Image Credit: Regional District of Kootenay Boundary

Community Engagement Summary

Potential Use of ProcellaCOR FX in Christina Lake

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1.0 Executive Summary

Keefer Ecological Services (KES) was contracted by the Regional District of Kootenay Boundary (RDKB) to conduct community engagement activities over the summer and fall of 2025. The goal of this engagement was to gather community input regarding the potential use of the aquatic herbicide ProcellaCOR FX to help manage Eurasian watermilfoil (*Myriophyllum spicatum*) in Christina Lake.

This engagement was not undertaken to decide whether or not ProcellaCOR FX would be used at Christina Lake, but rather to determine whether there was sufficient interest within the community to even begin pursuing its use as a management strategy. The Ministry of Environment and Climate Change Strategy ultimately decides whether the herbicide can be approved for use through a Pesticide Use Permit, and the RDKB will only apply for this permit if there is evidence of community support. The engagement activities were therefore designed to gather community questions and concerns on the potential use of ProcellaCOR FX.

Engagement activities took place over several months, and were guided by the goal of sharing information on both Eurasian watermilfoil and ProcellaCOR FX, then providing opportunities for community members to give feedback and ask questions based on the information they had received. The engagement process included an information package, in-person and online engagement sessions, an FAQ document, and an online community survey. The survey acted as the primary mode of gathering community feedback.

Survey results indicated that most residents are well informed on the challenges associated with the presence of Eurasian watermilfoil in Christina Lake, along with the Regional District's ongoing measures to control the invasive weed. Many residents indicated that the presence of Eurasian watermilfoil negatively impacted their use of the lake and expressed desire for the continuation of management efforts. The opinions expressed about ProcellaCOR FX were divided. Some community members supported its potential use as a way to manage the large-scale infestation of Eurasian watermilfoil in Christina Lake, while others strongly opposed its use, citing the need for more long-term data and studies on its impacts on human health and the environment. The most common concerns were the herbicide's effects on drinking water safety, human and environmental health, and long-term ecological impacts to the lake.

Throughout the engagement process, residents showed up and shared their opinions. The community is deeply invested in the health of Christina Lake and want to ensure its ecological well-being into the future. It is clear that residents want any future management actions to balance ecological protection with human health and safety. The information collected throughout this process can be used to help guide the next steps of Eurasian watermilfoil control and ensure that community perspectives and concerns are reflected in future management decisions.

2.0 Introduction

2.1 Background

Christina Lake is a large, deepwater lake in British Columbia's Boundary Country, situated between the Okanagan Valley and the West Kootenay region (Christina Lake Tourism, 2025). Known as "BC's favourite lake," it attracts visitors from across the province and beyond, with recreation and tourism playing a key role in the local economy. The lake is the warmest tree-lined lake in Canada due to hot springs deep in the lake (Christina Lake Tourism, 2025).

Covering approximately 2,508 hectares, Christina Lake stretches 18 kilometres north to south, with an average width of 1 kilometre and a maximum depth of 53 metres (AquaTechnex, 2006). It drains into Christina Creek at its southern end, which connects to the Kettle River and ultimately the Columbia River in Washington State, USA. The lake's flushing rate is estimated at 4.5 years (Cavanagh et al., 1994). Steep shorelines and a narrow profile mean that the majority of the littoral zone (the areas where sunlight penetrates through the water column) is located in the south and north shores of the lake.

The littoral zone is the region of the lake that supports the growth of most aquatic plants. Since the late 1980s, Christina Lake has been infested with the noxious aquatic weed Eurasian watermilfoil *(Myriophyllum spicatum,* hereafter referred to as EWM or milfoil). EWM is an invasive aquatic plant capable of spreading rapidly through fragmentation, with even a single plant fragment capable of forming a new colony. Dense EWM mats displace native vegetation, reduce habitat quality, and, when decomposing, can deplete oxygen levels in the water. Infestations can also reduce recreational opportunities, damage boat motors, and lower waterfront property values. Managing milfoil is therefore an important part of protecting the lake's ecological health, recreational value, and community use priorities (Invasive Species Council of BC, 2019; Invasive Species Manitoba, n.d.).

Since 1987, EWM in Christina Lake has been manually removed annually by a dive crew. However, as infestations grew in number and size, the Regional District of Kootenay Boundary (RDKB) explored other management options, including weevils (a natural predator of EWM) and benthic mats. A 2024 benthic mat pilot showed some success, with shorter plants suppressed but taller plants persisting. Methods were adjusted for the 2025 pilot of benthic mats to hopefully increase success (Wiebe, 2024).

To supplement these ongoing efforts, the RDKB is considering the use of ProcellaCOR FX, an aquatic herbicide, to control EWM. Keefer Ecological Services has been retained to engage with community members and gather feedback, opinions, and thoughts regarding the potential use of ProcellaCOR FX to manage EWM in Christina Lake.

This report serves as a formal documentation of the engagement process and results. It summarizes the engagement activities undertaken, the perspectives shared by engaged parties, and the insights gathered around the potential use of ProcellaCOR FX at Christina Lake.

2.2 Purpose of Engagement

The engagement process was designed to gather community perspectives on the potential use of the aquatic herbicide ProcellaCOR FX in Christina Lake. The goal was not to determine whether ProcellaCOR FX would be used, but rather to understand whether there was community interest or support in pursuing the use of ProcellaCOR FX as an EWM management tool.

This process sought to create a structure through which the RDKB and community could communicate, ensuring that community voices were heard and concerns were documented.

3.0 Engagement Approach

All engagement activities were centered around respect and transparency. The goal was to provide all parties with interest in the lake with information to create an informed opinion on the use of ProcellaCOR FX in the lake and then an opportunity to share that opinion in a manner where it would be heard by the RDKB.

Engagement strategies centered on summarizing a range of information about EMW and ProcellaCOR FX, distributing this information to the community, and providing engagement sessions and a survey in order to listen to and learn from community perspectives. This process aimed to provide neutral, accessible information about ProcellaCOR FX and then use the resulting feedback to identify overall community feelings around its use, highlight any specific concerns or uncertainties around ProcellaCOR FX, and understand where gaps in the public knowledge around the use of ProcellaCOR FX remain.

Regarding the interested parties approached through the engagement process, please note the following definitions:

- Community members: Those residing in Christina Lake either part-time, full-time or seasonally as well as those that frequently visit and work in the area.
- First Nations: Those who have territory rights and claims to the Christina Lake area including Osoyoos Indian Band (OIB), Okanagan Nation Alliance (ONA), Splats'in First Nation, Shuswap Band, Ktunaxa Nation Council, and Lower Similkameen Indian Band. Please note that we also initially contacted Okanagan Indian Band, yet since the project is located outside of their Area of Responsibility as a member of the Sylix, they deferred to the Lower Similkameen Indian Band and Osoyoos Indian Band for a more in depth review.
- Local stewardship organizations: including the Christina Lake Stewardship Society, Christina Lake Waterfront Property Owners Association, Christina Lake Boat Access Society and Okanagan Basin Watershed Board.

4.0 Engagement Activities

In order to maximize community engagement, a combination of in-person and online engagement methods were used to attempt to increase accessibility and maximize participation in the engagement.

4.1 Commencing Engagement

- The RDKB's intent to engage with community members regarding the potential use of ProcellaCOR FX in Christina Lake was announced to the public via the RDKB's "Join the Conversation" page on June 25 2025, which serves as an online community bulletin. This announcement outlined the project's purpose, those involved (Keefer and RKDB), and forecasted the near release and circulation of an information package and survey.
- First Nations were emailed a similar announcement at the end of May and early June.

4.2 Information Package

- To ensure that community members were well informed about the project, ProcellaCOR FX and EWM prior to providing feedback, Keefer designed an information package (see Appendix D).
- The content included:
    - A summary of EWM: its adverse effects, how it spreads, how it can be managed, and previous EWM management efforts in Christina Lake.
    - A summary of ProcellaCOR FX: its uses, how it works, how it's applied, the approval process, its advantages in comparison to other herbicides, its impacts to public health and the environment, its effectiveness in treating EWM, the treatment process and whether its been peer-reviewed.
    - A summary of next steps: Other management references being considered by the RDKB, next steps in the pesticide use permit (PUP) application, and who to contact for additional information.
    - References to consult for additional information.
- The information package, along with the notification of project commencement, was posted on the RDKB's "Join the Conversation" page on June 25th 2025, and emailed to all First Nations as well as local stewardship organizations at the end of June/early July.

4.3 Survey

- The primary tool used for feedback in this project was an anonymous Google Survey.
- This survey was designed with the goal of understanding community thoughts, opinions and concerns regarding ProcellaCOR FX, EWM and the overall ecological health and management of Christina Lake.
- The survey consisted of 20 multiple choice or ranking based questions, and 1 open-ended question, that aimed to address the goals outlined above (see Appendix C for survey questions).
- Although the survey was anonymous, a few demographic questions were included to help the RDKB and Keefer conduct a more in-depth analysis of community feedback.
- The survey was open from June 27th, 2025 to October 2nd, 2025.
- A total of 505 survey responses were received, 503 online submissions and 2 paper copies.
- In order to limit the technical complexity of the survey and to preserve anonymity, sign-in to a Google Account was not required, and responses were therefore not limited to one per person.

- The survey was posted on the RDKB's "Join the Conversation" page on June 25th, 2025 and emailed to all First Nations as well as local stewardship organizations at the end of June/early July.
- Several announcements were made to the "Join the Conversation" page and RDKB social media platforms from July to October to remind community members to voice their concerns and thoughts. See sections 4.7 and 4.8, below, for more details on online announcements and engagement.

4.4 In-Person Engagement Session

- An engagement session was held in-person at the Christina Lake community hall on Saturday, July 19th 2025 from 9:30am to 11:30am.
- The purpose of this engagement session was to address concerns, clarify technical/regulatory questions, and provide an opportunity to establish a relationship between Keefer, the RDKB and community members.
- The in-person engagement session was promoted to the general public through the RDKB's "Join the Conversation" page, Facebook, and Instagram posts.
- Information regarding the session (date, time, and purpose) was emailed to all First Nations as well as local stewardship organizations in early July.
- The format of the session was an informative presentation by Keefer staff, followed by a discussion between attendees, Keefer staff, and RDKB representatives.
- Approximately 125 people attended this session. Participation from community members was very high and very respectful.
- Paper copies of the survey and information package were available at this time for community members who preferred to complete the survey by hand rather than online. Of these paper copies, only two surveys were returned. They were incorporated into the analysis by manually entering the written values into the response sheet.
- The slide deck was posted to the RDKB's "Join the Conversation" page on August 5th, 2025 for public review.
- A timeline and FAQ document that addressed many of the key themes and questions raised during the in-person engagement session were posted on the RDKB's "Join the Conversation" page on August 5th, 2025.

4.5 Online Engagement Sessions

- A secondary engagement session was held online, using Microsoft Teams, on Thursday, August 14th from 6:30pm to 8:30pm.
- The online engagement session was promoted to the general public through the RDKB's "Join the Conversation" page, social media posts on Instagram and Facebook, and a post card mailout sent to all registered addresses of Christina Lake.

- A RDKB representative was present at, and screened the meeting from, Christina Lake Community Hall to provide community members who were unable to access the online meeting a chance to participate.
- The format of the session was an informative presentation by Keefer staff, followed by a discussion/Q&A period between attendees, Keefer staff and RDKB representatives.
- Approximately 35 people joined the online session, with two attendees present at the community hall. Community members were engaged and respectful.
- Paper copies of the survey and information package were available at the Christina Lake Community Hall for community members who preferred to complete the survey by hand rather than online.
- A recording of the online session was made available to the public through a YouTube link which was posted on the RDKB's "Join the Conversation" page on August 5th, 2025.
- Two First Nations that had been previously contacted were invited to participate in private online engagement sessions; however, these sessions did not take place.

4.6 Emailed and Posted Questions

- Some questions emailed to either RDKB or Keefer staff, as well as those posted on the RDKB's "Join the Conversation page, were answered in separate documents.
- These documents were subsequently posted to the "Join the Conversation" page on August 5th, 2025, and September 22nd, 2025, to ensure that all interested community members had access to the questions posed and the provided answers.

4.7 Engagement through the "Join the Conversation" page

The RDKB's "Join the Conversation" page was a central platform for distributing engagement material and served as a place where community members could access the survey (Appendix C), view the engagement session slides (Appendix E), download information documents (Appendices D and F), and post questions or concerns (Appendices G and H).

Over the course of this project, the "Join the Conversation" page received just over 2,000 total visits, the posted documentation had 544 total downloads, and 62 additional questions were answered regarding the project topic: 12 through the platform and 50 separate questions answered through online Q&As.

Specific downloads are as follows:

- **Information Package** (Appendix D): 295 downloads
- **Engagement Slide Deck** (Appendix E): 93 downloads
- **FAQ Document** (Appendix F): 141 downloads
- **Additional Q & A Document** (Appendix G): 25 downloads

4.8 Social Media Outreach

Over the course of the engagement activities, the RDKB posted five outreach posts to their social media platforms: three advertising an engagement session and two reminders to complete the survey. These

posts were shared across both Facebook and Instagram to maximize post reach and engagement. The specific metrics for each post are described below:

1. **Topic:** Engagement session advertisement
    - **Post date:** July 2nd, 2025.
    - **Facebook engagement:**
        - Content was played or displayed 1,153 times
        - Content was shown to 702 unique accounts
        - Content was reacted to, saved, commented on, or shared 9 times
        - Content generated 12 link clicks
    - **Instagram engagement:**
        - Content was played or displayed 335 times
        - Content was shown to 200 unique accounts
        - Content was reacted to, saved, commented on, or shared 2 times
2. **Topic**: Check your mailbox and online engagement session announcement
    - **Post date:** August 5th, 2025
    - **Facebook engagement:**
        - Content was played or displayed 3,024 times
        - Content was shown to 1,200 unique accounts
        - Content was reacted to, saved, commented on, or shared 21 times
        - Content generated 38 link clicks
    - **Additional engagement via Facebook shares of this post:**
        - Played or displayed 465 times; shown to 276 unique accounts; reacted to, saved, commented on, or shared 1 time; and generated 2 link clicks
        - Played or displayed 484 times; shown to 197 unique accounts; and generated 4 link clicks
        - Played or displayed 518 times; shown to 321 unique accounts; and generated 2 link clicks
    - **Instagram engagement:**
        - Content was played or displayed 460 times
        - Content was shown to 168 unique accounts
        - Content was reacted to, saved, commented on, or shared 4 times
3. **Topic:** Check your mailbox and online engagement session announcement (Repost of August 5th, 2025 post)
    - **Post date:** August 11th, 2025
    - **Additional engagement via Facebook Shares of this post:**
        - Played or displayed 577 times; shown to 329 unique accounts; and reacted to, saved, commented on, or shared 3 times
        - Played or displayed 670 times; shown to 237 unique accounts; and reacted to, saved, commented on, or shared 3 times
        - Played or displayed 447 times; shown to 278 unique accounts; and generated 1 link click

4. **Topic:** Reminder to complete the survey
    - **Post date:** August 29th, 2025.
    - **Facebook engagement:**
        - Content was played or displayed 1,313 times
        - Content was shown to 747 unique accounts
        - Content was reacted to, saved, commented on, or shared 12 times
        - Content generated 30 link clicks
    - **Instagram engagement:**
        - Content was played or displayed 524 times
        - Content was shown to 234 unique accounts
        - Content was reacted to, saved, commented on, or shared 2 times
5. **Topic:** Reminder to complete the survey
    - **Post date:** September 26, 2025.
    - **Facebook engagement through RDKB Facebook Feed:**
        - Content was played or displayed 431 times
        - Content was shown to 264 unique accounts
        - Content generated 4 link clicks
    - **Facebook engagement through the "What's up Christina Lake" Facebook Feed:**
        - Content was played or displayed 322 times
        - Content was shown to 214 unique accounts
    - **Instagram engagement:**
        - Content was posted in RDKB instagram highlights with a link to the survey

5.0 Results and Feedback

5.1 Survey Results

As previously mentioned, a total of 505 survey responses were recorded. However, responses of a test survey completed on June 27th, 2025 and two duplicate responses, were omitted from the analysis, bringing the total to 502 responses. To facilitate an in-depth analysis of the responses, survey results are broken down into several categories.

First Nations Engagement

A total of 25 respondents identified as members of a First Nation. The remaining 472 respondents of the survey did not identify as members of a First Nation and 5 respondents left this question blank. While 16% (4) of the total 25 respondents did not provide a response for their identified community, 36% (9) identified themselves as being a part of a First Nation not identified in the list, 28% (7) as members of Ktunaxa Nation, 8% (2) as members of Shuswap Band, and 4% (1), 4% (1), and 4% (1) as members of Osooyoos, Lower Similkameen Indian Band, and Okanagan Indian Band, respectively (Figure 1).

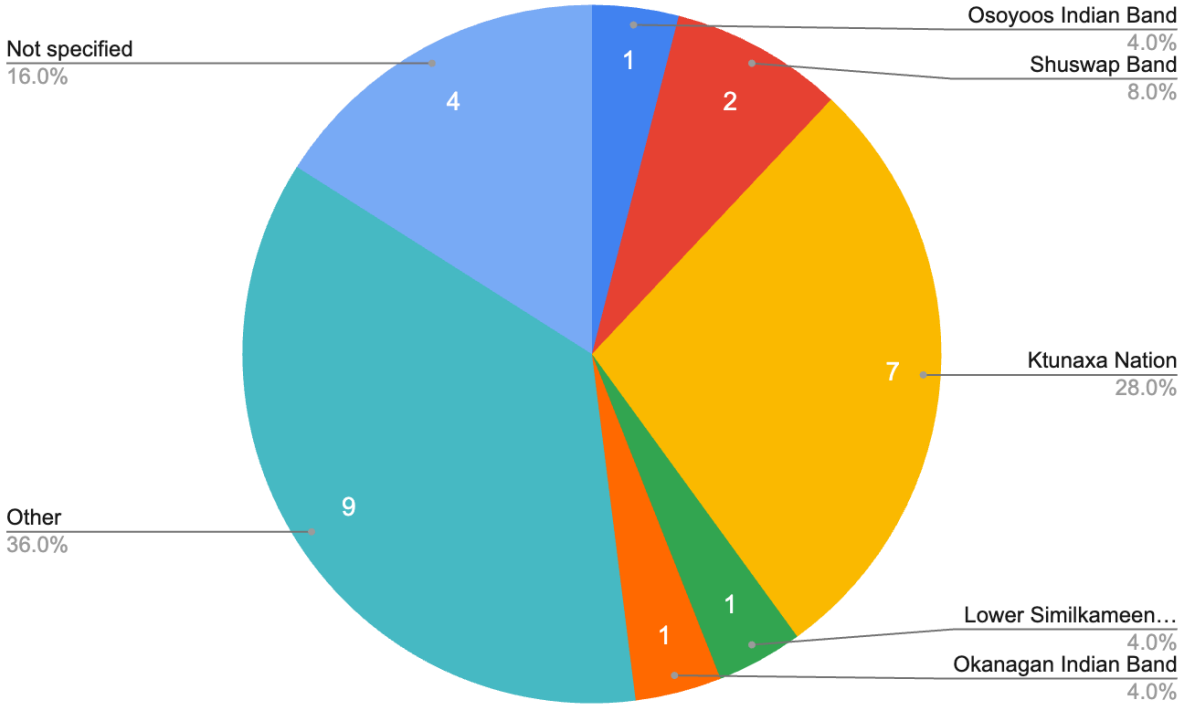


Figure 1. Summary of First Nations engaged through the survey. The number of responses for each First Nation are provided within the chart.

Demographics

Exactly 64.4% of respondents were aged 55 and above (325) (Figure 2). A respective 17.4% (88), 11.08% (56), 5.54% (28), and 1.58% (8) of respondents were between the ages of 45-54, 35-44, 25-34, and 18-24 (Figure 2). Three respondents did not provide an answer to this question and some respondents selected more than one age range.

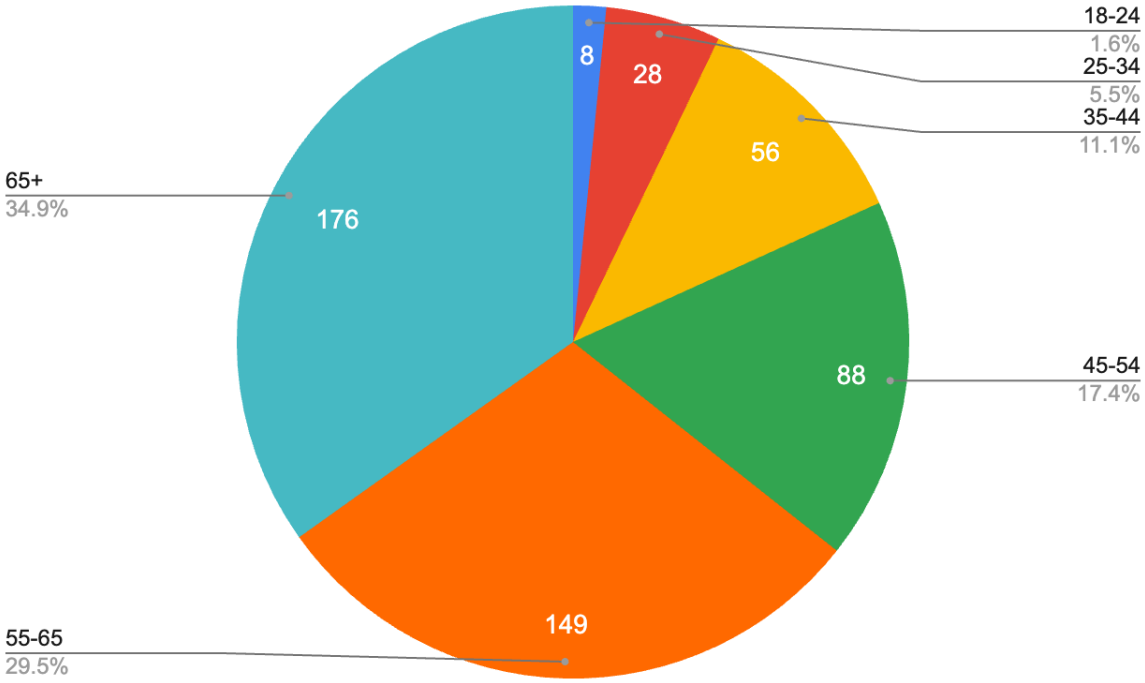


Figure 2. Age range of survey respondents. The number of responses for each age range are provided within the chart.

A total of 501 respondents identified their connection to Christina Lake, yet a total of 597 responses were documented. Therefore, some respondents identified more than one connection to Christina Lake (i.e. they work here and live full-time in the area for instance). One respondent left this question blank and 14 responses were omitted from the analysis due to repetition (see Appendix B-1 for a list of omitted responses). A total of 41.50% (242) of respondents stated that they live full time in the area, 40.82% (238) own property here (part-time or seasonal), 10.29% (60) visit for recreation, 4.28% (25) work in the area, 1.88% (11) selected another option, and 1.20% (7) identified the area as their traditional First Nations territory (Figure 3).

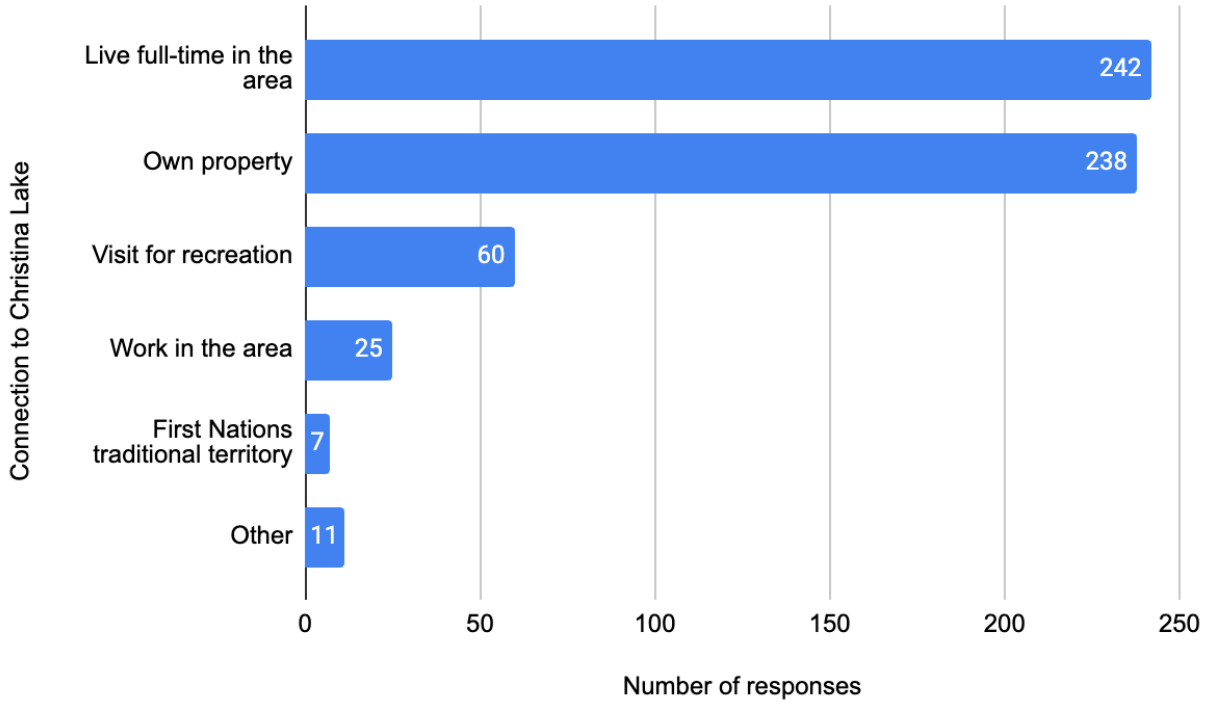


Figure 3. Summary of survey respondents' connection to Christina Lake. The number of responses for each connection are provided within the chart.

To continue, a total of 500 respondents identified how EWM impacts their experience at Christina Lake, yet a total of 832 responses were documented. Therefore, some respondents identified more than one way in which EWM impacts their experience. A total of 21.75% (181) of respondents stated that EWM does not negatively impact their experience at the Lake (Figure 4). EWM negatively impacts the traditional and cultural values, ecological values, recreational activities, property, and work of a respective 5.40% (45), 20.31% (169), 34.37% (286), 16.58% (138), and 1.56% (13) respondents (Figure 4). Two respondents left this question blank.

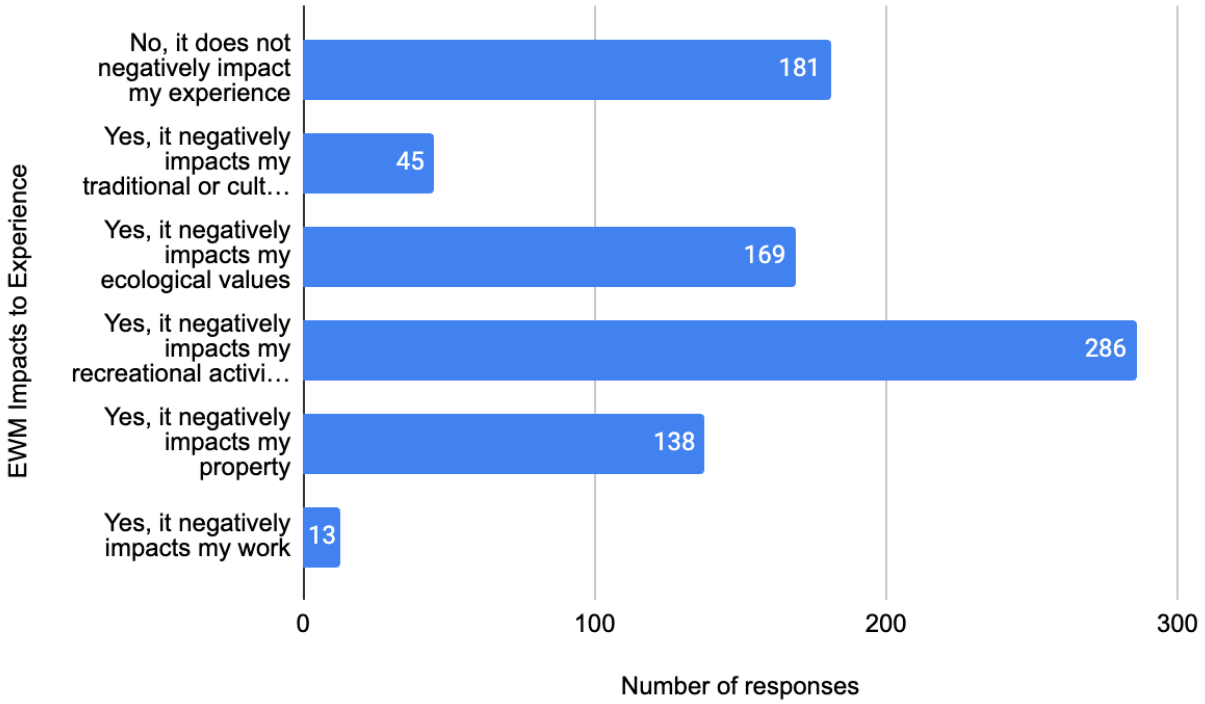


Figure 4. Summary of the impact(s) of EWM to respondents' experience at Christina Lake. The number of responses for each impact are provided within the chart.

Prior Information

A total of 499 respondents identified how much they knew about the RDKB's efforts to control EWM infestations in Christina Lake. 1 respondent left the question blank and 2 respondents provided answers that are omitted from analysis (see Appendix B-2 for a list of omitted responses). A total of 60.52% of respondents (302) were well aware of the RDKB's efforts, while 35.47% (177) were generally aware and 4% (20) were unaware (Figure 5).

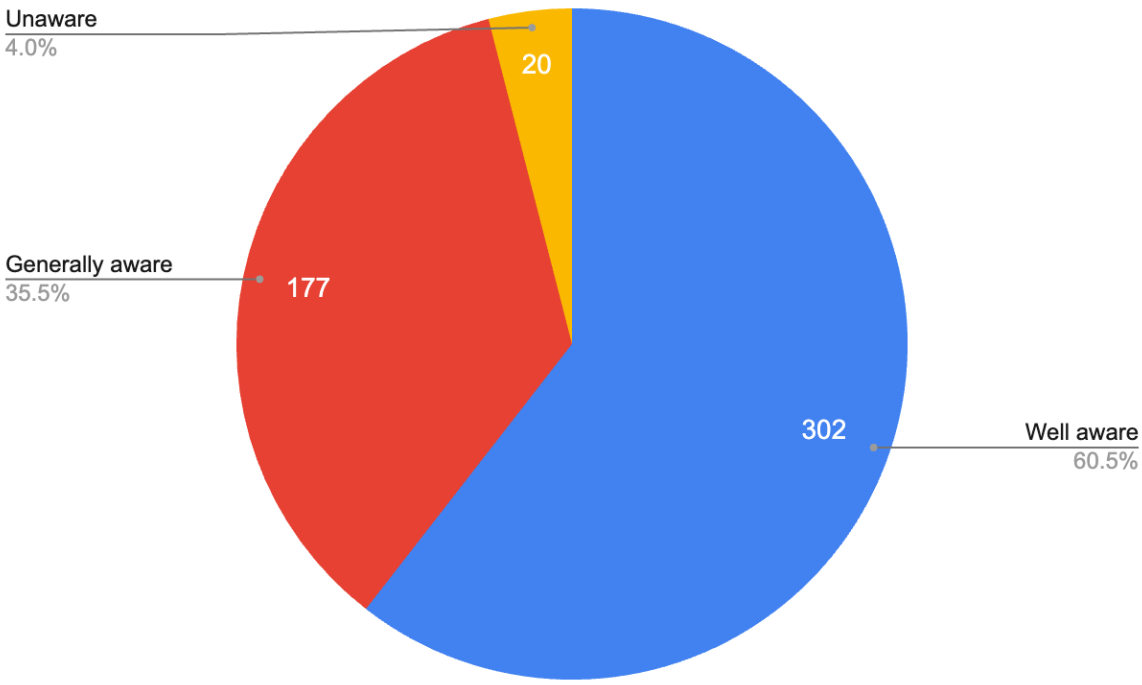


Figure 5. Summary of the awareness of respondents to the RDKB's EWM control efforts. The number of responses for each awareness level are provided within the chart.

