



# **SUMMIT CWMA Final REPORT 2020-2021**

**EDRR Low Elevation Garlic Mustard Control  
in Summit County**

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# 01

## PROJECT SUMMARY

“My nightmares are filled with garlic mustard rosettes popping up here, there and everywhere. I frantically try to control the spreading garlic mustard deciding which plants to pull and which to spray ... The battle is exhausting . . . and then I awake, at 3:00 AM, to the realization that my garlic mustard nightmare is reality. ”

Cheryl Culbreth , Landscape Restoration, Inc.

The Low Elevation Garlic Mustard ISM EDRR Weed Control project in Summit County is funded through the Utah Department of Agriculture and Food, Invasive Species Mitigation Fund, and partner matching funds and in-kind donations. The project focuses on the Class 1B state noxious weed, garlic mustard (*Alliaria petiolate*). The Summit CWMA was awarded \$85,000 for the treatment of Garlic mustard in the lower Basin and northern Park City area during the 2021 fiscal year. Summit County, a member of the Summit CWMA, acted as the fiscal agent and Ecology Bridge as the Project Manager.

The project area was selected based on over 10 years of garlic mustard control data in Western Summit County. The Low Elevation Garlic Mustard Control project area focuses on removing garlic mustard and restoring natural ecosystems for protection of water ways and forests.

This is the ninth year of ISM funded garlic mustard treatment in Western Summit County, seventh year of contiguous treatment of garlic mustard in both the spring and fall of the same year, and the fourth year the project used hand weeding in remote, backcountry locations and prior to herbicide treatment (to thin flowering plants for better plant-herbicide contact).

This is the third year we partnered with local HOAs to assist with member outreach and obtain access to HOA open space. In 2021, the number of partnering HOAs increased; as such, HOAs became important for project promotion and volunteer participation in weed pull events. Summer 2021 was also the first official year of

the annual Garlic Mustard Games. The Garlic Mustard Games was designed to incentivize residents and visitors to assist in garlic mustard control while learning how to properly match control methods to target noxious weeds for greater success and less environmental impact.



*Glenwood Cemetery volunteers with members of Ecology Bridge on the first Garlic Mustard Games event of the season.*

# 02

## TREATMENT AND DATA COLLECTION

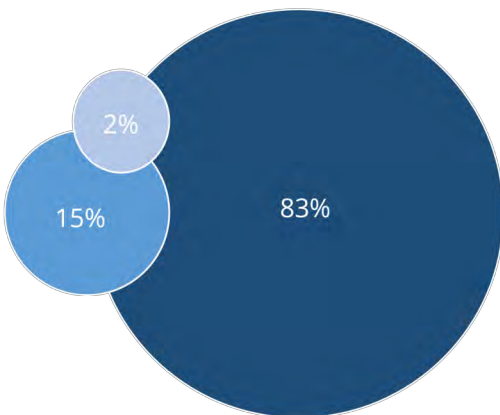
Treatment for this project is completed through a combination of partner staff, contractors and volunteers. Volunteers assist with hand removal of weeds and all chemical work is completed by licensed staff and commercial contractors.

The main partners include Summit County, Park City Municipal Corporation, Snyderville Basin Special Recreation District, Deer Valley, Moose Hollow HOA, North Shore HOA, Ranch Place HOA, Copper Moose Farms, Swaner EcoPreserve (outreach support), USU Extension Coalville Office (outreach support), and Temple Har Shalom. Along with partner in-house weed control efforts, the project used four weed management contractors including Providia Management Group (PMG), Ground Solutions, EcoLawn, and Ecology Bridge. PMG and EcoLawn provided herbicide control. Ground Solutions primarily provided herbicide control, but also limited mechanical removal, monitoring and seeding. Ecology Bridge was contracted to manage the project, manually control, monitor infestations prior to and after herbicide treatment, complete weeding in remote backcountry areas where follow up herbicide treatment was not efficient or necessary, carry out revegetation efforts, and run the Garlic Mustard Games.

Because garlic mustard has invaded hundreds of acres in Summit County, control using herbicide may be the most cost effective approach; however, the double layer canopy of this species limits herbicide efficacy. Because first-year rosettes do not get enough herbicide contact to be killed, complete control is difficult to achieve through a single application. We have addressed this issue by using hand weeding to thin dense second-year plants prior to herbicide application. This method has significantly increased our success rate. To bring the per acre cost of this work down, we strive to incentivize volunteer weed pulls. In 2021, we implemented a community-wide garlic mustard pull competition—drawing on HOA partnerships and outdoor groups, and offering prizes—to meet as much of our weeding needs as possible.

We continue to use ArcGIS Collector to capture new garlic mustard and other priority noxious weeds, and record treatment actions and herbicide rates. The app collects the following attributes: percent cover (or absence), dominant growth stage, control method used with herbicide rates, contractor or partner that applied treatment, number of bags of garlic mustard pulled from a site, number of hours on site, number of crew

## Treatment Methods



### Manual/Mechanical Control

The use of two approaches allowed for rapid treatment of backcountry patches while reducing overall herbicide use and ensuring more complete herbicide coverage of plants in all patches.

- Dense Patches: Flowering plants are weeded to thin the mustard canopy for more complete herbicide coverage using less herbicide.
- Small and Backcountry Patches: Both flowering and rosette stages are weeded.

### Herbicide Treatment

Four herbicides are used and chosen based on species treated, environmental condition and land use. Herbicide rates were also tailored for particular locations and sensitive individuals or resources.

- 2,4-D (Amine): 64oz/ac plus MSM 60: 1.5oz/ac
- Aquaneet: 2qt/ac
- Escourt XP (partner contractors)

### Cultural Control

Where other treatments have resulted in significant reduction of garlic mustard, revegetation is used to introduce competition. When herbicide is not an option and manual methods too laborious, garlic mustard is buried to prevent germination while the seedbank ages and dies off.

- Revegetation: Native grass seeding
- Mulch: mulching in shaded residential areas

and notes. The app was used to record areas monitored around known populations and newly reported populations, map treatment, and increase the efficiency of herbicide crews.

### 03a

#### TREATMENT RESULTS

Waterways in Snyderville Basin (i.e. Willow Creek) and Park City (i.e. Poison Creek) have significantly reduced garlic mustard cover. Population boundaries in Park City along McLeod Creek and the creeks of Thayne’s Canyon had declined in 2019; however, the distribution in 2020 was more similar to historic cover. This site remains dense with woody species making treatment difficult. A portion was thinned in 2021, weeded as part of the Garlic Mustard Games program and treated with herbicide. We will be monitoring this area in 2022 to see if our efforts already show progress.

Newly accessed HOA open space and residential properties that are newer to the program had dense garlic mustard populations and tended to have more flowering plants than those treated in the past.

