



Cottonwood Canyons Foundation Invasive Weeds Program 2023 Report

CONTENTS

- Season Summary
- Big Cottonwood Canyon Overview
 - Trails Scouted
 - Restoration Sites
 - Areas of Concern
- Little Cottonwood Canyon Overview
 - Trails Scouted
 - Restoration Sites
 - Areas of Concern
- Millcreek Canyon Overview
 - Trails Scouted
 - Restoration Sites
 - Areas of Concern
- Wasatch Front Overview
- Discussion of Herbicide Application
- Species of Highest Priority
 - Garlic Mustard
 - Oxeye Daisy
 - Dyers Woad
 - Dalmatian Toadflax
 - Leafy Spurge
 - Spotted Knapweed
 - Yellow Toadflax
 - Phragmites
- Seed Collection
- Rare Plant Surveys
- Cottonwood Canyons Community Outreach and Education
- Funders and Partners
- Looking Ahead

SEASON SUMMARY

Season Totals

- Total Miles of Trail Surveyed: 206 miles
- Total Weight of Invasives Removed: 13,291 pounds
- Total Native Wildflowers Planted for Restoration: 1,185
- Rare Plant Surveys Conducted: 5
- Number of volunteer days hosted: 24 days

Invasive Species Surveyed and/or Treated during 2023 Season

- Dalmatian Toadflax, *Linaria dalmatica*
- Garlic Mustard, *Alliaria 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, *Euphorbia 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, *Convolvulus arvensis*
- Phragmites, *Phragmites australis*
- Medusahead, *Taeniatherum caput-medusae*
- Perennial Pepperweed, *Lepidium latifolium*
- Sow Thistle, *Sonchus oleraceus*
- Money Plant, *Lunaria annua*
- Dyers Woad, *Isatis tinctoria*

Community Volunteers for Weeds

- Total Volunteers: 337
- Total Volunteer Hours: 1229
- Total Volunteer Hour Value: \$36,808
- Total Volunteer Events: 24

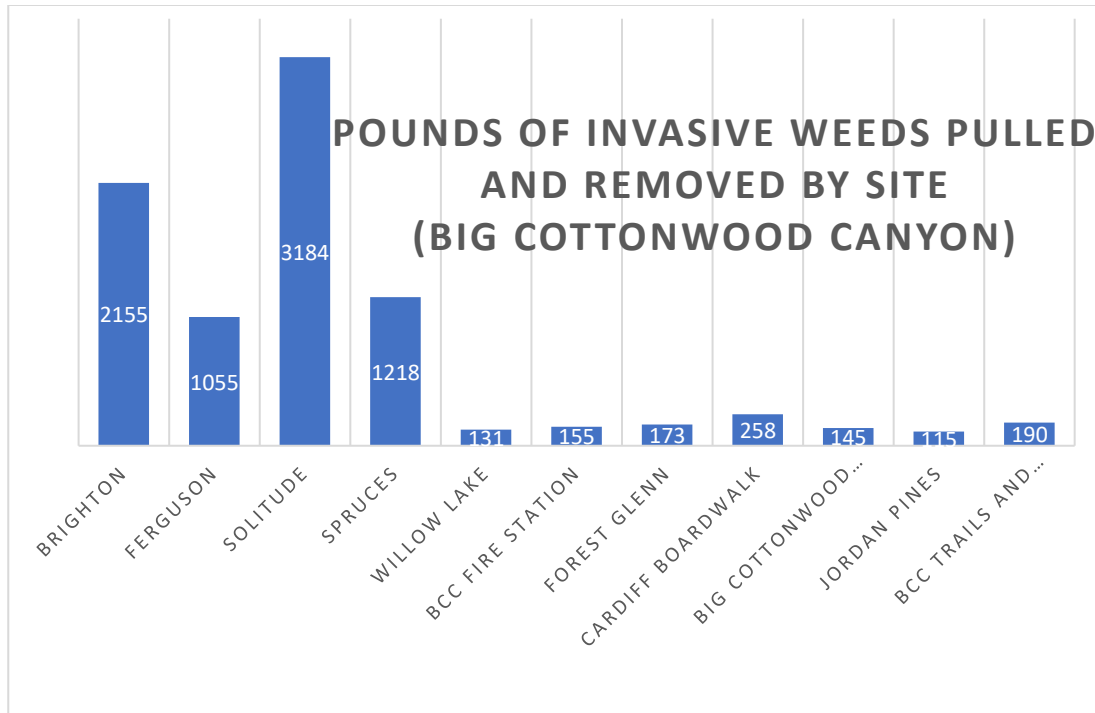
Weight of Weeds Breakdown

- Big Cottonwood Canyon- 8547 lbs.
- Little Cottonwood Canyon- 2563 lbs.
- Millcreek Canyon- 1722 lbs.
- Wasatch Front- 495 lbs.

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 2023 season were thistle species (primarily Canada, bull thistle, and musk thistle), oxeye daisy, spotted knapweed, houndstongue, Dalmatian toadflax, and common mullein.

Community engagement through volunteer events was a priority this season, leading to many successful and effective volunteer days – particularly in upper BCC. CCF focused volunteer efforts at Brighton, Solitude, Spruces campground, Cardiff boardwalk, as well as the new Ferguson Bonneville Shoreline Trail segment at the mouth of BCC. Residents of Forest Glenn wanted to become more involved with mitigation efforts both on their own properties and on public lands and CCF partnered with Save our Canyons, the National Forest Service, Solitude, Brighton and many company volunteer groups (Ultradent, Progressive, Sam’s Club, Theiss, and Comp Health). Wasatch 100 runners were an important demographic of volunteers this season and their stewardship led to record-breaking weed pull events. We also hosted two events with Realms of Inquiry school where education about the impact of invasives on the watershed was a priority. All these volunteers and events resulted in a significant increase in mass of invasive material CCF was able to hand-pull in BCC.



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, and Desolation Lake.

Restoration Sites

The following restoration sites were established in BCC: Cardiff Boardwalk, Brighton loop road, Silver Lake Visitor Center, and Ferguson BST. These sites were all planted with genetically native wildflower seedlings grown by Dryland Horticulture and watered several times after planting.



