



# INTERREG IVA project CRESH



CRESH  
PROJECT



## Cephalopod Recruitment from English Channel Spawning Habitats *Céphalopodes Recrutement Et Suivi des Habitats des pré-recrues de Manche*

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Ifremer

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UMR-IFREMER-100-Physiologie et Ecophysiologie des Mollusques Marins  
IBFA Esplanade de la paix, Caen, France

Meeting of the CHANNEL PROGRAM, March 30-31 2010 Rouen

# Presentation of the CRESH project



## Contents:

- Context and justification
- Objectives and tasks
- Organisation and partners expertise



# Presentation of the CRESH project



## Context and justification:

- 1) Cuttlefish and Loliginid squid are among the first marine resources for English Channel Fisheries (they are **shared resources** exploited by both French and UK fishing fleets)
- 2) Previous studies have shown that fishing pressure can be high but seems to have less influence on stock renewal than pre-recruit stages environment (Challier et al, 2005)
- 3) Direct observation of pre-recruit stages is desirable for both assessment purposes (recruitment estimates) and ecosystem functioning (**essential habitats**).



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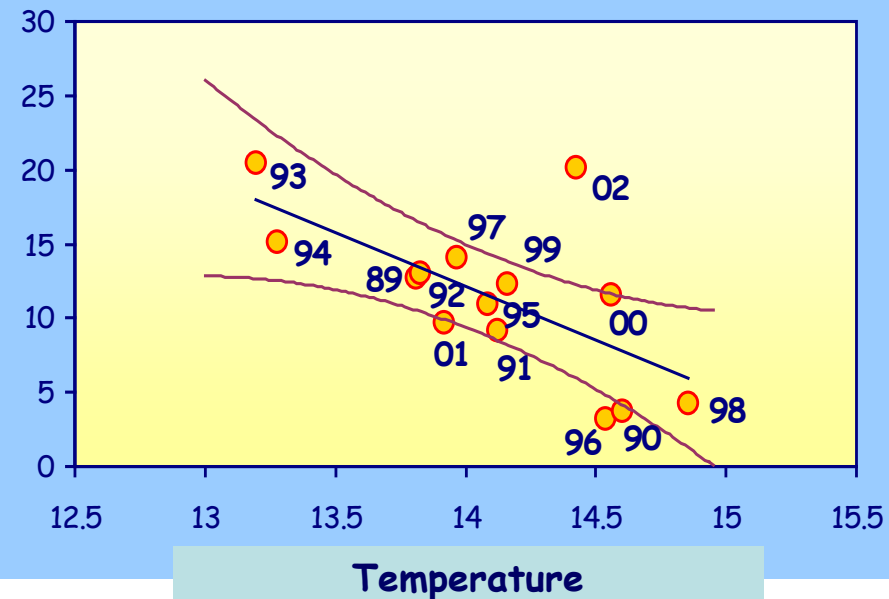
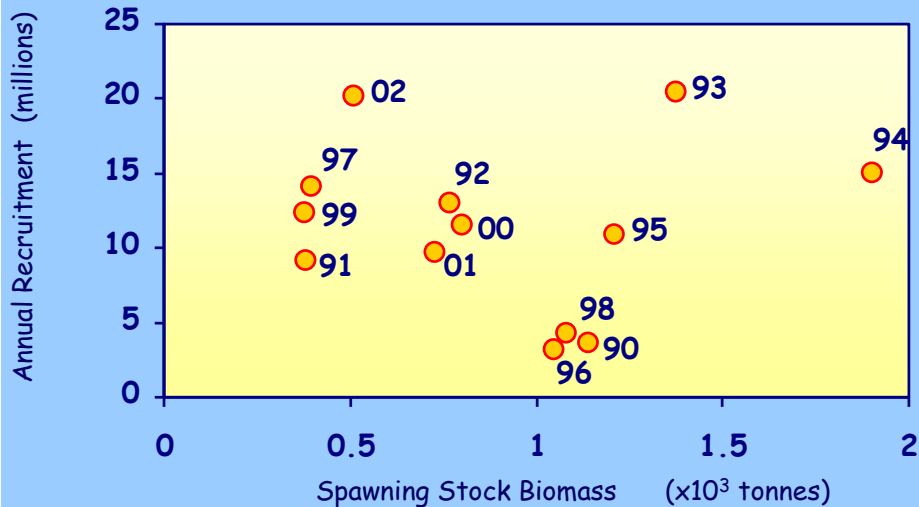
## Context and justification:



English Channel *Loligo forbesi* (13 annual cohorts) **Challier et al 2005**

Stock-Recruitment relationships were not significant

Significant relationship between Recruitment and environment.



