

Gill Lice and Whirling Disease in North Carolina



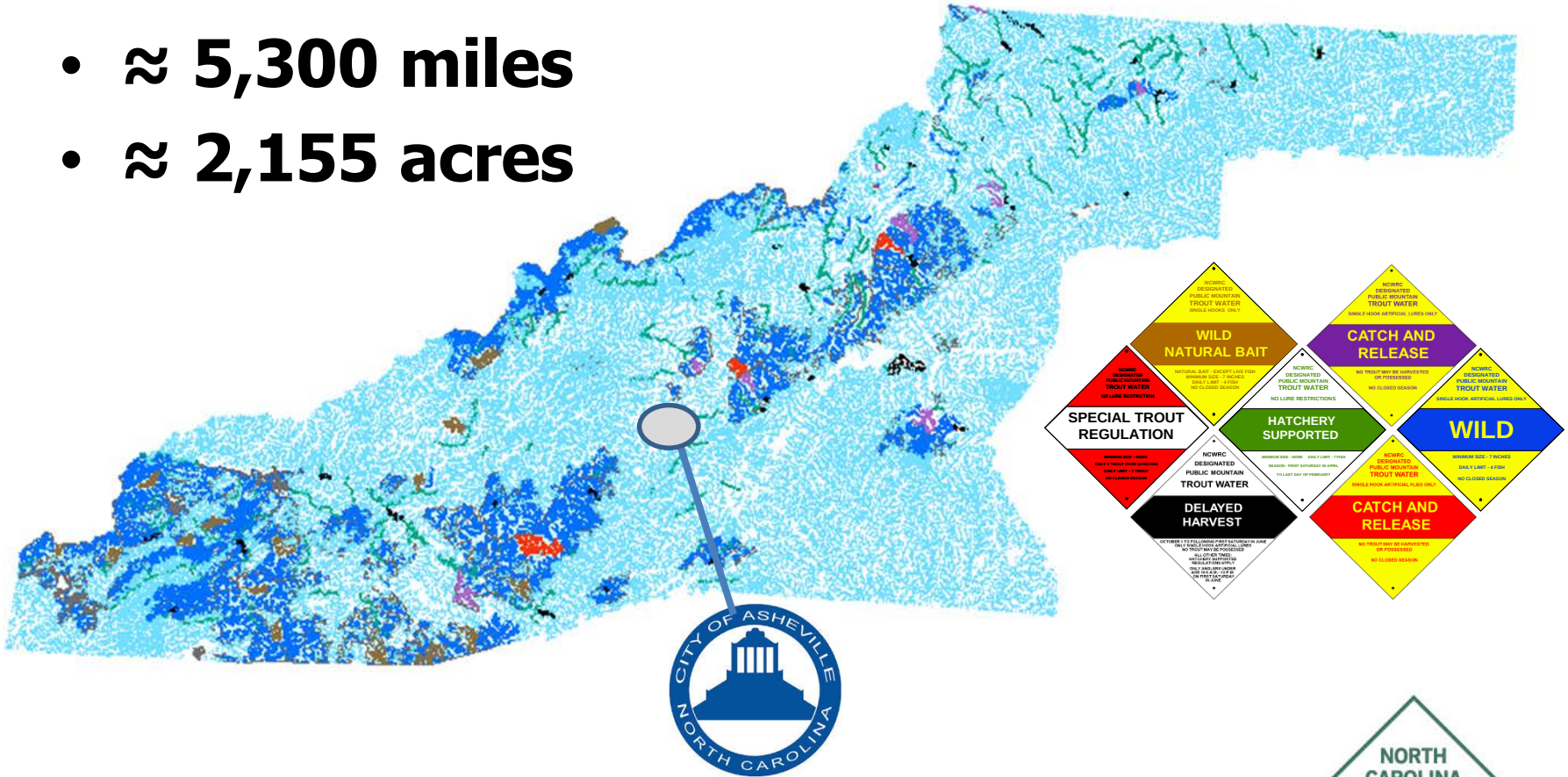
J. Rash, Coldwater Research Coordinator



Sport Fish Restoration Program

Public Mountain Trout Waters

- $\approx$ 5,300 miles
- $\approx$ 2,155 acres



Angler Reports: Whirling Disease

- **Rainbow Trout**
 - Watauga River (1 July 2015)
 - Nantahala River (3 July 2015)
 - Elk River (4 August 2015)
- **Samples provided to Southeastern Cooperative Fish Parasite & Disease Laboratory at Auburn University**



