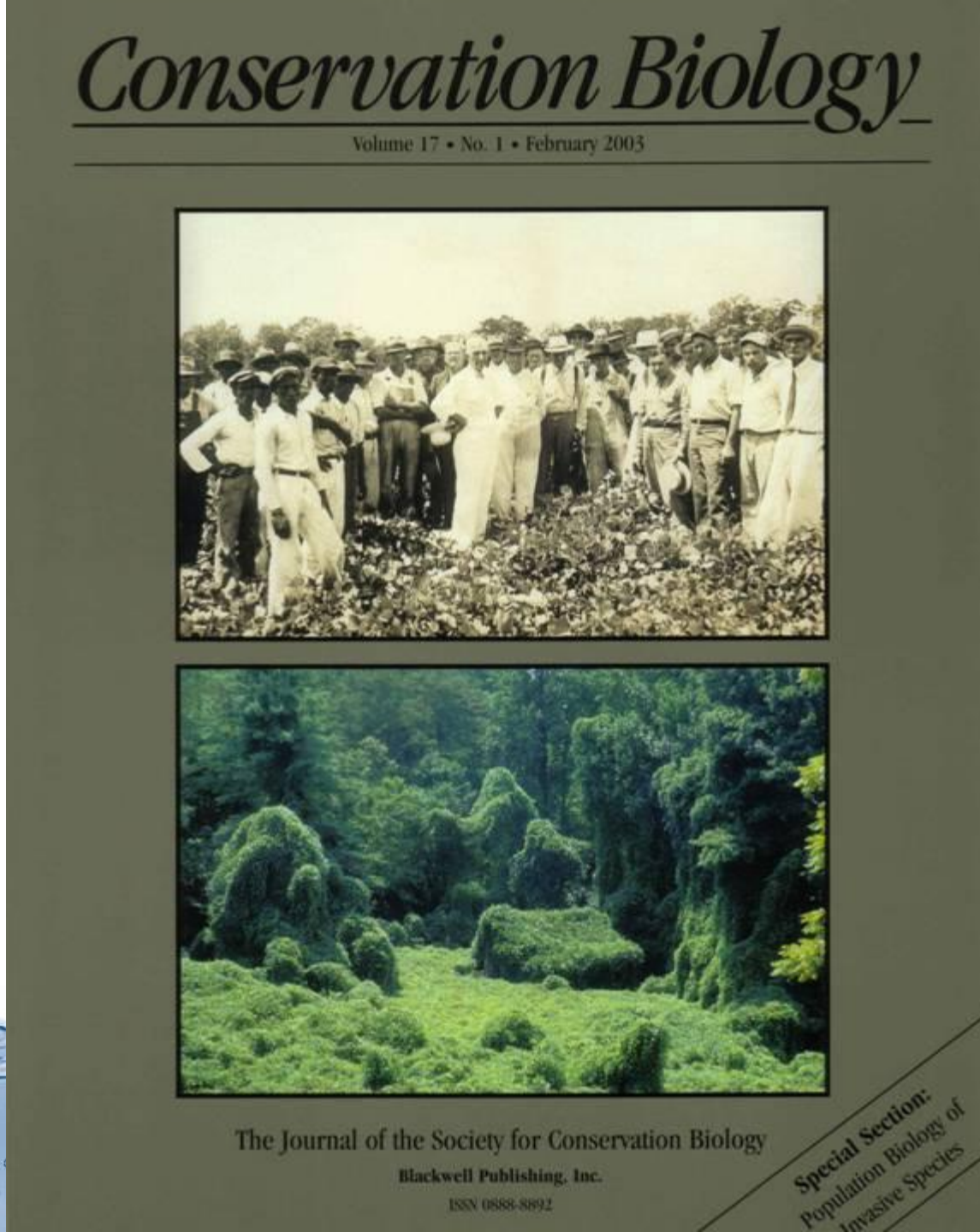
Alien Invasive Species

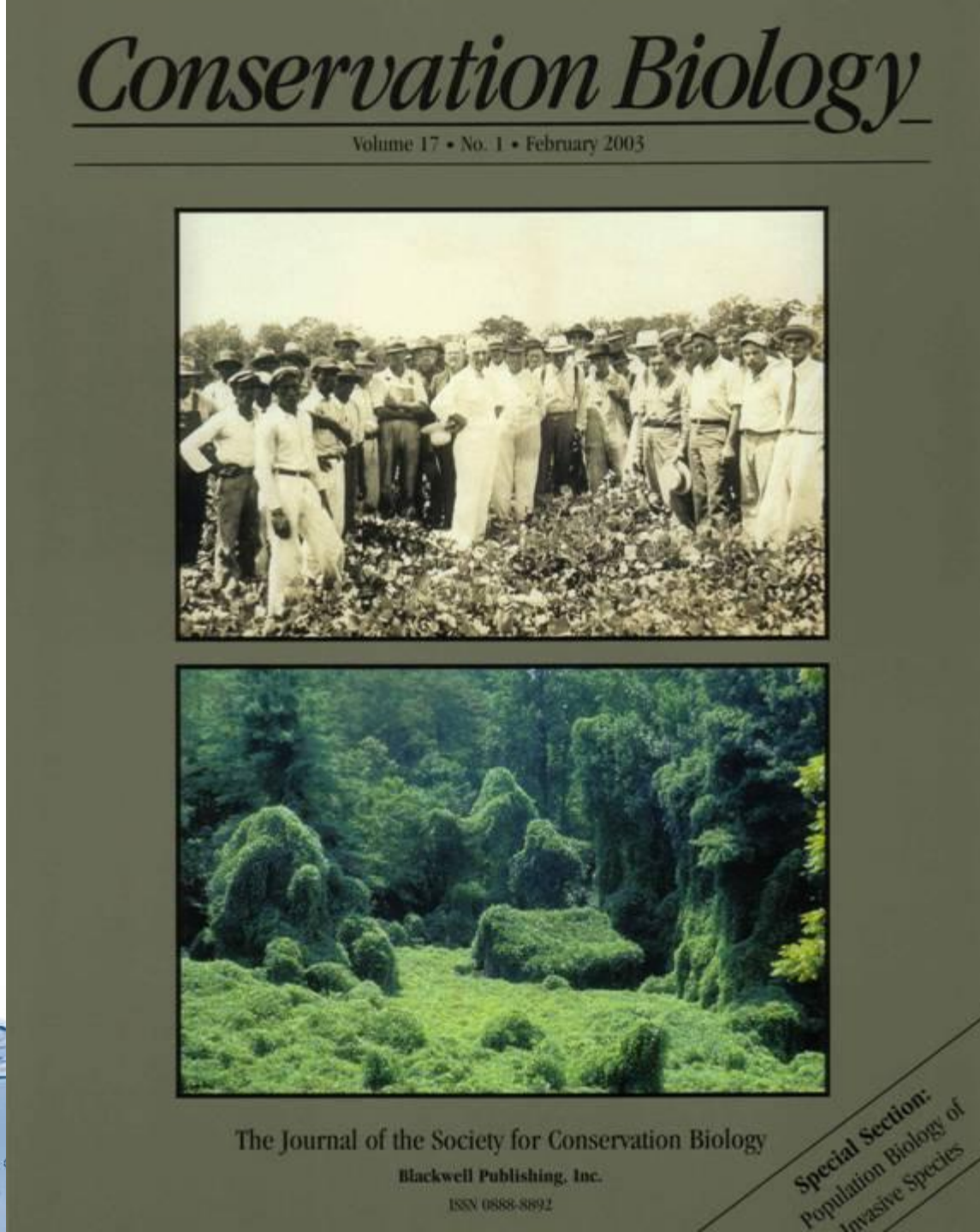


Alien Invasive Species

Problem:

Net Effect =

