

Exotic Plant Management Klondike Gold Rush National Historical Park



Summer 2009

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ABSTRACT

In 2009 the Klondike Gold Rush National Historical Park (KLGON) worked with the Alaska Exotic Plant Management Team to control existing invasive infestations and prevent their spread through the park or into the nearby continental interior. In this sixth year of the program, park staff and volunteers devoted approximately 1000 hours, nearly double from last year, to managing the 49 exotic species found in Skagway and Dyea. 660 of those hours were spent manually removing plants on park land and in high risk areas near the park. The infestations controlled in the park this year covered approximately one-half of an acre while nearly one-tenth of an acre of previous infestations were found to be eradicated.

Some known infestations, including the white sweet clover at the airport, were found greatly diminished at the beginning of the season, while seven new exotic species were identified, and some known species were found in new areas. Discoveries of particular concern include the reappearance of toadflax (*linaria vulgaris*) in Dyea, the spread of ornamental jewelweed (*Impatiens glandulifera*) out of Skagway yards, and the perennial sowthistle (*Sonchus arvensis*) at the north end of town. Handling these infestations in future seasons will require additional control work as well as education and outreach to the private property owners harboring exotic species.

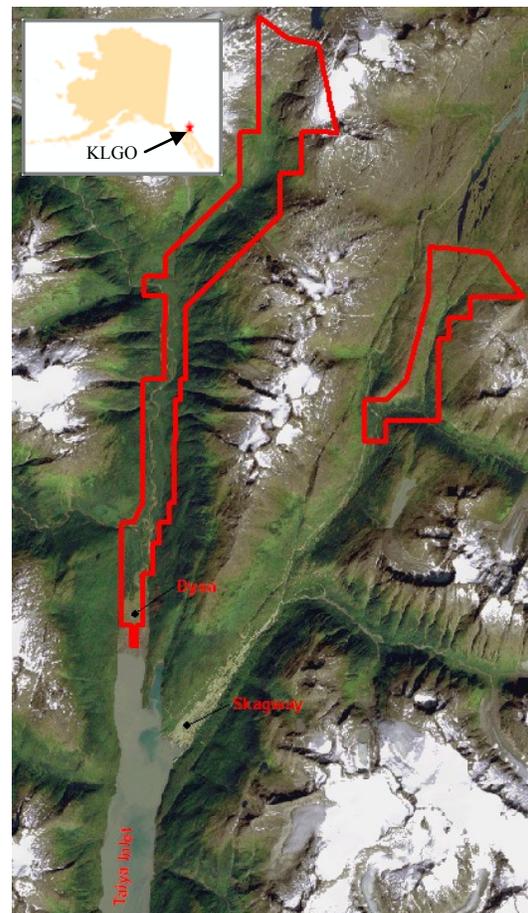
KEY WORDS

Exotic plants, Klondike Gold Rush National Historical Park, Survey, Control, Alaska

INTRODUCTION

The idea of controlling exotic plant species in Alaska as a natural resource management strategy is relatively new. With Alaska's pristine environment, relatively cold climate, and lack of human presence, land managers have been fortunate enough to avoid the headache that their counterparts in the lower 48 states have had to endure. However, increased development, high levels of intermodal transportation and a warming climate are making it more possible for exotics to thrive in the last frontier, and the lands managed by the Klondike Gold Rush National Historical Park (KLG0) are not immune. Many characteristics of the Skagway and Taiya river valleys, which house the park, may in fact make it particularly vulnerable to the introduction and spread of exotic species.

The Skagway and Taiya rivers flow into the upper Lynn Canal in northern Southeast Alaska, at the end of the Taiya Inlet (shown at left). The bustling tourist port of Skagway and the ghost town of Dyea are approximately three miles apart by air and nine miles by road, each occupying the bottomlands of their respective river valleys. With rapid elevation changes from sea level to over 4000 feet, the valleys contain a wealth of ecological niches from tidal flats to alpine, with the Chilkoot and White passes acting as rare glacier-free conduits between the coastal rainforest and the dry continental interior (DeLost 2004). Interspersed with, private, municipal and state-owned property, the park owns sections of the valleys, outlined in red at left, set aside by Congress to commemorate the Klondike Gold Rush. The historic Chilkoot Trail originates near Dyea and follows the Taiya River up to the Chilkoot Pass where the hiking trail enters Canada, while the motorized Klondike Highway connects Skagway to Canada through White Pass. Every summer, thousands of visitors from all over the world arrive in the Skagway port and traverse the park by foot, in cars, in airplanes, on horseback, on bicycles. Combined with the frequent road maintenance required to support the infrastructure for visitation, the tourism industry creates prime vectors for exotic seeds.



Park lands at local and regional scales.

So far, most of the non-native plant invasions have occurred in disturbed areas, in road ditches and through the transport of fill material. There are, however, locations where non-native plants are spreading into well-established native vegetation from disturbed sites. KLGGO has joined national parks across Alaska in implementing the first stages of exotic plant management – an accurate inventory, a regular monitoring plan, and a fast-acting treatment plan with long-term goals.

Focus

In 2009, the emphasis of Klondike Gold Rush National Historical Park's (KLGGO's) exotic plant management plan was the continued control of known exotic plant populations, especially in those areas of greatest concern in 2008.

On park land, the small patches of highly invasive large-leaf lupine (*Lupinus polyphyllus*), oxeye daisies (*Leucanthemum vulgare*), and toadflax (*Linaria vulgaris*) in Dyea were the highest priority but least time-intensive of the known infestations. After any new plants of these species were removed each visit, control work focused on the larger infestations of tall buttercup (*Ranunculus acris*) from June to mid-July, and creeping buttercup (*Ranunculus repens*) and common eyebright (*Euphrasia nemorosa*) through July and August. Neither of the Chilkoot Trail or White Pass park units was formally surveyed this year. However, the exotics on the trail were informally catalogued by EPMT staff on off-duty hikes, and one trip was made up the Klondike Highway to monitor the infestations of reed canarygrass (*Phalaris arundinacea*) reported in 2008.

As in previous years, control work outside of park property focused on particularly invasive weeds, including white sweet clover (*Melilotus alba*), oxeye daisies, reed canarygrass and bird vetch (*Vicia cracca*); and particularly high-traffic areas, such as the Skagway airport, railroad yard, and semi-truck parking lot at Main St. and Otter St.

Finally, park staff worked to educate Skagway gardeners and landowners. With a volunteer weedpull and a multi-week program with the Skagway Summer Camp, park staff hoped to inspire locals to manage the exotic plants on private and municipal property, *before* they become problems for the park.

METHODS

EPMT staff used previous reports and recommendations, adapted to this season's phenology and available labor, to prioritize work areas and species, select equipment and control methods, and manage personnel. Methods of mapping and data collection were taken from the Alaska Exotic Plant Management Protocol (Rapp 2009).

Defining Work Areas

To make planning control efforts and studying the data more manageable, the park and its surroundings were divided into six work areas. Results and recommendations in this report are divided by work area, and each area is mapped separately along with the primary exotic species for that section.

The six work areas are:

- 1) the Nelson slough restoration site (Appendix A);
- 2) the Chilkoot trail (Appendix B);
- 3) Dyea, which is all the area in Dyea except the above two (Appendix C);
- 4) the Dyea road from Skagway to the pavement in Dyea (Appendix D);
- 5) the town of Skagway (Appendix E); and
- 6) the Klondike Highway from Liarsville to the summit of White Pass, including the White Pass sector of the park (Appendix F).

The Nelson Slough restoration site is treated separately due to the high concentration of invasive species, while the Chilkoot Trail is separated by its relative inaccessibility. Highest priority was placed on eradicating infestations from park land in the first three areas, while the highest concern with the last three was to keep plants from spreading into the surrounding park and wilderness areas.

