

Exotic Plant Management at
Wrangell-St. Elias National Park and Preserve
Summer 2004 Field Season Report



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Introduction

The summer of 2004 marked the fourth year that baseline surveys for non-native plant species were carried out on National Park Service (NPS) lands in Alaska. These surveys serve as the first source of data to be used in formulating a long-term monitoring and control plan for these plant species in Alaska's NPS units. Exotic plant species are a concern to resource managers because they threaten the genetic integrity of native flora through hybridization (D'Antonio et. al 2001), can out-compete resident plant species for limited resources, and can change the structure and function of ecosystems through alterations of geochemical and geophysical processes (Ruesnik et. al 1995, Gordon 1998). By 1996, exotic plant species had infested an estimated 7 million acres of NPS lands, with 4,600 acres of new infestations occurring daily (NPS 1996).

Until recently, NPS lands in Alaska have been rather immune to the establishment of many pernicious exotic species found in the lower 48 states (Westbrooks 1998). Several factors have contributed to this immunity. The first is climate. Circumboreal flora are adapted to a wide range of climatic conditions that most exotic plants cannot tolerate. In addition, parklands in Alaska have remained relatively free of man-made disturbances that encourage the introduction of exotic species, such as livestock grazing, wildfire suppression, and altered hydrological regimes, and they still have all of the major floral and faunal ecosystem components (Densmore et. al 2001). Despite these protective factors, the threat of exotic plant invasion is increasing due to global warming and increases in human activity and development. Fortunately, the NPS has the opportunity to get a head start on exotic plant introduction in Alaska before it becomes a problem, but research and active management must begin now (Spencer 2001).

Wrangell-St. Elias National Park and Preserve (WRST) is unique among Alaska NPS units with respect to exotic plants for several reasons. Two factors especially lend to its vulnerability to invasion. First, WRST is the largest national park in the nation, and the terrestrial landscape is undergoing continuous transformation across a mosaic of successional stages in the colonization of areas recently exposed by glacial retreat. Second, there are several avenues for the introduction of exotic plants into the park. The Nabesna and McCarthy roads and associated settlements host established exotic plant populations, and the ATV trails spurring off these main corridors are likely recipients of future infestations. Most exotic plants are associated with areas of human activity, with roads and other forms of linear disturbance being the major vectors of introduction, particularly in parklands (Hall and Kuss 1989).

The Kennecott mine and its surroundings pose a problem in terms of exotic plant management. As development of and visitation to this area increases as planned, the potential for the introduction and spread of exotic plants in this area will grow. Changes in soil nutrient regimes, repeated disturbance of the topsoil, and the constant influx of propagules from vehicle and foot traffic will allow exotics to become established (Schmidt 1989). Also, the issue of "historic plants" presents a cultural dilemma in Kennecott. The towns of McCarthy and Slana present their own challenges. The threat of exotic plant introduction is encouraged by the influx of summer visitors, the escape of

planted ornamentals from private gardens, and ongoing maintenance activities which create new areas of disturbance that can facilitate the establishment of exotic species. Finally, multiple exotic plant species have gained a foothold at the new Visitor Center in Copper Center, and they have the potential to be spread by visitors to other areas of the park through recreation-related activities. Since exotic plants are likely to spread if disturbed areas are created by construction projects (Densmore 2001), ongoing construction around the visitor center will likely continue to encourage exotic plant establishment.

The purpose of surveys in WRST during the 2004 field season was to more accurately map out disturbed areas of the park and to update any new exotic plant introductions to the park since the last survey in 2003. Information on the status and number of exotic plant species in WRST will be used to help prioritize areas in the state and park for long-term monitoring and control of these species on Alaska NPS lands. Scientific species names were used throughout this report. Common names of the species can be found at the end of this report (Table 1).

Methods

Exotic species were identified using field guides (Pojar and MacKinnon 1994, Royer and Dickinson 1999) and texts (Hultén 1968). If an unknown species or species of unknown exotic status was encountered, several photos of the plant were taken and shown to botanical experts to help identify the plant.

