

Six Rivers Iceland Atlantic Salmon Conservation

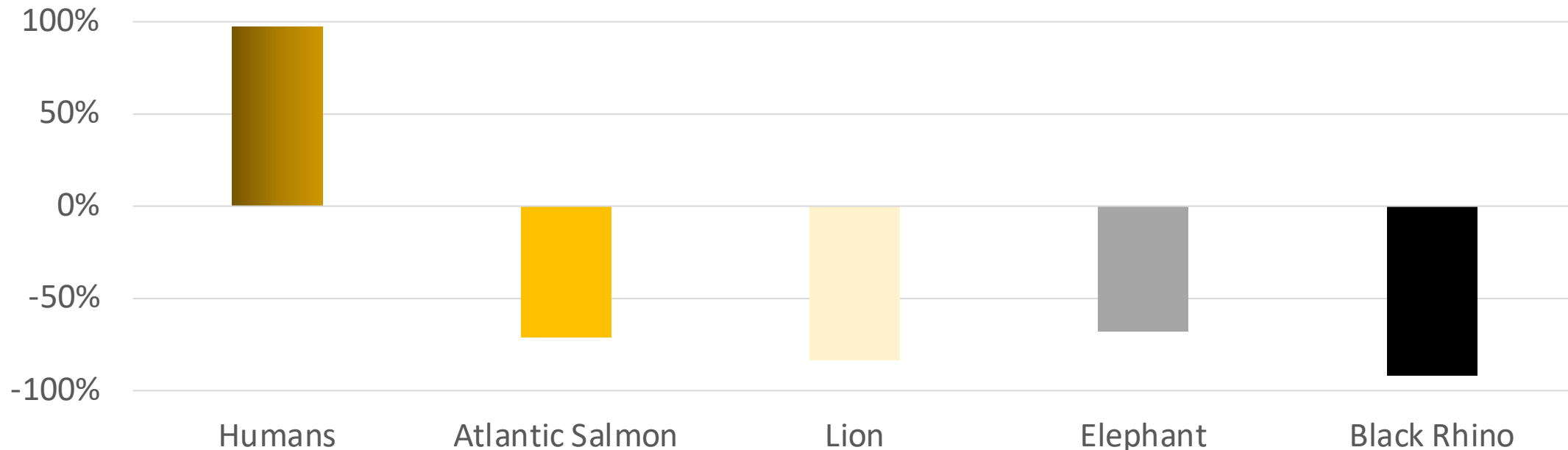
- Context
- Overview
- Summary Of Work To Date
- Discussion



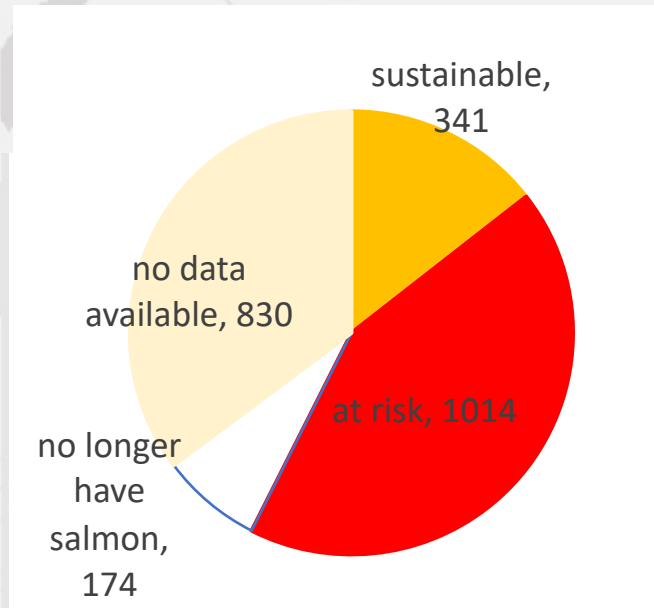
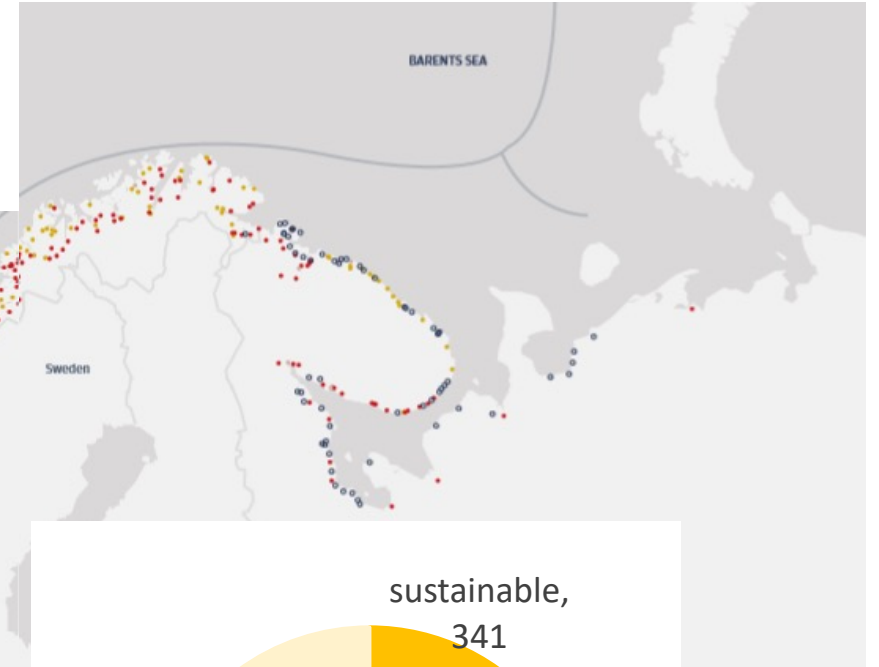
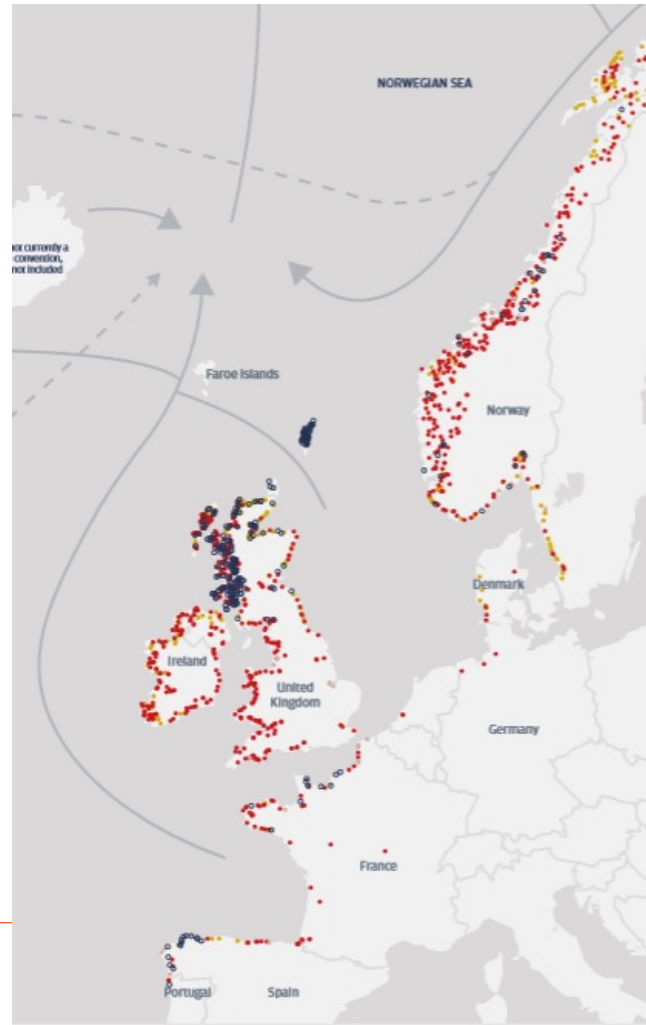
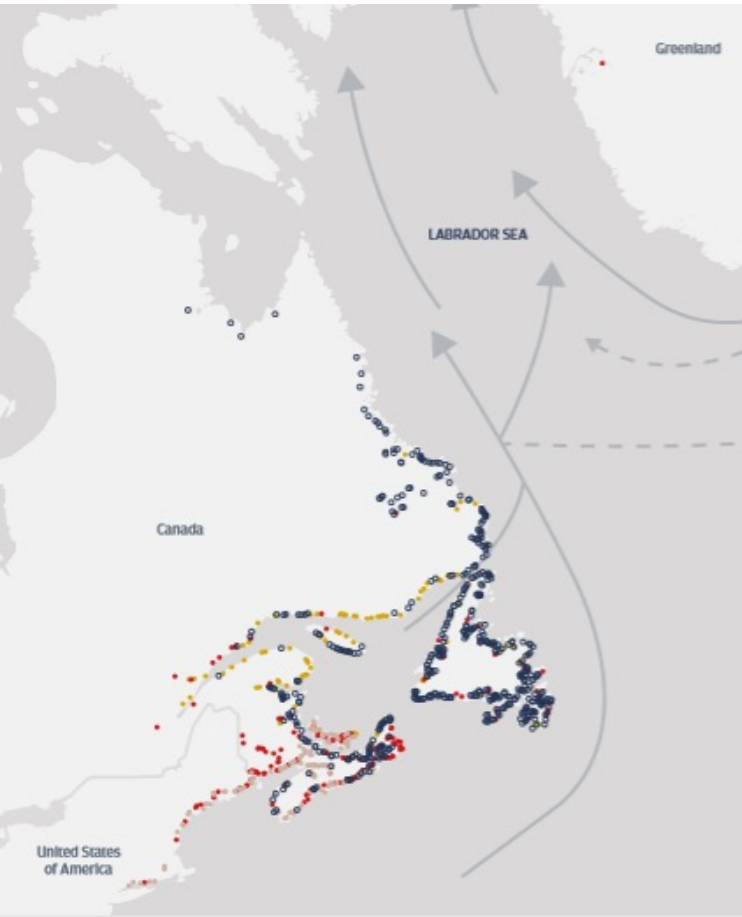
The River Sela

