Status of Invasive Plant Species in the Boundary 2020



Blueweed



Hoary cress



Common tansy



Rush skeletonweed

Prepared for: Boundary Invasive Species Society

Prepared by: Barb Stewart, RP Bio, P. Ag.
Boundary Invasive Species Program
April 2021

Acknowledgements

The Boundary Invasive Species Society (BISS) is grateful for the funding support from partners for delivering all programs throughout the year.

We would like to recognise the assistance of:

- Field staff who completed activities this season. including Seasonal staff Jen, Jenna, and Darrin;
- The board of directors of the society who donate their time to guide the society and its programs;
- All the society members and partners that operate management programs or assist with projects.

The programs would not operate without the generous support of our partners.

The invasive plant program was completed with funding received from: Regional District of Kootenay Boundary Weed Function - Electoral Areas D and E; Christina Lake Parks and Recreation Commission; Min. Forests, Lands, Natural Resource Operations and Rural Development; Min. Transportation and Infrastructure; BC Hydro; FortisBC Energy Inc.; FortisBC Inc.; Canada Summer Jobs Program; Village of Midway; and City of Greenwood

In-kind donations from: Christina Lake Stewardship Society, Granby Wilderness Society, Interfor Ltd., Trails to the Boundary, and volunteers helping with planting projects.

TABLE OF CONTENTS

1.0 Invasive Species Program Overview 4
2.0 Inventory and Monitoring 4
3.0 Management Strategy: Category 1: Eradication or Annual Control 5
3.1 Cutleaf evergreen blackberry (*Rubus laciniatus)* 5
3.2 Field scabious *(Knautia arvense)* 6
3.3 Fragrant waterlily *(Nymphaea odorata)* 7
3.4 Giant knotweed *(Fallopia sachalinensis)* 7
3.5 Greater knapweed *(Centaurea scabiosa)* 7
3.6 Himalayan blackberry *(Rubus armeniacus)* 7
3.7 Japanese and Bohemian knotweed (Reynoutria japonica and Reynoutria X bohemica) 7
3.8 Longspine sandbur *(Cenchrus longispinus)* 8
3.9 Plumeless thistle *(Carduus acanthoides)* 8
3.10 Puncturevine *(Tribulus terrestris)* 9
3.11 Rush skeletonweed *(Chondrilla juncea)* 9
3.12 Russian knapweed (Rhaponticum *repens)* 9
3.13 Scotch broom *(Cytisus scoparius*) 9
3.14 Scotch thistle *(Onopordum acanthium)* 10
3.15 Tansy ragwort *(Senecio jacobaea)* 10
3.16 Teasel *(Dipsacus fullonum)* 10
3.17 Yellow iris *(Iris pseudacorus)* 10
3.18 Summary for Eradication Species 11
4.0 Management Strategy: Control and Contain 11
4.1 Curly leaf pondweed *(Potamogeton crispus)* 12
4.2 Eurasian watermilfoil *(Myriophyllum spicatum)* 12
4.3 Baby's breath *(Gypsophila paniculata)* 13
4.4 Blueweed *(Echium vulgare)* 13
4.5 Common bugloss *(Anchusa officinalis)* 13
4.6 Common tansy *(Tanacetum vulgare)* 15
4.7 Cypress spurge *(Euphorbia cyparissias)* 16
4.8 Himalayan balsam / Policeman's helmet *(Impatiens glandulifera)* 16
4.9 Hoary alyssum *(Berteroa incana)* 17
4.10 Heart-podded hoary cress *(Cardaria draba)* 17
4.11 Leafy spurge *(Euphorbia esula)* 18
4.12 Milk Thistle *(Silybum marianum)* 18
4.13 Russian olive *(Elaeagnus angustifolia)* 18
4.14 Tamarisk/Saltcedar *(Tamarix spp)* 18
4.15 Yellow Archangel *(Lamium galeobdolon)* 18
4.16 Summary for Control and Contain 19
5.0 Management Strategy: Strategic Control 20
5.1 Burdock *(Arctium species*) 20
5.2 Chicory *(Cichorium intybus)* 20
5.3 Common/yellow toadflax *(Linaria vulgaris)* 21
5.4 Orange hawkweed *(Hieracium aurantiacum)* 21
5.5 Scentless chamomile *(Matricaria perforata)* 21
5.6 Siberian elm *(Ulmus pumilla)* 22
5.7 Spotted Knapweed *(Centaurea stoebe)* 22
5.8 Sulfur cinquefoil *(Potentilla recta)* 22
5.9 Yellow flowered non-native hawkweeds *(Pilosella spp)* 22

5.10 Nodding Thistle *(Carduus nutans)* 23
5.11 Wormwood (Artemisia absinthium) 23
6.0 Management Strategy: Biocontrol *23*
7.0 Provincial EDRR Species *24*
7.1 Dyer's Woad *(Isatis tinctoria)* 24
7.2 Mouse-ear hawkweed *(Pilosella pilosella)* 24
7.3 North Africa grass *(Ventenata dubia)* 24
8.0 Unlisted Species *25*
9.0 Summary and Future Needs *25*

LIST OF TABLES

Table 1. Breakdown of number of sites and area infested for species with management goal of eradication or annual control. *6*
Table 2. Breakdown of number of sites and area infested for species with management goal control and contain. *12*
Table 3. Breakdown of size and treatment status of common bugloss sites. *15*
Table 4. Breakdown of size and treatment status of common tansy sites. *16*
Table 5. Breakdown of number of sites and area infested for species with management goal strategic control. *20*
Table 6. Breakdown of patch size by jurisdiction for orange hawkweed. *21*
Table 7. List of unclassified species where survey information is being recorded. *25*

LIST OF FIGURES

Snapshot of ipad screen showing Gilpin Ventenata dubia sites (green stars) and survey track lines (yellow)..4

LIST OF APPENDICES

APPENDIX 1. Ministry of Forest, Lands and Natural Resource Operations Provincial Top 25 List (2020). ..*27*
APPENDIX 2. Current Distribution of Invasive Plants in the Eradicate or Annual Control Category. *28*
APPENDIX 3. Current Distribution of Invasive Plants in the Control and Contain Category. *36*
APPENDIX 4. Current Distribution of Invasive Plants in the Strategic Control Category *47*
APPENDIX 5. Current Distribution of Invasive Plants in the Biocontrol Category. *58*

1.0 Invasive Species Program Overview

A collaborative coordinated approach has proven very effective in management of invasive species since invasive species often cross arbitrary jurisdictional boundaries. The Boundary Invasive Species Society, a non-profit and registered charity, was founded in 1999 to undertake an education program and has taken on a key role in coordination of management activities, inventory, and strategic planning. A key partner in the Boundary is the Regional District of Kootenay Boundary (RDKB) who operate a weed management function under a bylaw that currently delivers all on ground herbicide treatments for partnering land managers. Land managers include provincial government agencies, municipalities, utility companies, forest companies, agriculturalists, conservation and stewardship groups, private landowners, and industry including mining companies.

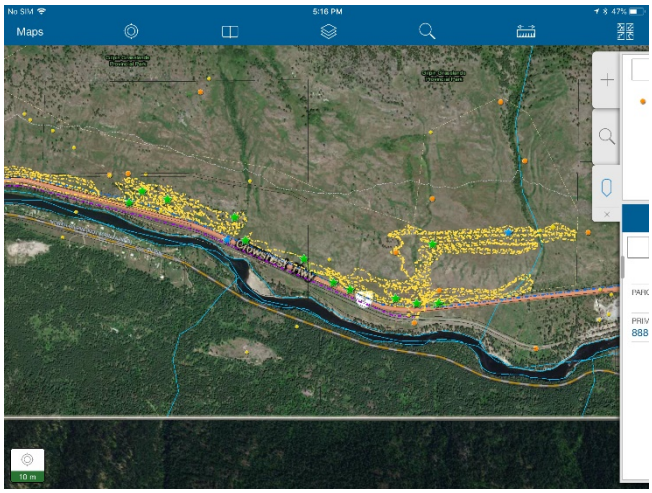
Three Invasive Plant Management Areas (IPMA) have been set up for the Boundary which roughly follow the RDKB Electoral Area Boundaries. West Boundary includes the area bounded by Electoral Area E with the addition of Hwy 3 west to Nine Mile Pit. East Boundary includes the area bounded by Electoral Area D. Christina Lake Area includes Area C and portion of Area B up to the Paulson Summit.

This report provides a summary of the status of each invasive plant species including total area infested, general locations, treatments undertaken to date, and maps showing distribution for the species.

2.0 Inventory and Monitoring

The Boundary Invasive Plant Inventory is contained in the online Invasive Alien Plant Program (IAPP) which contains detailed inventory information on priority species and broad distribution information for widespread species. The society continues to annually update the database and make map layers available for use by staff and contractors.

All field data was recorded in an online database through the GIS Collector app. The main advantage of this system is automatic syncing of data amongst all users enabling everyone to see what other staff and contractors have completed. This system was used by BISS staff and RDKB treatment contractors (on iPad and tablets) for collecting inventory, monitoring, and treatment information. Invasive plant layers, reference layers and treatment lists were uploaded enabling easy navigation to treatment site locations. Additional information is collected and updated including well location, well buffer locations, and no spray buffer requests to assist treatment contractors.



Snapshot of iPad screen showing Gilpin Ventenata dubia sites (green stars) and survey track lines (yellow).

Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) who maintain the IAPP database is nearing completion on a new database called invasivesbc that will go online early in 2021. Some of the 2020 data was entered manually but most was uploaded using the bulk upload tool. The upload tool does require time to reformat and verify the data is correct but overall has significantly reduced the time required for data entry. The online mapping component of the IAPP program is available to anyone by going to https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/iapp .

Inventory and monitoring during 2020 continued to focus on priority species (Category 1 and 2)

including field scabious, longspine sandbur, plumeless thistle, Scotch thistle, common tansy, common bugloss, blueweed, knotweeds, tansy ragwort, and plumeless thistle. New inventory was focussed in areas in proximity to known category 1 species. Detailed inventory was done at many locations. A few new invasive plant sites were reported by forest tenure and range tenure holders this year and verified. The number of weed reports from the public was similar to last year, with many coming in through Facebook. The program has been promoting use of the Report-A-Weed app, however very few reports have been received from our area.

3.0 Management Strategy: Category 1: Eradication or Annual Control

Management Focus: Eradication or the permanent removal of 100% of an invasive species from a selected site or area. This is usually only attainable for small, isolated patches/clumps of an invasive plant or noxious weed species and may take many years of repeated treatments to be achieved.

Of the eighteen invasive plants with the goal of eradication or annual control there are currently 150 known locations. Puncturevine was removed from the eradicate list and put onto the watch list since the only known location had been eradicated, however has been put back on the eradicate list because of a report of a patch up Sidley that still needs to be confirmed. Purple loosestrife was removed from this category since the only patch was removed by the landowner. Rush skeletonweed was added to this group in 2019 from the watch list since a location was found near Grand Forks. For species in this category 83 were monitored in 2020 while 99 were monitored in the past two years, which is an increase over last year. There were sites that were not re-monitored in 2020 including fragrant waterlily (9) and yellow iris (20) due to insufficient resources. There were 2 private water gardens and a natural wetland with yellow flag iris that were controlled by the landowners, but records were not provided for upload. There were two sites last monitored before 2014 on private land and the landowner has reported no plants but this has not been verified by staff, so records have not been entered. Table 1 shows a summary by species of the total number of sites and their size class. There are some sites where treatment is being done by the landowner and their work is not being input into IAPP. Maps showing the location of each species in this category are contained in Appendix 2.

3.1 Cutleaf evergreen blackberry (*Rubus laciniatus)*

There are three known locations in Christina Lake Community Park. The first was found in 2013 and controlled, but more locations have been found. This species is hard to find in dense riparian vegetation most of the season, however, it stands out in late fall after the leaves of other species have fallen. The current estimated area is 0.045 ha at three locations and two were treated with herbicide while the other was mechanically treated. The sites should all continue to be monitored for regrowth and retreated as needed. The infestation showed up in areas where garden waste was being illegally dumped, suggesting this species is present in gardens in the area.

Table 1. Breakdown of number of sites and area infested for species with management goal of eradication or annual control.

Invasive Plant Species	Number of Sites in Each Size Class						Total # of Sites by Species	Estimated Current Area Infested (ha)
	0	<0.001	0.0011 to 0.01	0.011 to 0.1	0.11 to 1	1 or >1		
Bohemian knotweed (FALL BOH)	1	7	1				**9**	0.0054
Cutleaf blackberry (RUBU LAC)				3			**3**	0.045
Field scabious (KNAU ARV)	1				1		**2**	0.2111
Fragrant water lily (NYMP ODO)		5	2	1	1		**9**	0.6075
Giant knotweed (FALL SAC)	1						**1**	0
Greater knapweed (CENT SCA)		1					**1**	0.001
Himalayan blackberry (RUBU ARM)	1	2					**3**	0.0005
Japanese knotweed (FALL JAP)	11	10	5	1			**27**	0.0491
Longspine sandbur (CENC LON)		1	1	1	1		**4**	0.2056
Plumeless thistle (CARD ACA)	7	3	2	3	1		**16**	0.1897
Puncturevine (TRIB TER)	0						**0**	0
Rush skeletonweed (CHON JUN)		1					**1**	0.001
Russian knapweed (ACRO REP)	15	1	4	1	1		**22**	0.3969
Scotch broom (CYTI SCO)	3	1					**4**	0.001
Scotch thistle (ONOP ACA)	4	3	5				**12**	0.0391
Tansy ragwort (SENE JAC)	4	2					**6**	0.002
Teasel (DIPS FUL)	1	2	1				**4**	0.0106
Yellow iris (IRIS PSE)	1	7	8	4	3	1	**24**	4.3145
Grand Total	**50**	**46**	**29**	**14**	**8**	**1**	**148**	**6.08**

3.2 Field scabious *(Knautia arvense)*

Field scabious is limited to two known sites in the area, both near Boundary Creek. The main infestation is near 5 km on Boundary Creek Rd. A smaller infestation was found and treated in 2012 near 1 km, presumably moved on hay or equipment by the landowner from the 5 km site. The original site was found in 2000 and believed to have started on the roadside, likely from a vehicle. The site was estimated to be 1 ha and very dense when found and treatment was started in the early 2000's although the data is not recorded in IAPP since it predates the online system. The IAPP data shows annual treatments since 2006 with spot treatments each year ranging from 0.07 ha to 0.42 ha. In 2020 only 0.211 ha were treated with herbicide. The density of plants continues to decline but similar time is required to treat since the entire area will have to be covered. Each year all plants with flowers are deadheaded then sprayed, then a follow-up manual treatment to remove any missed plants. Most of plants that remain are in the creek buffer. In 2016 the crews did locate a new dense patch on the edge of the known boundary along a seasonal creek and the plants were dug out in 2020. The new landowner has been cooperative the past few years however the property changed ownership again in 2020. There was one other site up Rother Rd reported by a contractor, but they could not be sure it was for sure field scabious, the site was visited several times since then and no plants were found. This site was not recorded in IAPP. Since the infestation at 5km on Boundary Creek did go out into the hayfield, it could have been moved to other locations before the site was found and control began. Estimated area infested is 0.211 ha.

3.3 Fragrant waterlily *(Nymphaea odorata)*

Fragrant waterlily is known at three locations in Christina Lake (2 in South end and 1 in North bay) and found down Christina Creek. It was known to be in the lake for many years prior its first being recorded in IAPP. Locals report it was planted by a foreshore landowner many years ago. It has since spread in the upper part of Christina Creek and patch size is increasing in the lake. In 2014 a detailed survey was done to enable a future assessment of rate of spread. In 2015 it was found in Moody pond which is a small dam-controlled pond off Stewart Creek. It was likely planted by the dam manager. No surveys or monitoring were done from 2018 to 2020. Based on 2014 inventory there is 0.6 ha of fragrant water lily. No control work has been started but a trial to test using divers to compare costs for remove roots or cutting stems was completed in October 2018. For safety reasons a dive crew is preferred rather than workers wading out to do removal. There is a plan to start treatment when resources for control of aquatic plants are provided by the province.

3.4 Giant knotweed *(Fallopia sachalinensis)*

The first confirmed location in the area was found in 2015 on a berm along the Kettle River upstream of the nursery bridge. A float survey in 2015 did not find any other locations through Grand Forks down to Gilpin Creek. Since this species is normally spread through gardeners it is possible there are more patches in yards in the area. The site was controlled with herbicide in fall of 2015. The 2017 to 2020 monitoring found no plants. There is a possible site on Christina Lake on the East shore reported by a boater however it has not been verified yet.

3.5 Greater knapweed *(Centaurea scabiosa)*

The site was found in 2000 by recreation program staff biking along the rail grade. The infestation was reported as very dense both in the open and under tree canopy and area was estimated at 0.0013 ha in 2001 after the first treatment in 2000. Unfortunately, the area from 2000 was not recorded. The infestation was treated with selective herbicide from 2000 to 2005, then manual treatments were done in 2006 and 2007 until crews realised that the plants were re-growing from broken off roots. Herbicide treatment combined with deadheading of flowers has been completed annually since 2008. The amount of area treated with herbicide is slowly declining from a high of 0.1 in 2007 down to 0.001 ha in 2020. This species is difficult to treat due to the steep terrain and the rosettes blending into other vegetation, so the site is normally grid hiked with multiple spotters to ensure no plants are missed.

