

# The peatbog meta-project : a master plan for restoring bogs connectivity in the Walloon Region



**Marc Dufrêne**

Marc.Dufrene@ulg.ac.be



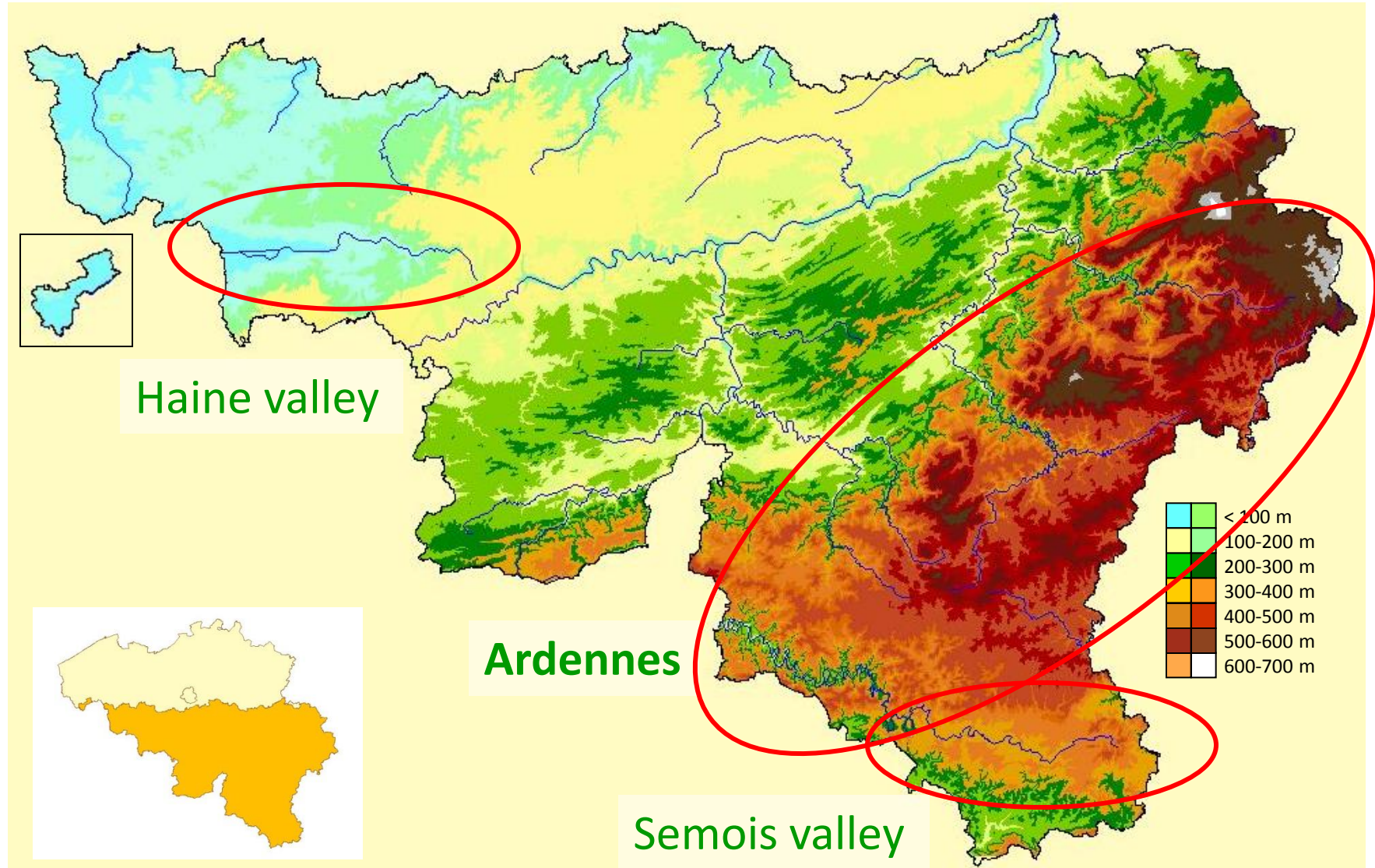
Gembloux Agro-Bio Tech  
Université de Liège

With the collaboration of Philippe Frankard, Julie Plunus, Maïté Loute, Sara Cristofoli, Annick Pironet, Grégory Motte et Denis Parkinson.

References : [Dufrêne et al. 2015, Hautes-Fagnes, 300 : 24-42.](#)  
<http://biodiversite.wallonie.be/fr/meta-peatbog?IDC=5778>



