

Boulder County Parks and Open Space Wildlife Program Annual Report

2015 In Review:
Goals and Accomplishments

Flood Response:
Recovery and Restoration

Critical Wildlife Habitat:
Conservation in Action

Annual Program of Work:
Resource Monitoring
Planning and Coordination
Practical Applications

Research on Open Space
Rabbit Mountain Herps
Front Range Cougar
Study

Looking Ahead:
Goals for 2016

▶ 2015



Parks &
Open Space





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2015 PROGRAM GOALS

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. In 2015, with the increase in a need for raptor nest data, we will expand this program to acquire updated locations of plains nests on parks properties, including observations of Swainson's and Red-tail hawk nests in 2016.

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.

Continue to consult with United States Fish and Wildlife Service on Endangered Species Act 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 Environmental Resource Element of the Boulder County Comprehensive Plan.

4 This step is critical in assuring the long-term usability of these documents, and maintaining the continuity of knowledge towards the next update process.

Establish a revised and complete list of topics for the Wildlife Policy.

ACCOMPLISHMENTS & RESULTS

The 2015 raptor nest monitoring season resulted in 233 electronically filed reports on 22 nest sites, including red-tailed and Swainson's hawk nests. A significant amount of staff and volunteer time was spent monitoring a single site following the electrocution of the adult female Bald eagle of a mated pair near Hygiene.

Macroinvertebrates were collected from every sampling trip in 2015. We continue to collaborate with universities and government colleagues on methods to identify and analyze the results of these collections. It is anticipated that increased invertebrate monitoring will occur in coming years, and both the collection and processing of samples will include the assistance of volunteers.

Staff has continued to consult with USFWS, as necessary for both FEMA funded and non-FEMA funded projects. (See Restoration and Regulatory Compliance for further details.)

Wildlife staff has continued to refine methodology for long-term monitoring for baseline and future recovery of species. (See Impacts to Wildlife for further details)

Wildlife staff has provided detailed and technical input on all major grant applications for creek restoration on Open Space. As proposals are solicited and bid upon, wildlife staff will continue to provide direction and comments to the consultants and other work groups as we move forward with implementation. Funding opportunities are constantly being evaluated, and while many are not appropriate for our needs, we have successfully identified funding sources for fish passage and native fish conservation activities from Federal and State sources.

Staff has continued to establish and maintain close working relationships with our partner agencies including USFWS, CPW, CSU, CU and our adjoining municipalities.

All documents and literature have been stored onto a fail-proof backup device which is shareable over the POS network on a case-by-case basis. We have also entered all scientific and technical literature into the EndNote X7 database for easy retrieval and usage for other Department needs, accessible by Wildlife staff.

Wildlife staff have brainstormed and compiled a working list of concepts and topics from which a Wildlife Policy outline may be drafted. Early efforts by planning staff and the Wildlife Policy Planning Team provided many conceptual topics, and wildlife staff has begun refining these concepts into more organized subject areas. After consideration of all appropriate subject areas to include in the Wildlife Policy, a draft outline will be built. With a comprehensive outline, staff will begin to flesh out the details of the Policy subjects and construct the full text document. This will be achieved through research and interviews with staff and subject matter experts, and consideration of other Department policy documents. The Wildlife Policy document will likely include several appendices, such as technical documentation or maps, a glossary and potentially an index of the different subjects in the Policy. The intent of this process is to create an applied policy which is highly useful to all groups with the department.



2013 Flood

GRANTS

A key step in our flood recovery efforts has been, and will continue to be finding funding to pay for the planning and implementation of restoration work that needs to be done. Wildlife staff has assisted the department with the development of several grant applications toward this end.

These funds will be used for the design and/or implementation of flood recovery projects on Parks and Open Space properties. Wildlife staff contributed to the development of the following grants:

► Restoration & Recovery

AS REQUIRED UNDER THE ENDANGERED SPECIES ACT, MIGRATORY BIRD TREATY ACT AND BALD AND GOLDEN EAGLE PROTECTION ACT, BOTH FOR FEMA AND NON-FEMA FUNDED PROJECTS, STAFF CONTRIBUTED SUPPORT TOWARDS RESTORATION AND RECOVERY PLANNING VIA DESIGN, COMPLIANCE AND IMPLEMENTATION FOR THE FOLLOWING:

Design input and USFWS consultation(s)

- Heron Lake Flood Relief Channel Construction (Design input, provided guidance on ESA, MBTA, BGEPA concerns and on-site monitoring.)
- Ramey Property Grading Restoration Project (Design input and USFWS consultation)
- Walden Breach Repairs (Design input, provided guidance on ESA, MBTA, BGEPA concerns)
- Pella-Marlatt Breach and Trail Repairs (Design input, provided guidance on ESA, MBTA, BGEPA and South Platte Depletions Program)
- Hall Meadows/South St. Vrain 30% Planning study (RFP development)
- Hall 2 Road Reconstruction Project (Design input, provided guidance on ESA, MBTA, BGEPA concerns)
- City of Longmont St. Vrain Stream Restoration Project (Guidance on terrestrial and aquatic wildlife habitat)
- *Davis and Downing Ditch Breach Repair (Breach a result of June 4th 2015 severe storm event. Not related to 2013 flood. Non-FEMA project emergency consultation.

CDBG-DR
RESILIENCY
PLANNING
GRANT – POST-
FLOOD
ASSESSMENT OF
NATURAL
RESOURCES
AND RECOVERY
PLANNING.
(\$139,500)
AWARDED

CDBG-DR
RESILIENCY
PLANNING
GRANT – ST.
VRAIN CREEK
RESTORATION
BREACHES 1
AND 2
(\$255,570)
AWARDED

Flood Impacts:

Long-term Monitoring of Wildlife's Response

The flood event of 2013 affected every watershed in Boulder County. Although the magnitude of the impacts varied across the affected drainages, all drainages endured some level of disturbance to instream and riparian habitat.

Immediately post-flood, the wildlife group recognized the need to establish a long-term monitoring program to monitor and assess the response of wildlife inhabiting the riparian and aquatic ecosystems. Riparian areas are recognized by the State as areas of highest natural resource value, supporting a vast majority of our regional biodiversity. Riparian ecosystems in the semi-arid west are known to harbor greater 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 following the flood to assess wildlife responses to flood impacts: small mammal trapping, riparian breeding bird surveys,

stream biomonitoring of fish and aquatic insects.

We continued these monitoring efforts through 2015, adding more data and sample sites. The information accumulated through these long-term monitoring efforts is of significant value and will benefit the agency in their role as land stewards in the following ways:

- Measure and predict the status of habitat and species of county concern,
- Guide wise resource management and land use decisions,
- Provide BCPOS staff information needed to make decisions about long-term recovery of our riparian and aquatic ecosystems.



The Preble's meadow jumping mouse (PMJM) is a riparian obligate and is listed as Threatened under the Endangered Species Act (ESA). 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. Thus, the post-flood status and distribution of PMJM populations, and populations of other small mammals, was 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 small mammal distribution and population status, with a special focus on PMJM.

Methods

In the summer of 2015, BCPOS biologists surveyed 14 properties. Sample sites were distributed across four of the major drainages in the county; three sites on the main stem of St. Vrain Creek, two sites on the South Branch of St. Vrain Creek, five sites on ephemeral intermittent or streams, one site on Lefthand Creek, one site on the Little Thompson River, and two sites along irrigation ditches feed off St. Vrain Creek.



Small mammal trappers (left to right) Dan Thomasetti,-CPW, Tim Shafer-BCPOS and Chelsea Beebe-BCPOS.

Flood Impacts: continued...

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. The 2015 trapping season was the second year of the presence/absence survey and completes and initial county-wide post-flood assessment of PMJM habitat and PMJM presence on POS property.

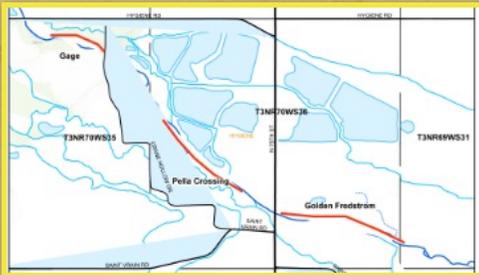


Figure 1: Example of trapping transects (along St. Vrain Creek) for small mammal study

Sample Site Selection

Sample sites were selected to cover BCPOS properties across the spectrum of drainage type, flood impacts, sub-drainage, historic PMJM occupancy, and management implications. Sites were distributed across the five major sub-drainages in Boulder County (Rock Creek, Coal Creek, Boulder Creek, Lefthand Creek, and St. Vrain Creek), and included drainages of perennial, intermittent and ephemeral streams. Within these sub-drainages, sample sites were distributed across both flood affected areas (inundated) and

areas not inundated by flood waters. Within flood impacted areas, sample sites were distributed in such a way to capture the range of flood impacts (i.e. erosion, deposition, unaltered). Selection of sample sites within 1 km of PMJM historically occupied habitat was weighted to include both occupied and unoccupied reaches, facilitating analysis of both continued occupancy of flood affected PMJM populations and dispersal to previously



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 three consecutive trapping nights, unless delayed by severe weather.

