



Habitat Characteristics and Management of Brook Trout in New Hampshire



Physical Characteristics

Olive-green coloration with several yellow and blue spots

Males develop deep red coloration at spawning time

Male

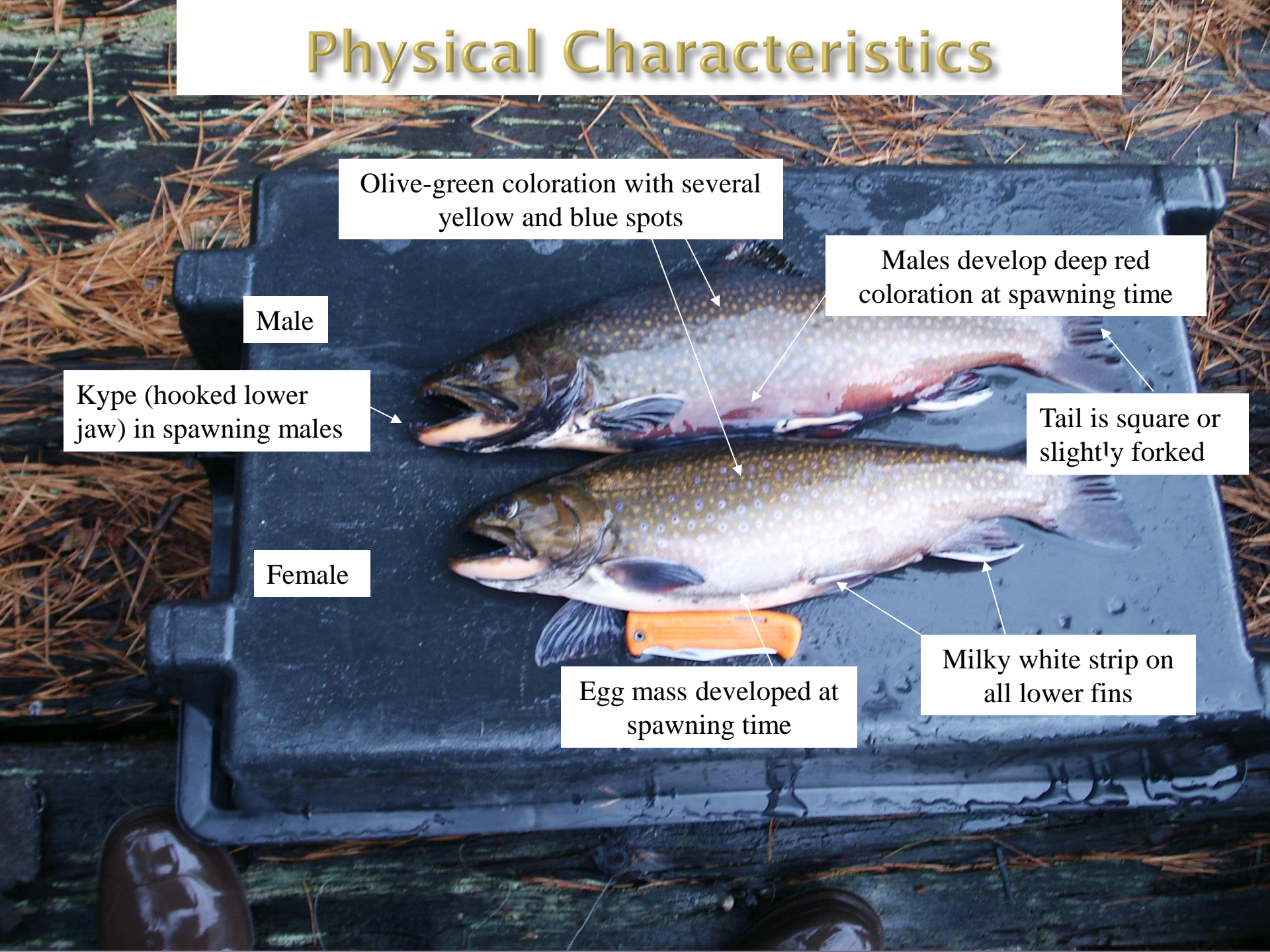
Kype (hooked lower jaw) in spawning males

Tail is square or slightly forked

Female

Egg mass developed at spawning time

Milky white strip on all lower fins





Maxilla

Pectoral Fins

Parr Marks

Pelvic/Ventral Fins

Dorsal Fin

Adipose Fin

Anal Fin

Caudal/Tail Fin

Habitat Requirements

- Well oxygenated and cold water
- Streambed material (substrate) can range from bedrock to mud. Sufficient areas of gravel are necessary for spawning
- Springs or cooler water temperatures below a summer thermocline are required for brook trout to inhabit lakes/ponds
- Stream Opportunists: Found from high gradient mountain streams to slow moving meadow brooks