Angler Reports: Whirling Disease

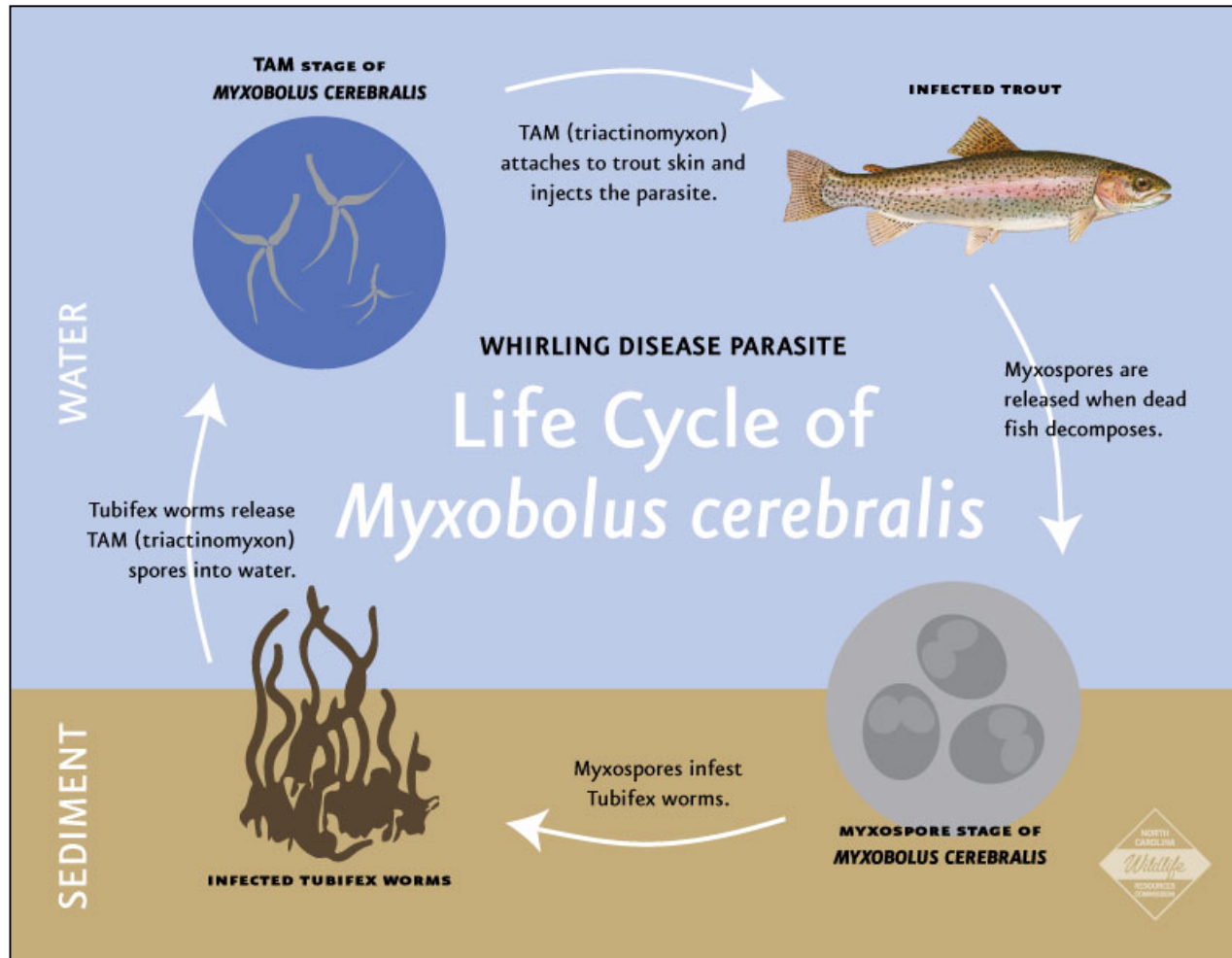
- **Rainbow Trout**
 - Watauga River (1 July 2015)
 - Nantahala River (3 July 2015)
 - Elk River (4 August 2015)
- **Whirling Disease confirmed in Watauga River and Elk River collections**