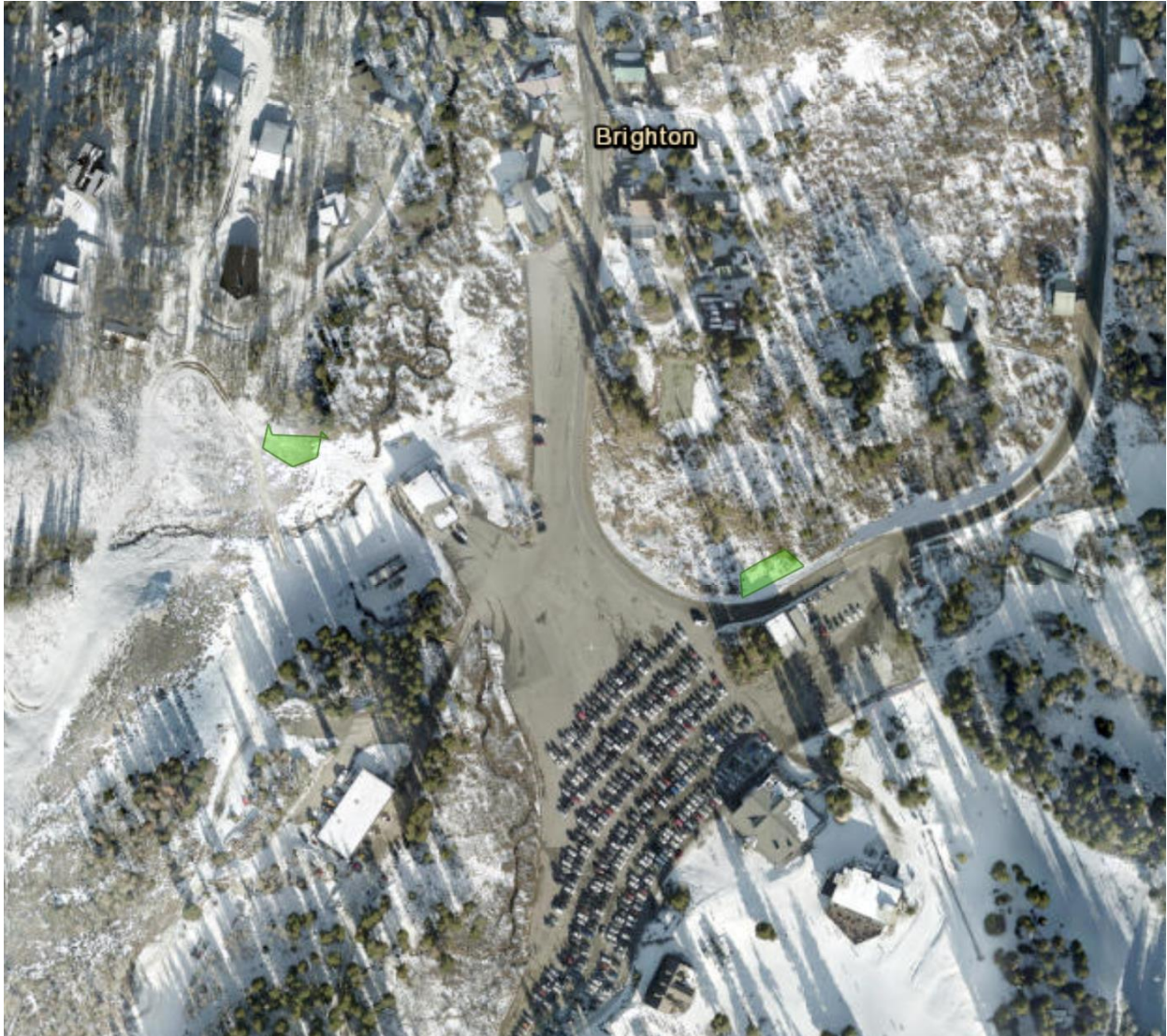
Cardiff Boardwalk Restoration Site. After construction of the boardwalk was complete, CCF partnered with the Forest Service to help restore the sensitive wetland/ meadow plant community that was disturbed by construction. The total area of these restoration polygons is 0.4 acres, planted with yarrow, fireweed, and assorted aster species. 90 seedlings were planted by three CCF weeds crew members and one Forest Service staff member. There are many invasives in this area as well and careful management of this sensitive habitat is essential in the years to come.



Solitude Village Restoration Site: native wildflowers were planted in areas treated by hand pulling for oxeye daisy. This restoration site is 3422 sq ft planted with yarrow, white sage, and milkweed. CCF is trying to reintroduce natives to areas that have been disturbed by mechanical control of oxeye daisy.



Native wildflower seedlings were planted around the Silver Lake Environmental Center to be used as an educational tool as well as to fill in disturbed areas that are now blocked off with ropes. Total restoration area of these polygons is 5428 sq ft, planted over two days with CCF weeds crew and volunteers. Once the Silver Lake boardwalk project is complete, CCF plans to do restoration of disturbed areas using high elevation native graminoids (grasses, sedges, and rushes) and willows.



Wildflower seedlings were planted by the Millie lift (left polygon) in a highly disturbed area of slope with Wildflower Festival volunteers as an educational activity (3460 sq feet). Seedlings were also planted inside of the Brighton Loop Road where we focused several volunteer days on pulling Canada Thistle (3482 sq ft). Canada Thistle is difficult to eradicate from a site: an integrated pest management approach (using multiply tactics) is necessary. We hope that the combination of pulling and planting natives will eventually contain this population.



This is a new section of Bonneville Shoreline Trail that connects Ferguson to Dogwood Picnic Area where there is a dense infestation of Money Plant. CCF hosted 3 volunteer days in this area to pull money plant and one volunteer day to establish this restoration site (4812 sq ft). The disturbance from trail building along with the density of money plant resulted in very few natives present to rebuild the native plant community and seedbank. To help foster the reintroduction of natives, we planted wildflower seedlings at this site.

Areas of Concern

Solitude Entry 1: The Moonbeam parking lot has the highest concentration of invasive weeds in the tri-canyons, in both density and number of species. We hosted two big volunteer weed pulls in this area totaling 2775 lbs pulled and removed. Species removed were Common Mullein, Musk Thistle, Bull Thistle, Canada Thistle, Yellow Sweet Clover, and Spotted Knapweed. There are also populations of phragmites that need to be controlled during the 2024 field season with chemical control. Given its rhizomatous root system, mechanical control is not an effective method of eradication. 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.

Solitude Entry 2 (The Village): 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: Construction at Cardiff Fork naturally led to significant soil disturbance surrounding the installation of a walking bridge and new trail segment. CCF treated the area (pre-construction) as thoroughly as possible *without* the use of chemical control due to its proximity to water. However, Canada thistle has become established since construction finished.

Silver Lake Boardwalk: Construction of the raised boardwalk loop around Silver Lake this season (2023) has created disturbance in this sensitive ecosystem. Luckily, there were very few invasives present pre-construction so CCF can focus on restoring the native grasses, sedges, rushes, and willows.

