

EAST VAIL BIGHORN SHEEP WINTER RANGE ENHANCEMENT

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February 5, 2019

Presentation for:

Vail Town Council

Western Ecosystems, Inc.

Ecological Consultants

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EAST VAIL BIGHORN SHEEP WINTER RANGE ENHANCEMENT

- 1. CPW-mapped bighorn sheep ranges**
- 2. Winter range used over 2017/2018 winter**
- 3. Proposed East Vail development**
- 4. Proposed East Vail parcel habitat enhancement**
- 5. Recommended adjacent habitat enhancement**



Legend

- BSSCA
- BSSWR
- BSWCA
- BSWR

**CPW-mapped Bighorn Sheep
Summer & Winter Ranges**

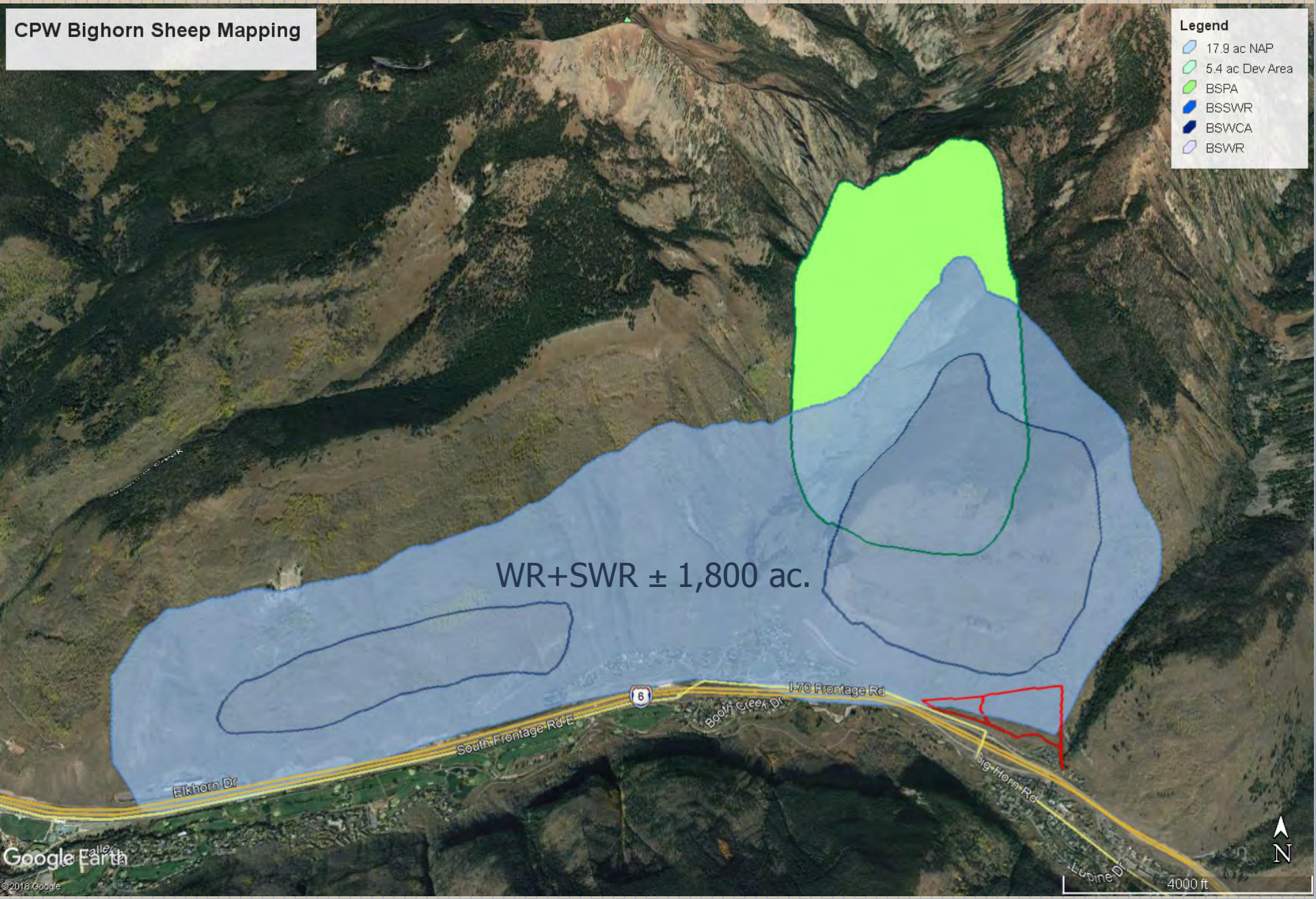


6 mi

CPW Bighorn Sheep Mapping

Legend

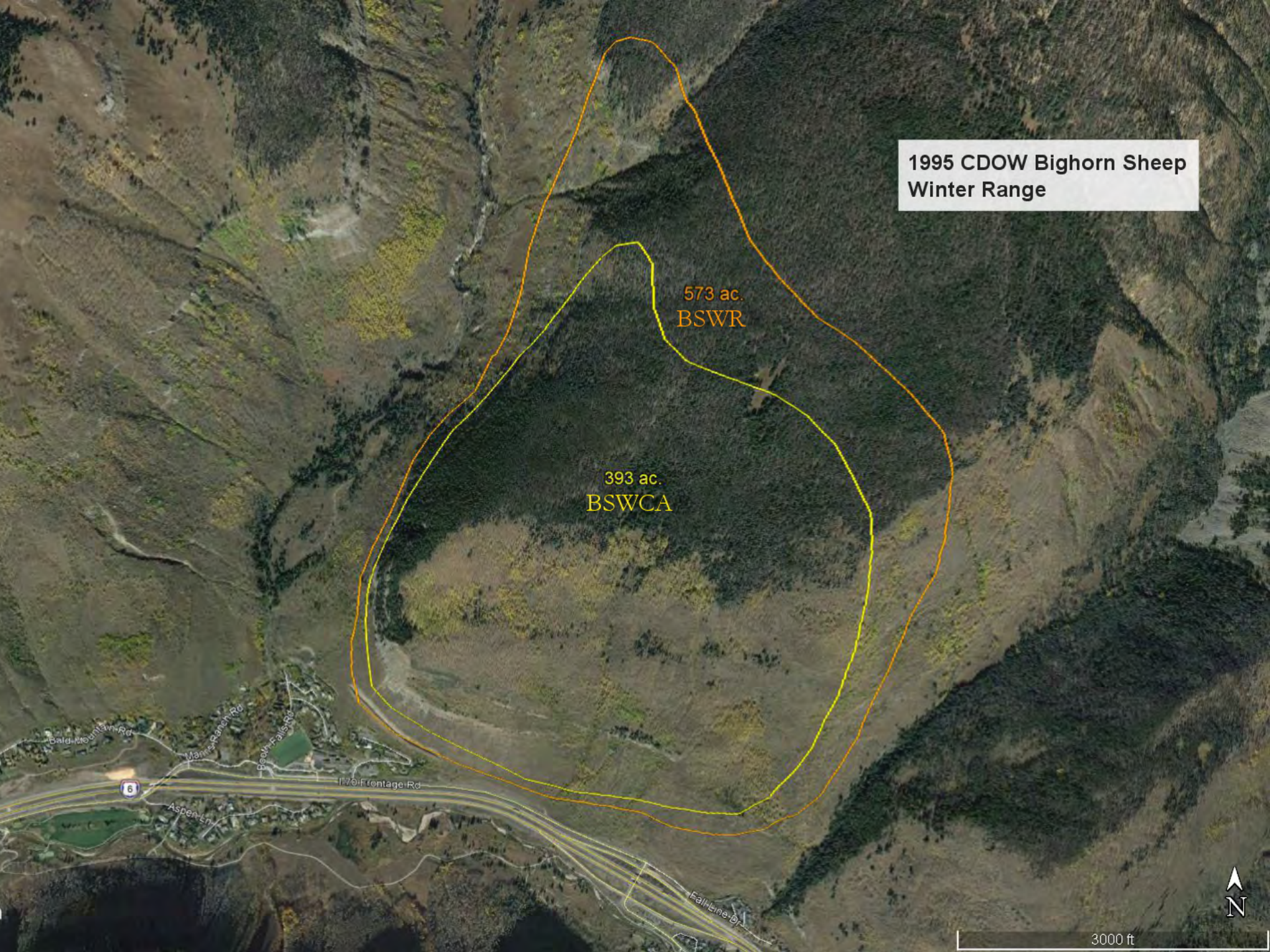
- 17.9 ac NAP
- 5.4 ac Dev Area
- BSPA
- BSSWR
- BSWCA
- BSWR



