



Development Permit Application

Referral Form – RDCK File DP2609A

Date: August 14, 2026

You are requested to comment on the attached DEVELOPMENT PERMIT for potential effect on your agency's interests. We would appreciate your response WITHIN 30 DAYS (PRIOR TO September 15, 2026). If no response is received within that time, it will be assumed that your agency's interests are unaffected.

LEGAL DESCRIPTION & GENERAL LOCATION:

12541 Lewis Bay Road, Boswell, BC, Electoral Area 'A'

STRATA LOT 22 DISTRICT LOT 5027 KOOTENAY DISTRICT STRATA PLAN NES75 TOGETHER WITH AN INTEREST IN THE COMMON PROPERTY IN PROPORTION TO THE UNIT ENTITLEMENT OF THE STRATA LOT AS SHOWN ON FORM V (PID: 030-857-741)

PRESENT USE AND PURPOSE OF PERMIT REQUESTED:

The subject property is part of a Strata Subdivision in Boswell on the East Shore of Kootenay Lake. Staff were made aware of disturbance within the Riparian Area through the investigation of a complaint for a self-supporting deck and a placement of a tiny home on wheels. The tiny home has been removed from the property and prior to consideration of building permits for a deck and accessory buildings, an Environmentally Sensitive Development Permit (ESDP) application is required to determine the level of disturbance that has occurred and the best way to restore the riparian area.

AREA OF PROPERTY AFFECTED

0.14 ha (0.36 acres)

ALR STATUS

n/a

ZONING

Country Residential (R2)

OCP

Country Residential (RC)

APPLICANT: Shaun Thankachen and Kristin Thankachen

Please provide your response via email.

If your agency's interests are 'Unaffected' no further information is necessary. In all other cases, we would appreciate receiving additional information to substantiate your position and, if necessary, outline any conditions related to your position. Please note any legislation or official government policy which would affect our consideration of this permit.

☒ MINISTRY OF TRANSPORTATION AND TRANSIT

☒ HABITAT BRANCH

☒ FRONTCOUNTER BC

☒ ARCHAEOLOGY BRANCH

☐ AGRICULTURAL LAND COMMISSION

☐ REGIONAL AGROLOGIST

☐ ENERGY & MINES

☐ MUNICIPAL AFFAIRS & HOUSING

☒ INTERIOR HEALTH, HBE TEAM

☐ SCHOOL DISTRICT NO.

☐ WATER SYSTEM OR IRRIGATION DISTRICT

☒ UTILITIES (FORTIS, BC HYDRO, NELSON HYDRO, COLUMBIA POWER)

REGIONAL DISTRICT OF CENTRAL KOOTENAY

DIRECTORS FOR:

☒ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H ☐ I ☐ J ☐ K

ALTERNATIVE DIRECTORS FOR:

☒ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H ☐ I ☐ J ☐ K

☒ APHC AREA 'A'

☒ RDCK FIRE SERVICES

☒ RDCK EMERGENCY SERVICES

☒ RDCK BUILDING SERVICES

☐ RDCK UTILITY SERVICES

☐ RDCK RESOURCE RECOVERY

☐ RDCK REGIONAL PARKS

FIRST NATIONS

☒ KTUNAXA NATION COUNCIL

YAQAN NU?KIY (LOWER KOOTENAY)

?AKINK'UM?ASNUQ?I?IT (TOBACCO PLAINS)

?AKISQNUK (COLUMBIA LAKE)

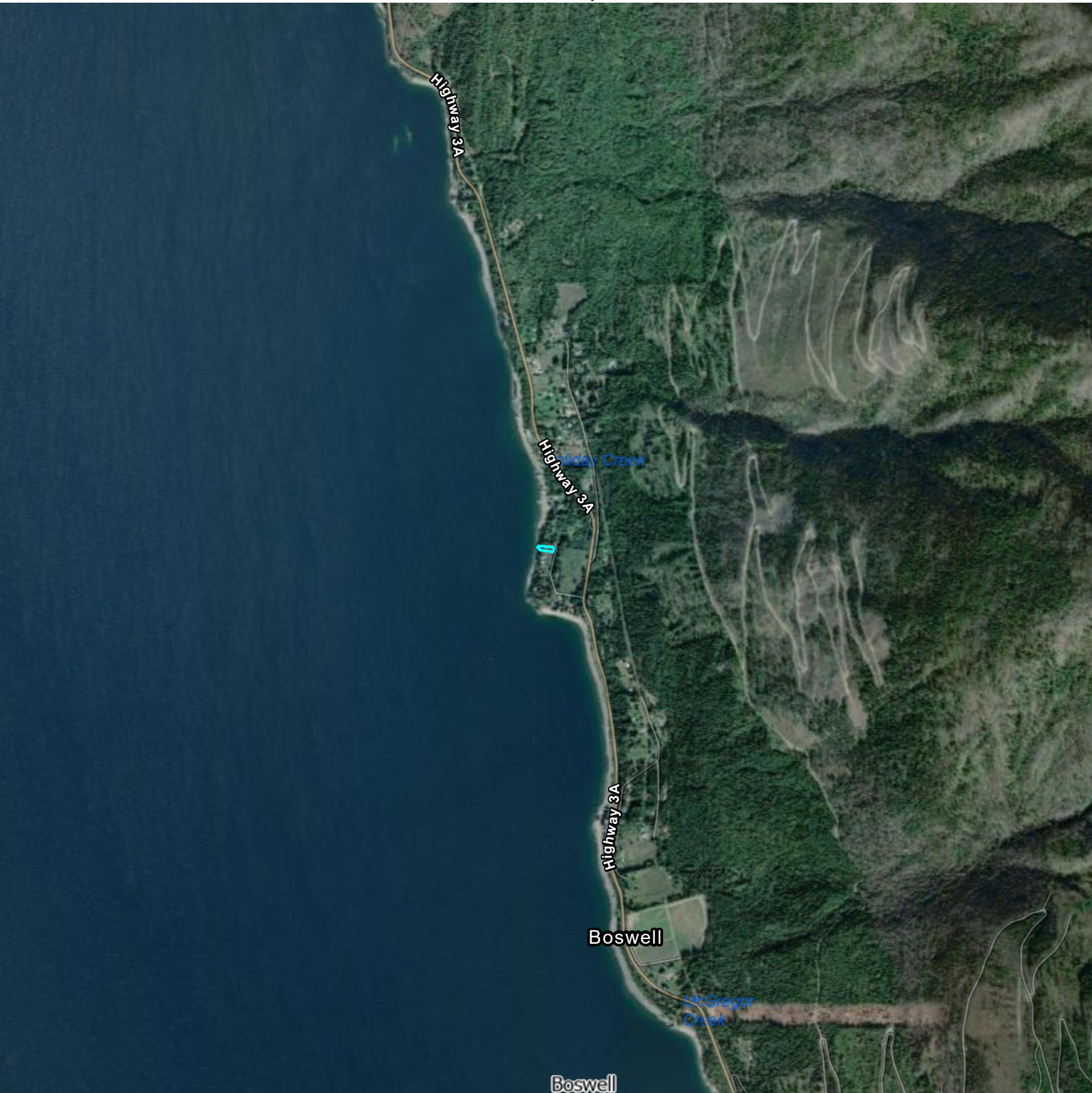
?AQ'AM (ST. MARY'S)

Nelson Office: Box 590, 202 Lakeside Drive, Nelson, BC. V1L 5R4

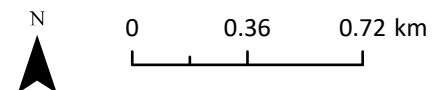
Phone: 250.352.6665 | Toll Free: 1.800.268.7325 (BC) | Email: info@rdck.ca | Fax: 250.352.9300

The personal information on this form is being collected pursuant to *Regional District of Central Kootenay Planning Procedures and Fees Bylaw No. 2457, 2015* for the purpose of determining whether the application will affect the interests of other agencies or adjacent property owners. The collection, use and disclosure of personal information are subject to the provisions of FIPPA. Any submissions made are considered a public record for the purposes of this application. Only personal contact information will be removed. If you have any questions about the collection of your personal information, contact the Regional District Privacy Officer at 250.352.6665 (toll free 1.800.268.7325), info@rdck.bc.ca, or RDCK Privacy Officer, Box 590, 202 Lakeside Drive, Nelson, BC V1L 5R4.

RDCK Map



 Electoral Areas

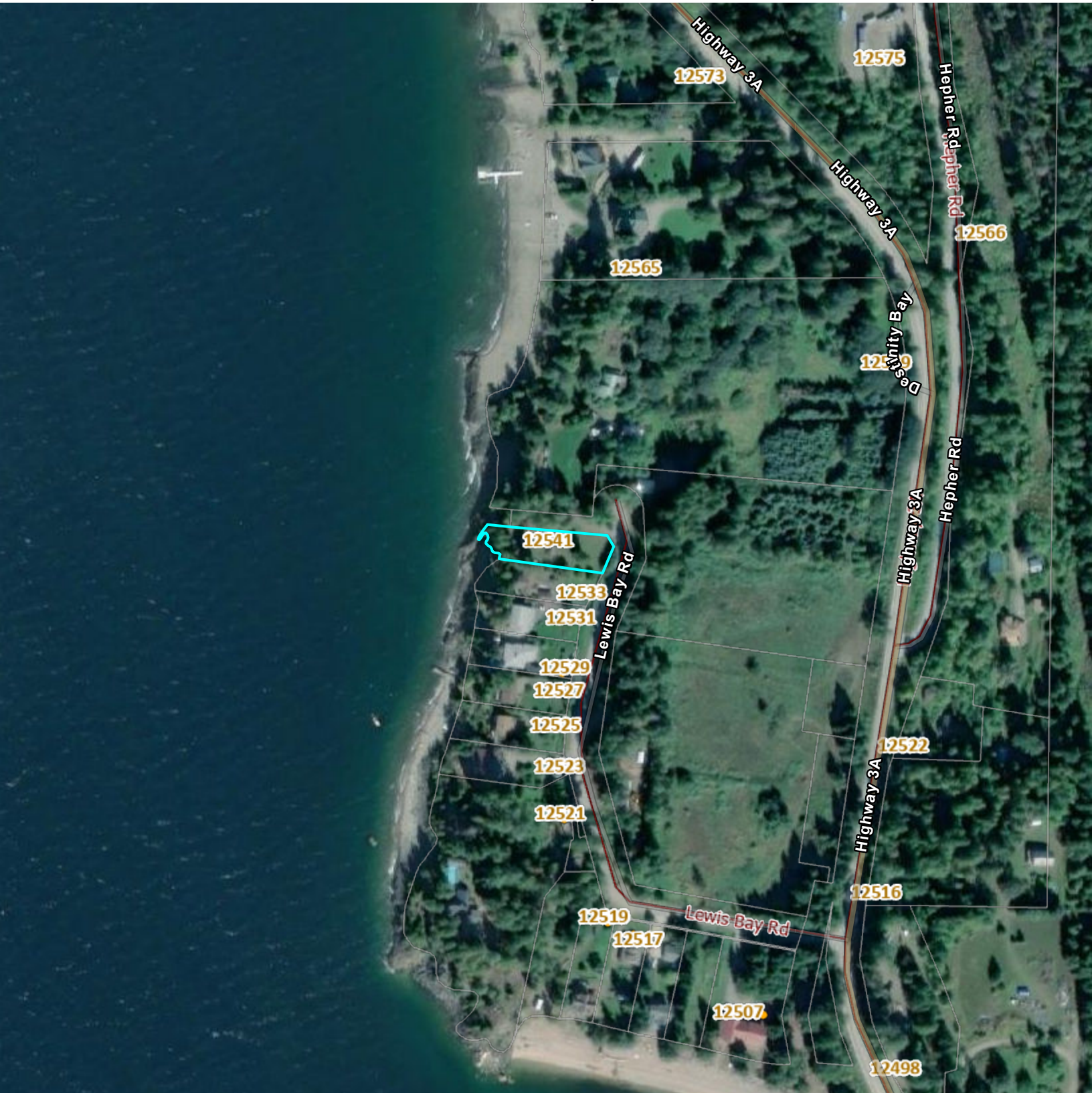


Scale: 1:36,112
August 14, 2026 1:55 PM
Size: 8.5 x 11"

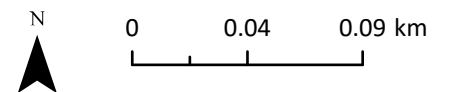


The map data are approximate for reference only.
The Regional District of Central Kootenay is not
liable for any errors or omissions on this map nor
any loss or damage resulting from its use.

