Early Detection of Invasive Alien Aquatic Species in the St. Lawrence River and Estuary through a Commercial Fisherman Network:

A Four-year Experiment Evaluation

Guy Verreault,

Kim Belzile and Anne-Marie Pelletier

Northeast Aquatic Nuisance Species Panel
Ville de Québec, April 27th, 2011

Ressources naturelles et Faune
Québec

Introduction

Ressources naturelles et Faune
Québec

Context

- **Invasive Alien Aquatic Species (IAAS) are serious threat,**
- **Early Detection + rapid action are essential to prevent IAAS establishment,**
- **Early detection in large territory with different habitats,**
- **Role of Scientific support for effective Early Detection.**

Ressources naturelles et Faune
Québec

Context

- Partnership reduces cost,
- Commercial fishing in the St. Lawrence River and Estuary,
- Commercial fishermen are worried about IAAS,
- Discarded fish outnumbered targeted fish species,
- IAAS may be present among discarded fish.

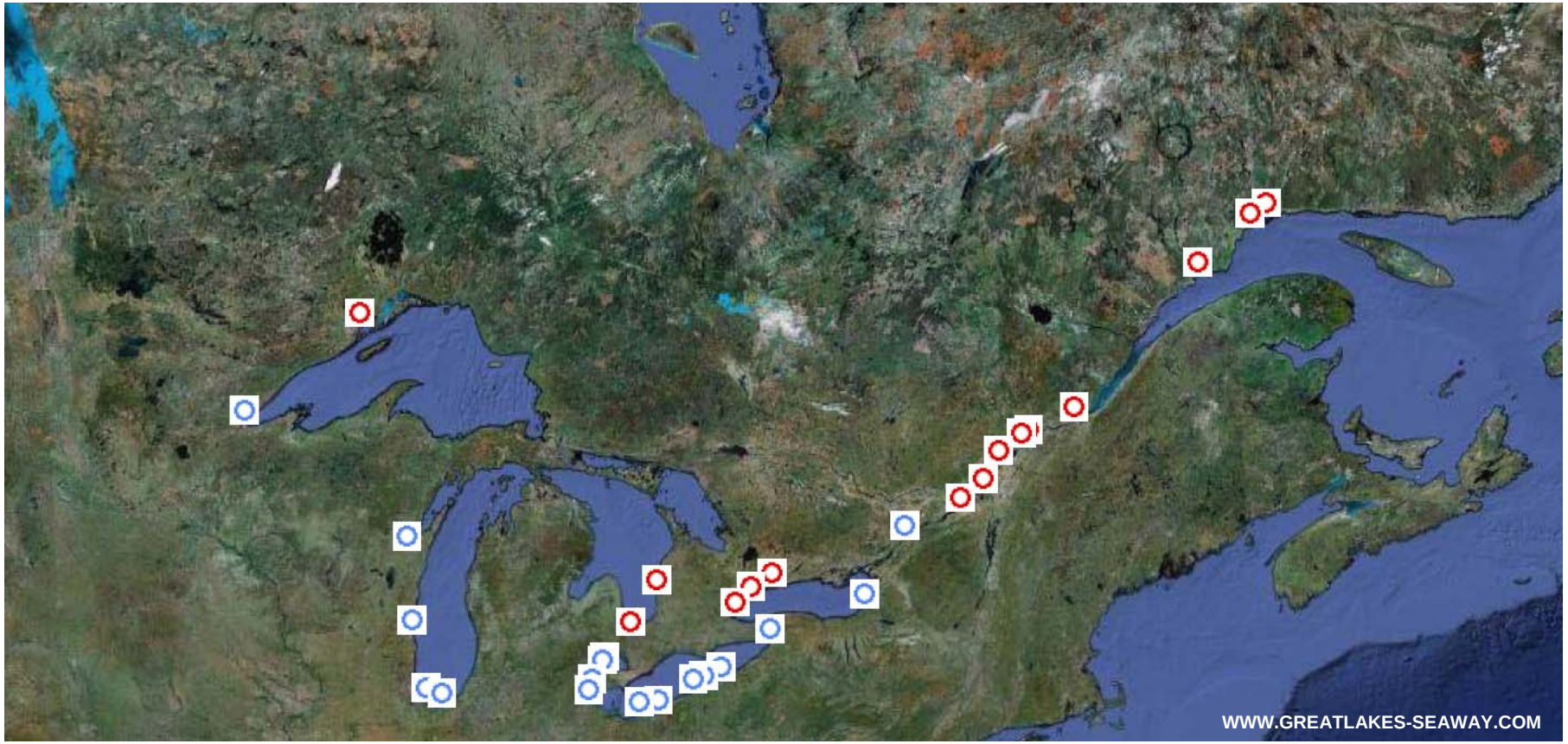
Ressources naturelles et Faune
Québec

Objectives

- Detect IAAS among discarded fish by setting up an Early Detection Network (EDN) with fishermen,
- Implement and support the EDN,
- Develop IAAS detection training tools and procedures,
- Efficiency evaluation of EDN after four years and implementation.