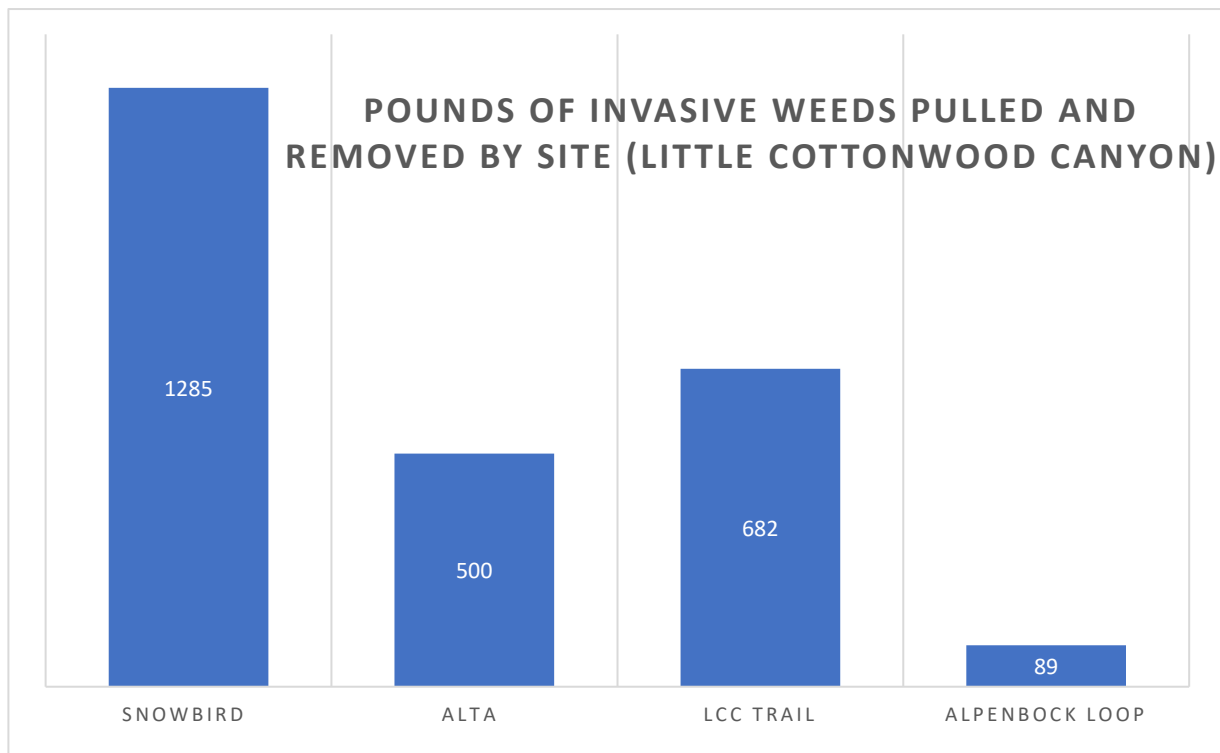
Ferguson BST: CCF Trail Crew in partnership with the Forest Service completed a new section of trail connecting BCC Dogwood to Ferguson Canyon. This area was a hotspot for invasives pre-construction and even though CCF has done consistent mitigation during trail building, the invasive seed bank is there and will respond to this disturbance. Continued monitoring will be important in the years to come.



Volunteers pulling Canada thistle at Cardiff Boardwalk. This is a sensitive and important wetland area that is also very high-use for recreators.

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 2022 season were yellow sweet clover, Common Mullein, Dyer’s Woad, Canada Thistle, Bull Thistle, and Houndstongue. The CCF Invasive Weeds Crew surveyed and mitigated 14 weed zones (totaling 18.86 acres) at Alta in partnership with the Alta Environmental Center. We spent 7 days working on weed zones and removed 500 lbs of weeds total.



Trails Scouted

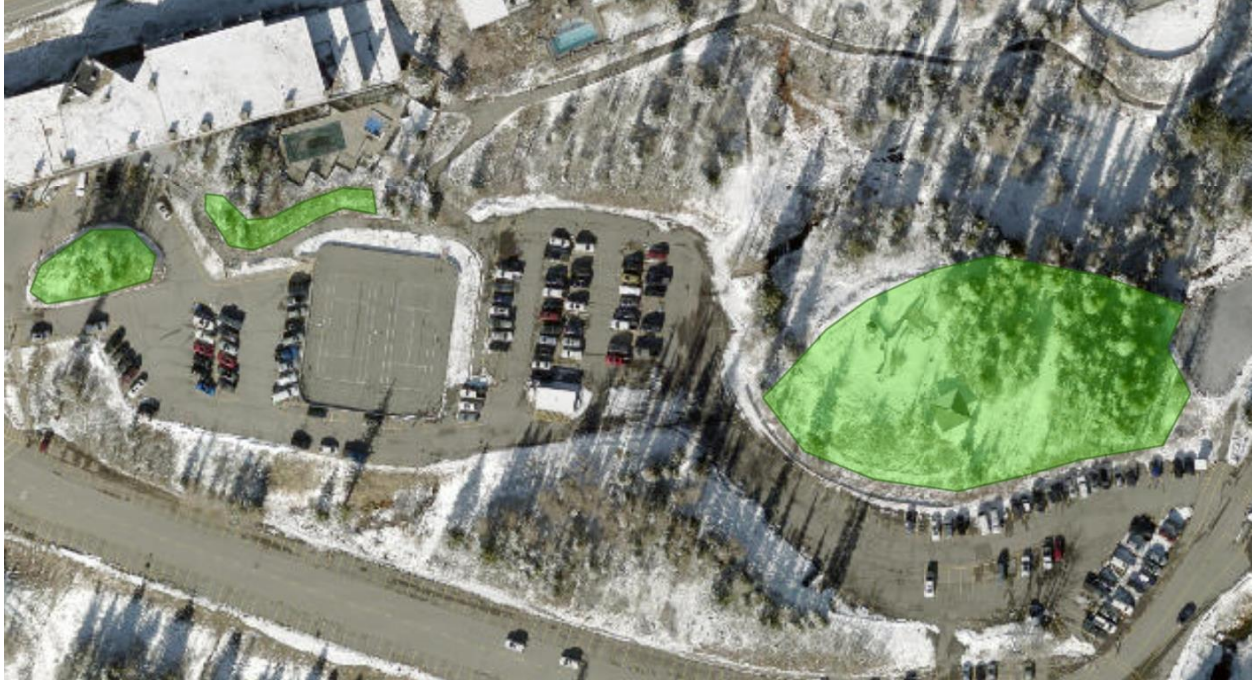
The following trails were scouted in LCC: Alpenbock Loop, Little Cottonwood Creek Trail, Temple Quarry, Red Pine, White Pine, Cardiff from Alta, Gloria Falls, Lisa Falls, Catherine’s Pass to Sunset, and Albion Meadows.

Restoration Sites

The following restoration sites were established and/or expanded in LCC: Snowbird parking lot areas and Alta near the Peruvian Lodge.



These restoration sites at Snowbird were established during the National Forest Foundation, Snowbird, and Forest Service partner event (together, 5543 sq ft). This area of the parking lot has a lot of invasives that were treated by hand pulling this season and replaced with native wildflower seedlings.



These restoration sites were also established with the help of volunteers from Morgan Stanley and the Snowbird Youth Athletes Team (combined, 1.03 acres). The restoration zone on the right in this map was unfortunately lost to construction that occurred after planting. No one involved with this restoration knew that the construction would be impacting this area, but nonetheless future restoration sites were chosen with more consideration of construction after this.



This restoration site was established after pulling occurred with a volunteer group in a very disturbed area between the Alta Wildcat parking area and the Peruvian Lodge. Total restoration area is 0.5 acres planted with 180 seedlings of fireweed, yarrow, antennaria, white sage, pearly everlasting, and stinging nettle.

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.

The most rapidly spreading weed in the Wasatch Resort Road neighborhood is money plant, *Lunaria annua* – which has infested almost every residential property in the neighborhood. Though it is not yet declared as invasive by the state, it is dense and aggressively spreading. All but one resident gave CCF permission to remove money plant from their property. Next season it may be appropriate to schedule a neighborhood weed-pull for those interested in helping with these efforts.

Alta: Common sow thistle was found last year at Alta, and two more individuals were found and removed this season. It appears we have caught this population early enough that there is a high possibility of eradication. Phragmites has also been found at Alta and needs to be treated next season.



