

Movements and migration of Atlantic wolffish (*Anarhichas lupus*)



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Main aims



- **Fishery-independent geographical mapping throughout the year on area fidelity & movements of wolffish during feeding in fjord area**
- **Fish depth recorded in order to map the vertical movements of wolffish in fjord area**
- **Spawning migration and spawning in outer areas delimited by the period of absence of the wolffish from the fjord area**
- **Introduction of findings from monitoring of wolffish individuals in order to establish basis to estimate the need for area based criteria when regulating coastal fishery on wolffish at feeding grounds**

Tagging of wolffish

Site: Hvalfjord SW-Iceland

Dates: June 2010 & May 2011

Fishing gear: Longline

Number: 16 wolffish tagged with ultrasonic tags

Size: 67-93 cm in length (mature fish)

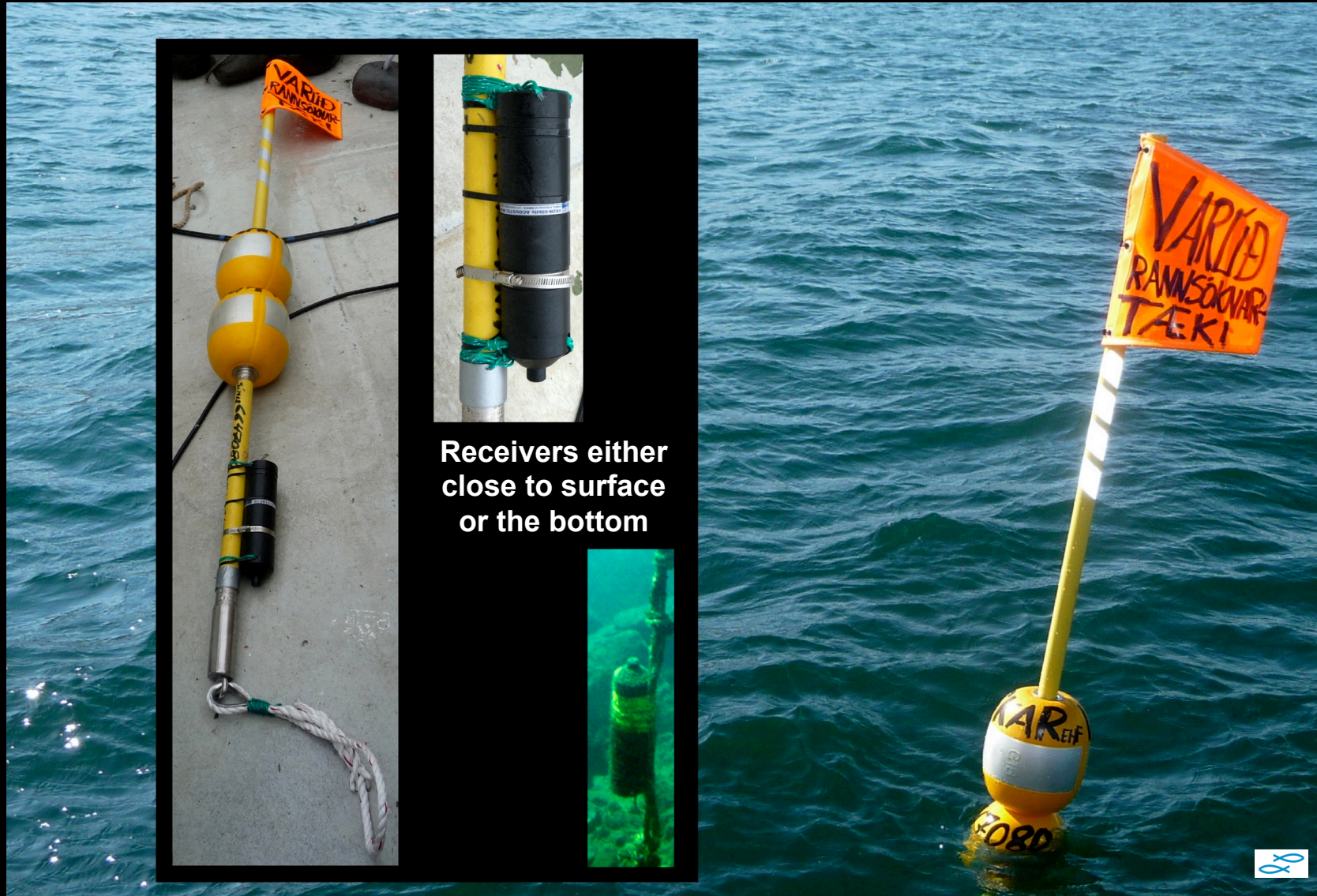
Study period: Approx 2 years (June 2010 – March 2012)

