Cottonwood Canyons Foundation
Plant Stewardship Program 2024 Report

CONTENTS

SEASON SUMMARY

Season Totals

- Total Miles of Trail Surveyed: 205 miles
- Weeds surveyed and mapped: 133 acres (Not including weed zones)
- Weed zones at resorts treated: 94.66 acres
- Mechanical weed treatment on trails: 20 acres
- Chemical weed treatment: 2 acres
- Restoration: 1 acre of seedlings (1,200 plants), 0.25 acres of seeding
- Volunteer days: 25 days

Invasive Species Surveyed and/or Treated during 2023 Season

- Dalmatian Toadflax, *Linaria dalmatica*
- Garlic Mustard, *Alliiaria petiolata*
- Yellow Toadflax, *Linaria vulgaris*
- Oxeye Daisy, *Leucanthemum vulgare*
- Common Mullein, *Verbascum thapsus*
- Wand Mullein, *Verbascum virgatum*
- Burdock, *Arctium minus*
- Myrtle Spurge, *Euphorbia myrsinites*
- Leafy Spurge, *Euphoribia esula*
- Yellow Sweet Clover, *Melilotus officinalis*
- Canada Thistle, *Cirsium arvense*
- Musk Thistle, *Carduus nutans*
- Bull Thistle, *Cirsium vulgare*
- Scotch Thistle, *Onopordum acanthium*
- Houndstongue, *Cynoglossum officinale*
- Spotted Knapweed, *Centaurea stoebe*
- Field Bindweed, *Convovulus arvensis*
- Phragmites, *Phragmites australis*
- Medusahead, *Taeniatherum caput-medusae*
- Perennial Pepperweed, *Lepidium latifolium*
- Sow Thistle, *Sonchus oleraceus*
- Money Plant, *Lunaria annua*
- Dyers Woad, *Isatis tinctoria*
- Russian Olive, *Elaeagnus angustifolia*
- Bittersweet, *Solanum dulcamara*
- Cat mint, *Nepeta cataria*
- Oriental clematis, *Clematis orientalis*

Community Volunteers for Plant Stewardship

- Total Volunteers: 364
- Total Volunteer Hours: 1092
- Total Volunteer Hour Value: $32,704
- Total Volunteer Events: 25

Season summary

This season there were changes to crew protocols with the goal of improving *efficiency* and *effectiveness* of crew time and energy.

- Two crew leads to increase efficiency for scouting
- New mapping protocol to track change in weed populations year to year, treatment, rare plants, disturbances, priority planning, and restoration.
- Quantifying treatment using acres, not lbs
- Instead of digging up, bagging, and carrying out the entire plant every time, the crew cut off and bagged only seed heads or plant material that could propagate vegetatively. In other words, why carry out invasive plant material if it won't grow? This allowed the crew to cover more ground, and use the extra time and energy to treat other populations.
- Emphasis on identifying plants
- Photos, plant ID and mapping on hike out, treatment on hike back (for out and back).
- Giving crew time each week for keying and photo organization
- Seedling survival study
- Treatment plans for each species
- Priority planning map layer
- We added a new loyalty punch card system this season, which led to more volunteers returning for multiple events. We even had two volunteers come for more than 10 events!
- Electronic version of daily stewardship log

BIG COTTONWOOD CANYON OVERVIEW

Invasive populations in Big Cottonwood Canyon ("BCC") were heavily concentrated around areas of human disturbance (campgrounds, ski areas, and roadsides); Spruces, Redman, and Jordan Pines Campgrounds; Cardiff Fork, Solitude, Brighton; and within the first half mile of high-use trails. The most prevalent invasive weeds *treated* in BCC during the 2024 season were thistle species (primarily Canada, bull thistle, and musk thistle), oxeye daisy, spotted knapweed, houndstongue, dalmatian toadflax, common mullein, phragmites, oriental clematis, and field bindweed.

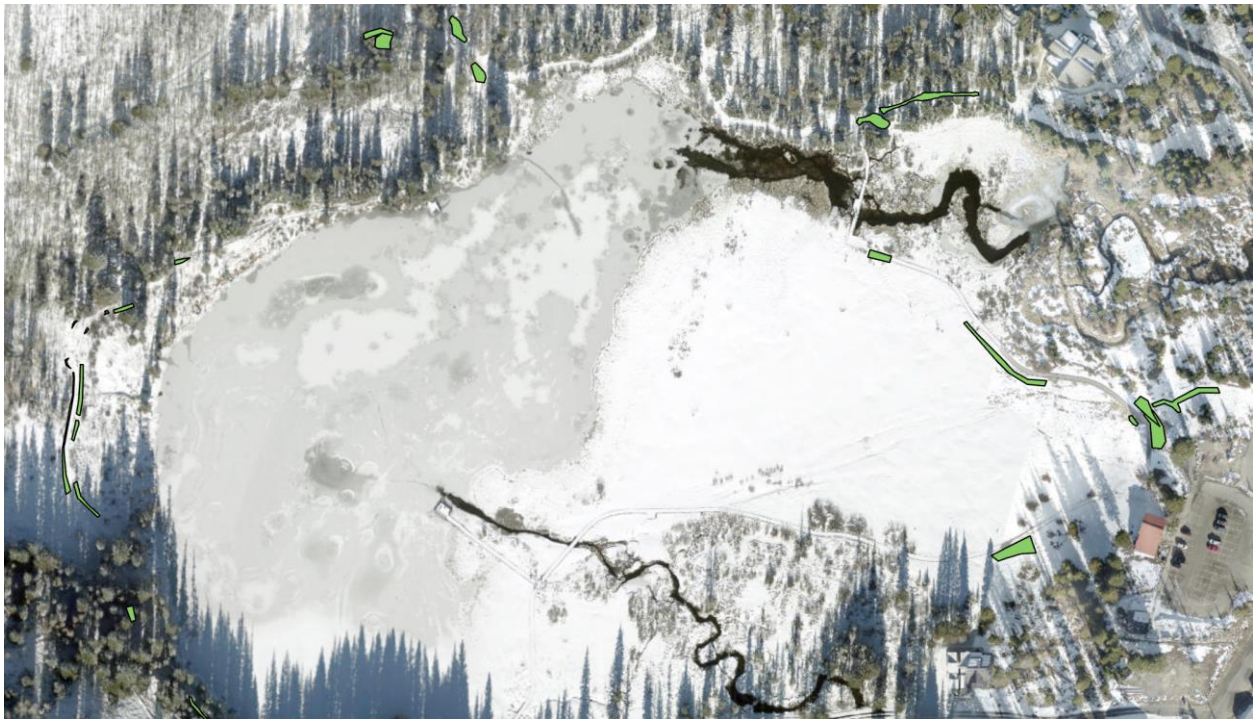
Community engagement through volunteer events was a priority this season, leading to many successful and effective volunteer days from lower BCC on the BST Ferguson trail to Silver Lake. CCF focused volunteer efforts at Brighton, Solitude, Silver Lake, Spruces, Cardiff boardwalk, as well as the new Fergusen Bonneville Shoreline Trail segment at the mouth of BCC. CCF partnered with Alltrails, Trails Utah, the National Forest Service, Solitude, Brighton, Wasatch 100 runners, and many company volunteer groups (Deloitte, Sam's Club, Striker, Otsuka, Goldman Sachs, and others).

Trails Scouted

Ferguson, Broads Fork, Mill D North, Lake Blanche, Donut Falls, Butler Fork, Wasatch Crest, Willow Lake, Days Fork, Lake Solitude, Brighton Lakes, Honeycomb Cliffs, Challenge Buttress, Mill B to Mt. Raymond, Cardiff, Reservoir Ridge, Mill B North, Mineral Fork, Mill A Gulch, Beartrap, Mule Hollow Mine Trail, and Desolation Lake.

