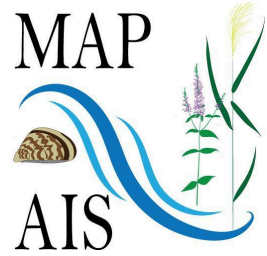




Joint GSARP & MAPAIS Fall 2023 Hybrid Meeting **November 14 -16, 2023**

Embassy Suites Riverfront
9 Estell Lee Pl, Wilmington, NC 28401



This document contains a general summary of Days 1 and 2 and the official meeting minutes for the MAPAIS-specific meeting the morning of Day 2. The official meeting minutes for the joint-meeting portions on Day 1 and the afternoon of Day 2 are currently being drafted by GSARP. Once GSARP finalizes the rest of the meeting minutes, a singular document containing these notes will be distributed to both panels.

Amendment 1/14/2025:

- **Note: This document does not include minutes from the joint-meeting portions from Day 1 and afternoon of Day 2.**

The presentations from the joint-meeting portions of Day 1 and 2 can be found under the “Meeting Files” section on this GSARP webpage:
<https://www.gsarp.org/2023/10/06/mapais-gsarp-fall-2023-joint-meeting/>

November 14, 2023; 08:30-4:30 ET

GENERAL SUMMARY OF DAY 1: JOINT-MEETING

08:30 – CALL TO ORDER

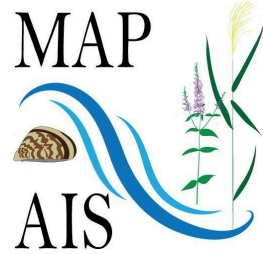
- Welcome and roll call
- Review of the agenda
- Public comment

08:50 – STATE UPDATES:

- **NEW YORK:** Presented by Steven Pearson (NYDEC)
- **TEXAS:** Presented by Monica McGarrity (TPWD)
- **PENNSYLVANIA:** Presented by Sean Hartzell (PAFBC)
- **LOUISIANA:** Presented by Rob Bourgeois (LDWF)
- **NEW JERSEY:** Presented by Heather Desko (NJ WSA)
- **MISSISSIPPI:** Presented by Mike Pursley (MDMR)
- **WEST VIRGINIA:** Presented by Katie Zipfel (WV DNR)
- **ALABAMA:** Presented by Jessica Marchant (ADCNR)
- **DELAWARE:** Presented by Michael Steiger (DNREC)
- **FLORIDA:** Presented by Matt Phillips (FWC)
- **MARYLAND:** Presented by Jay Killian (MDNR)
- **GEORGIA:** Presented by Jim Page



**GSARP/MAPAIS FALL 2023 MEETING:
GENERAL INFORMATION & MEETING MINUTES**



- **VIRGINIA:** *There was no updated provided by Virginia*
- **SOUTH CAROLINA:** *Presented by Peter Kingsley-Smith (SCDNR)*
- **NORTH CAROLINA:** *Presented by Rob Emens (NCDEQ)*

01:05 – NC-SPECIFIC PROJECTS/UPDATES

- **NCDOT ADAPTIVE MANAGEMENT PLANNING AND TREATMENT OF PHRAGMITES AT BODIE ISLAND LIGHTHOUSE:** *Presented by Wes Cartner (NCDOT)*
- **ADAPTIVE MODELING APPROACHES TO MAPPING PHRAGMITES USING UAV IMAGERY:** *Presented by Kerry Mapes (Geo Owl)*
- **CAROLINA BEACH STATE PARK WETLAND RESTORATION:** *Presented by Bree Charron (NCCF)*
- **ERADICATING YELLOW FLOATING HEART THROUGH THE REGULATORY PROCESS:** *Presented by Jarred Driscoll (NCDA&CS)*
- **REMOVING GIANT SALVINIA FROM GAPWAY SWAMP (COLUMBUS COUNTY, NC):** *Presented by Rob Emens (NCDEQ)*
- **IMPACTS AND MANAGEMENT CHALLENGES OF THE INVASIVE ALABAMA BASS ON NORTH CAROLINA’S RESERVOIRS AND RIVERS:** *Presented by Chris Wood (NCWRC)*
- **POPULATION DYNAMICS AND TROPHIC ECOLOGY OF NON-NATIVE FLATHEAD CATFISH IN THE LOWER CAPE FEAR RIVER ECOSYSTEM:** *Presented by Fred Scharf (UNCW)*
- **THE CONUNDRUM OF RED SWAMP CRAYFISH IN THE CAROLINAS: KNOWLEDGE GAINS AND GAPS OF A SPREADING ISSUE:** *Presented by Bronwyn Williams (NCMNS)*

04:05 – OTHER BUSINESS

04:30 – DAY 1 ADJOURNED.

