



Invasive and Exotic Plant Management in Denali National Park and Preserve

2016 Summary Report

Natural Resource Report NPS/DENA/NRR—2016/1352



ON THE COVER

Top: SCA Alaska Corps Members and Intern group photo at Wonder Lake.

Bottom: SCA intern identifying invasive dandelions with a volunteer at the Dandelion Demolition event.

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Natural Resource Report NPS/DENA/NRR—2016/1352

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Abstract

This report describes the work performed by the Exotic Plant Management Team (EPMT) at Denali National Park and Preserve (DENA) during the 2016 field season. This marks the twelfth season DENA has monitored and controlled invasive plants in accordance with the Alaska Exotic Plant Management Team protocol (Million et al. 2016). The 2016 DENA EPMT conducted the majority of field work in the entrance area. We also performed control efforts along the park road, including miles 17 to 42 and 70 to 92, as well as the airstrip in Kantishna (Mile 92). The 2016 EPMT further monitored and controlled invasive plants within the community of McKinley Village and on the George Parks Highway. The team mapped 3.28 gross infested acres of invasive plants, all of which were treated manually or chemically. EPMT staff chemically treated infestations of flixweed (*Descurainia sophia*), bird vetch (*Vicia cracca*), foxtail barley (*Hordeum jubatum*) and narrowleaf hawksbeard (*Crepis tectorum*). We manually treated a total of six invasive plant species in DENA and three outside park boundaries in 2016. The DENA EPMT also conducted revegetation of disturbed sites with native species. These projects were completed at the beginning of the season to allow the seeds to germinate, creating enough of a root system to survive the winter and prevent erosion of the soil from spreading into the surrounding ecosystem. Exotic plant management at DENA is an ongoing effort to prevent the introduction of new invasive plants species, reduce current infestations, and restore native plant communities (Figure 1).



Figure 1. Wendy Mahovlic demonstrates how to manually pull *Taraxacum officinale*.

Acknowledgements

The Denali National Park and Preserve Exotic Plant Management Team would like to thank all of those who contributed to making the 2016 season a success including; Christopher Overbaugh and Peter Frank, and DENA's Trail Crew, who collaborated with us on multiple revegetation projects throughout the 2016 field season. Thank you also to the Student Conservation Association Alaska Corps Crew and those that participated in the 2016 community Dandelion Demolition and Need for Seed events. We would also like to thank our individual volunteers throughout the summer. Without this vast support network, the Exotic Plant Management Team would not have been nearly as successful as it was.

Acronyms

AKNHP Alaska's Natural Heritage Program

AKEPIC Alaska Exotic Plants Information Clearinghouse

DEC Denali Education Center

DENA Denali National Park and Preserve

EDRR Early Detection Rapid Response

EPMT Exotic Plant Management Team

GIS Geographic Information System

GPS Global Positioning System

MSLC Murie Science and Learning Center

NFS Need For Seed

NPS National Park Service

SCA Student Conservation Association

YCC Youth Conservation Corps

Introduction

Denali National Park and Preserve (DENA) contains six million acres of wilderness in interior Alaska which varies in geographical features from boreal forests to alpine tundra along valleys, plains and hills leading to high mountains. Due to its high latitude, tree line is only around 2,000 to 2,500 feet (Figure 1). DENA is best known for Denali, the tallest mountain in the United States; the mountain stands at 20,310 feet in elevation and its impressive sight brings half a million tourists to the park each year. The entrance area, (mile 1-15), sees by far the most visitation of any area of the park due to its accessibility for all personal vehicles. High visitation has subjected the entrance area to unintentional establishment of invasive plants by visitors, researchers, and park staff. This is demonstrated by the fact that the entrance area contains the largest and most diverse infestations of invasive plant species found within the park. Though most of the backcountry of Denali National Park and Preserve remains free of invasive plants, visitor use at scenic view points and camping areas has led to the establishment of isolated invasive plant populations. Regular monitoring of these and other secluded sites is necessary to effectively control invasive plant populations in these remote environments. Invasive plants pose a serious threat to biodiversity by threatening the genetic integrity of native plants, out-competing native plants for resources, and disturbing the structure and function of ecosystems. Geographic isolation and cold climate has limited the introduction of invasive plant species to DENA compared to other parks and regions. Because of this, DENA is in a unique position to be able to contain or mitigate invasive plant populations within the park. DENA has been controlling invasive plants as part of the Alaska Regional Exotic Plant Management Team (EPMT) since 2004. The DENA EPMT aims to prevent introductions of new invasive plant species, reduce current infestations, and restore native plant communities. This is accomplished through inventorying and monitoring, treatment and control, outreach and education, and revegetation projects. The DENA EPMT employs a control strategy in which the entrance area is regularly monitored and treated for invasive plants. For more remote sites, an early detection, rapid response approach is utilized to locate and treat infestations before they establish themselves beyond the point in which containment or eradication is feasible.



