

Okanagan Basin Water Board Meeting Agenda



Okanagan Basin
WATER BOARD

DATE: Tuesday, May 7, 2019

TIME: 9 a.m. to 10:30 a.m.

PLACE: Four Points Sheraton Hotel, 5505 Airport Way, Kelowna, B.C.

1. **CALL MEETING TO ORDER**

1.1 Acknowledgement of First Nations Traditional Territory

2. **INTRODUCTION OF LATE ITEMS**

3. **APPROVAL OF AGENDA**

4. **ADOPTION OF MINUTES**

4.1. Minutes of the Regular Meeting of the Okanagan Basin Water Board of April 2, 2019 at Regional District of North Okanagan ([page 1](#))

5. **CHAIR'S REPORT**

6. **STAFF REPORTS**

6.1. Executive Director Report ([page 7](#))

6.1.1. Presentation on Aquahacking challenge

6.1.2. OBWB Briefing Note to federal Standing Committee on Fisheries & Oceans re: aquatic invasive species

6.1.3. OBWB letter to B.C. Minister of Forests, Lands, Natural Resource Operations and Rural Development and Minister of Fisheries & Oceans Canada re: invasive milfoil and native mussels

7. **NEXT MEETING**

7.1. The next meeting of the Okanagan Basin Water Board will be on Tuesday, June 4, 2019 at 10 a.m., at the Regional District of Okanagan-Similkameen in Penticton.

8. **ADJOURNMENT**



**MINUTES OF A REGULAR MEETING OF THE OKANAGAN BASIN WATER BOARD
HELD APRIL 2, 2019, AT THE REGIONAL DISTRICT OF NORTH OKANAGAN
9848 ABERDEEN RD., COLDSTREAM, B.C.**

PRESENT

Chair Sue McKortoff	Regional District Okanagan-Similkameen
Director Rick Fairbairn	Regional District North Okanagan
Director Bob Fleming	Regional District North Okanagan
Director James Baker	Regional District Central Okanagan
Director Colin Basran	Regional District Central Okanagan
Director Toni Boot	Regional District Okanagan-Similkameen
Director Rick Knodel	Regional District Okanagan-Similkameen
Alt. Director Natasha Lukey	Okanagan Nation Alliance
Alt. Director Zee Marcolin	Water Supply Association of BC
Director Denise Neilsen	Okanagan Water Stewardship Council

REGRETS

Vice-Chair Cindy Fortin	Regional District Central Okanagan
Director Victor Cumming	Regional District North Okanagan

STAFF

Anna Warwick Sears	Executive Director
Nelson Jatel	Water Stewardship Director
James Littley	Operations and Grants Manager
Corinne Jackson	Communications Director
Kellie Garcia	Policy and Planning Specialist
Stefanie Wenker	Water Demand Model Specialist

1. CALL MEETING TO ORDER

Chair McKortoff called the meeting to order at 10:04 a.m.

Chair McKortoff respectfully acknowledged that the meeting was being held on the traditional and unceded territory of Okanagan Nation and Splatshin First Nation.

2. APPROVAL OF AGENDA

"THAT the agenda of the regular meeting of the Okanagan Basin Water Board of April 2, 2019 be approved."

CARRIED

3. ADOPTION OF MINUTES

3.1 Minutes of the Regular Meeting of the Okanagan Basin Water Board of March 5, 2019 at the Regional District of Okanagan-Similkameen.

"THAT the minutes of the regular meeting of the Okanagan Basin Water Board of March 5, 2019 at the Regional District of Okanagan-Similkameen be approved."

CARRIED

4. DELEGATION**4.1 Paul Demenok and Erin Vieira, Shuswap Watershed Council on “An Overview of the Shuswap Watershed Council”**

Mr. Demenok, who chairs the Shuswap Watershed Council, provided an overview of the council noting it is a collaboration between Columbia Shuswap Regional District, Thompson-Nicola Regional District, District of Sicamous, City of Salmon Arm, Regional District of North Okanagan, Secwepemc Nation and B.C.'s Ministries of Agriculture, and Environment and Climate Change Strategy and works with additional agencies and interests. The mandate of the Shuswap Watershed Council is to help enhance water quality and safe recreation, and the work of the council is managed by the Fraser Basin Council.

As part of this effort, the council coordinates with 17 groups for the collection of water samples, and collects and reports this data.

Dir. Boot entered the meeting at 10:12 a.m.

The council has also been involved in water research, including looking at nutrient dynamics with UBCO. Water Quality Reports are available at shuswapwater.ca

There is also concern about invasive mussels and the council has partnered with the Columbia Shuswap Invasive Species Society to do outreach and water sampling for the mussels.

Safe recreation is also part of the council's mandate. As such it also funds a “Kids Don't Float campaign” which includes a personal floatation device loaner station at boat launches.

The council has also advocated to senior government on Agricultural Waste Control Regulations and invasive mussels.

In response to questions, Mr. Demenok added that the council is approaching year four of a five-year pilot program. Some of the issues they see are seasonal nutrients entering the water, which they are looking to mitigate. There have also been issues with forestry and debris flows during freshet season. These are issues that will need to be addressed recognizing the impacts exacerbated by climate change, he added.

5. CHAIR'S REPORT

Chair McKortoff noted that the Osoyoos Lake Board of Control is concerned about potential drought and is watching the situation closely. The Emergency Operations Centre at RDOS is also gearing up, getting ready for potential floods and fire.

6. STAFF REPORTS**6.1 Executive Director Report**

Dr. Sears reminded the board that the next meeting is on Tues. May 7 and starts at 9 a.m. at Four Points Sheraton. It will be followed by a strategic planning session with the Water Stewardship Council (WSC). The meeting runs until 3 p.m.

Work on several flood-related projects are underway. The first set of LiDAR data is now being shared with local Okanagan governments with the rest of the data expected later in April. A meeting is planned for April 9 with local and First Nation governments, including planners, engineers and mapping staff, as well as provincial staff and consultants.

The board was told about an invitation from North Okanagan–Shuswap MP Mel Arnold, asking the OBWB to present to the federal Standing Committee on Fisheries and Oceans regarding a study looking at financial support to address aquatic invasive species. Staff will be following up.

The Water Board has been talking with organizers of an Aquahacking Challenge. The purpose of the challenge is to engage university students in solving real-world water problems and has been running for five years in Eastern Canada. Organizers are now looking to expand out west in 2020. The OBWB is recommending that the challenge focus on the Okanagan.

“THAT the Executive Director’s Report, dated March 26, 2019, be received.”
CARRIED

6.2 Water Stewardship Director Report

Mr. Jatel provided an overview of the March council meeting and presentations regarding source protection. The next council meeting on April 11 will look at climate and weather.

The annual Water Supply Webinar is set for Fri. April 12 and will include updates on snowpack, groundwater, a weather and fire forecast to support local governments, water managers, agriculture water users and others plan for the upcoming summer.

Staff are working with ONA to do bathymetry cross-sections in Okanagan River Channel. Sockeye eggs are emerging now so work will resume in June.

Alt. Dir. Zee Marcolin entered the meeting at 10:49 a.m.

In response to questions, Alt. Dir. Lukey added that the ONA monitors spawning using the Fish Water Management Tool. Emergence was pushed back a couple weeks because of cold temperatures this year. Work has been done on Woolsey Dam (e.g. with fish ladders) to help the salmon but there have been issues with sediment loading and the impact on fish eggs. The public is invited to a sockeye fry release on May 2 in Penticton on Green Mountain Road, she added.

“THAT the Water Stewardship Director’s Report, dated March 27, 2019, be received.”
CARRIED

6.3 Operations and Grants Manager Report

Mr. Littley gave an update on winter rototilling (de-rooting) efforts for milfoil noting that not much could be done in the North Okanagan due to native Rocky Mountain Ridged Mussels (RMRM), which are a protected species, in the area.

The board was given an overview of the RMRM issue and how earlier studies suggested low numbers. More recent studies, however, have found larger numbers of the mussel. At the same time, the federal government is considering listing the species as endangered, which would curtail rototilling significantly. In addition, some provincial staff have suggested that the OBWB move to a harvest-only control method. However, this is less effective and mainly cosmetic.

There was discussion about the need for further study, including a look at the impact invasive milfoil may have on the local mussel. Pat Field, who has been working with the milfoil control program since the 1970s, noted that milfoil mats in the mid-70s were so dense that boats could not get through. Since mussels need water movement to filter water, it’s possible that rototilling has been beneficial and created more habitat for the species.

The board asked that a letter be sent to the provincial and federal government asking for further study before moving to list the RMRM as endangered.

“THAT the OBWB send a letter to the B.C. and federal governments asking for further study of the Rocky Mountain Ridged Mussel, its numbers, and the impact of invasive milfoil on the mussel before moving to list it as endangered.”

CARRIED

“THAT the Operations and Grants Manager’s Report, dated March 27, 2019, be received.”

CARRIED

6.4 Communications Director Report

Ms. Jackson gave an update on Canada Water Week activities, including the March 7 screening of “Beyond Climate” and follow-up panel with film narrator David Suzuki, director Ian Mauro, Syilx knowledge keeper Jeanette Armstrong, and Dr. Sears, and follow-up reception. The board was also briefed on the Okanagan WaterWise Challenge, encouraging youth to “Be a Climate Hero.”

An update was provided on Don’t Move A Mussel and Make Water Work campaigns, which will be rolling out in May. The board was also provided details from the province’s 2018 mussel inspection efforts and plans for 2019.

“THAT the Communications Director’s Report, dated March 27, 2019, be received.”

CARRIED

6.5 Policy and Planning Specialist Report

Ms. Garcia noted that as part of the OBWB’s outreach to utilities and agriculture customers, staff are promoting the Water Supply Webinar as a useful tool for gathering the most recent information on valley water supplies to help plan for the upcoming summer and irrigation season.

Staff are updating the OBWB’s Drought Response Strategy which will be triggered if a sub-basin has water supply challenges or if the province declares the region in Level 2 drought. The province’s Thompson-Okanagan Drought Response Team will be holding its first call April 24 to review progress made on action items from 2018 and plan for the upcoming season. OBWB staff participate in these calls, sharing local water supply conditions and helping ensure a coordinated response.

Work on the Sustainable Water Strategy continues. A draft should be ready by June and delivered to the board in September.

In response to a question, Alt. Dir Marcolin, who also works for RDNO-Greater Vernon Water, noted that their upland reservoirs are high so the utility is releasing some water to prepare for potential spring rains. The concern is if the rains don’t come and the utility has to draw down its storage as summer continues, then there could be issues.

