Aquatic Invasive Pathogens in the Chesapeake Bay, what you need to know

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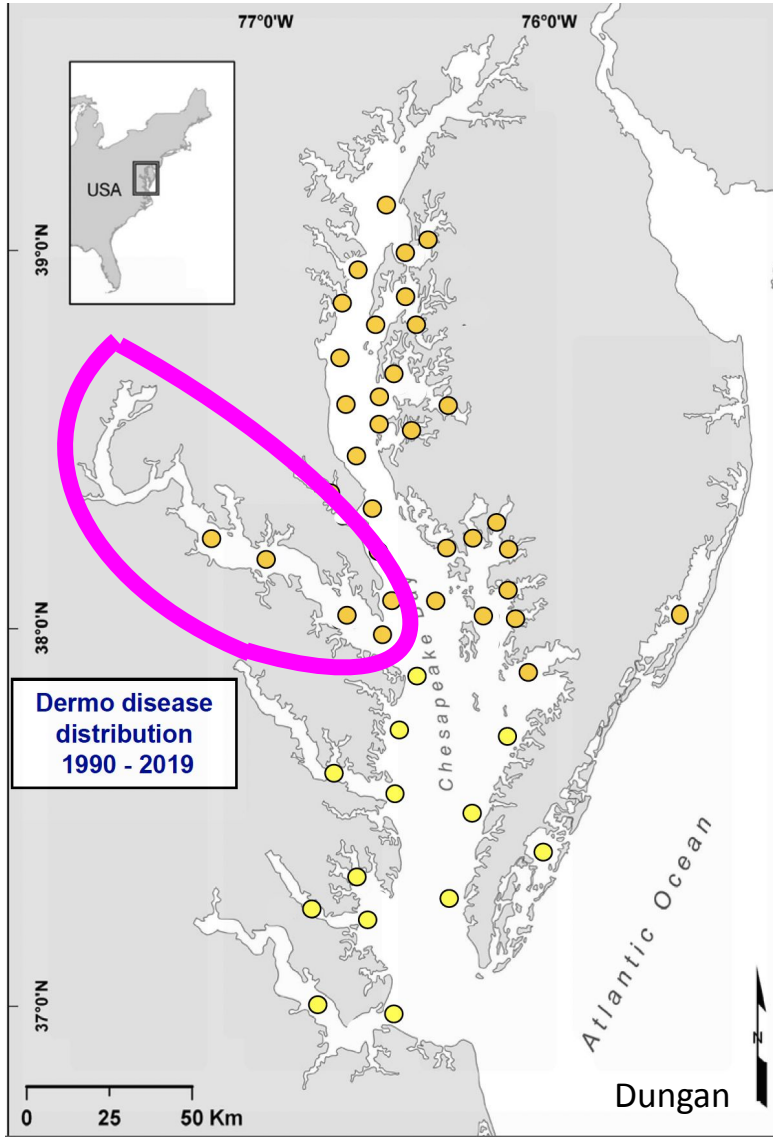
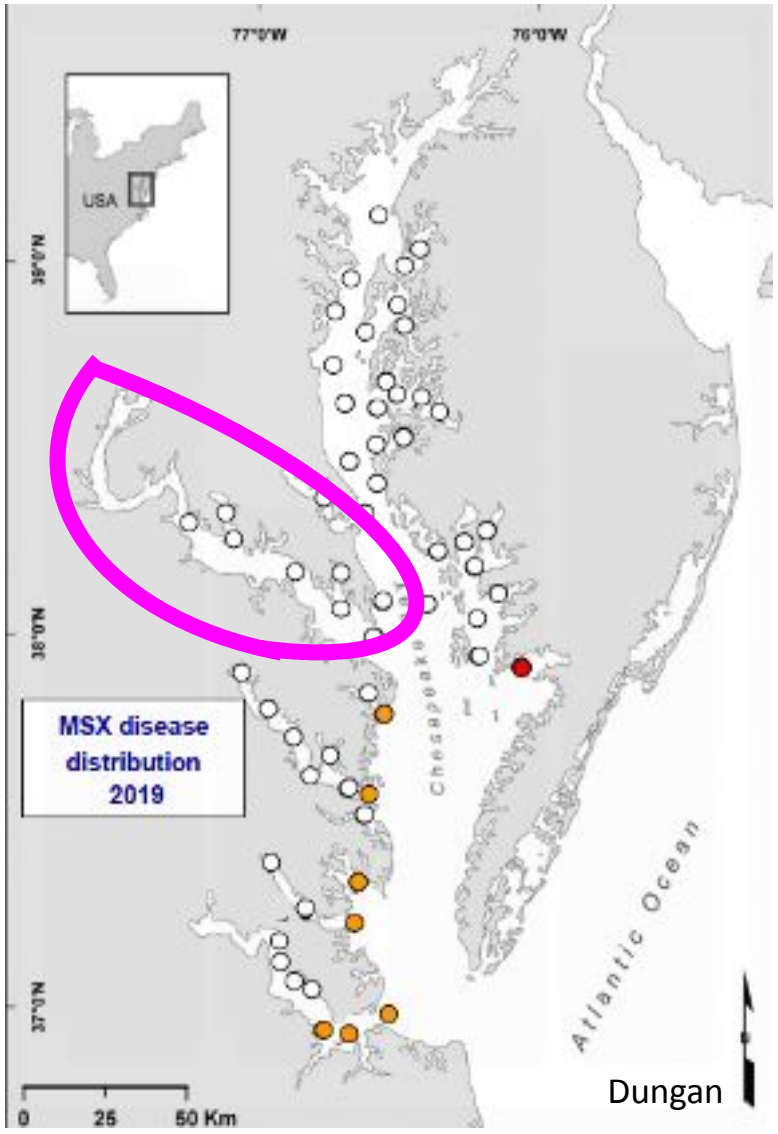
Tidal Rivers and Estuary
Potomac River