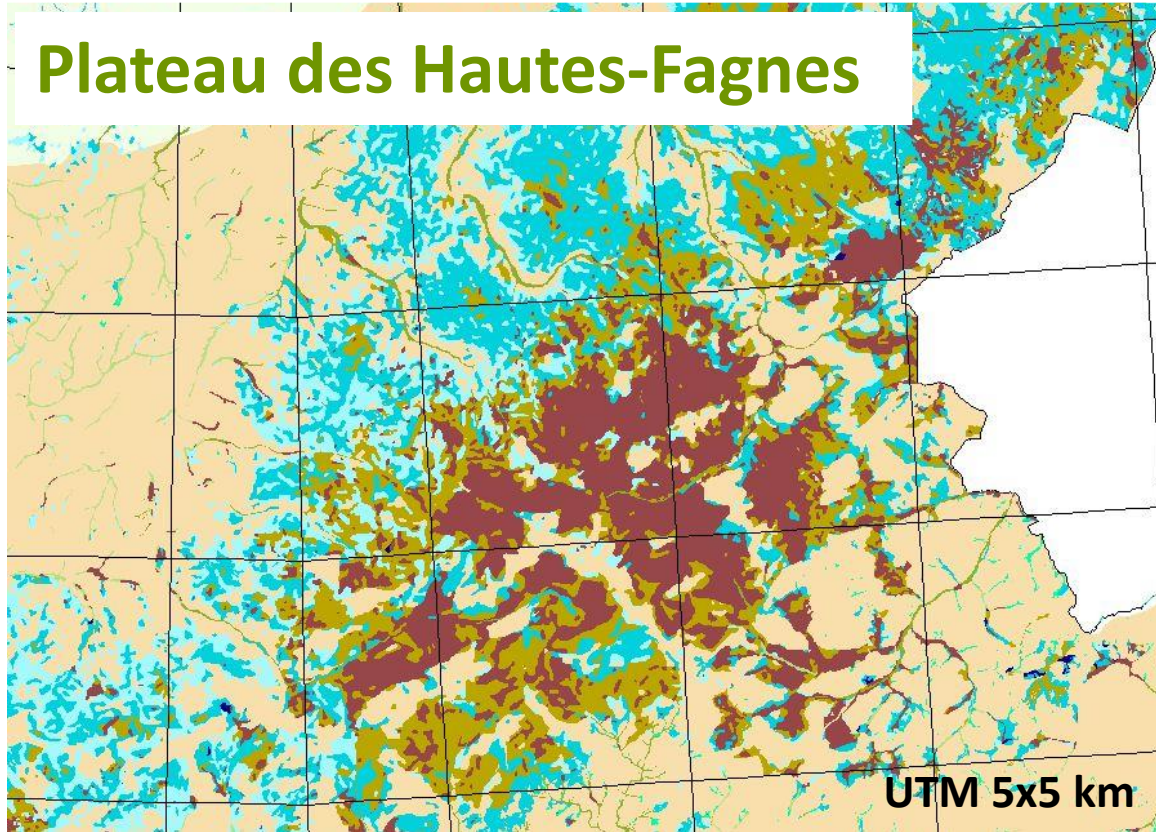
# Peatbogs and wetlands in Southern Belgium



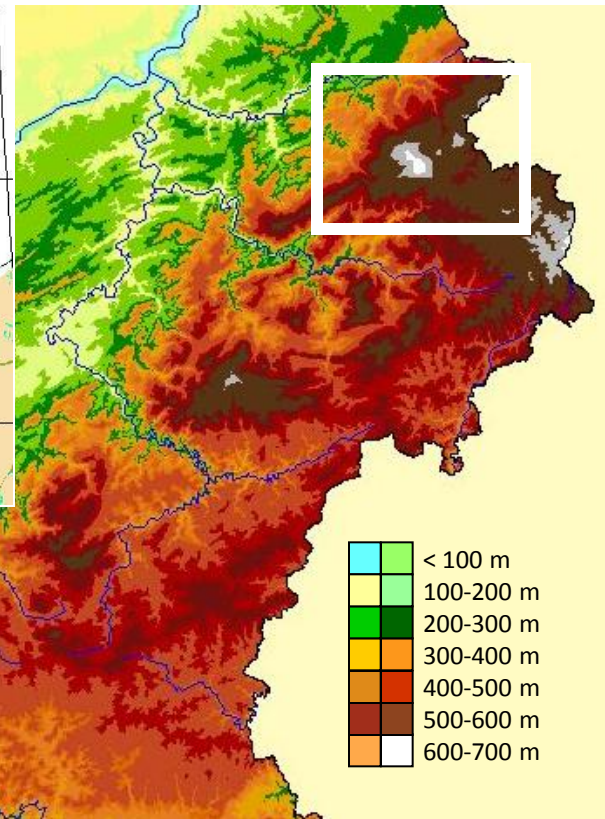








# Peatbogs and wetlands in Southern Belgium








## Plateau des Hautes-Fagnes



UTM 5x5 km



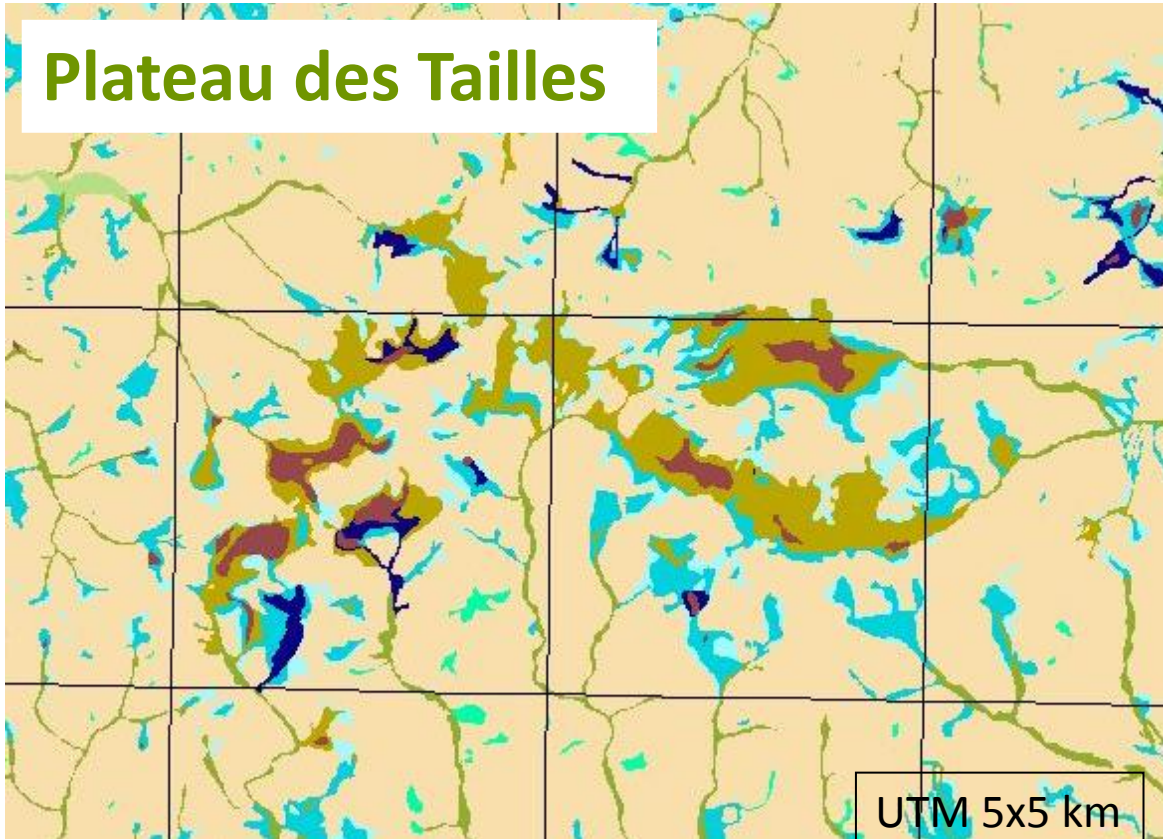
-  Alluvial soils
-   Peat (high, low)
-    Wet gleyed soils

