



Guidance for Determining High Water Marks for Lakes in the Okanagan under the Riparian Areas Regulation



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Ministry of Forests, Lands and Natural Resource Operations
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COVER PHOTOS

Clockwise from left: natural foreshore on Vaseux Lake; natural foreshore on Ellison Lake; marina development on Okanagan Lake; erosion protection structure on Okanagan Lake (©2013 Josie Symonds)

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1.0 INTRODUCTION

The Okanagan Valley in British Columbia is defined by numerous lakes. These lakes are influenced by natural hydrological processes such as flooding from snowmelt and rainfall events, as well as drought conditions resulting from low precipitation. These lakes also experience substantial wave action due to their typically large surface areas and north-south orientations that parallel the prevailing wind patterns in the valley. Water levels within some of these lakes, including many of the valley bottom large lakes, are actively managed by dam structures, with target lake levels established for different months or seasons of the year. These factors have resulted in uncertainty over how the “high water mark”¹ (HWM) is determined for various lakes in the Okanagan under the provincial Riparian Areas Regulation (RAR; Province of British Columbia 2004). The Ecosystems Section of Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) provides the following guidance to “qualified environmental professionals” (QEPs) to address this uncertainty.

2.0 DEFINING THE HIGH WATER MARK

Section 1(1) of the provincial RAR defines the HWM of a “stream” (including lakes) as follows, which includes the “natural boundary” (as defined under the provincial *Water Act*; Province of British Columbia 1996b) plus the “active floodplain” of the stream:

High Water Mark: The visible high water mark of a stream 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 stream 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

Section 3.8.1.2 of the RAR Schedule (RAR Assessment Methods) identifies that “natural boundary” is a term used in lakeshore surveys that does not always match the existing HWM, despite the similar definitions presented in provincial legislation. As such, this section of the RAR Schedule identifies HWM separately for ungauged lakes, gauged lakes and reservoirs as follows to allow a more appropriate HWM to be determined for these lake types²:

High Water Mark (Ungauged Lake): The high water mark where the presence and action of annual flood waters are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the body of water a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself, and includes areas that are seasonally inundated by floodwaters

High Water Mark (Gauged Lake): A calculated lake level that agencies have agreed upon, which includes those areas that are seasonally inundated more frequently than once in five years on average

High Water Mark (Reservoir): Full pool

These various HWM definitions have complicated HWM determination in the Okanagan where the visible HWM has the potential to vary substantially from the surveyed “natural boundary.”

¹ Definitions for all words in quotation marks are provided in this document

² RAR does not provide definitions for the terms ungauged lake, gauged lake, and reservoir

3.0 DETERMINING THE SITE-SPECIFIC HIGH WATER MARK

The following sections provide guidance to QEPs for determining site-specific HWMs for ungauged lakes, gauged lakes, and reservoirs in the Okanagan under RAR.

3.1 Ungauged Lakes

The HWM of ungauged (i.e., non-measured, natural) lakes that are not actively managed by dam structures will be determined using natural indicators as per the HWM (Ungauged) definition identified in the RAR Schedule. Examples of ungauged lakes in the Okanagan include Ellison (aka Duck) Lake and Mabel Lake.

3.2 Gauged Lakes

The HWM of gauged (i.e., measured, managed) lakes will be based on the highest target lake level (HTLL) as established under a provincial operating plan for still water conditions, and take into account natural hydrological processes and wave action as determined by site-specific bathymetry and fetch lengths. These lakes will surpass the HTLLs during flood conditions, which may occur more frequently in the future due to climate change (Ministry of Environment 2011a). The HTLLs are periodically updated to reflect current management practices that balance the needs of numerous uses, including water licenses, recreational activities and fisheries values.

- The **recommended HWM** for a site is the **HTLL plus 0.5 m** to account for wave action. This value has been measured as the average HWM in exposed foreshore areas of Okanagan Lake and is commonly applicable to other large lakes as well. The HWM for the majority of sites should be the recommended HWM.
- As an exception, the HWM for some sites may be either higher or lower than the recommended HWM where natural indicators on the shoreline (e.g., change in soil, change in vegetation) show that wave action or other hydrological processes affect the shoreline to such an extent that the recommended HWM is not applicable at that site (e.g., highly exposed or sheltered sites). A site-specific HWM can only be used where the QEP has provided a signed and sealed technical rationale for why the recommended HWM is not applicable. The technical rationale must include photo documentation of the site shoreline with a stake or marker indicating the location of both the recommended HWM and the proposed HWM.
- The minimum acceptable HWM is the HTLL plus 0.1 m.

Table 1 provides the HTLL, recommended HWM, and minimum HWM for select lakes based on available provincial operating plans. For the purposes of this guidance document, each lake listed here is considered to be a gauged lake in the Okanagan.

