

Programme LIFE+

CONSERVATION OF THE FRESHWATER PEARL MUSSEL OF THE ARMORICAN MASSIF

LIFE09 NAT FR 000583

AN ACTION COORDINATED BY :



Sites and project presentation

26 oct. 2011
Brennilis

www.life-moule-perliere.org/accueilmoule.php



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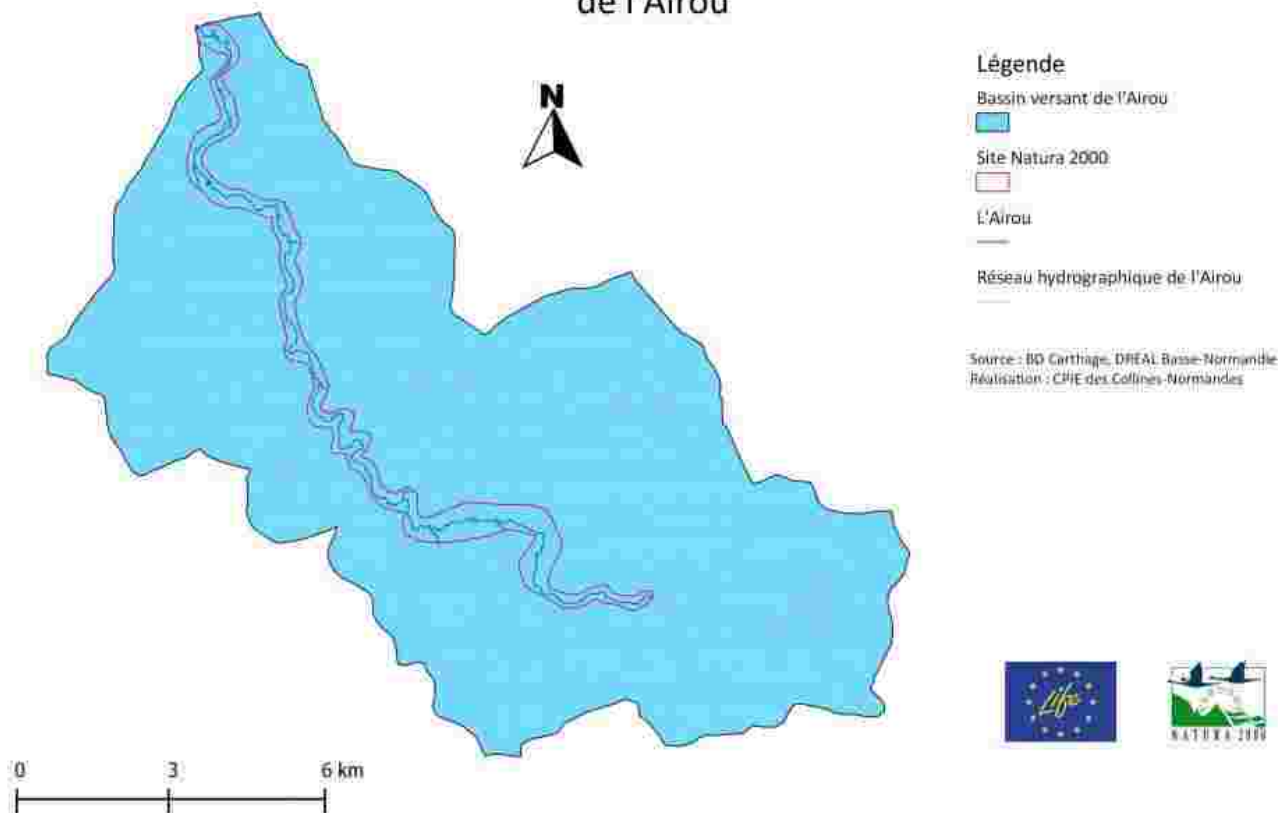


(1) SIAES : intercommunal Syndicate for the Management and Upkeep of the Sienne river
 (2) CCKB / CCCA : The Kéz Breizh Community of Municipalities alternately with the Cabaec-Angoul Community of Municipalities
 (3) CTMA : Aquatic Environments Territorial Contract
 (4) CPIE : Permanent Center for Environmental Initiatives

Airou river



Bassin versant et réseau hydrographique de l'Airou



Airou river

Natura 2000 area n°FR2500113
« Bassin de l'Airou »

Studied drainage basin
River linear

11 530,9 ha
138,6 km

Studied drainage basin in Natura 2000 area
River linear in Natura 2000 area

708,2 ha
64,7 km

Mussel population in 2011

180 ind.







Rouvre river

Bassin versant et réseau hydrographique de la Rouvre

Légende

Bassin versant de la Rouvre



Site Natura.2000



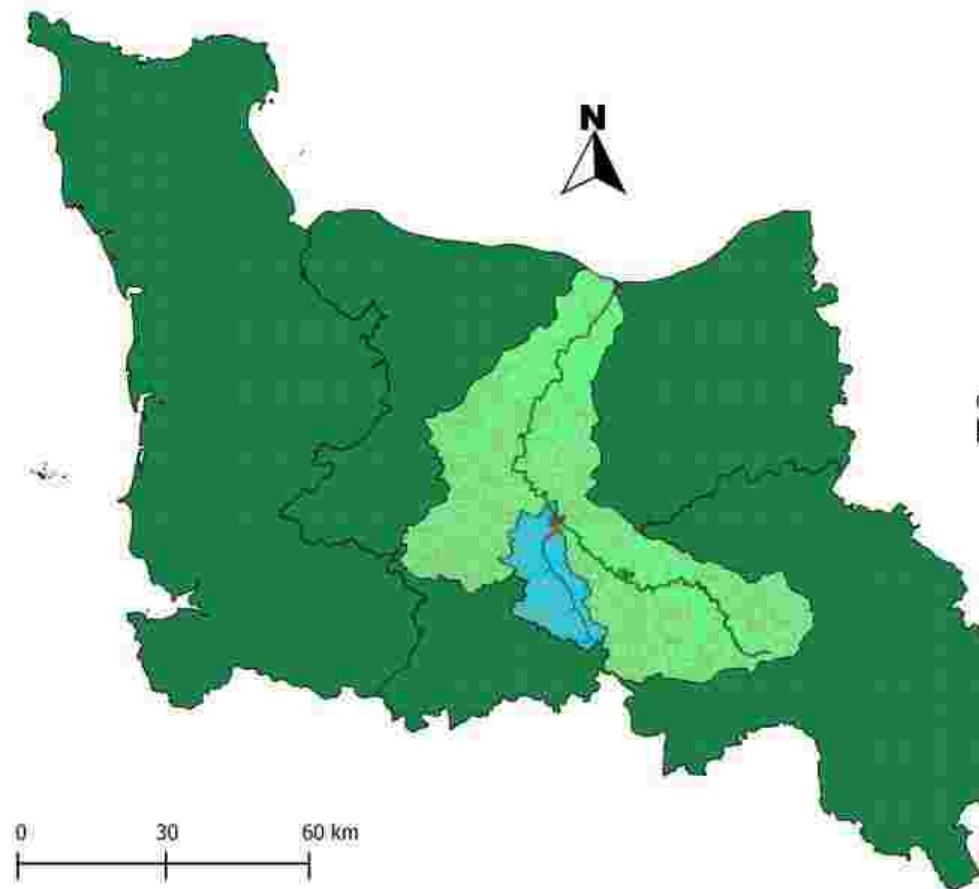
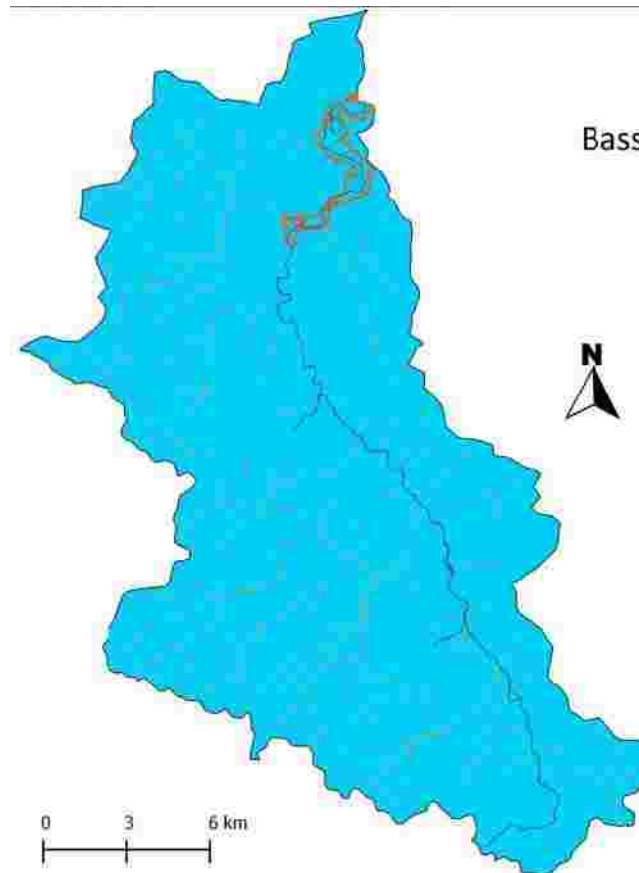
La Rouvre



Réseau hydrographique de la Rouvre



Source : BD Carthage, DREAL Basse-Normandie
Réalisation : CPIE des Collines-Normandes



Rouvre river

Natura 2000 area n°FR5300013
« Vallée de l'Orne et ses affluents »

Studied drainage basin	32 435,5 ha
River linear	367,8 km

Studied drainage basin in Natura 2000 area	428,9 ha
River linear in Natura 2000 area	12,4 km

