

# TAKING STOCK

How and why hatchery trout are used to create fisheries in North Carolina

written by Jacob Rash

photographed by Thomas Harvey

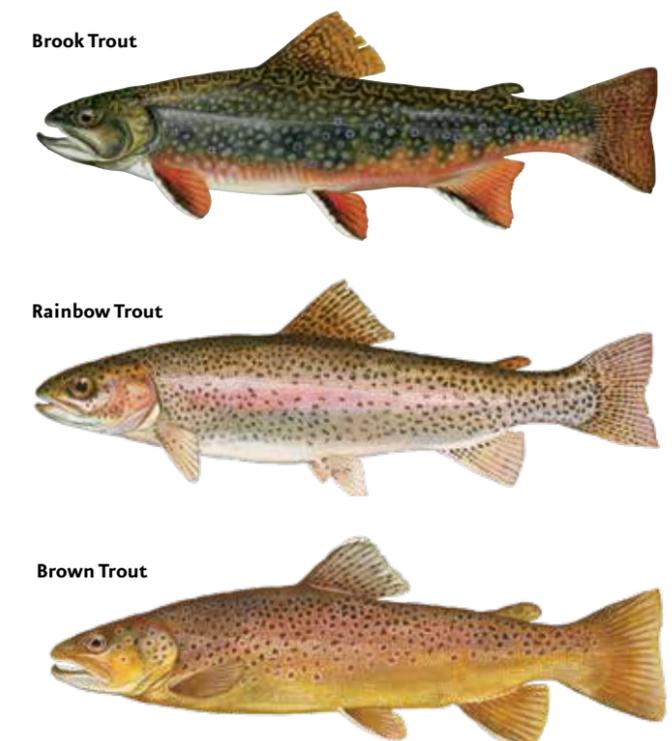
If you look closely you'll realize this is a mass of trout eggs, or roe. Every year the N.C. Wildlife Resources Commission stocks trout in over 900 of the approximately 5,400 miles of water in its Public Mountain Trout Waters.

**IT IS HARD TO SAY WHEN THE FIRST HATCHERY-RAISED** trout was stocked in North Carolina, but historic records point toward the early 1880s and the introduction of rainbow trout from California. Since that time, the use of stocked trout has become a consistent management tool for the N.C. Wildlife Resources Commission. In fact, a little over 18 percent of the approximately 5,400 miles of water in the Commission's Public Mountain Trout Waters (PMTW) are managed via trout stockings, while the remainder depend on self-sustaining populations to provide fisheries.

It is unlikely that the folks involved with those initial stockings in the late 19th century could have imagined how far things have progressed from the milk cans and railcars they depended upon to move fish. Today, state-of-the-art facilities and hauling trucks help the Commission stock roughly 1 million trout annually, but these advances in technology and husbandry are only part of the story.

At the end of the day, stocking comes down to releasing fish into the water, just as it was over a century ago. But Commission staff like myself—I serve as the coldwater research coordinator in the Inland Fisheries Division—must consider a variety of factors prior to using stocked trout as a management tool. With the miles of flowing water (from small creeks to large rivers) and acres of impoundments that range in size from sizable power-supply reservoirs to municipal lakes in the state, there are numerous opportunities to stock trout. However, the Commission wants to ensure that we are using stocked trout as efficiently and effectively as possible.

Let us explore some of the common questions regarding stocked trout management to learn more about how and why the Commission gets to the moment of releasing a trout into your favorite water.



ILLUSTRATIONS BY DUANE RAVER



**Left:** Trout from the Armstrong State Fish Hatchery are released, including a large one. Four percent of all stocked trout are over 14 inches long. At the Erwin (Tenn.) National Fish Hatchery, trout are corralled prior to propagation and the triploid process via a partnership with the N.C. Wildlife Resources Commission. **Opposite:** A mixed net of trout are released into the North Toe River in Avery County.

#### Why does the Commission stock trout?

The Commission stocks trout to provide recreational opportunities for anglers. Although the Commission prioritizes management of the state's self-sustaining trout, many waters lack wild trout or support low-level wild trout populations that are inadequate to maintain self-sustaining fisheries. Hatchery trout may be used in these situations to improve or create angling opportunities. Because we control the number and size of trout stocked, as well as the frequency of stocking, a diversity of fishing opportunities can be provided for anglers through our stocked trout management.