RDCK Map



- Address Points
- Cadastre Property Lines
- RDCK Streets
- Electoral Areas



Scale: 1:4,514
August 14, 2026 1:56 PM
Size: 8.5 x 11"

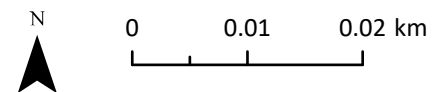


The map data are approximate for reference only.
The Regional District of Central Kootenay is not
liable for any errors or omissions on this map nor
any loss or damage resulting from its use.

RDCK Map



- Address Points
- Cadastre Property Lines
- RDCK Streets
- - - Electoral Areas

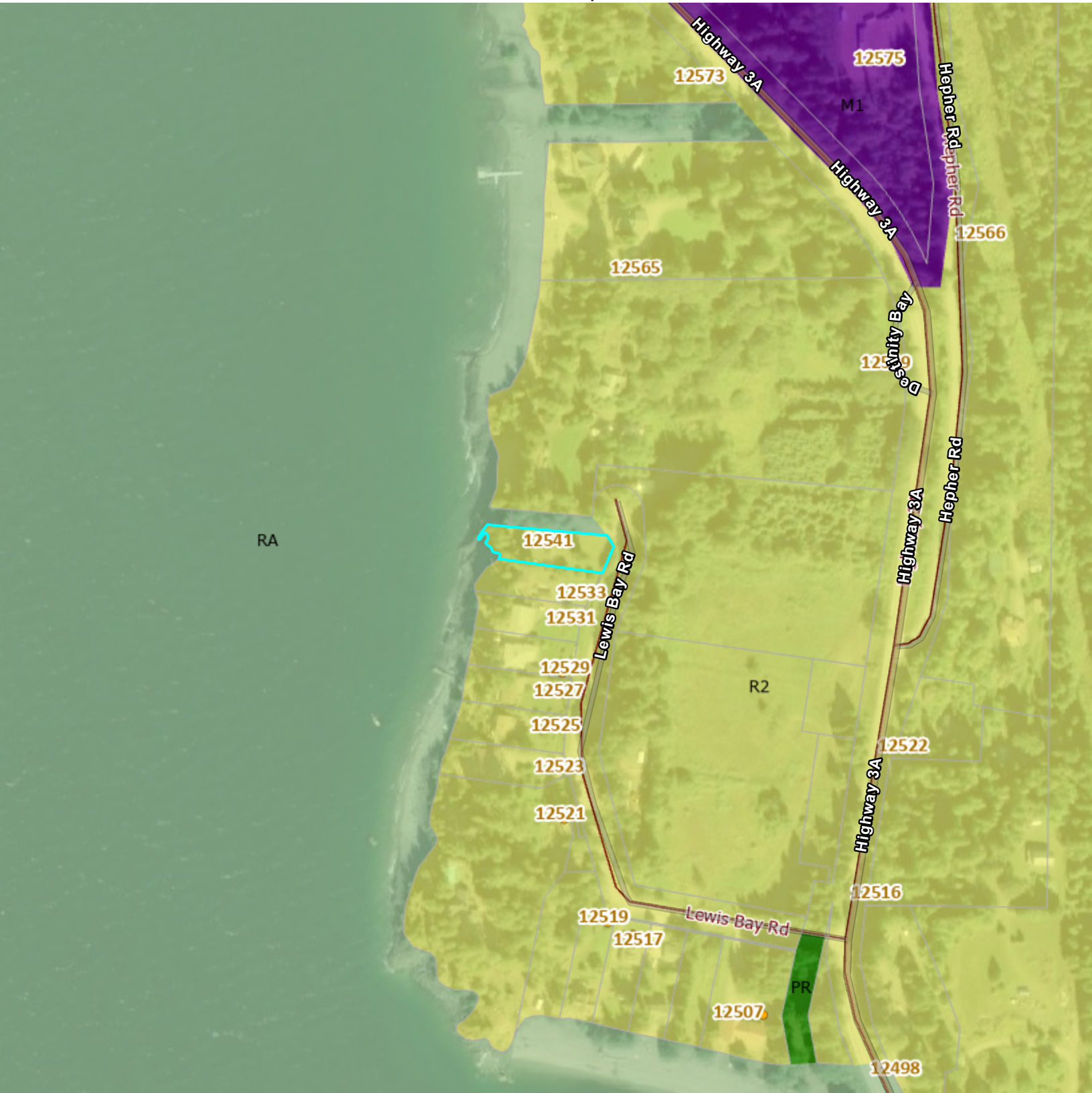


Scale: 1:1,128
August 14, 2026 1:56 PM
Size: 8.5 x 11"

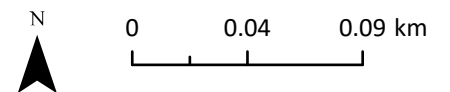


The map data are approximate for reference only.
The Regional District of Central Kootenay is not
liable for any errors or omissions on this map nor
any loss or damage resulting from its use.

RDCK Map



- | | |
|--|--|
|  Address Points |  Parks and Recreation |
|  Cadastre Property Lines |  Residential 2 |
|  RDCK Streets |  Resource Area |
| Zoning |  Electoral Areas |
| Class | |
|  Industrial | |



Scale: 1:4,514
August 14, 2026 1:56 PM
Size: 8.5 x 11"

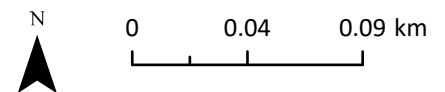


The map data are approximate for reference only.
The Regional District of Central Kootenay is not liable for any errors or omissions on this map nor any loss or damage resulting from its use.

RDCK Map



- | | |
|-------------------------|----------------------|
| Address Points | Industrial |
| Cadastre Property Lines | Parks and Recreation |
| RDCK Streets | Resource Area |
| Official Community Plan | Electoral Areas |
| Country Residential | |



Scale: 1:4,514
August 14, 2026 1:57 PM
Size: 8.5 x 11"



The map data are approximate for reference only.
The Regional District of Central Kootenay is not
liable for any errors or omissions on this map nor
any loss or damage resulting from its use.

This site plan shows the location of structures that were within the ESDP Area.



Date: May 13, 2026

Prepared by: AW and FL

Scale: As shown

LEGEND

--- 30 m Riparian Assessment Area

15 m Environmentally Sensitive Development Permit Area (ESDPA) and 15 m SPE

--- Litterfall/Insect Drop and LWD ZOS (15 m)

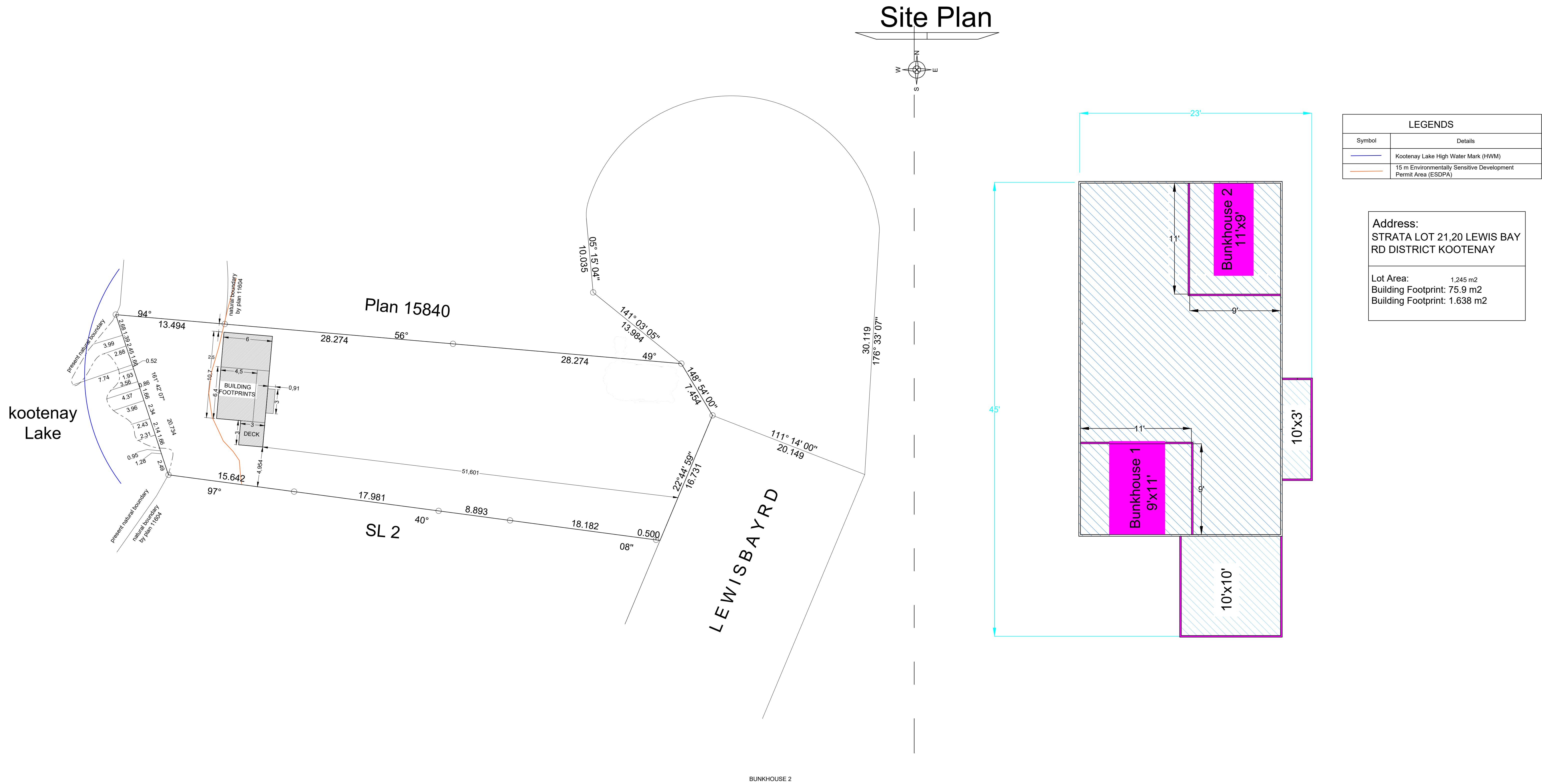
--- Shade ZOS (0 - 5 m)

--- Kootenay Lake High Water Mark (HWM)

Existing Structures

Subject Property

This site plan shows the proposed development. Note that no structures are to remain within the ESDP Area.





