

DYER'S WOAD MANAGEMENT PLAN



**SUBMITTED BY
THE DYER'S WOAD TASK FORCE
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Executive Summary

Dyer's Woad has the potential to become a major weed problem in Montana. It is a native of southeastern Russia and was grown as a source of blue dye in China, Europe, and North Africa. It was imported into Virginia as a cultivated plant during colonial times and was taken, ultimately, to Utah. Dyer's Woad was first reported in Montana in the 1950's.

Dyer's Woad is a highly competitive plant that can lead to the displacement of native plants, decreased forage, and increased erosion and ecosystem degradation. It has established itself in eight western states and has, in fact, spread into tens of thousands of acres in our neighboring states of Idaho, Utah and Wyoming. It has the potential to do the same in Montana. Each Dyer's Woad plant produces hundreds of seeds. A chemical substance contained in the seedpods suppresses germination and growth of other plants, as well as of Dyer's Woad. This delayed seed germination enhances Dyer's Woad survival by ensuring a future seed source.

Dyer's Woad grows in a wide range of environmental conditions and appears to be especially well suited to the environmental and physical conditions of the intermountain west. If Dyer's Woad is not stopped, it will spread and eventually become a major weed problem in Montana. *Montana's Weed Management Plan, May 2008* states that the management of "Established New Invaders" is the second highest priority in Montana". The Montana Dyer's Woad Cooperative Project addresses this priority, as its goal is the containment of the existing small infestations and to prevent them from spreading to non-infested sites. The ability of the State of Montana to keep Dyer's Woad populations in check is a test of weed management in the State.

The summer of 2015 will be the nineteenth year of an intensive continuing effort to prevent Dyer's Woad from becoming a major noxious weed problem in Montana. Because of the major effort to prevent this new invader from gaining a stronghold in Montana, Dyer's Woad infestations have remained at a low level in comparison to those of spotted knapweed, leafy spurge, and Dalmatian Toadflax. Therefore, the dollar amount needed to ensure the containment of this weed also remains small. This is proof that an aggressive program to prevent the spread of new invaders is cost-effective. The sole purpose of the Montana Dyer's Woad Cooperative Project has been to prevent Dyer's Woad from increasing in Montana. As the reports over the last eighteen years indicate, the program has been very successful in stemming the spread of this exotic invader. Not only is continued vigilance required to ensure that the success over the last eighteen years continues, but the cooperators on this project feel that there is a need to put even more effort into inventorying areas within an expanded buffer zone of each infestation and adding chemical treatment along with hand-pulling to the duties of the task force.

Existing Situation and Capabilities:

Over the past twenty-four years the Dyer's Woad Task Force has worked to control woad in Montana. The Task Force coordinates with weed managers throughout the state and makes bimonthly visits during the growing season to infested areas to evaluate and ensure the removal of woad species prior to seed set. Site visits have been concentrated in Park, Beaverhead County, Missoula, Flathead, Treasure, and Lewis & Clark Counties. Park, Beaverhead, Missoula, and Flathead Counties have historically had Dyer's Woad infestations. New infestations were located in Treasure (2015), Lewis & Clark (2015), Stillwater (2018), Jefferson (2019), Powell (2019), Butte Silverbow (2019), and Sweetgrass (2019) Counties since the last revision of the management plan. Butte Silverbow had an active dyer's woad site that was deemed eradicated in 2013. The newly identified area is approximately 1.5 miles from the historical location. Sweetgrass county also had a single plant found in 2000. The new location is approximately 16 miles from the previously found single plant. All the new sites have been added to the list of regularly monitored sites.

The Livingston site is of concern for containment. There has been a decrease in the overall number of plants found in this area, however numbers have remained consistent for several years. Diligent monitoring, hand spraying and pulling were done to ensure containment at these sites. The County Weed District has also assisted by spraying areas where the majority of plants were found. The size of the area monitored was greatly expanded in 2004. No plants have been found at the Mill Creek or East End Fishing access site since 2008. Working Dogs for Conservation has assisted in surveying this site intermittently. As the site is reaching eradication level, the combined management strategies including detector dogs will be a benefit to the site.

The Monida Pass/Lima area has shown decreases through the years. Many plants were found at the edges of the known infestation area. The main infestation area has been sprayed yearly. County crews have also been assisting by spraying known sites. The Task Force and Beaverhead County have intensified the monitoring and chemical application at all the sites in Beaverhead County. Removing the Dyer's Woad species prior to seed set and diligently spraying the rosettes should be reducing the seed bank and production. Unfortunately, with the limited access by Union Pacific in 2014 and significant increase in numbers was seen in the 2016 and 2017 seasons. In 2018, when Union Pacific again denied access to the site, Beaverhead County Weed District pursued non-compliance actions and have been operating under non-compliance with Union Pacific since that time. Working Dogs for Conservation has been assisting with monitoring this site twice a year (spring and fall) since 2012. Continued extensive monitoring is needed at the site due to the size, habitat, and potential for re-infestation of areas due to the proximity to and seed source vectors (Union Pacific Railroad, I-15) in Idaho and Utah.

The Missoula site has had a significant decrease in the number of plants since 2005. Numbers have remained fairly consistent until summer 2009 when the number of plants

decreased by nearly 72%. In 2014, numbers had decreased by 99% from the 2005 numbers. Except for 2017, numbers from 2015-2018 have remained fairly constant averaging 25 plants per year. In 2017 a total of 4 plants were found. Utilizing the Working Dogs for Conservation dyer's woad detection dogs as the primary search method has aided in this expedited decrease in numbers. As the site reaches eradication, monitoring efforts will need to be maintained to ensure no plants are missed.

The Flathead site was much larger than first thought when the site was identified in 2009. Management of the site has included monitoring and herbicide treatment. Continued monitoring is needed at this site to ensure successful containment and eradication. It is believed a significant seed source is available at the site. Since the discovery of the site, numbers have fluctuated from year to year. In 2018 and 2019, a dedicated surveyor was hired to monitor and manage the site. Working Dogs for Conservation has also been used to survey the area on a yearly basis. In 2019, an individual plant was located along the North Fork Road approximately 1 mile south of the Big Creek Campground. This new area and surrounding roads will be surveyed to detect any other dyer's woad plants.

In 2015, past Dyer's Woad project coordinator, Monica Pokorny identified a dyer's woad plant roughly 200 yards east of MP 62 along Interstate 94. The site is nearest to the town of Hysham in Treasure County. Monica notified Amber Burch with the task force and Amber notified the county coordinator, Jennifer Cramer. Fortunately, only a single, non-seeding plant was found at the site. In 2016, a single plant was again found and reported by Monica Pokorny. However, instead of removing the plant from the site, Treasure County Coordinator, Jennifer Cramer was notified of the location. Jennifer was able to remove the plant and now has an exact location of the area. Zero plants have been found at this site since. Management of this site will include monitoring by Treasure County weed coordinator, Jennifer Cramer and Amber Burch will provide assistance as needed at the site.

In 2015, an intentional planting of Dyer's Woad was identified within the city of Helena along Boulder Avenue. The site was originally identified by Celestine Duncan and reported to Dave Burch, Montana State Weed Coordinator. Dave notified Larry Hoffman with Lewis and Clark County, Greta Dige with the city of Helena, and Amber Burch with the Dyer's Woad Cooperative Project. The plants were pulled by Greta Dige and Shantell Frame-Martin. The site was revisited by Greta and Amber Burch to ensure no regrowth of plants. Since 2017, zero plants have been found at the site. Continued monitoring is needed at the site to ensure no regrowth of plants or subsequent plantings.

In May 2018, past Dyer's Woad project coordinator, Monica Pokorny identified dyer's woad along I-90 roughly 0.5-0.8 miles before the Springtime Road Exit #400 sign in the east bound lane. The site is nearest to the town of Columbus. Monica notified Amber Burch with the task force and Amber notified the county coordinator, Dana Weatherford. Zero plants were found in 2019 at the original site, however, Dana Weatherford identified three other single plants along Montana Highway 10. Three, non-seeding plants were found and removed from the site. Management of this site will include monitoring by

Stillwater County weed coordinator, Dana Weatherford. The task force and Amber Burch will provide assistance as needed at the site.