Harm > Benefit



Lots of Spread and Impacts from Small Beginnings

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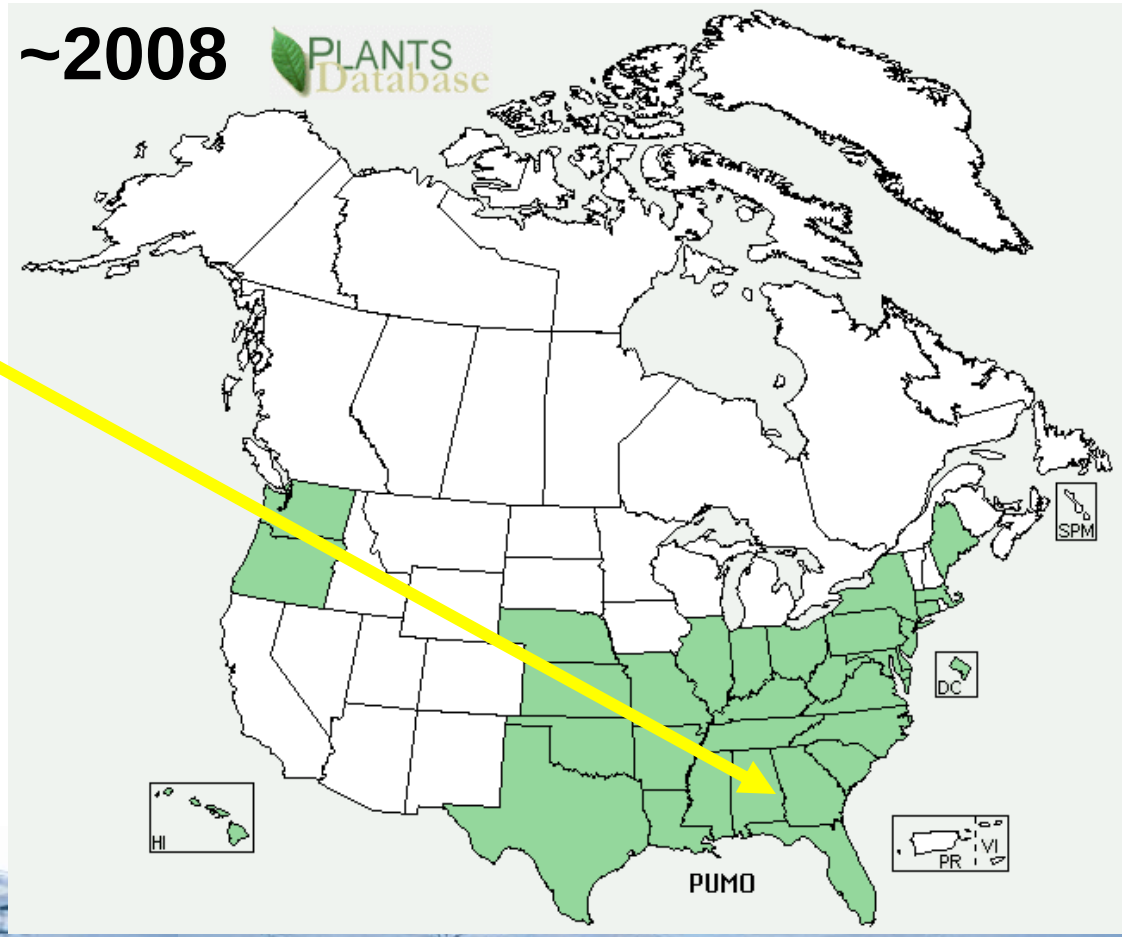

