

Fundy Salmon Recovery: An Innovative Collaboration Turning the Tide in Wild Atlantic Salmon Restoration

Kurt M. Samways*, Corey Clarke, Tim Robinson, Matthew Ingersoll, and Betty House



Hatching Plans: The Future of Fisheries Enhancement Programs - Sub-theme

International Year of the Salmon Synthesis Symposium, Vancouver, NB

Oct. 4 - 6, 2022



Integrate

Collaborate

Adapt



FUNDY
SALMON
RECOVERY



Integrate

Collaborate

Adapt



Parks
Canada

Parcs
Canada



Fisheries and Oceans
Canada

Pêches et Océans
Canada



Law Enforcement
Coalition



TARGET POACHING | **CIBLONS le BRACONNAGE**
24/7 1 800 222-TIPS (8477)



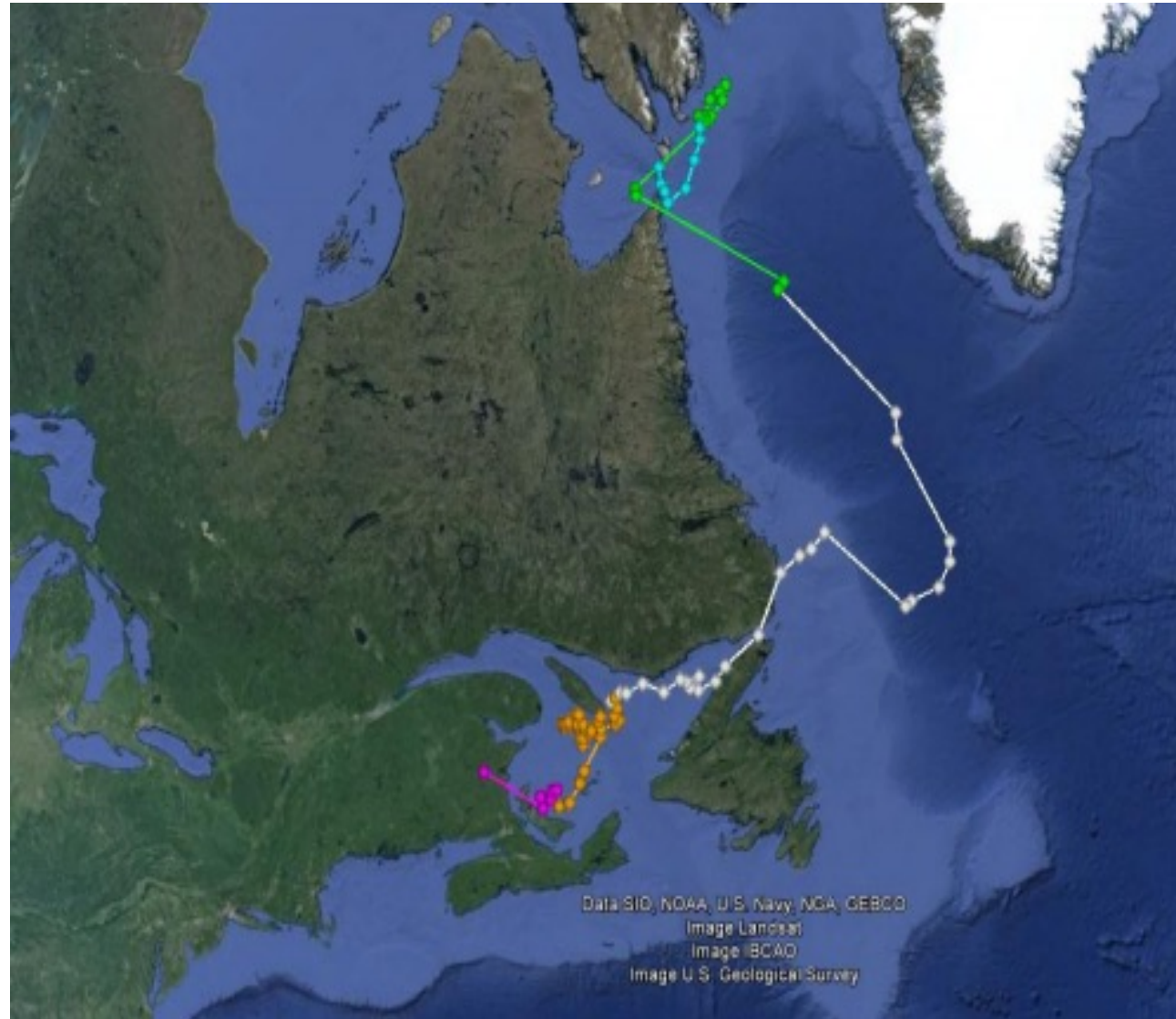
acffa

Atlantic Canada
Fish Farmers Association



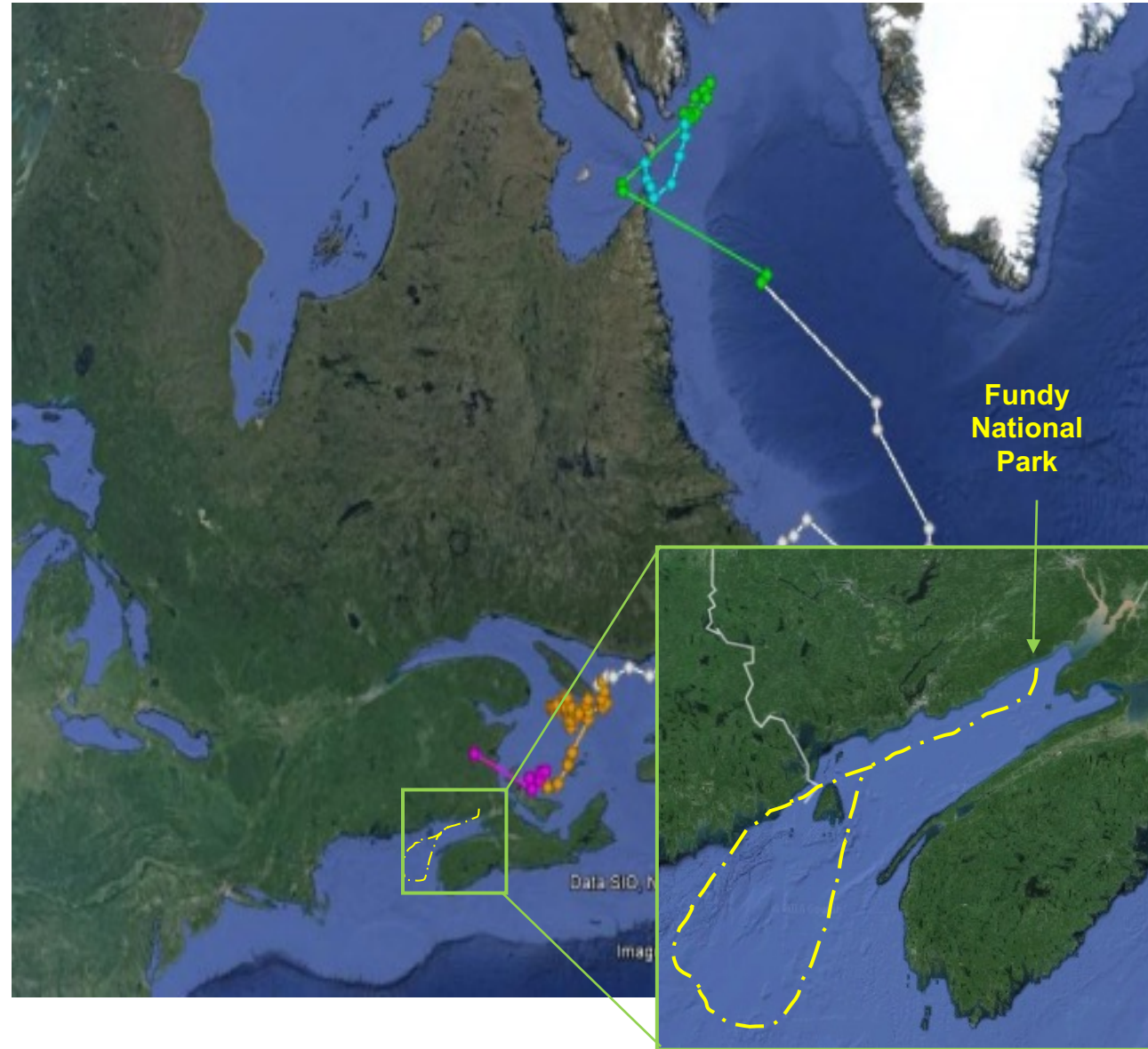
What are Inner Bay of Fundy Atlantic Salmon?

