



Salmon in Schools

Teacher Aquarium Guide

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Resources and Video Library: <https://www.n-sea.org/salmon-in-schools-resources>

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Program Timeline

November	Set up the aquarium and turn on equipment – do this <u>before</u> Thanksgiving at the latest.
December – January	Cycling mode: Keep aquarium and equipment running, check on the equipment weekly, test the waste levels weekly, sprinkle in food if needed, and top off the water level as needed.
Late January/early February	Eggs will be delivered to you and placed in your aquarium
February – March	Weekly care of the fish, including removing dead eggs/fish, testing the water and recording waste levels, performing water changes, and feeding (if needed)
March – April	Salmon fry will be released at release ceremonies scheduled by NSEA. After your aquarium is empty, NSEA will tear down the aquarium – keep it in a dry location until next year.

Inventory of Equipment

Aquarium stand with two doors – place the open end against the wall so the doors open out



55-gallon glass aquarium- this is placed on top of the stand



2 glass lids – these rest on the top of the aquarium to prevent fish from jumping out. Keep plastic on the back of one and off the other to allow room for hoses to go into and out of the aquarium.



Gravel – this is put in the bottom of the aquarium and should be cleaned out occasionally with the siphon



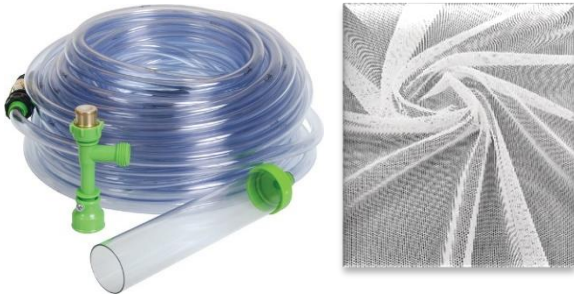
Filter, hoses, and filter media – canister filter filled with sponges and other material to help with waste levels and keep the water clean. This should be kept in the stand, behind the doors.



Chiller and hoses – takes filtered water, runs it through the chiller to cool it before pumping it back into the aquarium. This should be kept on the floor next to the stand.



Siphon – this hooks directly up to the faucet for taking water out of and putting water into the aquarium. Mesh netting prevents anything from getting sucked up the tube while cleaning.



Freshwater testing kit – includes vials, chemicals, instructions, and a color chart for testing pH, along with waste levels including ammonia, nitrite, and nitrate.



Net and egg remover – for removing eggs that don't hatch or dead alevin/fry



Chemicals – ammonia additive to add when setting up the aquarium, bacteria booster to add when setting up the aquarium, and water dechlorinator to add every time you do a water change



Fish food – add this throughout the cycling process before getting eggs and then before releases if salmon are getting big enough to eat