Similarly, 499 respondents identified how much they knew about EWM and its effects prior to reading the information package. Therefore, 3 respondents left this question blank and 3 respondents provided other answers that were omitted from analysis (see Appendix B-3 for a list of omitted responses). More than half of the respondents (58.1% or 290) knew little about EWM and its effects, while 35.4% (177) knew a lot, and 5.8% (29) knew nothing (Figure 6).

Lastly, 498 respondents identified how much they knew about ProcellaCOR FX prior to reading the information package. 4 respondents left this question blank and 3 respondents provided other answers that are omitted from analysis (see Appendix B-4 for a list of omitted responses). More than half of respondents (61.21% or 303) knew nothing about the herbicide, while 32.92% (163) knew a little and 5.85% (29) knew a lot (Figure 6).

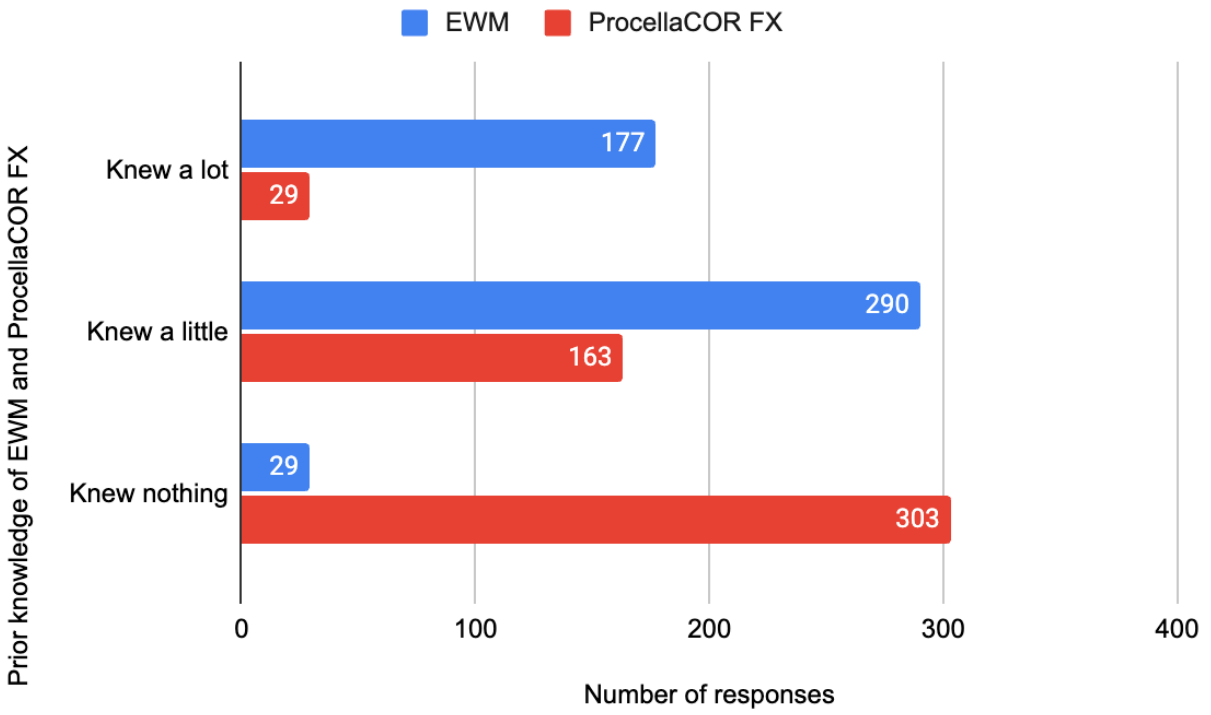


Figure 6. Knowledge of respondents to EWM (blue) and ProcellaCOR FX (red) prior to reading the information package. The number of responses for each knowledge level are provided within the chart.

Invasive Species Management

We investigated how important respondents felt that managing invasive species in Christina Lake was for maintaining cultural value or traditional values, ecological and community values, protecting native plant and animal life, maintaining the lake for public recreation, ensuring public safety, and keeping treatment costs reasonable. A respective total of 496, 496, 498, 501, 498, and 495 respondents provided an answer to each sub-question. Where level 1 is not important and level 5 is very important, 27.4% of respondents (136) and 27.2% (135) respectively felt that managing invasive species to maintain cultural or traditional values was very important (level 5) and moderately important (level 3) (Figure 7). 19.35% (96), 12.1% (60), and 13.1% (69) of respondents respectively felt that it was not important (level 1), a little important (level 2), and important (level 4) to do so (Figure 7).

To continue, more than half of respondents (52.62% or 261) felt that managing invasive species to maintain ecological and community values was very important (level 5) (Figure 7). The remaining 22.1% (110), 16.5% (82), 6.04% (30), and 2.6% (13) respectively felt that it was important, moderately important, a little important, and not important (Figure 7). Similarly, a respective 65.06% (324), 18.07% (90), 11.64% (58), 3% (15), and 2.2% (11) of respondents felt that managing invasive species for the protection of native plant and animal life was very important, important, moderately important, a little important, and not important (Figure 7).

Of the 501 responses recorded, 67.46% (338) of respondents felt that managing invasive species to maintain the lake for public recreation was very important. 19.16% (96) felt it was important, 10.57% (53) felt it was moderately important, 1.6% (8) felt it was a little important, and 13.77% (69) felt it was not important to do so (Figure 7). In a similar fashion, more than three-quarters (81.32% or 405) of respondents felt that managing invasive species to ensure public safety was very important (Figure 7). The remaining 12.04% (60), 3.81% (19), 1% (5), and 1.6% (8) of respondents respectively felt that doing so was important, moderately important, a little important, and not important (Figure 7). Finally, 28.2% (140) and 26.41% (131) of respondents respectively felt that managing invasive species while keeping costs reasonable was moderately important and very important (Figure 7). This factor was important, a little important. and not important to the remaining respective 25.6% (127), 11.08% (55), and 8.46% (42) of respondents (Figure 7).

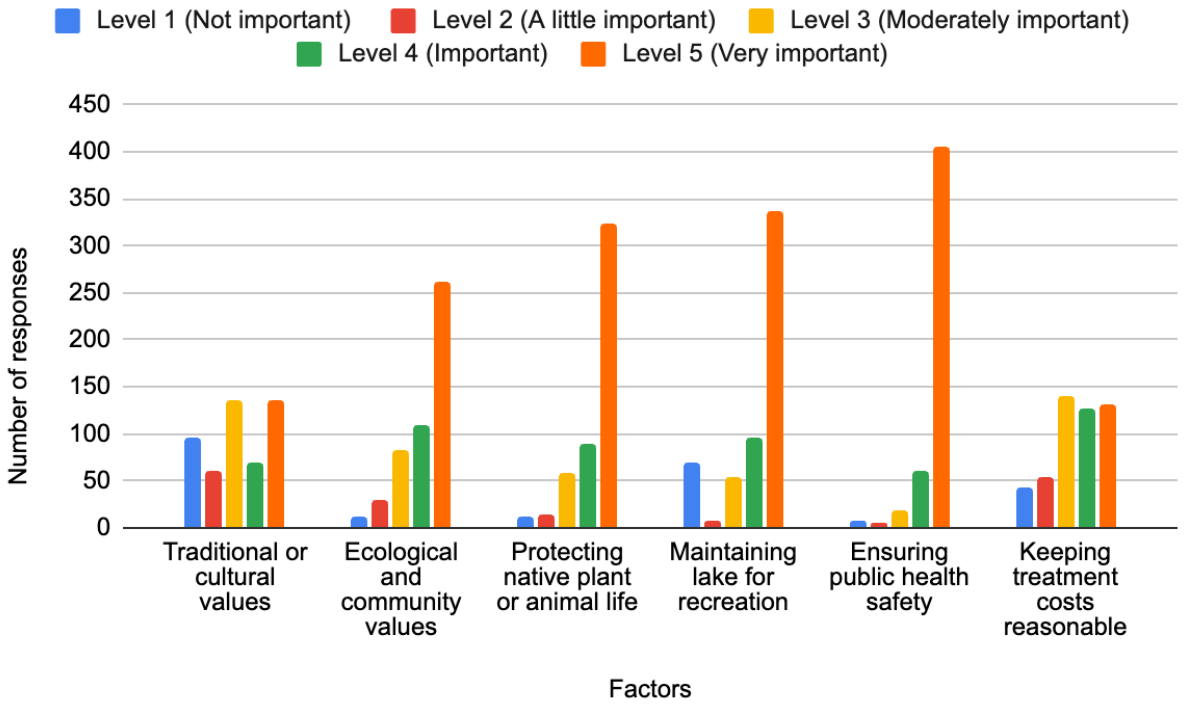


Figure 7. Summary of importance in managing invasive species for five different factors according to survey respondents.

A total of 501 respondents identified which approaches to EWM control they support, yet a total of 1,155 responses were selected. Therefore, some respondents selected more than one approach (i.e. manual control and benthic mats). One respondent left this question blank. The most supported approach was mechanical or manual control, with 36.01% (416) respondents supporting this method (Figure 8). Control using selective herbicides followed with 22.42% (259) of respondents supporting this method (Figure 8). 20.34% (235) and 16.62% (192) of respondents respectively supported the use of benthic mats and biological control methods (Figure 8). 3.80% (44) of respondents were unsure and required more information, while 0.77% (9) supported doing nothing to control EWM (Figure 8).

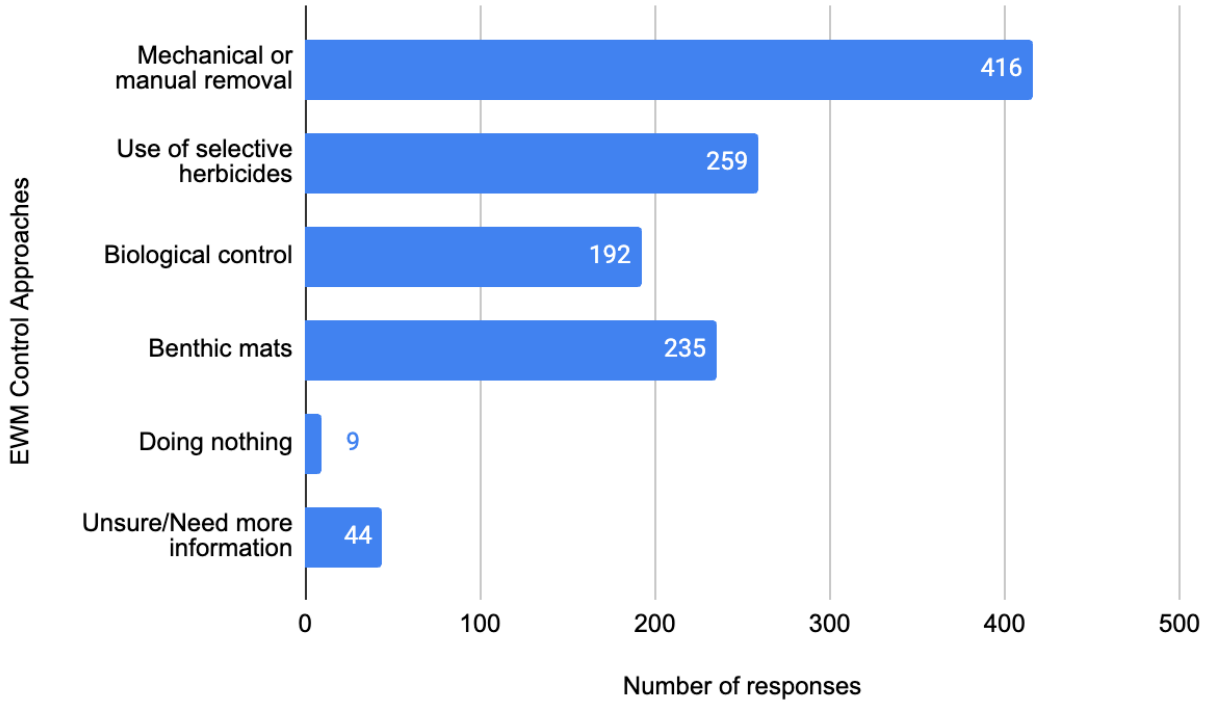


Figure 8. Support of survey respondents to various EWM control approaches. The number of responses for each control approach are provided within the chart.

ProcellaCOR FX

A total of 502 respondents identified their initial opinion regarding the potential use of ProcellaCOR FX in Christina Lake, yet a total of 515 responses were documented. Therefore, some respondents identified more than one initial opinion. The most common initial opinion was supportive, with 33.20% (171) respondents sharing this opinion (Figure 9). The second most common opinion was extremely opposed, with 25.04% (129) respondents sharing this opinion (Figure 9). 20% (103) were cautiously supportive and 12.23% (63) were opposed (Figure 9). The remaining 5.24% (27) and 4.27% (22) were respectively unsure and neutral (Figure 9).

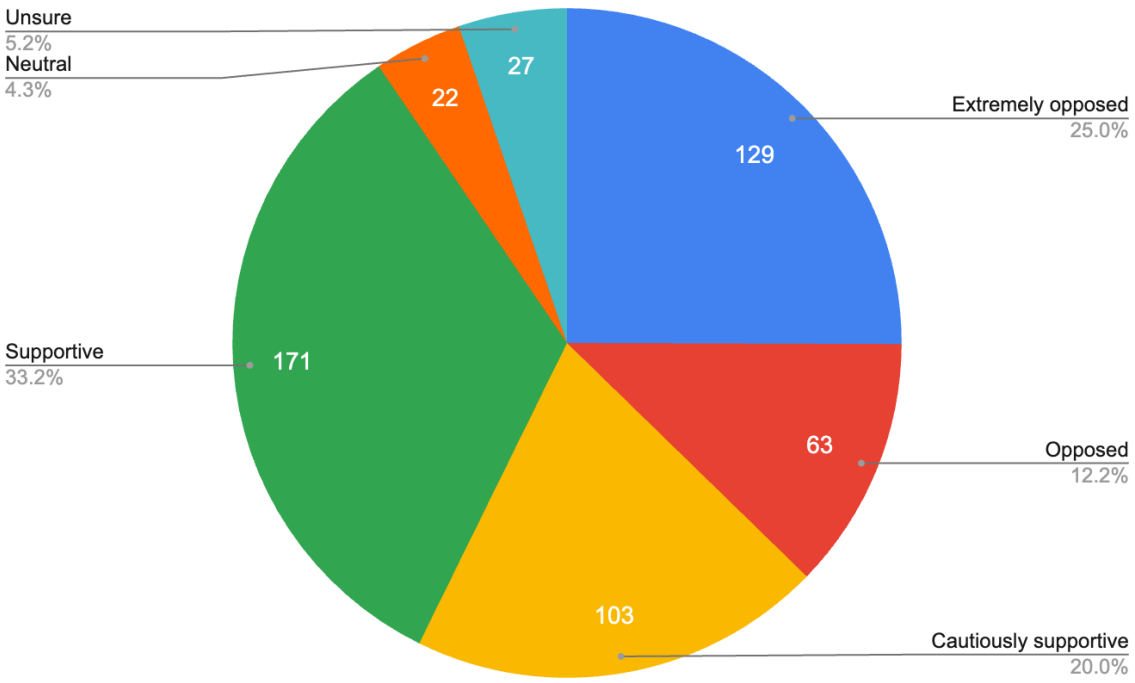


Figure 9. Initial opinion of survey respondents to the potential use of ProcellaCOR FX in Christina Lake. The number of responses for each initial opinion are provided within the chart.

A total of 500 respondents identified their concerns regarding the potential use of ProcellaCOR FX in Christina Lake, yet a total of 1,425 responses were provided. Therefore, some respondents identified more than one concern, and two respondents left the question blank. About one quarter of respondents (25.26% or 360) were concerned about ProcellaCOR FX's potential impact to public health and safety (Figure 10). Similarly, 24.56% (350) and 20.21% (288) of respondents were respectively concerned about the herbicide's long term environmental impacts and impacts to native plants and animals (Figure 10). 10.73% (153) of respondents were concerned about impacts to ecological and community values, while 8.77% (125) were concerned about impacts to recreational activities (Figure 10). The remaining 5.89% (84) and 4.56% (65) respectively had no concerns and were concerned about ProcellaCOR FX's potential impacts to cultural and traditional values (Figure 10).

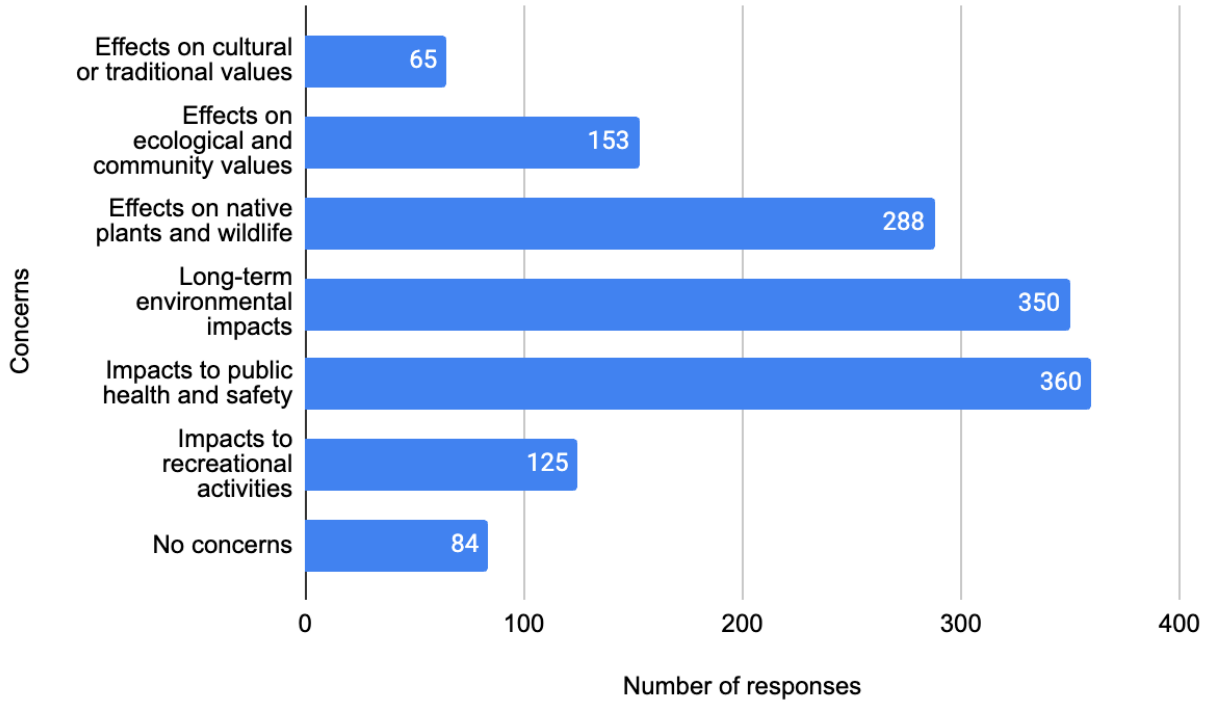


Figure 10. Concerns of survey respondents to the potential use of ProcellaCOR FX in Christina Lake. The number of responses for each concern are provided within the chart.

When invited to elaborate on their concerns/opinions, 221 respondents provided text-elaborations while 281 survey respondents did not. Of these 221 responses, 14 text elaborations were omitted from analysis as they did not pertain to concerns regarding the use of ProcellaCOR FX in Christina Lake or were unclear (see Appendix B-5 for a list of omitted responses). Similar themes could be identified between responses. so a frequency count of themes was conducted to determine the most common themes. Some responses pertained to multiple themes, and therefore had more than one frequency count awarded. Examples of concerns/opinions presented for each theme are presented below:

- **Opposition:** openly stated opposition to the use of ProcellaCOR FX in Christina Lake.
- **Support:** openly stated support of the use of ProcellaCOR FX in Christina Lake.
- **Neutral support:** Not opposed nor supportive, neutral opinion in the matter, unsure what to think, or have no concerns to express.
- **Public health and safety:** Concerned over the effects of ProcellaCOR FX on water health, since this water is used for drinking, cooking, bathing, etc.
- **Recreational activities:** Concerned over how ProcellaCOR FX in Christina Lake would impact recreational activities.
- **Long-term effects:** Concerned over the lack of long-term studies or would like to see results from long-term studies that demonstrate potential effects to human health, public safety, recreation, and the environment.

- **Environmental impacts:** Concerned about the potential environmental impacts of ProcellaCOR FX to native fauna, flora, and natural ecosystems.
- **Alternative or current methods:** Prefer to use alternative control methods or continue with current control methods.
- **Additional information:** Would like to have access to additional information such as costs associated with ProcellaCOR FX or the number of applications; suggest notifying the public prior to use so that they can make other arrangements for drinking or irrigation water; suggest testing the herbicide in localized areas first.

The most frequent theme that arose from this specific question was long-term effects, with 24.04% (63) of the responses touching on this topic (Figure 11). Furthermore, opposition as well as public health and safety were also common themes with respective frequencies of 23.66% (62) and 16.41% (43) (Figure 11). The themes of support and additional information followed, with 11.45% (30) and 6.87% (18) of responses touching on these themes, respectively (Figure 11). The least common themes included environmental impacts, alternative or current methods, neutral support, and recreational activities with respective frequencies of 6.48% (17), 4.96% (13), 3.05% (8), and 3.05% (8) (Figure 11).

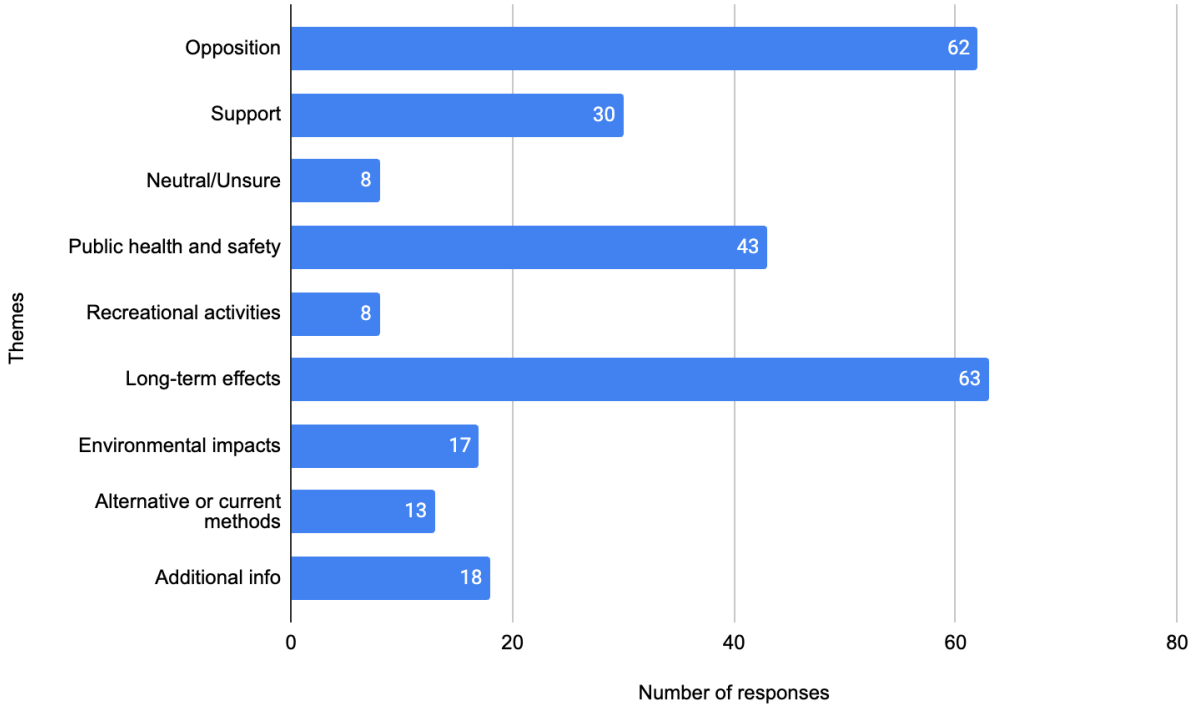


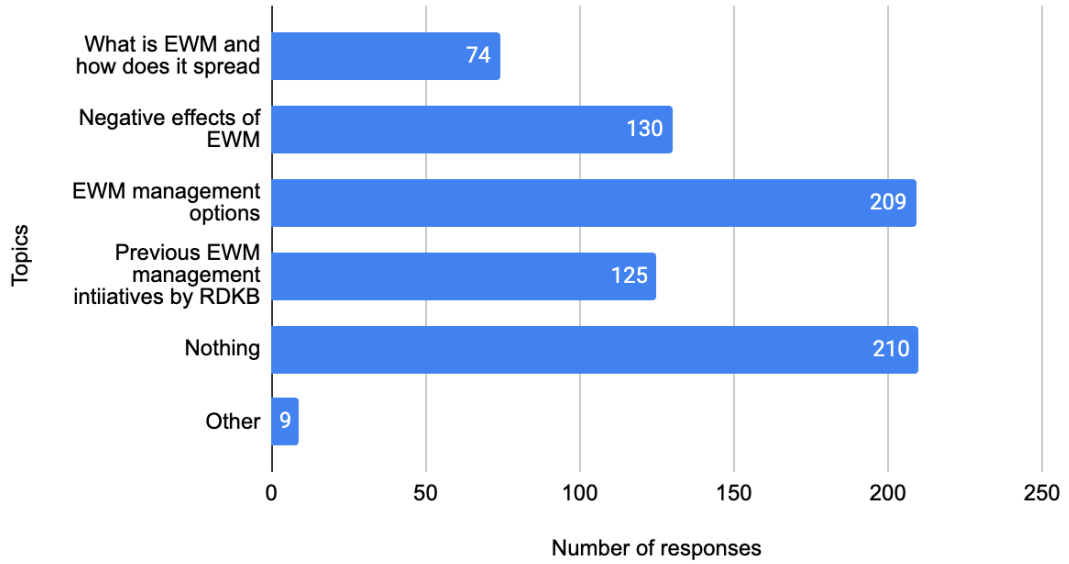
Figure 11. Summary of frequency of themes discussed by survey respondents in their text-elaborations. Frequency counts are included within the chart.

Future Community Engagement

A total of 490 respondents identified what topics they might be interested in learning more about regarding EWM, yet a total of 756 responses were received. Therefore, some respondents were interested in learning about more than one topic. 12 respondents left this question blank and 7 responses were omitted from analysis as they diverged from the question (see Appendix B-6 for a list of omitted responses). The majority of respondents (28.03% or 210) had no further questions at the moment regarding EWM (Figure 12A). 27.90% (209) and 17.35% (130) were interested in learning more about EWM management options and the negative effects of EWM (Figure 12A). 16.68% (125) were interested in learning more about previous EWM management initiatives undertaken by the RDKB, while 9.87% (74) had an interest in learning more about what EWM is and how it spreads (Figure 12A). Lastly, 1.20% (9) of respondents had questions pertaining to EWM that were not in the provided options (Figure 12A).

A total of 493 respondents identified what topics they might be interested in learning more about regarding ProcellaCOR FX, yet a total of 878 responses were received. Therefore, some respondents were interested in more than one topic. 8 respondents left this question blank, and 9 responses were omitted from analysis as they diverged from the question (see Appendix B-7 for a list of omitted responses). 28.47% (250) of respondents were most interested in learning more about the studies that assessed the impacts of ProcellaCOR FX on ecological and public health (Figure 12B). 18.33% (161) of respondents wanted to learn more about Health Canada's approval process, 18.10% (159) of respondents had no further questions (Figure 12B). A respective 17.42% (153) and 16.05% (141) of respondents were interested in the advantages of ProcellaCOR FX in comparison to other herbicides and how ProcellaCOR FX controls EWM (Figure 12B). The remaining 1.59% (14) of respondents had questions pertaining to ProcellaCOR that were not in the provided options (Figure 12B).

A)



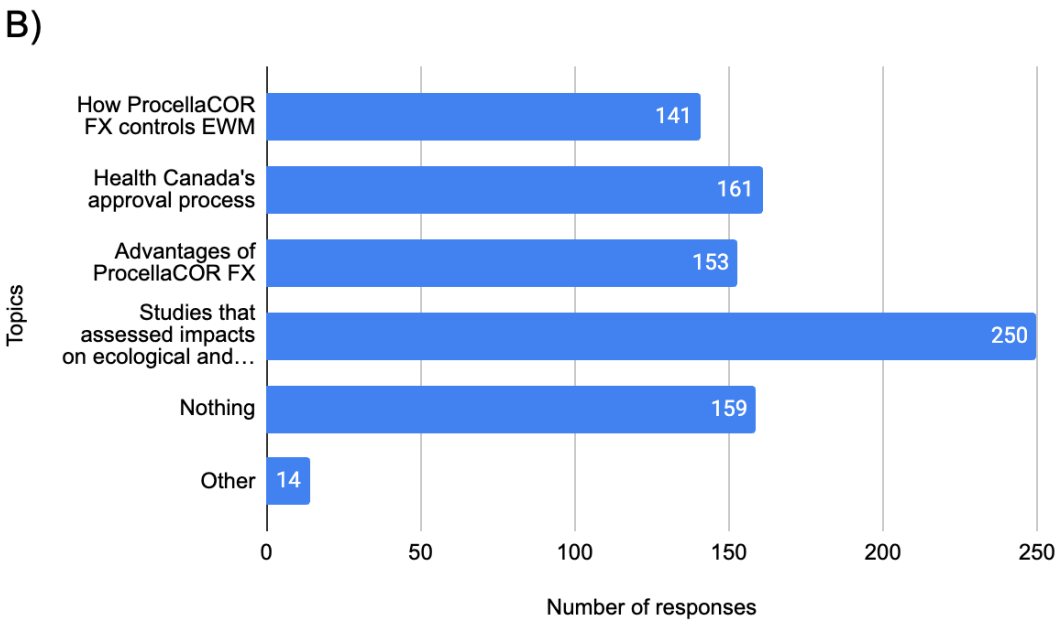


Figure 12. Summary of topics that survey respondents would be interested in learning more about as it pertains to EWM (A) and ProcellaCOR FX (B). The number of responses for each topic are provided within the respective chart.

Finally, 488 respondents indicated their interest in being involved in future discussions or decisions regarding EWM management. While 14 respondents left this question blank, 71.10% (348) of respondents were interested, and 28.89% (141) were not interested (Figure 13).

