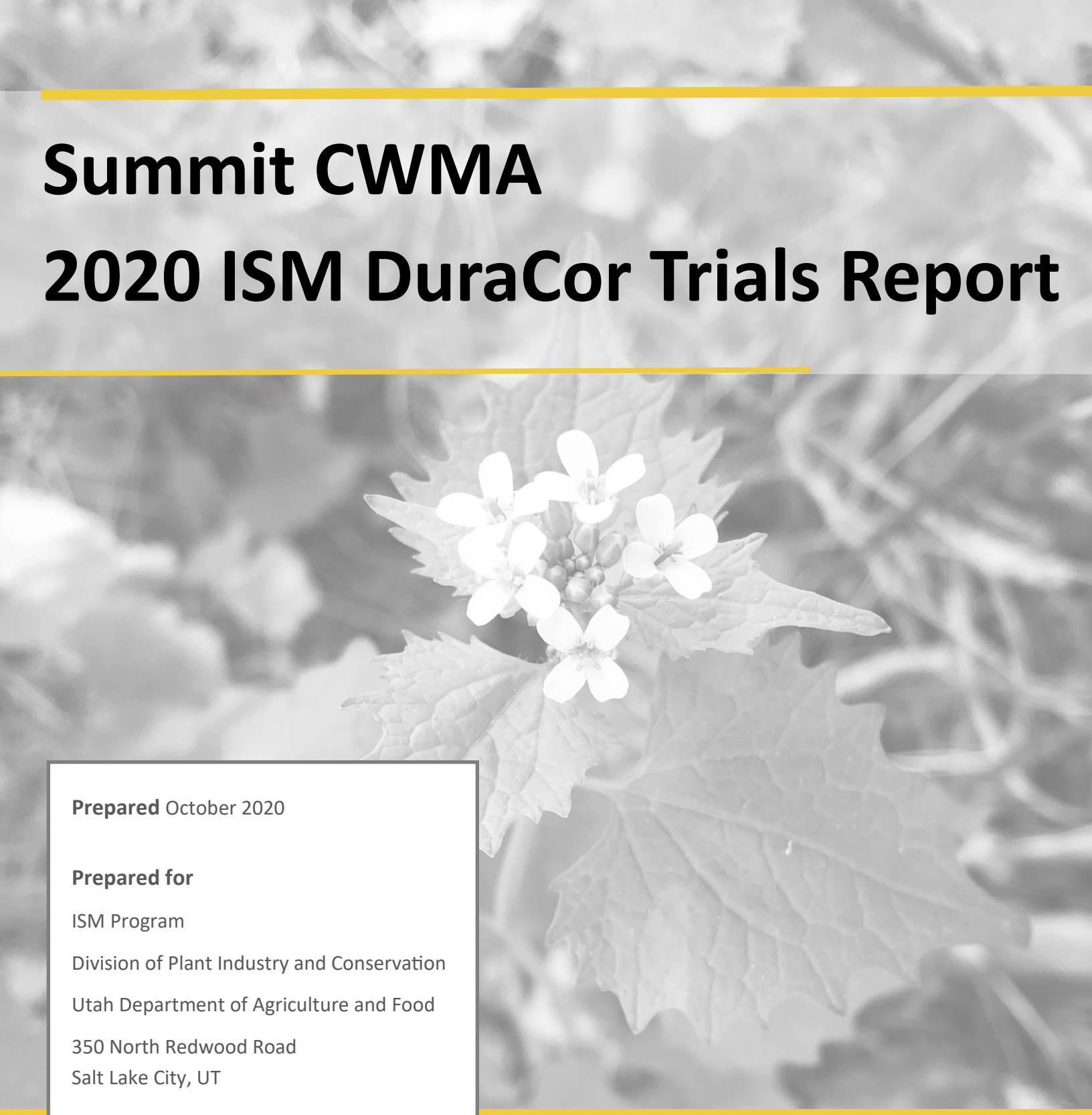
Summit CWMA
2020 ISM DuraCor Trials Report



