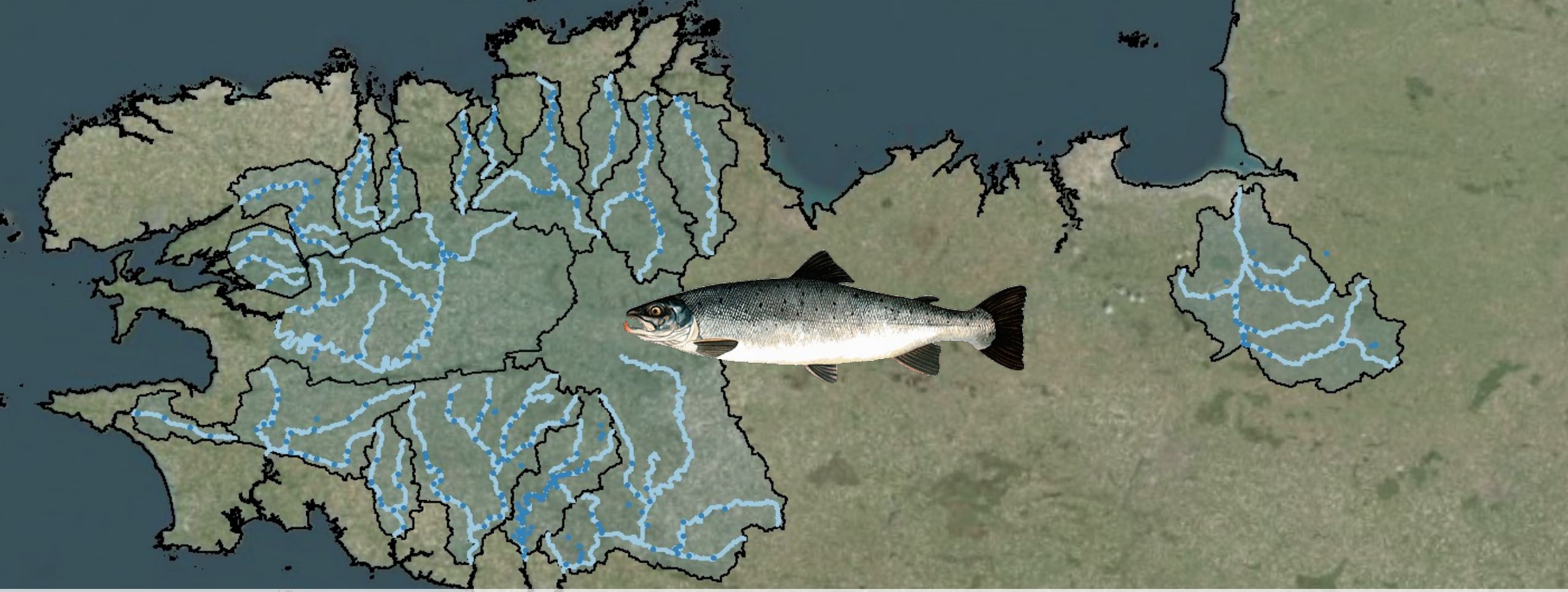


# Renovating the harvest regulation of angling fishery targeting Atlantic salmon in Brittany (France)

**Authors – Clément Lebot** (Institut-Agro), Etienne Prévost (INRAe) Marie-Andrée Arago (OFB), Laurent Beaulaton(OFB), Gaëlle Germis(BGM), Marie Nevoux(INRAe) and Etienne Rivot (Institut-Agro)

**Date –** 05/10/2022

OFB OFFICE FRANÇAIS DE LA BIODIVERSITÉ

INRAE

L'INSTITUT agro Rennes Angers

UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR

# Atlantic salmon

## Conservation and fishery regulation in France

**Conservation concerns**

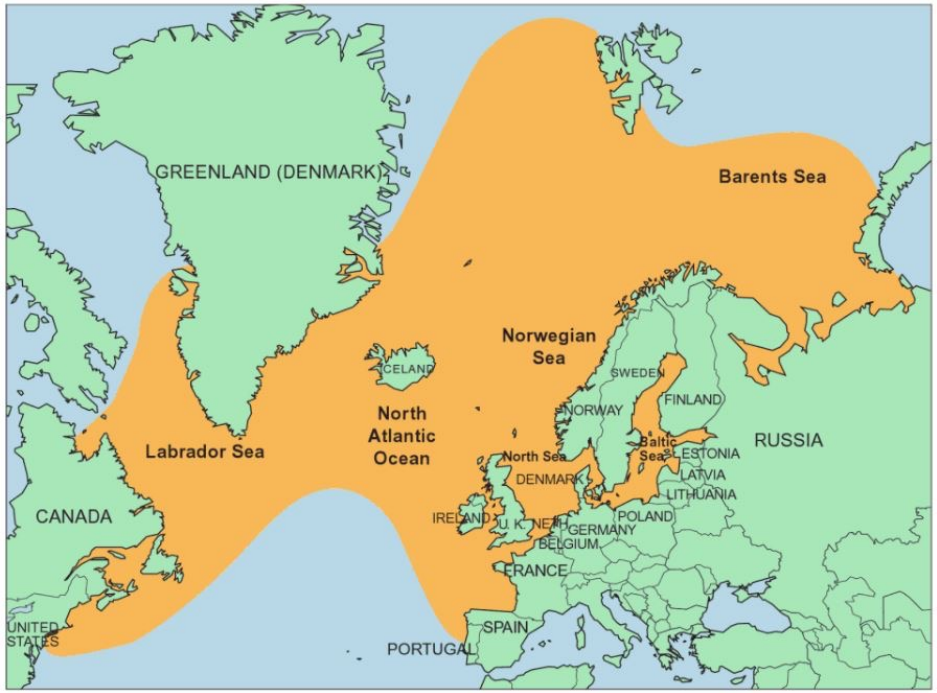
18th century

20th century

# Atlantic salmon

## Conservation and fishery regulation in France

### Conservation concerns



# Atlantic salmon

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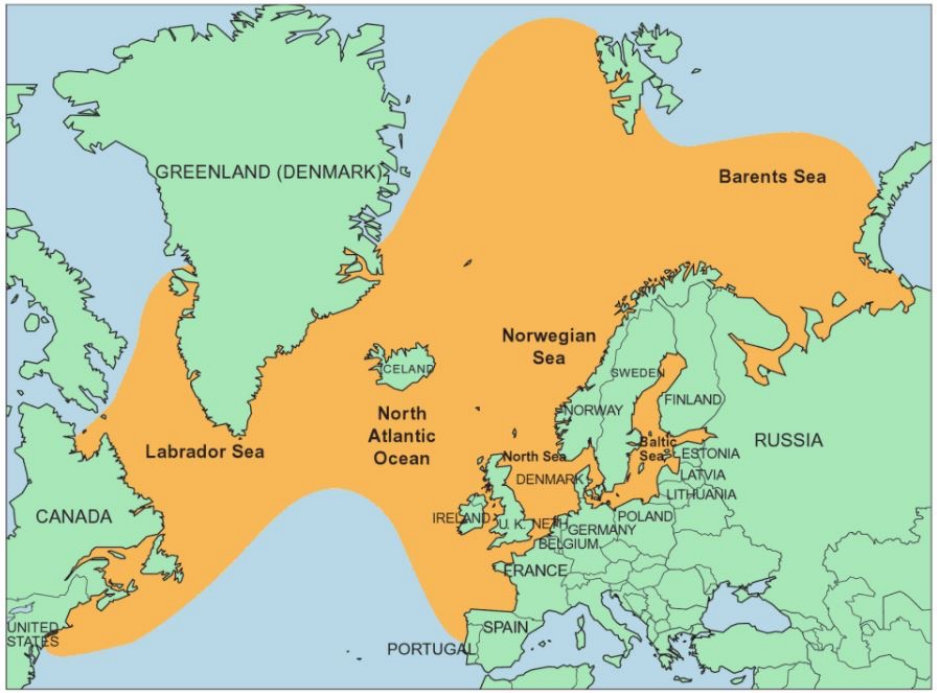
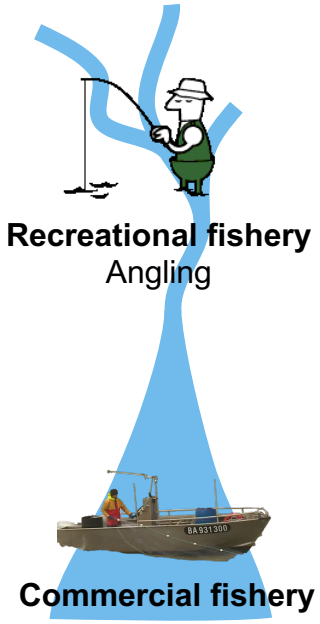



### Fisheries and regulation



**Recreational fishery**
Angling

**Commercial fishery**
Net

# Atlantic salmon

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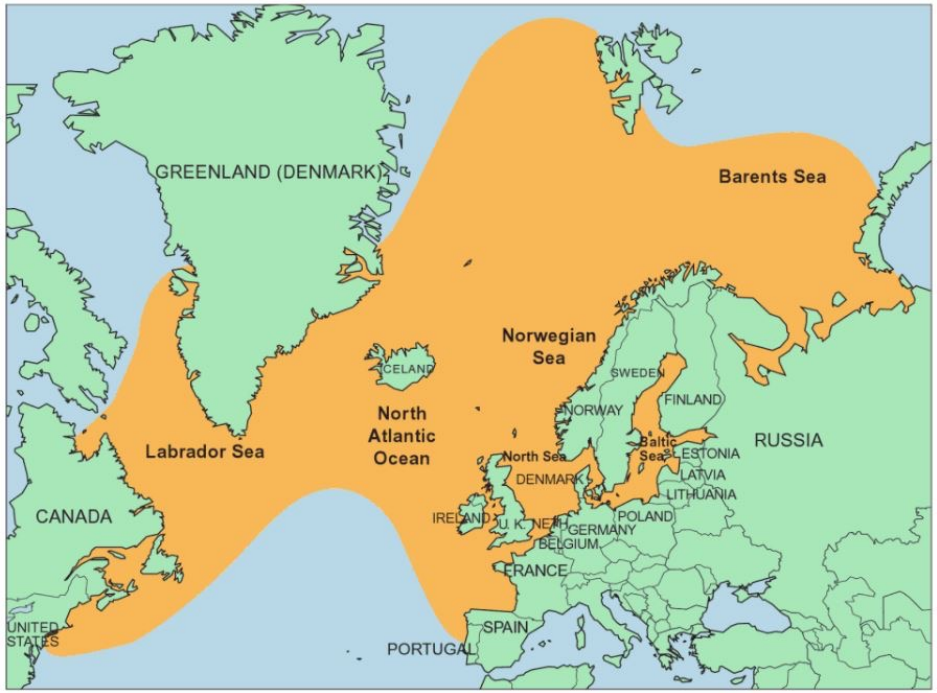


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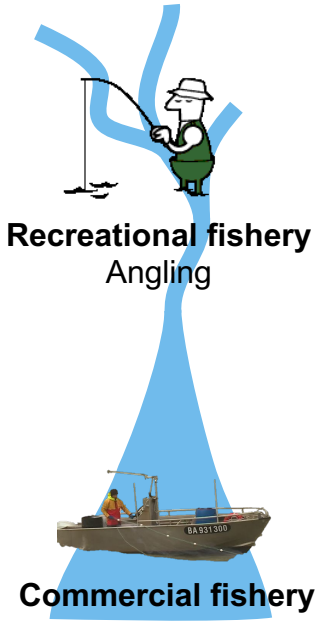

**Recreational fishery**
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9 management commitees

# Atlantic salmon

## Conservation and fishery regulation in France

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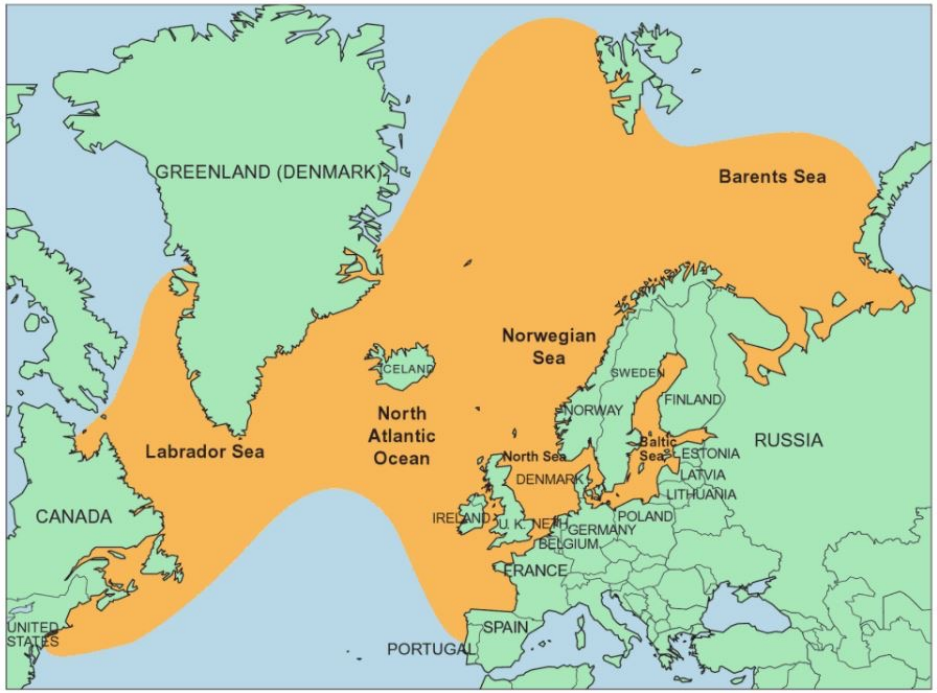


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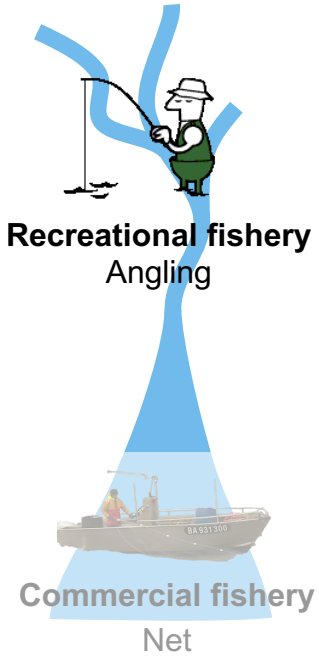
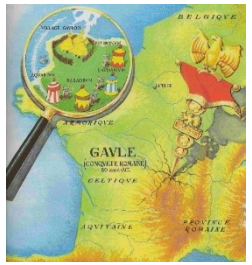




9 management commitees

### Regulatory system in Brittany

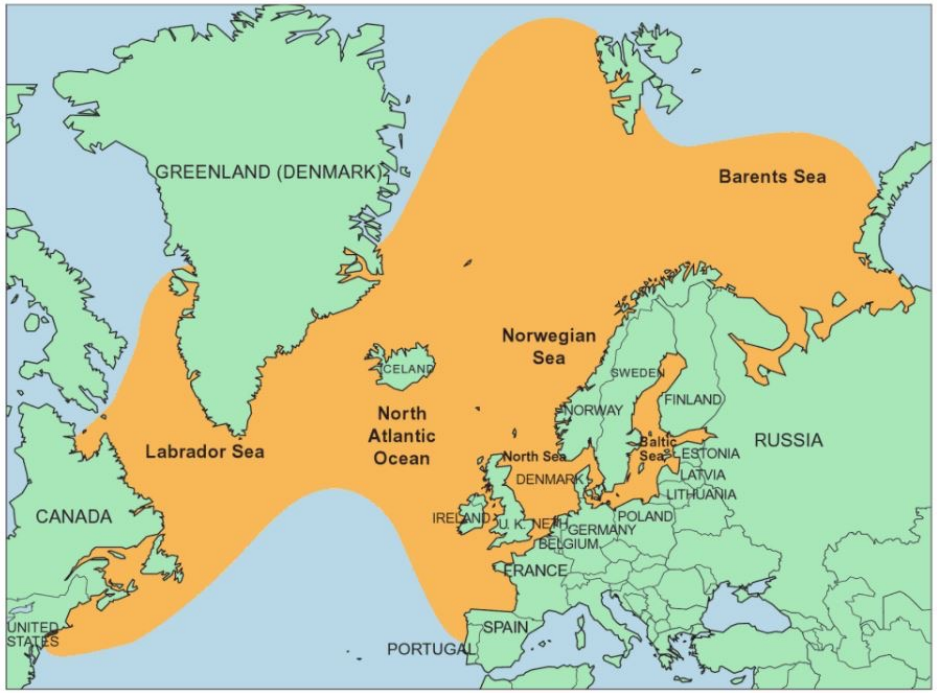



Implementation (1996) : Fishing periods / TAC / CL (MSY)

