

Mid-Atlantic Panel on Aquatic Invasive Species



15-16 November 2016

Chesapeake Bay Field Office
US Fish and Wildlife Service
177 Admiral Cochrane Dr.
Annapolis, MD 21401

<https://www.fws.gov/chesapeakebay/location.html>

Conference Line: (515) 604-9300 **Code:** 428477#

Adobe Connect: <http://epawebconferencing.acms.com/hgitmapais/>

(Note: Enter as Guest with your name and affiliation)

AGENDA

Tuesday, November 15, 2016

- | | | |
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| 9:00 am | Coffee | |
| 9:30 am | Call to Order | <i>Ray Fernald, Panel Chair</i> |
| | <ul style="list-style-type: none">• Welcome/Housekeeping• Introductions | |
| 9:40 am | Review & Approve Agenda/Minutes | <i>Ray Fernald</i> |
| 9:50 am | Spring 2016 Meeting Action Items | <i>Ray Fernald</i> |
| 10:00 am | Funded Projects Update | <i>Mike Allen, Panel Vice-Chair</i> |
| | <ul style="list-style-type: none">• Update on 2016 funded grants• Update on ongoing/completed projects | |
| 10:10 am | All Panel Meeting, 8 November 2016 | <i>Ray Fernald</i> |
| 10:20 am | ANSTF Update | <i>ANSTF Representative</i> |
| 10:50 am | Break | |
| 11:00 am | Small Grant Project Report and discussion:
"New Zealand Mud Snail" | <i>Ed Levri, PSU</i> |

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| 11:30 am | Chesapeake Bay Nutria Eradication Program | <i>Marnie Pepper</i> |
| 12:00 pm | Lunch | |
| 1:00 pm | Zebra Mussels | <i>Matt Ashton, MDDNR</i> |
| 1:30 pm | Biogeography of Didymo | <i>Matt Shank, Susquehanna River Basin Commission</i> |
| 2:15 pm | Maryland Invasive Species Plan | <i>Joe Love, MDDNR</i> |
| 2:30 pm | Break | |
| 2:45 pm | New Business and Decision Items: <ul style="list-style-type: none"> • 2017 Panel budget • Review of RFP priorities for 2017 • MAP Project or Workshop ideas • Next Meeting | <i>Mike Allen, Ray Fernald</i> |
| 4:00 pm | Member/Interested Parties Updates | <i>Panel Members and Interested Parties</i> |
| 5:00 pm | Adjourn for day | |

Wednesday, November 16, 2015

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| 9:00 am | Tour of SERC Facility |
| 12:00 pm | Adjourn |

Minutes of the Mid-Atlantic Panel on Aquatic Invasive Species Meeting Annapolis, Maryland November 15-16, 2016

Participants

Ray Fernald, MAPAIS (Chair), VA DGIF
Mike Allen, MAPAIS (Vice Chair), MDSG
Paige Hobough, CRC (Staffer)
Matt Ashton, MD DNR
Barbara Beelar, Friends of DCL
Jenna Clark, MDSG
Kathryn DesJardin, FL PRISM
Rob Emens, NC DEQ
Jay Killian, MD DNR

Ed Levri, PSU
Mark Lewandowski, MD DNR
Joe Love, MD DNR
Don Maclean, USFWS
Jonathan McKnight, MD DNR
Patrick Megonigal, SERC
Whitman Miller, SERC
Steve Minkinen, USFWS
Robert Morgan, PA FBC
Susan Pasko, USFWS/ANSTF Rep.
Marnie Pepper, USDA

Action/Decision Items

Decision: The Spring 2016 minutes were approved.

Action: Send headshots to Paige Hobaugh (Hobaugh.paige@epa.gov) for the MAPAIS website.

Action: Fernald, Whitney, and Sea Grant Executive Committee will survey and allocate a number of “Mid-Atlantic Field Guide to Aquatic Invasive Species” copies to each MAPAIS state.

Action: Interbasin transfer will be addressed again once the scope and scale of the project is defined. Please send Ray Fernald (ray.fernaldd@dgif.virginia.gov) any information on invasive interbasin transfers via canals and pipelines that you are aware of.