Measurements: Fish depth (pressure) for 5 fish

Tag types: Vemco – ultrasonic V9 & V13 (transmitting for 2-3 years)

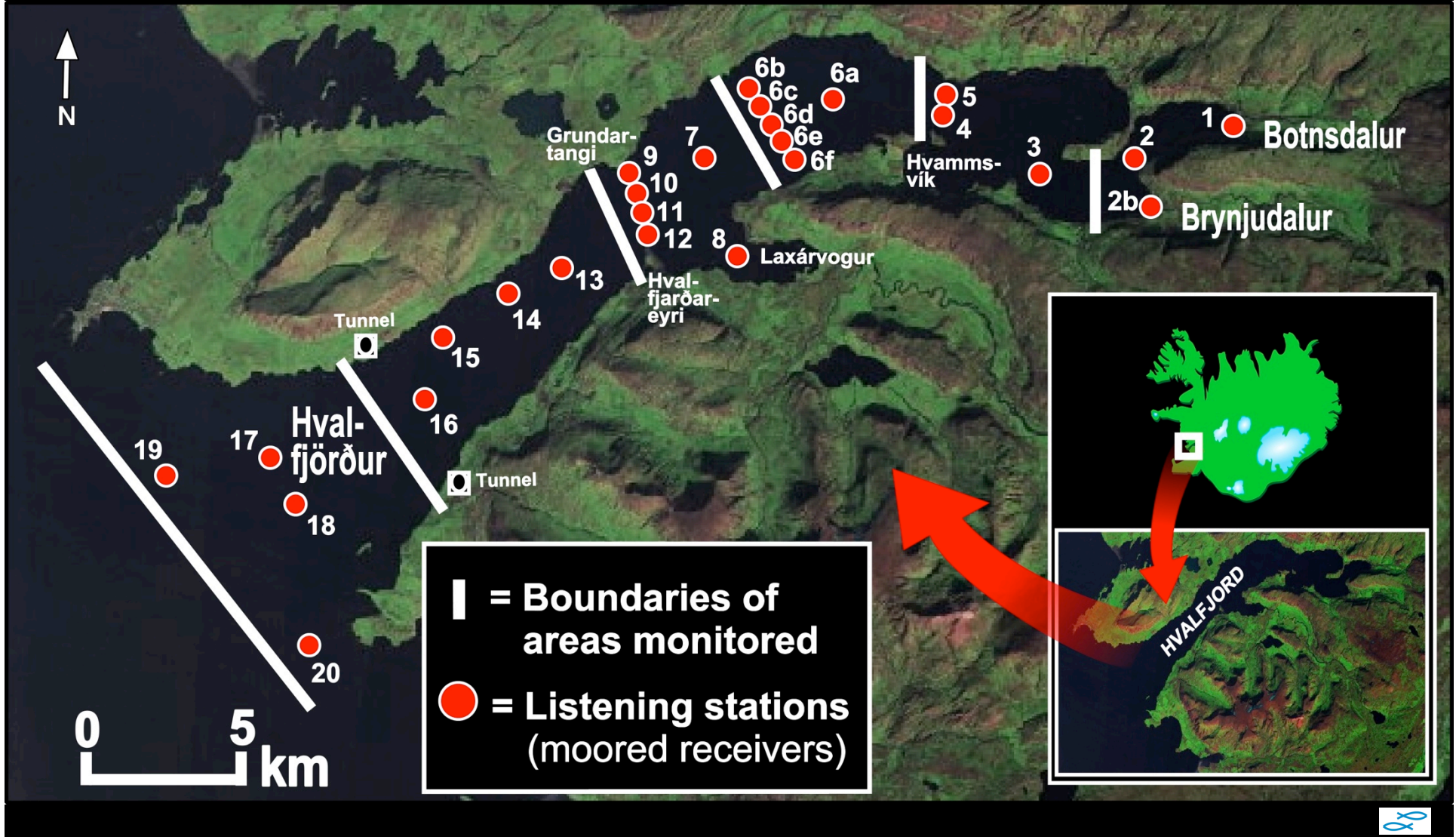


Autonomous logging receivers used to monitor presence of tagged wolffish in surrounding area of size close to 0.5 km² (+/- 0.3 km²). A coverage usually representing 300-500 m radius