Prepared October 2020

Prepared for

ISM Program

Division of Plant Industry and Conservation

Utah Department of Agriculture and Food

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Project Description

Garlic mustard rosettes spring of 2020

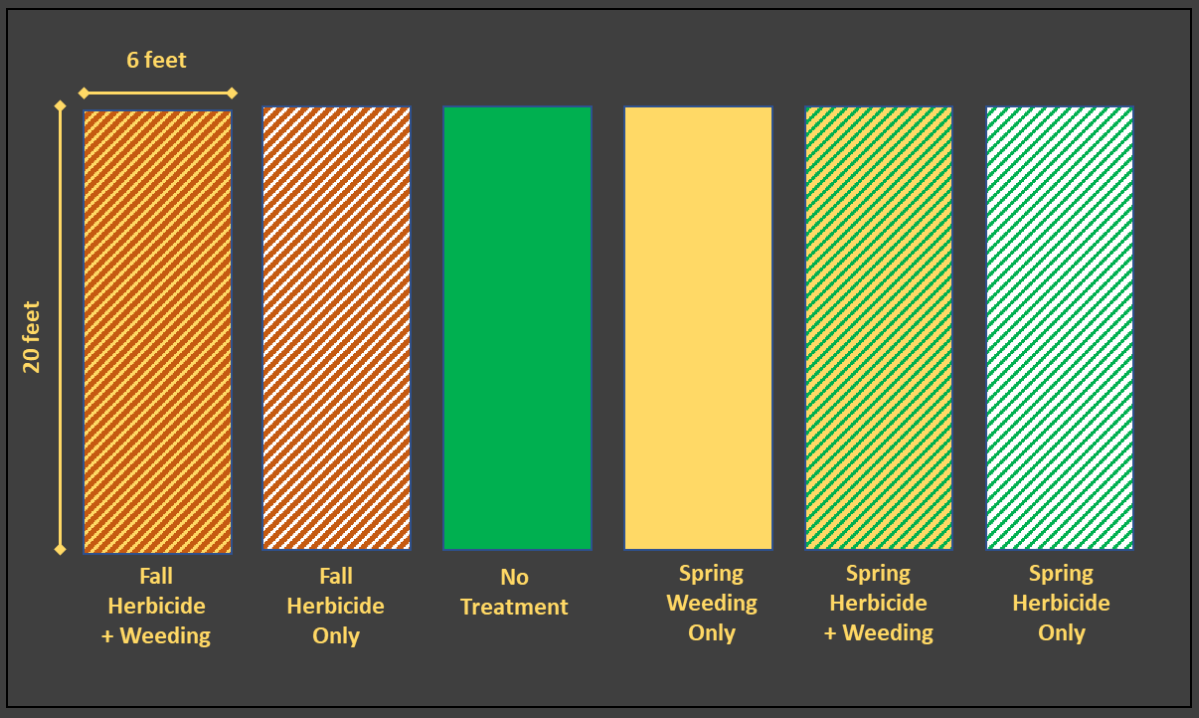
Summit County, Utah has the largest and highest numbers of garlic mustard populations in the State. Efforts to map and control this Class 1B species began in Summit and adjacent Salt Lake Counties in 2010. These efforts relied heavily on herbicide and integrated hand weeding as a contracted treatment in 2018. Results from years of control are promising, however, the ten year seedbank of garlic mustard means more than ten years of control are needed. With treatments that occur two to three times annually, ten years of treatment is incredibly costly and, depending on garlic mustard density, would require substantial amounts of herbicide to be applied to the soils.

During the 2019 Utah Weed Control Association Conference, Claire Volk, of Corteva introduced a pre-emergent herbicide that is showing promise on several mustards. Garlic mustard was mentioned as a species that would likely be effected but needed more trials to confirm the herbicides effects. The Summit CWMA partnered with Corteva and Summit County to obtain and run trials of DuraCor on garlic mustard. If DuraCor proves effective, it could eliminate the need for complete population control twice-three times annually down to once every three years with minimal annual treatment of small patches. This would result in substantial reductions in labor costs and volume of herbicide used annually to address dense populations common in western Summit County.

The study site was established in Park City, UT (see map) along the popular Armstrong Trail. The site was identified, and rough boundaries of much of the invasion was determined in 2018 and 2019. The garlic mustard invasion, at that time, was known to cover 33 acres with most of the area between 60-100 percent cover garlic mustard.

Plot Layout

Five treatments crossed hand weeding of flowering garlic mustard plants with DuraCor application.



Garlic mustard density in the study plots area during plot establishment in spring of 2020.

