Monarch Pass Forest & Watershed Health Project Final Report

PREPARED FOR CWCB CONTRACT CMS# 121379/CTGG1 2019-2511

PROJECT SUMMARY

REPORT PERIOD	PROJECT NAME	PREPARED BY
January 1, 2021 – December 2021	Monarch Pass Forest & Watershed Health Project	Andy Lerch Lead Forester Carrie Adair Operations Director

STATUS SUMMARY

Introduction

The Monarch Pass Forest & Watershed Health Project has successfully completed operations for the 2021 season, culminating two seasons of treatments, totaling 468 acres, to protect forest and water resources in the headwaters of the South Arkansas River. This project aimed to reduce the likelihood of high severity fire near Monarch Pass, as well as to demonstrate the ability to use innovative tethered Cut-to-length (CTL) harvest technology to treat steep slopes in Colorado, with hopes that this equipment may be useful to address forest management challenges in other parts of the state.

Background

A spruce beetle outbreak caused widespread overstory mortality near Monarch Pass, leaving a continuous expanse of forest with excessive fuel loading near local high-value resources and assets. In the pre-treatment condition, the headwaters area of the South Arkansas River was vulnerable to high severity wildfire that would be difficult or impossible for firefighters to engage in suppression efforts due to the inherent dangers posed by aerial fuels on steep terrain. A wildfire and associated post-fire flooding and debris flow in the headwaters area pose a substantial threat to municipal water supplies, irrigation water, and agricultural infrastructure for Salida and Poncha Springs. Additional threats from wildfire include damage to aquatic habitats, fisheries, and recreational uses on the main stem of the Arkansas River. The Monarch Pass area also contains a convergence of local values essential for Chaffee County's economic and social wellbeing. These include Monarch Mountain Ski Area, the Continental Divide trail, US 50

transportation corridor, and Western Area Power Administration transmission lines. During the 2020 fire season, wildfires demonstrated that high elevation beetle kill could fuel large-scale wildfires with dire consequences for human safety and the environment.

The steep and rugged terrain within the project area necessitated the use of timber harvesting equipment that met the definition of "high floatation" under the United States Forest Service (USFS) Pike-San Isabel Forest Plan. Historically, this meant using a helicopter or cable yarding. However, the tethered CTL system is a ground-based alternative that meets "high floatation" standards because of the sophisticated engineering of this equipment, that includes eight wheels on an extended chassis that minimizes ground pressure. This tethered system, along with various design features, allows this equipment to reduce the environmental impacts of using ground-based equipment on steep slopes. These include an articulating chassis for maneuverability, an independent bogey system that enables the wheels to undulate with the terrain, removable tracks that allow for enhanced traction on steep and loose terrain, and a computer-controlled cable tether that adjusts tension to maintain traction and reduce slippage and rutting. These features minimize soil disturbance that could cause compaction or substantial erosion issues. USFS silviculture and timber staff ultimately decided on the use of tethered CTL because it showed promise to yield satisfactory environmental results while substantially reducing costs in comparison to helicopter or cable yarding methods. Additionally, CTL equipment is novel for the Rocky Mountain Region and provides an excellent demonstration of the capability and utility of this harvesting technique in Colorado.

Cut-to-length equipment is a set of two machines that complete the entire timber harvest operation. The harvester cuts each tree, de-limbs and partially de-barks the tree, and processes the tree into the final logs at the stump. After the harvester finishes, the forwarder moves along the same trail to retrieve the processed logs and carry them on an elevated bunk to a collection area for loading onto a log truck. Generally, the harvester starts at the top of the unit and moves downhill with the fall line, harvesting everything within its trail, along with the trees designated for harvest within 30 feet of the trail. The harvester processes and places the slash, consisting of treetops and limbs, within the trail to create a slash mat that incorporates into the soil surface, further helping to reduce erosion and environmental impacts. After completing a line, the harvester returns to the top of the unit and starts another parallel cutting trail approximately 60 feet from the previous trail. This process repeats many times, creating a "tiger stripe" pattern of trails across the unit. While this method differs visually from most timber operations, the advantage of this system is to limit impacts to the narrow trails, leaving intact surface vegetation and undisturbed soils over the majority of the unit.

