



**HAL**  
open science

# Etudes des facteurs environnementaux et des variations individuelles influençant la phénologie de migration d'une population de saumon atlantique (*Salmo salar*)

Edel Lheureux, Mathieu Buoro, Etienne Prévost

## ► To cite this version:

Edel Lheureux, Mathieu Buoro, Etienne Prévost. Etudes des facteurs environnementaux et des variations individuelles influençant la phénologie de migration d'une population de saumon atlantique (*Salmo salar*). JST LIFE 2022, INRAE Thonon les Bains, Nov 2022, Thonon les Bains, France. hal-04778444

HAL Id: hal-04778444

<https://univ-pau.hal.science/hal-04778444v1>

Submitted on 12 Nov 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0 International License

# ➤ Investigating environmental determinants and individual variation of the migration phenology in wild Atlantic salmon (*Salmo salar*)

➔ Focus on the observation process

Edel Lheureux

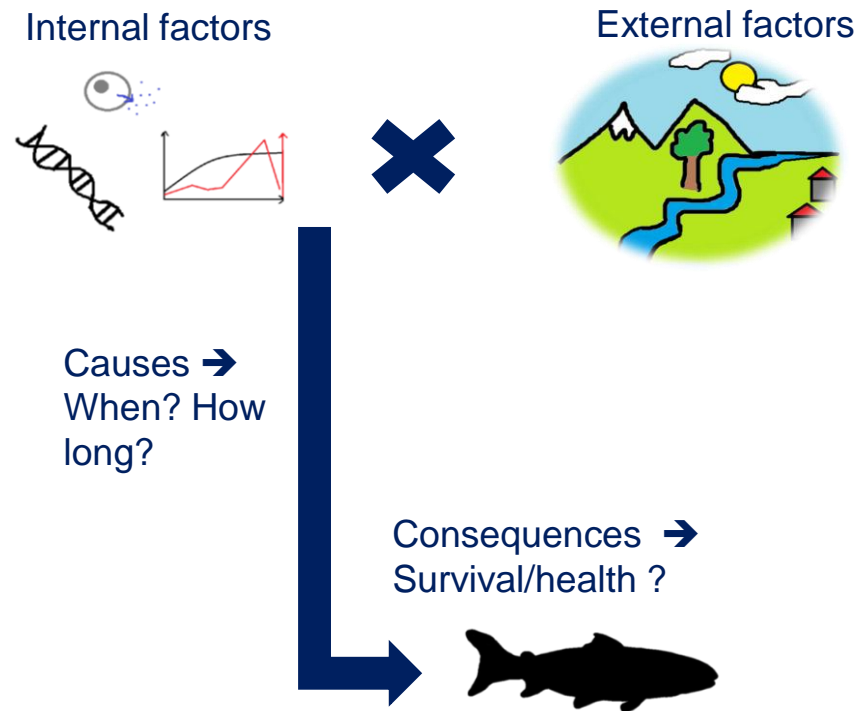
Direction : Buoro Mathieu-Prévost Etienne

2021-2024



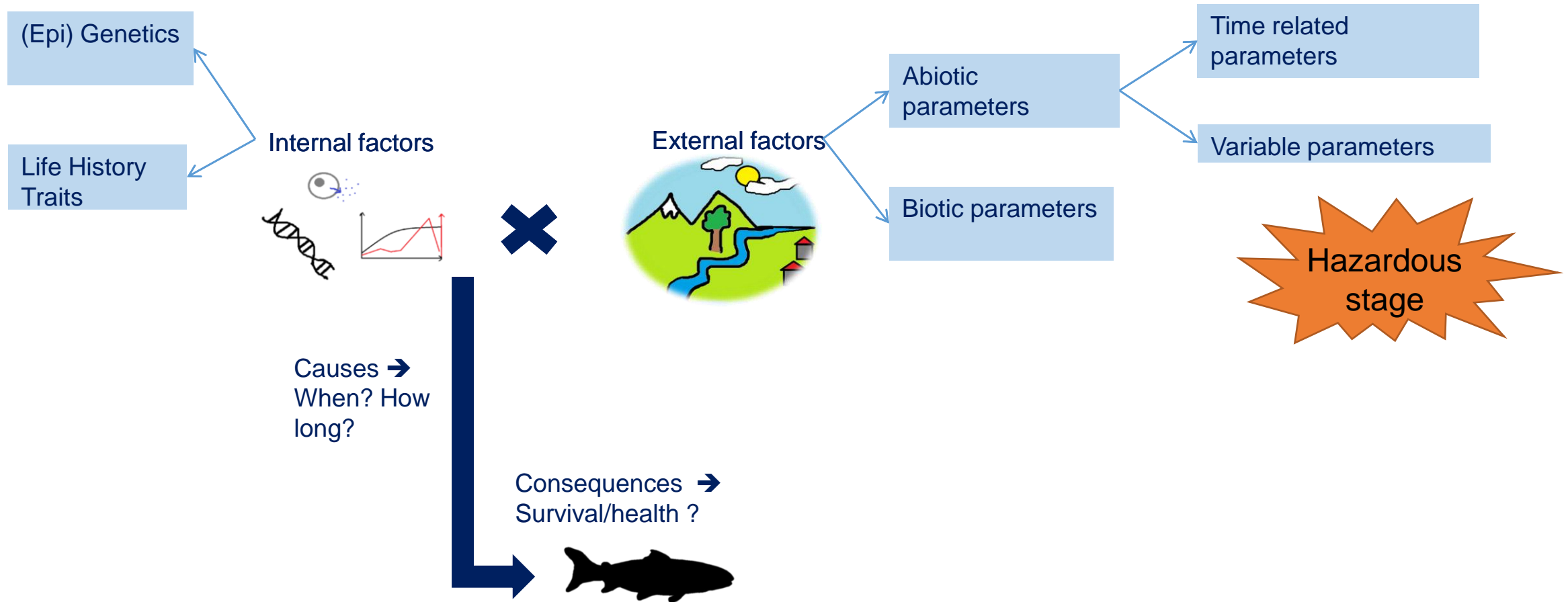
## ➤ Migration phenology :

The time at which the individual onsets its migration from an habitat to another



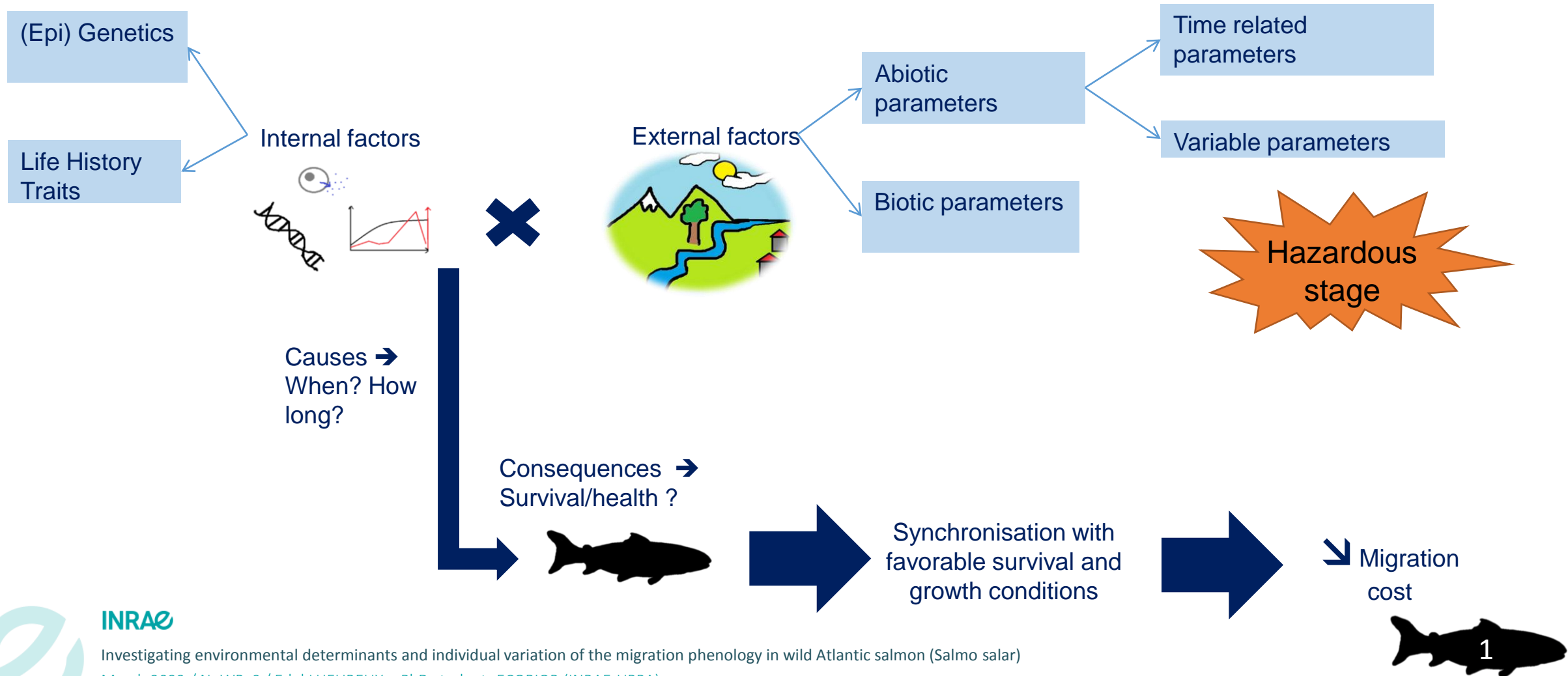
## ➤ Migration phenology :

