



Welcome to *The Current*, the North Central Region Water Network's Speed Networking Webinar Series

Recreational Water Quality and Invasive Species: 2PM CT

1. Submit your questions for presenters via the chat box. The chat box is accessible via the purple collaborate panel in the lower right corner of the webinar screen.
2. There will be a dedicated Q & A session following the last presentation.
3. A phone-in option can be accessed by opening the Session menu in the upper left area of the webinar screen and selecting "Use your phone for audio".

This session will be recorded and available at northcentralwater.org and learn.extension.org.



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northcentralwater.org



Today's Presenters:

- **Eugene Braig**, Program Director, Aquatic Ecosystems, The Ohio State University
- **Sarah Orlando**, Clean Marinas Program Manager, Ohio Sea Grant

Follow @northcentralh2o and #TheCurrent on Twitter for live tweets!





Eugene Braig



Fisheries biologist Eugene Braig is Program Director for Aquatic Ecosystems with Ohio State University Extension. He represents the state of Ohio on the Mississippi River Basin Panel of the national Aquatic Nuisance Species Task Force and chairs a committee to advise the state on aquatic invasive species and is active with several additional advisory committees and professional organizations. Fully embracing nerd status, Eugene moonlights as a classical musician and serves as Artistic Director of a small concert series.



Recreational Water Quality and Aquatic Invasive Species:

Context and Resources for Stakeholders



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Eugene Braig,
Program Director,
Aquatic Ecosystems

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OSU Extension, School
of Environment and
Natural Resources

The outline

- **A brief background**
- The AIS-policy setting
- Ohio's AIS committee, e.g.
- Invasive-specific resources



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The value of freshwater fishing

- “In 2016, 30.1 million Americans fished 383 million days and took 322 million trips” (U.S. Fish & Wildlife Service: USFWS 2018).
- Estimated 2016 expenditures for trips and equipment: **\$29.9 billion**—\$2.2 billion on the Great Lakes alone (USFWS 2018).
- Estimated total economic impact of Great Lakes fishing: **\$7.1 billion annually** (Southwick Associates 2007).



Vocabulary

Clean Water Act (1972, 1977):

- 101.a. “The objective of this Act is to restore and maintain the chemical, physical, and **biological integrity** of the Nation's waters.”
- 202.6. “**The term ‘pollutant’ means** dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, **biological materials**, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.”

Aquatic invasive species (AIS) as “biological pollution” gained substantial traction after zebra mussel invasion of the Great Lakes in the late '80s.



Vocabulary

Invasive species defined (legally):

- Executive Order 13112 (1999), revised and expanded as Executive Order 13751 (2016):
 - “...a **non-native** organism whose introduction causes or is likely to **cause** economic or environmental **harm**, or harm to human, animal, or plant health.”
- Only a small proportion of non-native species in the aquatic environment come to be considered “invasive.”
- However, definitions vary.



