1. Introduction
2. Project Background and Process
3. Outlet Options
4. Next Steps
Who We Are
Local Expertise, Community focus

Steve Arends, P.Eng

Doug Nuttall, P.Eng

Alex Sereda, E.I.T.
Our Perspective
Responsibilities of an Engineer

1. Duty to protect public health & safety
2. Duty to protect property & the environment
3. Duty to the client
Project Background

Jp2g Methodology

1. Desktop review of existing documentation, correspondence, modeling, etc
2. Site Investigation
3. Public survey and stakeholder consultation
4. Option Analysis and Recommendation
Desktop Review
Reports, Studies, and Recommendations

Elevation of Access Roads

- Elevation points are shown along Roads 09, 010 and 011B
- Lowest recorded points:
  - Road 09 – 125.092 m
    - 1.100 – 40.8 cm of water
    - 2014 – ~37.9 cm of water
  - Road 010 – 125.196 m
    - 1.100 – 30.4 cm of water
    - 2014 – ~27.5 cm of water
  - Road 011B – 125.128 m
    - 1.100 – 37.2 cm of water
    - 2014 – ~34.3 cm of water

Report to the Municipal Services Committee
January 24, 2018
Otter Lake, Outlet and Creek Follow-up Report

Rideau Lakes Subwatershed Report 2014
LOWER RIDEAU LAKE CATCHMENT

Elevation points are shown along Roads 09, 010 and 011B.

Lowest recorded points:
- Road 09 – 125.092 m
  - 1.100 – 40.8 cm of water
  - 2014 – ~37.9 cm of water
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- Road 011B – 125.128 m
  - 1.100 – 37.2 cm of water
  - 2014 – ~34.3 cm of water
Site Investigation
April 18, 2019
Site Investigation
April 18, 2019
Public Survey and Stakeholder Consultation

1. Jp2g: 300 hard copies printed and distributed
2. Township: Online survey and print advertisements
3. ~250 responses received (hard copy returns, email, online response)
4. Will be accepting further survey responses and stakeholder input until June 24th
Public Survey and Stakeholder Consultation

Q2: Role
(% of Respondents)

- Resident
- OLLA Member
- General Interest
- Other
Public Survey and Stakeholder Consultation

Q3: How are you impacted by lake water levels?

- Private Road Access: 14%
- Public Road Access: 1%
- Recreational use: 58%
- Shoreline flooding or erosion: 7%
- Other: 49%
Q4: Have you experienced negative impacts from high water levels?

- Private Road Flooding: 10%
- Public Road Flooding: 0%
- Water encroachment on private property: 7%
- Shoreline Erosion: 6%
- Other (None): 71%
Public Survey and Stakeholder Consultation

Q5: Have you experienced negative impacts from low water levels?

- Boating/swimming access and safety: 70%
- Water intake issues: 20%
- Weeds: 50%
- Dock damage: 30%
- Other (None): 10%

Q5: Have you experienced negative impacts from low water levels?
Q6: How do you feel about the average water level in Otter Lake?

- Should be lower: 3%
- Should be higher: 38%
- Should be maintained to match existing condition: 59%
Public Survey and Stakeholder Consultation

Q7: How do you feel about the seasonal high water level in Otter Lake?

- Should be lowered to protect private property: 3%
- Should be lowered to protect private road access: 6%
- Should be lowered to protect public road access: 1%
- Should be lowered to prevent shoreline erosion: 4%
- Should be left alone: 94%
Public Survey and Stakeholder Consultation

Q8: Please rank these methods for managing peak lake water levels and mitigating negative impacts such as flooding and shoreline erosion.

- Raising of private roads: 221 points
- Private shoreline management (first): 129.5 points
- Public Shoreline management (second): 86 points
- Alteration to existing outlet culvert: 30.5 points
- Install additional outlets: 25.5 points
- Alteration to downstream channels as necessary: 26.5 points
- Other: 25 points
Public Survey and Stakeholder Consultation

Q9: What would be a reasonable budget to improve the lake outlet (including engineering, construction, and permitting costs)?

