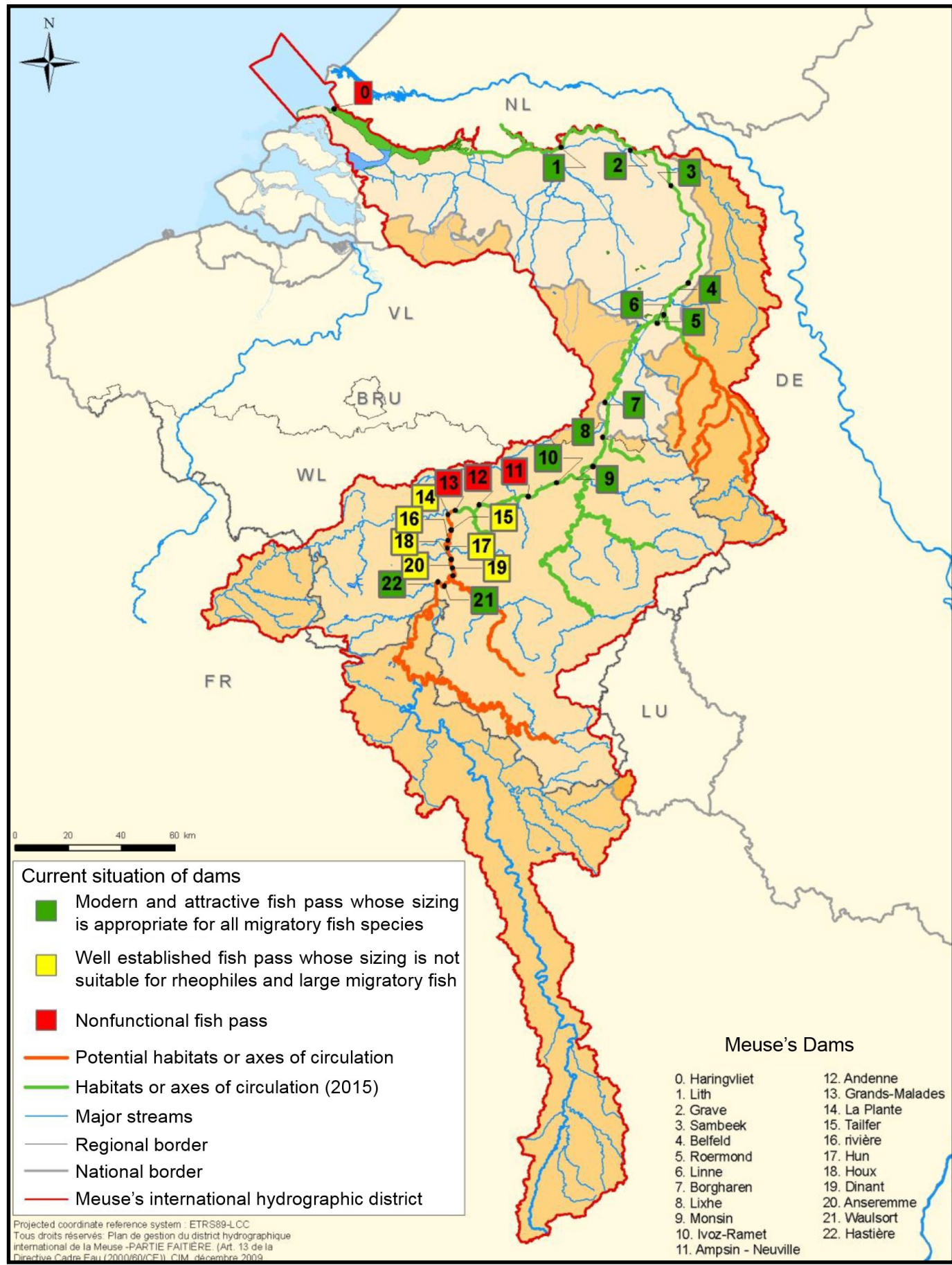


## DOWNSTREAM FISH MIGRATION ALONG THE LOW MEUSE RIVER

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