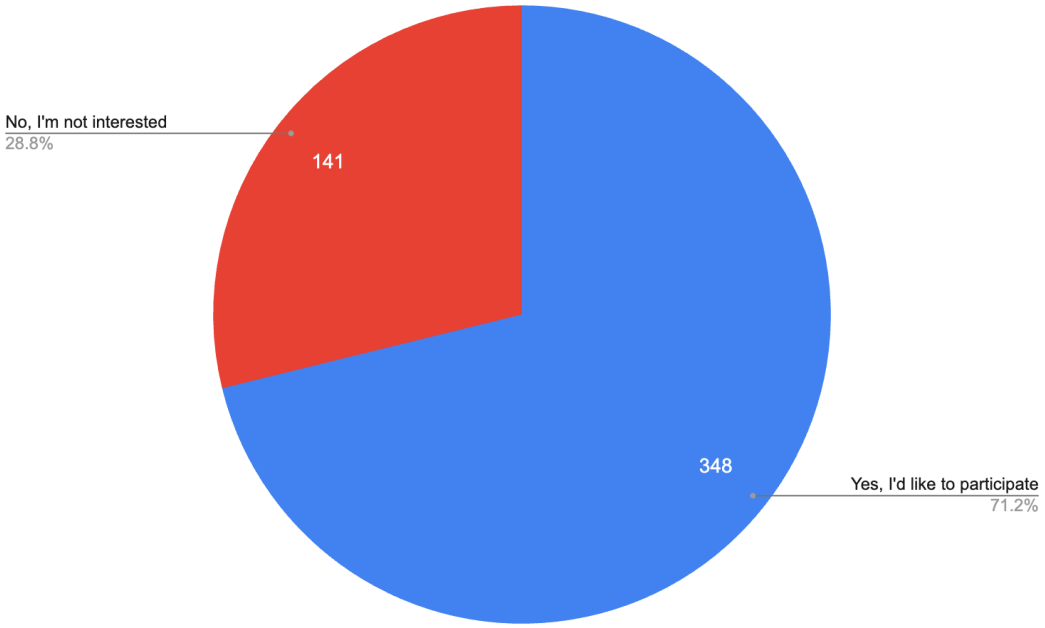


Figure 13. Interest of survey respondents in participating in future discussions or decisions regarding EWM management. The number of responses for each interest level are included within the chart.

5.2 Engagement Session Feedback

Both engagement sessions included a Q&A session at the end, where participants had a chance to ask questions or make comments about EWM and the potential use of ProcellaCOR FX in Christina Lake. These questions were recorded and used to create the FAQ document (Appendix E). At the in-person engagement session, some key themes appeared as questions were asked. These themes are presented below:

- **Human health:** Concerns about drinking water that was treated with ProcellaCOR FX, potential reproductive or pregnancy impacts, and why watering restrictions apply if the water is safe to drink.
- **Environmental behaviour:** Questions about how long ProcellaCOR FX persists in the water column, what it breaks down into, what factors impact its degradation, whether it could spread beyond Christina Lake via the lake outflow, whether filtration can remove ProcellaCOR FX from the water, and whether ProcellaCOR FX contains PFAS or "forever chemicals."
- **Aquatic ecosystem impacts:** Concerns about which native plants may be impacted by ProcellaCOR FX application, how it could affect wildlife such as aquatic invertebrates, fish, or painted turtles, and whether the decomposition of large amounts of milfoil (e.g. if they died after an herbicide treatment) would affect lake water quality.
- **Effectiveness in a high flow lake:** Questions about how the replenishment rate of Christina Lake would impact application, how well ProcellaCOR FX works in higher flow conditions, how often it needs reapplication, and whether the lake's high flow would require more frequent reapplication.
- **Decision-making and project oversight:** Questions about who is responsible for decision-making (RDKB vs. Province), how community input influences the final decision, project costs and timelines, and whether independent, peer-reviewed research has been conducted on ProcellaCOR FX.
- **Application methods and safety:** Concerns about the potential for herbicide spread beyond application zones, whether application sites will be buffered, limiting factors for the effectiveness of ProcellaCOR FX, whether future monitoring will occur, and what re-entry periods are following application.
- **Requests for more information:** Expressed desire for examples of ProcellaCOR FX use in lakes used as drinking water sources and long-term studies of ProcellaCOR health effects and environmental behaviour over time.
- **Alternative control methods:** Interest in weevil control of EWM, including population sizes necessary for control and whether weevils could remove EWM or just reduce its density.

In the online engagement session, very similar themes and questions were raised with an increased focus on whether ProcellaCOR FX would contaminate drinking water and the long-term impact on human health.

6.0 Discussion

6.1 Interpreting the Survey Results

When analyzing the responses for the survey, some notable themes and trends emerged. To begin, the survey received 502 (once duplicates were omitted) responses. Such large numbers indicate that the engagement methods used by the RDKB to reach as many community members as possible were quite successful. Furthermore, results demonstrate that, while most survey respondents were aged 55 and above, the survey was successful at reaching all demographics of Christina Lake.

To continue, all respondents had strong ties to the lake, but the majority of respondents either lived in Christina Lake full time or owned property there. We compared the initial opinion of survey respondents to ProcellaCOR FX with their connections to Christina Lake in order to gain a better understanding of how individuals with different connections felt about the potential use of a herbicide to manage EWM infestations. For respondents who identified more than one connection, their opinions were counted for each connection category. Results demonstrated that 50% (124) of survey respondents who live full-time in the area are supportive (includes cautiously supportive and supportive answers) of ProcellaCOR FX, while 42.33% (105) are opposed (includes extremely opposed and opposed answers) (Figure 14). A considerable 62.19% (153) of survey respondents who own property here are supportive of the use of ProcellaCOR FX while 28.45% (70) are not (Figure 14). 42.85% (27) of respondents who visit for recreation are supportive and 46.03% (29) are opposed to ProcellaCOR FX (Figure 14). Results for respondents who work in the area, provided another connection, and who identified that this is their First Nations traditional territory were almost equally in support and in opposition of the use of ProcellaCOR FX (Figure 14). Overall, the majority of respondents exhibited similar feelings of support regarding the use of ProcellaCOR FX, despite having different connections to Christina Lake. However, while property owners generally shared strong support, opinions were more mixed among those who live in the area year-round and those who visit for recreation.

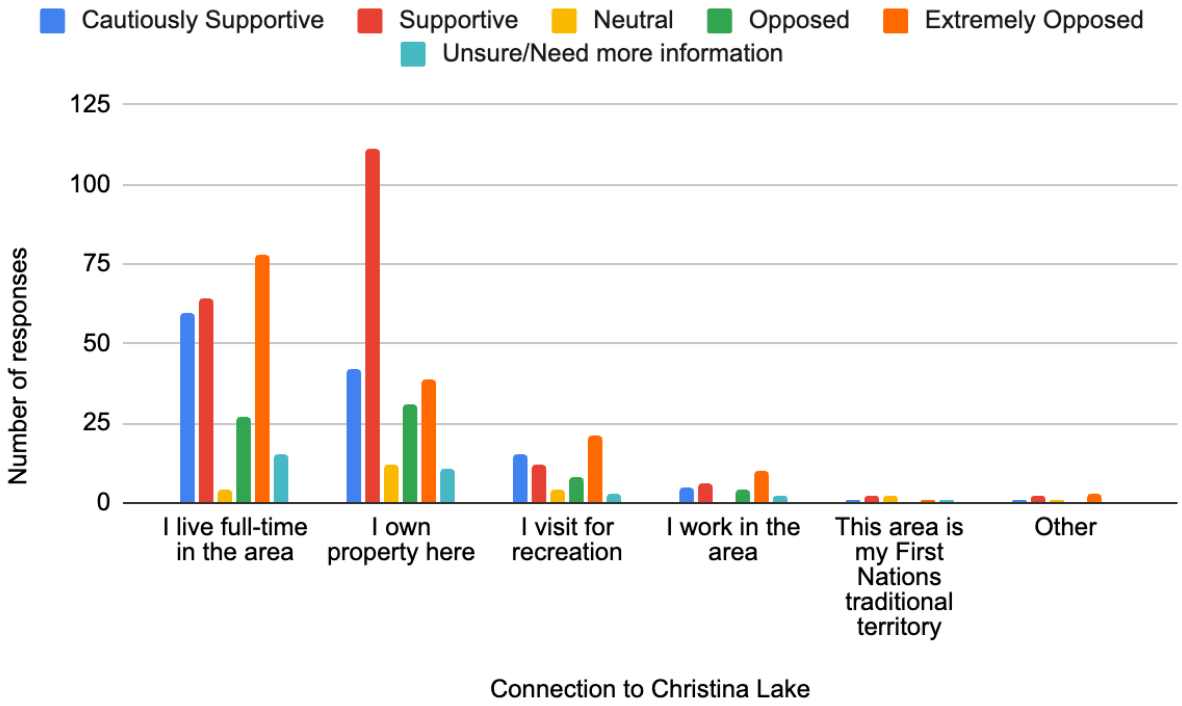


Figure 14. Initial opinion of survey respondents to the potential use of ProcellaCOR FX in Christina Lake according to their identified connection to Christina Lake. The number of responses for each opinion and connection combination are included within the chart.

Overall, respondents were well informed about EWM, its presence in the lake, and the RDKB's previous efforts to try to control it prior to reading the information package. Respondents were less informed about ProcellaCOR FX, with more than half knowing nothing about the herbicide prior to reading the information package. However, when asked if respondents had any further questions on EWM or ProcellaCOR FX after reading the information package and completing the survey, many respondents indicated that they had no outstanding questions at the moment, particularly regarding EWM. These results suggest that the information included in the information package was useful in addressing community questions and concerns.

The majority of respondents felt that EWM negatively impacted their experience at the lake, particularly affecting their recreational activities. An additional analysis was conducted in order to understand how respondents with different connections to Christina Lake were similarly or differently impacted by EWM. Please note that for the purpose of this analysis, impacts were not categorized. If a survey respondent selected one or more types of impact, they were counted in the "Yes" category. If a survey respondent selected no impact, they were counted in the "No" category. Over 62% (151) of respondents who identified as living in the area full time also identified that EWM negatively impacts at least one of their experiences at the lake (e.g. cultural or traditional values, ecological values, recreational activities, property, or work) (Figure 15). Similarly, over 66% (157) and 68% (39) of respondents who identified

themselves as owning property here and visiting for recreation, are negatively impacted by EWM (Figure 15). Results demonstrate that survey respondents who work in the area are almost equally affected and unaffected by EWM (Figure 15). Respondents whose First Nations traditional territory is in the Christina Lake area, and those who provided other answers, were also impacted by the presence of EWM (Figure 15). In summary, it seems as though EWM infestations negatively impact a large majority of lake users regardless of their connection to Christina Lake.

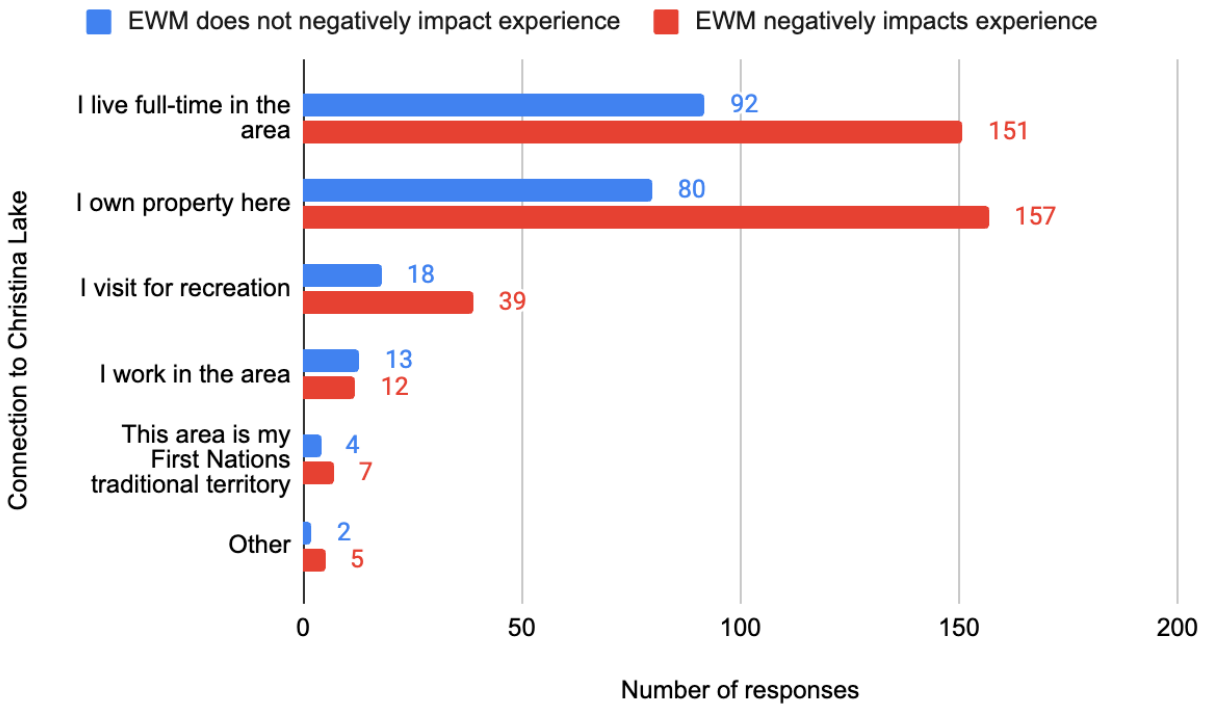


Figure 15. Impacts of EWM to respondents' experiences according to their identified connection to Christina Lake. The number of responses for each impact and connection combination are included within the chart.

An additional analysis was conducted to determine the relationship between survey respondents' initial opinions towards ProcellaCOR FX and the impact of EWM infestations to their experiences. Most (70.71% or 128) respondents who stated that EWM infestations do not negatively impact their experience were opposed (includes extremely opposed and opposed answers) to ProcellaCOR FX (Figure 16). Similarly, 73.87% (246) of respondents who are negatively impacted by EWM were supportive (includes cautiously supportive and supportive answers) of ProcellaCOR FX (Figure 16). Interestingly, 15.46% (28) of respondents who were not impacted by EWM were still supportive of ProcellaCOR FX, while 18.92% (63) of respondents who were impacted by EWM in one or more ways were opposed to the use of ProcellaCOR FX (Figure 16). These results demonstrate that EWM impacts to survey respondents' experiences did not always influence their initial opinion towards the potential use of ProcellaCOR FX.

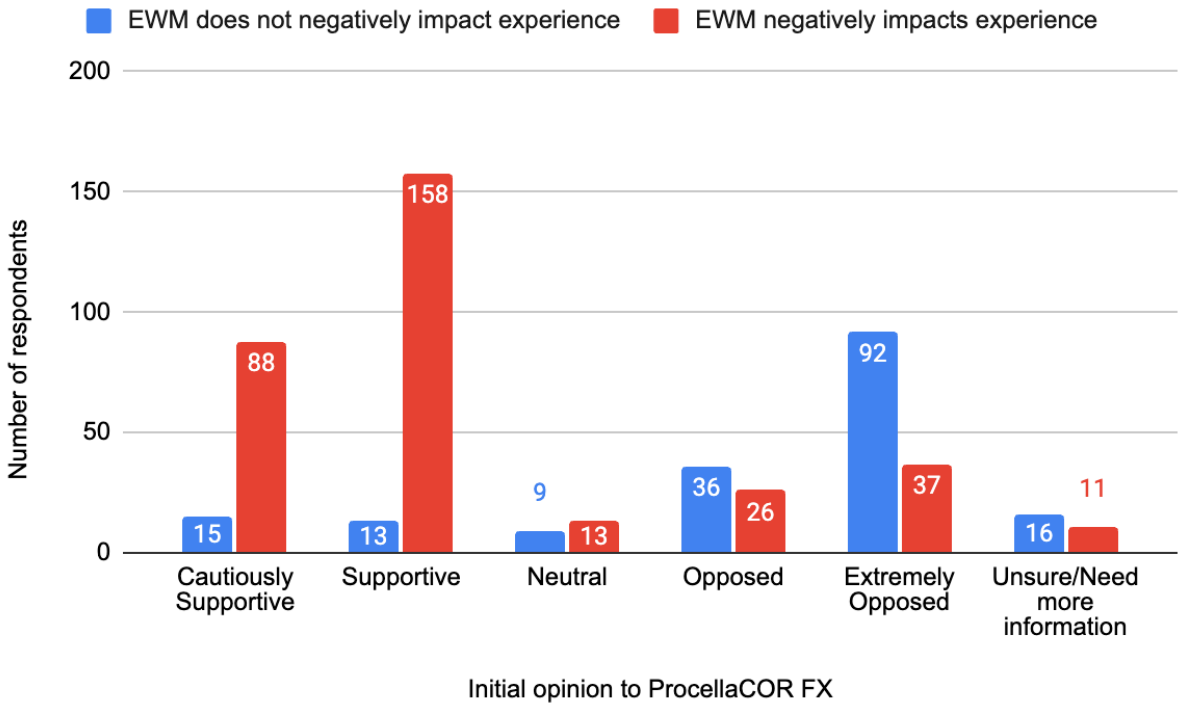


Figure 16. Initial opinion of survey respondents to the potential use of ProcellaCOR FX in Christina Lake according to the identified impacts of EWM to their experiences. The number of responses for each opinion and impact combination are included within the chart.

When asked about managing invasive species within Christina Lake, the majority of respondents felt that ensuring public health and safety, maintaining ecological values, protecting native species, and maintaining the lake for recreation were very important. Most respondents felt that keeping costs reasonable and maintaining traditional or cultural values were moderately-important to important. Specific to EWM management, the majority of respondents supported mechanical or manual removal. Respondents also indicated support for selective herbicides, benthic mats, and biological control. Respondents' initial opinions about using ProcellaCOR FX showed an unusual split. The majority of responses indicated support for its use, closely followed by responses that were extremely opposed. The next highest response category was cautious support of the use of the herbicide, followed by opposition to its use. Overall, more than half of the respondents support and cautiously support the use of ProcellaCOR FX. A small number of respondents were neutral or indicated they needed more information. When asked about their concerns regarding the use of ProcellaCOR FX, most respondents identified impacts to public health and safety, long-term environmental impacts, and effects on native plants and wildlife as their primary concerns.

Moreover, when invited to elaborate on their concerns about the use of ProcellaCOR FX, 221 (44%) of respondents provided text elaborations. A total of 14 of these written responses were omitted from the analysis since they did not have to do with concerns relating to ProcellaCOR FX and/or were unclear. Therefore, a total of 207 text elaborations were provided for survey question 18. To understand the link

between each respondent's initial opinion on the use of ProcellaCOR FX in Christina Lake and their written responses, the text elaborations were divided by each respondent's choice for their initial opinion on the use of the herbicide. For respondents who identified more than one initial opinion as well as a written response, the response was counted for each opinion. Of the respondents who provided written feedback, 43.47% (90) and 14.49% (30) were initially extremely opposed and opposed to the use of ProcellaCOR FX (Figure 17). A respective 21.25% (44) and 13.04% (27) of respondents who provided feedback were supportive and cautiously supportive of ProcellaCOR FX (Figure 17). The remaining 8.21% (17) and 2.41% (5) were unsure and neutral (Figure 17). These results demonstrate that respondents who were initially extremely opposed or opposed towards ProcellaCOR FX were more vocal about their concerns than those who were supportive, cautiously supportive, neutral or unsure.

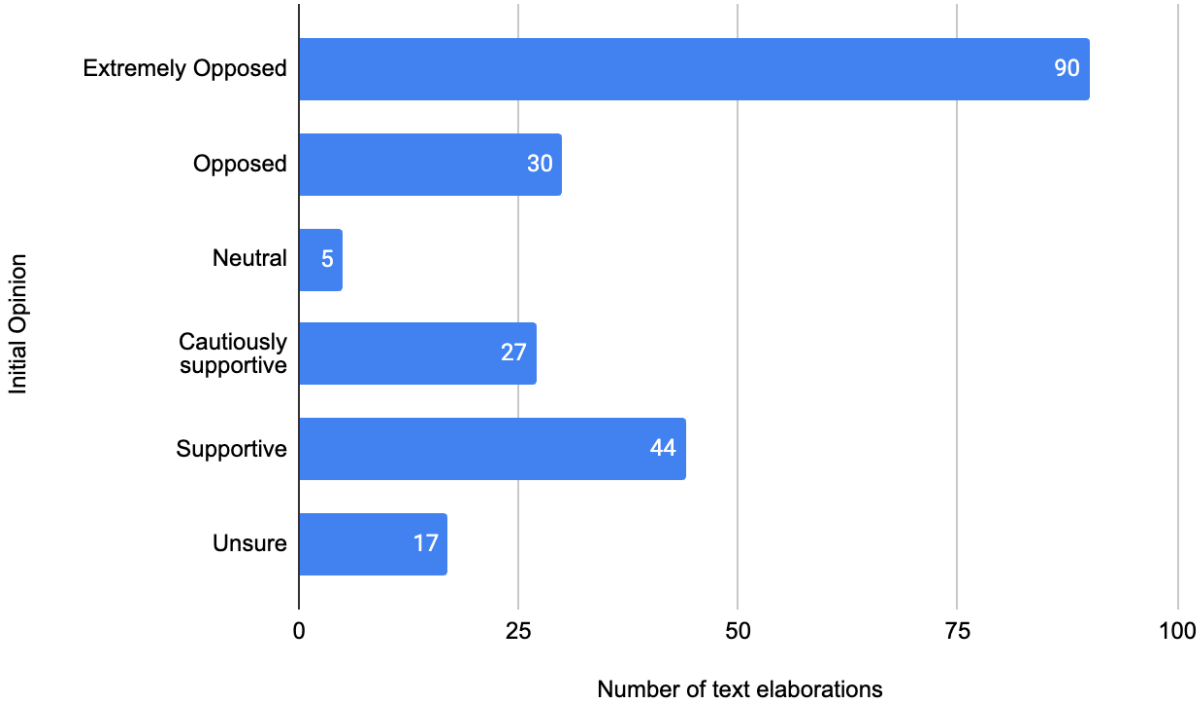


Figure 17. Number of text elaborations according to respondents initial opinions on the use of ProcellaCOR FX. Numbers are included within the chart.

Among the text elaborations provided for question 18 of the survey, some key themes emerged. Please see Appendix A for full responses to this question.

- The most frequent concern was that of long-term effects to human health, particularly since Christina Lake provides drinking water for many residents. Respondents are worried about consuming the water, swimming in it, and the potential for long-term health issues, particularly for children and pregnant women. Many view the community as "guinea pigs" for a relatively new herbicide.

- Many responses stated concern about the contamination of their drinking water and were opposed to its application. Several respondents view the herbicide as “poison” and adamantly are against the use of it in Christina Lake. Respondents were also concerned about ProcellaCOR FX’s impact on the lake’s ecosystem, particularly on fish and wildlife. They stated their concern about introducing a new chemical with unknown long-term impacts into the lake environment.
- A smaller group of the respondents to this question indicated strong support for the use of ProcellaCOR FX.
- Some respondents noted the need for additional EWM control methods and suggested alternatives such as mechanical harvesting, more benthic mats, dredging areas that are artificially shallow, controlling boat traffic/motor size, and addressing nutrient loading from septic systems.

These responses highlight mixed opinions on the use of ProcellaCOR FX within the community. While some respondents expressed support of the use of ProcellaCOR FX, as long as transparent communication about application locations and timing was provided, others expressed strong opposition to its use based on concerns about the lack of long-term data on the herbicide’s safety and environmental impact. Much of the feedback received seems to indicate that residents want to find a solution to control EWM, yet are hesitant to introduce a chemical into the lake without clear, credible, and long-term studies on its impact. Respondents were clear, regardless of how they felt about ProcellaCOR FX, that preserving their lake and ensuring its ecological integrity and health into the future were their highest priorities.

Regarding First Nations engagement specifically, only a small number of respondents identified as members of a First Nation. Therefore, future engagement efforts should include conducting individual virtual or in-person engagement sessions with all First Nations with rights, title, and claims to the Christina Lake area.

Overall, the survey results indicate the community of Christina is engaged, informed, and deeply invested in the health and future of their lake. Many respondents took the time to provide thoughtful and detailed answers, demonstrating their care for their lake and their desire to make their voices heard throughout the engagement process.

6.2 Identified Gaps in Knowledge around the Use of ProcellaCOR FX

Through both the Q&A section of the engagement sessions and the open-ended question in the survey, community members expressed their opinions on the application of ProcellaCOR FX in Christina Lake. Through their comments, participants helped identify several areas where the provided data were incomplete, unclear, or not specific to Christina Lake’s conditions. An overarching theme for almost all of these gaps was the shortage of long term data on ProcellaCOR FX. The key community-highlighted knowledge gaps are listed below:

- **Long term drinking water safety:**

Residents are concerned about the lack of long-term studies on toxicological effects of exposure to ProcellaCOR FX since many properties draw their drinking water from the lake.

- **Cumulative human health effects:**

Closely tied to concerns about exposure via drinking water were concerns and questions about long-term human health impacts from exposure to ProcellaCOR FX through swimming or otherwise ingesting lakewater. Engagement participants highlighted that the current data are sourced from short-term studies that cannot address long-term or cumulative health effects, particularly for more vulnerable populations such as children, the elderly, and immunocompromised individuals.

- **Cumulative environmental health effects:**

Participants identified the limited availability of monitoring data that quantified the impact of ProcellaCOR FX on environmental health over time. Concern was raised about its impact to native plants, fish, and wildlife, with specific comments about benthic invertebrates, painted turtles, beaver, otters, and ducks.

- **Lack of studies in lakes with similar hydrology to Christina Lake:**

Another identified knowledge gap was the expected behaviour of ProcellaCOR FX in Christina Lake, and how the lake hydrology could change the efficacy of ProcellaCOR FX. Specifically, concerns were raised as the label for ProcellaCOR EC states that it is suitable for use “in slow-moving or quiescent waters with little or no outflow” (SePRO Corporation, 2018). This requirement is likely relevant for ProcellaCOR FX as well. Christina lake has both an input and outflow, and experiences higher flow and relatively frequent water turnover. Many residents stated that Chrsitina Lake should not be considered "quiescent waters,” and requested data on the use of ProcellaCOR FX use in larger, higher flow lakes. Concern was also raised that the flow within Christina Lake could cause the herbicide to spread outside of its application area and impact unintended areas of the lake. Previous lake applications have primarily been done in shallow, low (or no) flow lakes, so the relevance of these studies to Christina Lake was questioned, especially regarding how water movement might influence herbicide dispersion and efficacy.

- **Debate over status of active ingredient in ProcellaCOR FX**

The classification of the active ingredient in ProcellaCOR FX (florpyrauxifen-benzyl) as a PFAS, or forever chemical is currently under debate. Currently, florpyrauxifen-benzyl is not defined as a forever chemical by Canadian standards, but is considered one by the Minnesota Department of Agriculture. Residents have expressed concern about the possibility of introducing a forever chemical into the lake.

Overall, these identified gaps highlight the desire for more long term research to be done on ProcellaCOR FX, particularly on its impact on human health, the environment, and whether or not it should be considered a forever chemical. Additional research on ProcellaCOR FX’s behaviour in deep lakes with faster flow would also provide clarity on how the herbicide could be expected to behave in Christina Lake.

6.3 Addressing the Identified Knowledge Gaps

Unfortunately, there currently are no available resources to fill the gaps for in long term knowledge, as ProcellaCOR EC was approved in the USA in 2018 and ProcellaCOR FX was approved in Canada in 2023 The number of published studies around ProcellaCOR FX (as well as ProcellaCOR EC and other formulations) is expanding rapidly as its use becomes more common. However, there is no denying that its recent approval results in minimal long-term data. Addressing the gaps in the literature surrounding long-term studies will entail waiting for these long-term studies to come out and remaining aware of the state of other lakes that have applied ProcellaCOR FX.

Currently, there is not a definitive source as to whether or not the active ingredient within ProcellaCOR FX should be considered a forever chemical. The inconsistency between definitions of forever chemicals established by different regulatory bodies creates a knowledge gap that is difficult to resolve.

However, questions regarding the efficacy of ProcellaCOR FX in higher flow environments are more easily researched. Previous reports contain valuable information on the hydrology of Christina Lake (e.g. Cavanagh et al., 1994 and Northwest Hydraulic Consultants Ltd., 2023) that can be compared with the hydrology of previous lakes that have applied ProcellaCOR FX (or other ProcellaCOR formulations).

7.0 Next Steps

The community perspectives gained from this engagement process will help the RDKB understand whether there is community support to further explore the use of ProcellaCOR FX to control EWM in the lake. This report serves as a summary to compile and share what we heard from the community during the engagement process and assist the RDKB in determining whether to move forward with considering the use of ProcellaCOR FX as an EWM management tool. If there is sufficient community support for the use of ProcellaCOR FX, the RDKB will conduct additional studies to ensure the conditions of Christina Lake are suitable for application. If these studies indicate that the lake environment is conducive to a future ProcellaCOR FX application, the RDKB will consider applying for a PUP. The PUP application process is a multi-year, multi-step process and is regulated under the Integrated Pest Management Act and Regulation. Due to the need for further studies, in addition to the length of the PUP application process, any possible application of ProcellaCOR FX will be several years in the future. A PUP application requires:

- The development of a detailed draft treatment plan in conjunction with the Ministry of Environment and Climate Change Strategy;
- Ongoing consultation on the treatment plan with both community and First Nations;
- Opportunities for public review and comment on the application plan;
- Formal reports on both public and First Nations consultations on the treatment plan; and
- Final review and approval of the treatment plan by the ministry.

If a PUP is pursued, there will be more opportunities for further engagement and community feedback. If the RDKB moves forward with applying for a PUP, the final decision of whether to grant the PUP lies with the Ministry (Figure 14).

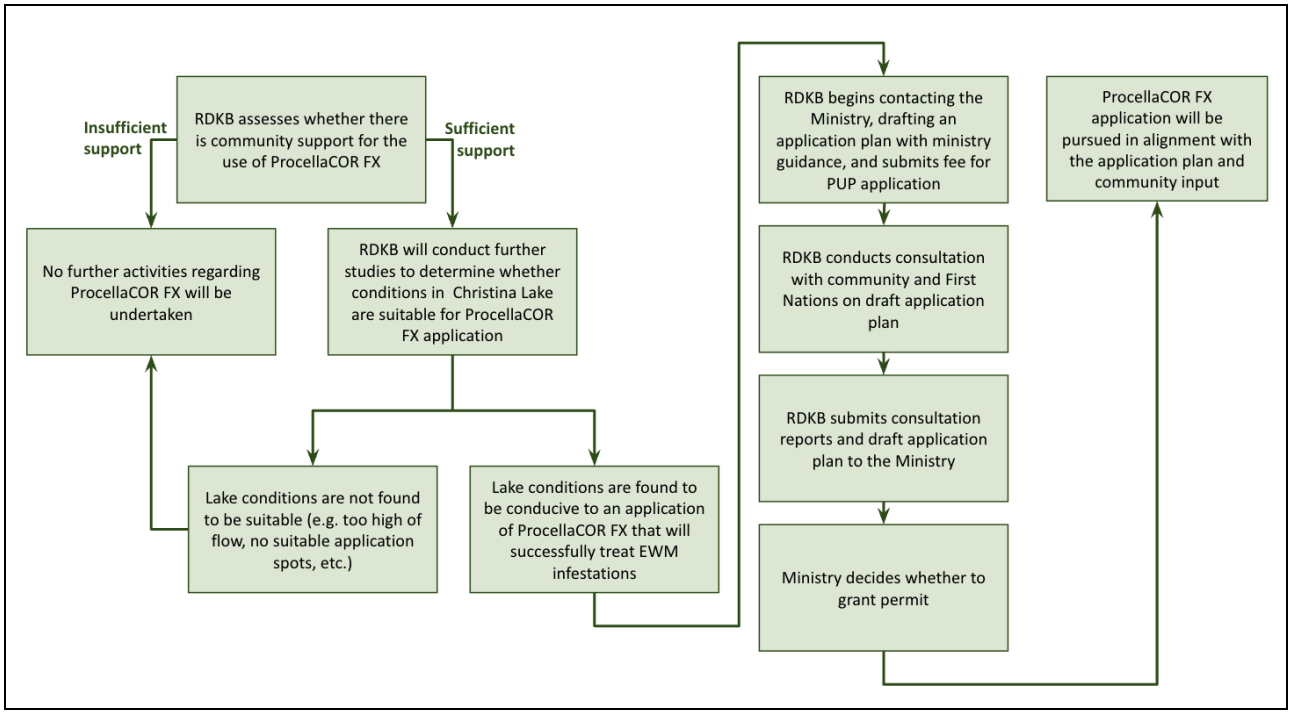


Figure 15. Next steps of the ProcellaCOR FX process. Following publication of this report, the RDKB will begin assessing community support, kicking off the decision making process outlined here.