12541 Lewis Bay Road, Boswell BC
Riparian Assessment V1.0



Prepared for:
Kristin and Shaun Thankachen
88 Riverside Way SE
Calgary, AB T2C 3V8

June 10, 2026

Prepared by:
Masse Environmental Consultants
812 Vernon Street
Nelson, BC, V1L 4G4

Project Number 2026-1280

Riparian Assessment Report Revision History

Name	Date	Version
Amber Warkentin, ATAg	June 10, 2026	1.0

Disclosure Statements

This report has been prepared by Amber Warkentin, ATAg. and Fiona Lau, ASCT.

1. The authors are Qualified Environmental Professionals as defined under Section 21(2) of the Riparian Areas Protection Regulation,
2. The content of, and all associated statements in, this report are consistent with:
 - a. The Riparian Areas Protection Regulation methodology.
 - b. Provincial and federally recognised best management practises.
 - c. Relevant Species at Risk management Plans under the Species at Risk Act.
 - d. The habitat protection provisions of the Fisheries Act.
3. This report has been prepared for the property owner to support a development permit approval.
4. The report has been prepared for Kristin and Shaun Thankachen at their expense. The RDCK may rely upon the information and recommendations in this report for the purposes of a Watercourse Development Permit Area application.

Limitations

This report has been prepared by the authors solely for the clients, Kristin and Shaun Thankachen. The content reflects the authors' professional judgment based on the information available at the time of preparation. Any use, reliance, or decisions made by third parties based on this report are solely at their own risk. The authors assume no liability for any damages, losses, or consequences arising from actions or decisions taken by third parties in reliance on this report. A record copy of this report is maintained at Masse Environmental and is considered the official version, superseding any copies or reproductions of the report.

TABLE OF CONTENTS

Table of Contents	i
List of Tables	ii
List of Figures	ii
List of Appendices	ii
1 Introduction	1
2 Project Overview	2
2.1 Site Description	2
2.1.1 Location.....	2
2.1.2 Existing Development	3
2.1.3 Watercourses and Aquatic Habitat	5
2.1.4 Vegetation.....	6
2.1.4.1 Invasive Species	7
2.1.5 Wildlife	8
2.1.5.1 Species at Risk	9
3 Regulatory Overview	9
3.1 Streamside Protection and Enhancement Area (SPEA)	9
3.2 Kootenay Lake Shoreline Management Guidelines	10
4 Proposed Development	11
5 Impact Assessment	11
6 Measures to Protect the Integrity of the SPEA.....	11
6.1 Danger Trees	11
6.2 Windthrow	12
6.3 Slope Stability.....	12
6.4 Protection of Trees and Vegetation in the SPEA.....	12
6.5 Encroachment	12
6.6 Erosion and Sediment Control	13
6.7 Stormwater Management	13
6.8 Floodplain Concerns.....	13
6.9 Invasive Plant Management.....	13
7 Restoration Plan	14
8 Environmental Monitoring and Post Inspection.....	15

9	Conclusion.....	15
10	References	17

LIST OF TABLES

Table 1. Species at Risk with the potential to occur on the Property.....	9
Table 2. Results of detailed RAPR assessment for Kootenay Lake.	10
Table 3. Aquatic and Archaeological Risk Results.....	10
Table 4. Recommended Riparian Plant Species.....	15

LIST OF FIGURES

Figure 1. Location of Subject Property.....	2
---	---

LIST OF APPENDICES

Appendix 1. Site Plan
Appendix 2. Species at Risk (Kootenay Lake South Arm)
Appendix 3. Revegetation Plan
Appendix 4. Invasive Species Factsheets

1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Kristin and Shaun Thankachen (Owner) to conduct a riparian assessment on their Property at 12541 Lewis Bay Road, Boswell, BC (Strata Lot 22, Plan NES75, District Lot 5027, Kootenay Land District, PID: 030-857-741). The assessment is required in response to a building complaint for construction of a deck without a permit and a Do Not Occupy notice for occupancy of a tiny home without an Occupancy Permit issued by the Regional District of Central Kootenay (RDCK; dated March 30, 2026, and April 8, 2026, respectively). The RDCK has requested the Owner submit an Environmentally Sensitive Development Permit (ESDP) application and to attain a QEP to assess the disturbances and confirm if the deck and tiny home are within 15 of the high-water mark (HWM) of Kootenay Lake.

A site visit was completed on May 4, 2026, by Amber Warkentin (ATAg) and Fiona Lau (AScT) to conduct a riparian assessment on the Property. The assessment evaluates the current condition within 15 m of the HWM of a watercourse (RDCK Area A), calculates a Streamside Protection and Enhancement Area (SPEA) setback following the methodology of the Riparian Area Protection Regulation (RAPR; BC 2019), identifies potential environmental impacts from the development, and provides recommendations to mitigate for the alteration of the riparian area. It is based on the following regulatory framework and best management practices:

- Electoral Area 'A' Comprehensive Land Use Bylaw 2315, 2013
- RDCK Floodplain Management Bylaw No. 2080, 2009
- British Columbia Riparian Areas Protection Regulation
- British Columbia Water Sustainability Act
- British Columbia Wildlife Act
- Federal Migratory Birds Convention Act
- Kootenay Lake Shoreline Management Guidelines.

Disturbances were confirmed within 15 m of Kootenay Lake. Disturbances include vegetation removal and construction of a deck including concrete pilings, placement of a tiny home and a portion of a shed structure.

2 PROJECT OVERVIEW

2.1 Site Description

2.1.1 Location

The subject Property is located at 12541 Lewis Bay Road, Boswell, BC, along the eastern shore of Kootenay Lake. The Property is 0.355 acres in size, has a western aspect and is bordered by public property to the north, Lewis Bay Road to the east, private property to the south and Kootenay Lake to the west (Figure 1).

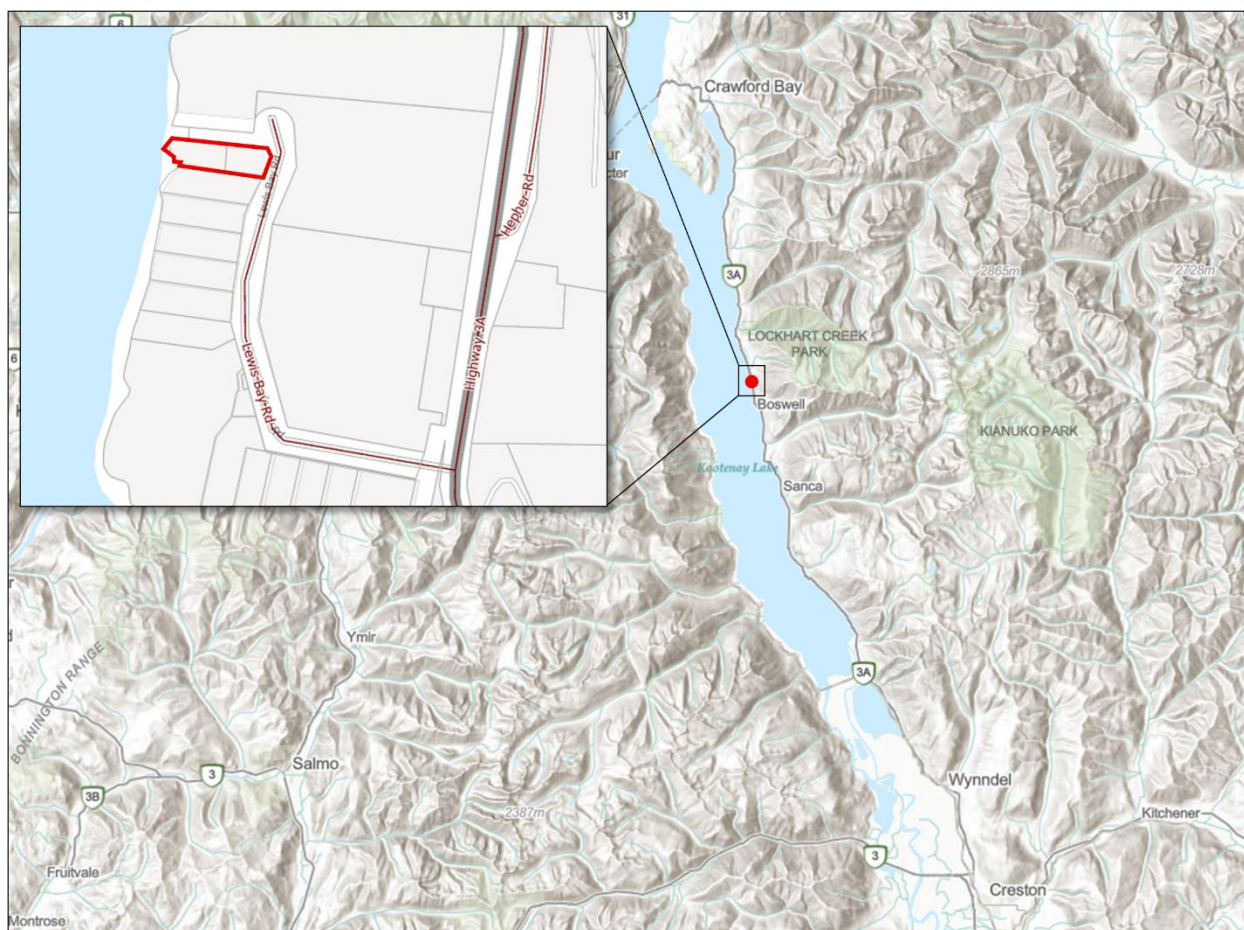


Figure 1. Location of Subject Property.

2.1.2 Existing Development

The Property was purchased by the Owner in May of 2025. There were no structures on the Property at the time of purchase and tree clearing and land leveling was completed prior to the purchase by the previous owner.

Existing development within the 15 m ESDP Area of Kootenay Lake consists of:

- Deck on concrete pilings with two sets of stairs measuring approximately 7 m x 7 m (Photo 1 and Photo 2).
- Tiny home adjacent to the deck measuring approximately 8 m x 2.6 m (Photo 3).
- Shed adjacent to the tiny home (Photo 4).
- Stacked rock wall along Kootenay Lake (Photo 5). Owner confirmed the wall was present when the Property was purchased.

In addition, land development activities within the riparian area of Kootenay Lake involved some vegetation removal, including 3 large Douglas fir trees and potentially shrubs and grasses within the deck, tiny home and shed footprint (Photo 6 and Photo 7). An existing driveway located within the Ministry of Transportation Right of Way (RoW) is used by the Owners to access the lower portion of the Property (Photo 8).

Refer to Appendix 1 for Site Plan showing existing development.



Photo 1. Deck structure within 15 m ESDP area (May 4, 2026).



Photo 2. 15 m ESDP stake adjacent to deck structure (May 4, 2026).



Photo 3. Tiny home within 15 m ESDP area (May 4, 2026).



Photo 4. Shed partially within 15 m ESDP area (May 4, 2026).



Photo 5. Stacked rock wall within 15 m ESDP area (May 4, 2026).



Photo 6. Tree removal within 15 m ESDP area adjacent to deck (May 4, 2026).



Photo 7. View under the deck where vegetation may have been removed (May 4, 2026).



