ARCH PROJET

Activity 1

-Synthesis-

CONTENT

1 ARCH project context

1.1. General context

The Kent and Nord-Pas de Calais regions have a common natural heritage (rare woodlands but sometimes of a high value, calcareous grasslands, wet areas) coming from the same geological basis and similarly formed by the climate and the human activities. They share similar issues regarding the fragmentation of the landscape, which accelerates the degradation of habitats, the loss of biodiversity, and stops the nature to adapt to the already visible effects of the climate change.

To face these common difficulties and to coordinate them, several partners in Kent and Nord-Pas de Calais have developed the ARCH project within the framework of the INTERREG IVA to:

- EVALUATE the natural habitats evolution and their fragmentation
- PROMOTE the use of natural habitat data within planning projects

1.2. The ARCH Project

The ARCH project "Assessing Regional Changes to natural Habitats" has been launched in July 2009, Kent being the lead partner.
The ARCH project aims to promote, improve the management of nature, the landscapes, the natural heritage, as well as the link between the urban, peri-urban and rural areas. Concretely, it means improving the way in which the natural habitats are maintained and restored in Kent and in Nord-Pas de Calais, by developing common and innovative assessment and mapping methods of the state of the natural habitats, in order to monitor and preserve the natural habitat in the long term, according to the Göteborg biodiversity protection objectives.

1.3. The Project ARCH partners

Within the framework of the 2 seas programme, the project ARCH partners are:

- The Kent County Council
- The Conseil Régional du Nord-Pas de Calais, hereafter named as the Nord-Pas de Calais
- The Centre régional de Phytosociologie agréé conservatoire botanique national de Bailleul, herafter named as CRP-CBNBL

The ARCH project is supported by the following organisations:

- Direction Régionale de l'Environnement (DREAL Nord Pas de Calais),
- The Environment Agency
- Kent & Medway Biological Records Centre
- Kent Wildlife Trust
- Natural England
- Maidstone Borough Council
- Tunbridge Wells Borough Council
- Canterbury City Council
- Swale District Council
- Medway Council

The European networks will be regularly informed (for instance the European Environment Agency and the European Commission DG ENV).

1.4. The ARCH project content

At present, the Kent and Nord-Pas de Calais regions do not have a sustainable system facilitating the assessment of the state and extend of the natural habitats. In order to enable an efficient cross-border work, especially a rapid assessment of the impact of planning projects on the biodiversity, both regions wish to develop a common integrated approach to assess the natural habitats.

This shared approach includes:

- the production and update of a common map of the natural habitats state in Kent and Nord-Pas de Calais which can be interpreted at a local, regional and international level, improving the knowledge of the natural habitats and measuring the evolution of their surface areas
- the development of a sustainable method to measure and understand the landscape fragmentation, to assess the state of the natural habitats and to take into account these data in restoration programmes
- the use of new technologies, such as satellites, to develop in the long term a monitoring system of the extend, the quality and the fragmentation of the natural habitats and to enable a regular update of the indicators
- the strengthening of the cross border exchanges of expertise and knowledge, the preservation and the management of the natural habitats, as well as the techniques, experiences and solutions
- the dissemination of the project results within the 2 seas areas and within other European countries to raise awareness and inform local authorities (planners, land owners, developers etc...) for a better monitoring and a better
- the strengthening of the cross border expertise and knowledge exchanges, the preservation and the management of the natural habitats, as well as the techniques, experiences and solutions enabling the reduction of the impact on biodiversity of planning developments
- the dissemination of the project's results within the 2 seas areas and within other European countries in order to raise information awareness amongst local authorities

To achieve its objectives, the ARCH project is composed of 4 activities:

- **Activity 1:** Evaluation of the quality and the conditions of the biodiversity in Kent and Nord-Pas de Calais
- **Activity 2**: Access to data and information, especially the data collected during Activity1 and the list of species for planners
- **Activity 3** : Feasibility study of new remote sensing technologies for the long term monitoring of habitats
- **Activity 4**: Project promotion during seminars and conferences at European level

2 Activity 1 - Mission 1

2.1. Presentation

Mission 1 of Activity 1 consists of the creation of a natural habitat map at 1/10000 in Nord-Pas de Calais in 2005 and 2009 and of the analysis of the observed evolutions.