Prioritizing Species

Deliberation between KLGGO Natural Resources staff and Alaska Regional EPMT staff in 2006 resulted in a list of the following six high priority species: bird vetch, common tansy, white sweet-clover, oxeye daisy, yellow toadflax, and narrowleaf hawksbeard. These plants are all considered species of greatest concern in Alaska (Carlson et al 2004). Along with the species of greatest concern, common eyebright was recognized as a species of priority, due in large part to its limited distribution and recent appearance just outside of NPS owned land. In general, the order of their priority is as listed above, with smaller infestations with greater chances of effective control taking precedence over larger and more intractable patches.

Work in 2009 mostly reflected these guidelines, with focus also remaining on the small infestations of large leaf lupine controlled in 2008 and expanding to include the spreading ornamental jewelweed and newly-discovered perennial sowthistle. Additionally, the ubiquity of large yellow toadflax infestations in Skagway, particularly on private property, made it impractical to prioritize its control in town. The full list of exotic species identified by the park can be found, listed with common and scientific names, in Appendix G.

Tools for Identification and Data Collection

For plant identification, the primary field guides referenced were Flora of the Pacific Northwest (Hitchcock and Cronquist 1987) and Pojar and MacKinnon's 1994 Plants of the Pacific Northwest Coast (Pojar and Mackinnon 1994). In the office, Flora of Alaska and Neighboring Territories (Hulten 1968) was used to confirm identification. An online database, E-Flora BC (<http://www.eflora.bc.ca>), was used as an additional reference at the suggestion of Whitney Rapp. Most of the plants encountered were also available at the KLGGO herbarium. When KLGGO staff could not identify a species with these resources a specimen and photographs were sent to the regional office for consultation.

Spatial data on the exotic infestations were collected using two GPS units, the Juniper Systems Archer, and the Trimble Recon[®] with Trimble ProXT[®] and Trimble Hurricane

L1[®] antenna. Each of these units is accurate when strict data collection techniques and standards are followed. Trimble Pathfinder Office 4.0[®] was used to edit the data, then differentially correct positions with CORS Gustavus and SOPAC Whitehorse base station data.

In early September, collected data were sent to Whitney Rapp for entry into the National Park Service's Alien Plant Control and Management (APCAM) database. It was also converted to ArcMap[®] shapefiles for use in KLG0 GIS projects and the Alaska regional plant database.

Control Methods

The primary control method employed for exotics removal was hand-pulling, occasionally with small hand tools, which allowed for the most selective and low-impact control. The greatest concern with this method was that the entire root system be removed with the plant. Plants with just a single tap root pulled easily, but those with rhizomal root systems needed special care to remove the entire root system. Most of these plants can grow back from just a small portion of root left in the soil. This has been observed in previous years with common tansy and oxeye daisy, and is responsible for the persistence of the few remaining large-leaf lupine plants.

All removed plants were bagged on site, deposited in a Park Service truck, and then burned in the Skagway incinerator, which helped to ensure that any seeds collected with the exotic plants were not dispersed to other locations. To reduce the risk of dispersal and in consideration for park service maintenance staff, bags are no longer left in park dumpsters around Skagway.



Pulled plants overflowed park dumpsters, risking seed dispersal

The use of chemicals for control is not employed by the National Park Service in Alaska at this time. However, the Municipality of Skagway has asked the KLG0 Natural Resource Unit for assistance in the application of herbicide next season on municipal land in two cases – for the patch of bird vetch at 9th and Spring and for the infestations of Reed canary grass on the Dyea Road and the Klondike Highway.

Personnel

The plant phenology and the park's labor source both changed from last year, requiring particular effort to match the available work crews with infestations that needed the most work. The hot dry early season led to slow growth of some high-priority infestations, so these sites were monitored while control work focused on infestations that went more rapidly to seed. Last year's system of hiring SAGA crews for week-long periods was not available, so the park found local volunteers and hired park staff from other divisions on their lieu days. Work was sporadic and sometimes short-notice in the beginning of the season, but by the end of July regular crews of three to five people were pulling at least twice a week. Hiring these regulars contributed to the program beyond their logged

hours-as they learned the plants, some discovered new infestations while off-duty, while others helped to educate the community through their interpretive work.

RESULTS

As shown in Table 1 below, the total amount of time spent on exotic plant management in 2009 was nearly 1000 hours, an increase from 600 hours in 2008. The work hours can be broken into three categories: (1) Control work, which consists of all removal work, including time donated by volunteers; (2) GIS and GPS work, which includes mapping infestations, uploading and editing rover files, and managing GPS units, as well any survey time or follow-up visits that did not involve control work; and (3) Office and administrative tasks, which includes data management, research, report writing, planning, outreach, training, and travel.

Table 1. Exotic plant management work hours by category

Work Category	Hours
Control	660
GIS/GPS, Inventory, Monitor	137
Other (Administration, outreach, etc.)	221
Season Total	1018

The park also tracks control work by acreage, measuring the season's accomplishments against goals set for the exotic plant management program in accordance with the Government Performance Results Act. The park sets goals for the acres of previous infestations found to be eradicated, the size of infestations that are being controlled, and the acreage of the plants actually pulled. As shown in Table 2, below, the results for 2009 matched or exceeded each projection for the season.

Table 2. Results by acreage of control work, compared to GPRA targets

Metric	Projected	Actual
Acres eradicated	.1	.1
Acres of controlled infestations	.6	.6
Acres treated (plants pulled)	.5	.7

The acreage for plants pulled is larger than the infestation acreage since many of the infestation sites were revisited, and new plants pulled, throughout the season. The result for this final metric was originally recorded as less than half an acre, because the repeat visits were noted in the time log but not remapped with the GPS unit. A comparison of the time log and the maps at the end of the season made it possible to calculate the acres controlled on repeat visits and yielded the more accurate totals above.

On a smaller scale, the results are addressed by work area in the following sections.

Nelson Slough Wetland Restoration Site

Native plants in the restoration site are thriving despite the continued presence of red, white and alsike clovers (*Trifolium pratense*, *T. repens*, *T. hybridum*) and reduced patches of tall buttercup and common eyebright. The clovers, along with dandelions (*Taraxacum officinalis*) and common plantain (*Plantago major*) covered most of the ground between the native lupine and iris, but these bare spaces were fewer than last year and by mid-summer were mostly shaded by the much taller natives. Several patches of eyebright that had been mapped around the restoration area in previous years did not reappear this season – these potential eradications are shown on the map in Appendix A. The restoration site was checked at least weekly for new invasives, and any flowering common eyebright along with small patches of tall buttercup were pulled whenever they appeared.

The dandelions, plantain and clover species were not a focus of regular control work due to their ubiquity at the site. They are all easily identified, however, making them the ideal plants for a large group of young volunteers like the Skagway summer camp to pull. The 10 eight-to-twelve year olds spent three Thursday afternoons in June rooting out these plants in the restoration site. Control efforts were diverted elsewhere by August, when the lupine and iris were growing so thickly that in some places workers would have had to trample natives in order to pull the invasives.

Chilkoot Trail

The Chilkoot Trail has not been formally surveyed since 2006, when dandelions, sheep sorrel (*Rumex acetosella*), tall buttercup and clover were mapped. No official survey occurred this year for logistical reasons, but as in 2007 the site was opportunistically surveyed in August by hikers familiar with the exotic species of the area, and the results are shown in Appendix B. On August 15th, EPMT staff on a recreational through-hike mapped small infestations of dandelions in the first few miles, and reported more north of Sheep Camp. Another EPMT worker on a separate hike identified a patch of tall buttercup near the Sheep Camp Ranger station, which the trail crew subsequently removed. Sheep sorrel and clover were not found, though it may simply have been too late in the season to see them.

Dyea

The Dyea area continues to be the focal point of exotic plant management in the KLGO. It is the most heavily used and accessible natural site in the park. Except for dandelion and one or two species of lesser concern, the exotic plant populations lie in disturbed sites adjacent to roads.

