2004). In addition to the vegetation data, we recorded information on anthropogenic impacts, again, following the protocol developed by Ruggles et al. (2004).



Results

Our trapping efforts from the summer of 2014, one year post flood, documented PMJM presence at all sampled properties along St. Vrain Creek where PMJM had been historically captured. A breeding population of PMJM was also detected at a location on St. Vrain Cr. that had been previously trapped in 1997 and again in 2000 with no positive PMJM captures. This property now marks the eastern most documented capture of PMJM on the St. Vrain. The western boundary of this property is a bridge structure at the road-stream crossing and was thought to serve as an effective barrier to PMJM movement and dispersal. This is because a known population historically and currently exists less than a mile upstream from this site yet the new eastern site had remained unoccupied, until only recently. (This hypothesis has not been tested). It is not known whether the mice successfully dispersed to the new eastern property pre-flood, or if the flood served as a non-behavioral mechanism for dispersal,

depositing mice downstream. Monitoring this site will be critical in determining the long-term viability of this newly detected population.

All PMJM captures occurred along St. Vrain Cr. or the South Branch ditch, an irrigation ditch fed by St. Vrain Cr. No PMJM were captured at BCPOS properties on Left Hand Creek, Boulder Creek, Rock Creek, Coal Creek, or the intermittent stream sampled on Caribou Springs Ranch (table 1). Habitat at PMJM capture sites generally had some semblance of an intact riparian habitat.

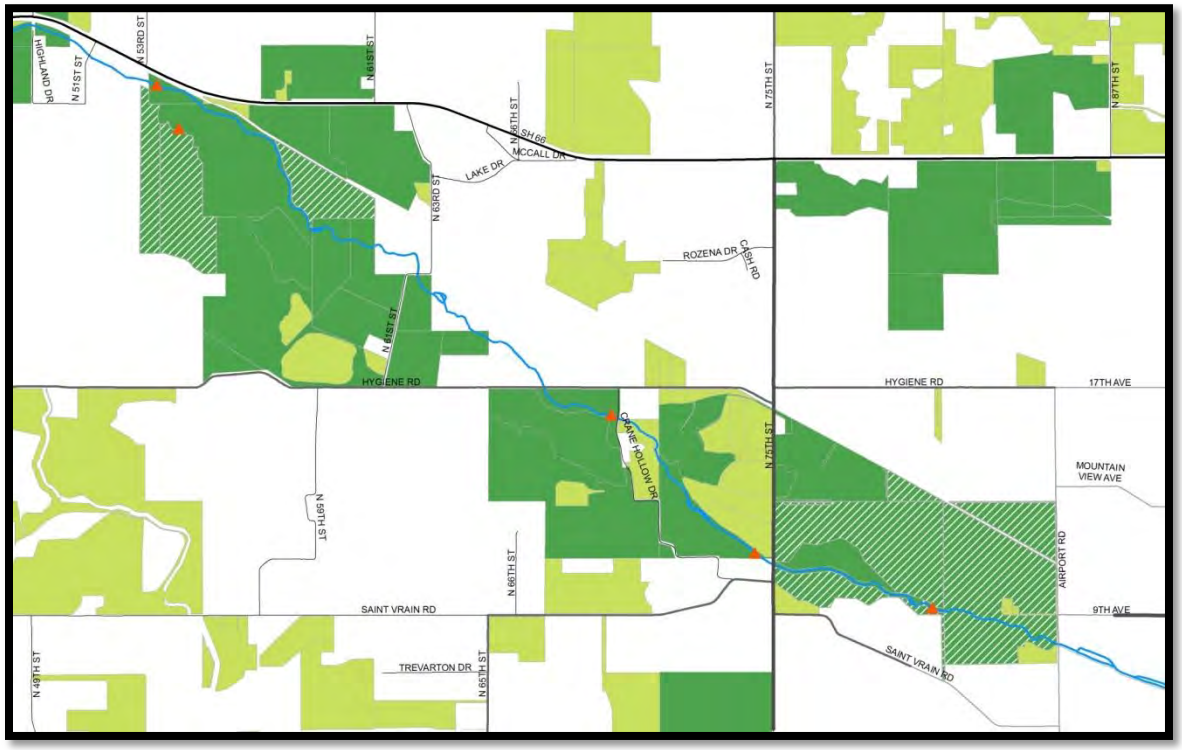


Figure 3: Sampling sites along St. Vrain Creek, summer 2014.

These capture data, in conjunction with vegetation surveys completed at each site, establish a year-one post-flood baseline that will be used to inform restoration work, guide management and land use decisions, and provide insight into ecological processes that influence PMJM population success and small mammal community composition in the wake of a large infrequent natural disturbance process. As monitoring continues over consecutive years, the value of this information will increase as we learn more about the successional trajectory of the post-flood riparian habitat and the associated responses of wildlife that inhabit it. Information from this study has already been used by Colorado Parks and Wildlife, the U.S. Fish and Wildlife Service, Boulder County, and the City of Longmont to guide flood recovery activities and mitigate potential impacts to PMJM. As many residents in Boulder County have questioned whether or not PMJM survived the flood, this study has provided evidence that they well adapted for survival in such a flood event and that continued efforts to conserve this species and protect existing populations are warranted.

Citations:

Ruggles, A. K., Whittemore, L. S., Armstrong, J., Clippinger, N. 2004. Preble's meadow jumping mouse habitat monitoring protocol. Prepared for the United States Air Force Academy, Colorado Springs, Colorado. Bear Canyon Consulting, LLC. Boulder, Colorado, USA.

Stream	*Chaetodipus hispidus*	*Microtus sp.*	*Microtus ochrogaster*	*Microtus pennsylvanicus*	*Mus musculus*	*Neotoma floridana*	*Neotoma mexicana*	*Peromyscus maniculatus*	*Peromyscus nasutus*	*Reithrodontomys megalotis*	*Zapus hudsonius preblei*	**Species Richness**	**Total**
BC			10	7	14			203		2		**5**	**236**
			2	2	10			219				**4**	**233**
CC			1	1				38		2		**4**	**42**
RC	1		25				17	118		1		**5**	**162**
		1	15	4	3		3	64		2		**6**	**92**
LHC	1		1	1			13	222	14			**6**	**252**
SVC				1	4			115			1	**4**	**121**
				7	4			158			6	**4**	**175**
			3	6	3			347				**4**	**359**
				5		2	5	164		1	2	**6**	**179**
			2		6			94				**3**	**102**
		1	15	5				195		13	10	**5**	**239**
			7	34			3	200			5	**5**	**249**
IS			55				9	77		6		**4**	**147**
Total	**2**	**2**	**136**	**73**	**44**	**2**	**50**	**2213**	**14**	**27**	**24**	**11**	**2588**

Table 1. Total capture numbers (including recaptures) of all species by site. (BC = Boulder Creek, CC = Coal Creek, RC = Rock Creek, LHC = Lefthand Creek, SVC = St. Vrain Creek, IS = Intermittent Stream.)

