Hatchery Care

Thank you for your participation in the Classroom Hatchery Program, part of the Lake Ontario Atlantic Salmon Restoration Program. On behalf of the program's partners, we appreciate your time and efforts to help bring back this magnificent and important species. This manual contains information on how to set up and maintain the hatchery and keep the fish healthy. We hope you enjoy the experience!

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1. Starting up

Make sure your kit has the following prior to set-up or packing away for the summer:

Part	*Purpose*
Tank (15 or 20 gal.)	---
Chiller unit	Chills the water
Gravel	Substrate for the eggs/fish
Scotty incubator unit ("fish condo")	Holds the eggs as they hatch and develop into fish
Filter with cartridge (marineland or aquaclear)	Cleans the water
Filter intake screen with elastic	To keep fish out of the filter intake
Air pump with hose and air stone	Adds oxygen to the water
Thermometer	Displays water temperature
Uniodized, freshwater aquarium salt (we provide when eggs are delivered)	Reduces fungal and harmful bacterial growth
Insulated siding and lid	Insulates the tank and maintains darkness until the eggs hatch
Power bar (GFCI - water fail-safe)	Powers the components
Water Pump, Hoses (2), and Clamps (3)	For pumped-water chillers (Arctica) only

*** You may also want a 4" net to remove any mortalities you may have.**

When the unit is set up, set the chiller thermostat to 4°C. Check the tank thermometer to ensure the water temperature is 3-5°C, ideally stabilizing at 4°C. Let it run for at least two days before the arrival of the eggs. Letting it run allows for chlorine in the tap water to evaporate and for beneficial aquatic bacteria to grow in the filter. This also provides enough time for the water to cool to the right temperature.

The gravel should be spread about 15mm (½") deep on the floor of the tank. The incubator unit, with 100 eggs, will be set vertically into the gravel, oriented so the holes are at the bottom of the cells (the top is marked on the unit). With the incubator, you will be able to see the eggs hatch and develop into fry.

The tank should generally be kept in darkness with the cover and insulated sides on until release day. It is fine for the cover to be briefly removed each day to check the temperature, water level, and development/health of the eggs/fish.

2. Water set-up

The water should always be kept cold. Cold water has more oxygen, warm water has less. Keeping the water cold ensures the eggs and fry of this sensitive, cold-water species will be healthy.

The students can check the temperature and record it daily. The water should always be between 3-5°C, ideally at 4°C. If the water is too warm, the fish will develop too quickly, and even with feeding fewer fish will survive.

The water level should also be checked daily, and if it gets low, do not use city tap water straight from the tap to top it up. City water straight from the tap contains chlorine, which is harmful to fish if precautions aren't taken to let the chlorine evaporate. While letting tap water sit for one to two days may typically be sufficient to allow the chlorine to evaporate, during the late winter and early spring, municipalities will increase the chlorine content of tap water and it isn't possible to predict how long the water will need to sit.

<u>Therefore, use spring/distilled water only, or if you have access to it, fresh, clean stream water.</u>

Make sure to add the water slowly, because the water you are adding is warmer than the water in the tank - if you add warm water too fast you will shock your sensitive fish! If possible, chill the water in a refrigerator before adding to the tank. Remember to add salt (see below) if a significant amount of water is added.

3a. Chilling System (Coil Type)

Use:
The chiller is responsible for keeping the tank water cold. Water is chilled by the coils in the tank. If it is not working, water temperature will rise to room temperature, which is too warm. It is also possible for the thermostat to be set too low, which will freeze the water in the tank solid. Note these units have a thermostat that is marked in Celcius!

Maintenance:
Check tank thermometer daily. Make sure the chiller is on and working at all times. Keep the thermostat dial and ON power switch covered with tape to prevent tampering.

Troubleshooting:
If you notice the water is becoming warm, check to make sure the chiller is on and working, and the thermostat is set to the proper temperature. Look for any disconnected parts and check the power supply. Call one of our program staff if you cannot locate the problem. If the power goes out on the weekend, make sure the custodian knows to notify the teacher and keep an eye on the water temperature. Both the plug on the chiller and the GFCI power bar have reset buttons that may need to be pushed. The fish will be fine if the water warms up for only a few hours. In an emergency, ice packs placed in clean ziplock bags (not ice made from tap water – chlorine again!) can be used to maintain or lower the temperature.

