

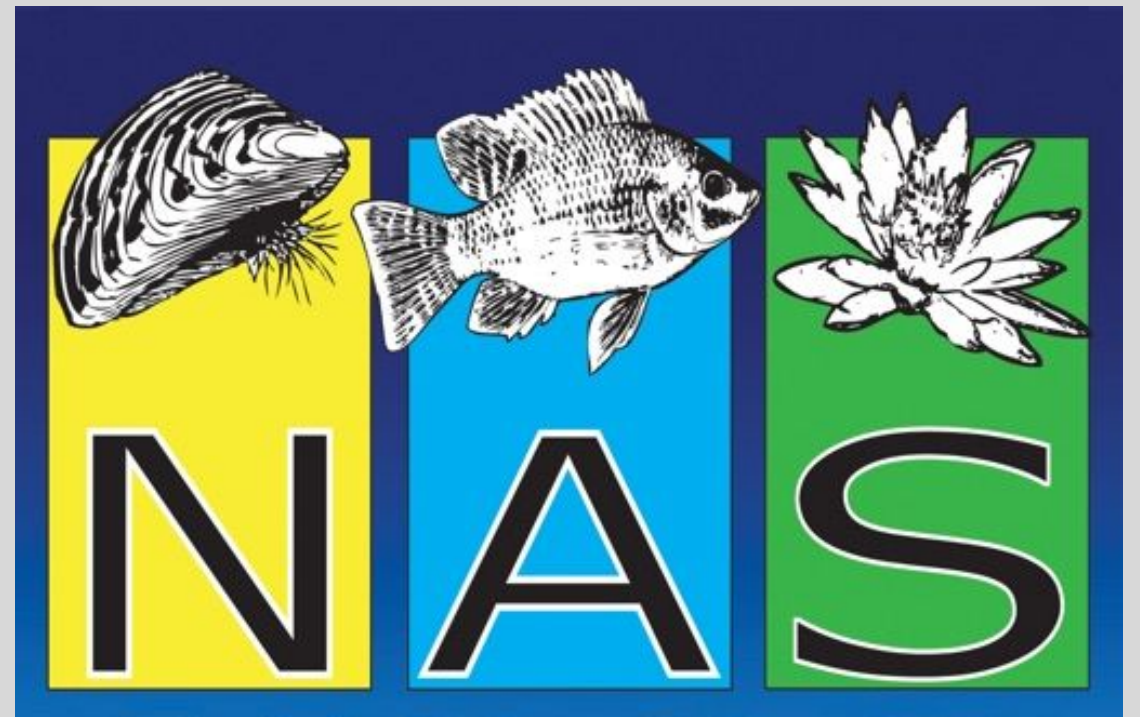


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Welcome to the **Aquatic Disease and Pathogen Repository** (AquaDePTH), a public-facing national repository that supports bio surveillance of aquatic animal diseases and pathogens. The program provides scientific reports, online/real time queries, spatial data sets, and general information. The data are made available for use by biologist, interagency groups and the general public.




Bio-sketch

View list of informational profiles of pathogen or hosts.



Pathogen Map

Search for AquaDePTH pathogen records via a custom spatial query map




Host Map

Search for AquaDePTH host records via a custom spatial query map



Pathogen List

Search for pathogen records by species group and broader geographical borders.



USGS Data Submission

Submitⁿ surveillance or mortality observations to USGS for review and upload



1,000
Host Species



200
Pathogen Species



500
surveillance Events




100
Mortality Events



10,000
Point Records



100,000
Visits



2,000
Downloads



Bio-sketch



Pathogen

- Agent Name:
- Overview:
- Description of etiological agent:
- Host Species:
- Associated disease name and description:
- Range Map:
- Life cycle and ecology:
- Preventive measures to minimize spread:
- References:



Non-NA S Host

- Species name:
- Common name:
- Synonyms and Other Names:
- Taxonomy:
- Identification:
- Size:
- Native Range:
- References:



NAS Host

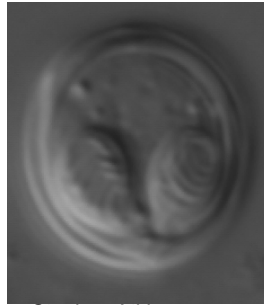
- Species name:
- Common name:
- Synonyms and Other Names:
- Taxonomy:
- Identification:
- Size:
- Native Range:
- Nonindigenous Occurrences:
- Ecology:
- Means of Introduction:
- Status:

