

Summit CWMA Knapweeds, Starthistle & Phragmites 2024 ISM Control Program Report

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PROJECT OVERVIEW

The Summit CWMA Knapweeds, Starthistle, and Phragmites Control Program originally focused on spotted (*Centaurea stoebe*), diffuse (*Centaurea diffusa*) and Russian knapweeds (*Rhaponticum repens*) and yellow starthistle (*Centaurea solstitialis*). In 2018, all were believed to be limited in distribution within Summit County. Since then, increased inventory has identified extensive spotted knapweed invasion and several acres of diffuse knapweed but in a limited number of sites (primarily Vail Ski Resorts). Russian knapweed and yellow starthistle, however, remain limited in distribution. Phragmites was added to the program due to an increase in small Phragmites populations, particularly along state roads and downstream and creeks with previously known Phragmites populations.

All but the spotted knapweed are still at a distribution level for which eradication is possible. Spotted knapweed has reached a threshold where eradication may still be possible in most of Summit County if

property owners act now. However, near Vail Resorts, the populations may have reached a stage where containment is the only option unless they take an aggressive approach to control in 2025.



Yellow Starthistle

A large portion of the mapped populations of these noxious weeds in western Summit County are on private property and escaping to public lands. In order to facilitate control of these species and prevent spread into natural lands, cross jurisdictional efforts are essential. This Summit CWMA project assists in creating, maintaining and growing cross jurisdictional partnerships as well as assisting with control and community outreach.

METHODS

The Summit CWMA implements an integrated approach to weed management that includes inventory/



Dave Bingham and Dan Pena at the spring Summit County Weed Tour, an event Summit CWMA participates in to share resources and show the community the importance of partnerships in weed control.

surveying, mapping, herbicide application, biological control, revegetation, and monitoring. We additionally provide outreach and support partner outreach events to increase community awareness of noxious weeds, their control and revegetation options.

Inventory is conducted to determine the extent of noxious weeds beyond the currently known population boundaries. Often, inventory priorities are determined based on currently mapped locations, reports of noxious weeds made to the Summit CWMA or partners, and areas with increased vectors of spread. For knapweed, this generally means ski slopes, trails and new developments. In the case of Phragmites, the goal is to inventory up and downstream from known and newly found populations to determine how much of the stream/creek is impacted.

Treatment methods depend on population size, plant growth stage, accessibility and natural resources on site. Chemical control is our primary control method for the primary target noxious weeds of this program and is applied during rosette, flowering, and just prior to pre-dormant

stages. Chemical applications primarily consisted of a Milestone (6oz/ac) for starthistles and knapweeds and Aqua Neat for Phragmites along with an appropriate colorant and/or surfactant.

Mechanical control of knapweed and yellow starthistle is used only in a few locations, typically in gardens, in situations where mechanical control is necessary for prevention of seed spread, and at small, difficult to access patches. Mechanical control of Phragmites involves cutting the live plant biomass to two feet from ground level and removing dead biomass, to the extent possible, to prepare for fall herbicide treatments.

Biological control is used for large populations of spotted and diffuse knapweed and in areas where high potential for off-target species damage or other environmental factors are a concern. Biological control agents (three weevil species - *Cyphocleonus achate*, *Bangasternus fausti*, and *Larinus minutus*) are supplied by the Summit County Weed Division to the extent insects are available.

