

Watch Lake, B.C. Lakeshore Survey

June 2008

By

Amanda Robinson

Environmental Monitoring Technician (Co-op)

Environmental Protection Division

Ministry of Environment

Thompson Region

ABSTRACT

A lakeshore survey for Watch Lake was completed by motor boat on June 17, 2008 in preparation for a long-range community land and resource planning exercise and for future lakeshore analysis and water quality evaluations.

A photograph and video catalogue was created of the developed lakeshore on Watch Lake to help better understand the nature of development on all lakeshore lands and foreshore areas and its effect on water quality. Particular attention was given to the riparian buffer zone left along the lakeshore, human-induced shoreline erosion from development and boating activity, the use of breakwaters and/or retaining walls, the setback distance of houses and outhouses from the lake, and the presence of imported sand, gravel, or treated wood structures. Overall the Watch Lake lakeshore lands and foreshore areas showed high densities of vegetation providing a functioning riparian buffer along the majority of the developed shoreline. The visible areas of concern were generally low in numbers. There was limited clearing for access and/or view, and not a lot of visible erosion.

In order to maintain and/or improve the Watch Lake water quality, lakeshore lands, and foreshore areas it is important to continue educating lakeshore owners and/or developers on the importance of maintaining a natural vegetative riparian buffer zone and following proper lakeshore practices as outlined in the Cariboo Regional District (CRD) Lakeshore Management Policy. Continual observation should also be maintained to ensure that the quality of Watch Lake's water, lakeshore lands, and foreshore areas is maintained for generations to come.

INTRODUCTION

Watch Lake Facts

The Watch Lake area is a land rich in history, wide open spaces, and abundant wildlife. Watch Lake is known for its excellent trout fishing and is located approximately 35km Southeast of 100 Mile House (Appendix A). It is a eutrophic lake, a lake with high primary productivity, resulting from high nutrient content. Its perimeter is 14.6km in length of which 70% is privately owned and 30% is crown land. It has a surface area of 260ha, a mean depth of 4.3m, and a flushing period of >7 years (CRD 2004). The lakeshore of Watch Lake supports approximately 113 developed lots which include summer cabins, permanent residences, RV parks, resorts, and public access parks and roads.

What is a Riparian Buffer Zone?

A riparian buffer zone is a natural vegetation retention zone along the water's edge that is influenced by the water body and water table and plays a crucial role for many living things. When a shoreline is cleared and native vegetation removed along with any rocks, logs, root wads, and boulders the erosion risk increases. This can result in the physical loss of shoreline property, increased flood risk, pollution from runoff, changes in nutrient input, and destruction of fish and other wildlife habitat.

What is the Benefit of Having a Riparian Buffer Zone?

The riparian buffer zone acts as an erosion protection device, flood control method, pollution prevention method, and fish and wildlife habitat and preservation area along the waters edge. The roots of a riparian buffer reinforce the soil and sand, and help to hold them together preventing land loss by protecting the shoreline from slumping or being washed away. It is more desirable to have riparian species in the riparian zone versus

upland species (i.e. typical lawn grass) because riparian species have deeper rooting capabilities and better soil holding capacities making them more efficient at reducing erosion. The leaves and plants also reduce the energy of waves and currents, slow runoff, and reduce the force of falling rain protecting the shoreline from erosion.

Vegetation, rocks, logs and boulders slow down flood waters thus reducing damage to shoreline property. Vegetated riparian buffers can affect water quality by slowing down and retaining water, settling particles, and removing nutrients and other chemicals from runoff from yards, roads, fields, and septic systems before it reaches the lake water. If properly established, a full riparian buffer can remove at least:

- 50% of chemical fertilizers
- 60% of some bacteria
- 75% of sediment (Kipp and Callaway 2002).

The riparian buffer zone provides food, nesting cover, and shelter for fish and other wildlife. It is a connecting habitat corridor enabling wildlife to safely move from one area to another and provides cover and shade keeping the water cool for fish. Insects and litter from vegetation also provides food and nutrients for aquatic life.

A vegetated riparian buffer zone is vitally important to the lakes ecosystem. It provides shade in the summer, and protection in the winter, privacy from activities on the water and other residences, protects lakeshore property and water quality. Overall a riparian buffer results in an increased quality of life for everyone involved.

