



# What do fish do during and after the opening of a migration axis ?

## An analyse of their colonisation dynamic

---

Justine Gelder

J-P. Benitez & M. Ovidio

Unité de Gestion des Ressources Aquatiques et  
Aquaculture (UGERAA)



# Introduction



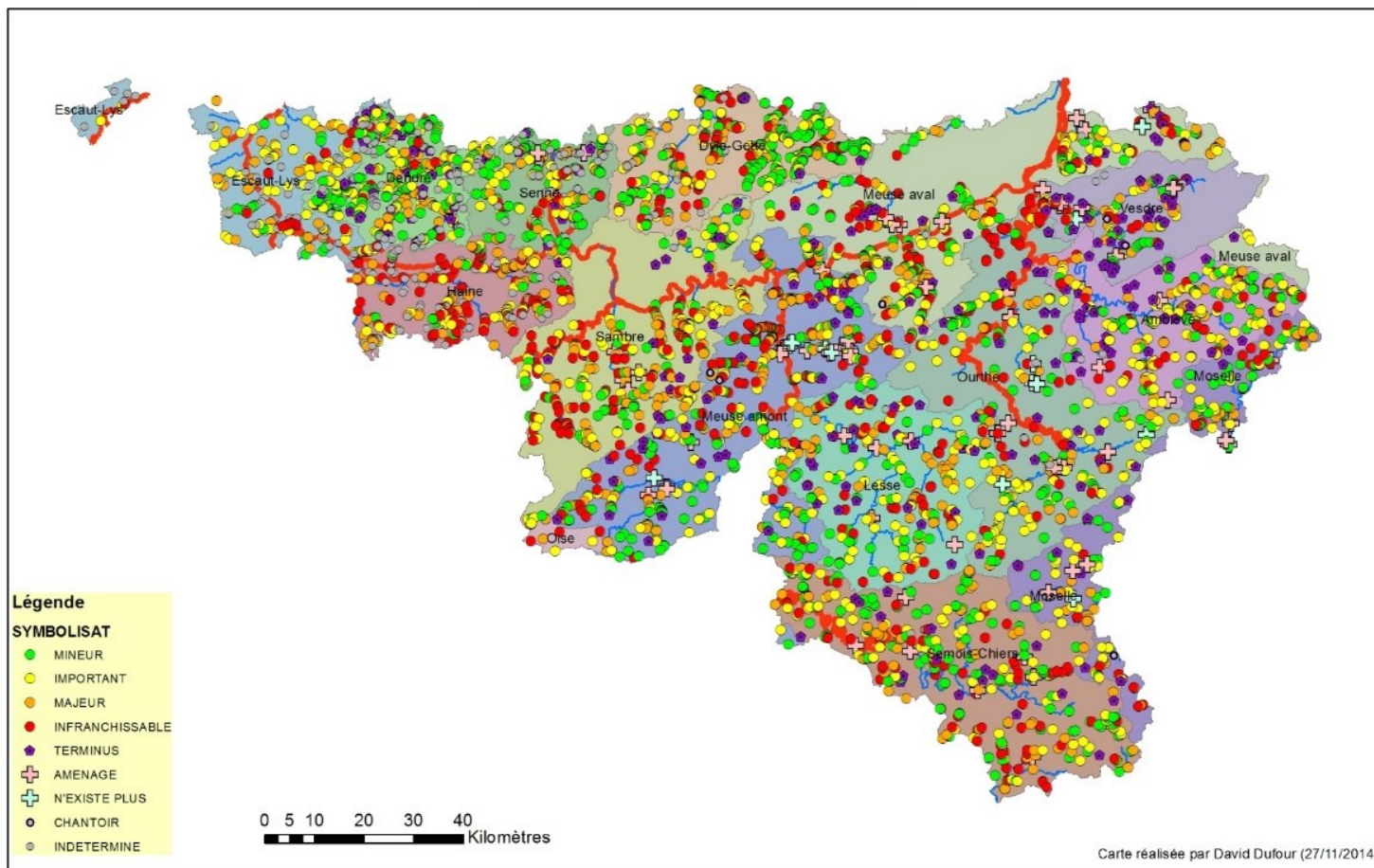
Wallonie



Service public de Wallonie

## Obstacles à la libre circulation des poissons

Sur base de l'inventaire des obstacles réalisé par la Fédération des Sociétés de Pêche de l'Est, le Département de Biologie des Facultés Universitaires Notre-Dame de la Paix de Namur et l'association momentanée Almadius-Profish.



# Introduction

Fishway



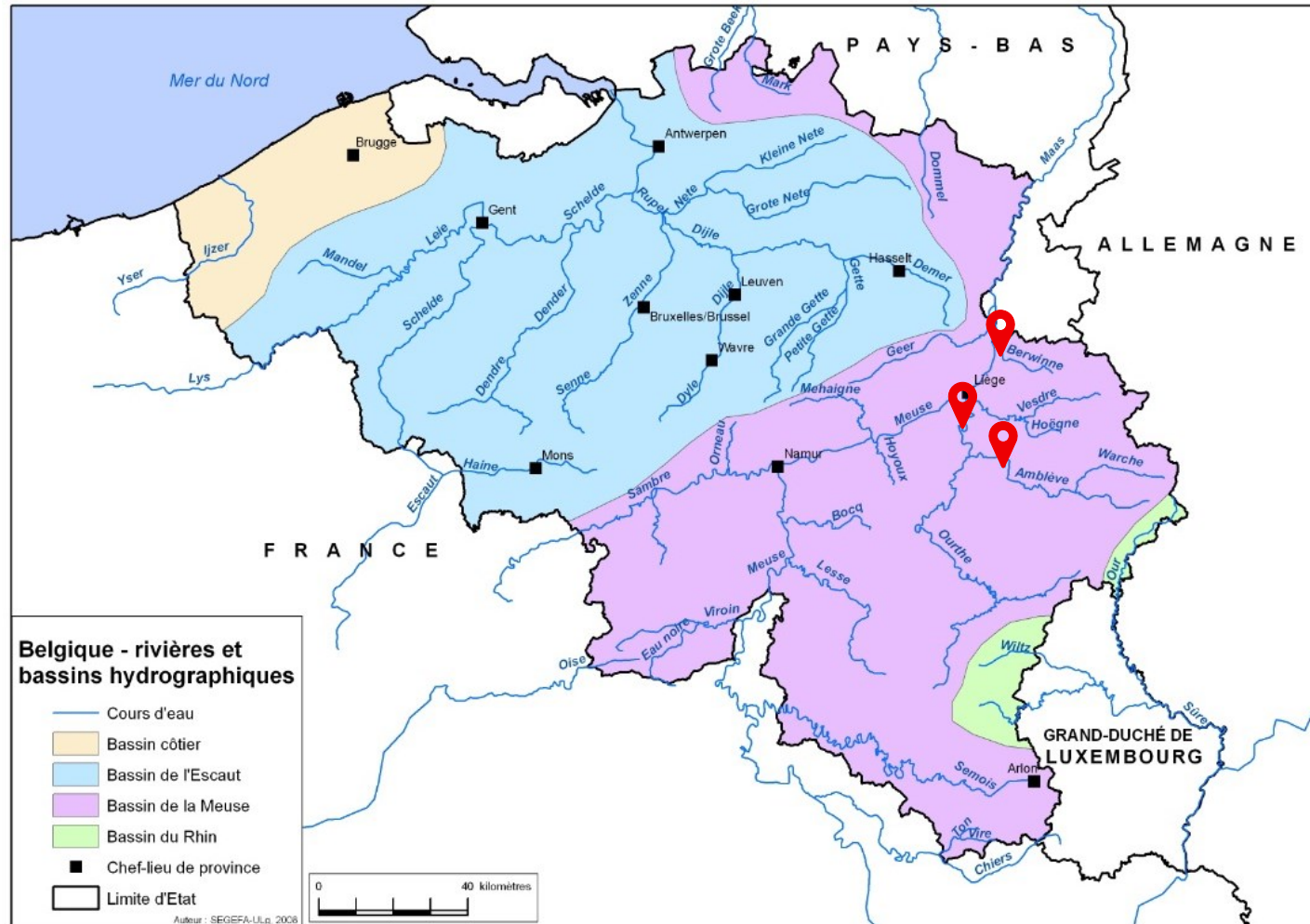
Capture cage



Use of the fishway

# Objective and study sites

What happens **DURING** the opening ?



# Study site



Berneau  
(Berwinne)



6 years



Lorcé  
(Amblève)



8 years

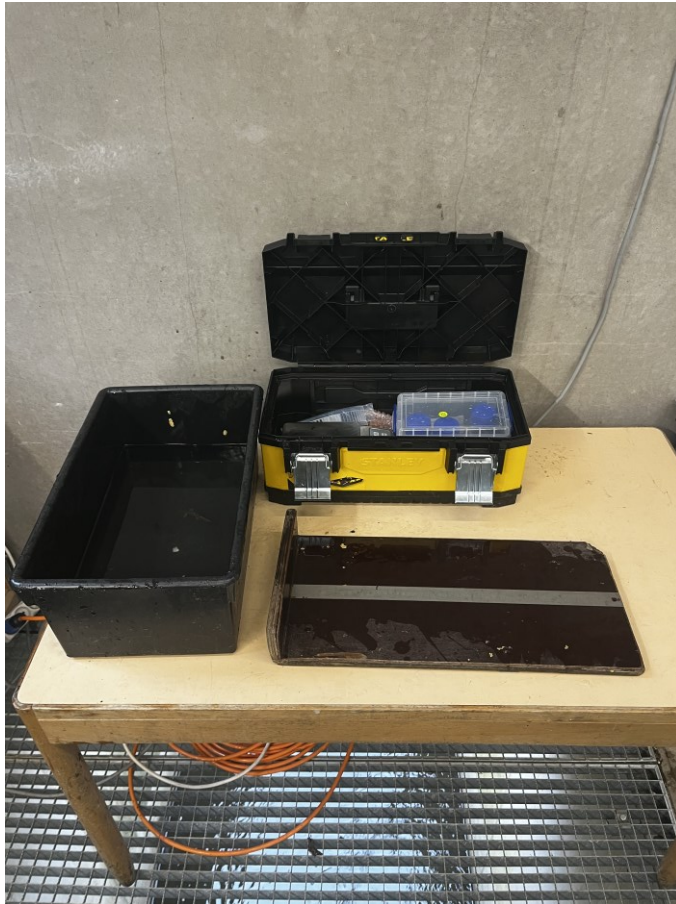


Grosses-Battes  
(Ourthe)

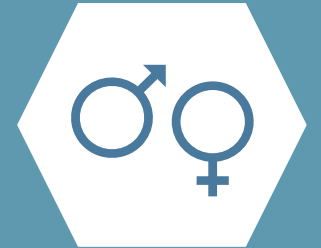
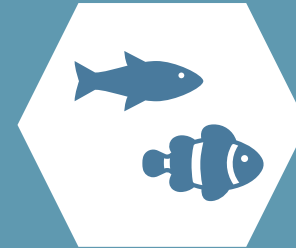


3 years

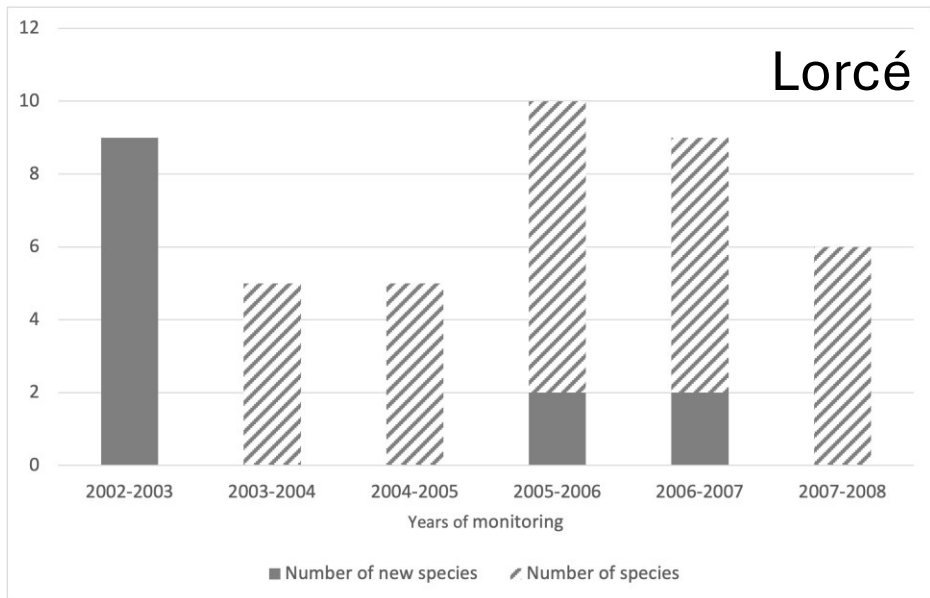
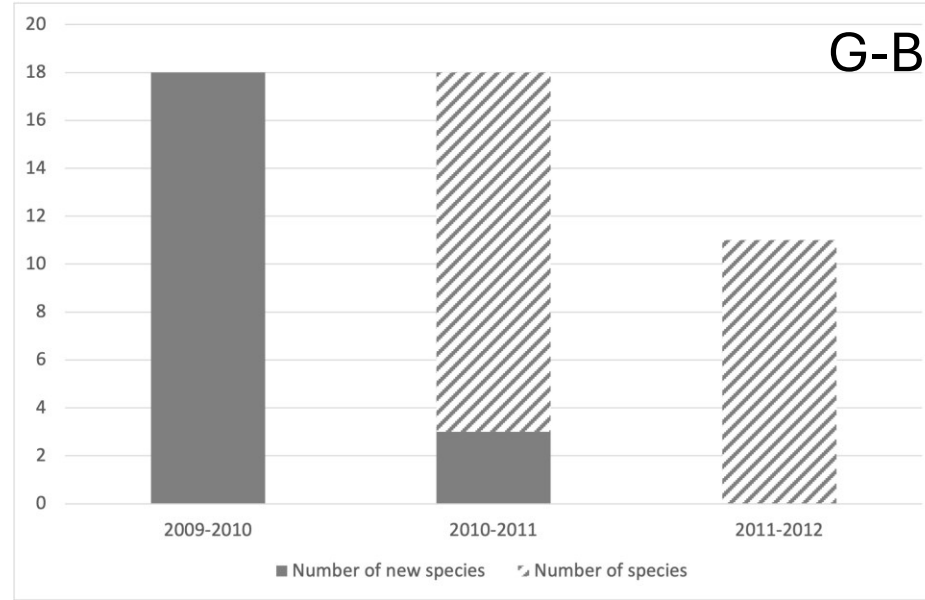
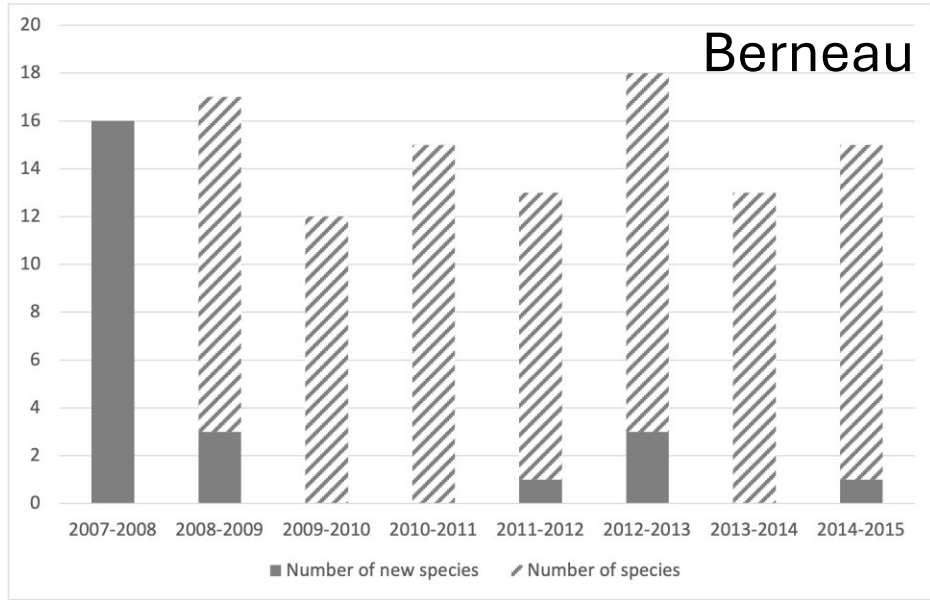
# Materials and methods