Photo 8. Existing driveway adjacent to Property used for access to the lake (May 4, 2026).

2.1.3 Watercourses and Aquatic Habitat

Kootenay Lake borders the Property along the western boundary; it is a long, narrow, and deep lake with a surface area of approximately 400 km². Kootenay Lake's main inflows are the Kootenay River to the south and the Duncan River to the north. The lake drains through the West Arm into the Kootenay River. Lake levels can vary up to 4 m throughout the year, affecting the extent of the exposed shoreline (Fortis 2024).

Kootenay Lake supports a variety of fish species, including several species of regional interest such as Kokanee (*Oncorhynchus nerka*), Rainbow Trout (*O. mykiss*), Bull Trout (*Salvelinus confluentus*; BC-Blue-Listed; SARA Special Concern), White Sturgeon (*Acipenser transmontanus pop.1*; BC Red-Listed, SARA Endangered), Westslope Cutthroat Trout (*O. clarki lewisi*; BC Blue-Listed; SARA Special Concern), and Burbot (*Lota lota pop.1*; BC-Red-Listed).

The Kootenay Lake foreshore adjacent to the Property consists of a shallow, rocky habitat along the edges and is located within Foreshore Inventory Mapping (FIM) Segment 165. The aquatic habitat index rating for this segment was rated as low (Table 3; Ecoscape 2016) and has potential to support juvenile rearing (Photo 9 to Photo 12).



Photo 9. Shallow, rocky substrate suitable for juvenile rearing and cover (May 4, 2026).



Photo 10. Foreshore of Kootenay Lake west of deck (May 4, 2026).



Photo 11. Kootenay Lake foreshore with HWM stake (May 4, 2026).



Photo 12. Rocky foreshore at north end of Property with pin (May 4, 2026).

2.1.4 Vegetation

The Property is within the Interior Cedar – Hemlock, very dry warm (ICHxw) biogeoclimatic subzone. This subzone typically ranges at the lowest elevations at valley bottom or shores edge and is characterized by very hot, very dry summers, and mild dry winters with low snowfall. This subzone is the driest Interior Cedar – Hemlock subzone that supports a variety of tree species (MacKillop and Ehman 2016).

The Property has been historically cleared and landscaped, leaving limited natural vegetation in the riparian area. The riparian area of Kootenay Lake is characterized by rocky, exposed bedrock; however, does support sporadic trees, shrubs and mosses (Photo 13 to Photo 16). Tree species include Douglas fir (*Pseudotsuga menziesii*), Western redcedar (*Thuja plicata*) and black cottonwood saplings (*Populus trichocarpa*). (Shrubs include soopolallie (*Shepherdia canadensis*), mock orange (*Philadelphus lewisii*), Oregon grape (*Mahonia aquifolium*), rose (*Rosa* spp), thimbleberry (*Rubus parviflorus*), saskatoon (*Amelanchier alnifolia*), oceanspray (*Holodiscus discolor*) and douglas maple (*Acer glabrum* var. *douglasii*). Herbaceous species are limited to pasture sage (*Artemisia frigida*), hookedspur violet (*Viola adunca*), grasses and mosses.



Photo 13. View of riparian vegetation along foreshore of Kootenay Lake (May 4, 2026).



Photo 14. Riparian vegetation facing east from Kootenay Lake (May 4, 2026).



Photo 15. Saskatoon located on bedrock within riparian area (May 4, 2026).



Photo 16. Hookedspur violet and mosses on bedrock shoreline (May 4, 2026).

2.1.4.1 Invasive Species

Invasive species observed within the riparian area include knapweed (*Centaurea* spp), common tansy (*Tanacetum vulgare*), scotch broom (*Cytisus scoparius*), vetch (*Vicia* spp), clover (*Trifolium* spp) and dandelion (*Taraxacum officinale*). Invasive species were mostly confined to disturbed areas with high infestations of tansy and knapweed in the riparian area and scotch broom growing in the steep rocks on the north foreshore boundary (Photo 17 and Photo 18). Appendix 4 contains reference material on tansy and knapweed.

See Section 6.9 for Invasive Species Management.



Photo 17. Tansy and knapweed within riparian area of Kootenay Lake (May 4, 2026).



Photo 18. Scotch broom within riparian area of Kootenay Lake (May 4, 2026).

2.1.5 Wildlife

Riparian ecosystems provide key habitat features, including water, shelter, and food, and often function as migration corridors linking aquatic, riparian, and upland environments. Along this shoreline, limited perching trees are present, however there are some mature coniferous trees in the north adjacent Property offering perching and nesting habitat for raptors (Photo 19). Warm, rocky west facing shoreline areas provide suitable habitat for reptiles, including garter snakes (*Thamnophis spp.*), Northern alligator lizard (*Elgaria coerulea*), and Western skink (*Plestiodon skiltonianus*) (Photo 20). Presence of deer droppings throughout the Property indicates use of the area by ungulates.

No wildlife was observed during the site visit.



Photo 19. Potential perch trees north of Property (May 4, 2026).



Photo 20. Rocky warm, west facing habitat suitable for reptiles (May 4, 2026).

2.1.5.1 Species at Risk

The BC Conservation Data Center (CDC) occurrence data and critical habitat for Federally listed species were queried within iMap BC, using a 1 km buffer around the South Arm of Kootenay Lake. In addition, the Global Biodiversity Information Facility (GBIF 2026) was queried using the same buffer. Eighty-seven species at risk were identified (Appendix 2) as occurring within this buffer. Of these, 8 species have the potential to occur on the property and are listed in Table 1.

Table 1. Species at Risk with the potential to occur on the Property.

Common Name	Scientific Name	BC Conservation Status ¹	Federal Status COSEWIC/ SARA ²
Amphibians and Reptiles			
Northern Rubber Boa	<i>Charina bottae</i>	Yellow	Special Concern
Western Skink	<i>Plestiodon skiltonianus</i>	Blue	Special Concern
Birds			
Barn Swallow	<i>Hirundo rustica</i>	Yellow	Threatened/Special Concern
Common Nighthawk	<i>Chordeiles minor</i>	Blue	Special Concern
Fish			
Bull Trout	<i>Salvelinus confluentus</i>	Blue	Not Listed/Special Concern
White Sturgeon (Upper Kootenay River Population)	<i>Acipenser transmontanus</i> <i>pop. 1</i>	Red	Endangered
Insects and Gastropods			
Variegated Fritillary	<i>Euptoieta claudia</i>	Blue	Not Listed
Yellow-banded Bumble Bee	<i>Bombus terricola</i>	Blue	Special Concern

¹ BC Conservation Status (CDC): Red = extirpated, endangered, or threatened. Blue = special concern. Yellow = secure.

² COSEWIC/SARA: Endangered = Facing imminent extirpation or extinction. Threatened = Likely to become endangered. Special concern = May become a threatened or an endangered. Species listed on Schedule 1, SARA are legally protected.

3 REGULATORY OVERVIEW

3.1 Streamside Protection and Enhancement Area (SPEA)

A detailed assessment of the subject property was conducted to calculate the SPEA setback for Kootenay Lake as per the RAPR. The SPEA for the subject Property was determined based on the large woody debris (LWD) and litter fall and insect drop Zones of Sensitivity (ZOS) which were plotted 15 m inland from the HWM of Kootenay Lake and the shade ZOS plotted 30 m south from the HWM of Kootenay Lake. Therefore, within the Property, the SPEA was determined to be 15 m from the HWM of Kootenay Lake as it is determined based on the ZOS with the greatest width (Table 2). Results for the Zones of Sensitivity (ZOS) and SPEA are presented in Table 2 and Appendix 1.

Table 2. Results of detailed RAPR assessment for Kootenay Lake.

Feature Type	SPVT ¹	Zones of Sensitivity			SPEA ³
		LWD ²	Litter Fall & Insect Drop	Shade	
Kootenay Lake	TR	15 m	15 m	0-5 m	15 m

¹ SPVT: site potential vegetation type (TR-tree)² LWD- large woody debris³ SPEA- streamside protection and enhancement area

3.2 Kootenay Lake Shoreline Management Guidelines

The Kootenay Lake Foreshore Integrated Management Planning (FIMP; Schleppe and McPherson 2022), the Foreshore Inventory Mapping (FIM; KLP 2023) and the Kootenay Lake Shoreline Management Guidelines (KLP 2020) were used to help determine site-specific risks for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline. The Property is located within FIM Segment 165. The aquatic habitat index rating was rated as low for this segment, with moderate juvenile rearing potential (Table 3).

Table 3. Aquatic and Archaeological Risk Results.

Aquatic Habitat Index Rating (AHI)	Environment Sensitivity	Archaeological Risk	Enhanced Engagement Required
Low	Yes	Yellow	Yes

The ecological risk matrix provided in the Kootenay Lake Shoreline Management Guidelines indicates a risk assessment rating of “Very High” associated with the removal of native riparian vegetation.

Kootenay Lake is part of the traditional territory of the Ktunaxa, Sinixt and Syilx (Okanagan) First Nations and archaeological evidence is documented at multiple sites along the shoreline and mountain sides of Kootenay Lake, and most of the east side of Kootenay Lake is considered to have archaeological potential.

The archaeological risk matrix provided in the Kootenay Lake Shoreline Management Guidelines indicates that for the segment with a yellow classification there is a high level of risk associated with native vegetation modification/removal. High risk pertains to localized and/or relatively superficial effects in locations where the physical evidence is likely to be very sparse, highly localized, deeply buried and/or already too highly disturbed to be of further archaeological value. Consulting an archaeologist is recommended in situations where the activity is deemed to be high risk. Following an Archaeological Chance Find Procedures is recommended for moderate risk activities.

The cultural values engagement matrix provided in the Kootenay Lake Shoreline Management Guidelines indicates that enhanced engagement with Ktunaxa is required for land development, including building permit applications and native vegetation removal.

4 PROPOSED DEVELOPMENT

No new development proposed within the 15 m ESDPA.

5 IMPACT ASSESSMENT

The disturbed area within 15 m of Kootenay Lake includes construction of a deck and stairs with concrete footing foundations, a tiny home on wheels and a shed situated on wood beams. The tiny home extended outside of the Property boundary. The estimated footprint of the deck disturbance is approximately 40 m², the tiny home disturbance is approximately 21 m², and the shed disturbance is approximately 4 m² and is shown on the Site Plan in Appendix 1.

The primary ecological impacts associated with the existing development is habitat loss and shade alteration. Both these impacts are considered temporary, as the structures are proposed to be removed and revegetation completed. Refer to Restoration Plan (Section 7).

As of June 9, 2026, the Owner has confirmed that the status of structure removal is the following:

- Tiny home – has been removed from the property.
- Shed – has been removed.
- Deck – removal is in progress.

6 MEASURES TO PROTECT THE INTEGRITY OF THE SPEA

This section provides measures to protect the integrity of the SPEA as described in the RAPR, as well as recommended best management practices to minimize the potential effects of development.

6.1 Danger Trees

No danger trees were observed; however, professional assessment of danger trees is outside the scope of this report and should be conducted by a certified Danger Tree Assessor. Any proposed danger tree removal should be assessed by a certified arborist. Trees felled within the SPEA should be left as coarse woody debris and should be replaced according to the provincial tree replacement criteria. Where possible, danger trees should be topped rather than felled.