A Great Lakes example

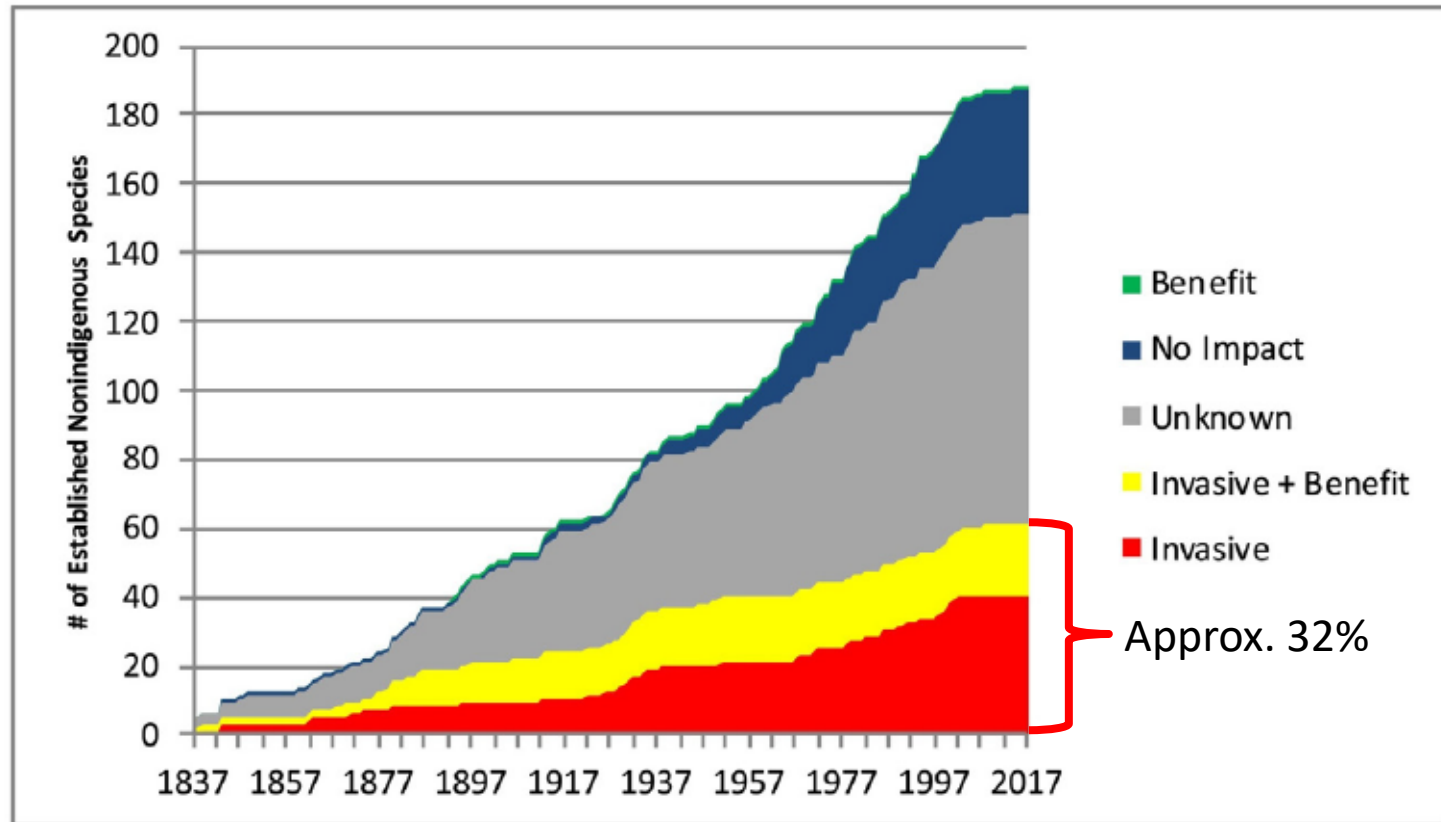


Fig. 8. A history of nonindigenous species introductions by impact.

(Sturtevant et al. 2019)



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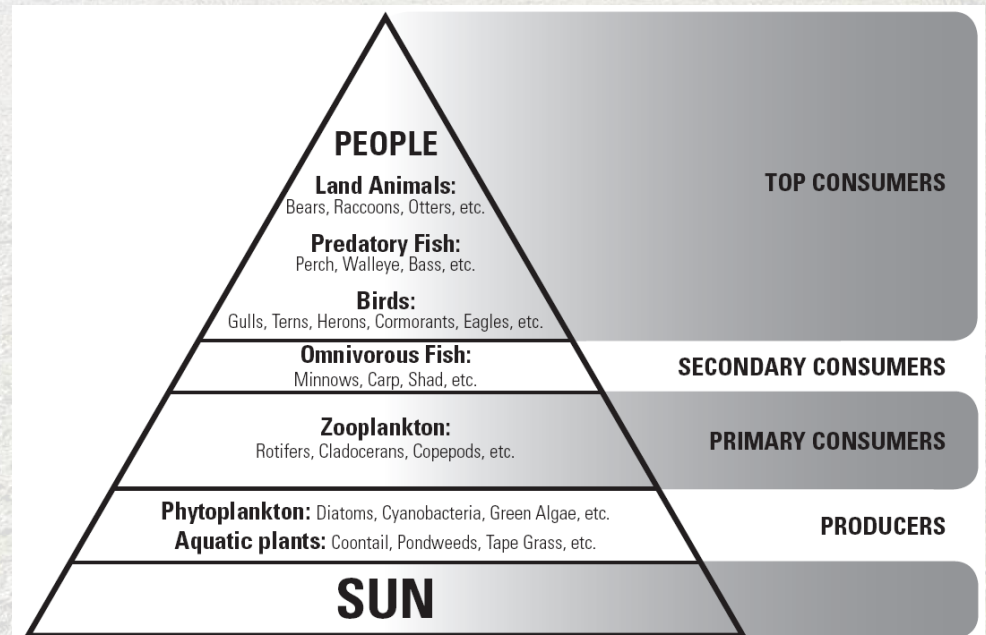
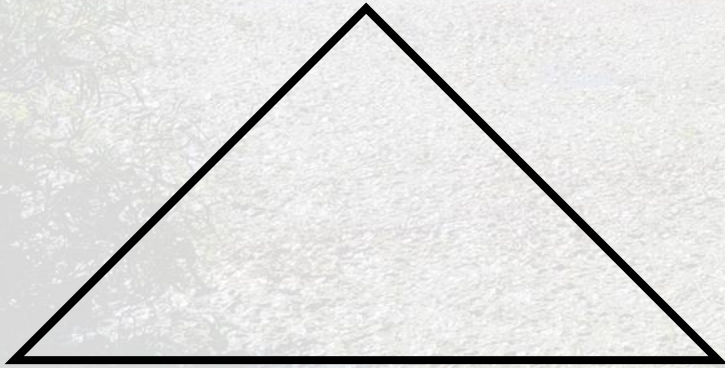
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Select effects of AIS

- Economic: Great Lakes region-wide liability estimated at “significantly over \$100 million annually” (Anderson Economic Group, LLC 2012).
- Environmental:
 - Predation on or parasitism/infection of native species.
 - Competition with native species.
 - Disrupting habitat function.
 - Genetic.
 - Serve as food source for native species.
 - Trophic cascade effects:
 - Mobilizing historic contaminants: e.g., bioaccumulation of PCBs.
 - **Shifting bioenergetic flow** (the big game changer).



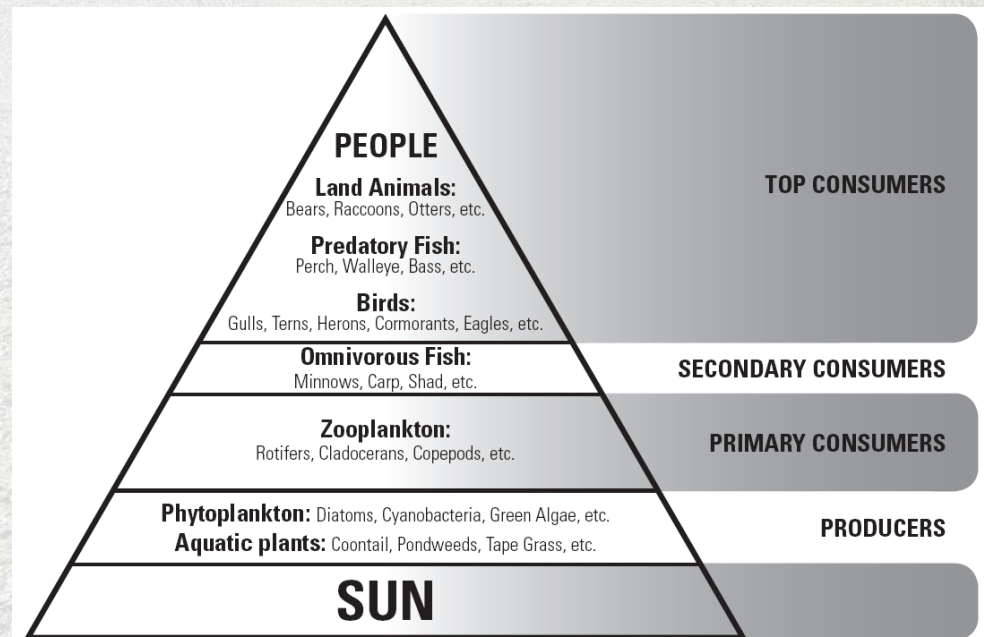
Environmental effects: Shifting bioenergetic flow



