Chinese Mitten Crab
Eriocheir sinensis

Judith Pederson, Ph.D.

NEANS Panel Meeting

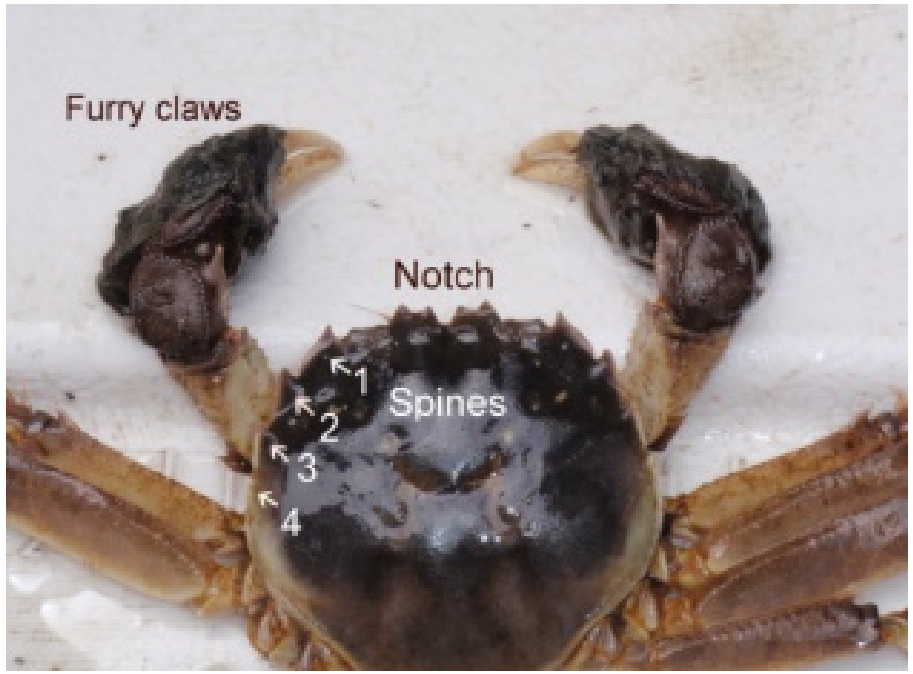
May 18-19, 2021

footage.framepool.com

MIT, NH and ME SG collaborated on developing a Rapid Response Plan for New England

