



Tank Maintenance Manual

SALMON IN THE CLASSROOM

Instructions for Aquarium Preparation and Maintenance during the Egg to Fry Lifecycle

The following information will provide users sufficient details to ensure they can provide a functional and safe environment for salmon eggs and the resulting evolution into fry prior to release into an appropriate salmon rearing habitat.

Materials and Equipment:

- Aquarium
- Small fish net
- Air stone
- Siphon or water ladle
- Thermometer
- Two 5 gallon plastic buckets
- 1/3 of a bucket of $\frac{3}{4}$ " to 1-1/2" clean rocks
- Egg tray

1. Inspecting and Cleaning the Aquarium and Equipment

- Check there is no fungus growing on the inside of the aquarium. If there is, clean with a mild white (clear) vinegar mixture. Do not use detergent (residual soap deposits may cling to the glass or frame and poison the water). Do not be too vigorous with the cleaning; gently scrubbing does the job nicely.
- Check the electrical cord. Make sure it is connected. Make sure it is not damaged. Replace if necessary. Contact your Clear Creek Task Force liaison to help.
- Check that the air tube (figure 1) and the air stone (figure 2) are both in the aquarium. The air tube provides a source of atmospheric oxygen while the air stone provides an abundance of tiny air bubbles deeper in the tank. Check that the thermometer (figure 3) is also included and isn't broken.

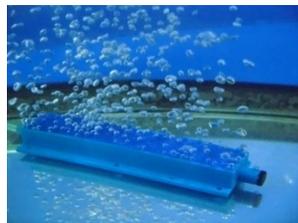


Figure 1: Air Tubing

Figure 2: Air Stone

Figure 3: Thermometer

- Check that you have a siphon tube, ideally with a scoop at one end. Check that the two five (5) gallon buckets are clean. If they are not, clean them with a bleach or vinegar solution versus detergent.
- If anything is missing, needs to be replaced, or you need assistance, contact your Clear Creek Task Force liaison.

2. Egg Tray

- Check that it is not broken - the plastic screen should be intact. Set the egg tray in the bottom of the aquarium.

3. Installing the Rocks

- The rocks should be stored with the aquarium and buckets.
- Clean rocks as necessary to ensure no fungus is present. This can be done by lightly agitating them in a water and bleach or water and vinegar solution.
- Cover 1/2 of the bottom of the aquarium with rocks.
- Place the rocks over the base of the egg tray leg. The rocks hold the egg tray in place so it doesn't float. Use one or two layers of rocks so you can't see the bottom of the aquarium in the end you are placing them.

4. Add Water

- The water should have sat in the five gallon buckets for at least twenty-four (24) hours prior to adding it to the aquarium to allow for any off gassing of chlorine if using tap water.
- Water should be at least one inch above the cooling tube on the inside of the aquarium.
- The cooling tube must be under water.

5. Switch On

- Plugging in the cord may be enough to switch on the aquarium. The system should start up immediately.
- Check to make sure that the air stone is directly under the cooling tube.
- Check that the air stone is working. This aerates the water as well as preventing ice build-up on the cooling tube.
- Check that the thermometer is working. Water temperature should drop to between 45-48 degrees Fahrenheit. This may take 1 to 2 days.

6. Validation of Proper Set Up

- Run the aquarium for at least two days before eggs are due to arrive.
- Check water temperature often.
- Check for leaks around aquarium window and under aquarium.
NOTE: Condensation will form on the window. This is normal and should not be mistaken for leakage.
- Check for excessive icing of piping to the cooling tube. Light frosting of this pipe above the water line is normal. Once the water is at the desired temperature, the

cooling compressor will cycle on and off as needed to maintain water temperature.

- Check that the air stone runs all the time.
- Contact your coordinator if there appears to be any problems or if you have questions related to your aquarium.

7. Placing the Eggs in the Egg Tray

- Place the eggs **gently** in the tray.
- Gently spread the eggs evenly over the mesh bottom of the tray.
- Remove any obviously dead eggs. These are eggs with an opaque white or light orange appearance as opposed to red-orange and “eyed” eggs (figure 5).



