

Results of Surveying Teslin's Invasive Plant Community

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Table of Contents

| | |
|---|----|
| Acknowledgement..... | 3 |
| Abstract..... | 4 |
| Introduction..... | 5 |
| Methodology..... | 5 |
| Target of Study..... | 5 |
| Area of Study..... | 6 |
| Carrying out the Survey..... | 6 |
| Results and Discussion..... | 7 |
| Species of Prevalence..... | 9 |
| <i>Taraxacum officinale</i> | 9 |
| <i>Crepis tectorum</i> | 11 |
| <i>Trifolium hybridum</i> | 13 |
| <i>Melilotus albus</i> | 15 |
| <i>Bromus inermis</i> | 17 |
| Developing a Mitigation Strategy..... | 19 |
| Inventory..... | 19 |
| Prevention..... | 19 |
| Early Detection and Rapid Response..... | 20 |
| Monitoring..... | 20 |
| Control..... | 21 |
| Conclusion..... | 22 |
| Bibliography | 23 |

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Abstract

Currently, information regarding invasive species in the Yukon Territory is limited. This makes for a precarious situation as efforts are being made to try to control the spread and impact of invasive species; due to an information gap within communities on invasive species, citizens are sometimes counteracting the control efforts taken by planting invasive species in gardens, or having the seeds travel on clothing and pets. There have been two previous published reports concerning invasive plant species completed in the Yukon, none of which take an in-depth look at the village of Teslin. To address this lack of information, a survey of Teslin's invasive plant species community was conducted along roadways to provide information on how these species can be controlled and how the community can become engaged on the project. Concluding this project, the results showed that while there is not a very diverse community of invasive species in Teslin, the existing one is thriving and healthy. Common dandelion in particular was of concern due to the reason the plant was found in 90.7% of surveyed plots while also, it can be seen creeping towards native, undisturbed ground. Dandelion is not near as invasive as other species found, but shows the extent that a species can reach.

Introduction

When it comes to invasive species, Yukon is rather fortunate. There are 154 non-native species in the Territory, but of those, only 20 are invasive, compared to BC's 36 invasive plant species. Invasive species are non-native, introduced plants which have a negative effect on economy, environment, and health (Yukon Invasive Species Council, 2010). Typically, most invasive species are extremely aggressive and often out-compete many surrounding native species, decreasing natural biodiversity. As harmful as these plants are, though, many places do not have management practices in place or education components to address an existing information gap on invasive species. The purpose of this study is to try to address the lack of locally-relevant knowledge of invasive plant species by creating a mitigation strategy to reduce the spread and effects of invasive species, as well as developing methods of public outreach to support this strategy. Teslin has a very diverse plant community spanning over several ecotypes, all of which play important roles in maintaining the stability of the boreal ecosystem. Many people in Teslin rely on the land to provide for themselves, whether it is mossberries or a moose. For that to happen, though, an ecosystem needs to be complete and healthy right down to the soil.

Methodology

Target of Study

The plants focused on in surveying Teslin's invasive plant community were on a list 20 suggested species set out by the Yukon Invasive Species Council (YISC) and several other species to watch for. In order to focus the survey, a pre-test survey had to be completed to gain a

Results of Surveying Teslin's Invasive Plant Community

better understanding of the plant community in this area, the densities they occur at, and the level of ground disturbance. Following the conclusion of a pre-test survey, eight plants were chosen to be the focus of the survey. As part of the pre-test survey, 10 plot samples were carried out in an effort to better anticipate the density of plants per square meter, along with getting a closer look at what species were being affected by the presence of invasive species.

Area of Study

In total, 2.65 km of roadways were surveyed in the Village of Teslin with the study area ranging from Nisutlin Drive down to Tlingit Drive near the lake. This area provided a superb selection of diverse plant communities and disturbance levels. In this small area, several geographical types are found, including a riparian area, pine forest, and disturbed land making for a rather contrasted community of plants in general. Part of the reasoning for choosing the residential portion of the Village of Teslin was because of its disturbance level. A fair percentage of Teslin's population live in the village, which has resulted in various levels of disturbance, and prime conditions for the establishment of invasive species.