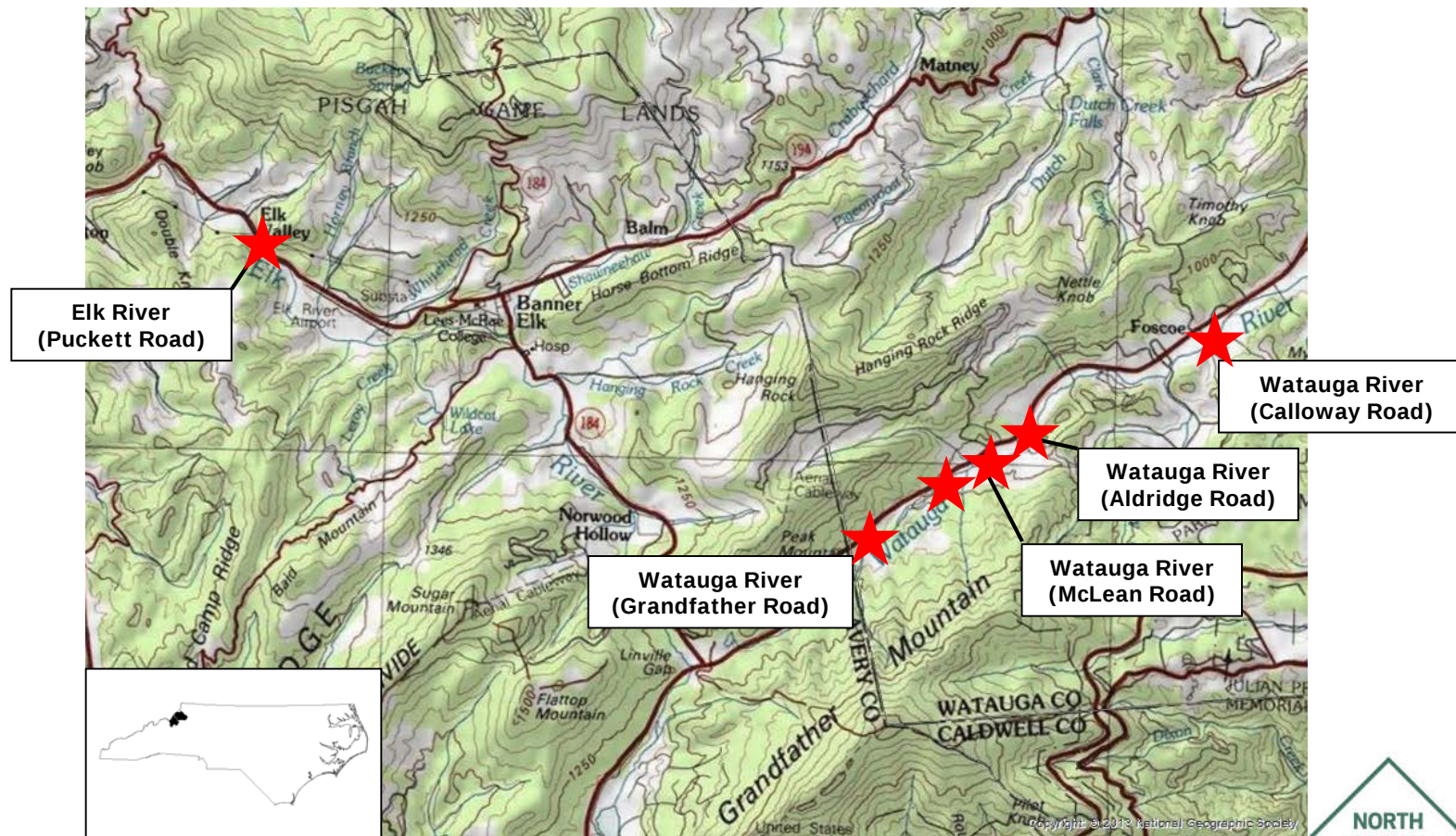
A. Bullard, Auburn University



Whirling Disease Life Cycle



Initial Fish Sampling: Positive Collections (2015)