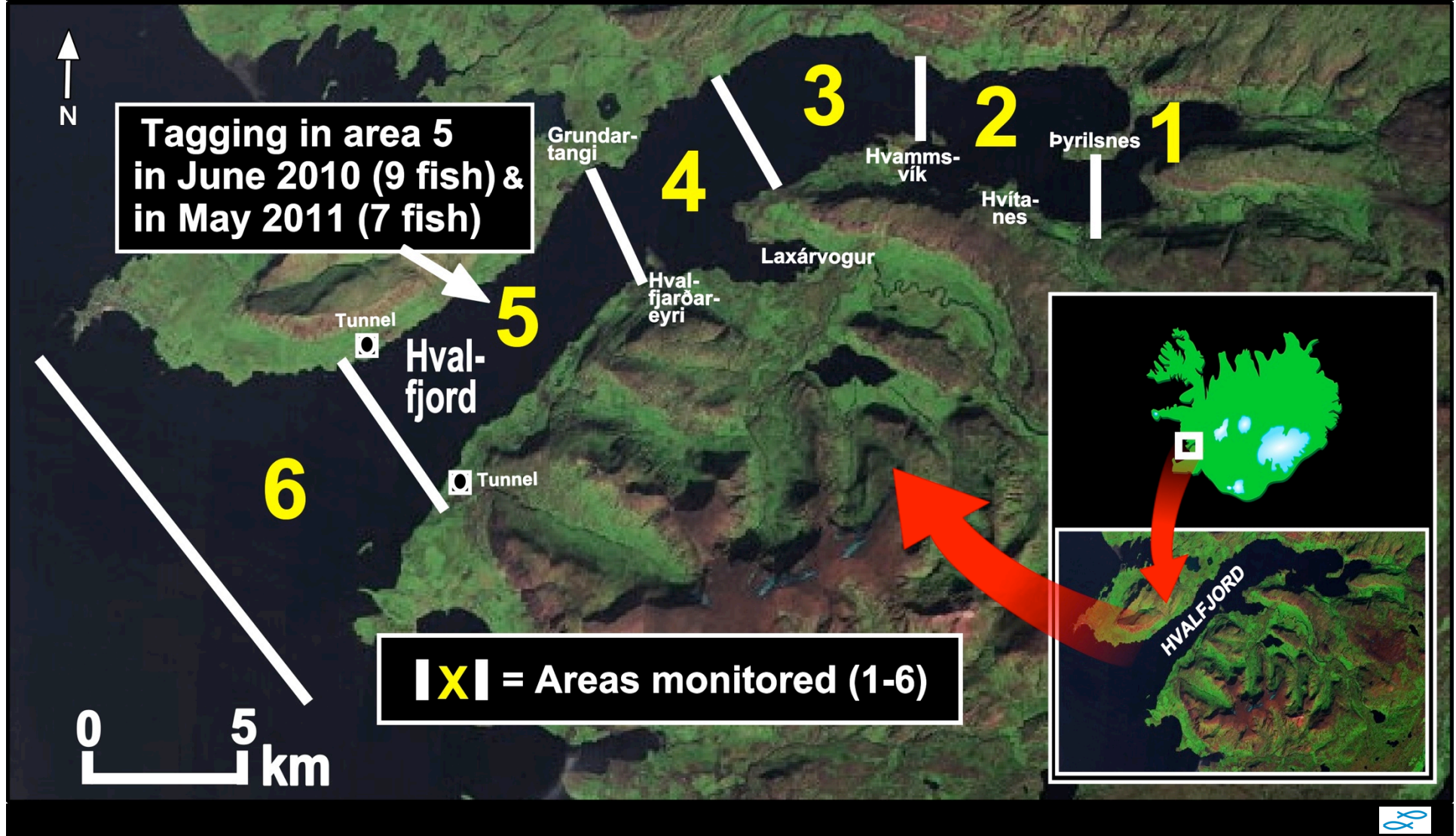


Study area of wolffish (2010-2012) and haddock (2009-2012) in fjord Hvalfjord SW – Iceland