Importation to US of CMC is Banned by Lacy Act

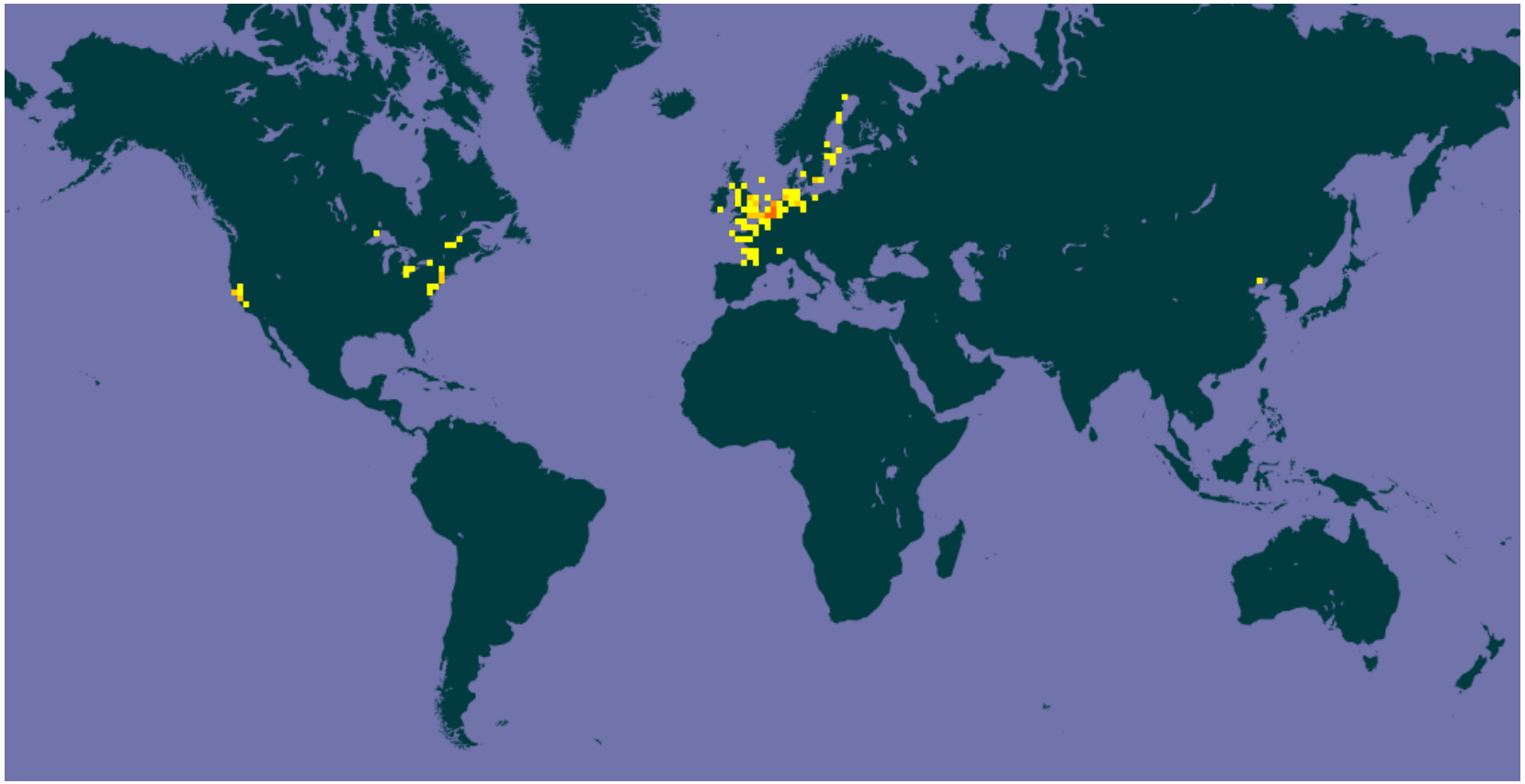
Chinese Mitten Crab: Identification and General Characteristics



SERC, CMC hot line

- Catadromous
- Identified by furry claws
- 4 spines on side
- Notch in middle
- Can grow to 10 inches

Known Global CMC Distribution (~ 26 °N – 54 °N)