# Atlantic salmon

## Conservation and fishery regulation in France

### Conservation concerns

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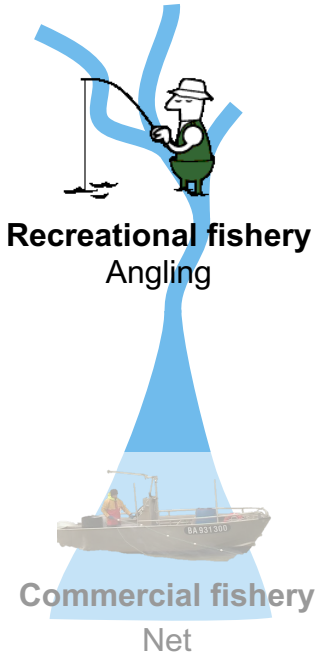



9 management commitees

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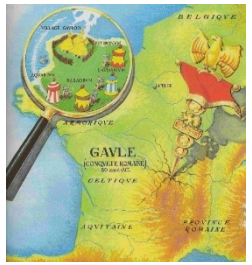


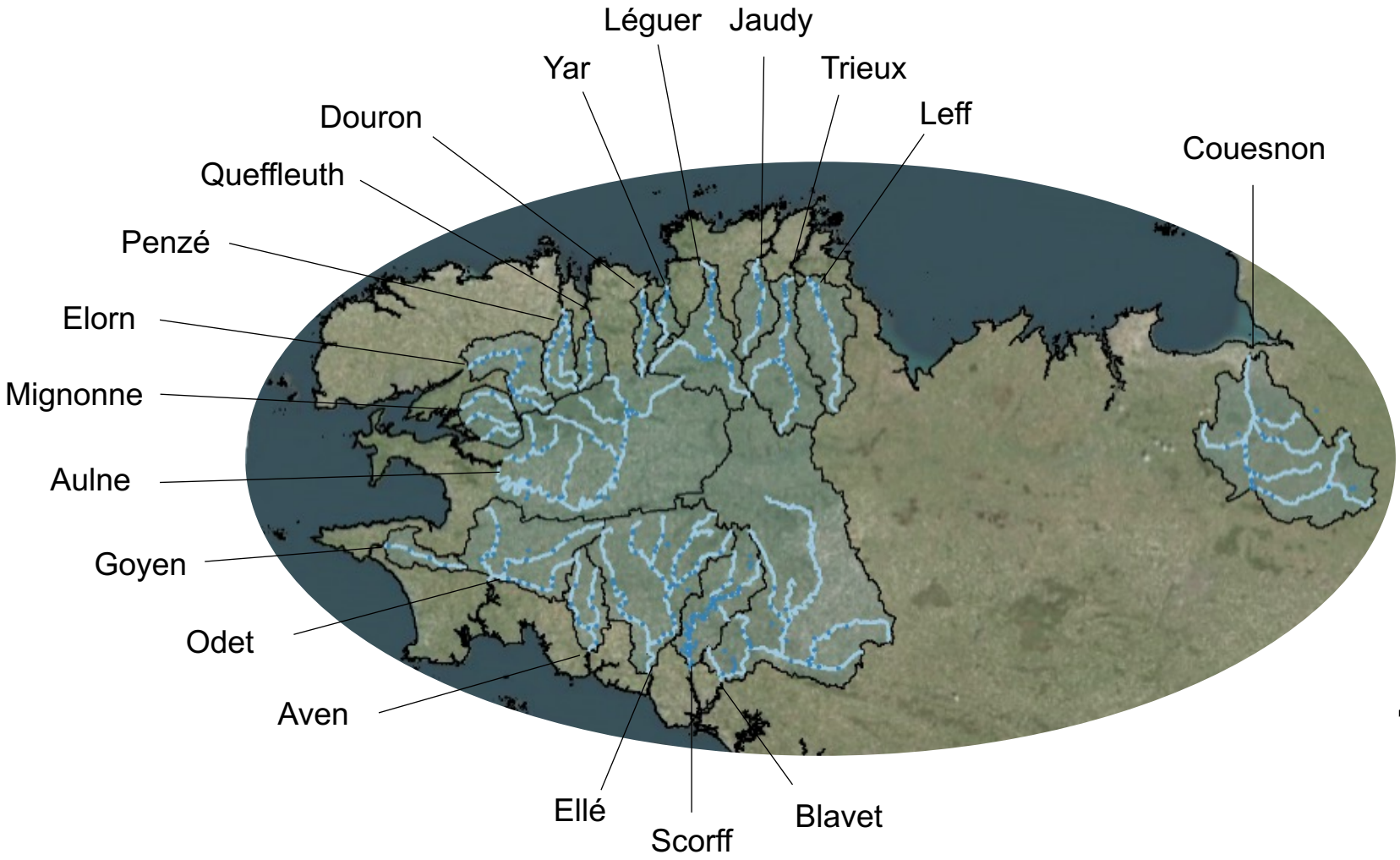

Implementation (1996) : Fishing periods / TAC / CL (MSY)

- . Almost never assessed
- . Marginally updated
- . New recommendations from NASCO not considered

**Renovation of the regulatory system (RENOSAUM project)**

# RENOSAUM project

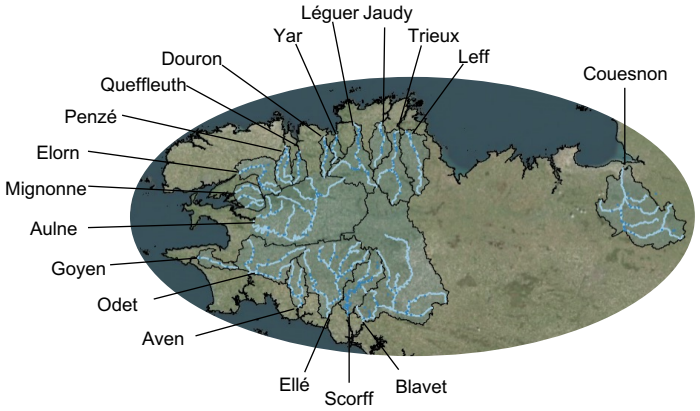
## Overview




**18 rivers**

# RENOSAUM project

## Overview




Escapement

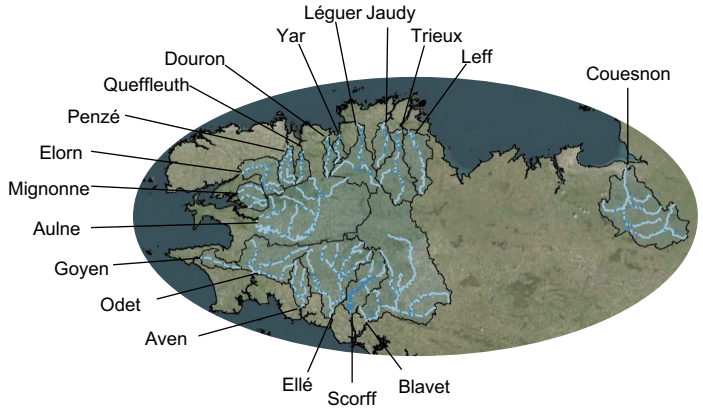
Adult return

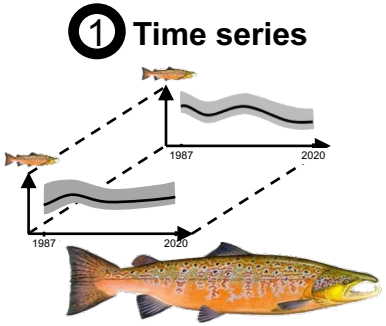
Parr 0+

**Retrospective analysis**

# RENOSAUM project

## Overview

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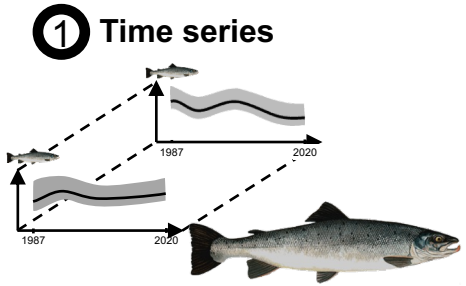
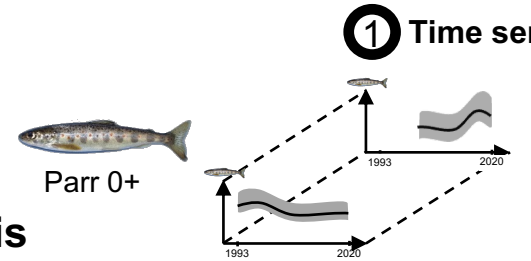



Adult return

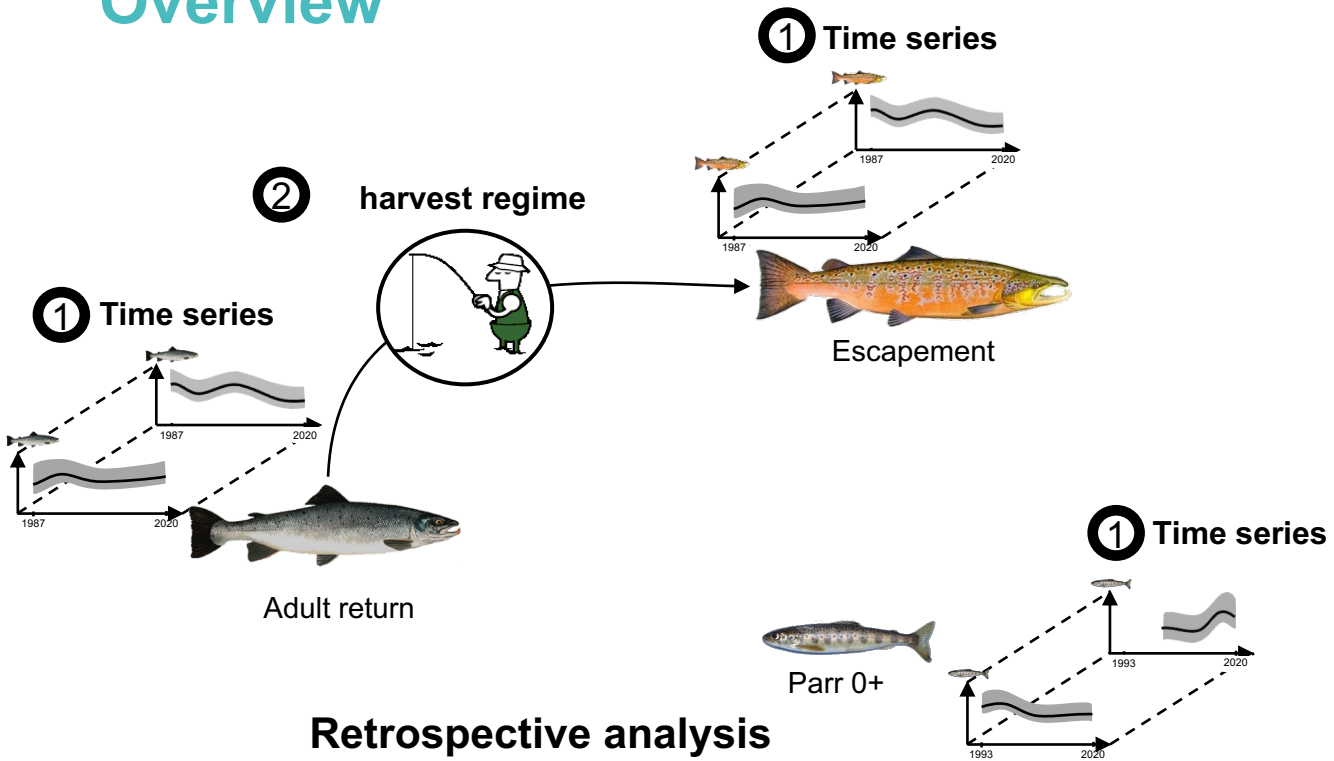


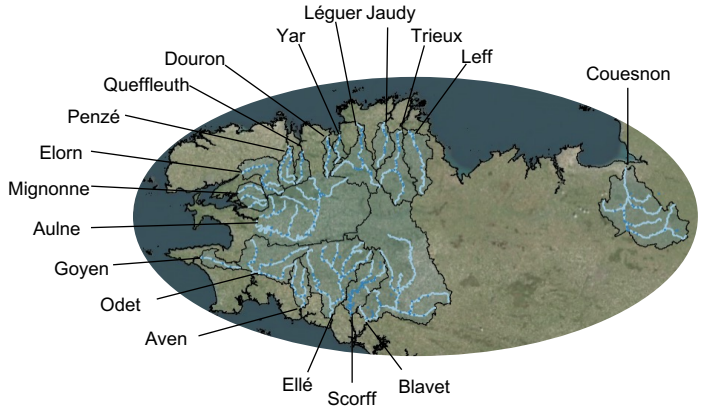

Parr 0+

**Retrospective analysis**

# RENOSAUM project

## Overview



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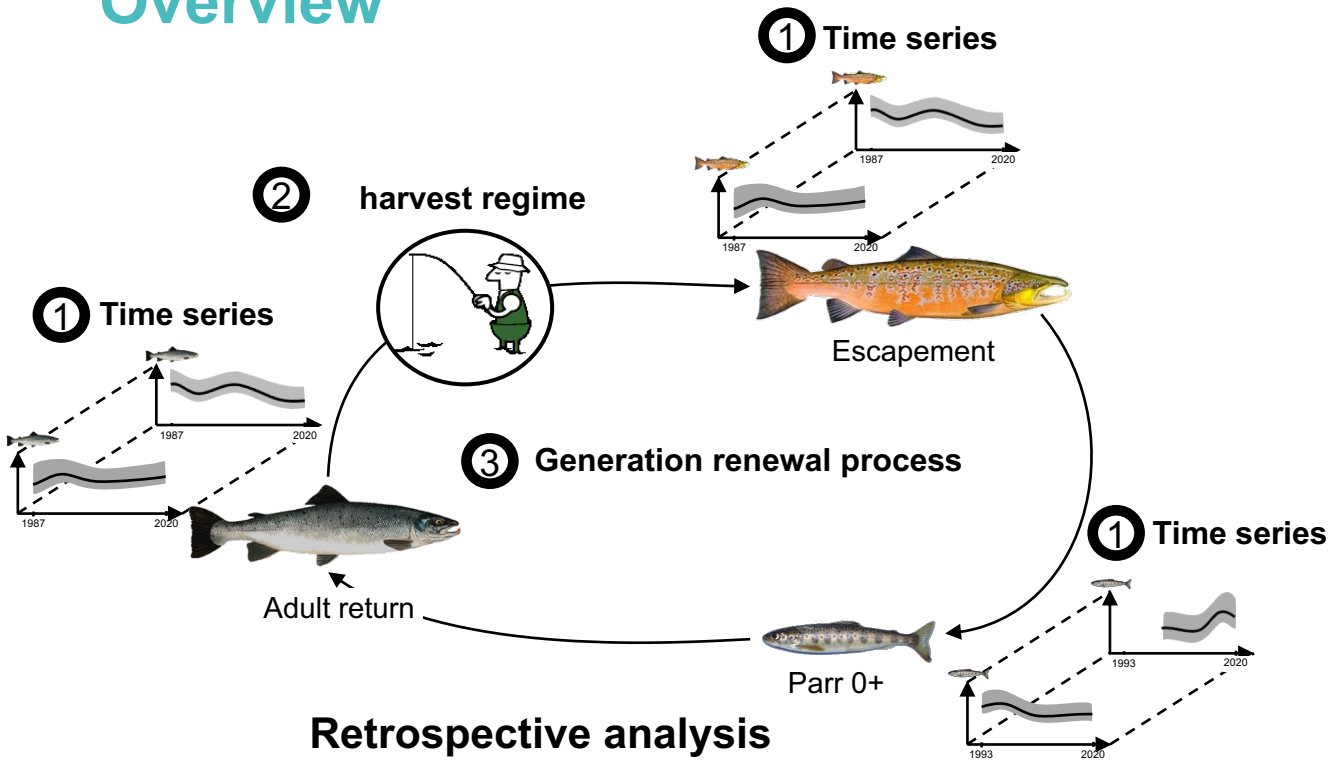