Evolution Of Selected Animal Populations

Changes In Population Of Selected Species
Between 1970 and 2015

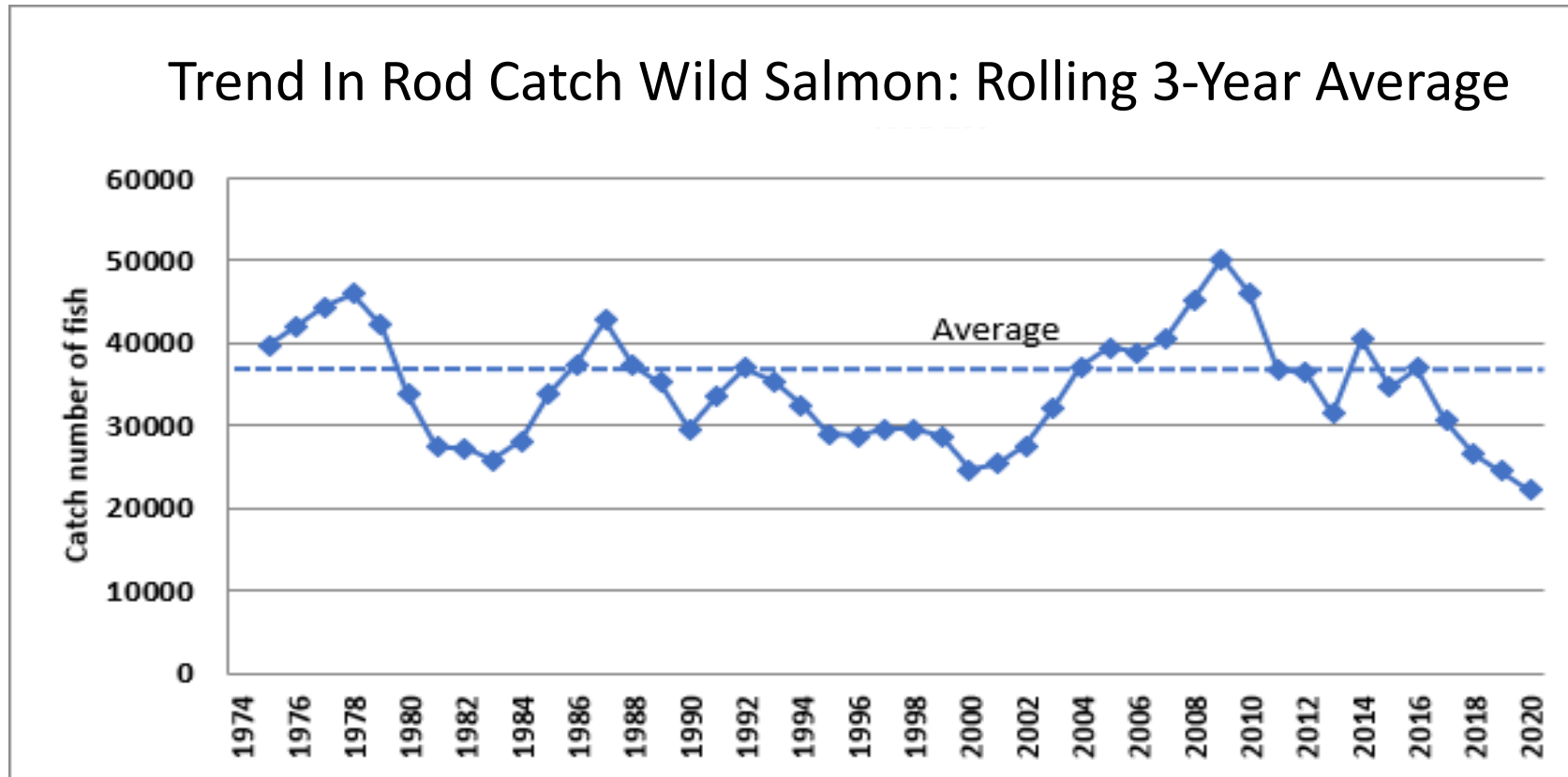


Status Of Atlantic Salmon Rivers



Context: North-East Iceland

Iceland: Trend In Rod Catch



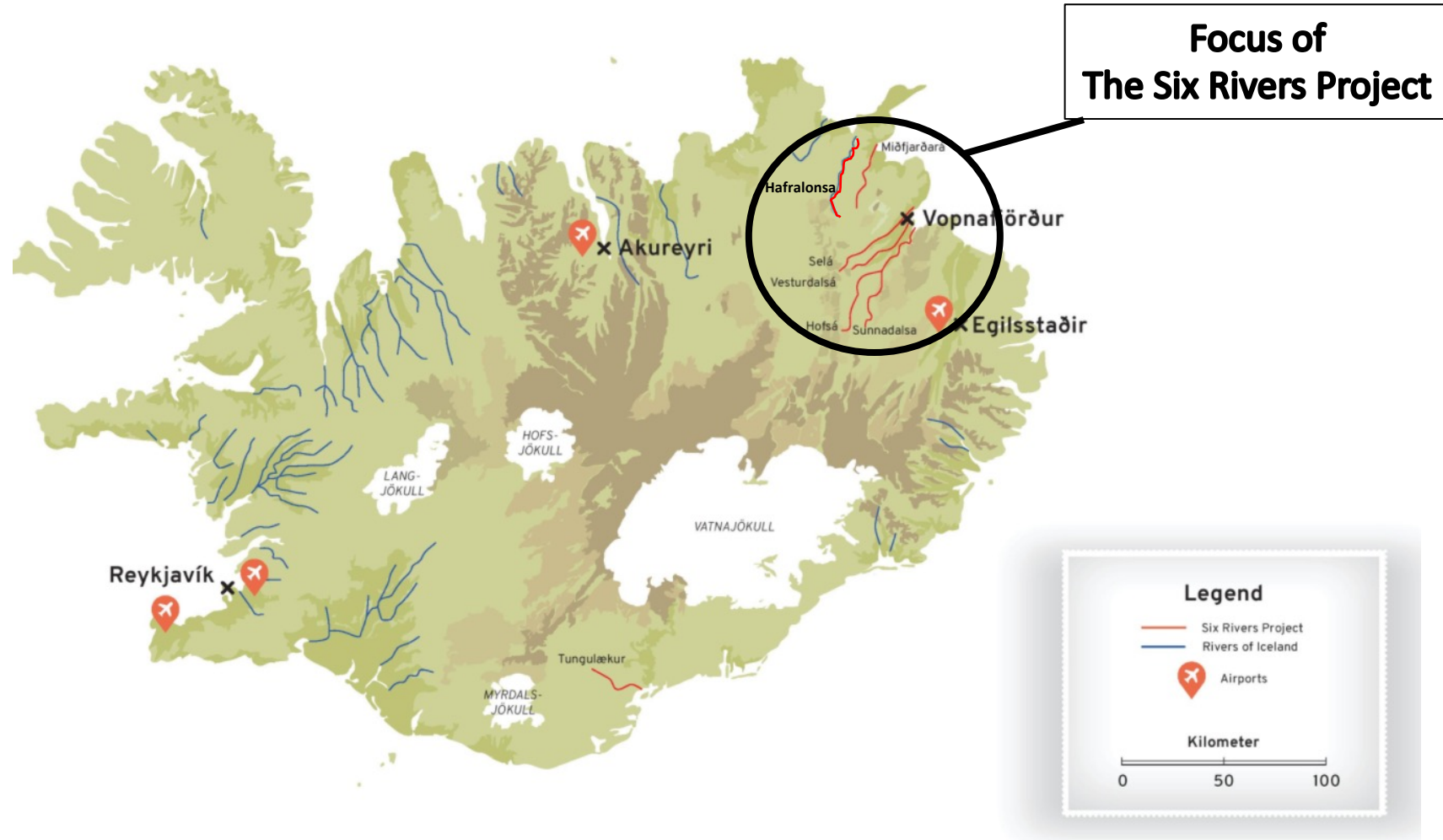
MFRI Data

Six Rivers Iceland

A not-for-profit organisation which reinvests all its funds into salmon research and the preservation and restoration of the salmon habitat