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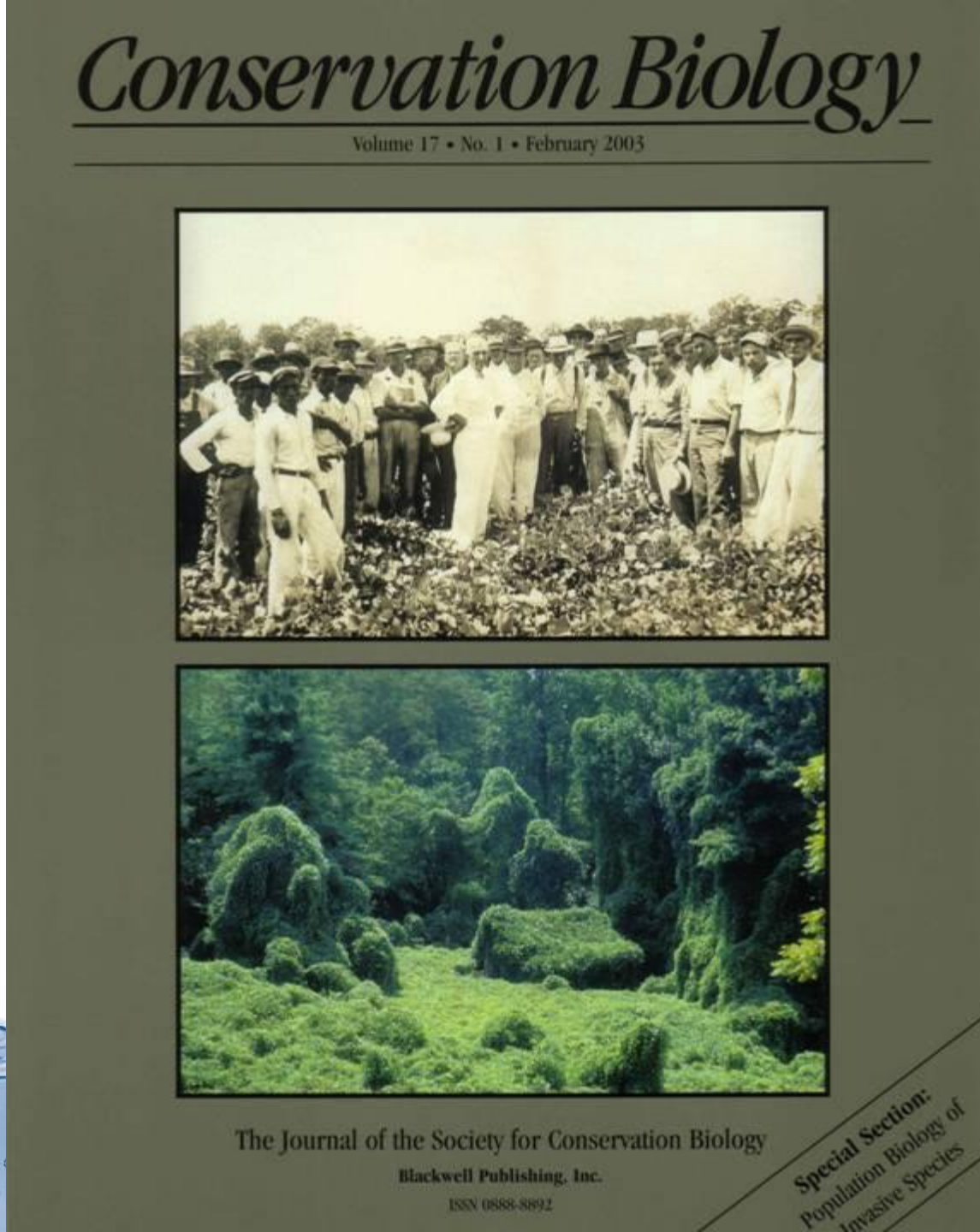
Alien Invasive Species

Problem:
Net Effect =
Harm > Benefit

Solution:
Risk Analysis-guided pre-import decisions



Risk Assessment and Risk Management of Aquatic Invasive Species

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David M. Lodge
Center for Aquatic Conservation
University of Notre Dame

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Laurentian Great Lakes: Example of impacts

