

Pesticide Use Permit Application

This application is submitted under the *Integrated Pest Management Act* to obtain a permit for the use of pesticides as prescribed under the Integrated Pest Management Regulation (IPMR)Section 18. Following the

Permit Application Number:

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submission of this application, the applicant will be provided an application number by ministry staff and instructed to consult the public in accordance with IPMR Section 60. The applicant must submit evidence of consultation and a statement of action proposed in response.

Pesticide use may not proceed unless a permit has been issued.

A fee of \$1,000 must be submitted with this application. The fee is non-refundable once processing has occurred.

PLEASE PRINT CLEARLY. PROVIDE ADDITIONAL SHEETS IF REQUIRED.

1. Full Legal Name of Applicant

This name must be a Limited or Incorporated Company registered with the BC Registrar of Companies. Please provide the name exactly as registered along with the incorporation registration number. If the applicant is not a Limited or Incorporated Company use full personal name.

Grieg S	eafood BC Ltd.	BC1147456				
Applica	nt's Name	B.C. Incorporation Registration #				
				Sam Tomkinson		
Busines	s Operating Name, if differen	Name of the Contact Person for the Permit				
106	1180 Ironwood Street		Campbell River	British Columbia	V9W 5P7	
Suite # Street Name and Number			City	Province	Postal Code	
Sam.to	mkinson@griegseafood.com	250 286 0838		250 327-3918		
E-mail Address Area Code + Tel		ephone #	Area Code + Cell Phone #			

2. Name of the Owner or Manager of the Treatment Location

Treatment location is leased from the Province of BC through licence of occupation. File number 1411084 for Atrevida, 1405634 for Concepcion, 1411100 for Gore, 1411168 for Muchalat North, 1411064 for Muchalat South and 1411068 for Williamson.

3. Purpose of Proposed Pesticide Use

Topical removal of sea lice – Lepeophtheirus salmonis.

4. Proposed Start and End Date of Pesticide Use

	2022	12	01		2025	12	31
Commencement Date	Yr.	Mo.	Day	Completion Date	Yr.	Mo.	Day

5. Description of the Geographic Area to be covered by the Permit

Describe the location of the proposed treatment area:

Finfish aquaculture sites (Atrevida, Concepcion, Gore, Muchalat North, Muchalat South and Williamson) located in Nootka Sound near Gold River on the West Coast of Vancouver Island.

In addition, a map must be attached to the application, identifying the gross boundaries of the treatment area.



For MOE IPM Office Use Only							
Date received:		Date permit mailed:					
Payment OK ()		Not Attached ()	Incomplete () or Incorrect ()				
Log No.:	Permit Expi	ry Date:	Permit No:				
Application Processed by: Referral to		BCPCC () Regions ()()()	Region(s):				

6. Type of Pesticide Use Requiring a Permit

Please check the category below that corresponds with your intended pesticide use. Note: the category must be for a pesticide or pesticide use as prescribed under the Integrated Pest Management Regulation Section 18.

- b) Aerial application of a pesticide
- c) \square Use of a pesticide in or on a body of water
- d) Use of a pesticide on public land not prescribed as requiring a licence or confirmation

e) Use of a pesticide under a confirmation or licence requiring an exemption from the applicable prescribed standards in Division 7, Part 2 of IPMR

If the prescribed use for which a permit is required falls under e) above, provide details of the regulated standard that the permit applicant considers impractical to meet and why. Propose alternative terms and conditions that in the opinion of the applicant will not cause unreasonable adverse effects.

7. Pesticide Information

a. Active Ingredient (common name)	b. Pesticide Trade Name	c. P.C.P. No.	d. Application Rate (kg a.i./ha)	e. Treatment Area (ha)	f. Quantity (kg a.i.)				
Hydrogen Peroxide (H2O2)	Interox Paramove 50	31393	1200 mg/l*	5.95	2,656,800 kg				
* Application rates also subject to vary as described in Research Authorization No. 0048-RA-21, in effect until 31-December-2023.									