Breeding Birds Surveys

In order to assess flood impacts on avian diversity, the Wildlife staff expanded their existing Breeding Bird Survey (BBS) program to include more sample locations within the flood impacted riparian areas. Some of these points were previously established and sampled as part of our regular BBS program, putting us in a unique and serendipitous position of having pre-flood data to compare against post-flood data gathered as a part of the new flood related long-term monitoring program. The methods and protocol for establishing sample sites, sampling of these sites, and subsequent data analysis follow the existing protocol for the established BCPOS BBS program. The only modification is to the sampling schedule. The return interval for sampling these sites parallels the study design for the small mammal trapping program. We are using a three-year rotating panel design, where a subset of sites will be sampled each year, with sites being resampled every three years.

Fish Passage

Throughout every drainage in Boulder County the ditch infrastructure − essential to water delivery for agricultural irrigation, municipal water, and a variety of other uses − sustained significant damage from the flood event of 2013. As this infrastructure is critical to many citizens of Boulder County for their access to drinking water and the economic viability of their businesses, there was a substantial push to rapidly reconstruct this infrastructure in order to ensure water delivery during the coming water season. This meant that a number of instream diversions were slated to be rebuilt and thus provided an opportunity to engage ditch companies in conversations about incorporating multiple objective designs for their new diversion structures.

The design objectives would be to build a structure that: 1) Delivers the full decree of water to the ditch companies, 2) Is resilient to future flooding, 3) Passes native (and non-native) fishes, and 4) Facilitates natural stream processes, such as sediment transport. Wildlife staff took on the role of facilitating these conversations among stakeholders and coordinating efforts to support the implementation of such structures.

Our efforts were met with mixed success. Although there were many opportunities to pursue multi-objective diversion structures, there were also many challenges in the post-flood environment that resulted in a number of missed opportunities. There were significant permitting and funding impediments that deterred ditch companies from implementing multi-objective designs. Additionally, due to the rapid pace of reconstruction following the flood, the window of time to ascertain the needs in the water community and effectively engage the ditch companies was very narrow, as their needs to secure water delivery for the coming water season were urgent.

There were successes, however. We were able to help support the proposed implementation of one fish passage structure on South St. Vrain Creek that is currently in the permitting process and is scheduled to be built spring 2015. Wildlife staff aided in the development of grant applications that were awarded to the ditch companies and are fully funding the reconstruction of the South Ledge and Meadows Ditches diversion structure (see Grants section). We also have contributed, and are continuing to contribute in kind resources in the form of staff time, letters of support, construction materials (e.g. root wads), equipment, and design review. This project combines two diversion structures into one instream structure that facilitates passage of native fish and promote natural stream processes and

restores connectivity to unimpeded upper reaches of South St. Vrain Creek. It also serves as a demonstration of successful collaboration among public and private entities to meet multiple objectives.

Perhaps our greatest success has been the partnerships we have built though our multi-stakeholder collaborations that will forge ahead to pursue future opportunities to support conservation of our native fishes and aquatic ecosystems. Internally, we have worked closely with our Water Resources staff to build a better understanding of the complexities of water rights issues, ditch infrastructure and management, and the organization of water users in the basins. Outside of POS, we have developed a partnership among government and non-government entities geared towards working together to help ditch companies recover from the floods and benefit the streams and the native fishes that inhabit them through the implementation of multi-objective diversion structures.

Among the partners are USFWS, CPW, BCPOS, Trout Unlimited, St. Vrain Lefthand Water Conservancy District, the City of Longmont, and Colorado Water Conservation Board. We are currently building partnerships with municipalities to be more inclusive of water users in the basin. The participants of this group offer a tremendous amount of knowledge and technical expertise to aid in the implementation of structures that will benefit native fishes and natural stream processes. Additionally, this group has brought significant financial contributions to the table to fund these projects and are continuing to build strong partnerships. In 2015 we hope to successfully engage ditch companies and fund the design and construction of at least one multi-objective diversion structure on St. Vrain Creek.

Restoration Skills Development

The flood demanded that nearly everyone involved with flood recovery take on new roles, responsibilities, and subject matters with which they may have had minimal prior experience. Fortunately, the need for dissemination of valuable information for flood recovery was recognized and there were many opportunities to attend training, seminars, conferences, and workshops on a variety of subjects pertinent to stream restoration and flood recovery. Wildlife staff was eager to learn and build stronger foundations for the challenges of flood recovery that lay ahead. We took advantage of the

learning opportunities presented to us and were in attendance at a number of these offerings. Wildlife staff attended the following events:

a. Colorado Water Conservation Board and Colorado Parks and Wildlife − Fish Passage Workshop

b. Colorado Stream Restoration Network

    i. Colorado Flood Recovery: Tools For What's Next

    ii. Rosgen workshop

    iii. CSRN Runoff Preparation Knowledge Transfer Workshop

c. Small Mammal Trapping Training (specific to Preble's Meadow Jumping Mouse) −presented by Carron Meaney

d. Colorado Parks and Wildlife − Bioengineering Review Meeting

e. Sustaining Colorado Watersheds Conference

f. Ecological Integration and FEMA Hazard Mitigation Training

Critical Wildlife Habitat

Although management recommendation guidelines for the newly updated Species of Special Concern (SSC) and Critical Wildlife Habitats (CWH) were not integrated fully into our internal program of work, we utilized these designations during discussions and actions related to management decisions on several occasions, including:

CWH#76-The Eldorado Canyon to Walker Trails Study- BCPOS BLM South parcel is designated as due to its contiguous, unfragmented habitat value, and also for nesting raptors and hill-topping butterflies. This designation is being used in the Walker-Eldo Trails Study Analysis.

CWH#15- This area (west of Lagerman Reservoir) is designated as critical wildlife habitat due to nesting and wintering raptors and rare songbirds. It was decided amongst staff to restore this parcel and exclude grazing.

CWH#75- Ingersol Quarry. This area is designated due to its importance as a stable water source for many types of wildlife, and specifically, bats (designated SSC). In 2013, we buffered the quarry with a 34.5 acre buffer during Forestry treatments.

CWH#80-Giggey Lake-This area is excluded from grazing due to the diversity of breeding birds (several designated SSC) and vegetation.

CWH# 64-Southern Grasslands- one aspect of why this area was designated was breeding northern leopard frogs. In 2014, we drained a waterbody due to invasion by bullfrogs. This was active management on behalf of one of our CWHs and an SSC.

Avian Program 2014

Raptors

Raptor nests were again monitored in 2014 for productivity. Monitoring is done by BCPOS staff and volunteers, CPW and Rocky Mountain Bird Observatory Bald Eagle Watch. BCPOS Volunteers and staff monitor golden eagle, osprey, and prairie falcon nests. Volunteers (6) contributed **292** hours to this effort in 2014. All nesting information was sent to the University of Colorado for inclusion into the annual cliff-nesting raptor report for the Front Range (golden eagles, prairie falcons and peregrine falcons.)

Bald Eagle Nest Monitoring

We continued to coordinate monitoring five bald eagles nests on POS property with Colorado Parks and Wildlife.

In 2014, observations of the Western Mobile nest recorded two potential dates for onset of incubation, as the female appeared to settle onto eggs, but was then observed off the nest during a high level of human activity in the area in late February. The nest was confirmed a failure when the female left the nest during the final days of incubation and did not return. From 2011-2013, nesting attempts have been successful at Western Mobile, producing 2-3 fledglings each summer. The potential for disturbance to this nest is high, given the proximity to roads and high visibility. Additional signage has been installed to discourage trespassing on the private road next to the nest, and encourage the public to view the nest from their vehicle. The former Braly nest location remains an important roost site for the Western Mobile pair.