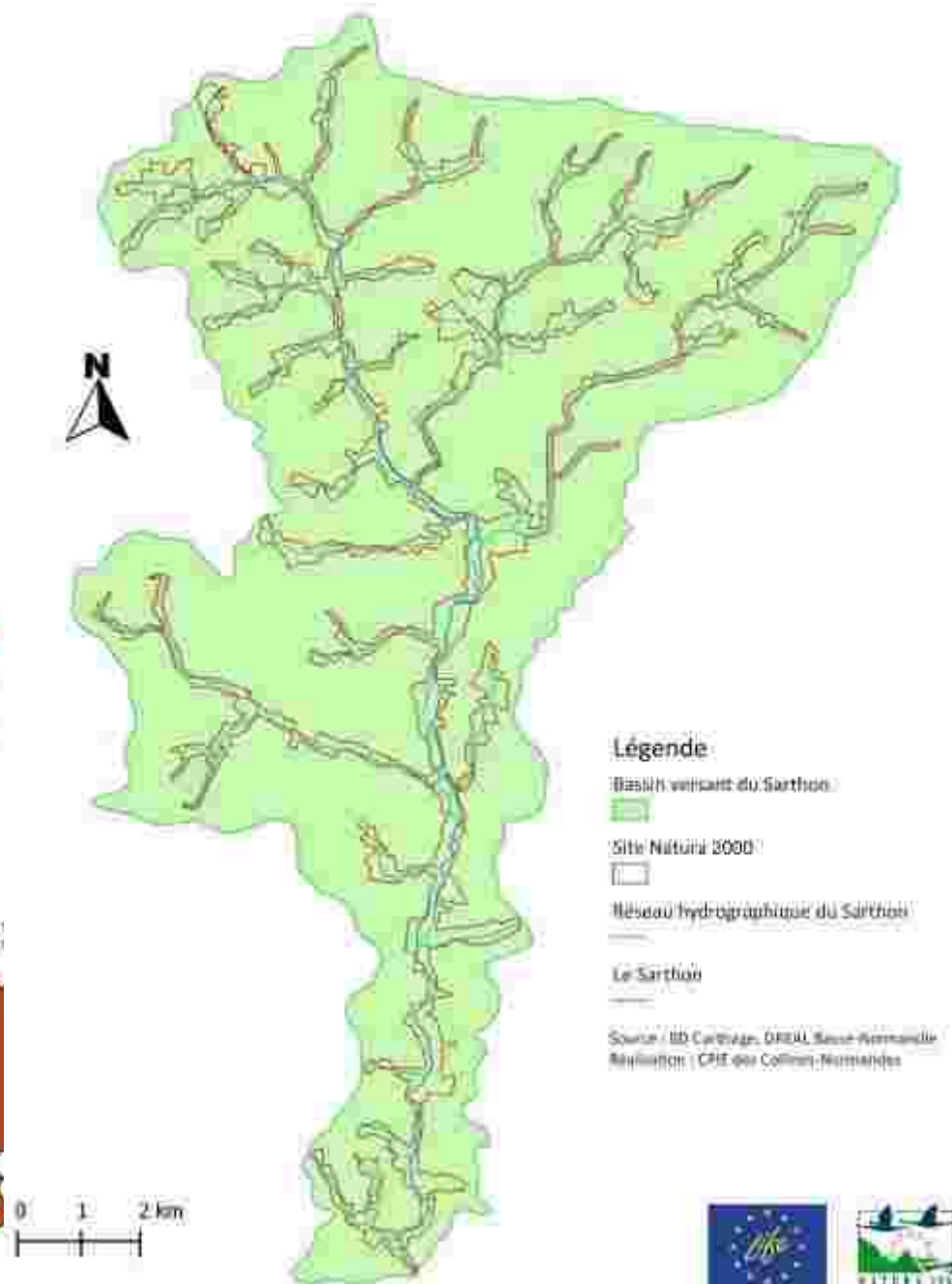
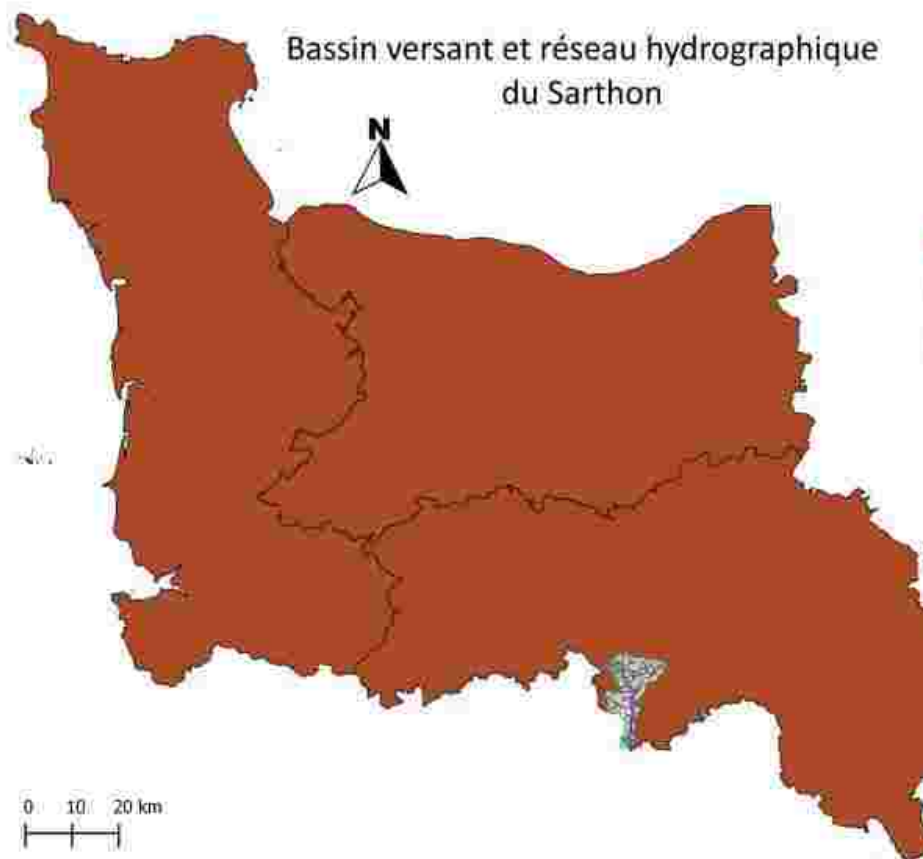
Mussel population in 2011	200 ind.
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Sarthon river



Sarthon river

Natura 2000 area n°FR2502015
« Vallée de l'Orne et ses affluents »

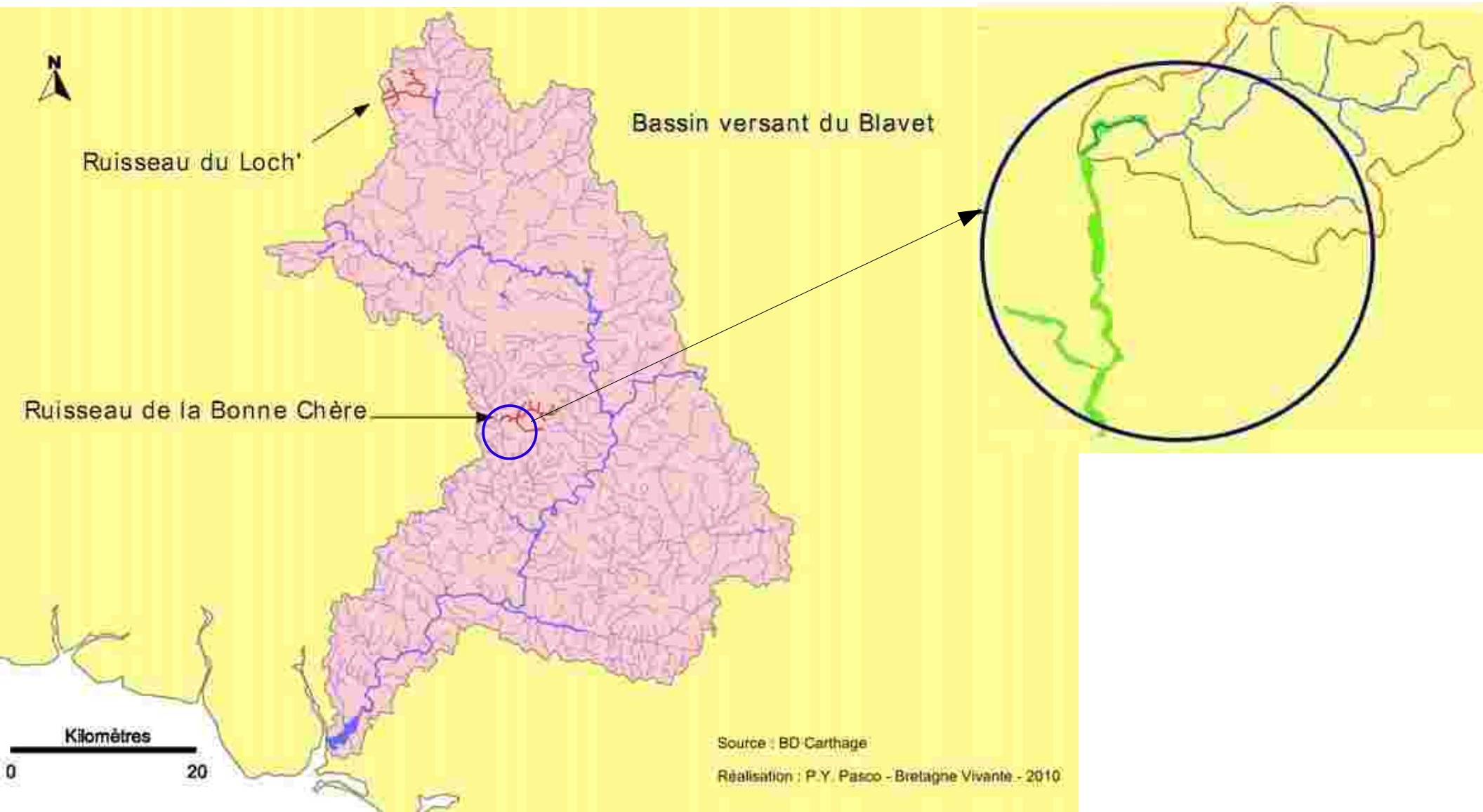
Studied drainage basin	12 033,4 ha
River linear	127,6 km
Studied drainage basin in Natura 2000 area	16,5 ha
River linear in Natura 2000 area	127,6 km
Mussel population in 2011	200 ind.