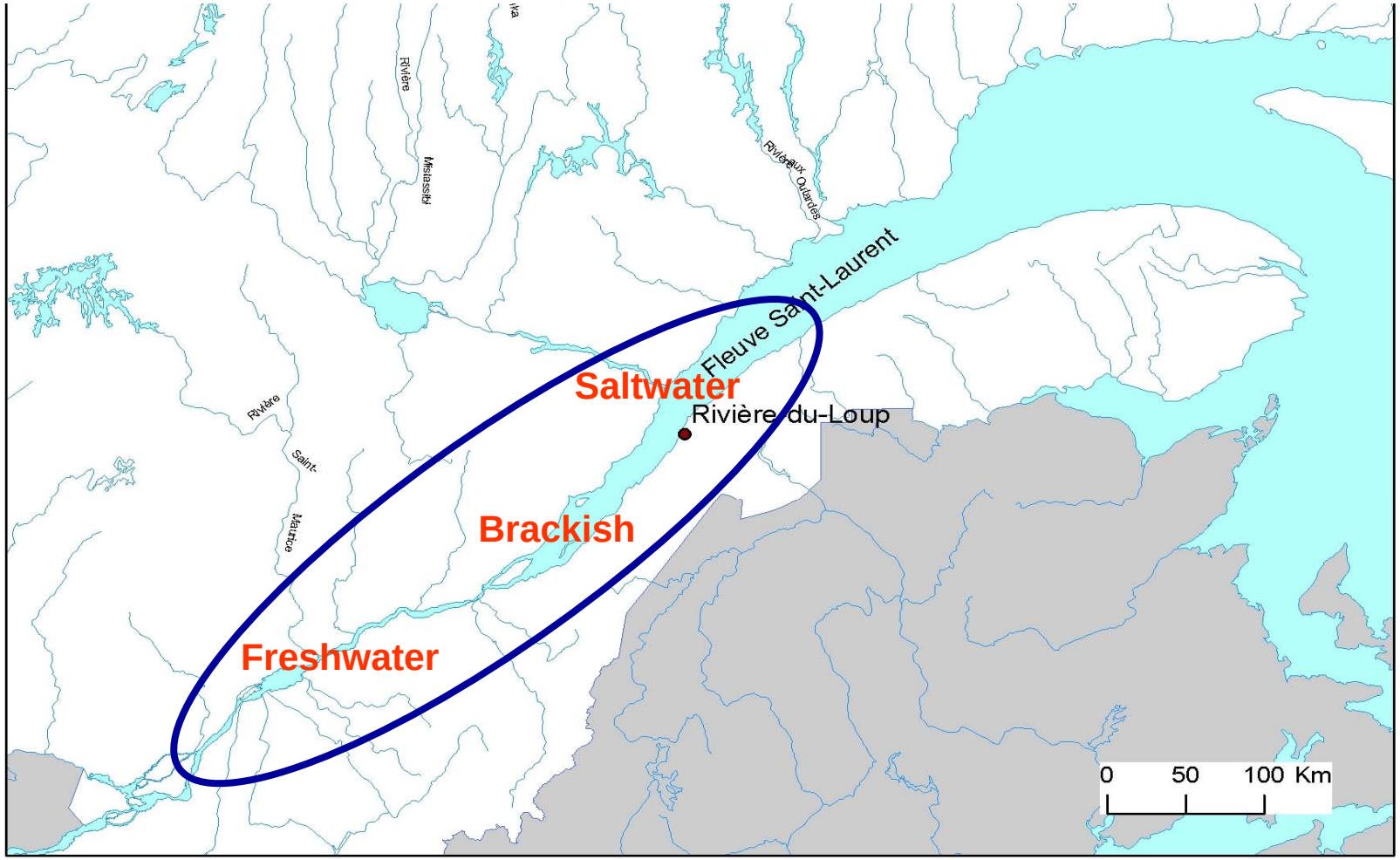
Ressources naturelles et Faune
Québec

Study area



Ressources naturelles et Faune
Québec

Study area



Ressources naturelles et Faune
Québec

Methods

- **Traditional fishery, fish habitat and fishing gears:**
  - **Eel fishery on tidal flats with weir traps**
  - **Sturgeon fishery in river and estuary with gillnets**
  - **Yellow Perch fishery in lakes and marshes with hoopnets**

Ressources naturelles et Faune
Québec

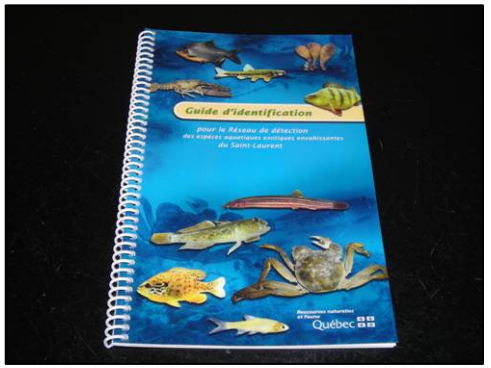
Methods

- Use of existing fishing gears,
- Fishing activities from April to November,
- Fish lengths from 10 to 1500 mm in fishing gears,
- Fishing gears visited once or twice a day.