2.2. Data used and production methodology

2.2.1 Image data

The orthographic mosaics provided by PPIGE (Public Platform of Geographical Information) forms the basis of the data information.

- 2005 Orthophotography, natural colours, resolution 50 cm
- 2009 Orthophotography, natural colours and infrared, resolution 20cm

2.2.2 Classification

The natural habitats classification used is based on the CORINE Biotope classification. A number of adjustments have been necessary in order to adapt it to the regional habitats and to the orthographic possibilities. At the end 62 habitats have been defined.

2.2.3 Geometrical précision

The photo-interpretation work has been achieved at 1/3000^{éme}.
The smallest polygon is 100 m² and the minimum distance between two boundaries is 5m.

2.2.1 API phases

The habitats map has been achieved first with the 2009 images, as per the interpretation practices criteria compiled in the « illustrated guide of photo interpretation ».

The result of this first interpretation is crossed with the 2005 images in order to identify and process the changes between both years.

This basis enables a state of the regional habitats in 2005 and 2009 to be obtained as well as the identification and the analysis of the changes between the two dates.

2.2.2 Existing map databases

A bibliographic research was carried out prior to the photo interpretation in order to make an inventory of the habitat maps already existing and available in GIS format over the regional territory.

This data is necessary to locate certain habitats which aerial images cannot easily identify.

2.2.3 Confidence index

In order to nuance the pertinence of the cartographic information, a confidence index has been associated to the habitats processed in the base:

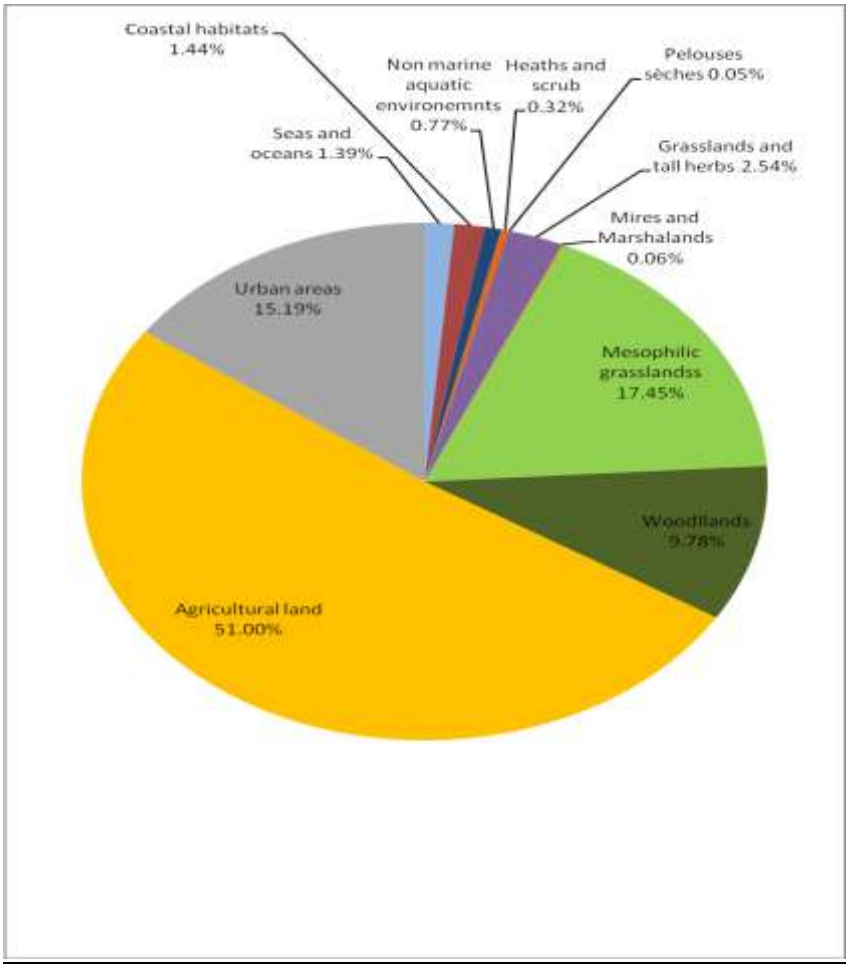
1 – Reliable photo-interpretation
2 – Problematic photo-interpretation, without map or field data to support the interpretation
3 – Cartographic data used (precision of the bibliographic reference in the field « source »)
4 – Expertise (personal local knowledge)
5 – Field validation