Food Sources

- Primarily feeds on all life stages of aquatic insects (e.g. stonefly, caddisfly, mayfly)
- Smaller trout will feed on zooplankton
- Other fish make up a small part of the diet



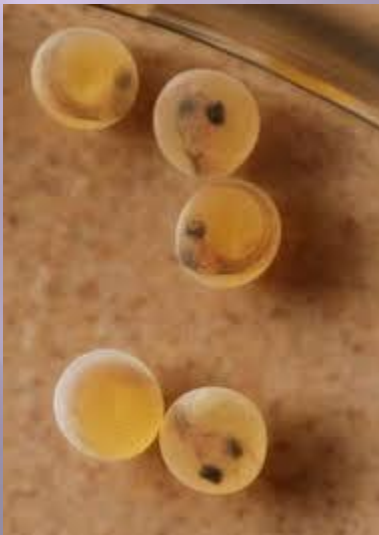
Spawning

- **Temperature driven**
 - ❖ **Wild fish-September thru October**
 - ❖ **Hatchery fish-November thru early December**
- **Brook trout seek cooler, well oxygenated gravel substrate**
- **Females dig small nests called “redds”**
- **Eggs and milt are deposited together in the redd**
- **Very stressful to males and females**



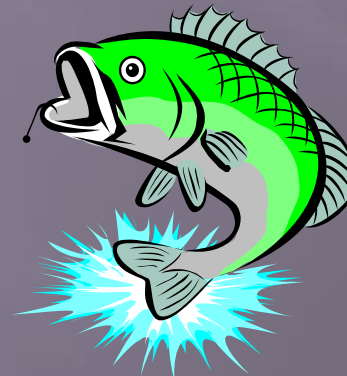
Life Cycle

- After fertilization, development occurs inside the egg
- Once fully developed, the trout hatches (hatch time is temperature dependent)
- Newly hatched brook trout (sac fry/alevin) use their yolk sacs for food
- Upon yolk sac absorption, the brook trout fry swim up from the substrate in search of food and to establish territories
- Growth rates are significantly dependent on habitat characteristics (e.g. food availability, water temperature)



Threats to Brook Trout

- Urbanization
- Sedimentation
- Stream Fragmentation
 - ❖ Dams
 - ❖ Poor Stream Crossings
- Non-Native fish
- Acid Deposition
- Overfishing



Poor Riparian Zone Management



Extreme vegetation removal along waterbodies can:

- Increase water temperature
- Increase pollution from runoff
- Decrease buffering capacity
- Reduce streambank stability and increase sedimentation
- Reduce cover for fish and wildlife



Sedimentation and Erosion



Barriers to Dispersal

- Poorly designed crossings can limit passage of aquatic species
 - ❖ If crossings are undersized, there is a greater chance of becoming perched or blown out



- Direct mortality to turtles and amphibians can occur when they must cross roads

Acid Deposition

Primary Sources: Fossil fuel combustion and automobile exhaust

- Brook trout are very sensitive to pH fluctuations in water
- Mortality usually occurs when pH levels descend close to 5.0 (juvenile fish are even less tolerant)
- Most of New Hampshire's waters have poor acid buffering capacities (low levels of alkalinity)
- Acid rain can leech metals from the sediment further impacting brook trout
- Snow melt can deliver an acid shock to aquatic systems

Brook Trout Management



The Eastern Brook Trout Joint Venture



Wild Brook Trout Management



Objectives:

- Establish areas that support wild trout populations at sufficient densities (≥ 15 kg/ha [13 lbs/acre])
- Provide angling opportunities without sustaining or supplementing the fisheries with stocked trout
- More restrictive regulations to protect the wild trout population

Management of Stocked Trout

Purpose: To sustain or supplement recreational fishing opportunities in suitable waters



- NHFG annually stocks approximately 1 million trout into New Hampshire's lakes, ponds, and streams
- 318 lakes/ponds and 296 rivers/streams receive brook, rainbow and/or brown trout