“THAT the Policy and Planning Specialist’s Report, dated March 26, 2019, be received.”

CARRIED

7. NEW AND UNFINISHED BUSINESS**7.1** Review of 2014-2019 OBWB Strategic Plan

Dr. Sears introduced the last strategic plan and reviewed the purpose and mandate of the OBWB, key strategies and desired outcomes, long-term goals and strategic priorities, in preparation for next month's planning session.

Drs. Fleming and Boot noted the importance of bringing greater attention to aquatic invasives, including milfoil and zebra and quagga mussels.

Dir. Basran suggested that climate change be addressed. Dir. Nielsen added the need to look at land use and its water impacts. Alt. Dir. Marcolin continued, noting a climate projections report being conducted by RDNO and SFU that will look at infrastructure but perhaps should look at impacts and solutions.

Dir. Baker noted the importance of sufficient supply, the need to measure what we have, what we use, and ensure enough to meet our needs in a changing climate (e.g. fire-fighting).

Dir. Boot added that municipalities are responsible for ensuring enough clean drinking water and planning land use. As such, more attention should be spent on addressing building in floodplains and interface areas near forests.

As discussion continued it was noted that climate change for the Okanagan has meant a shift in hydrology patterns so we have an earlier spring melt, the frequency and intensity of extreme weather events increases. It also impacts the amount and type of water available. It was noted that the OBWB looks at adaptation but needs to look at mitigation as well.

8. IN-CAMERA

8.1 In-camera session (under sec. 90(1)(m) of the Community Charter)

9. RISE & REPORT FROM IN-CAMERA

"THAT the Okanagan Basin Water Board approve the 2019 grant funding as presented."

CARRIED

Dir. Nielsen and Alt. Dirs. Lukey and Marcolin abstained

10. NEXT MEETING

10.1 The next meeting of the Okanagan Basin Water Board will be Tuesday, May 7, 2019 at 9 a.m. at Four Point Hotel (across from Kelowna airport), 5505 Airport Way.

10. ADJOURNMENT

"THAT there being no further business, the regular meeting of the Okanagan Basin Water Board of April 2, 2019 be adjourned at 1:27 p.m."

CARRIED

Certified Correct:		
Chair		Executive Director

MEMORANDUM

Okanagan Basin Water Board
Regular meeting
May 7, 2019
Agenda No: 7.1

File No. 0550.04

To: OBWB Directors
From: Anna Warwick Sears
Date: May 1, 2019
Subject: **Executive Director Report**

Collaborations on Flood Risk Reduction - update

On April 9th, OBWB and RDCO co-hosted a meeting with the flood mapping local government/First Nations working group in Kelowna. We had more than 40 people attending, with participants from 14 different jurisdictions, as well as provincial staff, and consultants working on the projects. There was intense interest in working together, and learning how to go from the flood maps to developing flood mitigation measures. The remainder of the Okanagan LiDAR and aerial images should be available very shortly and will be distributed to Okanagan communities. I also had the opportunity to attend the ONA's flood and debris flow risk/resilience assessment workshop on April 25th, and that project is developing interesting results at a watershed scale – vulnerabilities that aren't necessarily obvious when you focus on individual communities.

Aquahacking

I've had continuing dialogue with Kariann Aarup, the B.C. Partnerships and Program Development Lead for the Aquahacking Challenge (<https://aquahacking.com/en/aquahacking-challenge/>), an initiative that originated in Quebec and has run for 5 years in eastern Canada, and is being brought to the west for 2020. The Aquahacking Challenge was established by the de Gaspe Beaubien family foundation, to engage emerging Canadian tech talent in solving real-world water problems. Other major partners include the RBC Foundation and IBM (which provides access to their artificial intelligence/machine learning programs). Teams of university students propose tech solutions to a range of water problems, and compete for a spot at a start-up incubator. I've attached a presentation with more information.

The Aquahacking Challenge will take place in B.C. for 2020 and 2021. There is a strong possibility that their board will select to focus the challenge on the Okanagan's water issues (since most of B.C.'s freshwater concerns are found here), with the OBWB playing a host/organizer role. Their board will make a decision later in May, and if they make an offer to us, the board can make a determination at our June OBWB meeting. It's an exciting opportunity to showcase and provide access to our extensive water data, and link in university and tech partners, bringing a higher public profile to Okanagan water.

Presenting in Ottawa at Aquatic Invasive Species committee

I was invited to present on April 29th in Ottawa to the House of Commons Standing Committee for Fisheries and Ocean. The Committee is undertaking a study on aquatic invasive species (AIS), specifically regarding DFO's resources dedicated to preventing and eliminating AIS, whether resources are equitably and consistently distributed across Canada, and whether the AIS program has the resources to be effective. I've attached the briefing note prepared for this presentation.

The Office of the Auditor General recently released a report on Aquatic Invasive Species, highlighting the issues of both milfoil and invasive mussels. That report can be found here:

http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201904_01_e_43307.html

Mussels and Milfoil

Since the last milfoil update, OBWB staff have sent a response to DFO regarding their recommendation to up-list Rocky Mountain Ridged Mussels from "at-Risk" to "Endangered" under the Species at Risk Act. We have asked for a new assessment based on current information, and a new round of public consultation. The assessment that is currently being used is from 2010, and the last round of public consultation was in 2011 and minimal. Subsequently, we sent a letter to the Minister of DFO and the BC Minister of FLNRORD, formally requesting an authorization under the Fisheries Act, or the Species at Risk Act as necessary, to continue conducting milfoil de-rooting in valley lakes. This letter was also forwarded to Okanagan local governments, the ONA Chiefs' Executive Council, and Okanagan Tourism Organizations and Chambers of Commerce, requesting letters of support on this issue. Please find this letter attached.

On Thursday, April 18th, OBWB received a letter from the permitting authority at the province, which renewed our milfoil permit for five years, but confirmed the prohibition on rototilling in any areas within 100 meters of where RMRM have been found, dead or alive. Under this guidance, each year OBWB will be required to update it's mapping program and if there are any new mapped occurrences of RMRM in our treatment areas, de-rooting will then be prohibited in those areas. If this prohibition stands, it is likely that the milfoil de-rooting program will continue to be reduced, and there will be no way to control the large areas of invasive milfoil in our lakes. We are also still awaiting a response from DFO with any of their conditions for the next five years.

In July, prior to harvesting for public safety, we will start to document the resurgence of milfoil infestations in areas which have now been restricted from rototilling for several years. This will include the shoreline of the District of Summerland, the North end of Osoyoos Lake, and the Northwest corner of Kin Beach in Vernon. We expect that there will be significant emergent (through the surface of the water) milfoil in these locations, depending on weather conditions.

Finally, we have contacted staff at the Ministry of FLNRORD and suggested that we work together between now and the beginning of the next rototilling season in October to design and conduct any studies which will answer some of the legitimate questions that remain about the costs and benefits of the current approach. The OBWB would not fund the studies, but could harvest in areas for their divers. We hope to have a response and action plan by the June board meeting.

Communication and Outreach Update

We will be holding our Make Water Work launch on Thurs. May 16, 10:30 AM in Kelowna. For those new to this, Make Water Work is our valley-wide outdoor water conservation campaign aimed at tackling the 2nd largest use of water in our valley. The campaign is delivered in partnership with local governments and utilities throughout the valley. You can learn more at www.MakeWaterWork.ca.

As in past years, mayors from throughout the valley are invited to gather to pledge to Make Water Work and invite their residents to do the same. (Find a short video from last year's event here: <https://youtu.be/OofPP8iDkVA>.) WaterWise yard prizes will be awarded throughout the summer, but also the community with the most pledges at the end of the summer are named "Make Water Work Community Champions." Like last year's fun and successful launch, mayors will be invited to do some planting with material from the Make Water Work Plant Collection, but this year mayors will be paired with students. Media will be invited to cover the event, helping spread the message further throughout our valley.

Also, as part of the launch, we will be recognizing MWW contest sponsors and MWW Plant Collection/ Garden Centre partners.

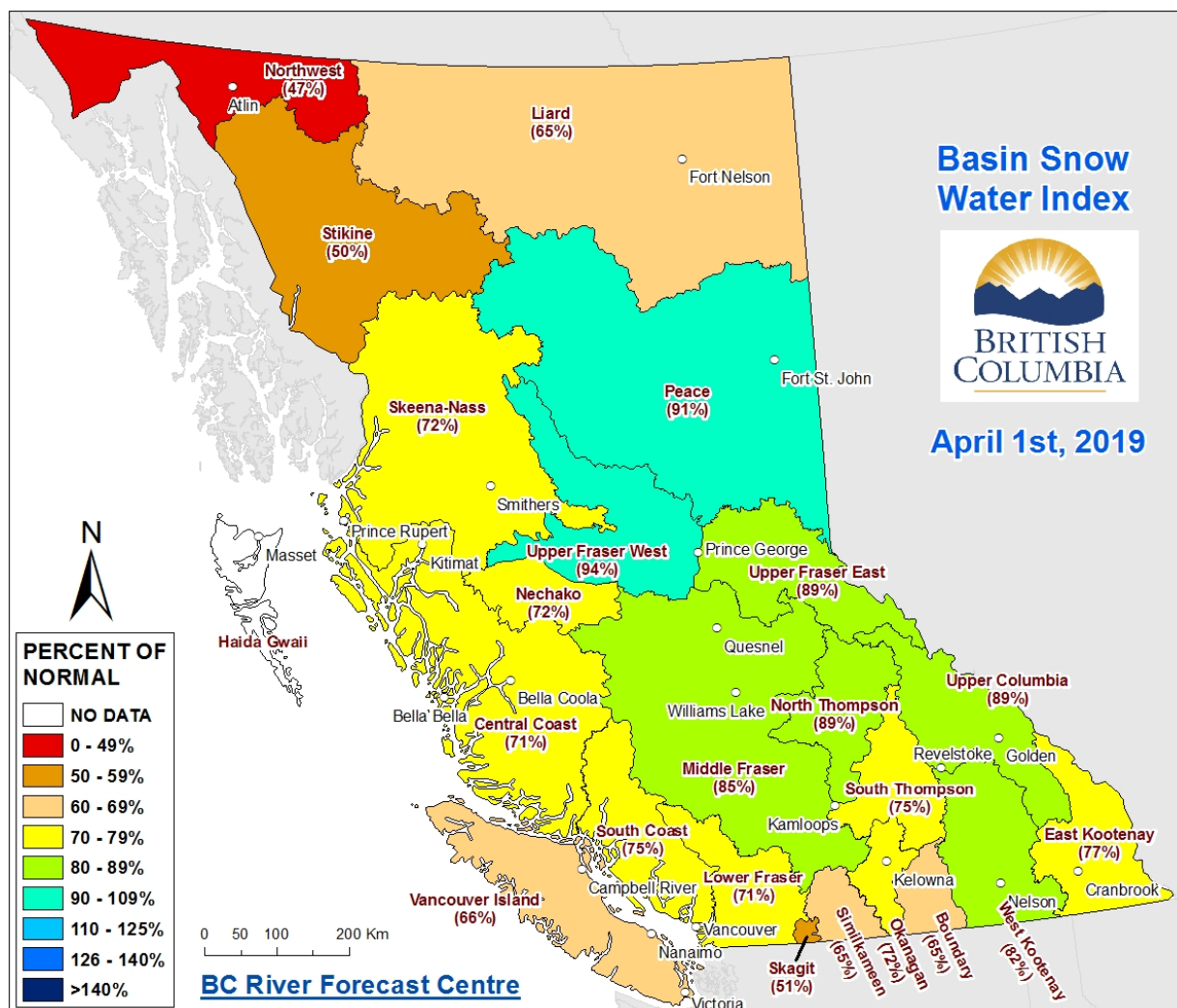
The event location is to be determined, but we're looking at a school in Kelowna which has been adding low-water gardens to attract pollinators and teach kids and the community about WaterWise gardening in the Okanagan.

