



Fisheries and Oceans  
Canada

Pêches et Océans  
Canada



# Organisms in Trade in Canada and the Great Lakes

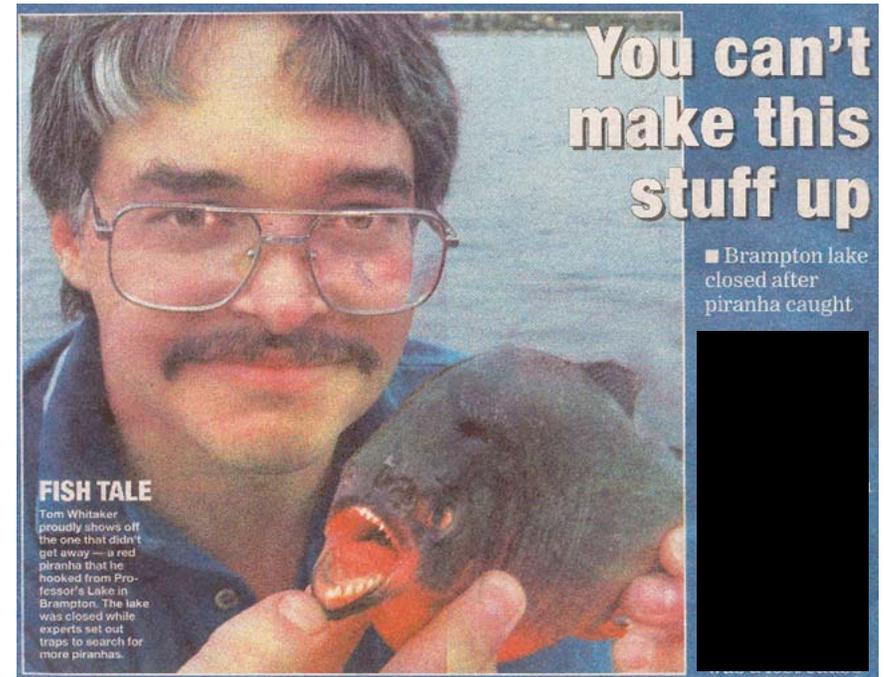


Canada



# Mandrak and Cudmore 2010

- 69 non-native fishes introduced into the Great Lakes:
  - 35 are established
  - 29 are failed
  - 5 are uncertain status





# Pathways

- Commercial Shipping
- Dispersal
- Recreational Boating and Angling
- Stocking
- Live Trade



# Pathways

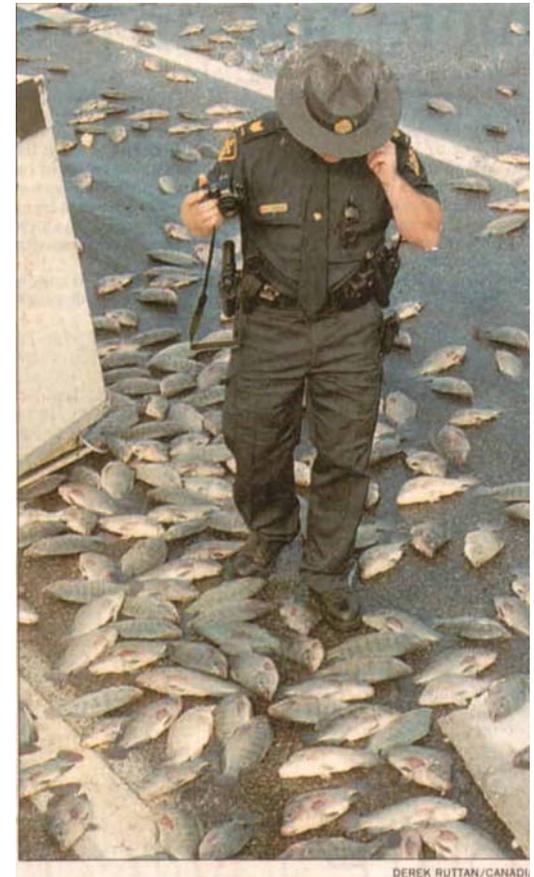
- Commercial Shipping
- Dispersal
- Recreational Boating and Angling
- Stocking
- **Live Trade**
  - **Canada**
  - **Great Lakes**





## Live Trade

- Imported
- Not intended for release into wild
- Kept live to point of sale or use
- Provides a source of individuals for unauthorized release (intentional and unintentional):
  - Accidental
  - Ethical
  - Cultural
  - ?