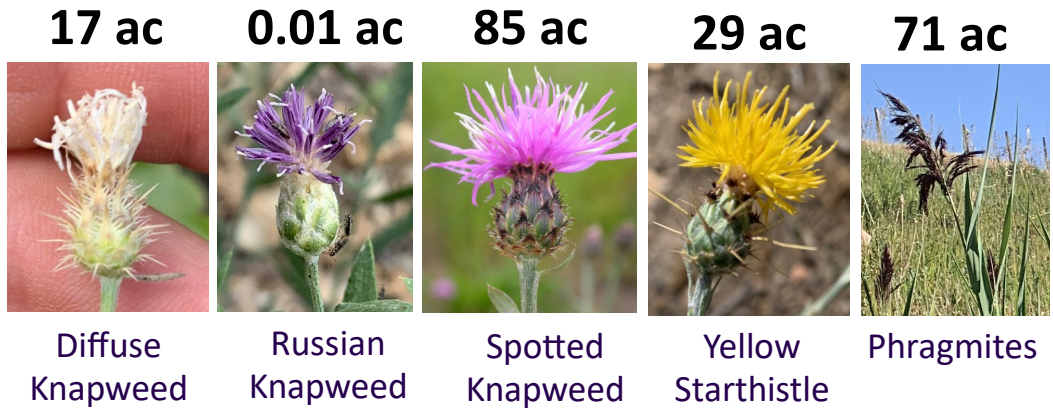
Revegetation to reduce reinvasion is used in areas where spotted and Russian knapweed and yellow starthistle have been significantly reduced. Establishment of native grasses in these areas allows continued control with selective herbicide while facilitating native plant community reestablishment.

Monitoring is conducted for three main purposes: rechecking known populations for weed status, assessing revegetation status, and evaluating treatment effect.

OUTREACH

Outreach efforts for this program are achieved through coordination with other CWMA control

**121
ACRES
TREATED
IN 2024**



programs via the Summit CWMA website, social media presence, community training and the Noxious Weed Ambassador Program. The Ambassador Program uses trail side volunteer stations that provide volunteers with tools to mechanically control weeds and a sign that directs them as to how to identify and control each common weed species and also enter into a biweekly drawing for prizes provided by local businesses. In 2024, Bill White Farms, Silver King Coffee, Park City MARC, Ol' Miner Express Car Wash, Park City Films and the Salt Lake Brewing Company donated gift certificates to help incentivize volunteer participation. Volunteers pulled almost 1,000 pounds of weeds, particularly common burdock, houndstongue and thistles.

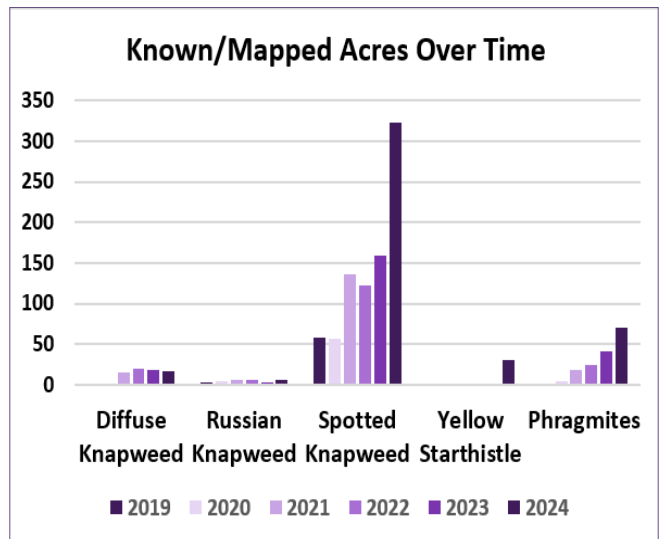


Noxious Weed Ambassador Station with bags of thistle and common burdock pulled by volunteers.

RESULTS

In 2024, 2,330 acres were inventoried, bringing the total acres inventoried for these species since 2018 to 12,027 acres. The number of acres of these species mapped has increased both due to spread and inventory efforts identifying locations that had previously gone unmapped.

Inventory priorities in 2024 included the 910 Ranch, Vail Ski Resorts (Park City Mountain and Canyons Resort), the trails of Park City and Jordanelle State Park at Rock Cliff.



The number of known populations significantly increased with expanded monitoring efforts and access to additional lands.



Treasure Hill Area treated annually since 2018 shows significant reduction in cover and distribution of both diffuse and spotted knapweed. Other areas of the ski resort currently have diffuse and knapweed invasion to the level of 2018 due to non-treatment.

Russian knapweed is remaining low or absent where treatment has nearly eradicated it and revegetation efforts are in progress.

