Boulder County Parks & Open Space

BLM Exchange-Ward Area
Transfer of Management
Brainard Lake Road Construction Project
October 26, 2017

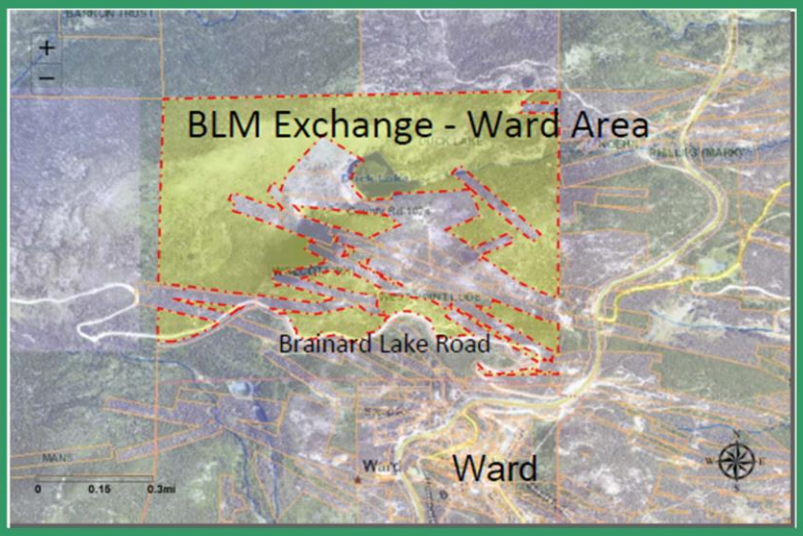
Overview

Brainard Lake Road Upgrade Project

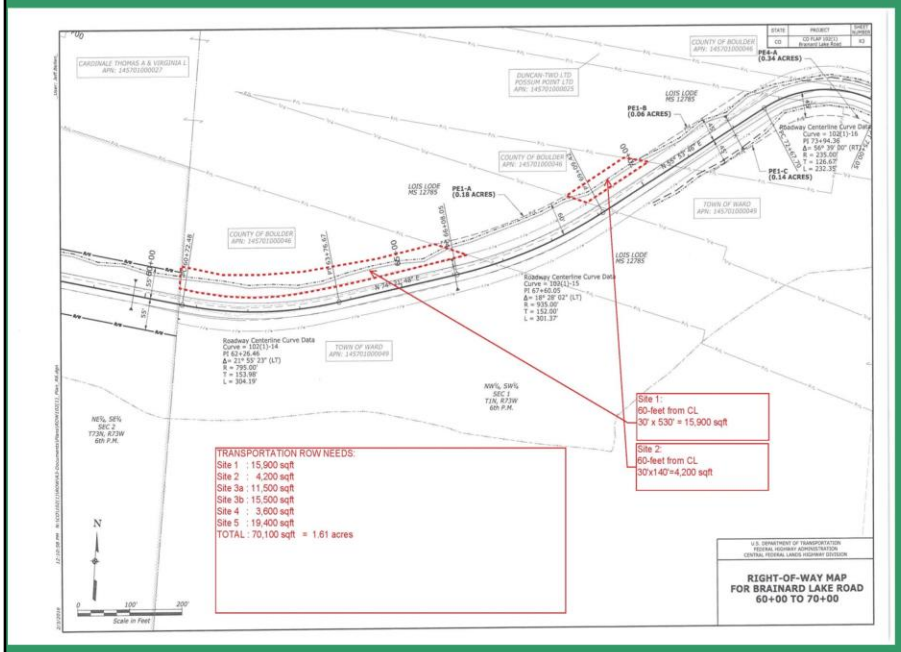
Some of the Improvements Planned:

- Full reconstruction of Brainard Lake Road
- Widening of the road – 2.5 mile stretch
- Four foot shoulder on uphill side of road – to enhance pedestrian and cyclist safety

Open Space Property Affected
BLM Exchange –Ward Area

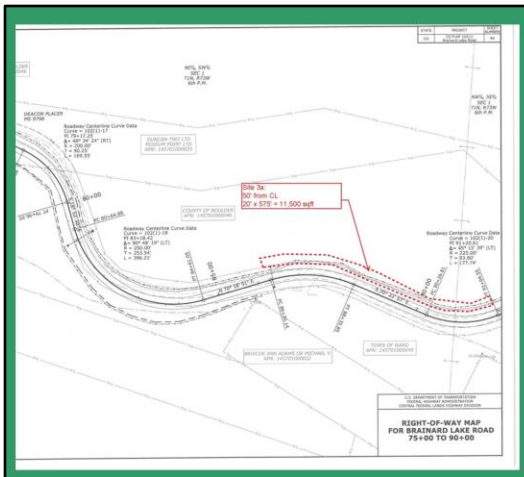


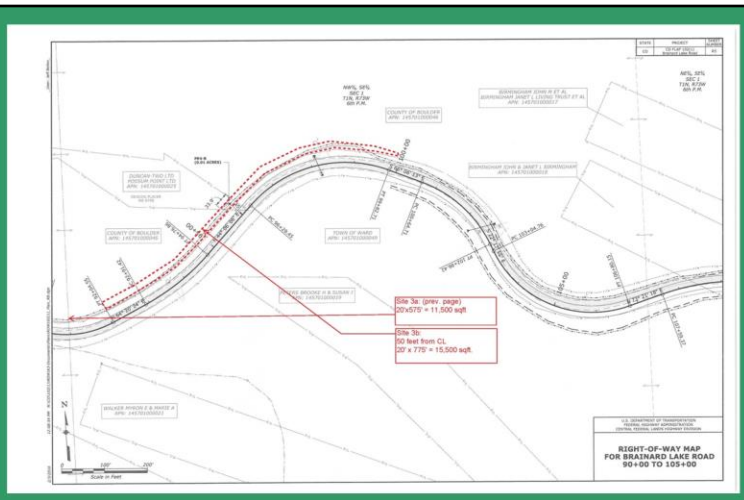
Site 1
Site 2
Site 3
Site 4
Site 5
Site 6
BLM EXCHANGE-WARD
WOLCOTT (RH)
BLM EXCHANGE-WARD AREA-BROOME
WEST POINT LODE
BRAINARD LAKE DR
MALDE
MC CURE
SH 72
WARD-BLAIR



<u>Site 1</u>: 15,900 sq. ft.

<u>Site 2</u>: 4,200 sq. ft.



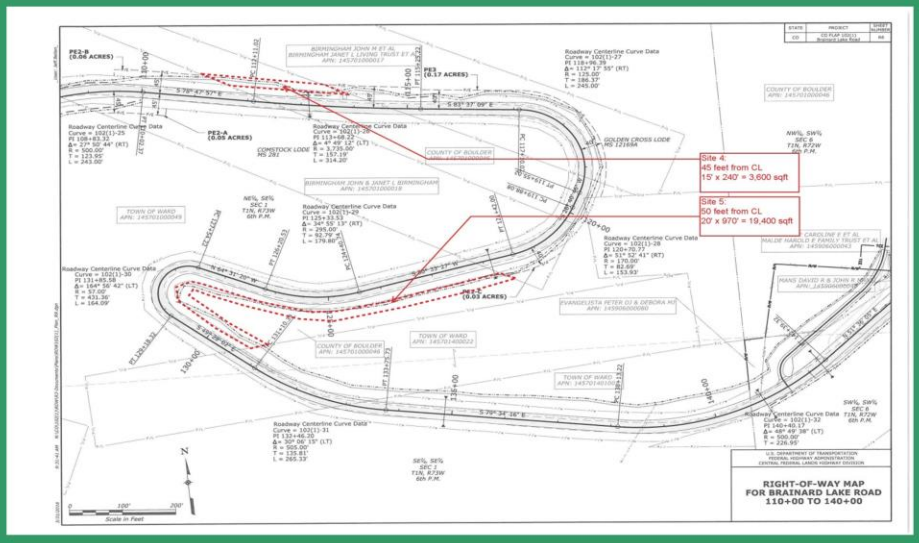


<u>Site 3</u>: 11, 500 sq. ft.

<u>Site 4</u>: 15,500 sq. ft.

Site 5: 3,600 sq. ft.

Site 6: 19,400 sq. ft.



Brainard Lake Road – Transfer of Management

Site 1: 15,900 sq. ft
Site 2: 4,200 sq. ft.
Site 3: 11,500 sq. ft.
Site 4: 15,500 sq. ft.
Site 5: 3,600 sq. ft.
Site 6: 19,400 sq. ft.

Total: 70,100 sq. ft. = 1.61 acres

Boulder County Parks & Open Space

Open Space Cultural Resources & Historic Preservation Projects

Last update May 2015

What is a cultural resource?

buildings, sites, structures, objects, districts or cultural practices evaluated as having significance in prehistory or history.

What is historic preservation?

Historic preservation is defined as the stewardship of the important places from the past, including buildings, structures, sites, districts, and landscapes. Understanding the character of Colorado's cultural resources is essential for their protection.

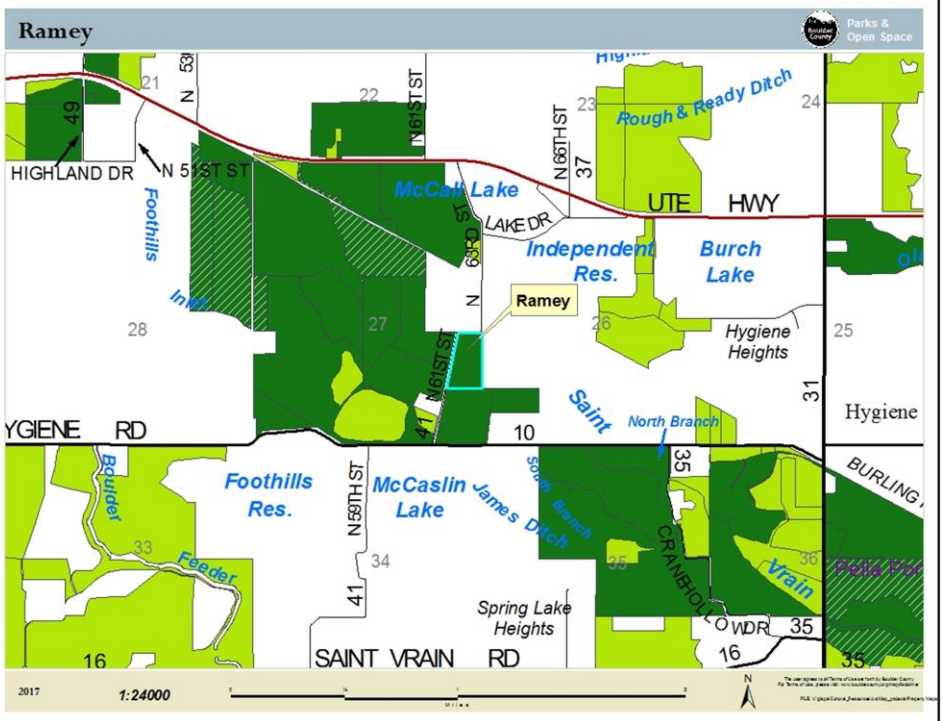
Colorado Cultural Resource Survey Manual

The Numbers…

Approx. 1,600+ identified cultural resources on open space
(includes prehistoric, historic archaeology and historic resources)

- 325+ buildings and structures that are 50 years of age or older that are actively managed on 56 open space properties
- $1.5 million in historic preservation grants
- 204 archaeology surveys completed on open space properties

Ramey Flood Recovery Project


Ramey
Parks & Open Space
Rough & Ready Ditch
HIGHLAND DR
N 51ST ST
Foothills
Inlet
McCall Lake
N 61ST ST
N 66TH ST
LAKE DR
UTE
HWY
Independent Res.
Burch Lake
N 69RD ST
Ramey
Hygiene Heights
Saint
North Branch
YGIENE RD
Hygiene
Foothills Res.
McCaslin Lake
N 59TH ST
James Ditch
South Branch
CRANBROOK DR
Vrain
Boulder
Feeder
Spring Lake Heights
SAINT VRAIN RD
2017
1:24000

DISCLAIMER: This map is for illustrative purposes only and the features depicted on it are approximate. More site specific studies may be required to draw accurate conclusions. Boulder County makes no warranties regarding the accuracy, completeness, reliability, or suitability of this map. Boulder County disclaims any liability associated with the use or misuse of this map. In accessing and/or relying on this map, the user fully assumes any and all risk associated with the information contained therein.