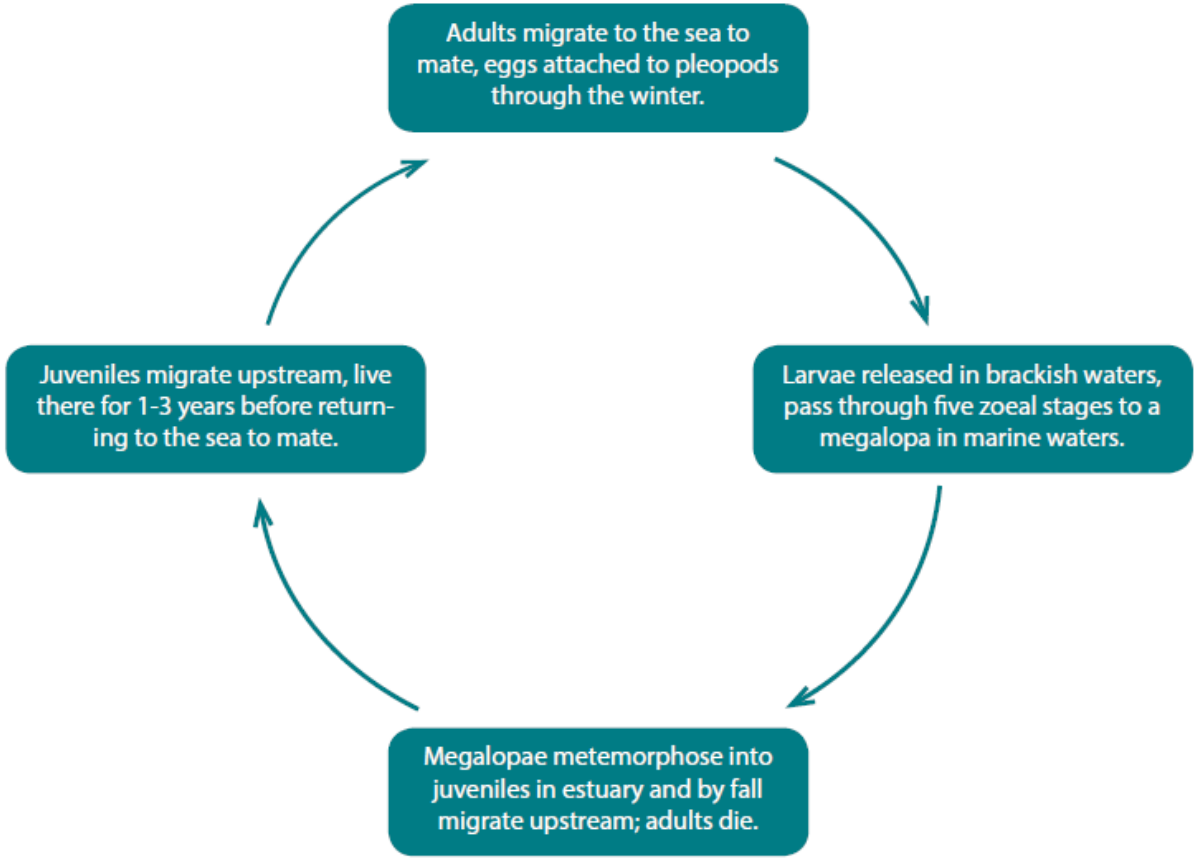


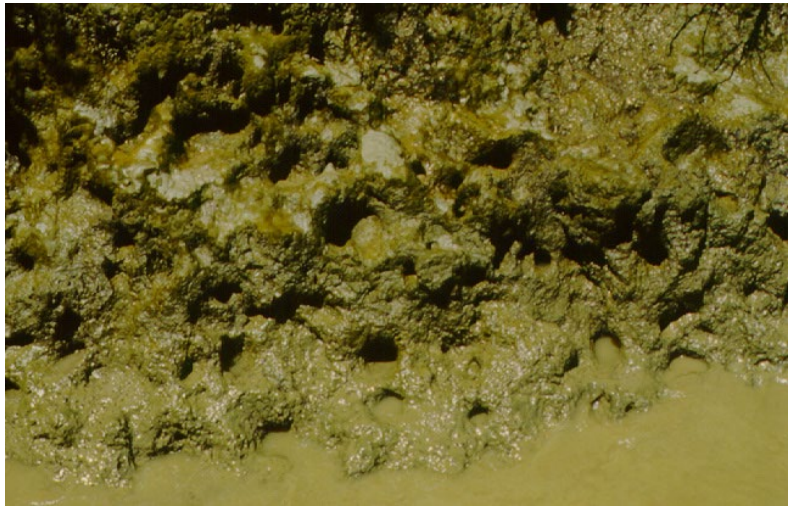
Map from GBIF Secretariat (2016).

Chinese Mitten Crab Arrival

- Invaded Europe in 1912; found throughout Europe
- First US sighting in 1965, Erie and Great Lakes (1974-1994, Mississippi Delta in 1987; Chesapeake area in 2005
- West Coast sighting, San Francisco Bay 1991-2012 (rarely seen since then)
- Great Lakes and Gulf of Saint Lawrence 2004 Hudson River in 2007, breeding populations; individuals or carapaces found from 2012-2021 in Long Island Sound
- Housatonic Estuary in 2018 -2021, found 17 crabs with 2 gravid females, up river as well, possibly in the Quinnipiac estuary