BCC Restoration

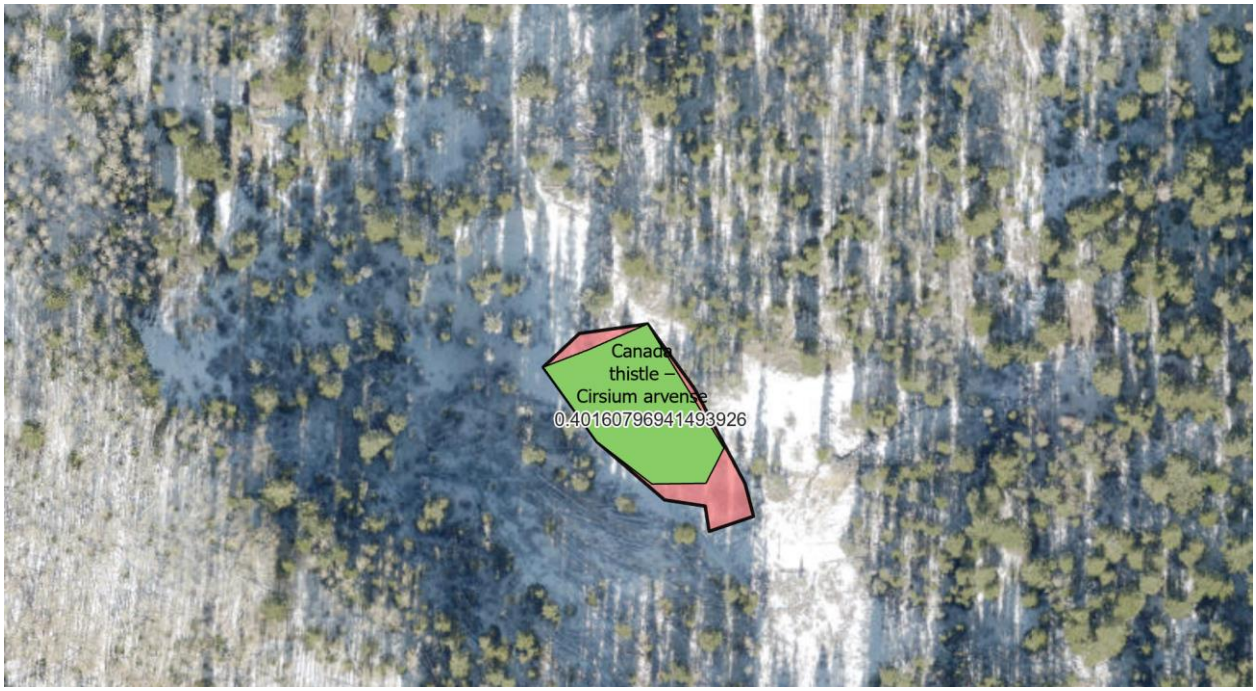
After the Silver Lake Boardwalk and natural surfaces trail were completed this summer, CCF began significant restoration efforts. Smallwing sedge, service berry, willow, and penstemon seedlings were planted around the boardwalk and seed mix (Baltic rush *Juncus balticus*, Nuttal alkaligrass, *Puccinellia nuttalliana*, Small wing sedge *Carex microptera*, and Yarrow *Achillea millefolium*) covered with decomposable erosion control blanket were used around the steep cutbacks of the natural surfaces trail. Cardiff boardwalk restoration continued from last season by planting more seedlings and decompacting the access road used for construction so the contractor could seed again. CCF also began a new restoration site about a mile up the Day's fork trail in a dense patch of Canada thistle. At this site, thistle was pulled by volunteers and replaced with native seedlings. This technique seemed to be effective in the Brighton loop road restoration project last season.



Silver Lake restoration sites. CCF partnered with Trails Utah and the US Forest Service to plan and implement these restoration efforts.

Cardiff Boardwalk Restoration Site. After construction of the boardwalk was complete, CCF partnered with the Forest Service to help restore the sensitive wetland/ meadow

plant community that was disturbed by construction.



Days fork restoration site. Canada thistle (shown in pink) was treated and then seedlings were planted (shown in green). More restoration will likely be needed to fully out-compete the Canada thistle.

Areas of Concern

Solitude: The Moonbeam parking lot has the highest concentration of invasive weeds in the tri-canyons, in both density and number of species. Species removed were Common Mullein, Musk Thistle, Bull Thistle, Canada Thistle, Yellow Sweet Clover, Spotted Knapweed and Phragmites. Solitude has also been adding more mountain bike trails which has created a disturbance which will require invasive species mitigation in the years to come. The village also has a high density of invasives including a population of Oxeye Daisy which was planted for wedding photo backgrounds. This population has been treated through a combination of spraying and hand pulling for years and will need continued management.

Spruces, Jordan Pines Campground, and Cardiff Boardwalk: These sites are highly trafficked, often have construction or machinery, and have a seed bank of invasive species. This means they will need to be monitored and treated each year. They are also excellent sites for volunteer events with bathrooms, parking, and accessible work areas.

Ferguson BST: CCF Trail Crew in partnership with the Forest Service completed a new section of trail connecting BCC Dogwood to Ferguson Canyon. This area was a

hotspot for invasives pre-construction and even though CCF has done consistent mitigation during trail building, the invasive seed bank is there and will respond to this disturbance. CCF hosted multiple volunteer event on this section of trail this season, effectively responding to the invasives that grew after the trail building disturbance.

BCC Water Treatment Facility

CCF got permission from SLC Public Utilities to remove dyer's woad growing on the BCC water treatment facility property. This was a very large population that CCF has not treated before, so there is a significant seed bank. Continued treatment will be crucial.

Lower BCC Creek Clematis

Although oriental clematis is not listed as an invasive species in the state of Utah, CCF and partners are concerned about the spread of this plant in lower BCC. Because this is a woody vine, the best treatment would be cutting the base and treating with stump killer. Unfortunately, this plant prefers growing near the creak in the riparian zone where we cannot use herbicide. CCF plans to treat this plan mechanically in early season next year before seeds can form by lopping off growing vines.

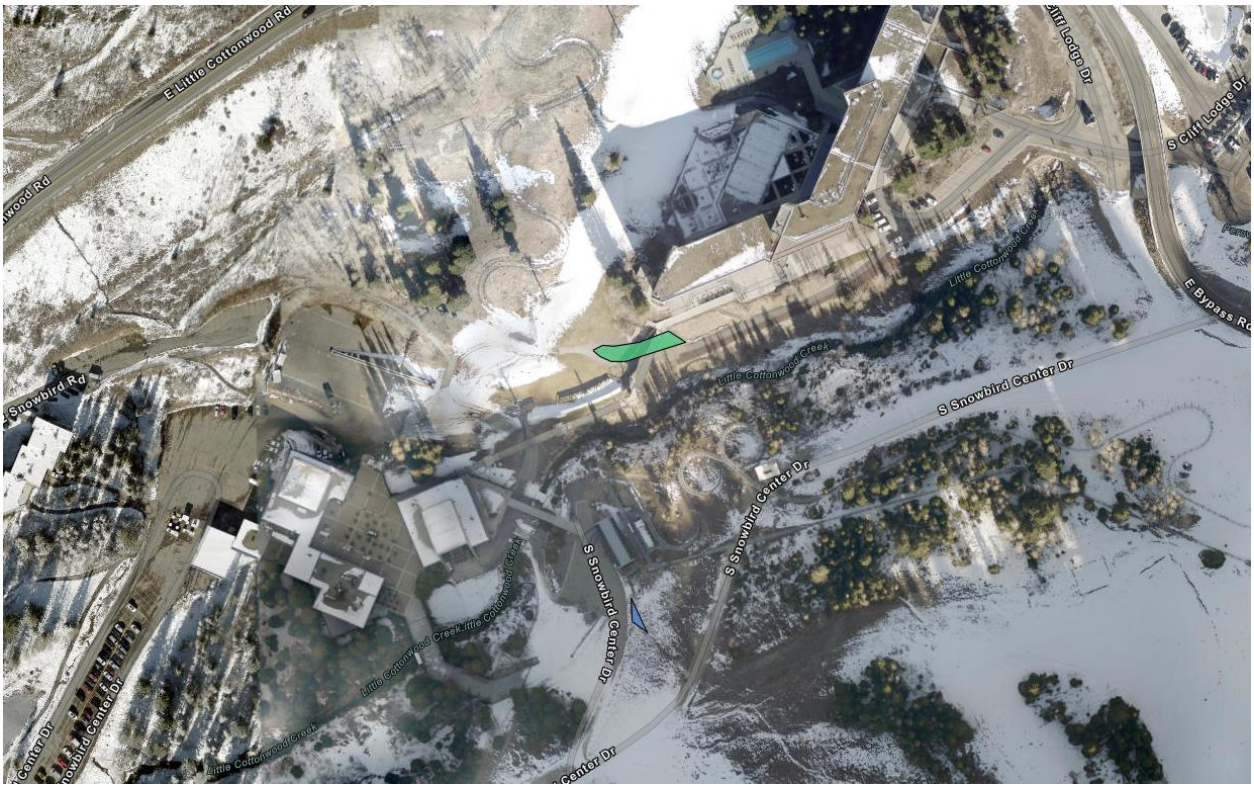
LITTLE COTTONWOOD CANYON OVERVIEW

Invasive populations in Little Cottonwood Canyon ("LCC") were heavily concentrated around areas of high human use and disturbance including Grit Mill and Little Cottonwood Canyon Trail; Snowbird, Alta, roadsides; and within the first half mile of high-use trails. The most prevalent invasive weeds noted in LCC during the 2024 season were yellow sweet clover, common mullein, dyer's woad, Canada thistle, bull thistle, scotch thistle, Houndstongue, phragmites, and field bindweed. The CCF Plants Crew surveyed and mitigated 14 weed zones (totaling 25.5 acres) at Alta in partnership with the Alta Environmental Center and added new weed zones at Snowbird (treating a total of 31.46 acres).