7.1 Option 1: Sufficient Community Support

Further Studies

If there is sufficient community support for the use of ProcellaCOR FX, the RDKB will undertake additional research to determine whether the environmental conditions in Christina Lake would support a successful application of ProcellaCOR FX. This work will focus on understanding lake characteristics including, but not limited to, characterizing the hydrological patterns in Christina Lake, mapping areas suitable for ProcellaCOR FX application or benthic mat placement, identifying regions with high native plant diversity or sensitive habitats, and understanding recreation visitation patterns. These efforts will aim to address current knowledge gaps regarding ProcellaCOR FX's behaviour in Christina Lake and to determine whether the lake is a suitable candidate for herbicide application.

Hydrology studies will examine lake characteristics, such as water circulation patterns, inflow and outflow rates, as well as water stratification and mixing patterns to determine whether the lake's hydrology can support effective herbicide treatment. Understanding hydrology is essential because water circulation and residence time determine how long the herbicide will remain in contact with the EWM plants and how effective it will be at controlling infestations. In lakes with high flow or rapid hydrologic turnover, ProcellaCOR FX may be rapidly diluted or transported away from the treatment area, reducing its efficacy.

Mapping efforts will identify areas of the densest milfoil infestations to prioritize potential treatment zones for benthic mat placement and ProcellaCOR FX application. These mapping studies can also determine the distance from dense infestation areas to sensitive habitats and water intakes. Following

the conclusion of these additional studies, the RDKB will determine whether the conditions in Christina Lake meet hydrological and ecological parameters necessary to support a safe and effective ProcellaCOR FX application. A PUP application will only be considered if the conditions in Christina Lake display favourable characteristics that support an effective treatment.

PUP application process

If a PUP application is pursued, it is likely that many of the concerns raised during the engagement session could be addressed through the development of a site-specific application plan, which will be created with input from the Ministry of Environment and Climate Change Strategy, First Nations in the area, and Christina Lake community members. The application plan would be iterative, with drafts incorporating community feedback. All engaged parties would be consulted throughout the entirety of the application process.

The application plan would be tailored to the conditions found within Christina Lake, and, more specifically, the conditions at specific application areas within the lake. Application locations would be strategically selected to target areas of densest milfoil growth, while also considering adequate buffer space between application areas and sensitive habitats, areas of high water flow, or water intakes. Application rates could be adjusted between different locations to maximize the chance of EWM uptake but minimize the risk of herbicide drift within the lake. Targeting areas with particularly dense EMW growth reduces the chance of harm for native aquatic plants, as these plants are unlikely to be found in these areas due to competition with EWM. The application plan can be fine-tuned with community input to create a plan that is targeted to reduce EWM, while accounting for native species and habitat, the community's water intakes, and flow patterns in the lake.

7.2 Option 2: Insufficient Community Support

If the community does not express sufficient support for pursuing ProcellaCOR FX, the RDKB will not proceed with a PUP application. In this case, the RDKB will continue to focus on existing, non-chemical methods, including hand harvesting by the dive crew and the use of benthic mats, and may explore other alternative control techniques as new research and technologies become available.

7.3 Implications for the Future of Christina Lake

Current efforts to manage EWM at Christina Lake, including diver hand-pulling and the use of benthic mats, have been effective in containing the spread of the weed within localized areas but have not resulted in a measurable decline in the overall population (Maki, 2024). These methods are best suited for smaller-scale or newly established infestations, as they allow for direct removal or suppression of plants in small areas. However, both approaches have significant limitations when applied to a large, well-established infestation such as that found in Christina Lake. Hand-pulling, while highly selective for EWM, is labour-intensive and time-consuming. Benthic mats, while effective, are logistically challenging to deploy at scale, require regular maintenance, and will harm native aquatic plants if they are covering them in addition to EWM (Quantitative Environmental Analysis, 2008).

If control methods remain the same, EWM conditions are unlikely to improve. In unmanaged lakes, EWM population trends vary, with the population in some lakes reaching an equilibrium value, while in other lakes the population exhibits more dramatic fluctuations year to year (Lake Metonga Association, 2016). The fluctuations can be due to water quality, flow, light penetration, and many other factors. However, an EWM population of even approximately 10% littoral occurrence can negatively impact the function of a lake (Lake Metonga Association, 2016).

Without continued intervention, it is probable that EWM will continue to expand until it reaches its ecological carrying capacity within Christina Lake. At this point, the plant is likely to dominate all suitable habitats in the littoral zone, replacing diverse native plant communities with dense EWM mats. These beds reduce habitat diversity and limit food and shelter for fish, amphibians, invertebrates, and other organisms that rely on the lake. Seasonal die-offs of dense EWM mats also contribute to oxygen depletion, because bacteria and microorganisms use oxygen in the water as they break down the dead plant material, potentially creating low-oxygen zones that can stress or kill nearby aquatic organisms (Invasive Species Manitoba, n.d.). In addition to these ecological effects, ongoing EWM infestations have social and economic implications. EWM mats can damage boat motors, create unsuitable swimming conditions, limit access to areas of the lake where EWM is most dense, and decrease property values around the lake (Zhang & Boyle, 2010).

Eurasian watermilfoil infestations are harmful to the lake, hence the reason for looking into varied management options. Continuing to rely on hand-pulling and benthic mats is likely to entail substantial long-term operational and financial costs (Gagné, 2023). These methods require yearly, intensive effort, and are unlikely to result in the decline of EWM given the scale of the current infestation. Without the introduction of additional, integrated management strategies, EWM is likely to remain a dominant species in Christina Lake. This outcome carries ecological, recreational, and financial implications that should be considered in future management planning.

It is important to manage the EWM infestation in a holistic and effective way that incorporates community feedback. The feedback gathered through this engagement process will help guide future management planning to ensure that stewardship of Christina Lake reflects community values and priorities, while also being informed by the best available scientific knowledge.

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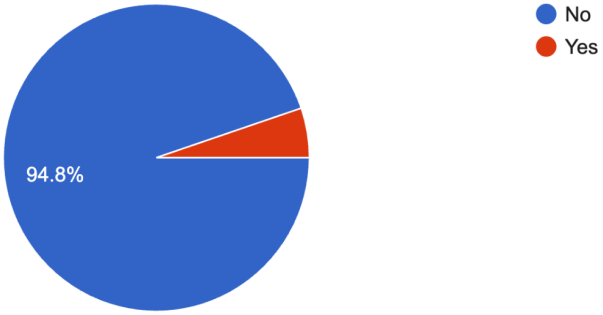
Appendix A: Raw Survey Graphics

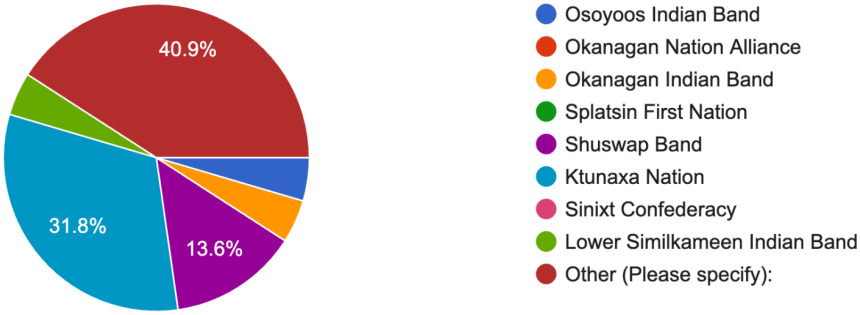
Are you a member of a First Nation?

498 responses



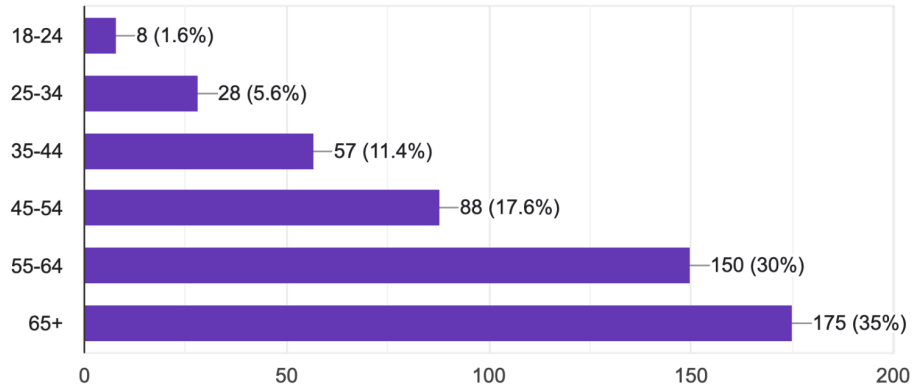
Which First Nation community are you apart of?

22 responses



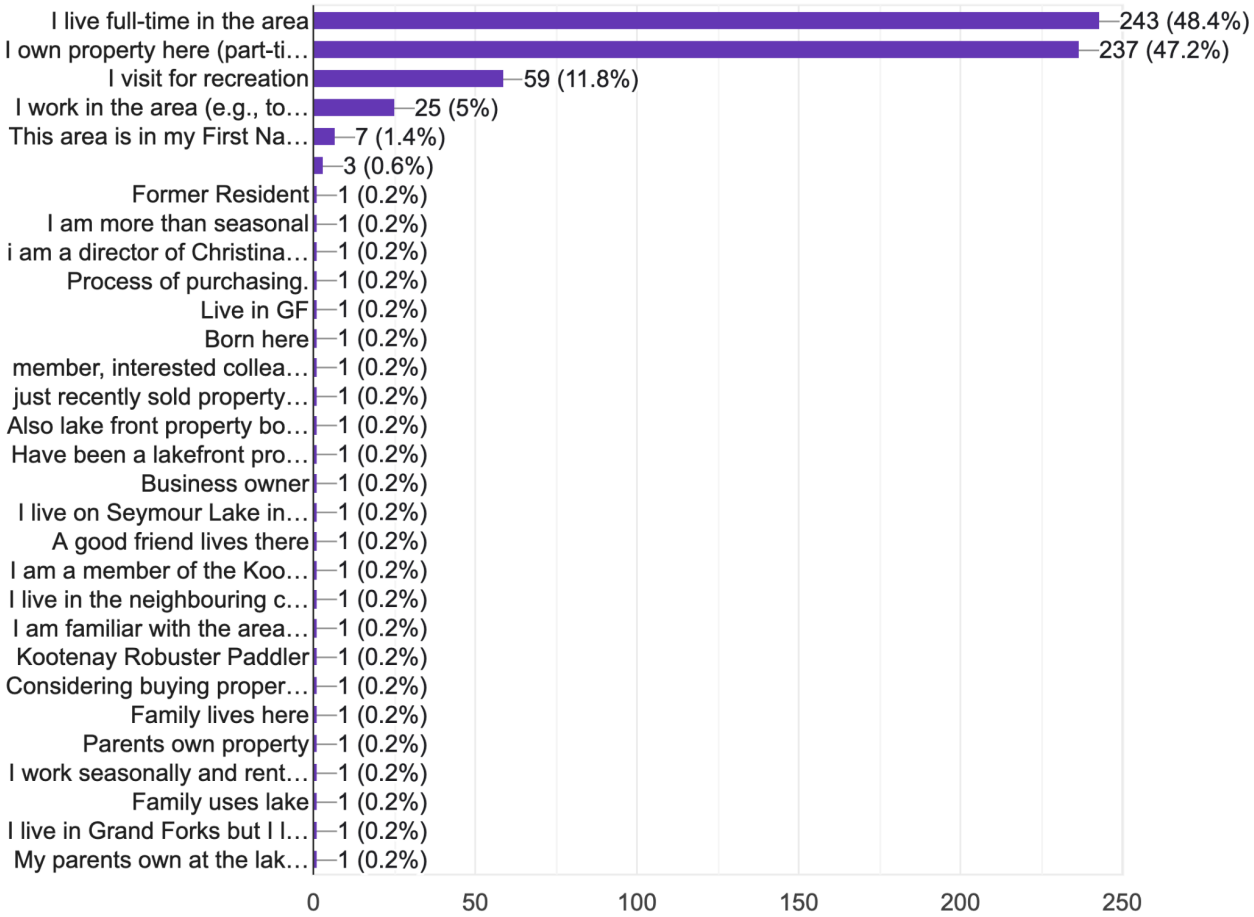
What is your age range?

500 responses



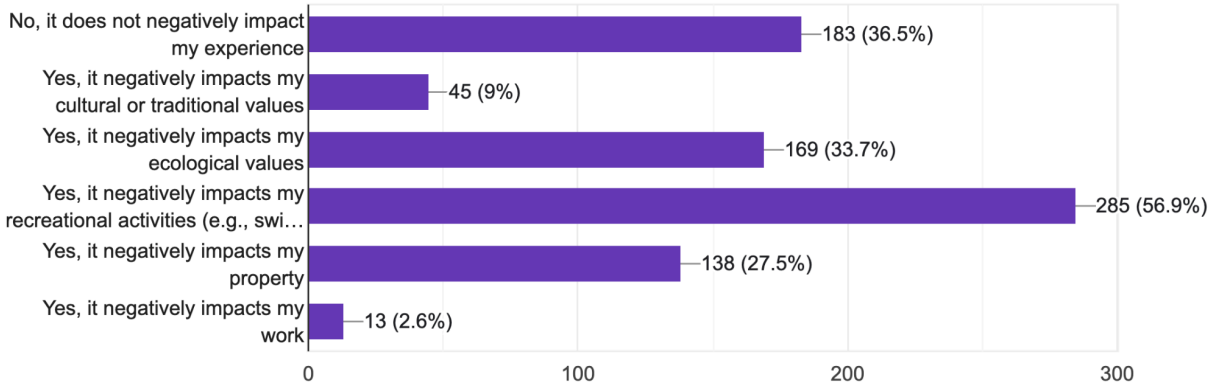
What is your connection to Christina Lake? (Check all that apply)

502 responses



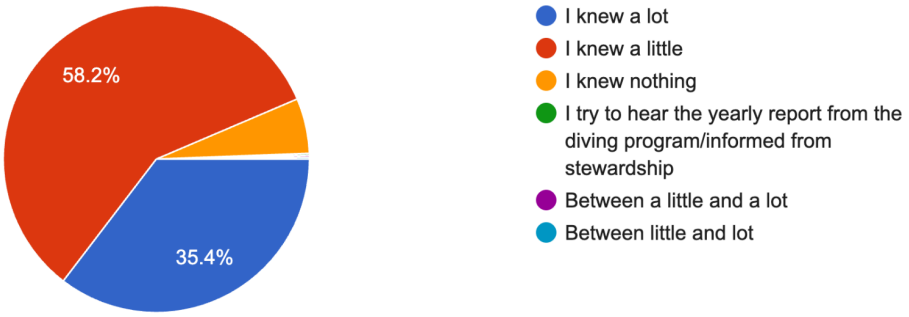
Does the presence of Eurasian watermilfoil negatively impact your experience at Christina Lake? (Check all that apply)

501 responses



Prior to reading the information package, how much did you know about Eurasian watermilfoil and its effects?

500 responses

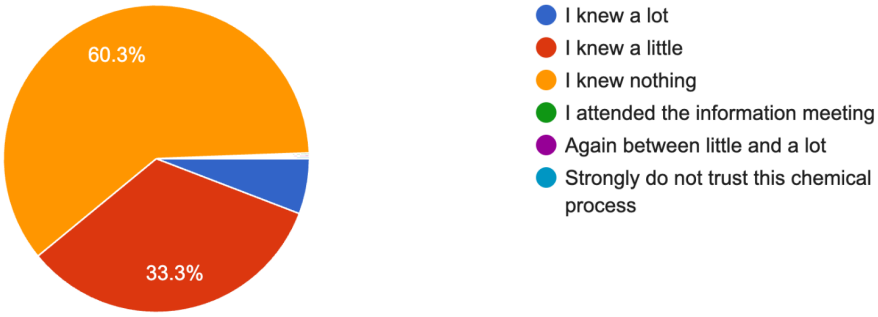


Prior to reading the information package, were you aware of Eurasian watermilfoil in Christina Lake and the RDKB's efforts to control infestations?

502 responses

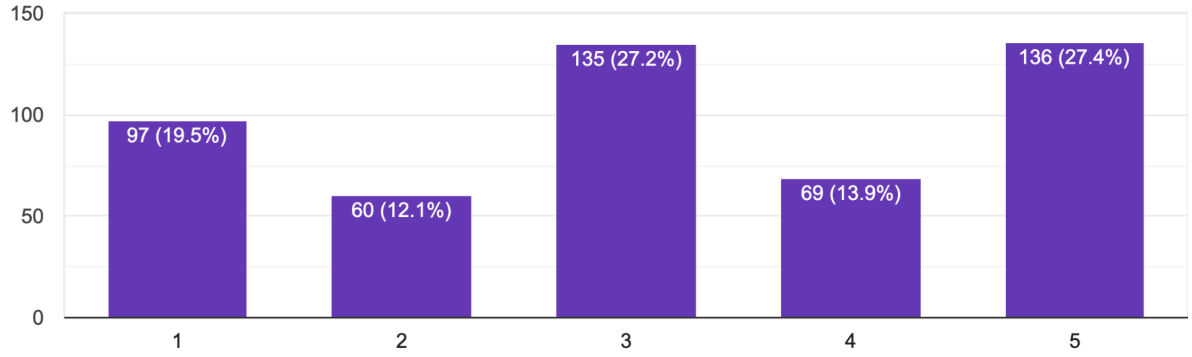
Prior to reading the information package, how much did you know about ProcellaCOR FX?

499 responses



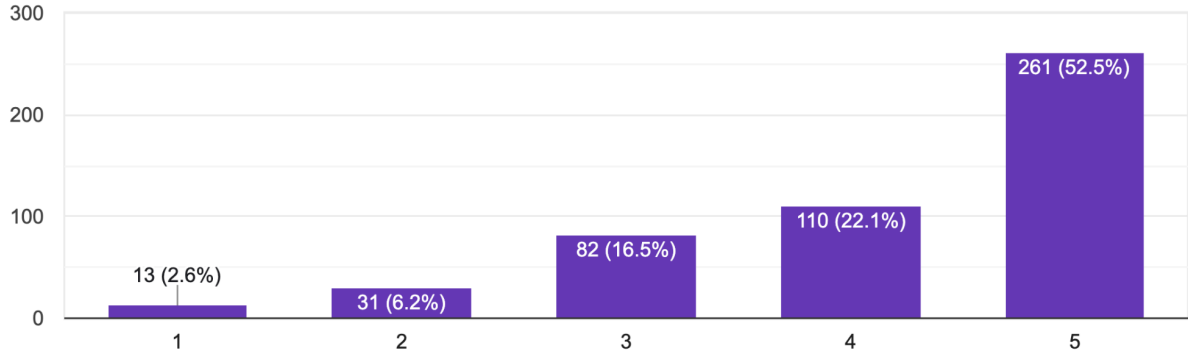
How important do you think each of the following factors is in managing invasive species in Christina Lake? i) Maintaining cultural or traditional values

497 responses



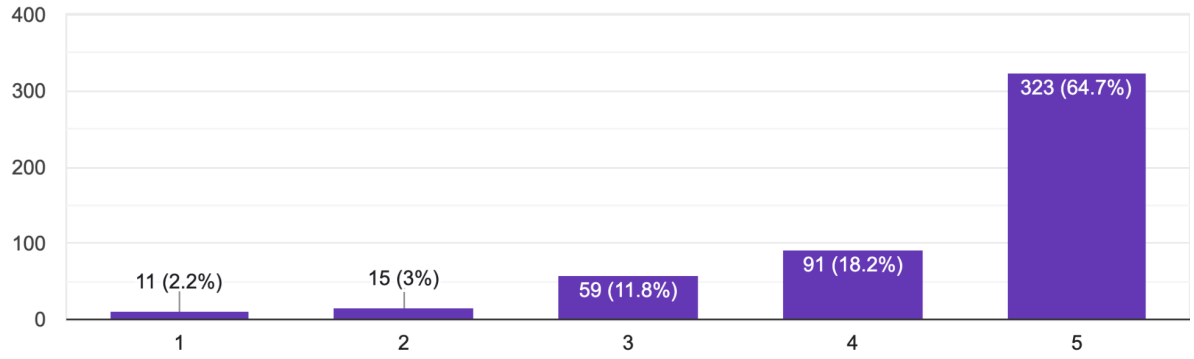
ii) Maintaining ecological and community values

497 responses



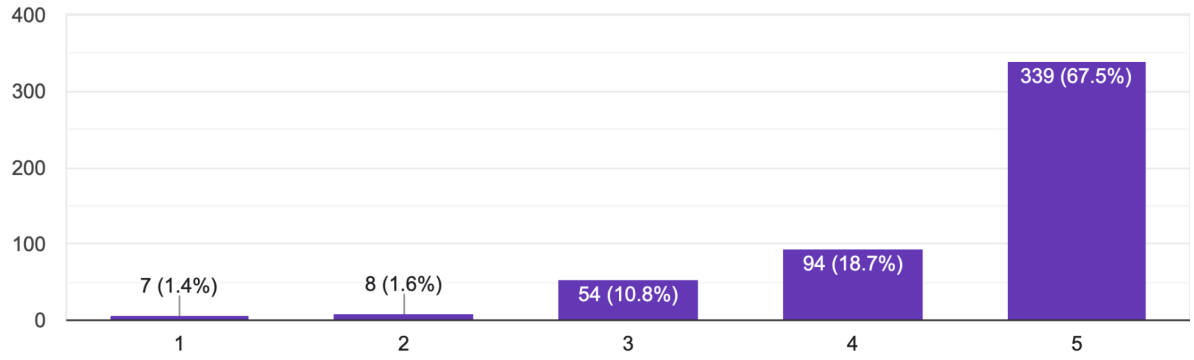
iii) Protecting native plant and animal life

499 responses



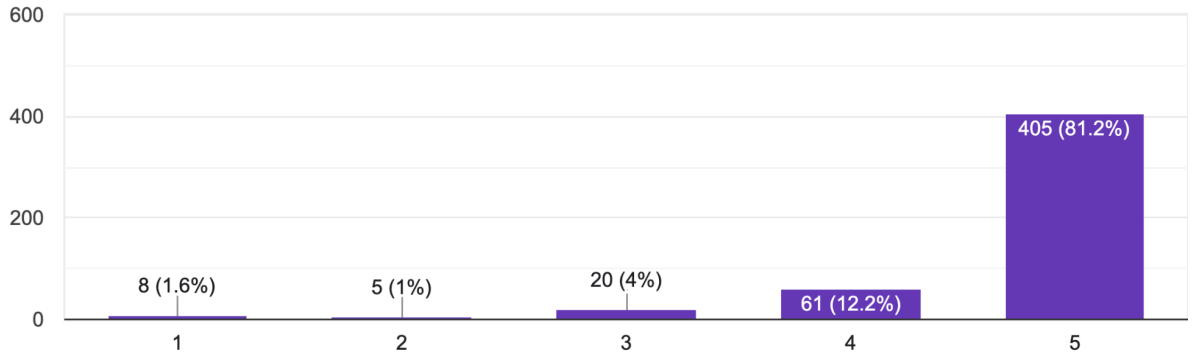
iv) Maintaining the lake for recreation (e.g., boating, swimming)

502 responses



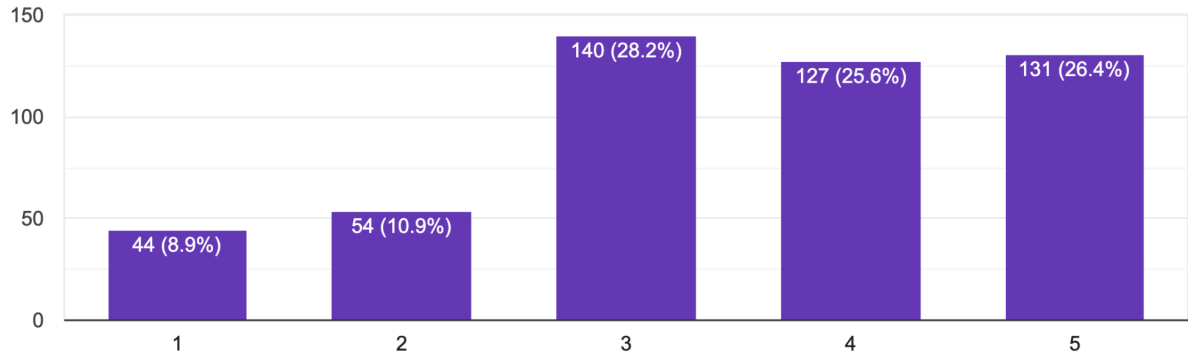
v) Ensuring public health and safety

499 responses



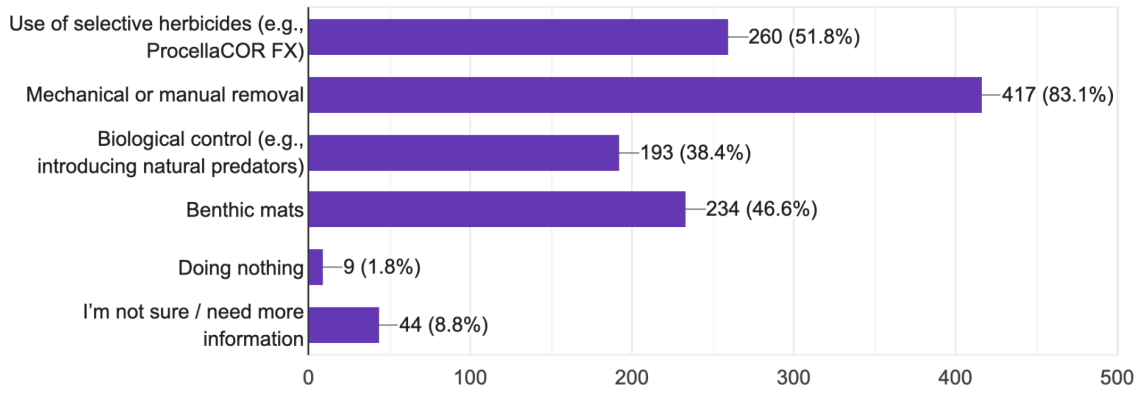
vi) Keeping treatment costs reasonable

496 responses



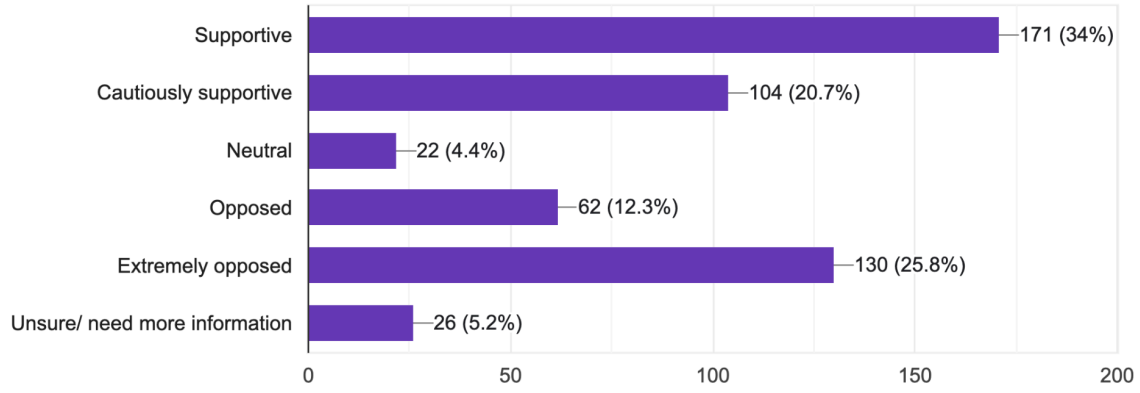
Which approaches to managing Eurasian watermilfoil do you support? (Check all that apply)

502 responses



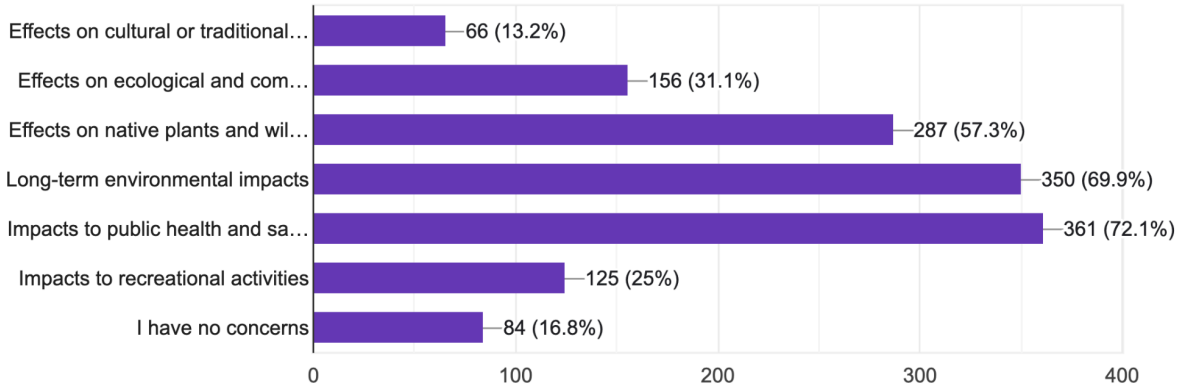
What is your initial opinion about using ProcellaCOR FX in Christina Lake?

503 responses



What concerns, if any, do you have about using ProcellaCOR FX in the lake? (Check all that apply)

501 responses



Note – every effort has been made to keep these responses anonymous. Any personal information has been deleted and replaced with [...] to indicate where information was removed.

Please use this space to briefly elaborate on your concerns, if any, about the potential use of ProcellaCOR FX in Christina Lake.
Use it, the sooner the better. Environment Canada has approved its use and has been effective in other lakes.
None
Ban wakeboard boats to help stop the stress of milfoil! Didn't have this problem prior to these wakeboard boats.
I really think the use of ProcellaCOR FX in Chirstina Lake is a mistake, due to the lack of long-term human studies, potential toxicity of its metabolites, concerns about environmental persistence and bioaccumulation, and its possible impact on other aquatic species. Moreover, I personally know several individuals that pump/use water from the lake for drinking/showering/washing, and there is an increased risk of human exposure to this chemical, which has not been fully studied for its long-term effects on human health with direct exposure. I understand the milfoil is a large problem, but I really don't believe the use of a Herbicide/chemical is the way to go. I Appreciate your consideration on the matter.
Not in support, no long term study done over 25-50 of uses, just plain against it. Too much at risks to compromise our drinking water for recreational purposes.
Unknown process to our area. Has it been used elsewhere and what were the results??
I personally feel this is our best option . The quality of the lake is decreasing rapidly each year. We have personally spent hundreds of dollars each year having divers remove the water milfoil each year only to have it return a few weeks later. I see the dive boat go by daily every year, all summer long That is costly and getting us nowhere.
This chemical is still in testing phase. Has potential to be a forever chemical. Drinking water comes from lake. Long term side effects of being exposed through swimming or drinking are unknown. Very risky imo. That said the dive boat is HIGHLY INEFFICIENT at controlling the milfoil. Time to get a weed harvesting boat that can be run by a single operator.
I have lived at the south end of Christina Lake for over [...] years, and have watched it be overtaken by Eurasian milfoil, watershield and fragrant water lily. The south end is being completely destroyed by the exponential growth of these three invasive species. It's time to clean up this compost heap, it's such a mess and amounts to ecological negligence. It's time to try ProcellaCor
We are losing the battle with current methods.
We need to try something soon!
As with any newly developed product, I would be mildly concerned about unknown long term impacts
It seems to be taking over with current and past attempts to eradicate it failing

Available information, with relatively limited time frame, strongly suggests that this option would be economically attractive. The existing program faces cost and qualified diver challenges.
My main concern would be the long term effect on the environment, humans, and animals living here. The short term studies may prove to be safe but the product has only been approved for 2 years this is not long enough to know what longe term effects there are especially to the ecosystem. I do not support the use of this product at this time especially since we have other options. Thank you
We local residents drink the water from the lake. Please, with emphasis, do not put herbicide in our drinking water.
ProcellaCOR FX There have been no long term studies on this chemical. If you dig deep you will get to know that there are risks to people, plants and animals.
It is important to know (and to communicate to the public) how long the product has been on the market. Where has it been applied. Are there any negative effects of the product on the lakes being treated? While Christina Lake may be a prime candidate for the application of the product, the long term effects (if any) must be well understood before the product is applied.
Many times in the past, new treatments have come out where studies show how good the new treatment will be. Then, as some time passes, the true effects are suddenly realized, and often in a negative way. Since this has only been approved since 2023, I feel more time is needed to fully understand the longterm effects of applying ProcellaCOR FX.
My major concern is the long term effects of chemicals on native species. I am somewhat cynical about the published results of tests performed to determine the safety of agricultural chemicals. Long term consequences often take decades to appear, for example, DDT or Monsanto's "Round-Up"
It appears to be well-researched but putting any herbicide in our lake seems scary.
Before proceeding I would need to know costs for the application & materials, how many applications would be required (Annually?) Have you prepared a budget to cover the costs in lieu of just raising my taxes once again ? Please advise at your earliest [...]
I have spoken to [...]. He has a doctorate in biology and grew up here. I sent him this information and he had absolutely no knowledge this chemical of it except for one study he looked up, done on one Lake. Not enough to put a whole bunch of chemicals in our beautiful pristine lake. We drink out of this lake. He also asked is it a problem in certain areas or is it a problem everywhere. I replied, and my opinion, it is a problem in certain areas with Busy boat traffic, and not in other areas. I am very opposed to it until there is more studies and research.
My drinking water is from the lake and my family spends a lot of time in the lake three of the four seasons of the year. Adding a chemical to the lake for this purpose may affect the health of my family and the community. Plus the article points out that this herbicide may need to be continually used. How could this be good for this lake and community?

