North Carolina - Aquatic Invasive Species report to GSARP, April 2017

Tiger Shrimp:

In 2016, there were 12 tiger shrimp reported, 7 were confirmed by photographs. The first report was September 16, 2016. Unconfirmed reports were also most likely tiger shrimp based on fishermen descriptions, mainly the large size. Gears were either cast nets or skimmer trawls and all were in estuarine waters. There is no current research underway on tiger shrimp in NC.

Chinese Mystery Snail:

The Chinese mystery snail is now known from the following waters: Catawba basin (Lake Hickory, Lookout Shoals Lake, and Lake Norman), Yadkin/Pee Dee basin (High Rock Reservoir, Tuckertown Reservoir, Pee Dee River below Lake Tillery, and Pee Dee River below Blewett Falls Reservoir), Cape Fear basin (Jordan Lake, Oak Hollow Lake), Neuse River basin (Neuse River below Falls Lake), and the Roanoke basin (Lake Gaston).

Flathead Catfish:

Flathead Catfish appear to be moving upstream in several watersheds in the Tar River and Neuse River basins and are the likely cause for the decline of Carolina Madtoms. Intensive surveys and management actions, including Flathead Catfish removal, may be needed in the very near future to prevent Carolina Madtoms from going extinct. The US Fish and Wildlife Service Sport Fish Restoration Grant has funded a non-native catfish project in the Cape Fear which will begin in 2017. This study will look at habitat and prey selection of flathead catfish.

***Salmincola spp.*:**

Since September 2014, NCWRC biologists have documented new biological threats to salmonids within the State. Gill lice (Copepoda: Lernaeopodidae: *Salmincola*) have been found on Brook Trout and Rainbow Trout populations. Elsewhere within the United States, *S. edwardsii* and *S. californiensis* are known to parasitize salmonids of the genera of *Salvelinus* and *Oncorhynchus*, respectively. Taxonomic and molecular analyses of copepods have now confirmed the identification of both species in North Carolina. In addition, anglers have been asked to report observations of gill lice during recreational outings, while the NCWRC will continue to sample Brook Trout and Rainbow Trout populations across the mountains of North Carolina to document the distribution and status of gill lice.

Whirling Disease:

On July 27, 2015, whirling disease was confirmed in Rainbow Trout collected from Watauga River – the first occurrence of the disease in North Carolina. Subsequent testing has identified the disease within Elk River. In addition, the NCWRC collected *Tubifex tubifex* (the worm host of the parasite) from its Delayed Harvest Trout Waters to test for the presence of *Myxobolus cerebralis* (the parasite that causes whirling disease); *T. tubifex* from Mill Creek and Watauga River were found to be positive. In addition, infected *T. tubifex* were collected above the NCWRC's Marion State Fish Hatchery. Currently, this facility is under renovation and biosecurity measures have been incorporated into the facility design. Trout have also been tested from NCWRC's trout production facilities – all were found to be negative. The NCWRC initiated testing of self-sustaining wild trout populations in spring 2016 for the presence of *Myxobolus cerebralis* and whirling disease. This effort focused on collecting representative samples across

a wide spatial extent, which examined approximately 1,500 trout from 36 localities. Four collections from three major river basins (Yadkin River, French Broad River, and Watauga River) were infected with *Myxobolus cerebralis*: Rainbow Trout from Roaring Creek; Brown Trout from South Toe River, Laurel Creek, and Boone Fork; and Brook Trout from Laurel Creek.

***Didymo*:**

Researchers from Tennessee Tech University collected cells of the microscopic algae *Didymosphenia geminata* (Didymo) in Tuckasegee River while conducting regional surveys in late 2015 – the first time the organism has been documented in North Carolina. Additional research is needed to determine its prevalence in Tuckasegee River and throughout the State. NC WRC is working to educate anglers on cleaning equipment and using extra caution to prevent the spread.

Lionfish:

The NOAA Fisheries Lab in Beaufort, NC compiles lionfish reports in the state. Lionfish continue to thrive off the NC coast. NOAA is working to address lionfish ecological impacts, control strategies, and various commercial harvesting methods. A current PhD student is working with NOAA making process on lionfish aggregating devices, control plan development approaches, and research on lionfish sound production.

Aquatic Weed Control Program:

<u>Lake Waccamaw:</u>
Lake Waccamaw is one of only a handful of natural lakes in North Carolina, with around 9,000-acres of water. 2017 will be year 5 of a large-scale herbicide treatments with fluridone conducted in the lake. Hydrilla has been completely suppressed by the treatments. No Hydrilla plants have been detected outside of the treatment area and there is no evidence that new tuber production has occurred since treatment began. Tuber densities have declined from the 960-acre treatment area in 2012, to less than 600-acre with detectable Hydrilla. Continued management is needed to fully deplete the tuber bank in the infested area.