Presentations to Local Governments

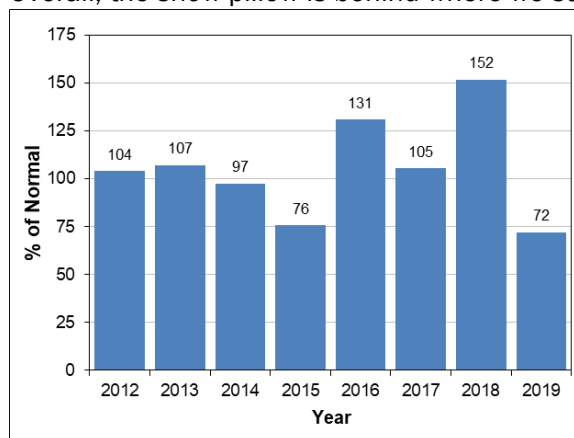
In May I will be making presentations to Spallumcheen and the City of West Kelowna Councils, with an overview of OBWB, projects and programs. I'm happy to come and meet with any board or council, if directors feel it would be valuable and welcome – please let me know.

Weather Report

It's shaping up to be a dry spring, as predicted.



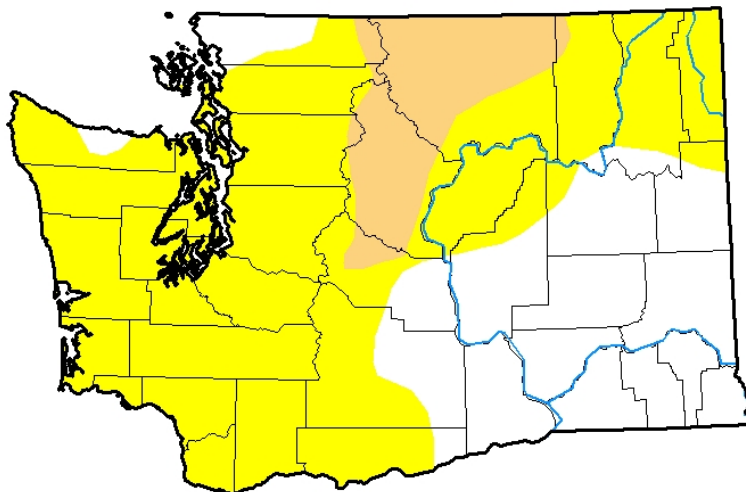
Overall, the snow pillow is behind where we started in 2015, the last big drought year:



Drought monitor for Washington State (most recent regional prediction available): As of April 23, Okanogan County is in a Moderate Drought condition. This is the southern half of the Canada/U.S. Okanagan/Similkameen Basin. B.C. has not updated it's drought map for 2019.

U.S. Drought Monitor
Washington

April 23, 2019
(Released Thursday, Apr. 25, 2019)
Valid 8 a.m. EDT



Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

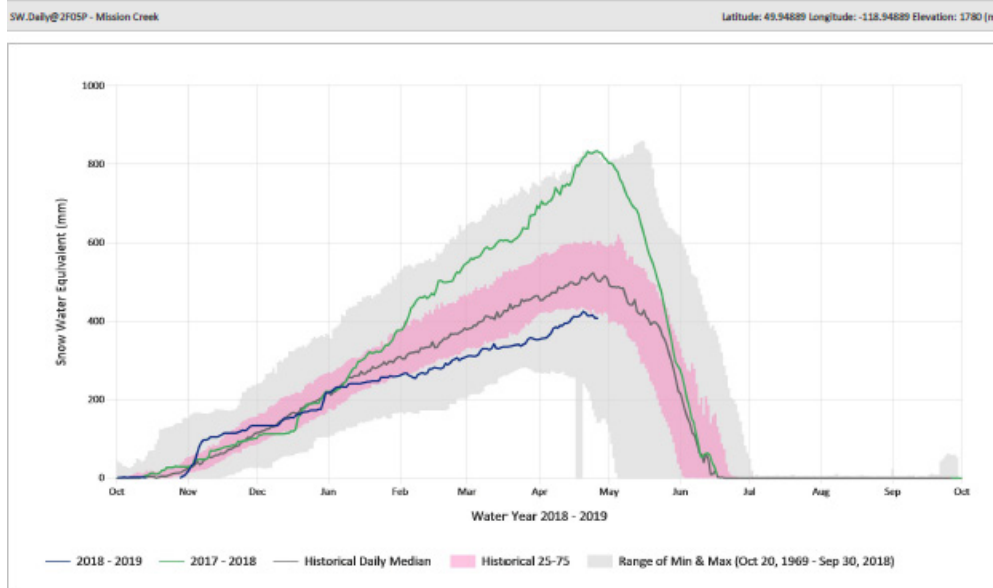
Author:

David Miskus
NOAA/NWS/NCEP/CPC

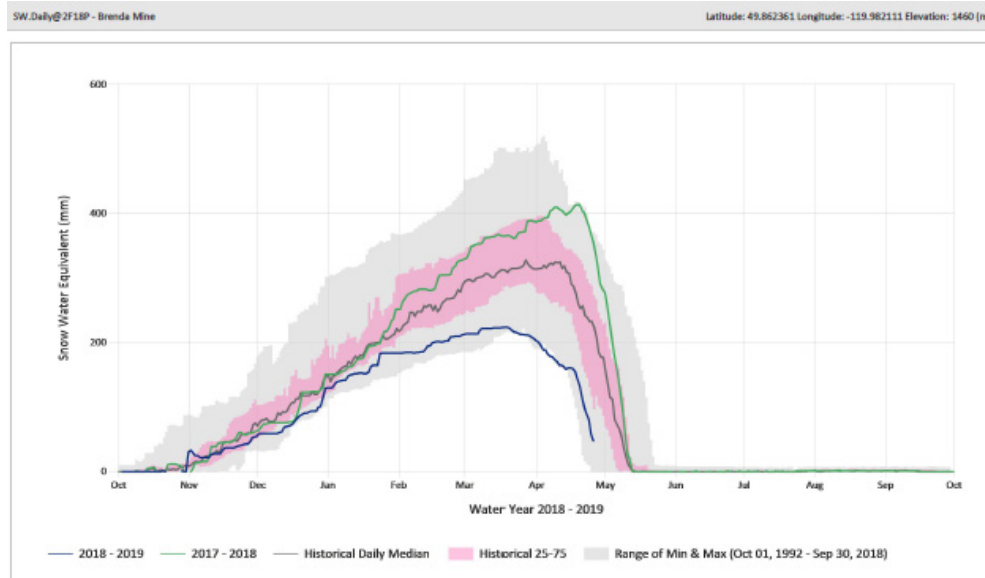


<http://droughtmonitor.unl.edu/>

Mission Creek Snow Pillow – April 26, 2019 (Elevation 1794m): This graph shows that freshet is still to come at high elevations, but that the overall snow pack is below normal.



Brenda Mines Snow Pillow – April 26, 2019 (Elevation 1,453 m): This snow pillow shows that the snow is almost entirely melted from the mid-elevations, and is below normal.



Osoyoos Lake: Osoyoos Lake did not meet the April drought criteria for declaring a drought, but there is still concern about low flows in the Similkameen causing water shortages downstream of Osoyoos Lake. The Osoyoos Board of Control is watching the system carefully.



A tech-challenge & pre-incubator
for freshwater

Coming to BC in 2019-2020



A tech-challenge & pre-incubator for freshwater...

Why?

Water is a critical & complex **issue** that needs solving

New perspectives can **make the difference**

Tech innovation can offer **solutions**





Direct impact in 4 years

'15: Ottawa River / '16: St. Lawrence River / '17: Lake Erie / '18: Lake Ontario



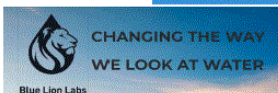
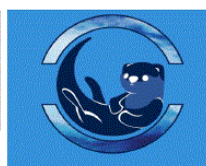
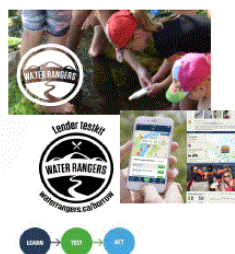
12 active start-ups: 75% survival rate

10 critical water issues actively being worked on

800+ tech-savvy millennials around the Great Lakes St. Lawrence Watershed are more water-aware



12 active water-tech start-ups



Issue: e-coli outbreaks on public beaches

Solution: artificial intelligence predictive model to enable municipalities to alert citizens before the outbreak occurs.

Issue: nitrate run-off from agricultural land

Solution: portable soil analysis lab and mobile app for real time soil data to avoid over use of fertilizers by farmers.

Issue: flood prediction & adaptation.

Solution: a multi-platform app to map potential flooded areas based on discharge forecasts from ECCC, while also assessing the impact on citizens and critical infrastructures to predict damages and alerts subscribers.

That is just to highlight 3 of the 12 solutions !