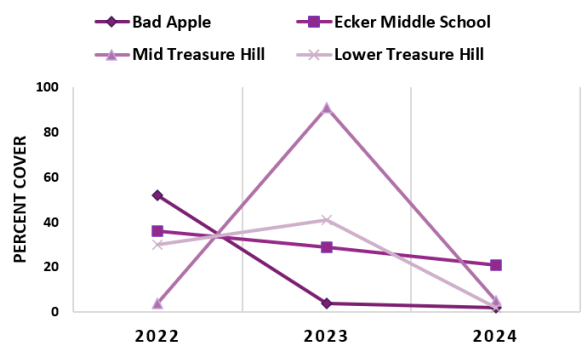
Diffuse knapweed has significantly increased. The Treasure Hill population that was once only 4 acres has now reached 17 acres. These populations are fairly limited to the ski runs and resort base and trails and roads associated with the ski runs, however large areas of similar terrain have yet to be inventoried. Failure to control along with mowing of ski runs to prepare for the upcoming ski season by Vail Resorts is the most likely cause of this rapid spread. The areas of Treasure Hill that the Summit CWMA has partnered with Park City to treat for several years has been reduced by over 60 percent cover.

The two new populations of diffuse knapweed found along East Canyon Creek in previous years appear to be eradicated. We will monitor these sites for the next few years.

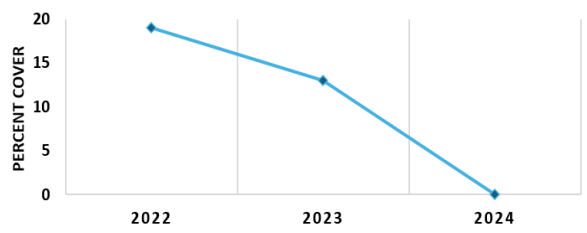
Percent cover of spotted knapweed in some of the largest populations has been greatly reduced. This is particularly true at some of the sites that previously had the densest populations, such as at the Canyons

KNAPWEED TRANSECTS

SPOTTED KNAPWEED PERCENT COVER



DIFFUSE KNAPWEED MID TREASURE HILL



Transects were established to track changes in spotted and diffuse knapweed in 2022. Both diffuse and spotted knapweed percent cover has significantly reduced even reaching near zero at all locations except Ecker Hill Middle School.

Golf Course, two runs on Treasure Hill, Summit Center, The Avenues, and Round Valley. The spotted knapweed at Quarry Mountain has been reduced to 5% cover site wide.

However, project-wide, spotted knapweed is increasing. This is particularly true at Treasure Hill, Park City Mountain, Canyons Resort, and at the Glenwild and Preserve HOAs. In 2024, a portion of the Canyons ski resort was inventoried following multiple reports of knapweed and thistle by trail users. Crews inventoried two days each at the Canyons Resort and the Park City Resort. There are now 65 acres of spotted knapweed at the Canyons Resort and 16 acres at Park City Resort. There remains over a hundred acres that have not been inventoried at these resorts that have similar growing conditions to the invaded sites. It is likely an additional 50 acres or more of knapweed will be found with additional inventory.

The 910 Ranch site is east of known yellow starthistle populations in Immigration Canyon and the western boundary of the Ranch had not been inventoried specifically for noxious weeds for some time. While no yellow starthistle was found along the boundary, a large population (3 ac) was found in a primary drainage and two additional populations (0.3 ac) were found on similar slopes further north and across the Morgan County boundary.

The yellow starthistle of Jordanelle State Park was known to be extensive before the 2024 inventory efforts. The aim of these inventory efforts was to begin reassessment of the distribution of this weed and aid in planning a long-term effort to contain these populations. Due to the speed at which yellow starthistle went from flower to seed in a short period of time, only two days of inventory at the Jordanelle occurred. In total, 27.3 acres of yellow starthistle, 0.001 acres spotted knapweed and 7.7 acres of dalmatian toadflax were mapped.



Sixty five newly mapped acres of Spotted knapweed at the Canyons Resort. Top: Blue polygons show spotted knapweed distribution. Lower Left: service roads lined for miles. Lower Right: Full ski runs invaded to near 100% cover.

