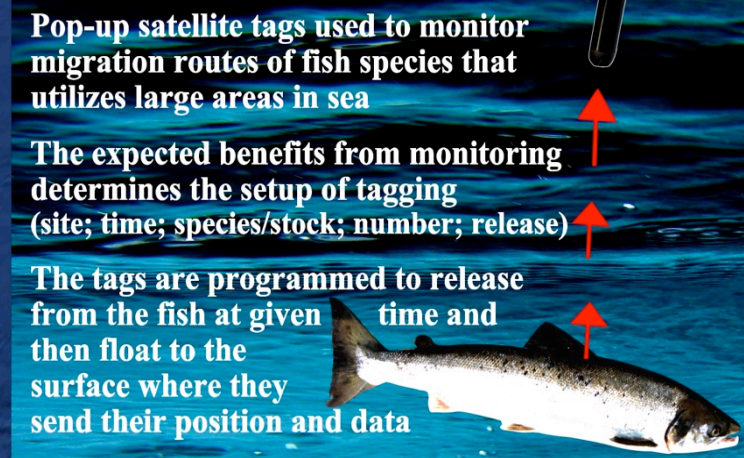


# FISHTRACK-DIRECT

Johannes Sturlaugsson  
Laxfiskar

Fish migrations & behavior monitoring by satellite  
used to improve the fishery & fish research

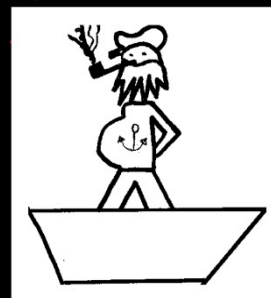


Pop-up satellite tags used to monitor migration routes of fish species that utilizes large areas in sea

The expected benefits from monitoring determines the setup of tagging (site; time; species/stock; number; release)

The tags are programmed to release from the fish at given time and then float to the surface where they send their position and data

## Main aims



The fishery



The researchers

Increased yield of fishery and fish research  
- energy saving, improved fishing and research





# **Pop-up satellite archival tags (PSATs) has been used with success in Icelandic studies on Atlantic salmon and cod**

**2011**

**Pop-up satellite tags used first time to study Icelandic fish**

**- Study by Laxfiskar on the migration of Atlantic salmon that  
was part of International study lead by Audun Rikardsen Norway**

**2012**

**First study on cod migration worldwide using PSATs  
carried out by Laxfiskar in Icelandic waters**

**2013**

**Laxfiskar introduce formally the idea of developing monitoring  
service system based on fish tagging with satellite tags  
in order to improve the yield of the fishery and fish research**



**Monitoring with pop-up satellite tags  
on distribution of fish,  
their behavior  
and environmental parameters  
is independent of the recapture of the fish**

**The methodology is therefore promising as additional way  
to search for the location of fish that utilize vast sea areas  
not the least as the information is sampled and retrieved  
regardless of fishing areas, fishing gear and fishing effort**



## What information will be retrieved?

- 1. Geological data on fish position in “real time” from the actual position of fish when tags float up and send their position gives various information on areas used by the fish:**
  - New areas in relation to known distribution (possible new fishing areas)
  - Migration in International fishing zones
  - Within known fishing zones at known fishing time intervals
  - Within known fishing zones at time when fishing is unknown
  - Within area of high predation risk (data from tags swallowed with fish)
  - Indirect data on fish species that the monitored fish preys upon within given seasonal periods e.g. cod vs capelin



## What information will be retrieved?

- 2. Information on fish depth and sea temperature covering the time from tagging to release of tag**
- 3. Back-calculated geological positions from the migration period from tagging until release of tag (based on data sampled on light and geomagnetic field)**
- 4. Information collected in database where it is possible to obtain predictions on the following parameters:**
  - Estimated geographical distribution of fish for given time of year and areas in relation to fish species/stocks and fish sizes
  - The depth where fish are dwelling and corresponding sea temperature in relation to areas, time of year and fish sizes



## **Benefit to the fishery from satellite monitoring of fish**

### **1. Energy saving (less fuel cost at average)**

- Shorter distances to fishing areas at average
- Shorter trawling time at average in the long run
- Increased sustainability that supports environmental certifications and marketing in general
- Positive influence on CO<sub>2</sub> quota commitments of Iceland

### **2. Added value of fish products**

- Increased opportunities for managing fishing in relation to time of year and prices of the corresponding fish products.