1995 CDOW Bighorn Sheep
Winter Range

573 ac.
BSWR

393 ac.
BSWCA



3000 ft

CDOW/ CPW Bighorn Sheep Winter Range



10/9/2015

Booth Ck

Booth Creek Cliffs

Upper Cliff

Lower Cliff

Rockfall Berm

Kalsos Ranch

TC5

I-70 Frontage Rd

6

TC3

TC2

TC4

TC1

EV Interchange

Pitkin Ck

Fall Line Dr

Englewood Rd

Bridge Rd

Lupine Dr

© 2018 Google

East Vail Peregrine nest cliff

Google earth

Imagery Date: 10/9/2015 1999

13 S 387412.90 m E 4389344.42 m N elev 8375 ft

Eye alt 14016 ft

23.3-acre East Vail Parcel

Legend

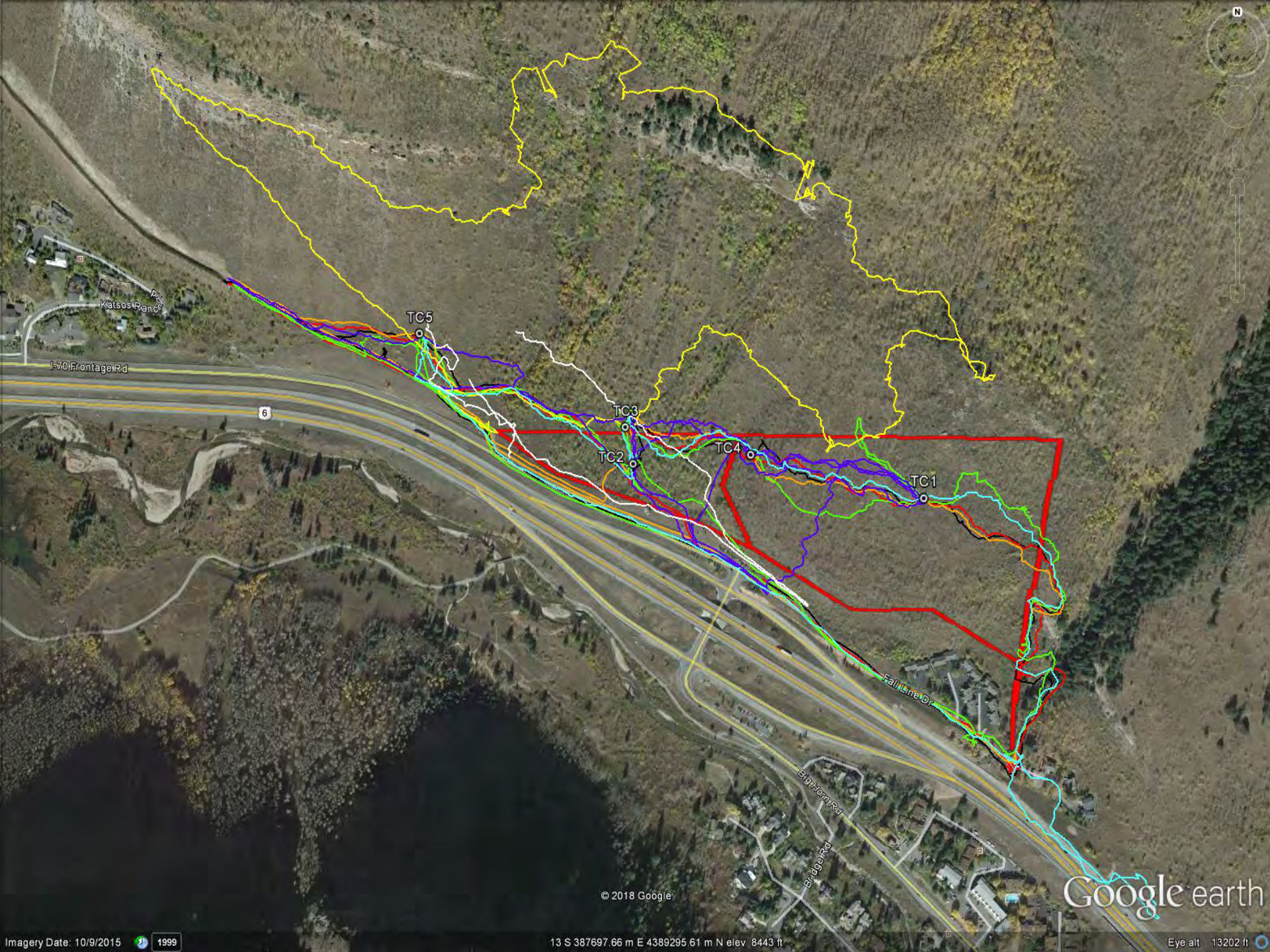
- 17.9 ac NAP
- 5.4 ac Dev Area



2017-2018 Wildlife Study for Vail Resorts

Purpose: Evaluate sheep winter range use on and within the influence of an inhabited East Vail parcel.

- 1. Focused on sheep WR use**
- 2. October 13, 2017 to June 14, 2018**
- 3. Min. 2 survey days/month of entire WR polygon**
- 4. Addt'l. surveys when sheep were in vicinity of EV**
- 5. 5 trail cameras; M-A & TL, 125,699 camera images**



TC5

TC3

TC2

TC4

TC1

I-70 Frontage Rd

6

Kaisos Ranch

Fall Line Dr

Bidwell Rd

© 2018 Google

Google earth

Imagery Date: 10/9/2015 1999

13 S 387697.66 m E 4389295.61 m N elev 8443 ft

Eye alt 13202 ft



PTC5

PTC3

PTC2

PTC4

PTC1

6

Bothero Rd

Fall Line Dr

N

900 ft



MOULTRIE



66°F

#MOULTRIECAM

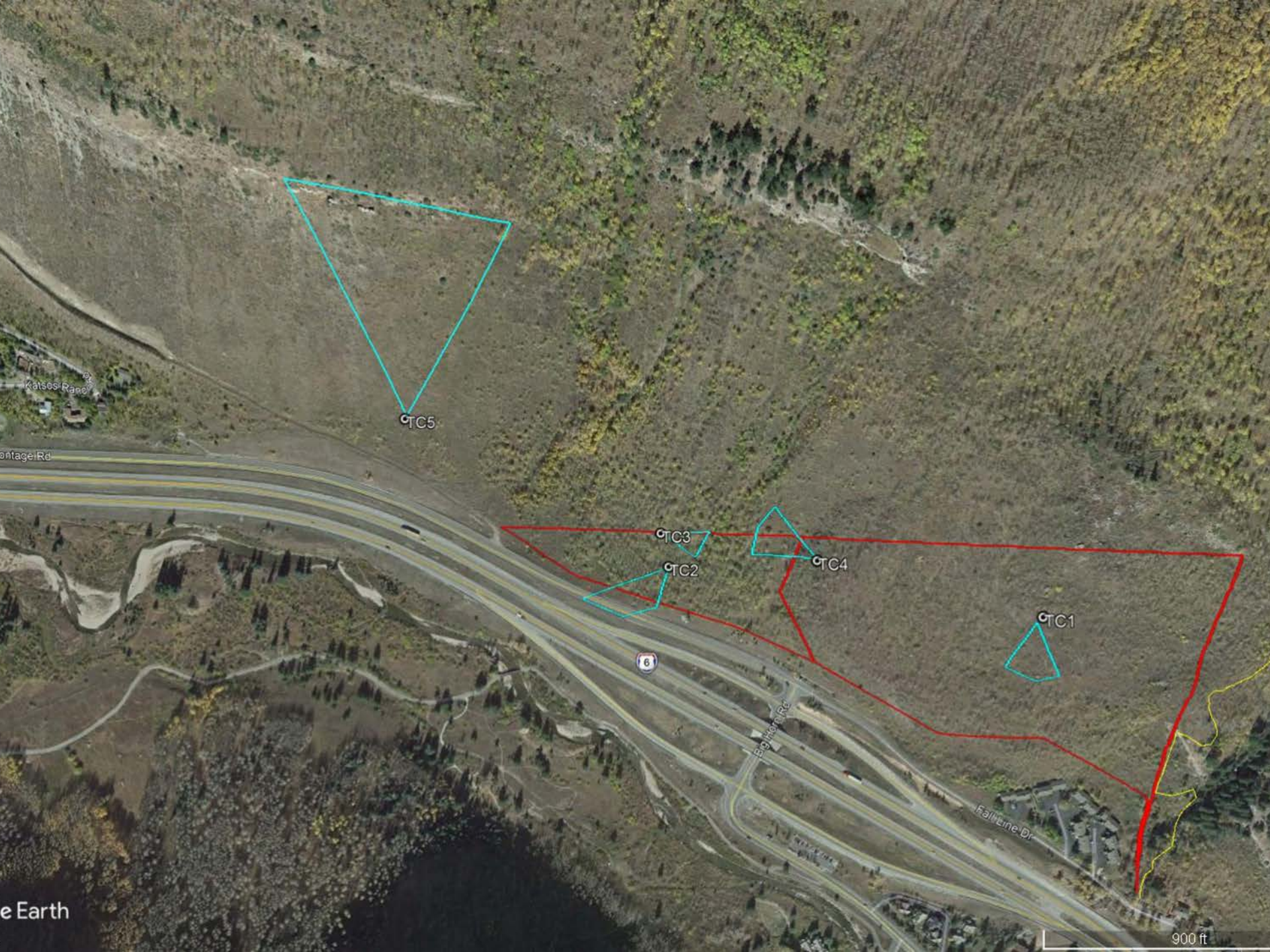
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TC1