Chinese Mitten Crab Life History

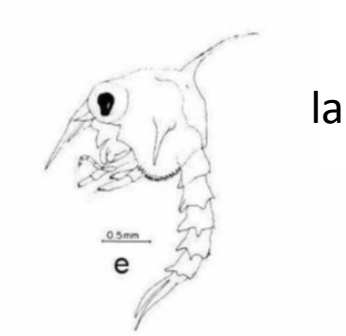




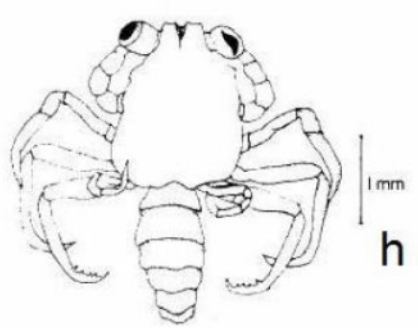
Burrows of CMC, Photo: CA FWS

Larval Temperature and Salinity for Survival

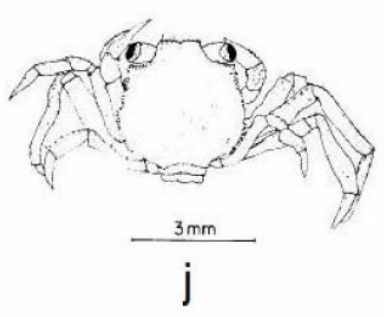
- Temperature
  - Optimal temperatures 15-25 °C
  - Death occurs <10 °C and > 30 °C



larva



megalopa



Benthic crab

- Salinity
  - Optimal salinity 20-25 psu
  - Survival at higher salinities
  - Megalopa migrate to brackish water to metamorphose into benthic crabs

Large Scale Criteria Used for Identifying Suitable Habitats

1. Watershed area: Land-based area encompassing freshwater

2. Estuary area: where the ocean meets and mouth of a river

3. Tidal influence: head of time, farthest upstream extent of tidal influence

4. Salinity intrusion: mixing of salt and fresh water in the estuary

5. Flushing time: time it takes to replace the freshwater volume at estuarine rate of flow

NOAA's list of estuaries along the New England Coast and a ranks of low (yellow), moderate (orange) or high (red) that each characteristic ideal for larva.. White indicated data.

All estuaries are within the latitude and longitude of known range of CMC

Estuary	Watershed Range	Estuary Size	Salt water Intrusion	FW Flushing Rate	Temp. Days for Larvae	Salinity for Larvae Suitability	Overall Ranking of Suitability
Passamaquoddy Bay (Incl. St. Croix)				No data			Low
U.S. 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
Merrimack 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
Gardiners Bay*			No data			No data	Low
Connecticut River							Moderate
Thames River*							Low
Long Island Sound							High
Hudson River/Raritan Bay							Present