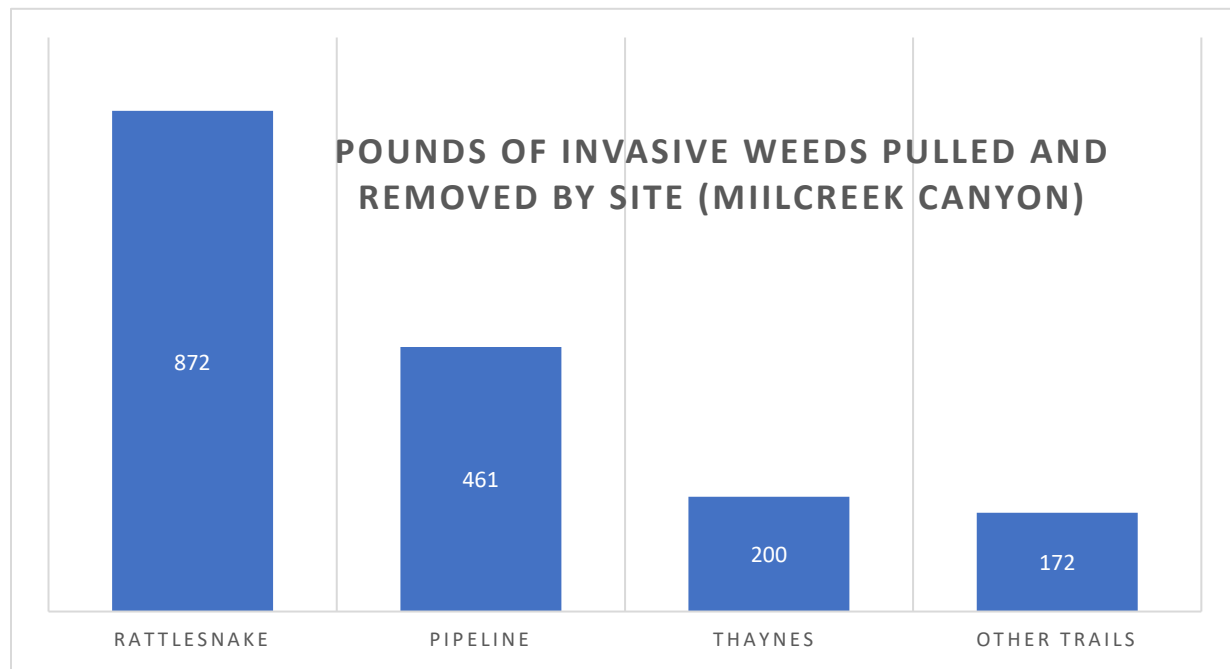
The Snowbird student athletes came out to help pull invasive weeds and plant wildflowers for restoration.

MILL CREEK CANYON OVERVIEW

Invasive populations were heavily concentrated at and below Elbow Fork, lower Pipeline, Rattlesnake Gulch, within picnic areas, roadside, and parking areas. The most prevalent invasive weeds noted in Millcreek during the 2023 season were myrtle spurge, leafy spurge, Dalmatian toadflax, common mullein, houndstongue, and burdock. Herbicide application is necessary in 2024 for a population of leafy spurge off Pipeline from Church Fork. This will be chemically treated and monitored next season to ensure containment of the population. CCF plans to aid in the control of Myrtle Spurge by establishing a boundary line for the population and halting the up canyon spread by pulling any individuals above the line. Volunteer groups are not ideal for the invasive populations on Pipeline given the steep and loose terrain. We hosted volunteer weed pulls at Rattlesnake Gulch and Thaynes Canyon trail which were very successful for removing houndstongue and common mullein in these high traffic areas. 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

Restoration efforts were focused in BCC and LCC this season. No new restoration sites were established in MCC.

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.

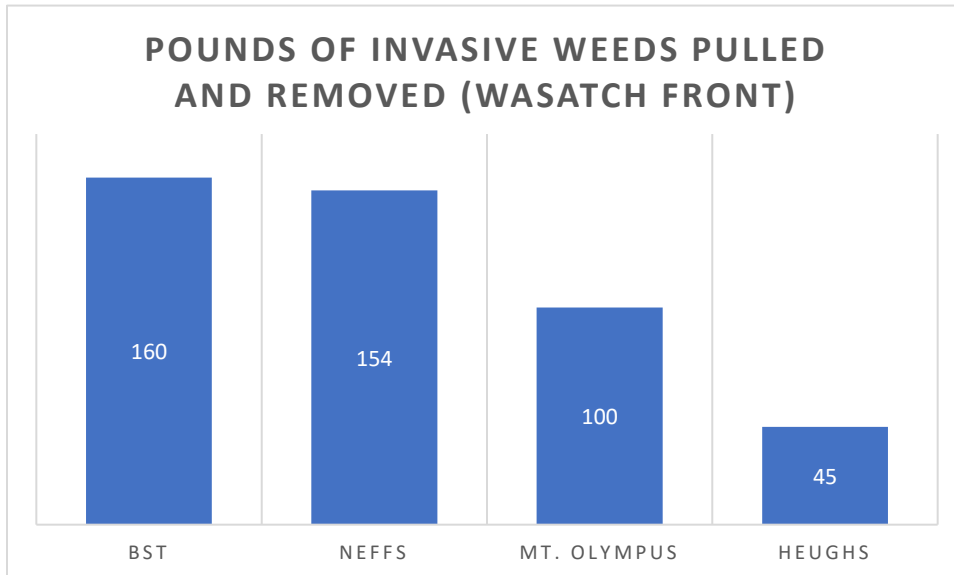


The Mount Olympus High School Mountain Biking Team volunteered with CCF to pull common mullein and houndstongue along the new section of Rattlesnake Gulch Trail.

WASATCH FRONT OVERVIEW

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, Neffs Canyon, and Lambs Canyon.



Areas of Concern

Mt. Olympus: A new population of leafy spurge was found on the face of Mt. Olympus. It was treated by hand pulling but needs chemical treatment next season due to its large size and distance from trailhead.

HERBICIDE APPLICATION

Due to safety training requirements, CCF did not spray any herbicide this season. We were able to direct all our focus to mechanical control and increase our scope in other areas. Starting in 2024, the CCF weeds crew will be trained and certified to spray herbicide to control species of high priority that cannot be contained mechanically. This will allow us to implement an integrated pest management plan (IPM) on a species-by-species basis.

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. Luckily, there were no Class 1A species detected in the Tri-canyons this season. This section discusses CCF's treatment and management of all Class 1B and Class 2 species that occur in the Tri-canyons as well as Phragmites (Class 3) which is a high priority for control in the canyons.

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

Garlic mustard was of high concern in LCC as a dense population is 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 approved all mitigation efforts thus far. CCF will continue to treat this population with a combination of spraying and hand pulling each season. A couple individual plants were found across the gravel road along the creek, which were also hand-pulled. This spread should continue to be carefully monitored. A population has been mapped in previous years at the intersection of Rattlesnake Gulch and Pipeline, which was scouted but not found this season. We also received a polygon from the Salt Lake Public Utility Watershed Program for a population at the first switchback of Broads Fork, which we hand pulled and mapped this season. We found only seedlings, no flowering plants (approximately 200 seedlings total).



All area measurements are in sq. meters. This map shows the 'S' Curve in BCC as well as the beginning of the Broads Fork Trail. We received a polygon from Nicole Smeeding about this population and visited the site on 9/27/23. We located the population and pulled all seedlings found as well discovering a new little population approximately 150 ft down the trail. We carefully scouted the surrounding hillside and found no other garlic mustard plants. In total we pulled and removed ~5 lbs of seedlings, which had a cover of ~10% prior to treatment.



All area measurements are in sq. meters. This map shows a small area of Wasatch Resort Road at the base of LCC, with the polygon depicting our highest density population of Garlic Mustard. We pulled Garlic Mustard Seedlings and surveyed the surrounding area to limit spread on 5/31/23, 6/13/23, and 7/21/23, and removed ~30 lbs of seedlings (this is a small weight because the seedlings are extremely small and light). Prior to treatment, this population was at about 50% cover within this polygon. After treatment, the cover was <1%.