November 15, 2023; MORNING SESSION: 08:30-11:30 ET

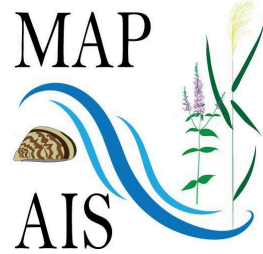
MEETING MINUTES FOR DAY 2: MAPAIS-SPECIFIC MEETING

ATTENDEES (23):

Aaron Henning, Susquehanna River Basin Commission	Austin Matthews, NC DEQ	Bailey Robertory, Chesapeake Research Consortium	Christine Densmore, USGS
Chris Smith, PA DEP	Dede Lawal, Chesapeake Research Consortium	Don Maclean, USFWS	Heather Desko, NJ WSA
Ian Pfungsten, USGS	Jay Killian, MDNR	Jen Wanat, Washington College	Jenny Carney, Smithsonian Institution
Katlyn Fuentes, Chesapeake Research Consortium	Kristopher Abel, PA Dept. of Ag.	Matthew Shank, PA DEP	Michael Steiger, DNREC
Michele Tremblay,	Rob Emens,	Sara Mirabilio,	Sarah Whitney,



**GSARP/MAPAIS FALL 2023 MEETING:
GENERAL INFORMATION & MEETING MINUTES**



NatureSource Communications	NC DEQ	NC Sea Grant	PA Sea Grant
Sean Hartzell, PFBC	Steve Minkinen, USFWS	Steven Pearson, NY DEC	Tara Whitsel, USACE

08:30 – CALL TO ORDER:

Presenter: Steven Pearson (Panel Chair; NY DEC)

- Welcome & roll call

08:45 – OLD BUSINESS:

- **APPROVAL OF TODAY’S FALL 2023 AGENDA:**

- Motion made: Steven Pearson
- Seconded: Heather Desko

- **SPRING 2023 MAPAIS MEETING:**

- **APPROVAL OF MEETING MINUTES:**

- Motion made: Rob Emens
- Seconded: Ian Pfungsten

- **BAIT TRADE STUDY & FOLLOW-UP ACTION ITEM FROM SPRING MEETING:** MDNR completed a survey of the Maryland bait trade. This survey was sent to approx. 70 bait shops and the results generated a list of wholesalers that sell live bait to these shops. As of November 2023, the final report for this project is near completion. The report will be finalized by Spring 2024.

- **ACTION: Final report will be sent to MAPAIS leadership to distribute to the Panel.**

- **ANNUAL REPORTS:**

- **ACTION. Steven Pearson requested that if the current years’ report has not yet been finalized, to send the previous years’ report and provide the current year report when complete. Katlyn will post all submitted reports to the MAPAIS website.**
- Received from New York and still need report from Maryland
- **ACTION: Maryland will send the report to the Panel Leadership to distribute to Panel Members & to post to the website.**
- Sean Hartzell submitted the Pennsylvania 2020 ANS Management Plan grant report to MAPAIS Leadership today and sent the 2019 report earlier this year. There are significant delays in the grant reports due to Covid/capacity issues.
- **ACTION: Sean Hartzell will send MAPAIS Leadership a copy of the new ANS Management Plan grant report for Pennsylvania once it has been finalized.**

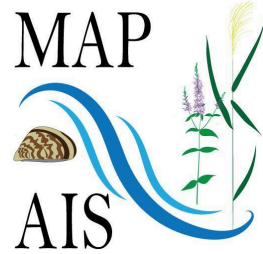
- **MID-ATLANTIC FIELD GUIDE:** Will use remaining panel funds from the previous & current fiscal years to update the field guide and create an app. Physical copies of the new field guide won’t be ordered.

- **ANSTF RECOMMENDATIONS:** Following the Spring 2023 meeting, MAPAIS submitted a recommendation to fund additional work on Chinese Pond Mussel eradication.

- **ANSTF RESPONSE:** ANSTF does not have funding to distribute but are aware of the issue and acknowledge its significance/importance.