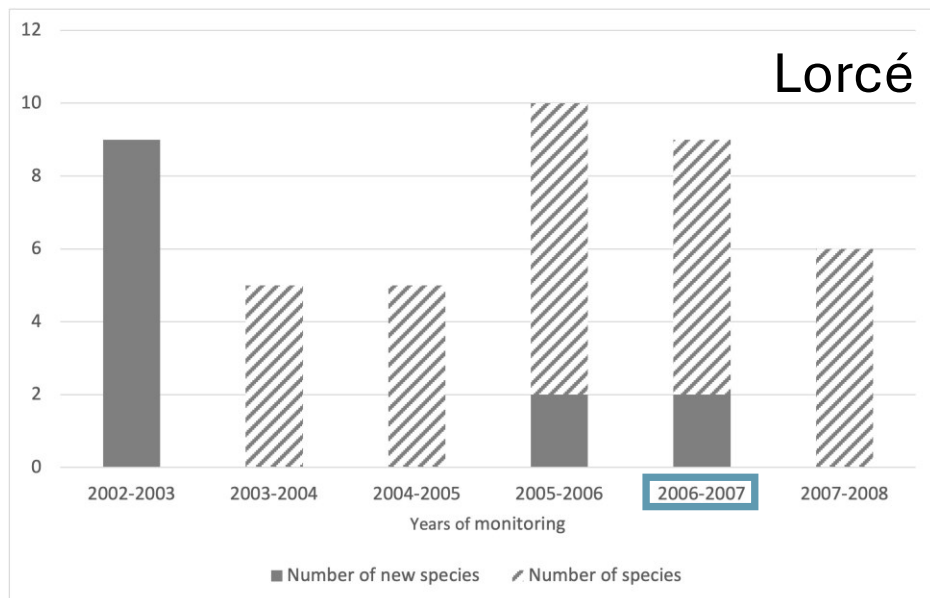
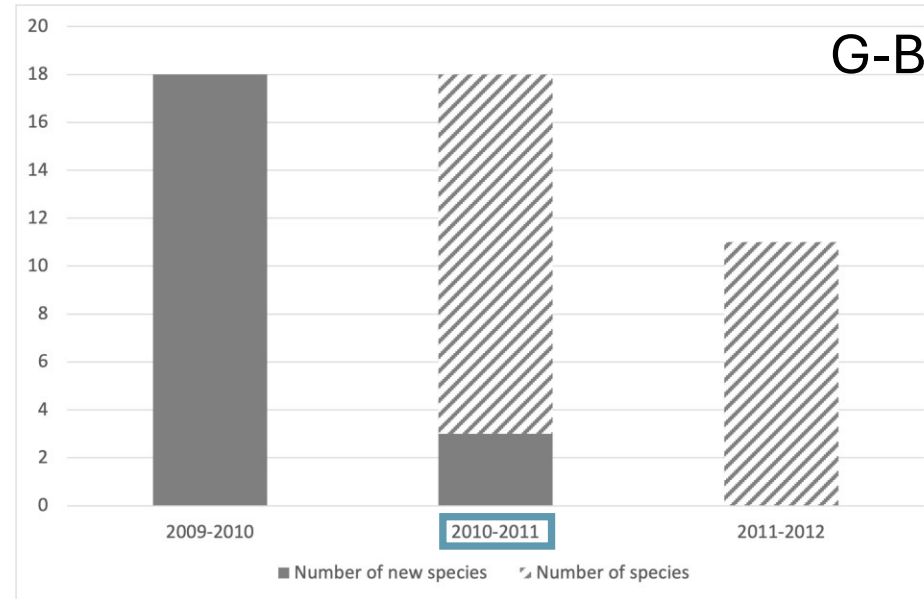
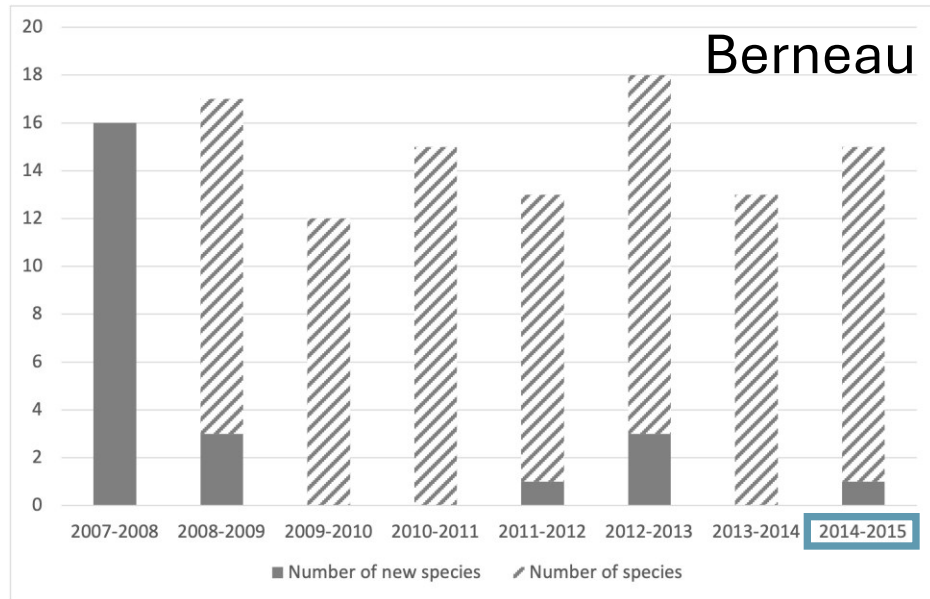
2 to 5 times per week



# Results : new fish species captured



# Results



New species captured after

- Berneau : 5 years
- Lorcé : 8 years
- Grosses-Battes : 2 years



# Results : number of individuals captured

Berneau	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>nd</sup> year	4 <sup>nd</sup> year	5 <sup>nd</sup> year	6 <sup>nd</sup> year
Total	460	193	183	533	225	177

G-B	1 <sup>st</sup> y.	2 <sup>nd</sup> y.	3 <sup>rd</sup> y.
Total	1796	234	780

Post-opening effect

# Results : number of individuals captured

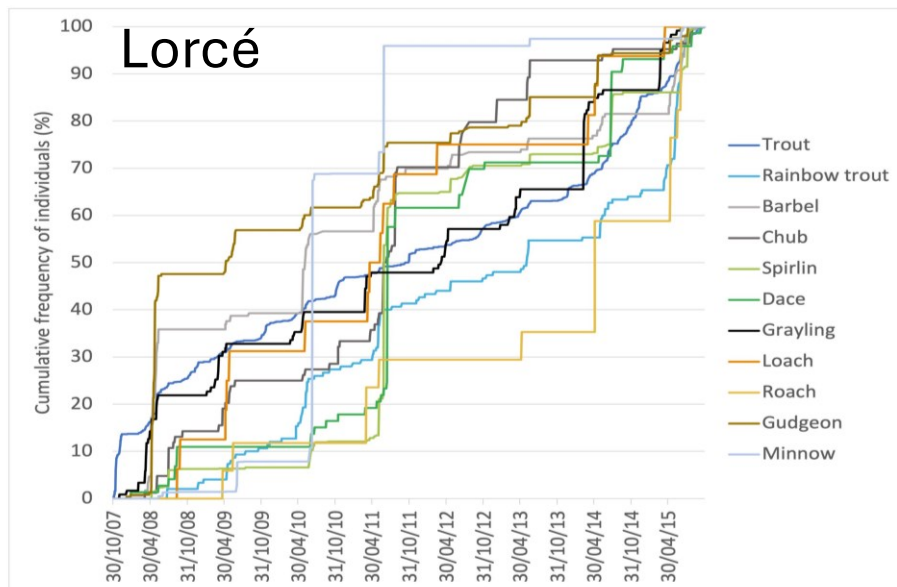
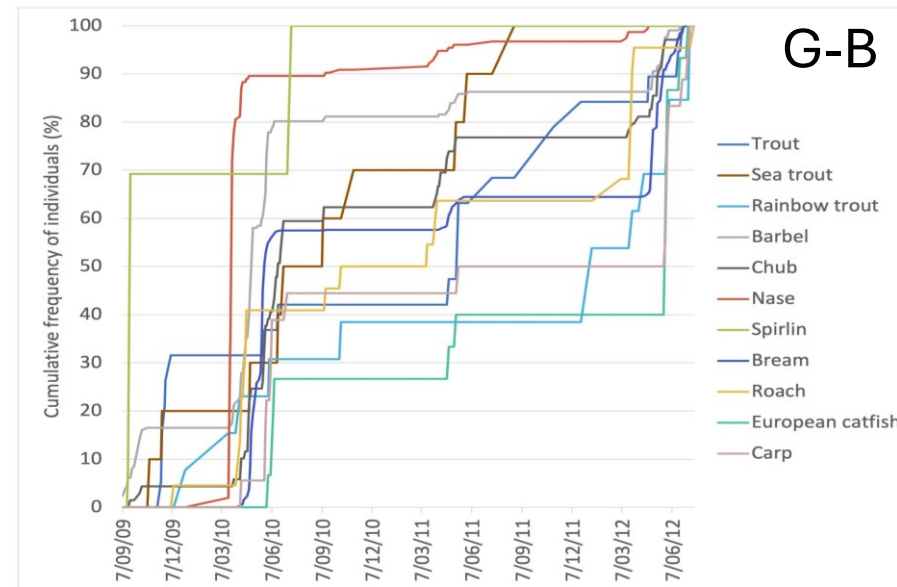
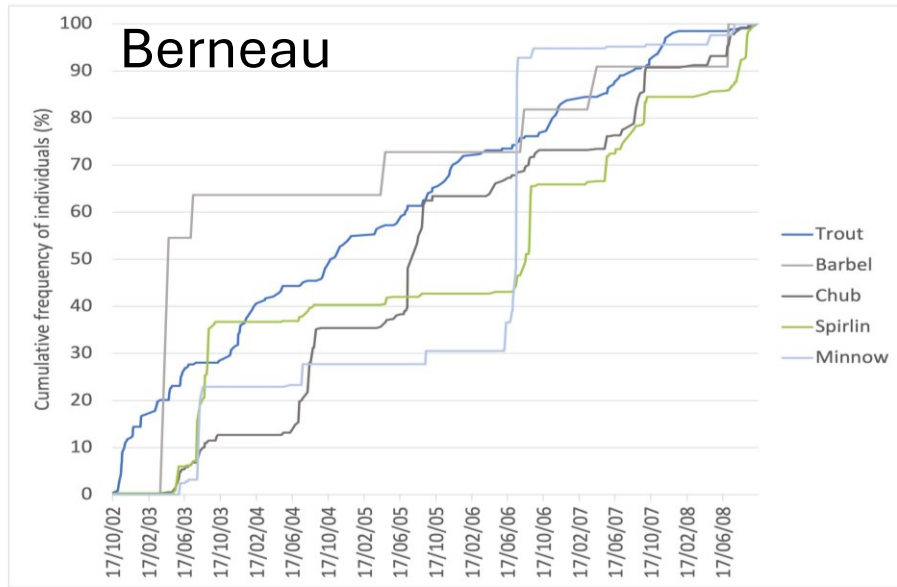
Berneau	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>nd</sup> year	4 <sup>nd</sup> year	5 <sup>nd</sup> year	6 <sup>nd</sup> year
Total	460	193	183	533	225	177