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## Context and justification:

English Channel *Sepia officinalis* migration cycle  
is rather well known

2 year old females lay eggs inshore in both FR & UK coasts...

but on which substratum?  
(but the fishing traps !).



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## Objectives and tasks:

INTERREG IVA Operational Programme **keywords**

Priority 4: Ensure a sustainable environmental development of the common space

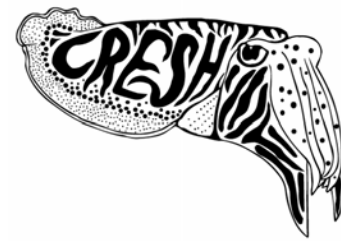
Specific Objective 10 - Ensure a balanced management of the environment and raise awareness about environmental issues



## CRESH project specific objectives:

- + Improve knowledge of habitats most suitable for reproduction
- + Estimate the contribution of different spawning grounds to the recruitment.
- + Study environmental factors that determine recruitment success
- + Update recruitment estimates and stock assessments
- + Propose to the stakeholders recommendations for sustainable management of Cephalopod resources and/or essential marine areas

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## List of project tasks:

### Habitat preferences

- 1) Review existing knowledge / search databases
- 2) New observations of natural egg-laying habitats
- 3) Infer "potential spawning areas" from habitat data

### Comparison of eggs & juveniles from different pilot areas

- 4) egg & juvenile quality (survival + physiology)
- 5) Trophic signatures (stable isotopes)
- 6) Genetic differences (using molecular data)
- 7) Trace elements

### Relationships between pre-recruits and resource abundance

- 8) Integration into stock (and recruitment) assessment
- 9) Recommendations for habitat management

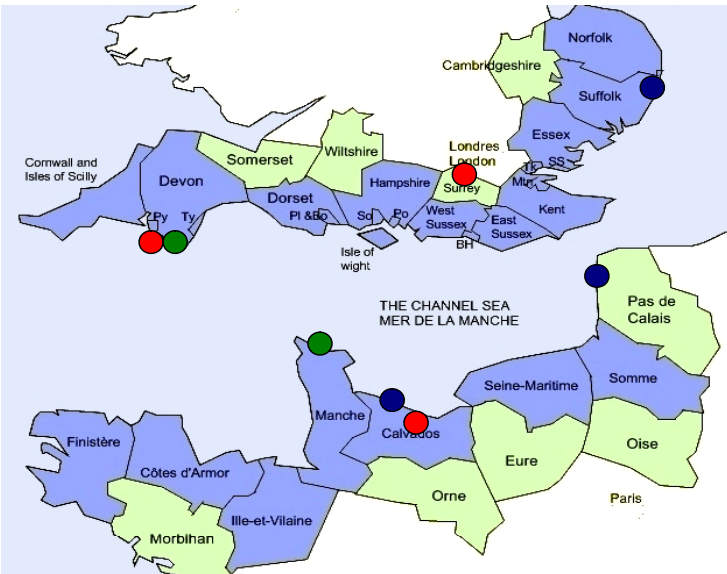


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## Organisation and partnership

Balanced UK/France partners of similar types



- Universities :  
Plymouth-MBA - RHUL / UCBN
- "Research Institutes" :  
CEFAS / Ifremer (BL & PeB)
- "Fishermen's organisations" :  
Devon Sea Fisheries Committee  
Comité Régional des Pêches BN



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## Partners expertise

Co-operative research project gathering

Cephalopod scientists

Marine habitats community ecologists

Population geneticist

Fisheries Scientists - Marine Biologists

Fishermen's organisations

Some examples of useful contributions...



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## Partners expertise

examples of useful contributions ...

