

**Exotic Plant Management
Klondike Gold Rush
National Historical Park**



Euphrasia nemorosa

Summer 2007

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ABSTRACT

In 2007, there was a continuation of the exotic plant management plan developed in 2006 at the Klondike Gold Rush National Historical Park (KLGOR). Nearly 900 hours were devoted to exotic plant management, approximately 500 of those were spent manually removing exotics, with the majority of time spent in Dyea and at Nelson Slough restoration site. There was a reduction in the total number of exotic species recorded this year from that in previous years, which can be attributed to the effectiveness of the management plan. The success of previous years' control work is readily apparent with a reduction in common eyebright (*Euphrasia nemorosa*) in Nelson Slough and a complete elimination of oxeye daisy (*Leucanthemum vulgare*) within the park.

KEY WORDS

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

INTRODUCTION

Overview

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. Things are changing though. With the ever increasing use of land due to population growth, coupled with a warming climate, Alaska is beginning to show more of the effects that exotic plants can have on the environment.



Lower 48 headache of Butter-and-eggs

Land managers in Alaska's national parks have initiated the first stages of exotic plant management. This involves an accurate inventory, a regular monitoring plan, and a fast-acting treatment plan with long-term goals.

Focus

The emphasis of Klondike Gold Rush National Historical Park's (KLGO's) exotic plant management plan in 2007 was the continued control of known exotic plant populations, especially in those areas of greatest concern in 2006. Secondly, eyes were always alert for any new exotic species or populations. Finally, exotic plants were monitored in locations where control was difficult, or in sites that didn't include priority species.

The majority of this year's work took place in Dyea where a population of common eyebright (*Euphrasia nemorosa*) has been expanding on the eastern edge of the Dyea flats. The Nelson Slough restoration site was continuously monitored for 14 previously inventoried exotic species, although removal of common eyebright was the only control work necessary. A significant effort was put forth in Skagway, with the assistance of TCCC (Red Team) and People to People volunteer groups, to reduce the abundance of white sweet-clover (*Melilotus alba*) and butter-and-eggs (*Linaria vulgaris*) in and around the airport as well as in the railroad yard. Additionally, several days were dedicated to the manual removal of bird vetch (*Vicia cracca*) on Spring Street. The Chilkoot trail was only briefly surveyed for exotic plants, while the White Pass unit of the park was not surveyed at all due to time and logistical constraints.

METHODS AND MATERIALS

Identification

When an unknown plant was found, field guides were used for identification. The primary field guides referenced were Weeds of Canada (Royer and Dickinson 1999) and 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. Most of the plants encountered were also available at the KLG0 herbarium.

Data Collection

To collect the spatial location of each infestation, the Trimble GeoExplorer3[®], Trimble Ranger[®], and Trimble ProXT[®] GPS units were used. The GeoExplorer3[®] was used in the first weeks of the season, but was soon replaced with a new Ranger[®] paired with the ProXT[®] GPS receiver. Each of these units is accurate when strict data collection techniques and standards are followed. A Trimble Hurricane L1[®] antenna was used in many cases to enhance GPS accuracy, both beneath thick forest canopies and in the open.

Data collection was again made simple by the AKEPMT's data dictionary and protocol (Heys and Rapp 2007). This data dictionary was given to all National Parks in Alaska to use when collecting exotic plant information. This ensured that every member of the AKEPMT was collecting data the same way, and that the data could be brought together to analyze the exotic plant situation in Alaska.

The collected data was downloaded into Trimble Pathfinder Office 4.0[®] software where it underwent spatial corrections and editing. In early September, this data was then sent to Jeff Heys and Whitney Rapp who entered all the relative information 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. A time log of work was maintained to track the total hours spent working on each aspect of exotic plant management (see Table 1).

Control Methods

The simple control method of hand pulling was employed to combat exotic plants. 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 (*Tanacetum vulgare*) and oxeye daisy (*Leucanthemum vulgare*).

All removed plants were bagged on site, deposited and disposed in nearby NPS garbage cans for the effect of double bagging, 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.

The use of chemicals for control is not employed by the National Park Service in Alaska at this time.

RESULTS

Defined Work Areas

In this report, five work areas are defined as follows:

- 1) Dyea, which is all the area in Dyea except the Chilkoot trail and the Nelson slough restoration site, (Appendix B);
- 2) the Nelson slough restoration site, (Appendix C);
- 3) the Chilkoot trail, (Appendix D);
- 4) the Dyea road from Skagway to the pavement in Dyea, (Appendix E); and
- 5) the town of Skagway, (Appendix F).

Species of Concern and Priority



Bird Vetch



Common Tansy



Common eyebright

Deliberation between KLGGO Natural Resources staff and Alaska Regional EPMT staff in 2006 resulted in a list of the following six high priority species: Narrowleaf hawksbeard (*Crepis tectorum*), oxeye daisy, butter-and-eggs, white sweet-clover, common tansy, and bird vetch. 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.

Dyea

The Dyea area continues to be the focal point of exotic plant management in the Klondike National Historical Park. It is the most heavily used and accessible natural site in the park. Except for dandelion (*Taraxacum officinale*) and one or two species of lesser concern, the exotic plant populations lie in disturbed sites adjacent to roads. The major species of concern in Dyea this year was narrowleaf hawksbeard. Oxeye daisy was of equal concern in 2006, but none was located in Dyea in 2007.