Other locations where single plants were found in 2019 include Powell, Jefferson, and Butte Silverbow. The Powell and Jefferson county woad finds were reported by Peter Lesica in June. The sites had no other woad plants through the growing season. Areas will need to be monitored to ensure no other plants are found in years to come. A single plant was also found in 2019 along I-15 approximately ¼ mile south of MP 110 in the north bound lane. This area is approximately 1.5 miles from a historical dyer's woad location in Silverbow County that was deemed eradicated in 2013. The original site will be re-surveyed to assess if any other plants are found.

Sweetgrass County weed coordinator, Connie Weston followed up on a report from a private landowner about a large site of dyer's woad approximately 5 miles from the Springdale exit on private lands. Connie and her crews went with the landowner and upon sending photos to project coordinator, Amber Burch, the site was confirmed. A field day was quickly scheduled and on June 24th, Connie, her crews, Amber Burch, and Kara Maplethorpe returned to the site to remove plants and treat the area. The site was surveyed to determine the density and extent of the infestation. A boundary was established, and perimeter mapped using a GPS. The two areas identified, and boundaries established consisted of approximately 7 acres total. One boundary being 5 acres in size and the second approximately 2 acres. Within the 7 acre sites, approximately 1395 flowering plants were dug, pulled, bagged and removed from the site. The number of rosettes found was too great to accurately count. A ratio of 5 rosettes to every flowering plant was calculated as a baseline measurement for reporting purposes. Rosettes at the site were broadcast treated. A follow-up site visit occurred on Tuesday, July 16th, when crews from Sweetgrass County, Amber Burch, Montana Department of Agriculture's Jasmine Reimer and Carol Bearden returned to the site to re-survey and treat the locations. During this trip, the sites looked much better. A total of 25 flowering, 30 rosettes, and 4 seeding plants were found. Edges where rosettes were found and areas containing seeding plants were treated by Amber Burch. On Tuesday, September 24th, the site was visited again by Sweetgrass county crews, Amber Burch, Montana Department of Agriculture's Jasmine Reimer, DNRC's Dan Dobler and crew member, as well as Ngaio Richards and Orbee from Working Dogs for Conservation. During this visit the areas were surveyed by human surveyors and followed by the canine surveyor and handler. During this visit, a total of 54 rosettes were found. No flowering or seeding plants were identified.

Sweetgrass County previously contained a dyer's woad site around the Big Timber exit that was surveyed for dyer's woad from 2000-2010. No dyer's woad plants have been found at this site since 2000 (Table 7 and Figure 7). In 2009, Amber Burch provided the county coordinator with a tour of the site and a dyer's woad specimen to share with county crews. The site was monitored in 2010 mainly by the county coordinator and crews. The original Sweetgrass County dyer's woad population numbers have been maintained at zero plants. The site was deemed eradicated by the Dyer's Woad Task Force in December 2009.

To ensure containment and management of this newly identified sizable population of dyer's woad in Sweetgrass County, crews will need to be vigilant in surveying the area and removing all plants found past the rosette stage. Herbicide treatments, potentially broadcast applications, will be needed to manage the seed bank and rosette numbers at the site. It is recommended that a late May, early June trip is scheduled to the site with follow-up visits approximately every 2 weeks through the growing season. In the fall, a canine survey will be scheduled with Working Dogs for Conservation. There is also concern if any other unknown locations of dyer's woad are found in the area. An aerial survey is recommended to be conducted during peak flowering.

The Task Force felt confident at the end of the 2019 growing season that it had identified the outer limits of all the known infestation areas. Statewide from 2009-2019, the project has seen a 12.6% increase in numbers due to the large infestation identified in Sweetgrass County in 2019. When the Sweetgrass County site is not factored into the total number of plants in the state, the project has seen a 97.4% decrease in numbers since 2005.

Plan of Action: This Plan covers the years 2020 through 2024.

1. Mapping:

The Task Force uses a GIS system to track and map Dyer's Woad infestations. The maps are updated annually by the Task Force and will be made available to the counties, the Mt. Dept. of Agriculture, the Noxious Weed Trust Fund Advisory Council and other interested parties. A system of map overlays is used to monitor progress from year to year. Maps of all the project sites are found in Attachment A. All mapping data that is collected will be submitted to EDDMaps to be included in the statewide database.

2. Control Measures:

The Objectives of the Dyer's Woad control program are to:

- 1) Decrease the number of dyer's woad plants found at each site for the next 5 years.
- 2) Maintain zero plants at the Lewis & Clark and Treasure County sites.
- 3) Decrease number of plants with the goal of zero plants at the Stillwater, Powell, Jefferson, and Silverbow County sites by year 2024.
- 4) Ensure $\leq 1\%$ of dyers woad plants produce seed.

The Dyer's Woad Program consists of three steps to control the weed.

a. Inventorying and Monitoring:

In 2004, the project was expanded to increase inventorying and monitoring of existing sites and to include buffer areas that could have been infested by water events that carry seed. With the work done in 2004, and monitoring of new infestations, the Task Force feels confident it has now identified the outer reaches of all known infestations and will concentrate on treatment of the sites.

Intensive monitoring will be repeated every two years to ensure that plants are not escaping.

Each season the sites will be monitored. County, University, and city personnel will be utilized at the Missoula site to monitor the infestation. There are plans to use Dyer's Woad detector dogs in Missoula, Beaverhead, and Park Counties. Beaverhead County will monitor the site. The project coordinator will monitor the Park County site with the assistance of County personnel if needed. Flathead National Forest personnel and the project coordinator will monitor the site in Flathead County. The project uses a "circuit-rider" approach to travel to each county/site to monitor and treat the infestations biweekly from May through October to ensure that no plants go to seed.

b. Treatment – Hand-Pulling and Chemical Application by Task Force Personnel and County Weed Districts:

The summer employees carry backpacks and will spray plants along with hand-pulling to ensure that any stray seed on the ground is also treated to prevent regrowth.

c. County Weed District personnel will work with the Task Force to control the Dyer's Woad. The Project Leader will work with Weed District Coordinators in the cooperating counties to keep them informed about the infestations in their respective counties and to seek their assistance in monitoring and treating in between Task Force visits to the sites. When a site is on private land, the Task Force will work with the landowner on a cooperative basis to remove/treat the infestation. If the landowner is unwilling to remove/treat the infestation according to State law the Task Force will turn the matter over to the local Weed District for enforcement action.

Control methods include hand removal and spraying. Hand removal includes a combination of pulling, grubbing and cutting to control light infestations. Spraying includes the use of backpacks and hand lines as appropriate.

The equipment to be used for this project includes backpack sprayers, ATVs with hand lines, and trucks with hand lines owned by Park, and Beaverhead Counties.

The herbicide used will be a tank mix of Aminopyralid, 2,4-D, and Metsulfuron. All herbicide treatments will be done under proper climatic conditions, following labeled rates and safety procedures. Applications by licensed applicators or operators applying under a licensed applicator.

3. Educational Activities:

Education is a vital component of the program. The "Bounty Program" was added to the program in 1998 to assist the Task Force with identification of new plants and as an educational tool. A person finding an infestation/plant of Dyer's Woad not previously identified by the Task Force will be paid \$50.

The Project Coordinator will prepare press releases, and distribute information through the Montana Weed Control Association, to sportsmen's organizations, conservation districts, and other interested groups, and work closely with local weed boards and groups to help advertise the program.

Every year, memos will be sent to all the Weed Districts, Extension Offices, alerting them to status of Dyer's Woad as a noxious weed, the State Cooperative Program, and the Bounty Program through the MWCA website, and as needed by mail. The Task Force will follow up with other educational activities as needed or opportunity arises.

As in the past pre-existing Dyer's Woad educational materials including 8" x 10" glossy color photos, posters, and an updated *Dyer's Woad Montguide* published by the Montana State University Extension Service will be distributed by the Extension Service in the affected counties.

The Task Force, Beaverhead County, and MWCA will distribute weed identification handbooks throughout Montana at special events. Dyer's Woad is one of the plants in the handbook. The Task Force will visit with local people in areas directly adjacent to the infestations to enlist their help in identifying potential new infestations. News articles will be used to alert citizens to the problem and the work of the Task Force.