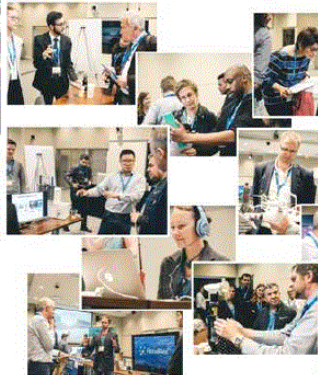


Skills-building workshops



A 7-month challenge

Judged semi-final



"Even though we are in the middle of a competition, this weekend did not feel like that at all." David Blair



On-the-water expedition

Dragon's Den Final



Established by:



de Gaspé Beaubien Foundation

Powered by



Foundation

Founding Partner



Sponsors



Partners





Interested BC Partners



Let's make a splash in BC!



Be a financial partners: to complement RBC Foundation seed funding



Be a program partner:

- Advisory committee member
- Water issue leader
- Recruiting hub
- Judge
- Expert Mentor
- Incubator





Briefing Note – Need for AIS resources in the Okanagan

To: House of Common's Standing Committee on Fisheries and Oceans (FOPO)

From: Dr. Anna Warwick Sears, Okanagan Basin Water Board (OBWB)

Date: April 29, 2019

We understand that FOPO is undertaking a study on aquatic invasive species (AIS), specifically regarding DFO's resources dedicated to preventing and eliminating AIS, whether resources are equitably and consistently distributed across Canada, and whether the AIS program has the resources to be effective.

We also note the Report on Aquatic Invasive Species recently published by Julie Gelfand, the Commissioner of the Environment and Sustainable Development. Our experiences managing invasive Eurasian watermilfoil, and our experiences seeking to prevent an invasion of zebra and quagga mussels are consistent with her findings: "In general, it costs far less to prevent an aquatic invasive species from entering an area than to control it afterwards." Often what is lost can't be replaced at any cost.

Background: The Okanagan Basin Water Board is a local government agency in B.C. established in 1970 through provincial legislation, with a mandate to provide leadership on valley-wide water issues. Part of our mandate is to manage invasive Eurasian watermilfoil (Milfoil) on Okanagan public beaches. Milfoil is an AIS introduced to the Okanagan in the late 1960s. Our experience with Milfoil has informed our concerns about other AIS – especially invasive mussels – being introduced to Western Canada.

Eurasian watermilfoil

- The program targets public beaches and boating areas, up to 14% of the shoreline.
- Milfoil rototilling is the only effective management measure beyond aquatic herbicide (not permitted in Canada for a drinking water source).
- Some summer harvesting is done for cosmetic purposes.
- Without management, Milfoil creates dense weed beds and deadly anoxic aquatic environments.
- A 1991 provincial study found that terminating the program would lead to \$135M loss in tourism revenues, as well as lost property values, tax dollars, and 2,500 jobs.
- These costs would be much greater in 2019, given huge increases in the population, property values and economy.
- The Milfoil program costs were fully downloaded to the OBWB and local communities in 1998.
- Our current annual budget for this program alone is \$850,000 of local property taxes, spending an estimated \$20 million over the life of the program.
- Control of these weeds is essential for the environmental quality of lake waters, protection of cultural and social values, and protection of the local economy and jobs.
- We have received no federal assistance with this program.

Invasive species management vs. SARA listing

- DFO regulatory actions could create obstacles and additional costs to managing Milfoil.
- A proposed SARA listing of the native Rocky Mountain Ridged Mussels would eliminate our rototilling program.

- The proposed listing was published in the Canada Gazette without any serious consideration of environmental, social, cultural or economic impacts of NOT managing invasive Milfoil.
- The proposed listing also does not consider a 2015 UBC study that states the population is not at risk of extirpation by Milfoil rototilling.
- We are in the process of challenging this listing and calling for a Fisheries Act exemption for our Milfoil control activities.
- Conflicting mandates like this, imposing additional costs, should also be considered by the FOPO committee.

Invasive zebra & quagga mussels

- Okanagan communities are alarmed about the potential invasion of zebra and quagga mussels.
- The Okanagan, Kootenay and Fraser Basin are high-risk for invasion due to water chemistry.
- These areas represent the most productive salmon habitat in southern B.C.
- Invasive mussels threaten the restoration of the Okanagan sockeye salmon, which accounts for 80% of sockeye in the Columbia River system.
- Invasive mussels are a much greater threat to the native Rocky Mountain Ridged Mussel than is our program for invasive milfoil control, yet stopping their spread receives little federal attention.
- Most of mussel-fouled boats coming to our region come from Eastern Canada, which would benefit from a federally-led response.
- The Pacific Northwest Economic Region (PNWER) has estimated that invasive mussels would cost \$500 million annually to the region.
- Our studies found invasive mussels would cost the Okanagan economy \$42 million annually.
- As of 2019, we have spent \$520,000 in local tax dollars on awareness and monitoring campaigns, and with matching funding from local businesses delivered more than \$850,000 in prevention actions since 2012.
- The U.S. government allocated \$16 million in 2017 to match funding from Northwest States.
- In 2018 DFO funded \$133,000 annually over three years for outreach and education, and \$25,000 annually for four years for research.
- More federal resources are needed to prevent invasive mussels from destroying aquatic environments in Western Canada.

Summary

Aquatic Invasive Species are a national challenge that cannot be transferred to the provinces. The damage caused by aquatic invasive species often can't be repaired. We risk losing our environment, our quality of life and cultural values, and severely impacting local economies. We need more federal resources to combat AIS in Western Canada.

Action requests:

- **That DFO provide an exemption for Eurasian watermilfoil control activities in high-value public areas of the Okanagan, as allowed under the Fisheries Act;**
- **That DFO provide equivalent resources for invasive species management to Western Canada as it does to the East and North, and equivalent matching resources for invasive mussel prevention to Provinces as the US federal government provides to States.**
- **That the federal government fully implement the recommendations of the Report on Aquatic Invasive Species by Commissioner Julie Gelfand.**

Hon. Jonathan Wilkinson
Minister of Fisheries and Oceans Canada
min@dfp-mpo.gc.ca

Hon. Doug Donaldson
Minister of Forests, Lands, Natural Resource Operations and Rural Development
FLNR.Minister@gov.bc.ca

April 24, 2019

Re: Reducing conflict between native mussel protection and invasive milfoil control in the Okanagan

Dear Minister Wilkinson and Minister Donaldson,

The Okanagan Basin Water Board (OBWB) is a local government agency in B.C. established through provincial legislation in 1970, with a mandate to provide leadership on valley-wide water issues. One part of OBWB's legislated mandate is to "participate in and undertake an aquatic weed control program under a cost-sharing agreement with the province." We are writing to make you aware of a conflict that is developing between the requirement to protect a species of freshwater mussel (Rocky Mountain Ridged Mussel, RMRM), and the need to control the growth of invasive Eurasian watermilfoil (milfoil) for ecological, social and economic reasons (Appendix A). While we strongly support the protection of native species and their natural habitats, we believe that a more evidence-based and balanced approach is needed in this particular case.

While RMRM are currently listed as 'at-risk' under the Species at Risk Act (SARA), they are now being considered for up-listing to 'endangered' which would greatly increase regulatory requirements for the milfoil control program. We have submitted feedback under the Canada Gazette process for this SARA listing proposal and have included it as Appendix C.

Decision sought:

- We request that the milfoil control program of the OBWB be formally authorized, on a permanent basis, under the terms of the Fisheries Act, Aquatic Invasive Species Regulations, Section 19 (2) (a) (iii) and (b) by either the Minister of Fisheries and Oceans, or the Minister of FLNRORD. Specifically, that the Minister may take measures

to control any aquatic species in a particular region or body of water frequented by fish where the aquatic species is not indigenous and may harm fish, fish habitat or the use of fish (harm as noted in Appendices A and C).

Should the proposed up-listing of RMRM as endangered under SARA be approved, the following is an alternative to authorization under the Fisheries Act:

- We request that the Minister issue a long-term permit authorized under SARA, Section 73 (1) and (2) (c) allowing OBWB to engage in milfoil control activities in which “affecting the species is incidental to the carrying out of the activity.”

If neither of these authorizations are granted:

- We ask that Fisheries and Oceans Canada and the BC Ministry of FLNRORD conduct a literature review and further field research into the effect of uncontrolled invasive milfoil on RMRM and other native species, prior to prohibiting the ongoing beneficial and locally-funded program to de-root milfoil;
- We ask that the ministries allocate sufficient funding to complete surveys to establish the extent of RMRM habitat (a requirement if up-listing under SARA occurs), and to determine the total estimated population in Okanagan large lakes. It is likely that surveys of this type will also have a number of periphery benefits such as detecting other freshwater mussel species and informing other regulatory decision-making;

and:

- **Until further research is conducted and an evidence-based decision can be made, we ask to continue to conduct milfoil de-rooting in areas which have historically been treated using this method; and**
- **We ask that milfoil de-rooting in the Okanagan by the OBWB be allowed to continue in high public-use areas regardless of future recordings of RMRM, ensuring that prohibitions do not continue to expand in future years.**

History:

The OBWB has been controlling milfoil in the Okanagan’s major lakes for more than four decades, with a current budget of \$825,000 – entirely funded by local property taxes. The program was developed by the B.C. Ministry of Environment following more than 17 years of experiments into control methods including chemicals, bottom-barriers, biological control and several methods of mechanical treatment (Appendix B).

Ultimately, de-rooting the invasive weed using barge-mounted rototillers was found to be the most effective method of control (after aquatic herbicides), achieving an 80-97% reduction in

stem densities in water depths up to 3.5 meters.¹ Our operations are conducted using best practices incorporating all known environmental concerns and regulated species work windows, and are permitted through both provincial and federal ministries.² This program targets only invasive Eurasian watermilfoil during winter months when the plant is dormant and cannot spread.

Our annual treatment areas represent a small fraction of the lakeshore, focusing on public beaches and boating areas. Untreated areas can experience dense growth of the invasive weed, degrading the beaches for swimming and recreation. Further, untreated weed beds become mucky and anoxic with decaying milfoil.