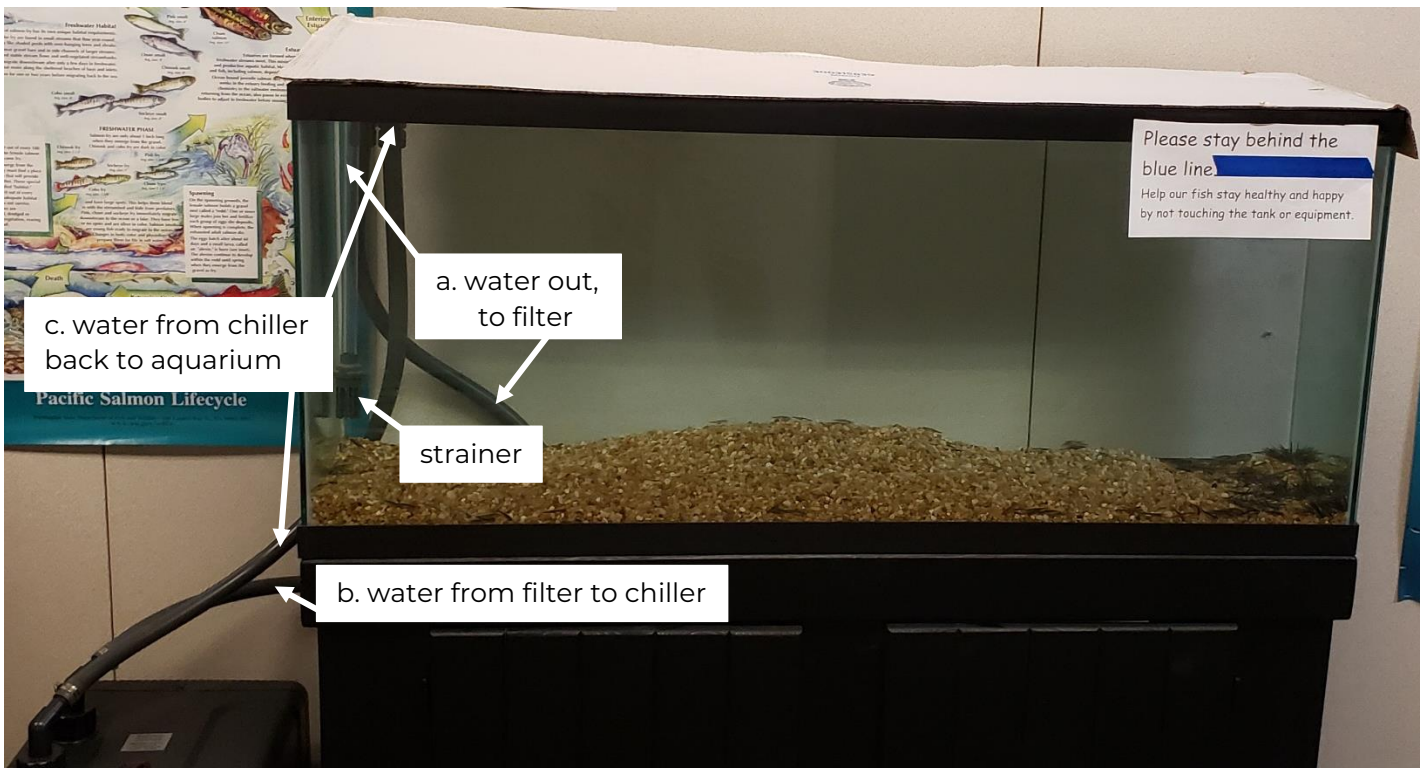


Thermometer – to see what the temperature of the water is and double check the temperature on the chiller for accuracy



Aquarium setup

1. Put the filter baskets into the canister filter. From the bottom to the top, it should be: sponge, sponge with bag of material, ceramic circles.
2. Fill the canister filter with water until all of the baskets are covered with water. Close the cap of the filter and latch it shut.
3. Connect the hoses to the filter and the chiller. For the chiller, hose A connects to port A and hose B connects to port B. The way water moves through the system is as follows
 - a. Water moves out of the aquarium through the strainer on the plastic tube into the filter “in” side,
 - b. Water moves out of the filter “out” side, into the chiller “in” side
 - c. Water moves out of the chiller “out” side back into the aquarium through the nozzle.The hoses will be left with connectors on them and at appropriate length from previous years, to help with the setup process. The photo below shows the path of water.
4. Fill the aquarium with cold water using the siphon attached to a sink.
5. Prime the filter by pumping the small lever at the top of the tube with the strainer until you don't see any air bubbles entering the aquarium from the other tube, typically 10-15 times. Then, plug the filter in. You should hear the sound of water moving through the hoses, but should not hear loud clunking or crackling noises. If you hear these noises, try priming the filter more. If that does not solve the problem, turn everything off and contact NSEA.
6. You DO NOT need to plug the chiller in now. This should be done 2 days before eggs are delivered. Do a check for leaks so you know the hoses are on tightly. If you see water dripping out of the chiller or filter, turn everything off and try tightening the hoses. If you do that and continue to see dripping, shut everything off and contact NSEA.
7. If everything looks good, add the chemicals
 - a. Add one capful of the Prime water conditioner
 - b. Shake and then add the entire bottle of Dr. Tim's aquatics nitrifying bacteria
 - c. Add 4 capfuls of the ammonia additive.
8. Stick the thermometer on the inside the aquarium and put the 2 glass lids on the top.



