Wycliffe Conservation Complex Invasive Plant Management Report

2023

Prepared for:
Ministry of Water, Land, and Resource Stewardship
Nature Conservancy of Canada
Nature Trust of British Columbia

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Contract No. 2023-77-KR
February 15, 2024

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Introduction

The East Kootenay Invasive Species Council (EKISC) is a regional non-profit organization that strives to mitigate the negative environmental, social, and economic impacts of invasive species within the East Kootenay Region. Part of this work includes coordinating the inventory and treatment of invasive species on different land jurisdictions. As such, EKISC engaged with the Ministry of Water, Lands, and Resource Stewardship (MWLRS), the Nature Conservancy of Canada (NCC), and The Nature Trust of British Columbia (NTBC) to develop an Invasive Species Management Plan (ISMP) for the Wycliffe Conservation Complex ('WCC' or 'Complex').

In 2020, extensive invasive plant inventories occurred across the WCC to determine which areas and species should be prioritized for treatment. Informed by the inventories, a limited number of treatments occurred in the Fall focusing on low- and medium-density species. In 2021, larger scale invasive plant treatments occurred across the complex. The focus was on species with low and medium densities, as well as higher densities species within identified priority areas on MWLRS, NCC, and NTBC lands. Treatments continued in 2022, with focus on restoration areas and priority species.

In 2023, treatments continued in identified priority areas across the WCC. This report provides information on areas that received invasive plant treatments, including species treated, herbicide used, and monitoring notes specific to treatment completion and efficacy. In addition, recommendations are provided that were developed based on contractor advice and monitoring observations, that align with the Wycliffe Conservation Property Complex Invasive Species Management Plan (EKISC, 2021).

Treatment Summary

Treatments for noxious and invasive plants commenced on 1 September and were completed on 25 September 2023. A total of 29.14 ha was treated across all WCC properties, with 11.28 ha treated on NTBC properties, 2.73 ha treated on MWLRS jurisdiction, and 15.13 ha treated on NCC properties. The primary invasive plants that were targeted included:

- Blueweed
- Common tansy
- Dalmatian toadflax
- Spotted knapweed
- Sulphur cinquefoil
- Yellow hawkweed

Table 1 summarizes treatments, including hectares treated, and undiluted herbicide used per site. All treatment data was uploaded into Invasives BC before the deadline of December 1st, 2023.

Table 1. Invasive plants targeted, hectares treated, and herbicide used for each property in the Wycliffe Conservation Complex in 2023.

Property	Species Targeted	Herbicide	Amount of Undiluted Herbicide Used (Kg) [1]	Area treated (ha)
NTBC Trap & Skeet	Common toadflax, Spotted knapweed, St. John's wort, Sulphur cinquefoil	Clearview	1.29	6.45
NTBC Pine Butte	Common toadflax, Sulphur cinquefoil,	Clearview	0.97	4.83
NCC Luke Creek	Blueweed, Common tansy, Hound's tongue, Spotted knapweed, Sulphur cinquefoil, Wormwood	Clearview	2.3	11.5
NCC Pine Butte	Sulphur cinquefoil	Clearview	0.73	3.63
MWLRS Lone Pine Butte	Dalmatian toadflax, Spotted knapweed, Sulphur cinquefoil	Clearview	0.55	2.73
			Total:	**29.14**

Table 2 summarizes the amount of area treated at the WCC from 2020-2023, including area that is newly treated each year. The newly treated area is estimated by adding up the area treated only on newly created sites, as determined through IAPP Site IDs. It is worth noting that the site IDs represent a 200 m^2 area, and that all created sites within that buffer zone will get put under the one site ID. As invasive plant infestations are dynamic and the area represented under a single site ID is large, it is likely that different parts of the infestation are treated annually, although this can't be determined as they are considered a single site. Therefore, the variation of treated area within a site is not captured in this estimate. In 2023, due to lack of site IDs in the new Invasives BC database, the estimate was determined by drawing buffers around the past IAPP and comparing past tracks and polygons to determine which new points fall outside that previously treated area.

Table 2.Total hectares treated and new treated area in the Wycliffe Conservation Complex from 2020-2023.

Year	Area Treated (ha)	New Treated Area (ha)
2020	8.55	8.55
2021	34.98	20.22
2022	23.30	14.2
2023	29.14	11.25

[1] The amount of undiluted herbicide used varies greatly based on the type of herbicide. Each herbicide is diluted to the application rate specified on its label. The amount of undiluted herbicide used at a project site should not be used as a metric to evaluate invasive plant infestation size or success of treatment when comparing following years.

As outlined in the WCC workplan, Priority 1 treatments were conducted across the complex targeting low to medium distribution species, specifically Blueweed, Common tansy, Scentless chamomile, and Spotted knapweed. Dalmatian toadflax was treated advantageously when adjacent to higher priority species. The focus for Priority 1 treatments was where planned Ecosystem Restoration work was to be taking place in 2023-2024. Specific Treatment Units (TU) that received invasive plant management were NCC TU 3, NTBC TU 2, NTBC TU 5, and NCC TU 5. Priority 2 treatments focused on infestations of Yellow hawkweed and Sulphur cinquefoil within areas that received thinning treatments from 2021-2023, specifically NCC's Luke Creek ER Unit, MWLRS's Western ER Unit, and NTBC's Trap and Skeet ER Unit. Finally, priority 3 treatments focused, as resources allowed, on satellite or outlier sites of Sulphur cinquefoil and Yellow hawkweed in areas adjacent to the previously mentioned ER units. Included in this priority was a broadcast spray treatment along the inside fence line of NCC's Luke Creek Property from north to south, along the westside of Miles Road and broadcast treatment of the Trap and Skeet club lease area. Finally, parcels where adjacent private landowners are actively treating high distribution species were targeted.

The following sections will outline the treatments that took place on specific properties within the WCC. On each map, the treatment points indicate approximate treatment sites, bearing in mind that treatments encompass different sized areas, depending on species targeted, terrain, and priority. Linear segments travelled indicate where the contractor travelled and often treated targeted invasive plants. Treatment sites indicate which species were targeted along the linear segments in the vicinity of the points location. All priority noxious species found along roads, trails, and open areas were treated. When infestations are detected off road, a hose reel system is used to apply herbicide directly to the plants. If infestations are large, the entire infestation is systematically treated using a UTV vehicle equipped with a boom sprayer.

Luke Creek

At the Luke Creek property the main species targeted were Sulphur cinquefoil, in the planned tree thinning treatment units in the north-west corner of the property (Figure 1). The perimeter of the open fields in the south end of the property was treated in an effort to contain the Sulphur cinquefoil. In addition, smaller contained infestations of Blueweed, Common tansy, Hound's tongue, Spotted knapweed, and Wormwood were treated.