-  < 100 m
-  100-200 m
-  200-300 m
-  300-400 m
-  400-500 m
-  500-600 m
-  600-700 m

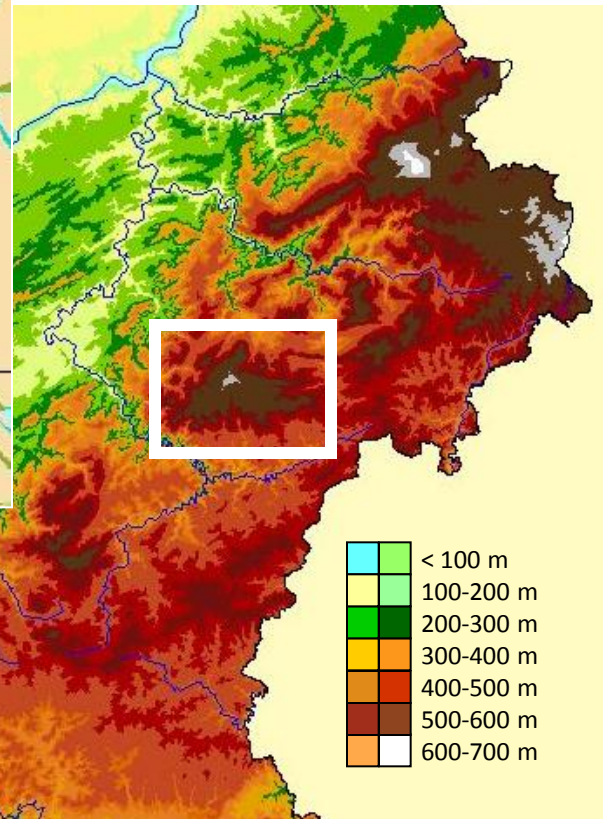


# Peatbogs and wetlands in Southern Belgium

## Plateau des Tailles



UTM 5x5 km



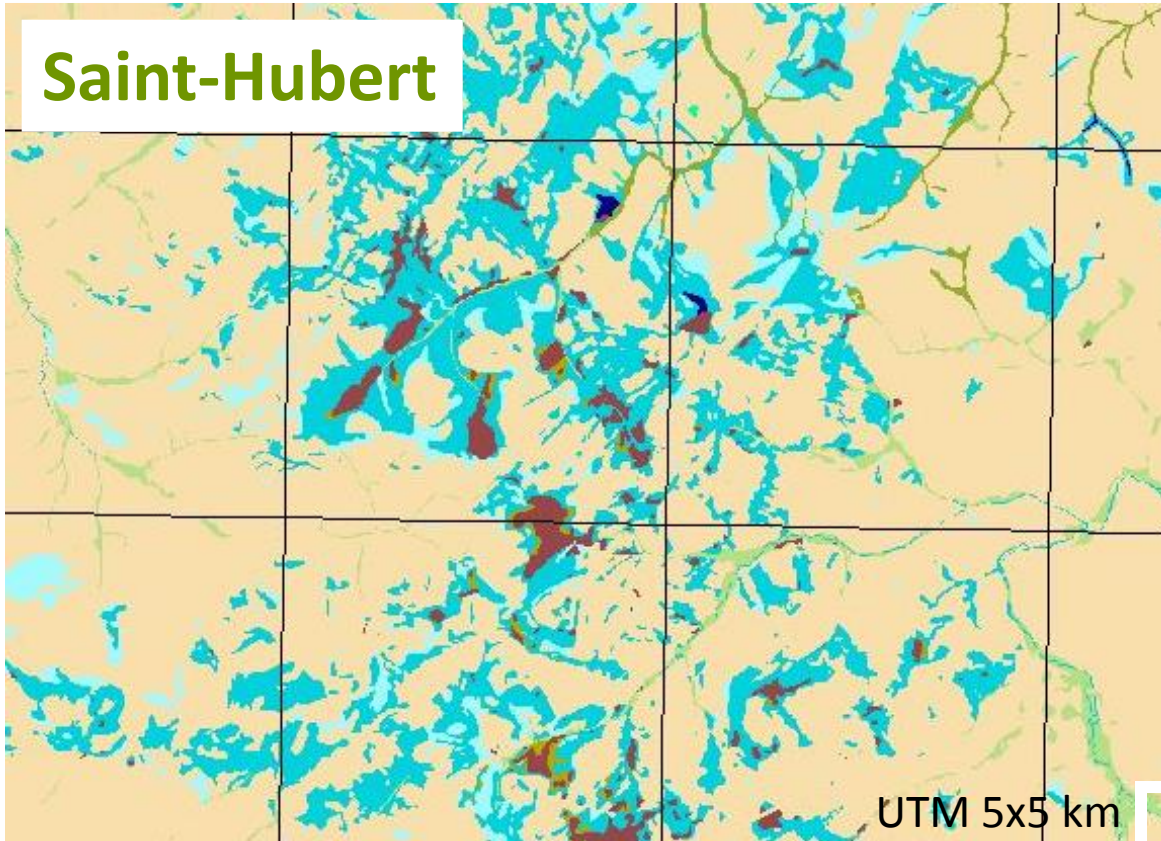
- Alluvial soils
- Peat (high, low)
- Wet gleyed soils