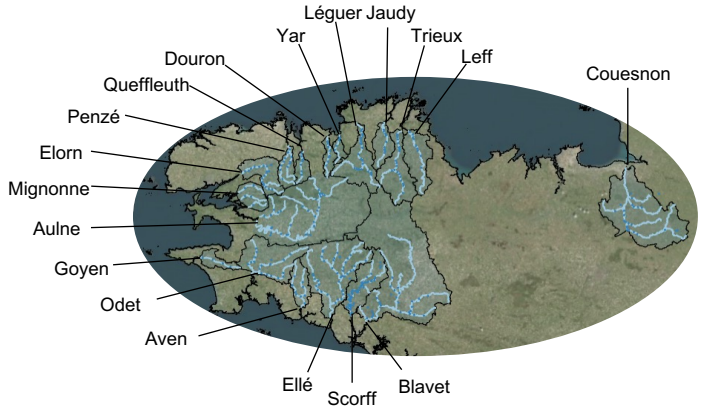

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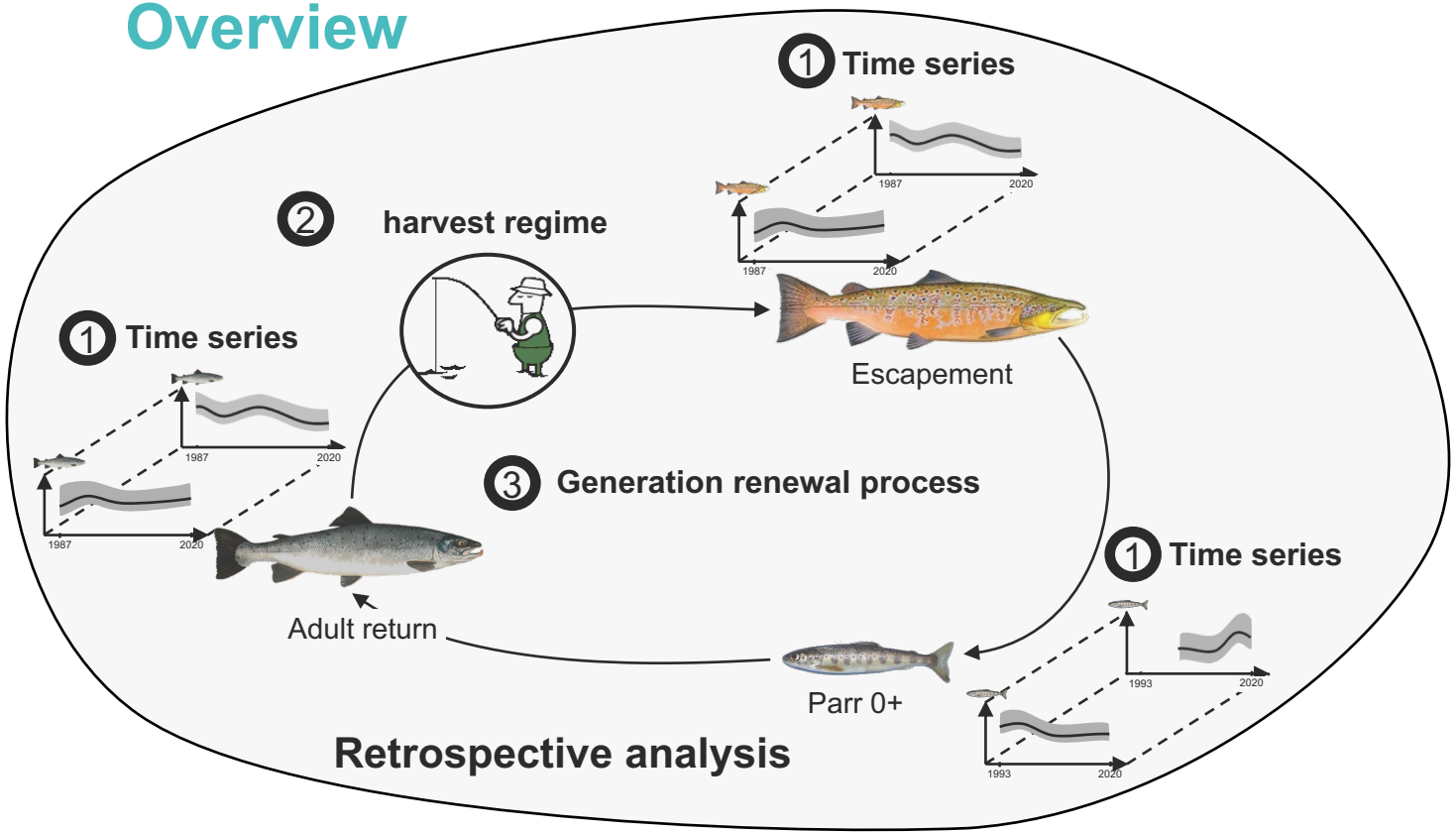


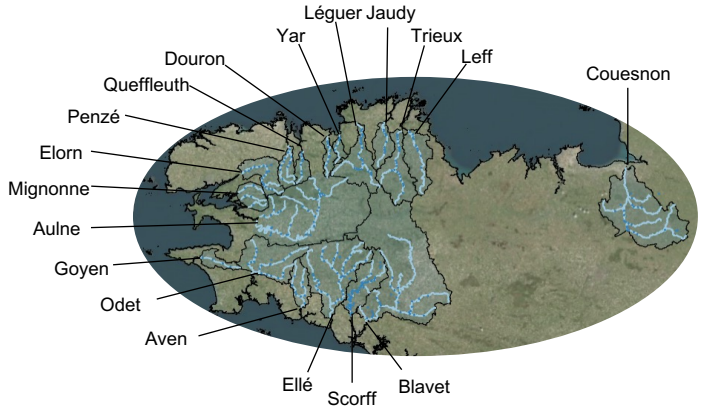

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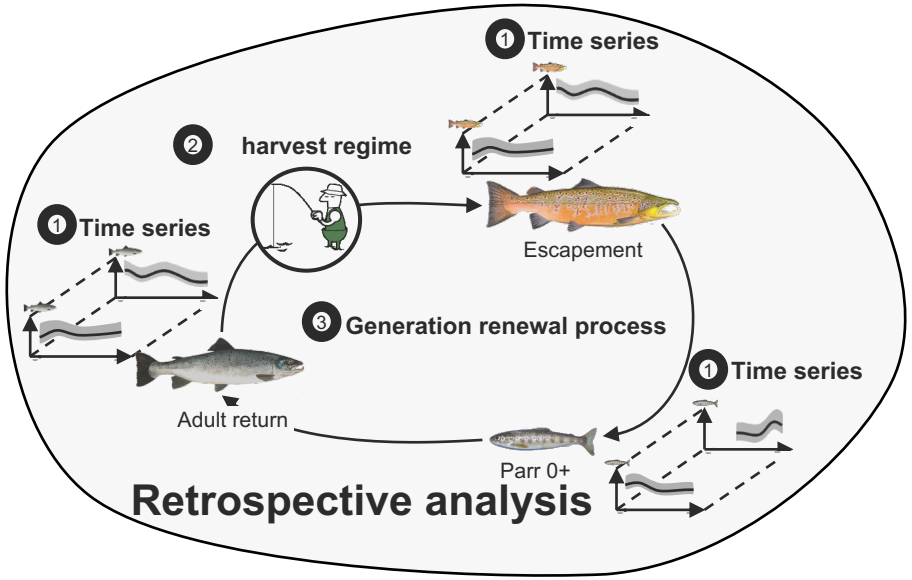


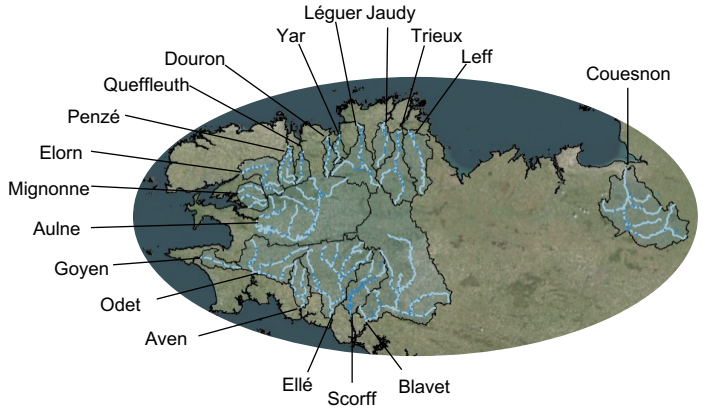

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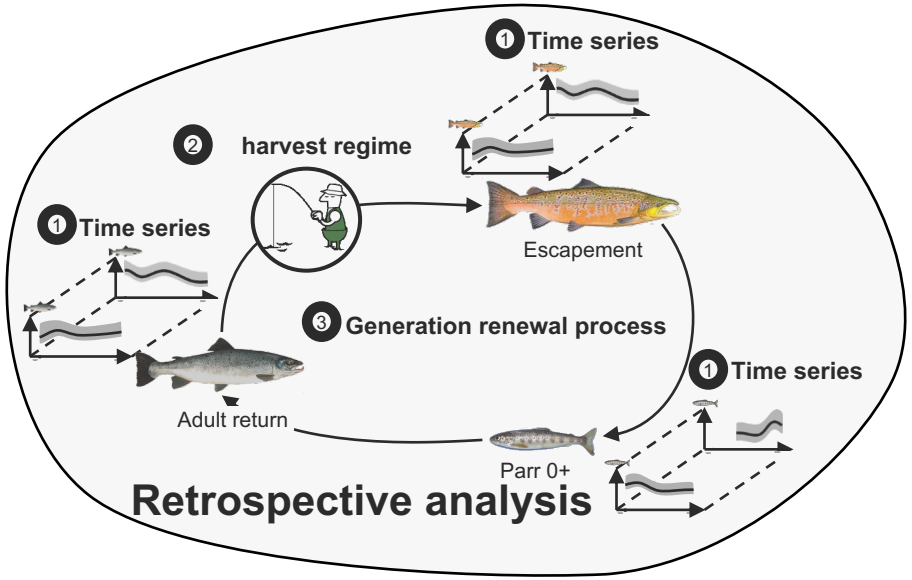
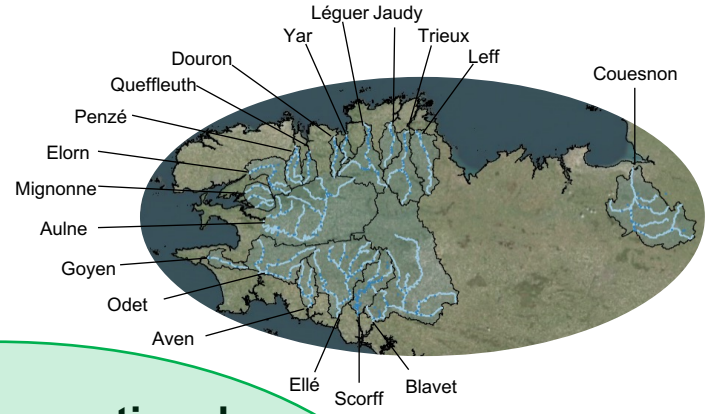


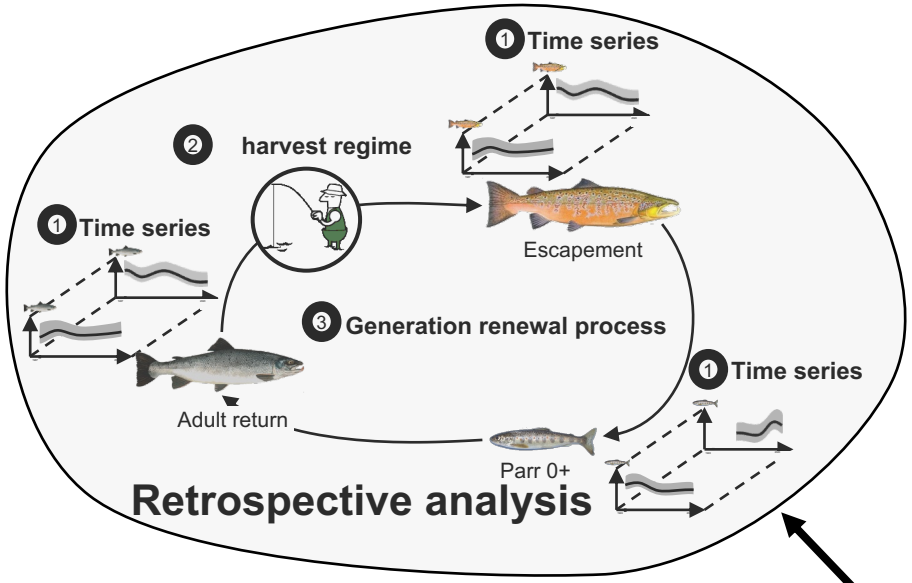



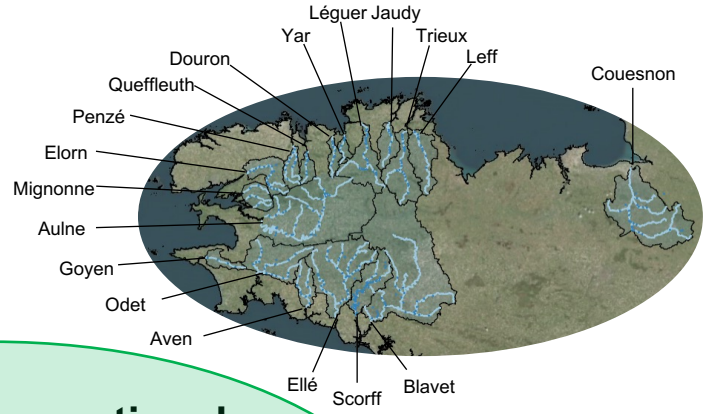

### Renovating recreational fishery regulation

4. **New definition of conservation based on demography and evolution**
5. **Comparative analysis of a large set of regulatory scenarios**

# RENOSAUM project

## Overview



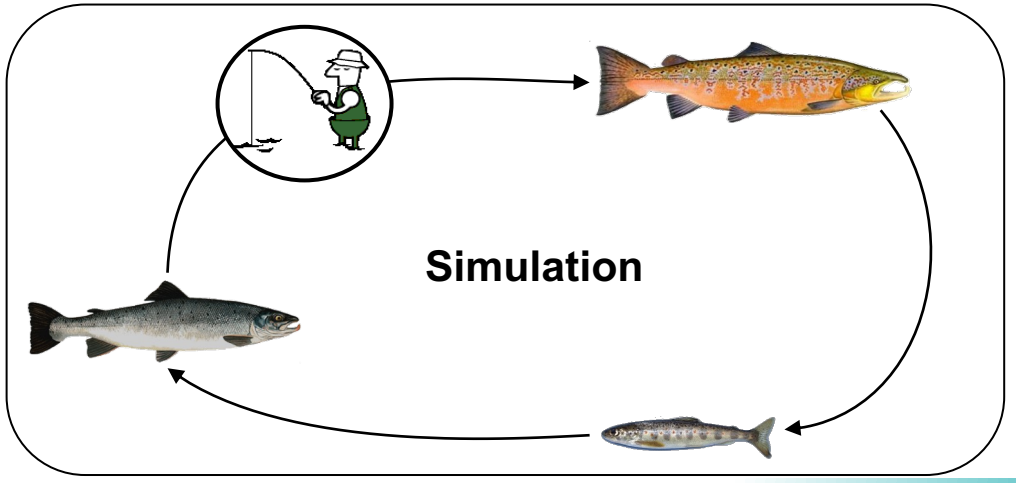

### Renovating recreational fishery regulation

4. **New definition of conservation based on demography and evolution**
5. **Comparative analysis of a large set of regulatory scenarios**

### Stakeholders

**Numerous interactions**
6 years long project 2016-2022
8 meetings

# Comparative analysis of regulatory scenarios



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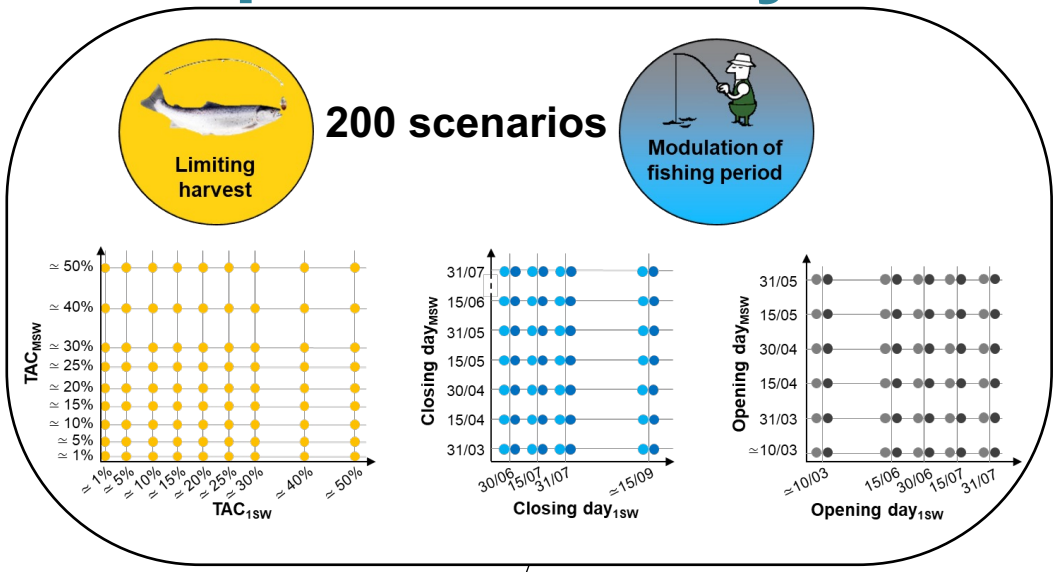


