

# 2020 HERBACEOUS WEED REPORT

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# Table of Contents

Overview .....	2
Table 1.....	2
Management Units .....	3
Table 2.....	3
Table 3.....	3
Herbaceous Weed Species.....	4
Table 4.....	4
Table 5.....	4
Comparison of 2019 & 2020 .....	5
Important Notes.....	5
Example of Weed Management .....	6
Lessons Learned.....	6
Recommendations for 2021 Weed Season.....	7
Photos .....	8
Photo A.....	8
Photo B.....	9
Photo C.....	10

## Overview

Management Type	Worker Hours	Herbicide (gal)	Area (acre)	Average hour/acre	Average gal/acre
<b>Boom Spray</b>	67.05	3310	723.61	4.97	4.57
<b>Mowed</b>	17.55	0	73.35	0.49	0
<b>Carpet Wicked</b>	4	2	24.65	0.5	0.08
<b>Spot Treated</b>	598.47	173.83	1807.3	0.33	11.91
<b>Re-swept</b>	50.75	0	360.54	0.65	0
<b>TOTAL</b>	<b>737.82</b>	<b>3485.83</b>	<b>2989.45</b>	<b>N/A</b>	<b>N/A</b>

Table 1: General summary of weed management performed by Nachusa’s 2020 restoration crew and permanent staff. For clarification, a ‘spot treatment’ is an initial sweep of a planting on foot, targeting one or more specific invasive species.

A ‘re-sweep’ is a second or third sweep of a previously spot-treated planting. Plantings are generally re-swept after invasive species are found while performing other restoration tasks in that planting. Weed cruises are also done periodically to check already swept plantings for weeds. A ‘weed cruise’ consists of driving around a planting and scanning for missed weeds or late season weed growth. If enough weeds are spotted during a weed cruise, the planting will be re-swept. Some re-sweeps were completed using hand tools, usually a ‘parsnip predator’ specialized spade, to remove entire invasive plants, particularly those that were mature enough to produce viable seed. The restoration technician crew are responsible for most of this on-foot treatment.

In the case of very large patches of dense invasive growth, these areas are mowed and/or boom sprayed using a tractor, which equates to many gallons of herbicide applied in a short amount of time. This affects the data much differently than a slower, walking sweep of a large planting with a comparatively smaller volume of herbicide applied. New this year is the use of carpet wick herbicide application, an additional method to cover large areas of weeds. Bill Kleiman, Cody Considine, and occasionally additional stewards are responsible for tractor work.

Overall, 2989 acres were managed for weeds. Resources consumed were 3485.83 gallons of herbicide and 737.82 worker hours. It is important to note that time spent weed cruising and pulling the occasional one or two weeds spotted from the truck was not recorded. However, if a larger weed patch required more than just a couple crew members and 5 or so minutes to remove, the location and time spent was recorded.

## Management Units

Management Unit	Worker Hours	Herbicide (gal)	Area (acre)
Clear Creek Knolls	99.15	1347.25	394.73
Hook Larsen	42.25	191.33	126.26
Schafer Knob	35.2	40.25	23.27
Williams	26	53.25	162.55
East Heinkel	24.65	47.25	78.04
Thelma Carpenter	23.5	0	58.66
Senger	23	5	77.6
Holland Prairie	22.7	97.75	96.89
Fen	20	10	20.61
Rolling Thunder	20	7	34.14

Table 2: Top 10 most highly managed units in terms of restoration worker hours

Table 2 represents the top 10 most highly managed units in terms of restoration worker hours. The 2020 restoration crew also spent time and resources managing several other units, but in much smaller quantities. The quantity of weeds found in a management unit varies and can be affected by many factors. A single management unit may contain multiple separate plantings that vary in size, age, composition, and historical use. In general, larger units take more time to manage and smaller units less time, but the amount of herbicide applied does not coincide with planting size. For example, invasive species in remnant areas are usually removed using hand tools rather than spraying herbicide, which in turn takes more time to treat.

