

## RESEARCH OUTPUTS / RÉSULTATS DE RECHERCHE

### Downstream fish migration along the low Meuse river

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DOWNSTREAM FISH MIGRATION ALONG THE LOW MEUSE RIVER

Imen Ben Ammar, Robert Mandiki, Sascha Antipine, Enora Flamion, Patrick Kestemont

THE MEUSE RIVER

Heavily modified water body: Dam, Hydropower plant HPP

Home to 10 highly migratory diadromous fish species and ≈ 30 non-diadromous species

TARGET SPECIES

Atlantic salmon *Salmo salar*

**1930s:** Disappearance of *S. salar* from the Belgian Meuse basin

Reintroduction programs in Europe and Belgium (Meuse Saumon 2000)

European eel *Anguilla anguilla*

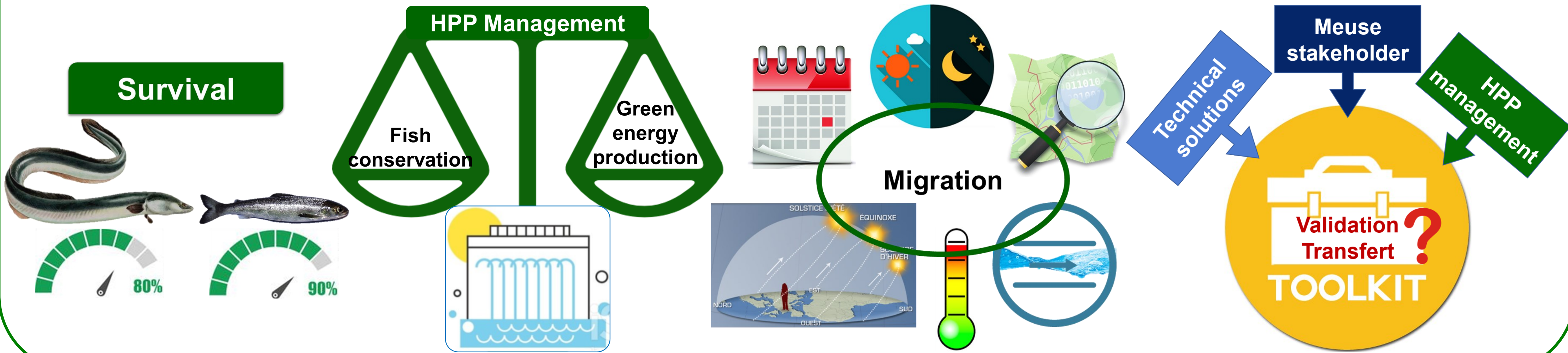
**1980s:** distribution area ↘, population ↘, natural recruitment of glass eels ↘

UE management plan: ↘ of all anthropogenic causes of mortality + Escapement of 40% of the biomass compared to “pristine” population