#### What kind of trout does the Commission stock?

The Commission stocks a mixture of trout at a targeted ratio: brook trout (40 percent), brown trout (20 percent) and rainbow trout (40 percent). As noted previously, approximately 1 million catchable trout are stocked annually. They average 10 inches in length, with 4 percent of the fish exceeding 14 inches, giving anglers an opportunity to catch a large, trophy trout.

#### How does the Commission grow and stock trout?

The Commission has four hatchery facilities to support the production and stocking of trout. Armstrong and Bobby N. Setzer state fish hatcheries are the Commission's primary production facilities, while Table Rock and Marion state fish hatcheries hold trout seasonally and support the program through stocking assistance and fingerling production. Brown trout and brook trout eggs are produced at Commission facilities during the fall of each year, and thanks to a partnership with the U.S. Fish and Wildlife Service's Erwin National Fish Hatchery, rainbow trout eggs are received as needed. On average, it takes about 12 months to raise an egg to our target stocking size of 10 inches. The larger trout require about eight more months of growth to exceed 14 inches in length.

As with any large-scale, husbandry effort, a lot of care is placed into these animals. Commission staff work year-round on trout production, from daily feedings to water quality monitoring to fish health screening to constant vigilance during storm events so water intakes do not get blocked. Staff also monitor production plans closely to ensure that fish are of target size at time of stocking. Once of size, trout are loaded on stocking trucks that can hold several thousand trout for distributing.

#### Where does the Commission stock trout?

Hatchery Supported and Delayed Harvest are the primary classifications within PMTW that depend on stocked trout, and these classifications are popular with anglers (over 1.1 million days were spent fishing them in 2014, according to the most recent survey). Hatchery Supported waters provide seasonal fisheries by stocking trout at frequent intervals in the spring and early summer. These trout are immediately available to harvest (opening day is the first Saturday in April).

Delayed Harvest waters provide seasonal catch-and-release fisheries (Oct. 1 to the first Saturday in June) by stocking trout during the fall and spring when water temperatures are suitable for trout. Since the stocked trout typically would not survive the warm summer months, we encourage harvest of trout via no size limits and liberal creel limits starting the first Saturday in June.

Stocking locations can be determined by important factors such as public access, stocking access, expected fishing pressure, in-stream habitat, average stream flows and seasonal water temperatures. Of these parameters, suitable habitat and public access are key because they determine if trout can survive and anglers have opportunities to access the resource. Currently, a large portion of PMTW are on private lands, where angling access is provided by the generosity of landowners. We work to retain these waters in PMTW, but

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# TRIPLOID TROUT



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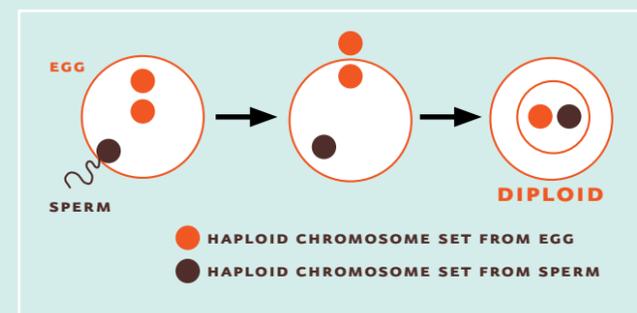
## What does triploid mean and how is the process of making trout sterile accomplished?

- A fish egg prior to fertilization has two sets of chromosomes but, 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 set of chromosomes, leaving it with one from the egg and one from the sperm (diploidy)
- However, the Commission uses hydrostatic pressure to cause the egg to retain the extra set of chromosomes immediately after fertilization, leaving it with three sets of chromosomes (triploidy)
- The additional set of chromosomes renders the fish sterile
- Triploid fish are not genetically modified animals

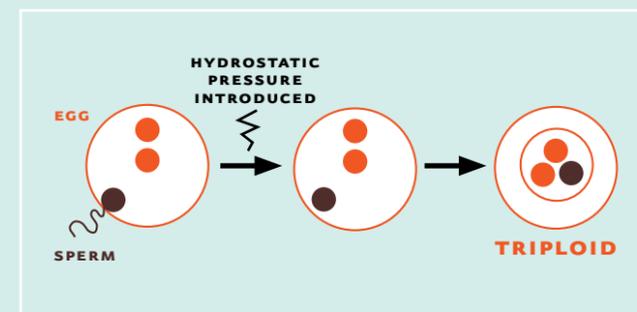
## Why does the Commission produce sterile trout?