All area measurements are in sq. meters. This population was scouted this season, but our team was unable to locate it. This polygon was mapped in 2020 and Garlic Mustard hasn't been found there since. Due to the near impossibility of complete eradication of Garlic Mustard once established, continued monitoring of this area is necessary.

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). In 2021 and 2022 the Invasive Weeds Crew focused efforts on mitigating oxeye daisy at Entry 2 with both mechanical and

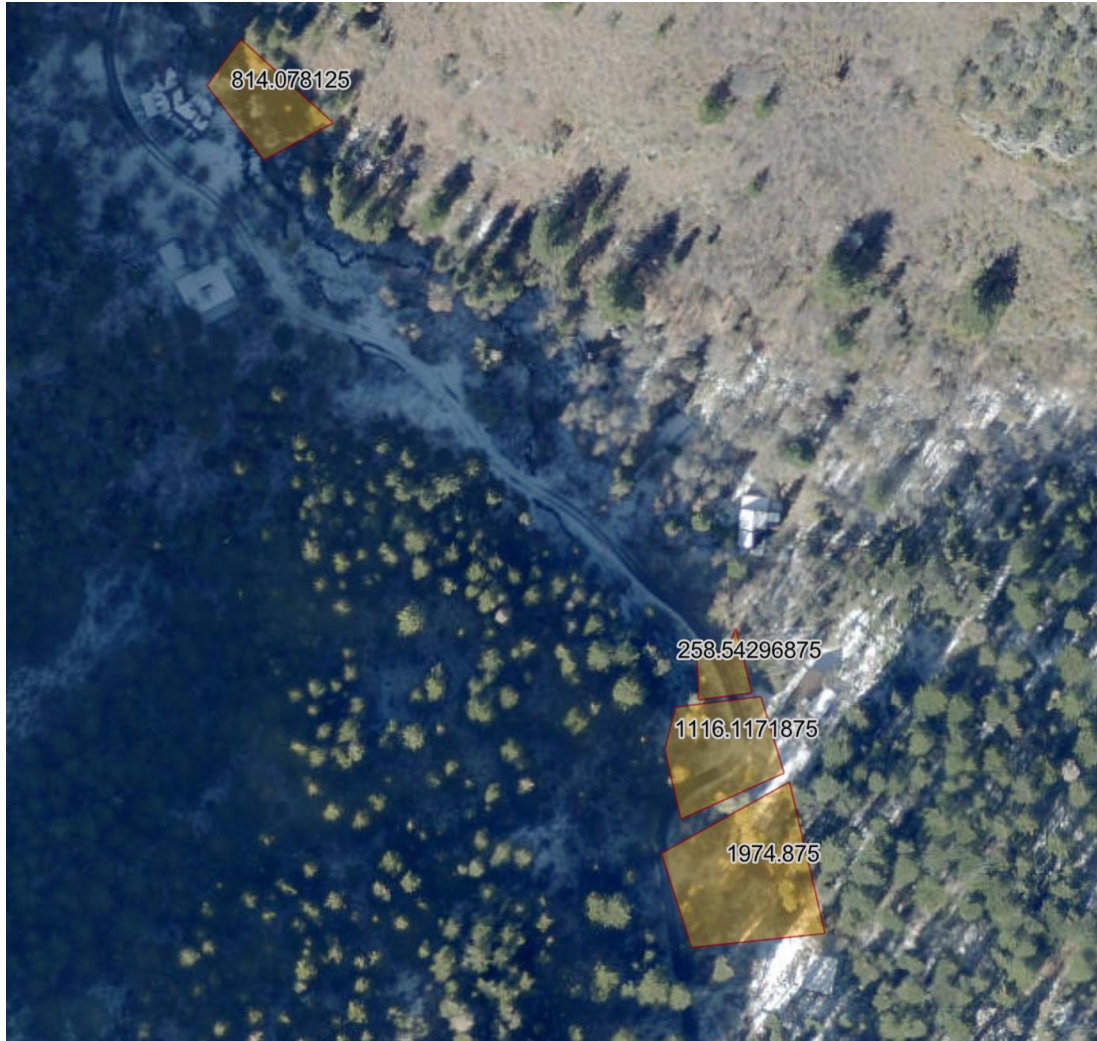
chemical control methods. In 2023, we saw a noticeable decrease in flowering individuals in areas that were treated the previous two seasons. This oxeye daisy management project was of interest to the monitoring team of the ISM grant, and they came out to survey our population to see if it met their requirements for weed density, acreage, and access. We were excited at the prospect of participating in their study but fortunately (from a management perspective) our population of oxeye daisy was too small to meet their monitoring requirements. The invasive weeds crew did not spray this season but did treat some of the populations with mechanical control. CCF plans to treat this population chemically and mechanically in 2024.



All area measurements are in sq. meters. This map shows the area around Solitude Entry 2 (The Village) where oxeye daisy was planted for wedding photos. A new patch was found and mapped this season (marked by 700.15625 sq. meters). Scouting, mapping, and pulling in this area took place on 7/6/2023, 7/21/23, 9/14/23 for a total of 179 lbs of oxeye daisy removed. Percent weed cover in these polygons ranges from mostly low to medium in some areas (2-15% cover).



All area measurements are in sq. meters. This map shows the Brighton Loop Road where there are two small patches of oxeye daisy (6-10% cover). These populations were not treated this season but will be a high priority for treatment next season with a combination of mechanical and chemical control.



All area measurements are in sq. meters. This map shows a section of Porter Fork Road in Millcreek Canyon where oxeye daisy was planted on private property. Before the next field season, appropriate communication and permission will be acquired to access these populations and treat them next field season (2024). The upper two polygons were classified at medium percent cover (6-25%) and the lower polygon is low percent cover (1-5%).

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. It is currently well contained (with only a few populations) and CCF will continue to treat by hand pulling.



All area measurements are in sq. meters. This area at the mouth of Little Cottonwood Canyon is the most dense population of dyers woad in the Tri-Canyons. We hand pulled here on 5/18/23, 5/24/23, 5/26/23, and 6/15/23 totaling approximately 350lbs of dyers woad removed. The largest polygon has a cover class of ~2% dyers woad, while the other polygons are a medium percent cover (6-25%) prior to treatment, but had less than 0.01% cover after treatment.



All area measurements are in sq. meters. This area was heavily infested in 2022 and treated by hand pulling before seeds were released. The population was significantly smaller and less dense this year (2023) and we pulled every plant we found for a total of ~40 lbs on 5/18/23. This population had a cover of less than 5% prior to treatment.



All area measurements are in sq. meters. This map shows a population near the intersection of Wasatch Blvd. and Big Cottonwood Canyon Rd. We pulled ~20 lbs of dyers woad in this area on 5/18/23. This population was not very dense, with a percent cover of ~1%. We will continue to monitor these areas in the hopes of eradication.

Yellow Toadflax, *Linaria vulgaris* (Level 2)

Yellow toadflax (also called butter and eggs toadflax) is a perennial flowering plant from Europe that is locally contained to just a few small populations in the Tri-canyon area. It 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.