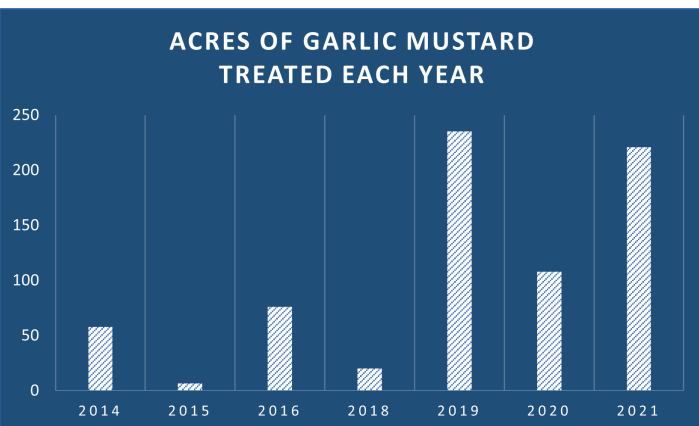
In 2021, approximately 221 acres were weeded with an additional 430 acres monitored. Within monitored areas,

small patches of garlic mustard were manually controlled and garlic mustard was absent on 186 acres revisited for treatment. Of the lands treated, four percent were private and the remaining 96 percent were public. Due to multiple germinations of garlic mustard, several sites were treated twice July through November and some three times. Additionally, 37 acres were reseeded with native bunchgrass.

To increase control success, we removed overgrown brush along a small section of McLeod Creek. Crews had been treating this area for years and the garlic mustard along the edge of the shrubs was significantly reduced but the garlic mustard in the shrubs remained dense. Thinning the shrubs provided better access to manual control and spray crews. In spring of 2022, garlic mustard populations were lower here, but Canada thistle was increasing.

The request to have residents pull flowering plants prior to our herbicide treatments was less relevant in 2021 due to low cover of flowering plants. Regardless, a few residents did inform us that they had pulled their flowering plants even though there were so few.

The ArcGIS Collector App continues to increase efficiency in management of control crews by allowing assignment of treatment work digitally and real time crew monitoring. However, some contractors still struggle to accurately map control areas; accordingly, regular monitoring of the data and follow up with crews regarding data is necessary.



*The number of acres treated has increased annually over the past seven years. This increase may be a reflection of increased funding, efficiency of the program and success of outreach efforts that facilitates more resident participation.*

### 03b

#### SPECIAL PROJECTS

Garlic mustard at the Masonic Trail site was first treated in 2018. Since then, percent cover of garlic mustard has remained below 15%. This rate is 72% less than original cover. A minor increase in seedlings was observed spring of 2020 and a single herbicide treatment again left the site with primarily bare ground except where seeding trials were established. In 2021, the site again remained

# 03b

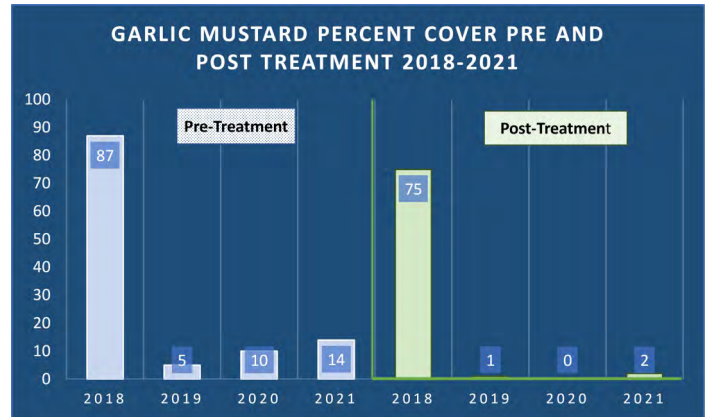
## SPECIAL PROJECTS

### Masonic Trail: Garlic Mustard Control Assessment Transects



Masonic Trail: Park City Open Space garlic mustard reduced to < 5%

below 15% cover however, dense populations were found downslope of the original site. The population appears to be moving along moose trails and exploding in ravines.



### Virginia Mine : Common St Johnswort Control and Revegetation



Description: Common St Johnswort dominated the site on the lower slopes, and upper slopes had a mixture of garlic mustard, dyer’s woad and Dalmatian toadflax in dense patches. After three years, control efforts had significantly reduced noxious weed populations, particularly the Common St Johnswort; however, native vegetation was not recovering. The bare ground needed to be covered to prevent erosion and reinvasion of St. Johnswort and garlic mustard.

Erosion matting was used to prevent soil erosion and hold seed in place until plants could grow and stabilize the slope. The tops of slopes and more gradual slopes were treated with a compost/biochar soil amendment then seeded with native grass mixes created for drier hillsides and high mountain elevations.

Current Results: Grasses have started to establish in patchy distribution. Greater establishment has occurred on less steep slopes. Additional seeding may be necessary and the use of amendments appears to be crucial in these mining-contaminated soils.



# 04

## Outreach

### Community Weed Pulls

The Summit CWMA Garlic Mustard Games combined our knowledge of garlic mustard control with community service to reduce herbicide use on public and private land while successfully controlling garlic mustard and triggering recovery of forest health. The project proposed two components; the first was a community-wide competition, and the second was a competition between HOA’s that have extensive garlic mustard populations and are working on its control. Due to the 2020 and 2021 drought conditions, there was significantly less flowering garlic mustard than in the previous five years. While this status, at first glance, seemed like great news, it was more likely a result of poor germination rates driven by poor growing conditions than a reflection of our success in controlling garlic mustard. While we’ve seen significant reductions in garlic mustard in the project area, control of this weed will take several more years.

The lack of flowering plants made it difficult to direct volunteers to garlic mustard populations unaccompanied. If we sent volunteers to known garlic mustard populations without first checking if they had enough flowering plants to make them visible, we risked volunteers getting frustrating or pulling native look-a-likes. To address this, we combined the two project components mentioned above into one community-wide competition. The new format included multiple weed-pull events with prizes and opportunity drawings, and a food truck party for overall winners—the individuals and teams that pulled the most garlic mustard over the course of the summer.



*Members of Ecology Bridge participating in a water quality outreach event at the Utah Olympic Park. Along with noxious weed information, staff informed the public on responsible revegetation post weed control and the new Trout Friendly Landscape program in Summit County.*

Official garlic mustard weeding events took place within the project area. Locations were selected by proximity to waterways, trails, and popular recreation areas. These sites are considered at high risk of further garlic mustard spread. In addition to organized events, residents could participate by pulling garlic mustard on their own, within their neighborhoods or on public lands. These participants were asked to weed garlic mustard, bag it, and then leave the bag at a trailhead or road or bring it to an event. They were also asked to take a photo of their pulled weeds and email it to [jo@ecologybridge.com](mailto:jo@ecologybridge.com) and post on Instagram or Facebook to enter the opportunity drawing.

Staff experienced in garlic mustard control were

*Table 1. Summary of Participation and Garlic Mustard Removal*

Event	# of Conversations With Passing Residents	# of Weed Books Taken	# of Volunteers	Lbs Garlic Mustard Removed
Recycle Utah Dumpster Days	12	2	2	37
McLeod Creek - Rotary Club Weed Pull	1	0	15	200
Ecology Bridge Crew During Events	0	0	5	400
Ongoing Individual Volunteers	0	0	4	100
<b>Total</b>	<b>13</b>	<b>2</b>	<b>26</b>	<b>737</b>

## 05

### Additional Partnership Project Components

present at each official event to assist volunteers in identifying garlic mustard and answer participant and passerby's questions. They also assisted volunteers pulling garlic mustard on their own to locate populations to pull. The presence of staff provided opportunity to discuss noxious weed impacts and the wide range of control methods available to residents. It also allowed us to sign more properties up for assistance with garlic mustard control and give site-specific direction for residents wanting to control weeds on their own.

A total of 26 volunteers participated in the removal of 737 pounds of garlic mustard. This amount of garlic mustard included both rosettes and flowering plants because of the lower-than-normal distribution of flowering plants. In addition, Sara Jo Dickens, the project manager, was a guest on KPCW's This Green Earth radio show to discuss noxious weeds and the environment and the Garlic Mustard Games.