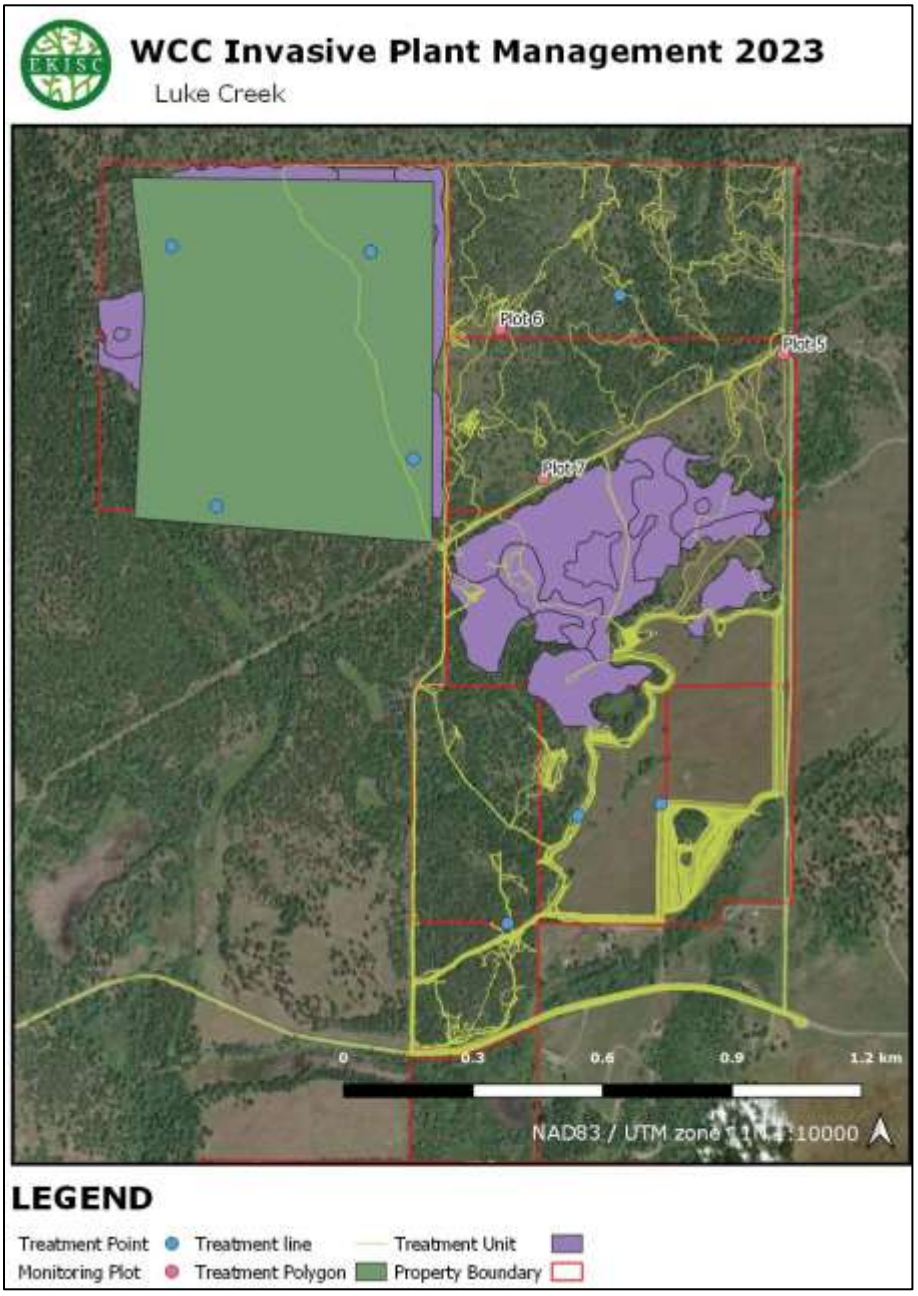


Figure 1. Invasive plant treatments on the Nature Conservancy of Canada's Luke Creek Property in the Wycliffe Conservation Complex completed in 2023.

Trap & Skeet

The Trap & Skeet property invasive plant treatments mainly treated Sulphur cinquefoil, particularly in the shooting range and surrounding area, as well as the open fields in the north end of the property (Figure 2). In addition, smaller contained infestations of Common toadflax, Spotted knapweed, and St. John's wort were treated.

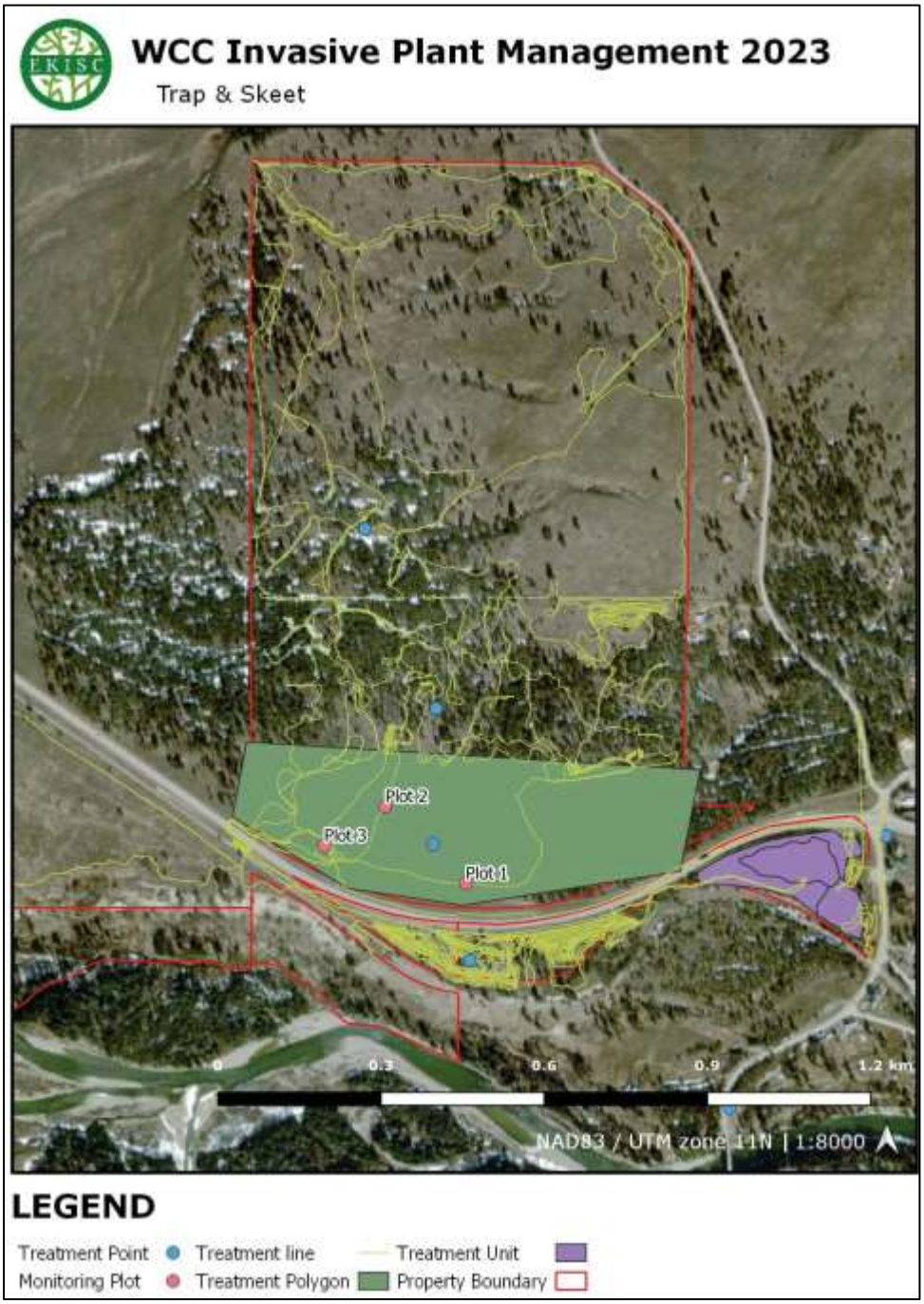


Figure 2. Invasive plant treatments on the Nature Trust of BC's Trap and Skeet Property in the Wycliffe Conservation Complex completed in 2023.