All captured animals were identified to species and the age, sex, and reproductive status was 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 PMJM-positive trap was

“Restoration of habitat and habitat connectivity will be vital to the long-term recovery and conservation of this species.”

unoccupied sites. Sites where flood recovery and restoration work is expected were prioritized for inclusion in the study to establish a monitoring baseline for restoration activities.

Trapping Methods



Results of the 2015 Trapping Effort

Our continued trapping effort in the summer of 2015, two years post flood, is shedding light on the broad scale impacts of the flood on PMJM distribution in the county. We documented PMJM at four BCPOS properties, including two sites on the South Branch of St. Vrain Creek (Gage and Braly/Sadar open space properties), Tom Davis Gulch on the Walker Ranch Open Space, and an intermittent stream on a parcel of the Loukonen Dairy Farm. The greatest number of individual PMJM captures was recorded at Tom Davis Gulch. There are no records of the Gage or Braly/Sadar properties having been trapped for PMJM prior to the 2015 field season. Surveys on both properties occurred along the South Branch of St. Vrain Creek, a waterway determined to have high conservation value for multiple species of concern in the county. Loukonen Dairy Farm was recently acquired by BCPOS and has an active agricultural lease. PMJM have been historically documented there.

The sites surveyed in 2015 were either historically occupied by PMJM, adjacent to sites that had been historically occupied, or areas that have never been trapped for PMJM but had suitable habitat. These areas of suitable habitat exist as patches woven into a broader mosaic of varying land use and habitat quality. While some areas have a developed riparian area and were resistant to flood impacts, other patches experienced substantial flood impacts and some have endured persistent and historical anthropogenic impacts.

PMJM were not detected at seven of the sites that had been historically occupied. Other sites that were historically unoccupied but adjacent to occupied PMJM sites were impacted heavily by the flood and remain in an altered state two years later. Surveys at these properties provided important baseline data for monitoring success of restoration activities and efforts to expand, improve, and connect degraded and fragmented PMJM habitat.



Restoration of habitat and habitat connectivity will be vital to the long-term recovery and conservation of this

SITE	STREAM	SPECIES												SPECIES RICHNESS	SITE TOTAL	
		Hispid pocket mouse	Prairie Vole	Meadow Vole	Long-tailed weasel	House mouse	Mexican woodrat	Deer mouse	Rock mouse	Western harvest mouse	Shrew spp.	Least chipmunk	Preble's meadow jumping mouse			
Western Mobile	CT			35			1	108		2					4	146
Hall 2- Cow Cave	ES		4	2		1	4	14		10					6	35
Loukonen Dairy Farm	ES	1		3		1	28	68		8			1		8	111
North Pointe	ES		5				45	90	60	19					5	219
Trevarton	ES	7	5				21	81	1						5	115
Imel	LHC			2		15		89							3	106
Parrish	LT		1				16	76		1					4	94
Braly-Sadar	SB		1	12		1	4	28		1			11		7	58
Gage	SB			7				9					14		3	30
Loukonen Outlots	SLD						25	46	1	2					4	74
Bullock-Wallace	SVC		5	1		2	1	153							5	162
Hall 2	SVC		1	2			1	115							4	119
Hall Meadows	SVC		12	18		2	5	115							5	152
Tom Davis Gulch	TDG			77	1			169			1	3	45		6	296
SPECIES TOTALS		8	34	159	1	22	151	1161	62	43	2	3	71		1717	

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.

U.S. Fish and Wildlife Service. 2004. Preble's meadow jumping mouse (*Zapus hudsonius preblei*) survey guidelines. Ecological Services, Colorado Field Office, Lakewood, CO. <http://www.fws.gov/mountain-prairie/species/mammals/preble/CONSULTANTS/pmjm2004guidelines.pdf>

Stream Bio-monitoring

Native Fish and Aquatic Insects

Wildlife staff established a stream monitoring program for assessing Open Space flood recovery on the St. Vrain Creek. We started this effort with CPW in November of 2013, and are pleased to see the program taking shape and collecting vital information for watershed recovery. We capture and release fishes, collect and describe aquatic insect communities and then sample and measure water quality and describe the changing condition of the stream and upland habitats along the river. Over time, this study will draw a picture of the progress of habitat and species recovery in our watersheds, especially threatened native fishes, and help us measure the progress of our restoration efforts.



In the spring and fall of 2015 we sampled on 13 occasions among 9 different Open Space locations on the St. Vrain Creek for fish, insects, water quality and habitat information. We collected and released over 6,500 fish, many were species of rare native fishes, and although not the focus of our study, 976 of those were brown trout ranging from 0.7 inches to 19 inches! (But the average was 5 inches, so don't get too excited!). A number of POS staff and collaborating agencies assisted us this year, including the Cities of Longmont and Boulder, and CPW. We are thankful for their support and hard work in the field! On our eastern properties, Keyes North and jointly-owned Peschel, we had a tremendous diversity of fishes, including state listed species. We learned a lot from Keyes North and we will bring "the whole team" the next time we visit.

The "transitional" area from about Airport Road to Western Mobile is very interesting because we find rare and threatened species solely adapted to this region creek. This is one reason why we are working hard to install fish passage in this area and allow these species to expand their range onto Open Space. The fish community becomes simpler as you move west and upward in elevation, and we find many more brown trout and native fishes such as the longnose dace and white sucker.



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We will be producing a report from the work we've completed, but in general, the flood had mostly positive effects on native fish and trout habitat. We've observed clean and un-cemented cobbles for the first time in decades, plenty of spawning ground, and an abundance of insects upon which these fishes prey. All our fish are collected with care and safely released after we record their information.

As for insects, water quality and habitat monitoring, we can only report general observations because we are still getting the data entered and organized, and the insects identified. In general, we have observed good numbers of pollution intolerant insects, such as stonefly and



caddisfly, and in some cases in very high densities. It is a pleasure to note all of the insect exuvia (shed exoskeletons) on the banks of the stream – a sign of the emergences of insects feeding the river and its wildlife communities. The Hess sampler does a wonderful job to collect insects in a numerical fashion so we can statistically say how and what is changing over time.

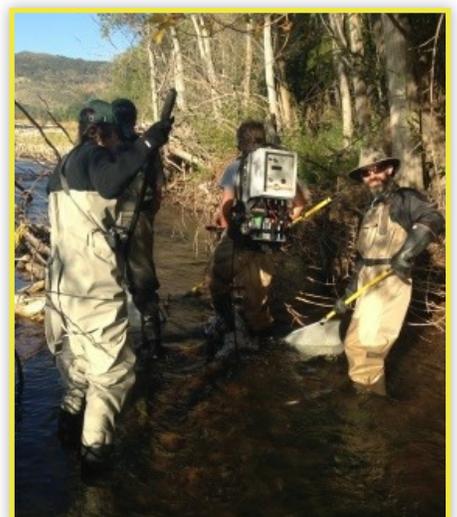
A bit more about water quality and habitat. Another benefit of the flood to the ecosystem was moving around the stones and flushing out the years of accumulated silt and fine sediment. This has allowed the “scrubbing” power of bacterial communities which live under the river to clean the water, and more water to agitate as it flows under and around cobbles. This shows up as higher oxygen levels, more normal pH, and fewer algal blooms in the water of the river. Clean cobbles are the only way healthy fish and insects populations can build up. We are lucky to have



several high quality instruments to measure DO, pH, conductivity, ORP, turbidity, velocity, and a wide range of nutrients. These measures, in general, have been in the “good” range with nearly 100% oxygen concentration, normal pH and good conductivity, but this does vary as you move eastward to the County Line Road as accumulated influences of land uses modify the water chemistry. We have noted a natural but concerning loss of shading over the river, which has likely increased water temperatures (and decreases

oxygen) compared to pre-flood conditions. Tree loss along Front Range streams is historically a very natural process, so we will monitor the influence this lack of shade is having over time.