To celebrate the many people that participated in the program in 2021 the Summit CWMA held a fall Garlic Mustard Games Food Truck party. Because the cost per person for the food truck was less than expected, we were able to invite everyone that volunteered to enjoy the delicious eats of Komrad's food truck and a final round of prizes for the season. Ashley Caldwell, who pulled almost 400 lbs. throughout the season, was announced the 2021 Garlic Mustard Games Champion. Weeding by volunteers and support staff prevented the need for application of 15 backpack sprayers of herbicide. Outreach beyond participants included conversations with 53 additional residents and tourists.

The Ranch Place and Northshore HOAs have continued to assist in advertising the program. The Moose Hollow HOA gave greater access to their open space which lead to discovery of a new, sizable patch of garlic mustard that will be the site of a garlic mustard event in 2022. Moose Hollow and the adjacent Jeremy Ranch HOAs continue to advertise our program to their residents.

#### Seeding Trials

The Summit CWMA was awarded funding from the Utah Weed Control Association for revegetation seed mix, soil amendments and biochar trials for shady garlic mustard treatment sites. Shady sites remain difficult to revegetate due to the lack of an effective seed mix and possible soil legacy effects of garlic mustard allelopathy. However, these trials are showing promise for identifying seed mixes and methods to address soil legacy impacts of long-term garlic mustard invasion. Trials were established along the Masonic Trail. To date, trials suggest there are native grasses that will germinate and establish under maple stands. Most grasses have not reached a growth stage that allows for identification; however, blue wildrye did flower and may be the most common species germinating. An additional set of plots was established fall of 2021 to further test the value of soil amendment applications for seeding.



*Newly established seeding trial plots in Rotary Park.*

#### UDAF Monitoring

Britany Duncan of UDAF established transects in Copper Moose Farms to track treatment success under the differing treatment methods. She and her crew were back to monitor these transects again in 2021.

## 06

### Contributors to Success

The following is a list of the project components we found most effective.

- Increasing the number of contractors allowed timelier treatment and response to limiting weather conditions.
- Use of Survey 123 to electronically invite residents to participate and gain consent to treat continues to make consent collection efficient and allowed discontinuation of paper letters.
- Hosting this program on the Summit County Weed Division website has made it easy for residents to find and sign up for the program. We look forward to seeing how the new CWMA website will increase participation.
- Use of the Arc Collector App keeps coordinating contractors efficient, and makes data available to partners to view at anytime.
- Partnering with HOAs further increased the reach of the outreach program and increased number of residents in new areas signing up for the program. Access to HOA open space not previously treated is helping address creeks and stream populations and have inspired HOA weed program development.
- Consistent partners and treatment
- Pre-treatment monitoring/survey: herbicide crew efficiency
- Post treatment monitoring to assess completeness and new growth
- Local government and weed department support.

## 07

### Challenges

Inconsistent participation of individual landowners continues to be a challenge. Each time a property goes two or more years without treatment, we see recovery of garlic mustard populations. We are using our historical treatment data along with current population data to aid in targeting long treated parcels to maintain the progress made in previous years. However, if a historically treated parcel is in the middle of a neighborhood with extensive invasion, the parcels may be placed secondary to other parcels that are adjacent open space and the edges of invasion fronts.

Some contractors continue to be inconsistent with the use of the ArcGIS Collector App. This reduced the efficiency of communication and slowed planning of contractor assignments. We will continue to work with supervisors to increase data entry on site before moving to the next treatment assignment.

Exceptionally late fall rains and snow led to Garlic mustard germination too late in the season to treat due to cold temperatures. This late germination also occurred in sites that have shown drastically reduced or no garlic mustard in recent years indicating a mass flush of the seedbank. This flush will result in cover of flowering plants in 2022 that will be difficult to completely control and may put previous success at risk.



*Glenwood Cemetery had limited flowering garlic mustard in 2021, but volunteers were committed to pulling it anyway.*



# 08

## Future Treatment Plans

### Monitoring

In 2022, a primary goal will be to continue monitoring of the newly found populations of garlic mustard at the Moose Hollow HOA to find its boundaries, monitor the East Canyon State Park populations, and monitor around the Masonic trail populations. These populations are known source populations for which we are less sure of the extent of the population distributions.

We will also continue monitoring the previous restorations, trials and transects. This includes the treatment transects at the Masonic Trail, the two seeding trials at Masonic Trail and Rotary Park, as well as, the Virginia Mine revegetation post common St Johnswort control.

### Outreach

The Summit CWMA website was completed in February of 2022 and has enabled the CWMA to more effectively educate the public and recruit volunteers and program participants. One element that will be most important is the calendar which we can use to keep volunteers in the loop throughout the season. We have several events in the planning stage for 2022.

To increase contractor effectiveness, we will be reimplementing the weed identification training we provided partners and the community prior to COVID. In 2022 there will be two trainings, April and June, to enable us to reach year-round staff that will hit the ground in May and then the seasonals that often do not start until June.

The Garlic Mustard Games will be held again in 2022 for which we have 12 community weed pull events planned. They will begin in May and continue through July or August. To celebrate the participants, we will use the remaining funds from the Park City Community Foundation - Climate Fund to hold a food truck party for the top 60 competitors (volunteers) in September of 2022. It is our hope that we will minimize contractor costs for mechanical removal by incentivizing residents and using good hearted competition between community groups.

In addition, we will continue compiling a list of respectable weed control contractors and landscape crews that can assist residents with weed control. This list is on the Summit CWMA website.

**Summit CWMA Low Elevation Garlic Mustard Control Program 5-Year Plan**

Garlic Mustard control began in 2010 as a partnership between the Summit CWMA, Salt Lake County and the Salt Lake Watershed. Garlic mustard has been treated using hand weeding, mulching, herbicide and restoration. Since the program began, over 1646 acres have been monitored and 42 acres revegetated/restored. Each year we anticipate needing to control more acres as more populations are found during monitoring, but we also anticipate the treatment efforts can be reduced in areas that have been treated for more than 10 years allowing us to continue to treat a similar number of acres with less effort.



	2021	2022	2023	2024	2025
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>	146	200	200	200	200
<b>Acres Restored</b>	37	1	1	1	1
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<b>Acres Monitored</b>	407/221	430	450	460	475
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<b>Acres Monitored</b>					
<b>Acres Restored</b>					
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
<b>Acres Restored</b>					
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
<b>Acres Restored</b>					
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
<b>Acres Restored</b>					
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
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<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
<b>Acres Restored</b>					
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
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<b>Acres Monitored</b>					
<b>Acres Restored</b>					
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
<b>Acres Restored</b>					
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
<b>Acres Restored</b>					
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
<b>Acres Restored</b>					
<b>Acres Revisited/Controlled</b>					
<b>Acres Monitored</b>					
<b>Acres Restored</b>					

# 10

## Project Partners

Thank you so much to our partners and sponsors for their contribution to this program. Thanks to the Utah Department of Agriculture and Food for funding this project. Thanks to the following partners and contractors for their participation:

Brook Hollow Village HOA: Barbara Yamada

Copper Moose Farms: Ben Smaha

Cove at Eagle Mountain: Ryan Dickey

Deer Valley: Laura Sexton and Paul Hedman

Ecology Bridge: Sara Jo Dickens

Ground Solutions: Sterling Graham

Hidden Cove HOA: Erin Ferfusion

Jeremy Ranch HOA: Tom Spencer

Moose Hollow HOA: Ryan Dickey

Park City Community Foundation: Diego Zegarra

Park City Gardens: Tissa Gardia and Sophie Kohler

Park City Municipal Corporation: Logan Jones

Providia Management Group: Nate Elwood

Ranch Place: Brenda Lake

Summit County: Dave Bingham, Dan Pena, Jessica Kirby, and Robin Judd

Snyderville Basin Special Rec District: Matt Benge

Southshore HOA: Insa Riepen

Swaner EcoPreserve: Nell Larson

The Oaks and Solamere HOAs: Tom Mohor

Utah Department of Agriculture and Food: Brittany Duncan

Utah State University Extension: Elizabeth Cohen

Utah Weed Supervisors Association

Vail Resorts: John Sale

Windrift Condos HOA: Brenda Lake

# 11

## Financial Summary

The low elevation Garlic Mustard ISM Project focused on the control of garlic mustard. The project was awarded \$85,000 for July 1, 2021 to June 30, 2022. The Proposed budget allowed for \$8,500 to be spent on administrative costs (fiscal agent and project management). The remaining line item allotment and expenditure is defined in the table below. Along with staff time and equipment, in-kind matches, Summit County has continued to provide assistance with contacting residents with properties needing assistance, donating space for training, providing fiscal agent services, providing the Summit County weed book. USU Extension continues to provide their noxious weed book assist with outreach events.

# 12

## Conclusions

Treatment is reducing garlic mustard density and containing populations where treatment has been consistent over the last seven years. Several new, large populations in open space and some residential areas were found and many were treated. Each year we find more populations and continue monitoring the edge of these known populations for spread. Given the extensive invasion in residential areas, accountability mechanisms are needed to motivate land owners to address their garlic mustard.

*Financial summary of expenditures and remaining budget as of November 2019.*

Budget Category	Line Item	Budget	Expenditure	Remaining For
			July 31 - Dec 31, 2021	Jan 1- June 31, 2022
Consultants/Contracts	GIS Specialist	\$2,529.00	\$2,532.00	(\$3.00)
	Herbicide Contractor	\$41,557.00	\$41,754.34	(\$197.34)
	Mechanical Control Contractor	\$18,096.00	\$6,630.00	\$11,466.00
	Monitoring and Mapping Contractor	\$10,000.00	\$2,952.90	\$7,047.10
Indirect	Summit County Admin	\$4,250.00		\$4,250.00
	Ecology Bridge Admin	\$4,250.00	\$128.00	\$4,122.00
Supplies	Biological Controls	\$500.00		\$500.00
	Herbicide	\$648.00		\$648.00
	Natve Forb Seed Mix	\$720.00	\$688.00	\$32.00
	Native Grass Seed Mix	\$2,450.00	\$2,046.00	\$404.00
<b>Total</b>		<b>\$85,000.00</b>	<b>\$56,731.24</b>	<b>\$28,268.76</b>

Appendix B: Masonic Trail Transect Photos

2018 Pre-treatment (left) and 2021 Late Summer (right)



0 ft



10 ft



20 ft

## Masonic Trail Transect Photos

2018 Pre-treatment (left) and 2021 Late Summer (right) - Continued



30 ft



40 ft



50 ft

## Masonic Trail Transect Photos

2018 Pre-treatment (left) and 2021 Late Summer (right) - Continued



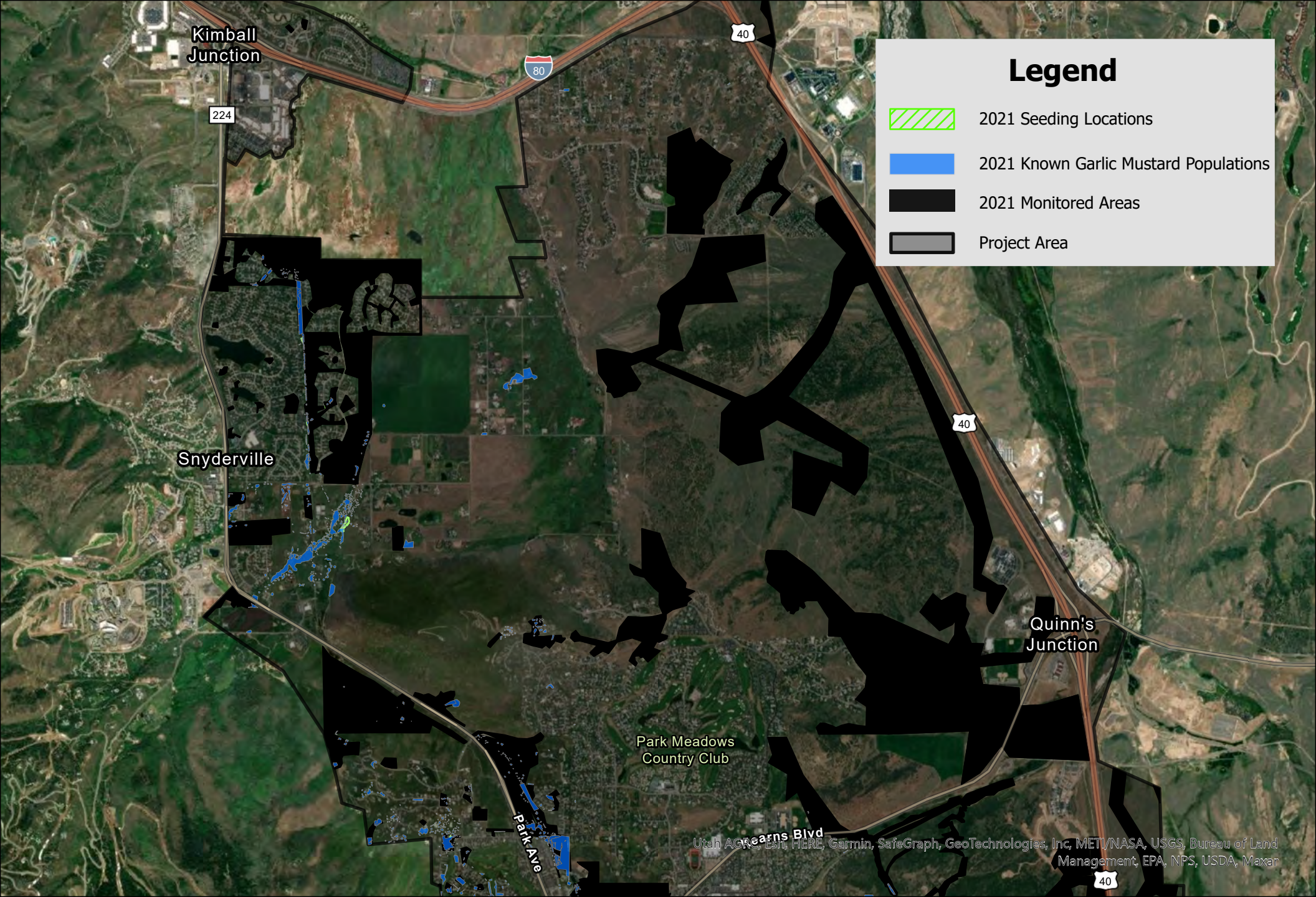
60 ft



70 ft



80 ft



Utah AGR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, Maxar

**Summit CWMA Low Elevation Garlic Mustard Control ISM Program 2021 Report**

Known populations, all monitored areas and 2021 seeded areas in the Snyderville Basin section of the low elevation garlic mustard management area. Known populations data are cumulums of data since 2018.

