



**Parks & Open Space Advisory Committee  
AGENDA**

February 27, 2020  
6:30 p.m.

Commissioners' Hearing Room, 3rd Floor  
Boulder County Courthouse, 1325 Pearl Street, Boulder, CO

*Suggested Timetable*

**6:30 Call to Order**

**Approval of the January 23, 2020 Meeting Minutes**

*ACTION REQUESTED: Minutes Approval*

**6:35 Public Participation - Items Not on the Agenda**

**Presentations**

**6:40 McLachlan Acquisition**

*ACTION REQUESTED: Recommendation to BOCC*

PRESENTER: Sandy Duff, Senior Land Officer

**6:50 Madison Farms Acquisition**

*ACTION REQUESTED: Recommendation to BOCC*

PRESENTER: Sandy Duff, Senior Land Officer

**7:00 Ron Stewart Preserve at Rabbit Mountain Elk and Vegetation Management Plan Extension**

*ACTION REQUESTED: Recommendation to BOCC*

PRESENTER: Therese Glowacki, Manager, Resource Management Division

**7:45 Red Hill Elk Management Plan**

*ACTION REQUESTED: Recommendation to BOCC*

PRESENTER: Therese Glowacki, Manager, Resource Management Division

**8:45 Director's Update**

**8:50 Adjourn**

**DRAFT**

**Parks &  
Open Space**

**Parks & Open Space Advisory Committee  
MINUTES**

January 23, 2020  
6:30 p.m.

Commissioners' Hearing Room, 3rd Floor  
Boulder County Courthouse, 1325 Pearl Street, Boulder, CO

**Call to Order**

The meeting was called to order at 6:30 p.m. by Jenn Archuleta

**Members:**

Scott Miller  
Sue Anderson  
Kira Pasquesi  
Heather Williams  
Jenn Archuleta  
Steven Meyrich  
Trace Baker  
James Krug -- **Excused**  
Paula Fitzgerald -- **Excused**

**Staff:**

Eric Lane  
Vivienne Jannatpour  
Renata Frye  
Nik Brockman  
Jeff Moline  
Janis Whisman  
Blake Cooper  
Trent Kischer  
Sandy Duff

**Approval of the December 19, 2019 Meeting Minutes**

*ACTION REQUESTED: Minutes Approval*

ACTION: Pasquesi moved approval of item. Meyrich seconded the motion.

VOTE: **AYES:** Miller, Anderson, Pasquesi, Williams, Archuleta, Meyrich, Baker; **EXCUSED:** James Krug, Paula Fitzgerald;

**Public Participation - Items Not on the Agenda**

None

Attachment: Jan. 23 Minutes (3216 : Approval of the January 23, 2020 Meeting Minutes)

## Presentations

### Tucker Acquisition

*ACTION REQUESTED: Recommendation to BOCC*

PRESENTER: Sandy Duff, Senior Land Officer

Public Comments (electronic submissions):

Steve Bond, 5120 Illini Way, Boulder. It would be great to see new trails on this open space, particularly a new mountain bike trail. Many of the days I ride have me driving an hour or more to ride a new trail. Having more trails closer to home would be a great thing to finally see.

Ian Wilson, 4651 Dapple Lane, Boulder. I am pretty concerned that an acquisition such as this will be categorically shut off for recreation. We are spending millions of public funds to buy a piece of land and you are stating that there will be no chance to responsibly recreate on it. You will likely state something to the effect of "this is protecting the land forever from development." That land hasn't been developed in over 100 years. Yes, we can still protect it from development, but we should be able to enjoy the land as responsible recreational stewards instead of just looking at it longingly from the road. Yes, it is possible to recreate and enjoy the land while still protecting it. Buying this and shutting it down is just taking it from one private owner to the next even if the name "open space" is next to the name. As it is public money, the public should be able to enjoy it.

ACTION: Baker moved approval of item. Anderson seconded the motion.

VOTE: **AYES:** Miller, Anderson, Pasquesi, Williams, Archuleta, Meyrich, Baker; **EXCUSED:** James Krug, Paula Fitzgerald;

### Carbon Sequestration Study Update

*ACTION REQUESTED: None, Information item only*

PRESENTERS: Vanessa McCracken and Trent Kischer, Resource Specialists; Dr. Blake Cooper, Agricultural Resources Division Manager

### Director's Update

- The Boulder Area Trails app was finally released and we're getting very positive reviews.
- The Heil Valley Ranch Forestry Project has begun. This is a nearly \$1M project that will eventually use a helicopter to remove trees just like the successful Betasso Preserve project. There will be some trail closures at Heil while the helicopter is flying, slated for early to mid-February and should last 4-8 weeks.
- A sky quality meter was installed early January at the Walker Ranch Homestead by the National Park Service Natural Sounds and Night Skies Division. The meter will continuously collect data throughout the spring and into the summer, measuring light pollution and the reflection of city lights off clouds. Contact Deborah Price at [dprice@bouldercounty.org](mailto:dprice@bouldercounty.org) if you have questions.
- We held our annual prairie dog stakeholders meeting a couple of weeks ago. There were over 70 people who attended. The Birds of Prey Foundation brought a live Red-tailed Hawk and talked about the value of the prairie dogs we donate to them. No new policies are proposed at this time.
- We are accepting nominations for the Land Conservation Awards through the end of January. The categories for nominations are Land Conservation, Environmental Stewardship, and Historic Preservation. We'd love to get nominations from you if you know of any people or groups who have done work that meets the criteria for these categories. The event will be on Tuesday, April 21, at the Parks &

Open Space building. We'll also be honoring exceptional volunteers and partners that day-we hope you can make it! All the information and the nomination form are on the website.

- We are working on the agenda for the annual POSAC retreat. A draft will be sent to you shortly.

### **Adjourn**

The meeting was adjourned at approximately 7:39 p.m.



## Parks & Open Space

5201 St. Vrain Road • Longmont, Colorado 80503  
303.678.6200 • Fax: 303.678.6177 • [www.bouldercounty.org](http://www.bouldercounty.org)

### PARKS & OPEN SPACE ADVISORY COMMITTEE

<b>TO:</b>	Parks & Open Space Advisory Committee
<b>DATE/TIME:</b>	Thursday, February 27, 2020, 6:30 p.m.
<b>LOCATION:</b>	Commissioners Hearing Room, 3 <sup>rd</sup> floor, Boulder County Courthouse, 1325 Pearl Street, Boulder, CO
<b>AGENDA ITEM:</b>	McLachlan Acquisition
<b>PRESENTER:</b>	Sandy Duff, Senior Land Officer
<b>ACTION REQUESTED:</b>	Recommendation to the BOCC

#### Summary

Boulder County proposes to pay \$2,400,000 to acquire fee title to Courtney and Brittany McLachlan's 73 acres of agricultural property with wetland features. The property's address is 1000 N. 65<sup>th</sup> Street in Longmont, and is at the north-east corner of N. 65<sup>th</sup> Street and Nelson Road. The property is located approximately  $\frac{3}{4}$  mile from the town limits of Longmont. The county is also proposing the creation of two lots to be in the north-west portion of the property, each approximately two acres in size, to be marked for sale at a future date, subject to county-held conservation easements.

#### Background

The 73-acre McLachlan property contains dryland agriculture, wetland features, and the James Ditch that meanders through the property. The property is immediately adjacent to the Clover Basin Reservoir. The property is also adjacent to the Clover Basin Ranch conservation easement property and lies east of the Bergen Family Farm NUPUD conservation easement property and north and west of the Lyons conservation easement property and the Suitts Open Space property.

The City of Longmont controls the Clover Basin Reservoir and has long desired these parcels for additional open space around the reservoir.

#### Deal Terms

Boulder County will acquire fee title to approximately 73 acres. The county is proposing the creation of two lots located in the north west portion of the property, each approximately two acres in size, to be marketed for sale at a future date. The future uses on these lots will be subject to county-held conservation easements limiting uses to single-family residential uses, subject to future review and approval by Boulder County Planning & Permitting. The remaining 69 acres of land will be open space. The City of Longmont will reimburse the county for one-half of the purchase price of the property, less one-half of any closed sale on a residential lot, and the city will own and manage the 69-acre property. The county will then hold a conservation easement over the vacant 69-acre property.

*Acquisition Summary*

Acres	Water Rights	# Building Rights County Will Acquire	Price per Acre	Water Right Value	Purchase Price
73 Fee*	None	2	\$32,876	N/A	*\$ 2,400,000
<b>Total County</b>					<b>*\$ 2,400,000</b>

\* The county will sell two lots totaling approximately four acres, subject to CEs, with each lot having a residential building right. The county will then convey the remaining 69 acres to the City of Longmont, subject to a county-held CE. The net cost of this transaction is unknown, but the lots will each have substantial value.

The purchase of the property will include all mineral rights.

A Phase I environmental assessment has taken place, and no recognized environmental conditions were identified.

**Boulder County Comprehensive Plan Designations**

Because the maps in the Boulder County Comprehensive Plan (Comp Plan) are intended to be illustrative rather than specific, the following designations are indicators of importance but not confirmation that these features exist on the property. The Comp Plan indicates the property contains these features: Significant Agricultural Lands of Statewide Importance, Riparian Areas and Wetland Areas at the inlet to the reservoir, and View Protection Corridor.

**Public Process**

A public 'division of land' process is required, because this transaction will create two, two-acre lots. Divisions of land under 35 acres require Boulder County Commissioners' approval pursuant to the Subdivision Exemption regulations contained in the Land Use Code.

Adjacent property owners have been notified of the proposed divisions of land. The notices included an invitation to attend and comment at this meeting. No public comments have been received to date, and any additional comments we receive after the date of this memo will be shared with you at the meeting.

**Staff Discussion and Recommendation**

Staff recommends approval. The property is a haven for a variety of waterfowl species, including bald eagles and osprey. There are a couple of elevated goose nests on the property. This property has always been of interest for the City of Longmont, as well as the county, which is why we are proposing to partner with the city. By partnering with the City of Longmont, the county and the city will be able share in limiting development along Nelson Road and preserve this important property.

**POSAC Action Requested**

Recommendation to the Boulder County Commissioners for approval of the acquisition as further described above and by staff at the POSAC meeting.

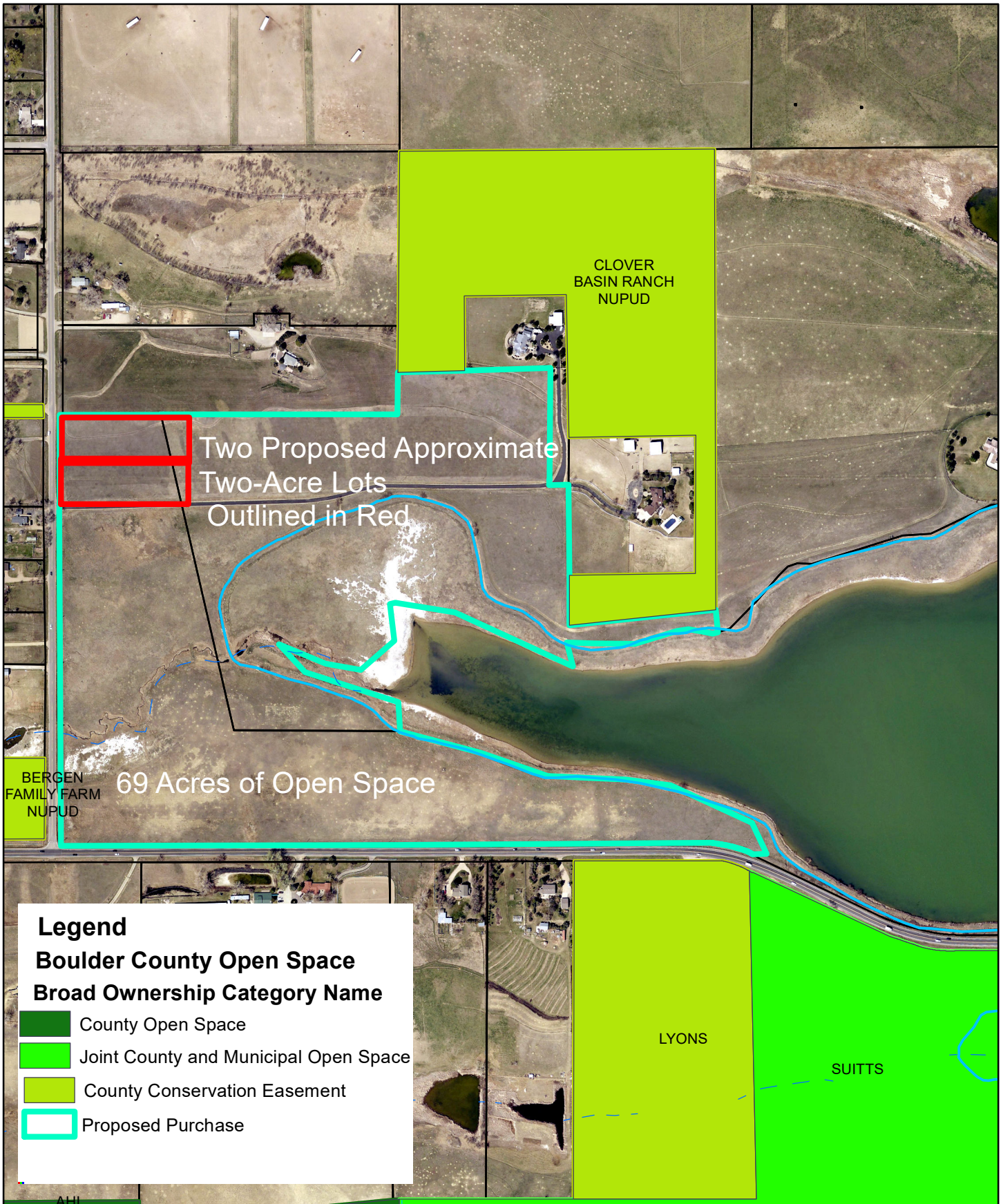
Suggested motion language: I move approval of this transaction as staff has described.