Submission

Myxobolus cerebralis

Whirling disease

Resources



Stephen Atkinson, OSU



Download Citation

Found 5 Host(s) Records in AquaDePTH



Pathogen Map



Animated Map

Agent Name: *Myxobolus cerebralis* (Hofer, 1903)

Overview: *Myxobolus cerebralis* is a cnidarian myxozoan parasite that causes whirling disease in salmonid fish. This parasite has a complex life cycle with two distinct life stages and hosts: a mixospore, infectious to an oligochaete worm (*Tubifex tubifex*), and a triactinomyxon infectious to fish. Whirling disease damages the fish cartilage and affects its nervous system, causing swimming behavior in a whirling motion, blackened tail, and skeletal deformities. Susceptibility to whirling disease varies based on host and environmental factors. For instance, young rainbow trout are highly susceptible to whirling disease. *Myxobolus cerebralis* first appeared in the United States in 1958 and has since been detected in 25 states. However, detection does not mean the parasite has an established population. Several efforts exist to track and manage the disease, given its impact on some salmonid fish. There is no risk of infection to humans for whirling disease.

Description of etiological agent: *Myxobolus cerebralis* is a cnidarian myxozoan parasite that forms two distinct life stages: a myxospore and a triactinomyxon. Myxospores, infectious to an oligochaete worm, are mostly spherical to oval, approximately 9 micrometers in size, and contain two symmetrical polar capsules of about 5.1 by 3.2 micrometers (Figure 1A). Polar capsules are the equivalent of other cnidarian nematocysts, with each containing a polar filament with 5 to 6 coils, which are used during the attachment of spores when infecting its host (Lom and

Host Species: Myxospores only infect the invertebrate oligochaete worm, *Tubifex tubifex*, where they produce and shed actinomyxons (triacinomyxons). Salmonid species are the only suitable vertebrate hosts for the actinomyxons, with rainbow trout being particularly susceptible to infection (O'Grodnick, 1979; Wolf and others, 1986; Hoffman, 1990; Hedrick and others, 1999b; Kerans and others, 2004). Certain strains of salmonids have various levels of resistance to whirling disease, showing milder disease impacts (Hedrick and others, 2003; Wagner and others, 2006).

Table 1. Host species for *Myxobolus cerebralis* with data points present in AquaDePTH*.

Host species	Common name
1. <i>Oncorhynchus mykiss</i>	Rainbow Trout
2. <i>Oncorhynchus clarki</i>	Cutthroat Trout
3. <i>Oncorhynchus clarki virginalis</i>	Rio Grande Cutthroat Trout
4. <i>Salmo trutta</i>	Brown Trout
5. <i>Salvelinus fontinalis</i>	Brook Trout

