

The importance of migratory fish data and monitoring as decision making tools for dam removal projects

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Migratory fish and river restoration

- ✓ Several ecological requirements

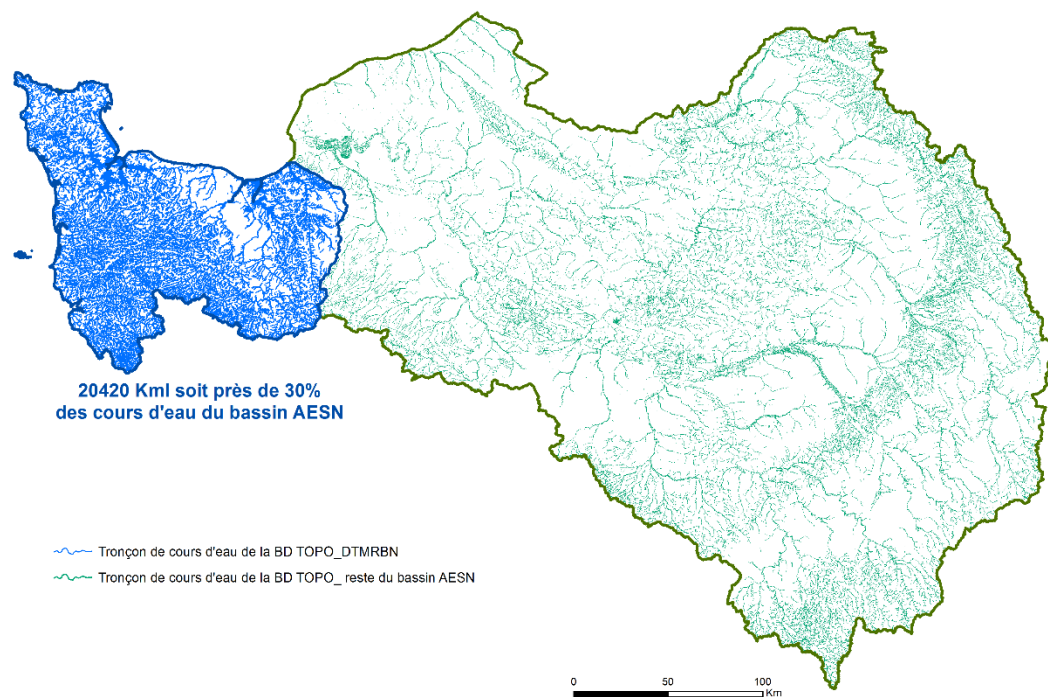
Ecological continuity, water temperature, water quality, habitats quality...

- ✓ Species to protect
- ✓ Patrimonial species
- ✓ Pedagogical support
- ✓ Quick responses to river restoration works -> **Indicators**