Ressources naturelles et Faune
Québec

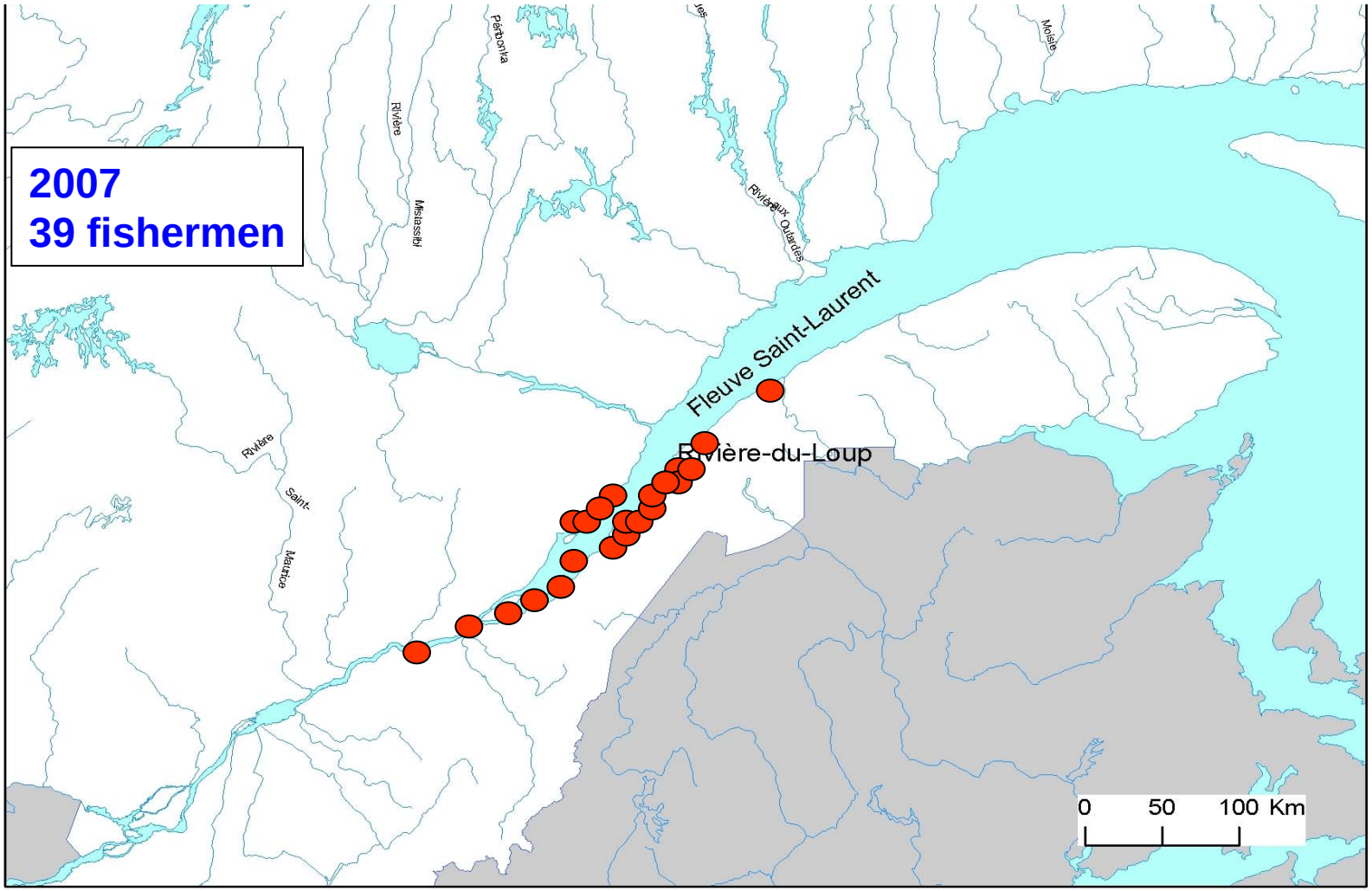
Methods (Training)

- **A biologist dedicated to IAAS EDN project for three seasons,**
- **Field guide for IAAS,**
- **Training and field visit,**
- **Protocol adapted for fishermen,**
- **Telephone survey during the fishing season,**
- **Website dedicated for IAAS.**