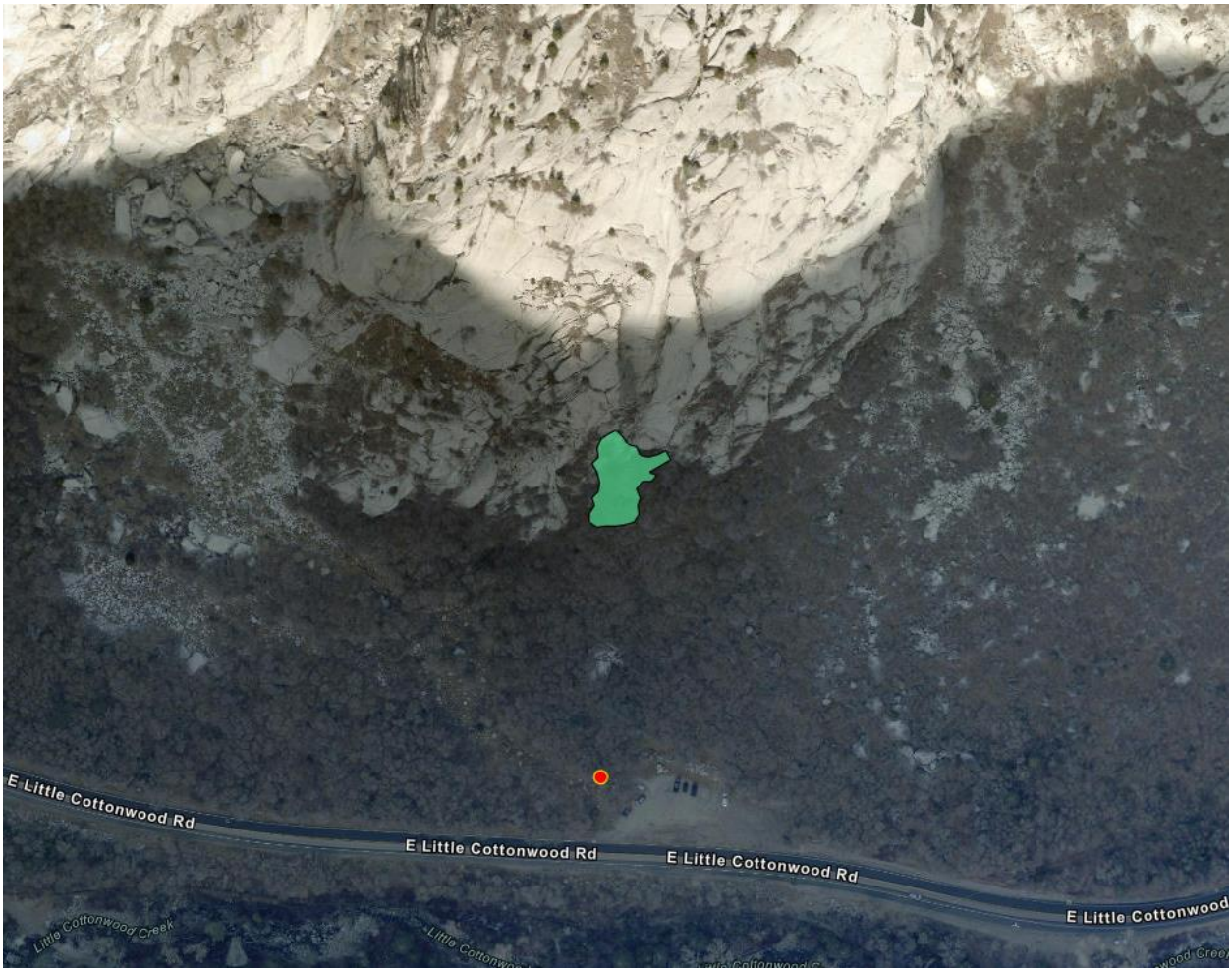
Trails Scouted

The following trails were scouted in LCC: Alpenbock Loop, Little Cottonwood Creek Trail, Temple Quarry, Red Pine, White Pine, Maybird Gulch, Cardiff from Alta, Gloria Falls, Lisa Falls, Catherine's Pass to Sunset, Albion Meadows, Grizzly Gultch, and Tanner Gulch.

Restoration Sites



This polygon shows the site of the seedling survival study at Snowbird. See the section called ‘Seedling Survival Study’ for more details on methodology.



This polygon shows where seed mix and re-vegetation mat were used to stabilize the slope after the CCF trail crew installed a new climbing access trail at East Gate Buttress.

Areas of Concern

Snowbird: Snowbird has a high density of invasives which were treated through hand-pulling volunteer events this season. Due to construction around the ski resort base, weed infestations are expected to grow and careful mitigation is essential. CCF would like to implement a Weed Zone program at Snowbird modeled after the Alta Weed Zone system.

Wasatch Resort Road/ LCC Trail: Garlic mustard was of high concern in LCC as a dense population has established on the residential property of **4971 Wasatch Resort Road.** The homeowner is aware that garlic mustard has become a ground cover species on the property, and they approved of all mitigation efforts thus far. The population was treated through hand pulling on 5/31/23, 6/13/23, and 7/21/23 and no individuals were allowed to flower or go to seed. A small population exists across the

gravel road along the creek, which was also hand-pulled. This spread should be carefully monitored.

Dyers woad at the base of LCC:

It is unclear whether dyers woad is spreading, or just had a good year this season. CCF has been working to contain the population at the base of LCC, only using manual control. Chemical control may be necessary if these populations cannot be contained.

MILLCREEK CANYON OVERVIEW

Invasive populations were heavily concentrated at and below Elbow Fork, lower Pipeline, Rattlesnake Gulch, within picnic areas, roadside, and parking areas. The invasive weed species scouted and mapped in Millcreek during the 2024 season were garlic mustard, myrtle spurge, leafy spurge, Dalmatian toadflax, common mullein, houndstongue, and burdock. CCF completed extensive mapping of Myrtle Spurge in lower MCC, establishing an upper boundary line for the population at Church Fork. This polygon data will be shared with the DNR, who will target those areas next season. CCF will treat any populations above the boundary line, effectively halting the up canyon spread. Volunteer groups are not ideal for the invasive populations on Pipeline given the steep and loose terrain. CCF hosted a volunteer weed pull at Rattlesnake Gulch in partnership with Trails Utah targeting houndstongue, common mullein, burdock, and cat mint. Houndstongue is especially prevalent in Millcreek due to dogs spreading the bur-like seeds on their fur.

Trails Scouted

The following trails were scouted in Mill Creek Canyon: Alexander Basin, Porter Fork, Pipeline Trail, Bowman Fork, Dog Lake, Desolation Trail, Upper Bigwater, Lower Bigwater, Old Red Pine Road, Birch Hollow, and Grandeur Peak, Rattlesnake Gulch, Thaynes Canyon Trail, Burch Hollow Trail, Mt Aire, and Lambs Canyon.

Restoration Sites

CCF tried a new method of controlling myrtle spurge along the rattlesnake gulch trail. The spurge was first pulled my hand using picks to remove most of the root. The bare patches were then replaced with mountain mahogany and white sagebrush seedlings, in the hope that these areas are eventually shaded which may exclude myrtle spurge.

Areas of concern

Lower MCC Myrtle Spurge: Myrtle Spurge is a class IV (prohibited) invasive and is most prevalent in Mill Creek Canyon. It is widespread across the rocky, exposed, lower areas of the canyon and specifically along the steep cliff sides and gullies under the Pipeline Trail. Myrtle spurge spreads by seeds being flung 10-15 ft and contains a milky sap which is toxic to humans – making this species incredibly difficult to mitigate safely and effectively. In 2022, Myrtle spurge was found as high in elevation as Upper Box Elder Picnic Area; this population was treated with herbicide. Treating all the populations in MCC is not feasible for CCF given our current resources, but we plan to establish an upper boundary line and treat any populations above the line with a combination of hand pulling and spraying. Exactly where this line will be established depends on surveys next season to locate the leading edge of spread.

Rattlesnake Gulch: A very significant re-route was added recently as a more moderate grade hiking and biking option to the old Rattlesnake Gulch trail. This huge trail project created disturbance that invasive weeds have taken advantage of. We hosted a very

successful volunteer day at this site but did not have the time or human power to get everything this season. This area becomes dangerously hot to work in during peak summer months but will be a priority for next season.

WASATCH FRONT OVERVIEW

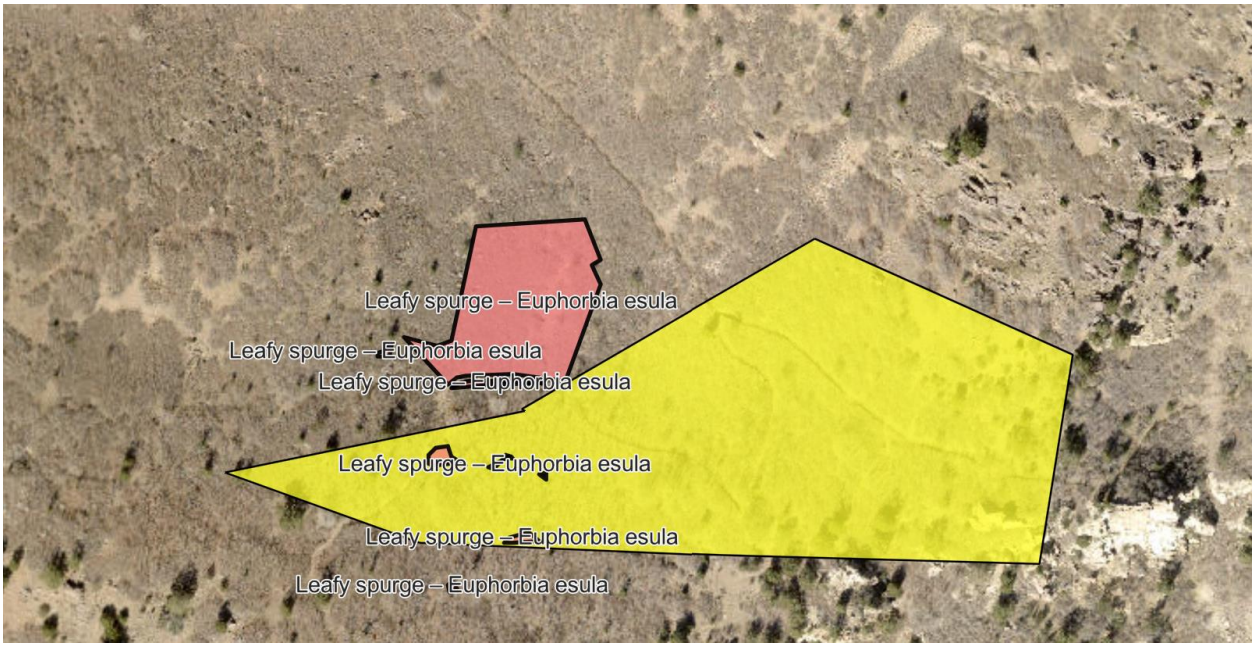
The CCF Plant Stewardship Crew spent less time in the Front overall this season, instead prioritizing the canyons. The Front is characterized by different microclimate, elevation, and threats than the canyons, creating a hotspot for weeds. There are several species that are already established in the foothills: especially myrtle spurge and dalmatian toadflax. Mitigation of these species in the foothills is beyond the scope of CCF's field crew and also outside of our mission of stewardship of the canyons. CCF will continue to map invasive species in the Wasatch Front in the hopes of catching new invasive populations early before they can spread into the canyons.