Decision: MAPAIS will host a joint Spring 2017 meeting with NEANS in NY.

Action: Pasko will look into a no-cost extension of MAPAIS’ grant from USFWS.

Action: “Mid-Atlantic Field Guide to Aquatic Invasive Species” slides will be distributed along with MAPAIS Minutes.

Action: Fernald will pursue contact with NOAA, EPA, USFS, and USCG to fill MAPAIS vacancies.

Action: Fernald will contact Carolyn Junemann (Carolyn.Junemann@dot.gov) of ANSTF to add Dept. of Transportation representation to MAPAIS.

Action: All committees under ANSTF are open membership, if you would like to join one, please email Susan Pasko (Susan_Pasko@fws.gov).

Outcome: The MD Invasive Species Plan was approved by ANSTF

Action: The MD Invasive Species Plan will be added to the MAPAIS website.

Action: If anyone would like to work together with the MRBP on Live Release issues, please contact current chair, Jessica Howell (Jessica.howell@ksoutdoors.com).

Action: If anyone has ideas for communicating the ANSTF report to Congress, please email Susan Pasko.

Action: A report of the yearly MAPAIS activities will be posted on the MAPAIS website for use of the ANSTF for the report to Congress.

Action: Fernald will distribute email soliciting needs of panel members for travel to the Spring Meeting.

Action: Allen will distribute grant RFP for review. Please direct any thoughts on modification to Mike Allen (mallen@mdsg.umd.edu).

Action: RFP will be modified and reissued by February in time for discussion at the Spring Meeting.

Action: Whitney and Allen will assist Fernald with SOP Revisions.

Action: The website will be run as is for now. Website management and the potential for a workgroup will be discussed at the Spring Meeting.

Action: Allen, Pfungsten, Fernald, and Clark will discuss providing an interactive map AIS occurrences in the region at a later date.

Action: Pet trade issue will be addressed at All Panels meeting rather than focusing on it as a regional work group. Email Ray Fernald if you are interested in working on this issue.

Action: The MAPAIS/NEANS meeting will be held the 3rd week of May 2017.

Action: Send member updates to Paige Hobaugh for inclusion in minutes.

Minutes

Review of the Spring 2016 Meeting Agenda/Minutes and Action Items

- **Decision:** The Spring 2016 minutes were approved.
- NOAA Sentinel Site consideration of AIS is low on their radar; we will pursue this conversation with them further as the need arises.
- Fernald reached out to congressional staffers for a list of who was in the AIS Caucus last year and is awaiting response. Caucus may not be a good way to get money allocated as state programs are a higher priority than panels.
- **Action:** Send headshots to Paige Hobough (Hobough.paige@epa.gov) for the MAPAIS website.
- **Action:** Fernald, Whitney, and Sea Grant Executive Committee will survey and allocate a number of “Mid-Atlantic Field Guide to Aquatic Invasive Species” copies to each MAPAIS state.
- **Action:** Interbasin transfer will be addressed again once the scope and scale of the project is defined. Please send Ray Fernald (ray.fernaldd@gif.virginia.gov) any information on invasive interbasin transfers via canals and pipelines that you are aware of.
- The Experts Directory experienced server issues that are currently being solved. Pasko will provide updates.
- No recommendation on VIDA, its importance seems to rise and fall. Allen Pleus (Allen.Pleus@dfw.wa.gov) of the Washington Dept. of Fish and Wildlife is the VIDA contact.
- **Decision:** MAPAIS will host a joint Spring 2017 meeting with NEANS in NY.

2016 Budget Update, Mike Allen

Funding is on target, expecting about \$40,000 for 2017. There is money returned to us from previous grantees that can be allocated to the next grant funding cycle (begins October 2017). The grant currently awarded to MAPAIS ends July 2017; a no-cost extension from USFWS will be needed to fund existing sub-awards.

There are 4 sub-award funded projects that are currently ongoing:

1. Pymatuning invasive species boat inspections stations- Began October 1
2. Use of eDNA to detect emergent infectious pathogens in amphibians- Began October 1
3. Economic analysis of the AIS risk and risk reduction in the bloodworm trade- Began July 1
4. Training and evaluation of dogs for nutria early detection- Ongoing

Sub-award funded projects that been completed:

1. Characterizing the invasive New Zealand mud snail population in central Pennsylvania
2. Mid-Atlantic Field Guide to Aquatic Invasive Species

There is \$6,000 in this year’s budget to provide travel assistance to panel members planning to attend the joint MAP/NEANS meeting in NY this coming spring.