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Spread of mussels

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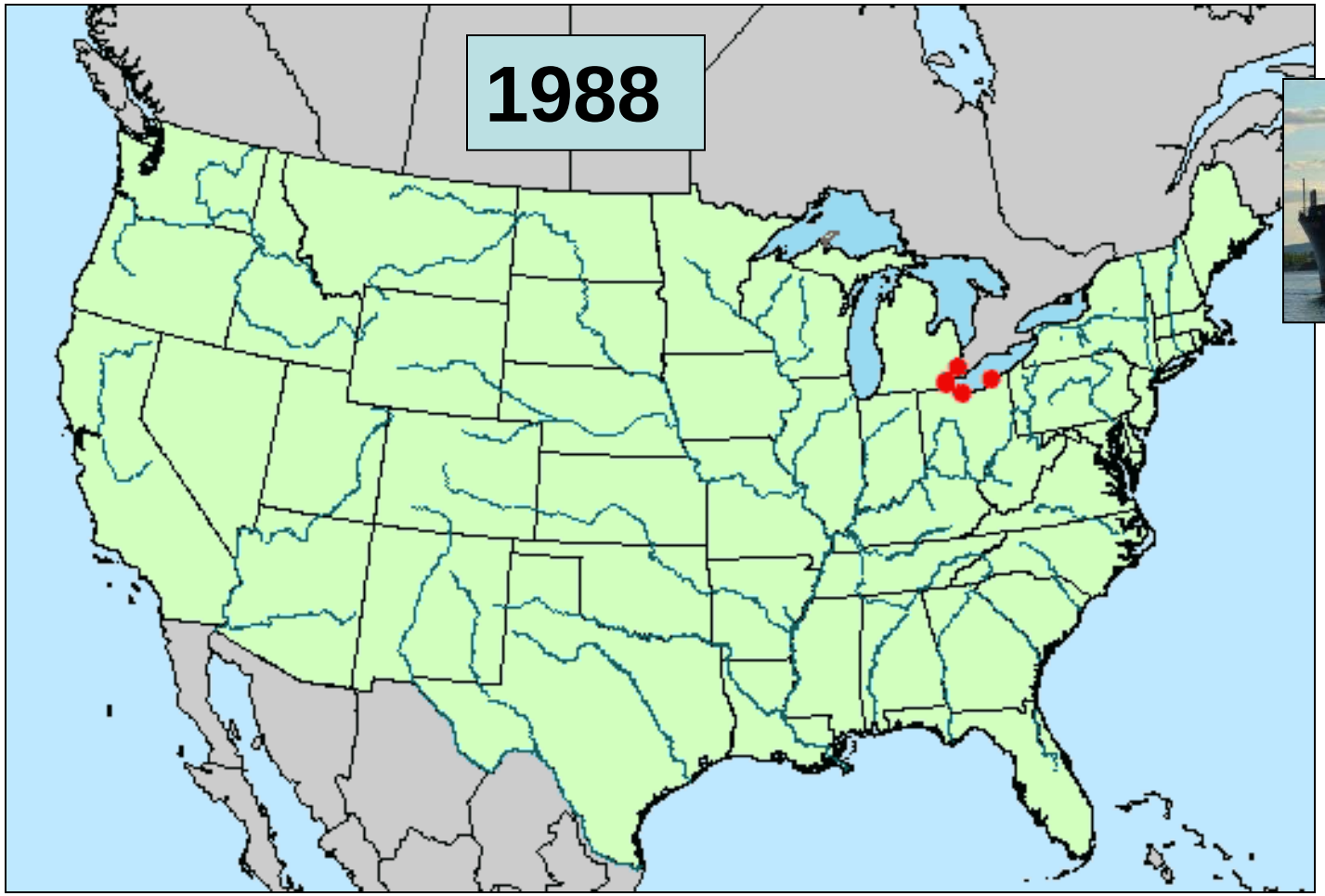

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Spread of mussels

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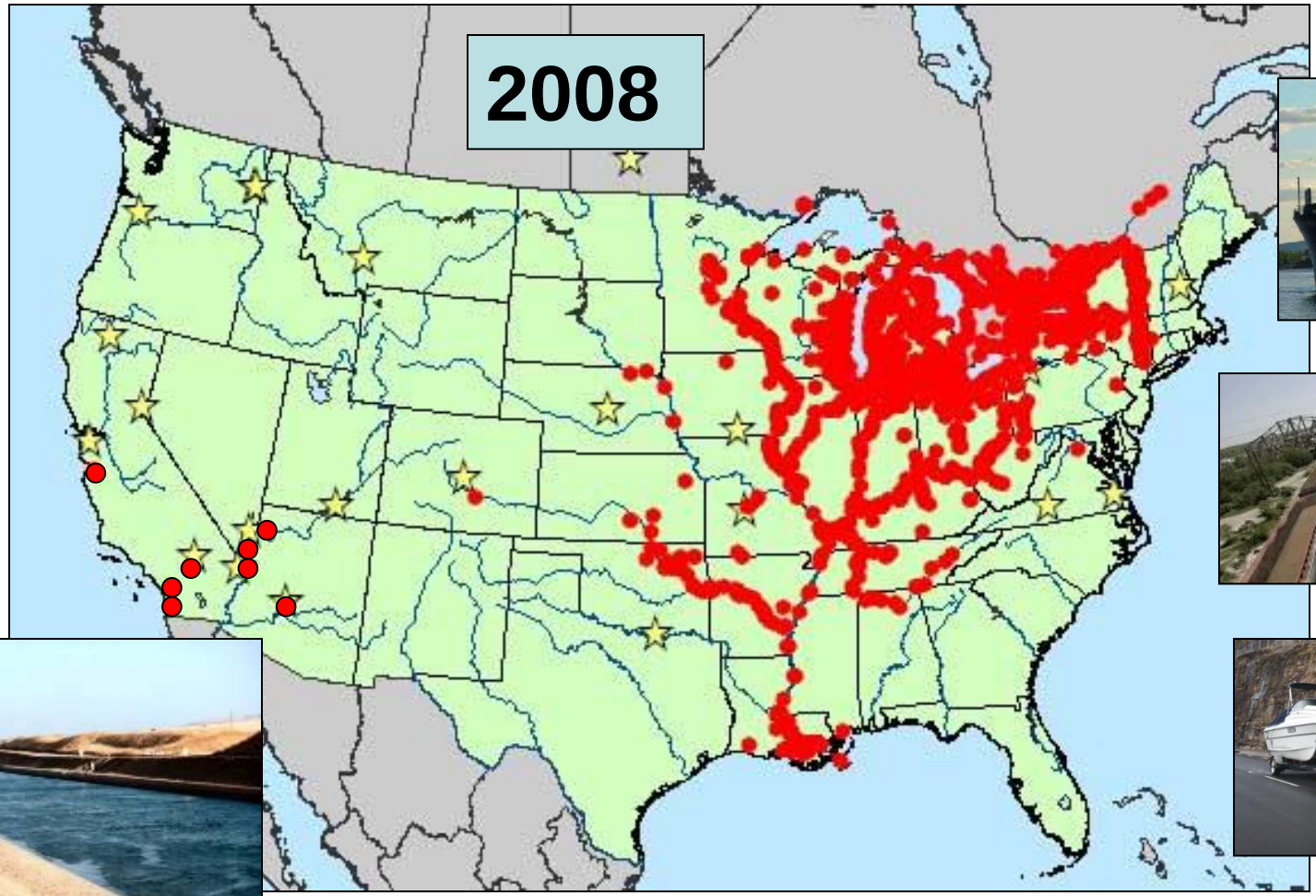