### THE MEUSE RIVER

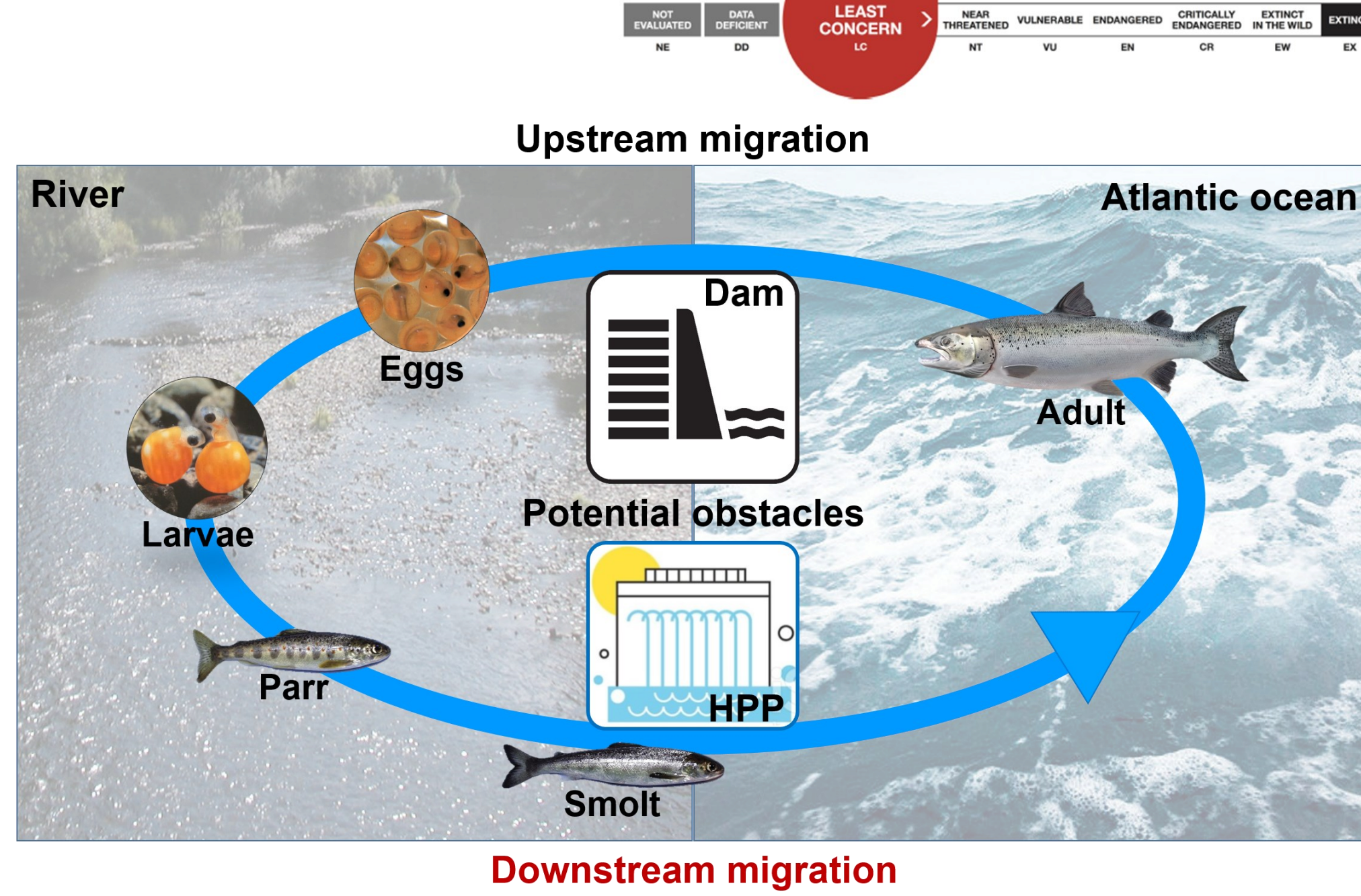
Heavily modified water body: Dam, Hydropower plant HPP



