



Invasive Plant Management in Klondike Gold Rush National Historic Park

2024 Summary Report





ON THE COVER

The newly constructed bridge north of Sheep Camp built to re-establish the Chilkoot trail after a landslide.

ON THIS PAGE

Top Left: Helicopter landing at the Sheep Camp heli-pad, this is currently the only way to access Sheep Camp. Top right: Taiya River near Sheep Camp. Lower left: The Sheep Camp Ranger Station where weeds were surveyed and treated. Lower Right: A mushroom found while surveying.

Photography by NPS/Dustin Reed

Invasive Plant Management in Klondike Gold Rush National Historic Park

2024 Summary Report

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Abstract

The Invasive Plant Management Team (IPMT) program has worked to manage invasive plants within and around KLGO since 2004. Unlike the previous few years, in 2024 there were no Student Conservation Association (SCA) interns doing IPMT work in the park, so the work performed by IPMT was limited to one week in August. The objective was to use herbicide to treat a few patches of reed canary grass (*Phylaris arundinacea*) and quackgrass (*Elymus repens*) that had been mapped in 2023 at the Sheep Camp campground. This remote part of the park cannot currently be accessed by hiking due to flooding and landslides that destroyed parts of the hiking trail up to this area, so the site had to be accessed via helicopter. All identified reed canary grass and quackgrass populations in the Sheep Camp area were treated as well as all other identified invasive species in Sheep Camp.

Acknowledgements

The Invasive Plant Management Team would like to thank Natalie Velez-Suarez for being our point of contact while in the park, finding accommodation for our science technician and logistical support. We would also like to thank Jenn Larsen for on the ground logistical support and orientation, and Martin Hobmeier for assistance with surveying in the park. The now retired Carolyn E. Furbish was instrumental in the mapping of the area in 2023 and advocating for the IPMT to go to this site. Lastly, we would like to thank the rest of the KLGO employees for helping during our stay in Skagway, in particular the Cory Thole who was the helicopter flight manager for the work, Clayton Buffer who provided additional aviation support, and organized the transportation of herbicide to and from sheep camp, and Dylan Morgan who provided area orientation at Sheep Camp and provided insight into the work that had been done in previous years.

List of Terms

AKRO	Alaska Regional Office
EDRR	Early Detection and Rapid Response
IPMT	Invasive Plant Management Team
NPS	National Park Service
PPE	Personal Protective Equipment
KLGO	Klondike Gold Rush National Historic Park
SCA	Student Conservation Association

Introduction

The Alaska Regional Invasive Plant Management Team (IPMT) is one of 17 established IPMT in the country. Each IPMT serves multiple parks within a geographic region. They work to identify, develop, conduct, and evaluate invasive species removal projects and undertake appropriate native species restoration efforts. Due to the remote nature of many of the Alaska park units and the associated high cost of travel, the Alaska IPMT does not always have the funding to have a centralized crew that travels to each park in its region like a lot of the lower 48 crews. Historically the Alaska IPMT has worked cooperatively with partner parks to train existing park staff, partially fund seasonal employees, and support in park internship positions.