Figure 2. Overview of the Park Road of Denali National Park and Preserve.

Methods

The DENA EPMT performed fieldwork during the 2016 season following the Alaska Exotic Plant Management Team 2016 Field Protocol (Million et al. 2016). The 2016 DENA EPMT aimed to prevent introduction of new invasive plants, reduce current infestations, and restore native vegetative communities. The majority of fieldwork occurred between June 1st and August 26th. Fieldwork consisted of surveying and treating invasive plants while collecting geospatial data. Geospatial data collected from previous years was used to return to all previous infestations to survey for the presence or absence of invasive plants and to complete any work. Prioritization of fieldwork was done with consideration to geographic location, weather, available personnel, availability of resources such as transportation along the park road, and plant phenology. The road is paved from the entrance to mile 15 at Savage River. Once past mile 15, the road is unpaved and graded. The Entrance Area was focused on most for monitoring and removal of invasive plant species. These 3 miles of park road were heavily monitored due to the high volume of traffic and the inherent potential vectors. Past mile 15, only Park Service vehicles, shuttle and tour buses, service vehicles, and construction equipment are permitted to drive the road. These vehicles are the largest vectors for invasive plants spread along the park road corridor. The entrance area of DENA received below average snowfall during the 2015-2016 winter season, impacting the overall phenology of the vegetation. Common dandelions (*Taraxacum officinale*) around the entrance area reached maturation sooner than historically typical, making manual treatment of infestation sites in this area an early season priority. Areas of invasive plant control work in 2016 can be categorized into four general locations: the entrance area (mile 1 – 3 Park Rd), mile 15-92 Park Rd, Glitter Gulch (mile 238 – 239 Parks Hwy) and the community of McKinley Village (mile 226 – 234 Parks Hwy). The entrance area is the most accessible and contains the majority of invasive plants found in the park, so more time was spent surveying and controlling invasive plants in this area. To most effectively and efficiently monitor more remote locations in the park, we prioritized sites visited based on higher chance of visitor use, amount of time since the area was last surveyed and previously documented presence of invasive plants. Each site in the entrance area was surveyed a minimum of three times over the duration of the 2016 season. We surveyed sites located on the west end of the park, Glitter Gulch, and in the community of McKinley Village once during the 2016 season. Denali National Park's EPMT employs the Alaska Natural Heritage Program's invasive plant ranking system to determine the invasive plant species that have the potential to spread throughout the park.

Table.1 2016 Project Areas

Areas	Field Sites
Entrance Area (Mile 1-3 Park Road)	Backcountry Information Center
	Denali Visitor Center
	Murie Science and Learning Center
	Wilderness Access Center
	Waste Water Treatment Plant
	Riley Creek Campground
	Post Office
	Mercantile
	Power Plant
	Steam Plant
	Park Headquarters
	Sled Dog Kennels
	Employee Housing
	Maintenance Facilities
West End	Mile 70-92 Park Road
	Kantishna Airstrip
Community of McKinley Village	Mile 226–234 George Parks Highway
	Denali Education Center
	Old Parks Highway
Glitter Gulch	Mile 238–239 George Parks Highway

Control Methods

Manual Treatment

Manual treatment of invasive plants within DENA consists of physical removal. Depending on the species, hand tools are used to remove individual plants or dense vegetation mats of interconnected rhizomes. All removed vegetative material was placed in trash bags and taken to the compost pile where DENA's fire crew will burn it over the winter of 2016. Manual treatment within DENA is the preferred and primary method of treatment performed by DENA's EPMT and should be done before the plant goes to seed. Manual treatment is not going to eradicate invasive plants from the park, rather it serves more as a constraining process to curb the spread of invasive plants into in new areas.