**GSARP/MAPAIS FALL 2023 MEETING:
GENERAL INFORMATION & MEETING MINUTES**



09:15 – BUDGET AND FUNDED PROJECT UPDATES:

Presenter: Steven Pearson (on behalf of Mike Allen, Panel Fiscal Agent)

● **BUDGET STATUS OF EXPIRING MAPAIS GRANT (Maryland Sea Grant):**

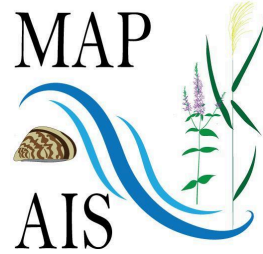
- Current award period September 2018-August 2024
- Operations: \$6,000 remains in travel (ANSTF) and meeting costs/web maintenance for 2024
 - Fall 2023 shared meeting costs paid from this balance (est. \$3,000)
- Small grants: \$34,635 remains outstanding in open awards; approx. \$4,475 has been forfeited
- \$6,700 in direct costs is available for spend on the Mid-Atlantic Field Guide or other MAPAIS action before August 2024 (plus any additional forfeitures)

● **CLOSED PROJECTS:**

- “Impacts of two functionally distinct invaders on facilitation and community succession”; Project Lead: Amy Fowler; ended 2016; forfeiture \$6.
- “Quantifying multiple ecosystem-level threats to the upper Juniata River system from the invasion and occupation of rusty crayfish”; Project Lead: George Merovich; ended 2020; forfeiture \$99.
- “Promoting tidal and marine invasive species awareness and response in DE among diverse stakeholders”; Project Lead: Kate Fleming; ended February 2021; \$0 balance.
- “Early detection of invasive *Phragmites australis* at the tidal marsh-forest ecotone with airborne LiDAR”; Project Lead: Keryn Gedan; ended 8/2022; \$13 forfeiture.
- “Assessing the potential impact of Dominion Cove Point LNG export facility on ballast mediated invasions in Chesapeake Bay”; Project Lead: Jenny Carney; ended 5/2022; \$16 forfeiture.
- “Revisiting *Rapana venosa* in Hampton Roads as TBT abates”; Project Lead: Roger Mann; ended 2/2022; \$0 balance.
- “An integrative approach to studying Flathead Catfish invasion in the Susquehanna River Basin: linking ecological field studies and public perception for effective outreach on aquatic invasive species”; Project Lead: Megan Kepler Schall; ended 8/2022; \$52 forfeiture.
- “Development of an Aquatic Invasive Species Management Plan for Delaware”; Project Lead: Michael Stangl; ended 3/2023; Final Report forfeited \$2,685.
- “Test an environmental DNA assay to detect nutria in the Mid-Atlantic and explore how activity patterns impact detection”; Project Lead: Stephanie Coster; ended 8/2023; Final Report.
- “Evaluating the impact of a rural to urban land use gradient on the incidence of chytridiomycosis, ranavirus, and overall salamander health in the Chesapeake Bay watershed”; Project Lead: Jennifer Wanat; ended 8/2023; Final report; forfeited \$173.
- “Ecosystem experiment to evaluate the return of American Eels for controlling invasive crayfish & restoring ecological structure in streams and rivers”; Project Lead: Erik Silldorf; ended 8/2023; awaiting final report and billing.



**GSARP/MAPAIS FALL 2023 MEETING:
GENERAL INFORMATION & MEETING MINUTES**



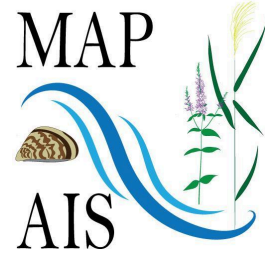
- o “Investigating the feeding ecology of two invasive predators in the Nanticoke River, USA using stomach content and stable isotope analyses”; *Project Lead: Noah Bressman; ended 8/2023; final report; forfeiture \$1,624.*
- **ONGOING PROJECTS:**
 - o “Development of an aquatic invasive species management plan for New Jersey”; *Project Lead: Joseph Billinski; end 2/2024; extended; awaiting report and billing.*
 - o “Marine Bioinvasions of the Mid-Atlantic Coast: Rapid Assessment Survey for Introduced Marine Organisms from NJ to VA”; *Project Lead: Amy Fowler; ends in 2/2024; extended; assessment in June 2023 and extended through February 2024 for dissemination.*
- **PANEL FINANCE LEADERSHIP/UPDATED ON NEW FISCAL AGENT:** Grant with Maryland Sea Grant is in a no cost extension period through August 2024 and the new grant with NatureSource Communications began in September 2023 and the final acceptance of the contract will be in November 2023. **Michele Tremblay** will now be the new Panel Fiscal Agent.
 - o Three new subawards (contracting in process)
 - o Recommended MAP financial procedures document shared
 - o Draft progress report template shared