Dyer's Woad Task Force:

A Montana Dyer's Woad Task Force will help ensure more effective control of the weed through an integrated approach and coordination among agencies. The Task Force will facilitate technology transfer and help leverage funding for the Dyer's Woad Cooperative Project.

The Task Force will be composed of a board, with at least one member from by each area that has an identified infestation. Each member shall have one vote. All authority for policy shall reside in the Board.

- The task force will act as an advisory council.
- No member of the task force shall receive compensation for their services.
- The task force shall:
 - Elect from their membership a Chairperson, Vice-Chairperson for one-year terms. Such officers may serve successive terms;
 - The project coordinator will act as the secretary;
 - Adopt procedures for the conduct of the business of the organization;
 - Hold at least two meetings, one in the fall and one in the spring. Special meetings can be held at the request of the Chairperson or two task force members. Five board members shall constitute a quorum. The order of business will follow the Robert Rules of Order to give all members a right to vote.

Administration: The Beaverhead County Weed District is the designated administrator for as long as the Task Force Board deems necessary, and shall perform the following duties:

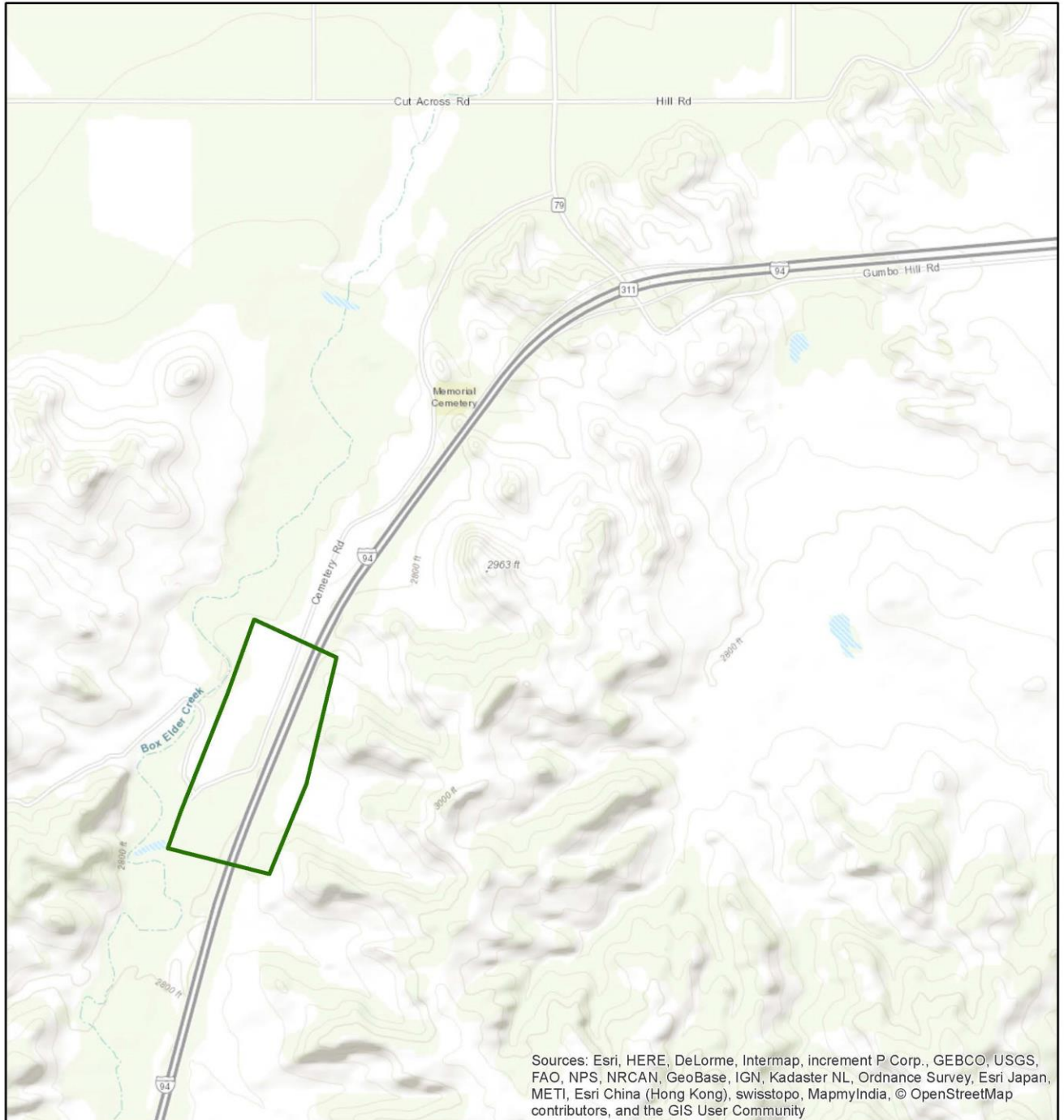
- Provide accounting functions for the funds, to include receipts, expenditures, and reporting.
- Compensation paid to the administrator shall be negotiated but cannot exceed the percentage available from the grantors.

Funding: The funding for the Montana Dyer's Woad Task Force shall be from grants, bequests or gifts. Counties with infestations will also assist with in-kind or cash match contributions.