2.3. Results of the 2005-2009 diachronic analysis

2.3.1 By major habitat types

Considering the major habitat types present in the Nord-Pas de Calais region, we can observe that the global distribution does not vary much between the two dates. Below the 2005 distribution:

Distribution of the major habitat types in 2005

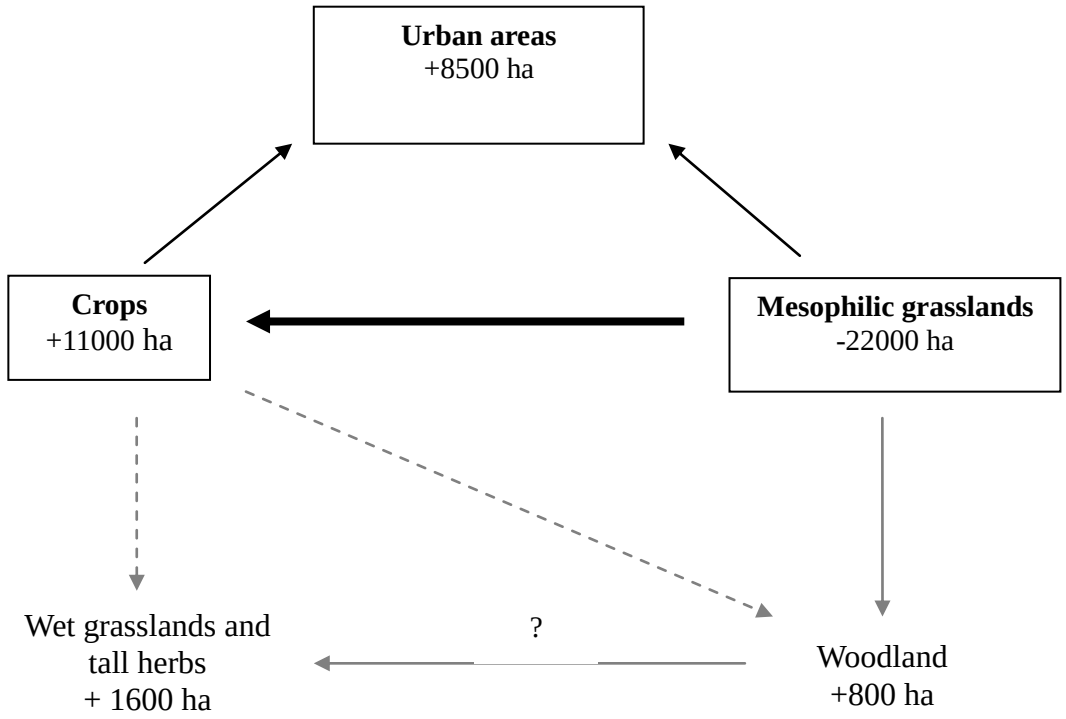


With 51% of the area the Nord-Pas de Calais region, agricultural lands are clearly dominant.
The other half of the areas is essentially split between mesophilic grasslands (17%), the urban zones (15%) and woodlands outside dunes (10%).

