

Kalispel Tribal Hatchery

Production Procedures Handbook

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I. INTRODUCTION

This handbook is intended to give detailed steps for the production of largemouth bass raised at the Kalispel Tribal Hatchery. The major components for the hatchery operation include: two rearing sloughs, raceway spawning, egg incubation, fry transfer, fry harvest, tagging operation, and brood fish collection and handling. This document is intended to list the procedures involved in the producing fry/fingerlings for outplanting. The specific procedures for operating all of the mechanical pumps are contained in the Operations and Maintenance Manual.

II. REARING SLOUGHS

The rearing sloughs are located adjacent to the river and can be accessed via the service road to the pump station. The mouth of the south slough is next to the pump station and the mouth of the north slough is located approximately 500 yards north of the pump station. Depending on the time of the year, you may only be able to access the north slough by ATV and even then it will be tough. The following section details the approximate timelines and activities needed to have the sloughs ready to accept the newly hatched fry.

Draining (Pre-Spawn)

If the river elevation is lower than the slough elevation, you can open the gate valve on the dam to speed up the draining process. Once the river and the slough are at the same elevation close the gate valve and begin draining with the 3" trash pump.

1. Before starting the engine make sure that the oil level and gas are full and everything looks O.K.
2. Set the pump on top of the sheet pile dam and secure it. Attach the suction line. The suction line should be fairly level with no high spots. The discharge line should be OK-just run it over the dam and tie it off somewhere. It is a good idea to aim the end of the discharge line in the air so you can tell if the pump has lost its prime.
3. Prime the pump. The black knob on top of the pump. Pour in as much water as it needs and tighten the knob securely after finished.
4. Start the engine. Once the engine is started, keep an eye on the discharge, it should start splashing water. If not, you will need to turn off the engine and re-prime the pump. Try again.

The total amount of time needed to drain the slough is around 10-16 hours. You will need to have enough gas to make it through the day (5 gallons). Once the pump seems to be working correctly, you can leave and work on other items needing completed. Check on the pump every 45 minutes to refuel and check if still pumping.

If you are trying to drain the south slough during the spring you need to make sure that no water is pouring into the south slough. The stop logs may need to be re-installed. These stop logs are located at the head of the slough. If you cannot stop the water flowing into the slough, you won't be able to drain the slough completely.

We need to drain the slough in order to remove any unwanted fish and aquatic vegetation.

Fertilization

Once the pond has been cleaned and all unwanted fish removed from the slough, it can be filled and made ready to receive the newly hatched fry. The only remaining step is the fertilization. There should be no need to inoculate the slough with zooplankton. Once the water warms up zooplankton will be everywhere. The water temp in the sloughs should be around 60 degrees F. during this operation.

1. The ponds should begin preparation 7 days prior to the spawn. This should give you about 3-4 weeks for phytoplankton/zooplankton growth before the fry arrive.
2. The initial application of organic fertilizer at 150 lbs/acre (Alfalfa meal) and Inorganic fertilizer (16-20-0) at 8 lbs/acre. The two sloughs are approx. $\frac{3}{4}$ acre each. Add approx. 100 pounds of organic fertilizer and about 5 pounds of inorganic to each slough. This is the first treatment.
3. The second treatment should be applied in two days and will be at the same rate as the initial.
4. After these two applications, the amounts will lessen to about 50 pounds of inorganic fertilizer per slough. I would apply the same amount inorganic.
5. Application rates should keep at this amount until the fry are ready for planting. You can fertilize every 3 days after the first two applications.

III. RACEWAY SPAWNING.

Spawning activities should take place as soon as the river water temperature reaches 65 degrees Fahrenheit. No water will need to be heated, once the river water warms up, the bass will spawn. This should be May/June. During this time, there shall be minimal contact w/ any hatchery personnel or visitors. This is our most critical time of year.

Once the first spawn is noticed, the brood fish will be allowed to spawn for an additional 14 days. Each nest will be visually inspected for the presence of a male protecting the fertilized nest. I am not sure that we will witness the female doing her thing, she may not lay her eggs until dawn or dusk. Once eggs are noticed on the nests, the nest will remain in the raceway for another day where the male will protect it from predators.

Once the nest is seen to have eggs it will be removed from the raceway and placed in the hatchery. Hatchery staff will raise the nest from the bottom of the raceway and gently slide a galvanized wash tub underneath the nest, lifting the nest out of the raceway. The area in which the nest was located will be swept with a fine mesh net to pick up any loose eggs that may have fallen out of the nest. These eggs shall be placed in the galvanized wash tub with the nest. This will minimize the amount of hatched fry swimming around in the raceway.

IV. EGG INCUBATION

The nest will be immediately transferred to the hatchery building and placed into an incubation trough. All spawns will be treated with Formalin at 250 mg/l for 60 minutes (see Attachment 1). Treatment will continue until the eggs hatch (2-3 days). Once the eggs hatch, all formalin treatments will stop. The nests will be held vertical in the troughs so that the water flows through the nests. Each trough can hold 7-10 nests that are no more than 3 days apart.

Following the hatch, the nests will remain in the troughs for 7-10 days until the fry swim up. You will see the fry at the bottom of the tank when they hatch. Once the fry "swim up" they are ready to be moved to the sloughs. The "swim up" means that the fry are looking for food. Before the fry are to be moved to the sloughs, they first must be counted. The displacement technique can be used to estimate the numbers of fry. Place the fry into the beaker until the water level is displaced 1000 ml. In time, we will know how many fry/ml conversion. Down in Colorado, they estimated 275 fry/1000 ml water displaced.