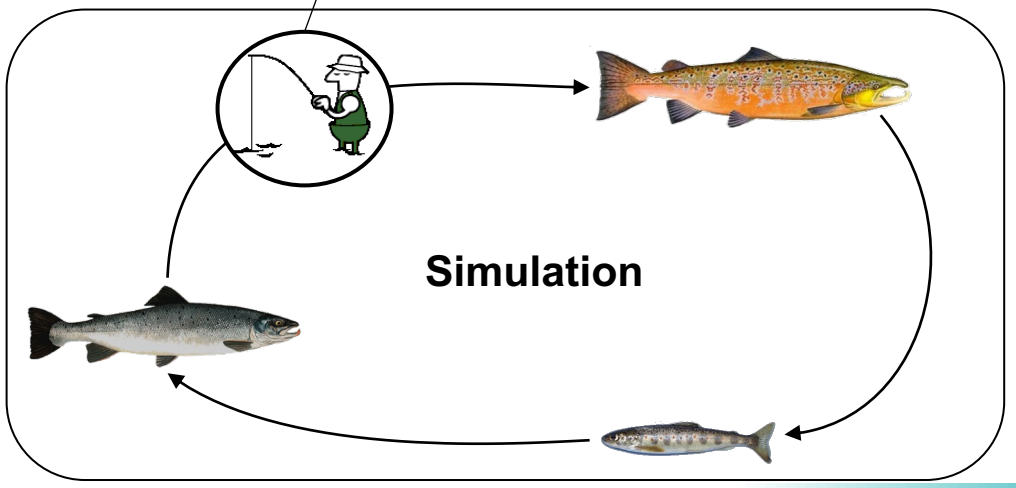

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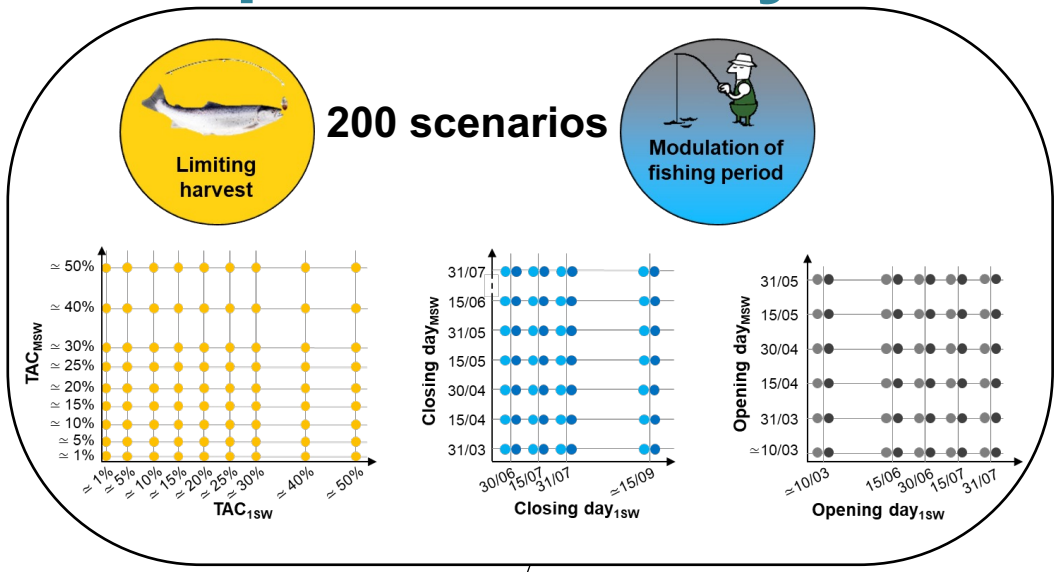
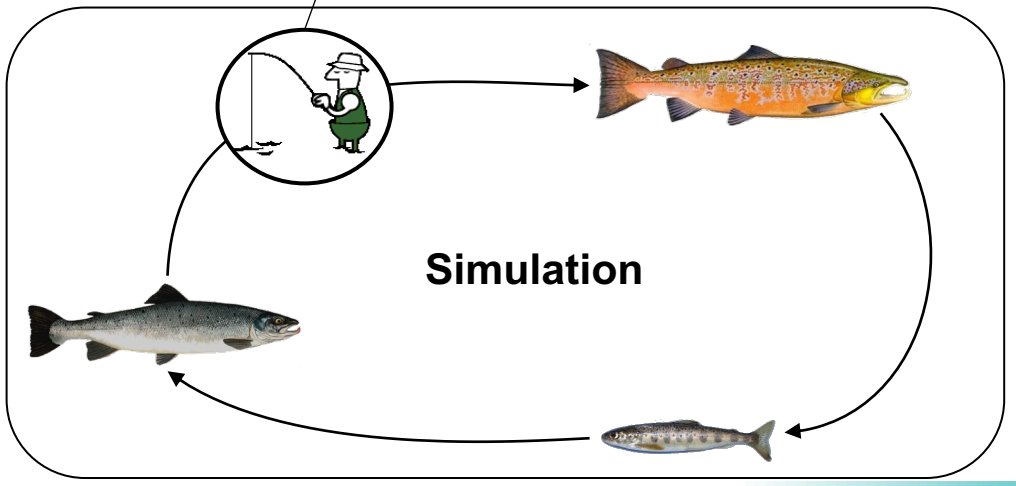
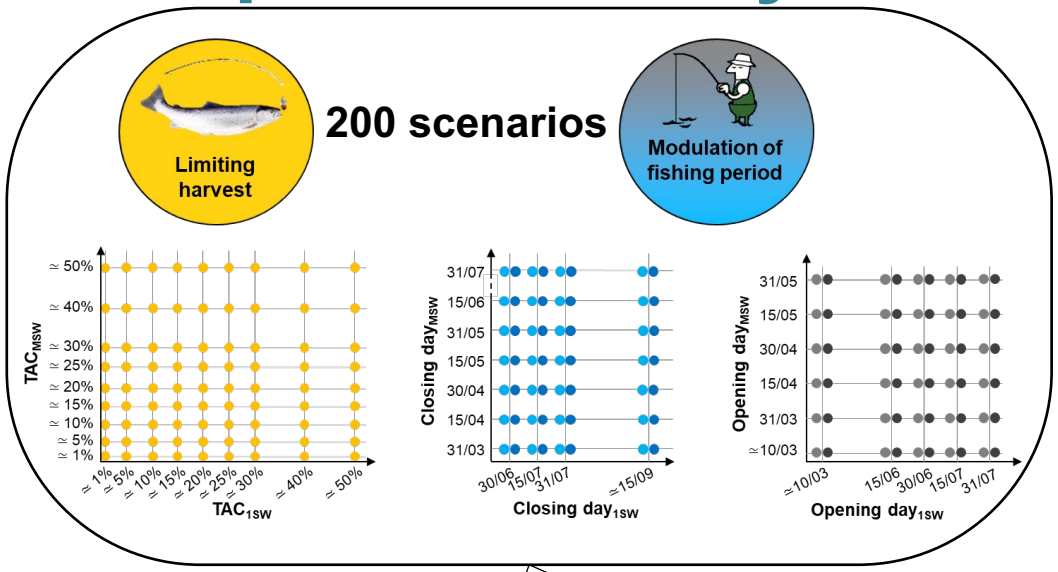
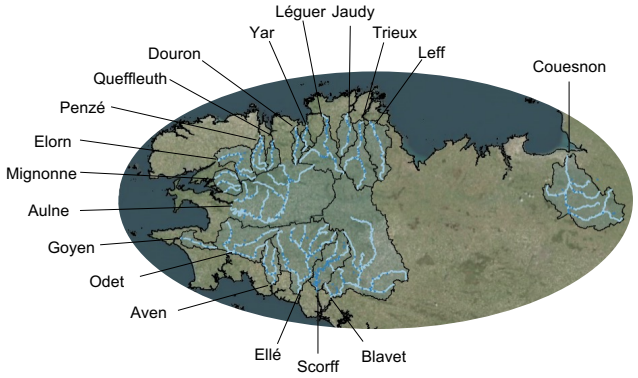


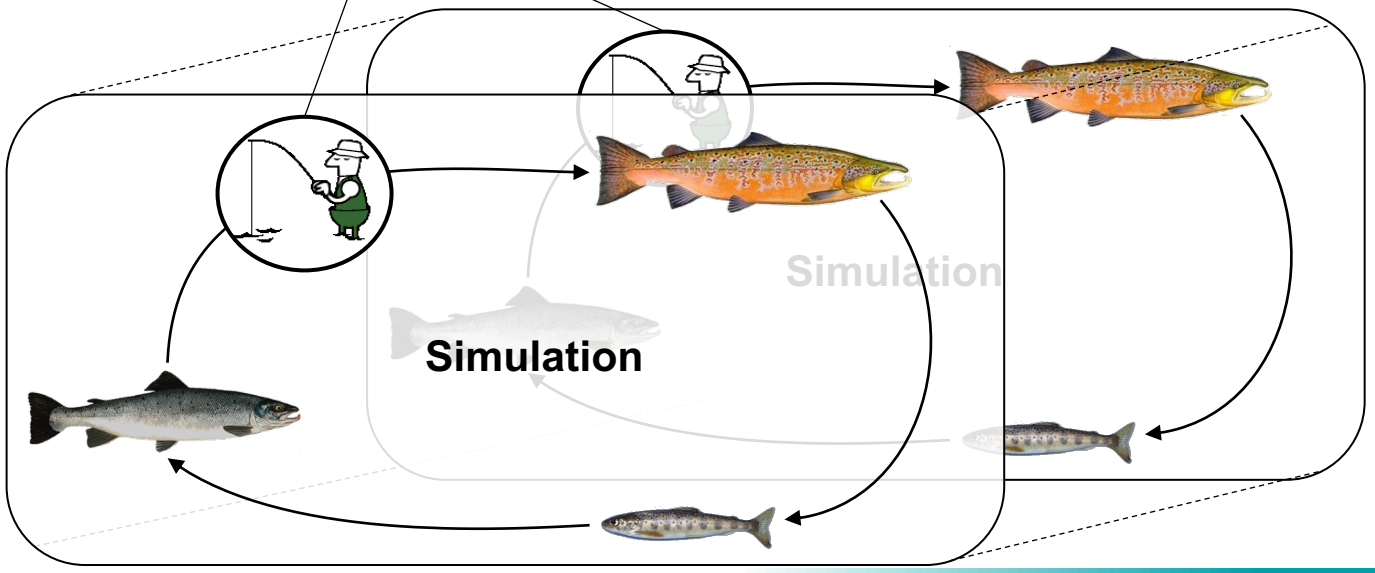




**Distinct regulatory measures set for each sea-age class**


# Comparative analysis of regulatory scenarios



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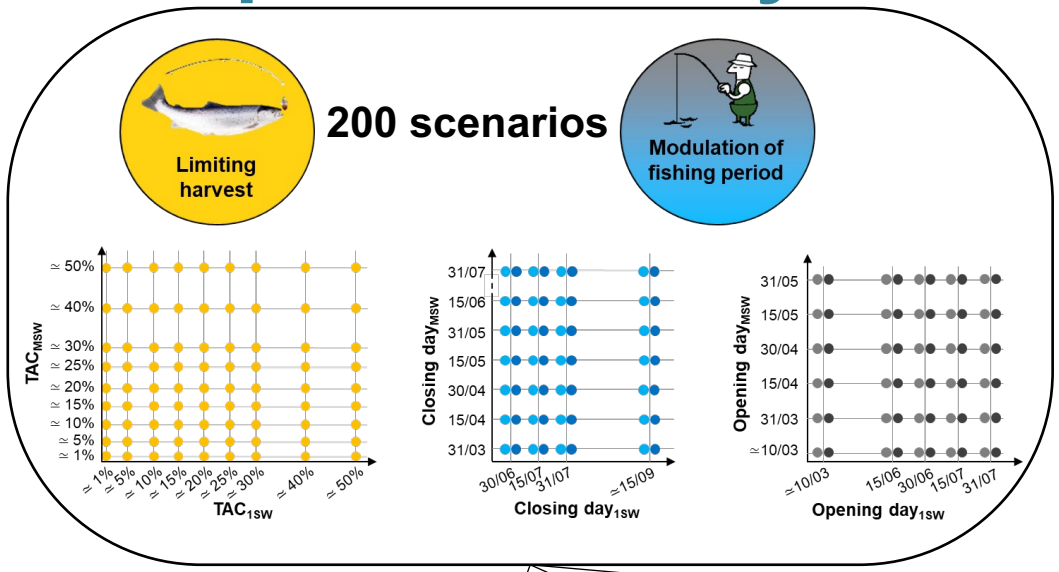