Aquarium Troubleshooting

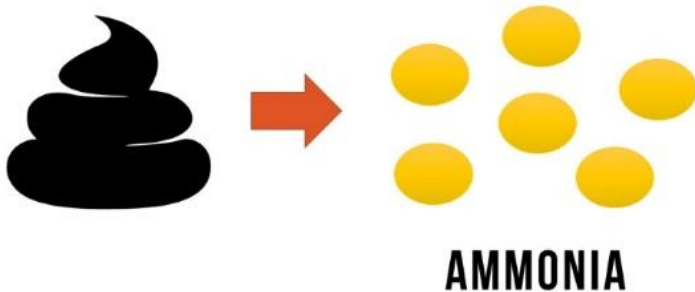
Is something unusual happening with your aquarium? Here are the solutions to the most common problems. Do you have something new that is not on this list? Let NSEA know so we can solve it and add it to the list!

1. The temperature on the chiller is higher than it should be
It is normal for the temperature to be within a range of ~3 degrees of what it is set at. If it is outside of that range, try the steps to set the temperature again (press set, change the temperature). If this does not work, unplug the chiller, plug it back in again, and repeat the temperature setting process. If the problem is still there, contact NSEA.
2. The filter is making a crackling/popping noise
Unplug the filter. Clean off the strainer – often times, if there is a lot of debris here, air bubbles may get into the filter and cause noise. Lightly shake the filter so the air bubbles rise. Plug the filter back in. If the noise is still there when turning on, prime the filter by pumping the small lever at the top of the tube with the strainer. If this does not fix the noise, unplug the filter and contact NSEA.
3. There is water at the bottom of the stand
This most likely means there is water leaking out of the filter. Unplug the filter and tighten the hoses that connect to the filter. Plug the filter back in and watch for water dripping down the filter. If you continue to see water, unplug the filter and contact NSEA.
4. There is water under the chiller
This most likely means there is water leaking out of the chiller. Unplug the chiller and tighten the hoses that connect to the chiller. Plug the chiller back in and watch for water dripping down the chiller. If you continue to see water, unplug the chiller and contact NSEA.
5. There are a lot of fish that are acting lethargic on the bottom of the aquarium
Test the waste levels of the water and if you see that any levels are in the danger zone, do a large (30-50%) water change. Test daily to monitor waste levels and change the water as needed to limit levels being in the danger zone. If you continue to see this for more than a week, contact NSEA.
6. There are a high number (10+) of alevin/fry that are dying within a week
While some alevin/fry dying is normal and will happen, large numbers of them dying is not. Test the waste levels of the water and if you see that any levels are in the danger zone, do a large (30-50%) water change. Test daily to monitor waste levels and change the water as needed to limit levels being in the danger zone. Continue tracking mortality, and if you continue to see this for more than a week, contact NSEA.

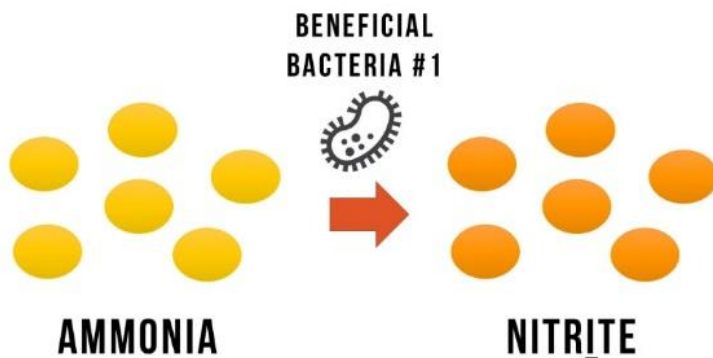
Aquarium cycling and waste levels

Your aquarium should be set up and running at the latest by the start of winter break. This will allow the tank to cycle, which you will help with by sprinkling food into the aquarium once a week until you get eggs delivered, or waste levels are high enough to stop doing this. Here is a short overview of waste levels in the aquarium and how this looks when you test the water.

