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Early Detection Surveillance within Invasion Hotspots: Southeast Region Pilot Project

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Southeast Region

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Early Detection Surveillance within Invasion Hotspots: Southeast Region Pilot Project

- **Early Detection Surveillance within Invasion Hotspots** is intended to be for priority invasive species **not** yet affecting the United States or **high priority** species at risk of spreading across ecosystem boundaries or watersheds.

- A **surveillance plan will be developed in cooperation with state authorities** and other partners, of the exact methods for traditional and molecular sampling for priority non-native species.

- **Implementation of the EDRR Framework** - Early Detection Surveillance:

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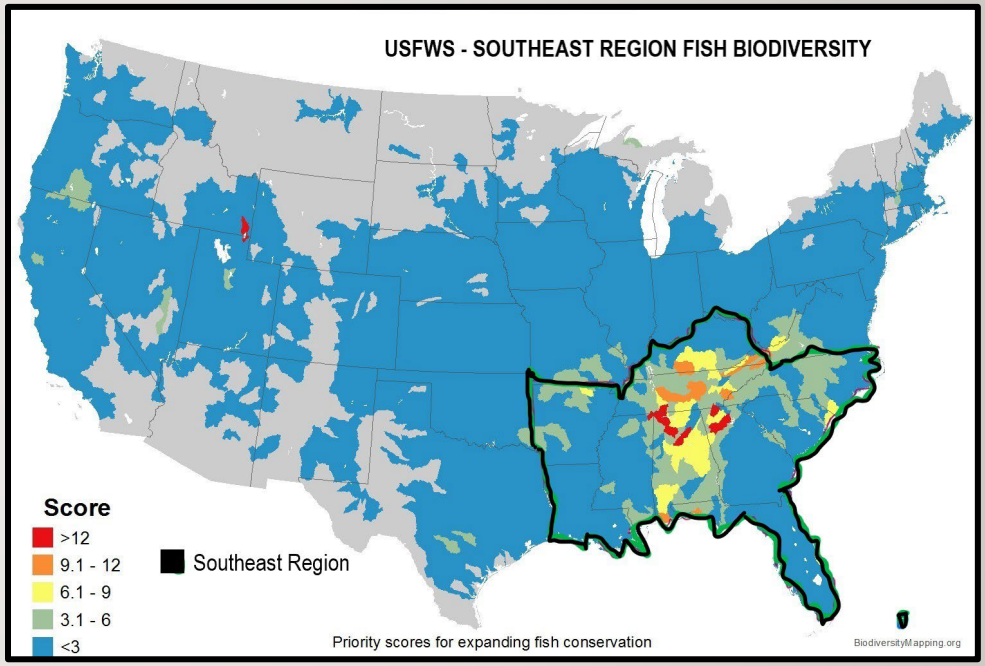
Why the Southeast Region?

The southeastern United States [USFWS Region 4] is a global hotspot for aquatic biodiversity:

- Over 1,043 fish, mussel, and crayfish species found in this Region
- ~ 30% of the world's crayfish species
- ~ 40% of the world's freshwater mussel species are found in the Southeast [91% of US mussel species]
- Of the 831 freshwater fishes in the U.S. and Canada, over 550 (79%) are found in the Southeast.

The Southeast Region also has the highest number of threats from aquatic invasive species (e.g., Florida)