Lone Pine Butte

The Lone Pine Butte and area south of Highway 95 treatments focused on Sulphur cinquefoil, with smaller infestations of Spotted knapweed and Dalmatian toadflax also being treated. Treatments were focused on trails and roads through the property, with several known infestations targeted off trail (Figure 3).

Figure 3. Invasive plant treatments on the Lone Pine Butte in the Wycliffe Conservation Complex, completed in 2023.

Pine Butte

Treatments on Pine Butte targeted primarily Sulphur cinquefoil, as the open fields in this area contain high densities of the species (Figure 4). Smaller infestations of Common toadflax were also treated. The treatments focused on the roads within the property, with some griding taking place on the perimeters of the property in fields with dense amounts of Sulphur cinquefoil.

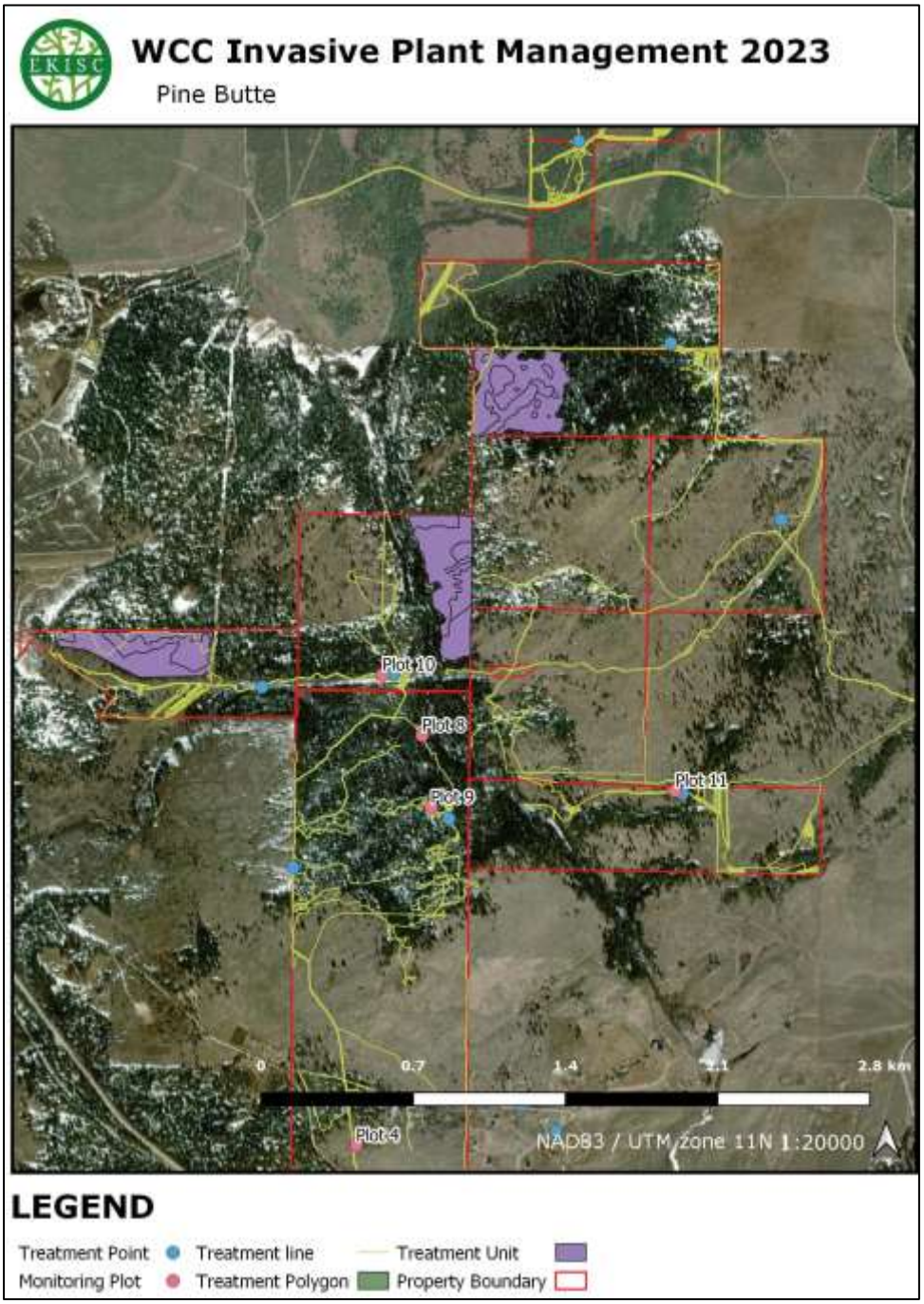


Figure 4. Invasive plant treatments on the Lone Pine Butte in the Wycliffe Conservation Complex, completed in 2023.

Monitoring Summary

A total of 8 treatment points out of 18 were monitored for site completion and efficacy on 26 September and 6 October 2023. In addition, several areas were walked to document impacts of past treatments and collect inventory points. Five of the sites were on NTBC property, two sites on MWLRS land, and one on NCC property.

In addition to monitoring, the Field Operations Manager participated in a ride along with the contractor while conducting treatments on NCC's Luke Creek Property. This provided an additional opportunity to document the impact of treatments on invasive plant infestations. The contractor indicated areas where treatments had been taking place since the beginning of the project and contrasted them with areas that have received less treatments, such as the large fields in the south end of the property, or the private land adjacent to Luke Creek. There has been a noticeable decrease in invasive plant levels in the areas that have received consistent treatment. This is evident in the reduction of isolated infestations, such as with Spotted knapweed, but also at a landscape level with the reduction of Sulphur cinquefoil.

Invasive Plant Inventory

Showcasing treatment efficacy has always been a challenge on the complex as invasive plant infestations take several years to be effectively managed. In addition, the prevalence of lower priority species, in particular Sulphur cinquefoil, means that even when densities of higher priority species are reduced, lower priority treatments can still take place. To expand monitoring efforts to further demonstrate treatment success, several infestations were selected to show the decreasing density and distribution of invasive plants across the WCC. This was accomplished by using inventory data collected in 2020 and comparing it to survey and treatment data from 2023.

The inventory was conducted on 26 September 2023, concurrently with treatment monitoring. Data collection followed the same protocol as in 2020, and standardized density and distribution codes were used to represent the infestation extent (EKISC, 2021). The 2020 data was used to guide the inventory, allowing for comparison between previously detected invasive plants and the current condition of the infestation. The focus was on isolated patches, as opposed to large continuous distributions, such as those found with Sulphur cinquefoil, because those are unlikely to have had as great of a reduction due to the treatment priorities. A total of fifteen inventory comparisons were made, distributed across Trap & Skeet, Lone Pine Butte, and Luke Creek properties (Table 2; Figure 5; Figure 6; Figure 7). Out of the fifteen sites visited, eight of the infestations were no longer present, denoted as "no weed found". Of the remaining sites, most had a reduction of both distribution and density. The Sulphur cinquefoil site (Map ID 8) was recorded as having a greater distribution in 2023, but it remained at a medium density. The blueweed site in Luke Creek (Map ID 15) has been persistent; although it reduced from "5 a few patches clumps" in 2020, to "4 several sporadic individuals" in 2023, it has still maintained a medium density of plants.