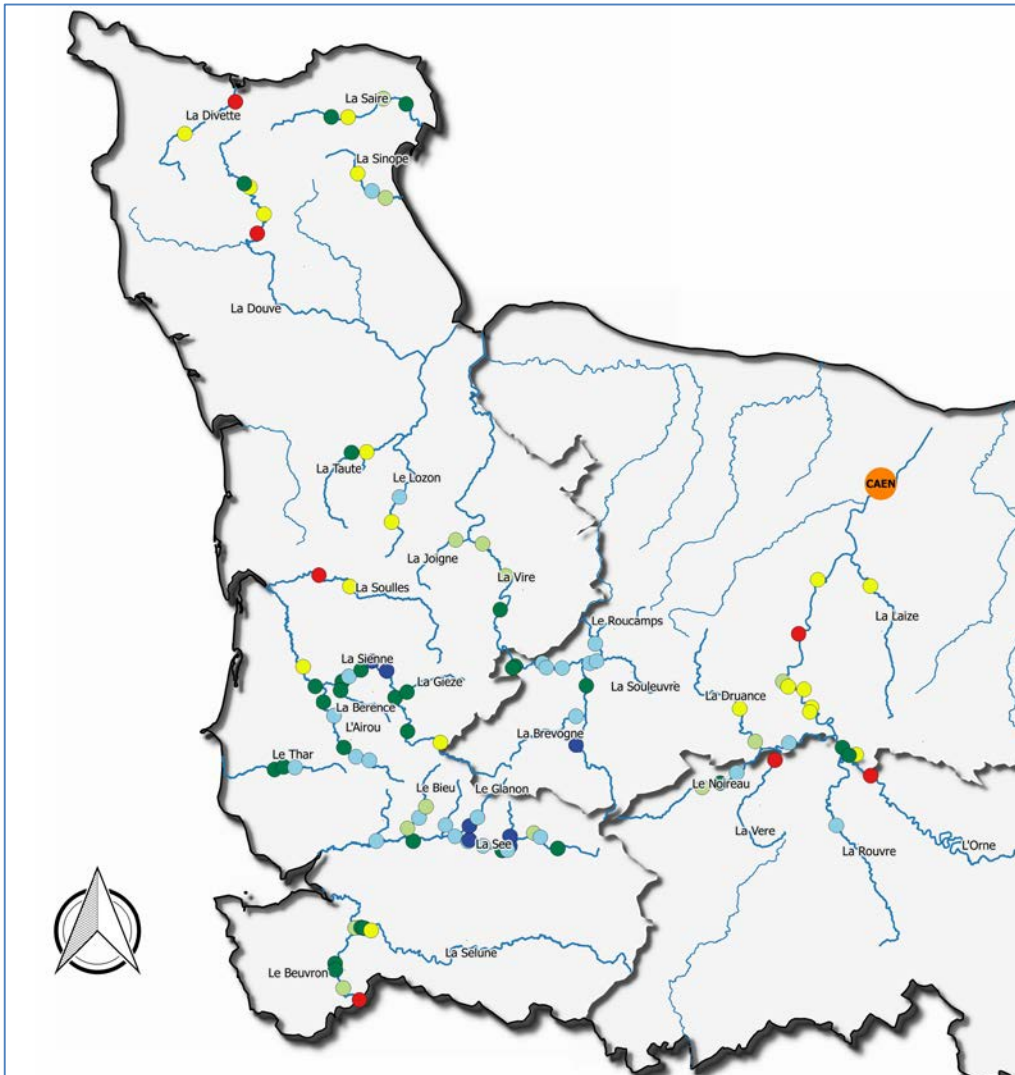


Occidental Normandy and rivers

- ✓ Dense river system, many coastal rivers
- ✓ Many breeding and feeding habitats for migratory fish
- ✓ Highly impacted rivers by dams and weirs



Salmon Abundance Index (IAS)



- ✓ IAS network: over than 100 monitoring stations
- ✓ Realize by the Fishing Federation of Manche
- ✓ Since 2001

The IAS protocol

- ✓ Electrofishing
- ✓ 5 min fishing
- ✓ Prospection on riffles
- ✓ Index: number of parrs (0+) for 5min fishing



IAS and dam removal projects

- ✓ Issues shown by the IAS: dams and weirs stop/slow down the migration to the spawning areas, change habitats (breeding and feeding) into still waters...