Chemical Treatment

Thirteen locations in DENA were selected for herbicide application using the integrated pest management decision tree in the Alaska Region Invasive Plant Management Plan. The DENA EPMT applied two herbicides in the 2016 season; Milestone, a broadleaf herbicide with aminopyralid as the active ingredient, and AquaMaster, a non-selective herbicide with the active ingredient glyphosate. All herbicide treatments were completed by staff licensed by the State of Alaska. Herbicide applicators used calibrated backpack sprayers to spot spray target invasive plants. The DENA EPMT

used Milestone to treat three small infestations of bird vetch, (*Vicia cracca*) within the park: the entrance area of the Power Plant, across from the steam plant, and in the C-Camp parking area. Milestone was also used to treat bird vetch populations on the George Parks Highway, between miles 231-241; as well as on the old road of the Denali Education Center campus in McKinley Village. A relatively large population of narrowleaf hawksbeard (*Crepis tectorum*) was also sprayed with Milestone at the Waste Water Treatment Plant. A small infestation of Foxtail Barley (*Hordeum jubatum*) was chemically treated with AquaMaster at the Waste Water Treatment Plant. The DENA EPMT also used AquaMaster to treat flixweed (*Descurainia sophia*) at Tek Pit, mile 26 of the park road. Areas of invasive plant control work in 2016 can be categorized into four general locations: the entrance area, mile 42-92, the George Parks Highway and the community of McKinley Village.

Mapping and Collecting Data

For all populations of invasive plants surveyed and monitored during the 2016 field season, park personnel collected geospatial data using a handheld 2008 Trimble Geoexplorer XT unit. Characteristics gathered included the disturbance type, taxon, phenology, percentage of ground cover, stem count, control effort, action, percentage of infestation treated, and control hours per person. Data was then transferred and edited using Microsoft Pathfinder Office. This GPS data was sent every two weeks to the Alaska Regional EPMT for final analysis and converted into GIS data. The provided data will be submitted to two other databases including the National Park Service's National Invasive Species Information Management System (NISIMS) and the Alaska Natural Heritage Program's Alaska Exotic Plant Information Clearinghouse (AKEPIC). Data collected from years previous set the groundwork to keep an ongoing and up to date history of invasive plant transmission, inside and outside of the park. Areas surveyed are recorded as either monitored, inventoried, or treatment. "Inventory" signifies a new survey location. "Monitor" signifies an area that has previously been surveyed. "Treatment" signifies areas where invasive plants have been controlled either chemically or manually. Alaska Natural Heritage Program (AKNHP) provides information through the Alaska Exotic Plants Information Clearinghouse (AKEPIC), which makes data available to the public. Furthermore, the AKNHP ranks each species and provides a framework for prioritizing plant treatment.

Personnel

The 2016 DENA EPMT consisted of Wendy Mahovlic, Revegetation Specialist & Supervisor of the Exotic Plant Management Team in DENA, and Jamie Lay, Student Conservation Association (SCA) intern. Chris Overbaugh, the Alaska EPMT Program Manager, assisted with herbicide application and Peter Frank, EPMT Technician and Data Manager, provided training and assistance throughout the 2016 season. We had a six-person SCA crew that assisted with revegetation and invasive plant removal from June 5th-June 17th, and August 22nd-26th, as well as an eight-person Youth Conservation Corps (YCC) crew that performed invasive plant removal from August 1st -August 5th.

Results

2016 Field Season Overview

The focus of DENA's EPMT 2016 field season was to revisit all previously surveyed infestations and to survey new areas determined to be susceptible to invasive plant establishment. The 2016 DENA EPMT revisited all known sites and located new sites within the community of McKinley Village, specifically on the George Parks Highway. For the 2016 field season, DENA's EPMT surveyed a total of 3.28 acres. A total of 0.80 acres were infested, and manually or chemically treated. Park staff and volunteers removed an estimated total of 2982 pounds of invasive plants. The majority was common dandelion, white sweetclover, and foxtail found at the park entrance area and the George Parks Highway. We conducted herbicide treatment at thirteen different locations; the Waste Water Treatment Plant, Tek pit, the steam plant, power plant, Denali Education Center (DEC) campus, and along the George Parks Highway, between miles 231-241.