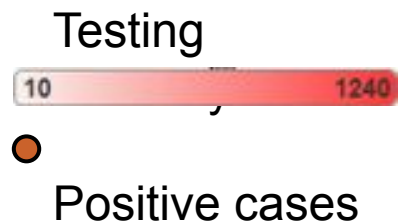
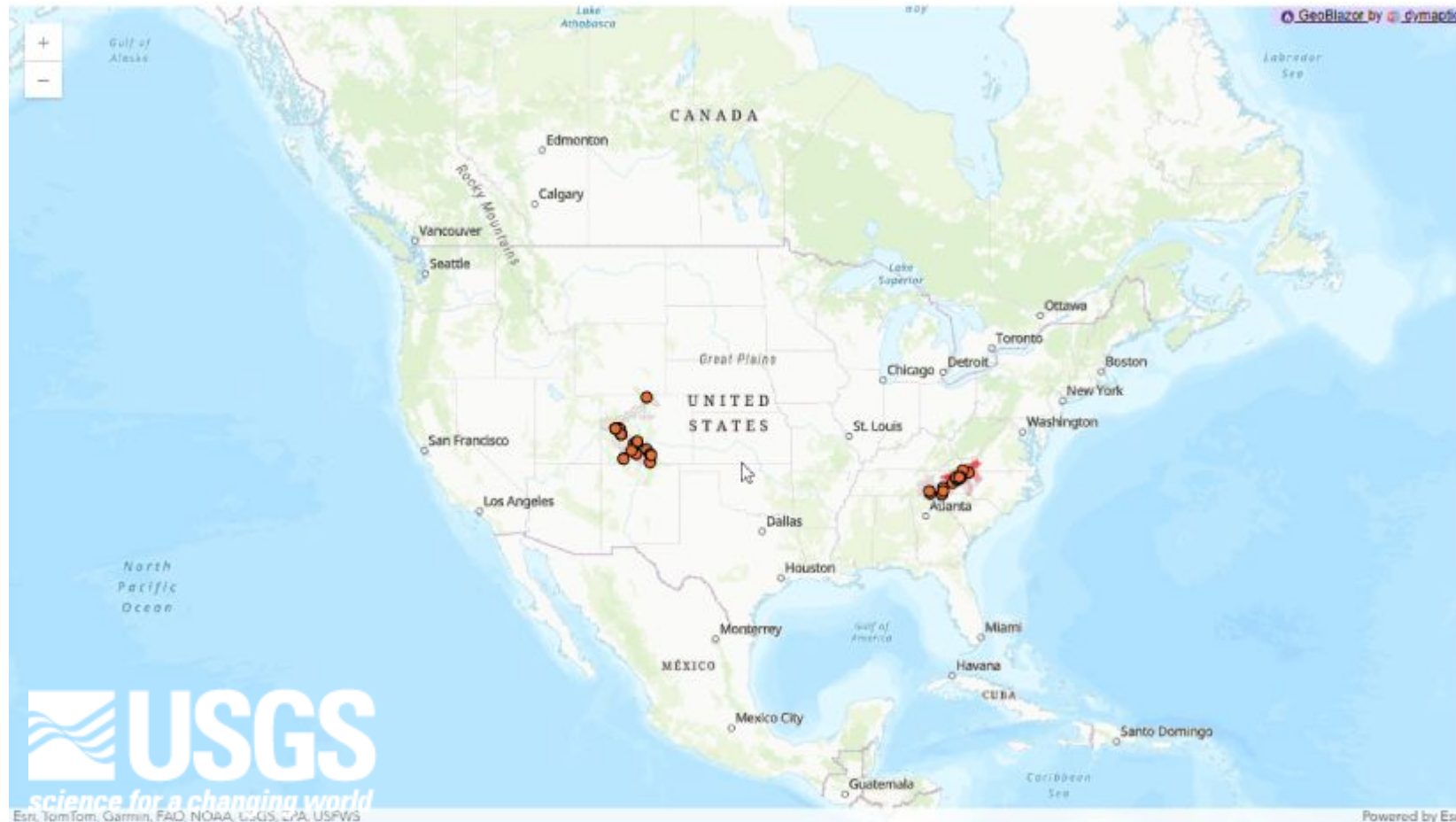
* List includes only host(s) present in AquaDePTH for the specific pathogen listed. Not an inclusive list of all potential hosts

Associated disease name and description: *Myxobolus cerebralis* causes whirling disease in several salmonid species. Disease susceptibility depends on species, environmental factors, and host developmental stage, with young fish most susceptible (Gilbert and Granath, 2003; Steinbach Elwell and others, 2009; Sarker and others, 2015). Asymptomatic disease carriers are possible in some salmonid species (Hedrick and others, 1999a). Upon infection of the fish, the parasite migrates through the nervous system concentrating in cartilage rich areas, like the cranium and spine, in which it develops into the hardier myxospores while permanently damaging the cartilage. The disease is characterized by several clinical signs: 1) whirling behavior, due to spinal cord constriction and brain stem compression that causes fish to swim erratically in tail-chasing or whirling form; 2) blackened tail caused by pressure on nerves that control pigmentation; and 3) skeletal deformities of the head, spine and operculum due to cartilage damage and interference with bone development (Halliday, 1976; Wolf and others, 1986; Hedrick and others, 1999b; Rose and others, 2000). Common deformities include shortened operculum, indented skull, crooked spine, and shortened nose (Fig. 2). The disease can cause mortality due to direct physical damage or inability to feed or evade predators, younger fish are more susceptible than older fish due to the high proportion of developing cartilage (Steinbach Elwell and others, 2009).



Figure 2. Clinical disease signs of whirling disease in fish. Images courtesy of Sascha L. Hallett, Oregon State University.

