

RIPARIAN AREAS & A DEVELOPMENT PERMIT

Kristina Anderson, RDKB Watershed Planner

OPEN HOUSE July 5, 2023

Official Community Plan: Electoral Area C / Christina Lake



OUTLINE

What is a “Riparian Area”

History of riparian communication
in Electoral Area C

Why is it important?

What have we heard from you?

Riparian Development Permit Area

WHAT IS A RIPARIAN AREA?

The strip of land beside a water-body (lakes, rivers, creeks wetlands) shaped from and developed due to the presence of water close to or at its surface.

Riparian areas have a small footprint but a big impact on watershed function and health. They are among the most productive areas and often at risk of damage due to human influences.

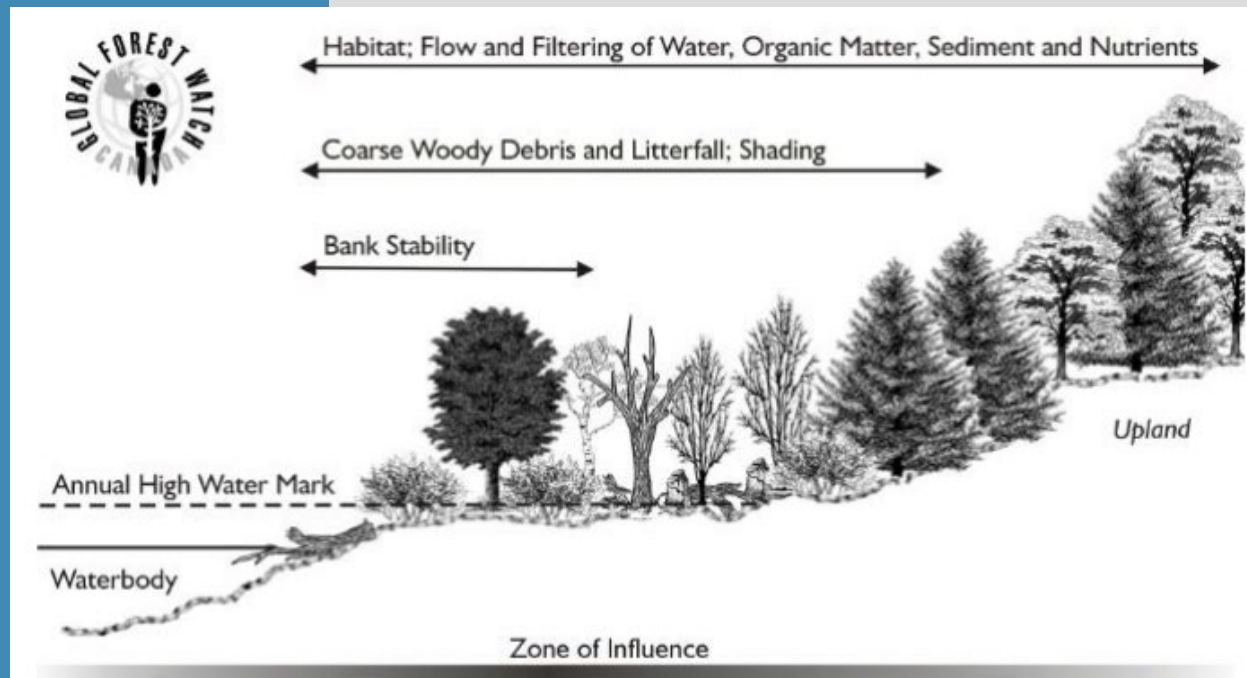
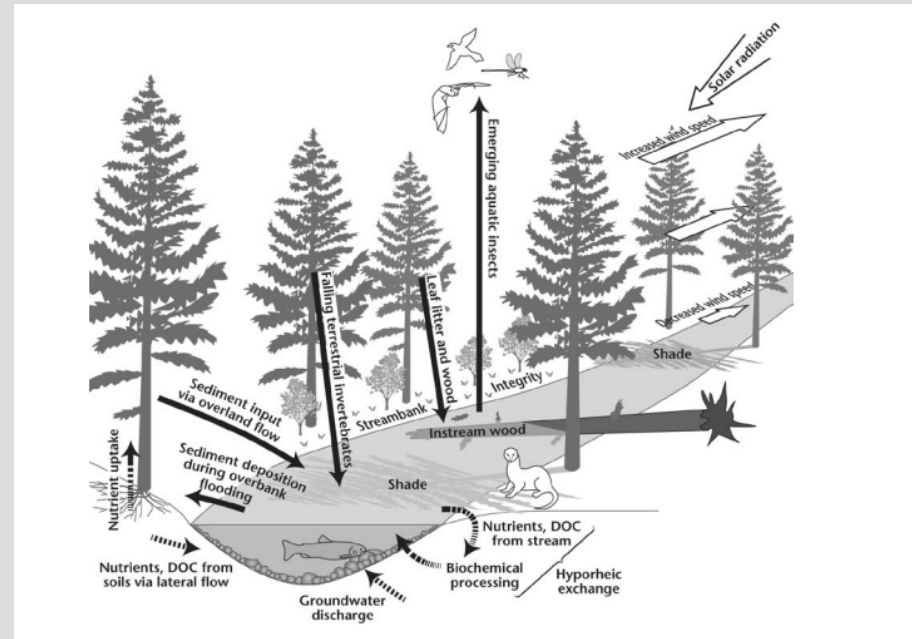


Figure 1. Riparian area zone of influence components and functions. Image from Global Forest Watch [15].



Okanagan Lakeshore Living (www.okcp.ca)

A healthy watershed is central to clean and abundant source water. Establishing setbacks, restoring riparian buffer zones along watercourses, and acquiring watershed segments can save money by preventing costly impacts to source water. SourceWaterProtection_Toolkit (2019)