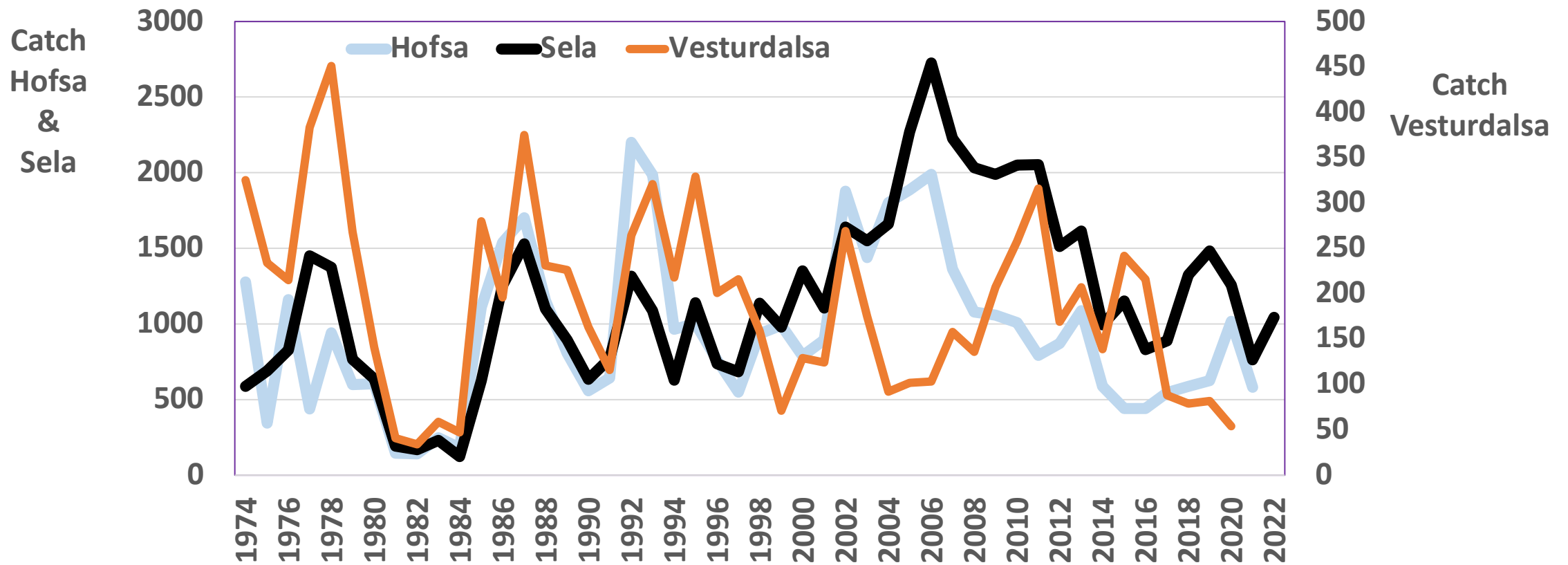
1. Holistic programme of conservation to support the Atlantic Salmon
2. Combining longer term scientific research and environmental restoration with immediate practical interventions.
3. Built on a common aim to leave river and land and salmon in better shape than we found it.
4. A sustainable model : all revenues from world class fishing re-invested into community and conservation.