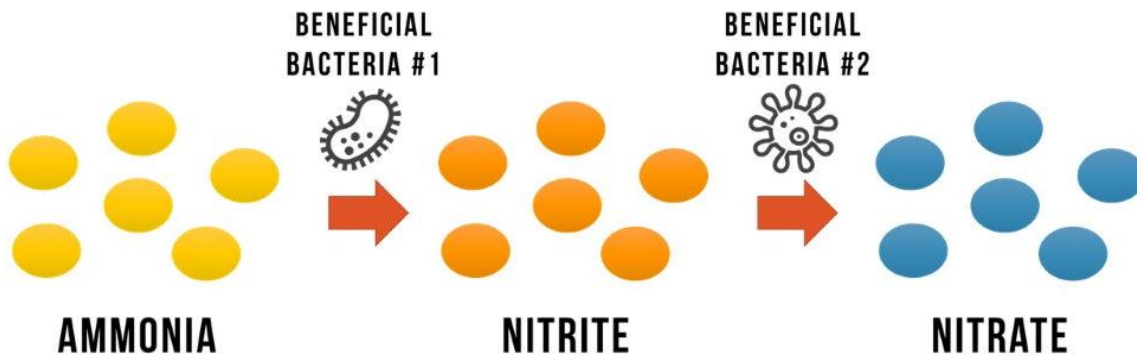
Fish waste produces ammonia, which is toxic to fish. Imagine swimming in a pool with a lot of waste in it – that would be bad for you too.



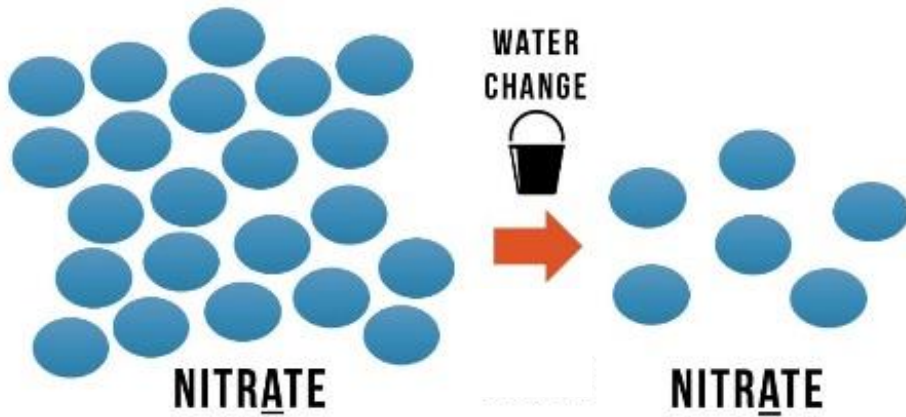
The cycling process of adding food to the aquarium is similar to fish waste and will start developing beneficial bacteria. This bacteria lives in the gravel and in the filter and breaks down harmful ammonia into slightly less harmful nitrite. While less toxic than ammonia, it is still harmful to fish.