Bonne Chère river



Bonne Chère river

Natura 2000 area n°FR5300026

« Rivière du Scorff et de la Sarre, forêt de Pont-Calleck »

Studied drainage basin
River linear

1 737,3 ha
26,7 km

Studied drainage basin in Natura 2000 area
River linear in Natura 2000 area

18,5 ha
2 km

Mussel population in 2011
including youngs

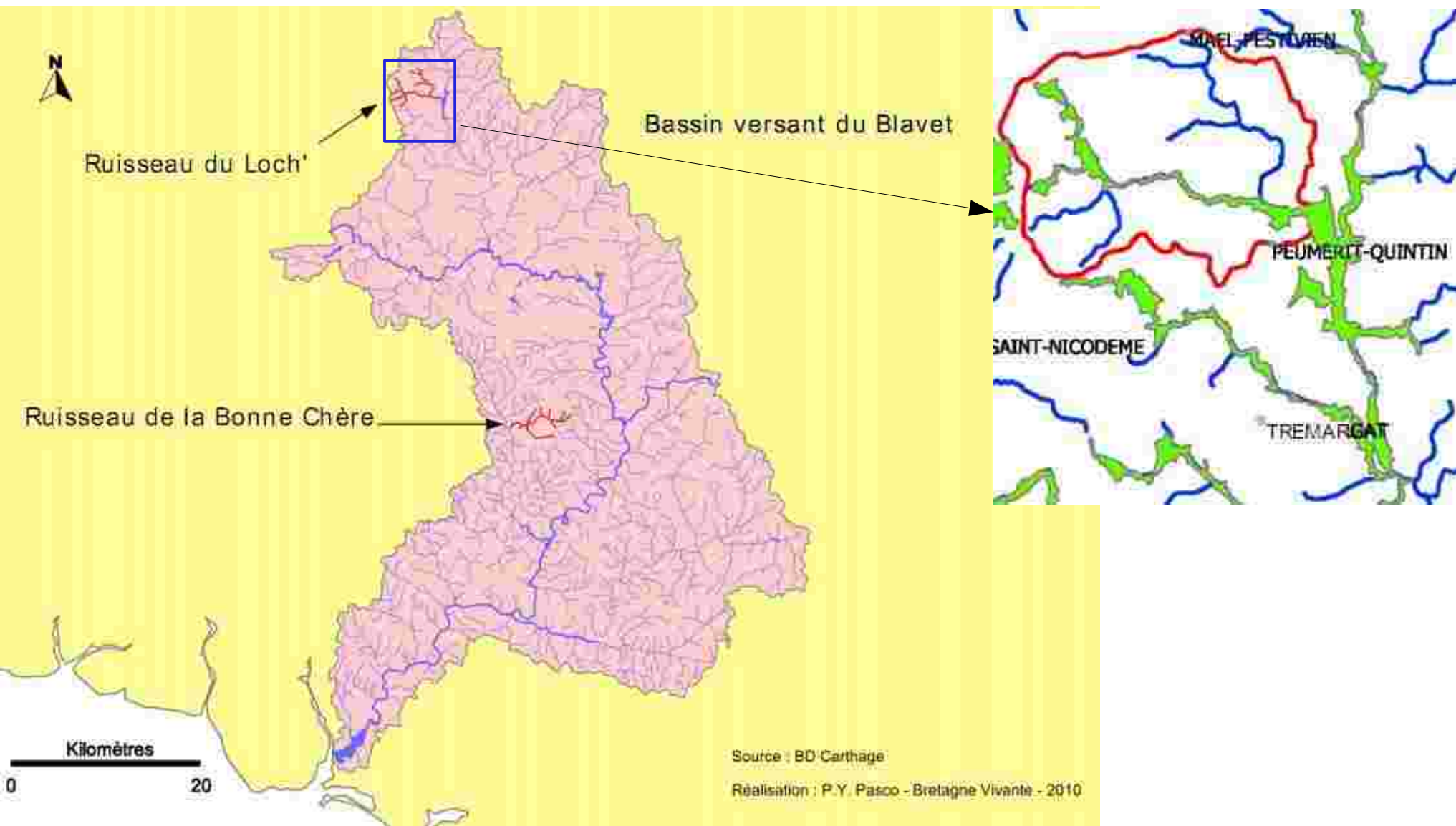
2 000 ind.







Loc'h river



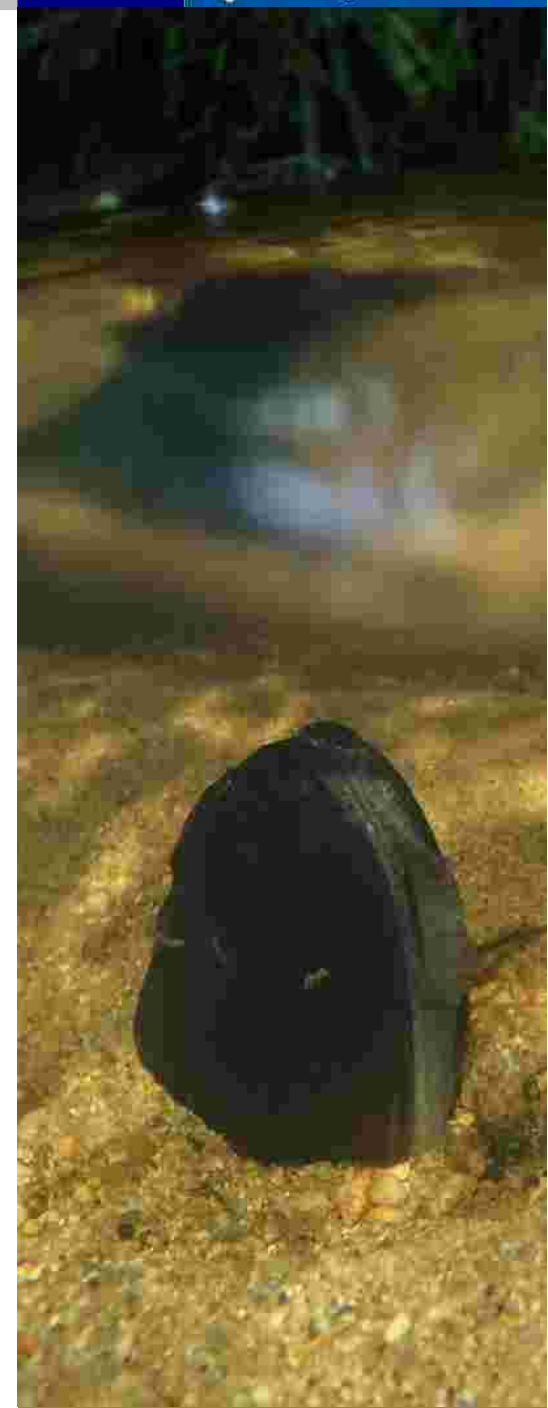
Loc'h river

Natura 2000 area n°FR5300007
« Têtes de bassin du Blavet et de l'Hyères »

Studied drainage basin	1 864,5 ha
River linear	28,9 km

Studied drainage basin in Natura 2000 area	99,9 ha
River linear in Natura 2000 area	9,2 km