Action: Pasko will look into a no-cost extension of MAPAIS’ grant from USFWS.

Action: “Mid-Atlantic Field Guide to Aquatic Invasive Species” slides will be distributed along with MAPAIS Minutes.

All Panels Meeting Update, Ray Fernald

The All Panels meeting took place last week (November 8) in Falls Church, VA.

The topic of federal member participation was brought up. It was suggested that each panel make sure to fill the gaps in representation of participating federal agencies on their panel.

MAPAIS Federal Agency Representation:

- **USFWS:** Steve Minkinen, Sandra Keppner (Alternate)

- **NOAA:** No current representative
- **USACE:** Jeremy Crossland
- **EPA:** John Darling
- **USFS:** Kevin Leftwich, Anne Timm
- **Dept. of Transportation Maritime Administration:** No current representation
- **NPS:** Marian Norris, Jil Swearingen (Alternate)
- **Coast Guard:** No representative for a number of years
- **Dept. of Agriculture APHIS:** Kevin Michaels, Marnie Pepper
- **USGS:** Ian Pflingsten

MAPAIS does not need representation from the following agencies: BLM, Dept. of State, USBR

Action: Fernald will pursue contact with NOAA, EPA, USFS, and USCG to fill MAPAIS vacancies.

Action: Fernald will contact Carolyn Junemann (Carolyn.Junemann@dot.gov) of ANSTF to add Dept. of Transportation representation to MAPAIS.

ANSTF Meeting Updates, Susan Pasko

ANSTF took place November 9th and 10th in Falls Church, VA.

Agenda Review:

Day 1

- Representatives from the National Aquaculture Association presented and offered unique perspectives regarding the industry: workers try to do the right thing but are confused by the regulations and AIS issues that vary from state to state. They are advocating for a system to clear that confusion. The Mississippi River Basin Panel reported on a Bait Trade workshop they hosted and its outcomes. Members of USFWS Law Enforcement presented about the Lacey Act and challenges with trying to enforce and regulate it, particularly with controlling internet trade. ANSTF hopes to continue and to expand the internet trade conversation as tools are being developed by panels (e.g. Great Lakes Commission) with success to combat this issue.
- The Coast Guard spoke about their legislation and the timeframe for enforcement of their new schedule for standards on ballast water. The EPA presented on vessels permits. Kathy Metcalf from the Chamber Shipping of America gave an industry perspective on the challenges that ship owners have following regulations and how VIDA may impact the shipping industry. Mario Tamburri from the UMD Maritime Environmental Resource Center reported on ballast water standard technology improvements. He mentioned the International Maritime Organization (IMO) regulations that were recently passed and ratified (expected to be in effect by September 2017) and spoke about the implications they could have on the shipping industry.
- Day 1 ended with regional panel updates and a review of decision and action items.

Day 2

- ANSTF took on 2 new members at the last meeting: The National Marine Manufacturers Association and the National Aquaculture Association. Possible solutions could include being more stringent toward new member apps, making sure a new member is filling a gap not currently represented on the Task Force, and making sure the new member will be responsive to the Task Force. This discussion will be continued in the future.

- As a result of the recent GAO audit, the ANSTF created an activity report form which was sent to all Task Force members so they could report on FY15-16 accomplishments. This report will be used to establish a baseline of all of the various ANSTF-related activities so as to better report on strategic plan goals, to identify any areas where there are opportunities for collaboration amongst members, and to identify any gaps in work. This is still a work in progress.
- Committee Updates
 1. Boating Committee: They are working on a technical information report which will provide guidance for boat manufacturers to design boats in a way as not to be as strong vectors for AIS and suggestive language to be used for boat owner outreach and boat owner manuals to reduce spread as well. The report is currently in its second round of review and the ANSTF hopes to be able to share a final product soon.
 2. Economics committee: They are trying to focus on how to do an economic report while recognizing that they lack key economists to do a complete study. They would like to look at existing scientific and economic literature to bridge the gap between science and management and develop that economic information into format that could be more easily understood. They are also beginning to gather a list of contacts from industry to survey and interview for personal testimonies and stories of people being impacted by invasives to be put into a journalistic report. This approach will shed light on indirect costs of AIS as opposed to only government costs.