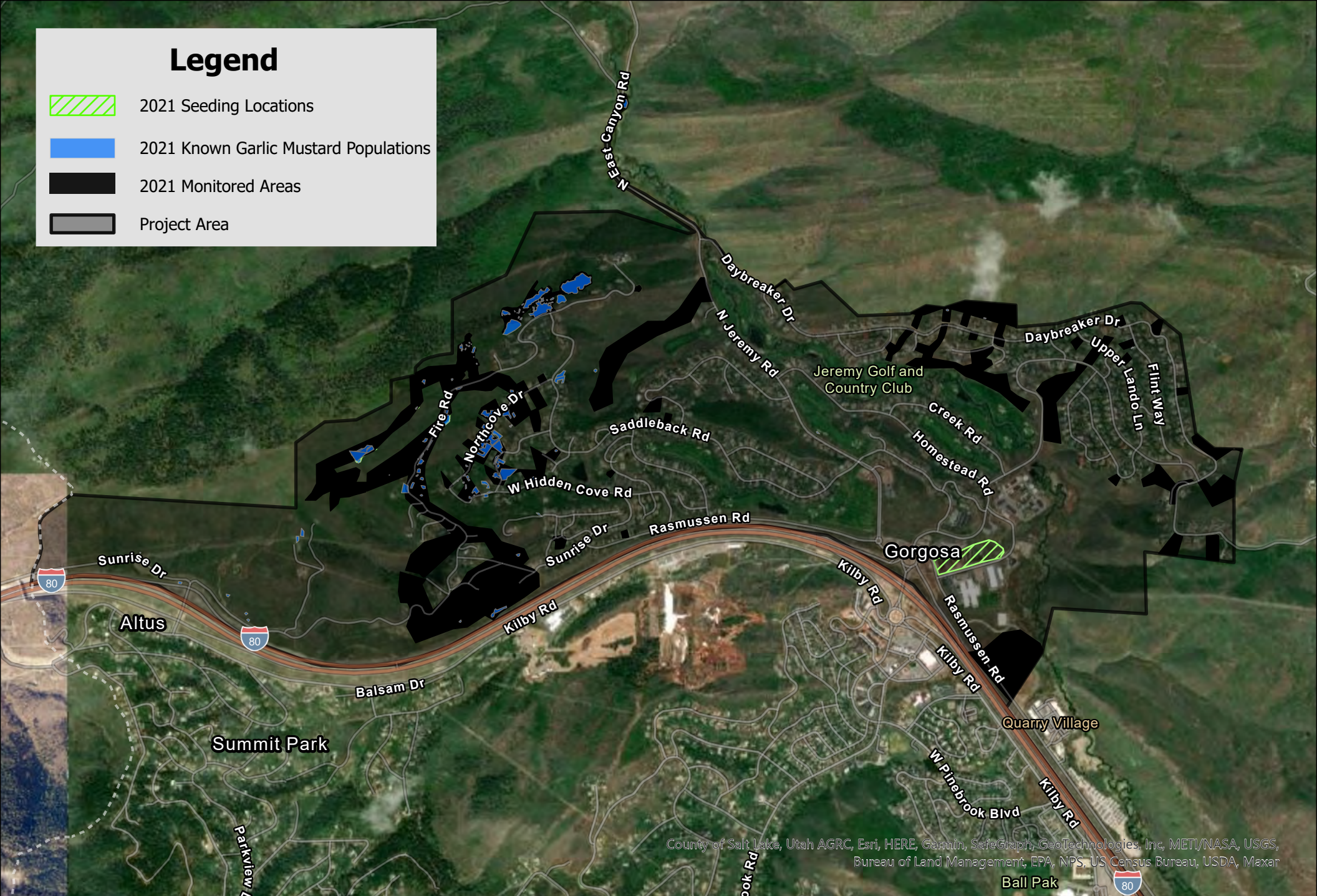


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 Betsy Hochman  
 betsy@ecologybridge.com



# Legend

-  2021 Seeding Locations
-  2021 Known Garlic Mustard Populations
-  2021 Monitored Areas
-  Project Area



County of Salt Lake, Utah AGRC, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Maxar

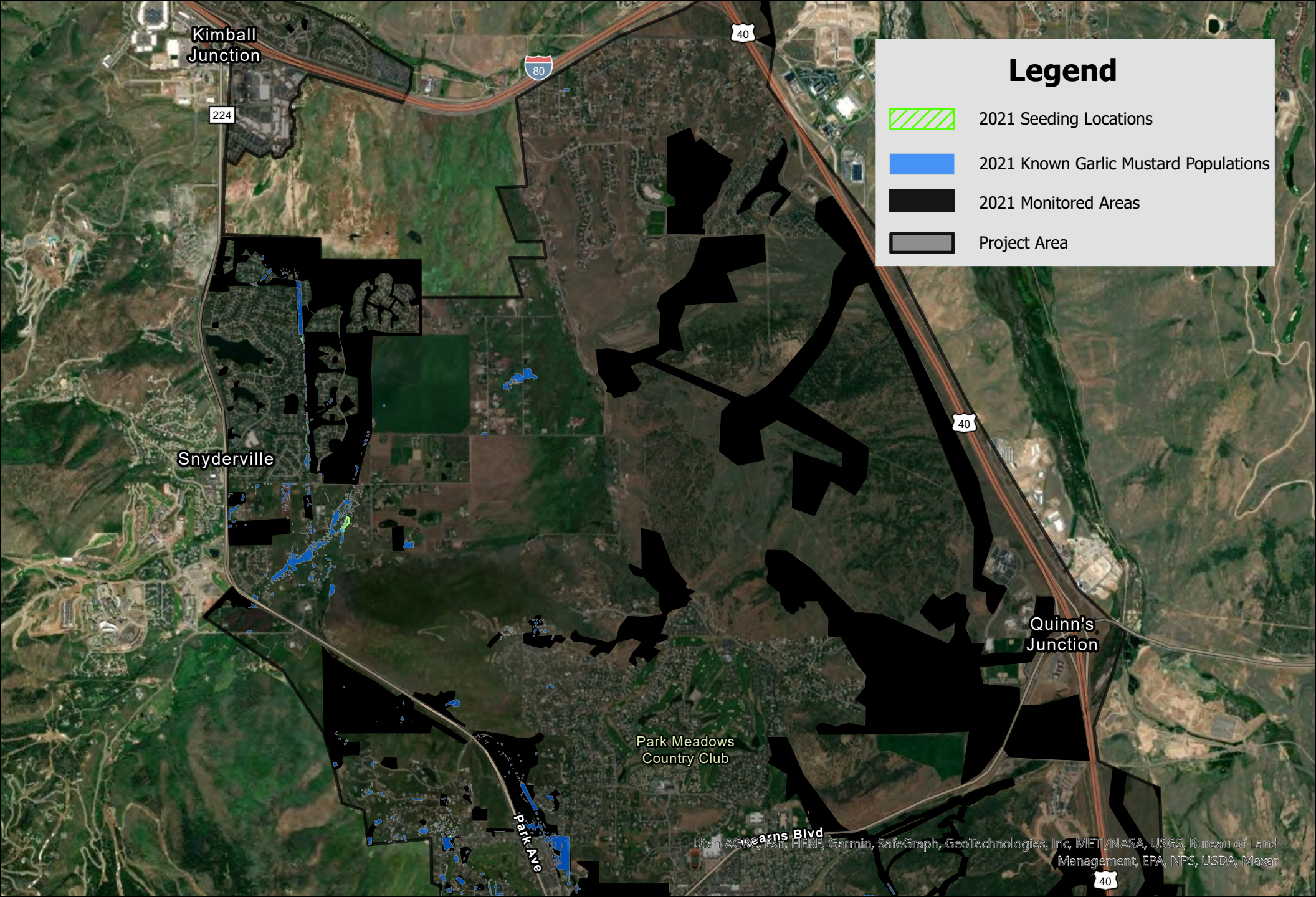
## Summit CWMA Low Elevation Garlic Mustard Control ISM Program 2021 Report

Known populations, all monitored areas and 2021 seeded areas in the Jeremy Ranch section of the low elevation garlic mustard management area. Known populations data are cumululations of data since 2018.