Carrying out the Survey

Conducting the survey took 2 days with set up and surveying taking place on both days. To make sure a healthy and lively invasive plant community was abundant during surveying, July 13-14, 2015 were the days used to conduct our survey. Two surveyors walked on either side of the road in 50 metre sections and visually estimated the percent coverage up to 2 metres away from the roadway. Visual estimation of percent coverage was broken into 5 groups as follows: 0.01%, <5%, 5-50%, 50-75%, and 75-100%. Using the groups of 5 estimations allowed for a

decreased error in our final results as well as increasing the efficiency of data analysis. When identifying which plants were in each plot, flowering structures were preferably used, as most species had been in flower, but for those that weren't, leaf structure were used for identification.

Results and Discussion

After compiling survey data, a list of five invasive species which show the most prevalence in Teslin was constructed. All five species show a moderately high level of occurrence in Teslin, ranging from occurring in 90.7% of plots to 16.6% of plots. The species found are as follows: Common Dandelion (*Taraxacum officinale*), Narrowleaf Hawksbeard (*Crepis tectorum*), Alsike Clover (*Trifolium hybridum*), White Sweet Clover (*Melilotus albus*), and Smooth Brome (*Bromus inermis*). There is not a very diverse invasive plant community in Teslin, which make implementing a mitigation and control plan much more feasible. Percent cover in some plots was concerning though, as 10 plots had invasive species coverage of 50-75% for a single species. When plants are recorded in a 50 m section with such a high percent coverage, it runs the risk of developing into a monospecific stand, totally diminishing the biodiversity of the area. Also worth noting is that bird vetch (*Vicia cracca*) was found in two plots throughout Teslin. In both plots it can be seen that the bird vetch is dominating the surrounding species by overgrowing and binding them with the tendrils that latch onto anything near. In one observation, a spruce sapling had been effectively over taken by bird vetch and it was apparent that the sapling was losing its resources to the bird vetch as growth looked to be stunted, as well, needles looked to be discoloured and falling off. A management practice used in

Results of Surveying Teslin's Invasive Plant Community

controlling invasive species is called "Early Detection, Rapid Response" or "EDRR" which involves identifying a problem species and the effects it can have on its surrounding environment, then treating it in a culturally, and environmentally responsible manner. The concept is not complicated and is quite simple to implement, making it an excellent practice to treat a species like bird vetch before it can become established.

Species of Prevalence

Common Dandelion (*Taraxacum officinale*)

Common dandelion typically grow in basal rosettes with very distinct, deeply lobed leaves growing to 30 cm or more. Scapes reach heights of 40 cm or more. How most people identify dandelions is by their very bright, yellow ray flower which gives way to fluffy white achenes later in the growing season as they prepare to seed. Roots are usually single taproot descending various depths (Cody, 1996). Common dandelion adapts very well to moist soil conditions and many other climates.

Common dandelion was introduced from Eurasia and is wide spread across North America (Cody, 1996). At first glance it may be easy to confuse this dandelion with its native counterpart, the horned dandelion (*Taraxacum ceratophorum*); however, the horned dandelion only grows in moist forests or tundra in addition to having an entire leaf margin. When pulling dandelions, it is recommended that the entire plant including the roots are pulled and put in a clear plastic garbage bag to roast the seeds and diminish the seed bank.

In a survey of Teslin's invasive species community, the common dandelions were found in 90.7% of the sections ranging in percent coverage from 5-50%. It was also noted that dandelions were seen creeping in towards native undisturbed, forested areas.

Figure 1. Map of Teslin Indicating of Distribution of *Taraxacum officinale*



Photo by Nick Hogan

Narrowleaf Hawksbeard (*Crepis tectorum*)

Narrowleaf Hawksbeard is a perennial which grows in disturbed places, roadsides, burn areas, and river bars. As its name suggests, this plant has very narrow leaves which run the length of the stem, decreasing in size as it grows taller. Stems can grow upwards of 60 cm, very recognizable by its solid green stem which becomes many branched as the plant grows. Much like the dandelion, the narrowleaf hawksbeard has bright yellow ray flowers which turn into fluffy purplish-brown achenes later in the growing season. Plant comes from a taproot that is typically very deep (Yukon Invasive Species Council, 2010).