The Six Rivers Iceland



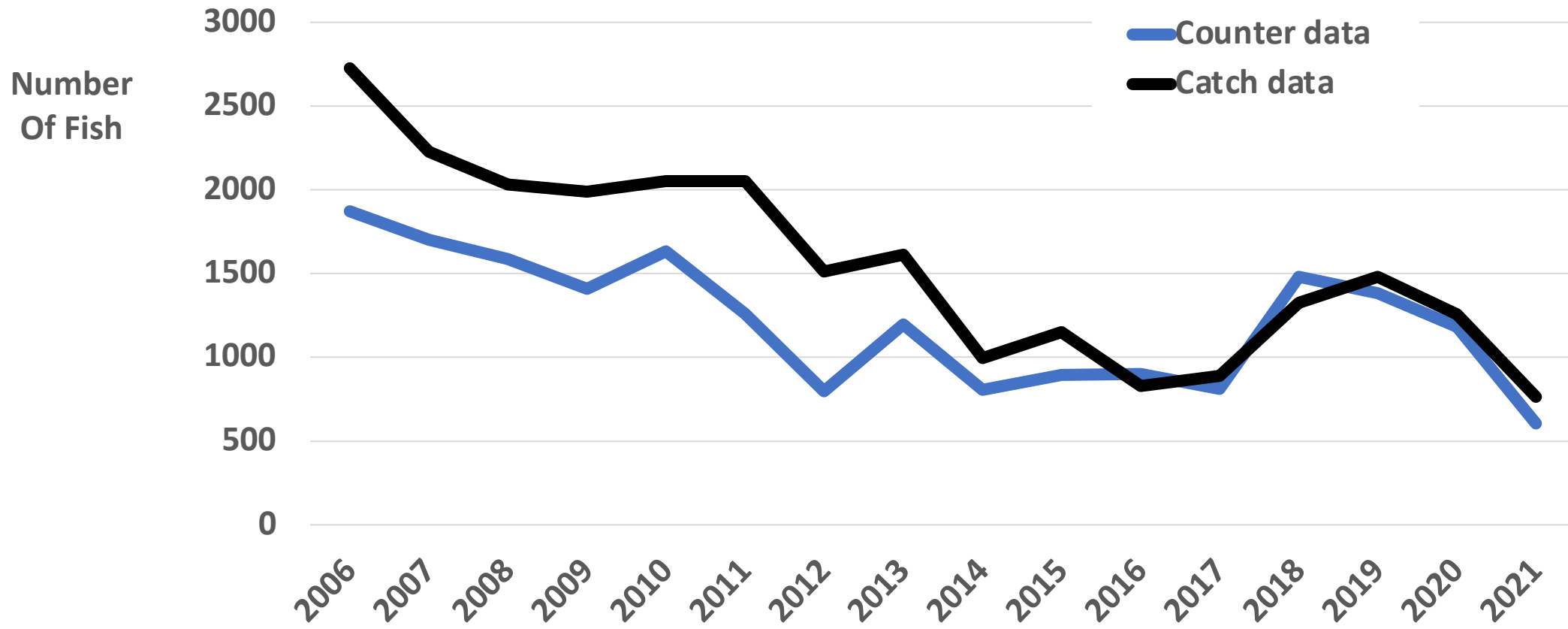
Salmon Catch 1974-2022

Sela, Vesturdalsa, Hofsa



RIVER SELA

Comparison Of Reported Salmon Catch And Number Of Salmon Counted In The River



The Six Rivers Iceland

Main Themes

1. Improvement of infrastructure for world class catch & release sports fishing
 - Income for community
 - Funding for research & conservation
2. Management of fishing pressure
3. Extension of breeding grounds
 - Installation of salmon ladders, e.g. on the Mifjardara river
 - Re-location of adult fish to new river areas
 - Egg planting
4. Food supply
 - Enhancing vegetation around rivers
 - 100,000 trees to be planted annually
5. Parr and Smolt tagging
 - PIT tags to understand success rates and return rates, and correlations with river conditions and fish health
6. Development of matrix population models to capture knowledge and prioritise actions