- Typical migration to North Atlantic
- Significant multi-seawinter component



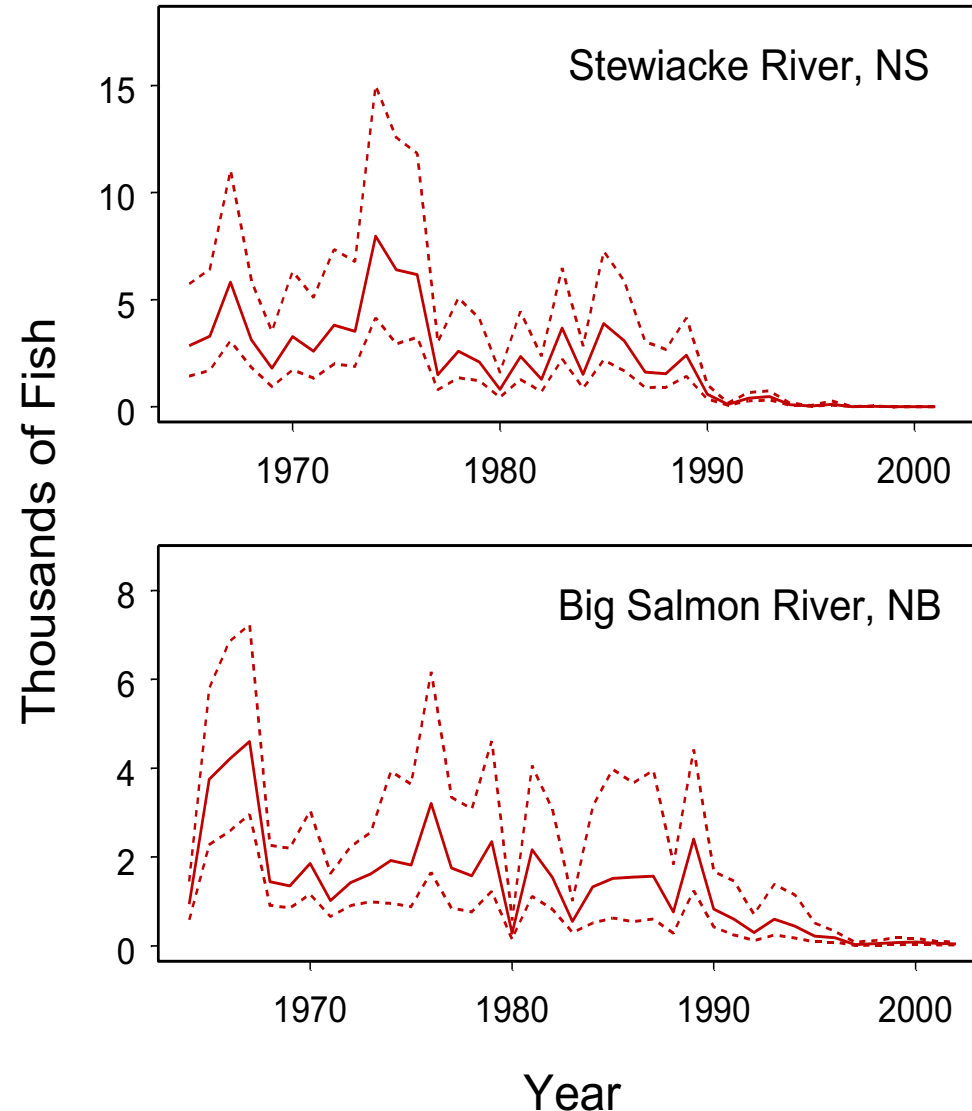
What are Inner Bay of Fundy Atlantic Salmon?

- IBoF spawn exclusively in inner Bay of Fundy
- Migrate in Bay of Fundy and Gulf of Maine
- Majority first seawinter spawners



Why are IBoF Salmon Endangered?

- Historic runs of 40k adult salmon in ~ 40 rivers now less than 200
- Listed as Endangered under Species at Risk Act (SARA) 2003
- Marine survival is most troublesome
- Most rivers are extirpated
- Live Gene Banking has avoided extinction although pop'n at critically low numbers



Live Gene Bank – Salmon Life Support

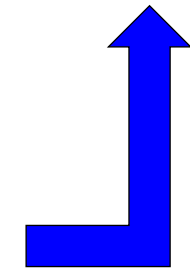
- Began in the late 90's
- Live Gene Banking avoids extirpation
- Population fails to recover



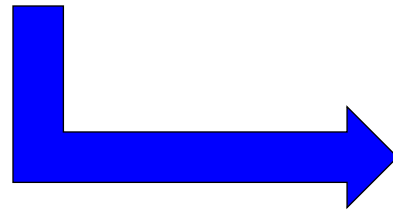
Collect remnant
wild fish as
Smolts



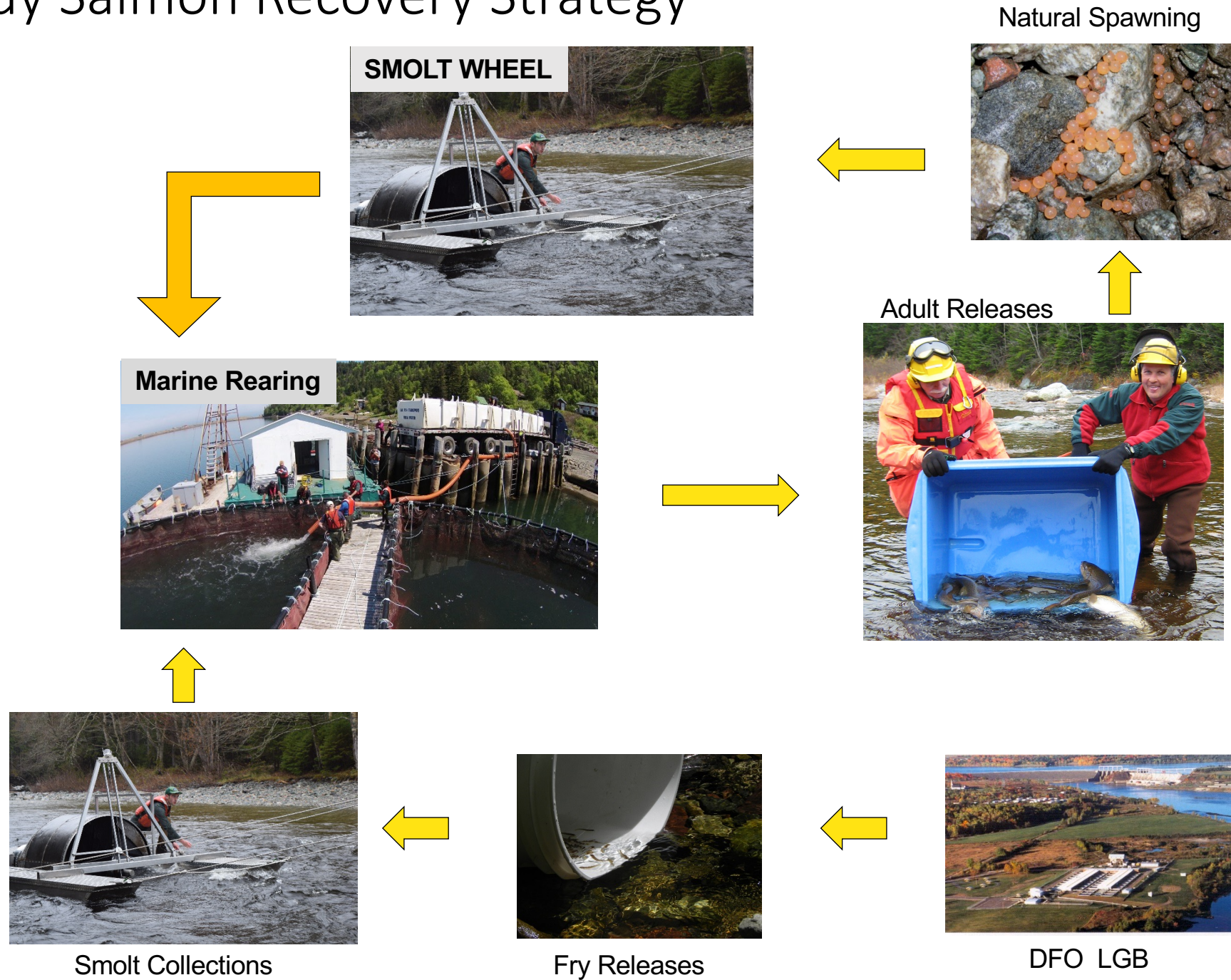
Fisheries and Oceans Hatchery
Captive Rearing



3 Release
Strategies

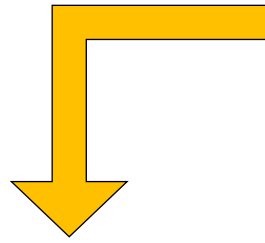


Fundy Salmon Recovery Strategy

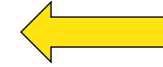


Fundy Salmon Recovery Strategy

- 2023 onward:
- Only wild hatch smolt



Natural Spawning



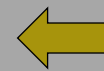
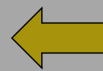
Adult Releases