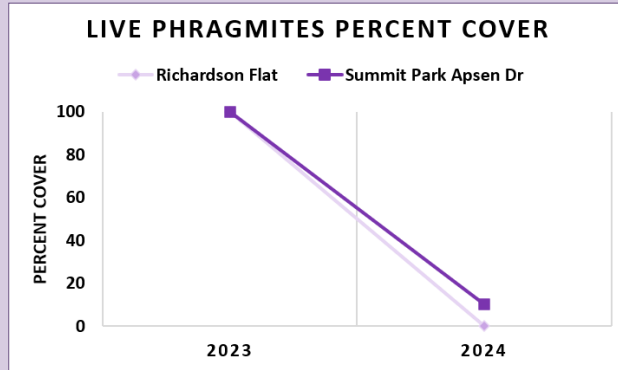
Additionally, through a new partnership with the staff of the Jordanelle State Park, park staff will be submitting an ISM grant application in 2025 to help fund long-term management of the yellow starthistle as well as a number of additional noxious weeds.

As of fall 2024, 71 acres of Phragmites are currently mapped. In general, Phragmites populations that the



Many of the populations at Richardson Flats appeared almost entirely dead in 2024.

PHRAGMITES TRANSECTS



Transects were established in three locations of dense Phragmites, one at the Utah Olympic Park (70% cover), one at the base of Summit Park off Aspen Drive and one at Richardson Flat. We were unable to access the UOP site to survey in 2024. The other two sites had high cover of dead Phragmites in 2024, but the live plants were below 10% in cover.

Summit CWMA and Summit County Weed Department are aware of and have treated are reducing. A few exceptions to this include the Summit Park Moose Moss population that shows no impact from treatments and a population within Silver Creek at Prospector Park that has expanded in size.

Phragmites continues to decline in the old snow pond at the Utah Olympic Park; however, nearby populations continue to thrive and spread. The population of Aspen Drive in Summit Park has been reduced by 95% cover of live plants but the dead biomass is substantial. Deer Valley pond populations continue to decline. Round Valley and the Silver Creek populations are declining and the two reported as eradicated in 2023 remain absent.

Where significant progress has been made in treating spotted and Russian knapweed and yellow starthistle, most revegetation projects show recovery of native grasses. Areas we have seeded

show greater success where compost or a compost/biochar blend was applied. This may reflect better nutrient availability or water-holding capacity of soil amendments.

PINEBROOK REVEGETATION PROJECT COMMON ST JOHNSWORT

Since the initial discovery of this Common St Johnswort (*Hypericum perforatum*) population, treatment had resulted in two years of complete absence of the species, however a limited recovery was observed in 2024. Contractors treated these plants along with small populations of yellow toadflax, Dame's rocket, oxeye daisy, knapweed and phragmites. Revegetation efforts used the application of compost, biochar, and native grass and wildflower seed in 2022. By 2024, the seeded areas remain dominated by natives or patches of bare ground. We will continue to monitor this site and treat the weeds as needed. Additional restoration is not planned.

DEER VALLEY REVEGETATION PROJECT YELLOW STARHISTLE

The historic population of yellow starthistle at the Deer Valley Café continues to persist, but at low percent cover. Previous years of reseeding by Deer Valley staff has had little success. In 2024, the



Deer Valley Café Yellow
Starthistle site.

Summit CWMA partnered with Deer Valley Resort to bring in a compost-biochar blend to apply to a portion of the site to see if the soil is limiting native grass establishment. Additionally, some nitrogen fixing and early succession wildflowers were lightly seeded.

CANYONS RESORT RESTORATION PROJECT

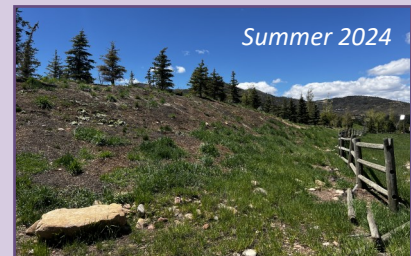
SPOTTED KNAPWEED

The base of the Canyons Ski Resort has been the focus of spotted knapweed control for several years. One area of particular concern is near the Cabriole, a ski lift whose base had been heavily invaded by spotted knapweed. Spring of 2020, knapweed was reduced to less than 10% so topsoil and compost were spread 4-5 inches thick and native grasses broadcast seeded. As of 2024, spotted knapweed remained less than 5% cover and native grasses established. Unfortunately, this site is likely to be demolished during development of new parking structures for the resort. No further work or reporting will occur at this site.