STUDY AREA: LOW MEUSE

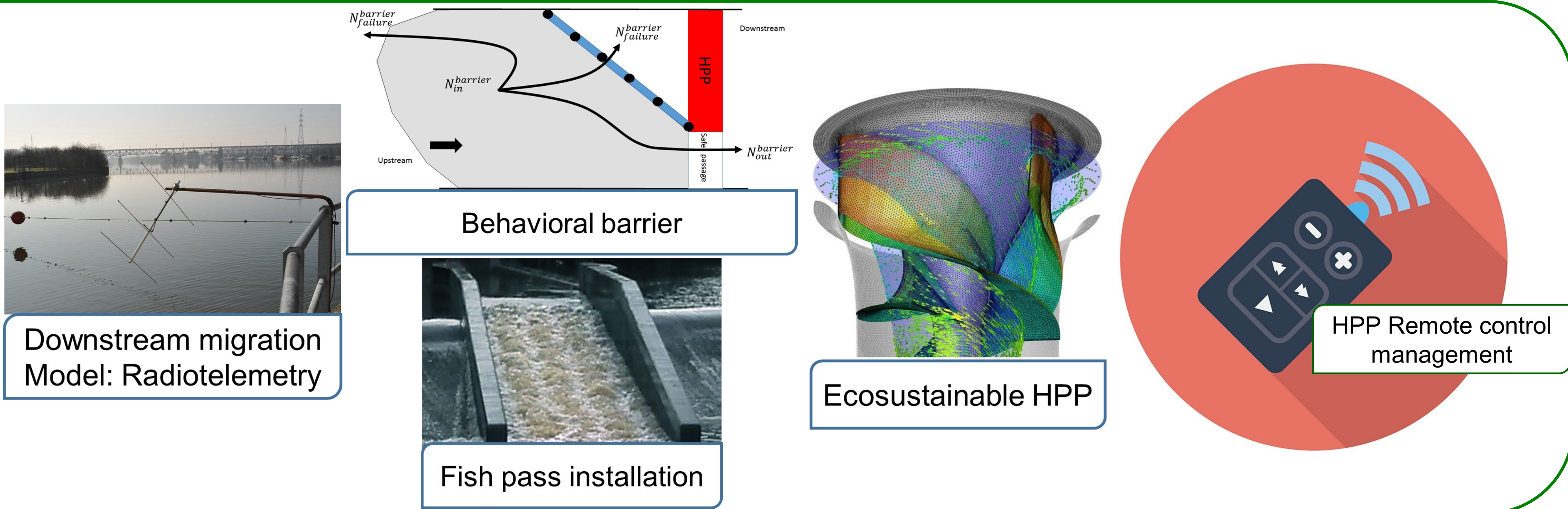


PROJECT OBJECTIVES



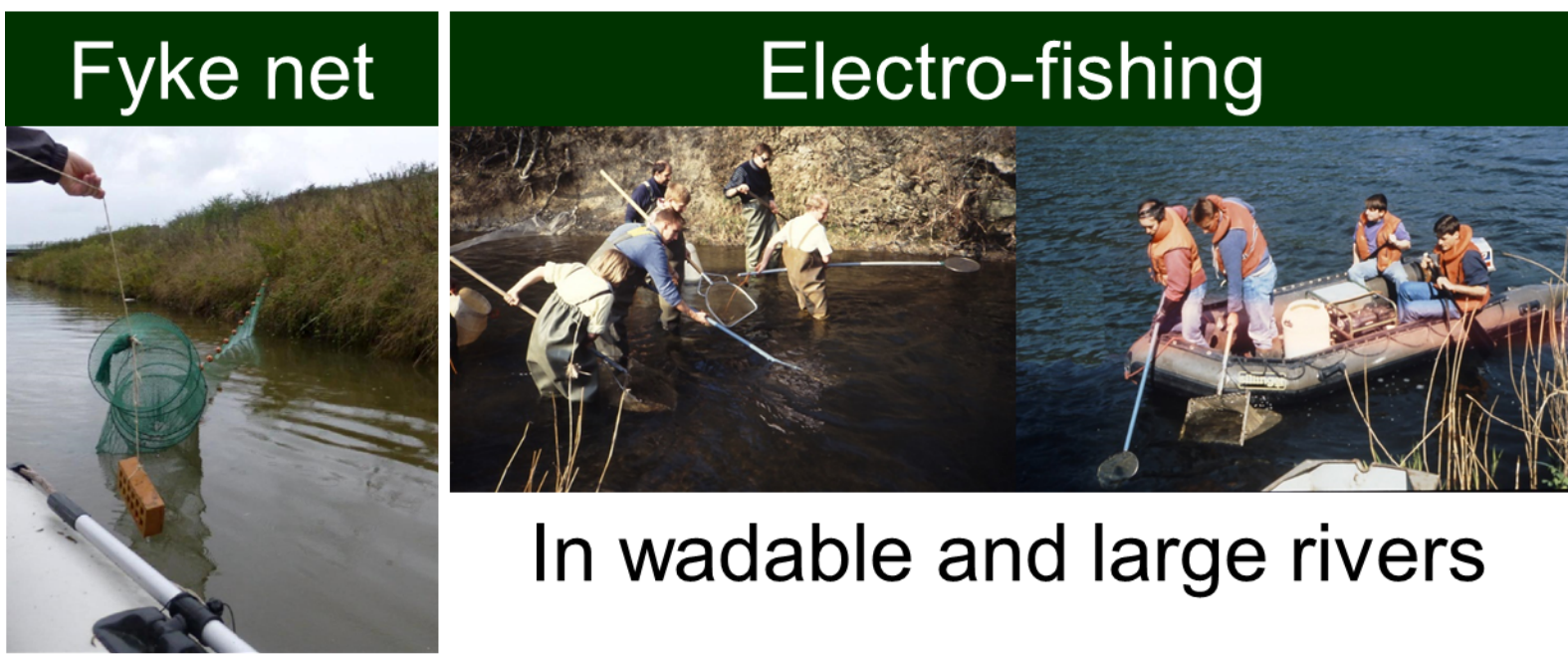
STUDY AXIS

- Downstream migration model
- Hydrodynamic modelisation
- Resident populations: characterization
- Impact of hydropower plant on fish
- Performance indicators: definition/evaluation