Project Goals

- Reduce the risk of large scale, high severity wildfire
- Protect the headwaters of the South Arkansas River
- Promote healthy and resilient forest conditions
- Ensure public safety & protect infrastructure
- Demonstrate the utility of CTL equipment for steep slopes in Colorado
- Utilize timber & promote the local economy

Implementation

ARWC and USFS staff finalized the South Arkansas Stewardship Agreement during the first project year, formally establishing the relationship between the agency and our organization. The USFS began the presales work to design treatment units and designate them on the ground with boundary paint. The original 600-acre project area was refined to 341 treatment acres in 16 units, to exclude drainages, spring or seep areas, rock outcroppings, and treeless ridgetops. The final determination of acres, volume and

timber appraisal was completed in October 2019, along with finalized timber removal specifications. Shortly afterwards, ARWC offered an RFP to solicit bids from qualified CTL contractors and hosted tours for four interested contractors. While this offer generated substantial interest from local Colorado contractors, none ultimately purchased CTL equipment due to the risk and uncertainty of future demand for the equipment in Colorado. Miller Timber Services, Inc., of Philomath, Oregon submitted the only qualifying bid and was selected for the Monarch Pass Project.

In early 2020, ARWC negotiated the terms and executed a contract with Miller Timber to complete 185 acres, including sanitation in the Monarch Park Campground (30 acres) on low-angle terrain and 155 acres of steep slope salvage treatment along Monarch Ridge. Harvest operations were scheduled over two seasons due to the short operational season at such high elevations. The units selected for harvest during 2020 were chosen for ease of access, allowing the contractor to become familiar with the terrain and site-specific challenges before tackling the more isolated and difficult units the following year. Miller Timber arrived in early August, and ARWC and USFS partners conducted a pre-work meeting to align expectations and ensure that operations align with contract specifications. Operations started in the campground to calibrate their equipment to the tree species on-site on flat ground. We were impressed at the maneuverability of this large 8-wheeled equipment within the narrow confines of the campsites and the ability to harvest trees without damage to infrastructure.

After completing the campground, operations moved onto the steep slopes where the cable tethering and steel tracks were required for safety and to minimize the environmental impacts. Both ARWC and USFS staff were pleased that the equipment had minimal effects on soils or to the residual trees within the stand, with very little observed damage from breakage or tree rub. ARWC was responsible for ensuring compliance with the contract and US Forest service standards. We accomplished this through weekly site visits and post-treatment inspection plots. There were no significant issues regarding compliance. We credit this to the open communication between ARWC, USFS, and Miller Timber and the excellent professionalism from Miller Timber. Snowstorms made operations more complex by November, yet Miller completed 183 acres of treatment before ceasing operations in mid-November despite the adverse conditions. We met our goals for the 2020 season, save for a 2-acre unit that we determined would fit better operationally with the units for 2021.

In December 2020, the partnership began looking at the possibility of adding additional acreage to the stewardship project. The USFS developed the Headwaters Timber Sale, a 125-acre conventional sale on low-angle terrain adjacent to already contracted steep slope units. The sale went to bid twice, with no contractors ultimately placing a bid. To achieve landscape-scale benefits with connective treatments, the USFS and ARWC leveraged the initial success of the Monarch Project to acquire additional funding. This support was provided by the US Forest Service ($501,000), Chaffee Common Ground Fund ($50,000), and Sangre de Cristo Electric Community Foundation ($2,000).

The addition of the Headwaters Timber Sale required an additional CTL team to treat the remaining project acres during the summer of 2021, mainly due to the technical challenges and long forwarding distances. Two teams running simultaneously were more demanding on ARWC and USFS to inspect and ensure compliance. Still, Miller Timber's operators did an excellent job incorporating our feedback, which allowed for smooth operations. 283 acres of beetle-kill salvage and lodgepole pine thinning were accomplished during the 2021 season. The additional acres were valuable for connecting treatments from Monarch Ridge up to Monarch Pass and the Monarch Mountain Ski Area.