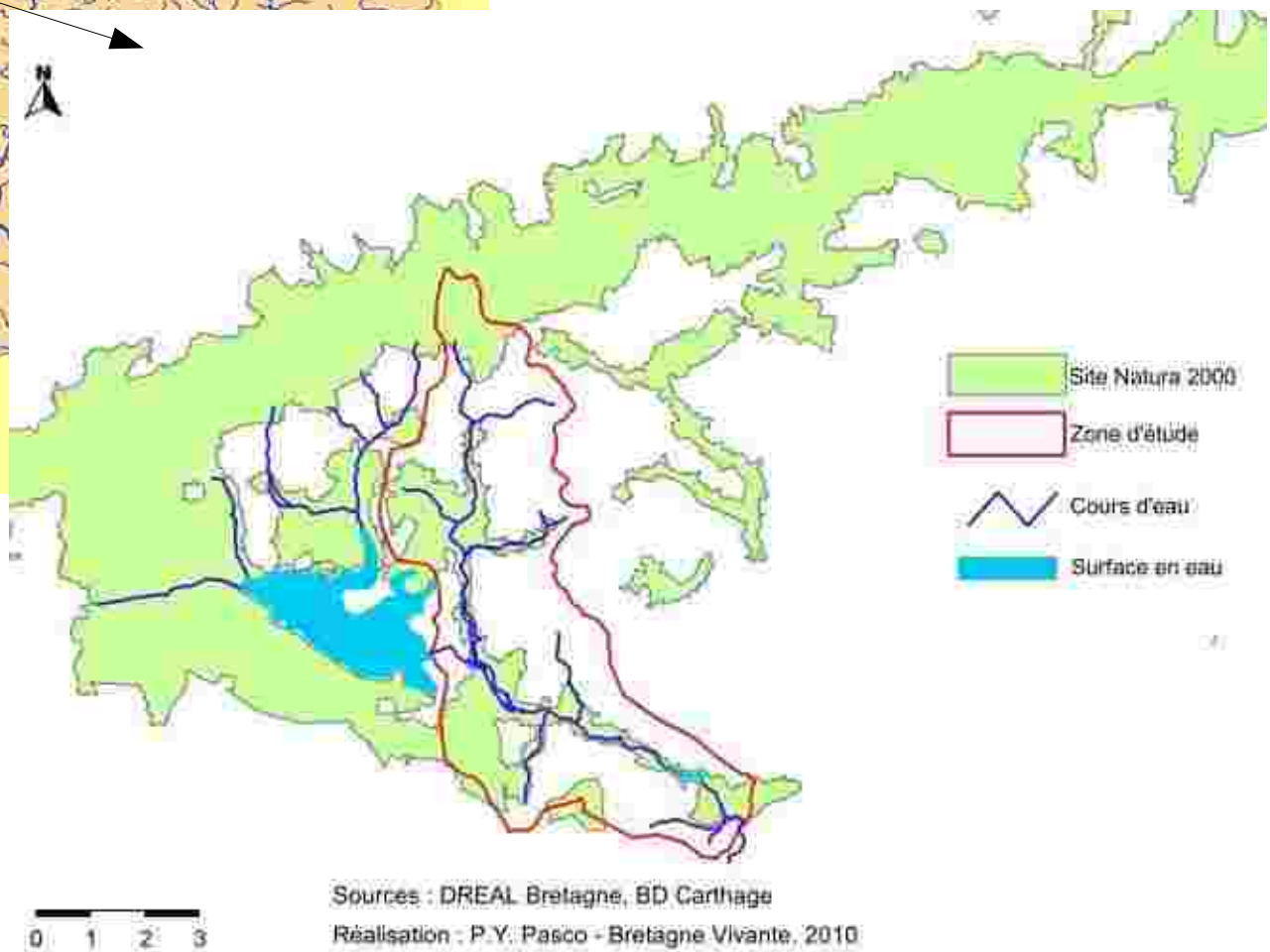
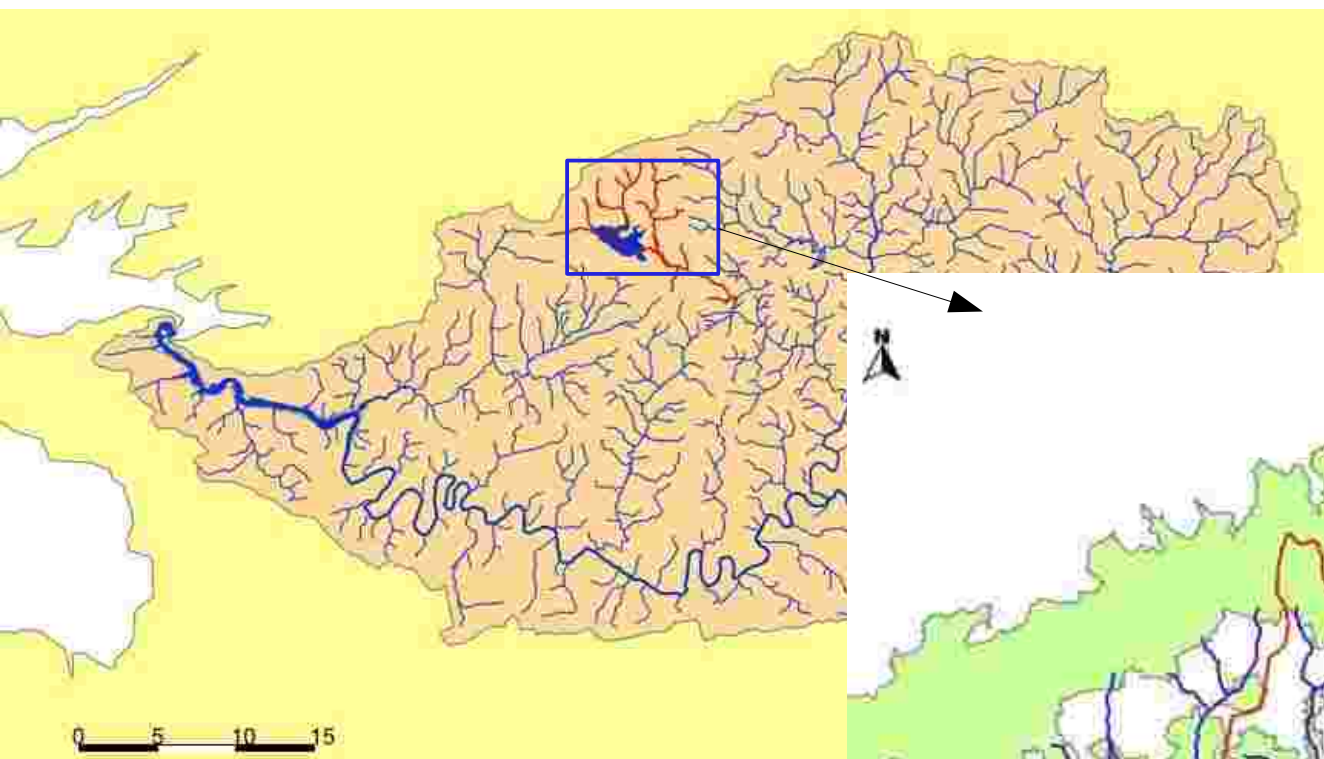
Mussel population in 2011	280 ind.
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Elez river



Elez river

Natura 2000 area n°FR5300013
« Monts d'Arrée »

Studied drainage basin	2 769,6 ha
River linear	29,7 km

Studied drainage basin in Natura 2000 area	971,3 ha
River linear in Natura 2000 area	21,2 km

Mussel population in 2011	900 ind.
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Six different rivers

	Bonne Chère	Loc'h	Elez	Airou	Sarthon	Rouvre
Studied catchment (ha)	1 737,3	1 864,5	2 769,6	11 530,9	12 033,4	32 435,5
Catchment in Natura 2000 (ha)	18,5 (1%)	99,9 (5%)	971,3 (35%)	708,2 (6%)	16,5 (0,1%)	428,9 (1%)
River linear (km)	26,7	28,9	29,7	138,6	127,6	360,9
River linear in Natura 2000 (km)	2,0 (7%)	9,2 (32%)	21,2 (71%)	64,7 (47%)	127,6 (100%)	12,4 (3%)
Average width of the river (m) in summer	3	3-5	8-10	5-7	5-7	10-20
Average depth (cm) in summer	5-40	5-30	20-150	40-100	5-50	30-100
Mussel population	~ 1 800	~ 280	~ 900	~ 180	~ 200	~ 200

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LIFE « mulette » 2010-2016

Objectives Preserve main populations of the Armorican Massif

Population Six identified populations :
3 in Brittany
3 in Lower-Normandy

Actions Breeding station
Monitoring of the environment quality
Coaching in environment restoration
Awareness



COLLINES NORMANDES



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L'instrument financier pour l'environnement (LIFE)

Nature & Biodiversity

Application of Directives « Birds » and « Habitats »

M. margaritifera : annexe II & V « Habitats »

50% of the costs eligible to european co-financing

Setting-up

Deposit

Agreement

january-august 2009

september 2009

may 2010

Total budget

EC co-financing 50 %

2 517 546 €

1 258 772 €



Fédération du Finistère pour la Pêche et la Protection du Milieu Aquatique



COLLINES NORMANDES



I. Preparatory actions

1. Threats assessment

gather threat information for FWPM populations

➔ *draft inventory to be improved before mid-2012*

2. Conservation plans

for each population including establishment of protected areas

➔ *ongoing common framework but need of the threat assessment*

3. Further studies

genetic / salmon & trout relationships

➔ *genetic samples in may 2011, salmon & trout study for 2012*



I. Preparatory actions

4. Authorizations and preparation of breeding

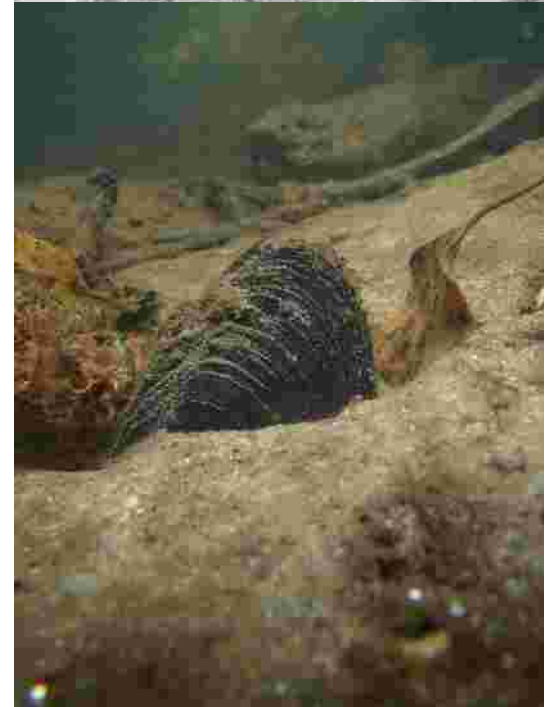
manipulation, transport, breeding... of a protected specie

- ➔ *general authorizations ok but sanitary measures needed*
- ➔ *feasibility study for breeding and reinforcement*

5. Further inventories

prospection of other FWPM area on the same catchment

- ➔ *almost done on all concerned sites*



Threats assessment on Rouvre river

Quelques sources de dégradation du milieu de la Mulette perlière et de la qualité de l'eau de la Rouvre



