

Programme LIFE+

CONSERVATION OF THE FRESHWATER PEARL MUSSEL OF THE ARMORICAN MASSIF

LIFE09 NAT FR 000583

AN ACTION COORDINATED BY :



Presentation and questions

Scientific Comitee
27 sept. 2011
(La Défense)

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



LIFE « mulette » 2010-2016

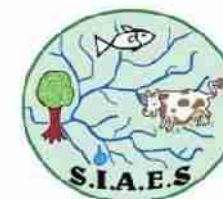
Objectives Preserve main populations
of the Armorican Massif

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



Programme LIFE+

CONSERVATION OF THE FRESHWATER PEARL MUSSEL OF THE ARMORICAN MASSIF

AN
ACTION
COORDI-
NATED
BY :



(1) SIAES : intercommunal Syndicate for the Management and Upkeep of the Senne river
(2) CCKB / CCCA : The Kraiz Breizh Community of Municipalities (formerly with the Callac-Argoed Community of Municipalities)
(3) CTMA : Aqualis Environments Territorial Contract
(4) CPIE : Permanent Center for Environmental Initiatives

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

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*



II. Concrete conservation actions

1. *Ex-situ* breeding station

new building fonctionnal in january 2011...

- ➡ *earthwork would began next days, ready for the end 2011*
- ➡ *infected Trout and Salmon :*

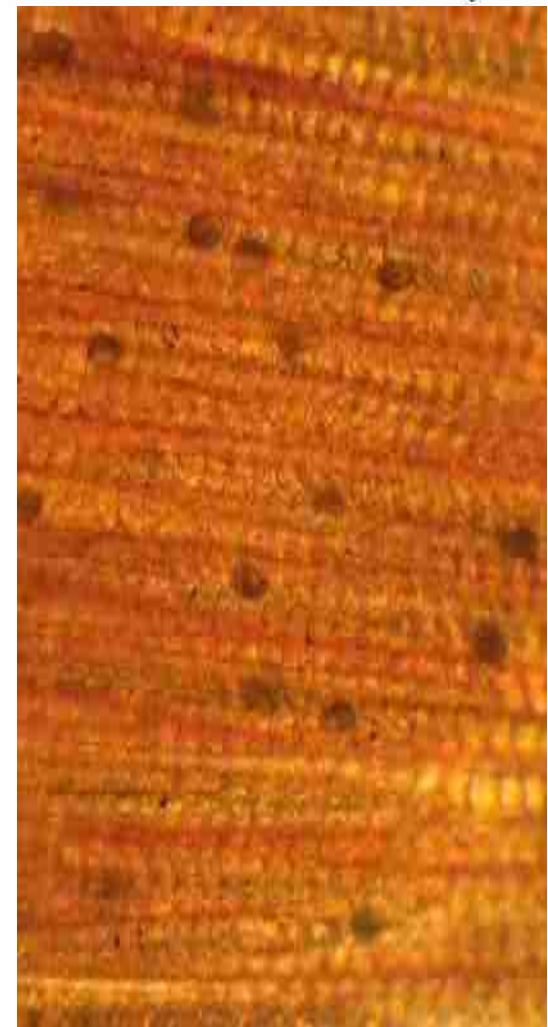
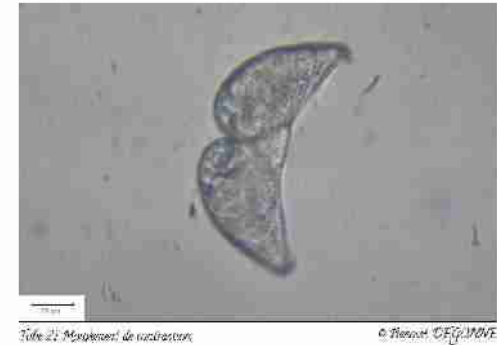
Bonne Chère ~ 2 millions larvae on 2 300 BrT O+