Control of the narrowleaf hawksbeard in the road right-of-way in front of the Chilkoot Trail Outpost Lodge began in late June, and was only performed infrequently. This project was a continuation of the control efforts during the last two seasons. There were difficulties in timing the control, as the lodge owners would cut the grass in the right of way and the DOT used their road grader to control the growth in the ditches by plowing them. This helped to control the exotics in the short term but ultimately created newly disturbed sites for the establishment of new exotic populations.



Narrowleaf Hawksbeard

The range of narrowleaf hawksbeard in Dyea has changed little since 2006. These plants were found along the right-of-way, south of the lodge, but not on the opposite side of the road or north of the site as they were last year. Control work will continue through the month of September. Hopefully, this will get the last of the flowering plants this season, although hundreds of rosettes remain on the ground.

Intensive searching for oxeye daisy took place in the northern road right-of-way, west of the Taiya river bridge and along the beginning of the Dyea flats road, with no plants found. Following a major decline in the oxeye daisy population noted in 2006, it appears that the populations in these two sites have been effectively eradicated. This has been the brightest spot in the KLGO exotic plant control effort, but vigilance is needed in monitoring these areas for returning growth in the coming years.



Oxeye Daisy

The creeping buttercup along the northern segment of the road to Dyea flats, first sighted in 2006, was located and monitored again this year, but no control work was possible due to time constraints.

The greatest amount of time and effort in exotic plant management this season was dedicated to mapping, removing, and experimenting with control methods on common eyebright. Plants remained in the two locations where it was found in Dyea in 2006. The smaller patch in the forested region, which was manually treated in 2006, returned in small numbers in 2007 and was again removed by hand. The larger patch, located near the Taiya River on the eastern edge of the flats, showed significant growth and was too expansive for full manual treatment. Jeff McKinney, the 2007 exotic plant biotechnician, arranged a series of experimental plots to explore the possibility of hoeing as a means of control (See Table 2 and Figure 1). The results will be assessed in 2008.

In general, all of the road side ditches have a few common species of exotic plants. They include dandelions (*Taraxacum officinale*), sheep sorrel (*Rumex acetosella*), plantain (*Plantago major*), sticky ragwort (*Senecio viscosus*), tall buttercup (*Ranunculus acris*), clover (*Trifolium spp.*), and pineapple weed (*Matricaria discoidea*). These species have been given low priority status because of their widespread distribution and/or their inability to encroach into undisturbed native Alaskan plant communities. Sheep sorrel

was also present in much of the unforested region of the Dyea flats. Tall buttercup existed in large numbers in certain open sites within the forested region of the flats, and pineapple weed was present along virtually every roadway in Dyea.

Nelson Slough Wetland Restoration Site

The work at the Nelson slough wetland restoration site continued as it has in the past. After the seeding and transplants that took place in 2006, the site is now filled with flourishing wild-flag (*Iris setosa*), Nootka lupine (*Lupinus nootkatensis*), northern rice root (*Fritillaria camschatcensis*), and Sitka spruce (*Picea stichensis*) seedlings. There continues to be a number of exotic species of lesser concern including plantain, sheep sorrel, tall buttercup, and most notably the white and red clover, which are populating the areas between previous years' transplants. It is believed that the best way to reestablish the native flora there is to continue to transplant native vegetation onto the site. Hopefully, the native plants can then out-compete and overtop the non-native vegetation, eventually propagating throughout the site. Unfortunately, there were no transplants conducted in 2007 due to time constraints, but those from 2006 have shown vigorous growth.

Common eyebright continues to be the one threatening species in the site, and control work was performed on it throughout the season in 2007. The initial control was difficult and very time consuming due to the abundance of individual in the early season, and also because of their miniscule size, which ranged from only a few millimeters to just over one centimeter tall. As the season progressed, the plants became more apparent and easily pulled with their shallow root system. In August, they were nearly all flowering and control was at its greatest efficiency. Further removal was performed on the remaining plants with limited time in September, after they had begun to seed.

Chilkoot Trail

A monitoring effort was undertaken on July 11th on the Chilkoot trail from the trailhead to the raft put-in, finding only dandelion along a limited stretch of the trail. Passive monitoring was conducted by Lucretia Fairchild and Dashiell Feierabend while hiking the Chilkoot Trail to the pass and back for purposes other than exotic plant management from July 16-20, 2007, but no more exotics were seen. The edges of the trail were weed-whacked in mid-July, so it is likely that any exotics would have been overlooked during the hiking period. The extent of tall buttercup, sheep sorrel, dandelion, and clover found in 2006 should be reassessed in 2008.

No effort was made to continue the removal of the sheep sorrel at the Canyon city trail crew cabin in 2007. However, it is believed that in the next few years, with diligently repeated treatments, it can be removed from its Canyon city site.

No new exotic species were found on the trail in 2007.