6.2 Windthrow

The foreshore of Kootenay Lake is susceptible to strong winds and may be prone to windthrow. Clearing of trees is not proposed within the ESDP area. A formal assessment of windthrow risk is beyond the scope of this report and any such assessment should be conducted by a Registered Professional Forester (RPF).

6.3 Slope Stability

No slope stability hazard indicators were observed during the site visit. Further assessment of geotechnical hazard is beyond the scope of this report, and any such assessment should be led by a P. Geo, or P.Eng.

6.4 Protection of Trees and Vegetation in the SPEA

The following protection measures should be taken to minimize further impacts to existing and potential trees and vegetation within the SPEA:

- Avoid removal of any vegetation within the SPEA.
- Protect existing tree roots along the SPEA boundary.
- Plant native vegetation in areas that have been impacted to improve the resilience of existing and potential vegetation.
- Trees with wildlife attributes (cavities, peeling bark), should be left standing where they do not pose a threat to structures.
- Any future developments on the Property should consider clearly identifying limits of disturbance along the SPEA boundary to prevent impacts to trees and their roots within the SPEA. This should include: no trenching through the root zone, no paving around trees, no changes to ground level around trees, no parking under trees, and no concrete washout or other pollutants around trees (BC 2019).

6.5 Encroachment

Protection measures to minimize effects of encroachment within the SPEA include:

- Avoid any new developments or additional disturbance within the SPEA.
- 15 m SPEA setback has been delineated and staked in the field to support future proposed development on the property.
- Restrict human use to existing trails, and minimize noise, bank disturbance and vegetation trampling (BC 2019).

6.6 Erosion and Sediment Control

No erosion and sediment control measures required at this time. If future construction is planned outside of the SPEA, careful consideration should be given to prevent the discharge of sediment laden water into the SPEA or Kootenay Lake (BC 2019).

6.7 Stormwater Management

The following mitigation measures will help decrease stormwater impacts to the SPEA:

- Design roof rainwater collection systems that direct rainwater into suitable landscape features which can absorb and utilize runoff.
- Do not use the vegetated area within the SPEA to filter sediment laden water.
- Stormwater management infrastructure should not be located in the SPEA and any discharges to streams will require meeting the *Water Sustainability Act* and any other applicable legislation.

6.8 Floodplain Concerns

Assessment of floodplain concerns is beyond the scope of this report; however, no floodplain concerns were observed during the site assessment. Further evaluation by a qualified professional in floodplain management would be required if deemed necessary.

6.9 Invasive Plant Management

Invasive species were observed within the 15 m ESDP area. Land use activities can potentially increase prevalence of these invasive plant species which can out-compete native riparian vegetation, causing damage to habitat and ecosystem function. The following mitigation measures are recommended to reduce impacts of plant species.

- Monitor existing invasive plants to ensure they do not spread or increase in distribution.
- Hand pull invasive plants noted in Section 2.1.4.1.
- Any equipment used for construction activities should be thoroughly washed and inspected before entering the site to prevent the import of new invasive plant seeds and root fragments.
- All exposed soils should be re-vegetated immediately following restoration activities.

Central Kootenay Invasive Species Society (CKISS) manages invasive species regionally using a prioritized approach. The management strategy for a specific species is based on several factors including the phase of invasion and the potential impacts of the species (CKISS 2023). The subject Property is located within the Creston Invasive Plant Management Area, and the priority species list can be found at <https://ckiss.ca/invasive-plant-priority-lists/>.

7 RESTORATION PLAN

Mitigation for impacts of the development within the Kootenay Lake SPEA is based on the hierarchy of mitigation options outlined in RDCK 2024 to achieve a no net loss of habitat. This is achieved by applying the following mitigation options: 1. Avoidance of environmental impacts; 2. Minimizing unavoidable impacts; 3. On-site restoration; and 4. Offsetting impacts that cannot be minimized.

In the case of this property, unauthorized works have already occurred, resulting in approximately 65 m² of habitat disturbance. Avoidance and minimizing are therefore not possible; however, mitigation to help reverse the impacts are proposed. This includes the removal of the deck, tiny home structure and shed from the SPEA, removing invasive weeds and revegetating the disturbed areas. The total revegetation area is estimated to be ~50 m². As this area is rocky in sections, planting locations should be selected carefully and based on available soils. Refer to Appendix 3 for Revegetation Plan.

Revegetation will include:

- De-compact soil creating rough and loose conditions by hand in areas identified for planting.
- Planting a mixture of 20 native plants with a minimum of 6 trees. Refer to Table 4 for recommended plant species list. Recommended pot size is 1 gallon for trees and shrubs and 4" for herbaceous species.
- Plants to be planted in clusters of 3 to 5 plants. Trees to be planted with a minimum 3 m spacing and shrubs will be planted with a minimum 1 m spacing.
- Composition and plant locations within the revegetation area are at the discretion of the owner.
- Bark mulch placement (3-4" in depth) around each of the planted stock will help the soil retain moisture and reduce weeds and watering requirements.
- Planting should not occur during periods of hot dry weather unless they are irrigated daily. Preferred planting periods are in the spring or fall.
- Additional soil amendments, including topsoil, mycorrhizae, and shrub and tree transplant fertilizer are recommended during planting.
- Ensure the objective of the restoration is to naturalize the riparian area and not create a landscaped garden.
- Regularly irrigate new plantings during the plant establishment period for a minimum of 3 years.

Table 4. Recommended Riparian Plant Species.

Common Name	Latin Name
Ponderosa pine	<i>Pinus ponderosa</i>
Douglas fir	<i>Pseudotsuga menziesii</i>
Red osier dogwood*	<i>Cornus sericea</i>
Sandbar willow*	<i>Salix exigua</i>
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>
Scoulers willow	<i>Salix Scouleriana</i>
Nootka rose*	<i>Rosa nootkana</i>
Prickly rose*	<i>Rosa acicularis</i>
Saskatoon	<i>Amelanchier alnifolia</i>
Oregon grape	<i>Mahonia aquifolium</i>
Common snowberry	<i>Symphoricarpos albus</i>
Douglas maple	<i>Acer glabrum</i>
Ocean spray	<i>Holodiscus discolor</i>
Shrubby penstemon**	<i>Penstemon fruticosus</i>
Golden aster**	<i>Heterotheca villosa</i>
Common yarrow**	<i>Achillea millefolium</i>

*Flood tolerant and suitable for planting along HWM

**Suitable for dry rocky slopes

8 ENVIRONMENTAL MONITORING AND POST INSPECTION

The anticipated effort for environmental monitoring and professional guidance on this project includes the following:

- QEP will conduct a post inspection once structure removal and planting are complete to assess compliance and completion of the project.
- QEP will prepare an environmental summary report and submit to the RDCK once restoration is complete.

9 CONCLUSION

The riparian area assessment conducted within the 15 m ESDP Area in accordance with the *Riparian Areas Protection Regulation* determined that the appropriate setback for the subject Property, the SPEA, is 15 m measured from the HWM of Kootenay Lake. The removal of the structures and revegetation of these areas within the SPEA will facilitate habitat recovery and help compensate for the temporary impacts that have occurred. In addition, measures to protect the integrity of the SPEA are provided to ensure SPEA protection from future development.

We trust the information provided in this report meets your current requirements. If you have any questions or require further information do not hesitate to contact the undersigned.

Sincerely,



Amber Warkentin, ATAg
Masse Environmental Consultants Ltd.

Reviewed by,



Fiona Lau, ASCT
Masse Environmental Consultants Ltd

10 REFERENCES

- [BC Habitat Wizard] Province of British Columbia. 2024. Habitat Wizard [web application]. Victoria, B. C. Canada. Accessed May 2026. Available at: <https://www2.gov.bc.ca/gov/content/environment/plants-animals/ecosystems/ecosystems/habitatwizard>
- [BC iMap] Province of British Columbia. 2025. iMap BC [web application]. Victoria, B. C. Canada. Accessed May 2026. Available at: <https://www2.gov.bc.ca/gov/content/data/geographic-data-services/web-based-mapping/imapbc>
- [BC] Province of British Columbia. 2019. Riparian Areas Protection Regulation. B.C. Reg. 178/2019, last amended February 4, 2021, by B.C. Reg 11/2021. Victoria, British Columbia, Canada.
- [BC] Province of British Columbia. 2014. Water Sustainability Act. SBC 2014, current to August 24, 2022. Victoria, British Columbia, Canada.
- [BC] Province of British Columbia. 1996. Wildlife Act. SBC 1996, current to January 30, 2024. Victoria, British Columbia, Canada.
- [BCCDC] Province of British Columbia. 2026. BC Conservation Data Centre, Species and Ecosystems Explorer. B.C. Ministry of Environment, Victoria B.C. Available at: <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre>
- [CKISS] Central Kootenay Invasive Species Society. 2023. CKISS Invasive Plant Priority List 2023. Available online at: <https://ckiss.ca/species/invasive-plant-priority-lists/>
- Fortis BC. 2024. Kootenay Lake Levels. Available at: <https://www.fortisbc.com/in-your-community/kootenay-lake-level-monitoring/kootenay-lake-levels>
- [GBIF] Global Biodiversity Information Facility. 2026. Available at: <https://www.gbif.org/> (Accessed April 2026)

Gov of Canada. 1994. Federal Migratory Birds Convention Act. (S.C. 1994, c. 22). Available at: <https://laws-lois.justice.gc.ca/eng/acts/m-7.01/>

iNaturalist. 2026. iNaturalist.org. Available online at: <https://www.inaturalist.org/observations>

[KLP] Kootenay Lake Partnership. Ktunaxa Nation Council, Regional District of Central Kootenay, Ministry of Forests, Lands, and Natural Resource Operations, Ecoscape Environmental Consultants Ltd., Tipi Mountain Eco-Cultural Services Ltd. The Firelight Group Ltd., Wayne Choquette. 2020. Shoreline Guidance Document – Kootenay Lake. Prepared for Kootenay Lake Partnership.

[KLP]. Kootenay Lake Partnership. 2023. Kootenay Lake Shoreline Inventory Mapping Interactive Map. Available online at: <http://kootenaylakepartnership.com/>

Mackillop, D. and Ehman, A. 2016. A Field Guide to Site Classification and Identification for Southeast British Columbia: the South-Central Columbia Mountains. Province of B.C., Victoria, B.C. Land Management Handbook 70.

[RDCK] Regional District of Central Kootenay. 2019. RDCK Floodplain Management Bylaw No. 2080, 2009. Updated December 12, 2019.

[RDCK] Regional District of Central Kootenay. 2024. DRAFT Standardized Terms of Reference for Riparian Assessment Reports.

Schleppe, J.¹, and S. McPherson². 2022. Kootenay Lake Foreshore Integrated Management Planning. Prepared for Living Lakes Canada. Prepared by: Ecoscape Environmental Consultants Ltd.¹, and Lotic Environmental Ltd.