The time at which the individual onsets its migration from an habitat to another



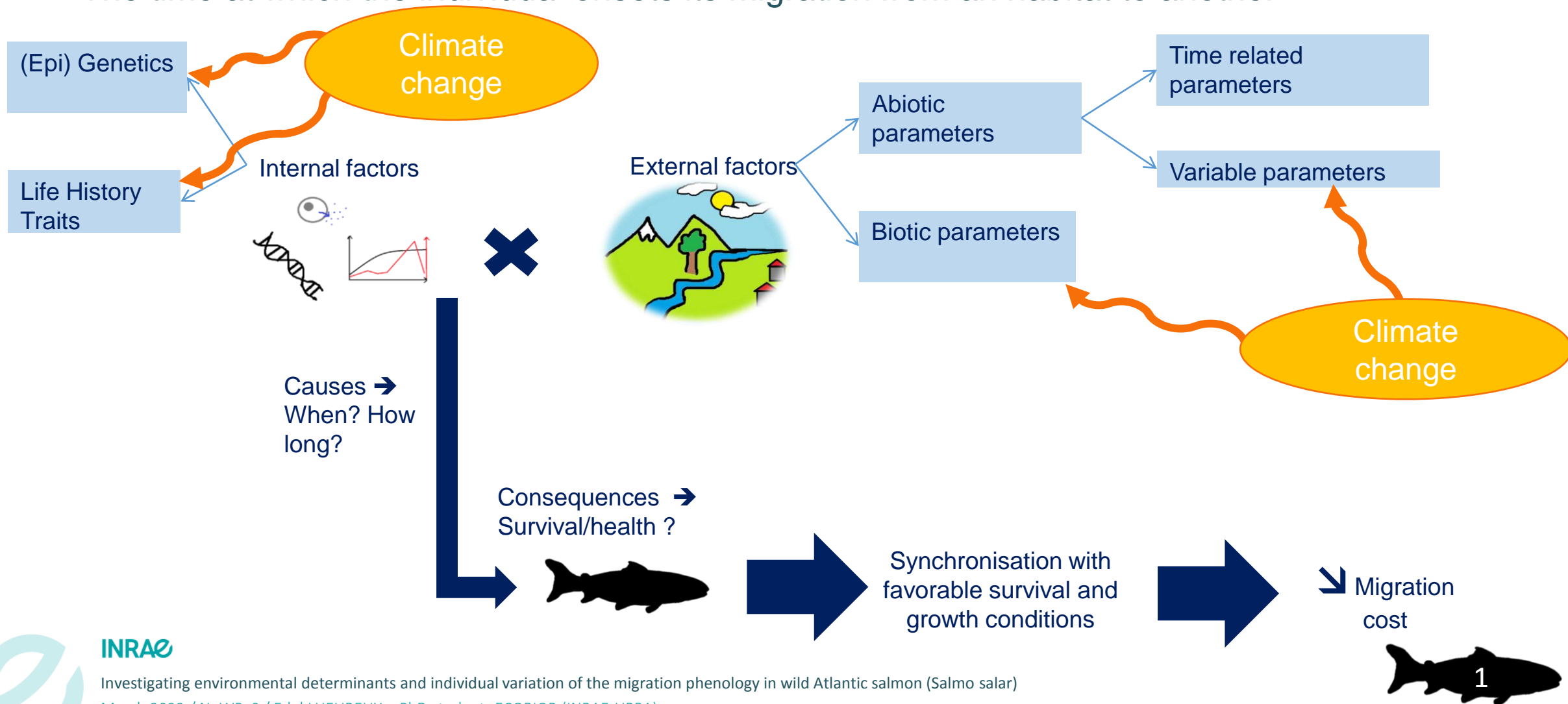
## ➤ Migration phenology :