Areas of moderate likelihood of CMC invasion

Estuary	Watershed Range	Estuary Size	Salt water Intrusion	FW Flushing Rate	Temp. Days for Larvae	Salinity for Larvae Suitability	Overall Ranking of Suitability
Merrimack 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
Gardiners Bay*			No data			No data	Low
Connecticut River							Moderate
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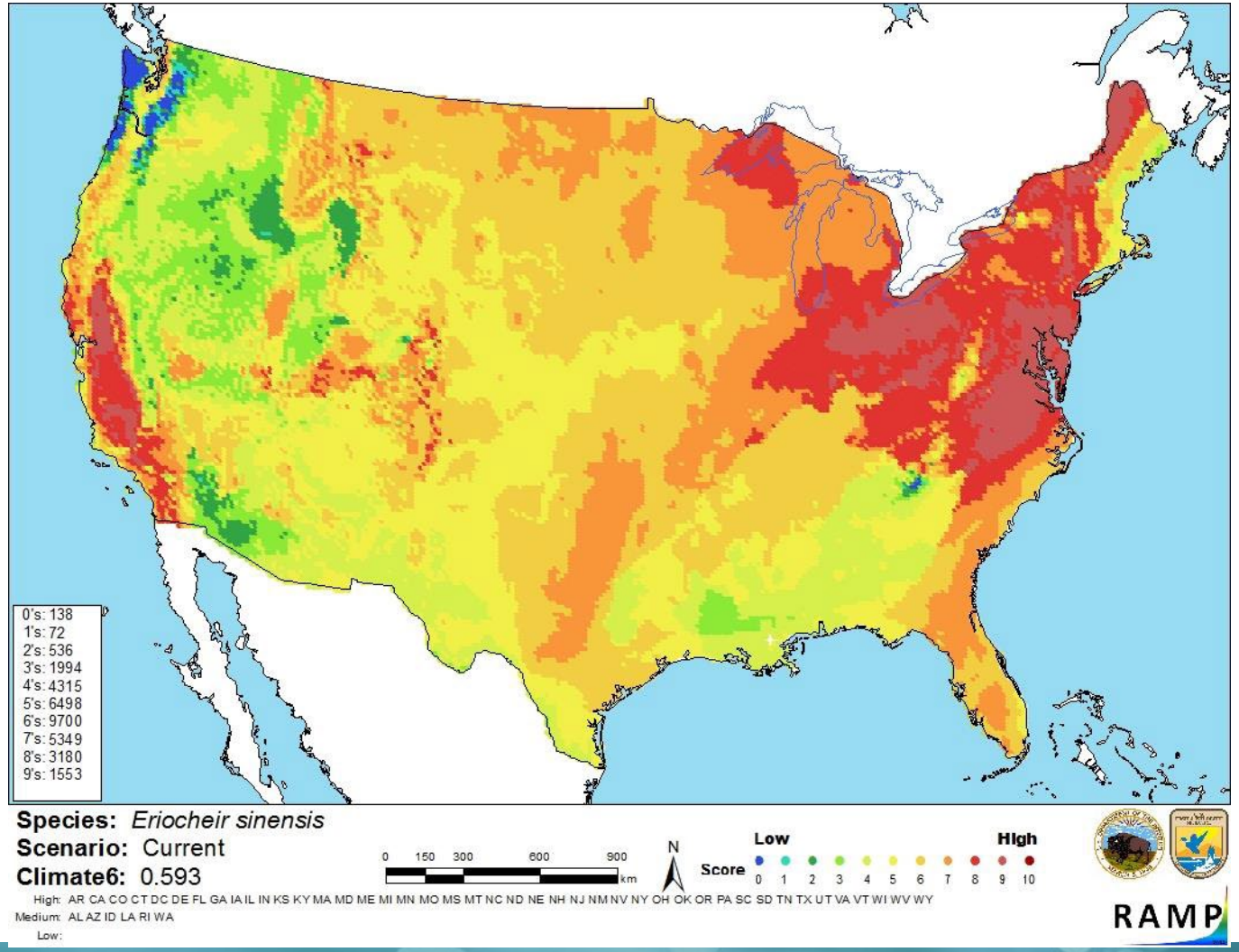
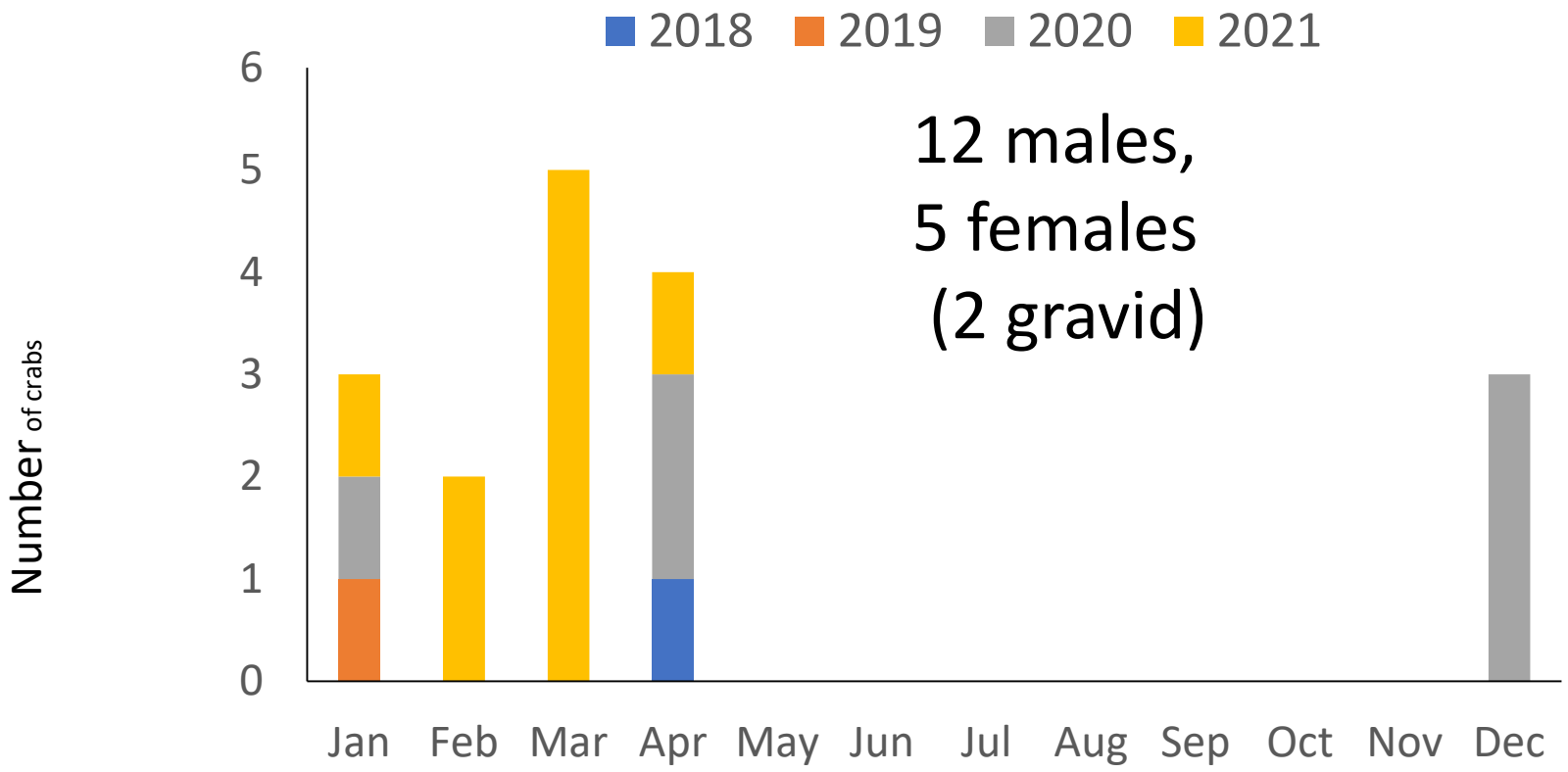
Long Island Sound							High
Hudson River/Raritan Bay							Present