Methods

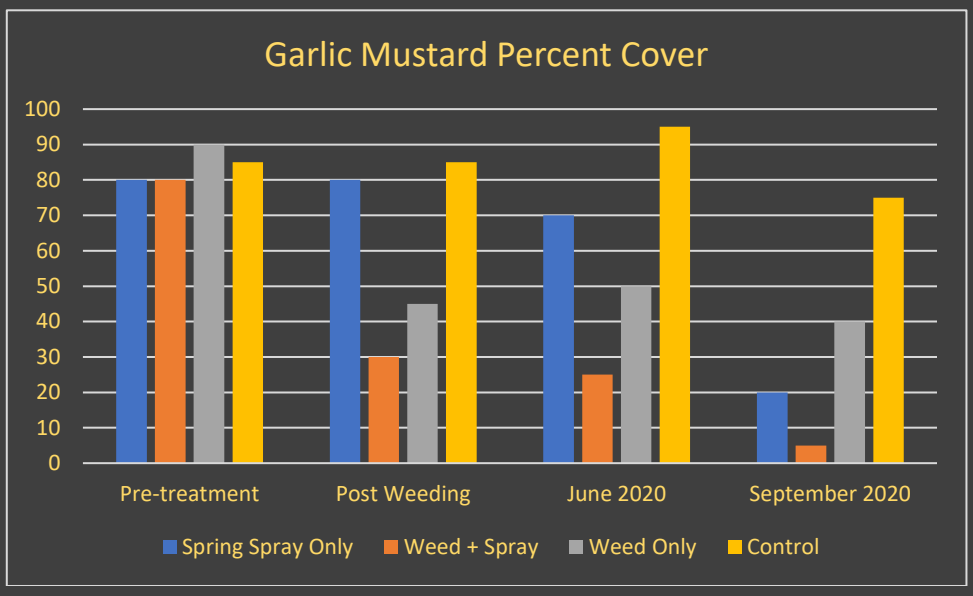
Herbicide treatment using 2,4D amine (64 oz/ac) and MSM 60 (1.5 oz/ac) was used in 2019 to treat the majority of the known population, however, a portion of the site was not treated because USU Esplanade trial research plots had been established and a sizable buffer had been identified to prevent ISM control crew efforts from affecting the USU plots. The DuraCor trial plots were established in this untreated area adjacent the USU plots June 2, 2020. Spring treatments of Weeding Only (second year plants only), Herbicide + Weeding or Herbicide Only were applied and treatment with DuraCor was applied at a rate of 16% . At the time of treatment, plots had 80-100 percent cover of garlic mustard and weeding reduced cover by 40 and 50 percent in the two weeding plots. A third plot was established and weeded mid summer adjacent the fall treatment plot to enable a fall herbicide only and herbicide plus weeding treatment. Percent cover reduction was similar in this plot to the other weeded plots.

Photos were taken of the full length of the plots and at 5 foot intervals along the edge of each plot. In addition, percent cover of garlic mustard was recorded during three visits.

In October of 2020, the fall herbicide treatment was applied to both a Herbicide Only and Herbicide + Weeding treatments. DuraCor application rates were the same as spring treatments. In addition, wild game trails running just below and through the plots were treated to reduce wildlife mediated seed spread from reaching the plots.

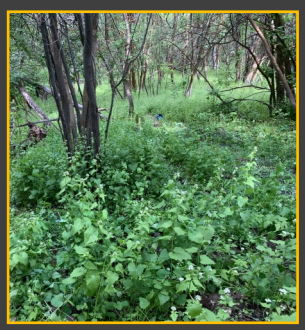
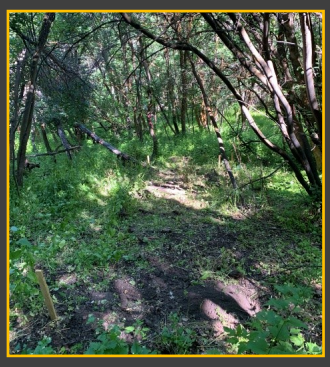
To prepare for spring treatments of the Armstrong Trail garlic mustard population in and adjacent the plots,

Table: Percent cover change as a result of spring DuraCor application in June 2020 and September of 2020.



Spring Treatment Result Photos

Does not include the two fall Herbicide Only and Herbicide + Weeding treatment photos as these plots did not receive treatment until October 2020 .

