



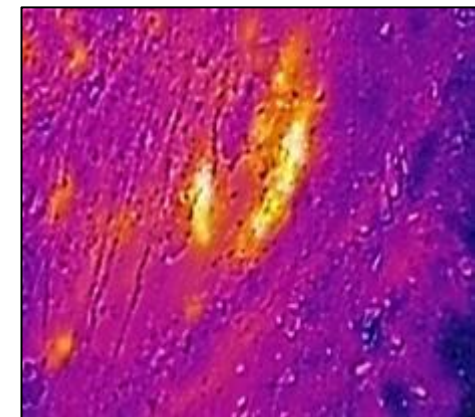
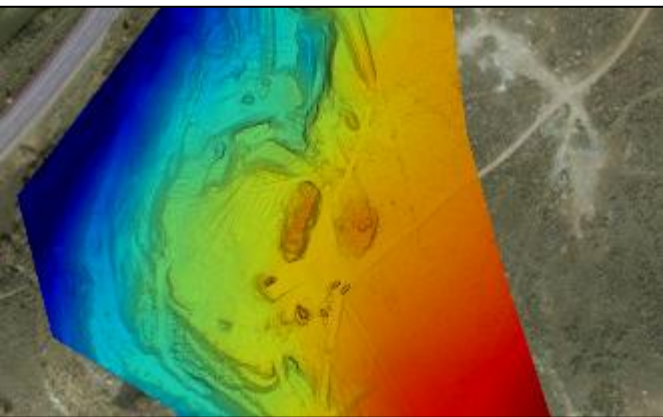
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Long Term Review of Reclamation and Vegetation Management at Colorado's Underground Coal Fire Sites

43rd ASRS Annual Meeting – Laramie, Wyoming

June 7-11, 2026



Presenter Contact Information

Presenter

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Co-Presenter

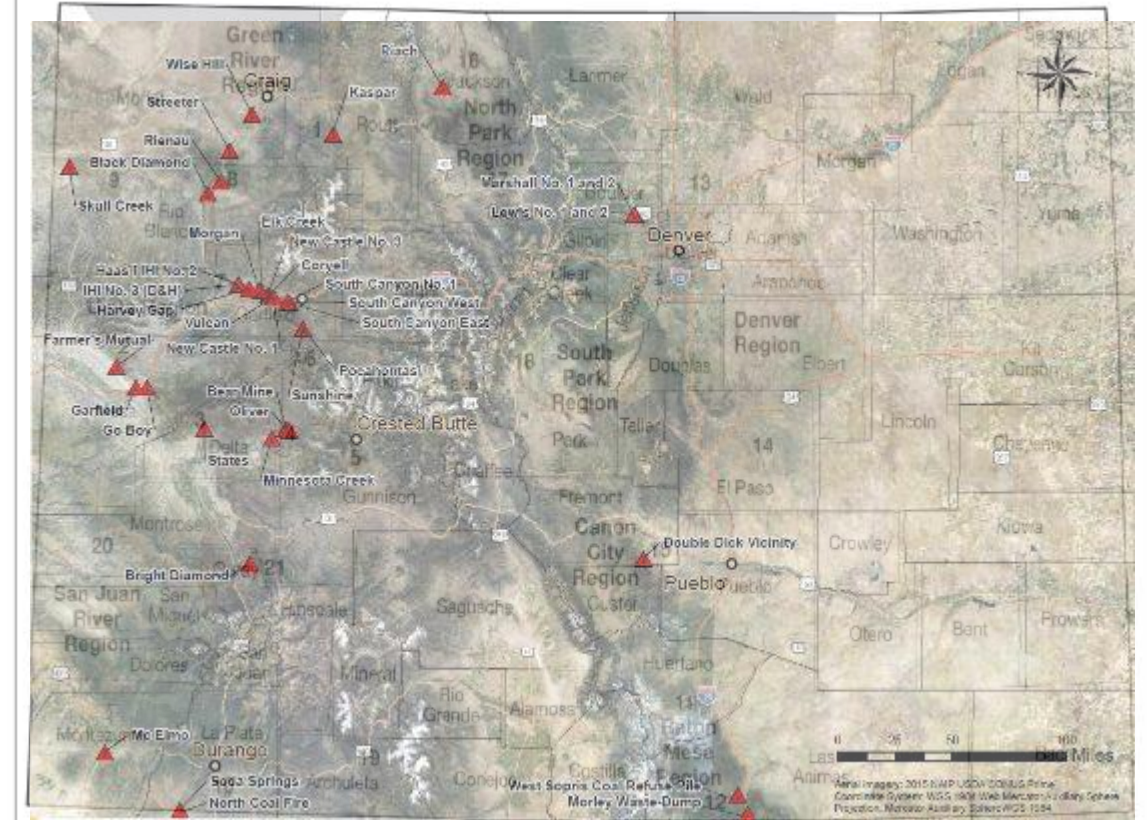
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Colorado Coal Fields and Coal Fire Locations

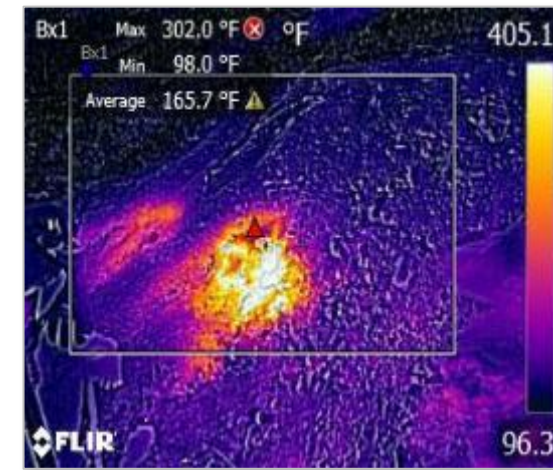


- | | | | |
|----------------|----------------------|----------------------|--------------------|
| 1. Yampa | 7. Grand Hogback | 12. Trinidad | 17. Middle Park |
| 2. Book Cliffs | 8. Danforth Hills | 13. Boulder-Weld | 18. South Park |
| 3. Grand Mesa | 9. Lower White River | 14. Colorado Springs | 19. Pagosa Springs |
| 4. Somerset | 10. Durango | 15. Canon City | 20. Nucla-Naturita |
| 5. Crested | 11. Walsenburg | 16. North Park | 21. Tongue Mesa |
| 6. Butte | | | |