APPENDIX 1. SITE PLAN

Site Plan
12541 Lewis Bay Road

Kootenay Lake



Tiny Home
Shed
Deck
Stairs
Stairs

0 25 50 m

Date: May 13, 2026
Prepared by: AW and FL
Scale: As shown

LEGEND

- 30 m Riparian Assessment Area
- 15 m Environmentally Sensitive Development Permit Area (ESDPA) and 15 m SPEA
- Litterfall/Insect Drop and LWD ZOS (15 m)
- Shade ZOS (0 - 5 m)
- Kootenay Lake High Water Mark (HWM)
- Existing Structures
- Subject Property

APPENDIX 2. SPECIES AT RISK (KOOTENAY LAKE SOUTH ARM)

Species at Risk confirmed within 1 km radius of Kootenay Lake (South Arm)

Common Name	Scientific Name	BC Conservation Status ¹	Federal Status SARA ²	Federal Status COSEWIC ²
Amphibians and Reptiles				
Coeur d'Alene Salamander	Plethodon idahoensis	Blue	Special Concern	Special Concern
Northern Leopard Frog	Lithobates pipiens	Red	Endangered	Endangered
Painted Turtle - Intermountain - Rocky Mountain Po	Chrysemys picta pop. 2	Blue	Special Concern	Special Concern
Rubber Boa	Charina bottae	Yellow	Special Concern	Special Concern
Western Skink	Plestiodon skiltonianus	Blue	Special Concern	Special Concern
Western Toad	Anaxyrus boreas	Yellow	Special Concern	Special Concern
Birds				
American Avocet	Recurvirostra americana	Blue	Not Listed	Not Listed
American Bittern	Botaurus lentiginosus	Blue	Not Listed	Not Listed
American Golden-Plover	Pluvialis dominica	Blue	Not Listed	Not Listed
American White Pelican	Pelecanus erythrorhynchos	Red	Not at Risk	Not Listed
Baird's Sandpiper	Calidris bairdii	Red	Not Listed	Not Listed
Band-tailed Pigeon	Patagioenas fasciata	Blue	Special Concern	Special Concern
Bank Swallow	Riparia riparia	Yellow	Threatened	Threatened
Barn Swallow	Hirundo rustica	Yellow	Special Concern	Threatened
Black Swift	Cypseloides niger	Blue	Endangered	Endangered
Black Tern	Chlidonias niger	Blue	Not Listed	Not at Risk
Black-bellied Plover	Pluvialis squatarola	Yellow	Not Listed	Not Listed
Black-necked Stilt	Himantopus mexicanus	Red	Not Listed	Not Listed
Bobolink	Dolichonyx oryzivorus	Red	Special Concern	Threatened
Brant	Branta bernicla	Blue	Not Listed	Not Listed
California Gull	Larus californicus	Red	Not Listed	Not Listed
Caspian Tern	Hydroprogne caspia	Blue	Not at Risk	Not Listed
Clark's Grebe	Aechmophorus clarkii	Red	Not Listed	Not Listed
Common Nighthawk	Chordeiles minor	Blue	Special Concern	Special Concern
Common Tern	Sterna hirundo	Blue	not at risk	Not Listed
Eared Grebe	Podiceps nigricollis	Blue	Not Listed	Not Listed
Evening Grosbeak	Hesperiphona vespertina	Yellow	Special Concern	Special Concern
Forster's Tern	Sterna forsteri	Red	DD	Not Listed
Flammulated Owl	Psiloscops flammeolus	Blue	Special Concern	Special Concern
Harris's Sparrow	Zonotrichia querula	Not ranked	Special Concern	Special Concern
Horned Grebe	Podiceps auritus	Yellow	Not Listed	Special Concern
Horned Lark	Eremophila alpestris	Blue	Not Listed	Not Listed
Hudsonian Godwit	Limosa haemastica	Red	Not Listed	Threatened
Killdeer	Charadrius vociferus	Blue	Not listed	Not listed
Lark Sparrow	Chondestes grammacus	Blue	Not Listed	Not Listed

Species at Risk confirmed within 1 km radius of Kootenay Lake (South Arm)

Common Name	Scientific Name	BC Conservation Status ¹	Federal Status SARA ²	Federal Status COSEWIC ²
Lesser Yellowlegs	<i>Tringa flavipes</i>	Blue	Not Listed	Threatened
Lewis's Woodpecker	<i>Melanerpes lewis</i>	Blue	Threatened	Threatened
Long-billed Curlew	<i>Numenius americanus</i>	Yellow	Threatened	Special Concern
Long-tailed Duck	<i>Clangula hyemalis</i>	Blue	Not listed	Not listed
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Yellow	Special Concern	Special Concern
Parasitic Jaeger	<i>Stercorarius parasiticus</i>	Red	Not Listed	Not Listed
Prothonotary Warbler	<i>Protonotaria citrea</i>	Accidental	Endangered	Endangered
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Blue	Special Concern	Special Concern
Rough-legged Hawk	<i>Buteo lagopus</i>	Blue	Not at Risk	Not Listed
Rusty Blackbird	<i>Euphagus carolinus</i>	Blue	Special Concern	Special Concern
Sage Thrasher	<i>Oreoscoptes montanus</i>	Red	Endangered	Endangered
Short-billed Dowitcher	<i>Limnodromus griseus</i>	Red	Not Listed	Threatened
Short-eared Owl	<i>Asio flammeus</i>	Blue	Threatened	Special Concern
Stilt Sandpiper	<i>Calidris himantopus</i>	Blue	Not listed	Not listed
Surf Scoter	<i>Melanitta perspicillata</i>	Blue	Not Listed	Not Listed
Tundra Swan	<i>Cygnus columbianus</i>	Blue	Not Listed	Not Listed
Western Grebe	<i>Aechmophorus occidentalis</i>	Red	Special Concern	Special Concern
White-throated Swift	<i>Aeronautes saxatalis</i>	Blue	Not Listed	Not Listed
Yellow-billed Loon	<i>Gavia adamsii</i>	Blue	Not listed	Not at risk
Yellow-breasted Chat	<i>Icteria virens</i>	Red	Endangered	Endangered
Mammals				
Little Brown Myotis	<i>Myotis lucifugus</i>	Blue	Endangered	Endangered
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	Blue	Not Listed	Not Listed
Yuma Myotis	<i>Myotis yumanensis</i>	Blue	Not Listed	Not Listed
Fish				
Bull Trout	<i>Salvelinus confluentus</i>	Blue	Not Listed	Special Concern
White Sturgeon (Upper Kootenay River Population)	<i>Acipenser transmontanus</i> pop. 1	Red	Endangered	Endangered
Plants and Fungi				
American sweet-flag	<i>Acorus americanus</i>	Blue	Not Listed	Not Listed
Armillaria solidipes	<i>Armillaria solidipes</i>	Blue	Not Listed	Not Listed
beardless wildrye	<i>Elymus curvatus</i>	Blue	Not Listed	Not Listed
Bjerkandera adusta	<i>Bjerkandera adusta</i>	Blue	Not Listed	Not Listed
Cantharellus subalbidus	<i>Cantharellus subalbidus</i>	Blue	Not Listed	Not Listed
Geopyxis carbonaria	<i>Geopyxis carbonaria</i>	Blue	Not Listed	Not Listed
Neournula pouchetii	<i>Neournula pouchetii</i>	Blue	Not Listed	Not Listed
Pink Water Speedwell	<i>Veronica catenata</i>	Blue	Not Listed	Not Listed
Piper's Anemone	<i>Anemone piperi</i>	Red	Not Listed	Not Listed

Species at Risk confirmed within 1 km radius of Kootenay Lake (South Arm)

Common Name	Scientific Name	BC Conservation Status ¹	Federal Status SARA ²	Federal Status COSEWIC ²
Purple Meadowrue	<i>Thalictrum dasycarpum</i>	Blue	Not Listed	Not Listed
Whitebark Pine	<i>Pinus albicaulis</i>	Blue	Endangered	Endangered
Woolly Blue Violet	<i>Viola sororia</i>	Blue	Not Listed	Not Listed
Insects and Gastropods				
Banded Tigersnail	<i>Anguispira kochi</i>	Blue	Not at Risk	Not Listed
Coeur d'Alene Oregonian	<i>Cryptomastix mullani</i>	Blue	Not Listed	Not Listed
Ephestiodes erythrella	<i>Ephestiodes erythrella</i>	Blue	Not Listed	Not Listed
Fernald's Cuckoo Bumblebee	<i>Bombus flavidus</i>	Blue	Not Listed	Not Listed
Ground Beetle	<i>Anisodactylus sanctaecrucis</i>	Blue	Not Listed	Not Listed
Ground Beetle	<i>Chlaenius lithophilus</i>	Blue	Not Listed	Not Listed
Nine-spotted Lady Beetle	<i>Coccinella novemnotata</i>	Red	Endangered	Endangered
Oregon Forestsnail	<i>Allogona townsendiana</i>	Red	Endangered	Endangered
Ponderosa Pineconeworm Moth	<i>Dioryctria auranticella</i>	Blue	Not Listed	Not Listed
Pyrausta fodinalis	<i>Pyrausta fodinalis</i>	Blue	Not Listed	Not Listed
Threeridge Valvata	<i>Valvata tricarinata</i>	Red	Not Listed	Not Listed
Twelve-spotted Skimmer	<i>Libellula pulchella</i>	Blue	Not Listed	Not Listed
Western Bumblebee	<i>Bombus occidentalis</i>	Yellow	Threatened	Threatened
Yellow-banded Bumblebee	<i>Bombus terricola</i>	Blue	Special Concern	Special Concern
Ecosystems at Risk				
Pacific Willow / Red Osier Dogwood/ Horsetails	<i>Salix lasiandra</i> var. <i>lasinadra</i> / <i>Cornus sericea</i> / <i>Equisetum</i> spp.	Blue	Not Listed	Not Listed

Conservation Status Description

¹ BC Conservation Status (CDC): Red = extirpated, endangered, or threatened. Blue = special concern. Yellow = secure.

² COSEWIC/SARA: Endangered = Facing imminent extirpation or extinction. Threatened = Likely to become endangered. Special concern = May become a threatened or an endangered. Species listed on Schedule 1, SARA are legally protected.

References

[CDC] BC Conservation Data Centre. 2026. Species and Ecosystems Explorer. Available at: <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre>

[GBIF] Global Biodiversity Information Facility. 2026. Available at: <https://www.gbif.org/> (Accessed April 2026)

iMap. 2026. Available at: <https://www2.gov.bc.ca/gov/content/data/geographic-data-services/web-based-mapping/imapbc> (accessed April 2026)

APPENDIX 3. REVEGETATION PLAN

Revegetation Plan
12541 Lewis Bay Road



Kootenay Lake



Date: June 4, 2026

Prepared by: AW and FL

LEGEND

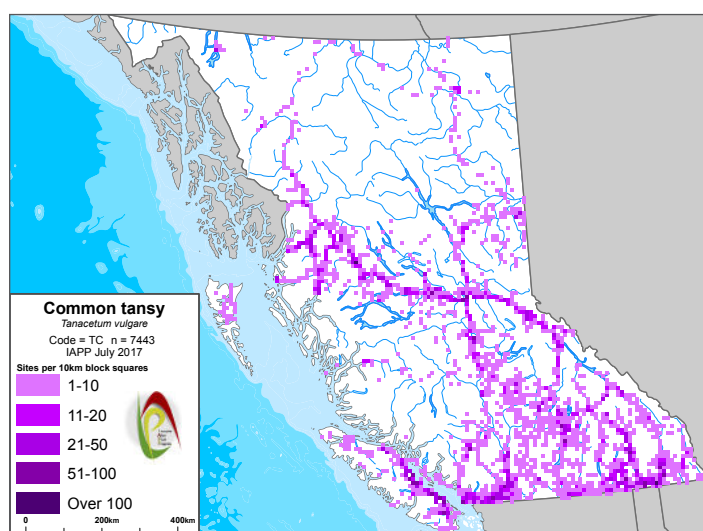
-  15 m Environmentally Sensitive Development Permit Area (ESDPA) and 15 m SPEA
-  Kootenay Lake High Water Mark (HWM)
-  Invasive Species Removal and Re-vegetation Area (~50 m²)

APPENDIX 4. INVASIVE SPECIES FACTSHEET

Common Tansy *Tanacetum vulgare*

Legal Status

Invasive Plants Regulation, Forest and Range Practices Act;
Noxious Weed (Regional), BC Weed Control Act



Distribution

Currently distributed: Bulkley-Nechako, Central Kootenay, Columbia-Shuswap, East Kootenay, North and South Okanagan Regional Districts, and within Greater Vancouver, Fraser Valley, Southeast coast of Vancouver Island, Gulf Islands, Sunshine Coast, and Squamish/Pemberton.