Table 3. Invasive plant density and distribution collected in 2020 and 2023 at Trap & Skeet, Lone Pine Butte, and Luke Creek properties in the Wycliffe Conservation Complex.

Location	Map ID	Species	2020 Density	2020 Distribution	2023 Density	2023 Distribution
Trap & Skeet	1	St. John's wort	3 single patch clump	Medium (2-5 plants/m^2)	2 few sporadic individuals	Low (<1 plant/m^2)
	2	Spotted knapweed	8 continuous few gaps	Medium (2-5 plants/m^2)	3 single patch clump	Low (<1 plant/m^2)
	3	Spotted knapweed	3 single patch clump	Medium (2-5 plants/m^2)	No weed found	
	4	Spotted knapweed	5 a few patches clumps	Medium (2-5 plants/m^2)	No weed found	
	5	Spotted knapweed	5 a few patches clumps	Medium (2-5 plants/m^2)	No weed found	
	6	Spotted knapweed	5 a few patches clumps	Medium (2-5 plants/m^2)	No weed found	
	7	Spotted knapweed	2 few sporadic individuals	Low (<1 plant/m^2)	2 few sporadic individuals	Low (<1 plant/m^2)
	8	Sulphur cinquefoil	5 a few patches clumps	Medium (2-5 plants/m^2)	6 several well-spaced patches	Medium (2-5 plants/m^2)
	9	Common tansy	5 a few patches clumps	Medium (2-5 plants/m^2)	No weed found	
	10	Spotted knapweed	3 single patch clump	Medium (2-5 plants/m^2)	2 Few sporadic individuals	Low (<1 plant/m^2)
	11	Dalmatian toadflax	3 single patch clump	Medium (2-5 plants/m^2)	No weed found	
Lone Pine Butte	12	Dalmatian toadflax	3 single patch clump	Medium (2-5 plants/m^2)	2 few sporadic individuals	Low (<1 plant/m^2)
	13	Spotted knapweed	1 rare individual single occurrence	Low (<1 plant/m^2)	No weed found	
	14	Spotted knapweed	4 several sporadic individuals	Low (<1 plant/m^2)	No weed found	
Luke Creek	15	Blueweed	5 a few patches clumps	Medium (2-5 plants/m^2)	4 several sporadic individuals	Medium (2-5 plants/m^2)

Figure 5. Invasive plant Inventory conducted in 2020 and 2023 at Trap & Skeet property in the Wycliffe Conservation Complex.

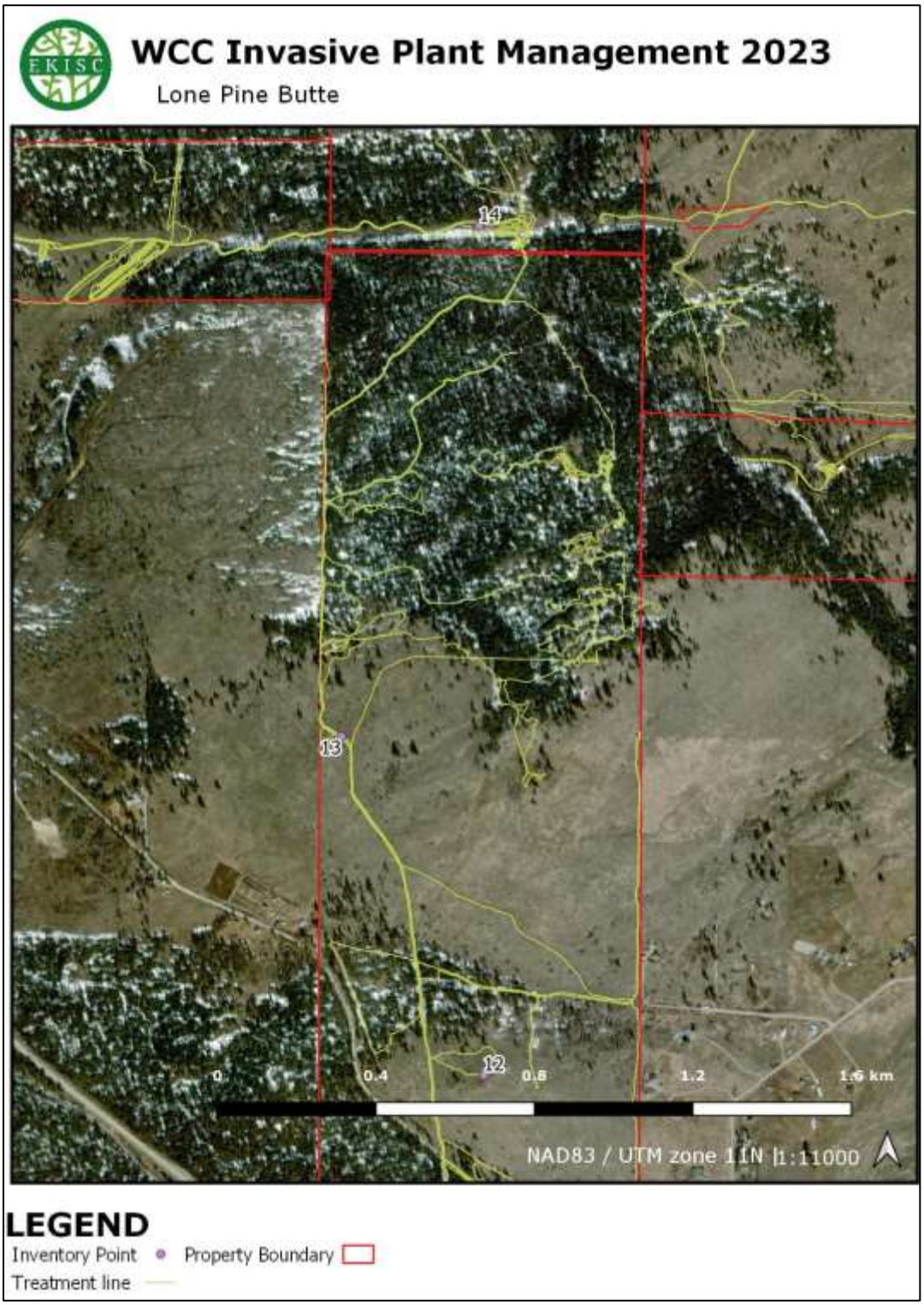


Figure 6. Invasive plant Inventory conducted in 2020 and 2023 at Lone Bine Butte in the Wycliffe Conservation Complex.