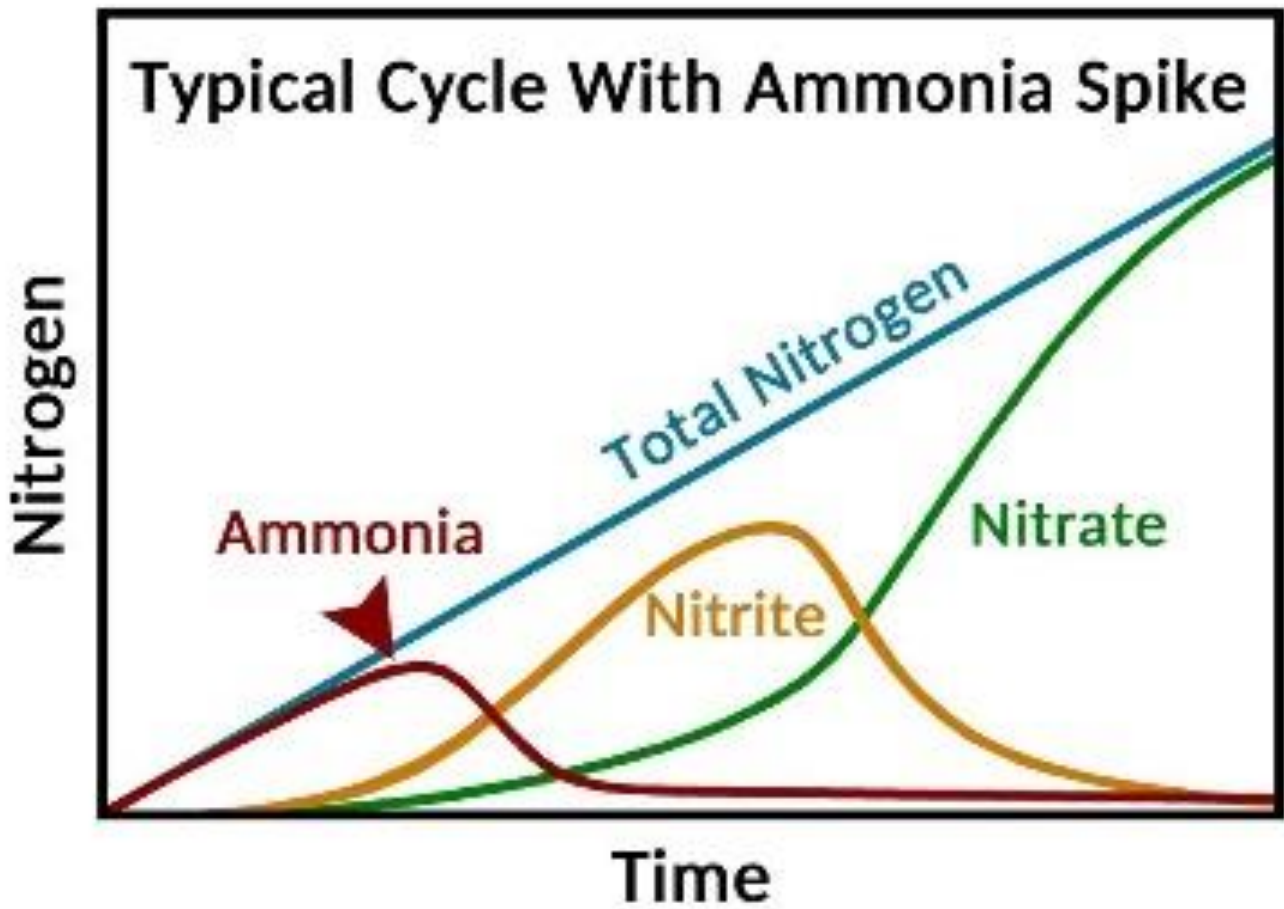
The cycling process continues as more beneficial bacteria breaks down nitrite into nitrate. This is not nearly as toxic as nitrite or ammonia but can still be harmful at high levels. This is where regular water changes are important.



By testing waste levels and changing the water, you are reducing waste levels to be at levels that are safer for fish.



Throughout the cycling process and after eggs have been delivered, it is completely normal to see spikes in waste levels in fairly predictable cycles. This is because the beneficial bacteria takes time to develop and break down each waste type (ammonia and nitrite). Keeping track of these levels and changing the water when they are in the danger zone will reduce the stress on the fish.



Weekly Aquarium Maintenance Checklist

Use this checklist to track weekly maintenance such as water testing, water changes, and feeding fish. Use this with your monitoring record, which is located at the end of this guide. For all waste level measurements, use the cheat sheet located at the end of this guide.

Week of aquarium setup – the goal is to have your aquarium setup by Thanksgiving

- Follow the setup directions above, on page 5 and fill aquarium with water
- Plug in the filter and check to make sure there are no leaks
- When everything is setup and running, add the chemicals following the directions above
- Test the water and record the data on the monitoring record.