2/2 trails

0.75-ac. FOV

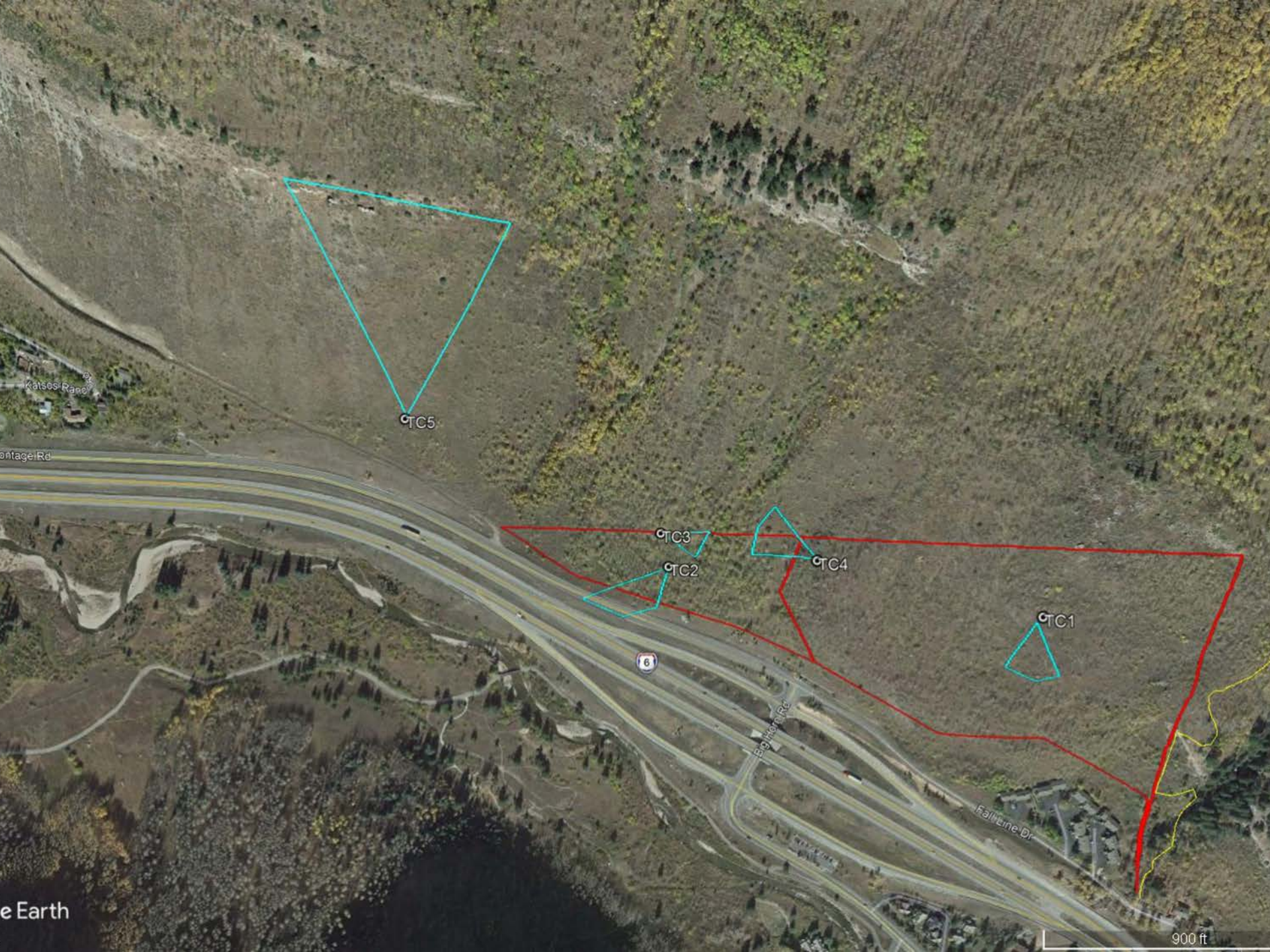
WR enhancement area





MOULTRIE  55°F @MOULTRIECAM4 12 MAY 2018 08:01 am

TC4 ½ main trails 0.79-ac. FOV meadow in development area



GTC5

GTC3

GTC2

GTC4

GTC1



MOULTRIE



64°F

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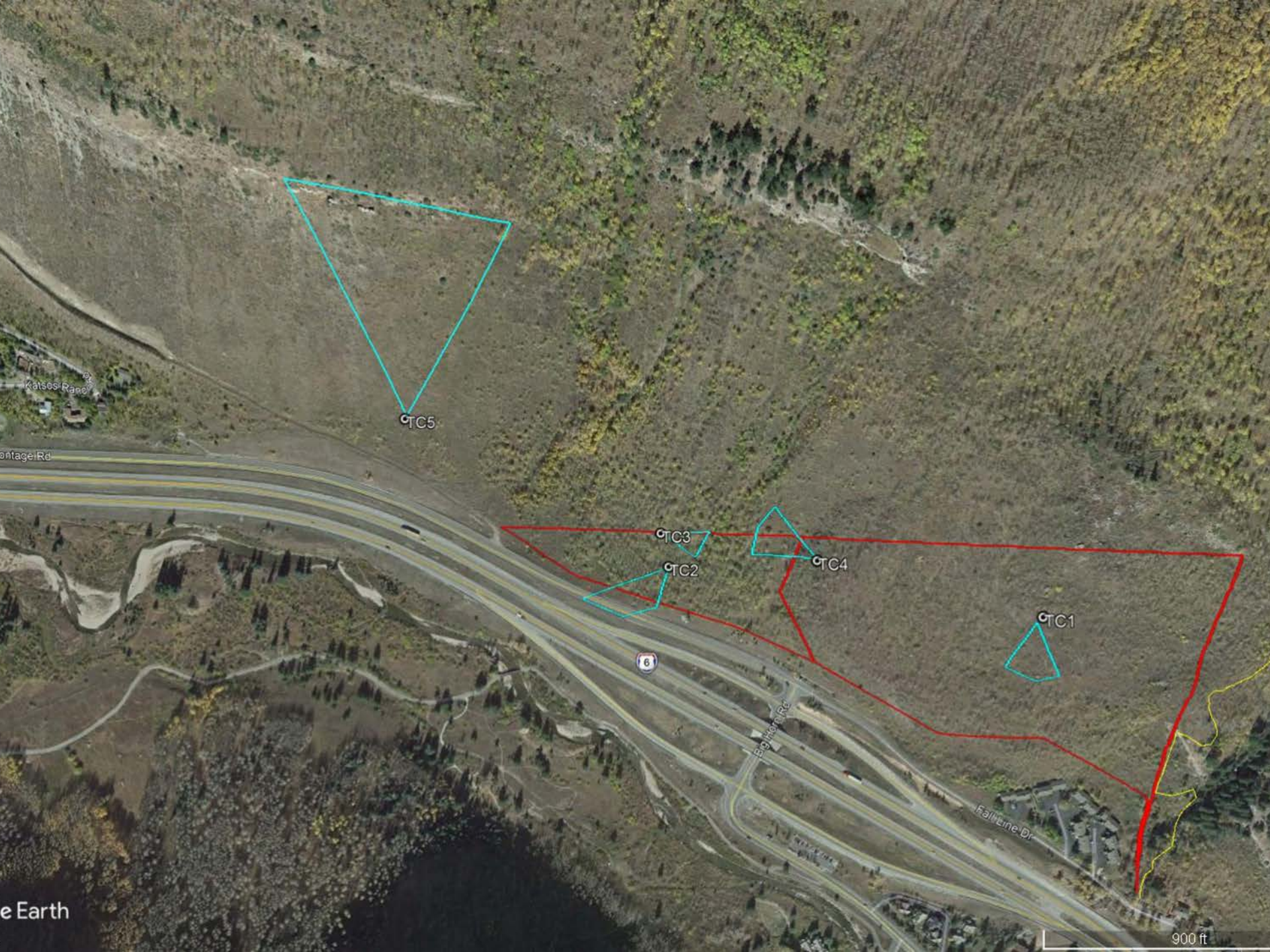
07 MAR 2018 02:43 pm

TC3

½ trails

0.2-ac. FOV

in Dev. Area



GTC5

GTC3

GTC2

GTC4

GTC1

Montage Rd

e Earth

900 ft



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57°F

#MOULTRIECAM2

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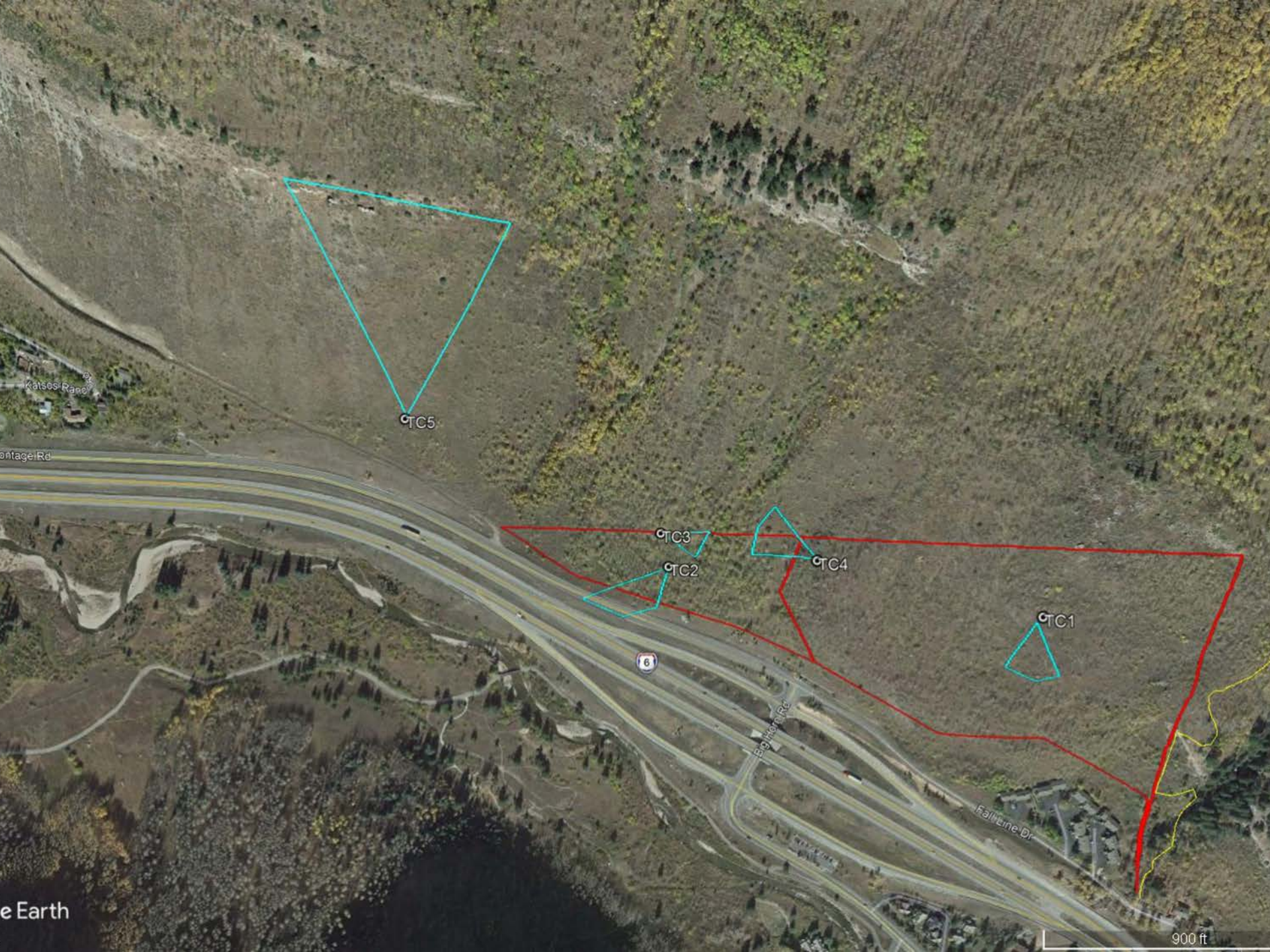
TC2