Elez ~ 2 millions larvae on 1 700 BrT & 1 000 Salmons O+

2. Reinforcement

each year on each river if quality environment is sufficient

- ➡ *choice of the main in-situ breeding systems ?*



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*



Questions to scientific comitee

Axis 1. Breeding and reinforcement

1. Host fishes on Elez river
2. Genetic monitoring
3. Reinforcement

Axis 2. Monitoring FWPM populations

Axis 3. Environment quality

Axis 4. Conservation plans and river restoration



Axis 1. Breeding and reinforcement

Hosts fish on Elez river

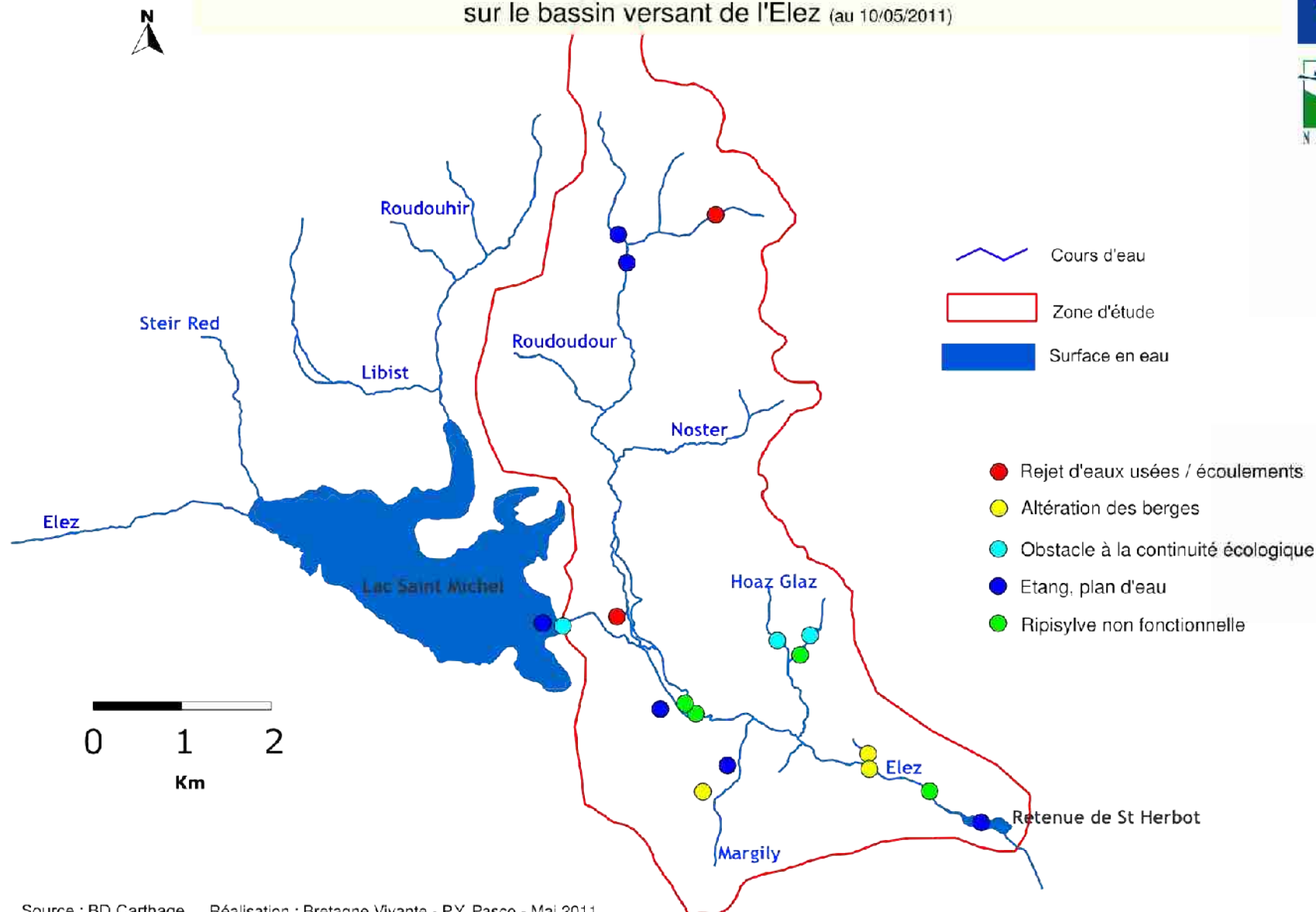
on Elez river : 26 BrT / 100 m (FWPM rivers 66,2 / 100 m)
dam in 1936 : reducing access to spawning ground area
pike and carp presence from private ponds
sudden water release from Saint-Michel : habitats changing