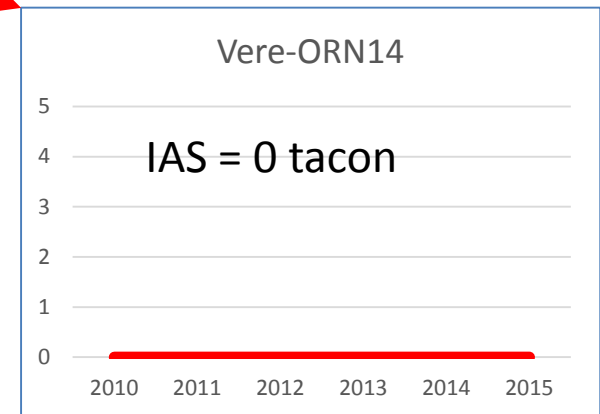
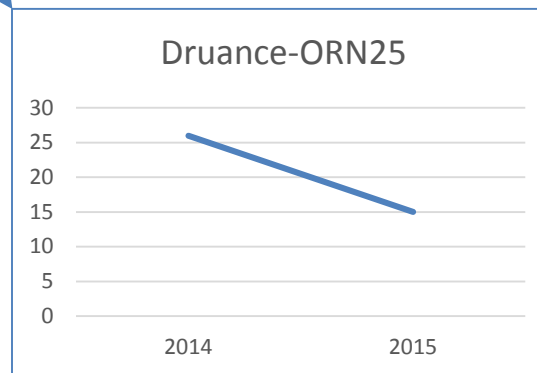
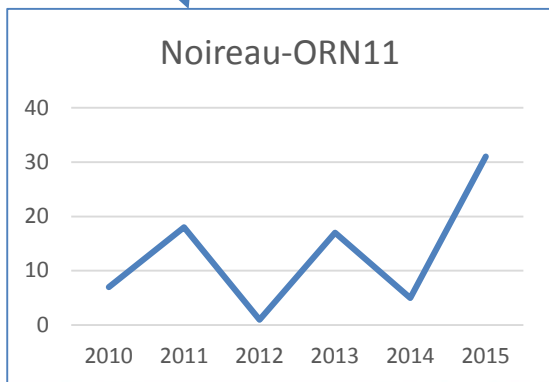
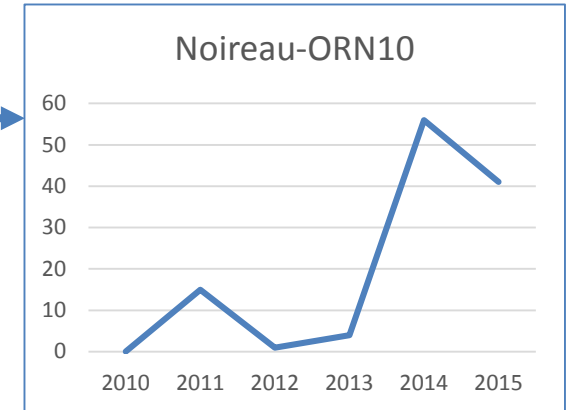
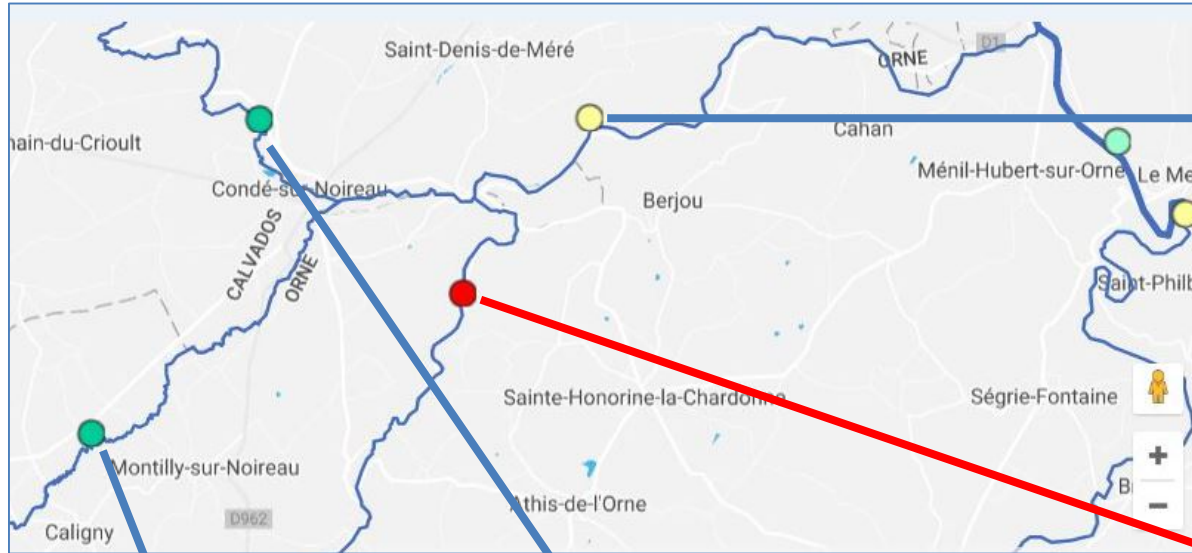