Humans have a poor track record when we think we know enough to interfere in the environment. Think Mysid shrimp for example. We also do a bad job labelling a chemical as safe and effective. Many, many examples.
Please continue to manually or mechanically remove the milfoil, to guarantee safety and well-being to people and wildlife.
Looking for Names of other Lakes in Canada that have used ProcellaCOR FX & Dates of Application. Are one of the front runners?
There are always side effects. People keep trying to manage nature and it doesn't work.
I cannot believe this is even being considered. Our beautiful clean lake is here we all swim, and drink from and shower with this water. You cannot manage nature with chemicals and not expect side effects! There will be some very adverse side effects that did t show up in a controlled test. Knowingly poisoning our water is unconscionable!!!!
I adamantly disagree with knowingly introducing a poison to a water supply. Any herbicide is a chemical with short term and long term repercussions affecting the lake heath and the heath of those whose drinking water comes from the lake as well as swimming in the lake. Who would want to swim in a lake full of chemicals!?!? Not me and not my family. Do not add ProclaCOR FX to the Christina lake water.
I think more information from various sources, including peer reviewed research, is necessary in order for us to make an informed decision regarding the use of this here.
I am sure that these issues have been studied as I know that this product is approved for use in Canada but.. it is important to review the studies done and reassure the public of its safety.
Potential (unknown) risks vs benefits
I do not think that we should introduce anything to our water.
Would like notification of when and where it will be applied, so we can use bottled water for a brief period if we choose to do so.
What are the long term effects of its use? How long has it been tested. What are other areas has it been tested and what are the results? What are he costs and who pays?
I am strongly opposed to using ProcellaCOR FX in Christina Lake. I am Indigenous from SXFN and I live in Full time in [...] and go to the lake every day from March 1-Nov 1
no one wants poison in our lake
We do not want any herbicides in our drinking water.
I worry that, because this is a relatively new product, there is not enough information about potential long term effects on animals and humans.
Corrective action should be done in the offseason
We use the lake for drinking and am concerned how these chemicals affect this

This is our drinking water. Introducing poison no matter what form is unethical and has potential short and long term consequences for all other life in the lake as well as humans
Water for all homes on the southern end of Christina Lake is taken from the south end of the lake. Putting chemicals into our lake is not a great idea concerning personal health benefits to residents that use this water!!! [...] works for [...] as there water pervayor daily checks are done for cryptosporidium, ecoli etc just not a solution to this problem.
Do we truly understand the long term effects? I feel we have not explored all other options like limiting boat traffic to reduce the spread. If we limited the HP of boat motors on the lake paired with the current programs we have I think we would see a reduction without the use of chemical interventions. Why must we accomodate these holiday boaters? Why are their needs greater than the environmental needs of the lake?
Once again the RDKB is not commuting well with the community. Not everyone has good internet service and this should have been a notice through the postal services, since everyone has a mailbox. It appears you have made a decision and are moving on that decision no matter what the response. Just like the Ministry of Parks in the 1990's trying to rid the south end of milfoil by driving out on the then frozen lake with dump trucks of dirt to bury the problem you seem to feel there is no way out of one bas decisions save another.
None get rid of the boys
I get my drinking water from CL, in not keen to drink this stuff. It's a relatively new chemical with unknown long term effects on human and environmental health.
Boaters should pay extra for shredding and spreading.
I have been part time resident here for [...] years now. It just a recreational property. My wife and I reside here a large portion of the year in our retirement. We have been slowly losing our portion of useable recreational area of the lake. The divers picking the milfoil have not had any kind of impact on making things better!!! I believe Procella COR FX is our only choice now.
It's just out right wrong. Who would want to eat any fish from the lake? Nevertheless swim in it. Especially a child!!

I have been visiting the lake most summers since 1974 and have friends with residences on the lake [...]. I have several concerns about the use of this herbicide to control invasive milfoil in Christina Lake: - the limnology of the lake is such that this issue is primarily at the south end and I wonder whether the proposed use of the herbicide is driven by the rich homeowners in that area. - with respect to the herbicide, the main concern in my opinion is not the active ingredient that mimics plant growth hormone (auxin) but rather with the several other chemicals (solvents and adjuvants) used in its formulation, which are "trade secrets" (propriety of the chemical company that manufactures it). The negative impacts of these formulation chemicals on non-target plants and animals must not be overlooked! - use of this herbicide will never rid the lake of milfoil, it might temporarily reduce plant growth but the plant will always rebound and grow again. - the logistics of administering sufficient herbicide to actually kill milfoil will mean that very large volumes will need to be applied repeatedly to have any effect. There will undoubtedly be negative impacts on native aquatic and terrestrial (nearshore) plants and animals, many of which have important ecosystem services (e.g., pollinators). - there are minimal human health concerns but substantial ecological concerns with this proposed use of the herbicide formulation. - the mantra of chemical companies producing such herbicides is "better living through chemistry" and of course they will always say that there's no problem with the use of any chemical on the planet Earth, because they must make profits for their shareholders.
Worried about our safe drinking water
Long term health impacts on the drinking water
I am very familiar with the use of ProcellaCor as selective Herbicide for the treatment of Eurasian milfoil and it is the only solution That should be considered
I assume there has been extensive study on the long term effects of this chemical. I am concerned about the "selective" ability of a chemical in a body of water that continuously moves.
Not in support.
do not want any more chemicals in our lake!
I think it’s a great idea. I don’t see any significant drawback to using it. I swim a lot in the lake with a mask & snorkel , especially down at the end of the lake where a lot of milfoil is, and I noticed that it definitely encroaches on the fish environment. The fish tend to congregate on the open areas that the mats have created so I can see that the milfoil is crowding out the fish. Also, due to the lack of circulation of the water, the water at the end of the lake is becoming more of a meadow than an actual lake. We really need to find a solution, such as what you have proposed to remedy the situation.
I hope people can understand and support the science of this treatment method - very in favour.
I haven't seen what the cost would be for this. This wouldn't change my opinion on it being used but I am curious. The minimal environmental impacts associated with this product are reassuring.
Not even a question. People drink from this lake. The health of this lake is already stressed. No chemicals

I think it is important to keep and nice area for swimming
Seems a bit rushed to only be the second lake this has been trialled in Canada. The other lake it was used in was very small by comparison and does not appear to be used by the people living there for their own household use either.
Can't use chemicals. Go as natural as can be.
Adding chemicals to our drinking water and the unknown long term effects are far too risky to proceed. A small portion of the lake is affected. Full time residents will have to live with the consequences, while tourists and vacation property owners go home after the summer. Please do not add chemicals to our lake.
Due to results in Ont lakes I think it is a very good method to deal with the problem. But you do not stop testing to ensure human safety is maintained
It is concerning that there are no long term studies on health effects, and no studies that focus on exposure to children and infants, I have heard that it effects macro aquatic invertebrate behaviour and fertility but an unsure of the source of that info
I would feel more confident about the product if long term use impacts were known from other lakes using the product. This includes the impact on humans who regularly drank water in which the product was added to control weeds. Sadly for the victims, many chemicals initially declared safe were proven not to be over time, and caused cancers, organ failures, birth defects, etc etc.
There’s not enough knowledge about the long term impact of using this product on our drinking water and our plants and animals. We have great drinking water. What happens to our community if the water is contaminated over time? If we find that we have been consuming water and now have illnesses like cancer? What if we inadvertently harm plants and animals that we didn’t know would be impacted?
There needs to be more research and studies on it There have not been any long term data collected
Totally opposed! We are just starting to understand the long term consequences of pesticides and herbicides used in the farming industry, despite using them for the last 50-70 years. Let’s not put our drinking water and best community asset at risk while increasing its forever chemicals levels. Plus, the lack of long term study done is a huge concern. The other lakes where it was previously used in Canada didn’t have any outflow, or residents using it for drinking water purposes. Truly hope this method of removal will not be approved.
I'm concerned about the long term effects it could have on the lake as it has not been used for very long.

The dataset is extremely limited and the lack of long term knowledge is very dangerous. No one knows the long term effects of how it might harm humans and other wildlife. We drink this water, cook with it and bathe in it. Please don't risk a far worse problem to deal with something small. Keep in mind that the studies you are relying on are provided by the company trying to sell this product. Putting chemicals into our water is simply not a good idea
Sooner the better to use it
If ProcellaCOR FX is applied early enough before peak swimming and tourist season the health risks can be minimized. Test areas will help convince skeptical population that this program truly will work and have little impact. Test areas monitored before full scale application, will be easier to convince the skeptical and overly cautious population in my opinion. The target should be to reduce and help control the multiplying ewm. Total Wipeout of ewm probably will never happen, but control is achievable.
My biggest concern is putting a chemical in our drinking water that hasn't been studied for twenty years. I don't want it in my drinking water, even if it does help eliminate the mifoil.
My drinking water supply comes from the lake. Not sure this chemical has had enough research on long term effects on humans, animals and fish. Why would you want to contaminate this beautiful lake with more chemicals, it is getting enough from boats and humans. Who would want to swim in this chemical?
Horrified to think you are considering adding a chemical to the lake absent long term studies and impact of chemical on children and pregnant women. The lake in Ontario is in no way similar to CL, not a drinking water source, contained water basin. I don't want our community to be the guinea pig for the chemical company.
long-term effects and other lakes in Canada who are using this on a similar scope
I drink this water everyday and no human trials have been done
To my knowledge it hasn't been used in a high flow lake like ours, we use our lake for drinking water, lack of long term studies concerns me greatly
Don't play with our drinking water, keep it safe for all
This is a rich people problem as they don't want milfoil around their docks or boats, not worth having the whole community becoming lab rats
I think its a bad idea i am afraid that it will destroy the fish beavers. Otters. And it may harm those that swim
Not enough long term safety data on previously treated lakes. Benefits vs risks not clear enough from all the data provided from the application of this chemical in US and Canadian lakes.
There must be either mechanical or natural predator options instead of using chemicals
long-term effects on lake ecosystems and potential impacts on drinking water drawn from treated sources

Clean, pure water is very important in this time period.
with no long term studies its not worth the risk! Id rather have too many plants in the lake than too many chemicals!
No concern
The weed infestation NEEDS to be addressed ASAP
Our children swim in that lake. Find a non toxic way to deal with the issue.
This product does not have enough use to and proof of no long term issues to human or other living species. It is sickening to believe our representatives would even consider a chemical in a lake with such extensive use.
Not much mention of its affect on fish
We have had property on the south end in our family for close to a century. I have been at the lake every year (all throughout the year) and have never seen the milfoil like it is now. We watched the divers for years, saw the result of using mats and now we need to utilize science to help eradicate this problem.
I drink the lake water and count on it being safe to consume.
My concern is long term effects/safety on those swimming in the lake or using as a water source.
I'd like to know how milfoil has changed over the past 20 years. Has it significantly increased in area in Christina Lake? How did previous mitigation measures affect its abundance? Why is Procellacor being considered now?
In past various herbicides have been approved only to be discovered they were not as safe as initially found. I am especially concerned for those who use the lake as their primary drinking water source. This risk is low but definitely still a concern.
Long term health of people in the area
From my understanding ProcellaCOR FX's long term effects aren't fully understood. My fear is that by introducing this into the water it may have devastating effects on plant, animal, and human life, even if that doesn't appear until years later. I really feel like we are being used as Guinea pigs to test this chemical out without regards to what the possible outcomes could be.
Although this product is deemed safe it goes against my ideas of putting chemicals into our drinking water.
https://obwb.ca/obwb-reignites-decades-long-fight-against-chemicals-in-okanagan-lakes/

This product has not been tested enough to be safe and has not been used on a lake like ours, which supplies drinking water and has an outflow. I am concerned about the long term effects of ANY herbicide in our lake, as too many "safe" herbicides and pesticides have proven years layer to cause illness and death and destruction of natural flora and fauna. Specifically in our lake this would cause damage to benthic invertibrate populations and may also harm the painted turtles; it can't be safe for drinking if one can't water a garden with it!; it could result in dead EWM washing up on beaches; not enough is known about how it will impact other aquatic species; and many other concerns. I am VERY opposed to its use in our lake.
The only people deciding if this product should be used or not are the people that use it as their drinking/bathing/gardening water. We can choose not to drink it (even though we pay for it) but we should not be left with no choice but to bathe and water our gardens full of the food we eat with this poorly studied product. It's too new. Wait another decade. Put in a buoy system, amp up education. Get some wash stations for the boat launches. Just because chemicals are an easy fix doesn't mean its the a good choice! I got a $350 water bill and also another $350 charge for water in my property taxes. I don't want to pay $700 a year for poisoned water! Dont try to tell me it's safe. No one actually knows that for sure. Not a risk I want to take for my young children. My kids aren't your guinea pigs.
Not that enthused about using chemicals in our lake especially as so many rely on it for their water supply, but it sounds like a least-toxic option.
If it were possible to do further testing in a small safe area of our lake, I would support that
As community members who live in the area use the lake as their main source of water I do feel concern for their long term health and safety after prolonged exposure to PrecellaCOR FX.
My answers are in the survey. I disagree with use of anything other than manual removal. I hope to have generations of people experience a clean water lake. Thank you for listening
Need more and longer research
I am concerned around the long movement of pesticides into the main rivers that Christina Lake feeds into. I am also concerned about how long term studies are not available and this product was not recommended for the high flow rate of Christian Lake according to the pesticide user guide.
I am 100% in favor and my main concern is that misinformation and general negative bias towards pesticides will sway decision makers away from using this tool in controlling milfoil. Science has provided an excellent tool here and I am cautiously optimistic that it could help return our lake to a more natural state.
Must be safe for people
I’m in favour of using this to clean up the lake for a more enjoyable environment
The sooner the treatments begin the sooner we can eradicate millfoil. Please use ProcellaCOR FX asap to get this issue under control!

I'm in favour of using this product as the lake is being distroyed at the moment. The scobbadivers have done our area for years with I'm assuming a high cost with very minimal effect and making a mess of the swim area while they are here. Put that money towards something more effective. And long term answer to the problem. Please move forward with the use of ProcellaCOR FX. Please save our lake!
As owners at the south end of the lake for over [...] years, we have watched numerous iterations of weed control and watched it get progressively worse after each attempt. It has become a cesspool with duck and goose feces. We personally can't swim in our swim area due to the weeds and lily pads encroaching and the fact that Fish and Wildlife won't allow us to pull them. We strongly support the use of Proclella CorFX. We also feel that better water flow would also help in the weed situation if the sand bar was dug out at the mouth of the creek.
The vast majority of waterfront owners use the lake as their ONLY source of water - drink, cook, water vegitable gardens, dogs drinking, along with swimming etc. where are the LONG term aquatic anjmal studies? I spent [...]decades in science, [...] conducted long term studies with fish . It can be done.
We use this water as our drinking water and adding chemicals anywhere in the lake is adding them everywhere in this lake and can't be undone.
So many people use the lake for drinking water. I don't support adding herbicides because of that
The infestation of Milfoil is destroying this beautiful lake. The dive boat is not even able to keep it at bay and the studies show it continues to get worse. What is it going to take to actually save this lake? This is a tourism community and many people from all over enjoy this lake however soon it will be just a swamp and people will stop coming and those of us living here full time will be left with property of no value due to the demise of the lake.
There is no data about the effects of it long term. All studies are peer reviewed or in a lab. How do we know the safety of the product.
Mechanical removal doesn't work. Do nothing and eventually it will infest the whole lake. We are lucky 90% is just before the outflow, the should make application and control much easier and effective, thanks for caring
Why does it matter if a person is First Nations? What is the point of cultural and traditional values in protecting lake water? Perhaps that could have been explained. I found this confusing.

It has not been used and studied for long enough for me to feel comfortable with us using it in the lake. I don't want to be a guinea pig. Our lake has a high output rate in the exact places that we would be using the herbicide, so we would have to use a lot higher concentration for it to be successful. This would be right in the drinking water I take areas. Also, it will affect our wildlife habitat. The genetic marker that the herbicide kills is the same as some plant species that is important for the painted turtle habitat. Pouring rock and dirt into the lake in the early 90's is one thing (totally backfired and ended up being a big mistake), but knowingly putting chemicals into our clean water is a totally different oopsies if it ends up being a mistake. There is too much at stake and not enough long term data. I suggest contacting the Nature Conservancy of Canada to ask for help. I also suggest putting buoys out marking where power boats can't run (this would be in the areas with high concentrations of milfoil), investing in cleaning stations in all boat launch areas, using benthic mats and dredging out the areas that we made shallower in the early 90's with fill.
Please do not poison our drinking water. Think of sensitive people like children, the elderly and immunocompromised. There are no long term studies. This is an unethical experiment!!!!
Although current studies show it is safe there are no long term studies as of yet.
I am fully supportive in any method that provides safe drinking and swimming water in the lake. I also believe that a healthy safe water supply is the priority. I am very surprised that the RDKB has no water back up system.....wells should be in place by the old Moody Creek water station.
just would like notice when it would be used so we can plan to not water plants at home
Go ahead with the test use in one small area ASAP. Then rollout over whole lake later that same season.
I am concerned of long term effects to water quality, plant and fish life
As a gardener and hopeful farmer i am very concerned by the warning that lake water could be rendered inappropriate for irregation. This suggests that localized applications of herbicide do not stay in one place and cannot be simply neutralized.
Drinking water is biggest concern
The lack of long term testing is the most concerning. I would like to see more research in the effects of human consumption particularly since so many of us drink lake water.
They don't use it in the Okanagan either
Try it.

I do not believe we should be using ProcellaCOR FX. I do not trust the FDA. Moody creek gets it's water from the lake and so do many houses on west lake drive and other areas that are not connected to a water system. I believe our mill foil problem should be handled with mechanical machinery that I see other communities have taken that approach. Christina lake is drained by christina creek, which dumps into the kettle river, and then into the columbia river and all the way to the ocean. I for one am not willing to risk the health of the fish in our lake, the community's health, the property values that people have in their homes around christina lake or the tourism that would be adversely affected if this procedure was to go bad.
Active ingredient in Proellacor fix as a PFAS or forever chemical, which are difficult to break down in the environment and some have been linked to causing cancer. The active ingredient is called florpyraxifen - benzoyl. Our drinking water comes out of the lake.
I would like to see the weavil that was formally proven to be native to Christina Lake tried before ever trying a chemical
Please Do Not use ProcellaCOR
Member of Lower Similkameen Indian Band. Any reason my band wasn’t listed in your survey?
This is our drinking water - I am absolutely opposed to putting any chemicals in the lake
We get our drinking water from the lake
Heath concerns to humans & wildlfe (which includes fish, ducks, otters, beavers, etc)
Inadequate scientific research Not enough research on the types of lakes
N/a
I appreciate all the solutions to control Eurasian Milfoil. There are tough decisions but if we don’t come up with a more effective plan we could lose all the habitat in and around the lake. Only concern is long term effects
Definitely need to be sure there is no long term health hassard . All residents must know when the treatment is going to take place in case they do not wish to use water for drinking during that time, because of health concerns.
Why use chemicals? Why not taking the water from the creeks surrounding instead from the lake for drinking? Why allowing so many motorboats during summer on the lake (boats per day could be limited in quantity per day)
Please do not use this in our lake. Maybe if it wasnt going to be in our drinking water I would consider it. Seems sketchy with a lack of long term studies.
Long term consequences on local ecology and native species, and environmental impacts of its use
No human tests and once it’s in the water it’s in the water you can’t roll this back. DDT was safe!! Till it wasn’t

I believe from the evidence given this is our best option to keep Christina lake alive and healthy
It is regrettable that the infestation has progressed as much as it has. Invasive mass has doubled every year since 2018. Doing nothing is not an option. [...]
I need more information accessible to the public who is not informed by a First Nation newsletter
What other kind of herbicide is presently being used and how will the use of ProcellaCOR FX in Christina Lake efffect other herbicides.
I fear that if we pollute our beautiful lake with ProcellaCOR FX we and/or future generations will suffer. My family drinks the lake water and there's no way we will support adding chemicals of any kind to the lake, regardless of the assurances that there will be no negative consequences. We'd rather live with the weeds than suffer potential health problems in the future.
How stupid do you have to be to use chemical solutions to ANY problem!!!
My concern is that if we DON'T use ProcellaCor FX many other areas of out lake will be infected. Studies have shown it is quite safe.
Look at the warning labels, keep away from children, use proper PPE when handling !!
I do not think this product has been effectively studied as to its long term effect on health snd wildlife.
I am concerned over the long term results of the application.
There are NO long term studies on the dangers of this toxic unnatural herbicide to people, environment, wildlife it should NOT be placed in our waterways EVER You can not control one issue by introducing something NOT NATURAL abd TOXIC especially into the water PERIOD
I wont be using the lake if these chemicals are used. Disgusting!🤢🤮
Just Don't
terrible idea.
It cannot be used it is detrimental also since you're pulling water from the lake for drinking purposes that you will then have to chemicalize even more than you have it is a vicious cycle of wrong
Long term effects on environment and human health are not established as this product is new as of 2023.
Why are chemicals our first go to for pest control? Why not use predatory species? The earth has managed just fine without human intervention, because the earth has a predatory/prey system. Use that and leave the chemicals for an absolute last resort.

I am concerned not enough safety data is available on this herbicide. It doesn't sound safe if you can not use water from lake or stream for drinking, watering gardens for 5 days after applucation. Once you poison the water there is no return. The toxic harm this herbicide will have on lake habitat, humans, children, pets, wildlife and the environment will last for decades and generations to come. I would never recommend people come to Christina Lake for family recreation if this Herbicide is used. There is long term Liability for anyone Who will be responsible for putting this herbicide into the Lake.
EWM may be an annoyace, but it doesn't justify introducing a chemical. There isn't enough long term data.
No long term studies. Minnesota Dept. of Agriculture determination should be considered a red flag rather than an anomaly. Christina Lake should not be used as a test case. This survey is misleading and poorly written.
Residents like myself use the lake for our only source of water. The rdkb does not care about my health, or any residents concerns.
I do not believe there has been enough research on long term effects to both human health and the environment because it hasn’t been used historically long enough.
No concerns
Safety and health concern!!!!I do not support at all!!
We swim in and drink this water.
As I know they are maintaining it by manually pulling it out and I support that … all the chemicals at the end cause problems to us and mainly to fish … I don’t support using the ProcellaCOR FX
Hi - this is a survey response from [...] I share this google account [...] so it isn't a double survey.

My concerns are summarized in the ProcellaCOR report created by the Shawnigan Basin Society: Since this lake is a source of water for people, "and since there has been no testing for potential toxicity of long-term intake of florpyrauxifen nor hydroxy-florpyrauxifen, it is recommended that the efficacy of florpyrauxifen-benzyl in killing Eurasian watermilfoil be done in a body of water that is not a source of drinking water. 2) Further, if such testing is done, then not only must the aquatic plants be monitored, so must the vertebrates and invertebrates that inhabit that body of water. 3) Further, the distribution of florpyrauxifen-benzyl and its metabolites should be measured over time, not only at the site of administration but also at the epilimnion throughout that body of water as well as in deeper sites, and in the sediment. 4) There needs to be testing for vertebrate toxicity of florpyrauxifen and, particularly, hydroxy-florpyrauxifen. The fact that repeated ingestion of florpyrauxifen-benzyl in mammals and birds showed no long-term toxic effect and even though florpyrauxifen and hydroxy-florpyrauxifen were found in liver and kidney in significant amounts does not necessarily mean that these compounds when ingested have no toxic effects. If florpyrauxifen and hydroxy-florpyrauxifen were formed in the intestine, liver and kidney, then these compounds could be quickly inactivated through the actions of phase 1 & 2 enzymes and excreted through the feces, bile and urine, respectively. I think there should be studies examining the long-term effect of chronically ingesting florpyrauxifen and hydroxy-florpyrauxifen in drinking water..."
Just want to be notified when it will be applied
Very against using this in our beautiful lake
The introduction of chemicals to solve a problem, as a general rule over history has not worked and has always resulted in unanticipated effects and damage to the ecological system, resulting in further damage - our lake is not a test site and the risk is too high, regardless of the chemical company claims.
I am very very against the use of herbicides in the lakes, I don't feel there is enough positives to out weigh all the negative effects for years and years to come after the fact of using it- Christina lake should be a safe place for families to swim I think using a herbicide will greatly impact their ability to provide a safe swimming space and they could loose revenue in local business with people unwanting to swim there due to the use of herbicides, Say NO to the use of herbicides!!
Need longitudinal studies to determine impact on health from those using Christina Lake as a drinking water source.
This seems like a huge red flag in this day and age with so many concerns around the environment. If this product has long term unforeseen negative impacts our property drops in value as does our enjoyment and health of the lake.
Seems reasonable, as mechanical removal is not viable.

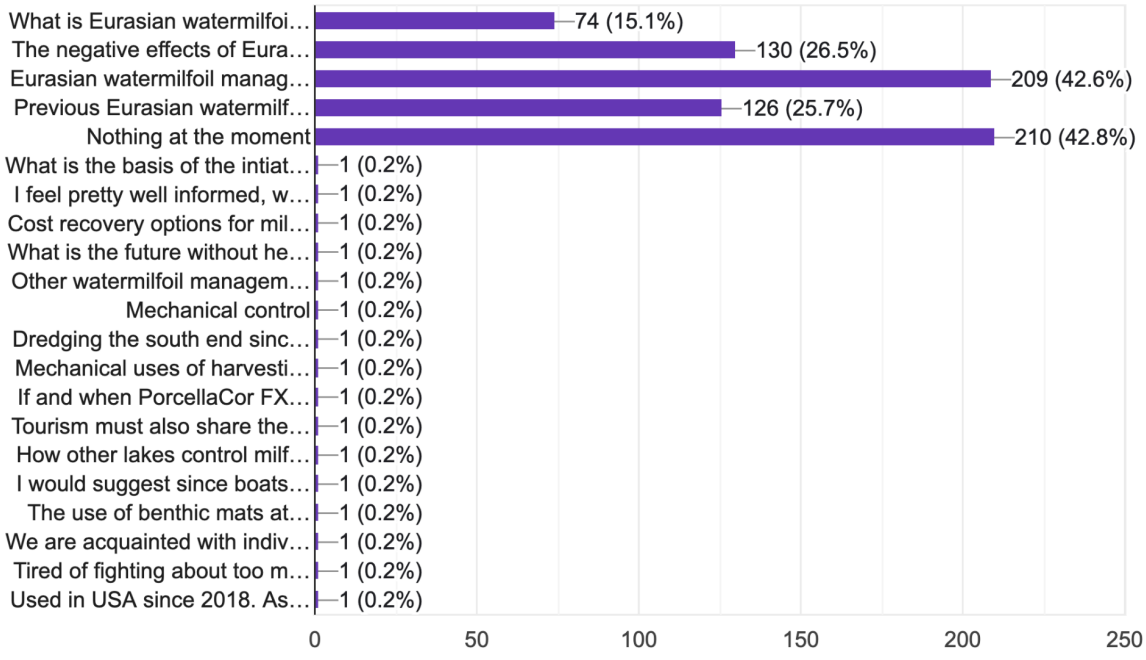
Manufacturers of ProcellaCOR will not provide proof that the active ingredient in ProcellaCOR FX has gone through a long-term study showing it is completely safe.
Prefer to treat with mechanical means before going to a chemical
There are long term studies which makes Christina Lake a test case
There have been no long term studies, effect on humans and wildlife swimming and drinking lake water. Using christina lake as a test case, guinea pig! What are the long term side affects?
There has not been enough research on the long term impacts of this product to support a responsible recommendation of this product and I have seen studies suggesting risks that I do not think should be taken at this time.
I am hesitant to add chemicals to our lake. It seems like such a risk with unknown long term consequences. I'd prefer to spend more on manual removal for milfoil remediation.
Many people get their drinking water from Christina lake, and the use of this herbicide could negatively impact that. Christina Lake is one of the most pristine lakes in the province, we should keep it that way. The long term health effects of this herbicide are unknown, so why would we want to pilot it in our own waters? Since Eurasian milfoil first became an issue in the lake in my memory, early 2000s, at our property the level of milfoil has declined or sustained with the efforts of the manual pull dive team. I am strongly opposed to the introduction of this herbicide. Additionally, the Okanagan lakes have decided to not use the herbicide and the Okanagan Nation Alliance strongly opposed its use. Where has the indigenous consultation been for Christina lake? I have not been aware of anything. We have the chance to keep Christina lake clean and pure for our future generations-why take the risk to jeopardize that with the success of the current control methods.
Do not do this, don't risk our lake. This is a bad idea
Hard no
The lake is fast becoming overgrown with these weeds
There have not been enough long term studies done. There are not enough studies done in "real" Canadian lake situations. Christina Lake is my drinking water and when they say do not use the treated water for irrigation of greenhouse vegetables and fruit., that is VERY concerning. I'm not in favour of using ProcellaCor FX at this time.
It's a chemical .. not natural. We do not know enough of the long term effects.
Use it
Impact on drinking water & on fish & wildlife

I have been visiting/living at Christina Lake for [...] years and to see the deteriorating condition at the foot of the lake is heartbreaking. Years ago families spent days at the foot of the lake swimming in a great area for kids and their parents. Now due to the expanding milfoil the area is hardly used. What a shame! It is time to bite the bullet and clean this mess up and make that area as pristine as it was for future generations. We know the present effort does not work and that is not a reflection on the divers doing their best. Short term pain for long term gain. We don't want to let this beautiful area become a swamp.
Why is there no independent studies on the long term effects. Only from the company. How do we know that is true?
Mechanical means is better then to introduce this product into our water.
I am way more concerned about properties on the lake who have their septic running into the lake. The bio waste from provides nutrition for the milfoil.
I'm concerned about the long-term ecological effects of introducing a pesticide into the water column and ecological community. I understand the argument that there is a risk of doing nothing, but sometimes management decisions can have unintended outcomes, and introducing a new chemical into the lake could have unknown effects not seen in the lab or mesocosm studies performed so far. During the time my mom and grandparents have lived at the lake, they have seen massive changes to the ecological community from increasing development (i.e. less loons, less mayflies, etc.), so I am skeptical of management decisions that could have unknown effects on the ecological community as a whole. I'm also concerned about water quality around the areas to be treated, knowing that there are areas that some people draw drinking water from the lake. While I'm not opposed to invasive species management, I believe the current methods (benthic mats, mechanical control) are a more risk-averse approach to the problem. From a recreation stand-point, the southern end of Christina Lake has always had a lot of vegetation; I think it would be difficult to create a completely vegetation-free swimming experience in those areas, especially without non-target species being affected. I think the current control methods for milfoil are sufficient for enjoyable recreation experiences at the lake, unless visitors/residences are expecting the most lakeweed-free oligotrophic lake possible. But in most lakes, including Christina Lake, native vegetation is a part of the lake environment. Even though the milfoil population is undesirable, I don't think it justifies introducing a chemical that could have potential unknown consequences to the ecological community.
There is not enough long term evidence that this is not going to negatively impact this already stressed ecosystem. This type of product should be used in a closed system where it cannot further affect the receiving environment. And why are we not pursuing other options for supporting lake health like promoting or mandating foreshore Restoration (yes, reduce those manicured lawns that everyone loves in favour of natural species that provide shade, habitat and filtering of sediments), banning fertilizers use and investigating and removing septic inputs. All of these things can help with the nutrient loading in the lake which may (with patience) assist with weed management. Please reconsider this.
I don't believe we have enough information about the potential long term effects or negative impacts ProxellaCOR FX could have. There hasn't been any studies done about how the herbicide influences a lake that is used as drinking water, has kids playing in it for months on end and has such a vibrant community living on its shoreline. I think it would be short sighted to not gather more information first.