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(from Portner et al. 2009)

Environmental effects: Shifting bioenergetic flow



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AND ENVIRONMENTAL SCIENCES
(from Portner et al. 2009)

My recent regional concerns

- Grass Carp (*Ctenopharyngodon idella*): 2011 spawning event on western Lake Erie...
 - 2015, 2017, 2018, 2019...
- Red swamp crayfish (*Procambarus clarkia*): Recently expanding in north-central region.
- Aquatic plants recently on the move:
 - *Hydrilla verticillata* (commonly referred to by genus).
 - Yellow floating-heart (*Nymphoides peltata*).
 - European frogbit (*Hydrocharis morsus-ranae*).





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U.S. regulatory authority

More than 20 US agencies with diverse and often specific authorities.

Highlights:

- Nonindigenous Aquatic Nuisance Prevention and Control Act (1990), amended and expanded as the **National Invasive Species Act** (NISA: 1996), created the **Aquatic Nuisance Species Task Force** (ANSTF) chaired by USFWS and the National Oceanic and Atmospheric Administration (NOAA): <https://anstaskforce.gov/>.
- National Invasive Species Council within Dept. of Interior: established by **Executive Order 13112** (1999): <https://www.doi.gov/invasivespecies/>.
- **Lacey Act** (1900) largely administered by the USFWS: <https://www.fws.gov/injuriouswildlife/> (with caveat).
- **Plant Protection Act** (2000), largely administered by the U.S. Department of Agriculture: <https://www.law.cornell.edu/uscode/text/7/chapter-104>.
- **Vessel Incidental Discharge Act** (VIDA: 2018), USEPA standards enforced by U.S. Coast Guard: <https://mariners.coastguard.dodlive.mil/2019/02/01/2-1-2019-vessel-incident-discharge-act/>.



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- **Vessel Incidental Discharge Act** (VIDA: 2018), USEPA standards enforced by U.S. Coast Guard: <https://mariners.coastguard.dodlive.mil/2019/02/01/2-1-2019-vessel-incident-discharge-act/>.

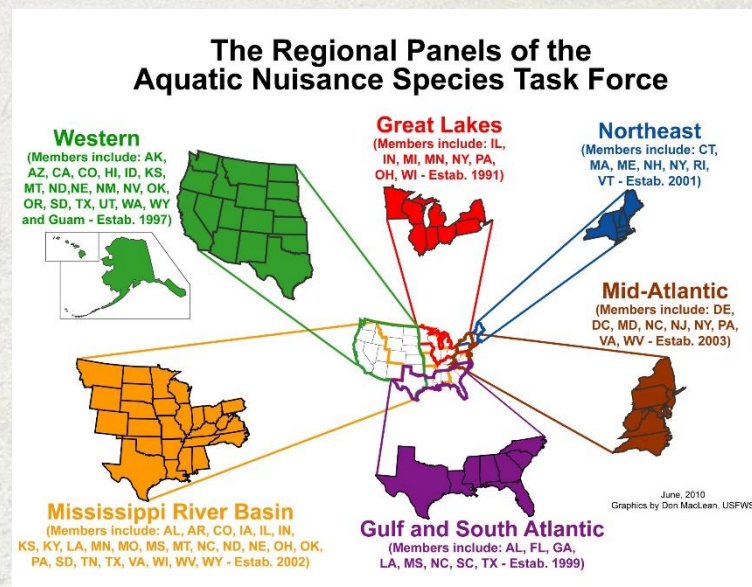


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The national ANSTF

- Implements NISA by developing programs to:
 - Prevent introduction and dispersal;
 - Monitor, control, and study;
 - Conduct research;
 - Coordinate programs and activities; and...
 - Educate and inform.
- Advised by and sends funding to states via six regional panels.

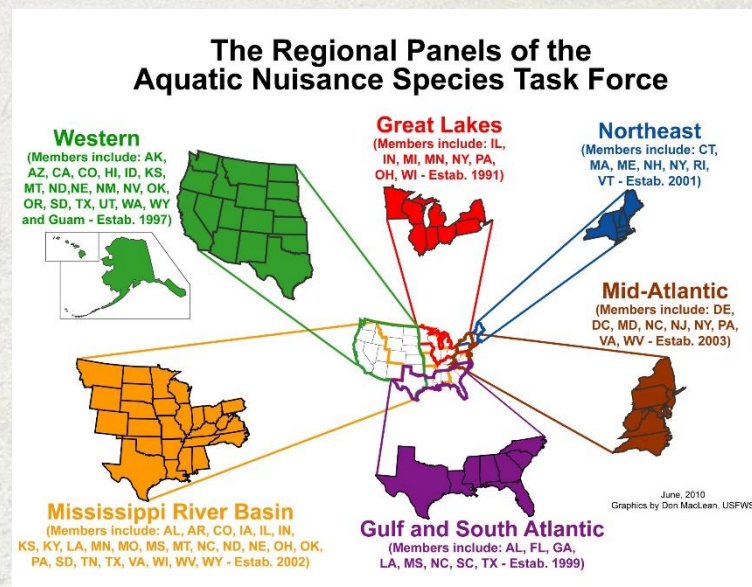


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The national ANSTF

- The North Central Region's three:
 - Mississippi River Basin Panel (coordinated by the Mississippi Interstate Cooperative Resource Association): <http://mrbp.org/>
 - Great Lakes Panel (coordinated by the Great Lakes Commission): <https://www.glc.org/work/glpan>s
 - Western Regional Panel (coordinated by the Invasive Species Action Network): <https://westernregionalpanel.org/>