<u>Eno River:</u>
A large section of the river (~16 miles) was treated with fluridone in 2015 and 2016 to control hydrilla. This will be the third year of treatment, expanding the two-year pilot project with the objective to demonstrate the effectiveness of an herbicide treatment (fluridone) to control hydrilla in a riverine system. In 2015, a liquid formulation of fluridone was metered into the water at a single location. The treatment began in June and ended in August. The treatment effectively controlled the growth of hydrilla throughout the 16-mile stretch; however, treatment was ended early because of concern there may be impacts to non-target aquatic plant species. Two injectors were used in 2016 to control target concentrations with more precision and reduce the quantity of herbicide needed to control Hydrilla. Preliminary survey results suggest there was significant control of hydrilla with minimal to no impact to non-target plant and animal species.
The pilot project was overseen by the Eno River Hydrilla Management Task Force (ERHMTF), a partnership of local state and federal government agencies, academia and non-profit organizations. Eight of its members agreed to fund the two-year demonstration. Due to a programmatic limitation, DWR did not allocate cost-share any funds for 2016 and the 2016 was primarily funded by the remaining 7 partners. DWR Aquatic Weed Control Program limitation issue is described in another section of this report.

The ERHMTF is currently working on a 5-year management plan and 2-year implementation plan. A central location for information regarding this project has been developed on the NC Invasive Plant Council website, see http://nc-ipc.weebly.com/eno-river-hydrilla-project.html

Cape Fear Basin:
NCWRC staff are working towards a plan to identify the extent of hydrilla occurrence in the upper half of the Cape Fear basin, with potential survey expansion into other vital rare aquatic species' habitats in the Chowan and Neuse basins.

Lake Gaston Hydrilla Project:
Approximately 3,500 acres of the ~20,000 acre lake have been infested with Hydrilla since 2000. Management has historically consisted of stocking triploid grass carp and large-scale fluridone treatments (averaging 1,000 acres per year). Herbicide treatments have been scaled back since 2013 responding to annual fall surveys which have showed significantly reduced hydrilla beds.

Albemarle Sound and Chowan River Project:
Hydrilla was confirmed at 4 sites along the Chowan River near Rockyhock in 2009. Additional hydrilla sites along the Chowan River plus sites within the Albemarle Sound (Eastmost River, Batchelor Bay, Salmon Creek, and tributaries of Edenton Bay) were identified in 2010. A delimiting survey was needed to cover the extensive area. In 2014 the NC Sea Grant organized a citizen-science volunteer survey to begin tackling this daunting task. The volunteers used tablets that were pre-loaded with an app that guided them through the data collection process. In 2015 the survey expanded in scope with the addition of Albemarle-Pamlico National Estuary Partnership (APNEP) and other government agency staff.

APNEP formed a Hydrilla Technical Advisory Group. This group drafted an action plan on how to monitor and manage Hydrilla. Signs have been posted at boat ramps to educate boaters and other users on stopping the spread of aquatic invasive species. However, the group ran into funding problems in 2016. The 2016 reports indicate that no hydrilla was found during the annual surveys in the Chowan River.

2016-2017 Funding:
State legislation was amended to resolve previous limitation set on state aquatic weed funds in 2015-2016 of "waters of the state located within lakes." The current fiscal year budget now allows operations in all "water of the state." The Aquatic Weed Control Program has a 2017 work plan in place with $502,600 earmarked for about 62 project sites. All projects require cost-share at a 1:1 match.

Blue Catfish:

Recently blue catfish have become a topic of concern again in some parts of North Carolina. The blue catfish range in North Carolina has been expanding over the years and the commercial landings have been increasing. Commercial fishermen have been actively fishing the large numbers of blue catfish, especially in the Chowan River. The NC Division of Marine Fisheries has partnered with SeaGrant and NC Wildlife Resource Commission in monitoring blue catfish in the state. The US Fish and Wildlife Service Sport Fish Restoration Grant has funded a non-native catfish project in the Cape Fear which will begin in 2017. This study will look at habitat and prey selection of blue catfish.

State ANS Plan:

The North Carolina Aquatic Nuisance Species Management Plan was drafted in 2014-2015. The Plan was signed by NC Department of Environmental Quality, NC Wildlife Resources Commission, and NC Department of Agriculture in February of 2016. At the time, there was no plan for submission to the national ANS Task Force for review/approval. With a new administration, conversation has been renewed on the status of the ANS Plan.

End of report - compiled by Corrin Flora 04/28/2017