2016 Invasive Plant Roadside Survey
Yukon Territory

Prepared for:
Yukon Government
Invasive Species Interdepartmental Working Group

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Yukon Government

YISC Yukon Invasive Species Council

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EXECUTIVE SUMMARY

The 2016 roadside survey provides insight into changes in distribution and abundance of White Sweet-clover along Yukon's major highways, gravel pits, rest areas, pullouts, and watercourses since the 2007 roadside survey, as well as baseline abundance and distribution data for other priority invasive plant species. The 2016 roadside survey surveyed for 14 priority invasive plant species along Yukon's major highways, gravel pits, rest areas, pullouts, and watercourses. Surveys were carried out by two lead surveyors including a driver, totaling 19 survey days between June 26 and July 28, 2016.

White Sweet-clover was the most common priority invasive plant species observed along Yukon's major highways, followed by Alsike Clover, Smooth Brome, Narrow-leaf Hawk's-beard, Red Clover, Alfalfa, Yellow Sweet-clover, and Yellow Lucerne. Species found infrequently along major highways included Umbellate Hawkweed, Oxeye Daisy, Reed Canary Grass, Field Sow-thistle, and Common Tansy. Scentless Chamomile was not seen along any of the surveyed roadsides, but a few scattered individuals were noted in a pullout/disturbed area near Sidney Lake on the South Canol Road and in the dump near Johnson's Crossing. Within gravel pits, rest areas, and pull outs the most common and abundant priority invasive species included Narrow-leaf Hawk's-beard, White Sweet-clover, Alsike Clover, and Smooth Brome. Relatively few watercourses had invasive species present; however, 97 watercourses (44%) had priority invasive species present in close vicinity to the watercourse (e.g., around bridges, above banks, or along the road above the watercourse).

Observations indicate that White Sweet-clover increased along some highways and decreased along others since 2007. As indicated by the abundance category there was an increase in White Sweet-clover along the Silver Trail and along the North Klondike Highway south of Carmacks from Sparse and Uncommon/Absent in 2007 to Continuous and High Scattered in 2016. Sections of the Campbell Highway east of Carmacks also show some increase from Uncommon/absent in 2007 to High Scattered and sections of Rare in 2016.White Sweet-clover abundance had declined notably in 2016 along the Alaska Highway west of Burwash from short areas of Continuous in 2007 to High Scattered and Rare in 2016, north of Carmacks from Continuous in 2007 to High Scattered, and from Johnson's Crossing to Swift Current on the Alaska Highway from sections of Continuous in 2007 to mostly High Scattered in 2016. Gravel pits, rest areas, and pullouts do not appear to have changed in overall abundance since 2007.

Long-term monitoring should consider resurveying a sub-sample of active gravel pits, rest areas, pullouts, and watercourses from the 2016 roadside survey and resurvey Yukon's major highways according to the methodology provided in this report.

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AUTHORSHIP

This report was prepared by Rhonda Rosie, a resident botanist and plant specialist in the Yukon Territory. Others who contributed to the survey methodology for the 2016 roadside survey include Bruce Bennett (Environment Yukon), Brett Pagacz (EDI Environmental Dynamics Inc.), Alberto Suarez-Esteban (University of Alberta, Yukon Research Centre), and Michael J. Oldham (Natural Heritage Information Centre, Ontario Ministry of Natural Resources and Forestry).

INTRODUCTION

Invasive plants are species that are not native to an area and have negative effects on our economy, our environment, or our health (YISC 2016). The impact of invasive plants can be extensive such as displacement of native species, modification of ecosystems and ecosystem functions, introduction of pests and diseases, and reduction in biodiversity (Line et al. 2008). According to the International Union for Conservation of Nature (IUCN), invasive species are the second most significant threat to biodiversity, after habitat loss (Government of Canada 2016). Invasive species have cost Canada billions of dollars in direct losses, control costs, and reduced annual production every year (Government of Canada 2016).

A roadside survey of invasive plants was conducted by in 2007 by Yukon Government along Yukon roadways (Line et al. 2008). This survey was the first of its kind in Yukon specific to invasive plants and was intended to provide a baseline inventory. The survey focused on the distribution of Sweetclover (*Melilotus* spp.) along major Yukon highways, as well as the presence and abundance of invasive plants at rest stops, campgrounds, gravel pits, and other disturbed areas along major Yukon highways. To improve understanding of the changes to invasive plant distribution and abundance since the 2007 roadside survey, a follow-up roadside survey was conducted in the summer of 2016. This survey was funded by the Yukon Government (YESAA Implementation Fund) in collaboration with the Yukon Invasive Species Council (YISC) and the Yukon Government Invasive Species Interdepartmental Working Group (ISIWG).

A survey of 14 priority Yukon invasive plant species was conducted during the summer of 2016 (Table 1). The survey included highways, gravel pits, rest areas, pullouts, and watercourses. Surveys were carried out on 19 days between June 26 and July 28, 2016 when the majority of invasive plant species were in flower and conspicuous. Non-priority introduced plants were also noted when seen. In repetition of the 2007 road survey, all highways were surveyed with the exceptions of the Dempster Highway, Stewart-Cassiar Road, North Canol Road, and Nahanni Range Road.

A total of 559 sections along the highways were surveyed (Appendix D, Tables 1, 2), with each section being approximately 5-km long, except where shortened at boundaries of communities or sections of active road construction.

A total of 61 active gravel pits were surveyed (Appendix D, Table 3) including 21 along the Alaska Highway, 18 along the Campbell Highway, ten along the North Klondike Highway, four along the Haines Highway, four along the Silver Trail, and one along each of the remaining four highways (South Klondike Highway, Tagish Road, Top of the World Highway, and South Canol Road).

A total of 29 rest areas were surveyed (Appendix D, Table 4) including 12 along the Alaska Highway, seven along the North Klondike Highway, five along the Silver Trail, four along the Campbell Highway, and one along the Top of the World Highway.

A total of 75 pullouts were surveyed (Appendix D, Table 5) including 31 along the Alaska Highway, ten along the Haines Highway, 11 along the Campbell Highway,ten along the North Klondike Highway, seven along the South Canol Road and four along the Top of the World Highway, and two along the South Klondike Road.

A total of 222 watercourses (Appendix D, Tables 6, 7, 8) were surveyed including 94 along the Alaska Highway, 36 along the North Klondike Highway, 35 along the Campbell Highway, 31 along the South Canol Road, 17 along the Haines Highway, seven along the Silver Trail, and two along the South Klondike Highway.

OBJECTIVES

The objectives of the 2016 roadside survey were to:

- Repeat the 2007 roadside survey for Sweet-clover (*Melilotus* spp.) along major Yukon highways and at rest stops, pull-outs and gravel pits;
- Survey for additional priority invasive plant species as part of the 2016 roadside survey; and
- Expand the survey to include watercourses (e.g., riverbanks) for priority invasive plants.

PRIORITY INVASIVE PLANT SPECIES

All known introduced plant species in Yukon are provided in Appendix A. The 2016 roadside survey focused on relatively common and widespread invasive plant species in Yukon (Table 1).

Fourteen priority invasive plant species were selected for the 2016 roadside survey. Factors used for the selection of priority invasive plant species for the survey included distribution in Yukon, biology of the species, and likelihood of identification from a moving vehicle.

Table 1. Priority invasive plant species for the 2016 Roadside Survey, Yukon.

Scientific Name	Common Name
Bromus inermis	Smooth Brome
Crepis tectorum	Narrow-leaf Hawk's-beard
Hieracium umbellatum[1]	Umbellate Hawkweed[1]
Leucanthemum vulgare	Oxeye Daisy
Medicago falcata [2]	Yellow Lucerne[2]
Medicago sativa[2]	Alfalfa[2]
Melilotus albus (syn. M. alba)	White Sweet-clover
Melilotus officinalis	Yellow Sweet-clover
Phalaris arundinacea	Reed Canary Grass
Sonchus arvensis[3]	Field Sow-thistle[3]
Tanacetum vulgare	Common Tansy
Trifolium hybridum	Alsike Clover
Trifolium pratense	Red Clover
Tripleurospermum inodorum	Scentless Chamomile

[1] This is a rapidly expanding species believed to be native, but can be confused with similarly appearing introduced species.
[2] Yellow-flowered forms of Alfalfa and Yellow Lucerne are difficult to distinguish from a moving vehicle. If the identification is in doubt, the species should be recorded as *Medicago* sp.
[3] May be difficult to detect if the survey occurs early in the summer as this species flowers later in the season.

1: METHODS

HIGHWAY SURVEY

The 2016 roadside survey included three components:

1. Highway Survey (same as 2007 survey)
2. Pull-outs, Rest Areas, and Gravel Pits (same as 2007 survey excluding campgrounds)
3. Watercourses (e.g., riverbanks; new component)

Yukon highways targeted for the 2016 roadside survey were:

- Alaska Highway - Highway 1
- North Klondike Highway - Highway 2
- South Klondike Highway - Highway 2
- Haines Highway - Highway 3
- Robert Campbell Highway - Highway 4 (including access roads into Faro and Ross River)
- South Canol Road - Highway 6
- Tagish Road - Highway 8
- Top of the World Highway - Highway 9
- Silver Trail to Keno City - Highway 11

Yukon highways were systematically surveyed for invasive plant species by driving at moderate speed (generally 30-40 km/hr). Each vehicle had a driver and an observer/recorder, enabling assessment of both sides of the road. Two surveyors per vehicle permitted greater safety, probability of detection of invasive plants, and ease of recording information.

The survey focused on the vegetated section within the road right-of-way. The term "right-of-way" refers to the width of a road measured from the highway centerline on both sides of the highway. A 30 m right-of-way is in effect for all Yukon highways, except for the Alaska Highway, which extends 45 m out from the highway centerline (both sides). In this report, "right-of-way" is used to denote the vegetated part of the entire right-of-way width on both sides of the road. However, along some of the less-travelled roads the actual cleared right-of-way was less than 30 m and in some cases essentially absent, with dense native vegetation growing right to the road edges. For more detailed descriptions of the highways see Section 2, Description of Highways in this report.

Using a GPS, surveyors recorded a waypoint at the beginning of highway travel, and again after approximately every 5-km of travel. For each 5-km road section, priority species observed were ranked for abundance using the descriptions provided in Table 2, and entered on paper forms. Communities along the highways and some

sections of highways which were under active construction (Appendix E, Figure 1) were not surveyed, but where some observations of invasives were recorded, these have been included in this report.

Surveyors recorded direction of travel, type of road (i.e., paved or gravel), and any causes of reduced detectability, (i.e., highway construction; Appendix E, Figure 1), mowed (Appendix E, Figure 2), weather conditions, traffic, etc.; however, neither weather nor traffic were limiting factors.

When priority invasive plant species were observed beyond the highway corridor (i.e., invading into natural habitat) a waypoint was taken, and habitat type and distance from the highway were recorded.

Stops were made occasionally to inspect a right-of-way in more detail or to verify and collect a species. Unknown specimens were collected when field identification was uncertain. Specimens collected for verification were sent to Bruce Bennett (Coordinator, Yukon CDC) for identification confirmations and deposited at the National Herbarium of Agriculture and Agri-food Canada (DAO) in Ottawa.

Photos were taken of notable occurrences of a species and also of representative sites along the highways, surveyed gravel pits, rest areas, pullouts, and watercourses.

Table 2. Abundance categories for the 2016 roadside survey, Yukon (Sub-Categories of the Sporadic category were used during the survey for species ranking).

Category	Sub-Category[1]	Description
Continuous	--	Plants form a dense and continuous patch greater than 100 m long along one or both sides of the highway. Density distribution class of 7 or 8[2].
Sporadic	• High scattered abundance	Plants form occasional patches less than 100 m long which are broken by large sections (i.e., several hundred metres) of scattered or no growth. Patches of high scattered abundance have a density distribution class of 5 or 6[2].
	• Low scattered abundance	Plants form occasional patches less than 100 m long which are broken by large sections (i.e., several hundred metres) of scattered or no growth. Patches of low scattered abundance have a density distribution class of 3 or 4[2].
Rare	--	Very few plants observed (i.e., small isolated patch). Density distribution class of 1 or 2[2]. Mark a single waypoint.
Absent	--	No plants observed.

[1] The 2007 Roadside Survey suggested including a sub-category to further define the abundance of the sporadic category for future surveys.

[2] See Luttmerding et al. (1990); Appendix B.

GRAVEL PITS, REST AREAS, AND PULLOUTS

A number of gravel pits, pull-outs, and rest areas surveyed as part of the 2007 survey were re-surveyed in 2016 as part of long-term monitoring objectives.

Surveys of all sites were conducted on foot or from the vehicle where feasible. Abundance ranks were assigned to priority invasive species observed. Non-priority invasives were also recorded where observed. Random selections of active gravel pits were surveyed.

Gravel pits were categorized as either active or abandoned. A list of active gravel pits was provided by Geomatics Yukon (Appendix C).

Rest areas large enough for vehicles to pull into and park are maintained by Yukon Government. One or two outhouses and trash barrels are usually present at these sites.

Pullouts are defined as unpaved areas along a road. These are not Yukon Government rest areas or active gravel pits, but are large enough for a vehicle to pull into. Yukon Government maintained trash barrels and outhouses are not present at these sites. Other sites included as pullouts were two active and two inactive commercial sites (gas stations/restaurants), dumps, an airstrip, an airport parking area, a public quarry, an access road, a culvert storage area, and a road shoulder and road junction.

WATERCOURSES

Watercourses are riparian systems of varying sizes including creeks, streams, and rivers which intersect Yukon highways, flowing either under bridges or through culverts beneath the road.

Watercourses were surveyed from a vehicle or on foot where feasible. All four edges of the watercourse were checked for priority invasive species. Priority invasive species observed within the riparian zone were recorded, along with other relevant information, such as presence of bridges and culverts, size of stream, proximity to other disturbances, etc. Non-priority introduced or invasive plant species were noted as well.

2. DESCRIPTIONS OF HIGHWAYS

The following provides descriptions of highways surveyed, including priority invasive plant species observed. For detailed information regarding priority invasive species see Section 3, Priority Invasive Plants Along Yukon Highways.

HIGHWAY 1: ALASKA HIGHWAY — 182 sections surveyed

The Alaska Highway was the longest highway surveyed as part of the 2016 roadside survey, with a length of 935 km from its western border with Alaska to the British Columbia border south of Watson Lake. The highway was surveyed from the Alaska border to Watson Lake.

Road elevations were between 521 and 1027 m. The highest elevations were recorded in the Cassiar Mountains west of Watson Lake.

The highway was generally in good condition with the exception of some areas of ongoing roadwork, including one 26 km long section west of Whitehorse. The road is two-laned and chipsealed, with shoulders sloping down to a wide right-of-way through most of its length.

Some roadside edges and right-of-ways appeared to have been mowed prior to the survey between Haines Junction and the Aishihik Road cutoff, as well as long stretches of roadside between Whitehorse and Jake's Corner and along Teslin Lake.

Most of the priority species seen along the roadside edges, as well as in the right-of-way, were mixed in with native herbaceous and woody species.

The most common and abundant priority invasive species along the length of the Alaska Highway was White Sweet-clover, followed by Smooth Brome, Narrow-leaf Hawk's-beard, and Alsike Clover.

Other priority invasive species seen with more widely scattered locations and much less abundance were Red Clover, Yellow Sweet-clover, Alfalfa, Yellow Lucerne, and Oxeye Daisy.

HIGHWAY 2: NORTH KLONDIKE HIGHWAY — 105 sections surveyed

The North Klondike Highway from Whitehorse north to Dawson City is 524 km long and runs through hilly terrain with road elevations ranging from 332 to 860 m.

The highway was in good condition with only one 5-km long section being resurfaced during the survey. The highway is two-laned and chipsealed with a generally widely cleared right-of-way.

Approximately 40 km along the highway between Whitehorse and Carmacks, and approximately 105 km between Carmacks and Pelly Crossing had been mowed during the current season.

The most common and abundant priority invasive species along the length of the North Klondike Highway was White Sweet-clover, followed by Smooth Brome, Alsike Clover, and Narrow-leaf Hawk's-beard.

Other priority invasive species that were widely scattered and much less abundant were Red Clover, Alfalfa, Yellow Lucerne, Yellow Sweet-clover, Umbellate Hawkweed, Field Sow-thistle, Oxeye Daisy, and Common Tansy.

HIGHWAY 2: SOUTH KLONDIKE HIGHWAY — 16 sections surveyed

The South Klondike Highway runs through hilly and mountainous terrain from the Alaska Highway east of Whitehorse to the British Columbia border, a distance of about 77.5 km, with road elevations ranging from 670-793 m.

The highway was chipsealed and in good condition with a wide, mostly brushed-out right-of-way.

The most common and abundant priority invasive species observed were Smooth Brome, Alsike Clover, and Narrow-leaf Hawk's-beard, followed by only a few sections each of White Sweet-clover, Yellow Sweet-clover, Yellow Lucerne, Alfalfa, and Red Clover.

No other priority invasive plant species were seen along the South Klondike Highway.

HIGHWAY 3: HAINES HIGHWAY — 21 sections surveyed

The Haines Highway runs through mountainous terrain southward from Haines Junction to the British Columbia border and beyond to the Alaska coast. Its length in Yukon is 100 km with road elevations ranging from 590 to 957 m.

The highway is two-laned, chipsealed its entire distance within Yukon, and was in good condition.

The cleared right-of-way is not as wide as the Alaska Highway, and supports a mix of native and introduced species through all but about 30 km at the southern end of the road, where the right-of-way narrows and native shrubs grow right to the road edges.

Mowing was in progress at the time of the survey along one short section of the highway near Dezadeash Lake, and no highway construction was encountered.

The most common and abundant priority invasive species along the road was Alsike Clover, followed by Smooth Brome, Narrow-leaf Hawk's-beard, and Red Clover. White Sweet-clover was seen in only one section.

Other priority species noted were Yellow Lucerne, Alfalfa, Umbellate Hawkweed, and Reed Canary Grass.

Creeping Thistle (*Cirsium arvense*) is known from Km 223.8 along the west side of the Haines Highway. This is a non-native, invasive species that is well known at this location for over a decade. It is present within the right-of-way for approximately 100 m along the highway with a cover of approximately 50% this area; however, it was not reported during the 2016 survey. This patch has been actively managed by volunteers to prevent spreading of the population by “dead heading” or plucking off flowers prior to seed set.

HIGHWAY 4: CAMPBELL HIGHWAY — 127 sections surveyed

The Campbell Highway runs through hilly and mountainous terrain west to east from Carmacks to Ross River, and east to southeast, south from Ross River to Watson Lake with a total distance of 582 km. Road elevations range from 521 to 1027 m.

The highway between Carmacks and Faro is two-laned and chipsealed. The road was in relatively good condition, with a narrower right-of-way than the Alaska Highway. The roadside and right-of-way had been cut along 60 km east of Carmacks during the current season and along 25 km west of Ross River in the previous season, but the area in between was "uncut with vegetation growing right to the road edge and occasionally in the cracks in the chipseal" (Brunner 2016).

Between the turnoff to Faro and Watson Lake, the road is gravelled and in variable condition, with notable recent improvements between Watson Lake and the (now closed) Wolverine Mine access road near Finlayson Lake. Ongoing road construction was encountered along approximately 13 km south of Tuchitua. The northern part of the road southeast from Ross River towards Finlayson Lake is much narrower, with little to no right-of-way. A dense cover of native trees and shrubs often grows up to the edge of the roadside along these sections.

Between Carmacks and Ross River the most common and abundant invasive species was White Sweet-clover, which was present throughout the distance, followed by Alsike Clover, Narrow-leaf Hawk's-beard (which is also present in a number of gravel pits), Smooth Brome, Yellow Sweet-clover, and Alfalfa, with a few instances of Yellow Lucerne and Field Sow-thistle. Common Tansy was seen in a pullout near Faro.

Between Watson Lake and Ross River the only priority invasive species found along most of the road was Narrow-leaf Hawk's-beard, mainly growing singly or in small patches along the road edges. Other species that were commonly seen from Watson Lake to the Frances Lake area were Alsike Clover, White Sweet-clover, and Red Clover. Smooth Brome and Alfalfa were seen in only a few sections of the road between Watson Lake and Frances Lake, and Yellow Sweet-clover was seen infrequently near Watson Lake and Ross River.

Oxeye Daisy was seen at the junction of the Campbell Highway and the Watson Lake airport road, and along the access road to the Sa Dena Hess mine.

HIGHWAY 6: SOUTH CANOL ROAD — 49 sections surveyed

The South Canol Road is 225 km long and runs through hilly and mountainous terrain between Johnson's Crossing and the Campbell Highway near Ross Rive, with road elevations ranging from 731 to 1183 m.

The road is unpaved, and some sections were somewhat rough, especially north of Quiet Lake. Some roadwork was in progress in the Quiet Lake area. The right-of-way is relatively narrow, and in the northern part is absent or nearly so, with dense native shrubs growing right to the edge of the road.

Alsike Clover and Smooth Brome were the two most common and abundant priority invasive plant species mainly occurring along the southern half of the road. Narrow-leaf Hawk's-beard was noted in several places, but White Sweet-clover and Yellow Sweet-clover were each seen only once.

Scentless Chamomile was found in a dump near Johnson's Crossing and near Sidney Lake farther north along the road.

HIGHWAY 8: TAGISH ROAD — 10 sections surveyed

The Tagish road is 54 km long and runs through hilly and mountainous terrain from Carcross to the Alaska Highway at Jakes Corner with road elevations ranging from 658 to 794 m.

The road was paved and in good condition with a wide mostly brushed-out right-of-way.

Smooth Brome, White Sweet-clover, and Narrow-leaf Hawk's-beard were the most common priority invasive plant species seen along the road. Alsike Clover was also seen, but less commonly, and Yellow Sweet-clover, Alfalfa, and Red Clover were found in only one section each.

HIGHWAY 9: TOP OF THE WORLD HIGHWAY — 24 sections surveyed

The Top of the World Highway in Yukon is 106 km long and runs from Dawson City west to the Alaska border. Road elevations range from 321 to 1325 m, with much of the western part of the highway near or above treeline.

The road is gravel except for the first eight kilometers near Dawson, which is chipsealed. Most of the right-of-way is uncut and native vegetation grows right to the road shoulder (Brunner 2016). A small area was cut the previous year near the Clinton Creek turnoff (Brunner 2016).

Only one priority invasive plant species, Alsike Clover, was significant along the highway from Dawson to the Sixty Mile turnoff, and was absent from there west to the border. White Sweet-clover was recorded along only eight kilometers from the ferry landing at Dawson and was absent for the rest of the distance to the border.

A 2 x 50 m patch of Oxeye Daisy was found along the road shoulder near the Clinton Creek turnoff.

HIGHWAY 11: THE SILVER TRAIL — 25 sections surveyed

The Silver Trail is 110 km long and runs through hilly terrain from Stewart Crossing to Keno City. Road elevations range from 473 to 925 m.

The road is chipsealed between Stewart Crossing and Mayo, with a wide right-of-way, and has been mechanically cleared for all but the first ten kilometers.

Between Mayo and Keno the road is mostly gravelled, and only partly chipsealed, with a wide but uncut shrubby right-of-way.

The most common and abundant priority invasive species along the road was White Sweet-clover, followed by Narrow-leaf Hawk's-beard. Smooth Brome was common from Stewart Crossing to Mayo, and Alsike Clover was present near Stewart Crossing and north of Mayo partway to Keno.

Other priority invasive plant species observed were Yellow Lucerne in several road sections, Yellow Sweet-clover near Mayo, and Umbellate Hawkweed near Stewart Crossing.

3: PRIORITY INVASIVE PLANTS ALONG YUKON HIGHWAYS

Distributions of the 14 priority species surveyed along Yukon highways (Appendix D, Table 1) and other disturbed sites (Appendix D, Table 2) are discussed below. Further information about their presence in gravel pits, rest areas, pullouts, and watercourses can be found in Section 4, Gravel Pits, Rest Areas, Pullouts, Watercourses in this report.

1: WHITE SWEET-CLOVER

White Sweet-clover was recorded in 366 (65%) of the 559 road sections surveyed and was the most common of the priority invasive species (Figure 1). It was seen growing as individual plants or forming dense stands, mainly along the roadside edges but sometimes also in the right-of-way, except where dense native vegetation was dominant. Brunner (2016) noted that in the western part of the Alaska Highway "it often appears in a low growth form amongst last year's stocks. In areas where it is well established for a number of years, [White Sweet-clover] is always in a tall mature flowering stage as in the Dawson and Mayo areas." Second-year plants were flowering and obvious, but it is possible that areas of very low first-year growth were missed, especially in the right-of-way.