Colorado Coal Mine Fires – Causes and Types

Coal Fire Causes

- Human
- Wildfires
- Lightening
- Spontaneous Combustion



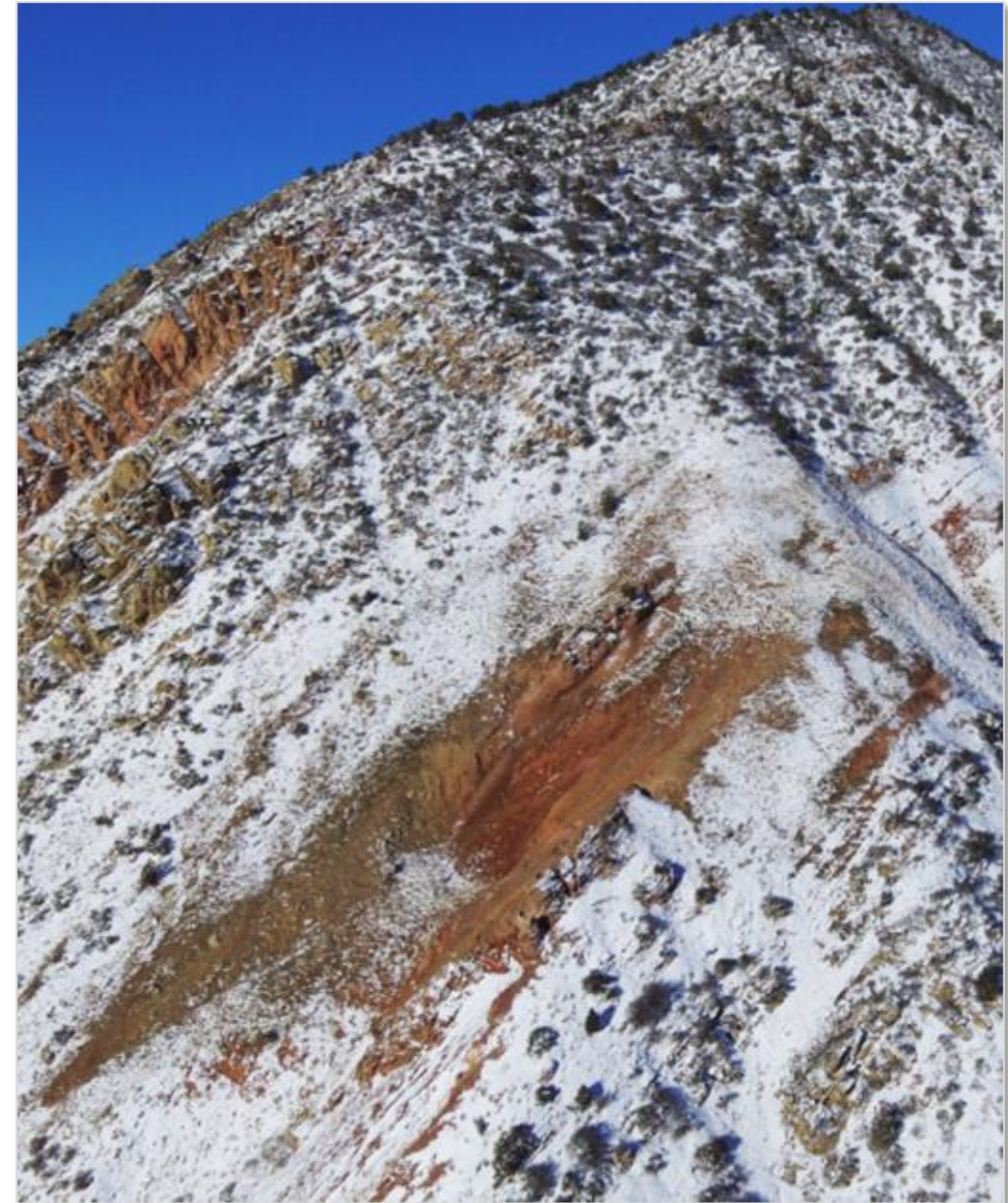
Types of Coal Fires

- **Active fire** – Quantifiable coal oxidation/combustion.
- **Dormant fire** – No quantifiable coal oxidation/combustion
- **Refuse pile fires** – Coal or coal waste piles oxidation/combustion.
- **Coal Seam Outcrop fire** oxidation/combustion of unmined in-situ coal.
- **Mitigated Fires** are coal mine fire, refuse pile, and coal seam fires that have been mitigated.

Colorado Coal Mine Fires – Fire Activity / Hazards

Relative Fire Activity

- **Mitigated / Dormant** – Mitigation activities completed at the site, no reported fire activity.
- **Dormant** – No observed fire activity
- **Low** – Low temperatures (<200°F), emissions, little change to the surface expression.
- **Moderate** – Increasing or variable site temperatures, emissions, and changing surface features.
- **High** – High temperatures(>600 °F), emissions, and changes to surface expression of the fire.
- **Very High** – Extreme temperatures, emissions, and changes to surface expression of the fire.