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Environmental and economic impacts of mussels

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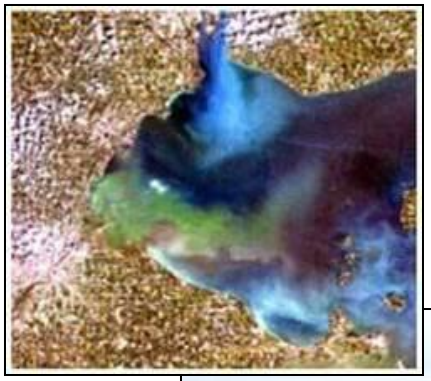

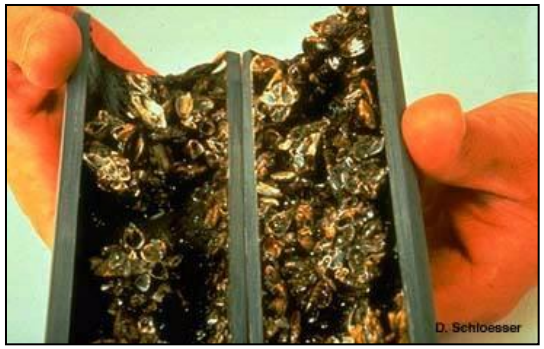

Non-market costs: extirpation of native clams & impacts recreation

Market costs: >$200 million annually - clog water intake pipes

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Nonindigenous Species Numbers

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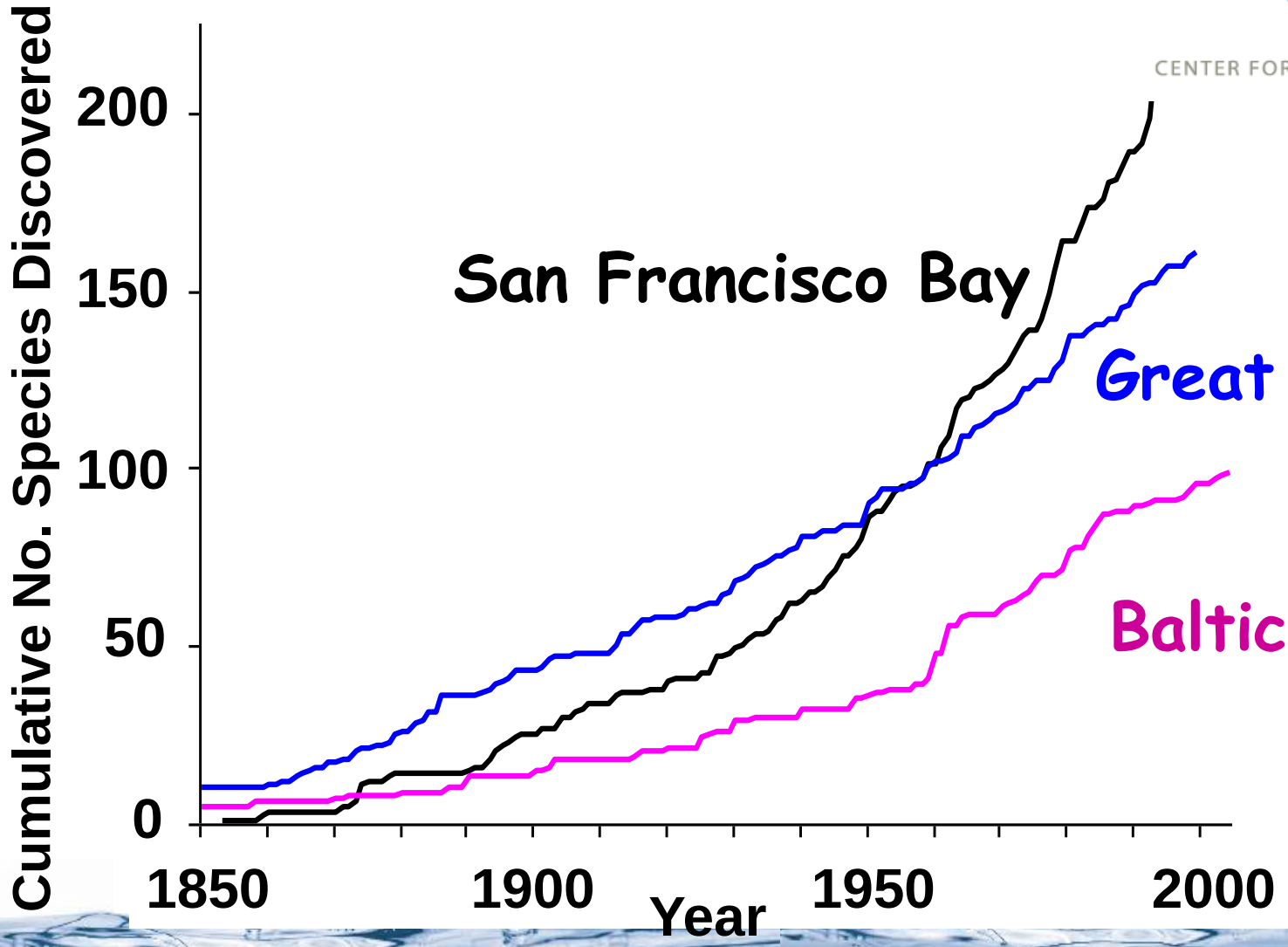

(Cohen and Carlton. 1995. US Fish and Wildlife Service), Ricciardi 2006, Baltic Marine Biologists. 2005.)