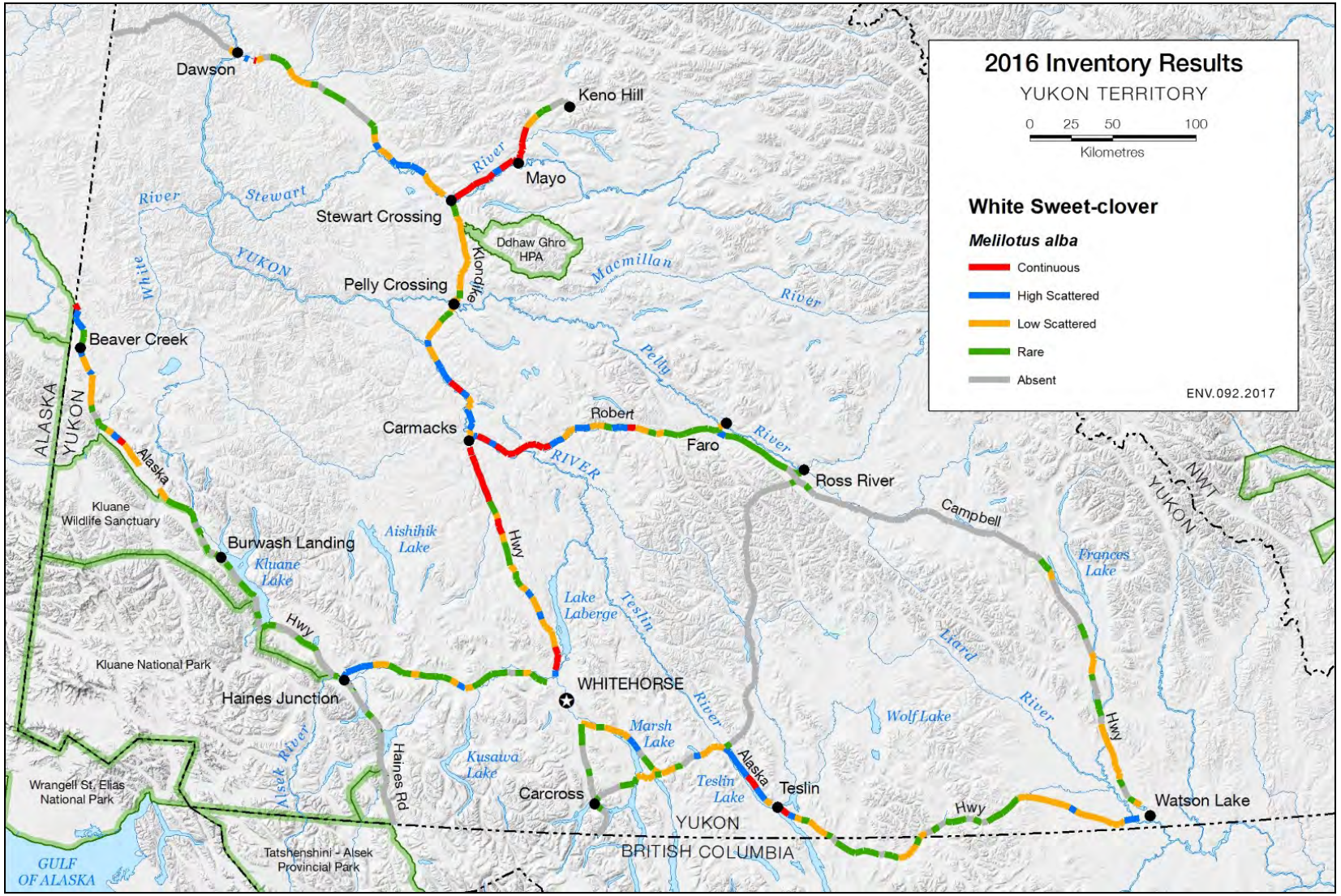
Significant sections of *Continuous* and *High Scattered* White Sweet-clover abundance were seen north, south, and east of Carmacks, along the road to Mayo, near Dawson, north of Whitehorse, along the Alaska Highway near the border with Alaska, near Haines Junction, near Jake's Corner, southeast of Johnson's Crossing as far as Teslin, and near Watson Lake town.

Sections of *Low Scattered* and *Rare* abundance with some sections of *Absent*, were common along the rest of the highways, except for the Campbell Highway from Frances Lake to Ross River, the South Canol Road, and the Top of the World Highway, where it was *Rare*.

A 150 m long stretch of White Sweet-clover was seen at KM 0.5 along both sides of the road to the now closed Sa Dena Hess mine near the junction of the Campbell Highway, and a single plant was seen and pulled at KM 19 (Burns pers. comm. 2017).

White Sweet-clover was also seen in some gravel pits, rest areas, road junctions, near bridges, and in other disturbed areas such as areas of recent road construction, old road cuts and recontoured areas of the western Alaska Highway.

Figure 1. Distribution of White Sweet-clover along Yukon highways, 2016 roadside survey (note: *M. alba* is a synonym of *M. albus*).



2: ALSIKE CLOVER

Alsike Clover was recorded in 291 (52%) of 559 sections surveyed, and was the second most common of the surveyed invasive species (Figure 2). It was present growing as small single clumps and in patches of variable size along the roadside edges and often in the right-of-way as well. Due to its low stature, it is likely that some occurrences were missed, especially in the right-of-way when obscured by taller plants and also when growing on the banks leading down into the right-of-way which were not visible while driving.

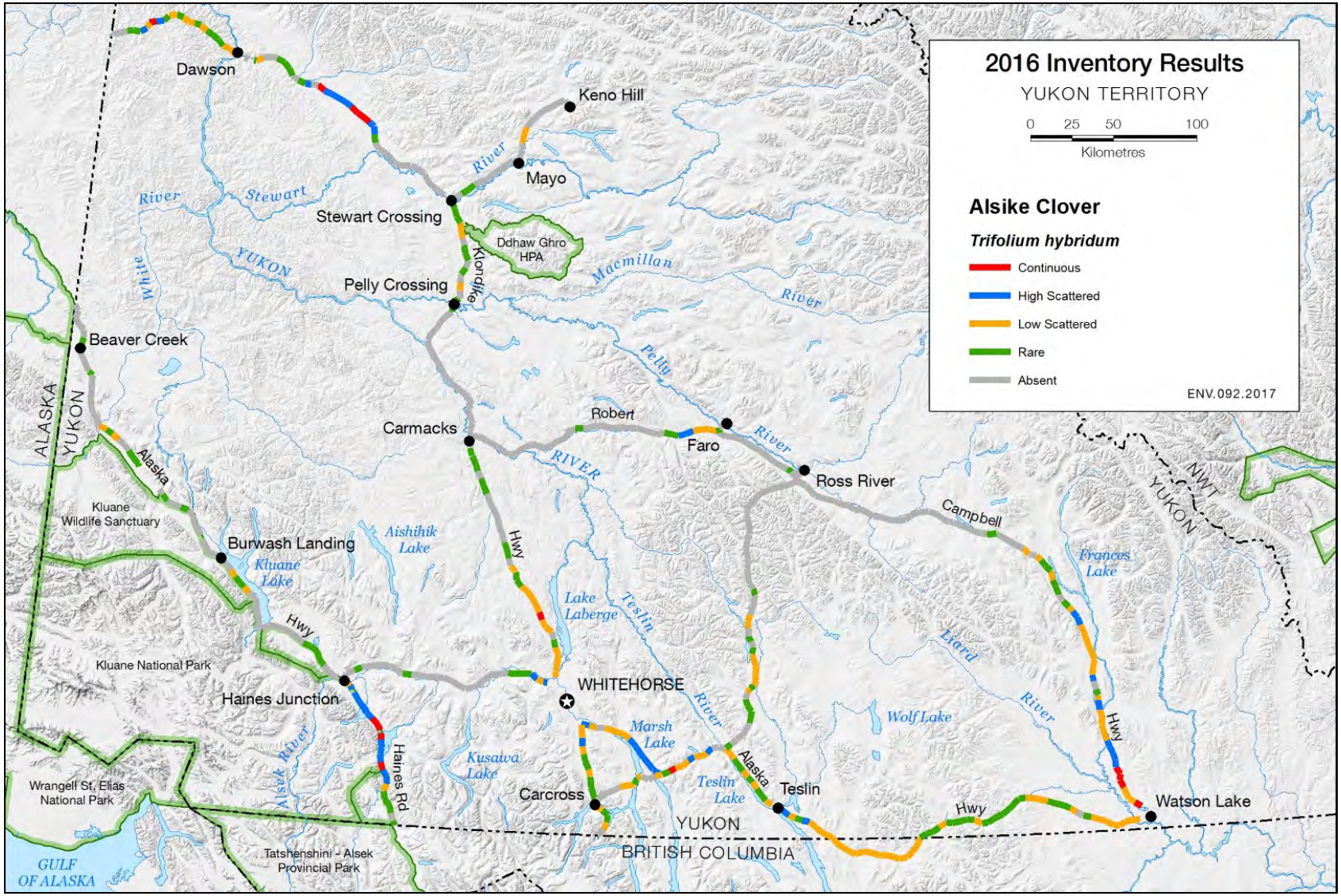
Alsike Clover was present along all of the highways surveyed, with sections of *High Scattered* and some *Continuous* rankings along the Haines Highway, near Whitehorse, between Whitehorse and Johnson's Crossing, near Teslin, near Watson Lake and along the southern part of the Campbell Highway, in the Faro area, along the North Klondike Highway between McQuesten and the turnoff to the Dempster Highway, and along the western part of the Top of the World Highway.

Rankings of *Rare* and *Low Scattered* dominated along the Alaska Highway between Whitehorse and Watson Lake, between Whitehorse and the Alaska border, between Whitehorse and Stewart Crossing, along the southern half of the South Canol Road, most of the South Klondike Highway, most of the Tagish Road, and most of the Top of the World Highway.

It was *Absent* or nearly so along parts of all of the highways, most notably along the northern part of the South Canol Road, and along the Campbell Highway from the Finlayson Lake area to near Ross River.

Alsike Clover was also seen in some sections of highway construction, in many gravel pits, pullouts, rest areas, and near bridges.

Figure 2. Distribution of Alsike Clover along Yukon highways 2016 roadside survey.



3: SMOOTH BROME

Smooth Brome was recorded in 275 (49%) of 559 sections surveyed along Yukon highways and was the third most common of the surveyed invasive species (Figure 3). It was present along the roadsides, but was often common in the right-of-way as well, often forming large swaths, especially along the Alaska Highway.

Smooth Brome is widespread in Yukon, but was most common along the Alaska Highway between Haines Junction and Watson Lake with long stretches of *Continuous* and *High Scattered* abundance between Champagne and Swift River, and lower rankings elsewhere.

Shorter stretches of *High Scattered* and occasional *Continuous* abundance were also recorded along the Tagish Road, near communities, and occasionally elsewhere.

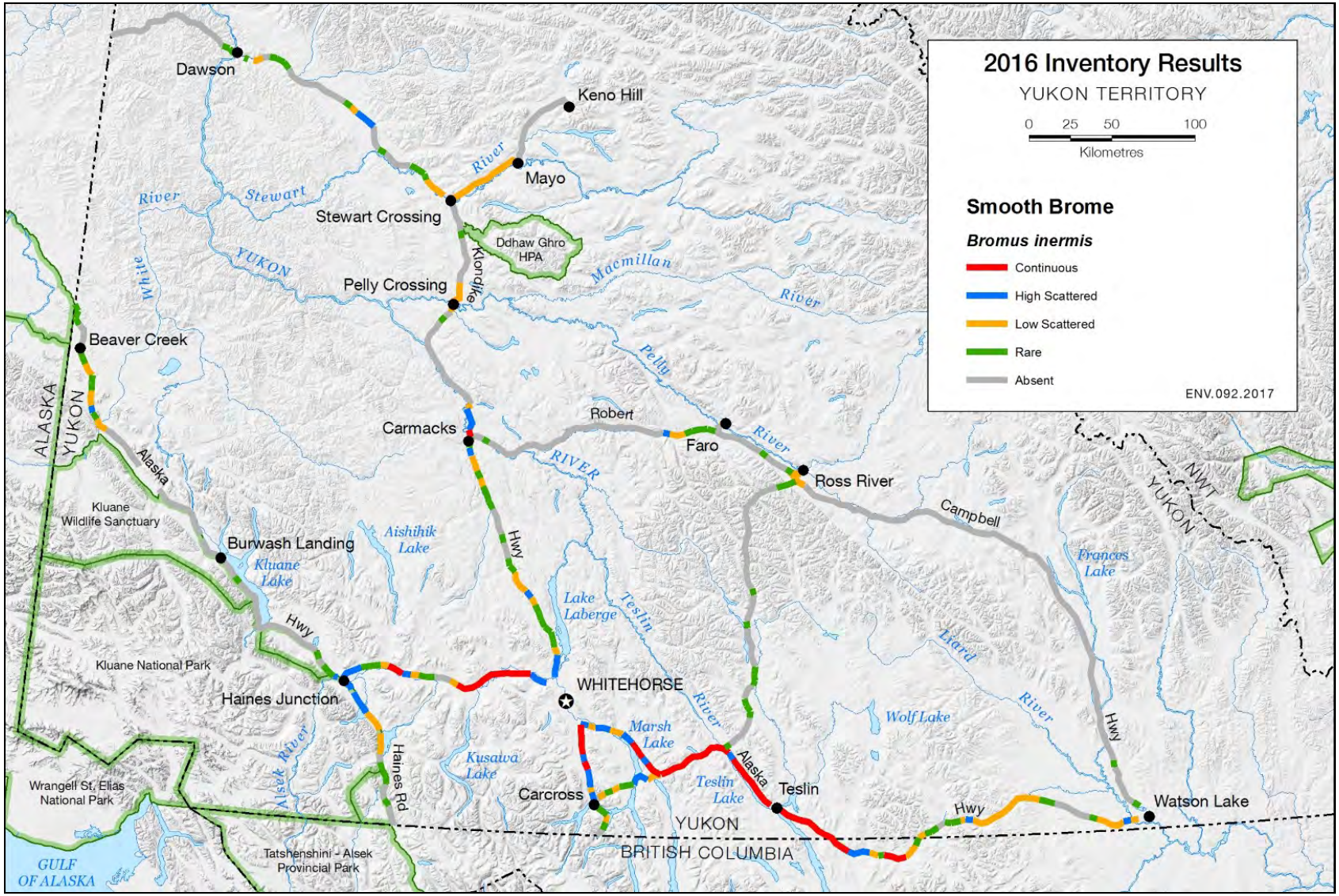
It was also common along the South Klondike Highway and the Haines Highway, with rankings of *High Scattered* and *Continuous*, and between Whitehorse and Carmacks, but mostly as *Rare* and *Low Scattered*.

It was present along the Silver Trail between Stewart Crossing and Mayo as *Low Scattered*, and along the North Klondike Highway from Carmacks to Dawson with mostly *Rare* and *Low Scattered* rankings.

It was ranked as *Absent* along most of the Campbell Highway, the Top of the World Highway, on the Alaska Highway between Haines Junction and Koidern (near the northwest end of Pickhandle Lake), and most of the South Canol Road. Where present along those roads, it was recorded mainly as *Rare* or *Low Scattered*.

Smooth Brome was also seen in old road cuts and recontoured areas, in some sections with what appeared to be recent road construction, in some gravel pits, pullouts, and rest areas, and was noted growing on a gravel bar in a stream (Appendix D, Table 6).

Figure 3. Distribution of Smooth Brome along Yukon highways, 2016 roadside survey.



4: NARROW-LEAF HAWK'S-BEARD

Narrow-leaf Hawk's-beard was recorded in 266 (48%) of 559 sections surveyed, and was the fourth most common of the surveyed invasive species (Figure 4). It occurred mainly as scattered individuals along the roadside edges, but was often also present in the right-of-way growing among other forbs, or occasionally forming patches.

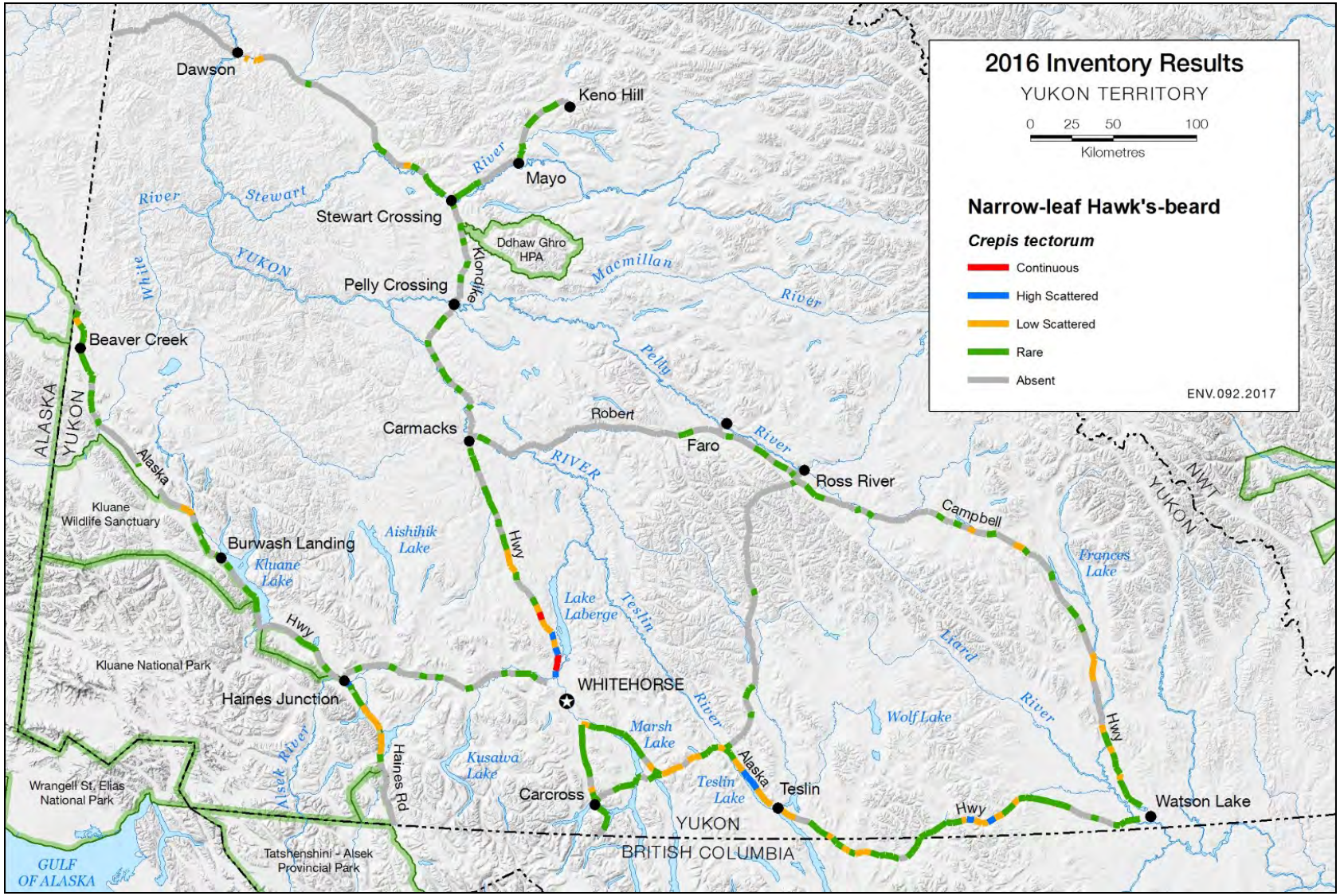
It was present along most of the roads surveyed, but ranked mainly as *Rare* and *Low Scattered*. However, several sections along the North Klondike Highway were ranked as *Continuous* or High Scattered, and sections of *High Scattered* abundance were also seen near Haines Junction, along the Alaska Highway between Johnson's Crossing and Teslin, and near Rancheria.

It was ranked as *Absent* along most of the South Canol Road, between Carmacks and Faro on the Campbell Highway, between McQuesten and Dawson on the North Klondike Highway, and the Top of the World Highway.

It was also present in 15 of 18 surveyed road sections along the access road to the Sa Dena Hess mine, off the Campbell Highway.

It was also present in many gravel pits, rest areas, pullouts, and near watercourses.

Figure 4. Distribution of Narrow-leaf Hawks-beard along Yukon highways, 2016 roadside survey.



5: RED CLOVER

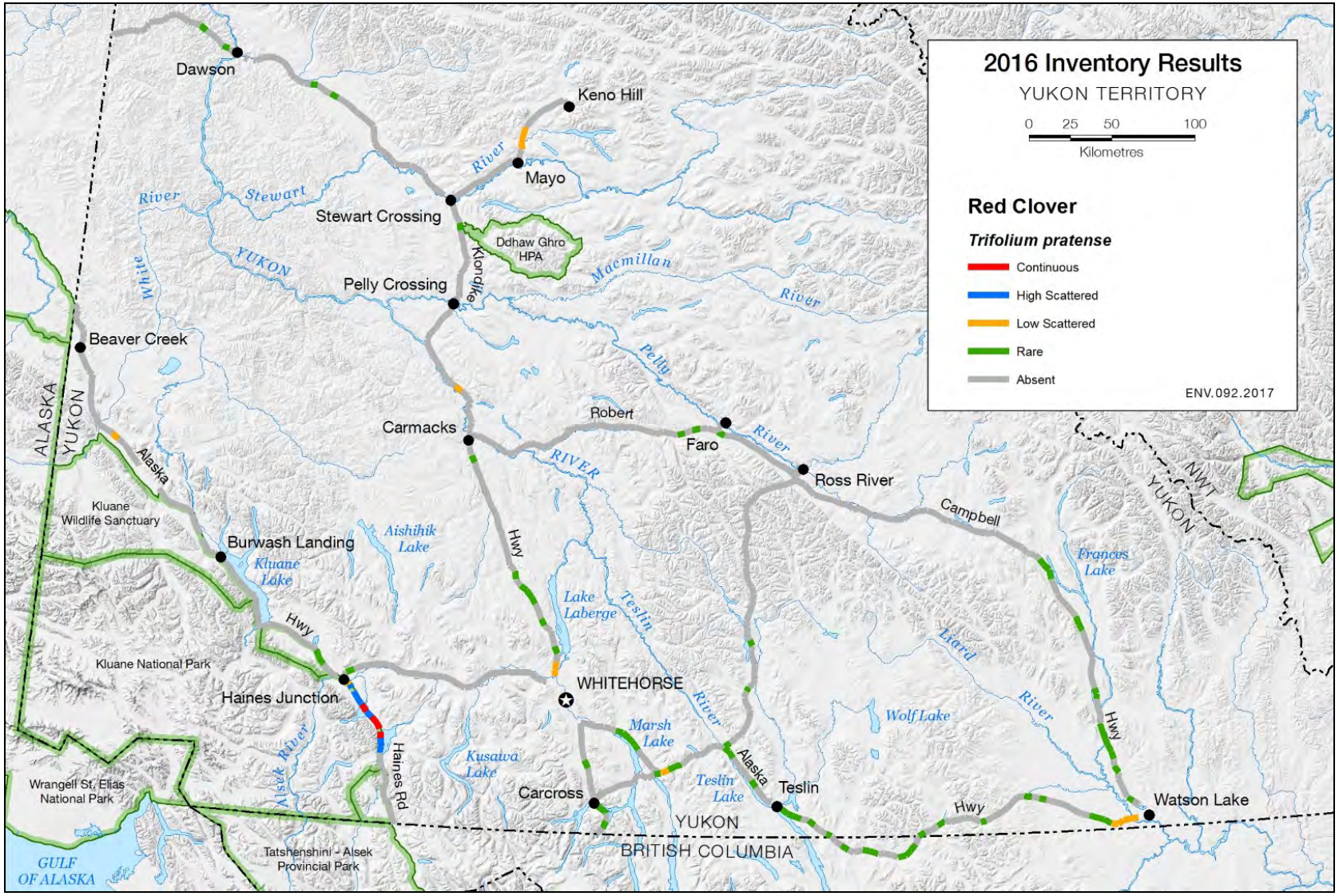
Red Clover was recorded in 89 (16%) of 559 sections surveyed, and was the fifth most common of the surveyed invasive species (Figure 5). It occurred as individuals or forming small patches, either alone or growing with Alsike Clover, along the roadside edges or in the right-of-way.

High Scattered or *Continuous* sections were seen only along the north half of the Haines Highway (in Yukon).

Elsewhere, Red Clover was ranked as *Absent* for long stretches of most of the highways, and where present was recorded as mainly *Rare* or *Low Scattered* abundance, with the *Low Scattered* rankings usually near communities.

It was also recorded in some gravel pits, pullouts, and rest areas, as *Rare* or sometimes *Low Scattered*, and was also seen near several bridges and culverts.

Figure 5. Distribution of Red Clover along Yukon highways, 2016 roadside survey.



6: ALFALFA

Alfalfa was recorded from 78 (14%) of 559 surveyed road sections and was the sixth most common of the surveyed invasive species (Figure 6). It was seen growing along roadside edges, in right-of-ways, road cuts, and recontoured slopes.

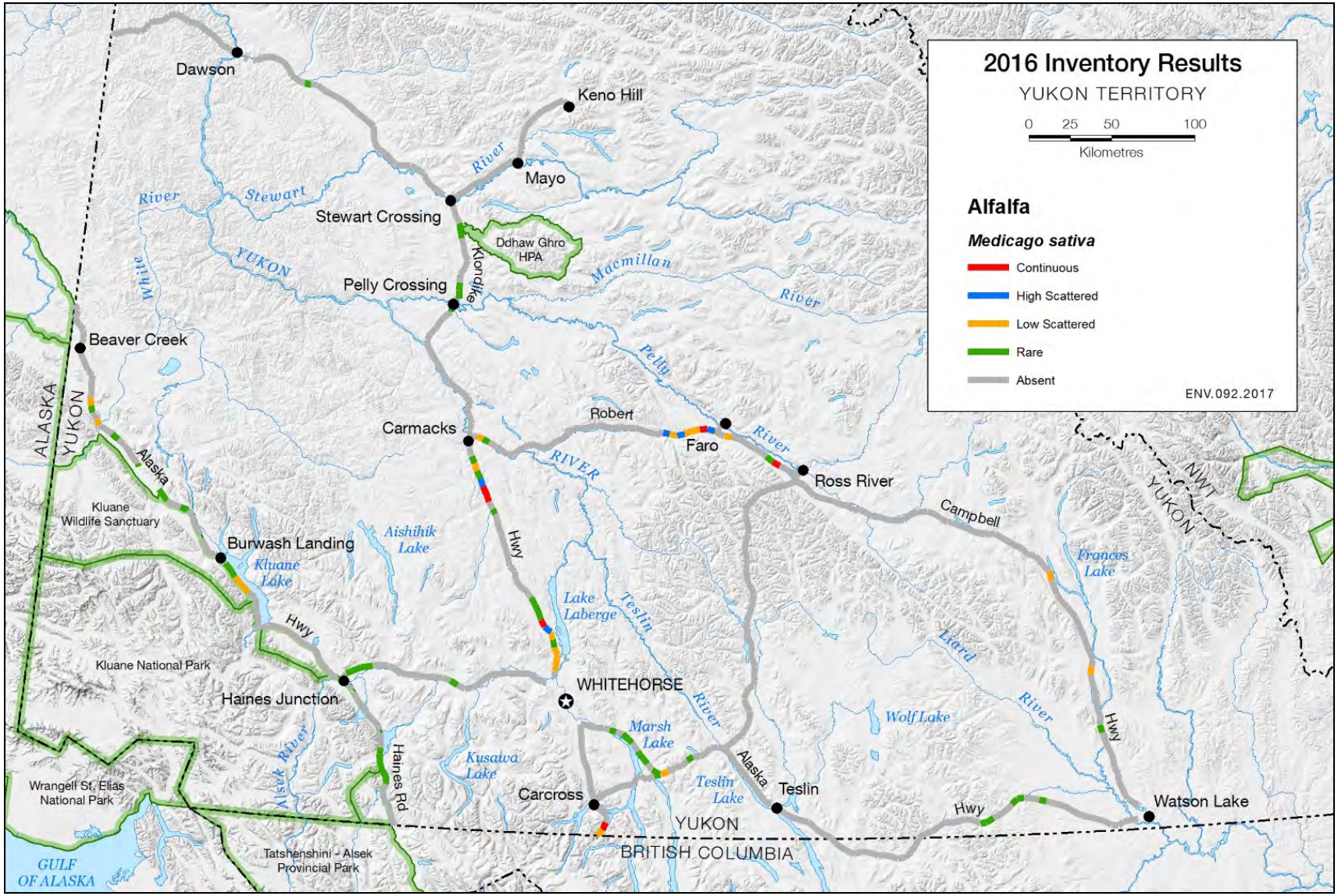
Several sections of High Scattered and *Continuous* were seen between Whitehorse and Carmacks, and also near Faro and Ross River along the Campbell Highway.