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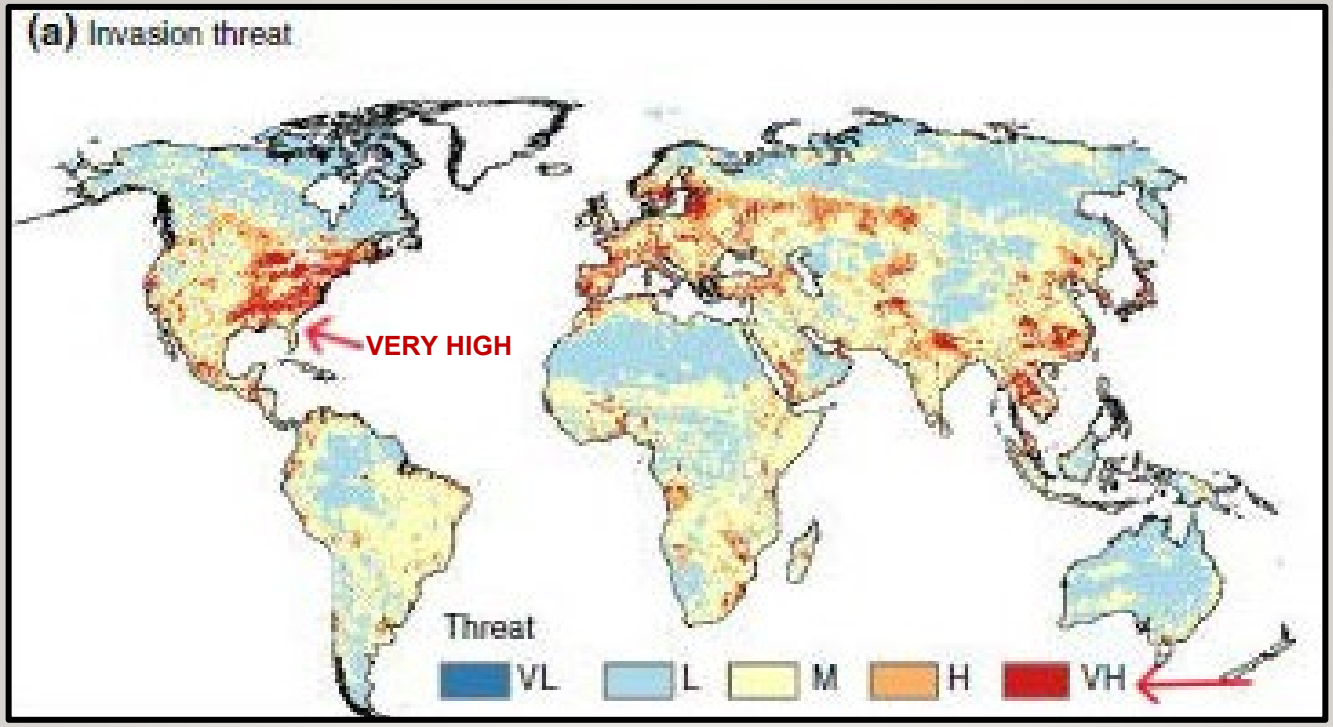
Why the Southeast Region?



Bellard et al. (2016) investigated how climate, land use, habitat characteristics, and socioeconomic activities contribute to predict the potential global distributions of “100 of the world’s worst invasive alien species”

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Southeast Region EDRR Pilot Project

Three locations were proposed on the following criteria:

- Represents an invasion hotspot based on current and future exotic fish introductions from the **Global Horizon Scan of Vertebrate Species in Trade** (Daniel et al. In review).
- Represents an area at risk of non-native plant introductions from the results of the **Regional Aquatic Plant Horizon Scan** (Himes, Williams, and Wyman-Grothem 2022).
- Location is already known to be at risk from new introductions from fishes and aquatic plants based on data from the **USGS Nonindigenous Aquatic Species (NAS) Database** and other invasive species efforts.

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Southeast Region EDRR Pilot Project

Proposed Areas (Subject to change with recommendations from State Partner**)**

- Mobile, Tombigbee, Tennessee Watersheds:
- Apalachicola and Altamaha Watersheds
- Central and South Florida region

Southeast Region EDRR Pilot Project

- Any novel non-native species found in a targeted watershed will be reported (within 24 hours of verification) to State authorities, the USFWS – Aquatic Invasive Species (AIS) Program, and USGS Nuisance Aquatic Species (NAS) Database, for consideration for rapid response action.

- **Invasion hotspot analyses** for:
  1. Streams [FY-24, FY-25 & FY-26]
  2. Lakes [FY-25 & FY-26]

Outcome: U.S. ecosystems will be protected by supporting targeted early detection surveillance within invasion hotspots for priority high-risk invasive species new to the United States or moving across ecosystem boundaries and watersheds.