Dyea Road

There was no formal survey conducted on Dyea road in 2007, although eyes were always on the lookout during travel to and from Skagway. None of the common tansy or wormseed mustard (*Erysimum cheiranthoides*) found in 2006 was located this year. However, there is a small group of butter-and-eggs on the first ascent after turning onto Dyea road from Main Street. There are also several locations of narrowleaf hawksbeard on private drives. The oxeye daisy continues to thrive and spread from a single location on private property, and many other exotic species such as plantain, dandelion, and sheep sorrel were found along the road in numerous locations. In the end, there wasn't time or reason to survey common exotics along a road outside the park boundary.

Skagway

Skagway is known as the garden city. With gardening can come many exotic plants that can escape and grow where they are not wanted. This has happened in Skagway in some cases and it has become an overwhelming problem. The goal now is to stop the spread of these plants outside of the Skagway area and keep the problem locally contained.

Skagway contains five species of high concern, which include narrowleaf hawksbeard, butter-and-eggs, oxeye daisy, bird vetch, and the most troubling, white sweet-clover. With the help of the TCCC crew and People to People volunteer groups, an effort was made to pull the white sweet-clover and butter-and-eggs from around the airport runway and terminal, similar to the efforts in 2006. After three days of work, most of the white sweet-clover stems were removed from this area, but many of the root systems remain due to the difficulty of excavation.



White sweet-clover before pulling



White sweet-clover after pulling

The bird vetch found in 2005 at the corner of Spring and 9th Street is still contained in the same location. Manual treatment was performed on the plant twice this year, as it was in 2006, but showed little improvement. The fact that bird vetch has a long-running weak root system makes it difficult to remove the whole plant to prevent it from re-sprouting. The plant generally breaks off and sprouts from the remaining root left in the soil. The only effective way to control this plant will be with the spot use of herbicide. It was also discovered that grass clippings were being dumped in and around the population

of bird vetch, which may be aiding the plant's growth through a change in available nutrients, while also smothering competing native vegetation.

A new species of exotic plant was reported on private property in Skagway at the beginning of September. It was tentatively identified as ornamental jewelweed (*Impatiens glandulifera*) and should be investigated further in 2008.

KLGO has been working closely with the Taiya Inlet Watershed Council (TIWC) on the white sweet-clover and the bird vetch issues in Skagway in previous years. Because of multi-ownership issues, the desire is to have the TIWC continue to take the lead in the exotic plant management role in Skagway. However, TIWC's transition between executive directors this summer resulted in NPS acting as the contact and organizational leader of volunteer efforts for the 2007 season.

Log of Work

The total amount of time spent on exotic plant management in 2007 was just below 900 hours. This 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; 3. Office work, which consists of data management, research, and planning.

Table 1. Exotic plant management work hours by category.

Work Category	Hours
Control	502.5
GIS/GPS	50.5
Other	334.13
Season Total	887.13

TCCC AND VOLUNTEERS

During the first week in July, a Tribal Civilian Community Corps (TCCC) crew arrived in Skagway to help with exotic plant management. The TCCC crew had the enviable task of spending the summer moving from park to park in Alaska, helping with exotic plant management. Having assisted in exotic plant control at KLGO in 2006, their help was much anticipated in 2007.

Under the direction of Jeff McKinney, the crew spent the first two days principally working in Dyea and Nelson slough on the removal of common eyebright. At that time, the plants were no larger than a thumbnail, and the work proved to be tedious and ultimately ineffective despite the collective pulling of thousands of plants. Some time was also spent in the removal of narrowleaf hawksbeard along the ditches at the northern end of Dyea road.

During the last two days, the crew returned to Skagway to concentrate on the control of white sweet-clover surrounding the airport. It should be noted that, in 2006, the locations where the plants were pulled had fewer plants remaining than in places where the white sweet-clover was cut. The only effective manual treatment of white sweet-clover is to pull the plant completely, root and all. While there is an overwhelming amount of white sweet-clover in Skagway, the TCCC made a large impact in the areas where control work was concentrated

On July 28th and 29th, the organization People to People offered the assistance of nearly 60 youth participants. They worked on removing white sweet-clover and butter-and-eggs around the airport terminal and along the east side of the airstrip. Because of the difficulty and strength needed to remove the roots of the white sweet-clover, most of their success was in eliminating the flowering stalks. They also removed a significant amount of flowering butter-and-eggs, but the relative difficulty in identification of non-flowering plants, in addition to their sheer abundance, meant that there were many occurrences left standing.

A repeat performance was made on August 3rd and 4th when People to People returned with another set of youth groups numbering 60 strong. In addition to following up on the remaining white sweet-clover and butter-and-eggs in and around the Skagway airport and railroad yard, some groups assisted in the removal of common eyebright in Dyea. Small hands found their way to these small plants, and once again there was localized success.



People to People volunteers tearing through sweet white-clover near the Skagway Airport



People to People volunteers with exotic bouquets

The park is grateful for the enthusiastic effort and cooperation of the TCCC and volunteer groups, whether the progress made in exotic plant management was large or small. NPS and People to People recognized this activity as an educational opportunity for the kids, as well as a chance to build bridges between organizations for the future. There is as much importance in teaching children about the interactions between exotics and native ecosystems as there is in receiving their contributions to the park.