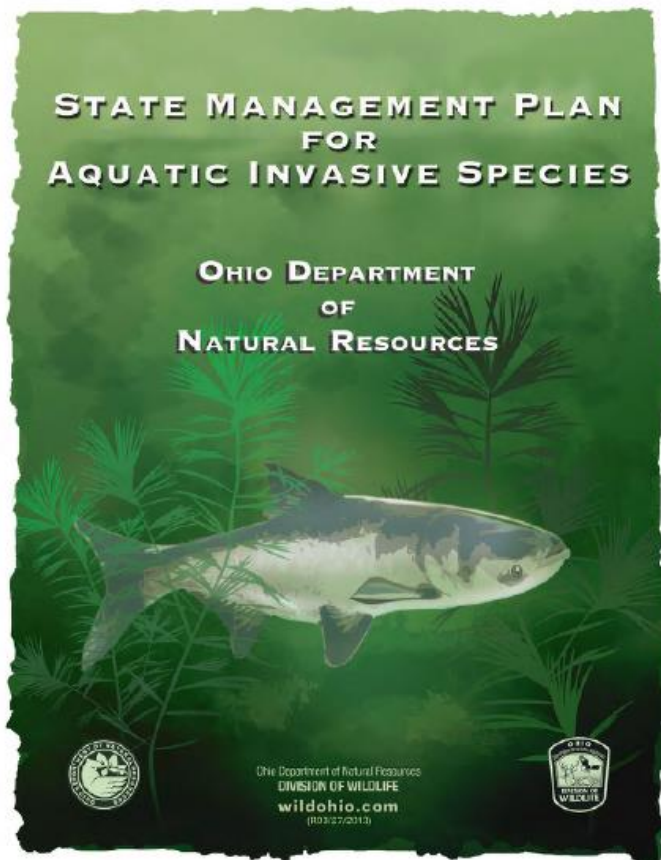


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State regulatory authority

- **Largely falls to state agencies charged with management and/or regulation of natural resources** (e.g., Ohio Dept. of Natural Resources, Division of Wildlife: ODW) with some related roles to a few other agencies (e.g., Ohio Dept. of Agriculture).
 - Maintenance of an AIS management plan qualifies states for some federal funding via NISA and the Aquatic Nuisance Species Task Force (ANSTF).



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Our mission statement

- *“To provide a forum for Ohio’s diverse stakeholders (its resource management agencies and related industries and organizations) to advise the state about the prevention and control of aquatic invasive species and for the state to inform those stakeholders about developing issues and policy.”*

<https://senr.osu.edu/extensionoutreach/ponds-fisheries-aquatics/aquatic-invasive-species-committee>



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Information resources

U.S. Geological Survey's (USGS) Nonindigenous Aquatic Species (NAS) database:

- Links to frequently updated range maps and fact sheets for catalogued species.
- Depends on user reports (so please submit your reports).
- Seems to find most frequent use among professional managers.

<http://nas.er.usgs.gov/>

USGS
science for a changing world

NAS - Nonindigenous Aquatic Species

USGS Home
Contact USGS
Search USGS

Home Alert System Database & Queries Taxa Information

Welcome to the Nonindigenous Aquatic Species (NAS) information resource for the United States Geological Survey. Located at Gainesville, Florida, this site has been established as a central repository for spatially referenced biogeographic accounts of introduced aquatic species. The program provides scientific reports, nomenclature, species, spatial data sets, regional contact lists, and general information. The data is made available for use by biologists, interagency groups, and the general public. The geographical coverage is the United States.

The NAS site will no longer serve data or track aquatic plants or marine invertebrates (except for Asian tiger shrimp - *Penaeus monodon*). Plants are being discontinued due to budget cuts. Marine invertebrate data can now be obtained from our partners at the Smithsonian Environmental Research Center from their [National Exotic Marine and Estuarine Species Information System \(NEMESIS\)](#).

The NAS system will focus on freshwater introductions and fishes (freshwater and marine).

Invertebrates

Bryozoans Cnidarians Crustaceans Mollusks

Vertebrates

Amphibians Fishes Mammals Reptiles

Accessibility FOIA Privacy Policies and Notices
U.S. Department of the Interior | U.S. Geological Survey
URL: <http://nas.er.usgs.gov>
Page Contact Information: Pam Fuller - NAS Program
Page Last Modified: Monday, October 01, 2012

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Information resources

Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS):

- Great Lakes-specific search engine housed by NOAA's Great Lakes Environmental Research Laboratory.
- Species accounts drawn from USGS database by default.

<https://www.glerl.noaa.gov/glansis/>



The screenshot shows the GLANSIS (Great Lakes Aquatic Nonindigenous Species Information System) website. The header includes the GLANSIS logo and the text "GREAT LAKES AQUATIC NONINDIGENOUS SPECIES INFORMATION SYSTEM". Below the header is a navigation bar with links: "GLANSIS Home", "About the Database", "Search the Database", and "Additional Resources". A banner asks users to help improve GLANSIS by clicking a link to take a user survey. The main content area is titled "Generate a customized non-indigenous species list and access profiles" and includes a link to "Guidance on using this tool". A note states: "NOTE: all results must be interpreted as a minimum, and no query will return a list of all nonindigenous species in the Great Lakes." The search filters include: "Species Category" (Nonindigenous*Range Expanders), "Group" (All), "Lake (HUC)" (All Great Lakes Drainages), "Genus" (text input), "Species" (text input), "Common Name" (text input), "Status" (All), "Pathway" (All), and "Sort by" (Taxonomic Group). There are "Reset" and "Submit" buttons. A map of the Great Lakes is shown on the right side of the filter section.