SIWŋKʷ - WATER

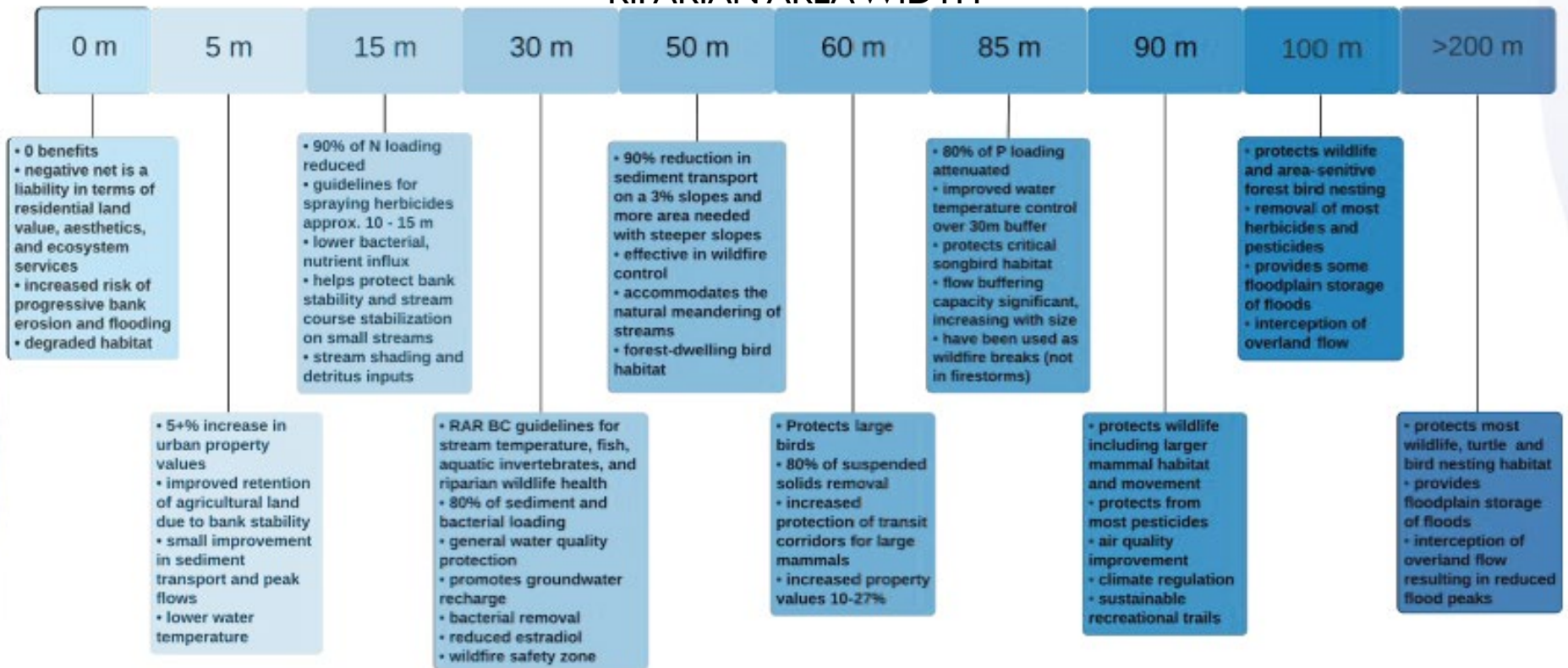
Syilx Nation siwŋkʷ Declaration (July 2014)

siwŋkʷ must be treated with reverence and respect. Our relationship with siwŋkʷ is not taken lightly; we are responsible to ensure that our relation can continue to maintain the health and resiliency of our tmxw ulaxw and timixw.

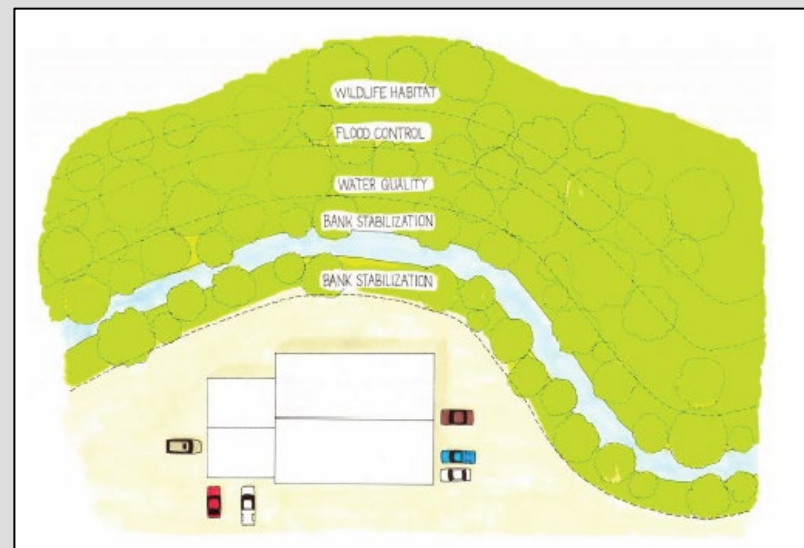
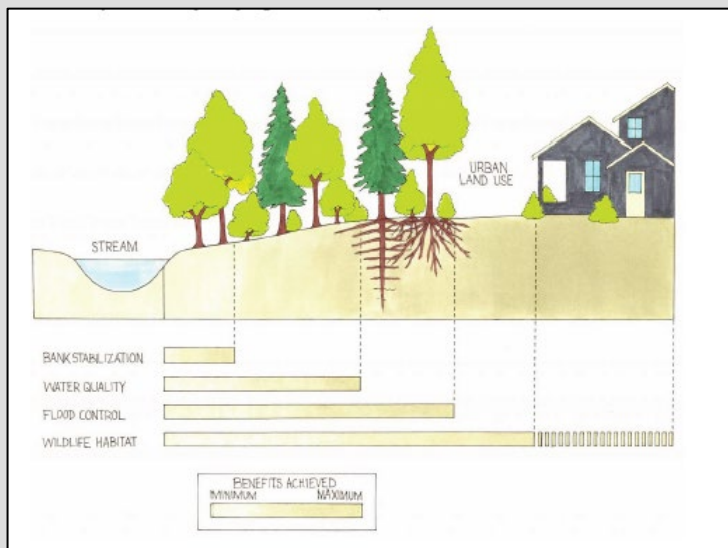


Bear processed plants (Sagebrush Nursery)

RIPARIAN AREA WIDTH



SourceWater Protection Toolkit OBWB 2021



August 2002

Dear Christina Lake Property Owner:

As a lakeshore property owner, you can have a significant impact on the aquatic environment of Christina Lake. Many species of fish and wildlife rely on an abundance of natural habitat both in the lake and on the adjoining lands. Land development activities around the lake have significantly degraded this habitat over time, and unless action is taken to limit the impacts, some of these species will be in serious jeopardy. Property owners may also be

HISTORICAL

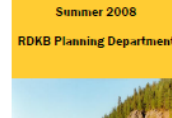


Kettle River Watershed Management Plan
VERSION 1.0.1 - JANUARY, 2010

The Kettle River starts here.

August 2008

Please Join Us!