It's just wrong! Would you want to drink or bathe in it?
Putting chemicals with no long term studies in our drinking water is unethical and it is alarming that it is even being considered.
Let nature take its course. With human or mechanical help. Not chemicals!!
I drink and bath every day
As Christina Lake is the main water source for a significant portion of our population, I feel the absence of long term effects when used as a main drinking water source. Also, my husband swims in the Lake from April to November, what studies have been conducted on full body exposure to the chemical over an extended period of time.
I am strongly opposed to the use of ProcellaCOR FX in Christina Lake for health and safety reasons. This is our community's drinking water source and no chemical should be introduced without absolute certainty of safety. Most available data on ProcellaCOR FX come from the manufacturer, and independent, long-term studies on drinking water exposure are lacking. The product has never been used in a water supply for people. We do not know the potential long-term effects on public health or the environment, and I believe the risks are too great. There are safer non-chemical ways of managing aquatic vegetation.
Studies carried out on the effects of procellaCor FX on drinking water are very limited mostly done by the manufacturer over the short period it has been available and it is being introduced right at our water intake there could be long term effect we do not know about yet .
It is my drinking water, what are long term effects
Prior testing and usage results
Make everyone aware of the pros and cons. Investigate if filtration can keep drinking water from containing any of the ProcellaCOR FX

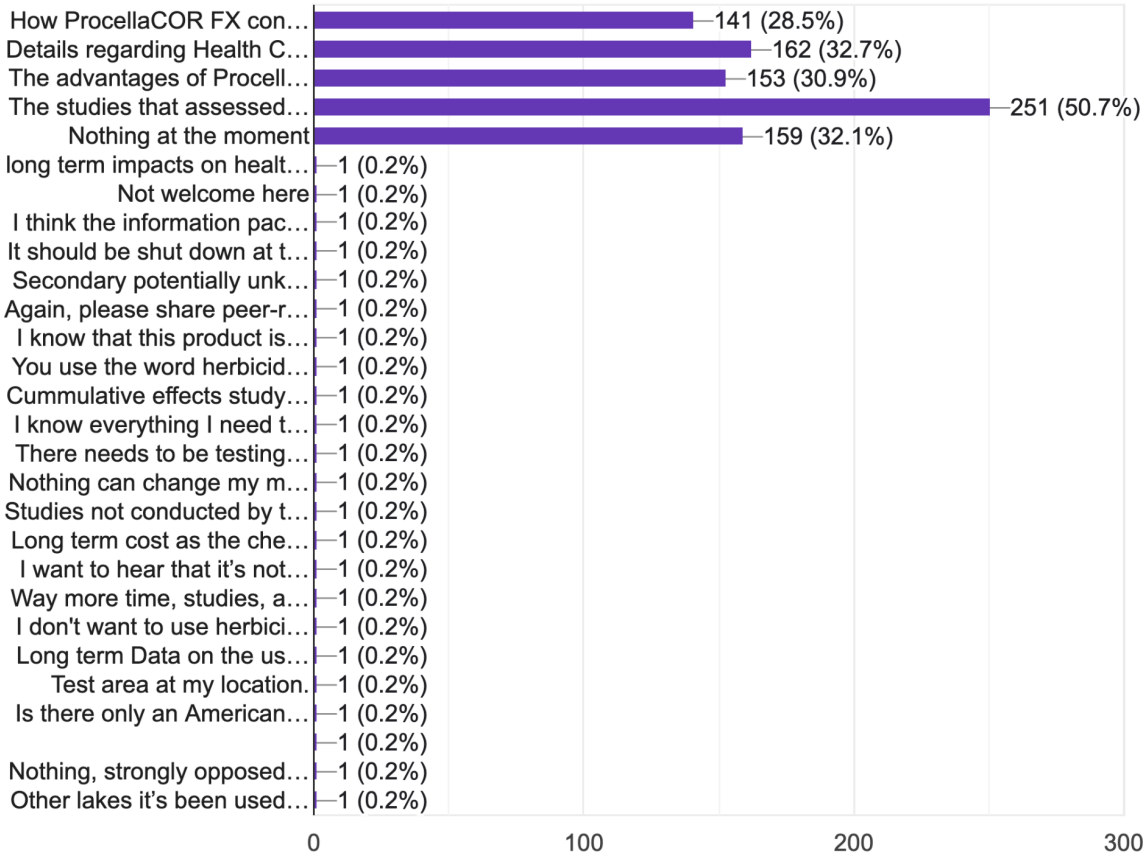
Regarding Eurasian watermilfoil, what would you be interested in learning more about? (Check all that apply)

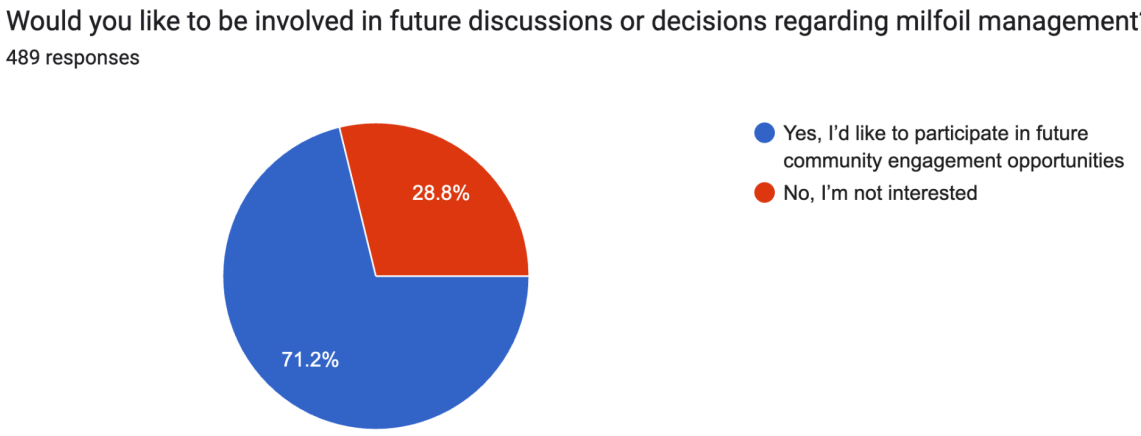
491 responses



Regarding ProcellaCOR FX, what would you be interested in learning more about? (Check all that apply)

495 responses





Appendix B: Responses Omitted from Data Analysis

Appendix B-1: Responses Omitted from Survey Question 4: "What is your connection to Christina Lake?"

Note - every effort has been made to keep these responses anonymous. Any personal information has been deleted and replaced with [...] to indicate where information was removed.

1. "Business owner" having already indicated that they work in the area.
2. "Born here" having already indicated that they live full-time in the area.
3. Blank
4. "I am director of [...]" having already indicated that they live full-time in the area.
5. "Also lake front property boat access" having already indicated that they live full-time in the area.
6. "I am more than seasonal" having already indicated that they own property here.
7. Blank
8. Blank
9. "I live in the neighbouring community: Grand Forks" having already indicated that they visit for recreation.
10. "Family uses lake" having already indicated that they visit for recreation.
11. "I am a member of the Kootenay Robusters Dragon Boat Team" having already indicated that they visit for recreation.
12. "Live in GF" having already indicated that they visit for recreation.
13. "Parents own property" having already indicated that they visit for recreation.
14. "Family lives here" having already indicated that they visit for recreation.

Appendix B-2: Responses Omitted from Survey Question 7: "Prior to reading the information package, were you aware of Eurasian watermilfoil in Christina Lake and the RDKB's efforts to control infestations? "

1. “A little info on this”
2. “We have a family friend who was part of the dive team removal of milfoil”

Appendix B-3: Responses Omitted from Survey Question 6: “Prior to reading the information package, how much did you know about Eurasian watermilfoil and its effects? ”

1. “Between a little and a lot”
2. “Between little and lot”
3. “I try to hear the yearly report from the diving program/informed from stewardship”

Appendix B-4: Responses Omitted from Survey Question 8: “Prior to reading the information package, how much did you know about ProcellaCOR FX? ”

1. “Again between little and a lot”
2. “I attended the information meeting”
3. “Strongly do not trust this chemical process”

Appendix B-5: Responses Omitted from Survey Question 18: “Please use this space to briefly elaborate on your concerns, if any, about the potential use of ProcellaCOR FX in Christina Lake. ”

1. “Ban wakeboard boats to help stop the stress of milfoil! Didn’t have this problem prior to these wakeboard boats.”
2. “Boaters should pay extra for shredding and spreading.”
3. “Hi - this is a survey response from [...] - I share this google account with [...] so it isn't a double survey.”
4. “I am way more concerned about properties on the lake who have their septic running into the lake. The bio waste from provides nutrition for the milfoil.”
5. “I need more information accessible to the public who is not informed by a First Nation newsletter.”
6. “It is regrettable that the infestation has progressed as much as it has. Invasive mass has doubled every year since 2018. Doing nothing is not an option. [...]”
7. “Member of Lower Similkameen Indian Band. Any reason my band wasn’t listed in your survey?”
8. “N/a”
9. “No concern”
10. “No concerns”
11. “None”
12. “None get rid of the boys”
13. “Once again the RDKB is not commuting well with the community. Not everyone has good internet service and this should have been a notice through the postal services, since everyone has a mailbox. It appears you have made a decision and are moving on that decision no matter what the response. Just like the Ministry of Parks in the 1990’s trying to rid the south end of

milfoil by driving out on the then frozen lake with dump trucks of dirt to bury the problem you seem to feel there is no way out of one bas decisions save another."

14. "Why does it matter if a person is First Nations? What is the point of cultural and traditional values in protecting lake water? Perhaps that could have been explained. I found this confusing."

Appendix B-6: Responses Omitted from Survey Question 19: "Regarding Eurasian watermilfoil, what would you be interested in learning more about?"

1. "Tourism must also share the importance of not pull the milfoil and throwing back in the lake"
2. "I would suggest since boats and anything motorized is part of the problem spreading Milfoil that it be proposed NO motorized recreational activity be allowed in Christina Lake for a 3 year period to see if this helps with control of milfoil and spreading. Milfoil is Also a natural water purifier"
3. "Dredging the south end since it is not a natural water source but was a swamp till parks decided to remove the natural cleaning sough to build a park they never really had a budget to maintain properly"
4. "We are acquainted with individuals that were employed every summer preforming manual harvesting. Slso involved with the issue of the early milfoil infestation of Kalamalka lake in Vernon in the '70's.."
5. "I feel pretty well informed, what we need is riparian protection"
6. "If and when PorcellaCor FX will be used"
7. "Tired of fighting about too much milfoil, no body listens"

Appendix B-7: Responses Omitted from Survey Question 20: "Regarding ProcellaCOR FX, what would you be interested in learning more about?"

1. Blank
2. "You use the word herbicide like it's something we sprinkle on our food it is a pesticide end of story"
3. "Nothing can change my mind about this, stay away!"
4. "Not welcome here"
5. "Nothing, strongly opposed to it, no matter how long we will talk about it"
6. "I want to hear that it's not going to be used in the lakes!"
7. "I know everything I need to know about it and it's a flat out no"
8. "I don't want to use herbicides in our lake"
9. "It should be shut down at this point and proceed with riparian protection"

Appendix C: Community Survey

Community Survey: The use of ProcellaCOR FX in managing Eurasian watermilfoil in Christina Lake

This survey is designed to gather community input regarding the potential use of ProcellaCOR FX in Christina Lake to manage Eurasian watermilfoil. In recent years, Eurasian watermilfoil infestations have grown more dense and widespread, negatively impacting recreational activities, cultural and traditional values, native flora and fauna, and more. The Regional District of Kootenay Boundary (RDKB) is exploring the potential use of a highly selective herbicide, ProcellaCOR FX, to help effectively control Eurasian watermilfoil infestations.

Your needs, interests, and opinions provided through this survey will help guide the RDKB in ensuring that community values and concerns remain central to the decision-making process as they explore options for effectively addressing the spread of Eurasian watermilfoil in Christina Lake.

1. Are you a member of a First Nation?

Mark only one oval.

- ◯ No *Skip to question 3*
- ◯ Yes *Skip to question 2*

First Nation Communities

2. Which First Nation community are you apart of?

Mark only one oval.

- ◯ Osoyoos Indian Band
- ◯ Okanagan Nation Alliance
- ◯ Okanagan Indian Band
- ◯ Splatsin First Nation
- ◯ Shuswap Band
- ◯ Ktunaxa Nation
- ◯ Sinixt Confederacy
- ◯ Lower Similkameen Indian Band
- ◯ Other (Please specify):

General Information and Background Knowledge

3. What is your age range?

Check all that apply.

- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65+

4. What is your connection to Christina Lake? *(Check all that apply)*

Check all that apply.

- [ ] I live full-time in the area
- [ ] I own property here (part-time or seasonal)
- [ ] I visit for recreation
- [ ] I work in the area (e.g., tourism, conservation, services)
- [ ] This area is in my First Nations traditional Territory
- [ ] Other: _____

5. Does the presence of Eurasian watermilfoil negatively impact your experience at Christina Lake? (*Check all that apply)*

Check all that apply.

- [ ] No, it does not negatively impact my experience
- [ ] Yes, it negatively impacts my cultural or traditional values
- [ ] Yes, it negatively impacts my ecological values
- [ ] Yes, it negatively impacts my recreational activities (e.g., swimming, fishing, rowing, ect)
- [ ] Yes, it negatively impacts my property
- [ ] Yes, it negatively impacts my work

6. Prior to reading the information package, how much did you know about Eurasian watermilfoil and its effects?

Mark only one oval.

- ◯ I knew a lot
- ◯ I knew a little
- ◯ I knew nothing
- ◯ Other: _____

7. Prior to reading the information package, were you aware of Eurasian watermilfoil in Christina Lake and the RDKB's efforts to control infestations?

Mark only one oval.

- ◯ Yes, I was well aware
- ◯ Yes, I was generally aware
- ◯ No, I was not aware
- ◯ Other: _____

8. Prior to reading the information package, how much did you know about ProcellaCOR FX?

Mark only one oval.

- ◯ I knew a lot
- ◯ I knew a little
- ◯ I knew nothing
- ◯ Other: _____

Invasive Species Management and ProcellaCOR FX

9. How important do you think each of the following factors is in managing invasive species in Christina Lake?

i) Maintaining cultural or traditional values

Mark only one oval.

	1	2	3	4	5	
Not	◯	◯	◯	◯	◯	Very important

10. ii) Maintaining ecological and community values

Mark only one oval.

	1	2	3	4	5	
Not	◯	◯	◯	◯	◯	Very important

11. iii) Protecting native plant and animal life

Mark only one oval.

	1	2	3	4	5	
Not	◯	◯	◯	◯	◯	Very important

12. iv) Maintaining the lake for recreation (e.g., boating, swimming)

Mark only one oval.

	1	2	3	4	5	
Not	◯	◯	◯	◯	◯	Very important

13. v) Ensuring public health and safety

Mark only one oval.

	1	2	3	4	5	
Not	◯	◯	◯	◯	◯	Very important

14. vi) Keeping treatment costs reasonable

Mark only one oval.

	1	2	3	4	5	
Not	◯	◯	◯	◯	◯	Very important

15. Which approaches to managing Eurasian watermilfoil do you support? *(Check all that apply)*

Check all that apply.

- [ ] Use of selective herbicides (e.g., ProcellaCOR FX)
- [ ] Mechanical or manual removal
- [ ] Biological control (e.g., introducing natural predators)
- [ ] Benthic mats
- [ ] Doing nothing
- [ ] I'm not sure / need more information

16. What is your initial opinion about using ProcellaCOR FX in Christina Lake?

Check all that apply.

- [ ] Supportive
- [ ] Cautiously supportive
- [ ] Neutral
- [ ] Opposed
- [ ] Extremely opposed
- [ ] Unsure/ need more information

17. What concerns, if any, do you have about using ProcellaCOR FX in the lake? *(Check all that apply)*

Check all that apply.

- [ ] Effects on cultural or traditional values
- [ ] Effects on ecological and community values
- [ ] Effects on native plants and wildlife
- [ ] Long-term environmental impacts
- [ ] Impacts to public health and safety
- [ ] Impacts to recreational activities
- [ ] I have no concerns

18. Please use this space to briefly elaborate on your concerns, if any, about the potential use of ProcellaCOR FX in Christina Lake.

Information to Guide Future Community Engagement

19. Regarding Eurasian watermilfoil, what would you be interested in learning more about? *(Check all that apply)*

Check all that apply.

- [ ] What is Eurasian watermilfoil and how does it spread
- [ ] The negative effects of Eurasian watermilfoil
- [ ] Eurasian watermilfoil management options
- [ ] Previous Eurasian watermilfoil management initiatives by the RDKB
- [ ] Nothing at the moment
- [ ] Other: _____

20. Regarding ProcellaCOR FX, what would you be interested in learning more about? *(Check all that apply)*

Check all that apply.

- [ ] How ProcellaCOR FX controls Eurasian watermilfoil
- [ ] Details regarding Health Canada's approval process
- [ ] The advantages of ProcellaCOR FX in comparison to other herbicides
- [ ] The studies that assessed impacts on ecological and public health
- [ ] Nothing at the moment
- [ ] Other: _____

21. Would you like to be involved in future discussions or decisions regarding milfoil management?

Mark only one oval.

- ◯ Yes, I'd like to participate in future community engagement opportunities
- ◯ No, I'm not interested

Appendix D. Information Package

Eurasian watermilfoil management in Christina Lake:

Historic management techniques and information on novel herbicide, ProcellaCOR FX

Introduction:
In an effort to effectively control EWM, the RDKB is considering the use of ProcellaCOR FX. However, before proceeding, the RDKB would like to engage with, and hear from, Christina Lake community members. Keefer Ecological Services has been retained to engage with community members and gather feedback, opinions, and thoughts regarding the potential use of ProcellaCOR FX to manage EWM in Christina Lake.

What is Eurasian Watermilfoil (EWM)?
EWM is an invasive, perennial aquatic plant that spreads rapidly and is capable of outcompeting native plants. It has long, slender stems and feather-like green leaves that are arranged in whorls around the stem in groups of 4 or 5. EWM grows submerged in shallow waters, with roots that attach to the substrate and stems growing upwards. It is primarily found in depths between 3–5 metres, and a maximum depth of around 10 metres. It has small, reddish flowers, that typically bloom in July or August and grow on spikes that sit above the water.

How does EWM spread?
EWM reproduces primarily through fragmentation. Natural forces like wave action and human activities such as swimming and boating can break the plant into fragments, which are then carried by water currents to new locations. Long-distance spread often occurs when fragments hitch a ride on boats, propellers, trailers, or fishing gear moved between water bodies. EWM can also spread through its root network, seeds, and buds.

What does EWM affect? How does invasive management benefit the community and ecosystem?
EWM grows in dense mats that block sunlight from penetrating the water column and crowd out native aquatic vegetation. This subsequently reduces food sources for fish, other aquatic creatures and waterfowl. When these mats decompose, oxygen in the water is depleted, threatening the survival of species located nearby. EWM presence also creates areas of relatively still water that can increase mosquito abundance in and around the lake. EWM infestations can also impact recreational and economic opportunities by decreasing waterfront property values, damaging boat motors, limiting fishing access, and creating undesirable swimming conditions.

Effective control of EWM supports the growth and reestablishment of native plants, which are important for a healthy lake. Healthy native aquatic vegetation helps regulate water quality, providing essential habitat for fish and other lake organisms, and supports overall ecosystem health.

How can EWM be managed?
Hand pulling: Divers pull up EWM plants, focusing on removing both plant shoots and roots. Rakes can be used to supplement hand pulling.
Benthic mats: Mats are installed over EWM growth, blocking sunlight and preventing the plant from photosynthesizing. This can restrict EWM spread in localized areas covered by the mats.
Machine harvesting: Blades physically remove the roots of the plant from the lake sediment.
Dredging or suction harvesting: Divers remove EWM with a dredge hose that uses suction to uproot plants.
Biologic control: The most successful biological control agent for EWM is the North American weevil, an aquatic insect that feeds on milfoils.
Chemical: Various herbicides have been approved in Canada to control EWM. These include 2,4-D and Diquat. Recently, ProcellaCOR FX was approved for aquatic use in Canada.

How has EWM in Christina Lake previously been managed?

EWM entered Christina Lake sometime in the mid 1980s. It is likely that EWM colonies established from one single stem fragment that was introduced by a watercraft. Since 1987, EWM in Christina Lake has been manually removed annually by a dive crew. However, as infestations grew in number and size, the Regional District of Kootenay Boundary (RDKB) explored other management options. For example, the use of weevils to naturally control EWM infestations was considered but ultimately deemed unfeasible.

In 2024, the RDKB piloted a benthic mat project. The aim is for these mats to stunt EWM growth by blocking access to sunlight. While the mats were successful at controlling short (1-2m) EWM plants 8 weeks after deployment, taller plants (3-4m) persisted. Methods were adjusted for the 2025 pilot of benthic mats to hopefully increase viability of success.

Milfoil collection through the RDKB diving program.

What is ProcellaCOR FX and what are its uses?

ProcellaCOR FX is a growth regulating aquatic herbicide developed by SePRO, a US-based environmental services company. The active ingredient, florpyrauxifen-benzyl, was initially developed as a herbicide for agricultural food crops such as rice. The formulation has since been modified to selectively and effectively control a number of invasive aquatic plants including EWM, hybrid milfoil, hydrilla, water hyacinth and others.

When and how was ProcellaCOR FX approved?

In 2019, SePRO applied to have ProcellaCOR FX registered in Canada. Health Canada's Pest Management Regulatory Agency (PMRA) then conducted numerous studies to determine whether the product was effective and safe. Specifically, the PMRA aimed to determine if ProcellaCOR FX poses a threat to human health, native plants and wildlife, or the natural environment. The product was approved for use in Canada by the PMRA in May 2023.

What is the PMRA approval process for aquatic herbicides?

Prior to approval, the PMRA requires the registrant (in this case, SePRO) to submit results of over 100 tests evaluating the herbicide's effects. These tests must demonstrate its impact on the target organism, as well as assess potential risks to non-target species, human health, and the environment. For aquatic herbicides, additional data is required on their effects on aquatic plants and animals, persistence in sediments, and the toxicity of breakdown components over time.

How does ProcellaCOR FX work?

ProcellaCOR FX works by stimulating unregulated growth in target invasive plants by mimicking natural plant growth hormones. Once applied, the herbicide is absorbed by EWM and works to kill the plant in three phases. First, it speeds up the plant's metabolic activity causing abnormal growth. Next, growth is stunted and the EWM begins to weaken. Lastly, EWM dies as its cells and tissues break down.

A number of studies have documented the sensitivity of invasive aquatic plants to ProcellaCOR FX's active ingredient. Milfoil species; however, have demonstrated a strong sensitivity, which is what makes the herbicide so effective in controlling EWM at low concentrations.

How is ProcellaCOR FX applied?

Application of ProcellaCOR FX is conducted by a licensed applicator who has been trained by SePro in the use of the aquatic herbicide. ProcellaCOR FX is first diluted with lakewater to an appropriate dosage. Once the mixture has been created, it is applied to specific, target EWM areas. While exact application procedures may vary based on the site features, target species, and infestation size, EWM is usually treated by injecting the mixture into the water column at the height of EWM growth. In previous studies, this has been accomplished by trailing weighted hoses behind a boat.

Preparation of ProcellaCOR FX mixture. Image credit: FCLA, 2023.

What happens to EWM once ProcellaCOR has been applied?

After application, ProcellaCOR FX is quickly absorbed by EWM and transferred within the plant. The plant then dies over a 7-21 day period. Approximately 1-2 weeks after treatment, EWM still stands but becomes brown and wilted. Leaflets fall off allowing branches to curl and break. 2-4 weeks after treatment, EWM shows signs of degradation, appearing blackened. Finally, 4-6 weeks after treatment, EWM has disappeared entirely. A preliminary study conducted by SePRO found that EWM frequency declined from 95% to 2% by 6 weeks post treatment.

EWM before and after ProcellaCOR FX treatment. Image credit: SePRO.

What are the advantages of ProcellaCOR FX in comparison to other aquatic herbicides?

Due to the sensitivity of EWM to the herbicide, ProcellaCOR FX can be applied at much lower concentrations than other aquatic herbicides. It is usually applied at a dosage of approximately 7 parts per billion (roughly equivalent to 1 ounce in a typical size swimming pool). This application rate is roughly 1000x less dosage than other herbicides used to treat EWM.

ProcellaCOR FX has a short half life, ranging from 1-6 days, and does not remain in the water column long after application. One study found that ProcellaCOR FX had dissipated entirely less than 48 hours after application.

Does ProcellaCOR FX pose a public health risk?

Health Canada's PMRA determined that the presence of ProcellaCOR FX in food or drinking water does not pose a health risk. Even if consumed on a regular basis, individuals would still only be exposed to less than 1% of the acceptable daily intake.

The NOAEL, or "no observed adverse effect level," is the highest amount of a substance that can be taken without causing any harm. In one long-term study, rats were given ProcellaCOR FX every day for two years, and no harmful effects were seen at doses up to 50 milligrams per kilogram of body weight per day. To reach that same level, a typical adult (about 154 pounds) would have to drink over 70,000 litres of water treated with ProcellaCOR FX everyday for a significant portion of their life. For a child, it would be more than 20,000 litres a day.

Will ProcellaCOR FX negatively impact the lakes native fauna and flora?

Previous studies have shown that ProcellaCOR FX does not significantly harm most native plants. Only a few species exposed to the herbicide showed damage, and these symptoms were minor. In many lakes treated with ProcellaCOR FX, the number of native plants increased due to the removal of competition between native plants and EWM for space and resources. According to the PMRA, ProcellaCOR FX does not pose any excessive risks to the environment. Peer-reviewed research has concluded that it does not pose risks to mammals, reptiles, amphibians, or fish and does not bioaccumulate in fish or freshwater clams.

Has ProcellaCOR FX been peer-reviewed?

Since its initial development in 2010, ProcellaCOR FX has been subject to many peer-reviewed studies, which led to its initial approval by the US Environmental Protection Agency (EPA) in 2017. For instance, one study found that EWM is sensitive to ProcellaCOR FX even at low concentrations and for short exposure periods, but that native plants display much lower sensitivity.

In addition to the regulatory review undertaken by the PMRA and EPA, additional third party bodies, including USA state departments, universities, and aquatic plant management associations have conducted independent research on ProcellaCOR FX. These studies have evaluated its impacts on human health, aquatic ecosystems, and fish and wildlife. None of these studies have identified adverse effects.

Has ProcellaCOR FX proven to be effective in other lakes?

The first freshwater use of ProcellaCOR FX in Canada occurred in Farlain Lake, Ontario in 2023. Since 2014, the Farlain Lake Community Association (FCLA) had been attempting to control EWM using a variety of methods such as hand harvesting, benthic mats, diver assisted suction harvesting, herbicides, and integrated management approaches. However, EWM continued to spread, causing the FLCA to look into alternative management approaches.

In 2023, ProcellaCOR FX was applied to 15 target sites of EWM dispersed across Farlain Lake. Assessments conducted four weeks following treatment revealed that while EWM was dying, native aquatic vegetation appeared unharmed. An additional assessment conducted in July 2024 found that ProcellaCOR FX had been effective in treating EWM, as no infestations were observed at the previously treated sites and nearby native vegetation was unscathed.

Does ProcellaCOR FX fully eliminate all EWM in one treatment?

Once established in a water body, EWM is extremely difficult to fully eradicate. While ProcellaCOR FX is designed to control infestations for several seasons, there is the potential for EWM to persist following treatment. This can be due to annual variations in climate, water conditions, native plant diversity, recreational use as well as the overall size and location of the infestation.

Would ProcellaCOR FX be used instead of other control methods?

The RDKB is planning to continue using an integrated management approach to control EWM. While ProcellaCOR FX may be used to target dense infestations or those found in challenging locations, hand-pulling and/or benthic mats would be used to treat smaller, local infestations.

If the RDKB moves ahead with the use of ProcellaCOR FX, what are the next steps?

In order to apply a herbicide such as ProcellaCOR FX to public lands, the RDKB requires a Pesticide Use Permit (PUP) from the Ministry of Environment and Climate Change Strategy as outlined under the Integrated Pest Management Act. To submit a PUP application, the RDKB must pay an application fee and provide the ministry with a draft treatment plan, maps of the areas to be treated, and reports of public and First Nations consultations. If approved, the RDKB must then connect with licensed ProcellaCOR FX applicators within BC.

What documents can I refer to for more information?

- Beets, J., Heilman, M., & Netherland, M. D. (2019). Large-scale mesocosm evaluation of florpyrauxifen-benzyl, a novel arylpicolinate herbicide, on Eurasian and hybrid watermilfoil and seven native submersed plants. J. Aquat. Plant Manage. 57(2), 49-55.
- Buczek, S. B., Archambault, J. M., Gregory Cope, W., & Heilman, M. A. (2020). Evaluation of Juvenile Freshwater Mussel Sensitivity to Multiple Forms of Florpyrauxifen-Benzyl. Bulletin of Environmental Contamination and Toxicology, 105(4), 588–594.
- Cattoor, K. B., Londo, A., Walsh, J., & Lund, K. (2022). Evaluation of florpyrauxifen-benzyl on invasive hybrid watermilfoil in a central Minnesota lake. J. Aquat. Plant Manage. 60(1), 16-22.
- Davidson, A. D. (2023). Field application of florpyrauxifen-benzyl to treat hybrid Eurasian watermilfoil: Initial effects on native and invasive aquatic vegetation. Management of Biological Invasions, 14(3), 467–476.
- Farlain Lake Community Association (2023). EWM Management Year End Report.
- Mudge, C. R., Sartain, B. T., Getsinger, K. D., & Netherland, M. D. (2021). Efficacy of Florpyrauxifen-benzyl on Dioecious Hydrilla and Hybrid Water Milfoil-Concentration and Exposure Time Requirements. US Army Engineer Research and Development Center, Environmental Laboratory.

What should I do if I have more questions?

If you have any additional questions or would like to learn more about EWM and/or ProcellaCOR FX, we invite you to attend one of our in-person or virtual community engagement sessions. Specific details, including the date and time of these sessions, will be provided on the RDKB's Join the Conversation page and social media pages. Please refer to these pages.

