

# The effects of invasive green crabs on native species

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# Introducing the European green crab, *Carcinus maenas* Linnaeus (Portunidae)

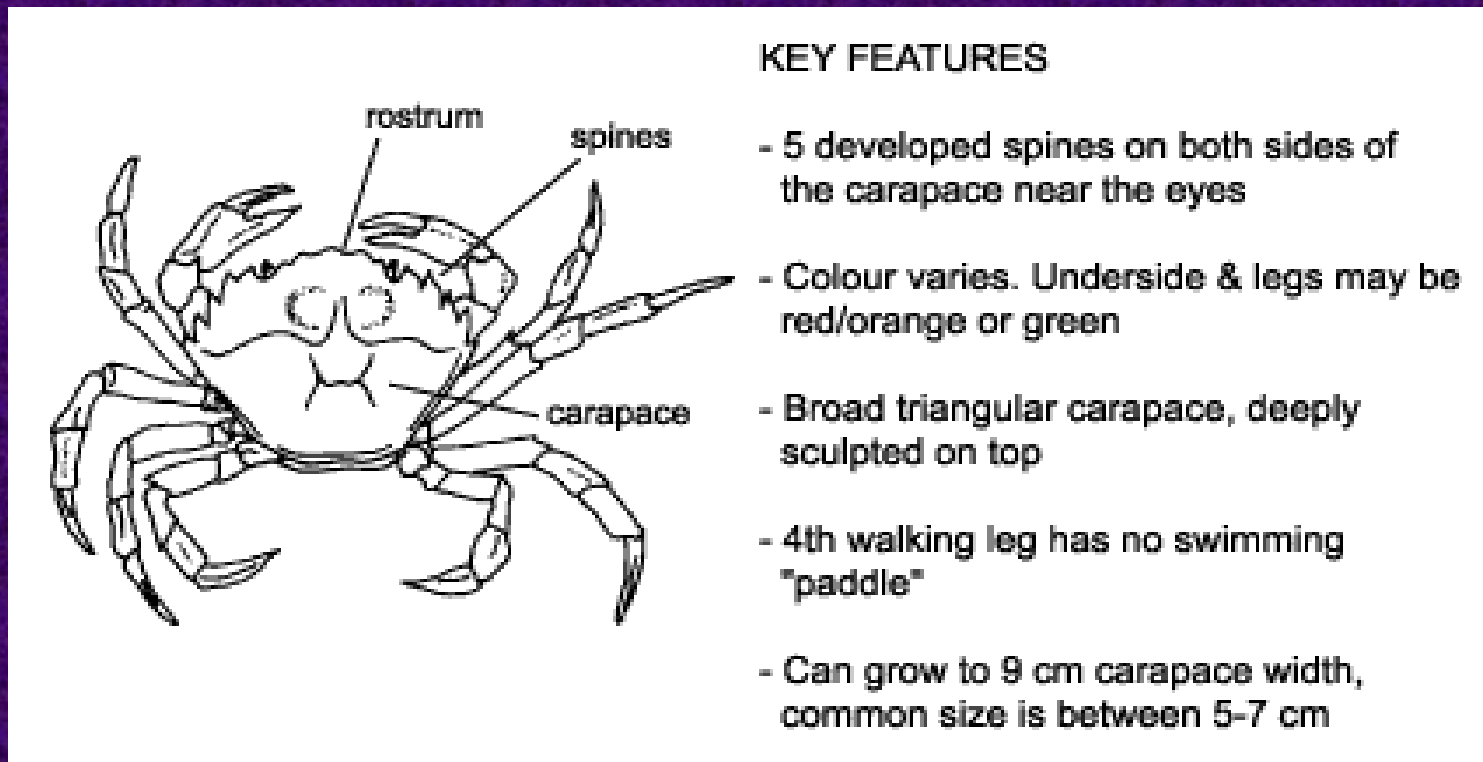


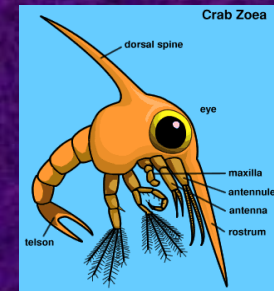
Diagram: Caleb Gardener, Tasmanian Aquaculture and Fisheries Institute  
[www.marine.csiro.au](http://www.marine.csiro.au)