8. Application Method

The pest control product, Paramove 50, will only be administered with a receipt of a Pesticide Use Permit and as per the IPMA.

Only personnel certified to administer and use H2O2 will apply the product. Paramove 50 will only be used in accordance with the directions on the product label or in accordance with the to the Research Authorization (attached) at the concentration prescribed by the company veterinarian. Paramove 50 application will take place in either a well boat or tarp designed specifically for this purpose. Application time will be a maximum of 30 minutes. Water quality, temperature and dissolved oxygen conditions will be checked prior to proceeding. Oxygen will be monitored and added as needed.

Well boat treatment, completed by the Ronja Islander, will require fish to be crowded and seined if needed and transferred to a well boat. Paramove 50 will be added at the amount needed to treat fish at the prescribed concentration, staff will check fish behavior and titrate water from holds. After maximum dosing time vessel holds will be flushed with sea water to neutralize H2O2 and oxygen added as needed. When all H2O2 has been neutralized and fish behavior is normal, fish will be pumped back into net pens. To ensure efficacious treatments, the well boat must remain adjacent to the system during treatment and flushing.

Tarpaulin treatment will require fish to be crowded in a shallow net pen, a tarp will encompass the net pen and will be ensured that it is full of water and securely tied in place. Oxygen will be added, and dispersion and diffusion equipment utilized as needed. Once fish are settled and water is circulating within the tarp, Paramove 50 will be added, and water monitored to ensure prescribed concentration within the tarp. Staff will check fish behavior and titrate every 8 minutes. After maximum contact time, tarp will be removed, and air circulation will continue to run help and neutralize H2O2.

The Ronja Islander is equipped with a sophisticated sea lice recapture technology that removes lice in five stages:

- 1. Eight large circulation pumps pump all well water to eight, 150 micron filters during treating, flushing, and unloading.
- 2. Eight Krone filters are equipped with a flushing system. The filters take turns flushing.
- 3. While Krone filters are flushing, a bypass line then transports the captured lice to the two bag filters.
- 4. The bag filters are the second and final stage of lice filtering.
- 5. All water travels through the through the two stages of filtering and returns to the cargo well. As an example, if an egg was missed, it will make continuous passes until caught by the bag filter.

The system is designed to catch and remove all lice stages. Any unfiltered lice remain in the well until the wells are emptied for disinfection. Any remaining lice in the wells are rendered immobile, non-infectious or non-viable, depending on the stage (<u>Johnson, S.C et al.</u>, Jones et al. <u>ACDRP</u>, upcoming). Lice are disposed of accordingly with Grieg's "SOP SW – Mortality Collection and Storage".

9. Signature

The undersigned declares that the use of pesticides under the authority of this permit will comply with the *Integrated Pest Management Act* and Regulation.

Print Name: <u>Kristin Storry</u>

The

Position Title: <u>Environmental and Regulatory</u> <u>Responsibility Manager</u>

Signature: _

_Date: July 26, 2022



Clearly mark the location of sites where pesticide use is intended.