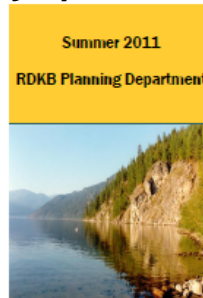


The Regional District of Kootenay Boundary is currently considering adopting new policies and regula-

areas around Christina Lake. The 'Christina Lake area' is considered important to streams, support a unique environment, and provide important riparian habitat. The area has identified riparian areas around Christina Lake.

Please Join Us!

July 2011



Since 2008, the Regional District of Kootenay Boundary Planning Department has been working with the Electoral Area 'C' Advisory Planning Commission and the community on draft guidelines to encourage the protection of riparian areas along the shorelines of Christina Lake, its tributary streams, and the Kettle River. A copy of the current draft development permit guidelines can be viewed on the RDKB's website under the "Hot Topics" heading (www.rdkb.com).

This would involve the riparian areas adjacent to the lake. The riparian area is considered important to streams, support a unique environment, and provide important riparian habitat. The area has identified riparian areas around Christina Lake.

Important meeting regarding Christina Lake area.

This meeting will offer an opportunity to hear more about the issue from staff of the Regional District Planning Department, the Christina Lake Stewardship Society, and the Ministry of Environment. You will also be provided with an opportunity to share your knowledge of the area and any concerns or suggestions that you may have regarding riparian area protection.

Christina Lake Community Hall
90 Park Road
Wednesday, August 6, 2008
7:00 PM to 9:00 PM

For information:
Contact RDKB
Planning Dept. @
1-800-355-7352
www.rdkb.com



ELECTORAL AREA C - CHRIS

Riparian Area
Protection

CHRISTINA LAKE MANAGEMENT PLAN

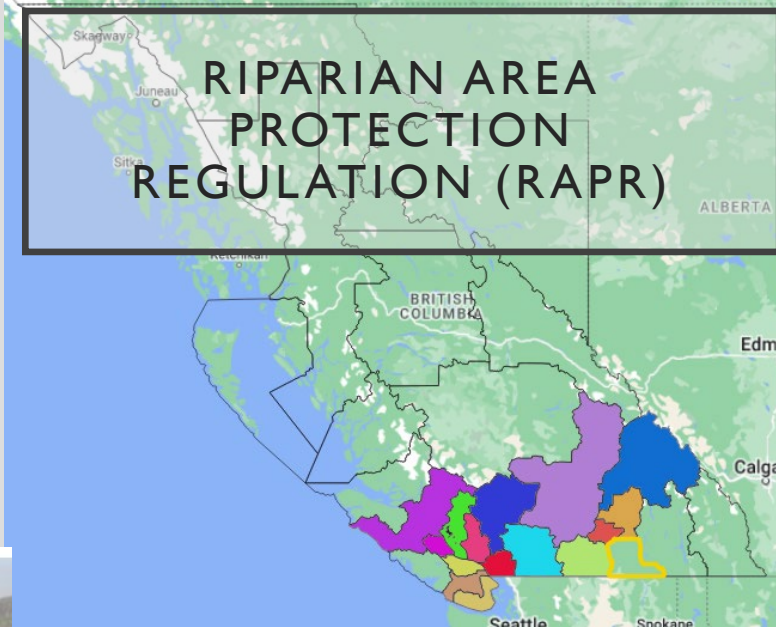
"A Community Watershed-Based Plan"



To achieve sustainable development and management of land and water resources while maintaining environmental values and to increase the level of protection for this important habitat, a multi-agency government initiative is being implemented to notify property owners of habitat values, environmental protection standards and legislative controls on foreshore development activities.

Date	Delivered by	Title
August 2002	Province of BC	Letter sent to all Christina Lake Property Owners – discussing the need to protect the riparian areas and shorelines.
July 2004	Province of BC	Riparian Area Regulation (Riparian Area Protection Reg)
August 2005	Christina Lake Stewardship Society	Christina Lake Management Plan – “A Community Watershed Based Plan”
August 2008	RDKB Planning Staff	Riparian Area Protection public meeting
July 2011	RDKB Planning Staff	Riparian Area Protection public meeting
December 2011	RDKB Planning Staff	Riparian Area Protection public meeting
September 2014	Kettle River Watershed Management Stakeholder Advisory Group	Discussion Paper 5. Stepping back from the Water: Managing Wetlands, Riparian Areas, and Floodplains in the Kettle River Watershed.
January 2015	RDKB	Kettle River Watershed Management Plan
April 2017	Granby Wilderness Society	Threat Assessment of Riparian Areas in the Kettle River Watershed
October 2019	RDKB	Declaration of a Climate Action Imperative
November 2019	RDKB (Associated Environmental)	Christina Lake Water Utility Source Water Protection Plan
December 2020	Province of BC	GIS Indicator Based Protocol for Assessing Cumulative Watershed Effects. KBR

RAPR applies to 15 Regional Districts and associated municipalities (a total of 110 Local Governments). Covers areas in BC with higher population in 2004.



[Home](#) > [Farming, natural resources and industry](#) > [Forestry](#) > [Forest Stewardship](#) > [Silviculture](#) > [Silviculture Guidebooks](#) >

- Timber Supply Review and Allowable Annual Cut
- Sustainable Forest

Riparian Management Area Guidebook



FREP
Forest & Range
Evaluation Program

The Forest and Range Evaluation Program (FREP) measures the effectiveness of forest and range practices by monitoring and evaluating the condition of eleven resource values. Find an overview of the program and strat



CLIMATE CHANGE
ADAPTATION PROGRAM

Linking farmland to flood

Farmland-Riparian Interface Stewardship Program (FRISP)

BC Cattleman's Association



[Home](#) > [Farming, natural resources and industry](#) > [Agriculture and seafood](#) > [Agricultural land and environment](#)

- Agricultural Land Reserve
- Agroforestry
- Air management
- Biodiversity

Riparian areas

All habitats within the agricultural landscape are important, but aquatic and riparian areas are especially significant to both biodiversity and agricultural production.