The time at which the individual onsets its migration from an habitat to another

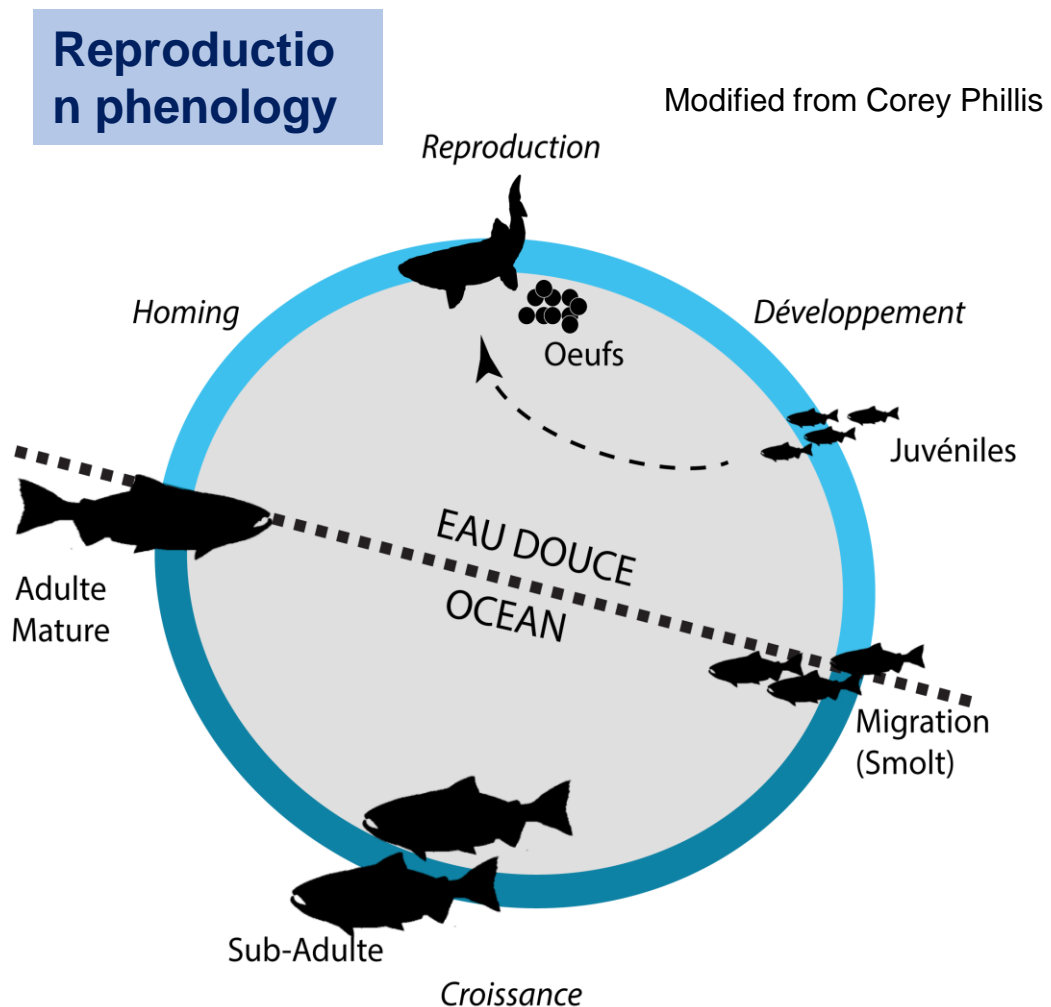


## ➤ Migration phenology :

The time at which the individual onsets its migration from an habitat to another



## > Focus on the salmon phenology

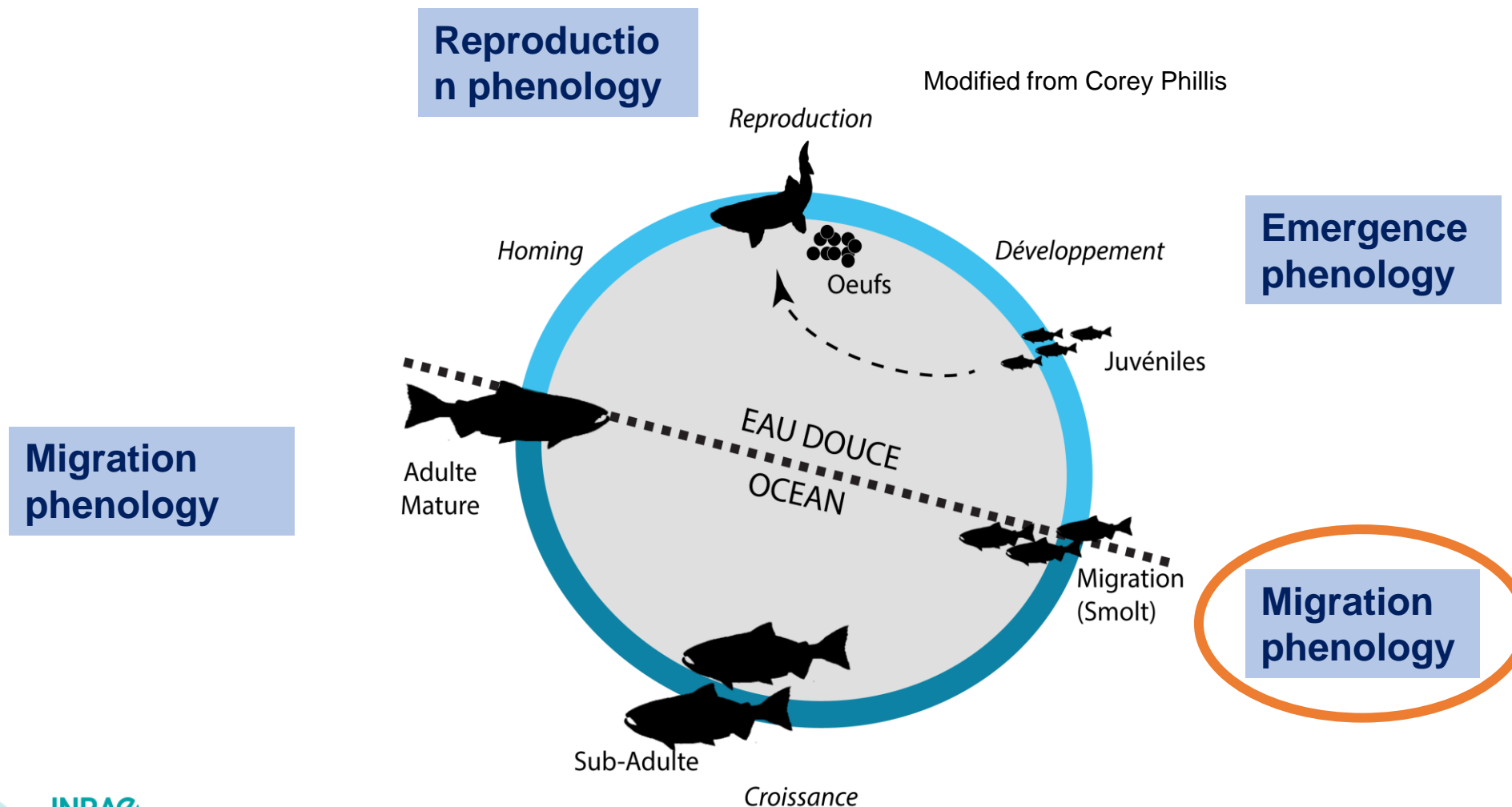


Migration phenology

Emergence phenology

Migration phenology

## > Focus on the salmon phenology





## > Problematic

How the individual variation and the environmental factors influence the phenology of migration ?

## > Objectives



Assessing the biological processes of interest : smoltification & migration



To identify the proximate factors involved in the biological & observation processes

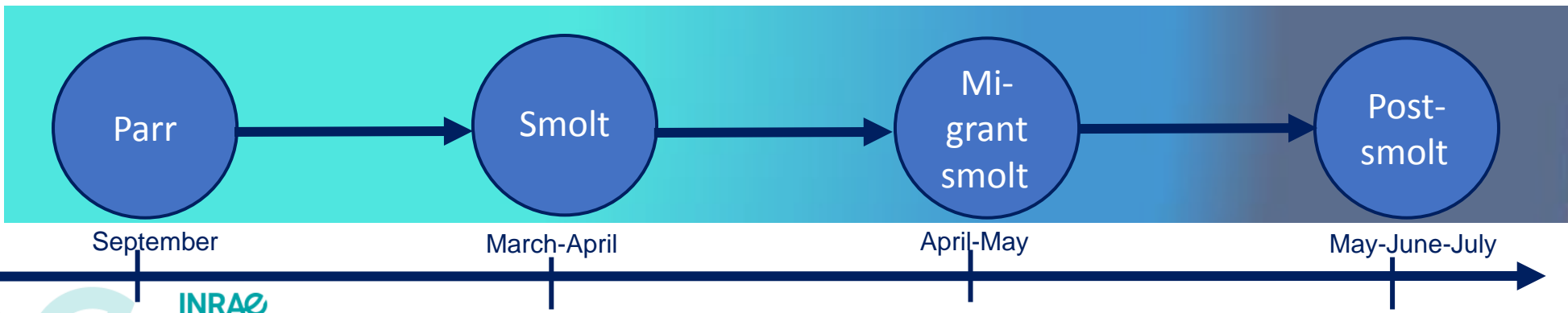
# > Data

Scorff location (Source: Ore DiaPFC)



 Location : Scorff river (Brittany,France)

 Tagging/recapture since 2005



Investigating environmental determinants and individual variation of the migration phenology in wild Atlantic salmon (*Salmo salar*)  
March 2022 / NoWPas / Edel LHEUREUX – PhD student- ECOBIOP (INRAE-UPPA)



# > Data

Scorff location (Source: Ore DiaPFC)



 Location : Scorff river (Brittany, France)

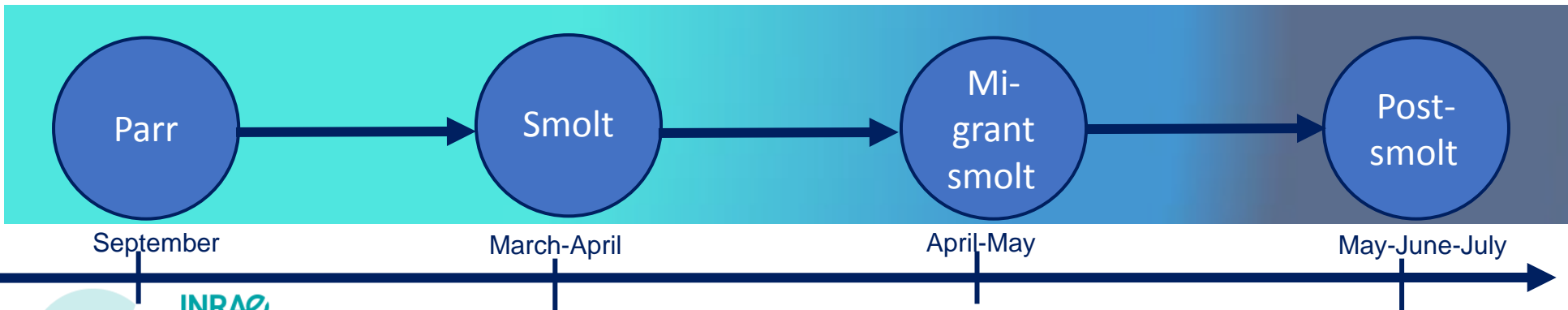
 Tagging/recapture since 2005



Electric fishing (Sources photo: INRAE-Ecobiop-U3E )



Tagging of the parr, (Sources photo: INRAE-Ecobiop-U3E )



INRAE

Investigating environmental determinants and individual variation of the migration phenology in wild Atlantic salmon (*Salmo salar*)  
March 2022 / NoWPas / Edel LHEUREUX – PhD student- ECOBIOP (INRAE-UPPA)



# > Data

Scorff location (Source: Ore DiaPFC)



Location : Scorff river (Brittany, France)



Tagging/recapture since 2005

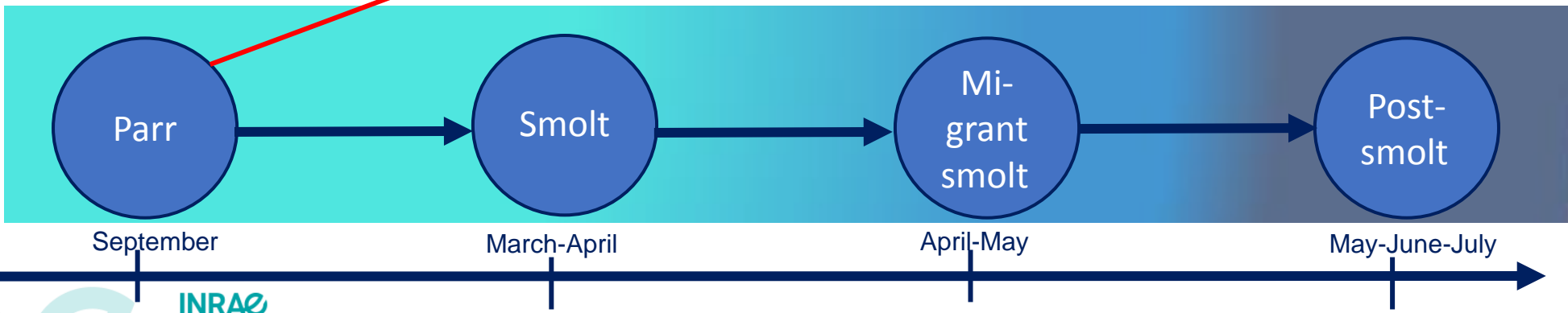
Weight , length, parr localisation



Electric fishing (Sources photo: INRAE-Ecobiop-U3E )



Tagging of the parr, (Sources photo: INRAE-Ecobiop-U3E )



INRAE

Investigating environmental determinants and individual variation of the migration phenology in wild Atlantic salmon (Salmo salar)  
March 2022 / NoWPas / Edel LHEUREUX – PhD student- ECOBIOP (INRAE-UPPA)



# > Data

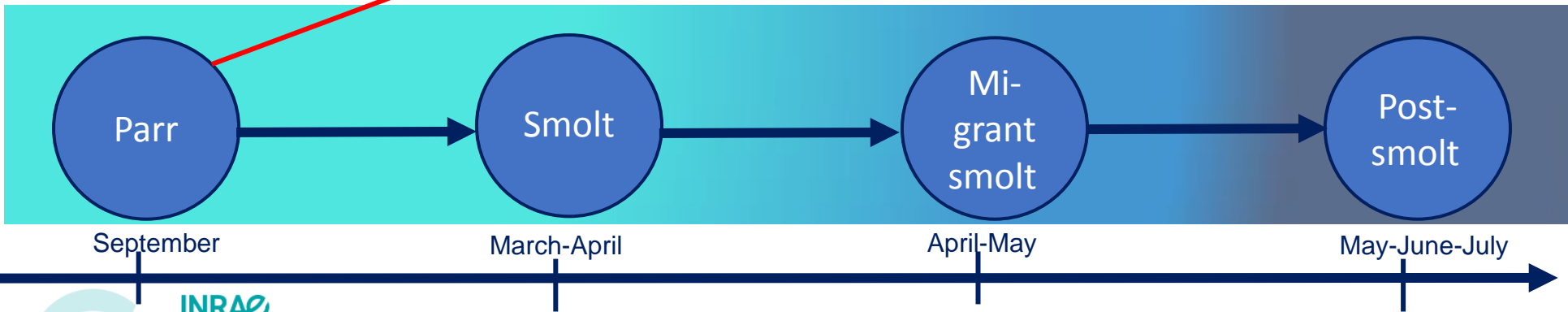


Princes trap (Source: Ore DiaPFC)