Table 2. Species specific monitoring and treatment throughout the season

Year	EPMT Personnel		Volunteer Crews		Total Person Field Hours	Invasive GPS Data NPS Lands(non-NPS lands)		
	# pers.	Field Hours	# pers.	Field hours		Species Acres Surveyed	Species Acres Infested*	Acres Treated
2004	1	39	1	25	64	2.553 (6.557)	0.934 (6.557)	0.450 (0.035)
2005	1	224	8	544	768	16.713 (2.321)	12.877 (1.531)	3.261 (0.186)
2006	1	454	8	679	1,133	750.313 ¹ (2.958)	16.866 (0.349)	10.211 (0.121)
2007	2 ²	743	16	1,173	1,916	805.951 ¹ (7.826)	11.329 (0.301)	8.368 (0.289)
2008	2 ²	626	10	454	1,080	741.687 ¹ (11.982)	12.750 (7.968)	11.051 (0.649)
2009	2 ²	571	5	385	956	749.459 ¹ (4.210)	20.437 (0.317)	11.370 (0.317)
2010	3 ³	1,893	16	2,560	4,453	159.034 (35.245)	16.766 (2.616)	14.125 (2.586)
2011	3 ⁴	764	3	143	907	290.592 (23.395)	29.348 (7.228)	10.290 (2.010)
2012	2 ²	478	35	912	1390	61.872 (6.397)	19.108 (2.366)	10.519
2013	2 ²	500	27	980	1480	118.85 (8.3)	5.783 (1.89)	4.56 (.461)
2014	2 ²	443	14	337	780	80.33 (0.23)	6.24 (0.04)	0.84 (0.03)
2015	3 ³	1040	14	1350	2390	73.55 (0.41)	5.66 (0.03)	4.71 (0.03)
2016	2 ²	1288	159	2338	3626	3.28 (0.18)	0.80 (0.07)	0.80 (0.07)

¹ Acres infested represent the area of a mapped infestation multiplied by the percent cover of invasive plants in that mapped area.

² Acres treated represent the area of a mapped infestation multiplied by the percent cover of invasive plants in that mapped area and by the percent of the infestation treated.

¹-This acreage includes the actual road surface of the Denali Park Road.

²-Includes one SCA intern

³-Includes two SCA interns

⁴-Includes one SCA intern and one international SCA intern

Fieldwork Sites

The Entrance Area

The entrance area is the most accessible and contains the majority of invasive plants found in the park, so more time was spent surveying and controlling invasive plants in this area. To most effectively and efficiently monitor more remote locations in the park, we prioritized sites we visited based on higher chance of visitor use, amount of time since the area was last surveyed and previously documented presence of invasive plants. Each site in the entrance area was surveyed a minimum of three times over the duration of the 2016 season. We surveyed sites located on the west end of the park, along the George Parks Highway and in the community of McKinley Village once during the 2016 season. The DENA EPMT spent a large part of the season in the Entrance Area. The Entrance Area receives the vast majority of visitation to DENA and hosts the majority of invasive plant species in the park. The Entrance Area is divided into high priority sites where staff monitored and controlled invasive plants. *Taraxacum officinale* has always been the main focus of park EPMT activities, working to prevent rapid spread of the species along the park road. *Taraxacum officinale* is the most widespread invasive plant species within the park boundaries and is treated throughout the summer. At the beginning of the season, it is the first invasive plant species to bloom making it the first target. Ideally, the taproots are removed before the plant goes to seed. Constant vigilance is needed to prevent spread further into the park and along the gravel bars of Denali's braided rivers. The second species targeted within the entrance area is *Crepis tectorum*, or narrowleaf hawksbeard, a highly invasive plant species ranking 51 on the AKEPIC invasiveness scale (AKEPIC 2016). Monitoring of *Crepis tectorum* begins at the end of June as the plant begins to flower. The DENA EPMT began removing *Crepis tectorum* from the park in summer 2004 (Walter and Mahovlic, 2011). It is most effective to manually treat certain areas in the park in late June because it is difficult to spot when it is not in bloom. The monitoring and manual treatment of *Crepis tectorum* includes both sides of the Park Road from the Waste Water Treatment Plant, into Riley Creek Campground Road, and into the Aramark Bus and Employee Parking Lots and between the Denali Visitor Center and Park Road. *Crepis tectorum* was chemically treated in the Waste Water Treatment Plant in 2016. Because this species is relatively new to Denali National Park and Preserve and has aggressively advanced up the park road, it is crucial to monitor and control *Crepis tectorum* on a weekly basis to prevent spread. This species should be sought out specifically near disturbed areas such as construction sites or areas where buses frequently stop.