Species of particular focus last year, the large leaf lupine, common eyebright and the oxeye daisy, were found greatly reduced at early and mid-summer, and some patches appeared to be locally eradicated. These sites were monitored regularly for new growth throughout the season, and the remaining and eradicated infestations are shown in Appendix C.

A few stems of large-leaf lupine reappeared every few weeks and were immediately controlled. No plants went to seed, and no plants were found outside of the two patches discovered last year. The area where oxeye daisies were recorded last year in the Dyea townsite was carefully monitored, but they never reappeared. Patches previously documented at Matthew's Cabin, the Chilkoot Trail Outpost Lodge, and the raft pullout, but not seen last year were reconfirmed as eradicated (and are labeled separately in Appendix C). However, new patches were found on the dirt road south of the townsite and were pulled while flowering – again, none appeared to go to seed. The new patch of toadflax, also mapped in Appendix C, was treated in the same way with no plants going to seed.

The approach to the common eyebright evolved over the summer. Last year's report concluded that mechanical removal of the plants only encouraged more to grow, while hand-pulling the tiny plants was more work than it was worth. Because of these results, the authors did not recommend attempting to control common eyebright in 2009. However, when the eyebright became visible near the end of the 2009 season, most infestations that were treated last year had shrunk considerably, and some were gone altogether. It might have been the weather, but it may also mean that last year's control efforts were more worthwhile than previously suspected. This possibility of successful control and the relatively manageable size of the infestations seemed to justify some manual control this season. Small crews spent three days removing all plants visible from several of the smaller infestations and pulling flowering plants from the edge of the large infestation by the dog camp parking lot. Crews couldn't pull further into the center of this infestation without risking the many juvenile *Buffo borealis*, a native and increasingly rare toad species, discovered among the eyebright plants.

Lower-priority species were controlled early in the season while the above infestations were being monitored. Much time was devoted to controlling tall buttercup south of the townsite, and along the road in Dyea, with success in removing some patches and reducing the extent of others. Later in the season, the creeping buttercup along the road and a new infestation at Lost Lake were effectively pulled by hand with crews of three or four people. The slender cinquefoil found in the townsite last season, and identified as a weed in consultation with Hulten's [Flora of Alaska and Neighboring Territories](#), reappeared and was controlled over a few weeks in 2009. (At the end of the season it was noted that Hulten's diagnoses are often out-of-date, and that the E-flora BC database categorizes slender cinquefoil as a native.) The unknown knotweed species on the tidal flats, mentioned though not mapped in last year's report, was not relocated. Finally, the species identified in last year's survey of exotic grasses were not remapped this year.



Pulling creeping buttercup at Lost Lake

Dyea Road

The land along Dyea Road is not on park property – in fact, much of it is or is regarded as private property – so in the past park staff have only surveyed in transit and controlled the highest-priority species in limited areas. This year the first few miles from Skagway were also surveyed by bicycle, which made it easier to spot and quickly remove small infestations. Results of these surveys are mapped in Appendix D.

As in previous years, the results from the opportunistic 2009 surveys of this section emphasize how the road can act as a conduit for plants introduced in Skagway to reach park lands. Toadflax, for instance, is common in Skagway gardens, was spotted further and further along the Dyea Road over the last few years, and appeared along a path in Dyea in 2009. This scenario could repeat itself with more highly invasive plants. One possible candidate is perennial sowthistle, currently not found on park land but located in 2009 just outside Skagway at the beginning of the Dyea Road. Thus the most invasive plants, particularly those that are unknown or infrequent in Dyea, seemed to merit control, and this season oxeye daisies, toadflax, and a single patch of common tansy were monitored and pulled whenever time permitted. Narrow-leaf hawksbeard and tall buttercup were also monitored, but due to their high numbers, control focused on the stretch of Dyea Road, north of the ranger station, that is nearest the park. Finally, the lower-priority species sheep sorrel, common plantain, dandelions, both red and white clovers, and pineapple weed, were seen but not exhaustively mapped or controlled.

New small patches of toadflax were spotted, and pulled, outside the patch seen in a private garden last year, and seems well on its way to becoming as common as tall buttercup along the Dyea Road. The two large patches of oxeye daisies seen last year have also continued to spread from the private properties where they were originally planted. The one nearest Dyea, located at the curve past the shooting range, had spread to the untended ditch alongside the road. These were pulled late in the season as they were going to seed. The second patch was not pulled by park staff as even the plants in the right-of-way seemed like they were tended by nearby property owners. Smaller patches of one or two oxeys were also found along the paved section nearest Skagway, and were controlled as they flowered.

The patch of reed canarygrass found last year at the edge of the paved section was mapped but not hand-controlled this season, as the Skagway municipality expressed interest in partnering with the park to treat the infestation with herbicide. The municipality did not apply herbicide this year but will consider it again next year with finalization of the Regional Exotic Plant Environmental Assessment. Meanwhile, the patch doesn't appear to have grown from last year, and no other infestations were found.

Skagway

Skagway is known as the garden city, and with gardening can come many exotic plants with the potential to escape and grow where they are not wanted. This is currently the case in Skagway where exotics have become an overwhelming problem. A concerted

effort between the park, local government and residents would be necessary to address the underlying causes of the problem: private gardens where exotics are planted but not contained, and disturbed or bare soil on public property where spreading plants can establish themselves. With so many existing infestations, however, the goal for the park in past years and in 2009 was to contain the problem: to stop the spread of exotics to park and wilderness lands outside of town, by controlling the most highly invasive plants in high-traffic areas. These priority areas and species are mapped in Appendix E.

The surveys of Skagway this season showed that the town continues to be a font of new and well-established weeds. Seven new species of exotics were identified and some of the most aggressive species from previous years, such as ornamental jewelweed and perennial sowthistle, were found outside their former locations. Five of the species of concern identified in 2006 – narrowleaf hawksbeard, yellow toadflax, oxeye daisy, bird vetch, and white sweet-clover – were observed last year and reappeared this season. The sixth species of concern, common tansy, also turned up again in several back yards after not being seen in Skagway for two years.

Though greatly reduced from last year, particularly along the riverbank, white sweet-clover persisted down the center medians of the airport, on both sides of the fencing, and sparsely around the terminal and parking lot. Toadflax covers much of the same area, as well as parts of the river bank and the airport medians farther north. The local volunteer day with the Taiya Inlet Watershed Council and a SAGA crew, another day with just a SAGA crew and a morning with a Boy Scout troop were the large-scale efforts to pull all the sweet clover, yellow toadflax, and some isolated oxeye daisies from the airport areas, as well as the nearby semi-truck parking lot by Otter Way. Potentially because of the dry, hot weather, the white sweet clover covered a much smaller area at the beginning of the season than in previous years, and the large crews were able to remove most of the



SAGA volunteers pull white sweet clover on the airport

plants along with lower-priority narrow-leaf hawksbeard and tall buttercup. However, follow-up crews in late July and August found many white sweet clover and yellow toadflax plants sprouting, in new areas farther north as well as places that had already been controlled that year. Around 75% of these had been controlled by mid-August, but the resprouting continued as monitoring and control work wound down. Two isolated plants of an unidentified aster species were also seen while controlling white sweet clover, and a specimen was collected for post-season identification.

The railyard infestations of white sweet clover, however, remained much smaller than last year's, and were controlled regularly by small crews who also pulled oxeye daisies, toadflax and narrowleaf hawksbeard in the area. The oxeye daisies were more numerous than the very small group found last year, and were found much farther south along the railroad at the trailhead for the Devey Lakes System. However, the toadflax in the dry creek bed by the railyard was again the least manageable infestation in the area, especially as the plants began to flower while still in the practically ungraspable rosette stage.