METHODS

The lakeshore of Watch Lake was surveyed by motor boat on June 17, 2008. A photograph and video catalogue (Appendix C) was created for Watch Lakes developed shoreline and foreshore area to help better understand the nature of all lakeshore development. Particular attention was given to the riparian buffer zone left along the

lakeshore, human-induced shoreline erosion from development and boating activity, the use of breakwaters and/or retaining walls, the setback distance of houses and outhouses from the lake, and the presence of imported sand, gravel, or treated wooden structures in or near the water. The method used is summarized below:

- A photograph was taken of each development, including public accesses, Crown land and parks;
- Notes were taken regarding riparian buffer classification, building infringement, visible erosion, and any questionable land uses such as erosion control methods, visible pipes, artificial beaches, and treated wood structures in or near the water, and the excessive removal of vegetation;
- Video footage was taken of the entire foreshore to determine general shoreline condition and to ascertain the proportion of developed land.

Lakeshore survey guidelines (Appendix B) were developed based on the Cariboo Regional District's Shoreland Management Policy and Interior Health information. They were then used to classify the riparian buffer zones of each developed property on the lakeshore. In addition all visible areas of concern such as erosion, breakwaters and/or retaining walls, visible pipes, artificial beaches, and treated wood structures in or near the water were noted for each site. The data collected was then categorized and analyzed to provide an indication of the nature of current development on the Watch Lake lakeshore lands and foreshore areas. From this information some conclusions and recommendations were made to improve and/or maintain the quality of these areas both for now and the future.

The information gathered by the study will also be used by the Cariboo Regional District as baseline data to assist with policy development in conjunction with the Watch Lake, Green Lake, 70 Mile House and Area Official Community Planning exercise.

RESULTS

Watch Lake Data

Location:	35km Southeast of 100 Mile House
Ownership:	70% - private and 30% - crown land
Developed Lots:	approx. 113 lots
Elevation:	1128m
Perimeter:	14.6km
Surface area:	260ha
Mean depth:	4.3m
Flushing period:	>7 years

TABLE 1.1 – Summary of Data*

DEVELOPMENT	TOTAL # of Developed Lots	% of Developed Lots
Total Number of Developed Lots	113	100
Building Infringement*	59	52.2
Outhouse Infringement*	7	6.2
BUFFER CLASSIFICATION	TOTAL # of Developed Lots	% of Developed Lots
No Riparian Buffer	19	16.8
Low Riparian Buffer	14	12.4
Moderate Riparian Buffer	46	40.7
High Riparian Buffer	21	18.6
Complete Riparian Buffer	13	11.5
OTHER	TOTAL # of Developed Lots	% of Developed Lots
Visible erosion	7	6.2
Breakwaters/Retaining walls	11.5	10.2
Treated wood structures	16	14.2
Visible Pipes	7	6.2

* The data compiled in this summary is the result of field data obtained by boat that has been electronically entered from field data sheets (Appendix B) and analyzed yielding the above results. Thus it may not be completely accurate when compared with current lot maps and lot numbers.

*Setback distances for buildings and outhouses are based on the lakeshore survey guidelines (Appendix B)