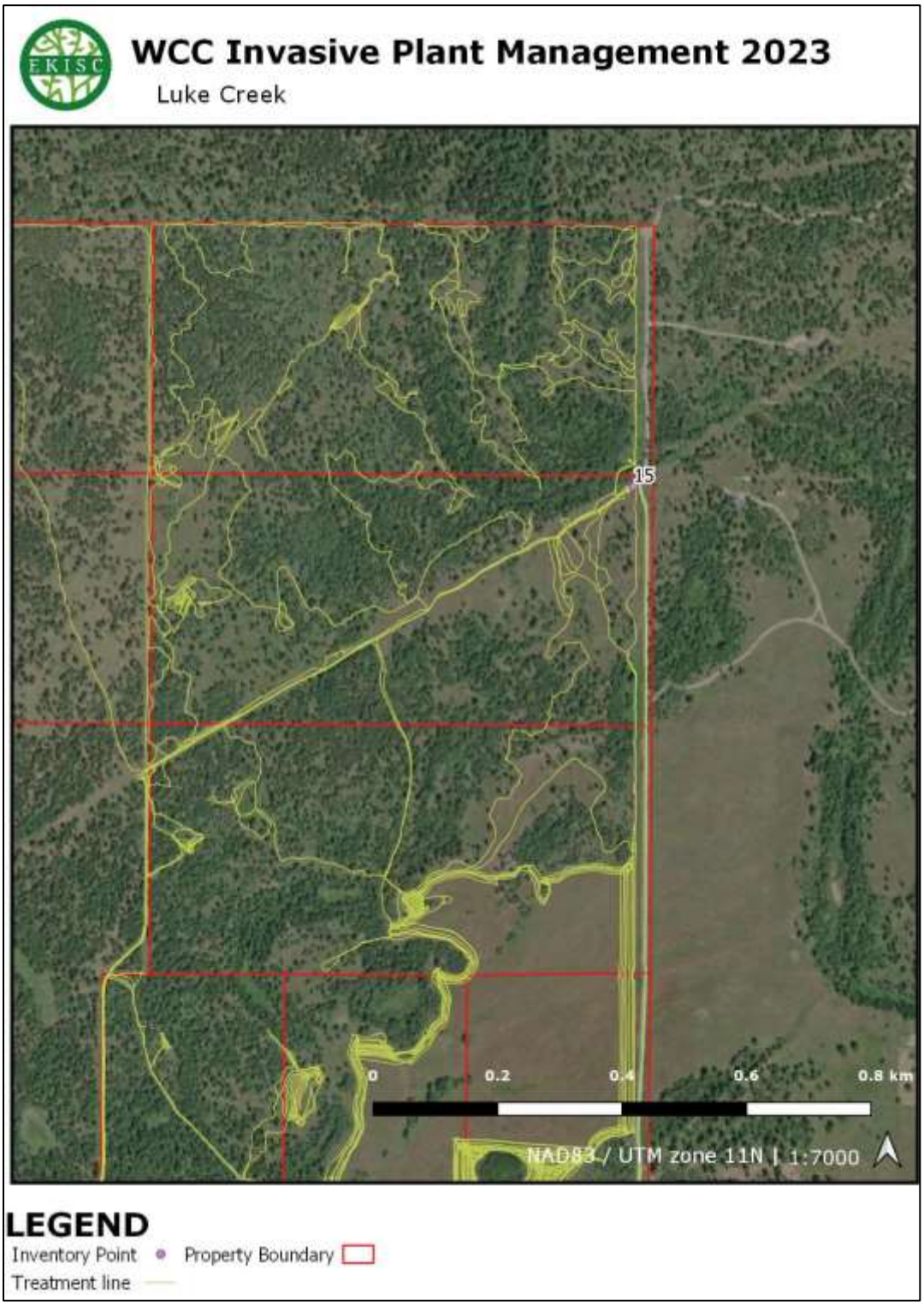


Figure 7. Invasive plant Inventory conducted in 2020 and 2023 at Luke Creek property in the Wycliffe Conservation Complex.

Vegetation Plot Monitoring

Vegetation data was collected from the 11 previously established monitoring plots on 28 & 29 June 2023 (see *Appendix A* for treatment locations). Data collection followed the standardized methods outlined in the ISMP (EKISC, 2021). Percent cover of each invasive species and native species type found in the plots was documented. Again in 2023, the most common invasive species found in the plots was Sulphur cinquefoil (6 out of 11 plots), followed by cheatgrass (4 out of 11 plots). This is a trend which is repeated on the landscape as these are the most abundant species found on the Complex according to previous inventories (EKISC, 2021; Keefer Ecological Services Ltd, 2020). All data collected in 2023 and invasive percent cover data from all years monitored can be found in *Appendix B & C.*

Comparison between plot data collected between 2020 and 2023 indicates a decrease in total mean invasive species percent cover in 10 out of 11 plots (Figure 6). The most dramatic decrease occurred between 2020 and 2021, following the first year of treatment, with levels remaining relatively constant or slightly increasing between 2021 and 2023 in most plots. The decrease in percent cover is most notable in species targeted in Priority 1 treatments, specifically Blueweed, Spotted knapweed, and St. John's wort. At least one of these species was detected in six out of eleven plots in 2020, but was only found in three plots in 2023, all with lower than 4% cover. However, the lower priority species did not have as great of decreases as they are not guaranteed to be treated every year. In 2020, ten out of eleven plots had Sulphur cinquefoil and Yellow hawkweed detected, and it was still present in six plots in 2023.

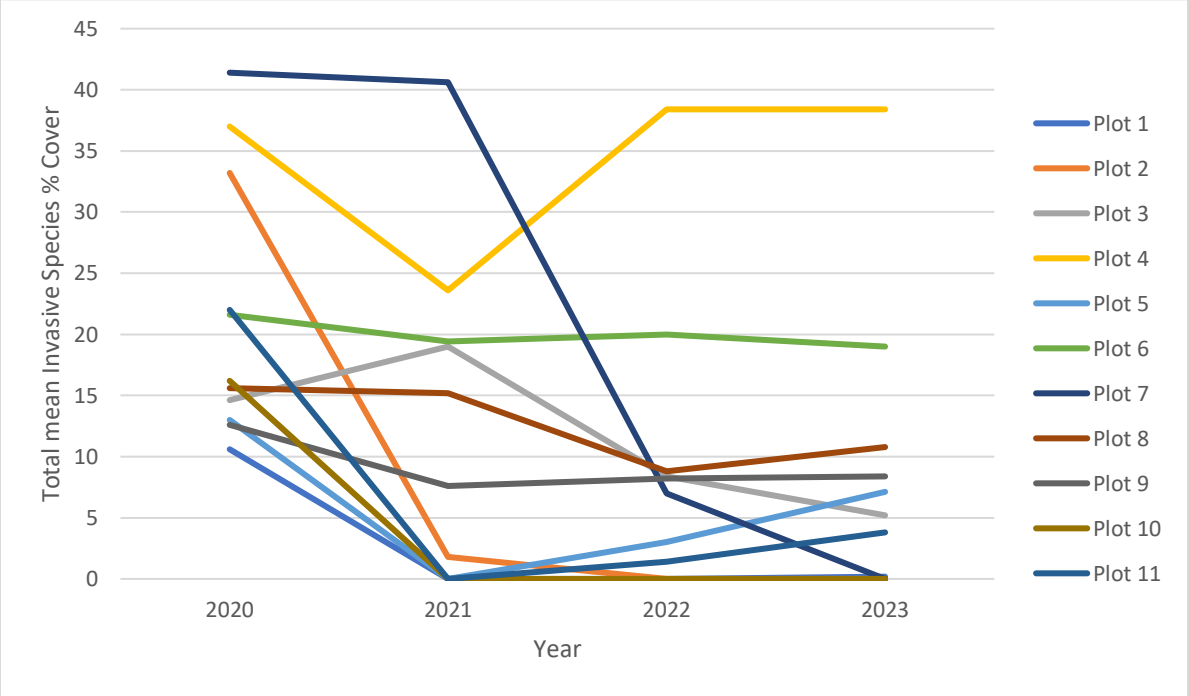


Figure 8. Total mean invasive species percent cover at monitoring plots within the Wycliffe Conservation Complex, collected in 2020, 2021, 2022, and 2023.