Similar to many other invasive species, narrowleaf hawksbeard was introduced from Europe. Originally seen in cultivated fields, pastures, and waste places, the plant has become widespread throughout much of North America and thrives in human-disturbed areas. Flowers follow the sun as they open shortly after sunrise and close later in the afternoon. Like most other invasive plants, hand pulling to remove all root structure before seeding is ideal. However, narrowleaf hawksbeard will continue to mature even after removal, meaning that all plants removed in any manner should be placed into a clear plastic garbage bag and left exposed to the sun to roast seeds.

Narrowleaf hawksbeard was found in large quantities, occurring in 70.9% of plots and ranging 5-50% coverage in each plot.

Figure 2. Map of Teslin Indicating of Distribution of *Crepis tectorum*



Photo by Nick Hogan

Alsike Clover (*Trifolium hybridum*)

Alsike clover is a plant which can take many different forms depending on where it grows.

Generally, alsike clover grows 20-40 cm tall ascending from creeping stolons. Trifoliate leaf arrangement, three leaves originating from the same stem, with distinct pinkish-white round flower cluster growing from the same leaf peduncle. Fruit coming from alsike clover are legumes, albeit very small legumes, which do not split when ripe (Cody, 1996).

Introduced from Europe as a forage plant, the alsike clover has its benefits due to its nitrogen fixing nodules on its roots. Alsike clover is also being an indicator species due to its preference towards soils which are slightly acidic. Although alsike clover is not as harmful compared to plants like narrowleaf hawksbeard, it is still putting at risk the biodiversity of local plants. For agriculture, this plant has some negative effects on the health of livestock, such as Trifoliosis which causes photosensitivity from dew-dampened alsike clover (John, 2008). Trifoliosis shows signs such as swollen lips and tongue, severe drooling, and swollen spots of contact. To control alsike clover in an urban environment, pulling by hand before seeding and taking the whole root will stop growth and spread, but mechanical control such as mowing, weed-whipping or digging up will also slow down growth and spread of the plant.

Alsike clover was found in 66.6% of plots in Teslin, many of which were disturbed ditches and maintained lawns. Several places where plots backed onto an undisturbed forest, alsike clover could not be found.

