



Preparing for Next Freshet:

Water Sustainability Act and Flood Response, Reporting and Recovery

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2018 QP Workshop
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Presentation Outline



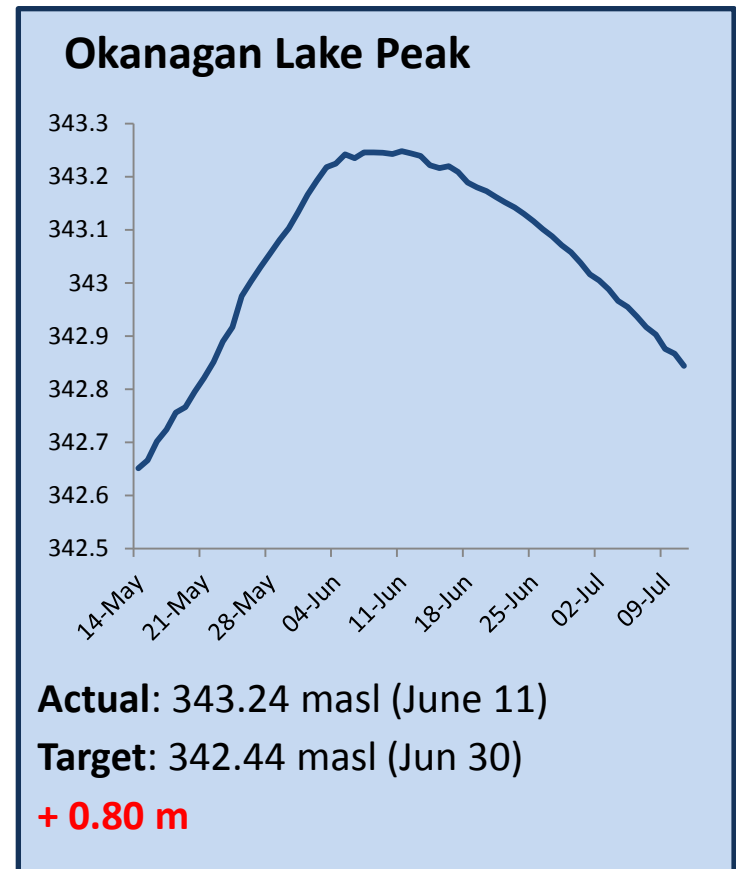
1. Okanagan Flood Event 2017
2. Post-Flood Recovery and WSA
3. Sedimentation & Channel Dredging
4. Preparing for 2018 Freshet

Okanagan Flood Event 2017

Flood 2017

A Historic Event

- One of worst flood seasons in BC Interior
- Snowpack in Feb and Mar were indicators of drought
- Precipitation in Feb, Mar, Apr: 150-300% of normal
- Late fall rains left saturated soil conditions, intensifying runoff in spring
- Inflows to Okanagan Lake increased rapidly