3.6 Himalayan blackberry *(Rubus armeniacus)*

Himalayan blackberry was reported in 2013 by a hiker along the edge of a road in the Christina Lake area where garden waste had been dumped. It was treated in 2013 and 2014 with herbicide and no re-growth was found in 2015 or 2016 but a plant was found in 2017. No plants were found in 2018-2020. In 2017 a small patch was found along Fife Rd and in 2018 some was found near junction of East Lake Drive and White Rd. Both sites were treated in 2020. This plant is likely being grown in some gardens in the area, so awareness work should continue to encourage gardeners to remove it and prevent its escape. A sample was not submitted to the RBC museum so should be collected if any more growth is found on the site. Estimated area infested in 2020 was 0.0005 ha.

3.7 Japanese and Bohemian knotweed (Reynoutria japonica and Reynoutria X bohemica)

Japanese knotweed formerly in the *Fallopia* genus has been changed to *Reynoutria* genus as a result of DNA testing. Bohemian knotweed is a hybrid species and most sites in BC previously identified as *R. japonica* are likely the hybrid *R. x bohemica*. For the purposes of this report the two species have been grouped together and treated as one for this summary.

Knotweed is present in some gardens in the Grand Forks, Christina Lake, Greenwood, Midway and Beaverdell areas. Gardeners indicated it was being shared around in the early 2000s and was being sold at local seed exchanges. Management is focussing on locations where it is escaping from gardens and encouraging landowner to remove it from yards. There is an estimated 0.062 (620 m^2) ha recorded (only included areas it has moved out of yards) but there are many more locations suspected in private yards. The largest patch is less than 100 m^2 so no large sites exist in the Boundary.

One new patch was found in Christina Lake along McRae Rd where the patch is spreading onto the roadside from the yard. Of the 32 sites recorded, there are eleven locations with no plants found where treatment has been successful in complete removal. In 2020 five sites were treated with herbicide. There are fourteen sites with no treatment records, one cannot be relocated (likely controlled by landowner), four are still inside yards and not controlled, four sites where landowners have controlled (no record of treatment exists), one that is along Jewel Lake shoreline making control difficult, and six in the city of Grand Forks who were not successful in getting landowner cooperation for treatment. This is a high priority species for treatment and monitoring due to its potential impacts to infrastructure. In total the infested area is estimated at 0.049 ha.

With the number of sites along roads in Christina Lake and Grand Forks a targeted inventory along secondary roads is recommended annually.

3.8 Longspine sandbur *(Cenchrus longispinus)*

In 2010 a small patch was found in the ditch at the junction of Hwy 3 and East Lake drive in the Christina Lake area and all mature plants were pulled. The site was hand pulled in 2011-2012 but the number of plants continued to increase so a combination of herbicide treatment followed by manual control was started. In 2014-2019 the Christina Lake sites were treated with non-selective herbicide to remove all vegetation prior to flowering. Follow-up hand pulling is being done to remove any missed plants. The seed is relatively short lived so once no more plants are found for over a year the site will be reseeded and vegetation re-established. One of the sites was ditched in 2018 and the landowner who took the soil was contacted to notify them of the potential for it to contain sandbur. In 2017, a site was found in Rock Creek at a former staging area for a Telus line maintenance project. All plants were pulled and bagged but some seed had been released. The site continues to be pulled annually. Surveys during 2020 of roads and trails near the known patches did not locate any new infestations but found low density of plants throughout previously treated areas with isolated plants found beyond the previous site boundaries. A private landowner off Swanson Rd next to one of the original sites reported pulling plants in 2018 but no information was shared regarding 2019 or 2020 control work. Total area infested is 0.205 ha with most plants on the private lot where there is no program to support control by the landowner.

3.9 Plumeless thistle *(Carduus acanthoides)*

Plumeless thistle was first recorded in 2004 at three locations. A total of thirteen locations are known and five of those sites did not have any plants in 2020. Twelve sites were monitored in 2020, the only one missed has poor access and crews were not able to get in to check or control the site. The 2004 record from Johnstone Creek is likely a misidentification as the site has nodding thistle which looks very similar at young growth stages, so this site has been excluded from the data used for this summary. The landowner up the Christian Valley diligently pulled the plants for years and has not had any plants for many years now. The site in Christina Lake Community Park had one rosette last year that was removed. The cluster of sites up the Santa Rosa did not have any plants on the right-of-way this year but some plants were present upslope on the private land. This was pulled by a crew and the sites off O'Farrell main were treated with herbicide. Total area infested is 0.0687 ha which is significantly lower than previous years.

3.10 Puncturevine *(Tribulus terrestris)*

There is only one recorded location of puncturevine in the Boundary along Kerr Creek Rd. The patch was found and controlled in 2009 by the adjacent landowner and has not had any plants since 2009. The location has been deemed eradicated and the puncturevine was moved back onto the watch list. Over the winter 2018 there were reports of a site in the Sidley area that still need to be verified and confirmed, and for now this species has been put back in the eradicate category.

3.11 Rush skeletonweed *(Chondrilla juncea)*

A single plant was found east of the Grand Forks landfill on the steep hillside in 2018 and subsequently treated with herbicide. Monitoring in 2019 found plants surrounding the spot treated the previous year, likely growing from seed. A survey of surrounding areas in 2019 and 2020 failed to locate more plants, but this species is very difficult to spot so further surveys of nearby should be completed annually for the next few years. This is the first record of this species in the Boundary. It is widespread in Spokane and Vernon areas. There is biocontrol being used on this species in Idaho and Washington.

3.12 Russian knapweed (*Rhaponticum repens)*

Russian knapweed was first recorded in 2000 with sites in the Midway, Greenwood and Gilpin areas. Patches continued to be found until 2010 with two new sites found in 2018 for a total of twenty-two sites. Fourteen of the 22 site were surveyed in 2020. Distribution of sites include: Rock Creek/Bridesville (7); Midway (5); Kerr Creek/Greenwood (7), Gilpin (2), and Grand Forks (1). Of these sites, 12 have not had plants for five to seven years while another 11 sites continue to be treated. Two sites on private are being treated with herbicide by the landowner. The preference is for fall treatment after the first hard frost but before a killing frost which seems to work very well to kill the extensive root system of this plant. However, the past few years the dry summer conditions have resulted in no green growth in the fall so treatment timing has been changed to a summer treatment when plant is green. A few private sites are being pulled by the landowner and two sites have not been treated yet. There is one site in a creek buffer on a steep slope that is being dug out annually. Biocontrol that works on other knapweeds does not work on this species, although in Washington a gall insect is being used currently, but that insect is not available in Canada. Total estimated area of 0.397 ha which is down from last year.

3.13 Scotch broom *(Cytisus scoparius*)

There are four known locations where Scotch broom has been found on roadsides. It was first recorded in 2001 along East Lake Drive in Christina Lake which was treated (not recorded in IAPP). It showed up at that location again in 2011 and the adjacent landowner had planted it again along the roadside. The landowner committed to dead heading it after flowering but was unwilling to remove it. The right of way location at this site is unclear so MOTI would not remove it directly without the landowner's agreement. It is no longer growing on the site, so the adjacent landowner has removed it. The site on West Lake Drive was found in 2007 on an unstable slope above the road, and treatment has been limited to cutting or selective herbicide while leaving the root systems intact to provide some slope stability. The slope stability concerns have prevented control work in some years on this site. A bioengineering treatment using live brush layers with willow cuttings might address the slope stability, but an engineer would need to be involved. The third location in Boundary Creek has not had plants since it was found in 2003 when it was a single plant. The final site was found and treated in 2016 along a roadside where some wood chips had been dumped, suggesting it is being grown in a garden in the Greenwood area. It is likely there are some in gardens in the region since it historically was sold as an ornamental. There is currently only 0.001 ha in our region which is fortunate considering how widespread this species is in the West Kootenay.

3.14 Scotch thistle *(Onopordum acanthium)*

Scotch thistle was first recorded in 2005 and patches continued to be found until 2014 and again in 2020. In total there are twelve confirmed locations totalling 0.0297 ha. Two new sites were recorded in 2020 in Rural Grand Forks, and one was controlled while the other landowner refused to control it. Both locations were found since neighbours had reported the locations. There were two other sites reported by FLNRORD staff, but only nodding thistle has been found at the locations so they have been excluded from this summary. Five of the confirmed sites did not have plants in 2020 but several of the sites are being controlled manually so continued monitoring and control work will be needed since the soil disturbance from digging out plants results in germination of seed often increasing density of plants. Locations are known in Bridesville (1); Rock Creek/Johnstone (2); rural Grand Forks area (9).

In 2005 it was found in the Grand Forks landfill and the second location found was at a garden waste dump location. Discussions with gardeners confirmed that they had been sharing Scotch thistle plants amongst gardeners so there is likely more in gardens in the area. In 2011 it was moved to the Rock Creek landfill from the Grand Forks landfill in compost used for reclamation suggesting the current composting system does not kill the seeds. There is no information about how the sites in Bridesville and Johnstone Creek got started. The new sites found in Rural Grand Forks were likely garden introductions. Total estimated area infested is 0.297ha which is up from last year.

3.15 Tansy ragwort *(Senecio jacobaea)*

Tansy ragwort was first recorded in 2004 near the height of land west of Carmi, presumably the source is from the Naramata area infestations northeast of Penticton. One new plant was found at Big White in 2018 and pulled and not found again in 2019. In 2020 no sites were monitored due to limited staff capacity and challenges with accessing sites on deactivated roads. Based on previous years surveys the estimated area is 0.002 ha. Of the six current sites, three had not had plants for several years. One site may have been a misidentification by a contractor since after several years of monitoring no plants have been found at that location. The largest patch is on a spur road off Saunier FSR and this site has been treated since it was found in 2004 either with herbicide and/or digging within 1 m of a small seasonal seepage area. Unfortunately, this site was not monitored or treated in 2019 or 2020. An ATV is now used to access two of the sites since the access road has been deactivated. Two other sites have not had re-growth for several years following herbicide treatment. Inventory should be continued in the general area to locate any new infestations that start because of spread from the large infestation near Naramata where biocontrol agents are being used for control.

3.16 Teasel *(Dipsacus fullonum)*

There are four known locations totalling 0.011 ha. All the sites are small, and all the sites were either monitored or treated this year. One site did not have plants this year. The site on Gibbs Creek Rd is partially on private and although the landowners had committed to controlling it, there were plants going to seed on the private portion each year since. The RDKB New Invaders program has offered to do some pulling on private with the permission of the landowner but they did not request the help this year. Total area infested is 0.011 ha.

3.17 Yellow iris *(Iris pseudacorus)*

Infestations are known in the Saunier Lake/Eugene creek (3), Idabel Lake (4); Wilgress Lake (1); Christina Lake/Creek (7); Moody pond (1), and Johnstone Creek wetland (2). There are two known locations in water gardens. A new site was found in 2018 near the Kettle River in a drainage ditch in the Grand Forks area. Total number of sites is twenty-four covering an estimated area of 3.2 ha. Only five of the sites were monitored or treated in 2020. To date management has focussed on Saunier/Eugene creek where good control has been found after at least three years of repeated

digging. It took until 2013 to get through the entire 2 km of infestation along Eugene Creek with the limited resources available. In 2020 the crew spent two days removing plants over the lower portion of the infestation. Removal was not completed in Saunier Lake itself this year. The small infestation at Wilgress lake has been dug out several times which seems to have worked since no plants were found for the past five years. The infestation along Christina Lake in Christina Lake Community Park has been dug out since 2009 but each year a couple previously missed patches are found. Crews encountered only a few new patches in the park that had not been previously treated so hopefully the full extent has now been treated. Work started in 2015 down the upper part of Christina Creek primarily using tarping with some digging. The tarping did not work well as hoped since it was difficult to secure the tarps well enough to prevent air exchange. The wetland area was not re-treated this year since there were no resources. Control started at Idabel Lake on the crown sites in 2016 and 2017 but the private lands sites have not been treated to date. The extent of the infestation up Johnstone Creek was surveyed in 2016 and the landowner has already removed most it but reported regrowth in 2020 and plans to do further removal work. No treatment has been attempted at Moody pond, but since the pond has a dam it may be possible to alter water levels to achieve control and this possibility needs to be discussed with the dam manager in 2021. Overall removal is very labour intensive but quite effective if repeated for at least three years. Only a few of the sites are being managed with the current funding levels for control work.

3.18 Summary for Eradication Species

The level of monitoring and treatments is coming close to the goal set of monitoring annually but is not stopping all seed production since the yellow flag iris is only partially being controlled and no management has been undertaken for the fragrant waterlily. There are a few species/sites where treatments were not completed this year, so some seed production did occur.

4.0 Management Strategy: Control and Contain

Management Focus: Containment to the current location and/or distribution. Preventing or reducing access to areas with invasive species infestations is also a strategy employed in containment. Herbicide treatments or other removal method would generally only occur within the containment boundary if sensitive sites or unique resources are identified by the planning committee as a priority.

In this category there are 13 terrestrial invasive plant species and two aquatic plants. There are 1,770 sites recorded in IAPP (some sites have more than one species) and species records covering 468.5 ha. On sites where private landowners undertake treatment themselves there are no records in IAPP, so these sites show up as untreated. Since the strategy is control and contain, sites along roads or in locations where it can easily spread are a higher priority and more likely to be treated in a given year. Hoary alyssum sites outside of the containment lines have been included in the upper part of Table 2 while the sites within the containment line are listed below the main table. Appendix 3 contains maps showing current distribution of each invasive plant in this category.

Table 2. Breakdown of number of sites and area infested for species with management goal control and contain.

Invasive Plant Species	Number of Sites in Each Size Class						Total # of Sites by Species	Estimated Current Area Infested (ha)
	0	<0.001	0.0011 to 0.01	0.011 to 0.1	0.11 to 1	1 or >1		
Aquatic Plants								
Curly leaf pondweed (POTA CRI)		6	1		1		**8**	0.244
Eurasian watermilfoil (MYRI SPI)				1	2	4	**7**	16.4
Terrestrial Plants								
Baby's breath (GYPS PAN)	14	29	14	54	25	3	**139**	16.2
Blueweed (ECHI VUL)	18	5	3	13	8	1	**48**	4.8
Common bugloss (ANCH OFF)	41	22	32	50	73	29	**247**	98.2
Common tansy (TANA VUL)	134	67	45	48	28	10	**332**	134.4
Cypress spurge (EUPH CYP)	1	3	1				**5**	0.004
Himalayan balsam (IMPA GLA)		1					**1**	0.0003
Hoary alyssum (BERT INC)	124	134	140	235	200	42	**875**	185.6
Heart-podded hoary cress (CARD DRA)	12	5	5	10	15	2	**49**	9.4
Leafy spurge (EUPH ESU)	13	5	6	12	3	2	**41**	3.2
Milk thistle (SILY MAR)							**0**	0
Russian olive (ELAE ANG)		5	3	3			**11**	0.107
Saltcedar / tamarisk (TAMA RAM)		7					**7**	0.004
Yellow archange (LAMI GAL)							**0**	0
# Sites by Size Class	**357**	**289**	**250**	**426**	**355**	**93**	**1770**	**468.5**
Hoary alyssum (BERT INC)	24	57	81	157	217	70	**606**	278.9

*Notes: *Hoary alyssum only includes estimates outside of containment line. **Russian Olive includes sites along river system recorded in IAPP. ***Eurasian water milfoil only includes sites recorded in IAPP which is an under estimation for Christina Lake.*

4.1 Curly leaf pondweed *(Potamogeton crispus)*

Curly leaf pondweed occurs in Christina Lake and down Christina Creek. No other lakes or creek have known sites based on surveys during 2014 and 2015. It is present in a water garden in Grand Forks and may be present in others. 2014 and 2015 surveys at Christina lake documented it in the south bay north to Schulli boat launch, and then in the north bay. It has not been confirmed in other parts of the lake however much of the littoral zone has not be surveyed specifically for it. It is likely present in other parts of the lake. No control has been attempted to date since there are not resources available for management of aquatic invasive plants. A diver crew would be required for any control work.

4.2 Eurasian watermilfoil *(Myriophyllum spicatum)*

Eurasian watermilfoil (EW) first appeared in Christina Lake in the 1980s. It is being actively controlled in Christina Lake by the Regional District of Kootenay Boundary under a milfoil control function established in Electoral Area C. For details on the activities of this program contact the RDKB or visit www.rdkb.com under environmental services. Aquatic plant surveys in 2014 and 2015 covering the busiest lakes in the Boundary found it was present in only one other lake, Idabel Lake. Idabel Lake mainly sees boats from the Okanagan which is likely where it was introduced from. The lake mainly has smaller fishing boats so no large boats causing disturbance to the sediments. The littoral zone has a dense mat of *Potamogeton robbinsii* where EW would be expected to thrive suggesting the lack of disturbance and the vigorous native pondweed may be competing with the EW. Further surveys

should be done in future years to track if the EW is increasing or whether the population is being held in check.

4.3 **Baby's breath** *(Gypsophila paniculata)*

Baby's breath has been present since before 1980 however the first record in IAPP is from 2005 when inventory information started to be collected for it. A survey in Grand Forks in 2018 added 25 new sites into IAPP and a few isolated sites were found along main highways. Site areas located in: Rock Creek/Kettle Valley (39), Westbridge/Christian Valley (5), Midway (51), Greenwood/Kerr (7), and Grand Forks (28). Of the 139 recorded locations, 14 have recorded areas of zero this year and most of these were small sites that have been treated. Total area recorded is 16.2 ha. Through the 1980's it was harvested in the Kettle Valley, Midway and Grand Forks areas but that stopped in the 1990's. A large infestation is present along the abandoned rail grade through Grand Forks and smaller patches present along Whitehall Road. Small, isolated patches are present in the Christian Valley, Chenier area and on Gable FSR. It has been moving along main highway corridors for many years and treatment from 2008 to 2020 was focussed on control along travel corridors. The Village of Midway has been doing treatment work on municipal roads since 2010. In Kettle Valley area grazing animals seems to be grazing it and suppressing seed production. As other invasive plant species have come under control it has enabled some resources to be spent on control of baby's breath in the Midway grasslands to prevent it from climbing further up the hill sides. More work will be needed in 2021 to re-treat the grassland areas treated in 2017 to 2019. No control work has been done in the Grand Forks area but the main infestations along the rail grade is surrounded by developed land which is likely containing its spread. The current priority is keeping it from moving into natural grasslands. Based on herbicide trial results from Okanogan County, WA, it is being treated with a mix of dicamba and metsulphuron-methyl at approximately 18 inches in height. This mix was found to be highly effective at killing the large taproot.