Additionally, the perennial sowthistle found only in one spot in this last year has now been located throughout town, in many place where it may have been previously misidentified as the less invasive narrowleaf hawksbeard. A few plants were found and controlled near the Hunz property on the Klondike Highway just before the turnoff to Dyea. However, the largest infestation was found just outside the airport fence at the north end of Alaska Street, where the plants were already in seed and so brittle that it was difficult to touch the plants without dislodging the fluffy seed heads. EPMT staff pulled only at the edges of this patch, leaving most of the plants in place to avoid inadvertently spreading the seeds. The infestation is therefore expected back in greater numbers next season.

Outside these high-transit areas, two infestations from last year were of particular concern: the ornamental jewelweed planted at Dedman's photography shop and the bird vetch on municipal property at 9th and Spring Street. Both species are highly invasive and currently found only in town, great reasons to control them as soon as possible. Unfortunately, little progress was made this season with either species. The owners of last year's patch of ornamental



Ornamental jewelweed and its exploding seed pods are invading Skagway

jewelweed will not permit the park to remove it, and a new patch was found spreading from a private lot several blocks north on 20th street.

This patch was removed with the permission of a tenant on the property, but was found late in the season and may have already gone to seed.

Like the reed canarygrass on the Dyea Road, the bird vetch was considered by the municipality for an herbicide treatment that could not be completed this season but is planned pending the environmental assessment for 2010. When it was clear that chemical control would not occur, one attempt was made to remove the entire patch of bird vetch and the seed bank in the top several inches of surrounding soil with shovels. Much of the vegetation and soil in the main open section of the infestation were successfully removed, but the plants had also spread into the brush in the surrounding woods. Here shovels were completely ineffective, and hand-pulling not worth the effort, as the plant's long-running

weak root system makes it difficult to remove the whole plant and prevent it from resprouting. Though over 100 pounds of material were removed from the site, half or less of the patch was controlled. The effort mostly reinforced the lesson of previous years, that manual control is inadequate for removing this species.

The oxeye daisies on the south side of Otter Street reappeared, and the ones in the right-of-way were controlled along with a few stems of narrowleaf hawksbeard. Several patches of oxeyes were also seen within the fenced-off private property and mapped from a distance. While not yet taking over the fenced-off meadow, they are likely to continue to spread, so as noted last year the right-of-way should be monitored for new growth.

A late season survey of the Pullen Creek meander installed last year turned up several exotics never before seen in Skagway, and confirmed last year's impression that exotic plants were dominating the willows and grass planted on the newly constructed streambank. Black medic, black bindweed, and tall tumble-mustard were all identified as new to Skagway, along with new infestations of the previously documented species white sweet clover (removed during the survey) prostrate knotweed, night-flowering silene, splitlip hempnettle, narrowleaf hawksbeard, creeping buttercup, shepherd's purse, lambsquarters, red and white clovers, common plantain and pineapple weed. The black bindweed and white sweet clover were identified as the highest priorities and all plants seen were pulled.



Black bindweed, newly discovered at Pullen Creek

Park staff also walked the streambank with an intern for the Taiya Inlet Watershed Council, who oversaw the construction of the meander, and provided an illustrated and prioritized list of the exotics identified there. The watershed council, who had thought they were purchasing weed-free fill, is arranging for volunteers to pull the remaining weeds throughout fall 2009, and will work with a high school intern this winter on a long-term plan to replace the invasives on the meander with native plants appropriate for a riparian area.

Finally, a few species of lesser concern were newly-identified in Skagway: stinking chamomile, corn chamomile, common pepperweed and narrow-leaved collomia were all found along North Alaska Street. The sites were mapped for monitoring in future years, though none of the species are expected to aggressively invade.

Klondike Highway

Due to time constraints, a comprehensive survey of the Klondike and White Pass Unit was not completed this year. However, the reed canarygrass on the highway both inside and outside the park was remapped, as shown in Appendix F, with the hope that the

Skagway municipality can treat the infestations with herbicide next season. All four infestations remained from last year, but no others were spotted.

A single opportunistic visit to the Liarsville and quarry roads off the highway revealed large swaths of white sweet clover, possibly spread from commercial traffic out of Skagway to these roads. Perennial sowthistle, narrow-leaf hawksbeard, toadflax and several lower-priority species were also mapped on these roadsides, while the unidentified aster spotted as a single specimen on the airport was seen in greater numbers here. The infestations may be beyond the park's ability to control, but provide still more incentive to keep exotics in heavily traveled areas of Skagway from going to seed.



Reed canary grass, Klondike Highway mile 11.5

Outreach and Education

The park held two large-scale volunteer weed-pulls this summer. In late June, thirty park staff, local volunteers and traveling SAGA crewmembers removed over 400 lbs of invasives from the airport in one morning. The Taiya Inlet Watershed Council arranged lunch donated by a local restaurant, and the park thanked volunteers with invasive plant booklets and a commemorative t-shirt from a Skagway screen-printing shop. The volunteer efforts extended beyond the day's work – several locals now pass on sightings in the town and park of the weeds they'd pulled at the airport, and one participant continued to pull weeds with the EPMT staff throughout the season. In late July, the SAGA crew returned for a full day's work at the airport, incorporating removal of invasives for the park with a week-long restoration project with the watershed council. Partnership with TIWC continues as the volunteer organization will be holding a third weed-pull this fall to remove invasives identified by park staff from their stream restoration site at the Pullen Creek meander.

The Skagway Summer Camp learned and worked with the Klondike EPMT staff through Devoted to Dyea, a program coordinated by the park's education specialist and funded by a National Parks Foundation grant. Once a week throughout June, the small group of 8-12-year olds would come to Dyea, learn something new about the area ecosystems, and spend part of the afternoon identifying and removing invasive plants. At the end of June, the campers put together a



Campers prepare to race for nutrients in a game explaining challenges for native plants in an invaded ecosystem.

booth at the Junior Ranger festival to show their work and educate visitors about exotics in Dyea.

The arrangement for park staff to pull weeds for overtime also had a successful educational component, as the rangers provided native and exotic plant information to visitors and scouted for new infestations on their hikes and walking tours. Since nearly a dozen staff members participated in the program, even a commitment to casual observation greatly expanded the surveying capabilities of the EPMT program - the creeping buttercup at Lost Lake and a patch of tall buttercup on the Chilkoot Trail were both discovered by park staff that had pulled weeds this summer. Since they were also consistently productive and hard-working, the park staff on overtime accomplished more for the program with the same amount of money usually used to hire SAGA crews.

There was no coordinated outreach to private land owners with exotic plants, and individual encounters yielded mixed results. The owner of the ornamental jewelweed at Dedman's in Skagway firmly reiterated her affection for the plant, as did the gardener of one of the oxeye daisy patches on the Dyea road. Both expressed skepticism towards the idea that the plants could compete with native vegetation. However, the church at 10th and Main removed the toadflax from the grounds when a church member who worked for EMPT this summer pointed out the plant's invasive potential.

RECOMMENDATIONS AND PLANS FOR THE COMING YEAR

Recommendations are given separately below for control, outreach and GPS work. However, a general recommendation based on this year's planning experience is to revisit the priority species outlined in 2006. So many new species with comparable invasive potential have been discovered since then that using the 2006 framework to plan a season may no longer be appropriate. Formally laying out a new set of priorities could also be an opportunity to decide on best practices specific to KLGO that may not have been specified by the regional training. Are there species that are such low priority that can be noted as present in a work area, once, then regularly not mapped? For what species and areas does this apply? Where is it ok to search for only one plant, and where is it important to be exhaustive? The guidelines and priorities could be checked occasionally to make sure they still fit the weather and phenology of the season, but having them made explicit could help keep data collection consistent and save everyone time. This would also be a great opportunity to learn about and incorporate an upcoming regional staff project to rank newly-detected invasive species.