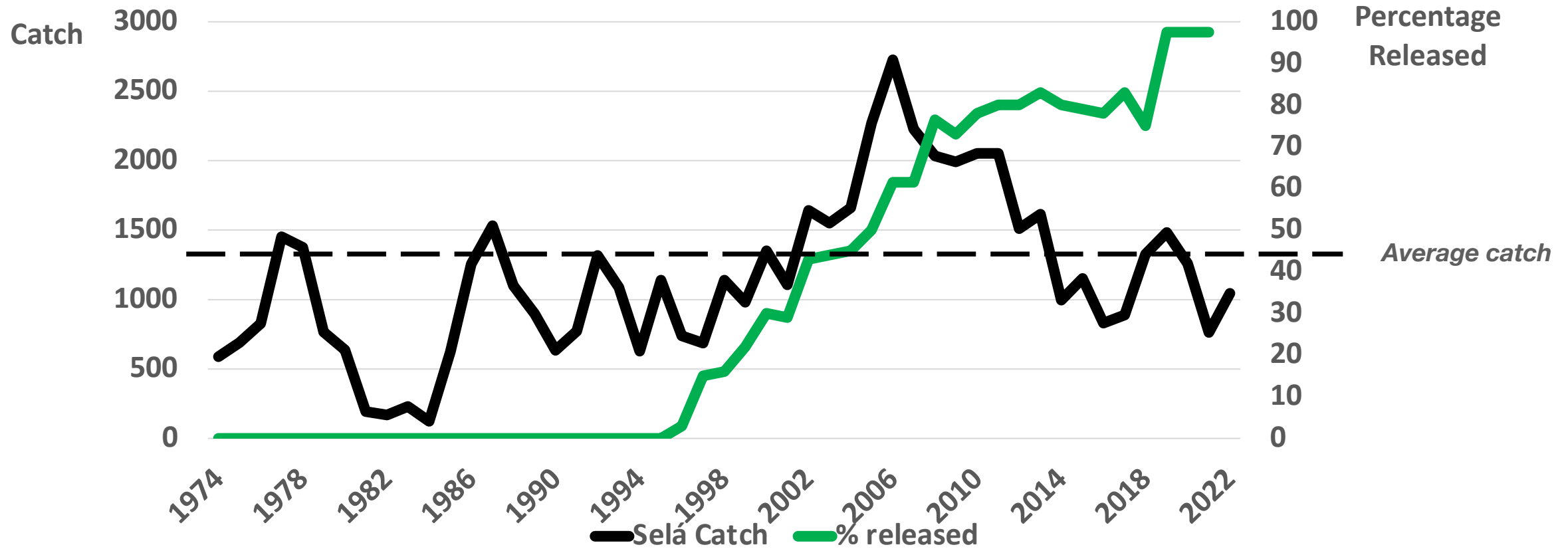
The Six Rivers Iceland Research Team

- Marine & Freshwater Research Institute Iceland (MFRI)
 - 40+ years of knowledge and world-renowned expertise
 - Extensive river data
- Imperial College London
 - Freshwater ecology, advanced data and modelling and genetic expertise.
- Two PhD students in place
 - One based at MFRI, one based at Imperial, single team, joint supervision
- Supported in the field by the Six Rivers team

2. Fishing Pressure: Angling Rules

1. All fishing is catch and release.
2. Anglers are allowed a maximum of two 4-hour sessions a day.
3. Only 2 fish can be caught in any pond and only 4 in any session.
4. Each angler must be guided.
5. The maximum hook size is 12 and no weighted or sinking lines may be used.

Sela Salmon Catch: Impact Of catch & Release



3. Extension Of Breeding Grounds: Salmon Ladders

- Example: new salmon ladder on Mio
- Carved from rock
- Opened Sept 14th 2017



3. Extension Of Breeding Grounds: Relocation Of Spawning Adults

- Adults relocated to upper reaches of Sela & Vesturedalsa and radio-tagged.
- 23 fish in 2020, 40 in 2021
- Tracking results:

2020/21

9 died after spawning (39%)
8 died on the way down (35%)
6 made it to sea (5 cocks, 1 hen) (26%)

2021/22

19 died after spawning (48%)
13 died on the way down (32%)
8 made it to sea (all hens) (20%)

- Electrofishing confirms that spawning is successful

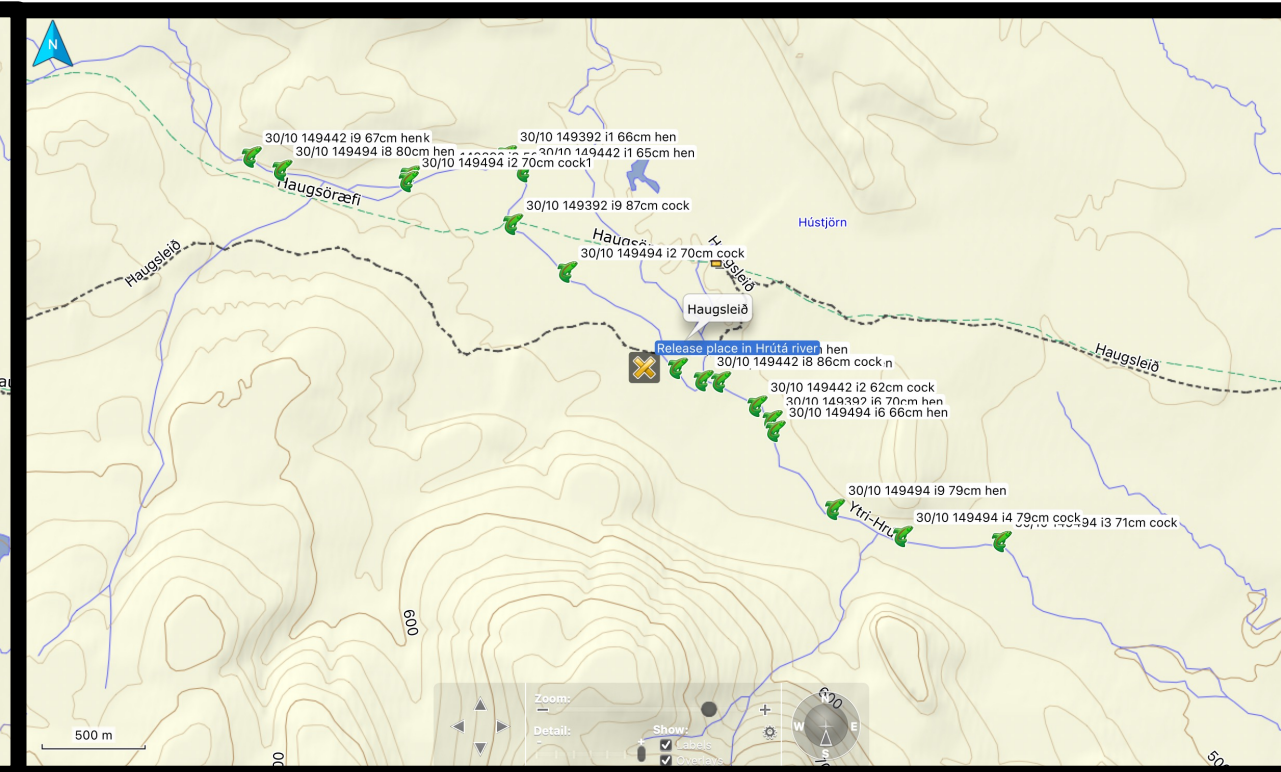
Example Of Relocation: Hruta Tributary Of Sela