Action: All committees under ANSTF have open membership. If you would like to join one, please email Susan Pasko (Susan_Pasko@fws.gov).
 3. Prevention Committee: The National Invasive Species Council (NISC) is operating under a new director and a new management plan and will no longer participate on the prevention committee. As a result, the Task Force established a group to assess how to restructure the committees, if at all. This topic will be discussed at the next ANSTF meeting.
- Communications Update: “Habitatitude” and the “Stop Aquatic Hitchhikers” campaigns are being revised, modernized, and rebranded by USFWS by the end of the year, complete with new websites. Susan Berks from Minnesota DNR reported that their “Play, Clean, Go” campaign has grown rapidly, discussed how to cobrand with the “Stop Aquatic Hitchhikers” campaign so they do not compete/provide conflicting messages. Illinois/Indiana Sea Grant is asking for review of and recommendations on their new “Taking AIM” campaign website.
 - Elizabeth Brown, Co-Chair of the Communication, Education, and Outreach committee, presented briefly to set stage for further conversation around the number, clarity, and cohesiveness of AIS outreach campaigns and choosing campaigns appropriate for your audience and region. The committee would like to draw a communications framework with which agencies can evaluate a campaign’s quality and effectiveness.
- Joe Love presented on the MD Invasive Species Plan.

Outcome: The MD Invasive Species Plan was approved by ANSTF

Action: The MD Invasive Species Plan will be added to the MAPAIS website.
- A recommendation was received from the Mississippi River Basin Panel as they begin to address the potential pathway concerns of live release by cultural and religious groups. ANSTF will continue this conversation with NISC for potential adoption by one of their task teams.

Action: If anyone would like to work together with the MRBP on live release issues, please contact current Chair, Jessica Howell (Jessica.howell@ksoutdoors.com).

- After a long review process, the Report to Congress (2004-2015) has been finalized, is currently being printed, and should be available by the end of this year. ANSTF is working on a communication strategy to deliver it to Congress while also beginning work on the next Report. **Action:** If anyone has recommendations for communicating the ANSTF report to Congress, please email Susan Pasko.

ANSTF Activity Report Form Accomplishment Survey

Sent to 13 Federal Members, 18 ex-officio members, and all 6 Regional Panels for completion. Not all accomplishments have been reported yet. The report summary gives a snapshot of where agencies see their role in AIS management and how much they spend on AIS. Regional panels only reported on money they received (\$40K from USFWS). These data will be used to inform the next report to Congress, help decide the goals of the Task Force, and help recognize gaps and room for improvement.

Much money is spent on in the prevention category on projects that should technically fall under control (e.g. AIS barriers). AFWA and USFWS provide much of the funding. EDRR, prevention, and control are contributed to by almost all agencies. Coordination happens amongst the panels, BLM, NOAA, USFWS, AFWA.

- **BLM:** Coordination with state agencies, inspection and decontamination of boats program, monitoring activities, outreach.
- **UFS:** Invasive species pathway education and blocking recreational boat pathways.
- **USBR:** EDNA technology, restoration, prevention programs, control method testing.
- **USACE:** Aquatic plant control program, leadership team for invasive species promotion, building and maintaining electric fish barriers to prevent Asian carp in the Great Lakes, GLMRIS, GLRI activities.
- **USFWS:** Pet trade initiatives, training and use of HACCP, removal, monitoring, and control programs (knotweed, NZ Mud snail), outreach projects.
- **NOAA:** Emphasis on lionfish- control methods, removals, tsunami debris, restoration and invasive species removal, Sea Grant program for research.
- **NPS:** Restoration, prevention of Zebra Mussels out west.
- **EPA:** Research is a high priority, use and control of ballast water, prevention and EDRR
- **AFWA:** Coordination with state agencies, policy issues, support of the entities they work with. No spending to report.
- **CBP:** Control activities, focus on Water Chestnut and Hydrilla.
- **NAA:** Aquaculture webinar series.
- **Tahoe Regional Planning Agency:** Watercraft inspections.
- **Western Regional Panel:** Coordination
- **Northeast:** Rapid response grant, Asian clam watch cards.
- **Gulf:** Coordination, traveling trunk available to schools for education.
- **Mississippi River Basin Panel:** Coordination, outreach, control, research studies, workshop on bait trade.
- **Mid Atlantic:** Coordination, Small grants program.