It is without surprise that bank erosion is significant in many reaches, but this incision or evulsion has created new habitats for many species, such as amphibian shelters, bank nesting swallow burrows and, on softer banks, nesting habitat for turtles, to name a few. We do have concern about erosion putting silt into the stream, but there are benefits from erosion to the stream ecosystem, such as the lateral movement of the stream creating critical backwater habitats for threatened native fishes and re-creation of natural channel processes which have been absent for decades. We are also concerned about areas of “flat” bottom creek channels but, due to spring and summer high water flows, some of these areas have naturally regenerated into more complex creek beds with riffle, pool and runs. In fact, the flood created many deep pools in the St. Vrain that are hotbeds of biological productivity, left many wonderful tree roots and branches in the stream serving as shelter and food to many aquatic species, and re-sprouting willow and shrubs on the flood deposited banks are creating a new generation of trees to replace the decadent old growth.



► Stream Biomonitoring...

Looking forward, we will change our “rapid” measuring of in-stream and riparian health. Rapid assessment is a good approach to get information fast about watershed health and condition. We have good “baseline” documentation and going forward we will further assess and describe the riparian plant communities. Our 2016 habitat monitoring will begin to focus more specifically on in-stream habitats and stream channel changes. We will also look at expanding our sampling in 2016 to inventory aquatic resources in other streams and Open Space properties, such as Left Hand and Boulder Creeks, and Caribou and Walker Ranch.

The St. Vrain is a vital ecosystem for all local wildlife and it is on the verge of a re-birth if we can simply manage to keep the positive ecological changes brought on by the historic flood event. Our hope is that monitoring will help to observe and sustain these positive changes on Open Space.



The flood demanded that nearly everyone 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:

BMP's for Working in Waterways – Keep It Clean Partnership (February 5, 2015)

Annual Water Users Meeting - St. Vrain Lefthand Water Conservancy District (March 20, 2015)

Hydraulics and Hydrology - Colorado Stream Restoration Network (8/12/15)

Stream Channel Repair and Restoration Following Extreme Flooding Damage – NRCS Webinar (March 26, 2015)

Rocky Mountain Stream Restoration Conference, Breckenridge, CO (July, 2015)

Colorado Stream Restoration Network – Presentation on Native Fish Conservation, Fish Passage and Preble's Meadow Jumping Mouse Habitat and Presence Post-Flood. (March 18th, 2015, Longmont CO)

Living Streambanks: A Manual of Bioengineering Treatments for Colorado Streams, staff participated in providing input and edits towards the first bioengineering manual for arid Colorado streambanks.

“Management of Large Wood in Streams of Colorado’s Front Range: A Risk Analysis Based on Physical, Biological, and Social Factors”- Staff assisted with the development of this innovative document produced via a CSU collaborative effort.

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 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.

In 2015 we saw the completion of the first fish passage project on the St. Vrain that BCPOS had been involved with. We were able to help support the implementation of a fish passage structure on South St. Vrain Creek (Meadow and South Ledge diversions). The structure has been serving the water users through the 2015 water season. It is not yet known (no study has been conducted) whether or not fish are able to pass the structure.

Wildlife staff have continued to work with the fish passage working group (now under the St. Vrain Creek Coalition – Aquatics Committee, see Collaborations) on the planning for implementation of two other fish passage structures; The Beckwith diversion structure, at Golden Ponds and the Niwot and South Flatt diversion structures in the Golden-Fredstrom stream reach of St. Vrain Creek. USFWS funded the engineering of 30% conceptual designs for these structures. After meeting with

the City of Longmont, it was decided that further work on the Beckwith structure would be tabled until we had a clearer picture of what Longmont would be proposing for stream restoration in this reach, as the two projects necessarily need to be integrated. For the Niwot and South Flat diversion structures, our working group successfully worked with the ditch company to gain approval to move forward with design work. As we move into 2016, we will be meeting with the ditch companies to present the finalized conceptual designs and move toward funding acquisition and ditch company support for construction of fish passage structures in 2016-2017.

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South St. Vrain ditch solution near Lyons means a safer trip for fish

Project aims to prevent further flood damage without harming the ecosystem

By Karen Antonacci
Staff Writer

POSTED: 11/10/15 08:45:01 PM MST | UPDATED: 3 MONTHS AGO

Unique fish passages like the four-month-old one on the South St. Vrain river near Lyons may soon become common around the state.

The flood in September 2013 obliterated the channels that used to feed the Meadow and South Ledge ditches off the South St. Vrain. The Meadow ditch is a water right dating back to the 1860s and provides water to five nearby landowners, while the South Ledge provides water to the Genex plant, as well as other companies and landowners.

When the flood destroyed these

Gary German, president of the Meadow Ditch Co., discusses the new irrigation diversion structure near the South St. Vrain River in Lyons on Wednesday. (Matthew Jones / Staff Photographer)

BREEDING BIRD 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 for the schedule of sampling. 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.



Too Many Acronyms

BBS Breeding Bird Survey
BCCP-ERE Boulder County Comprehensive Plan - Environmental Resource Element
BCPOS Boulder County Parks and Open Space
BGEPA Bald and Golden Eagle Protection Act
CDBG-DR Community Development Block Grant Disaster Recovery
CPW Colorado Parks and Wildlife
CWH Critical Wildlife Habitat
ESA Endangered Species Act
EWP Emergency Watershed Protection
FEMA Federal Emergency Management Agency
MBTA Migratory Bird Treaty Act
OSMP Open Space and Mountain Parks
PMJM Preble's Meadow Jumping Mouse
RFP Request For Proposals
SSC Species of Special Concern
USFS United States Forest Service
USFWS United State Fish and Wildlife Service

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.

Some examples include:

CWH #7 St. Vrain Corridor Incorporated into all Restoration Planning Requests For Proposals and Master Plans.

CWH #14- Lefthand Creek Cottonwood groves. This area has been awarded EWP funding. We are working closely with project proponents on designs.

CWH #25- Walden and Sawhill ponds. Flood Recovery Design and Implementation input. Additionally, we will interface with the contractors once construction begins to outline resource considerations.

CWH #81- Hall II. Ongoing focus on this property towards future management plan update. This area is highly diverse and productive. (Bird surveys, remote cameras, raptors).

CWH #86- Powers Marsh. Considered an important area for potential future harrier nesting.

CWH #87- Quicksilver. Considered during discussions with Longmont Flood Recovery planning. This area is integral in restoration planning for resiliency in connection with Sandstone, and to attenuate future flooding.

Impacts, Records or Observations in CWH during 2015

CWH #42- Long Lake Willow Carr. Lake Isabelle, west side of CWH, was drained for dam construction in 2015. The Lefthand ditch company has pre-wilderness easement access. They used helicopters and motorized vehicles to repair a partial collapse of a water tunnel. A USFS permit was issued for the work, and had mitigations to reduce noise impacts.

CWH #65- Kenosha wetlands. Provided input towards the necessary modifications to this wetland due to challenges in water court. Depending on future conditions at Kenosha, post modification, this designation may be reconsidered.

CWH #12- Marietta Canyon. Although this observation is not in Marietta Canyon, but rather Plumely Canyon, it is close enough that the 2015 discovery of Ebony Jewelwing will be noted for #12.

CWH #95- Winiger Ridge Elk Herd & #30. Arapaho Ranch Tucker Homestead. Proposal being made by Nederland to annex the "Aspen Trails", a parcel that is between and touching both an integral migratory corridor and a CWH montane parkland.

CWH #8- Rabbit Mountain. Awarded small grant to researchers to do an overall inventory of reptile/amphibians, as well as a rattlesnake telemetry study to identify important hibernacula. The diversity of reptile species is unprecedented in Boulder County. Additionally, we worked closely with CPW on the increasing numbers of elk present on the property. We initiated (and continued) vegetation monitoring related to browse pressure.



Annual Program of Work

BIRDS. FISH. MAMMALS. HERPETOFAUNA.

RAPTORS

Volunteers and staff monitored 22 Bald eagle, Golden eagle, Osprey, Prairie falcon, Red-tailed hawk and Swainson's hawk nest locations in 2015. Status and productivity of cliff-nesting species is sent to the University of Colorado for inclusion into the annual Cliff-nesting Raptor Report, which compiles data from Front Range localities. Monitoring of prairie dog colonies for presence of burrowing owls yielded just one nest in a small colony limited to an agricultural corner. Due to time constraints, no nocturnal surveys for small forest owls were completed in 2015, however known sites for Great-horned owl and Barn owl were monitored.

Bald Eagle Nest Monitoring

We continued to coordinate monitoring of seven Bald eagle nests on POS property, County conservation easements, and adjacent Open Space where possible. General time frame for onset of incubation was from Feb. 17-24th, hatch events suspected to take place from March 24 into early April. Early June observations recorded the start of branching behavior, with short flights recorded in mid-July. Nest monitoring of two sites dominated the field time for this species due to

mate loss and a flood mitigation project.