It was also present along much of the Alaska and North Klondike Highways with rankings of mostly *Rare* and some *Low Scattered*.

It was *Absent* in parts of the Alaska and North Klondike Highways, and *Absent* from the Top of the World Highway, the Silver Trail, the South Canol Road, between Johnson's Crossing and Rancheria on the Alaska Highway, the Tagish Road, and most of the Campbell Highway between the Watson Lake airport road and Ross River.

It was also seen in some pullouts and gravel pits along the North Klondike Highway, Tagish Road, Alaska Highway, and Campbell Highway, and near some watercourses.

Figure 6. Distribution of Alfalfa along Yukon highways, 2016 roadside survey.



7: YELLOW SWEET-CLOVER

Yellow Sweet-clover was recorded in 60 (11%) of 559 surveyed road sections, and was the seventh most common of the invasive species surveyed (Figure 7). It was present along roadside edges, in right-of-ways, occasionally on older contoured slopes, and near most communities.

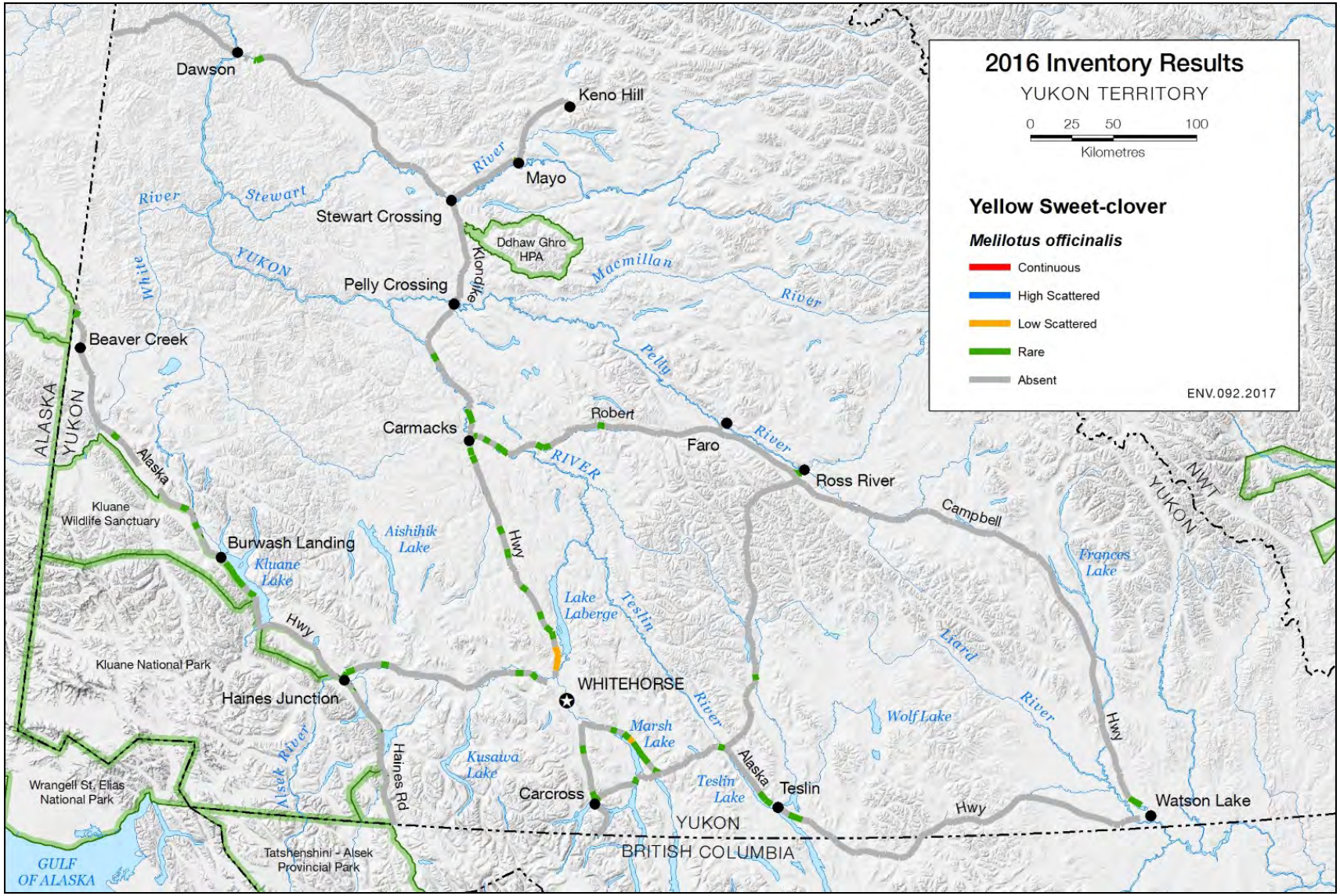
It was relatively common along much of the Alaska Highway and North Klondike Highway, but ranked mostly as *Rare,* with only a few sections of *Low Scattered*.

It was ranked as *Absent* along most of the Alaska Highway between Teslin and Watson Lake, most of the Campbell Highway, most of the North Klondike Highway north of Carmacks, along the Silver Trail, the Tagish Road, and the South Canol Highway.

It was not recorded along the Haines Highway or the Top of the World Highway.

It was present in some rest areas and pullouts along the Alaska Highway, in a dump along the South Canol Road, and near some watercourses.

Figure 7. Distribution of Yellow Sweet-clover along Yukon highways, 2016 roadside survey.



8: YELLOW LUCERNE

Yellow Lucerne was recorded in 55 (10%) of 559 surveyed road sections, and was the eighth most common of the invasive species surveyed (Figure 8). It was recorded mainly in the western half of Yukon, and was found along roadsides, in right-of-ways, and on an abandoned highway section.

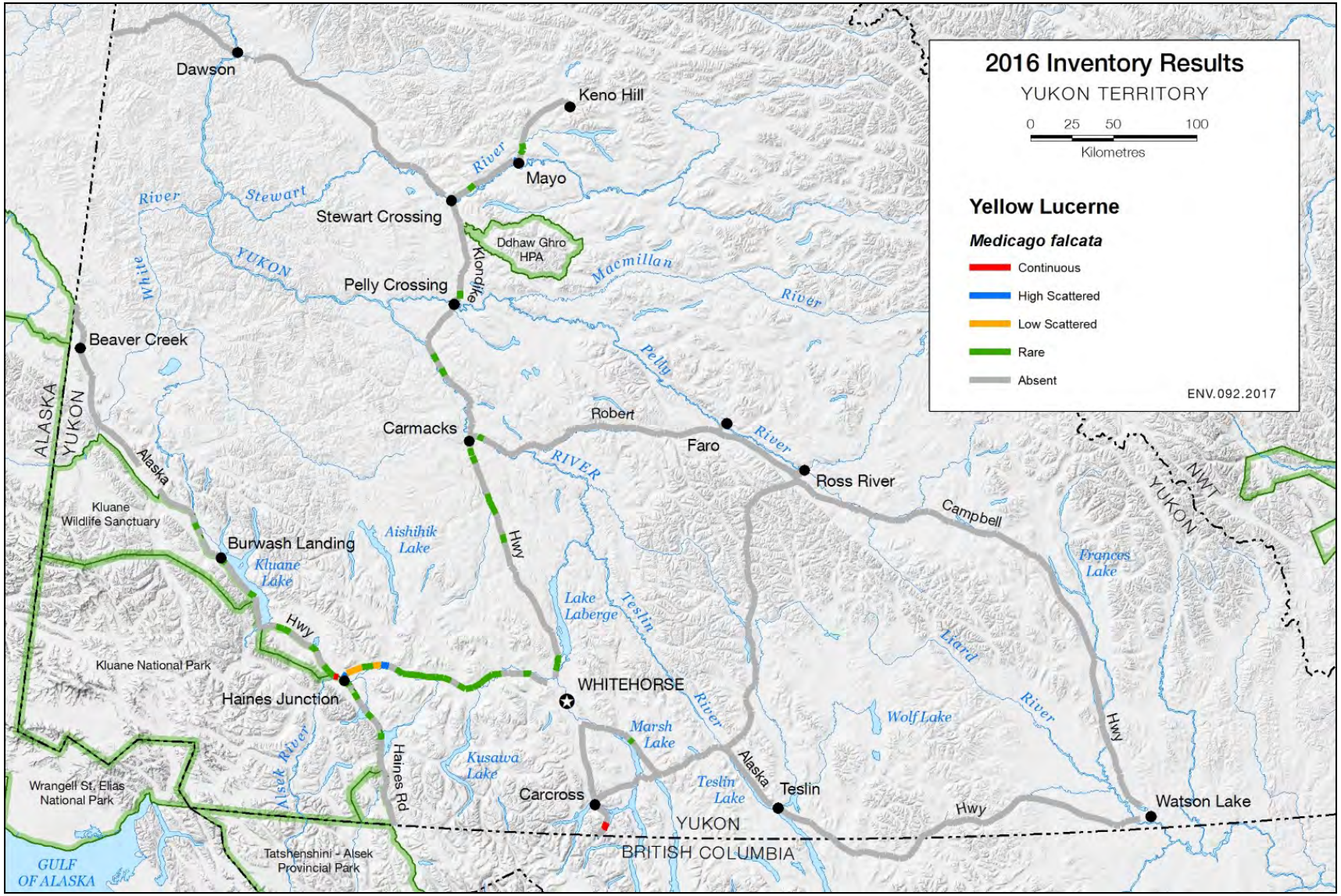
It was present mainly along the North Klondike Highway as far as Stewart Crossing, along the Silver Trail Highway, and the Alaska Highway from Whitehorse to the northwestern end of Kluane Lake. Rankings were mostly *Rare* and occasional *Low Scattered,* but Brunner (2016) reported "an extensive growth near the experimental farm near Haines Junction covering many acres, and also near Mayo along the roadside."

It was also recorded from the Dawson area, and a notable *Continuous* concentration was seen at the southern end of the South Klondike Highway.

It was ranked as *Absent* along the Alaska Highway east of Whitehorse, except in one section between Whitehorse and Jake's Corner where it was ranked as *Rare*. It was ranked as *Absent* along the Top of the World Highway, the South Canol Road and the Campbell Highway.

It was also noted in some rest areas and pullouts and near three watercourses.

Figure 8. Distribution of Yellow Lucerne along Yukon highways, 2016 roadside survey.



9: UMBELLATE HAWKWEED

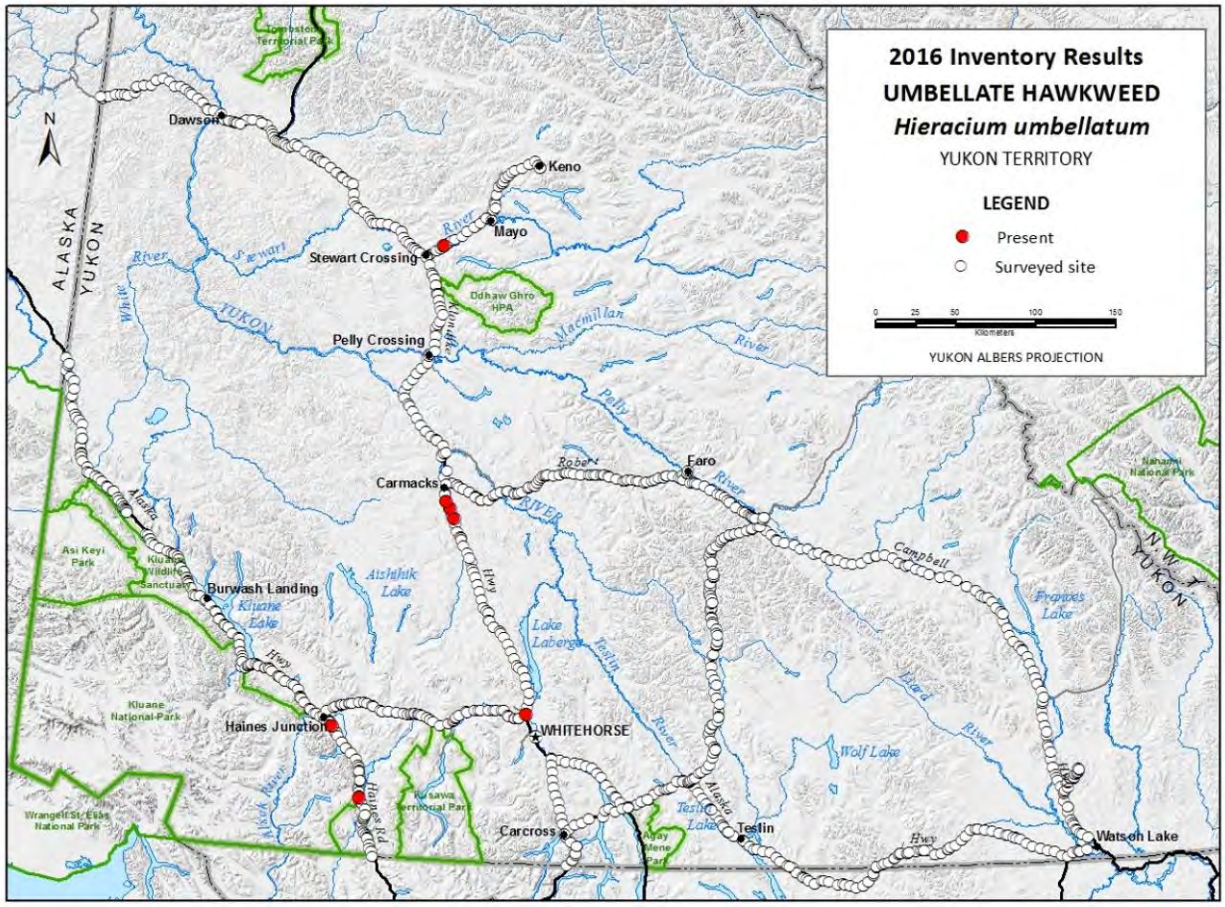
Umbellate Hawkweed was recorded in seven (1%) of 559 sections surveyed (Figure 9).It was seen along both roadside edges and in right-of-ways in five widely separated areas.

It was ranked as *Continuous* in one section along the Silver Trail midway between Stewart Crossing and Mayo.

In one section of the North Klondike Highway near Whitehorse it was ranked as *Low Scattered.* It was *Rare* in three sections of the North Klondike Highway south of Carmacks, and in two sections along the Haines Highway.

The nativity of Umbellate Hawkweed, has been questioned in the past. The species was considered native and rare in Yukon (Douglas et al. 1981) and was only known from two sites in southeast Yukon, where it was associated with undisturbed springs. Cody (1994) reported the species from four sites including a collection from 1949 in the vicinity of Dawson, and thought the species may have been introduced. Since 2001, this species has begun to rapidly expand along the roadways, particularly the Alaska Highway, the South Klondike Highway and the Tagish Road (Bennett pers. comm. 2017).

Figure 9. Distribution of Umbellate Hawkweed along Yukon highways (N.B,: red represents presence only, not abundance), 2016 roadside survey.



10: OXEYE DAISY

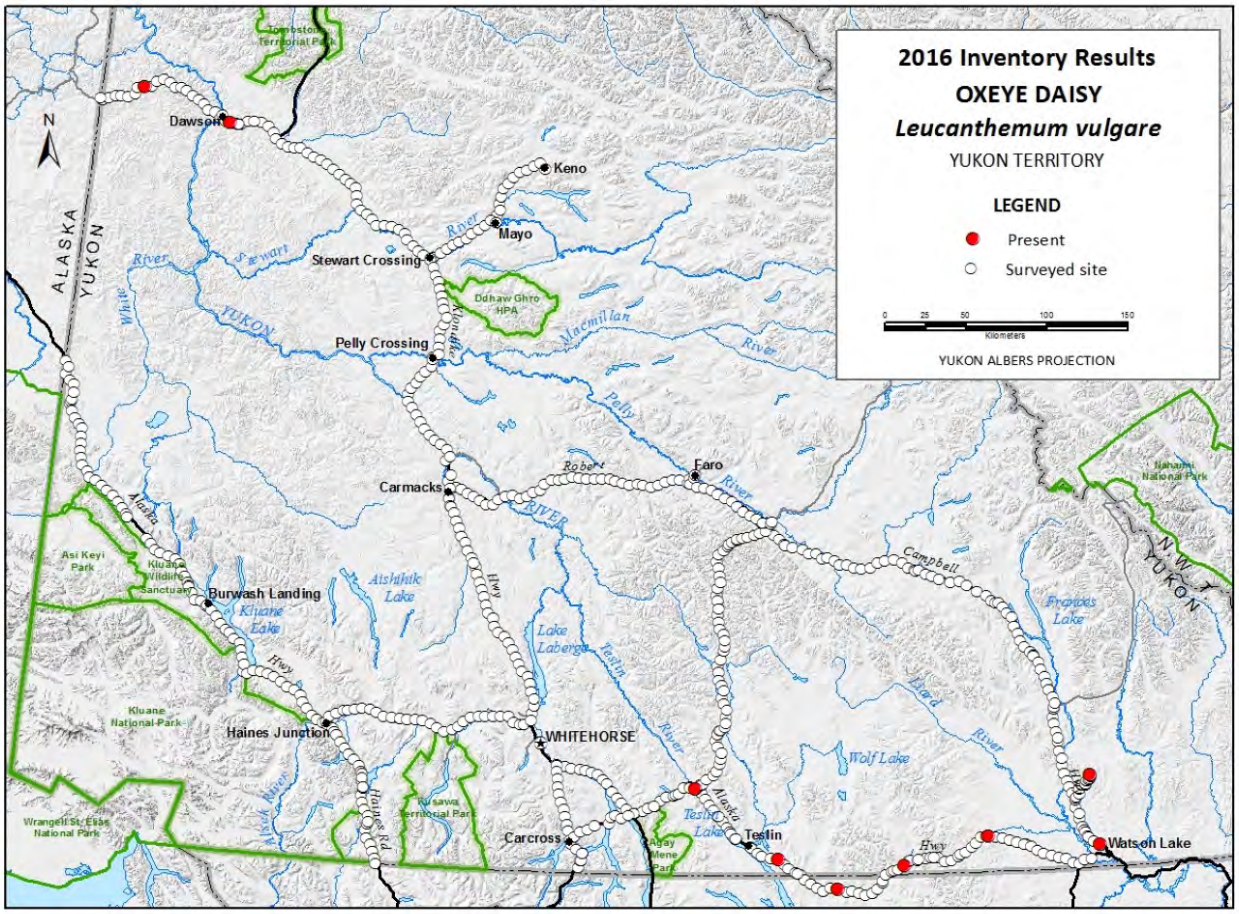
Oxeye Daisy was recorded in seven (1%) of 559 sections surveyed (Figure 10). Due to its relatively short stature, it may well be more abundant in the right-of-ways than was noticeable during the survey.

It was found as individuals or in small patches along the roadside or in the right-of-way in four widely separated locations along the Alaska Highway, and near the Watson Lake Airport road on the Campbell Highway. It was also found in one section along the Top of the World Highway in a drainage ditch, and ranked as *Low Scattered*.

Several individual plants were also seen in a weedy area along the side of an access road off the Alaska Highway near Johnson's Crossing.

A patch of Oxeye Daisy was seen at KM 23 on the road to the Sa Dena Hess minesite, off the Campbell Highway (Burns pers. comm. 2017).

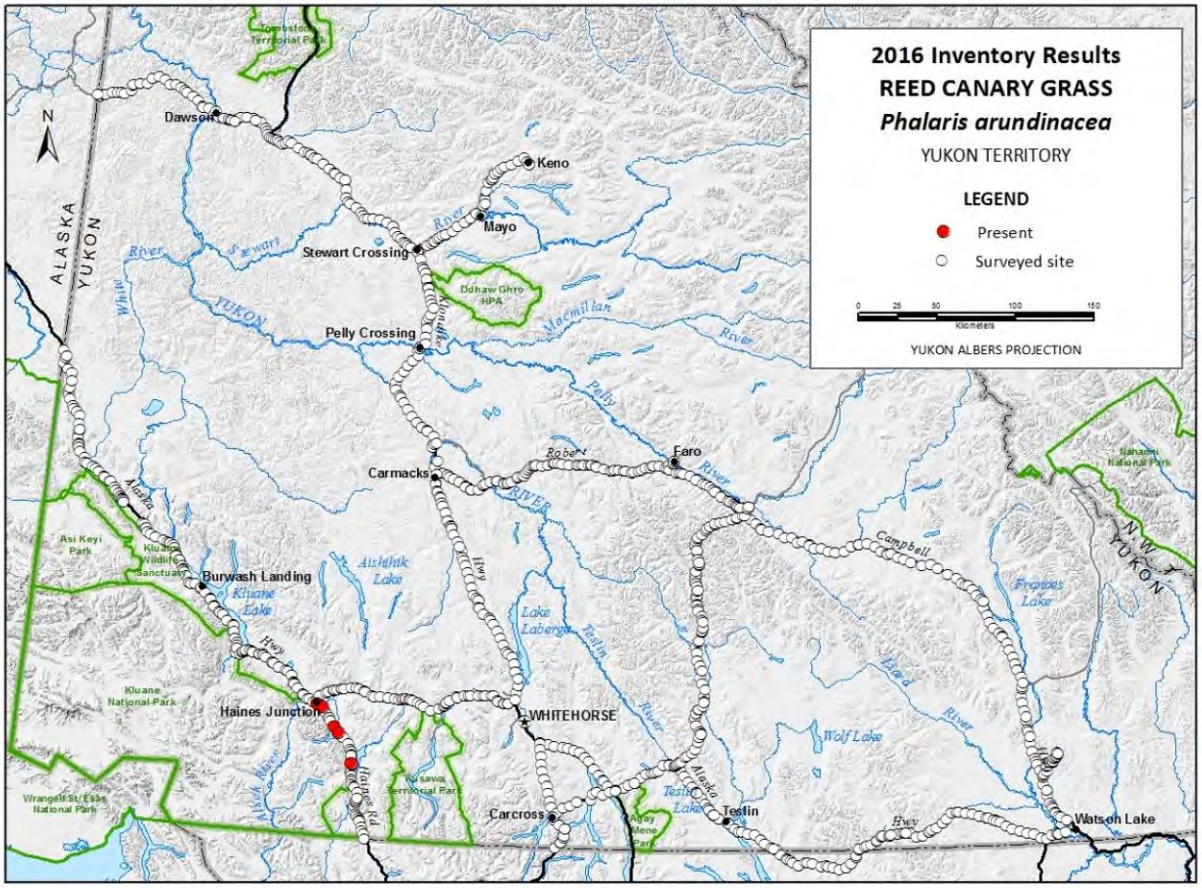
Figure 10. Distribution of Oxeye Daisy (N.B.: red indicates presence only, i.e. not abundance, in all locations where seen), 2016 roadside survey.



11: REED CANARY GRASS

Reed Canary Grass was recorded in five (<1%) of 559 road sections surveyed (Figure 11). It was seen along the roadside and in the right-of-way and near a creek along the Haines Highway, and was ranked as *Rare*.

Figure 11. Distribution of Reed Canary-Grass (N.B.: red indicates presence only, i.e. not abundance), 2016 roadside survey.

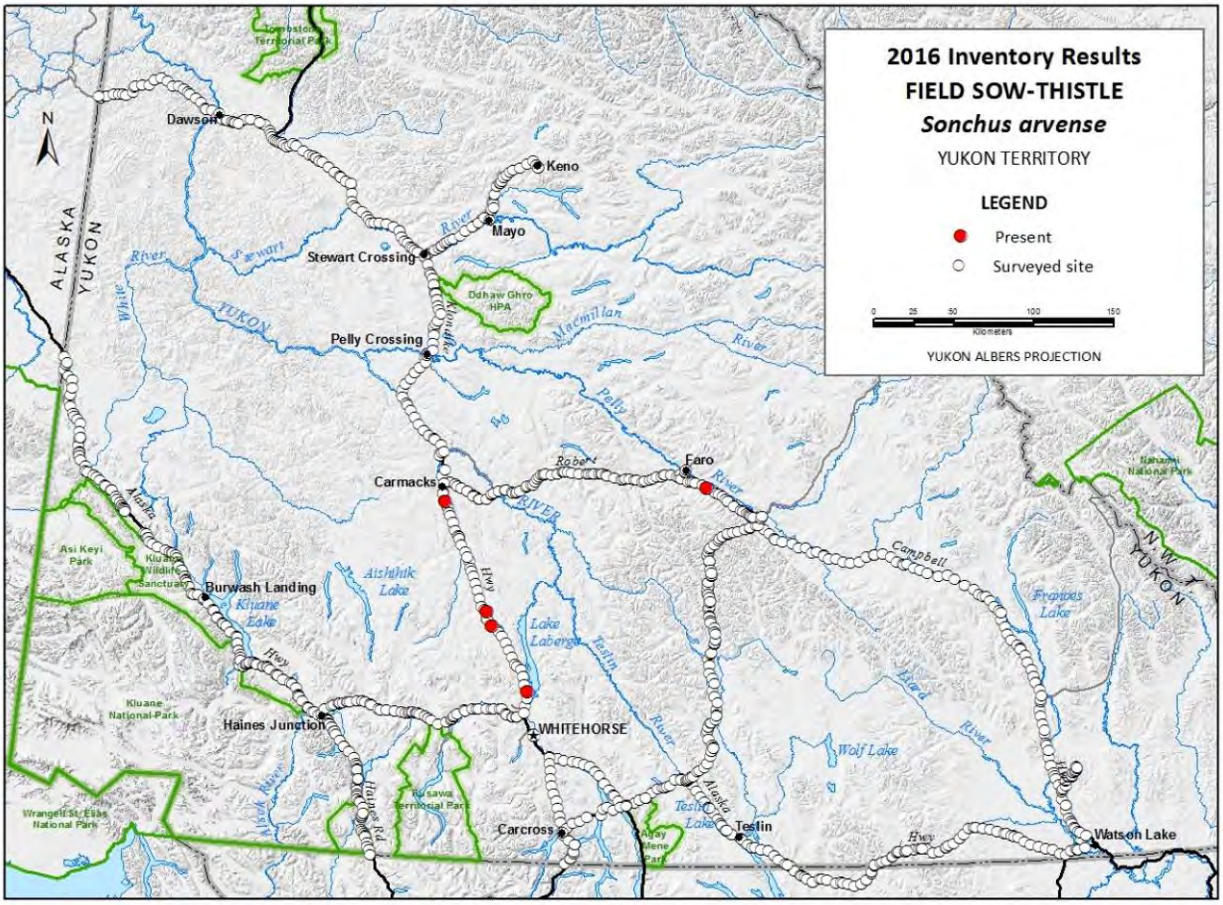


12: FIELD SOW-THISTLE

Field Sow-thistle was recorded in five (<1%) of 559 road sections surveyed (Figure 12). It was found in one section along the Campbell Highway near Faro, in four sections along the North Klondike Highway (near Whitehorse, near Carmacks, and in two sections in between), all ranked as *Rare*.

