Putting Mittens on a Crab

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NEANS meeting
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Mitten Crab Project Overview

Project goals

1. Identify GOM habitat most vulnerable to invasions

1. Create an early detection network of citizens and professionals to help observe and report early sightings

1. Develop a rapid response plan

Mitten Crab Project Overview

Funded by National Sea Grant office

Project area:

- Early detection network – ME, NH, MA
- Rapid response plan – Northeast region

Early Detection Network - Outreach

Audience	ME	NH	MA
Citizen monitoring groups	✔	✔	✔
Recreational boaters/fisherman	✔	2015	2015
Aquaculturists	✔	✔	✔
Shellfisherman	✔	✔	✔
Harbormasters	✔	✔	✔

Project timeline

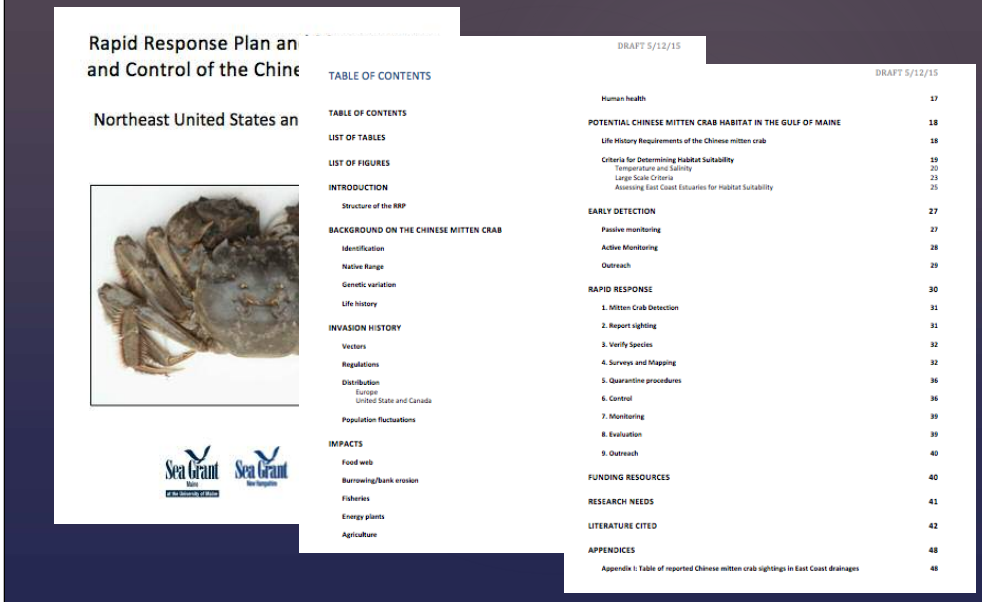
Now

- Rapid response plan in review

Summer/Fall 2015

- Finalize rapid response plan
- Remaining outreach activities
- RRP meetings

Rapid Response Plan Overview



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Sea Grant Maine
Sea Grant New Hampshire

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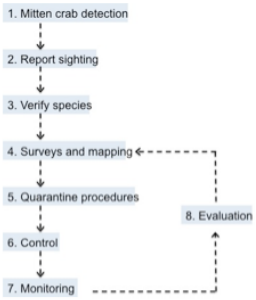
Rapid Response Plan –Habitat Suitability

Estuary	Watershed Range	Estuary size	Salinity intrusion	FW flushing rate	Temp days for larvae	Salinity for larvae survivability	Overall ranking of Suitability
Passamaquoddy Bay (incl. St. Croix)				No Data			**LOW**
US St Croix/ Cobscook Bay							**LOW**
Englishman Bay			No Data	No Data		No Data	**UNKNOWN**
Narraguagus Bay						No Data	**UNKNOWN**
Blue Hill Bay			No Data	No Data		No Data	**UNKNOWN**
Penobscot Bay							**HIGH**
Muscongus Bay						No Data	**MODERATE**
Damariscotta River			No Data	No Data		No Data	**UNKNOWN**
Sheepscot Bay						No Data	**LOW**
Kennebec/Androscoggin River			No Data	No Data		No Data	**UNKNOWN**
Casco Bay							**MODERATE**
Saco Bay							**LOW**
Wells Bay			No Data	No Data			**LOW**
Great Bay							**LOW**
Hampton-Seabrook Estuary							**LOW**
Merrimac River							**MODERATE**
Plum Island Sound			No Data	No Data			**MODERATE**
Boston Bay							**LOW**
Massachusetts Bay							**MODERATE**
Waquoit Bay			No Data				**LOW**
Cape Cod Bay			No Data				**MODERATE**
Buzzards Bay			No Data				**MODERATE**
Narragansett Bay			No Data				**MODERATE**