Range Map:



Map last updated in 1/5/2026. Map shows only data present in the AquaDePTH database and does not represent all testing or positive cases. [Pathogen Map](#)

Submission

Cyprinus carpio

Common carp



Kaitlin Kovacs, USGS

Resources

Download Citation

Found 2 Pathogen(s) Records in AquaDePTH

Host Map

Animated Map

NAS Records

Cyprinus carpio (Linnaeus, 1758)

Common name: Common Carp

Synonyms and Other Names: European carp, German carp, leather carp

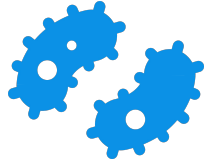
Taxonomy: available through

Identification: Adults are light gold to dark brown in color, with reddish fins. Scales cover the entire body and barbels accent the mouth (one per side). Head is triangular with a blunt snout and thick nose plate. Does not possess a true spine. Wheeler (1978); Becker (1983); Page and Burr (1991); Etnier and Starnes (1993); Jenkins and Burkhead (1994); Balon (1995). In Eurasia there are two poorly defined subspecies *C. c. carpio* and *C. c. haematopterus*; unfortunately, feral Common Carp, descendants of earlier escapees or introductions, have greatly confused the picture (Balon 1995). Several genetic strains—some bred in aquaculture or used as ornamentals (e.g., leather carp, mirror carp, Israeli carp, koi)—are recognized by some as separate varieties (Robison and Buchanan 1988; Balon 1995).

Size: 122 cm

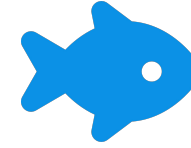


Maps



Pathogen Map

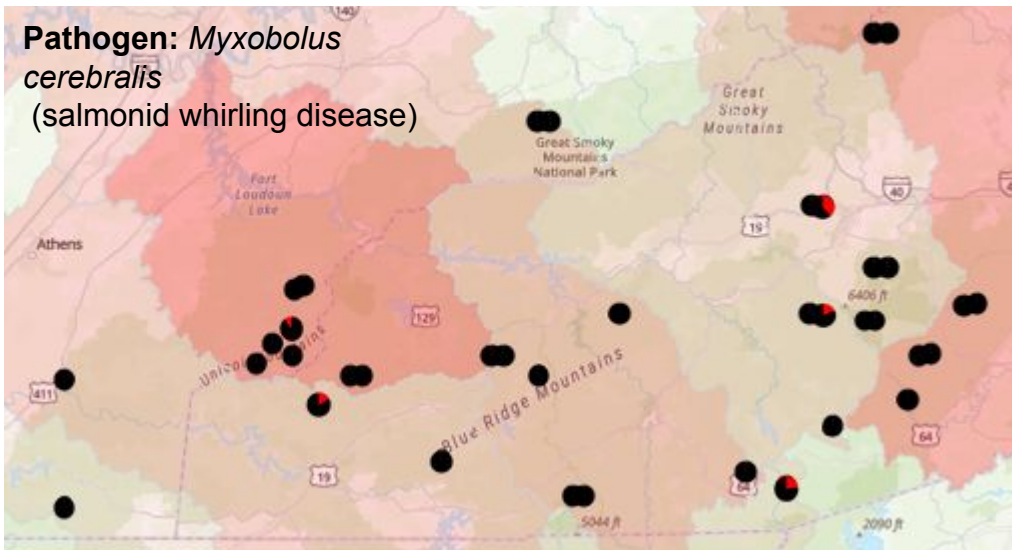
- Proportion of positive vs negative samples for a pathogen or set of pathogens?
 - Provides **Proportion** at zoom in



Host Map

- What type of pathogens are present in a particular host or set of hosts?
 - Provides **Pathogen Species** at zoom in

- Negative
- Positive



- *Carp edema virus* sp. - I
- *Cyivirus ciprinidallo3* (Cyprinid herpesvirus)
- European Carp edema virus sp-I and Cyivirus Ciprinidallo3.
- Other

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, online/realtime queries, spatial data sets, distribution maps, and general information. The data are made available for use by biologists, interagency groups, and the general public. The geographical coverage is the United States.



Search

Search for NAS records via our custom spatial query map.



NAS FaST (Flood and Storm Tracker)

Explore how flooding events can potentially impact the spread of nonindigenous aquatic species.

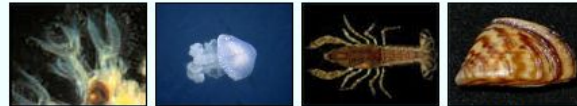


Environmental DNA

eDNA comprises genetic material that has been released into the environment and can be detected in water, soil, and air.

