

Summit CWMA Yellow Toadflax and Spurge 2023 ISM Control Program Report

January 2024

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PROJECT OVERVIEW

The Summit CWMA Yellow Toadflax and Spurge Control Program is a multijurisdictional effort to control yellow toadflax (*Linaria vulgaris*), a Class 1B noxious weed, Myrtle spurge (*Euphorbia myrsinites*), a Class 3 noxious weed, and leafy spurge (*Euphorbia esula*), a Class 2 noxious weed. The project area includes one large area (Deer Valley Resort to the base of Wasatch State Park) and several smaller areas (Snyderville Basin and Chalk Creek) in Summit and Wasatch Counties.

Yellow toadflax is very common on Bonanza Flat and has spread into the wildlands leading into Wasatch State Park. Myrtle spurge occurs in the state park and in



YELLOW TOADFLAX
Class 1B
Noxious Weed

Snyderville Basin and Park City in small populations. Large populations of leafy spurge have been mapped (2021 - 2023) in Wasatch State Park Campground, Dutch Hollow, and Chalk Creek/South Fork. Smaller populations have been mapped in Pinebrook, along East Canyon Creek and at Coyote Canyon. One of the

driving forces behind this dual county program is concern that extensive recreational trails and their use will carry yellow toadflax and leafy spurge further into Wasatch and Summit County. Partners in Summit and Wasatch counties hope to stop the spread of these species by working together.

METHODS

Inventory and Monitoring

Inventory and Mapping

Inventory efforts for new populations of yellow toadflax, Myrtle spurge, and leafy spurge are focused along roads, trails, creeks and rivers and areas adjacent to known populations. The goals of inventory are to identify population distributions and boundaries within the project area so strategic treatment plans can result in cost effective control. Weed distribution and percent cover data are collected in the field using ArcGIS Field Maps and used to direct control efforts.

Monitoring

Contractors monitor current populations and areas adjacent known populations. The goals of monitoring are to track population statuses and treatment effects.

Monitoring also includes the use of transects of 70 feet in length monitored using line intercept method and, at some sites, 2x2 ft plots every 10 feet along the transect. Transects and plots are established to track the changes in weed cover, native plant cover, and plant diversity.

Herbicide Application

Herbicide treatment targets yellow toadflax (Herbicides: Telar or 2,4D x Milestone combo) in the late vegetative and flowering stages, while Myrtle and leafy spurge are treated at all stages prior to holding seed (Herbicides: 2,4D and Milestone).

Mechanical Treatment

Three Myrtle spurge populations at Toll Canyon, Utah Olympic Park and Empire Pass are hand weeded and treated with herbicide approximately one month later. Because the percent cover of spurge at these sites is less than 10%, revegetation efforts are in progress. Weeding allows us to limit herbicide use while seeded natives are establishing.

Biological Control

Partnering with the Summit County Weed Supervisor, Utah Weed Supervisors Association and UDAF, we are able to use biological control agents for yellow toadflax and leafy spurge.



Leafy Spurge Flea Beetle (Apthona spp)

Because biological controls act slowly and cannot completely eradicate the weed, multiple control methods—particularly herbicide— are used alongside biological control. In 2023, biological control agents were not used as the shifted season—due to a late spring—caused plants to mature too late in the season to obtain bugs.

RESULTS AND ACCOMPLISHMENTS

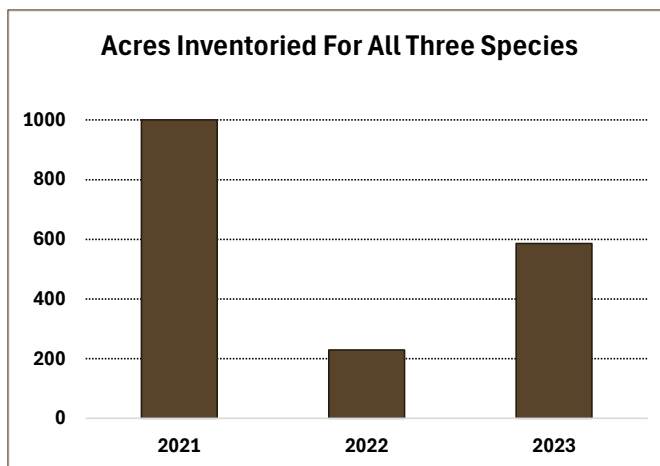
During the summer of 2023, 591 acres of additional land were inventoried for yellow toadflax, Myrtle spurge, and leafy spurge. Approximately 50 acres of leafy spurge and

PROJECT GOALS

Gain a more accurate map of yellow toadflax, Myrtle spurge, and leafy spurge distribution to allow for direct adaptive management of these species, prevention of further spread, containment of large populations, and, wherever possible, eradication.

2 acres of yellow toadflax were identified and mapped during inventory efforts. Herbicide treatment was completed for 10.1 acres of yellow toadflax, almost 1 acre of Myrtle spurge, and 14.6 acres of leafy spurge.

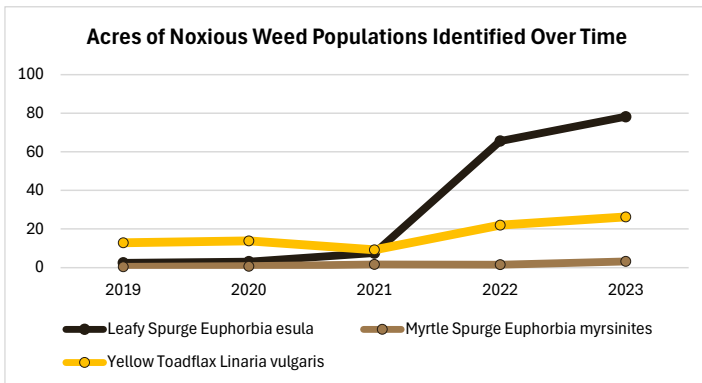
We prioritized inventory for these three target species in the areas adjacent the Toll Canyon Myrtle spurge population (particularly downslope), a portion of the Deer Valley Trail system, additional trails in Bonanza Flat, Wasatch State Park trails and campground area, Dutch Hollow, and Coyote Canyon. This list equated to the prioritization of 400 acres for inventory, with a goal of actually inventorying 250 acres. We exceeded both of our goals, and even the total prioritized acres, by inventorying 591 acres. That said, we did not monitor all of the areas we had prioritized due to delayed access (late snowmelt) or consent to access certain properties. Specifically, we did not inventory additional areas in Bonanza Flat, portions of Wasatch State Park, the areas downslope from the Toll Canyon Myrtle spurge population. Regardless, we inventoried more acres than



