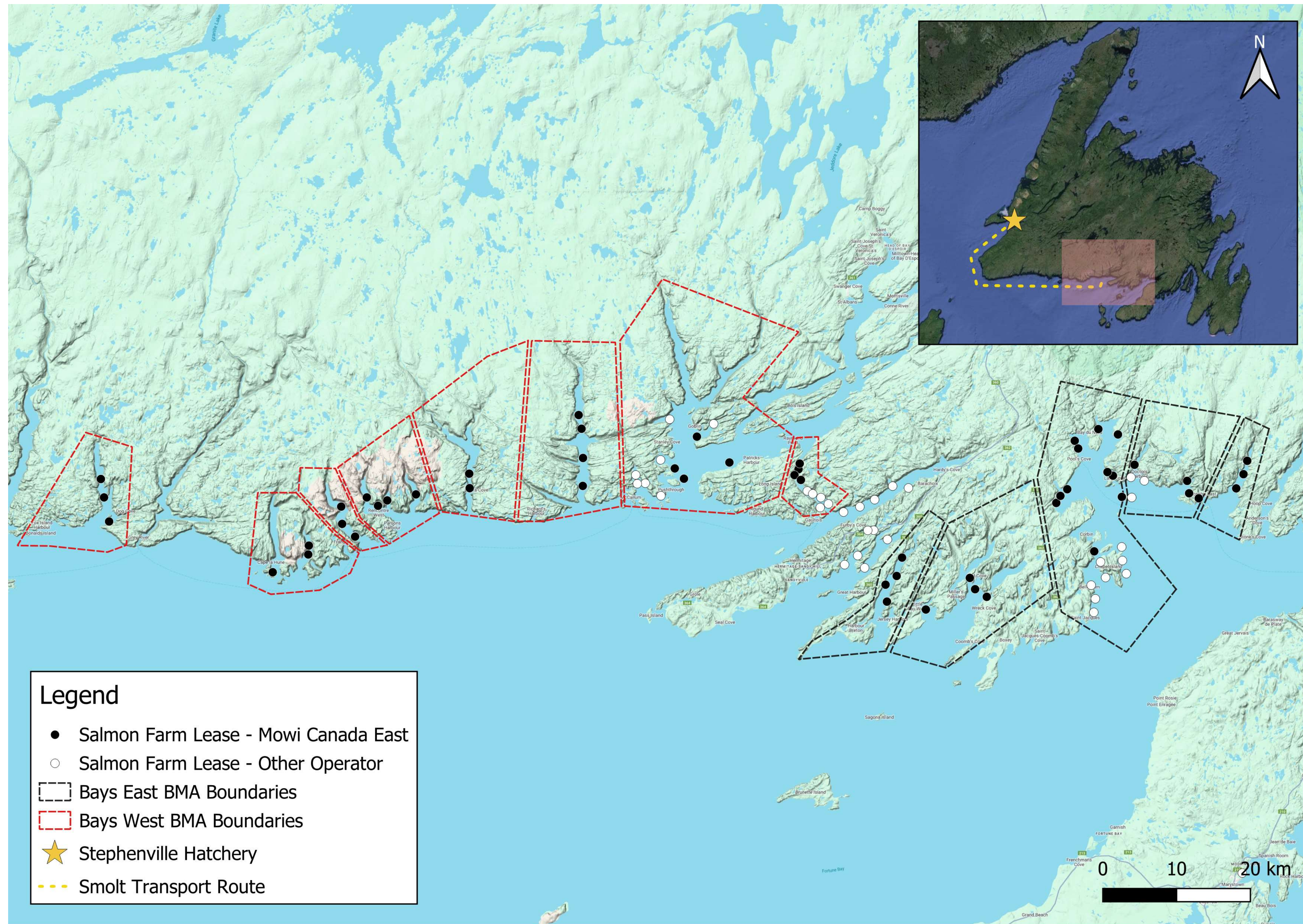
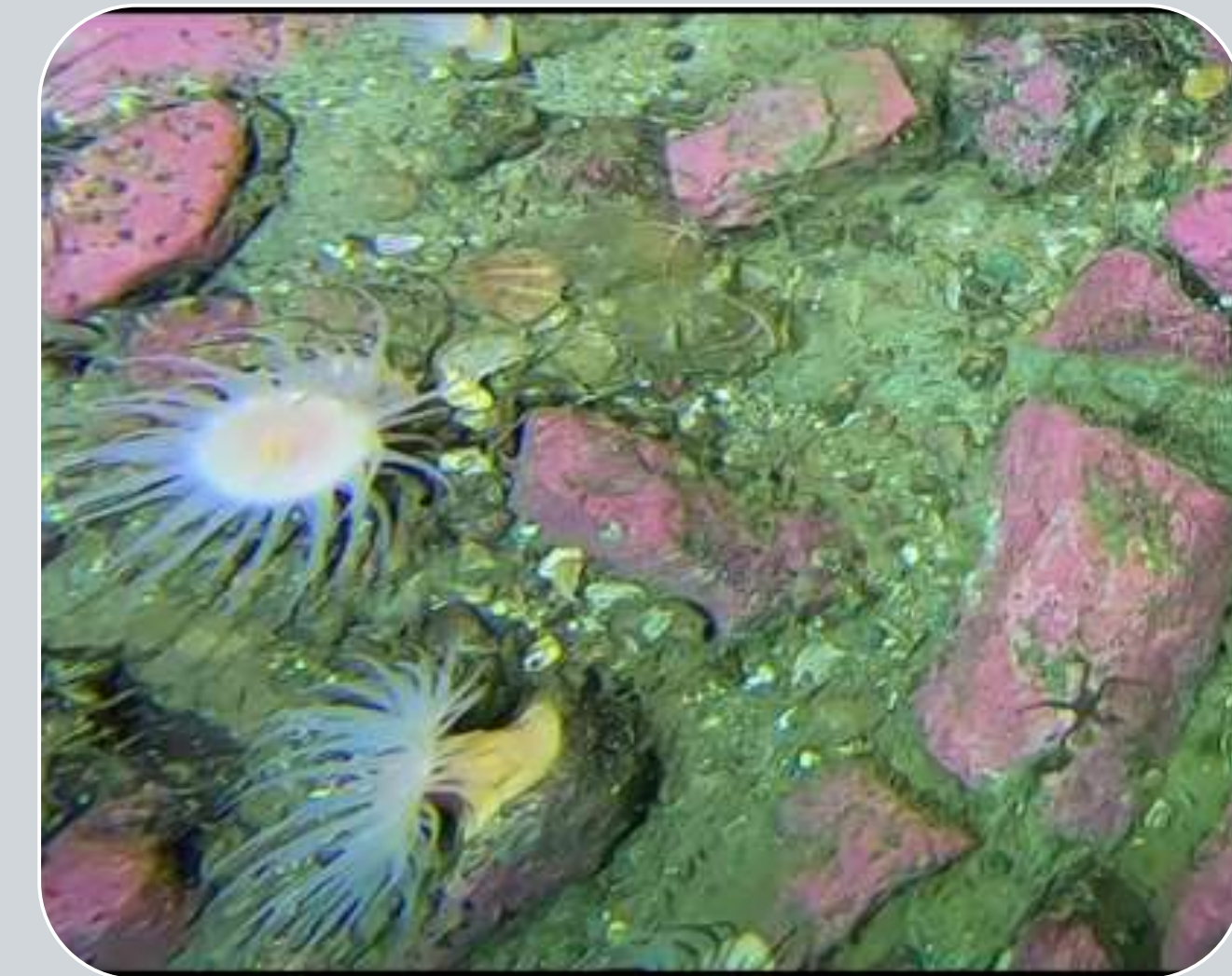