DISCUSSION

Exotic Plant Management: 2007 vs. 2006

There little change in direction from the 2006 season to the 2007 season. The emphasis again was on control work with the continuation of monitoring and inventorying. There was a notable reduction in the number of exotic plants in some areas, while other occurrences maintained their numbers from previous years. Where the white sweet-clover was pulled last year, there was a minor reduction in plants found in 2007. The oxeye daisy occurrences in Dyea appear to have been effectively eliminated, and all but one of the common eyebright occurrences have been significantly reduced in number after the last few years of persistent control work. The burgeoning occurrence of common eyebright in Dyea flats is under experiment in hopes of determining the most efficient method of eradication to be used in the coming years.

Common Eyebright Control Experiment

In 2007, three sites were selected for experimentation within the large occurrence of common eyebright located on the eastern edge of the Dyea flats (see Figure 1). Each site contains three plots that are one square meter in size: a hoed plot, a hand-picked plot, and an unmanipulated plot for control. Each treated plot underwent a complete removal of all common eyebright, while the control was left undisturbed. The percent coverage by common eyebright in each plot was recorded (see Table 2) before the treatments were conducted on July 17 and 23, and should be measured again in 2008 to assess the effectiveness of each treatment. In August of 2007, it was already apparent that hand-picking was only marginally effective, as many new flowering plants had regrown in all three hand-picked plots. Alternatively, hoeing was clearly a time efficient and effective method of removing all existing eyebright, but with the severe disadvantage of removing the entire existing flora and upper organic layer along with it. In August of 2007, only a handful of grass had sprouted in the hoed plots where moss had often represented the greatest percent coverage in the past. It is unclear yet whether hoeing has the potential to eliminate the common eyebright seeds in the seedbank.

Table 2. Common eyebright coverage by plot.

Site	Plot	Date Treated	Treatment Method	% Common Eyebright Coverage
1	a	7/17/07	Picked	40
1	b	7/17/07	Hoed	35
1	c	7/17/07	None	30
2	a	7/23/07	Picked	40
2	b	7/23/07	Hoed	40
2	c	7/23/07	None	43
3	a	7/23/07	Picked	30
3	b	7/23/07	Hoed	47
3	c	7/23/07	None	45

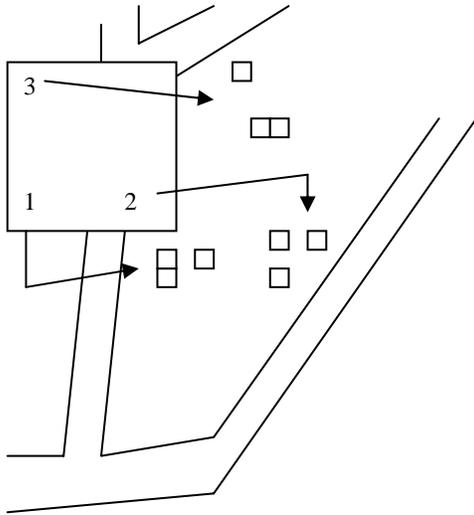


Figure 1. Common eyebright plots.

The Threat of Non-Native Plants to KLGO and the Surrounding Area

Most of the non-native plant invasions have occurred in disturbed areas (e.g. road ditches and fill material). There are, however, locations where non-native plants have established themselves in disturbed areas and are now spreading into native vegetation. This is the case at Nelson slough where the common eyebright has established itself and is growing up through the moss and around native plants in undisturbed areas. In general, exotic plants have a difficult time gaining a foothold in undisturbed areas in Alaska. The lack of disturbance, coupled with limited human presence and a cold climate, has kept Alaska relatively safe from non-native plants. However, this is changing as an increase in developed lands for a growing population inevitably brings with it more ecological stress and disturbance on the surrounding ecosystems. Add to this a warming climate, and you have a recipe for an outbreak of exotic plants in Alaska. This is becoming evident in the Dyea and Skagway valleys. A continued vigilance is needed to contain and eliminate existing occurrences of exotics and prevent the establishment of new ones.

RECOMMENDATIONS AND PLANS FOR THE COMING YEAR

Dyea

Once flowering starts (approximately the end of May), continue weekly pulling treatments of the narrowleaf hawksbeard and any oxeye daisy or common tansy occurrences that may reappear. The narrowleaf hawksbeard pulls very easily if you pull from the base of the flowering stock. The complete root will come out most of the time. However, since oxeye daisy is rhizomal, care is needed to remove the entire root mass to prevent it from re-sprouting. Also, the search of all road sides and disturbed areas should continue to determine if these plants are extending their range.

Continue to remove the few remaining common eyebright that may appear through the season in the small occurrence within the forest region of Dyea flats. They might be too difficult to see at the start of the season, so the optimal time for control would be in late July and early August as they begin to flower. Manual control of the large patch on the eastern edge of the flats is extremely time consuming, so the experimental plots should be assessed between the 17th and 23rd of July and the results used to decide the best method of control to be implemented later in the season.

Nelson Slough

The Nelson Slough wetland restoration site poses some interesting dilemmas. 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 (*Trifolium pratense* and *T. repens*). In 2006 the clover encroached into the spaces between the transplants and covered approximately 30% of the restored area with a thick mat of vegetation. Additional native plant transplants are needed to break up some of the clover. Manual treatment of the clover should follow, and seeding of the area with native plant seeds collected in 2006 would help the restoration move along. The manual treatment of clover will be very time consuming so, if another crew similar to the TCCC can be obtained, this would be an ideal place to start. The same situation exists to a lesser extent with the prostrate knotweed (*Polygonum aviculare*) and mouse-ear chickweed (*Cerastium fontanum*). These two plants spread out similarly to the clover but without the vigor and density.