The remaining 7% correspond to humid grasslands and tall herbs, (2.5% are essentially wetlands situated in alluvial valleys), to coastal habitats (1.5%) and sea surface areas included in the map. The body water and associated habitats represent 0.8%.

Peat-bogs and swamps, dry grasslands, lands and thickets are shared within the 0,4% left.

A more detailed analysis of the evolutions still enables us to highlight the following global dynamic:



2.3.1 Priority habitats

A series of habitats, not necessary over big surface areas, are not easily represented in the global analysis. However their identification and preservation are important.

Most of the time, these habitats require cartographic data in order to be identified.
The only cases where there are significant evolutions are grasslands with scrub encroachments or clear heaths

The evolutions observed are in the hectare range. The surface areas being small at the start, the relative evolution can however be high.

Humid dune slacks :
Their evolution is limited to a total of **1.5 ha**.
It is mainly shrubs on dunes areas in 2005 cleared in 2009
A slight fragmentation is noticeable: from 353 polygons classed in 163 in 2005 to 363 in 2009.

Heaths:
Only 0.6 ha has evolved:

- 800 m² of woodlands which evolve in wet heaths in favour to a local clearing
- A total of 5000 m² of dry heaths which are cleared for the benefit of the surrounding dry heaths. We can notice a slight fragmentation (from 32 polygons in 2005 to 35 in 3 2009)

Lowland calcareous grasslands:
There is a reduction of 4 ha for the benefit of crops and fallow lands.
The change from 406 polygons in 2005 to 407 in 2009 does not constitute a significant division.

Lowland dry acid grasslands:
The 2 ha increase results from local clearing (codes 312 or 318 depending on the case) for the benefit of dry grassland.
There is no division between the two dates.

Paleo-costal dunes :
Following local clearing 1,7 ha of dunes with scrub in 2005 are identified in paleo-coastal dunes in 2009.
There is a reduction of polygons from 31 in 2005 to 32 polygons in 2009 which does not constitute a significant division.

The methodology applied to wetlands and tall herbs makes challenging the appreciation of the evolutions for these habitats.

3 Activity 1 – Mission 2

3.1. Presentation

Mission 2 of Activity 1 consists of the creation of a georeferenced database of natural habitats. This mission fits in with Mission 1.

3.2. Data model

The database produced for the Nord-Pas de Calais region is georeferenced in the projection system RGF Lambert93, official system in France. It corresponds to the land cover, orientated to best describe the natural habitats of the region and is composed of two objects:

- Object 1 : Natural Habitats (layer of the entities' surface areas)
- Object 2 : Edges (layer of the linears)

Habitats Naturels	
code2009	Texte
habitat2009	Texte
code2005	Texte
habitat2005	Texte
indice	Entier court
source	Texte
evolution	Entier court
THEME09	Texte
INTITULE09	Texte
DESCRIPTION09	Texte
EUNIS09	Texte
HIERARCHISATION09	Texte
THEME05	Texte
INTITULE05	Texte
DESCRIPTION05	Texte
EUNIS05	Texte
HIERARCHISATION05	Texte
SHAPE_Length	Réel double
SHAPE_Area	Réel double

Haies	
evolution	Texte
SHAPE_Length	Réel double

4 Activity 1 - Mission 3

4.1. Presentation

Mission 3 of Activity 1 consists of the creation of a cross border map to 1/10000 of natural habitats in 2009, covering the Kent and Nord-Pas de Calais territories.

4.2. Setting a common classification

In order to start a cross border map, it was necessary to establish a common classification, as reliable and respectful as possible, of habitats defined by each regions, by limiting much as possible the loss of information.

The preparatory phases of the work are as follow:

- Collect the last Kent database version
- List the codes (themes or habitats) present in Kent (nearly 200) and establish the correspondence with each *Corine* codes
- Understand and analyse the Kent classification via a French translation, in order to highlight the differences in the logic used to define the habitats and to notice that the prevailing and strategic habitats for the biodiversity are not necessarily the same in both sides of the channel.