35 km upstream, altitude greater than 400m

Five Days After Relocation

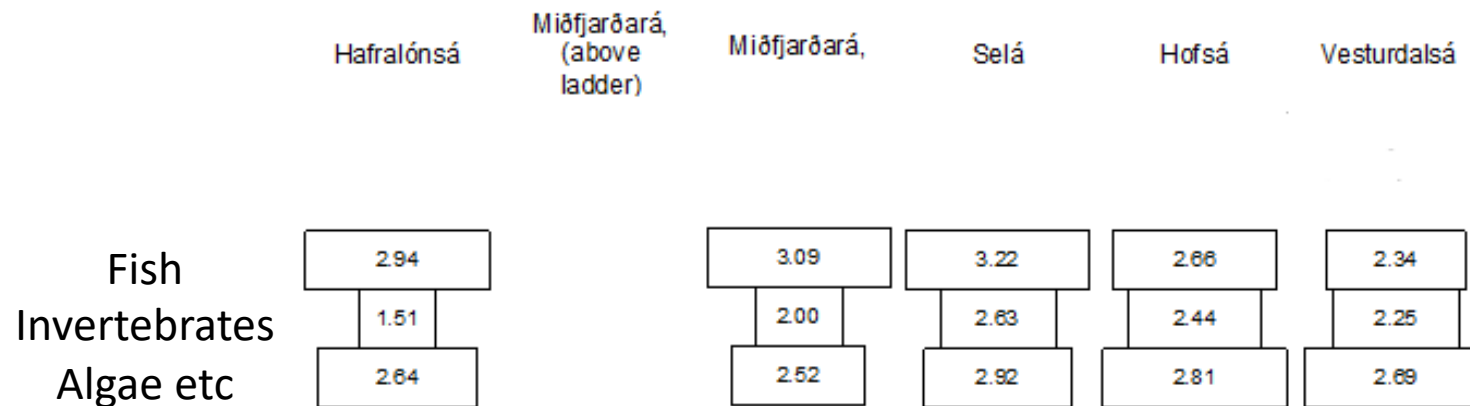


Twenty Days After Relocation

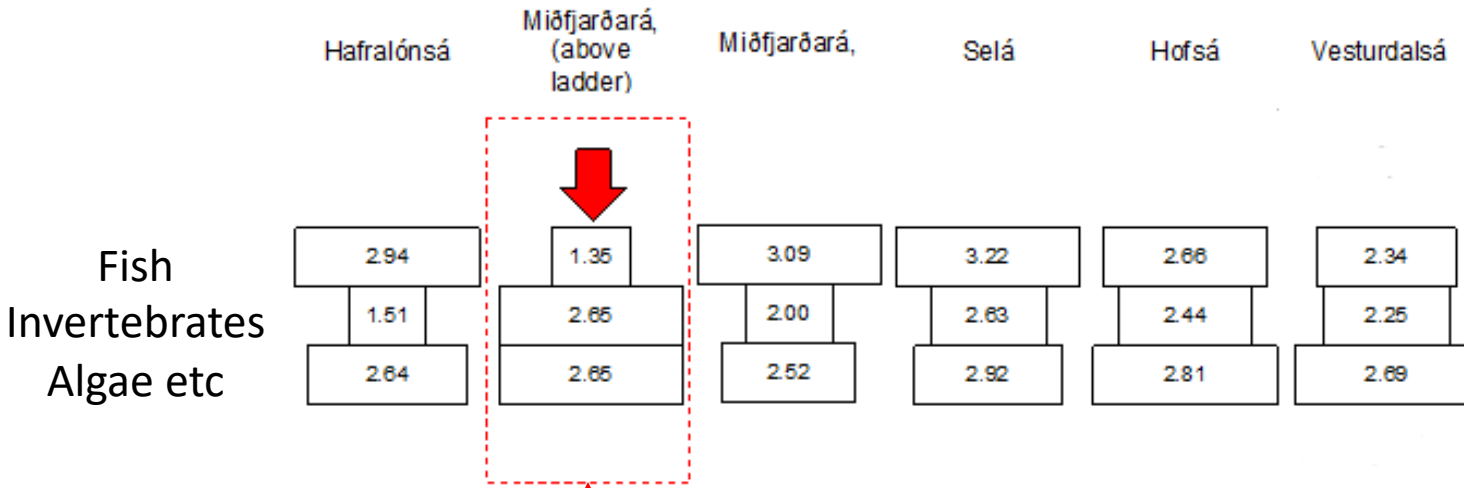


4. Food Supply: Biomass Content Of Rivers

- Biomass mapping of rivers underway:
 - Different locations, repeat measurements over time
 - Example of utility



Biomass Content In Different Rivers

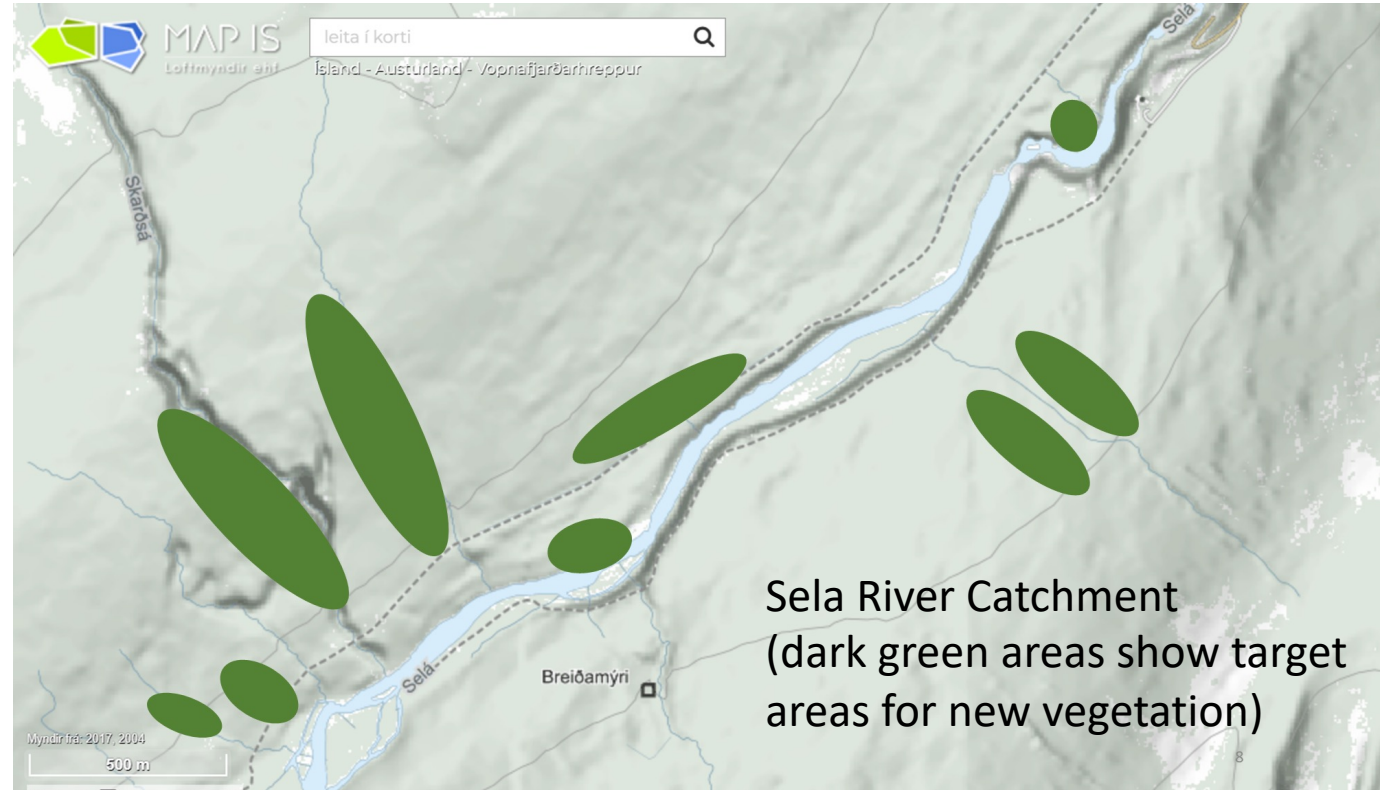


Spare capacity to support more salmon above the new ladder on the Miðfjarðará



Food & Vegetation

- Thesis: food is limited
- Tree planting in catchment areas to increase biomass in over long term by planting more trees and shrubs
- 20,000 trees / year, and increasing to 100,000