0.79-ac. FOV

½ trails

In Dev. Area

15 BS on CDOT ROW





MOULTRIE 16°F #5OULTRIECAM 25 JAN 2018 08:20 am

TC5 4.4-ac. FOV On NFS land ≥ 33 BS, ≤ 241 yds. away



Summary: 2017-18 Winter Sheep Use of the EV Parcel

- 3 occasions of several minutes to hours of foraging along the Frontage Rd. on the parcel, including 1 in which 24 sheep were chased from the road into the parcel's forested interior.
- 2 occasions of sheep foraging immediately adjacent to the EV parcel on CDOT ROW.
- 1 occasion of 8 sheep chased into the parcel's forested interior from the north.
- Entire EV parcel should be considered WR.



Figure 4-6. Eighteen bighorn sheep (on this side of the rockfall berm road gate; another seven, including One Horn, on the far side of the gate) that had recently foraged on the western tip of the East Vail parcel on January 22, 2018, their trails visible in the fresh snow (photo taken at 0940 hrs.).

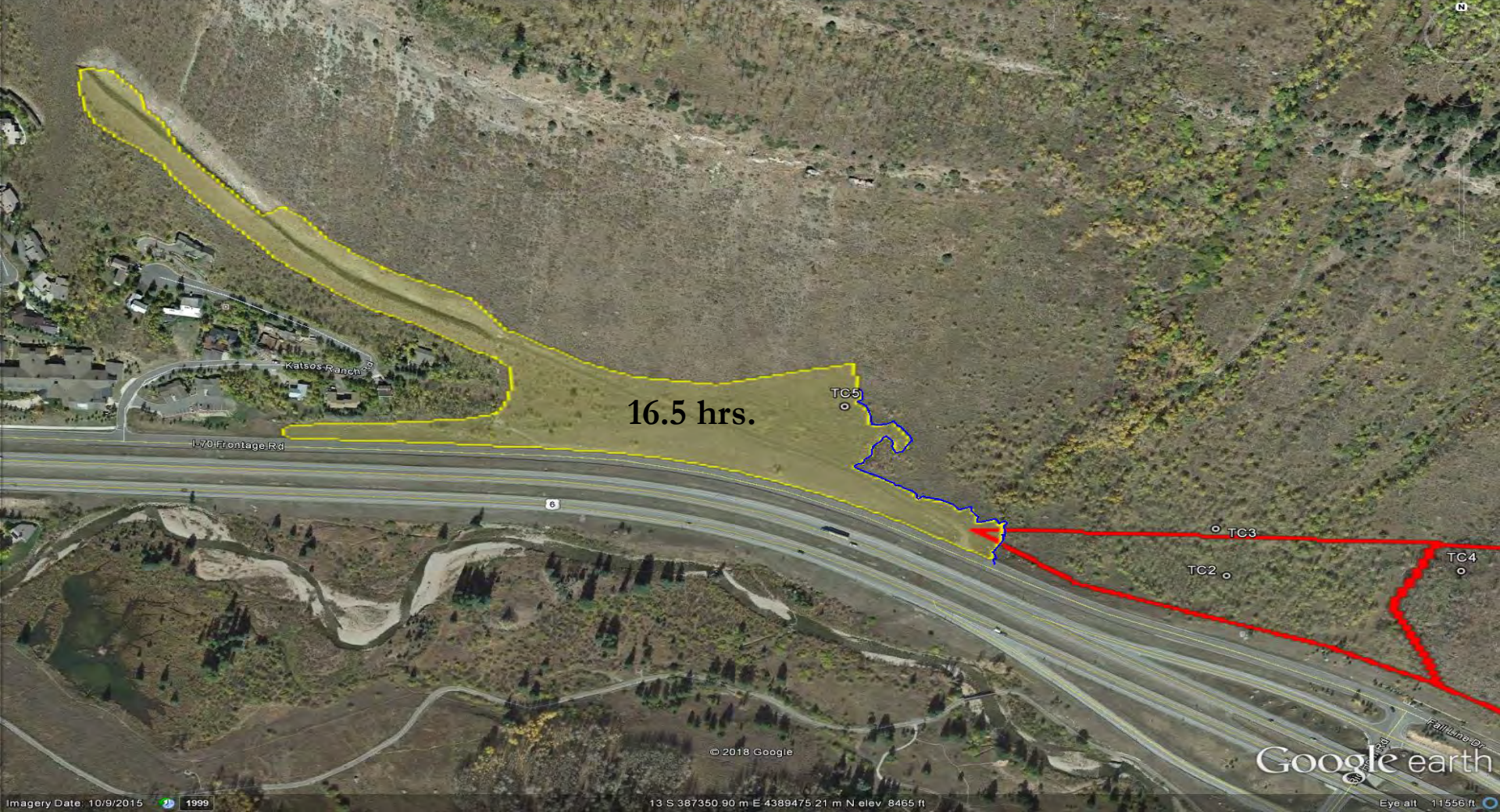


Figure 4-7. Foraging distribution (outlined yellow polygon) of 37 bighorn sheep between approximately 2200 hours on January 21, 2018 and 1424 hours on January 22, 2018, including that of the 18 sheep that foraged onto the East Vail parcel (red outline). The sheep approached this foraging polygon from above (not shown). The blue line is a GPS track establishing the eastern extent of the foraging.



Figure 4-1. Orientation of the trail (white line) used by 24 sheep on January 24, 2018 as they foraged east through the smooth brome-dominated cut slope above the Frontage Road on the CDOT ROW and on East Vail parcel, then were spooked into the interior of the 5.4-acre development area. See text for a full description.