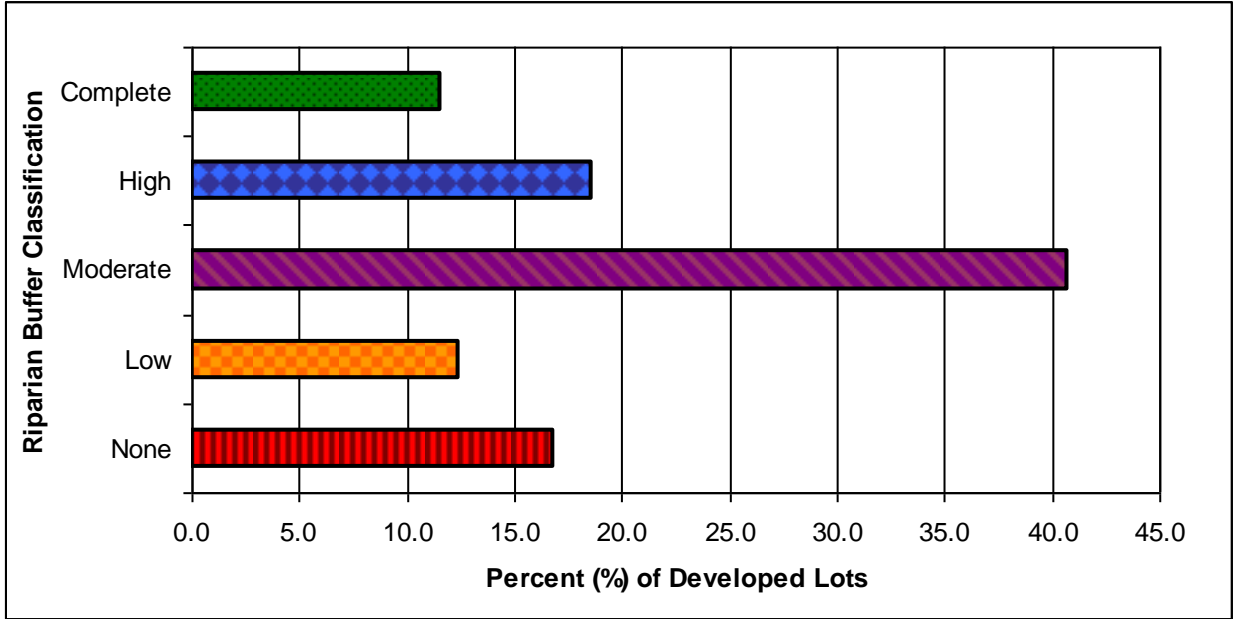


FIGURE 1.1 – A comparison of riparian buffer classification shows that the majority of the developed lakeshore on Watch Lake is within the moderate riparian buffer classification and higher. 40.7% Moderate, 18.6% High, and 11.5% Complete, classifications were based on the lakeshore survey guidelines (Appendix B)

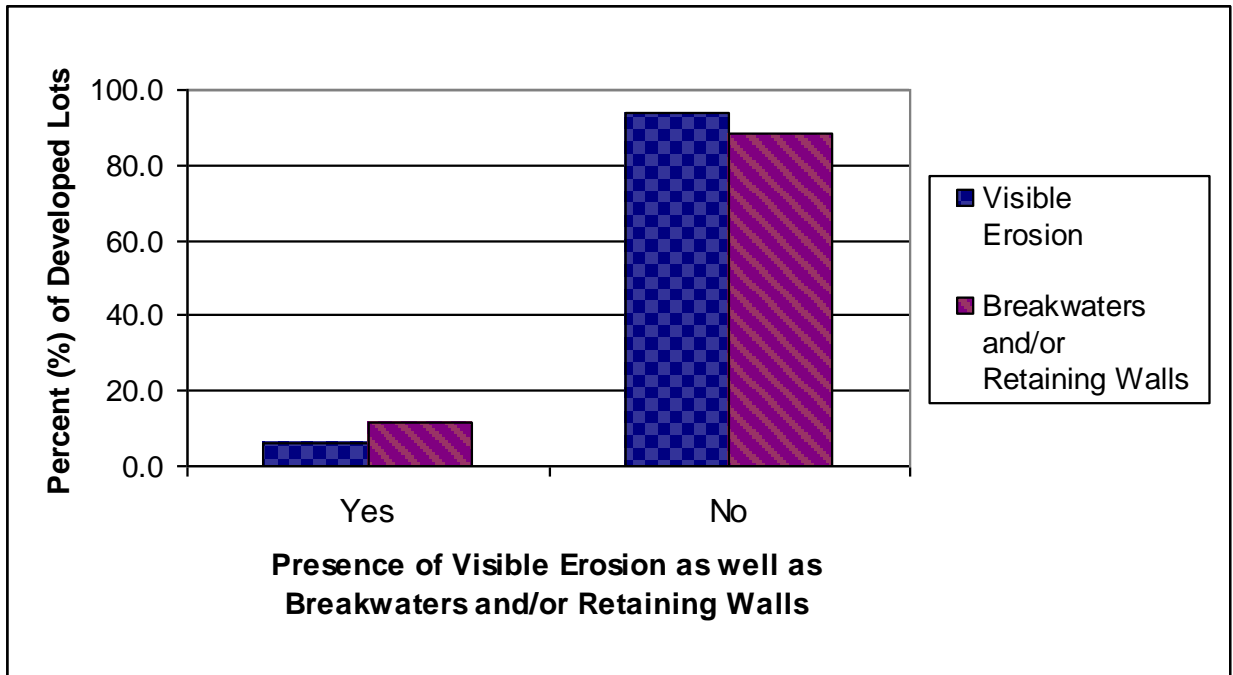


FIGURE 1.2 – The presence of a breakwater and/or retaining wall can promote erosion on neighbouring lots due to the deflection of waves and water currents from one shore onto another increasing the erosion risk. The majority of developed lots on Watch Lake do not show signs of erosion and do not have breakwaters and/or retaining walls.