Management Unit	Mower		Boom Spray			Spot Treat			Re-swept		
	Worker Hours	Area (Acres)	Worker Hours	Herbicide (gal)	Area (Acres)	Worker Hours	Herbicide (gal)	Area (Acres)	Worker Hours	Herbicide (gal)	Area (Acres)
Clear Creek Knolls	1.45	2.11	9.70	1341.00	202.62	88.00	6.25	190.00			
Hook Larsen			5.00	190.00	31.35	30.25	1.33	67.67	7.00		27.24
Schafer Knob	3.00	13.74	1.20	40.00	3.52	31.00	0.25	6.01			
Williams			4.00	50.00	17.84	21.00	3.25	130.03	1.00	0.00	14.68
East Heinkel	0.50	1.66	1.15	47.00	2.13	23.00	0.25	74.25			
Thelma Carpenter	2.00	8.18				21.00	0.00	50.36	0.25	0.00	0.11
Senger	1.00	4.44				21.00	5.00	49.40	2.00	0.00	23.76
Holland Prairie			4.70	96.00	3.09	18.00	1.75	93.80			
Fen						20.00	10.00	20.61			
Rolling Thunder						20.00	7.00	34.14			

Table 3: A breakdown of table 2 by management type.

Table 3 breaks down how each unit was managed. This information will help determine which units will need more or less management during the 2021 weed season. Eighty-eight worker

hours that were spent walking through Clear Creek Knolls, plus the 1,341 gallons that were boom sprayed in the unit, indicates the area will most likely need more attention in 2021. Most of the on-foot work in Hook Larsen was spading, seen from the lack of herbicide. The majority of the problem weeds were sweet clovers that had viable seeds. This means Hook Larsen should be swept earlier.

## Herbaceous Weed Species

Herbaceous Weed Species	Worker Hours	Herbicide (gal)	Area (acre)	Average hour/acre
<i>Melilotus officinalis</i> (YSC)	308.35	2151.58	1350.52	0.23
<i>Lotus corniculatus</i> (BFT)	124.50	651.25	300.59	0.41
<i>Melilotus albus</i> (WSC)	123.25	4.00	466.32	0.26
<i>Hieracium piloselloides</i> (King Devil)	76.50	6.25	267.64	0.29
<i>Phalaris arundinacea</i> (RCG)	39.30	294.00	81.13	0.48
<i>Pastinaca sativa</i> (Wild Parsnip)	9.60	0.00	41.02	0.23
<i>Hemerocallis fulva</i> (Daylily)	6.00	6.00	8.06	0.74
<i>Trifolium pretense</i> (Red Clover)	4.00	90.00	54.73	0.07

**Table 4:** Summary of the top eight invasive plant species managed for in 2020

After a planting is swept, the data recorded includes time spent, amount of acreage covered, gallons of herbicide applied, and species treated. Multiple species are often treated in a single sweep, however, the most abundant invasive species encountered in that particular sweep is recorded as the primary weed species treated during that sweep.

Herbaceous Weed Species	Tractor			On-foot		
	Worker Hours	Herbicide (gal)	Area (acres)	Worker Hours	Herbicide (gal)	Area (acres)
<i>Melilotus officinalis</i> (YSC)	29.85	2116.00	487.59	278.50	35.58	862.93
<i>Lotus corniculatus</i> (BFT)	13.00	595.00	120.28	111.50	56.25	180.31
<i>Melilotus albus</i> (WSC)	4.50	0.00	7.18	118.75	4.00	459.14
<i>Hieracium piloselloides</i> (King Devil)	0.00	0.00	0.00	76.50	6.25	267.64
<i>Phalaris arundinacea</i> (RCG)	11.30	284.00	24.96	28.00	10.00	56.17
<i>Pastinaca sativa</i> (Wild Parsnip)	9.60	0.00	41.02	0.00	0.00	0.00
<i>Hemerocallis fulva</i> (Daylily)	0.00	0.00	0.00	6.00	6.00	8.06
<i>Trifolium pretense</i> (Red Clover)	4.00	90.00	54.73	0.00	0.00	0.00

**Table 5:** Break down of table 5 by management type. Tractor includes mowed, boom spray, and carpet wick. On-foot includes spot treatment and resweeps.

*Melilotus officinalis* (YSC) had the most worker hours for both tractor work and on-foot management. It remains the most problematic herbaceous weed at Nachusa Grasslands. Both *Melilotus* species are easiest to spot when in full bloom. However, because they appear all over the preserve, the window to spray them with herbicide and before they start producing seed

can be only a few weeks. Most of the *M. albus* was targeted after seeds had already developed. Thankfully, a giant central taproot makes spading them out of the ground a relatively easy task.