3a. Chilling System (Pump Type - Arctica)

Use:
The chiller is responsible for keeping the tank water cold. Water is chilled by a pump in the tank circulating water into the chiller and back. If it is not working, water temperature will rise to room temperature, which is too warm. It is also possible for the thermostat to be set too low, which will freeze the water in the tank solid. Note the thermostat on these units is set in Fahrenheit!

Maintenance:
Check tank thermometer daily. Make sure the chiller is on and working at all times. Keep the temperature controls covered with tape to prevent tampering.

Troubleshooting:
If you notice the water is becoming warm, check to make sure the chiller is on and working, and the thermostat is set to the proper temperature. Look for any disconnected parts and check the power supply. Make sure the pump is submerged underwater and working. Ensure nothing is blocking air flow into the chiller vents. Call one of our program staff if you cannot locate the problem. The GFCI power bar has a reset button that may need to be pushed. If the power goes out on the weekend, make sure the custodian knows to notify the teacher and keep an eye on the water temperature. The fish will be fine if the water warms up for only a few hours. In an

emergency, ice packs placed in clean ziplock bags (not ice made from tap water – chlorine again!) can be used to maintain or lower the temperature.

4. The filter

Use:

The filter removes waste from the water. It does this by taking up water through an intake pipe and forcing it through a carbonated filter cartridge. Debris and waste products collect here, allowing only clean water back out. You will see water running out of the filter like a waterfall when it is working properly. If you have large slits in your filter intake pipe, then it will be covered by mesh to prevent the fry from being drawn into the filter. You can also set the filter to its lowest flow setting to reduce the possibility of fry getting stuck to the mesh on the filter.

Maintenance:

Units with separate sponges never need to have the sponge replaced (including from year to year), but it should be rinsed periodically in COLD tap water. Remove any dead fish that may appear in the filter.

Troubleshooting:

If there is little water coming out of the filter, it may be clogged. Check to make sure the filter cartridge is clean. If the filter cartridge is very dirty (some brownish color is normal), follow the maintenance instructions for rinsing it. With the cartridge out of the filter, examine the motor and see if anything is interfering with it (algae may grow here unnoticed) or if the intake tube is ajar. Also check to ensure there is nothing clogging the underwater portion of the intake tube, where the water gets drawn in. Then you can put the cartridge back and plug in the filter again, but wait a few seconds for it to take up water. Please note that if your filter isn't drawing water, and has no water in it, you may need to 'prime' your filter to get it going again by adding some tank water to it. If this doesn't increase the flow, you may have to adjust the filter to a higher intake setting.

5. The Fry

When the eggs hatch, the fish are initially called sac fry (alevin) because you will see a little yellow or orange sac on the fry. This is the yolk sac and the fish will feed on the yolk until it is absorbed. While Atlantic Salmon feed on their yolk sac, they hide in the gravel and don't reappear until they are looking for food. The incubator ("fish condo") lets you have a chance to observe them before they hide. Once all the eggs have hatched and the students have had a chance to observe them, you can release the fish from their incubator.

During the hatching period, you may also notice foam at the top of the tank and a slight odour. This is a natural process from the egg cases dissolving and will disappear shortly.

If at any time a fish has died and is visible, use the net to remove it from the tank.

Atlantic Salmon are great jumpers, in fact their name means "the leaper" in Latin, so make sure the tank is always covered with the insulation.

6. Feeding

We keep development slow by keeping the water temperature low throughout the winter – this eliminates the need to feed the fish and thereby reduce waste build-up in the tank. If the fish do develop to the point of requiring feed (which ONLY happens if your tank was not kept at 4°C), you should talk with our program staff to obtain food and figure out when it is best to start feeding. Please look for the following changes as a warning sign that your fish need to be fed: when the yolk sac is absorbed, the parr marks (vertical bands along the side of the fish) are obvious, and, most importantly, the fish are free swimming in the water column. The tank's temperature can now be set to 8°C and the front cover can be removed. The tank should receive 5mm of the starter feed on the flat end of a toothpick at each feeding time. Initially the tank will receive one feeding a day. As more fish begin feeding, this can slowly be increased up to four feedings a day. No more than one additional feeding should be added every 1-2 weeks.