Threats assessment on Sarthon river

Quelques sources de dégradation
du milieu de la Mulette perlère
et de la qualité de l'eau sur le bassin du Sarthon



Piétinement du lit du cours d'eau
par les animaux



Colmatage des fonds sur une
station de Mulette perlère



Obstacles à la continuité écologique :



Etang sur le lit du cours d'eau



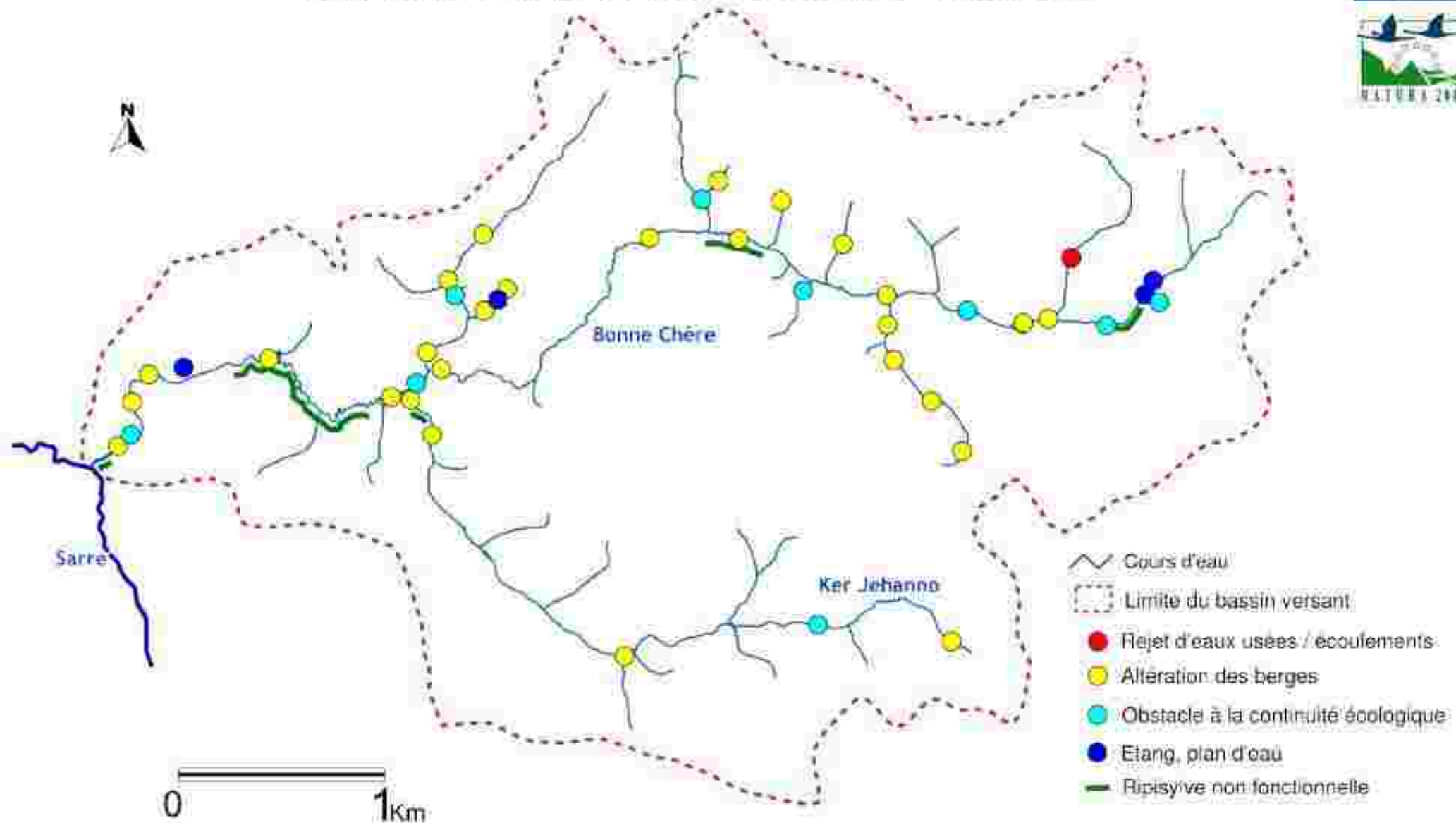
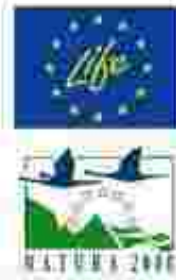
Cours d'eau basé



Barrage

Threats assessment on Bonne Chère river

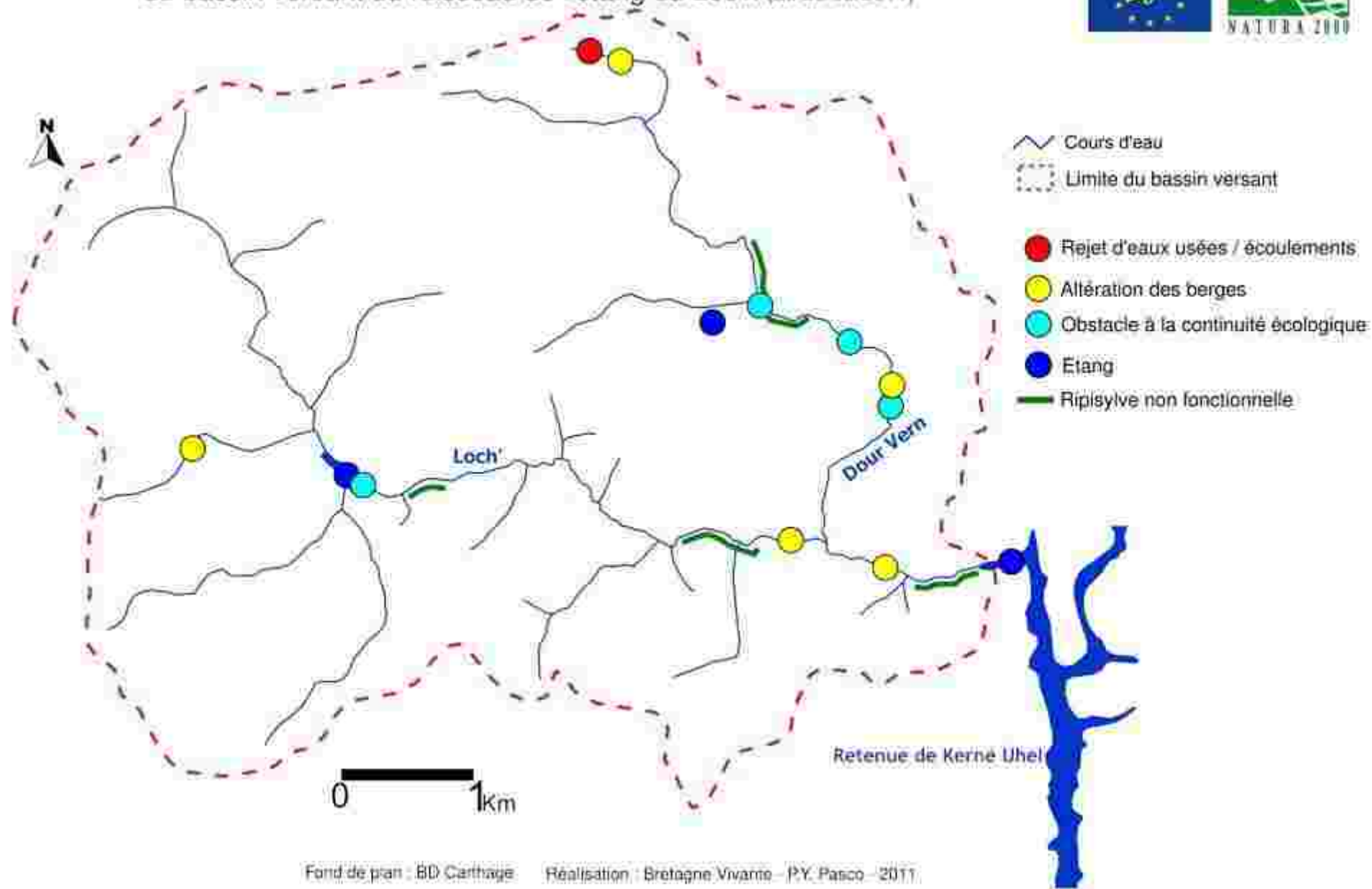
Points à résoudre pour améliorer le fonctionnement de la population de moules perlières sur le bassin versant du ruisseau de Bonne Chère (au 20/05/2011)