The West End

The EPMT team and SCA crew of six conducted an entire week of manual treatment of *Taraxacum officinale* between miles 70-92.5 Park Rd. as well as the Kantishna airstrip within the week of June 13th. Small infestations were all along the shoulder of the Park Road. NPS staff chemically treated Flixweed, *Descurainia sophia* at Tek Pit, mile 26 of the Park Road.

Community of McKinley Village and the George Parks Highway

The DENA EPMT monitored newly revegetated areas completed by the Department of Transportation (DOT) after a construction project on George Parks Highway between mile markers 232-235. The EPMT found *Crepis tectorum* within this area and manually treated the infestation on

multiple occasions throughout the 2016 field season. DENA's EPMT along with an eight-person YCC crew manually treated several infestations of white sweetclover (*Melilotus albus*) along the shoulder of the George Parks Highway between miles 226-239. 450 pounds of *Melilotus albus* was pulled by the YCC in this area from August 1 – 4.

D.O.T. and the State of Alaska completed the Riley Creek Bridge construction project at the entrance to Denali National Park (Mile 237 George Parks Highway) in the summer of 2015 and hydro-seeded the area with annual rye and a grass seed mix that was acquired through the Alaska Plant Materials Center. In the summer of 2016, the grass seed mix was not doing well, but the annual rye and the invasive plant, *Chenopodium album* (lambsquarter) were thriving. D.O.T. was notified and they organized their contractor from Fairbanks, Great Northwest to pull up the lambsquarter from the 2 acre area. The DENA EPMT was notified that *Vicia cracca* and *Melilotus albus* were also found in that area. This area should be closely monitored in the future.

Revegetation

The DENA EPMT along with a six-person SCA crew and DENA's eight-person trail crew all collaborated on the revegetation of the permanent housing area in headquarters, which was completed within three weeks. Due to the replacement of all the underground utilities (Utilidor Project) in the general area last year, the yards and sides of the road within permanent housing were first raked to get rid of all of the large rocks, then filled with about 2 – 4" of topsoil from Great Northwest Co. in Fairbanks and seeded with native seeds (Figure 3). Native seeds used in the revegetation consisted of: *Hedysarum alpinum*, *Astragalus alpinus*, *Elymus sp.*, *Oxytropis campestris*, *Leymus innovatus*, *Arnica frigida*, *Lupinus arcticus*, annual rye grass and fertilizer (Florikote 14-14-14). With the help of others, the EPMT revegetated a total of 0.83 acres over 2016 field season. Total hours = 660. 480 = SCA crew. 180 = NPS staff (trail crew and reveg tech).



Figure 3. SCA Alaska Corps member disperses native seeds in the Permanent Housing area.

Outreach and Educational Events

Outreach and education are the most effective, preventative and inexpensive efforts that can help to reduce future treatment efforts which have the tendency to be more resource dependent. Because of this, the EPMT in DENA focused copious amounts of energy on informing the public on invasive plants throughout the 2016 field season.

The EPMT coordinated two Tundra Tots events with local NPS partner, Denali Education Center, (DEC). Tundra Tots, a program for children between the ages of two and five employs storytelling, play and art to provide meaningful outdoor experiences for local preschoolers and families in which to enjoy and understand the natural world. Our Tundra Tots event with DEC was on the topic of “Alien Invaders” within DENA. As a group, we identified invasive dandelions, (*Taraxacum officinale*), learned the significance of carefully pulling the seed off and disposing of it properly to prevent the spread (Figure 4). We then made crowns and necklaces with the stems of the plants. The group also learned about the highly invasive bird vetch (*Vicia cracca*) that has the ability to take over all native vegetation within an area. The second Tundra Tots event focused on flowers native to DENA.



Figure 4. SCA intern teaching Tundra Tots about “Alien Invaders” at DEC

A community “Dandelion Demolition” event was organized for National Trails day on Saturday, June 4th. A total of forty-one people including staff from DENA and local community members and families participated in the event (Figure 5). The event focused on areas surrounding the visitor center in the front country. Common dandelion, (*Taraxacum officinale*) was manually treated, and a total of 116 pounds was successfully removed.



Figure 5. Volunteers of the Dandelion Demolition on National Trails Day pictured with the 116 pounds of common dandelion.