09:30 – NEW BUSINESS:

- **RECOMMENDATIONS TO ANSTF:** **If you have any AIS recommendations that you want to put forth to ANSTF, please contact Steven Pearson (Steven.Pearson@dec.ny.gov) and Rob Emens (rob.emens@deq.nc.gov).**
 - o **Question:** *If there is no additional ANSTF funding to support recommendations (e.g., asking for funds to be directed to Chinese Pond Mussels), how should we frame these AIS recommendations moving forward?*
 - **Answer:** Continue to be clear when funding is needed, but request that ANSTF help explore other avenues for funding
- **NEW MEMBER NOMINATIONS:** **New member nominations can be sent to Steven Pearson (Steven.Pearson@dec.ny.gov) and Rob Emens (rob.emens@deq.nc.gov).**
 - o **ACADEMIC:** The following two nominations were approved via a unanimous vote from the Panel membership. **Motion made** by Rob Emens and **seconded** by Tara Whitsel.
 - **Virginia:** **Dr. Bryan Brown** (Virginia Tech)
 - **Delaware:** **Dr. Greg Shriver** (University of Delaware)
 - o **WASHINGTON D.C.:** There is currently no Panel Representative for Washington D.C.
 - **ACTION: Steve Minkinen will reach out to DC Fisheries folks to see if anyone is interested in acting as a Panel Representative for DC.**
 - o **NOAA:** There is currently no Panel Representative for NOAA
 - Aaron Henning invited Jonathan Watson to join the Panel as a NOAA Representative, but he is not available to participate.



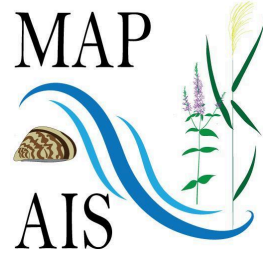
GSARP/MAPAIS FALL 2023 MEETING: GENERAL INFORMATION & MEETING MINUTES



- **ACTION: Bailey Roberatory (Coordinator of the Chesapeake Bay Program's Invasive Catfish Workgroup) will reach out to his NOAA contacts re: filling this position.**
- **USFS:** There is currently no Panel Representative for the U.S. Forest Service
- **MEMBERSHIP UPDATES:**
 - **DELAWARE STATE REPRESENTATIVES:** Edna Stetzar will be stepping down from her position as DE Primary Member and will now be the Alternate Member. Mike Steiger (current DE Alternate Member) will now be the DE Primary Rep.
 - **ACTION: Katlyn Fuentes will update the website to reflect this change in membership.**
 - **ACADEMIC REPRESENTATIVE FOR NEW YORK:** Steven Pearson contacted several people to invite as a Panel Academic Rep. for New York but thus far, there are no potential nominations for this position.
- **MAPAIS SPRING 2024 MEETING PLANNING:** This will be a hybrid meeting with both in-person and virtual attendance options available. The in-person location will be at the EPA's Chesapeake Bay Program Office in Annapolis, MD. More information on this meeting, including the agenda, will be sent out as it gets closer.
 - The ANSTF Meeting is the first week of May – these dates should be avoided when planning the MAPAIS meeting.
 - **ACTION: Katlyn will send out a calendar availability poll.**
- **MAPAIS FALL 2024 MEETING PLANNING:** This will be a hybrid meeting with both in-person and virtual attendance options available. The in-person location will be at the USGS Eastern Ecological Science Center in Kearneysville, WV.
 - Katie Zipfel and Christine Densmore will act as contacts in helping plan this meeting.
 - **DATE:** Plan on holding this meeting in November or early December.
 - **ACTION: Christine Densmore will check the availability of the conference space at USGS and provide a list of date options. In Spring, Katlyn Fuentes will send a calendar availability poll to the Panel.**
 - The North American Lake Management Society (NALMS) conference is the first week of November – this week should be avoided when planning for the MAPAIS meeting.
- **MAPAIS LIST OF SPECIES OF INTEREST:** Matt Shank provided an update on the MAPAIS species of interest list HTML document. This list was last updated in 2016 and Matt Shank has been working to update this list.
 - The current list on the MAPAIS website (under "[Resources](#)") was last updated in 2016. This version of the list can be accessed via .pdf download.
 - <https://www.midatlanticpanel.org/wp-content/uploads/2016/09/MAP-Species-of-Interest-2016.pdf>
 - The newly updated list will be integrated as a database also accessible from the MAPAIS webpage. This database will have a search function allowing users to search through the database by scientific name and common name. Results can be further filtered by additional