Control

Dyea

The highest priority in Dyea should be given to any reappearances of large-leaf lupine, with great care taken to track down and remove as much of the rhizomes as possible. The

sites will require a few follow-up treatments toward the end of the season to remove the new, smaller plants that will have grown from the remaining rhizomes.

The second priority should be to monitor the oxeye daisy locations, both where they were seen and pulled in 2009 and where they were controlled in previous years but didn't return this season. Because oxeye daisy is rhizomal, care is needed to remove the entire root mass to prevent it from re-sprouting. The search of all roadsides and disturbed areas should continue to determine if these plants are extending their range.

Once flowering starts near the end of May, conduct weekly pulling treatments of the narrowleaf hawksbeard and any common tansy occurrences that may reappear. The narrowleaf hawksbeard pulls very easily – if grasped at the base of the flowering stalk the complete root will come out most of the time. The single patch of slender cinquefoil should also be regularly revisited in hopes of eradicating the infestation. When work is completed on higher-priority species in the park, time can be devoted to removing the patches of creeping and tall buttercup, especially if monitoring suggests that the work in 2009 was effective in reducing the infestations. In particular, the new patch of creeping buttercup at Lost Lake should be treated first because of its arrival in a less disturbed area. Additionally, the undisturbed areas in the tidal flats should be searched for more small patches of tall buttercup, as well as any reappearance of the unidentified knotweed species from 2008. These should take priority over the larger buttercup infestations by Nelson Slough.

The reduction in common eyebright from last year suggests that it's worthwhile to remove the species from its various locations, with priority going to complete eradication of the small, scattered patches, especially those in high-traffic areas. The reduced extent of areas mapped in 2009 may have been due to the unusually hot, dry weather, so it makes sense to consult maps of previous years and prepare for a resurgence of these infestations. The optimal time for control would be in mid July and early August once they have grown to a manageable size and begin to flower. Hoeing could be considered as a method of removal for small infestations. Manual control of particularly large patches may not be a good use of time at this point, but they should be mapped carefully in order to assess the rate of expansion from previous years. In general, common eyebright control should be given lower priority until removal is more efficient, or it becomes more clearly detrimental to surrounding vegetation.

Finally, it would be interesting to build on the exotic grass tutorials conducted in the park in 2008, to prioritize the species found and work towards their eventual eradication from the park. Though no species were mapped, the 2008 report listed quackgrass (*Agropyron repens*), smooth brome (*Bromus inermis*), common timothy (*Phleum pretense*), and foxtail barley (*Hordium jabetum*). Though the extent of each species in the park should be determined before prioritizing removal, it might make sense to start with foxtail barley, which with a ranking of 63 is the most invasive grass found last year in Dyea.

Nelson Slough

While the restoration project in the Nelson Slough is ever more successful, the dilemma of control work in the restoration site remains: removing exotics from in-between transplants only opens up the space for the seed bank to germinate and for the encroachment of other exotics. Currently the most established exotics are the red and white clovers, with small patches of common eyebright and tall buttercup. The eyebright, buttercup and red clover will be controllable with regular pulling, while removal of the smaller and less aggressive white clover is a less effective use of time. As recommended last year, control of these species would be more effective if followed up by transplanting natives or applying some of the lupine and iris seed collected in 2006.

Chilkoot Trail

So few invasive species were seen on the Chilkoot Trail this year that it doesn't seem efficient to allot time purely for a survey hike. It does make sense to inform park staff or enthusiastic visitors hiking trail of species they might see, and ask them to report any sightings. Such requests are an excellent opportunity to distribute some of the park's overabundance of invasive plant booklets.

Dyea Road

The best work the park can do on the Dyea Road may simply be to reach out to the property owners. While some species on unambiguously public property can be controlled, they can't be eradicated if nearby residents keep planting, but not containing, them. Information about the invasive potential of oxeye daisies and toadflax might be alienating on its own, but could be paired with seeds of similar native alternatives like alpine daisies and Unalaska paintbrush (or even less invasive exotics like Shasta daisies). However, some people may be uninterested in having their exotic plants removed, and care is needed not to overstep the park's jurisdiction.

At the same time, all efforts must be made to keep the most highly invasive plants from spreading to the park in Dyea. Park staff should assist the municipality with applying herbicide to the Reed canary grass, control any oxeye daisies and yellow toadflax in the right-of-way, and pull narrowleaf hawksbeard, as time allows, near Dyea. The roadside should continue to be monitored throughout the coming years, and certainly anytime park biologists drive to Dyea, they should be keeping an eye open for new exotic occurrences. A bicycle survey at least once a season will help to find infestations difficult to see from a car window.

Skagway

As on the Dyea Road, education will be an integral part of effective future exotic plant management in Skagway, but control work should continue to focus on preventing the spread of the most invasive plants outside of Skagway. The spread of white sweet clover to roads off the Klondike highway, shows how challenging this can be, but should be a reminder of the continued vigilance necessary to keep this species as limited as possible in heavy transit areas. As always, concentrated work on the white sweet-clover around the airport is necessary to prevent seeds from attaching themselves to planes, people, and luggage headed to other Southeast Alaskan communities. This continues to be an ideal

job for groups like the SAGA crew and any other powerful volunteers. Also, eyes should continue to be kept open for this plant along the roadways and railways going out of Skagway to help minimize its spread.

The bird vetch could be eliminated with the use of an herbicide. Manual methods can prevent the plant from going to seed and from growing out of control but will not result in eradication. Park staff should assist the municipality as much as possible to control this infestation.

Common eyebright was documented on the Haines airport in 2008 by Whitney Rapp, and others have reported seeing it in different locations around Haines. While it was not found on the Skagway airport in 2009, with the frequent air traffic between Skagway and Haines, keeping an eye out for eyebright and any new species on the airstrip will help catch infestations before they are on the scale of the white sweet clover. The railroad yard should be surveyed with similar diligence. The piles of gravel are a source of frequent oddballs like the poppy found in 2008 and an unidentified geranium-like plant in 2007. It may be that people are tossing old plant materials here.

Monitoring the invasives identified at Pullen Creek this year and pulling the most aggressive species, like white sweet clover, will be necessary to keep the infestations from getting out of control. Park staff should also support the Taiya Inlet Watershed Council in their work to eliminate the invasive species at the Pullen Creek meander, and at other restoration projects they undertake. Their help with community outreach and their enthusiasm for learning about the Pullen Creek weeds suggest great potential for continued partnership between the council and the park.

Klondike Highway/White Pass

Clearly greatest priority in the White Pass Unit should be given to monitoring the Reed canary grass and searching for new infestations. To this end the walking survey of 2008 should be repeated, and a survey from the train may also be useful. Species of concern such as the narrowleaf hawksbeard and perennial sowthistle seen on the Klondike Highway should be removed whenever possible. Monitoring of the White Pass railroad line should be conducted again in 2010 to assess any new invasions, and most importantly, anytime someone rides on the train they should look for white sweet-clover along the tracks. It would be a shame to see a population established along the railroad tracks and then move its way down to the river where the worst effects of white sweet-clover would manifest themselves.

Outreach

Outreach pays dividends well beyond the hours of the presentation or the volunteer day. In a place, like Skagway, where the exotic plants outstrip the ability of park staff to control them, connections between the park, land owners, and any potential volunteers are vital. The volunteer weedpulls held over the last couple of years have been a growing success and should certainly be repeated once. If labor is available to plan them, it may

be worthwhile to hold two a season, both to accommodate the phenology of a wider range of invasives and to draw people who hear about but cannot make the first one.

The refreshments and T-shirts provided this year played a large enough role in the appeal that they should be repeated in some form if at all possible. Drawing from the previous years' advertisements, designs, and educational materials will save time. One adaption suggested by this year's experience would be to provide each group of volunteers a bouquet of the invasives that they will be pulling, since providing only photographs of the plants caused considerable confusion.