- All Lessons learned from the Southeast Pilot Project will be shared with future Early Detection Surveillance within Invasion Hotspots (e.g., Great Lakes, Western, Southeast AK)

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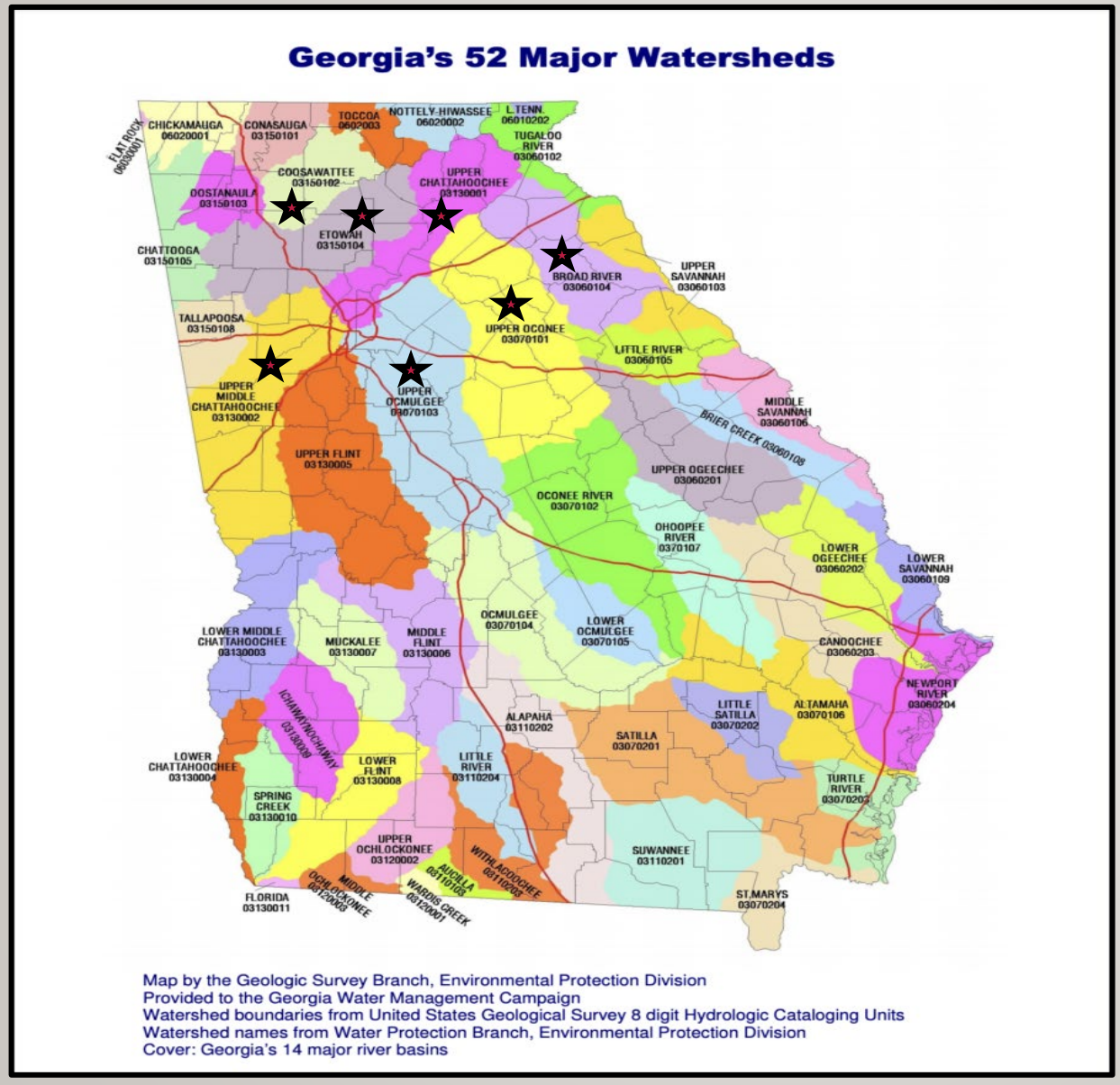
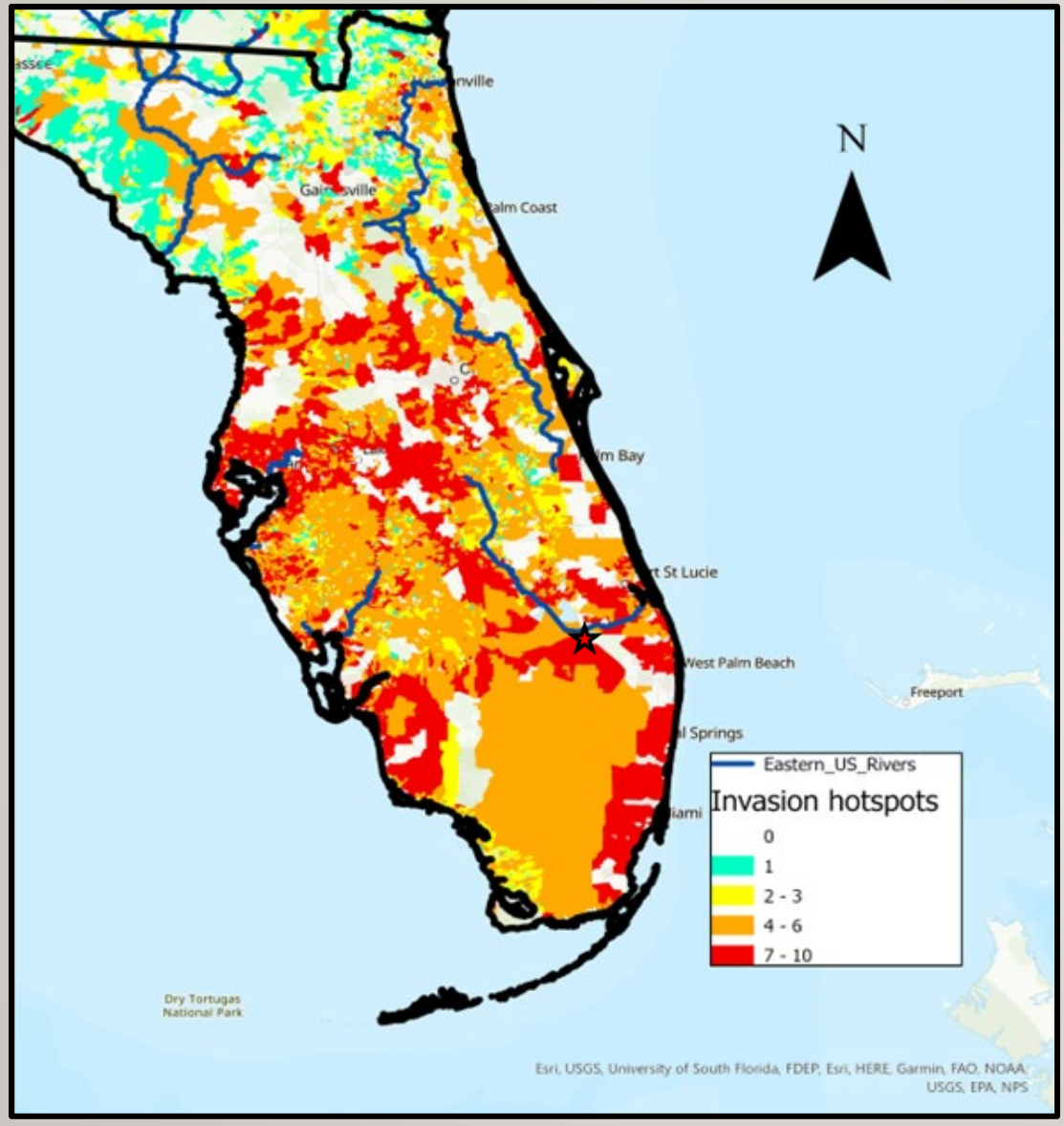
Proposed Sampling Locations in Georgia