## Live Trade

- Aquarium
- Water Garden
- Live Food
- Biological Supply House
- Research
- Aquaculture (but not for stocking)



## Live Trade

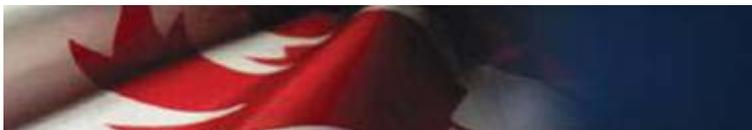
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## Live Trade Data

- Import:
  - Relies on importers for correct ID
  - Records (database, entry pt visits)
  - Market visits
- End Users:
  - Surveys (AQ, WG)





# Aquarium - Canada

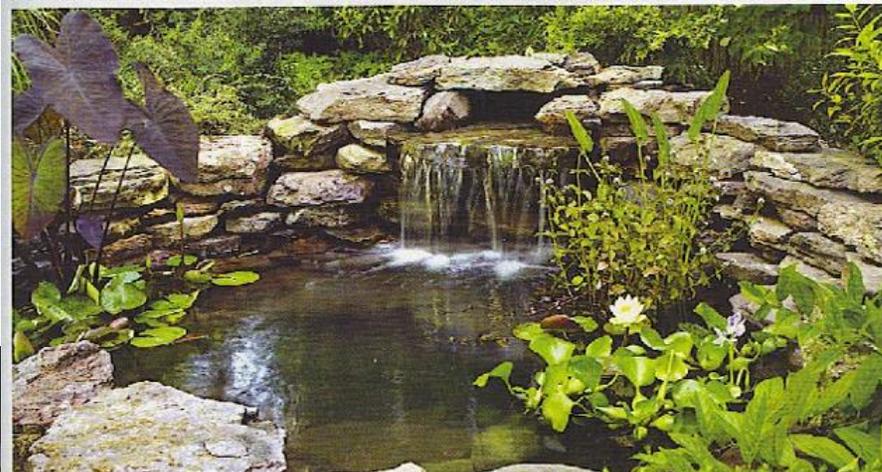
- ~2,000 fishes.
- Not all tropical (e.g. snakeheads, cloud minnows).
- Survey: 1% of aquarists release fishes.





## Water Garden - Canada

- ~75 species (fishes, plants, invertebrates).
- Many temperate survive winter.
- Many released because ponds freeze.
- Survey: 1% of aquarists release fishes.
- Increasing in popularity?

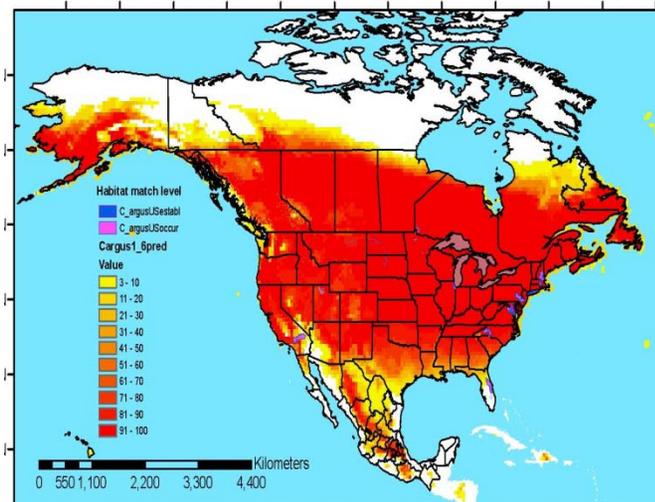




# Live Food Trade - Canada

~ 30 fish species.