Action: A report of the yearly MAPAIS activities will be posted on the MAPAIS website for use of the ANSTF for the report to congress.

The Ecology of Invasion: The New Zealand Mud Snail in North America, Ed Levri

The New Zealand Mud Snail (NZMS) is native to New Zealand, is found on 5 continents, and is considered a worldwide invasive species. The NZMS can be found in just about any type of aquatic environment and exists in very high densities. Its effects are still being researched, but the NZMS can outcompete native grazers, alternate food webs, probably influence predator populations, and can alter nitrogen and carbon cycles in streams.

In North America, there are 3 clones (possibly more) of the NZMS in 2 broad regions, but populations have been migrating to more inland regions, including central Pennsylvania. Clone US1 was introduced to the American West in the 1980's most likely due to the introduction of trout from Australia and US2 was introduced to the Great Lakes via international shipping ballast water. A third clone, US3, is found in just one western location and lacks the range expansion of the two previous clones.

Some goals of the study were to compare the DNA of the three clones to determine if and how the genotypes differ from one another in regard to behavior, figure out which clone the Pennsylvania NZMS was, and how and at what rate would it expand its range. The PA genotype is the US1 population, the western US clone, and it doesn't appear to have spread to new watersheds. The PA US1 genotype is similar to the western US1 genotype in a few ways (geodetic and photogenic behavior) and different from the western US1 clone in other ways (PA US1 moved downstream (rheotaxis) and exhibited some differences in dispersal behavior). It doesn't appear that the PA US1 clone is necessarily more invasive. The lab will continue to monitor range expansion and behaviors.

Chesapeake Bay Nutria Eradication Program, Marnie Pepper

Nutria are large semi aquatic rodents that were brought to America for the fur trade, but the market never established. Many were released or escaped on their own. Nutria destroy root masses of marshes; any slight deviation in elevation on Delmarva leads to erosion and open water areas. Federal, NGO, private, and state agencies coalesced to create a nutria management team in 2002 in response to the damage done by the rodent at the Blackwater National Wildlife Refuge. The team has since removed almost 14,000 animals and protected 0.25 million acres of wetlands. Today, nutria populations on Delmarva are near zero and it's been over a year since any have been detected.

As of 2016, the nutria management team structure is composed of a smaller group of people. The team is currently doing saturation monitoring in each watershed with every tool and technique available to the team, including detector dogs that detect nutria scat. The National Detector Dog Training Program is a part of APHIS that requires each canine handler team be retested each year to uphold standards. The dogs wear GPS collars and can cover 1.5-2.5 times the area the handler can cover. Since there has been no nutria detected for over a year, the dogs were brought to a North Carolina refuge to help with their nutria problem. The dogs were also introduced to swine scat as feral swine are issues in False Cape State Park in VA and San Diego, CA.

Biogeography of Didymo, Matt Shank

Didymo is a yellow and tan diatom also known as "rock snot" that grows in clumps in cool, flow regulated streams and rivers. It disperses in the winter, and cells attach to substrate and form stalks in the warmer spring months. It is "paradoxical" in that it doesn't thrive in eutrophic conditions. It is found

in a number of mid-Atlantic locations including Gunpowder Falls in MD, the Delaware River in NY/PA, and in Trout Run in PA.

Didymo displaces native algae, impacts base trophic levels and benthic habitat, and increases the pollution tolerance of the streams and rivers where it is found. Its distribution is thought to be controlled by a specific kind of phosphate, soluble reactive phosphorus (SRP). Didymo tends not to appear in areas with greater than 10 micrograms/liter of SRP. Didymo's historical presence in the mid-Atlantic region will be examined further in paleolimnological research for presence/abundance of Didymo and nutrient concentrations.