The University of Caen has acquired experience in Cephalopod Population Dynamics and in cuttlefish nutritional physiology.

- + Spatio-temporal trends in abundance of the resource
- + First stock assessment published in Loliginid squid in Europe.
- + First exploitation diagnostic in cuttlefish in Europe
- + Age-at-recruitment and juvenile growth modeled with statolith countings



# Presentation of the CRESH project



## Partners expertise

examples of useful contributions ...

The University of Plymouth and MBA have been involved in projects about marine habitats and about seagrass hosted communities (Jackson *et al.* 2006)



## Landscape models

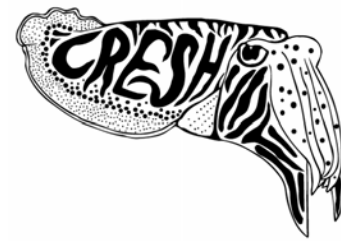


A comprehensive scientific knowledge base and practical guidance for the application of the Ecosystem Approach to the sustainable development of Europe's regional seas.



Coordinate the running of the UKMPA Centre website an independent virtual centre providing up to date scientific information, news and on Marine Protected Areas (MPAs) in the UK.

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## Partners expertise

examples of useful contributions ...

The Royal Holloway University of London has developed molecular primers for population genetic structure of marine species



Two objectives in the CRESH project:

- Genetic differences between cuttlefish spawning areas
- Identification of juvenile squid with DNA bar-coding

# Presentation of the CRESH project

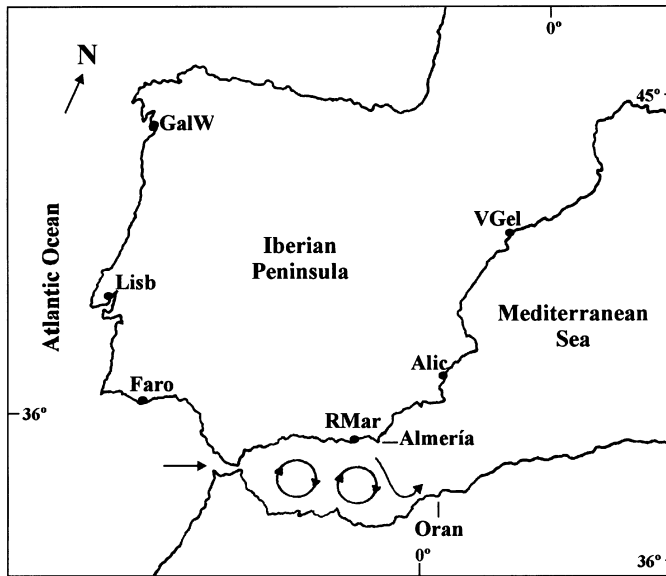


Partners expertise

RHUL genetic studies



*Sepia officinalis* genetic differences between cuttlefish spawning areas



Around Spanish waters

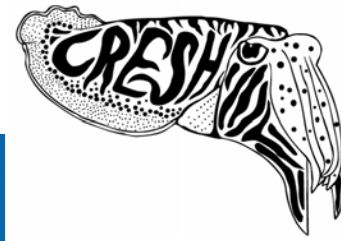
Isolation by distance :

significant differences observed between sites (several hundred km apart)

Preliminary results about English Channel inconclusive (inconsistent homing?)



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Partners expertise



RHUL genetic studies

Identification of juvenile squid with DNA bar-coding

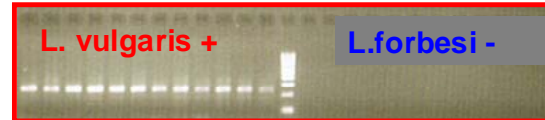
Chromatophore patterns are at present the only way to determine squid hatchlings