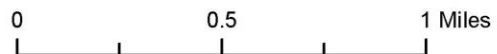
APPENDIX A

SITE MAPS

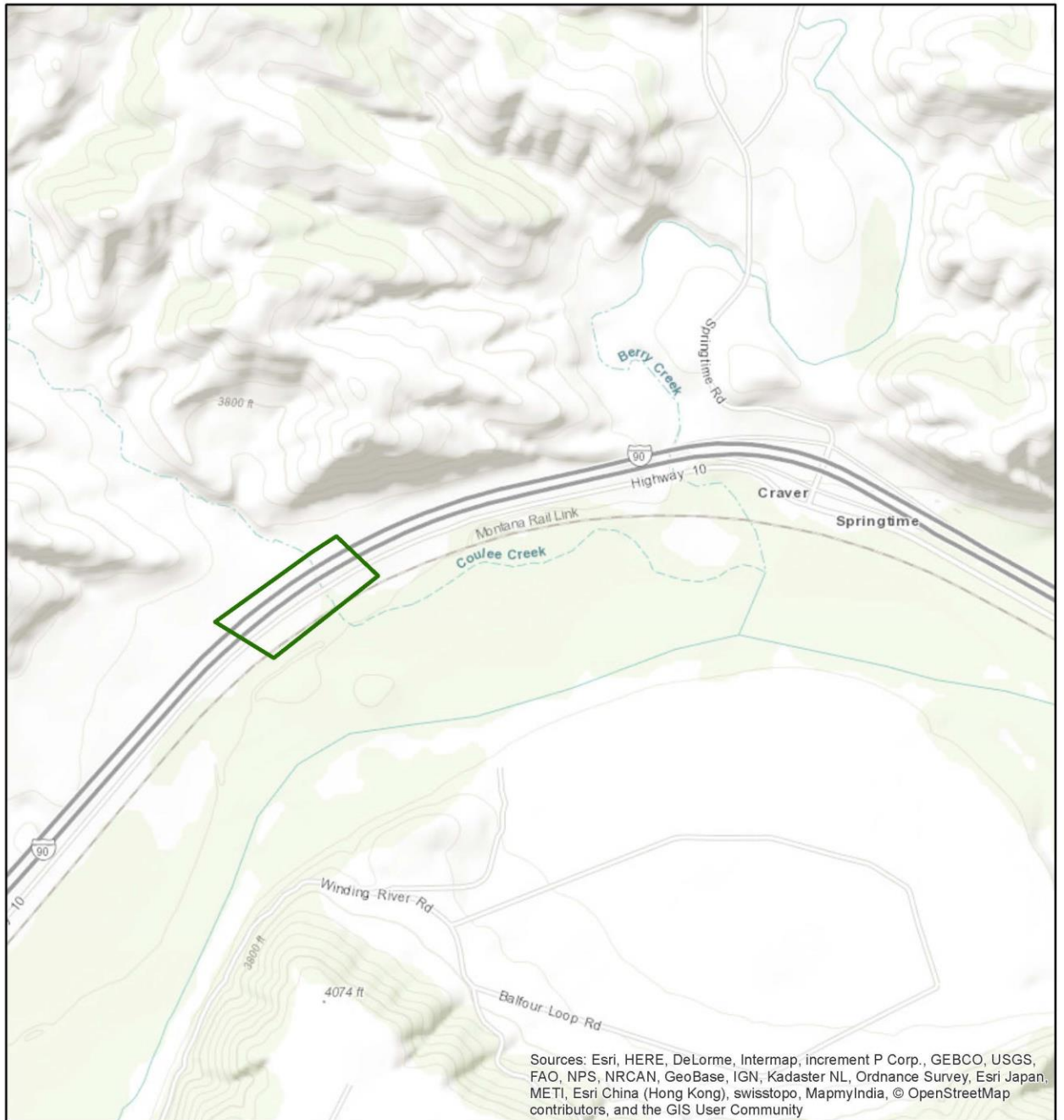
Treasure County Dyer's Woad



Legend



Stillwater County Dyer's Woad



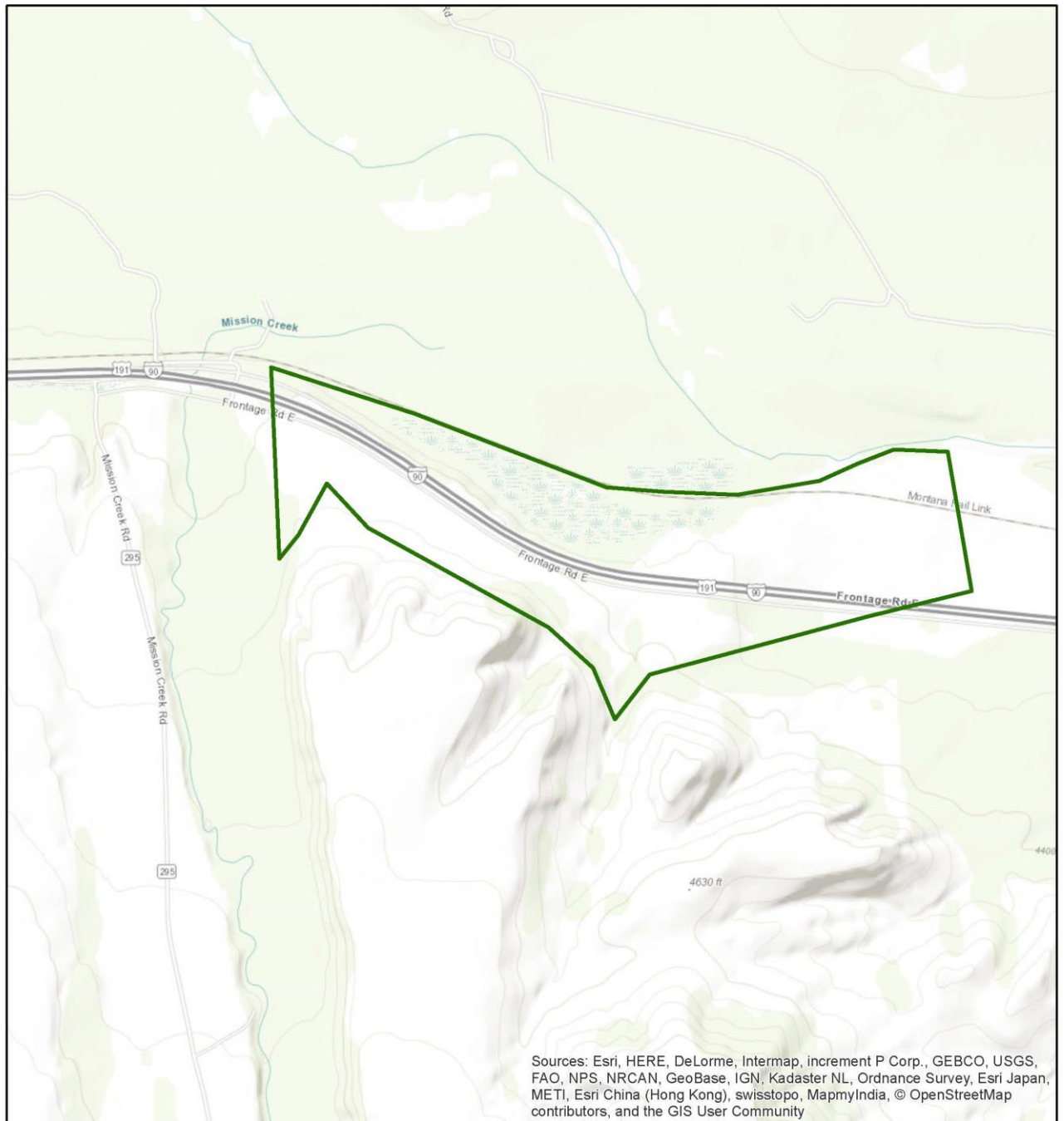
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0 0.35 0.7 Miles



Park County: Mission Creek Dyer's Woad



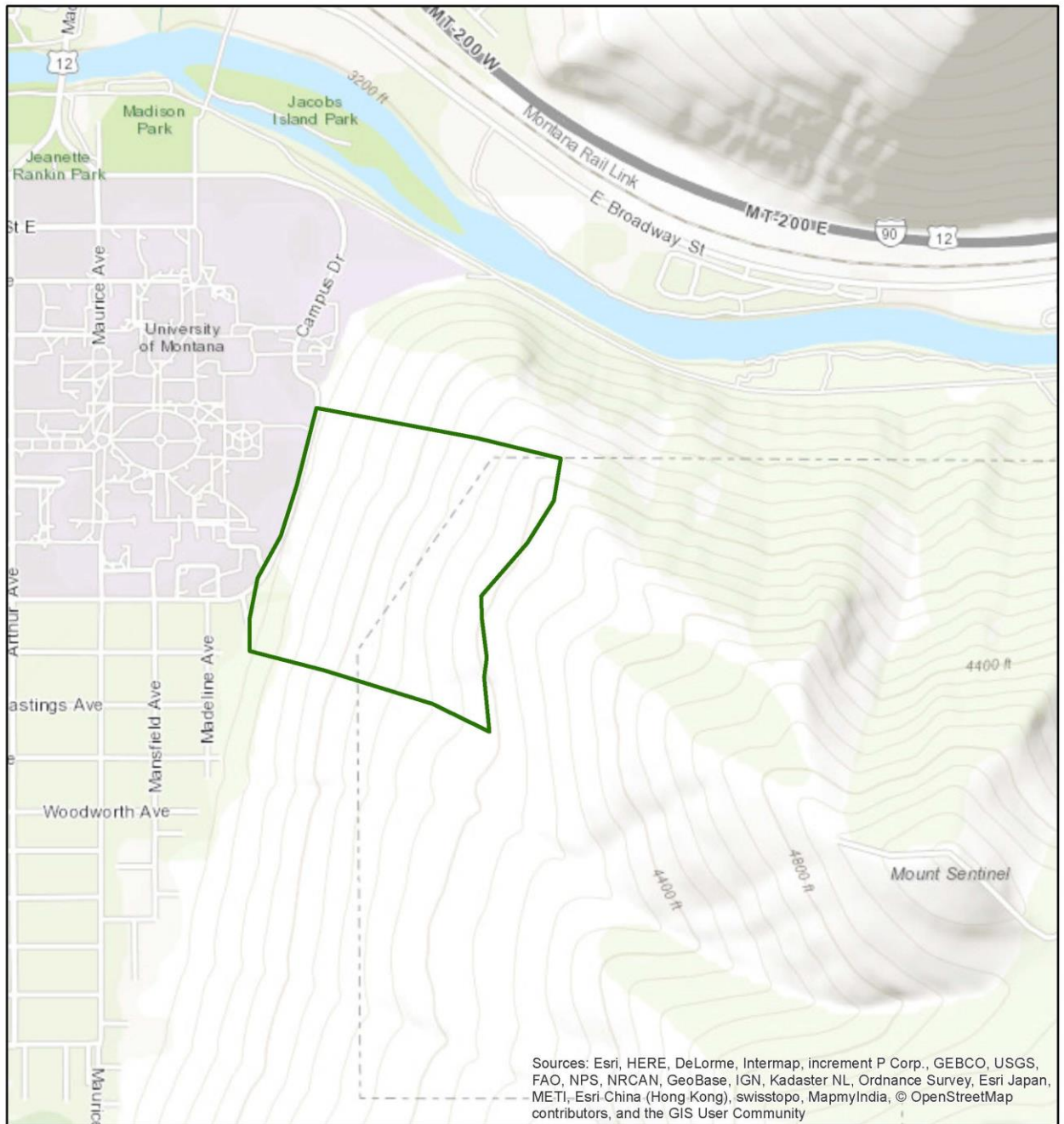
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0 0.5 1 Miles