Persistent Drought

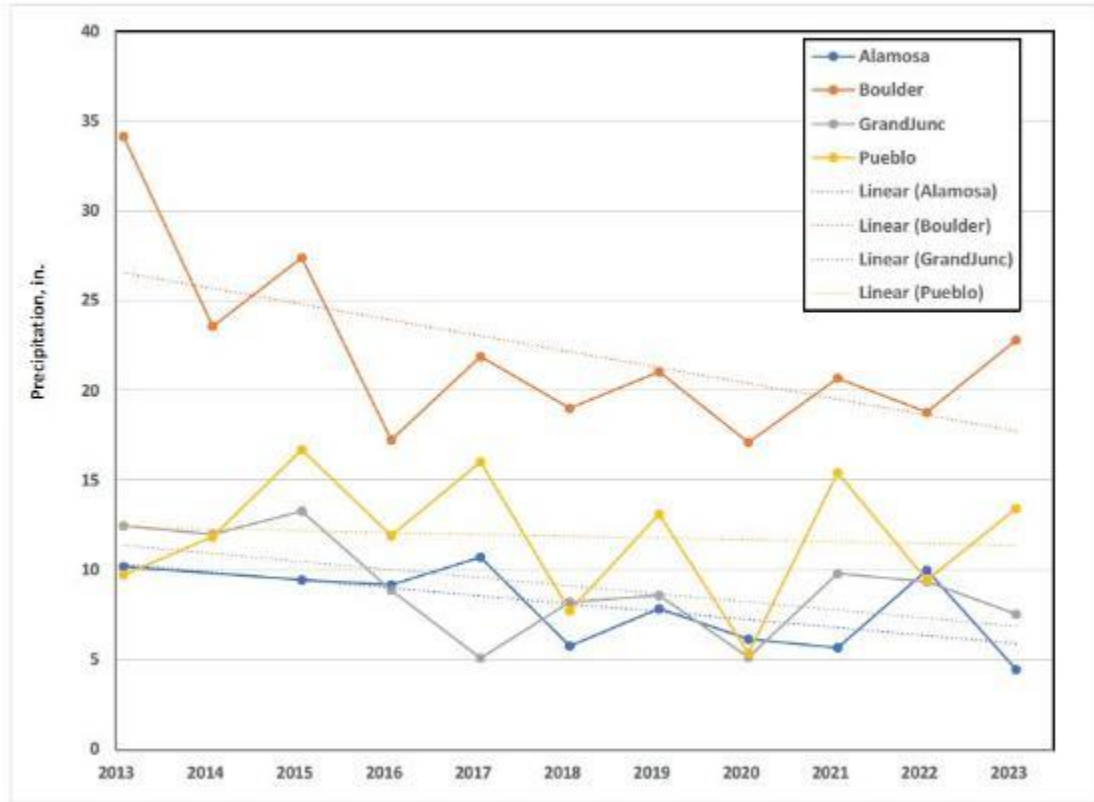


Figure 2-3 – Annual Precipitation at Select Colorado Cities, 2013-2023

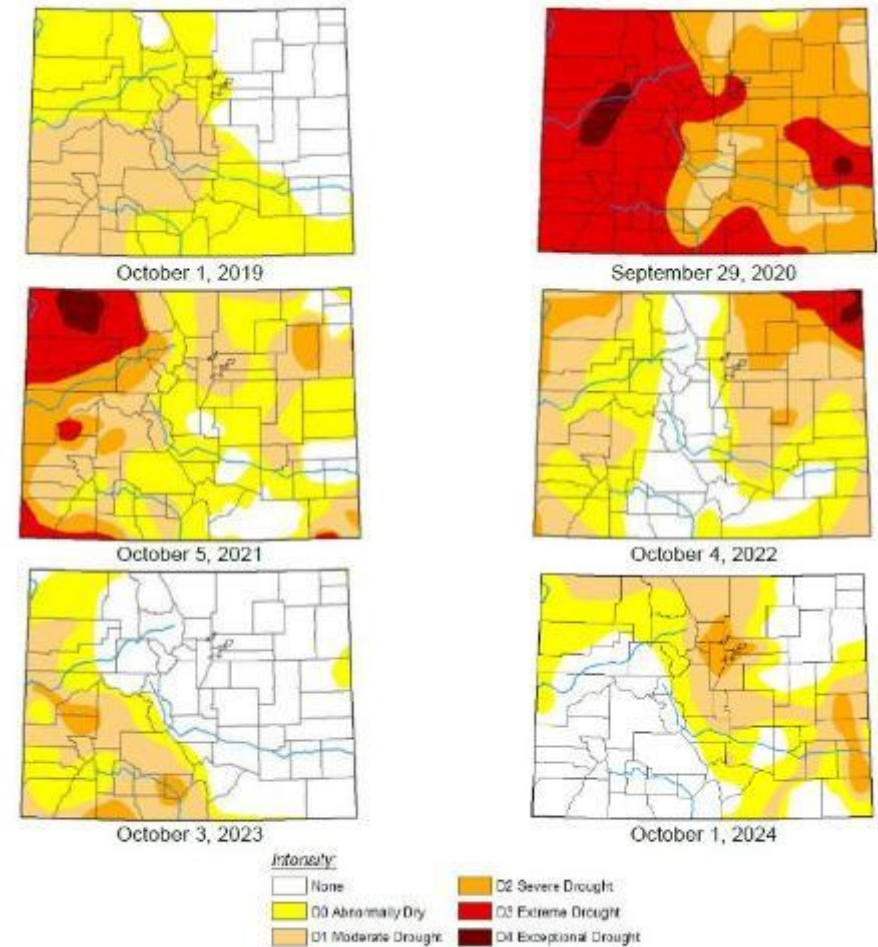
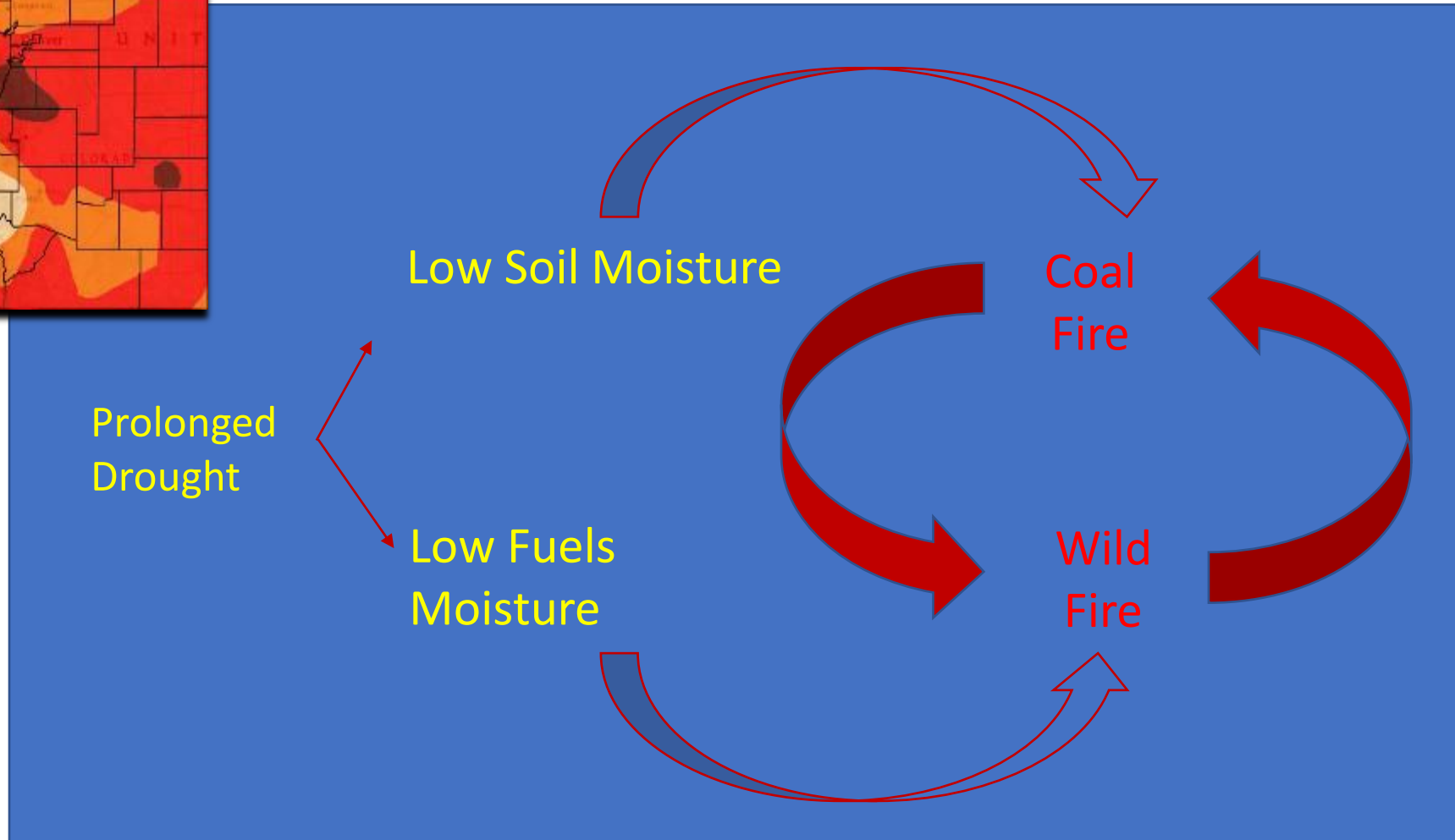
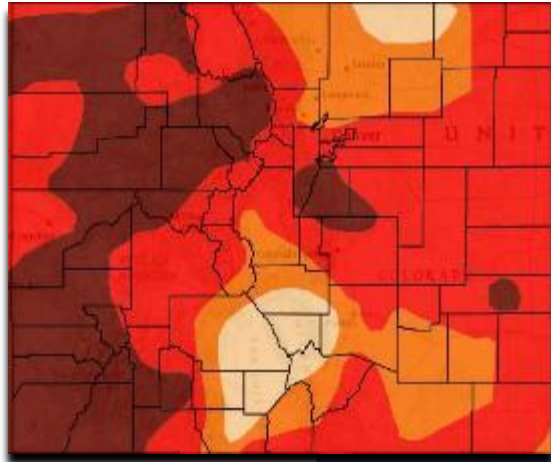


