

Exotic Plant Management at
Denali National Park and Preserve
Summer 2005 Field Season Report

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Introduction

The 2005 exotic plant field season at Denali National Park and Preserve was the fifth year of an inventory designed to provide a baseline for future monitoring and management of non-indigenous flora. This survey builds on the data collected by previous inventories and provides spatial information critical for effective control. Recent and ongoing heavy construction projects in the front country of the park have left disturbed areas highly susceptible to exotic plant invasion. These areas were the focus of this year's survey. The goal of this year's field season was to survey these areas that likely harbor exotic plants, inventory their presence and control them when possible. The survey attempts to provide the vigilance necessary to prevent expansion of exotic plants further into the park.

This field season marks the second year that the Alaskan Exotic Plant Management Team (EPMT) has conducted baseline surveys in the park using the mapping grade GPS units. The 2004 data, loaded into the GPS units, helped to guide team members to previously mapped exotic plant control sites. Once at the site, team members searched for re-growth of exotic plants and if found, the plant was pulled and/or mapped. This evaluation of previous control efforts should increase treatment effectiveness.

Two Exotic Plant Management Team members were stationed at Denali through the majority of the growing season. Emphasis was placed on mapping the exotics present in the first mile of the park road and the control of *Melilotus alba* along the George Parks Highway. This field season also saw the continuation of various weed prevention activities including volunteer weed pull events, weed education presentations and re-vegetation projects.

As in past years, exotics in Denali were confined to anthropogenic disturbed land. The high visitation and the associated construction projects will continue to increase the vulnerability of the front country to exotic plant invasion.

Methods

Members of the Alaskan EPMT at Denali conducted an opportunistic survey of the many disturbed lands of the park. Surveys were conducted along George Parks Highway inside

of the park, the park road from the entrance to park headquarters, park housing, C-camp, New Visitor Center, Railroad Depot, and Savage River Cabin interpretive area. Various parts of the gravel portion of the park road were also treated and surveyed using volunteers. The park road in the Kantishna area was also surveyed as part of a volunteer weed control event. These areas were chosen because of their susceptibility to establishment of exotic plants due to disturbance. Data collected in 2004 also guided the survey site selection (Bauder, 2004). Team members scouted sites most likely to support exotic plants. These areas were along roadsides, footpaths, vehicle compacted soils, drainage ditches, and parking lots.

Locations and relative area of all encountered infestations were recorded with either a Trimble Geo XT or Explorer III GPS unit. Additionally, attributes describing the exotic plant phenology and habitat were also recorded using the units. The locations and attributes will be used to develop maps that graphically represent exotic plant locals and patch area. This information will also be loaded into GPS units in coming field seasons in order to guide monitoring. The graphic below describes various attributes recorded into the data dictionary for this survey.

Table 1. 2005 Alaskan EPMT data dictionary

Field	Description
LocationID	Location Description (Kantishna, etc.)
Taxon	Dominant exotic species
Phenology	Phenology of dominant exotic species (no flower, full flower, or in seed)
CvrClsPer	Cover class percentage of dominant exotic species (1, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 95, or 100)
CntrlEffrt	Control effort (low, medium, or high)
Action	Inventory, Treatment, Monitoring, or Retreatment
Treatment	Treatment (only PULL/DIG-MANUAL this year)
Undetermined	Stem count of dominant exotic species
Dstrbncs	Disturbance Type (fill importation, ORV disturbance, mining, trampling, abandoned homesite, landslide, streambank, or postglacial)
Remarks	Remarks
AssocPark	Associated park (DENA)
Recorder	Recorder (CPM = Chris McKee, JAH = Jeff Heys, or PSB = Penny Bauder)
Taxon2, Taxon3	Additional fields for additional species at the same site

Digital photos of exotic plants were taken when encountered during the survey. Photo points were also collected using the Geo XT. These point locations could be used in the future to make qualitative comparisons of treatment and infestation sights. Additionally, digital photos were taken to reference for plant identification purposes. All photos and photo points were submitted as part of the data collection package.

Specimens were collected when a species new to Denali was found or if a team member needed to confirm identification. Date, location and collector name was recorded and all specimens were provided to EPMT coordinator for herbarium processing.