Trails Scouted on Wasatch Front

The following trails were scouted along the Wasatch Front: Mount Olympus, Ferguson/BST, BST from Thousand Oaks to Neffs, Heughs Canyon, and Neffs Canyon.

Areas of Concern

Mt. Olympus: A population of leafy spurge was found on the face of Mt. Olympus. After hand pulling the population in 2023 (shown by yellow polygons), it was smaller and more patchy in 2024 (shown by the salmon colored polygons). CCF plans to treat this population with a combination of hand pulling and herbicide in 2025.



HERBICIDE APPLICATION

CCF's Plant Stewardship Director and Crew Leads were certified with pesticide applicator licenses. The SLC Public Utility generously allowed CCF to operate our herbicide treatment out of their spray barn and use their spray backpacks as well as provided expertise on which chemicals are effective for each target species. In serveral instances, the target species population was close to or within 100ft of surface water. CCF chose to take a conservative stance on spraying herbicide near surface water, opting for other treatment measures whenever possible. Two populations of garlic mustard that were originally planned for herbicide treatment were not sprayed because they were ~100 ft from a stream.

CCF did treat oxeye daisy at Solitude Mountain Resort (entry 2). The herbicide 2,4-d and MSM60 (a pre-emergent) were used for a spot treatment applied with a backpack sprayer. The treatment appears to be extremely effective so far.

CCF plans to focus on herbicide application for high priority species in the early spring of 2025. Leafy spurge, myrtle spurge, garlic mustard, and oxeye daisy will be treated with herbicide.

SPECIES OF HIGHEST PRIORITY

The state of Utah has a categorization system for invasive weed species based on preventative or management measures. The Utah State University Noxious Weed

Guide describes Class 1A (Early Detection Rapid Response, plants not known to occur in Utah, but present in neighboring states. If found, high priority to eradicate.), Class 1B (Early Detection, plants that occur in Utah at low levels, eradicate known populations and prevent new populations), Class 2 (Control, these species have reasonable distribution in Utah, but not everywhere), Class 3 (Contain, plants widely distributed in Utah, try to reduce spread), and Class 4 (Prohibited, present in Utah, illegal to sell or buy as ornamentals) species. Taking these classifications, input from partners, and CCF's mapping data into consideration, the potential for invasiveness and impact to local ecosystems is considered to create this priority list.

Garlic Mustard, *Alliaria petiolata* (Level 1B)

Garlic mustard is a highly invasive plant that is extremely difficult to eradicate completely, even with a combination of chemical and mechanical control. A new population was discovered at Bells Canyon this season, which could easily be spread further up into LCC. CCF partnered with Salt Lake County and Sandy City to host two volunteer events where close to 2,000 lbs of garlic mustard were pulled, treating 0.7 acres. This population should be chemically treated next spring either by CCF or Sandy City. The population at the residential property on Wasatch Resort Rd was treated manually multiple times throughout the season, and after close measurement was determined to be too close to water to spray with herbicide. The population at the intersection of Rattlesnake Gulch and Pipeline was successfully relocated and mechanically treated multiple times this season. The population at the Broads fork trailhead was also mechanically treated multiple times this season.

This map shows the ‘S’ Curve in BCC as well as the beginning of the Broads Fork Trail. There are two small patches of garlic mustard which after careful measurment, are too close to Big Cottonwood Creek to chemically treat. CCF is committed to closely monitoring this population and mechanically treating each season. The percent cover prior to treatment was low (1-5%) and 0% after treatment.

This map shows a small area of Wasatch Resort Road at the base of LCC, with the polygons showing areas mechanically treated this season. The percent cover prior to treatment was medium (6-25%) and trace (<1%) after treatment.

This population was successfully relocated this season after not being found for a few years due to the polygon being in the wrong location. There were many flowering plants, and there is most likely a significant seed bank which will need to be carefully monitored. Mechanical and chemical treatment is advised. The percent cover prior to treatment was medium (6-25%) and trace (<1%) after treatment.

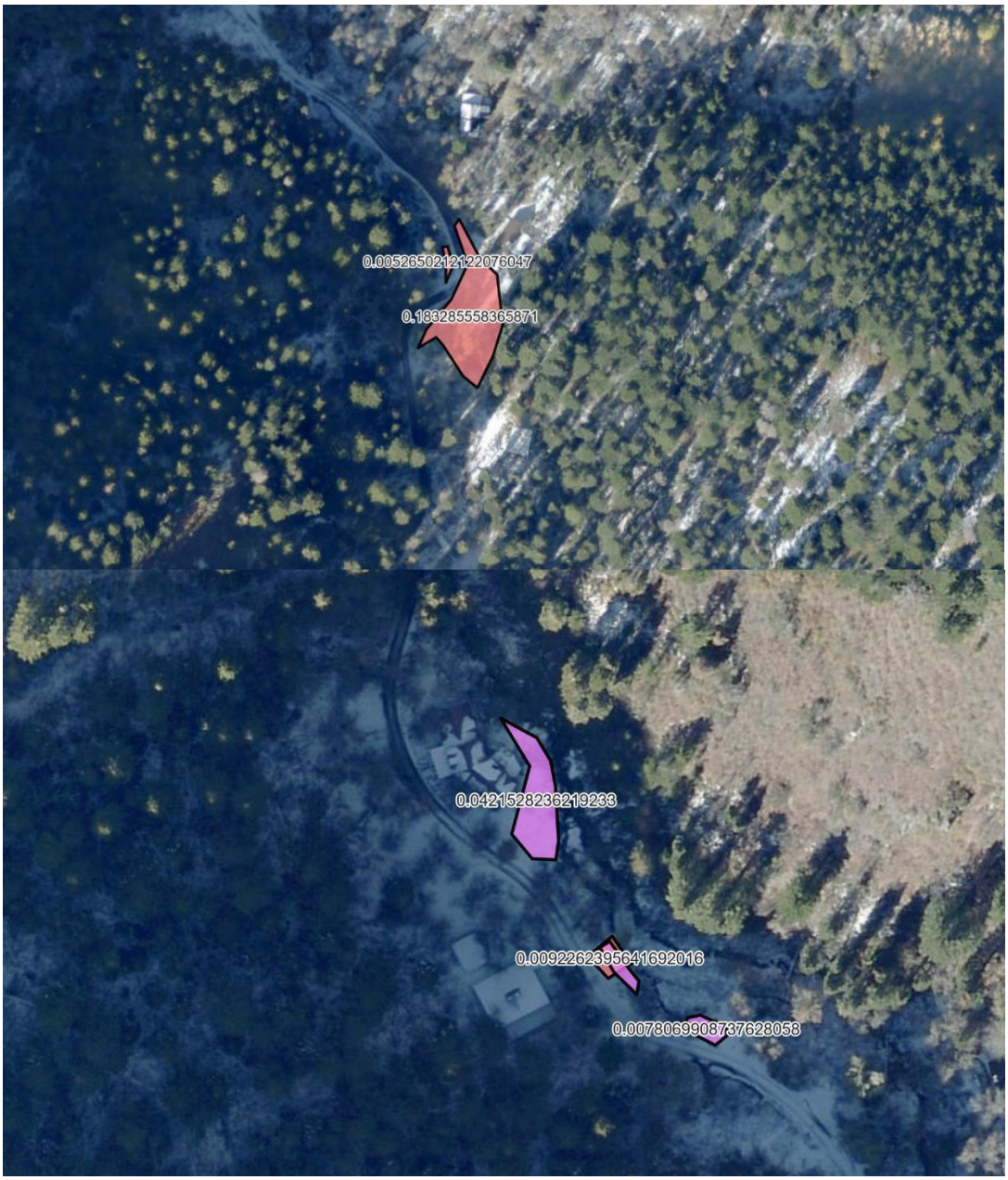
These polygons indicated the newly discovered Bell's canyon population of garlic mustard that were treated manually by volunteers this season. The total area is ~0.7 acres. The percent cover prior to treatment was majority (>50%) and low (1-5%) after treatment.

Oxeye Daisy, *Leucanthemum vulgare,* (Level 1B)

Oxeye daisy is a creeping, rhizomatous perennial that prefers poor soils and is drought tolerant. It is often found in meadows, roadsides, waste areas, etc. Planted as an ornamental at Solitude many years ago, oxeye daisy has become widespread across the resort, particularly in Entry 2 (the Village). Chemical treatment was done using the herbicide 2,4-d and MSM60, shown with the blue colored polygons while the populations within 100 ft of surface water were manually treated (salmon-colored polygons).

This map shows the area around Solitude Entry 2 (The Village) where oxeye daisy was planted for wedding photos. The percent cover prior to treatment was medium (6-25%) and trace (<1%) after treatment.