Outreach to individual landowners could also be a much more consistent and systematic part of the EPMT program. Efforts were made this year to note waste sites and untended lots in town that continually sprout new infestations, and a map showing these sites along with their owners and nearby high-priority exotics can be found in Appendix H. Next year's work could build on this information by contacting the owners of the properties, perhaps in partnership with community-rooted groups like the watershed council, the sustainability council and the garden club, to offer supplies and volunteer work for restoring these sites.

Restoration

The past several reports have emphasized that removing invasives leaves behind more bare and disturbed soil for plants to colonize, and recommended reseedling the sites with natives. However, restoration of controlled sites with native plants has not become a regular part of the KLGO exotic plant management program. It was hard to think about restoration in the summer - there always seemed to be another species going rapidly to seed, leaving no time to consider an area after it had been controlled. It can also be risky. The exotics introduced from imported fill at the Nelson Slough restoration site showed how even careful restorative projects can contribute to invasive problems, and even where soil isn't being introduced, the native seeds are wasted if the plants don't thrive. A successful restoration program at KLGO, then, would need careful planning to reduce the risk and a wider pool of labor to maintain the projects. A literature review of restoration techniques for this area along, with outreach to volunteer groups like the Skagway Garden Club and the Taiya Inlet Watershed Council, are recommended to integrate this important complement to exotic plant control into the park's management program.

GPS

Though the situation seemed improved from 2008, there were many times this year when satellite availability was limited and geometry was poor. Skagway's location, sitting low between deep valleys and high mountains, is anything but ideal for collecting GPS data. Most satellites lie on the southern horizon, so achieving a clear view of the south sky is crucial for data collection. The antenna with the Pro-XT receiver does improve accuracy, but the receiver should be tested and serviced this winter to address its inability to reliably hold a charge, which limited use this season.

With respect to the seasonal report, it is useful to collect a point feature to accompany each small polygon feature so that the infestation is easily displayed at any scale on a map. An example from this year is the bird vetch in Skagway, which is at most 15 meters wide and is hardly visible as a polygon at the city-wide scale.

ACKNOWLEDGEMENTS

The authors thank Dave Schirokauer for providing guidance, Whitney Rapp for her continued assistance in every aspect of the program and this year's many indefatigable weed-pulling crews – particularly the park staff from Natural Resources, Interpretation and Maintenance - for their hard work and upbeat attitude. They also thank those whose dedicated efforts in the past have resulted in the tremendous progress seen today in KLGO exotics management.

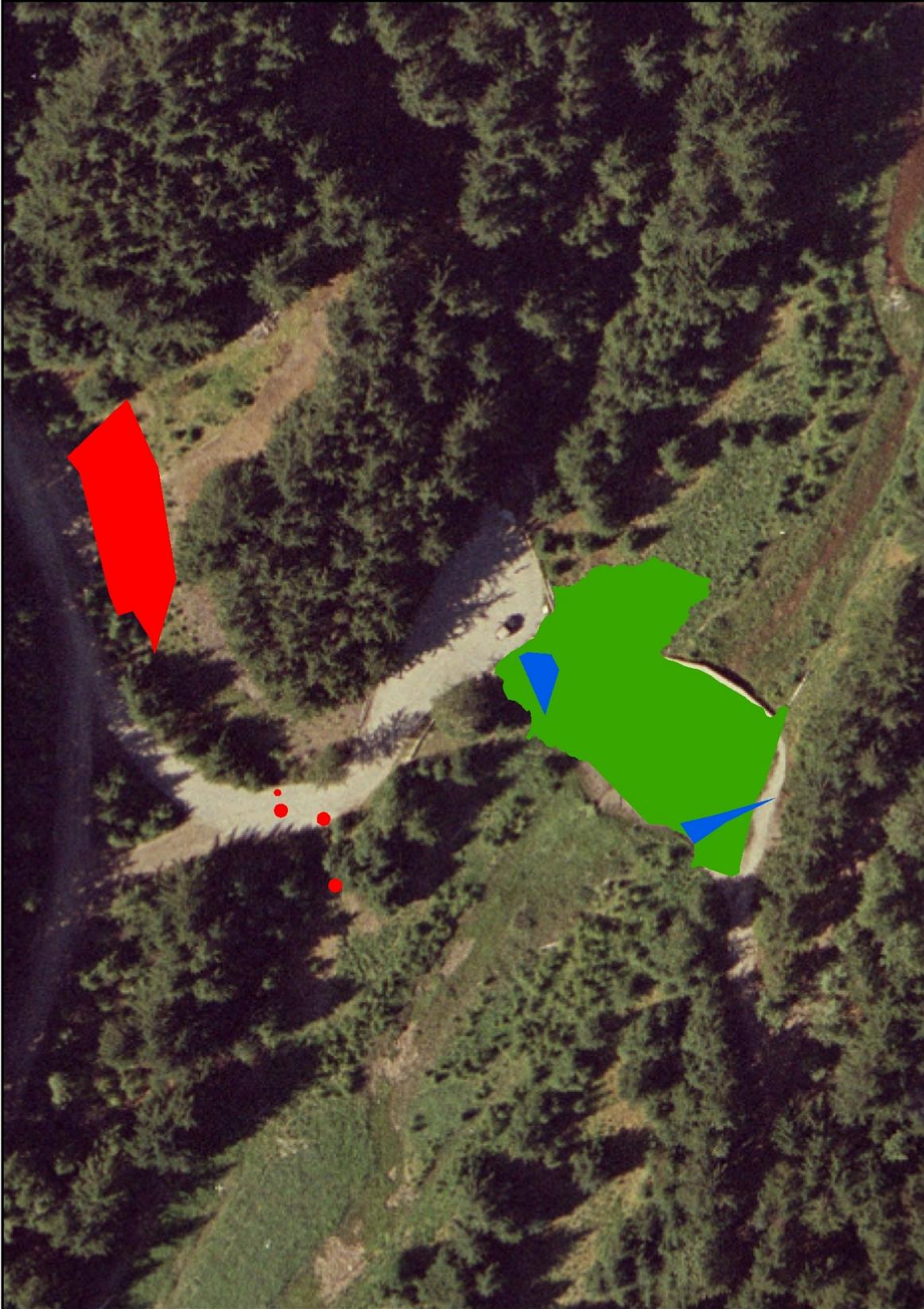
LITERATURE CITED

- Carlson, Matthew L., Michelle Sturdy, Rob Lipkin, and Julie A. Michaelson. 2004. *Klondike Gold Rush NHP, Vascular Plant Inventory, Final Technical Report*. Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska, Anchorage, AK.
- Delost, Jeremy. 2004 *Exotic Plant Inventory of Klondike Gold Rush National Historical Park*. EPMT-KLGO, Skagway AK.
- Hitchcock, C. Leo, and Cronquist, Arthur. 1973. *Flora of the Pacific Northwest*. University of Washington Press. Seattle and London.
- Hulten, Eric. 1968. *Flora of Alaska and Neighboring Territories*. Stanford University Press. Stanford, CA.
- Pojar, Jim and Andy MacKinnon. 1994. *Plants of the Pacific Northwest Coast*. Lone Pine Publishing. Vancouver, British Columbia.
- Rapp, Whitney. 2009. *Alaska Exotic Plant Management Team (AK-EPMT) Protocol 2009*, EPMT Alaska Region, Anchorage, AK.