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Pathways of Nonindigenous Species into the US

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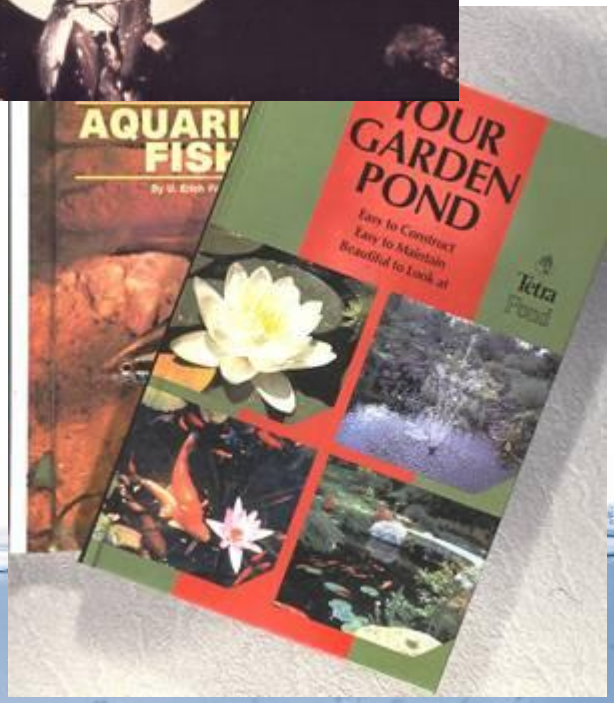

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Shipping: Global Network Linking World's Waterways

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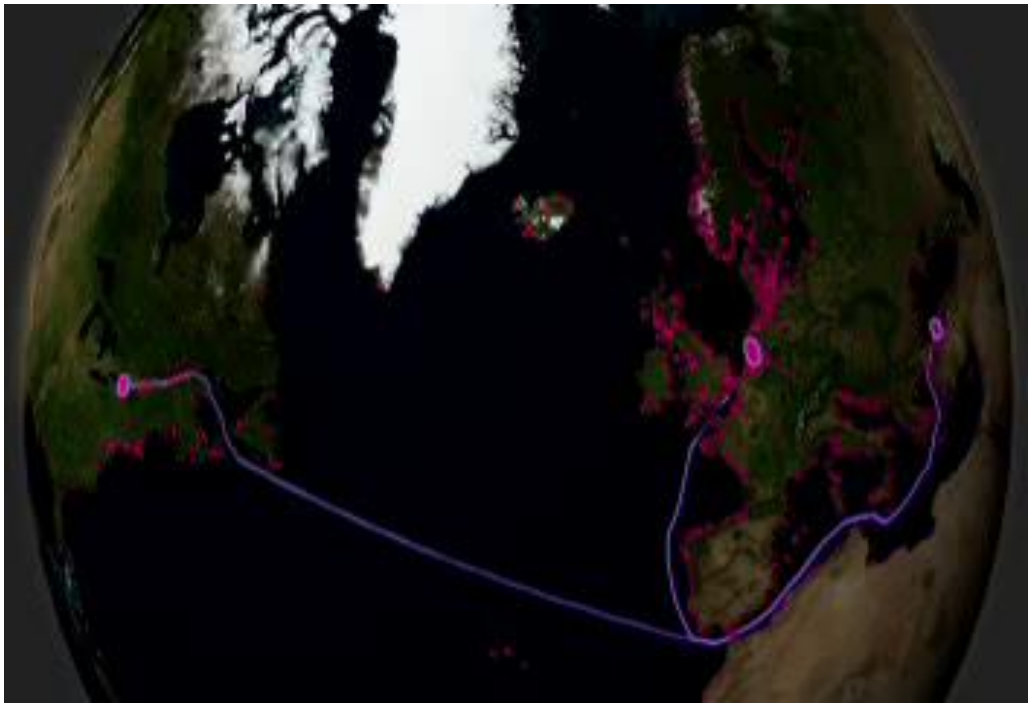

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Risk Management for Ships

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- **Current stop-gap approach**
  - Ballast water exchange
- **Longer-term solution**
  - On-board water treatment (IMO, etc)
  - Ship-specific risk management (ship origin)
  - Hull fouling?