GSARP/MAPAIS FALL 2023 MEETING: GENERAL INFORMATION & MEETING MINUTES



fields such as rank, taxonomic serial number (TSN), taxonomic hierarchy, etc. The information contained in this database will be downloadable as a .csv file.

- **Sean Hartzell** suggested adding freshwater drum (*Aplodinotus grunniens*) to this list.
 - Panel members in attendance supported the inclusion of this species to the list.
 - **ACTION: Matt Shank added freshwater drum to the list and sent the updated HTML file to Katlyn Fuentes to upload to the webpage. Katlyn will update the website to include this updated file.**
- **2024 MAPAIS SMALL GRANTS RFP:** The RFP for the FY2024 MAPAIS Small Grants Competition will go out in early 2024. Once proposals have been received, the Panel Coordinator will put out a request for reviewers to review and score the proposals. The project proposals will be discussed with Panel Members at the Spring 2024 meeting, at which point Panel Members will vote on which project(s) to approve for funding.

10:00 – BREAK

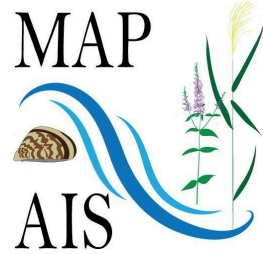
10:20 – RANGE EXPANSIONS OF INVASIVE NEW ZEALAND MUDSNAILS (*Potamopyrgus antipodarum*) IN PENNSYLVANIA:

Presenter: Sean Hartzell (PA Fish & Boat Commission)

- **NEW ZEALAND MUD SNAIL:** benthic freshwater snail native to New Zealand and associated islands
 - Size: typically <6mm
 - Shell morphology: dextral shell with 6-8 whorls separated by deep grooves
 - Habitat generalist: tolerant of pollution/sedimentation in streams, lakes, rivers, may also inhabit brackish waters
 - Low conductivity may be a limiting factor for occurrence
- **SPREAD & POSSIBLE IMPACTS:** North American populations are asexual clones; one snail may produce ~230 young per year
 - Can achieve very high densities in some freshwater ecosystems which may result in declines of other macroinvertebrates
 - Impacts on higher trophic levels are understudied but some data suggest impacts to trout
 - Local spread mostly attributed to fishing gear. This is exacerbated by the snail's small size, resistance to desiccation/cleaning agents, and clonal biology.
- **PENNSYLVANIA FISH & BOAT COMMISSION SURVEYS 2021-2023:**
 - Survey protocol modified from Levri et al. (2020); consisted of a min. of 20 minutes/site and identification using keys in Dillon et al. (2019)
 - 2021: Focus on select streams and rivers in the Susquehanna & Delaware basins
 - 2022/2023: Statewide surveys in select lakes and popular wild/stocked trout waters
 - Results submitted to Pennsylvania iMap Invasives and USGS Nonindigenous Aquatic Species database
- **SUMMARY OF RESULTS:**