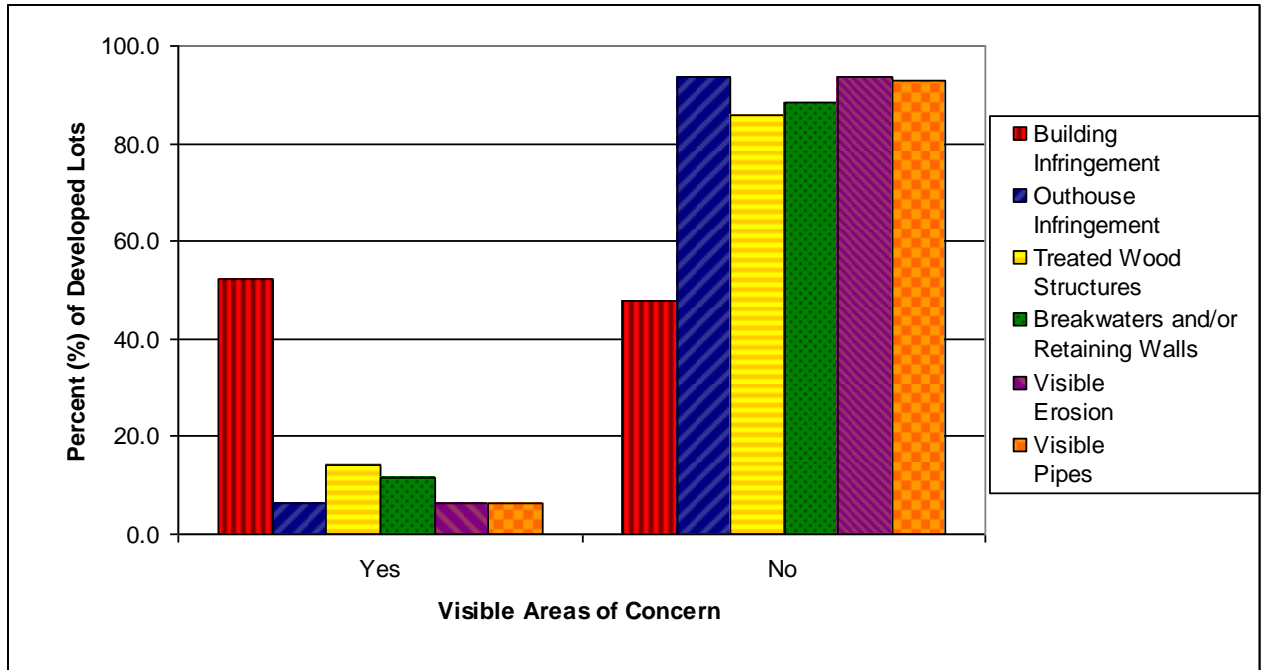


FIGURE 1.3 – An overview of the visible areas of concern clearly shows that the most visible concern is building infringement. 52.2% of the buildings on the Watch Lake lakeshore are less than 15m from the high water mark. The setback distances are based on the lakeshore survey guidelines (Appendix B).

DISCUSSION

During the Watch Lake lakeshore survey on June 17, 2008, 113 developed lots were surveyed by motor boat. Particular attention was given to the riparian buffer left along the lakeshore, human-induced shoreline erosion from development and boating activity, the use of retaining walls and/or breakwaters, the setback distance of houses and outhouses from the lake, and the presence of imported sand, gravel, or treated wooden structures in or near the water.

The following percentage of developed lots and respective riparian buffer classification was observed: 16.8% None, 12.4% Low, 40.7% Moderate, 18.6% High, and 11.5% Complete (Figure 1.1). Overall the majority of developed lots showed a riparian buffer

classification of moderate or higher suggesting that the overall condition of the lakes riparian buffer was generally functioning.

Shoreline erosion was only visible on seven (6.2%) of the developed lots along the Watch Lake lakeshore. In five of the seven cases the erosion was due to steep slopes and the resulting foot traffic and removal of vegetation allowing for lake access. The other two cases were due to cattle accessing the lake for drinking water. The low occurrence of erosion may be due in part to the high percentage of densely vegetated riparian buffers. The low presence of breakwaters and/or retaining walls may also have contributed to the lack of visible erosion due to the lack of deflection of waves and water currents from neighbouring breakwaters and/or retaining walls (Figure 1.2).

An overview of the visible areas of concern (Figure 1.3) clearly shows that the most visible area of concern is building infringement. 59 (52.2%) of the buildings on the Watch Lake shoreline are less than 15m from the high water mark as is the recommended distance according to the CRD Shoreland Management Policy. Infringing buildings are problematic because they leave insufficient room for a natural vegetated riparian buffer zone and adequate distance between septic systems and the lake. This can result in the physical loss of property, increased flood risk, pollution from runoff, destruction of fish and other wildlife habitat, and changes to nutrient input affecting water quality.