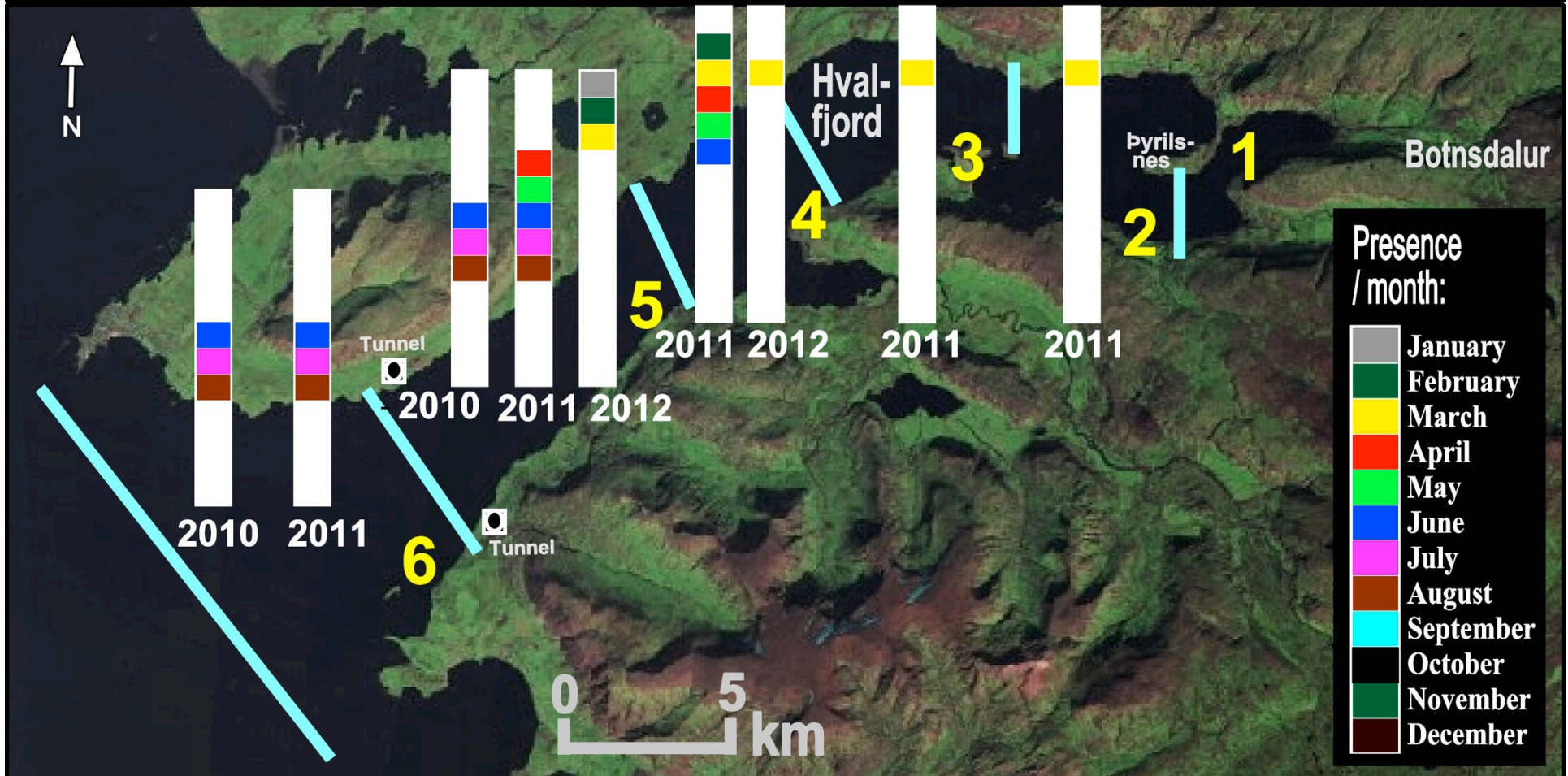
Boundaries of areas monitored are shown and within them sites of autonomous logging receivers for ultrasonic tags



The study area of wolffish (2010-2012) in fjord Hvalfjord SW – Iceland showing the areas monitored and the tagging area