4.4 Blueweed *(Echium vulgare)*

Blueweed has been present in the Christina Lake area since the mid 1980s but the first record in IAPP was from 1999. A local reported that a resident had planted a seed packet that had been received as a gas station giveaway and had planted it along Hwy 3 when a construction project had upgraded the highway leaving exposed soil. Treatment was undertaken along the roadside every few years through the 1980 and 1990s, but it was not completely controlled and spread onto adjacent private land (pers. comm W. Baliko). The main infestation continues to be in Christina Lake area with some outlying small infestations in a pit near Westbridge and on McCrae Rd. Isolated plants have been found up the Christian Valley, on North Fork Rd, and along Hwy 3 east of Grand Forks. Treatment has focussed on containment by controlling all sites outside of Christina Lake, along Hwy 3 through Christina Lake, and on the lower Santa Rosa Rd. There are relatively large patches on private land adjacent to the highway corridor however many of the lots are owned by absentee landowners who have not been contacted. The large patches on private land are not currently recorded in IAPP. There are 48 recorded locations in IAPP and 18 have a recorded area of zero this year, most of these were small sites or isolated plants to start with. Since 2010 Clearview or Reclaim have been used with excellent control achieved with spring or fall applications. Very little remains on the highway corridor and complete control can only be achieved if the private landowners control it on their properties which would likely require enforcement to achieve. Total estimated area is 4.8 ha but this is an underestimation due to some large private lots with absentee owners not being surveyed yet.

4.5 **Common bugloss** *(Anchusa officinalis)*

Common bugloss was first recorded in IAPP in 2000 although range staff pictures date back to 1997. Former range staff, W. Baliko, reported the first plants at Ingram Pit in the mid 1990s and he speculated that it had come in on some equipment from Spokane, WA used on a highways upgrade

project. It was controlled at the time it was found but it had already spread to Bubar Rd area and then Nicholson Creek Rd. By 2002 the estimated area of infestation was 27 ha. By 2013 it had reached 103 ha and in 2020 the infested area was estimated at 186 ha due to expansion within known sites, primarily Nicholson Creek. Treatment from 2003-2005 focused on smaller sites outside the main Nicholson Creek infestation, and in 2006 treatment began on the main infestation since the owners, who operated as organic farmers, realised the manual control was not working and their property was being overtaken. This work focused on the north and west edges of the infestation to reduce spread outwards and then working back towards the large main patches. The number of new sites found each year declined until 2009 as the majority had been located however new sites found are increasing again with most new sites showing up along the Hwy 3 and 33 corridors. Of the 247 sites recorded (Table 3) 73% have been treated, 41 have no plants and another 21 are less than 0.001 ha. There are some sites where only a portion was treated, and the extract is grouped by the last recorded treatment type so use caution with these numbers since sites treated using both methods will only show up in one category. Of the 40 untreated sites there are 18 sites with no record of treatment and no plants remaining and these are sites where the landowner controlled the patches. Of the treated sites 59.5 % have had treatment in the past 3 years which is significantly lower compared to last year (74%). There are a few larger sites where manual treatments have been done in buffers only. Many of the sites are in the Kettle Valley area since each private property is given a separate site number to track treatment per property so this makes the total number of sites seem large.

Control up until 2010 was mainly using Tordon 22k or Grazon however the results were only achieving 70% control so limited work was done until a more effective herbicide was available. Based on results of herbicide trials by Min. Agriculture staff Clearview and Reclaim started to be used in 2011 which produced much more effective control, although there were still issues with less than expected residual control and fine tuning of timing and delivery rates had to be worked out. Some demonstration plots with different three way tank mixes has found anaddition of Garlon XRT in the fall after frost increases kill of mature plants, and Grazon XC seems to perform well in the spring and summer treatments.

Due to the scope of the infestation in Nicholson Creek the program does not have capacity to address all sites each year. The area of the main infestation remains stable, but the distribution of plants is down from an 8 to a 4 on average. There is still about a 3-ha patch on the Nicholson property that has not ever been treated on the crop land on the bottom bench where use of residual herbicide is not desired. This area needs to be farmed to achieve control but the soil is too sandy to support dryland farming. There is a 1 ha patch on the steep hillside that has not been treated since treatments have focussed on the more accessible areas. The overall area treated in 2020 was 43.7 ha and covers a much larger amount of the total area infested than it appears since herbicide area reflects actual area of invasive plant treated rather than coverage area whereas surveys are based on total area infested.

Table 3. Breakdown of size and treatment status of common bugloss sites.

Common Bugloss Size Class by Last Treatment Type	Number of Common Bugloss Sites and Year Last Treated														No Record of Treatment	Total Sites by Size Class
	2003	2007	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Chemical		**2**	**2**	**4**	**3**	**1**	**1**	**4**	**6**	**10**	**8**	**37**	**38**	**60**		**176**
0		2	1	2	1			2	1	2	1		1	1		14
<0.001												2	2			4
0.0011 to 0.01					1				1	2	2	8	2	2		18
0.011 to 0.1				2		1			2	2	1	12	9	15		44
0.11 to 1			1		1		1	2	2	1	3	11	20	25		67
1 or >1										3	1	4	4	17		29
Mechanical	**1**		**1**		**1**		**1**	**2**	**2**	**5**	**6**	**7**		**5**		**31**
0			1		1		1	2		2	2					9
<0.001									1	1	2	3				7
0.0011 to 0.01	1									1	2	3		1		8
0.011 to 0.1												1		2		3
0.11 to 1									1	1				2		4
No Record of Treatment															**40**	**40**
0															18	18
<0.001															11	11
0.0011 to 0.01															6	6
0.011 to 0.1															3	3
0.11 to 1															2	2
Grand Total	**1**	**2**	**3**	**4**	**4**	**1**	**2**	**6**	**8**	**15**	**14**	**44**	**38**	**65**	**40**	**247**

The amount of area treated each year is limited by the resources available and if more funds were available more work would be done. Approximately 30% of the RDKB new invaders program budget was spent on treatment of common bugloss this year and 50% of the FLNRORD budget so the investment in common bugloss control each year is a significant amount.

4.6 Common tansy *(Tanacetum vulgare)*

The main infestation is in the Sidley area with some large patches present in the Myers and Greenwood areas. Isolated plants and small patches have been found along road networks throughout the Boundary. Five new sites were recorded this year ranging in size from 0.0001 ha to 0.007 ha so relatively small. In total 332 sites are recorded with 134 recorded as no plants during the last survey. Only 75 sites (22%) were surveyed in 2020 but when you combine surveys for the past two years 177 (53%) sites were surveyed in 2019 or 2020. Treatment has focused on roadside corridors as the highest priority and many of these small sites no longer have plants. The next focus was as resources were available through the RDKB private land program to assist landowners with control in the Sidley area. The estimated area infested is 134 ha with over 100 ha on two properties in Sidley where the infestation started. There is one site in Midway where it is expanding through an unused field that is underestimated in IAPP. Table 4 contains a breakdown of site size and year treated. Since the program has sites for individual properties the number of sites seems high but 67 of these are in the Sidley area covering 122 ha. The remaining 265 sites have a cumulative estimated area of 13 ha (10 of total area infested). 78% of sites have had some treatment occur, but for larger sites it may not be all of the site. There are 28 sites with no treatment but a current area of zero so either the landowner is controlling it, the site was last treated prior to treatment being recorded in IAPP, or during data cleanup a site was retired so area was set to zero. The majority of untreated sites are on private land with only a few crown sites not yet treated. The amount of common tansy treated each year on private land is limited by the resources available through the RDKB New Invaders Program and landowner cooperation.

Table 4. Breakdown of size and treatment status of common tansy sites.

Common Tansy Size Class by Last Treatment Type	Number of Common Tansy Sites and Year Last Treated													No Record of Treatment	Total Sites by Size Class
	2003	2007	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019		
Chemical		**1**	**2**	**9**	**17**	**16**	**15**	**19**	**20**	**23**	**52**	**38**	**24**		**236**
0		1	2	8	8	9	10	10	15	18	13	1			95
<0.001				1			1	4	3		9	8	4		30
0.0011 to 0.01					1		3		2		13	12	4		35
0.011 to 0.1					5	4	1	4		3	11	11	5		44
0.11 to 1					3	2		1		2	6	5	6		25
1 or >1						1						1	5		7
Mechanical	**1**	**1**	**1**			**1**	**1**	**1**		**2**	**2**	**6**	**7**		**23**
0	1	1	1			1	1	1		2	1	2			11
<0.001												2	5		7
0.0011 to 0.01											1		1		2
0.011 to 0.1												2	1		3
No Record of Treatment														**73**	**73**
0														28	28
<0.001														30	30
0.0011 to 0.01														8	8
0.011 to 0.1														1	1
0.11 to 1														3	3
1 or >1														3	3
Grand Total	**1**	**2**	**3**	**9**	**17**	**17**	**16**	**20**	**20**	**25**	**54**	**44**	**31**	**73**	**332**

4.7 Cypress spurge *(Euphorbia cyparissias)*

Cypress spurge was popular for planting in cemeteries and was sold as an ornamental. There are three biotypes and the tetraploid type has been reported to spread while the other two are more or less sterile. Other than DNA testing there is no way to identify the type based on morphological characteristics, so we have only recorded sites where plants appear to be spreading. There are four recorded sites and only one roadside site is being actively treated. A second roadside site with a well nearby should be pulled when staff have time available. The site found in 2013 in rural Grand Forks is roadside with some on private land where the landowners do not want herbicide used. The site on private found in 2017 should be added to the treatment list for 2021 as the landowner is cooperative. Total estimated area for sites in IAPP is 0.004 ha.

4.8 Himalayan balsam / Policeman's helmet *(Impatiens glandulifera)*

Himalayan balsam is known to be grown in some gardens and awareness work has included this species to discourage gardeners from growing it. There is only one location where it has been found outside of yards. The site is along McRae Creek near Christina Lake and it was pulled from the creek bank in 2015 and 2016. One adjacent landowner reported that it had come down the creek to his place from the neighbour above. Crews did not find any plants in 2017-2019 and an adjacent landowner reported controlling it all through the year in 2018. The creek experienced erosion from the spring flood in 2018 and plants re-established from seed banked in the soil after the bank

restoration work was complete. Crews dug out a few plants in 2020 along McCrae Creek totalling 0.0003 ha.

4.9 Hoary alyssum *(Berteroa incana)*

A containment line has been created that includes the Grand Forks area east to Gilpin Creek, west to July Creek and north up the Granby valley to 30km on North Fork Rd. In the 2019 planning meeting containment areas were added in Midway and Kettle Valley areas although the lines have not actually been drawn yet. This estimated containment area has 606 recorded location which is an underestimation, so a more accurate estimate of area infested within the containment lines is over 2,000 ha. Selective herbicides effective on this species have residual control up to 1.5 years so repeat treatments are required. The number of sites treated annually outside the containment area continue to increase as a result of control gained in some areas enabling expansion to more new areas. In 2020 127 sites were treated of the 1,481 recorded in IAPP. There are also many private land sites that are being controlled by the landowners but there is no record of treatment in IAPP. The overall trend is that sites under management decline sharply after the third year of treatment to a point where they can be controlled through hand pulling. Unfortunately, many landowners are not willing to invest the time and resources for more than a single treatment. The RDKB offers a 50% cost share program and spray equipment loan out for treatment on private land. During spring 2019 hoary alyssum was added as a cost share species in Electoral Area E under the RDKB 50% cost share program. This did deter some landowners in Area E from completing treatment, but a surprising number of landowners did go forward with treatment. Within the containment area the roadsides are treated on a rotation basis. Roadsides outside of the containment line (MOTI and municipal) are targeted for treatment annually or every two years which has resulted in a decline in plants with most areas now only having isolated plants or very small patches the year following treatment. Outside of the containment areas there are a few fields infested that are not being controlled by the landowner and each year neighbours do complain about the lack of control in both the West and East boundary.

4.10 Heart-podded hoary cress *(Cardaria draba)*

Hoary Cress is mainly located in the Sidley (28) and Bridesville (3) areas with some isolated sites in the Myers Lake (1), Kettle Valley(7), Midway (5), Grand Forks (2), Christina Lake (1), and Granby (2) areas. Within the Sidley area each property has its own site number, so it makes it seem like the plant is more widespread than it is. There are 49 sites recorded with a total area of 9.4 ha. There were twelve sites with no plants in 2020 and four did not have treatments recorded but two had been treated prior to IAPP. The site in the river buffer was treated the past two years and the mill has plans to bury the site in mulch. Over the years 80% of sites have been treated with eighteen treated in the past two years. There was significant expansion of the patches in the Sidley area between Hwy 3 and the border in 2019 likely a result of the extreme summer drought in 2018 stressing plant communities combined with some sites not being treated in 2017 since the treatment window was missed. There was far less in Sidley in 2020 as a result of the extensive 2019 treatment work. Normally, hoary cress is one of the first weeds to flower and has to be treated prior to full flower stage for full effectiveness, typically late May or early June. For herbicide control a mix of dicamba + metsulphuron-methyl is used or a mix of dicamba+2,4D. In 2020 only the four largest sites were treated totalling 4.15 ha of hoary cress. The total estimated areas infested is 9.4 ha.

4.11 Leafy spurge *(Euphorbia esula)*

Leafy spurge is present in small patches in the southern valleys. Management has been ongoing since the early 2000's on most sites. There are 34 known locations totalling 4.0 ha not including two protected biocontrol release sites. If those were included the area would increase to about 5.5 ha. Of the sites included in this summary, fourteen were surveyed in 2020 and 13 had no plants on the last survey. Fourteen sites were treated in 2020, which is up slightly over the last year. Two sites are primarily managed through biocontrol including the site on Spencer hill and a site near Norwegian Creek. For the largest patch on Johnstone Creek East (3 sites in IAPP) treatment has shifted to spring herbicide treatment by the landowner, since the majority of root system has been controlled, and now the focus is on stopping all seed production. In the past it has been treated in fall after the first hard frost to maximise root kill. There four new sites found between Kettle River Recreation Area and Johnstone Creek in 2020. The Riverside/Kettle River East Rd area needs to be surveyed to see if more new sites are present in the forest openings. This species is likely being moved by the elk herd as new sites continue to be found along game trails.

4.12 Milk Thistle *(Silybum marianum)*

One location was identified in the early 2000s and a follow-up visit a few years later confirmed no plants. Based on discussions with gardeners it is suspected to be present in some gardens however no garden escapes have been found.

4.13 Russian olive *(Elaeagnus angustifolia)*

Russian olive is grown as an ornamental in the area and is grown and sold at local nurseries. The current priority is to prevent it from establishing and spreading along the river systems. A risk assessment by UBCO identified the Kettle River as at high risk for infestation based on current climatic conditions[1]. Inventory over the past few years have identified a site along the river in Midway (2014) and Rural Grand Forks (2015). Three locations were recorded in IAPP within the City of Grand Forks on private or municipal land. All locations have only single trees. Landowners should be contacted and encouraged to remove trees near the Kettle River. No management is recommended for all the sites in gardens that are not recorded in IAP since biocontrol research looks promising.

4.14 Tamarisk/Saltcedar *(Tamarix spp)*

Saltcedar has potential to become problematic if allowed to establish in riparian areas along rivers and streams in warm parts of the Boundary. As our climate changes it is expected to favour expansion of this species. Seven sites were recorded in IAPP on public land. It is being grown by gardeners in many communities however there are no known locations where it has escaped from yards yet. Awareness work focusses on discouraging planting of this species. This species will continue to be monitored and should be removed from sites near riparian areas to prevent future potential problems.

4.15 Yellow Archangel *(Lamium galeobdolon)*

There are no locations recorded in IAPP. There are two locations along roads in Christina Lake where this species has escaped yards, however treatments have not yet been initiated. Based on growing site preferences this species is likely to have the most potential for spread in the Christina Lake area since it does not do as well in hot locations without water. This species will continue to be included in outreach work to gardeners to discourage planting and encourage removal from gardens.

[1] Collette L. and J. Pither. 2015. Russian-Olive (*Eleangnus angustifolia*) Biology and Ecology and its Potential to Invasive North American Riparian Ecosystems. Invasive Plant Science and Management Volume 8:1-14. 14 pages.

4.16 Summary for Control and Contain

Overall, most sites in this category are being controlled, but there are not enough resources to treat them all, particularly on crown land. Focus has been on travel corridors and from 2016 - 2020 a secondary focus became sites in proximity to high value grasslands. There are some private land sites that show up as untreated, but the landowner has been treating them, there are just no records in IAPP. For some species there are some duplicate sites that need have their sites paper file ID changed in IAPP, so they can be more easily removed from summary data sets. The bulk of treatment resources are being spent on species in this category. The investment has slowed or stopped the expansion of these species except hoary alyssum which continues to expand.