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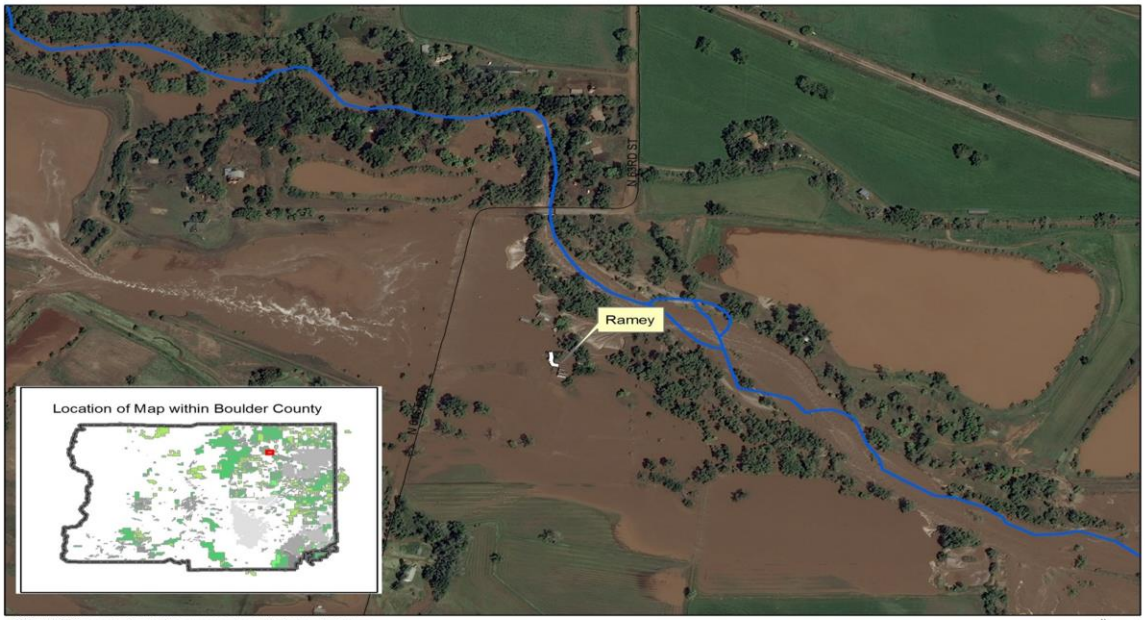
Ramey



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Ramey

September 2013

April 24, 2014

October 10, 2015
CAT
CAT
329E

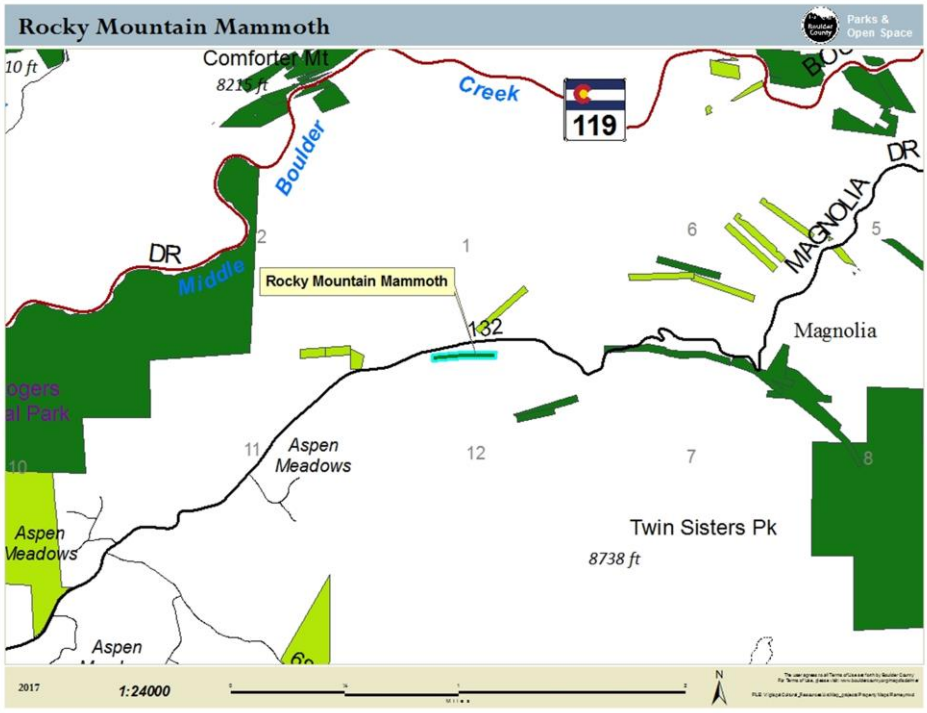
July 15, 2016

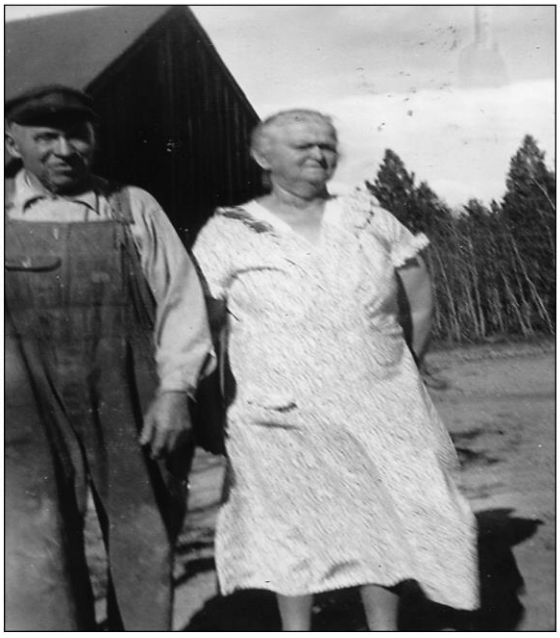
August 5, 2016

March 15, 2013

March 17, 2017

Rocky Mountain Mammoth
Shaft House


Rocky Mountain Mammoth
Parks & Open Space
Comforter Mt
Creek
119
Boulder
DR
Middle
Rocky Mountain Mammoth
MAGNOLIA
DR
Magnolia
Aspen Meadows
Twin Sisters Pk
8738 ft
2017
1:24000
N

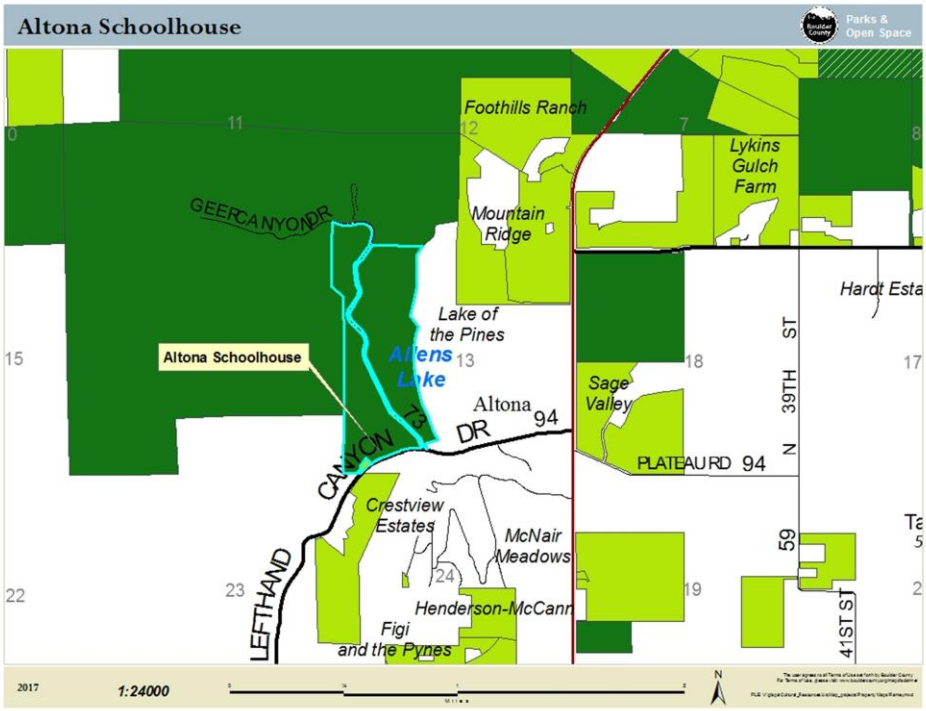


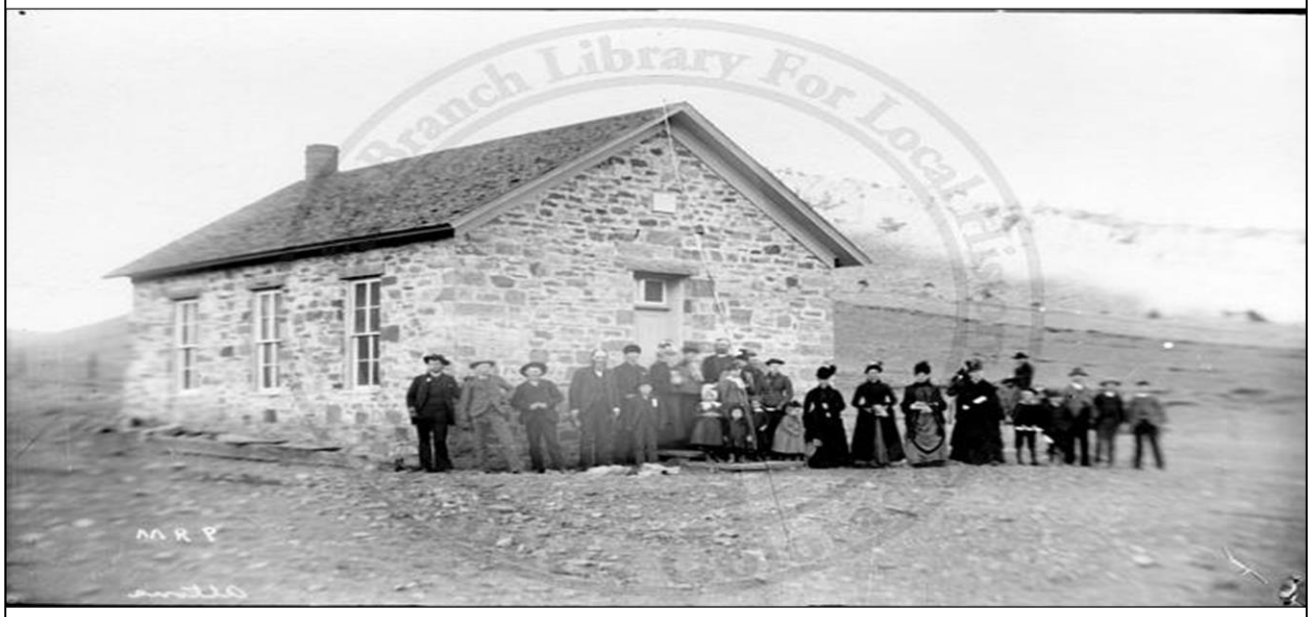
September 9, 2015
YANMAR

Roof

October 5, 2015

Altona Schoolhouse Restoration


Altona Schoolhouse
Parks & Open Space
Foothills Ranch
Lykins Gulch Farm
Mountain Ridge
GEER CANYON DR
Lake of the Pines
Allens Lake
Altona Schoolhouse
Altona
DR
94
73
CANYON
LEFTHAND
Crestview Estates
McNair Meadows
Henderson-McCann
Figi and the Pines
Sage Valley
PLATEAU RD
94
39TH ST
N
59
41ST ST
Hardt Esta
11
12
7
8
15
13
18
17
22
23
24
19
2017
1:24000
N