- Less than $100,000: 67%
- $100,000 - $300,000: 28%
- $600,000 - $1,000,000: 5%
Public Survey and Stakeholder Consultation

Q10: Please assign a weight to the evaluation factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Accumulated Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost effective</td>
<td>70</td>
</tr>
<tr>
<td>Assessment of risk to the Township and safety of public (including property)</td>
<td>77</td>
</tr>
<tr>
<td>Significance of impacts to the existing ecosystem and natural conditions</td>
<td>186</td>
</tr>
<tr>
<td>Addressing stakeholder concerns</td>
<td>81</td>
</tr>
<tr>
<td>Timely</td>
<td>41</td>
</tr>
</tbody>
</table>
Q11: When should final construction (if any) be complete?

- No Construction: 79%
- Fall 2019: 3%
- Spring 2020: 3%
- Summer 2020: 0%
- Fall 2020: 3%
- Further Study required: 7%
Q12: Please rate your comfort level with possible interventions

Concerns: My family have lived on the lake since 1942. Water levels have followed a consistent pattern of slightly higher in the spring, normalizing quickly and sometimes lower in late summer. Access issues on roads is a private and not public concern. This survey is being done by an engineering/project managing group. Is intervention/construction already planned?

The minimum water levels, in my opinion, must be maintained or raised to allow water access to bay properties. Lowering would impede this! Users with road access issues should raise their private roads. Thanks.

Our property is mostly affected by low water levels. We have no issue with high water levels.

This survey is biased, leading, and completely unacceptable to the majority of Otter Lake residents who are fed up with a small number of people trying to alter the water level.

We want the Otter Lake Outlet and water level left alone.
Q12: Please rate your comfort level with possible interventions

I am totally against this movement. The water levels in Otter Lake were extremely low last year. We were not able to dock boat, kids could not use swimming area, very low levels for boating safely. In my opinion, the water levels are fine and modifications to natural environment should not be considered. Our tax dollars should not be used for private and individual issues.

There should not be any construction/changes to the Otter Lake Outlet and water level. Let mother nature, through precipitation, flowing streams and evaporation determine the Otter Lake water level. I want the Otter Lake Outlet and water level left alone.

We are happy the way things are. Don't raise or lower the water levels. We have been on this lake or 40 years without any major concerns.

Water levels should not be changed due to human intervention - no construction

The handling of this whole exercise has created animosity. I'm skeptical that the survey results will be reliable or helpful.

Changing water levels is irresponsible and not necessary due to effects on environment primarily. Problems of flooding on access roads should be dealt by residences using the road.
Summary of Preliminary Analysis
Understanding Regulatory Constraints and Approvals

• DFO
• MNRF
• RVCA
• MECP
• Transport Canada
• Township of Rideau Lakes
Preliminary Analysis
Understanding Regulatory Constraints and Approvals

PART VI
REGULATION OF AREAS OVER WHICH AUTHORITIES HAVE JURISDICTION

Prohibited activities re watercourses, wetlands, etc.

28 (1) Subject to subsections (2), (3) and (4) and section 28.1, no person shall carry on the following activities or permit another person to carry on the following activities, in the area of jurisdiction of an authority:

1. Activities to straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or to change or interfere in any way with a wetland.

2. Development activities in areas that are within the authority’s area of jurisdiction and are,

   i. hazardous lands,
   ii. wetlands,
   iii. river or stream valleys the limits of which shall be determined in accordance with the regulations,
Summary of Preliminary Analysis

- Current outlet performance is within expected parameters
- Any increase in discharge will impact downstream wetlands and landowners
- Any change to evaluated wetlands involves extensive modeling and analysis to satisfy regulatory requirements
- Immediate hydraulic constraint is the rocky ridge – not the culvert
Summary of Preliminary Analysis

- Current outlet performance is within expected parameters
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- Any change to evaluated wetlands involves extensive modeling and analysis to satisfy regulatory requirements
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Summary of Preliminary Analysis

- Downstream A1 = 4 ha
- Downstream A2 = 22 ha
- Downstream A3 = 86 ha
- Total downstream area = 1.12 km² = 112 ha
- Surface area of Otter Lake = 6 km² = 600 ha (6x larger)
A 10 cm (4”) reduction in water level on Otter Lake means roughly 60 cm (2’) increase in water levels down to Lombardy
This would require interventions at:

1) Otter Lake Rd Culvert
2) Rocky Ridge
3) Forest Corridor
Option Analysis

1. No Intervention
2. Increase Downstream Hydraulic Conveyance (Rocky Ridge)
3. Increase Outlet Conveyance (New Culvert)
4. Restrict Low-Level Outflow (Inlet Weir)
5. Some Combination of the Above
Option Analysis

1. No Intervention
Option Analysis

1. No Intervention

Pros

• Least costly
• Hydraulic performance and expected conditions are well understood
• Least impact to wetlands and existing ecosystem
• No additional permits or approvals required

Cons

• Does not address private access issues
• Does not address low water level concerns during dry/drought seasons
Option Analysis

2. Increase Downstream Hydraulic Conveyance (Rocky Ridge)
Option Analysis

2. Increase Downstream Hydraulic Conveyance (Rocky Ridge)

Pros

• Increase available storage for high-volume events
• Reduce peak water levels on lake shore
• Reduce risk of flooding private property and road access

Cons

• Extensive analysis, modeling, and reporting required - regulatory approvals may be a lengthy and/or expensive process
• Impacts to wetlands and ecosystem
• Increased liability due to downstream impacts
Option Analysis

3. Increase outlet conveyance
Option Analysis

3. Increase outlet conveyance
Option Analysis
3. Increase outlet conveyance

Pros
• Reduce head loss across culvert in peak flows
• Provide some level of redundancy for the lake outlet
• Reduce risk of flooding private property and road access

Cons
• Extensive analysis, modeling, and reporting required - regulatory approvals may be a lengthy and/or expensive process
• Impacts to wetlands and ecosystem
• Increased liability due to downstream impacts
Option Analysis
4. Restrict Low Level Outflow
Option Analysis

4. Restrict Low Level Outflow
Option Analysis
4. Restrict Low Level Outflow

Pros
• Increase minimum lake levels during dry or drought conditions
• Improve boating/swimming safety

Cons
• Extensive analysis, modeling, and reporting required - regulatory approvals may be a lengthy and/or expensive process
• Impacts to wetlands and ecosystem
• Increased liability due to downstream impacts
• New inspection and maintenance costs
Summary of Preliminary Investigation

Points of Consideration

- Protection of public safety and property
- Hydraulic impacts, both up- and down-stream of Otter Lake
- Lake ecosystem and shoreline protection
- Regulatory Approvals
## Summary of Preliminary Investigation

### Points of Consideration

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addresses Stakeholder Concerns</td>
<td>The proposed intervention is likely to satisfy Bass Lake stakeholder concerns and align with the Bass Lake Management Plan.</td>
</tr>
<tr>
<td>Environmental and Ecological Protection</td>
<td>How significant are the potential impacts to the existing ecosystem and natural conditions. This would also impact the complexity and duration of regulatory approval processes.</td>
</tr>
<tr>
<td>Cost Effective</td>
<td>How much improvement relative to existing condition can be expected relative to the required investment.</td>
</tr>
<tr>
<td>Timely</td>
<td>The proposed intervention is likely to be design and constructed by the end of 2020.</td>
</tr>
<tr>
<td>Risk</td>
<td>How likely the proposed intervention is to create liability to the Township with respect to protection of the safety and property of the public.</td>
</tr>
</tbody>
</table>
Summary of Preliminary Investigation

Points of Consideration

Timely

• Emergency access concerns
• Resolve ongoing discussion amongst residents and stakeholders
Summary of Preliminary Investigation

Points of Consideration

Cost Effective

• Value for money
• Minimize *life-cycle* costs
Stakeholder Satisfaction

• Addresses residents’ concerns
  • Community buy-in
Environmental Protection

• Minimize impact to the lake’s habitat and ecosystem
  • Simplify regulatory approval process
Risk Reduction

• Remove uncertainty around access concerns
• Minimize risk of sudden or catastrophic failure
• Minimize liability to the Township, taxpayers, and residents
Next Steps…

Summary Report and Recommendations

1. Jp2g Summary Report detailing results of the desktop review, investigation, stakeholder consultation, and preliminary analysis to be submitted to the Township.

2. Township staff to review report recommendations.

3. *If necessary*, a new contract for the detailed design, tender, and construction oversight services for the preferred option is initiated and construction phase.
Questions?