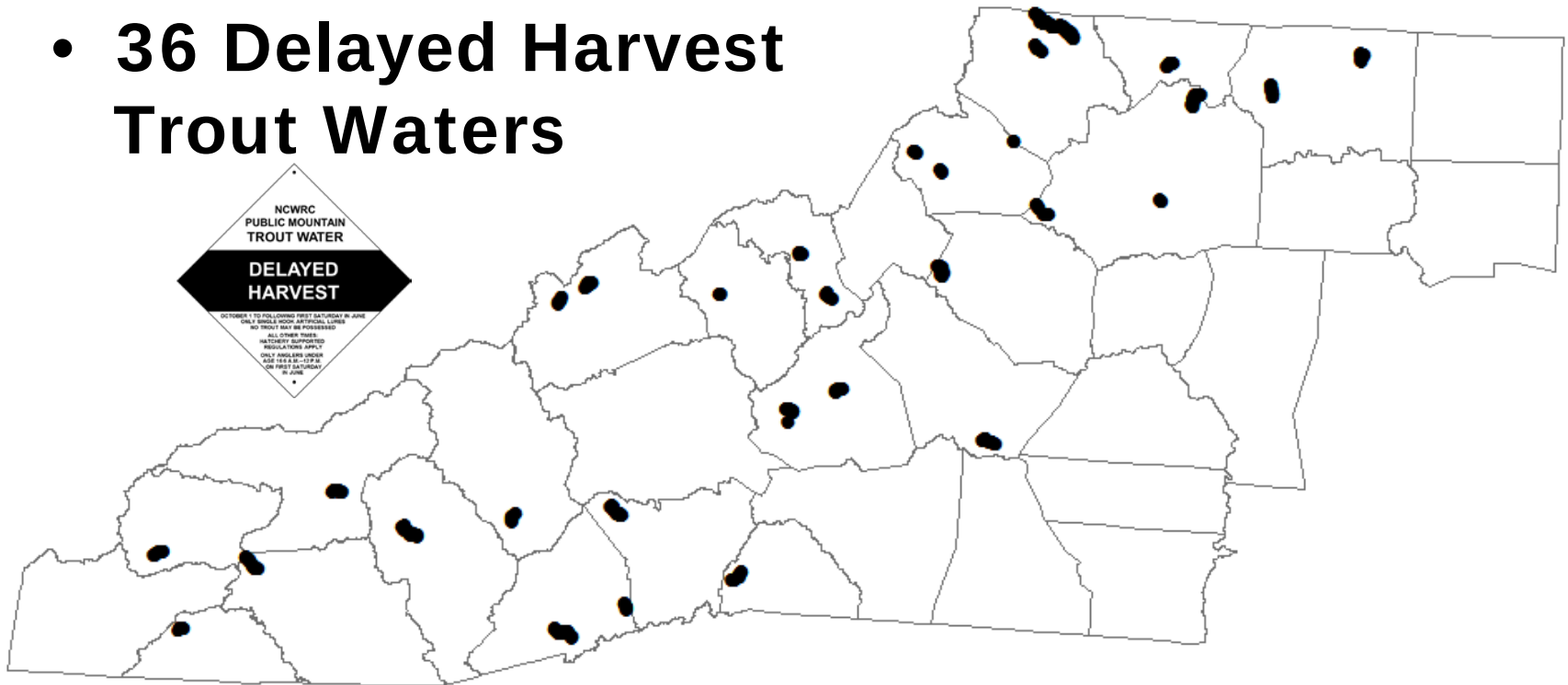
Sampling for *Myxobolus cerebralis* at NCWRC Facilities (2015)

- Fish and oligochaetes were tested
 - No positive fish were found at any facility
 - Marion State Fish Hatchery
 - *M. cerebralis* confirmed in oligochaetes (not fish)
 - Extensive biosecurity measures implemented



Oligochaete Sampling (2015)