# McLachlan Acquisition and Proposed Future Lots



Parks &  
Open Space



Attachment: POSAC-McLachlan Acquisition 2-27-2020 (3217 : McLachlan Acquisition)

Map Printed: 2020  
Aerial: 2018

The user agrees to all Terms of Use set forth by Boulder County  
For Terms of Use, please visit: [www.bouldercounty.org/mapdisclaimer](http://www.bouldercounty.org/mapdisclaimer)  
FILE: V:\gispa\RealEstate\Staff\Sandy\McLachlan Tracts A & B.mxd



0 287.5 575 1,150 Feet



## Parks & Open Space

5201 St. Vrain Road • Longmont, Colorado 80503  
303.678.6200 • Fax: 303.678.6177 • [www.bouldercounty.org](http://www.bouldercounty.org)

### PARKS & OPEN SPACE ADVISORY COMMITTEE

<b>TO:</b>	Parks & Open Space Advisory Committee
<b>DATE/TIME:</b>	Thursday, February 27, 2020, 6:30 p.m.
<b>LOCATION:</b>	Commissioners Hearing Room, 3 <sup>rd</sup> floor, Boulder County Courthouse, 1325 Pearl Street, Boulder, CO
<b>AGENDA ITEM:</b>	Madison Farms Acquisition
<b>PRESENTER:</b>	Sandy Duff, Senior Land Officer
<b>ACTION REQUESTED:</b>	Recommendation to the BOCC

#### Summary

Boulder County proposes to pay \$2,150,000 to acquire fee title to Madison Farms, Inc.'s 74 acres of irrigated agricultural land and a conservation easement over a 4.8-acre Centennial Farm homestead that will be retained by the sellers. The property's address is 14020 N. 87<sup>th</sup> Street in Longmont, and is at the south-east corner of N. 87<sup>th</sup> Street and Woodland Road.

#### Background

The property lies north of the Shubert Open Space fee and conservation easement properties, and is immediately west of the R and R NUPUD conservation easement property. The property is a Centennial Farm, meaning it has been owned and operated by the same family for 100 years or more. It has been on the county's acquisition priority list since the 1970s. The family is extremely supportive of the acquisition, and they are in agreement that any future changes to the structures on their retained farmstead be similar in design to the historic buildings of the past. The family desires to continue farming on the property, which is why they are retaining approximately 4.8 acres for their continued farming operations.

#### Deal Terms

If approved, Boulder County will acquire fee title to approximately 74 acres of the agricultural property, including one development right, and the county will accomplish a division of land to separate 4.8 acres containing the house and accessory structures, which will become its own legal parcel. This 4.8-acre house lot will be subject to a county-held conservation easement that will allow one residence with a total of 3,000 square feet of residential floor area, and the total of all agricultural accessory structures shall not exceed 4,200 square feet.

The purchase includes all mineral rights, along with eight shares of Lake McIntosh and 1.75 shares of Highland Ditch. The county's purchase includes the first right of refusal to lease an additional 0.25 share of Highland Ditch water if it is not being used on the retained lot.

The property has been used for agriculture, and so it will be closed for agricultural purposes.

A Phase I Environmental Assessment is being completed, and if the results show that there are any hazards on the property being acquired, staff will notify the State of Colorado's Division of Mining, Reclamation and Safety for formal closure.



*Acquisition Summary*

Acres	Water Rights	# Building Rights County Will Acquire	Price per Acre	Water Rights Value	Purchase Price
74 Fee (with associated water rights)	Yes	1	\$23,176	\$335,000	\$1,715,000
4.8-acre CE					\$100,000

\*Sellers will retain one building right which is used on the existing house.

**Boulder County Comprehensive Plan Designations**

Because the maps in the Boulder County Comprehensive Plan (Comp Plan) are intended to be illustrative rather than specific, the following designations are indicators of importance but not confirmation that these features exist on the property. The Comp Plan indicates the property contains these features: Significant Agricultural Lands of National Importance and a View Protection Corridor of 2.19.

**Public Process**

A public 'division of land' process is required, because this transaction will create a 4.8-acre house lot. Divisions of land under 35 acres require Boulder County Commissioners' approval pursuant to the Subdivision Exemption regulations contained in the Land Use Code.

Adjacent property owners have been notified of the proposed divisions of land. The notices included an invitation to attend and comment at this meeting. No public comments have been received to date, and any additional comments we receive after the date of this memo will be shared with you at the meeting.

**Staff Discussion and Recommendation**

Staff recommends approval. The property has long been a priority for the open space program for its agricultural importance and history. Combined with the surrounding open space lands, this acquisition adds to the preservation and protection of the agricultural heritage and landscape along Woodland Road, and removes one development right while protecting the existing Centennial farmstead.

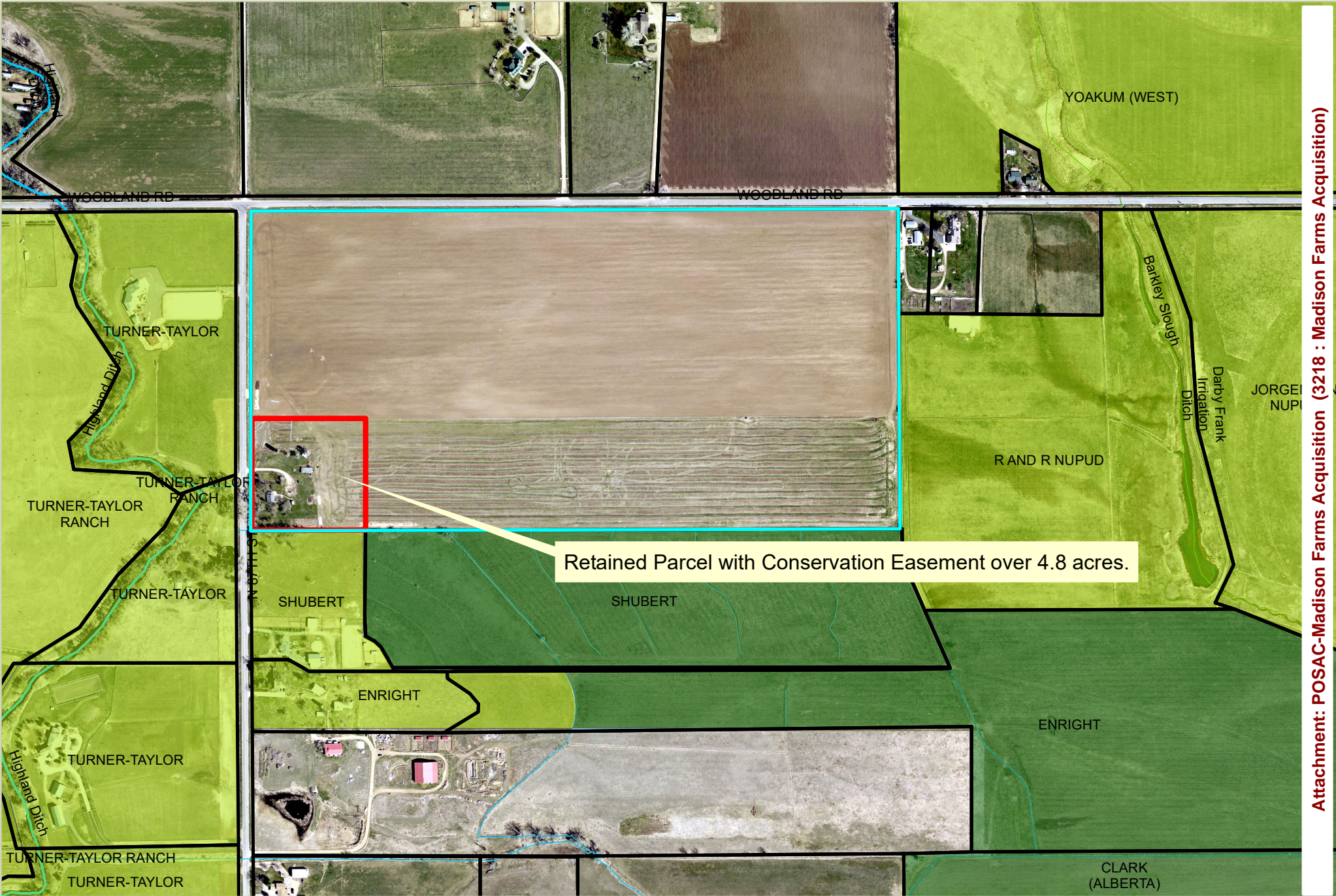
**POSAC Action Requested**

Recommendation to the Boulder County Commissioners for approval of the acquisition as further described above and by staff at the POSAC meeting.

Suggested motion language: I move approval of this transaction as staff has described.



# Madison Farms LLC 74 Acres







# Parks & Open Space

5201 St. Vrain Road • Longmont, Colorado 80503  
303.678.6200 • Fax: 303.678.6177 • [www.BoulderCountyOpenSpace.org](http://www.BoulderCountyOpenSpace.org)

4.a

## PARKS & OPEN SPACE ADVISORY COMMITTEE

<b>TO:</b>	Parks & Open Space Advisory Committee
<b>DATE/TIME:</b>	Thursday, February 27, 2020, 6:30 p.m.
<b>LOCATION:</b>	Commissioners Hearing Room, 3 <sup>rd</sup> floor, Boulder County Courthouse, 1325 Pearl Street, Boulder, CO
<b>AGENDA ITEM:</b>	<b>Ron Stewart Preserve at Rabbit Mountain Elk and Vegetation Management Plan Extension</b>
<b>PRESENTER:</b>	<b>Therese Glowacki, Manager, Resource Management Division</b>
<b>ACTION REQUESTED:</b>	<b>Recommendation to BOCC</b>

The third year of elk and vegetation management on Ron Stewart Preserve at Rabbit Mountain ended on January 31, 2020. The third year of the managed hunt went smoothly and is moving POS in the direction outlined in the management plan: reducing the numbers of elk using Ron Stewart Preserve year-round and getting elk to move beyond their six square mile high-use area.

We will present the results of the three years of implementation including hunting success, public input, and elk counts and distribution.

POS and Colorado Parks and Wildlife staff continued monitoring the radio-collared elk, including regular coordinated counts. The most recent count was about 120 elk, which is 130 fewer than the previous year.

The elk are spending less time on Rabbit Mountain, but are still utilizing agricultural areas (crops and corn) throughout the year. Their distribution has expanded north and west, including areas into Larimer County.

While all signs are positive that the number of non-migratory elk using this area is declining, we have not reached our goal of 30 non-migratory or up to 70 migratory elk in this herd. For this reason, we are proposing to continue implementing the plan for up to five more years.

Attached is the plan Addendum for your consideration.

**Action Requested:** Recommendation to the BOCC on the proposed plan extension.

## Ron Stewart Preserve at Rabbit Mountain Elk and Vegetation Management Plan (2017-2020) – Addendum

The Ron Stewart Preserve at Rabbit Mountain Elk and Vegetation Management Plan established goals of reducing resource damage to open space areas, reducing damage to croplands and private property, inducing migration in portions of the elk herd, and reducing the population size of the herd. Boulder County Parks & Open Space has completed the three years approved by the plan, during which time we have allowed limited public hunting in the fall and winter and taken other management actions to address the goals set by the plan.

The limited hunting occurred from September through January in 2017, 2018, and 2019. The results produced harvests of 25, 31, and 27 elk from the open space properties respectively. Additionally, elk were redistributed to adjacent properties, which resulted in increased private land harvest. Estimated harvest in the whole sub-unit, including county open space and damage licenses for the first two plan years, was around 50 elk. We anticipate plan year three to be similar but sub-unit harvest data is still being collected. These numbers represent an increase from the 12-25 harvested in the previous years of the subunit, when hunting did not occur on open space.

We installed fencing around two key high-use areas on Rabbit Mountain. The fencing has been a success at keeping the elk out and removing their prime bedding grounds. We continued to haze periodically and noted that the elk became even more habituated to the hazing, thus harder to move off Rabbit Mountain. We continued to monitor the vegetation transects, both shrubs and grasses, and will continue this monitoring in the future.

Hunting pressure, harvest, fencing, and hazing combined to decrease elk use at Ron Stewart Preserve at Rabbit Mountain. Public hunting has been the most effective management action to both reduce the size of and disperse the elk herd. The area used by elk during the hunting season prior to the public hunting on open space was approximately 16 square miles, centered around Rabbit Mountain and Indian Mountain. This area increased to 27 and 44 square miles in the first two years of the public hunting on open space. This wider distribution, combined with a smaller herd, reduced presence and impact to the Ron Stewart Preserve at Rabbit Mountain. On multiple days and weeks during the hunting seasons, no elk were present on Rabbit Mountain itself.

Wildlife game damage claims still occurred on the same properties as before the plan. Private land impacts and complaints persist but have not increased. The elk population winter counts have dropped from the high of 360 in 2015 to around 130 in early 2020. This reduction is a positive trend; and with reduced herd size, we anticipate game damage claims will go down in the future.

The results of this management action are all trending toward meeting the goals of the management plan. However, the goals of this plan, particularly having a herd size of 30 non-migratory to 70 migratory elk, have still not been met. Therefore, we would like to extend the Ron Stewart Preserve at Rabbit Mountain Elk and Vegetation Plan for a period of five years.

The proposed management actions for 2020 mirror that of 2018 and 2019 (three hunters per week in the fall/winter). The plan and its adaptive management strategy provide the flexibility to alter the number of days, hunt weeks, hunters, breaks, and other hunt parameters to achieve hunting pressure and harvest if the metrics of the goals are met or get close. We foresee doing the same or



less public hunting moving forward. We want to maximize the amount of time Ron Stewart Preserve at Rabbit Mountain remains open to the public, while still achieving the plan's objectives.



## Parks & Open Space

5201 St. Vrain Road • Longmont, Colorado 80503  
303-678-6200 • POSinfo@bouldercounty.org  
[www.BoulderCountyOpenSpace.org](http://www.BoulderCountyOpenSpace.org)

5.a

### PARKS & OPEN SPACE ADVISORY COMMITTEE

<b>TO:</b>	Parks & Open Space Advisory Committee
<b>DATE/TIME:</b>	Thursday, February 27, 2020, 6:30 p.m.
<b>LOCATION:</b>	Commissioners Hearing Room, 3 <sup>rd</sup> floor, Boulder County Courthouse, 1325 Pearl Street, Boulder, CO
<b>AGENDA ITEM:</b>	Red Hill/Table Mountain Elk Herd
<b>PRESENTER:</b>	Therese Glowacki, Resource Manager/BCPOS Ben Kraft, Terrestrial Biologist/Colorado Parks & Wildlife
<b>ACTION REQUESTED:</b>	Recommendation to the BOCC

The Red Hill elk herd's habitat ranges from the plains along Highway 36 and extends all the way to the Indian Peaks. This herd was nearly exclusively migratory in nature, summering in the Indian Peaks area west of the Peak-to-Peak Highway and wintering primarily on Heil Valley Ranch. They would also use portions of open space just east of Highway 36.

The elk use pattern has changed dramatically in the last several years, with a growing portion of the herd becoming non-migratory, with significant use of areas south of Nelson Road. This includes the Federal Department of Commerce facility at Table Mountain and adjacent private property. Informal counts and observations detected these summering animals. New radio telemetry surveys have confirmed this summer use pattern. Three formal summer counts in 2019 all counted in excess of 88 elk, including a large segment of calves.