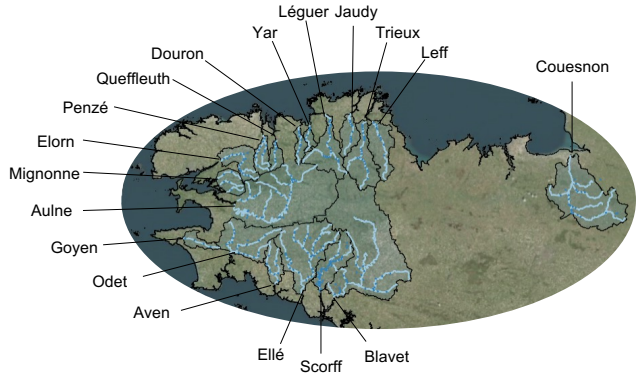


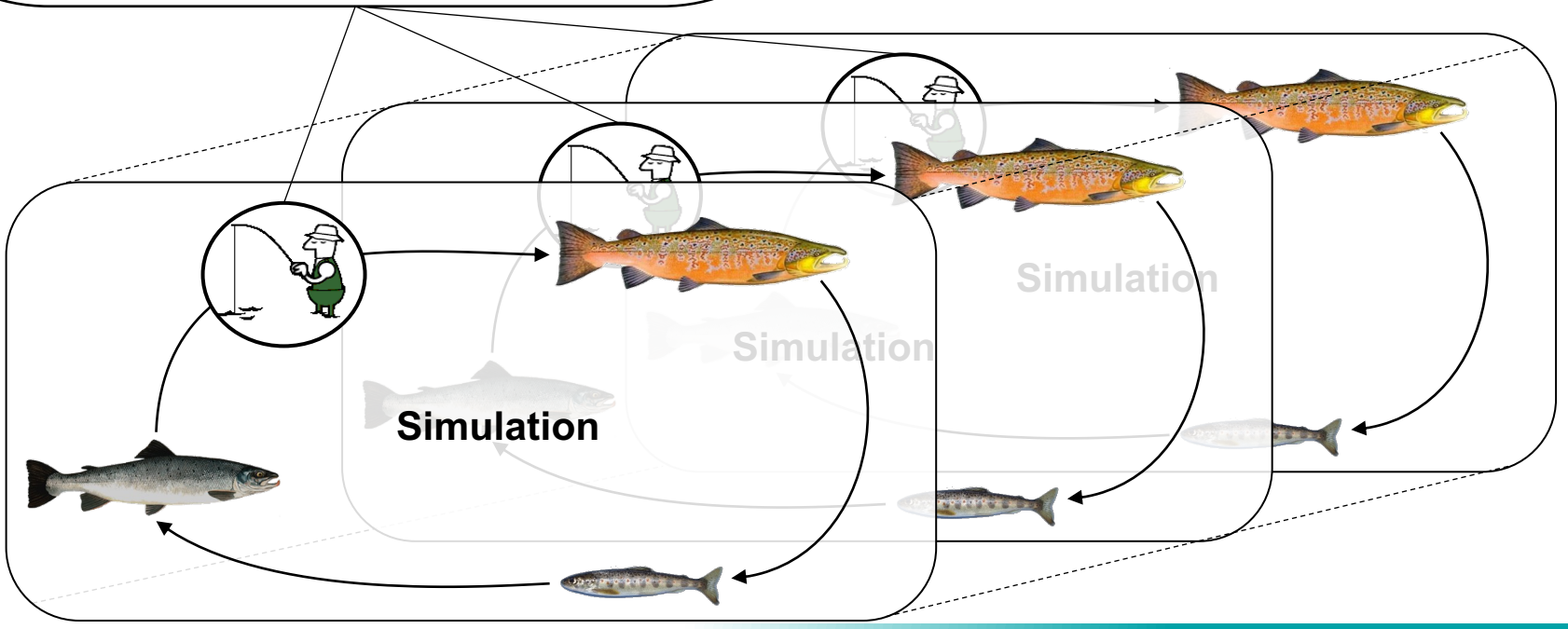

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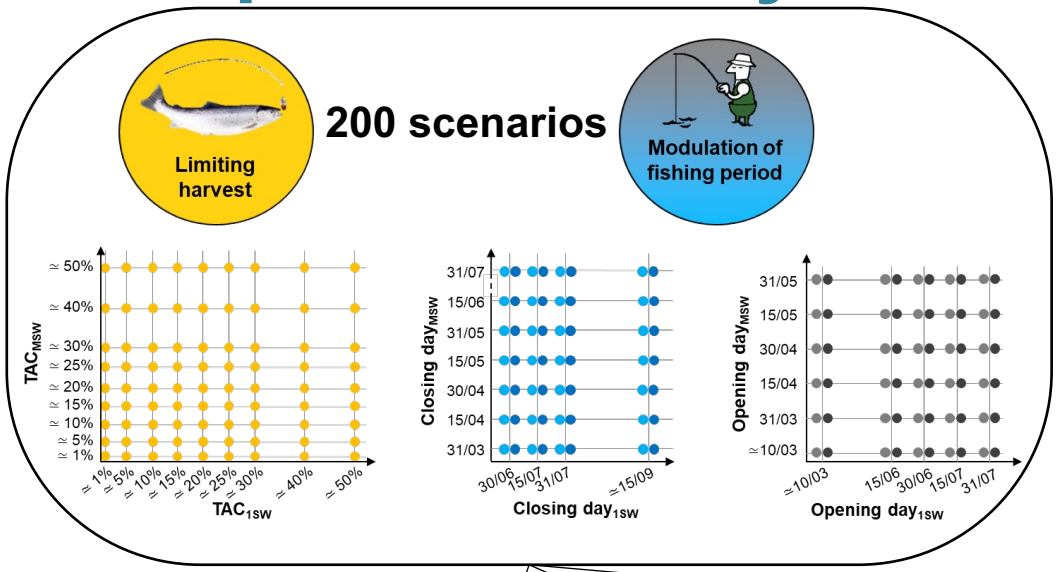
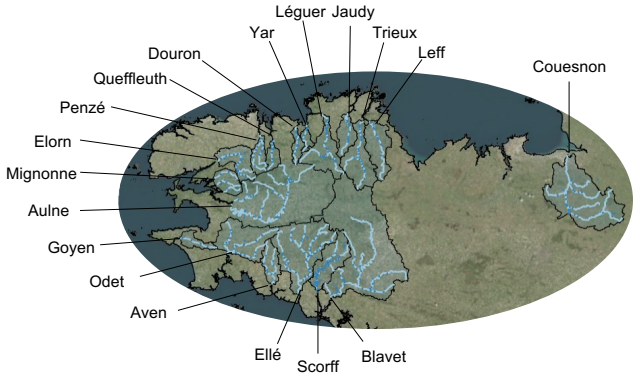
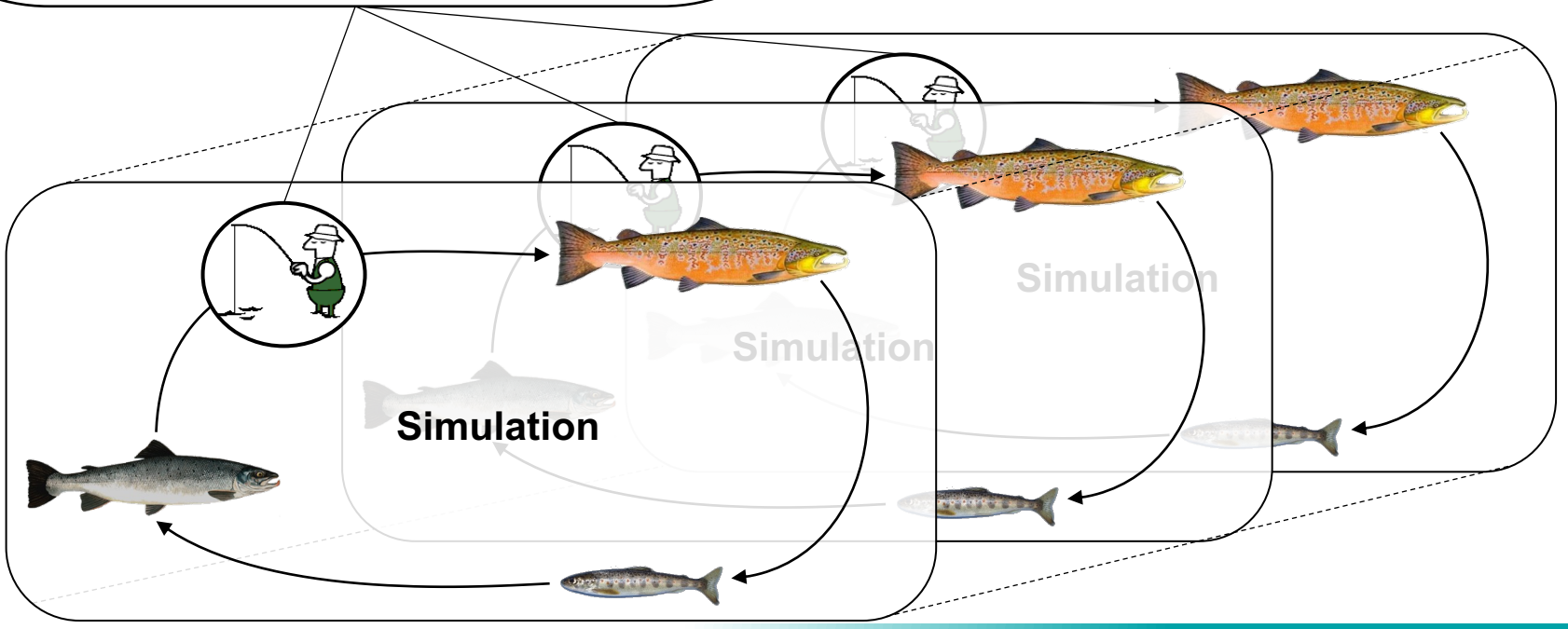



## Forecast horizon

2021-2038



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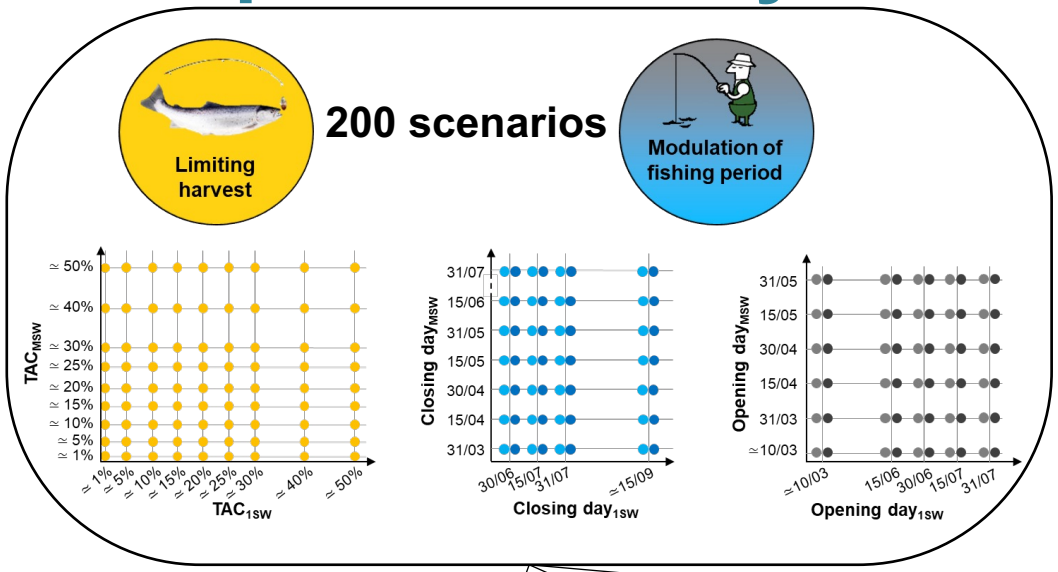
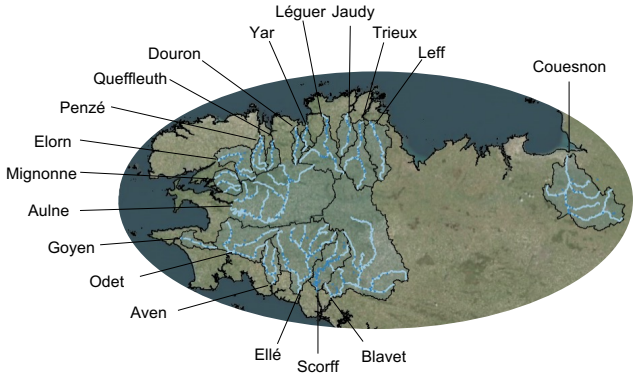
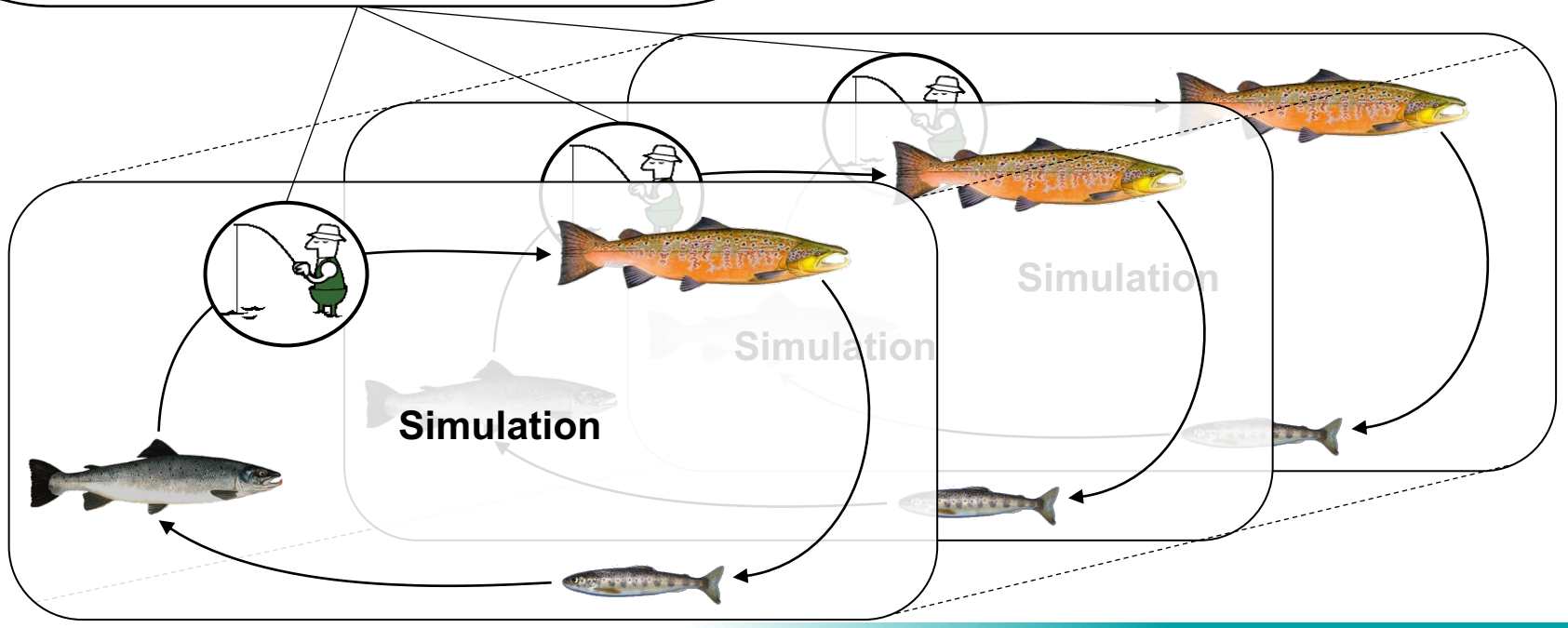



## Forecast horizon

2021-2038




## Performance assessment

# Performance assessment

## Regulatory objectives and hierarchy

Performance assessment

**Regulatory objectives**

**Conservation**

**harvest**

# Performance assessment

## Regulatory objectives and hierarchy

Performance assessment

**Regulatory objectives**

**Conservation**

**Priority**

NASCO

**harvest**

# Performance assessment

## Regulatory objectives and hierarchy

**Performance assessment**

**Regulatory objectives** → **Performance criterion**

**Conservation** → **Risk of low recruitment**
Demography

**Priority**

**harvest**

# Performance assessment

## Regulatory objectives and hierarchy

**Performance assessment**

**Regulatory objectives**

**Performance criterion**

**Conservation**

**Priority**

**Risk of low recruitment**
Demography

**Unselective harvest**
Evolution


**harvest**

# Performance assessment

## Regulatory objectives and hierarchy

Performance assessment

| Regulatory objectives | Performance criterion |
|---|---|
| **Conservation** | **Risk of low recruitment** Demography |
| **Priority** | **Unselective harvest** Evolution |
| harvest → | **Maximizing catch** |

# Performance assessment

## Regulatory objectives and hierarchy

**Performance assessment**

**Regulatory objectives** → **Performance criterion**

**Conservation**

**Priority**

- **Risk of low recruitment** — Demography
- **Unselective harvest** — Evolution


NASCO

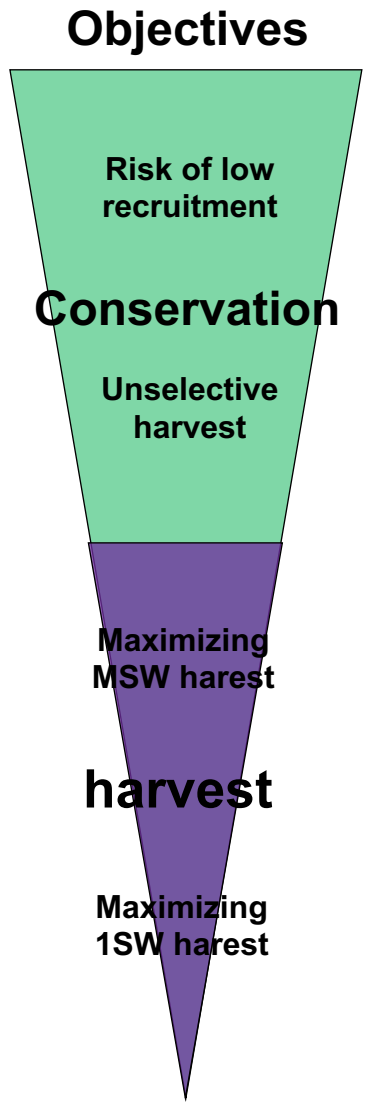
**harvest** → **Maximizing catch**

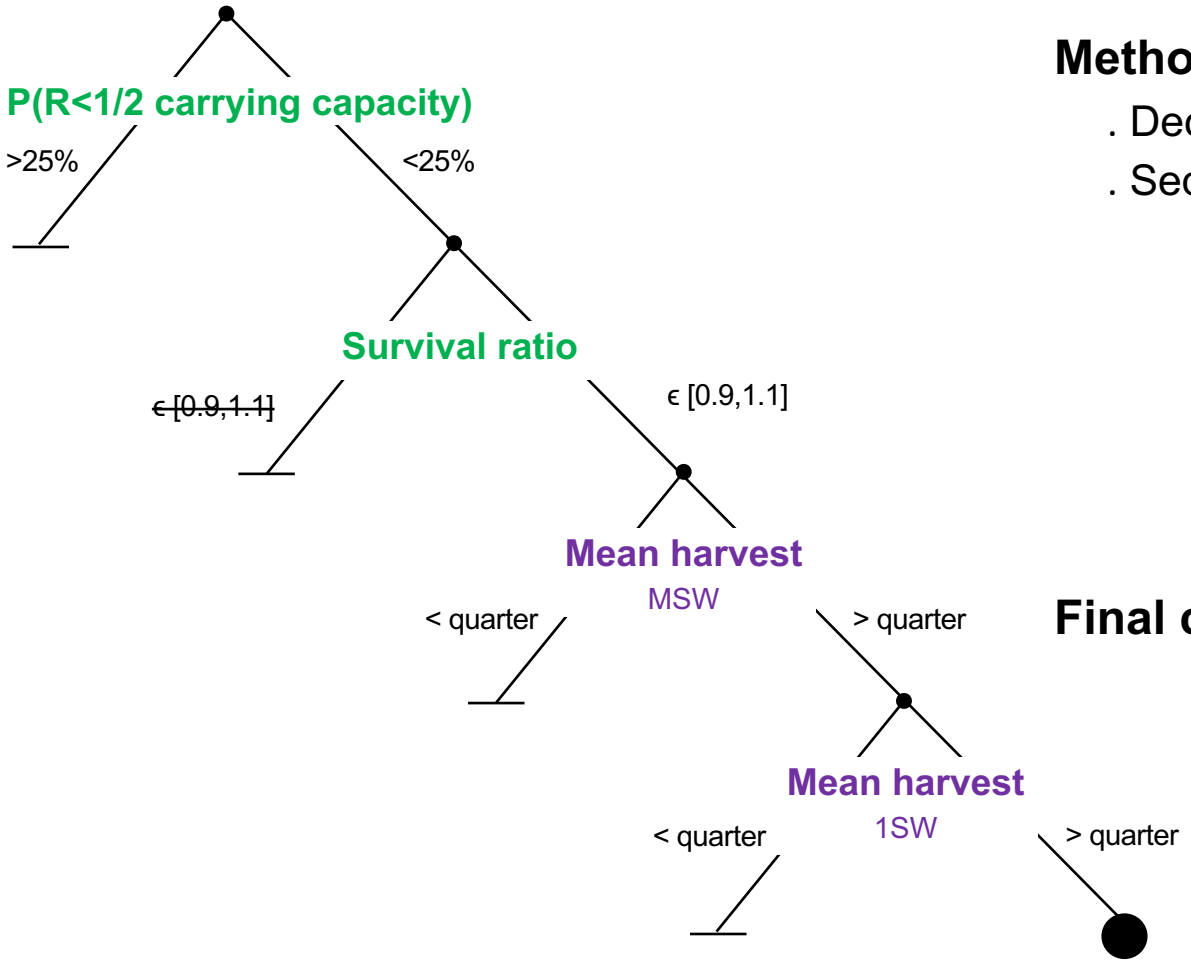
- **MSW**
- **1SW**

**Fisher preferences**

# Performance assessment

## Assessment method




Prefered scenarios

Performance assessment

**Method** :

. Decision tree

. Sequential assessment with two selection filters:

- **Conservation** :
  Only scenarios that ensure conservation go through the conservation filter
- **harvest** :
  1/16 of the scenarios ensuring conservation are selected by the harvest filter thanks to their particularly good harvest performances

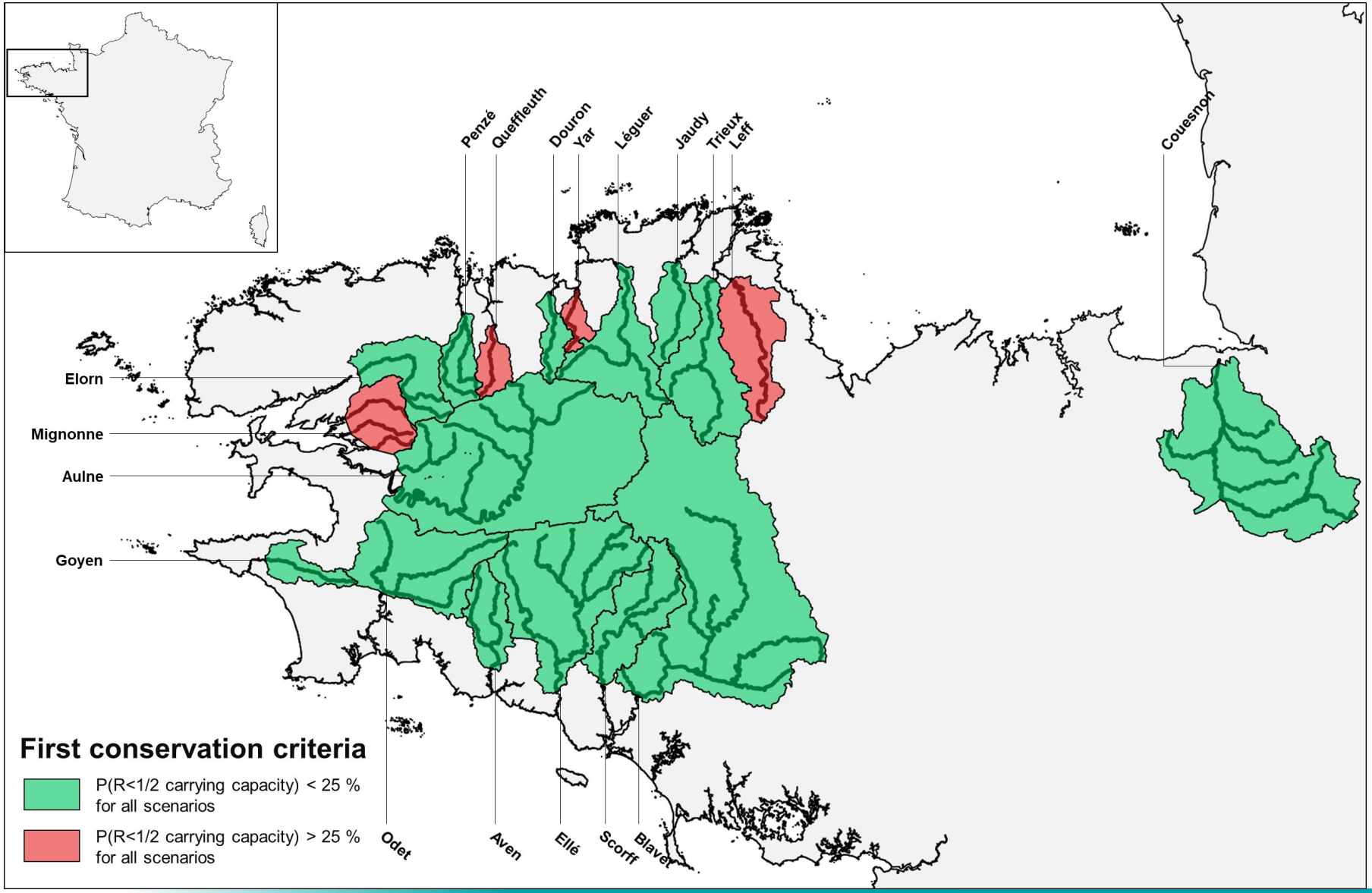
**Final cut let to the stakeholder**

# First conservation criterion

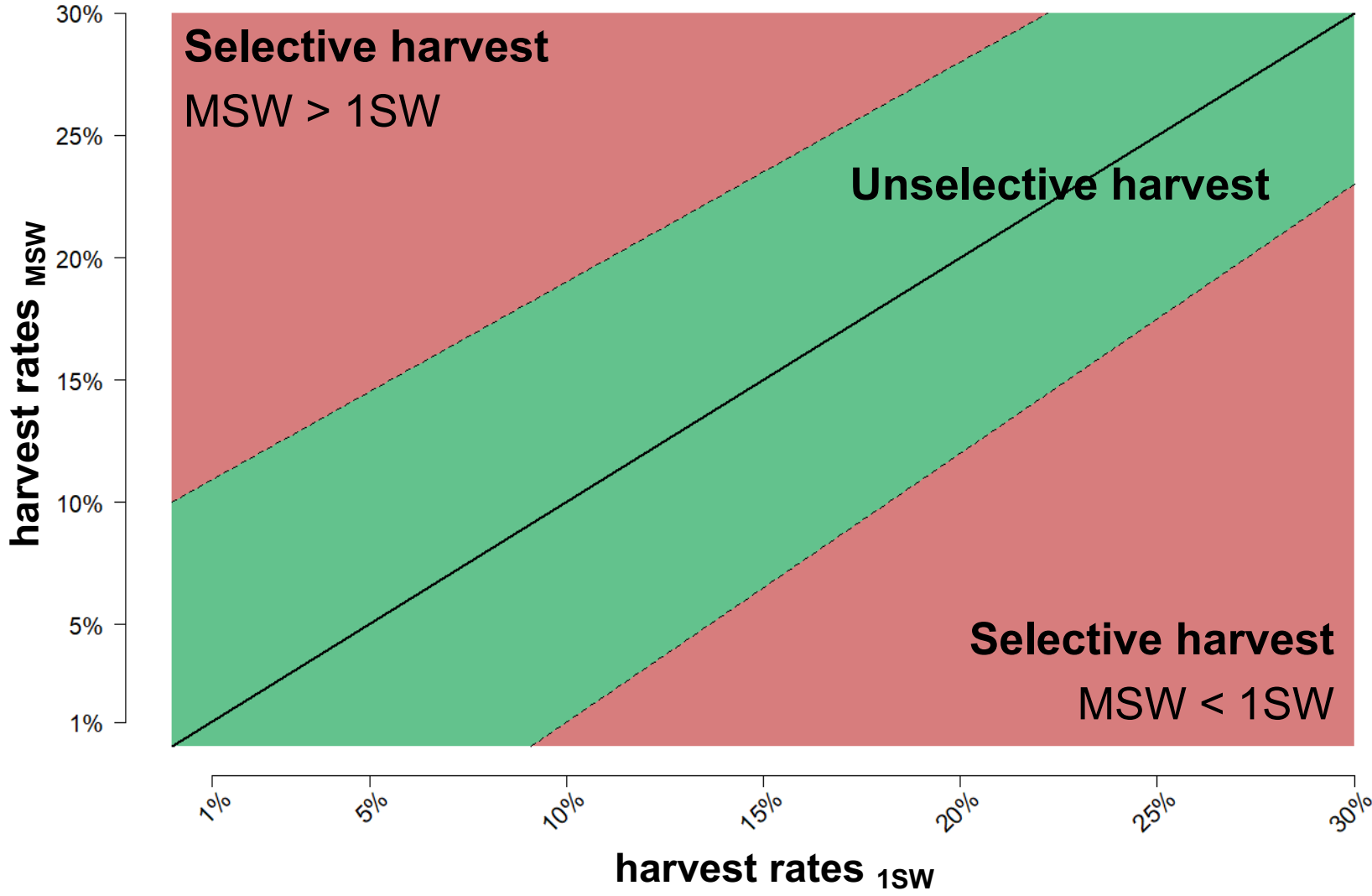
. All or nothing

. 4 rivers : non compliance with the first conservation criteria

. 14 rivers : control the risk of low recruitment whatever the scenario

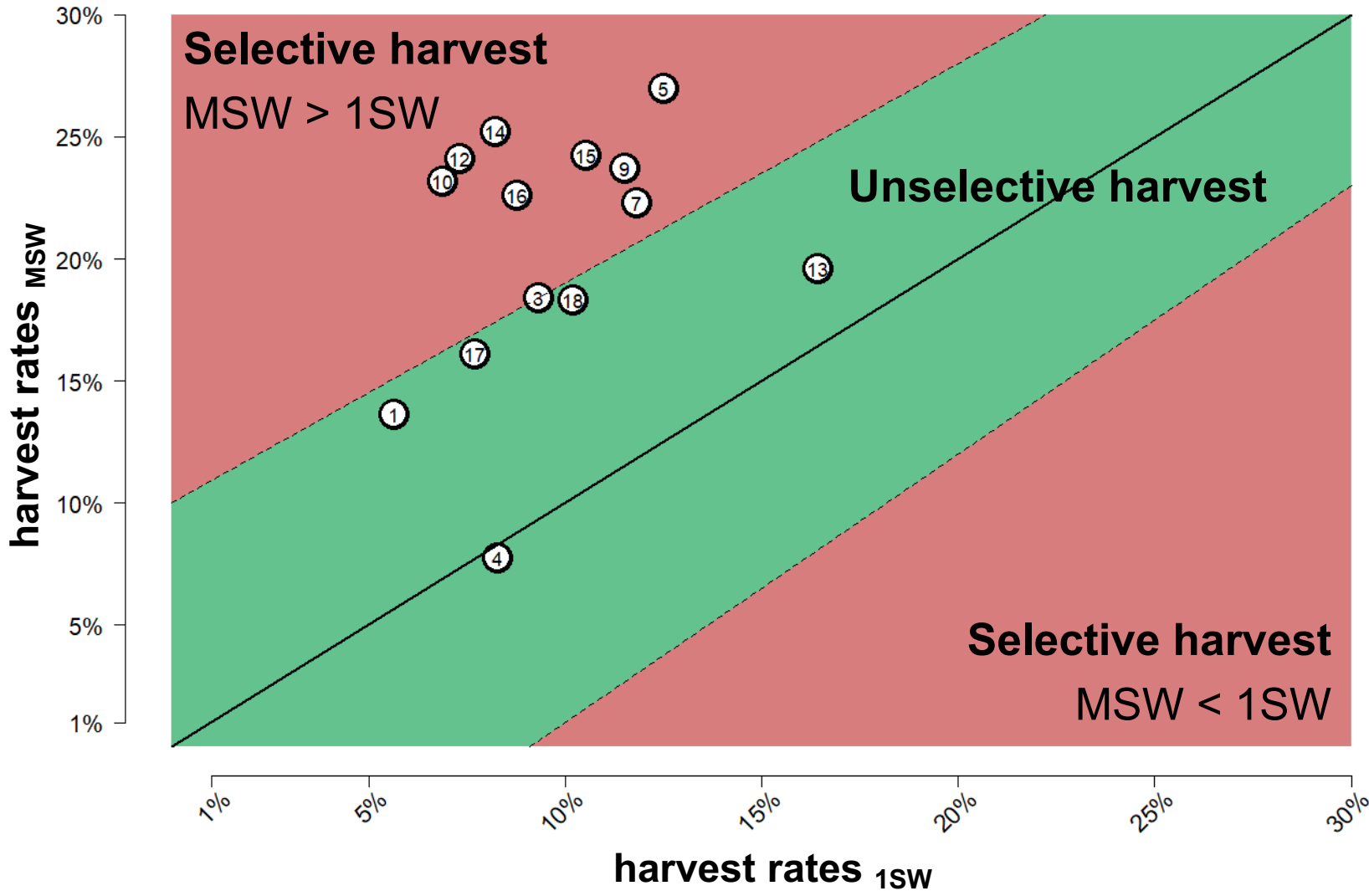


# second conservation criterion



# second conservation criterion

. Without regulation : “Selective” harvest of MSW

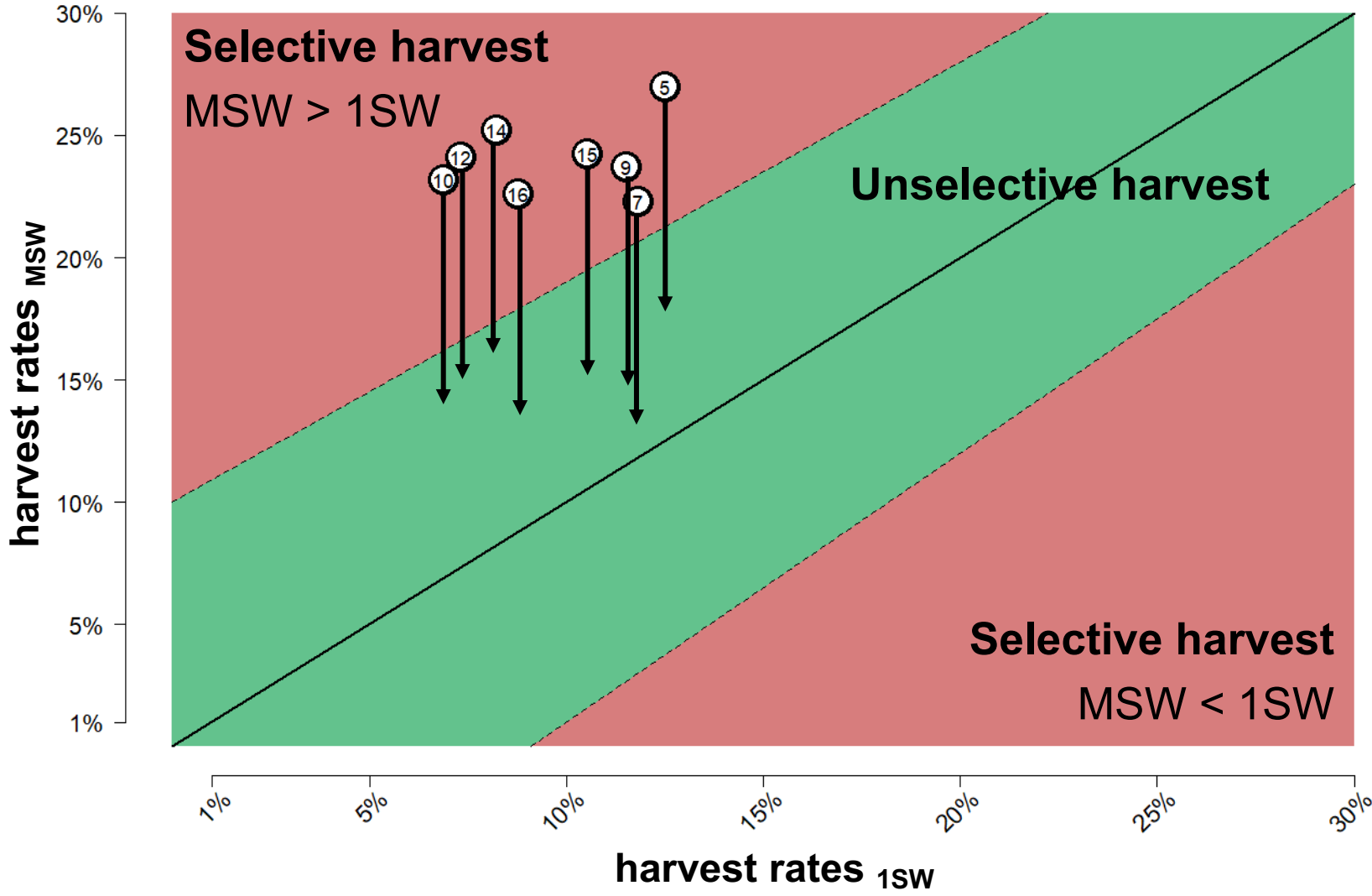


# second conservation criterion

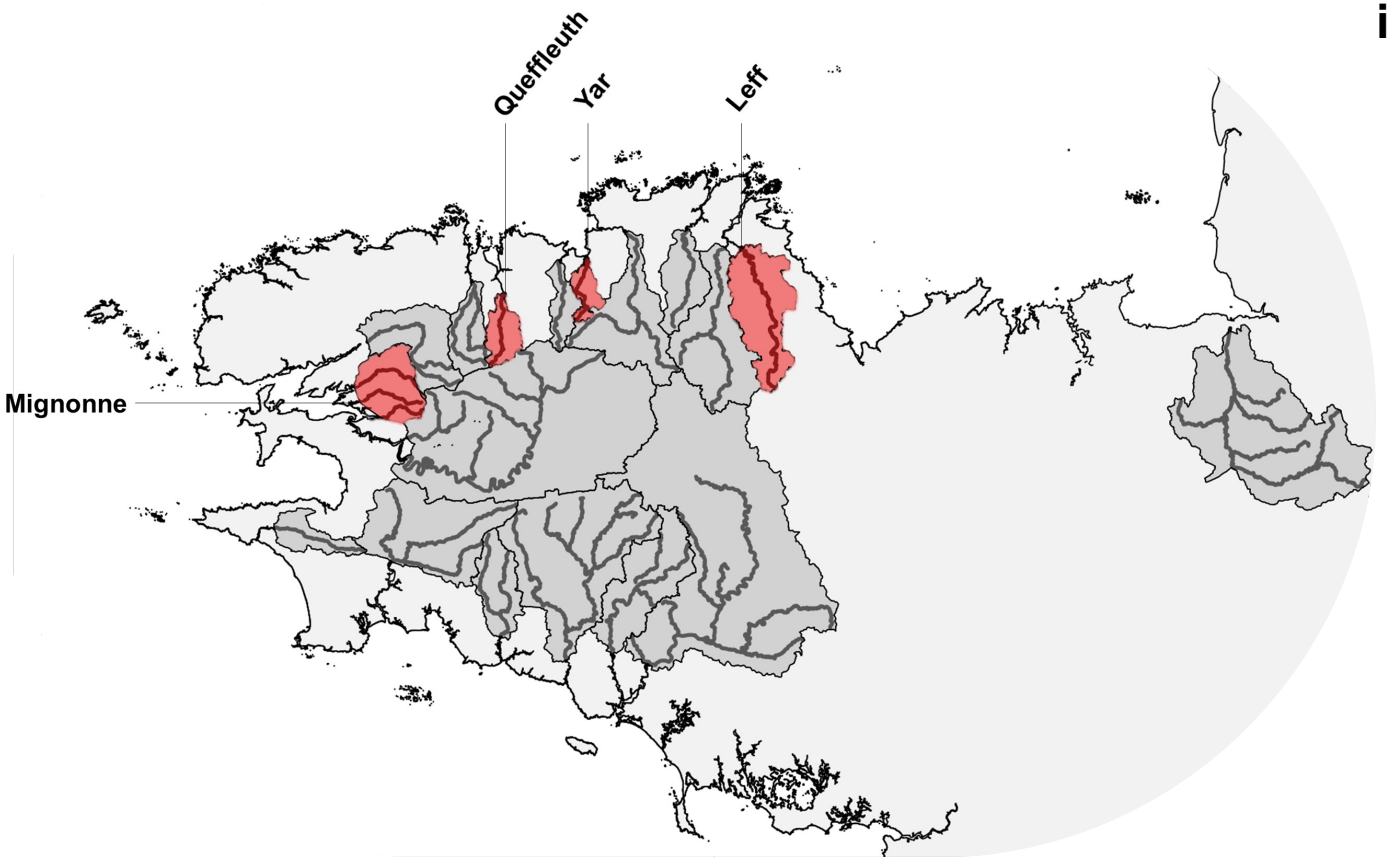
. Without regulation : “Selective” harvest of MSW

. Reducing selectivity :

- Limit the harvest of MSW