Leslé trap (Source: Ore DiaPFC)

Weight , length, parr localisation



INRAE

Investigating environmental determinants and individual variation of the migration phenology in wild Atlantic salmon (*Salmo salar*)  
March 2022 / NoWPas / Edel LHEUREUX – PhD student- ECOBIOP (INRAE-UPPA)



# > Data



Princes trap (Source: Ore DiaPFC)

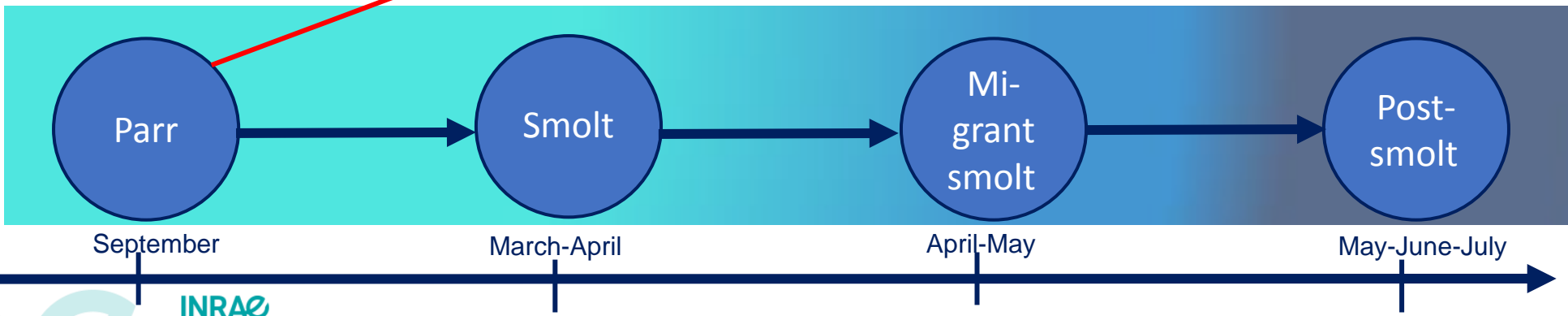


+ Tagging !



Leslé trap (Source: Ore DiaPFC)

Weight , length, parr localisation



INRAE

Investigating environmental determinants and individual variation of the migration phenology in wild Atlantic salmon (*Salmo salar*)  
March 2022 / NoWPas / Edel LHEUREUX – PhD student- ECOBIOP (INRAE-UPPA)



# > Data



Princes trap (Source: Ore DiaPFC)



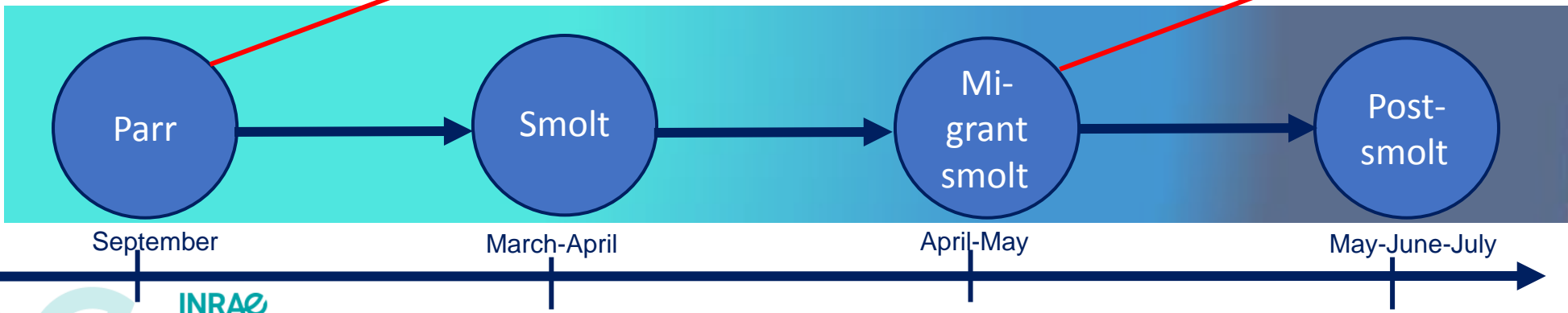
+ Tagging !



Leslé trap (Source: Ore DiaPFC)

Weight , length, parr localisation


Weight , length, date of migration



INRAE



# > Data

 Daily water temperature, water flow and photoperiod



Princes trap (Source: Ore DiaPFC)



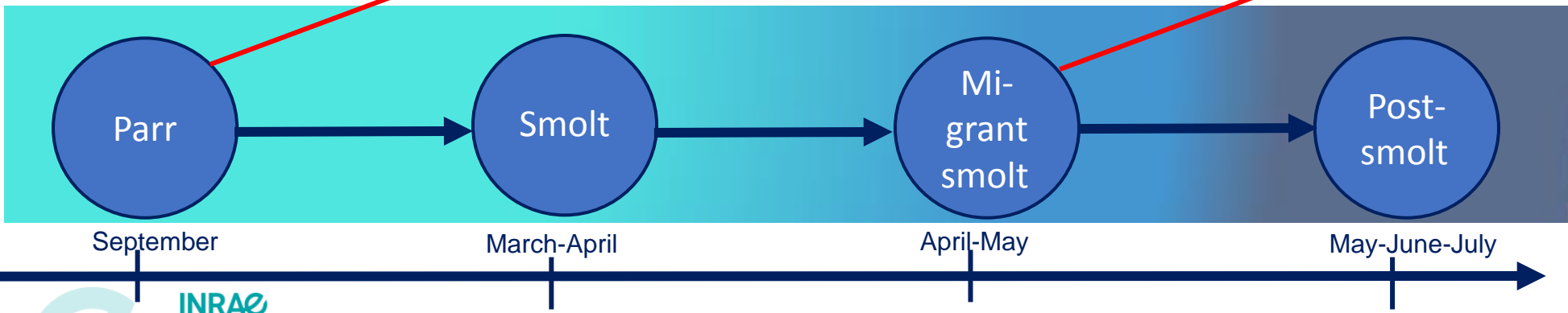
+ Tagging !



Leslé trap (Source: Ore DiaPFC)

Weight , length, parr localisation

Weight , length, date of migration



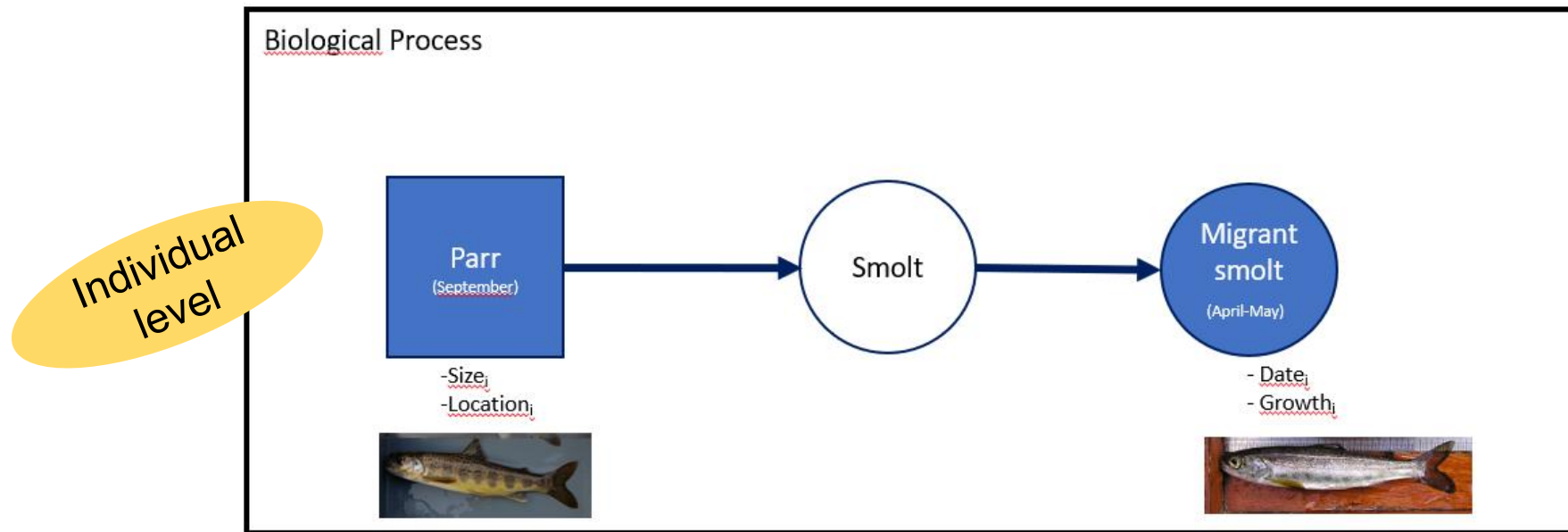
INRAE

Investigating environmental determinants and individual variation of the migration phenology in wild Atlantic salmon (*Salmo salar*)  
March 2022 / NoWPas / Edel LHEUREUX – PhD student- ECOBIOP (INRAE-UPPA)