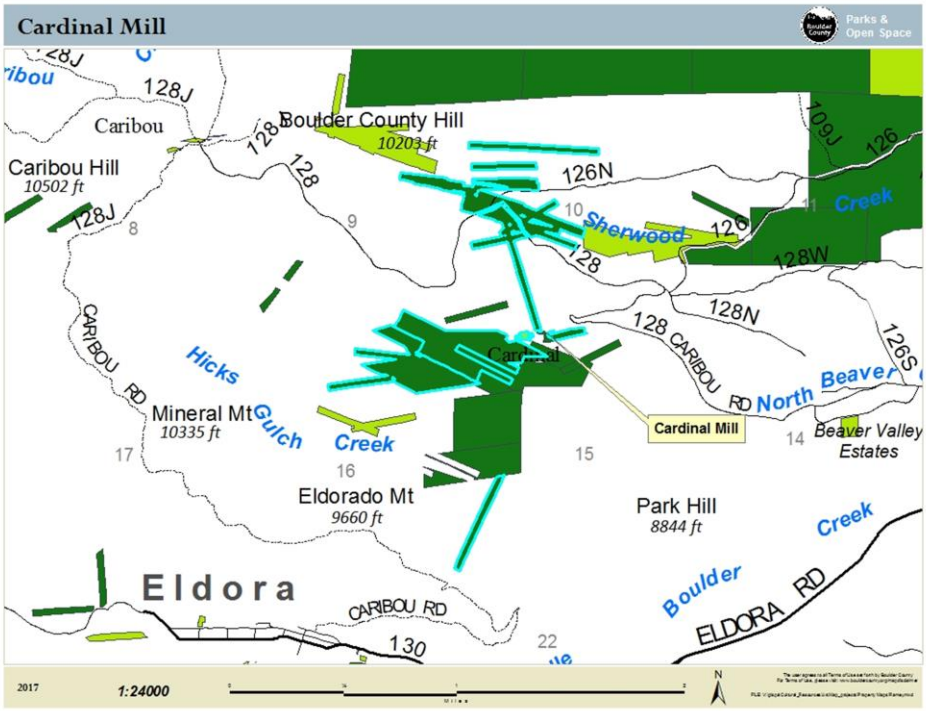

MRP

June 24, 2015

July 28, 2015

Pam Pak
PEPPERS
Pam Pak
PEPPERS

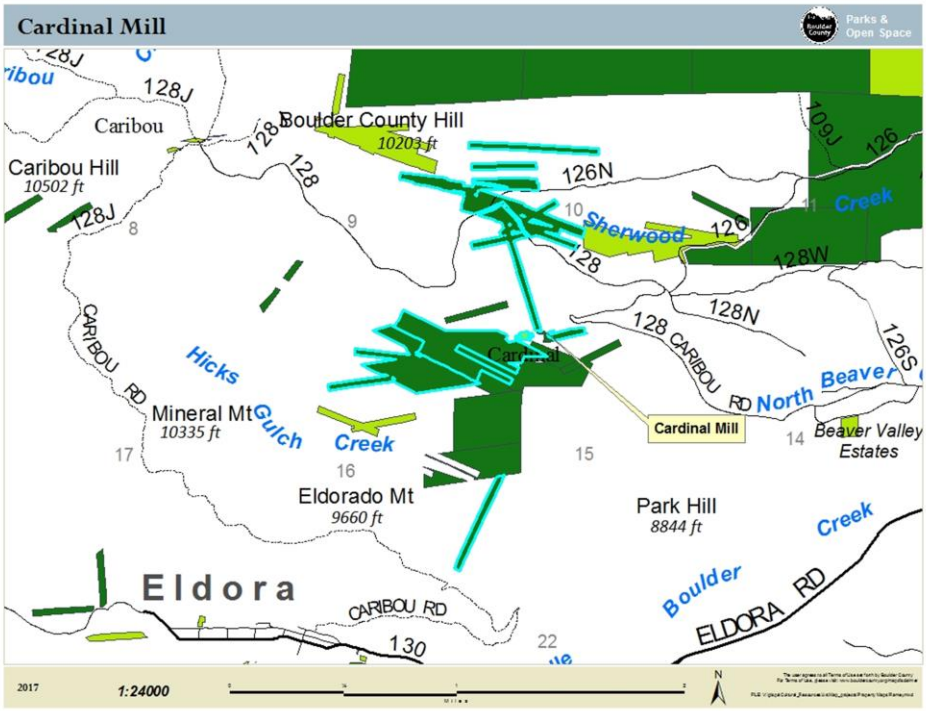
Boulder County Tunnel Enclosure


Cardinal Mill
Parks & Open Space
Caribou
Caribou Hill
10502 ft
Boulder County Hill
10203 ft
128J
128
126N
109J
126
Sherwood
Creek
128W
128N
126S
CARIBOU RD
Hicks
Gulch
Creek
Mineral Mt
10335 ft
Cardinal
Cardinal Mill
North
Beaver
Beaver Valley
Estates
Eldorado Mt
9660 ft
Park Hill
8844 ft
Boulder
Creek
Eldora
ELDORA RD
130
2017
1:24000
N

August 6, 2015

August 27, 2015

Cardinal Mill
Public Access


Cardinal Mill
Parks & Open Space
Caribou
Caribou Hill
10502 ft
Boulder County Hill
10203 ft
128J
128
126N
109J
126
Sherwood
Creek
128W
128N
126S
CARIBOU RD
Hicks
Gulch
Creek
Mineral Mt
10335 ft
Cardinal
Cardinal Mill
North Beaver
Beaver Valley Estates
Eldorado Mt
9660 ft
Park Hill
8844 ft
Boulder
Creek
Eldora
ELDORA RD
130
2017
1:24000
N

July 2004

October 2015

April 18, 2017

DECKFAST
DECKFAST Epoxy
June 28, 2017

July 13, 2017

July 26, 2017

August 3, 2017

October 12, 2017

Defensible Space

Betasso Preserve

Edwards Site

The Edwards site is a multi-component site with historic and prehistoric components spanning 6000-7000 years.

Ashley Edwards, an avocational archaeologist, discovered the site.

END

Fall Cereals On-Farm Demonstration Plot

POSAC Meeting

Oct 26, 2017

Presenter: Dr. Blake Cooper

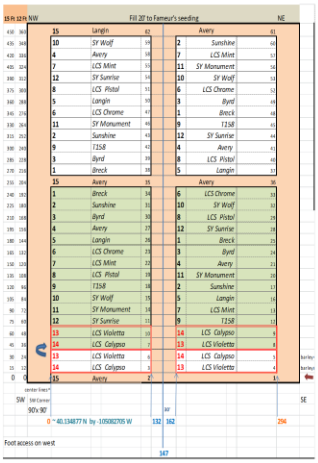
Agricultural Resources Division Manager

Introduction:

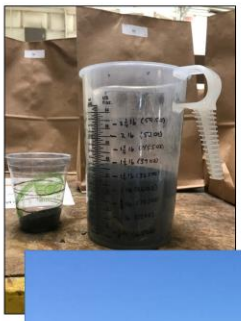
- Origins
  - Grew up on a small family farm and ranch near Avondale, Colorado.
- Formal Education
  - Dual major, BS Biology and BS Chemistry, University of Southern Colorado *(Now CSU Pueblo),* 1975.
  - MS Plant Pathology, Kansas State University, 1979.
  - PhD Plant Breeding and Genetics, Kansas State University, 1981.
- Work Experience
  - 35 years in the private sector breeding small grains *(developed and released many types of wheat and malt barley).*
- Excited to be a part of BCPOS as the new Agricultural Resources Division Manager, since August 2017.

2017 Fall Cereals On-Farm Demonstration Plot

RCBD Split-Plot Experimental Design Map



- 12 Varieties of Winter Wheat
  - 5 new CSU releases
  - 3 new Syngenta (AgriPro) releases
  - 4 new Limagrain Cereal Seed releases
- 2 Varieties of Winter Malt Barley
  - Two row winter malting types from Europe.
- Each variety is tested with and without Coolterra™ Biochar provided by Cool-Planet, in Greenwood Village, CO.
- Each treatment combination was replicated 2x. Individual plots are ~ 0.036 Ac. or about 25x normal small research plot size.
- **Concept is to use Farmer-sized equipment and practices where we can.**



2017 Fall Cereals BCPOS On-Farm Demonstration Plot

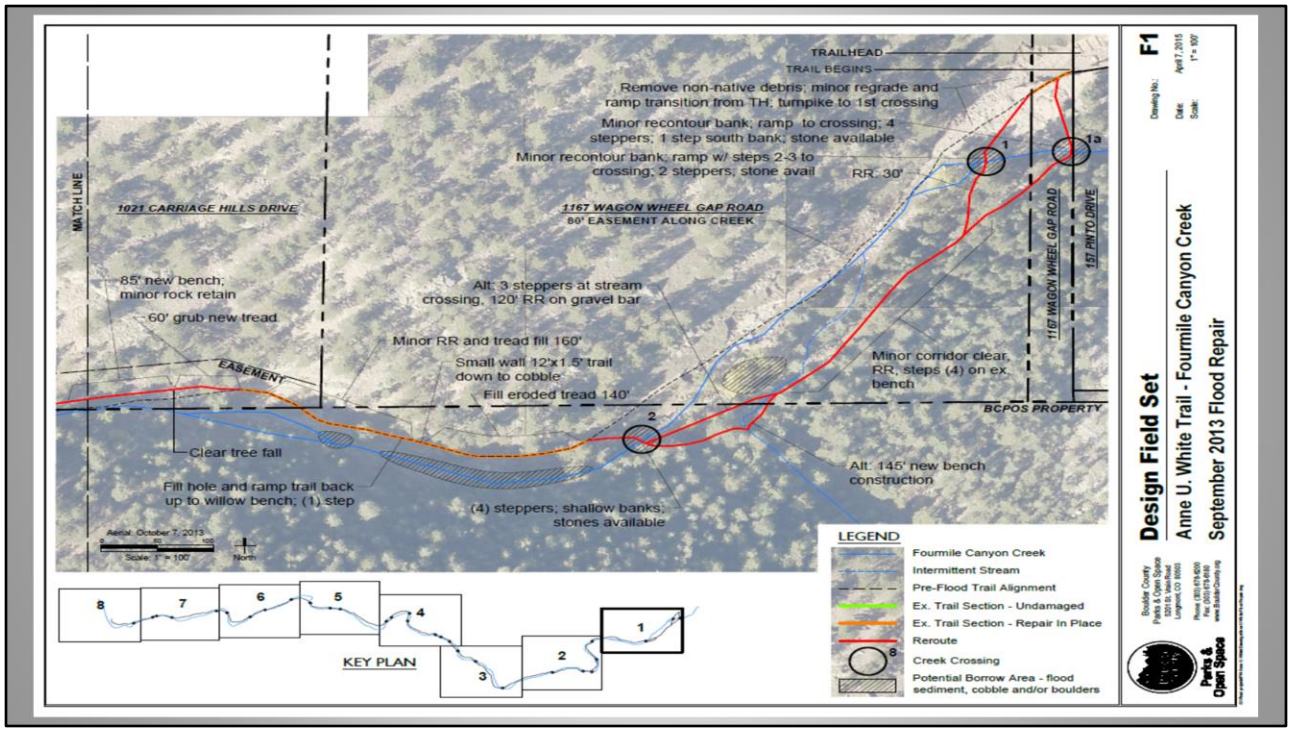
Trails Staff

- 6 Full Time Employees
- 8-12 Seasonal Employees (May – November)
- Volunteer Coordinator

Open Sky Loop Opens

Lagerman/AHI Trails
Parks & Open Space
PIKE RD
PROSPECT RD
Lagerman Reservoir
2016
Trails
Fence
Roads
N

Anne U. White Trail Repairs 2016


TRAILHEAD
TRAIL BEGINS
Remove non-native debris; minor regrade and ramp transition from TH; turnpike to 1st crossing
Minor recontour bank; ramp to crossing; 4 steppers; 1 step south bank; stone available
Minor recontour bank; ramp w/ steps 2-3 to crossing; 2 steppers; stone avail
RR: 30'
1a
1
1167 WAGON WHEEL GAP ROAD
80' EASEMENT ALONG CREEK
1021 CARRIAGE HILLS DRIVE
MATCH LINE
85' new bench; minor rock retain
60' grub new tread
Alt: 3 steppers at stream crossing, 120' RR on gravel bar
Minor RR and tread fill 160'
Small wall 12'x1.5' trail down to cobble
Fill eroded tread 140'
EASEMENT
Minor corridor clear, RR; steps (4) on ex. bench
1167 WAGON WHEEL GAP ROAD
1157 PINTO DRIVE
BCPOS PROPERTY
2
Clear tree fall
Fill hole and ramp trail back up to willow bench; (1) step
(4) steppers; shallow banks; stones available
Alt: 145' new bench construction
Aerial: October 7, 2013
Scale: 1" = 100'
North
KEY PLAN
8
7
6
5
4
3
2
1
LEGEND
Fourmile Canyon Creek
Intermittent Stream
Pre-Flood Trail Alignment
Ex. Trail Section - Undamaged
Ex. Trail Section - Repair In Place
Reroute
Creek Crossing
Potential Borrow Area - flood sediment, cobble and/or boulders
Design Field Set
Anne U. White Trail - Fourmile Canyon Creek
September 2013 Flood Repair
Drawing No.: F1
Date: April 7, 2015
Scale: 1" = 100'
Boulder County Parks & Open Space
Parks & Open Space

6,000 FTE & Seasonal Staff Hours

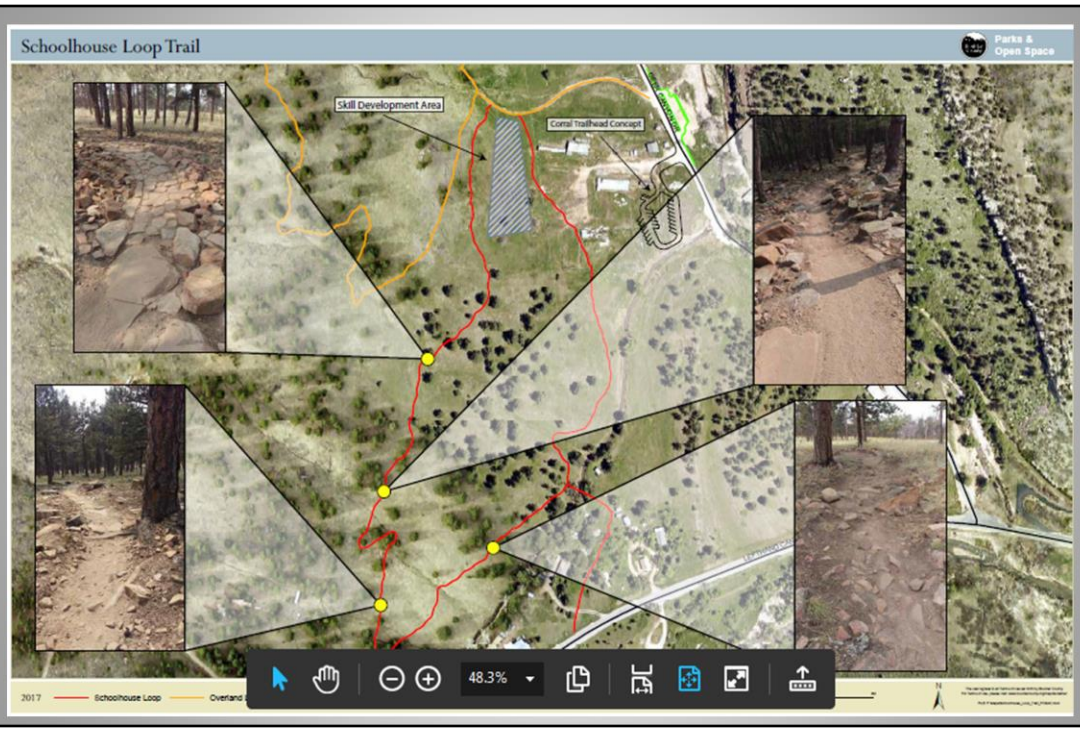
Heil Valley Ranch 2 Management Plan: Proposed Facilities
Parks & Open Space
2016
Heil Valley Ranch 2
New or Existing Structures
County Open Space
County Conservation Easement
Subdivision or Platted Area
Roadway
Stream
Main Ditch
Multiuse Trail
Pedestrian Equestrian Trail
Pedestrian Trail