Survey of Christina Lake residents: 2018

Not important —————> Very Important

	1	2	3	4	5 Total	WA
Environmental Concerns						
a) Water Quality	11	2	12	46	412	483
Percentage	2%	0%	2%	10%	85%	4.8
b) Aquatic Invasive Species	14	10	25	68	366	483
Percentage	3%	2%	5%	14%	76%	4.6
c) Wildfire Risk	11	11	32	77	349	480
Percentage	2%	2%	7%	16%	73%	4.6
d) Land Based Invasive Species	19	14	81	119	249	482
Percentage	4%	3%	17%	25%	52%	4.2
e) Foreshore Erosion / Riparian Areas	33	25	97	101	216	472
Percentage	7%	5%	21%	21%	46%	3.9

Environmental Regulation.

a) Continue to protect water quality within the Environmentally Sensitive Waterfront Development Permit Area (which applies to lands which border Christina Lake or any tributary stream).	19	18	48	85	314	484
Percentage	4%	4%	10%	18%	65%	4.4
b) Increase the amount of land for parks and trails (for recreation and environmental protection)	48	38	135	108	148	477
Percentage	10%	8%	28%	23%	31%	3.6
Parks and Recreation						
a) Protectin and conservation of sensitive habitats and species at risk within park and recreation areas	41	29	91	114	196	471
Percentage	9%	6%	19%	24%	42%	3.8

Over 50%

Between 40-50%

CHRISTINA LAKE SOURCE WATER PROTECTION PLAN (2019)

According to the Source-to-Tap Guideline, risk likelihood of a hazard occurring by the consequence of that hazard. To determine potential risks, two ratings were applied to each hazard:

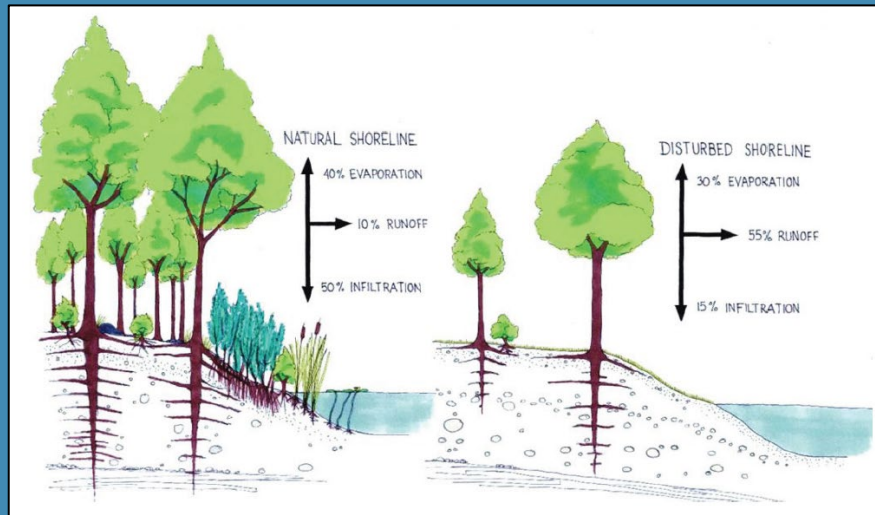
1. The likelihood of occurrence (i.e., the probability the event occurs, and that if it occurs, the contaminant will migrate to the lake intake); and
2. The magnitude of consequence if that event was to occur.

- Flooding: very high (B4)
- Wildfire: very high (C4)
- Forestry: high (D4)
- Septic Systems: high (C3)
- Residential Lakefront Properties: high (C3)
- Campgrounds: high (C3)
- Organic Matter: moderate (D3)

Risk (Likelihood Consequence) Matrix					
Likelihood	Consequence				
	I (Insignificant)	2 (Minor)	3 (Moderate)	4 (Major)	5 (Catastrophic)
A (almost certain)	Moderate	High	Very High	Very High	Very High
B (likely)	Moderate	High	High	Very High	Very High
C (possible)	Low	Moderate	High	Very High	Very High
D (unlikely)	Low	Low	Moderate	High	Very High
E (rare)	Low	Low	Moderate	High	High

Sec. 4.2.1 Flooding. The occurrence of flooding cannot be altered by the RDKB. However, select management practices can help mitigate the impact of flooding on the community of Christina Lake. Although the use of Crown Land is managed by the Province, local governments may be able to reduce the effects of flooding through land use management activities such as zoning, flood elevation mapping, and riparian restoration.

WHY DO SO MANY PEOPLE CARE?



Native vegetation protects water quality from polluted runoff and helps soil absorb water.

Hard surfaces and reduced vegetation increase runoff and erosion potential and decrease absorption by the soil.

Riparian functions: A healthy riparian area will demonstrate some of the following key ecological functions, provide ecosystem services to the surrounding region and support our adaptation with a changing climate:

- Builds and maintains stream banks (erosion protection)
- Increases infiltration potential and reduces stream flow energy (erosion protection and loss of land)
- Recharges groundwater, improves conditions during droughts
- Traps sediments
- Wildlife/Ecosystem connectivity corridors
- Filters nutrients from water (water quality)
- Maintains and enhances biodiversity
- Shades the stream to reduce solar heat gain
- Provides positive impact on mental, physical and social health

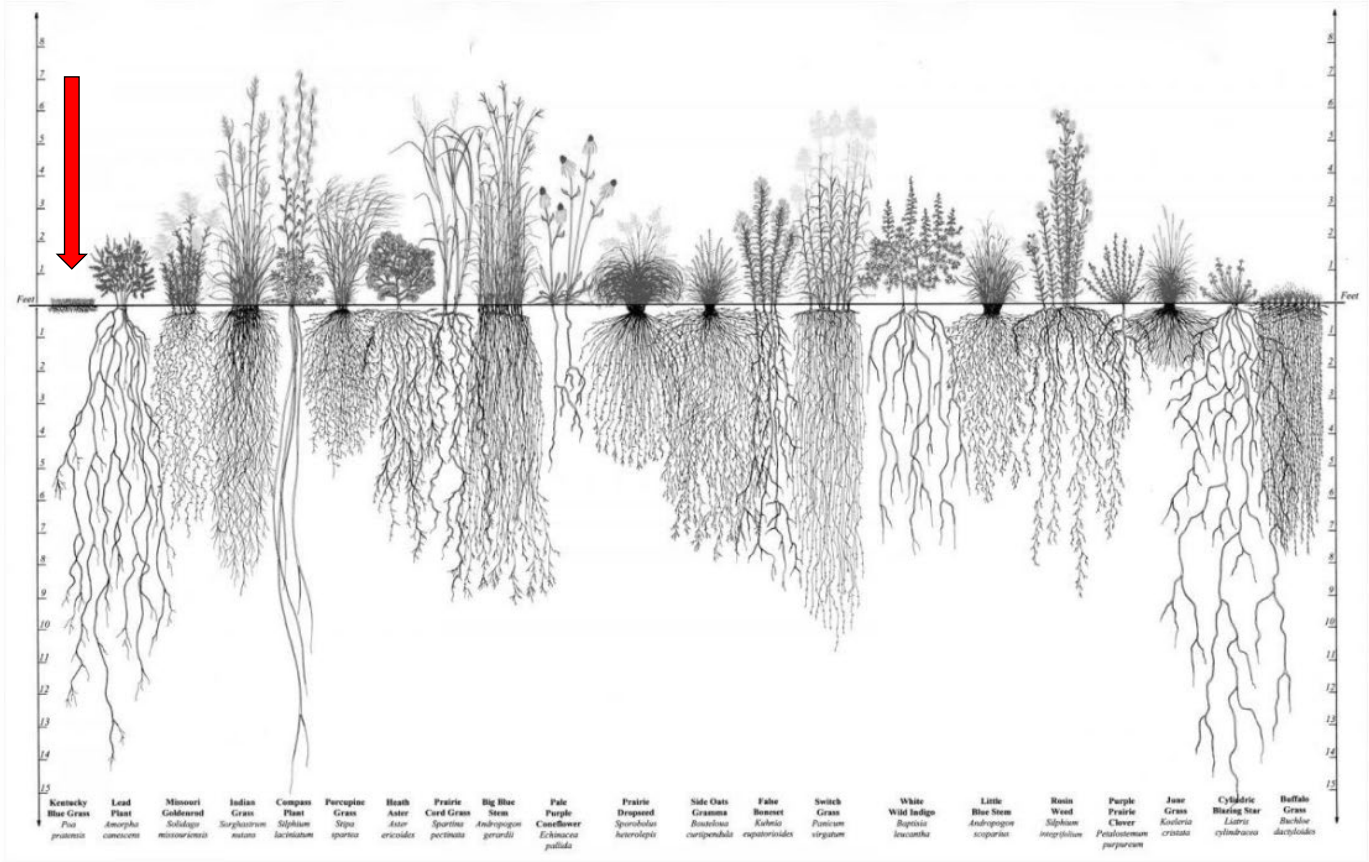
We are part of one watershed, so all a part of the long-term solution.