Exotic Species in Nelson Slough - 2009

Klondike Gold Rush National Historical Park

Department of the Interior
National Park Service



Exotic Plant Species

-  Euphrasia nemorosa returned in 2009
-  Euphrasia nemorosa not detected in 2009
-  Scattered lower-priority species*

Appendix A

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Biological Technician
Klondike Gold Rush NHP



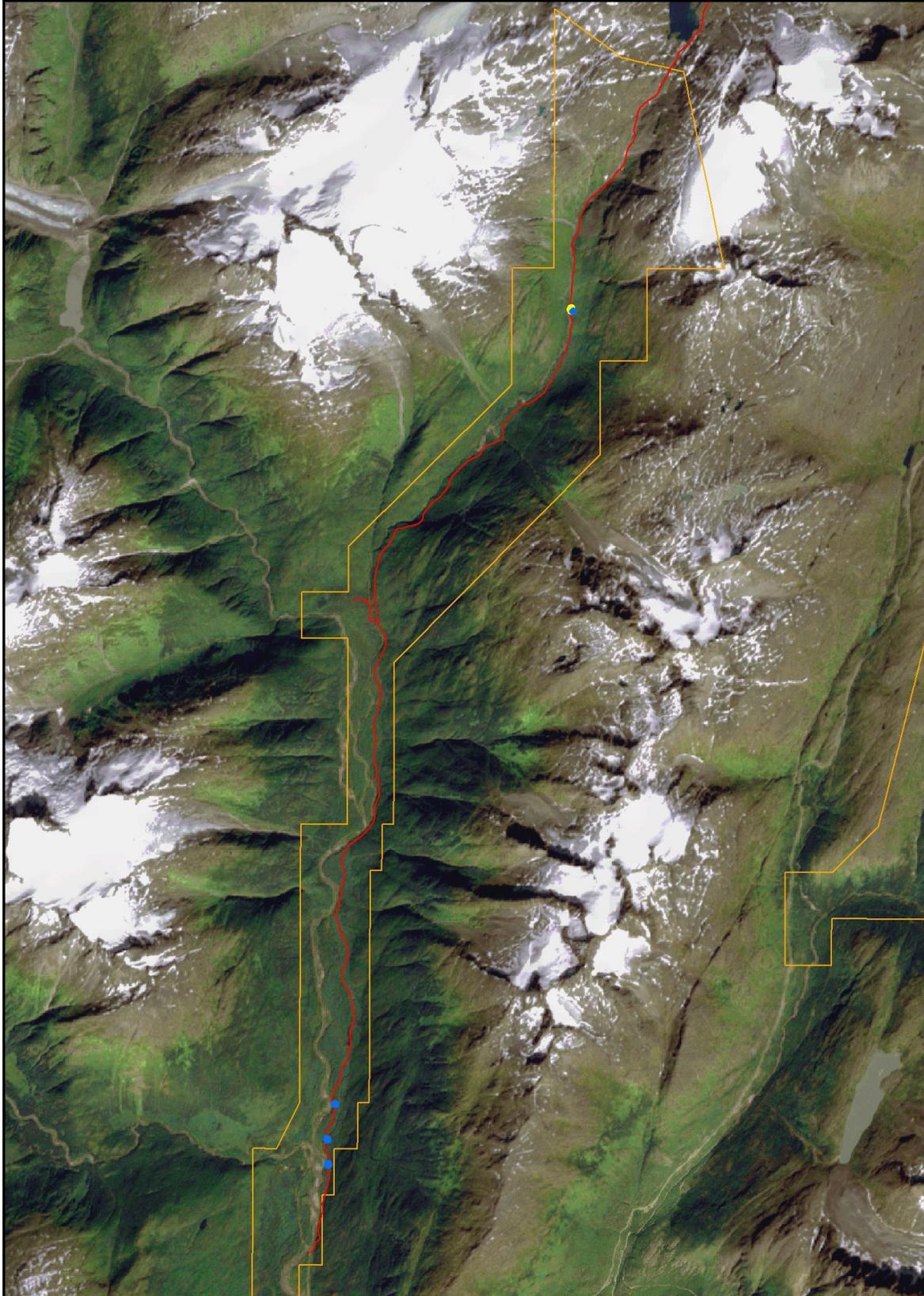
0 5 10 20
 Meters

*In order of most to least prevalent: red, white, and alsike clovers; dandelion; tall buttercup

Exotic Species on the Chilkoot Trail - 2009

Department of the Interior
National Park Service

Klondike Gold Rush National Historical Park



Exotic Plant Species

-  *Ranunculus acris*
-  Chilkoot Trail- USGS
-  *Taraxacum officinale*
-  KLGO Boundary

Appendix B

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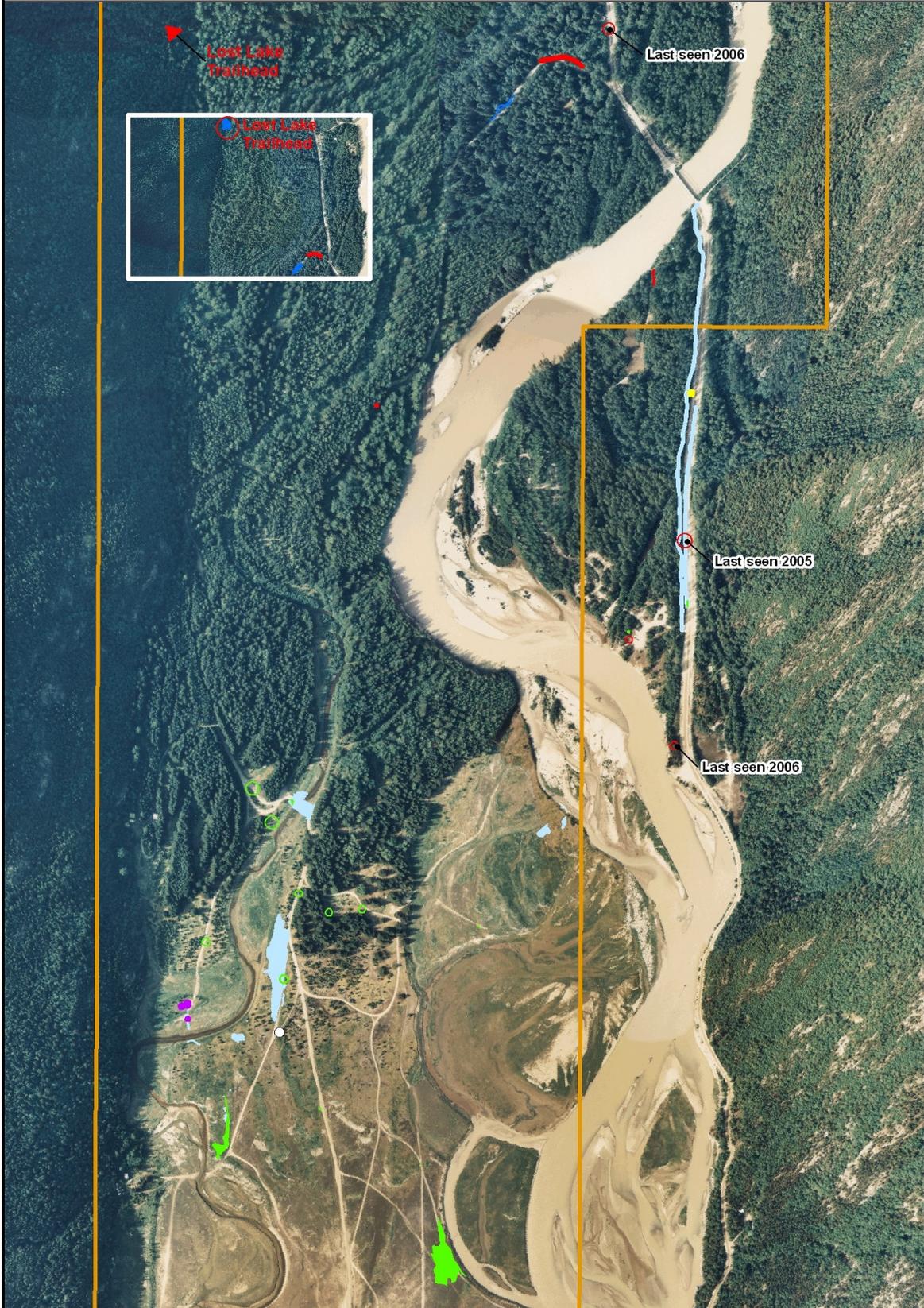