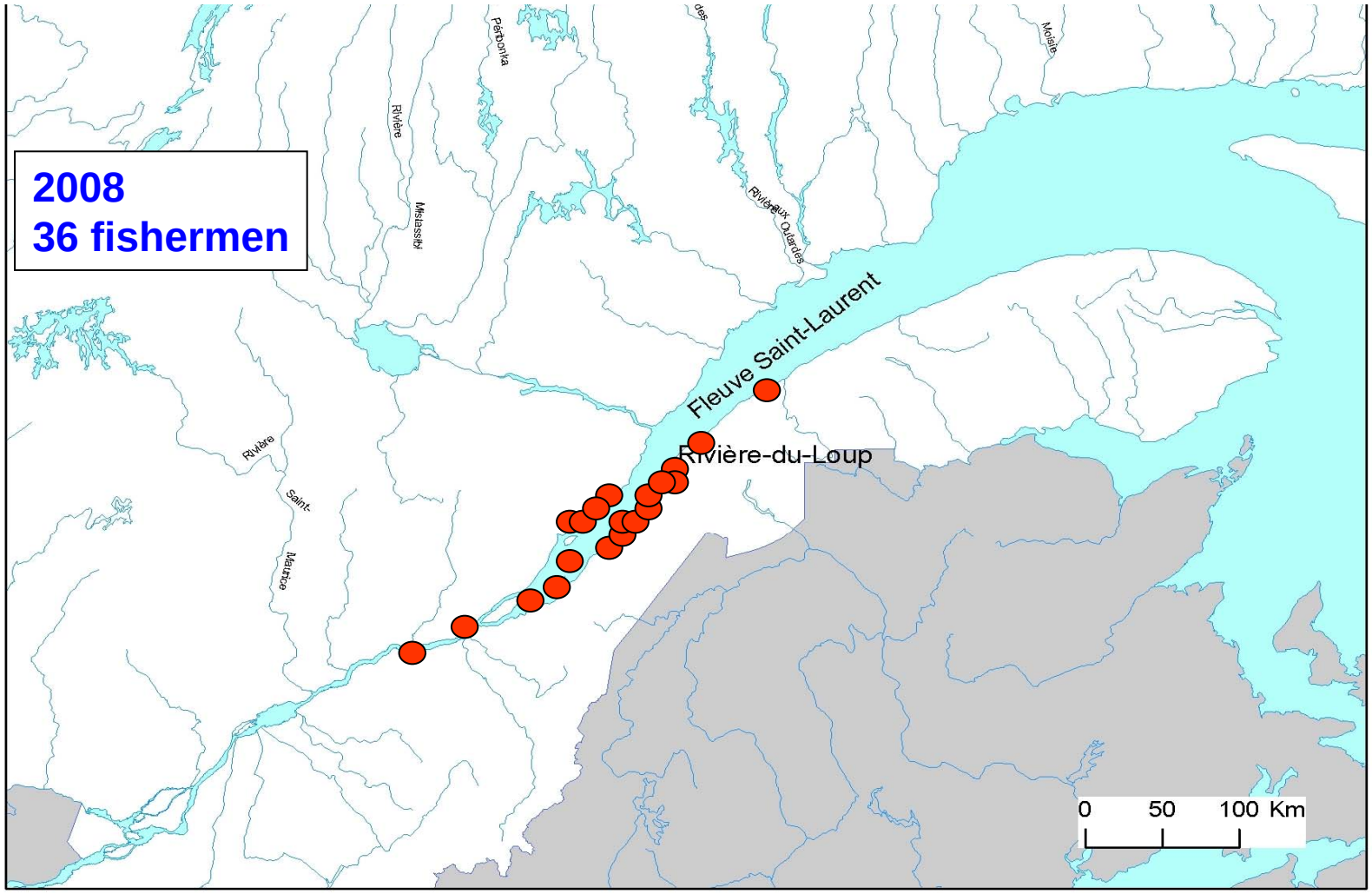
Ressources naturelles et Faune
Québec

Early Detection Network implementation



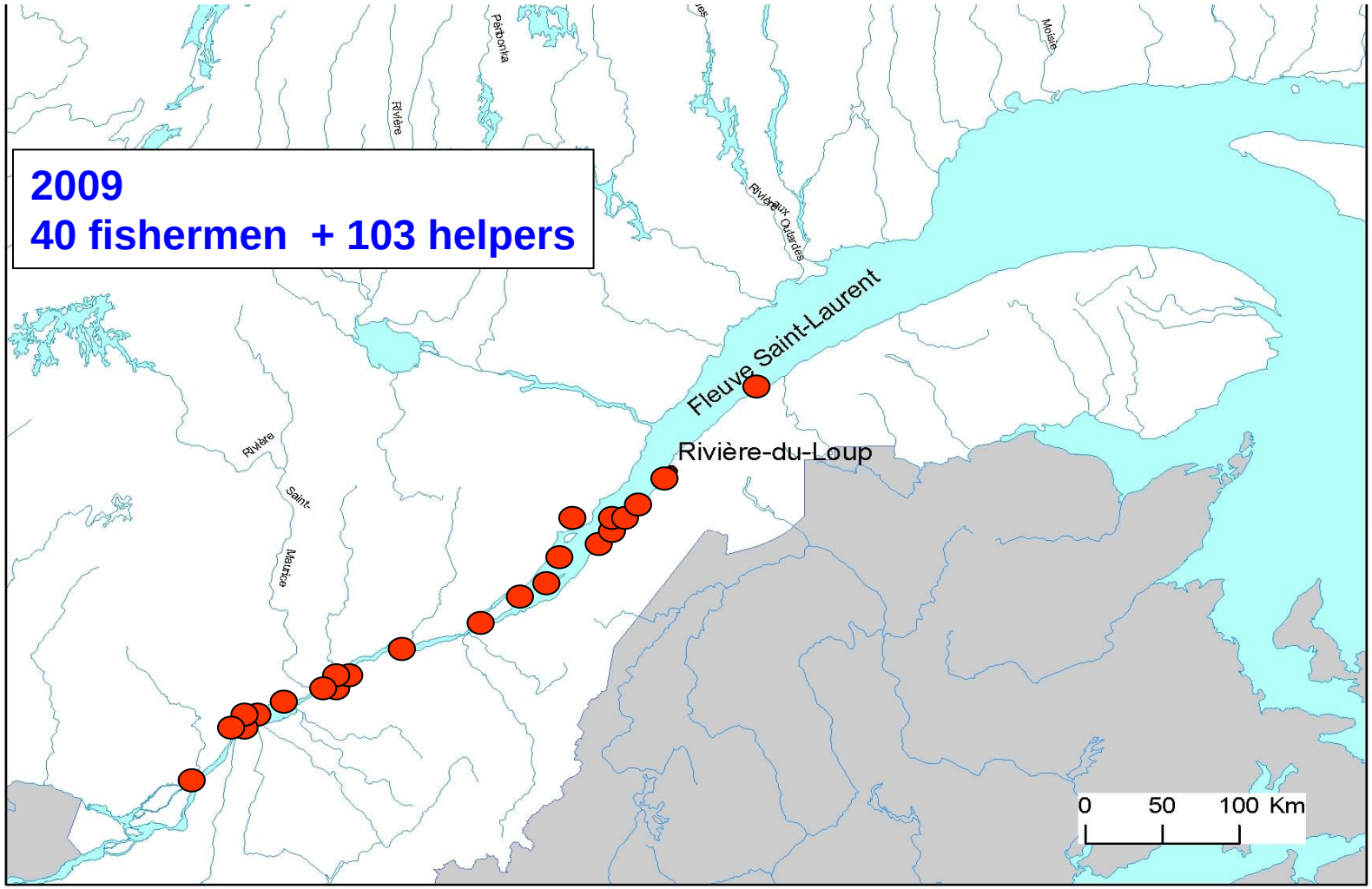
Ressources naturelles et Faune
Québec

Early Detection Network implementation