The acres inventoried each year is dependent on funding and access. When roads and easily accessed trails are inventoried, more acres can be visited than when inventory areas are more remote or require bushwacking.

| COMMON NAME | LATIN NAME | 2019 ACRES | 2020 ACRES | 2021 ACRES | 2022 ACRES | 2023 ACRES |
|-----------------|-----------------------------|------------|------------|------------|------------|------------|
| Leafy Spurge | <i>Euphorbia esula</i> | 2.47 | 3.11 | 7.56 | 65.6 | 78.21 |
| Myrtle Spurge | <i>Euphorbia myrsinites</i> | .42 | 0.708 | 1.64 | 1.52 | 3.18 |
| Yellow Toadflax | <i>Linaria vulgaris</i> | 12.82 | 13.79 | 9.22 | 21.97 | 26.32 |

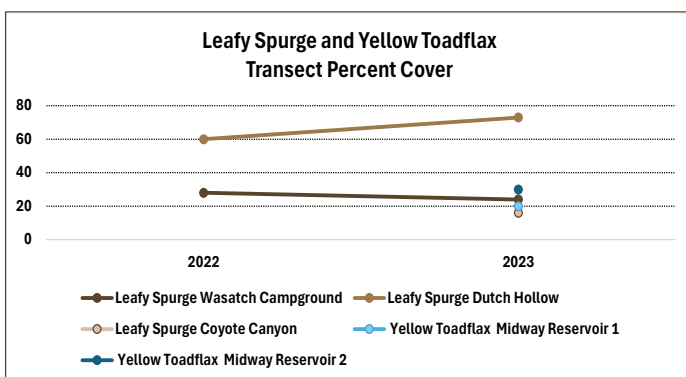
Known populations of the targeted noxious weeds. Each species known acres has increased, however, this increase is due to inventory work in new locations identifying additional populations.



The number of acres of each species has increased each year due to increased inventory efforts, not due to spread.

we had planned by accessing newly emerging priority areas in regards to yellow toadflax and leafy spurge. New populations of Myrtle and leafy spurge were found in residential properties and treated where consent could be obtained. Yellow toadflax populations were found on public and private lands and treated on public lands to the extent possible in this shortened season.

Because we anticipated that access to—and therefore treatment of—Bonanza Flat could be significantly



Three of the five transects were established in 2023 so we have limited data. We will continue to monitor these sites.

delayed due to weather conditions and snowpack, we reached out to the Summit County Weed Board to see if there were known populations of either spurge or yellow toadflax that landowners needed help with. The Board identified a number of private ranch properties along South Fork Creek and Chalk Creek with leafy spurge that had not yet been mapped. Given their proximity to flowing bodies of water, these sites became a priority; work was aimed at preventing the spurge from reaching the Weber River. We inventoried 466 acres of these properties and found 7 acres of leafy spurge. All populations were treated with herbicide. We plan to assist these landowners again in 2024 and may acquire biological controls to enhance treatment impact. We also intend to inventory additional properties just up and downstream from these known populations.

Additional populations of leafy spurge were also found and mapped in Wasatch State Park, Dutch Hollow and Coyote Canyon. Almost two acres of leafy spurge were mapped within the 260 acres inventoried along the Coyote Canyon Trail system. These new populations were not treated in 2023 because we had not identified the correct land manager to gain consent from. In 2024, we will work with Quinten Lewis of the Wasatch County Weed Department and Wasatch Trails Foundation to spray these new populations.

Small populations of yellow toadflax were identified and mapped throughout the project area, but previously mapped populations remained stable or are declining. Percent cover of yellow toadflax at Bonanza Flat continues to decline in populations we have previously mapped and treated; however, new populations

2023 % PROJECT GOALS COMPLETE

ACRES
INVENTORIED
250%

594 Acres Inventoried
35.6 Acres Monitored
52 Acres Mapped
5 Transects Monitored

ACRES
TREATED
52%

25.7 Acres Herbicide Treatment
0.1 Acres Hand Weeding
10.08 Acres of Yellow Toadflax
0.8 Acres of Myrtle Spurge
14.61 Acres of Leafy Spurge

BIO-
CONTROLS
RELEASES
0%

0 Leafy Spurge Beetle Releases
0 Yellow Toadflax Beetle Releases

ACRES
RESTORED
456%

4 Restoration Sites
9.18 Acres Revegetated

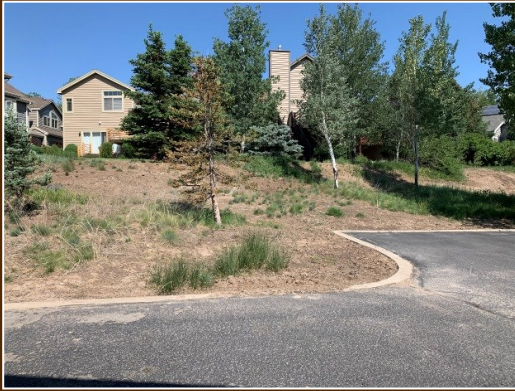
2023 Yellow Toadflax and Spurge Control Program Partners

Deer Valley - Laura Sexton, Paul Hedman
District - Phares Gines, Matt Bengo
Ecology Bridge - Sara Jo Dickens
Park City School District - Todd Hansen
Pinebrook HOA - Stephen Herrerra
Snyderville Basin Special Recreation
Summit County - Dave Bingham, Dan Pena
USU Extension - Elizabeth Cohen
Utah Dept of Agriculture and Food
Utah Weed Control Supervisors - Jerry Caldwell
Wasatch County - Quinten Lewis
Wasatch State Park - Jonathan Hunt and Tom Halladay

Ecker Hill Leafy Spurge Control Project

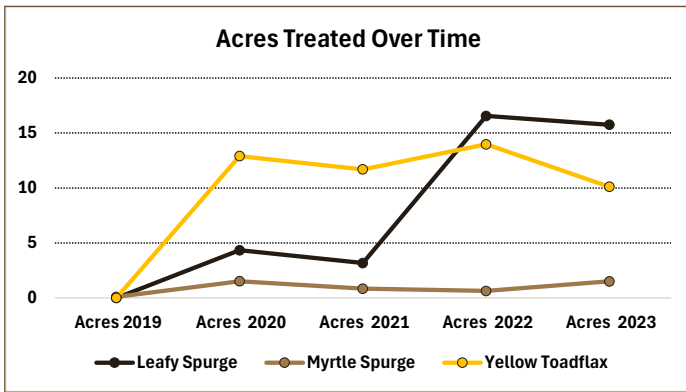
Property along the boundary of Ecker Hill Middle School and Pinebrook HOAs historically had a leafy spurge population of 6 acres. After 5 years of treatment with biological control agents and herbicide (Tordon), the leafy spurge is nearly absent. Whitetop (*Lepidium draba*) then invaded to replace the spurge. After two years of treating the whitetop, it too is declining.