**GSARP/MAPAIS FALL 2023 MEETING:
GENERAL INFORMATION & MEETING MINUTES**

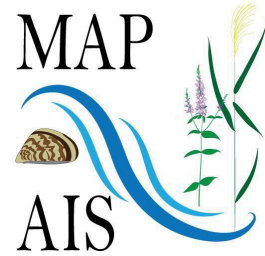


- **2021 Surveys:** 3 of 9 (33%) Susquehanna River basin tributaries surveyed contained NZM; 12 of 14 (86%) Delaware River basin tributaries surveyed contained NZM
- **2022/2023 Surveys:** No NZM were found in any of the lakes surveyed throughout the Commonwealth (only streams/rivers); First records for the Potomac River basin, Ohio River basin, and North Branch Susquehanna River sub-basin
- **DISCUSSION:**
 - NZM more widespread in Pennsylvania than previously realized
 - Pattern that NZM are prevalent in tributaries but occur in low density in receiving waters
 - Is there a high occurrence of local spread on waders? most invaded sites are popular wild and/or stocked trout waters
 - Are limestone spring creeks at greatest risk? association with conductivity and NZM presence identified in a prior PA study
- **FUTURE DIRECTIONS:**
 - Additional survey work/monitoring (possibly eDNA?)
 - Further identification of habitat preferences
 - Genetics on clonal strains and spread mapping?
 - Exploring the impacts to coldwater fisheries/ecosystems in PA and the northeast
- **MANAGEMENT ACTIONS:** Chemical control is typically not practical in natural systems; education is key to reduce spread; more details on NZM education/messaging on the PFBC website
- **TAKE HOME MESSAGE:** NZM may be more prevalent on the east coast than previously realized
- **COMMENTS/QUESTIONS:** **If you have any additional questions, please contact Sean Hartzell (sehartzell@pa.gov).**
 - **Heather Desko:** Have the new/expanded NZM detections across the state changed any operations of PFBC? For example: decontamination of gear between sites, changes in stocking protocols, hatchery operations, etc.?
 - **Sean Hartzell:** Yes, quite a bit. We've updated our biosecurity protocols for field staff and state fish hatcheries have had major changes to stocking operations as well.
 - The PFBC AIS Action Plan for New Zealand Mud Snails can be found here: <https://www.fishandboat.com/Conservation/Plans/Documents/ais-control-plan-nzm.pdf>
 - **Jay Kilian:** Are there examples of NZM snails thriving (reaching high densities) in warm water systems? Do you think there is a high temperature (>20° C) limit to the species or is the distribution just associated with coldwater because of their spread by trout anglers?
 - **Sean Hartzell:** I'm not aware of any examples of high densities in warmwater ecosystems (at least in PA) but that's a good question – not sure at this time if the coldwater correlation is due to trout angling/risk of spread and/or habitat preference.

10:40 – ASSESSING THE POTENTIAL IMPACT OF DOMINION COVE POINT LNG EXPORT FACILITY ON BALLAST MEDIATED INVASIONS IN THE CHESAPEAKE BAY:



GSARP/MAPAIS FALL 2023 MEETING: GENERAL INFORMATION & MEETING MINUTES



Presenter: Jenny Carney (Smithsonian Institution-SERC)

- **PROJECT GOALS:**

- Assess ballast water and vessel activity at the Dominion Cove Point LNG export facility using the National Ballast Information Clearinghouse (NBIC) data
- Compare taxonomic zooplankton data from two sites close to dominion cove point LNG export terminal. Collect samples seasonally throughout project and compare data with samples collected previously by Marine Invasions Lab in 2012 and 2014

- Use these data to answer two questions:

1. How does ballast water activity at Cove Point alter ballast water activity in Chesapeake Bay?
2. Can we detect introduced species at the site where significant ballast water import has just come online?

- **BALLAST WATER AND VESSEL DATA STUDY:** Compared patterns and changes in arrival numbers and vessel types to Cove Point and Chesapeake Bay ports: coastwise vs. overseas arrivals. Also explored patterns and changes in ballast water discharges to Cove Point and Chesapeake Bay Ports

- **SOURCE LOCATIONS OF BALLAST DISCHARGES:**

- 46 source ports for discharge in 2021
- 21 novel source ports for discharge in 2021
- 40% of ballast water discharged to Cove Point in 2021 was from source locations novel for Chesapeake Bay (i.e., not represented in discharges at any other port)

- **ZOOPLANKTON SAMPLE COLLECTION & ANALYSIS:** Samples were collected using vertical plankton tows in October 2019 and June, August, October 2020. Taxonomic data was compared to data collected in 2012, 2014, and 2017.

