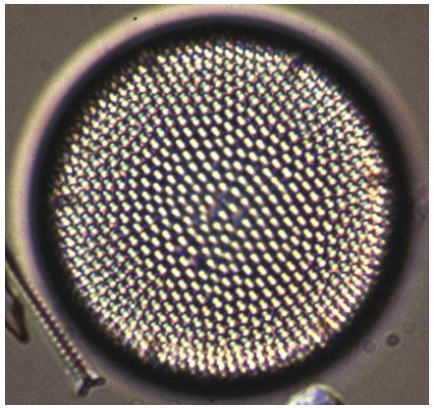
GLANSIS Update

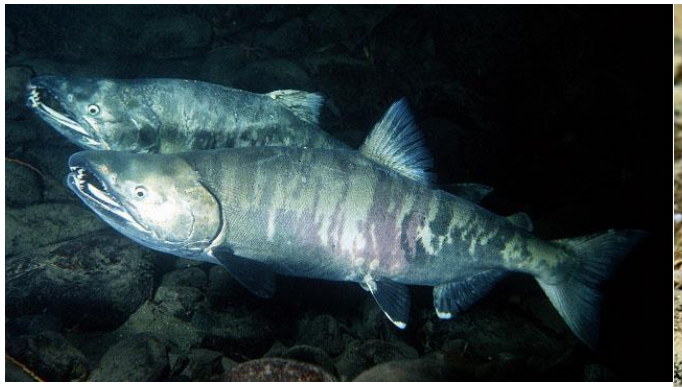
Great Lakes Panel on ANS

June 14, 2021

“Retired and Reclassified” Species



- *Actinocyclus normanii fo subsalsa* – reclassified as cryptogenic
- Removing from the Watchlist
  - *Atherina boyeri*
  - *Oncorhynchus keta*
  - *Benthophilus stellatus*
  - *Cottus gobio*



The assessments for these species which led to their removal from the lists will be placed in the RA Clearinghouse

New Species

- New Nonindigenous
  - *Microstegium vimineum*
  - *Salmincola californiensis*
- New cryptogenic/Range Expander
  - *Stagnicola palustris*
  - *Salmincola edwardsii*
  - *Elimia livescens*
- New Watchlist
  - *Cyprinella lutrensis*
  - *Lithoglyphus naticoides*
  - *Prymnesium parvum*
  - *Salvinia minima*

Coming Soon

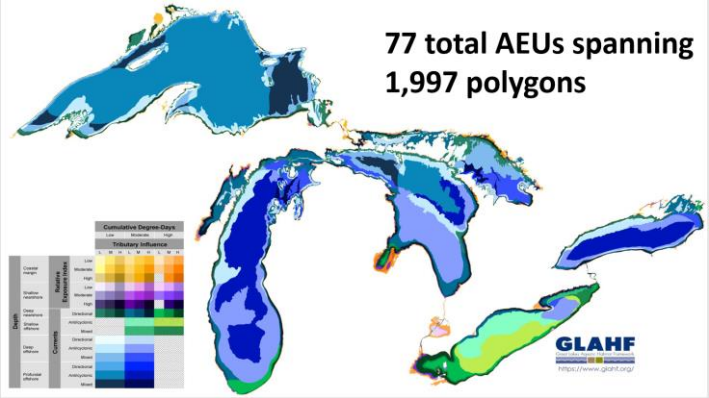
- Reptiles (Turtles) and Amphibians (Frogs)
  - *Trachemys scripta elegans* (Established)
  - *Trachemys scripta scripta* (High Risk Watchlist)
  - *Macrochelys temminckii* (Possible Range Expander)
  - *Pseudemys concinna* (High Risk Watchlist)
  - *Kinosternon subrubrum*
  - *Pelodiscus sinensis*
  - *Bombina bombina* (High Risk Watchlist)
  - *Xenopus laevis* (High Risk Watchlist)
  - *Eleutherodactylus planirostris* (Watchlist?)
  - *Lithobates catesbeianus* (Possible Range Expander – not native to UP or northern MN)
  - *Osteopilus septentrionalis*
  - *Duttaphrynus melnostictus* (Moderate Risk in ERSS)

Please contact us if you have additional suggestions to this list of species!