➡ release 1000 infected BrT / year

➡ *in 2009, sample of genitors from downstream river
but insufficient reproduction for the 1000 BrT expected in 2011
instead, use of ~600 adult BrT in 2011 (still from Elez)*



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 OF THE FRESHWATER PEARL MUSSEL OF THE ARMORICAN MASSIF



Bretagne Vivante

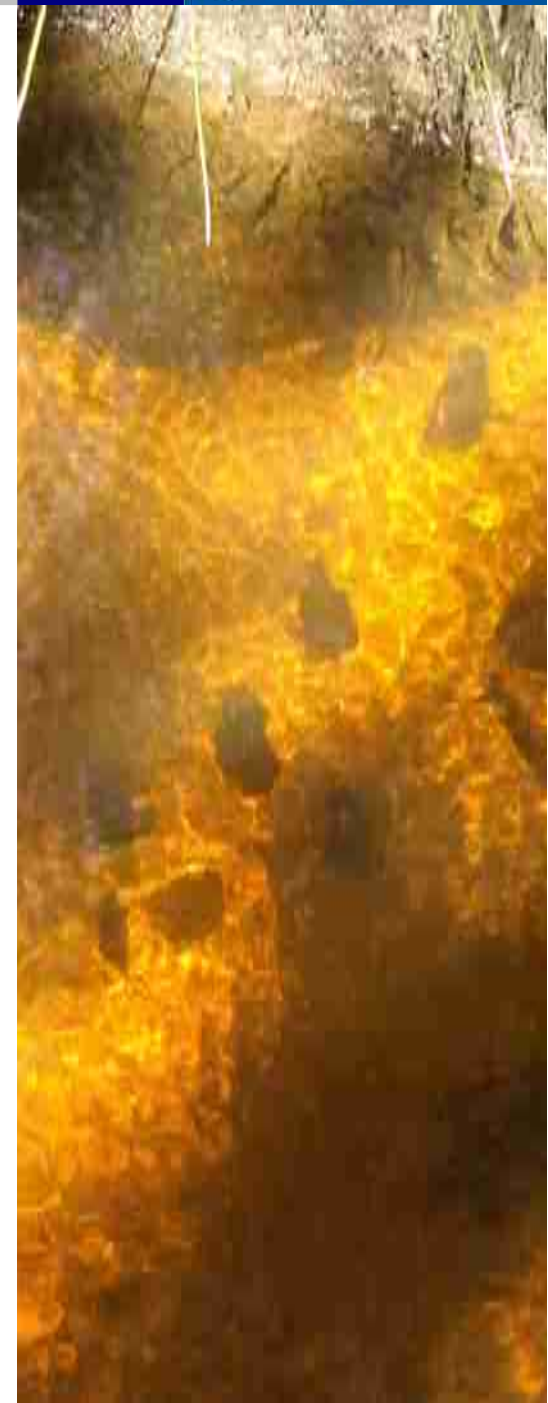


Herbot

Axis 1. Breeding and reinforcement

Hosts fish on Elez river

If the fish breeding would be unsuccessful, would it be possible to use an other BrT stock from a close catchment (Elorn) to restock Elez ?



Axis 1. Breeding and reinforcement

Genetic monitoring

breeding of the 6 selected populations until 2016
collect of glochidia each year (2011 to 2015)
genetic draft in breeding system ?