This growing population has now come into conflict with neighbors and BCPOS tenants north and south of Nelson Road. Colorado Parks and Wildlife paid \$4,500 in game damage in 2019. This situation mirrors that of the Ron Stewart Preserve at Rabbit Mountain: a non-migratory herd is growing and developing in an area that sees very little hunting. Colorado Parks and Wildlife was concerned enough about the situation to expand the Unit 20 sub-unit for the 2020 hunting season to encompass both the Rabbit Mountain and Red Hill/Table Mountain areas to enable harvest on the Red Hill sub-herd. Thirty-two game damage tags have also been issued to multiple landowners in 2019.

CNHP inventoried Boulder County in 2007 and 2008 to assess the county's biodiversity. This survey identified areas with the highest biodiversity significance based on rare, threatened, and endangered species and habitats. Red Hill was awarded a B1 ranking due to its concentration of four or more globally critically imperiled to globally imperiled element occurrences that are in excellent or good condition. Red Hill is one of three areas in Boulder County that holds a B1 ranking. Additionally, Table Mountain and the Lykins Gulch area (east of US 36) are CNHP B2 areas (Very High Biodiversity Significance; CNHP 2009).

Having experienced natural resource damage on Ron Stewart Preserve at Rabbit Mountain by an overabundant, resident herd, the growing resident herd at Red Hill therefore warrants immediate action. Preventive management of the Red Hill herd will benefit the otherwise irreplaceable resources of Red Hill and the surrounding area.

In addition, public safety along Highway 36 is concerning to all. There have been 89 elk collisions along this stretch of highway since 2005, and the trend shows more collisions in recent years with increases in traffic.

If no management action occurs to limit population growth and encourage redistribution, the non-migratory segment of the Red Hill elk herd will continue to increase with the recruitment of calves, as well as recruitment of individuals from the remaining migratory segment. As elk numbers increase, impacts to natural resources, damage to crops and private property, and threats to public safety are expected to increase.

POS held an open house on Feb 5, 2020 to discuss this issue with the public. We also had an on-line questionnaire for the public to provide input on potential management actions. The public input included: 1) neighbors concerned with the increasing elk damage on their private property; 2) neighbors concerned with the potential safety issue of hunting open space adjacent to their residences; 3) public support for elk management because it has proven to be effective at Ron Stewart Preserve at Rabbit Mountain; 4) public opposition to hunting elk on open space; 5) public support for elk management in general.

With this in mind, we have drafted the attached Red Hill Elk Management Plan.

**Goal:**

Manage a sustainable, migrating elk population on open space properties surrounding US 36 through adaptive management to protect areas of high biodiversity and reduce elk-human conflicts.

**Objectives:**

1. Prevent impacts to areas of high biodiversity, including grassland sites, shrub stands, and forested areas in the Heil Valley Ranch/Red Hill area and natural lands east of US 36.
2. Maintain a migrating elk herd, with no more than 25 summering individuals.
3. Continue to work with agricultural tenants, farmers, and landowners to minimize elk-human conflicts and elk damage.
4. Facilitate highway safety along US 36 and Nelson Road by reducing elk-highway interactions and establishing partnerships with local, state, and federal agencies.

**Action Requested:** Recommendation to the BOCC regarding this management plan.

# Red Hill Elk Management Plan

## 2020-2025



Submitted to the Boulder County Parks and Open Space Advisory Committee

February 27, 2020





## Table of Contents

Introduction .....	3
Background .....	3
Elk-Human Conflicts.....	6
Actions Taken to Address Elk Impacts .....	9
Plan Goal and Objectives.....	10
Management Options Considered.....	10
Status Quo.....	10
Fertility Control .....	10
Trap and Transplant .....	11
Professional Culling.....	11
Public Harvest .....	12
Fencing .....	12
Hazing .....	13
Wildlife Movement Facilitation .....	14
Public Input and Opinion .....	15
BCPOS Management Recommendations .....	15
Short-Term.....	16
Long-Term.....	20
Monitoring .....	22
Partnerships .....	23
Plan Duration.....	24
Literature Cited.....	24
Appendices .....	25
Frequently Asked Questions .....	25
Appendix A: BCPOS Acquisitions and Land Use Changes (1990-2019) .....	26
Appendix B: Efficacy of Fertility Control for Managing Red Hill Elk .....	28
Appendix C: Culling vs. Hunting .....	30
Appendix D: Highway Crossing Methods .....	32
Appendix E: Public Harvest Program Requirements and Training Topics .....	34

## Introduction

This document provides management direction for the Red Hill elk (sub-herd of the St. Vrain elk herd) that uses Boulder County Parks & Open Space (BCPOS) properties near U.S. Highway 36 (US 36). This plan highlights historic behaviors of the herd and recent changes in their movement and space-use patterns, specifically documenting the recent population increase of a segment of the herd that has stopped migrating. The impacts of these behavioral changes are outlined, including an increase in elk-human conflicts with agricultural properties, threats to highway safety along US 36 and Nelson Road, and potential threats to native biodiversity. Finally, it presents recommendations for management of the herd in both the short and long term. Short-term strategies are aimed at alleviating immediate negative elk impacts and minimizing the growing non-migratory population segment. Long-term strategies are outlined to maintain a sustainable elk population, improve habitat, and alleviate barriers to safe movement.

## Background

### *Red Hill Elk Herd*

The Red Hill elk is a sub-herd of the St. Vrain elk herd residing in northern Boulder and southern Larimer counties. This Red Hill herd was studied by Colorado Parks and Wildlife (CPW) and BCPOS from 1997-2005, around the time of purchase and opening of Heil Valley Ranch open space. The study helped identify important habitats in both summer and winter range, movement corridors, and the timing of migration. The lower elevations of Heil Valley Ranch (and Red Hill) are the primary winter range of the entire sub-herd. The study showed a migratory pattern for all but a few elk, with the majority of the herd migrating west of the Peak-to-Peak highway to calve and summer. The high elevation meadows and wetlands between Niwot Ridge and St. Vrain Mountain provide the rich habitat to birth and rear calves. That segment returns to the lower elevations in late summer (September/October) for the rut.

As Heil Valley Ranch transitioned from a working ranch and quarrying area to open space with trails, the study was able to monitor those impacts and changes in the elk distribution. Elk changed their use areas to avoid the areas open to visitation. Elk began to use more of the significant acreage closed to the public on the hogback adjacent to US 36, where Red Hill is situated, and areas west of the Wapiti/Ponderosa Loop Trails. More recently, use areas were bisected by the establishment of the Picture Rock Trail. Overall use areas along the hogback extend far to the north toward the Loukonen stone quarry in Lyons and south into areas adjacent to the Lake of the Pines/Foothills Ranch/Mountain Ridge subdivision area (4.5 miles long; approximately 2,800 acres).

Portions of this general area, along the hogback, were acquired by BCPOS over the last 15 years to create an area in relatively natural condition owned and managed exclusively by BCPOS and virtually devoid of people (see Appendix A). However, with the acquisition of these properties (and Heil Valley Ranch), a substantial area (more than 5,000 acres) was removed from hunting. Open areas east of US 36 were used as winter range after heavy snowfall and as spring range during green-up before migration. Telemetry and observations identified a few key crossing points along US 36.

In conjunction with the Rabbit Mountain elk herd study, a new study began in 2017 at Red Hill to identify changes and verify use patterns. One new development confirmed by the study was

the establishment of a resident elk herd in the area and substantial use areas south of Nelson Road east of US 36. In the 1997-2005 study, none of the telemetered animals used this Table Mountain area. Recent observations and counts revealed winter group sizes of more than 200 animals south of Nelson Road. BCPOS and CPW also began to track summer use of areas around Red Hill and east of US 36 and discovered a sub-herd of elk that did not migrate (as those elk had done in the previous study; Figure 1).

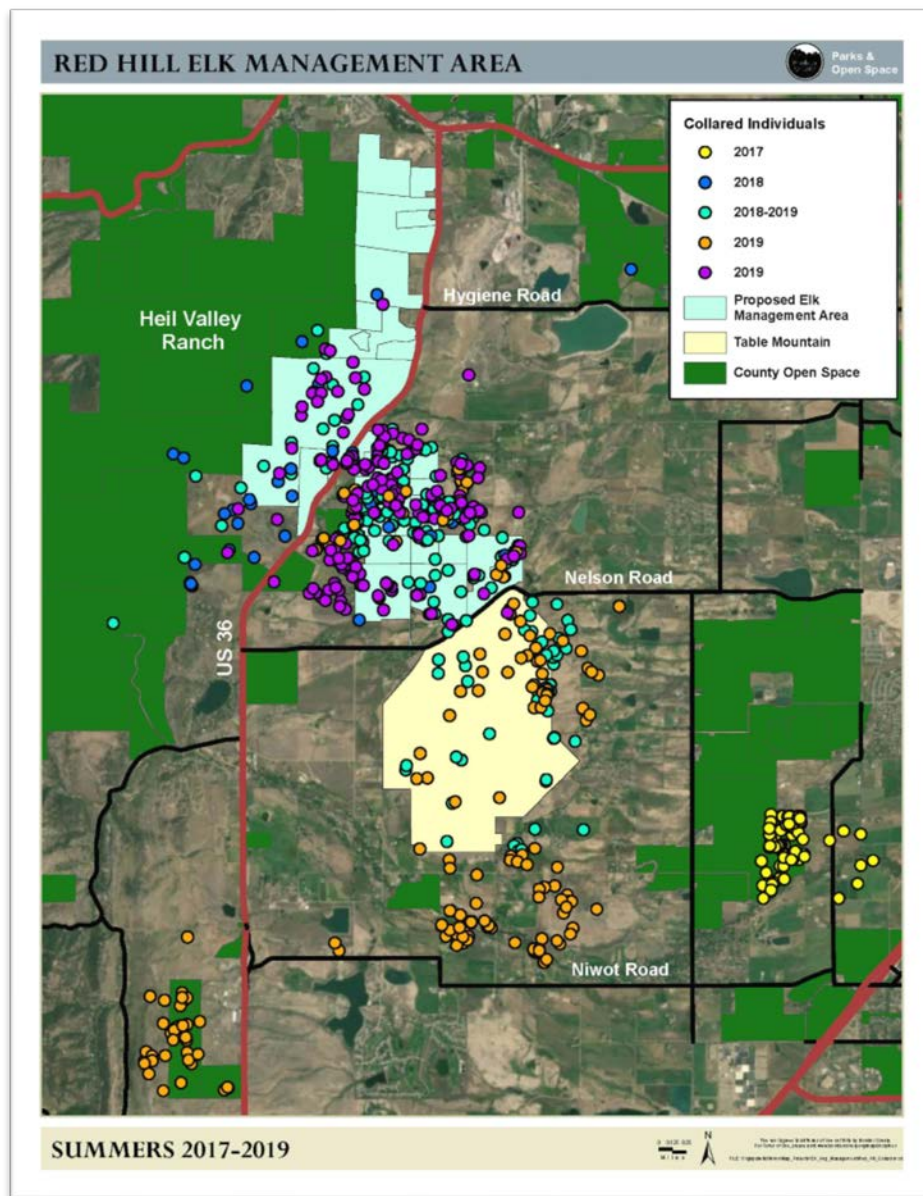


Figure 1. Elk management area showing use by collared individuals from summer 2017-2019.

Cows and calves were observed and counted over the summer of 2018 and 2019, revealing a growing year-round, resident population of more than 100 individuals in June of 2019. In July 2018, staff counted approximately 48 elk. Just one year later in June 2019, staff counted 108 elk. This growth in number represented recruitment of calves (2018 and 2019) and was large enough

to imply immigration of adult elk from the migratory herd (Figure 2). This sub-herd of the Red Hill population has the potential to continue to grow in number.

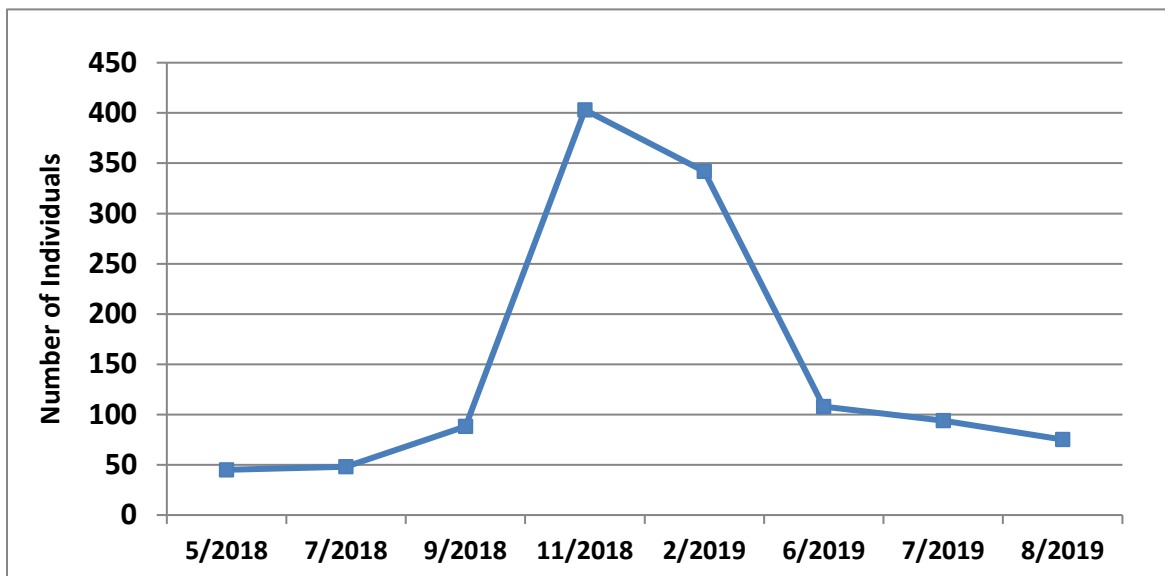


Figure 2. The Red Hill elk herd minimum counts from summer 2018 through summer 2019.

### Land Use/Cover

The areas east of US 36 north of Nelson Road are a mixture of development, irrigated fields, and (mostly) native shortgrass prairie. The area, bounded by Nelson Road (south), US 36 (west), 51<sup>st</sup> and 49<sup>th</sup> St. (east), and St. Vrain Road (north) comprises about 2,250 acres. It is loosely ringed by scattered homes and ranches with a core area devoid of roads and little human activity. BCPOS manages about 1,130 acres in this area. About half of that area has been acquired by BCPOS with the Loukonen Dairy (606 acres) and Trevarton (740 acres) in the past 10 years (see Appendix A). There are about 215 additional acres of native prairie open space managed by City of Boulder Open Space and Mountain Parks. The native prairie/riparian area of Lykins Gulch and Red Hill shrublands provides shade, cover, and forage for the elk when they are east of US 36 and are proximate to the irrigated areas.