The tragic death of banded female U6 left a new male mate to care for two nestlings at a site west of Hygiene. The nestlings were approximately 4 weeks from fledging stage. The nest west of the town of Hygiene is well-known and easily observed by many locals, both BCPOS and Bald Eagle Watch nest monitors, photographers, and birders. From the time the nest was built in 2011, the unusual circumstance that both birds were banded afforded not only background information such as year and place of birth of the individuals, but enabled more detailed observations than may not have typically been possible. To say the public, and staff, knew and felt attachment and responsibility for these birds would be an understatement.

U6 was reported electrocuted on a power pole by an adjacent County land tenant, who proactively took photos, and called Parks and Open Space, CPW and the electric company. All agencies responded quickly to confirm cause of death via necropsy, and outline pole mitigation actions to be completed immediately. Necropsy results detailed a lack



of both entry and exit points typical of electrocution. Given the duration and severity of rain events at the time of the event, the fact that the wet bird and the large fish in its talons contacted the lines resulting in an otherwise protected pole to deliver a low intensity shock killing the bird. The bird was otherwise in good health. Additional mitigation was followed through by the power company as directed by CPW staff.

Given the nature of the loss, being human-caused and creating a precarious fate for the remaining mate and nestlings, BCPOS and CPW staff agreed to deviate from a standard policy of no intervention. A tiered response based on possible outcomes was defined, and included alternatives from no action to supplemental feeding if



warranted. In normal circumstances, POS wildlife staff, supported by CPW, takes the position of not interfering with naturally occurring events that result in loss or death of nestlings or adult birds. Staff values the ability of wildlife to express natural behaviors, and upholds the need for wildlife to interact as wholly as possible with the Open Space that has been provided, in part, for the benefit of wildlife.

There is little information documenting expected outcomes for similar events for this species, although undoubtedly its not a unique event. In the weeks that followed, staff and volunteers recording the developments, could not have predicted the turn of events.

The day following the mate's electrocution, the male was observed rotating between briefly tending the young, calling repeatedly for his mate from their shared perch, and disappearing on the wing for short durations. The male was observed feeding young on the second day following electrocution, and continued to call at length for relief from his missing mate. By the third or fourth day, another adult bald eagle appeared in the area, and confusing reports of aggressive chases and the new bird perching near the nest started coming in. During pre-dawn

hours on the fifth day, both birds were seen roosting together near the nest, then proceeded to perform what appeared like aggressive chases with physical contact, mixed with pair bonding rituals. Within a week's time, the male and this new female began sharing duties of nest attendance, and the public had seen at least one food item delivered by the new female to the nestlings. This continued for the duration of the season. The first nestling to fledge may have fledged slightly early, and the event was captured on remote camera. The birds location and status was tracked by staff from alternate locations used by the public. The public often lost sight of the fledgling and became concerned. The second nestling, smaller and far less interested in leaving the nest, fledged later and appeared sick or injured shortly after. Attacks on the weaker fledgling, and its grounded status prompted intervention by wildlife staff and CPW, as agreed upon following the loss of the original mate. The sick fledgling was captured and transferred to Rocky Mountain Raptor Program. The diagnosis was a rattlesnake bite to the toe, and the bird has since recovered but remains in captivity until ready for release.

Due to popularity of the nest with the public, and an increase in visitation following media coverage, additional signage

was 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 nest location along the St. Vrain continues to be a roost site for the resident pair.

THE FIRST record of Bald eagles nesting in Boulder County was in 2002 near Coal Creek. Initial nesting attempts were of mixed success and failure, but the territory remained active in 2015 and the pair continues to produce young. Since that time, 10 more bald eagle pairs have become residents and defend active nest territories in Boulder County.

Since 2010, the pair of Bald eagles claiming Lagerman Reservoir as their territory have shared the area with countless wintering Bald eagles. Despite an initial nesting attempt that failed in April of 2012, the pair has successfully reared 2 young annually since 2013 for a total of 6 fledglings. In 2015 they fledged 2 offspring.



The Bald eagles nesting southeast of Longmont near County Line Road built an alternate nest to the east in late 2014. This site was used in 2015 and fledged 2 young.

Since 2012, a pair of Bald eagles nesting near Rock Creek Farm has been successful each year except in 2014. In late 2014 they began building an alternate nest near Stearn's Lake and BCPOS temporarily closed the recreational trails in that area. By mid-February, the pair had returned to the original nest and within days had begun incubation at that location. This pair fledged 2 young in 2015.

The Panama Reservoir pair continued to successfully nest since 2006. The 2015 season was again successful with 2 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,

Golden Eagle Nest Monitoring Staff and volunteers monitored the seven known golden eagle nest sites on BCPOS properties in 2015. Two previously unknown nest sites near BLM South were monitored again by OSMP staff in 2015.

Burrowing Owl Nest Monitoring A single nest site was located on Boulder County properties in 2015, at the same location as previous years. This continues a trend of fewer nests located on Open Space, from both BCPOS and OSMP.

Osprey Nest Monitoring BCPOS staff and wildlife volunteers monitored osprey nests at Lagerman Reservoir, Western Mobile (owned by Martin Marietta Materials) adjacent to BCPOS Toteve property, and the St. Vrain private Conservation Easement platform. Casual observations of the latest platform installed by the City of Longmont (75th and Nelson Rd.) recorded one young. We monitored the osprey platform at Boulder County Fairgrounds using a remote camera linked to an online hosting website.

An additional pair appeared at Lagerman Reservoir, nesting on a decommissioned power



pole approximately 250m west of the resident pair. Disputes between the resident and new pair continued through the nesting season and after the new pair's nest attempt failed.

Osprey nest-building activity was observed on a power-pole near Clover Basin Reservoir, and along Rodgers Road south of Golden Ponds. Both were reported to City of Longmont, but neither structure was completed nor used for nesting. Bird spikes were installed on the pole to deter future nesting.

Prairie Falcon Nest Monitoring Staff and volunteers determined known nesting sites failed or were inactive during the 2015 season, likely due to an extended duration of heavy rain that fell during incubation. Few



2015 RESULTS FOR BALD EAGLES

County Designation*	Locality	# of Fledglings
Panama Reservoir and Wetlands & East County Environmental Conservation Area	East-Central County	2
Near East County Environmental Conservation Area and Quicksilver Critical Wildlife Habitat	Alternate Keyes-Peschel North County	2
Adjacent to St. Vrain Critical Wildlife Habitat Corridor and Riparian Habitat Connector	Hygiene	2
Near Lagerman Reservoir and Wetlands Critical Wildlife Habitat	Lagerman Reservoir	2
Near Buffalo Gulch and Rock Creek Critical Wildlife Habitat	Stearn's Lake Trillium - Shirk IGA	2
Adjacent to St. Vrain Critical Wildlife Habitat Corridor and Riparian Habitat Connector	Pella	1

2015 RESULTS FOR GOLDEN EAGLES

County Designation*	Locality	# of Fledglings
Marietta Canyon Critical Wildlife Habitat and High Biodiversity Area	Heil Valley Ranch	1
Significant Natural Community, High Biodiversity Area	Heil Valley Ranch	1
Steamboat Mountain Critical Wildlife Habitat, High Biodiversity Area	Steamboat Mountain	1
Adjacent to St. Vrain Critical Wildlife Habitat Corridor and Riparian Habitat Connector, Significant natural Community and High Biodiversity Area	Hall Ranch	1
Rabbit Mountain Environmental Conservation Area and Critical Wildlife Habitat, High Biodiversity Area, Significant Natural Communities	Rabbit Mountain	2
South Draw Natural Area, High Biodiversity Area, Walker Ranch/Eldorado Canyon Environmental Conservation Area	Walker Ranch/South Draw	Not Active
Boulder Mountain Park/South Boulder Critical Wildlife Habitat and Environmental Conservation Area	BLM South Boulder Creek/East Draw	Not Active

2015 RESULTS FOR BURROWING OWLS

Nest Locality	# of Fledglings
Southwest County	0
Northwest County	0
Northeast County	4
Southeast County	0

*Boulder County Comprehensive Plan-Environmental Resources Element- 2013

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).