All area measurements are in sq. meters. This map shows Solitude Entry 2 where there are small patches of yellow toadflax around the homes in the village (cover ~10%). We are planning to do 2-3 pulling and education events with the Solitude HOA members next season to gain access and spread awareness about invasives on private property. Scouting, mapping, and pulling in this area took place on 7/6/2023, 7/21/23, 9/14/23 for a total of 15 lbs removed.



All area measurements are in sq. meters. This map shows the Alta Wildcat Base as well as part of the Bypass Road where there are two populations of yellow toadflax. We treated these by hand pulling on 9/9/23 for a total of approximately 50lbs removed. The lefthand polygon had a cover of 1-5% (low) and the righthand polygon had a cover of 1-5% (low) prior to treatment. Both had less than 0.1% cover of yellow toadflax after treatment.

Dalmatian Toadflax, *Linaria dalmatica* (Level 2)

Dalmatian toadflax is a perennial flowering plant that can tolerate habitats from the Wasatch Front all the way to higher elevations around Alta Ski area. This plant can spread rhizomatously and resprout from roots when pulled as well as produce 500,000 seeds per plant (in optimal conditions). There is a biocontrol weevil available for this plant which CCF will explore as an option for containment. Hand pulling and removal is

important to reduce the seedbank but observational evidence leads CCF to believe that after hand pulling, plants can resprout and flower within the same growing season.



All area measurements are in sq. meters. This map shows a large area of the Wasatch Front between Neffs and Heughs Canyons where there are widespread infestations of dalmatian toadflax. We scouted and pulled in this area on 8/22/23, 8/24/23, and 10/4/23 for a total of 260 lbs removed and carried over a mile to the nearest trailhead. These polygons range in cover from low (1-5%) to medium (6-25%). Hand pulling is not effective, so other treatments will be utilized next season.



All area measurements are in sq. meters. This map shows the new Rattlesnake Gultch Trail as well as a section of the Pipeline Trail in Millcreek Canyon. This area was a major focus this season as the disturbance from trail building resulted in many invasives in this area. We scouted and pulled dalmatian toadflax in this area on 5/17/23, 6/1/23, 6/17/23, 8/29/23, 9/7/23, 9/19/23 for a total of 388 lbs. The cover in these areas ranges from trace (<1%) to low (1-5%).



All area measurements are in sq. meters. This map shows the Albion Basin parking area at Alta Ski Area where there is a significant population of dalmatian toadflax. These areas are mostly contained within Alta Weed Zones and are treated systematically by hand pulling each year. We pulled in these areas on 8/8/23, 8/23/23, 8/30/23, 9/26/23 for a total of 241 lbs removed. The upper polygon had a cover of ~15% while the lower polygon had ~5% cover prior to treatment.

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.



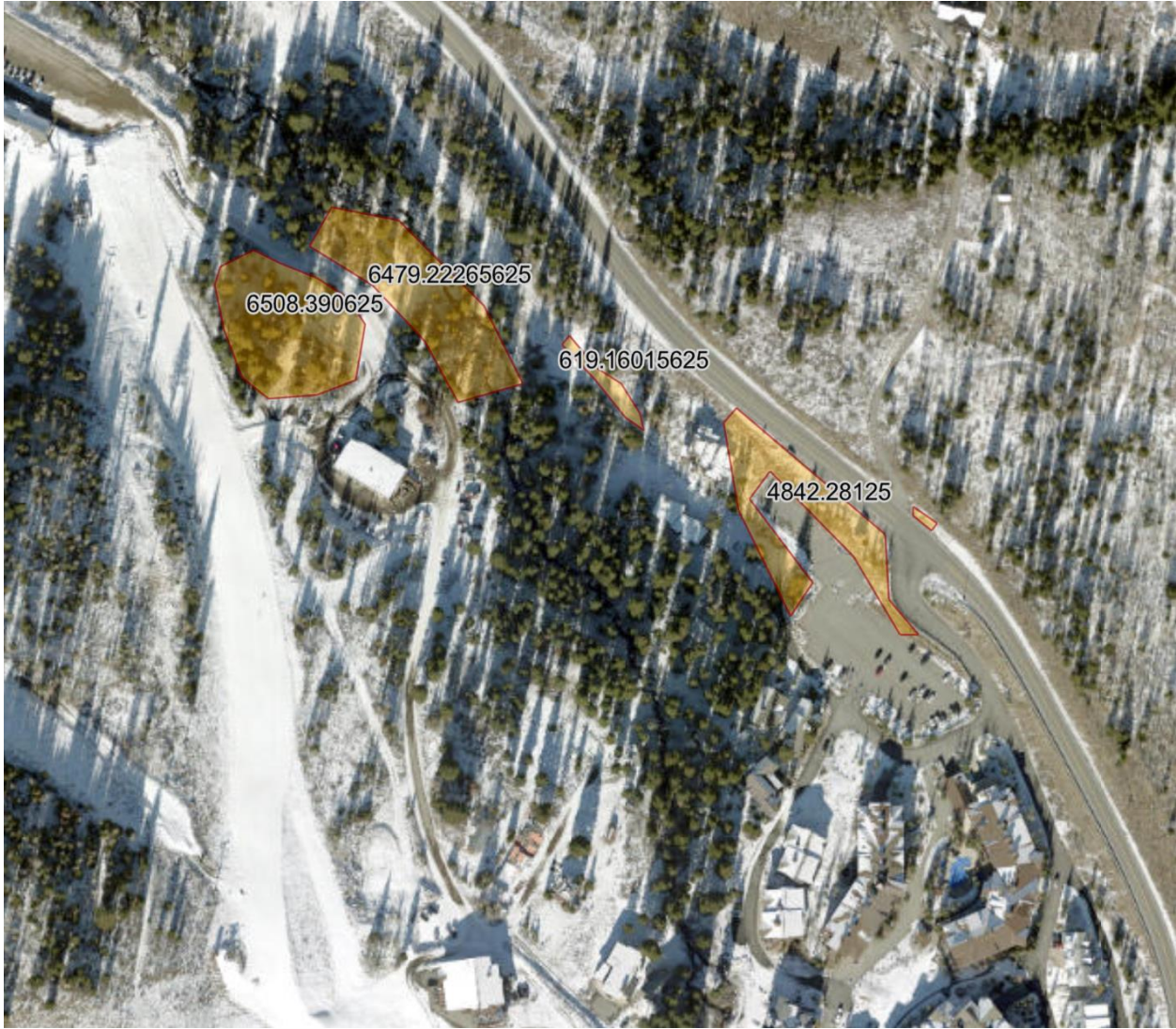
All area measurements are in sq. meters. This map shows a section of the Pipeline Trail in Millcreek Canyon where Leafy Spurge has been found historically but was not found this this season. We will continue to monitor this area in the hopes of complete eradication.



All area measurements are in sq. meters. This map shows a new population of Leafy Spurge that was found along the Mount Olympus trail this season (cover ~20%). We scouted and pulled in this area on 8/22/23 and 8/24/23 for a total of 40lbs removed.

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.



All area measurements are in sq. meters. This map shows the area between Solitude Entry 1 and Entry 2 where most of the Spotted Knapweed is concentrated. We worked on pulling Spotted Knapweed with a group of volunteers in this area on 9/27/23 and pulled approximately 200 lbs. We will continue to treat this area with hand-pulling in future seasons. The polygons had an average cover of <5% spotted knapweed prior to treatment, and after treatment had a cover class of <1%.