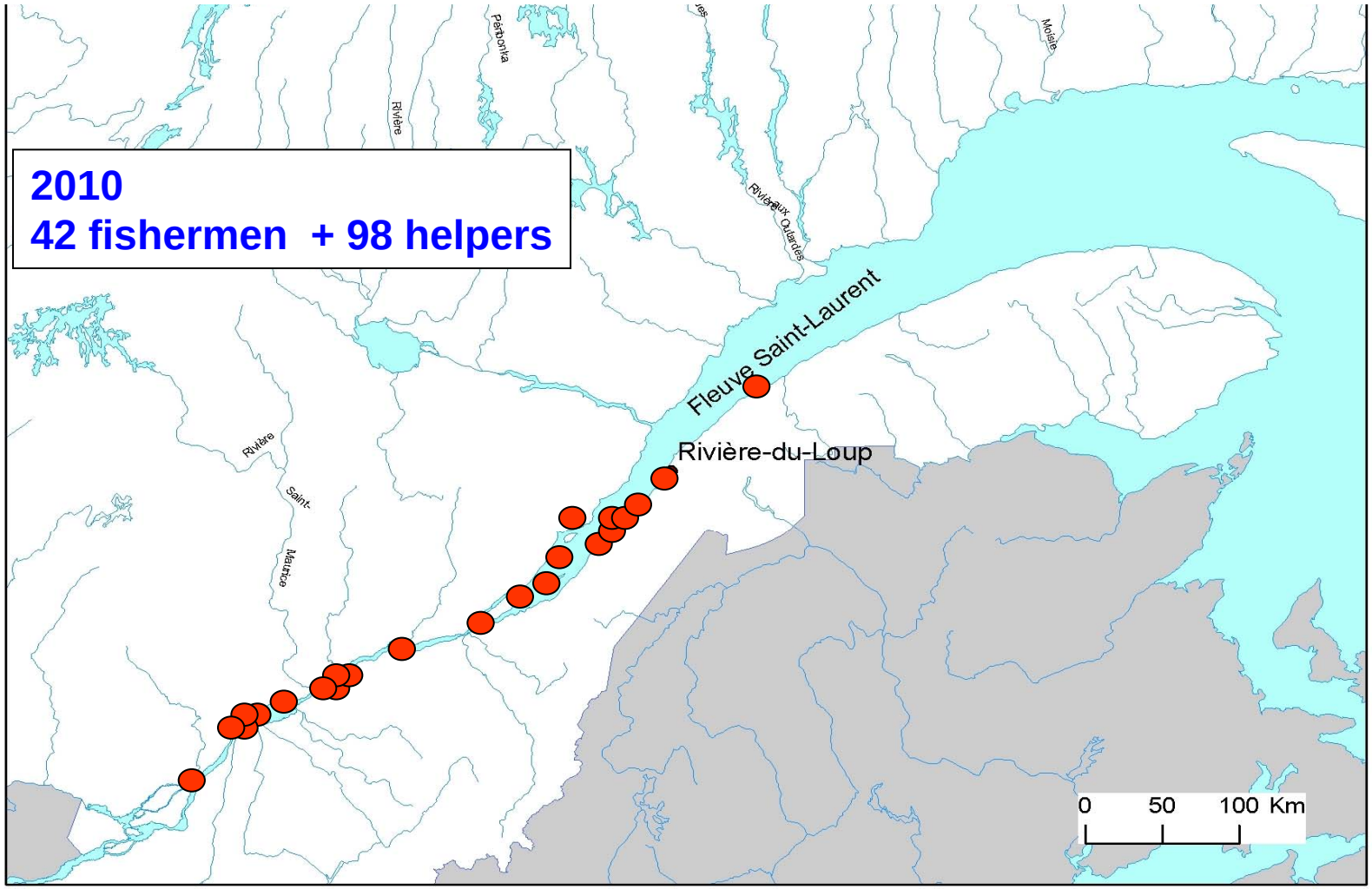
Ressources naturelles et Faune
Québec

Early Detection Network implementation



Ressources naturelles et Faune
Québec

Early Detection Network implementation



Ressources naturelles et Faune
Québec

Results