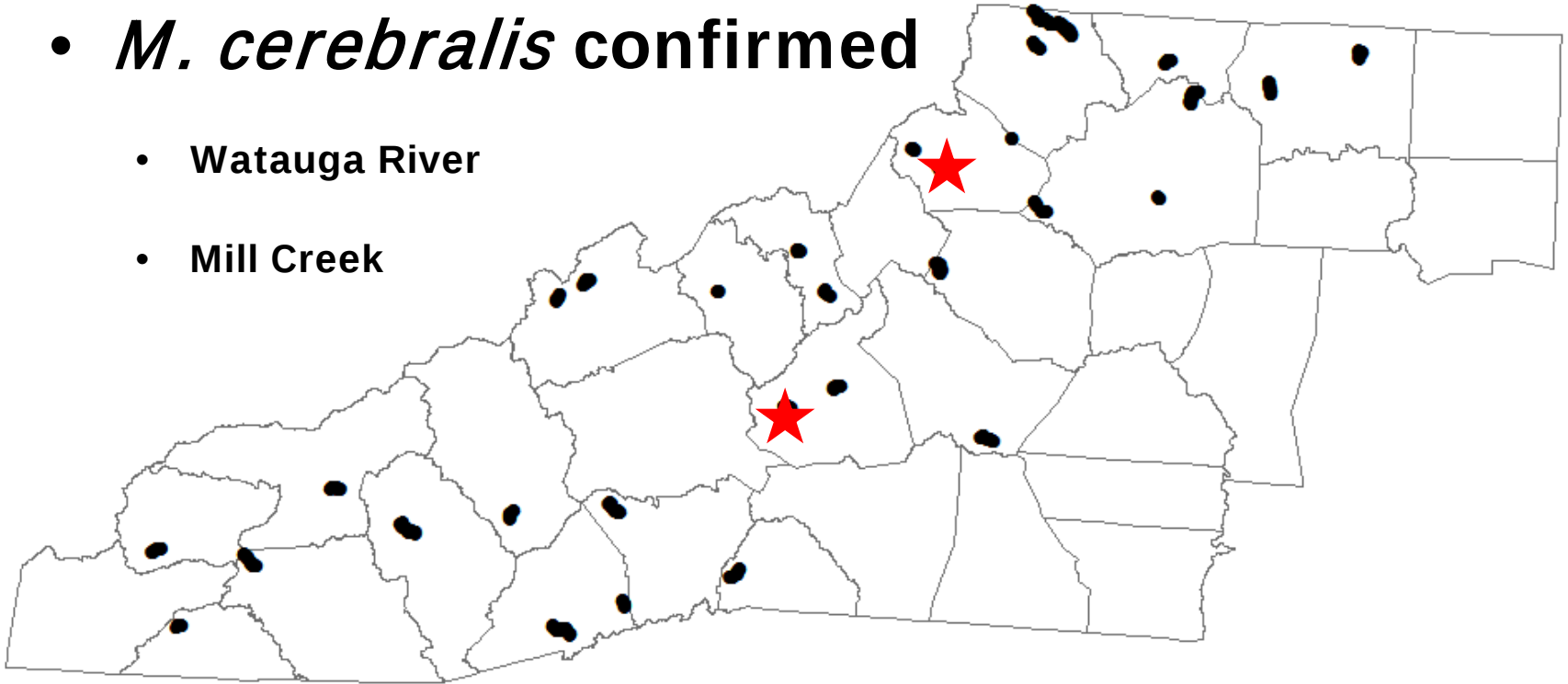
- 36 Delayed Harvest Trout Waters



Oligochaete Sampling (2015)