Most of the weed species encountered at Denali during the 2005 field season are not natural area colonizers. There is however two species found in the park that are listed as invaders of natural areas and have the potential of altering ecosystem function. These species are the highest priority for management. *Melilotus alba* is a concern because of its aggressive spread along George Park Highway and for its ability to establish itself along the region's riverbanks (Densmore et. al 2001). EPMT members at Denali considered control of *Melilotus spp* a high priority and pulled all that were encountered. Wendy Mehovlic, EPMT member and Denali re-vegetation technician located many of the *Melilotus alba* plants controlled on George Parks Highway because of her frequent cycling of that road. The George Parks Highway was surveyed from McKinley Village north to the park entrance. The two team members spent three days pulling *Melilotus alba* from the side of the highway. Additionally a volunteer weed control event utilizing Alaskan Department of Forestry interns controlled a 0.25 acre *Melilotus alba* site also along the highway. This site (mile 231 Parks Highway) should be revisited next year in order to evaluate the effectiveness of this season's efforts. The two EPMT members also surveyed the riverbanks underneath the bridge just north of the park entrance. *Melilotus alba* was not found, but was present on the newly disturbed soil along the highway in proximity to the bridge. The Parks Highway along the business district of the Denali borough was surveyed. An abundant population of *Melilotus officinalis* was found along a service road at the McKinley Chalet.

Vicia cracca was also given high control priority due to its aggressive spread and its listing as a native area invader (Plant Conservation Alliance, 2005). This weak stemmed legume has the potential to crowd out stretches of native plants. It can be hard to control due to its fragile nature and difficulty of removing all of the root structure. *Vicia cracca* was found in three areas of the park. One of these *Vicia cracca* sites was reoccurring from treatment in 2004. The second site was newly discovered in the permanent employee housing area. The third plant was discovered in a crack in the asphalt in front of the car wash of the DENA auto shop.

Crepis tectorum again was present in abundance at the sewage lagoon area and along the first mile of the Park Road. Most sites were treated at least twice by either members of the EPMT or volunteers. This plant proved very difficult to control. It's slender profile is difficult to see unless flowering. Soon after the lagoon and roadside was cleared of visible *Crepis tectorum* plants, a new crop would emerge. This plant is not known to be a native area invader, but does affect the visual qualities of the roadside.

Much of the exotic plant activity at Denali has been focused on control of *Taraxacum officinale*, dandelion. This plant is very aggressive and has spread along roadsides and disturbed land throughout the park. Control of *Taraxacum officinale* has been prioritized due to its visual impacts along the park road in the interior of the park and the first mile. With limited time and personnel, treatment efforts were confined to the Park Road west of mile 15. In the front country an effort was made to record all *Taraxacum officinale* encountered. Special emphasis was given to plants that were at the edge of undisturbed natural areas. In the front country many abundant species were only inventoried and not treated due to their low priority. Some of these included: *Plantago major*, *Trifolium repens*, and *Matricaria discoidea*.

Results

Twenty-three exotic plant species were recorded during the 2005 field season. All were confined to anthropogenic land disturbance. *Taraxacum officinale*, *Plantago major*, *Trifolium repens* and *Matricaria discoidea* were found throughout many of the roadsides and parking lots of the front country. One species, *Tripleurospermum perforata* had never previously been recorded at Denali. This plant was found on sites in the train depot area that had previously been hydroseeded. An abundant population of *Phleum pratense*, Timothy, was found and treated near the Aramark bus washing depot. *Phleum pratense* is an invasive grass not yet common in Denali and previously had not been recorded in the front country. In 2004 it was found at the horse corral in Kantishna (Bauder, 2004). A patch of *Lupinus polyphyllus* was found at the pull out at mile 7 on the Park Road. *Lupinus polyphyllus* is similar in appearance to native lupines but is larger and with more leaflets. This exotic lupine had been previously found in Kantishna, but not in the front country of DENA (Bauder, 2004). All of the above ground plant material was removed but some of the roots remained in the soil. This area should be resurveyed next year.

Table 2. Exotic Plant list for 2005 survey at Denali National Park and Preserve

P= Park Road

H= Headquarters

K=Kantishna

PH = Parks Highway

F= First Mile of Park Road

Species	Common Name	General Location
<i>Bromus inermis</i>	Smooth brome grass	P,PH
<i>Capsella bursa-pasto</i>	Shepherd's purse	H
<i>Chenopodium album</i>	Lambsquarters	F