CANYONS GOLF COURSE REVEGETATION PROJECT

SPOTTED KNAPWEED, MUSK THISTLE, DALMATION TOADFLAX

Installed in 2023, the Canyons Golf Course berm adjacent SR224 had been dominated by spotted knapweed. Nearly 10 years of treatment reduced knapweed coverage to less than 5%. In 2023, after removal of new noxious weeds, compost and biochar (4:1 ratio) was spread 3-5 inches thick and native seed applied. In 2024, grass was establishing in patches and fewer noxious weeds returned. Spotted knapweed was limited to a few plants. Additional seeding may be needed. Assessment of the site in 2025 will determine next steps.



MOVIE STUDIO REVEGETATION PROJECT

VIPER'S BUGLOSS

Since the initial discovery of this common viper's bugloss population, percent cover of the bugloss has been reduced to less than 2% cover. Only limited, scattered bugloss plants have been observed. Use of a native grass seed mix has enabled continued treatment. Further restoration is unnecessary at this site. We will continue to treat the bugloss and monitor the restoration for at least two additional years.

While the original site is progressing, other locations within the Movie Studio Parcels have increased in cover. All were treated in 2024.



BOO RADLEY ALLEY REVEGETATION PROJECT

SPOTTED KNAPWEED

The alley adjacent Boo Radley Art Park had been treated for spotted knapweed for 4 years. Spotted knapweed had been reduced to less than 20% cover so revegetation began in 2023. A thin layer of compost and biochar was applied and native grass seed was broadcasted. By 2024, portions of the site had thick native grass, however large patches remained unvegetated or invaded by new weeds (mainly Dyers woad and thistle) so weeds were hand removed and a second round of soil amendment and seed was applied to the patches in 2024.



FAIRWAY CONNECTOR REVEGETATION PROJECT

RUSSIAN KNAPWEED

A relatively small area of Russian knapweed at the intersection of two popular trails within Round Valley Open Space was identified in 2017. Milestone was used to treat plants for 2 years. In 2020, a thin layer of biochar and compost was applied to the site and native grass seed hand broadcasted. Additional seeding occurred in 2021 and 2023. Native wildflowers were seeded in 2023. In 2024, Russian knapweed remained below 2%. Careful spot spraying or hand weeding is being used to maintain control while natives establish.

ROUND VALLEY POND RESTORATION PROJECT

RUSSIAN KNAPWEED

Russian knapweed had dominated areas around a pond in Round Valley Open Space. After three years of control with Milestone, hand-weeding, and raking away of dead knapweed plants, the site was below 5% cover of Russian knapweed. Native vegetation, however was not recovering. In addition to the knapweed, the pond had experienced a great deal of erosion.

In 2020, the pond was recontoured, the soil was amended with compost and biochar, and the full site was seeded with native grasses, wildflowers, native shrub seedlings, and narrowleaf cottonwood (*Populus angustifolia*) and willow canes were planted.

The site has experienced dense establishment of native grasses and sparse establishment of wildflowers. Rubber Rabbitbrush (*Ericameria nauseosa*) is flourishing. Russian knapweed cover remains below 5% and can be maintained with hand weeding. In 2024, areas adjacent the original site and within the site were planted with native upland and wetland natives supplied by the Utah Pollinator Program to increase native plant diversity.



CONCLUSIONS

Knapweeds, particularly spotted and diffuse knapweeds, are spreading. A few populations of Phragmites were mapped in 2024, but not as many new populations were found in 2024 as were found in previous years.