Zebra Mussels, Matt Ashton

Zebra mussels (ZM) are invasive, nuisance organisms found throughout most of the Ohio River, Upper Mississippi River, and the Northeast US into Canada, including the Chesapeake Bay and Delaware River watersheds. They were introduced into the Great Lakes in the 1980's and the first record of them in MD was in the early 2000's at the Conowingo Dam. Zebra mussels are generally restricted to the upper parts of the Chesapeake Bay, particularly in the Susquehanna Flats, but can be found as far south as Middle River/Hart Miller Island on rip rap, SAV, and buoy anchors. They have been increasing in numbers over the past 5-7 years in the Chesapeake Bay, though the population appears to be highly variable and detailed distribution information is limited.

They tend to persist at public boat launches and private marinas and launches and can travel via boat and vehicle, mooring buoys, and SAV. MD DNR institutes best practices to decontaminate equipment due to AIS and pathogens, for example, rinsing equipment with chemicals after use and before entry into another water body. DNR hatchery boats at the Susquehanna River dump their water through filters before disposing of it. The risk of invasion is highly variable among inland water bodies and conditions may possibly become more hospitable for the ZM over time as water hardness increases. To better inform the public about these threats, DNR has produced a website with fact sheets, developed citizen reporting forms, conducted outreach via boating registration renewal, and responded to media requests. Management options include localized physical control and use of molluscicides in contained systems and intake pipes. Eradication is considered impossible in large, open water systems, but increasing salinity may limit its spread to the southern Chesapeake Bay.

Maryland Invasive Species Plan, Joe Love

DNR has worked on this plan for three years, and it has gone through several revisions after external review by state agencies. It was presented to the ANSTF and approved unanimously in October. DNR plans to compete for federal AIS management funding in the next fiscal year. Jonathan McKnight (jonathan.mcknight@maryland.gov) will lead MD Invasive Species Team through the objectives and actions of the MD Invasive Species plan, making sure funding is allocated in a way that actions are achievable. The plan will be updated routinely.

New Business and Decision Items, Mike Allen and Ray Fernald

- RFP Review: The question arose of how MAPAIS can work to encourage more small grant proposal submissions. It was suggested that members emphasize the simplicity of the application and reporting process.

Action: Fernald will distribute email soliciting needs of panel members for travel to the Spring Meeting.

Action: Allen will distribute grant RFP for review. Please direct any thoughts on modification to Mike Allen (email).

Action: RFP will be modified and reissued by February in time for discussion at the Spring Meeting.

- 4 Topics that may be appropriate for MAPAIS workgroup projects:
 - **SOP Revision**

Action: Whitney and Allen will assist Fernald with SOP Revisions
 - **Website Management:** Website is designed so that nothing goes out of date too quickly. Clark, Allen, Hobough, and Runion are all trained to update the site.

Action: The website will be run as is for now. Website management and the potential for a workgroup will be discussed at the Spring Meeting.
 - **Map representation of AIS occurrences in the region**

Action: Allen, Pfingsten, Fernald, and Clark will discuss providing an interactive map AIS occurrences in the region at a later date.
 - **Pet Trade**

Action: Pet trade issue will be addressed at the All Panels meeting rather than focusing on it as a regional work group. Email Ray Fernald if you are interested in working on this issue.
- The next ANSTF meeting will be held the 1st week of May 2017.

Action: The MAPAIS/NEANS meeting will be held the 3rd week of May 2017.
- Possible topics for the Spring Meeting:
 - The best ways and places to implement boat inspections and boat launch decontaminations (NEANS is interested in this topic as well).
 - Using a journalistic approach to economics-related AIS issues as opposed to a technical information approach.
 - Presentation on how we manage our website. Discussion about how to keep website interesting and how to maintain it.
 - Invasive blue catfish and snakehead
- What MAPAIS would like to learn from NEANS:
 - Species of interest, overlap of species between both regions
 - Hydrilla collaborative results
 - Invasive catfish species harvesting

Member Updates

Maryland DNR

- Maryland DNR reexamined its regulatory ban on felt-soled waders and reaffirmed its opinion that the ban is the correct policy for the prevention of introduction and spread of numerous freshwater stream invasive species.
- Maryland's AIS Plan was accepted by the AIS Task Force in November 2016.
- DNR Resource Assessment Service biologists discovered the presence of Didymo in the Youghiogheny River in Friendsville, Maryland (39.663734 -79.407670) on July 12, 2016. This site is less than 3 river km upstream of Youghiogheny Lake. In a separate survey of Maryland Lakes, Didymo was also discovered in the Savage River Reservoir near Swanton, Maryland (39.511578 -

79.136508) on September 1, 2016. These are the first documented occurrences of this invasive species in these water bodies.