The EPMT hosted a community “Need for Seed” (NFS) event on Saturday, August 6, in which thirty local community members participated and assisted in the collection of native seeds around the DVC for future revegetation purposes. As a group, we collected milk vetch (*Oxytropis campestris*), Eskimo potato (*Hedysarum alpinum*), and wheatgrass (*Elymus sp.*). We had a second NFS event on Sunday, August 7 for local Holland America Princess employees. The group collected native seeds from the Riley Creek area where milk vetch (*Oxytropis campestris*), and Eskimo potato (*Hedysarum alpinum*) were collected. Volunteers were educated about not only the purpose of collecting native seeds, but also the entire process of revegetation and the significance of DENA’s diverse seed bank. The Centennial Committee of DENA posted updates of the EPMT activities during the 2016 field season to the park’s Facebook page. A total of 9.85 lbs. of native seeds were collected.

A Need for Seed volunteer event also took place on the West end of the Park on August 15 – August 20 with 7 volunteers from the Anchorage area. Native seeds collected were: *Oxytropis campestris*, *Elymus sp.*, *Calamagrostis canadensis* and *Leymus innovatus*. The seeds were collected from Toklat, Eielson, Wonder Lake and Kantishna. A total of 4 lbs. of native seeds were collected.

The DENA EPMT also had the opportunity to collaborate with a film class from the Orange County School of the Arts. The group of twenty students manually treated and pulled up 52 lbs. of *Crepis tectorum* along the George Parks Highway while learning of the correlation between filming aspects of the outdoors and the hands-on involvement of the outdoor world (Figure 6).



Figure 6. Students of Orange County School of the Arts' film class after manually treating *Crepis tectorum*.

Discussion and Recommendations

The invasive plant management team at DENA has been preventing introduction of new invasive plants, reducing current infestations, and restoring native plant communities for 12 years. The geographic isolation and cold climate of DENA has limited the introduction of invasive plant species into the park. As long as the EPMT continues operations, DENA continues to be in a unique position in which we can significantly limit the extent of invasive plant establishment. The following are recommendations from the 2016 EPMT for ways to improve invasive plant management at DENA.

Native seed collection should continue to occur on a yearly basis to add to the number of native seeds available for restoration needs. There are multiple construction projects planned for the summer of 2017 and native seeds will be needed to revegetate when the projects are completed.

Partnering and outreach should continue to be an important component of the invasive plant program into the future. The community dandelion demolition and Need for Seed (NFS) events are a great opportunity to work with community volunteers. For the future, DENA's EPMT should consider working with other agencies and organizations as it provides opportunities to create partnerships and share resources. Denali Education Center (DEC) is a local organization that is open to working with the EPMT in the past. Ask them about a Need for Seed with kids. Contact the local Healy school and see if High School students could help the EPMT in the summer – for example, an internship or have kids from the school come to volunteer. Contact the local hotels to see if their employees would like to volunteer.

Contact the local hotel landscapers in the spring and instruct them about the different invasive plants in the area.

Centennial – Boot brush stations at the Wilderness Access Center (WAC) where the visitors get on the shuttle buses. Also locate them at the Denali Visitor Center (DVC) and at Eielson Visitor Center (EVC). That would be a great opportunity to have people clean their foot gear and instruct them on how invasive plants spread.

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Appendix A - 2016 Volunteer Hours and Invasive Pounds – Exotic Plant Management Team

Dandelion Demolition – *Taraxacum officinale* - Front Country – June 4, 2016

- National Trails Day – volunteer day with Kathleen Kelly and volunteer department. Pulled dandelions – Healy Overlook, Roadside Trail, Horseshoe Lake, and DVC Campus.
- Jamie Lay (SCA intern) represented the Exotic Plant Management Team. 7 hours.
- 41 volunteers for 4 hours = 164 hrs.
- 116 lbs. of dandelions.