Since 2011, a pair has claimed the Lagerman Reservoir area as a territory. Appearing in 2010, nest building in 2011, and commencing regular nesting since 2012, the Lagerman pair failed in their first attempt. However, both nesting events in 2013 and 2014 produced two fledglings.

In 2006, a pair of Bald eagles began nest-building on County Open Space south of Longmont near County Line Road. This pair did not nest successfully until 2008, but fledged 12 young from 2008-2014. This site was observed by Steve Jones to record the pair's response to construction of sewage line within 400m of the nest during September and October of 2010. Disturbance was noted as mid-October approached and construction activities remained within 100m of the nest. In September and October of 2014, special monitoring of the pair again occurred due to the post-flood reconstruction of the County Line Bridge. Final stages of construction continued within 400m of the nest into mid-October, and the pair began building an alternate nest to the east.

In 2012, a pair began nesting in a tree just south of the county line, but due to the proximity of Boulder County owned land, this site has been monitored by County staff and volunteers. The pair nested successfully in 2013, during which a Take Permit was acquired for construction of a housing and recreation development west of the nest. The development converted approximately 100 acres of adjacent open land. At the time of this writing (February 2015) the pair has constructed a partial nest on Rock Creek Farm approximately .7miles from the original nest, but have returned to commence building on the original nest

The Panama Reservoir pair continue to successfully nest since 2006. The 2014 season was particularly successful with all three nestlings surviving to fledge.

During the breeding season, bald eagles are sensitive to a variety of human activities. However, behavioral variation exists in response to type and duration of disturbance activity, and in this way not all eagles respond similarly. Some eagles nest successfully while in close proximity to human activity, while others abandon sites in response to activities outside of recommended buffers. The variability in responses may be due to visibility, duration, noise levels, extent of landscape change, and an individual bird's experience.

2014 Results

Nest Location -Bald Eagles	Number of Fledglings
Panama Reservoir	3
Keyes	2
Hygiene	Fail
Lagerman Reservoir	2
Stearns Lake	Fail

Golden Eagle Nest Monitoring

Staff and volunteers monitored the seven known golden eagle nest sites on BCPOS properties in 2014. Two previously unknown nest sites near BLM South were monitored by OSMP staff in 2014. Multiagency collaboration was organized by CDOT to guide and support post-flood highway repairs planned for Highways 7 and 36 outside of Lyons. To facilitate resource cataloging along Highway 7, POS staff, USFS, CDOT and CU biologists convened and mapped sensitive resources such as raptor nest sites along the St. Vrain Highway 7 corridor.

2014 Results

Nest Location-Golden Eagles	Number of Fledglings
Heil Valley Ranch	2
Heil Valley Ranch	Fail
Wyn/Forsberg	2
Meadow Park	Not active

Rabbit Mountain	1
BLM South	Fail
BLM South	Fail

Burrowing Owl Nest Monitoring

In 2014, only one nest site was located on Boulder County properties, a stark decline from previous years. A very wet, cool Monsoonal rain year resulted in high vegetative growth through the spring season, making potential nest sites unsuitable or undesirable to burrowing owls. OSMP also reports fewer nests at known sites.

2014 Results

Nest Location -Burrowing Owls	Number of Fledglings
Southwest County	0
Northwest County	0
Northeast County	4
Southeast County	0

Osprey Nest Monitoring

BCPOS staff and wildlife volunteers monitored osprey nests at Lagerman Reservoir, Western Mobile, and the St. Vrain private Conservation Easement platform. We monitored the osprey platform at Boulder County Fairgrounds using a remote camera linked to an online hosting website. The osprey-cam allows anyone to observe the nesting activity in real-time, day and night.

Returning ospreys used platforms at Lagerman and the conservation easement on St. Vrain Road in 2011-2014. New platforms were installed by the City of Longmont (75th and Nelson Rd.) and Longmont Power (owned by Martin Marietta Materials) adjacent to BCPOS Toteve property.

2014 Results

Nest Location-Osprey	Number of Fledglings
Lagerman Reservoir	2
Fairgrounds	1
Conservation Easement – St. Vrain Road	2
Western Mobile\Toteve	2
75th and Nelson	1

Prairie Falcon Nest Monitoring

Staff and volunteers determined known nesting sites were inactive during the 2014 season, however prairie falcon sightings were recorded throughout the season. All nesting information was sent to the University of Colorado for inclusion into the annual cliff-nesting raptor report for the Front Range (golden eagles, prairie falcons and peregrine falcons.)

2014 Results

Nest Location-Prairie Falcon	Number of Fledglings
Walker Ranch	Inactive
Hall Ranch	Inactive
Heil Valley Ranch	Inactive
Heil Valley Ranch	Inactive
Steamboat Mountain	Inactive

Northern Goshawk Monitoring

In 2014, surveys for northern goshawks were conducted in targeted areas along the Peak-to-Peak corridor. It was an unusual year with all known 9 countywide territories active. Spring collaboration with USFS resulted in locating and mapping 3 additional nests, and a third party reported locating a nest in a formerly surveyed area with positive detections.

2014 Results

Nederland Area- Broadcast surveys were conducted in several locations of south of Nederland and along the Boulder Creek corridor. One known site was inactive, with ravens nest-building in an adjacent tree. An alternate nest site was found recently occupied later in the season.

Ward Area- Dawn Acoustical surveys were performed near Duck Lake with no detections. An alternate nest site was confirmed active following displacement of the pair by great-horned owls. The site is assumed to have successful fledging due to the aggressive defense of the territory by the adults.

Peaceful Valley- Broadcast surveys were conducted on Boulder County and USFS land in the area of Peaceful Valley, with no detections. Wildlife sign observed during the survey determined the area used by raptor species, possibly Cooper's Hawk.

Breeding Bird Surveys 2014

In 2012, breeding bird survey methodology was updated to follow the 2011 Rocky Mountain Bird Observatory design which selects survey points in a spatially balanced way, and includes distance sampling as part of the field protocol. Selection of new survey points was done using a combination of Program-R and ArcMap, and continues to be used to select new points for new baseline surveys. Current breeding bird surveys are conducted using the distance sampling protocol, with preliminary data analysis forthcoming. For a description of the site selection and methodology, refer to 2012 and 2013 Annual Reports.

The third year of baseline surveys at BLM South was cancelled due to road damage and access issues, and additional sites along the St. Vrain were surveyed as part of post-flood monitoring.
The following properties were surveyed in 2014:

-
- Gage, Pella Crossing and Golden-Fredstrom
- Hall Ranch
- Hall-II
- Southeast Buffer
- Two Creeks
- Walker Ranch
- Western Mobile/Braly

All point count stations were surveyed four times during the timeframe of May 15 through July 15. Selection of properties to be surveyed was based on the need for monitoring post-flood conditions along the St. Vrain corridor, continuation of baseline/trend monitoring via long-term survey schedule or in response to future management activities. All surveys were conducted by wildlife staff. Resource protection assisted with Hall Ranch and Hall-II surveys (Denny Morris and Kevin Grady).

Results

Results from these surveys, including species detected and relative abundance indices are on file and can be accessed via communication with wildlife staff at Parks and Open Space. Pilot data collected using the new spatially balanced method will not be available until staff evaluates use of this method on BCPOS.