Manuscripts/Tech Memos

- Sturtevant, R., E. Lower, A. Bartos, and A. Elgin. 2021. A Review and Secondary Analysis of Competition-Related Impacts of Nonindigenous Aquatic Plants in the Laurentian Great Lakes. *Plants* 10(2)406 https://doi.org/10.3390/plants10020406
- Gap Analysis Tech Memo
- 161-d – 2020 Impact Assessments
- 169-d – 2020 Risk Assessments

GLAHF-AEU Habitat Distributions



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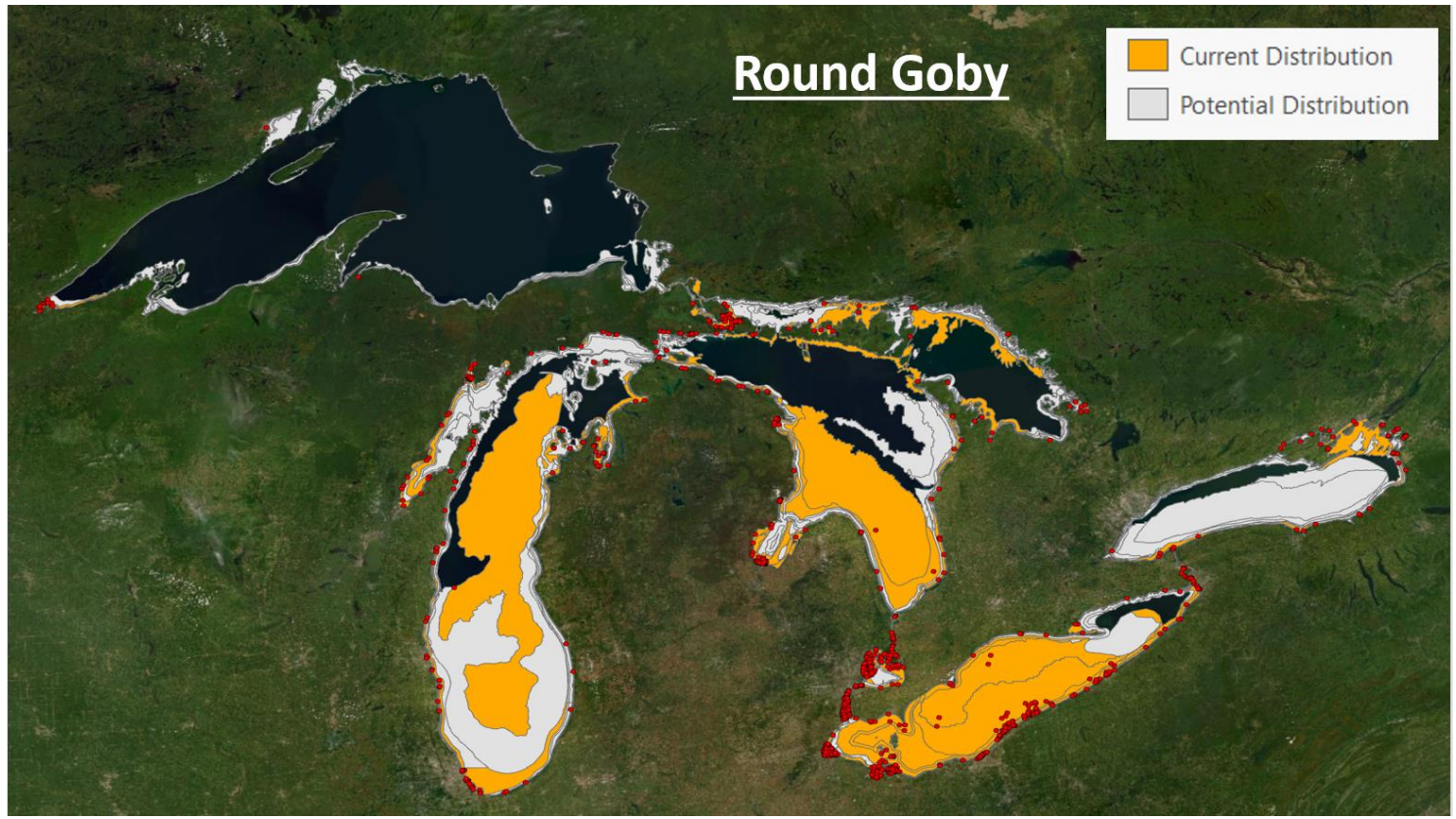
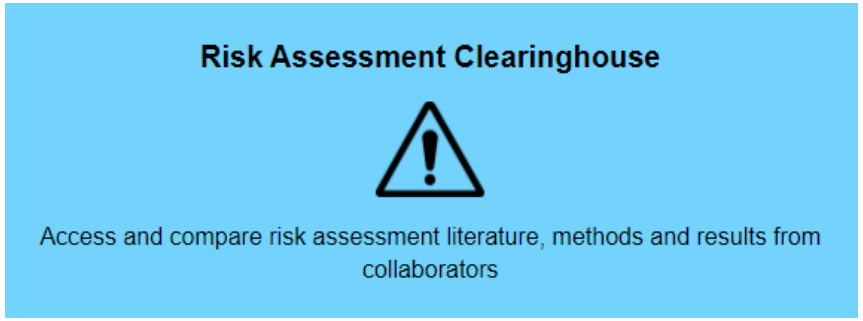
GLANSIS