	Pre-treatment June 2, 2020	Post-treatment June 2, 2020	Revisit June 27, 2020	Revisit September 2020
Control/ No Treatment				
Weeding Only				
Herbicide Only				
Herbicide + Weeding				

additional 42 acres adjacent known population boundaries were monitored and an additional 3.7 acres of garlic mustard were mapped and added to the Summit CWMA 2020-21 garlic mustard treatment schedule. This included moderate sized patches and smaller patches of 20 square feet or less, as well as a couple populations consisting of a handful of plants. The distribution of these patches suggest they are at an edge of the main population and some may be satellite populations. These new populations are connected to the main Armstrong population within which the DuraCor trials are located.

Results

Prior to treatment, plots averaged 88% cover (range 80-95%). Summer treatments showed some burn down of both rosettes and flowering plants with rosettes showing the greatest impact at the first monitoring visit. In plots that were not weeded, the rosette layer beneath the flowering plants did not show signs of herbicide contact. By fall, all second year plants treated with DuraCor were dead and flowering stocks showed no seed development. Weeded plots showed some green rosettes though many had higher levels of yellowing than rosettes in the adjacent weeded areas that had not received DuraCor treatment. By September, plots receiving any combination of spray and weeding did not have second year plants that formed seed. In the weeded only plots, second year plants that were missed during weeding did not have enough time to grow and produce seed prior to death. The control plot showed nearly 100% seed formation in second year plants.

Results of the fall treatments will be recorded and monitored as

Typical density of second year garlic mustard (left) becomes more clear once the second year plants are removed (left). Soon after, the lower layer of first year rosettes and newly germinating seedlings will fill in the bare ground if not treated with herbicide.

Project Partners

Funding Partners

- Utah Department of Agriculture and Food
- Corteva
- Ecology Bridge LLC

Landowner Partners

- Park City Municipal Corporation

Summit County CWMA Members

- Crescent Ridge Condo HOA
- Deer Valley Resort
- Ecology Bridge
- Ground Solutions
- Historic Glenwood Cemetery
- Park City Municipal Corporation
- Jeremy Ranch HOA
- Pinebrook Master HOA
- Ranch Place HOA
- Salt Lake County
- Snyderville Basin Special Recreation District
- Sun Peak HOA
- Summit County
- Summit Park and Timberline HOAs
- Swaner Eco Center
- The Colony HOA
- Utah State University Extension
- Utah Olympic Park - Park City
- Vail Resorts
- Woodward School

part of the Summit CWMA ISM Garlic Mustard Program and reported in the 2021 report.