This map shows the Brighton Loop Road where there is a very small population of oxeye daisy. The percent cover prior to treatment was low (1-5%) and trace (<1%) after treatment.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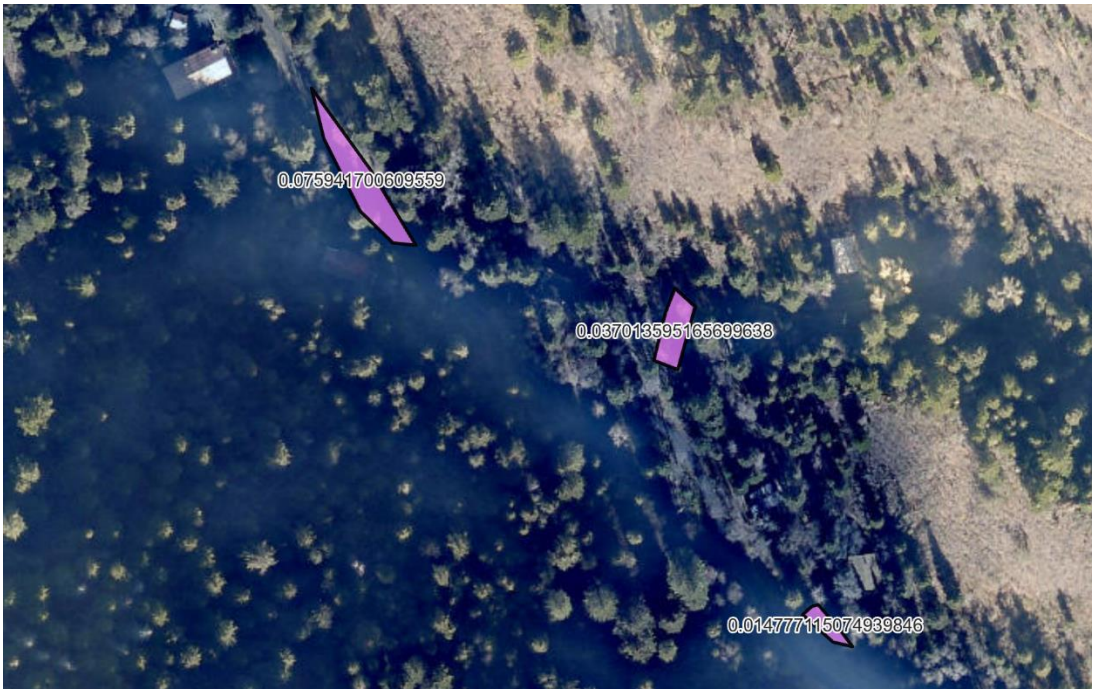
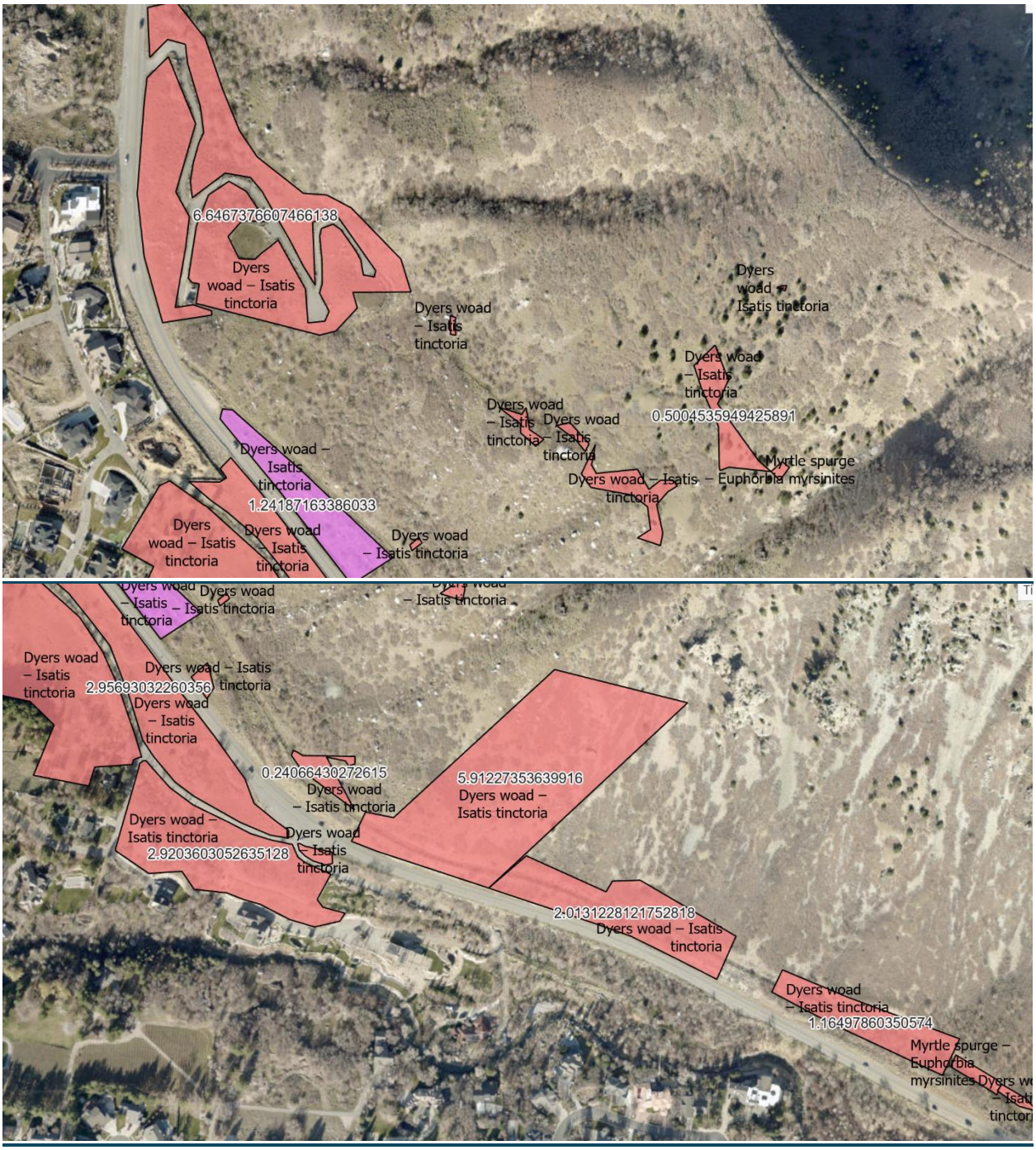


The above 3 maps show sections of Porter Fork Road in Millcreek Canyon where oxeye daisy was planted on private property and has since spread along the roadside and to other properties. Permission to treat these polygons was acquired from the Forest Service and they were hand pulled and bagged this season. The percent cover prior to treatment was medium (6-25%) and trace (<1%) after treatment.

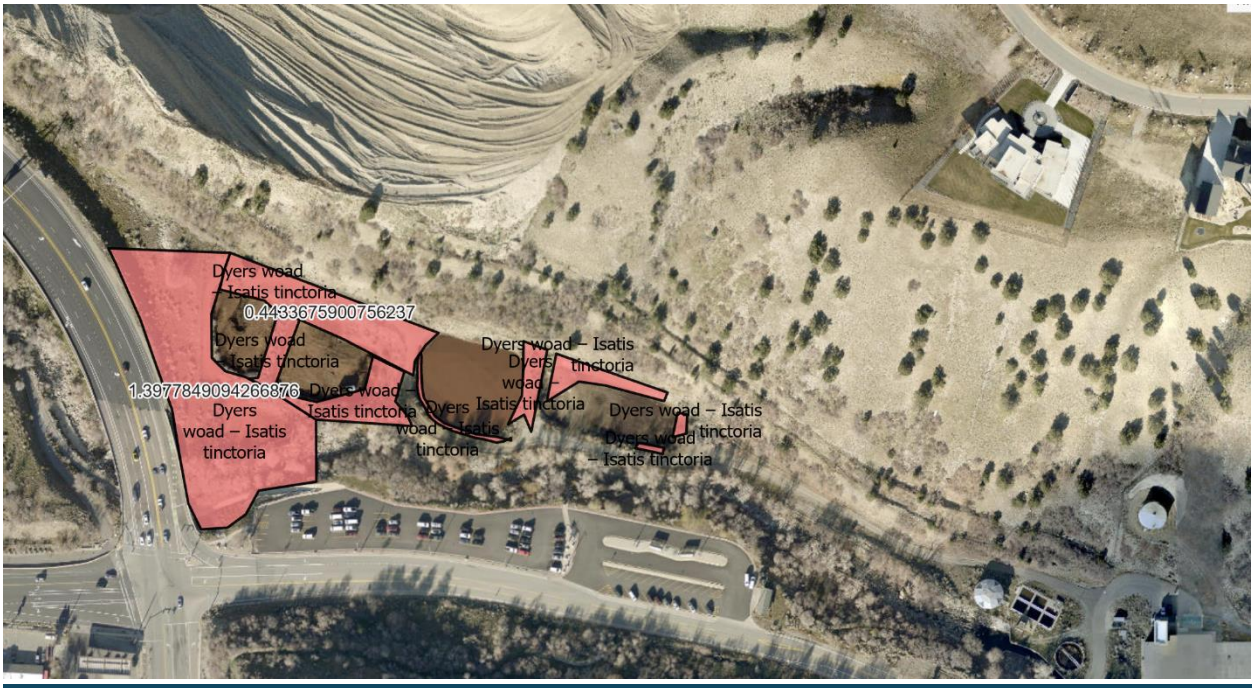
Dyer's Woad, *Isatis tinctoria* (Level 2)

Dyers Woad (*Isatis tinctoria*) is a lower elevation invasive species that thrives in dry, rocky soil. Due to its habitat preferences, this species is a major priority for containment before it spreads to other foothill areas. This season seemed to be optimal for germination and growth of this species, with more coverage and density than previous years. Mechanical treatment was done before seeds could be released within as many populations as possible. After more data is collected on the effectiveness of manually control, chemical control should also be considered.