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

### TARGET SPECIES

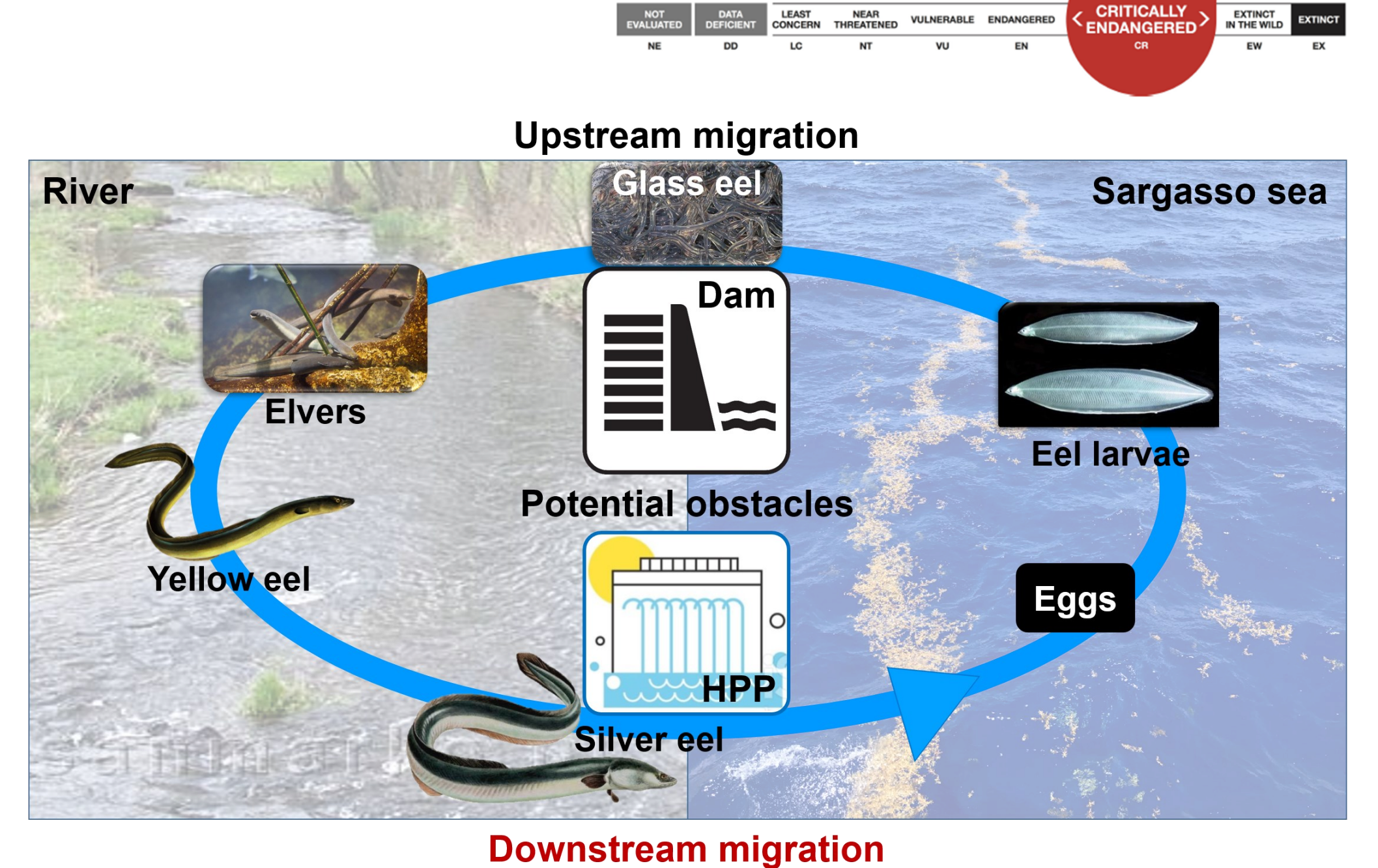
#### Atlantic salmon *Salmo salar*



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

Reintroduction programs in Europe and Belgium (Meuse Saumon 2000)