5.0 Management Strategy: Strategic Control

Management Focus: Treatments will be focused on high value or sensitive areas only, either for environmental, social or economic reasons.

Control work being done on strategic control species is limited to the resources available after the higher priority species have been treated. Table 5 contains a list of species and the current number of locations by size category. Maps for select species are contained in the Appendix 4 of this report.

Table 5. Breakdown of number of sites and area infested for species with management goal strategic control.

Invasive Plant Species	Number of Sites in Each Size Class						Total # of Sites by Species	Estimated Current Area Infested (ha)
	0	<0.001	0.0011 to 0.01	0.011 to 0.1	0.11 to 1	1 or >1		
Bachelor's button (CENT CYA)		2	1			1	**4**	5.0
Burdock species (ARCT SPP)		2	3	7	4		**16**	1.6
Chicory (CICH INT)	7	14	22	4	1	1	**49**	4.6
Nodding thistle (CARD NUT)	15	53	53	65	47	11	**244**	159.0
Orange hawkweed (HIER AUR)	43	39	69	90	33	3	**277**	21.5
Scentless chamomile (MATR PER)	25	13	13	16	5		**72**	2.6
Siberian elm (ULMU PUM)		7	7	2			**16**	0.1
Spotted knapweed (CENT BIE)	42	117	119	158	295	78	**809**	1412.2
Sulphur cinquefoil (POTE REC)	11	146	114	157	130	23	**581**	111.5
Wormwood (ARTE ABS)	5	38	30	69	37	5	**184**	29.5
Yellow hawkweed species (HIER SPP)	136	233	304	447	269	33	**1422**	217.3
Yellow/common toadflax (LINA VUL)	3	14	19	8	2		**46**	0.9
# Sites by Size Class	**287**	**678**	**754**	**1023**	**823**	**155**	**3720**	**1965.8**

5.1 Burdock *(Arctium species)*

There are only 16 locations in IAPP, however, it is present along the Kettle river and many tributaries throughout the region. It mainly grows in riparian areas along creeks and the river under the shade of trees. It has not been recorded growing in any hot dry location in the area. This species is being controlled by some livestock owners due to the risk of blindness if the barbed seeds get into eyes, and because of the burr-like seeds getting caught in animal coats. The seed balls have been known to snag small songbirds and bats resulting in death.

5.2 Chicory *(Cichorium intybus)*

Chicory is very limited in its current distribution and has only been recorded at 49 locations totalling 0.44 ha. This is a relatively accurate inventory. Isolated plants have been showing up along Hwy 3 from Rock Creek to Anarchist Summit and Hwy 33 north of Rock Creek over the past few years, likely being moved on mowing equipment. Treatment has shifted to mostly herbicide treatments along highways as contractors are treating other species, with the exception of the patch east of Grand Forks which has not been controlled to date, there are four sites 0.01 ha or larger, and the rest are single plants or small clumps along road edges. There is a good opportunity to completely control infestations in the area since all patches are limited to roadside infestations at this point.

5.3 **Common/yellow toadflax** *(Linaria vulgaris)*

Common toadflax has been recorded in 46 locations in the Sidley- Johnstone (16), Kettle Valley/Midway (4), Greenwood (7), and the remaining sites spread out through the southern half of the Boundary. Total area recorded in IAPP is 0.88 ha but there are probably some additional small sites that have not been located. Several locations have been found where it appears to be hybridizing with dalmatian toadflax resulting in plants with characteristics of both. Several years ago, monitoring found *Calophasia lunula* in many locations and it appeared to be providing some control but not consistently. *Mecinus janthiniformis* has not been observed on yellow toadflax likely because the insects are done for the season prior to yellow toadflax growing and flowering. A new insect that feeds on seed is being tested by Range Branch and a release of the insect was completed on a crown land site in the Bridesville area in 2018.

5.4 **Orange hawkweed** *(Hieracium aurantiacum)*

Orange hawkweed has been recorded at 277 locations totalling an estimated 21.5 ha (Table 6). There are 43 locations with no plants at the time of the last survey. The bulk of the sites were found in 2008-2010 when extensive inventories of FSRs were done and the number of new sites found each year has declined since then. The majority of sites(67%) are on crown land and the ministry no longer considers this species a high priority since it is considered to be too widespread which is unfortunate as it will reduce range forage. Herbicide treatment on this species peaked during 2009-2011 and has since declined on provincial forest land due to insufficient resources. Treatment has been continuing at some rural road-side sites and only five sites were treated in 2020. There are several large sites in and around wetlands or pesticide free zones which will require changes to regulations to enable treatment with herbicide. The current strategy for these large infestations is waiting for biocontrol insects. The potential agent has overwintered in the Shuswap but orange hawkweed is not their preferred host plant so it is unclear how effective this agent may be at suppression. Digging/pulling is not considered effective. Sites continue to be found in gardens suggesting there are likely more patches growing inside fenced yards which is not surprising since it has been found as a contaminant in wildflower seed mixes. It is relatively easy to control with selective herbicides, but often plants are missed since they seem to blend into the grass and other plants.

Table 6. Breakdown of patch size by jurisdiction for orange hawkweed.

Jurisdiction	Total Sites by Species
BC Hydro (100%)	1
BC Hydro (100%)	1
Ministry of Forests, Lands and Natural Resource Operations (100%)	191
Ministry of Transportation and Infrastructure (100%)	39
Municipality owned land (100%)	7
Private Land (100%)	45
Provincial Parks (100%)	1
Regional District owned land (100%)	1
Total # Sites	**286**

5.5 **Scentless chamomile** *(Matricaria perforata)*

Scentless chamomile has been recorded at 72 locations with a combined area of 2.6ha. It was introduced into a hayfield in rural Grand Forks as a seed contaminant and the landowner has been diligent at controlling it. Unfortunately, one neighbour is not controlling it and so it is continuing to spread. There is another possible location in a field up the Christian Valley that has not been confirmed but is likely a sizable area if it was correctly identified. There are 25 sites that did not have

plants at the time of the last survey. Only two sites were treated in 2019 and only 20 in the past five years. Because this species is not as high a priority within this category all sites are not treated annually. Treatment is focussed on sites adjacent to agricultural land and busy roadsides. There are some duplicate sites so further work needs to be done to clean up the data for this species.

5.6 Siberian elm *(Ulmus pumilla)*

Siberian elm was planted in the Grand Forks area but has now become a problematic species due to spread by seed. It is found all along the Hwy 3 and Hwy 33 corridors, presumably being spread by road maintenance equipment. Since trees are not tolerated on the roadside to protect sight lines it is being controlled to some degree already on main highways by the roadside mowing program. Within Grand Forks trees are being replaced where possible on city property but it continues to grow on vacant lots. It is present along the Kettle River downstream of Grand Forks and will presumably continue to spread.

5.7 Spotted Knapweed *(Centaurea stoebe)*

Spotted knapweed was first recorded in 1988 in the Bridesville area and later established large infestations in the Beaverdell, Christina Lake and Greenwood areas. It has since spread from these main infestations along roads. Containment lines have been created around the main infestations and work continues mainly on roadsides outside the containment line to keep it from further expansion. A total of 809 locations have been recorded but some are duplicate sites from biocontrol releases or sites where spotted, rather than diffuse, knapweed was recorded due to poor identification skills by treatment contractors. Differentiating the hybrids can be difficult. Biocontrol insects have been released at 90 locations over the years and is the primarily method of control within the containment lines. To date there is no visible impact from the bioagents as the plants seems to survive the feeding and continue growing but one site was showing reduced vigour and what appears to be a reduced density although measurements have not been taken. There were 42 sites with no plants during the last survey (all very small locations treated with herbicide) and 293 sites with an area of >0.1 ha. The remaining 360 sites comprise the balance of area estimated at just over 4,000 ha. The information in IAPP totals 1,412 ha but this is an underestimation since so many sites have not had surveys in the past ten years.

5.8 Sulfur cinquefoil *(Potentilla recta)*

The area of infestation currently within IAPP is only 111 ha but it more likely over 6,000 ha. Very few sites have had surveys in recent years, and the inventory coverage for this species is incomplete. Staff are working to get a better handle on distribution, but it will take time. The inventory on crown land is relatively accurate to represent locations but not necessarily area infested. There are many sites on private land that have not been recorded but most are likely relatively small and mostly in heavily grazed areas. Most of the large infestations are in the valley bottoms with small sites all through the region on roadsides in more remote areas. The search for a biocontrol insect has now been stopped and is not expected to resume. Alternative control methods including targeted grazing need to be explored to maintain forage on crown ranges where treatment is not feasible. Sulphur cinquefoil has been treated when it is located near a priority site, along a roadside being treated, or within restoration areas. With the new focus of protecting grasslands a more thorough inventory of its presence in grasslands should be done to determine the full extent of infestation.

5.9 Yellow flowered non-native hawkweeds *(Pilosella spp)*

The yellow flowered invasive hawkweeds include several species including *P. floribundum* (kingdevil), *P. prealtum* (queendevil)*, P.glomeratum* (yellowdevil), *and P. caespitosum* (meadow). This group was formerly *Hieracium* but based on DNA testing the genus has been changed to *Pilosella*. There has been difficulty identifying between the species and a key is used by staff for identification. Treatment

contractors are not asked to identify species, only to record as either yellowdevil which is quite distinctive or invasive yellow hawkweed species. The changing of species has resulted in many records with multiple species thus data duplication. The main infestation in the Carmi area is mainly tall hawkweed while other areas often have a mix of species. Christina Lake and Granby seem to have more yellowdevil than other species. Overall control work was mainly done up to 2012, in an effort to contain and suppress it but when FLNRORD reduced funding and decided it was less of a priority, less work has been done on crown land where most of it is located.

In total within IAP there are 1,286 sites. The majority of records are on crown land (1,109), followed by roadsides and pits (128) and all other jurisdictions (49). 136 sites did not have plants recorded during the last survey and some of these were because of change to identification as the species was zeroed out but not removed. This is a species that is mainly on crown land but is spreading from crown onto private in a southerly direction. The total area infested is only listed as 200 ha but many records within the containment line have not been updated in recent years, so it is likely easily several thousand hectares by now. Most of the untreated sites are within the containment lines. For the past few years 1 to 5% of sites were treated each year. The plan had been to do containment work along forest service roads on a rotational basis however based on current resources and the number of roads it will take eight years before a road is retreated which will likely result in further expansion. Focus in 2020 was on treatment of patches that threaten high value grasslands and patches along main highway corridors.

5.10 Nodding Thistle *(Carduus nutans)*

Nodding thistle is mainly present in the Bridesville and Rock Creek areas. Isolated patches are present in the East Boundary with increasing reports in the Gilpin area where plants are showing up across the park and on private land in main valley. The main method of control is biological control. The insects normally find a patch within a few years and are suppressing seed production and plant size. Herbicide treatment is being done along roadsides and within restoration areas as other species are being treated. Manual treatments are being done along the border with Okanogan County to reduce seed spread into the US where control is mandatory. When isolated plants are found in new areas they are normally dug out and bagged. Herbicide treatment is being used in Area D to control patches to reduce further expansion and associated impacts.

5.11 Wormwood (Artemisia absinthium)

Absinth wormwood is found throughout the regional mainly in around farm buildings but has established large patches in range areas in the Greenwood, McCarron Creek, and north of Rock Creek. It is a spreading relatively slowly but is difficult to control once established. It seems to like disturbed areas outside of the hot dry grasslands, although it has established and is slowly spreading on the West fire which is a relatively dry location. So far 184 locations have been recorded, but likely many more exist. Outreach work focuses on advising landowners about this species and encouraging control. It can be used as a natural wormer, but grazing animals should not ingest too much of it as its toxicity from long term ingestion is not known. It is being treated in areas where other priority invasive plants are already being treated.

6.0 Management Strategy: Biocontrol

There are seven species where the management strategy is biological control insects. These include bull thistle, Canada thistle, diffuse knapweed, dalmatian toadflax, field bindweed, hound's tongue, and St. John's wort. A summary of the status of biocontrol was included in the Annual Report for 2020 so is not included here. Appendix 5 contains maps showing the locations of sites for species in the biocontrol category.

7.0 Provincial EDRR Species

7.1 Dyer's Woad *(Isatis tinctoria)*

Dyer's woad is a provincial EDRR species, but is known to have occurred in the area prior to its listing. It was first reported by a landowner who was using it for dye back in 2004. The grower has since stopped growing this plant and reported no plants growing on the site in 2014 and again in 2016, however, provincial staff have not been able to check the site to verify its continued absence. A sample was collected when it was first identified but was then temporarily misplaced and has since been found and will be provided FLNRORD staff.

7.2 Mouse-ear hawkweed *(Pilosella pilosella)*

A site was found in Christina Lake Provincial Park between the parking areas by range branch staff in 2012. It was speculated that it likely was brought there by a park user who had also visited Kokanee Creek Provincial Park. Since this species is a provincial EDRR species, the site was treated with herbicide as soon as possible. The surrounding area was intensively surveyed in 2012, 2013 and again in 2015. In 2014, and 2016 -2019 the main areas near the known patch were surveyed. In 2013 BISS summer student surveyed other provincial park campgrounds and did not find any new locations and a similar result was found during the 2015 FLNRORD auxiliary staff surveys of other provincial parks. No plants have been found since the original sighting in 2012. The site will continue to be monitored by FLNRORD staff with assistance by BISS when requested.

7.3 North Africa grass *(Ventenata dubia)*

North Africa grass, a species on the provincial prohibited list, was found in Gilpin Grasslands Provincial Park in 2018 by BISS staff at two locations. This species has potential to reduce livestock forage by up to 80% so could have a significant impact on local extensive agriculture. The lower grasslands were surveyed by FLNRORD and BISS staff in the fall of 2018 locating 10 more sites. Additional surveys were completed by FLNRORD staff at Gilpin and other likely areas including trails through rural Grand Forks, and the fence constructed after the fire in Rock Creek. New sites were found on Spencer hill along and surrounding the crown rail grade, and some small sites along the fence on hwy 33 through the fire. FLNRORD is leading management and survey efforts with support from BISS when requested. Based on the amount found to date the province has change the approach from provincial EDRR to provincial containment. How this will affect the management approach will be determined in 2021 as land managers take on control responsibility.

8.0 Unlisted Species

There are a number of species currently not listed under the operational plan where monitoring is being done to get a handle on distribution or because they may be future species of concern. Some of these species not included in IAPP so there are no IAPP records for them.

Table 7. List of unclassified species where survey information is being recorded.

Unclassified Species	Status
Bulbous bluegrass (POA BUL)	started recording in surveys in 2018
Coast fiddleneck (AMSI MEN)	no survey records
Curled dock (RUME CRI)	limited inventory
Curlycup gumweed (GRIN SQU)	started recording in surveys in 2018
Flat pea / flat peavine (LATH SYL)	started recording in surveys in 2018
Hairy cat's-ear (HYPO RAD)	limited inventory
Hairy Vetch (VICI VIL)	limited inventory
Japanese Brome (BROM JAP)	limited inventory
Kochia (KOCH SCO)	partial inventory
Manitoba Maple (ACER NEG)	started recording in surveys in 2018
Mullein (VERB THA)	nuisance species
Myrtle spurge (EUPH MYR)	started recording in surveys in 2018
Norway Maple (ACER PLA)	started recording in surveys in 2018
Oxeye daisy (LEUC VUL)	limited inventory
Perennial sow thistle (SONC ARV)	limited inventory
Queen anne's lace / wild carrot (DAUC CAR)	started recording in surveys in 2016
Reed Canary grass (PHAL ARU)	limited inventory
Russian thistle (SALS KAL)	limited inventory
Sheep sorrel (RUME ACE)	limited inventory
Silvery cinquefoil (POTE ARG)	limited inventory
Small bugloss (ANCH ARV)	species not in IAPP but sites present in Rural Grand Forks
Smooth Brome (BROM INE)	started recording in surveys in 2018
Soft Brome (BROM MOL)	started recording in surveys in 2018
Tree of heaven (AILA ALT)	started recording in surveys in 2016
Virginia creeper (PART QUI)	started recording in surveys in 2018

9.0 Summary and Future Needs

Development of the strategic plan and operational plan in 2014 helped to focus work onto species of highest priority and likelihood of success. It has also provided some criteria on which to assess progress. The funding levels each year by each jurisdiction affects whether the management focus set out annually is being achieved or not making assessing the progress challenging. The Ministry of Transportation and Infrastructure has maintained reasonably consistent funding levels the past few years enabling investment into pit cleanup, addressing all category 1, almost all category 2 sites, and treating all species on some stretches of main highways. BC Hydro and FortisBC (power) and FortisBC Energy provide funding at a level sufficient to address all eradication and most control and contain species locations and a few strategic control species. This is the level that all land managers should be operating at. Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) Range Branch funding level is only able to address eradicate species and some control and contain species sites. Whereas the ecosystem restoration program of FLNRORD investment is addressing all species down to and including suppression of widespread species on high value restoration sites.

FLNRORD recreation sites and trails management funding is only addressing a small number of the priority sites. The Regional District of Kootenay Boundary New Invaders program provides support to landowners for eradicate and control and contain species, and the cost share program supports control of a few strategic control species where the landowner is investing 50%. But this program only helps on properties where landowners give permission for herbicides to be used and is only truly effective when the landowner does some treatment themselves to maintain the progress.