G-B	1 <sup>st</sup> y.	2 <sup>nd</sup> y.	3 <sup>rd</sup> y.
Total	1796	234	780

Post-opening effect

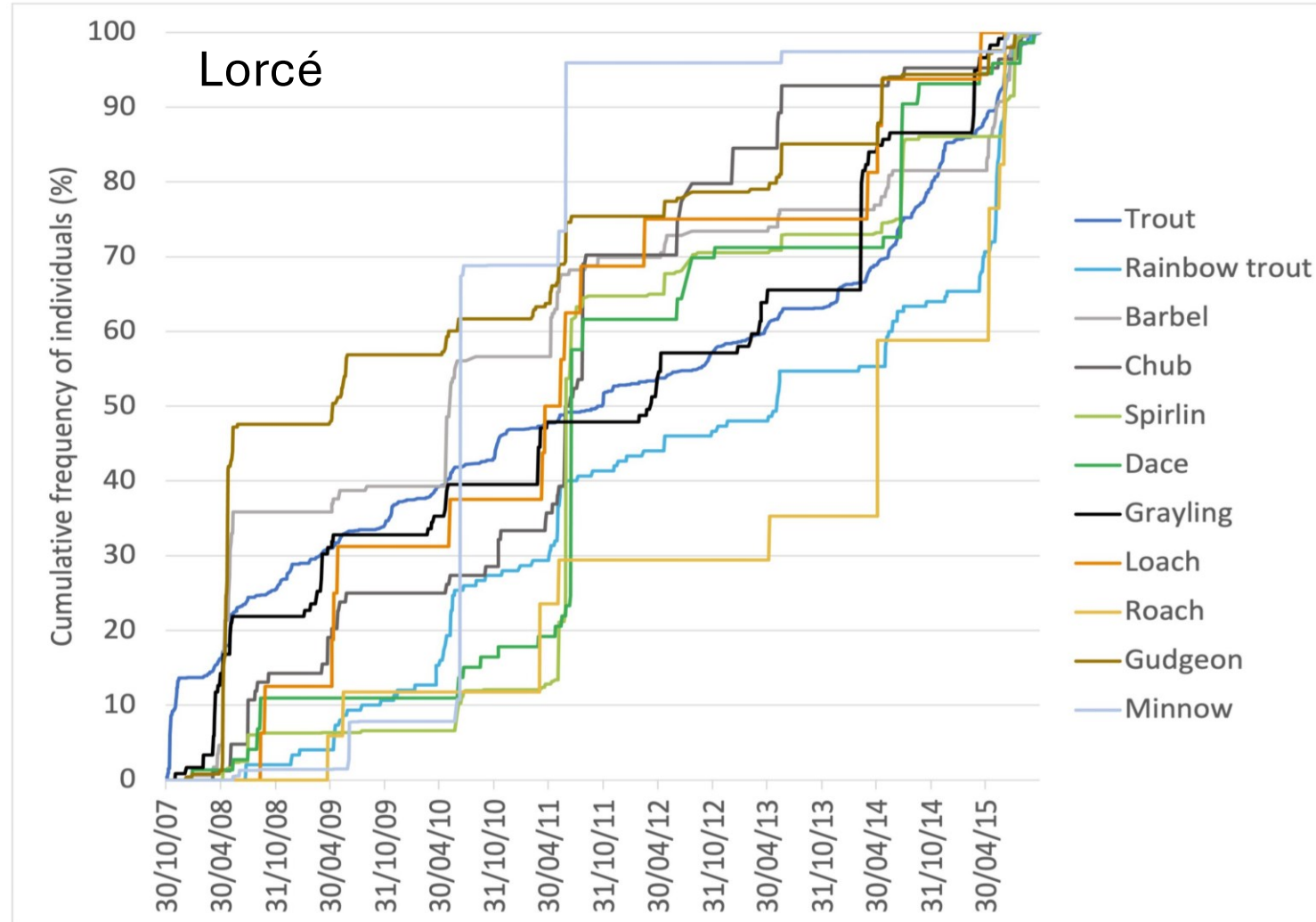
Lorcé	1 <sup>st</sup> y.	2 <sup>nd</sup> y.	3 <sup>rd</sup> y.	4 <sup>nd</sup> y.	5 <sup>nd</sup> y.	6 <sup>nd</sup> y.	7 <sup>nd</sup> y.	8 <sup>nd</sup> y.
Total	688	411	2467	1736	170	213	386	556

# Results : periodicity of capture

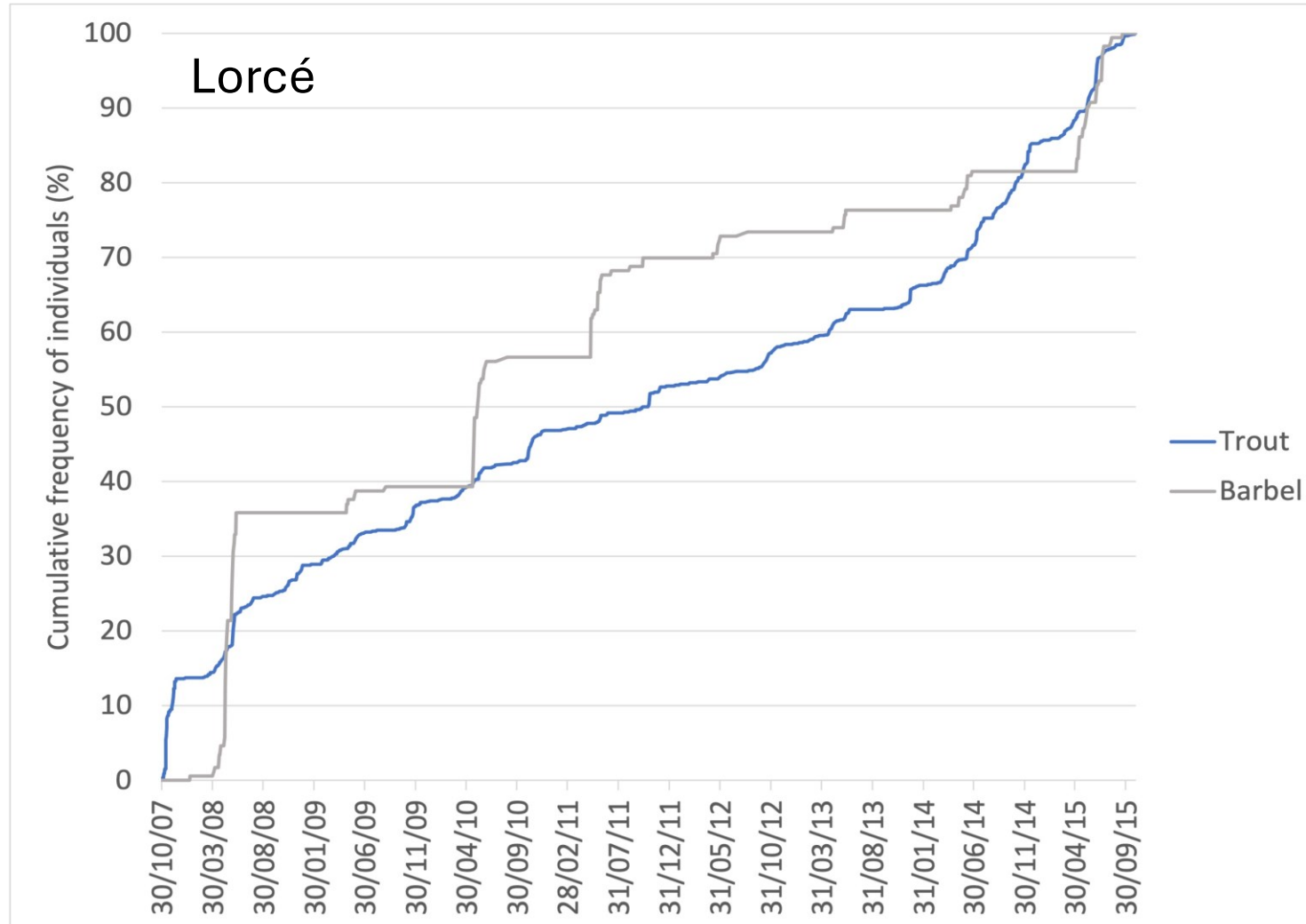


Capture periodicity throughout the year / precise periods

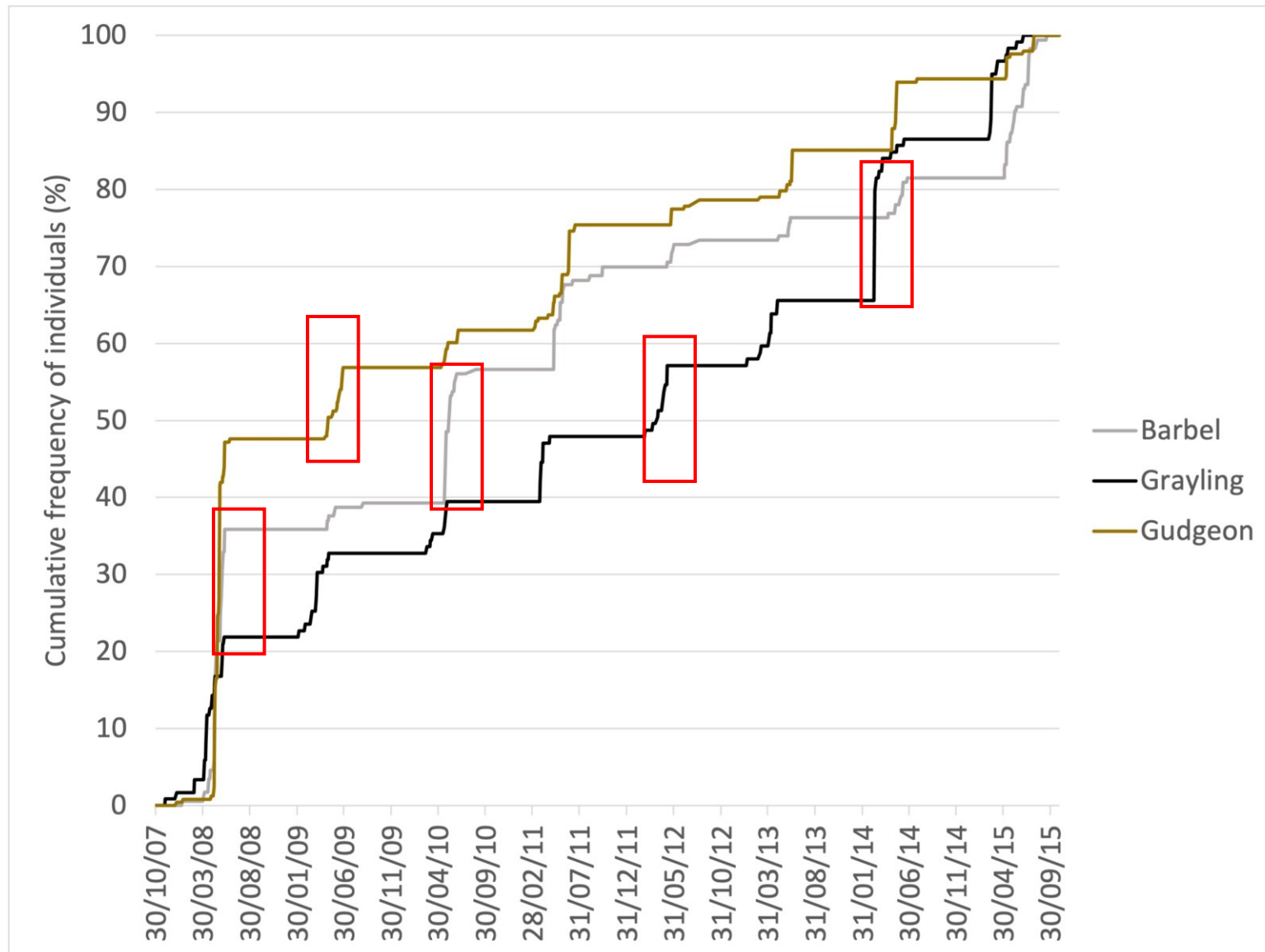
# Results : periodicity of capture



# Results : periodicity of capture






# Results



Main peaks captured during spawning period




# First conclusions

Monitoring over several years :

-  New species still captured after several years
-  Opening effect visible during the 1st year
-  Capture peak reached after several years

# First conclusions

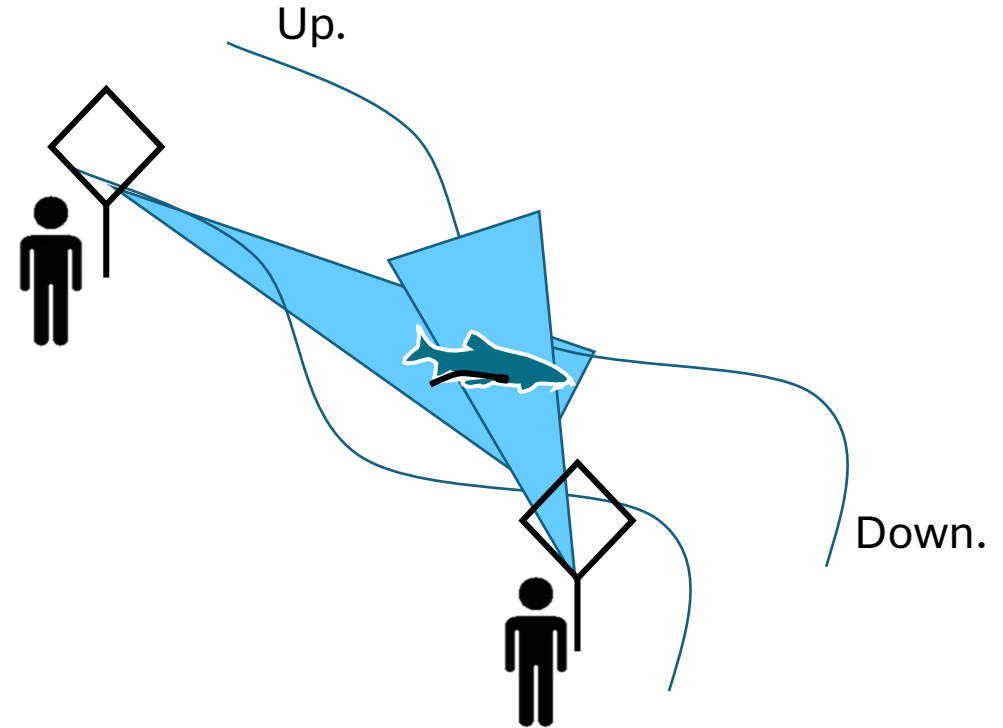
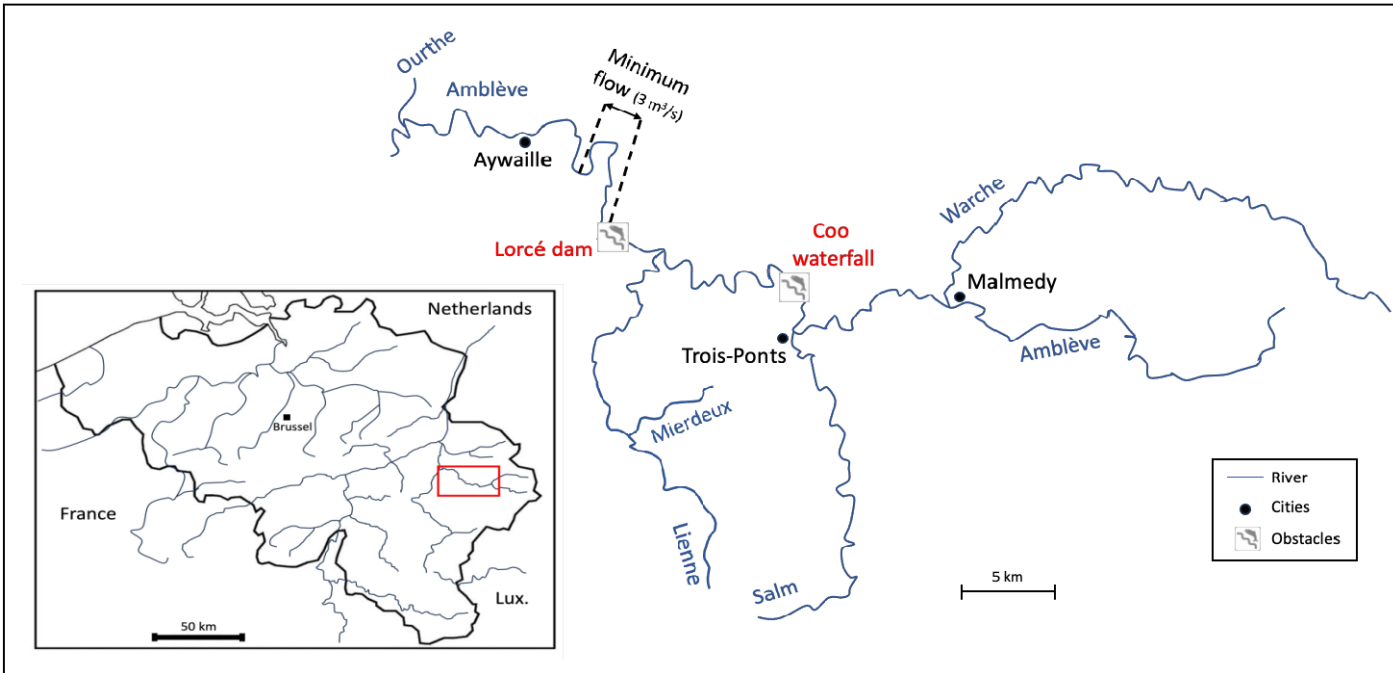
Monitoring over several years :

-  New species still captured after several years
-  Opening effect visible during the 1st year
-  Capture peak reached after several years

What happens **AFTER** the opening ?



