



What makes invasive species so successful?



# Definitions

- Non-native: Alien, outside its native range
  - Exotic, introduced, weedy, non-indigenous
  - Not normally part of ecosystem
  - Established, self-sustaining population
- ‘10% rule’
  - ~10% survive
  - ~10% of these become invasive
- Human activities involved
- What is an invasive species? –one that is aggressive and threatens local biodiversity.



# Common Characteristics of Successful Invasives

- Few natural enemies
  - Predators
  - Competitors
  - Parasites and diseases
- High reproductive rate
- Long lived
- Good dispersal
- Generalists
- Pioneer species

# Why worry about invasive species?

- Tend to crowd out /replace native species
- Can severely damage ecosystem health
- Harm human activities (agriculture, forestry, fisheries, recreation)
  - \$137 billion/ year in damages and pest control costs  
(Pimentel, 2000)



USDA

\$37 million loss to mid-Atlantic apple production in 2010 alone

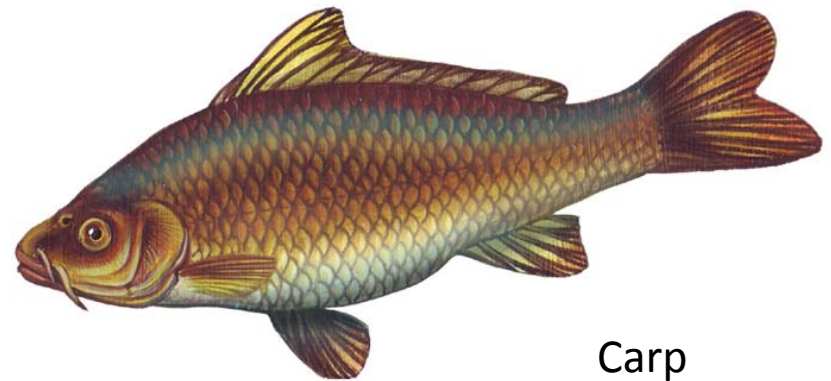
There are more than 100 invasive species in the Hudson River, including many of our most familiar plants and animals



Zebra mussels

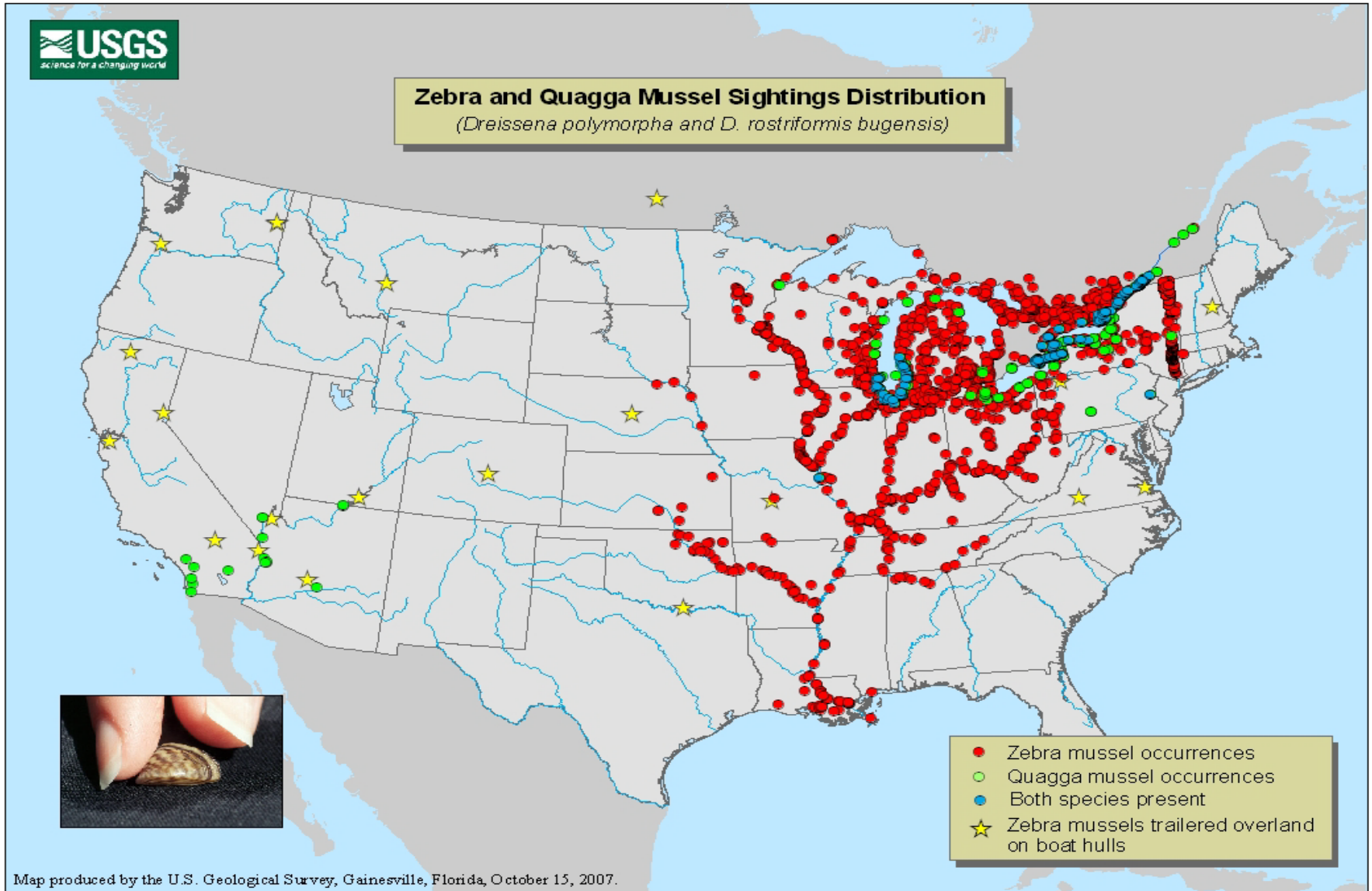


Seed from water chestnut plant



Carp

# Extent of zebra mussels in the US



# Life history

Mature at 1 year

Live 6 - 7 years

**Growth**

Up to 700,000 /m<sup>2</sup>



Filter feeders (plankton)  
Eaten by some fish, ducks,  
crayfish & crabs

**Filter Feeding:**  
1 liter water /day



Settle on hard  
surfaces

40,000-  
1,000,000 eggs  
/year



**Settling:**  
10,000 /m<sup>3</sup> /day

Larvae  
(Veliger)  
500,000 / m<sup>3</sup>

95% die

200,000,000  
sperm

Warm water, external  
fertilization