Despite the demonstrated beneficial effects and best practices of the milfoil control program, concerns about a native freshwater mussel, (Rocky Mountain Ridged mussel, RMRM) have prompted ministry staff at both levels of government to issue increasing restrictions on the de-rooting method of milfoil control. These restrictions are based on an assumption that milfoil de-rooting has a negative effect on RMRM in the local area of milfoil control, but does not consider the negative effects of the milfoil itself on RMRM, other species, or their habitat.³

In 2010, a fisheries officer at DFO gave instructions that de-rooting could no longer be used at any site where RMRM were present, although we have been de-rooting in these locations for decades.⁴ In 2013, more mussels had been recorded at more historical de-rooting sites, and the prohibition expanded.⁵ In January 2018, the Thompson-Okanagan Ecosystem Section at the B.C. Ministry of FLNRORD released “Guidance for Freshwater Mussels in the Okanagan” which has the effect of formally prohibiting milfoil control (both de-rooting and harvesting⁶) in any area where RMRM are present, and the prohibited areas were again expanded due to new mussel recordings in historical treatment sites. These restrictions now extend to major sections of four large lakes, in areas of high public use and ecological value (Appendix A).⁷

Concerns:

We feel that the decision from both federal fisheries officers and provincial habitat officers is based on limited evidence, and does not achieve a balance between the need to protect RMRM and the need to consider the other ecological, social and economic concerns that will arise from limiting milfoil control. Serious questions remain.

1. Studies from other areas show that invasive milfoil displaces beneficial native macrophyte communities⁸, changes aquatic food webs⁹, substrate conditions and oxygen availability¹⁰ (Appendix A). It is unknown if sensitive RMRM would prefer, or could even survive in areas of untreated invasive milfoil infestation.¹¹ By removing

milfoil through de-rooting, we may help preserve more natural habitat for RMRM and other species. More research in this area is needed

2. Invasive milfoil has been shown to negatively effect many other native species of plants and aquatic animals, including salmonids and other fish (Appendix A). In extreme cases of milfoil infestation, there have been recordings of direct fish mortality from the anoxic conditions created in those areas.¹² Preventing milfoil de-rooting for RMRM is an example of one-species management, without consideration of the potential negative effects to other species.
3. Areas which have already been subject to de-rooting for several decades still show evidence of live RMRM and successful juvenile recruitment (reproduction) at the periphery of the treatment area. Any damage to individual RMRM in these limited de-rooting areas would have occurred long ago, and it is unlikely that the method of milfoil control is having a negative population-level effect on the species, given the limited total shoreline area where de-rooting occurs. More research in this area is needed.
4. A provincially-commissioned report in 1991 found that termination of the program would lead to a projected economic decline of \$85 million in annual tourism revenue, \$360 million in lost property value and over 1,700 job losses in the Okanagan alone. The study also found the further loss of \$40 million in provincial tourism revenues, \$3 million in lost provincial tax revenue and a further 800 job losses province-wide. It is likely that the numbers today are much higher given the dramatic population, economic and tourism growth in the valley in the last 28 years. We recommend that the province conduct another study to determine the current socio-economic benefits of the milfoil control program to inform decision makers of the effects of their decision to slowly erode this important program.

We have also expanded on these concerns in our feedback to the proposed changes to SARA in Appendix C.

Some B.C. provincial staff have asserted that milfoil in the Okanagan can be controlled through summer harvesting, which we conduct in limited areas where rototilling is already restricted, or where underwater infrastructure makes rototilling unfeasible. This short-term method does not have the same beneficial effects on water quality and habitat, does not prevent anoxic conditions at the lake bottom, and because it occurs during the plant's growing season, also spreads fragments which can lead to increased infestations in other areas.¹³

Harvesting is less effective than de-rooting as the plant grows back to the surface within four to six weeks of treatment, and the root systems are allowed to spread and densify. Harvesting also creates an increased danger to public safety through increased weed growth in swimming areas, as the machines enter swimming areas during beach-use, and operate in peak boating season. Harvesting is also less cost-effective and requires more equipment and on-shore infrastructure to collect and transfer the weeds to land for disposal. Finally, the harvesting season is only two months long; too short a window to treat the extensive areas of milfoil infestation in five major lakes. Harvesting is not an alternative to de-rooting for milfoil control, it is a less-effective aesthetic-only method which has limited benefit to aquatic health, and given the size of the infested treatment areas, is cost-prohibitive.

Summary:

Current management decisions being made by ministry staff under the B.C. Water Sustainability Act, the Fisheries Act and potentially the Species at Risk Act are not sufficiently informed by available evidence, and do not take a balanced approach to natural resource management. These decisions have the potential to return some areas of Okanagan lakes to the aquatic conditions of the 1970's with uncontrolled milfoil growth promoting poor water quality and toxic algae blooms, anoxic lake-bottom conditions, increased nutrient release into the water, and unusable swimming areas. There is little evidence that the restriction of milfoil de-rooting will have a positive effect on the overall RMRM population, and there is some evidence to suggest these restrictions may actually cause negative effects in their habitat. Further, RMRM are primarily known to reside in healthy populations in streams such as the Okanagan River, which are not infested by milfoil, and not subject to milfoil control.

As a water management agency, the OBWB provides leadership and funding to improve water quality, protect source waters, conserve water, prevent new invasive species and manage those that are here. Even as a small regional agency we have provided more than \$90 million over our history to support these efforts. In cooperation with federal, provincial, and local governments and First Nations, the programs of the OBWB over the last 50 years, including the control of invasive milfoil, have likely had a significantly positive effect on the RMRM species and its habitat. Provincial studies show that the species is thriving in several locations, including through healthy juvenile recruitment, and in parts of our system which were heavily modified in the last several decades, demonstrating their resilience.

We ask you to consider the potential harm that could be done to the Okanagan aquatic ecosystem, economy and way of life if milfoil treatment is curtailed. We are happy to continue working with ministry staff at all levels of government and to continue to provide leadership on valley-wide water issues.

Sincerely,



Anna Warwick Sears, Executive Director
Okanagan Basin Water Board

CC:

- Okanagan MPs: Mel Arnold, Stephen Fuhr, Dan Albas, Richard Cannings;
- MLAs: Eric Foster, Norm Letnick, Steve Thomson, Ben Stewart, Dan Ashton, Linda Larson, Jackie Tegart, Greg Kylo
- Chiefs Executive Council, Okanagan Nation Alliance;
- Regional District Chairs for North Okanagan, Central Okanagan, and Okanagan-Similkameen;
- Okanagan Municipalities;
- Okanagan Chambers of Commerce
- Thompson Okanagan Tourism Association
- FLNRORD Thompson Okanagan Region, Ecosystems Section Head

References

- ¹ Newroth, Peter R. and Roger J. Soar, "Eurasian Watermilfoil Management Using Newly Developed Technologies." *Lake and Reservoir Management*, Vol 2, Issue 1, 1986, pp. 252-257. <https://www.tandfonline.com/doi/abs/10.1080/07438148609354638>
- ² Letter from Ministry of FLNRO, 12 July, 2013. File: R8-7520
- ³ RMRM have been found on the periphery of milfoil beds and rototilling areas, but due to the conditions created in the milfoil bed, surveyors have been unable to enter the beds. Sloey, David et al., 1996 found that "the edges of the milfoil bed (either shallow or pelagic or both) contained higher biomass, density and taxa richness than the center of the bed." (abstract) This correlates with a finding that RMRM would be healthier at the margins of a milfoil bed, but not necessarily able to live within the bed.
- Sloey, David., Terry Schenck and Richard Narf, "Distribution of Aquatic Invertebrates within a Dense Bed of Eurasian Milfoil (*Myriophyllum spicatum* L.)." *Journal of Freshwater Ecology*, Vol 12, Issue 2, 1997, pp. 303-313.
<https://www.tandfonline.com/doi/abs/10.1080/02705060.1997.9663537>
- ⁴ Email correspondence DFO, 08 November 2010.
- ⁵ Letter from Ministry of FLNRO, 29 November, 2012. File: R8-7222
- ⁶ Recent changes (January 2018) to the Okanagan Large Lakes Foreshore Protocol upgraded milfoil harvesting to a "high-risk" activity, requiring extra mitigation measures than were previously required when it was designated as a "low-risk" activity, including through the new Guidance for Freshwater Mussels, also published in January 2018.
- ⁷ Mussel Habitat Zones Okanagan Region:
<https://catalogue.data.gov.bc.ca/dataset/mussel-habitat-zones-okanagan-region>
- ⁸ Ring, R.A., N.N. Winchester and I.V. MacRae. "Myriophyllum spicatum L., Eurasian Water Milfoil (Haloragaceae)." *Biological Control Programmes in Canada, 1981-2000*, edited by P.G. Mason and J.T. Huber, CABI Publishing, 2002, pp. 402-407.
<https://books.google.ca/books?hl=en&lr=&id=tDHWhOEhTckC&oi=fnd&pg=PA402&dq=milfoil+and+anoxic&ots=b6jZsJiqqd&sig=mGPMJgTxkVSwuDNpH3JmUm-pqXU#v=onepage&q&f=false>
- Madsen, J.D., C.F. Hartleb, and C.W. Boylen. "Photosynthetic characteristics of *Myriophyllum spicatum* and six submersed aquatic macrophyte species native to Lake George, New York." *Freshwater Biology*, Vol. 26, Issue 2, 1991, pp. 233-240. Found that the canopy of invasive milfoil reduces light transmissivity into the water column, preventing other native plants from growing.

⁹ Wilson, Sarah J. and Anthony Ricciardi. "Epiphytic macroinvertebrate communities in watermilfoil (*Myriophyllum spicatum*) and native milfoils *Myriophyllum sibiricum* and *Myriophyllum alterniflorum* in Eastern North America." *Canadian Journal of Fisheries and Aquatic Sciences*, Vol 66, Issue 1, 2009, pp. 18-30. Found that invasive milfoil supports different macroinvertebrate communities compared to native aquatic macrophytes and "the replacement of native milfoils by *M. spicatum* (Eurasian water milfoil) may have indirect effects on aquatic food webs." (Abstract)

<https://www.nrcresearchpress.com/doi/10.1139/F08-187#.XK-Go5hKjcs>

¹⁰ Frodge, Jonathan et al., "Mortality of Largemouth Bass (*Micropterus salmoides*) and Steelhead Trout (*Onorhynchus mykiss*) in Densely Vegetated Littoral Areas Tested Using in situ Bioassay." *Lake and Reservoir Management*, Vol 11, Issue 4, 1995, pp. 343-358.

<https://www.tandfonline.com/doi/abs/10.1080/07438149509354216>

Zavinski, Erik, "Lake Group Responds to Burtis Bay fish kill." *Observer*. November 17, 2018.