<i>Chrysanthemum leucanthemum</i>	Oxeye daisy	McKinley village
<i>Crepis tectorum</i>	Narrowleaf hawkbeard	F,H
<i>Descurainia Sophia</i>	Flixweed	F,H
<i>Erysimum cheiranthoi</i>	European stickseed	P
<i>Lepidium densiflorum</i>	Common peppergrass	F,H,P
<i>Lupinus polyphyllus</i>	Streamside lupine	P
<i>Matricaria discoidea</i>	Pineapple weed	F,H,P,PH
<i>Melilotus alba</i>	White sweetclover	F,PH
<i>Melilotus officinali</i>	Yellow sweetclover	McKinley chalet
<i>Phleum pratense</i>	Timothy	F
<i>Plantago major</i>	Plantain	F,H,P,PH
<i>Polygonum aviculare</i>	Prostrate knotweed	F,H
<i>Ranunculus repens</i>	Creeping buttercup	
<i>Sonchus oleraceus</i>	Annual sowthistle	McKinley chalet
<i>Stellaria media</i>	Common chickweed	H
<i>Taraxacum officinale</i>	Dandelion	F,H,P,PH
<i>Trifolium pratense</i>	Red clover	F,H,P,PH
<i>Trifolium repens</i>	White clover	F,H,P,PH
<i>Tripleurospermum perforata</i>	scentless false mayweed	Train depot, New to DENA
<i>Vicia cracca</i>	Bird Vetch	F,H

The revegetation technician and EPMT member Wendy Mahovlic and 14 volunteers surveyed and treated 48 miles of Park Road, from mile 40 to mile 15 and from mile 77 to mile 90. This effort gathered 310 pounds of *Taraxacum officinale* and took 376 volunteer hours to complete. Other volunteer control efforts were focused on treating *Crepis tectorum* at the sewage lagoon and surrounding area.

Revegetation with native seed collected by the re-vegetation tech and volunteers was also used to combat the impacts of exotics on newly disturbed lands created by recent construction projects. Denali has extensive experience with native plant restoration and these efforts have reduced the impact of exotic plants in the park. This year 11 volunteers devoted a total of 527 hours to collecting native seeds to be used in future

revegetation projects. Seeds collected in previous seasons were prepared and used to revegetate newly disturbed areas on the first mile of the park road (Mahovlic 2005).

Discussion

The continued and steady construction in the front country of Denali National Park and Preserve has provided the necessary land disturbance for exotic plant establishment. Coupled with the susceptible disturbed land of the roadsides and parking lots is the relatively high vehicle and foot traffic that brings in propagules from outside the park. Areas that were disturbed this year due to construction should be monitored closely at the beginning of the growing season in order to find new exotic plant sites.

This survey did not find any exotics migrating into natural areas. Yet, aesthetic impacts from *Taraxacum officinale* and *Crepis tectorum* and potential biological threats from *Melilotus alba* and *Vicia cracca* are ever present. Continual vigilance, education, and volunteer exotic plant control events seem to have a positive effect in limiting impacts to the park. The data collected in 2004 and 2005 and field seasons to come will help to evaluate if these current management techniques are indeed limiting the spread. Currently the greatest utility of the data collected is a guide to past infestation. Institutional memory about past weed problem is valuable, but can be lost with the movement of personnel. This yearly inventory provides the continuity necessary for effective control.

With current budgets and resources, prioritization of what species will be treated and by what means is necessary. *Taraxacum officinale* is pervasive throughout the front country of the park. Pulling all of the *Taraxacum* in the front country with current resources would be extremely difficult due to the extent of the infestation. A realistic approach of halting the spread of *Taraxacum officinale* further into the park is to continue to treat the outlying populations past headquarters all the way to Kantishna with the help of volunteers.

Investigations should be made into alternative mechanical treatments of the various abundant exotics. Hand pulling is effective for many exotic plants, but labor intensive and time consuming. Because of the short growing season, repeated spot mechanical treatment (weed eater) at the right time in the growing season, before seed set, might provide enough stress to the plant to negatively affect the population. This could be tried on the *Taraxacum officinale* along the first mile of the park road.

Control of *Melilotus alba* took top priority this field season. All populations found in the park were pulled during the flowering stage. Most of these populations were small (<10 plants), located along the George Parks Highway. Larger populations were pulled by volunteers which allowed more time for surveying new areas. Time efficient control techniques should be continually explored so as to allow sufficient time for a thorough inventory. Striking a balance between data collection and treatment was difficult. Not all of the identified disturbed lands were surveyed. The front country landing strip was not inventoried. The railroad corridor, which was not surveyed this year, runs inside the

eastern edge of the park and like the George Parks Highway, probably harbors exotic plant populations. This area could be surveyed in cooperation with the Alaskan Railroad as they perform track maintenance. This should only be attempted if it can be accomplished safely.

The revegetation of disturbed areas with native species is an important part of limiting the impacts of exotics at Denali. The more roadside areas that are covered with native plants, the less space there is for exotics to establish. *Taraxacum officinalis* and *Crepis tectorum* seemed to thrive in open, fully exposed areas and did not do as well when crowded out. This season's revegetation projects utilized seeds gathered from the park, tundra mats and plant material harvested from areas that were slated for construction. In addition to these plant material sources, greenhouse grown native plants may also help to revegetate disturbed areas. Container grown plants have the advantage of suffering less from transplant shock than salvaged plants. Plant material could be grown at local greenhouses (University of Alaska at Fairbanks) or a small facility at Denali could be constructed (Densmore, 2000). This solution, of course, is contingent on funding.