Spotted knapweed has decreased across all plots where it was first detected in 2020. Initially, it was documented in four plots, with an average cover of 10.65%. In 2023, it was only found in two plots, covering less than 2% of the plot area. Unfortunately, for one of the plots it was the first time Spotted

knapweed has been found; this plot is located in the Trap & Skeet property, an area with many known knapweed infestations and an established seed bank. Blueweed was only found in one plot location in 2020, Plot 5 at the Luke Creek property. In 2023, Blueweed was found covering 3.3% plot area, down from 13% in the first survey year. Similarly, St. John's wort was only documented at one plot in 2020, but has not been detected for the following three years of monitoring.

Sulphur cinquefoil is the species with the highest percent cover across the monitoring plots. The two plots with the highest percent cover in 2020 displayed only a slight decrease in cover in 2023. Plot 4 went from having 37% cover of Sulphur cinquefoil in 2020, to 30% in 2023. This plot is located on the MWLRS Lone Pine Butte property, where Priority 1 treatments are primarily carried out. Similarly, only a slight change is present at Plot 6 where percent cover decreased from 21.6% to 19% over four years. However, two plots did show a substantial decrease in Sulphur cinquefoil. Plot 7 had no Sulphur cinquefoil detected in 2023, a decrease from the 17% cover in 2020. This plot is found in Luke Creek, in an area that consistently receives Priority 2 treatments. Similar results were found at Plot 11, located in NCC's Lone Pine property. Although the monitoring results for Sulphur cinquefoil are mixed, the species has not spread into plots where it was undetected in 2020. Although this is not indicative of the species' movement across the complex, it does show that treatments at certain plot locations are keeping this species from becoming established.

As indicated by the plots, cheatgrass has been steadily increasing in density and distribution across the complex. Cheatgrass was not detected in a single plot in 2020, but now can be found in four (up from three in 2022). In every plot where cheatgrass was initially detected in 2021, the percent cover has increased. This trend is most evident in Plot 4, which has greater invasive plant cover in 2023 then in 2020, before invasive plant management had begun. Cheatgrass was first detected in the plot in 2021 and continues to be documented each year. In addition, this plot has the highest density of Sulphur cinquefoil contributing to the high level of invasive plant cover found. The increase in cheatgrass density and distribution is a worrisome trend as there are currently no viable management options for this invasive grass in BC.

The plots have demonstrated a decrease in invasive plant cover across the Complex. This is mainly evident in the species listed for Priority 1 treatments, as they are specifically targeted annually. More widespread species are harder to manage due to their higher density and distribution across the complex. Several plots have seen eradication of invasive plants and others have greatly lowered levels, this will increase the potential for native species growth and establishment.

Invasives BC

In 2023, there was a transition from collecting data for the Invasive Alian Plant Project (IAPP) database, to Invasives BC. This has resulted in removal of the site ID system, and a shift into a polygon system. Ideally, each invasive plant surveyed or treated will be associated with a polygon showing the extent of the infestation. However, as this was the first year of launching the database and there was no associated field data collection system released in conjunction, the polygon data was not collected. Instead, all treatment point data was input manually into the Invasives BC database. All the data collected in 2023 does not have a site ID associated with it, neither does it have a polygon. The contractor collected track data, detailing where they traveled while conducting treatments, as well as some specific polygon data for areas of high invasive species density. The site IDs are not provided on the maps detailing treatments in 2023, as this is no longer a possibility with the new database.

Moving forward, the way the data will be displayed spatially will be dictated by Invasives BC. Currently we are in a transition period where we are still collecting data as we did under IAPP but making it fit into the new polygon system. Unfortunately, until the app is released, we cannot alter our current data collection protocol. Historically, we have relied on IAPP site IDs to compare sites over time, this will no longer be an option under the new system. We are still unclear how the new data collection system will work for larger, landscape level treatments, as a polygon system seems particularly geared towards isolated finite infestations. As this has been a slow roll out from the Province, we still have many unanswered questions about how exactly data collection and site comparison will work. We anticipate that most of those questions will remain unknowns until the app is released, which will not happen during the 2024 field season. Unfortunately, this means that our ability to present treatment data that is comparable to previous reports is limited. We will continue to work on ways that the data can be presented, and how metrics of success can be determined as we progress with Invasives BC.

Recommendations

Integrated pest management is a decision-making process that utilizes all available information to enable environmentally and economically sound management actions. Under an integrated management plan various treatment methods are available to manage invasive plants, such as chemical, mechanical, and biological treatments. Chemical treatments have been the primary method applied at the WCC, but other methods can be used to increase the effectiveness of management.

Biological control is a long-term strategy used on invasive plants. They do not have the ability to eradicate species, rather they work to maintain lowered levels. There are biocontrol agents for Spotted knapweed and Dalmatian toadflax that are widespread in the East Kootenay region, and they are likely already present on the complex. We submit requests for biocontrol every year with the Province but we have not received any for several years. We will continue to put in requests on behalf of WCC. We also have the capacity to conduct biocontrol surveys to confirm the presence of biocontrol on the complex.

The funding received in 2023 was adequate to accomplish all priority 1 and 2 treatments. If similar funding levels are maintained, treatments can continue at a comparable scale. Treatment focus should continue to be on Priority 1 species, which have lower density and distributions across the complex. Priority 2 treatments, on higher density Sulphur cinquefoil and Yellow hawkweed should continue in previously determined areas. These areas can be chosen based on land manager goals and contractor suggestions. Priority 3 treatments should continue as funding allows.

In 2022, post-season discussions with the contractor revealed some concerns with direction and treatment goals. The contractor said that targeting priority species across the WCC, as opposed to property specific goals, made it difficult to track if funding was being appropriately allocated to each property. In 2023, the workplan had clearer allocation between properties, allowing for greater contractor efficiency. It is recommended to continue developing the work plan with a percentage of the funding divided between each property.

Questions around linear segments and how they correspond to treatment points have been raised by the funders. As well as, how to determine when a linear segment consists of treatments or just movement across an area. This is not something that can be determined based on the spatial data provided by the contractor, as it consists of a GPS track showing only where they travelled. This is something that was discussed with the contractor ahead of treatments, however the number of records and associated spatial data does not offer greater clarity for 2023 treatments. This is something that will

be reiterated ahead of the 2024 field season, and further effort from EKISC will be made to ensure more documentation takes place. As an alternative, additional inventory points were collected in an effort to convey success of previous treatments and document the changing density and distribution of invasive species on the complex.