1st week of December

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2

2nd week of December

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2

3rd week of December (last day before winter break)

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If either test shows ammonia and nitrite at 0.5 ppm or lower, sprinkle in a pinch of food

1st week of January

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If either test shows ammonia and nitrite at 0.5 ppm or lower, sprinkle in a pinch of food

2nd week of January

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If either test shows ammonia and nitrite at 0.5 ppm or lower, sprinkle in a pinch of food

3rd week of January

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If either test shows ammonia and nitrite at 0.5 ppm or lower, sprinkle in a pinch of food

4th week of January

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If either test shows ammonia and nitrite at 0.5 ppm or lower, sprinkle in a pinch of food.
Skip this if eggs have been delivered.
- Do the following 2 days before eggs are delivered:
 - Do a 50% water change using the python siphon
 - Turn on and set the temperature of the chiller to 48 degrees. To set, press the “Set” button and then adjust the temperature until it shows 48 degrees. After doing this, the chiller will most likely start running because the temperature of tap water is warmer.

1st week of February

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If any waste levels are in the danger zone – do a 30-50% water change. Be careful not to suck up any eggs/fish while vacuuming the gravel to remove waste.
- Remove any dead eggs/fish and record mortality and count on the monitoring record.

2nd week of February

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If any waste levels are in the danger zone – do a 30-50% water change. Be careful not to suck up any eggs/fish while vacuuming the gravel to remove waste.
- Remove any dead eggs/fish and record mortality and count on the monitoring record.

3rd week of February

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If any waste levels are in the danger zone – do a 30-50% water change. Be careful not to suck up any eggs/fish while vacuuming the gravel to remove waste.
- Remove any dead eggs/fish and record mortality and count on the monitoring record.

4th week of February

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If any waste levels are in the danger zone – do a 30-50% water change. Be careful not to suck up any eggs/fish while vacuuming the gravel to remove waste.
- Remove any dead eggs/fish and record mortality and count on the monitoring record.

1st week of March

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If any waste levels are in the danger zone – do a 30-50% water change. Be careful not to suck up any eggs/fish while vacuuming the gravel to remove waste.
- Remove any dead eggs/fish and record mortality and count on the monitoring record.
- If fish have “buttoned up” and have no egg sac or slit on the underside, sprinkle in a pinch of food – enough for fish to eat in 1 minute but not more (to keep waste levels down).

2nd week of March

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If any waste levels are in the danger zone – do a 30-50% water change. Be careful not to suck up any eggs/fish while vacuuming the gravel to remove waste.
- Remove any dead eggs/fish and record mortality and count on the monitoring record.
- If fish have “buttoned up” and have no egg sac or slit on the underside, sprinkle in a pinch of food – enough for fish to eat in 1 minute but not more (to keep waste levels down).

3rd week of March – do this up until your salmon are released

- Test the water and record the data on the monitoring record – test 1
- Test the water and record the data on the monitoring record – test 2
- If any waste levels are in the danger zone – do a 30-50% water change. Be careful not to suck up any eggs/fish while vacuuming the gravel to remove waste.
- Remove any dead eggs/fish and record mortality and count on the monitoring record.
- If fish have “buttoned up” and have no egg sac or slit on the underside, sprinkle in a pinch of food – enough for fish to eat in 1 minutes but not more (to keep waste levels down).