Grieg Sites in Nootka Sound



Approximate Treatment Areas





Addendum

Sea lice are parasitic copepods (Copepoda, Caligidae) found in the marine environment. There are two genera, Lepeophtheirus and Caligus, which are commonly found on both wild and farmed salmonids. The dominant species in British Columbia waters is Lepeophtheirus salmonis. In a life cycle, the copepod goes through 2 larval stages (naupulii, copepodid) before entering a chalimus stage denoted by a specialized frontal filament that is used to attach to the host. Upon reaching the pre-adult stage the louse becomes motile before finally morphing into reproductive adults. Lice are readily transferred from wild adult returning salmon in late summer and early fall. Lice levels, survival and fecundity are influenced by a number of factors including adult wild returns (more adult wild returning salmon = more lice), salinity (lower salinity = fewer lice as sea lice do not tolerate lower salinity), temperature (higher temperatures = faster lice growth and reduced life cycles), oceanographic factors impacting distribution, and presence of filter feeders such as mussels that feed on lice and other natural zooplankton. To limit the interaction between out-migrating smolts and the fish on the farm, lice levels are monitored as required in the conditions of the Marine Finfish Aquaculture Licence issued under the Fisheries Act (at a minimum). If at any time the lice levels rise above an average of 3.0 motile lice (pre-adults and adults) per fish sampled, mitigation measures must be implemented to reduce the levels Lice levels routinely increase late summer and early fall with returning adult pacific salmon.

When levels reach an average of 3 motile sea lice per fish, a treatment using the active ingredient Emamectin Benzoate has historically been used effectively. Any effective integrated pest management plan, including all farmed animals and crops, requires coordinated treatments, coordinated fallowing, and alternation of treatment classes. Grieg Seafood already coordinates treatments and fallow sites and uses a mechanical treatment vessel. An alternative product such as hydrogen peroxide is a useful tool, to ensure we responsibly manage pests such as sea lice in the Nootka Sound facilities.

<u>Training</u>

Staff that will help lead the application of Paramove 50TM will be Grieg's Veterinarian, Operations Manager and crew, and the facility manager. Grieg employees have been successfully conducting Paramove 50 treatments in tarps and well boats since 2017. The following training was provided to ensure the safe and effective application of Paramove 50TM. Additional training for new staff is conducted as needed.

Two courses are required for staff involved in the treatments

- Hydrogen Peroxide Health and Safety
- Pesticide Applicator (Aquaculture Marine Hydrogen Peroxide Only)

Storage and Application

Paramove 50TM will be stored off-site in a fenced secure location prior to application at farms. Safe and secure storage during transport and use in appropriate and inspected containers will ensure the containment of Paramove 50TM.

OBJECTIVES

To set out Grieg Seafood's principles to control sea lice levels to avoid negative impact on wild and farmed salmonids, on biodiversity, and the ecosystem.

PREVENTION

Grieg Seafood prefers to use preventive and biological sea lice measures rather than medical and non-medical treatments. Harvesting will always be considered when sea lice-infected fish are close to harvestable weight.

AREA BASED MANAGEMENT

All farms in one area are single year class and are treated and fallowed at the same time.

BREEDING

When available, Grieg uses roe from salmon that have proven resistance to sea lice.

BARRIERS

"Sea lice skirts" are utilized to prevent the sea lice from entering pens. Most sea lice live down to seven meters below the ocean surface. Sea lice skirts are specialized barriers that are put around the pens 10 - 15 meters down from the ocean surface.

MONITORING

FREQUENCY

To limit the interaction between out-migrating smolts and the fish on the farm, lice levels are monitored as required in the conditions of the Marine Finfish Aquaculture Licence issued under the Fisheries Act (at a minimum).

SAMPLING PROTOCOLS

Adequate netting is placed under sampling area to ensure escapes cannot occur. Fish are placed in anaesthetic bath before examination.

All fish selected are examined for the presence of lice, regardless of fish health status.

Fish are held in the water as they are examined to promote good animal husbandry while identifying both *Lepeophtheirus sp.* and *Caligus sp.*

All fish are examined for the presence of lice, and numbers of lice recorded in the field notebook. Lice counts are recorded for the following categories:

Lepeophtheirus sp. (categorized)

- Gravid (adult female with egg-strings)
- Female (adult)
- Male (adult)
- Pre-Adult (juvenile)
- Chalimus

Caligus sp. (uncategorized, counted as total sum)

When sampling is completed, water in the anaesthetic tote should be examined for detached sea lice. These must be categorized, counted, and recorded as the "tote count or Sedation Unit". These counts must be included when calculating the total pen lice number/average.