Northern Goshawk Nest Monitoring

In 2015, known nest locations of Northern goshawks were again monitored, in addition to investigating five historic locations and sighting records. Thanks to collaboration with the Nature Conservancy and private landowners, one historic database record was able to be confirmed and updated to reflect an active Cooper’s hawk nest, and an adjacent new nest location for goshawks. One historic nest was determined to no longer exist, and no activity was detected despite stand conditions remaining suitable. Follow-up stand assessments for sightings at two additional locations determined potential nesting and post-fledging habitat worthy of future surveys. At one location, an additional 2 alternate nests were located during scheduled monitoring events. Spring weather conditions were similar to that of 2014, bringing cool, wet weather for much of the season, and a high proportion of nests were active and successfully reared young.

2015 RESULTS FOR PRAIRIE FALCONS

Nest Locality	# of Fledglings
Walker Ranch	0
Hall Ranch	0
Heil Valley Ranch	0
Heil Valley Ranch	0
Steamboat Mountain	0

2015 RESULTS FOR OSPREY

Nest Locality	# of Fledglings
Lagerman Reservoir 1	2
Lagerman Reservoir 2	0
Boulder County Fairgrounds	3
Conservation Easement - St. Vrain Road	2
Western Mobile - Highway 66	2
75 th /Nelson Road ROW	1



SEASON HIGHLIGHTS



Nesting Sage thrashers



BREEDING BIRD SURVEYS

Wildlife staff continued **Breeding Bird Surveys (BBS)** in flood-affected reaches of the St. Vrain Creek for the 2nd season. 2016 will be the third and final year of post-flood, baseline data collection for breeding birds at Gage, Western Mobile, Golden-Fredstrom, and Pella Crossing. These locations will be revisited in 2021.

Survey methodology was updated in 2012 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. For a more complete description of site selection and methodology, refer to 2012 and 2013 Annual Reports.

The following properties were surveyed in 2015:

- *Rabbit Mountain (restoration site)*
- *Heil Valley Ranch – Picture Rock Trail*
- *Giggey Lake, Reynolds Ranch*
- *Gage, Pella Crossing, Golden-Fredstrom*
- *Hall-II*
- *Benjamin (north Betasso)*
- *Western Mobile/Braly*
- *BLM South*

Results

Pilot data collected using the new spatially balanced method will not be available until analysis is complete (projected 2017).



Common Poorwills calling before sunrise



Clark's Nutcrackers
Betasso Preserve

Breeding Bird Surveys run from May 15 - July 15 each year at selected properties. Staff visits every two weeks and collects data at predetermined points to complete 4 surveys over the course of 8 weeks.

MAMMALS

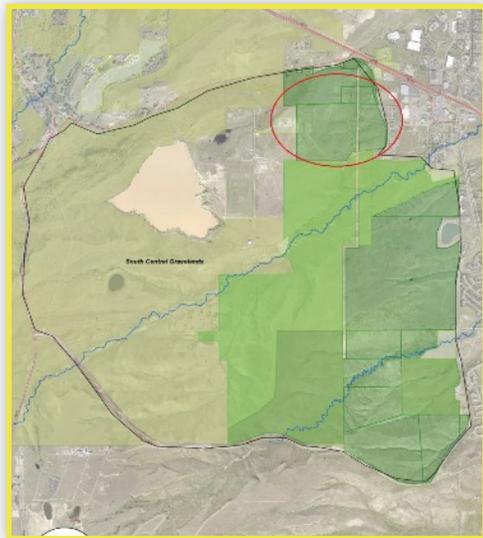
PRAIRIE DOG MANAGEMENT

Relocation

In 2015, two relocations were implemented.

Colorado Horse Rescue, Implemented by the Prairie Dog Coalition, 60 animals relocated
Kestrel Housing Development Site (Owned by BOCO Housing Authority, Implemented by Smith Environmental, 71 animals relocated

The destination receiving site for both of these relocation efforts was Cohig, located in south



central area of the County. Trapping and Removal
Removal via trapping of prairie dogs occurred on 6 properties in 2015. 2 of these properties are designated as No Prairie Dog (NPD) and 4 are designated as Multiple Objective Area (MOA) and (NPD). A total of 1,513 prairie dogs were successfully trapped in 2015. Of these, 603 prairie dogs were delivered to the US Fish and Wildlife Service Black-footed Ferret Recovery Facility, 903 were delivered to the

Birds of Prey Foundation. Trapping occurred on the following properties: AHI, Hirshfeld, Lagerman, Suitts, Warembourg, and Western Mobile.

Lethal control occurred on 36 properties, 10 of which are designated as (MOA) and (NPD), and 6 as (MOA), and 20 as (NPD). Some of these properties were trapped first, as referenced above, then received lethal follow up. These properties are as follows: AHI, Hirschfeld, Lagerman, Suitts, Warembourg, and Western Mobile. All control was done using CO cartridges, CO machine, and Fumitoxin. (MOA) and (NPD) properties are AHI, Alexander Dawson, Imel, Lagerman Reservoir (east side is not MOA), Leonard, Loukonen Dairy, Monarch Park, Rock Creek Farm, Suitts, and Warmbourg. (MOA) properties are Archdiocese, Cemex, Doniphan, James Construction, Peck, and Stevenson Nelson. NPD properties are 66 Investments, Autry, Beachem/Roberts, Becky, Bragg/Spangler, Brewbaker, Dirks, Gage, Harney Lastoka, Henry Eastlack, Hirschfeld, IBM, Keyes West, Leyner, Lohr, Macy, Smith, Turkey Farm, and Western Mobile.

Tenant Control

Control measures by agriculture tenants occurred on 12 properties via carbon monoxide or Fumitoxin. Properties that received treatments included: AHI, Beachem/Roberts, Becky, Autrey, Eddy, Gage, IBM, Imel,

Leonard, Leyner, Peck, and Rock Creek Farm.

Plague Management

In 2015, BCPOS seasonal crews used Delta Dust to inhibit flea reproduction at Lagerman, Western Mobile and Warembourg.

Mapping

We completed comprehensive mapping of colony extent within our properties in 2015. Acreage totals for 2014 and 2015, and associated percentage occupancies per management category are shown in Table 2.

Barrier Fencing

Barrier Fencing was erected or re-enforced at the following properties: Suitts, Rock Creek Farm, and Stephenson-Nelson. The Stephenson-Nelson project was a cost-share with a local business. The work at Suitts was accomplished with the Boulder County Youth Corps Resource Management Team.

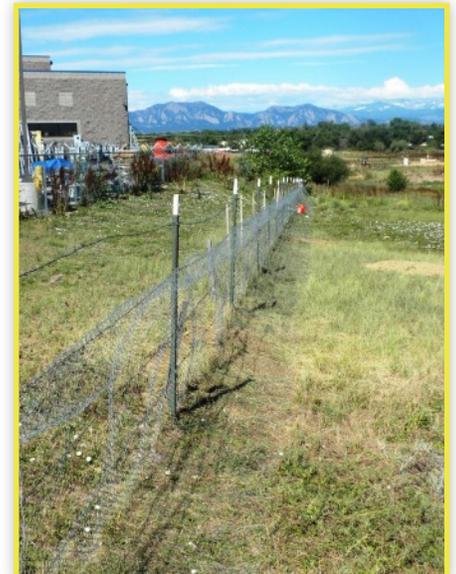


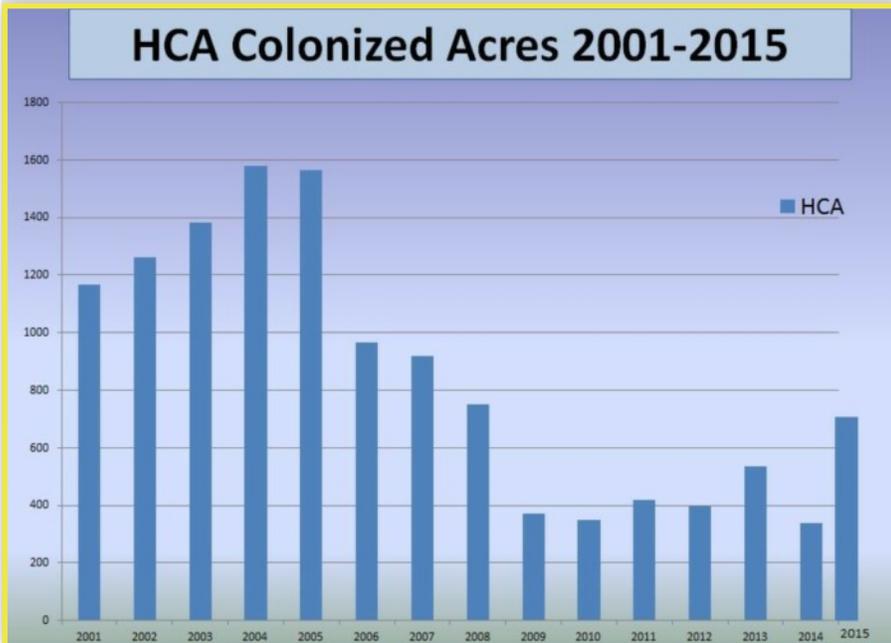
Table 2: Percent Occupancy of Designated Property Management Categories- 2014, 2015