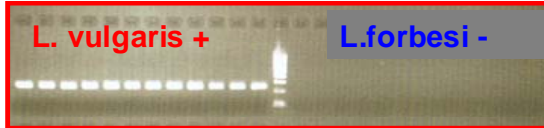
Primer set 1



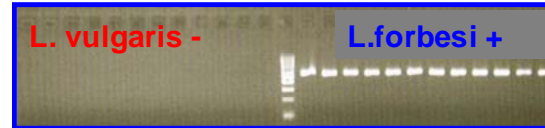
Primer set 2



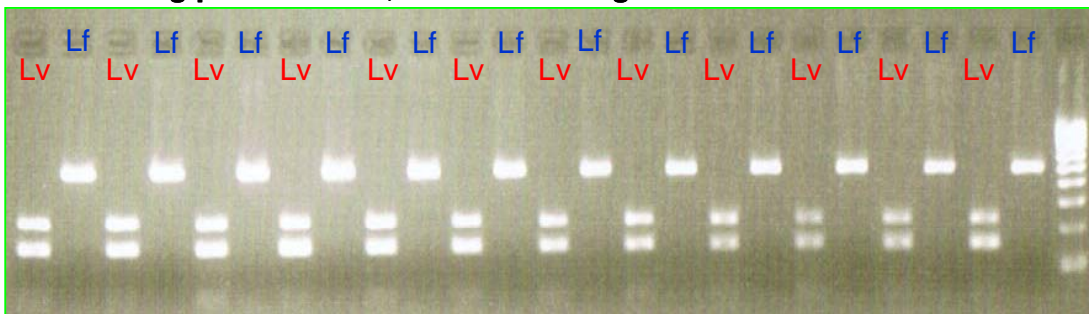
Primer set 3



Primer set 4



Combining primer sets 1,3 & 4 into a single reaction



Species identification using a single PCR-based assay  
Reliable, Easily Interpreted, Fast & Cheap



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## Partners expertise

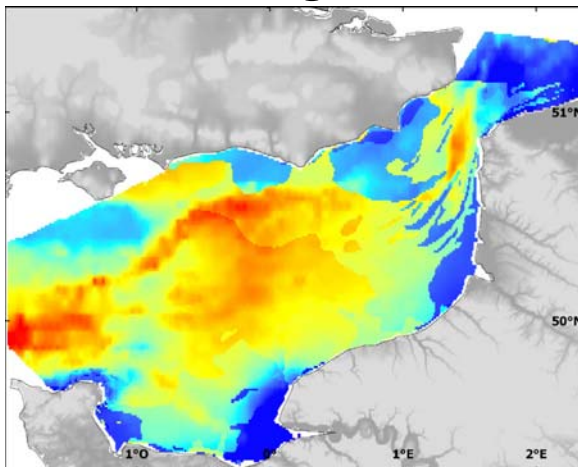
examples of useful contributions ...



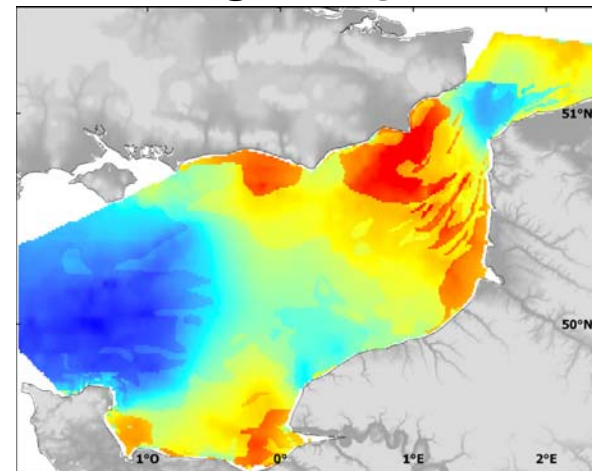
Ifremer and CEFAS have derived habitat preferences from Eastern Channel **trawl survey data** during the CHARM II project

## Channel Habitat Atlas for marine Resource Management habitat preferences (October)

*Loligo forbesi*



*Loligo vulgaris*



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Partners expertise

examples of useful contributions ...