Bluebird Nest Box Project

In 2014, volunteers from both BCNA and Boulder County Audubon Society (BCAS) monitored approximately 100 bluebird nest boxes. The box routes are located at Heil Valley Ranch, Betasso Preserve, Walker Ranch, Minnick and Bald Mountain. At the end of 2013, after two seasons of high predation rates, staff tested the use of predator guards on 7 boxes at Bald Mountain. In 2014, Bald Mountain nest attempts were successful with the added protection of the predator guards. As in previous years, all data are being shared with the Cornell Lab of Ornithology Nestwatch Program, which monitors nest box data nationwide. For the first time since the start of the program, volunteers were given access to enter their own data on the Cornell site.

Volunteers worked in pairs and visited their assigned nest box route approximately once per week. Despite a late start to our 2014 season due to flood-related access issues, **18** volunteers contributed **700** hours to this project between April and September.

Waterfowl Monitoring Project

The aquatic bird volunteers covered 33 water bodies on five major plains aquatic habitat areas; Braly/Western Mobile complex, Pella Ponds, Kenosha Ponds, Hodgson Harris Reservoir and Walden Ponds. All aquatic species seen during these visits, including wading birds and shorebirds are recorded in a county hosted online database. The September 2013 flood event caused damage to all monitoring locations and the volunteer effort was temporarily suspended due to access and safety concerns. In late spring of 2014, the Waterfowl Monitoring Program was restructured and a volunteer coordinator was sought through BCAS. Following 4 hours of in-house training, and field training provided by Bill Kaempfer, 18 volunteers contributed **410** hours to surveys and data entry.

Owl Prowl – Nocturnal Owl Surveys

Very few nocturnal owl surveys have been performed on Parks and Open Space properties due to the wintery conditions and late evening hours required. In 2014, a biologist-led, public evening owl survey was piloted with positive results. Volunteers and staff met at designated trailheads, and surveyed predefined routes along POS trails and access roads. Volunteers were provided with mapped survey routes and coordinates prior to field work, and logged personal GPS units with the survey points beforehand. The Owl Prowl is a passive-listening survey only, no call playback is used. Fifteen volunteers surveyed 6 sites and contributed **161** hours.

Results

All surveys were conducted between 7pm and midnight at Betasso Preserve, Hall Ranch, Heil Valley Ranch, Rabbit Mountain, and North Point. Additional driving surveys were performed by two volunteers surveying the Louisville and Southeast buffer areas. At each location, one or more Great-horned owls were detected, and at Hall Ranch, Northern Saw-whet and possibly Barn Owl, were detected.

Wintering Raptors – Boulder County Nature Association

Wildlife staff continues to acknowledge the ongoing support from members of Boulder County Nature Association who contribute to a variety of field surveys. In an effort to support the data collection of the

long-running Wintering Raptor Surveys hosted by BCNA, staff designed an online data-entry form with updated maps and adjusted protocol.

Mammals 2014

Prairie Dog Management

Relocation

In 2014, no relocation efforts occurred. This is due primarily to the 2013 flooding event taking precedence in our program of work. Additionally, several acres of active colonies were lost due to the flooding, and assessments of these losses became our priority.

Flood Impacts

Several properties containing active colonies were impacted by the flood event. For instance, Western Mobile "West" is now covered with cobble where there used to be a 30 acre colony. Additionally, portions of the Alexander Dawson property received significant flooding and approximately 20 acres of colony are now covered in a cobble layer. Impacts to a small colony on our Keyes North property occurred as well, and it remains to be seen if the area is still inhabitable. The rocks and cobble may support plants in the future, and therefore prairie dogs may recolonize, but it remains unknown if they'll be able to burrow through the thick rocky deposits.

Trapping and Removal

Removal via trapping of prairie dogs occurred on 8 properties in 2014. All of these properties are designated as No Prairie Dog (NPD). A total of 1,226 prairie dogs were successfully trapped in 2014. Of these, 634 prairie dogs were contributed to the U.S. Fish and Wildlife Service Black-footed Ferret Recovery Facility, 592 were contributed to the Birds of Prey Foundation. Trapping occurred on the following properties: AHI, IMEL, Lagerman, Alexander Dawson, Suitts, Warembourg, Hodgson Harris Reservoir and Imel West.

Lethal control occurred on 39 properties, 33 of which are designated as NPD, and 5 as MOA and 1 undesignated (Heil II). Some of these properties were trapped first, as referenced above, then received lethal follow up. These properties are as follows: AHI, IMEL, Lagerman, Suitts, Warembourg, Alexander Dawson.

Tenant Control

Prior to the control moratorium time period (March 1-May 31), tenants controlled prairie dogs on their properties. These properties were Warembourg, Eddy, Imel, Leonard, Rock Creek Farm and Becky. After the moratorium time period, nine permits were issued and two of those tenants treated prairie dogs on the properties Leonard and Beecham Roberts. All tenant control activities are only allowed on NPD designated properties, and colony sizes must be less than 50 animals.

Property Designation Update

Newly acquired properties in 2014 were designated as follows:
Elliot- NPD due to irrigated croplands.
Loukenon Parcels- These parcels are being acquired over time by the County. As such, all parcels are to be designated as NPD until all parcels are acquired (will occur 2019). At that time, a comprehensive plan will be crafted for the entirety of the properties as a whole.

Designation Changes Update

In 2012, changes were made to two property designations. The first, Darby, was changed partially to an MOA due to the presence of burrowing owls. (65 acres were changed from NPD to

MOA). Secondly, the AHI Turkey Farm property (west end of Lagerman Reservoir) was partially changed from NPD to MOA. This is due to the overlapping designation of this area as Critical Wildlife Habitat #15. This CWH designation is due to the presence of northern harriers, savannah sparrows, short-eared owls and burrowing owls. A total of 76 acres were changed from NPD to MOA.

In 2014, the decision to restore CWH #15 occurred. This area will be planted with a cover crop, then natives, and fencing will be moved to exclude the area from cattle grazing. No prairie dogs will be removed during the restoration process, due to the potential return of nesting burrowing owls.

Mapping

We completed comprehensive mapping of colony extent within our properties in 2014. Included below are acreage totals for 2014, and associated percentage occupancies. The 2012 table is included to allow for comparisons between 2012 and 2013.

Table 2: Percent Occupancy of Designated Property Management Categories- 2012, 2013, 2014

	Property	2012	% Occ.	2013	% Occ.	2014	% Occ.
Designation	Total Acreage Acres	Colonized Acres Acres		Colonized Acres Acres		Colonized Acres	
HCA	3,326	398	12%	535	16%	339	10%
MOA	4,419	760	17%	965	22%	841	19%
NPD	17,198	472	2.7%	368	2.1%	287	1.6%

Table 3: 2009-2014 Black-tailed Prairie Dog Colony Occupancy Acreage Change and Average