Pathways of Nonindigenous Species into the US

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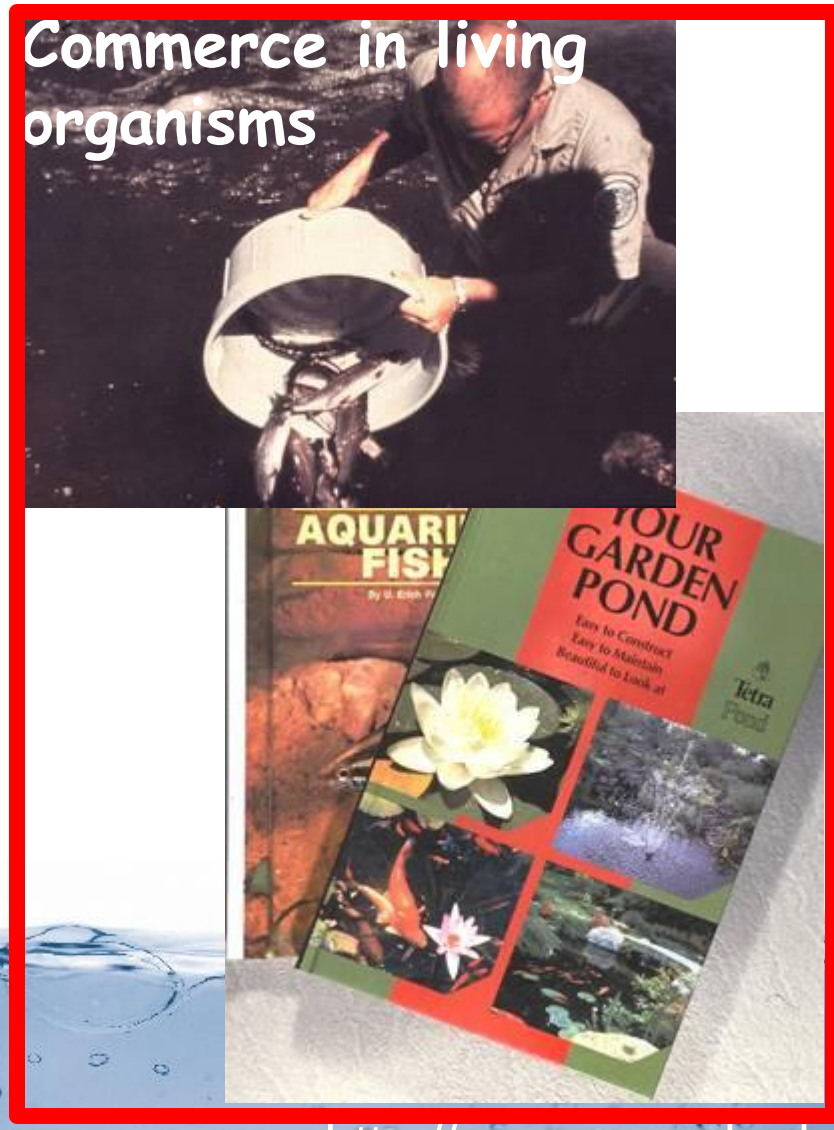

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High Risk:
Almost Any Import is Legal

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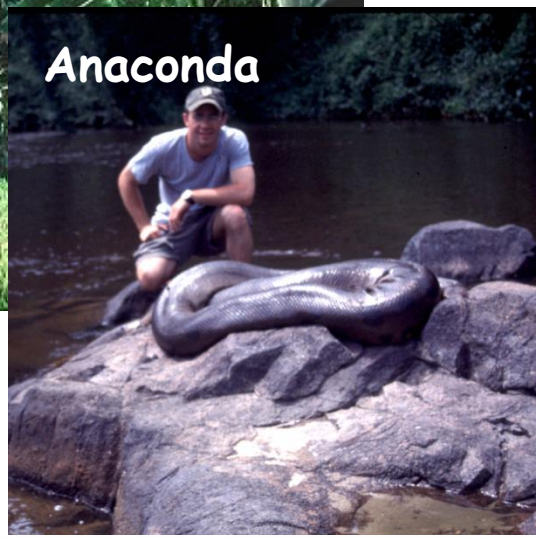

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Species-specific Risk Assessments

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1. Recent scientific advances allow 80-90% accuracy in risk assessment.

2. Importation can be banned only for harmful species, increasing net benefit of trade in benign species.

3. Screening provides environmental *and* economic benefits (Keller, Lodge & Finnoff 2007 PNAS).

4. Workshop (April 2008, U Notre Dame) provided guidance to CBD on best practices for pre-import screening (http://www.cbd.int/doc/?meeting=COP-09)

Part of a Solution: Species Risk Assessments

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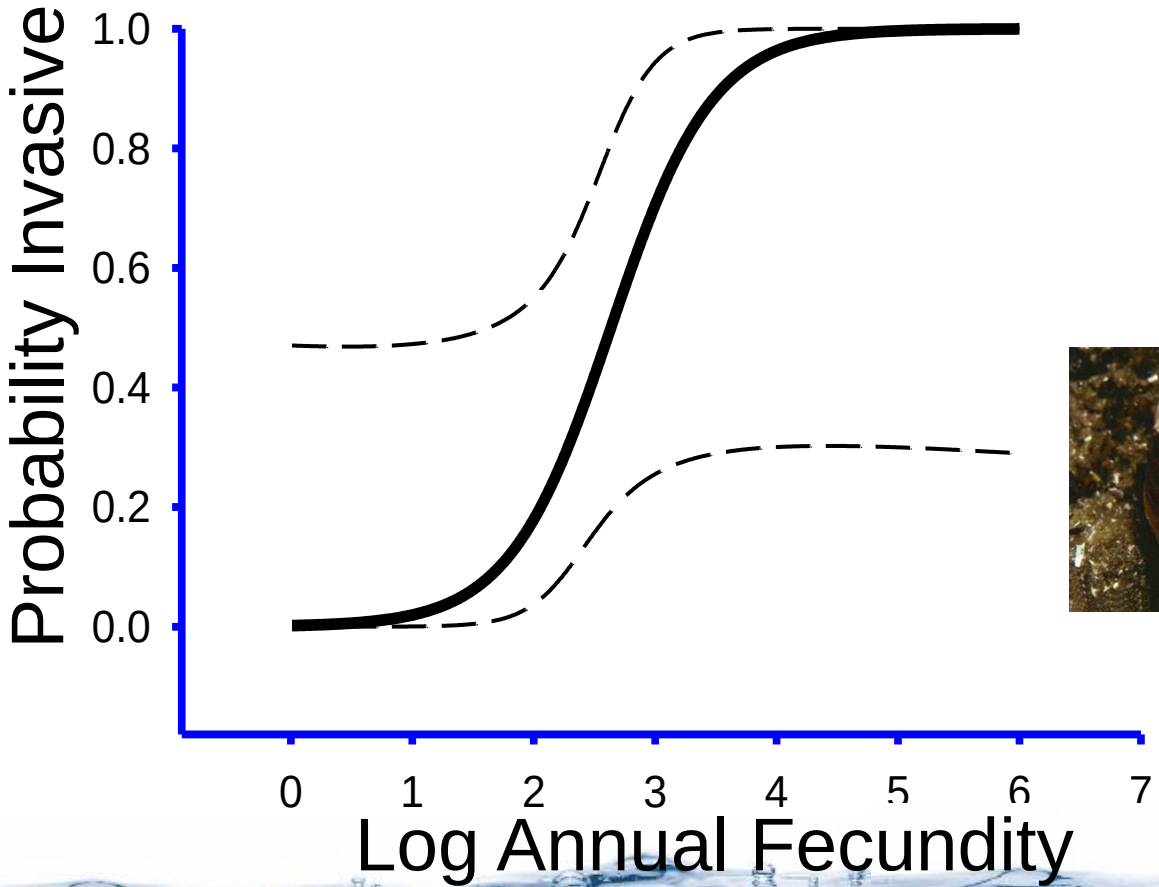