Three years of revegetation using a range of intensities from seeding alone to the application of soil amendments (biochar/compost mixture) followed by seeding is starting to show success. Bare ground patches are still present and patches of both weeds still need treatment but the site is progressing towards a desirable native bunchgrass and wildflower state.



Top: 2021 after several years of biocontrol and herbicide but before revegetation
Bottom: 2022 Spring

Bottom Center and Right: Fall 2023

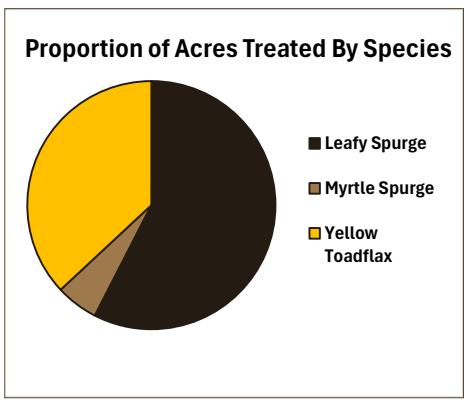


Fewer acres of yellow toadflax were treated due to the delayed growth of populations on Bonanza Flat. The control window was too short to treat as many populations as we have in the past.

continue to be discovered. Due to the late spring, Bonanza Flat was not ready for treatment until much later in the season than usual; snow came in before we were able to inventory the areas adjacent to known populations or monitor and treat the known populations.

In addition to inventorying for weeds, crews monitored known sites to direct treatment and assess weed population status over time. Transects within leafy spurge populations at Dutch Hollow and Wasatch State Park were revisited in 2023. Results indicate that spurge may be declining at the State Park site and increasing only slightly at the transect in Dutch Hollow. An additional transect was established in leafy spurge at Coyote Canyon in 2023. Yellow toadflax transects were established at two locations around Midway Reservoir. All transects will be revisited in 2024. Monitoring was also used to update EDDMaps data.

Treatment efforts were somewhat more difficult to manage in 2023 than in other years. Delayed spring conditions resulted in a shortened control season and



limited control crew availability. Many contractors accepted work outside of their normal service areas while sites in our project area were still

under snow; this situation caused scheduling difficulties later in the season. That being said, 25.7 acres of noxious weeds were still treated, the majority of which were leafy spurge populations.

The Ecker Hill Middle School leafy spurge population, along with the whitetop (*Lepidium draba*) that replaced it, was treated and portions of the site were revegetated.

Myrtle spurge populations in the three open spaces, Toll Canyon, Utah Olympic Park and Empire Pass/King Road areas, were hand-weeded and then treated with herbicide. The need for hand removal was limited in 2023 as population densities are declining. This is particularly true of the Utah Olympic Park population where only a few plants were observed and removed. These sites were also revegetated, using either seeding alone or soil amendments plus seeding, in fall of 2023.

CHALLENGES

Weather - The record-breaking snowpack of 2022-23 resulted in a late spring, as well as high water levels in creeks and streams. This delayed our access to areas such as Bonanza Flat and portions of Deer Valley’s trail systems, and limited our ability to cross Southfork and Chalk Creeks. We addressed this issue by inventorying everywhere that we could get consent to access as soon as conditions allowed. Still, weather conditions shortened the length of the season in which reliable plant identification and treatment could occur.



Midway Reservoir Wetland

Herbicide Contractor Availability - While we work with a number of dedicated herbicide contractors, the increased work loads taken on by these contractors in 2023 limited our ability to get crews to all of the locations we needed treated at the proper time. To address this, we brought in another contractor with larger crews from American Fork. We have already made arrangements to have them take on a larger portion of our control needs in 2024.

Access - There are known populations of Myrtle and leafy spurge that have not been mapped or treated, and additional populations of yellow toadflax that have not been treated because we have not been able to either identify the property owner or obtain consent to access their property. We will continue to work with our partners to communicate with these landowners.

ADAPTIVE MANAGEMENT PLANNING

The population of leafy spurge mapped along Chalk Creek and Southfork Creek are fairly large and, with their proximity to moving water, it is unlikely that these are the only populations in the creek system. We have already begun efforts to obtain contact information for parcels up and downstream of these populations in preparation for extending inventory efforts in 2024. We will also treat as much of these populations as possible. Given the size and density of populations, introducing biological control insects would be appropriate. We hope to also establish 2 transects (one where we include biological control and one where we do not) within the



Leafy spurge population in Chalk Creek

area to track change over time.

Through a growing partnership with Quinten Lewis and the Wasatch CWMA, we have learned that focusing our inventory and treatment on the Wasatch State Park Campground and trails and the state lands south of Heber City, and managing control crews to treat leafy spurge on the Coyote Canyon trails would be most useful to them. They have a good handle on Dutch Hollow, so we are removing that location from our project area

In the case of yellow toadflax, we aim to inventory trails and roads of Bonanza Flat and the trail system between Bonanza Flat and Wasatch State Park Campground. Additional trails within the Deer Valley trails system and a new population reported on the trails of the Canyons Ski Resort will also be priorities.



Myrtle spurge population in Parley's Canyon

Myrtle Spurge continues to remain limited in Summit County. As such, we plan to revisit all known populations that we have access to, assess population statuses, and develop a plan for future inventory. One area of potential concern is the 910 Ranch property recently put under a purchase agreement with Summit County. Given the high density and prevalence of Myrtle Spurge in Parley's Canyon, there is concern it may have crossed the county line into the Ranch. The Summit CWMA plans to partner with Jessica Kirby of the Summit County Open Space Department to inventory this boundary for Myrtle spurge, along with yellow starthistle, to inform the noxious weed management plan they are currently developing for the property.

Treatment will focus on known areas, using herbicide as

the primary control. We would like to increase the use of biological control; however, obtaining the necessary bugs has been a challenge. We hope to work closer with the Utah Weed Supervisors Association to expand this component of our program.