TYPE	Property	2014	% Occupied	2015	% Occupied
Classification	Acres	Colonized Acres	%	Colonized Acres	%
HCA	3,326	339	10%	718	21.3%
MOA	4,419	841	19%	1,162	26%
NPD	17,198	287	1.6%	341	2%

Table 3: 2009-2015 Black-tailed Prairie Dog Colony Occupancy Acreage Change

Designation	2009	2010	2011	2012	2013	2014	2015
	Acres	Acres	Acres	Acres	Acres	Acres	Acres
HCA	371.47	348.41	418.43	397.92	535.13	339.3	718.1
MOA	784.07	685.62	766.07	760.66	965.16	841.1	1162.3
NPD	489.53	344.57	371.95	472.01	368.36	287	341.4
Totals	1645.07	1378.6	1556.45	1630.59	1868.67	1521.4	22218

Figure 4: Summary of Colony Size on HCAs, 2001-2015



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). We saw an increase of occupied acreage on HCAs in 2015 of 11.3%.

Stakeholders Meeting

December, 2015

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 flood event. However, Stakeholders' meetings were held in both November 2014 and December 2015.

Topics covered in 2015 included:

- Colonized Acreage of Prairie Dogs Per Property Designation Category (HCA, MOA and NPD),
- Relocation site at Rabbit Mountain update
- Relocation to Cohig in 2015
- Reintroduction of Black-footed ferrets Potentials
- Burrowing owl nest success 2013, 2014, 2015
- Restoration of CWH#15 (AHI Turkey Farm, west side of Lagerman Reservoir)
- Prairie Dog Vegetation Monitoring Results and Analysis
- Vegetation Criteria for Relocation-Overview and Proposed Changes
- Elimination of Aluminum Phosphide for control method
- Restoration Criteria as related to Prairie Dog Reintroductions and Resiliency
- Extension to Relocation Timeframe
- Barrier Fencing Installation and Maintenance
- NRCS EQIP Program

During the Stakeholders' meeting, we received input on a variety of issues. One example is the request for an extension to our stated relocation timeframe within the Prairie Dog Habitat Element. We presented a proposal for an extension of the timeframe to POSAC in January 2016, and will present the extension amendment to the BOCC for final approval.

WILDLIFE CAMERA TRAPS

The use of remote cameras to collect data on species presence and habitat use continued in 2015 at the Hall Ranch and Heil Valley Ranch 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 from 2012 to 2014 in order to capture a high volume of data in preparation for the upcoming planning process for that property. This dataset is now ready for staff review and eventual upload to related software.

Photographic wildlife data is an exceptionally useful tool in drafting management recommendations and providing habitat assessment for staff. In 2015, a video was produced showcasing camera photos taken during the field survey period for Hall-II. This area is currently closed to the public for management review, and the preliminary data shows an exceptionally high quality habitat for high numbers of diverse species.

For a slide show of wildlife camera photos, please visit:

<http://www.bouldercounty.org/openspace/pages/wildlife.aspx>



ELK MOVEMENTS, HERDS, AND HABITATS

The herd of elk at Rabbit Mountain has been steadily increasing over the past few years. Neighboring private lands are experiencing elk foraging in their crops. Colorado Parks and Wildlife (CPW) approached Boulder County Parks and Open Space to discuss this herd's expansion and forays into neighboring private parcels. Wildlife staff has been working with CPW towards developing a plan of action to address the issues of crop damage as well as potential damage to areas on Rabbit Mountain due to over browsing and loafing. We have conducted site visits with the Boulder County Commissioners and with members of Parks and Open Space Advisory Committee. We are conducting vegetation utilization



surveys and have partnered with CPW in the purchase of radio collars to track movements. This issue is complex and will require extensive agency discussions as well as outreach to our public. We acknowledge that this situation is problematic and are working towards solutions.

BLACK-FOOTED FERRET REINTRODUCTION

As part of the long term planning for our prairie dog Habitat Conservation Areas (HCA), 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 required qualifications. 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 the City of Boulder Open Space and Mountain Parks to determine if the South Central Grasslands may be large enough to accommodate ferrets. Historically, the highest level of occupancy was ~1,400 acres of combined of prairie dog colony coverage.

Another potential property is Rabbit Mountain. At its maximum occupancy, there were 1,574 acres of active prairie dog colonies. In summer 2014, USFWS (contracted APHIS) dusted 3,000 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.

Wildlife staff will proactively dust Rabbit Mountain and the South Central Grasslands in 2016.

RECREATIONAL FISHERIES

RECREATIONAL FISHING

Fishing on open space has remained understated since the September 2013 flooding. The best regional fishery (Pella Crossing, with its five ponds) is still out of commission. The flood relief channel from Heron Pond to St. Vrain Creek was completed in December. The project worksheet for the repairs to **Pella Crossing** has been approved by FEMA. Design for the dam, trail, and facility infrastructure has been contracted and completed. Construction should start on the dam fixes in spring 2016, with the park infrastructure construction and repair to follow. POS is hopeful of opening the park in the fall. CPW was able to survey the Pella ponds in 2015 and we are coordinating about how best to structure any stocking or regulation changes. The massive plume of sand and sediment that took over Webster Pond, and the accompanying dam breach, will result in it not being retained as a recreational fishery. It will be re-sculpted to turn the pond into marsh with small pockets of open water that will benefit waterfowl, wading birds, native fish, and amphibians.



Current barrier keeping stocked fish in Wally Toevs Pond, March 2015

Walden Ponds was open all of 2015, including both a spring and fall fishing season at Wally Toevs Pond. We also held our spring Senior Fish-Off (April) and our Junior-Senior Fishing Derby (October). The dam breach project worksheet has been approved, and the design contract completed. The repairs to both the Wally Toevs-Cottonwood Marsh breach and Bass Pond-Cottonwood Marsh breach were delayed from fall of 2015, and should be completed in the spring of 2016. The aerators and power supply will be removed for the completion of the Wally Toevs repairs, and replaced afterward. The spring fishing stocking/season may be shortened or abandoned, should the repairs run long. The pond will likely be closed during a short construction window and afterward to give the water some time to settle. Re-separating Cottonwood Marsh from Wally Toevs Pond should improve the water quality, temperature, and fishing at Wally Toevs by eliminating the movement of weeds, unwanted fish, and warmer water into the pond.

Fishing Events

We reinstated the Catfish Nights event at Stearns Lake in August. The turnout was low, but we will continue holding this event annually. The Rogers Park trout fishing segment of Boulder Creek continues to enjoy near-daily use by anglers and picnickers.

Amenities

The flood destroyed or damaged most of the amenities at Pella Crossing, including all 3 new fishing platforms at Webster Pond. These will be rebuilt in the Pella repairs, except for those at Webster Pond. The large stones for the fishing platforms will be reclaimed, stored, and re-used for other amenities (new platforms). The fish habitat structures planned for fall of 2015 for Lagerman Reservoir will become a spring 2016 project with the aid of the Lefthand Outdoor Challenge program run by POS Resource Protection.



Flagstone fishing platform at Webster Pond destroyed by 2013 flood.

AMPHIBIANS & REPTILES

Northern Leopard Frog

*The Northern Leopard Frog (*Lithobates pipiens*) underwent review by USFWS 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.*

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.

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 collaboration 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 2015 we surveyed known and potential habitat including areas of the southeast buffer, one former breeding site near Lyons, and a series of ponds on the North Point property. None of the sites had NLF egg masses, tadpoles, metamorphs or adults. The Lyons breeding site, which had over a dozen metamorphs in summer of 2013, had no Leopard frog activity a second year after the flood inundated the pond with mine sediment. Incidentally, like Boulder County sites, a known productive site in Larimer County had no reproduction in 2015. Very cold temperatures during spring rains of 2015 may have compromised the breeding season for this species.

Northern Leopard Frog is considered a sensitive species by USFS, BLM and CPW, is on Boulder County's Species of Concern List, and is one of our program's selected indicator species.

Reptiles

Since 2012, wildlife staff has confirmed the presence of Short-horned lizards in the south central county. Annual walking surveys are performed, and in 2015 the surveys were performed in August during the time short-horned lizard females give birth to live young. No adults or young were located. Additional surveys were performed near Table Mountain and Rabbit Mountain, but no lizards were located at either location.