Field Sow-thistle is known to occur along the Alaska Highway west of Watson Lake, but it was not seen there during this survey, possibly due to the earliness of that part of the survey, i.e. the plant had not attained sufficient height at that time to be conspicuous while driving.

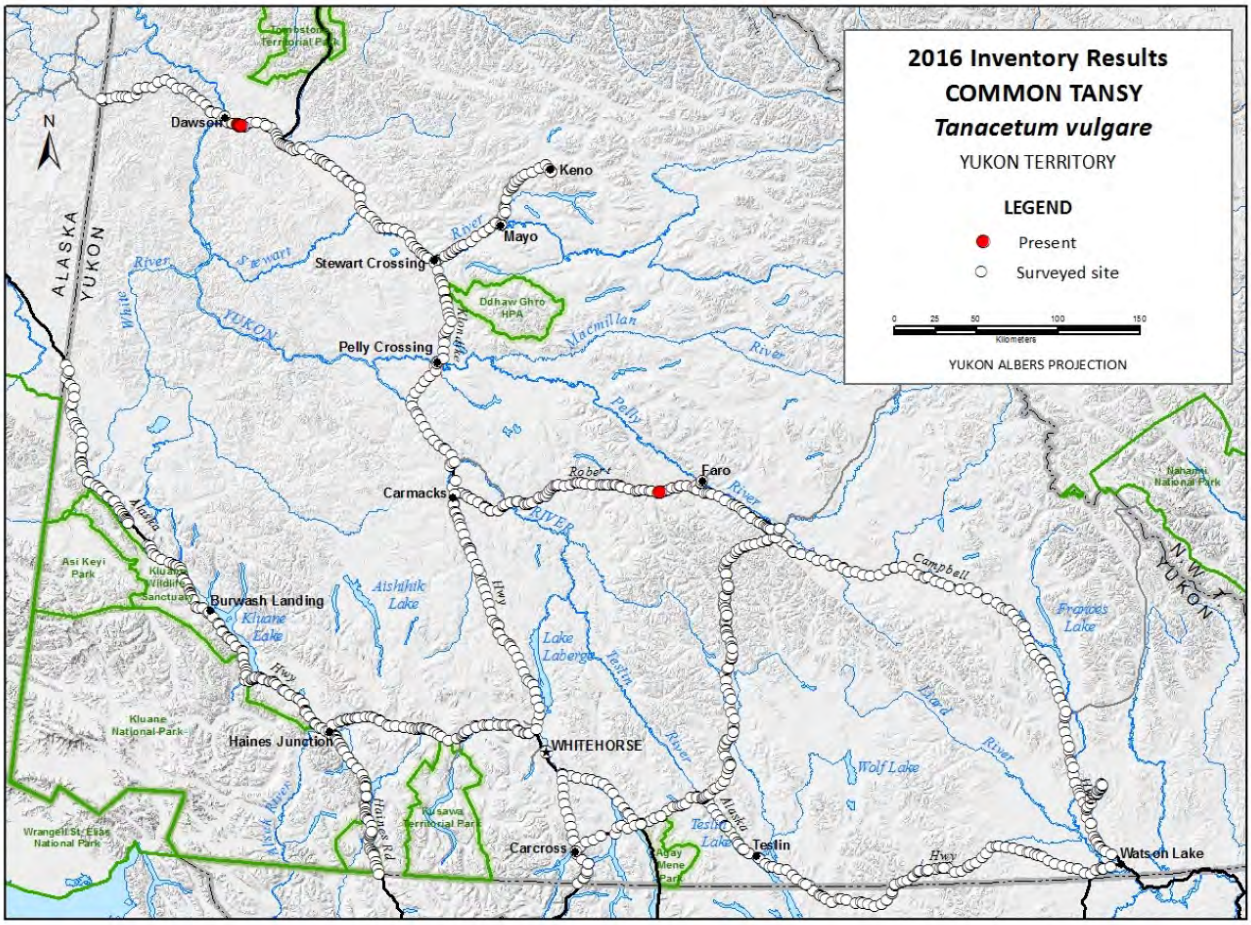
Figure 12. Distribution of Field Sow-thistle (N.B. red indicates presence only, i.e., not abundance), 2016 roadside survey.



13: COMMON TANSY

Common Tansy was seen in one (<1%) of 559 road sections, east of Dawson, and plants seen were pulled (Figure 13). It was also seen in a pullout along the Campbell Highway west of Faro. Brunner (2016) noted that it was a "small patch 10 m x 2 m; many plants, well-established".

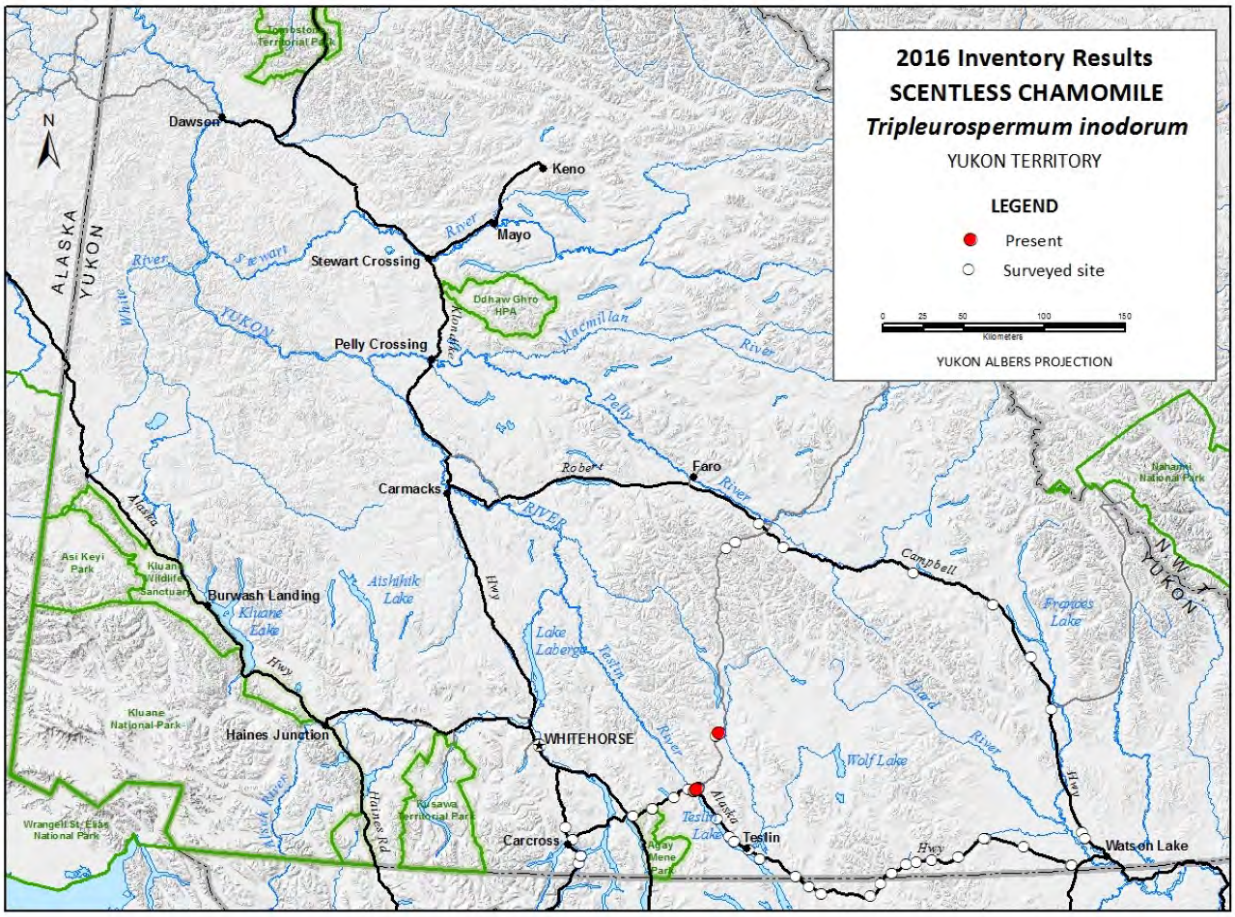
Figure 13. Distribution of Common Tansy (N.B.: red indicates presence only, i.e. not abundance), 2016 roadside survey.



14: SCENTLESS CHAMOMILE

Scentless Chamomile was not seen along any of the surveyed roadsides, but a few scattered individuals were noted in a pullout at Sidney Lake on the South Canol Road, and in the dump near Johnson's Crossing (Figure 14).

Figure 14. Distribution of Scentless Chamomile (N.B.: red indicates presence only, i.e. not abundance), 2016 roadside survey.



4: GRAVEL PITS, REST AREAS, PULLOUTS, WATERCOURSES

ACTIVE GRAVEL PITS

The most common and abundant priority invasive plant species seen along access roads into gravel pits and within the 61 active pits surveyed (Appendix D, Table 3) were Narrow-leaf Hawk's-beard, White Sweet-clover, and Alsike Clover, and to a lesser extent Smooth Brome. Six pits lacked priority invasives (Figure 15).

Narrow-leaf Hawk's-beard was recorded in 52 gravel pits (85% of 61 pits total) along the Alaska Highway (18 pits – 13 *Rare*, one *High Scattered,* four *Low Scattered)*, the Campbell Highway (16 pits - 14 *Rare,* two *Low Scattered*), the North Klondike Highway (nine pits - seven *Rare,* two *Low Scattered),* the Haines Highway (three pits – all *Rare*), the Silver Trail (three pits – one *Rare,* two *Low Scattered*)*,* the South Klondike Highway (one pit – *Low Scattered*), the Tagish Road (one pit – *Low Scattered*), and the South Canol Road (one pit – *Rare*).

White Sweet-clover was recorded in 28 gravel pits (46%) along the Alaska Highway (12 pits - eight *Rare*, two *Low Scattered*, two *High Scattered*), the North Klondike Highway (six pits - two *Rare*, four *High Scattered*), the Campbell Highway (six pits - three *Rare*, two *High Scattered*, one *Continuous*), and the Silver Trail (three pits - all *High Scattered*).

Alsike Clover was recorded in 23 gravel pits (38%) along the Alaska Highway (nine pits - four *Rare*, two *Low Scattered*, three *High Scattered*), the Campbell Highway (six pits - four *Rare*, two *Low Scattered*), the North Klondike Highway (four pits - three *Rare*, one *Low Scattered*), the Haines Highway (two pits - both *Rare*), the South Canol Road (one pit- *Rare*), and the South Klondike Highway (one pit - *Rare*).

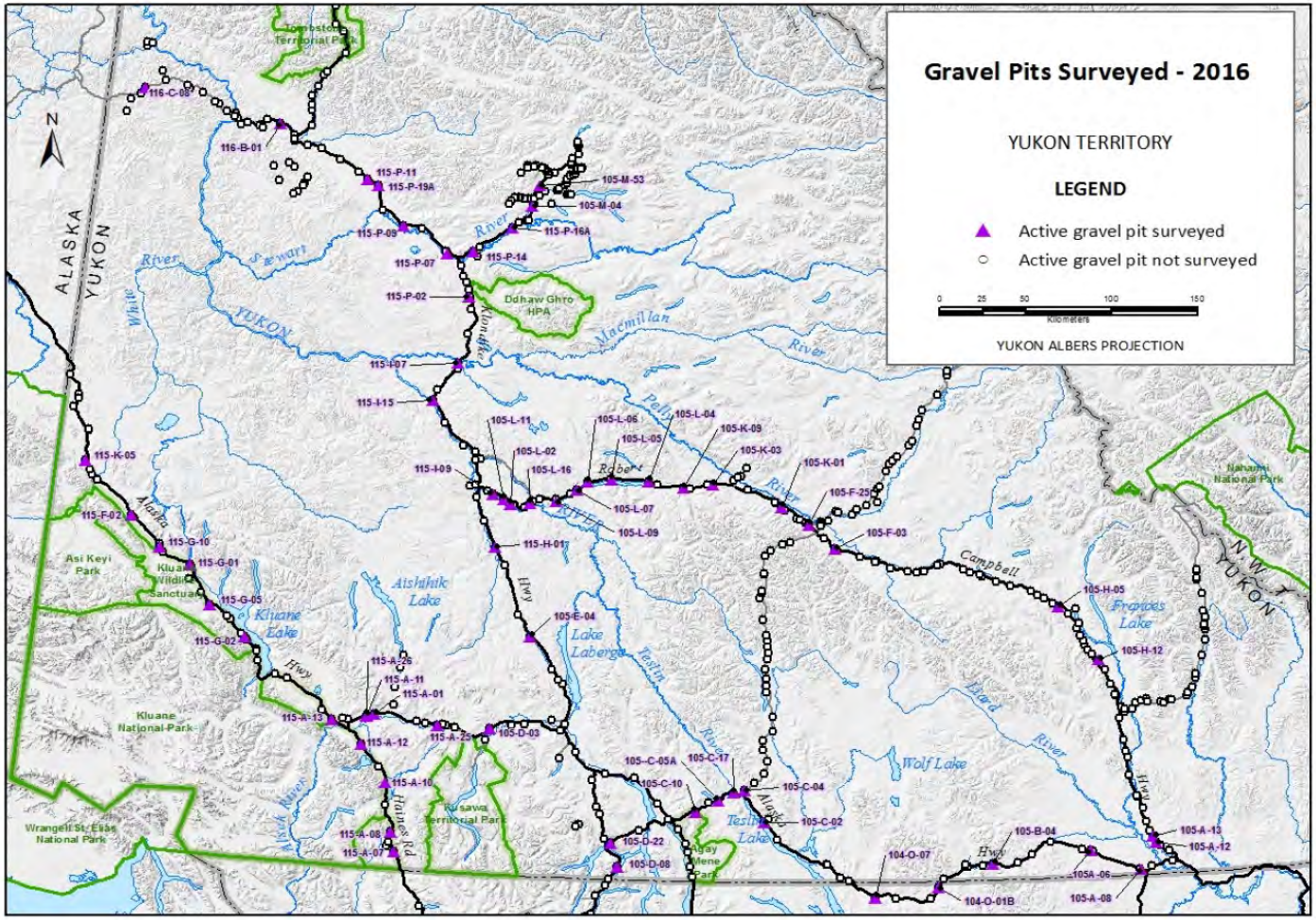
Smooth Brome was recorded in three pits (5%) along the Alaska Highway (two *Rare*, one *Low Scattered*).

Red Clover was recorded in three pits (5%) along the Alaska Highway (one pit - *Rare*), the North Klondike Highway (one pit - *Rare*), and the Haines Highway (one pit - *Rare*).

Alfalfa was recorded in two gravel pits (3%), along the Campbell Highway (one pit - *Rare*), and the Tagish Road (one pit - *Rare*).

Yellow Lucerne was recorded in one gravel pit (2%) along the Alaska Highway, ranked as *Rare*.

Figure 15. ***Locations of surveyed gravel pits, 2016 roadside surveys.***



REST AREAS

Invasive plant species in rest areas are most commonly found bordering the adjacent highway and along the edges of the gravelled part of the rest areas. The most common and abundant priority invasive species found in the 29 rest areas surveyed were Narrow-leaf Hawk's-beard, White Sweet-clover, Alsike Clover, and Smooth Brome (Figure 16; Appendix D, Table 4). Four rest areas lacked priority invasives.

Narrow-leaf Hawk's-beard was recorded in 21 (72%) rest areas, along the Alaska Highway east of Whitehorse (11 sites), the North Klondike Highway (six sites), the Silver Trail (three sites), and the Campbell Highway (one site).

Abundance ranks for Narrow-leaf Hawk's-beard were mainly *Rare to Low Scattered*, but with 1 *High Scattered* and two *Continuous* were recorded in two rest areas along the Alaska Highway, and one *High Scattered* on the Campbell Highway.

White Sweet-clover was recorded in 17 (59%) rest areas along the Alaska Highway (five sites), the North Klondike Highway (five sites), the Silver Trail (four sites), and the Campbell Highway (three sites).

Abundance ranks for White Sweet-clover ranged from *Rare* to *Low Scattered*, except for one ranking of *High Scattered* on the Campbell Highway.

Alsike Clover was recorded in 12 (41%) rest areas along the Alaska Highway (seven sites), the North Klondike Highway (three sites), the Campbell Highway (one site), and the Silver Trail (one site).

Abundance ranks for Alsike Clover were mainly *Rare* and *Low Scattered*, with one *High Scattered* in one rest area along the Alaska Highway, and one along the Campbell Highway.

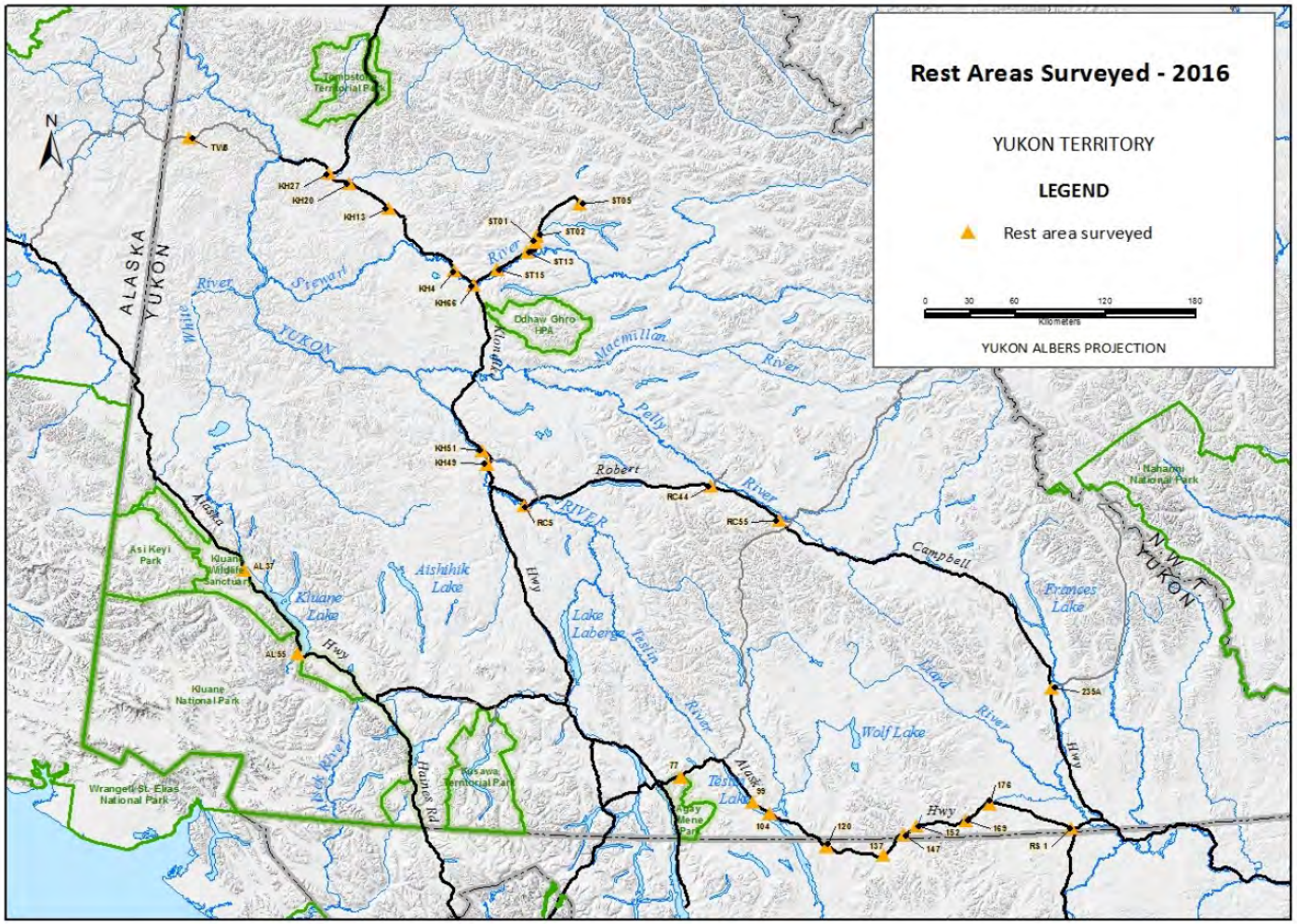
Smooth Brome was recorded in ten rest areas (34%) along three highways: Alaska Highway (eight sites), North Klondike Highway (one site), and the Campbell Highway (one site).

Abundance ranks for Smooth Brome along the Alaska Highway east of Whitehorse ranged from *Rare* to *Continuous*, with *High Scattered* and *Rare* in the other two rest areas.

Red Clover was recorded in three rest areas (10%) along the Alaska Highway (two sites), and the Campbell Highway (one site), all with rankings of *Rare*.

Yellow Sweet-clover was recorded in only one rest area (3%), along the Alaska Highway, and ranked as *Rare*.

Figure 16. Locations of surveyed rest areas, 2016 roadside survey.



PULLOUTS

The most common and often abundant species found in the 75 surveyed pullouts were Alsike Clover, White Sweet-clover, Narrow-leaf Hawk's-beard, and Smooth Brome (Figure 17; Appendix D, Table 5). Twenty pullouts lacked priority invasives.

Alsike Clover was recorded in 31 pullouts (41%) on six highways: Haines Highway (8 sites), Alaska Highway (nine sites), Campbell Highway (three sites), South Canol Road (four sites), North Klondike Highway (four sites), and the Top of the World Highway (three sites).

Abundance ranks for Alsike Clover in most sites were mainly *Rare* or *Low Scattered*, with two sites on the Alaska Highway, two on the South Canol Road, one site on the Haines Highway and one site on the Top of the World Highway ranked as *High Scattered*, and two sites along the Haines Highway ranked as *Continuous*.

White Sweet-clover was recorded in 25 pullouts (33%) along four highways: the North Klondike Highway (nine sites), the Campbell Highway (six sites), the Haines Highway (one site), and the Alaska Highway (nine sites).

Abundance ranks for White Sweet-clover in most sites were *Rare* or *Low Scattered*, with *High Scattered* recorded in one site on the Campbell Highway and two sites on the Alaska Highway.

Narrow-leaf Hawk's-beard was recorded in 24 pullouts (32%) along five highways: the Haines Highway (four sites), the Alaska Highway (ten sites), the Campbell Highway (three sites), the North Klondike Highway (four sites), and the South Canol Road (three sites).

Abundance ranks for Narrow-leaf Hawk's-beard in all sites were mainly *Rare* or *Low Scattered*, but one *High Scattered* was recorded along the Haines Highway.

Smooth Brome was recorded in 19 (25%) pullouts on four highways: the Alaska Highway (12 sites), the Haines Highway (two sites), the Campbell Highway (one site), and the North Klondike Highway (four sites).

Abundance ranks for Smooth Brome were mainly *Rare* or *Low Scattered*, but three *High Scattered* and one *Continuous* were recorded along the Alaska Highway, and one *High Scattered* along the North Klondike Highway.

Red Clover was recorded in eight pullouts (11%) along three highways: the Haines Highway (two sites), the Alaska Highway (four sites), and the South Canol Road (two sites).

Abundance ranks for Red Clover in all sites were *Rare* or *Low Scattered*.

Alfalfa was recorded in six pullouts (8%) along three highways: the Alaska Highway (three sites), the Campbell Highway (one site), and the North Klondike Highway (two sites).

Abundance ranks for Alfalfa in all sites were *Rare* or *Low Scattered*.

Yellow Lucerne was recorded in five pullouts (9%) along two highways: the Alaska Highway (two sites) and the Haines Highway (three sites).

Abundance ranks for Yellow Lucerne in all sites were *Rare* or *Low Scattered*.