General search for nonindigenous aquatic species information

Invertebrates

[Bryozoans](#)[Coelenterates](#)[Crustaceans](#)[Mollusks](#)

Vertebrates



Updates to the NAS Database

Fresh
modern look

Updated
graphics and
figures

New
geospatial
layers



New status layer

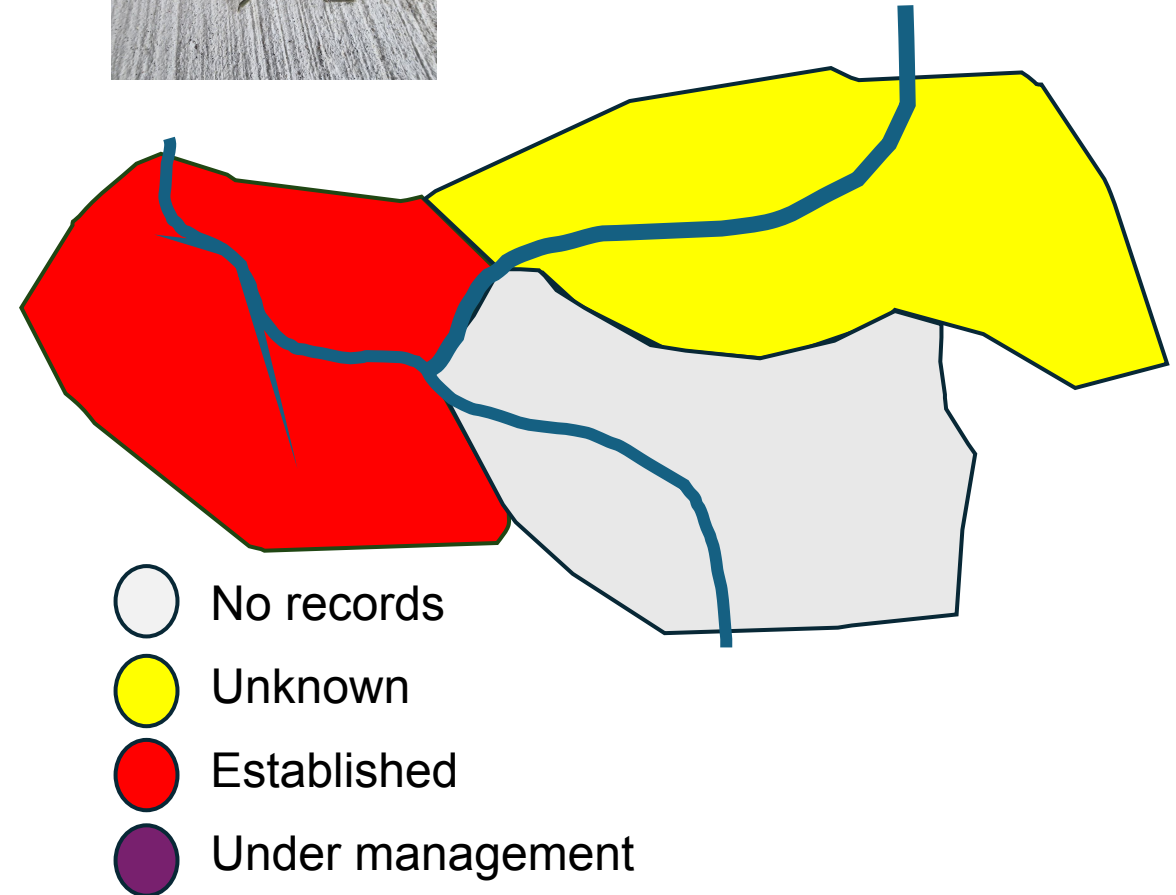
**Create a new map layer to show known/
recognized status of AIS populations**

- Allow better understanding of status
- Can show management actions on the NAS Database
- No afraid to say “unknown”