Identification

Flowers: Many yellow disc flowers that resemble buttons are found at the top of the plant in a flat-topped cluster. There are no ray flowers. 20-200 flower heads per plant.

Stems: Up to 1.8 m in height. When mature, stems can be purplish-red. Glands give a dotted appearance.

Leaves: Dark green, divided leaves with serrated leaflets. 10-20 cm long and 4-8 cm wide.

Fruits: 1 mm long achenes (simple, dry, one-seeded fruit). Dotted with glands and 5-angled.

Similar Species: Common tansy is sometimes confused with tansy ragwort, which has ray flowers.

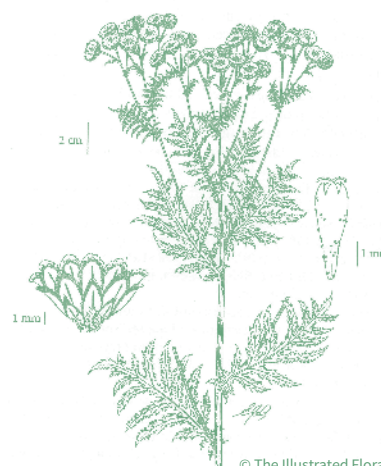


Ecological Characteristics

Habitat: Prefers sunny areas with well-drained soils. Often infests stream banks, pastures, and other disturbed sites such as roadsides. Cannot effectively establish in frequently cultivated soils.

Reproduction: Perennial species that reproduces by seed. Seeds can remain viable in the soil for up to 25 years.

Dispersal: Plants spread mainly through seed but also through roots. Seeds can be transported by birds, animals, and on vehicles that have been working in infested areas. Control of seed dispersal is more important than control of vegetative spread.



© The Illustrated Flora of BC

Impacts

Economic: Infestations may be toxic to grazers (leaves contain neurotoxins, toxic oils, and the pesticide pyrethrin). Dairy cattle consuming the leaves often have unpleasant tasting milk.

Ecological: Infestations of common tansy displace native vegetation.

Integrated Pest Management

IPM is a decision-making process that includes identification and inventory of invasive plant populations, assessment of the risks that they pose, development of well-informed control options that may include a number of methods, site treatment, and monitoring.

Prevention

» Report infestations:

- Regional Invasive Species Committees: www.bcinvassives.ca/about/partners/bc-stakeholders/regional-committee-map
- Online: www.gov.bc.ca/invasive-species
- Toll Free: 1-888-933-3722

The use of fertilizer can increase the competitive ability of grasses and other desirable plants, thereby preventing or reducing infestations of common tansy.

Mechanical Control

- » Common tansy can not be controlled with single mowing events (e.g. once-a-year), as the plants will respond with an increase in vegetative growth.
- » Mowing sites very low to the ground before July can prevent seed production.
- » Combined mowing and subsequent herbicide treatment of re-growth appears to be an effective control method. Treatments must be repeated over several years.
- » Hand pulling may be used in areas where mowing and herbicide application are not feasible. Gloves and other protective clothing should be worn to prevent skin irritation.



Chemical Control

Herbicide recommendations and use must consider site characteristics and be prescribed based on site goals and objectives. Herbicide labels and other sources of information must be reviewed before selecting and applying herbicides.

- » Ensure that chemical treatments do not injure or kill susceptible, non-target vegetation.
- » The following herbicides provide effective control for common tansy: picloram or metsulfuron methyl alone or mixes of picloram or aminopyralid + 2,4-D or aminopyralid + metsulfuron methyl.
- » Application of pesticides on Crown land must be carried out following a confirmed Pest Management Plan (Integrated Pest Management Act) and under the supervision of a certified pesticide applicator: www.env.gov.bc.ca/epd/ipmp/

References/Links

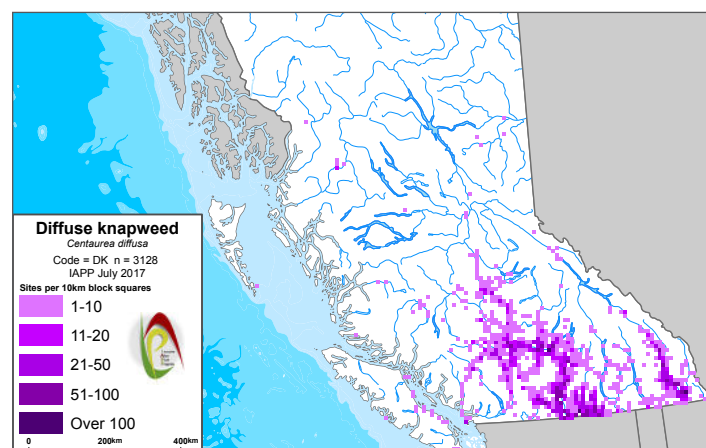
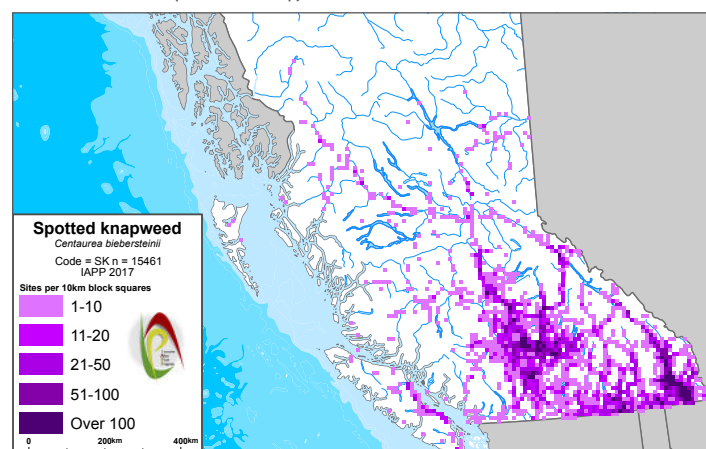
- » BC Ministry of Forests, Lands, and Natural Resource Operations, Invasive Alien Plant Program (IAPP). www.for.gov.bc.ca/hra/Plants/application.htm
- » E-Flora BC, an Electronic Atlas of the Plants of BC. www.eflora.bc.ca/
- » King County Noxious Weed Control Program, Best Management Practices for Common Tansy. King County, Washington. <http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/common-tansy-control.pdf>
- » Noxious Weed Information on Common Tansy. Colorado Weed Management Association. <https://cwma.org/weed-information/weed-list/common-tansy/>
- » Alberta Invasive Species Council. Common Tansy. <https://abinvasives.ca/wp-content/uploads/2017/11/FS-CommonTansy.pdf>

Knapweeds

Spotted - Centaurea biebersteinii
Diffuse - Centaurea diffusa

Legal Status

Invasive Plants Regulation, Forest and Range Practices Act;
Noxious Weed (Provincial), BC Weed Control Act

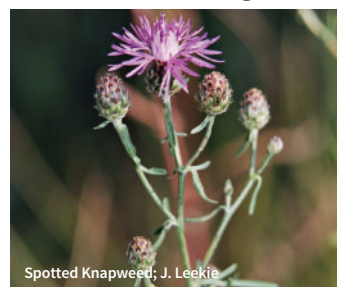


Distribution

Currently distributed throughout Southern BC and are of major concern in the Omineca, Peace River, Kootenay, Okanagan, Thompson, and Cariboo regions. Coordinated efforts in Southern BC are attempting to prevent or minimize the spread of spotted knapweed. Concerted efforts in Northern BC have resulted in the eradication or containment of spotted knapweed infestations, thus minimizing and preventing the threat of wide-scale spread.

Identification

Flowers: Spotted: Purple, sometimes white, found individually, non-clustered, at the ends of branches. Black-tipped flower head bracts give plants a spotted appearance. **Diffuse:** White, sometimes rose-purple or lavender, broadly urn-shaped, found in clusters or solitary at the end of branches. Bracts are yellowish with a brownish margin, sometimes spotted, fringed on the sides, and terminating in a slender bristle or spine.



Spotted Knapweed; J. Leekie



Diffuse Knapweed; R. Mueller

Stems: Spotted: Height to 1.5 m. **Diffuse:** Height 0.1 to 0.6 m.

Leaves: Spotted: Stem leaves are multi-divided and decrease in size closer to the shoot. **Diffuse:** Stem leaves are smaller, alternate, less divided, stalkless, and become bract-like near the flower clusters. Basal leaves are stalked and divided into narrow, hairy segments.

Fruits: Spotted: Seeds are bristled.

Diffuse: Seeds are light brown to black in colour; non-bristled.

Similar Species: (i) Meadow knapweed has undivided leaves and larger flower-head bracts with comb-like fringes at the tips; (ii) Russian knapweed has smaller flowers and no black marks on the bracts; (iii) Black knapweed has undivided leaves and loral bracts with long, black fringes from a black or dark brown triangular center; and (iv) Brown knapweed has a few egg-shaped or lance-shaped basal leaves on long stalks and solitary heads at the ends of branches with somewhat hairy bracts that have a torn appearance. Spotted and diffuse knapweeds are capable of hybridizing and it is expected to be occurring in BC; therefore, identification can be somewhat difficult.



Spotted Knapweed
© The Illustrated Flora of BC



Diffuse Knapweed
© The Illustrated Flora of BC

Ecological Characteristics

Habitat: Both species prefer open areas and well-drained soils and can become established in grasslands, open forests, and along roadsides and right-of-ways. Spotted knapweed is more intolerant to dense shade and prefers moister habitats than diffuse knapweed; however, spotted knapweed is still a problem in forested areas disturbed by logging, fire, or other factors. Diffuse knapweed cannot tolerate cultivation or excessive moisture and is therefore uncommon on cultivated land.

Reproduction: Both are biennial or short-lived perennials that reproduce solely by seed. Dormant seeds may remain viable in the soil for over 8 years, with studies indicating that some seeds may be viable for over 15 years. Both species flower in late spring/early summer (e.g. June-July) and produce mature seed in summer (e.g. July-August).

Dispersal: Seeds are usually dispersed in the immediate vicinity of the parent plant. They can be spread greater distances in hay, on and through animals, and on vehicles.

Impacts

Ecological: The physical form of knapweed tends to be sparse compared to most native vegetation. Large infestations of spotted knapweed can increase runoff and erosion, leading to sedimentation of watercourses. Displacement of native vegetation may impact biodiversity. Dead plant material can increase risk of fire. Allelopathic properties can alter soil chemistry, preventing the growth of other plants.

Integrated Pest Management

IPM is a decision-making process that includes identification and inventory of invasive plant populations, assessment of the risks that they pose, development of well-informed control options that may include a number of methods, site treatment, and monitoring.