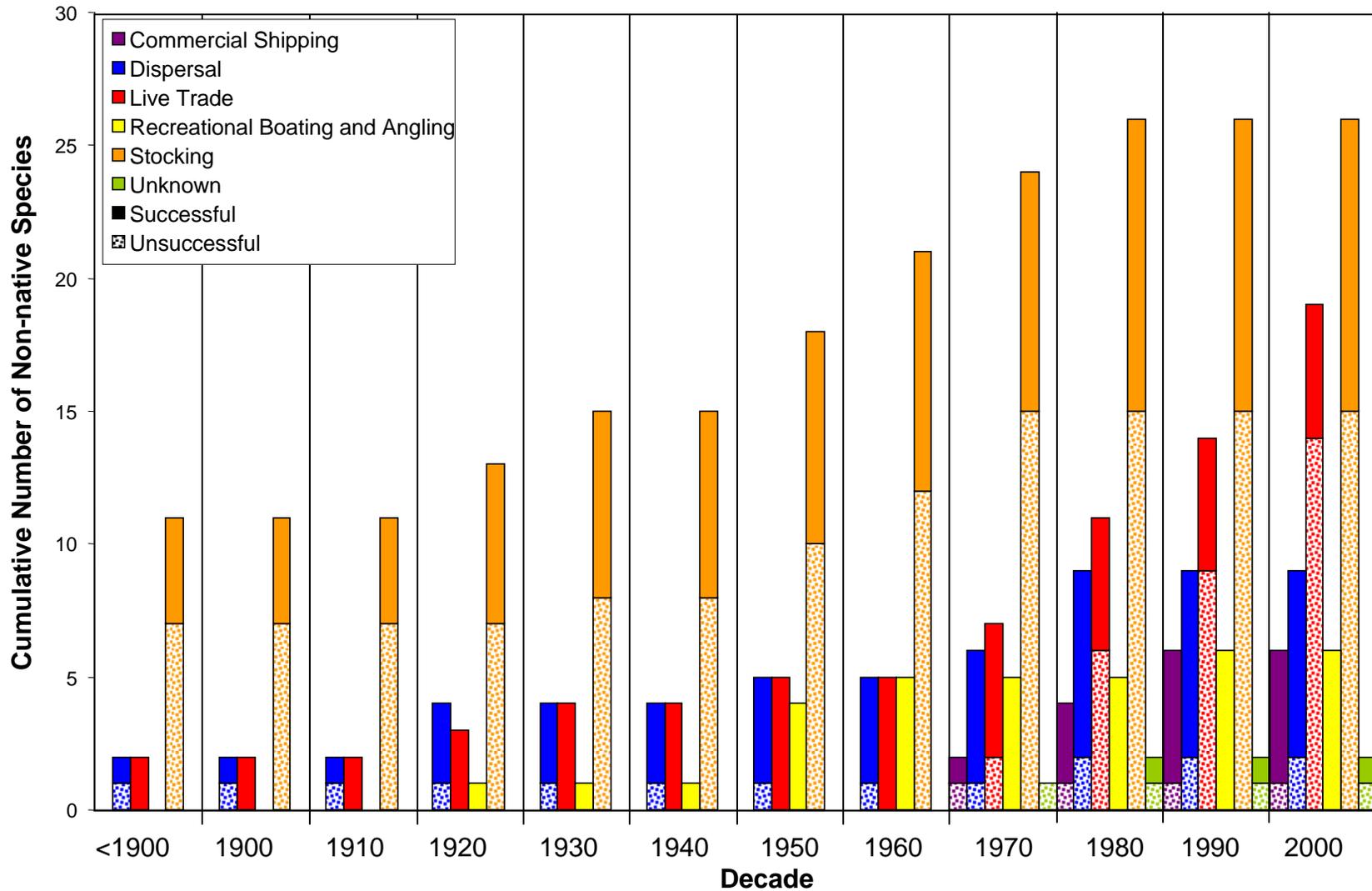
- Many temperate (e.g. snakeheads, tench).
- Demand likely to increase with increasing population.





# Pathways – Fishes in the Great Lakes

- Commercial Shipping
- Dispersal
- Recreational Boating and Angling
- Stocking
- Live Trade





## Live Trade over Time

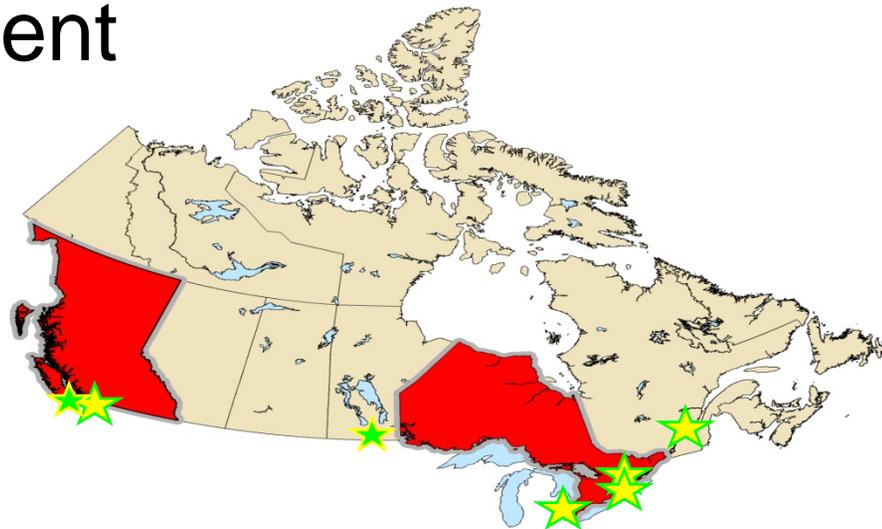
- One of the earliest pathways of introduction
- Increases in importance 1920s, '30s, '50s
- Steadily increasing since 1970s
  
- 19 species introduced; 5 have been successful





# Federal Regulations

- United States – Gaps and lengthy additions to lists
- Canada – currently none for import; under development





## Preventing Future Invaders

- Protect GL from AIS impacts – prevent them from becoming introduced and established
- Requires a good understanding of the pathways, species present, associated vectors, potential impacts
- Best organized in a risk assessment





## Risk Assessment for OiT

- Develop effective policies and management actions to prevent the introduction and establishment of riskiest species
- Centre of Expertise for Aquatic Risk Assessment – national pathway risk assessment underway

**CEARA**

Centre of Expertise  
for Aquatic Risk  
Assessment

Centre d'expertise  
analyse des risques  
aquatiques



## Overall...

- We have shown with focus and resources, we can address AIS in a pathway and reduce risk
- Need to turn attention to other pathways in the Great Lakes