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64°F

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24 JAN 2018 02:19 pm



MOULTRIE



64°F

#MOULTRIECAM2

24 JAN 2018 02:20 pm

Part of group of 24 sheep



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64°F

#MOULTRIECAM2

24 JAN 2018 02:21 pm

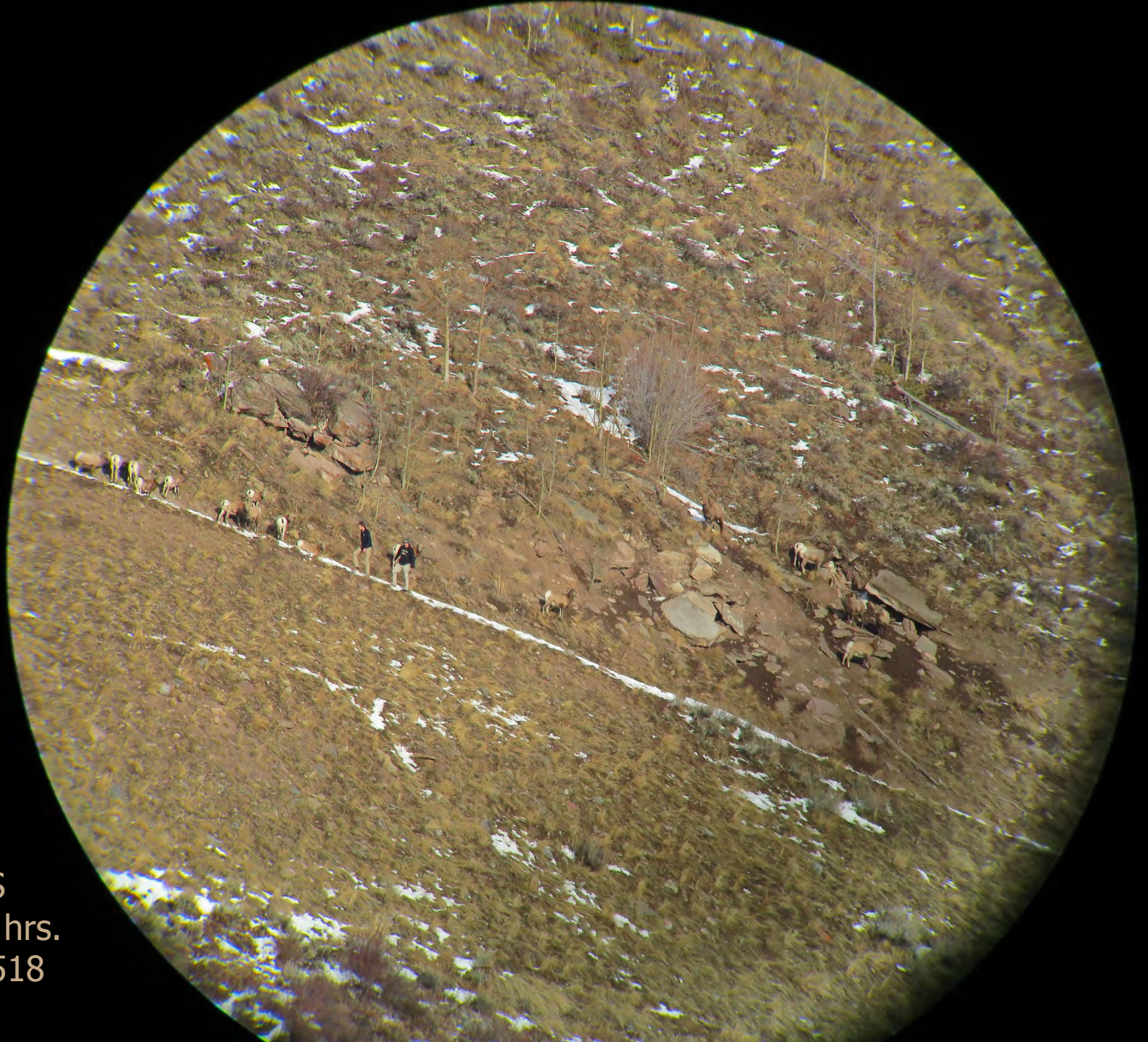




Figure 4-2. Part of a group of 24 sheep that were spooked from the Frontage Road into the interior of the 5.4-acre development area on January 24, 2018, (TC3, Jan2418, 431). Sheep are lined up on the single file trail (at left) that they used from the road to the open habitat below the Booth Creek cliffs. The three foreground sheep split off from the trail with three other sheep and travelled back to the cut slope above the Frontage Road, where they resumed foraging.



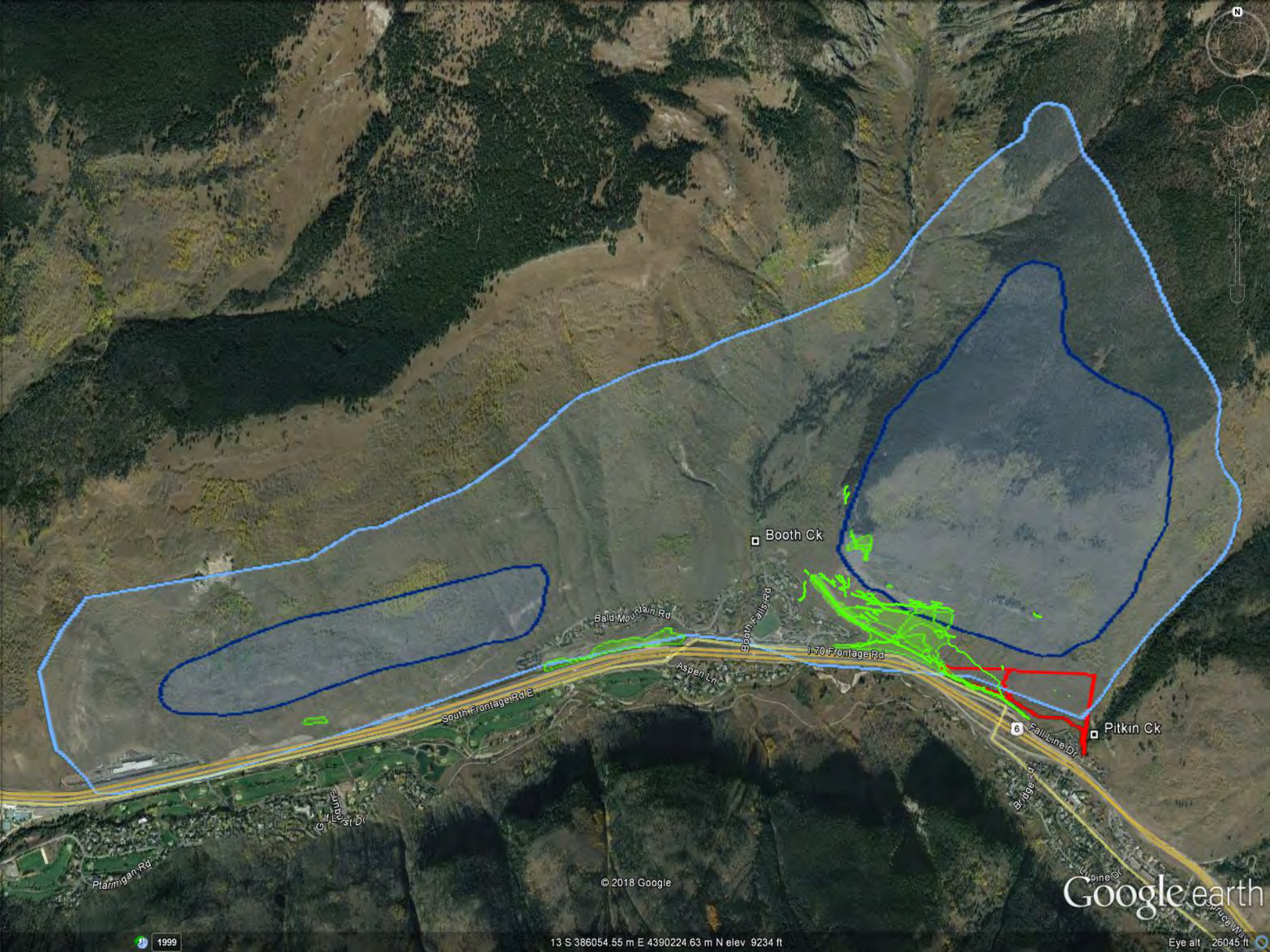
Figure 4-3. Group of 28 bighorn sheep on the CDOT ROW (below the EV parcel boundary [red line, approx.]; Jan. 28, 2018) that had foraged east along the narrow cut slope between the Frontage Road and the aspen forest, most of which are being chased off after attempting to lick road salt.



19 BS
1549 hrs.
Jan2518



Mar1418



Booth Ck

Bald Mountain Rd

Booth Falls Rd

I-70 Frontage Rd

South Frontage Rd E

Aspen Ln

Pitkin Ck

6 Fall Line Dr

Bridge Rd

Plamigan Rd

Golf Course St Dr

© 2018 Google

Google earth


1999


13 S 386054.55 m E 4390224.63 m N elev 9234 ft


Eye alt 26045 ft

Bighorn Sheep 2017/2018 Winter Range Use Polygon

Legend

 17.9 ac NAP

 2017/18 Winter range use polygon

 5.4 ac Dev Area

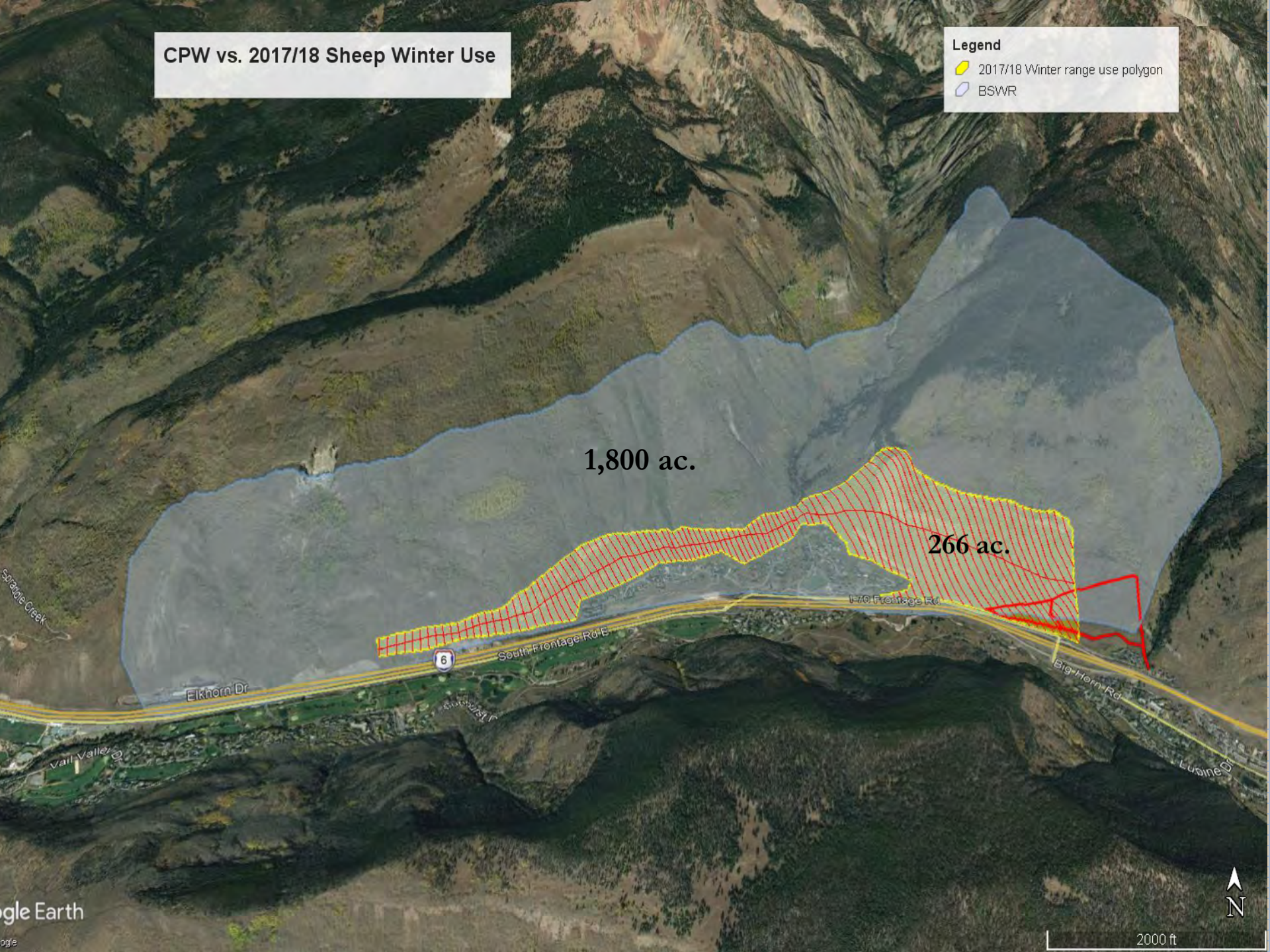


CPW vs. 2017/18 Sheep Winter Use

Legend

2017/18 Winter range use polygon

BSWR



2017/18 Sheep Winter Range Use

- 15% (266.28 acres) of CPW's 1,800-acre winter range polygon was used during winter 2017/18.
- Likely a function of:
 - (1) the smaller present population of 41 sheep,
 - (2) the sheep now using the highest quality habitat available,
 - (3) sheep avoiding forested habitats, and
 - (4) sheep restricted from some portions of their winter range by jackstrawed logs.
- Rams used more distant portions of winter range compared to ewes and lambs.