Clover in-between transplants

It is also recommended that all the spruce planted within the restoration site be removed. The spruce trees were not included in the specifications for the revegetation of the slough. The spruce trees within the restored meadow do not represent the plant communities within the adjacent meadows (Phillips 2002).

Control work should continue on the common eyebright where there has been a significant decrease in the number of plants in 2006 and 2007. This reveals that the extensive control work of the past two seasons is paying off and needs to be followed through to completion. As on Dyea flats, it is ideal to pull the common eyebright in late July or early August when it has grown to a height that is easily seen, and when it has begun to flower so that it stands out among the other plants.

Chilkoot Trail

Currently, the non-native species on the trail are low on the priority list. Continued mapping of the trail should be done on a yearly basis to see if the plants are extending their range and becoming a problem. It might be reasonable to work on controlling the tall buttercup in its limited distribution along the trail. Also, even though the sheep sorrel is low on the priority list by itself, the occurrence at the Canyon City trail crew cabin

should be treated anytime crews are in the vicinity, since it is isolated and easy to access. To begin control of the dandelions on the trail, those that surround the helipad at Sheep Camp should be the first to be removed. Help from the trail crew and trail rangers in clipping the flower heads as they appear would enable this process to be effective over the span of a few years. With their help, a biannual removal of dandelions might be effective in the long term.

The alpine dandelions close to The Scales are thought to be the native horned dandelions. A few voucher specimens should be taken to verify this tentative identification.

Dyea Road

The Dyea road is a prime spot for new infestations. With a large seed source in Skagway and the first few miles of the road, these plants have the potential to extend their range along the road and then into Dyea. The exotic plant control work has been centered on land that is not adjacent to residential property. Many people have planted exotics on their property (i.e. oxeye daisy) and are not interested in having them removed. Care is needed here not to overstep our jurisdiction. The roadside should continue to be monitored throughout the coming years. Anytime park biologists drive to Dyea, they should be keeping an eye open for new exotic occurrences.

Skagway

Skagway is home to just about all the exotic species known in the area. Preventing the spread of these plants outside of Skagway should be the focus of exotic plant management here. The two species of concern in Skagway that are possible to manage are white sweet-clover and bird vetch. It should be possible to prevent the white sweet-clover from moving out of Skagway and to actually eradicate the bird vetch from its one known site.

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. Also, eyes should be kept open for this plant along the roadways and railways going out of Skagway to help prevent its spread.

The bird vetch occurrence is going to need some extra attention, as manual eradication is next to impossible. Manual methods can prevent the plant from going to seed and from growing out of control but will not result in eradication. Herbicides look to be the only way to remove this exotic.

Finally, the recent sighting of ornamental jewelweed should be verified and monitored.

It will be essential to work with the TIWC on the exotic plant issues in Skagway. They have spearheaded the work in the past and they are an essential ally when working in residential areas.

White Pass

Very little work was done on the White Pass unit of the park in both 2006 and 2007. This was mainly due to the workload in other areas and the logistics of accessing and traveling within the unit. Monitoring of the White Pass railroad line will be needed in the future to see if species from Skagway are making their way up to the White Pass unit via the White Pass railroad. It is important that anytime someone rides on the train, they 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 true damaging effects of white sweet-clover would be noticed.

ACKNOWLEDGEMENTS

I would like to thank Jeff McKinney and Lucretia Fairchild for working by my side all season, Dave Schirokauer for providing guidance and GIS support, Whitney Rapp for answering the inevitable technical questions, Jeff Heys for his regional support, the TCCC crew and People to People for their hard work, and the TIWC for their continued involvement in Skagway exotic plant issues. I would also like to thank those whose dedicated efforts in the past have resulted in the tremendous progress seen today in KLGO exotics management.

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Appendix A

KLGO Exotic Species List

Scientific Name	Common Names	Chilkoot Trail	Nelson Slough	Dyea	White Pass ¹	Dyea Road ²
<i>Capsella bursa-pastoris</i>	shepard's purse		* * *			* *
<i>Cerastium fontanum</i>	mouse-ear chickweed		* *			
<i>Chenopodium album</i>	lambsquarters		* *			* *
<i>Crepis tectorum</i>	narrowleaf hawksbeard			* * *		* * *
<i>Erysimum cheiranthoides</i>	wormseed mustard		* * *			* *
<i>Euphrasia nemorosa</i>	common eye-bright		* * * *	* *		
<i>Galeopsis tetrahit</i>	hemp nettle		* * *			
<i>Impatiens glandulifera</i>	Ornamental jewelweed	Found only in Skagway				
<i>Leucanthemum vulgare</i>	ox-eye daisy			* * *		* * *
<i>Linaria vulgaris</i>	butter-and-eggs		* * *		*	* * *
<i>Matricaria discoidea</i>	pineapple weed		* * * *	* * * *	*	* * *
<i>Melilotus alba</i>	white sweetclover	Found only in Skagway				
<i>Plantago major</i>	plantain		* * * *	* * *	*	* * *
<i>Poa pratensis</i>	Kentucky bluegrass	* * *		* *	*	
<i>Polygonum aviculare</i>	prostrate knotweed		* * *			* *
<i>Ranunculus acris</i>	tall buttercup	* * *	* *	* * *	*	* *
<i>Ranunculus repens</i>	creeping buttercup			* *		
<i>Rumex acetosella</i>	sheep sorrel	* * *	* * * *	* * *	*	* * *
<i>Rumex crispus</i>	curled dock		* * *			* *
<i>Senecio viscosus</i>	sticky ragwort			* *		* *
<i>Senecio vulgaris</i>	common groundsel		*			
<i>Silene cucubalus</i>	bladder campion		* *			* *
<i>Stellaria media</i>	common chickweed		* * *			* *
<i>Tanacetum vulgare</i>	common tansy					* *
<i>Taraxacum officinale</i>	dandelion	* * * *	* * *	* * *	*	* * *
<i>Thlaspi arvense</i>	field pennycress		*			
<i>Trifolium repens</i>	clover	* * *	* * * *	* * *	*	* * *
<i>Vicia cracca</i>	bird vetch	Found only in Skagway				
<i>Viola tricolor</i>	johnny-jump-up violet		*			