- * Protection to ensure waterways stay healthy over time.
- * Limit the extent of impervious surfaces.
- * We can not engineer our way out of climate change impacts... or ignore them.

THERE ARE DIFFERENT TYPES OF RIPARIAN AREAS



And that lawn, its root system is *pitiful* compared to *native plants*.

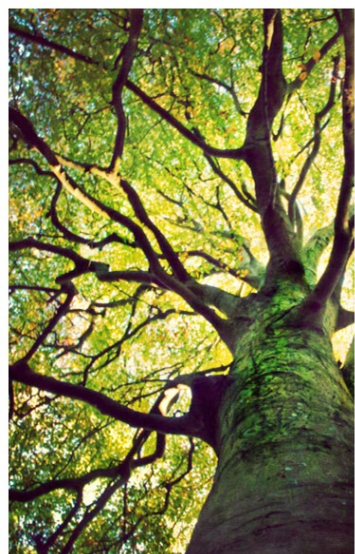


Rooting depth of common lawn grass (far left) compared to Wisconsin's native prairie plants (Lake Ripley)

<https://www.thedailygarden.us/garden-word-of-the-day/rooting-depth>

Erosion Protection, Water Quality, Water Quantity, Healthy Habitats, Increased Biodiversity Wildlife Corridors ...

Bank of the Kettle River

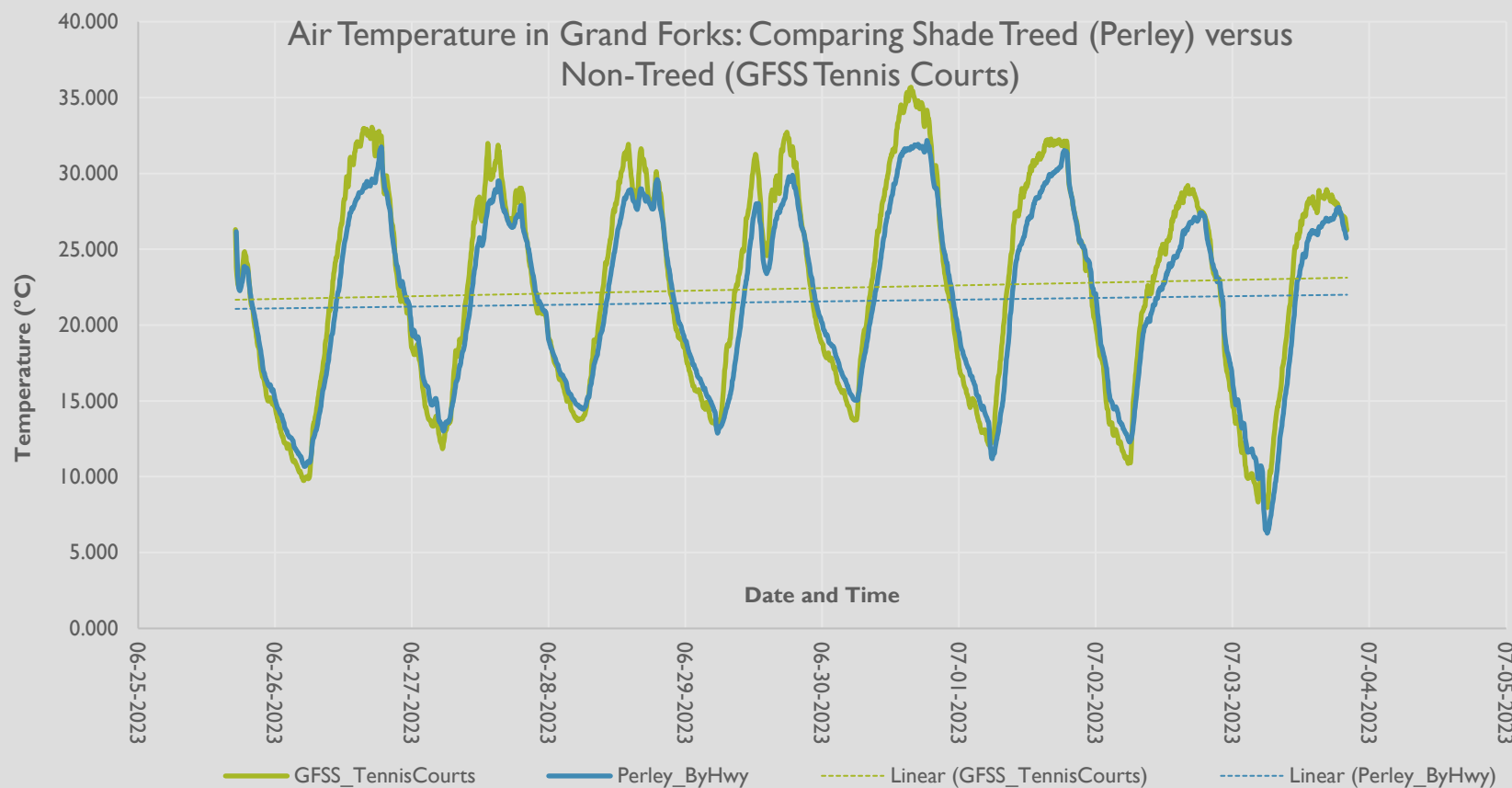


Regional District of
Kootenay Boundary

HOW DO SHADE TREES IMPACT THE SURROUNDING AIR TEMPERATURE?