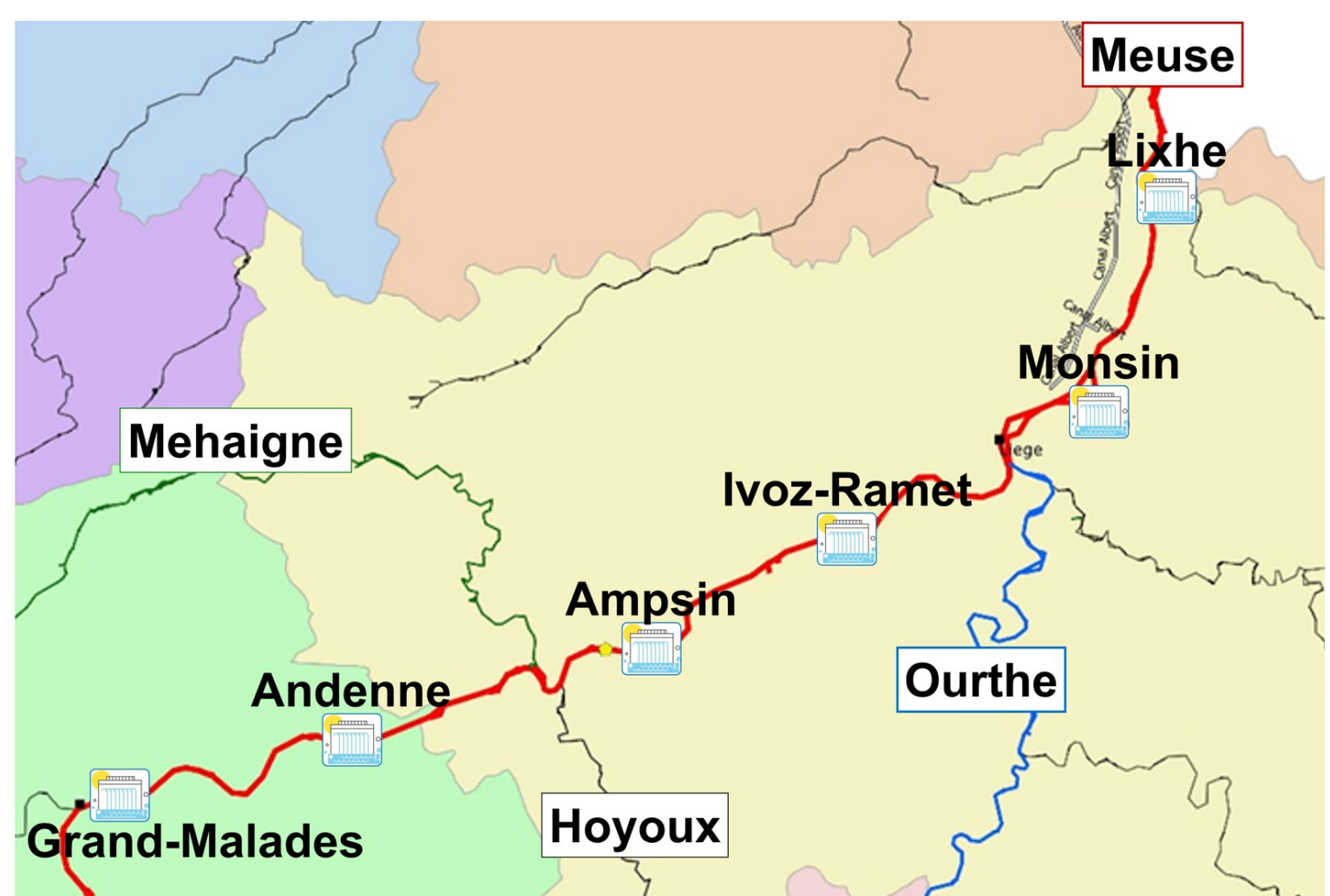
#### European eel *Anguilla anguilla*



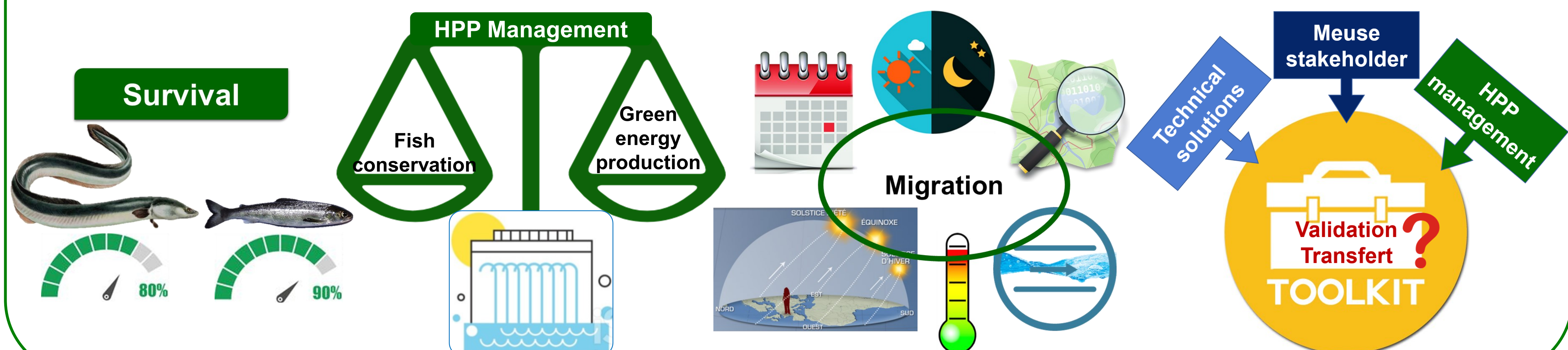
1980s: distribution area ↓, population ↓, natural recruitment of glass eels ↓

UE management plan: ↓ of all anthropogenic causes of mortality + Escapement of 40% of the biomass compared to "pristine" population