Outhouse infringement was also observed on seven (6.2%) of the developed lots where outhouses were closer than 30m from the high water mark as is the recommended distance according to the CRD Shoreland Management Policy and Interior Health . This can result in the contamination of the lake water with disease-causing parasites, harmful strains of bacteria, and nutrient rich sewage.

Also of concern were 16 (14.2%) of the developed lots that had treated wood structures in or near the water. The use of treated wood should always be avoided where possible to reduce the risk of introducing toxic preservative chemical leachate into the lake water. It was also observed that seven (6.2%) of the developed lots had pipes going into the lake. It appeared that most if not all of the pipes were water intake pipes as opposed to effluent discharge pipes which are not permitted into the lake. This assumption was made based on the small diameter of the pipes and the presence of pumps or pump houses from which the pipes often ran to or from.

CONCLUSION

Overall the Watch Lake lakeshore lands and foreshore areas showed high densities of vegetation providing a functioning riparian buffer along the majority of developed lots along the shoreline. The visible areas of concern were generally low in numbers. There was limited clearing for access and/or view, and not a lot of visible erosion.

RECOMMENDATIONS

In order to maintain and/or improve Watch Lakes water quality, lakeshore lands, and foreshore areas it is important to continue educating lakeshore owners and/or developers on the importance of maintaining a natural vegetative riparian buffer zone and following proper lakeshore practices. Some examples of available educational information include the following:

- On the living Edge: Your Handbook to Lakeshore Living, by Sarah Kipp and Clive Callaway
- CRD Shoreland Management Policy, available online at www.crd.bc.ca
- CRD Protecting Water Quality and Shorelines brochure, available online at www.crd.bc.ca

- Interior Health Privy (outhouse) and Vault Privy Information, available at your nearest Interior Health office
- Waterfront Living information and brochure, available at www.livingbywater.ca

Current developments should be encouraged to improve their current riparian buffer zones as much as possible. This can be accomplished by planting/replanting natural vegetation and using natural water break methods as opposed to retaining walls and imported breakwaters.

New development should continue to be encouraged to correspond with the CRD Lakeshore Management Policy and district lot sizes should consistently be large enough to support adequate septic systems and riparian buffer zones.

Continual observation should be maintained to ensure that the quality of Watch Lake's water, lakeshore lands, and foreshore areas is maintained for generations to come.

REFERENCES

Cariboo Regional District, 2004. Shoreland Management Policy, CRD, Williams Lake, BC.

Kipp, S., and Callaway, C., 2002. On the Living Edge: Your Handbook for Waterfront Living. BC ed. FBCN, Canada.