This area at the mouth of Little Cottonwood Canyon covers the largest area, but is on average 1-5% cover. Serveral of these polygons are on private property, which started to be developed this season. Some of these polygons are steep and above the road, making navigating them dangerous. The percent cover prior to treatment was low (1-5%) and trace (<1%) after treatment.

This population at the Gitt Mill parking area was also treated this season. The percent cover prior to treatment was low (1-5%) and trace (<1%) after treatment.



This map shows a population on the property of the Salt Lake City Public Utility Water Treatment Plant. We got permission to manually treat this area. The percent cover prior to treatment was high (26-50%) and low (1-5%) after treatment.

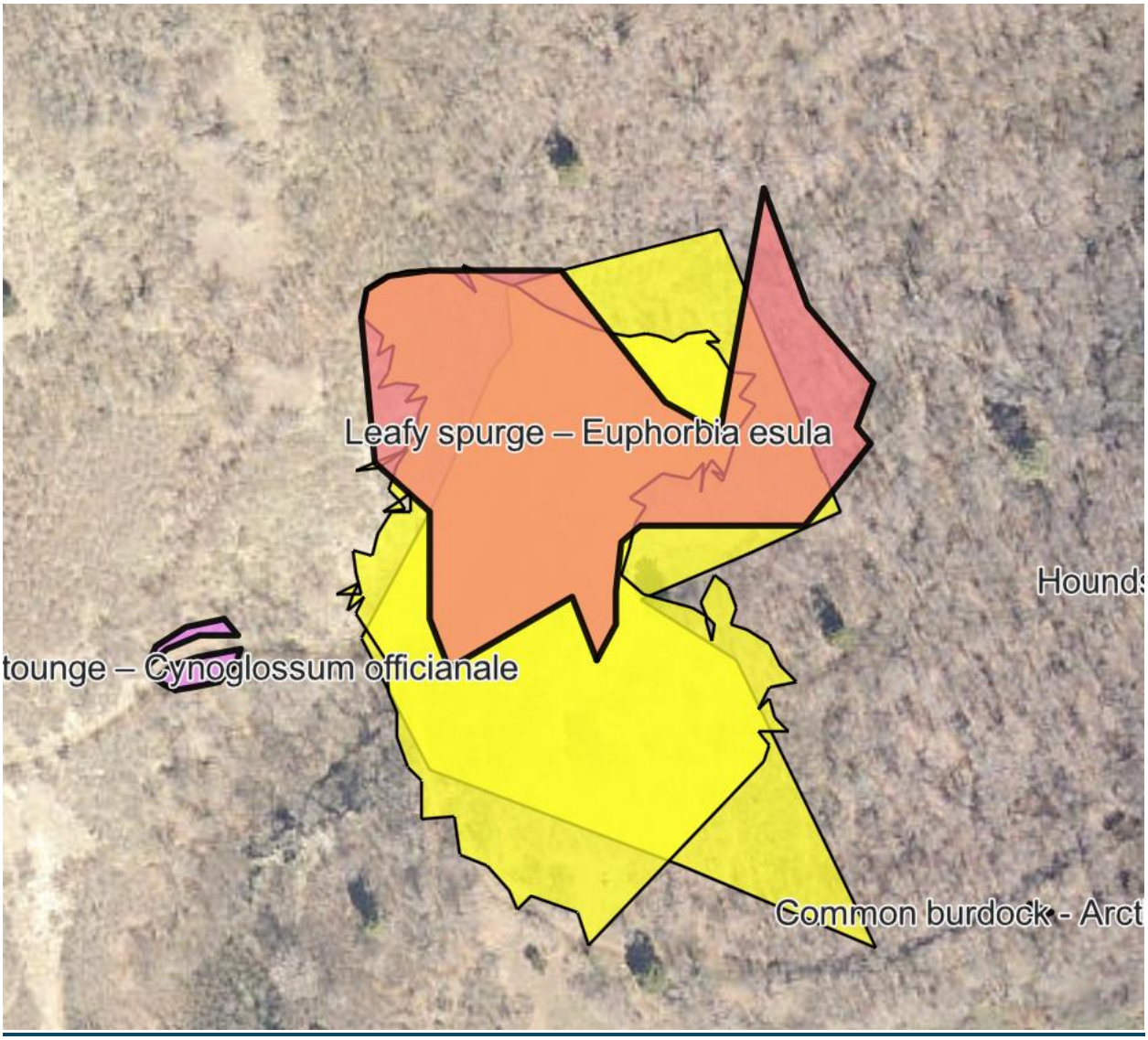
Yellow Toadflax, *Linaria vulgaris* (Level 2)

Yellow toadflax (also called butter and eggs toadflax) is a perennial flowering plant from Europe that can survive well at high elevations but does not seem to spread as vigorously as dalmatian toadflax. Containment through hand pulling seems to be effective.

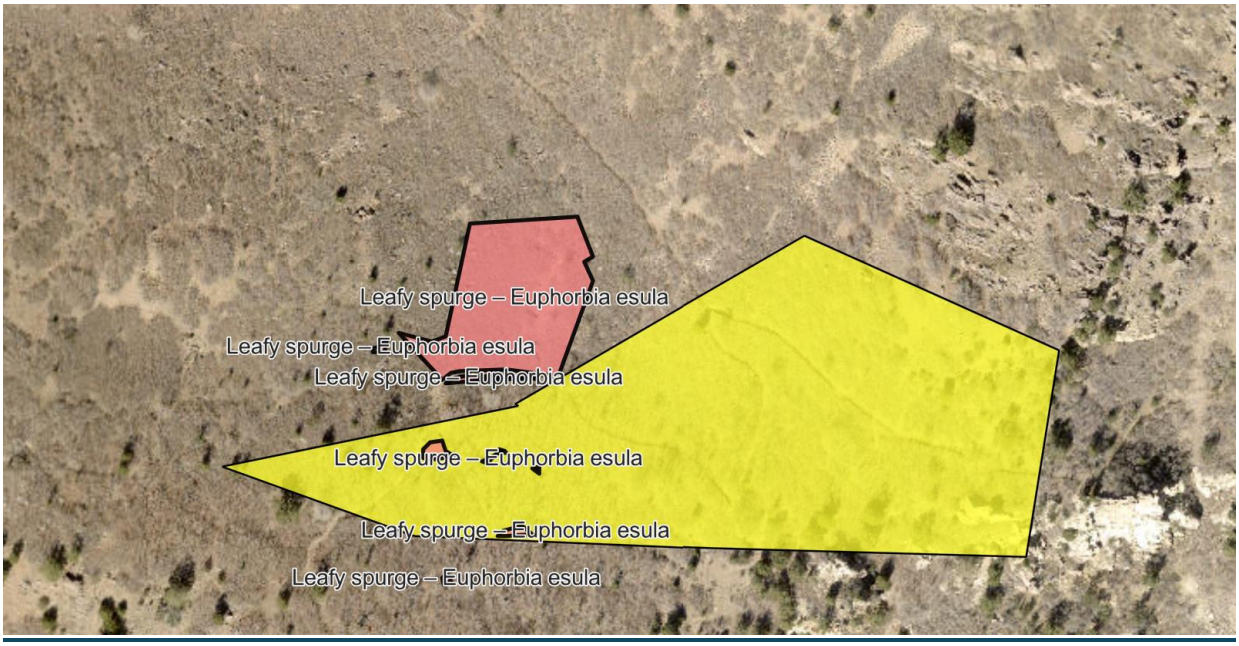
This map shows the largest population of yellow toadflax (which may be hybridizing with dalmatian toadflax). After pulling this plant by hand last season, the population was significantly reduced. CCF will continue to monitor whether manual control is effective.

Leafy Spurge, *Euphorbia esula*, (Level 2)

Leafy Spurge is an herbaceous perennial plant with only a couple small populations in the Tri-canyons so far. Due to its limited spread in the canyons so far, this plant will be a high priority for mechanical and chemical control next season.