The area south of Nelson Road is dominated by the Department of Commerce Table Mountain research facility. It is approximately 1,700 acres of shortgrass prairie with restricted access, few roads, isolated small research buildings, and the two large radio telescopes. The areas surrounding the facility are almost exclusively private residences, ranches, and farms on larger-acreage lots. Some of these contain irrigated fields for hay or vegetables/market farms. Elk use in the area is facilitated by the relative quiet of the research facility, its grasslands, and some of the irrigated operations ringing the mesa. There are no POS properties contiguous to Table Mountain, with only the small (71 acres) Brewbaker-Sorensson parcel along Lefthand Creek, south of the mountain. Three OSMP parcels are proximate to Table Mountain, totaling 246 acres.



Colorado Natural Heritage Program (CNHP) inventoried Boulder County in 2007 and 2008 to assess the county's biodiversity. This survey identified areas with the highest biodiversity significance based on rare, threatened, and endangered species and habitats:

“The foothills of Boulder County harbor the highest concentration of globally rare biodiversity elements. There are two foothills areas with outstanding biodiversity significance (B1), Rabbit Mountain and Red Hill south of Lyons, which achieve B1 ranks due to their concentration of four or more globally critically imperiled to globally imperiled (G1-G2) element occurrences that are in excellent or good (A- or B-ranked) condition. These elements include foothills natural communities, several mountain mahogany shrublands, and two Piedmont grassland communities. Additionally, embedded within these areas are shale outcrops with globally imperiled Bell's twinpod (etc.). Rabbit Mountain and Red Hill South of Lyons are the only areas in Boulder County where foothill shrublands contribute significantly to the vegetation mosaic on the landscape” (CNHP 2009).

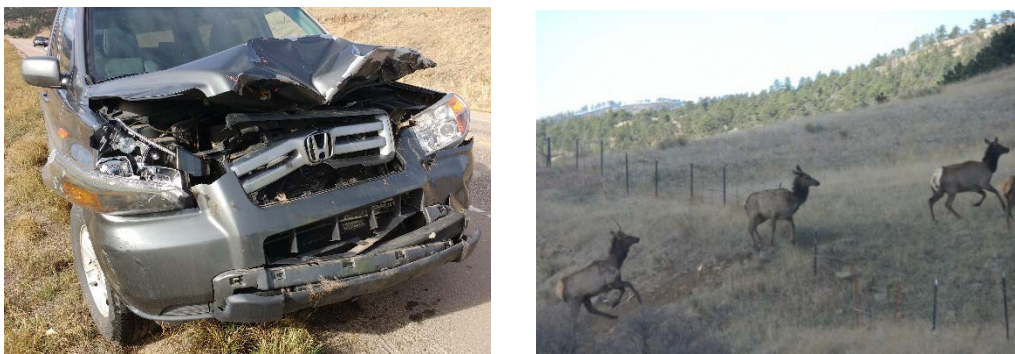
Table Mountain and the Lykins Gulch area (east of US 36) are CNHP B2 areas (Very High Biodiversity Significance; CNHP 2009). Table Mountain is primarily a U.S. Department of Commerce facility with restricted access, south of Nelson Road. It is a shortgrass prairie mesa of approximately 1700 acres with a few roads and a handful of isolated small research buildings. Portions of those areas east of US 36 are irrigated and intensively farmed for hay and alfalfa (and mostly private property). These areas are largely Boulder County Parks and Open Space lands. Additionally, there are several small vegetable/specialty farming operations both north and south of Nelson Road.

## Elk-Human Conflicts

### *Highway Safety*

The Colorado Department of Transportation (CDOT) has identified the corridor of US 36 between Boulder and Lyons as an area of concern for wildlife-vehicle collisions. Since 2005, there have been 256 incidents involving vehicles hitting deer or elk along this corridor. Of those accidents, 35 percent (89) involved elk. The average property damage cost of a wildlife-vehicle collision is estimated at approximately \$3,000.

Within the last five years, road strikes have increased. Frequent crossings by the Red Hill elk herd within a 10-mile crossing zone (mile markers 22-33) have resulted in at least 40 elk strikes (Figure 3). BCPOS staff have identified three areas where elk frequently cross in the four-mile stretch north of Nelson Road: 1) near the Foothills Baptist Church, south of the Boulder Feeder Canal crossing; 2) just south of St. Vrain Road and 3) about half mile north of Nelson Road.



*Figure 3. At left, elk damage sustained to a vehicle owned and operated by Boulder County staff. At right, elk crossing through right-of-way fence along US 36.*

Mitigation measures have been introduced with little success. Yellow wildlife crossing caution signs and a series of reflectors meant to scare elk were installed. Additionally, the stretch of US 36 between mile markers 25 and 33 was designated as a Wildlife Crossing Zone in 2010 by House Bill 10-1238. It was selected for enforcement of a nighttime speed reduction from 60 to 55 miles per hour from October through June. However, enforcement was minimal, and at the end of the pilot program in 2012 the original speed limit was reinstated (Figure 4).



*Figure 4. At left, speed limit signs highlighting the nighttime speed reduction from 2010-2012. At right, an example of one of two wildlife crossing caution signs along US 36.*

Videos of crossings by the elk have recently been featured on local newscasts (KDVR-TV, KUSA-TV) and on community pages (Lyons Facebook page). With continued population growth resulting in increases in annual daily traffic along US 36, the number of wildlife-vehicle collisions is expected to increase (Figure 5).

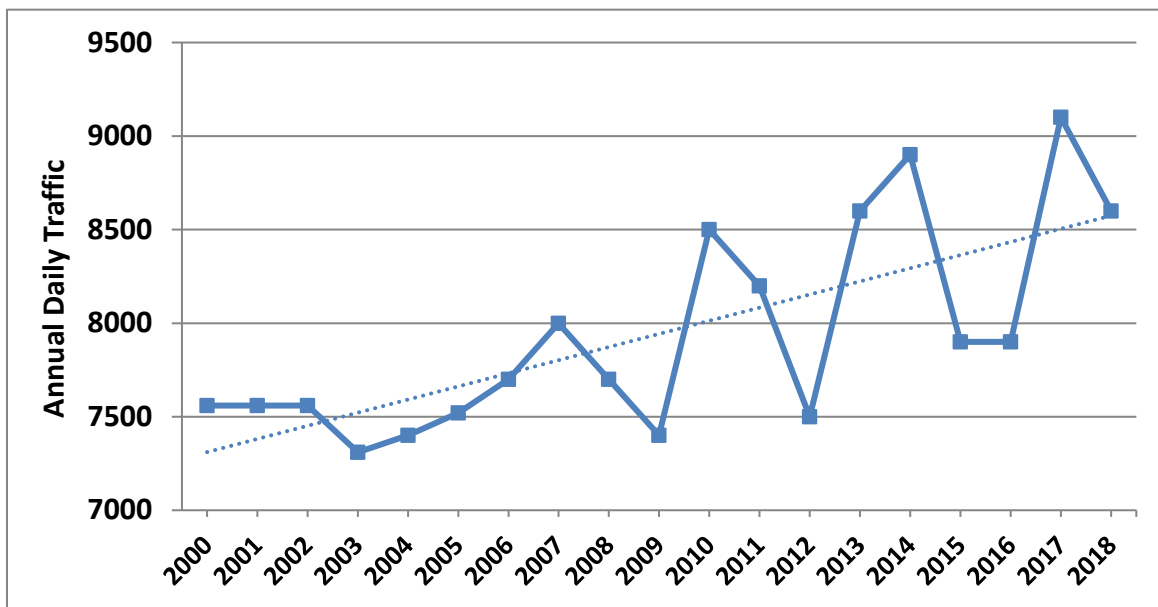


Figure 5. Average annual daily traffic along US 36 between Boulder and Lyons from 2000-2018. Data provided by CDOT.

### Agricultural Damage

Changes in the herd's overall distribution have caused considerable damage to agricultural producers both north and south of Nelson Road. The concentration of several small specialty vegetable and farming operations in the area attracts elk with novel and unfenced forage. The elk herd has caused damage to growing crops, stored crops, ornamental trees and shrubs, and fences. CPW is liable for damage by elk to agricultural products under cultivation and fences (C.R.S. 33-3-103 and 33-3-104).

Game damage hunting licenses have been issued by CPW to private landowners that share a property boundary with either BCPOS property or Table Mountain. In 2019, 32 game damage licenses were issued to adjacent landowners. Of those 32 issued, only three elk have been harvested to date.

CPW has counseled eight total landowners with either agricultural or ornamental damage to provide remediation through stockyard fencing or reimbursement through game damage claims. However, five of the eight landowners own and operate small, organic farms, and the remaining three landowners are experiencing ornamental damage, losses that are sometimes not eligible for reimbursement under state damage laws. CPW has paid one claim totaling \$4,500. The landowner has been experiencing damage for the past three years.

CPW and BCPOS worked to provide relief from elk impacts to BCPOS tenant-occupied properties in 2019, including the Imel property. Because BCPOS does not allow firearms or hazing wildlife on county-owned property, BCPOS Director approval was required before administering noise makers/pyrotechnics by Resource Protection staff to haze animals off property. In one instance, CPW and BCPOS staff coordinated a closure of N. 63<sup>rd</sup> St. to haze approximately 100 animals west. The group returned shortly thereafter.

Following the initial hazing event, the area was routinely monitored, and animals were hazed by Resource Protection staff. But to provide continuous and immediate relief, BCPOS gave the tenant permission to haze when needed and CPW provided cracker shells, fuse rope, and M80s. More recently, the elk herd accessed the tenant's hay barn overnight.

### ***Potential Impacts to Natural Resources***

As highlighted earlier, CNHP inventoried Boulder County in 2007 and 2008 to assess the county's biodiversity. This survey identified areas with the highest biodiversity significance based on rare, threatened, and endangered species and habitats. Red Hill was awarded a B1 ranking due to its concentration of four or more globally critically imperiled to globally imperiled element occurrences that are in excellent or good condition. Red Hill is one of three areas in Boulder County that holds a B1 ranking. Additionally, Table Mountain and the Lykins Gulch area (east of US 36) are CNHP B2 areas (Very High Biodiversity Significance; CNHP 2009).

Having experienced natural resource damage on Ron Stewart Preserve at Rabbit Mountain by an overabundant, resident herd, the growing resident herd at Red Hill therefore warrants immediate action. While the area surrounding Red Hill and the current distribution of the elk herd differs from conditions at Ron Stewart Preserve, preventive management of the Red Hill herd will benefit the otherwise irreplaceable resources inventoried at Red Hill and the surrounding area.

### ***Actions Taken to Address Elk Impacts***

- As described above, CPW has provided counsel, remediation, and game damage fees to numerous landowners adjacent to the elk management area. To help address problem elk and redistribute animals, CPW has also distributed 32 game damage tags.
- In 2010, CDOT enforced a nighttime speed reduction from 60 to 55 miles per hour from September through April. Enforcement was minimal, and at the end of the pilot program, the original speed limit was reinstated.
- Prior to 2010, large yellow wildlife crossing warning signs were placed at both ends of the areas where elk frequently cross in attempt to influence driver behavior. An attempt to alter the physical environment and crossing conditions in the form of reflectors meant to frighten elk were also installed in a half-mile portion of the crossing zone just north of Nelson Road.
- In fall of 2019 (for 2020 hunting season), CPW extended the boundaries of the special elk hunting subunit around Ron Stewart Preserve to encompass the Red Hill elk management area.
- Similar to the creation of the Rabbit Mountain subunit in 2015, the subunit increase to encompass the Red Hill elk management area will serve to intensify hunting pressure and enable harvest on private land surrounding open space.
- CPW, with assistance from BCPOS, captured six elk from the Red Hill elk herd (for GPS collars) in March and April of 2017; four elk in February and March of 2018; and three elk in March of 2019. As of February 2020, four collars are in operation. An additional



11 collars total will be deployed between the Red Hill and Rabbit Mountain elk herds in 2020.

- BCPOS and CPW highlighted the issue of growing elk conflicts during a presentation to the Boulder County Commissioners (BOCC) on April 25, 2019, and to the Boulder County Parks and Open Space Advisory Council (POSAC) on November 21, 2019.

## Plan Goal and Objectives

### Goal:

Manage a sustainable, migrating elk population on open space properties surrounding US 36 through adaptive management to protect areas of high biodiversity and reduce elk-human conflicts.

### Objectives:

1. Prevent impacts to areas of high biodiversity, including grassland sites, shrub stands, and forested areas in the Heil Valley Ranch/Red Hill area and natural lands east of US 36.
2. Maintain a migrating elk herd, with no more than 25 summering individuals.
3. Continue to work with agricultural tenants, farmers, and landowners to minimize elk-human conflicts and elk damage.
4. Facilitate highway safety along US 36 and Nelson Road by reducing elk-highway interactions and establishing partnerships with local, state, and federal agencies.

## Management Options Considered

### Status Quo

If no management action occurs to limit growth of the summer population and encourage redistribution, the non-migratory segment of the Red Hill elk herd will likely continue to increase with the recruitment of calves, as well as immigration of individuals from the remaining migratory segment. As summering elk numbers increase, impacts to natural resources and damage to crops and private property are expected to increase. This increase also has the potential to affect public safety year-round, not just during peak migration.

As private landowners employ deterrent methods to protect crops and as harvest pressure increases on private land within the subunit, these factors may further concentrate elk on open space and BCPOS tenant-occupied properties (which are not currently open to hunting). This condition may potentially intensify elk-human conflicts and promote resource damage on open space property, if no management occurs. Utilizing open space as refuge, the Red Hill elk herd can potentially cause resource damage by browsing, grazing, and trampling. CPW and BCPOS agree that management action is needed.

### Fertility Control

Fertility control is not a proven, nor approved means of controlling wild elk populations. The Environmental Protection Agency (EPA) has regulatory authority over fertility control agents for

use in free-ranging wildlife under the Federal Insecticide, Fungicide and Rodenticide Act (1947). Although two fertility control agents have been approved for use in feral horses (PZP and GonaCon) and one in white-tailed deer (GonaCon), the EPA has not approved any fertility control agent for use in free-ranging elk populations. As a result, there is no legally available fertility control agent that could be considered for management of elk using the Red Hill/Table Mountain area.

Because the herd is a mix of migratory and non-migratory elk – and other techniques could lead to encouraged migration – there is a likelihood of ending up treating migrants with fertility control agents, which would be redundant. It would also then not likely be efficacious in keeping the summering population small. Since the population is not isolated from the migrants, fertility control would not do anything to reduce immigration from the migratory elk. And fertility control does not remove any animals from the population that are currently causing the summer damage. For the above reasons BCPOS has decided against Fertility Control as a management option. See Appendix B for more information about fertility control.