Predicted range of CMC in US



FWS, accessed 221

Appearance of Chinese mitten crab in Housatonic River Estuary (data as of 4/21/21)



Data courtesy of
Richard Harris, Maritime Aquarium Consultant
David Hudson, Maritime Aquarium, Norwalk, CT

Managing CMCs: Good, Bad, Ugly

- Good:
  - Block net enclosure, beach seining
  - PVC pipes to collect Megalopa
  - Burrows census to id juveniles
  - Trenches/barrels into which migrating crabs are trpped

- Bad and Ugly
  - Baited traps in FW, bycatch
  - Modified crayfish
  - Ring net – crabs escape

- Sort of Good
  - Snare Trap, star trap, fish not best bait
  - Otter trawl/oyster dredge
  - Crab traps
  - Fyke net (need to protect eels that are also caught)

Early detection, particularly in areas where they have not been "see" may help with early removal actions

Acknowledgements:

MIT, NH, ME Sea Grant College Programs

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To obtain a copy of the Rapid Response Plan contact me, any author or National SG Library (currently updating web); jpdederso@mit.edu

Eberhardt, A., J. Pederson and B. Bisson. 2016. Rapid Response Plan for Management and Control of the Chinese Mitten Crab - Northeast United States and Atlantic Canada. New Hampshire, MIT and Maine Sea Grant Programs