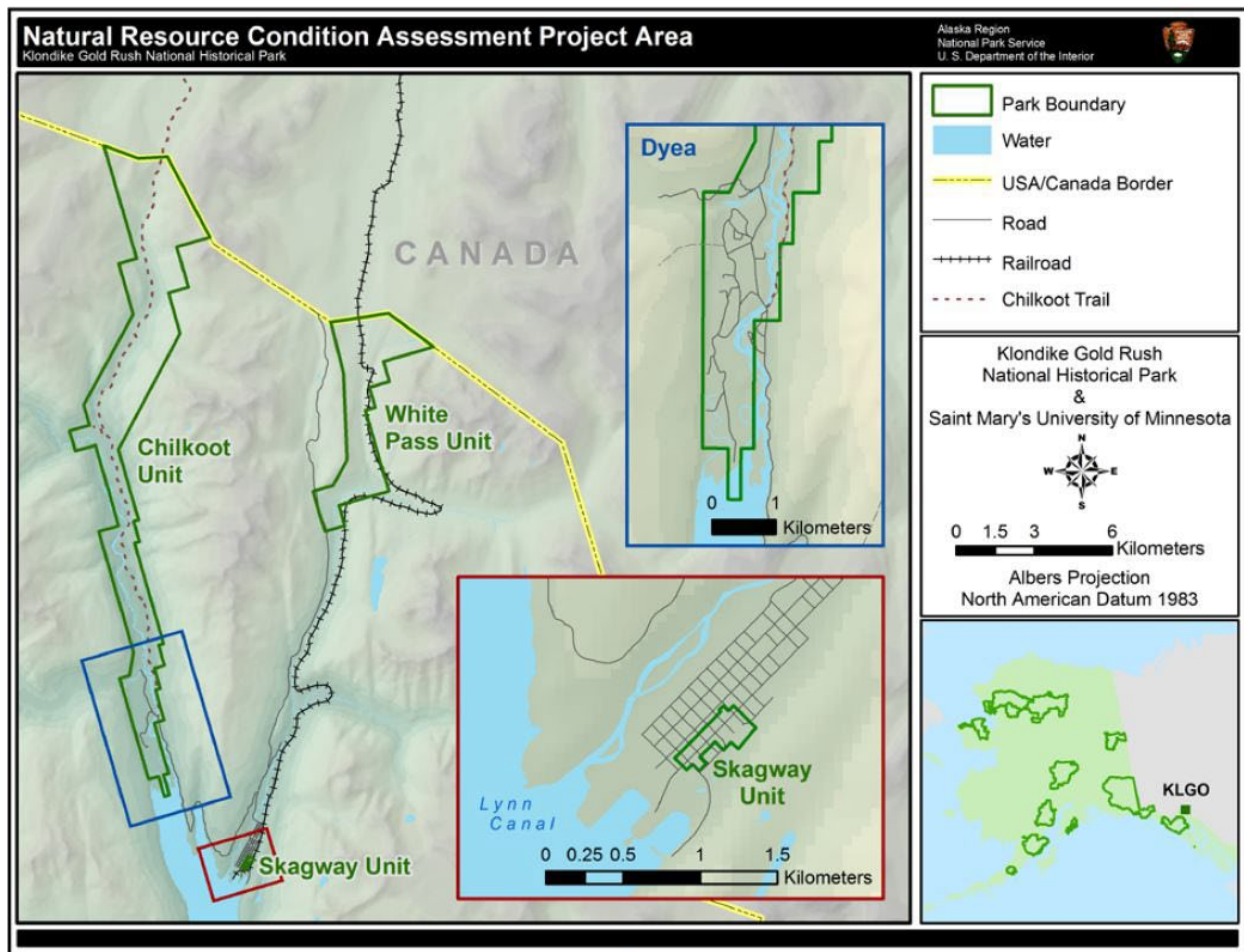


Figure 1: The three units of Klondike Gold Rush National Historic Park

Klondike Gold Rush National Historical Park (KLGO) is in Southeast Alaska at the northern terminus of the Inside Passage. The park is approximately 13,000 acres divided among three separate units located within the Taiya River and Skagway River valleys (Figure 1). These areas are rich in biodiversity, occurring at the ecotone between temperate coastal rainforest and boreal interior forest and encompass an ecological gradient that includes lowland tidal flats, coastal rainforest, sub-alpine

boreal forest, high-alpine meadow, and alpine tundra. The gradient is the result of varying elevation and aspects found within the park, ranging from sea level to approximately 6,000 feet at the peaks of the coastal mountains.

There are a variety of ways in which exotic plants pose a threat to our public lands. The structure of the native plant community becomes vulnerable by reducing species richness and diversity, changing pollinator relationships, and displacing available resources such as light, water and nutrients. This culminates into altered ecosystems by changing fire regimes, nutrient cycling, and hydrology (Levine 2003). Left unchecked invasive plants can have widespread effects on ecosystems. Humans play an important role in the global spread of non-native species, as well as provide disturbance areas where invasive species can infiltrate and thrive (Vitousek 1997).

Invasive plants are ranked based on their potential to cause habitat disruption. In Alaska the invasiveness ranking system includes at least 170 known invasive plants within the state and is based on a scale of 0 to 100; a plant ranked at 0 is not a threat to native ecosystems, while a plant ranked at 100 is a very high threat to native ecosystems. The invasiveness ranking system for invasive plants in Alaska is based on an initial climate screening and an evaluation of ecological impacts, biological characteristics and dispersal ability, ecological amplitude and distribution, and feasibility of control (Carson et al. 2008). This allows for work treating invasive species to be prioritized towards the species that pose the greatest risk to ecosystems