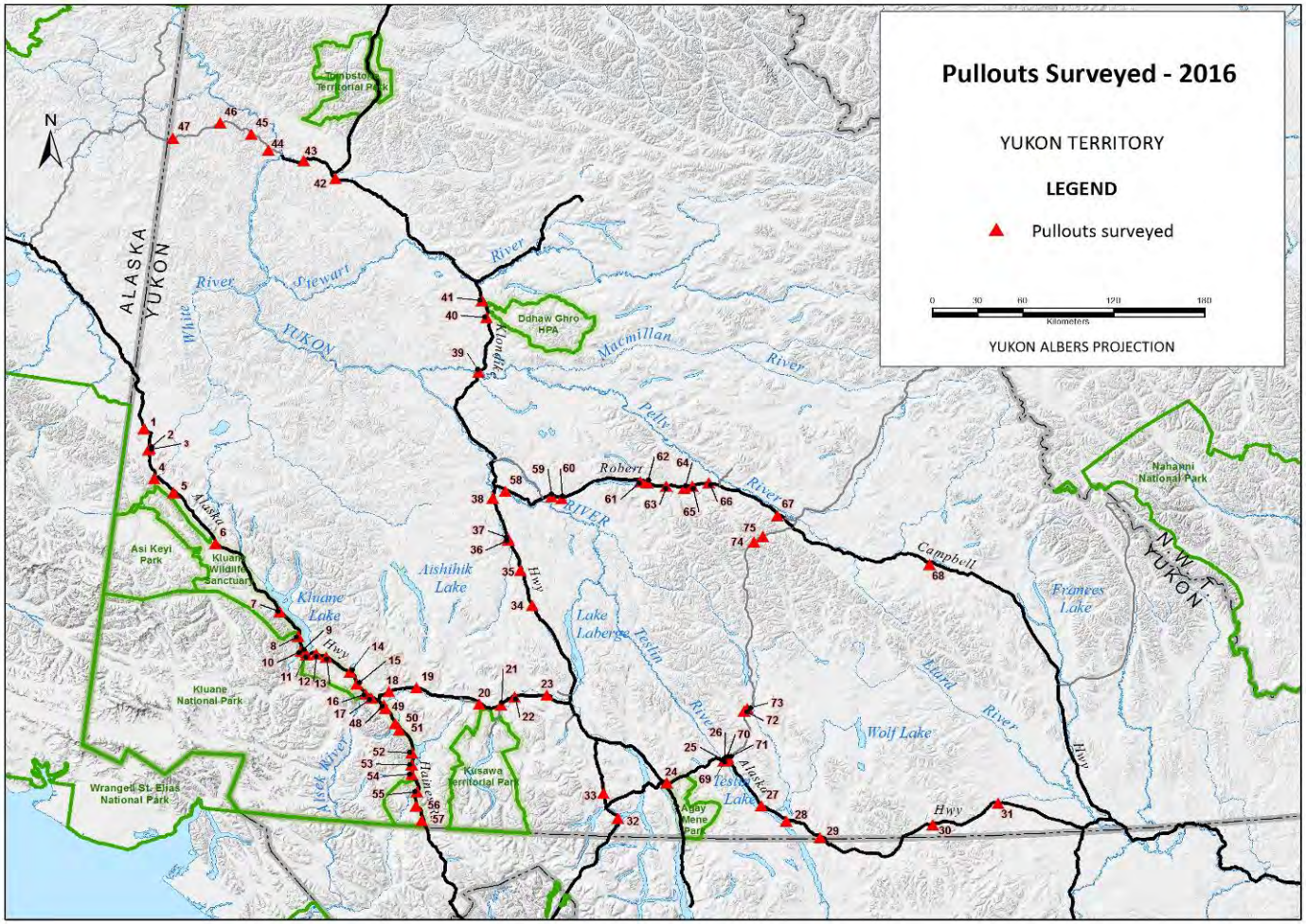
Yellow Sweet-clover was recorded in four pullouts (5%) along two highways: the Alaska Highway (three sites), and the South Canol Road (one site), all ranked as *Rare*.

Oxeye Daisy was found along a side road leading to a boat launch near Johnson's Crossing.

Scentless Chamomile was seen (several plants) in an open grassy area along Sidney Lake on the South Canol Road, and in a dump near Johnson's Crossing.

Common Tansy was seen in one pullout along the Campbell Highway.

Figure 17. Locations of surveyed pullouts, 2016 roadside survey.



WATERCOURSES

Of 222 watercourses surveyed, 12 (5%) had invasive species present either in the water at the time of the survey or along the banks below the high water mark (Appendix D, Table 6). Species seen were White Sweet-clover (five streams), Alsike Clover (four streams), Narrow-leaf Hawk's-beard (two streams), Red Clover (two streams), Smooth Brome (one stream). In addition, the introduced (but not invasive) Meadow Foxtail was present in one stream. These species, except for Meadow Foxtail, were also commonly present above the banks, along approaches to the watercourse, around bridges, or along the road above the watercourse.

Ninety-seven watercourses (44%) had priority invasive species close to the watercourse but above the banks, along approaches to the watercourse, around bridges, or along the road above the watercourse (Appendix D, Table 7). The usual species present in these sites include White Sweet-clover, Alsike Clover, Red Clover, Smooth Brome, and Narrow-leaf Hawk's-beard.

Priority invasive species were absent in or near 113 watercourses (51%) and non-priority species were absent in or near most of them (Appendix D, Table 8). Many of these were small creeks flowing through culverts beneath the road, and/or were surrounded by dense native vegetation with minimal human disturbance.

5: OTHER INTRODUCED SPECIES SEEN DURING SURVEY

A number of other introduced species (Appendix D, Table 9) were noted along the roadsides, either while driving, during stops along the way to check the right-of-way, or while surveying gravel pits, pullouts, rest areas, and watercourses. It is possible that some occurrences were missed while driving if they were small and/or growing among other forbs in the right-of-way.

The species are listed here according to their invasive rank (as per Appendix A).

Species ranked as 1: highly invasive — may displace or replace native ecosystems

Crested Wheatgrass was recorded in only one road section, on the Haines Highway near Haines Junction, ranked as *Rare.* It was also seen in one rest area along the Silver Trail.

Butter-and-eggs was found in one section along the Campbell Highway between Faro and Ross River, and in one section along the Haines Highway, opposite a pullout. It was also seen near Dawson and in a gravel pit near Rancheria on the Alaska Highway.

Dalmatian Toadflax was noted near Champagne along the Alaska Highway, and the two plants seen were pulled.

Spotted Knapweed was seen at a road shoulder along the Alaska Highway, near KM 1589. Only a few plants were seen and were pulled.

Tufted Vetch was found in three sections along the North Klondike Highway east of Dawson, forming extensive dense growth in one site on both sides of the road; and is believed to have been introduced “when reinforcing the shoulder against river flow several years ago" (Brunner, 2016). He noted "dense growth from the Klondike Bridge into and throughout Dawson now", and that it was also seen at the Clinton Creek turnoff along the Top of the World Highway. He also noted it in the Drury Creek campground along the Campbell Highway, believed to be “a recent introduction”, and in the Goring Creek gravel pit on the North Klondike Highway between Dawson and the Dempster Highway. It was seen in 2007 in one location at the Drury Creek Campground, but "has now spread into the forest around campsite 1 and around the cook shelter", and that in in the Goring Creek pit it was in the area where it had been seen in 2007, but was "spreading up on tall willow shrubs and into the adjacent forest."

In addition to the above introduced species, the invasive Tall Hawkweed *(Hieracium piloselloides)* was seen growing along the roadside and/or in the right-of-way in thirteen road sections along the Alaska Highway between Morley River and Watson Lake, in seven sections along the southern part of the Campbell Highway and one section near Frances Lake. It was commonly seen in those sections along the roadside and/or in the

right-of-way, with rankings of *Rare* and *Low Scattered*. It was also seen within the town of Watson Lake, and has expanded its previously known range in Yukon from the Morley and Rancheria areas.

Species ranked as 2: aggressive — widespread, persistent, but may not replace native species or change ecosystem function

Bladder Campion was found in three road sections and a gravel pit east of Dawson on the North Klondike Highway, and at a rest area on the North Klondike Highway near Stewart Crossing, and was ranked as *Rare*.

Chick-pea Milk-vetch was ranked as *Rare*, *Low Scattered*, and *High Scattered* along five sections of the Haines Highway. Brunner (2016) noted that it was growing along the roadside and in the right-of-way, occasionally growing into the shrubs along the right-of-way perimeter. It was also noted in a pullout along the Haines Highway.

Common Dandelion was seen along highways, in gravel pits, rest areas, pullouts, and near watercourses.

Kentucky Bluegrass was seen in one rest area along the Alaska Highway.

Orchard Grass was seen in one rest area along the Alaska Highway.

Quack Grass was recorded in five sections along the Haines Highway near Haines Junction and southwards, with rankings of *Rare* and one *Low Scattered*, and was also recorded in two sections in the Faro area, ranked as *Rare* and *Low Scattered*. It was also seen near four creeks along the Alaska Highway.

Species ranked as 3: taxa present in the territory that area not known to be invasive here but have been found to be invasive in other jurisdictions

Black Medick was seen only once, along the Alaska Highway just west of Watson Lake, ranked as *Rare.*

Common Sanfoin was found in seven sections along the Alaska Highway, growing along the road edge and in the right-of-way. Between Whitehorse and Jake's Corner three sections were ranked as *Low Scattered*, and two were ranked as *Rare*. Southeast of Johnson's Crossing two sections ranked as *Rare* were recorded. It was not seen elsewhere during the survey.

Common Shepherd's Purse was found in one rest area along the Alaska Highway.

Meadow Foxtail was recorded in two sections along the western end of the Alaska Highway, and was also seen in two rest areas along the Alaska Highway and Silver Trail, one gravel pit along the Alaska Highway, two pullouts along the Alaska Highway

and one along the Top of the World Highway, and in a marshy area near the Koidern River bridge on the Alaska Highway.

Pineapple weed was seen in some rest areas and pullouts.

Siberian Cow Parsnip was seen in one section of the North Klondike Highway near Dawson, forming a dense stand along 75 m of both sides of the road and in the right-of-way. Two plants were seen along the roadside at the north end of Whitehorse (just south of the junction with the North Klondike Highway). It was also noted in the Dawson airport long-term parking lot, where Brunner (2016) commented that it was apparently "transported from roadwork waste material located [nearby] at waypoint "KH 30" several years ago".

Species ranked as 4: has been reported in the territory, but is not been shown to be problematic, may not persist

Meadow Timothy was recorded along the Tagish Road near Jake's Corner, along the southern part of the South Canol Road, and west of Watson Lake, all with low density. It was also noted in a gravel pit on the North Klondike Highway, in pullouts on the Top of the World Highway and the Haines Highway, and in a rest area along the North Klondike Highway.

Red Sand-spurry was seen in one pit along the North Klondike Highway.

Species ranked as 5: species that likely don't persist

Common Rye was seen along the road and right-of-way in several sections south of the Tuchitua road maintenance camp on the Campbell Highway, where it had been introduced via seeding in 2011 (Appleby pers. comm. 2017).

Species ranked as 7: native and introduced populations exist

Common Plantain was commonly seen along the highways, in gravel pits, rest areas, pullouts, and near watercourses.

6: COMPARISONS WITH 2007 SURVEY

Only White Sweet-clover can be compared to the 2007 roadside survey, as it was the only species surveyed in both the 2016 (Figure 1) and 2007 (Figure 18) surveys.

There were slight differences in the methodology between the 2007 and 2016 roadside surveys, due to the scope of the 2016 which was expanded from the 2007 roadside survey. In 2007, species abundance ranks were applied when a change in distribution and abundance was observed, whereas the 2016 survey applied species abundance ranks based on 5-km road segments. Also, the 2007 survey suggested splitting the *Sporadic* abundance rank (i.e. *Scattered*) into a High and Low category which was applied to the 2016 survey. Overall, differences in the abundance and distribution of White Sweet-clover from 2007 to 2016 can be assessed by comparing the maps for both years (Figures 18, 19).

For the purposes of comparison, the 2016 abundance ranks of *Continuous* and *High Scattered* can be combined to represent the 2007 *Continuous* class. The 2007 *Sparse* class can be represented by the 2016 *Low Scattered* and 2007 *Uncommon/Absent* can be represented by 2016 *Rare* and *Absent*.

In 2007, "patches of continuous Sweetclover were predominantly recorded along the highways near the major communities of Watson Lake, Teslin, Whitehorse, Haines Junction, Carmacks, Faro, Mayo, and Dawson. The most extensive ‘continuous’ patches were recorded east and north of Carmacks and east and west of Teslin" (Line et al 2008),

In 2016, long stretches of *Continuous* and *High Scattered* were seen north, south, and east of Carmacks, along the Silver Trail, near Dawson, north of Whitehorse, and southeast of Johnson's Crossing as far as Teslin, with shorter stretches along the Alaska Highway near the border with Alaska, near Haines Junction, east of Whitehorse, and near Watson Lake. In addition, the 2016 survey found *Continuous* and *High Scattered* White Sweet-clover along the road from Stewart Crossing to Dawson and the Silver Trail. Compared to the 2007 survey, less White Sweet-clover was observed east of Teslin in 2016.

Low Scattered and *Rare* White Sweet-clover was observed in 2016 along most of the length of the Alaska Highway from Whitehorse to Jake's Corner, and from Morley Bay to just west of Watson Lake. In a few cases it was *Absent*, *Low Scattered,* and *Rare* rankings, with sections of *Absence*, also dominate much of the Alaska Highway from Whitehorse to Haines Junction, the North Klondike Highway to Dawson, the Campbell Highway from Watson Lake to Frances Lake, from Ross River to east of Carmacks, and along the Tagish Road.

From 2007 to 2016, White Sweet-clover remained more or less absent along the Haines Highway, the South Canol Road, and the Robert Campbell Highway from Frances Lake

to Ross River. The 2016 survey also noted the absence of White Sweet-clover along the South Klondike Highway to the B.C. border, the Tagish Road, and from Dawson west to the Alaska border along the Top of the World Highway.

Some gravel pits, rest areas and pullouts that were surveyed in 2007 were resurveyed in 2016.

One pullout along the Campbell Highway (Fisheye Lake) was noted to have an increase in White Sweet-clover from 2007, but most pullouts and rest areas checked in 2007 did not appear to have changed notably, although in several cases White Sweet-clover had increased in the vegetated section between the highway and the parking area of several Rest Areas.

Differences in White Sweet-clover abundance and distribution were noted from 2007 to 2016 surveys in some gravel pits. In 2007, gravel pit 105-M-04 on the Silver Trail had 10% cover of White Sweet-clover, and in 2016 it appeared to be more than 10% cover, with a ranking of *High Scattered* assigned to the plants observed in the early first year growth stage (Brunner 2016).

Tufted Vetch was noted in 2007 in gravel pit 116-B-01 (Goring Creek), along the Campbell Highway, and in 2016 it was seen to have "spread into surrounding forest and up tall willows" (Brunner 2016).

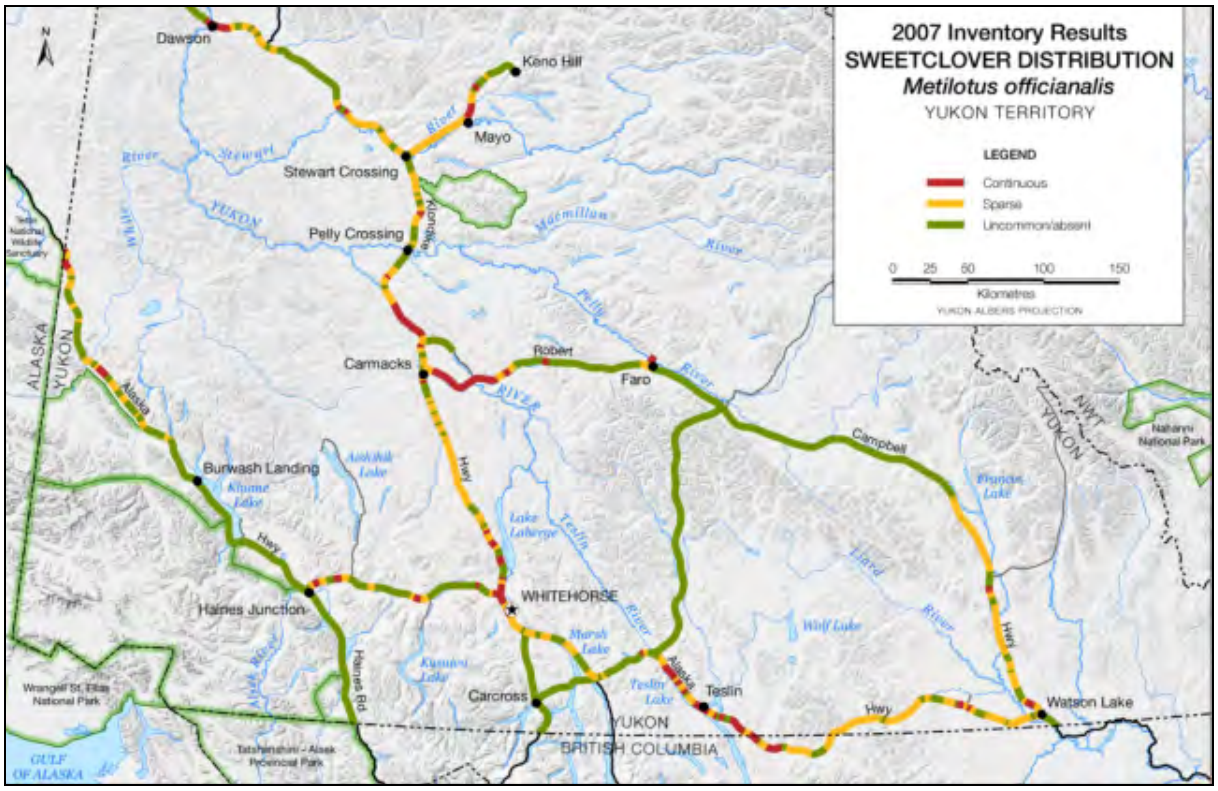
Long abandoned gravel pits appear to support mainly native vegetation, or occasionally White Sweet-clover, Narrow-leaf Hawk's-beard, Alsike Clover and, in one case Alfalfa.

Observations indicate that White Sweet-clover increased along some highways and decreased along others since 2007. As indicated by the abundance category there was an increase in White Sweet-clover along the Silver Trail and along the North Klondike Highway south of Carmacks from *Sparse* and *Uncommon/Absent* in 2007 to *Continuous* and *High Scattered* in 2016.

Sections of the Campbell Highway east of Carmacks also show some increase from *Uncommon/absent* in 2007 to High Scattered and sections of Rare in 2016.White Sweet-clover abundance had declined notably in 2016 along the Alaska Highway west of Burwash from short areas of *Continuous* in 2007 to *High Scattered* and *Rare* in 2016, north of Carmacks from *Continuous* in 2007 to *High Scattered*, and from Johnson's Crossing to Swift Current on the Alaska Highway from sections of *Continuous* in 2007 to mostly High Scattered in 2016.

Overall, gravel pits, rest areas and pullouts do not appear to have changed in overall abundance since 2007.

Figure 18. Distribution of White Sweet-clover along Yukon highways, 2007 roadside survey.



7: RECOMMENDATIONS FOR FUTURE SURVEYS

Due to time constraints, intensive surveys of gravel pits, rest areas, and pullouts were not feasible.

Finding the entrances into gravel pits was sometimes a problem. Access roads are not clearly marked and those where the pit is obscured by forest are often not apparent. Even with known GPS coordinates, it is easy to drive past the entry road.

In some cases it was found that gravel pits listed as "active" appeared not to have been in recent use. This was particularly the case along the South Canol Road.

A tablet with a built-in GPS and good imagery of Yukon roads and terrain would be useful for finding gravel pit entrances.

Field forms should be concise and quick to fill out. Electronic forms on a tablet might be useful if properly designed.

It is strongly recommended that the protocols and methodology for future surveys be road-tested before the actual survey begins, to work out any problems that might arise and to gauge the time necessary to complete the survey.

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Appendix A: Yukon Invasive Plants by Invasiveness

Invasiveness Rank
1 - highly invasive - may displace or replace native ecosystems
2 - aggressive - widespread, persistent, but may not replace native species or change ecosystem function
3 - taxa present in the territory that area not known to be invasive here - but have been found to be invasive in other jurisdictions
4 - has been reported in the territory. Has not been shown to be problematic, may not persist
5 - species that likely don't persist
6 - false reports
7 - native and introduced populations exist

General Abundance
C common - widespread established
F falsely reported,
P possible but not yet documented
R rare known from only 1 or two localities,
U unknown
X possibly not persistent,
? possibly native,

Persistence
1=widespread
2=local
3=not persistent,
4=falsely reported

Alaska Invasiveness Rank
not ranked
<40 = Very Weakly Invasive
40-49 = Weakly Invasive
50-59 = Modestly Invasive
60-69 = Moderately Invasive
70-79 = Highly Invasive
>80 = Extremely Invasive
Ranking from: Matthew L. Carlson, Irina V. Lapina, Michael Shephard, Jeffery S. Conn, Roseann Densmore, Page Spencer, Jeff Heys, Julie Riley, and Jamie Nielsen. 2008.
Invasiveness Ranking System for non-native plants if Alaska. USDA Forest Service Alaska Region R10-TP-143 http://www.fs.fed.us/r10/spf/fhp/invasive/invasiveness%20ranking%20report.pdf
Introduced Plants of the Yukon - Source Cody, 1996 (cody et al 1998, 2000, 2001, 2002, 2003, 2004, 2005) Bennett, B. et al. (2008)
revised by B.A. Bennett December 2011 - this is a tentative list for review purpose only

Invasiveness Rank	Family	Genus	Species	Common Name	Abundance	Persistence	Alaska Rank	Source	Date of first collection
1	Grass family	Agropyron	cristatum	Crested Wheat Grass	C	1	nr	revegetation	1947
1	Grass family	Bromus	inermis	Smooth Brome	C	1	62	agriculture, revegetation	1943
1	Sunflower family	Centaurea	stoebe	Spotted Knapweed	X	3	86	unknown	1995
1	Sunflower family	Cirsium	arvense	Creeping (Canada) Thistle	R	2	76	transportation	1995
1	Sunflower family	Crepis	tectorum	Narrow-leaved Hawksbeard	C	1	56	transportation	1957
1	Euphorbia family	Euphorbia	esula	Leafy Spurge	R	2	84	argiculture	1992
1	Sunflower family	Hieracium	caespitosum	Field Hawkweed	R	2	79	transportation	2009
1	Sunflower family	Leucanthemum	vulgare	Oxeye daisy	R	1	61	horticulture, transportation	1980
1	Grass family	Leymus	angustus	Narrow-leaved (Altai) Lyme Grass	R	2	nr	revegetation	1998
1	Figwort family	Linaria	dalmatica	Dalmatian Toadflax	X	3	58	unknown	2004
1	Figwort family	Linaria	vulgaris	Butter-and-Eggs	C	1	69	horticulture	1970
1	Pea family	Medicago	falcata	Lucerne	C	1	64	argiculture	1967
1	Pea family	Melilotus	alba	White Sweetclover	C	1	81	agriculture	1935
1	Pea family	Melilotus	officinalis	Yellow Sweetclover	C	1	69	argiculture	1980
1	Grass family	Phalaris	arundinacea	Reed Canary Grass	?	1	83	agriculture, revegetation	1979
1	Sunflower family	Sonchus	arvensis ssp. uliginosus	Field Sow-thistle	C	1	73	unknown	1980
1	Sunflower family	Tanacetum	vulgare	Common Tansy	U	2	60	horticulture, transportation	1995
1	Sunflower family	Tripleurospermum	inodoratum	Scentless Chamomile	R	1	48	unknown	1980
1	Pea family	Vicia	cracca	Tufted Vetch	C	2	73	agriculture, transportation, horticulture	1943

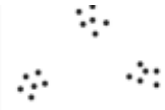
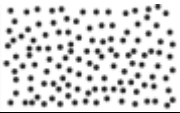
Invasiveness Rank	Family	Genus	Species	Common Name	Abundance	Persistence	Alaska Rank	Source	Date of first collection
2	Pea family	Astragalus	cicer	Chick-pea Milk-vetch	R	2	nr	revegetation	1995
2	Pea family	Caragana	arborescens	Siberian Peashrub	R	2	74	horticulture	1949
2	Buttercup family	Clematis	tangutica	Golden Clematis	R	1	nr	horticulture	1958
2	Grass family	Dactylis	glomerata	Orchard Grass	R	3	53	revegetation	2000
2	Grass family	Elymus	repens	Creeping Wild Rye	U	2	59	revegetation	1949
2	Grass family	Elymus	sibiricus	Siberian Wild Rye	C	1	53	revegetation	1980
2	Grass family	Lolium	perenne	Perennial Rye Grass	R	1	52	revegetation	1994
2	Pea family	Medicago	sativa	Alfalfa	C	1	59	agriculture, revegetation	1980
2	Grass family	Poa	pratensis ssp. pratensis	Kentucky Blue Grass	C	1	52	unknown	
2	Knotweed family	Polygonum	achoreum	Leathery Knotweed	U	1		transportation	1997
2	Rose family	Prunus	padus	Maytree or European Bird Cherry	C	2	74	horticulture	2003
2	Pink family	Silene	vulgaris	Bladder Campion	R	2	42	agriculture, horticulture	1984
2	Sunflower family	Sonchus	asper	Prickly Sow-thsitle	R	2	46	horticulture	1904
2	Rose family	Sorbaria	sorbifolia	False Spiraea	R	2	nr	horticulture	1992
2	Pink family	Stellaria	media	Common Chickweed	C	1	42	agriculture, horticulture	1943
2	Sunflower family	Taraxacum	officinale	Common Dandelion	C	1	58	unknown	1943
2	Grass family	Thinopyrum	ponticum	Tall Wheat Grass	R	1	nr	agriculture	2000
2	Sunflower family	Tragopogon	dubius	Yellow Goat'sbeard	R	2	50	transportation	1995
2	Pea family	Trifolium	hybridum	Alsike Clover	C	1	57	agriculture, revegetation	1902
2	Pea family	Trifolium	pratense	Red Clover	C	1	53	agriculture, revegetation	1902
2	Pea family	Trifolium	repens	White Clover	C	1	59	agriculture, revegetation	1916
3	Maple family	Acer	negundo	Manitoba or Ash-leaf Maple	R	2	nr	horticulture	1998
3	Grass family	Agrostis	gigantea	Redtop	R	2	nr	revegetation	1916
3	Grass family	Alopecurus	pratensis	Meadow Foxtail	C	1	52	agriculture	1947
3	Forget-me-not family	Amsinckia	menziesii	Menzies' Fiddleneck	R	2	nr	unknown	1943
3	Grass family	Avena	fatua	Wild Oasts	R	3	nr	agriculture	1943
3	Mustard family	Brassica	rapa	Bird's Rape	R	1	50	agriculture, revegetation	1980
3	Mustard family	Capsella	bursa-pastoris	Shepherd's Purse	C	1	40	agriculture	1916
3	Goosefoot family	Chenopodium	album	Lamb's-Quarter	C	1	37	unknown	1883
3	Knotweed family	Fallopia	convolvulus	Eurasian Black-bindweed	C	1	50	horticulture	1975
3	Grass family	Festuca	rubra ssp. rubra	Red Fescue	C	1		revegetation	
3	Mint family	Galeopsis	tetrahit var. bifida	Bifid Hemp-nettle	R	1	50	revegetation, horticulture	1980
3	Carrot family	Heracleum	sibiricum	Siberian Cow-parsnip	R	2		unknown	1991
3	Mustard family	Hesperis	matronalis	Dames Rocket	R	2	41	horticulture	2010
3	Forget-me-not family	Lappula	squarrosa	European Stickseed	U	2	44	unknown	1973
3	Mustard family	Lepidium	ramosissimum	Branched Pepperwort	C	1	nr	unknown	1979
3	Pea family	Lotus	corniculatus	Garden Bird's-foot Trefoil	R	3	63	revegetation	2000
3	Mallow family	Malva	neglecta	Common Mallow	R	2	nr	agriculture	2008
3	Sunflower family	Matricaria	discoidea	Pineapple Weed	C	1	32	unknown	1902
3	Pea family	Medicago	lupulina	Black Medick	R	2	48	transportation	2007