GLANSIS Database Search: NO: X

https://www.glerl.noaa.gov/glansis/nisListGen.php

GLANSIS AQUATIC NONINDIGENOUS SPECIES INFORMATION SYSTEM

GLERL Great Lakes RESTORATION

GLANSIS Home About the Database Search the Database Additional Resources

Want to help improve GLANSIS? Please click here to take our user survey.

GLANSIS Home, GLANSIS Search Portal

Generate a customized non-indigenous species list and access profiles

Guidance on using this tool

NOTE: all results must be interpreted as a minimum, and no query will return a list of all nonindigenous species in the Great Lakes.

Species Category: Nonindigenous*Range Expanders

Group: All

Lake (HUC): All Great Lakes Drainages

Genus:

Species:

Common Name:

Status: All

Pathway: All

Sort by: Taxonomic Group

Reset Submit

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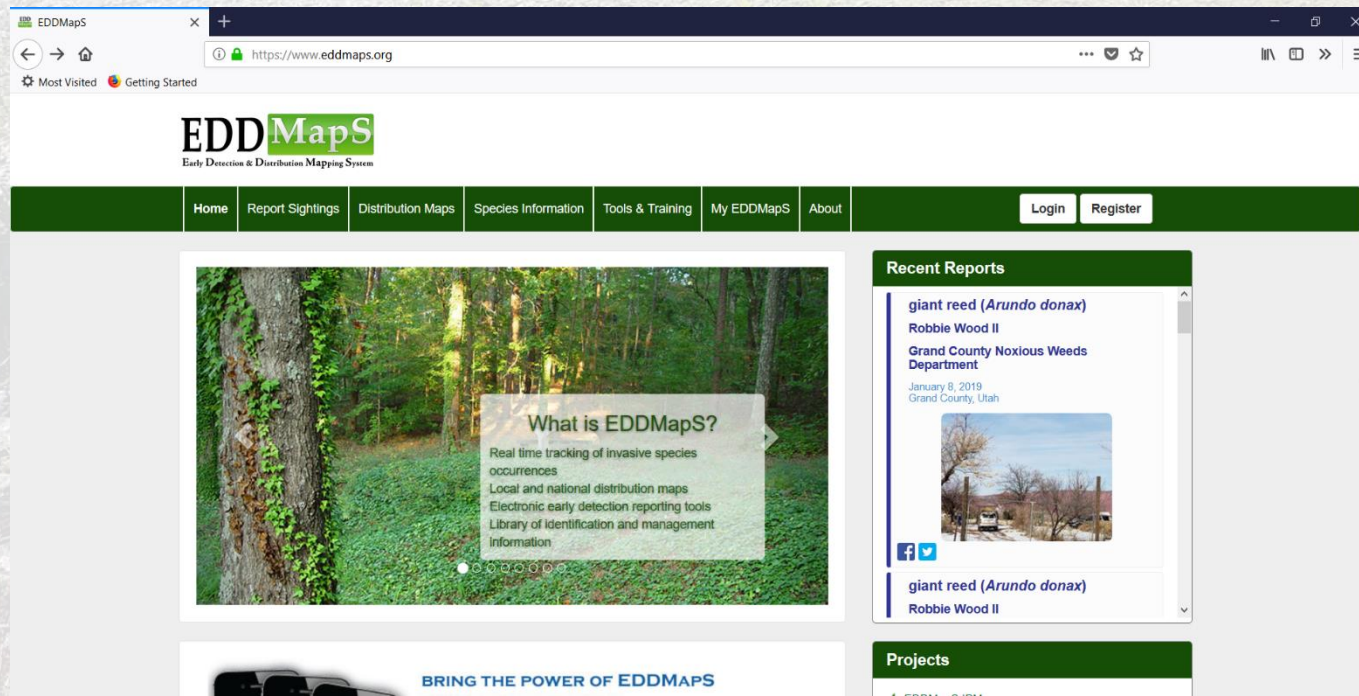
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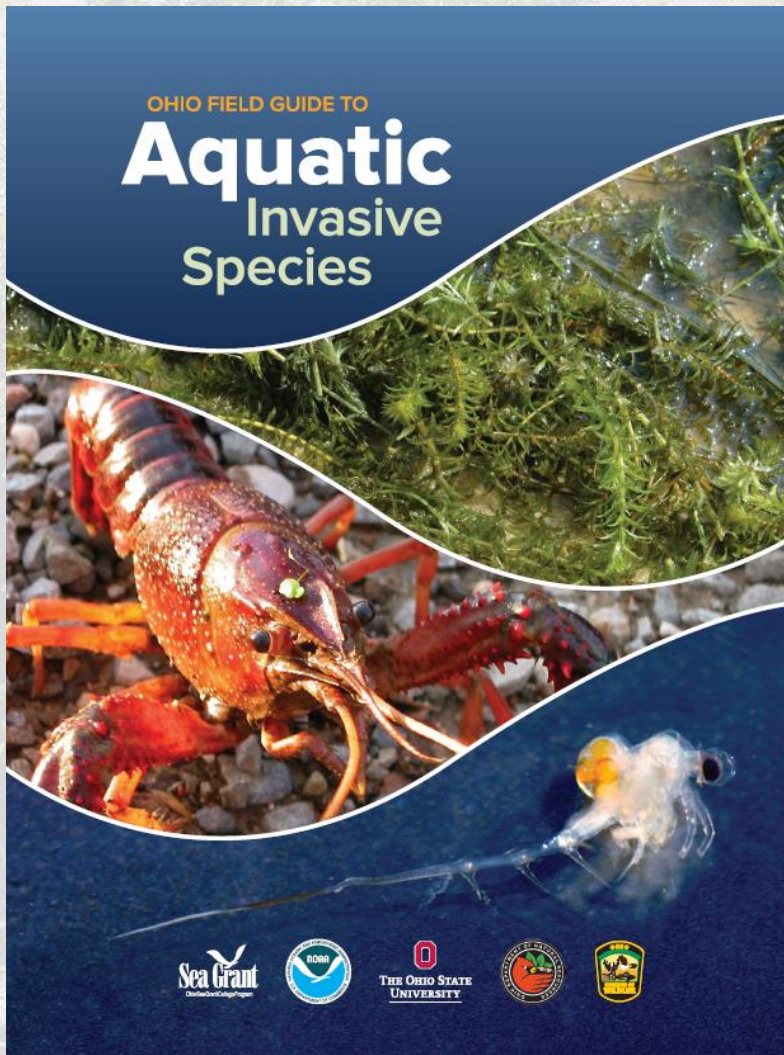
Information resources