OUR CURRENT STUDIES

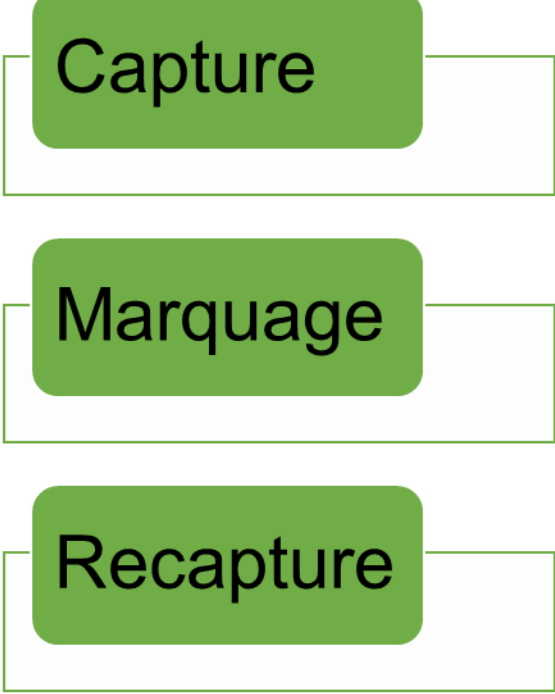
1. Stock assessment



Morphology & health status

- ✓External & internal examination (X-ray)
- ✓Parasitism/pathology
- ✓Herpes virus (RT-PCR) (eel)

2. Stock estimation

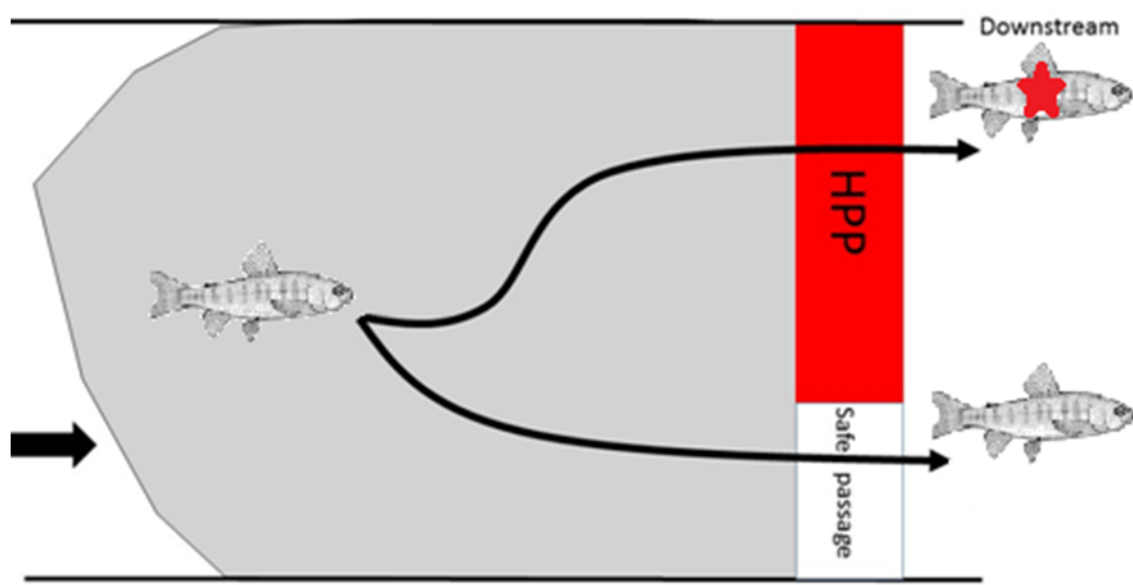


4. Characterisation of fish population

Physiological/immune status

- ✓Cortisol
- ✓HSP70 and 90
- ✓Growth & thyroid hormones
- ✓Immunological activities
- ✓Immune gene expression

3. HPP impact on fish



Swimming ability / Behavioral responses

Use of swimming tunnel

- ✓Ventilation rate
- ✓Escape speed
- ✓Locomotion