**We will work with the Panels
to help create this new data**



Procambarus virginalis
marbled crayfish



New status layer

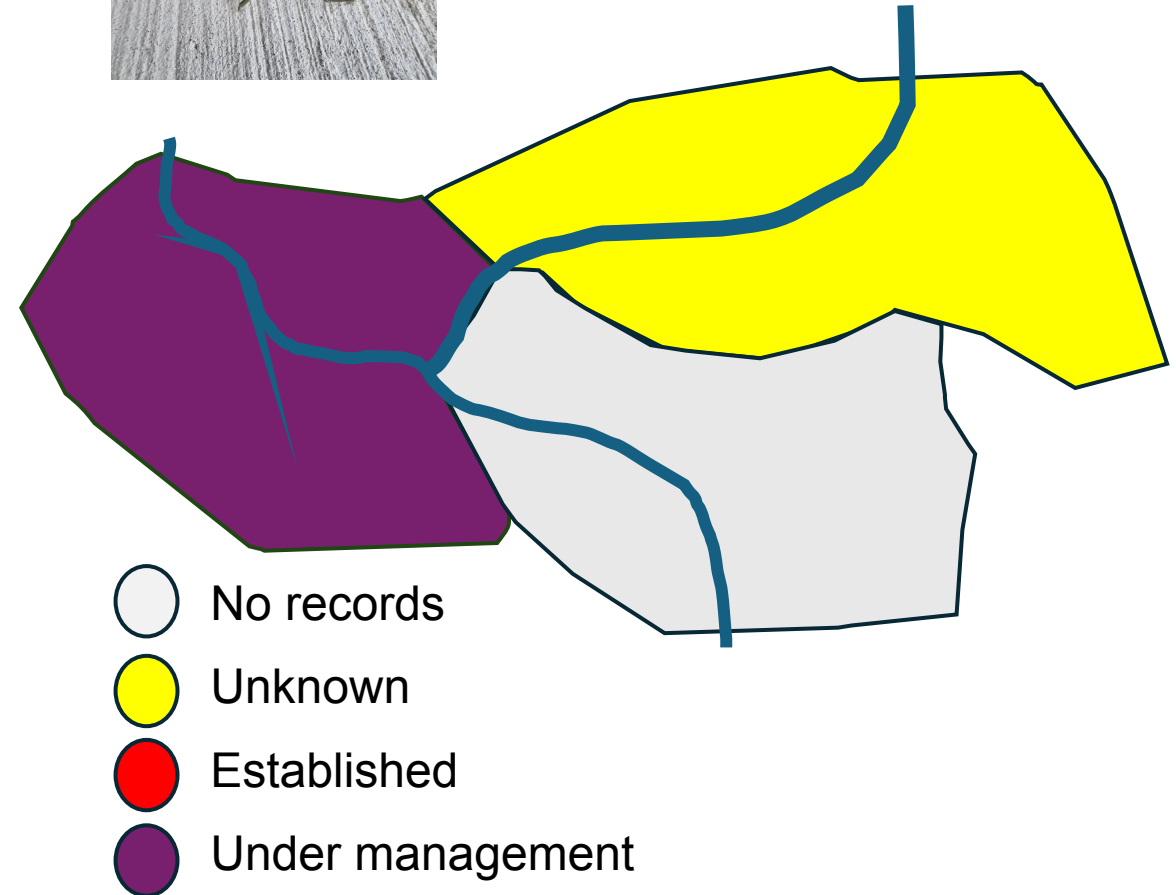
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Procambarus virginalis
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New status layer