Rapid Response Plan Overview

RAPID RESPONSE

The goal of rapid response efforts is to contain or eradicate an invasive population to mitigate its impacts. Successful rapid response efforts require that the species be detected in time to allow for sound decisions to be made quickly, that responses to invasions be effective and environmentally sound, that information is disseminated to all relevant stakeholders clearly and efficiently, and that prior experiences are used to guide efforts (NISC 2003). Due to the time-dependent and complex nature of rapid response efforts, it is critical that a well-coordinated progression of events occur. Some states and provinces in the northeastern U.S. and eastern Canada are developing or have developed state specific guidelines for rapid response planning. Links to state/province specific resources or examples can be found in Appendix IV.



Rapid Response Plan – Monitoring Methods Rev

Method	Life stage	Habitat	Notes	Reference
Recommended				
Block net enclosure with beach seining depletion	juveniles, adults	shallow intertidal and sub tidal areas; can be used in dense submerged vegetation but not recommended for emergent vegetation	low recovery efficiency;	Veldhuizen et al. 2002
Crab Condo (2 inch pipe arranged vertically in a crate, covered on all sides and bottom with netting and left open at the top)	Juveniles, megalopae can settle within	dense emergent or submerged aquatic vegetation, shallow and deep waters, strong current, fine sediments	open top allows crabs to leave structure, need to be picked up vertically and quickly, if in strong current additional weight needed. high success rates observed with differing set times (2 weeks and 48 hours)	Veldhuizen et al. 2002; Hewitt and McDonald 2013
Burrow Census	juveniles	tidally influenced sections of streams with silty banks exposed during low tide	only effective once population has been established	Veldhuizen 1997; Veldhuizen et al. 2002
Needs further evaluation				
star trap (crab tap where four rigid sides fold up to form a pyramid)	adults; possibly juveniles depending on mesh size	shallow water, slow current	needs further evaluation and design modifications (i.e. smaller mesh and additional weight), caught no crabs with sardine bait	Veldhuizen et al. 2002
snare trap (bait cage with monofilament snares that can be cast with a fishing rod)	adults	slow currents; slack tide preferred	attaching a single whole sardine to outside of trap was more successful than filling the trap with frozen sardines.	Veldhuizen et al. 2002
otter trawl	adults; possibly juveniles depending on mesh size	open water	vegetation causes clogs, snags on rocky outcrops or structurally complex environments	Veldhuizen et al. 2002; Hewitt and McDonald 2013

Rapid Response Plan Overview

5. Quarantine procedures

Quarantine procedures are used to limit the spread of mitten crabs to additional areas of a waterbody or to adjacent waterbodies. Based on the habitat survey, if quarantine is warranted and feasible, the appropriate authorities for implementing the quarantine should be identified based on habitat type (freshwater and/or marine habitat) and property ownership. Quarantine procedures may involve the installation of temporary barriers in a waterbody as well as the restriction of activity (e.g., boating, fishing, swimming) to limit/prevent the spread of mitten crabs. In some states/provinces, permits may be required for installing barriers (Table 4).

Outreach to local residents on why the quarantine is in place is important for generating community support and understanding for the efforts. Outreach will also increase success of enforcement efforts to restrict or limit human access to or from an infected waterbody.