Early Detection & Distribution Mapping System (EDDMapS):

- Developed by U. Georgia and tends to be used and promoted by academics.
- Much input by “citizen scientists” (but confirmed by system administrators), often via diverse regional apps (e.g., the Great Lakes Early Detection Network: <https://go.osu.edu/GLEDN>).
<https://www.eddmaps.org/>



Information resources



- Seek locally specific field guides where available, e.g.:
 - Gabriel, T., J. Navarro, and E. Braig, editors. 2018. Ohio field guide to aquatic invasive species. Ohio Sea Grant College Program and Ohio Department of Natural Resources, Columbus.



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Public/Stakeholder engagement

- **Stop Aquatic Hitchhikers!** campaign.
 - Consistent message for boating and angling public.

<http://stopaquatichitchhikers.org/>

- **Habitattitude** campaign.
 - Partnership among federal government (USFWS and ANSTF) and industry players (namely pet, aquarium, and nursery/landscape).

<http://www.habitattitude.net/>

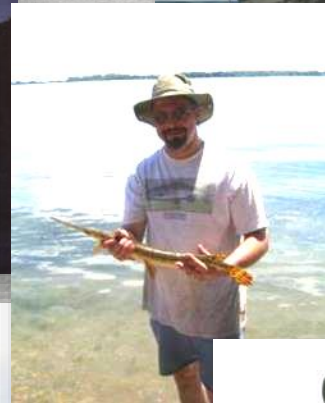


...And partnership programs!



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Questions?



Recreational Water Quality and Aquatic Invasive Species

Eugene Braig,
Program Director,
Aquatic Ecosystems
614-292-3823
braig.1@osu.edu



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AND ENVIRONMENTAL SCIENCES



Sarah Orlando



Sarah Orlando is the Program Manager for the Ohio Clean Marinas Program, providing education and outreach to the marina and boating community on a variety of topics including stormwater, wastewater, aquatic invasive species, marine debris, and coastal resiliency. Sarah holds her bachelor's degree in biology with minors in marine science and English from Wittenberg University, and her master's degree in marine resources management from Texas A&M University at Galveston.



OHIO SEA GRANT AND STONE LABORATORY

Recreational Water Quality and Invasive Species – Part II

Sarah Orlando

Clean Marinas Program Manager

Ohio Sea Grant



Outline


- Ohio Clean Marinas and Clean Boater Programs
- AIS and Recreational Boating
- Stop Aquatic Hitchhikers!
- Educational Resources
- AIS Landing Blitz



The Ohio Clean Marinas Program

- **Educating** marinas on best management practices
 - ~500 marinas in Ohio
- **Encouraging** voluntary, incentive-based participation
- **Protecting** 3,965 square miles of water and 312 miles of Ohio Lake Erie shoreline














10 REASONS TO BE PROUD OF YOUR OHIO

CLEAN MARINAS

- KEEP IT CLEAN:** Ohio Clean Marinas help keep oil, fuel, sewage and other contaminants and nutrients out of Ohio's waterways.
- HEALTHY HABITATS:** Maintaining high water quality builds healthy habitats for people, fish and wildlife.
- MAKE A SPLASH:** Clean water is safer and more desirable for swimming.
- WASTE NOT:** Recycling programs and reduced trash and contamination means less waste in landfills.
- BE PART OF THE SOLUTION:** Ohio Clean Marinas and responsible boaters help prevent the spread of invasive species and diseases.
- IN GOOD COMPANY:** Ohio Clean Marinas attract boaters who appreciate a cleaner environment and follow good boating practices.
- KEEP IT MOVING:** Better marina design improves water circulation and reduces the need for dredging.
- A GOOD REPUTATION:** Ohio Clean Marinas enhance the positive image of coastal communities and contribute to regional economic prosperity.
- SAFER AND SMARTER:** Educated marina staff members follow environmentally sound best management practices.
- WIN-WIN:** Everybody wins when we keep Ohio's waterways clean!

ohioseagrant.osu.edu/clean
 #OhioCleanMarinasCleanBoaters

The Ohio Clean Marina Program and Ohio Sea Grant Program are implemented with financial assistance provided by the Coastal Zone Management Act of 1972, as amended, administered by the Ohio Coastal and Great Lakes Program, National Oceanic and Atmospheric Administration, Office for Coastal Zone Management and collected into the Ohio Sea Grant Program funds. Funding for the statewide system is provided by the USFWS Division of Wetlands.