Smolt Collections



Fry Releases



DFO LGB

Dark Harbour, Grand Manan NB

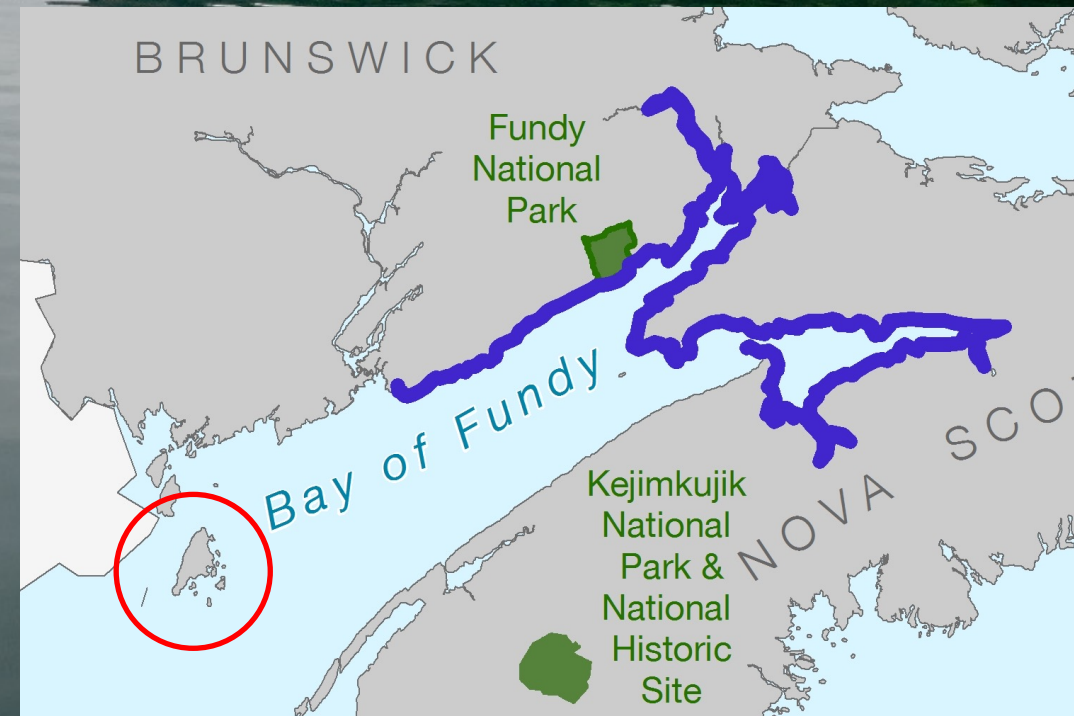
Worlds First Dedicated Marine Conservation Farm

Smolt grown to maturity in marine environment

Released as adults to native rivers



Village of
Grand Manan
New Brunswick, Canada



Fundy National Park Adult Salmon Releases



2015: 426* (mostly immature)

2016: 846

2017: 928

2018: 922

2019: 427

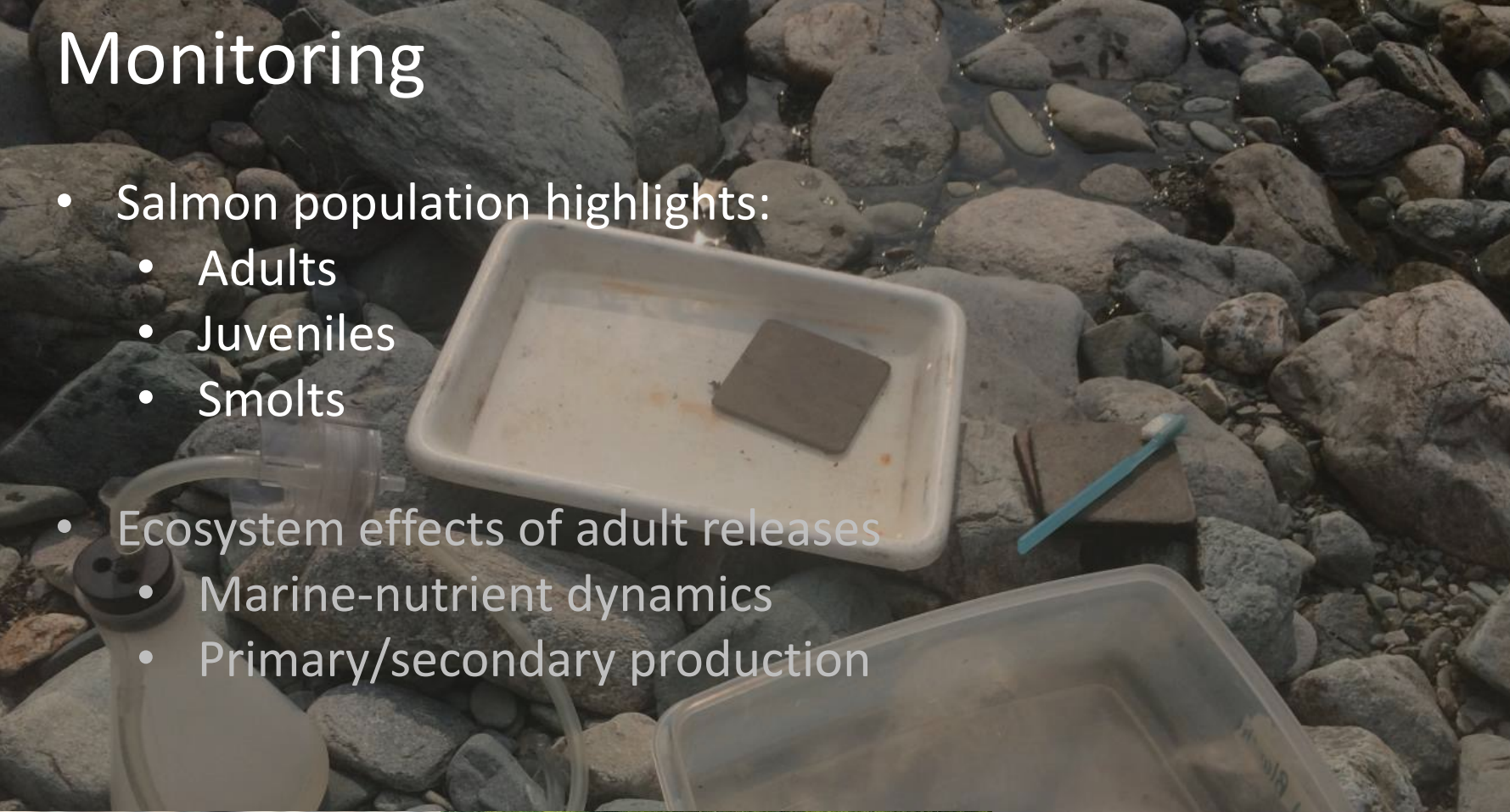
2020: 674 (both USR and PWR)