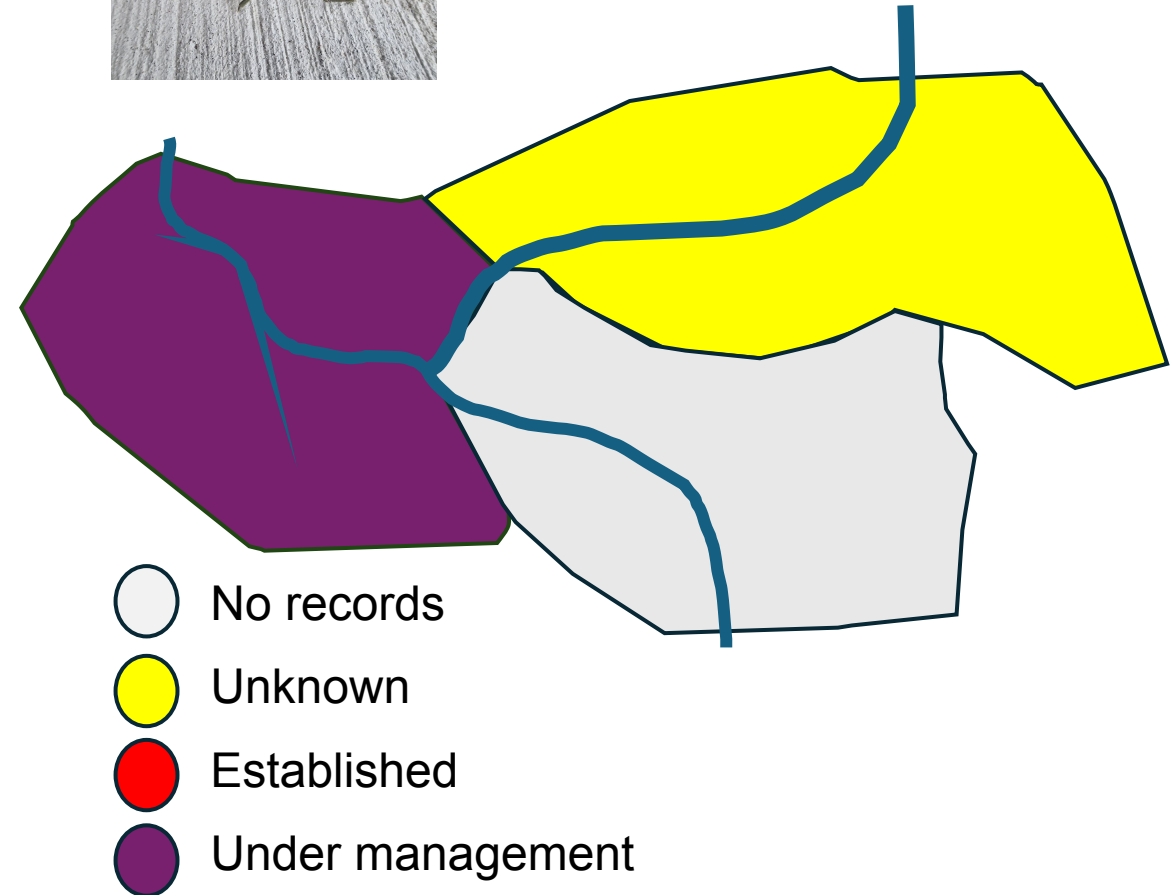
Need to established set of criteria

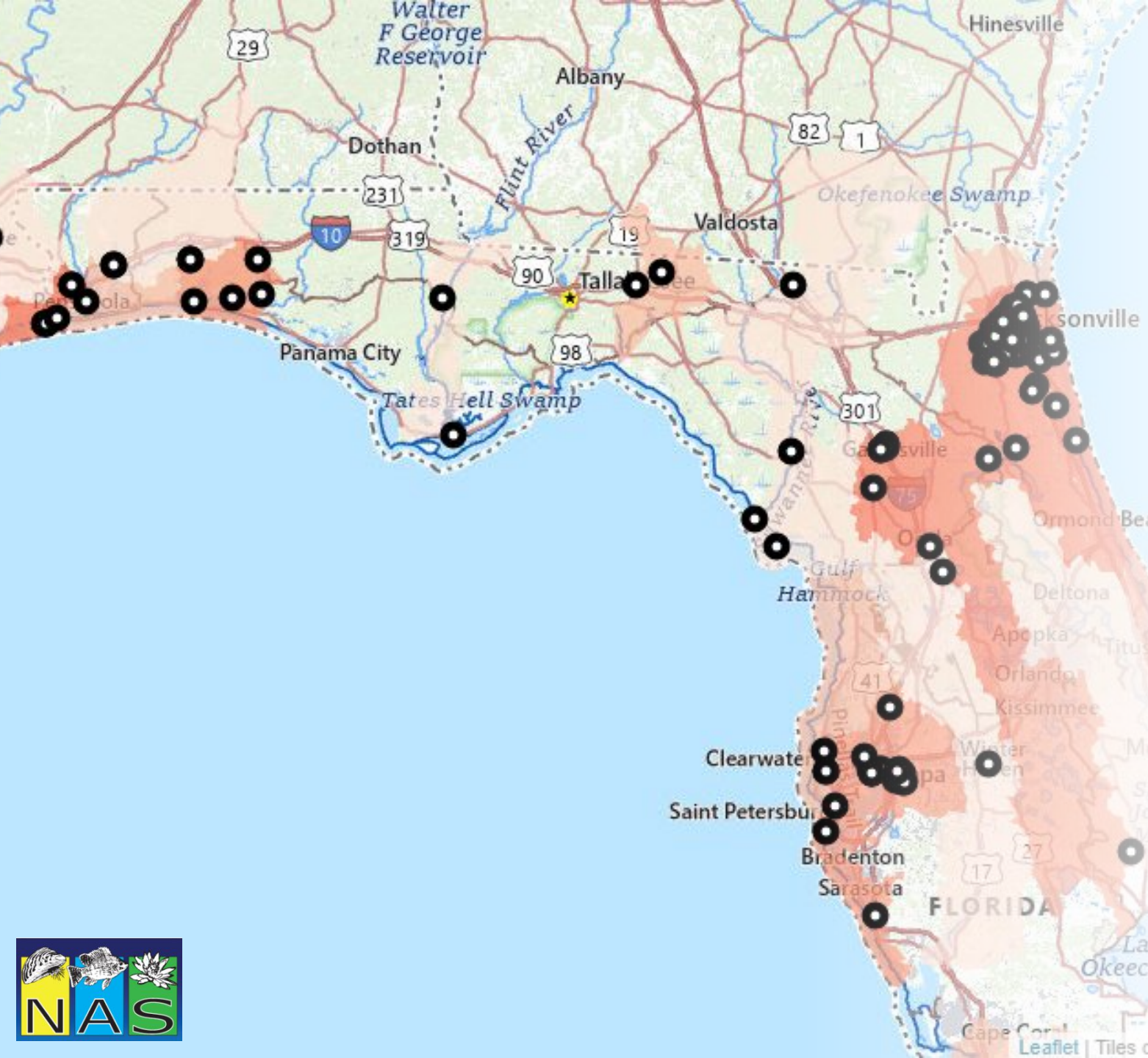
- How we define established?
- What are the best units?
- What temporal nature of the data?