* 2004 survey results

* 2005 survey results

* 2006 survey results

* 2007 survey results

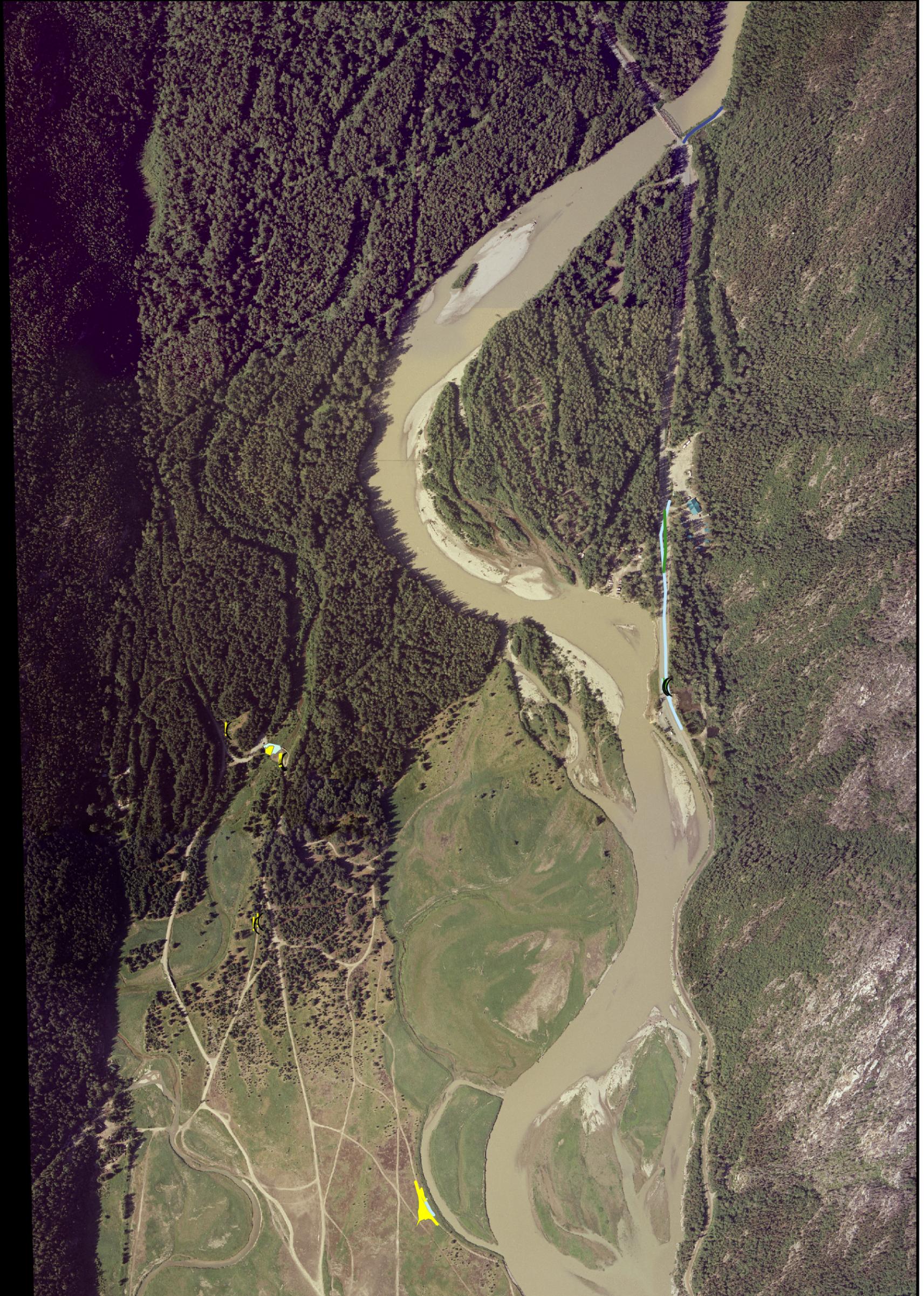
¹not surveyed in '05 '06 '07

²not surveyed in 2004

Klondike Gold Rush National Historical Park

Exotic Species in Dyea, 2007

Dept. of the Interior
National Park Service



Exotic Plant Species

- | | | | | |
|---|-----------------------------|---|-----------------------------|---|
| (| Other | — | Other | |
|) | <i>Euphrasia nemorosa</i> | — | <i>Euphrasia nemorosa</i> | |
| (| <i>Crepis tectorum</i> | — | <i>Crepis tectorum</i> | (|
|) | <i>Taraxacum officinale</i> | — | <i>Taraxacum officinale</i> |) |
| | | | | (|
| | | | |) |