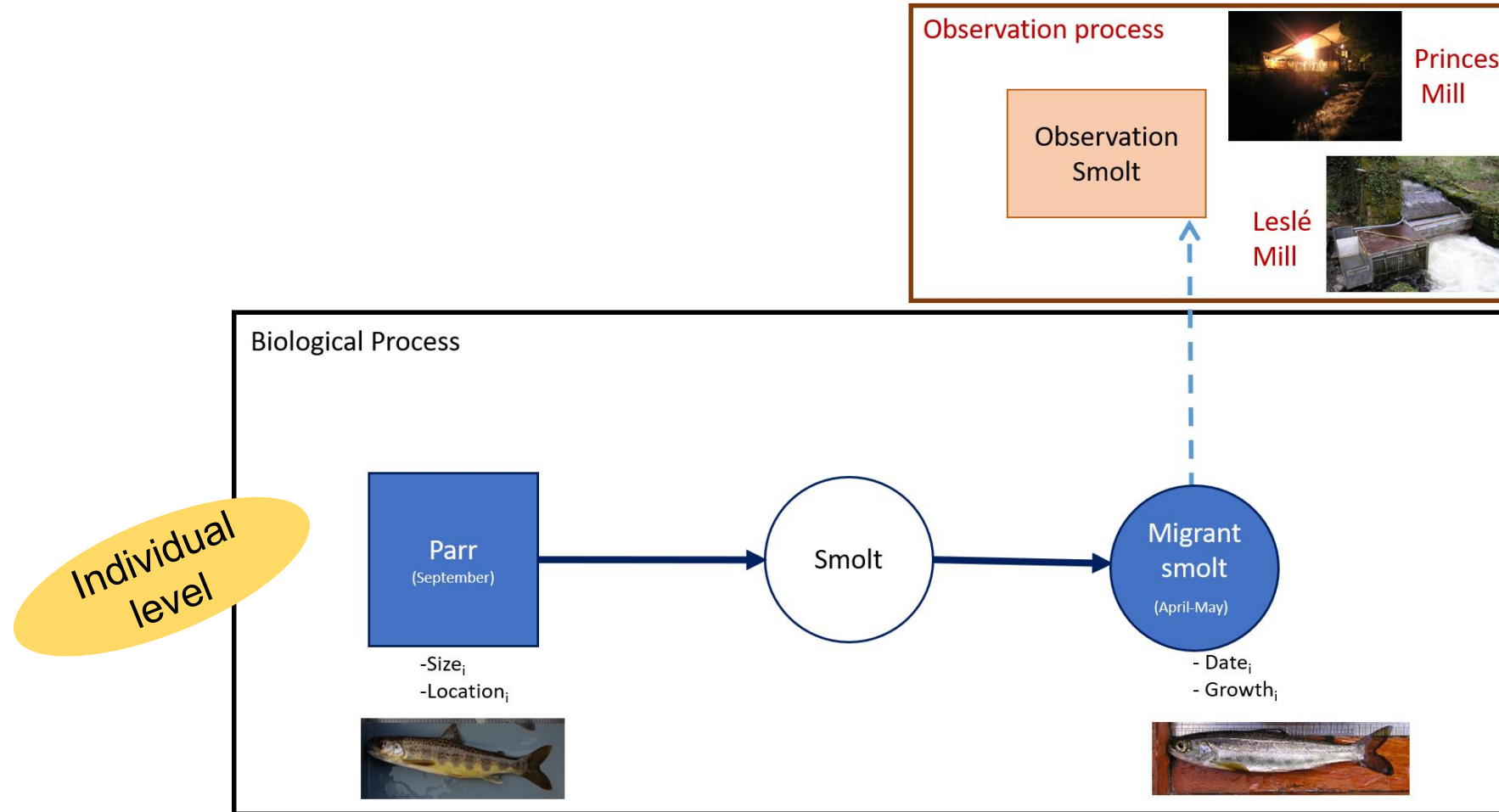




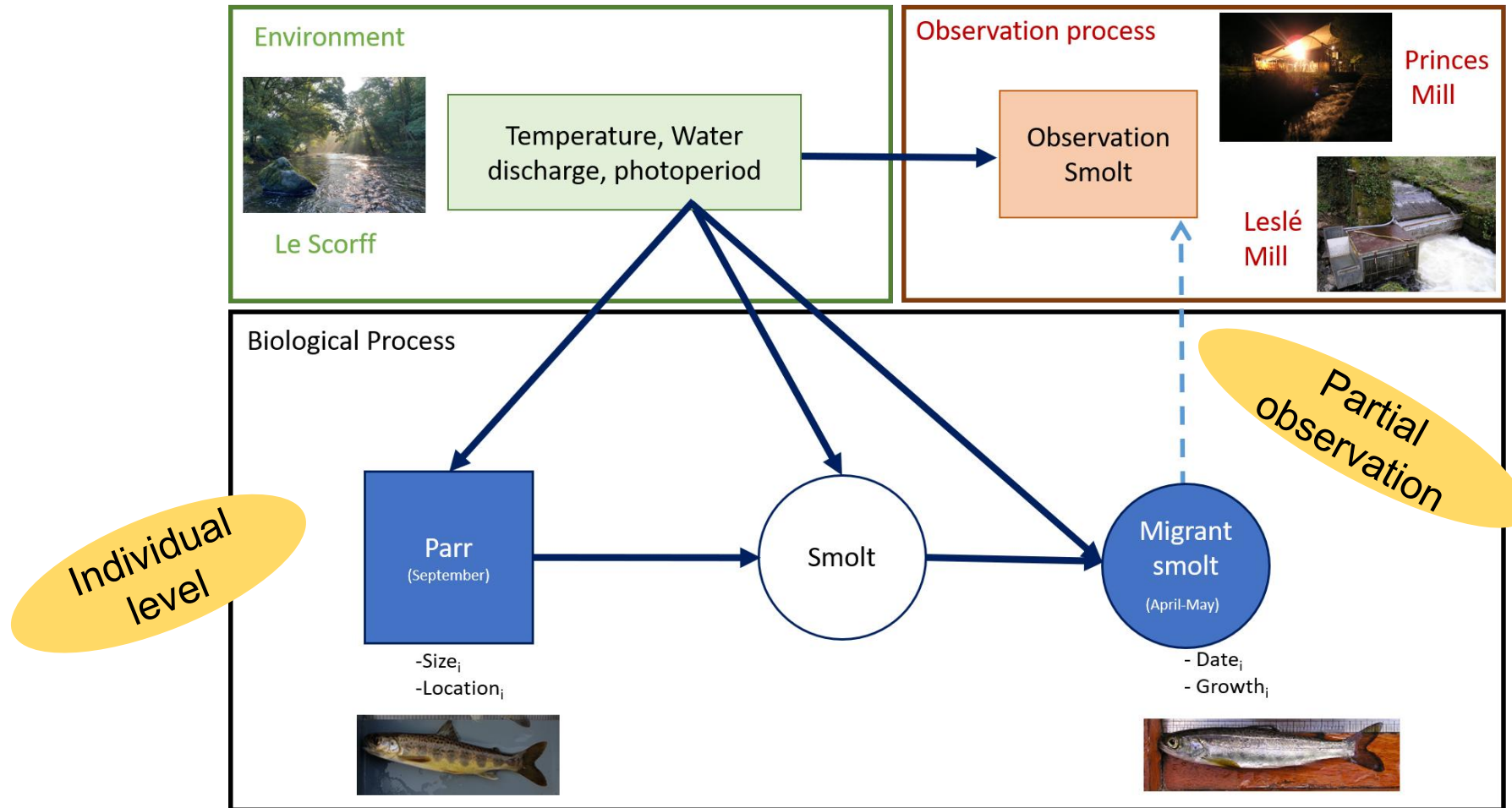
## ➤ II.1. The model: different processus = multi-state model



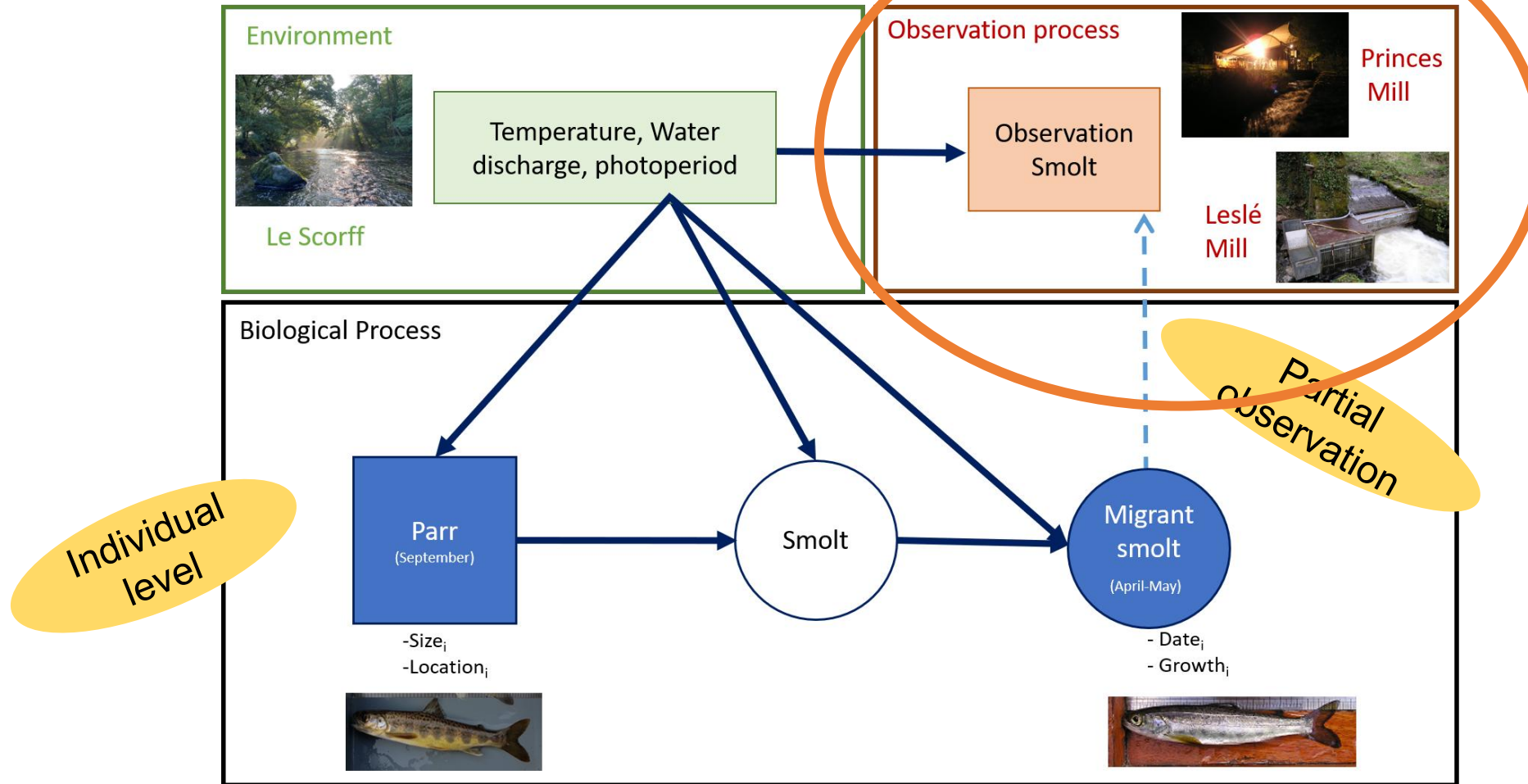
## > II.1. The model: different processus = multi-state model