- < 100 m
- 100-200 m
- 200-300 m
- 300-400 m
- 400-500 m
- 500-600 m
- 600-700 m

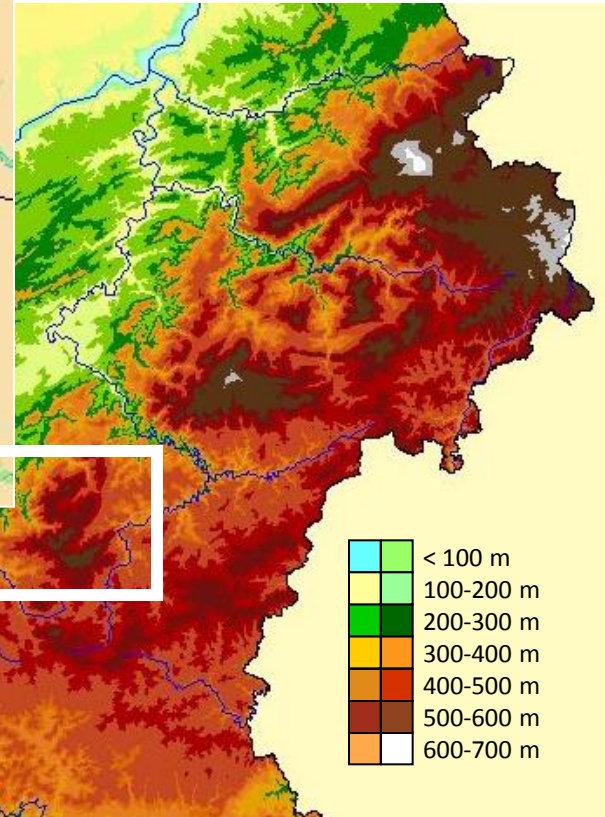








# Peatbogs and wetlands in Southern Belgium








## Saint-Hubert



UTM 5x5 km



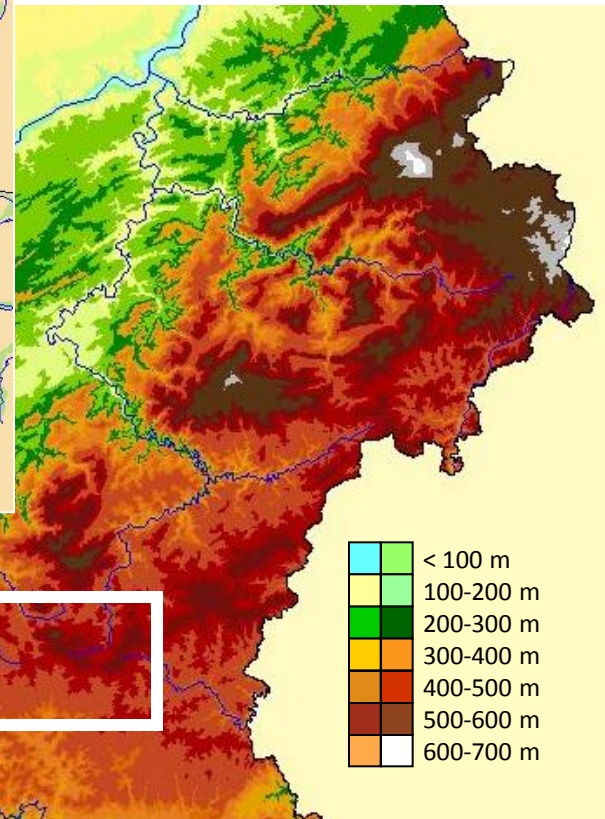
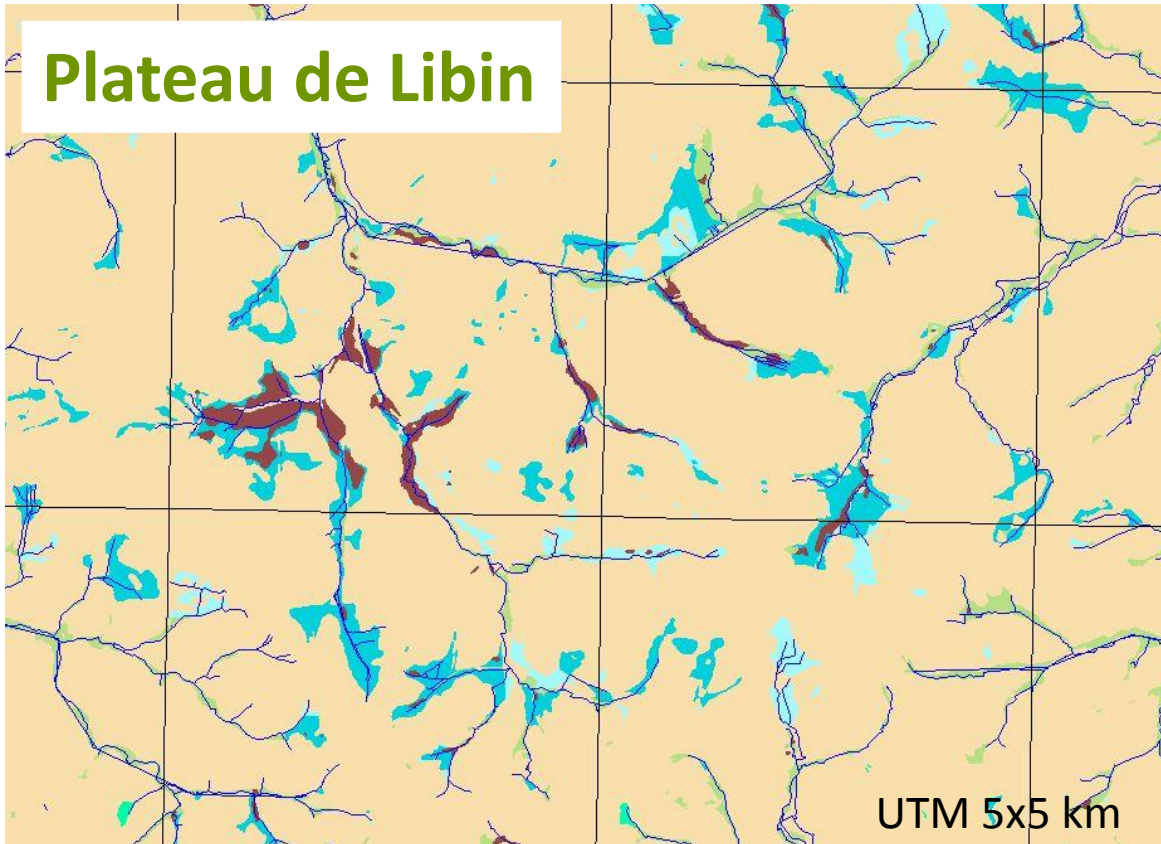
-  Alluvial soils
-   Peat (high, low)
-    Wet gleyed soils