Having then a Corine Biotopes correspondence for each of these databases with an advanced knowledge of priority habitats from both partners, a common classification has been agreed in consensus. There are finally 50 codes.

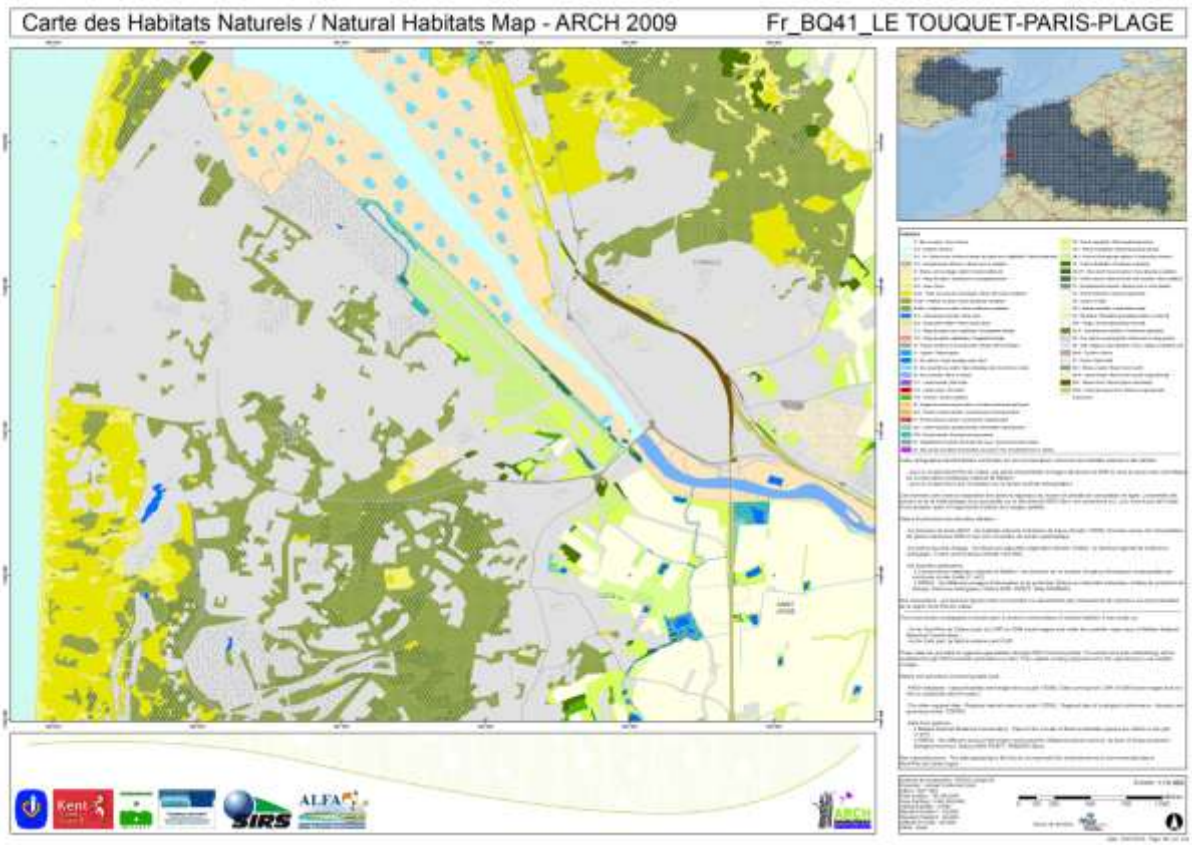
4.3. Structure and representation of the cross-border database