All area measurements are in sq. meters. This map shows a section of the BCC road just East of Solitude. We found these populations during an upper BCC road survey we did this season but the sheer quantity of invasives along the road led us to wait on treatment. A management plan should be developed with UDOT for the ROW weed populations as this task is beyond the scope of our CCF Weeds Crew.



All area measurements are in sq. meters. This map shows a population of Knapweed along the road just downcanyon of Cardiff. See notes under above map about roadside weed management.

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. Phragmites will be a high priority for chemical treatment next season because mechanical control can often stimulate more growth.



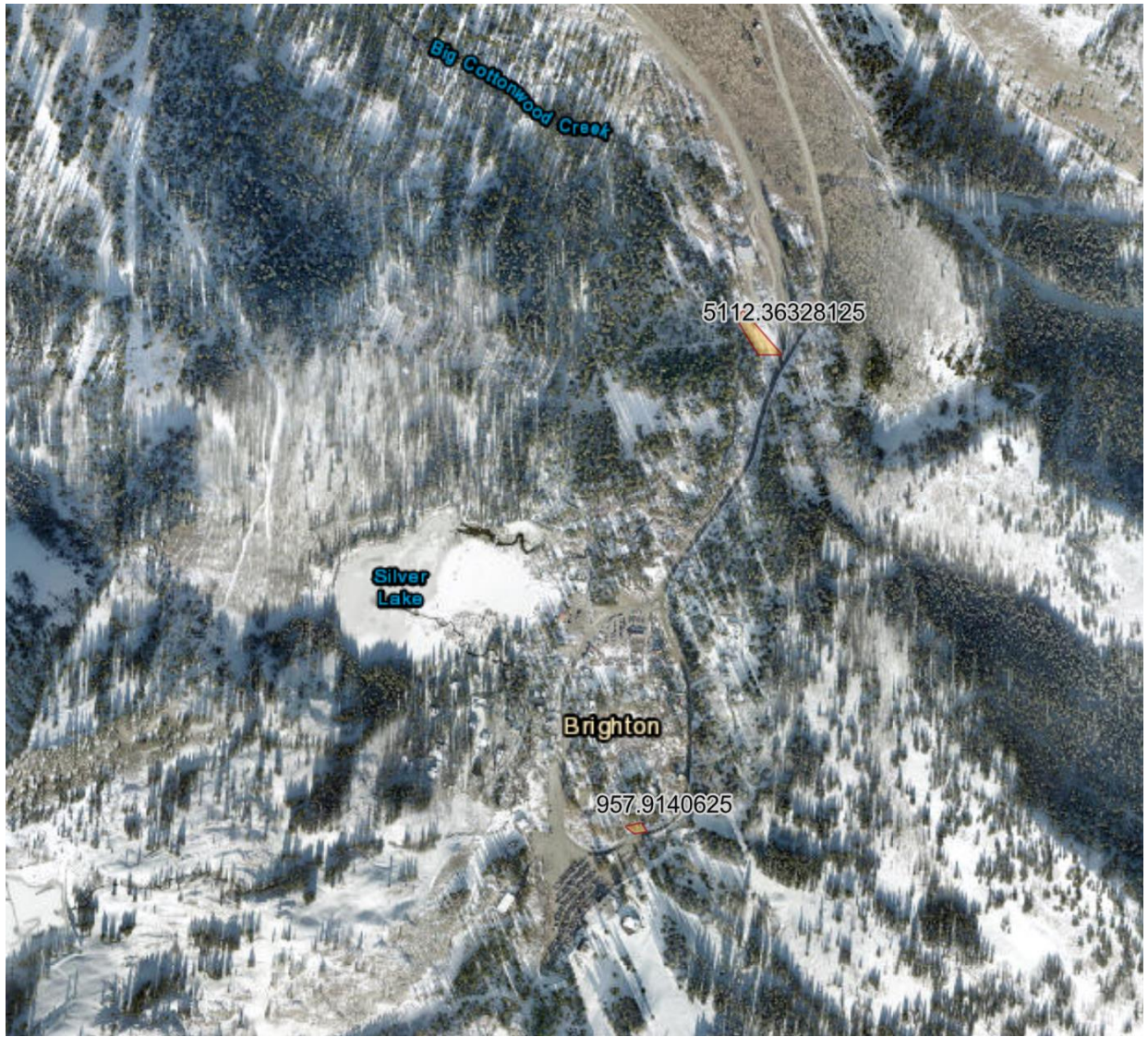
All area measurements are in sq. meters. This map shows scattered small populations around Snowbird Resort. No treatment of these populations occurred this season.



All area measurements are in sq. meters. This map shows a new, large population of Phragmites at Snowbird that is encroaching on otherwise pristine native habitat (relatively low disturbance). The cover in this polygon was medium (~20%). Many experts site that Phragmites tends to thrive in wetland areas, but this is a dry slope. This population is concerning because it demonstrates that Phragmites can not only survive on dry, high elevation slopes but out-compete natives, making it very dangerous for our canyon's local biodiversity.



All area measurements are in sq. meters. This map shows a small patch of Phragmites at Alta (cover ~5%). This population as well as other high elevation sites will be a high priority for chemical treatment in 2024.



All area measurements are in sq. meters. This map shows two patches of Phragmites around the town of Brighton (upper polygon cover ~10%, lower polygon ~5%). These should be treated with herbicide next season before they are allowed to spread further.



All area measurements are in sq. meters. This map shows the Solitude Moonbeam parking lot where there is a well-established population of Phragmites near the riparian corridor (cover ~50%). This might be difficult to treat due to its proximity to water.



All area measurements are in sq. meters. This map shows a small population of Phragmites growing around a bridge in Millcreek Canyon (cover ~25%). This is one of the first recorded populations of Phragmites in MCC and therefore a high priority for containment.

Species of Highest Priority- Record of Actions:

Date	Surveyor / Agency	Weed	Location	Notes on Treatment
7/10/23	Sage Fitch, SLCO	Myrtle spurge	11355 E Big Cottonwood Canyon	Sent letter to landowner
8/2/23	Ella Abelli-Amen, CCF	Myrtle spurge	11355 E Big Cottonwood Canyon	Observed population on property and ROW, emailed photos to Sage Fitch
5/31/23	Taylor Litwin, CCF	Garlic Mustard	Wasatch Resort, Little Cottonwood Canyon	Hand pulled by weeds crew
6/1/23	Ella Abelli-Amen, CCF	Garlic Mustard	Pipeline Trail in MCC near	Population scouted but not found. Could the polygon be slightly misplaced? Will

			Rattlesnake Gulch	widen the search radius next season.
6/13/23	Ella Abelli-Amen, CFF	Garlic Mustard	Wasatch Resort, Little Cottonwood Canyon	Hand pulled all rosettes around property
9/27/23	Ella Abelli-Amen, CFF	Garlic Mustard	Broads Fork, Big Cottonwood Canyon	Found population and hand pulled, found new patch nearby original polygon, mapped and hand pulled.
7/21/23	Ella Abelli-Amen, CCF	Oxeye Daisy	Solitude Mt Resort	Mapped/ scouted for new populations, did not handpull yet
9/14/23	Ella Abelli-Amen, CFF	Oxeye Daisy	Solitude Entry 2	Pulled and mapped Oxeye Daisy with the Weeds crew.
5/18/23, 5/24/23, 5/26/23, 6/15/23	Ella Abelli-Amen, CFF	Dyer's Woad	Mouth of LCC	CCF weeds crew hand pulled and mapped populations.
5/18/23	Ella Abelli-Amen, CFF	Dyer's Woad	Grit Mill Parking lot in LCC and base of BCC	CCF weeds crew hand pulled and mapped populations.
7/6/2023, 7/21/23, 9/14/23	Ella Abelli-Amen, CFF	Yellow Toadflax	Solitude Entry 2	Mapping and hand pulling.
9/9/23	Ella Abelli-Amen, CFF	Yellow Toadflax	Alta Wildcat Base	Mapped and pulled with volunteers.
8/22/23, 8/24/23, 10/4/23	Ella Abelli-Amen, CFF	Dalmatian Toadflax	Wasatch Front between Neffs and Heughs	Mapping and pulling with weeds crew