2021: 825

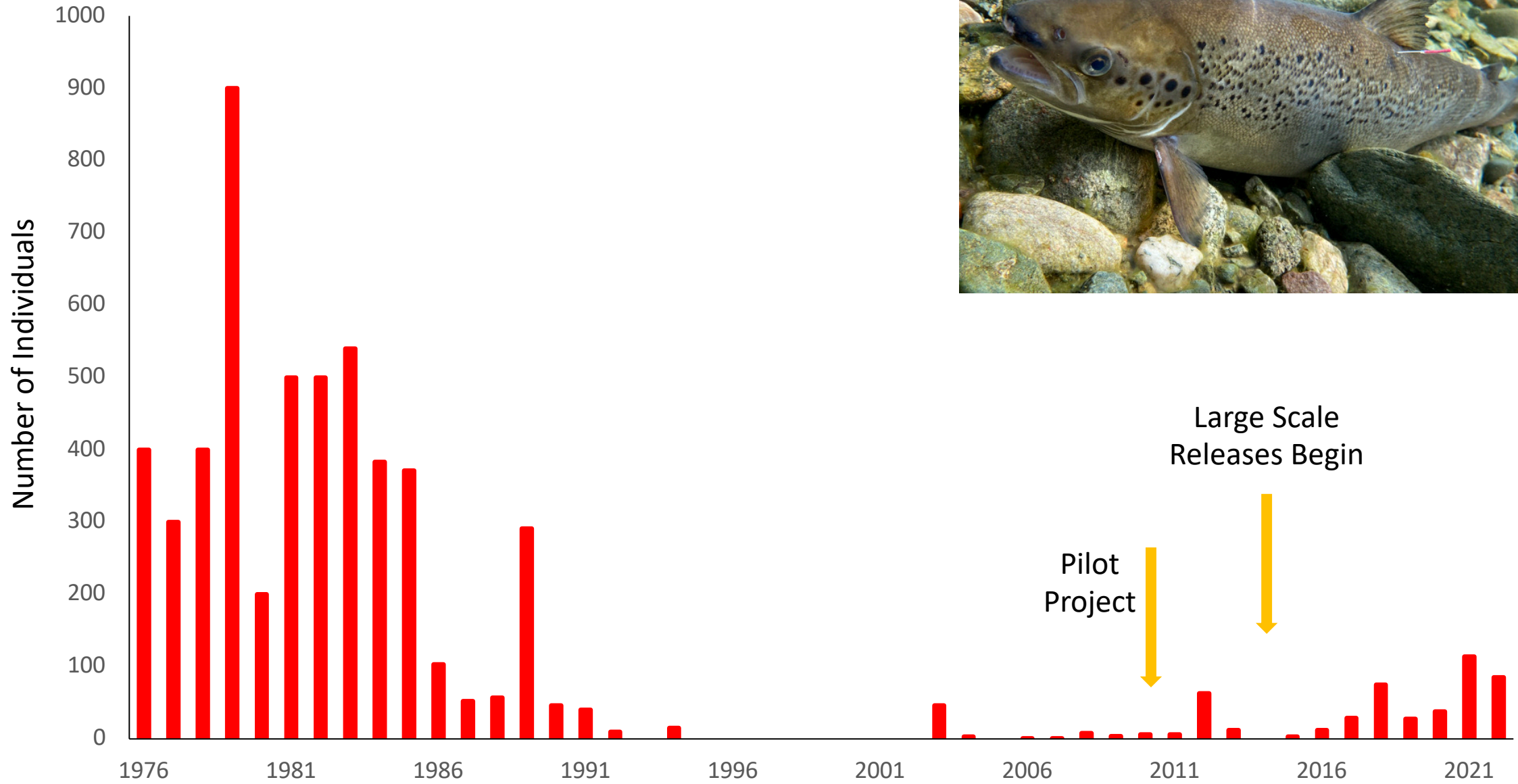
2022: 682 (projected)

Monitoring

- Salmon population highlights:
 - Adults
 - Juveniles
 - Smolts
- Ecosystem effects of adult releases
 - Marine-nutrient dynamics
 - Primary/secondary production



Adult Returns to Fundy National Park

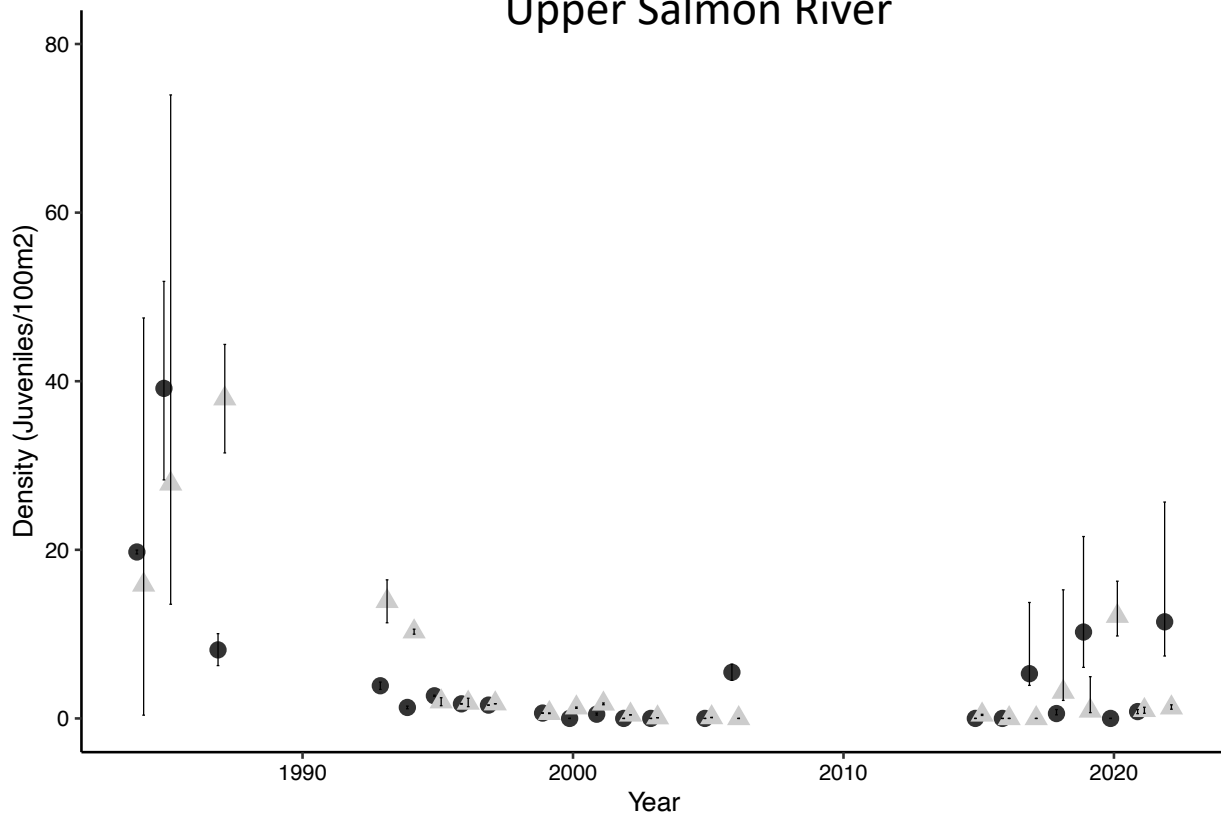


Juvenile Salmon Densities

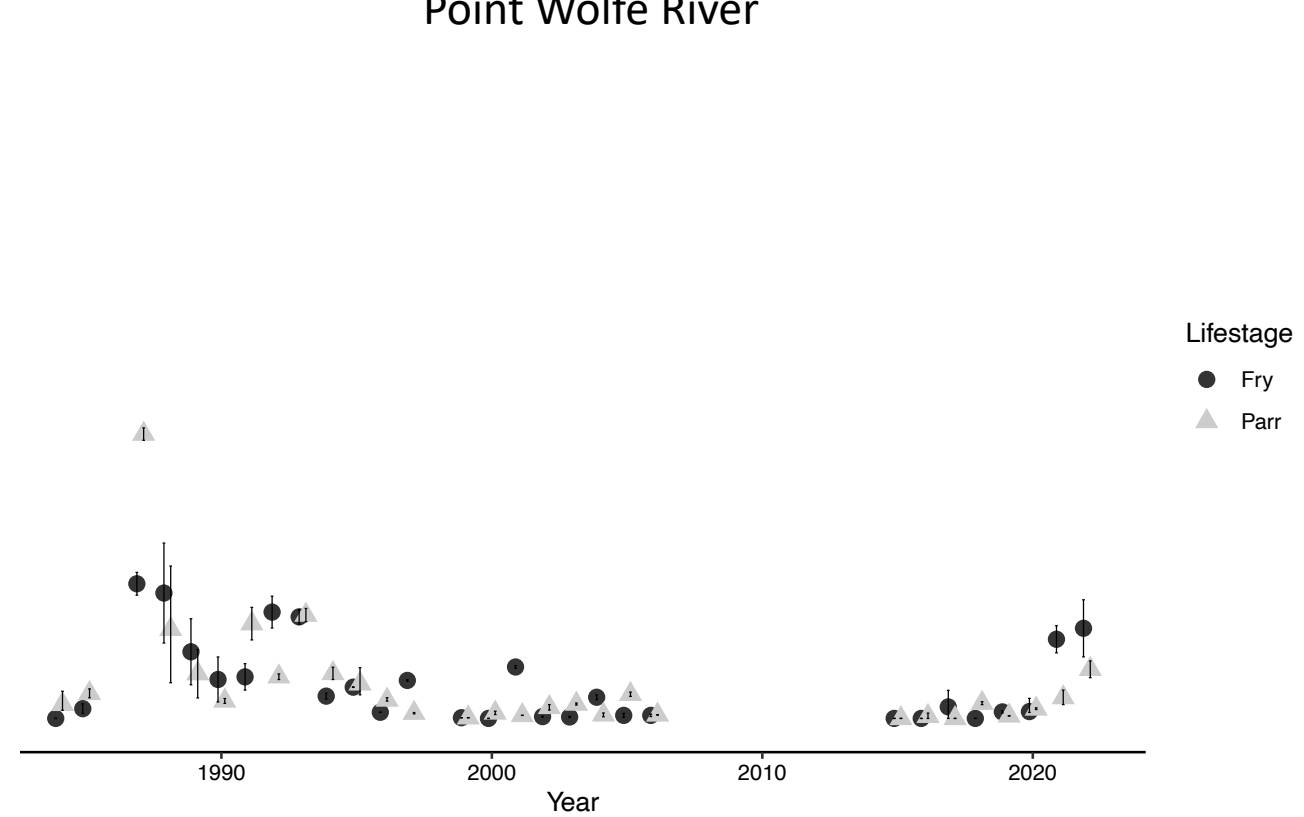
- **Only** iBoF river with exclusively wild hatched salmon