➡ genetic monitoring of Elez BrT and of breeding mussels

➡ *contact with SYSAAF* : 200 000 € for the project !!
second estimation about 4 000 € / year (total of : 20 000 € !)
only for sample collection !*

** Union of poultry breeders and aquaculture*



Axis 1. Breeding and reinforcement

Genetic monitoring

Is it pertinent to monitor mother FWPM and descendants in the breeding station ?

If yes, how to do this knowing LIFE project could not finance this action ?



Axis 1. Breeding and reinforcement

Population reinforcement

Each year if environment suitable for FWPM

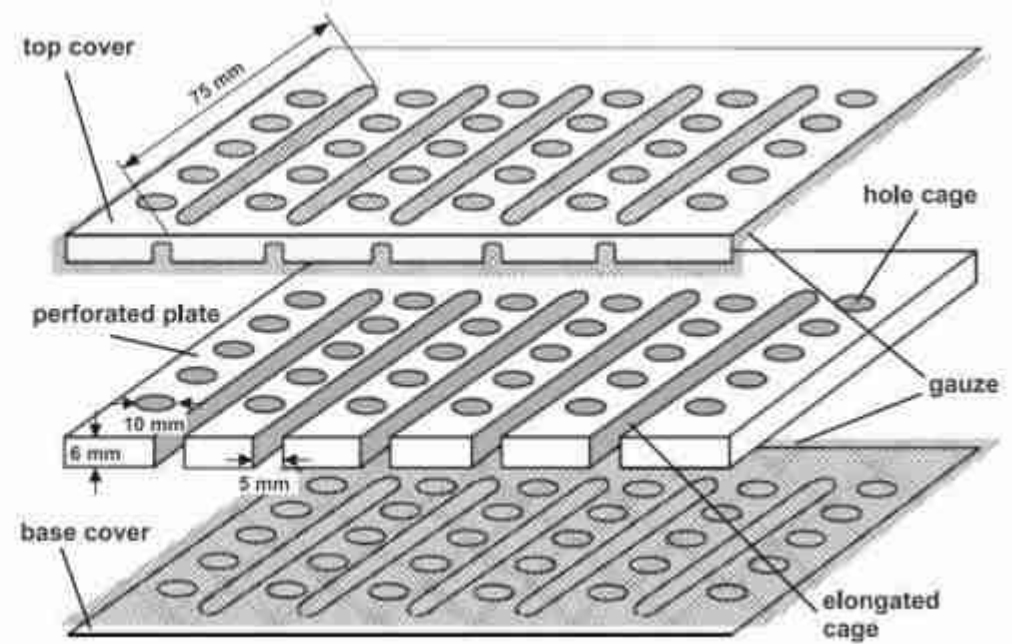
➡ direct reinforcement, in-situ systems and infection of local fish

➡ *feasibility study : different suggested in-situ systems*

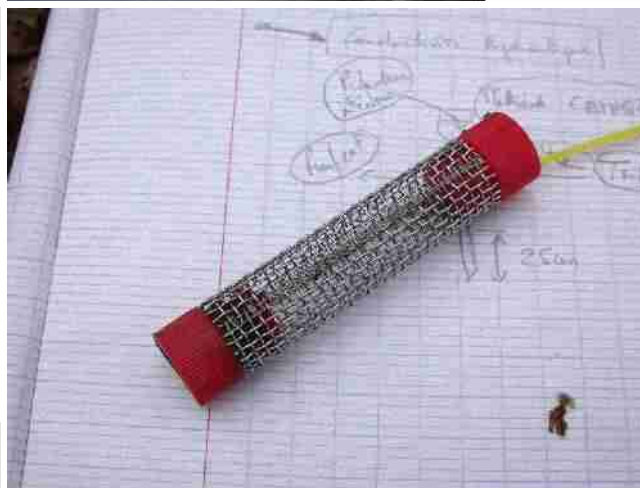
- *Buddensiek cages (substrate / flowing water)*
- *pond basket (ponds water)*
- *roller (substrate)*
- *silo (flowing water)*