This approach of focusing on certain species with limited distribution could lead to small measurable successes but overall a potential huge loss as more widespread species expand causing impacts to ecosystems. Balancing this out by preventing further spread to new areas is important. It is being achieved on highways roads, but not on resource roads or rangeland which is a real concern. A significant increase in investment is needed for controlling invasive plants on rangelands for all the top 25 species currently listed provincially. The list of FLNRORD top 25 is contained in Appendix 1. The current FLNRORD funding address species only up to #12 and does have some flexibility to address regional priority species. Over 85% of the land base in the Boundary is owned by the crown and a significant investment is needed to have a truly effective program.

There is no dedicated funding for aquatic invasive plant control from the province despite having jurisdiction over all water bodies in our area. Fortunately, surveys in 2014 and 2015 found very few water bodies with infestations. A small amount of funding has been invested by FLNRORD Habitat Section for control of select locations of emergent species yellow flag iris and to do some demonstration control work on fragrant waterlily, but it is not enough to address the scope of infestation. Water bodies are very high value areas, yet little is being done to manage invasive plants and this needs to become a priority. The planning meetings have identified a need to re-survey waterbodies to enable early identification of new species, but no resources have been available to do more surveys.

APPENDIX 1. Ministry of Forest, Lands and Natural Resource Operations Provincial Top 25 List (2020).

Crown Land "Top 25" Invasive Plant Species Priorities

The Top 25 list was developed by Invasive Plant Specialists in the Ministry of Forests, Lands, Natural Resource Operation and Rural Development, Ministry of Transportation and Infrastructure, and the BC Parks and is endorsed by the BC Inter-Ministry Invasive Species Working Group. The ranking considers each species' current and potential distribution throughout the province and its threat and impacts to people, ecosystems and economic development. The list is used as a planning tool to determine funding of management activities throughout the Province for Provincial Public Land. Annual regional priority adjustments are then also considered and reflected in annual work plans.

Note: this list represents species priorities Province-wide (aka from a Provincial scale). The Provincial Public land containment lines mentioned below are for Provincial public land planning purposes only. Invasive Plant Species (Species with containment lines in red)	NEW RANK 2021
Bohemian knotweed	1
Giant knotweed	1
Japanese knotweed	1
Giant hogweed	2
Marsh plume thistle	3
Wild chervil	4
Himalayan knotweed	5
Poison Hemlock	6
Wild Parsnip	7
(NEW) North Africa grass	8
Garlic mustard	9
Rush skeletonweed	10
Common tansy	11
Yellow flag iris	12
Common bugloss	13
Blueweed	14
Field scabious	15
Spotted knapweed	16
Scotch broom	17
Hoary alyssum	18
Himalayan blackberry	19
Teasel	20
Puncturevine	21
Leafy spurge	22
Hoary cress	23
Orange hawkweed	24
Whiplash hawkweed	24
Yellow archangel	25

APPENDIX 2. Current Distribution of Invasive Plants in the Eradicate or Annual Control Category.

Invasive Plants in the Boundary

Category 1
Eradicate or Annual Control

Legend
- ★ Fragrant waterlily

Japanese & Bohemian knotweed
- ✱ no plants
- ★ plants present

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W

Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake





N

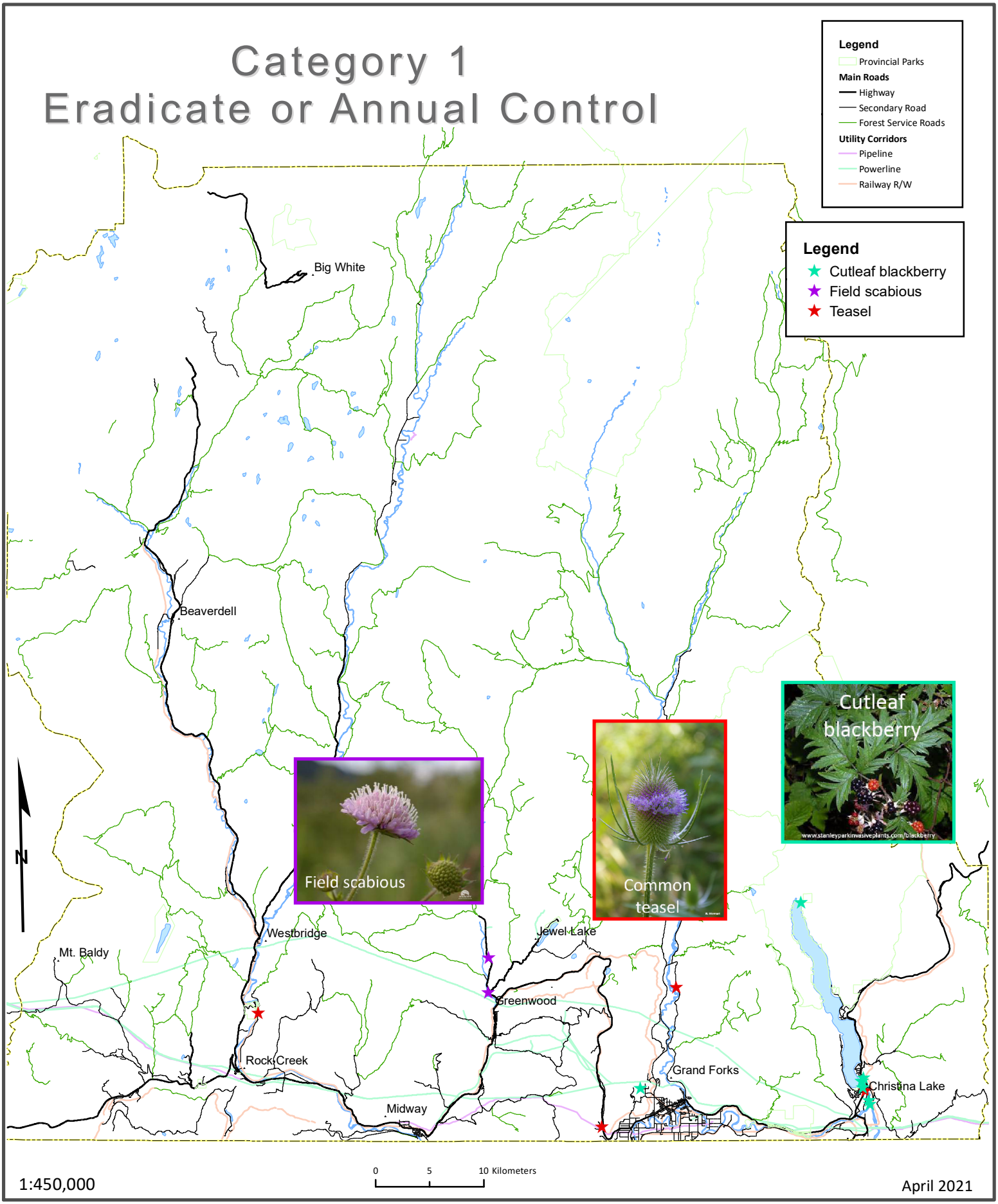
1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 1
Eradicate or Annual Control



Invasive Plants in the Boundary

Category 1
Eradicate or Annual Control

Legend
- Giant knotweed
- Greater knapweed
- Himalayan blackberry

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W

Big White
Beaverdell
Westbridge
Mt. Baldy
Rock Creek
Midway
Greenwood
Jewel Lake
Grand Forks
Christina Lake







N

1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 1
Eradicate or Annual Control

Legend
- Longspine sandbur

Plumeless thistle
- no plants
- plants present

Russian knapweed

Russian knapweed
- no plants present
- plants present

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W







Big White
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake

N

1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 1
Eradicate or Annual Control





1:450,000

April 2021

Invasive Plants in the Boundary

Category 1
Eradicate or Annual Control

Legend
- Scotch broom
  - no plants
  - plants present
- **Scotch thistle**
  - no plants
  - plants present
- **Tansy ragwort**
  - no plants
  - plants present

Legend
- Provincial Parks
- **Main Roads**
  - Highway
  - Secondary Road
  - Forest Service Roads
- **Utility Corridors**
  - Pipeline
  - Powerline
  - Railway R/W







Big White
Beaverdell
Mt. Baldy
Rock Creek
Midway
Greenwood
Jewel Lake
Grand Forks
Christina Lake
N

1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 1
Eradicate or Annual Control

Legend
★ Yellowflag Iris

Legend
Provincial Parks
Main Roads
Highway
Secondary Road
Forest Service Roads
Utility Corridors
Pipeline
Powerline
Railway R/W



Big White
Beaverdell
Mt. Baldy
Westbridge
Rock Creek
Midway
Jewel Lake
Greenwood
Grand Forks
Christina Lake
N

1:450,000

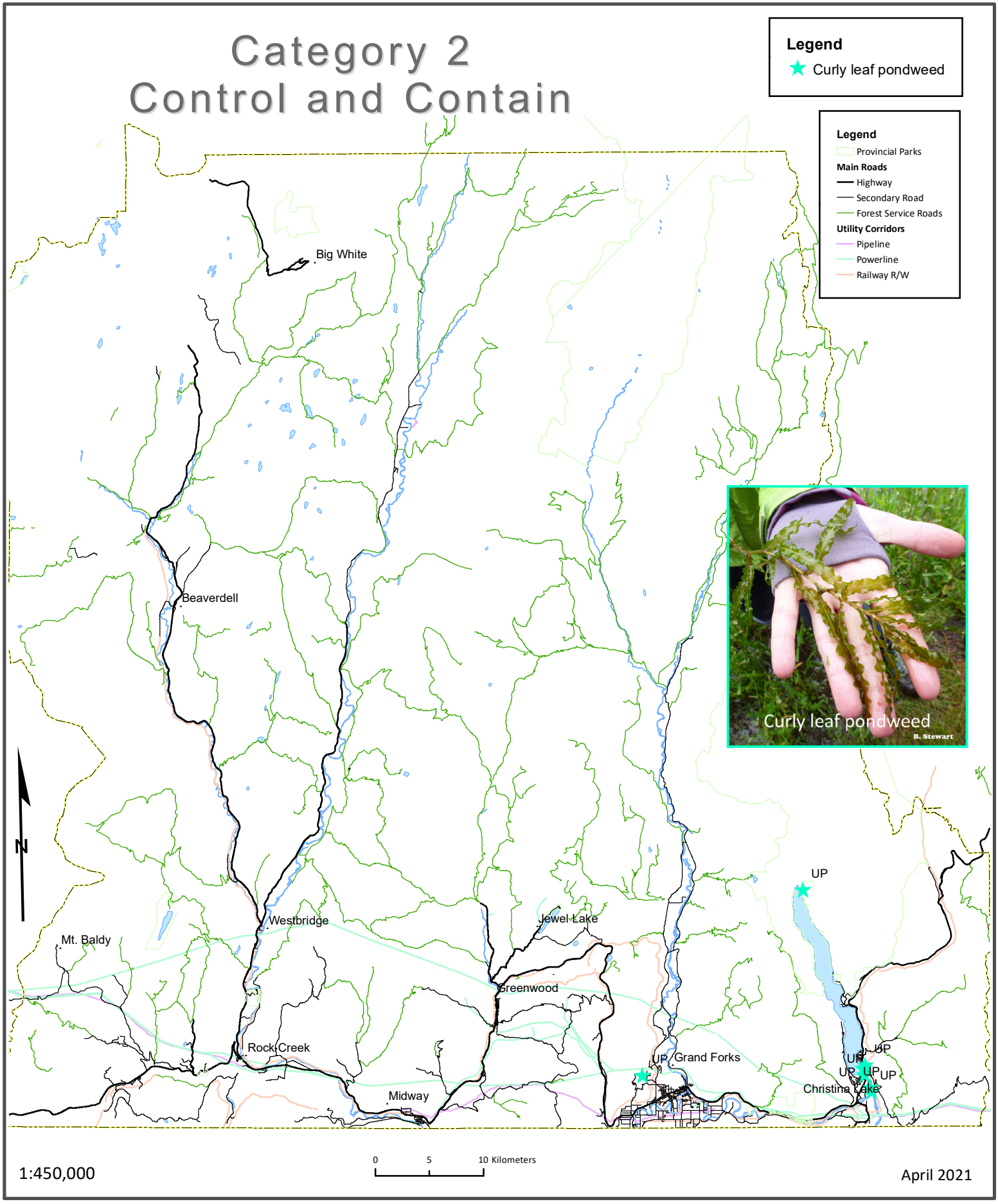
0 5 10 Kilometers

April 2021

APPENDIX 3. Current Distribution of Invasive Plants in the Control and Contain Category.