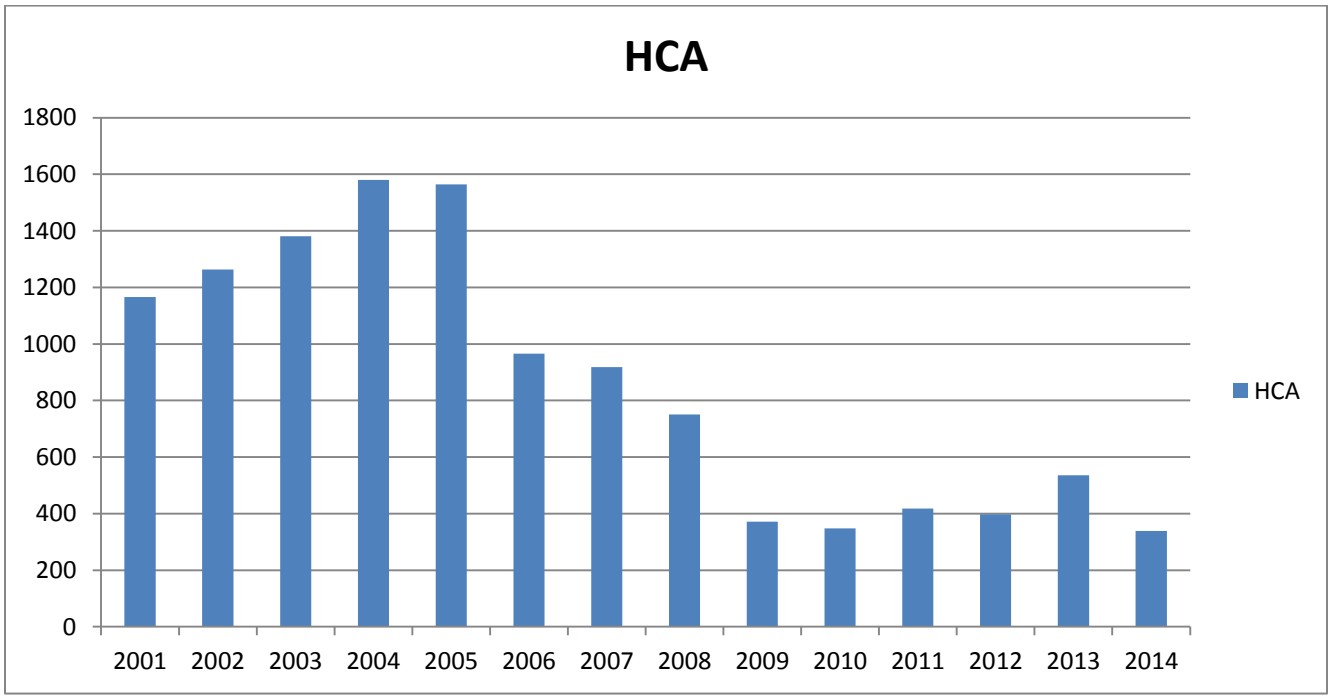
	2009	2010	2011	2012	2013	2014	2009 - 2014 Avg.
Designation	Acres	Acres	Acres	Acres	Acres	Acres	Acreage Avg. Acres
HCA	371.47	348.41	418.43	397.92	535.13	339.3	401.77
MOA	784.07	685.62	766.07	760.66	965.16	841.1	800.45
NPD	489.53	344.57	371.95	472.01	368.36	287.0	388.90
Total	**1,645.07**	**1,378.6**	**1,556.45**	**1,630.59**	**1,868.67**	**1,521.4**	**1,591.12**

Stakeholders Meeting–November, 2014

As part of the Prairie Dog Management Plan Update in 2012, BCPOS committed to holding annual stakeholders meetings. In 2013, this did not occur due to the flooding event. However, it was held in November 2014. Topics covered included:

- Colonized Acreage of Prairie Dogs Per Property Designation Category (HCA, MOA and NPD),
- Overview of newly acquired Property and Designations,
- Flood Impacts to Prairie Dogs and recovery
- Relocation site at Rabbit Mountain update
- Reintroduction of Black-footed ferrets Potentials,
- Burrowing owl nest success 2013, 2014
- Restoration of CWH#15 (AHI Turkey Farm, west side of Lagerman Reservoir)
- Prairie Dog Vegetation Monitoring Results and Analysis
- Restoration Criteria as related to Prairie Dog Reintroductions and Resiliency
- Restoration Projects initiated since 2012
- Lower Boulder Creek Project.

Figure 4: Summary of Colony Size on HCAs, 2001-2014



Active prairie dog colonies located within Habitat Conservation Areas have decreased since the highest level in 2004. This decrease is due to plague and slow recovery times, post plague. We have also seen decreases due to lost habitat during the flood event of late 2013 (note: annual mapping occurred prior to September 2013, so loss of colonized acreage due to the flood is reflected in 2014).

Barrier Fencing

Barrier Fencing was erected or re-enforced at the following properties: Suitts, Hicks, Rock Creek Farm and Keyes North. Many of these projects were accomplished by volunteers and so are detailed in the "One Day Volunteer Projects" Section.

Volunteers and staff working on erecting barrier fence at Carolyn Holmberg Preserve.

Black-Footed Ferrets Relocations

As part of our long term planning for our HCAs, recently, we've been researching whether we have the capacity to become a black-footed ferret relocation area. State legislation has recently changed so that local governments are now able to accept ferrets in Colorado, if the local conditions meet the qualifications required.

Those qualifications include having 1,500 acres of active prairie dog colonies. This number is based on the home territory size for a single female ferret, and how many ferrets are needed to self-sustain a population. USFWS goal for adults is 30+ breeding adults per release site with the ratio being 20 females to ten males.

We've been working with OSMP to determine if the **South Central Grasslands** may be large enough to accommodate ferrets. Historically, the highest level of occupancy was 1,400 acres combined of prairie dog colony coverage.

Staff from OSMP and BCPOS met with USFWS in December 2014 to discuss the potential of accepting ferrets, and what our current conditions are related to active prairie dog colony extents. We inquired about the inclusion of Rocky Flats into a larger contiguous area, as it is adjacent (separated by Highway 128) with our combined property ownership. Currently we are awaiting a response.

Another potential property is Rabbit Mountain. At its maximum occupancy, there were 1,574 acres of active prairie dog colonies. In summer 2014, USFWS dusted 3000 burrows at Rabbit Mountain as a precaution against plague. With protections over the next several years, we are hopeful that our acreage of colonies at Rabbit Mountain will increase back to its high numbers. Currently there are 350 acres of colonies.

Remote Camera Surveys

The use of remote cameras to collect data on species use continued in 2014 at the Hall and Heil properties. Selection of properties for camera studies is based on management planning schedules, previous data or a need for baseline inventory. Hall II was prioritized for camera surveys in 2012 in order to capture a high volume of data in preparation for the upcoming planning process for that property. New sites were included in 2014, in addition to a subset of sites revisited to collected seasonal data. The September 2013 flood event destroyed one camera along the St. Vrain on Hall-II and limited access to all sites for the remainder of the year. Cameras resumed operation at the start of 2014.

Photographic wildlife data is an exceptionally useful tool in drafting management recommendations and providing habitat assessment for staff. In 2014, a summary of the remote camera survey program was presented to Boulder County Commissioners, the Park and Open Space Advisory Committee and resource management staff at BCPOS.

Front Range Cougar Study – Wildlife staff and Colorado Parks and Wildlife biologist Mat Alldredge presented results and continued direction of the Front Range Cougar Study to the Board of County Commissioners in December 2013. The BOCC granted an extension of the program on POS lands to continue several study lines. The primary study emphasis is on DNA capture and analysis that can lead to population estimation. Hair snag sites are distributed along Front Range foothills habitats from Lyons to Golden, with multiple sites on Hall Ranch, Heil Valley Ranch, and Walker Ranch. Wildlife staff and Resource Protection staff are working with CPW to ensure safe operation of these sites and reducing their impact on habitat, animals, and visitors.