### Trap and Transplant

Chronic wasting disease (CWD) occurs in both elk and deer in the Red Hill area and within the St. Vrain Elk herd. CWD, along with the potential transmission of other diseases, is the primary reason for not transplanting elk from Red Hill to areas far enough away to ensure elk will not return. Moving them within the migratory segment is not an option, because they still have the ability to not migrate the following season. In addition, most Colorado elk herds are near or above population objectives, so finding a suitable release location is problematic especially for elk habituated to feeding on agricultural crops. Cost and logistics are also restrictive for such an extensive capture operation. For these reasons, CPW and BCPOS conclude trap and transplant is not a viable option.

### Professional Culling

Culling is the lethal removal of animals from a population in an organized fashion. It is controversial because of the immediacy and negative connotations associated with removing large segments of (often visible) populations. Some citizens object to lethal removals of any kind (hunting, trapping, or culling). Most culling is done at night with suppressed weapons by professional sharpshooters in an efficient, condensed time period. That method of culling may or may not be the case with this elk population.

Although this method can potentially be effective at reducing ungulate populations, it is in opposition to state statute 33-1-101 (4) C.R.S., which states that hunting will be the primary method of effecting necessary wildlife harvests. Agency and professional culling is also counter to the North American Model of Wildlife Conservation (Organ et al. 2012). However, ungulate culling, primarily deer, has become a common practice throughout the United States over the last 20 years.

Past CPW experience involving agency culling for CWD management and a public survey of Evergreen residents regarding elk management options (Chase et al. 2002) indicate that the public prefers public harvest over professional culling in Colorado. In BCPOS' online survey of public input on the Ron Stewart Preserve at Rabbit Mountain plan, of 353 respondents, only seven – less than 2 percent – suggested professional culling.

Culling is costly to implement. Estimates range from \$900 (White Buffalo personal communication; best case scenario) to \$4,700 per animal (Powers et al. 2016). The number of animals to be removed (50-70) is reasonable for this technique and might be achievable in a relatively short period of time with minimal effort, if conditions are favorable. However, there are unknowns about how well culling might work, harvesting in the summer and early fall when baiting is not an option.

These unknowns and constraints would likely drive costs higher (White Buffalo, pers comm 2020). The operation would likely be undertaken as a job/hourly contract because of the unknowns, which could very well lead to not meeting harvest goals or require excessive costs. The total cost estimates would likely range from \$75,000-200,000 for 50 animals with good success. That cost could go nearly as high as \$350,000 for 70 animals at the high cost end of the spectrum. The per-animal cost could end up being very high if the contract is hourly and the success rate is low because of constraints and unfavorable conditions. Additionally, periodic lethal removal would be required in the long-term to maintain objectives.

There is currently no procedure in Colorado for applying and implementing a contracted culling plan. Additionally, there are concerns about animals dispersing across roads (Nelson Road and/or US 36) at night when visibility is diminished as a result of this type of operation. The cost and effort, unknowns, safety concerns, tenant/livestock concerns, and reticence of the state toward this option have led us to conclude that culling is not an option for this issue on POS lands. See Appendix C for more information.

### Public Harvest

Harvest of elk and deer for food is firmly rooted in local history, dating back to Native Americans over 10,000 years ago. Private property within the Red Hill elk management area permitted public harvest for decades prior to acquisition by BCPOS. Through acquisition, BCPOS helped eliminate this local-scale management of elk populations, ultimately fostering landscape-scale changes through the promotion of safe refuge for the elk.

Hunting has proven to be highly effective and expedient in managing wildlife populations and their distribution (Organ et al, 2012). Public harvest has therefore been utilized as a game management method by multiple municipalities along the Front Range, including BCPOS. When BCPOS first published the Ron Stewart Preserve at Rabbit Mountain draft elk management plan online with proposed limited public hunting, 66 percent supported the plan, 7 percent supported the plan with modifications, and 27 percent did not support the plan. The largest number of comments (17 percent) supported the plan because of concern for the natural resources adversely affected by too many elk. The largest objection to the plan was opposition to hunting on county open space (9 percent).

### Fencing

Temporary, limited fencing can be an effective tool to aid in native plant recovery in areas overgrazed and trampled by elk when employed in conjunction with population reduction and distribution management options. BCPOS used this strategy in the Ron Stewart Preserve at Rabbit Mountain Elk and Vegetation Management Plan. Two important bedding areas inside the core use area for elk were fenced off to deny shade and make the area less attractive to elk. A single, small riparian area east of US 36 has been identified as one that might warrant fencing

because of degradation by heavy elk use. It might also deny elk a place for calving/calf-rearing. No areas west of US 36 (grassland, shrubland, or riparian) have been identified as degraded by elk use. This condition is likely a result of the vast amount of suitable, quality habitat available – in sharp contrast to Ron Stewart Preserve at Rabbit Mountain.

All fencing would be built to be wildlife friendly (allow movement of other species). However, monitoring would need to prevent other unfenced areas from damage as the elk are excluded from the fenced area. Fencing costs can be expensive, depending upon the fence type and size of the area(s) to be fenced. Standard 8-foot game fencing on wood posts is likely to cost between \$15-30/meter. Electric fence for elk has also been used with high efficacy (high tensile and braided hotwire). The high tensile 5-7-strand fence costs \$10-12/meter. Electric braid fencing costs \$10-12/meter as well. BCPOS would determine the best alternative to fence any highly impacted locations on open space.

Fencing high-value private lands (vegetable production areas) is an option. These areas on the outskirts of the Table Mountain are suited to fencing as they do not represent barriers to animal movement and are of sufficiently small size to be cost-effective over the long-term. Even short visits by limited numbers of elk can have a severe impact on an operation. Fencing of the few hot spots in the area would be a deterrent, resulting in greatly decreased resources available to elk over the summer and fall. Whether CPW could help defray any fencing costs on private lands would need to be determined. CPW has a series of game damage amelioration strategies, but fencing is far down the hierarchy of preferred choices. This strategy protects specific properties over the long term and should decrease game damage payments. If a concurrent population reduction program is not implemented, then elk will visit other attractive private lands more frequently.

### Hazing

Hazing can cause elk to move, at least temporarily, but the literature and experience show it is labor intensive and elk eventually habituate over time (Walter et al. 2010). In addition, hazing does not result in direct population reduction of overabundant elk. CPW may be liable for damage to real and personal property by elk while being moved by CPW (C.R.S 33-3-104(b)).

BCPOS tested hazing on Ron Stewart Preserve during the fall and winter of 2015-2016. BCPOS staff visited the southern portion of Ron Stewart Preserve more than 20 times from July 2015 through March 2016. The elk always chose to move away from the staff. In nearly all cases, elk ran away as a large group. Staff was able to influence the direction of travel in most cases. Radio-collared animals returned to Ron Stewart Preserve in usually one to three days (as long as six days). But they always returned.

In hazing exercises from 2018 and 2019 at Ron Stewart Preserve at Rabbit Mountain, elk resisted longer movements and needed to be pushed and pursued more intensively to get the same movement. Elk were also less likely to cross the road and the mine, remaining on Rabbit Mountain, seemingly becoming more tolerant of hazers. Noisemakers and cracker shells have been used on the Red Hill herd on the BCPOS Imel property. The current agricultural tenant reports that although methods worked the first few times, they are already ineffective at moving these elk.

Because of the safety risk of sending the herd across US 36 and lack of sustained response within the Rabbit Mountain herd, we have concluded that hazing has been ineffective at producing real behavior change in elk herds. Hazing will therefore be used in limited instances to reduce immediate crop damage on BCPOS agricultural lands and to encourage spring migration.

### **Wildlife Movement Facilitation**

With BCPOS properties comprising the bulk of the elk winter range, with the Heil Valley Ranch complex to the west, and the Loukonen Dairy Farm, Pierce, Wolf Run, Platt, and Centennial Ranch properties east of the highway, elk crossings are frequent. Public safety and wildlife migration are priorities for the State of Colorado. It is estimated that 4,000 wildlife-vehicle crashes are reported state-wide each year, representing an estimated \$80 million in damages. Several sites along US36 in the Red Hill area have been identified as places to facilitate safe wildlife crossings.

Acknowledging the continued growth of Colorado's population and increasing pressure on wildlife migration and threats to public safety, several working groups and funding sources have been made available.

### **Partnerships**

- Colorado Wildlife and Transportation Alliance was created in 2018 to ensure safe and successful migration of big game species.
- Partners of the Alliance include CDOT, CPW, the Bureau of Land Management, U.S. Fish and Wildlife Service, Department of Transportation, the National Wildlife Federation, U.S. Forest Service, Great Outdoors Colorado, Rocky Mountain Elk Foundation and the Mule Deer Foundation.

### **Funding Sources/Initiatives**

- In 2018, the allocation of state resources for addressing state-wide issues were bolstered by federal funding opportunities made available through a U.S. Department of the Interior Secretarial Order 2018-3362.
- In 2019, Colorado Governor Jared Polis signed an Executive Order (D-2019-011) to conserve Colorado's big game winter range and migration corridors.

For example, the State Highway 9 (SH 9) Colorado River South Wildlife and Safety Improvement Project in Grand County was completed in 2015. The overpass and underpass system was extensive and involved the construction of two wildlife overpass structures, five wildlife underpasses, nine pedestrian walk-throughs, 10.4 miles of eight-foot-high wildlife exclusion fencing, 62 wildlife escape ramps, and 29 wildlife guards to reduce wildlife-vehicle collisions throughout an 11-mile stretch south of Kremmling. The system resulted in a 90 percent reduction in wildlife-vehicle collisions in the first year.

Feasibility and available funds for larger projects, such as an overpass or underpass, will depend on transportation improvement programs and a CDOT Prioritization Study, similar to the study that was completed on the Western Slope prior to initiation, funding, and construction of the SH 9 mitigation network (see CDOT Western Slope Wildlife Prioritization Study). The following are examples of partnerships and funding sources from the SH 9 system construction.



## SH 9 Funding Sources

- CDOT/RAMP
- CPW
- Blue Valley Ranch
- Muley Fanatic Foundation
- Rocky Mountain Elk Foundation
- Woodcock Foundation

Wildlife movement can be facilitated, and wildlife-vehicle collisions reduced by affecting either driver behavior or the physical environment in areas where wildlife cross roadways. However, while an overpass or underpass would reduce road strikes, it will not reduce the growth of the newly formed resident elk herd or reduce human-elk conflicts on private property.

See Appendix D for examples of high-cost, high-technology and low-cost, low-technology options viable for enabling local movement and reducing wildlife-vehicle collisions.

## Public Input and Opinion

Staff presented the issues related to the Red Hill elk herd during the November 21, 2019, POSAC meeting and at an open house on Feb. 5, 2020. At the POSAC meeting, the committee heard these comments from the public: 1) neighbors concerned with the increasing elk damage on their private property; 2) neighbors concerned with the potential safety issue of hunting open space adjacent to their residences; 3) public support for elk management because it has proven to be effective at Ron Stewart Preserve at Rabbit Mountain; 4) public opposition to hunting elk on open space. These opinions were confirmed at our open house.

Public comment was also accepted online for one week after the open house. Of the 39 respondents, 37 (95 percent) agreed that the herd needed to be managed. Sixteen (41 percent) of respondents indicated that they were directly affected by the herd, whether they were an adjacent neighbor in the area, farmer or agricultural producer in the vicinity of the area, or a local commuter. Among the top concerns were impacts to local natural resources, highway safety, and damage to crops. Proposed management methods included public harvest, culling, the establishment of a wildlife overpass over US 36, and investigating effective and accessible programs for those with agricultural losses.

## BCPOS Management Recommendations

BCPOS proposes to use a combination of approaches, both in the short and long term. Short-term methods will help mitigate impacts to natural resources, local agriculture, and summer highway safety by managing the growing segment of non-migratory elk. In the long term, we recommend managing for a small summer elk population, exploring ways to improve habitat, and alleviating barriers to safe movement.

The mix of management techniques will be adjusted within the planning cycle depending upon the conditions, herd size, success rates from various control methods, other factors, partner contributions, and actions taken by others. Proposed harvest will be managed by timing, area, number of hunters, access, and length of season. All recommendations will employ routine

monitoring, data collection and analysis to measure progress toward objectives, which will serve to improve the elk management program.

### **Short-term**

- Limited public harvest program
- Targeted hazing during peak migratory periods
- Coordinated hunting with adjacent landowners (private and BCPOS tenant)

### **Long-term**

- Limited public harvest program
- BCPOS tenant assistance
- Habitat assessments to inform where habitat improvement projects could be prioritized
- Facilitation of elk movement between habitats east and west of US 36 through the construction of a wildlife overpass, underpass, or other highway crossing method

### **Short-Term**

#### ***Public Harvest***

To target the rapid growth of the non-migratory segment, mitigate elk-human conflicts, and elk-intensive damage to agricultural properties, BCPOS recommends a controlled, antlerless-only public harvest program. Building on the success of the public harvest program at Ron Stewart Preserve at Rabbit Mountain as a model of safe hunting on open space property, only strict adherence to established safety measures will be expected in managing the Red Hill elk herd. Safety concerns noted by residents adjacent to the Red Hill elk management area will be addressed.

This option would require minimal cost to CPW and BCPOS. Participants would be required to purchase an elk hunting license, provide their own equipment, and volunteer their time. All harvested animals will be properly prepared and all edible parts will be removed from the property as legally required. The mechanisms for licensure allowing animal harvest already exist via established CPW processes. A public harvest program would be in compliance with state statute 33-1-101(4) C.R.S that articulates the state will use hunting as the primary method of effecting wildlife harvest and is compatible with the North America Model of Wildlife Conservation (Organ et al. 2012).

### **2020 Plan Implementation**

Following is the plan for a safe public harvest program for the Red Hill elk herd. Updates on this program, as well as significant changes to this approach, will be brought to POSAC and the Board of County Commissioners in 2020.

**What:** Limited Antlerless-Only Elk Harvest

**Who:** GMU 20 subunit (Hunt Code E-F-020-L3-R) antlerless rifle license holders, except Private Land Only licenses. Four hunters per week, each with one companion and one vehicle (only on access road). In future years, the number of hunters may decrease depending on effectiveness. No motorized vehicles will be allowed off road.

**How:** Solicitation of subunit license-holders for declaration of interest in hunting Ron Stewart Preserve at Rabbit Mountain (pending approval) or Red Hill followed by lottery type-access system, both administered by BCPOS.

Short-range weapons (archery, muzzleloader, and shotgun slug) only; foot, horseback and/or pack animal only. Muzzleloader and shotgun slug will be permitted throughout the elk management area. Archery will be restricted to areas west of US 36. Non-lead ammunition only.

The type of weapon could be modified to include centerfire rifle should harvest success not meet objectives, pending approval and a safety assessment.

**When:** August 15, 2020 – October 31, 2020

- Six days per week from Monday-Saturday. This weekly duration could be modified depending on hunting success and elk movements in future years.
- Property can be accessed one hour before sunrise to one hour after sunset. Hunters can hunt only one-half hour prior to sunrise and one-half hour after sunset per CPW regulation.
- Variable message signage will be incorporated along US 36 and Nelson Road to alert commuters of the potential for more frequent movements by the elk herd (four signs total).

