

Ministry of Environment & Climate Change Strategy
#401 - 333 Victoria St., Nelson, BC
V1L 4K3

March 17, 2022

Attn: Albert Chirico

Memorandum: Fish collection permit CB21-625527 Timber Ridge mussel salvage summary

To whom it may concern,

Background

Timber Ridge is a community situated along the shores of Windermere Lake, BC (Figure 1). The Timber Ridge Property Owners Association (Timber Ridge) was incorporated in 1981, to manage the community's common and natural areas. Shoreline facilities at Timber Ridge include a marina and beach. The marina is authorized under a Marina Lease Agreement, through the BC *Land Act* (Disposition 880473, August 2010). The marina was established in 1985 and had no record of prior dredging activity. However, the nearshore section of the marina has become very shallow over time and required maintenance dredging (the Project, Figure 2). Lotic Environmental Ltd was contracted by Timber Ridge to complete the environmental tasks associated with planning, permitting, and environmental monitoring during the maintenance dredge.



Figure 1. Project location (UTM 11U 570250.73 E, and 5594115.92 N)

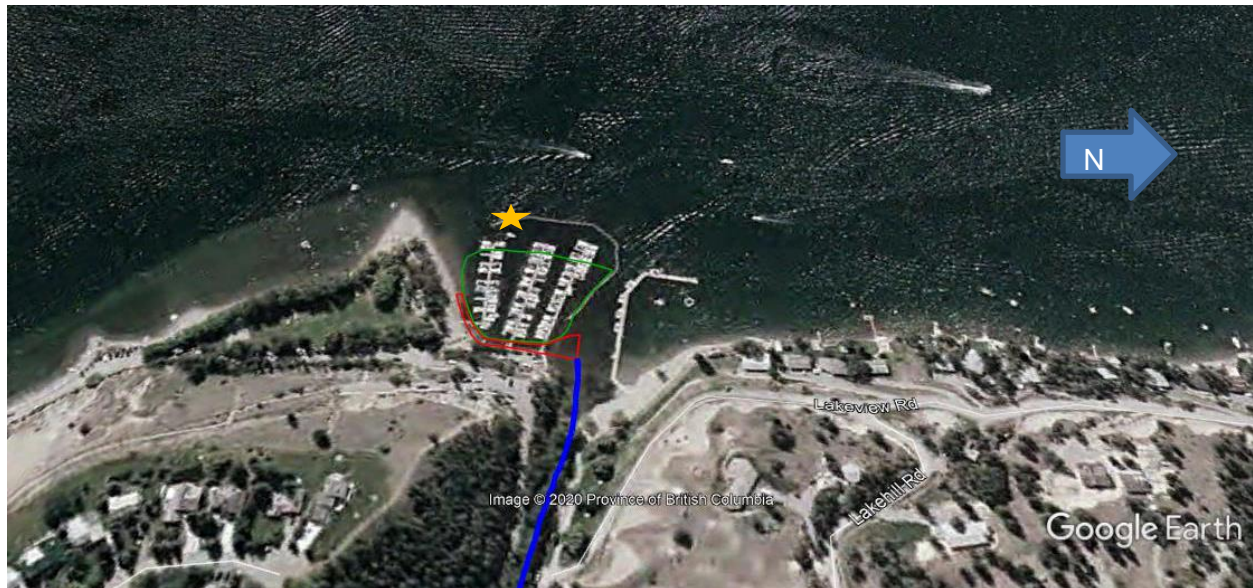


Figure 2. Maximum area to be dredged (green), shoreline excavation buffer zones (red), and mussel translocation areas (yellow star).

In 2021, the Timber Ridge dredge activity was authorized through a BC *Water Sustainability Act Approval*, and a Fisheries and Oceans Canada (DFO) Letter of Advice. A condition of these authorizations, and as previously outlined in the project environmental management plan, was for a mussel salvage to be completed prior to implementation. Lotic Environmental thus obtained a *BC Wildlife Act* scientific fish collection permit to conduct the salvage. The results of the salvage are provided here.