- Provides a greater level of control over stocked salmonids
- Protection of the genetic integrity of native brook trout populations
- Produces higher quality large trout (4 percent of stocked trout exceed 14 inches in length)
- Lack of gonad development in larger fish held in captivity may assist with maintaining fish health
- Several state management agencies utilize this technique, but the Commission was one of the first in the eastern United States by incorporating it in 2007

### NORMAL DEVELOPMENT



### INDUCTION OF TRIPLOIDY



1. Rainbow trout are netted and placed into a holding tank. 2. A hatchery technician strips eggs from a female rainbow trout. 3. A technician strips milt (sperm) from a male rainbow. 4. Fertilized eggs are put into a tube before being placed in a hydrostatic pressure chamber. 5. The tube is lowered into the chamber. 6. Water with iodine for egg disinfection runs out as a technician closes the machine. 7. Eggs are transferred to buckets and taken into the hatchery, where they will incubate.



How Do Trout Use An Adipose Fin?  
See Nature's Ways, page 43.

JACOB RASH/NCWRC

Opposite: An angler fly-fishes the North Toe River, one of the many Public Mountain Trout Waters the Commission stocks with trout. Above: Brown trout congregate in a raceway at a hatchery.

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unfortunately, we occasionally must remove waters from the program if public access becomes too restricted.

#### **What are triploid trout and how do Commission biologists create them?**

Triploid trout are sterile and cannot reproduce successfully because they have three sets of chromosomes (triploid) instead of the normal two sets (diploid). The use of sterile, triploid trout in stockings is a practice that several states use in our region. Our production program has utilized triploid trout for all three species (brook trout, brown trout and rainbow trout) since 2007. By utilizing these sterile fish, we have a greater level of control over our stocked trout.

Potential impacts to wild stocks, especially native brook trout, are greatly reduced in the event these fish leave a stocking location (emigration or illegal transport). In addition, the lack of gonad development in larger fish held in captivity can assist with maintaining fish health. Disrupting gonad development and subsequent egg production prevents the fish from having to reabsorb eggs, which is a stressor to the animal. You can also see increased growth within triploid trout—this is especially true in our larger fish (greater than 14 inches long) when they should be diverting energy into reproduction.

#### **Why aren't trout used to create or supplement wild populations?**

North Carolina has a vast number of trout populations that maintain themselves via natural reproduction. These populations are driven by the environments in which they live (like available habitat, food, temperature and flow). As a result, each water has a population carrying capacity—or the rough number of fish that the water can

support naturally—so adding more trout to an existing wild trout fishery will not result in more or larger wild trout through time.

#### **What is the harm of self-stocking a water?**

A permit issued by the Commission is required to stock any fish in North Carolina. This permit is free; plus, it allows biologists to provide useful information that can save you time and money. Stockings can have major unintended consequences, such as disease introductions, degradation of native brook trout stocks and establishment of unwanted populations. Also, remember that it is illegal to move fish from one body of water to another, even if they are captured with hook and line.

#### **Want to learn more?**

Hopefully, this information has helped to shed light on how and why the Commission uses stocked trout to establish fisheries in North Carolina. These resources are an integral part of Public Mountain Trout Waters, with Hatchery Supported and Delayed Harvest Trout Waters being the most fished among PMTW classifications.

Please visit [ncwildlife.org/trout](http://ncwildlife.org/trout) to learn more about these classifications, stocking dates, PMTW locations and more. Come see the fish in person at the Pisgah Center for Wildlife Education (adjacent to the Bobby N. Setzer State Fish Hatchery) near Brevard or Armstrong State Fish Hatchery, north of Marion, where the public can view trout during normal business hours. ♦

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