### **3. Increased value of catch per unit effort**

- Increased value per unit of fishing time in the long run when the applicability of direct fish monitoring as guidance for fishing has developed e.g. improved selectivity towards fish sizes



## **Benefit to the fishery from satellite monitoring of fish**

### **4. Lower ressearch cost**

- Increased use of remote data sampling on fish geolocation and the corresponding behaviour of the fish and their environment enables to reduce use of research vessels. Such monitoring is in some instances the only skilfull method to sample such infomation on fish and their environment e.g. in some international waters

### **5. Indirect value**

- New practical findings increase yield of fish research in general

### **6. Innovation that improves the main industry of Iceland**

- Service in direct fish monitoring as guidance for fishing improves both the fishery and fish research and involves that new specialized jobs are established in the industry



### Tagging Atlantic cod with pop-up satellite archival tags in 2012





Greenland

The geographical distribution of cod in relation to time  
- example from tagging in Bay Faxafloi in April 2012

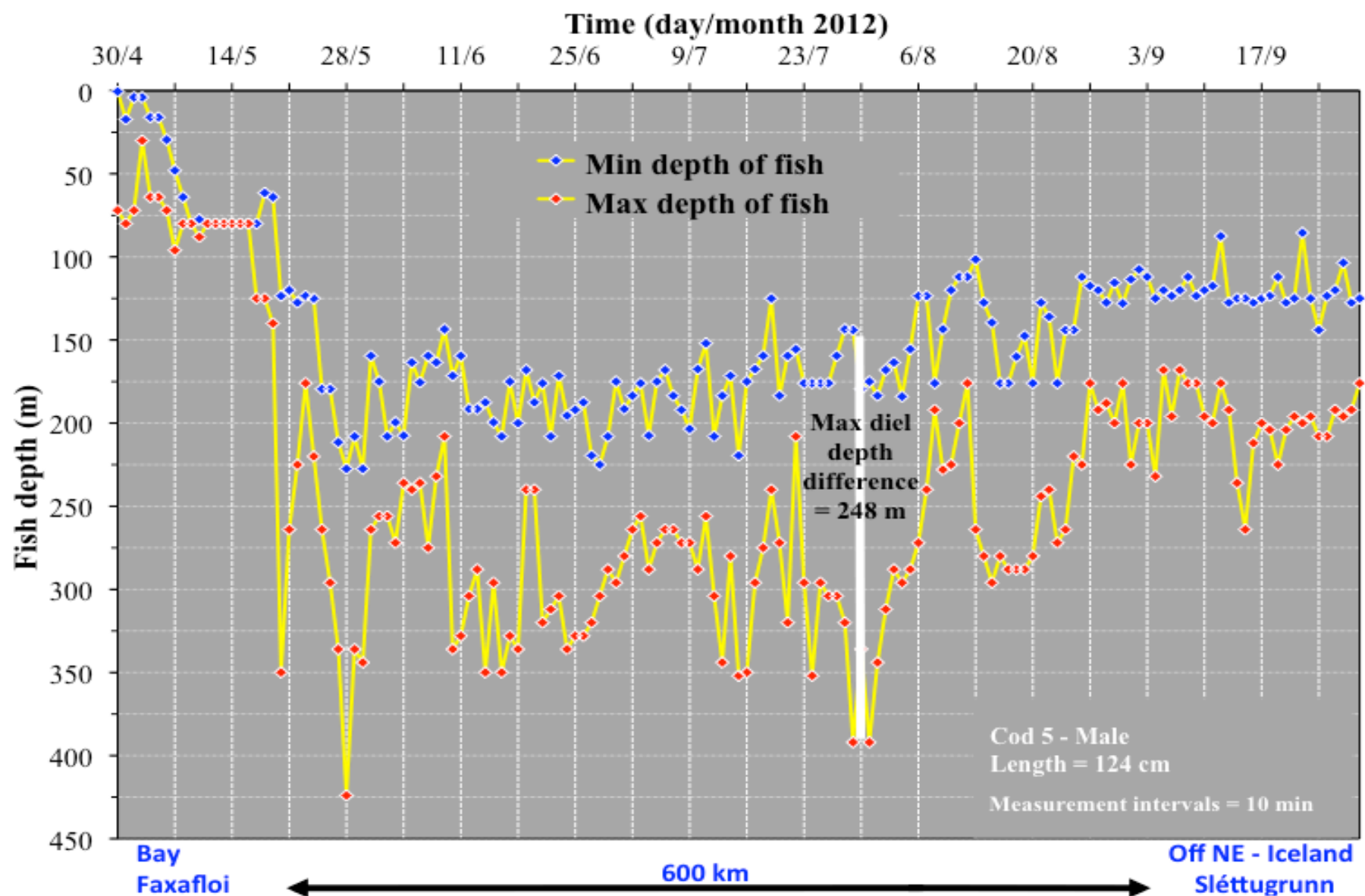


Faroe Islands



## Example of Atlantic cod migration pattern in relation to fish depth and time

- minimum and maximum depth per day received via sampling of pop-up satellite archival tag





**Laxfiskar is leading a multidisciplinary work towards the aim that the FishTrack-Direct monitoring service system will be part of the sustainable future of the fishery and fish research in Iceland**