Winter 2017/18 Sheep Herd Characteristics

- Max. n sheep obs. @ one time = 39.
- Min. n=
 - 21 ewes,
 - 10 lambs (born in 2017; max. of 10 seen twice),
 - 10 rams,
 - $\Sigma = 41$ sheep.
 - + min. 7 lambs (born in 2018, obs. Jun1418) = 48.
- No 2017/18 overwinter lamb or sheep mortality.

FIRE SUPPRESSION & HABITAT DETERIORATION

- 1. 1998 USFS/ CDOW recognized habitat deterioration in proximity to escape terrain.**
 - Aspen encroachment into mtn. shrub, aspen q.
 - Jackstrawed logs – mvmt. restrictions.
 - Decadent mtn. shrub out of browsing range.
- 2. USFS Proposed BS WR habitat enhancement:**
 - Create travel corridors for sheep to move to escape cover and other WR segments.
 - Reduce fuel loadings to ↓ wildfire risk.
 - Regenerate over mature shrubs and aspen.
 - Improve quantity & quality of forage for big game.



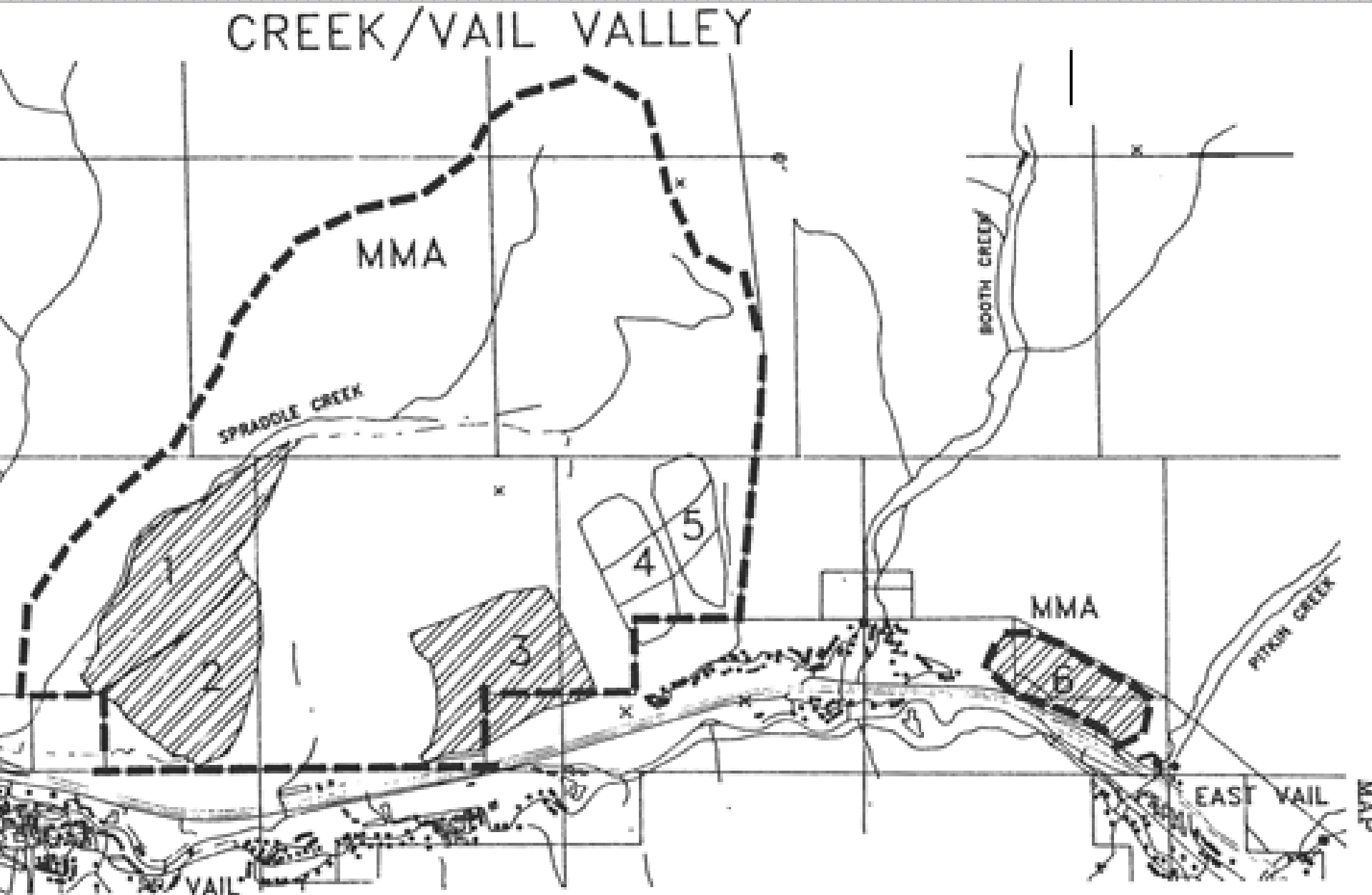








USFS (1998) EA Fig. II-1 Proposed Action (Alternative 2) Map



Alt. version of Burn Map with more accurate parcel boundaries

Booth Creek Rx Burn

Unit 1: 880ac USFS, 20ac TOV

Unit 2: 300ac USFS

Unit 3: 20ac USFS, 40ac TOV

$$\Sigma = 1,240 \text{ ac.}$$

A topographic map of the East Vail Parcel. The map features contour lines indicating elevation, with labels for 10,000 and 9,000 feet. A blue shaded area is highlighted on the map, representing a specific land parcel. The text "East Vail Parcel" is written across the map in a large, bold, black font.

USFS (1998) Findings

- In 1998, sheep herd was +/- 125 animals.
- W/o enhancement:
 - Aspen stands would continue to age, disease and insect infestations would increase, and the stands would die.
 - Dead and down timber would further restrict big game movements to winter foraging areas and escape terrain.
 - Aspen and aged shrub communities would not regenerate.
 - There would be fewer sheep as a result of continued habitat degradation.

Results

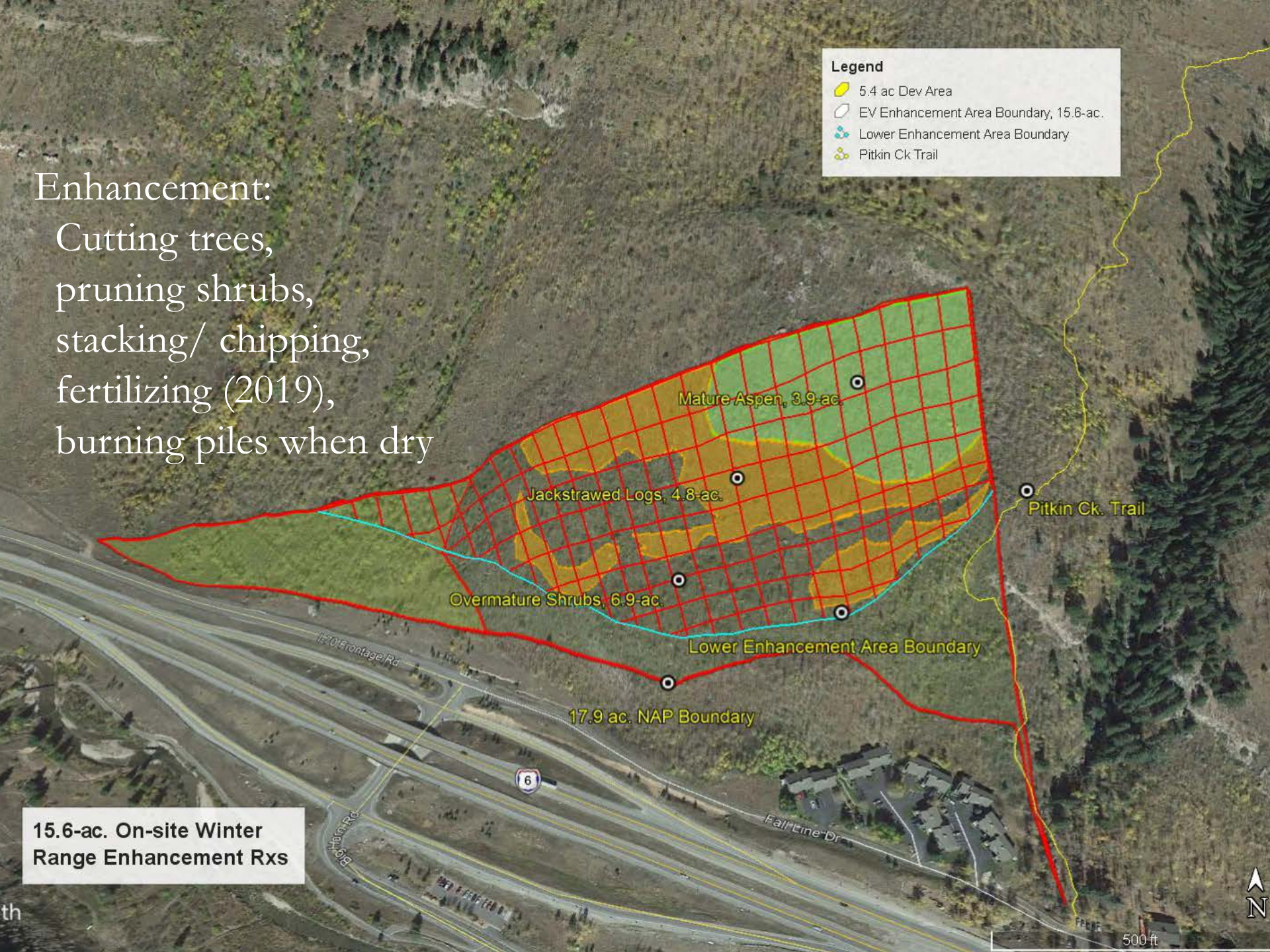
- Enhancement was approved, but not implemented because of community opposition to the use of fire.
- Were 2 small enhancement projects on TOV & EV.
- Habitat has continued to deteriorate.
- Sheep now using 15% of their winter range.
- Sheep herd has declined by 67%.
- Effective winter range availability is arguably the greatest threat to the East Vail sheep herd.