- Four organisms identified in this study were not recorded in the 2012 and 2014 samples
 - Tintinnid: *Tintinnopsis campanula*
 - Harpacticoid copepods: *Biocamptus sp.* and *Parastenocaris sp.*
 - Foraminiferan: *Elphidium sp.*

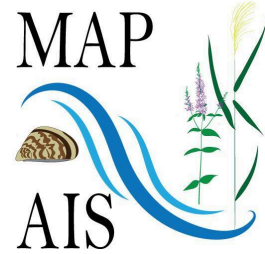
- **CONCLUSIONS:**

- Ballast water discharge to Cove Point LNG Export Terminal has substantially increased since 2018 – 3.3 million m³ in 2021
- 40% of ballast water discharged in 2021 was sourced in novel source ports to Chesapeake Bay
- Majority of ballast discharged to Cove Point is treated using onboard ballast water management systems – 83% higher than the national average
- 4 organisms were identified that weren't present in sampled collected previously
- When compared to ballast water discharge in Chesapeake Bay, Cove Point is emerging as a new recipient location for significant volumes of ballast water discharge

- **COMMENTS/QUESTIONS:** If you have any additional questions, please contact Jenny Carney (CarneyK@si.edu).



**GSARP/MAPAIS FALL 2023 MEETING:
GENERAL INFORMATION & MEETING MINUTES**



- **Steven Pearson:** Regarding the four organisms that were found in the new samples but not during previous sampling efforts – are these species known from the Atlantic Coast?
 - **Jenny Carney:** I don't recall what their native ranges are, but they are not from the Chesapeake Bay region.

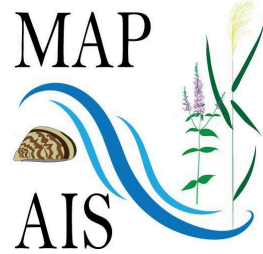
11:00 - EVALUATING THE IMPACT OF A RURAL TO URBAN LAND USE GRADIENT ON THE INCIDENCE OF CHYTRIDIOMYCOSIS, RANAVIRUS, AND OVERALL SALAMANDER HEALTH IN THE CHESAPEAKE BAY WATERSHED

Presenter: Jen Wanat (Washington College)

- Chytridiomycosis (*Batrachochytrium dendrobatidis*), ranavirus, and land use change are causing amphibian population declines globally
- **RESEARCH GOALS:**
 - Evaluate if and how spatial change surrounding critical ephemeral wetlands impacts disease prevalence and overall amphibian health
 - Facilitate the development of dermal swabbing as a novel noninvasive technique for analysis of biomarkers indicative of amphibian health
 - Analyze pesticide, nitrate, and phosphorus concentrations in wetlands to determine if correlations exist with surrounding land use, amphibian disease, and biomarkers
- **METHODOLOGY:** 8 wetland ecosystems in Maryland's coastal plain were sampled during fall breeding migrations in 2021 and 2022. Sampled in urban and agricultural areas, as well as forested areas (the control group). Salamanders were swabbed, sexed, and photographed in the field.
- **RESULTS:**
 - Salamanders that traverse agriculture landscapes were significantly smaller in size (both snout to vent length, and surface area),
 - Pesticides were detected from sediment analysis at all wetland sites at low concentrations,
 - Dicrotophos was detected at 100% of the sites
 - Spinosad detected at 94%
 - Primicarb detected at 83%
 - And both Pyraclostrobin and Chlorantraniliprole at 78%
 - Mucosal levels of the biomarker, glutathione, are not significantly different between salamanders traversing different landscape gradients.
 - Disease occurrence did not differ across landscape gradients. Ranavirus was detected in all landscape gradients whereas Chytridiomycosis was not found in all landscapes and *BSal* (*Batrachochytrium salamandrivorans*) was not found in any landscape gradients.
- **OUTREACH GOALS:** Engage students underrepresented in STEM on anthropogenic impacts critical to wetlands and amphibian health. Additionally partner with government agencies and NGOs at study sites to help spread awareness of the importance of ephemeral wetlands and salamander health.



**GSARP/MAPAIS FALL 2023 MEETING:
GENERAL INFORMATION & MEETING MINUTES**



● **CONCLUSIONS:**

- Salamanders that traverse agriculture landscapes were significantly smaller than those traversing urban or forested gradients suggesting that agriculturally dominated landscapes may be limiting to growth.
- A general trend in data showed lower glutathione levels in salamanders from forested wetlands.
- Pesticides were detected in all wetland sites at low concentrations. Unique assemblages of pesticides varied by landscape gradient, which may be an important factor in salamander growth and overall health.
- Ranavirus was detected in all landscape types, while Chytridiomycosis was only detected in forested and agricultural ecosystems.
- No Bsal was detected at any of the wetlands sampled.
- Disease occurrence did not differ across landscape types, suggesting that anthropogenic impacts in the 1000 m wetland buffer zone may not contribute to or enhance disease spread.