2006 Priority tasks

- Revisit all 2004, 2005 *Melilotus spp.*, *Vicia cracca*, *Crepis tectorum*, *Phleum pratense* sites.
- Set up either chemical or multiple mechanical treatments of sewage lagoon, possibly disking of *Crepis tectorum* before seed set.
- Revisit work completed along the gravel portion of park road with volunteer groups
- Thoroughly survey areas not surveyed in the 2005 field season; airstrip, railroad tracks, outlining campgrounds.
- Begin dialog with area lodges to prevent exotic plant occurrence at Denali's border. Schedule a workshop with lodge maintenance crews and investigate feasibility of a control event.
- Continue dialog with park and Aramark personnel about exotic plant prevention. Savage Cabin interpreter expressed interest in pulling *Taraxacum officinale* at cabin.

DANDELION DEVEG – 2005

Wendy Mahovlic
Denali National Park and Preserve

The Denali Park Road corridor is becoming increasingly infested with exotic plant species. *Taraxacum officinale* is the invasive dandelion species in the Park that is most obvious along the Park Road, including the gravel road beyond Savage check station. Dandelion Deveg 2005 was a volunteer project organized to try to limit the spread of the dandelion. The Reveg Tech recruited 14 people from all over the country to dig up dandelions on the East (Sable Pass – mile 40 to mile 15) and West (mile 77 to the Kantishna Airstrip – mile 90) ends of the Park. The project this year was accomplished in two separate sessions lasting four days each and accumulating 376 volunteer hours. At the conclusion of Dandelion Deveg 2005, we had destroyed more than 310 lbs. of dandelions along over 30 miles of the road corridor. We walked most of the sections of the Park Rd. that we were deveging. Uprooted dandelions were bagged and will be burned at the Sewage Lagoon, along with the Road and Trails brush pile in the winter of 2005.

SESSION #1: EAST END: June 7 – June 10, 2005. The spring of 2005 was about two weeks earlier than “normal” which also occurred in 2004. Most of the small dandelions were not in bloom from Sable Pass (Mile 40) to Savage Bridge (Mile 15), but the large ones were in flower. None of these dandelions had gone to seed at this time. At the Park entrance area, most all of the dandelions were in flower.

SESSION # 2: WEST END: June 13 – June 17, 2005. The phenology of the west end dandelions was the same as the east end – small dandelions were not in bloom but the large ones were in flower. There were three areas where some of the plants had already gone to seed – at the Horse corral; at the entrance to Denali Backcountry Lodge; and at the Kantishna airstrip. These areas have historically had terrible infestation problems.

Along the Park Rd. from Kantishna to the Front Country was visually inspected for exotics and mapped with a Trimble Geo Explorer III mapping grade GPS unit.

This is my seventh season doing the Dandelion Deveg and I have observed that most of the areas still exist with large populations of *Taraxacum officinale*, but the size of the dandelions and the number of them has decreased. Where there were small numbers of dandelions in the past, after eradicating them for a few seasons, they were gone. I have noticed that there are more very small dandelions in new locations along the Park Rd. Overall, I think that this program has been successful in that it has helped stop the spread of dandelions along the gravel portion of the Park Rd. If left to their own devices, the common dandelion would line both sides of the Park Rd. with their yellow flowers – from the Park entrance all the way to Kantishna.

RECOMMENDATIONS: Dandelion Deveg 2006 volunteers should be contacted in mid-April and work project plans finalized. With the assistance of the volunteer crew, every

dandelion from the Savage Box to the Kantishna Airstrip should be pulled before July 1, 2006. Though many of these dandelions will grow back in the following season, the goal at this time is merely to prevent existing plants from going to seed, and thereby prevent the problem from spreading any further. Time permitting; a “sweep” should be performed during the month of July to eradicate any late bloomers. This could be done with a few volunteers and the Reveg Tech by bicycle from Sable Pass to mile 15.

OTHER VOLUNTEER EFFORTS

Because other exotics are making a large impact on the Front Country area of Denali National Park, the Reveg Tech organized several weed pulling events. Most of these events were facilitated by the NPS intern, Leo Acosta.