The Ohio Clean Boater Program

go.osu.edu/cleanboaterpledge

go.osu.edu/cleanmarinasyoutube











- Voluntary **stewardship program** to keep Ohio's coastal and inland waterway resources clean
- Boaters **pledge** to follow environmental best management practices
- Conduct **outreach** at recreational boating events




10 WAYS TO BE A CLEAN BOATER




1. **REDUCE, REUSE, RECYCLE:** Avoid single use plastics and invest in a reusable boat cover.
2. **STOW IT, DON'T THROW IT:** Prevent trash being thrown or blown overboard, including cigarette butts.
3. **FUEL WISELY:** Use best practices when fueling to prevent overflows and increase fuel efficiency.
4. **KEEP IT CLEAN:** Use absorbent pads to clean up oil and gas.
5. **CHECK YOUR ENGINES:** Keep engines and machinery in fine working condition to reduce oil leaks.
6. **PLAN AHEAD:** Manage sewage wastes properly and use a pump-out.
7. **GREEN CLEANING:** Use plain water, non-toxic, biodegradable cleaners and non-abrasive pads to wash your vessel.
8. **CLEAN, DRAIN, DRY:** Assure all equipment is free of debris to prevent the spread of invasive species.
9. **MIND YOUR BAIT:** Always dispose of unused bait properly onshore and never dump into the water.
10. **KEEP A CLEAN BILGE:** Use an oil absorbent bilge sock or remove all oil from the bilge before discharging into the water.

ohioseagrant.osu.edu/clean

[@OhioCleanMarinasCleanBoaters](https://www.facebook.com/OhioCleanMarinasCleanBoaters)

The Ohio Clean Boater Program and Ohio Clean Boater Program are implemented with financial assistance provided by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resource Management, Federal Oceanic and Atmospheric Administration through the NOAA Office of Coastal Management and in-kind with The Ohio State University Sea Grant. Funding for the statewide program is provided by the NOAA Office of Ocean Management.

AIS and Recreational Boating

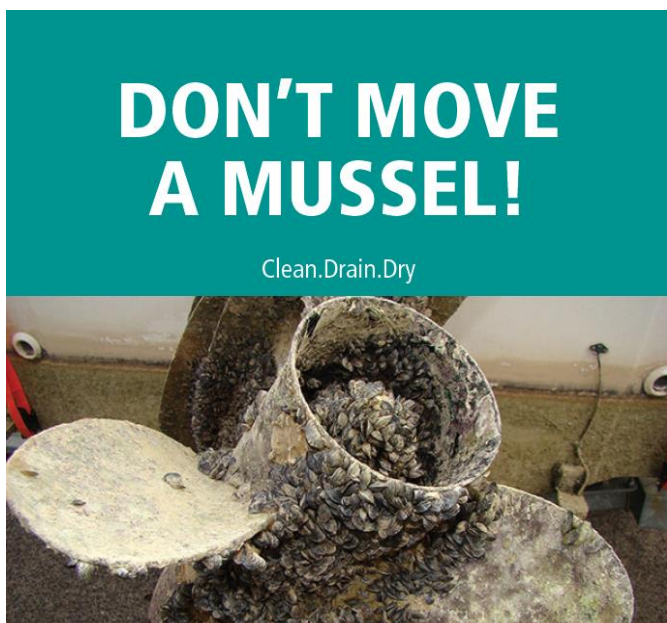
- Annual Economic Impact: **\$170 billion**



Stop Aquatic Hitchhikers!

National campaign with a goal of conveying a consistent message for recreational water quality users.

stopaquatichitchhikers.org



Stop the Transport of Invasive Species:

- **CLEAN** boots, gear, boat, trailer & vehicle of plants, fish, animals & mud.
- **DRAIN** bilge, ballast, wells & buckets before you leave the area.
- **DRY** equipment before launching watercraft into another body of water.



- **Purpose of guidelines:**

- ✓ Consistent, practical, and effective guidance to communication and outreach efforts
- ✓ Take into account key pathways, vectors, and life history of all AIS, including fish, aquatic plants, invertebrates and pathogens
- ✓ Support, not supersede local, state or tribal laws
- ✓ Promote voluntary actions to support the national *Stop Aquatic Hitchhikers!* campaign

Examples of Equipment

See <https://stopaquatic hitchhikers.org/prevention/#clean-drain-dry>
for additional guidance

Inspect, Clean, Drain, and Dry

- ✓ Waders
- ✓ Rope
- ✓ Anchor
- ✓ Dip net
- ✓ Field gear
- ✓ Bilge
- ✓ Livewell
- ✓ Trailer



**STOP AQUATIC
HITCHHIKERS!™**

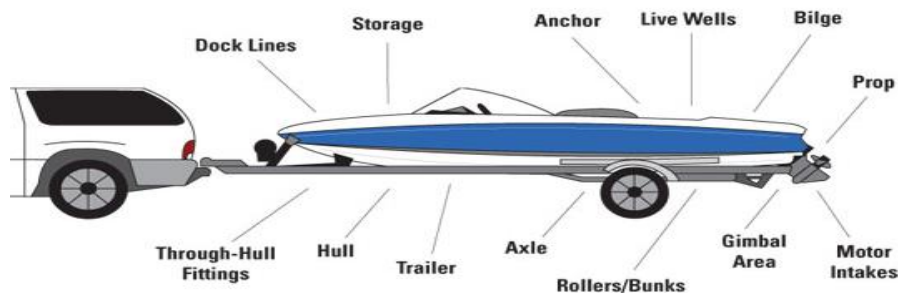
Be A Good Steward.
Clean. Drain. Dry.