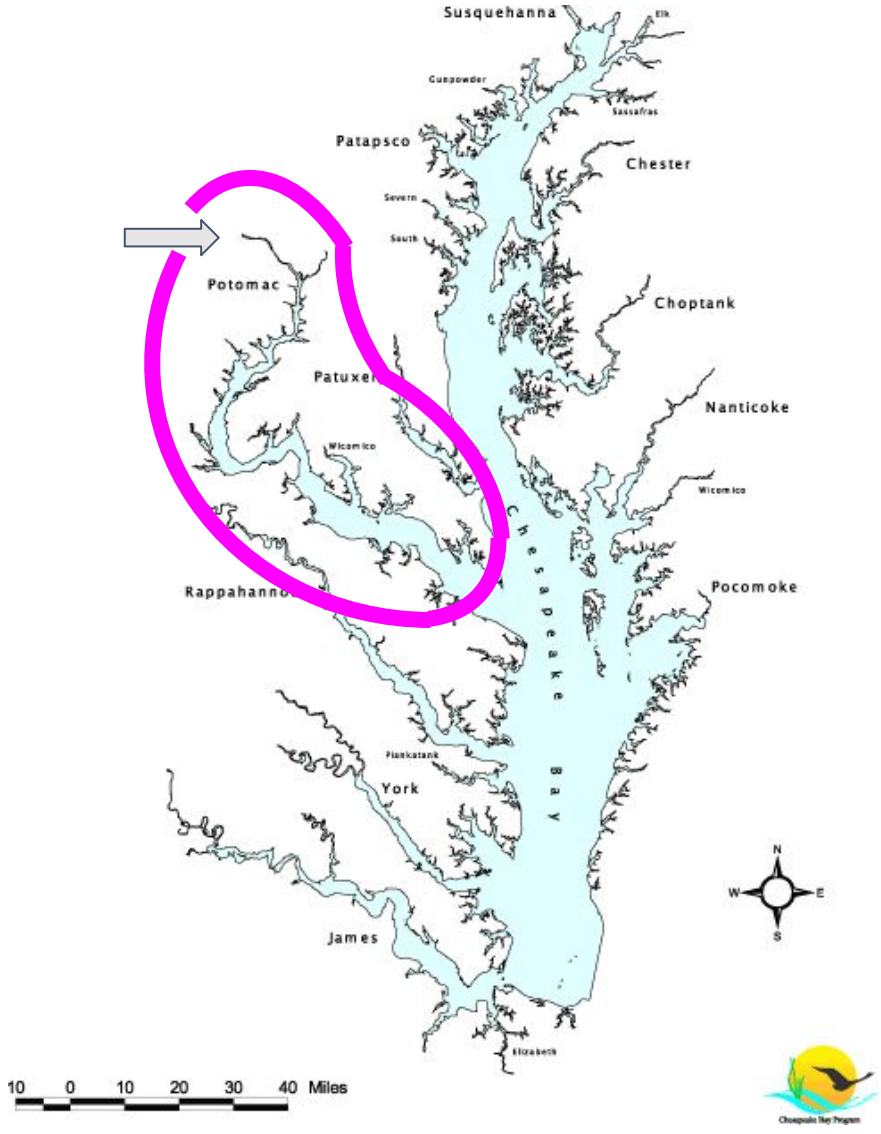
- Invasive aquatic pathogens
- List the economically essential host species they threaten
- Preview of our communication piece