### STUDY AREA: LOW MEUSE

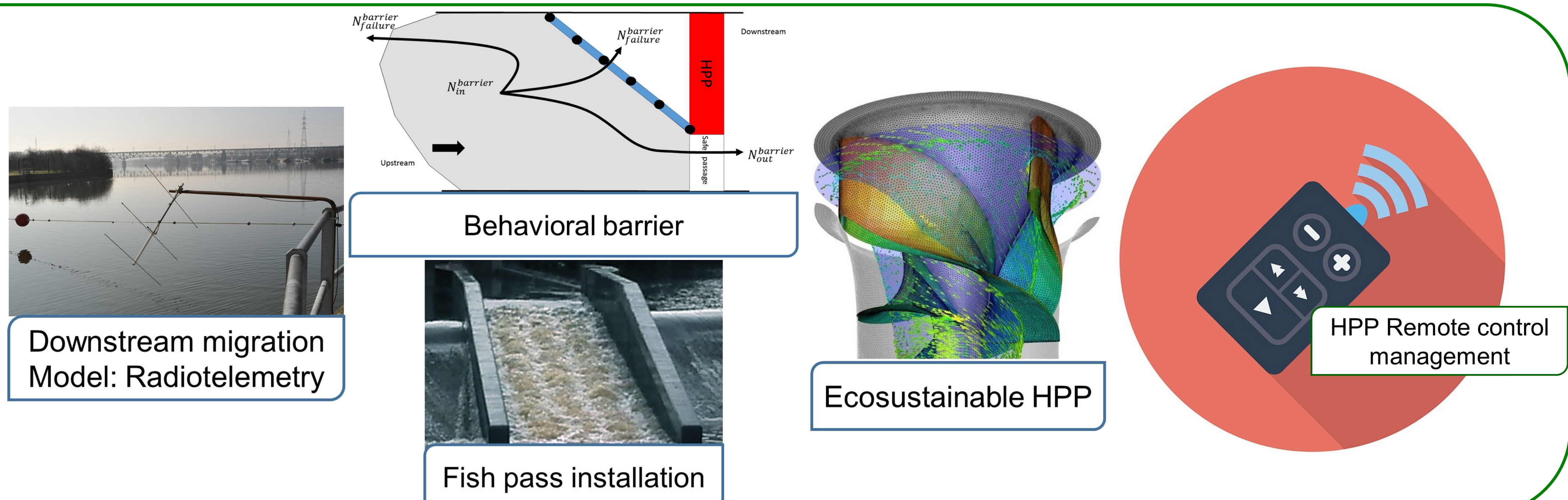


### PROJECT OBJECTIVES



### STUDY AXIS

1. Downstream migration model
2. Hydrodynamic modelisation
3. Resident populations: characterization
4. Impact of hydropower plant on fish
5. Performance indicators: definition/evaluation