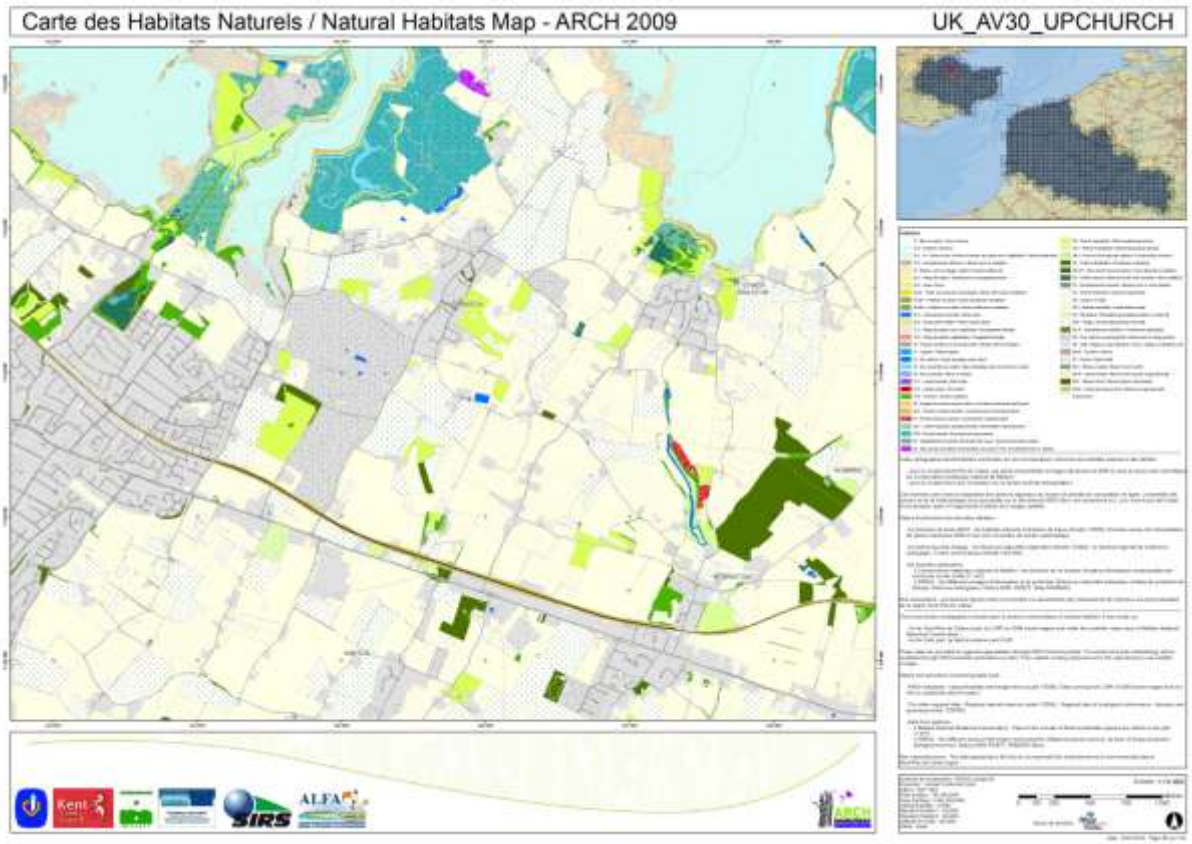
The next step has been to regroup both databases within a geodatabase comprising two classifications, one for the Kent territory (georeferenced in the British National Grid system), and the other one for the Nord-Pas de Calais region (georeferenced in the RGF Lambert93 system).

Finally, the choice of the cartographic representation of the habitats has been established by a working group, which proposed a list of symbols which was discussed, adjusted and validated by all the partners during an inter-regional workshop.
This symbology follows a number of rules on the choice of colours and patterns, which tend to optimise the display and the identification of the habitats on the map.

4.4. Cartographic atlas

Once the cross border database has been completed and the symbology defined, a cartographic atlas of natural habitats to the 1/10000 has then been generated with the help of the ArcGIS software. Constituted of 742 elements, this atlas covers the Nord-Pas de Calais territory via 564 maps, against 178 for Kent. An example of maps for each of the two territories is presented below:




Carte des Habitats Naturels / Natural Habitats Map - ARCH 2009
UK_AV30_UPCHURCH