Methods

The mussel survey and relocation was conducted by Lotic Environmental Aquatic Biologists in accordance with the Guidance for Freshwater Mussels in the Okanagan (BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development [FLNRORD] 2018)¹. The salvage occurred on September 29, 2021, from 13:30 – 15:00. The sky was clear, and the water was relatively clear. However, there was very dense aquatic vegetation and algal growth, particularly in the shallow waters near the shore. Fortunately, this is not where mussels were present during the initial 2020 survey and salvage conducted on July 7, 2020, when vegetation growth was less. The methods employed were as follows:

- 1) Scuba diving techniques were used throughout the marina.
- 2) The survey was conducted along transects running perpendicular to the shoreline from the high-water mark to the end of the dredge area. The transects were spaced 1 - 2 m apart.
- 3) A second person was in a kayak alongside the diver recording the findings (location, depth, substrate, and number), and placing the mussels in a mesh tote in the water off the edge of the kayak.

¹ Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD). 2018. Guidance for Freshwater Mussels in the Okanagan. FLNRORD, Resource Management, Ecosystems Section, Penticton, B.C.

- 4) Representative photographs of live samples and habitat conditions were taken.
- 5) Salvaged mussels were returned to similar habitat in Windermere Lake (substrate type, and water depth), and outside of high use areas (e.g., recreation beach). The area for relocation was adjacent to the marina, as depicted in Figure 2.
- 6) Lastly, during the dredge, the environmental monitor (EM) inspected the dredged spoils for any remaining mussels. If found, they were to be salvaged and moved as identified above.

Results

A total of 12 mussels were found during the fall survey. Of these, five were alive and seven were dead/empty shells. The live mussels were found in sand substrate habitat where there was no or little aquatic vegetation (Figure 3, Figure 4). Water depths were approximately 1 m. The mussels were present here because this is where there was improved flow with oxygenated water, as opposed to the heavily vegetated shallow sections of the marina.

The mussels found were *Anodonta californiensis/nuttalliana* clade (California/Winged Floater). This was consistent with past sampling on Windermere Lake by Lotic Environmental, including at Timber Ridge and Indian Beach marinas. This clade is secure in BC - yellow listed and ranked as S4? (Sept 2016), and widespread globally – G5 (BC Conservation Data Centre 2020).



Figure 3. View towards shore of Timber Ridge marina and mussels salvaged on Sept 29, 2021.

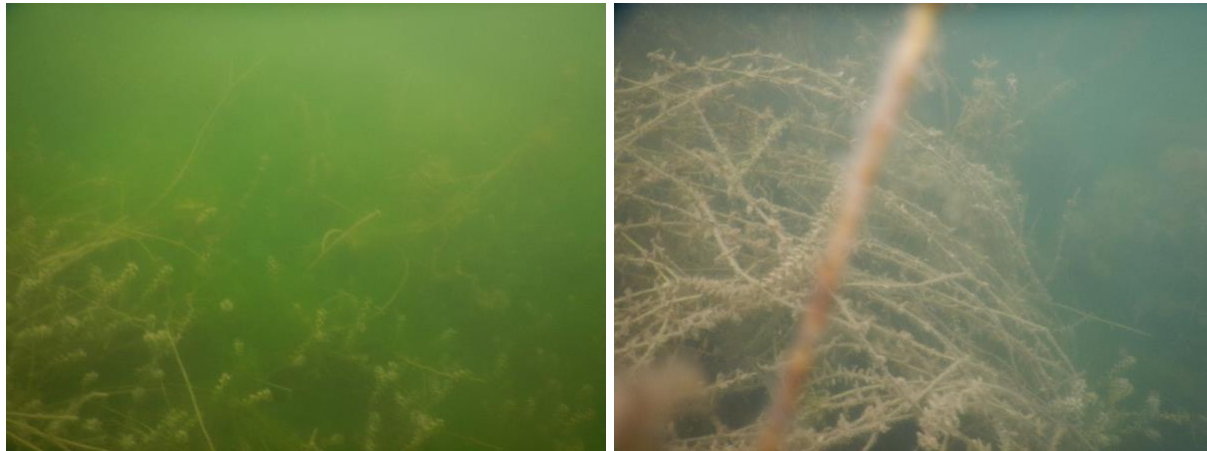


Figure 4. Poor water clarity due to thick aquatic vegetation growth and algae in the shallower areas of the marina (Sept 29, 2021).

The dredge was conducted on March 3, 4 and 8, 2022. During this time, no mussels were evident in the dredged material.

Closing

Please let me know if you have any questions regarding the 2021 and 2022 Timber Ridge marina mussel salvage findings.

Sincerely,

Reviewed by:



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