- The combination of GLAHF-Aquatic Ecological Units with GLANSIS specimen data can yield simple, easy to produce estimations of a species current and potential distribution in the Great Lakes
- Limited to the GLANSIS database
- Additional layers can be added (e.g., aquatic vegetation, salinity, etc.)

Risk Assessment Clearinghouse



- Updated GLANSIS OIA/RA
  - Davidson GLANSRA
  - Coming soon – 2020 updates and ‘range expansion species’
- USFWS ERSS
- Coming soon – MISAC Assessment
- **Suggestions welcome for additional assessments/methodologies.**

Video Series

- GOAL: **This video series aims to underscore the importance of past, present, and ongoing work related to invasive species in the Great Lakes.**
- Capstone (1 minute): Federal agencies are making a difference in the fight against invasive species in the Great Lakes through monitoring, control technologies, and mitigation.
- Ballast Water (<3 minutes): Identifying and halting major invasion vectors can be more effective than controlling individual species.
- *Dreissenid mussels* (<3 minutes): Sometimes, eradication isn't an option, and control methods must focus on small-scale maintenance to keep necessary activities/infrastructure running.
- *Sea lamprey* (<3 minutes): Even long-established invasive species can be controlled, if not eradicated, and constant funding and vigilance are still necessary.
- *Invasive carp* (<3 minutes): When we know a species is an imminent invasion threat, research, monitoring, and advance mitigation efforts are crucial.

IF you do key work in these areas and want to provide input to the storyboard process, please let us know!

GLANSIS Impact Assessments

Great Lakes Impacts:

***Dreissena polymorpha* has a high environmental impact in the Great Lakes.**

Realized:
Zebra mussels can have profound effects on the ecosystems they invade. They primarily consum
populations of zebra mussels in the Great Lakes and Hudson River reduced the biomass of phyto
invasion in Lake Erie (Holland 1993). As the invasion spread eastward during the years 1988 to
Lake Huron's Saginaw Bay, sampling stations with high zebra mussel populations experienced a

***Dreissena polymorpha* has a high socio-economic impact in the Great Lakes.**

Realized:
Zebra mussels are notorious for their biofouling capabilities—colonization of water supply pipes of hydroelectric and
heat exchangers, condensers, fire-fighting equipment, and air conditioning and cooling systems. Zebra mussel dens
al. 1991). Continued attachment of zebra mussel can cause corrosion of steel and concrete, affecting its structural

Navigational and recreational boating can be affected by increased drag from attached mussels. Small mussels can
can be fouled if left in the water for long periods. Deterioration of dock pilings has increased when they are encrust

There is little or no evidence to support that *Dreissena polymorpha* has significant beneficial effects in the Great Lakes.

Realized:
Several species of native fish may prey on zebra mussels in varying degrees, including lake whitefish (Madenjian et al. 2010, Rennie et al. 2009), freshwate
these species relative to pre-invasion is unknown.

Increased water clarity following zebra mussel introduction is perceived as a benefit by some, especially business owners and residents on invaded water bo

Potential:
Experimental studies have shown that zebra mussels generally increase benthic macroinvertebrate densities, sometimes by more than 10-fold (Botts et al.

Or the TM version…

Scientific Name: *Procambarus clarkii*
Common Name: Red swamp crayfish

IMPACT RESULTS

Environmental: Moderate
Socio-Economic: Moderate
Beneficial: Moderate

ENVIRONMENTAL IMPACT

Does the species pose some hazard or threat to the health of native species (e.g., it magnifies toxin levels, is poisonous, a virus, bacteria, parasite, or a vector of one)?