If seeking greater understanding of how invasive plant treatments are completed, it is recommended for project partners to ride-along with the herbicide contractor while they are conducting treatments. It is an invaluable experience to better understand the on-the-ground decision making that occurs when doing invasive plant management. It will also provide the opportunity to ask questions and better understand the process of treating weeds. The contractors really enjoy showcasing their successes; something that isn't always easy to convey through written reports.

For information on subsequent invasive plant treatments on the Complex, including recommendations for future invasive plant management and prevention strategies, refer to the Invasive Species Management Plan for the Wycliffe Conservation Complex 2021 document (EKISC, 2021) for program discussion and recommendations. Continued detailed work-planning is essential for the success of this multi-jurisdictional property.

Project Expenses

The following section provides a detailed financial summary of the invasive plant management at WCC in 2023 (Table 3).

Table 4. Financial summary of all the invasive plant management activities that occurred on the Wycliffe Conservation complex in 2023.

DESCRIPTION	RATE	QTY	AMOUNT
Project planning and coordination, contract administration	$440.00	3	$1,320.00
Contractor herbicide treatments - **Priority 1 *Annual treatments*** - Treat vectors of spread (roadways, high use recreation areas, trails, parking areas/trailheads, etc.) for low distribution species including TC, DK, SJ, BU, OH, BW, and SK. ii. Treat all occurrences of other low to medium distribution, but low priority species such as HT, DT, OD, and CT only advantageously (i.e., when nearby target species are being treated) to reduce spread. iii. In areas where planned Ecosystem Restoration work will be taking place in 2023-24 through tree thinning, treat satellite or outlier sites of SC and YH adjacent to and within the Treatment Units (TUs). For the 2023 treatment season, this will include from highest to lowest priority, as resources allow: i) NCC TU 3; ii) NTBC TU 2; iii) NTBC TU 5; iv) NCC TU 5). Refer to spatial files for locations of TUs.	$1,300.00	6.2	$8,027.84

Contractor herbicide treatments - **Priority 2** - Following the completion of Priority 1 treatments, the contractor will allocate time/funds to address the following Priority 2 treatments using a land base calculation where approximately 43% is allocated to NCC, 32% is allocated to NTBC and 24% is allocated to MWLRS. i) Treat all infestations of YH and SC within the containment lines in NCC's LCWC ER unit, WLRS Western ER unit, and NTBC's Trap & Skeet ER which were previously thinned in the years between 2021-23 , thus reducing further spread.	$1,300.00	5.85	$5,971.40
Contractor herbicide treatments - **Priority 3** - Following the completion of Priority 1 and 2 treatments, the contractor will allocate remaining time/funds to address the Priority 3 (i) treatments using a landbase calculation where approximately 43% is allocated to NCC, 32% is allocated to NTBC and 24% is allocated to MWLRS. There is recognition that resources may not stretch to allow treatments for (ii) and (iii) in 2023, and these do not need to be implemented using a landbase calculation. i) Treat satellite or outlier sites of YH and SC adjacent to the containment lines in NCC's LCWC ER unit, WLRS Western ER unit, and NTBC's Trap and Skeet ER unit, which were thinned in the years between 2021-23, thus reducing further spread. ii. A broadcast spray treatment of 1-2 boom widths along the inside fence line of NCC's Luke Creek Property from north to south, along the westside of Miles Road. If resources, permit a grided broadcast treatment of the Trap and Skeet club lease area (mowed and unmowed fields) will be completed. iii. In parcels where adjacent private landowners (Pat Rice) are actively treating high distribution species such as SC and YH, treat the fence line/border where the Complex meets privately owned land. The goal of this will be to reduce further spread of invasives onto private land and build community engagement through a "good neighbour" approach. EKISC to investigate opportunities.	$1,300.00	2.5	$4,655.76
Collecting data at permanent monitoring plots (2 crew members, including vehicle, fuel, etc.).	$1,250.00	2	$2,500.00
Herbicide[2]			$720.00

[2] Financial Summary does not include $4,000 herbicide donation from the Ministry of Water, Lands and Resource Stewardship

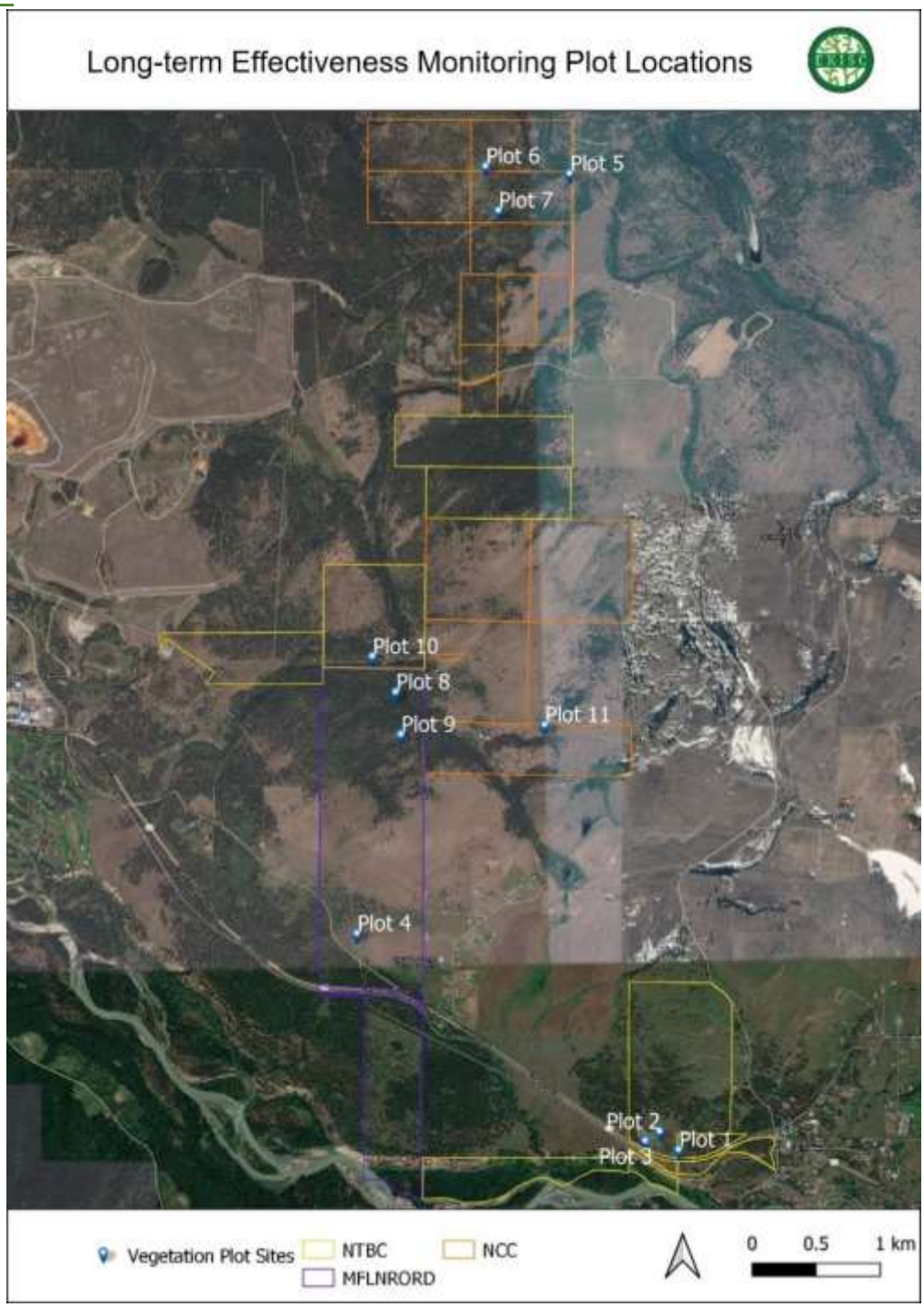
Monitoring plot supplies	$20.00	1	$20.00
Treatment efficacy monitoring (10% of treatment sites min)	$625.00	2.14	$1,337.50
Data management and entry into Provincial Database	$350.00	1.36	$476.00
Final report	$350.00	2	$700.00
Subtotal:	**$25,728.50**		
EKISC Administration Fee (12%)	$3,087.42		
Total (BEFORE GST)	**$28,815.92**		
GST	$1,440.80		
Total (After GST)	**$30,256.72**		