- No constraints on the harvest of 1SW



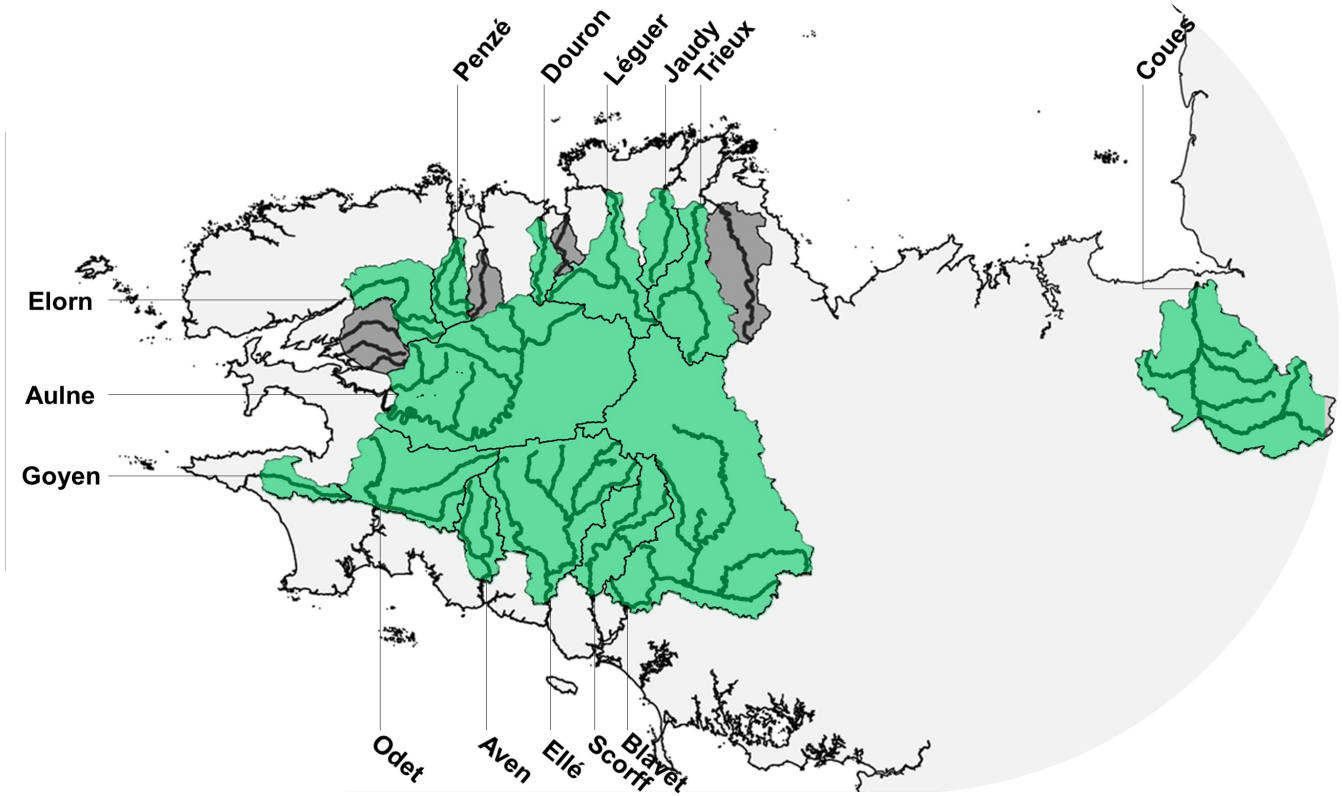
# The new regulatory system




**New regulatory measures will be implemented in 2023 :**

. Harvest will be forbidden in **4 rivers** non complying with the first conservation criteria

# The new regulatory system

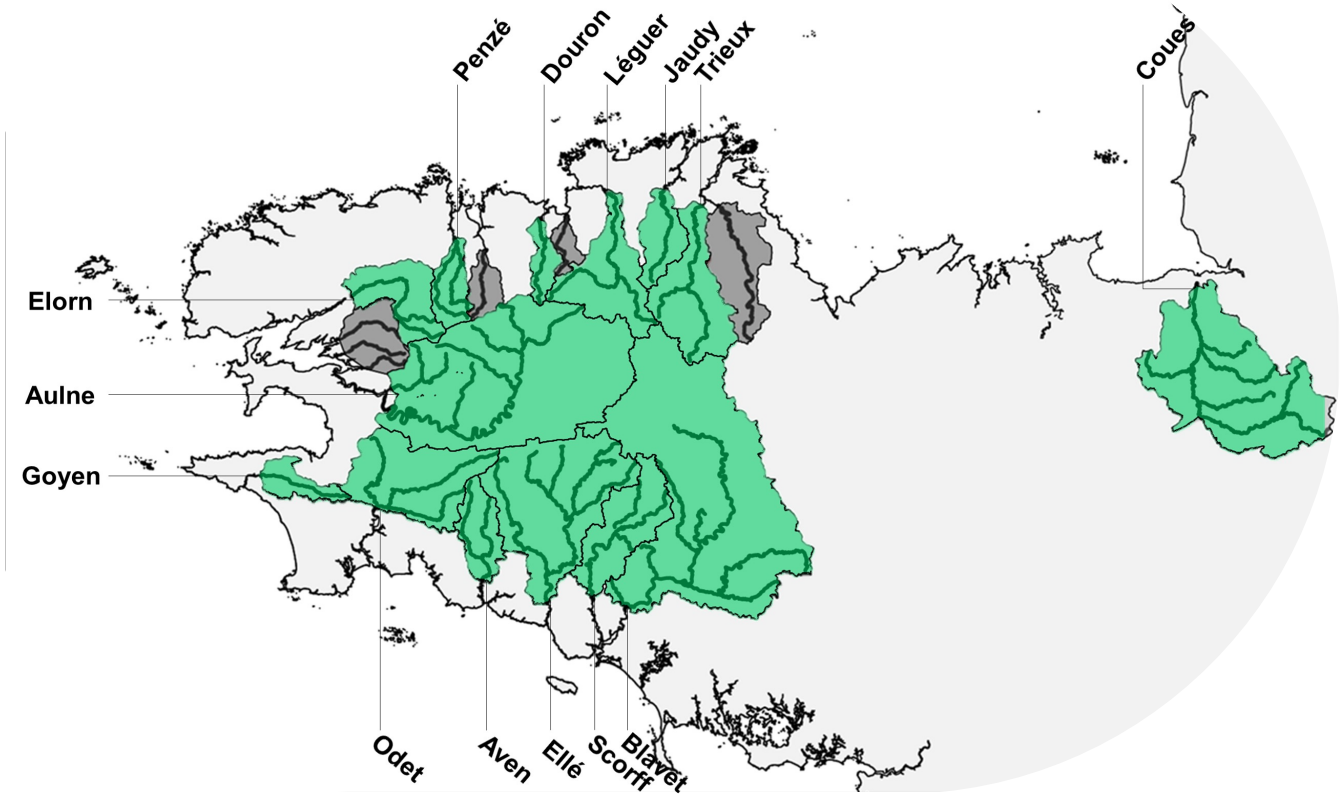



**New regulatory measures will be implemented in 2023 :**

. Harvest will be forbidden in **4 rivers** non complying with the first conservation criteria

. For the remaining **14 rivers**, new regulatory choices have been made to ensure unselective harvest :

# The new regulatory system



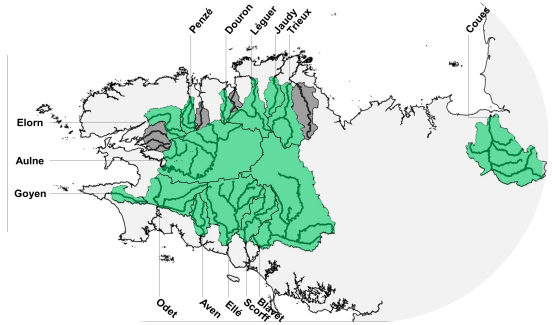

**New regulatory measures will be implemented in 2023 :**

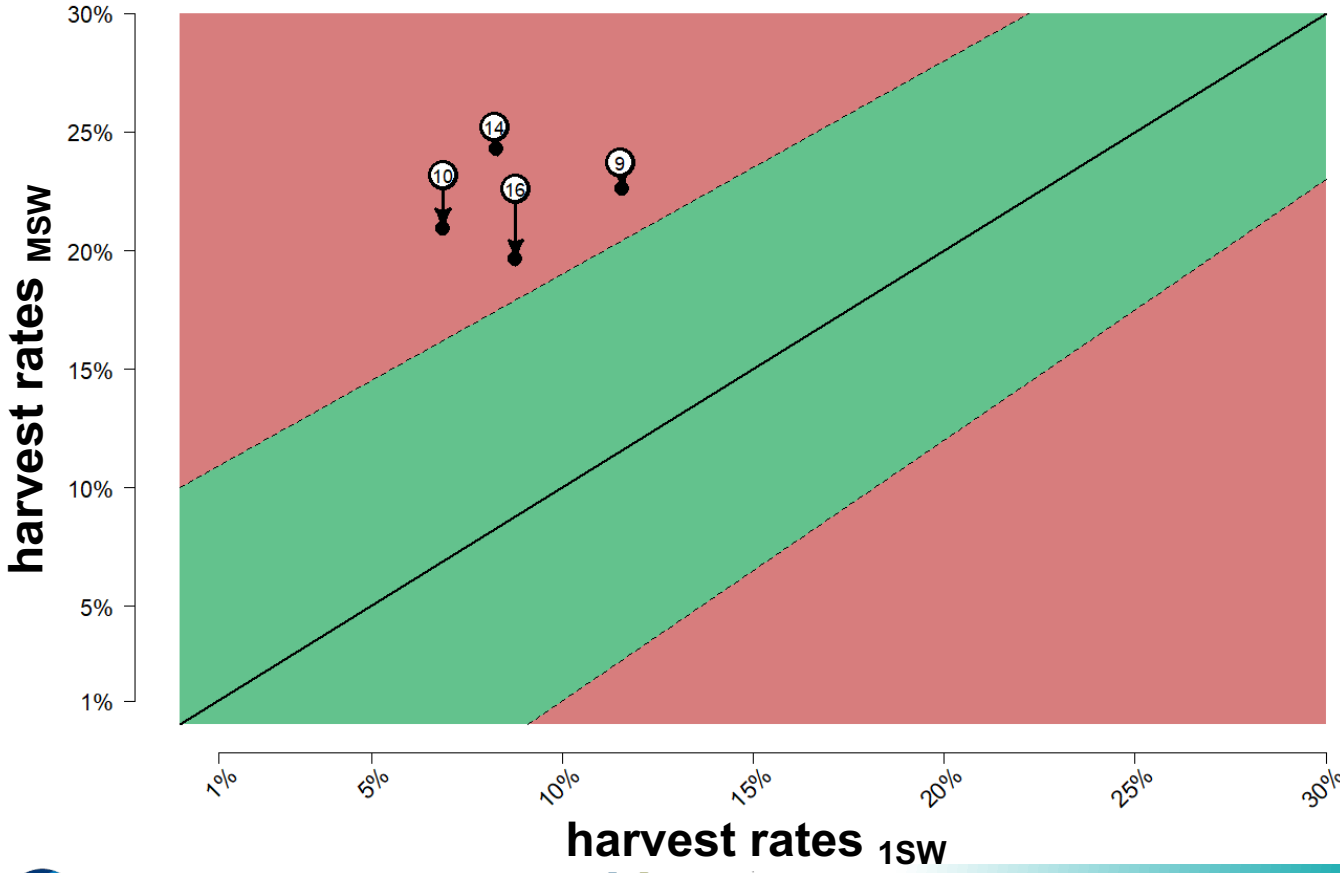
. Harvest will be forbidden in **4 rivers** non complying with the first conservation criteria

. For the remaining **14 rivers**, new regulatory choices will be made to ensure unselective harvest :