Invasiveness Rank	Family	Genus	Species	Common Name	Abundance	Persistence	Alaska Rank	Source	Date of first collection
3	Pea family	Onobrychis	viciifolia	Common Sainfoin	R	2	nr	revegetation	1980
3	Grass family	Poa	annua	Annual Blue Grass	C	1	46	transportation	1968
3	Grass family	Poa	compressa	Canada Blue Grass	U	1	39	revegetation	1980
3	Grass family	Poa	trivialis	Rough Blue Grass	U	1	52	revegetation	1902
3	Grass family	Psathyrostachys	juncea	Russian Wild-Rye	R	2	nr	agriculture	1960
3	Knotweed family	Rheum	rhaponticum	Rhubarb	C	1	nr	agriculture	1999
3	Knotweed family	Rumex	crispus	Curled Dock	R	2	48	unknown	**1980**
3	Knotweed family	Rumex	longifolius	Door-yard Dock	R	2	48	transportation	1980
3	Knotweed family	Rumex	pseudonatronatus	Field Dock	R	2	nr	transportation	2004
3	Grass family	Schedonorus	arundinaceus	Tall Fescue	R	2	66	revegetation	1980
3	Sunflower family	Senecio	vulgaris	Common Ragwort	R	2	36	horticulture, agriculture	1902
3	Pink family	Silene	noctiflora	Night-flowering Catchfly	R	2	43	revegetation	1996
3	Mustard family	Thlaspi	arvense	Field Pennycress	C	1	42	agriculture	1949
3	Valerian family	Valeriana	officinalis	Garden Valerian or Allheal	R	2	nr	horticulture	2007
3	Pea family	Vicia	angustifolia	Garden Vetch	R	2		unknown	1992
4	Sunflower family	Achillea	ptarmica	Sneezeweed	R	2	46	horticulture	2011
4	Grass family	Agropyron	fragile	Siberian Wheat Grass	U	2	nr	revegetation	1949
4	Grass family	Agrostis	capillaris	Colonial Bent Grass	R	2	nr	agriculture, revegetation	1993
4	Mustard family	Arabis	caucasica	Gray Rockcress	R	2		horticulture	2001
4	Mustard family	Arabis	glabra	Tower Mustard	?R	2	nr	transportation	1977
4	Grass family	Bromus	carinatus	California Brome	R	2		revegetation	1995
4	Mustard family	Camelina	microcarpa	Little-pod False Flax	R	2	nr	unknown	1943
4	Pink family	Cerastium	fontanum	Common Mouse-ear Chickweed	U	1	36	unknown	1968
4	Pink family	Cerastium	glomeratum	Sticky Mouse-ear Chickweed	R	2	36	horticulture	2004
4	Pink family	Cerastium	nutans	Nodding Chickweed	R	2		horticulture	1996
4	Mustard family	Descurainia	sophia	Herb-Sophia	U	2	41	unknown	1943
4	Grass family	Festuca	trachyphylla	Hard Fescue	R	2		agriculture	1949
4	Sunflower family	Gaillardia	aristata	Great Blanket-flower	R	2	nr	agriculture	1973
4	Oleaster family	Hippophae	rhamnoides	Sea-Buckthorn	R	2		horticulture	2007
4	Mint family	Lamium	amplexicaule	Common Dead-nettle	R	3	nr	horticulture	2007
4	Grass family	Lolium	multiflorum	Annual Rye Grass	R	1	41	revegetation	1902
4	Poppy family	Papaver	croceum	Saffron Poppy	U	2	39	horticulture	1949
4	Grass family	Phleum	pratense	Common Timothy	C	1	54	agriculture	1902
4	Knotweed family	Rumex	acetosella	Sheep Sorrel	R	2	51	unknown	**1994**
4	Pink family	Spergularia	rubra	Red Sandspurry	R	2	34	unknown	1977
4	Goosefoot family	Spinacia	oleracea	Spinach	R	2		agriculture	1980
4	Sunflower family	Taraxacum	erythrospermum	Red-seeded Dandelion	X	2		unknown	1949
4	Buttercup family	Thalictrum	dasycarpum	Purple Meadow-rue	R	2		agriculture	1991
4	Buttercup family	Thalictrum	venulosum	Veiny Meadow-rue	?R	2		unknown	1949
4	Grass family	Thinopyrum	intermedium	Intermediate Wheat Grass	R	2		transportation	1999

Invasiveness Rank	Family	Genus	Species	Common Name	Abundance	Persistence	Alaska Rank	Source	Date of first collection
4	Figwort family	Veronica	longifolia	Long-leaf Speedwell	R	2	nr	agriculture, horticulture	1980
4	Violet family	Viola	tricolor	Johnny-jump-up	C	1	34	horticulture	**1995**
5	Grass family	Aira	caryophyllea	Silver Hair Grass	X	3	nr	transportation	1946
5	Grass family	Alopecurus	geniculatus	Water Foxtail	R	2	49	agriculture	1899
5	Sunflower family	Anthemis	cotula	Stinking Chamomile	X	3	41	agriculture	**1902**
5	Forget-me-not family	Asperugo	procumbens	German Mad-wort	X	3	nr	horticulture	1949
5	Goosefoot family	Atriplex	patula	Spear Saltbush	X	3	nr	unknown	
5	Grass family	Avena	sativa	Cultivated Oats	X	3	nr	agriculture, transportation	1949
5	Grass family	Bromus	japonicus	Japanese Brome	X	3		revegetation	2003
5	Grass family	Bromus	racemosus	Bald Brome	X	3		agriculture	1902
5	Grass family	Bromus	secalinus	Rye Brome	X	3	nr	agriculture	**1902**
5	Grass family	Bromus	tectorum	Downy Brome	X	3	78	agriculture	1916
5	Mustard family	Camelina	sativa	Large-seeded False Flax	R	3	nr	agriculture	2007
5	Sunflower family	Centaurea	cyanus	Cornflower	X	3		horticulture	1998
5	Sunflower family	Chrysanthemum	ircutianum	Early Daisy	X	3		unknown	1949
5	Sunflower family	Crepis	capillaris	Smooth Hawksbeard	X	3	nr	transportation	1998
5	Grass family	Deschampsia	danthonioides	Annual Hairgrass	X	3	nr	unknown	1902
5	Grass family	Deschampsia	elongata	Slender Hairgrass	X	3	35	transportation (railway)	1902
5	Pink family	Dianthus	plumarius	Carnation	R	3		horticulture	**1994**
5	Mint family	Dracocephalum	thymiflorum	Thyme-flowered Dragonhead	R	3	nr	agriculture	1949
5	Mustard family	Erysimum	cheiri	Wallflower	X	3		horticulture	2001
5	Knotweed family	Fagopyrum	esculentum	Buckwheat	X	3	nr	agriculture (birdseed)	1997
5	Bedstraw family	Galium	aparine	Sticky-willy	X	3		agriculture (birdseed)	2007
5	Jacob's ladder family	Gilia	capitata	Blue-headed Gily Flower	X	3		unknown	**1902**
5	Pink family	Gypsophila	elegans	Showy Baby's-breath	R	3	nr	unknown	1980
5	Sunflower family	Helianthus	subrhomboideus	Stiff Sunflower	X	3		unknown	**1904**
5	Grass family	Hordeum	vulgare	Common Barley	R	3	39	agriculture	1983
5	Mustard family	Lepidium	sativum	Garden Pepperwort	X	3	nr	horticulture	1902
5	Grass family	Lolium	temulentum	Bearded Rye Grass	X	3	nr	unknown	1902
5	Sunflower family	Madia	glomerata	Mountain Tarplant	X	3	nr	unknown	1902
5	Forget-me-not family	Myosotis	scorpioides	True Forget-me-not	R	3	54	horticulture	2000
5	Mustard family	Neslia	paniculata	Yellow Ball-mustard	X	3	nr	agriculture	1904
5	Carrot family	Pastinaca	sativa	Wild parsnip	R	3	nr	agriculture	1949
5	Grass family	Phalaris	canariensis	Common Canary Grass	X	3	nr	agriculture	1941
5	Plantain family	Plantago	aristata	Large-bract Plantain	X	3		unknown	**1902**
5	Knotweed family	Polygonum	fowleri	Fowler's Knotweed	X	3		unknown	**1943**
5	Grass family	Polypogon	monospeliensis	Rabbit's-foot Grass	X	3		unknown	**1902**
5	Rose family	Potentilla	biennis	Biennial Cinquefoil	X	3	nr	unknown	1902
5	Buttercup family	Ranunculus	repens	Creeping Buttercup	X	3	54	transportation	1977
5	Mustard family	Rorippa	curvipes var. truncata	Blunt-leaved Yellowcress	R	3		unknown	1982

Invasiveness Rank	Family	Genus	Species	Common Name	Abundance	Persistence	Alaska Rank	Source	Date of first collection
5	Grass family	Secale	cereale	Common Rye	R	3	nr	agriculture, transportation	1949
5	Sunflower family	Senecio	eremophilus	Dryland Ragwort	R	3		transportation	1968
5	Grass family	Setaria	viridis	Green Bristle Grass	X	3	nr	transportation	1998
5	Mustard family	Sinapis	alba	White Mustard	X	3	nr	unknown	1902
5	Mustard family	Sinapis	arvensis	Corn Mustard	R	3	36	unknown	2002
5	Mustard family	Sisymbrium	altissimum	Tall Hedge Mustard	R	3	nr	unknown	1916
5	Pink family	Spergula	arvensis	Corn Spurry	X	3	32	unknown	**1902**
5	Pea family	Trifolium	cyathiferum	Cup Clover	X	3		agriculture	1902
5	Grass Family	Triticum	aestivum	Common Wheat	X	3	nr	agriculture, transportation	**1943**
5	Nettle family	Urtica	urens	Burning Nettle	X	3	nr	unknown	1904
5	Pink family	Vaccaria	hispanica	Cowcockle	R	3	nr	agriculture (birdseed)	1902
5	Figwort family	Veronica	arvensis	Corn Speedwell	R	3		unknown	**1970**
5	Figwort family	Veronica	serpyllifolia	Thyme-leaf Dragonhead	R	3	36	unknown	**1970**
5	Pea family	Vicia	villosa	Wolly Vetch	X	3	53	unknown	1916
5	Grass family	Vulpia	myuros	Rat-tail Six-weeks Grass	X	3	nr	unknown	**1902**
6	Mustard family	Armoracia	rusticana	Horse Radish	F	4			
6	Bedstraw family	Galium	palustre	Common Marsh Bedstraw	F	4			
6	Knotweed family	Persicaria	maculosa	Spotted Lady's-Thumb	F	4	47		
6	Sunflower family	Sonchus	oleraceus	Common Sow-thistle	F	4	46		
6	Verbena family	Verbena	hastata var. scabra	Simpler's-Joy	F	4			
7	Sunflower family	Artemisia	biennis	Biennial Wormwood	R	4	nr	unknown	
7	Sunflower family	Gnaphalium	uliginosum	Marsh Cudweed	?R	2	nr	unknown	
7	Forget-me-not family	Hackelia	deflexa	Nodding Stickseed	?X	3		unknown	
7	Forget-me-not family	Plagiobothrys	scouleri	Scouler's Popcornflower	?R	3		unknown	
7	Plantain family	Plantago	major	Great Plantain	?C	1	44	unknown	
7	Grass family	Poa	nemoralis	Forest Blue Grass	?	2		revegetation	
7	Knotweed family	Polygonum	buxiforme	Prairie Knotweed	?C	1	45	transportation	
7	Grass family	Puccinellia	distans	Spreading Alkali Grass	?C	1			
7	Mint family	Stachys	pilosa	Hedge-nettle	?R	2		unknown	
7	Pea family	Vicia	americana	American Vetch	?R	1		unknown	
P	Grass family	Agrostis	stolonifera	Creeping Bent Grass	P	P	nr	revegetation	

Appendix B: Density Distribution Classes For the 2016 Roadside Survey (Adapted from Luttmerding et al. 1990).

Guideline for Field Assessment					
Class	Density Distribution	No. of plants in 20 m x 20 m area	No. of plants/ha 100 m x 100 m	Diagram	Approximate % Cover Range
1	rare individual, a single occurrence	1	≤5		1-5
2	a few sporadically occurring individuals	2-5	5-50		1-5
3	a single patch or clump of species	1 patch (occupying an area smaller than one quadrant of the plot)	variable (3 patches)		1-10
4	several sporadically occurring individuals	≥6	≥50		5-10
5	a few patches or clumps of species	2-5 patches (each occupying an area smaller than one quadrant of the plot)	variable (3-10 patches)		10-30
6	several well-spaced patches or clumps	≥6 patches (each occupying less than one quadrant of the plot)	variable (10-many disjunct patches)		10-30
7	continuous occurrence of a species with a few gaps in the distribution	many	many (some openings)		30-60
8	continuous dense occurrence of a species	many	many		>60

Source: Luttmerding et al. 1990.
Notes: The density distribution class is determined over a sufficiently large area to account for normal variation in distribution pattern.

Appendix C: List of Active Gravel Pits in Yukon, 2016.

List available at: ftp://ftp.geomaticsyukon.ca/GeoYukon/Transportation/GRAVEL_PITS_25K/).

Appendix D: Tables 1 to 9

Table 1. Priority invasive plants along Yukon highways, 2016 (presence in number of sections/highway/species and percent of total sections).

HIGHWAY	#1 ALASKA HIGHWAY - 182 SECTIONS	#2 NORTH KLONDIKE HIGHWAY - 105 SECTIONS	#2 SOUTH KLONDIKE HIGHWAY - 16 SECTIONS	#3 HAINES ROAD - 21 SECTIONS	#4 CAMPBELL HIGHWAY - 127 SECTIONS	#6 SOUTH CANOL ROAD - 49 SECTIONS	#8 TAGISH ROAD - 10 SECTIONS	#9 TOP OF THE WORLD HIGHWAY - 24 SECTIONS	#11 SILVER TRAIL - 25 SECTIONS	% OF 559 TOTAL SECTIONS SURVEYED	COMMENTS
White Sweet-clover	154 (85%)	97 (92%)	5 (31%)	1(5%)	75 (59%)	3 (6%)	7 (70%)	2 (8%)	22 (88%)	366 (65%)	N/A
Alsike Clover	110 (60%)	53 (50%)	14 (87%)	20 (95%)	48 (38%)	18 (37%)	4 (40%)	19 (79%)	5 (20%)	291 (52%)	N/A
Smooth Brome	129 (71%)	57 (54%)	15 (94%)	15 (71%)	21 (17%)	13 (27%)	9 (90%)	3 (12%)	13 (52%)	275 (49%)	N/A
Narrow-leaf Hawks-beard	118 (65%)	51 (49%)	13 (81%)	12 (57%)	43 (34%)	8 (16%)	7 (70%)	1 (4%)	13 (52%)	266 (48%)	N/A
Red Clover	37 (20%)	13 (12%)	4 (25%)	10 (48%)	16 (13%)	3 (6%)	1 (10%)	2 (8%)	3 (12%)	89 (16%)	N/A
Alfalfa	32 (18%)	23 (22%)	2 (12%)	5 (24%)	15 (12%)	0	1 (10%)	0	0	78 (14%)	N/A
Yellow Sweet-clover	26 (14%)	16 (15%)	2 (12%)	0	11 (9%)	1 (2%)	2 (20%)	0	2 (8%)	60 (11%)	N/A
Yellow Lucerne	30 (16%)	11 (10%)	1 (6%)	6 (29%)	1 (<1%)	0	0	0	6 (24%)	55 (10%)	N/A
Umbellate Hawkweed	0	4 (4%)	0	2 (10%)	0	0	0	0	1 (4%)	7(1%)	N/A
Oxeye Daisy	4 (2%)	1 (<1%)	0	0	1 (<1%)	0	0	1 (4%)	0	7 (1%)	Also noted near Johnson's Crossing along road to boat launch, and on the road to Sa Dena Hess mine north of Watson Lake
Reed Canary Grass	0	0	0	5 (24%)	0	0	0	0	0	5 (<1%)	Reported from the Alaska Highway but not seen during this survey
Field Sow-thistle	0	4 (4%)	0	0	1 (<1%)	0	0	0	0	5 (<1%)	Reported from the Alaska Highway but not seen during this survey
Common Tansy	0	1 (4%)	0	0	0	0	0	0	0	1 (<1%)	Also noted in a pullout near Faro
Scentless Chamomile	0	0	0	0	0	0	0	0	0	0	A few individuals were seen in a pullout on the South Canol Road and in the Johnson's Crossing dump.

Table 2. Priority invasive plants recorded in gravel pits, rest areas, and pullouts, 2016.

SPECIES	ACTIVE GRAVELPITS (61 TOTAL)	REST AREAS (29 TOTAL)	PULLOUTS (75 TOTAL)	SUM OF SITES WITH PRIORITY INVASIVES	% OF TOTAL SITES (165) WITH PRIORITY SPECIES PRESENT
Narrow-leaf Hawk's-beard	52 (85%)	21 (72%)	25 (33%)	98	59%
White Sweet-clover	28 (46%)	17 (59%)	25 (33%)	70	42%
Alsike Clover	23 (38%)	12 (41%)	31 (41%)	66	40%
Smooth Brome	3 (5%)	10 (34%)	19 (25%)	32	19%
Yellow Lucerne	1 (2%)	0	5 (7%)	6	4%
Red Clover	3 (5%)	3 (10%)	8 (11%)	14	8%
Alfalfa	2 (3%)	0	6 (8%)	8	4%
Yellow Sweet-clover	0	1 (3%)	4 (5%)	5	3%
Scentless Chamomile	0	0	2 (3%)	2	1%
Oxeye Daisy	0	0	1 (1%)	1	<1%
Common Tansy	0	0	1 (1%)	1	<1%
Field Sow-thistle	0	0	0	0	0
Reed Canary Grass	0	0	0	0	0
Umbellate Hawkweed	0	0	0	0	0

Table 3. Active gravel pits surveyed along Yukon highways, 2016.

Highway	YG Pit Number	Survey Way-point	Near-est km post	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Comments	Latitude	Longitude	Elev (m)
#1 - Alaska Highway (21 pits)	104-O-01B	142	1142	A	R	R	A	A	A	A	A	A	N/A	59.969706	-131.22501	864
	104-O-07	127	1184	A	R	R	R	A	A	A	A	A	Gate was locked; walked in; invasives mostly near the entrance	59.916595	-131.87973	832
	105-A-06	105-A-06	1037	R	LS	HS	A	A	A	A	A	Meadow Timothy	Recent use	60.147149	-129.61983	763
	105-A-08	71	1004	A	LS	LS	A	A	A	A	A	A	Recent use; large gravel pile and equipment	60.031248	-129.10362	732
	105-B-04	485	1102	A	LS	LS	A	A	A	A	A	Butter-and-eggs	Butter and Eggs in 2 small patches in older vegetated area	60.091871	-130.647	901
	105-C-02	480	1272	LS	R	HS	A	A	A	A	A	A	N/A	60.331264	-133.05024	693
	105-C-05A	83	1312	A	R	A	A	A	A	A	A	A	Most invasives are in the older vegetated parts	60.446971	-133.53529	813
	105-C-10	105-C-10	1328	A	LS	R	A	A	A	A	A	A	Rest stop checked June 28, gravel pit on July 11	60.384307	-133.77634	809
	105-C-17	86	1300	R	HS	HS	LS	A	A	A	A	A	Some dead White Sweet-clover also	60.492991	-133.37725	795
	105-D-03	AL101	1484	R	R	A	A	A	A	A	A	A	Expansive pit old and new, White Sweet-clover on RS, 2007-AL13	60.805058	-135.99129	714

Highway	YG Pit Number	Survey Way-point	Near-est km post	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Comments	Latitude	Longitude	Elev (m)
#1 - Alaska Highway (21 pits)	115-A-01	AL82	1558	R	A	A	A	A	A	A	A	A	Reclaimed with White Sweet-clover clump in center	60.845073	-137.24079	680
	115-A-11	AL81	1560	A	R	A	A	A	A	A	R	A	Narrow-leaved Hawksbeard and White Sweet-clover on access road, very limited amount, Yellow Lucerne a single plant, reclaimed mostly native vegetation	60.83246	-137.32019	676
	115-A-13	AL74	1590	A	R	A	A	A	A	A	A	A	In use	60.799877	-137.68342	672
	115-A-25	AL89	1518	A	A	A	A	A	A	A	A	A	Stockpile	60.807849	-136.55751	707
	115-A-26	AL80	1560	R	R	A	A	A	A	A	A	A	One White Sweet-clover plant on stockpiles	60.838826	-137.31527	689
	115-F-02	AL23	1786	R	R	R	A	R	A	A	A	Meadow Foxtail	Main White Sweet-clover concentrated at recent use pile near equipment	61.816155	-140.08344	724
	115-G-01	AL34	1736	HS	R	A	A	A	A	A	A	A	Large stockpile, older area White Sweet-clover is HS	61.580761	-139.37457	724
	115-G-02	AL48	1678	R	R	A	A	A	A	A	A	A	Large stockpiles not recently used, a few White Sweet-clover plants in leveled area, pit is along Mines Creek which occasionally floods into pit.	61.214196	-138.70571	806

Highway	YG Pit Number	Survey Way-point	Near-est km post	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Comments	Latitude	Longitude	Elev (m)
#1 - Alaska Highway (21 pits)	115-G-05	AL40	1708	LS	R	A	A	A	A	A	A	A	Cover species on large area reclaimed is Elym trac, signifigant stands of White Sweet-clover	61.370253	-139.11584	851
	115-G-10	AL30	1758	R	R	A	A	A	A	A	A	A	White Sweet-clover along access road is HS	61.657777	-139.73305	715
	115-K-05	AL13	1832	HS	A	A	R	A	A	A	A	A	Extensive growth of White Sweet-clover along east side, not in stockpile yet.	62.086827	-140.67256	705
#2 - North Klondike Highway (10 pits)	105-E-04	KH36	260	A	A	A	A	A	A	A	A	A	No invasives	61.323672	-135.6091	842
	115-H-01	KH42	322	HS	R	R	A	A	A	A	A	A	Pit is unused with large stockpile, 2007-KH29, less tall growth White Sweet-clover in level area than 2007	61.808265	-136.05446	588
	115-I-07	KH56	460	HS	R	A	A	A	A	A	A	A	Some White Sweet-clover on stockpiles	62.807902	-136.59427	486
	115-I-15	KH54	430	HS	R	A	A	A	A	A	A	A	White Sweet-clover is C on perimeter, many patches in center of area, overall abundant, important pit summer and winter with power, satellite a shelter	62.596425	-136.85266	471

Highway	YG Pit Number	Survey Way-point	Near-est km post	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Comments	Latitude	Longitude	Elev (m)
#2 - North Klondike Highway (10 pits)	115-P-02	KH62	508	A	R	A	A	A	A	A	A	A	N/A	63.174731	-136.51807	737
	115-P-07	KH2	542	R	LS	A	A	A	A	A	A	A	No significant change since 2007, 2007-KH20	63.408613	-136.80897	475
	115-P-09	KH6	576	HS	LS	A	A	A	A	A	A	A	No White Sweet-clover on piles, White Sweet-clover is HS in bottom of pit.	63.542356	-137.34118	442
	115-P-11	KH10	616	A	R	R	A	A	A	A	A	Red Sand-spurry	Few plants of species noted.	63.781538	-137.80788	609
	115-P-19A	KH9	610	R	R	R	A	R	A	A	A	A	Clear Creek Road turnoff is often used to park equipment for transportation to mining area	63.754166	-137.67556	616
	116-B-01	KH29	686	A	R	LS	A	A	A	A	A	Tifted Vetch, Bladder Campion	Tufted Vetch is in area recorded in 2007 but has spread into surrounding tall willows.	64.048637	-138.90271	408
#2 - South Klondike Highway (1 pit)	105-D-08	461	90	A	LS	R	A	A	A	A	A	A	N/A	60.06958	-134.57431	746
#3 - Haines Road (4 pits)	115-A-07	HR31	158	A	A	A	A	A	A	A	A	A	N/A	60.097725	-136.91775	823
	115-A-08	HR26	172	A	R	R	A	A	A	A	A	A	Noted invasives on access road near ROW	60.204774	-136.97407	710

Highway	YG Pit Number	Survey Way-point	Near-est km post	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Comments	Latitude	Longitude	Elev (m)
#3 - Haines Road (4 pits)	115-A-10	HR12	204	A	R	R	A	R	A	A	A	A	Very limited distribution of invasives, mostly on access road	60.474826	-137.0602	721
	115-A-12	HR8	232	A	R	A	A	A	A	A	A	A	Very few plants	60.673011	-137.3523	830
#4 - Campbell Highway (18 pits)	105-A-12	207	20	A	LS	R	A	A	A	A	A	A	Large pit	60.17681	-128.93414	687
	105-A-13	211	24	A	R	LS	A	A	A	A	A	A	Small pit; looks older, but listed as active; Narrow-leaved Hawksbeard mainly near entrance	60.21238	-128.95903	729
	105-F-03	293	340	A	R	A	A	A	A	A	A	A	N/A	61.842349	-132.29538	830
	105-F-25	RC56	362	A	R	A	A	A	A	A	A	A	N/A	61.977289	-132.58697	776
	105-H-05	258	188	A	LS	R	A	A	A	A	A	A	N/A	61.498993	-129.85021	922
	105-H-12	246	144	A	R	R	A	A	A	A	A	A	N/A	61.196465	-129.44467	863
	105-K-01	RC50	382	A	A	A	A	A	A	A	A	A	Active new pit	62.071205	-132.88585	760
	105-K-03	RC41	428	A	R	LS	A	A	A	R	A	A	Alsike Clover is in old native revegetated area.	62.19272	-133.65948	784

Highway	YG Pit Number	Survey Way-point	Near-est km post	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Comments	Latitude	Longitude	Elev (m)
#4 - Campbell Highway (18 pits)	105-K-09	RC36	446	A	R	A	A	A	A	A	A	A	N/A	62.169882	-133.98328	709
	105-L-02	RC4	560	R	R	A	A	A	A	A	A	A	Stockpile but no recent use	62.047883	-135.90537	551
	105-L-04	RC29	468	A	R	A	A	A	A	A	A	A	Well used pit, also has Bank Swallows in one unused pile	62.20235	-134.37757	679
	105-L-05	RC23	490	A	R	A	A	A	A	A	A	A	Not used very frequently	62.206319	-134.79513	658
	105-L-06	RC20	506	A	A	A	A	A	A	A	A	A	No invasives	62.188207	-135.06151	650
	105-L-07	RC16	514	R	R	A	A	A	A	A	A	A	N/A	62.143162	-135.17803	666
	105-L-09	RC12	528	HS	R	R	A	A	A	A	A	A	White Sweet-clover growth extensive	62.077357	-135.4	648
	105-L-11	RC3	564	R	R	A	A	A	A	A	A	A	New pit, abundant White Sweet-clover on highway, very little in pit.	62.071757	-135.97946	540
	105-L-16	RC6	546	C	R	A	A	A	A	A	A	A	Stockpile not being used	62.058376	-135.68813	546
	115-I-09	RC2	572	HS	R	A	A	A	A	A	A	A	Extensive infestation of White Sweet-clover, 2007-RC9	62.096444	-136.10629	527

Highway	YG Pit Number	Survey Way-point	Near-est km post	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Comments	Latitude	Longitude	Elev (m)
#6-South Canol Road (1 pit)	105-C-04	325	2	R	R	R	A	A	A	A	A	A	N/A	60.50523	-133.26214	788
#8 - Tagish Road (1 pit)	105-D-22	466	n/a	A	LS	A	A	A	A	LS	A	A	Alfalfa mostly on vegetated slope at edge of pit	60.202334	-134.65359	736
#9-Top of the World Highway (1 pit)	116-C-08	TW7	76	A	A	A	A	A	A	A	A	A	No invasives.	64.162832	-140.56224	976
#11 - Silver Trail (4 pits)	105-M-04	ST11	62	HS	R	A	A	A	A	A	A	A	Active pit with new crush stockpile, White Sweet-clover in early 1st year growth, likely to be much greater cover when reestablished than in 2007, 2007-ST10	63.691585	-135.85138	591
	105-M-53	ST09	76	A	A	A	A	A	A	A	A	A	No invasives, large stockpile of gravel and White Sweet-clover on access road.	63.806423	-135.77913	728
	115-P-14	ST19	10	HS	LS	A	A	A	A	A	A	A	Extensive growth of White Sweet-clover as well as on stockpiles	63.426563	-136.50644	488
	115-P-16A	ST14	38	HS	LS	A	A	A	A	A	A	Common Plantain	One section White Sweet-clover is C, growing on gravel piles, 2007-ST4 and 2007-ST3	63.571352	-136.07017	547

Highway	YG Pit Number	Survey Way-point	Near-est km post	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Comments	Latitude	Longitude	Elev (m)
Notes: Abundance categories: C = continuous; S = Sporadic where HS = high scattered and LS = low scattered; R = rare; A = absent. YG = Government of Yukon km = kilometre kp = kilometre post m = metre ROW = right-of-way RS = roadside N/A = nothing noted																

Table 4. Rest areas surveyed along Yukon highways, 2016.