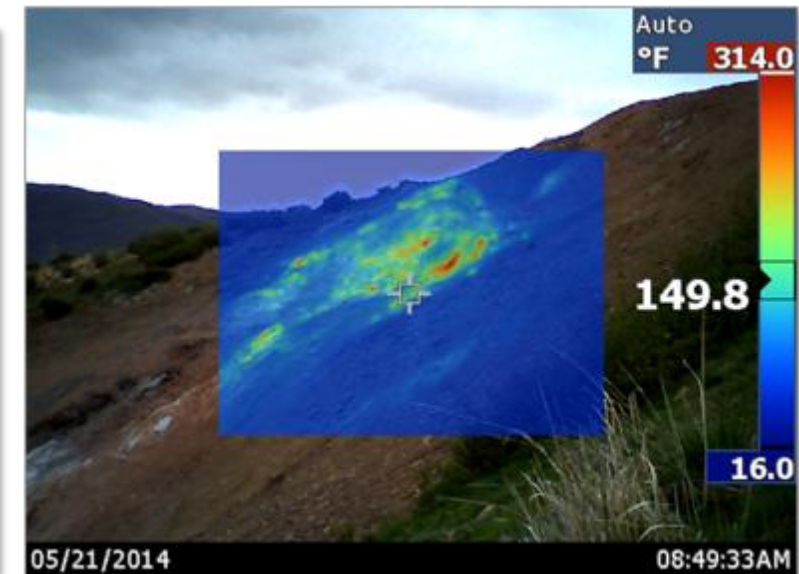
Figure 2-4 – Colorado Drought Monitoring Maps, 2019-2024. Data from droughtmonitor.inl.edu.

Colorado and the Western US Unique Coal Fire Environment



Site Monitoring

- Aerial Surveys
 - Drone flights
 - LiDAR
 - Thermal/IR
 - Ortho Imagery
- Pedestrian Survey and Mapping
 - Map all fissures/fractures/vents, air intakes, vegetation changes, heat zones and ground temps, subsidence, surface alteration, landslide scarps, etc
- Gas Compositions
 - Use 4 gas for rough estimates
 - GEM 2000 for more detailed gas %
 - VOC canisters, if needed
- Geophysics if applicable
 - Magnetometry
 - Gravity