- $TAC_{1SW}$ removed

# The new regulatory system

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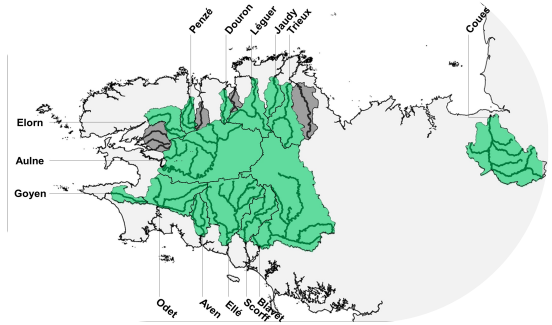
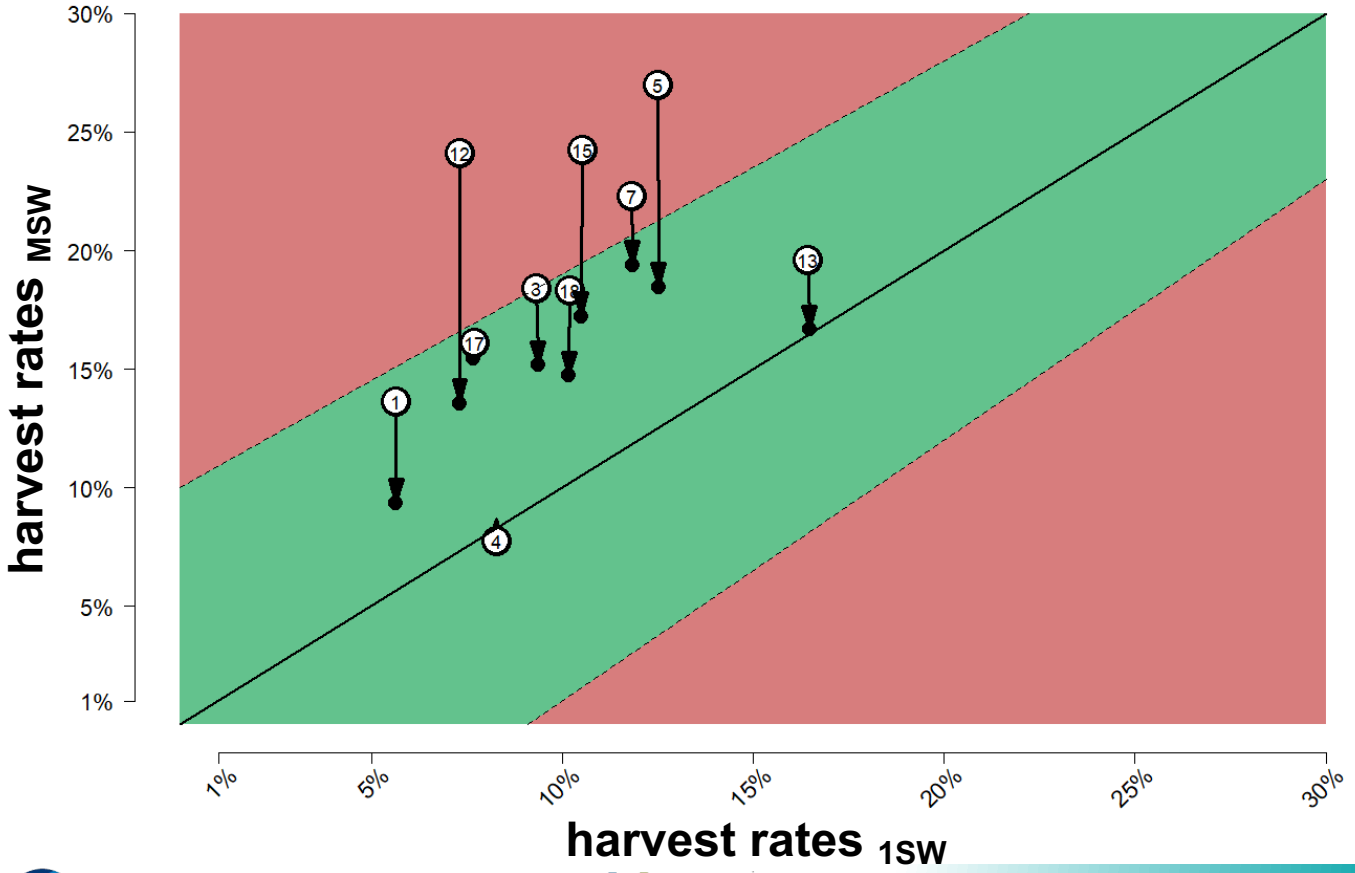
. For the remaining **14 rivers**, new regulatory choices will be made to ensure unselective harvest :

- $TAC_{1SW}$ removed
- More restrictive TAC of MSW will be implemented on the rivers for which the current TAC did not allow for unselective harvest

# The new regulatory system

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. Harvest will be forbidden in **4 rivers** non complying with the first conservation criteria

. For the remaining **14 rivers**, new regulatory choices will be made to ensure unselective harvest :

- $TAC_{1SW}$ removed
- More restrictive TAC of MSW will be implemented on the rivers for which the current TAC did not allow for unselective harvest
- Maintaining current $TAC_{MSW}$ in rivers for which harvest was already unselective

# Originality of the approach

**New definition of conservation :**

. **Demography** : Risk-based definition

. **Evolution** : Unselective harvest

# Originality of the approach

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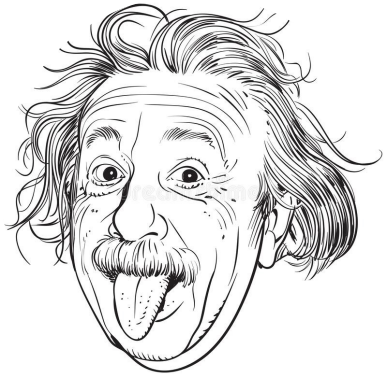
**Involving stakeholders**

. Time consuming process (6 years long project, 8 meetings)

**Stakeholders**



**Scientists**

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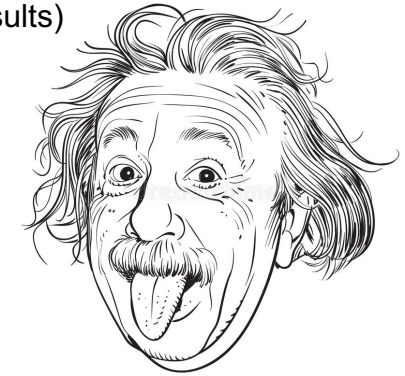

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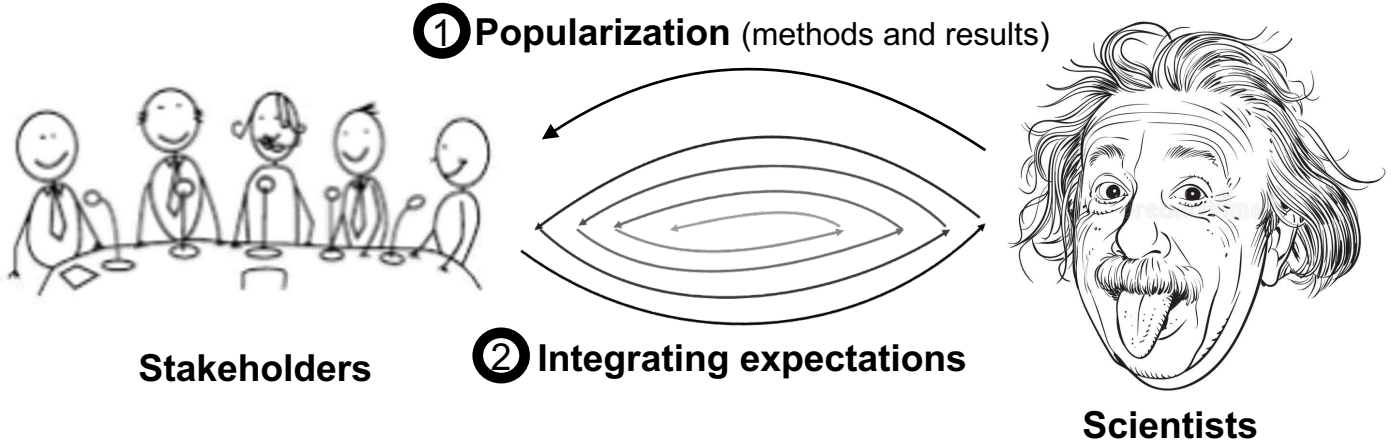

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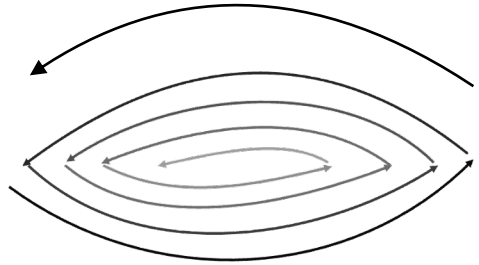

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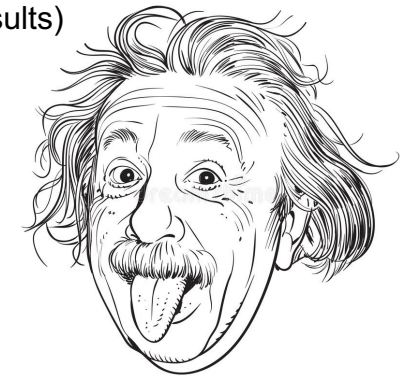

**Scientists**

③
- **Support for the future regulatory system**
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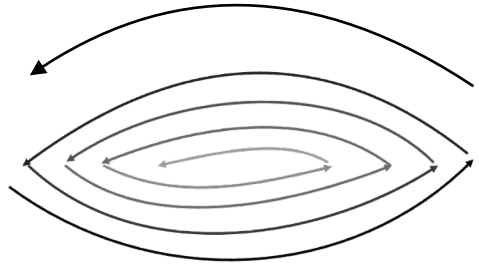

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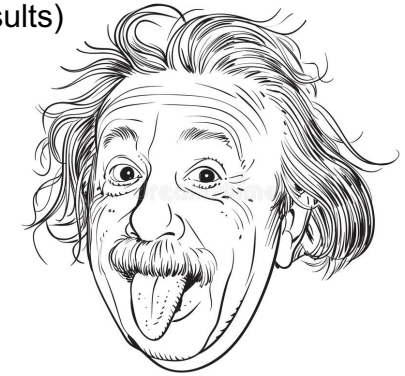

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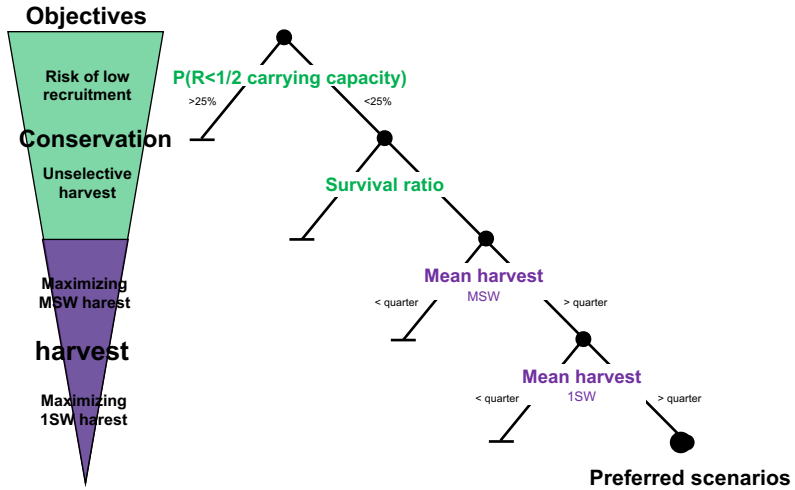
## How we facilitate interaction with stakeholders

- **The method** : Decision tree



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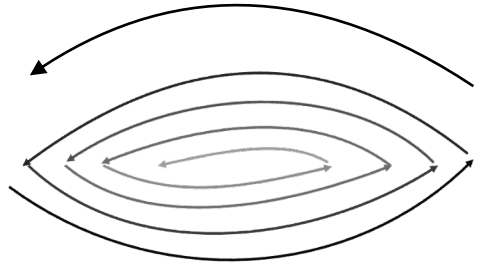

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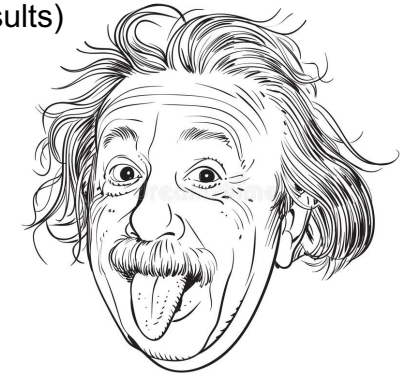

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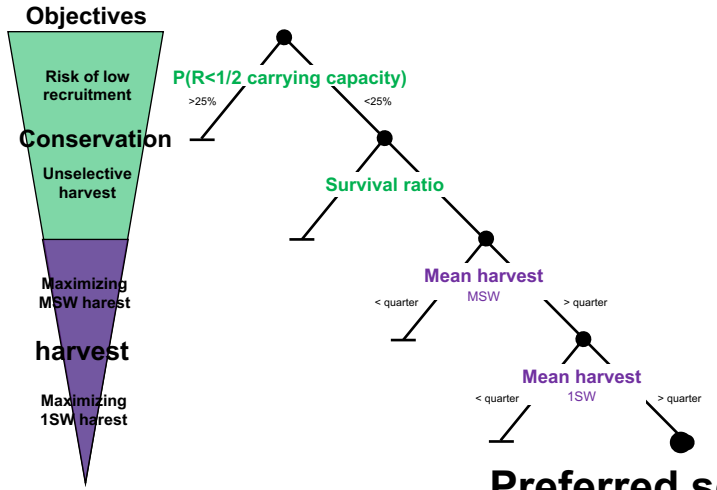
- **The method** : Decision tree
- **The results :** A set of preferred scenarios to let the final cut to stakeholders




**Preferred scenarios**

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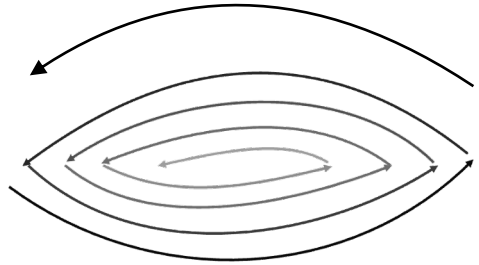

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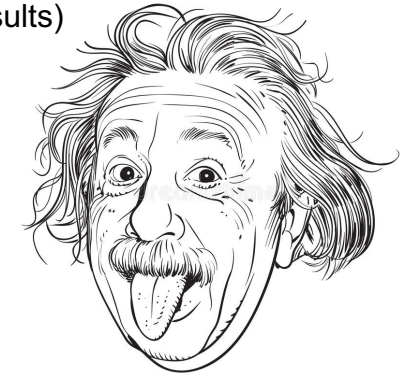

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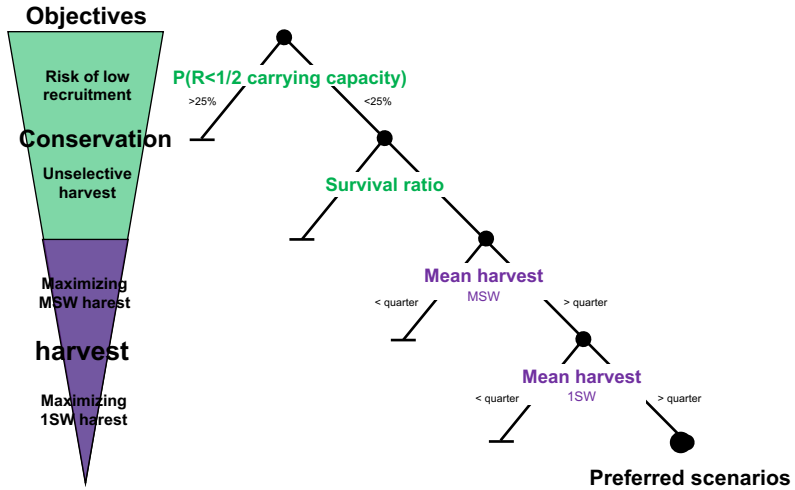
- **Scientific posture** : Help and inform the choice of the new regulatory system



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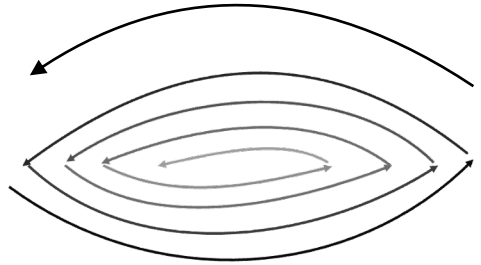

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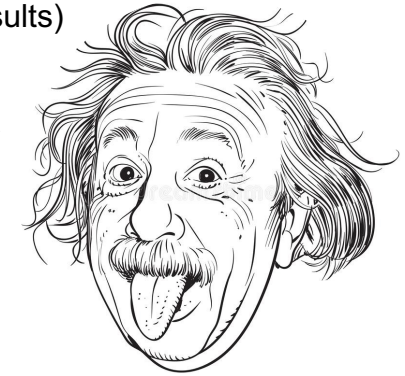

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