**Where:** Red Hill elk management area (see Figure 6 on page 18)

- No hunting within a safety buffer around property edges identified in elk management area.
- Hunting will be confined to areas currently closed to the public. Hunting boundaries adjoining Heil Valley Ranch will be drawn to maintain a minimum distance of one-quarter of a mile from public trails (Picture Rock trail).

#### **Proposed Access:**

##### ***Areas west of US 36***

- Inside gate at Dan Thompson
- Driveway of Loukonen Outlots
- Inside gate/old road bed at North Pointe
- Inside gate/old road bed at Trevarten

##### ***Areas east of US 36***

- Inside gate at Centennial Ranch

##### ***USFS adjacent land near Hall 2 (all applicable hunting licenses)***

- Promote legal access through BCPOS to USFS land immediately west of Heil Valley Ranch (currently illegally accessed) on the northwest corner of Hall 2 off Highway 7 near mile marker 31

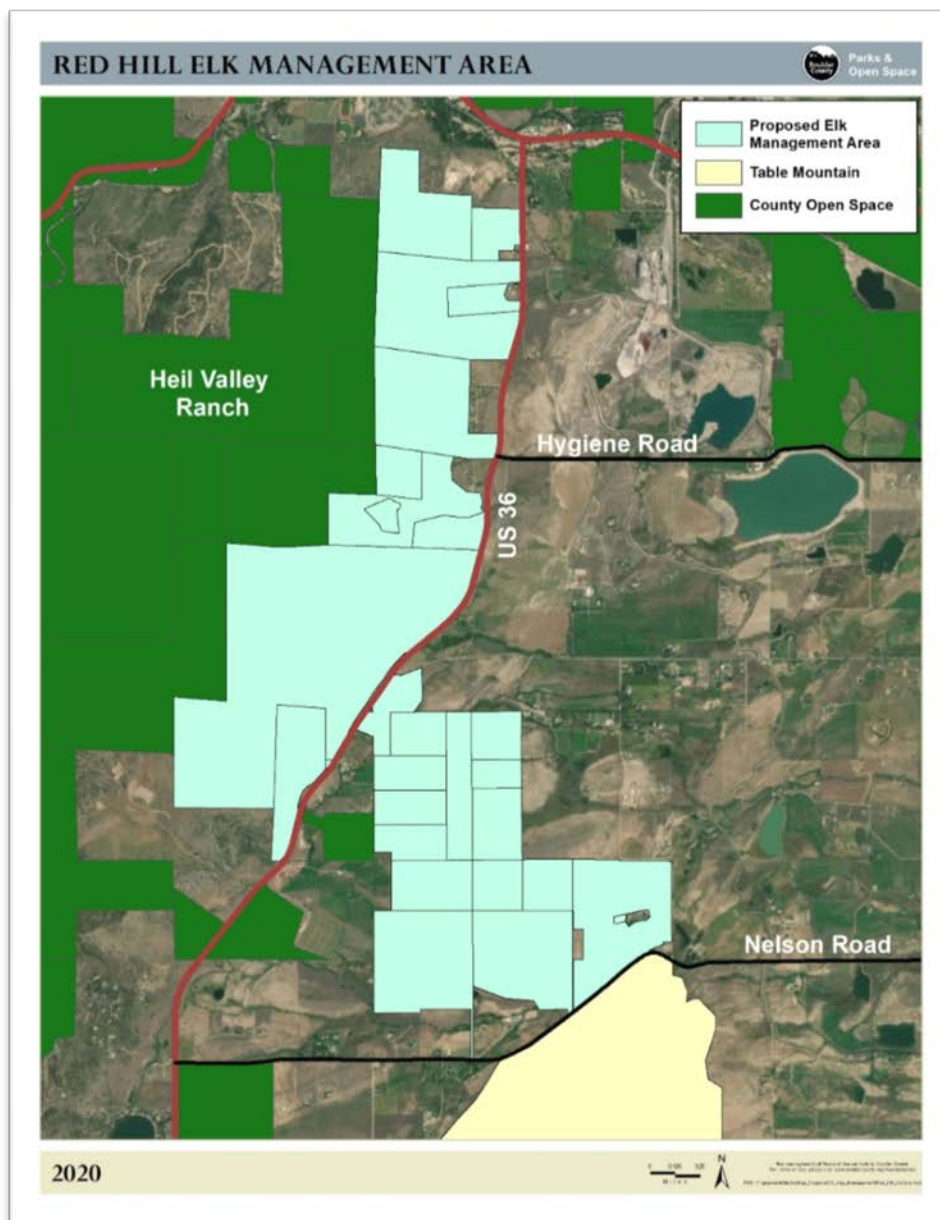


Figure 6. Proposed Red Hill elk management hunting area. Proposed access points and safety buffers not included.

#### General Rules and Regulations:

- CPW and BCPOS rules and regulations (Appendix E for orientation and training topics)
- Mandatory site orientation and shooting proficiency test
- Management by hunt coordinator, CPW District Wildlife Manager and BCPOS Resource Protection staff

### *Hazing*

Hazing in the Red Hill and Table Mountain area will be complex. Major roads (US 36 and Nelson Road) have high volumes of traffic at all hours. Hazing animals out of the BCPOS properties east of US 36 could force them to cross these busy roads, contrary to our goal of improving highway safety and reducing the potential for collisions.

The one partial option that could still function would be targeted hazing in the spring around the time elk choose to migrate to higher elevations (late April-early May). Hazing elk away and west from US 36 on the BCPOS properties in the Red Hill area could achieve some success. It would discourage animals from being in areas adjacent to US 36 and encourage them to be in areas farther to the west. However, there is so much habitat west of US 36 that it would be difficult to get elk to move in any coordinated direction. If we could get animals to actually move westward or stay west of US 36, they would have a better chance to associate with the migratory segment of the herd and migrate with them in mid-to-late May. This hazing could restore some of the activity that occurred on these lands prior to purchase by POS, which may have led to lower elk use. If this hazing is coupled with an active hunting program, it is possible that the combined human disturbance of the two activities will be synergistic and create uncertainty about the habitat quality and disturbance level elk have become accustomed to. It may help to encourage some of the non-migrants to join the migratory segment.

The results of the hazing will be difficult to quantify because of the lack of control of many factors. But the metrics to be looked at would include any changes in movement or distribution of the radio-collared segment and the summer count numbers.

### *Hunter Exchange with Landowners Program (HELP)*

To provide an additional resource to private landowners experiencing elk damage in the vicinity of the Red Hill elk management area and to maximize harvest within the subunit, staff proposes creating an online portal managed by BCPOS for pairing private property owners with local subunit hunters.

This recommendation is in response to the large pool of hunters that contacted BCPOS looking for hunting opportunities adjacent to Ron Stewart Preserve and within the subunit. Previously, an informal list of available hunters was developed each hunting season, with little success in pairing hunters with local landowners. This recommendation attempts to curtail the repeated number of hunters approaching landowners that either have their own hunting protocols or who do not want hunting on their property. It also attempts to identify private landowners that seek options and create success in facilitating connections.

**Who:** GMU 20 subunit (Hunt Code E-F-020-L3-R) antlerless rifle license holders, except Private Land Only licenses

Private landowners experiencing damage from either the Rabbit Mountain or Red Hill sub-herds. BCPOS tenants not eligible.

**How:** Local hunters would submit contact details, availability, and level of experience via the online portal, expressing interest in hunting local private land. Hunters would be required



to grant permission to release contact information to local landowner, if drawn. The portal would be advertised during BCPOS draw notifications.

Local landowners would submit contact details, nature of the issue, number of elk seen, frequency, size of parcel, and preferred level of experience and manner of take. As local landowners submit details, a local hunter will be randomly drawn from the list to be placed in contact. The portal would be advertised during public meetings and via BCPOS social media.

**When:** Duration of subunit license season (Aug 15, 2020 – Jan 31, 2021)

**Where:** Private land within the GMU 20 subunit (Hunt Code E-F-020-L3-R)

### ***Wildlife Issues on BCPOS Tenant Property***

BCPOS agricultural leases currently prohibit tenants from any form of control of wildlife, whether through non-lethal methods such as hazing or through lethal methods such as hunting. Firearms are prohibited on open space; therefore, tenants are not eligible for damage tags administered by CPW or allowed to solicit assistance from local hunters. Tenants may also be ineligible for game damage compensation via CPW for failing to meet specific criteria. In order for tenants to qualify, CPW requires that landowners do not unreasonably restrict hunting for the problem species on the property, restrict public land access, or lease hunting rights.

Because of these restrictions, tenants often suffer significant economic impact under BCPOS management policies, and requests for compensation for documented losses are often paid out internally. Payments can present a considerable drain to BCPOS operating budgets and resources overall, not to mention create a strain on BCPOS-tenant relationships. To address elk and other wildlife conflicts on tenant lands adjacent to the elk management area, BCPOS tenants experiencing elk-specific game damage will be eligible for a special wildlife management tag, provided by CPW and administered by BCPOS. In 2019, 32 game damage tags were provided to private landowners adjacent to the Red Hill elk management area. Depredation hunting tags are a common method for addressing conflict animals. Tenants with sustained game damage can file a complaint with BCPOS, which will then work with CPW to administer the game damage tag to a subunit hunter. Only hunters who have participated in the Red Hill or Ron Stewart Preserve program will be eligible.

### **Long-Term**

#### ***Public Harvest***

Herd management in some capacity will need to continue in the long term to address summer refuge on BCPOS property. The initial five-year period will serve to impact the growing resident population and encourage redistribution. Periodic or routine hunting pressure thereafter is expected to maintain population objectives and help cultivate long-term behavioral changes. Maintenance need not be as robust as the initial harvest period and would be tailored to meet the needs to the herd, habitat, local landowners, and threats to public safety. POSAC and BOCC approval would be solicited. Public harvest is necessary to maintain populations as habitat improvement projects and projects aimed at facilitating movement are considered.

### ***BCPOS Tenant Assistance***

As BCPOS agricultural leases currently prohibit tenants from any form of control of wildlife, to address elk and other wildlife conflicts in the long term, staff recommends developing a Standard Operating Procedure for year-round, non-lethal control of wildlife on tenant properties.

Developing a working group comprised of the Wildlife, Resource Protection, and Agriculture departments at BCPOS, the group will identify and/or outline the following:

1. Wildlife species, tenant properties, and agricultural products of concern
2. Critical timing/windows for planting or harvesting of agricultural products
3. Parameters for tenant management of nuisance species including hazing techniques (i.e., cracker shells) and pre-emptive measures (i.e., pallets, fencing)
4. Protocols for notifying BCPOS and CPW and streamlined routing for approval

### ***Habitat Evaluation***

Significant impact to our natural resources has not yet been seen in native areas west of US 36. A single riparian area east of US 36 that has apparent elk damage is under consideration for fencing. A combination of fencing, weed control, and fewer animals over shorter periods of time should restore this small habitat. BCPOS staff will periodically check the Red Hill area west of US 36 for indicators of heavy use, such as trailing and damage to shrub and tree stands.

### ***Habitat Improvement***

The flood of 2013 destroyed a ditch takeout on two open space properties west of US 36 and eliminated a former water source. As a result, the trees and shrubs along the ditch and the ponds that it fed have all have begun to deteriorate and die. The cost of the repairs and the number of ditch share owners make repairing this water source unlikely.

The other major land use change that affected elk use and distribution was the construction of the Picture Rock Trail. This trail has served to direct elk use to the hogback area, up away from the trail west of Red Hill. In order to mitigate this impact, BCPOS implemented a closure designation associated with the Red Hill Conservation area and Critical Wildlife Habitats (#71, #84). The commitment to retain these areas as closures is an important component of maintaining quality habitat west of US 36.

The other improvement for this area would be the removal of boundary and internal fences from areas of the newer purchases to facilitate elk movement. The area currently has many elk jumps along these fence lines, but complete removal (and the commitment to not utilize the lands in a grazing capacity) would be even more beneficial. BCPOS has been actively removing interior fences on our foothills properties for over 15 years and will continue to do so in this area.

There are several stock ponds on the Trevarton and North Pointe properties that collect rain and snowmelt runoff. Most are in good condition, but it may be possible to improve their water holding capability to improve more habitat areas west of US 36, again contingent on Colorado water law.

### ***Highway Crossing Methods***

To begin to address issues related to wildlife movement and wildlife-vehicle collisions, staff have partnered with Rocky Mountain Wild to conduct a fragmentation analysis of Boulder County and with Defenders of Wildlife to raise awareness about habitat connectivity and the landscape-level needs of wildlife. Staff also continue to work with CDOT to discuss mitigation options and monitor trends in wildlife-vehicle collisions along US 36 using CDOT roadkill reports. Finally, staff have identified three specific areas where elk frequently cross in the four-mile stretch north of Nelson Road: 1) near the Foothills Baptist Church, south of the Boulder Feeder Canal crossing; 2) just south of St. Vrain Road; and 3) about half-mile north of Nelson Road. These areas are suitable for wildlife crossing technologies.

To move the needle further, staff recommends and strongly supports the exploration of potential partnership options and funding sources for larger, long-term projects. As stated above, feasibility and availability of funds for larger projects will depend transportation improvement programs and on a CDOT Prioritization Study, similar to the study completed on the Western Slope prior to initiation, funding, and construction of the SH 9 mitigation network.

### ***Monitoring***

Data will be collected and analyzed to understand how management actions affect elk use of the greater Red Hill elk management area. Results will inform managers about changes that should be made to improve the program. This data includes the means and methods to monitor elk use (elk numbers, movements, seasonal migration, concentration areas, and shifting habitat use), as well as changes in the parameters of the elk population related to hunting seasons and the public harvest program.

The monitoring efforts will include collecting information on elk use within the greater Red Hill elk management area, elk distribution (through GPS collars), and the effects of hazing, tenant and private land hunting, and the public harvest program on elk use of the area. As of February 2020, four GPS collars are in operation within the Red Hill elk herd. An additional 11 collars total will be deployed between the Red Hill and Rabbit Mountain elk herds in 2020.

### ***Elk Use of the Management and Surrounding Area***

Coordinated ground surveys will be conducted in the greater Red Hill management area to monitor changes in overall population. Coordinated surveys will be conducted at dawn or dusk by a team of observers spread throughout the management area to maximize the detection of elk. Surveys will attempt to collect information on all groups of elk which have radio-collared elk and are within the greater management area.