Highway	Survey waypoint	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Location and nearest km post	Comments	Latitude	Longitude	Elev (m)
# 1 - Alaska Highway (12 rest areas)	104	R	C	R	C	A	R	A	A	Kentucky Bluegrass - R	North side of highway, just east of Teslin bridge - kp 1242	Trash bins, outhouses	60.16096	-132.69293	722
	120	R	C	A	A	A	A	A	A	Meadow Foxtail - R	In BC section of Alaska Highway, south side of road - kp 1194	Outhouses, trash bins	59.95486	-132.02326	804
	137	A	R	A	R	A	A	A	A	A	In BC section, south side of Alaska Highway - kp 1152	Small area, outhouse, trash bin	59.89729	-131.34038	861
	147	A	LS	LS	LS	A	A	A	A	A	South side of Alaska Highway, west of Watson Lake - kp 1130	Trash barrel only; brome growing 2 m into adjacent forest	60.02440	-131.09485	988
	152	A	R	LS	A	A	A	A	A	A	North side of highway, west of Watson Lake - kp 1120	Outhouses, trash bins	60.07344	-130.94248	981
	169	A	LS	R	R	A	A	A	A	A	South side of Alaska Highway, west of Watson Lake - kp 1084	Outhouses, trash bins	60.10196	-130.35254	878

Highway	Survey waypoint	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Location and nearest km post	Comments	Latitude	Longitude	Elev (m)
	176	LS	LS	LS	LS	R	A	A	A	A	North side of Alaska Highway, west of Watson Lake - kp 1064	Outhouses and trash bin	60.19898	-130.06114	807
# 1 - Alaska Highway (12 rest areas)	77	A	R	LS	HS	A	A	A	A	A	NE of Jake's Corner - kp 1328	Trash bins, outhouses	60.38339	-133.7765	809
	99	R	R	A	LS	A	A	A	A	Orchard Grass - R	Alaska Highway, SW of Johnson's Crossing, south side of highway - kp 1258	Outhouses and trash bin	60.23325	-132.91064	694
	AL37	A	A	A	A	A	A	A	A	A	Kluane River - kp 1726	2007-AL23, no target species noted.	61.49735	-139.29364	805
	AL55	R	R	A	A	A	A	A	A	A	Slims River, Visitor Center - kp 1648	White Sweet-clover is beginning to establish between old and new highway away from Visitor Center, 2007-AL21	61.01353	-138.52632	782
	RS 1	A	HS	HS	HS	R	A	A	A	A	South side of Alaska Highway west of Watson Lake - kp 1004	Rest stop with 2 entries. trash bins, outhouses	60.02982	-129.09196	724
#2 - North Klondike Highway (7 rest	KH13	A	R	C	A	A	A	A	A	Meadow Timothy– R	Gravel Lake rest stop - kp 622	2007-KH14	63.80713	-137.89738	626

Highway	Survey waypoint	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Location and nearest km post	Comments	Latitude	Longitude	Elev (m)
areas)	KH20	R	R	A	A	A	A	A	A	A	kp 656	White Sweet-clover along road opposite of site	63.94437	-138.45643	680
#2 - North Klondike Highway (7 rest areas)	KH27	LS	LS	HS	A	A	A	A	A	A	Dempster Corner - kp 0	Alsike Clover along perimeter is 10% coverage	63.99072	-138.75042	439
	KH4	R	R	A	A	A	A	A	A	A	kp 550	N/A	63.45426	-136.94141	454
	KH49	A	R	A	A	A	A	A	A	A	Five Finger Rapids - kp 380	N/A	62.27310	-136.34261	582
	KH51	R	A	A	A	A	A	A	A	A	kp 394	N/A	62.35574	-136.41921	528
	KH66	R	R	R	HS	A	A	A	A	Bladder Campion – R	Stewart Crossing - kp 534	N/A	63.37639	-136.67832	474
#4 - Campbell Highway (4 rest areas)	235A	R	HS	HS	R	R	A	A	A	A	North of Simpson Lake - kp 108	Small rest stop, outhouse, trash bins	60.90245	-129.2333	839
	RC44	R	A	A	A	A	A	A	A	A	Fisheye Lake - kp 418	Increase in White Sweet-clover from 2007, 2007-RC5	62.19162	-133.4667	799
	RC5		A	A	A	A	A	A	A	A	Columbia Disaster - kp 556	N/A	62.0294	-135.8476	657
	RC55	A	A	A	A	A	A	A	A	A	kp 362	N/A	61.97830	-132.58977	775
#9 - Top of the World Highway (1 rest area)	TW8	A	A	A	A	A	A	A	A	A	60 Mile turnoff - kp 86	No invasives, 2007-TW3	64.11608	-140.6941	1027
#11 - Silver Trail (5 rest areas)	ST01	R	R	A	A	A	A	A	A	A	5 Mile lake recreation site - kp 58	Virtually no invasives, no change since 2007, 2007-ST11	63.65767	-135.87869	588

Highway	Survey waypoint	White Sweet-clover	Narrow-leaf Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-clover	Alfalfa	Yellow Lucerne	Other species	Location and nearest km post	Comments	Latitude	Longitude	Elev (m)
	ST02	LS	R	LS	A	A	A	A	A	A	Minto Bridge - kp 64	Being used to repaint bridge, outhouses and tables present	63.70089	-135.8636	585
	ST05	A	A	A	A	A	A	A	A	Meadow Foxtail – R, Common Dandelion – R	Keno City community campground	Very limited invasives, 2007-ST9, no change since 2007	63.90747	-135.30314	930
	ST13	R	A	A	A	A	A	A	A	A	kp 44	ROW and RS on opposite side is White Sweet-clover – HS, 2007-ST5	63.59908	-135.99026	549
	ST15	LS	R	A	A	A	A	A	A	Crested Wheatgrass – LS	kp 18	White Sweet-clover is C along roadside, and Crested Wheatgrass between road and parking area, 2007-ST2	63.47644	-136.37677	522

Notes:
Abundance categories: C = continuous; S = Sporadic where HS = high scattered and LS = low scattered; R = rare; A = absent.
YG = Government of Yukon
km = kilometre
kp = kilometre post
m = metre
ROW = right-of-way
RS = roadside
N/A = nothing noted

Table 5. Pullouts surveyed along Yukon highways, 2016.

Highway	Map Ref. No.	Survey Way-point	White Sweet-clover	Narrow-leaved Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-Clover	Alfalfa	Yellow Lucerne	Other species	Location and/or nearest km post	Comments	Site type	Lat.	Long.	Elev (m)
# 1 - Alaska Highway-31 pullouts	1	AL6	LS	LS	A	HS	A	A	A	A	Meadow Foxtail - R	kp 1858	N/A	Pullout	62.2876	-140.7791	739
	2	AL8	A	A	A	A	A	A	A	A	A	Marshal Creek AL7 - kp 1842	Rhin mino abundant here.	Pullout	62.1729	-140.6779	694
	3	AL9	A	R	A	R	A	A	A	A	A	kp 1840	One plant Rhin mino	Pullout	62.1640	-140.6841	730
	4	AL16	A	R	A	R	A	R	R	A	A	kp 1820	Slope opposite seeded with Alfalfa.	Pullout	61.9917	-140.5664	734
	5	AL19	A	A	A	A	A	A	A	A	Meadow Foxtail - R	kp 1802	2007-AL27, no invasives on list	Pullout	61.9200	-140.3012	683
	6	AL31	A	A	A	A	A	A	A	A	A	Icefield Ranges - kp 1756	White Sweet-clover on RS but not in pullout, 2007-AL25	Pullout	61.6361	-139.7026	807
	7	AL45	R	A	LS	A	A	R	LS	A	A	kp 1686	Invasive along old road bed and side cuts, White Sweet-clover along main road	Pullout	61.2561	-138.8140	807
	8	AL50	A	R	A	A	A	A	A	A	A	kp 1662	N/A	Pullout	61.1186	-138.5575	786
	9	AL53	A	A	A	A	A	A	A	A	A	Info Signs - kp 1650	No invasives, new pullout since 2007	Pullout	61.0255	-138.5026	788
	10	AL54	A	A	A	A	A	A	A	A	A	Trail Head - kp 1650	No invasives, new pullout since 2007	Pullout	61.0253	-138.5056	787
	11	AL57	A	A	A	A	A	A	A	A	A	kp 1642	No target species	Pullout	61.0069	-138.4364	787

Highway	Map Ref. No.	Survey Way-point	White Sweet-clover	Narrow-leaved Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-Clover	Alfalfa	Yellow Lucerne	Other species	Location and/or nearest km post	Comments	Site type	Lat.	Long.	Elev (m)
	12	AL63	A	A	A	A	A	A	A	A	A	Kluane Lake - kp 1636	No target species	Pullout	61.0176	-138.3181	913
# 1 - Alaska Highway-31 pullouts	13	AL65	A	A	A	A	A	A	A	R	A	kp 1628	One plant in ditch between road and pullout	Pullout	61.0048	-138.1963	956
	14	AL71	A	A	A	A	A	A	A	A	A	Jarvis River - kp 1608	No target species	Pullout	60.9225	-137.8868	858
	15	AL73	A	A	R	A	R	A	A	A	A	kp 1600	Alsike Clover and Red Clover in ROW adjacent to pullout	Pullout	60.8548	-137.7942	992
	16	AL76	A	A	A	A	A	A	A	A	Spotted Knap-weed - R	Bear Creek - kp 1590	Plants removed and collected.	Other - road shoulder	60.7957	-137.6711	635
	17	AL77	A	R	A	C	A	A	A	LS	A	kp 1584	Yellow Lucerne along RS and edge of pullout	Pullout	60.7733	-137.5988	598
	18	AL78	R	R	A	A	A	A	A	A	A	kp 1564	Perimeter cut	Pullout	60.8215	-137.3908	683
	19	AL85	R	R	A	R	A	A	A	A	A	Canyon Creek - kp 1548	N/A	Pullout	60.8591	-137.0609	650
	20	AL98	HS	A	A	HS	A	A	A	A	A	kp 1504	N/A	Pullout	60.7832	-136.2885	692
	21	AL99	A	A	A	C	A	A	A	A	A	Takhini Valley - 1488	N/A	Pullout	60.7842	-136.0247	702
	22	AL103	A	A	A	A	A	A	A	A	A	kp 1476	Abandoned pit with native vegetation	Other - old gravel pit	60.8389	-135.8647	726
	23	AL106	HS	A	A	A	A	A	A	A	A	kp 1454	Perimeter cut back 2m	Pullout	60.8595	-135.4745	668

Highway	Map Ref. No.	Survey Way-point	White Sweet-clover	Narrow-leaved Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-Clover	Alfalfa	Yellow Lucerne	Other species	Location and/or nearest km post	Comments	Site type	Lat.	Long.	Elev (m)
	24	73	LS	LS	LS	C	A	A	LS	A	A	Jake's Corner - kp 1342	Checked area along highway and behind restaurant	Other - commer-cial - active	60.3406	-133.9873	784
# 1 - Alaska Highway-31 pullouts	25	319	A	A	R	R	A	R	A	A	Oxeye Daisy - R	Just southwest of Johnson's Crossing - no kp	Side road leading to boat launch area	Other - Side road off Alaska Highway	60.4829	-133.3109	696
	26	321	A	A	LS	A	R	A	A	A	A	Johnson's Crossing - kp 1296	Checked area along driveway of gas station/ restaurant area	Other - commer-cial - active	60.4831	-133.3075	696
	27	481	LS	R	HS	LS	R	A	A	A	A	North side of highway, across from the Teslin Cottage Lots - kp 1254	Sign calls it a public quarry - very similar looking to a gravel pit	Other – Quarry	60.2068	-132.8563	720
	28	107	LS	LS	LS	LS	R	A	A	A	A	SE of Johnson's Crossing, south side of Alaska Highway - kp 1232	Abandoned former gas station? Small house and other buildings present	Other - commer-cial - inactive	60.1122	-132.5613	720
	29	482	A	A	HS	HS	A	A	A	A	A	Morley Lodge - kp 1206	Checked area near the highway (not around buildings)	Other - commer-cial - inactive	60.0106	-132.1615	777
	30	484	A	A	R	A	A	A	A	A	A	Rancheria Falls entrance - kp 1112	Checked parking area only	Other - recreatio n area	60.0800	-130.8198	919

Highway	Map Ref. No.	Survey Way-point	White Sweet-clover	Narrow-leaved Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-Clover	Alfalfa	Yellow Lucerne	Other species	Location and/or nearest km post	Comments	Site type	Lat.	Long.	Elev (m)
	31	Old pullout	A	A	A	A	A	A	A	A	A	North side of highway - kp 1062	Might be an old gravel pit; dominant veg is *Dryas drummondii*/ willow-aspen	Other - old gravel pit	60.1987	-130.0358	804
#2 - South Klondike Highway- 2 pullouts	32	457	A	A	A	A	A	A	A	A	A	Near Bove Island, South Klondike Highway, east side of road - kp 96	Trash barrel only	Pullout	60.1134	-134.5575	769
	33	449	A	A	A	A	A	A	A	A	A	South Klondike Highway, east side - kp 116	South Klondike Highway, east side	Pullout	60.2668	-134.7456	729
#2 - North Klondike Highway- 10 pullouts	34	KH39	R	A	A	R	A	A	A	A	A	Fox Lake Fire - kp 272	N/A	Pullout	61.4110	-135.7102	883
	35	KH40	LS	A	A	A	A	A	A	A	A	Whitehorse Trough - kp 298	ROW is full of White Sweet-clover, continuous for 3km, width of a mower on the RS and into ROW. White Sweet-clover at access road entrances	Pullout	61.6228	-135.8788	654
	36	KH41	LS	R	LS	A	A	A	R	A	A	115H-01-kp 320	Pit no longer used, 2007-KH29	Other - old gravel pit	61.8048	-136.0499	587
	37	KH44	R	R	A	R	A	A	LS	A	A	kp 322	N/A	Pullout	61.8172	-136.0585	618

Highway	Map Ref. No.	Survey Way-point	White Sweet-clover	Narrow-leaved Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-Clover	Alfalfa	Yellow Lucerne	Other species	Location and/or nearest km post	Comments	Site type	Lat.	Long.	Elev (m)
	38	KH48	A	R	A	A	A	A	A	A	A	South of Carmacks - kp 352	N/A	Pullout	62.0578	-136.2788	555
	39	KH57	R	A	A	HS	A	A	A	A	A	Pelly Crossing - kp 464	N/A	Pullout	62.8325	-136.5668	527
	40	KH61	R	A	R	A	A	A	A	A	A	kp 508	N/A	Pullout	63.1786	-136.5070	750
#2 - North Klondike Highway- 10 pullouts	41	KH65	LS	A	LS	A	A	A	A	A	A	kp 522	N/A	Pullout	63.2732	-136.5868	527
	42	KH24	R	A	A	A	A	A	A	A	A	Tr'ondëk Hwëch'in pull out - kp 668	N/A	Pullout	63.9527	-138.6728	456
	43	KH31	LS	LS	LS	LS	A	A	A	A	Siberian Cow Parsnip - R	Long term parking Dawson airport - kp 698	2007-KH31, Siberian Cow Parsnip transported from roadwork waste material located at KH30 several years ago.	Other - Airport parking	64.0460	-139.1261	367
#3- Haines Road - 10 pullouts	48	HR4	A	HS	LS	LS	LS	A	A	R	A	kp 242	Large area disturbed with numerous invasives, pullout has toilets.	Pullout	60.7380	-137.4443	692
	49	HR6	A	R	HS	LS	A	A	A	A	A	Auriol Trail Head - kp 240	Invasives attributed to ROW reseeding	Pullout	60.7176	-137.4245	791

Highway	Map Ref. No.	Survey Way-point	White Sweet-clover	Narrow-leaved Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-Clover	Alfalfa	Yellow Lucerne	Other species	Location and/or nearest km post	Comments	Site type	Lat.	Long.	Elev (m)
	50	HR9	R	LS	A	A	A	A	A	R	A	Kluane World Heritage Site - kp 226	1st note of White Sweet-clover, recently cut around sign, probably all Yellow Lucerne. Decline in Yellow Lucerne since 2007??, 2007-HR2	Pullout	60.6277	-137.2881	782
	51	HR11	A	A	C	A	R	A	A	A	Butter-and-eggs - R	Kathleen River - kp 222	Butter-and-eggs on RS opposite site	Pullout	60.5915	-137.2291	734
	52	HR14	A	R	R	A	A	A	A	LS	A	Kluane Rock Glacier - kp 202	Perimeter cut but Yellow Lucerne still evident, 2007-HR4	Pullout	60.4553	-137.0601	744
#3-Haines Road – 10 pullouts	53	HR18	A	A	R	A	A	A	A	A	A	kp 192	N/A	Pullout	60.3802	-137.0506	709
	54	HR21	A	A	C	A	A	A	A	A	Chick-pea Milk-vetch - R	Stelias Lake Trail - kp 186	Alsike Clover throughout ROW	Pullout	60.3218	-137.0446	775
	55	HR25	A	A	R	A	A	A	A	A	A	kp 172	Few invasives noted	Pullout	60.2166	-136.9663	693
	56	HR28	A	A	R	A	A	A	A	A	Meadow Timothy - R	kp 160	Noted invasives in surrounding ROW	Pullout	60.1257	-136.9633	883
	57	HR30	A	A	A	A	A	A	A	A	A	kp 150	N/A	Pullout	60.0396	-136.8837	912
#4 - Campbell Highway – 11 pullouts	58	RC1	LS	R	A	A	A	A	A	A	A	kp 574	N/A	Pullout	62.1056	-136.1296	602
	59	RC8	HS	A	A	A	A	A	A	A	A	kp 536	N/A	Pullout	62.0858	-135.5402	581

Highway	Map Ref. No.	Survey Way-point	White Sweet-clover	Narrow-leaved Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-Clover	Alfalfa	Yellow Lucerne	Other species	Location and/or nearest km post	Comments	Site type	Lat.	Long.	Elev (m)
	60	RC11	R	A	A	A	A	A	A	A	A	kp 528	White Sweet-clover along RS is C	Pullout	62.0760	-135.4034	647
	61	RC26	R	A	A	A	A	A	A	A	A	kp 470	N/A	Pullout	62.1997	-134.4177	684
	62	RC31	LS	A	A	A	A	A	A	A	A	kp 466	N/A	Pullout	62.1938	-134.3312	711
	63	RC34	A	R	A	A	A	A	A	A	A	kp 452	Adjacent to RC33	Pullout	62.1751	-134.0879	695
	64	RC38	R	R	R	R	A	A	R	A	Common Tansy - R	kp 440	N/A	Pullout	62.1649	-133.8568	752
	65	RC40	A	A	R	A	A	A	A	A	A	kp 434	N/A	Pullout	62.1803	-133.7611	753
	66	RC43	A	A	LS	A	A	A	A	A	A	kp 422	N/A	Pullout	62.2041	-133.5506	874
#4 - Campbell Highway – 11 pullouts	67	RC53	A	A	A	A	A	A	A	A	A	kp 368	Old pit	Pullout	62.0047	-132.6757	762
	68	270	A	A	A	A	A	A	A	A	A	Finlayson airstrip - kp 244	No change from 2007	Other - Gravel/ dirt airstrip	61.6912	-130.7748	940
#6 - South Canol Road – 7 pullouts	69	323	A	R	LS	A	LS	A	A	A	A	NW side of South Canol Road, Johnson's Crossing - kp 0	N/A	Pullout	60.4908	-133.2955	737
	70	324	A	R	HS	A	R	R	A	A	A	<1 km north of Johnson's Crossing, on east side of road - kp 0	N/A	Other - Dump	60.4936	-133.2852	771

Highway	Map Ref. No.	Survey Way-point	White Sweet-clover	Narrow-leaved Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-Clover	Alfalfa	Yellow Lucerne	Other species	Location and/or nearest km post	Comments	Site type	Lat.	Long.	Elev (m)
	71	326	A	A	A	A	A	A	A	A	A	East side of South Canol Road - kp 2	Look like an old gravel pit	Other - old gravel pit	60.5035	-133.2597	787
	72	347	A	R	HS	A	A	A	A	A	A	West side of South Canol Road - kp 44	Large culvert storage area	Other - culvert storage	60.7936	-133.0700	747
	73	348	A	A	LS	A	A	A	A	A	Scentless Chamo-mile - LS	Open area along Sidney Lake, east side of road - kp 52	Lakeside grassy area with picnic table	Other - disturb-ed grassy area along lake	60.8090	-133.0344	724
	74	"Old pit and cabin"	A	A	A	A	A	A	A	A	A	n/a	Looks like an old gravel pit; old cabin present	Other - old gravel pit	61.8397	-132.9674	960
#6 - South Canol Road- 7 pullouts	75	408	A	A	A	A	A	A	A	A	A	North side of South Canol Road	Looks like an old pit; Hord juba only at entrance	Other - old gravel pit	61.8733	-132.8586	982
#9-Top of the World Highway – 4 pullouts	44	TW1	A	A	R	A	A	A	A	A	A	Welcome to Dawson signage 40 Mile Herd - kp 14	2007-TW7	Pullout	64.0879	-139.6135	978
	45	TW4	A	A	R	A	A	A	A	A	Meadow Timothy - R, Meadow Foxtail - R	kp 32	2007-TW5	Pullout	64.1739	-139.8773	1122
	46	TW5	A	A	HS	A	A	A	A	A	Tufted Vetch - R	Clinton Creek turnoff - kp 60	One clump of Tufted Vetch 1mx1m, recent introduction, 2007-TW4; Common Dande-lion-LS,	Other-Highway Junction	64.2196	-140.3157	1122

Highway	Map Ref. No.	Survey Way-point	White Sweet-clover	Narrow-leaved Hawk's-beard	Alsike Clover	Smooth Brome	Red Clover	Yellow Sweet-Clover	Alfalfa	Yellow Lucerne	Other species	Location and/or nearest km post	Comments	Site type	Lat.	Long.	Elev (m)
	47	TW9	A	A	A	A	A	A	A	A	A	Top of the World Highway pullout - kp 100	No invasives, 2007-TW1	Pullout	64.0923	-140.9231	1121

Notes:
Abundance categories: C = continuous; S = Sporadic where HS = high scattered and LS = low scattered; R = rare; A = absent.
YG = Government of Yukon
km = kilometre
kp = kilometre post
m = metre
ROW = right-of-way
RS = roadside
N/A = nothing noted

Table 6. Watercourses surveyed along Yukon highways — Watercourses with invasives present in streamflow or along bank slopes.