Over-feeding can result in poor water quality, growth of fungus and bacteria and eventual death of the fish. Under-feeding is better than over-feeding.

7. Salt Concentration

The tank will be initially set up with a salt concentration of 0.3% (3 parts per thousand) by weight, which should be maintained as water is added. This helps reduce fungus in the tank, and is much lower than seawater (35 parts per thousand). One mL of water is 1g, so 3g of salt should be added per 1L of water. This can be an exercise for the students to calculate how much salt is needed.

8. Other troubleshooting tips

Problem	Solution	Other Notes
The water is too warm.	Make sure the chiller is on and working (you will hear a fan running).	Call program staff if you still have a problem. Never attempt to open a chiller.
The water is cloudy.	Check to make sure the filter is working. Clean the filter if it is clogged (see #4 above).	If feeding, check for excess feed on the bottom of the tank – excess feed will cloud the water.
There is green on the inside tank.	This is algae and it is hard to avoid. It is not harmful to the fish. If there is too much you can scrape it with a flat blade.	

9. Daily Checks

To avoid serious problems with your hatchery that might result in decreased health and/or mortality of fish, it is imperative to check your unit daily (during the school week) to ensure all components are functioning properly and that the temperature is correct. By checking the unit daily any issue that might arise will be caught quickly and in most cases you will avoid a serious problem. If you encounter an issue, please inform us ASAP regardless if you have been able to rectify it or not as there may be additional actions or observations required.

Be sure to check your hatchery unit prior to going home for the weekend. If you know that the power has gone off on a weekend, visit the hatchery if you can to make sure that the chiller has returned to function (it may need to be reset). It is recommended you request a custodial staff member check on the hatchery over the March Break.

Below is an example of a daily checklist you can post near your classroom hatchery. We encourage you to involve your students in the daily check process.

Classroom Hatchery Daily Checks

Month/Year:

Date	**Time**	**Temp °C**	**Functioning**		**Filter Screen Intact Y/N**	**Insulation Intact Y/N**	**# Dead Fish**	**Checked By: Initials**
			Aerator Y/N	**Filter Y/N**				

NOTES:

10. Take Down and Storage

At the end of the program please clean dry and safely store the hatchery unit so that you can use it again next year. The steps to do this are:

*****DO NOT USE SOAP ON ANY PARTS*****

- Wipe, with a wet cloth, the filter and tank to remove any salt deposits.
- Wipe, but with just a damp cloth, the chiller coils (if you have them) and outer surface of the chiller (all types), also to remove any salt. This is key to prevent any corrosion of the unit.
- Throw out used blue filter cartridges (Marineland/Penguin filters) or white bio filters/black charcoal filters (Aqua Clear filters). The bio wheel (Marineland) and sponge (Aqua Clear) DO NOT get thrown out. The bio wheels in particular, cost over $20 to replace.
- The gravel should be rinsed in water a few times, then allowed to air dry. If the gravel seems particularly messy, then a mild dose of water+bleach may be needed, but the gravel then needs to be rinsed thoroughly and air dried.
- So the gravel doesn't get lost over the summer and fall, once dry it is best to store it back in the tank.
- All of the insulation should be saved for next year.
- Make sure the chillers (at least) are stored in temperature-controlled conditions and are well protected from accidental knocks etc. Also make sure other small pieces of equipment don't get lost.
- Make sure your incubator/egg condo trays are secured together with the nuts and bolts (when dry) so the parts don't get lost. These can also be stored in the tank when dry to prevent loss.

Those of you with the pumped-water chillers have three additional steps:

- With the hoses still attached to the chiller, get a bucket of fresh tap water and place both the water pump (attached to the inflow hose) and the outflow hose in the bucket (so it's a closed system), then plug in the water pump to turn it on and let the fresh water cycle through the pump for several minutes. The chiller does NOT need to be on for this, we're just flushing out the reservoir in the chiller.
- Then the hoses can be unclamped from the chiller and the water pump - please make sure the ring clamps are saved and that no part of the water pump accidently gets thrown out with the hose (some pumps have an adaptor that comes off easily once the ring clamp is off).
- The two screw-tops on the chiller (where the elbow tubes go in) should be removed so the inside of the unit can air dry over the summer - but don't lose the tops over the summer and fall.