Upper Salmon River



Point Wolfe River

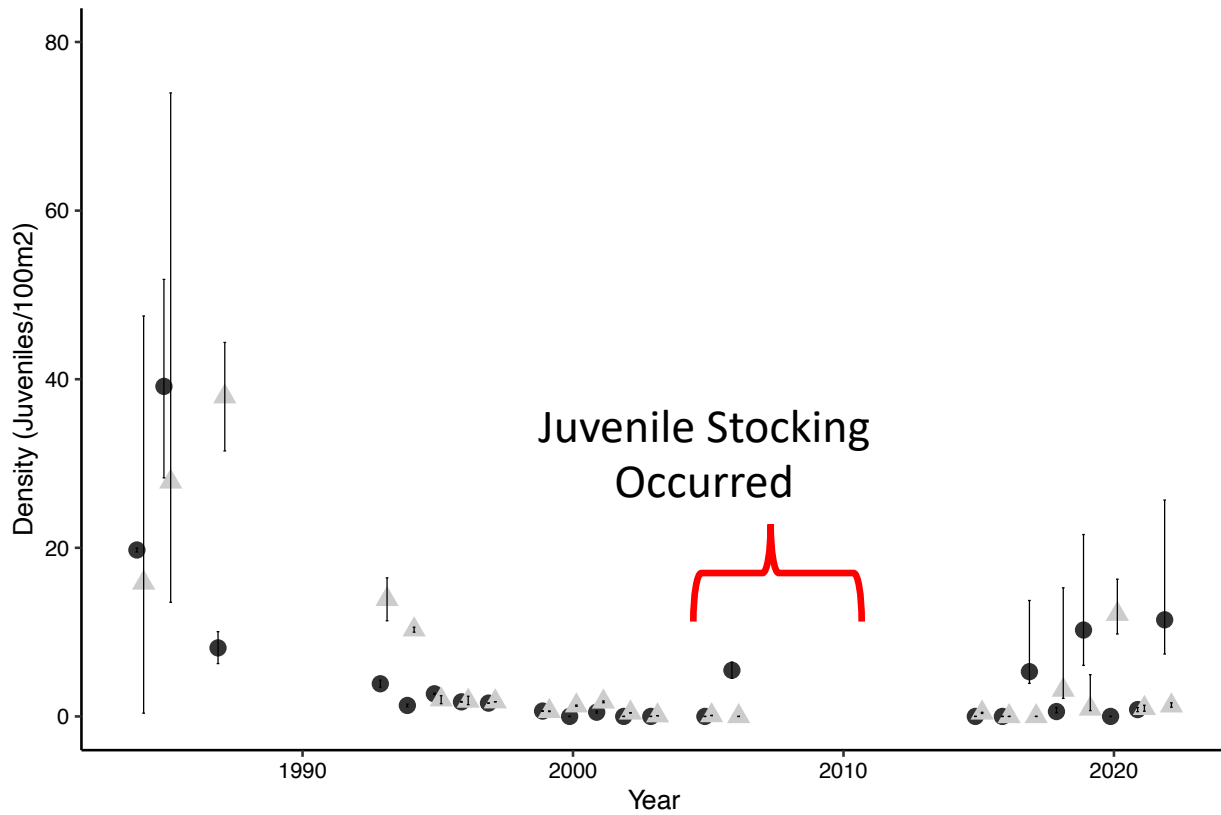


Juvenile Salmon Densities

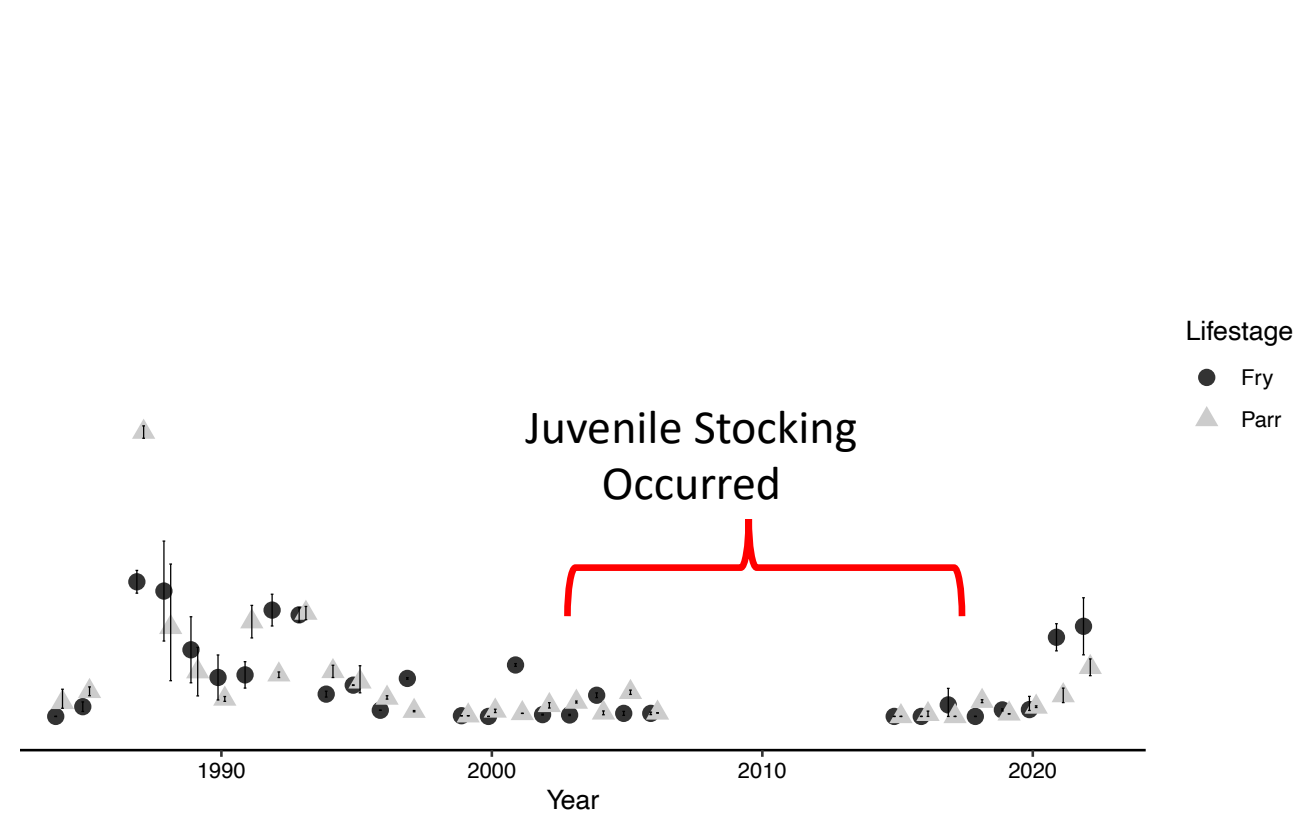
- **Only** iBoF river with exclusively wild hatched salmon