Restoration of the Ecker Hill leafy spurge population has proven difficult, but is making some progress. We will continue to monitor, treat weeds and supplement restoration sites. The change in plant community is quite visible and residents are starting to interact with us to learn about what is happening. Many have inquired about establishing pollinator habitat there. We will work with them to apply for plants from the State Pollinator Habitat Program if resident interest is still there in 2024 and irrigation can be supplied to the area.

We will also continue to monitor and supplement the revegetation sites in Toll Canyon, King Road, and the Utah Olympic Park.

FINANCIAL UPDATE

The Summit CWMA Yellow Toadflax and Spurge Program was awarded \$35,428 for the 2023-24 state fiscal year. In addition, \$14,031.46 carried over into spring 2023 from the 2022-23 state fiscal year grant funds making a total of \$49,459.46 available for the 2023 season. Of that budget, \$41,679.40 was spent in 2023 leaving \$7,780.06 to roll over into spring of 2024 to be spent before June 30, 2024.

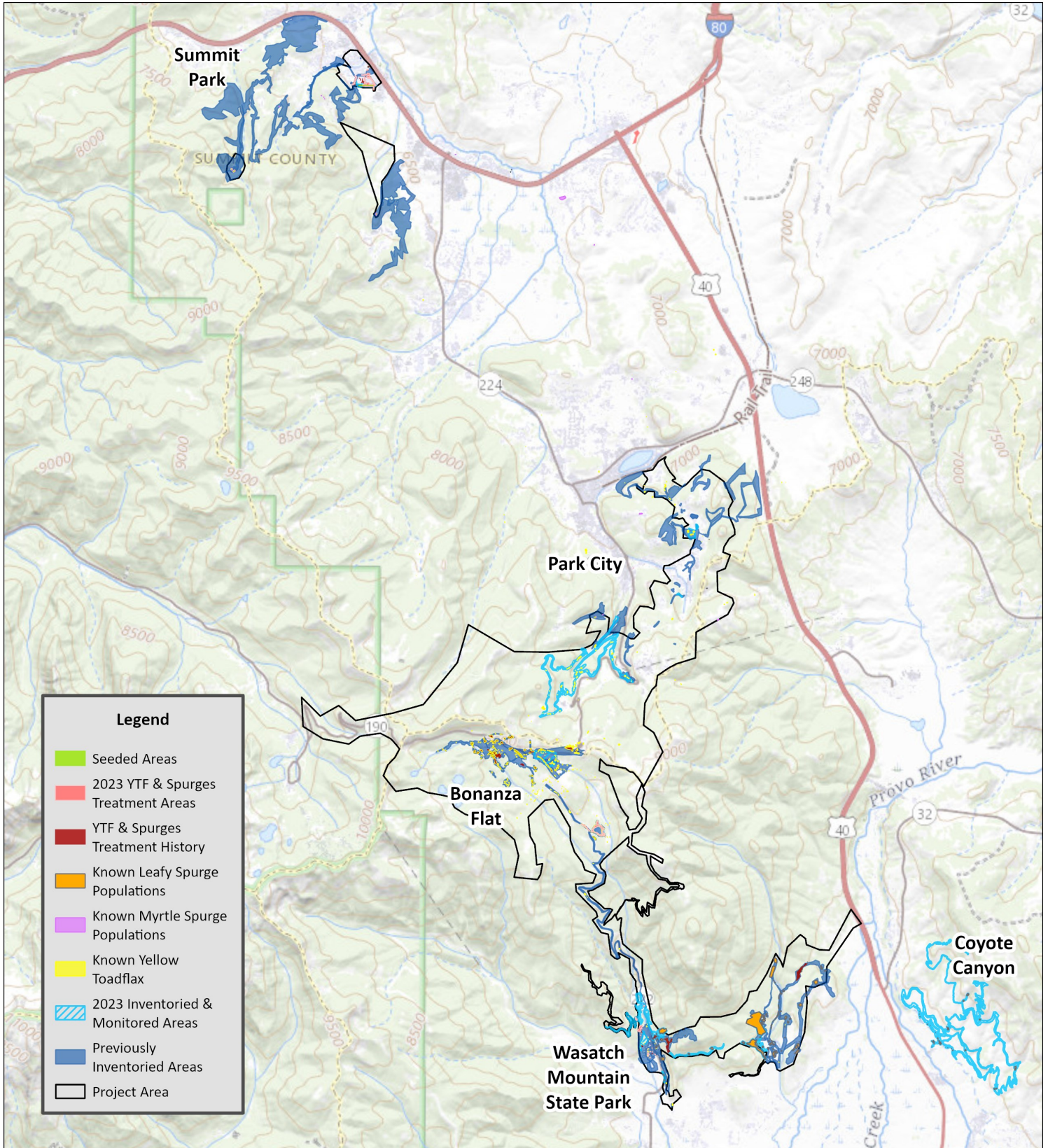
| Line Item | Description | Invoiced |
|---|---|--------------------|
| Expenses from January 1 - June 30, 2023 | | |
| Inventory | Inventory of new areas to map previously unknown populations of leafy spurge, Myrtle spurge and yellow toadflax | \$8,952.50 |
| GIS Specialist | Management of GIS databases, Updating Arc FieldMaps, Updating EDDMaps | \$1,500.00 |
| Administration | Project management, budgeting, partner correspondence, contract management and fiscal agent costs | \$239.45 |
| Mechanical Removal | Hand weeding of Myrtle spurge in limited areas | \$121.20 |
| Herbicide | Herbicide purchased from Summit County for partners to use | \$411.00 |
| Herbicide Contractor | Application of herbicide by licensed contractor | \$1,800.00 |
| Supplies | Soil amendment and native seed | \$1,007.31 |
| Expenses from July 1 - December 31, 2023 | | |
| Herbicide Treatment | Application of herbicide by licensed contractor | \$12,650.00 |
| Inventory and Monitoring | Inventory of new areas to map previously unknown populations of leafy spurge, Myrtle spurge and yellow toadflax | \$7,008.10 |
| GIS Specialist | Management of GIS databases, Updating Arc FieldMaps, Updating EDDMaps | \$905.30 |
| Revegetation Labor | Revisiting a limited number of known knapweed populations to assess status and control impact, monitoring transects and update EDDMaps data | \$4,664.40 |
| Supplies | Soil amendment and native seed | 1462.44 |
| Administration | Website costs, project management, budgeting, partner correspondence, contract management | \$957.70 |
| Total Spent in 2023 | | \$41,679.40 |

| Line Item | Description | Invoiced Amount |
|--------------------|--|--------------------|
| Other | Deer Valley Resort - Discounted lunch - State and Weed Supervisors biocontrol tour | \$ 714.00 |
| Administration | Ecology Bridge - Project reporting | \$ 280.00 |
| Labor | Basin Recreation - Staff hours aiding with the Toll Canyon revegetation | \$ 400.00 |
| Equipment | Basin Recreation - Truck to haul compost and biochar to remote Toll Canyon | \$ 44.00 |
| Total Match | | \$ 1,438.00 |