## > II.2. The model: different processus = environmental factors



## > II.3. Focus on the observation process

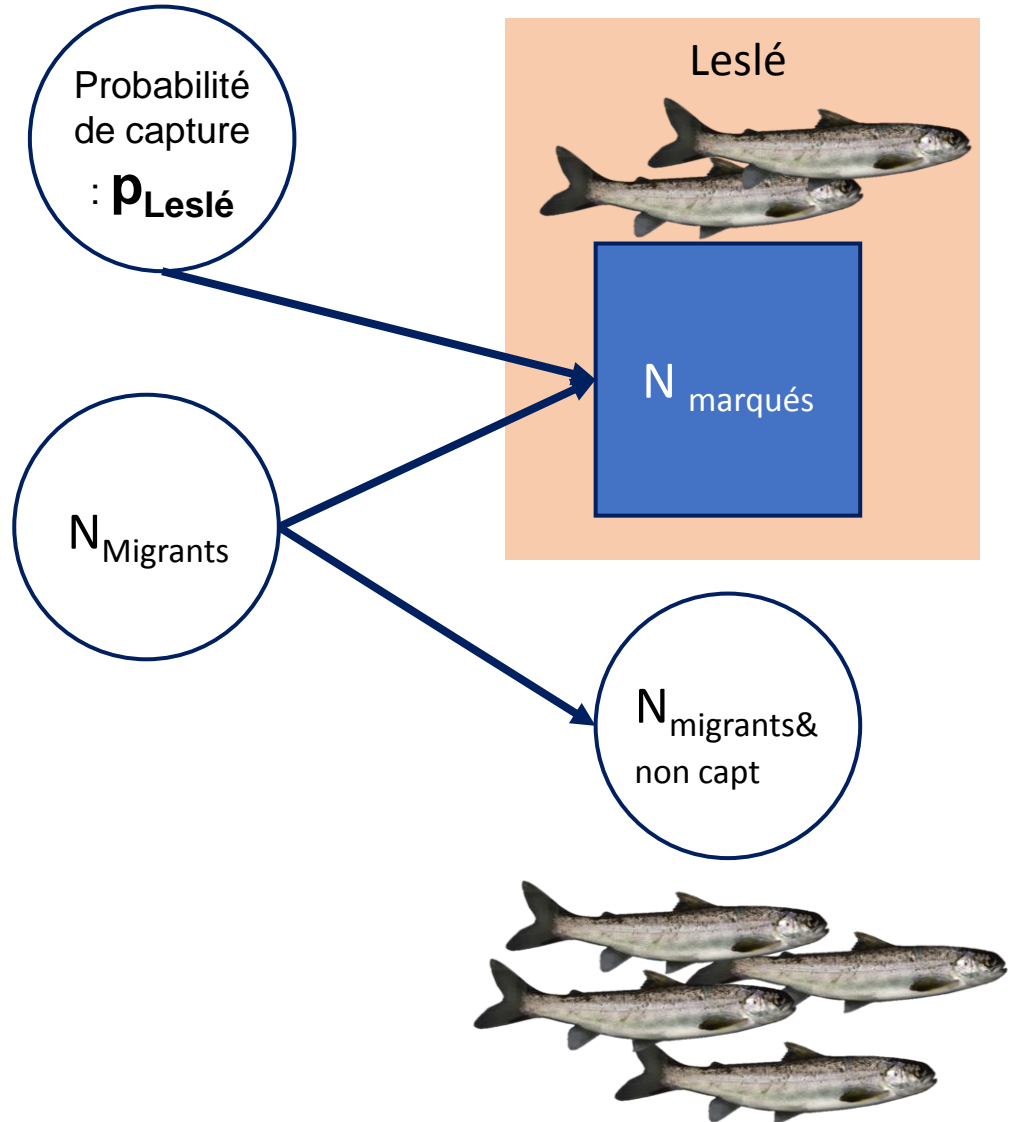


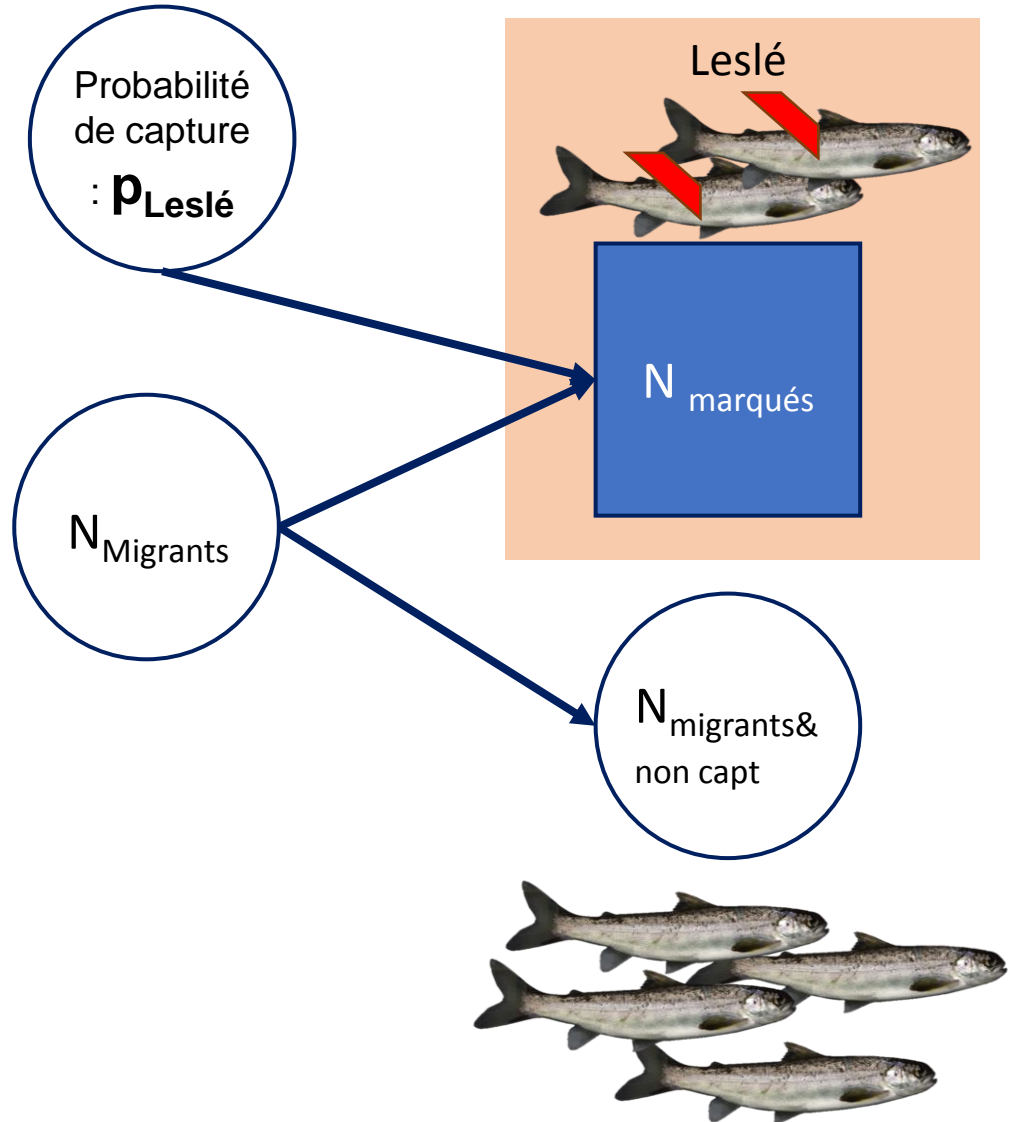
Leslé