Fundy National Park Upper Salmon River Juvenile Salmon Density



Fundy National Park Point Wolfe River Juvenile Salmon Density

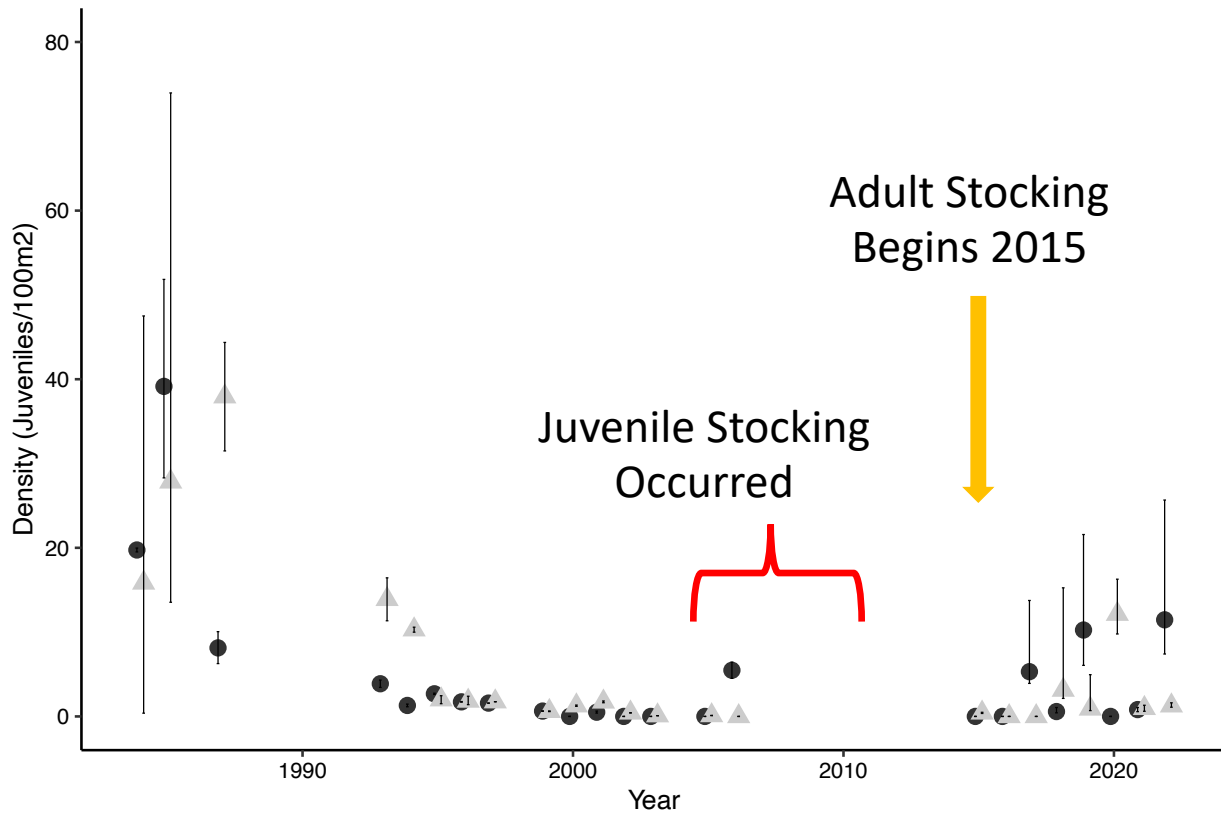


Juvenile Salmon Densities

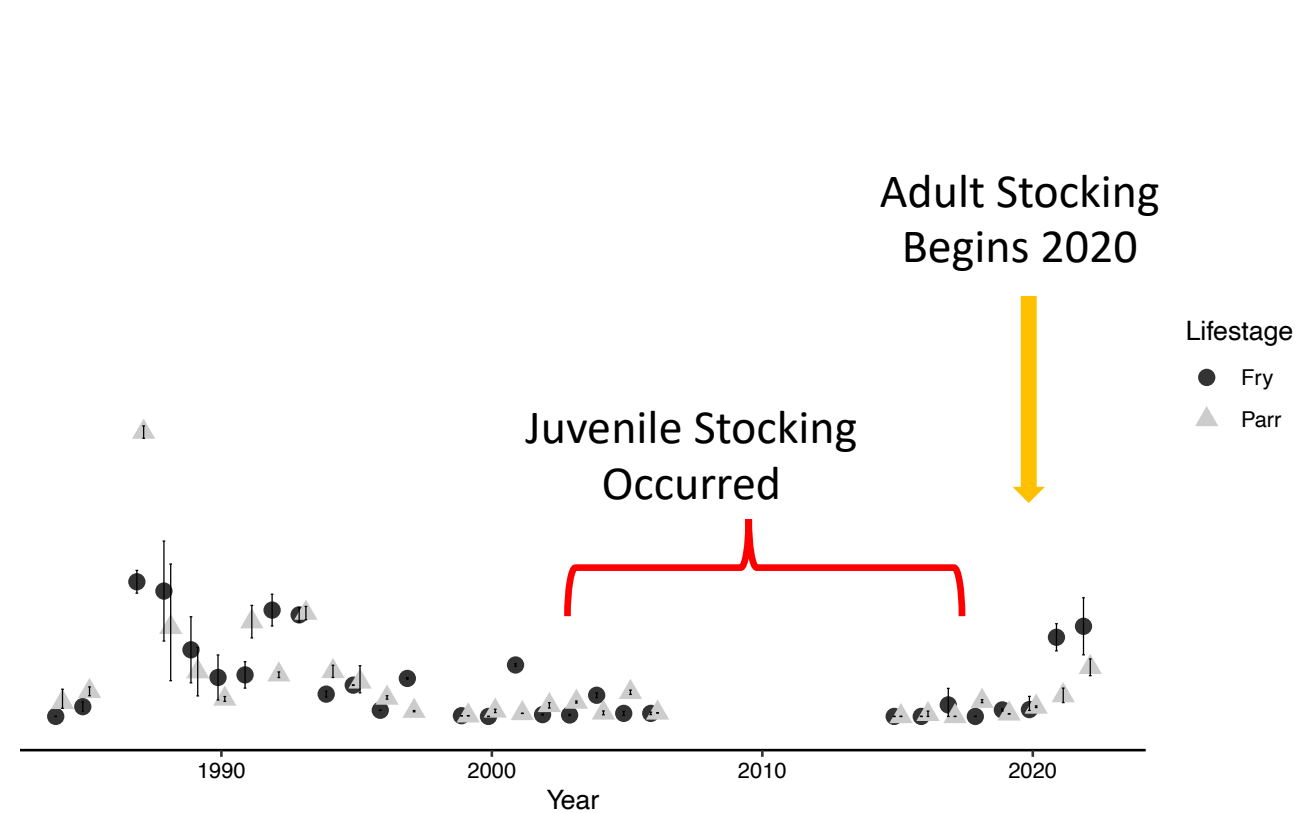
- **Only** iBoF river with exclusively wild hatched salmon



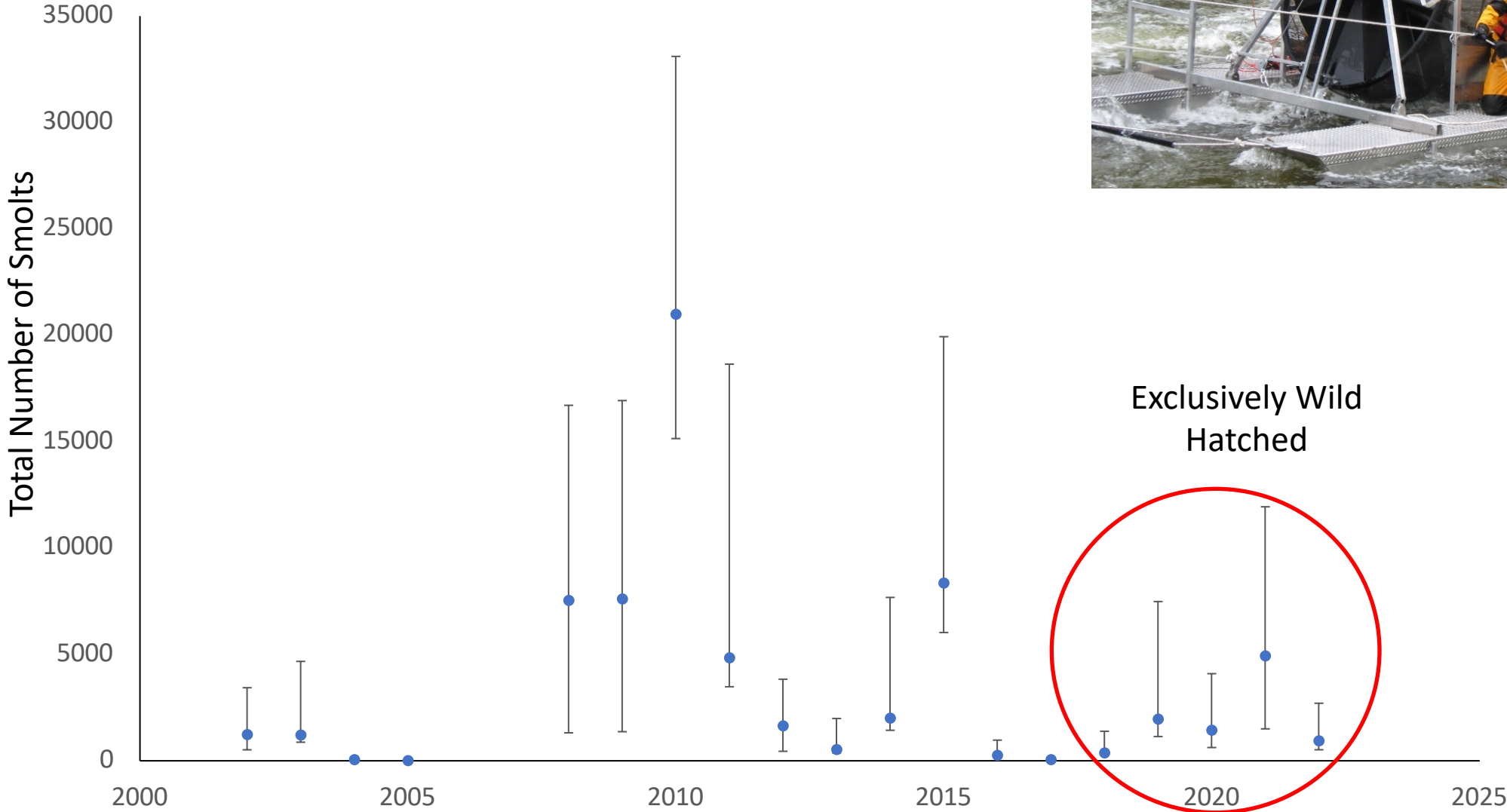
Fundy National Park Upper Salmon River Juvenile Salmon Density