0 0.17 0.35 0.7 1 Miles



N Created 3/28/2022  
Betsy Hochman  
betsy@ecologybridge.com



### Legend

- 2021 Seeding Locations
- 2021 Known Garlic Mustard Populations
- 2021 Monitored Areas
- Project Area

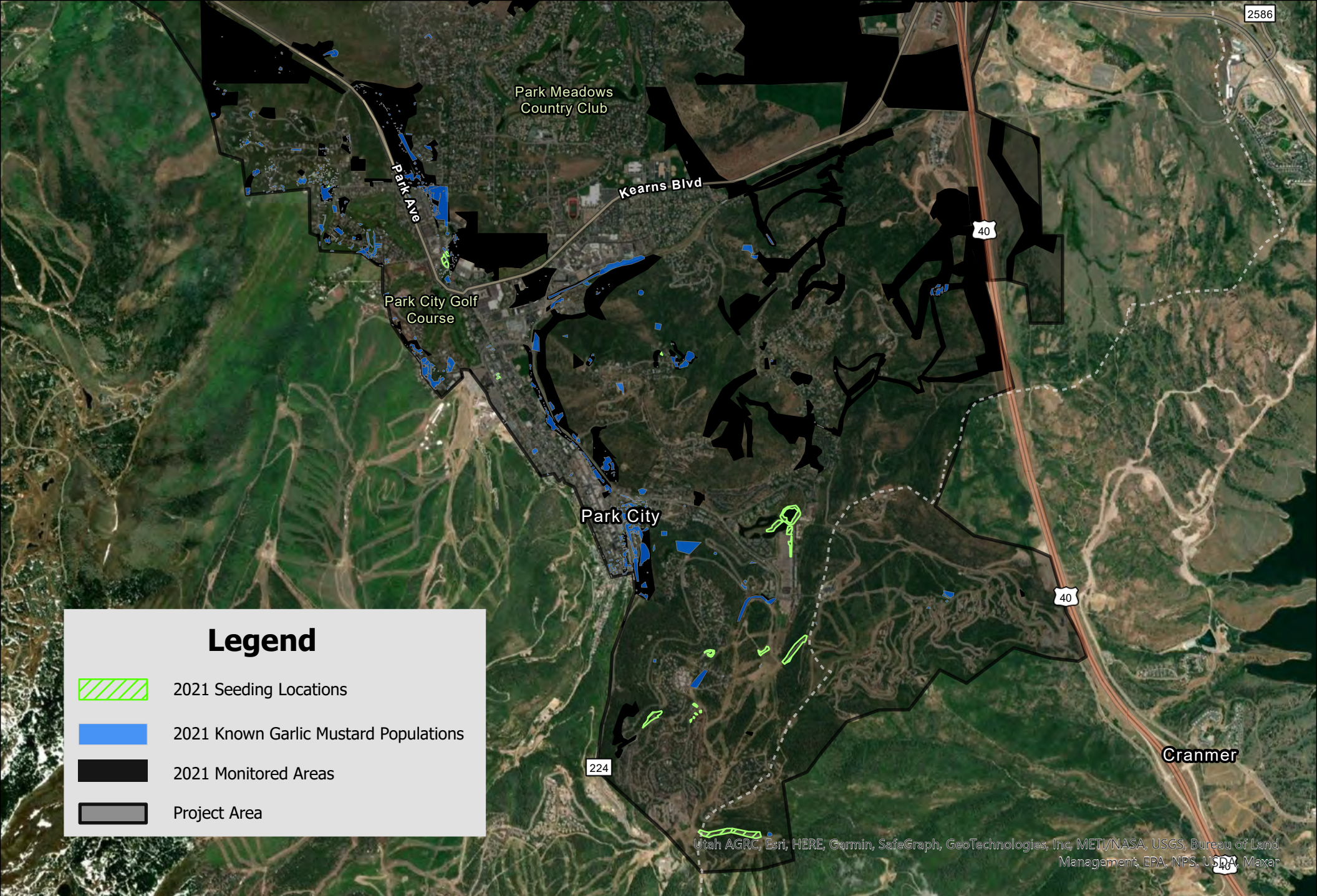
Utah AGR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, Maxar

**Summit CWMA Low Elevation Garlic Mustard Control ISM Program 2021 Report**

Known populations, all monitored areas and 2021 seeded areas in the Snyderville Basin section of the low elevation garlic mustard management area. Known populations data are cumulums of data since 2018.



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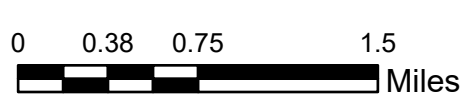
### Legend

-  2021 Seeding Locations
-  2021 Known Garlic Mustard Populations
-  2021 Monitored Areas
-  Project Area

Utah AGRC, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, Maxar

### Summit CWMA Low Elevation Garlic Mustard Control ISM Program 2021 Report






Known populations, all monitored areas and 2021 seeded areas in the Park City section of the low elevation garlic mustard management area. Known populations data are cumulations of data since 2018.



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 Betsy Hochman  
 betsy@ecologybridge.com



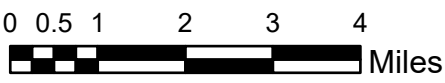
### Legend

-  2021 Treatment Areas
-  2021 Revisited For Treatment
-  Treatment History, pre-2021
-  Known Garlic Mustard Populations
-  Project Area

Earthstar Geographics, Utah AGRC, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA






### Summit CWMA Low Elevation Garlic Mustard Control ISM Program 2021 Report

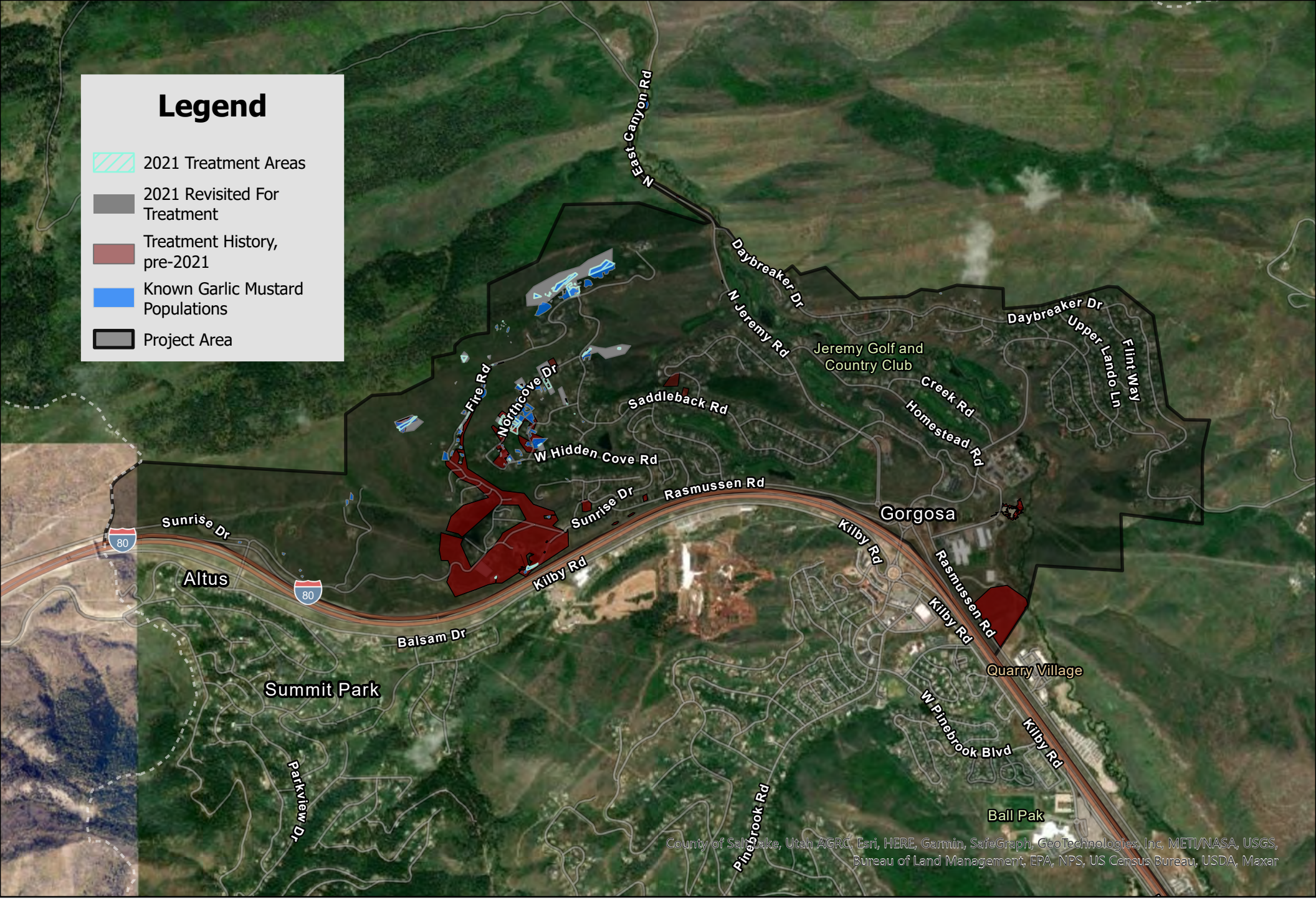
Treatment areas and history for the full 2021 high elevation garlic mustard management area. Known populations data are cumulations of data since 2018.



Created 3/25/2022  
 Betsy Hochman  
 betsy@ecologybridge.com

# Legend

-  2021 Treatment Areas
-  2021 Revisited For Treatment
-  Treatment History, pre-2021
-  Known Garlic Mustard Populations
-  Project Area



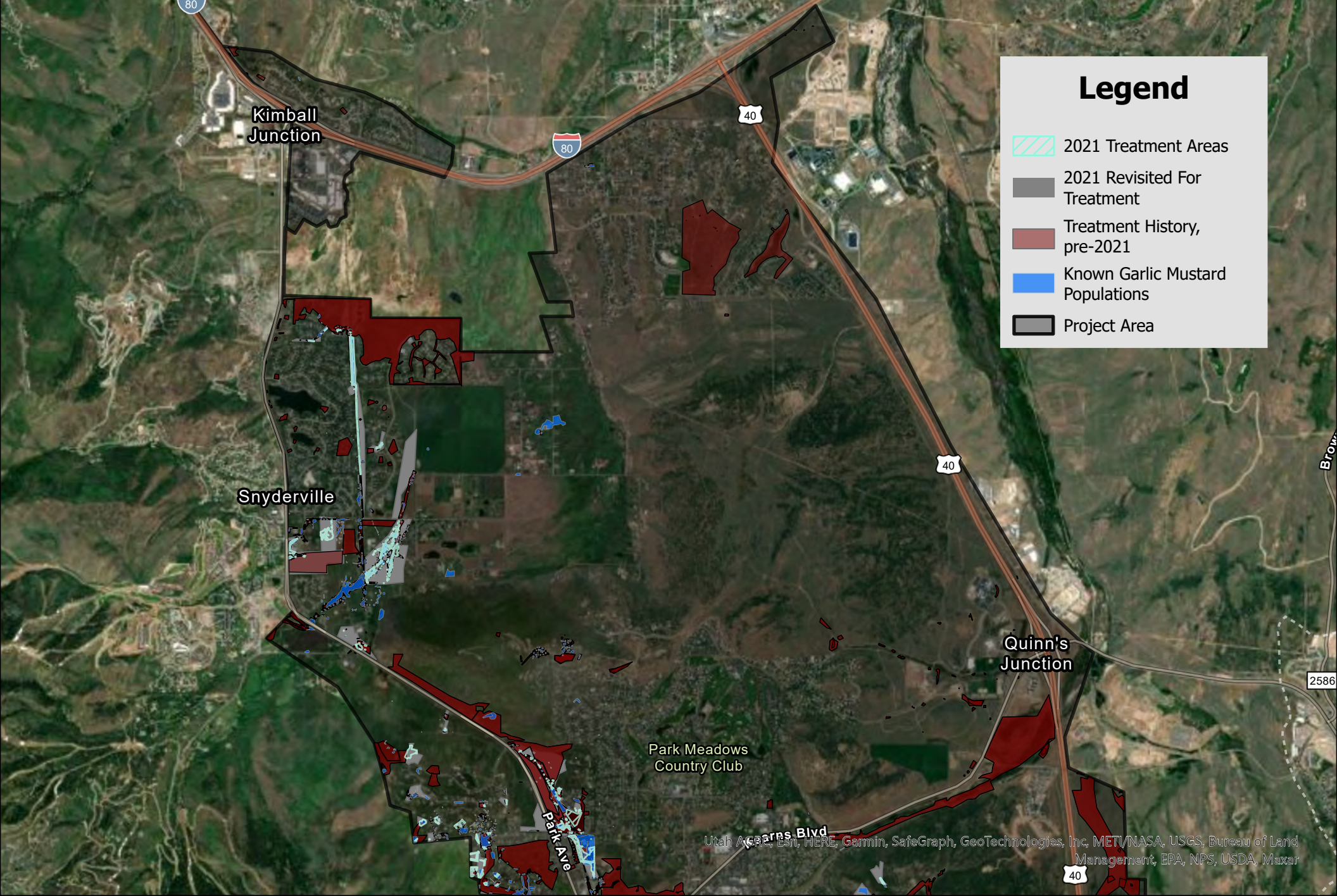
County of Salt Lake, Utah AGRC, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Maxar

## Summit CWMA Low Elevation Garlic Mustard Control ISM Program 2021 Report

Treatment history and 2021 treatment areas for the Jeremy Ranch section of the low elevation garlic mustard management area.