4th week of March – do this up until your salmon are released

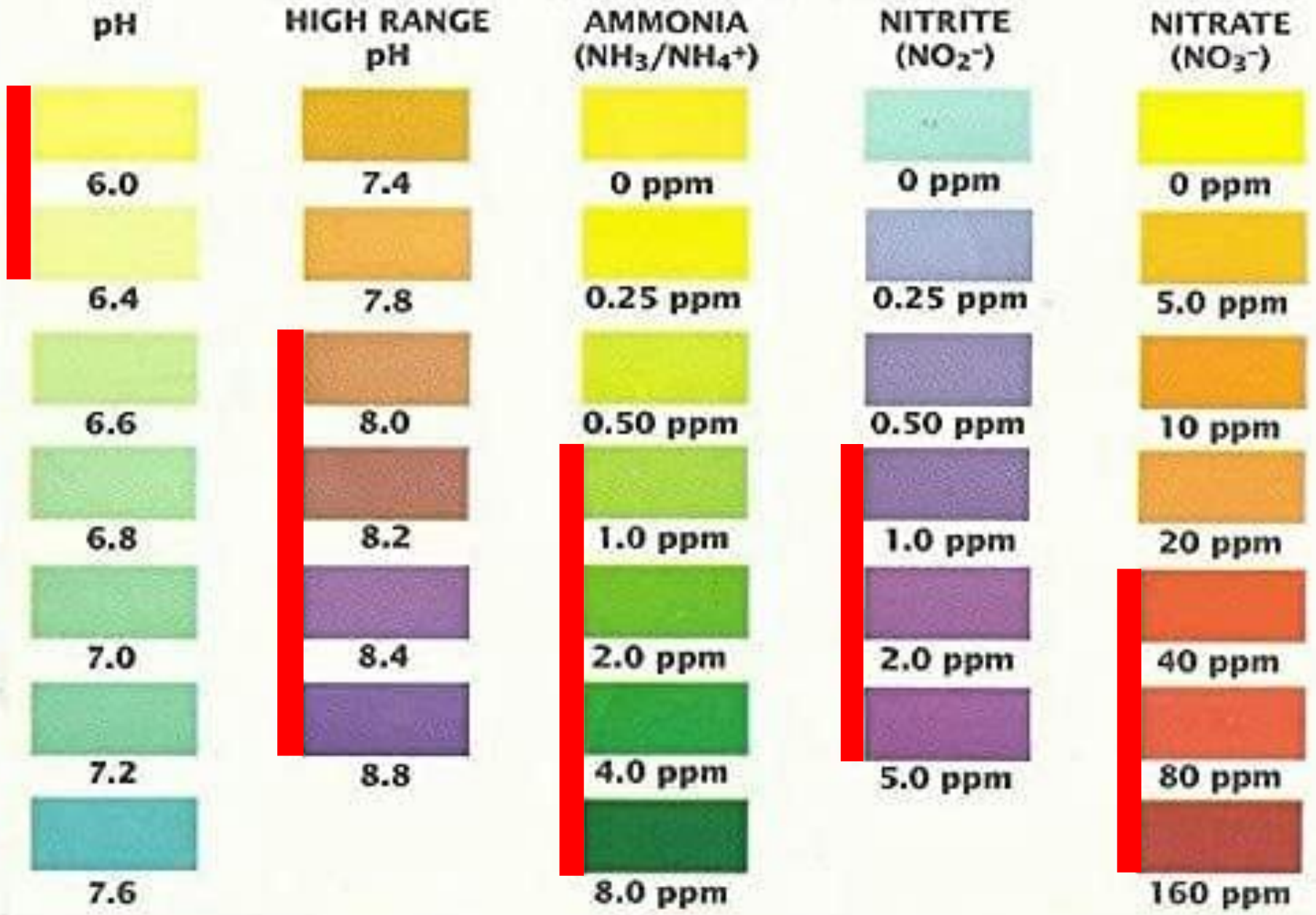
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- Remove any dead eggs/fish and record mortality and count on the monitoring record.
- If fish have “buttoned up” and have no egg sac or slit on the underside, sprinkle in a pinch of food – enough for fish to eat in 1 minutes but not more (to keep waste levels down).

Aquarium tear down

On the day of your salmon release, NSEA will come to your school and remove the fish from the aquarium. When all fish are out, we will run a bleach solution through the aquarium for 10-15 minutes to sanitize aquarium components before rinsing with water. We will then drain the aquarium as much as possible, disconnect the hoses from the filter and chiller (leaving these in the aquarium), rinse the filter compartments, and leave everything outside to dry. Please ensure materials get placed back by the aquarium or in the stand for use in future years.

API FRESHWATER MASTER TEST KIT

RM000725-00-1109



 = Danger Zone, do a 30-50% water change



Turbidity

is the measure of
how clear the water is.

Salmon need cold, clean, clear water.

Hold this sign up against one of the small sides of
the aquarium and look through the
other small side.

If you can read this and see Sammy,
then your water is clear!