You are also welcome to contact Stephen Gaim (sgaim@rdkb.com) and Janine Dougall (esmanager@rdkb.com) of the RDKB with any questions or concerns.

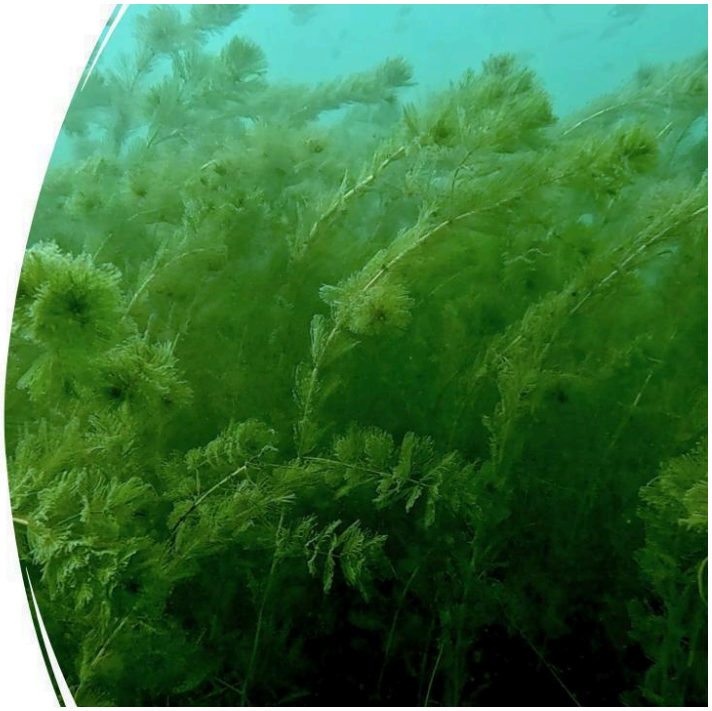
Appendix E. Engagement Session Slide Deck

Eurasian Watermilfoil Management in Christina Lake

Aquatic Herbicide
ProcellaCOR FX

Regional District of Kootenay Boundary

Keefer Ecological Services Ltd

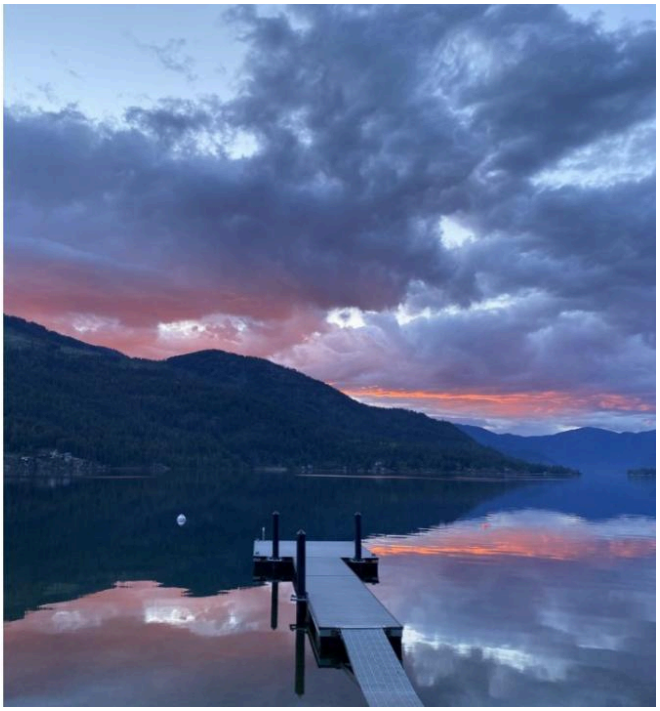


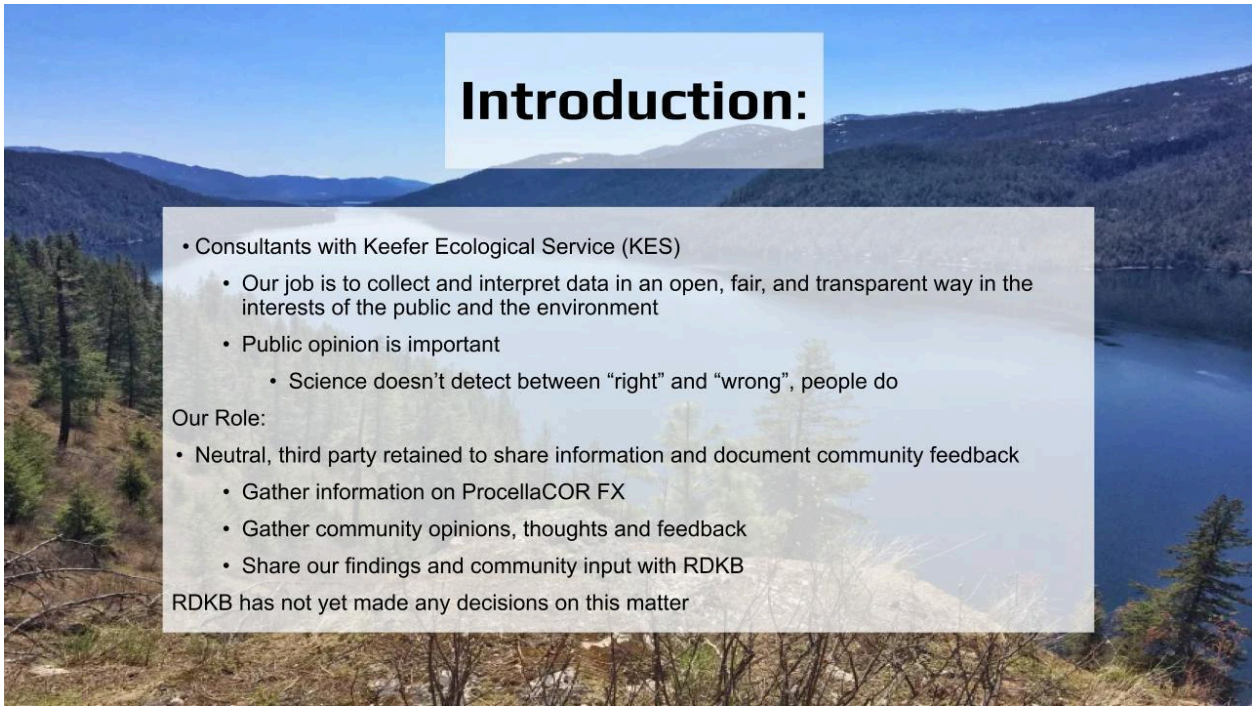
Outline

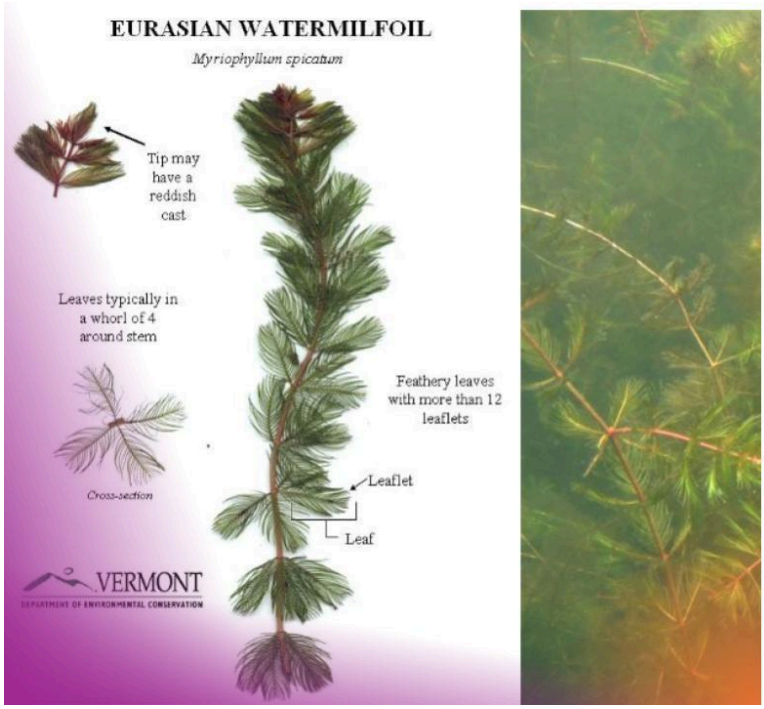
Introduction
- Who are we & what is our role in the project?

Background
- What is Eurasian watermilfoil and how does it impact the lake?
- Management methods
- Previous removal efforts

ProcellaCOR FX
- What is it? How does it work? How is it applied?
- Effects on people and ecosystems



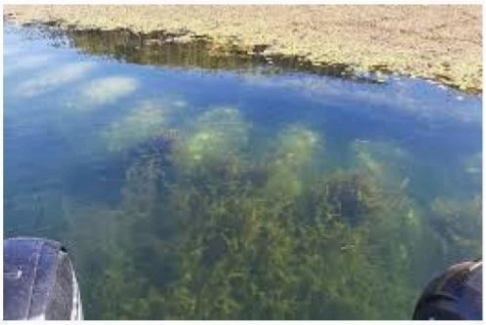




What is Eurasian Watermilfoil (EWM)?

- Aquatic invasive plant
- Arrived in Christina Lake mid-1980's
- Grows in warm, nutrient-rich water
- Depths of 3-5 metres

How does EWM impact the lake?



- Creates large monoculture mats
- Outcompetes native plants by blocking sunlight, reducing biodiversity
- Creates low-oxygen zones through decomposition
- Alters native habitat for fish and aquatic life
- Interferes with swimming, boating, and fishing

How can EWM be managed?

- **Hand harvesting**
  - Pros: simple, selective for EWM
  - Cons: labour intensive, can fragment plant, not feasible for large patches
- **Benthic mats**
  - Pros: cost efficient, can reduce EWM growth
  - Cons: only controls the area immediately below the mat, challenging logistics
- **Machine harvesting**
  - Pros: immediate results, removes EWM root, can target large areas
  - Cons: non-selective, causes EWM fragmentation, disruptive to lake ecosystem

Previous EWM Control Efforts in Christina Lake

- **Hand Pulling:** Since 1987 by SCUBA Divers
- **Benthic Mats:** Mats are installed over EWM growth, blocking sunlight and preventing the plant from photosynthesizing
- **Biocontrol:** Conducted preliminary studies for the use of weevils for biocontrol

Eurasian Milfoil Control Program Trends Over Time

Annual Plant Count Summary Table:

2024 Plant Count	2023 Plant Count	2022 Plant Count	2021 Plant Count	2020 Plant Count	2019 Plant Count	2018 Plant Count	2017 Plant Count	2016 Plant Count	2015 Plant Count
866,926	673,371	646,398	703,847	453,181	535,135	590,612	529,343	321,385	400,030

Next Steps?

- Research ProcellaCOR FX
- Engage Community
- Potentially adapt the Christina Lake Eurasian Watermilfoil Control Program

South-end of Christina Lake, areas of maximum milfoil growth

What is ProcellaCOR FX?

Chemical Control Agent:
Selectively targets invasive aquatic plants

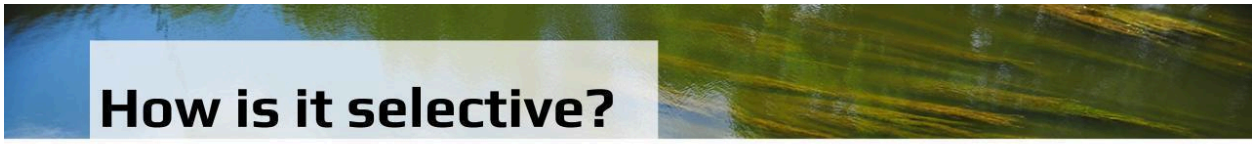
Active Ingredient:
Florpyrauxifen-benzyl (FPB), a novel compound approved in for use in the United States in 2018 and in Canada in 2023

One of two approved aquatic herbicides in Canada
Other is Diquat, also known as Reward

How does ProcellaCOR FX work?

Synthetic auxin mimic:

- Targets plant growth hormone pathway.
  - Auxin mimic targets a receptor specific to plants. Humans do not have this receptor
- Stimulates rapid and unregulated growth that the plant cannot sustain
- Impacts entire plant (systemic), including roots
- After exposure, plant dies within 2-4 weeks



How is it selective?

- Only targets dicot plants
- Many native species are monocots
  - But not all!
  - May impact nearby native dicots
- Milfoils are particularly susceptible to its control mechanism
  - Allows for very low application rates

Some native dicot plants in Christina Lake:

- Common bladderwort
- Water marigold
- Northern milfoil and whorled milfoil
- Common mare's tail
- White water buttercup and yellow water buttercup
- Water starwort
- Watershield
- Coontail

How is ProcellaCOR FX applied?

Very low rate: 1 to 7 parts per billion (ppb)

- Approximately one ounce in a typical-sized swimming pool
- Dosage is around 100 – 1000x lower than other aquatic herbicides

Applied by a licensed applicator

- Targeted spot treatment using subsurface injection
- Application rates can be specifically tailored for each treatment location

Timing: Most effective when applied to actively growing plants (spring and early summer)

- Can be successful in a range of plant growth stages and environmental conditions

Image credit: Dr. Mark Heilman, from *ProcellaCOR Overview for Farlain Lake Community Association*

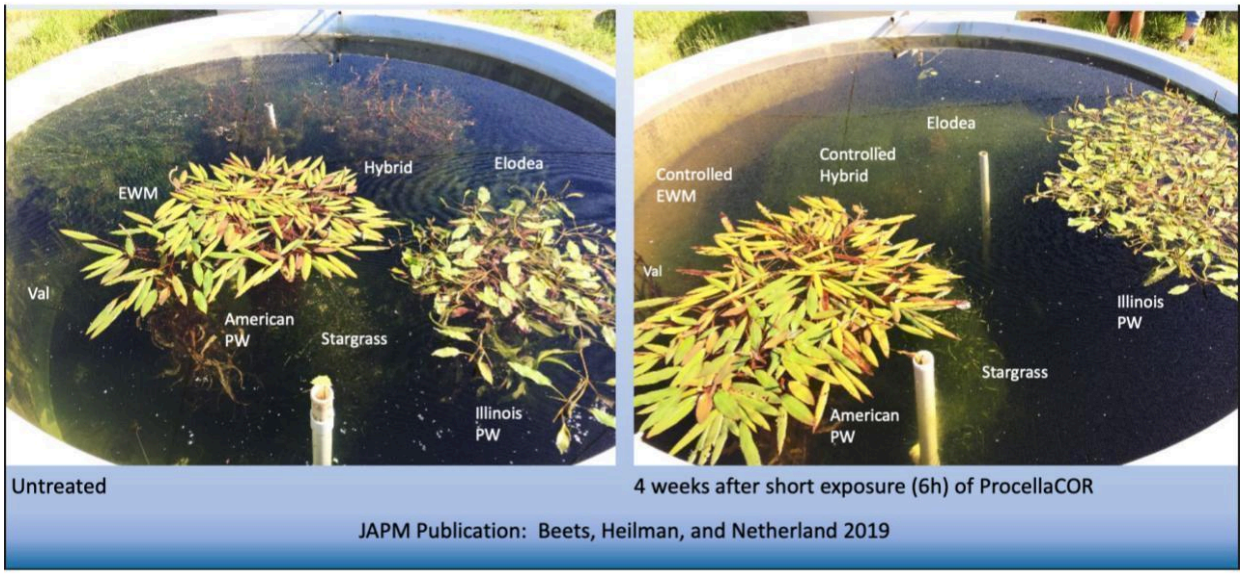


Image credit: Dr. Mark Heilman, from *ProcellaCOR Overview for Farlain Lake Community Association*

Does ProcellaCOR FX Pose a Human Health Risk?

- Not in the water column for long
  - Half life of 1 to 6 days
  - Studies have found it is undetectable after 48 hours

- Health Canada determined its presence in food or drinking water does not pose a health risk.
- Vermont Department of Health established a drinking water standard of a maximum of 3 mg/kg/day.
  - 400 times higher than the average EWM treatment concentrations.

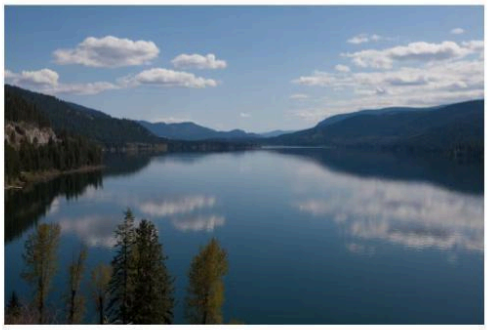
- In a two year study, rats were given ProcellaCOR FX every day and no harmful effects were observed.
- To reach equivalent dosage levels, an adult would need to drink over 70,000 L of water treated with ProcellaCOR FX everyday.

Will ProcellaCOR FX negatively impact the lake's native fauna and flora?

- Most native aquatic plants unharmed, possible damage to dicots
- No identified toxicological impacts on fish or aquatic invertebrates
- Third-party research has concluded that it does not harm reptiles, amphibians, or fish
- Has not been found to bioaccumulate

Water use restrictions following ProcellaCOR FX application

- No drinking water restrictions
- No swimming restrictions
- No fishing restrictions
- No restriction on turf irrigation



Do not use treated water for:

- Irrigation of greenhouse vegetables and fruit
- Hydroponic irrigation
  - Unless it has been filtered using activated charcoal or a similar filtration system prior to use
- Irrigation of gardens, landscape vegetation, or other non-food irrigation for 5 days after application
- Irrigation of commercial field crops until concentrations are below 2 parts per billion

Previous uses of ProcellaCOR

- Approved for use in Canada in 2023
  - Used in 5 Canadian lakes, so far
  - Farlain Lake (ON)
- Approved for use in USA by EPA in 2018
  - Used in over 200 lakes in the USA
- Applications have been successful, with dramatic reductions in watermilfoil and limited impact on native species
  - However – lack of long-term data

- **Case study: Farlain Lake**
  - First Canadian lake to use ProcellaCOR FX
  - Applied ProcellaCOR FX in September, 2023
  - Follow-up surveys in October, 2023
    - Determined watermilfoil was dying or dead, while native plants were still living
  - Surveys conducted in July, 2024 of treated areas did not find any watermilfoil
  - Native vegetation was found at 13 out of 15 sites
  - Future management will likely include hand harvesting and periodic applications of ProcellaCOR FX to control any new, dense milfoil sites

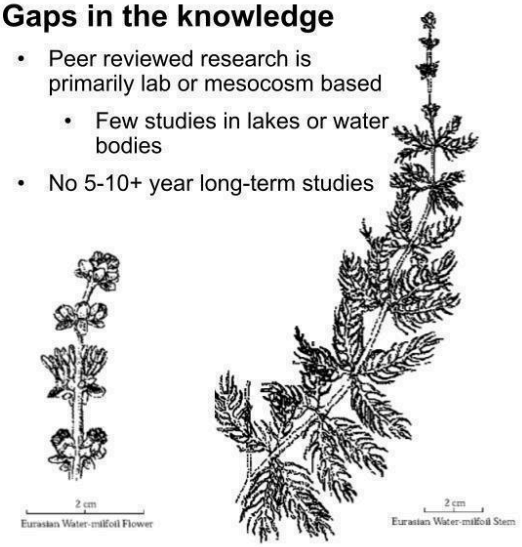
ProcellaCOR FX peer-reviewed research

Findings

- Effective in partial-lake treatments of EWM with limited non-target impacts to native species **(Davidson, 2023).**
- Significant control of EWM. Native species showed lower sensitivity **(Beets & Netherland, 2019).**
- Minimal declines in native aquatic plant species presence and increased species richness following treatments. EWM decreased from 72 to 1% and 58 to 8% after treatment and remained low 1 year after treatment **(Cattoor et al., 2022).**
- Herbicide formulations with ProcellaCOR's active ingredient were not toxic to juvenile freshwater mussels in tested concentrations. LC50 level (concentration with 50% mortality rate) could not be determined, due to the lack of mortality at the highest tested concentration **(Buczek et al., 2020).**

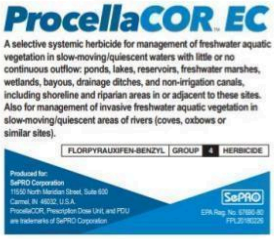
Gaps in the knowledge

- Peer reviewed research is primarily lab or mesocosm based
  - Few studies in lakes or water bodies
- No 5-10+ year long-term studies



Pest Management Regulatory Agency (PMRA) Herbicide Approval Process

1. **Applicant prepares a submission that documents:**
   a. The potential risks to human and animal health;
   b. The way the product degrades in the environment; and
   c. The residues that could be left on foods
2. **PMRA assesses the application, specifically:**
   a. Where, how, and by whom will the pest control product be used?
   b. What is its toxicity?
   c. Are there any potential health hazards to users or bystanders?
   d. Will food or drinking water be affected?
   e. What is the impact on the environment?



PMRA registration, continued

A herbicide is registered in Canada only if:

1. Sufficient data has been provided to assess the safety and value of the product;
2. A scientific review of health and environmental risks associated with its proposed use are acceptable; and
3. A value assessment determines that the product does what it claims to do and sets the lowest effective application rate

Approved pesticides and herbicides go through a re-evaluation process every 15 years to ensure they continue to meet current health and environmental standards

Current debate over active ingredient status

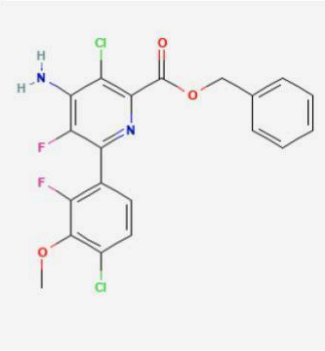
Disagreement over whether Florpyrauxifen-benzyl (FPB) should be classified as a "forever chemical," also known as a PFAS (per- and polyfluoroalkyl substance)

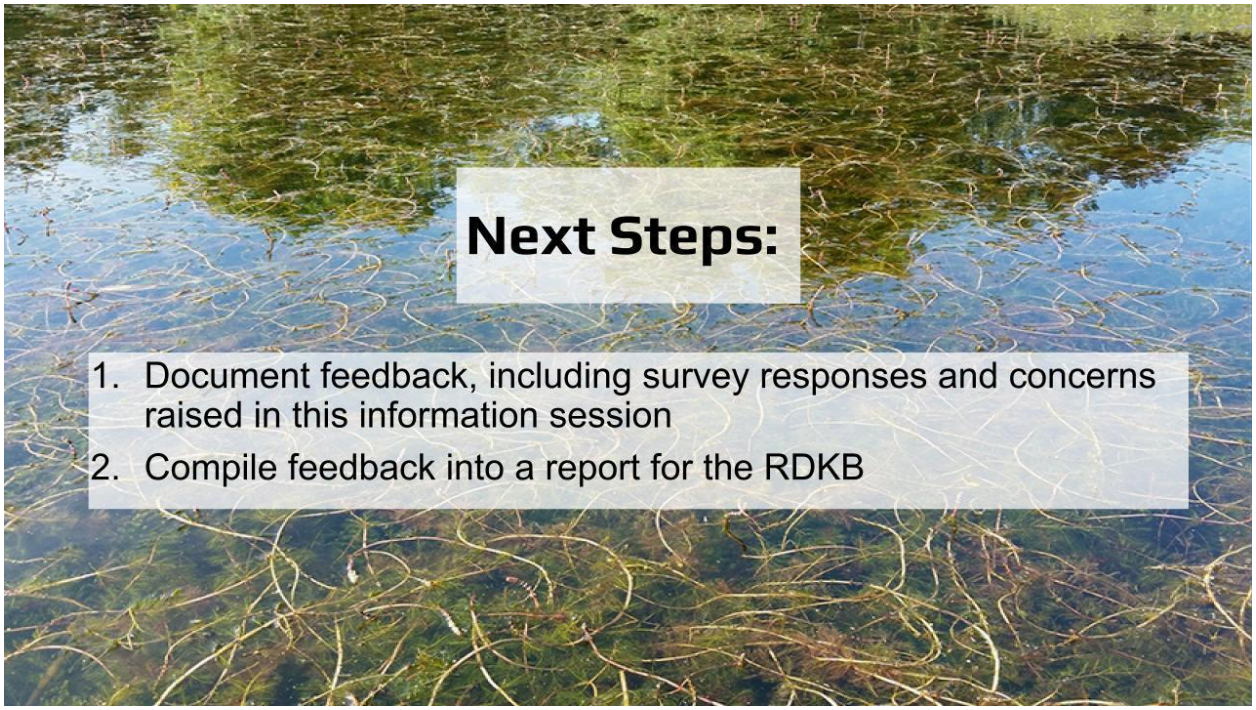
Currently

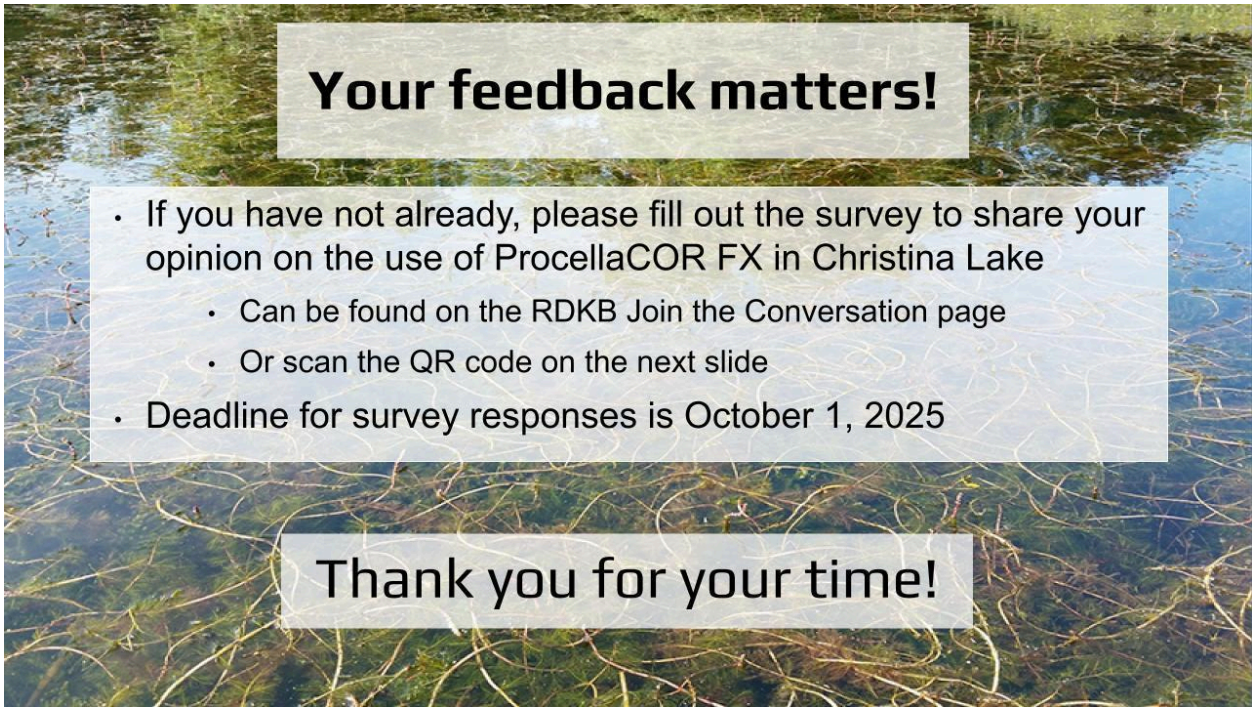
- US EPA does NOT classify it as a PFAS
- Minnesota Department of Agriculture (MDA) recently published a report that DOES include FPB on a list of PFAS

Why the difference?

- MDA defines any active ingredient that contains at least one fully fluorinated carbon atom as a PFAS
  - This is the broadest definition in regulatory use.
    - Broader than EPA, the European Chemicals Agency, and the Organization for Economic Co-operation and Development
  - Under this, 95 active ingredients are considered PFAS. Under EPA, it would be 6
  - Other regulatory bodies use narrower definitions with more restrictions on the compound's chemical structure




Next Steps:
1. Document feedback, including survey responses and concerns raised in this information session
2. Compile feedback into a report for the RDKB


Your feedback matters!
• If you have not already, please fill out the survey to share your opinion on the use of ProcellaCOR FX in Christina Lake
• Can be found on the RDKB Join the Conversation page
• Or scan the QR code on the next slide
• Deadline for survey responses is October 1, 2025
Thank you for your time!


Questions?
Relevant contact info:
• SePRO: Travis Fuller – travisf@sepro.com
• Farlain Lake Association: inquiries@farlainlake.ca
• RDKB: Stephen Gaim – sgaim@rdkb.com,
Janine Dougall – esmanager@rdkb.com
Please fill out the survey by scanning the code below:

Appendix F. FAQ Document

Frequently Asked Questions (FAQ) – ProcellaCOR FX at Christina Lake

Process, Engagement, and Governance

Q. What is the estimated cost of this project?

At this stage, cost estimates and funding decisions are not finalized, as the project is still in the consultation phase. Costs would be determined and influenced by the treatment plan that would be developed if a Pesticide Use Permit process was pursued.

Q. How is the BC provincial government involved?

If the community and RDKB decide to pursue the use of ProcellaCOR FX, the RDKB will begin the process of acquiring a Pesticide Use Permit (PUP). This application is regulated by the BC provincial government, and once the permit application process has begun, the BC provincial government will be involved with screening the permit application, providing feedback on the treatment plan, and ensuring continued community and First Nation engagement throughout the application process. Ultimately, the Provincial Government would decide whether ProcellaCOR FX would be authorized for use in Christina Lake.

Q. Who is responsible for Christina Lake: the federal government, the province, or RDKB?

Christina Lake is located in the unincorporated area of the RDKB called Area C/Christina Lake. The lake itself is considered a public waterbody which is therefore under Provincial jurisdiction (i.e. BC Government). The Federal Government also has some regulatory oversight and becomes involved in some circumstances (e.g. Department of Fisheries and Oceans).

The RDKB provides the milfoil control service through an establishment bylaw, which provides a description of the service and the methodology/limits in generating revenue (e.g. taxation). The Province authorizes activities that the RDKB can perform under the service. The hand removal of milfoil by the dive crew as well as the floating benthic mat pilot is authorized by the Province.

Even if residents of Christina Lake fully support the use of ProcellaCOR FX as a milfoil control option, the Province ultimately makes the final decision on whether the product would be authorized for use.

Q. Will there be a community vote on whether this project proceeds?

It has not been determined whether a community vote will be conducted. At this time, the focus is to engage with the community in a robust manner to hear and collect feedback from as many as possible. Engagement activities are also ongoing with First Nations. The results from the current engagement process will be reviewed by the RDKB and will influence future work.

Q. Who submitted the application for ProcellaCOR FX?

SePRO is the company that developed ProcellaCOR FX and applied for its approval in Canada.

Q. Has independent third-party research been conducted?

Yes, ProcellaCOR FX has been the subject of many rigorous, peer-reviewed studies. As part of the approval process, over 100 independent, peer-reviewed studies were submitted to the Canadian Pest Management and Regulatory Agency. Additional peer reviewed research is publicly available online.