WILDLIFE VOLUNTEERS



Long-Term Monitoring Programs

These volunteer programs were initiated by the wildlife department. Wildlife surveys and ongoing monitoring is used to collect baseline data and track trends over time. These long-term projects are a good fit for the needs of the wildlife department's scope of work. Volunteer contributions to the Wildlife program are essential to our success.

Over the years, the number of volunteers utilized has fluctuated in response to shifting program needs. In 2015, agriculture properties available for monitoring burrowing owls increased slightly from 2014, a vacant bluebird route reduced season totals slightly, citizen owl surveys skipped a year following piloting the program in 2014, and we utilized more volunteer breeding bird survey assistants. Overall, volunteer hours reached an appreciable high of 2,658 hours in 2015.

Bluebird Nest Box Project

In 2015, 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, and Bald Mountain. We continue to share a route with the US Forest Service on the Minnick property north of Caribou Ranch Open Space.

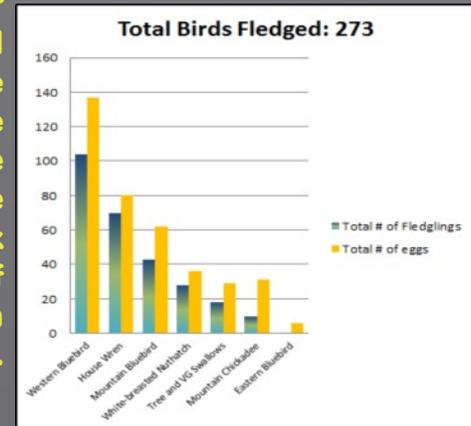
Volunteers

typically work in pairs and monitor boxes approximately once every ten days during the breeding season. They record the species and number of fledglings in each box, and enter their data on the Cornell Lab of Ornithology Nestwatch website. Nestwatch monitors nest box data nationwide.

In 2015, cool, wet spring weather made for a curious mix of occupied and unoccupied nest boxes, and seemingly fewer second clutches. 18 volunteers attended training, helped build and move boxes, and monitored nests, contributing approximately 700 hours.

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



Long-Term Wildlife Projects Volunteer Hours

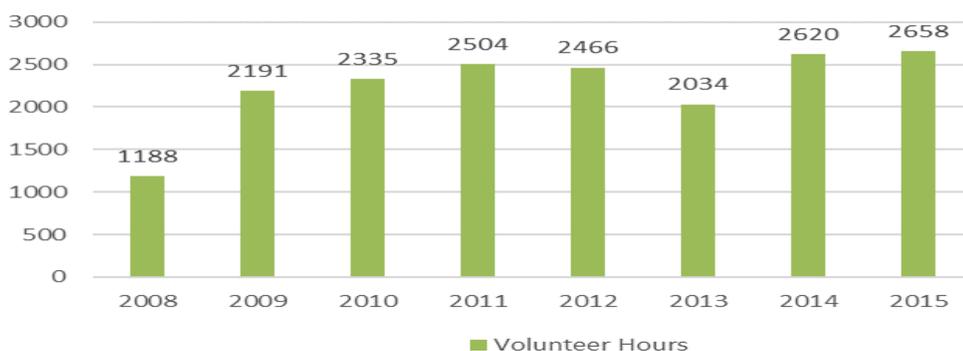


Figure 5- Long-Term Wildlife Projects- Volunteer Hours

the past decade however, BCPOS has adopted the Rocky Mountain Bird Observatory protocol for standardization of data collection. In 2015 one volunteer continued to gather post-construction bird data along the Picture Rock Trail at Heil Valley Ranch, and three survey assistants contributed 48 hours.

Burrowing Owl Monitoring Program

This program was initiated in 2007, and the following year a partnership was formed with Boulder County Nature Association and Boulder County Audubon Society. The 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 to mid-August). In 2015, we had a 25% decrease in the number of properties available for surveys due to increased trapping effort on agricultural prairie dog colonies. Fewer volunteers were needed, and the number of monitored nests decreased to only one due to poor nesting conditions in 2015. Volunteers attended in-house and field training led by BCPOS staff and BCNA/BCAS coordinators, who also help recruit and organize volunteers and compile field data from 30 properties. Thirty-eight volunteers contributed 468 hours.

Barn Owl Monitors

Volunteers monitored a pair of barn owls utilizing two dilapidated barn structures on the AHL property, adjacent to Lagerman Reservoir. Great-horned owls eventually displaced the Barn owl, however, the dilapidated structures were recently torn down. Barn owls continue to nest in a third structure on the property. This structure is still occupied by the Barn owl, which fledged at least 2 young in 2015. Two volunteers contributed 3 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. Data

Wildlife staff and volunteers had a rare opportunity to visit the USFWS National Eagle Repository at the Rocky Mountain Arsenal National Wildlife Refuge. Along the way, we went birding.



Wildlife Volunteers and partnering organizations contribute a tremendous amount of their personal time helping staff gather information on Boulder County's wildlife. Our volunteers are dedicated to the cause, and many return year after year to the long-term monitoring programs that could not happen without their help. Boulder County Parks and Open Space Wildlife staff would like to say THANK YOU to our volunteers, and to our partners, Boulder County Nature Association and Boulder County Audbon, who make these programs possible.

VOLUNTEER LONG-TERM MONITORING CONTINUED...

collected by volunteers is used in management planning and decisions, and shared with CPW and USFWS. In 2015, eight raptor nest volunteers contributed 344 hours.

Owl Prowl – Nocturnal Owl Surveys

Due to the workload and shifting priorities in 2015, public Owl Prowl surveys were not run in 2015.



Waterfowl Monitoring Program

The aquatic bird volunteers covered 33 water bodies on five major aquatic habitat areas, contributing to a high-quality data set with consistent recording throughout the seasons. Volunteers record species and count data of primarily waterfowl and shorebirds, but often include additional data on raptors and songbirds. Volunteers record their data in a county hosted online database.

In the past, the department used data from this program in property management plans (Walden Ponds Wildlife Habitat, Hodgson Harris Reservoir repairs) and continues to present this data as a component to ongoing flood-related projects and management planning. In 2015, 14 waterfowl volunteers and a volunteer crew leader contributed 507 hours to training, data entry, and field visits.



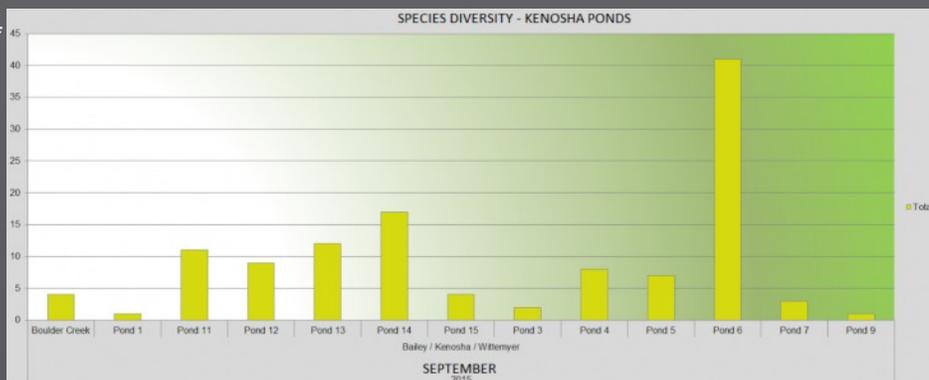
Butterfly Inventories

For fourteen years, Jan Chu has performed butterfly inventories on Boulder County open space properties. Jan and her assistants have tracked occurrence of common and rare species in a variety of habitats at more than 10 study sites, and have provided information on status and occurrence of host plants important to butterfly species. Each year, she compiles an annual report of her findings. In 2015, Jan and her associates (2) contributed 503 hours of butterfly research.

Boulder County Nature Association Wintering Raptor Surveys

In an effort to support the data collection of the long-running winter raptor surveys coordinated by BCNA, staff designed an online data-entry form with updated maps and adjusted protocol. Volunteers piloted the new method in 2014 and 2015, providing two years of data with which to test a geo-database structure enabling visual representation of field data. Using a team of volunteers in 2016, we hope to add historic data sets to the database for a more complete look at 10 years of Wintering Raptor Survey data.

Table 3: Snapshot of waterfowl species diversity at Kenosha Ponds during September of 2015



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 program resumed in 2015 with the access road to Heil Valley Ranch restored. Five new volunteers were trained and ready to go – but most of the spring weekends experienced rain or snow severely hampering efforts to complete transects. Five transects were completed. 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 will focus on the transects that are located in the controlled burn done in October 2014.