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Betsy Hochman  
betsy@ecologybridge.com



### Legend

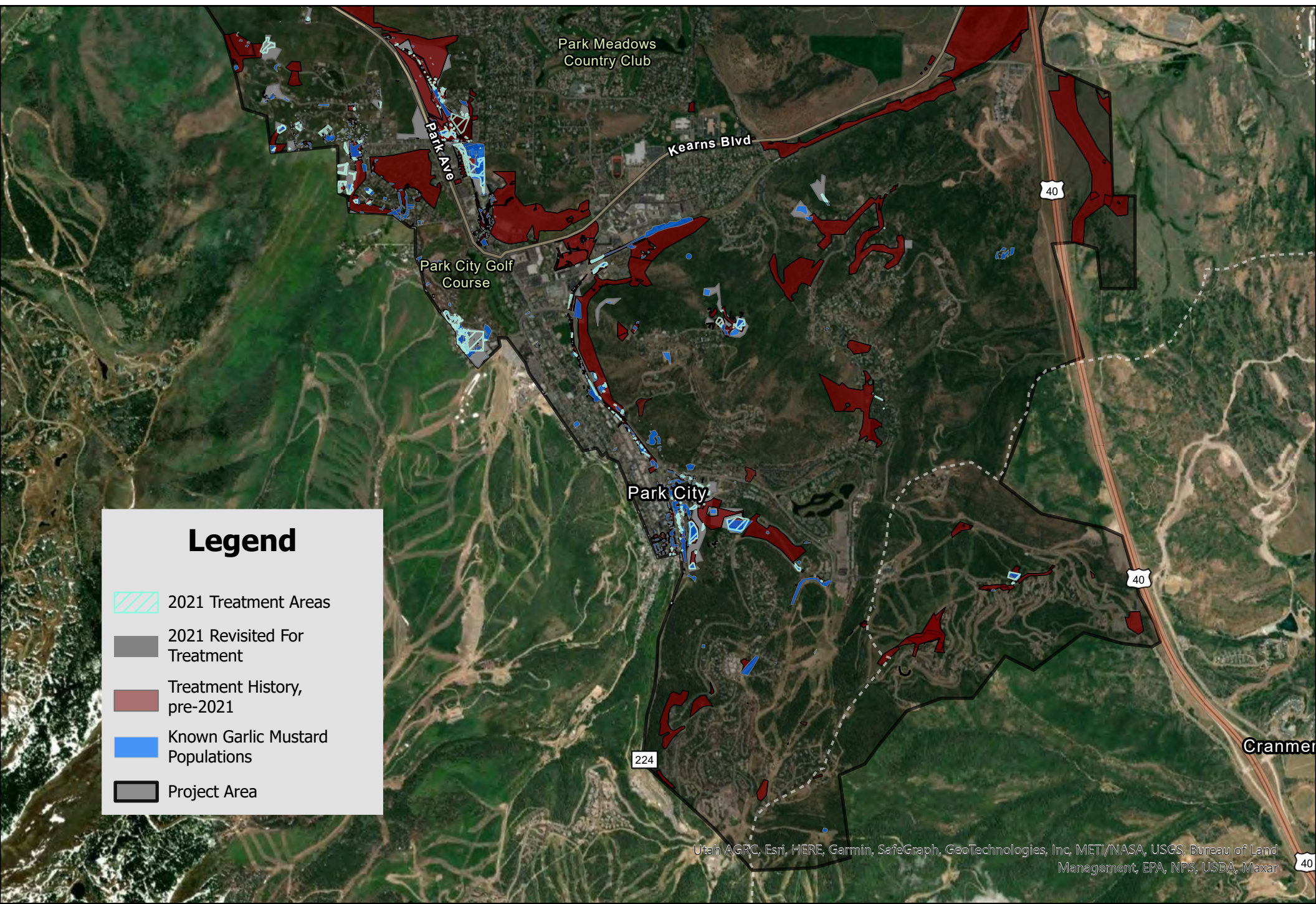
- 2021 Treatment Areas
- 2021 Revisited For Treatment
- Treatment History, pre-2021
- Known Garlic Mustard Populations
- Project Area

**Summit CWMA Low Elevation Garlic Mustard Control ISM Program 2021 Report**

Treatment history and 2021 treatment areas for the Snyder Basin section of the low elevation garlic mustard management area.

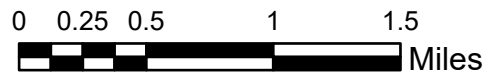


Created 3/25/2022  
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 betsy@ecologybridge.com



**Summit CWMA Low Elevation Garlic Mustard Control ISM Program 2021 Report**

Treatment history and 2021 treatment areas for the Park City section of the low elevation garlic mustard management area.



Created 3/28/2022  
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## **Summit CWMA 2021-22 Supplement to Annual Report: EDRR Low Elevation Garlic Mustard Control in Summit County**

Due to early autumn snowfall followed by short windows of warmer weather, garlic mustard germinated at rates not seen in years. These windows were too short to get herbicide contractors out to control prior to long-term, seasonal, snow accumulation. This, along with perfect spring growing conditions resulted in the most extensive of both first- and second-year plants in over 10 years. However, sites that consistently participated in the ISM program for greater than 5 years continued to show reduced garlic mustard densities and fewer populations. Those not consistently treated for an extended number of years showed substantial increases in both garlic mustard population size and density.

As in past years, we held two weed identification and control trainings in partnership with Summit County. A total of 27 participants attended from partner organizations, herbicide applicator companies, Summit County staff, members of a local land trust and residents.

Early control focus was on hand weeding of flowering plants. Herbicide contractors were not available early season and had limited availability into summer. This led to reduced control acres. That said, 9 acres were hand weeded and 14 treated with herbicide. In addition to contractor work, over 9,000 lbs. of garlic mustard were weeded and over 3,500 lbs. was done by Garlic Mustard Games volunteers. Of that 9,000 lbs., 1,000 lbs. were pulled by a team of 10–15-year-old kids in the Summit Park HOA area. These numbers are from the combined Low Elevation Garlic Mustard Program and High Elevation Program Areas. Garlic Mustard Games events were held at the Moose Hollow HOA, Deer Valley Resort, Crescent Ridge HOA and the Glenwood Cemetery.

We were not able to obtain the biological control agents we requested funding for, so the funds were directed towards additional herbicide treatment that was badly needed.

One goal for the 2021-22 season was to focus additional monitoring in areas that we know there are larger populations within or at the edge of larger forested areas. In total, 20 more acres were monitored in spring of 2022. In 2021 a new, large garlic mustard population was found in the open space of Moose Hollow HOA in Snyderville Basin. An additional 4 acres were monitored spring of 2022 and additional populations mapped that together totaled under 1.5 acres. In 2021, it was also discovered that the known Masonic Trail population had begun to move down slope. An additional 5.5 acres were monitored spring of 2022 and an additional 4 acres of garlic mustard mapped. Several other areas were monitored but these were the most concerning.

Partners provided in-kind matches similar to previous years:

- Summit County
  - Weed Guides



- Rental costs for weed identification and control trainings
  - County staff time to teach biological control concepts and share local noxious weed control resources at the trainings
- USU Extension
  - Noxious Weed Identification books
- Several partners aided with social media, both original posts and sharing Summit CWMA posts:
  - Summit County
  - Swaner EcoPreserve
  - Ecology Bridge
  - USU Extension
  - Deer Valley Resort