- *M. cerebralis* confirmed

- Watauga River
- Mill Creek



Wild Trout Sampling



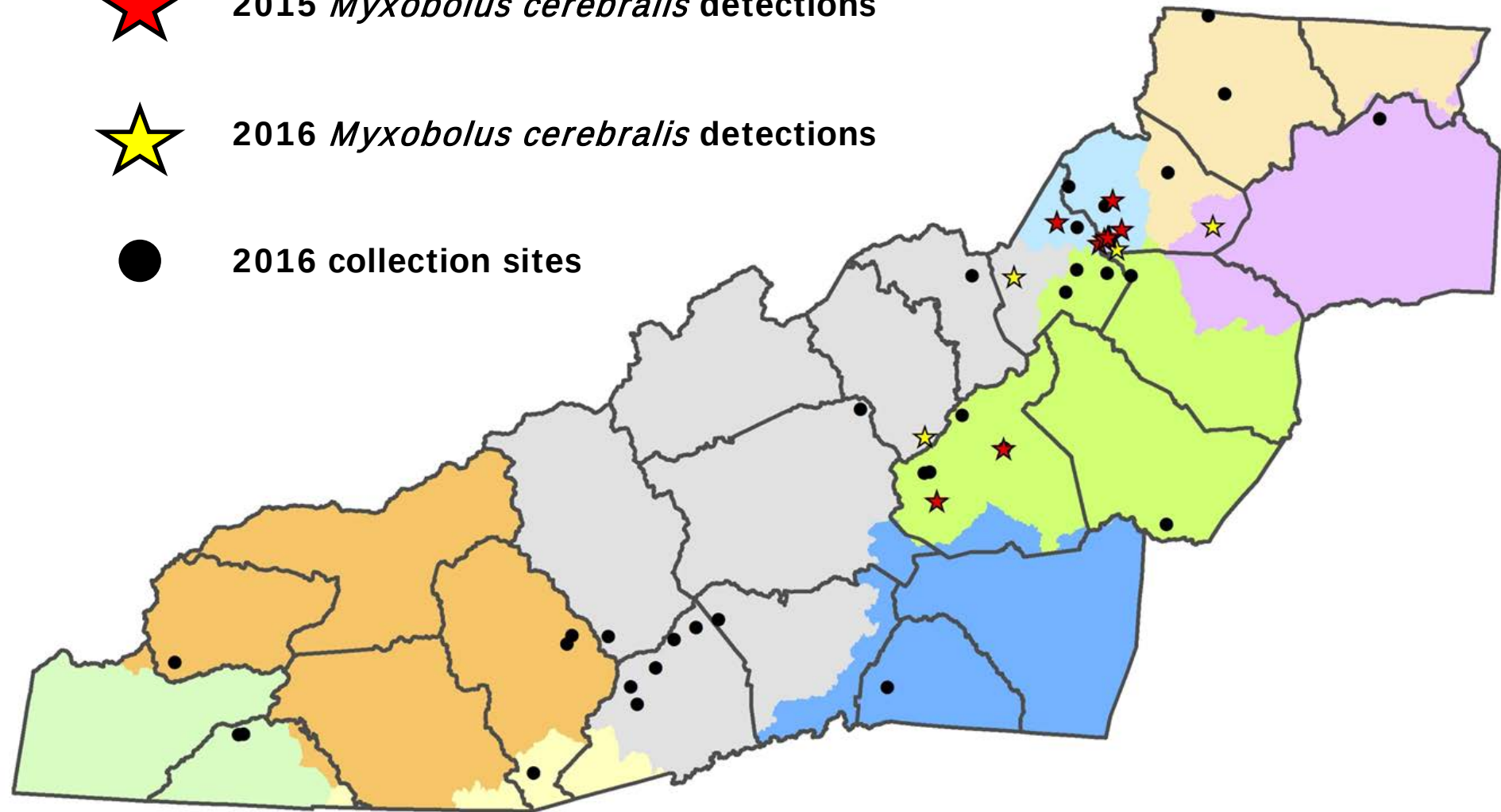
2015 *Myxobolus cerebralis* detections



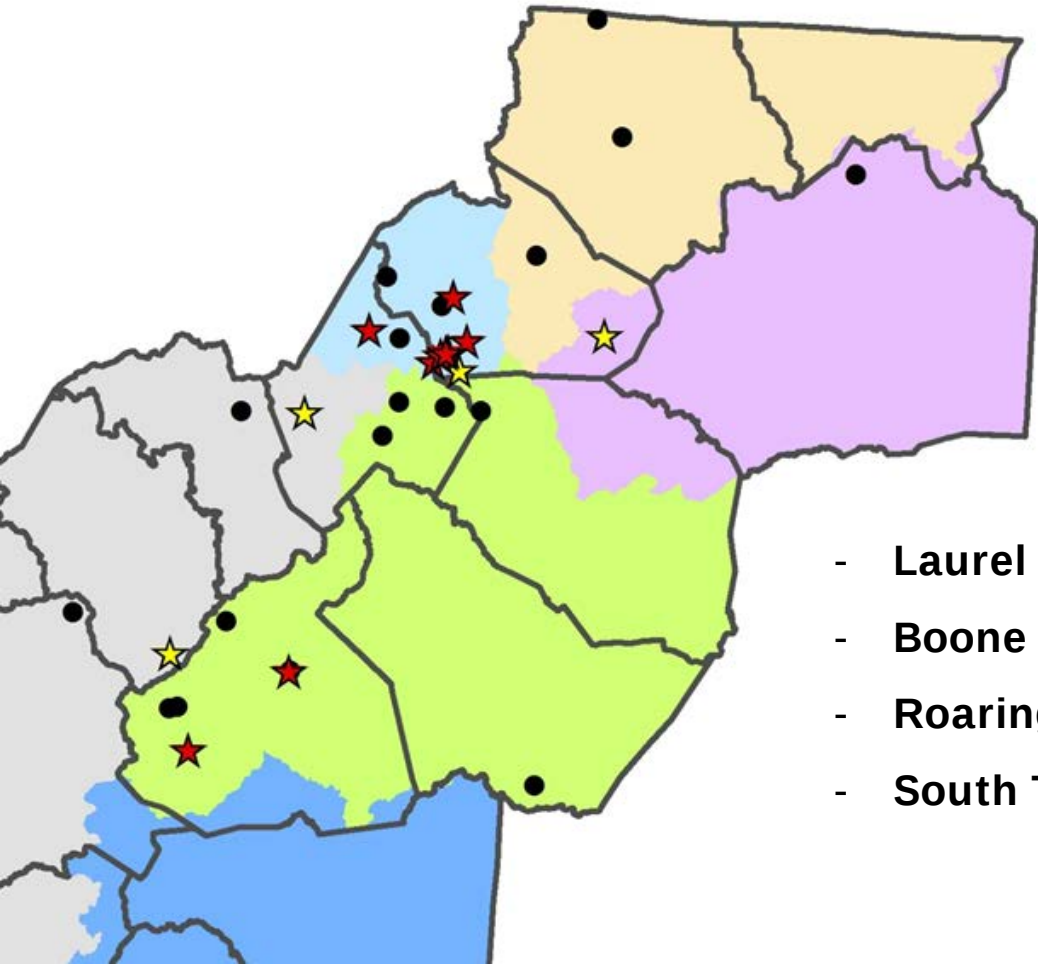
2016 *Myxobolus cerebralis* detections



2016 collection sites



Wild Trout Sampling



2015 *Myxobolus cerebralis* detections



2016 *Myxobolus cerebralis* detections

- Laurel Creek (Yadkin River Basin)
- Boone Fork (Watauga River Basin)
- Roaring Creek (French Broad River Basin)
- South Toe River (French Broad River Basin)



Next Steps

- **Continue to build upon existing data**
 - Manuscript in review
 - Additional research efforts
 - Distribution (current and predicted)
 - Investigate the parasite's ecology
 - Angler reports
- **Private stockings of public waters**
- **Continue to work with N.C. Department of Agriculture**
- **Consultation with management partners**
- **Outreach**



Gill Lice



- *Salmincola edwardsii*
 - Upper Cullasaja River basin, Macon County
 - Cantrell Creek, Transylvania County
- *Salmincola californiensis*
 - West Fork Pigeon River, Haywood County
 - Boone Fork Creek and Watauga River, Watauga County
 - Otter Creek, Macon County
- First documentation of either species of copepod on wild trout this far south