Fundy National Park Point Wolfe River Juvenile Salmon Density

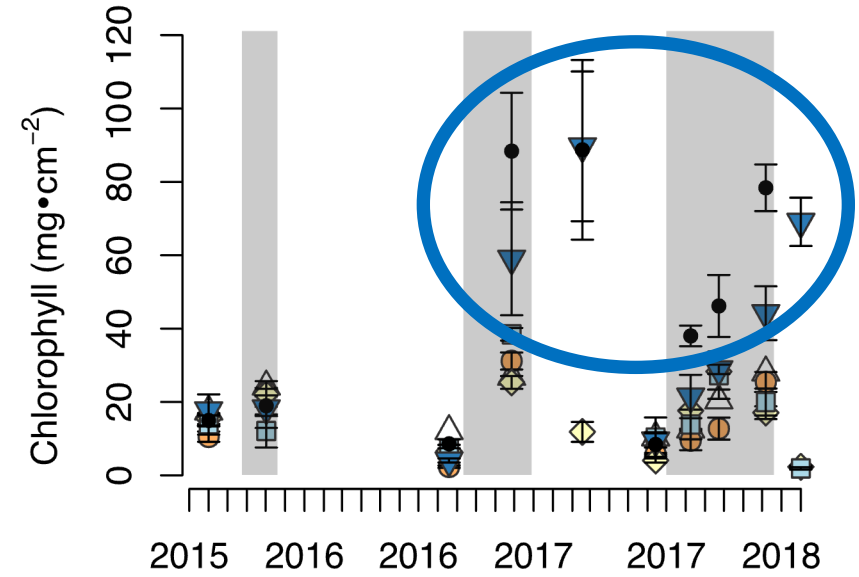


Smolt Abundances for Upper Salmon River

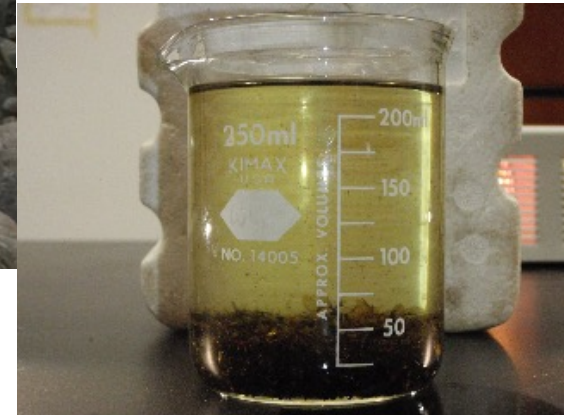
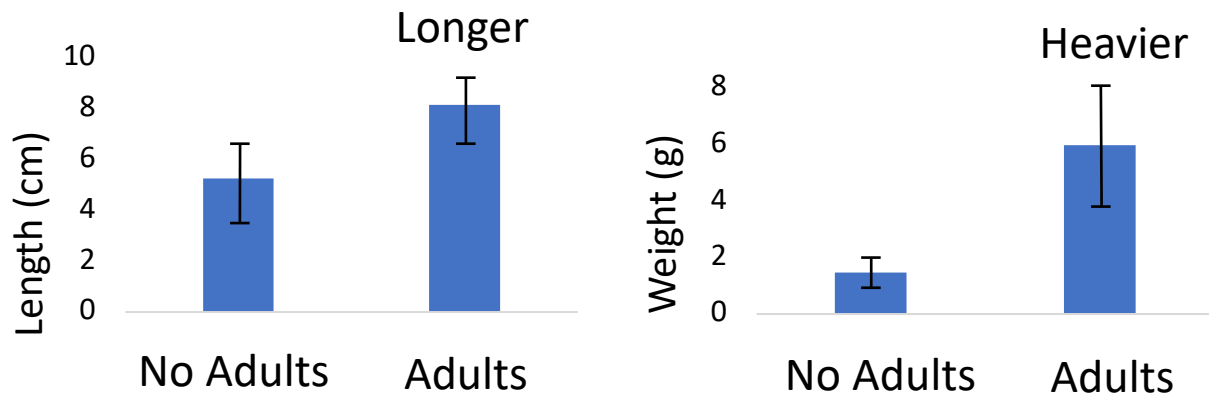


Monitoring

- Salmon population highlights:
 - Adults
 - Juveniles
 - Smolts
- Ecosystem effects of adult releases
 - Marine-nutrient dynamics
 - Primary/secondary production