# Material and methods



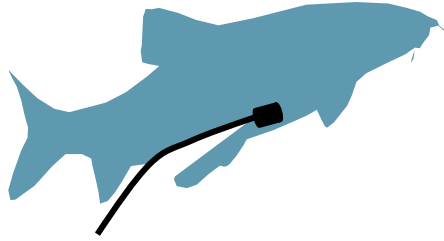
Coo waterfall



Lorcé dam

4 species : barbel, nase, trout and grayling

# Material and methods



Radio transmitter

Lorcé dam



2 trouts



3 graylings



1 nase



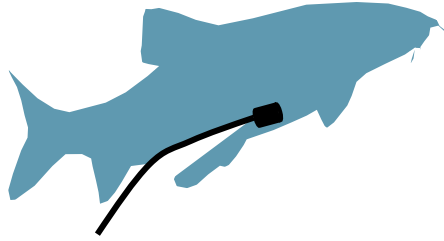
4 barbels

Coo waterfall



11 barbels

# Material and methods

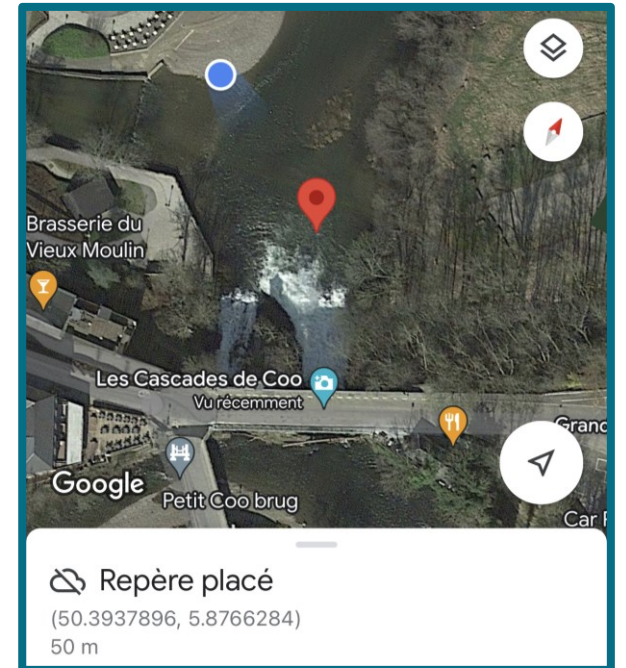


Radio transmitter

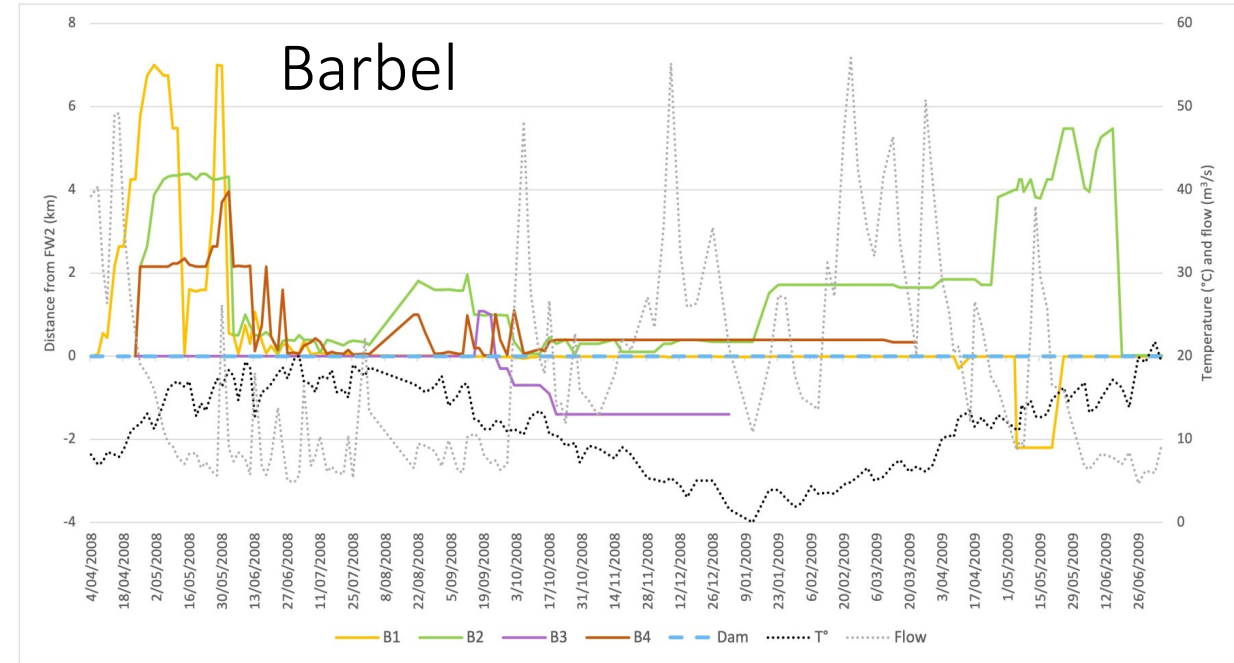
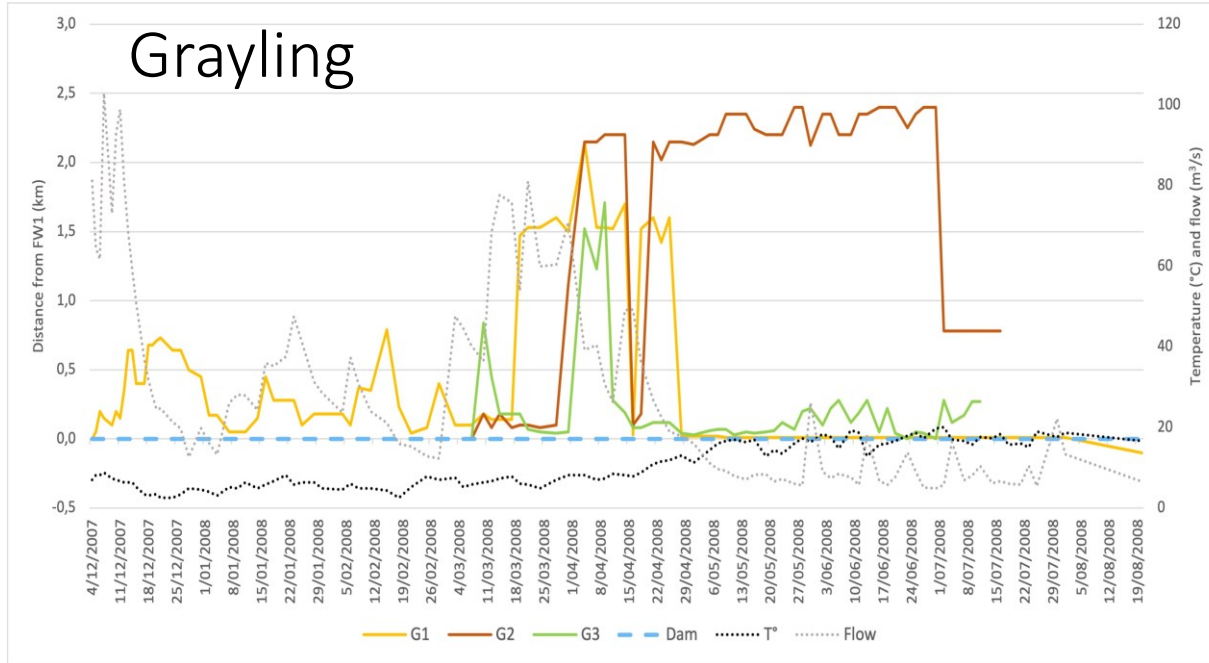


3 to 7 times / week

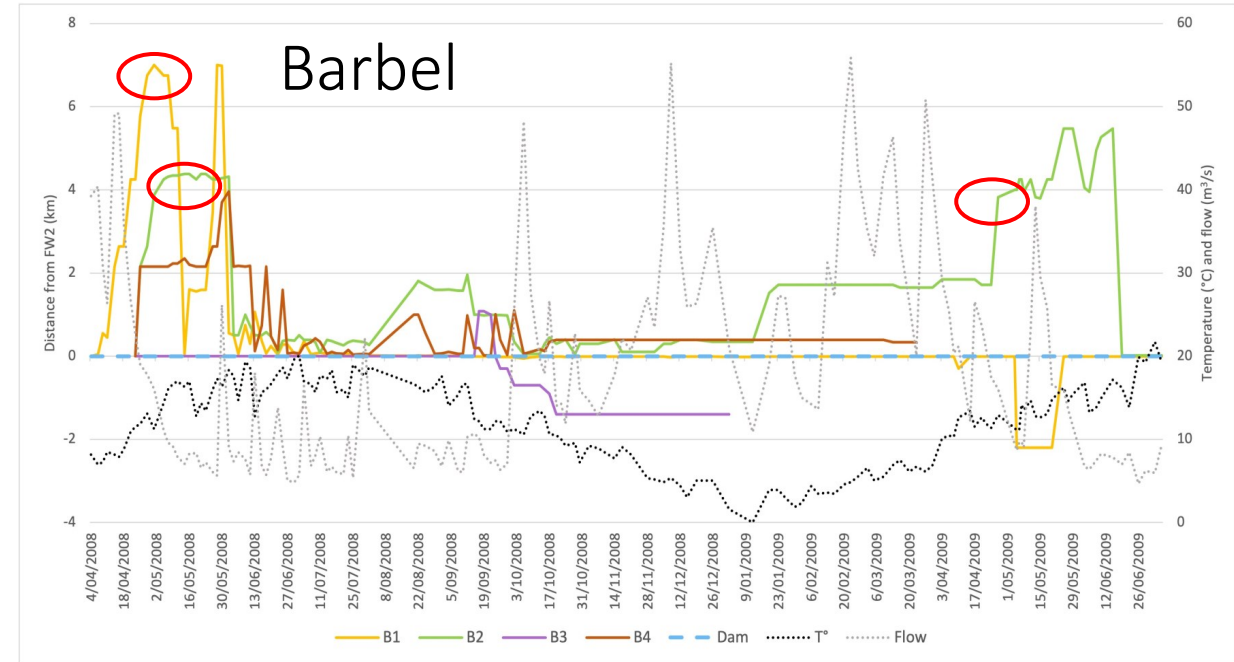
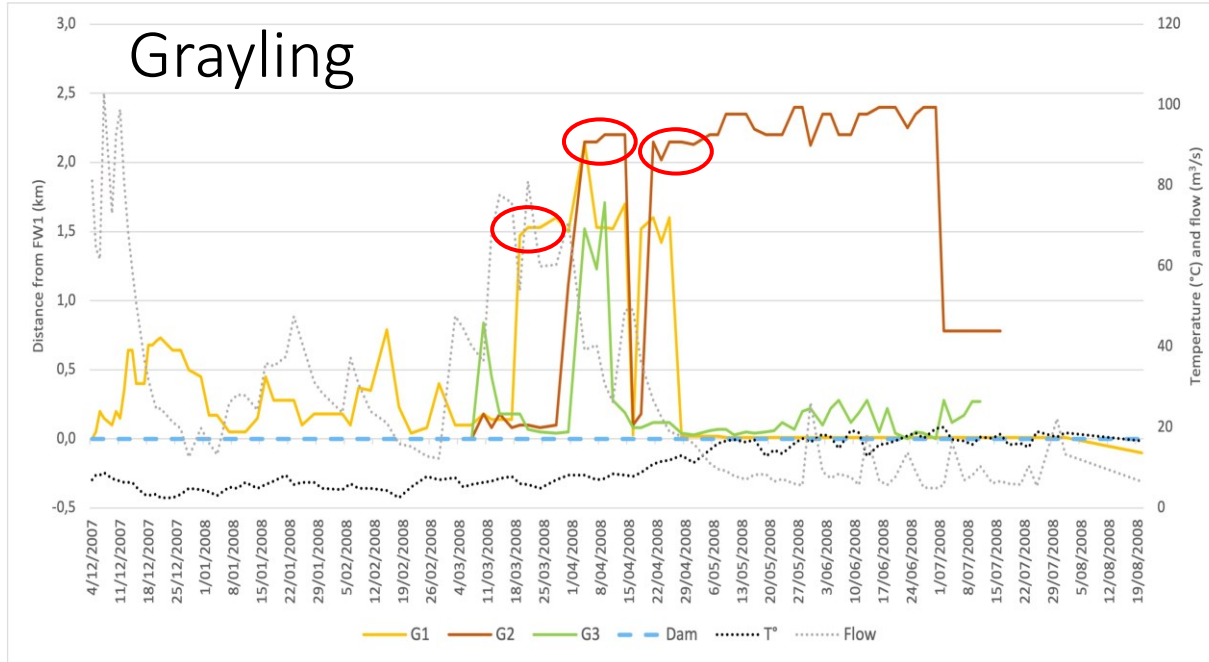
1 to 15 months