StopAquaticHitchhikers.org

- ✓ Bait containers
- ✓ Paddles
- ✓ Floats
- ✓ Mask & Snorkel
- ✓ Wetsuit
- ✓ ATVs
- ✓ Decoys
- ✓ Blinds

BMP – Good

- **Inspect** boats, trailers and all equipment
- **Remove** any vegetation, debris or animals
- **Drain** water from Motor, Bilge, Wells, etc.
- **Plan** and record your efforts



BMP – Better

- Inspect – Remove – Drain
- **Cold Rinse** boats, trailers and equipment with garden hose
- **Disinfect** with a mild bleach (0.5 oz/quart water) or salt solution (2/3 cup/gallon water) on all equipment



BMP- Best

- Inspect – Remove – Drain – Decontaminate
- **High Pressure Rinse** with a pressure washer in a wash line for boats/trailer



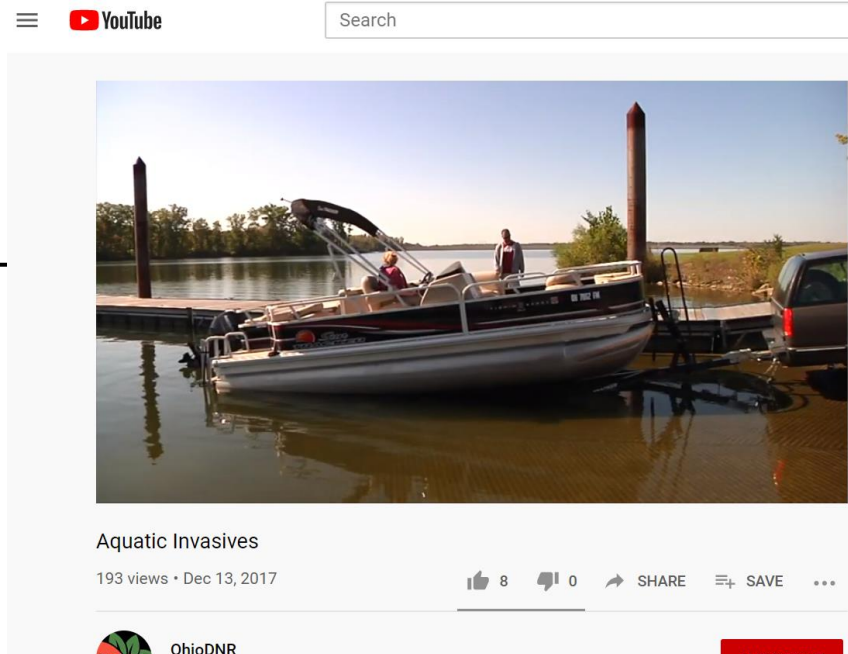
BMP – Exceptional

- Inspect – Remove – Drain – Decontaminate
- **Hot Pressure Rinse** with pressure washer with water above 140° F in a wash line for boats/trailers.



Educational Resources

- Ohio Clean Marina & Boater Resources – ohioseagrant.osu.edu/clean
- Ohio AIS Field Guide: <https://ohioseagrant.osu.edu/p/4j7wz>
- AIS in the Great Lakes Fact Sheet: <https://ohioseagrant.osu.edu/p/6bdd5>
- AIS Best Practices for Boaters YouTube Video: <https://go.osu.edu/cmairs>
- Clean Boats, Clean Tournaments YouTube Video: <https://www.youtube.com/watch?v=13FfNNWFyGk>



Great Lakes AIS Landing Blitz

- Collaborative **outreach campaign** to raise awareness about preventing the spread of aquatic invasive species through **recreational boating** and related activities
- Local **volunteers** partner with state agencies to deliver consistent messaging about preventing the introduction and spread of AIS from the movement of watercraft and equipment between water bodies at both public and private **boating access sites** throughout the state
- Effort occurs during a set **timeframe**
- Event is **promoted** locally and statewide.



Event Website:

<https://www.glc.org/work/blitz>

- Information about events across the Great Lakes from

June 28 – July 10, 2020

- Locations
- Partners
- How to Prevent the Spread of AIS
- Media Information and State Contacts

Great Lakes Aquatic Invasive Species LANDING BLITZ

Great Lakes boaters and anglers experienced a regionwide educational "blitz" encouraging them to clean, drain, and dry their boats and gear, and properly dispose of unwanted bait.

The **Great Lakes AIS "Landing Blitz"** is a binational multi-agency effort aimed at raising public awareness and promoting actions to prevent the spread of harmful aquatic invasive species (AIS).

In 2019, the two week event brought together hundreds of partners to support education efforts and watercraft inspections to reduce the risk of moving AIS between water bodies.

Thousands of people are becoming part of the solution:



Credit: Christal Campbell, LW Division of Extension

- Approximately **115,000 people** were educated about AIS by agency staff, watercraft inspectors and volunteers
- **1,400 public and private boat landings** in Great Lakes states and provinces participated in the most extensive, coordinated landing blitz event to date
- **94%** of participating boat landings also hosted boat inspections, leading to **over 130,000 inspections**
- Only **6%** of inspections found aquatic plants, animals, and/or mud attached to boats, motors, and trailers
- Multiple media outlets covered event happenings and **millions of people watched, listened and read about AIS prevention efforts** based on news releases by partner agencies
- At least **103,500 people** saw information about the event on Facebook, Instagram, and/or Twitter
- **780+** interested people got information about the event through the event webpage at www.glc.org/blitz



For more information
and to become a partner visit:
www.glc.org/blitz

Thank You!



CONTACT

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Ohio Sea Grant

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419-609-4120

FIND OUT MORE

ohioseagrant.osu.edu/clean

www.facebook.com/OhioCleanMarinasCleanBoaters

glcleanmarina.org

stopaquatichitchhikers.org



Question and Answer Session

We will draw initial questions and comments from those submitted via the chat box during the presentations.

Today's Speakers

Eugene Braig – braig.1@osu.edu

Sarah Orlando – orlando.42@osu.edu





NORTH CENTRAL REGION
WATER NETWORK



Thank you for participating in today's *The Current*!

Visit our website, northcentralwater.org, to access the recording and our webinar archive!

Upcoming Webinar:

Conservation Drainage – Managing Water for the Future

Hosted by the North Central Climate Collaborative

Monday, June 22nd at 1pm CT

[Register Here https://bit.ly/30SOGwz](https://bit.ly/30SOGwz)

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