Missoula County: Mount Sentinel Dyer's Woad



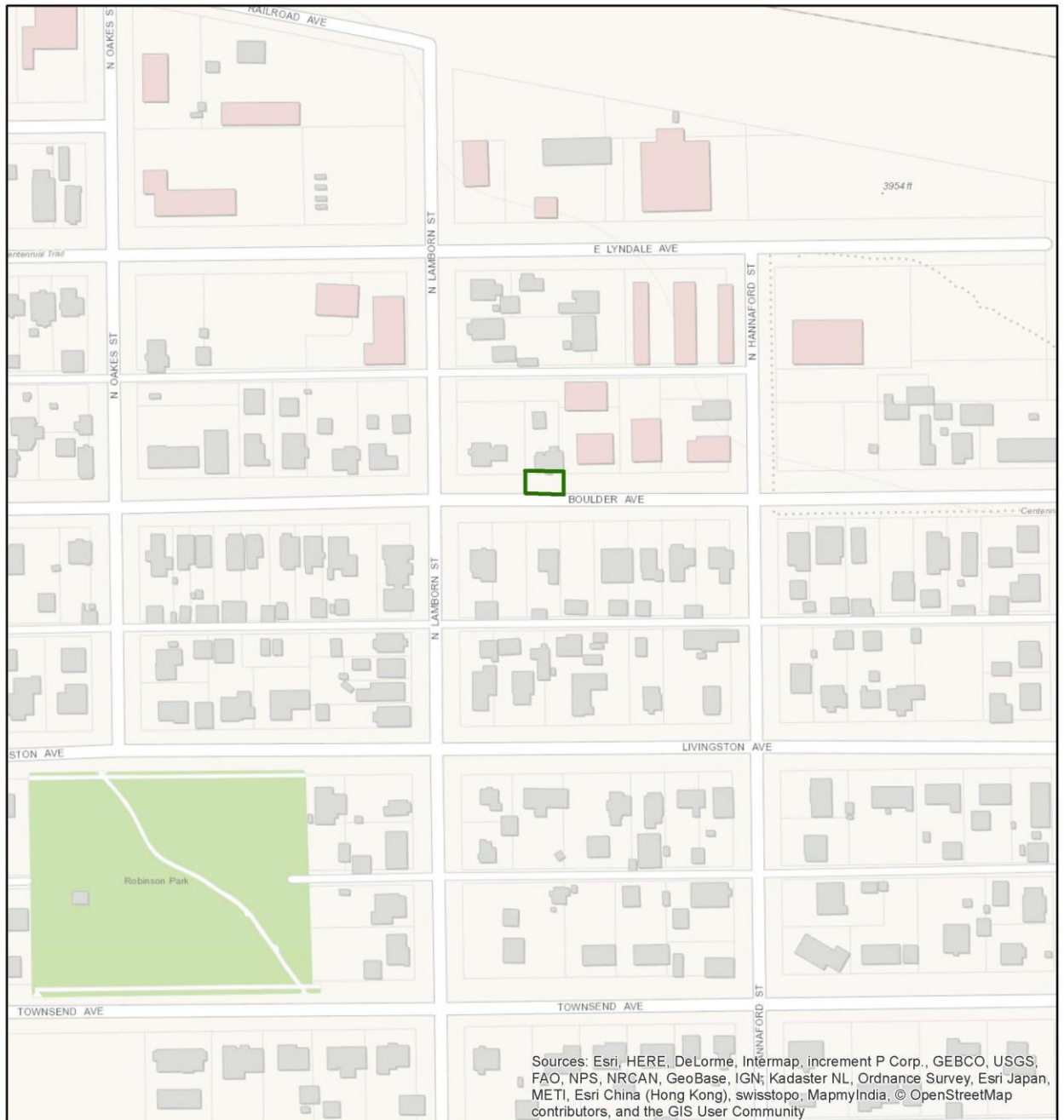
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 Project Area

0 0.25 0.5 Miles



Lewis and Clark County: Helena Dyer's Woad



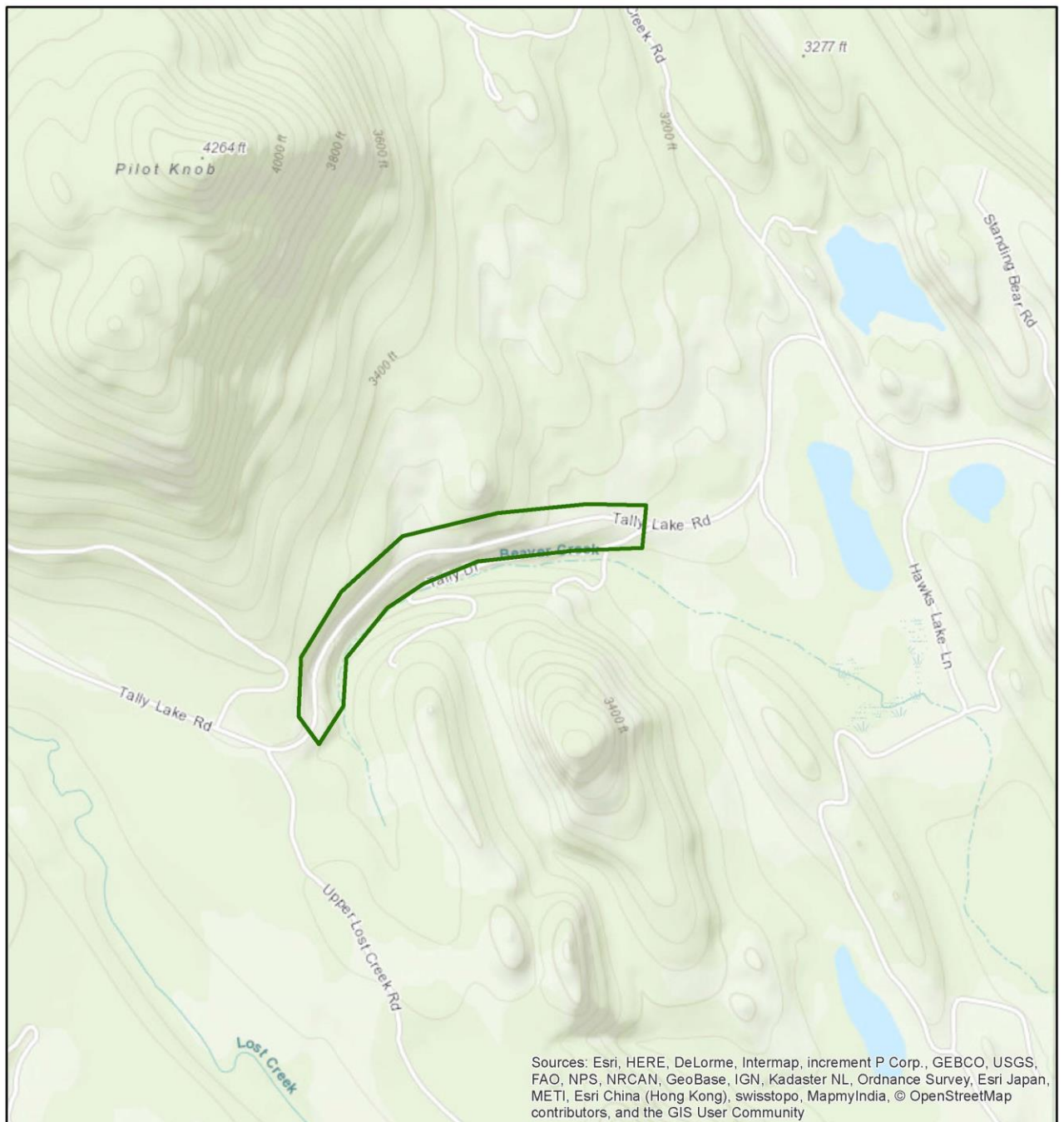
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0 0.05 0.1 Miles