# Results

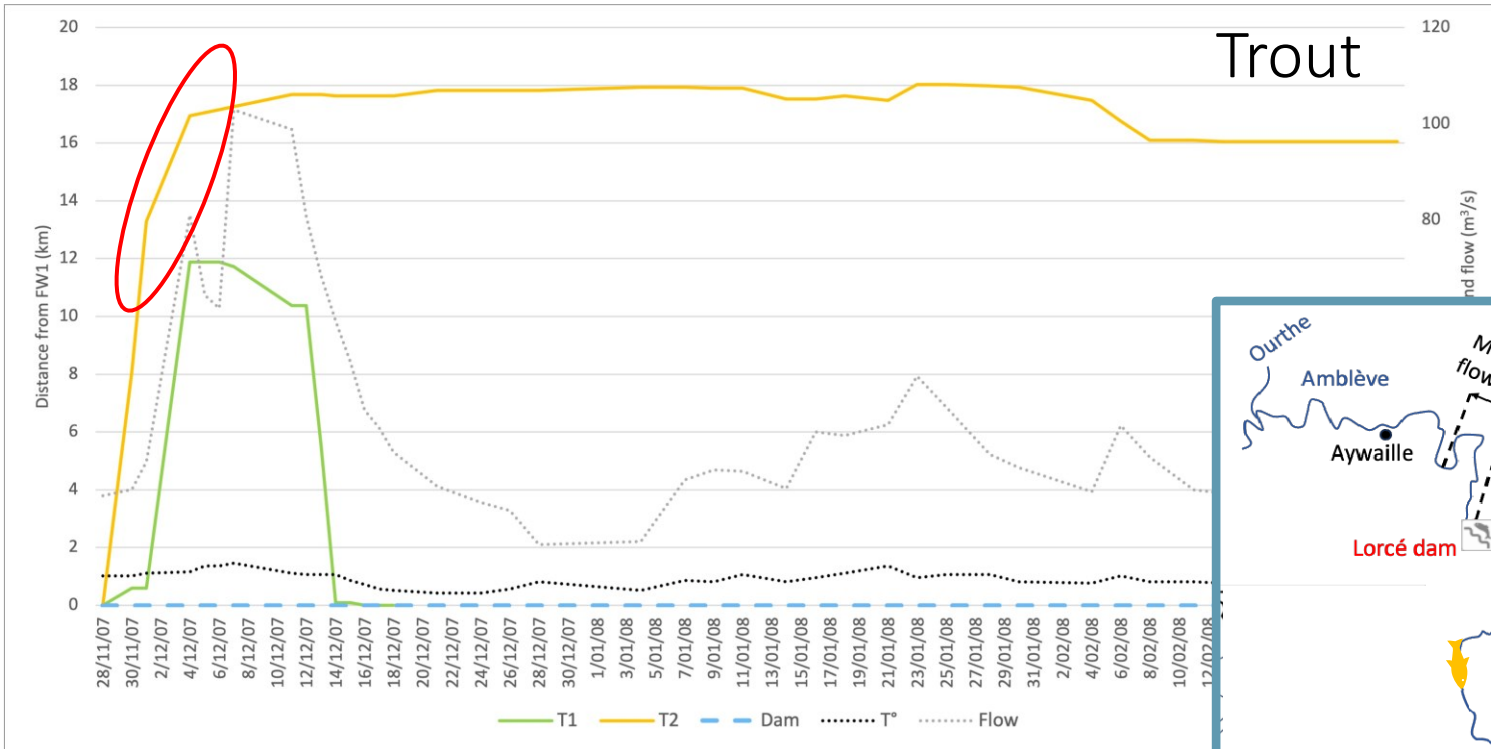


# Results

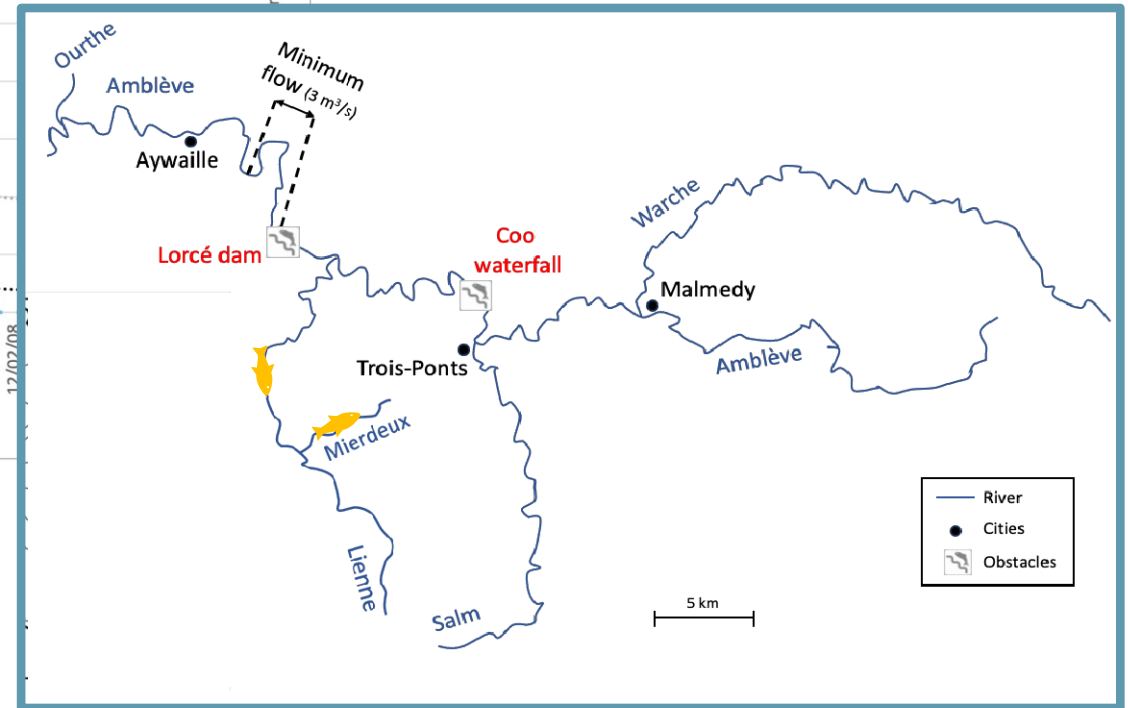


Longest displacements :  
spawning period

# Results : before/during spawning period



Tributary exploited

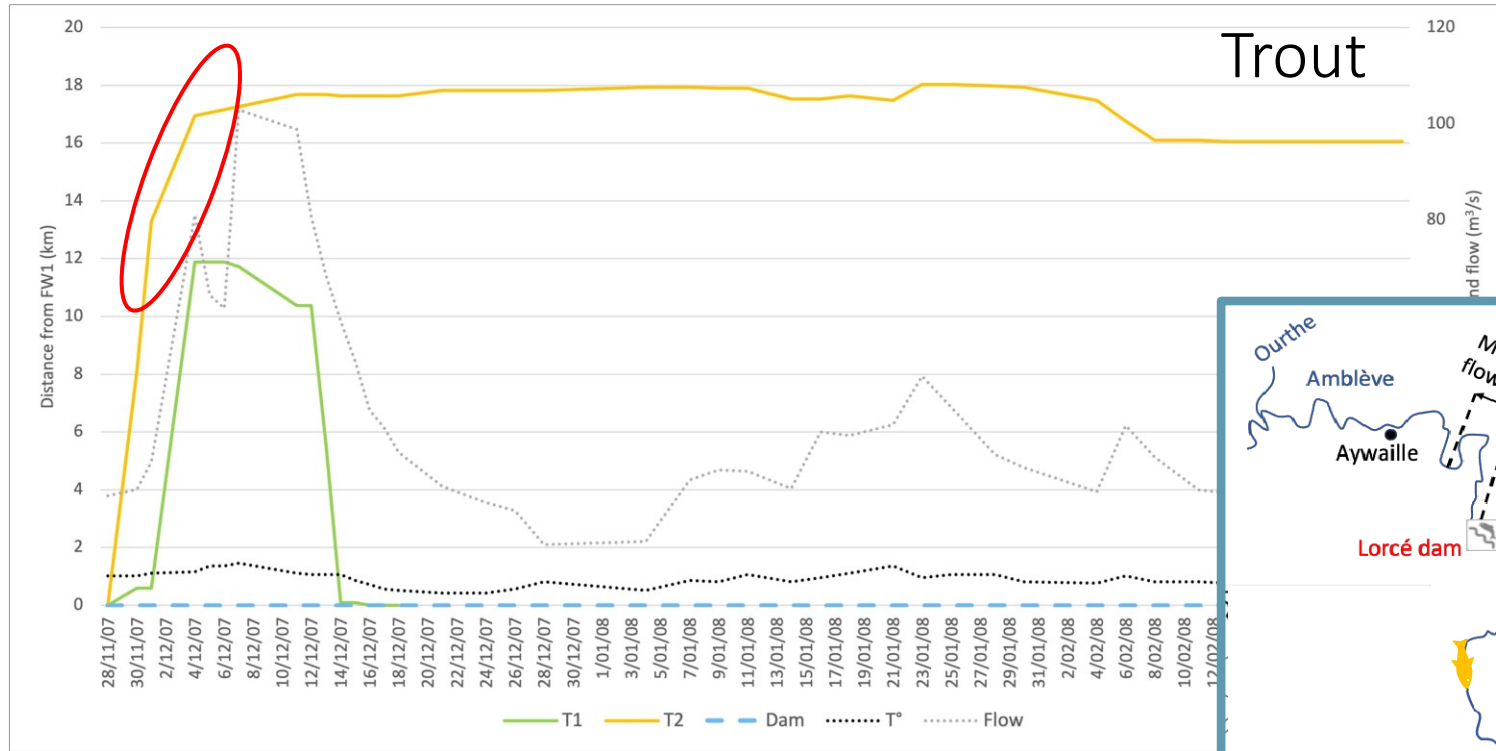


Lienne



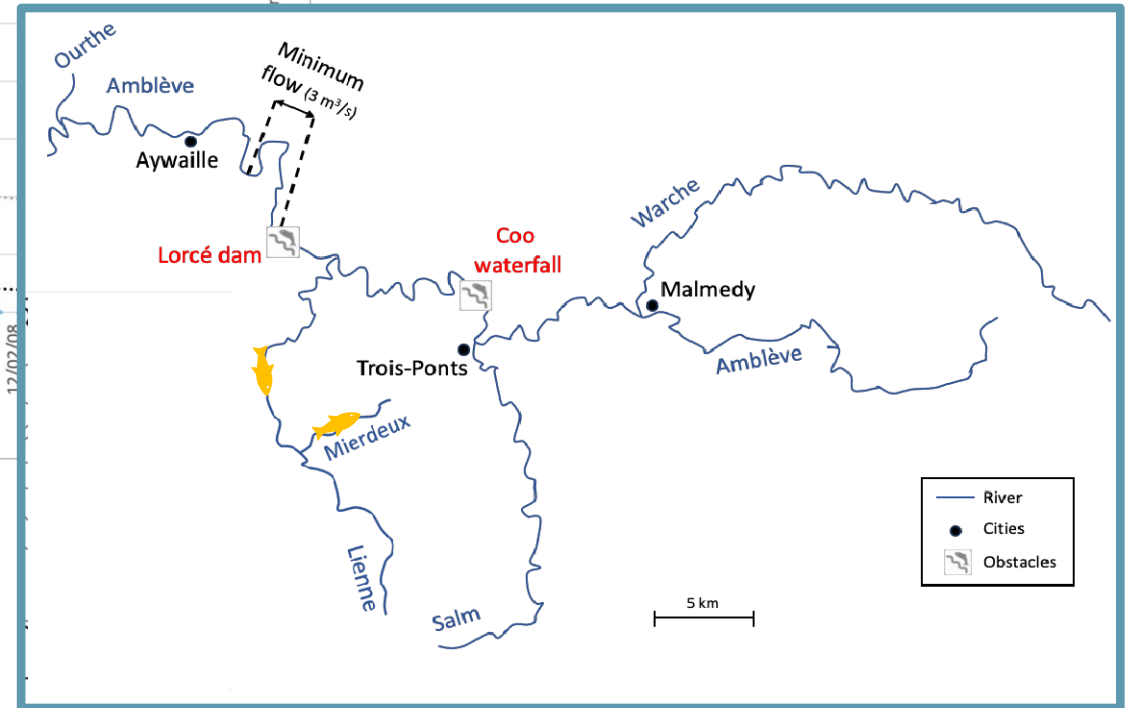
Mierdeux

# Results : before/during spawning period



Tributary exploited

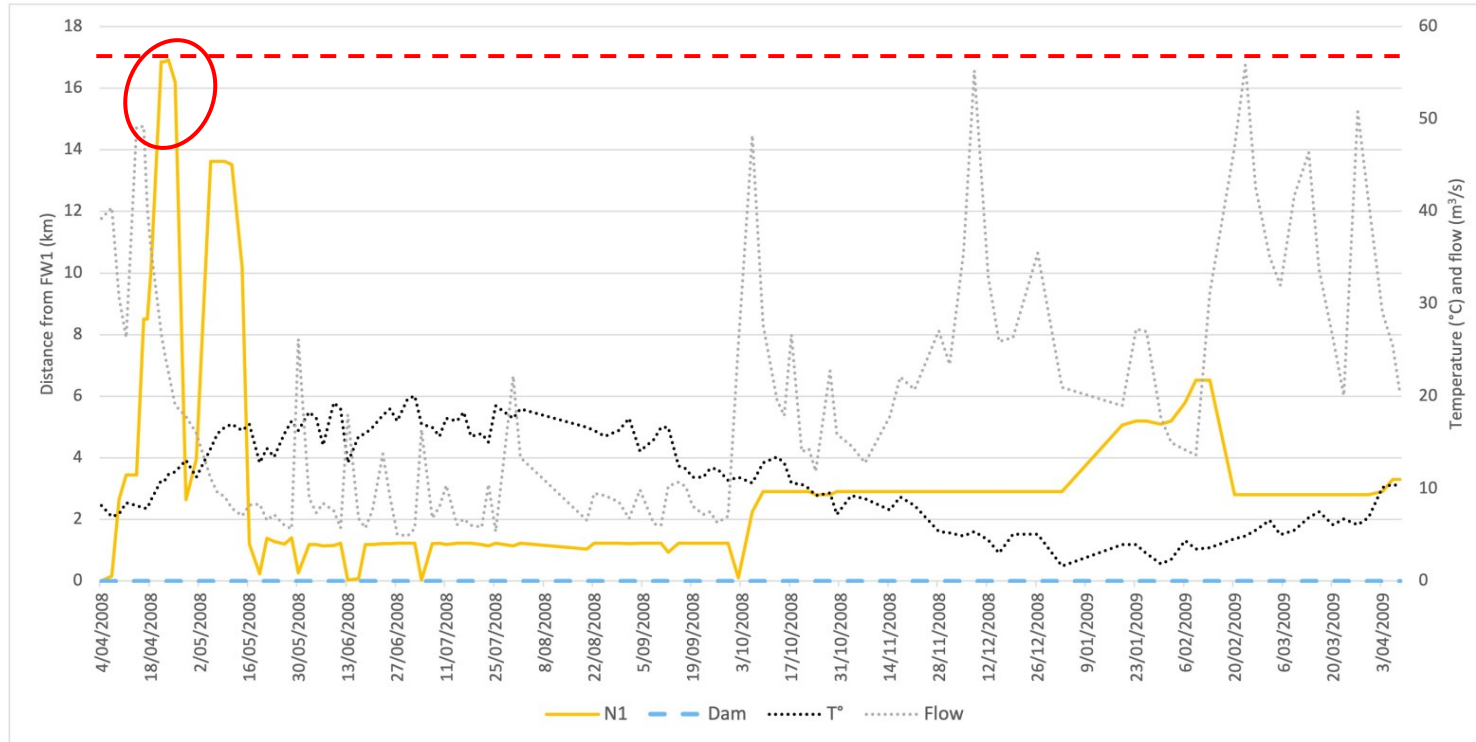
Connection between mainstream and tributaries