- The Maryland Park Service will continue with Year 4 of the Hydrilla Control plan in Deep Creek Lake and the Deep Creek Lake Voluntary Inspection program for 2017. Zebra mussels were intercepted for the first time in July 2016.
- The State Lakes Invasive Species Act of 2016 was passed by the General Assembly. The law, which applies to any vessel that is operated in a lake owned or managed by the State, provides that, “after April 1, 2017, an owner of a vessel may not place the vessel or have the vessel placed in a lake at a public launch or public dock unless the owner has cleaned the vessel and removed all visible organic material” NR § 8-703. A vessel owner who violates this requirement will be subject to civil penalties starting at \$100 for the first offense and increasing to \$250 for a second offense and \$500 for subsequent violations.
- Biologists from DNR’s Resource Assessment Service conducted the first baseline survey of all 16 state owned/managed water bodies to assess current level of AIS infestation.
- DNR Fisheries Service continues research on the flathead catfish as the catch in the non-tidal Potomac increases and will consider a possible blue catfish survey. DNR has documented increases in relative abundance of snakeheads in some tidal rivers of Maryland and will investigate the establishment in the upper Bay and non-tidal Potomac.

North Carolina AIS

- **Tiger Shrimp:**
In 2016, there have only been 3 tiger shrimp reported, none have been confirmed. The first report was September 16, 2016. Tiger shrimp reports generally occur during the fall white shrimp season. There is no current research underway on tiger shrimp in NC.
- **Chinese Mystery Snail:**
A new sighting of Mystery Snails has been reported from the Cape Fear basin (Oak Hollow Lake in High Point) in September 2016 and WRC staff are in the process of confirming identification. 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 (the 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.
- ***Salmincola spp.:***
Since September 2014, WRC biologists have documented new biological threats to salmonids within the State. Gill lice (Copepoda: Lernaepodidae: *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 WRC 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 WRC 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 WRC'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 WRC's trout production facilities – all were found to be negative. The WRC 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.

- **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 progress on lionfish aggregating devices, control plan development approaches, and research on lionfish sound production.

- **Aquatic Weed Control Program:**

Lake Waccamaw:

- Year 4 herbicide treatments with fluridone were conducted in 2016 at similar costs as 2015 (\$465K). 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 within the 960-acre treatment area since 2012, but remain at detectable levels. Continued management is needed to fully deplete the tuber bank in the infested area.

Eno River:

- A large section of the river (~16 miles) was treated with fluridone in 2015 and 2016 to control Hydrilla. This was the second year of a two-year pilot project. The objective of the project was to demonstrate the effectiveness of an herbicide treatment as a method to control Hydrilla in a riverine system. In 2015, a liquid formulation of the herbicide fluridone was metered into the river 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. Two injectors were used in 2016 to maintain target concentrations with more precision and potentially reduce the total quantity of herbicide needed to control Hydrilla. Preliminary survey results suggest there was

significant control of Hydrilla. To date there has been minimal to no impacts on 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 funding restriction DWR was not able to participate as a funding partner in 2016, the project was funded by the remaining 7 partners. The DWR Aquatic Weed Control Program operational limitation 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:

- A Hydrilla infestation in the Deep River at NC Highway 42 (Chatham County) was documented in August 2015. This is an important part of the range of federally endangered Cape Fear Shiner.
- WRC and DWR discovered Hydrilla in Lake Rim (Cumberland County) in Fayetteville in August 2016. The infestation appears to be limited to a small area right around the public boat access. The area was treated with herbicide in early September 2016 as a rapid response scenario. A management plan will be drafted and implemented in 2017.
- WRC 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 circa 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. Herbicide treatments in 2016 are expected to target 433 acres.