Overland Loop Opening
8-9-2017

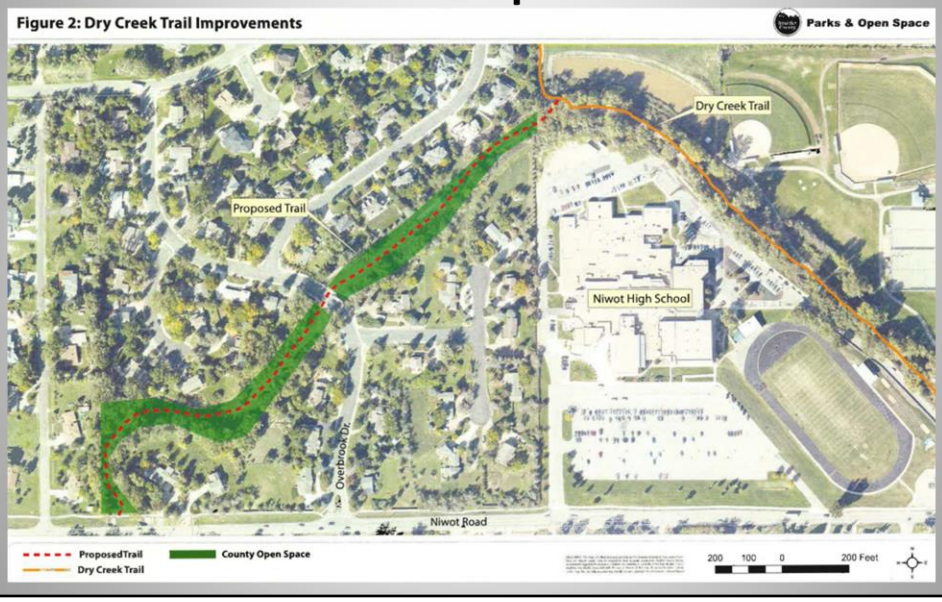
Heil 2 East Side Trail

Heil 2: Schoolhouse Loop
“Beginners Loop”

- Met on site with stakeholders for concepts about a “Beginners Loop”.
- Concept developed for “Alternate lines” along part of trail and “Skill Development Area”.
- Planning team has approved the concept.
- Trails staff will meet with stakeholders for final design concept.


Schoolhouse Loop Trail
Parks & Open Space
Skill Development Area
Corral Trailhead Concept
48.3%
2017
Schoolhouse Loop

Niwot Trail Improvements

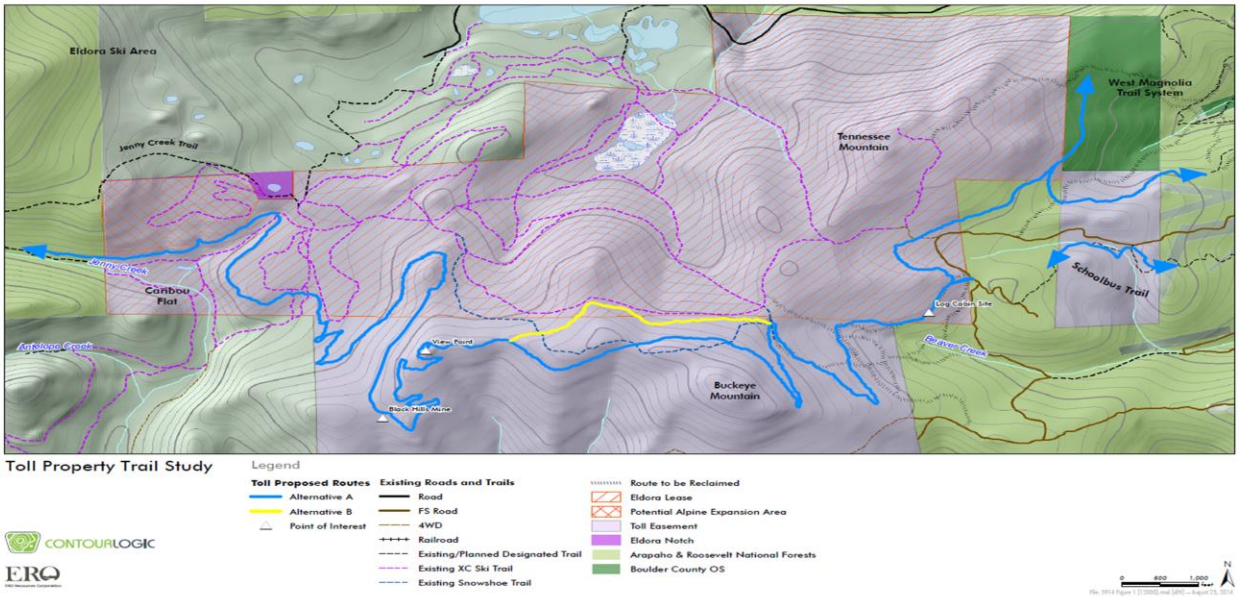


VULCAN

Bridge Maintenance

- Bridge Inspections completed in 2015.
- Several bridges identified as needing repairs in short term.
- 4 Bridges identified to have decking replaced 2016-2017.
- Cost: $32,000 (Decking and Hardware Only).

Pella Crossing Re-Opening


Eldora Ski Area
Jenny Creek Trail
Jenny Creek
Caribou Flat
Arapahoe Creek
Tennessee Mountain
West Magnolia Trail System
Schoolbus Trail
Log Cabin Site
Fairview Creek
View Point
Black Hill Mine
Buckeye Mountain
Toll Property Trail Study
Legend
Toll Proposed Routes
Alternative A
Alternative B
Point of Interest
Existing Roads and Trails
Road
FS Road
4WD
Railroad
Existing/Planned Designated Trail
Existing XC Ski Trail
Existing Snowshoe Trail
Route to be Reclaimed
Eldora Lease
Potential Alpine Expansion Area
Toll Easement
Eldora Notch
Arapaho & Roosevelt National Forests
Boulder County OS
CONTOURLOGIC
ERO
0
500
1,000
Feet
N

Toll Trail 2017/2018

- Finish construction documents with Contour Logic.
- Contract a cultural resource survey along trail corridor 2018.
- Strategize construction implementation starting in 2019.
- Apply for grant.

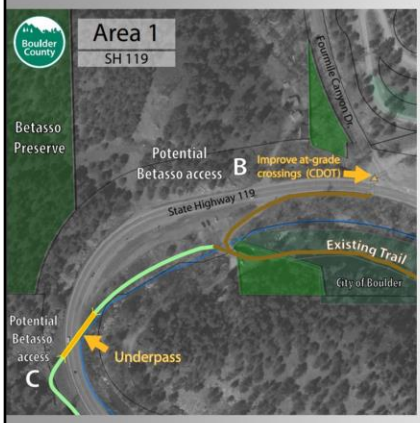
Challenges on Open Space
Hall Ranch “Rock Garden”

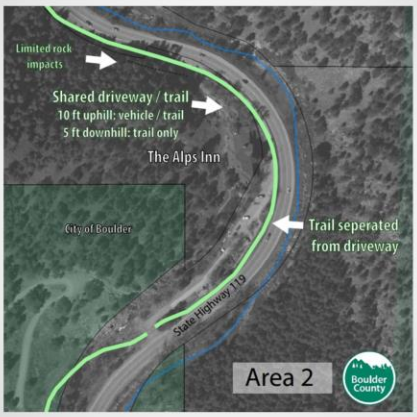
Rabbit Mountain Social Trails

- Social trail becoming evident prior to 2013.
- Fencing & signage placed to discourage use.
- Spring 2017 ~180 users/month.

RMNP Social Trail

Boulder Creek Path Extension





Plan is to bid out and start construction in 2018 with potential for construction to extend into 2019

Eldorado to Walker Planning Project

Multi-use Trail Connection between Eldorado Canyon to Walker Ranch

- Planning starting back up. Agency trails and resource staff starting site visits in November
- After site visits will have a number of in-house meeting to gather information/data and perspectives
- Spring public meeting to present the team's findings related to the data gathered and expert opinions of the project partners as well as case studies on carrying capacity to address the overcrowding currently impacting the Town of Eldorado Springs and the State Park
- The public comments and data will be gathered into a report for the Commissioners and elected officials at the City of Boulder and State

Trail Related Planning Priorities

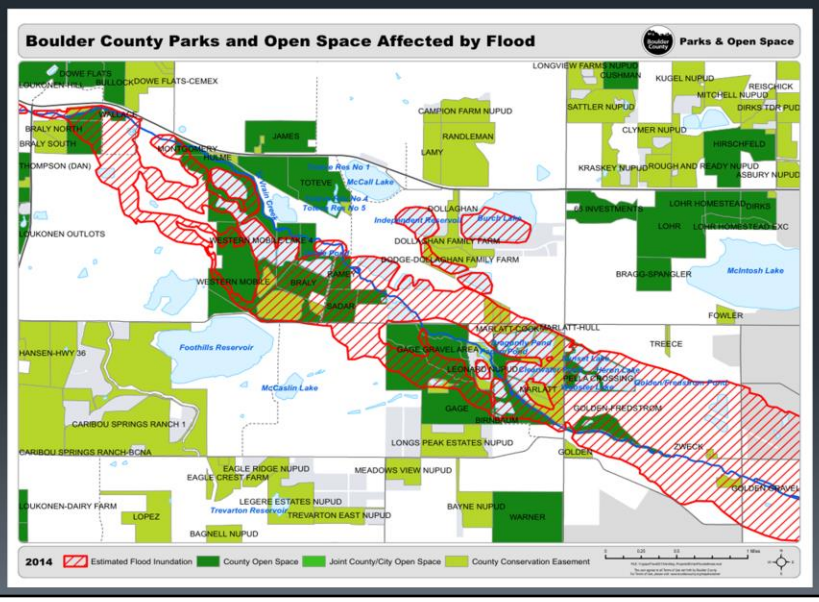
- Department planning schedule being discussed by staff
- Strive to set realistic goals for planning projects in 2018 and 2019
- Will bring planning schedule to POSAC for comment

Post-flood Monitoring of Preble's Meadow Jumping Mouse on BCPOS properties

Tim Shafer
Wildlife Biologist

Boulder County Parks & Open Space

Flood Impacts to Riparian Areas



Flood impacted all of our water ways in Boulder County.
-Erosion
-Aggradation
-Avulsion
-Downcutting of streams → riparian veg disconnected from water table

Riparian areas make up <2% of our land cover but harbor roughly 80% to 90% of our regional biodiversity in the semi-arid west 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 are of State importance to fish conservation and serve as a last stronghold in Colorado for a suite of native fishes.

Long-term monitoring

- Monitor responses of wildlife and habitat to flood impacts.

  "Long-term" = monitor change over time to establish trends

- Long-term monitoring will benefit POS in the following ways:
  1. Evaluate the status of species and habitat impacted by flood,
  2. Inform wise resource management and land use decisions,
  3. Guide long-term recovery of riparian and aquatic ecosystems.

The wildlife group recognized the need to establish a long-term monitoring program to monitor and assess the responses of wildlife inhabiting the riparian and aquatic ecosystems impacted by the flood.

Benefits of long-term monitoring:

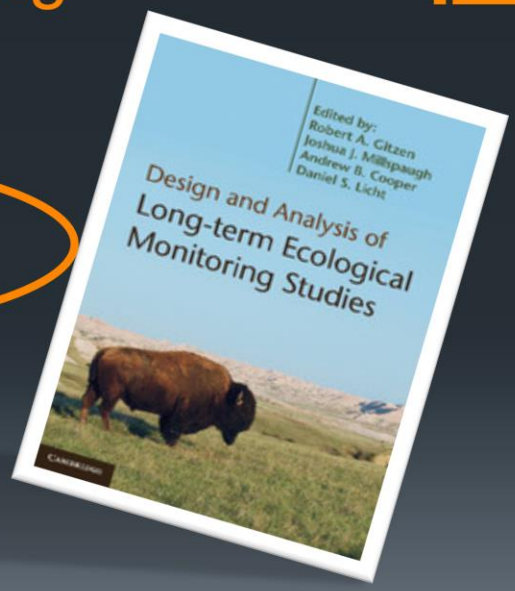
1. Evaluate the status of species and habitat impacted by the flood,
2. Use this information to inform wise resource management and land use decisions,
3. Guide long-term recovery and restoration of riparian and aquatic ecosystems.