Reclamation and Vegetation Management Strategies – Project Examples

Skull Creek – Full Mitigation and Reclamation

Black Diamond – Mitigation and On-going Management

Kaspar – Vegetation Management – Invasive Weeds

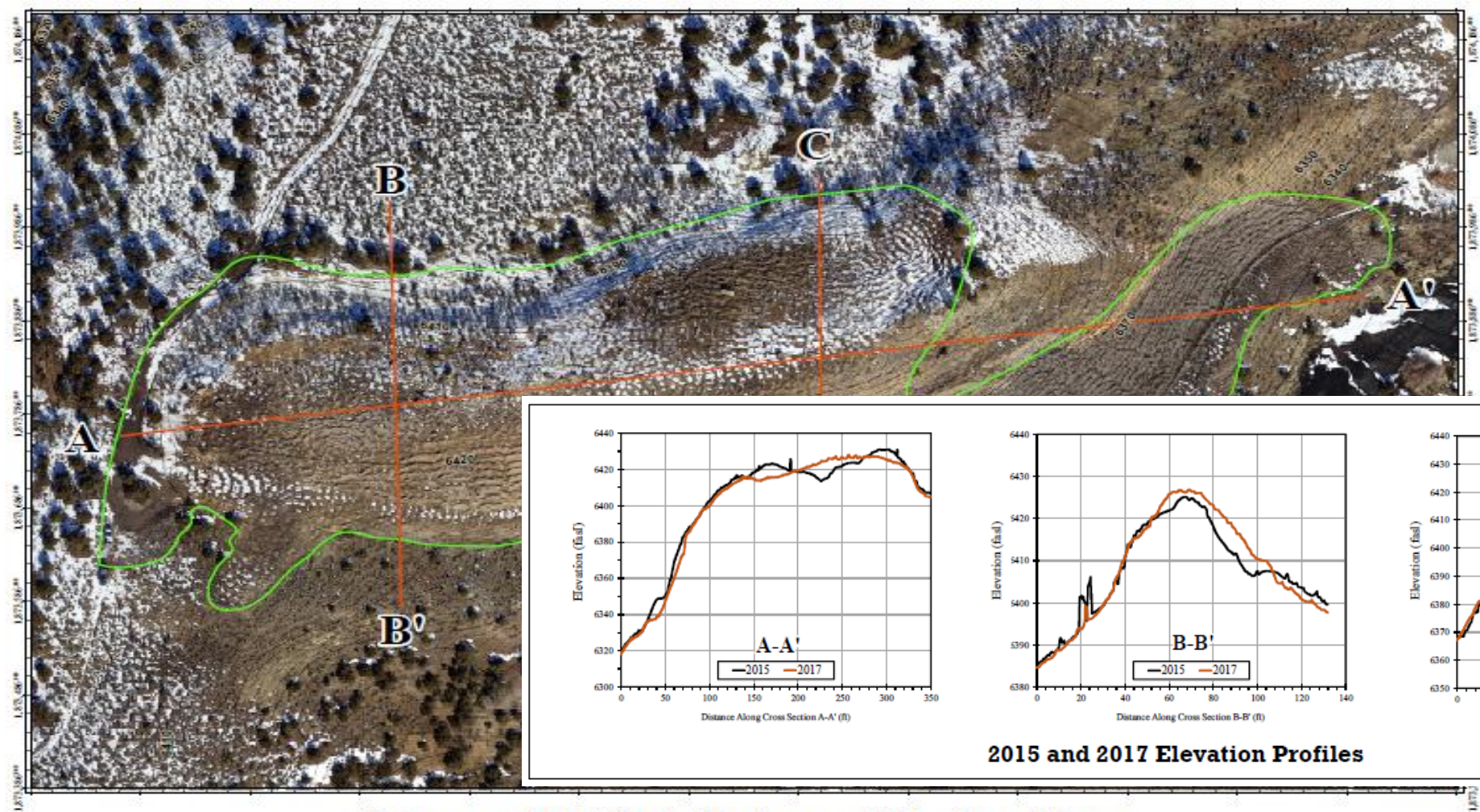
Edwards – Emergency Vegetation Management



Colorado Coal Mine Fires – Project Example: Skull Creek



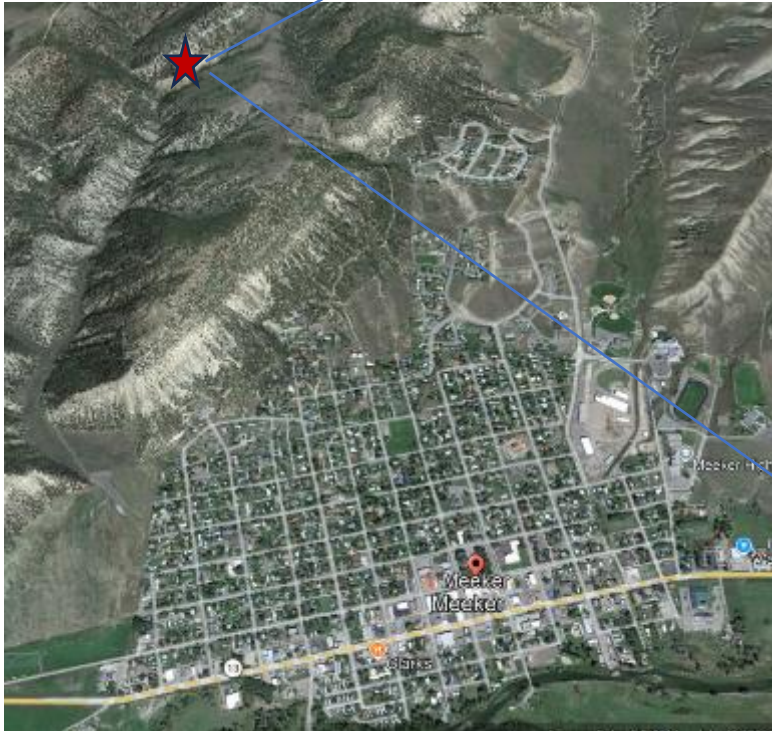
Colorado Coal Mine Fires – Fire Hazards



February 2017 Post-Abatement Site Conditions

Black Diamond Coal Mine Fire

Approximately 1.0 mile from Meeker Center
0.6 mile from closest residence
1.3 miles up Anderson Gulch