Prevention

- » Report infestations:
 - Regional Invasive Species Committees: www.bcinvasives.ca/about/partners/bc-stakeholders/regional-committee-map
 - Online: www.gov.bc.ca/invasive-species
 - Toll Free: 1-888-933-3722
- » Avoid unloading, parking or storing equipment and vehicles in infested areas.
- » Remove plant seeds and parts from personal gear, equipment, vehicles and machinery at designated cleaning stations before leaving infested sites.
- » Treat spotted knapweed before seed set, monitor results, and re-treat to prevent seed dispersal.
- » Monitor site annually until it is knapweed-free for several consecutive years.



Thank you to the BC Ministry of Environment and the BC Ministry of Transportation and Infrastructure for providing project funding, and to those who advised the development of these management recommendations

Mechanical Control

- » Pulling, cutting or mowing is most effective when completed prior to seed set. If the plants have not yet flowered, the removed plants can be left onsite, but stems should be twisted, bent or otherwise crimped.
- » If treatment is performed while flowers are present on stems, the plants must be bagged and removed from the site to prevent production of viable seeds.
- » Wherever possible, the root system should be removed to prevent re-sprouting; however, stem removal and prevention of seed set is most important.
- » Follow-up treatments will be required as knapweed has an extensive, long-lived seed bank.

Biocontrol

- » 12 knapweed biocontrol agents have been released in BC and are most effective when used in combination.
- » Several agents show promise for a variety of habitats.
- » Evidence strongly points to a suite of biocontrol agents (seed feeders and root feeders) as the primary drivers of knapweed decline in British Columbia's Southern Interior.

Chemical Control

Herbicide recommendations and use must consider site characteristics and be prescribed based on site goals and objectives. Herbicide labels and other sources of information must be reviewed before selecting and applying herbicides.

- » Effective herbicides include: picloram, dicamba, 2,4-D, clopyralid, aminopyralid and glyphosate.
- » Picloram has been determined most effective; however, it has residual effects.
- » Application: The use of a wick or selective spot spraying is recommended to minimize non-target damage.
- » Application of pesticides on Crown land must be carried out following a confirmed Pest Management Plan (Integrated Pest Management Act) and under the supervision of a certified pesticide applicator: www.env.gov.bc.ca/epd/ipmp/

References/Links

- » BC Ministry of Forests, Lands, and Natural Resource Operations, Invasive Alien Plant Program (IAPP). www.for.gov.bc.ca/hra/Plants/application.htm
- » Watch Out For Knapweed. Goodwin, K. and D. Burch. Montana State University. <http://www.msuxextension.org/publications/agandnaturalresources/eb0179.pdf>
- » Impact of Biological Control on Two Knapweed Species in British Columbia. as explained in the research report by Gayton, D and Miller, V. JEM Vol 13, N. 3 https://www.for.gov.bc.ca/hra/plants/publications/Gayton_Miller_knapweed.pdf

16.0 DEVELOPMENT PERMIT AREAS

Background

The OCP may designate Development Permit Areas under the authority of local government legislation. Unless otherwise specified, a development permit must be approved by the Regional Board, or delegate of the Board, prior to any development or subdivision of land within a designated Development Permit Area.

Development Permit Areas allow for implementation of special guidelines for the protection of the natural environment, protection from hazardous conditions, for revitalization of designated areas, or to guide the form and character of development within the Plan Area. Development Permit Areas can also be used to meet targets for carbon emission reductions and energy and water conservation.

Where land is subject to more than one Development Permit Area designation, a single development permit is required. The application will be subject to the requirements of all applicable Development Permit Areas, and any development permit issued will be in accordance with the guidelines of all such Areas.

Development Permit Area #1: Environmentally Sensitive Development Permit (ESDP) Area

Category

The ESDP area is designated under Section 488.1(1) (a) of the *Local Government Act* for the protection of the natural environment, its ecosystems and biological diversity.

Justification

The primary objective of this Development Permit Area designation is to regulate development activities in watercourses, lakes and wetlands and their adjacent riparian areas so as to protect aquatic habitat; and to conserve, enhance and, where necessary, restore watercourses and their riparian areas.

Area

The ESDP area is comprised of:

1. Riparian assessment areas (Figure 1) for fish and wildlife habitat and drinking water, including:
 - a. All areas within 15 metres of the high water mark of a watercourse, including the natural boundary of a lake;
 - b. within 15 metres of the top of the ravine bank in the case of a ravine less than 60 metres wide; and
 - c. within 5 metres of the top of the ravine bank in the case of a wider ravine that links aquatic to terrestrial ecosystems and includes both existing and potential riparian

vegetation and existing and potential upland vegetation that exerts an influence on the watercourse.

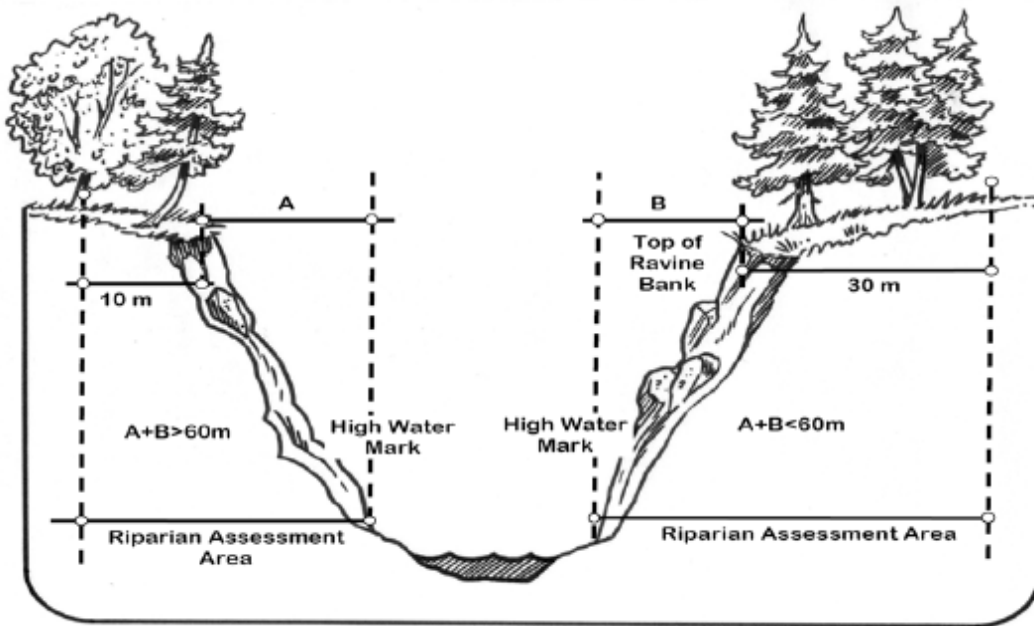


FIGURE 1: (for illustrative purposes only) **RIPARIAN ASSESSMENT AREA:** means the area within 15 m of the high water mark of a watercourse; within 15 m of the top of the ravine bank in the case of a ravine less than 60 m wide; and within 5 m of the top of the ravine bank in the case of a wider ravine that link aquatic to terrestrial ecosystems and includes both existing and potential riparian vegetation and existing and potential upland vegetation that exerts an influence on the watercourse. This DPA applies only to residential, commercial and industrial designations.

Source: British Columbia Ministry of Environment, *Riparian Areas Regulation Implementation Guidebook*, March 2005

Where the following definitions apply:

High water mark means the visible high water mark of a watercourse where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the watercourse a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself, and includes the active floodplain.

Lake means any area of year round open water covering a minimum of 1.0 hectares (2.47 acres) of area and possessing a maximum depth of at least 2.0 metres. Smaller and shallower areas of open water may be considered to meet the criteria of a wetland.

Top of ravine bank means the first significant break in a ravine slope where the break occurs such that the grade beyond the break is greater than 3:1 for a minimum distance of 15 m measured perpendicularly from the break, and the break does not include a bench within the ravine that could be developed.

Watercourse means any natural or man-made depression with well-defined banks and a bed 0.6 metres (2.0 feet) or more below the surrounding land serving to give direction to a current of water at least six months of the year and/or having a drainage area of two square kilometres (0.8 square miles) or more upstream of the point of consideration.

Wetland means any areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

Guidelines

A development permit is required, except where specified under the exemptions section, for development or land alteration on land identified as a riparian assessment area within the ESDP Area. Where not exempt, development requiring a development permit includes any of the following associated with or resulting from residential, commercial or industrial activities or ancillary activities to the extent that they are subject to local government powers under local government legislation or when triggered by the requirements of a building permit or subdivision approval:

- a. removal, alteration, disruption or destruction of vegetation;
- b. disturbance of soils;
- c. construction or erection of buildings and structures;
- d. creation of non-structural impervious or semi-impervious surfaces;
- e. flood protection works;
- f. construction of roads, trails, docks, wharves and bridges;
- g. provision and maintenance of sewer and water services;
- h. development of drainage systems;
- i. development of utility corridors; and
- j. subdivision as defined in section 455 of the *Local Government Act*;

Development shall be in accordance with the following guidelines:

- 2. All development proposals subject to this permit will be assessed by a Qualified Environmental Practitioner (QEP) or Registered Professional Biologist (RP Bio) in accordance with the Riparian Areas Regulation established by the Provincial and/or Federal governments as used elsewhere in the Province;
- 3. An ESDP shall not be issued prior to the RDCK ensuring that a QEP or RP Bio has submitted a report certifying that they are qualified to carry out the assessment, that the assessment methods have been followed, and provides in their professional opinion that a lesser setback will not negatively affect the functioning of a watercourse or

riparian area and that the criteria listed in the Riparian Areas Regulation has been fulfilled, and;

4. The Riparian Areas Regulation implemented through the ESDP does not supersede other Federal, Provincial and or local government requirements, including that of other development permit areas, building permits, flood covenants, Federal or Provincial authorization. Land subject to more than one development permit area designation must ensure consistency with the guidelines of each development permit area, to provide comprehensive stewardship of both fish and wildlife habitat.

Exemptions

The ESDP area does not apply to the following:

5. existing construction, alteration, addition, repair, demolition and maintenance of farm buildings and agricultural activities including clearing of land for agricultural purposes;
6. existing institutional development containing no residential, commercial or industrial aspect;
7. construction, renovation, or repair of a permanent structure if the structure remains on its existing foundation. Only if the existing foundation is moved or extended in to a riparian assessment area would a ESDP be required; and
8. an area where the applicant can demonstrate that the conditions of the ESDP Area have already been satisfied or a development permit for the same area has already been issued in the past and the conditions in the development permit have all been met, or the conditions addressed in the previous development permit will not be affected.

Development Permit Area #2: Residential Cluster Development Permit (RCDP) Area

Designation

The RCDP area is designated under Section 488.1(1) (a) and (e) of the *Local Government Act* for protection of the natural environment, its ecosystems and biological diversity and the establishment of objectives for the form and character of intensive residential development.

Area

The RCDP Area is comprised of all privately owned or leased lands designated as Suburban Residential (RS), Country Residential (RC), Multi-Family Residential (RM), and Mixed Use Residential (RMU) on Schedule 'A.1'.

Justification

The intent of the RCDP Area is to ensure that intensive residential development is completed in a manner that is sensitive to the rural character of the Plan area, adjoining lands, the natural environment, and achieves a high standard of appearance. Lands in the Plan Area have not been studied to a high level for their ability to sustain intense development over the long term. It is therefore desirable to allow development to occur in a manner which allows for efficient