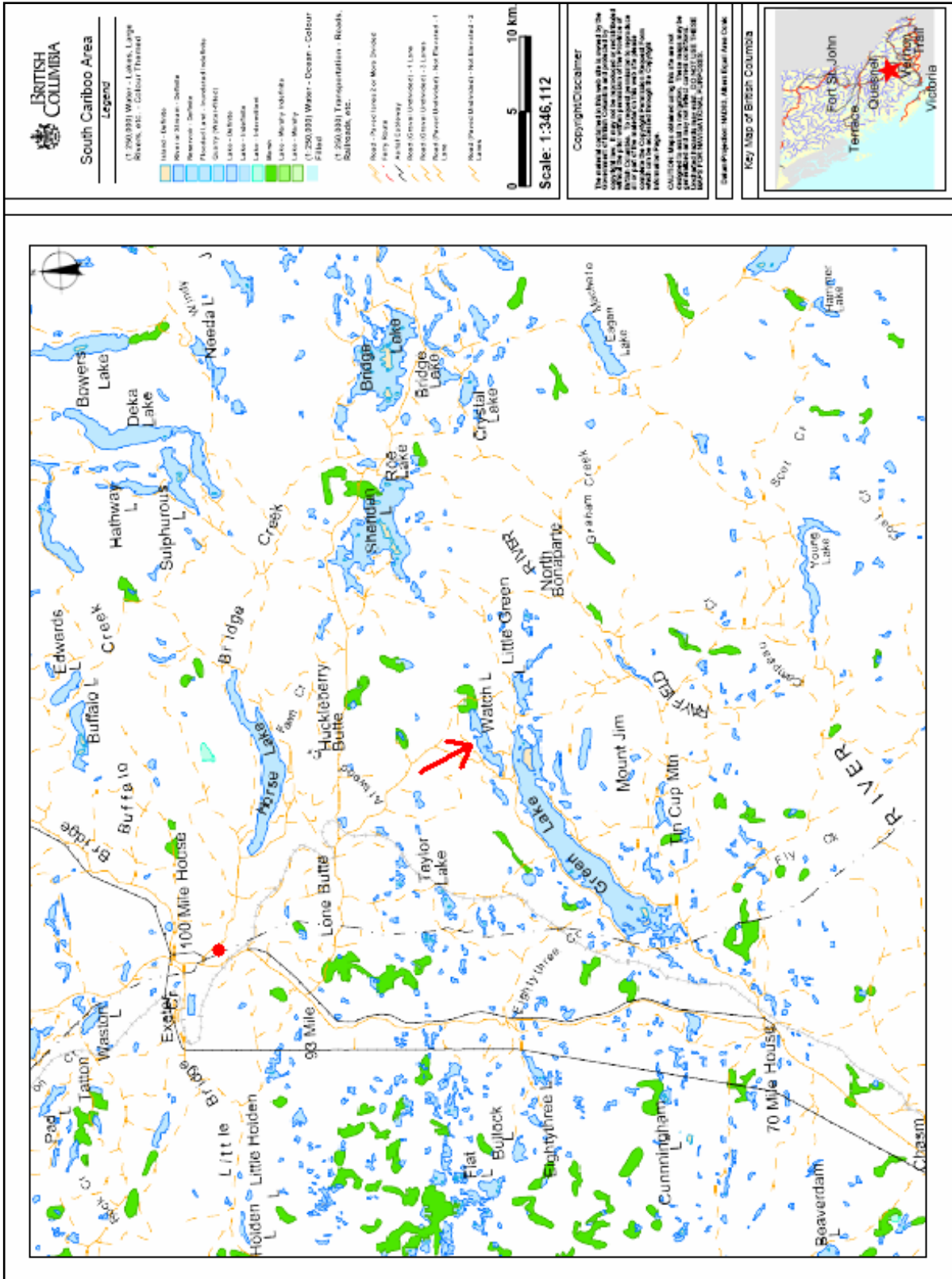
Interior Health, 2006. Privy and Vault Privy Information, Health Protection, Canada, BC

Cariboo Regional District, 2004. Protecting Water Quality and Shorelines, www.crd.bc.ca, CRD, Williams Lake, BC.