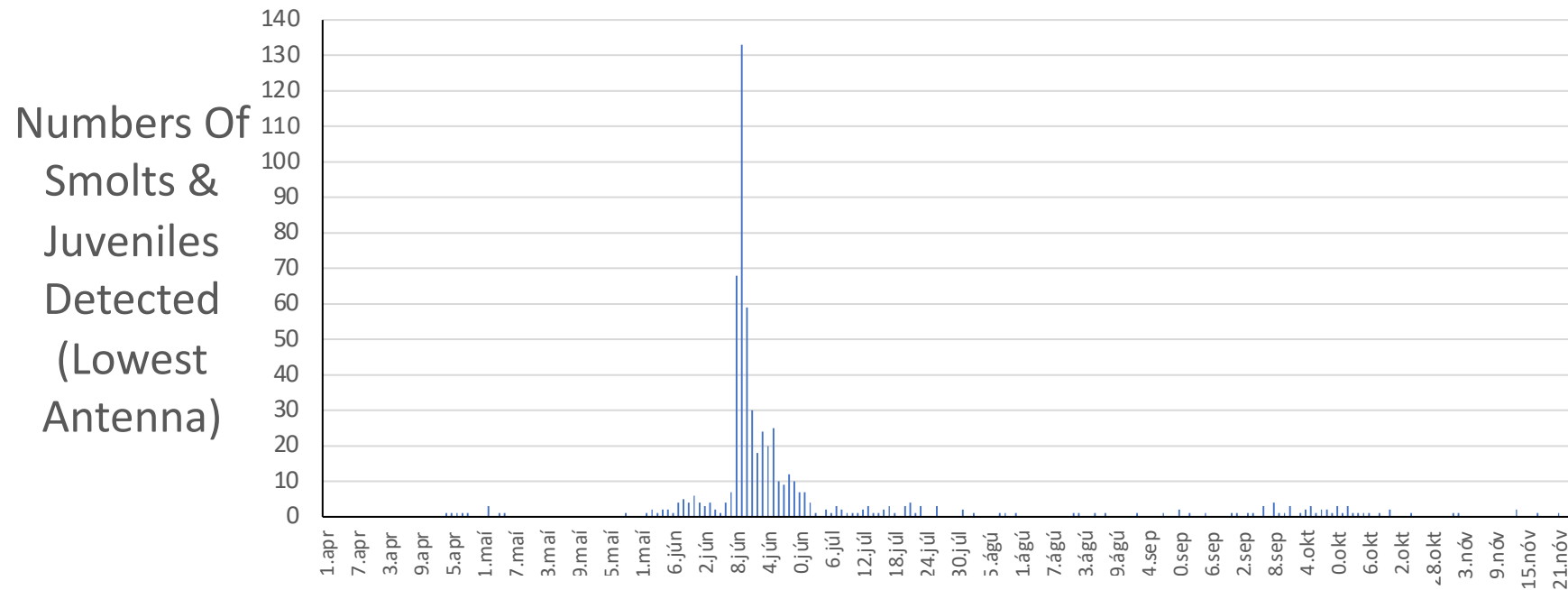


5. Juvenile Tagging In The Vesturdalsa



- A proportion of Parr and Smolts are tagged with PIT tags - unique identifiers for each fish which stay with the fish for its life.
- Tagged fish are detected using antenna at three locations along the Vesturdalsa
- River movements, migration and survival rates are measured