Enhancement:

Cutting trees,
pruning shrubs,
stacking/ chipping,
fertilizing (2019),
burning piles when dry

Legend

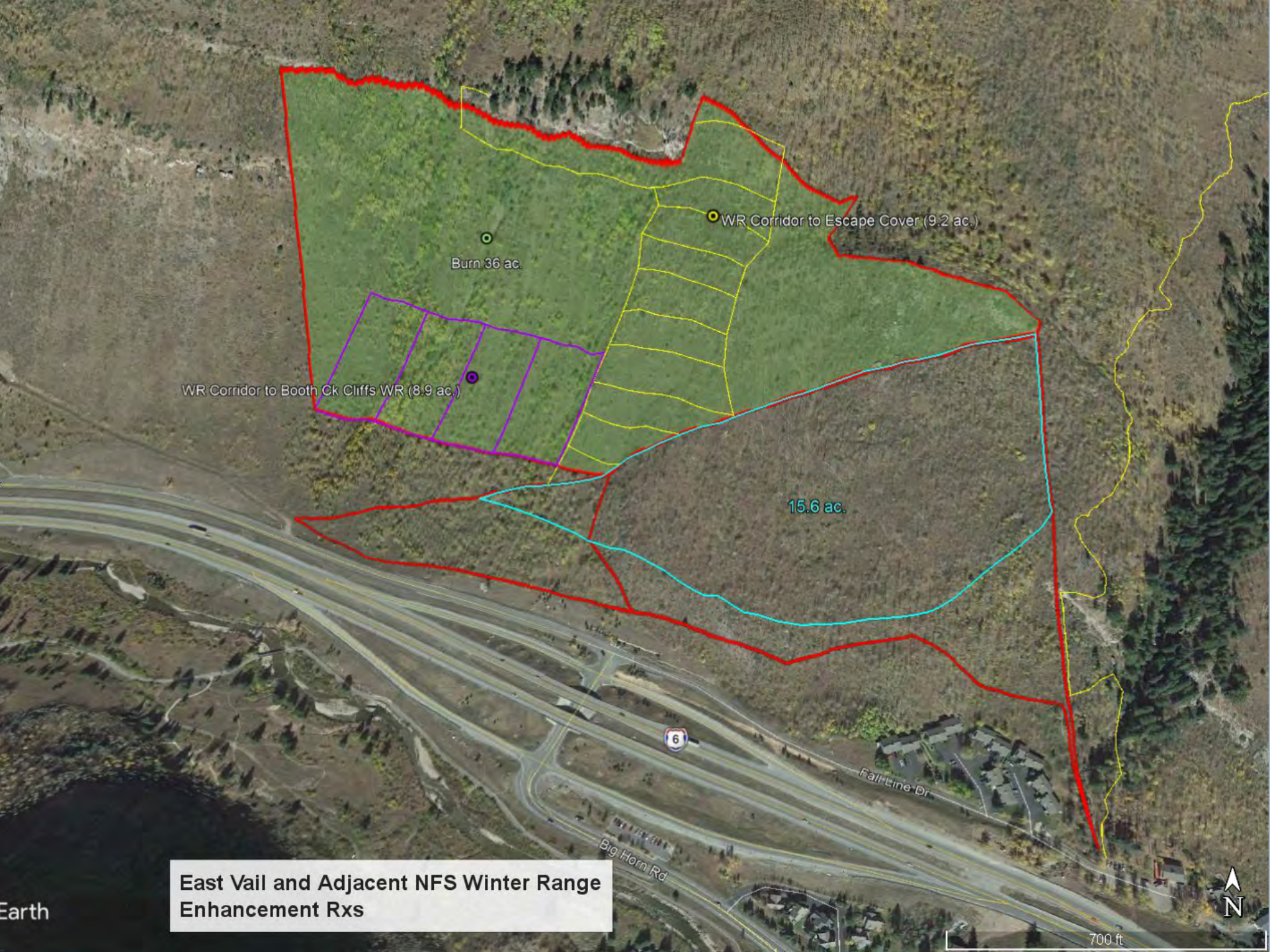
- 5.4 ac Dev Area
- EV Enhancement Area Boundary, 15.6-ac.
- Lower Enhancement Area Boundary
- Pitkin Ck Trail

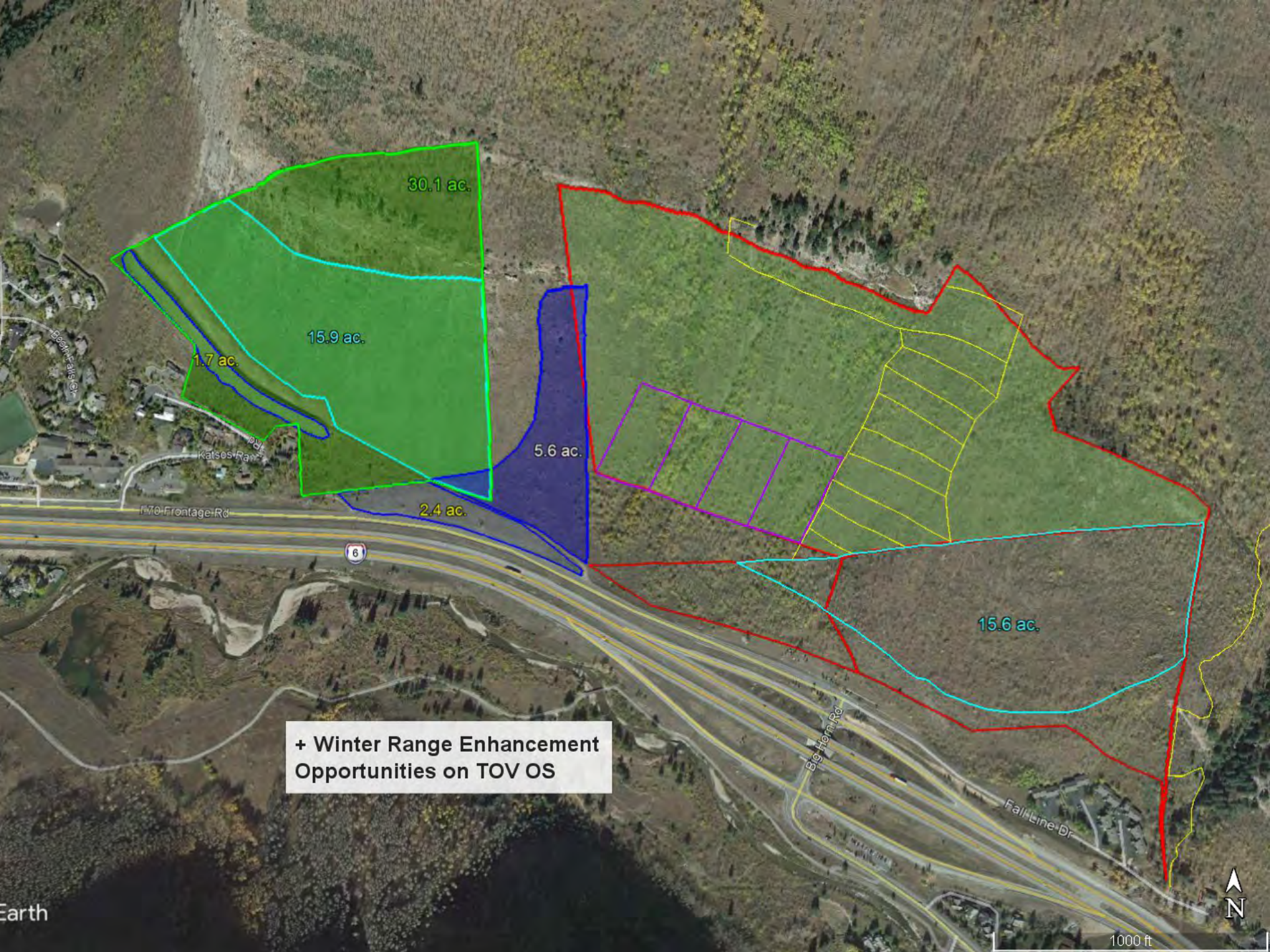


15.6-ac. On-site Winter
Range Enhancement Rx's

Recommended Adj. NFS Winter Range Enhancement

- For maximum habitat effectiveness of the private enhanced winter range, it should be connected with current high quality habitats on NFS lands below Booth Creek cliffs via non-forested corridors:
 - E-W corridor, 8.9 ac.
 - N-S corridor, 9.2 ac.
 - A broadcast burn (36 ac.) above all non-needed screening forest above the EV parcel would be most beneficial from WR and mvmt. corridor perspectives.