Reveg – East End – Denali Headquarters Permanent Housing area (Utilidoor Project): June 6 - 9, 2016

- 6 SCA (Student Conservation Association) Volunteers; 1 SCA (Student Conservation Association) intern. 3 YCC (Youth Conservation Crew) – supervised by Wendy (NPS Reveg Tech) and Trail Crew.
- 400 hours
 - o Perm Housing Area – **Reveg** – raked rocks out, spread topsoil (from Fairbanks – Great Northwest), planted native seeds, fertilizer (Florikote 14-14-14), and annual rye on some lawns, around fire hydrants, and some common areas.
 - o Perm Housing Area – **Reveg** – raked rocks out, spread topsoil (from Fairbanks), planted grass seed (8 stars lawn mix – from Alaska Feed, Fairbanks) and fertilizer (8-32-16) – for new lawns from Alaska Feed, Fairbanks.
 - o TOTAL hours for this Reveg – Utilidoor Project – 580 hrs. 5 NPS Trail Crew = 140 plus Wendy = 40 hrs. Plus 80 hrs. of SCA performing Erik Hendrickson's punch list in August. **Total hours = 660 hrs.**

Dandelion Deveg – West End – June 13 - 17

- 6 SCA volunteer crew and 1 SCA intern
- 168 hours
 - o Mile 70-92 Park Rd. including Airstrip
 - o 245 lbs. of dandelions dug

Reveg – Eldorado Creek – June 20

- Taught 3 trail crew members how to plant willow stakes in soil lifts of creek bed.
- 1 SCA intern
- 4.5 hours

Crepis Sweep – *Crepis tectorum* - Park Rd. – Merc to WAC and Sewage Lagoon – month of July

- 1 – YCC member – B. J. Yanucci and SCA EPMT intern (Jamie Lay) performed Crepis sweep several times. Jamie supervised.
- 24 hrs. total for YCC

Crepis Sweep on Mile 235 to 233 Parks Hwy – July 12

- Film Class – through Volunteer Department. Jamie Lay (SCA intern) supervised.
- 27 volunteers for 2 hours = 54 hrs.
- 52 lbs. of *Crepis*
- New D.O.T. Project – passing lanes

David Radcliffe – New Community Project – July 29

- 18 volunteers worked for 2 hours = 36 hours
- Savage Campground area
- Dandelions on the Park Rd. (Mile 12.5) and Campground = 20 lbs.
- Foxtail –*Hordeum jubatum* at Mtn. Vista Rest Area = 90 lbs.

YCC – from Talkeetna – Aug. 1 – 5

- 6 YCC crew members and 2 adult YCC leaders = 8 people
- 224 hours
- *Melilotus albus* (Parks Hwy Mile 236 – 226) = 450 lbs.
- *Crepis tectorum* (Parks Hwy Mile 232 – 235) = 70 lbs.
- *Hordeum jubatum* (Mile 4 Park Rd. – reveg from 2014) = 535 lbs.

Need for Seed – East – Aug. 6 & 7

- Centennial Volunteer project – with Centennial Committee, Volunteer department and SCA EPMT intern (Jamie Lay).
- Aug. 6 = 30 volunteers. Aug. 7 = 20 volunteers for 4 hrs. / day = 200 hrs.
- Collected 9.85 lbs. of *Hedysarum alpinum*, *Elymus sp.*, and *Oxytropis campestris*. Some cleaned and some uncleaned seeds

Need for Seed – West – Aug. 15 - 20

- 7 people = 268 hours
- Collected seeds West End – Toklat, Eielson, Wonder Lake, Kantishna
- Collected 3.95 lbs. *Hedysarum alpinum*, *Elymus sp.*, *Leymus innovatus*, *Arnica lessingii*, *Oxytropis campestris*, and *Calamagrostis canadensis*. Some cleaned and some uncleaned seeds.

Reveg – Aug. 22 – 25 – Punch list for Denali Headquarters – Perm Housing

- SCA crew – 6 members = 240 hours
- Pulaskied, planted native seeds, fertilizer on areas in Perm Housing that we didn't get to in June. Erik Hendrickson's Punch List
- Collected native seeds – Mile 4 reveg – north and south of Park Rd.
- Cleaned some seeds.

SCA Intern – Jamie Lay – May 23 – Sept. 10 (SCA contract). Sept. 11 – Oct. 1: Official Volunteer

- 1 volunteer
- 528 SCA hours
- 120 volunteer hours
- Pulled many invasive plants and mapped them with a GPS. Participated and assisted with Dande Deveg West and all of the Reveg projects. Planned and supervised Dandelion Demolition, Crepis Sweep (film crew), Crepis Sweep (YCC), Need for Seed East. Organized and planned Outreach at Tundra Tots (Denali Education Center) 2 times this summer. She also cleaned many native seeds.