# Results : before/during spawning period

Blocked by an obstacle

Nase



Coo waterfall

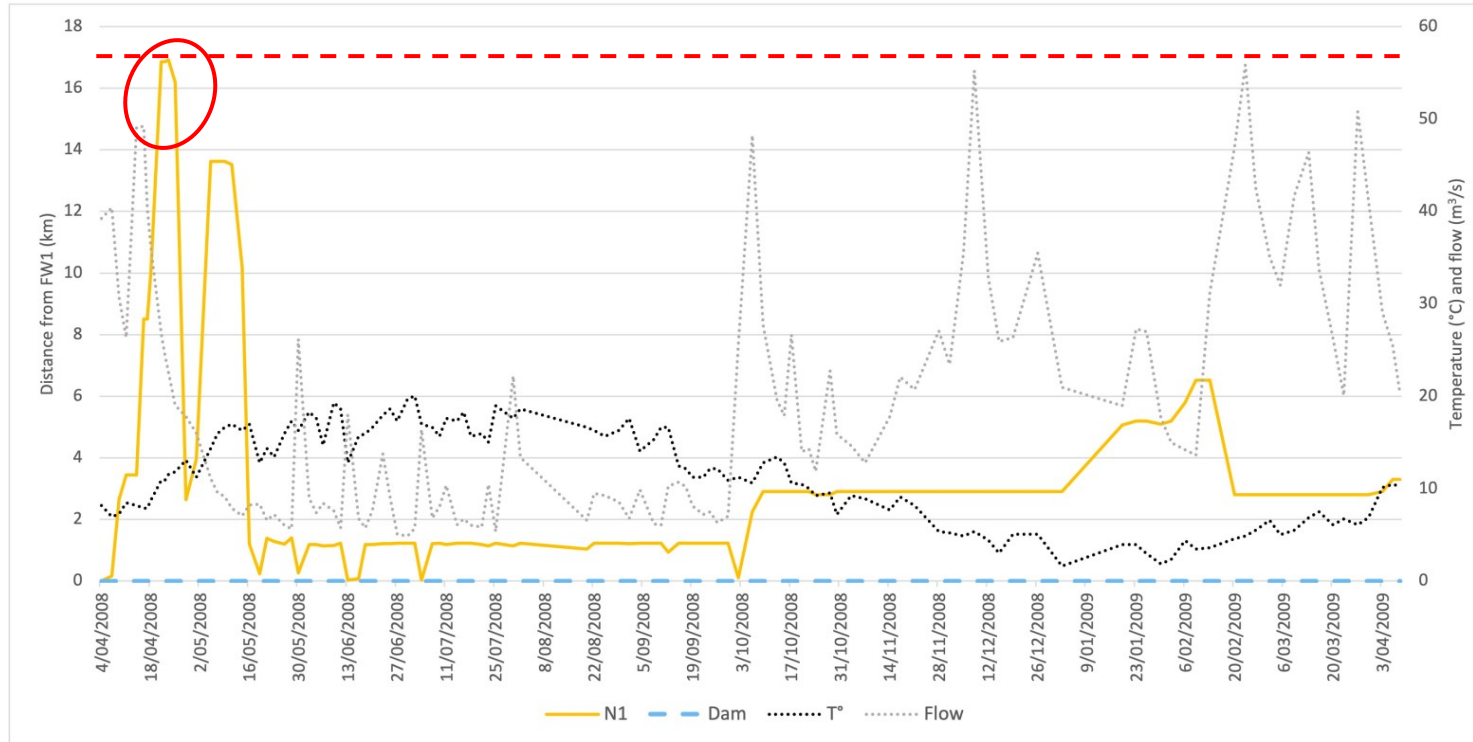




# Results : before/during spawning period

Blocked by an obstacle

Nase



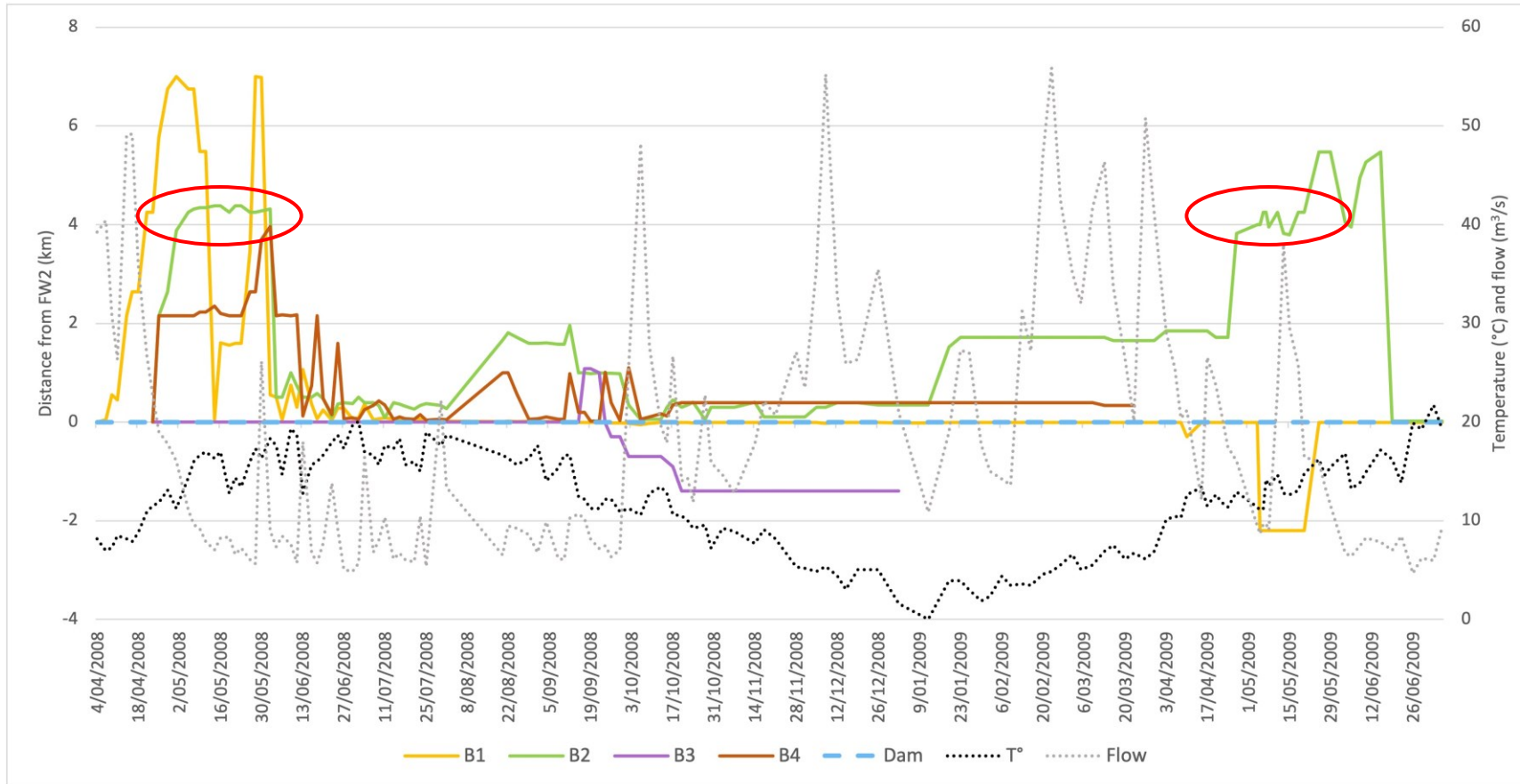
Coo waterfall



Restore connectivity along the entire length of the river

# Results : before/during spawning period

## Barbel

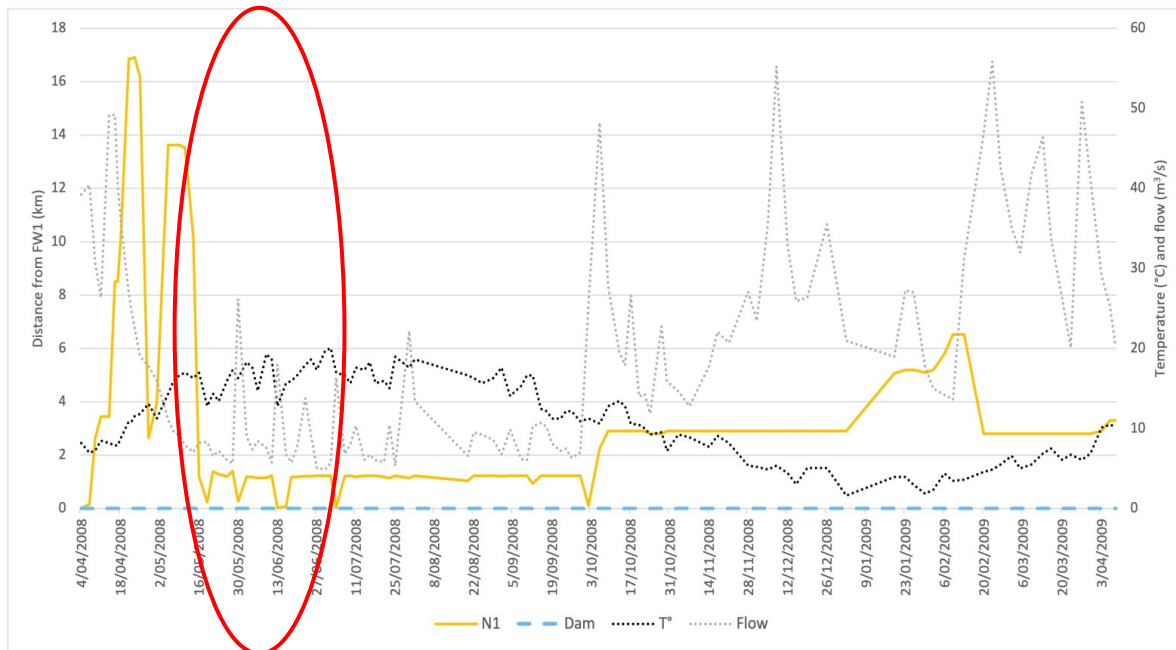