In addition to the steep slope timber harvesting, ARWC assisted with tree planting at the gravel pit reclamation, a watershed restoration project led by Trout Unlimited in 2019, and planted 1,200 trees with a crew of USFS employees. We have also placed a strong emphasis on outreach to both the public and natural resource professionals to raise awareness of this novel equipment and harvest system here in Colorado. We have hosted 6 on-site tours for forest managers, forest industry professionals, and stakeholders within the water community, with approximately 80 participants. Tours were limited by COVID-19, as we were unable to host large groups, and many interested parties were unable to travel. We plan to host additional tours in 2022 to accommodate those interested in viewing this project but were unable to attend previous tours. ARWC also developed a short informational video on the project that we plan to distribute via social media, our website, and to stakeholders. Lastly, we are working with Monarch Ski Area to put up informational posters and share the video on their screens to further public education of this ongoing work.

Outcomes

The Monarch Project treated 466 acres in the South Arkansas Headwaters to remove beetle kill, prevent large-scale wildfire, and protect our source waters. The project delivered 3.5 million board feet of timber to Montrose Forest Products, Pueblo Wood Products, Blanca Forest Products in the San Luis Valley, and various firewood dealers in Colorado. There were 72,880 trees harvested, with a volume that could fill nearly 9 Olympic size swimming pools. This timber, mainly consisting of dead trees, no longer has the potential to fuel a wildfire and instead is being utilized for studs, pallets, and firewood and contributing to Colorado's forest product industry. While the timber from this project is considered a byproduct of the forest stewardship work, utilizing this wood provides a substantial economic benefit for the state of Colorado and helps to support jobs and the viability of our forest industry.

A key to the success of this project was the effective and collaborative partnership between the US Forest Service and ARWC. Neither ARWC nor USFS had prior experience planning and implementing a tethered CTL timber sale. This effort took substantial research and coordination with outside experts to project the layout and design elements for CTL equipment. There was a tremendous amount of communication between the partners and our contractor, Miller Timber Services, which was paramount to ensure the desired outcomes. We look forward to continued partnership and stewardship with the US Forest Service to address needed treatments on Federal Lands.

One goal of the project was to serve as a demonstration so that others in Colorado may incorporate CTL equipment to complete steep slope treatments where they are appropriate. We were able to bring key forest industry representatives, forest managers, and other stakeholders out to view this equipment and its capabilities. So far, Monarch Mountain Ski Area and Colorado Springs Utilities have utilized this equipment as an alternative to using more expensive harvest methods. We see this as a success and look forward to seeing more CTL projects offered in the coming years.

Research has shown the use of steep slope tethered CTL equipment results in minimal soil disturbance and compaction and resulted in very little erosion, but most of this research was in the Pacific Northwest. Dr. Chuck Rhoades with the USFS Rocky Mountain Research Station has established a study to look at erosion and sedimentation following this project to determine the impacts of this project compared with undisturbed areas. The preliminary results are encouraging, which shows that while some erosion occurs in the CTL trails, most of this sediment is trapped by the slash within the trails. This sediment is only transported short distances along the slope and is unlikely to contribute substantial deposition into waterways. This research is valuable for understanding the actual environmental impacts of this work. USFS soil and hydrology specialists found the impacts to be entirely acceptable and have been impressed that ground-based equipment can have such a light touch on such steep slopes. We look forward to Dr. Rhoades conclusions

upon completion of the study.

BUDGET FIGURES

OVERVIEW

Total WSRF Budget	**= $ 403,739.00**
Reimbursement Request #1	**$ 72,703.30**
Reimbursement Request #2	**$ 171,523.00**
Reimbursement Request #3	**$ 116,262.25**
Reimbursement Request #4	**$ 43,250.45**
Grant Balance	**= $ 0**

GRANT BUDGET TABLE

Task	Grant	Match	Total
1. Prescriptions	$0.00	$135,325.01	$135,325.01
2. Fuels Treatment	$326,350.00	$1,110,046.00	$1,436,396.00
3. Gravel Pit	$77,389.00	$22,581.10	$99,970.10
4. Watershed Improvements	$0.00	$168,770.00	$168,770.00
5. Project Management	$0.00	$127,449.00	$127,449.00
6. Grant Administration	$0.00	$22,705.60	$22,705.00
Total Project	**$403,739.00**	**$1,586,867.71**	**$1,990,615.71**