Long-term monitoring

Breeding Bird Surveys (BBS)
- Avian diversity

Small mammal trapping
- PMJM distribution and status
- Small mammal community diversity
- Habitat condition

Aquatic biomonitoring
- Fish community assessment
- Aquatic insect biomonitoring
- Water quality and habitat
- Channel morphology



Small Mammal Trapping

Preble's meadow jumping mouse (PMJM)

(Zapus hudsonius preblei)

- Federally **THREATENED** (protected under ESA)
- Endemic to CO and WY
- Threats – Habitat alteration, degradation, and fragmentation due to:
  - Over grazing
  - Urban development
  - Alteration of natural hydrologic processes

1. **Endemic** to CO Front Range and foothills of south-central WY

Glacial Relic: Once the glaciers receded from the front range of Colorado and the foothills of Wyoming and the **climate became drier**, the Preble's mouse was **confined to the riparian systems** where moisture was plentiful. The **eastern boundary** for the Preble's is likely defined by the dry shortgrass prairie, which may present a barrier to eastward expansion.

Western Jumping Mouse (*Zapus princeps*) Same genus as PMJM but different species. Also found in moist habitats near water, but occur above 7,600' elevation.

1. Federally **THREATENED** – protected under ESA
   1. **THREATS**: Habitat alteration, degradation, and fragmentation due to over grazing, urban development, and alteration of natural hydrologic processes.

Small Mammal Trapping

Preble's meadow jumping mouse (PMJM)

(Zapus hudsonius preblei)

Sub-species of meadow jumping mouse.

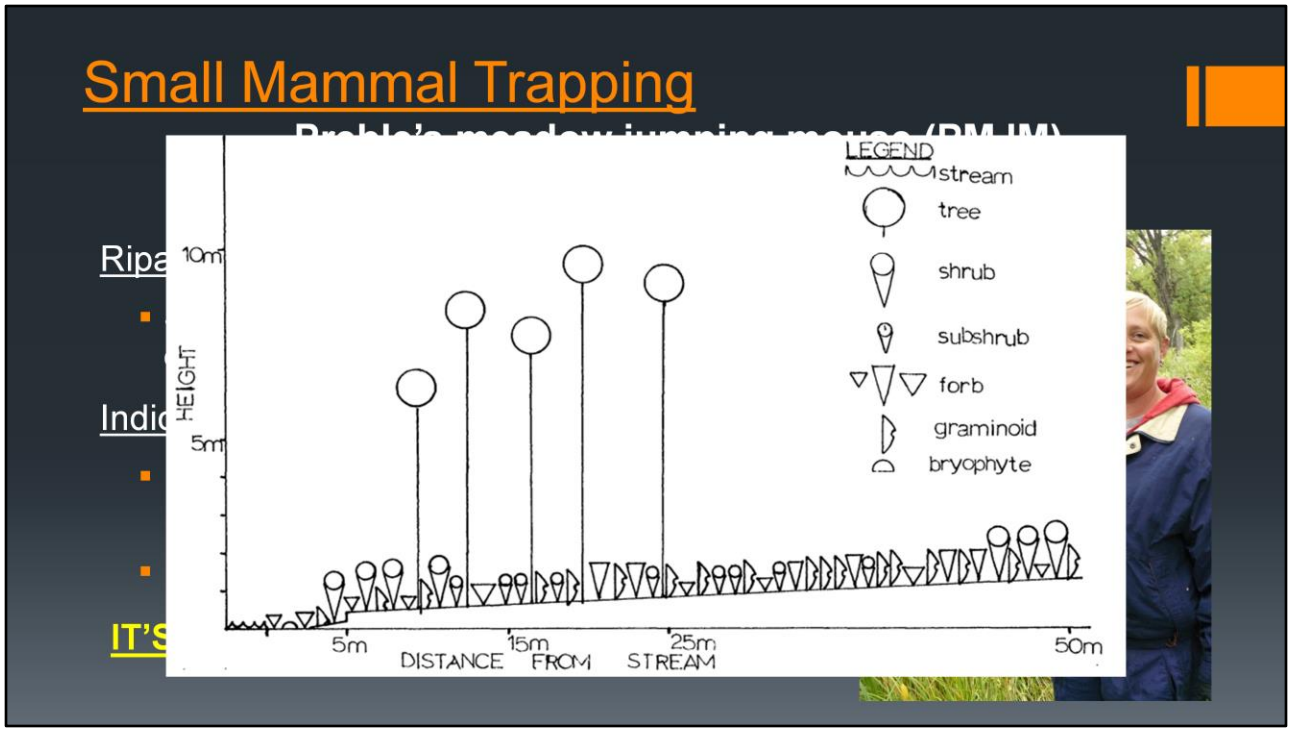
Habitat:

- Well developed riparian habitat
  (Grasses, forbs, shrubs, trees)
- Adjacent grassland community
  (High graminoid diversity)
- Nearby water source

Diet: Insects, seeds, fungi, moss, pollen

Habitat: Typical habitat for Preble's is comprised of well-developed plains riparian vegetation with adjacent, relatively undisturbed grassland communities and a nearby water source.
These riparian areas include a relatively dense combination of grasses, forbs, and shrubs. Preble's are known to regularly range outward into adjacent uplands to feed and hibernate.

Diet: Consists primarily of insects, seeds, fungi and pollen and shifts seasonally.



An **indicator species** is an organism whose presence, absence or abundance reflects a specific environmental condition.

Indicator species can **signal a change in the biological condition** of a particular ecosystem, and thus may be used as a proxy to diagnose the health of an ecosystem.

Especially those that are rare, sensitive, or dependent on particular habitat or environmental conditions.

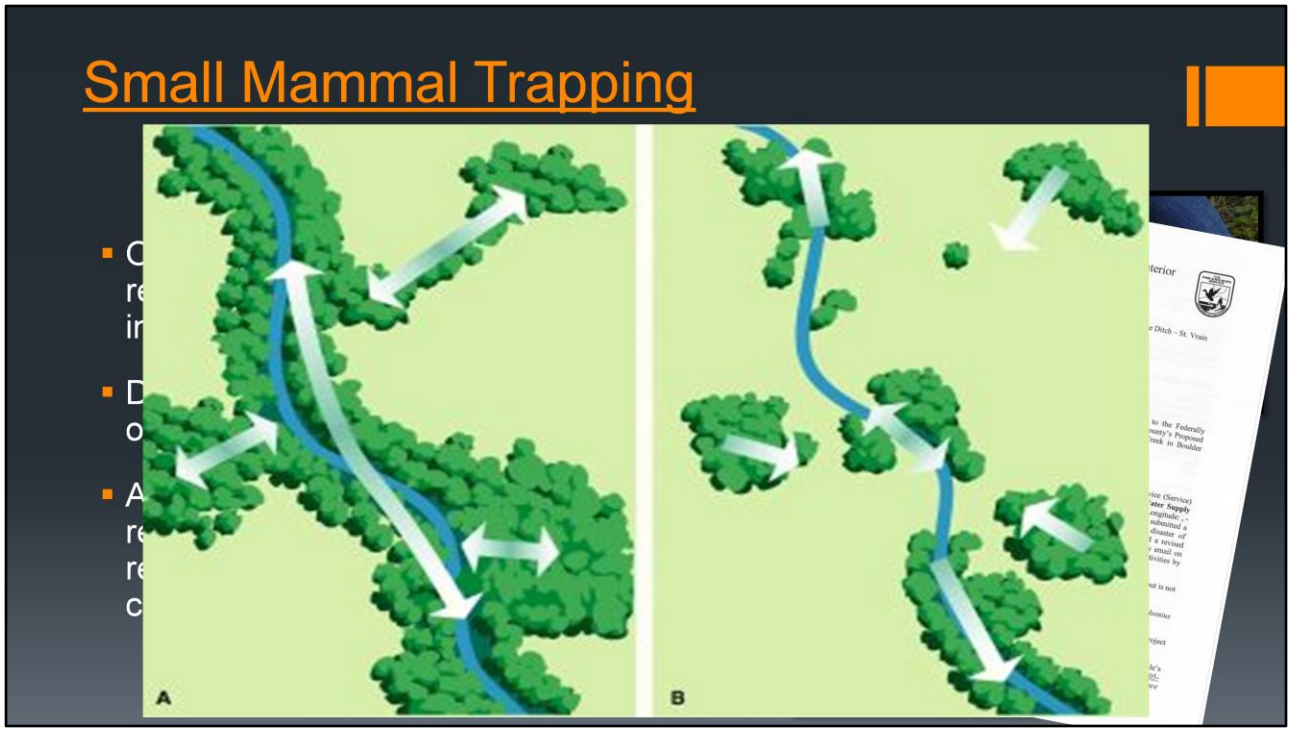
PMJM good indicator species because it is both naturally rare AND dependent upon a particular habitat type. Sensitive to changes in health of riparian ecosystem.

Can use an indicator species as a **surrogate for overall biodiversity**, monitoring the outcomes of management practices by observing changes in the distribution or demography of populations of indicator species.

Provide target conditions for restoration activities.

PMJM have evolved with and are adapted for specific habitat type. If we understand what PMJM habitat requirements are, we have a good indication of what a healthy and natural riparian ecosystem should look like, providing a target for restoration.

IT’S NOT JUST ABOUT THE MOUSE!!! Example of information we can get from habitat studies that can inform restoration.



1. Unique opportunity to study wildlife following a large infrequent natural flood event. Then use what we learn to inform management and guide our response to future floods.
2. Document post-flood distribution of PMJM in the county.
    1. Important for regulatory compliance in flood recovery efforts.
    2. USFWS consultation. Implementation of Conservation Measures.
    3. Information from POS trapping efforts has already been used by Federal, State, and Local entities in regulation of flood recovery activities.
3. Aid in the development of strategic resource management plans to restore habitat and habitat connectivity

Example of a fragmented linear riparian corridor where hypothetical PMJM populations are isolated and disconnected.
Connectivity is important for long-term viability of PMJM on the landscape. Needs for dispersal, gene flow, and resiliency to large and destructive natural or anthropogenic disturbance events.

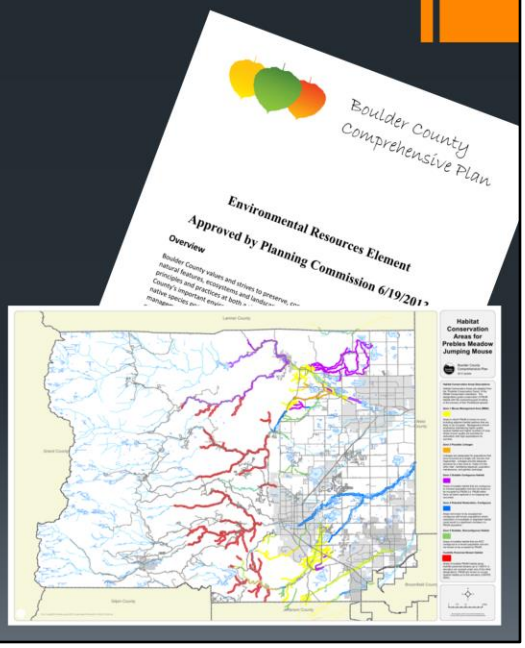
Small Mammal Trapping

Benefits from long-term monitoring

Inform development of policy

Build foundation for Species Conservation and Recovery Plan for PMJM

- Directive from County Commissioners from the ERE update process.



1. Inform development of policy
    1. Example: BCCP-ERE, map of PMJM Habitat Conservation Areas
    2. These are important land use planning tools that help to protect our important environmental resources.
2. Build foundation for Species Conservation and Recovery Plan for PMJM
    1. Outcome from ERE update process, directed by Commissioners to develop these plans for priority species in the county.