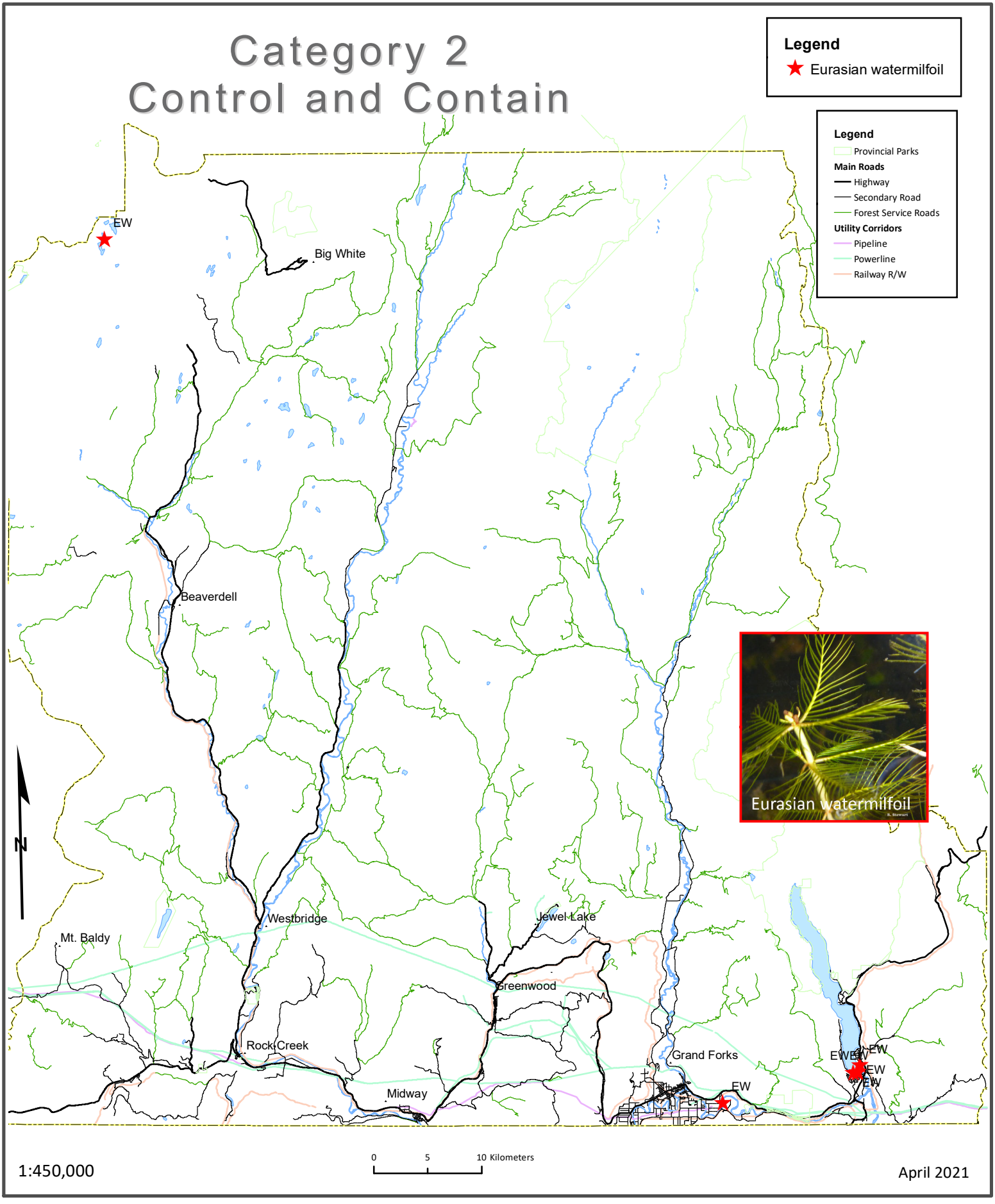
Invasive Plants in the Boundary

Category 2
Control and Contain



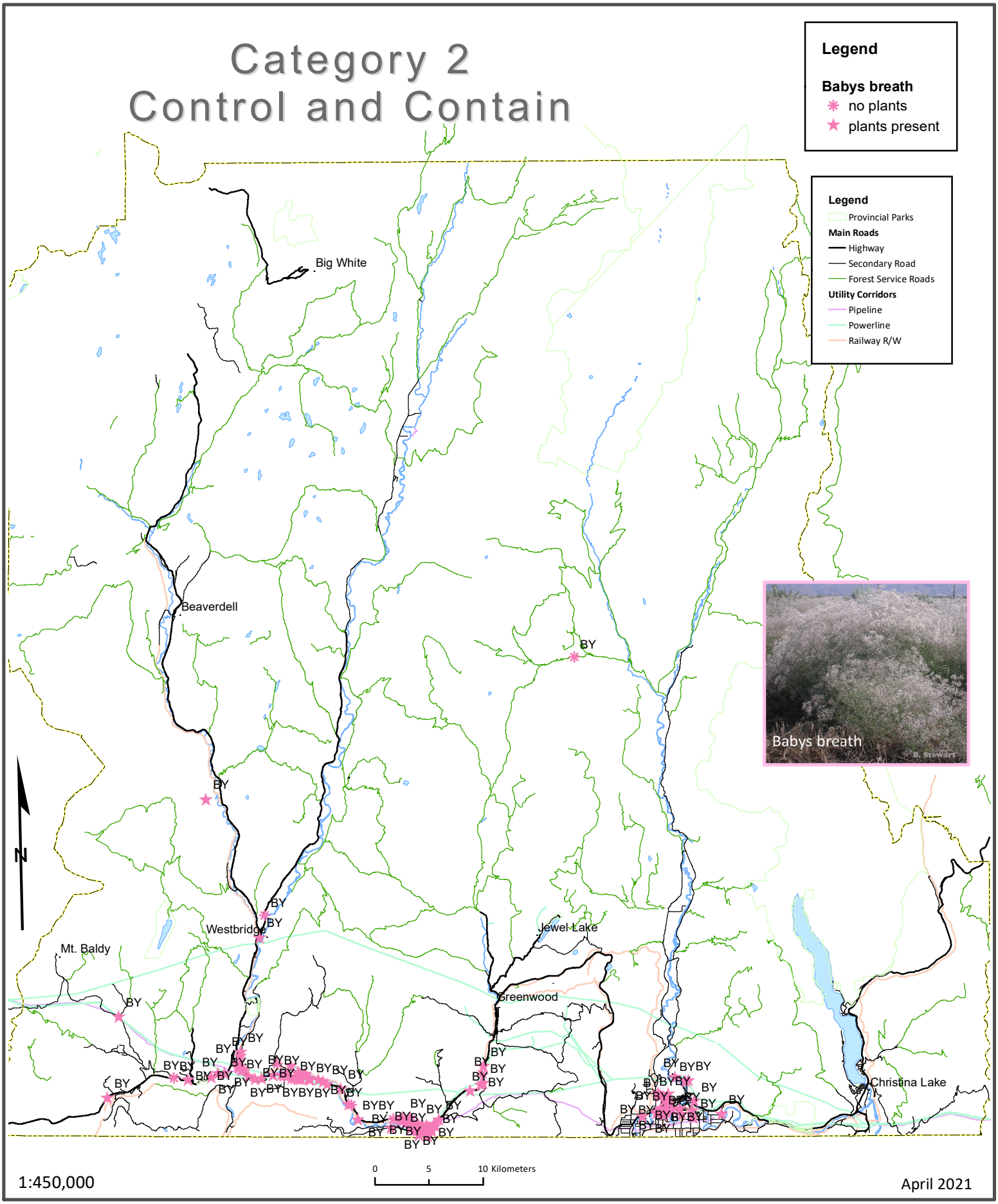
Invasive Plants in the Boundary

Category 2
Control and Contain



Invasive Plants in the Boundary

Category 2
Control and Contain



1:450,000

April 2021

Invasive Plants in the Boundary

Category 2
Control and Contain

Legend

Blueweed
- no plants
- plants present
- Blueweed_containment

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W



Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake

N

1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 2
Control and Contain

Legend

Common bugloss
- no plants
- plants present

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W



Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake
N

1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 2
Control and Contain

Legend

Common tansy
- no plants
- plants present

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W



Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake
N

1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 2
Control and Contain

Legend
- Cypress spurge
- Himalayan balsam
- Russian olive

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W

Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake







N

1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

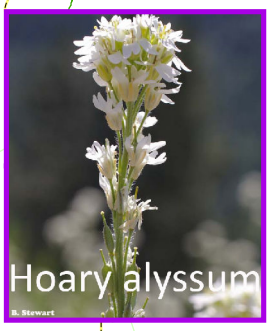
Category 2
Control and Contain

Legend
Hoary alyssum
- Hoary alyssum
- Hoary_alyssum_containment

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W



Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake

N

1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 2
Control and Contain

Legend

Hoary cress
- no plants present
- Plants present

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W



Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake
N

1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 2
Control and Contain

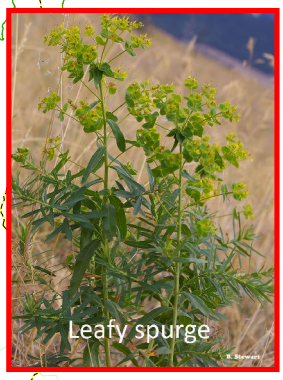
Legend

Leafy spurge
- no plants prsesent
- plants present

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W



Big White
Beaverdell
Mt. Baldy
Westbridge
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake
N

1:450,000

0 5 10 Kilometers

April 2021

APPENDIX 4. Current Distribution of Invasive Plants in the Strategic Control Category.

Invasive Plants in the Boundary

Category 3 Strategic Control

Legend
Bachelor's buttons



Legend
Provincial Parks
Main Roads
Highway
Secondary Road
Forest Service Roads
Utility Corridors
Pipeline
Powerline
Railway R/W

Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake

N

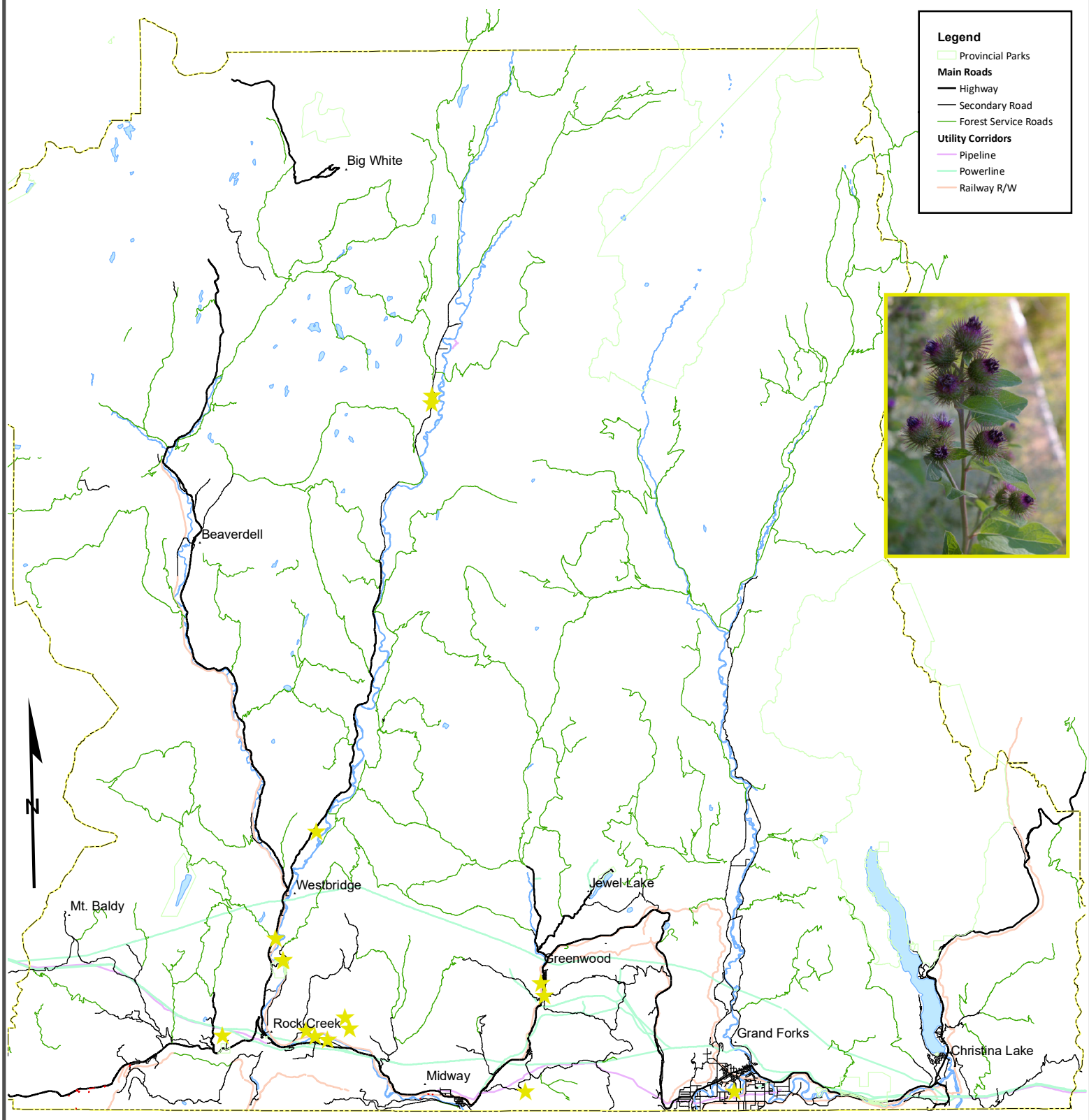
1:450,000

0 5 10 Kilometers

April 2021

Invasive Plants in the Boundary

Category 3 Strategic Control

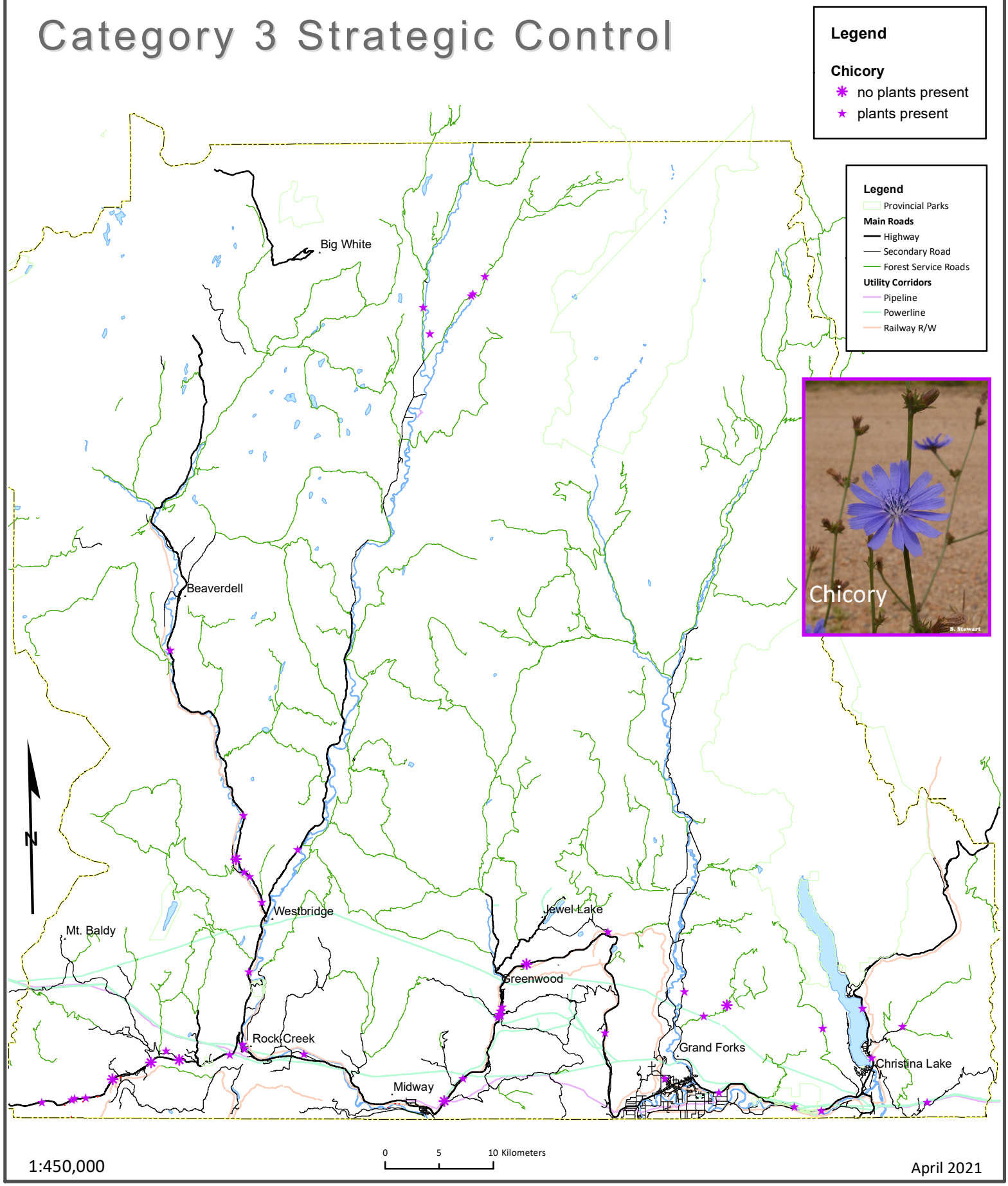


1:450,000

April 2021

Invasive Plants in the Boundary

Category 3 Strategic Control

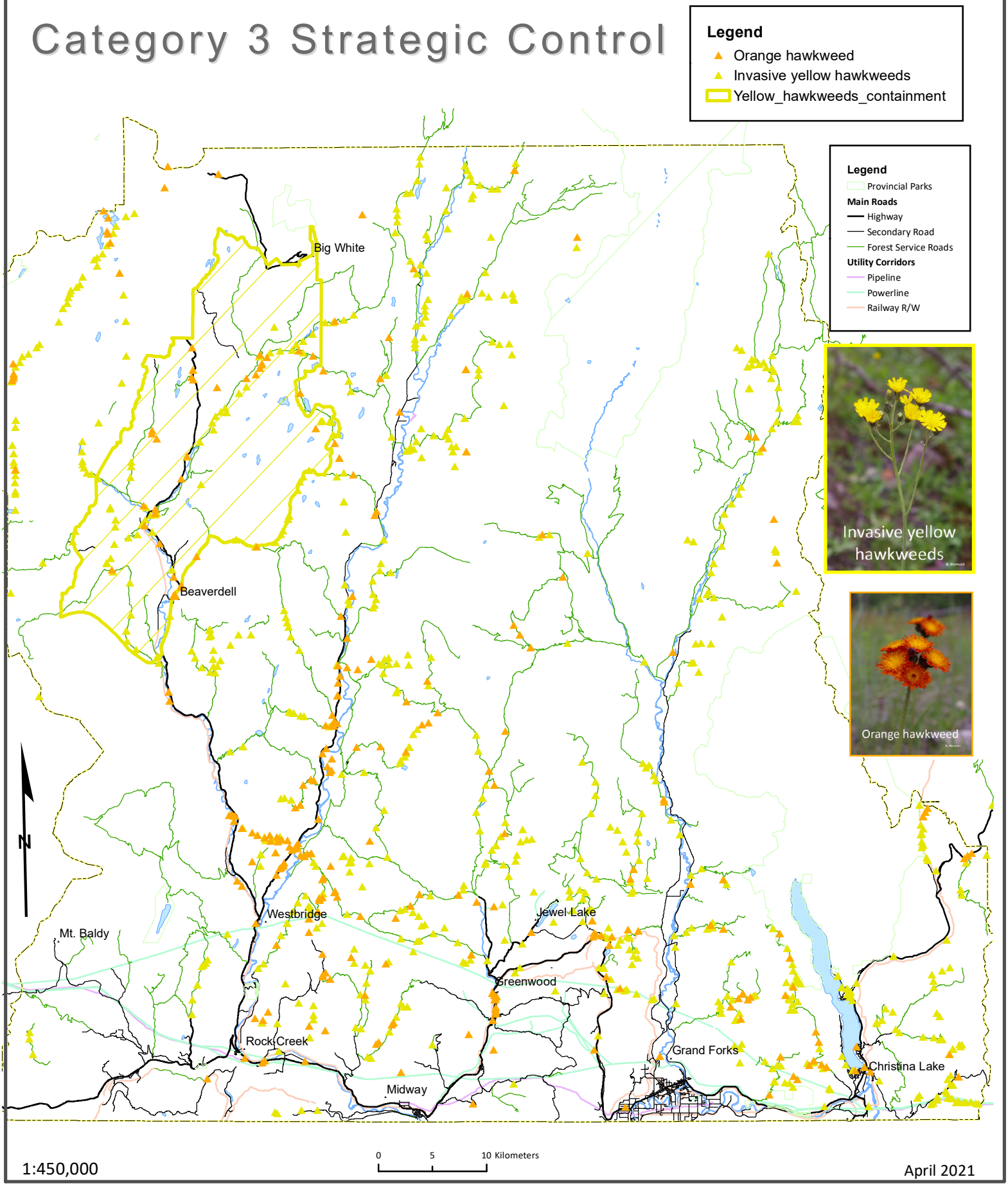


1:450,000

April 2021

Invasive Plants in the Boundary

Category 3 Strategic Control

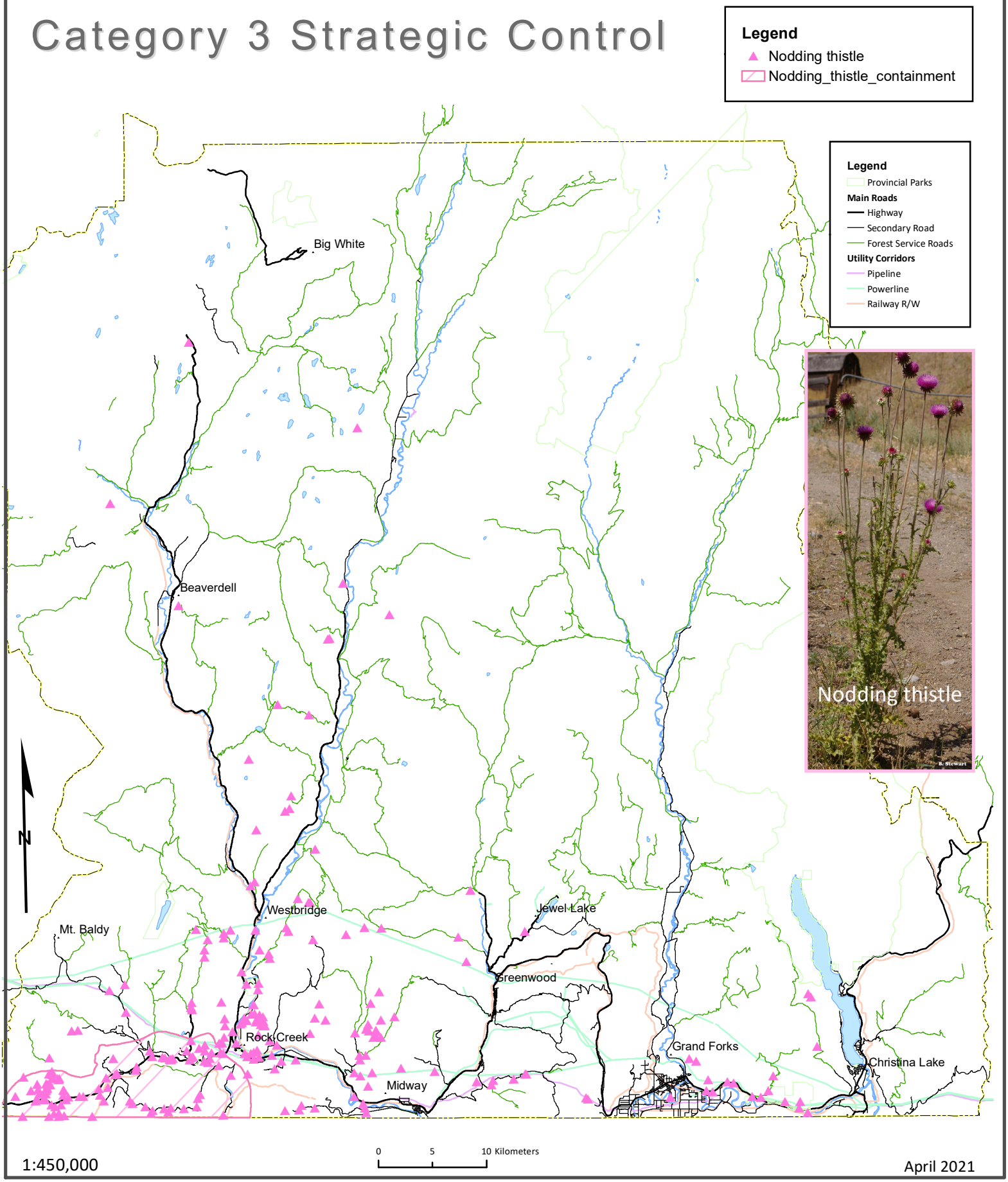


1:450,000

April 2021

Invasive Plants in the Boundary

Category 3 Strategic Control

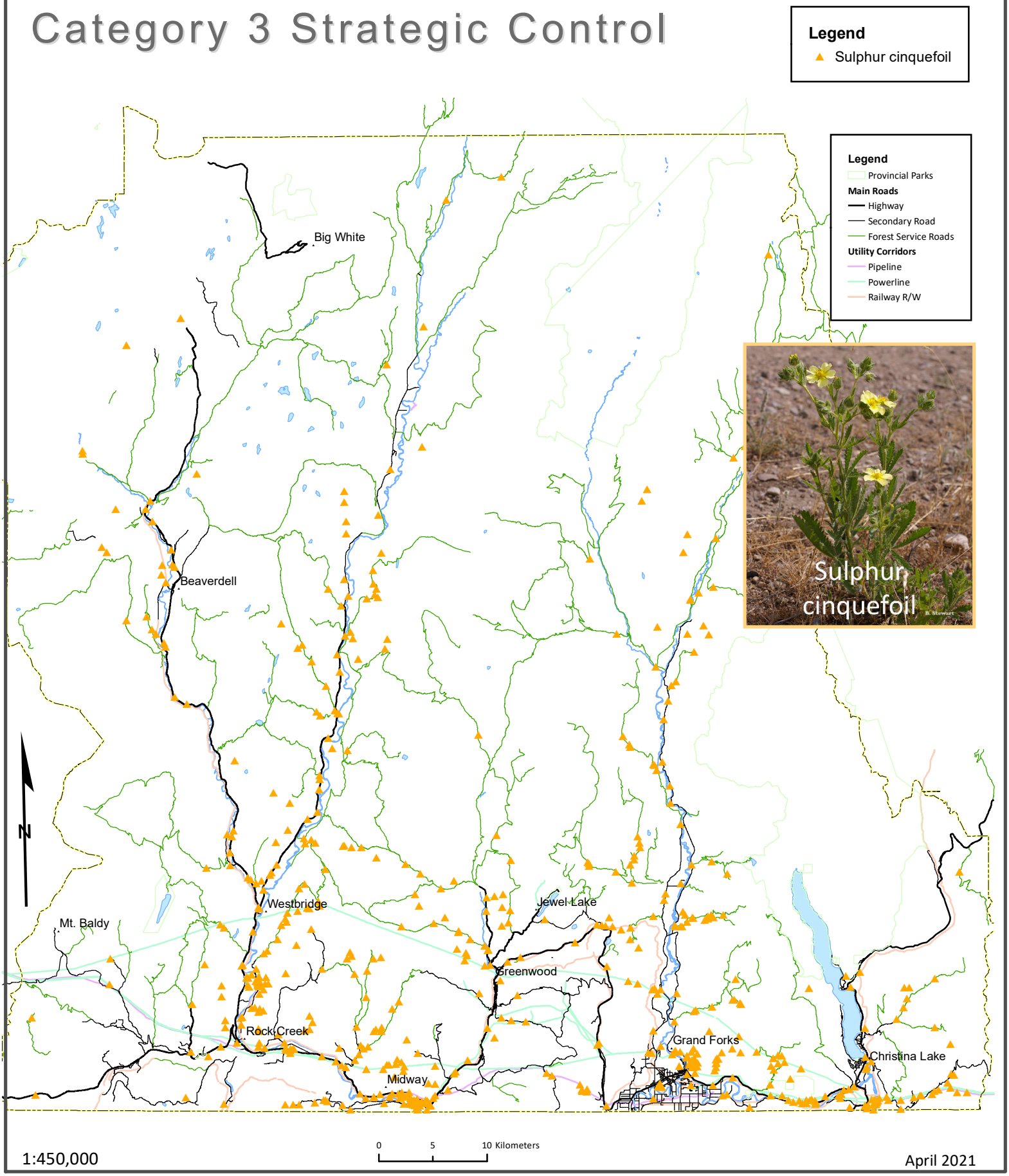


1:450,000

April 2021

Invasive Plants in the Boundary

Category 3 Strategic Control

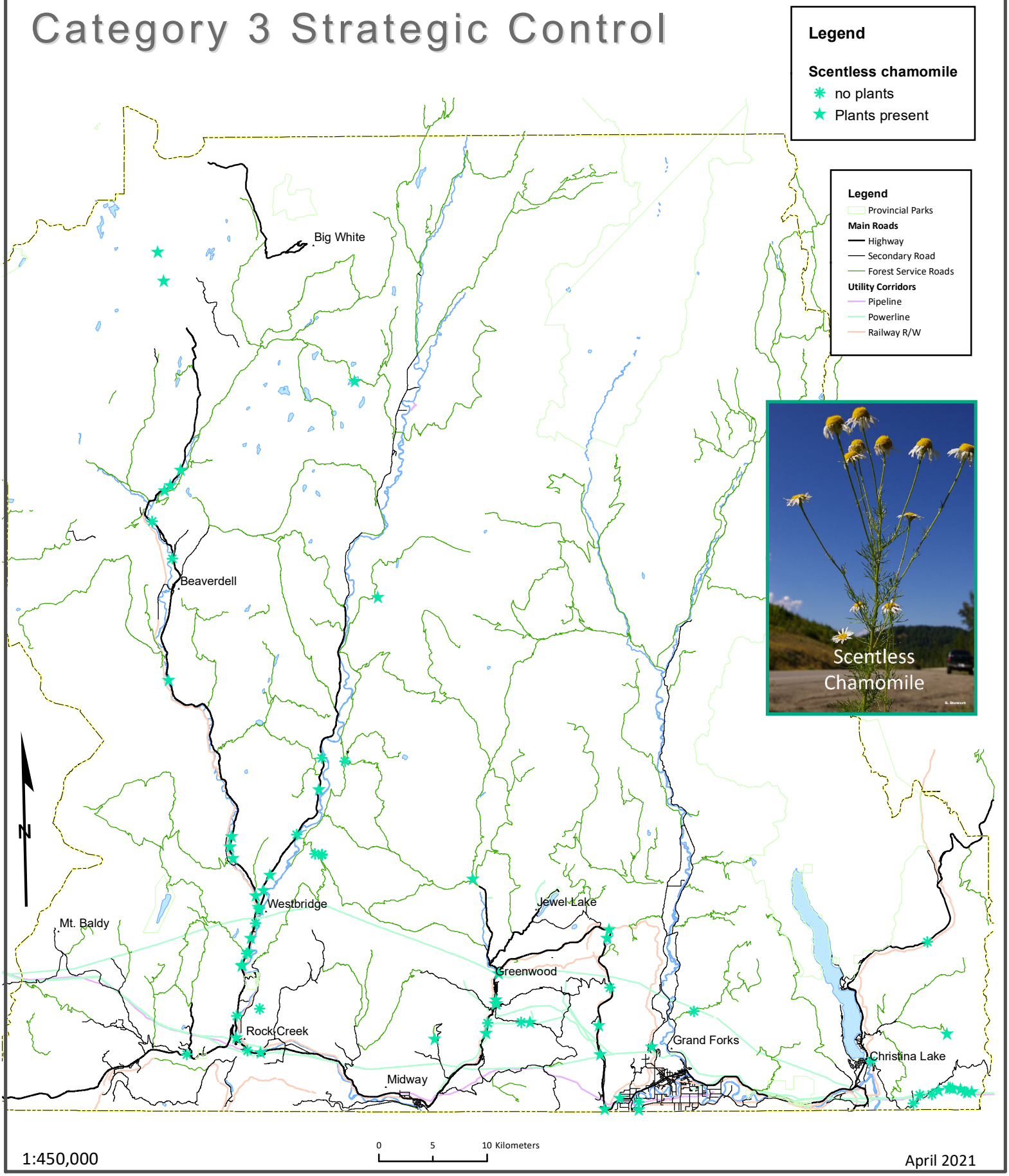


1:450,000

April 2021

Invasive Plants in the Boundary

Category 3 Strategic Control

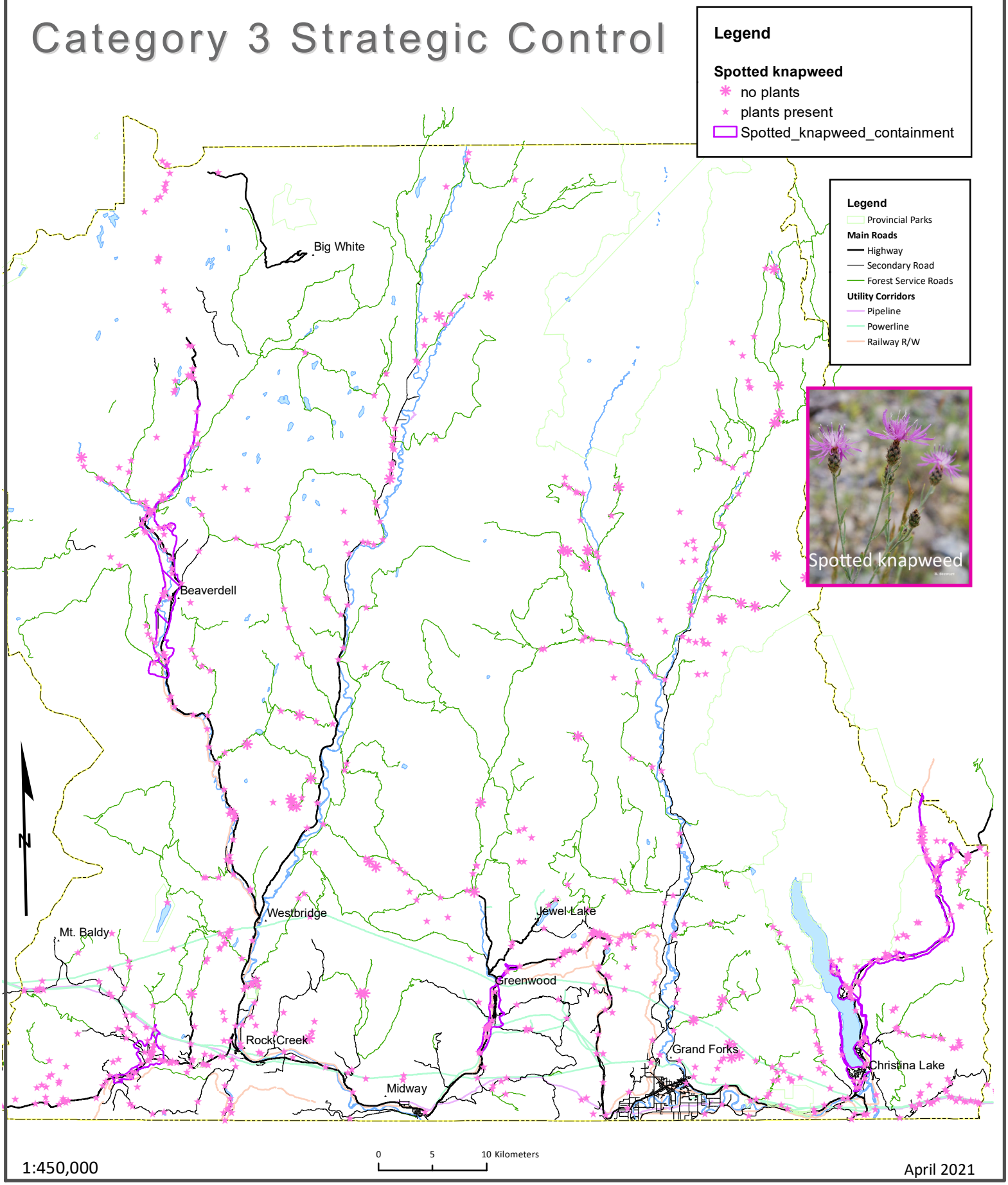


1:450,000

April 2021

Invasive Plants in the Boundary

Category 3 Strategic Control

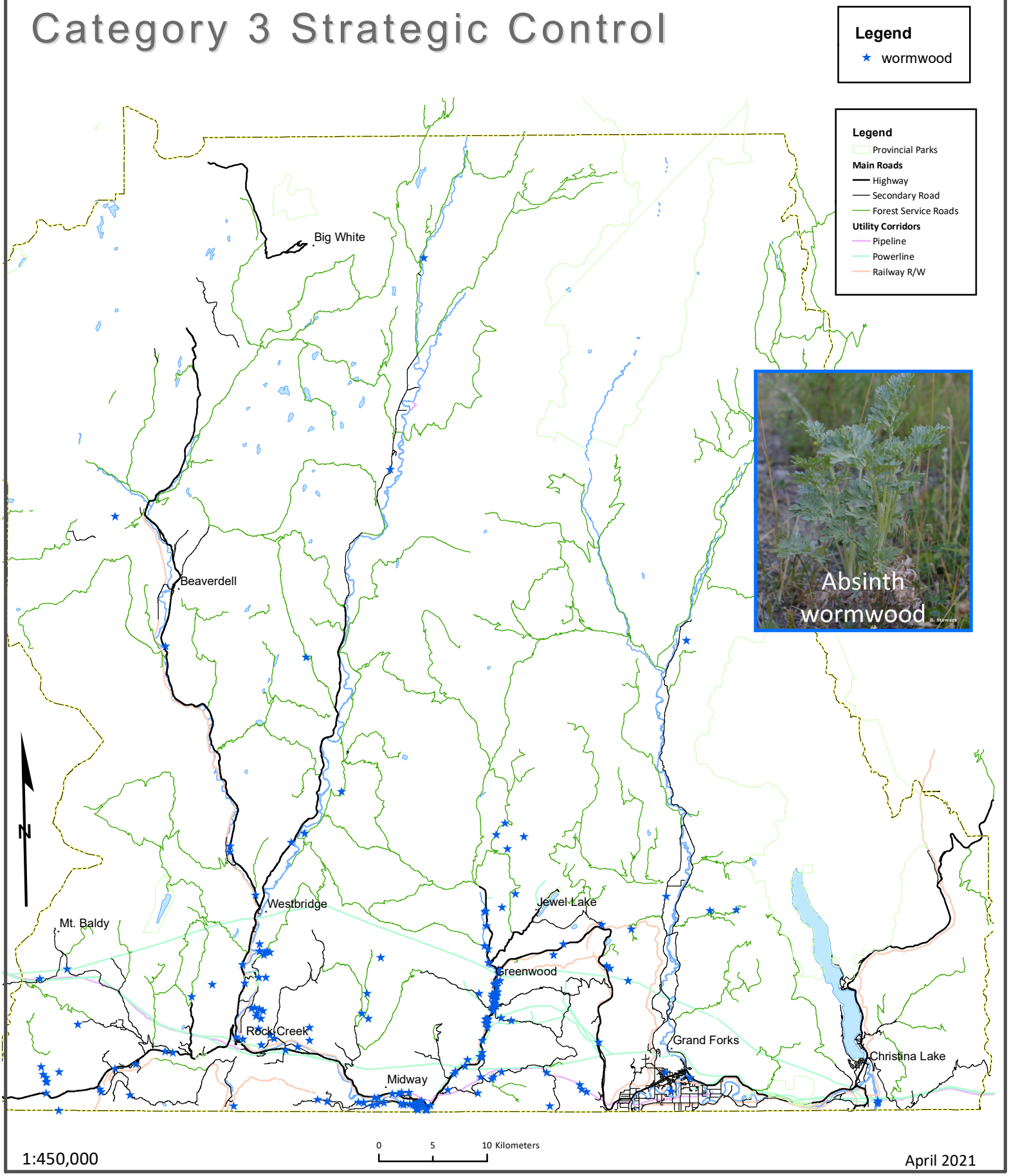


1:450,000

April 2021

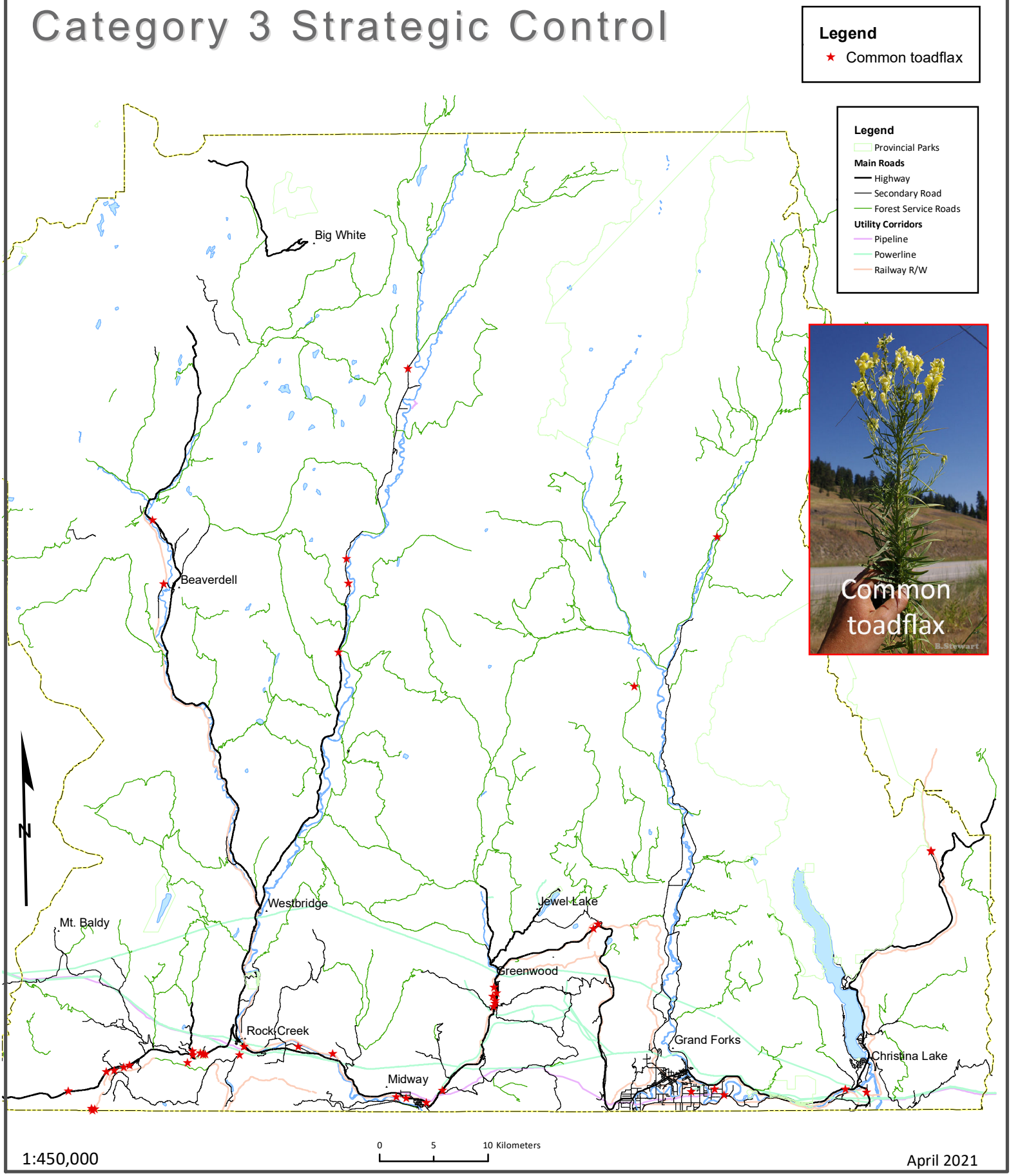
Invasive Plants in the Boundary

Category 3 Strategic Control



Invasive Plants in the Boundary

Category 3 Strategic Control



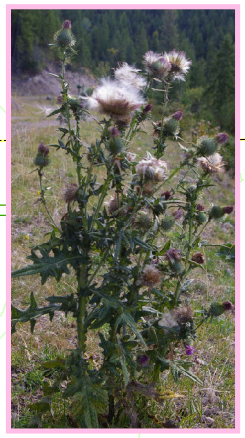
1:450,000

April 2021

APPENDIX 5. Current Distribution of Invasive Plants in the Biocontrol Category.