Flathead County: Tally Lake Road Dyer's Woad



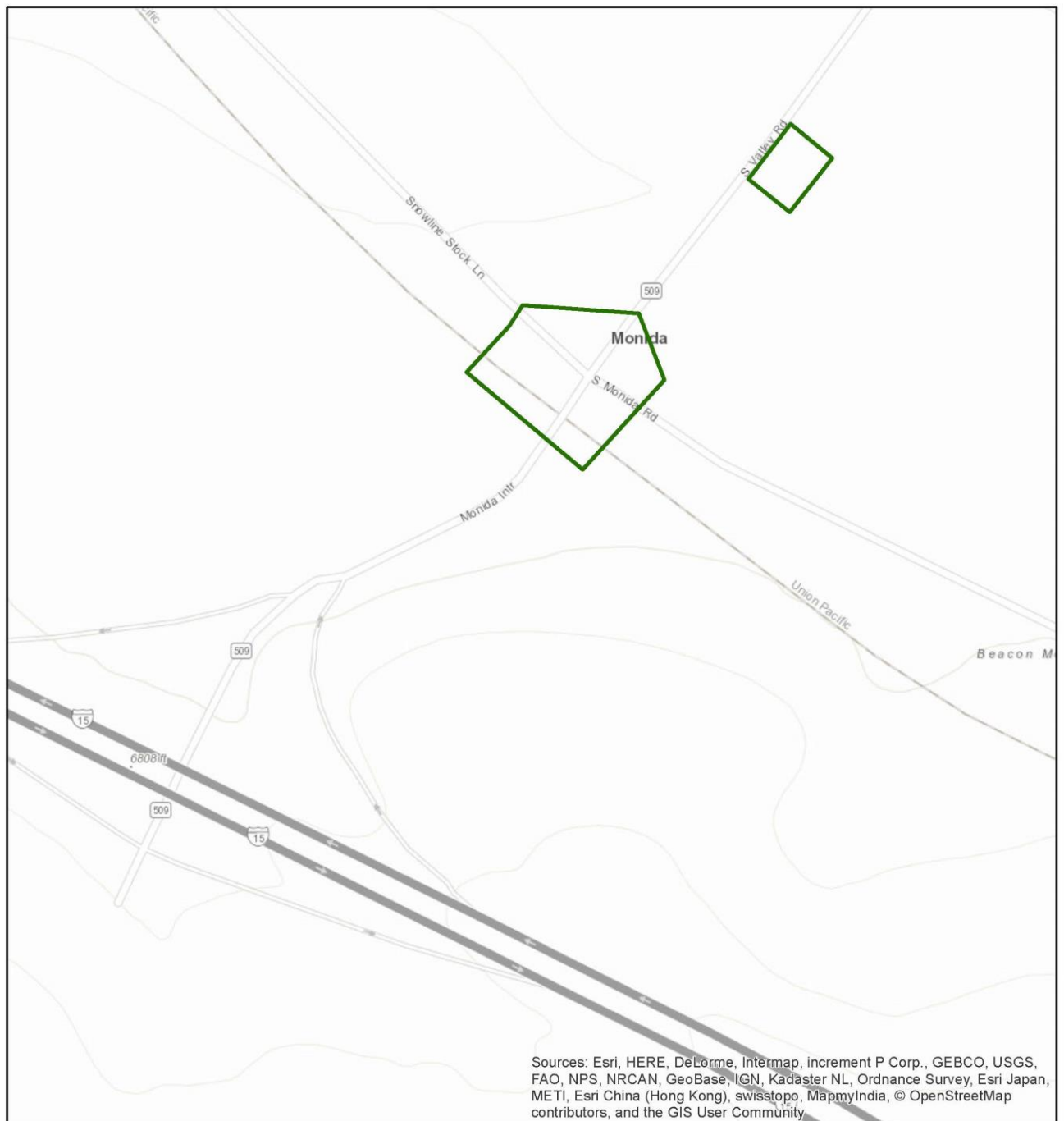
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0 0.25 0.5 Miles



Beaverhead County: Monida Dyer's Woad



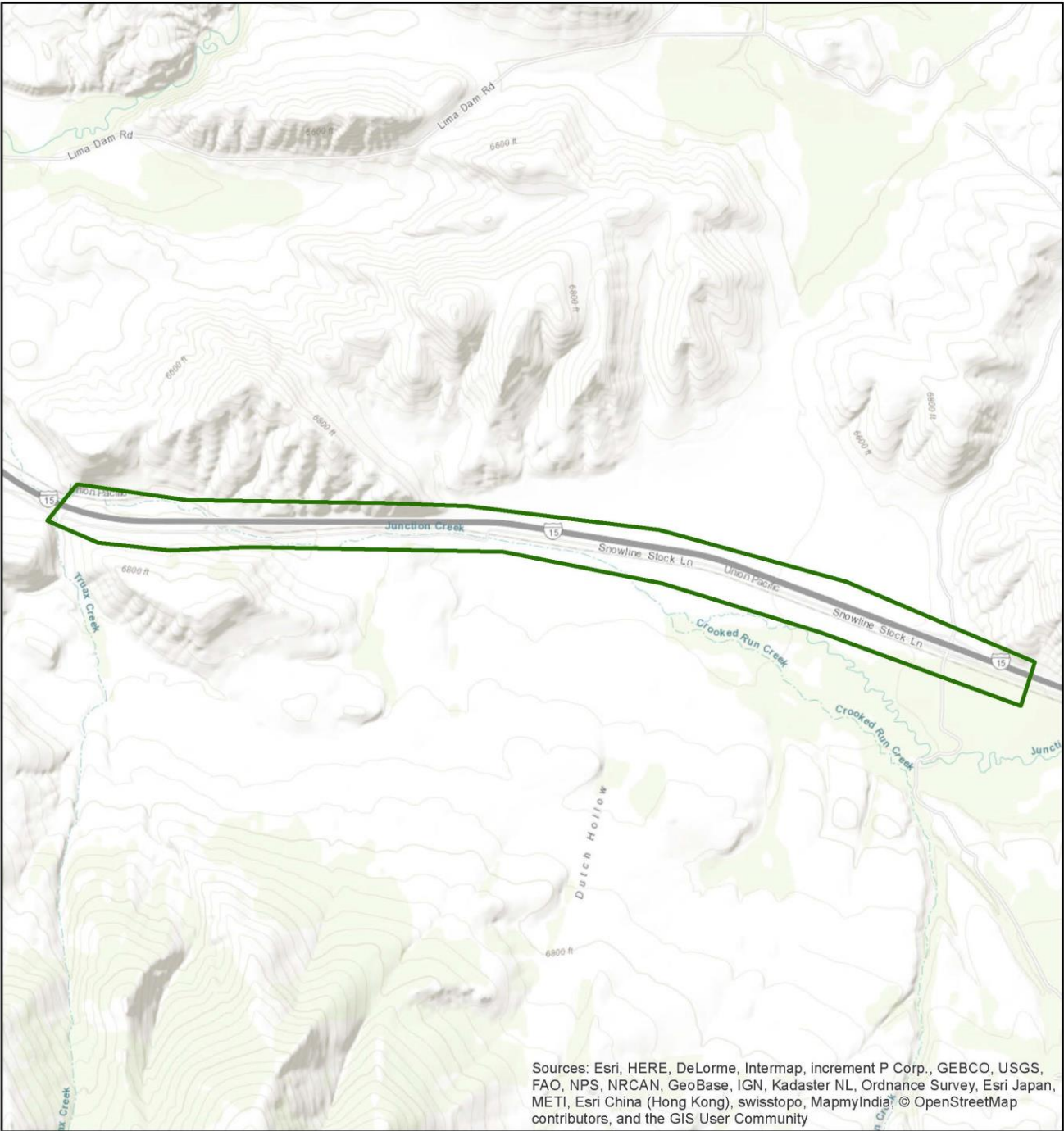
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0 0.1 0.2 Miles