V. FRY TRANSFER TO REARING SLOUGHS

After being weighed and estimated, the fry will be transferred to the sloughs using the 20 gallon galvanized wash tubs. The water temperature, Ph, and DO need to be carefully monitored so we do not put too much stress on the fry. The trough water will need to be slowly converted to fresh river water to better acclimate the fry to their new environment.

Once the fry have arrived at the slough, lower the wash tub into the water. Slowly tip the tub so that the river water gently mixes into the tub. This should take about 3-5 minutes. Closely observe the fry to see how they are taking the new water. After 3-5 minutes, the fry should be thinking of swimming away. Let them swim away at their own pace. Note the amount of fry and the date at which you released them. They should be OK for 3-4 weeks. The fry will drastically increase in size within this 3-4 week period.

VI. HARVEST OF FRY FROM REARING SLOUGHS.

After the fry have been in the slough for 4-6 weeks, it is time to remove them and ship them out to the identified outplanting location. The 4-6 week time frame reflects the amount of time it will take the fry to eat all of the zooplankton within the slough. After this time, they will start looking to eat each other.

Drain the slough. (see section II). Once most of the water is gone the fry should be crowded near the dams. You will need to walk the slough to net some of the fry that may be trapped in small pools or depressions. Once the fish are crowded near the dams, we can use the TRANSVAC fish pump to suck the fry from the slough and into the truck. If this is not very effective, then you will need to net each fish and place them into the truck by hand. Once loaded, transport the fry up to the hatchery for tagging.

VII. TAGGING OPERATIONS.

The Kalispel Tribal Hatchery is responsible for marking all hatchery-raised fish before outplanting into the Box Canyon reservoir. We have decided to use Coded Wire Tags for all of the fish. The first year we will tag all fish with "Agency Only" tags and later we will use tags that can identify the fish as being raised in that particular year. We plan to mark the first 100,000 fry in the nape. We feel that this will be the best area to tag these small fry.

The other 50,000 fry will be held in the hatchery for 1-2 months. We plan on raising these fish until the fingerling-size. Prior to release, these fish will be tagged with the coded-wire tag in the cheek. These two separate locations should enable the hatchery staff to differentiate between release size strategies.

The actual tagging operation has not been performed as of yet. Once tagging operations commence, we will be able to detail the necessary steps involved in this task.

VIII. BROODFISH GATHERING/HANDLING

The collection of broodfish for spawning activities needs to be an annual event. Following spawning, the brood fish need to be checked for injuries. If they are injured they should be released back into the reservoir to live out the rest of their life. This section will detail the appropriate safety measures needed when collecting brood fish for the hatchery.

Brood fish collection will be performed with the shocking boat. There needs to be at least 5 people involved in this operation in order to lessen the stress to the fish. Once on the water, salt can be added to the live well at a .3% concentration. The live well holds approximately 94 gallons so this comes up to be about 4 cups (2 lbs.) of salt. This should calm the fish down while in the boat. When transferring them to the hatchery this same concentration can be used for the transfer tanks.

When selecting a site to gather brood fish pick one that is accessible by a truck. This way you can easily transfer the fish from the boat to the truck. Once shocking has begun and you have netted the first fish, try to have the fish in the hatchery within 30 minutes. That means shocking for 5 minutes, transferring to truck 5 minutes, hauling to hatchery 20 minutes. The fish cannot be over crowded during the haul to the hatchery-around 5-8 fish will be best, depending on the size of the tanks being used for transfer.

Once the fish have arrived at the hatchery, they can be held in the raceway for 1 day. This will give them some time to get acclimated to their new surroundings. The next day the brood fish need to be started on a formalin treatment schedule to help clean themselves of those unwanted external parasites. We have used a 1:10000 mixture for the brood fish and this seems to be sufficient. This bath needs to be

administered every other day for at least 2 weeks. Treatment with Formalin will be needed for the brood fish for their entire life in the hatchery.

For a more detailed method of administering the formalin bath and concentration calculations, see Attachment 2.

Egg Disinfectant

Once the broodfish have done their thing and we have fertilized eggs on the mats we need to remove them to the hatchery troughs for incubation. All spawns need to be treated with a 250 ppm formalin bath for 1 hour. This treatment must be administered each day until they hatch.

1. Determine the volume of the trough. (Length x Width x depth). Make sure you convert the inches into a decimal. This answer will be cubic feet.
2. Once you have the volume of water we need to convert this number into an easier to measure form. Lets convert the cubic feet of water to LITERS. (The conversion is 28.32 liters = 1 cubic foot).
3. Now we need to calculate the amount of liters of formalin to add. The recommended dosage is 250 ppm. This is also shown as 250 mg/l and .025% treatment levels. We will use the .025% number. All we need to do is show the percentage as a decimal (.025 / 100) this comes out to be .00025. Multiply this number by the total amount of water in the trough (liters). This is the amount of formalin you need to add to the trough.

Example:

1. Trough volume
Ht: 18.5 inches = 1.54 ft.
Width 29.0 inches = 2.42 ft.
Length = 24.0 ft

$$L \times W \times H = 89.4 \text{ cubic ft.}$$

2. Convert this to liters of water. 89.4 cubic ft. x 28.32 liters/cubic foot.
2,532 liters of water.
4. Recommended dosage (250 ppm or .025%). All we need to do is to convert the percentage into a decimal (divide .025 by 100) = .00025. Multiply this number by the volume of water in the trough to get (2,532 x .00025) the amount of formalin to add. Answer: .633 liters.