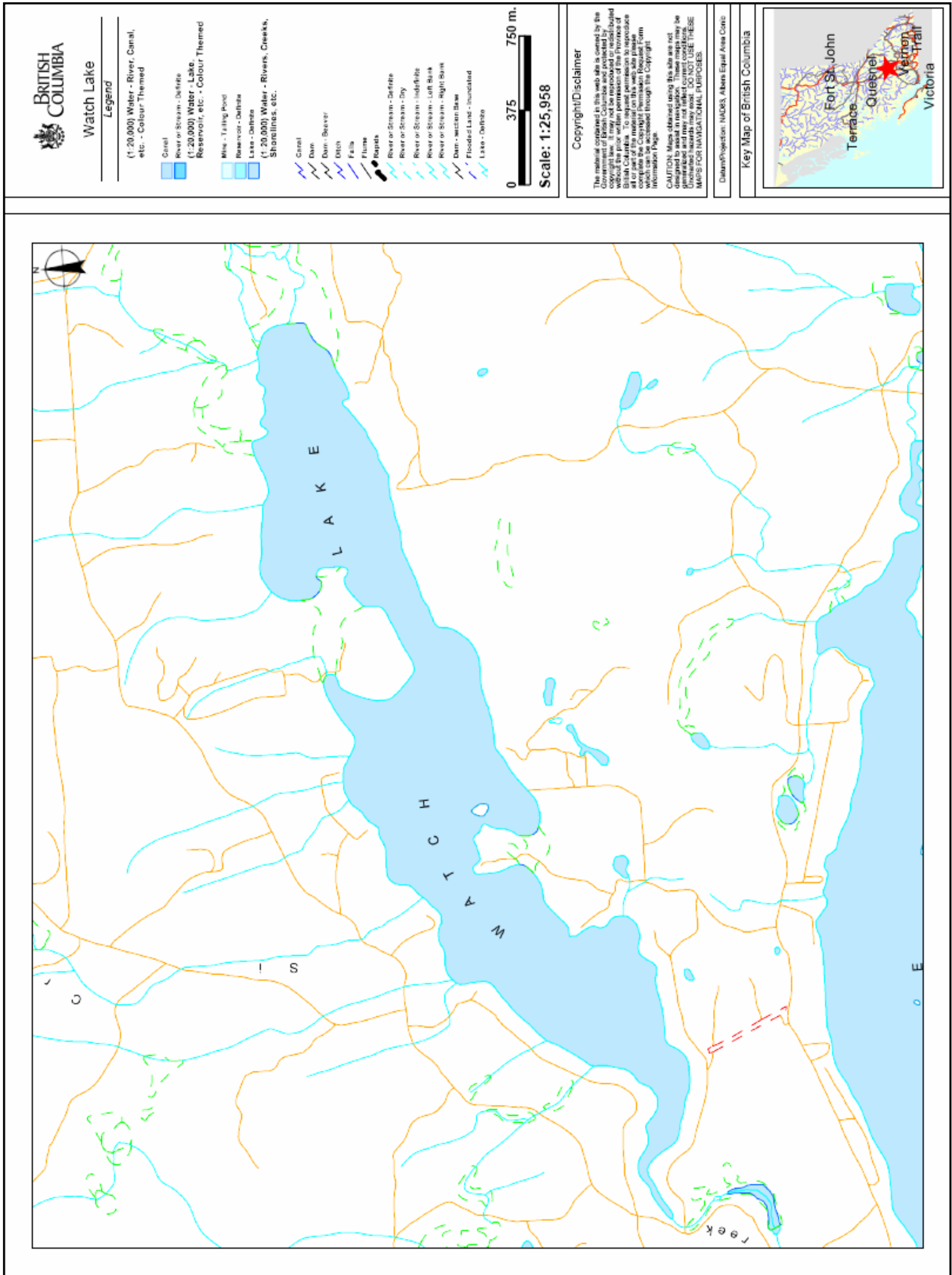
Environment Canada, Waterfront Living, www.livingbywater.ca