Beaverhead County: Lima to Snowline Dyer's Woad



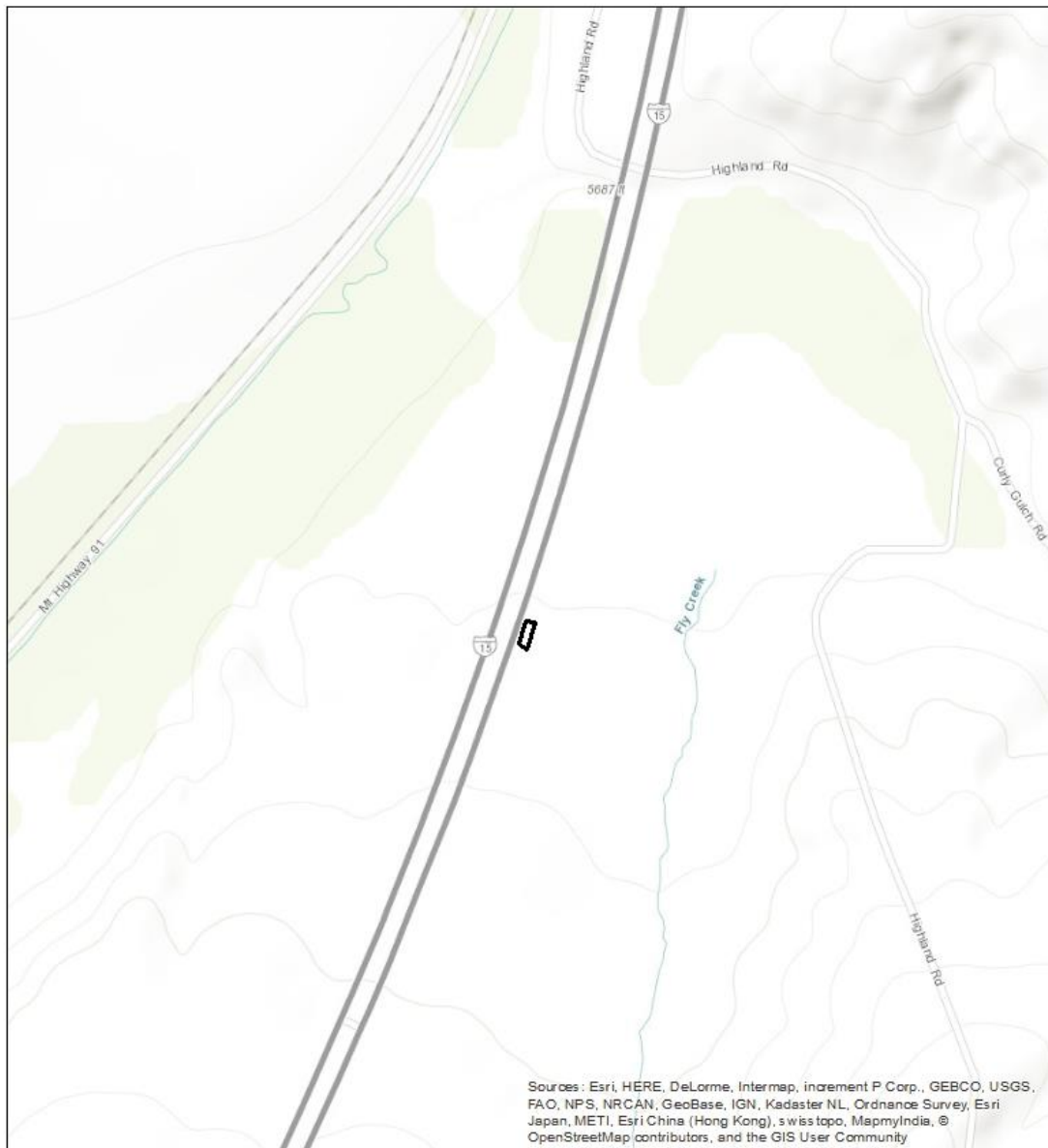
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 Project Area

0 1 2 Miles



Butte-Silver Bow: Feeley Dyer's Woad



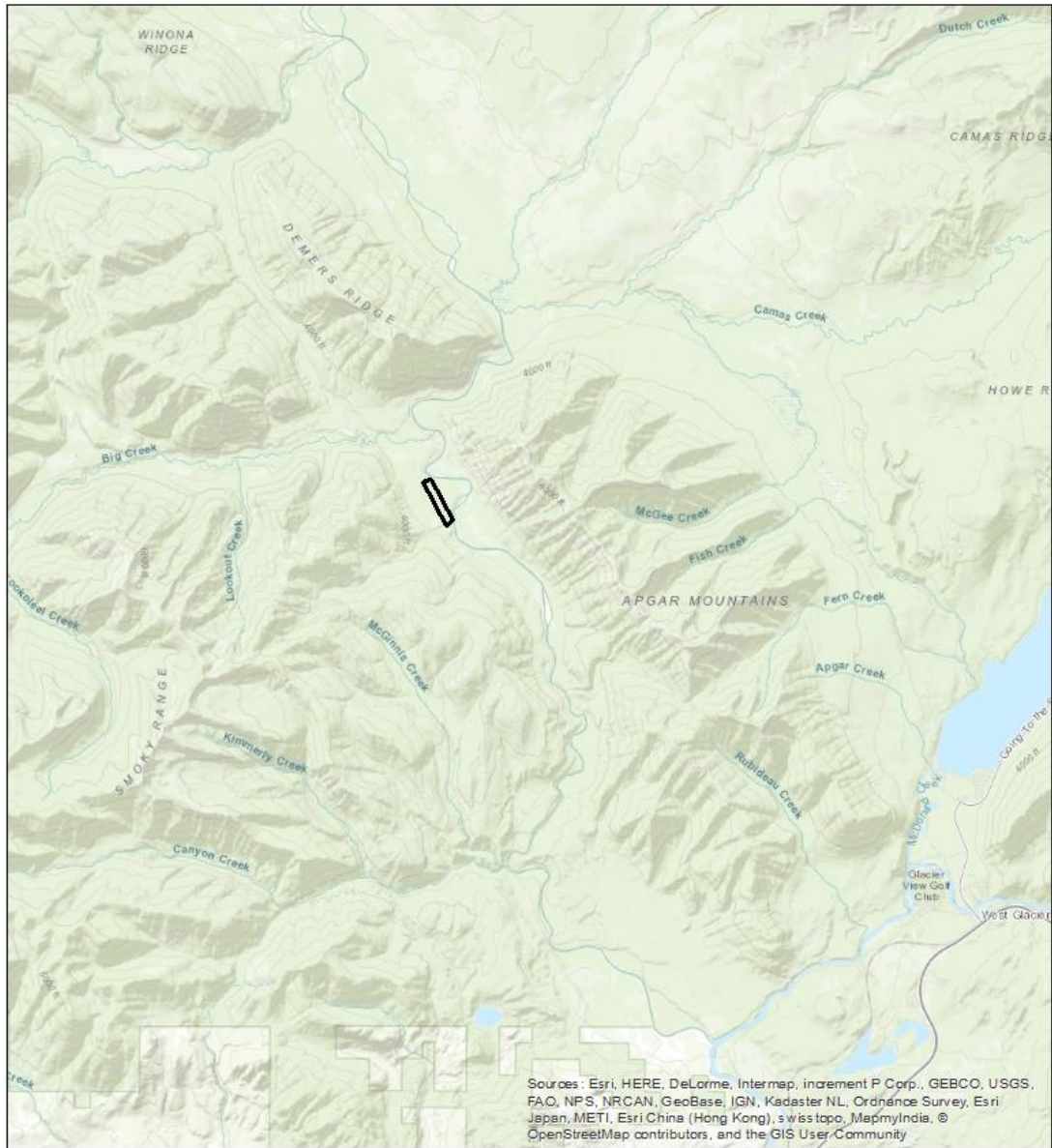
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 Dyer's Woad Location