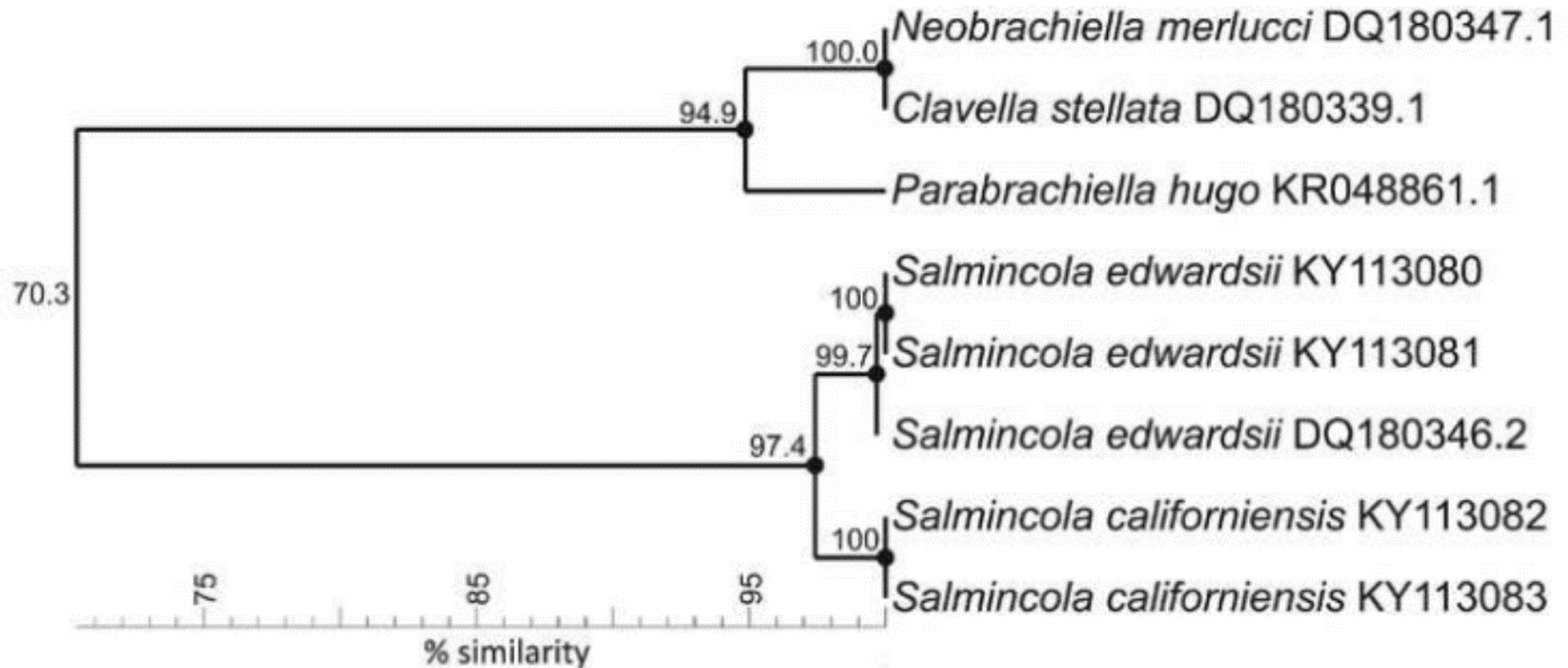






Ruiz et al. 2017

- Document NC collections
- Physical and molecular identification



Future Areas of Focus

- Determine the ultimate distribution
- Direct impacts of gill lice to the individual and population
- Factors that influence the magnitude and duration of infestation cycles
- Transfer mechanisms
- Prevention or containment of the spread
- Public education and outreach



Impacts

- **Biological**
 - To be determined
- **Staff**
 - 28 August 2015 – 13 July 2017
 - 1,247 h
 - 10,595 mi
 - Tradeoffs



Moving Forward

- **Research**
 - **Spatial and temporal distributions**
 - **Elucidation of the fine details of life cycles, incidence of disease, and pathological effects**



Moving Forward

- **Research**
 - Spatial and temporal distributions
 - Elucidation of the fine details of life cycles, incidence of disease, and pathological effects
- **Information exchange**
 - Intra- and inter-agency
 - Constituents



Education: Minimal Steps

- **CLEAN** equipment of all aquatic plants, animals and mud
- **DRAIN** water from boats, live wells and equipment
- **DRY** equipment thoroughly
- **NEVER MOVE** fish, plants, or other organisms from one body of water to another

PROTECT YOUR WATERS

YOU CAN HELP PREVENT THE SPREAD OF AQUATIC NUISANCE SPECIES BY DOING THESE BASIC STEPS:

-  **CLEAN** equipment of all aquatic plants, animals and mud
-  **DRAIN** water from boats, live wells and all equipment
-  **DRY** all equipment thoroughly
-  **NEVER MOVE** fish, plants, or other organisms from one body of water to another

 FOR MORE INFORMATION VISIT NCWILDLIFE.ORG



Moving Forward

- **Research**
 - Spatial and temporal distributions
 - Elucidation of the fine details of life cycles, incidence of disease, and pathological effects
- **Information exchange**
 - Intra- and inter-agency
 - Constituents
- **Aquatic animal health plan**



**Guidelines for Fish Health Management in
Northeastern States**

Northeast Fish Health Committee
A subcommittee of the Northeast Fisheries Administrators Association

April 2015

- **Regional Aquatic Health Plan**
 - Importation and transfer of fish
 - Communication
 - Management strategies
- **Needed in the southeast**



Moving Forward

- **Research**
 - Spatial and temporal distributions
 - Elucidation of the fine details of life cycles, incidence of disease, and pathological effects
- **Information exchange**
 - Intra- and inter-agency
 - Constituents
- **Aquatic animal health plan**
 - Regional need



Questions



Jake Rash
Coldwater Research Coordinator
828/659-3324 x 225
jacob.rash@ncwildlife.org