● **COMMENTS/QUESTIONS:** **If you have any additional questions, please contact Jen Wanat (jwanat2@washcoll.edu).**

- **Steven Pearson:** Regarding the smaller salamanders in the agricultural areas versus the urban/forested areas, did you see a relationship between fecundity and size in these salamanders? And if so, do you think that would eventually cause declines of salamander populations in these habitats?
 - **Jen Wanat:** I haven't investigated fecundity vs. size, but I can reach out to my colleague and get back to you.

11:20 – GENERAL PUBLIC COMMENT:

- **Ian Pfungsten:** I recently received a copy of “*Plant Invaders of the Mid-Atlantic Natural Areas: A Field Guide*” by Jil M. Swearingen and Judith P. Fulton. This is an excellent resource to have, and it is specific to aquatic and terrestrial plants. **If anyone wants a copy, please let me (ipfungsten@usgs.gov) know and I can send you the information.**

11:30 – MAPAIS-SPECIFIC MEETING ADJOURNED.

Day 2 of the Joint GSARP-MAPAIS Fall 2023 will resume after lunch concludes at 1:00 ET.

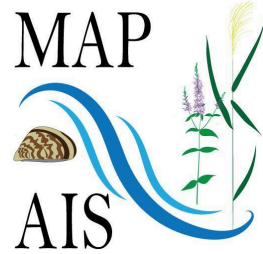
November 15, 2023; AFTERNOON SESSION: 1:00-4:30 ET

[GENERAL SUMMARY OF DAY 2: JOINT-MEETING](#)

01:00 – JOINT PANEL DISCUSSION: following the panel-specific meetings during the morning session of Day 2, GSARP/MAPAIS members reconvened for a joint discussion on themes common to both panels.



**GSARP/MAPAIS FALL 2023 MEETING:
GENERAL INFORMATION & MEETING MINUTES**



- **CURRENT APPLICATIONS OF GENETIC TOOLS TO AQUATIC NUISANCE AND INVASIVE SPECIES IN SOUTH CAROLINA:** *Presented by Tanya Darden (SCDNR MRR)*
- **BLUE LAND CRAB IN THE CAROLINAS:** *Presented by Daniel Sasson (SCDNR) & Bronwn Williams (NCMNS)*
- **NEW INVADERS NEED NEW TOOLS: ZEBRA MUSSELS AND APPLE SNAIL DETECTIONS IN NORTH CAROLINA AND THE NEED FOR A NCWRC ANS REPORTING TOOL:** *Presented by Rachael Hoch (NCWRC)*
- **CHESAPEAKE BAY WIDE COORDINATION TO ADDRESS THE SPREAD AND IMPACTS OF BLUE AND FLATHEAD CATFISH:** *Presented by Bailey Roberatory (NOAA, CBP)*
 - Link to the Chesapeake Bay Program's Invasive Catfish Workgroup: <https://www.chesapeakebay.net/who/group/invasive-catfish-task-force>

03:00 – FEDERAL UPDATES:

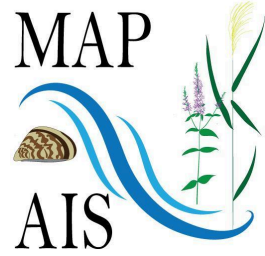
- **ANSTF/USFWS UPDATE:** *Presented by Kristen Sommers (USFWS)*
- **NAS PROGRAM UPDATE:** *Presented by Ian Pffingsten & Cayla Morningstar (USGS)*
- **USACE UPDATE:** *Presented by Tara Whitsel & Jon Lane (USACE)*

04:05 – OTHER BUSINESS

04:30 – DAY 2 ADJOURNED.



**GSARP/MAPAIS FALL 2023 MEETING:
GENERAL INFORMATION & MEETING MINUTES**



November 16, 2023; 09:00-12:00 ET

FIELD TRIP

On Day 3 of the meeting, GSARP and MAPAIS panel members attended a field trip to Carolina Beach State Park to visit a wetland restoration site. More information on the wetland restoration project can be found at this link: <https://www.nccoast.org/project/carolina-beach-state-park-wetland-restoration/>



A big thank you to North Carolina Coastal Federation/North Carolina Division of Parks and Recreation for hosting the field trip, and thank you to all who attended!