SUMMIT CWMA YELLOW TOADFLAX AND SPURGE CONTROL PROGRAM 5 YEAR PLAN

| Year | Annual Goals/Metrics |
|-------------|--|
| 2026 | Inventory - TBD based on previous inventory results and partner needs |
| | Monitoring/Research - 8 research transects: Wasatch State Park, Midway Reservoir, Dutch Hollow, Coyote Canyon, Chalk Creek, State land south of Heber |
| | Control Treatments - Treat 50 acres (herbicide/mechanical) |
| | Biological Control - 4 biocontrol releases (Coyote Canyon and Elk Horn Canyon) |
| | Revegetation - Maintain: Ecker Hill, Utah Olympic Park, Toll Canyon and King Rd (2 ac) |
| | Partnerships - TBD based on previous inventory results and partner needs |
| 2025 | Inventory - Remaining trails at Wasatch State Park, Bonanza Flat and Deer Valley and remaining areas of the State land south of Heber (300 ac) |
| | Monitoring/Research - 8 research transects: Wasatch State Park, Midway Reservoir, Dutch Hollow, Coyote Canyon, Chalk Creek, State land south of Heber |
| | Control Treatments - Treat 50 acres (herbicide/mechanical) |
| | Biological Control - 4 biocontrol releases (Chalk Creek and Elk Horn Canyon) |
| | Revegetation - Maintain: Ecker Hill, Utah Olympic Park, Toll Canyon and King Rd (2 ac) |
| | Partnerships - TBD based on previous inventory results and partner needs |
| 2024 | Inventory - Bonanza Flat, WOW trail and connector, State land south of Heber, Portions of 910 western boundary (400 ac) |
| | Monitoring/Research - 8 research transects: Wasatch State Park, Midway Reservoir, Dutch Hollow, Coyote Canyon, Chalk Creek, State land south of Heber |
| | Control Treatments - Treat 40 acres (herbicide/mechanical) |
| | Biological Control - 4 biocontrol releases (Chalk Creek and Elk Horn Canyon) |
| | Revegetation - Maintain: Ecker Hill, Utah Olympic Park, Toll Canyon and King Rd (2 ac) |
| | Partnerships - Partner with Wasatch Trail Foundation |
| 2023 | Inventory - Dutch Hollow, Wasatch State Park, Midway Reservoir, Coyote Trail System, Chalk Creek/Southfork Creek (591 ac) |
| | Monitoring/Research - 5 research transects |
| | Control Treatments - 26 acres treated (herbicide/mechanical) |
| | Biological Control - 0 biocontrol releases |
| | Revegetation - Maintain: Ecker Hill: Established 3 new: Utah Olympic Park, Toll Canyon and King Rd (2 ac) |
| | Partnerships - Partnered with the Wasatch CWMA |
| 2022 | Inventory - Dutch Hollow and Wasatch State Park (229 ac) |
| | Control Treatments - 31 acres treated (herbicide/ mechanical) |
| | Biological Control - 5 biocontrol releases |
| | Revegetation - Ecker Hill |
| 2021 | Inventory - Began inventory efforts in Wasatch State Park Campground and trails and at Dutch Hollow (334 ac) |
| | Control Treatments - 23 acres treated (herbicide/mechanical) |
| | Partnerships - Partnered with Wasatch County Weed Department |

2023 YELLOW TOADFLAX AND SPURGE PROGRAM INVENTORY AND TREATMENT MAPS

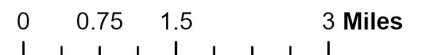


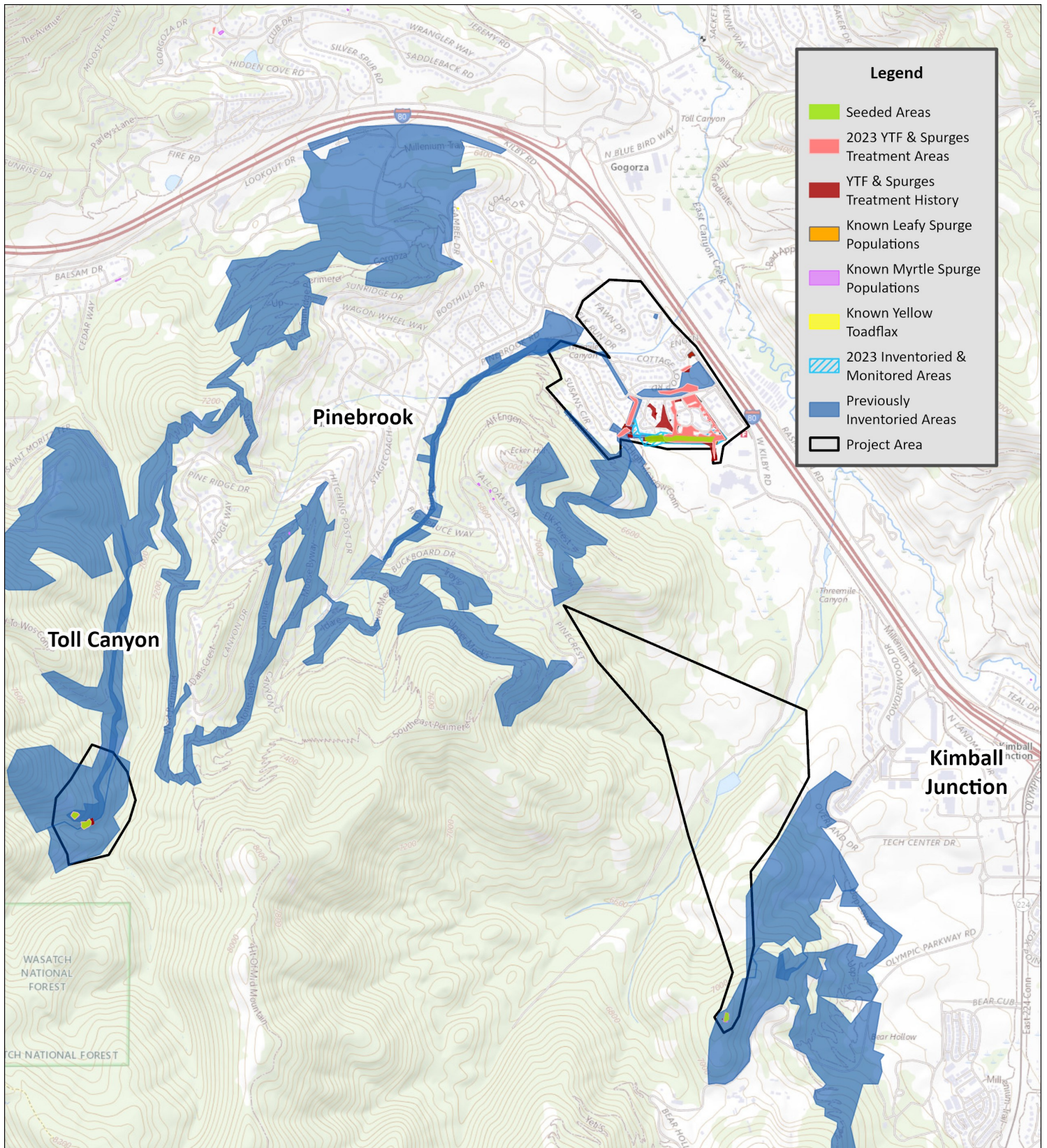
2023 Summit CWMA Yellow Toadflax & Spurges Control Program