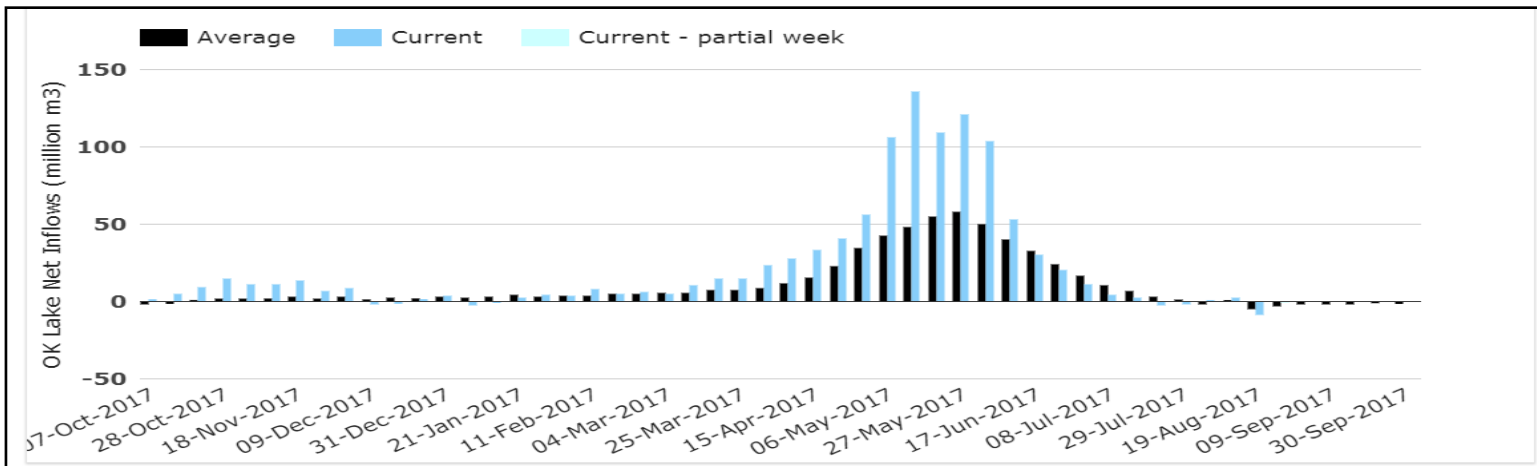


Flood 2017

A Historic Event

- Okanagan Lake inflows in 2017 almost double average
- 2017 (to June 21): 900 million m³
- Okanagan Lake dam (at Penticton): release 40 million m³ per week
- High water was sustained well into fall