Appendix B

Dashiell Feierabend
Biological Technician
Klondike Gold Rush NHP



Klondike Gold Rush National Historical Park

Exotic Species in Nelson Slough, 2007

Dept. of the Interior
National Park Service



Exotic Plant Species

- (Other
- (Euphrasia nemorosa
- (Matricaria discoidea
- Other
- Euphrasia nemorosa

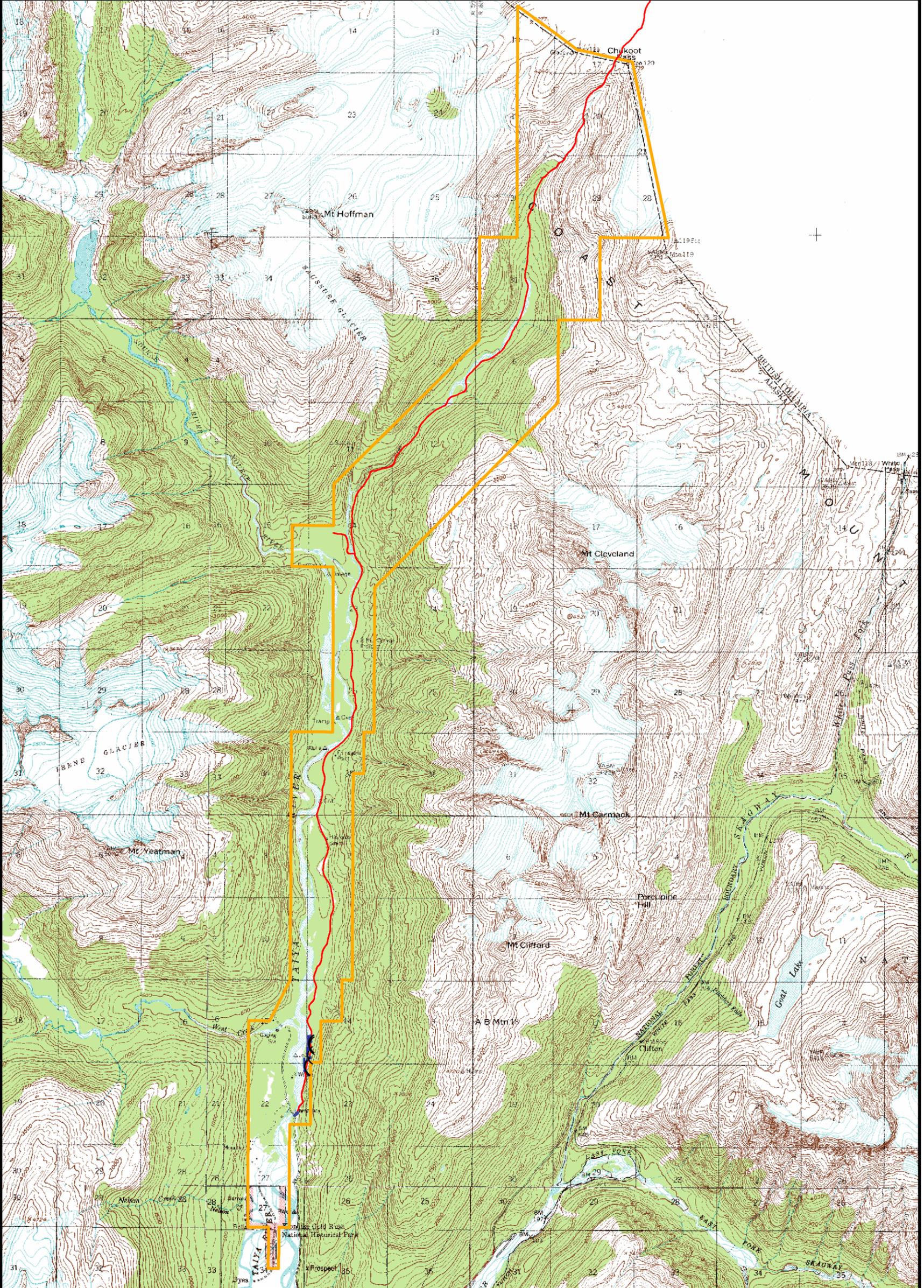
Appendix C

Dashiell Feierabend
Biological Technician
Klondike Gold Rush NHP



Klondike Gold Rush National Historical Park Exotic Species on the Chilkoot Trail, 2007