APPENDIX A

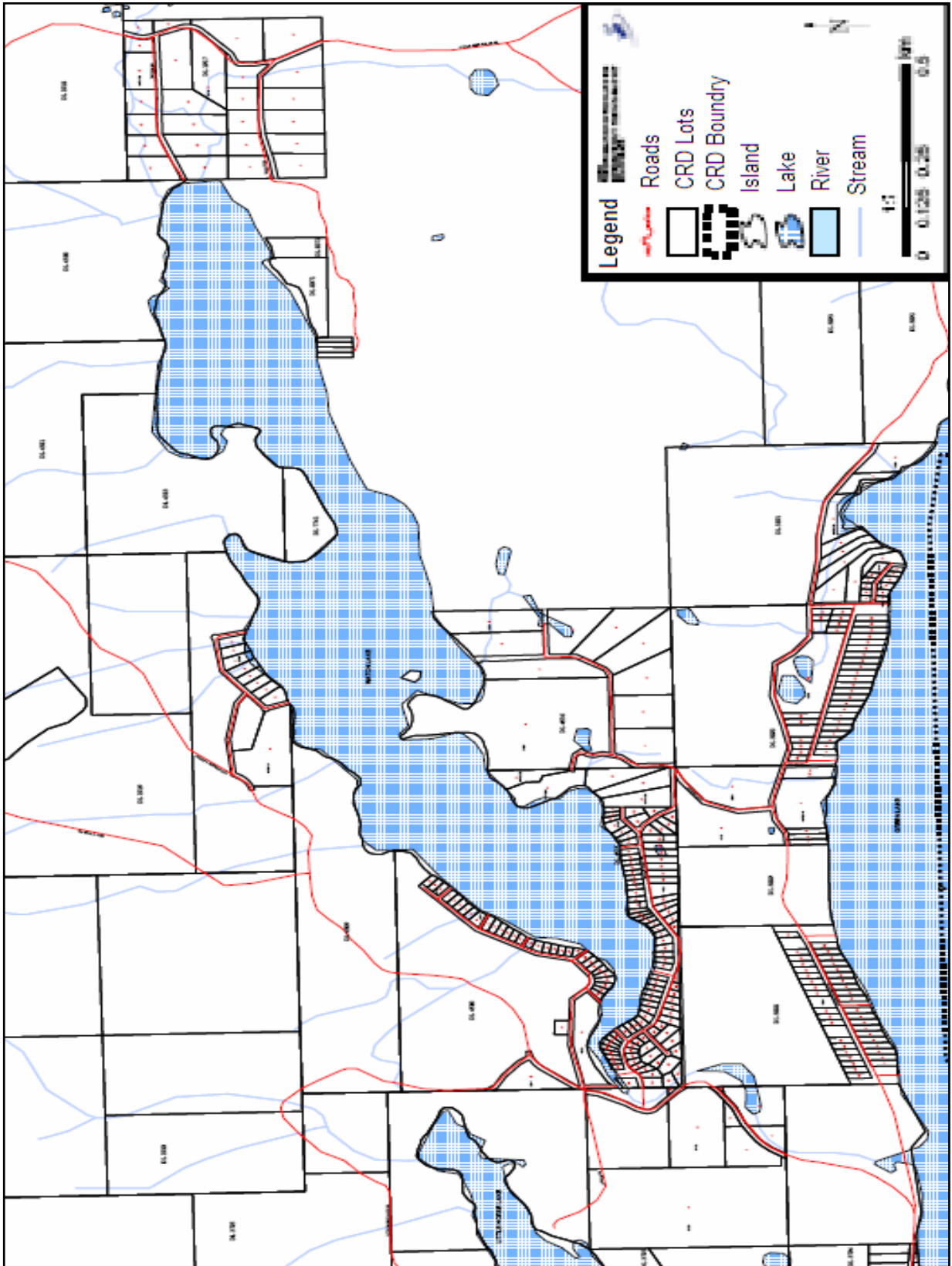
(i) South Cariboo Area Map



(iii) Watch Lake Map



APPENDIX A - Watch Lake District Lot Map (CRD)



APPENDIX B - Lakeshore Survey Guidelines

Lakeshore Survey Guidelines for Riparian Buffer Classification		
Riparian Buffer Classification	Description	
None	Mowed lawn or exposed ground to shoreline. Few if any trees or shrubs present on lawn.	
Low	Some tall grasses/shrubs in sparse patches along <30% of shoreline or in a very narrow strip OR mowed lawn with some interspersed trees or shrubs, not necessarily directly along the shoreline.	
Moderate	Strip of trees or shrubs several meters wide along >30% of shoreline OR when a high level of vegetation is retained on the property, but the proximity of the house to the water does not leave room for a sufficient buffer OR when the entire lawn has been left un-mowed, allowing the generation of tall grasses, but few or no shrubs and trees are present along the shoreline.	
High	Densely vegetated strip of trees and/or shrubs and herbaceous plants at least several meters wide along 70% (TNRD), 75%(CRD), or all of shoreline with small amounts of clearing for access and view.	
Complete	TNRD*	CRD*
	Minimum 15m, from streams , and 30m, from lakes , of vegetation in its natural state along entire shoreline, including trees as well as shrub and herbaceous understorey. Only 30% clearing to allow for access or view.	Minimum 15m of vegetation in its natural state along entire shoreline, including trees as well as shrub and herbaceous understorey. Only 25% clearing to allow for access or view.
Encroachment Distances from Lakeshore*		
Structure	Minimum Distance from Lakeshore	
	TNRD*	CRD*
Boathouse	Allowed at any distance at a size \leq 25% of lots water frontage	Allowed at any distance
Outhouse	30m	30m
Any Structure Excluding Boathouse/Outhouse	30m	7.5m
Septic Field	100m, if <100m property owner must consult a qualified professional)	35m
<i>*(TNRD) Thompson Nicola Regional District</i>		
<i>*(CRD) Cariboo Regional District</i>		
<i>*Distances according to the TNRD Lakeshore Development Guidelines and the CRD Lakeshore Management Policy</i>		
<i>*Distances from Lake for outhouses according to Interior Health Recommendations</i>		
Methods		
<ul style="list-style-type: none"> • A photograph will be taken of each residence or developed area • Notes will be taken regarding riparian buffer classification, building/outhouse infringement, visible erosion, and any questionable land uses such as erosion control methods, effluent-type pipes, artificial beaches, treated wood structures in/near the water, and excessive removal of vegetation. • Panoramic photographs will be taken of the lakeshore to determine general shoreline condition and proportion of developed land. 		

APPENDIX B - Field Data Sheets

					Page	of
Lakeshore Survey - Field Data Sheet						
Lake:			Date:		Initials:	
Plan/Lot #	Riparian Buffer Classification	Outhouse/Building Infringement	Other (Erosion Control, Visible Erosion, Artificial Beaches, Pipes, Treated Wood Structures, Excessive Removal of Vegetation)			Photo #