-  < 100 m
-  100-200 m
-  200-300 m
-  300-400 m
-  400-500 m
-  500-600 m
-  600-700 m



# Peatbogs and wetlands in Southern Belgium

## Plateau de Libin

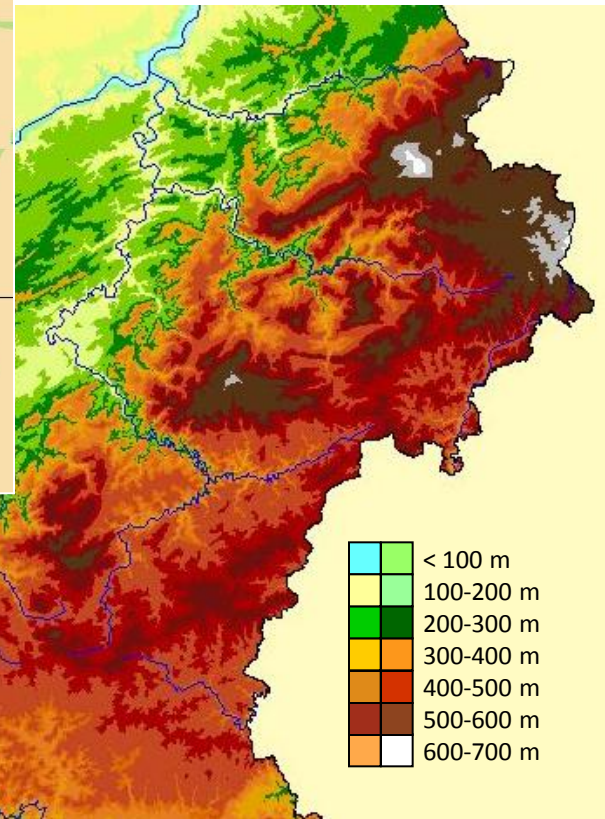
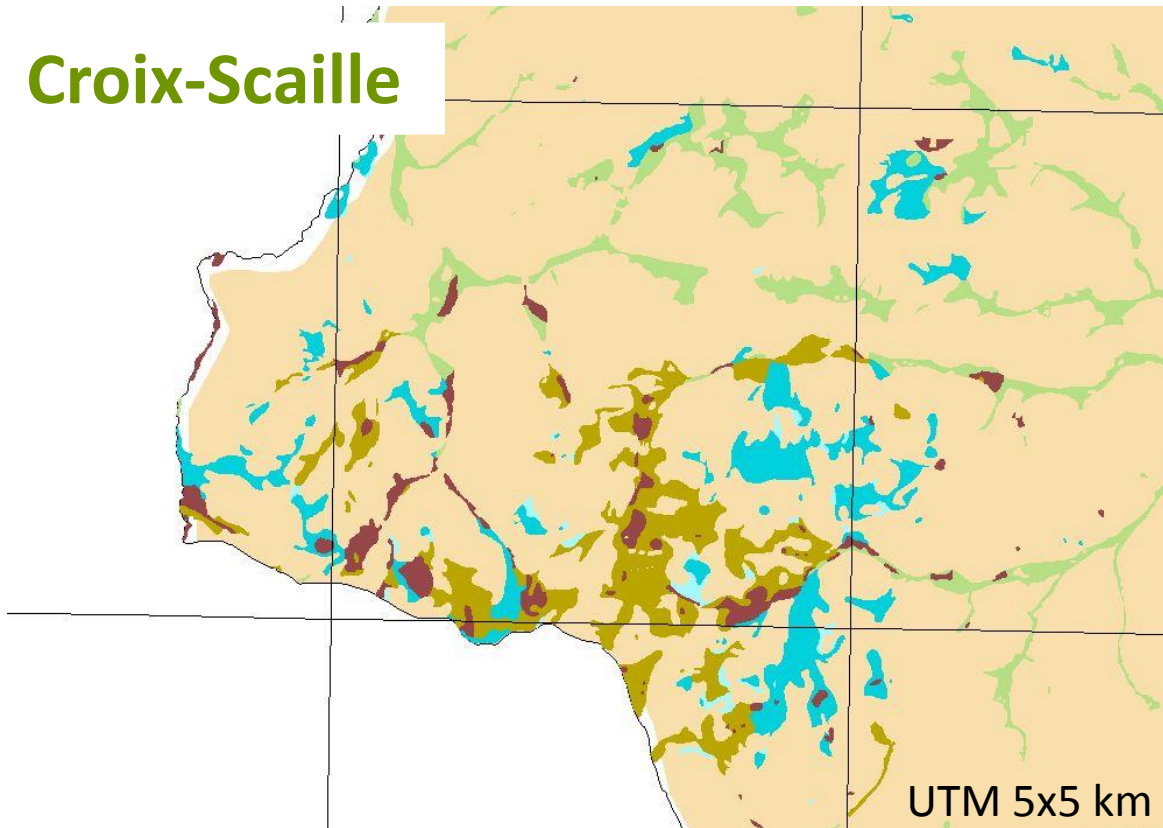


