

# Trout Production at the Bobby N. Setzer Fish Hatchery

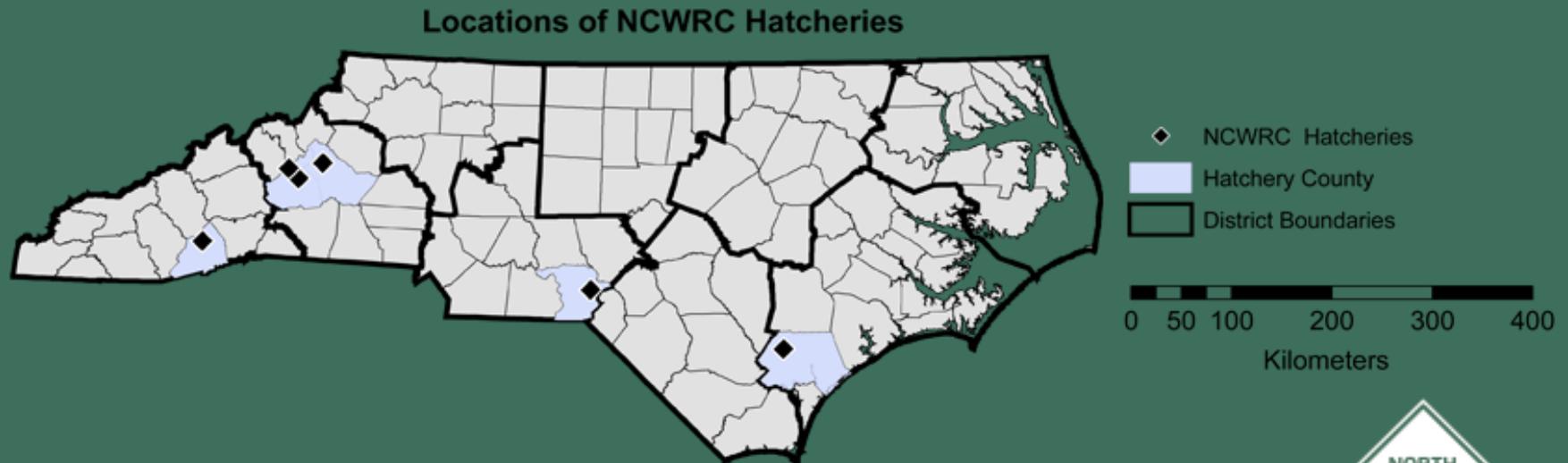
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A informational slide show on how trout are reared. Prepared by NCWRC staff for the Trout in the Classroom program.

# NC Wildlife Resources Commission Fish Hatcheries

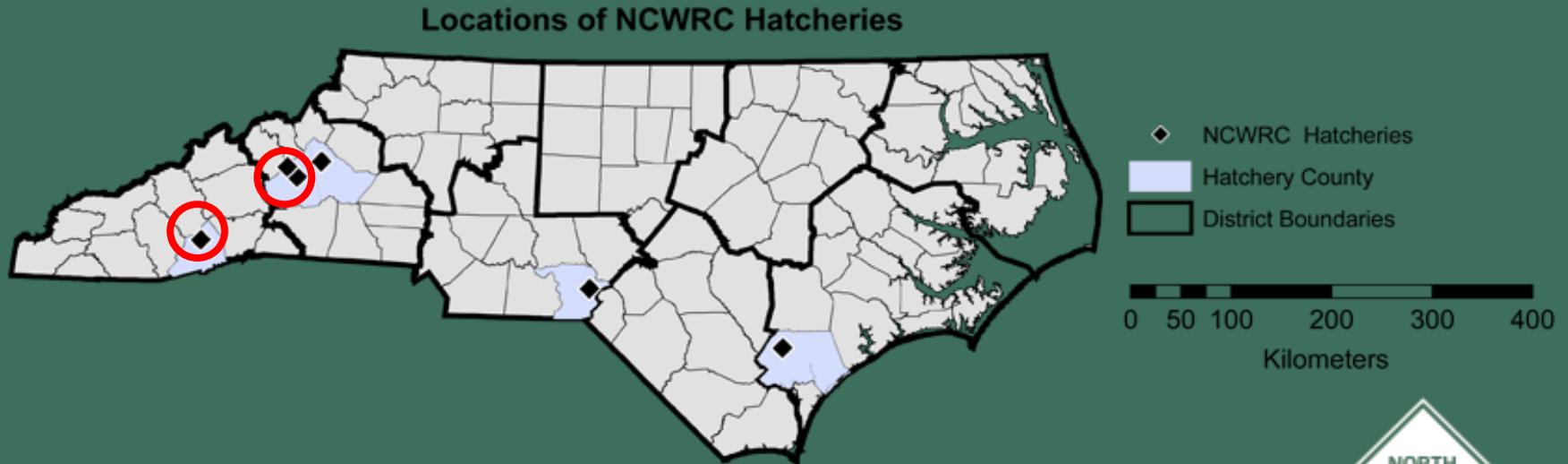
The NC Wildlife Resources Commission operates six fish hatcheries that raise a variety of fish for stocking into North Carolina's public waters. These fish include trout, striped bass, musky, catfish, walleye, shad, bass, and sunfish.