Source: https://fishdisease.ifas.ufl.edu/Parasites/Myxobolus_cerebralis.jpg

- *Myxobolus cerebralis* - Whirling disease – high
- *Bothrioscephalus acheilognathi* – Asian tapeworm – low
- *Proteocephalus ambloplitis* - Bass tapeworm – low
- *Novirhabdovirus* spp. - Viral Hemorrhagic Septicemia (VHS) - Unknown


77°0'W
76°0'W
USA
39°0'N
38°0'N
37°0'N
Dermo disease distribution 1990 - 2019
Chesapeake
Atlantic Ocean
0
25
50 Km
Dungan


77°0'W
76°0'W
USA
39°0'N
38°0'N
37°0'N
MSX disease distribution 2019
Chesapeake
Atlantic Ocean
0
25
50 Km
Dungan


Susquehanna
Elk
Gunpowder
Sassafras
Patapsco
Chester
Severn
South
Potomac
Choptank
Patuxent
Nanticoke
Wicomico
Wicomico
Rappahannock
Pocomoke
Chesapeake Bay
Piankatank
York
James
Elizabeth
N
W
E
S
10 0 10 20 30 40 Miles

Guidelines for Fish Health Management in Northeastern States

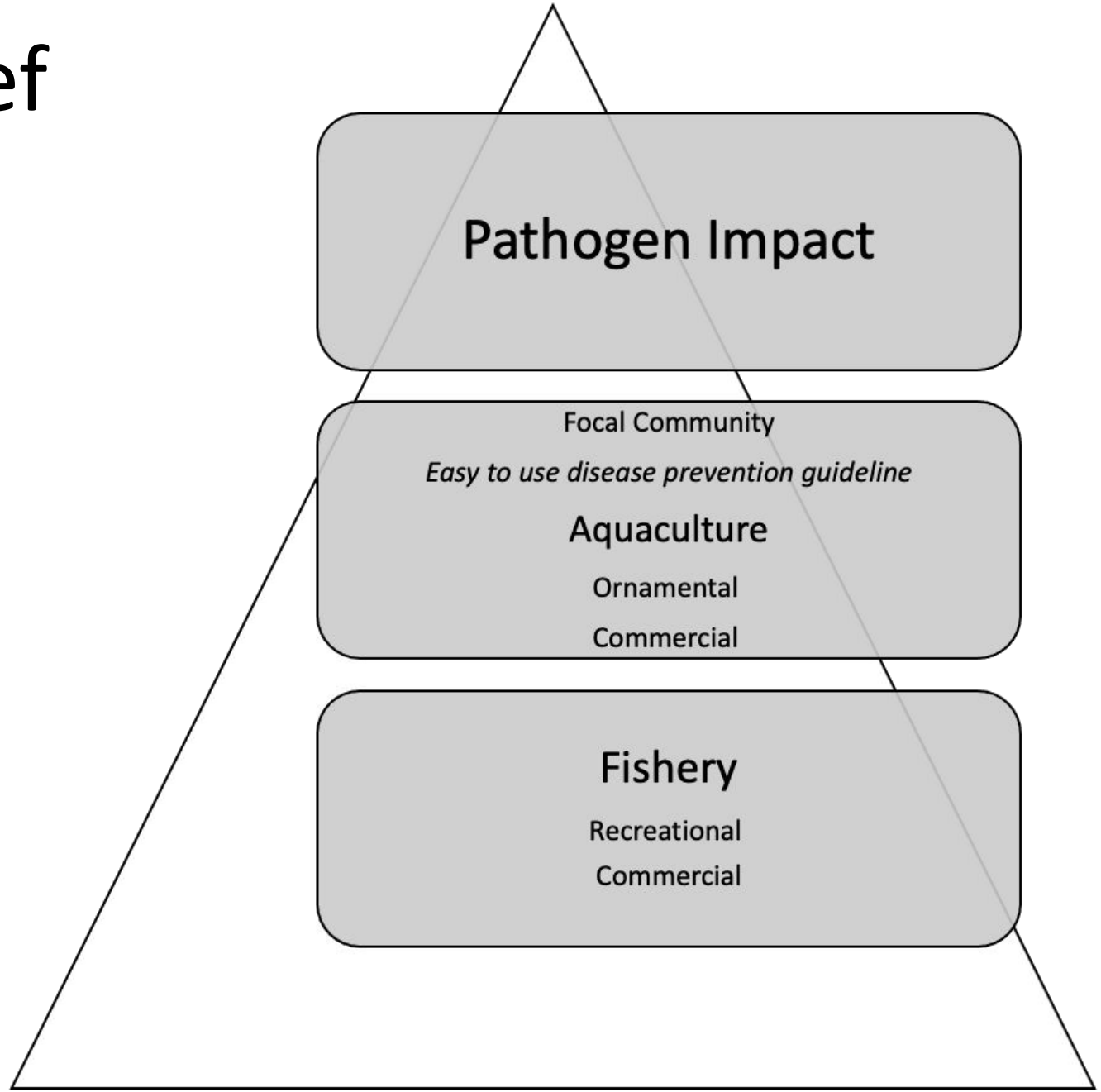
Emergency Pathogens:	Limited A:	Limited B:	Restricted pathogens
•Infectious hematopoietic Necrosis Virus •VHS (non-IV b) •*Ceratomyxa shasta* •Spring Viremia of Carp Virus •*Tetracapsuloides bryosalmonae*	•Whirling Disease •Infectious Salmon Anemia virus •VHS(IV b only)	•Infectious Pancreatic Necrosis virus •Largemouth Bass virus •*Renibacterium Salmoninarum* •*Aeromonas salmonicida* •*Yersinia ruckeri*	•Lake trout herpesvirus •*Nucleospora salmonis* •White Sturgeon Herpesvirus •White Sturgeon Iridovirus •Channel Catfish virus •Edwardsiella ictaluri •*Bothrioscephalus acheilognathi* •Lymphosarcoma virus •Piscerickettsia-like organism •Heterosporis