Smolt Run 2020

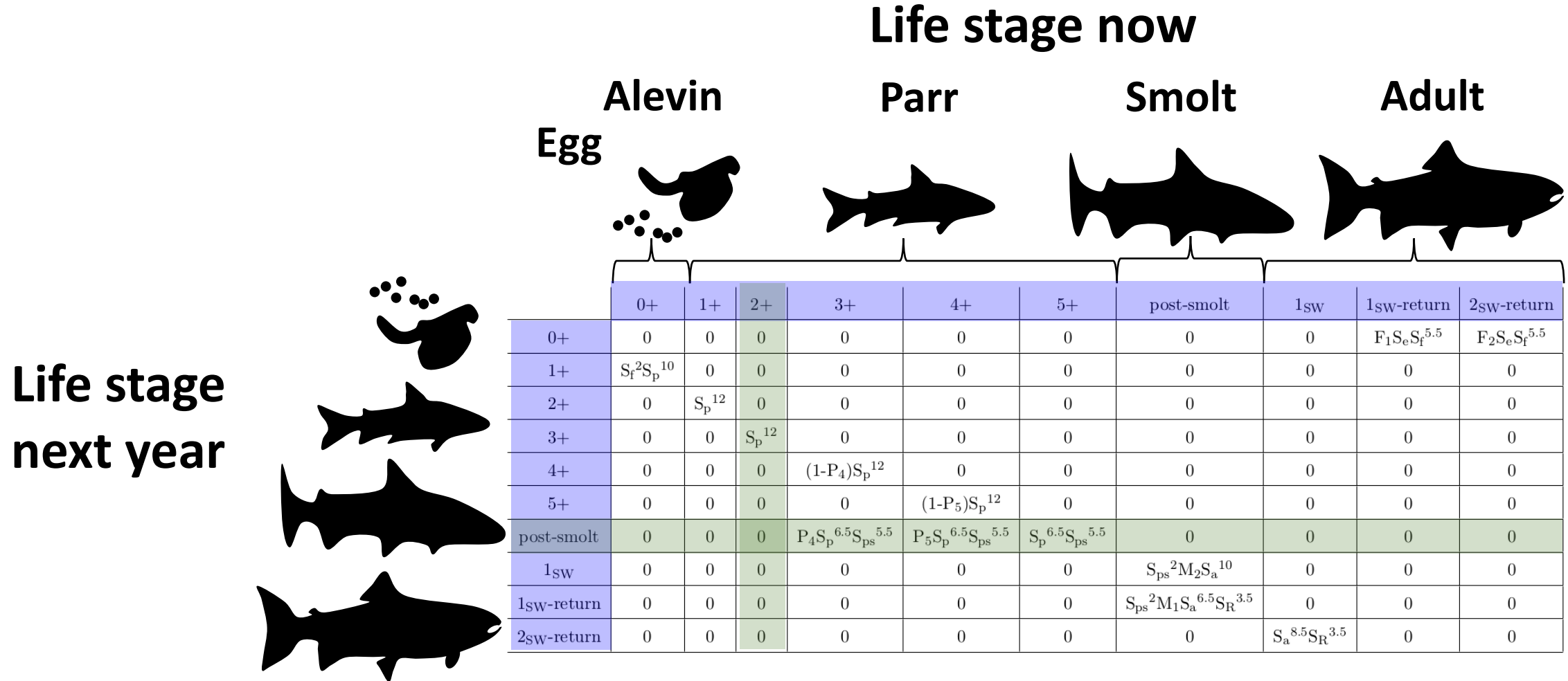


Vesturdalsa Smolt Run 2020

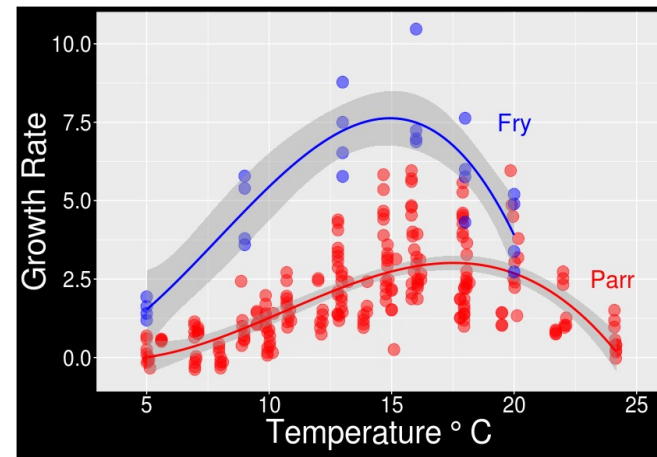
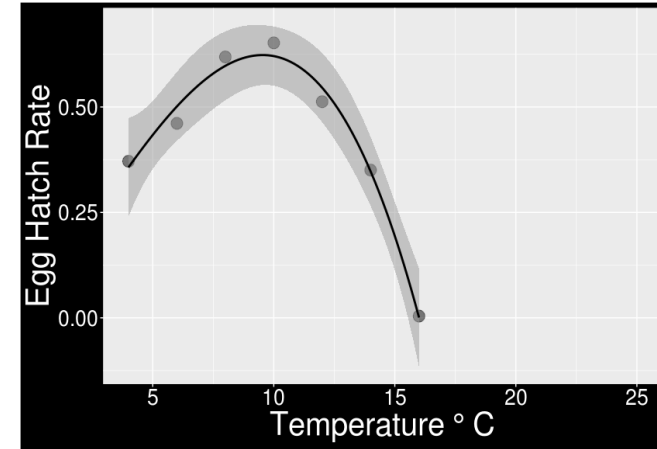
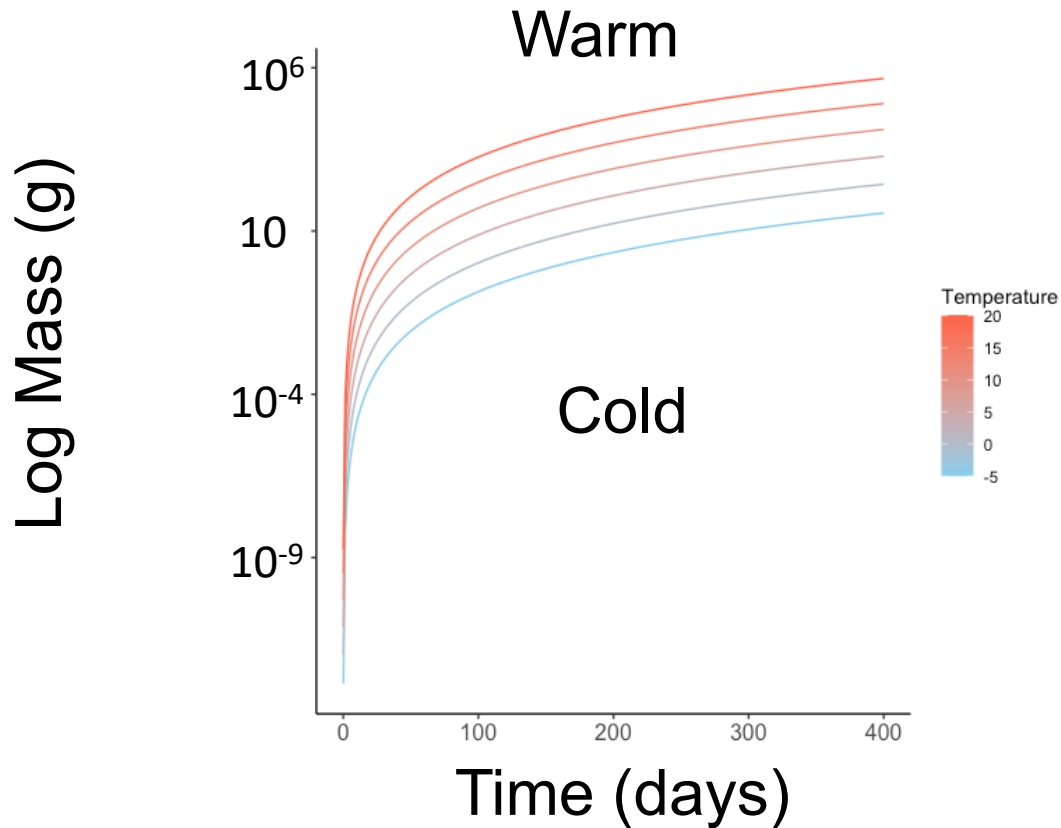
- Most leave when the water temperature rises in mid-June
- 50% of smolts are lost before leaving the river
- Effective smolt return rate 2 %
- Next steps to build up body of evidence for multiple cohorts

6. Matrix Population Model

Aim is to build a model to test potential management interventions



Model Terms Incorporate River Temperatures Other Parameters Under Development



Six Rivers Iceland

A not-for-profit organisation which reinvests all its funds into salmon research and the preservation and restoration of the salmon habitat

1. Holistic programme of conservation to support the Atlantic Salmon
2. Combining longer term scientific research and environmental restoration with immediate practical interventions.
3. Built on a common aim to leave river and land and salmon in better shape than we found it.
4. A sustainable model : all revenues from world class fishing re-invested into community and conservation.
5. Long Term!

Thank You

THE TEAM

Marine and Freshwater Research Institute, Iceland. (MFRI)

Guðni Guðbergsson, Head Of Freshwater Division, Dr Hlynur Bardarson, Senior Scientist, Sammia Lai, PhD Researcher

Imperial College London, Dept Of Life Sciences:

Professor Guy Woodward, Deputy Head Of Department,

Dr James Rosindell, Reader in Biodiversity Theory,

Olivia Morris, PhD researcher

Six Rivers Iceland Team:

Gisli Asgeirsson, Stefán Hrafnsson, Sveinn Björnsson, Helga Kristín Tryggvadóttir

Thanks also to

Rasmus Lauridsen, Head Of Fisheries Research, Game & Wildlife Trust, UK