THIS INVOICE (#4)

Description	Total Budget/Grant Funds	Previously Invoiced	Current Invoice	Remaining Total	Percent Complete
1. Prescriptions	$0.00	$0.00	$0.00	$0.00	
2. Fuels Treatment	$326,350.00	$287,785.25	$38,564.75	$0.00	100.0%
3. Gravel Pit	$77,389.00	$72,703.30	$4,685.70	$0.00	100.0%
4. Watershed Improvements	$0.00	$0.00	$0.00	$0.00	
5. Project Management	$0.00	$0.00	$0.00	$0.00	
6. Grant Administration	$0.00	$0.00	$0.00	$0.00	
TOTALS	$403,739.00	$360,488.55	$43,250.45	$0.00	

SUMMARIES, ACCOMPLISHMENTS TO DATE & NEXT STEPS

Task 1, Field Preparation & Silvicultural Prescriptions (USFS) – 100% Complete

- ARWC and USFS worked to finalize the South Arkansas Stewardship Agreement
- USFS completed the design and layout of the Monarch Pass Project. Refined the 600-acre project area into 34 treatment units on 466 acres.
- USFS completed timber cruise and appraisal in October 2019, finalizing the total volume at 5,026 CCF (2.2 million board feet).
- Finalized the silvicultural prescriptions, and timber removal specifications in November 2019.
- The USFS successfully completed this work to facilitate timely implementation.

- **Task 2, Contract Administration & Implementation of Fuels Treatment (ARWC) – 100% Complete**
  - ARWC acquired qualified contractors to complete the CTL harvest, purchase, and hauling of timber. ARWC distributed a request for proposals and held tours for 4 prospective contractors.
  - Selected and contracted Miller Timber for CTL project.
  - Generated substantial local/regional interest from CO contractors for investment in CTL technology
  - Completed 466 acres of salvage and thinning treatments
    - 311 acres of steep slope salvage treatments
    - 30 acres of hazard tree removal in the Monarch Park Campground
    - 125 acres of low angle salvage and thinning treatments

- **Task 3, Gravel Pit Reclamation (TU) – 100% Complete**
  - Trout Unlimited finished the Monarch Gravel Pit Reclamation Project

- **Task 4, Consultation, Project Management, Contract Management – 100% Complete**
  - Coordination with USFS to prepare for implementation

- **Task 5, Grant Administration – 100% Complete**

- **Next Steps**
  - Work with USFS staff to determine if there are additional operable acres within the NEPA footprint
  - Use the tethered CTL model to treat high priority steep slopes elsewhere

Outreach & Press

- ARWC produced short films on the Monarch Project:
- 10-minute film: https://vimeo.com/ebersole/monarchfull
- 3-minute film: https://vimeo.com/ebersole/monarchshort

- Timber Harvesting Magazine article: https://issuu.com/hattonbrown/docs/th1220_digimag?fr=sNzZhMDIxODE1MTY

- Local press release: https://heartoftherockiesradio.com/monarch-pass-project-addresses-beetle-kill-trees-on-steep-slopes/