Dept. of the Interior
National Park Service

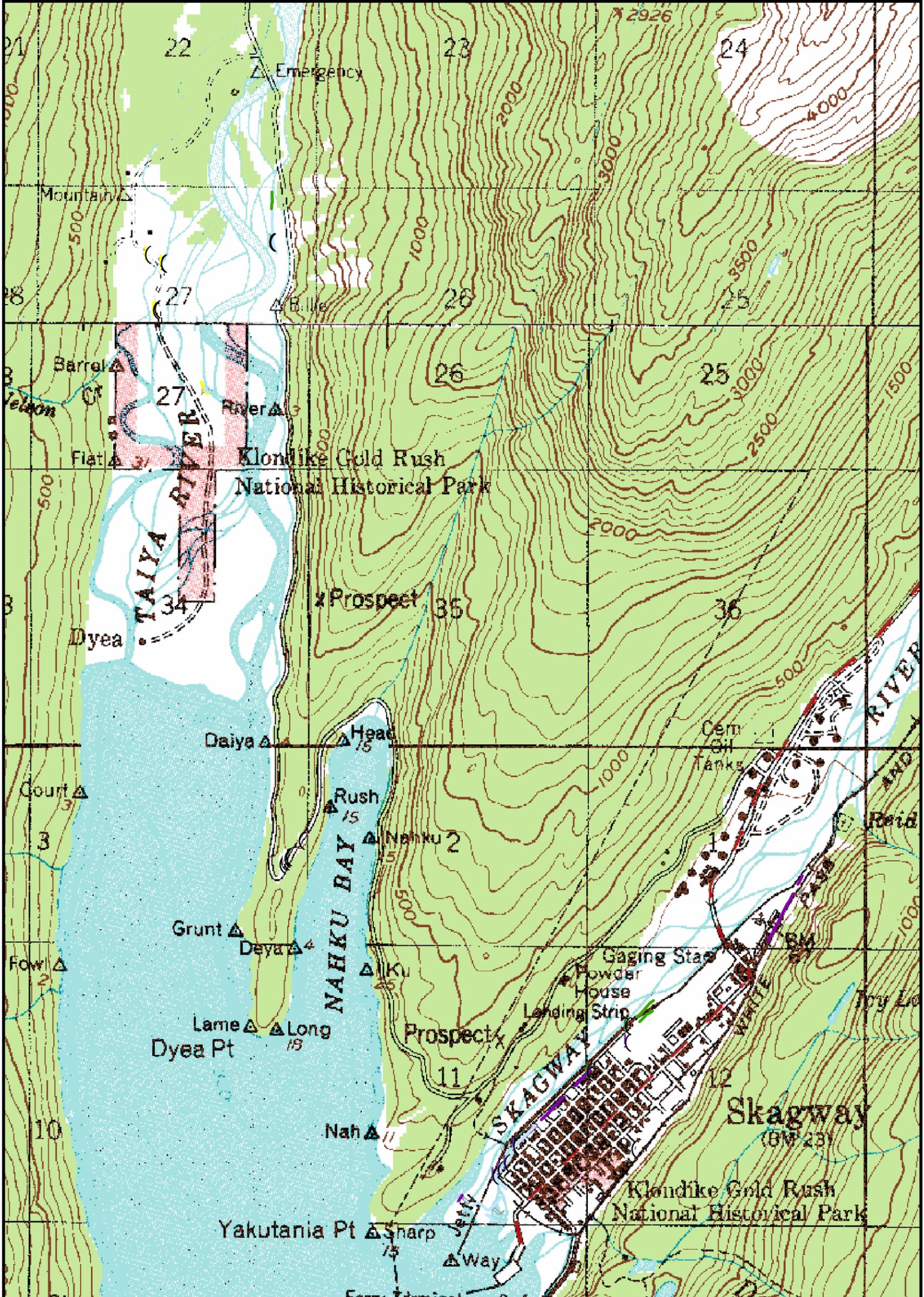


Exotic Plant Species		Appendix D	Dashiell Feierabend Biological Technician Klondike Gold Rush NHP 0.5 1 2 Kilometers	
Taxon	KLGO Boundary			
(Taraxacum officinale — Taraxacum officinale	 Chilkoot Trail			

Klondike Gold Rush National Historical Park

Exotic Species on Dyea Road, 2007

Dept. of the Interior
National Park Service



Exotic Plant Species

- | | | | |
|---|----------------------|----------------------|--------------------|
| (| Other | Other | |
| (| Euphrasia nemorosa | Euphrasia nemorosa | |
| (| Crepis tectorum | Crepis tectorum | |
| (| Leucanthemum vulgare | Leucanthemum vulgare | Other |
| (| Linaria vulgaris | Linaria vulgaris | Euphrasia nemorosa |
| | | | Linaria vulgaris |

Appendix E

Dashiell Feierabend
Biological Technician
Klondike Gold Rush NHP



Klondike Gold Rush National Historical Park Exotic Species in Skagway, 2007

Dept. of the Interior
National Park Service



Exotic Plant Species

- | | | |
|--------------------------|----------------------|------------------|
| () Other | Other | Other |
| () Crepis tectorum | Melilotus alba | Other |
| () Leucanthemum vulgare | Crepis tectorum | Melilotus alba |
| () Linaria vulgaris | Leucanthemum vulgare | Linaria vulgaris |
| () Vicia cracca | Linaria vulgaris | Vicia cracca |

Appendix F

Dashiell Feierabend
Biological Technician
Klondike Gold Rush NHP

0 125 250 500
Meters