- **5 000 fishing gear visits annually by fishermen enrolled in the network,**
- **Approx. 2 500 000 fish caught by index fishermen,**
- **64 fish species caught and identified in the study area,**
- **483 fish and crustaceans (suspected IAAS) reported and brought back in our lab,**
- **165 non native fish and crustaceans,**
- **4 Native Range Expansion Species,**
- **3 Invasive Alien Aquatic Species.**

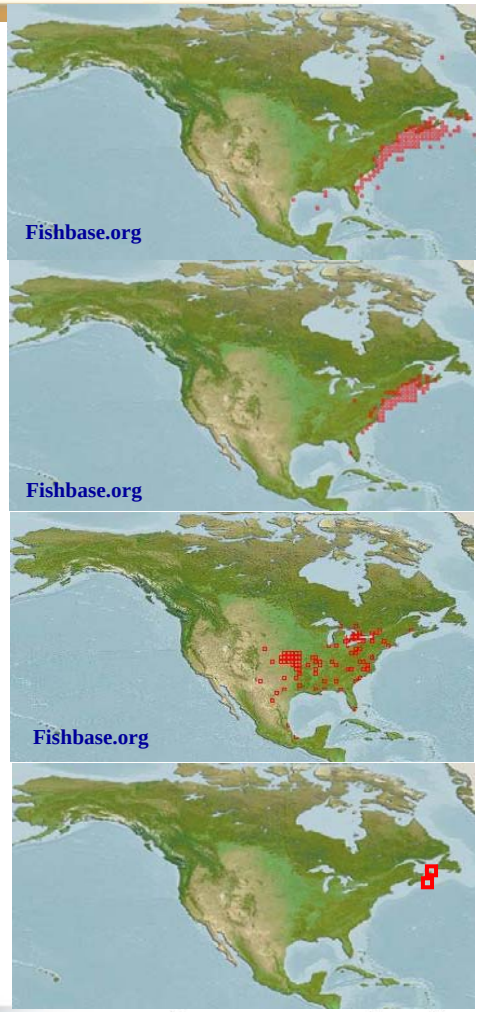
Round Goby

(Neogobius melanostomus)