Shrub Monitoring (Mountain Mahogany)

Shrub monitoring switched gears in 2015 to respond to the increased elk use of portions of Rabbit Mountain. Staff and volunteers placed 7 new transects (with a slightly different methodology) at the southern end of Rabbit Mountain. The goal of this monitoring is to gather stand information and the extent of heavy elk use. We will use it to help make decisions about the elk herd and about how best to manage/restore those habitats (cutting or burning) to improve habitat quality and diversity. We also had a volunteer project that lopped a mountain mahogany stand along the Eagle Wind Trail. Volunteers will be recruited to finish that plot and another (in the spring), and read the (2015) lopped plot in the fall.



Volunteer and staff on new shrub transect at Rabbit Mountain, December 2015

Long-term Monitoring Program	Vols	Hours
Raptor Monitoring	8	344
Barn Owl Monitoring	2	3
Bluebird Nest Box Monitoring	18	700
Breeding Bird Surveys	3	133
Burrowing Owl Monitoring	38	468
Butterfly Surveys	3	503
Owl Prowl - Nocturnal Owl Surveys	0	0
Waterfowl Monitoring	14	507
Natural Resource Monitoring Programs	Vols	Hours
Shrub Surveys	2	8
Abert's Squirrel Monitoring	7	30
Totals	95	2696

Volunteer contributions by program.

Total Volunteer Numbers and Hours 2011-2015 -Natural Resource Monitors and Long- Term Monitoring Programs Combined

Program	2011		2012		2013		2014		2015	
	Vols	Hours	Vols	Hours	Vols	Hours	Vols	Hours	Vols	Hours
Long-Term Monitoring	94	2464	99	2466	80	1942	105	2620	86	2658
Natural Resource Monitors	10	40	9	74	10	92	4	16	7	38
Totals	104	2504	108	2540	90	2034	109	2636	93	2696



YOUTH CORPS PROJECTS *ENHANCE WILDLIFE HABITAT*

Boulder County Youth Corps assists with wildlife projects such as removing miles of unnecessary barbed-wire and installing wildlife-friendly fence crossings.

ONE-DAY VOLUNTEER

The Wildlife Program sponsored **5 projects engaging 93 volunteers totaling 372 hours**. Our long-time partners from Defenders of Wildlife pitched in on two projects last year, building a spring enclosure at Reynolds Ranch. Other projects cleaned up sediment protection screens at Walden Ponds, built an important barrier to keep people off fragile rock formations important to rare lichens and bees, and lopped mountain mahogany at Rabbit Mountain. The mahogany lopping is a continuation of experimental disturbance treatments in lieu of fire. Two plots are scheduled to be lopped in the spring of 2016.



Collaboration

Wildlife staff collaborated with Colorado Parks and Wildlife on:

- Flood recovery creek sampling, special status species, stream restoration planning, grants, and special projects, including small mammal study design/sampling.
- Complementary projects on 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 in February and March of 2015.
- Bald eagle nest: BCPOS staff coordinated with CPW and Longmont Power on decisions to rectify mate loss and power pole protections.

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

- Wildlife monitoring including a bobcat study, 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 Boulder County 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 Hall Ranch (Nighthawk Rx Burn), 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. Permitting requirements, run-off, and the irrigation season delayed the groundbreaking until October. The new channel excavation began immediately and most of that rough grading was completed by the end of the calendar year.

Fine grading, pool/riffle construction, habitat structures, and planting and seeding will occur in 2016. This 1 ½ mile section of channelized stream will be re-aligned, protected, and replanted to restore it to conditions of a plains transitional stream with a connected floodplain.



Internal Collaboration

Wildlife staff collaborated with other work groups on many valuable projects, including:

Water Resources

- Helped to install a beaver deceiver on St. Vrain Creek.
- Coordinated plans for repairs to water control structures at Walden Ponds and Braly.
- Coordinated repair work to the Silver Lake ditch at Caribou Ranch.

Real Estate and Resource Planning

- Provided comments, recommendations, and site visits on several property purchases.
- Rights-of-way and processes for natural gas and water pipelines, surface drainage ways, and an electric power line replacement.
- Site visits and comments for oil/gas maintenance projects, repairs, and leaks.

Resource Management Youth Corps team

- Built fencing at the Suitts property, elk-friendly fence jumps at Heil Valley Ranch, built a safety fence at the Agricultural Heritage Center, and a fence to protect cultural resources at Heil Valley Ranch.

Agriculture Division

- Coordinated new pipeline and water redevelopment at Mayhoffer property.
- Constructed a new electric fence at the Golden property.
- Coordinated replacement fencing along Magnolia Road at Reynolds Ranch.

Resource Protection, Education and Outreach, and Trails

- Protected the rare turtleback sandstone formation at Hillside Estates with a low fence and an interpretative sign.
- Collaborated with staff on potential trail connections at Betasso Preserve.
- Collaborated with staff on brochures, photo library, and website.

Standing Teams

- Amenities Team, Fence Team, Trail Maintenance Team, Forestry ID Team, Prescribed Burn Team
- Submitted Migratory Bird Treaty Act guidelines for inclusion in prescribed fire planning.

Special Project Teams

- Pollinator Habitat Improvement Team.
- Provided training for our yearly recruitment of Volunteer Naturalists, Wildlife Masters, and Resource Management 101 staff training for the POS University.



Wildlife research continued to be an important component of management planning on open space in 2015. 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, native fish, black-footed ferret research techniques, and a school-run game camera program.

Final reports are available, along with other non-funded reports at:

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



Wildlife staff help deploy a wildlife camera trap for data collected by Altona Middle School students learning about riparian corridors post-flood.



For over a decade, Dr. Rick Adams from University of Northern Colorado has studied bats on Open Space.
REPORT: Census of Bats at Hall Ranch and Continued Research at Heil Valley Ranch and Hall II



Researchers performed general reptile and amphibian surveys at Rabbit Mountain, and followed rattlesnakes using radio telemetry.
REPORT: A General Herpetofauna Assessment and Mapping of Hibernacula at Rabbit Mountain Open Space

1

CITIZEN SCIENCE VOLUNTEERS Increase public participation in ongoing long and short-term volunteer resource monitoring programs, and develop new programs to engage the public in maintaining and analyzing wildlife data collected on Open Space.

- Double participation in raptor nest monitoring to increase information and knowledge about current nest sites.
- Co-create and provide BCNA and BCAS partner projects with updated program outlines and descriptive

job duties for coordinators and crew leaders.

- Engage a new group of volunteers to assist with data management and preparing data for analysis.



2

Our goal as wildlife staff is to remain flexible and accommodate new priorities as flood recovery and restoration projects evolve.

Provide support towards project design review to incorporate input towards inclusion of habitat restoration or enhancement features.



Continue to work closely with Project Managers to ensure all FEMA requirements are met during project planning and implementation (MBTA, ESA, conservation measures, BGEPA). Provide direct support (on-the-ground presence as needed depending on specific project parameters).

Assist department in grant application development, as needed. Also, wildlife staff will pursue pertinent grant opportunities as well.

3

Collaborate with fish passage working group and ditch companies on seeing two fish passage projects through to construction. Wildlife staff will work to find alternate funding sources, aid in development of designs and permitting, and communicate with ditch companies to garner their support.

- Wildlife staff will continue the long-term monitoring of wildlife in flood impacted areas.
 - A. Aquatic Biomonitoring.
 - B. Mark-Recapture study of Preble's Meadow Jumping Mouse in the St. Vrain corridor.
 - C. Breeding Bird Surveys.

4

Collaboration with Agricultural and Water Resources Group.

Continue conversations with on appropriate management of riparian areas on agricultural lands for multiple benefits. These discussions should result in an overall action plan for how we manage grazing in riparian areas.

Continue working with Agriculture and Water Resources groups towards

monitoring and implementing improved water quality standards and practices around agricultural fields. The goal is to use the current post-flood aquatic biomonitoring program to opportunistically sample water bodies that are of interest to the Agriculture group. At the same time, provide technical advice for how best to implement the monitoring program.

5

Continue collaboration on Pollinator Preservation on Boulder County Open Space with the Agriculture group. Goals this year include funding, attending and implementing Conservation Action Plans provided by Xerces on a working open space farm.

Participating on the Pollinator Action Team as a scientific advisor, and helping with other duties such as editing the PAT team

website, collecting and sharing literature and meeting with stakeholders.

Utilize the Riparian Wood Pollinator small grant study to better identify ways to collaboratively manage the riparian corridors which occur on Agricultural open space, as well as highlight the value of this habitat for pollinators both on and off of Agricultural lands.



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