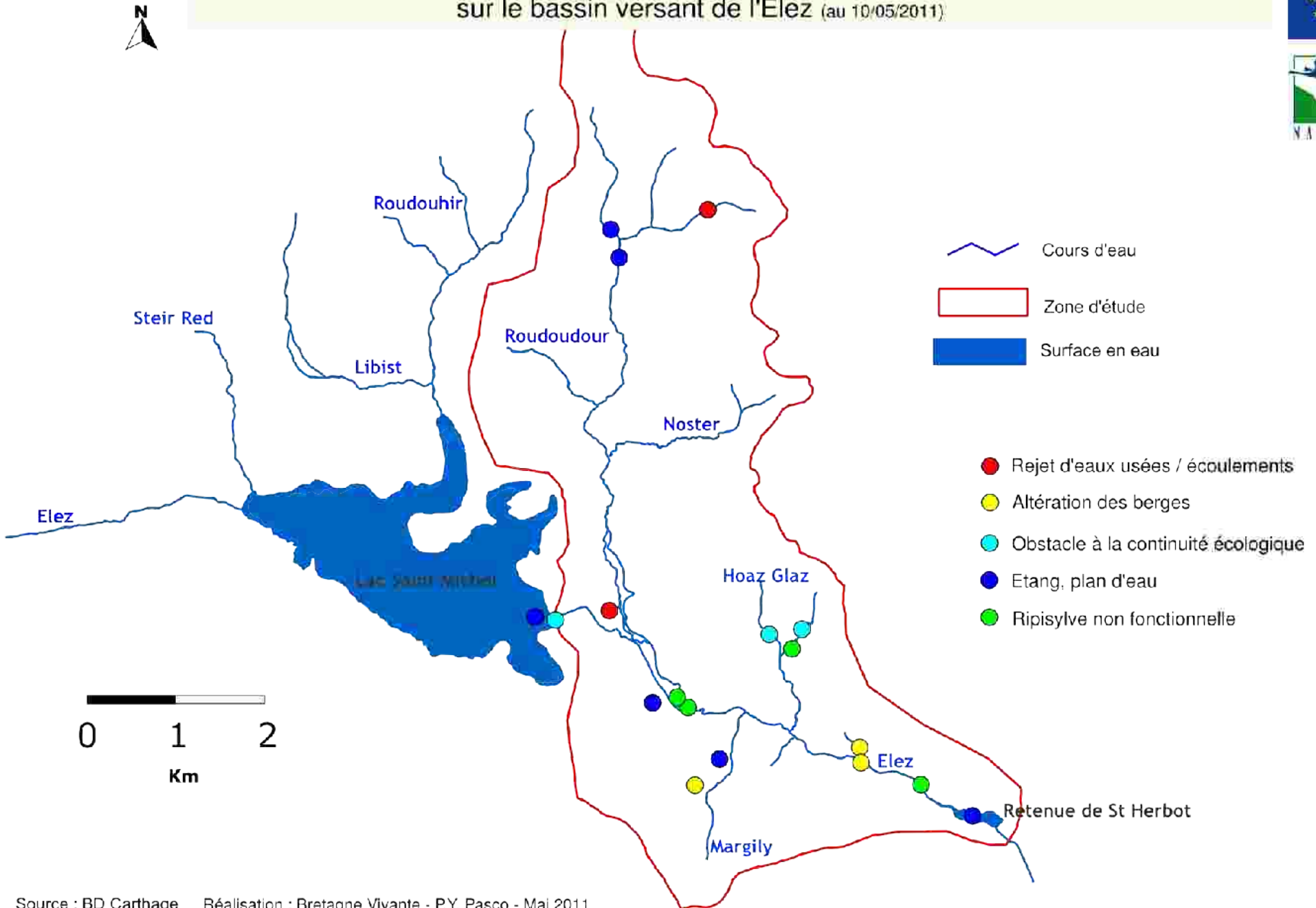
Threats assessment on Loc'h river

Points à résoudre pour améliorer le fonctionnement de la population de moules perlières
du bassin versant du ruisseau de l'étang du Loc'h (au 20/05/2011)



Threats assessment on Elez river

Points à résoudre pour améliorer le fonctionnement de la population de moules perlières sur le bassin versant de l'Elez (au 10/05/2011)



Conservation plan and river restoration

➡ conservation plan should synthesize main threat and planned action for FWPM on each river including establishment of protected areas

➡ ongoing common framework (based on A. Gerbaud 2011 & National action plan for *M. margaritifera*) :

I. FWPM and its habitat on considered catchment

II. Diagnosis of threats and consequences on FWPM

III. Action plan, human resources, budget and performance indicators



Conservation plan and river restoration

➔ Objectives :

1. Improve and monitor water and substrate quality
2. Improve and monitor host-fish
3. Reinforce and monitor FWPM populations
4. Stop foreign species
5. Improve datas and administrative tools

➔ Means :

Natura 2000 framework
Local restoration projects from different actors
National action plan for *M. margaritifera*



II. Concrete conservation actions

1. *Ex-situ* breeding station

new building should have been fonctionnal in january 2011...

- ➔ earthwork have began 20 oct., ready for the end 2011
- ➔ infection of Brown Trout and Salmon :

Bonne Chère ~ 2 millions larvae on 2 300 BrT O+

Elez ~ 2 millions larvae on 1 700 BrT & 1 000 Salmons O+
(but failure of salmons infection)

Loc'h ~ 70 000 larvae on 450 BrT O+

2. Reinforcement

each year on each river if quality environment is sufficient

- ➔ choice of the main in-situ breeding systems ?

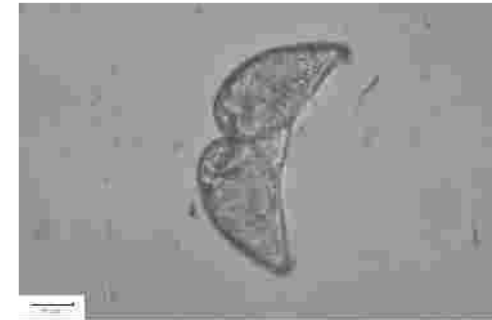


Table 22: Photographie de construction

© Bernard DEJUMNE



II. Concrete conservation actions

3. Monitoring of the environment quality

for FWPM context, for reinforcement area and for new poll-

- ➔ on going water, environment and substrate quality

4. Monitoring mussel populations

and control mussel gravidity for glochidia samples

- ➔ Update of inventory on Bonne Chère, Loc'h, Elez and Airou
- ➔ Collect glochidia on Brittany and check for Airou+Rouvre

5. Monitoring host-fish

on each river

- ➔ done on almost sites



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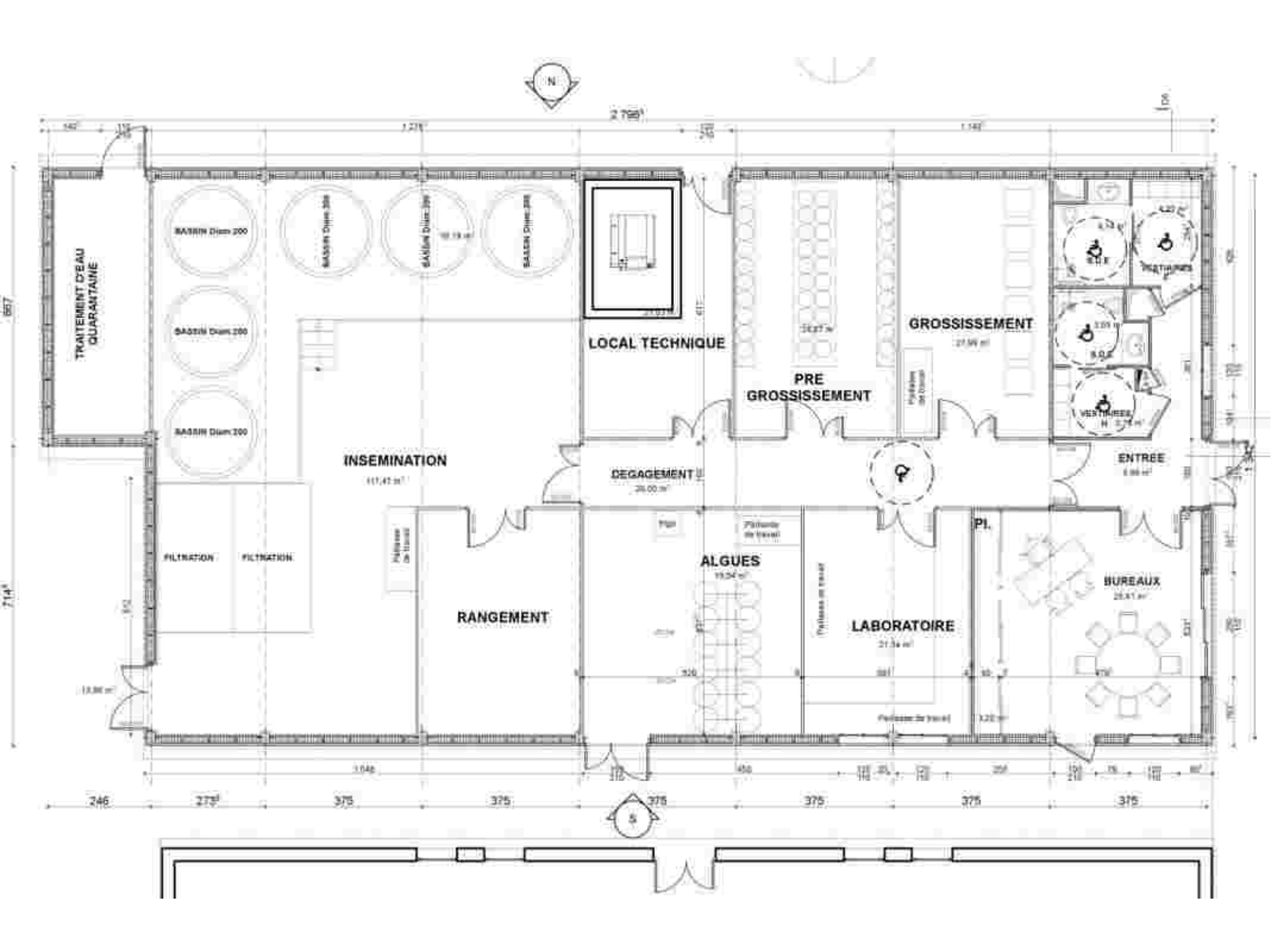
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Ex-situ conservation