Albemarle Sound and Chowan River Hydrilla Projects:

- 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 staff support from Albemarle-Pamlico National Estuary Partnership (APNEP) and other government agency staff.
- APNEP is forming a Hydrilla Technical Advisory Group. This group will draft 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.

2015-2016 Funding:

- The funding mechanism for the program is the Shallow Draft Navigation Channel Dredging and Lake Maintenance Fund. Up to \$500K can be used from the SDNCD&LM

Fund for aquatic weed control. Money comes from 1/6 of 1% of the motor fuel tax plus a portion of the money collected from boat titles and registrations. Projects supported by the SDNCD&LM Fund must be cost-shared with non-State dollars on a one-to-one basis. The cost-share cooperator must be a local government, public utility or other agency. Private landowners are not eligible for financial assistance.

- The operational limitation on the program to lake-only projects has been lifted. The NC General Assembly incorporated amendments to the language which restored the ability of the program to support projects in all waters of the state. The program retained two temporary environmental technicians to conduct field operations during the 2016 weed season.
- **Blue Catfish:**
Recently blue catfish have become a topic of concern again in some parts of North Carolina. In December 2015, the state record 105lb blue catfish was caught and released in Lake Gaston. The same fishermen also caught two other catfish over 90lbs in the last 6 months in the lake. There have also been reports in the Chowan River of catfish in pound nets over 70lbs. The blue catfish range has been expanding over the years and the commercial landings have been increasing. Much of the concern is centered on HR 2419 (The Farm Bill) and a provision intended to impact imported aquaculture raised fish. Commercial fishermen are concerned since this is an increasing portion of their catch that cost of inspection will hinder processors from continuing to handle blue catfish and thus the management of this invasive species in NC waters.
- **State ANS Plan:**
The NC Aquatic Nuisance Species Management Plan was drafted 2014-2015. DEQ, WRC and NCDR were major contributing partners of the drafting of the plan. All three departments have now approved the plan. Currently there is no intent to submit the plan to the Governor for signature.
- In 2016 the ANS Plan Steering Committee developed a budget to begin plan implementation. The budget request was submitted to DEQ for FY 2016/17.

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- Best management practices for decontamination of field gear and equipment was drafted for Fisheries Section Staff to consider implementing. It is currently going through the commenting/editing phase and has not been finalized.
- An overview of the mission, activities and grant program of MAP-AIS was presented at the Delaware Invasive Species Council annual meeting in October. The meeting was attended by over 100 representatives from government agencies, academia, and non-government organizations, but few indicated they were familiar with MAP-AIS. Hopefully the presentation will garner interest in submitting grant proposals in 2017.
- Invasive finfish/shellfish—no new watershed invasions reported, but there appears to be an increase in the size of Northern Snakehead and number of Blue Cats being caught in the Nanticoke River watershed
- No nutria sightings or confirmed reports in 2016, so again, thank you for the efforts taking place in other states.
- Phragmites control program update: sprayed 5,955 acres in 2016 on both private & state land; Cost-share program via WHIP (Wildlife Habitat Incentive Program) allows the Division to cover 87.5% of the cost with the landowner contributing the other 12.5% (about \$5 acre treated).

- To evaluate the permit process and effectiveness of using Grass Carp in Delaware to control aquatic vegetation, a questionnaire was sent to applicants that received a permit from 2005-2016. According to survey responses, ≥ 90 percent control of the intended target plant species was achieved in 6 months-2 years in ponds with hydrilla *Hydrilla verticillata*, low water milfoil *Myriophyllum humile*, water naiad *Najas sp.*, snailseed pondweed *Potamogeton bicupulatus* and the filamentous green algae *Spirogyra* and *Cladophora*. In some cases, herbicide treatments and mechanical removal were also integrated along with stocking to achieve this level of control. A 'loophole' in the permit process was discovered as some owners indicated they stocked additional Grass Carp without getting a supplemental permit. The permits were modified to include an explicit expiration date and to specify that the permit covers a 'one-time' stocking only. Grass Carp suppliers will also be notified of the change to ensure that each shipment is accompanied by a USFWS Certificate of Triploidy.