Figure 3. Map of Teslin Indicating of Distribution of *Trifolium hybridum*

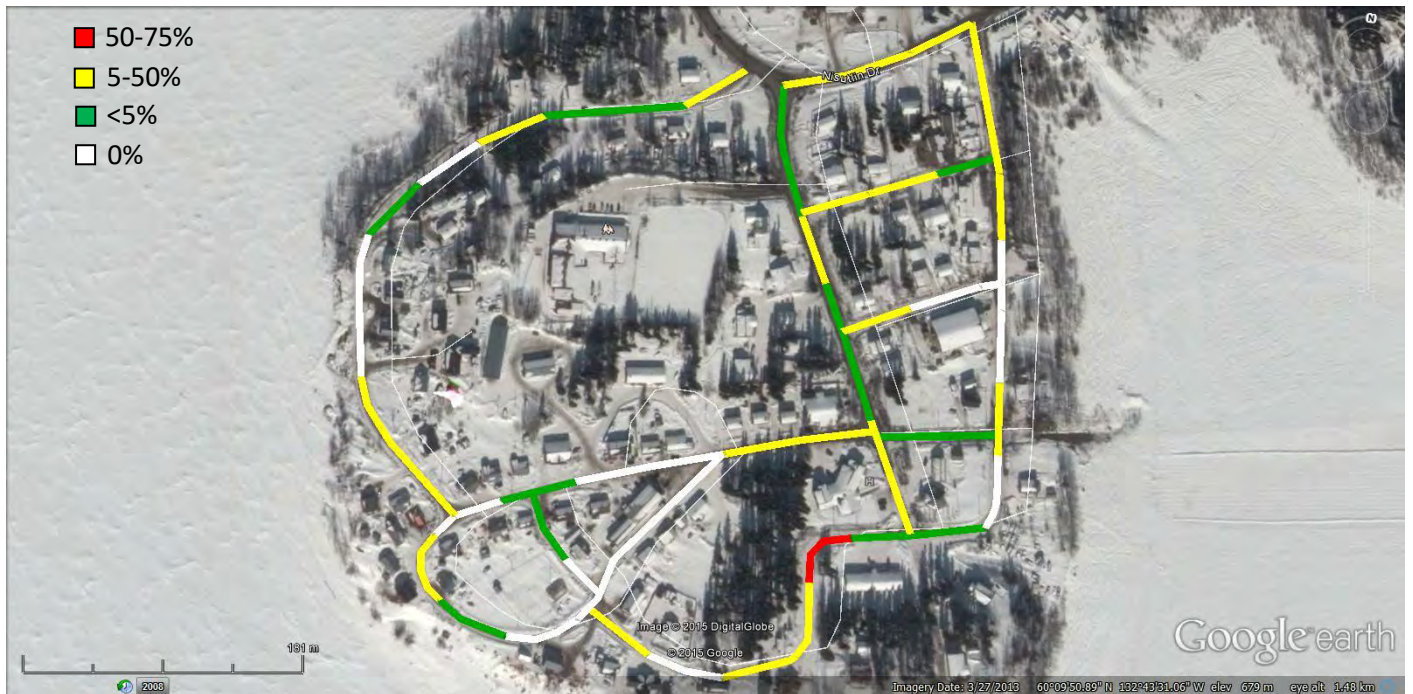


Photo by Colin Stone (Alberta Agriculture)

White Sweetclover (*Melilotus albus*)

White Sweetclover can be seen on many highways within the Yukon, enclosing the road for long distances and drastically reducing visibility of both vehicles and wildlife (Line J, 2008). White Sweetclover grows rapidly during the growing season up to two meters and rapidly colonizes disturbed, well-drained soils. Sweetclover grows from a fibrous taproot producing a single, many branched stem in its first year of growth. Second year of growth brings about a much thicker stem with many branches and trifoliate leaves. Flowers are typical of the Fabaceae family, containing 5 petals consisting of banner, keel, and wings all the color of white and no more than 5 mm long (Cody, 1996).

Introduced from Europe as a forage plant and still widely used, sweetclover has taken off as an invasive species being found in every Canadian province and territory. Very few places are considered uninhabitable by this species, and sweetclover can be found growing in river valleys, outcompeting bank stabilizing willows, gravel quarries where rainfall is the only water they receive, and roadsides blocking view for extended distances (Line J, 2008). To treat sweetclover locally, hand pulling before seeding would be ideal, but for larger outcrops, mechanical treatment before seeding and cleaning up clippings will diminish the seed banks for years to come.

In Teslin it was found that sweetclover had invaded 44.4% of the plots. There were many areas that had sweetclover, but the outcrop was out of our study area. Teslin does not have sweetclover established as strongly compared to areas such as the South Klondike Highway, which presents the opportunity to control this species in town.

Figure 4. Map of Teslin Indicating of Distribution of *Melilotus albus*



Photo by Nick Hogan

Smooth Brome (*Bromus inermis*)

Unmistakable from its characteristics, smooth brome ascends from rhizomes growing up to 1 metre or more, and has an unremarkable stem containing glabrous leaf sheaths and flat leaves. Panicle spreading from 15-25 cm long; has a rich purplish-brown color when mature. Seed heads are smooth when felt at maturity, as name suggests (Bush, 2002).

Smooth brome is frequently utilized in seeding in the Yukon Territory due to its deep binding roots which hold soil together well, but quite often spreads to surrounding suitable landscapes. This plant forms a dense sod which essentially suppresses the establishment of native species, decreasing natural biodiversity. While it is recognized that smooth brome has its place in nature as a bank stabilizer, this plant must also be controlled in communities so natural processes such as succession can take place. Removing smooth brome from an established area is quite difficult and often times unsuccessful. Mechanical treatment will stop that year's growth and decrease seed bank, but herbicides are more often required (Yukon Invasive Species Council, 2010).

It was found in Teslin that smooth brome only inhabited 16.6% of the surveyed plots. With such a small number of plots inhabited by smooth brome, control methods implemented swiftly and effectively can reduce the prevalence of smooth brome in the study area.

Figure 5. Map of Teslin Indicating of Distribution of *Bromus inermis*



Photo by Colin Stone (Alberta Agriculture)

Developing a Mitigation Strategy

To develop a mitigation and control strategy, the methods of control must first be discussed.

There are countless management and control plans out there to utilize, but there is no "one size fits all" approach to invasive species. Each plan has different variables it is suited to, so in the end one has to either piece together their own, or find one that is suited to your variables.