# Life cycle

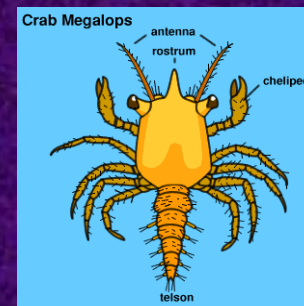
Up to 185,000  
eggs/clutch



1 (E. coast) to 2 (W. coast)  
clutches of eggs/yr



Larval duration  
50 to 90 days

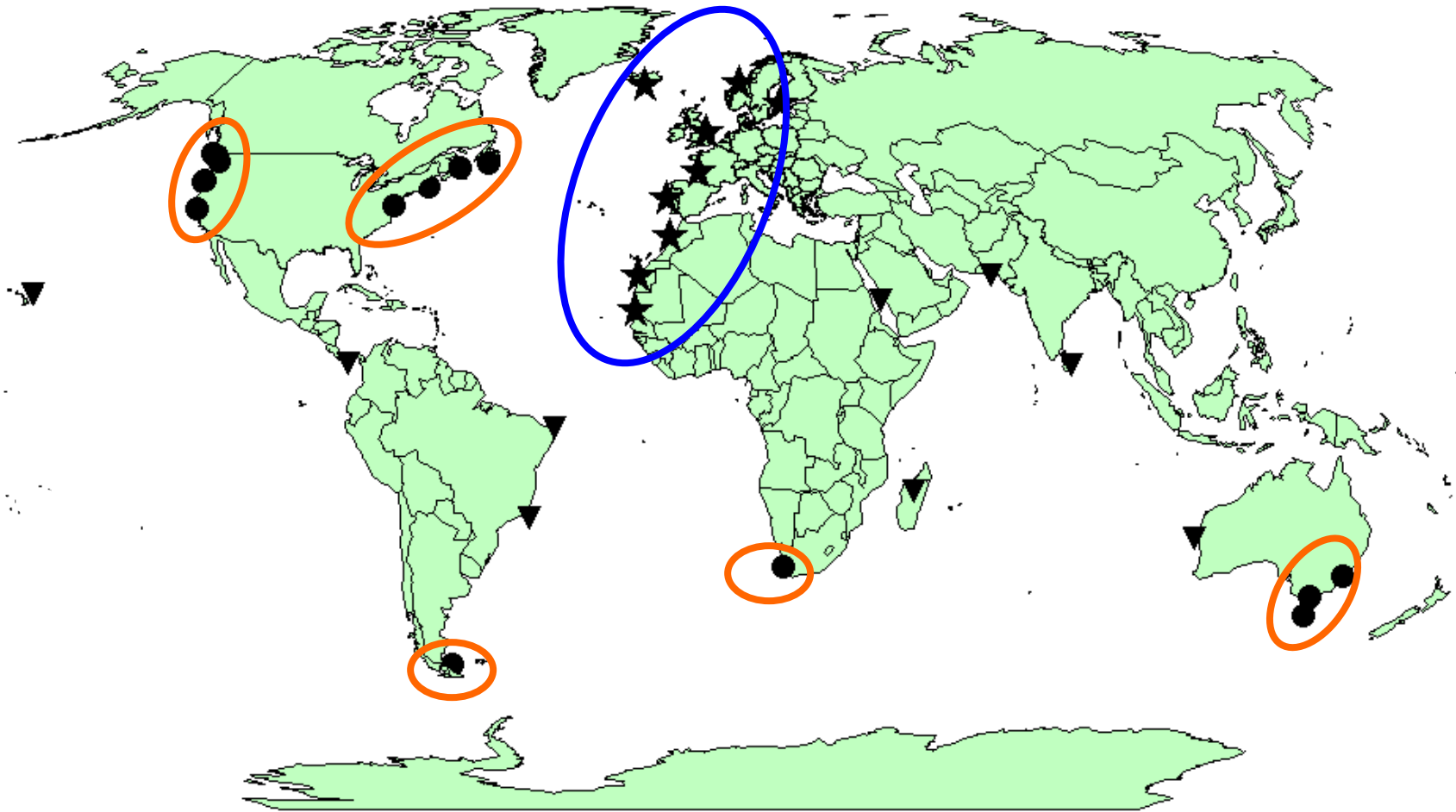


Mature at age 1  
(W. coast)  
to 2-3 (E. coast)

## Concerns about green crab

- Ranked by IUCN among the “100 worst” invasive species in the world
- Potential for serious impacts on ecosystem, fisheries, aquaculture
  - Predation, competition, habitat modification
  - Cascading trophic effects
  - Ecosystem engineer
- Range continues to expand on both east and west coasts