Interannual fidelity

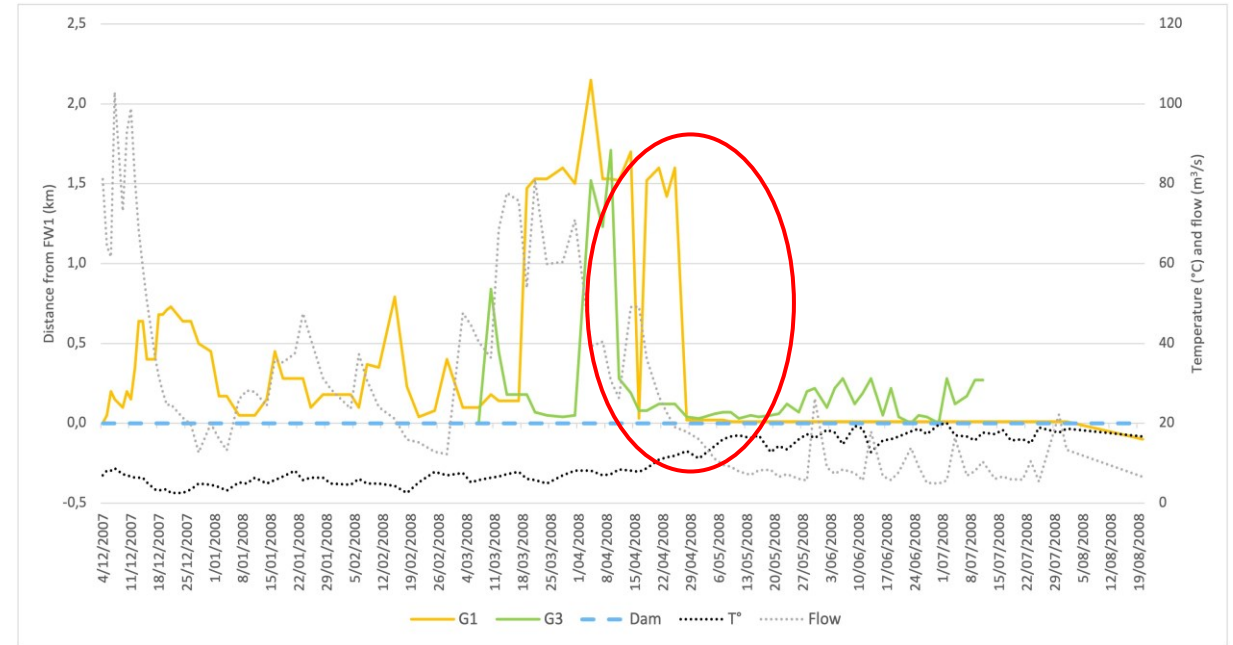
# Results : after spawning period

## Post-spawning downstream migration

Nase

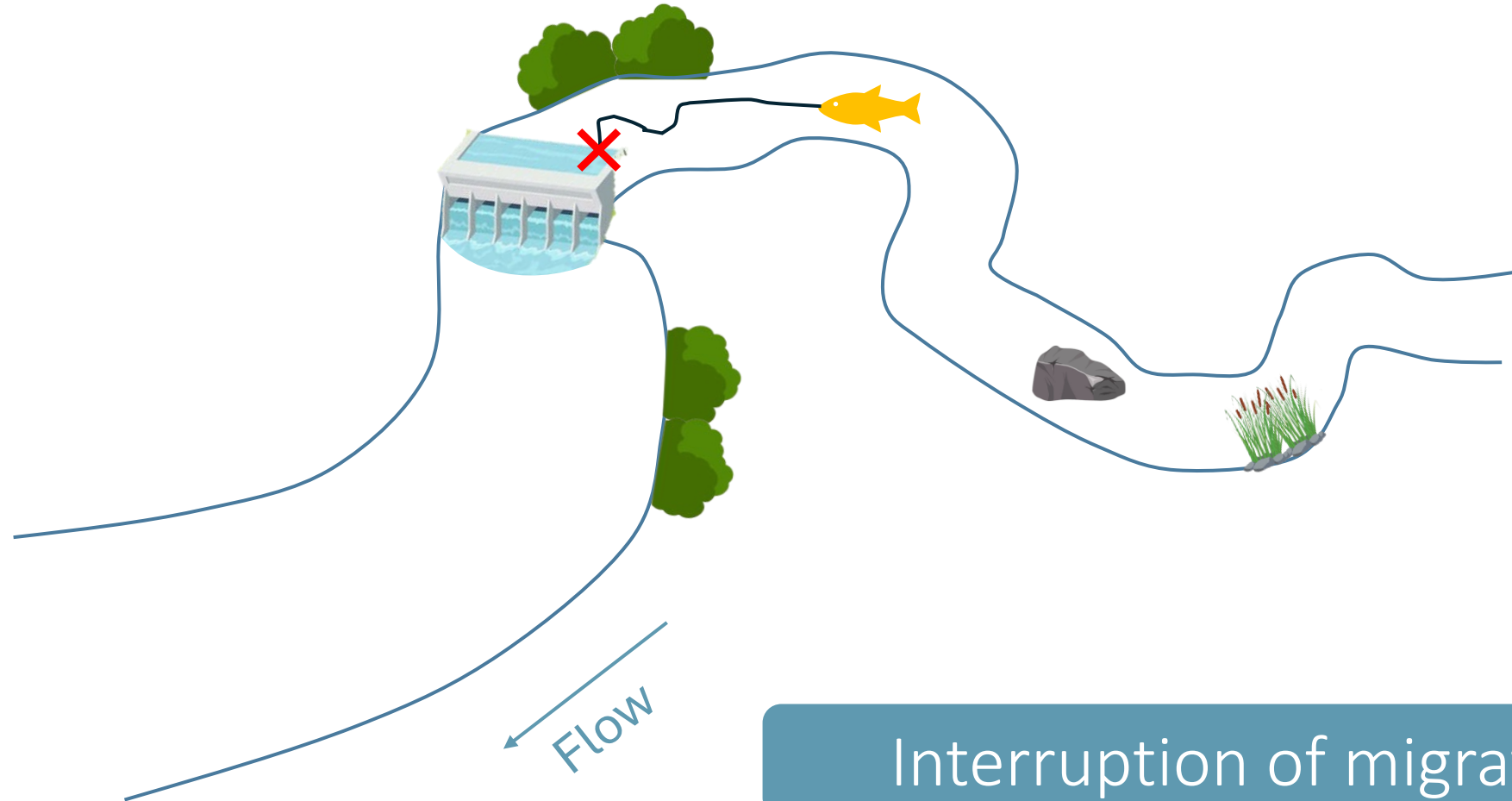


Grayling

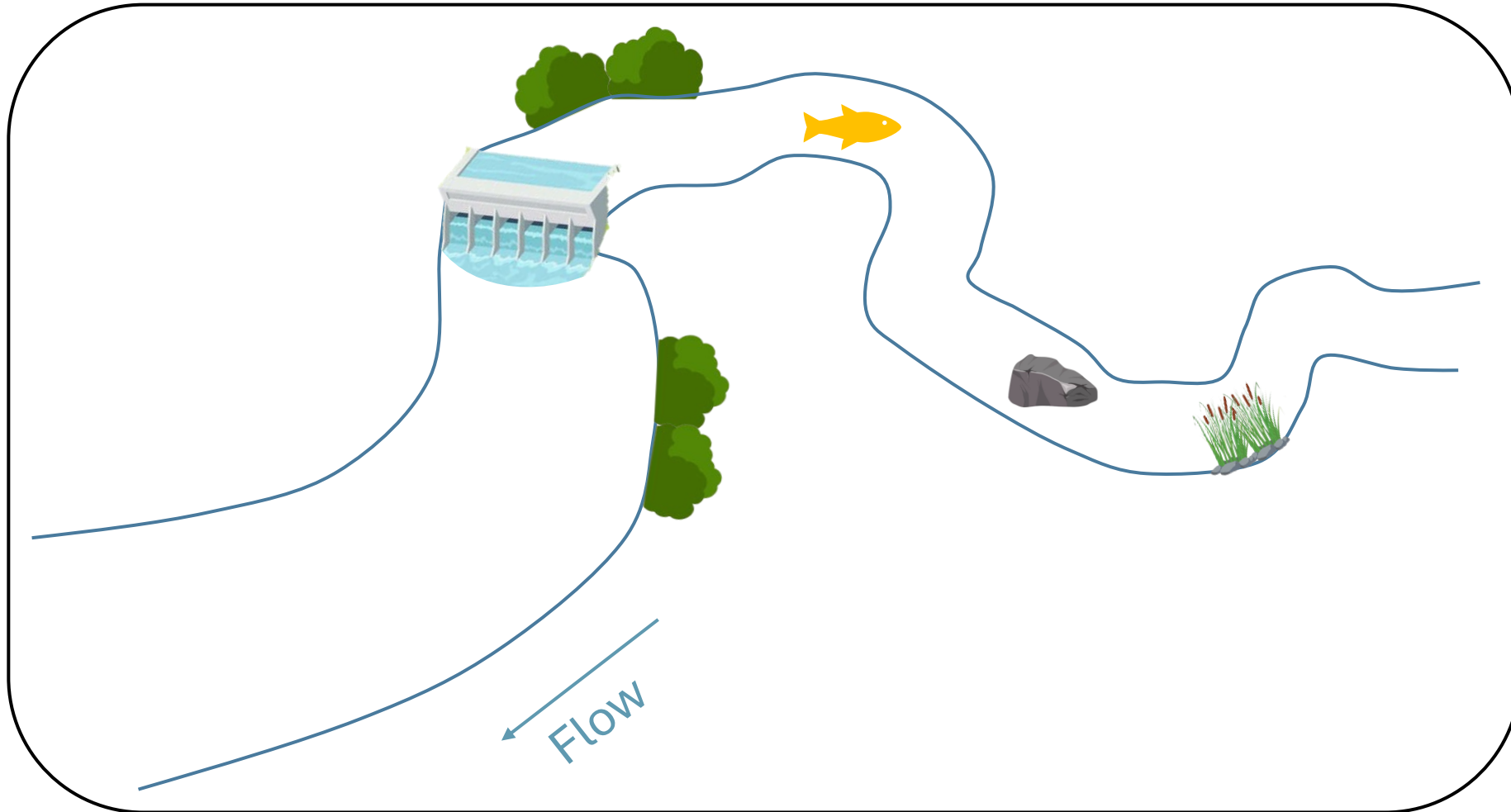


Fish interrupted by the dam

# Results : after spawning period



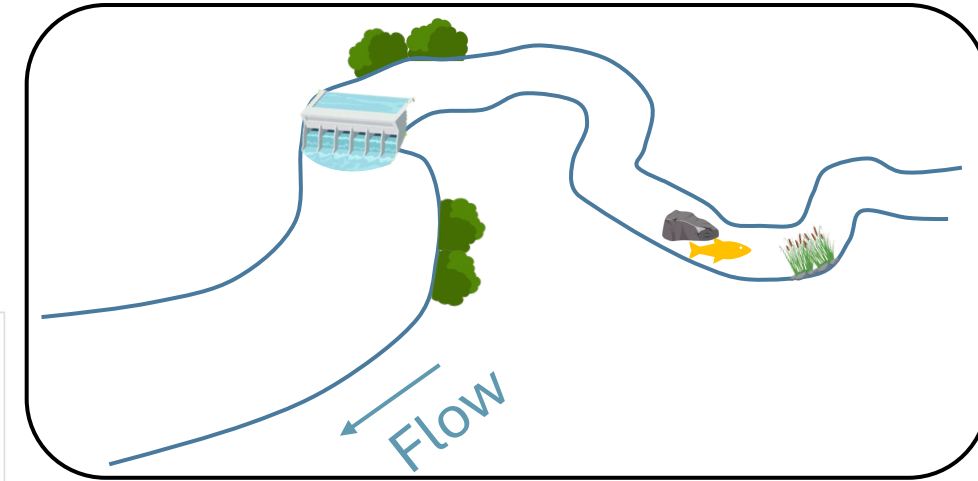
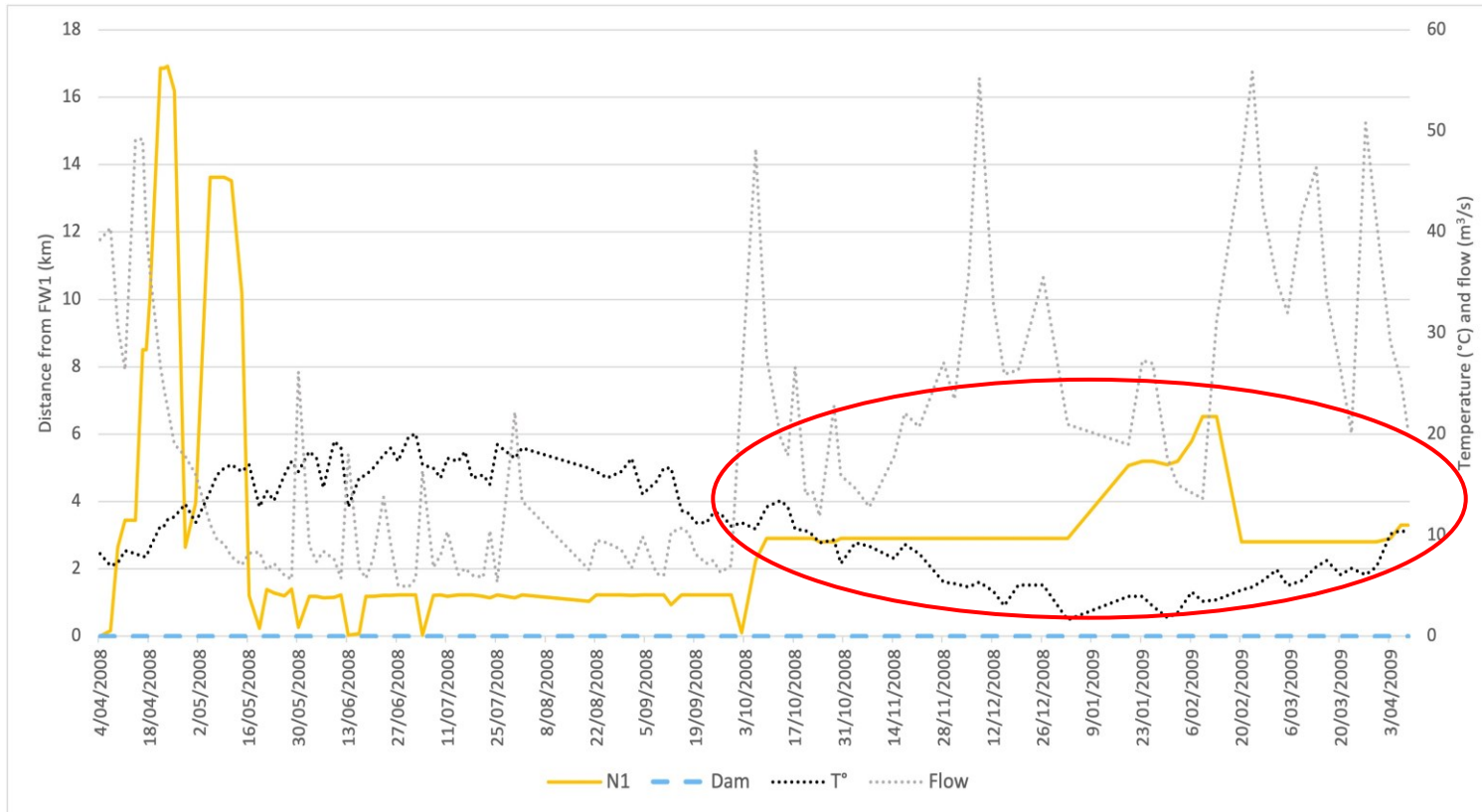
# Results : after spawning period