The crew started the weed season by targeting *Hieracium piloselloides* and *Melilotus* sp. at the beginning of June while past crews have started out targeting *Trifolium pretense* in younger and higher-quality plantings. The crew did not spray any red clover in 2020, compared to the 23 gallons of herbicide applied to 75 acres over a period of 44 worker hours in 2019.

## Comparison of 2019 & 2020

### Comparison Overview

Year	Worker Hours	Acres Treated	Herbicide Gallons
2019	1100	3005	2752
2020	738	2989	3486

### Management by crew

Year	Worker Hours	Acres Treated	Herbicide Gallons
2019	971	2092	315
2020	544	1788	120

### Management by tractor

Year	Worker Hours	Acres Treated	Herbicide Gallons	Acres Mowed
2019	129	913	2437	245
2020	88.6	822	3312	73

### Important Notes

Due to the COVID-19 state lockdown in Spring 2020 (SEE STATE EXECUTIVE ORDER <https://www2.illinois.gov/Pages/Executive-Orders/ExecutiveOrder2020-18.aspx>), fire season was cut short with few units properly burned. Most units had unburned brush from the previous year(s) which interfered with the speed of weed sweeps, depending on the unit. Early spring weed management was halted per state mandate. The restoration technician crew was comprised of 4 persons instead of the usual 6 and started June 1<sup>st</sup> instead of mid-May. The smaller crew and late start date accounts for the reduced worker hours. The late start time also meant a reduced period to apply herbicide to weeds, particularly *Melilotus* species, before switching to spading weeds that were starting seed production. A small handful of Nachusa's long-time devoted stewards were unable to commit as many hours due to health concerns, which meant the crew swept units that aren't usually included on the docket. COVID restrictions also prevented possible school fieldtrips which occasionally allow for large volunteer groups that can assist the crew.

# Example of Weed Management

## Weeds&Seeds\_2020



**Figure 1:** Map of Senger unit, planted by 2015 restoration crew. Color-coded polygons indicate method of weed management. Source: ArcGIS Online

This section was included to provide an example of how weed management is represented within a management unit. In the Senger, white sweet clover and yellow sweet clover were the primary weed species targeted and treated.

The 30 acres of Senger that were managed for weeds in 2020 required 20.5 worker hours and 5 gallons of herbicide in its initial spot treatment. The mowed area took 1 hour. Two worker hours were needed to resweep the area, which did not require any herbicide due to the seeding sweet clover.

## Lessons Learned

- The report is only accurate if the data has been input into collector correctly. During analysis, some weed management polygons were found to have missing or inaccurate data.
- Recommend implementing a spot in collector for identifying who input each polygon so that the crew leader can refer to that person if the information in a polygon needs to be clarified.
- Recommend adding drop down selections in Collector for spading and boom-less spraying.

- Introduce crew to collector on iPad first thing before first weed sweeps. For first sweep, take to open area and start with skinny lanes for transects. Always have extra flagging tape to mark transects.

## Recommendations for 2021 Weed Season

Should the 2021 season not be delayed by further COVID-19 restrictions, RCG and red clover should be the initial priorities, especially since they couldn't be fiercely targeted in 2020. More time should be devoted to sweet clover before they start seeding. Most of white sweet clover had to be pulled and removed from the field in 2020. Hook Larsen and the East side of Holland should receive more attention. Visit areas that needed to be mowed/boom sprayed the previous years early on in order to determine if tractor treatment is needed or if spot treatment will suffice. Weed sweeps have proven to be crucial- split crew up into 2-3 groups on Fridays starting at around 2:30pm (this still allows for 20-30 minutes devoted to cleaning HQ) and have them drive around specified units with binoculars.



## Photos



Photo A: Clyde Carr (volunteer), Anna Scheidel, and Matt Nugent using 'parsnip predator' spades to remove seeding *Melilotus officinalis* (yellow sweet clover)





Photo B: Matt Nugent, Molly Duncan, Eleanor (volunteer), and Connor Ross getting ready to spray herbicide on a massive patch of *Lotus corniculatus* (bird's-foot trefoil)





Photo C: Molly Duncan and Connor Ross applying herbicide to a patch of *Melilotus officinalis* amongst native flowering *Tradescantia ohiensis* (Ohio spiderwort) and *Penstemon digitalis* (foxglove beardtongue)