Populations of spotted knapweed, Russian knapweed, and Phragmites that have received multiple years of treatment are reducing in percent

cover; some populations have been eradicated. The Quarry Hill and Rail Trail populations of yellow starthistle have been eradicated. The population at the Parley's Canyon exit and Deer Valley Café persist and the new populations on 910 Ranch are likely not the only populations in these areas. Additional inventory and control of the known populations will be the highest priority for 2025 to prevent further spread.

Where significant progress has been made,

revegetation projects show recovery of native grasses. Areas we have seeded show greater success where compost or a compost/biochar blend is first applied to the site. This may reflect better nutrient availability, but most likely reflects greater water holding capacity of soil amendments.

Due to the rapid spread of knapweeds and, to a lesser extent Phragmites, more resources will be necessary to ensure larger populations remain contained while we continue to control and eradicate smaller populations.

MANAGEMENT PLANNING

We will continue our focus on areas such as the Canyons Golf Course, Summit Center, The Avenues, Round Valley and Quarry Mountain where reduction of spotted and Russian knapweed has been successful. We will also continue to revisit the eradicated yellow starthistle sites to ensure no recovery from seedbank occurs. To ensure containment is accomplished, the outer boundaries of known distribution of spotted and diffuse knapweed at the Canyons Resort, Deer Valley Resort, Park City Resort, the Glenwild and Preserve HOAs, Richardson Flat and Treasure Hill will be high priorities in 2025 for inventory and control. If enough biological agents are available in 2025, release of both root and seed head weevils would be added to the treatment of all larger populations of knapweed, as well as populations that are coming from private property for which we have been unable to obtain access to treat with herbicide.

Substantial inventory and treatment of trail systems through the project area will be necessary to determine how far knapweeds are spreading via recreation. New trails are also being proposed in areas of high knapweed invasion. We will work with trails organizations to mitigate noxious weed issues of these projects.

PROJECT PARTNERS

- ◆ Canyons Golf Course
- ◆ Deer Valley Resort
- ◆ Ecology Bridge
- ◆ Jeremy Ranch HOA
- ◆ Jordanelle State Park
- ◆ Lambert Lane Village
- ◆ Park City Municipal Corporation
- ◆ Park City Garden & Nursery
- ◆ Park City School District
- ◆ Pinebrook Master HOA
- ◆ Oaks HOAs
- ◆ Rockport State Park
- ◆ Silver Creek Ranch Development
- ◆ Snyderville Basin Special Recreation Dist.
- ◆ Snyderville Basin Water Reclamation Dist.
- ◆ Solamere HOAs
- ◆ Summit Center
- ◆ Summit County
- ◆ Summit Park HOA
- ◆ Sun Peak HOA
- ◆ Swaner EcoCenter
- ◆ Timberline HOA
- ◆ Utah Department of Agriculture and Food
- ◆ Utah Olympic Park
- ◆ Utah Pollinator Program
- ◆ Utah State University Extension
- ◆ Vail Resorts
- ◆ Wasatch County

The highest priorities going into 2025 will be the control of all yellow starthistle, inventory of areas around known yellow starthistle populations and nearby sites with similar terrain and soils to that of

current yellow starthistle sites. For the remaining target species, all small populations will be targeted to prevent additional satellite populations, and the largest populations will be contained via treatment of boundaries.

2025) and \$56,278.52 was spent in 2024. The remaining \$13,288.48 will be spent prior to June 30, 2025. ISM funds were matched primarily by in-kind partner staff time. This ISM grant was almost 200%

FINANCIALS

The Summit CMWA was awarded \$69,567.00 for the 2024 state fiscal year (July 1, 2024 - June 30,