Relative Humidity %	Air temperature °C											
	21	24	27	29	32	35	38	41	43	46	49	
0	18	21	23	26	28	31	33	35	37	39	42	
10	18	21	24	27	29	32	35	38	41	44	47	
20	19	22	25	28	31	34	37	41	44	49	54	
30	19	23	26	29	32	36	40	45	51	57	64	
40	20	23	26	30	34	38	43	51	58	66		
50	21	24	27	31	36	42	49	57	66			
60	21	24	28	32	38	46	56	65				
70	21	25	29	34	41	51	62					
80	22	26	30	36	45	58						
90	22	26	31	39	50							
100	22	27	33	42								

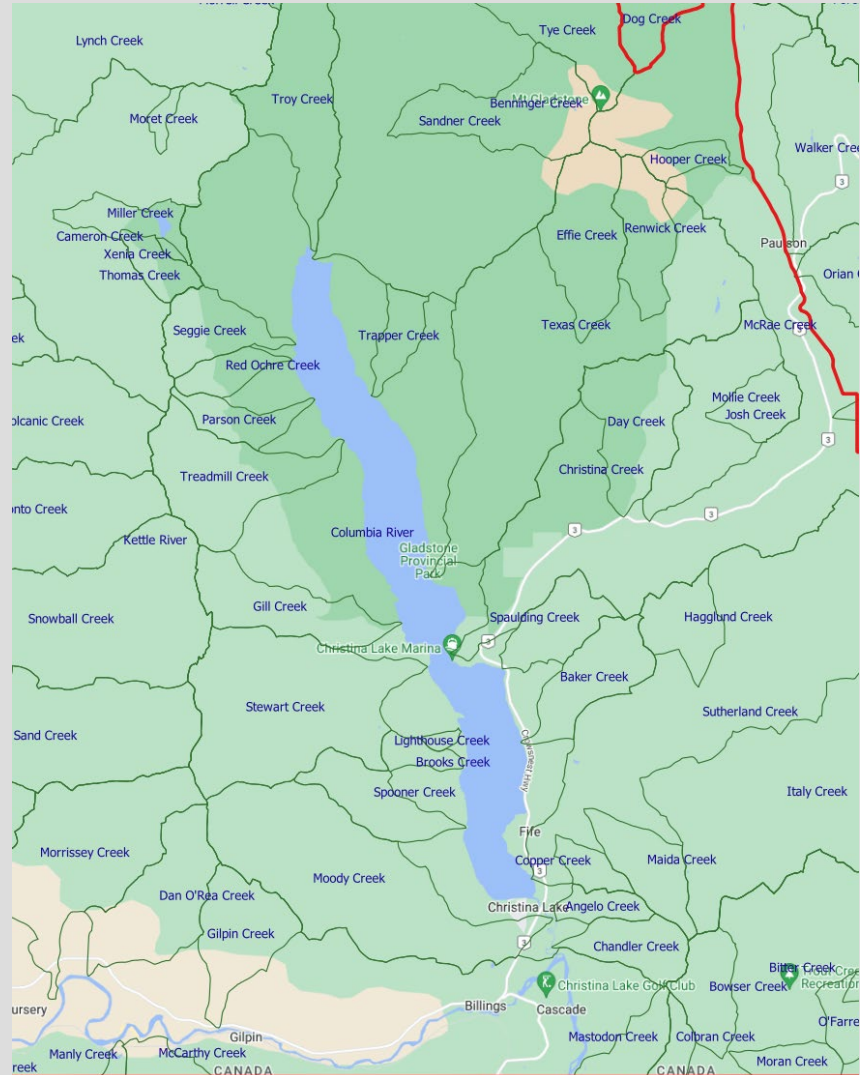
■ Serious risk to health - heatstroke imminent
■ Prolonged exposure and activity could lead to heatstroke
■ Prolonged exposure and activity may lead to fatigue