### OUR CURRENT STUDIES

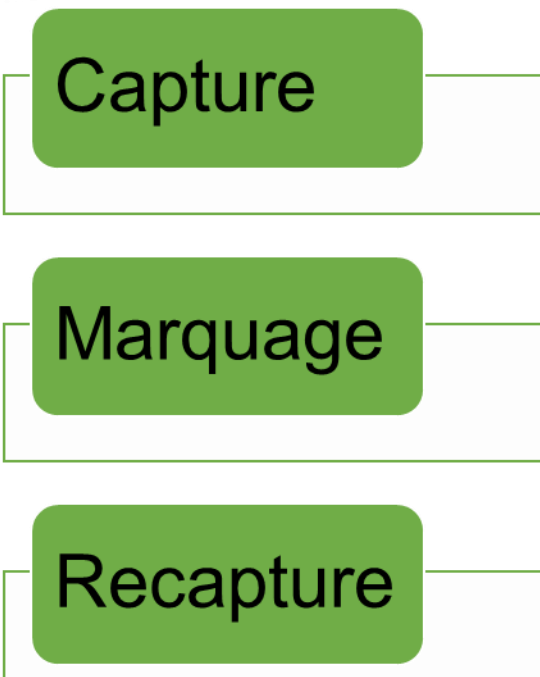
#### 1. Stock assessment



#### Morphology & health status

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

#### 2. Stock estimation

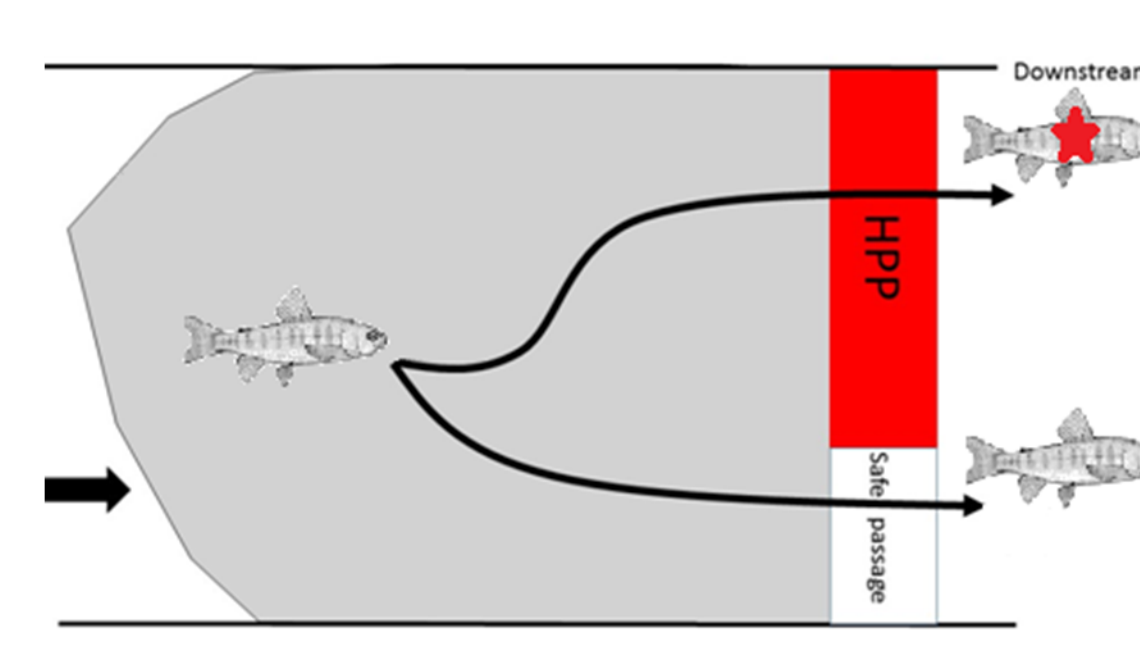


#### 4. Characterisation of fish population

#### 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