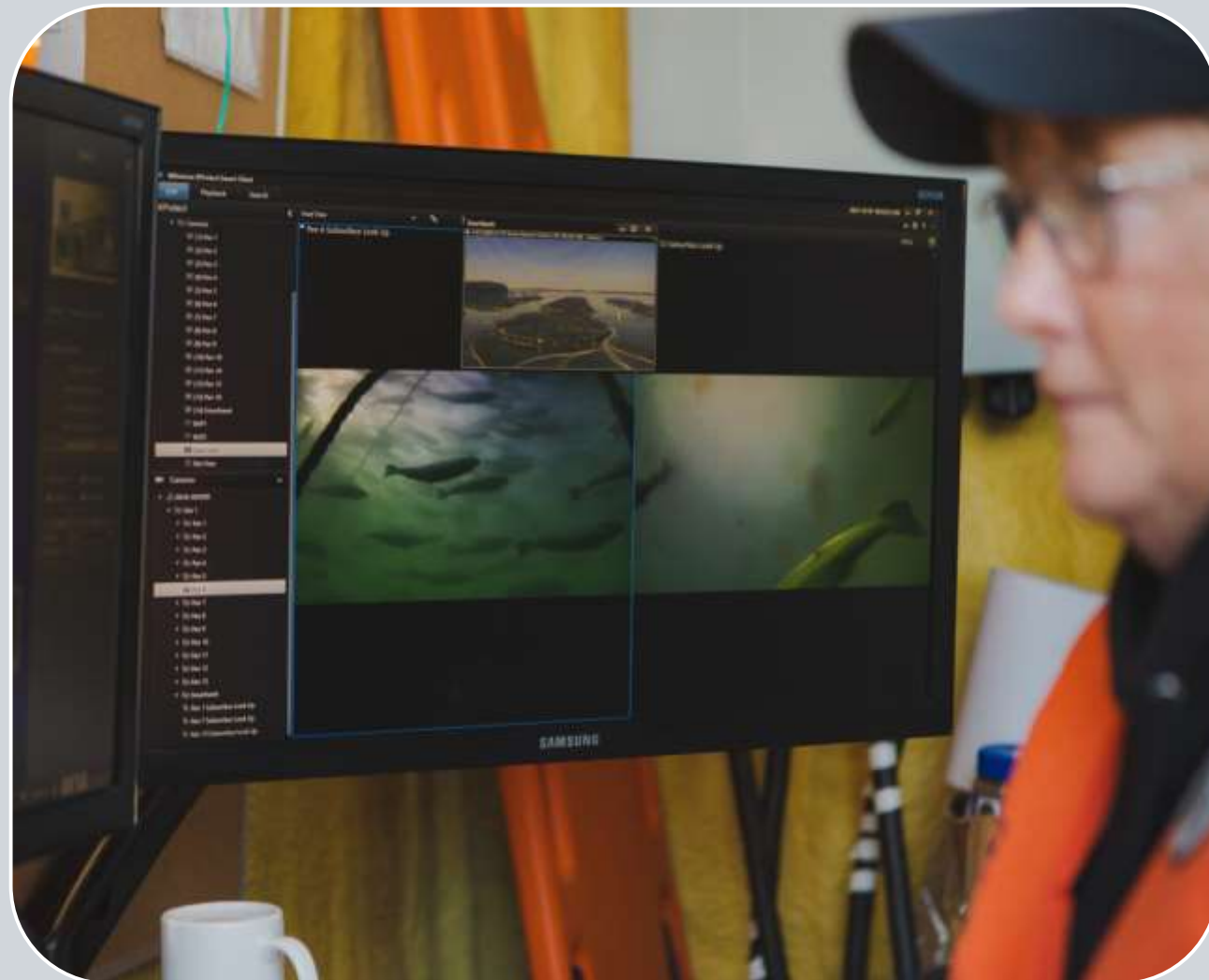