WATER SOURCES



Groundwater



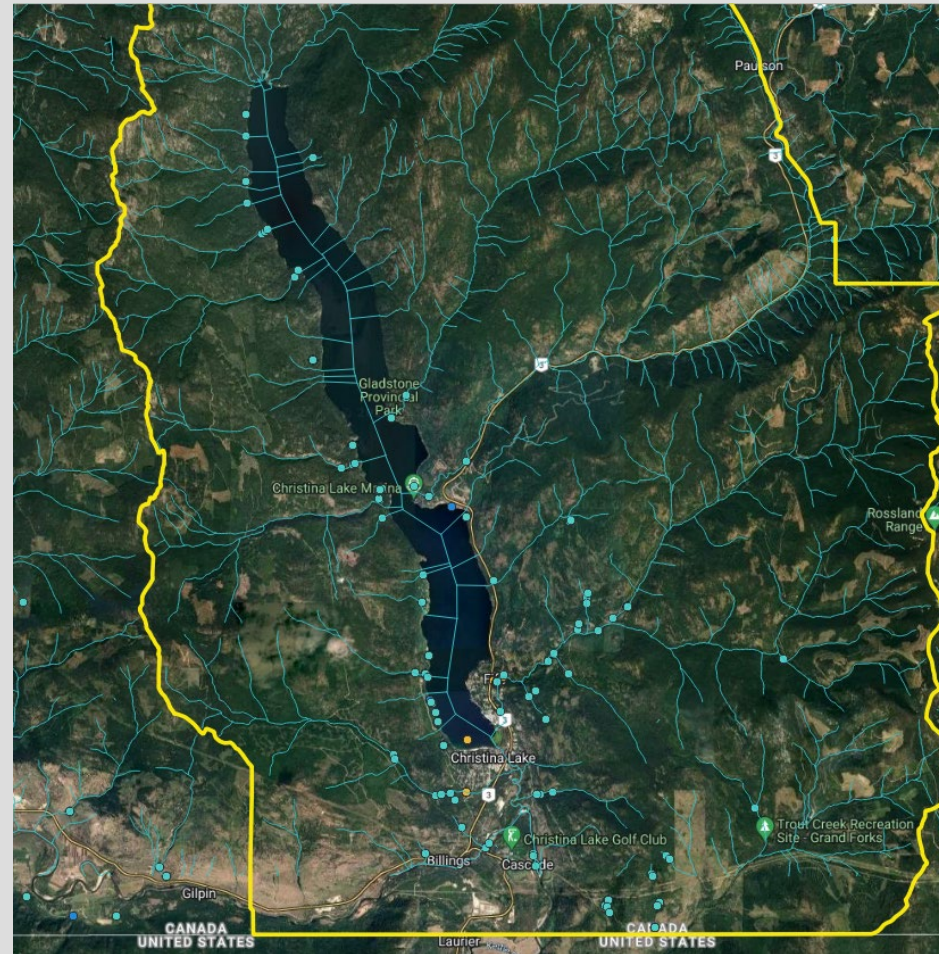
Surface Water



DOMESTIC AND DRINKING WATER LICENSES

WLS_WRL_P_point

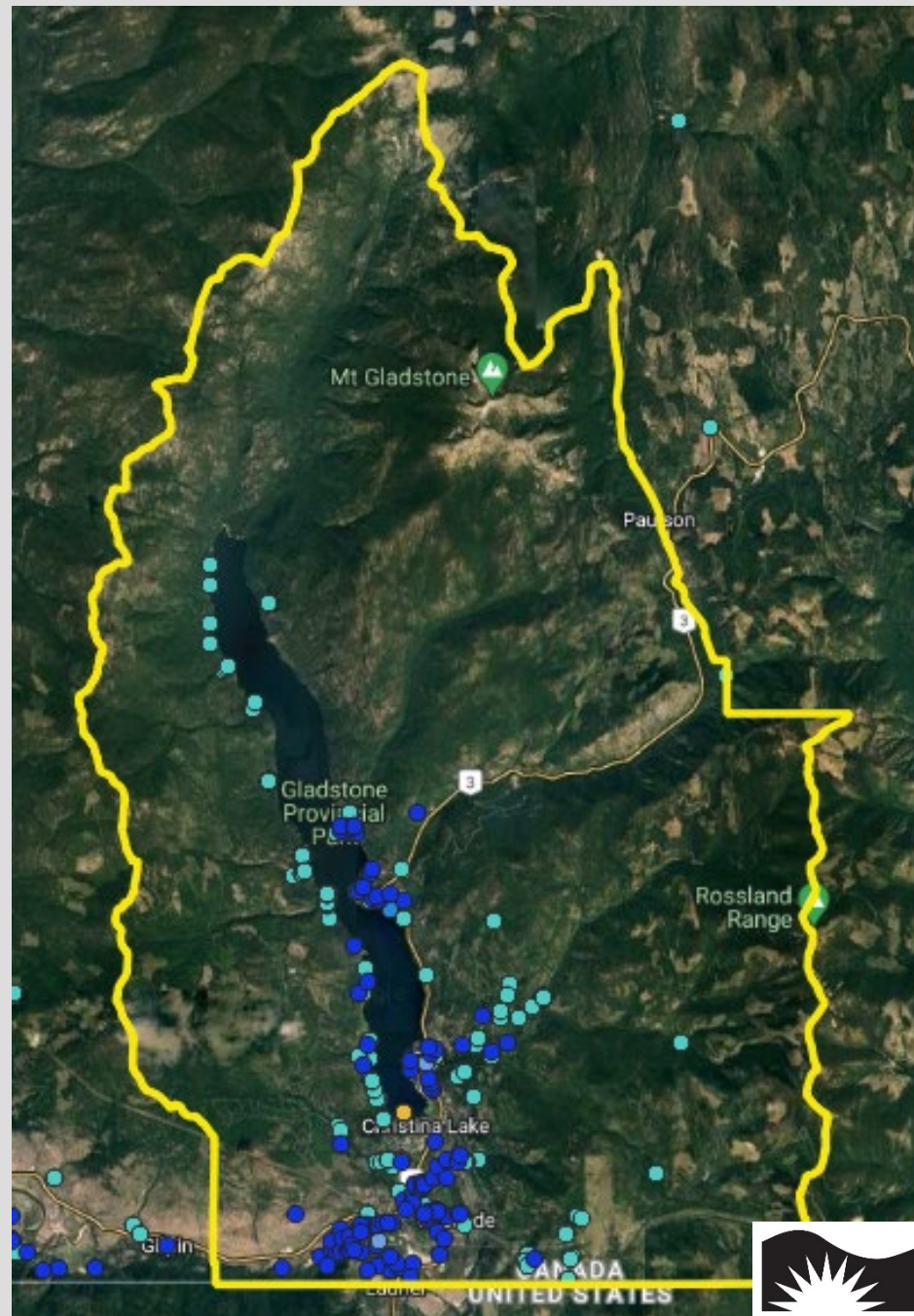
- ☒ 00A - Waterworks: Local Provider
- ☒ 01A - Domestic
- ☒ 02D - Comm. Enterprise: Enterprise
- ☒ 02F - Lwn, Fairway & Grdn: Watering
- ☒ WSA01 - Domestic (WSA01)





GROUNDWATER (WELLS) AND SURFACE WATER

DRINKING WATER LICENSES



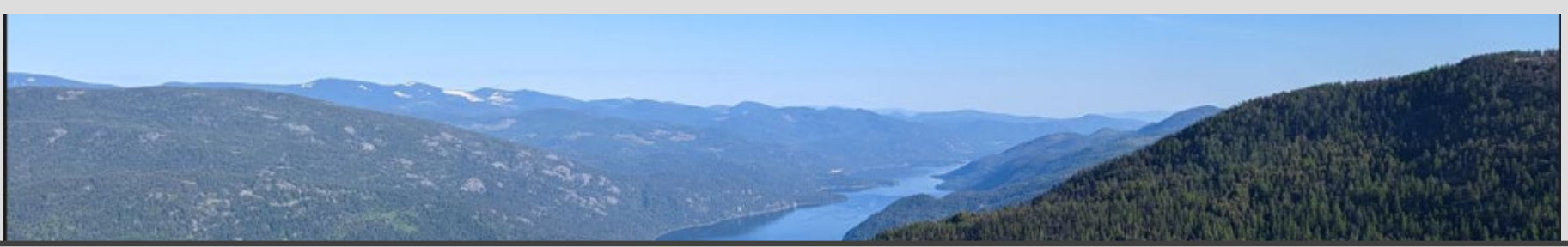
WHAT ARE THE BENEFITS OF HAVING A RIPARIAN DPA?