CONTROLS

Sea lice measures are based on IPM (Integrated Pest Management) principles. A multifaceted approach will give improved results and reduce the risk of sea lice becoming resistant. Any effective integrated pest management plan requires coordinated treatments, coordinated fallowing, and alternation of treatment classes.

Non-medical treatments are preferred if they provide an acceptable level of fish welfare. Treatment effectiveness and the risk of side effects on fish and the environment is regularly evaluated.

ACTION THRESHOLDS

If at any time the lice levels rise above an average of 3.0 motile lice (pre-adults and adults) per fish sampled, mitigation measures are implemented to reduce the levels.

SКАМІК

Grieg's treatment vessel, the *Coastal Server*, carries the SkaMik mechanical delousing technology.

SkaMik works both gently and efficiently. Balanced water distribution and low pressure ensures optimal fish welfare. It only takes 15 seconds from the start of the process until the fish is back in the cage.

Inside the unit, the fish undergoes several treatments.

- Drainage chamber
- Flushing chamber
- Brush chamber
- Final flushing chamber

All removed lice are collected in a filter system and disposed of on land, as per Grieg's *SOP – Mortality Collection and Storage*. Additionally, all process water is filtered before being returned to the environment.

PARAMOVE 50 (Hydrogen Peroxide)

Application will take place in either a well boat or tarp designed specifically for this purpose. Water quality, temperature, and dissolved oxygen conditions are checked prior to start, and oxygen is constantly monitored and added as needed during treatment.

Well boat treatment, completed by the *Ronja Islander*, requires fish to be seined and transferred to the well boat. Paramove 50 is added to achieve the prescribed concentration to treat fish. Staff check fish behaviour and titrate water from holds. After maximum dosing time, vessel holds are flushed with sea water to dilute H2O2 and oxygen added as needed. When all H2O2 has been diluted and fish behaviour is normal, fish are pumped back into net pens. To improve fish welfare and minimize time spent in the well boat, where possible, the well boat remains adjacent to the system during treatment and flushing.

The sophisticated sea lice recapture technology on the *Ronja Islander* is designed to catch and collect removed sea lice. Collected lice are disposed of on land in accordance with Grieg's *SOP* – *Mortality Collection and Storage*.

Tarpaulin treatment requires fish remain in a shallowed net pen. A tarp encompasses the net pen and is securely tied in place. Oxygen is added, and dispersion and diffusion equipment utilized as needed. Once fish are settled and water is circulating within the tarp, Paramove 50 is added, and water monitored to ensure prescribed concentration within the tarp. Staff will check fish behaviour and titrate. After maximum contact time, tarp is removed, and air circulation continues to run, to help neutralize H2O2.

Grieg employees have been successfully conducting Paramove 50 treatments in tarps and well boats since 2017.

SLICE[®]

When levels reach an average of 3 motile sea lice per fish, a treatment using the active ingredient Emamectin Benzoate has historically been used effectively.

Pharmaceuticals for sea lice treatments must be prescribed by authorized fish health personnel, and withdrawal periods for medicines used are rigorously controlled and documented.

Prior to SLICE use, fish and lice are evaluated in a laboratory to ensure that the treatment will be efficacious and that resistance is not being built.

POST-TREATMENT EVALUATION

Post-treatment sampling is completed for all pens and the efficacy assessed.

HEALTH AND SAFETY

Short daily tailgate safety meetings must be completed with all on-site staff and contractors. The group will review any site-specific hazards and/ or safety items that need to be addressed.

TRAINING

Annual sea lice identification training is required for all staff monitoring sea lice.

The following training is provided to all staff involved in treatments using Paramove 50[™], to ensure its safe and effective application. Additional training for new staff is conducted as needed.

Two courses are required:

- Hydrogen Peroxide Health and Safety
- Pesticide Applicator (Aquaculture-Marine–Hydrogen Peroxide Only)