Small Mammal Trapping

PRESENCE / ABSENCE

- (2014 – 2015)
- Determine post-flood distribution of PMJM

CAPTURE - RECAPTURE

- (2016 – 2018)
- Determine post-flood population status and trend
- St. Vrain Populations
- Estimates of density (# of mice per km of stream)
- Estimates of annual survival

Sampled 28 sites total: 14 each summer

First week of June through the second week of September

250 traps along 1 km reach of stream

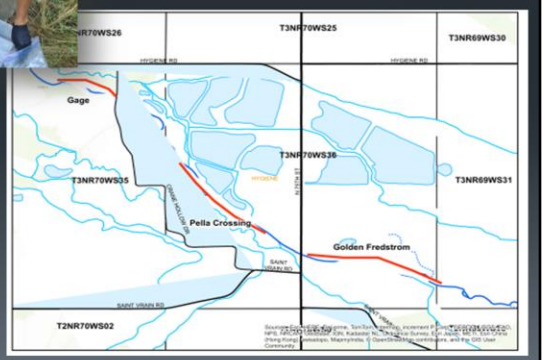
3 consecutive nights

Small Mammal Trapping

Presence / Absence

STUDY DESIGN

- Sampled 28 sites
  - 14 each summer
- First week of June through the second week of September
- 250 traps along 1 km reach of stream
- Trapped for 3 consecutive nights



Sampled 28 sitestotal: 14 each summer

First week of June through the second week of September

250 traps along 1 km reach of stream

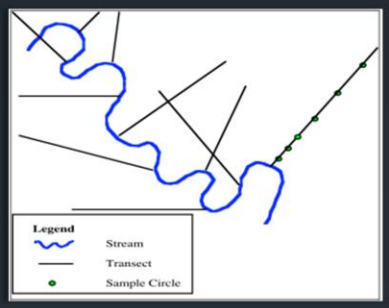
3 consecutive nights

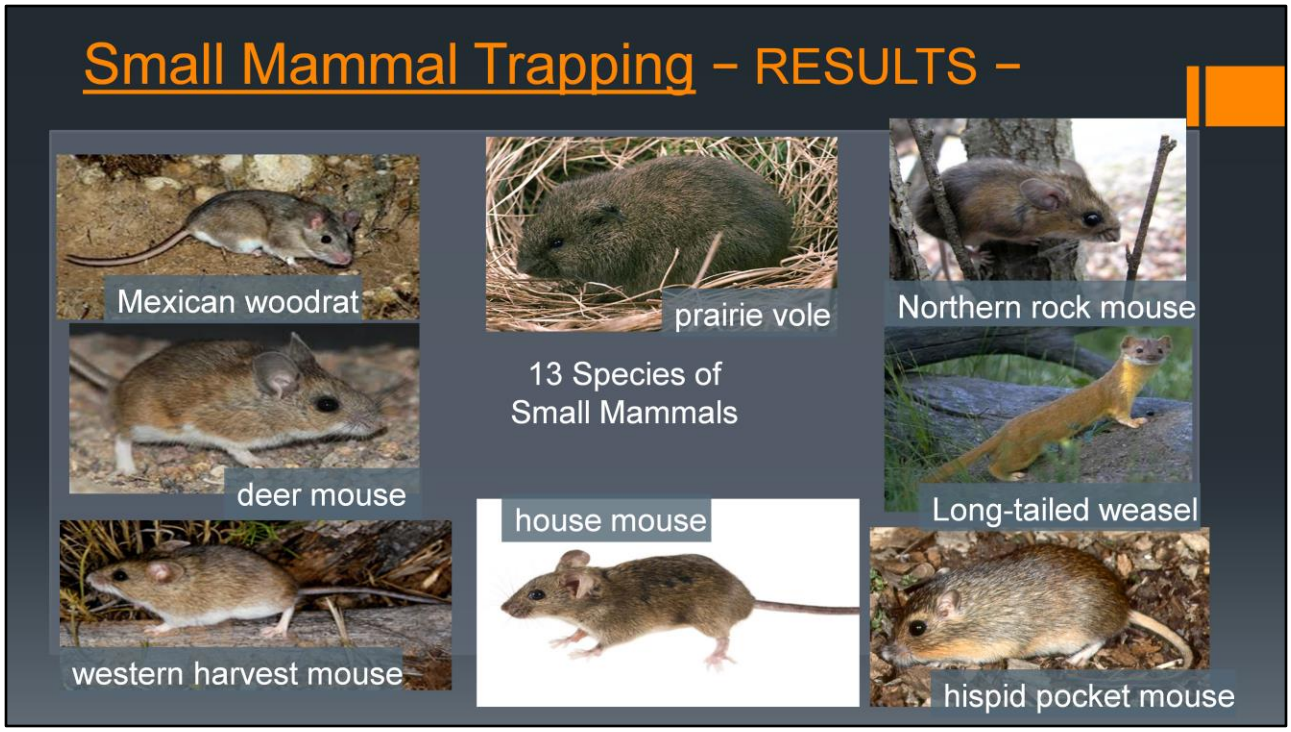
Small Mammal Trapping

Presence / Absence

HABITAT MONITORING

- Track post-flood succession of riparian vegetation.
  - Relate trends to PMJM occupancy/colonization/extinction
- Documented:
  - % cover for trees, shrubs, forbs, graminoids, bare ground/litter.
  - Anthropogenic impacts at site





Total of 13 different small mammal species captured across all sites.
Also caught a variety of other creatures: milk snake, toads, crayfish, weasel

Small Mammal Trapping
Presence / Absence

RESULTS

- Total Captures: 4,305
- Total PMJM Captures: 95
- Tom Davis Gulch: 45

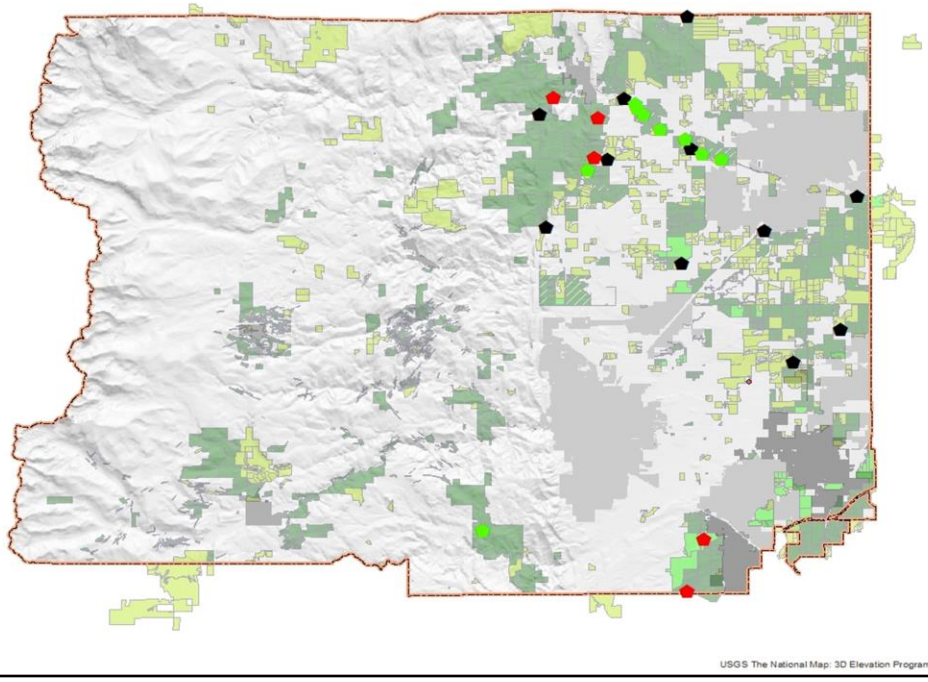
Deer mice made up nearly 80% of the catch (78.3%)

PMJM were not found everywhere, and where they were found, they made up a small proportion of the catch (usually <15%). PMJM are naturally rare, or in low abundance.

Tom Davis Gulch, Walker Ranch, was unique. Best habitat. Greatest number of PMJM caught (45) and the 2nd highest overall catch of all sites.

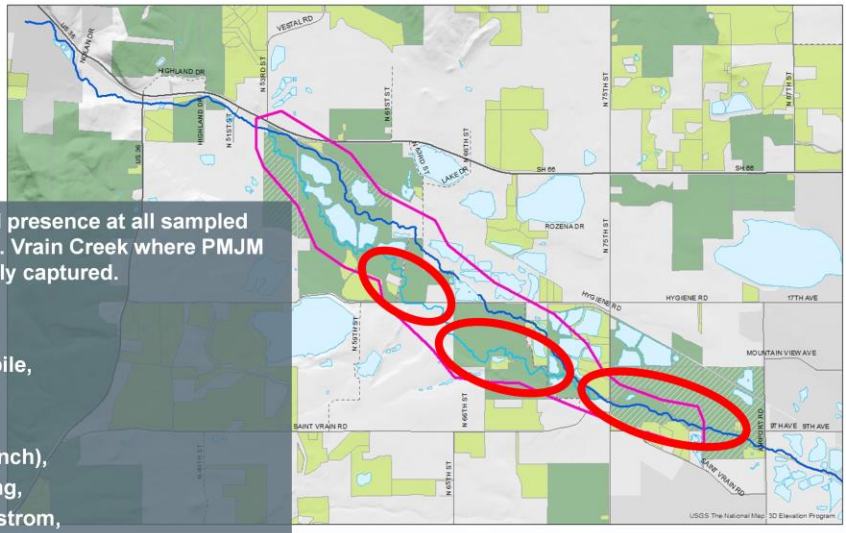
Gage: Highest proportion of PMJM caught (46% of catch). Only 3 species represented (lowest observed species richness).

Also caught a variety of other creatures: milk snake, toads, crayfish, weasel


USGS The National Map: 3D Elevation Program

Small Mammal Trapping

Presence / Absence - RESULTS



Documented PMJM presence at all sampled properties along St. Vrain Creek where PMJM had been historically captured.

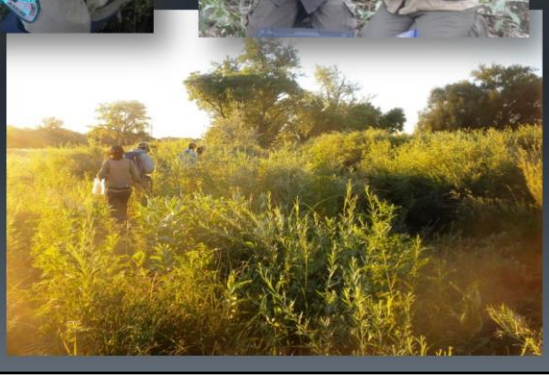
- Montgomery,
- Western Mobile,
- Braly / Sadar
- Gage (SVC)
- Gage (S. Branch),
- Pella Crossing,
- Golden-Fredstrom,

Small Mammal Trapping

Capture-Recapture Population Study

STUDY DESIGN

- Two trapping sessions
- Trapped for 8 nights
- 8 transects
  - 100 traps along 1/2 km reach of stream
- 5,066 total trap nights.

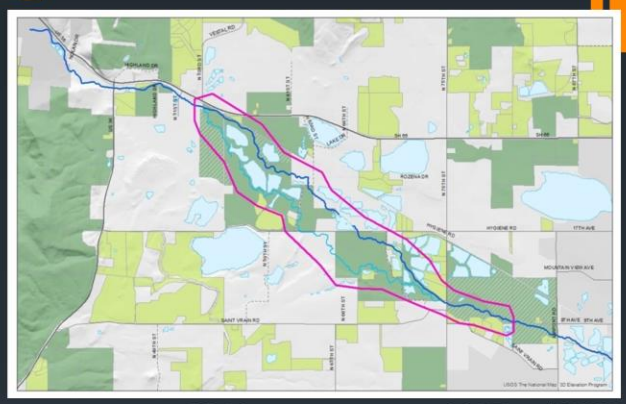


In 2016, we initiated a mark-recapture population study of known populations on St. Vrain Creek. We will be able to estimate density and, over time, survival.

Small Mammal Trapping

Capture-Recapture Study

RESULTS



	2016	2017	*2005
Total Captures	1,886	1,963	
Total PMJM Captures	315	273	34
Total Marked Individuals	154	108	30
Mean Density (mice/km)	37.8		12.9
Density (mice/km) - S. Branch	32.8 (4.3)	(analysis pending)	
Density (mice/km) - SVC main stem	42.9 (6.4)	(analysis pending)	

Banner year for PMJM on St. Vrain Creek:

Bakeman Meaney St. Vrain Study (2005): 34 total PMJM captures over 2000 traps nights. (30 unique individuals)

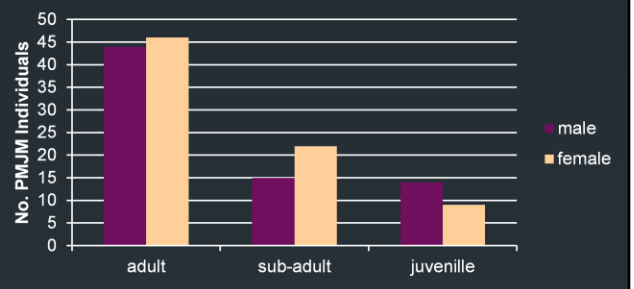
17 PMJM caught per 1,000 trap nights, compared to 63 PMJM caught per 1,000 trap nights captured in 2016

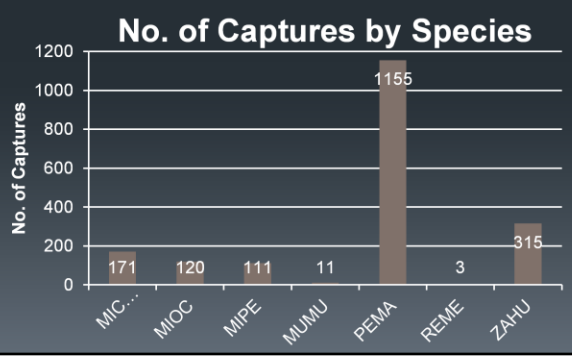
Small Mammal Trapping

Capture-Recapture Population Study

RESULTS (2016)

- 1,886 small mammals captured
- 154 individual PMJM





Microtus Spp. = voles
MIOC = Prairie vole
MIPE = Meadow vole
MUMU = House mouse
PEMA = Deer mouse

Banner year for PMJM on St. Vrain Creek:

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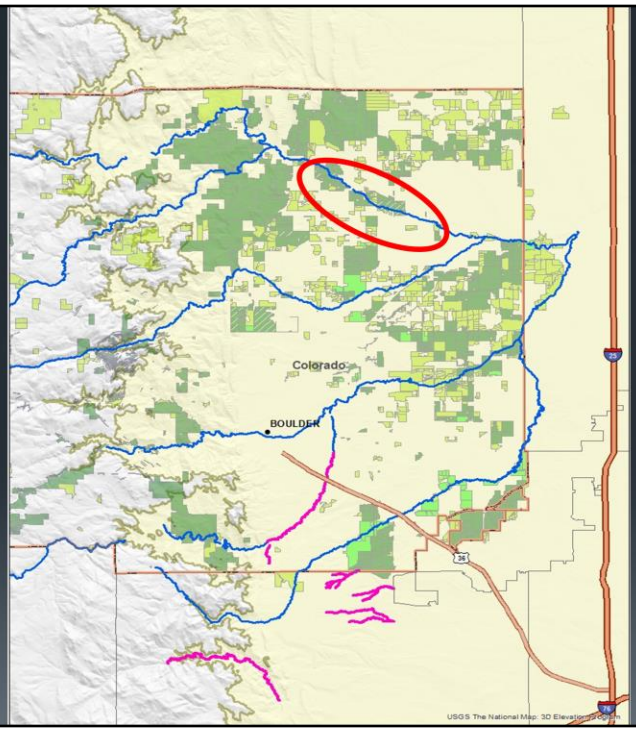
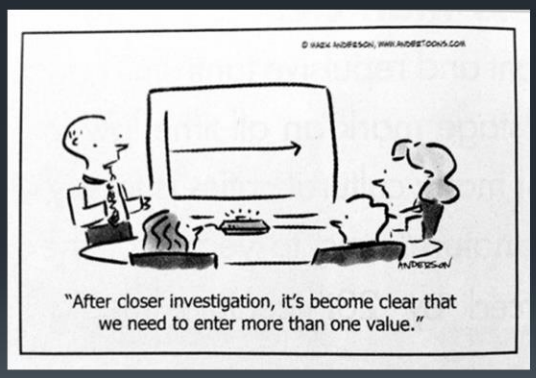

Colorado
BOULDER
25
36
USGS The National Map: 3D Elevation Program

Small Mammal Trapping
−Next Steps−

- Data analysis
- 2018 last year of Capture-Recapture study
  - Survival estimates for SVC populations
- Continue study as stream corridor recovers from flood.



Thank You's

Chelsea Beebe
Susan Spaulding
BCPOS Wildlife Group
Therese Glowacki
Carron Meaney
Tom Stanley (USGS)
Mike Sherman (CPW)
Lance Carpenter (CPW)
Alison Deans-Michael (USFWS)
Boulder County Commissioners
(And many others)

Habitat damage from flood

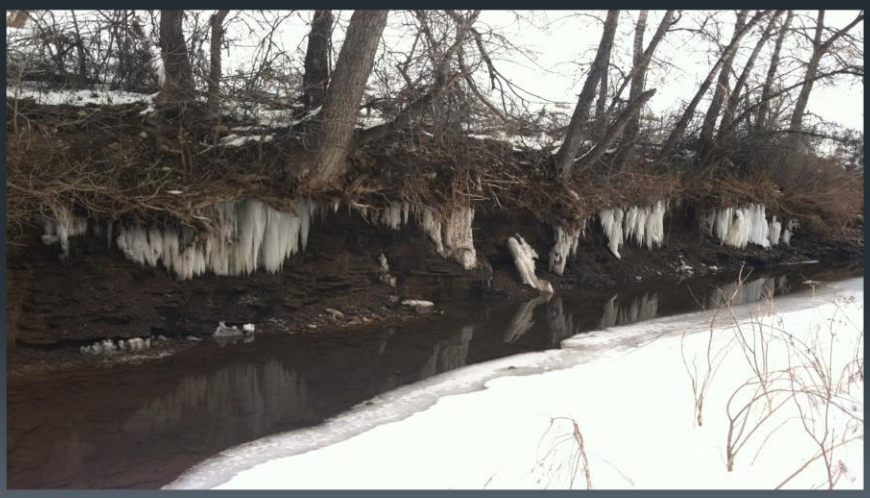
Scouring

Habitat damage from flood

Sediment Deposition

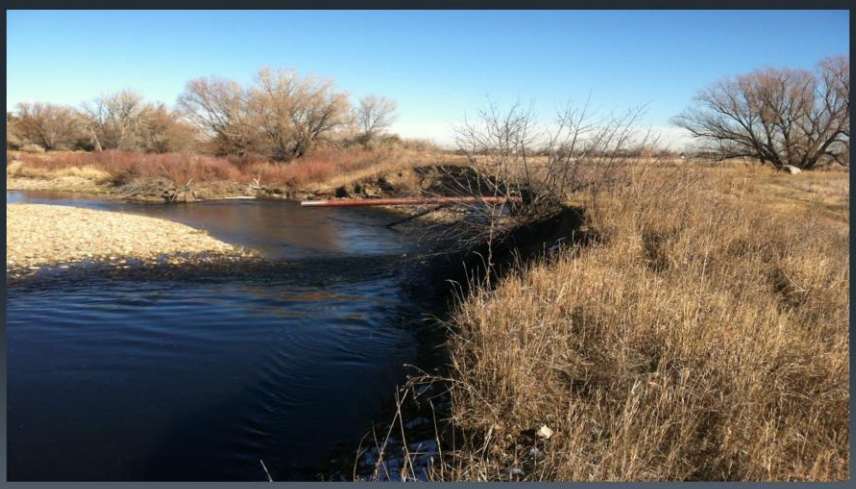
Habitat damage from flood

Downcutting of Channel



Habitat damage from flood

Bank Erosion



Here we see evidence of bank erosion.
Some bank erosion is a direct result of flood flows.
Some bank erosion may be ongoing as a result of changes in channel morphology from the flood that have created an instability in the system.

Stream bank erosion leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss

When riparian vegetation is changed from woody species to annual grasses and/or forbs, the internal strength is weakened, causing acceleration of mass wasting processes. Annual bank erosion rates were increased by three orders of magnitude due to willow eradication and conversion from woody species to a grass/forb riparian community on Wolf Creek, Colorado (Rosgen 2001a).

Habitat damage from flood

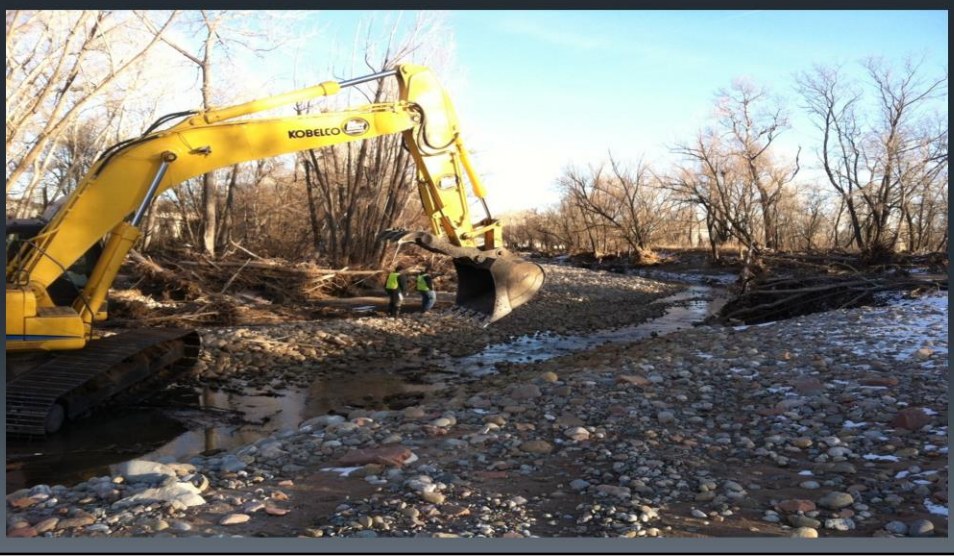
Avulsion

Habitat damage from avulsion:

1. Dewatering of former riparian corridor
2. Degradation of existing riparian habitat where new channel was cut

Habitat damage from emergency response

Heavy machinery activity in creeks and riparian areas



1. Removal of important habitat features (e.g. wood)
2. Disturbance of already sensitive post-flood stream bed
3. Hazardous materials spills
4. Alteration of channel morphology created from flood (more change may result in more or perpetuated instability)

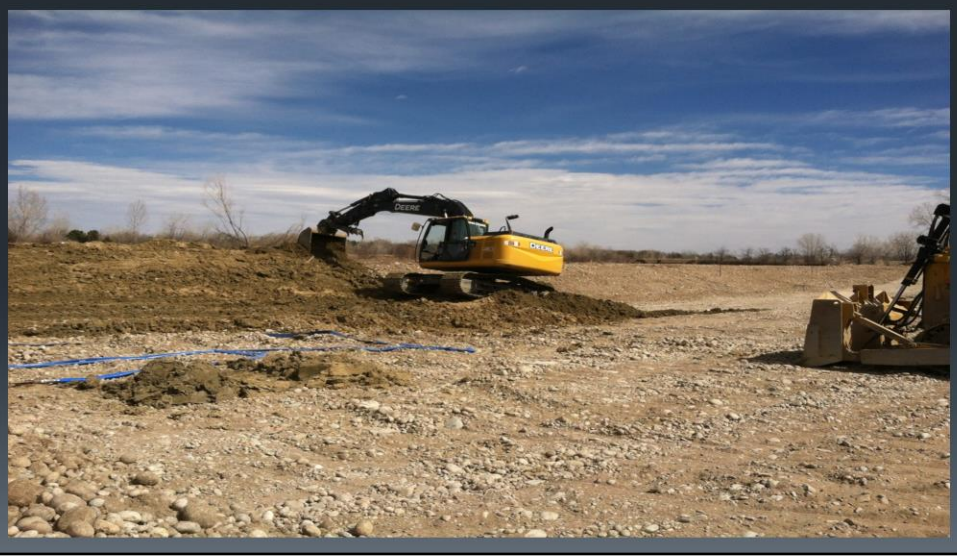
Habitat damage from emergency response

Sediment Removal

1. Artificial modification of spatial arrangement of sediment deposits that some riparian vegetation rely on
    1. Willow and cottonwood both capitalize on sediment deposition characterized by particular grain size.

Habitat damage from emergency response

Building of Berms

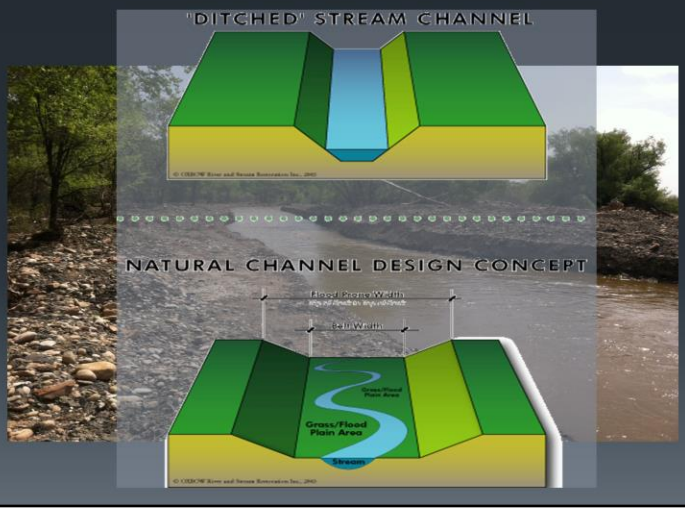


1. Disconnected flood plain
2. Increased elevation may preclude the establishment of riparian vegetation that necessitate early access to ground water.
    1. Vegetation important for stability and erosion protection.

Habitat damage from emergency response

Restoring pre-flood alignment and conveyance

- Channel alignment
- Channel straightening
- Restoring flow capacity
  (Trapezoidal channel)
- Artificial stream morphology
  - Loss of natural riffle-run-pool sequence.



1. Straightening of channel may increase stream velocities, promoting erosion and altering the development of natural channel morphology appropriate for a given stream type.
2. Restoration of channel capacity conventionally achieved through creation of a trapezoidal channel.
    1. Artificial stream morphology that does not promote natural stream processes or ecosystem health
        1. Loss of riffle-run-pool sequences found in natural streams.
        2. Sediment transport altered

Benefits to habitat from flood recovery activities

Creek Returned to Former Channel

- Ground water reconnected for maintenance of riparian vegetation
- Stream not flowing through ponds
  - Sediment balance
  - Predatory fish

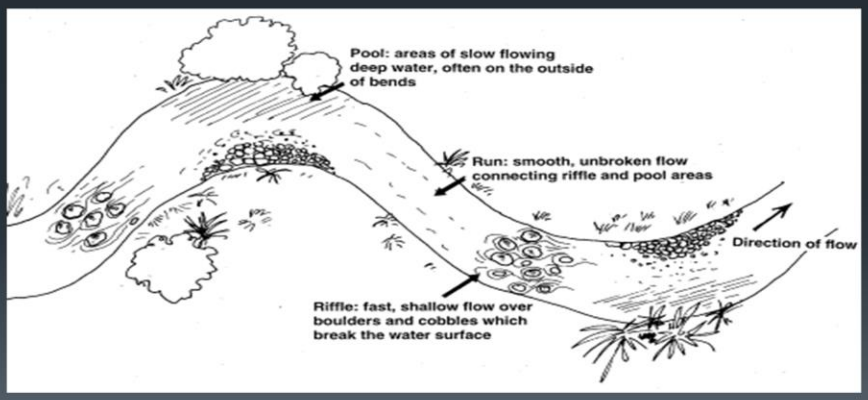
1. Restoring flow to the pre-flood channel may help to reconnect riparian vegetation to ground water that it is dependent upon. Riparian veg may otherwise die off.
2. Help maintain more stable sediment balance.
3. Prevent predatory warm-water game fish from preying on native minnows.