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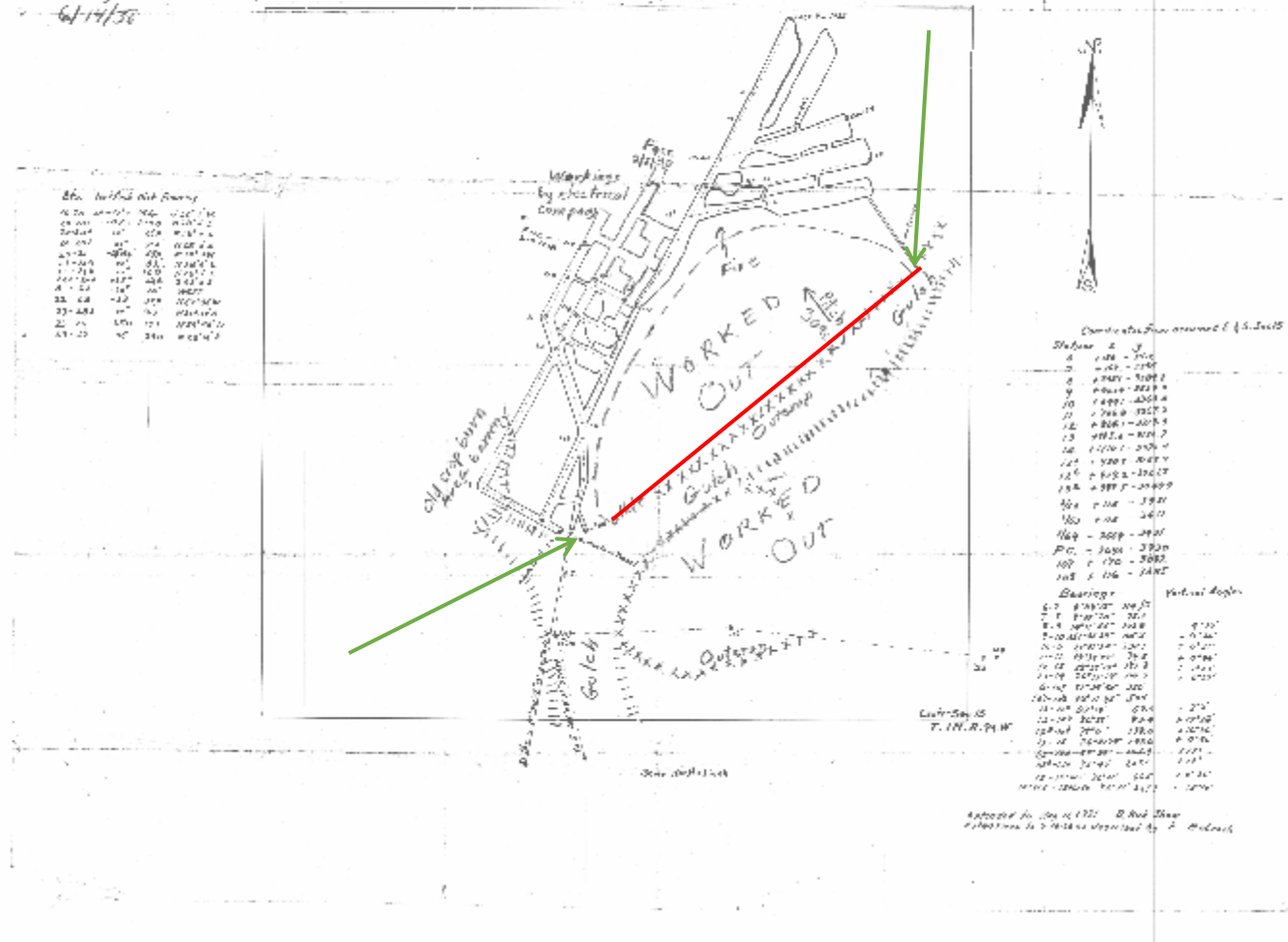
Department of Natural Resources

Black Diamond Coal Mine Fire

2400

1918-1919
Fire discovered 7/4/30
Mine re-opened 5/10/38 by M. Hilkey
& Meeker
Mine found to still be on fire and
Hilkey closed mine on
6/14/38

Black Diamond Coal Mine, Meeker Colo.
Surveyed Feb 26th 1919 by D.H. Shaw Located 10 Sec 13, T. 1 N. R. 94 W. 62 PM
Survey Extended 8-11, 1921 and 7-16-1922 by D.H. Shaw
Survey Extended 2-7-1928 by M.D. Hopkins C.E.



Section	Range	Latitude	Longitude	Section	Range	Latitude	Longitude
10	13	1	94	10	13	1	94
11	13	1	94	11	13	1	94
12	13	1	94	12	13	1	94
13	13	1	94	13	13	1	94
14	13	1	94	14	13	1	94
15	13	1	94	15	13	1	94
16	13	1	94	16	13	1	94
17	13	1	94	17	13	1	94
18	13	1	94	18	13	1	94
19	13	1	94	19	13	1	94
20	13	1	94	20	13	1	94
21	13	1	94	21	13	1	94
22	13	1	94	22	13	1	94
23	13	1	94	23	13	1	94
24	13	1	94	24	13	1	94
25	13	1	94	25	13	1	94
26	13	1	94	26	13	1	94
27	13	1	94	27	13	1	94
28	13	1	94	28	13	1	94
29	13	1	94	29	13	1	94
30	13	1	94	30	13	1	94



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Black Diamond Coal Mine Fire