Seeded areas, treatment areas & history, inventoried/monitored areas & history, and known populations of yellow toadflax, Myrtle spurge, and leafy spurge within the full project area. Known populations data are cumulations of data since 2018.



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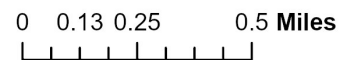


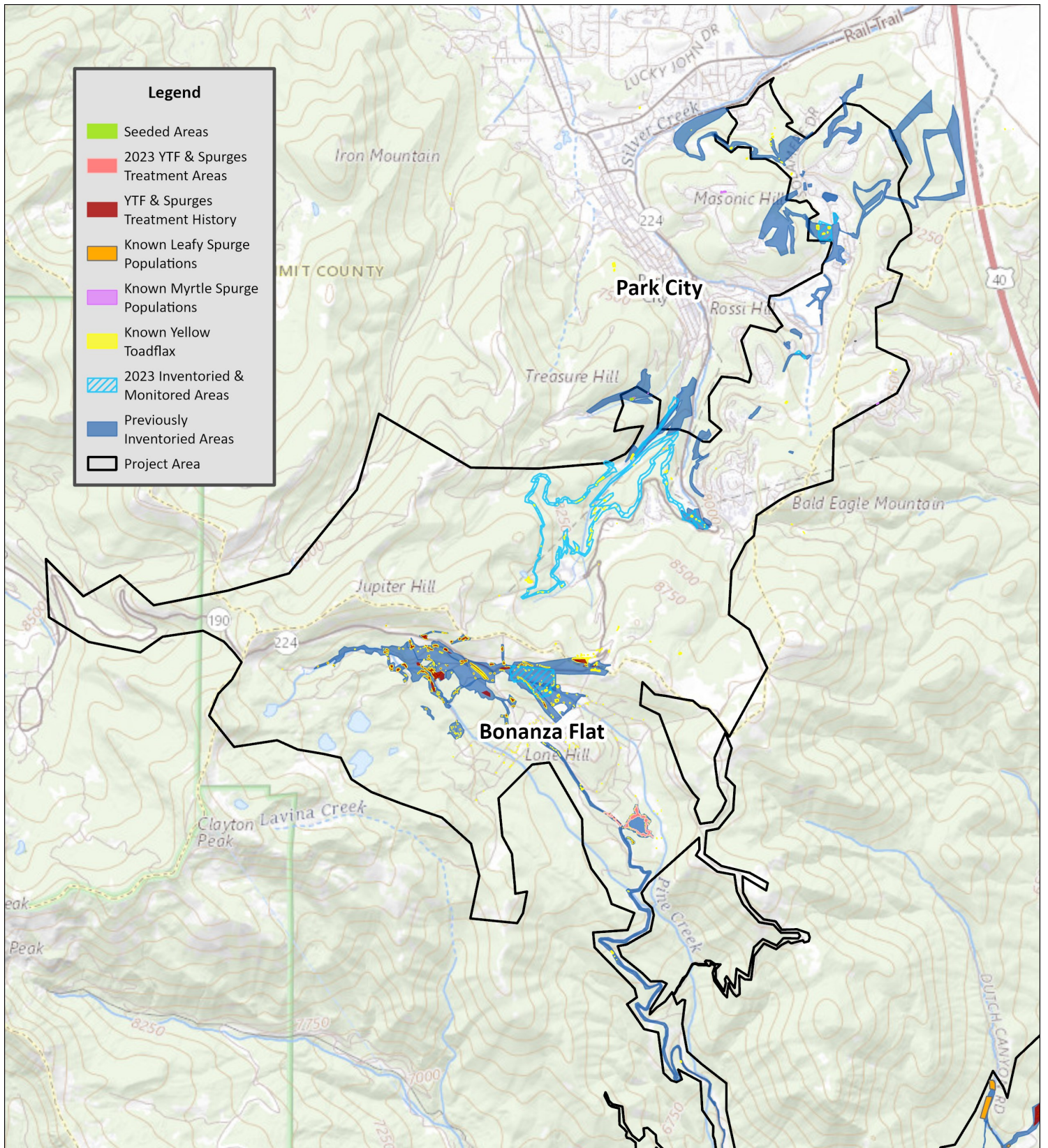
2023 Summit CWMA Yellow Toadflax & Spurges Control Program - Snyderville Basin

Seeded areas, treatment areas & history, inventoried/monitored areas & history, and known populations of yellow toadflax, Myrtle spurge, and leafy spurge within Pinebrook HOA, and Toll Canyon Open Space. Known populations data are cumulations of data since 2018.