### ***Distribution and Movement***

GPS collars on elk will be used to monitor elk distribution and movements as affected by:

- Hunting seasons
- Public harvest program on BCPOS properties
- Agriculture production (monitoring what crops elk are damaging via game damage claims)

- Season of year
- Elk life history (e.g., calving and the rut)
- Hazing (number of days of hazing, methods used, staff resources, movements of the elk, length of time elk stayed out of the core area)

### ***Hunting and Public Harvest Management Program Effects on Elk Use***

Mandatory reporting from hunters participating in the public harvest program will also be collected to provide information on elk use as related to the harvest program. The information collected will provide information on:

- Hunting effort on BCPOS properties (number of hunters and days hunted)
- Harvest success/number of elk harvested
- Harvest location
- Elk distribution related to hunting effort
- Behavior of elk

### **Partnerships**

#### ***CPW***

Colorado Parks and Wildlife is the state agency charged with managing wildlife populations. All proposed actions in this plan have been discussed with CPW and meets CPW regulations. The District Wildlife Manager will be a key partner in the implementation of any action taken in this area. This person works directly with any private landowner on game damage, depredation tags, hunting infractions, and public relations.

#### ***Table Mountain***

The situation for the Department of Commerce is a unique one. The department has the ability to control access to a very large acreage used by the elk herd. It also has some highly valuable equipment and studies occurring on its facility. Staff from the Department of Commerce are engaged in the elk herd discussion with CPW and are working on potential solutions that could contribute to the overall management of the herd.

#### ***City of Boulder***

As mentioned, the City of Boulder owns more than 200 acres of open space in the general area. The city will be brought into the management discussion, as there is the potential for its open space to also play a role in refuging.

#### ***CDOT***

Our partnership with CDOT will be critical for addressing the long-term issues concerning public safety along US 36. Staff will continue to partner with CDOT to monitor areas of concern and determine appropriate remediation methods and available funding sources. The timing and funding of any project will be dictated by the priorities set by transportation improvement programs and prioritization studies.



## Plan Duration

This five-year, short-term plan is to manage the Red Hill elk herd. After five years, staff will update the plan with lessons learned and modifications for the future. The update will be open to public comment, reviewed by POSAC, and approved by BOCC.

## Literature Cited

Chase, L. C., W. F. Siemer, and D. J. Decker. 2002. Designing stakeholder involvement strategies to resolve wildlife management controversies. *Wildlife Society Bulletin* 30:937-950.

CDOT Western Slope Prioritization Study.

<https://www.codot.gov/programs/research/pdfs/2019/WSWPS>

Colorado Natural Heritage Program (CNHP). 2009. Survey of Critical Biological Resources in Boulder County, Colorado. 415pp.

[http://www.cnhp.colostate.edu/download/documents/2009/BoulderCoReportFINAL\\_6-26-2009.pdf](http://www.cnhp.colostate.edu/download/documents/2009/BoulderCoReportFINAL_6-26-2009.pdf)

Organ, J. F., V. Geist, S.P. Mahoney, S. Williams, P. R. Krausman, G. R. Batcheller, T. A. Decker, R. Carmichael, P. Nanjappa, R. Regan, R. A. Medellin, R. Cantu, R. E. McCabe, S. Craven, G. M. Vecellio, And D. J. Decker. 2012. The North American Model of Wildlife Conservation. The Wildlife Society and The Boone and Crockett Club Technical Review 12-04. 47pp.

Powers, J. G., R. J. Monello, M. A. Wild, T. R. Spraker, J. P. Gionfriddo, T. M. Nett, and D. L. Baker. 2014. Effects of GonaCon Immunocontraceptive Vaccine in Free-Ranging Female Rocky Mountain Elk (*Cervus elaphus nelsoni*). *Wildlife Society Bulletin*: 38: 650-656.

Powers, J. and A. Moresco. 2015. Review of ungulate fertility control in the National Park Service: outcomes and recommendations from an internal workshop – February 2012. NPS Natural Resource Report. 110 pages. <https://www.nature.nps.gov/publications/nrpm/nrr.cfm>

Powers, J, R. Kahn, W. Whitworth, J. Mack and B. Bobowski. 2016. Elk Management in the National Park Service. Two case studies in the use of public volunteers. Natural Resource Rep. NPS/NRSS/BRO/NRR-2016/1119 24pp.

Responsive Management Newsletter – Survey on public opinions about hunting

[http://www.responsivemanagement.com/download/RM\\_ENews/RM\\_HuntPublic\\_newsletter.pdf](http://www.responsivemanagement.com/download/RM_ENews/RM_HuntPublic_newsletter.pdf)

Walter, W. K., M. J. Lavelle, J. W. Fischer, T. L. Johnson, S. E. Hygnstrom, and K. C. VerCauteren. 2010. Management of damage by elk (*Cervus elaphus*) in North America: a review. *Wildlife Research*. 37:630-646.

## Appendices

### Frequently Asked Questions

#### **Is public harvesting just Colorado Parks and Wildlife attempting to generate revenue?**

No. In Colorado, big game populations are managed for specific population size objectives, which are approved in a public process by the Parks and Wildlife Commission. The number of licenses issued is determined by size of the population relative to the objective. If the population is above the objective, more licenses are issued. If the population is below the objective, fewer licenses are issued. Finally, it is likely that the implementation of a public harvest program will result in fewer licenses issued than are currently issued after the refuge situation is removed and the elk population reductions are realized. The subunit hunt area is designed to be a locals hunt because of the extremely high percentage of private lands in the unit. The cost of an in-state elk license is less than \$55. And the subunit tag is a cow tag. Bull or either-sex tags (that allow bull harvest) are \$661.75. None of these licenses would be issued for this hunt.

#### **Do other municipalities use public harvest to manage wildlife?**

Yes, several open spaces and municipalities have public harvest programs to help manage wildlife populations. Below is a list of some programs on the Front Range, including the three-year public harvest program on Ron Stewart Preserve at Rabbit Mountain within Boulder County:

- Boulder County Parks and Open Space Ron Stewart Preserve at Rabbit Mountain Elk and Vegetation Management Plan for elk (<https://www.bouldercounty.org/open-space/management/rabbit-mountain-elk-management-plan/>)
- Jefferson County's Centennial Cone for deer and elk (<http://jeffco.us/open-space/parks/centennial-cone-park>)
- Larimer County's Red Mountain Open Space for elk, deer and pronghorn ([http://larimer.org/parks/red\\_mountain\\_hunting.htm](http://larimer.org/parks/red_mountain_hunting.htm))
- Larimer County's Eagle's Nest Open Space for deer and elk (<https://www.larimer.org/naturalresources/parks/eagles-nest>)
- The Green Ranch at Golden Gate State Park for elk (<http://cpw.state.co.us/placestogo/parks/GoldenGateCanyon/pages/huntinggreenranch.aspx>)

## Appendix A: BCPOS Acquisitions and Land Use Changes (1990-2019)

Transaction Name	Property	Closing Date	Parcel Name	Parcel Acres
CEMEX-Silica Quarry	CEMEX-Silica Quarry	8/10/2001	1	115.273
Centennial Ranch	Centennial Ranch	2/20/1996	1	146.593
Etter	Etter	7/17/2001	ALL	35
Hansen	Hansen	8/24/2000	ALL	80
Heil Valley Ranch 1	Heil Valley Ranch 1	1/5/1996	3	1240
Heil Valley Ranch 1	Heil Valley Ranch 1	1/6/1995	1 (TNC-County)	2374
Heil Valley Ranch 1	Heil Valley Ranch 1	1/6/1995	Parcel 2	1240
Heil Valley Ranch 1	Heil Valley Ranch 1	1/6/1994	Section 31	80
<b>Heil Valley Ranch 1 Total</b>				4934
Heil Valley Ranch 2	Heil Valley Ranch 2	10/29/2012	1	209
Loukonen-Dairy Farm	Loukonen-Dairy Farm	9/24/2019	J	65.89
Loukonen-Dairy Farm	Loukonen-Dairy Farm	9/18/2018	I	40.42
Loukonen-Dairy Farm	Loukonen-Dairy Farm	9/21/2017	H	40.5839
Loukonen-Dairy Farm	Loukonen-Dairy Farm	9/8/2016	G	39.99
Loukonen-Dairy Farm	Loukonen-Dairy Farm	9/9/2015	F	40
Loukonen-Dairy Farm	Loukonen-Dairy Farm	9/1/2014	E	40
Loukonen-Dairy Farm	Loukonen-Dairy Farm	10/16/2013	D	40
Loukonen-Dairy Farm	Loukonen-Dairy Farm	9/1/2012	C	40
Loukonen-Dairy Farm	Loukonen-Dairy Farm	4/6/2011	B	120
Loukonen-Dairy Farm	Loukonen-Dairy Farm	10/15/2010	A-3	0.7783
Loukonen-Dairy Farm	Loukonen-Dairy Farm	10/15/2010	A-4	76.4012
Loukonen-Dairy Farm	Loukonen-Dairy Farm	10/15/2010	A-5	39.5812
Loukonen-Dairy Farm	Loukonen-Dairy Farm	10/15/2010	A-6	22.3825
<b>Loukonen-Dairy Farm Total</b>				606.0271
Loukonen-Outlots	Loukonen-Outlots	10/10/2005	F	181.909
Loukonen-Outlots	Loukonen-Outlots	10/10/2005	1	29.954
<b>Loukonen-Outlots Total</b>				211.863
North Pointe	North Pointe	7/31/2007	Lot 7A	13.58
North Pointe	North Pointe	7/31/2007	OUT A	63.15
North Pointe	North Pointe	7/31/2007	OUT A	36.63
<b>North Pointe Total</b>				113.36
Pierce	Pierce	2/7/1998	Parcel 2	44.84
Pierce	Pierce	12/23/1997	Parcel 1	85.838
<b>Pierce Total</b>				130.678
Platt	Platt	2/20/1996	1	173.459
Thompson (Dan)	Thompson (Dan)	7/19/2007	A	38.304
Trevarton	Trevarton	1/22/1993	A-4	171.86
Trevarton	Trevarton	2/14/1992	A-3	200
Trevarton	Trevarton	2/15/1991	A-2	40
Trevarton	Trevarton	5/2/1990	A-1	80

<b>Trevarton Total</b>				491.86
Trevarton (Dorothy Ellen) Fee	Trevarton (Dorothy Ellen)	9/1/2017	All	716.5
Wolf Run	Wolf Run	5/16/1999	2	89.082
Wolf Run	Wolf Run	5/16/1999	1	72.066
<b>Wolf Run Total</b>				161.148
<b>Grand Total</b>				<b>8163.0651</b>



## **Appendix B: Efficacy of Fertility Control for Managing Red Hill Elk**

Even if a fertility control agent, such as GonaCon, was legally available for use in elk, it would require capture and treatment of a large portion of the breeding-age female elk population at least every other year. Under the most favorable conditions, fertility control would prevent population growth, but not reduce the herd size. Based on experience capturing female elk from the Red Hill elk herd, capture and treatment logistics are an insurmountable barrier to fertility control. These elk are wary and cannot be approached within dart gun range, and bait is not as effective as in normal circumstances because of the lack of persistent snow cover and the abundance of alternate food sources. In addition, human infrastructure and high velocity winter winds preclude effective helicopter capture of such a large number of elk.

Elk are long lived, with female life spans of 15-20 years. As a result, it would require a decade or more before fertility control to result in any population reduction to the non-migratory sub-population. This still won't account for immigration from the migratory sub-population, which can't be controlled. Also, fertility control agents would not promote greater movement of the elk herd or a return to seasonal migration. In addition, there is no evidence in the literature to indicate that fertility control techniques can be effectively applied on a scale enough large to limit population growth rates of open populations of free-ranging elk (Walter et al. 2010, Powers et al. 2014, Powers and Moresco 2015).

There are also ecological, behavioral and natural selection concerns, both known and unknown, associated with fertility control agents in free-ranging wildlife to be considered. Female ungulates treated with PZP experience multiple estrus cycles (which is not a common occurrence under natural circumstances), prolonging the breeding seasons and stress on treated and untreated animals (Powers and Moresco 2015). Fertility control may affect timing of mating and birthing seasons, and longevity of treated animals (Powers et al. 2014, Powers and Moresco 2015).

### **Frequently Asked Questions**

#### **What fertility control agents are approved for use in free-ranging elk populations?**

Fertility control agents must first be approved by the Environmental Protection Agency (EPA) and then by individual states before application in management situations. No agents have been approved for elk by the EPA or any states.

#### **Have fertility control agents been tested in elk?**

Porcine zona pellucida (PZP) and GonaCon have been tested in captive and in free-ranging elk. Both agents are effective in reducing pregnancy rates, although they are less effective in free-ranging elk than in captive elk. To date, neither fertility control agent is used or has proven to be effective at managing population size in free-ranging elk.

#### **What free-ranging animals are PZP and GonaCon approved for?**

PZP is approved for use in feral horses. GonaCon is approved for use in feral horses and white-tailed deer.

#### **What are the health or behavioral effects in treated animals?**

Females treated with PZP continue to have estrus cycles, but most often fail to become pregnant. As a result, the breeding season may be extended in members of the deer family from a few weeks to several months. The presence of PZP-treated female elk may result in bull elk

continuing to bugle, tend harems and fight other males past the normal September-October breeding season. The extended breeding behavior could result in social stress and reduced body condition for animals within the herd. For these reasons, PZP is not the preferred fertility control agent for members of the deer family. In contrast, females vaccinated with GonaCon showed a decrease in sexual activity and breeding behavior, although they were maintained as part of the harem. Behavioral effects of any type of fertility control have not been well studied in free-ranging elk.

#### **What is the treatment method for GonaCon in white-tailed deer?**

GonaCon must be hand injected in deer. At this time, it is not approved for use in elk. At the time of approval, an appropriate treatment method would be determined.

#### **How often would female elk need to be treated if GonaCon was approved?**

A study in Rocky Mountain National Park indicated that GonaCon was effective at reducing pregnancy rates in female elk for one to two years post treatment (Powers et al. 2014). Thus, female elk would need to be treated, at a minimum, every other year. It is unknown if after multiple treatments, female elk would be permanently infertile or maintain infertility for an extended period.

**Are there ecological effects of fertility control agents in elk?** Potentially. Changes to natural selection, effects on social structure and behavior, timing of mating and birthing season, changes to longevity, impacts to migration, all need to be studied before use as a management tool in free-ranging native populations (Powers et al. 2014, Powers and Moresco, 2016).

#### **Literature Cited:**

Powers, J. G., R. J. Monello, M. A. Wild, T. R. Spraker, J. P. Gionfriddo, T. M. Nett, and D. L. Baker. 2014. Effects of GonaCon Immunocontraceptive vaccine in free-ranging female Rocky Mountain elk (*Cervus elaphus nelson*). Wildlife Society Bulletin 38(3). 650-656.

Powers, J. and A. Moresco. 2015. Review of ungulate fertility control in the National Park Service: outcomes and recommendations from an internal workshop – February 2012. NPS Natural Resource Report. 110 pages. <https://www.nature.nps.gov/publication/nrpm/nrr.cf>.