<http://www.observertoday.com/news/page-one/2018/11/lake-groups-respond-to-burtis-bay-fish-kill/>

¹¹ Burlakova, Lyubov E., and Alexander Y. Karatayev., "The Effects of Invasive Macrophytes and water level fluctuations on unionids in Texas impoundments." *Hydrobiologia*, Vol 586, Issue 1, 2007, 291-302. "In two ponds, horizontal distribution of unionids was limited by dense beds of invasive and noxious macrophytes (mainly Eurasian watermilfoil *Myriophyllum spicatum* and American lotus *Nelumbo lutea*): mussel densities were significantly lower in these macrophyte beds ($P < 0.001$)." (Abstract).

<https://link.springer.com/article/10.1007/s10750-007-0699-1>

¹² Frodge, Jonathan et al., demonstrated that anoxic conditions caused by dense aquatic macrophytes led to significant fish mortalities (steelhead trout and largemouth bass) and found that "at high densities aquatic macrophytes can have significant detrimental localized effects on fish." (abstract) See note 10 for Citation.

¹³ Newroth, Peter R., "British Columbia Aquatic Plant Management Program." *Journal of Aquatic Plant Management*, Vol 17, 1974, pp. 12-19. Continued use of the harvester did not provide lasting control, and since it tended to encourage further spread of Eurasian watermilfoil, reviews of other mechanical removal options were continued." 17.

<http://www.apms.org/japm/vol17/v17p12.pdf>

Appendix A: Effects of invasive Eurasian watermilfoil

Economic Effects:

According to Fisheries and Oceans Canada: “Eurasian Water Milfoil grows and spreads rapidly while invading replacing native plants. It negatively impacts fish and wildlife populations as well as human activities such as swimming, boating, waterskiing, fishing and tourism in affected areas. This plant also has been known to impede flood control, water conservation and drainage and irrigation works. Milfoil populations can be very dense making it very costly to control.” <http://www.dfo-mpo.gc.ca/species-especes/profiles-profils/eurasianwatermilfoil-myrriophylleenepi-eng.html>

The current annual budget of the OBWB Milfoil Control Program is \$825,000.

In 1991, the BC Ministry of Environment released an independent report: *Evaluation of the Socio-Economic Benefits of the Okanagan Valley Eurasian Water Milfoil Control Program*. The report found that terminating the milfoil control program would lead to an economic decline of:

- \$85 million in tourism revenues;
- Employment in tourism of 1,700 positions;
- Real estate values of \$360 million (3.8% of net taxable values of Okanagan properties); and a further projected decline (outside the Okanagan) of:
- \$40 million in BC Tourism Revenues;
- Employment in tourism of 800 positions in BC;
- \$3 million in tax revenues;

Further, the report found that “increasing emphasis should continue to be placed on de-rooting rather than harvesting as a means to control Eurasian water milfoil.”

A 2014 study in King County, Washington found “that milfoil has a significant negative effect on property sales price (\$94,385 USD lower price), corresponding to a 19% decline in mean property values.” Olden J.D., and M. Tamayo. (2014) “Incentivizing the Public to Support Invasive Species Management: Eurasian Milfoil Reduces Lakefront Property Values.” *PLoS ONE* 9(10): e110458. <https://doi.org/10.1371/journal.pone.0110458>

Environmental Effects:

“From an ecosystem standpoint, the most important consequences of macrophyte decay are release of dissolved substances, deoxygenation and sediment accretion.” Carpenter, Stephen R. and David M. Lodge, “Effects of Submersed Macrophytes on Ecosystem

Processes.” *Aquatic Botany*, Vol 26, 1986, 341-370.

<https://www.sciencedirect.com/science/article/pii/0304377086900318>

Water flow effects One experiment on the effects of aquatic macrophytes on water flow, showed that invasive milfoil beds decreased water flux through the littoral zone by 36%. (Ibid 344)

Increase in organic sediments In streams, “macrophyte stands act as a sieve retaining coarse particulate detritus” and terrestrial organic material “is retained in macrophyte beds and decomposed to a much greater extent than in unvegetated reaches of streams. In lakes, macrophytes contribute refractory organic matter directly to sediments...” (Ibid, 344)

Changes in free-water dissolved oxygen levels Dense macrophyte stands create significant oxygen changes in the water column, reducing available dissolved oxygen near the lake substrate, and increasing it at the surface. “Oxygen flux in a dense *Myriophyllum spicatum* stand was about twice as great as that of an adjacent harvested plot.” (Ibid 345)

Nutrient release into the water column The literature review from Carpenter and Lodge (1986) found that submersed macrophyte stands act as translocators of dissolved organic carbon and phosphorus, by absorbing it from the substrate through the plant, and releasing it back into the water during decomposition. (349)

Social Effects:

Invasive milfoil infests many public beaches and boating areas throughout North America. In the Okanagan, approximately 58 linear kilometers of shoreline covering approximately 6km² have been historically treated for milfoil using either winter de-rooting or summer harvesting methods or both. This represents 13.9% of the total shoreline area of major Okanagan Lakes.

The following public beaches in the Okanagan are infested with milfoil and historically subject to milfoil control (* Areas are now partially or wholly prohibited for milfoil de-rooting due to RMRM occurrences.):

Kin Beach – Vernon *
Paddlewheel Park Beach – Vernon *
Kalamalka Beach – Coldstream
Beasley Park – Lake Country
Reiswig Regional Park – Lake Country
Tugboat Bay – Kelowna

Hot Sands Beach/City Park – Kelowna
Strathcona Park – Kelowna
Kinsmen Park – Kelowna
Boyce-Gyro Beach – Kelowna
Rotary Beach Park – Kelowna
Pritchard Park – West Kelowna
Gellatly Bay Park – West Kelowna
Willow Beach – West Kelowna
Okanagan Lake Provincial Park North
Okanagan Lake Provincial Park South
Crescent Beach – Summerland *
Gordon Beggs Rotary Beach – Summerland *
Rotary Park Beach – Penticton
Skaha Lake Park – Penticton *
Lions Park – OK Falls *
Christie Memorial Provincial Park – Skaha Lake *
Lions Park – Osoyoos
Veterans Memorial Park – Osoyoos
Legion Beach Park – Osoyoos
Gyro Park – Osoyoos
Goodman Park – Osoyoos
Haynes Point Provincial Park *
Osoyoos Lake Regional Park

Yacht Clubs and Marinas infested with or directly affected by milfoil and subject to historical milfoil control include:

Vernon Yacht Club *
Turtle Bay Marina
Kelowna Yacht Club
El Dorado Marina
Kelowna Sailing Club
West Kelowna Yacht Club
Summerland Yacht Club *
Penticton Yacht Club
Skaha Lake Marina *
Osoyoos Boat Launch and Marina

As well as public beaches, yacht clubs and marinas, extensive lakefront business and resort areas are also treated each year for invasive milfoil. Several of these areas are also now restricted due to RMRM occurrences.

Uncontrolled invasive milfoil represents a severe threat to the economy and local way of life in the Okanagan. In 2018, nearly 80% of all visitors to Kelowna participated in beach, park and water related activities with 10% reporting that it was the primary reason for their visit.

Uncontrolled milfoil also represents an increased risk to public safety as well as beach water quality and drinking water quality. As recently as 2017, Okanagan media covered a story of a man swimming in an uncontrolled milfoil bed who described getting tangled in milfoil off of Kelowna's City Park. <https://www.pentictonwesternnews.com/news/adversity-for-lake-milfoil-harvest/> In nearby lakes in northwestern states, several drownings have been attributed to swimmers becoming caught in dense milfoil beds. Further, reduction in water quality due to milfoil increases the occurrence of swimmers itch, and promotes toxic algae blooms, which can cause a hazard to both humans, pets and wildlife.

Appendix B: Methods of Milfoil Control

There are two methods of milfoil control used in the Okanagan Basin, summer harvesting and winter rototilling. Both methods have been historically used since the 1970s in Okanagan Lakes, and were developed by the B.C. Ministry of Environment during more than 17 years of control experiments. Each machine operator has a GPS-linked tablet on board with maps showing all environmental work windows, habitat and species concerns. All information relating to federal and provincial environmental permitting is updated annually by a Qualified Environmental Professional. All milfoil control work is GPS tracked and a report is also submitted to the province annually.

Summer harvesting uses specially designed machines to cut invasive milfoil approximately 5 feet below the water's surface, and to transport the cut weeds to land. Once on shore, a truck collects the weeds for disposal. This control method only occurs during the peak milfoil growth season in July and August when the milfoil reaches the water's surface. Since milfoil grows up to 5 cm per day, a harvested milfoil bed could be back at the surface of the water in 30 days after treatment. Milfoil starts growing at water temperatures as low as 15 degrees Celsius, which occurs in Okanagan Lakes from May to October. Since mature milfoil plants naturally spread through fragmentation, the process of cutting the weeds also leads to viable plant fragments floating freely in the water to potentially establish new plants. Although the harvester collects most of the weeds, other stray fragments can create piles on beaches, get caught in boating equipment and interfere with other recreational activities.

Harvesting is not an effective method for milfoil control and is only used as an aesthetic treatment in areas of high public value where rototilling is not feasible. Harvesting also presents increased public safety risks as the machines must operate in public swimming areas during peak summer beach use. July and August are also the busiest time for boating and all water-related recreation activities in the Okanagan, creating increased workplace hazards for machine operators.

Winter rototilling occurs between October and May while milfoil is dormant and plant fragments cannot spread. The machine tills the top few inches of the lake substrate in areas where high milfoil growth were previously mapped, and where plant fragments are still visible. Root fragments float to the surface of the water and wash ashore where they decompose. The root fragments are also a food source for waterfowl which can often be seen following the machine. One year of de-rooting can lead to reduced plant density of 80-97%, while ongoing de-rooting in the same area can locally eliminate plant growth for a few years. However, once de-rooting stops, the area will become re-infested. De-rooting milfoil can also lead to a resurgence of native aquatic plants which are beneficial to the ecosystem, although the exact

mechanism for this is unknown. Milfoil is known to outcompete native plants by reducing available light for photosynthesis, and these plants have different root structures, which may not be as effectively removed from the substrate through rototilling.

De-rooting only occurs in mapped milfoil beds, accounting for all known fisheries work windows, including fish, amphibians, waterfowl, and sensitive plant areas.

Milfoil control can also occur through the use of physical, biological and chemical methods which were studied during the development of the OBWB milfoil control program. Bottom barriers are used in some places, and can be effective for a short period. However, bottom barriers have a number of environmental drawbacks and are not as effective as de-rooting. Bottom barriers create a permanent change in the substrate, limiting access to fish spawning beds and preventing all plant growth, reducing the occurrence of native aquatic plants.