The 2004 summer field season marked the first year that extensive surveys for exotic plants were conducted using highly accurate Trimble GeoXT GPS units. These units can achieve sub-meter accuracy and can be equipped with data dictionaries (Table 2) tailored to the unique needs of a research or monitoring effort. The units were used to map both infested areas and areas without exotic plants with spatial detail sufficient for year-to-year monitoring of spread. Within the framework of a nationwide database for exotic plants on NPS lands, a data dictionary was customized for Alaska with multiple fields used to describe the composition, size, and severity of exotic plant infestations in a given area (Table 2). A digital photo of each site and species was recorded in addition to a qualitative description of the area. If exotic species were found in sufficiently low numbers or strategic locations, they were removed by hand.

In 2003, an opportunistic survey of all park roads was conducted as well as surveys in other areas of anthropogenic disturbance such as parking lot edges, road pullouts and other developed areas. The settlements of WRST – McCarthy, Kennecott and Slana – were the focus of 2004 efforts, with particular attention paid to the distribution of white sweetclover (*Melilotus alba*). This plant has been rapidly spreading along the region's roadsides over the past two years and is a species of concern statewide due to its ability to spread into natural areas along riparian corridors. ArcGIS (ESRI 2002) software was used to generate shapefiles that include all GPS records, from which maps of survey results

were generated (see Slana_exotics_2004.pdf and McCarthy_Kennecott_exotics_2004.pdf).

Results

A total of 22 exotic plant species have now been documented in WRST (Table 2). The 2004 inventory revealed four exotic plant species new to McCarthy – *Thlaspi arvense*, *Eschscholzia californica*, *Linaria vulgaris*, and *Leucanthemum vulgare* – and two in Kennecott – *Allium schoenoprasum* and *Descurainia sophia*. *T. arvense*, *E. californica* and *A. schoenoprasum* were previously undocumented in WRST. General results are addressed below by site:

Copper Center

Thirteen exotic plant species were found growing around the Visitor Center: *Bromus inermis*, *Capsella bursa-pastoris*, *Chenopodium album*, *Crepis tectorum*, *Descurainia sophia*, *Lappula squarrosa*, *Lepidium densiflorum*, *Matricaria discoidea*, *Plantago major*, *Polygonum aviculare*, *Taraxacum officinale*, *Trifolium hybridum* and *Trifolium repens*. Fortunately, none of these species are new to the park. Exotic plants near Copper Center are limited to the road system, except for one *Taraxacum officinale* plant which Devi Sharp, WRST Chief of Resources, reported growing adjacent to a helicopter landing location near Klawasi mud volcano.

A large patch of *Melilotus alba* was found about a quarter-mile south of the Visitor Center on the west side of the Richardson Highway, between the entrance to the Visitor Center and the entrance to the seasonal housing area. All individuals were removed from this patch, enough to fill five garbage bags. Follow-up monitoring and retreatment of this patch are essential priorities for 2005.

Particular attention should also be paid to the presence of *Crepis tectorum*, which was observed at the Visitor Center and in small numbers at the seasonal housing area. All individuals were removed from both areas, totaling about 30 plants from the former and 11 plants from the latter.

Approximately seven *L. squarrosa* were pulled up around the Visitor Center.

Slana and the Nabesna Road

For the most part, the 2004 survey of Slana and the Nabesna road produced few surprises and was consistent with prior inventories. However, a *Melilotus alba* patch growing at the junction with the Tok cut-off road has expanded exponentially in the past year. During the 2003 survey, a population of 250 to 500 individuals was reported. In 2004, the population had grown to an estimated 10,000 plants. Furthermore, this species was discovered on a trail that connects to the Visitor Center Interpretive Trail, which terminates on the bank of the Slana River about a mile upstream from its confluence with the Copper River. This trail appeared to be frequently used by ATVs and other motorized vehicles that could potentially spread seeds further down the trail. This is the highest

priority species and site in the park, due to the threat posed to the entire Copper River basin. *M. alba* was also observed growing beneath a forest canopy in this area (but not in the park), which has not been reported from elsewhere in Alaska.

Over 400 pounds of *M. alba* were removed from the area just outside of the park entrance at the intersection of the Tok cut-off road and the Nabesna road. Additionally, all plants were removed from the trail that connects to the Visitor Center Interpretive Trail on its way to the Slana River. Plants growing in the understory of the forested area were also pulled. Due to the proximity of *M. alba* to the river, this area is considered high priority for future control events. There are still established populations along the Tok cut-off road, running both north and south of the Nabesna road. Due to the extremely invasive nature of *M. alba*, it will be impossible to prevent this plant from becoming established in this section of the park without regular monitoring and control events.