Ressources naturelles et Faune Québec

Results

- **4 Native Range Expansion Species**
  - **Atlantic butterfish (*Peprilus triacanthus*),**
  - **Blueback Herring (*Alosa aestivalis*),**
  - **Gizzard Shad (*Dorosoma cepedianum*)**
  - **Atlantic Saury (*Scomberesox saurus*)**



Ressources naturelles et Faune
Québec

Results

- **3 Invasive Alien Aquatic Species**

  - **Round Goby (*Neogobius melanostomus*),**

  - **European Tench (*Tinca tinca*),**

  - **Chinese Mitten Crab (*Eriocheir sinensis*).**

Ressources naturelles et Faune Québec

Discussion

- **Evaluation,**
  - **Efficiency,**
  - **Cost,**
  - **Support & Training,**
  - **Usefulness.**

Gizzard shad (*Dorosoma cepedianum*)

Ressources naturelles et Faune
Québec

Discussion - Efficiency

- **Fishermen are very efficient identifying IAAS...and uncommon fish species,**
- **Nearly 100% detection for IAAS,**
- **Low gear selectivity for eel weir and hoopnets. Gillnets highly selective for large fish,**
- **Various fish habitats sampled,**
- **Protocol well known and applied.**

Ressources naturelles et Faune Québec

Discussion - Cost

- **EDN implementation, support and control (first 3 years) : $50 000 CAD/year,**
- **~150 fishermen + helpers involved,**
- **>2 500 000 fish sampled and controlled,**
- **EDN support and lab work (2010): $25 000 CAD/year,**
- **One cent/fish sampled.**

Atlantic Butterfish

(Peprilus triacanthus)

Ressources naturelles et Faune Québec

Discussion - Support & training

- **Support and training were essential during EDN implementation,**
- **Fishermen need two consecutive years of training to become efficient,**
- **Reporting rates for IAAS is correlated with training and support effort.**

Chinese Mitten Crab

(Eriocheir sinensis)

Training period (in 2009)	3 years	1 year
Fishermen + Helpers (n)	65	78
IAAS + NRES reported (n)	21	5
Uncommon species reported (n)	25	0

Ressources naturelles et Faune Québec

Discussion - Support & training

- **In 2010 (4 years after implementation…) difference tends to decrease.**

Atlantic Saury
(Scomberesox saurus)

Training period (in 2010)	4 years	2 years
Fishermen + Helpers (n)	65	78
IAAS + NRES reported (n)	5	28
Uncommon species reported (n)	84	17

Discussion - Usefulness

- **Fishermen-based EDN is an important tool in global IAAS strategy,**
- **Their *sampling effort* is important,**
- **Their spatial distribution covers many fish habitats,**
- **Low effort by government agencies is rewarded by high involvement by fishermen community.**

European Tench

(*Tinca tinca*)

Ressources naturelles et Faune Québec

Conclusion

- **Early detection for Alien Aquatic Species through a commercial fisherman Network was very effective in the St. Lawrence River and Estuary,**
- **EDN is cost-effective and efficient for detecting IAAS,**
- **Annual investment for control & support is low but essential,**
- **EDN is relevant in order to detect implement rapid action on IAAS.**

Ressources naturelles et Faune
Québec

Acknowledgments

The project was led by MRNF with the support of the following:

- **Fishermen associations in the St. Lawrence River and Estuary,**
- **Environment Canada Invasive Alien Species Partnership Program,**
- **Fisheries and Oceans Canada,**
- **Quebec Aquarium,**
- **St. Lawrence Estuary South Shore priority Intervention Zone Committee,**
- **Environment Canada / St. Lawrence Center.**

Ressources naturelles et Faune
Québec


Merci!
Thank you for listening.
Photo: Pierre Pettigrew