Okanagan Lake Weekly Inflows



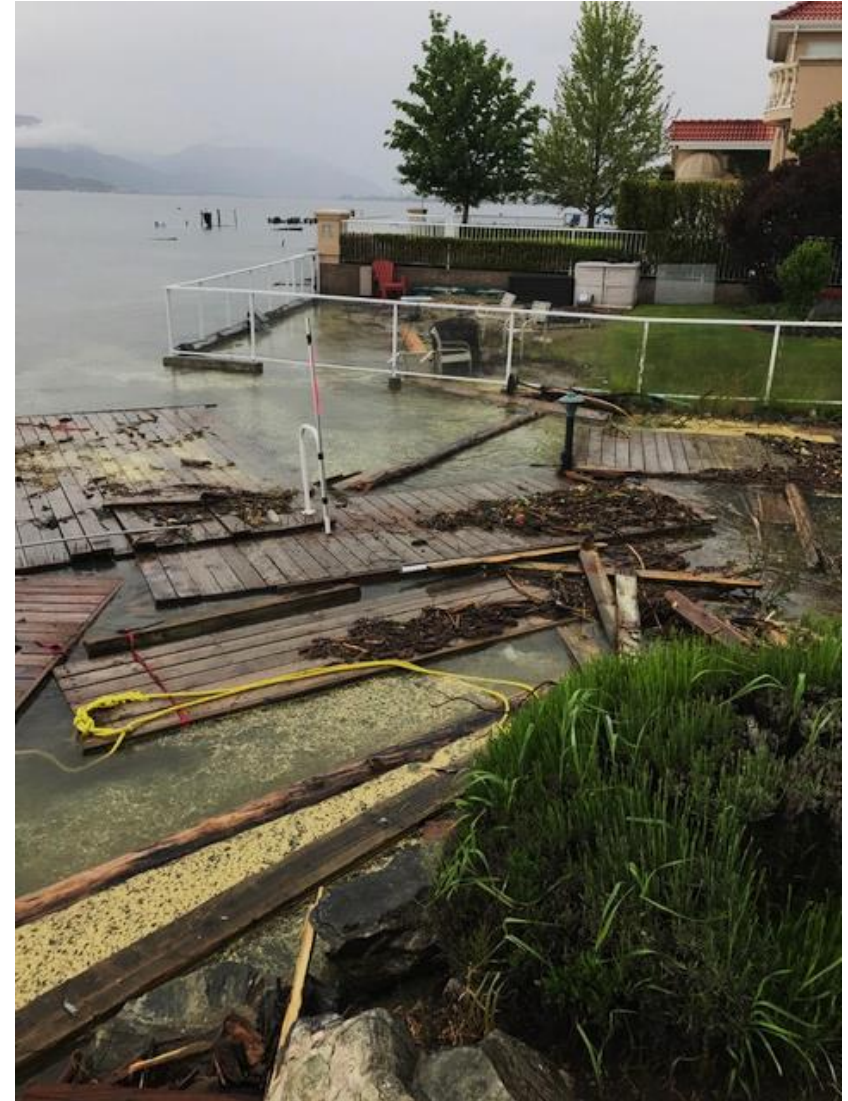
Flood 2017

Okanagan Lake: Foreshore



Flood 2017

Okanagan Lake: Docks



Flood 2017

A Lot of Emergency Instream Work!

- Sandbags (2.5 to 3 million) and tiger dams
- Shoreline protection
- Dredging
- Temporary berm construction
- Culvert replacements



Flood 2017

What FLNRORD is Doing



- Okanagan Flood Recovery Team based in Penticton/Vernon
- Additional dedicated Water, Lands and Ecosystems staff
- New FrontCounter BC office in Kelowna
- Dedicated FCBC staff available at 1-877-855-3222 to assist proponent with recovery
- Information bulletins and news releases to assist LG and waterfront landowners with recovery

Flood 2017

What FLNRORD is Doing: C&E

- Increased Compliance and Enforcement presence on Okanagan Lake
- Summary to end of 2017:
 - Two boats (north, south); 40+ days
 - 119 inspections: 62 compliant, 57 alleged non-compliant
 - Focussed on education/compliance with landowners
- **2018: new boat, increased presence, more lakes (Shuswap, Okanagan, Kalamalka, Skaha...)**



Post-Flood Recovery and the *Water Sustainability Act*

Post-Flood Recovery and WSA

Normally a Change Approval Application

- Dredging
- Bank Erosion Protection (unless prior approval)
- Lake/Stream Infill
- Retaining Walls
- Some Bridge Repairs



Post-Flood Recovery and WSA

Application Information

- **Dredging:** area, depth, volume, crown land tenure, disposal, sediment transport study
- **Bank Erosion Protection:** representative x-sections & plan with length, PNB, property lines
- **Lake/Stream Infill:** PNB, area, volume, property line, crown land tenure



Post-Flood Recovery and WSA

Application Information

- **Replacement Retaining Walls:**
PNB, property lines,
engineering, sediment
transport study, effects on
adjacent shoreline
- **Bridge Repairs to Foundation:**
engineered design, Q200 level,
scour modeling.



Post-Flood Recovery and WSA

Both Change Approval and Notification

- Landowner consent
- Construction environmental management plan – isolating the works
- Rationale and mitigation for work outside least risk window



Sedimentation & Channel Dredging

Sedimentation & Channel Dredging

Why?

- Accommodate flood flows
- Navigation
- An issue of channel capacity

Where?

- Accumulations
- Reduction in velocity
- Confluence with lake or stream
- Storm drain outlets



Sedimentation & Channel Dredging

Where

- ↓ in velocity
- ↓ in bedload carrying capacity
- Bridges and culverts
- Gravel bars



Sedimentation & Channel Dredging

Bridges

- How deep is that river?
- How much clearance is needed?



Sedimentation & Channel Dredging

Clearance or Sedimentation Issue?



Sedimentation & Channel Dredging

Alluvial/ Fluvial Fans



Sedimentation & Channel Dredging

Culverts



Sedimentation & Channel Dredging

When to Dredge?

- During the flood?
- Safety?
- Effectiveness?



Sedimentation & Channel Dredging

When to Dredge?

- Right before freshet?
- Expensive
- Habitat and population impacts (e.g., kokanee eggs in gravels)



Sedimentation & Channel Dredging

When to Dredge?

- Dry?
- Preferred!