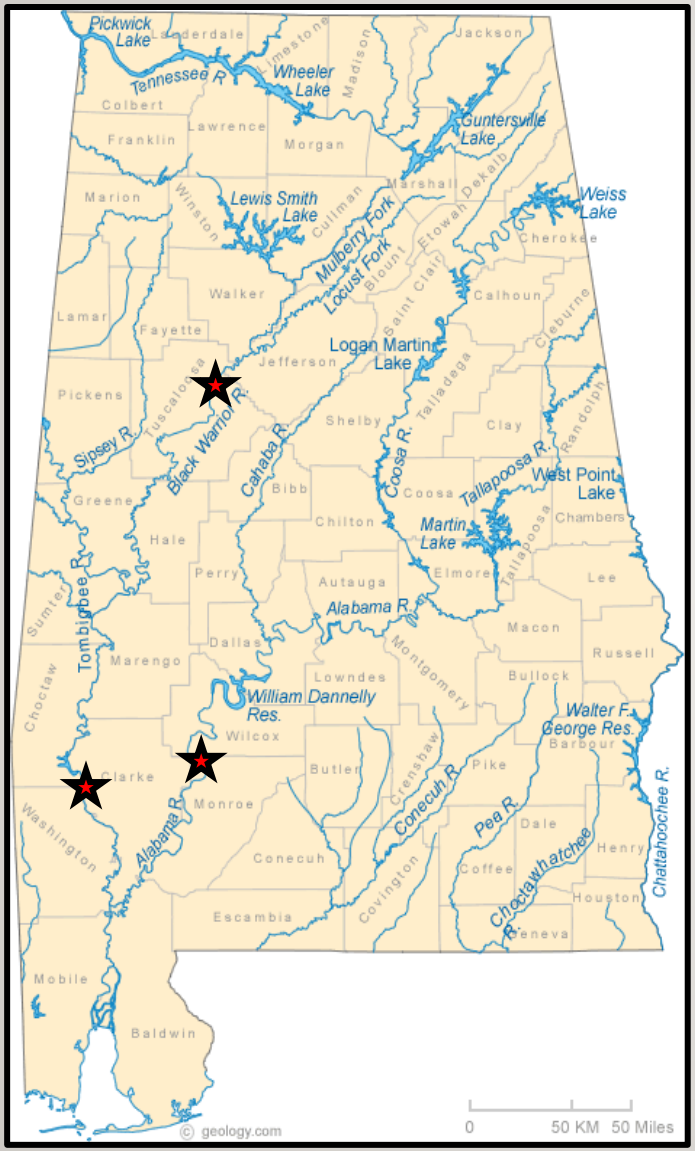
- Rivers
- Tributaries

Proposed Sampling Locations in Florida



- Lakes
- Rivers
- Tributaries

Proposed Sampling Locations in Alabama?



- Tombigbee River
- Alabama River
- Black Warrior River

Proposed Sampling Locations in MS and TN?

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Methods

- The exact methods and number of locations of the surveillance will be decided as a group between State authorities, USFWS, USGS, and/or University Cooperative Fish and Wildlife Research Units.
- The overall goal will be to create a systematic approach that samples fish and plant communities using both traditional and if the state(s) desire, eDNA techniques
- A representative number of sites for the designated drainages with planned bi-annual revisits of sites.
- If eDNA accepted by the State(s), species identified for molecular surveillance will be prioritized for marker development and validation through the national EDRR framework or through processes agreed to by the management jurisdictions.

Common Barbel (*Barbus barbus*)
Global Horizon Scan Risk HIGH

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Scientific Name	English Name	qPCR marker developed (probe or SYBR or other)	Ranking
Dreissena bugensis	Quagga mussel	yes (probe-based assay)	1
Orconectes rusticus	Rusty Crayfish	yes	1
Hypophthalmichthys nobilis	Bighead carp	yes (probe-based assay)	3
Hypophthalmichthys molitrix	Silver Carp	yes (probe-based assay)	3
Mylopharyngodon piceus	Black Carp	yes (probe-based assay)	3
Faxonius virilis	Virile Crayfish	probe based assay for AZ/NM	6
Cyprinella lutrensis	Red shiner	yes, probe	7
Cipangopaludina chinensis	Chinese Mystery snail	yes (probe-based assay)	7
Channa argus	Northern Snakehead	yes (probe-based assay)	9
Cherax quadricarinatus	Australian redclaw crayfish	yes (probe-based assay)	9
Salvinia molesta	Giant Salvinia	none found	9
Barbus barbus	Common Barbel	none found	12
Prochilodus lineatus	Streaked Prochilod	none found	12
Hydrilla verticillata	Hydrilla	yes (probe-based assay)	14
Monopterus albus	Swamp Eel	none found	15
Pomacea maculata	Giant applesnail	none found	16
Cipangopaludina japonica	Japanese Mysterysnail	none found	17
Azolla pinnata	feathered mosquitofern	none found	18
Cyperus blepharoleptos	Cuban bulrush	none found	18
Chondrostoma nasus	common nase	none found	18
Hemichromis lifalili	Blood-Red Jewel Cichlid	none found	18

CONTACTS:

- **James Ballard [James_Ballard@fws.gov] U.S. Fish and Wildlife Service – Region 4 Aquatic Invasive Species Program Coordinator**

- **Wes Daniel [wdaniel@usgs.gov] USGS – Nuisance Aquatic Species Database**

- **Allan Brown [Allan_Brown@fws.gov] Assistant Regional Director - U.S. Fish and Wildlife Service – Region 4 Fish and Aquatic Conservation Program**

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