Biological control includes the mass rearing of native aquatic insects such as weevils. The weevils prefer milfoil to other food sources, and also provide a food source for other species. However, in order to reduce overall milfoil density, huge numbers of weevils are needed which makes the mass-rearing process difficult and cost prohibitive. Weevils quickly consume a milfoil bed, which then eliminates the food source, killing the weevils and allowing the plants to re-grow.

Selective chemical treatment is the most effective method of milfoil control and is used extensively in the United States, including in the southern portion of the Okanagan Basin. Chemical treatment can lead to longer-term milfoil control while having limited effects on the aquatic ecosystem. Newer products have been developed since this method was last used in the 1980's in the Canadian Okanagan Basin, but they are not currently approved for use in Canada. Costs of chemical treatment are lower than the cost of rototilling and do not disturb the lake bottom. However, this method means releasing substances into drinking water while the plant has foliage in the summer months during peak beach-use. Chemical treatment does not have the same social licence as de-rooting and it is not likely a publicly acceptable alternative.

Appendix C: Comments Regarding Canada Gazette, Part 1, Volume 153, Number 12: Order Amending Schedule 1 to the Species at Risk Act

Julie Stewart, Director
Species at Risk Program
Fisheries and Oceans Canada
200 Kent Street
Ottawa, Ontario K1A 0E6

April 17, 2019

Re: Comments Regarding Canada Gazette, Part 1, Volume 153, Number 12: Order Amending Schedule 1 to the Species at Risk Act

Dear Director Stewart,

The Okanagan Basin Water Board (OBWB) is a local government agency in B.C. established through provincial legislation in 1970, with a mandate to provide leadership on valley-wide water issues. While we strongly support the protection of native species and their natural habitats, we believe that new evidence should be considered prior to the decision to up-list the Rocky Mountain Ridged Mussel (RMRM) from at-risk to endangered. To that end, we submit these comments to the subject Canada Gazette Order Amending Schedule 1 of the Species at Risk Act, regarding the recommended up-listing RMRM from “at-risk” to “endangered.”

Because of the limited time given to respond to the Canada Gazette publication, and the limited opportunity for communities to become informed and engaged, Okanagan elected officials will be directing additional correspondence directly to the Minister.

The listing considerations provided in the Canada Gazette are based on old information and in some cases, reach false conclusions. There is significant new scientific information to suggest that this species does not meet the definition of endangered under SARA, and that this new information has not been considered by COSEWIC. The Regulatory Impact Analysis Statement (RIAS) also significantly understates the social, economic and ecological impacts of regulations to protect RMRM should they be listed as endangered under the Order.

We strongly believe that the Minister should recommend to the Governor in Council that the matter be referred back to COSEWIC for further information and consideration. Specifically, that COSEWIC should consider new information about the species, published in 2015, and all

federal, provincial and academic surveys done on the RMRM since the last COSEWIC report in 2010, and that COSEWIC make a new recommendation based on this information.

This new information was also not available prior to the last round of (very limited) public, Indigenous and stakeholder consultations held in 2011. Since those consultations were held, there has been significant advancement in the understanding of Indigenous rights, changes in government at both the federal and provincial level, significant restoration activities in RMRM habitat areas, and an enhanced understanding of the issues and trade-offs among the stakeholders. **New consultations should be held to better inform the advice given to the minister.**

The Annex 1 – Description of species being added or reclassified to Schedule 1 of the Species at Risk Act section on RMRM asserts that “there may be some costs associated with reclassifying these species as endangered, due to the application of the SARA prohibitions; costs are not currently quantifiable, but are expected to be low.”

This conclusion is false and limited. There are significant extra direct and indirect costs associated with this decision which have been quantified in the past, and could be re-examined in detail given current information. There will be immediate and significant social and economic impacts related to a loss of the ability to control invasive Eurasian watermilfoil which have not been considered. We have outlined this information below.

Further, we believe it is appropriate for the Minister to consider the other factors given in this letter while preparing listing advice for the Minister of Environment.

We have organized our comments with specific reference to each of the considerations as outlined on page 5 of the Canada Gazette. Specifically: “In preparing listing advice to the Minister of Environment in relation to each aquatic species, the Minister of Fisheries and Oceans considers the following, as appropriate:

- The purposes of SARA;
- The species status assessment by COSEWIC;
- Other available information regarding the status and threats to the species;
- The *Fisheries and Oceans Canada Species at Risk Act Listing Policy for “Do Not List” Advice*;
- The results of consultations with the public, provinces and territories, appropriate Indigenous groups and organizations and wildlife management boards and with any other person or organization that the competent minister considers appropriate; and
- The socio-economic (costs and benefits) and biological impacts.

- The purposes of SARA

Page 3: The “Background” section outlines “the purposes of SARA, which are to prevent wildlife from becoming extinct or extirpated from Canada...” SARA defines an endangered species as “a wildlife species that is facing imminent extirpation or extinction.”

Comment: A 2015 study conducted by Post-Doctoral Fellow, Dr. Jon Mageroy, on behalf of the University of British Columbia and in partnership with the Province of B.C., found “Overall the investigation into RMRM juvenile recruitment in the Okanagan shows that juveniles have been recruited fairly recently at all the locations we surveyed, which indicates that the mussel population is not under immediate threat to be extirpated from the system.” (Mageroy P.4)

Further, between 1906 and 2002, only 14 records of RMRM exist from the entire range in Canada, leading to an initial precautionary COSEWIC listing of them as “at-risk”. However, Mageroy reported that snorkel surveys, limited to 3 meters in depth at only nine sites throughout the Okanagan directly recorded more than 5,500 RMRM individuals, and estimated the population at those nine sites to be over 13,300 individuals, and found healthy, recent juvenile recruitment in at least half of those surveyed sites. Mageroy also acknowledged that mussel surveys had to include excavations at the site as “juveniles are found buried in the substrate,” making them difficult to locate and identify. Still, the study found “mussels as young as two or three years old at a majority of the locations surveyed, and mussels seven years or younger at all locations.” (Mageroy P.3)

The precautionary principle defined on page 6 of the Gazette reads: “where there are threats of serious or irreversible damage to a wildlife species, cost-effective measures to prevent the reduction or loss of the species should not be postponed for a lack of full scientific certainty.” However, the initial COSEWIC assessment of RMRM as an at-risk species was only based on information available in 2003, while the latest assessment informing this Canada Gazette is only as recent as 2010. In the Mageroy study alone, the recorded population of the RMRM species in the Okanagan region increased by more than 390 times. That is, for every one Rocky Mountain Ridged Mussel recorded between 1906 and 2002, over 392 RMRM were found in just one study in just nine locations in 2013 and reported in 2015. Still, this information does not seem to have been assessed by COSEWIC, and does not seem to inform the recommendation to up-list this species to endangered.

Also since 2010, the B.C. Ministry of Forests, Lands, Natural Resource Operations and Rural Development have conducted more surveys, identified more RMRM locations, and should provide this information to COSEWIC for further assessment.

- The species status assessment by COSEWIC and The Fisheries and Oceans Canada Species at Risk Act Listing Policy for “Do Not List” Advice

The Fisheries and Oceans Canada Species at Risk Act Listing Policy and Directive for “Do Not List” Advice, 6.2.3. provides DFO with policy direction to provide “Do Not List” advice to the Minister to provide an option “to ‘refer back’ (to COSEWIC) when there is significant, credible information that:

- Was not available to, or not considered by, COSEWIC at the time of the assessment, and
- Could lead to a change in the conclusion that COSEWIC reached regarding the status of the species.”

Comment: In addition to the information on RMRM population numbers and healthy juvenile recruitment, Mageroy also examined and identified some of the host-fish species which are used by RMRM. The 2010 COSEWIC report indicated that “host species in Canada are unknown.” (COSEWIC RMRM, 2010, v.) This is another indication that the species status assessment by COSEWIC is outdated. Similarly, recent work by Snook (2018) identified more of the substrate types that provide habitat for RMRM species, another unanswered question given in the 2010 COSEWIC report.

Based on the Mageroy and Snook studies alone, there is “significant, credible information that was not available to COSEWIC and could lead to a change in the conclusion that COSEWIC reached regarding the status of the species.” It is likely that the Province of B.C. has further new information that was not previously available and should be considered.

- Other available information regarding the status and threats to the species

Significant assumptions have been made about this species and their decline in the Okanagan based on a lack of scientific knowledge. In the 2010 COSEWIC RMRM report Technical Summary, out of 21 factors used to determine demographic, extent and occupancy information, 11 were listed as “unknown,” 4 factors were listed as “possibly, likely or unlikely” and only 6 factors including geographic range were listed with certainty or from direct observation. Several of the unknown factors have now been studied in more detail and would provide for a more evidence-based assessment by COSEWIC.

The 2010 COSEWIC RMRM report also listed the following threats:

1. Introduction and establishment of the Zebra Mussel and/or Quagga Mussel in the Okanagan River basin.

Comment: Since 2010, the Province of B.C. in coordination with other northwestern jurisdictions has taken steps to prevent the introduction of invasive mussels. While these invasive species still represent the most serious threat, new prevention activities likely reduce the threat, and are another factor that has changed since 2010.

2. Ongoing foreshore/riparian development affecting quality/quantity of habitat especially on lake shorelines.

Comment: While we agree that foreshore/riparian development continues to be a threat to RMRM and aquatic habitat health in general, the regulations associated with the up-listing of SARA do not provide any additional protection for the species.

Further, habitat in the RMRM Extent of Occupancy area is generally improving from the conditions which likely led to any decline in the species in the past. Water quality in many of the main lakes of the Okanagan Basin has seen significant improvement since the 1960's, through reduced nutrient loading. Riverine environments in the Okanagan are also increasingly being protected and restored, and fish passage for potential host-fish species is being put in place around previously impassable barriers which may have prevented the species from moving in a natural way.

3. Regular rototilling of Eurasian Watermilfoil beds.

Comment: The assumption was made in both the 2010 COSEWIC RMRM report and the *Annex 1 – Description of species being added or reclassified to Schedule 1 of the Species at Risk Act section on RMRM*. However, there has never been any consideration of the effect of the invasive milfoil itself on the habitat of the RMRM. Introduced in the 1960's, invasive Eurasian water milfoil has significant effects on the substrate habitat conditions in many areas of the Okanagan. While RMRM individuals have been identified on the fringes of milfoil rototilling beds, there is no evidence that they can survive within dense milfoil beds that are left uncontrolled.