The Alaska Exotic Plant Information Clearinghouse (AKEPIC) has set out an invasive plant management plan compiled of 5 steps that have enough play within them to tailor the plan to a projects needs. AKEPIC's invasive plant management plan has 5 steps consisting of: inventory, prevention, early detection and rapid response, monitoring, and control, described below (Flagstad L, 2014).

Inventory

This step of the plan involves the process of correctly identifying plant species along with a collected baseline of non-native plants. From this baseline, future years of data collection can be compared and assessed as to how well control efforts are going. Surveying Teslin's invasive plant community is encompassed in this step; a baseline has come about from the conducted survey and now data collected in the future can be contrasted against these data points. The importance of completing this step properly is critical to the success of the entire project. If a plant is not properly identified, the management plan could be developed for the wrong plant and have different outcomes than what is needed (Flagstad L, 2014)

Prevention

After doing an inventory of the non-native plant community, prevention ensures that none of the identified plants have an opportunity to spread. Prevention entails developing procedure

and practices which minimize the potential of non-native or invasive plants spreading and becoming introduced. Community outreach and education is an essential component of prevention as it provides the knowledge to citizens on how their choices impact the community. Simple methods of outreach involve mostly alerting citizens to how they are assisting invasive species to spread, and how to mitigate that risk (Flagstad L, 2014)

Early Detection and Rapid Response (EDRR)

The process of this step has surveyors and researchers analysing inventory data to determine the composition of the invasive plant community, paired with efforts to eradicate targeted species before they begin to spread. Seen as a “putting out the fire” step, EDRR is the action taken to actually physically remove plants from an area. The outcome of this step is to ultimately stop growth of targeted species and ensure no other species have the opportunity to establish and spread. There may be some species in which eradication may not be feasible; however, the control process of plant management will take care of those species.

Monitoring

Here is where inventory plays a key role in plant management. Monitoring lets the people managing infestations compare their results and progress, as well as showing what species require more control efforts than others. Monitoring can be done in many different time periods depending on what the desired outcome is. For the Teslin area, monitoring can be done every year by a simple survey carried out in the summer. Comparing data at exact locations works quite well, but pictures of an area will also suffice (Flagstad L, 2014).

Control

Control is a long term process to be carried out over several years. While EDRR is a fast acting, quick response to a manageable-sized infestation, control is a long term project which attempts to minimize the impact the species is having and to also keep other invasive species out. For control methods to be effective they need to be implemented year after year in order to diminish seed bank count. Control methods include:

- Manual (hand pulling)
- Barrier (tarping, mulching)
- Mechanical (mowing, tilling)
- Cultural (prescribed fire, flooding)
- Biological (intentional introduction of biological control agents)
- Chemical (herbicides)

These are the list of control methods put out by AKEPIC and what they found to be effective. Several methods require years of research and data collection, like biological control, which does not make them very attainable. Methods such as manual, barrier, and mechanical all have very accessible tools and are not very difficult to implement (Flagstad L, 2014).

For the time being, community involvement and education on the subject is crucial. If citizens can become involved on the subject, they could potentially implement control methods within their own backyard, and can certainly contribute to monitoring efforts. An understanding of what plant species grow around ones yard can help push forward with the struggle against invasive plants.

Conclusion

Teslin village is a quiet community which revolves around tradition. Many of these traditions have been passed on for countless generations and are wished to be passed on for as long as it can be. Fresh berries for many are a welcome treat every now and then but many Teslin Tlingit Citizens rely on food like berries, or the animals that feed on them, to supplement a modern diet throughout the winter until they can gather more. Invasive plant species are a direct threat to this cultural need due to their aggressive nature and tendency to displace native species, thus decreasing biodiversity and possibly creating instability for a relied upon food source (Yukon Invasive Species Council, 2010). While surveying invasive species in Teslin may not seem to have any correlation to far away food sources, it has been shown that invasive plant species most typically travel by latching onto animals, vehicles, or people who come into contact with them. This means that when hunters or berry pickers venture out, any seeds attached to their clothing or vehicle is also coming with them into the backwoods. In a situation like this, knowledge is crucial in keeping invasive species from furthering their reach. Simple public outreach exercises can help accomplish the desired outcome of stopping the spread of invasive species further into natural land and minimize the impact within town.

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