Literature Cited

East Kootenay Invasive Species Council. 2021. Invasive Species Management Plan for the Wycliffe Conservation Complex.

Keefer Ecological Services Ltd. (2020). Wycliffe Conservation Complex: Grassland Management Plan.

Appendix A. Vegetation monitoring plot locations on Wycliffe Conservation Complex



Appendix B. Mean percent cover of invasive species, species type, and organic and inorganic features at monitoring plots within the Wycliffe Conservation Complex, collected in 2023. Note that only native and non-invasive species (e.g. Dandelion and clover) were included in percent cover for Grass spp, Forbes spp, and Shrub spp.

Species	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11
Bare ground	3	7.2	4.8	5.2	1.3	3.4	0	0.2	24	9.6	21
Cryptogram	0	6.8	0.2	0.2	0	0	0	0.6	0.6	8.8	2.6
Rock	0	0	2.4	0	5.7	0	1.3	0	1.8	0	0.8
Coarse Woody Debris	0	0	0	3.2	2.8	0	1.3	1.4	0.2	4.6	0.8
Litter	42	18.8	28.4	39	35.8	26.6	28.8	55	22.4	52	26
Scat	1	0.3	0	0.2	0	0	0	0	1	0	0.6
Grass Spp.	49	48.2	54.2	2.8	33.3	27.6	57.5	10.8	22.6	19.4	48
Forb Spp.	1.4	2	3.2	12	3.3	22.2	6.3	2.8	13	7.8	13
Shrub Spp.	4.4	2	0	5.6	0	0.4	1.3	18.4	5	0	0
Sedge Spp.	0	0.2	0	0	0.2	0	0	0	0	0.6	0
Blueweed	0	0	0	0	3.3	0	0	0	0	0	0
Cheatgrass	0	0	0	8.4	3.8	0	0	0	3.4	0	3.6
Japanese Brome	0	0	0	4.2	0.2	0	0	0	0.2	0	0.2
Silver cinquefoil	0	0	1.6	0	0	0	0	0	0	0	0
Spotted knapweed	0.2	0	1.6	0	0	0	0	0	0	0	0
Sulphur Cinquefoil	0	0	2	30	0	19	0	0.2	5	0	0.2
Yellow hawkweed	0	0	0	0	0	0	0	10.6	0	0	0

Appendix C. Mean invasive species percent cover at monitoring plots within the Wycliffe Conservation Complex, collected in 2020, 2021, 2022, and 2023.

Plot #	Year	Blueweed	Bull thistle	Cheatgrass	Oxeye daisy	Silver cinquefoil	Spotted knapweed	St. John's wort	Sulphur Cinquefoil	Yellow hawkweed	Total invasive species % cover
Plot 1	2020	0	0	0	0	0.6	0	8	2	0	**10.6**
	2021	0	0	0	0	0	0	0	0	0	**0**
	2022	0	0	0	0	0	0	0	0	0	**0**
	2023	0	0	0	0	0	0.2	0	0	0	**0.2**
Plot 2	2020	0	0	0	0	0	15	0	0.4	17.8	**33.2**
	2021	0	1.4	0	0	0	0	0	0	0.4	**1.8**
	2022	0	0	0	0	0	0	0	0	0	**0**
	2023	0	0	0	0	0	0	0	0	0	**0**
Plot 3	2020	0	0	0	0	0	9.6	0	5	0	**14.6**
	2021	0	0	0	0	3.8	9	0	6.2	0	**19**
	2022	0	0	0	0	2.8	3.6	0	2	0	**8.4**
	2023	0	0	0	0	1.6	1.6	0	2	0	**5.2**
Plot 4	2020	0	0	0	0	0	0	0	37	0	**37**
	2021	0	0	6.2	1.4	0	0	0	16	0	**23.6**
	2022	0	0	15.2	0	0	0	0	23.2	0	**38.4**
	2023	0	0	8.4	0	0	0	0	30	0	**38.4**
Plot 5	2020	13	0	0	0	0	0	0	0	0	**13**
	2021	0	0	0	0	0	0	0	0	0	**0**
	2022	3	0	0	0	0	0	0	0	0	**3**
	2023	3.3	0	3.8	0	0	0	0	0	0	**7.1**
Plot 6	2020	0	0	0	0	0	0	0	21.6	0	**21.6**
	2021	0	0	0	0	0	0	0	19.4	0	**19.4**
	2022	0	0	0	0	0	0	0	20	0	**20**
	2023	0	0	0	0	0	0	0	19	0	**19**
Plot 7	2020	0	0	0	0	24.4	0	0	17	0	**41.4**
	2021	0	0	0	0	19.6	0	0	21	0	**40.6**
	2022	0	0	0	0	0	0	0	7	0	**7**
	2023	0	0	0	0	0	0	0	0	0	**0**
Plot 8	2020	0	0	0	0	0	0	0	2.6	13	**15.6**
	2021	0	0	0	0	0	0	0	3.6	11.6	**15.2**
	2022	0	0	0	0	0	0	0	1	7.8	**8.8**
	2023	0	0	0	0	0	0	0	0.2	10.6	**10.8**

Plot #	Year	Blueweed	Bull thistle	Cheatgrass	Oxeye daisy	Silver cinquefoil	Spotted knapweed	St. John's wort	Sulphur Cinquefoil	Yellow hawkweed	Total invasive species % cover
Plot 9	2020	0	0	0	0	0	0	0	12.6	0	**12.6**
	2021	0	0	3	0	0	0	0	4.6	0	**7.6**
	2022	0	0	2.8	0	0	0	0	5.4	0	**8.2**
	2023	0	0	3.4	0	0	0	0	5	0	**8.4**
Plot 10	2020	0	0	0	0	0	10	0	1.4	4.8	**16.2**
	2021	0	0	0	0	0	0	0	0	0	**0**
	2022	0	0	0	0	0	0	0	0	0	**0**
	2023	0	0	0	0	0	0	0	0	0	**0**
Plot 11	2020	0	0	0	0	0	8	0	14	0	**22**
	2021	0	0	0	0	0	0	0	0	0	**0**
	2022	0	0	1.4	0	0	0	0	0	0	**1.4**
	2023	0	0	3.6	0	0	0	0	0.2	0	**3.8**