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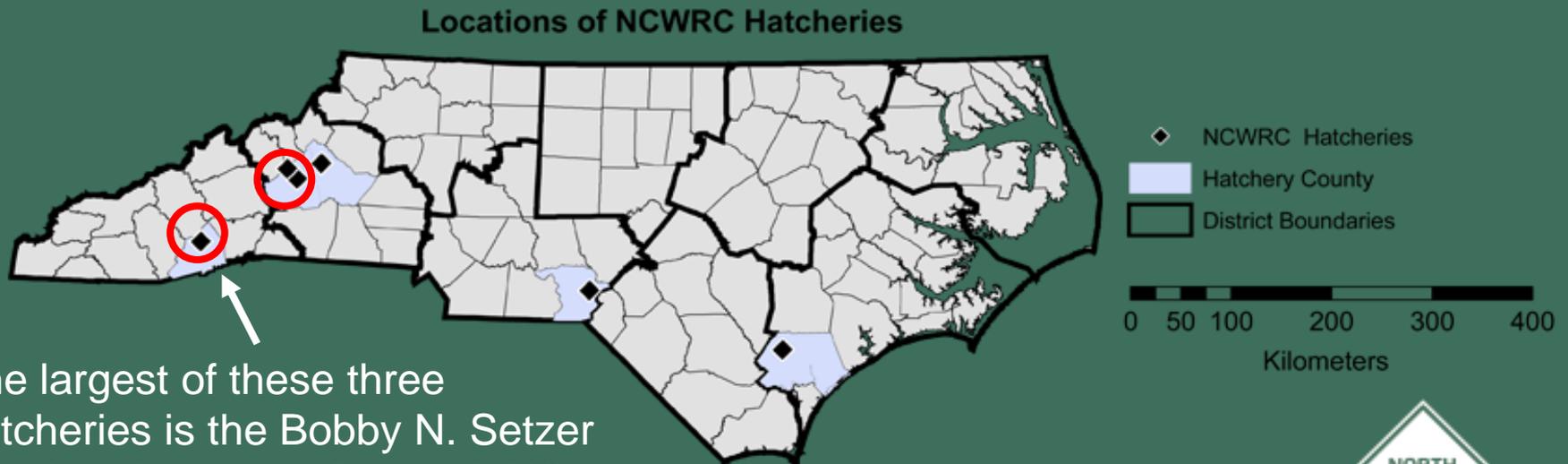
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The largest of these three hatcheries is the Bobby N. Setzer Fish Hatchery near Brevard, NC.



# NC Wildlife Resources Commission

## Bobby N. Setzer Fish Hatchery

Produces more than 500,000 trout annually

While the majority of trout are stocked into NC waters, the Setzer hatchery also provides fish for other states



# Species of Trout Reared at Setzer Hatchery

- There are many species of trout in the world, but only three that are raised at NC hatcheries



Brook Trout – the only trout native to NC

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Brook Trout – the only trout native to NC



Brown Trout – originally from Europe



Rainbow Trout – originally from western US



# Trout Spawning



- Spawning is done in late fall, once water temperatures have cooled
- For each species, the sperm (often called milt) is collected from male trout and mixed with eggs from female trout

# Diploid Trout vs. Triploid Trout

- Trout are typically diploids, meaning they have two sets of chromosomes.
  - Diploid fish are primarily used for reproductive purposes, and are only stocked in unique situations
  - They are typically not stocked into public waters since they can reproduce, and might interfere with wild trout populations
  - In an effort to preserve wild trout genetics, only sterile, triploid trout are stocked