Background and Previous Work

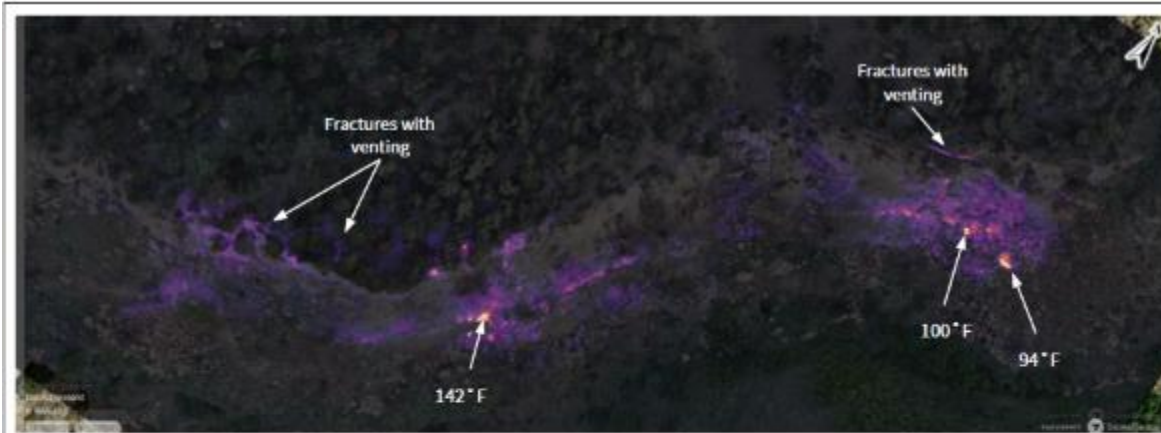
- 1989: Black Diamond Fire identified in Statewide Inventory, low activity
- 2001: Likely fire start from coal fire
- 2003: Vegetation Clearing, herbicide application
- 2005: statewide Fire Inventory
- 2009: Vegetation Clearing, herbicide application
- 2012: Vegetation Clearing, herbicide application
- 2013: statewide fire Inventory
- 2016: Excavation of the two portals and surface expression of fire
- 2018: Statewide Fire Inventory
- 2020: Site monitoring
- 2023: Site monitoring, changes in fire noted, tech memo issued
- 2025: Site monitoring, no significant changes noted
- 2026: Site monitoring, significant changes noted
- 2026: Emergency fuels reduction needed



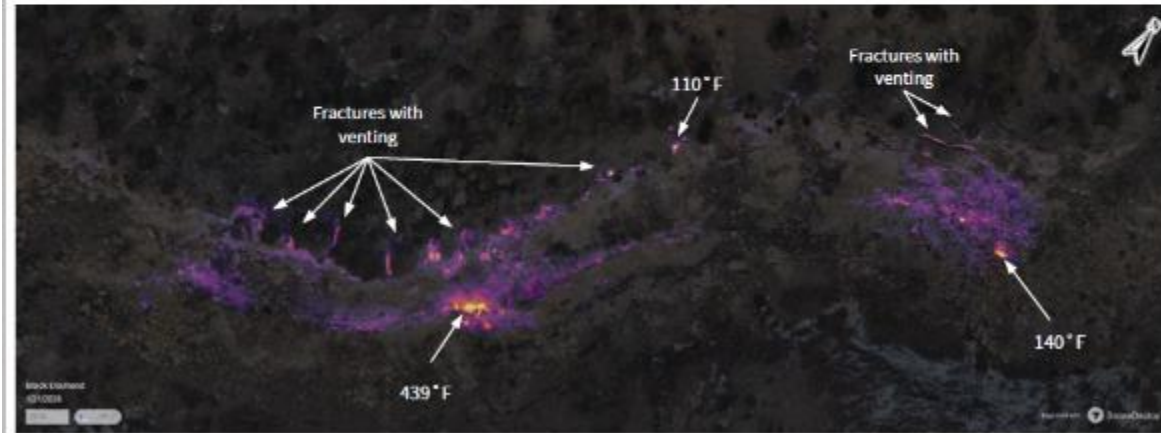
2016 Mitigation



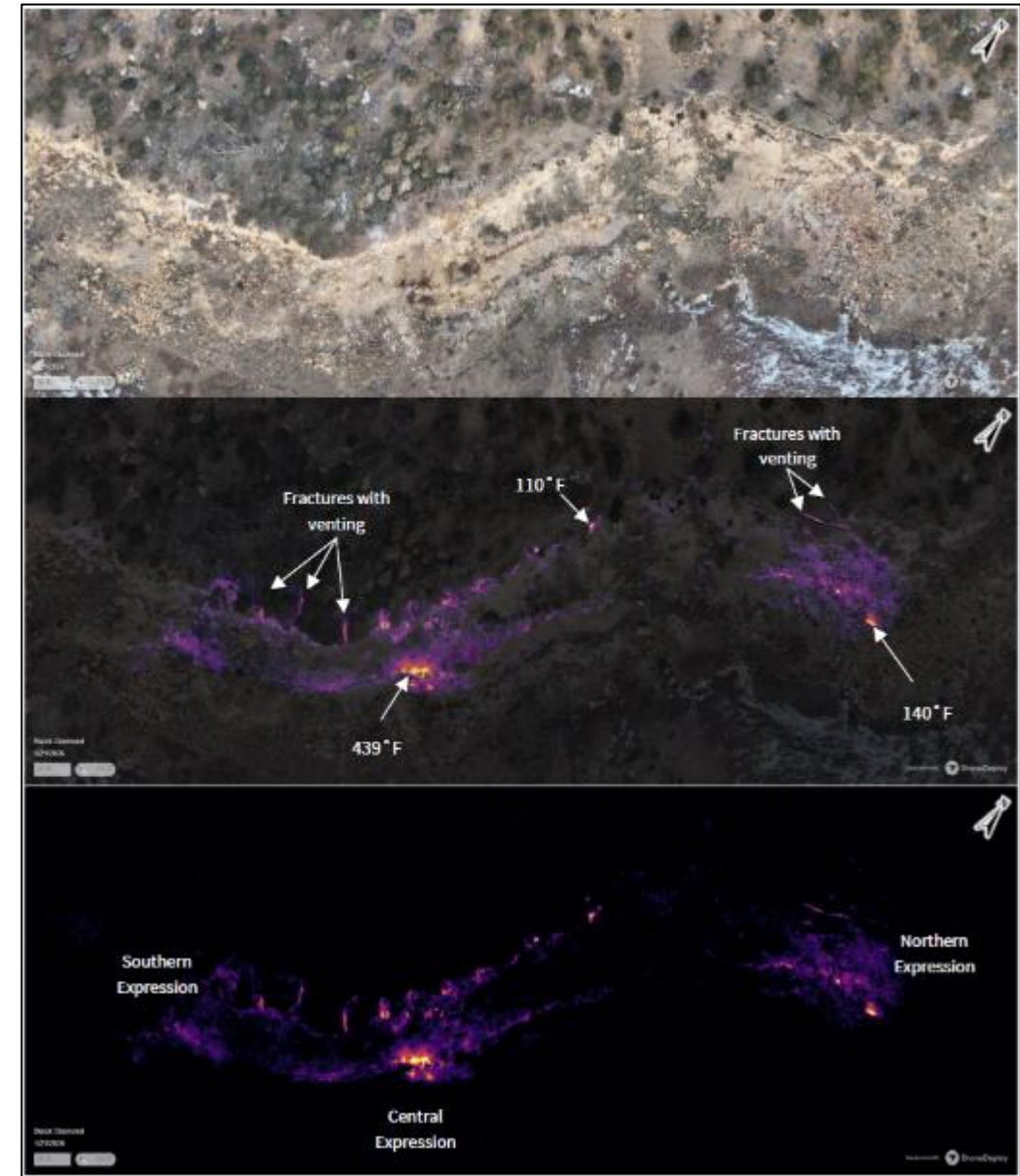
January 21, 2026 Inspection



2023: Thermal symbology constrained between 30-70°F, ambient temperature was 41°F.



