

### 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, florypyrauxifen-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](mailto:sgaim@rdkb.com)) and Janine Dougall ([esmanager@rdkb.com](mailto:esmanager@rdkb.com)) of the RDKB with any questions or concerns.