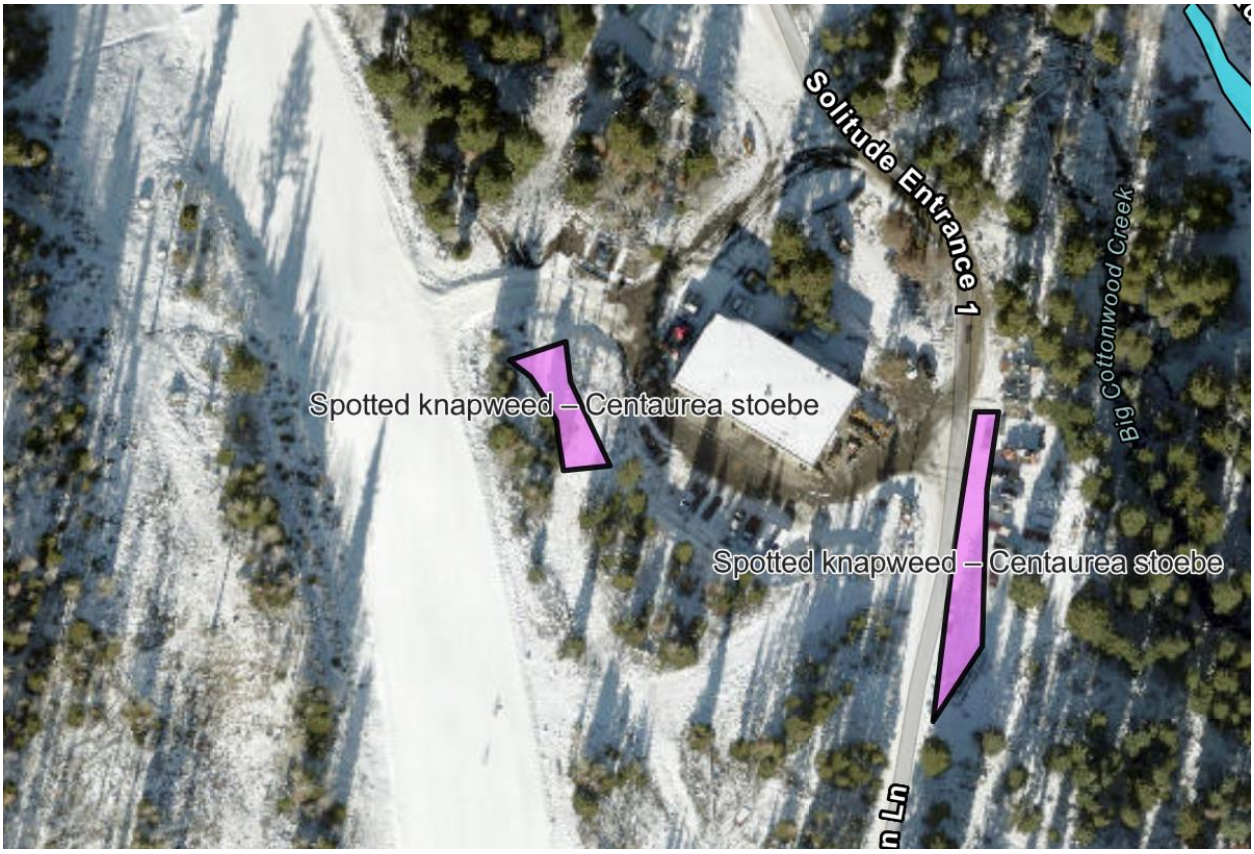
This map shows a section of the Pipeline Trail in Millcreek Canyon where there is an isolated population of Leafy Spurge. The yellow shows historic polygons, while the orange shows the population in 2024. Through careful monitoring and manual treatment, the population is decreasing. CCF plans to treat this population with herbicide in the spring of 2025.



This map shows a leafy spurge population on the face of Mount Olympus. Through careful monitoring and manual treatment, the population is decreasing. CCF plans to treat this population with herbicide in the spring of 2025.

Spotted Knapweed, *Centaurea stoebe var. micranthos,* (Level 2)

Spotted Knapweed is a biennial to short-lived perennial which usually gets established in disturbed areas but can spread into native plant communities and outcompete natives. One plant can produce 40,000 seeds. This plant seems to be concentrated around Solitude Mountain Resort and at an early enough stage of infestation that eradication is possible through hand pulling.



This map shows the area between Solitude Entry 1 and Entry 2 where most of the Spotted Knapweed is concentrated. The CCF Plant Stewardship Crew removed these populations by hand (with proper hand protection). The starting cover was 20% and the cover after treatment was <1%.

Phragmites, *Phragmites australis,* (Level 3)

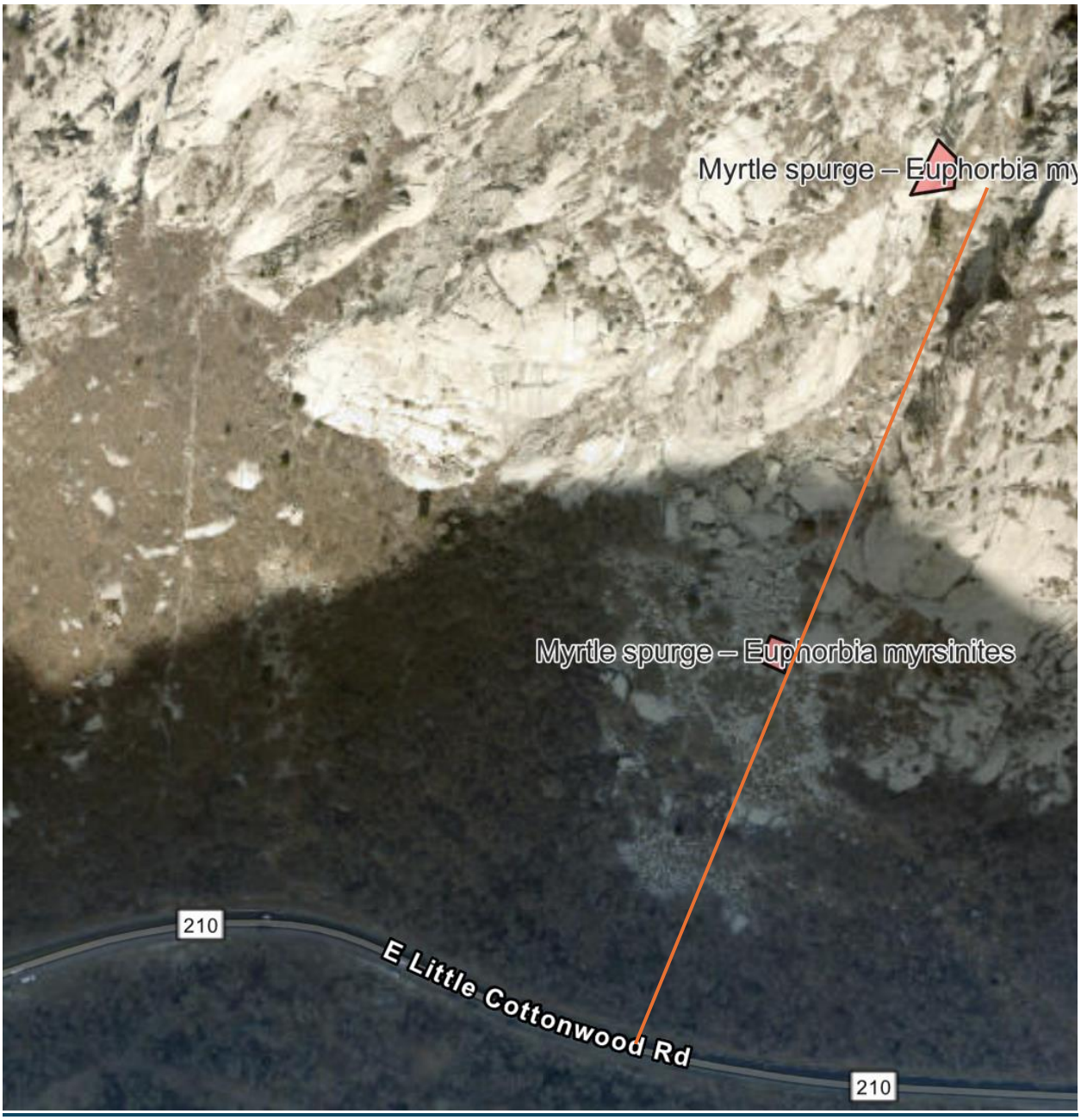
Phragmites is the only level 3 species included in this section due to the fact that it is relatively uncommon in the Tri-canyons at this time and extremely invasive and difficult to remove once established in other areas. Unfortunately, phragmites has spread significantly in the last year, with too many new small patches to go through each one. None of the populations are treatable with herbicide, so CCF began whacking them back with a trimmer. The hope is that the plants are weakened eventually and not allowed to spread or go to seed. This will be an ongoing effort.

Myrtle Spurge- *Euphorbia myrsinites* (Level 4)

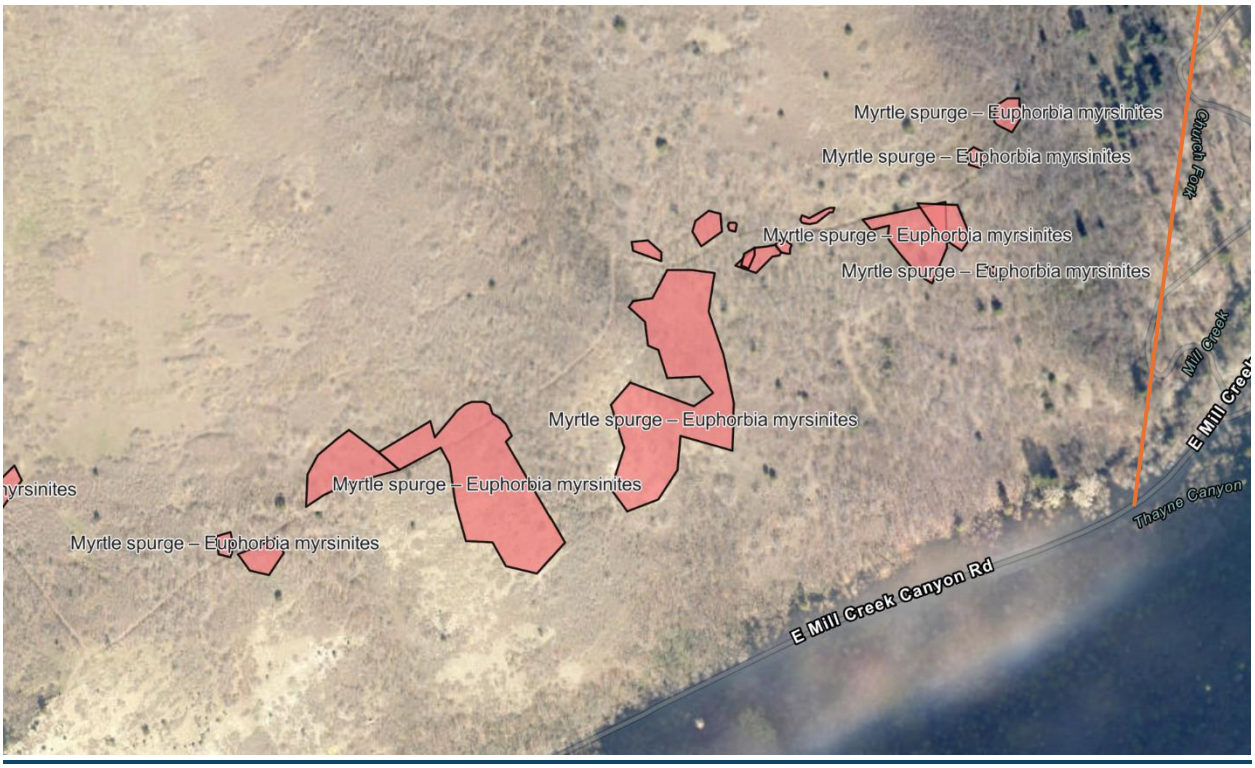
Myrtle spurge is a serious threat to the health of our ecosystems. If left unchecked, this plant is an aggressive invader that can thrive in xeric, rocky habitats. Myrtle spurge can fling its seeds 15ft through the air AND reproduce asexually via broken off stems or roots. CCF does not have the capacity to treat all the myrtle spurge in the Wasatch Front and lower canyons, but luckily the Utah Department of Natural Resources has the