5/17/23, 6/1/23, 6/17/23, 8/29/23, 9/7/23, 9/19/23	Ella Abelli- Amen, CFF	Dalmatian Toadflax	Millcreek canyon pipeline trail and rattlesnake gulch	Mapping and pulling with weeds crew
8/8/23, 8/23/23, 8/30/23, 9/26/23	Ella Abelli- Amen, CFF	Dalmatian Toadflax	Alta weed zones	Pulled and mapped.
8/22/23, 8/24/23	Ella Abelli- Amen, CFF	Leafy Spurge	Mount Olympus Trail	Mapped and pulled some, need to come back and spray next season
9/27/23	Ella Abelli- Amen, CFF	Spotted Knapweed	Solitude	Pulled with volunteers, removed every plant we found.
8/30/23	Ella Abelli- Amen, CFF	Phragmites	Snowbird	Mapped new population

SEED COLLECTION

In partnership with Dryland Horticulture, the CCF weeds crew was trained on the procedures of native plant seed collection. While our seed collecting permit is being finalized with the Forest Service, we were only able to collect seeds from privately owned areas of Snowbird. These seeds will germinate and overwinter with Dryland Horticulture, to then be planted as seedlings in the spring and summer of 2024. Dryland Horticulture will also grow seedlings for wetland restoration around Cardiff Boardwalk and Silver Lake Boardwalk.

RARE PLANT SURVEYS

CCF surveyed 5 rare plant populations this season, all of which resulted in successfully locating the plant of interest and conducting an official count of flowering individuals.

- Lady Slipper (*Cypripedium fasciculatum*) on Gloria Falls: 258 flowering plants found. The population is located along a social trail leading to the top of the falls. CCF was asked to complete the NEPA Botany section for a proposed trail project in this area. This trail would help limit the user impact on this rare plant population by limiting social trails and ending the trail below the falls, keeping recreators out of the densest part of this population.



- Wasatch Fumewort (*Corydalis caseana* var. *caseana*) at Gloria Falls: approximately 50 flowering individuals (due to their clumping growth form, determining one individual can be challenging). This population was not found the previous season but seemed very healthy this season which could be due to our high precipitation winter and summer. Wasatch Fumewort is very intolerant of dry conditions. This population is on the opposite stream bank from the social trail that leads to the falls which seems to be out of harm's way from being trampled. It is reasonable to believe Wasatch Fumewort could grow on both sides of the stream if recreators were not disturbing the habitat.
- Wasatch Shooting Star (*Dodecatheum dentatum* var. *Utahensis*) on Mossy Ledges: 145 plants found, 38 flowering. This population appears to be healthy and untampered. The exact location is difficult for the general public to access, though Mossy Ledges still appears on AllTrails and should be removed for the protection of this population.
- Lady Slipper (*Cypripedium fasciculatum*) at Lake Blanche: 695 past flowering individuals, and 8 rosettes. We surveyed this population twice this season (the first time turned out to be too early and the second time we were able to identify the plant even though it was past its peak flowering).
- Wasatch Shooting Star (*Dodecatheum dentatum* var. *Utahensis*) on Mt. Superior Waterfall: 135 flowering, ~200 rosettes, 10 budding, and 7 past bloom. This population is in a very steep waterfall area. For future surveys, only two crew members who are confident on loose, steep terrain should survey to reduce the risk of rockfall.

COTTONWOOD CANYONS COMMUNITY OUTREACH AND EDUCATION

Big Cottonwood Canyon:

- Realms of Inquiry School (5/19/23, 9/29/23) -- This group of students volunteered with CCF for two weed pull events this season. We focused on education about the watershed and how invasives impact the native ecosystem. Students were very engaged and inspired to help with conservation in action.
- Save our Canyons (6/3/23, 9/29/23) – We hosted two partner volunteer days with Save our Canyons which allowed us to share invasive plant and watershed information with other organizations and volunteers.
- Forest Glen (6/18/2022) – Attended annual neighborhood work-day, delivered a presentation about invasive weeds and pulled weeds along entry road and property boundaries with homeowners. Homeowners were empowered to tackle invasives on their own property and are interested in buying a bulk order of native seed from Granite Seed Co to reestablish natives in some disturbed areas.
- 11355 Big Cottonwood Canyon Property with Myrtle Spurge (8/2/23 and 8/19/23) – Scouted population of Myrtle Spurge and documented with photos to help determine whether the population is in the ROW or on private property. UDOT came out and sprayed the plants in the ROW, and the homeowner is on board with treating the plants on his property with the help of CCF next season.
- Solitude (9/14/23, 9/27/14) – We joined Solitude for their early season trash pickup day and hosted three big volunteer weed pull days. CCF is working with Onnalea Martin on developing a Weed Zone plan for next season to tackle the high-density populations systematically.

Little Cottonwood Canyon:

- Snowbird (6/29/23, 7/15/23, 8/31/23, 9/26/23) – CCF hosted a volunteer day each month of the summer for Snowbird employees and community members. We educated volunteers about weed identification and the importance of pulling around high-impact recreation areas like snowbird. Volunteers also helped plant wildflower seedlings in two areas and collect wildflower seeds.
- Snowbird Youth Athletes Team (7/27/23) – High School age volunteers helped with weeding and planting wildflowers with a strong emphasis on education and importance of stewardship for these natural places we use and recreate in.

- Alta Environmental Center (8/8/23) – Taylor Litwin gave a presentation to Alta Environmental Center and Friends of Alta about invasive species that occur at Alta and how to manage them so that they could treat their weed zones.

Millcreek Canyon:

- Mt Olympus Mountain Bike Team (6/17/23) – CCF had so much fun engaging with these students who love and use the MCC canyon trails for mountain biking. These students were so excited to give back and be stewards by pulling weeds.
- Trails Utah (6/17/23) – Trails Utah played a huge role in creating the new Rattlesnake Gulch trail and knew how important weeding would be after it was complete. Their ownership of this project and continued partnership with CCF to take care of these trails is inspiring!

General:

- Cottonwood High School (11/1/23) – Ella Abelli-Amen gave a presentation to Taylor Christenson's high school botany students about her career path, her current position as Plant Stewardship Director, and CCF's mission.

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 2024

The CCF Weeds Crew has so many impactful and important projects happening in the canyons. Looking ahead, we want to make sure that we are utilizing our resources in the most efficient and effective ways possible. We are planning to implement two scientific studies to better understand what leads to the highest survival for our wildflower seedlings and how each species of invasive weed responds to our mechanical control methods. The results of these studies will give us invaluable insights going forward about where/ when/ and what species to plant during our restoration projects and which species are worth spending our valuable volunteer time and energy pulling versus need to be treated chemically. 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.