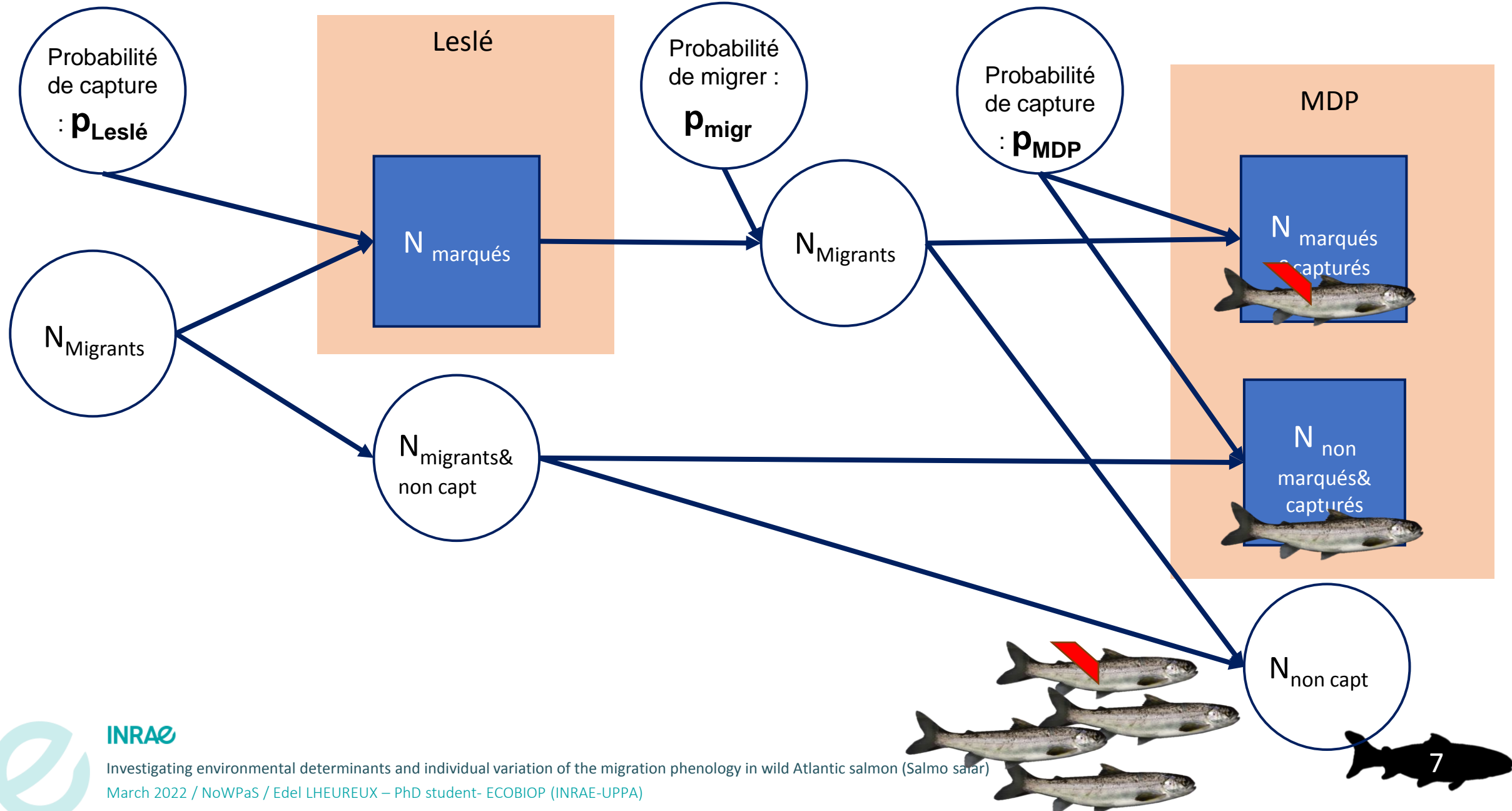
MDP

$N_{\text{Migrants}}$







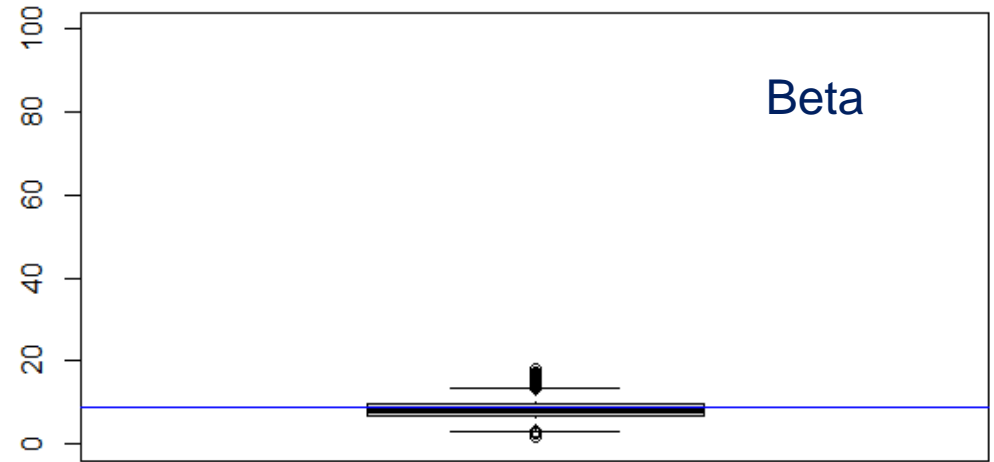
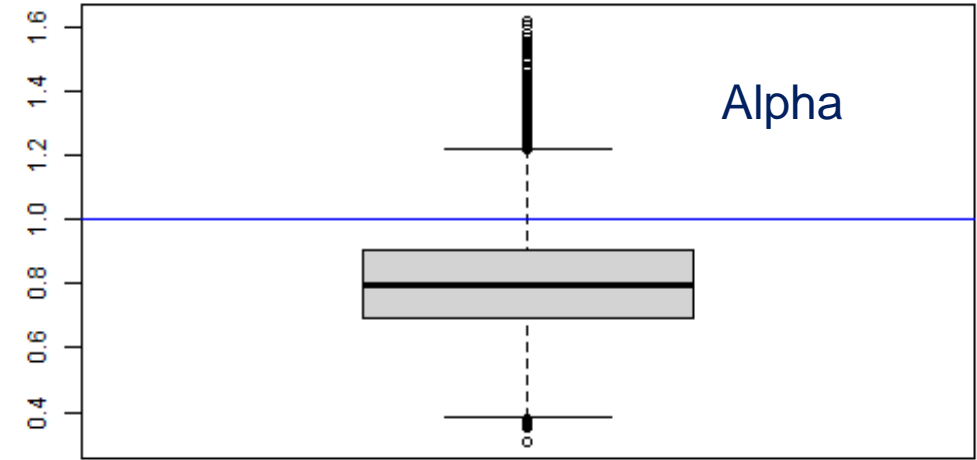
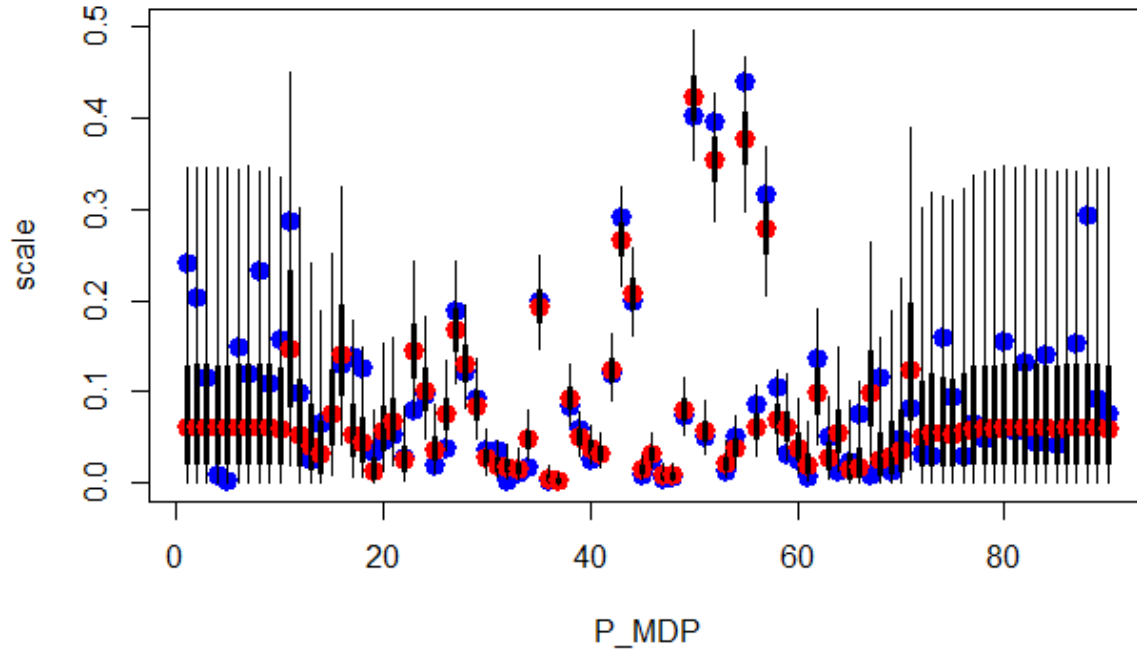