funding to take this on. CCF will provide mapping and analysis of treatment effectiveness, as well as treat any populations above the ‘fire line’. This line has been determined in each canyon based on where the most dense part of the population starts to dwindle. CCF will treat everything above the line, and the DNR will treat everything below.

This map shows the Storm Mountain picnic area, where CCF has found that the most dense part of the myrtle spurge population ends in BCC. This is where the CCF myrtle spurge fire line will be- anything above the line will be treated by CCF.



This map shows the Green Adjective Gully, where CCF has found that the most dense part of the myrtle spurge population ends in LCC. This is where the CCF myrtle spurge fire line will be- anything above the line will be treated by CCF.



This map shows Church Fork, where CCF has found that the most dense part of the myrtle spurge population ends in MCC. This is where the CCF myrtle spurge fire line will be- anything above the line will be treated by CCF.

SEED COLLECTION

In partnership with Dryland Horticulture, the CCF weeds crew was trained on the procedures of native plant seed collection. These seeds will germinate and overwinter with Dryland Horticulture, to then be planted as seedlings in the spring and summer of 2025. Dryland Horticulture will also grow seedlings for wetland restoration around Cardiff Boardwalk and Silver Lake Boardwalk.

SEEDLING SURVIVAL STUDY

Optimizing seedling survival is crucial for effective rehabilitation efforts. While there is general knowledge about seedlings' preferred habitat, best planting practices may be highly variable based on specific, and often changing, conditions. Environmental differences (such as water table depth, precipitation, heat, shade, disturbance, slope aspect, and planting practices) all influence seedling survival. Interaction between these variables is highly specific to micro-climates and often makes application of findings from related studies difficult. For example,

nutrient availability and disturbance type influence seedling emergence and vigor in alpine ecosystems, but the strength of those factors are dependent on species. Additionally, a 3-year-long study by the University of New Mexico found that climate was insignificant to tree seedling survival in post-wildfire landscapes, and topographical features were a greater predictor of survival. However, the same study found that effects differed greatly by species (Marsh et al., 2022). Another study found water table depth to be an important factor in establishment of wetland species in degraded ski areas sites (Cooper et al., 2017). In a review of alpine shrub establishment, Paschke et al. (2003) found planting practices and establishment success to vary based on ecotypes of each shrub species but encountered browsing and herbaceous competition to be the limiting factor.

With so many competing factors influencing seedling survival, our aim in this study is to observe two distinct factors - time of year planted and watering- that are under our control for practical application in the Central Wasatch. Early season water in May and June may be more conducive to some seedling establishment in the Rocky Mountain area (Tai et al., 2017), although standard practice for some tree species is to plant in late summer or fall due to the North American monsoon and winter dormancy patterns (March et al., 2022). Currently, many rehabilitation efforts plant throughout the summer, which may be due to time constraints and the limited planting season in alpine environments. Little, if any, research has been done on the long term survival of perennial shrubs and flowers based on time of year planted.

In this study, we will test if time of year planted and watering frequency affect seedling establishment in high elevation, disturbed areas in the Central Wasatch. At Alta, seedlings were planted in June, July, August, September and October of 2024 (all plantings occurred on approximately the 20th day of each month) to study time of year planted. At Snowbird and Solitude, seedlings were planted in August and September respectively to study watering frequency. For both studies, seedlings were planted in clusters of 10 that were randomly placed within each site. Each seedling was marked with a metal staple. Seedlings were planted using a rock bar, a metal pole with a tapered tip that is pounded into ground to make a cylindrical hole where the seedling is planted.

Data on survival will be collected for the next 3-5 years.

RARE PLANT SURVEYS

CCF partnered with Mindy Wheeler and her rare plants team from Utah State University to monitor and map the following Rare Plants Survey Species:

Scientific name	Common name	State Rank	UT Status	USFS Status	Threats
Aster kingii var kingii	King's Aster	S3	None	N/A	Invasive Plant Species – Non-native
Corydalis caseana ssp. brachycarpa	Wasatch Fitweed/ Sierra Fumewort	S2	SGCN	Sensitive	Channelization / Bank Alteration (direct, intentional), impacts from ski areas, climate change, Soil Erosion / Loss
Lepidium montanum var alpinum	Alpine peppergrass	S1	SGCN	Sensitive	Hiking / Foot Travel, climbers, ski industry development

Lesquerella (Physaria) garrettii	Garrett twinpod	S2	None	Sensitive	Rock climbers, Hiking / Foot Travel, non-native mountain goat grazing, changes in snowpack
Jamesia americana var. macrocalyx	Cliff Jamesia	S3	SGCN	Sensitive	Hiking / Foot Travel, rock climbers, ski resorts, changes in snowpack, non-native mountain goats
Erigeron garrettii	Garrett's Daisy	S2	SGCN	Sensitive	Rock climbing, Hiking / Foot Travel
Penstemon platyphyllus	Broadleaf beardtongue	S3	None	N/A	Invasive Plant Species – Non-native
Ivesia utahensis	Utah Mousetail	S2	SGCN	Sensitive	HikersHiking / Foot Travel, mountain goats, climate change
Dodecatheon dentatum var utahense	Utah Shooting-star	S1	SGCN	Sensitive	Hiking / Foot Travel
Draba globosa	Rockcress draba	S2	SGCN	Sensitive	Hiking / Foot Travel
Draba brachystylis	Short-style draba	S1	None	Sensitive	Development, Hiking / Foot Travel, user-created trails
Lloydia serotina var. serotina	Common alpine lily	None	None	N/A	Invasive Plant Species – Non-native
Erigeron ursinus var. meyerae	Bear river fleabane	None	None	N/A	Invasive Plant Species – Non-native
Ericameria obovata	Rydberg's Goldenbush	None	None	N/A	Invasive Plant Species – Non-native
Cypripedium fasciculatum	Clustered Lady's-slipper	S2	SGCN	Sensitive	Channelization / Bank Alteration (direct, intentional), timber industry, road construction, development, fire suppression, collecting, Hiking / Foot Travel.

Erigeron arenarioides	Wasatch Daisy	S3	None	Recommended sensitive	Invasive Plant Species – Non-native, Hiking / Foot Travel

VOLUNTEERING, COMMUNITY OUTREACH, AND EDUCATION

The CCF Plant Stewardship Crew hosted 364 volunteers over 25 days for a total of 1092 hours (valued at $32,704). The crew also attended the Wildflower Festival to share their plant knowledge with the public. Over the course of the season, the team worked together to photograph every species of plant we saw for the new edition of the Central Wasatch Wildflower Guide. Here are some highlights:

CCF, Deloitte, and Sandy City came together to pull ~2000 lbs of weeds at Bells Canyon.

Alltrails joined us for a weed pull and naturalist hike at Alta.

Many volunteers across multiple days helped to implement a huge restoration project at Silver Lake.

CCF and Trails Utah partnered to manage weeds on recently built trails (areas where weeds tend to be especially good at colonizing).

CCF's plant crew invited volunteers to join for a 'Dyeing with woad' natural dyeing workshop and community building event.

FUNDERS AND PARTNERS

Thank you for your incredible support for Cottonwood Canyons Foundation this year. Our work would not be possible without:

Utah Department of Agriculture

Salt Lake City Public Utilities Watershed Division

US Forest Service

Town of Brighton

National Forest Foundation

Central Wasatch Commission

REI Co-Op

Cabela's

Salt Lake County

Alta Ski Area

Brighton Resort

Snowbird Resort

Solitude Mountain Resort

Remkes Environmental

Dryland Horticulture

Wasatch Mountain Club

Snowbird Play Forever

Alta Environmental Center

Save our Canyons

Friends of Alta

LOOKING AHEAD: PLANS FOR 2025

The CCF Plants Stewardship Crew has so many impactful and important projects happening in the canyons. Looking ahead, CCF wants to make sure that we are utilizing our resources in the most efficient and effective ways possible. CCF is thrilled about the growth and impact of the weeds program this season and is looking forward to continuing to protect the watershed of the Tri-Canyons through education and stewardship.