Financials

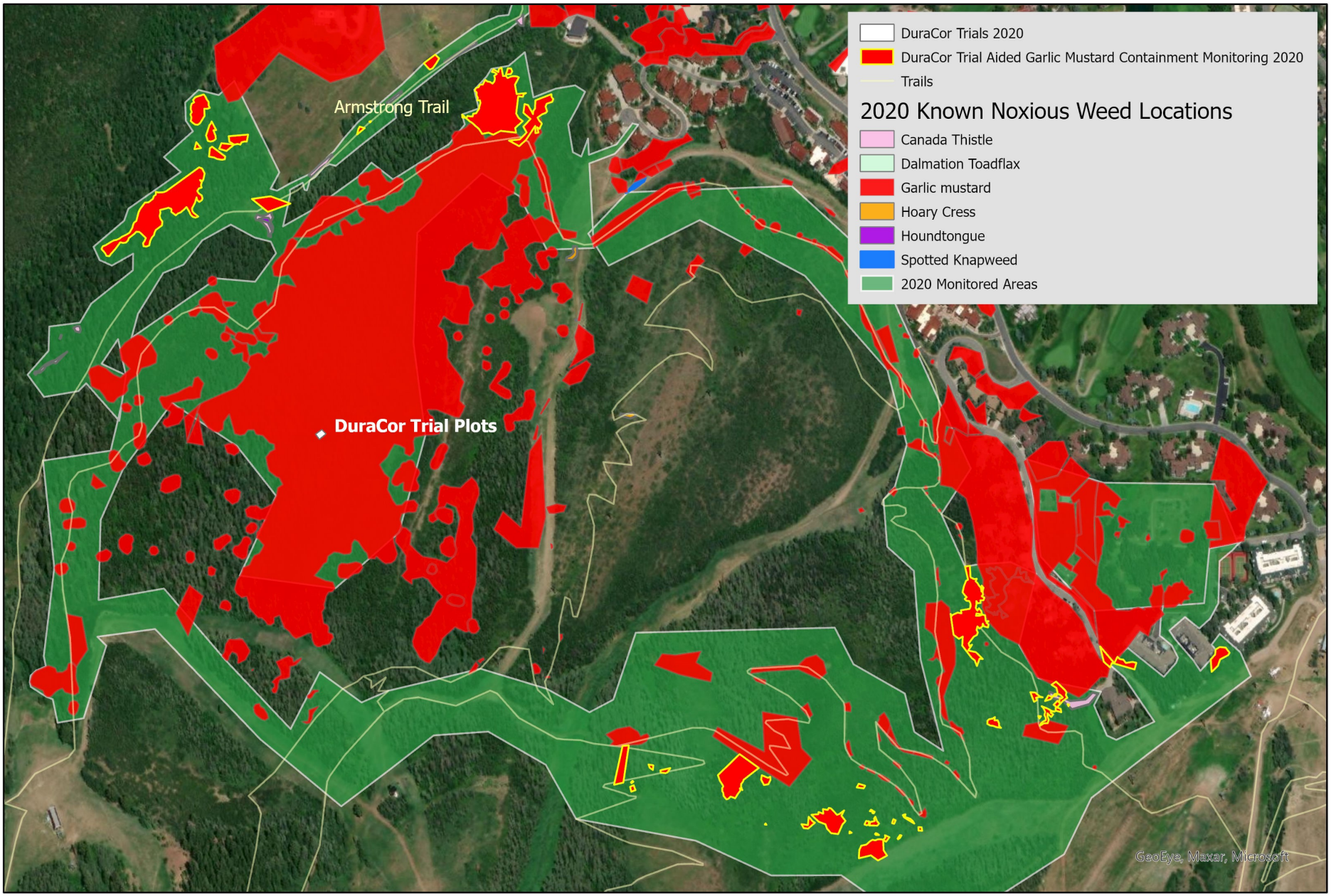
The Summit CWMA DuraCor Trial was awarded $5,110 and was matched by two partners at a value of $449.90. This results in a 8% match of the ISM funds of the research areas. Given this is a research project, partner matches are difficult to obtain. That said, control of garlic mustard in the Armstrong Trail population was conducted with funding from the Summit CWMA ISM Garlic Mustard Program and with Park City Municipal Corporation. These actions work to contain garlic mustard to the known boundaries while the actual boundaries are identified and new treatment methods tested.

Summit CWMA 2019-20 ISM DuraCor Trials Project Budget Summary				
Treatment #	Grant Line Item	Service	Invoiced Amount	Funding Source
1-Herbicide Application	Labor	Plot establishment, monitoring and maintenance	$4,042.57	ISM
1-Herbicide Application	Equipment and Materials	Plot stakes	$21.18	ISM
17-Admin	Project Mgmt/Admin	Organizing budgets, reimbersements and report	$0.00	ISM
1-Herbicide Application/17-Admin	Project Mgmt/Admin/monitoring	Admin/monitoring	$211.25	ISM
1-Herbicide Application	Herbicide Contrator	Herbicide contrator	$450.00	ISM
17-Admin	Donated Admin - Reporting	Admin	$240.00	Ecology Bridge
1-Herbicide Application	DuraCor	Hericide - 2 gal of Duracor	$209.90	Corteva
Total			**$5,559.90**	
ISM Funded			$5,110.00	
Partner Match			$449.90	
Percent ISM Funded			91.91%	

Conclusions

DuraCor was effective at killing garlic mustard within the season of application when used alone (75% reduction) and used in combination with hand weeding of second year plants (93% reduction). Weeding alone was also effective at reducing garlic mustard (52% and 55% reduction) but not at the level of DuraCor treatments. Because a primary use of DuraCor is it's preemergent properties. Data collection spring, summer and fall of 2021 will be essential to determine preemergent value in garlic mustard control. The Summit CWMA will continue to monitor and report results of these trial plots through 2023 as funding allows to record the long-term control potential of DuraCor on garlic mustard.

Level of control in Armstrong Trail population with 2,4D amine and MSM 60 treatment for 2 years. Never treated (left) and treated 2 years (right).



Summit CWMA 2020 ISM DuraCor Trials Report
Garlic Mustard Distribution and Project Map

The Summit CWMA has mapped more than 50 acres of garlic mustard in the Armstrong Trail along through the ISM funded Garlic Mustard Program. Containing this population while testing control methods such as the DuraCor Trials is essential to preventing large scale garlic mustard spread.

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Map Prepared November 3. 2020
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