Hatchery Techniques



Egg Taking



Egg Incubation



Egg Hatching



Fish Growth and Holding

Survey Techniques for Brook Trout

- Backpack Electrofishing
- Netting
- Tagging
- Creel Surveys

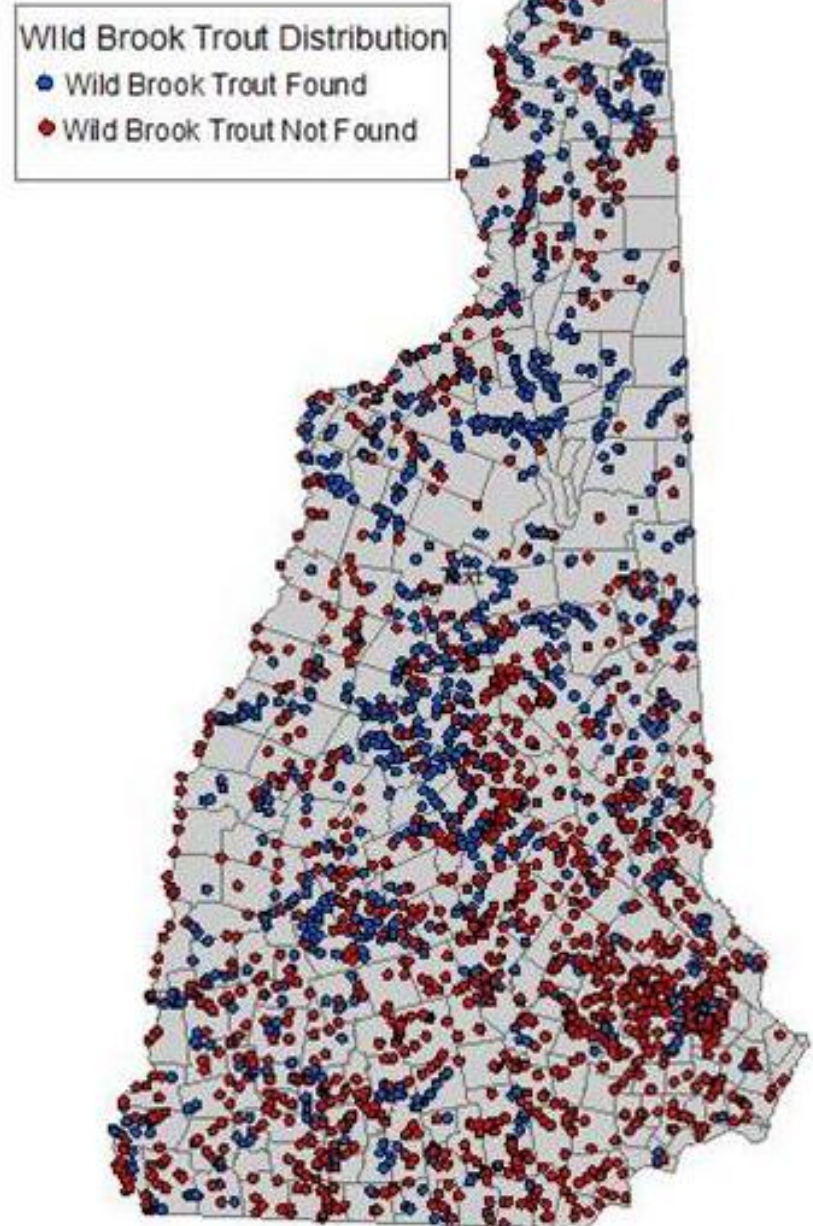


Brook trout assessments and Natural Resource Inventories.



Wild Brook Trout Distribution through 2015

Includes all
statewide sampling
techniques- past
and present



Stream crossing surveys by towns



Barriers to Dispersal



Habitat Improvement



Streambank re-vegetation



Dam removal



Habitat enhancement and restoration



Crossing removal/replacement

Middle Farrer Brook culvert removal November 6—7, 2007



**Pre-removal – looking
upstream**



**Post-removal – looking
upstream**

Horseshoe Brook culvert replacement May 6—10, 2013



Pre-replacement –
looking upstream October



Post-replacement –
looking upstream July 2013

How Can I Help?

- Support watershed education in your community.
 - Help implement the Water Education Plan
 - Take part in Watershed Congresses
- Teach local students - what is a conservation commission?
- Sponsor Citizen Science & intern opportunities.
 - Invasive species inventories
 - Natural Resource Inventory/EBT studies
 - Riparian buffer establishment/maintenance
- Support a Watershed/Trout in the Classroom School.
 - Be a liaison and egg deliverer
 - Fund tank and chiller supplies
 - Be a resource specialist to help with field days at the river
 - Provide resource studies and data

A healthy local stream is the reward for us all





Judy Tumosa, Watershed Education Specialist
NH Fish and Game Department
#603-271-0456, judy.l.tumosa@wildlife.nh.gov

Dianne Timmins, Fisheries Biologist
NH Fish and Game Department
Lancaster Field Office, Region 1