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Preparing for 2018 Freshet

2017: A Historic Event?? Or the New Normal

- Climate change projections are that these types of events will happen with greater frequency and intensity
- **2017 event resulted in new erosion and sediment sources**
 - Contributes to higher sediment loads and sediment accumulation
 - Concern over how that might affect future flooding likelihood
- Not all damage from the 2017 event has been addressed (e.g., blocked culverts, failed erosion protection, increased bedload)
 - This may lead to subsequent flood emergencies

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Water Sustainability Act and Flood Emergencies



- Working within existing legislation
- Flood-related information bulletins to assist LGs and public (*see **Workshop Package***):
 - *Flood Emergency Works and Recovery Information for Local Governments*
 - *Flood Recovery Information for Waterfront Landowners*
- Increased Provincial resources to facilitate timely authorizations

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Local Governments



Under the Water Sustainability Regulation, LGs are authorized to:

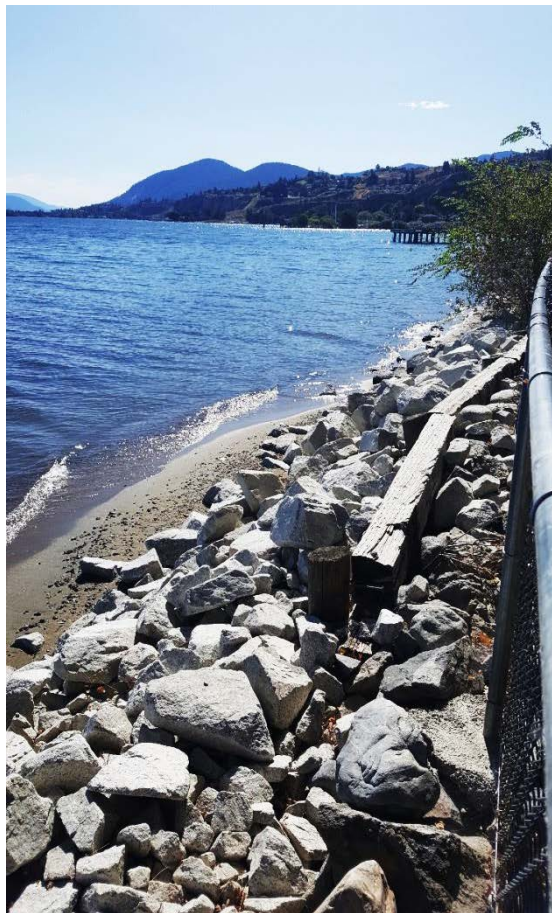
1. Construct or place erosion protection works or flood protection works during a declared flooding emergency
2. Clear obstructions from bridges or culverts during a flood where there is a potential for significant risk of harm

These are the only works that can be done without an authorization in hand



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Local Governments: Reporting Requirements



- LGs are required to report emergency works to a Habitat Officer (HO) within 72 hours
- **Legal requirement whether the works were authorized and/or funded by Emergency Management BC (EMBC) or completed using LG resources**
- HO may specify terms and conditions for the protection of aquatic habitat
- LG may be required to take measures to remediate the site

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Waterfront Landowners

- Landowners must retain authorization under Section 11 of WSA if works will result in Change in and about Stream
- All authorized flood protection works must occur on private property
- Landowners can place sandbags without WSA authorization
- **There are no exceptions under the WSR for non-flooding emergencies**

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LG vs. Waterfront Landowner Comparison



LG Works = Authorized during flooding emergency subject to HO notification within 72 hours



Landowner Works = Not authorized during flood; option to sandbag or apply for authorization

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How QPs can Assist in Flood Emergencies

- LGs are encouraged to retain QPs during flood emergency works where possible:
 - Provide environmental monitoring services
 - Assist contractor in following best management practices
- This will likely reduce the need for subsequent HO terms and conditions for the protection of aquatic habitat
- QPs can assist LGs with meeting reporting requirements
- QPs can assist with post-flood assessments to determine need for subsequent works and/or remediation

Questions?