0 0.5 1 2
Kilometers

Exotic Species in Dyea - 2009

Klondike Gold Rush National Historical Park

Department of the Interior
National Park Service



Exotic Plant Species

- | | |
|---|---|
| ■ Crepis Tectorum | ■ Euphrasia nemorosa, erad. |
| ■ Euphrasia nemorosa | ■ Leucanthemum vulgare, erad. |
| ■ Leucanthemum vulgare | ■ Ranunculus acris |
| ■ Linaria vulgaris | ■ Ranunculus repens |
| ■ Lupinus polyphyllus | |

Appendix C

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Klondike Gold Rush NHP
0 100 200 400
Meters



Exotic Species on the Dyea Road - 2009

Klondike Gold Rush National Historical Park

Department of the Interior
National Park Service



Exotic Plant Species

- *Crepis tectorum*
- *Phalaris arundinacea*
- *Tanacetum vulgare*
- Leucanthemum vulgare*

Appendix D

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0 270 540 1,080
Meters

Exotic Species in Skagway - 2009

Klondike Gold Rush National Historical Park

Department of the Interior
National Park Service



Exotic Plant Species

- | | |
|-------------------------------|--------------------------|
| <i>Impatiens glandulifera</i> | <i>Sonchus arvensis</i> |
| <i>Leucanthemum vulgare</i> | <i>Tanacetum vulgare</i> |
| <i>Melilotus alba</i> | <i>Vicia cracca</i> |
| <i>Ranunculus repens</i> | |

Appendix E

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Klondike Gold Rush NHP



0 135 270 540

Meters

September 30, 2009

Exotic Species on the Klondike Highway - 2009

Klondike Gold Rush National Historical Park

Department of the Interior
National Park Service



 KLGO White Pass Unit

Exotic Plant Species

- | | |
|--|--|
|  Sonchus arvensis |  Galeopsis tetrahit |
|  Melilotus alba |  Linaria vulgaris |
|  Crepis tectorum |  Phalaris arundinacea |

Appendix F

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Appendix G: KLGO Exotic Species List

Scientific Name	Common Names	Chilkoot Trail	Nelson Slough	Dyea	White Pass ²	Dyea Road ³	Klondike Highway ¹
<i>Anthemis arvensis</i>	Corn chamomile	Found only in Skagway					
<i>Anthemis cotula</i>	stinking chamomile	Found only in Skagway					
<i>Bromus inermis</i>	smooth brome				X		X
<i>Capsella bursa-pastoris</i>	shepherd's purse		X X X			X X	X
<i>Cerastium fontanum</i>	mouse-ear chickweed		X X				X
<i>Chenopodium album</i>	Lambsquarters		X X			X X	X
<i>Collomia linearis</i>	narrow-leaved collomia	Found only in Skagway					
<i>Crepis tectorum</i>	narrowleaf hawkbeard			X X X X X!	X	X X X X!	X
<i>Elymus repens</i>	Quackgrass			X		X	X
<i>Erysimum cheiranthoides</i>	wormseed mustard		X X X			X X	
<i>Euphrasia nemorosa</i>	common eye-bright		X X X X X!	X X!			
<i>Galeopsis tetrahit</i>	bristlestem hempnettle		X X X				
<i>Galeopsis bifida</i>	splitlip hempnettle	Found only in Skagway					
<i>Hordeum jubatum</i>	foxtail barley			X	X	X	X
<i>Impatiens glandulifera</i>	ornamental jewelweed	Found only in Skagway					
<i>Lepidium densiflorum</i>	Common pepperweed	Found only in Skagway					
<i>Leucanthemum vulgare</i>	oxeye daisy			X X X X!		X X X X!	X
<i>Linaria vulgaris</i>	yellow toadflax		X X X	!	X	X X X X!	
<i>Lupinus polyphyllus</i>	large-leaf lupine			X!			
<i>Matricaria discoidea</i>	pineapple weed		X X X X X!	X X X X X!	X X	X X X X!	X
<i>Medicago lupulina</i>	black medic	Found only in Skagway					
<i>Melilotus alba</i>	white sweet-clover						!
<i>Papaver nudicaule</i>	iceland poppy	Found only in Skagway					
<i>Phalaris arundinacea</i>	reed Canary grass				X	X!	X!
<i>Phleum pretense</i>	timothy grass						X
<i>Plantago major</i>	Plantain		X X X X X!	X X X X X!	X X	X X X X!	X!
<i>Poa pratensis</i>	Kentucky bluegrass	X X X		X X	X		
<i>Polygonum aviculare</i>	prostrate knotweed		X X X	X	X	X X	X
<i>Polygonum convolvulus</i>	Black bindweed	Found only in Skagway					

Appendix G: KLG0 Exotic Species List

Scientific Name	Common Names	Chilkoot Trail	Nelson Slough	Dyea	White Pass ²	Dyea Road ³	Klondike Highway ¹
<i>Potentilla gracilis</i>	slender cinquefoil			X!			
<i>Ranunculus acris</i>	tall buttercup	X X X!	X X X!	X X X X!	X X	X X X X!	X!
<i>Ranunculus repens</i>	creeping buttercup			X X X!			
<i>Rumex acetosella</i>	sheep sorrel	X X X	X X X X X!	X X X X!	X X	X X X X!	X!
<i>Rumex crispus</i>	curled dock		X X X			X X	
<i>Senecio viscosus</i>	sticky ragwort			X X		X X	
<i>Senecio vulgaris</i>	common groundsel		X	X	X	X	X
<i>Silene cucubalus</i>	bladder campion		X X			X X	
<i>Silene noctiflora</i>	nightflowering silene	Found only in Skagway					
<i>Sisymbrium altissimum</i>		Found only in Skagway					
<i>Sonchus arvensis</i>	perennial sowthistle	Found only in Skagway					
<i>Sorbus aucuparia</i>	European mountain-ash	Found only in Skagway					
<i>Stellaria media</i>	common chickweed		X X X	X	X	X X X	X
<i>Tanacetum vulgare</i>	common tansy					X X!	
<i>Taraxacum officinale</i>	Dandelion	X X X X!	X X X X X!	X X X X X!	X X	X X X X!	X!
<i>Thlaspi arvense</i>	field pennycress		X				X
<i>Trifolium hybridum</i>	Alsike clover					X X	X X
<i>Trifolium pretense</i>	red clover		X X!	X X!		X X	X X
<i>Trifolium repens</i>	white clover	X X X	X X X X X!	X X X X X!	X X	X X X X	X
<i>Vicia cracca</i>	bird vetch	Found only in Skagway					
<i>Viola tricolor</i>	johnny-jump-up violet		X				
X 2004 survey results	1 2009 survey results						
X 2005 survey results	¹ not surveyed in '08,'09						
X 2006 survey results	² surveyed only in '04,'08						
X 2007 survey results	³ not surveyed in 2004						
X 2008 survey results	Previously undocumented						

Waste sites to monitor in Skagway

Klondike Gold Rush National Historical Park

Department of the Interior
National Park Service

0. Gravel pile in railyard owned by municipality
1. Municipal yard waste piles at Seven Pastures parking lot
2. Open construction site owned by Eric and Katherine Moseley
3. Yard waste pile by bus parking lot, owned by WP&YR
4. Yard waste piles on open lot owned by Phyllis Brown
5. Rock quarry owned by Jeff Hamilton
6. Semi-truck parking lot owned by Howard Smith
7. Yard waste pile owned by Gary Hisman



Primary species on or by waste site

- | | |
|----------------------|---------------------|
| ○ Galeopsis tetrahit | ● Sonchus arvensis |
| ● Linaria vulgaris | ● Tanacetum vulgare |
| ● Melilotus alba | ● Vicia cracca |

Appendix H

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0 160 320 640
Meters