# Diploid Trout vs. Triploid Trout

- Triploid trout have three sets of chromosomes
- Triploid fish grow and function like regular, diploid trout, but are sterile

## Here's How It Works:

- A fish egg prior to fertilization has two sets of chromosome. For a brief moment in time after being fertilized by the sperm, it has three sets of chromosomes
- Normally after fertilization, the egg kicks out one of it's original sets of chromosomes, leaving it with one from the egg and one from the sperm = diploid
- However, heat and/or pressure can cause the egg to keep it's extra set of chromosomes, leaving it with three sets of chromosomes = triploid
- To create a triploid fish, the eggs are placed in a pressurized cylinder immediately after fertilization



# Triploid Trout



- Typical pressure chamber used to make triploid trout

# Quantity Calculations

After triploiding, a Von Beyer Trough is used to calculate the number of eggs/ounce.



# Green and Eyed Eggs

- Green eggs: eggs that do not yet contain developed fry
- Eggs can remain in this stage 3 to 8 weeks until developing fry can be visually seen inside the eggs' hull
- Eyed eggs: eggs that have a visibly developing fry
- The actual fry eye is typically the first indicator
- Once eggs show a visible eye, they typically hatch within 5 to 14 days



# Egg Incubation/Hatching Trays

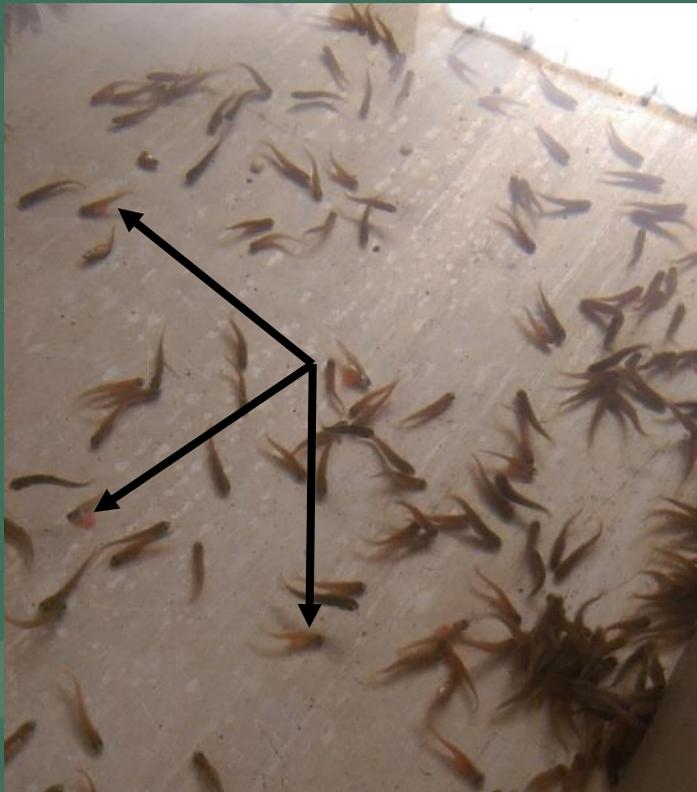


- Eggs are moved to incubation trays
- Specific water temperature and flow rates (gallons per minute) are configured
- Eyed eggs are routinely inspected and any dead eyed eggs are removed - this reduces bacterial and fungal infections



# Fry: Egg Sack and Feed-Stage Fry

- After hatching, fry receive nutrition through a abdominal sac called an egg sac
- Usually this stage lasts 1-3 week
- After the egg sac is diminished, the fry will begin swimming and searching for food
- After this occurs, the fry will be transferred from hatching trays to inside raceways



# Fry and Fingerling Husbandry

- Clean raceways
- Feed fish
- Disease recognition and treatment
- Check water flows
- Monitor fish densities



# Sampling for Numbers and Moving Fish to Outside Raceways

- Once fish reach 2-4", the fingerlings are moved from indoor raceways to external raceways
- Number of fish/pound is calculated by taking the weight of a net of fish, then counting them
- A total of five samples is taken to obtain a mean



# Life in the Raceways

- Feed size is dependent on fish size
- Feed rates are determined by species, size, density, and flow



Daily raceway duties include:

- Cleaning raceways
- Keeping track of mortalities
- Monitoring feed rates for growth
- Adjusting raceway length



# Feeding and Feed Types

- 26 different types of feed are used at the hatchery
- Each food has a different protein content