Table 7. Permits Required for Quarantine Efforts

Location	Action requiring permit	Permit required	Contact
Maine	Barrier installed longer than 7 months	Natural Resources Protection Act	Maine Department of Environmental Protection
Vermont	Closure of lakes, ponds or reservoirs to boating	Vermont Use of Public Water Rules (subsection (g) of Section 4.1)	Secretary of the Vermont Agency of Natural Resources
Federally navigable waters (US)	Limitation of access to federally navigable waters	Captain of the Port Order	Northern New England Sector of the United States Coast Guard
Navigable waters of the United States	Work and structures in navigable waterways including the use of fill, dams and dredging	Safe Rivers and Harbors Act (section 10); Clean Water Act (section 404)	United States Army Corps of Engineers
Quebec	Limiting or closing access to		Canadian Coast Guard of the

Rapid Response Plan Overview

6. Control

The elusive nature, cyclical population structure and wide range of physical tolerance of mitten crabs present many challenges to their control. As such, in areas where mitten crabs have successfully invaded, complete eradication may not be an achievable goal. In this case, natural resource managers may opt to focus on ecological control, where the goal is to bring population numbers down to levels where they do not negatively impact the ecological functions of the system. Regardless of approach, control will require continued coordination

Table 8. Potential Methods for Control of Chinese Mitten Crabs

Method	Status	Considerations	Reference
Biological Control (e.g., predators, pathogens, parasites)	• No known biological control specific to the mitten crab • Mitten crabs have invaded and persisted in areas with many potential predators (e.g., Germany, France, San Francisco Bay delta) suggesting predator-prey control is presently not a viable option	• Potential impacts to non-target organisms	Panning 1939; Hoestlandt 1948; ANSTF 2003; Rudnick 2003

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FUNDING RESOURCES

The availability of funding resources to support early detection and rapid response effort is generally scarce. The lack of funding opportunities represents a major obstacle to successfully control mitten crabs once they are detected.

The Northeast Aquatic Nuisance Species Panel has a Rapid Response Financial Assistance Program that provides funding to all eligible NEANS Panel states "for use in a marine or freshwater aquatic invasive species rapid response control or eradication effort. Eligible control and eradication efforts will include research, pilot programs, and/or implementation of control technologies which should result in new information or techniques that benefit the entire NEANS Panel." Information on the NEANS Rapid Response Financial Assistance Program can be found at http://northeastans.org/resources.html.

Other potential funding sources exist that are not specifically dedicated to early detection and rapid response efforts (e.g., Sea Grant Program Development Funds, Coastal Zone Management Funds). These funds are generally related to natural resource management and may be appropriate depending on funding availability and priorities in a given funding cycle. It is recommended that folks follow up with their state/provincial agency contacts to see what the best options are for each state/province.

Rapid Response Plan Overview

Appendix IV: State/Province Specific Rapid Response resources

Maine
Document - **Rapid Response Plan for Invasive Aquatic Plants, Fish, and Other Fauna – Part 2. Fish and Other Fauna Protocol**
http://www.maine.gov/dep/water/invasives/rrp_part2final.pdf

Massachusetts
Website - **Rapid Response to Aquatic Invasive Species Introductions**
http://www.mass.gov/eea/agencies/czm/program-areas/aquatic-invasive-species/response/

Lake Champlain Basin (Vermont and New York, USA and Quebec, Canada)
Lake Champlain Basin Rapid Response Action Plan for Aquatic Invasive Species
http://www.lcbp.org/wp-content/uploads/2012/08/2009-AIS-Rapid-Response-Plan.pdf

Rapid Response Plan

Thank you reviewers!

- Meg Modley
- John McPhedran
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- Isabelle Desjardins (Quebec)
- Bruce Thorpe (NB)
- Dawn Sephton (NS)

Rapid Response Plan – Ques for NEANS Pane

- Include section on prevention? If so, possible approaches?
- Is the detailed overview of life history useful given the target audience?
- Permits
- Funding resources
- Recognize that there is no reasonable chance of eradication?

Recommendation to NEANS Panel

Need exists for continued early detection efforts

Outreach program

- series of workshops or webinars
- Topics - Species of concern and emergent issues
- Audience – those people responsible for implementing rapid response
- Content - Resources that exist, Current and potential threats, What you can do