# Sea Farm Sites





# Sea Cage Sites: Monitoring



## Feeding, Behaviour, & Mortality

- Underwater cameras** provide a constant view above and below water
- Monitor feeding (reduce waste to ocean floor)
  - Monitor behaviour (stress, predators)
  - Monitor health (signs of parasites/disease, mortalities)

## Fish Health

- Surveillance Programs** are conducted by staff (daily, weekly) and both Mowi (monthly) and Provincial veterinarians (quarterly)
- Daily, monthly and quarterly monitoring for diseases (visual as well as bacterial sampling)
  - Weekly checks for parasites (sea lice)

## Water Quality

- Daily water sampling** of parameters such as temperature, oxygen, and plankton
- All active sea cage sites
  - On-site sampling daily
  - Continuous remote sampling with sensors

## Benthic Environment

- Benthic assessments** performed during peak feeding periods
- As per Federal Aquaculture Activities Regulations (AAR)
  - Mandatory fallow periods
  - Re-stocking not permitted unless benthic environment meets regulations



# Sea Cage Sites: Mitigation



## Prevent Escapes

- Certified, engineered cages and moorings
- HDPE stainless steel core nets
- Monthly underwater inspection reports submitted to regulators for review
- Emergency plans, trained staff and equipment ready for deployment
- Generational nets (reducing need for changes during production)



## Minimize Interactions (marine mammals, birds, fish)

- Larger smolt to sea (reduce time at sea)
- Siting in locations that minimizes overlap with wild salmon migration
- Underwater cameras for feeding (to reduce excess feed in environment)
- Vaccinating smolt against common bacteria & viruses
- Transit speeds and observations to avoid whales
- Bird netting over cages.
- Debris containment on-site & routine beach/area cleanups