- Truck feeding (bulk feeding)



- Hand feeding



# Flow Management and Dissolved Oxygen Levels

- Over 7 million gallons of water pass through the hatchery each day
- During times of low flow, water can be recirculated and added to fresh water intakes



- Due to high fish densities, oxygen is added to the water

oxygen tank



water diversion structure



# Disease Management Treatment

Low doses of formalin and hydrogen peroxide are circulated onto the eggs, and antibiotic coated feed is used to treat fish



# Predation and Scavenging

- Predation can cause declines in hatchery inventory, affecting stocking goals
- Avian species prey on fish
- Otters also target trout in raceways
- Raceway screens reduce bird predation
- Lights and predator recordings deter some animals from the raceways



# Environmental Impacts

The water that feeds our hatcheries and the streams where we stock trout can be affected by several issues

- Acid rain reduces pH levels, affecting fish health
- High development and poor land management practices can lead to excessive storm water runoff and erosion
- Low rainfall and high air temperatures raise water temperatures



# Loading Trucks for Stocking

- Trucks are equipped with aerators and oxygen
- Salt and ice are added to the tanks prior to loading fish to reduce stress
- Loading the trucks involves corralling the fish, netting and weighing the fish, and putting them into the truck

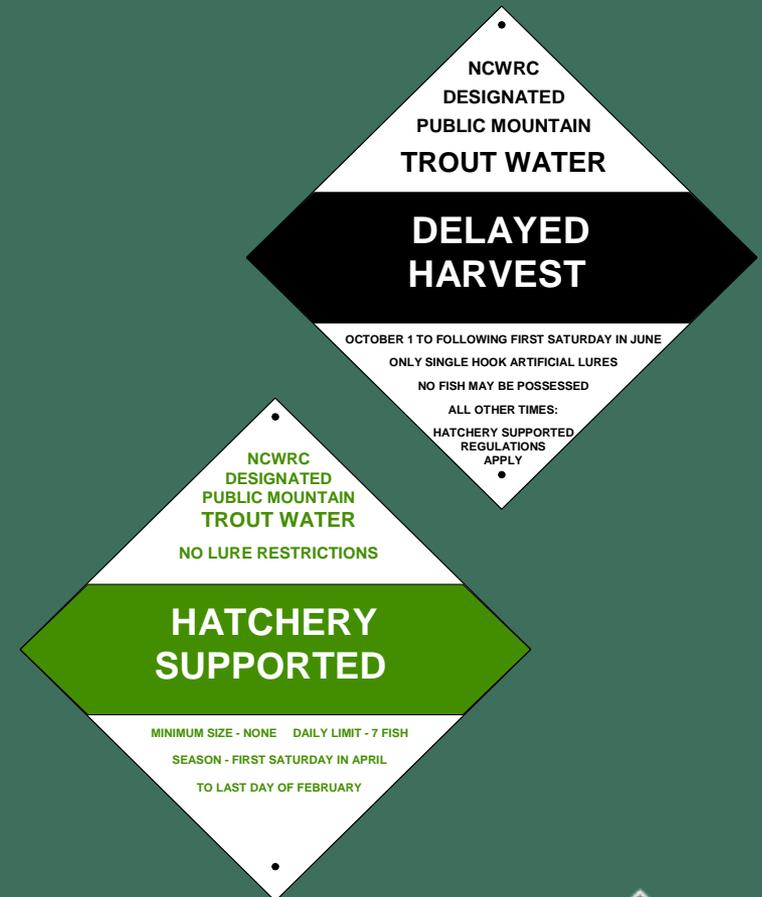


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# How many fish do we stock in a stream or pond?

- Biologists must collect habitat data (surface acres) to determine the number of fish to stock each time
- Delayed Harvest streams receive 150 fish/acre, and are stocked in early March, April, May, October, and November
- Hatchery Supported streams receive a variable rate of trout based on habitat, angler use, ease of access, and summertime water temperatures



# Trout Stocking

- NCWRC Hatchery staff stock > 200 streams and lakes a year, covering 25 counties in western NC
- Fish are transported from truck to stream using nets or buckets – fun, but hard work!



Our hatcheries produce and stock them, but it's up to you to catch them!



Thanks to the following NCWRC staff for  
contributing photos and materials

Jennifer Rowe

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Adam Moticak

Bobby N. Setzer Fish Hatchery Staff