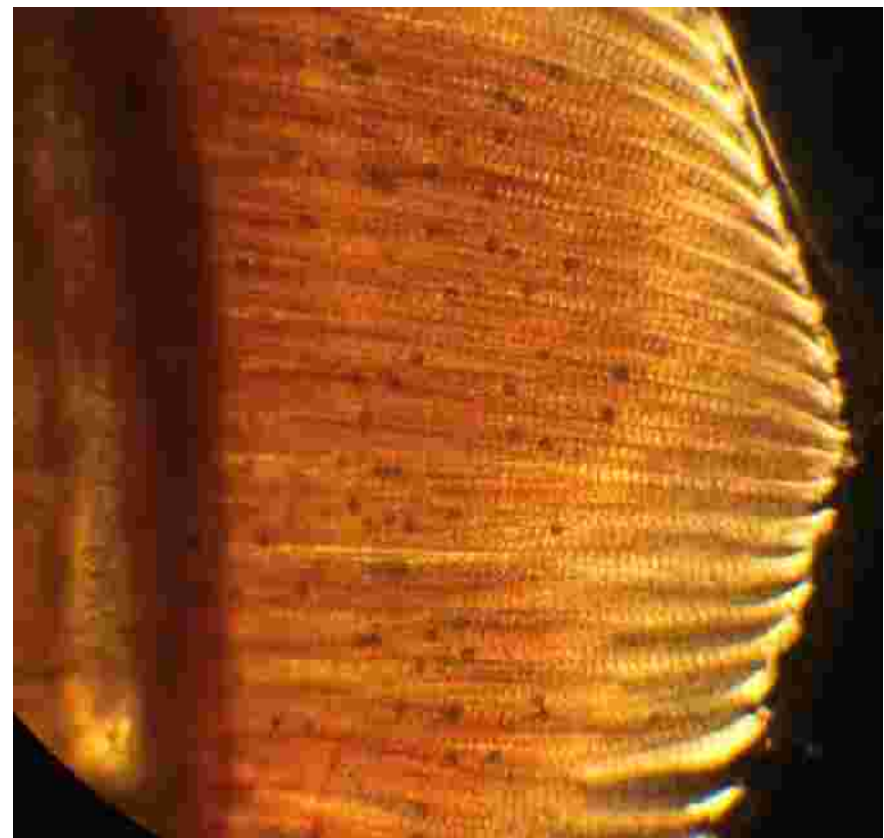


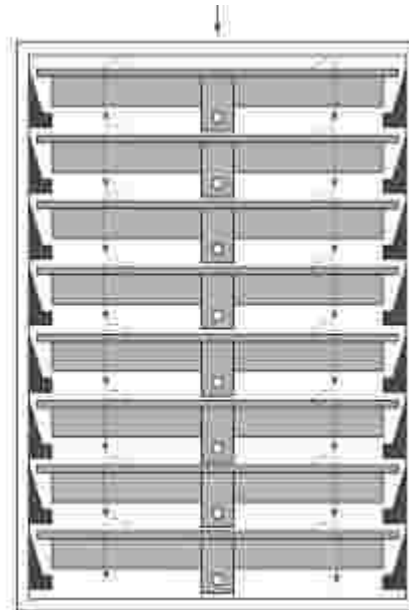
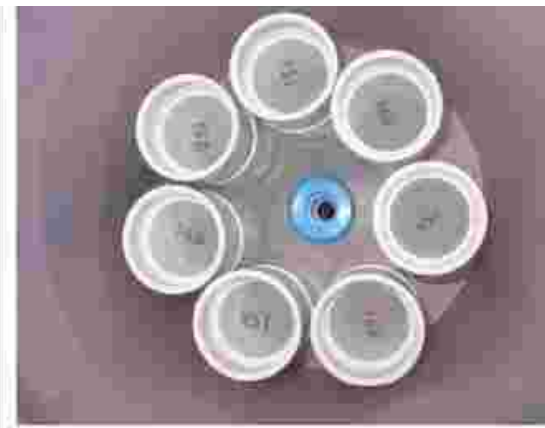
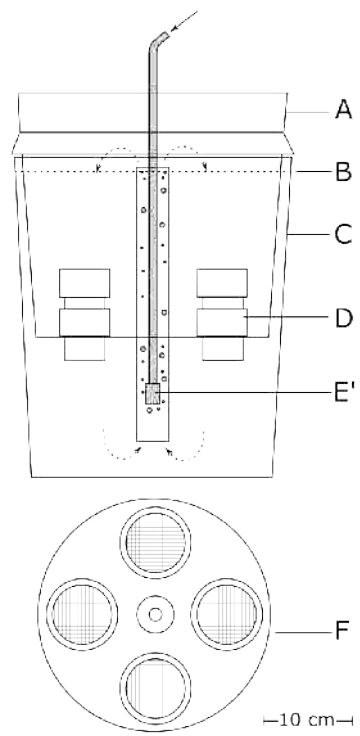




Tube 23 Mouvement de contraction

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Année	Système de la cohorte 0+ (0-1 an)	Système de la cohorte 1+ (1-2 ans)	Système de la cohorte 2+ (2-3 ans)	Système de la cohorte 3+ (3-4 ans)	Système de la cohorte 4+ (4-5 ans)
2012-2013	40 000-80 000				
2013-2014	40 000-80 000	20 000-40 000			
2014-2015	40 000-80 000	20 000-40 000	10 000-20 000		
2015-2016	40 000-80 000	20 000-40 000	10 000-20 000	5 000-10 000	
2016-2017	40 000-80 000	20 000-40 000	10 000-20 000	5 000-10 000	2 500-5 000

Reinforcement

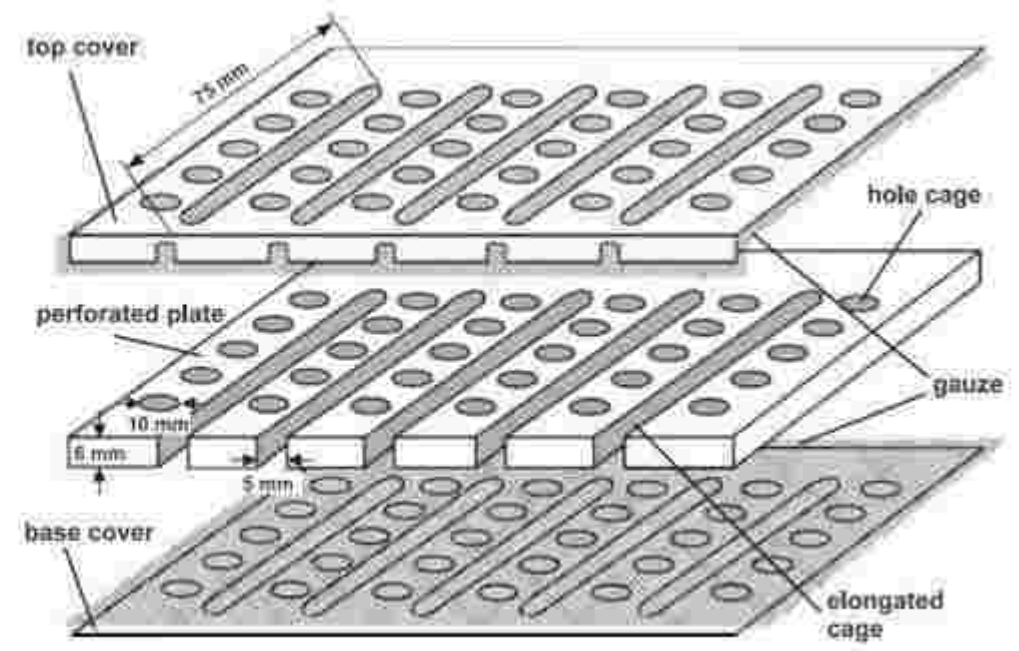
Each year if environment suitable for FWPM

- ➔ direct reinforcement, in-situ systems and infection of local fish

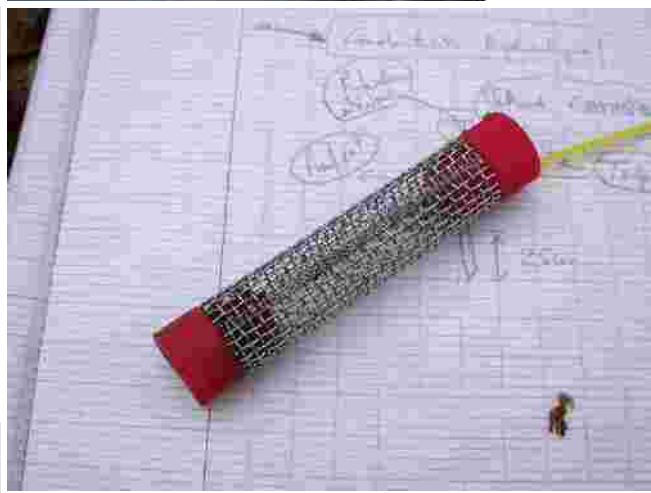
- ➔ feasibility study : different suggested in-situ systems
 - Buddensiek cages (substrate / flowing water)
 - pond basket (ponds water)
 - roller (substrate)
 - silo (flowing water)



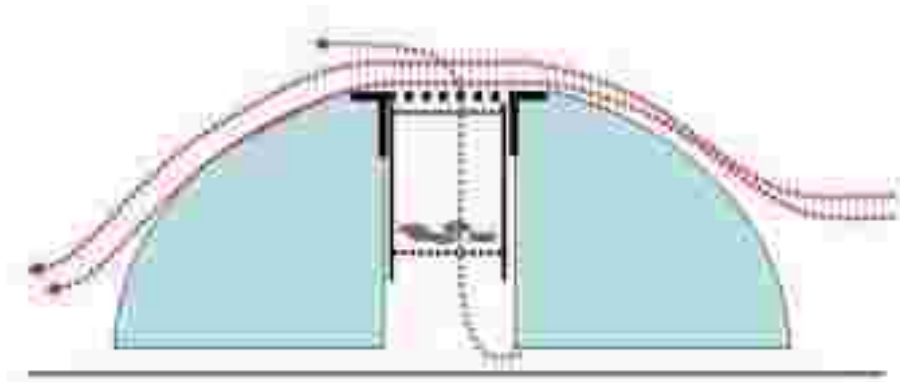
Cage sheet



Roller



Silo



Environment quality

measures to qualify FWPM environment and to choose appropriate reinforcement sites