Aquatic invasive species and Host species

Host Species	Common name | Disease	Pathogen Scientific Name
~25 fish species	VHS Viral Hemorrhagic Septicemia	*Novirhabdovirus* spp.
Black basses	Bass tapeworm	*Proteocephalus ambloplitis*
Blue and Channel catfish	Channel Catfish virus	*Ictalurid herpesvirus 1*
Carp and Freshwater fish	Asian tapeworm	*Bothriocephalus acheilognathi*
Carp and Minnow	Spring Viremia of Carp virus	*Rhabdovirus carpio*
Ornamental carp and common carp	koi herpesvirus	*Cyprinid herpesvirus 3*
Oysters	MSX Multinucleated unknown or multinuclear sphere X	*Haplosporidium nelsoni*
	Dermo or perkinsosis	*Perkinsus marinus*
Rainbow Trout	Whirling disease	*Myxobolus cerebralis*
Salmonid fish	Aeromonas salmonicida	*Aeromonas salmonicida*
	Myxosporean parasite	*Ceratomyxa shasta*
	Renibacterieum salmoninarum	*Renibacterium salmoninarum*
	PKD	*Tetracapsuloides bryosalmonae*
Trout	Infectious Pancreatic Necrosis virus	*Infectious Pancreatic Necrosis virus*
Yellow Perch	Heterosporis	*Heterosporis*

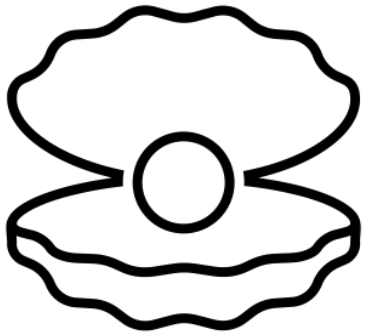
Management Challenges | Path of introduction