+ Winter Range Enhancement Opportunities on TOV OS



Jan2218



Oct1217_009



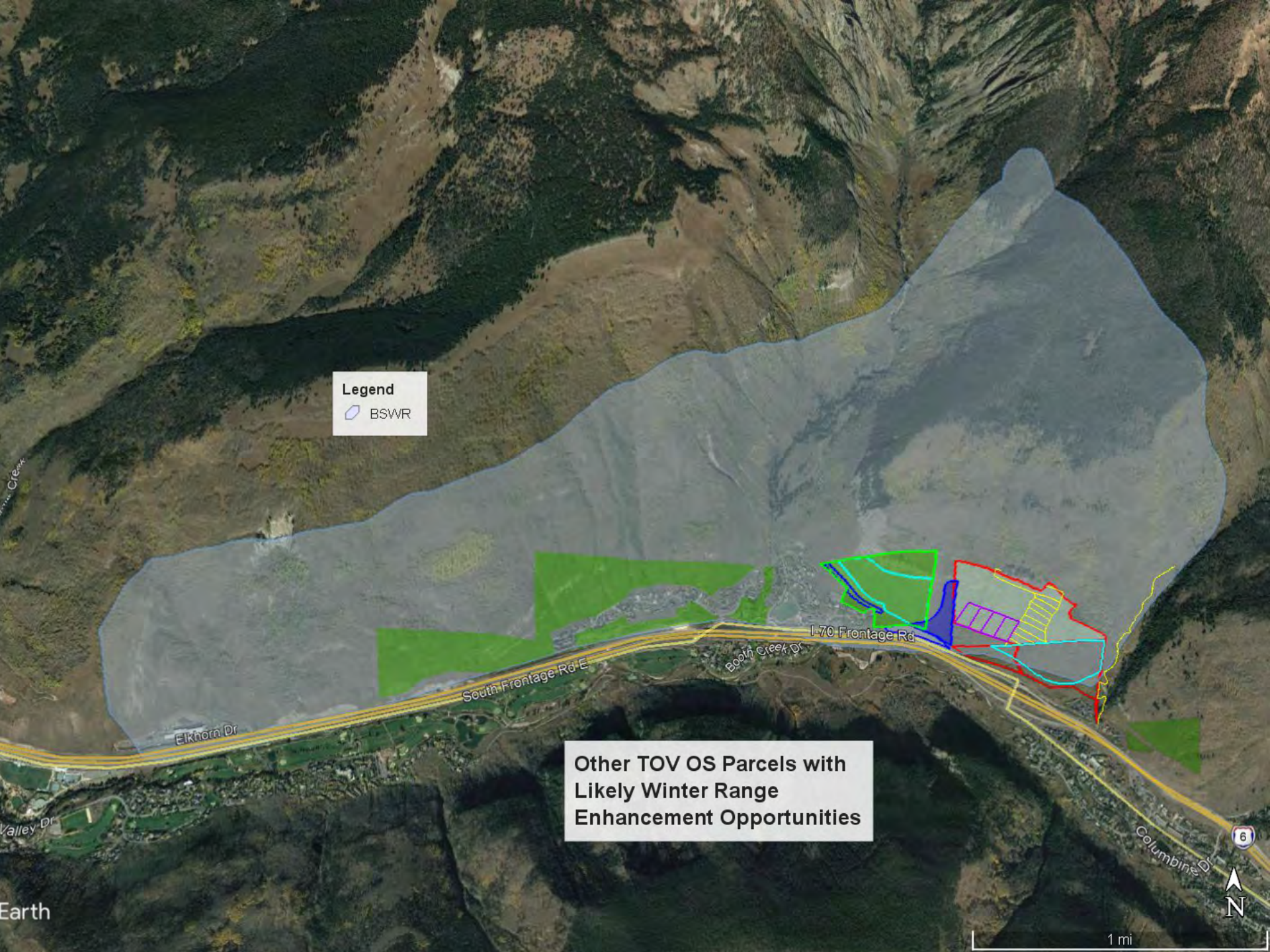
Jan2518_0030a

Adj. TOV Winter Range Enhancement Options


- 1. Early spring (April), 2019 burn of 2 smooth brome stands (4.1 ac.) below the rockfall berm & road:**
 - Reinvigorate stands**
 - Remove thatch**
 - Offset EV construction season displacement.**
- 2. Early spring, 2019 over mature & out-of-reach mountain shrub pruning (15.9 ac.) & fertilization.**
 - Reinvigorate shrubs**
 - Offset EV construction season displacement.**

Adj. TOV Winter Range Enhancement Options (Con't.)

- 3. Long-term, controlled burn of over mature mountain shrub with dense grass understory above the rockfall berm road (on NFS).**
 - Reinvigorate mountain shrub community.**
 - Impractical at this small scale on TOV.**
 - Implement on TOV OS as part of larger USFS enhancement plan?**



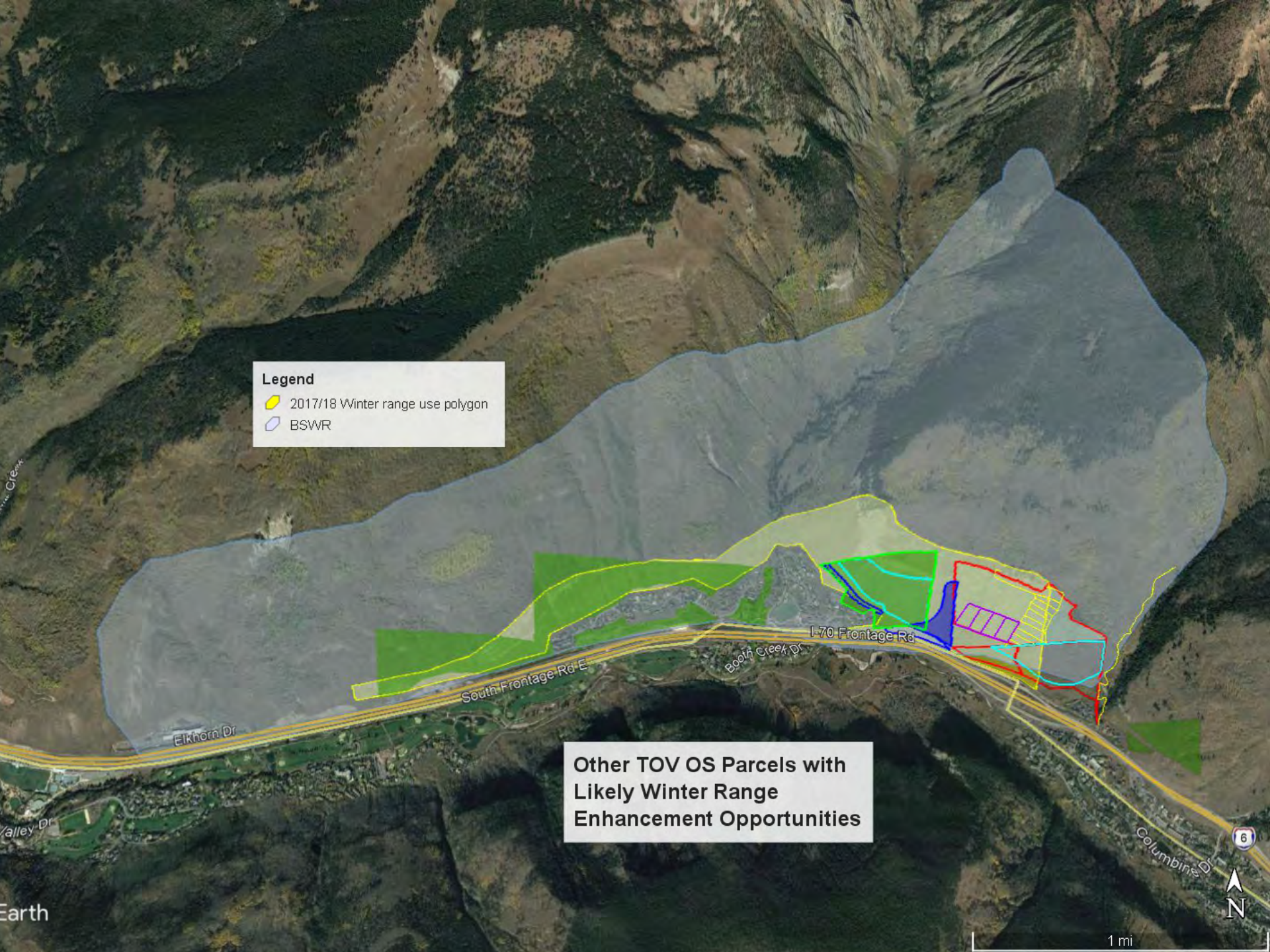
Legend

 BSWR

**Other TOV OS Parcels with
Likely Winter Range
Enhancement Opportunities**

1 mi





Legend

- 2017/18 Winter range use polygon
- BSWR

Other TOV OS Parcels with
Likely Winter Range
Enhancement Opportunities

1 mi





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25°F

#5OULTRIECAM

27 JAN 2018 09:07 am

Questions?