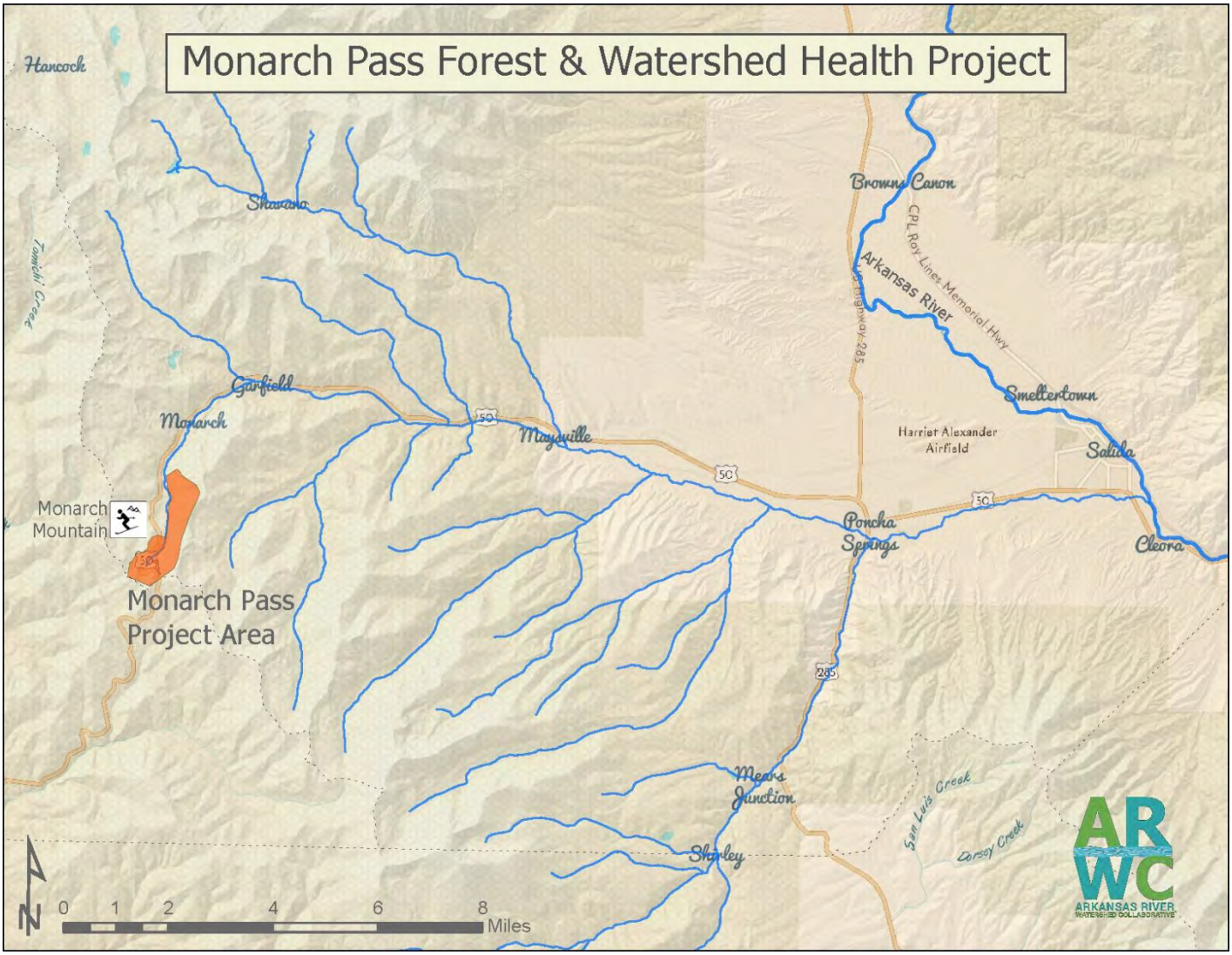
- Envision Chaffee County webpage:
  https://envisionchaffeecounty.org/skiers-to-see-changes-at-monarch-ridge/

- Monarch Mountain Ski Area posters:
  Poster #1:https://drive.google.com/file/d/1iw1nQxV0ceHvpl6bdGM2gA-SlH_BJFUL/view?usp=sharing
  Poster # 2:https://drive.google.com/file/d/1kDhnrjgLOLaq2Db9nQQIHGeML9mZ9AtB/view?usp=sharing

- Local press release:
  https://www.chaffeecountytimes.com/free_content/making-a-difference-at-monarch-pass/article_326902f6-26e3-11ec-89ac-f778d341f713.html