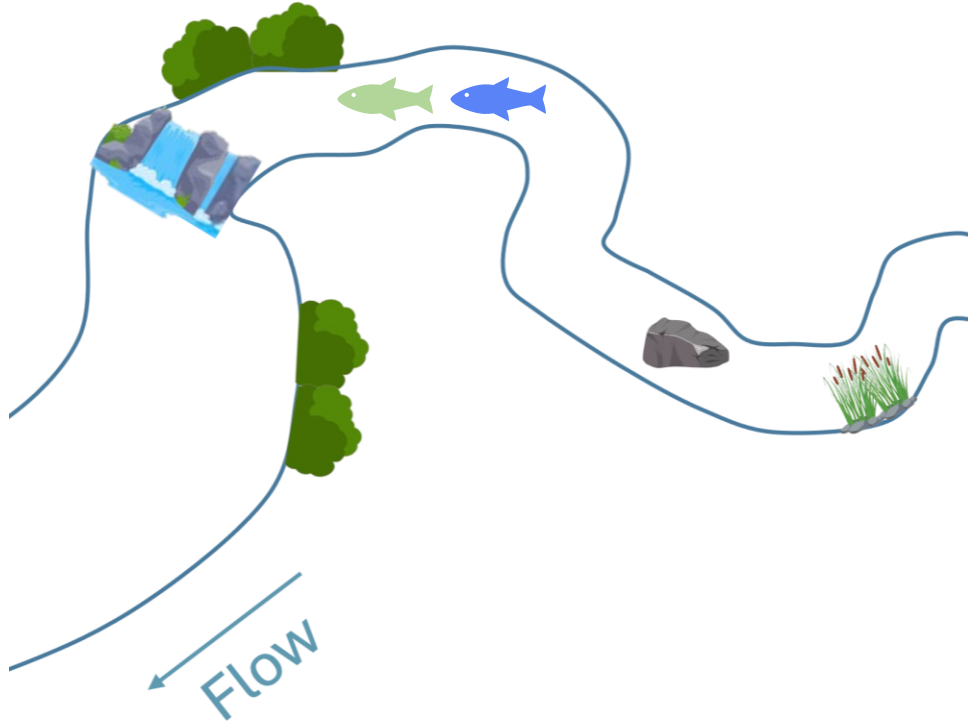
Use of substitution habitats

# Results : after spawning period

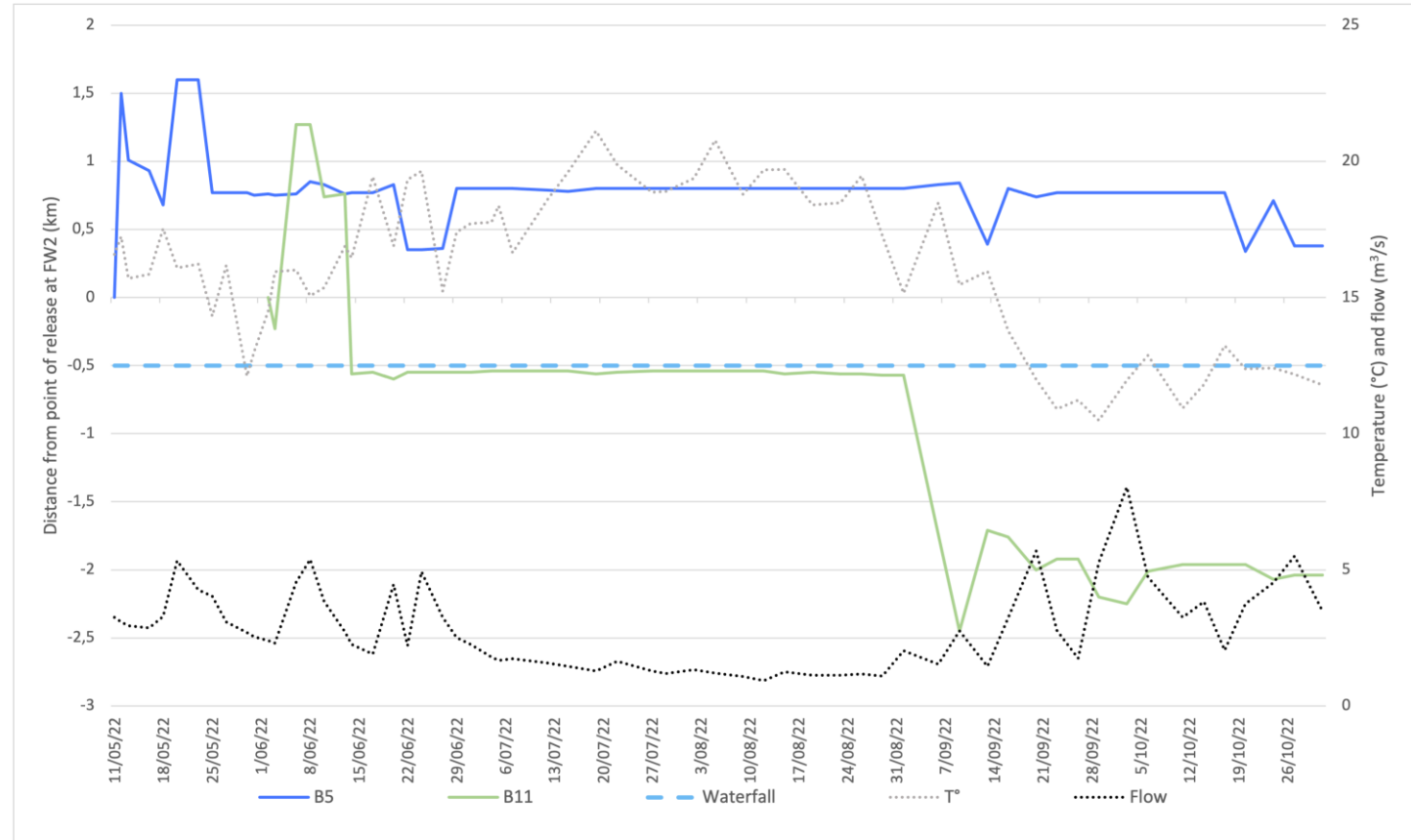
## Nase



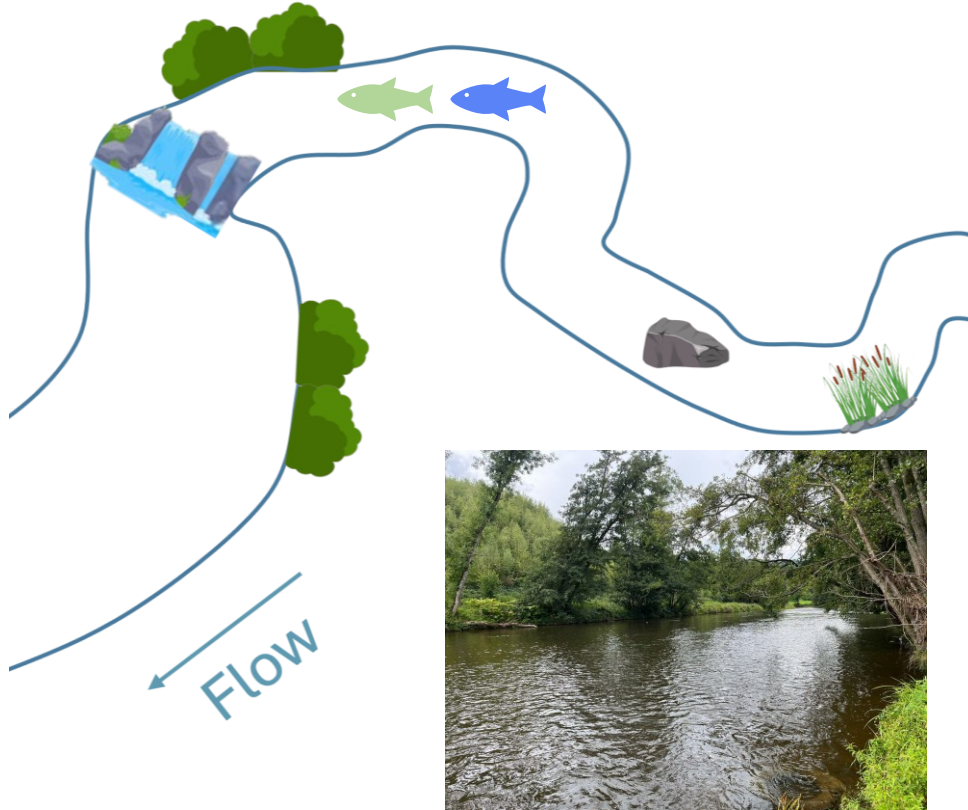
# Results : after spawning period



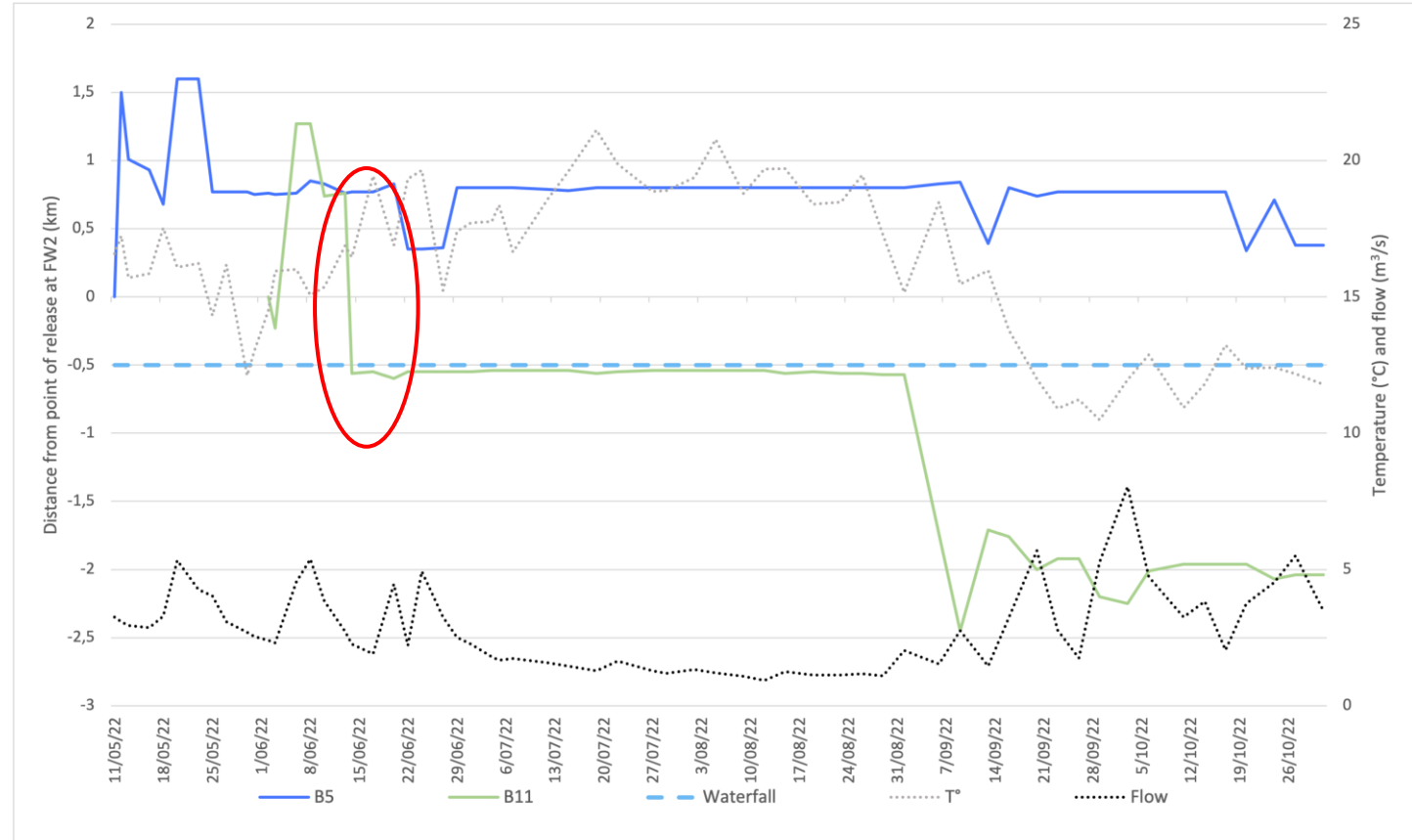
## Barbel



# Results : after spawning period



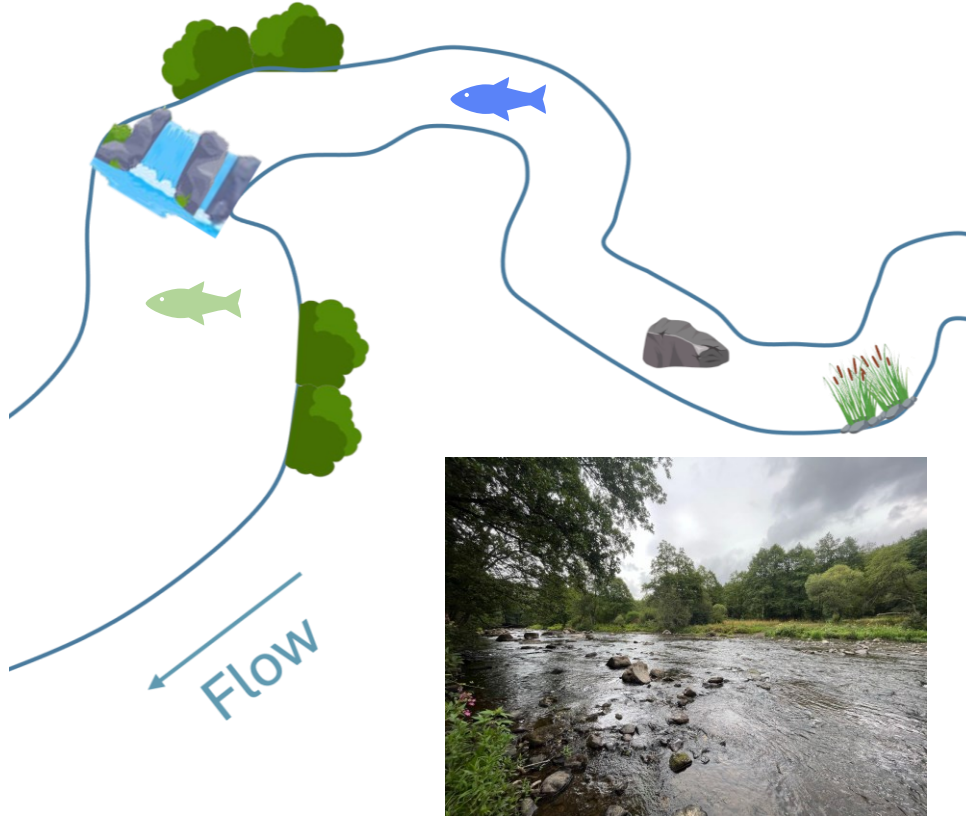
## Barbel



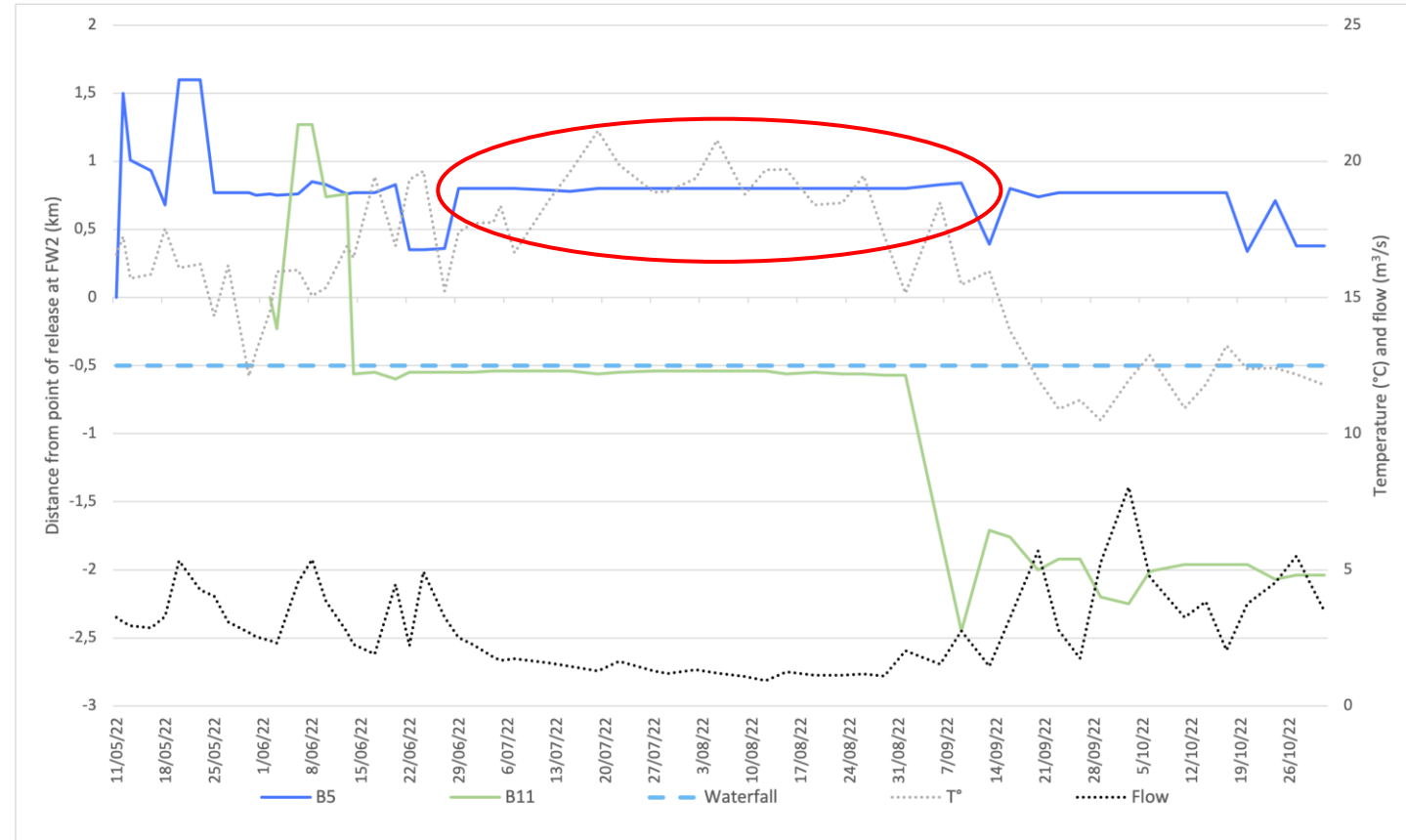
Moved downstream the waterfall



# Results : after spawning period






## Barbel



Established in new habitats

# Conclusion

Radiotelemetry AFTER the opening :

-  Exploit punctually or permanently habitats
-  Able to establish in new available habitats
-  Connectivity : entire maincourse and its tributaries

# Conclusion

What happens DURING and AFTER the opening



overview of the ecological benefits



*Thank you for your attention*