Most national parks in Alaska are still relatively unaffected by exotic species when compared to those of the lower 48. This is due to remoteness, extreme boreal climates requiring strict adaptations, as well as less frequent anthropogenic disturbances (McKee 2005). However, KLGO is not in the same fortunate position as many of Alaska's more remote parks. There is a long history of people traveling to the region dating back to the historic 1896-1899 Klondike Gold Rush. Much of the park also lies in developed areas, or in areas that were formerly developed. These factors combined with the milder climate of Southeast Alaska have led to a higher diversity of non-native species found in KLGO than other Alaskan parks in the past. The park is heavily trafficked in the summer by tourists that arrive to Skagway from cruise ships and traveling down the Klondike Highway to explore the recreation opportunities. These factors provide many opportunities for exotic plants to infiltrate park boundaries. For management efforts to be effective in KLGO, the park must work cooperatively with the surrounding federal, state, tribal and private landowners.

The park consists of three distinct units located in different areas of Skagway. All three units are adjacent to tribal, private, municipal, state and federally owned lands. Each landowner with a unique management mission. In addition, each unit has a unique combination of terrain, ecology, visitor use levels, and vectors for plant introduction. The unit with more management actions to control invasive species is the Chilkoot Trail Unit, but invasive species have been found in the Skagway Unit and the White Pass Unit also. Many invasive exotic plant infestations cross land-ownership boundaries within the park, or connect to nearby lands via transport corridors. Past

monitoring and control efforts have been coordinated with other entities such as the Skagway Traditional Council and the Municipality of Skagway.

The IPMT program on KLGO has been active since 2004. Traditionally there have been one or two SCA interns doing IPMT work stationed in Skagway that perform invasive plant surveys and treatments, and work with community and tribal organizations to organize community events (Varga 2023). However, in 2024 there were no interns in the park which resulted in the only invasive plant work scheduled being tasked to Dustin Reed, a Biological Science Technician on the AKRO IPMT traveling crew based out of Anchorage, AK. Dustin, spent one week at KLGO with the objective of treating a known population of *Phylaris arundinacia* (reed canary grass) and any other invasives found on site opportunistically. Additionally, previously collected unidentified plant specimens were identified.

In 2022 the Chilkoot Trail was designated as a National Historic Landmark. This new designation may have implications for both visitor use of the trail and how it is managed. This may provide new challenges or opportunities to the management of invasive species and land managers should take this into consideration going forward.

Methods

Methods for data collection and processing followed the Alaska Invasive Plant Management Team 2024 Field Protocol (O'Brien 2024) and the Alaska Invasive Plant Management Team 2024 Office Protocol (O'Brien 2024) developed by the Alaska IPMT Program. These protocols outline methods for data collection in the field and processing data. The IPMT collected data using a Samsung Galaxy Tab Active 3 paired with a Leica GG04 GNSS Receiver. Pairing the tablet with the Leica allowed the tablet to collect GPS data with better accuracy when mapping invasive plants in the field. Spatial and attribute data was collected using Esri's ArcGIS Field Maps.

All work was completed from August 19, 2024 to August 23, 2024 by Dustin Reed, a member of the AKRO IPMT's traveling crew out of Anchorage, AK, with assistance from the KLGO Biological Science Technician, Jennifer Larsen, and Museum Curator, Martin Hobmeier. Work was conducted in the Chilkoot Trail Unit of the park. The specific site that was previously identified to contain invasive species was near the Sheep Camp site. In the field Dustin applied herbicide while Martin mapped and assisted with identifying additional invasive species specimens.

The primary focus of this work trip was to treat a known population of reed canary grass that had been mapped by KLGO Biological Science Technician, Jennifer Larsen, and now retired Natural Resource Lead, Carolyn E. Furbish, in 2023. Additionally, there was a known quackgrass (*Elymus repens*) infestation that also needed treatment. The areas around Sheep Camp and the Sheep Camp Ranger Station were additionally surveyed for weeds. Any invasive plants identified were treated. All treatments completed were done using herbicide. Herbicide treatments were done via spot spraying using a backpack sprayer that had been calibrated to 32 gal/acre. The herbicide mixture used was Aquamaster mixed at a rate of 64 oz/acre with the dye Hi-Light Blue. Adjuvant Spreader 90 mixed at rates of 0.32 oz/gal and 0.08 oz/gal respectively. Identifications of unknown plants specimens were done using several reference books including Eric Hulten's *Flora of Alaska and Neighboring Territories* and *Identification of Non-native Plants in Alaska* by Cortes Flagstad et al..