Limiting factors for RMRM survival in dense milfoil beds include lack of water flow, low dissolved oxygen conditions, nutrient loading into the water column, and lower water temperatures. Each of these factors is explained by Snook (2018) in her discussion of RMRM critical habitat identification. **It is possible that failure to control invasive milfoil will lead to a decrease in RMRM population and lower habitat quality.**

4. Channelization and water regulation in the Okanagan River.

Comment: Snook (2018) showed that RMRM density is noticeably higher in locations along channelized sections, while being “nearly absent from natural sections of Okanagan River.” Since river channelization only occurred in the Okanagan in the 1950’s, the population of RMRM that colonizes these sections has demonstrated successful juvenile recruitment since that time. This is another example of a conclusion drawn in 2010 by COSEWIC which should be reconsidered based on new information.

- The results of consultations with the public, provinces and territories, appropriate Indigenous groups and organizations and wildlife management boards and with any other person or organization that the competent minister considers appropriate

Annex 1 – Description of species being added or reclassified to Schedule 1 of the Species at Risk Act section on RMRM describes “several opportunities for consultation” that were provided over two months from October 2011 - November 2011, and only 17 responses were received. Of note, the report includes that “a face-to-face meeting (...) took place between DFO management and the Okanagan Basin Water Board to discuss specific aspects of the reclassification of the species.”

The report states: “Opposition was mainly due to fear of anticipated increases in the management costs of Eurasian Water Milfoil (an invasive aquatic plant), where rototilling is used to eliminate the plant. However, management costs are not likely to change significantly as a result of the listing of this mussel. Typically, the same areas are treated each year and the mussel is unlikely to be present in areas where rototilling has already occurred.”

Comment: RMRM mussels have been found adjacent to areas where milfoil rototilling has taken place for more than 30 years. Recent provincial restrictions have already significantly increased management costs, while reducing the effectiveness of invasive milfoil control. Further, the recent description of RMRM “critical habitat” by Snook for DFO means that restrictions could be placed on any areas of potential RMRM habitat within 80 meters of shore from the high-water mark, while provincial restrictions place a 100 meter buffer for each individual RMRM. These requirements could lead to an 800 square meter exclusion zone for milfoil control work around each new RMRM individual discovered in the future, even where the new recording is directly adjacent to the boundary of a historical rototilling bed. This would lead to significantly increased direct costs to the management program, contrary to the conclusion reached in the report.

These restrictions will have a very direct, immediate and significant impact on the local environment, economy, culture, and public enjoyment of the beaches as they are degraded by invasive milfoil.

The report also states: “For new areas that would require rototilling to eliminate the invasive plant, an environmental assessment would be required under the legislative requirements of the *Fisheries Act*, which has administrative, information and mitigation requirements similar to those required for species listed under SARA. Therefore, incremental costs for Milfoil control attributable to reclassifying the species to endangered under SARA would be negligible.”

Comment: The Fisheries Act relies on the listing of a species under SARA as extirpated, endangered or threatened to be in effect. Thus, the up-listing of RMRM would bring about significant new legislative requirements under the Fisheries Act – ONLY in relation to the SARA. Under the current listing as at-risk, the Fisheries Act requires the avoidance of “serious harm” to RMRM, whereas the up-listing to endangered would require the avoidance of “impacts” to RMRM – a significantly lower bar with significantly increased costs.

Further, the Benefits and Costs Analysis for RMRM on page 19 of the Gazette indicates that “there will not be any incremental costs to businesses as the majority of development that could harm the species would require a *Fisheries Act* review.”

Comment: This analysis is flawed as it only accounts for direct costs associated with the administration of the SARA regulations should the up-listing of RMRM be accepted. As outlined in the next section, there will be significant indirect costs associated with both the new requirements of the SARA permitting process, and the potential loss of milfoil control in newly identified critical habitat areas.

- The socio-economic (costs and benefits) and biological impacts

The listing of RMRM as an endangered species under SARA could trigger significant added burdens to proponents of any change in aquatic environments in the Okanagan without offering significant and meaningful additional protections for the survival and recovery of the species. Most significantly, increasing restrictions on milfoil control will have measurable biological effects on other species, a direct negative socio-economic effect, as well as potential negative effects on RMRM themselves (as outlined above).

1. The perimeters of areas that have already been subject to de-rooting for several decades still show evidence of live RMRM and successful juvenile recruitment (reproduction). Any damage to individual RMRM in these limited de-rooting areas would have occurred long ago, are incidental to the activity, and it is unlikely that the

method of milfoil control is having a negative population-level effect on the species, given the limited total shoreline area where de-rooting occurs. More research in this area is needed.

2. A provincially-commissioned report in 1991 found that termination of the milfoil control program would lead to a projected economic decline of \$85 million in annual tourism revenue, \$360 million in lost property value and over 1,700 job losses in the Okanagan alone. The study also found the further loss of \$40 million in provincial tourism revenues, \$3 million in lost provincial tax revenue and a further 800 job losses province-wide. It is likely that the numbers today are much higher given the dramatic population, economic and tourism growth in the valley in the last 28 years. **This report was not taken into consideration in the RIAS.**

- Reasonable alternatives, feasible measures to minimize impact, and jeopardizing the survival or recovery of the species

Should the order to up-list RMRM be approved, the following would apply:

“In order to authorize an activity that would otherwise be prohibited under SARA, the Minister of Fisheries and Oceans must be of the opinion that **one** of the following conditions is met:

- the activity is scientific research relating to the conservation of the species and is conducted by qualified persons
- the activity benefits the species or is required to enhance its chance of survival in the wild
- or affecting the species is incidental to carrying out the activity (i.e. is not the purpose of the activity)

As well, the Minister must be of the opinion that **all three** of the following conditions are met:

1. all reasonable alternatives to the activity that would reduce the impact on the species have been considered and the best solution has been adopted
2. all feasible measures will be taken to minimize the impact of the activity on the species or its critical habitat or the residences of its individuals
3. and the activity will not jeopardize the survival or recovery of the species”

Reasonable alternative:

Some B.C. provincial staff have asserted that milfoil in the Okanagan can be controlled through summer harvesting, which we conduct in limited areas where rototilling is already restricted, or where underwater infrastructure makes rototilling unfeasible. This short-term method does not have the same beneficial effects on water quality and habitat, does not prevent anoxic conditions at the lake bottom, and because it occurs during the plant's growing season, also spreads fragments which can lead to increased infestations in other areas.

Harvesting is less effective than de-rooting as the plant grows back to the surface within four to six weeks of treatment, and the root systems are allowed to spread and densify. Harvesting also creates an increased danger to public safety through increased weed growth in swimming areas, as the machines enter swimming areas during beach-use, and operate in peak boating season. Harvesting is also less cost-effective and requires more equipment and on-shore infrastructure to collect and transfer the weeds to land for disposal. Finally, the harvesting season is only two months long; too short a window to treat the extensive areas of milfoil infestation in five major lakes. Harvesting is not a reasonable alternative to de-rooting for milfoil control, it is a less-effective aesthetic-only method which has limited benefit to aquatic health, and given the size of the infested treatment areas, is cost-prohibitive.

The only known effective alternative to milfoil rototilling is the **use of aquatic herbicides** which is not socially acceptable for use in source drinking waters, and is not authorized for use in Canada.

Feasible Measures to Minimize Impact

Current policy in both provincial regulations and through SARA suggest that relocation of mussels out of a proposed work area is a feasible measure to reduce species impact. However, relocation of RMRM has been shown to also be detrimental and in many cases, difficult to conduct, and prohibitively expensive in larger areas. Through an experiment in 2013, 50 RMRM relocated to a control site were surveyed four months after relocation. Only 21 live mussels were recorded at that site, suggesting less than 50% survival of RMRM at four months after relocation. Based on the cost of relocation and the limited change of RMRM survival, it is not a feasible measure to minimize impact to individuals, and is also not likely to have a population-level effect.

Jeopardizing the survival or recovery of the species

COSWEIC acknowledges that only 5% of RMRM global habitat is in Canada, and is limited to the Okanagan Basin. Because juvenile RMRM are carried on host fish, the greater threat to the survival of the species is likely the prevention of fish passage through hydroelectric dams, and water control structures causing habitat fragmentation. Most of these structures in the broader Okanagan/Columbia basin exist in the United States, outside the control of SARA. In the Okanagan Basin, river channelization, water pollution and invasive milfoil introduction all occurred in a period between 1950 and 1975. While foreshore and riparian development continue to be a problem for RMRM and other species, the greatest threat likely occurred during that time period of rapid negative habitat change.

Since 1970, RMRM have successfully re-established in dense numbers in the channelized sections of the Okanagan River, have demonstrated successful juvenile recruitment in lake and river environments, and have enjoyed the benefit of significantly improved water quality, reduced nutrient loading, enhanced fish passage and increasing legal protection. Further, there is no evidence that RMRM prefer the same habitat as invasive milfoil, or that they can even survive in dense milfoil beds. Although rototilling for milfoil control may have negative effects for individual RMRM, the harm would be incidental to the carrying out of the activity, and may even provide broader benefits for the population based on enhanced habitat for other species, including potential host fish. The limited scope of milfoil rototilling (a small fraction of the lake shores) is also unlikely to have population-level effects to RMRM.

Conclusion

With the current information available based on locally-controllable processes, it is as likely that RMRM is in a recovery stage compared to the 1950-70's as it is that they are in decline in the Canadian Okanagan region. However, COSEWIC and other sources assert that global populations of freshwater mussels are in decline. The broader global conditions such as climate change and related increases in extreme events, effects on habitat conditions and other processes that could negatively affect freshwater mussel populations will not be addressed through the proposed changes in SARA.

We strongly believe that the Minister should recommend to the Governor in Council that the matter be referred back to COSEWIC for review of newly available information. We also strongly support the re-assessment of the RIAS, as the current version is based on old information, false conclusions and assumptions, despite other information being available. Finally, we believe new consultations should be held to better inform the advice given to the Minister.

In addition to these comments to the Canada Gazette process, we will be providing a letter directly to the Minister of Fisheries and Oceans and our local Members of Parliament to make them aware of our concerns. We will also be requesting feedback to the Minister from local governments, First Nations and local stakeholders to ensure that any decision is based on full and recent consultations, rather than a limited Regulatory Impact Analysis Statement informed by information from 2010 and very limited consultations from 2011.

We would be happy to engage further with your office on this issue which affects the Okanagan region, economy, ecosystem and Okanagan communities.

Sincerely,



Anna Warwick Sears
Executive Director

anna.warwick.sears@obwb.ca
250-469-6251