Yes, and it has resulted in the reduction or extinction of one or more native species populations, affects multiple species, or is a reportable disease	6
Yes, but negative consequences have been small (e.g., limited number of infected individuals, limited pathogen transmissibility, mild effects on populations and ecosystems, etc.) AND/OR It has significantly affected similar species in past invasions outside of the Great Lakes	1√
Not significantly	0
Unknown	U

- *Many crayfish, including* P. clarkii, *are known to be a source of transmittance of heavy metals among different trophic levels of the food web. Crayfish pass heavy metal contamination on through enriched levels of the metals or pesticides in their organs or tissues, which is then transferred to their consumers (Otero et al. 2003).*
- *The red swamp crayfish harbors numerous flatworm parasites that may be passed on to vertebrates and can carry the crayfish plague fungus (*Aphanomyces astaci*) as a chronic or latent infection (Huner and Barr 1991, Longshaw 2011). It has been implicated in the spread of the fungus to native crayfish in Europe following initial introduction by the signal crayfish (Barbaresi and Gherardi 2000, Mastitsky et al. 2010).North American crayfish species appear to be resistant to most of these diseases (Hunner and Barr 1991).*
- *The white spot syndrome virus, which has caused mass mortalities among shrimp in Europe, can also be carried by* P. clarkii. *Together with its ability to carry the crayfish plague virus, the red swamp crayfish has been characterized within its invaded range as a host to high impact parasites (Mastitsky et al. 2010).*

Does it out-compete native species for available resources (e.g., habitat, food, nutrients, light, etc.)?

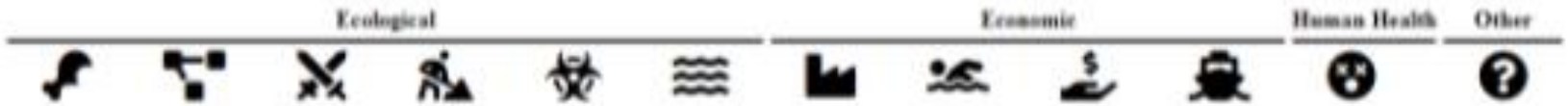
Yes, and it has resulted in significant adverse effects (e.g., critical reduction, extinction, behavioral changes, etc.) on one or more native species populations	6
Yes, and it has caused some noticeable stress to or decline of at least one native species population	1 √
Not significantly	0
Unknown	U

- Procambarus clarkii *is a strong competitor with native crayfish species, such as the white river crayfish (*P. acutus*) or the signal crayfish (*Pacifastacus leniusculus*), and may exclude these species from their shelters (Arrignon et al. 1999, Gherardi and Daniels 2004, Mueller 2007).*

Impact Database

Impact of Introduction:

Summary of species impacts derived from literature review. Click on an icon to find out more...



with each icon linking to a tabular output for that data ... e.g.,

10 results for *Dreissena polymorpha* (zebra mussel)

Results per page: 25

Impact ID	Scientific Name	Impact Type	Study Type	Study Location	Impact Description	Reference
2781	*Dreissena polymorpha*	Predation Herbivory	Observational	Field	Veligers have no severe negative impacts on the plankton community in the estuarine to freshwater...	20162
1898	*Dreissena polymorpha*	Predation Herbivory	Experimental	Field	Since zebra mussels became abundant in Oneida Lake water clarity has significantly increased while...	20612
2382	*Dreissena polymorpha*	Predation Herbivory	Observational	Field	Extremely low chlorophyll concentrations were found directly above reefs occupied with zebra...	20691
2887	*Dreissena polymorpha*	Predation Herbivory	Observational	Field	From 1983-1990, densities of major benthic macroinvertebrate groups (Diptera, Oligochaeta...	20728
2988	*Dreissena polymorpha*	Predation Herbivory	Observational	Field	Phytoplankton cell density decreased dramatically after the zebra mussel invasion and shifted from...	22621
2991	*Dreissena polymorpha*	Predation Herbivory	Experimental	Field	Species composition of the benthic algal community may have changed to diatoms due to the increase...	22633
2992	*Dreissena polymorpha*	Predation Herbivory	Observational	Field	Comparisons before and after the appearance of zebra mussels showed reductions of phytoplankton as...	22712
3089	*Dreissena polymorpha*	Predation Herbivory	Observational	Field	The impact of zebra mussels on the phytoplankton community of the pelagic waters of Lake Erie was...	23254
3096	*Dreissena polymorpha*	Predation Herbivory	Experimental	N/A	A model predicted that zebra mussels can affect the abundance of both small phytoplankton and...	23300
3642	*Dreissena polymorpha*	Predation Herbivory	Anecdotal	N/A	A general review of literature classifies the primary interaction of zebra mussels and several...	13190

Currently showing impact type "Predation Herbivory". View all impact types for *Dreissena polymorpha*

If you use this type of data, do you want to see a similar product for the Great Lakes?