Populations of reed canary grass and quackgrass have been present at Sheep Camp for many years and have historically been treated using both manual tarping methods and herbicide. Due to these species being rhizomatous and aggressive invasive plants, their populations have been reduced but not eliminated. This year's treatments were an effort to continue to control and hopefully eliminate both populations on the Chilkoot Trail.

Results

Dustin Reed arrived in Skagway on the 19th of August. On August 20th Dustin along with Martin Hobmeier, the park's museum curator, were transported via helicopter to the Sheep Camp site. Shortly after arrival rains prevented any treatment, but surveys of the area were completed. The reed canary grass and quackgrass populations were re-identified and no new infestation were found since the 2023 surveys. In addition to reed canary grass and quackgrass several other invasive plants were mapped (Table 1). Each occurrence of reed canary grass and quackgrass were mapped individually to be able to better track how these highly aggressive plants have fluctuated over time, but other invasive species were mapped within a standard polygon (Figure 2). In AK IPMT standard polygons are areas of a defined perimeter (i.e. an enclosed maintenance yard or mowed right-of-way along a highway where there is heavy infestation that needs prolonged treatment) with the perimeter of the mapped area preset the only things that change is information about which plant species are present and changes to their population and percent cover, and the treatments. With standard mapping of invasive plants, the perimeter of the polygon mapped changes every time based on where the infestation is. Using standardized polygons allows IPMT to track the success of repeat treatments over time.

On August 21st, clear weather allowed all the populations that had been identified the day prior of reed canary grass and quack grass to be sprayed with herbicide. All other invasive species found within the Sheep Camp area were sprayed, Also, all invasives species found at the ranger station were sprayed. Lastly, populations of tall buttercup (*Ranunculus acris*) that were identified on the trail between Sheep Camp and the ranger station were also treated. In total two gallons of herbicide mixture was used.

Upon returning to Skagway, on the afternoon of the August 21st, the rest of the time spent at KLGO was used to identify botanical vouchers, plant specimens collected by SCA interns around the Skagway Borough in previous years that had not been positively identified. These vouchers can be used by park staff and others to verify the identification of plants found in the park and for research purposes.

Table 1: Invasive plants surveyed and treated in the Sheep Camp area of KLGO

Invasive Plants Identified in 2024	Plant Common Names	Management Action	Historically Present	Invasiveness Ranking
Phalaris arundinacea	Reed canary grass	Herbicide Treatment	Yes	83
Elymus repens	Quackgrass	Herbicide Treatment	Yes	59
Taraxacum officinale	Common dandelion	Herbicide Treatment	Yes	58
Trifolium repens	White clover	Herbicide Treatment	Yes	59
Ranunculus acris	Tall buttercup	Herbicide Treatment	Yes	54

Figure 2: Areas treated with herbicide. Points are where reed canary grass or quackgrass was treated. All other species were treated within the orange standard polygons or the line.

Figure 3: Areas treated with herbicide. Points are where reed canary grass or quackgrass was treated. All other species were treated within the orange standard polygons or the line.

Figure 4: Areas treated with herbicide. Points are where reed canary grass or quackgrass was treated. All other species were treated within the orange standard polygons or the line.