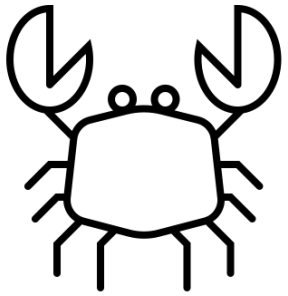
Synthesis | Brief

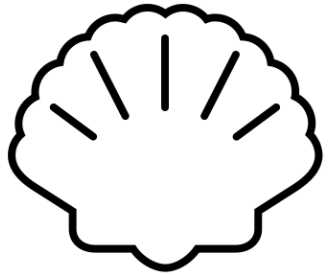


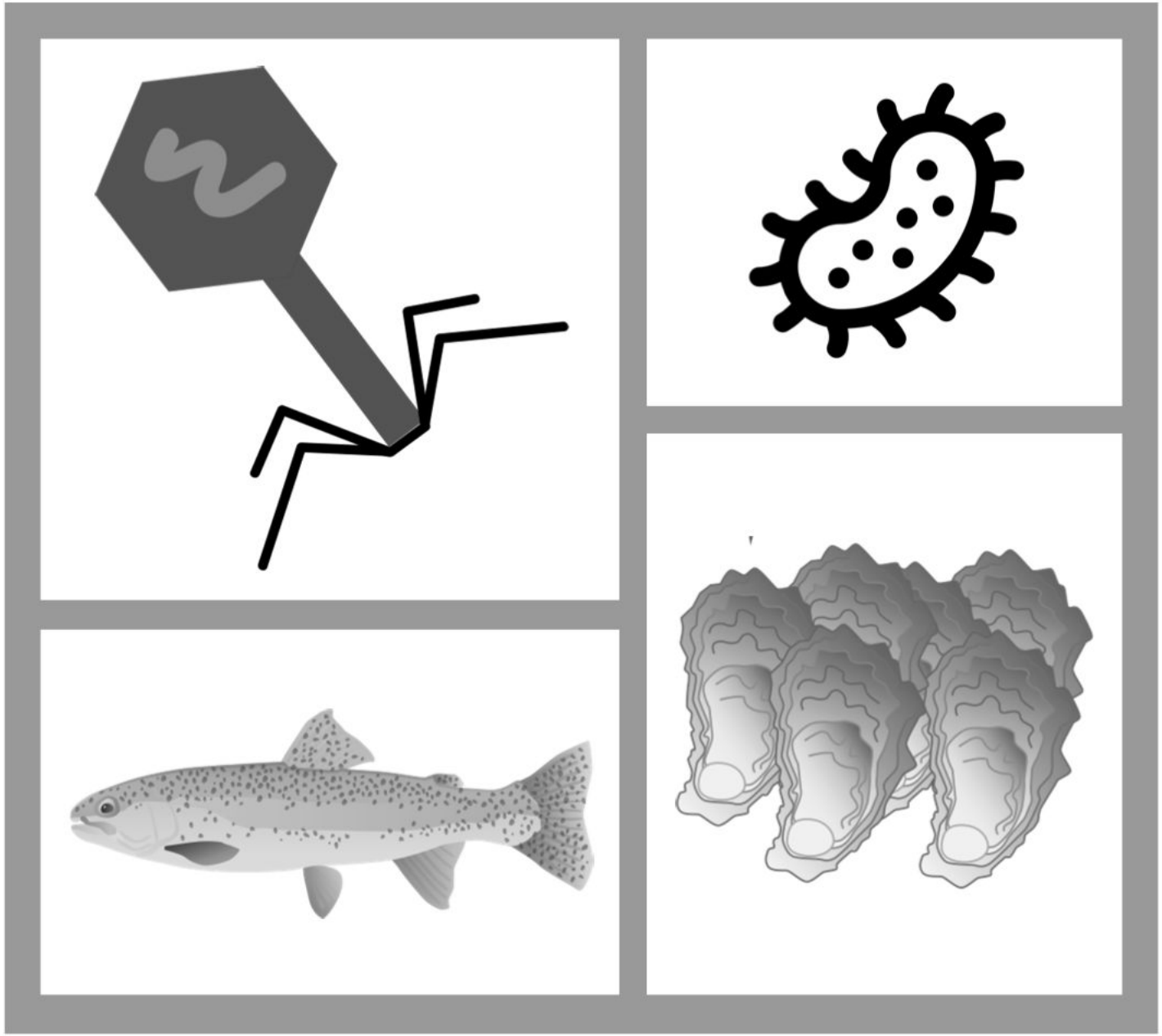
Management Challenges | Species Scope

- Maryland Aquatic Nuisance Species plan only mention pathogens from finfish
- Northeast Fish Health Committee
  - Freshwater finfish
  - Expanding to shellfish such as oysters, freshwater mussels and clams
  - Marine species







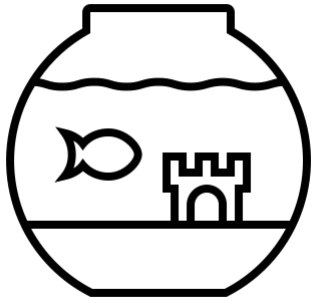


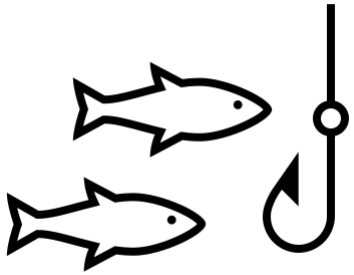
Synthesis | Summary for Managers

Table for Managers

- Scientific Name
- Common Name
- Host Species
- Origin Invasion Range
- Current Regulation

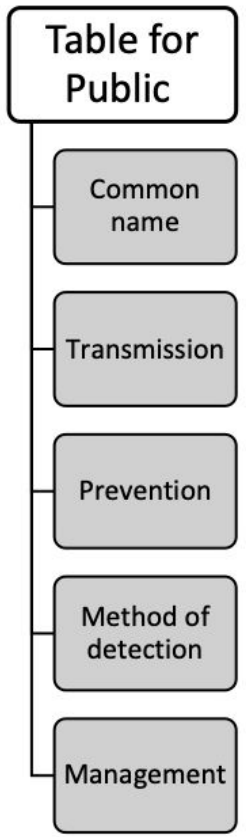
Management Challenges | Communication





- Lack of adequate regulation and education of the trade of live organism
- Retail bait shops selling known and potential invasive species
- Releasing unused live bait
- Introduction via aquarium/pet trade

Synthesis | Communication Piece



Management Solutions

- Pathogen risk assessment
- Monitoring and prevention of pathogens under the Northeast fish health committee guidelines - Culture species
- Continued education and communication about aquatic pathogens - e.g. the brief