Highway/Road	WP	Watercourse Name	Comments	Latitude	Longitude	Elev. (m)
1 - Alaska Highway	AL18	Koidern River No. 2	White Sweet-clover on approaches, widespread last km, Alsike Clover is rare, Alop prat in marshy area upstream side of bridge photo 0154	61.966674	-140.415957	682
	AL79	Marshall Creek	Narrow-leaved Hawksbeard and White Sweet-clover on road slopes, White Sweet-clover in creek	60.834885	-137.331087	657
	AL12	Sanpete Creek	Narrow-leaved Hawksbeard a few plants on approaches and Brom iner growing on gravel bar down stream	62.090139	-140.664319	703
2 - North Klondike Highway	KH64	Crooked Creek	White Sweet-clover in stream.	63.273246	-136.585655	528
	KH38	No name	Alsike Clover in stream	61.402843	-135.685411	854
	KH46	No name	Narrow-leaved Hawksbeard on gravel on downstream side	61.947884	-136.185517	591
	KH26	Too Much Gold Creek	Abundant White Sweet-clover and approaches and slopes, work completed in the last two years, one plant White Sweet-clover found in stream	63.957704	-138.709858	457
	KH59	Willow Creek	Meil alba by water edge, Alsike Clover by stream flow on both sides of road	63.00105	-136.490196	636
3 - Haines Road	HR10	Kathleen River	Alsike Clover and Red Clover on lower bank near water, Brom iner and Elym repe on approaches	60.592129	-137.23146	740
	HR12	No name	Alsike Clover and Red Clover near culvert on both sides of road.	60.474826	-137.060197	721
	HR7	Quill Creek	Narrow-leaved Hawksbeard a few plants by gravel bar on downstream culvert, Reed Canary Grass collected	60.676522	-137.359308	840
4 - Campbell Highway	RC45	Pelly River	White Sweet-clover on approaches, White Sweet-clover distributed at high water mark downstream	62.22082	-133.377969	653

Table7. Watercourses surveyed along Yukon highways — Watercourses with invasive species present along approaches to streams, near culverts, bridges, and roadsides.

Highway/Road	WP	Watercourse Name	Comments	Latitude	Longitude	Elev. (m)
1 - Alaska Highway	94	Deadman Creek	Banks densely vegetated with native vegetation; Narrow-leaved Hawksbeard occurs on roadside above stream	60.340098	-133.064595	689
	100	Ten Mile Creek	Banks densely vegetated with native vegetation; Narrow-leaved Hawksbeard occurs on roadside above stream	60.23373	-132.910828	694
	112	No name	Patch of Alsike Clover near culvert	60.065338	-132.318158	753
	116	Morley River	Smooth Brome on bank on south side of bridge; Alsike Clover below bridge; Red Clover below bridge	60.006861	-132.143276	792
	129	Smart River	Smooth Brome and Alsike Clover near creek along bank	59.932467	-131.782366	798
	315	Judas Creek	Alsike Clover app. 1.5 m from SW bank, and app. 3 m from SE bank	60.389403	-134.128794	736
	320	Boat launch area near Johnson's Crossing	Common Plantain at river edge; 1 White Sweet-clover and Alsike Clover near river; Yellow Sweet-Clover near road	60.483454	-133.3097	694
	AL10	Dry Creek No. 1	Very little Smooth Brome on approaches	62.134479	-140.681278	739
	AL101	Annie Ned Creek	White Sweet-clover and Yellow Lucerne on RS on both sides, culvert replacement started, very disturbed ground	60.805058	-135.991287	714
	AL104	Takhini River	White Sweet-clover on approaches	60.851907	-135.742397	654
	AL105	No name	Yellow Sweet-Clover down road embankment to stream	60.855365	-135.564487	653
	AL107	No name	White Sweet-clover and Yellow Sweet-Clover near creek	60.829036	-135.400098	734
	AL109	No name	Alsike Clover and Smooth Brome on RS	60.814893	-135.283829	737
	AL15	No name	Alfalfa, Smooth Brome and Narrow-leaved Hawksbeard in parking area close to creek	62.070209	-140.656237	688
	AL17	White River	Narrow-leaved Hawksbeard on approaches, photo 0149 shows revegetation Alfalfa on slope near bridge	61.988148	-140.558208	720
	AL2	Snag Creek	Smooth Brome and Narrow-leaved Hawksbeard rare on approaches, White Sweet-clover present on downstream side of bridge	62.476643	-140.86722	626
	AL21	No name	Next to Lake Creek Campground, White Sweet-clover on approaches, many plants on the East side and few on the West side.	61.851902	-140.143507	708
	AL22	No name	Alsike Clover and Narrow-leaved Hawksbeard on approaches	61.821079	-140.078778	725
	AL24	No name	White Sweet-clover and Alsike Clover abundant on approaches	61.814195	-140.060833	729
	AL25	No name	Alsike Clover and Narrow-leaved Hawksbeard on approaches	61.809294	-140.051633	734
	AL27	No name	White Sweet-clover, Narrow-leaved Hawksbeard and Alsike Clover along RS	61.80658	-140.047225	734
	AL29	Donjek River	White Sweet-clover abundant on southeast approach, access used for gravel and water	61.679457	-139.754589	725
	AL39	Duke River	One dense cluster of White Sweet-clover on approach, Narrow-leaved Hawksbeard present	61.376721	-139.145101	863
	AL4	Beaver Creek	White Sweet-clover and Narrow-leaved Hawksbeard on approaches, denser on south end	62.364626	-140.866501	678
	AL46	Bock's Creek	One plant Yellow Sweet-Clover in ROW	61.224608	-138.747585	850

	AL5	Enger Creek	Narrow-leaved Hawksbeard and Smooth Brome on approaches	62.303744	-140.790343	727
	AL61	No name	White Sweet-clover in ditch upslope from creek	61.021003	-138.390329	814
	AL7	No name	White Sweet-clover on approaches	62.173462	-140.677056	698
1 - Alaska Highway	AL72	No name	Alsike Clover near upper culvert	60.858906	-137.796455	985
	AL83	No name	White Sweet-clover on downstream RS and ROW	60.84555	-137.224454	673
	AL84	Aishihik River	Yellow Lucerne, Smooth Brome and White Sweet-clover on approaches	60.858842	-137.064669	652
	AL86	No name	White Sweet-clover and Smooth Brome on RS	60.843407	-136.968383	696
	AL87	No name	Smooth Brome is C in ROW	60.83767	-136.950563	698
	AL88	Cracker Creek	Smooth Brome is C in ROW	60.814697	-136.850552	686
	AL95	No name	Few plants of White Sweet-clover on RS on both sides near culvert	60.80461	-136.394492	722
	AL97	Mendenhall River	Extensive growth of White Sweet-clover along road both sides of river, Alfalfa and Smooth Brome near water edge, Narrow-leaved Hawksbeard along RS	60.784899	-136.294549	687
11-Silver Trail	ST03	Mayo River	Construction, bridge repainting, White Sweet-clover, Narrow-leaved Hawksbeard and Yellow Lucerne on appoaches to stream but not in stream	63.701486	-135.863442	588
	ST04	Crystal Creek	Small creek only native vegetation on road	63.921366	-135.327752	856
	ST06	No name	Small marshy creek, dense low growth White Sweet-clover on RS	63.875673	-135.664263	788
	ST07	No name	Small creek, dense low growth White Sweet-clover on RS	63.842026	-135.733644	770
	ST12	Mayo River	White Sweet-clover and Yellow Lucerne on approaches	63.605626	-135.899936	498
	ST16	No name	White Sweet-clover and Narrow-leaved Hawksbeard on RS, native vegetation beyond RS	63.456516	-136.438479	484
	ST18	No name	White Sweet-clover, Narrow-leaved Hawksbeard and Alsike Clover along RS and ROW, collected Hera umbe	63.440842	-136.476388	495
2 - North Klondike Highway	KH1	No name	White Sweet-clover and Smooth Brome on RS	63.3966	-136.768372	460
	KH11	No name	Alsike Clover along RS	63.784351	-137.816389	606
	KH12	Willow Creek	Alsike Clover along RS	63.787328	-137.820858	610
	KH15	Meadow Creek	Alsike Clover along RS	63.835849	-137.980916	603
	KH17	No name	White Sweet-clover on RS with a few plants at base of road slope	63.864828	-138.099104	579
	KH18	No name	White Sweet-clover, Alsike Clover and Red Clover on RS and ROW	63.880333	-138.157158	611
	KH19	Stone Boat Swamp	White Sweet-clover on RS	63.885434	-138.185935	615
	KH21	No name	Flat Creek Hill, road slope covered in Alsike Clover	63.926786	-138.523325	547
	KH22	Flat Creek	Bridge approaches overgrown with White Sweet-clover, one plant of Yellow Sweet-Clover	63.942837	-138.601218	470
	KH23	All Gold Creek	Recently built in the last two years, White Sweet-clover well established on RS and road slope	63.943076	-138.617795	467
	KH28	Goring Creek	Alsike Clover and White Sweet-clover on RS, small amount	64.042593	-138.884551	417
	KH3	Dry Creek	White Sweet-clover along RS and ROW, very little	63.42383	-136.86027	473

	KH33	Fox Creek	Alfalfa and Smooth Brome on approaches, large area reseed on both sides of creek north and south with Alfalfa	61.100388	-135.293443	732
	KH43	No name	Located at Montague House, White Sweet-clover on RS on downstream side	61.816966	-136.058638	617
	KH47	No name	White Sweet-clover, Yellow Sweet-Clover, Alfalfa, Narrow-leaved Hawksbeard and Smooth Brome on RS and ROW, White Sweet-clover abundant	61.982181	-136.217506	592
	KH5	Moose Creek	White Sweet-clover along approaches	63.508238	-137.022266	463
	KH50	Tatchun Creek	New bridge completed in 2015, White Sweet-clover starting on approaches, abundant in ROW on north side of creek	62.282677	-136.311282	514
2 - North Klondike Highway	KH52	McGregor Creek	White Sweet-clover is C on RS	62.3985	-136.555136	549
	KH53	McCabe Creek	Narrow-leaved Hawksbeard on lower abutment	62.535852	-136.764797	485
	KH58	No name	White Sweet-clover by culvert by upstream side	62.962166	-136.508629	612
	KH63	No name	White Sweet-clover on RS and ROW	63.21775	-136.536915	608
	KH7	McQuesten River	White Sweet-clover along approaches	63.55672	-137.412918	438
	KH8	Clear Creek	White Sweet-clover abundant continuus for several hundred meter along road and approaches, Alsike Clover – R	63.628348	-137.611413	442
2 - South Klondike Highway	462	No name	Native vegetation only, but Alfalfa grows app. 3 m from creek in depression at side of highway; Yellow Lucerne also present there	60.059513	-134.572395	695
3 - Haines Road	HR1	Dezadeash River	Alsike Clover and Red Clover on lower abutment, Smooth Brome, Narrow-leaved Hawksbeard and Quack Grass on approaches	60.747719	-137.50664	590
	HR15	No name	Narrow-leaved Hawksbeard on disturbed ground at edge of creek, high volume at spring freshet	60.441457	-137.052101	737
	HR19	No name	Alsike Clover and Chick-pea Milk-vetch near water's edge near downstream side	60.36807	-137.055291	715
	HR2	Dezadeash River channel	Smooth Brome and Quack Grass on approaches	60.745836	-137.505033	589
	HR20	Flying Squirrel Creek	Chick-pea Milk-vetch on upper culvert and Alsike Clover on RS and lower culvert	60.355717	-137.049382	711
	HR22	Gribbles Gulch	Chick-pea Milk-vetch on RS and Alsike Clover along ROW close to creek	60.305719	-137.038303	789
	HR23	Klukshu	Chick-pea Milk-vetch and Alsike Clover in ROW	60.287584	-137.000426	702
	HR29	Takhanne River	Alsike Clover along lower bank approaches	60.111618	-136.929669	728
	HR3	No name	Quack Grass, Crested Wheatgrass, and Reed Canary Grass collected	60.741921	-137.480536	618
4 - Campbell Highway	205	No name	Some Alsike Clover on NE edge, app. 1.5 m above creek	60.152909	-128.886035	680
	215	No name	Some Alsike Clover	60.300564	-129.007016	730
	222	Frances River	Some Alsike Clover app. 1.5 m above creek	60.471664	-129.11778	692
	RC10	No name	Km 532, White Sweet-clover is C on RS	62.081525	-135.453437	649
	RC13	No name	White Sweet-clover dense on downstream RS	62.078378	-135.388525	640
	RC14	No name	Native vegetation, limited low growth White Sweet-clover	62.114675	-135.270268	626
	RC15	No name	Limited White Sweet-clover on downstream RS	62.12155	-135.227328	618
	RC17	No name	White Sweet-clover on downstream RS	62.171276	-135.133223	644

	RC19	Bearfeed Creek	White Sweet-clover on approaches	62.184395	-135.084953	635
	RC24	No name	White Sweet-clover small amount on RS downstream side	62.197636	-134.533243	638
	RC27	Drury Creek	White Sweet-clover, Alsike Clover and Narrow-leaved Hawksbeard on approaches	62.200097	-134.388085	634
	RC39	No name	Alfalfa and Alsike Clover on RS	62.164843	-133.856535	755
	RC42	No name	Alfalfa, Alsike Clover and White Sweet-clover on RS	62.201269	-133.623367	819
	RC46	No name	Roadwork bitumen at creek, White Sweet-clover and Narrow-leaved Hawksbeard in area, disturbed	62.166618	-133.299975	737
	RC47	Buttle Creek	White Sweet-clover and Alfalfa on road slope	62.166989	-133.273319	718
	RC51	No name	Narrow-leaved Hawksbeard on upstream road embankment, Lina vulg on downstream road embankment, 15 m downslope of road surface.	62.058173	-132.860877	760
4 - Campbell Highway	RC7	No name	White Sweet-clover on RS on both sides, 100ft of fill	62.068875	-135.662482	570
	RC9	No name	White Sweet-clover is C on RS	62.087664	-135.524823	592
6 - South Canol Road	337	Murphy Creek	Alsike Clover and Common Dandelion along road near creek	60.676082	-133.012747	824
	355	Cottonwood Creek	Native vegetation along creek, but Yellow Sweet-Clover, Smooth Brome. amd Alsike Clover present but not within 2 m of creek	60.884546	-132.975943	746
	371	No name	Bromus and Alsike Clover 2 m from water on NE side	61.323931	-133.001882	890

Table 8. Watercourses surveyed along Yukon highways —Watercourses lacking invasive species (except Common Dandelion).

Highway	Survey Way-point	Watercourse Name	Comments	Latitude	Longitude	Elev. (m)
1 - Alaska Highway	88	Teslin River	Banks densely vegetated with Willow to water edge; no invasives seen at boat launch (looking from bridge)	60.484082	-133.303631	705
	121	Lower Hazel Creek	Native vegetation only	59.950993	-132.004403	804
	122	No name	Native vegetation along creek	59.942023	-131.976763	821
	134	Logjam Creek	Native vegetation, plus Common Dandelioni	59.910288	-131.549603	852
	140	No name	Native vegetation only	59.923612	-131.282536	854
	143	Partridge Creek	Bordered by dense tall Willow	59.970124	-131.224193	867
	145	Seagull Creek	Native vegetation along creek	60.007435	-131.186685	890
	149	Swift River	Native vegetation along creek	60.049925	-130.996619	916
	153	Upper Rancheria River	Dense native vegetation, mostly Willows; woodchuck or marmot here on bridge; BP took photos	60.079368	-130.921148	978
	156	Porcupine Creek	Native vegetation, plus Common Dandelion	60.076487	-130.840626	949
	160	Canyon Creek	Native vegetation, plus Common Dandelion	60.092715	-130.657327	917
	165	George's Gorge	Native vegetation only	60.092437	-130.390798	881
	171	No name	Native vegetation only	60.140782	-130.22763	853
	175	Lower Rancheria River	Native vegetation only	60.198812	-130.063227	802
	185	Big Creek	Native vegetation only	60.157869	-129.704743	771
	187	Little Rancheria River	Native vegetation only	60.142722	-129.609579	741
	197	No name	Native vegetation only	60.052383	-128.928776	622
	103	Fox Creek	Tiny creek; dense native vegetation	60.182687	-132.792154	694
	80	Seaforth Creek	Banks densely vegetated with native species	60.445689	-133.582163	800
	AL100	Stoney Creek	No invasives	60.798985	-135.998852	706
	AL108	No name	No invasives	60.816094	-135.324927	749
	AL11	No name	No invasives	62.095766	-140.66556	704
	AL14	No name	No invasives	62.072858	-140.658161	687
	AL20	No name	No invasives anywhere	61.9008	-140.225814	690
	AL28	Edith Creek	No invasives	61.801564	-140.039505	737
	AL32	No name	No invasives	61.594104	-139.458465	754
	AL33	Swede Johnson Creek	No invasives	61.592103	-139.427998	730
	AL35	Glacier Creek	No invasives	61.539591	-139.3433	769
	AL36	Quill Creek	No invasives	61.519595	-139.324801	781
	AL38	Burwash Creek	No invasives	61.431501	-139.220028	840
	AL41	Grace Chambers Creek	Entering Burwash Landing	61.353966	-138.999154	800
	AL42	No name	Overflow of Louis Creek (AL43)	61.295471	-138.87117	819
	AL43	Louis Creek	No invasives N/A	61.29351	-138.867738	819

1 - Alaska Highway	AL44	Cluet Creek	No invasives	61.257237	-138.815583	808
	AL47	Mines Creek	No invasives	61.21137	-138.7069	820
	AL49	Congdon Creek	No invasives	61.154544	-138.559197	794
	AL51	Williscroft Creek	No invasives	61.083484	-138.53695	798
	AL52	No name	No invasives	61.060716	-138.511194	793
	AL56	Slims River	No invasives	61.001124	-138.509873	795
	AL58	No name	No invasives	61.009237	-138.430061	795
	AL59	No name	No invasives	61.010676	-138.424638	789
	AL60	No name	No invasives	61.013747	-138.413551	786
	AL62	Silver Creek	No invasives	61.020894	-138.345716	869
	AL64	Christmas Creek	No invasives	61.007807	-138.238053	894
	AL66	No name	No invasives	61.001586	-138.175739	965
	AL67	No name	No invasives	60.969285	-138.075441	945
	AL68	No name	No invasives	60.960242	-138.048661	934
	AL69	Sulphur Creek	No invasives	60.939672	-137.993593	852
	AL70	Jarvis River	No invasives	60.922126	-137.883071	857
	AL75	Bear Creek	No invasives	60.795827	-137.671365	639
	AL90	No name	No invasives	60.809926	-136.516278	711
	AL91	No name	No invasives	60.812741	-136.482978	720
	AL92	No name	Used to pump water for road work	60.81239	-136.474476	725
	AL93	No name	No invasives	60.811014	-136.441492	718
	AL94	No name	No invasives	60.808014	-136.416648	718
2 - North Klondike Highway	KH16	No name	No invasives	63.863398	-138.096463	580
	KH35	No name	No invasives	61.289141	-135.526028	800
	KH37	No name	No invasives	61.361	-135.671579	830
	KH55	No name	No invasives	62.716672	-136.71117	575
	KH60	No name	No invasives	63.079547	-136.453297	738
	KH67	Stewart River	No invasives	63.381345	-136.682166	483
	KH68	Hunker Creek	No invasives	64.030273	-139.178719	395
	KH69	Bear Creek	No invasives	64.039325	-139.322169	329
2 - South Klondike Highway	464	No name	Native vegetation only	60.028434	-134.610921	688
3 - Haines Road	HR13	No name	No invasives	60.462425	-137.061767	739
	HR17	No name	No invasives	60.424299	-137.050874	758
	HR24	Vand Creek	Dry, but high volume runoff	60.226569	-136.960579	702
	HR27	Motherall Creek	No invasives	60.201655	-136.976579	719
	HR5	No name	No invasives	60.737072	-137.443275	699
4 - Campbell Highway	226	No name	Native vegetation only	60.646778	-129.19562	693

	253	Money Creek	Dense native shrub vegetation along creek	61.403918	-129.645194	753
	277	Big Campbell Creek	Dense native shrub vegetation along creek	61.751796	-131.117042	847
	285	Hoole Creek	Native vegetation only	61.748156	-131.710779	813
	294	Ketza River	Native vegetation only	61.848054	-132.308166	838
	RC18	No name	Native vegetation	62.182663	-135.102398	645
	RC21	No name	Native vegetation	62.203268	-134.846724	638
	RC22	No name	Native vegetation	62.205761	-134.833676	636
	RC25	No name	Alders	62.198562	-134.498655	639
	RC30	No name	No invasives	62.199201	-134.374895	646
	RC32	No name	No invasives	62.170623	-134.123291	680
	RC33	No name	No invasives	62.174863	-134.088199	673
	RC37	No name	No invasives	62.171433	-133.956947	724
	RC49	No name	No invasives	62.097097	-132.968513	780
	RC52	No name	No invasives	62.005156	-132.676905	763
	RC54	Lapie River	No invasives	61.986409	-132.605456	751

Table 9. Non-priority introduced species recorded along Yukon highways and in disturbed areas.

COMMON NAMES	SCIENTIFIC NAMES	ROAD-SIDES	GRAVEL PITS	REST AREAS	PULL-OUTS	WATER-COURSES
Black Medick	*Medicago lupulina*	Present				
Bladder Campion	*Silene vulgaris*	Present	Present	Present		
Butter-and-eggs	*Linaria vulgaris*	Present	Present		Present	
Chick-pea Milk-vetch	*Astragalus cicer*	Present			Present	Present
Common Dandelion	*Taraxacum officinale*	Present	Present	Present	Present	Present
Common Plantain	*Plantago major*	Present	Present	Present	Present	Present
Common Rye	*Secale cereale*	Present				
Common Sainfoin	*Onobrychis viciifolia*	Present				
Common Shepherd's Purse	*Capsella bursa-pastoris*			Present		
Crested Wheatgrass	*Agropyron cristatum*	Present		Present		Present
Dalmatian Toadflax	*Linaria dalmatica*	Present				
Kentucky Bluegrass	*Poa pratensis ssp. pratensis*	Present		Present	Present	
Meadow Foxtail	*Alopecurus pratensis*	Present	Present	Present	Present	
Meadow Timothy	*Phleum pratense*	Present	Present	Present	Present	
Orchard Grass	*Dactylis glomerata*			Present		
Pineappleweed	*Matricaria discoidea*			Present	Present	Present
Quack Grass	*Elymus repens*	Present				Present
Red Sand-spurrey	*Spergularia rubra*		Present			
Siberian Cow Parsnip	*Heracleum sibiricum*	Present			Present	
Spotted Knapweed	*Centaurea stoebe* ssp. *micranthos*	Present			Present	
Tall Hawkweed	*Hieracium piloselloides*	Present				
Tufted Vetch	*Vicia cracca*	Present	Present		Present	

Appendix E: Additional Maps

Figure. 1. 2016 roadwork and maintenance encountered during the 2016 roadside survey.

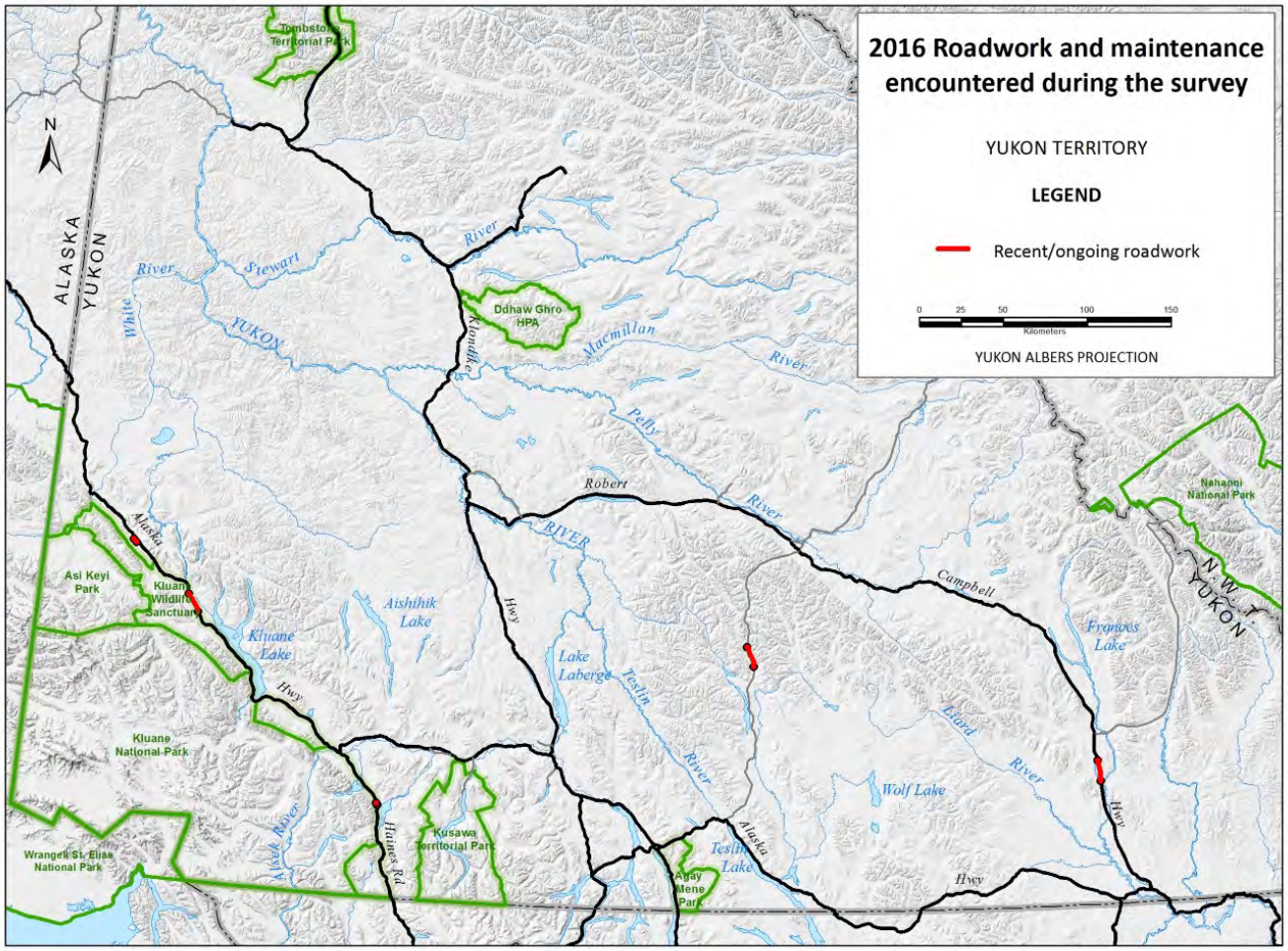


Figure. 2. 2016 mowed areas encountered along Yukon highways during the 2016 roadside survey.