## ➤ II.3. Focus on the observation process

### Results (simulated data)

- Données simulées
- Estimés

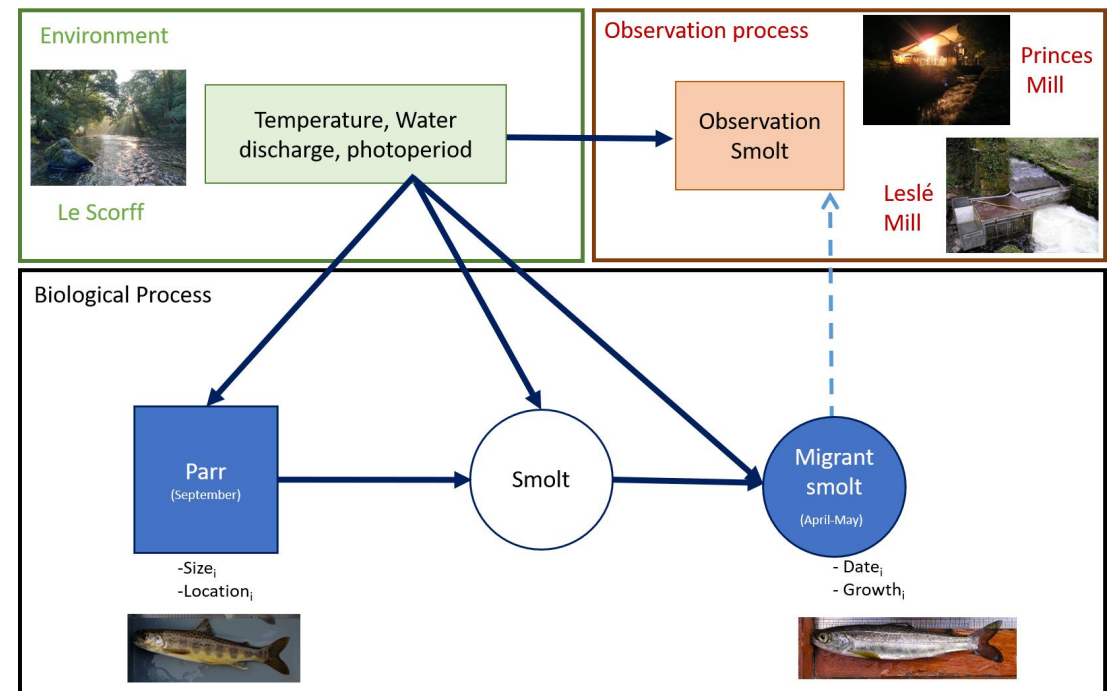


Paramètre proba de migration

## ➤ III. The model = perspectives:



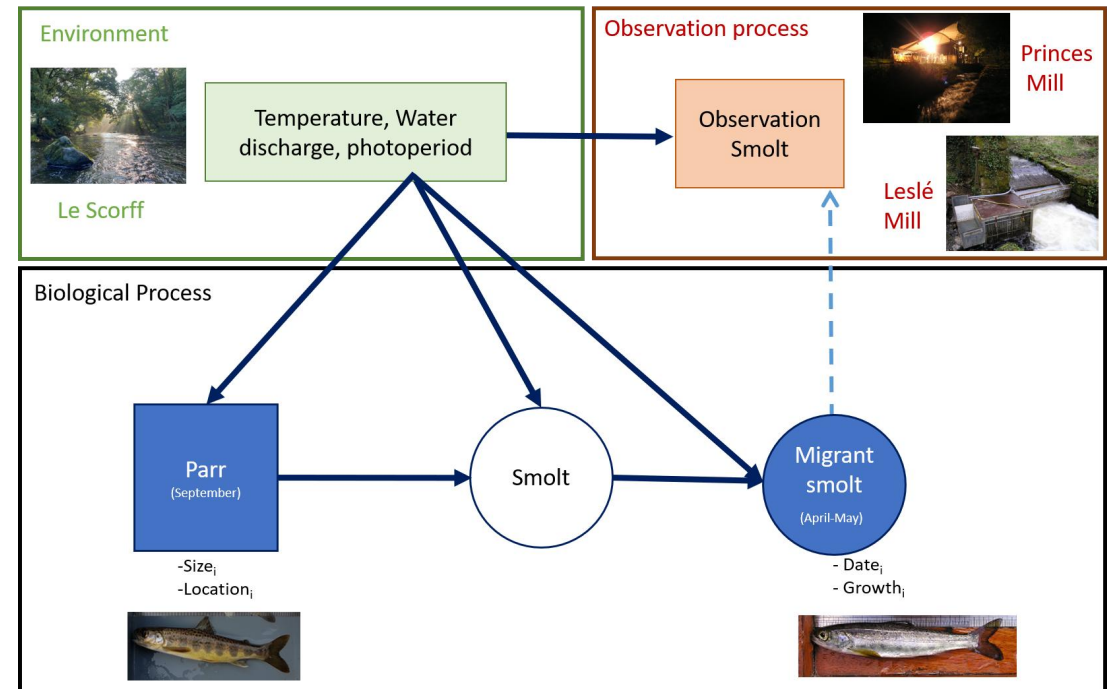
Complexifier le modèle d'observation : ajouter l'efficacité de capture au Leslé



## ➤ III. The model = perspectives:

 Complexifier le modèle d'observation : ajouter l'efficacité de capture au Leslé


 Intégration des processus biologiques



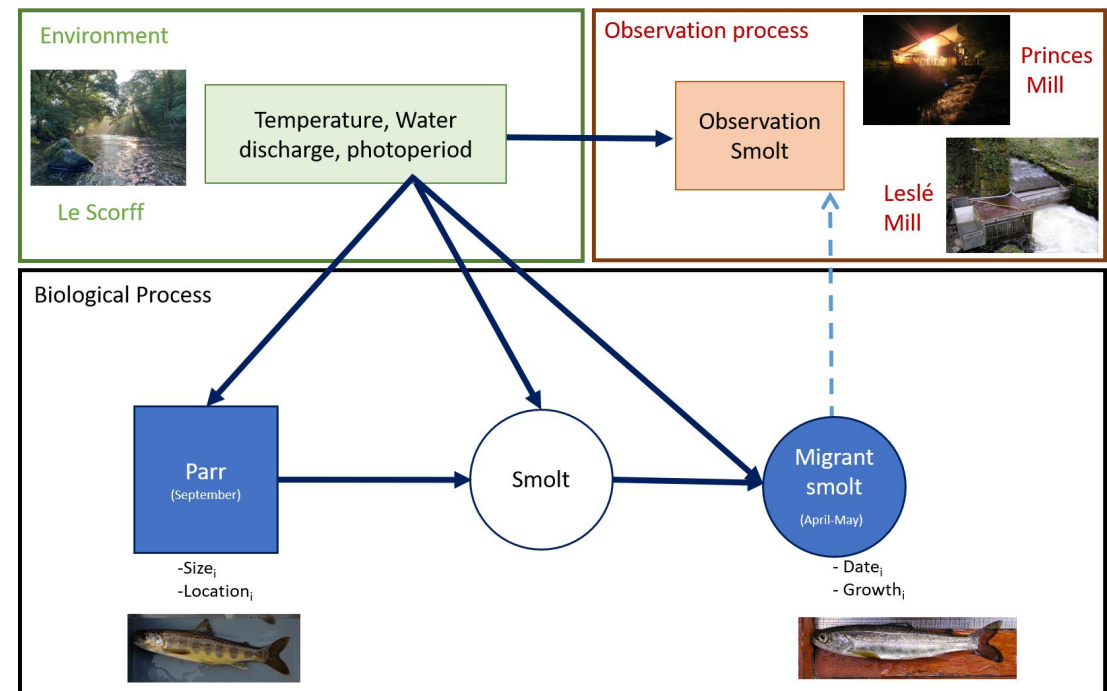
## ➤ III. The model = perspectives:

 Complexifier le modèle d'observation : ajouter l'efficacité de capture au Leslé

 Intégration des processus biologiques

 Intégration de covariables (débit, température...)


 Risque de confusion !



## ➤ III. The model = perspectives:

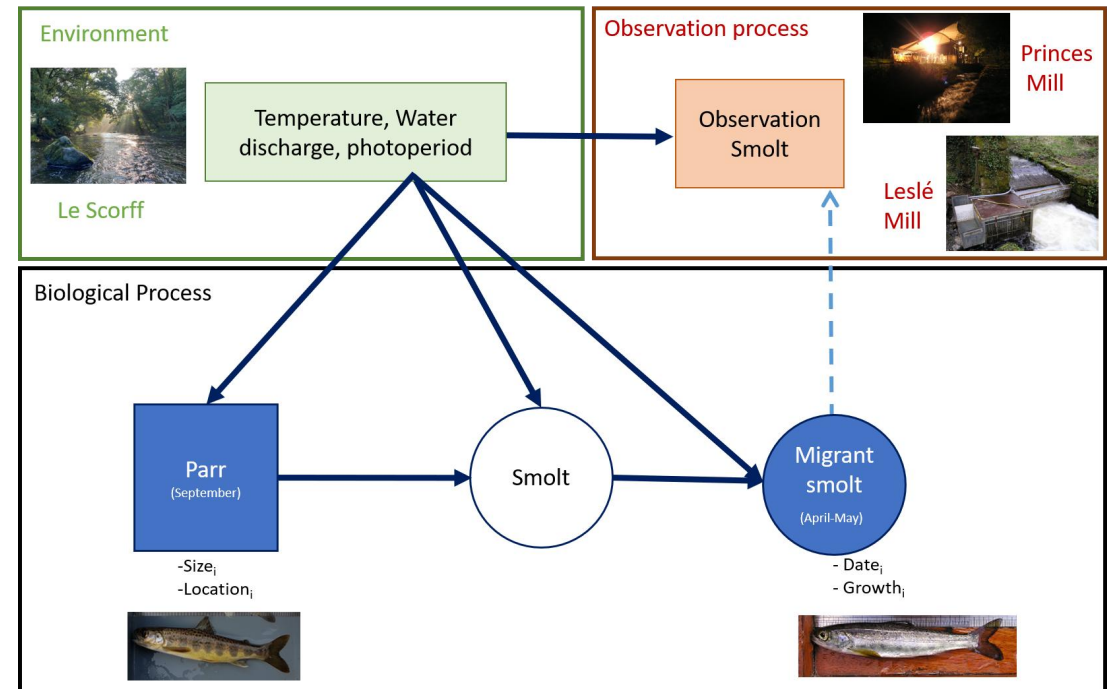
 Complexifier le modèle d'observation : ajouter l'efficacité de capture au Leslé

 Intégration des processus biologiques

 Intégration de covariables (débit, température...)

 Risque de confusion !

 Ajuster sur les vraies données



# Thanks for your attention