Q. What is the timeline for the project?

1. Deadline for survey: *October 1, 2025*
2. Future engagement sessions: *An online public engagement session will be held **August 14th 2025, at 6:00 pm** on Microsoft Teams. The meeting link can be found here, and will also be available on the RDKB's "Join the Conversation" page.*
3. Keefer Ecological Services compiles community feedback into a report: *October 1, 2025 – November 1st, 2025. When finished, the report will be posted on the RDKB's "Join the Conversation" page.*
4. Should a Pesticide Use Permit (PUP) be applied for: *The application for a PUP is a lengthy process, and makes it unlikely that ProcellaCOR FX could be used in 2026. It is likely that the earliest an application of ProcellaCOR FX could happen would be in 2027. The PUP process has multiple steps, including additional engagement. The process is outlined below:*
    1. ***Intake phase***
        i. *RDKB submits application and pays application fee*
        ii. *Ministry screens application*
    2. ***Application phase***
        i. *RDKB and ministry meet to discuss next steps, the requirements for a treatment plan, engagement, and project advertising*
        ii. *RDKB develops a treatment plan and submits a draft treatment plan*

iii. *RDKB conducts both public and First Nation engagement*

3. ***Review and Decision Phase***

i. *RDKB submits public and First Nations consultation reports, final treatment plan, and any additional application records*

ii. *Ministry reviews application package*

iii. *If approved, Ministry prepares a draft permit and sends it to the RDKB*

iv. *RDKB reviews permit and provides comments*

v. *Ministry makes a permitting decision and notifies the applicant. If approved, the ministry provides public notification instructions.*

ProcellaCOR FX and Its Behaviour in the Environment

Q. What is the half-life of ProcellaCOR FX in water?

1-6 days, with an average of 2.6 days.

Q. What does ProcellaCOR FX break down into?

ProcellaCOR FX breaks down into several degradates, including XDE-848 acid, its primary metabolite, which then further degrades to XDE-848 benzyl hydroxy and XDE-848 hydroxy acid. These metabolites degrade more slowly than the parent compound, with halflives of 6.3-18 days for the acid, 6-14 days for the benzyl hydroxy, and 53-121 days for the hydroxy acid. These degradates are structurally similar to the parent compound and US Environmental Protection Agency (EPA) concluded they are expected to have the same or lesser toxicity and similar hazard to florpyrauxifen-benzyl. The US EPA has also concluded that the presence of these degradates in food and water would not be expected to cause any adverse health effects. Also, the EPA noted that the metabolites of florpyrauxifen-benzyl (i.e., XDE-848 acid, XDE-848 benzyl hydroxy and XDE-848 hydroxy acid) are much lower in toxicity to aquatic animals than the parent compound.

Q. What happens to ProcellaCOR FX in the water?

After application, ProcellaCOR FX travels through the water to reach the target plant and undergoes substantial dilution due to water movement. Once it reaches Eurasian watermilfoil, it is rapidly uptaken by the leaves of the plant and transported to the stem and roots. The ProcellaCOR FX that remains in the water column breaks down quickly when exposed to sunlight. Studies have found ProcellaCOR FX to be undetectable in the water column after 48 hours.

Q. How are factors like depth, pH, and timing expected to affect what remains in the water column after treatment?

ProcellaCOR FX breaks down in water via exposure to sunlight (called hydrolysis). Areas of higher pH can also accelerate breakdown. It breaks down more slowly in deep water, as it has less exposure to sunlight; however, ProcellaCOR FX will not be applied to areas of deep water, as Eurasian watermilfoil only grows in shallow water where light penetrates.

Q. How does the herbicide affect aquatic invertebrates?

ProcellaCOR FX's active ingredient, florpyrauxifen-benzyl, has not been found to be acutely toxic to aquatic invertebrates up to its maximum solubility in water (approximately 25-660 ppb of active ingredient). Acutely toxic means that the substance causes significant negative health impacts from immediate or short term exposures. All tested degradation products were not found to be acutely toxic to freshwater invertebrates up to the maximum application rate.

One study tested the toxicity of florpyrauxifen-benzyl on aquatic midges, using growth as the measure of toxicity. Using this metric, florpyrauxifen-benzyl would be deemed toxic if it negatively impacted midge growth. The study found that midge growth was impacted at all concentrations of florpyrauxifen-benzyl, meaning that the active ingredient was found to be toxic at concentrations of 4.3 ppb and below. Overall organism survival was not impacted at concentrations up to 34.6 ppb.

Research conducted by the Massachusetts Department of Agricultural Resources indicates that in order to get a concentration in sediment pore water equivalent to the concentrations tested in this study, the application concentration of ProcellaCOR FX to the water column would have to be 232 ppb. This concentration is over 4.5 times greater than the maximum label rate. Additionally, when considering the rapid degradation and dilution from spot application techniques, the actual bioavailability of this herbicide to benthic invertebrates is likely to be much less than that simulated by these toxicity studies.

Q. How does the decomposition of large amounts of plant material affect lake water quality?

It can deoxygenate the water immediately surrounding the area of decomposing organic matter. This is due to bacteria and microorganisms in the water using oxygen as they break down the dead plant material. This process happens each fall when milfoil dies back and is also expected following the treatment of milfoil with ProcellaCOR FX, though it is likely that die-offs from the herbicide will be staggered over a period of 2-4 weeks.

Q. Does the Eurasian watermilfoil float or sink after it dies?

Milfoil can either float or sink after it dies, depending on the characteristics of the plant. In many cases, it sinks to the bottom. However, if it is cut or fragmented, these pieces will float temporarily and can be transported throughout the lake.

Q. Would a water quality monitoring program be implemented after treatment?

The possibility of implementing a water treatment program can be discussed if the community and the RDKB decide to pursue the use of ProcellaCOR FX.

Q. Is there a risk that PFAS (forever chemicals) are present or released?

It is currently being debated whether or not the active ingredient in ProcellaCOR FX (florpyrauxifen-benzyl) should be considered a PFAS or forever chemical. It is not currently defined as a forever chemical by the US EPA but is considered one by the Minnesota Department of Agriculture.

Canada uses the definition set out by the 2021 Organisation for Economic Co-operation and Development which defines forever chemicals as "fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it), that is, with a few noted exceptions, any chemical with at least a perfluorinated methyl group (–CF3) or a perfluorinated methylene group (–CF2–) is a PFAS." This definition does not classify florpyrauxifen-benzyl as a forever chemical.

Human, Wildlife, and Plant Health Concerns

Q. Why is it safe to drink the water but not use it for watering gardens?

ProcellaCOR FX targets a growth hormone system in plants that humans and other animals do not possess. Water treated with ProcellaCOR FX is considered safe to drink because it poses extremely low toxicity to humans. However, temporary restrictions on watering gardens can be put in place because some sensitive garden plants may be injured or killed by the herbicide, since they possess the growth hormone system. These restrictions are to prevent plants from dying, not because there is any health risk associated with humans eating food that has been irrigated by ProcellaCOR FX-treated water. These restrictions are precautionary and only last 5 days.

Q. Has the herbicide been tested for effects on pregnant women?

There have not been any studies done on pregnant women. However, lab studies have found that florpyrauxifen-benzyl did not cause birth defects or any other fetal effects in laboratory mammals and did not interfere with reproduction for lab mammals.

Q. Will there be any impacts for people using lake water downstream from the treatment area?

It is unlikely that ProcellaCOR FX will spread beyond Christina Lake due to its quick breakdown time. However, if the RDKB moves forward with applying for a Pesticide Use Permit (PUP) for ProcellaCOR FX, they will investigate the possibility of it impacting individuals downstream of Christina Lake. All people impacted by the potential use of ProcellaCOR FX will be informed of any application and the associated water restrictions.

Q. What plants could be impacted, and might this affect habitat for native species like painted turtles?

Native dicot plants may be impacted if they are close to application sites. Native dicot plants in Christina Lake include:

- Common bladderwort

- Water marigold
- Northern milfoil and whorled milfoil
- Common mare's tail
- White water buttercup and yellow water buttercup
- Water starwort
- Watershield
- Coontail

Of these plants, two are included on ProcellaCOR FX's label as plants that will be controlled by application:

- Watershield
- Coontail

The application of ProcellaCOR FX can be tailored to avoid areas of painted turtle habitat. If ProcellaCOR FX is pursued, the application plan can be strategically designed to leave a large buffer between application sites and turtle habitat areas.

Q. There is a lot of lily growth on the south end of the lake. Would ProcellaCOR FX control that?

This question is still under investigation. At this time, it is thought possible that ProcellaCOR FX may be able to control invasive lily growth, but more tests are required to confirm its effectiveness.

Q. Are there concerns about impacts to aquatic organisms more broadly?

There is currently low concern about the impact of ProcellaCOR FX on aquatic organisms when it is used according to label guidelines. The US EPA has determined that the herbicide poses low toxicity risks to aquatic species, as well as birds, mammals, and reptiles that may be found around the lake. Temporary bioaccumulation in aquatic species can occur at high concentrations, but studies have shown that the compound is rapidly metabolized or excreted within 1 to 3 days. The rates that caused this temporary bioaccumulation are much higher than permitted application rates, and, at permitted application rates, ProcellaCOR FX has not been found to bioaccumulate. Because the herbicide specifically targets plant growth, ProcellaCOR FX may impact non-target aquatic plants. There is also ongoing discussion about whether florpyrauxifen-benzyl, the active ingredient in ProcellaCOR FX, should be classified as a "forever chemical" or PFAS (per- and polyfluoroalkyl substances). Forever chemicals do not easily break down and can persist in the environment for long periods of time.

Application and Monitoring

Q. How far can the herbicide spread beyond the application zone? Is there a buffer?

Herbicide spread is dependent on the hydrology of the specific application site. There will not be a physical buffer containing the herbicide around application sites. However, when designing the application plan, a set distance buffer can be used to ensure there are no application sites close to sensitive areas in the lake, such as habitat for species at risk.

Q. How will you determine how far downstream to notify residents about water use restrictions?

If the use of ProcellaCOR FX is pursued, the RDKB will seek expert opinion to determine how far the herbicide is likely to spread. All individuals who will be impacted by water use restrictions will be informed well in advance of application to ensure adequate notice.

Q. What is the re-entry interval for treated areas? Is there a way to monitor or enforce this?

The re-entry interval for ProcellaCOR FX is 12 hours. If the use of ProcellaCOR FX is pursued, monitoring plans to prevent re-entry will be created.

Q. How many times have other lakes had to reapply ProcellaCOR FX?

The reapplication rate depends on the severity of the milfoil infestation. It can range between yearly to every 3-5 years. ProcellaCOR FX can be reapplied multiple times per growing season, as long as there is a minimum of 14-days between applications, but may only be applied a maximum of three times a year.

Q. Is this expected to be a one-time application, or could multiple applications be needed?

ProcellaCOR FX can be used as part of an integrated management strategy going forward, where the herbicide is used to control large or very dense patches of milfoil that are not viable for hand picking or benthic mat control. Once these patches are minimized, hand pulling and benthic mats could be utilized. It is likely that multiple applications would be needed over a period of years and could be completed in a phased approach.

Q. What is the range of effectiveness for ProcellaCOR FX in different studies?

ProcellaCOR FX has been found to be highly effective in all the lakes it has been tested in. Peer-reviewed research has confirmed that it is effective in controlling both Eurasian watermilfoil and hybrid milfoils that are created when Eurasian milfoil hybridizes with other milfoils in the lake.

Q. What are the limiting factors for its effectiveness?

1. Water flow: Eurasian milfoil needs to be exposed to ProcellaCOR FX for several hours in order for it to be effective. Areas with high water flow or strong currents can limit the exposure time.
2. Time of year for application: Application may be more effective in spring or early summer, when plants are still growing and readily uptake ProcellaCOR FX.
3. Stage of plant growth: More mature and resilient plants may be less susceptible to application and may require higher dosage.

4. Resistance: Invasive weeds can contain or develop resistance to herbicides if the herbicide is used regularly in the same area. ProcellaCOR FX should not be used for more than two consecutive years in the same area to reduce the chance of resistance development.

Q. What kind of filtration removes ProcellaCOR FX?

Activated charcoal filtration can remove ProcellaCOR FX from water.

Comparison with Other Lakes and Use Cases

Q. How does Christina Lake compare to other lakes where ProcellaCOR FX has been used?

In general, Christina Lake is deeper and has more water flow than other lakes where ProcellaCOR FX has been used.

Q. Of the five lakes treated in Canada, how many are sources of drinking water?

The only lake in Canada with publicly available data is Farlain Lake, which is not used as a source of drinking water.

Q. Since Christina Lake has a high replenishment rate, would that mean higher application rates or repeated treatments are needed?

If application is pursued, the specific treatment plan will be created in conjunction with the province and a qualified applicator. The treatment plan will take into account the replenishment rates, milfoil density in the treatment area, and any native species nearby. It is likely that slightly higher rates may be used in areas with more water movement but rates will never exceed the maximum approved rate.

Q. Have long-term studies been conducted on lakes with similar turnover rates to Christina Lake?

No, there is a notable lack of long-term data available, as the herbicide was only approved for use in Canada in 2023 and in the USA in 2018.

Q. Are there examples of lakes with water sources located as close to treatment zones as at Christina Lake?

No examples are readily available. However, ProcellaCOR FX has been found to be safe in drinking by both the USA EPA and Health Canada. There are no restrictions on drinking water following the application of ProcellaCOR FX.

Non-Chemical Control Methods and Alternatives

Q. Are there examples of using weevils to control Eurasian watermilfoil effectively?

It depends on the definition of “control.” There are no examples of weevils eradicating milfoil. However, weevils do feed on the plants and can cause damage. Studies have found that the overall biomass of Eurasian milfoil following weevil grazing is relatively unchanged, although the weevils do injure stems,

leaves, and roots and can cause the plant to lose buoyancy and fall out of the water column. Many factors can limit weevil effectiveness, including fish predation, water depth, winter temperatures, and plant nutrient content.

Q. Do weevils kill the plant or just reduce its density?

Weevils feed on the plant but do not typically eliminate it entirely. There have been mixed results on whether they reduce Eurasian milfoil density.

Q. Could larger weevil populations lead to better control?

Possibly. The Minnesota Aquatic Invasive Species Research Centre has predicted that densities of 100-200 weevils per square meter (or approximately 0.5-2 weevils per stem) may be able to effectively control Eurasian watermilfoil. In this context, effective control of Eurasian milfoil would decrease plant abundance and limit the formation of surface mats of milfoil, but would not eliminate the plant from the lake.

Appendix G. Additional Questions and Provided Answers

Q1: On the last page of the ProcellaCOR FX safety data sheet there is a section under the Safe Drinking Water and Toxic Enforcement Act that states there are chemical(s) in this product that are known to cause cancer, birth defects and reproductive harm. Why would you explore a product such as this to experiment with in our community? Especially when it is used for our drinking water? "low risk" is not a risk many of us want to take.

The warning on the ProcellaCOR FX Safety Data Sheet comes from California's Proposition 65, which applies more precautionary hazard criteria than many other jurisdictions. For example, some chemicals flagged under Proposition 65 are not considered hazardous by the US Occupational Safety and Health Administration.

In Canada, Health Canada's Pest Management Regulatory Agency reviewed over 100 studies on ProcellaCOR FX and concluded it does not pose a health risk when used as directed. Additional Independent assessments (https://caroga.town/wp-content/uploads/2023/07/ProcellaCOR-CT-DPH-1.pdf and https://www.mass.gov/doc/florpyrauxifen-benzyl/download) found low mammalian toxicity, with no clear indication of carcinogenicity, mutagenicity, or ability to cause reproductive effects, especially at the low environmental concentrations possible from its proper application. Section 11 of the Safety Data Sheet (https://sepro.com/Documents/ProcellaCOR_EC--SDS.pdf) covers toxicological information and states that the active ingredient in ProcellaCOR (florpyrauxifen-benzyl) did not cause cancer and did not interfere with reproduction in laboratory animals. The US Environmental Protection Agency also classifies it as "Not Likely To Be Carcinogenic To Humans" (https://npic.orst.edu/chemicals_evaluated.pdf)

With all that said, we recognize that "low risk" is not "no risk," and we value your concerns. Our goal is to listen to your concerns and share evidence-based information and resources to assist the community in making an informed decision.

Q2: I have no objection in trying to find something to get rid of milfoil. How is this going to affect CL Waterworks? We get our drinking water from the lake.

It is unlikely that the application of ProcellaCOR FX would affect CL Waterworks. Health Canada's Pest Management Regulatory Agency determined that the presence of ProcellaCOR FX in drinking water does not pose a health risk. There are no restrictions on using water treated with the ProcellaCOR FX for drinking, swimming, or fishing. The Vermont Department of Health established a drinking water standard of a maximum of 3 mg/kg/day. This equates to a maximum concentration that is 400 times higher than the proposed concentration to treat Eurasian milfoil in lakes. ProcellaCOR FX can also be removed from water using an activated charcoal filtration system or a carbon filter, such as a Brita.

Appendix H. Further Additional Questions and Provided Answers

1. With regards to ingestion or exposure to chemically treated lake water: I am uneasy about:

a. accumulation of chemical due to water movement and possible different breakdown processes resulting in a longer half-life and accumulation in sediment. If I understood the SEPRO ecological information sheet, it said 111 days for half-life with a pH7 (DT50 test) and, that the chemical also failed to pass OECD/EEC tests for biogradability. This seems inconsistent with the FAQ document from the RDKB/Keefer Ltd that outlines SEPRO expects a 1-6 day half- life. In recommendations from the State of Massachusetts, the Label advice for ProcellaCOR EC was quoted: "treatment of aquatic weeds can result in oxygen depletion and loss due to decomposition of dead plants which may cause fish suffocation, particularly in high plant density areas". These types of inconsistencies leave a lot of doubt in what to expect.

For clarity, I am breaking this question into two separate sections:

1. **Length of half-life and biodegradability of florpyrauxifen-benzyl**

The difference in numbers has to do with the specific conditions of each type of breakdown, as florpyrauxifen-benzyl (FPB) behaves differently depending on the particular conditions it is exposed to. The primary route for the breakdown of FPB is **aqueous phytolysis***, which is the breakdown of compounds in water due to the absorption of light photons. In other words, it is the breakdown of aquatic compounds due to sunlight exposure. Field dissipation studies conducted in Florida and North Carolina used applications of FPBl at 50 ppb and found the compound showed water half-lives of 1.4 – 2.3 days.

The SePRO Safety Data Sheet lists values based on **hydrolysis***, which is the breakdown of a compound due to water alone. This is a slower degradation process than aqueous phytolysis. The values reported in the Safety Data Sheet indicate the amount of time it takes for FPB to break down in water with differing pH values, without exposure to sunlight. At pH 7 (neutral water) FPB takes 111 days to break down. Due to Eurasian watermilfoil growing in shallow, sunlit waters, it is highly unlikely that ProcellaCOR would be applied to water without exposure to sunlight. If application is pursued, the RDKB will work with applicators to ensure the application plan keeps ProcellaCOR in shallow, sunlit waters, where it can quickly break down.

***NOTE: The FAQ document incorrectly labelled aqueous phytolysis as hydrolysis. We apologize for any confusion this caused.**

2. **Oxygen depletion due to plant breakdown.**

The breakdown of dead aquatic plants leads to oxygen depletion and, in the case of extremely dense areas of decomposing organic matter, "dead zones" in the immediately adjacent water. Deoxygenation is due to bacteria and microorganisms in the water using oxygen as they break down the dead plant material. This is already happening in Christina Lake because of Eurasian watermilfoil (EWM). EWM grows in thick mats during the summer, then dies back in the fall. As these mats decompose, they reduce oxygen levels in the surrounding water, and the denser the mat, the more severe the deoxygenation.

The use of ProcellaCOR will cause EWM to die back, and is expected to cause deoxygenation as the dead plants decay. However, this deoxygenation is the same process that is already occurring naturally with the infestations as they die back in the fall. To reduce risks, it is possible to stagger the application of ProcellaCOR over a period of several weeks, and treat areas with very dense infestations in sections. This approach allows for more gradual decomposition of plant material, slows bacterial consumption of oxygen in the water column, and helps protect fish and other aquatic life from sudden drops in oxygen.

b. How do you control exposure to the chemical outside the treatment area from drift? Although SEAPRO says the herbicide is safe in certain circumstances, it still lacks the longevity and the breadth of situations - which leaves the community of CL unnecessarily exposed to negative future consequences. I think there is 2 year data on rats, but not pregnant women and children-that is not an acceptable risk. Hoping that there will be no long term problems vs knowing long term data is very different.

Given that ProcellaCOR FX is directly applied to the water column, there is the potential for the herbicide to drift. On the ProcellaCOR FX Specimen Label, SePro outlines the different application techniques that can be used to treat Eurasian watermilfoil such as sub-surface injection, surface spray or trailing hose. For all application methods, they outline specific directions that should be followed to ensure effective application and minimize the potential for drift. If ProcellaCOR FX were to be applied to Christina Lake, the District would work closely with the licensed applicator to implement management strategies tailored to the target weed, management objectives and site conditions.

2. It is difficult to believe a chemical targeting a patch in the south end of Christina Lake will stay put and only effect those plants in that area. The SEPRO chemical label says it's: "a selective systemic herbicide for management of freshwater aquatic vegetation in slow moving/quiescent waters with little or no continuous outflow..." (Specimen Label for ProcellaCOR EC -EPA Reg No. 67690-80 Produced by SEPRO Corp) Christina Creek is an outflow for the Lake and just up from it is an inflow: Sutherland creek. By following the labels recommended application, the south end of the Lake would not be an appropriate body of water to treat because it is not a still body of water. Also, I believe there is a drinking water intake pipe located out from the public beach for the south of the Lake, which is concerning by itself; but it also would create water currents; as do springs; the two creeks; and the topography of the lake bottom; the seasonal stratification and weather. It seems a poor match according to their label & likely chemical drift could happen at Christina Lake - a lake with moving waters.

We acknowledge the potential for ProcellaCOR FX to drift within the water column as there is no guarantee that following application, it will not do so. However, in regards to the conditions of Christina Lake, while there is some normal inflow and outflow to the lake from creeks and spring freshet, the lake is not considered to have continuous outflow, as the lake gains and loses water throughout the year. A lake with continuous outflow, also known as an open lake, has water continuously flowing out of it often to a river or sea. For instance, the Great Lakes which deposit into the St. Lawrence are considered open lakes.

Additionally, if ProcellaCOR FX is accepted for use in Christina Lake, its application would be done by a licensed and SePRO authorized applicator who would ensure that the lake, and its conditions are eligible for application.

3. The south end of CL is habitat to animals in the nature park, Christina Creek, SutherlandCreek and the Lake. The 2018 Park management Plan, (RDKB) lists in its management plan to use the precautionary principle to guide decisions and to conserve it's at risk species and ecosystems. Several red and blue listed species have habitat that could be impacted such as the American Badger, Great Basin Spadefoot frog, Emma's Dancer, and Western River Cruiser. Other At-Risk Species observed are the Blotched Tiger Salamander, Olive clubtail, River Jewelwing. The western painted turtle requires aquatic vegetation and habitat like that found in the south end of Christina Lake. The south end of the Lake is unique to the species it supports. How can one realistically contain the chemical to limit exposure to these animals when for example a turtle could be anywhere in proximity to milfoil treatment areas? The degree of risk to these species seems irresponsible without long term evidence of the products safety.

Prior to approving the product for use in Canada, Health Canada's Pest Management Regulatory Agency reviewed results from over 100 studies that tested the aquatic herbicides impacts on human health, non-target species, and the environment. They did not find that the product had any adverse effects on any of these criteria. Furthermore, a number of peer-reviewed studies has concluded that it does not pose a risk to fish, amphibians, reptiles, and mammals. The herbicide specifically targets a growth hormone pathway found in plants that animals do not possess.

The RDKB recognizes that a number of at-risk species call Christina Lake home and prioritizes effective conservation of these species. If ProcellaCOR FX were to be used in the lake, the District would employ mitigation measures to attempt to minimize exposure of these at-risk species and their habitats to the aquatic herbicide. However, in the case where such species are inadvertently exposed to the herbicide, the District trusts the findings of peer-reviewed research that has found that their health would not be compromised.

4. If the herbicide is diluted because of water movement and seeps to surrounding areas, can it in fact create more super high growth milfoil or other plants because it has stimulated the growth hormone but not enough to cause unregulated growth? Is there a possibility of a resistant weed emerging? Is this something they have data on?

In all the lab and in-situ applications that SePro has conducted, there have been no reports of a herbicide-resistant weed emerging. While there is the possibility of a resistant hybrid milfoil weed emerging, this can be minimized by following herbicide application recommendations and employing integrated invasive management practices. For instance, in order to manage weed resistance, the ProcellaCOR FX Specimen Label states the following: "Any plant population may contain or develop plants naturally resistant to ProcellaCOR FX herbicide or other Group 4 herbicides. The resistant biotypes may dominate the plant population if these herbicides are used repeatedly in the same site. [...] Appropriate resistance-management strategies should be followed." It is also possible to minimize the potential for a herbicide resistant weed to emerge by managing invasive species through combined chemical and manual/mechanical control methods.

5. What would be the parameters of success? Would success mean most plants in the targeted area would be killed and the native ones would grow back in 2-5 years? "Historically the south end littoral zone supported a moderately dense and diverse native macrophyte community", p 19., Sept 1994, CL Water Quality Assessment and Objectives, Ministry of Environment, Lands and Parks. According to this report there are over 50 aquatic plant species identified in CL. It seems to me the Keefer presentation said the herbicide will likely affect native plant species so what degree is acceptable in terms of killing/damaging native plants? There is so much more to know on impacts specific to CL. Would CL's unique ecosystem be sacrificed because we are impatient for more comprehensive long term data?

The goal of the RDKB is to effectively manage and control Eurasian water milfoil in Christina Lake. Now established, milfoil will never be fully eradicated. Dense mats of milfoil do not allow for the establishment or growth of native plant species, impacts water quality and has other detrimental Impacts.

If ProcellaCor FX was to be utilized, the intent would be to focus use only on areas that are large, dense infestations of milfoil, that cannot be reasonably managed/controlled with the use of the dive crew or floating benthic mats. Treatment with the herbicide would reduce milfoil to levels that would allow for the dive crew to effectively treat the area, and ideally allow native plant communities to re-establish. Re-establishing an ecological balance that supports the growth and sustainability of native plant species will have positive effects from an ecosystem health perspective, recreational and tourism related community benefits.

6. Procella COR FX suggests of highly selective targeting of invasive aquatic plants. This is not seeming to be consistent with its own research according to SEPRO's paper of January 28, 2019, table 1 which lists the sensitivity to common native aquatic plants. Their land application also warns the number of plants that could be affected by unintended exposure which is in contrast to making the "highly selective" claim. The Keefer presentation talked about dicot plants being affected by the chemical. Of the 50 species in CL, do we know how many are dicot plants? In the RDKB package it said 8 plants were dicots. It seems backwards to justify the chemicals use, in order to encourage rich native plant re-growth, when we could be potentially killing or damaging all of those same plants. And if the chemical has to be reapplied, when would the native species re-establish?

The active ingredient in ProcellaCOR FX, florpyrauxifen-benzyl, was initially developed as a herbicide for agricultural food crops such as rice. However, the formulation has since been modified to selectively and effectively control a number of invasive aquatic plants. Therefore, its effects on terrestrial versus aquatic plants do differ significantly.

Since the District is considering the use of ProcellaCOR FX in an aquatic environment, effects to native aquatic vegetation were investigated.

Studies have shown that the aquatic herbicide could impact native dicots, yet in all studies, plants that were impacted and showed symptoms experienced only minor damage. It is important to note that ProcellaCOR FX does not directly encourage or benefit native plant re-growth. Instead, by removing

dense invasive milfoil mats, it reduces competition for space, light, and nutrients, giving native plants a better chance to reestablish. In cases where re-application is needed, invasive Eurasian watermilfoil will continue to be controlled, while native species can re-establish over time, likely with limited impact from the herbicide. Targeted application will be used to minimize herbicide exposure to native plants.

It is important to note that in areas with dense Eurasian watermilfoil (EWM) mats, few if any native aquatic plants are able to grow. The milfoil forms thick mats that outcompete native vegetation for light, space, and nutrients, severely restricting their growth. These dense patches are the primary targets for ProcellaCOR FX application. Because native plants are already absent in these areas due to competition, the likelihood of harming native vegetation during treatment is minimal, while the removal of milfoil allows space and resources for native plants to re-establish over time.

7. When researching other Lakes in the USA, the Lake George Association reviewed the entire US EPA registration docket and quoted the EPA: "due to lack of comparative information about superior selectivity to native plant species, the agency cannot conclude that this is a benefit of registration". Ambiguous information is not a good for risk mitigation. An environmental advocate, Cynthia Moulton, PhD., Carleton University-ecotoxicology (vtdigger.org) who even worked at the EPA in the office of Pesticides, said: "using Procella COR EC poses unacceptable risk and adverse effects to the non-target organisms in Lake Bomoseen..." This speaks to the fact that there are still divided opinions in the scientific community.

To clarify, ProcellaCOR EC is a different product that is an "older generation" version of the herbicide. The main difference is that FX is the newer, more effective, and lower-application-rate version of the EC formulation, providing better control of invasive aquatic plants at reduced chemical usage and with no restrictions on drinking water after application, while EC is an older, higher-application-rate, and less effective version that may also have restrictions on its use.

As with any herbicide product, there will be differences in opinions on effectiveness, risk and interpretation of data. Ultimately, ProcellaCOR FX has been approved for use in Canada by Health Canada for which this registration underwent a robust and peer-reviewed scientific process.

The use of herbicide products should always be considered on a case-by-case basis with close attention paid to local impacts, concerns and conditions which is why RDKB is running a thorough and inclusive research/consultation stage.

8. I would like to know what happens if the herbicide seeps into deeper water in a real lake vs in a controlled lab. Results from a lab setting doesn't ease my apprehensions. The RDKB question sheet says PorcellaCorFX breaks down in a week (Keefer presentation) but if it drifts to deeper water it could take 111 days, (which is reported by SEPRO documents) because break down is slower because the sun wouldn't reach it. With water movement and the Lake being oligotrophic, if currents take the chemical to the deeper areas would the chemical be present an unknown time? Also, if the by-products degradation (the acid form, albeit a weaker chemical form) shift to deeper areas and doesn't biodegrade like in a lab situation (via light) would we even know the timeframe it would be

present. I see how much EWM floats around in various parts of the lake, so it's difficult to believe that this chemical or its by-products won't be shifting to other parts of the Lake. Finally, can we be sure that a lake floor with an altered nutrient balance, would not give rise to other problems-like algae growth with the low oxygen areas?

At present, there is minimal long term data on ProcellaCOR seepage and breakdown in deep water. As you stated, in the absence of sunlight, such as in deeper waters, breakdown will take longer. Should application be pursued, the RDKB will take every precaution to create an application plan that minimizes the chance of herbicide transport to deep water (e.g. looking at hydrological models of the flow in the lake and determining areas with both minimal flow and high density EWM infestations). Following any potential application, the RDKB is open to conducting water quality monitoring to assess ProcellaCOR presence in the water.

Although decomposing EWM may alter the nutrient balance of the lake floor, it is unlikely to cause algae growth. As discussed in question 1, decomposing organic matter can cause low oxygen areas in the water surrounding the decomposition. Decomposing algal blooms also cause low oxygen areas for the same reasons (microorganisms using water in the water column to break down organic matter); however, algae blooms are not expected to be caused by the breakdown of Eurasian watermilfoil.

9. My understanding is that the majority of Christina Lake EM has been controlled with divers, and only parts of the lake at the south end are an issue. So, if diver EWM pulling is providing success for 85% of the Lake, can we wait a little longer instead of taking a risk? Could we use a less drastic management effort and mark with buoys a lane in/out of the infested areas for watercraft to control spread, along with the ongoing management tools?

The RDKB is continually looking at alternative and emerging control methodologies for milfoil. For example, in addition to the research into ProcellaCOR FX, a floating benthic mat pilot project has been underway since 2023. The purpose of these investigations is to establish a toolkit of methods that can be utilized effectively to address changing milfoil growth patterns within Christina Lake.

10. On the subject whether or not this is a forever chemical (PFSA)... with the Minnesota Dept of Agriculture saying it is but the EPA not, why are we so quick to accept that the lower standard is the standard to follow (even if Health Canada have accepted this lower standard)? If this is still being debated, why don't we use caution! Shall we keep in mind the answer provided by an RDKB staff person in the Join the Conversation comments: "low risk" is not "no risk".

As previously mentioned, the District is aware of the different standards across regulatory bodies and is taking all of these different perspectives into consideration.

Appendix I. Project Timeline