Invasive Plants in the Boundary

Category 4 Biocontrol



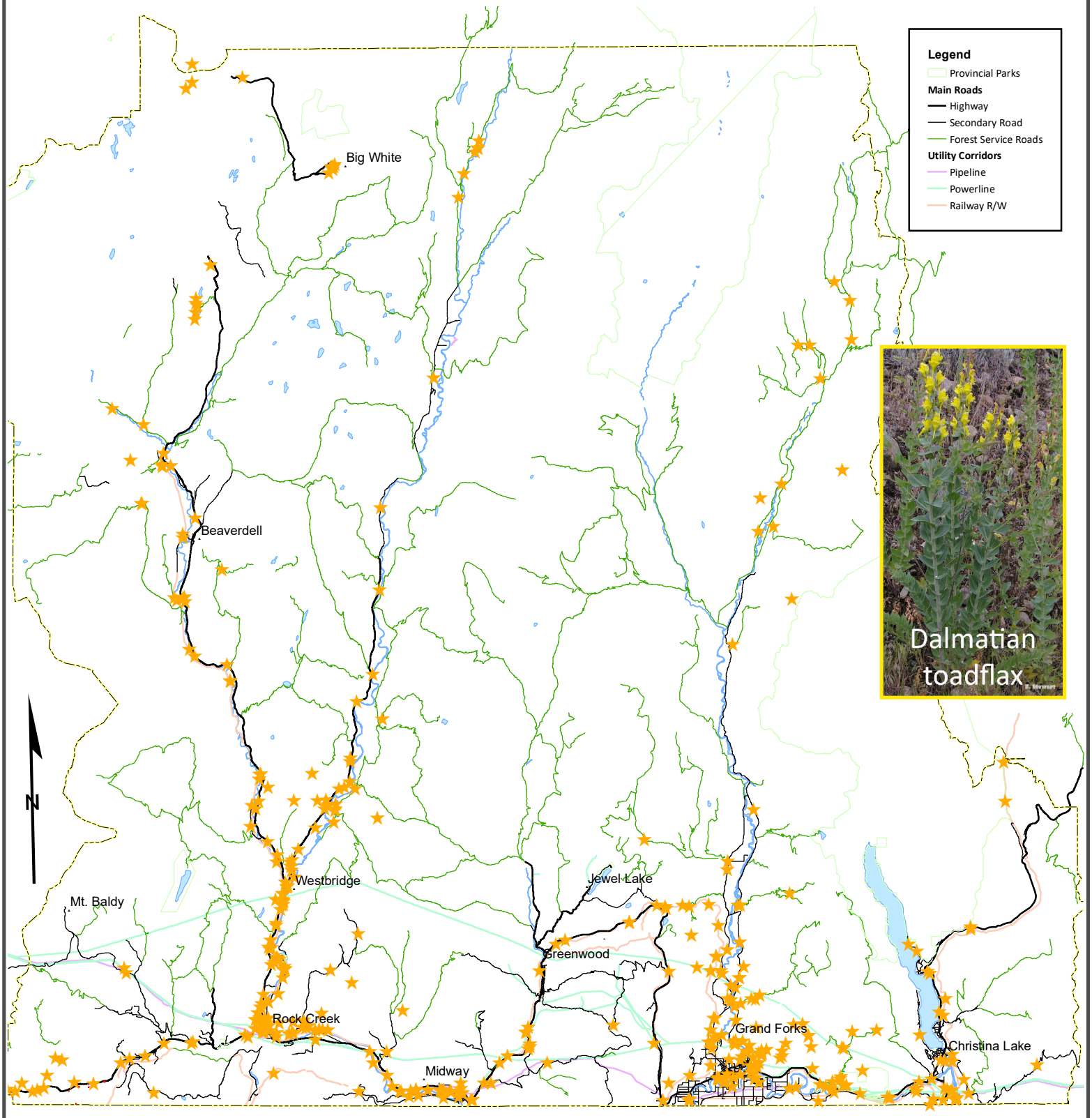


Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake
N
0 5 10 Kilometers
1:450,000
April 2021

Invasive Plants in the Boundary

Category 4 Biocontrol

Legend
★ Dalmatian toadflax



1:450,000

April 2021

Invasive Plants in the Boundary

Category 4 Biocontrol



Legend
- ★ Diffuse knapweed

Legend
- Provincial Parks

Main Roads
- Highway
- Secondary Road
- Forest Service Roads

Utility Corridors
- Pipeline
- Powerline
- Railway R/W

Big White
Beaverdell
Westbridge
Mt. Baldy
Rock Creek
Midway
Greenwood
Jewel Lake
Grand Forks
Christina Lake
N
0 5 10 Kilometers

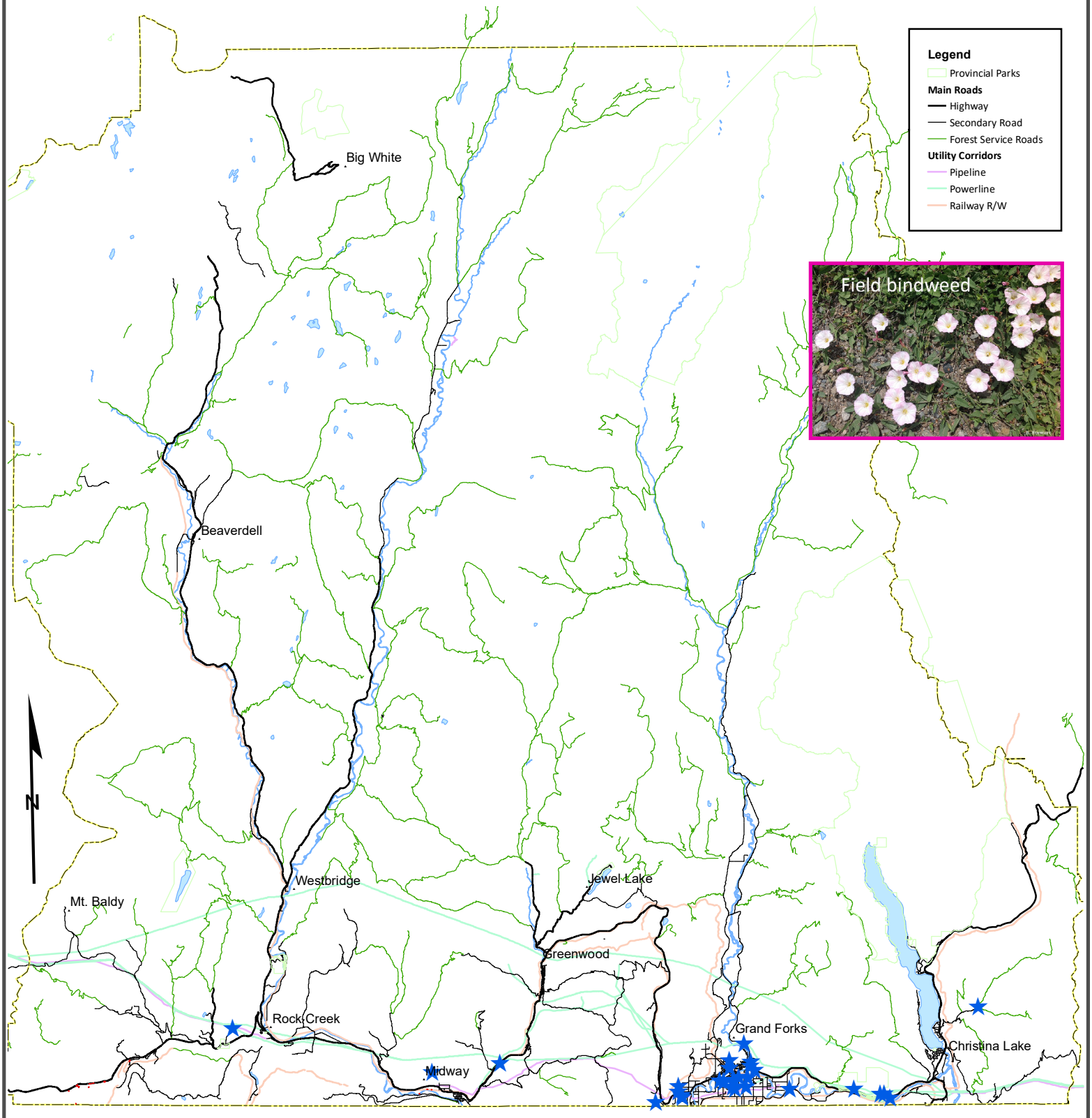
1:450,000

April 2021

Invasive Plants in the Boundary

Category 4 Biocontrol

Legend
★ Field bindweed

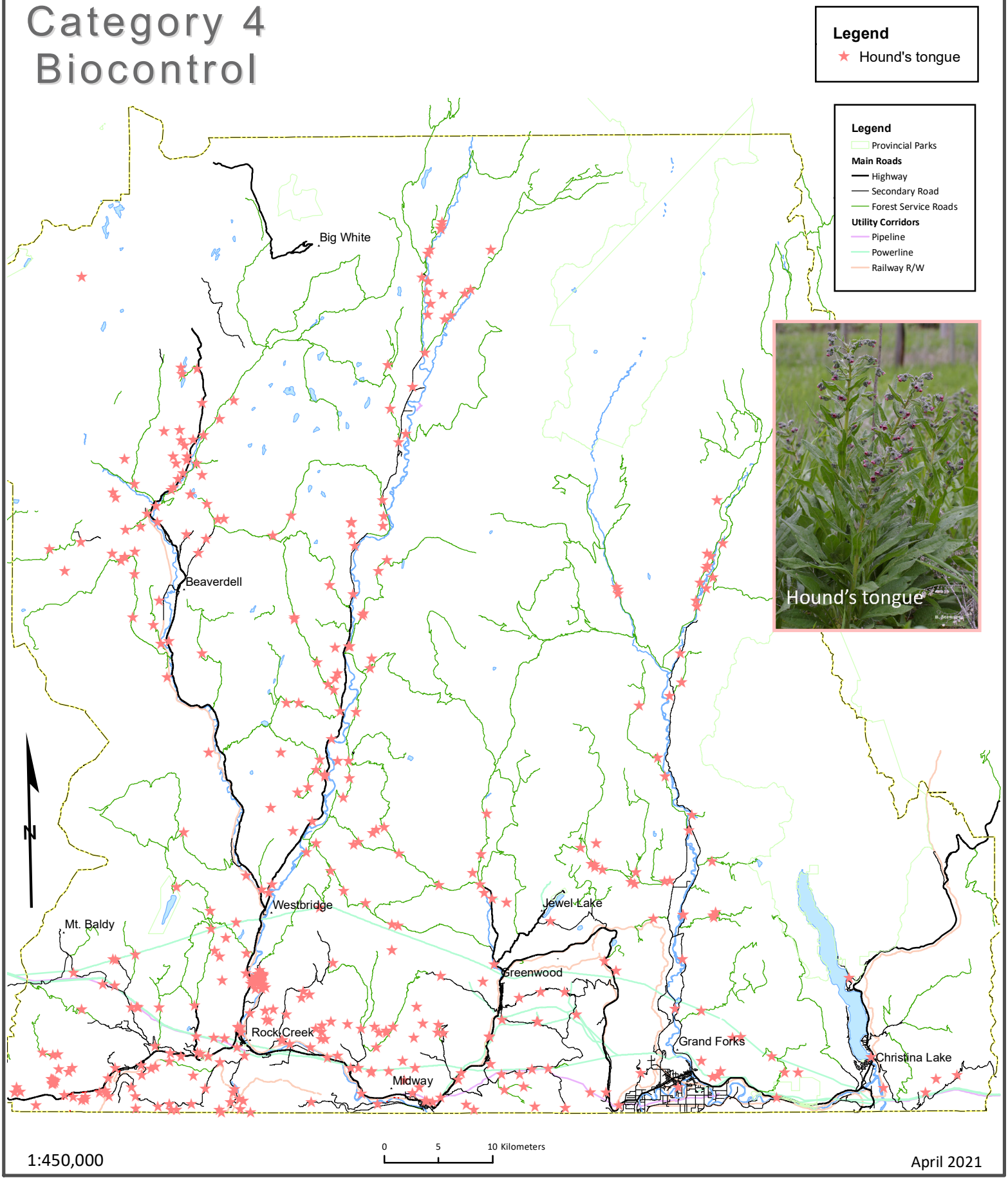


1:450,000

April 2021

Invasive Plants in the Boundary

Category 4 Biocontrol



1:450,000

April 2021

Invasive Plants in the Boundary

Category 4 Biocontrol

Legend
★ St John's wort

Legend
Provincial Parks
Main Roads
Highway
Secondary Road
Forest Service Roads
Utility Corridors
Pipeline
Powerline
Railway R/W



Big White
Beaverdell
Westbridge
Mt. Baldy
Jewel Lake
Greenwood
Rock Creek
Midway
Grand Forks
Christina Lake
N

1:450,000

0 5 10 Kilometers

April 2021