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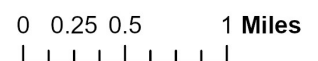


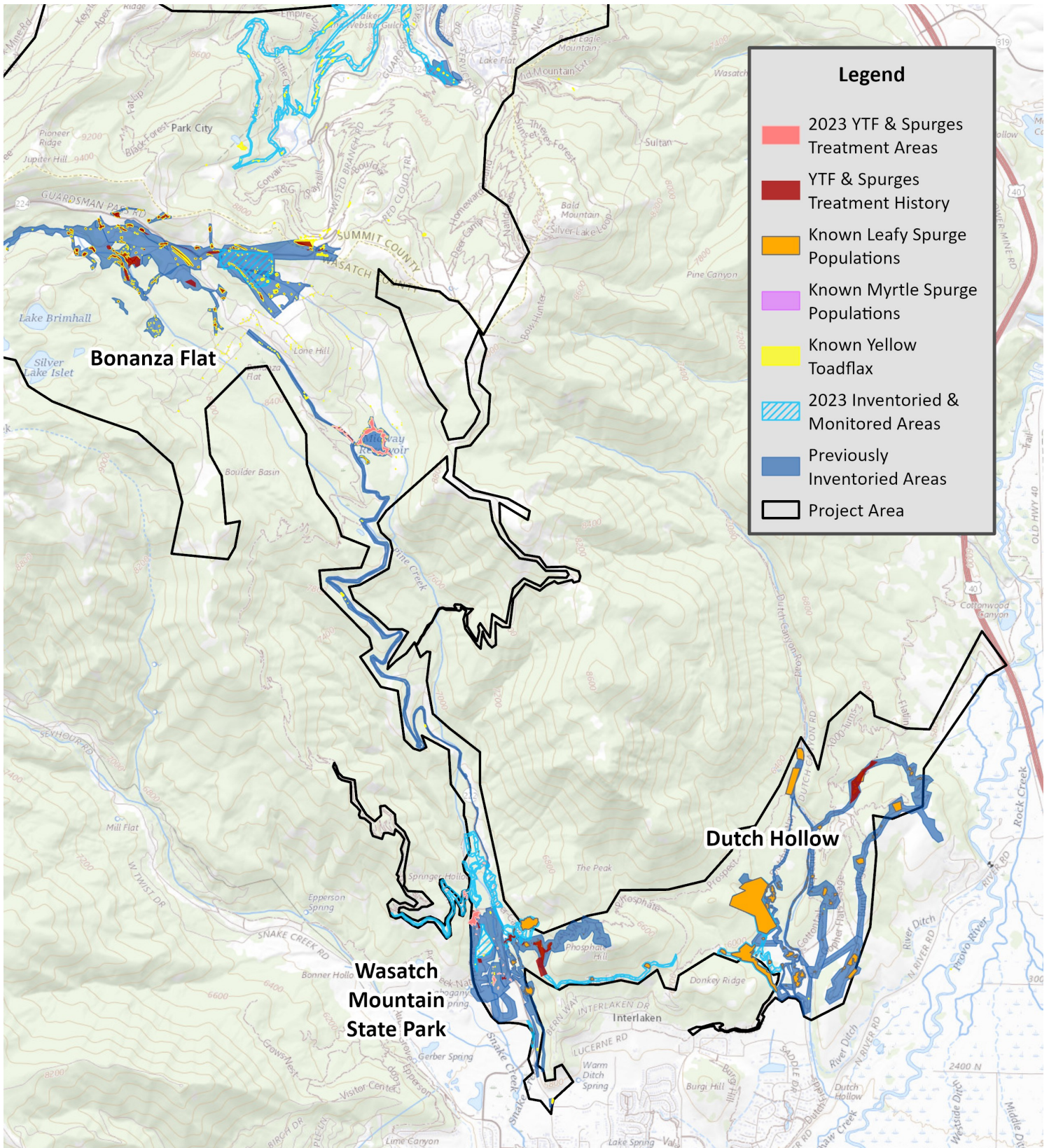
2023 Summit CWMA Yellow Toadflax & Spurges Control Program - Park City

Seeded areas, treatment areas & history, inventoried/monitored areas & history, and known populations of yellow toadflax, Myrtle spurge, and leafy spurge within Park City proper and Bonanza Flat. Known populations data are cumulations of data since 2018.




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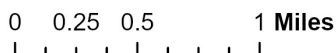