- Alluvial soils
- Peat (high, low)
- Wet gleyed soils



# Peatbogs and wetlands in Southern Belgium

## Croix-Scaille



- Alluvial soils
- Peat (high, low)
- Gleyed soils

- < 100 m
- 100-200 m
- 200-300 m
- 300-400 m
- 400-500 m
- 500-600 m
- 600-700 m

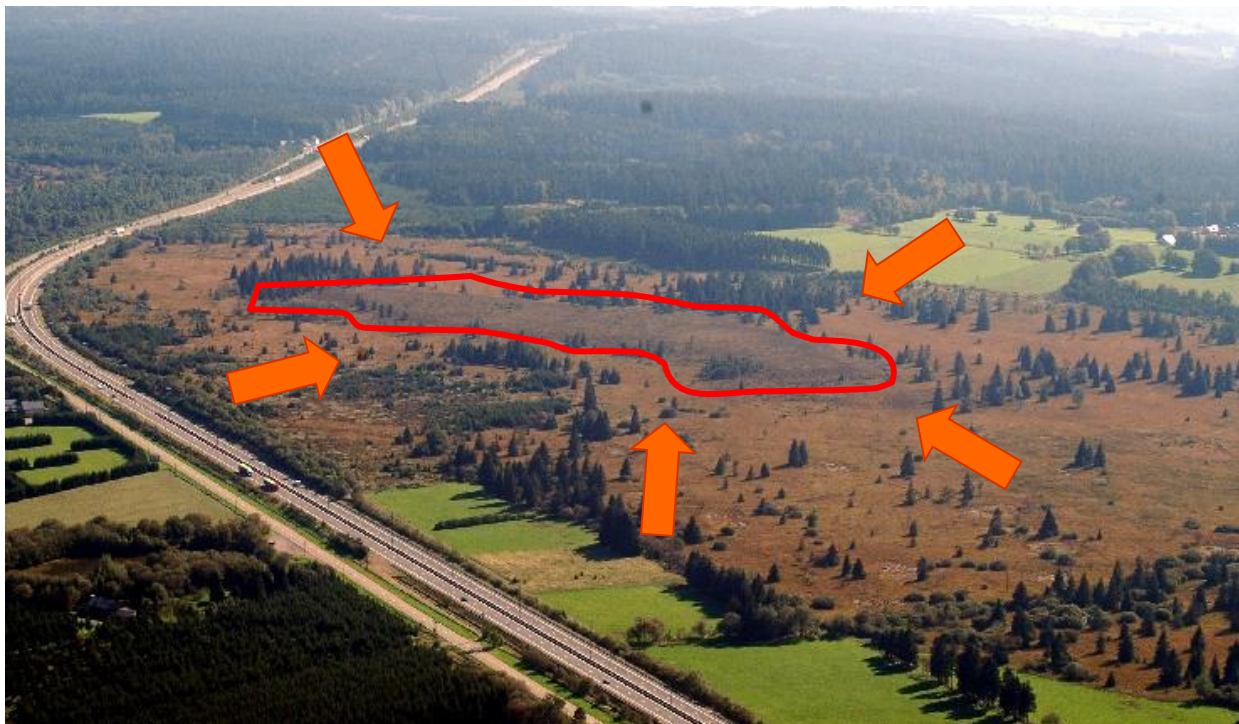


# Conservation state and threats

## Raised bogs :

- Historical peat extraction (for domestic heating)
- Recent drainage for spruce plantations

from 2.000 ha => 200 ha





# Conservation state and threats

## Other peaty biotopes (wet heaths, mires, bog wood, ...)

- Recent drainage for spruce plantations

from 11.000 ha => 1.000 ha





## Conservation state and threats

### Raised bogs :

- Historical peat extraction (for domestic heating)
- Recent drainage for spruce plantations

from 2.000 ha => 200 ha

### Other peaty biotopes (wet heaths, mires, wood, ...)

- Recent drainage for spruce plantations

from 11.000 ha => 1.000 ha

### Wet grasslands, mires, wet woods, alluvial forests :

- Drainage for agriculture and spruce plantations

from >150.000 ha => < 40.000 ha

**50% of wet Walloon habitats are in Ardenne !**



# Conservation state and threats

## Natura2000 biotopes :

Article 17 report

Natura2000 Habitats		Range	Area	Structure	Future	Global
4010	Wet heaths	Green	Red	Orange	Orange	Red
6410	Molinia meadows	Red	Red	Red	Red	Red
6430	Wet tall herb grasslands	Green	Green	Orange	Orange	Orange
7110	Active raised bogs	Green	Red	Orange	Orange	Red
7120	Degraded raised bogs	Green	Red	Orange	Green	Red
7140	Transition mires	Green	Red	Orange	Green	Red
7230	Alkaline fens	Green	Red	Red	Orange	Red
91D0	Bog woodlands	Green	Red	Red	Green	Red
91E0	Alluvial forests	Green	Red	Red	Red	Red