2026: Thermal symbology constrained between 15-70°F, ambient temperature was 9°F.



March 24, 2026 Site Visit

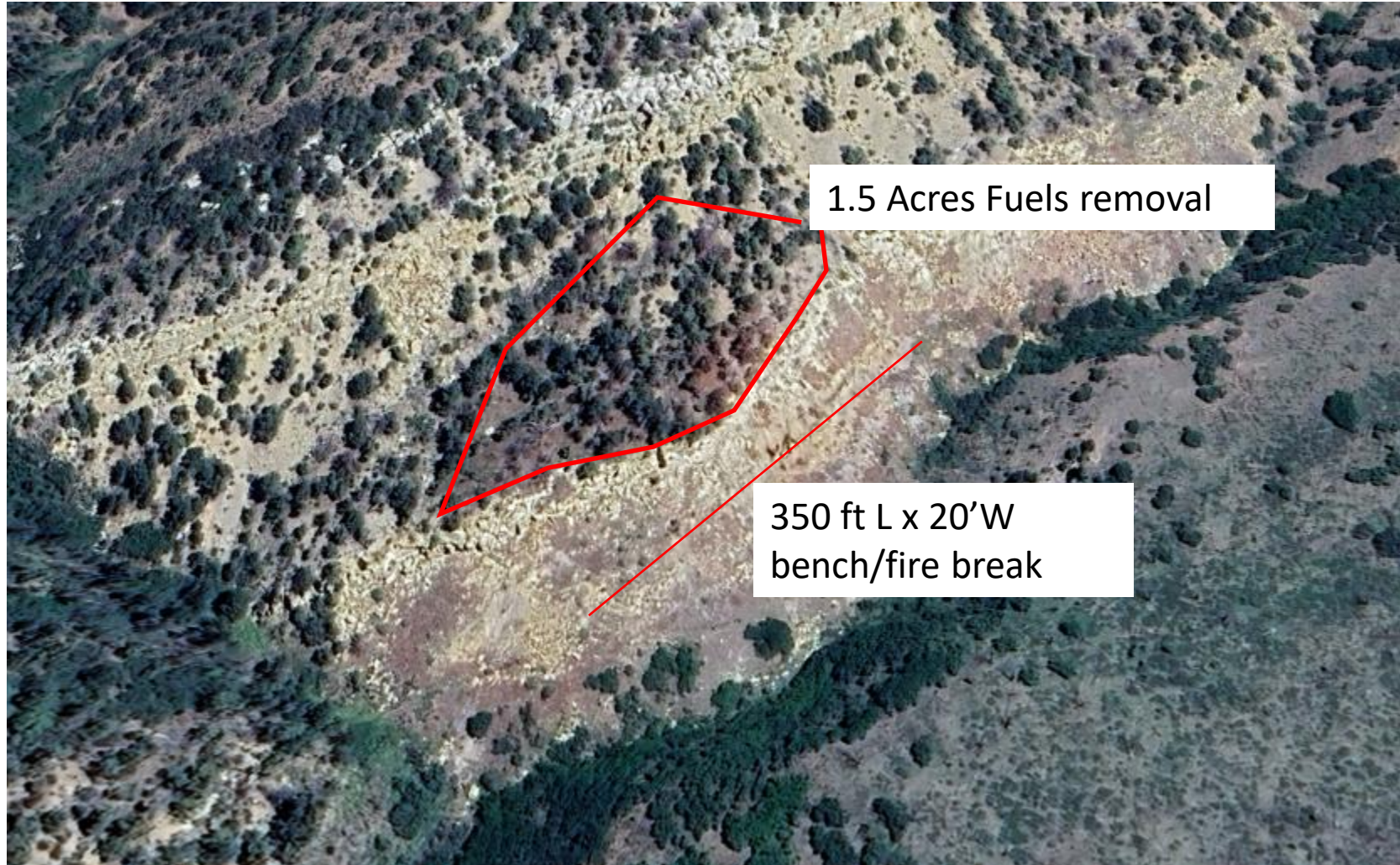
Determined that emergency fuels reduction is needed, site access needs to be constructed



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March 24, 2026 Site Visit

Determined that emergency fuels reduction is needed, site access needs to be constructed



Fuels Reduction Plan

- Precautionary fuels reduction to minimize wildfire danger from underground fire
- There is no imminent wildfire threat
- Project started 5/12/2026
- Access through Town property at Ute Park
- Access through Anderson Gulch along former mine road
- 1.5 acres of trees/vegetation will be removed from area above the fire
- 300' long bench will be established below the fire to catch any materials that may roll off of the cliff face
- Project expected to take 3 weeks
- Trees will be stacked or buried away from the burning area.



Edwards Mine Fire Emergency Sylvester Gulch Wildfire, July 2



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- On May 26, Edwards Mine (AML) Fire ignited a small wildfire on West Elk Coal Mine Property. Site is less than ¼ mile from the town of Somerset
- Extremely steep and dangerous site, 1:1 slopes with a 50' cliff below, thick oak brush
- Fire flared up again in early June, prior to DRMS mobilization
- June 14, DRMS mobilized crews to clear vegetation, construct access into the site, Close a large venting subsidence, and spray pre-emergent herbicide



Kaspar Coal Mine Fire

Kaspar Mine Fire

- Heat drive invasive weeds.
- Extreme wildfire risk.
- Annual maintenance.



Thank You for Having Us

Feel free to reach out:

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