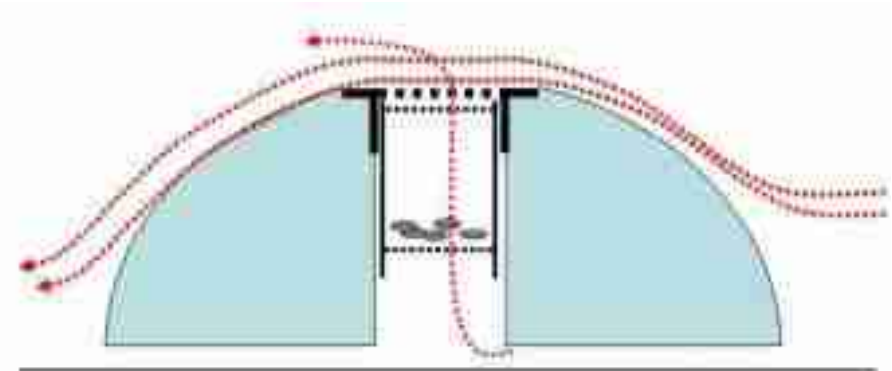
Cage sheet



Roller



Silo



Axis 1. Breeding and reinforcement

Population reinforcement

➡ monitoring environment for choose reinforcement areas :

Water quality - multiparameter	T°C, dissolved O ₂ , conductivity, pH (monthly)
Water quality - lab	N, P (monthly) pesticides (march, april, may, june & nov.)
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



Axe 1. Breeding and reinforcement

Population reinforcement

What are the best *in-situ* systems to use for having an estimation of reinforcement success ?

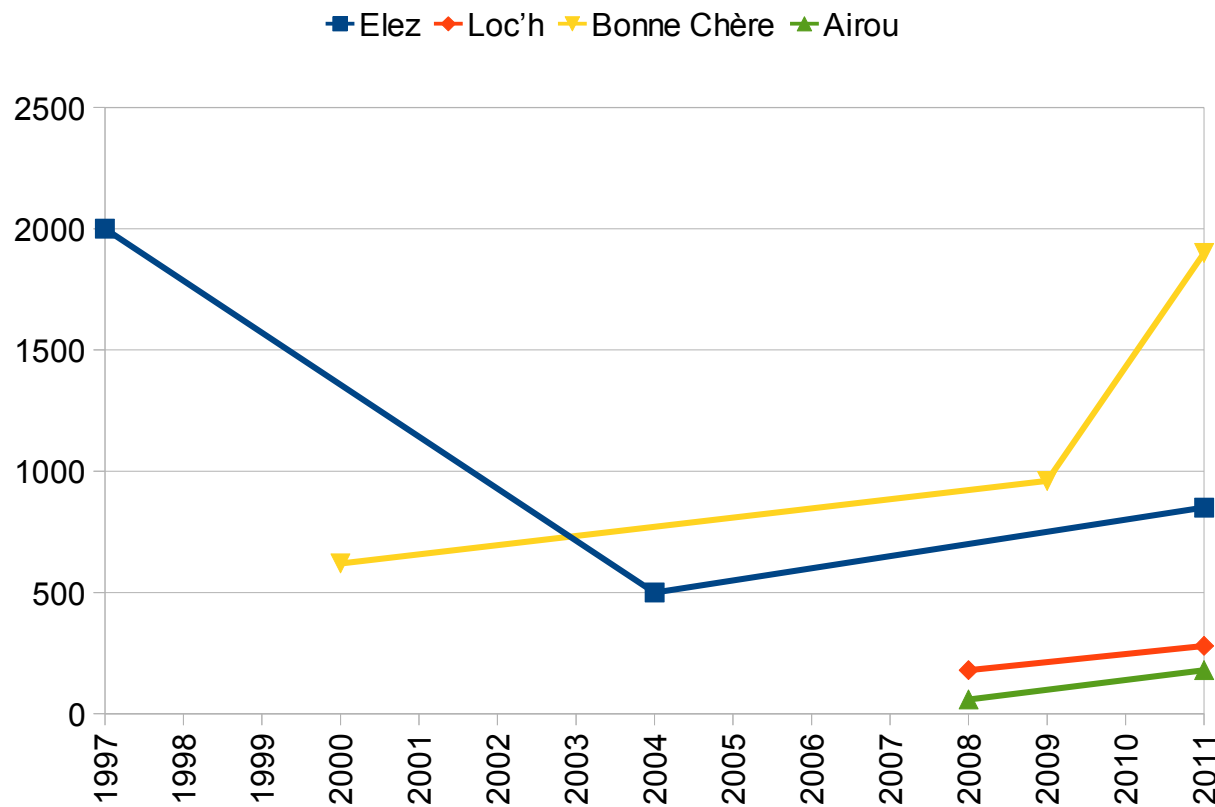
Measured parameters are they sufficient to the choice of reinforcement sites ?