We will work with the Panels to help create this new data layer



Procambarus virginalis
marbled crayfish





Creation of a freshness layer

1. Quickly reveals where data are outdated
2. Helps prioritize field surveys and monitoring
3. For researchers improves confidence in analyses
4. Enables transparent communication with stakeholders

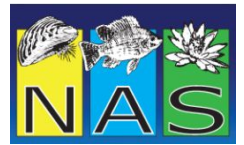


Assessing Species at High Risk of Invasion in the Southeastern United States in Current and Near-Future Climate Scenarios

Forecasting Invasive Species Risk to the Southeast



Led by Cayla Morningstar (USGS)



CALL FOR COLLABORATORS

Join us in a collaborative Southeast Horizon Scanning Project

USGS science for a changing world | UF UNIVERSITY OF FLORIDA | UNIVERSITY OF ARKANSAS

We will use a nationwide list of nonnative species to prioritize species most at risk of becoming established in the Southeastern United States based on their climate suitability, life histories, and pathways under current climate scenarios. We will also predict where species may be likely to spread in the future using climate projections for the region.

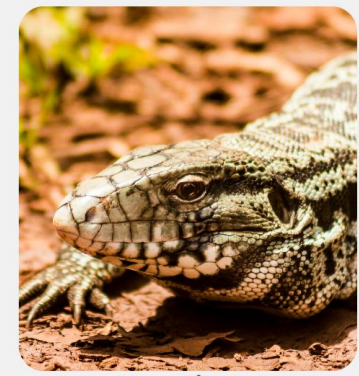
ALL EXPERIENCE LEVELS ARE WELCOME-TRAINING IS PROVIDED FOR STUDENTS & PROFESSIONALS

WE NEED PEOPLE TO:

- ✓ SCORE SPECIES
- ✓ REVIEW SPECIES SCORES

TIME COMMITMENT: ~25 HOURS
TIME FRAME: ~MARCH 2026–NOV 2026

- ~1–2 HOURS TRAINING
- ~20 HOURS SCORE/REVIEW
- VIRTUAL MEETING CHECK-INS
- OPPORTUNITY TO REVIEW RESULTS AT WORKSHOP
- AUTHORSHIP ON MANUSCRIPT
- RESULTS CREATE FUTURE RESEARCH OPPORTUNITIES



ALL WORK CAN BE DONE REMOTELY | ALL MEETINGS ARE VIRTUAL (WITH OPTIONAL IN-PERSON WORKSHOP)



To get involved, contact Cayla Morningstar: cr.morningstar@ufl.edu

iNaturalist

March to
Million records

904,919 Records

GBIF | Global Biodiversity
Information Facility



Nonindigenous Aquatic Species Database Team



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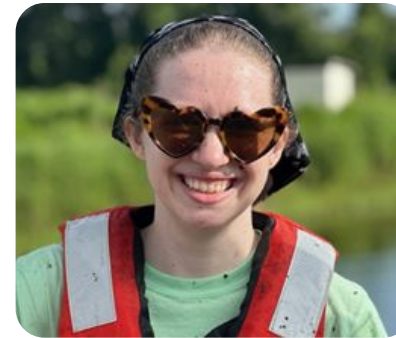
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