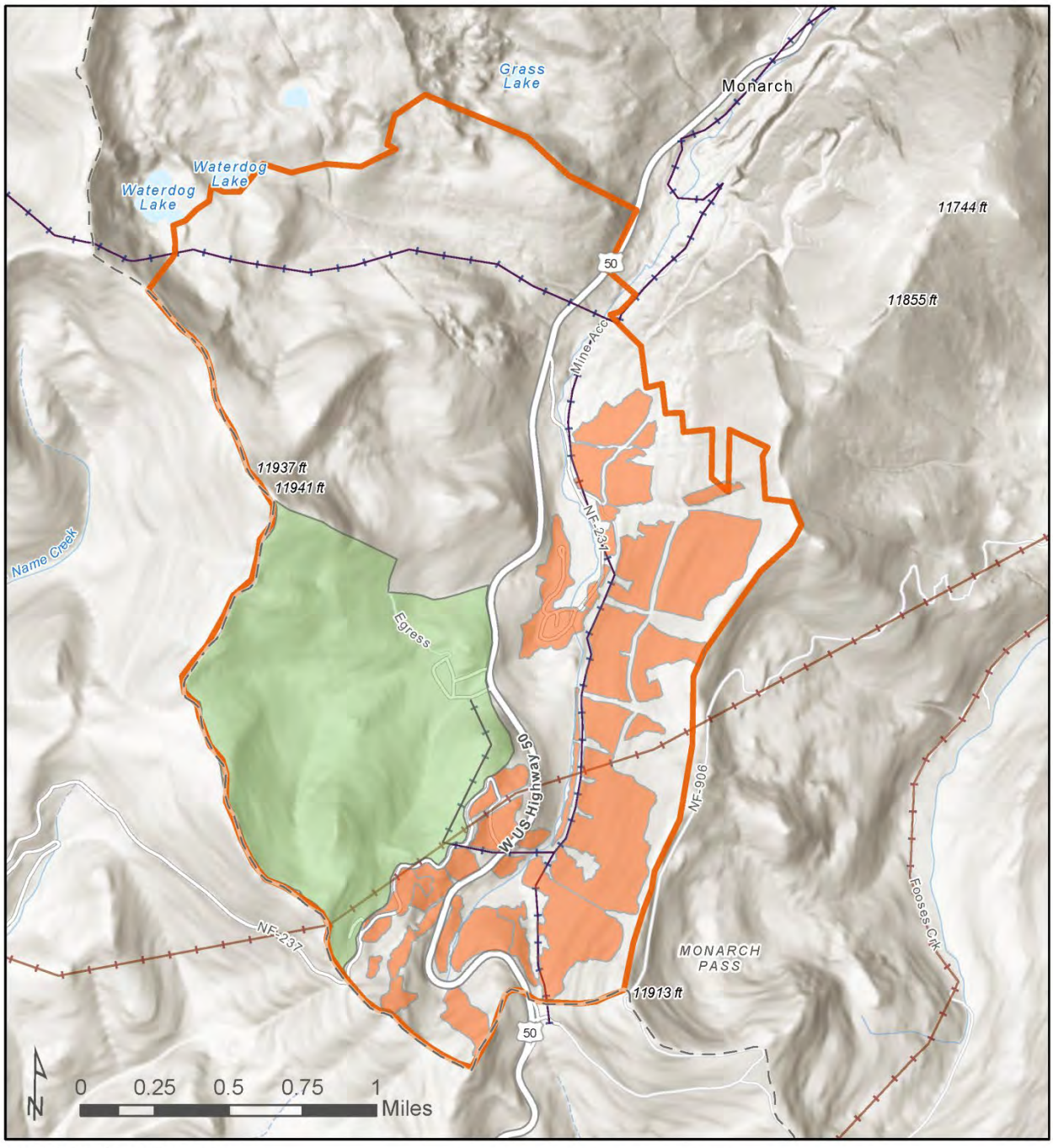
- Colorado Sun article:
  https://coloradosun.com/2021/10/06/monarch-pass-wildfire-mitigation/

Project Maps



Monarch Pass Forest & Watershed Health Project

South Arkansas Stewardship Agreement - Completion Status 11/22/2021



SASA Cutting Unit Status

- Completed Units
- Monarch Pass Vegetation Management NEPA

Non-Stewardship Fuels Treatment

- Monarch Ski Area Harvest Unit

WAPA Transmission Lines

Xcel Energy Powerline

Photos

Before

During

Before

After

Before

After

Completed Work

Equipment: Harvester

Equipment: Forwarder

Utilization