Axis 2. Monitoring FWPM pop.

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

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



Axis 2. Monitoring FWPM pop.

➡ *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



Axis 2. Monitoring FWPM pop.

What inventory protocol could we use to estimate population evolution ?

Is it possible to choose one only protocol valid on all very different sites ?

Is there some interest to measure individuals ? If yes, with what protocol ?



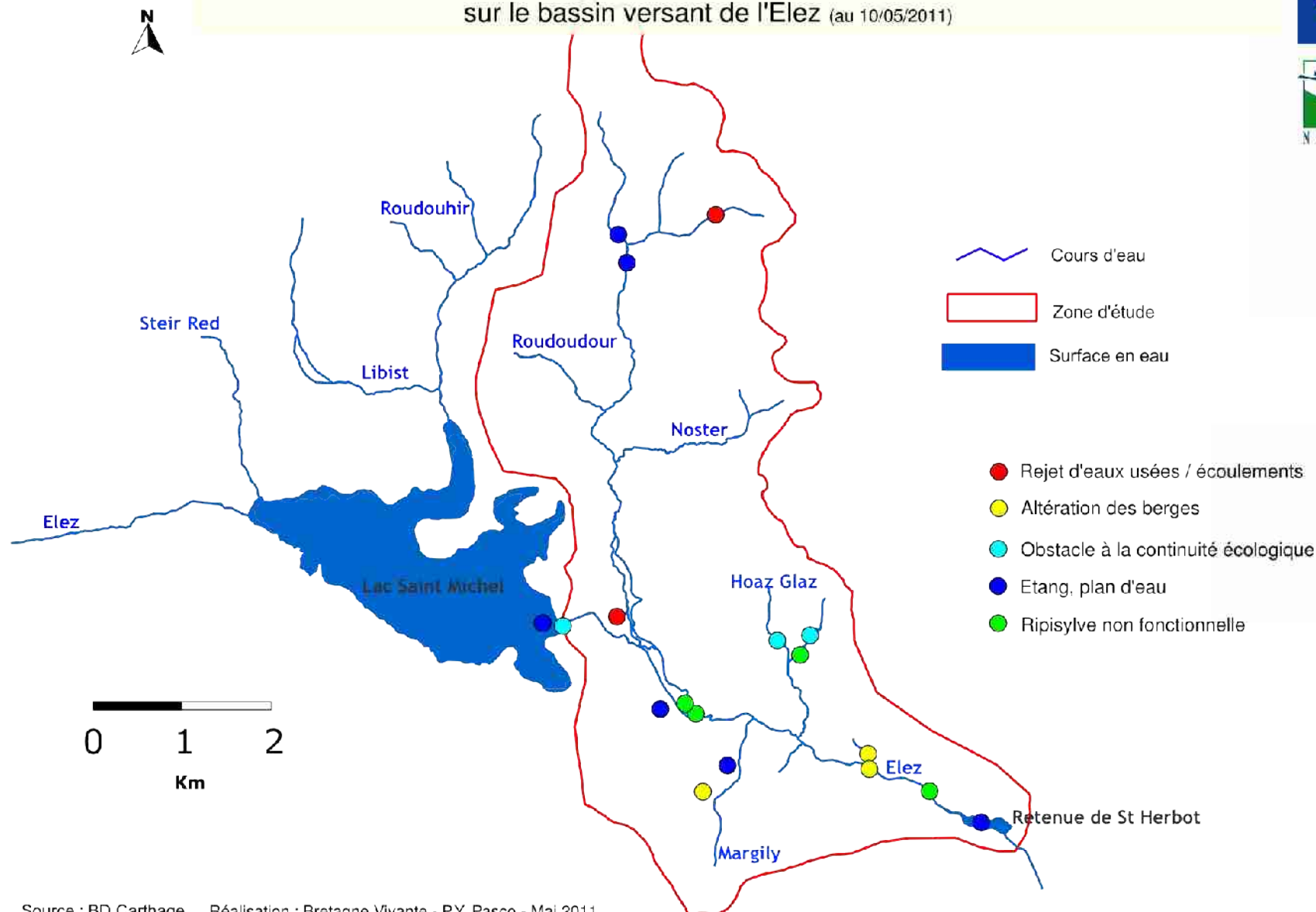
Axis 2. Monitoring FWPM pop.