➔ sample protocol established:

Water quality
- multiparameter

Dissolved O₂, conductivity, pH
(monthly) + T°C hourly

Water quality - lab

N, P (monthly)
pesticides (march, april, may, june & nov. in
2011 & 2015)

Substrate quality

penetrability
red-ox gradient potential
conductivity & pH gradient
nails liable to rust
(during critical situation in summer)

Environment quality

biotic index
diatom index
fish index



Environment quality

➔ indicative parameters choose for « good quality » FWPM environment :

Water flow

pH 6,3-8
N-NO₃ < 8 mg /L
P-PO₄ < 0,15 mg/L
conductivity < 150 μS/cm
DBO₅ < 3 mg/L

Substrate

pH 6,3-8
conductivity < 150 μS/cm
red-ox potential 200-250
penetrability 0,03-0,8 kg/cm²

Environment

presence of mussel juveniles
presence of adult mussel agregate



First results of the water quality

	Bonne Chère	Loc'h	Elez	Airou	Sarthon	Rouvre
N-NO3 (mg/L)	3-6	2-3	<1	4-5	2-7	3-6
P-PO4 (mg/L)	<0,15	<0,07	<0,05	0,05	<0,1	<0,4
conductivity	86-141	78-124	41-114	160-246	95-150	173-380
pH	6,5-7,5	6,8-7,4	6,3-7	7,2-7,5	7-7,9	7,5-8
Dissolved O2 (mg/L)	9-10	6-10	9-15	9-13	8-11	12-27

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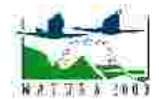
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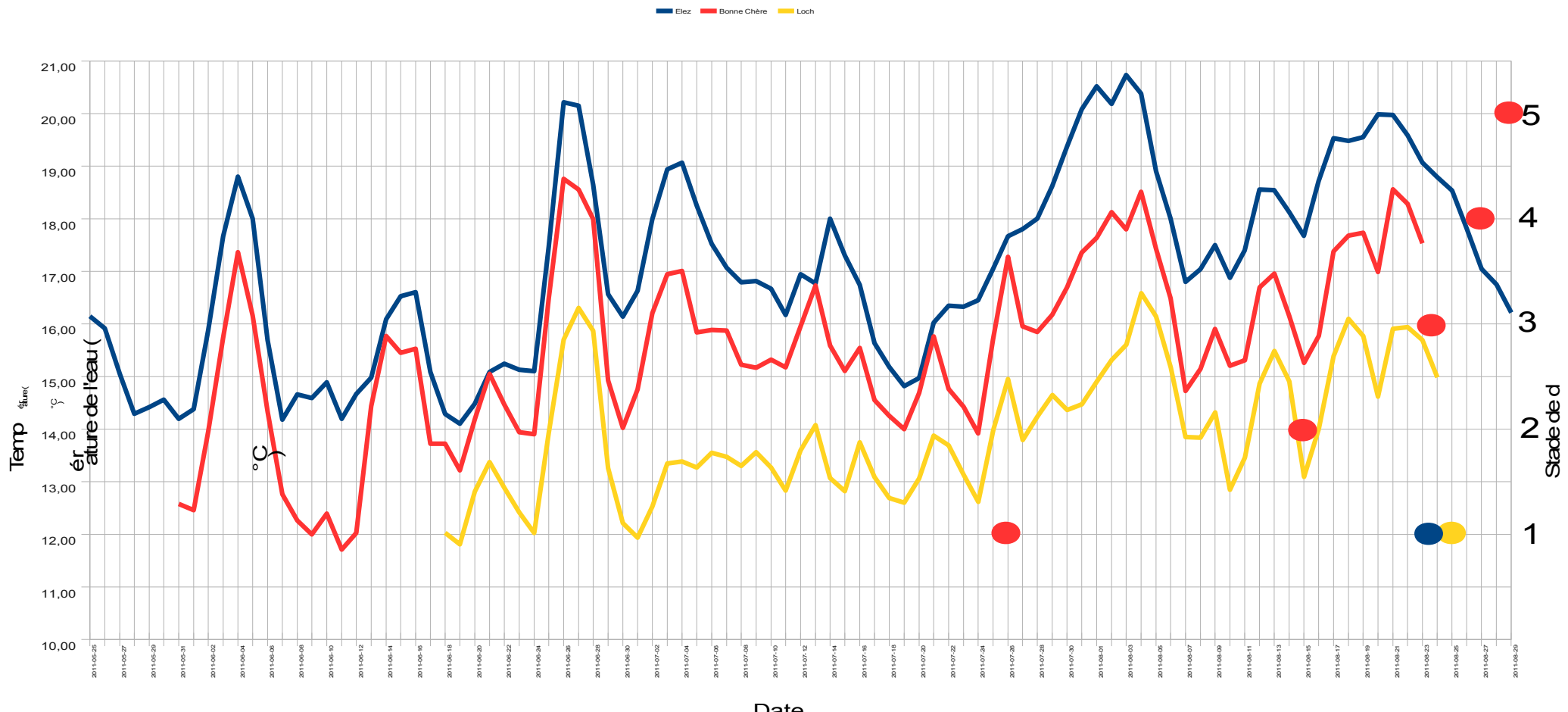
Day temperature average

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Evolution des températures des cours d'eau bretons



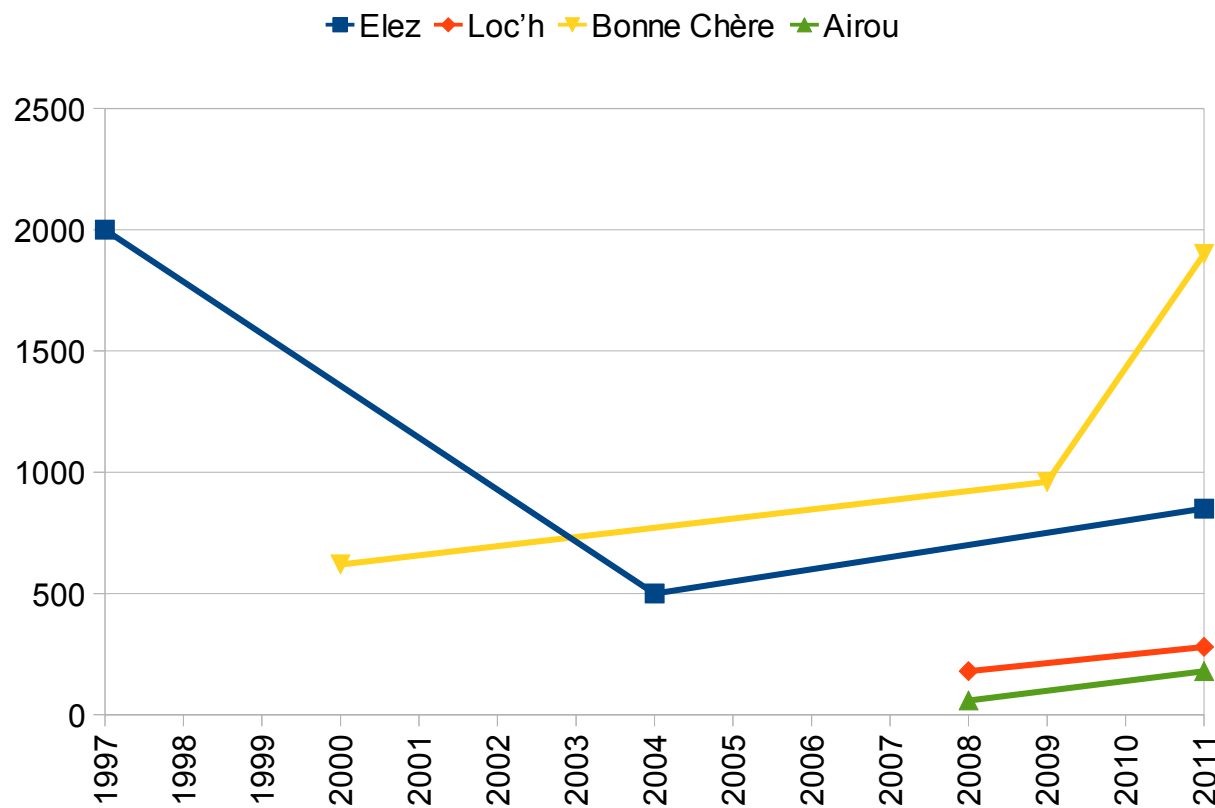
Evolutions de la température (moyenne journalière) et du développement des glochidies



Monitoring FWPM population

➡ inventory and cartography : 2011 & 2014
goal : estimation of each population evolution

➡ *visual exhaustif inventory on Elez, Loc'h, Bonne Chère, Airou*



Monitoring FWPM population

➔ *increase numbers linked to prospection effort (men / day)*

	Elez	Bonne Chère	Loch	Airou
FWPM	900	1900	280	184
method	scuba diving	aquascope	aquascope	aquascope
km	0,32	1	0,8	6,4
men	3	2	2	2
days	1	1	1	6
day/men/km	9,38	2	2,5	1,88



III. Communication & awareness

1. Public awareness

Visit of the breeding station & public animation around rivers

➔ from 2012 to 2015

2. Actors and institutional stakeholders awareness

Annual meetings (global and by site)

3. Project monitoring

- direction committee (2/year)
- scientific committee (1/year)
- follow-up committee (1/year)

4. Communication tools

Flyers, newsletter, movies, information board...



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Thank you for your attention



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www.life-moule-perliere.org/accueilmoule.php