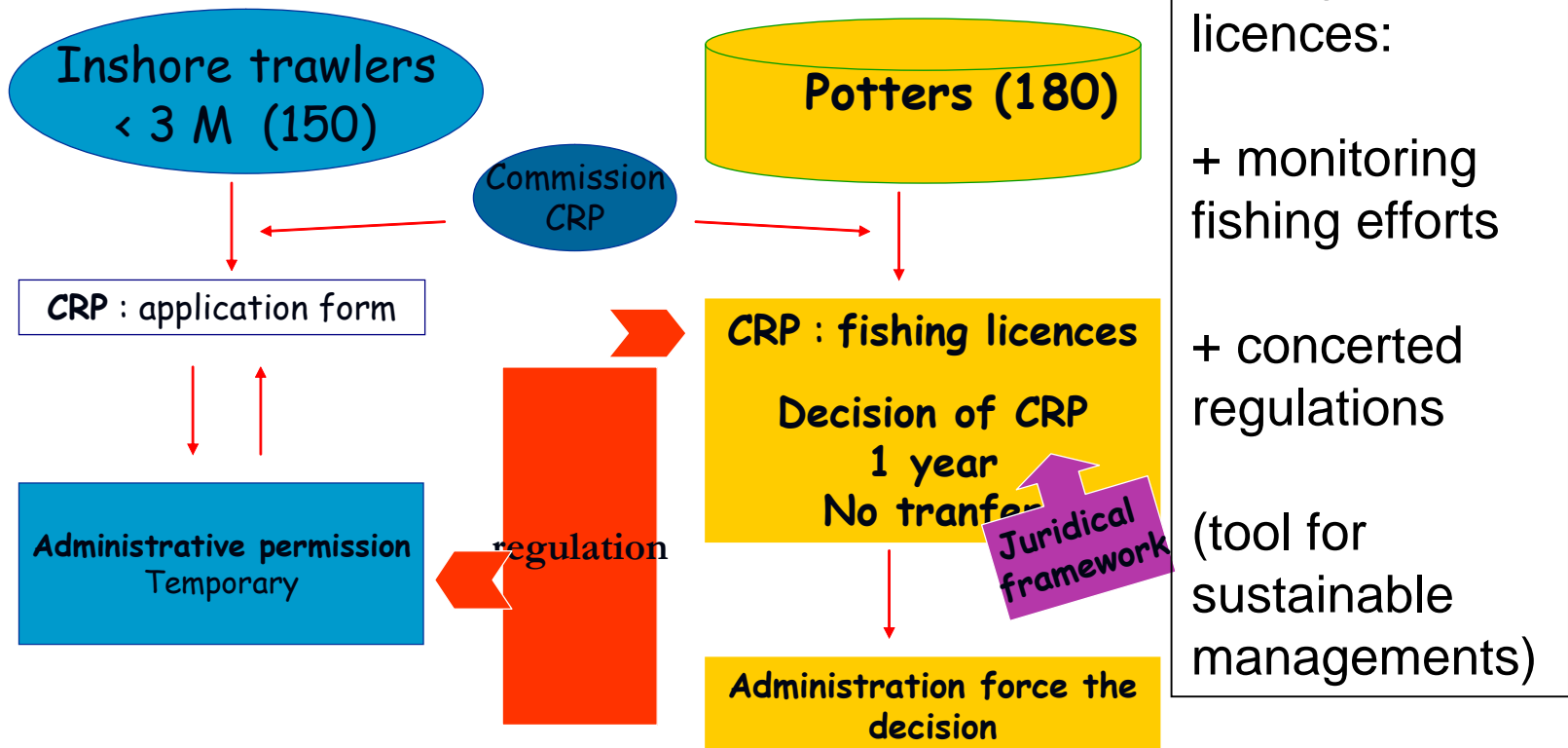
Fishermen's organisations



CRPM-BN



## Regulation of 2 inshore métiers by CRPM





# Presentation of the CRESH project



In a few words:



CRPM-BN



The challenge of the CRESH project

is to fill gaps in our knowledge between

spawning



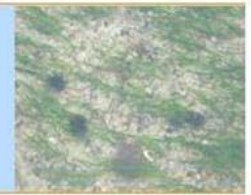
*Sabella pavonia*  
tube



fishing trap



*Fucus serratus*



*Zostera noltii*

and resource renewal  
(in multispecies and multimétiers fisheries)





france (manche)  
channel england  
**interreg**



Thank you for your attention...

[www.unicaen.fr/cresh](http://www.unicaen.fr/cresh)