- ➡ *on Elez river, FWPM are carried away in the downstream pond*
- ➡ *rescue operation has brought back 50 FWPM among the others*

During these rescue operations would it be possible to bring back FWPM in favourable sites, more upstream (on the tributary « Roudoudour » for example) ?



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



Axis 3. Environment quality

measures to qualify FWPM environment and to choose appropriate reinforcement sites

➡ sample protocol established. Reminder :

Water quality
- multiparameter

T°C, dissolved O₂, conductivity, pH
(monthly)

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



Axis 3. Environment quality

► limit 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



Axis 3. Environment quality

Would it be possible for the scientific comitee to valid these limit's parameters ?

For reinforcement, should we consider to obtain good value for all these measures or for a percentage of them ? Which one ?

Would it be possible for the scientific comitee to valid this protocol of environment quality ?



Axis 3. Environment quality

What are the effects of nitrates, phosphates, pesticides and suspended material (fines) ?

Effects are they on FWPM directly or on its habitat ?

Are there different effects on adults and juveniles ?

Does exist other proved molecules with a threat on FWPM ? Which ones ?

On what reference should we base ?



Axis 3. Environment quality

What evidence exists to prove an agricultural threat on FWPM ?

What evidence exists to prove a wastewater threat on FWPM ?

On what reference should we base ?



Axis 3. Environment quality

For sediment quality measurements, which space should we have between two station ?

Should we do several measurements around the point and make an average or retain only one value on all ?



Axis 4. 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 & National Action Plan on 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



Axis 4. 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*



Axis 4. Conservation plan and river restoration

It would be usefull that the scientific comitee could approve the first framework of the actions.

Would it be useful to put an application duration on these conservation plans ?



Axis 4. Conservation plan and river restoration

➡ river restoration, some questions for the Loc'h river :

How could we prove the impact of spruce forest ?

Would it be useful to plan removing brambles, etc., to improve sun access to the river and then, increase water temperature ?

Does the fact that wetlands are abandonned could be a threat for the mussels (less organic matter in the river, less biologic activities) ?



Axis 4. Conservation plan and river restoration

➡ river restoration, one question for the Rouvre river :

Kayak is practicable on the Rouvre river. This activity needs to clean branches or tree-trunks fell down into the river to allow kayaking.

Does this cleaning is incompatible with FWPM survival when we know some of them are sheltered behind such obstacles ?



Programme LIFE+

CONSERVATION OF THE FRESHWATER PEARL MUSSEL OF THE ARMORICAN MASSIF

AN
ACTION
COORDI-
NATED
BY :



Thank you very much !



photo : Ondrej Spisar



COLLINES NORMANDES