Elk Movements, Herds, and Habitats – Procurement delays, schedules, and weather conspired to delay radiocollaring elk for study in 2014. CPW has five radiocollars ready to be placed in 2015 on animals at Rabbit Mountain, and Heil Valley Ranch. Each of those herds has increased in their overwintering population over the last several years (Rabbit-from 40-60 in mid-2000's to nearly 180 in late 2014). While it is unclear whether the increase is due to population growth of the Rabbit Mountain herd, or immigration of additional animals to the overwintering population at Rabbit Mountain, CPW has reported an increase in crop damage payments to neighboring landowners to the east. For its part, CPW has attempted to address neighbor concerns by establishing Special Hunt Units on these private lands, and have had limited success.

The telemetry study will determine movement patterns, habitat use, migration routes, distribution, and summer/winter population estimates. Most of those parameters are known for the North Boulder elk herd that utilizes Heil Valley Ranch as winter range, but new collar information will update them, and perhaps give some insight into the growth of this herd (from 175-200 in mid-2000's to nearly 300 in late 2014). Corroborating and determining movement timing and corridors is important to managing habitat for these herds.

Centennial Ranch. 17 December, 2014.

Fisheries Program

Recreational

The past year was a tepid one for recreational fisheries on BCPOS. The best local fishery (Pella Crossing) is still out of commission. Some trail work has been completed, but breaches still exist in Heron Lake, Dragonfly Pond, and the massive breach at Webster Pond. The large void that swallowed the parking lot has been re-filled, but we are awaiting FEMA approval to begin repairs on the trail system and breaches. The situation is very complex and the immense structural damage is very expensive to fix. It would be optimistic to expect any public access in 2015.

Walden Ponds has fared much better and was open for all of 2014. Most of the FEMA-approved work there has been completed, except for the two breach repairs (at Bass Pond and Cottonwood Marsh). Engineering and design work is near completion, and those two breaches, and the trails atop them, should be repaired in 2015. Wildlife staff worked with Plant Ecology and Water Resources staffs to ensure that future water levels (as a result of the breach repairs) will maintain the ability to manipulate water and will be similar in their pre-flood depth and surface water extent. This will serve to keep the riparian habitat sub-irrigated and viable and reduce or eliminate a mud-flat ring of altered shoreline due to a permanently lower water level.

Separating Cottonwood Marsh from Wally Toevs Pond should improve the water quality, temperature, and fishing at Wally Toevs. Currently, the shared water supply is negatively affecting the fish in Wally Toevs. The stocking program and fishing events at Wally Toevs Pond occurred as scheduled, but the fishing was poorer than in the past with the water quality issues of the joined ponds to blame.

Duck pond received fish stock and upgrades from the Fishing-is-Fun Grant. However, the connecting pipe with Cottonwood Marsh is leaking and will need repair in 2015 to maintain water levels. We are hopeful that repairs can be affected in the spring, prior to peak run-off, to be able to store water (or replenish it if we need to lower levels to fix the drain).

New fishing platform at Duck Pond/Walden Ponds (May 2014).

Amenities
The Fishing-is-Fun grant for Walden Ponds and Webster Pond/Pella Crossing was completed in 2014. The grant upgraded or installed 19 items, including seven fishing platforms, at Duck Pond, Wally Toevs Pond, and Webster Pond for anglers and for fish. Most of the fish habitat structures were completed as part of an Eagle Scout project! Fish habitat structures are planned for fall of 2015 for Lagerman Reservoir with the aid of the Lefthand Outdoor Challenge program run by POS Resource Protection. Planning will also commence on some shoreline amenities at Stearns Lake and Cattail Pond.

Amphibians 2014

Northern Leopard Frog
The Northern Leopard Frog (*Lithobates* (=Rana) *pipiens*) (NLF) underwent review by the US Fish and Wildlife Service to determine if protection under the Endangered Species Act (ESA) was warranted. On October 5, 2011, the USFWS published its decision that this species does not merit protection under the ESA. This decision was based on the determination that the eastern population of NLF is not distinct from the western population. As the eastern population is more numerous, it was decided that listing was not currently warranted. http://www.fws.gov/policy/library/2011/2011-25498.html

However, this species has declined precipitously within Boulder County. It used to be quite common, but its decline has coincided with habitat loss and alteration, invasion by American bullfrogs and infectious diseases, such as chytrid fungus which is easily transferred between water bodies.

It is considered a sensitive species by USFS, BLM and CPW, and is on both the County's Species of Concern List, and is one of our program's selected indicator species.

Management considerations for this species involve limiting impact to breeding sites. To protect one of the most consistent breeding sites located on BCPOS lands, we have implemented, with our agricultural staff, a fencing project to restrict cattle and human access to this area.

As a program we are looking at providing protections for these frogs, in collaborative efforts with our plant ecology staff, such as habitat restoration. In all post-flood restoration efforts, we will ensure this species is considered in designing habitat characteristics such as areas of meanders which provide slow moving, shallow water which is what this species requires.

In 2014 we surveyed known and potential habitat including areas of the southeast buffer and one known breeding site near Lyons. Only a few, single individuals were seen during the course of the summer at the south buffer locations, and the southern documented breeding site had a single NLF present and a small population of tiger salamanders. The Lyons breeding site, which had over a dozen metamorphs in 2013, had no Leopard frog activity confirmed after nearly weekly visits over five months. Flood-related heavy clay erosional deposits from the hillside may have impacted the site, as even the tiger salamander population appears to have diminished significantly.

At the small breeding site near the Coalton Trail, a new, small population of bullfrogs appeared. Known to be a competitor and predator of NLF, and considerably difficult to eradicate, removal measures were taken in the fall of 2014. After considerable research and testing spotlight/gigging methods and following field experience with OSMP to pump a small pond south of Boulder, it was decided to move forward with reducing the water level in the breeding pond to a level unsuitable for maintaining bullfrogs. Wildlife staff coordinated with both Agriculture and Water Resources departments to facilitate pumping the stock pond to a level that would allow any remaining water to freeze solid over winter. The reduction in water level would make the pond unsuitable to bullfrogs and freezing would reduce the survival of any remaining individuals, tadpoles or young of the year. Excess water was pumped uphill and allowed to slowly percolate into the lower reaches of the drainage to reduce erosion potential. The remaining 4-6" of water supported a small population of larval salamanders which hibernate below the substrate during the winter months, and froze repeatedly during the winter of 2014/2015. It is thought that Northern Leopard frogs are migrating over land to this site early in spring, and not overwintering at this location.

BCPOS wildlife staff also followed up with a single visit to Pella Crossing following a CPW report stating the presence of NLF in a survey location. In the survey location, a number of bullfrogs were present, but no NLF was found. A follow-up visit to specifically look for NLF in this area will be planned for 2015.

Reptiles

There was one report and photograph of a single Spadefoot Toad during the summer of 2014.

Since 2012, wildlife staff has confirmed the presence of Short-horned lizards in the south central county. Annual walking surveys are performed, and in 2014 the surveys were performed in August during the time short-horned lizard females give birth to live young. Adult females and a low number of young were detected at three sites. Data from these field surveys is recorded in a geodatabase.