Expensed July 1 - December 31, 2024		
Line Item	Description	Expensed
Herbicide	Purchase of Milestone for partners with crews that can use in house labor as project match	
Restoration	Dry Native grass seed mix, Individual wildflower species seed and soil amendments (biochar: compost)	\$2,039.53
Herbicide Treatment	Contractors to treat with Milestone and 2,4D (75 ac)	\$27,534.90
Mechanical Removal	Mechanical removal of Phragmites	\$1,125.80
Restoration Labor	Application of soil amendment and seeding of native grasses	\$2,248.35
Monitoring	Monitoring known populations, EDDMaps updates, revisit of transects and revegetation	\$4,305.28
Inventory, Mapping	Contractors inventory areas adjacent the known populations in order to identify population distribution and boundaries in the project area	\$12,070.24
Arc GIS Data/Mapping	Updating and maintaining GIS data. Arc Field Maps and geospatial data analysis for reporting	\$2,476.32
Administration (Fiscal)	Management of grant accounts and payments	\$3,300.00
Administration (Project Management)	Management of project implementation, data management, Reporting	\$1,178.10
Total		\$56,278.52

In Kind and Cash Matches		
Snyderville Basin Special Recreation District	Staff hours: Controlling Dalmatian toadflax at Trailside and Silver Creek Village	\$ 660.00
Snyderville Basin Special Recreation District	Green Leaf - herbicide treatment at Gillmor, Triangle, East Canyon Creek Trailhead, Silver Creek Village for Thistle, spotted knapweed, Dyers Woad, Dalmatian Toadflax	\$ 9,068.00
Snyderville Basin Special Recreation District	Ground Solution herbicide treatment: Spotted knapweed, Phragmites, Houndstongue, Thistle, Dyers Woad, Dalmatian Toadflax and hoary cress	\$ 35,950.00
Snyderville Basin Special Recreation District	Ecology Bridge - mapping and weed control	\$ 3,257.23
Park City Municipal	Ecology Bridge - mapping and weed control	\$ 10,559.00
Summit County	Staff hours: mapping and control of yellow starthistle, knapweed and phragmites	\$ 26,400.00
Summit County	Biological Control - value of donated biocontrol (those given to Deer Valley and those to Summit CWMA and two releases at PCMR)	\$ 7,800.00
Summit County	Biological Control - staff hours to transport and release biocontrol agents	\$ 600.00
UWSA Noxious Weed Grant	Mapping and control of knapweed and yellow starthistle on 910 Ranch	\$ 2,000.00
Total Match		\$ 94,294.23

SUMMIT CWMA—SNYDERVILLE BASIN AND PARK CITY AREA KNAPWEEDS, STARHISTLE AND PHRAGMITES PROGRAM

The knapweed, starthistle and phragmites control program area primarily includes Western Summit County properties, but includes portions of Eastern Summit County as landowners contact the CWMA for assistance.

In 2019, the Summit CWMA began specifically mapping knapweeds and starthistle to better understand the distribution. Control began in 2020. Phragmites was added to the program in 2021.

In 2024, 2,330 acres of land were inventoried, 121 were treated, and 4 were restored. New yellow starthistle populations were the most concerning find in 2024. Three populations (3.3 ac) were found on the 910 Ranch and 27.3 acres of previously known populations were monitored to update maps of their distribution in preparation for a new treatment program in 2025.

Since 2018, 12,027 acres have been inventoried, and 86 acres of spotted knapweed, 17 acres of diffuse knapweed, 0.04 acres of Russian knapweed, and 71 acres of Phragmites are currently mapped.

CURRENT TRANSECT LOCATIONS: Bad Apple Trailhead, Ecker Hill Middle School, Treasure Hill, Utah Olympic Park, Summit Park off Aspen Drive and Richardson Flat.

CURRENT RESTORATION LOCATIONS: Round Valley Pond, Fairway Connector, Quarry Mountain, The Canyons Golf Course, Bad Apple Trailhead, Utah Olympic Park, PRI, Pinebrook HOA, Poison Creek Trail and the Park City’s Movie Studio parcel.

	INVENTORY GOAL	MONITORING GOAL	TREATMENT GOAL	RESTORATION GOAL
2025	700 Acres Priority will include public trails, streams and open space as well as additional areas of 910 Ranch	8 Restorations 9 Transects	900 Acres	Maintain and Enhance Previous Restorations
2026	500 Acres	8 Restorations 11 Transects	220 Acres	Maintain and Enhance Previous Restorations
2027	400 Acres	8 Restorations 11 Transects	250 Acres	2 New Acres

2020 to 2023