✓ Example: Opening the Vère river



- ✓ Orne river watershed
- ✓ 25 km long
- ✓ Classified as important for ecological continuity
- ✓ Priority Action Zones for European eels
- ✓ Potentially many salmon spawning areas

✓ Example: Opening the Vère river



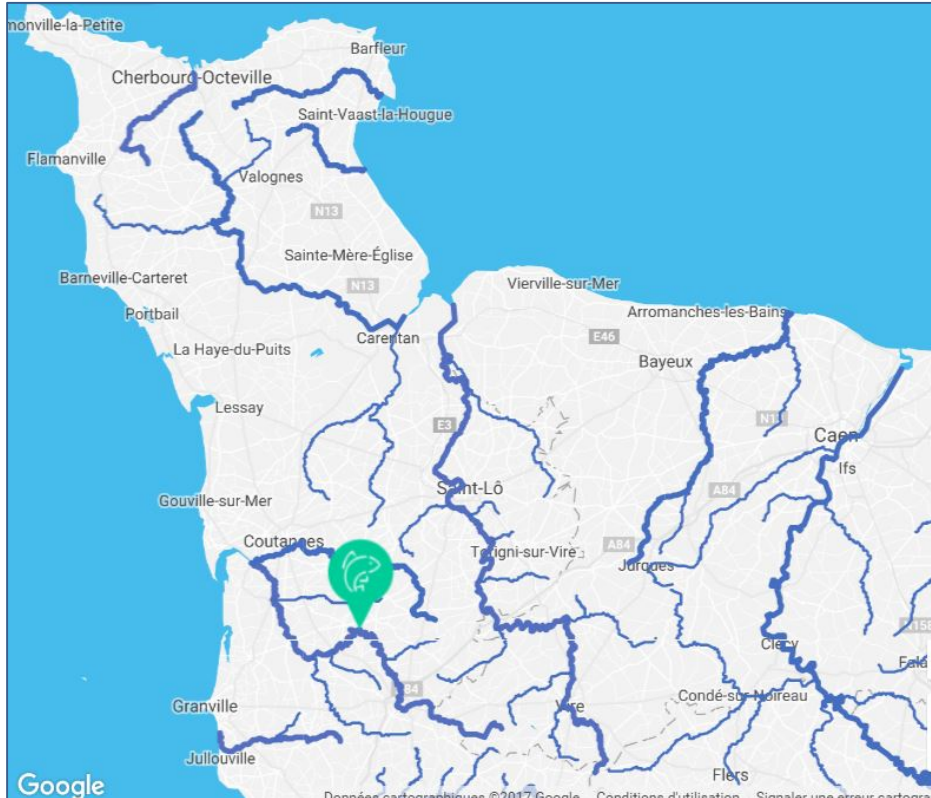
✓ Example: Opening the Vère river



- ✓ First dam on the river from the confluence
- ✓ Absolute barrier for all fish species

Decision making tool for a dam removal project. Works were done during autumn 2017. No parr found in 2018...

- ✓ Example: Dam removal on the Sienne river (Manche)

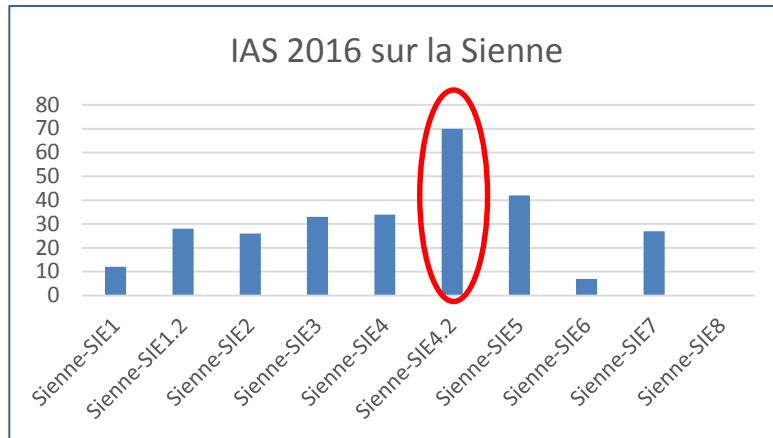


- ✓ River of the Mont-Saint-Michel bay
- ✓ High potential for habitats restoration (spawning areas)
- ✓ Works were done in 2015 by the Fishing federation of Manche