Crepis tectorum was also observed growing at the Nabesna road and Tok cut-off junction in 2004, despite that it was not observed on the Nabesna road or in Slana during 2003 except for one individual growing at mile 31 on the Nabesna road. These sites should be monitored, and plants found should be removed in 2005, prevent the establishment of a full-blown infestation similar to that of *M. alba*.

Capsella bursa-pastoris, *Lepidium densiflorum* and *Matricaria discoidea* were entirely removed from a campsite along the Slana River at the end of the Visitor Center Interpretive Trail. Approximately 100 plants total were pulled. This was the only site on the trail where these species were found, and it too should be monitored and retreated if necessary.

Overall, the Slana Visitor Center and the Nabesna road remain examples of medium-use areas that are relatively free of exotic plants. Except for one patch of *Descurainia sophia*, and sporadic patches of *Taraxacum officinale*, *Plantago major*, and *Matricaria discoidea*, the Nabesna roadsides are blanketed with only native vegetation, with exotics only located within 2 meters of the road edge. Nevertheless, due to the threat of *Melilotus alba* and *Crepis tectorum*, the many in-holdings on the Nabesna road (over 40), and the potential for invasive ornamentals to be sold at the local greenhouse, monitoring this area for exotic plants and controlling infestations found should be a continuous priority for the future.

McCarthy and the McCarthy Road

In McCarthy, four species were documented for the first time in 2004 and should be considered high priorities for monitoring, education, and control in 2005: *Eschscholzia californica*, *Thlaspi arvense*, *Linaria vulgaris*, and *Leucanthemum vulgare*. *E. californica* and *T. arvense* are species new to the entire park. *E. californica* was seen growing in a few yards, and in one location (by the outhouse across from the museum), it was apparently spreading outside the area where it was planted. This annual is considered an invasive exotic pest in Tennessee and is not known to spread into natural areas. Nevertheless, this plant easily colonizes areas of human disturbance and could potentially move into areas of natural disturbance.

T. arvense was found in only one location in McCarthy: the Wrangell Mountain Center's garden. *L. vulgaris* was found growing in the front yard of the Wrangell Mountain Center, and town residents reported never having seen this plant growing anywhere else. *L. vulgare* was found in the front yard of a private residence in McCarthy and was removed by the owners after an education event. These three species would make excellent candidates for eradication in McCarthy. Other exotic species growing in McCarthy and along the McCarthy road include *Bromus inermis*, *Capsella bursa-pastoris*, *Chenopodium album*, *Crepis tectorum*, *Lappula squarrosa*, *Lepidium densiflorum*, *Lolium perenne*, *Phleum pratense*, and *Polygonum aviculare*.

Most exotic species in the McCarthy district are limited to the road corridor and the town center, however *Trifolium hybridum*, *Trifolium pratense*, *Trifolium repens*, *Elymus repens*, *Bromus inermis*, and *Taraxacum officinale* were observed growing alongside McCarthy Creek. *T. officinale* and *B. inermis* appear to be spreading along the streambanks. Individuals of either species found upstream or downstream as outliers of the main infestation at the bridge should be controlled, and the entire area should be monitored to determine if they are indeed spreading into natural areas. *Trifolium repens*, *Taraxacum officinale*, *Plantago major*, and *Matricaria discoidea* were observed on the first mile or so of the Nugget Creek Trail off of the McCarthy road, and *M. discoidea* was also seen at a private cabin at the outlet of Copper Lake (Blain Anderson, pers. comm., 2004). Finally, an infestation of *Lappula squarrosa* that was controlled in 2003 at a pull-out at Mile 7 of the McCarthy road was monitored and retreated in 2004. The population was smaller than the year before and could be eradicated with regular monitoring and retreatment.

Kennecott

The Kennecott mine area and associated Bonanza Ridge and Root Glacier Trails were surveyed by foot. Most exotic species are confined to road edges, the mine area proper, and trails, although some species were found up to a meter into the forest understory on the Bonanza Ridge Trail.