Parr Size



Connecting People with Salmon



Spring:
Salmon Research Open House

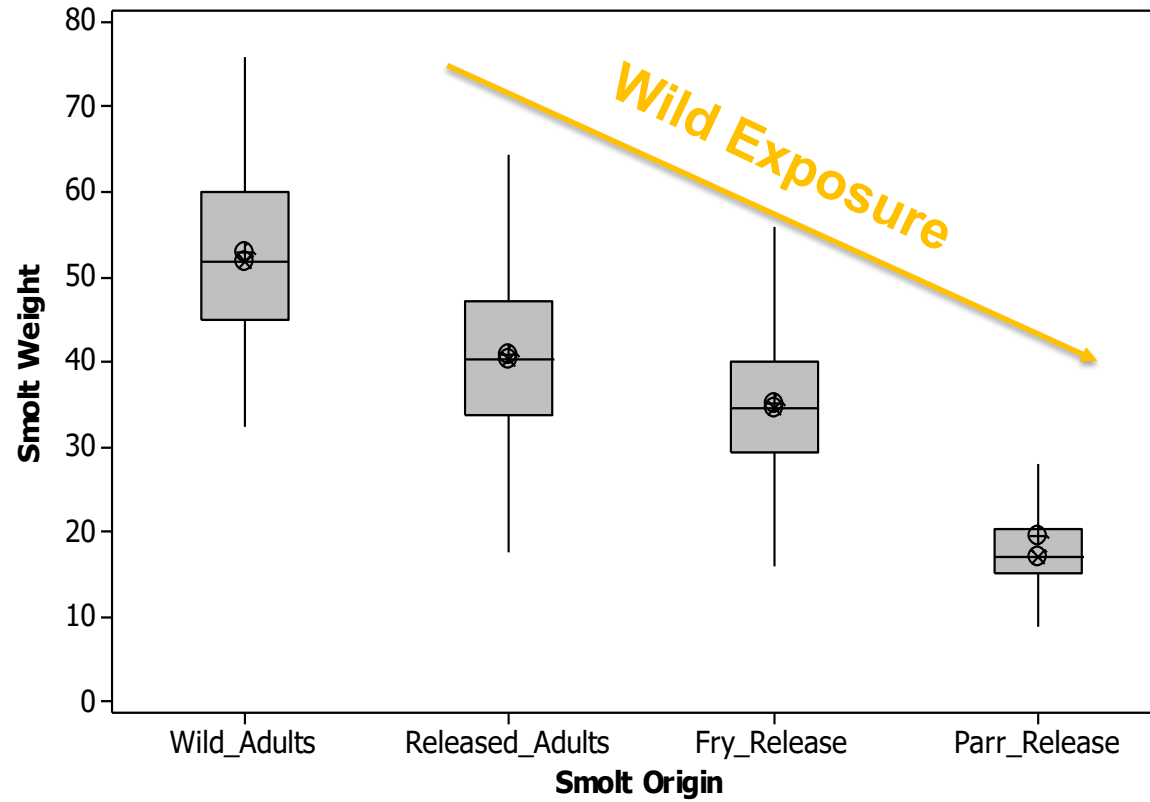
Summer:
Citizen Science Programming

Fall:
Swim with Salmon

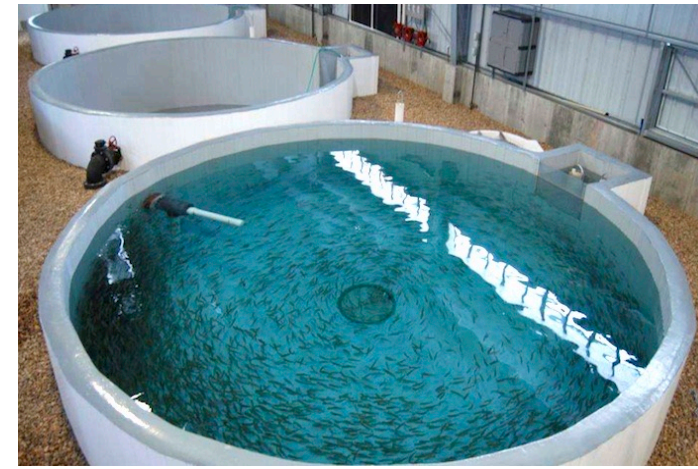
Good People Make Big Differences



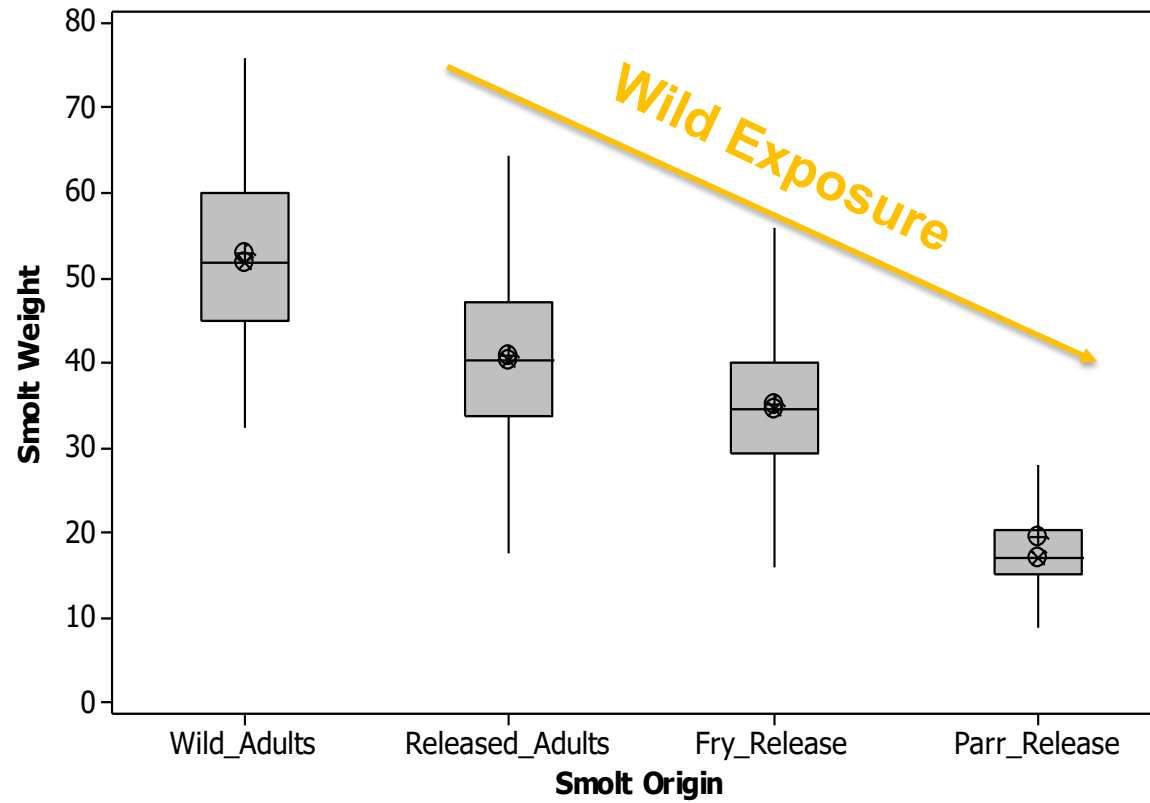
Importance of Early Exposure



Clarke et al. 2016



Importance of Early Exposure



Clarke et al. 2016

Less captivity = More wild fitness

Adult release = offspring with NO captive exposure



Parks
Canada

Parcs
Canada

With a mandate for Species at Risk recovery and connecting Canadians to nature, Fundy National Park has been passionately working in salmon conservation for decades. Fundy National Park's team of biologists work year round on salmon recovery operations and logistics. It was through their action that the collaboration of all expert partnering organizations came together to recover the King of Fish.





Fisheries and Oceans
Canada

Pêches et Océans
Canada

Operationally, the Live Gene Bank at the Mactaquac Biodiversity Facility is critical to preserving native genes of the endangered inner Bay of Fundy Atlantic salmon.



As the federal regulator, Fisheries and Oceans and the Species at Risk (SARA) are involved in permits for fish movements and oversee several aspects of the project. Fisheries and Oceans Canada is also a part of the inner Bay of Fundy Atlantic Salmon Law Enforcement Initiative.



Cooke Aquaculture, in partnership with the Atlantic Canada Fish Farmers Association, helped develop, and now equip, staff and manage the World's First Wild Atlantic Salmon Marine Conservation Farm on Grand Manan Island.





The Village of Grand Manan owns the Dark Harbour site where the Fundy Salmon Recovery conservation farm is located. The Village has granted use of the site to this project, making it possible for hundreds of endangered wild salmon to be grown each year.





The Atlantic Canada Fish Farmers Association (ACFFA) is an industry-funded association working on behalf of the salmon farming industry in Atlantic Canada. ACFFA plays an important project management and operational role in Fundy Salmon Recovery. Along with their work at Dark Harbour they coordinate logistics across a large and diverse group of partners.



Fort Folly First Nation's Habitat Recovery



Fort Folly First Nation's Habitat Recovery (FFHR) program was initiated in 1993 and its staff have been working passionately in Species at Risk conservation and recovery ever since. FFHR is the Fundy Salmon Recovery partner leading efforts to restore iBoF Atlantic salmon to the Petitcodiac River system, which historically produced 20% of the entire iBoF Atlantic salmon population.

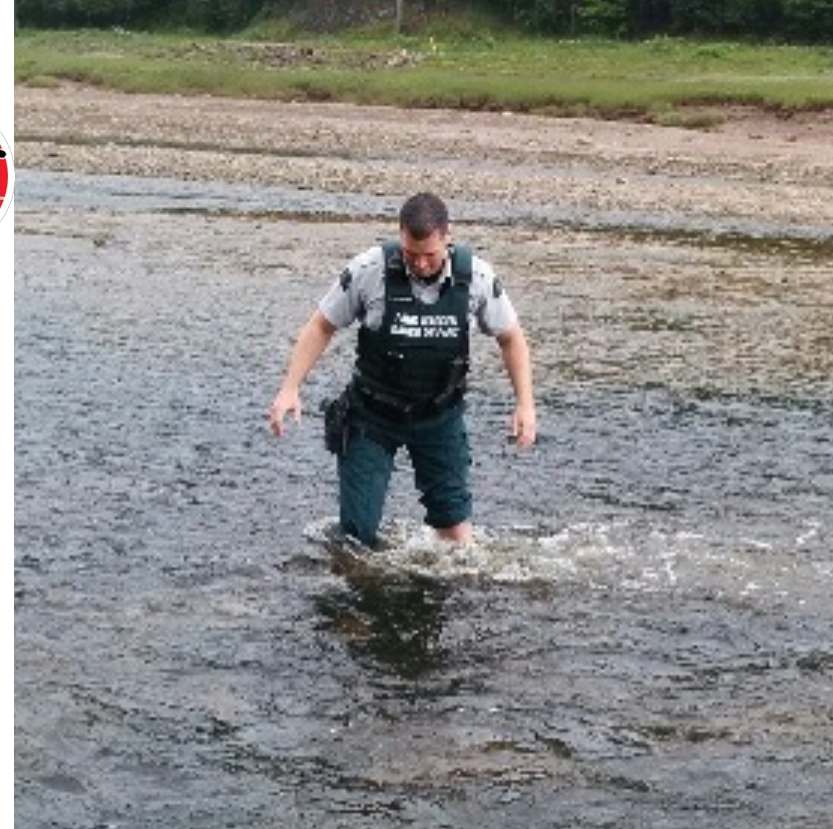
NB Department of Agriculture, Aquaculture and Fisheries

As the regulator of aquaculture activities in New Brunswick, the New Brunswick Department of Agriculture Aquaculture Fisheries oversees activities at the marine conservation farm at Dark Harbour, Grand Manan and is a lead in fish health management for the project.



Law Enforcement Coalition

Law Enforcement Coalition



- Parks Canada's Warden Service
- Fisheries and Oceans Canada
- RCMP and Crime Stoppers
- New Brunswick Department of Justice and Public Safety
- Environment Canada
- Crime Stoppers



University of New Brunswick

The University of New Brunswick and Canadian Rivers Institute researchers study the impacts returning salmon have on the river systems, as salmon populations are rebuilt. Research shows that salmon are an important contributor of marine nutrients in the rivers they spawn in which helps increase the productivity of aquatic vegetation and insects.