June 6, 2005 – the *Taraxacum officinale* problem in the Park is at its worse at the Park Headquarters area. Luckily, a Utah family of 16 wanted to give back to the Park and through the Denali Foundation dug up dandelions for 3 hours. In that short amount of time, they were able to eradicate 310 lbs. of dandelions in the Headquarters and Permanent Housing areas.

June 21, 2005 – Camp High Harbor, a YMCA organization from Atlanta, Georgia has been coming to Denali and volunteering for a day for 3 seasons. This year they brought 18 volunteers and worked a total of 54 hours eradicating *Crepis tectorum* from the Sewage Lagoon. They were able to pull up 175 lbs. of that very invasive plant.

June 30, 2005 – The Department of Natural Resources brought 13 volunteers and worked a total of 91 hours pulling up exotics. First they eradicated 200 lbs. of *Melilotus albus* from the Parks Highway at mile 232. Then they pulled up 60 lbs. of *Crepis tectorum* from the Sewage Lagoon.

The *Crepis* problem at the Sewage Lagoon is getting out of hand. It keeps growing no matter how many times we pull it. The Pest Management specialist in the Park, Pat Owen, will organize an herbicide application next season.

The Reveg Tech and the NPS Intern spent 3 days pulling the *Melilotus albus* along the Parks Highway from Glitter Gulch (mile 239) to the McKinley Village (mile 231). We eradicated 200 lbs. of that very invasive plant.

The Reveg Tech and the NPS Intern found *Erysimum cheiranthoides* on the east side of the Giglioni Bridge (west of Sable Pass – mile 41) along the south side of the Park Rd. It took us 1.5 hours to rid that area of the exotic. We pulled 50 lbs. We found out about this infestation from a Park Service Road and Trails employee who drives that part of the road often. These employees are invaluable for such information, as they are out there everyday.

RECOMMENDATIONS: More large group volunteer efforts need to be organized in Denali. The problem is finding the groups. Contact the Murie Science and Learning Center for possibilities. Call the Boy Scouts and Girl Scouts of Alaska to see if they could offer help. Keep in contact with the current volunteer groups. The interpretive staff at the Savage Cabin expressed interest in pulling dandelions. Enlist their help.

NEED FOR SEED – 2005

In Denali, native plant seeds are collected every fall to maintain a seed bank for restoration and revegetation projects. The collection is stored in two freezers located above the Auto Shop. Seeds are collected every fall and taken to the Plant Materials Center in Palmer (907) 745-4469 to remove insects and debris. The cleaned seeds are picked up the following spring and placed in the freezer clearly marked with the species name, where it was collected and the date of collection. The seeds are used in revegetation efforts when they match the species at the revegetation site and were collected nearby. It is best to maintain genetic integrity where at all possible. For the past 6 years there has been an increased need for seed due to the MANY construction projects that have been occurring throughout the Park. Planting native seeds insures that non-native species won't occur and the proliferation of invasive plants will be minimized.

The Reveg Tech organized and supervised a volunteer effort to collect native seeds from August 9 – August 12, 2005 on the east end; and August 15 – August 20, 2005 on the west end.

East end: 9 volunteers from all over the U. S. (mostly Alaska) worked 245 hours. We gathered seeds from Mile 1 – Mile 13 on the Park Rd.

West end: 2 volunteers from CA and FL worked 82 hours. We gathered seeds from the Toklat area; Eielson area; Wonder Lake Campground area; and the Kantishna area.

Supplies of *Hedysarum alpinum*, *Oxytropis campestris*, *Agropyron sp.*, *Elymus innovatus*, *Calamagrostis canadensis*, and *Poa alpina* were collected to replenish our depleting stock.

RECOMMENDATIONS: Seed collection should be performed every season to maintain a good seed bank for the increasing amount of park projects. Seeds should be collected at the Park entrance area; at Savage Turn-around; at Toklat road camp and Visitors Center; at Wonder Lake Campground area; at the Kantishna area; and particularly at the Eielson area as a new Visitors Center is under construction. The DENA Revegetation Manual can be used as a guide as to which seeds are most successful to collect and sow.

EDUCATIONAL OUTREACH

This year the Reveg Tech put on two presentations in Denali. A group of 14 Denali Borough teachers were involved with the Murie Science and Learning Center teacher weekend. We discussed exotic identification; why exotics are a problem; native seed identification and native seed collection.

A second presentation was given to grades K – 5 at the Tri-Valley school in Healy, AK. They were taught the basics about exotics and identification of some of the most common ones in their area.

RECOMMENDATIONS: Organize a workshop for the local landscapers of the hotels in the area to identify exotics and make them realize how dangerous they are to the environment. Then organize an exotic pull on all the hotel properties utilizing the seasonal workers employed by the hotels.

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