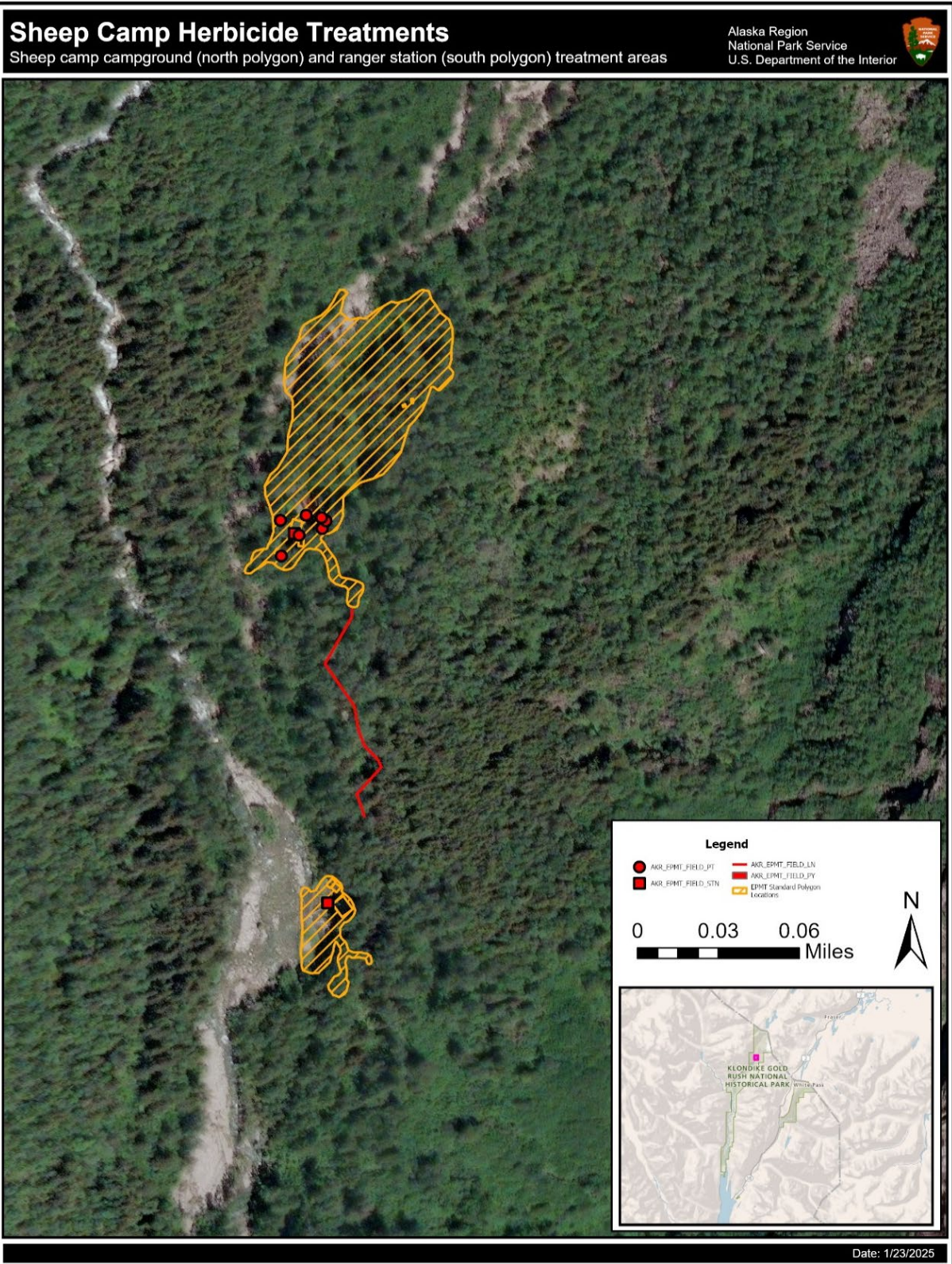


Figure 2: Areas treated with herbicide. Points are where reed canary grass or quackgrass was treated. All other species were treated within the orange standard polygons or the line.

Discussion

In 2024 there was lower IPMT activity than in previous years. Since there were no SCA interns stationed in the park in 2024 to be able to perform multiple surveys in a variety of sites through the season. The one week of work that was conducted prioritized treatments of the reed canary grass and quackgrass populations at Sheep Camp that had been identified in previous years. All known populations of both species were treated with herbicide, and no new populations were detected. This is the continuation of a long-term effort to eradicate both grasses at Sheep Camp. This effort appears to have had positive success and appears nearing total eradication at the site. Treatment and monitoring will need to be continued to completely eradicate these populations and ensure they do not establish again in the future. While looking at historic data for writing this report it was discovered that historically there has been a population of reed canary grass north of Sheep Camp that has not been treated since 2016. This population should be investigated again to ensure absence, and that the population has not had a resurgence in the past eight years.

Other invasives species surveyed in 2024 at Sheep Camp were also treated chemically, but these populations are much more abundant and will take longer to reduce and eradicate. With continued effort these populations can be reduced and possibly eliminated. This will only be achieved with consistent efforts year over year.

Sheep Camp has had limited traffic since 2020 due to pandemic closures, landslide closures, erosion and easement access issues on the Chilkoot trail, which is the only way to access the Sheep Camp from the United States side of the trail unless aviation is involved. The reduced impact now is an optimum time to make headway on these invasive populations. This should continue to be a priority for herbicide treatments within the park. Once access issues are resolved, Sheep Camp will experience high visitor numbers once again.

KLGO should continue to foster the interagency partnerships that has been built by previous SCA interns. These collaborations are valuable and provide an important opportunity to manage invasive species across the greater Skagway area and increase community awareness of the challenge of managing invasive species. Since KLGO has many more invasive species than most Alaskan national park units it is important to continue this management.

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