Populations of exotic plants have increased in this area since the 2003 field season. In 2003, only *Taraxacum officinale* and *Trifolium repens* were observed along the Bonanza Ridge Trail, while in 2004, *Matricaria discoidea* was also recorded along the trail. *T. officinale* is spreading rapidly up the Root Glacier trail. In 2003, only a few patches were found on the trail, while in 2004, there were more patches along the trail and plants were found to be spreading to campsites adjacent to the trail. This species' furthest extent is just in front of the glacier itself, where there is plenty of open ground available for its establishment. All *T. officinale* plants on the Root Glacier Trail were removed, accounting for about 30 individuals.

The primary infestation of *Leucanthemum vulgare* in Kennecott, located on a hill downslope from the lower road across from the Recreation Hall, has grown substantially since last year. It was the target of a control event that removed four large garbage bags of about 700 plants total, although some plants had already gone to seed. There are still

plenty of *L. vulgare* plants left in the garden of the Kennecott Glacier Lodge, but unfortunately they are on private property. It should be requested of the lodge owner to rid the garden of this species, thus eliminating a seed source that could inundate Kennecott with white daisies.

Descurainia sophia was also observed in Kennecott, and although there is no previous record of it in this area, it is likely that it has been present for some time.

Whether some exotic plants present in this area are considered “historic weeds” is a question under debate. Species under historic consideration include *Allium schoenoprasum*, the invasive potential of which is unknown, and a species of rhubarb (currently unidentified) that has escaped from the historic town garden. Several people in Kennecott have alleged that rhubarb pioneers have spread far into the neighboring forest. Apparently, the growth is thick enough for the chef at the Kennecott Lodge to frequently cook rhubarb pies. Further investigation into the invasive potential of these two species is recommended, along with continued monitoring.

Other species recorded in Kennecott include *Bromus inermis*, *Capsella bursa-pastoris*, *Chenopodium album*, *Elymus repens*, *Plantago major*, *Polygonum aviculare*, *Trifolium hybridum*, and *Trifolium pratense*.

Education

This year the Exotic Plant Management Team program put on two presentations in WRST and hosted three control events. A PowerPoint presentation was given in Slana to 7 interpretive rangers. A second presentation in Slana preceded a control event that was organized to remove *Melilotus alba* from the park entrance. Other control events took place along the Visitor Center Interpretive Trail in Slana and the Richardson Highway in Copper Center. There is still a lot of room for education about exotic and invasive species in WRST. The park and local residents would benefit from presentations and events scheduled well before the field season begins in order to secure desirable time slots and to assist in event planning. Additionally, there is a need for more educational handouts, brochures, and ID booklets.

Discussion and Recommendations

In Wrangell-St. Elias National Park and Preserve, the majority of exotic plants were found on roadsides and trails or confined to areas that had been recently or repeatedly disturbed by humans. However, numbers and distribution of exotic plant species within WRST seem to be growing. Three exotic species new to WRST were identified since the 2003 survey. Repeated disturbance associated with road maintenance and other human activities has been perpetuating a favorable environment for the growth and spread of exotic species.

The size of WRST, the nature of exotic plant distribution in WRST, and the politics surrounding exotics in the park demand immediate attention. Recommendations include

assigning staff to monitor and control current populations of exotic plants in WRST and to prevent new introductions. Long-term efforts should focus on planning. Different management plans should be created to address each geographical area's particular situation, needs, and associated threats. Particular attention should be paid to any *Melilotus alba*, *Crepis tectorum*, *Linaria vulgaris*, *Leucanthemum vulgare* plants found growing within or near WRST. All of these plants are potentially invasive and are becoming problems at all of Alaska's park units. Safeguarding the park from invasion by *M. alba* is the highest priority in the short term.

High Priority Tasks for 2005

- An exotic plant management plan should be created for each park district.

Copper Center

- Monitor and retreat the site where *Melilotus alba* was controlled on the Richardson Highway near the main WRST Visitor Center. This is an early season priority.
- Control backcountry dandelions near the volcanoes.
- Continue to pursue ways to eradicate exotics at the Copper Center visitor center, especially through revegetation with native plants.
- Participate in community talks in the spring or fall (apparently the only time this would work) at the visitor center in Copper Center.
- Give an exotic plant presentation at the annual training in the beginning of the summer.
- Make a park specific exotics brochure.