**Non-Natura2000 biotopes => similar evaluation**

**Only 1% of protected sites in Wallonia**  
( < 10.000 ha - rate of 150 ha/an)

**Very (very) slow process of protection and restoration !**

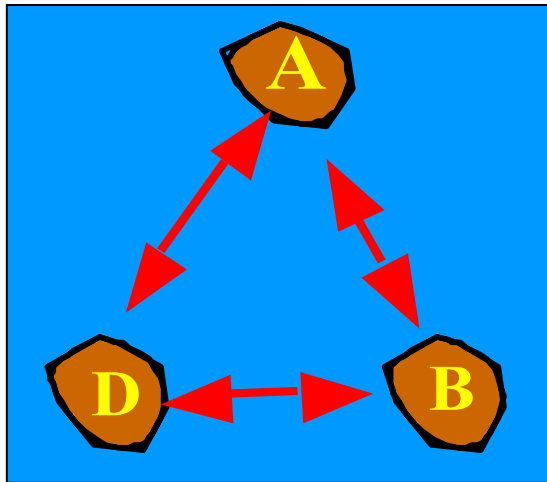




# Conservation priorities and actions

## Theoretical background of ecological networks

Extinction process of populations is a common process  
Rare species population persistence is driven by the equilibrium  
between **extinction (e)** and **colonisation (c)** processes within  
population patches



Isolated patches



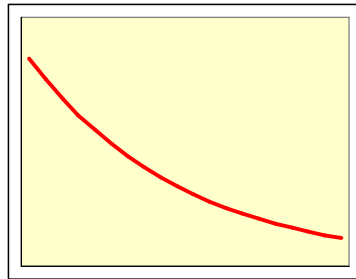
Persistence only if  $c > e$

# Conservation priorities and actions

## Theoretical background of ecological networks

### Extinction

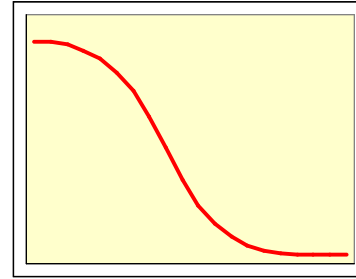
(e)



Area

### Colonisation

(c)



Isolation

## Operational strategy for ecological networks

- when area is the limiting factor ( $\Rightarrow \uparrow e$ ),  
we need to increase connectivity ( $\uparrow c$ )
- when isolation is the limiting factor ( $\Rightarrow \downarrow c$ ),  
we need to increase area ( $\downarrow e$ )

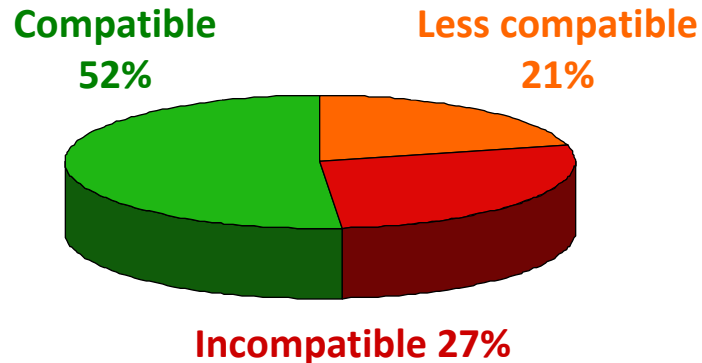


# Conservation priorities and actions

## Is it possible to restore area and/or connectivity ?

- 50 % of peat/wet soils are occupied by spruce plantations
- productivity and return on investment are very risky

### Spruce plantations



40.000 ha are on wet soils

**incompatible** for production !



**Large areas potentially available for nature !**

# Conservation priorities and actions

## General strategy

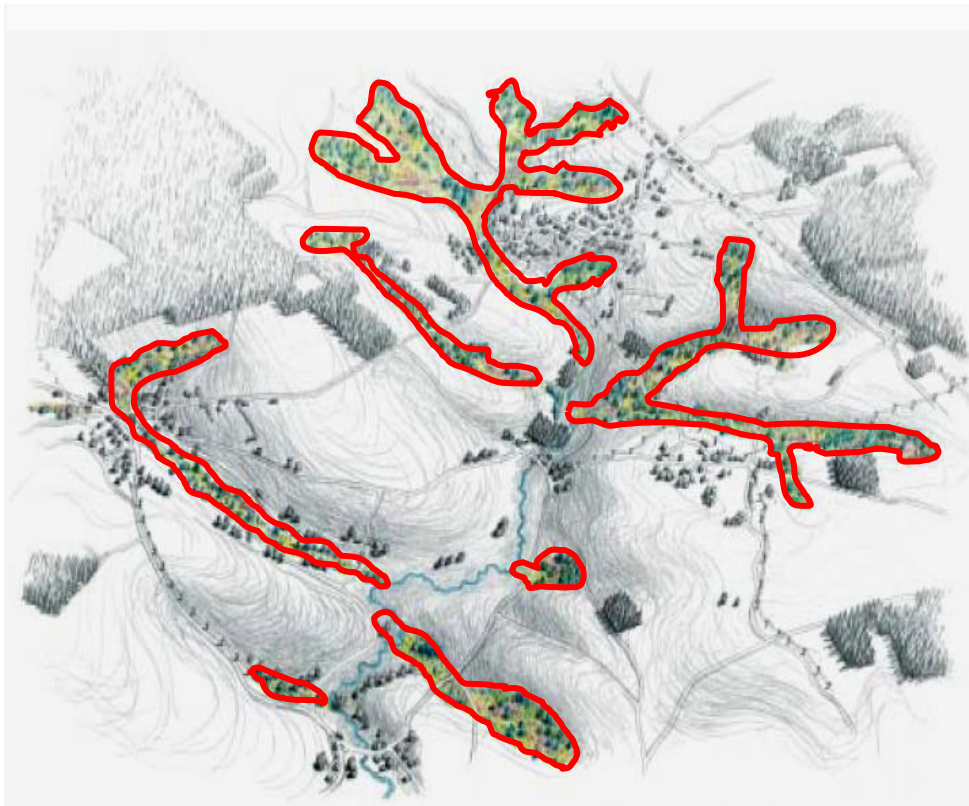
- to stop threats in existing sites
- to restore their quality and to extend area
- to restore new sites to increase connectivity