0 0.15 0.3 Miles



Flathead County: Glacier Dyer's Woad



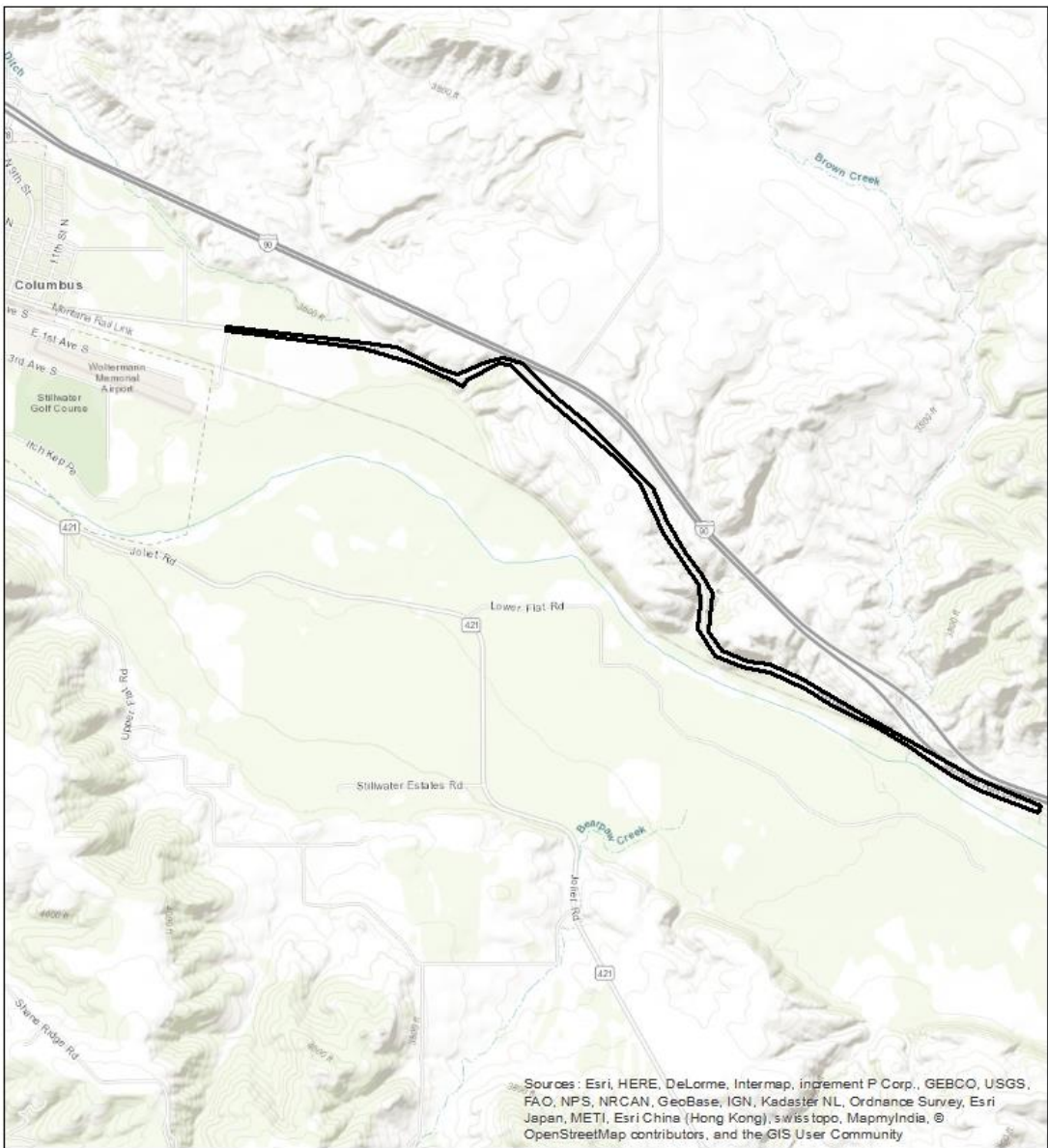
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 Dyer's Woad Location

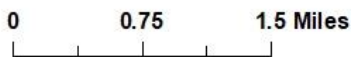
0 2.5 5 Miles



Stillwater County: Highway 10 Dyer's Woad



Legend



Powell County: Racetrack Dyer's Woad



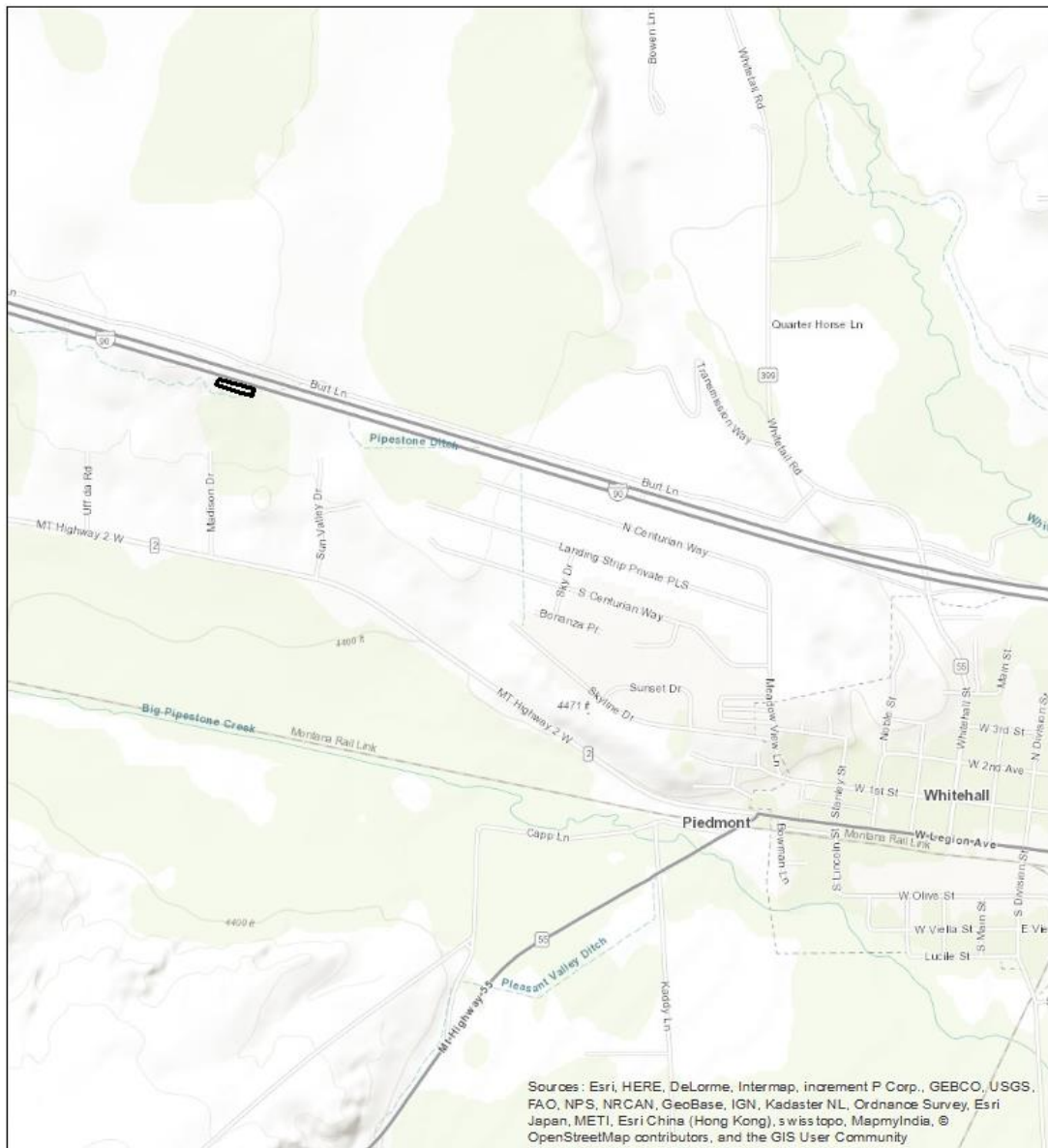
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 Dyer's Woad Location

0 0.15 0.3 Miles



Jefferson County: Whitehall Dyer's Woad



Legend

 Dyer's Woad Location

0 0.4 0.8 Miles