SCA CREW VOLUNTEERS = 6 members x 3 weeks x 40 hrs. /week = 720 hours

SCA INTERN = 1 intern = 648 hours

YCC CREW = 8 members x 1 week x 28 hrs. /week = 224 hours

OTHER VOLUNTEERS = 144 volunteers for 746 volunteer hours

TOTAL VOLUNTEERS = 159 VOLUNTEERS FOR 2338 HOURS

TOTALS

INVASIVES TREATED

***Taraxacum officinale* (dandelions):** 1046 lbs. – found mainly mile 1-43 Park Rd. and mile 72 - 92 Park Rd.

***Crepis tectorum* (narrowleaf hawksbeard):** 426 lbs. – found mainly in the Old Sewage Lagoon; along mile 1 of the Park Rd. and ARAMARK bus parking lot. Some also found in the recently revegetated areas at Mile 237.25 Parks Hwy and the new D.O. T. project at Mile 235 – 232 Parks Hwy (passing lanes).

***Melilotus albus* (white sweetclover):** 608 lbs. – found mainly at Mile 239 – 227 Parks Hwy. More this year due to D.O. T. projects along the Parks Hwy.

***Vicia cracca* (bird vetch):** 0 lbs. – found Mile 240 George Parks Hwy; in front of Chalet (Mile 239); State Pull out Mile 237.5; Mile 231.75 Parks Hwy, Denali Education Center, and Mile 230 Parks Hwy. Sprayed herbicide on all those populations – D.O.T. right of way permission. Sprayed herbicide on 5 small populations Mile 1 Park Rd. in 2012. Only 1 of those populations reappeared in 2014. Sprayed herbicide on 2 of those populations in 2016: near the door of the Power Plant and at the entrance to the Power Plant. A new population in the middle of the revegetation near C-Camp – just north of the C-Camp parking area. A population that was dormant for years came back: across from Steam Plant and old ATCO trailer. Sprayed both of those populations as well.

***Descurainia sophia* (Flixweed):** 128 lbs. – Rock Creek Bridge revegetation. Topsoil from Tek Pit.

***Tripleurospermum indorum* (scentless false mayweed):** 0 lbs. – was found at the Railroad tracks – Denali Depot and Shaffer Bldg. in 2012.

***Linaria vulgaris* (yellow toadflax):** 3 lbs. – was found at the Railroad tracks - Denali Depot

***Hieracium umbellatum* (narrowleaf hawkweed):** 5 lbs. – new population found at Mile 235 Parks Hwy. west side. At North end of D.O.T. road widening project.

***Hordeum jubatum* (foxtail barley):** 625 lbs. – found scattered Mile 1 – 2 Park Rd.; in recently revegetated areas; Mile 4 revegetated – north side of Park Rd.; Mountain Vista Rest Area – Mile 12.75 Park Rd.

***Trifolium pratense* (red clover):** 0 lbs. – was found at Mile 1 Park Rd.

***Lupinus polyphyllus* (bigleaf lupine):** 0 lbs. – was found at Mile 7 pull-out Park Rd. Sprayed with Milestone in summer of 2016.

***Silene noctiflora* (night-blooming cockle):** 0 lbs. – Kantishna Horse Corral in 2012.

***Galeopsis bifida* (Hempnettle):** 0 lb. – was found at Kantishna Horse Corral

TOTAL Invasives pulled = 2982 lbs.

2016 STATS –

Exotic Plant Management Team (EPMT) staff surveyed: 3.28 (0.18)

Infested with invasive plants: 0.80 (0.07)

EPMT staff treated: 0.80 (0.07)

NATIVE SEEDS COLLECTED

East End:

Hedysarum alpinum: 4.3 lbs.

Oxytropis campestris: 2.6 lbs.

Elymus sp.: 2.6 lbs.

TOTAL = 9.5 LBS.

West End:

Hedysarum alpinum: 0 lbs.

Oxytropis campestris: 1 lbs.

Elymus sp.: 2.6 lbs.

Leymus innovatus: .35 lbs.

Calamagrostis canadensis: 2 lbs.

Arnica lessingii: 1 lb.

Delphinium glaucum: .5 lbs.

Aster sibericus: .5 lbs.

TOTAL = 8 LBS.

Native seeds collected (some cleaned & some uncleaned) total = 17.5 lbs.

Areas revegetated by planting native seeds – .83 acres:

- Permanent Housing area and Headquarters area – Denali National Park Headquarters – Mile 3 Park Rd.

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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National Park Service
U.S. Department of the Interior



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