(Keller, Drake & Lodge 2006)

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Part of a Solution: Species Risk Assessments

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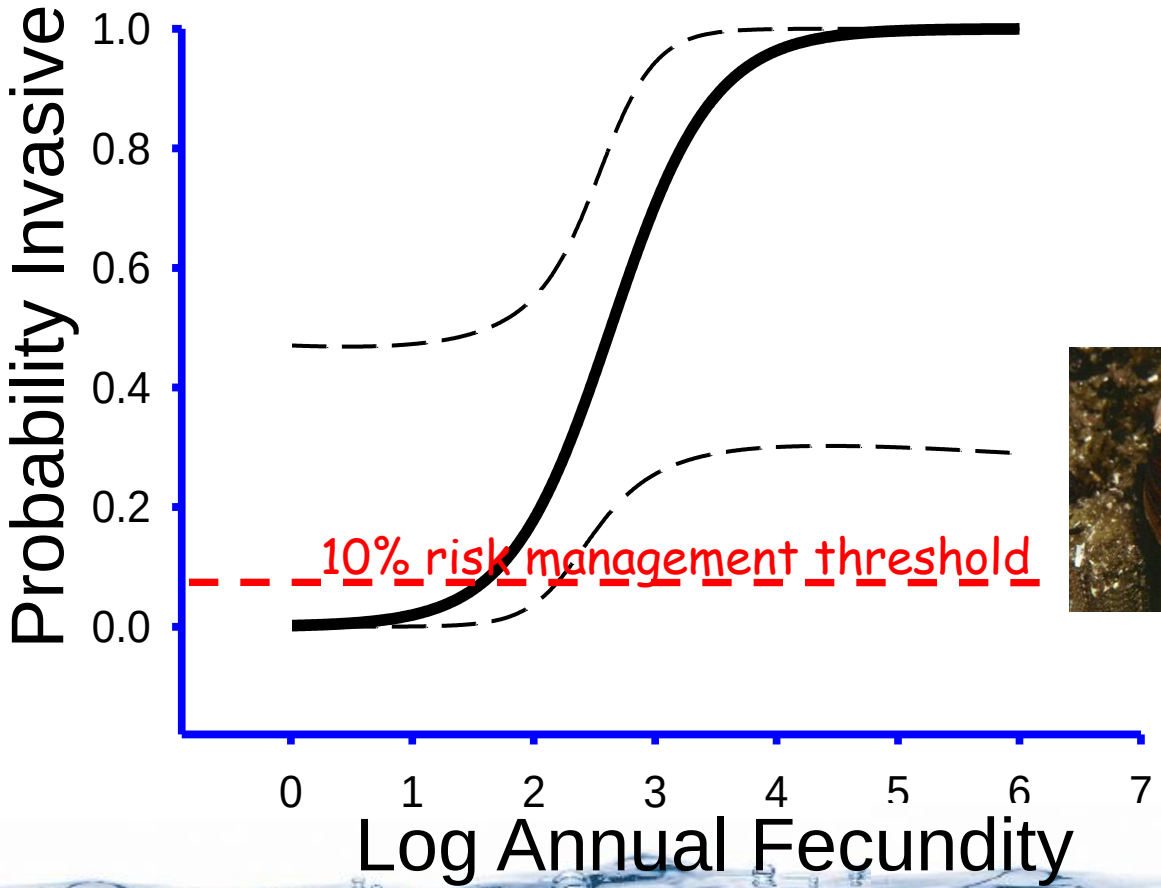

(Keller, Drake & Lodge 2006)

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Risk Management for Commerce in Living Organisms

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- World Trade Organization, Sanitary and Phytosanitary Agreement, OIE, etc
- U.S. Lacey Act, Injurious Wildlife risk assessment protocols (or replacement legislation)
- USDA Plant Protection Act, noxious weeds and plant pests risk assessment protocols, Q37
- States within US and consortia of states under similar threat
- City ordinances, e.g., Chicago

Conclusions

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- **Two types of pathways**
  - transportation-related
  - commerce in living organisms

- **For ships**--on-board water treatment, but a regulatory standard is required (IMO or national legislation)

- **For commerce in living organisms**--species-by-species risk assessment technologies are available, but a regulatory framework is required

- **New policies would foster green industries**