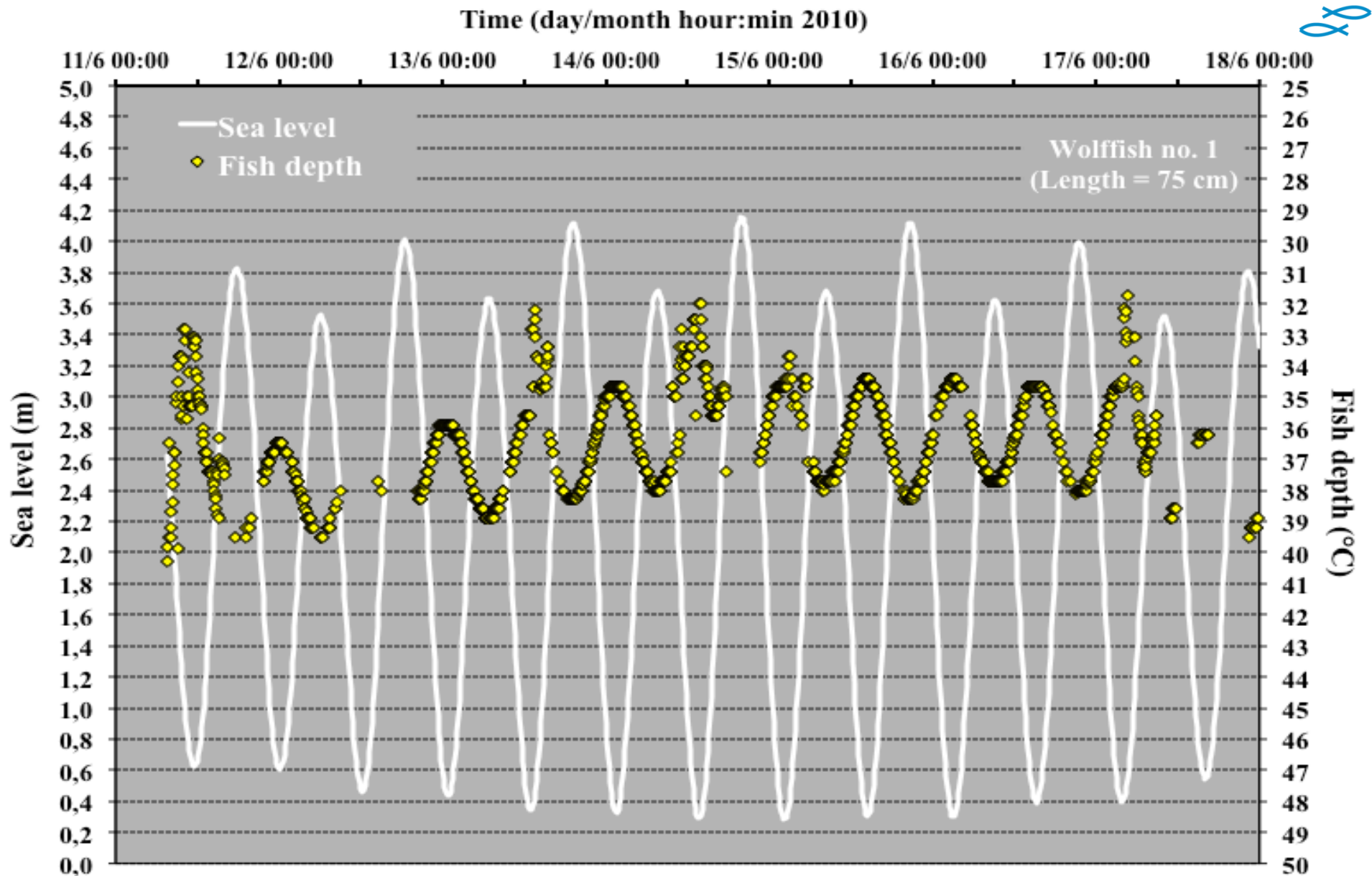
The monthly presence of all tagged wolffish in Hvalfjord during June 2010 - March 2012 shown for the 6 areas monitored



Example of geographical informations on movements of one wolffish in Hvalfjord and corresponding migration speed



Fish depth of wolffish in Hvalfjord & corresponding sea-level shown for 1 week in relation to time



Results – Movements and migration of wolffish

- **Sampled data:** movements of 11 fish recorded (34 thousand recordings)



- **Feeding migration**

- The overall yearly feeding period in Hvalfjord ranged from January – August
- Fidelity towards the same feeding grounds
 - Reflected by repeated use of same fjord area by tagged individuals, where 3 fish were shown to utilize the same area for 3 years in a row.
 - Some of the wolffish were also very stationary e.g. fish staying within detection zone of the same receiver for 20-63% of each week for 3 months in a row
- Movements slow when transferring between areas (receivers) with typical speed range 0.2 - 0.4 km/hour but examples of higher speed (max = 2.5 km/h)
- Diel vertical movements usually none or very little as fish depth variations corresponded with the tidal water level changes (semi-diurnal)
- Occurance of vertical movements up from bottom mainly during slack water
- Fish depth recorded = 22 – 49 m

- **Spawning migration**

- Starts mainly in August when fish migrate to outer areas



Conclusions



- **This first study giving behavioural data on wolffish individuals in Icelandic waters showed us that the wolffish in Hvalfjord had there what we could call a home feeding grounds**
- **Knowing that shows that we need area based criteria when regulating coastal fishery on wolffish at feeding grounds**



Thanks