Natural Resource Monitoring and Long-Term Monitoring Programs

Volunteer contributions to the Wildlife program are essential to our success. In 2014, our total numbers of volunteers and their contributions increased.

Table 3: Total Volunteer Numbers and Hours 2010-2014 (Natural Resource Monitors and Long-Term Monitoring Programs Combined

	2010		2011		2012		2013		2014	
Program	Vols	Hours	Vols	Hours	Vols	Hours	Vols	Hours	Vols	Hours
Long-Term Monitoring	51	2105	94	2464	99	2466	80	1942	105	2620
Natural Resource Monitors	9	230	10	40	9	74	10	92	4	16
Totals	60	2335	104	2504	108	2540	90	2034	109	2636

Natural Resource Monitoring Program-Wildlife-Related Projects
The Natural Resource Monitoring program was initiated in 2009, in an attempt to incorporate long-term monitoring projects into the BCPOS overall volunteer program. The recruitment process is overseen by Education and Outreach staff, and the projects are designed and coordinated by wildlife staff.

Abert's Squirrel Monitoring

The access road to Heil Valley Ranch experienced severe damage in the 2013 Flooding. Its closure did not allow for safe access in the time window of the monitoring for Abert's squirrels. Monitoring will resume in 2015. The goal of this monitoring is to gather before/after data as well as squirrel responses to forestry treatments. This information is helping us develop our forestry prescriptions and operations to reduce impacts on squirrels and to retain them in areas of harvest/treatment. We are especially interested in transects that are located in the controlled burn done in October 2014.

Shrub Monitoring (Mountain Mahogany)

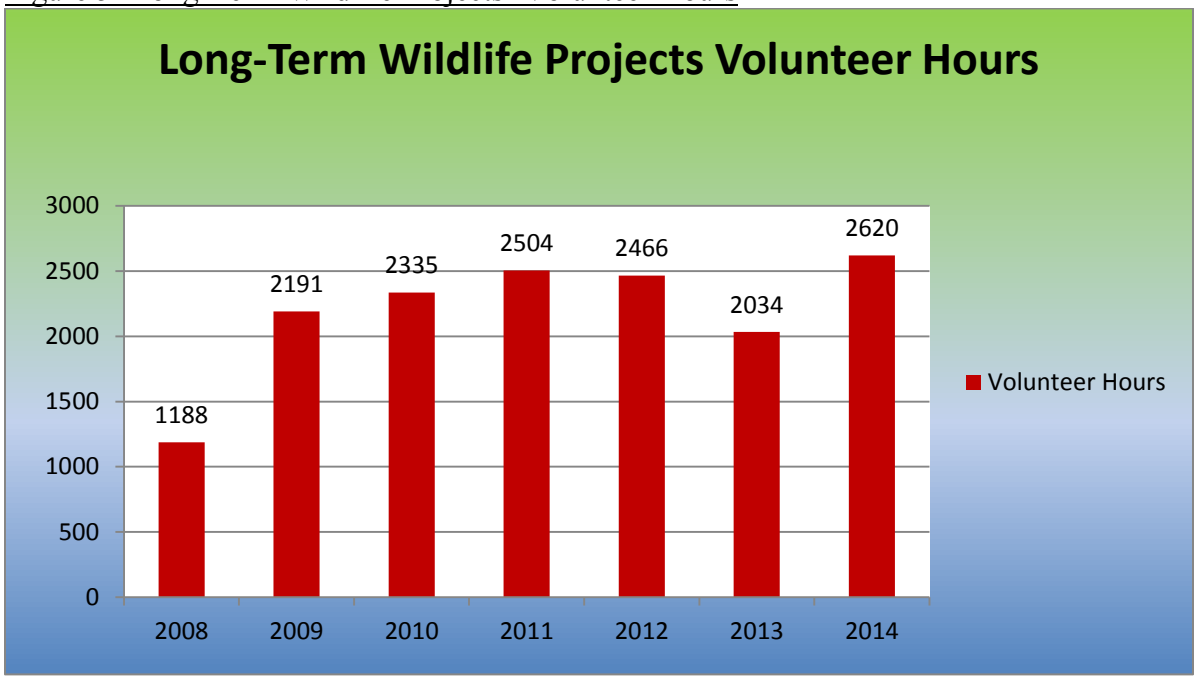
Staff continued to monitor shrub stands in Foothills ungulate winter range. In the fall/winter of 2014, volunteers established and read two new transects at Heil Valley Ranch. The goal of this monitoring is to gather stand information that may lead us to treatment options (cutting or burning) to improve habitat quality and diversity. Four volunteers contributed 16 hours to this program. Volunteers will also be recruited to establish 2 new lopping trials at Rabbit Mountain in spring 2015.

Volunteers on shrub transect at Heil Valley Ranch, Fall 2014.

Long-Term Monitoring Programs
These programs were initiated in the wildlife department. As wildlife monitoring is typically implemented to determine baseline, or trends over time, ongoing, long-term projects are a good fit for the needs of the wildlife department's scope of work.

In 2013, the number of volunteers utilized decreased in response to shifting program needs. Fewer agriculture properties were available for monitoring burrowing owls, post- trail construction breeding bird surveys along the picture rock trail were completed, two bluebird routes were discontinued for predation issues, and the September floods temporarily suspended volunteer efforts to survey waterfowl. 2014 bought new opportunities for volunteer involvement, and temporary suspension of some programs resulted in renewal of the volunteer base and updated structure. While some programs were late to start, yielding to post-flood access issues, other programs such as the pilot Owl Prowl presented opportunities for volunteer involvement in wildlife surveys.

Figure 5- Long-Term Wildlife Projects- Volunteer Hours



Bluebird Program

The bluebird monitoring program is a partnership with Boulder County Audubon Society. The program was initiated in its current form in 2005, and we now monitor 111 boxes on BCPOS properties. The boxes are located at Heil Valley Ranch, Betasso Preserve, Walker Ranch and Bald Mountain. Additional routes monitored on OSMP's Shanahan Ridge and Eldorado areas were discontinued due to repeated predation issues. We continue to share a route with the US Forest Service on the Minnick property north of Caribou Ranch Open Space. Volunteers typically work in pairs and monitor boxes approximately once every ten days during the breeding season, late April to early August. They record species and number of fledglings for each box used. Each route had up to 14 boxes and the project was successful due to dedicated volunteers, including outstanding volunteer project coordinators. Despite discontinuing two routes and an abbreviated season due to the flood event, **eighteen** volunteers contributed **700** hours to this program in 2014.

Breeding Bird Surveys

BCPOS has been recording information on birds on county open space properties since 1976. Historically, surveys included anecdotal observations during field visits and point counts. In the past decade however, we have adopted the Rocky Mountain Bird Observatory protocol for standardization of data collection. In 2014 **one** volunteer completed the post-trail construction bird surveys along the Picture Rock trail at Heil Valley Ranch and contributed **15** hours to the survey effort in 2014.

Burrowing Owl Monitoring Program

This program was initiated in 2008 by BCPOS. In 2009, a partnership arrangement was proposed to Boulder County Nature Association and Boulder County Audubon Society. Currently, this program represents a large-scale, comprehensive volunteer monitoring program for burrowing owls. The survey methodology developed by the Colorado Division of Wildlife is used, as it has high success in determining presence and absence of burrowing owls if repeated four times during the breeding season (April-mid August). In 2014, volunteers helped look for owls on more than forty properties. **Forty-one** volunteers contributed **710** hours to this project in 2014.