- Protect fish and wildlife habitats
- Connectivity corridors
- Water quality and temperature
- Drought resiliency
- Flood management
- Aquifer recharge
- Healthy biodiversity
- Natural assets
- Climate resilience
- Reduce sediment/erosion

TO BE CONSIDERED...

- ❖ How easy is the DPA to interpret?
- ❖ How will this benefit Area C?
- ❖ Will some areas benefit more than others?
- ❖ How will this negatively affect property owners? Can this be mitigated?
- ❖ How could this tie into other benefits that property owners in Area C will appreciate?
- ❖ What does the tourist/visitor need to know? How can they help?
- ❖ What does RDKB need to do to support the implementation of this DPA?
- ❖ What is missing?

We all live downstream from somewhere



RIPARIAN DEVELOPMENT PERMIT AREA

AREA

Privately owned or leased land that borders a watercourse (lake, river, wetland, creek).

GUIDELINES

- 10 metres from natural boundary of a lake,
- 30 metres from top of bank of Christina Creek and Kettle River, and
- 15 metres from top of bank of other watercourses and from natural boundary of wetlands.

Unless determined otherwise by a Qualified Environmental Professional.

CATEGORY

- Section 488.1(a) of the *Local Government Act*, protection of the natural environment, its ecosystems and biological diversity; and
- Section 488.1(b) of the *Local Government Act*, protection of development from hazardous conditions.

EXEMPTIONS

- | | |
|----------------------|----------------------|
| • Existing footprint | • Fences |
| • FireSmart | • Manual planting |
| • Weed removal | • Emergency Response |

Floodplain and Alluvial Fan Mapping (2023)

Christina Lake

CHRISTINA LAKE
PROVINCIAL PARK

LAVALLEY RD

SANDNER RD

ODE RD

Christina Creek

INUNDATION EVENT

- 10-YEAR + CC INUNDATION BOUNDARY
- 20-YEAR + CC INUNDATION BOUNDARY
- 50-YEAR + CC INUNDATION BOUNDARY
- 100-YEAR + CC INUNDATION BOUNDARY
- 200-YEAR + CC INUNDATION BOUNDARY
- 500-YEAR + CC INUNDATION BOUNDARY

Riparian Soil Parent Material, Drainage and Erodibility (2022)

Riparian Soil Parent Materials, Drainage and Erodibility

Scale: 1:10,000
Page Size: Tabloid (11 x 17 inches)

Riparian Soils Mapping to Inform Protective and Restorative Planting Initiatives



LEGEND:

TERRAIN LABEL

Surficial material
Texture(s) of surficial material
Surface expression
Surface Drainage

SURFACE EXPRESSION

- b blanket
- v veneer
- p plain
- j gentle slope
- a moderate slope
- k moderately steep slope
- s steep slope
- t terraced
- f fan
- h hummocky

TEXTURE:

- m Mud
- z Silt
- s Sand
- g Gravel
- d Mixed fragments
- r Rubble

SURFACE DRAINAGE:

- x Very rapidly drained
- r Rapidly drained
- w Well drained
- m Moderately well drained
- i Imperfectly drained
- p Poorly drained
- v Very poorly drained

SURFICIAL MATERIAL

- O Organic
- C Colluvial
- FA Fluvial (Active)
- F Fluvial (Inactive)
- L Lacustrine
- FG Glaciofluvial
- M Morainal (Till)
- R Rock

ERODIBILITY

- High
- Moderate
- Low

EROSION-PRONE AREA

- Generalized areas within which erosion is particularly likely (if not already occurring) based on observation of active channel migration/adjustment in time-lapse satellite imagery.

North American Datum 1983
Universal Transverse Mercator Projection Zone 11

Geology by: C. McGregor & R. McKillop
Cartography by: S. Murray
Date: December, 2022



WHAT CAN A LANDOWNER DO?



Complete a Riparian Zone Health Check

Is your site a candidate for Passive Restoration:

- What might grow at your site without active planting? Will you need to keep livestock out, weed control, fence from ungulates, beavers and voles?

Species Selection:

- Look at your site. What is growing close by? Do riparian plants at your site need to be tolerant to regular high water? How drought tolerant do they need to be? Soil type? Poor drainage? What animals may cause issues with the plants getting established?
- Talk to your local plant nurseries.

Questions?



Kristina Anderson: watershedplanner@rdkb.com

Determining the Health of a Riparian Zone

In order to determine the health of a riparian zone, specific information should be gathered from a riparian site that is representative of the whole stream, lake or wetland. The following checklist¹ includes some obvious signs to watch for that may indicate problems in a riparian area. Answer yes or no to the following statements:

Stream Channel	Yes	No
• active downcutting evident	☐	☐
• stream channel becoming wide and flat (except estuaries and deltas)	☐	☐
• stream channel actively moving and eroding banks and floodplain	☐	☐
• many new sand/gravel bars appearing	☐	☐
• increased sediment on stream bottom	☐	☐
• stream unable to overflow its banks during annual spring runoff	☐	☐
• increased stream width and decreased stream depth	☐	☐

Stream Banks	Yes	No
• stream bank shear damage by livestock	☐	☐
• active stream bank erosion from exposed soils	☐	☐
• bank caving from weight of animals	☐	☐
• reduction in stream bank undercuts	☐	☐

Floodplain	Yes	No
• drainage of wet meadows or lowering of water tables	☐	☐
• unusual changes in the timing and magnitude of floods	☐	☐

Vegetation	Yes	No
• reduction in streambank vegetation	☐	☐
• poor plant vigour; few large, desirable forage plants	☐	☐
• declining forage production	☐	☐
• change in plant species to drier upland types	☐	☐
• trees and shrubs are hedged	☐	☐
• reduction in overhanging vegetation into stream channel	☐	☐
• all trees and tall shrubs are old; no young trees, saplings or sprouts	☐	☐
• no trees or shrubs	☐	☐
• weed invasion	☐	☐

Wildlife	Yes	No
• fish are no longer abundant or have disappeared	☐	☐
• numbers of nesting songbirds are low	☐	☐
• wildlife species rarely observed	☐	☐

If you answered yes to the majority of these statements, you may want to consider some management changes. The following section will assist you with improving riparian area management.

¹ adapted from Adams, B. and L. Fitch. 1995. Caring for the green zone: riparian areas and grazing management. Produced by the Cows and Fish Partners. 37pp.