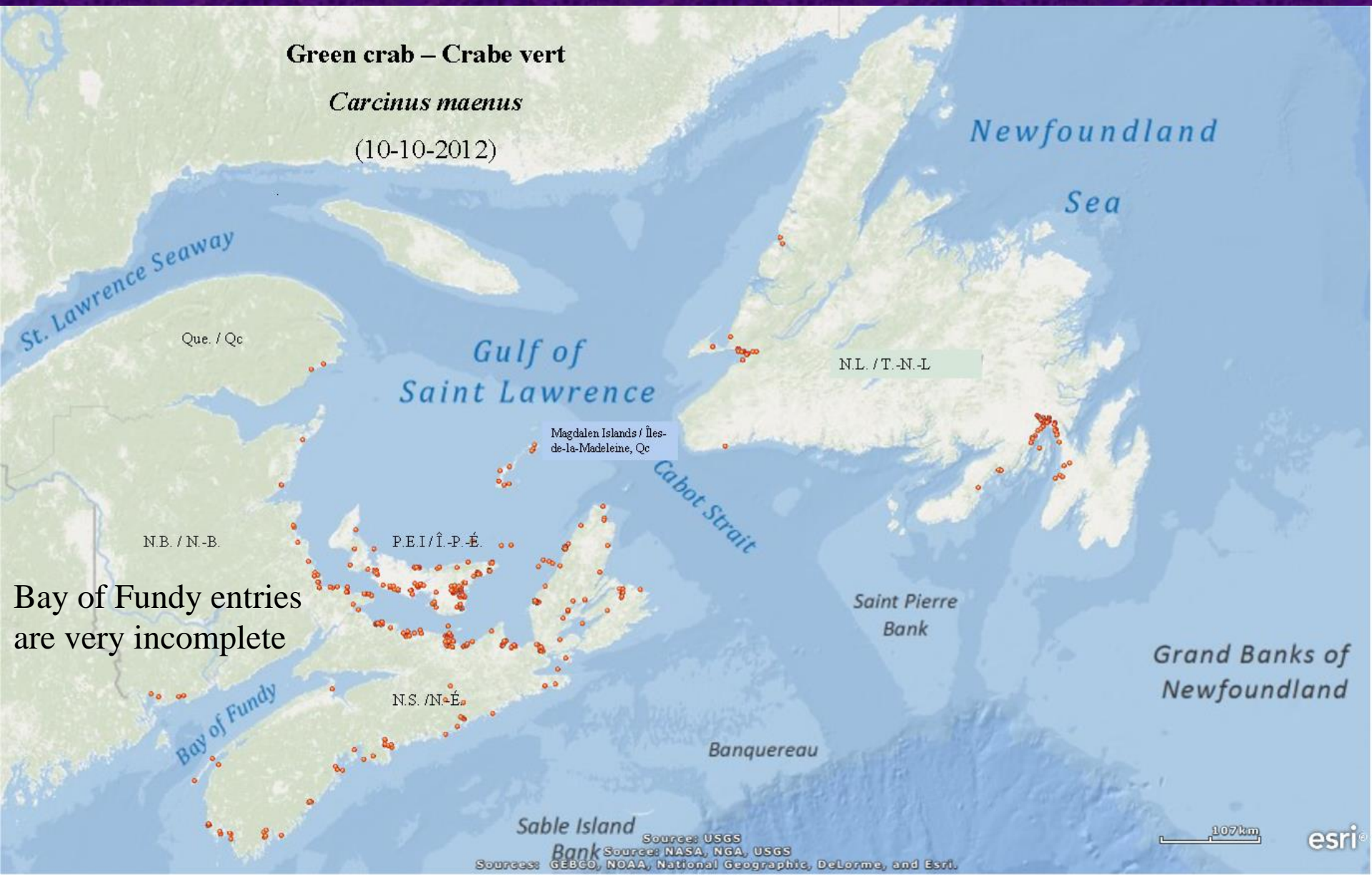
# Native and introduced range, and failed introductions



**Green crab – Crabe vert**

*Carcinus maenus*

(10-10-2012)



Bay of Fundy entries are very incomplete

Source: USGS  
Source: NASA, NGA, USGS  
Sources: GEBCO, NOAA, National Geographic, DeLorme, and Esri.

# What does green crab do?



## Predation:

- Eats 158 genera in 19 phyla
- Reduces abundance of invertebrate prey
- Predation linked to collapse of softshell clam industry in Maine during 1950's

## Competition:

- Competition for food with other predators, e.g. crabs, fishes
- Competition for habitat

## Habitat disturbance:

- Digs up eelgrass and sediments

- All studied introductions show effects on bivalve molluscs, most show effects on native crabs, few show (or measure) effects on fishes
- Prey preferences consistent:
  - Molluscs > crustaceans > polychaetes > green algae
  - Among molluscs, bivalves > gastropods
- Protected embayments are occupied in all invasions
- Major effects confined to embayments/estuaries



# Predictions and Results



## Effects on prey (invertebrates):

- Reduced diversity (species richness)
- Reduced abundance
- Change in community composition

## Effects on competitors (crabs & shrimps; fish):

- Reduced diversity  fish;  crabs/shrimps
- Reduced abundance  fish;  crabs/shrimps
- Change in community composition
- Changes in life history

## Effects on habitat (eelgrass meadows):

- Reduced eelgrass biomass