Figure 5: Healthy Salmon Eggs

8. Changing the Water

NOTE: It is not necessary to change the water on weekends or holidays unless the period between changes is going to exceed 3 days. If so, please arrange to change the water at least every 3 days during this period.

- **Change the water daily as follows:**
- Fill one bucket at least 24 hours before placing the water in the aquarium. This will allow any chlorine in the water to evaporate.
- Remove about five gallons (one bucket full) of water from the aquarium using the siphon tube or a small container. Discard the old water. Use for plants – they will love the natural fertilizer!
- **NOTE:** When changing the water in the aquarium, if possible, always keep the cooling tube under water.
- Gently pour the "prepared" water into the aquarium.
- **Fill the bucket with clean water and store for use the next day.**
- The clean water should be stored in a protected, cool area. If the water becomes contaminated, DO NOT USE. Instead, discard it, refill the bucket with clean water, and store it for 24 hours before placing it in the aquarium.

9. Egg Hatch

- Eggs will usually hatch in about 10 days and the immature fish (*alevin* aka sac fry salmon – see figure 6) will swim down into the rocks.
- Egg cases and a few more dead eggs will be left in the tray. Remove and discard the dead eggs.
- **NOTE:** While the eggs are hatching it is important to change the water daily (except for weekends) as the water will froth due to an enzyme released by the hatching eggs.



Figure 4: Alevin or Sac Fry Salmon

10. Feeding the Fish

- The fish will feed from their own egg sack for approximately one week. When the egg sacks are exhausted, the fish will begin to swim freely and it is time to start feeding the fish.
- Free swimming indicates the egg sack has been consumed and the fish are ready to eat normally. *Start feeding as soon as the fish appear and start to free swim.*
- The provided fish food is a product prepared specifically for Chum salmon fry. It is provided at the same time as the eggs are picked up.
- Store the food in a refrigerated area if possible. If storing it in a community refrigerator, be sure to mark it clearly, so it doesn't get mistaken for coffee grounds.

11. Feed the Fish Daily

- A pinch of food, four times each day is about the right amount.
 - Missing a couple of days over a weekend is okay.
 - Make special arrangements for longer periods.
- Try to avoid giving the fish more than they can eat as the uneaten food settles to the bottom of the aquarium. The decomposing food is messy to clean out of the aquarium.

12. Removing the Tray

- When the fish have developed into the fry stage (free swimming), the egg tray can be removed. This should be done carefully so as not to harm the fish.
- Discard the egg cases.
- Clean the egg tray, repair any damage and store until next year.

13. Removing the Rocks

- Fish prefer to hide in the rocks over swimming around exposing themselves to possible danger. However, to better view the fish as they grow, remove some of the rocks.
- Carefully remove about half to three quarters of the rocks. This leaves enough cover to provide some hiding places.

14. Removing the Fish in Preparation for Release into the Stream

PLEASE NOTE: The fish should not be removed from the aquarium until *immediately* prior to taking them to the release site as the water in the buckets will lose its oxygen in a couple of hours and the fish will die.

- Turn off or unplug the aquarium.
- Remove the rest of the rocks.
- Drain the aquarium down to about 2 inches by putting some of the water in the five-gallon buckets. The buckets will be about 2/3 full.
- When draining the water be careful not to suck any fish out through the siphon although this is fine if it occurs while filling the buckets to take the fish to release site.

Salmon in the Classroom

- Using the small net provided with the aquarium, carefully remove the fish and place them into the buckets.
- **NOTE:** Do not cover the bucket during transport. This deprives the fry of oxygen.

15. Transferring the Fish to the Stream

- This will take place during field trip. Instructions and tools will be provided by Salmon in the Classroom trained volunteers.



16. Clean the Aquarium and Equipment

- Return to Step 1 for a refresher on how to clean the equipment then store for next year.
- The aquarium can be used for other aquatic projects throughout the rest of the school year. However, care should be taken not to damage the aquarium, and particularly the mechanical components in the lower compartment.
- If damage does occur, contact the SitC liaison to schedule repair. Repair is provide free of charge by our partners AMS Heating and Cooling.

For further information and instruction

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