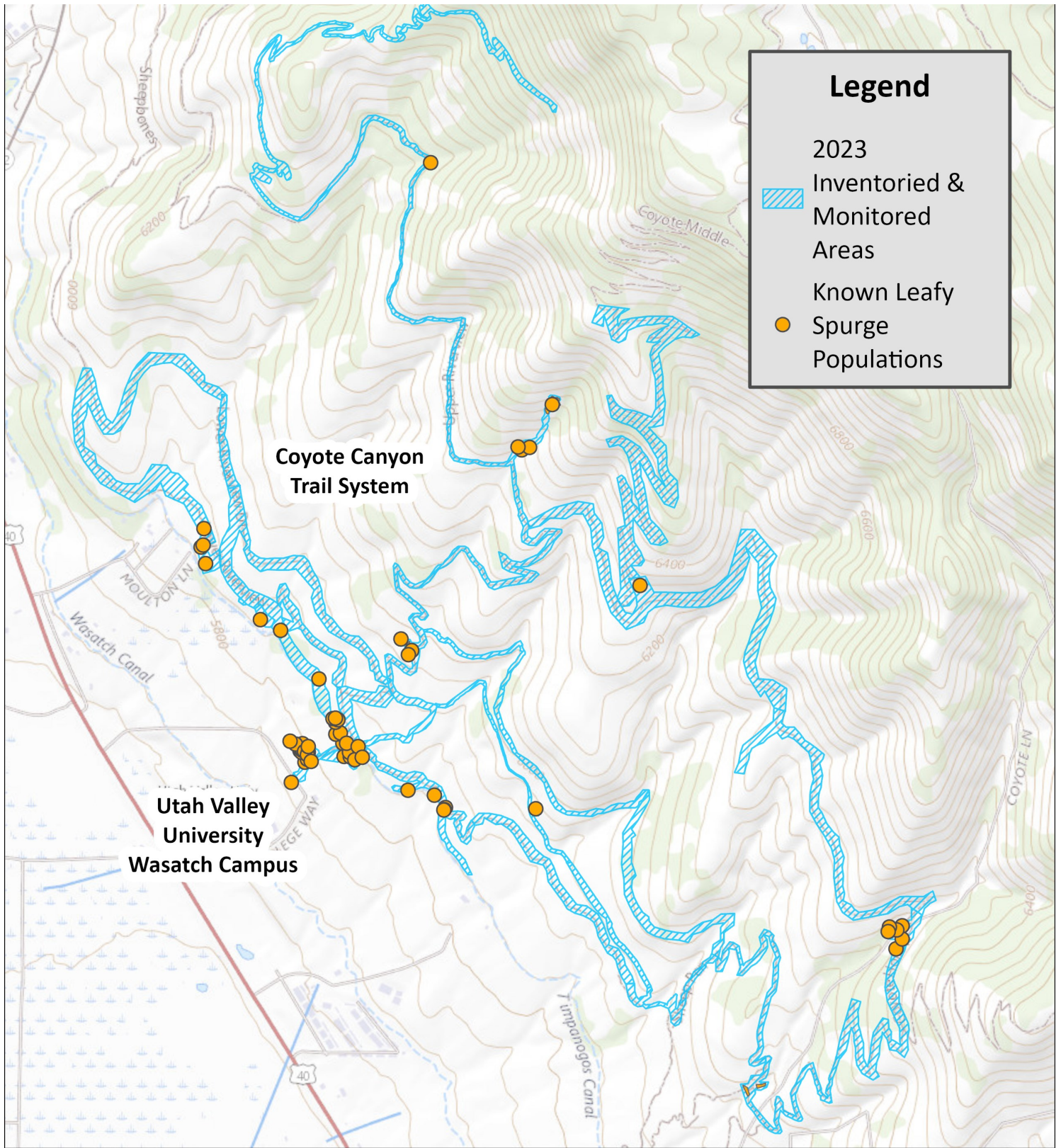


**2023 Summit CWMA Yellow Toadflax & Spurges Control Program -
Bonanza Flat & Wasatch Mountain State Park**

Seeded areas, treatment areas & history, inventoried/monitored areas & history, and known populations of yellow toadflax, myrtle spurge, and leafy spurge within Bonanza Flat and Wasatch Mountain State Park. Known populations data are cumulations of data since 2018.

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 Ecology Bridge LLC

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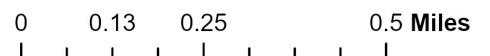


2023 Summit CWMA Yellow Toadflax & Spurges Control Program - Coyote Canyon & Riverview

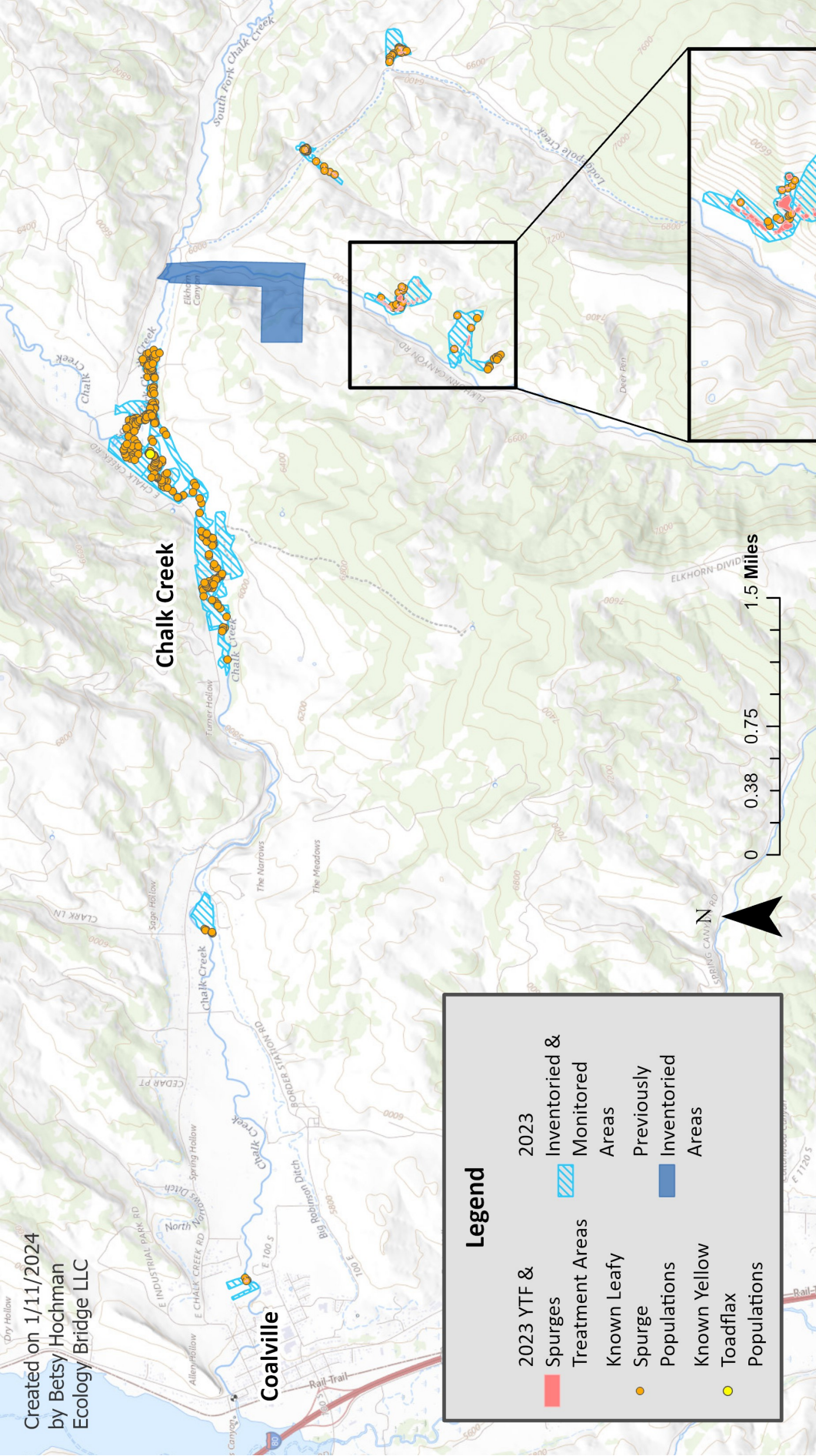
This map displays inventoried areas and known leafy spurge populations throughout the Coyote Canyon and Riverview trail systems located in Heber, Utah. This area had not been inventoried prior to 2023; small to large infestations were found along popular trails and throughout surrounding open space areas. This trail system is located across Highway 40 from the highly leafy spurge-infested Dutch Hollow trail system.



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by Betsy Hochman
Ecology Bridge LLC



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2023 Summit CWMA Yellow Toadflax & Spurges Control Program - Chalk Creek

Inventoried areas, known populations, and treated areas within Chalk Creek ranchland and open space. This area had not been inventoried prior to 2023; significant populations of leafy spurge have been mapped near waterways, areas frequented by wildlife, and adjacent land.