Benefits to riparian and instream habitat from flood
−Creation of new habitat −
Off Channel Pools & Backwaters

1. Scouring has created backwaters and off-channel pools that serve as vital habitat for a number of sensitive native fishes, as well as sensitive amphibians (NLF)

Benefits to riparian and instream habitat from flood
−Creation of new habitat −

Establishment of 'riffle-run-pool' sequences



We saw the development of natural riffle-run-pool sequences post-flood. These are natural stream features that are important for maintaining stream processes and providing habitat heterogeneity that is important.

Benefits to riparian and instream habitat from flood
−Creation of new habitat −

Abandoned Channels / New Channel Creation

1. New channel creation may lead to future development of new riparian vegetation, resulting in an expanded riparian corridor, if former channel maintains access to water.

Benefits to riparian and instream habitat from flood
−Creation of new habitat −
Sand / Sediment Deposition

1. Post-flood sediment deposits can be considered vacant real estate for the germination and establishment of flood adapted riparian vegetation (e.g willows, cottonwoods). Flood processes are crucial for recruitment of young cottonwoods to replace old and dying trees.

Benefits to habitat from flood recovery activities

Removal of trash, hazardous materials, debris

Resource management challenges for flood recovery

- Weeds
  - Competing with natives in post-flood establishment
- Restoration
  - Holistic planning for multiple benefits
  - Target conditions
- Flood impacts continue……
  - Creek stabilizing still
  - Persistent erosion
  - Lag effect on vegetation and associated wildlife

We are faced with many challenges as land stewards in our efforts to recover from the flood events. From an ecology or wildlife perspective, we are concerned with the **restoration of functional ecosystems** by **restoring habitat** and **facilitating natural processes** that maintain this habitat.

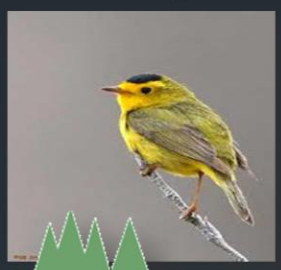
1. Weeds: **Invasive weeds** capitalize on disturbance. We saw a lost of disturbed ground following the flood. These weeds can and will **outcompete establishing native vegetation**, if not managed.
2. Restoration: We are challenged with providing input towards the development of **holistic stream restoration** that meets **multiple objectives** (e.g. agriculture, ecosystem function, recreation, flood hazard mitigation). Balancing the demands of various stakeholders and the time scale of different recovery efforts can be challenging.
    1. In stream or habitat restoration, we need to have realistic and science based goals and objectives. One of the more difficult challenges can be agreeing upon **target conditions** for restoration.

Breeding Bird Surveys (BBS)

Assess flood impacts on avian diversity

Study Design

- Expanded existing POS BBS program to include more sample locations within the flood impacted riparian areas.
- Some points were establishe pre-flood



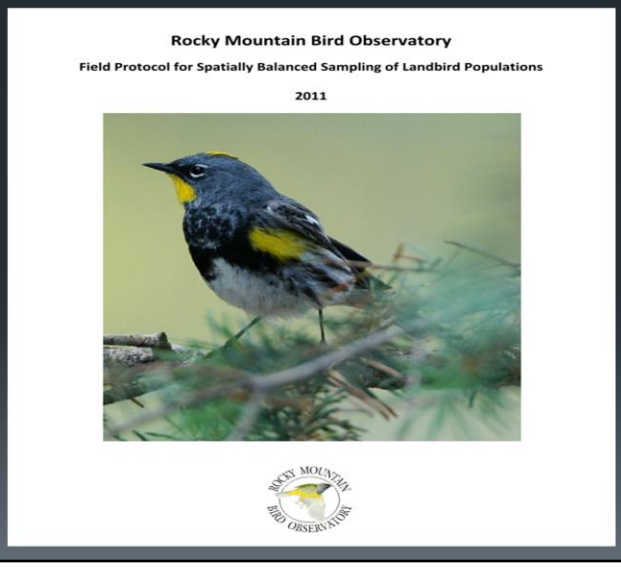
Breeding Bird Surveys (BBS)

Assess flood impacts on avian diversity

Methods

Methods follow the existing BBS protocol for:

- establishing sample sites
- sampling of these sites
- data analysis



Rocky Mountain Bird Observatory

Field Protocol for Spatially Balanced Sampling of Landbird Populations

2011

Breeding Bird Surveys (BBS)

Assess flood impacts on avian diversity

Results

- No analysis done yet.
  (Need multiple years of data to establish a trend)

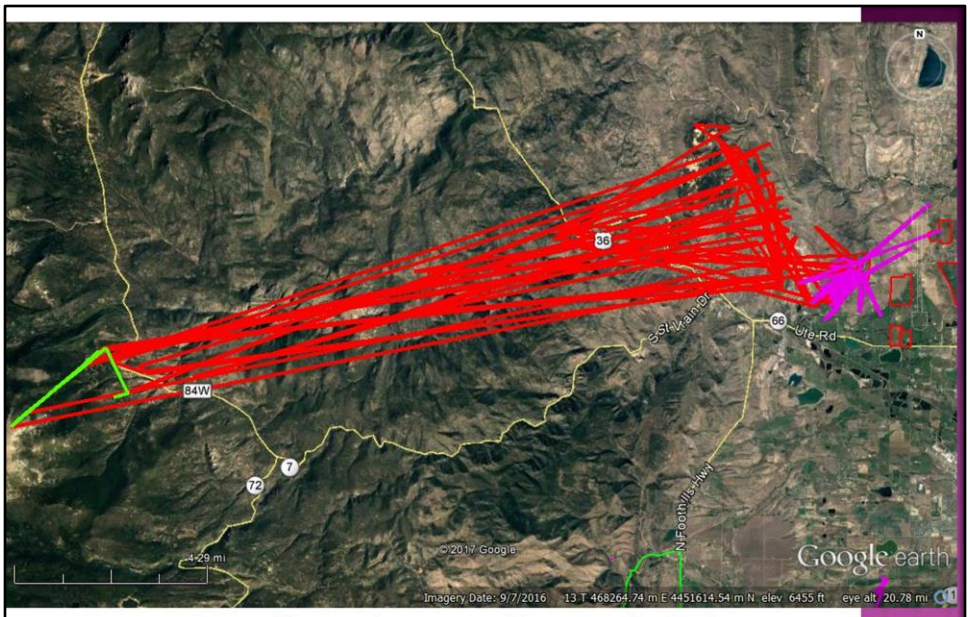
RON STEWART PRESERVE ELK AND VEGETATION MANAGEMENT UPDATE

September and October 2017

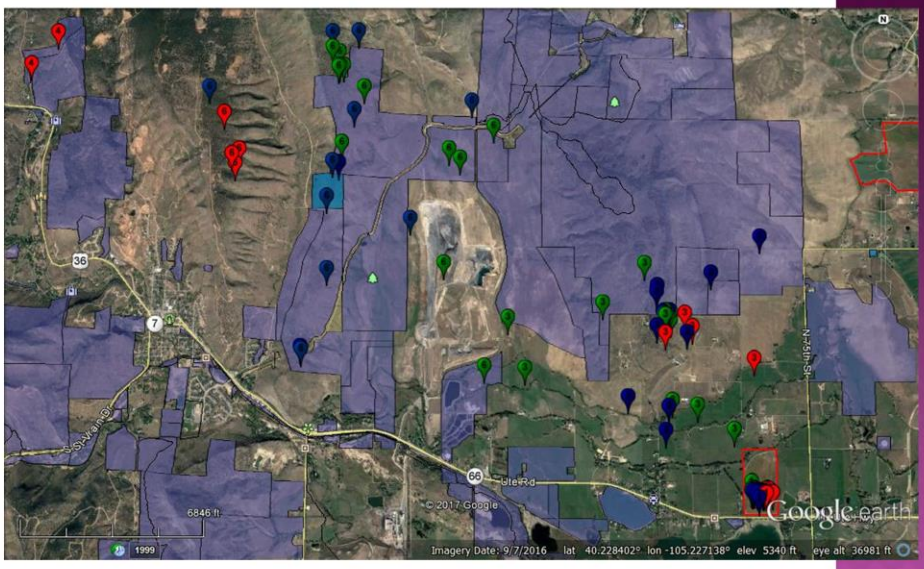
HUNTING

- 32 hunters are participating
- 11 of 14 have been successful (79%)
- Public Comment
  - 6 in first week
    - 3 in favor, 3 opposed
    - Fewer since
  - 1 trespass on RSP
  - 2 neighbor call/email
    - CPW and POS response

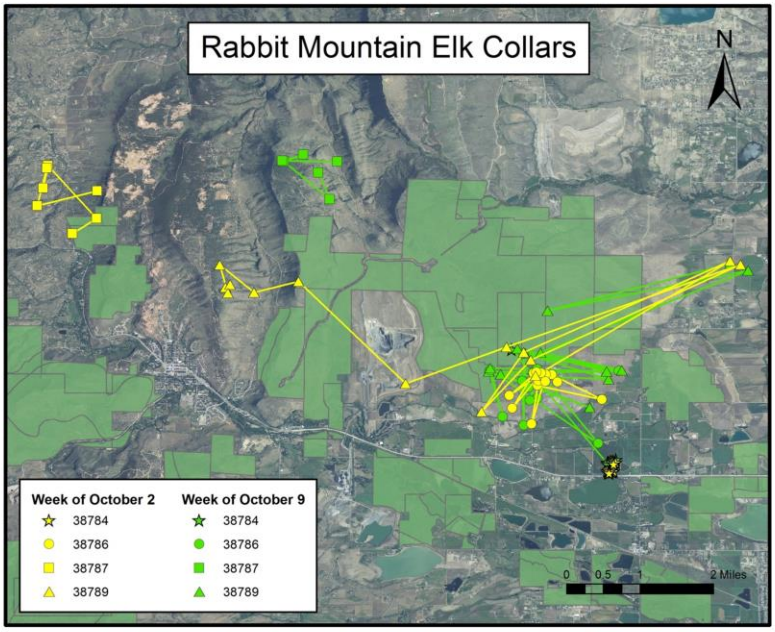
CHINOOK



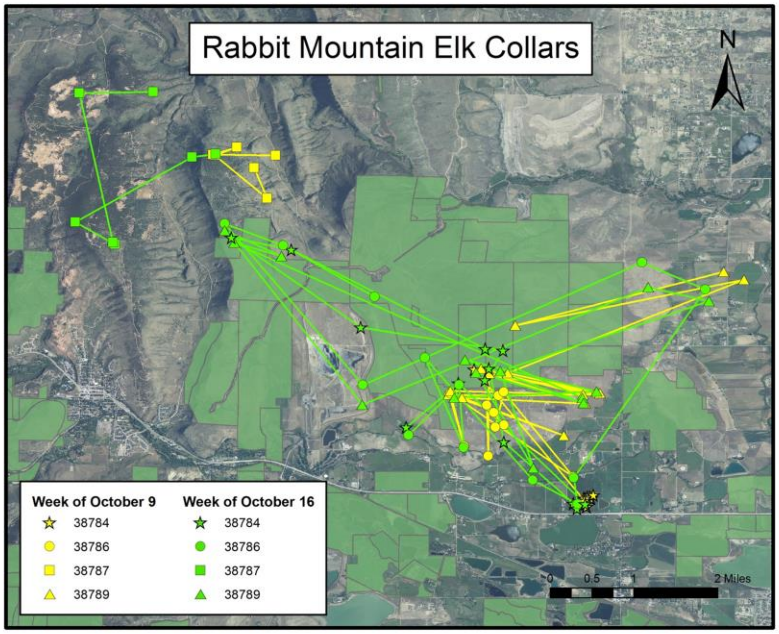
- One elk made it to Allenspark and back many times. June tracking data.



- September 4-22, 2017



- October 2-14, 2017


Rabbit Mountain Elk Collars
N
Week of October 9
38784
38786
38787
38789
Week of October 16
38784
38786
38787
38789
0
0.5
1
2 Miles

ELK COUNTS

- Mid September
  - 203
    - 120 on Indian
- Mid October
  - 102
    - Most on Rabbit

Counts are incomplete due to corn and forest

WHAT'S NEXT

- Hunting through Jan 31, 2018
  - Filling unfilled slots
- Winter elk count will be used for accuracy and comparison
- Replace collars
- Fencing Pine Pockets in winter
- Hazing as necessary
- Next Spring Evaluating
  - Hunting season and numbers
  - Closures for next year