Walter, W. K., M. J. Lavelle, J. W. Fischer, T. L. Johnson, S. E. Hygnstrom, and K. C. VerCauteren. 2010. Management of damage by elk (*Cervus elaphus*) in North America: a review. Wildlife Research. 37:630-646.

## Appendix C: Culling vs. Hunting

### Rocky Mountain National Park Elk & Vegetation Management Plan Fact Sheet

[https://www.nps.gov/romo/learn/management/elkveg\\_fact\\_sheet.htm](https://www.nps.gov/romo/learn/management/elkveg_fact_sheet.htm)

- A variety of conservation tools are used in (the RMNP) plan implementation, including fencing, vegetation restoration, and culling. Culling is the primary conservation tool used for lethal reduction of the herd. In future years, the park, using adaptive management principles, could reevaluate opportunities to use elk redistribution, wolves, or fertility control as additional tools.
- The actual number of animals the National Park Service (NPS) may cull, as well as the costs, will vary each year based on annual population surveys and hunter success outside the park. The level of management action taken to control the population size is adjusted annually based on the current population size estimates. Based on adaptive management, actions to control the population will be taken to manage for a population size within the range specified in the ROD (600-800 elk in the park subpopulation and 1,000 to 1,300 elk in the Estes Park subpopulation) and to meet vegetation objectives.
- NPS personnel are responsible for culling operations. To augment NPS personnel, authorized agents assist in culling operations under the direct supervision of NPS personnel. Cost, efficiency, and effectiveness are the factors that determine when additional personnel are needed. For purposes of this plan, "authorized agents" can include professional staff from other federal, state, or local agencies, Indian tribes, or qualified volunteers. NPS selects and supervises all personnel, including qualified volunteers. Short-term park closures can be implemented while culling activity is occurring.
- Cullers, including NPS personnel and authorized agents, are certified in firearms training, specially trained in wildlife culling, and are required to pass a proficiency test in order to qualify and participate in culling activities. Cullers are expected to work in teams under the supervision of an NPS team leader to insure humane dispatch and quality meat recovery.
- Culling activity has occurred during the winter months, early in the morning, to minimize impacts on park operations, visitors, private inholdings, and neighbors.
- What is the difference between hunting and culling?  
Hunting is not allowed in Rocky Mountain National Park and is not a part of the elk management plan. Hunting is a recreational activity that includes elements of fair chase and personal take of the meat. Hunting is administered by the State Fish and Game Agency.

Culling is used as a conservation tool to reduce animal populations that have exceeded the carrying capacity of their habitat. Culling is done under very controlled circumstances in order to minimize impacts on park operations, visitors, private inholdings, and neighbors. Culling is an efficient and humane way to reduce herds of animals that are habituated to the presence of humans.

- Why was public hunting considered but dismissed as an alternative?  
Hunting is prohibited in the park by law. In 1929, Congress prohibited hunting within the limits of Rocky Mountain National Park. Public hunting within the park raises several issues:
  1. It would significantly change the visitor experience in the park. Visitors expect to come to Rocky Mountain National Park and not encounter hunters.
  2. It would require changing the law that has been in place in the park since 1929.
  3. It would significantly displace the existing recreational use of park visitors and would compromise visitor safety.
- Park managers selected culling of elk, using specially trained park staff and authorized agents, to reduce the elk herd and minimize the impacts on park operations, visitors, private inholdings, and neighbors. For over 90 years, visitors have expected that recreational activities can take place in Rocky Mountain National Park without interference from hunting. Hiking, horseback riding, snowshoeing, and skiing in the backcountry are very popular activities, along with sightseeing and wildlife viewing along the park's roadways.
- The NPS recognizes that public hunting is an important recreational activity and wildlife management tool in Colorado. Currently, hunting is permitted on approximately 98 percent of the federal lands in Colorado, including lands managed by the U.S.D.A. Forest Service (Forest Service), the Bureau of Land Management, and numerous national wildlife refuges throughout the state. Further, the NPS recognizes and supports Colorado Parks and Wildlife's (CPW) use of hunting for management of wildlife in areas outside and adjacent to the park.

\_\_\_\_\_End of RMNP Fact Sheet\_\_\_\_\_

### **What were the resources necessary to carry out this culling program?**

RMNP had volunteer sharp-shooters who passed a proficiency test work alongside parks and CPW staff to take out the elk. Two teams of four people each carried out the culling; additional volunteers and staff retrieved the animals, field dressed them and transported them. CPW distributed the meat through a lottery system. Volunteer sharp-shooters were not eligible for the lottery. The estimated cost was \$4,700/elk.

### **How many elk did they cull?**

RMNP management plan estimated up to 200 elk could be culled. In the three years of implementation, 53 elk were culled.



## Appendix D: Highway Crossing Methods

The following are examples of high-cost, high-technology and low-cost, low-technology options viable for enabling local movement and reducing wildlife-vehicle collisions.

### Low-Cost/Low-Technology

Seasonal nighttime reduction in speed limits imposed in 2010 was one such attempt to modify driver behavior, though the original speed limit was reinstated after the end of the two-year pilot program. Large yellow warning signs were also placed at both ends of the areas where elk have crossed for many years, in another attempt to influence driver behavior. Additionally, reflectors meant to frighten elk were installed in a half-mile portion of the crossing zone just north of Nelson Road. However, reflectors have proved ineffective at reducing wildlife crossing and wildlife-vehicle collisions. Many reflectors are not in working order (broken, missing, out of alignment).

Low-cost, low-technology strategies, including seasonal, variable message signs in specific areas, have been effective at reducing speeds and collisions. Novitiate drivers pay attention to these signs, while habitual and repeated drivers may tend to ignore them over time. But drivers do notice when the signs are removed; hence they recognize the seasonal importance. However, this passive technology does nothing to affect elk or where they cross the roadway.

Rumble strips, chevrons, and pavement striping, in concert with signs (or the variable message signs), can affect driver behavior and speed for short distances but would likely be ineffective at reducing speeds over the entire stretch from Nelson Road to St. Vrain Road. Any of these strategies could be accompanied by fencing to direct elk to cross the highway at a specific point(s). Game-proof highway fencing costs \$12,000-15,000 per mile, not counting routine maintenance and monitoring.

### High-Cost/High-Technology

Three higher-cost, high-technology options involve informing drivers that elk are in the area adjacent to the highway or have entered the highway right-of-way.

1. Radio-collars on elk that trigger flashing warning lights and signs when elk are present. This option requires instrumentation of a significant portion of the herd (at least 10 percent), along with an array of radio receivers and warning signs.
2. Trip-beam sensors or cameras that detect elk in or near the road right-of-way and activate warning lights and signs.
3. Electromagnetic field cable that triggers warning lights and signs when large animals cross the cable, placed parallel to the road right-of-way in a crossing zone.

All of these technologies are more effective and less expensive if they are focused at single sites. They are not cost-effective over long stretches of highway. These strategies are labor and maintenance intensive and can sometimes result in false-positives – elk are present, but not

crossing the highway. They also suffer from false-negatives, where either technology failure or uninstrumented animals don't set off warnings, yet still cross the highway.

An additional strategy that could be adopted is exclusionary fencing along the entire four-mile stretch west of the highway, attempting to prevent elk from crossing the roadway at all. It would effectively remove the east side acreage from the winter range. Smaller species will still be able to pass under the roadway at several box culverts and pipe culverts. However, landowners in the Nelson Road area may object to this visual impediment.

The highest cost and most effective strategies are those that remove wildlife from the road surface, either by going over or under it. Constructed overpasses cost in excess of \$1,000,000 due to the extensive earth-moving and engineering of the bridge portions. Overpasses usually include directional fencing and have the largest footprint of any strategy. They are three-dimensional and have elevated, constructed approaches that exceed the width of the highway right-of-way.

Underpasses can be constructed at places along a roadway where there is suitable headroom to accommodate some form of tunnel. Constructed underpasses can be tailored to the animal species that gains by crossing the roadway. Culvert underpasses for desert tortoise, lynx, or Florida panther need not be large and can be fitted into most highway situations (\$10,000-60,000). Crossings for large ungulates usually require much larger openings and sightlines to allow passage and comfortable entry. As such, these underpasses cost considerably more (\$200,000-600,000). SH 9 underpass structure total cost was \$728,135. Large arch culverts are the preferred pipe structure, sized at least 12' x 24' wide, but as large as 18' x 60' wide to be accepted by elk. These can be either corrugated metal pipe or prefabricated concrete pieces. Underpasses often require significant excavation and shoring, but do not usually exceed the width of the road right-of-way.

New span bridges are an option that provides the openness and sightlines favored by large ungulates and may be used by all wildlife species. These costs are usually in excess of \$1,000,000. SH 9 overpass structure cost totaled \$1,260,012. Bridges can actually be constructed over excavated lands to put safe crossings at existing at-grade crossing points. But usually, existing bridges and culverts are retrofitted into wildlife underpasses at existing drainages. This can substantially reduce costs, especially if road maintenance or re-surfacing were going to update or replace the existing drainage structure. Roadways can be raised slightly or culvert size enlarged, adding little cost to existing plans. But this nuance is more appropriate for smaller, non-ungulate crossings.

## **Appendix E: Public Harvest Program Requirements and Training Topics**

### **Mandatory Shooting Proficiency Testing**

Participants will be given instructions on the shooting proficiency test and directions to the range. Shooters will be instructed to sight-in their weapon(s) of choice prior to coming to the test.

### **Mandatory Elk Management Area Orientation**

Participants will be given detailed maps and will be advised on the following. As part of their training, an on-the-ground tour will also be required prior to participation.

- Open space boundaries
- Access points
- Eagle closure boundaries/dates
- Parking lots and trailheads
- Roads and trails
- Residential areas

### **Contacts**

Participants will be given a list of contacts including staff from BCPOS and CPW, as well as numbers for the Boulder County Sheriff's Department and Colorado State Patrol.

### **Ethics**

Participants will be instructed on expectations regarding ethics, such as the discreet removal of harvested elk, what to do if they encounter someone (including surrounding landowners) while participating in the harvest program, proper treatment and care of habitat on the open space, etc.

Participants will be advised that participation in the Red Hill elk management program is a privilege, not a right, and that permits for participation may be revoked at the discretion of Boulder County and/or Colorado Parks and Wildlife staff.

### **CPW Rules, Regulations and Laws**

Instructors (BCPOS and CPW) will go over rules. Instructors will also cover laws and regulations, such as license/tagging requirements, manner of take, legal hunting hours, proof of sex, requirements to pursue wounded game and provide harvested animals for human consumption, safety laws, etc.

Participants will be required to comply with all rules, laws and regulations, including but not limited to those of Boulder County, Colorado Parks and Wildlife and the State of Colorado. Violation of any rule, regulation or law may result in the immediate revocation of the participants in the Public Harvest Permit Program. In order to participate, participants will sign an agreement to report any violation of rules, regulations or laws immediately, whether they are intentional or accidental (e.g., participant shoots spike bull elk thinking it was a cow).

### **Special BCPOS Regulations and Guidelines**

1. All hunters must participate in an onsite orientation program and proficiency test prior to their designated access dates.
2. Access permits are valid only for the days indicated on permit.
3. All hunters must be 18 years of age or older.
4. Hunting is for antlerless elk only.
5. Hunters may enter the property one hour before sunrise and remain onsite until one hour after sunset.
6. Hunters must check-in and out via the hunt voicemail whenever accessing or leaving Boulder County property.
7. Weapons must be unloaded when in the designated safety zone and may only be used within the designated safety zone to dispatch an injured animal.
8. Hunters are required to carry their hunting access permit at all times while hunting the Red Hill elk management area and adjacent Boulder County Parks and Open Space properties.
9. Each permitted hunter may be accompanied by one guest. Guests may not hunt or carry a firearm.
10. Parking is in designated locations only. Only one vehicle per hunting party is permitted. Parked vehicles must display a valid Boulder County Parks and Open Space parking placard.
11. Posting of photos taken during the Red Hill elk management program to social media sites is highly discouraged.
12. Elk must be field-dressed prior to removal from the hunting area. Gut piles must be at least 100 feet away from all trails or roadways.
13. Leave no trace. Hunters are required to pack out all of their waste.
14. All hunters will be required to complete an online post-hunt survey.
15. No motorized vehicles are allowed. Elk retrieval is by foot or horse only. Hunters may use designated fire roads for retrieval when appropriate. Wheeled game carts are allowed.
16. No smoking.
17. No drones or UAS may be used.
18. No collared elk may be taken.
19. No pets are allowed.

### **Checking-In, Checking-Out, Notifications**

Participants will be given instruction on how to check-in prior to entering the open space, how to check-out when they are ready to leave, and how to report hunting activities (number of days/hours hunted, harvest success, etc.), both of which will be required.

Hunters must notify the hunting coordinator via voicemail or text message when they enter or exit the hunting area.

Hunters are required to report all unrecovered animals, injured animals that travel onto private property, regulation infractions, and unauthorized access/use of the Red Hill elk management area and the surrounding hunting areas.

### **Private Property and Safety**

Instructors will give a thorough safety review, including rules/regulations related to safety and unique aspects of the public harvest program (e.g., neighboring lands). Participants will be provided with instructions on what to do if they wound an elk that then runs onto private property. Permission from the owner of the private property **MUST** be obtained prior to pursuing the elk on said property.

### **Media**

Participants will be given instruction on how to handle contacts with the media should they encounter or be contacted by media personnel. There will be no posting of news photos or stories relating to participation in the program on ANY social media outlets.

### **Liability Release**

Participants will be required to review and sign a liability release prior to participating in the program.

### **Open Space Resources**

Participants will be given notice that collecting items such as shed antlers, artifacts, plants, rocks, etc. from the open space is strictly prohibited and will be punished to the full extent of the law.

### **Mandatory Qualifications for Participation in the Red Hill Public Harvest Program**

1. Must be at least 18-years-old
2. Must have passed an accredited hunter education program
3. Must have a valid, unfilled GMU 20, Hunt Code E-F-020-L3-R, cow elk license
4. Must be capable of passing a shooting proficiency test
5. Must use non-lead ammunition
6. Must have the knowledge and ability to field dress an elk
7. Must have the knowledge and ability to pack out edible portions of an elk distances up to one mile without the use of a vehicle
8. Must attend mandatory training and mandatory orientation field trip
9. Must check-in prior to entering the open space and check-out when done
10. Must complete hunting report to include information on hunting activity and harvest success
11. Must remain in full compliance with all rules, laws and regulations, including but not limited to those of Boulder County, Colorado Parks and Wildlife and the State of Colorado. Violation of any rule, regulation or law may result in the immediate revocation of the Red Hill Public Harvest Program Permit.