IAS and habitats restoration



- ✓ Summer 2016: Colonized by many parrs born in the Sienne river (best monitoring station of the river!)
- ✓ Massive and immediat biological response



Good example to convince partners and owners to planify other dam removal projects, including ruined dams and weirs

Migratory fish nesting monitoring

- ✓ **Aims to** estimate success of migratory fish reproduction, and its spatial distribution. Highlights the migratory fish colonization, the impact of dams and the habitats quality.
- ✓ **Protocol:** count and geolocalize all the nests in a river. December – January for salmonids (Salmon and Sea trout) and in July for Sea lampreys.

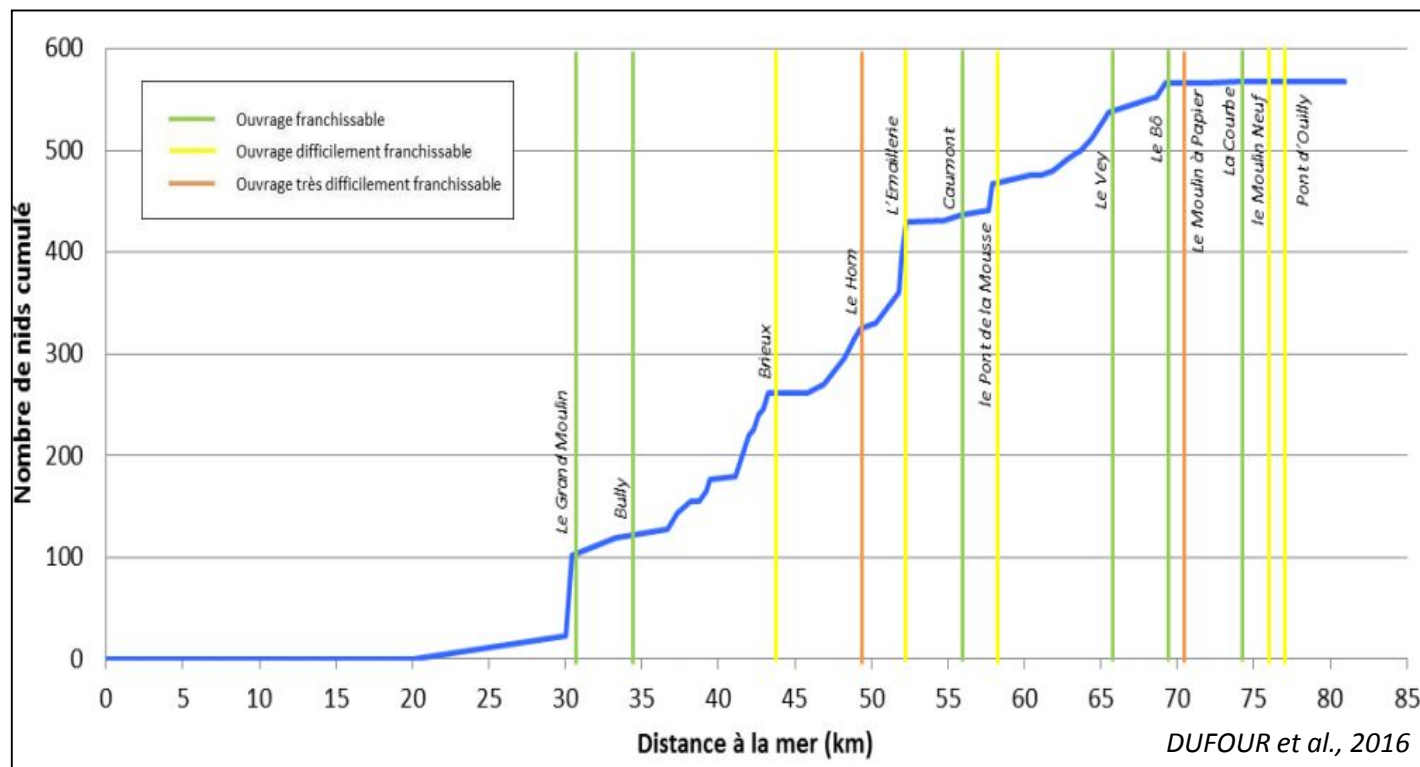


Sea trout nest



Nesting monitoring and dam removal projects

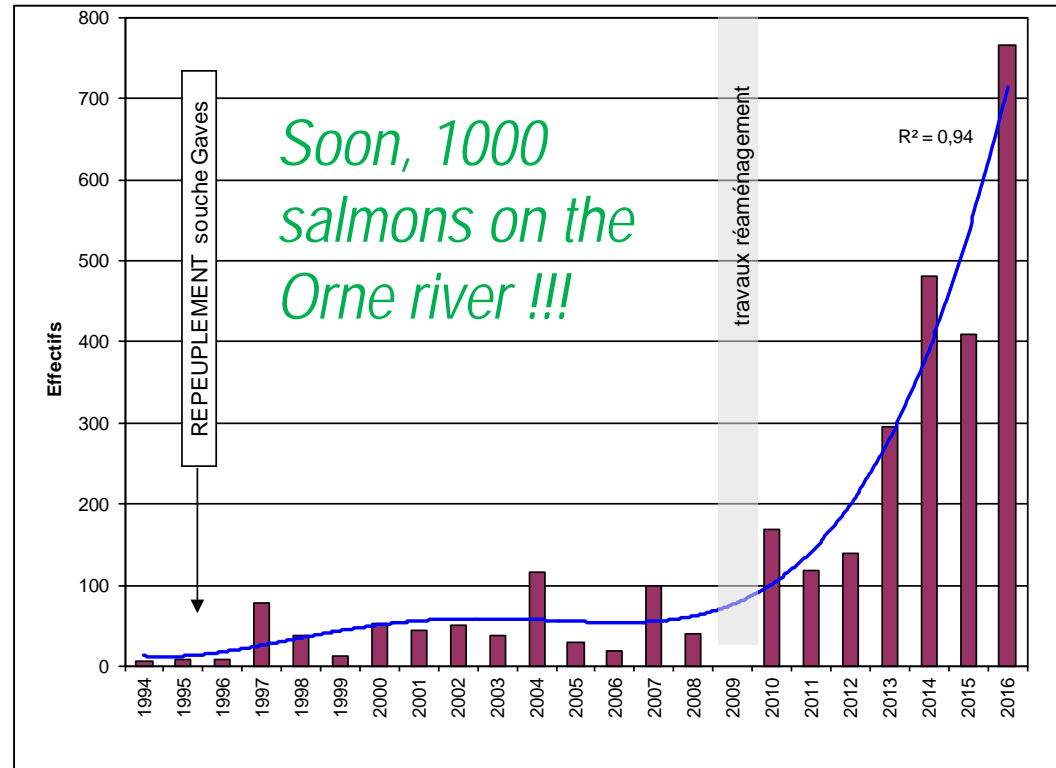
- ✓ Sea lampreys nests are followed since 2009 on the Orne river by the Fishing federation of Calvados



- ✓ Accumulated nesting downstream dams and weirs
- ✓ Highlights the migratory fish colonization, the impact of dams

Upstream migration monitoring

- Atlantic salmon disappeared in the 30s from the Orne river, due to different factors (dams, pollution...)
- More than 20 dams removed since 1997 in the Orne watershed (50 cm – 4 m), acceleration since 2010 (Water Agency funding program)
- Upstream migration followed since the 80s
- **Strong increase of the population since 2010**
- Opening migration axis and increasing spawning habitats (ALA, SAT, TDM, and LPM)



Number of salmon counted at the counting station on the Orne river. Source : AFB



Tool to evaluate and promote river restoration projects!

Discussion

✓ *Importance of environmental factors*

-> necessity to implement a multi-year monitoring

-> need of a well known field

✓ Importance of identifying the migratory fish potential of a river

✓ Interest of using several monitoring (Telemetry, Nesting, IAS...)

✓ Lack in downstream migration monitoring and turbines impact monitoring

✓ Need to evaluate more often the success (or not) of river restoration works



Thank you for your attention

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