Slana and the Nabesna road

- Monitor and retreat all *Melilotus alba* at the entrance to the Nabesna Road with special attention to the trail to the Slana River.
- Work with Vicki Penwell on establishing a native seed collection and revegetation program.
- Control *Descurania sophia* off the Nabesna road across from the Sportsman lodge.
- Revisit sites where *Taraxacum officinale* was observed on the Nabesna road in 2003, control the infestations early in the season, and monitor them later.
- Monitor and control *Crepis tectorum* at the entrance to the Nabesna road and at mile 31.

McCarthy and McCarthy road

- Schedule a talk with the Wrangell Mountain Center in McCarthy.
- Investigate the invasive potential of *Eschscholzia californica* in McCarthy.
- Monitor presence of *E. californica* and *Leucanthemum vulgare* in McCarthy. Control any plants that are not growing on private property.
- Obtain permission to pull the *Linaria vulgaris* and *Thlaspi arvense* growing on the property of the Wrangell Mountain Center.

Kennecott

- Obtain the permission of the owner of the Kennecott Glacier Lodge to control the *Leucanthemum vulgare* in the garden.
- Schedule short guided exotic walks with visitors in Kennecott. Megan, the interpretive lead in Kennecott, should be contacted to assist with this.
- Give an exotic plant presentation to Kennecott Student Conservation Association interns.
- Clear up the question of "historic weeds."

- Investigate invasive potential of *Allium schoenoprasum* in Kennecott.
- Identify the species of rhubarb growing in natural areas around Kennecott and investigate the invasive potential of the plant.

Table 1. Exotic plant list for 2004 surveys in Wrangell-St. Elias National Park and Preserve.

C = Copper Center Visitor Center

M = McCarthy and McCarthy road

K = Kennecott

S = Slana and Nabesna road

Species	Common Name	Location Description
<i>Allium schoenoprasum</i>	Wild chive	K
<i>Bromus inermis</i>	Smooth brome grass	K,C,M
<i>Capsella bursa-pastoris</i>	Shepherd's purse	K,C,M,S
<i>Chenopodium album</i>	Lambsquarters	K,C,M
<i>Crepis tectorum</i>	Narrowleaf hawksbeard	C,M,S
<i>Descurania Sophia</i>	Flixweed	K,C,S
<i>Elymus repens</i>	Quackgrass	K,M
<i>Eschscholzia californica</i>	California poppy	M
<i>Lappula squarrosa</i>	European stickseed	C,M
<i>Lepidium densiflorum</i>	Common peppergrass	C,M,S
<i>Leucanthemum vulgare</i>	Oxeye daisy	K,M
<i>Linaria vulgais</i>	Butter and eggs	M
<i>Lolium perenne</i>	Perennial ryegrass	M
<i>Matricaria discoidea</i>	Pineapple weed	K,C,M,S
<i>Melilotus alba</i>	White sweetclover	
<i>Phluem pretense</i>	Timothy	M
<i>Plantago major</i>	Plantain	K,C,M,S
<i>Polygonum aviculare</i>	Prostrate knotweed	K,C,M
<i>Taraxacum officinale</i>	Dandelion	K,C,M,S
<i>Thlaspi arvense</i>	Pennycress	M
<i>Trifolium hybridum</i>	Alsike clover	K,C,M
<i>Trifolium pretense</i>	Red clover	K,M
<i>Trifolium repens</i>	White clover	K,C,M

Table 2. Selected fields used in GPS data dictionary and GIS analysis for 2004 exotic plant surveys in Wrangell-St. Elias National Park and Preserve.

Field	Description
LocationID	Location Description (slana, nabesna_rd, mccarthy, mccarthy_rd, or Kennecott)
Taxon	Dominant exotic species
Phenology	Phenology of dominant exotic species (no flower, full flower, or in seed)
CvrClssPer	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
Dstrbncls	Disturbance Type (fill importation, ORV disturbance, mining, trampling, abandoned homesite, landslide, streambank, or postglacial)
Remarks	Remarks
AssocPark	Associated park (WRST)
Recorder	Recorder (CPM = Chris McKee, JAH = Jeff Heys, or PSB = Penny Bauder)
Taxon2, Taxon3	Additional fields for additional species at the same site

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