Table 1 High Water Mark for Gauged Lakes in the Okanagan

Lake	Highest Target Lake Level (HTLL)* (m)	Recommended HWM (HTLL + 0.5 m)	Minimum HWM (HTLL + 0.1 m)
Wood Lake	391.67	392.2	391.8
Kalamalka Lake	391.67	392.2	391.8
Okanagan Lake	342.48	343.0	342.6
Skaha Lake	338.00	338.5	338.1
Vaseux Lake	327.60	328.1	327.7
Osoyoos Lake	278.28	278.8	278.4

*Sources: MFLNRO *Kalamalka Lake Operating Plan* (Wood, Kalamalka); MFLNRO *Okanagan Lake Regulation System Operating Plan* (Okanagan, Skaha, Vaseux); 1982 *International Joint Commission Order of Approval* (Osoyoos); elevations updated from source documents to reflect current practices

3.3 Reservoirs

Reservoirs are defined for the purposes of this guidance document as artificial lakes or impoundments from a dam that primarily exist to store water, but do not include the lakes listed in Table 1. Examples of reservoirs in the Okanagan include Sugar Lake, Swalwell (aka Beaver) Lake, Chute Lake, and Headwaters Lake(s). The HWM for reservoirs is the full pool elevation as per the HWM (Reservoir) definition identified in the RAR Schedule.

4.0 RELATION TO THE WATER ACT

Section 1 of the provincial *Water Act* defines the “natural boundary” of a “stream” (including lakes) as having the same meaning as in the provincial *Land Act* (Province of British Columbia 1996a). Natural boundary lines on legal surveys are often based on historical survey data that may not accurately reflect current stream natural boundaries, particularly in areas where accretion or erosion have occurred. There is no definition for HWM under the *Water Act* or the *Land Act*.

Natural Boundary: The visible high water mark of any lake, river, stream or other body of water 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 body of water a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself

Activities at or below the natural boundary of a site may be regulated by the *Water Act* (e.g., Section 9 Approval or Notification for “changes in and about a stream”) and the *Land Act* (e.g., land tenure). Activities above the natural boundary may also be regulated by the *Water Act* where they affect the “stream channel.” Activities above the HWM are regulated by RAR throughout most jurisdictions in the Okanagan. All activities within large lakes in the Okanagan (including all lakes listed in Table 1) must follow the *Okanagan Region Large Lakes Foreshore Protocol* (Ministry of Environment 2009), which establishes different coloured sensitivity zones for these lakes based on the presence of regionally significant fish and species at risk. Works requiring a Notification under the *Water Act* must also follow the *Okanagan Region Habitat Officer’s Terms and Conditions for Changes in and about a Stream* (Ministry of Environment 2011b), which may also be applicable to *Water Act* Approvals. Additional provincial and region-specific guidance for instream works is available online³.

³ <http://www.env.gov.bc.ca/wld/BMP/bmpintro.html#first>

5.0 ADDITIONAL DEFINITIONS

5.1 Riparian Areas Regulation

The following additional definitions from the provincial RAR were referred to in this guidance document:

Active Floodplain: an area of land that supports floodplain plant species and is (a) adjacent to a stream that may be subject to temporary, frequent or seasonal inundation, or (b) within a boundary that is indicated by the visible high water mark

Qualified Environmental Professional: an applied scientist or technologist, acting alone or together with another qualified environmental professional, if (a) the individual is registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association, (b) the individual's area of expertise is recognized in the assessment methods as one that is acceptable for the purpose of providing all or part of an assessment report in respect of that development proposal, and (c) the individual is acting within that individual's area of expertise

Stream: includes any of the following that provides fish habitat: (a) a watercourse, whether it usually contains water or not; (b) a pond, lake, river, creek or brook; (c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph (a) or (b)

5.2 Water Act

The following additional definitions from the provincial *Water Act* were referred to in this guidance document:

Changes in and about a Stream: means (a) any modification to the nature of a stream including the land, vegetation, natural environment or flow of water within a stream, or (b) any activity or construction within the stream channel that has or may have an impact on a stream

Stream: includes a natural watercourse or source of water supply, whether usually containing water or not, and a lake, river, creek, spring, ravine, swamp and gulch

Stream Channel: means the bed of a stream and the banks of a stream, whether above or below the natural boundary and whether usually containing water or not, including all side channels

6.0 REFERENCES

International Joint Commission. 1982. *Order of Approval in the Matter of the Application of the State of Washington for Approval to construct a Control Structure near the Outlet of Osoyoos Lake*, <http://www.ijc.org/php/publications/html/osoyoos/orders.htm>

Ministry of Environment. 2011a. *Climate Change: Provincial Impacts*, <http://www.env.gov.bc.ca/cas/impacts/bc.html>

Ministry of Environment. 2011b. *Habitat Officer's Terms and Conditions for Changes in and about a Stream specified by Ministry of Environment Habitat Officers, Okanagan Region*, http://www.env.gov.bc.ca/wsd/regions/okr/wateract/terms_and_conditions_april-2011.pdf

Ministry of Environment. 2009. *Okanagan Region Large Lakes Foreshore Protocol*, <http://www.env.gov.bc.ca/okanagan/esd/ollp/ollp.html>

Ministry of Forests, Lands and Natural Resource Operations. No Date. *Kalamalka Lake Operating Plan*, Penticton, B.C.

Ministry of Forests, Lands and Natural Resource Operations. No Date. *Okanagan Lake Regulation System Operating Plan*, Penticton, B.C.

Province of British Columbia. 2004. *Riparian Areas Regulation B.C. Reg. 376/2004*. Queen's Printer, Victoria, B.C., http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/10_376_2004

Province of British Columbia. 1996a. *Land Act [RSBC 1996] Chapter 245*. Queen's Printer, Victoria, B.C., http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96245_01#section1

Province of British Columbia. 1996b. *Water Act [RSBC 1996] Chapter 483*. Queen's Printer, Victoria, B.C., http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96483_01