## Manage Mortality

- Healthy, robust smolt vaccinated prior to sea transfer
- Aeration systems in cages (to circulate cooler oxygenated water from depth)
- Deep nets ( $\geq 20$  m) (to provide access to cooler water)
- Stand-by vessels with capacity to collect in an emergency
- Efficient mechanical and Remotely Operated Vehicle (ROV) removal of mortalities (faster removal than via SCUBA diver)



# Managing Fish Health

## Monitoring

**Surveillance programs** are on-going by many specialists and staff:

- All fish certified disease-free before transfer to sea
- Daily observations of the fish by staff
- Weekly sampling to check for sea lice
- Monthly sampling for disease (Mowi)
- Quarterly sampling for disease (FFA)

## Reporting

Federal, Provincial and Mowi policies and procedures require reporting of sea lice as well as many diseases.

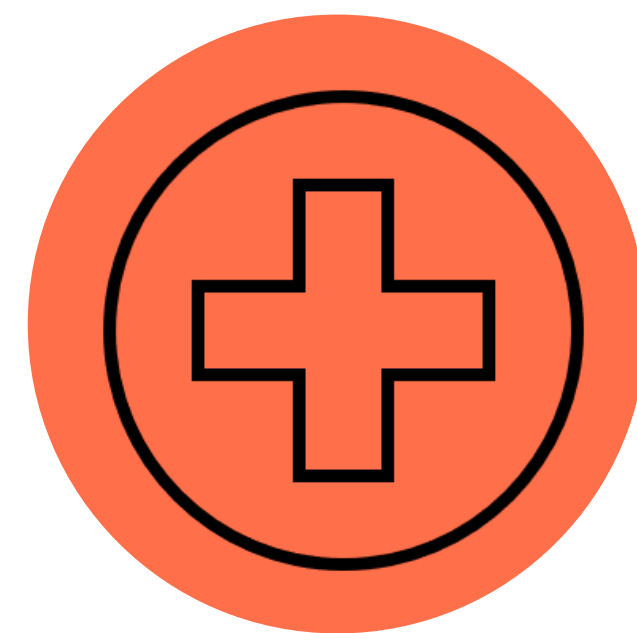
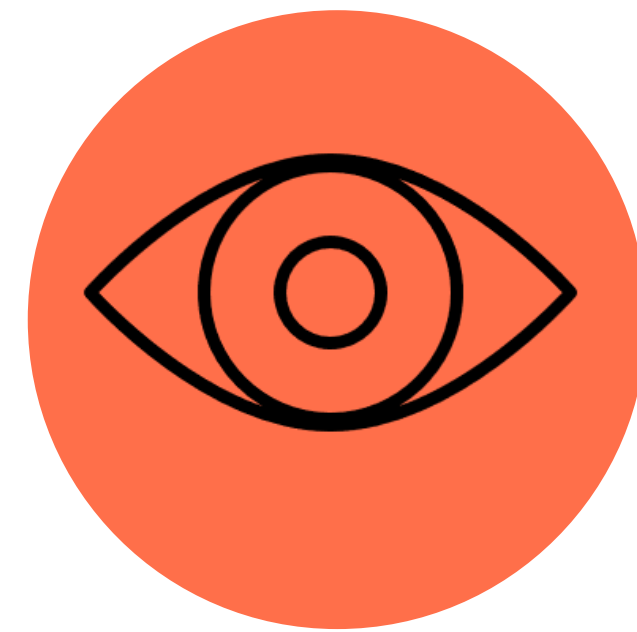
**Mowi adheres to all reporting requirements**

## Intervention

If prevention measures fail and the health of fish are a concern, **under direction of Mowi veterinarian and consulting with Provincial veterinarian, intervention**

options include:

- Therapeutants
- Mechanical removal of sea lice
- Harvest fish



## Transitioning to Sea

Moving from the hatchery to sea exposes smolt to various naturally-occurring bacteria, viruses, and parasites in the marine environment.

**Sea lice** are marine parasites. They attach to fish and feed on their mucus and blood causing wounds and sores.

**Diseases** are caused by bacteria and viruses. Administering vaccines before transfer reduces the likelihood of being infected. Also, screening parents (broodstock) aids to eliminate smolt that potentially could be infected because of genetics (vertical transmissions [parent to offspring]).