Barn Owl Monitors
Volunteers monitored a pair of barn owls utilizing two dilapidated barn structures on the AHI property, adjacent to Lagerman Reservoir. Since 2012, Great-horned owls had displaced the Barn owl, which was found to be using a third structure on the property. In winter of 2014, the dilapidated structures were removed, and at the time of this writing (January 2015) this structure is still occupied by the Barn owl, which fledged 3 young in 2014. **Two** volunteers contributed **2** hours to this effort.

Raptor Nest Monitors
Volunteers monitored raptor nests from December through July. They observe the nests for at least two hours at a time and note behavior, number of nestlings, prey deliveries, and pair status. Gathering nesting data for raptors is important to developing long and short-term management decisions. In 2014, several raptor nests were either not active or not successful. **Six** raptor nest volunteers contributed **292** hours.

Waterfowl Monitoring Program
Waterfowl volunteers monitored 33 water bodies at 5 wetland sites. They counted waterfowl species and numbers. In the past, the department used data from this program in property management plans (Walden Ponds Wildlife Habitat, Hodgson Harris Reservoir repairs). The September 2013 flood event caused damage to all monitoring locations and the volunteer effort was temporarily suspended due to access and safety concerns. In 2014, the Waterfowl Monitoring Program was restructured and **18** volunteers contributed **410** hours to trainings, data entry, and field visits.

Table 4- Volunteer Contributions per Program- 2014

Program	Volunteers	2014 Hours
Bluebird Nest Box Monitoring	18	700
Breeding Bird Surveys	1	15
Raptor Monitoring	6	292
Burrowing Owl Monitoring	41	710
Owl Prowl - Nocturnal Owl Surveys	15	161
Waterfowl Monitoring	18	410
Shrub Surveys	4	16
Abert's Squirrel Monitoring	4	0
Butterfly Surveys	4	330
Barn Owl Monitoring	2	2
Totals	**113**	**2636**

One-Day Volunteer Projects
The Wildlife Program sponsored **12 projects engaging 189 volunteers totaling 430 hours**. Additionally, wildlife staff co-sponsored two large projects at Walden Ponds; planting native trees and shrubs at Walden Ponds in the fall, and working on some flood-damaged areas in the spring. Those two projects involved over 60 people. Our long-time partners from Defenders of Wildlife pitched in on three projects last year, helping prairie dogs and building small barrier fences to protect habitat. Staff, volunteers, and inmate labor worked to reinforce existing prairie dog barrier fencing at the prairie dog preserve at Rock Creek Farm at Carolyn Holmberg Preserve. This work strengthened existing barrier along nearly ½ mile of the preserve where it is adjacent to crop fields. Other projects cleaned up trash and caged trees to protect them from beavers. Staff also sponsored an Eagle Scout project that built fish

structures at Walden Ponds, to complete the final tasks of a Colorado Parks and Wildlife Fishing-is-Fun grant.

Livestock exclosure fence at Schoolhouse Spring/Reynolds Ranch, September 2014.

Eagle Scout project at Walden Ponds, October 2014.

Habitat barrier construction at Lagerman Reservoir, May 2014.

Collaborations

External –
Wildlife staff collaborated with Colorado Parks and Wildlife on:

- Flood recovery: sampling, special status species, stream restoration planning, grants, and special projects, including small mammal study design/sampling.
- Complementary Projects: aquatic monitoring study design/sampling, raptor monitoring and joint monitoring of owls and bats.
- CPW coordinated counts of herons, waterfowl, elk, and bighorn sheep.
- Coordinated fish stocking
- Elk management issues and movement patterns, with radio-collaring slated for February and March of 2015.

Wildlife staff collaborated with City of Boulder Open Space and Mountain Parks (OSMP) on*:*

- Wildlife monitoring including a bobcat study and Northern leopard frogs and raptor monitoring.
- Built elk jumps on two OSMP properties with the Resource Management Youth Corps.

Within the county, wildlife staff collaborated with the Land Use Department on emergency flood recovery, debris management, grant processes, and monitoring a bald eagle nest associated with the County Line Road bridge over the St. Vrain. The massive effort of the Boulder County Comprehensive Plan update, portions of which were finally approved in June, September, and October, were conducted hand-in-hand with the planners of the Land Use Department. Staff was part of the deliberate, safe

planning and execution of the prescribed burning at Heil Valley Ranch, conducted and coordinated with Emergency Services and many local fire entities.

Lower Boulder Creek Restoration
The contract for the reconstruction of the Lower Boulder Creek site on the Alexander Dawson Property (east of US 287) was awarded late in 2014. Floodplain permitting has delayed starting until 2015. This 1 1/2mile section of channelized stream will be re-aligned, protected, and replanted to restore it to conditions of a nice plains stream with a connected floodplain. Wildlife staff assisted with the entire design process with other POS staff and the US Army Corps of Engineers: alignment, depth, meanders, protected areas, in-stream structures, pools/riffles, new vegetation/planting, and safeguarding the nearby heronry from construction activity.

Internal Collaboration –
Wildlife staff collaborated with other BCPOS work groups on many valuable projects, including:

Water Resources
- Wildlife report for the tree removal proposals for the Twin Lakes property.

Real Estate and Resource Planning
- Provided comments, recommendations, and site visits on several property purchases.
- Rights-of-way for natural gas and water pipelines, surface drainage ways, and an electric power line.

Resource Management and Ag Youth Corps teams
- Built fencing at the Suitts property to protect a dam from further damage and at Reynolds Ranch to build a pasture fence with elk-friendly jumps.

Resource Protection, Education and Outreach, and Trails
- Protected the rare turtleback sandstone formation at Hillside Estates with a low fence and an interpretative sign.

Water Resources and Resource Planning
- FEMA project worksheets developed for repairing flood damaged areas along St. Vrain Creek, Boulder Creek, Walden Ponds, Pella Crossing, and the Western Mobile area.
- Beaver impact management on flood-damaged sites at Pella Crossing and Walden Ponds.

Grant proposals for:
- Stream master planning, wildlife/wetland habitat improvements, fish passage, ditch and ditch diversion structure replacements, Fishing-is-Fun, and a large GOCO trail grant.

Standing Teams
- The Amenities Team, Fence Team, and Trail Maintenance Team, Forestry ID Team, Rx Burn Team

Special Teams
- Pollinator Habitat Improvement Team and providing training for our yearly recruitment of Volunteer Naturalists and Wildlife Masters.

Resource Management Youth Corps and elk jump at Reynolds Ranch, July 2014

Small Grants and Non-funded Research

Wildlife research continued to be an important process on open space in 2014. Staff consulted on and processed research permits for: moths and tent caterpillars, bees and bumblebees, dragonflies and damselflies, butterflies, bats, bird banding, bobcats, cougars, elk, and native fish.

In 2014, our small grants program funded one wildlife-related study titled-*Report on Continued Research on*
the Effects on Bats of Forest Structure Changes Caused by Fire and Human Manipulation, Dietary and Heavy Metal Contaminant Analyses and Bats at Hall II Property.

The final report is available, along with other non-funded reports at:

http://www.bouldercounty.org/os/culture/pages/posresearch.aspx