# Conservation priorities and actions

## Key point :

To concentrate actions on existing major regional nodes to have locally good population systems (sources for surrounding sinks) instead dispersed actions.



## Allow to develop :

=> optimal management and monitoring (concentration)

=> "cluster of local competences " with teams of specialized managers (nurseries for new projects)

=> interactions with local stakeholders

=> visitor facilities to connect people with nature

# Conservation priorities and actions

## General strategy

- to stop threats in existing sites
- to restore their quality and to extend area
- to restore new sites to increase connectivity

## Key point :

To concentrate actions on existing major regional nodes to have locally good population systems (sources for surrounding sinks) instead dispersed actions.

## Means :

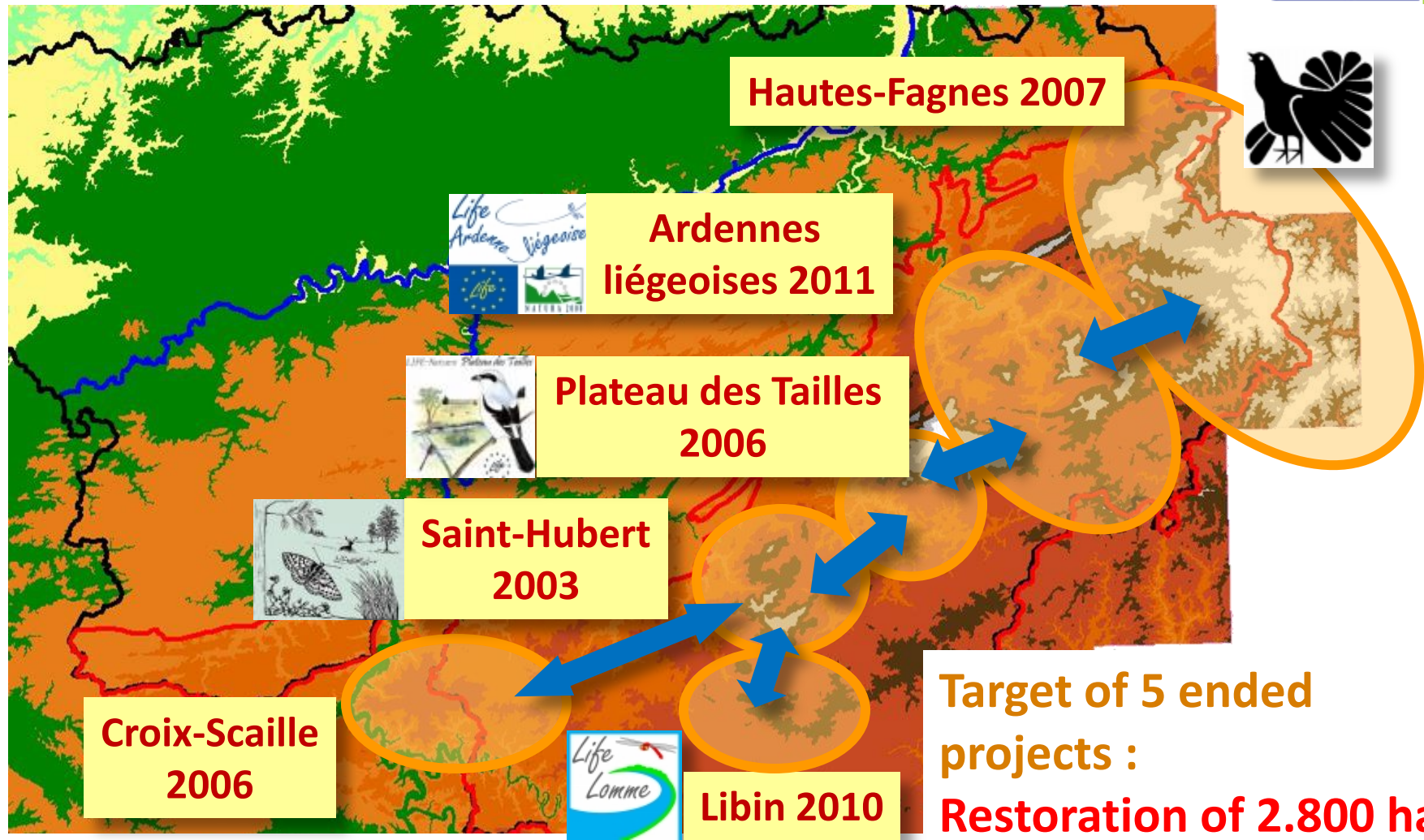
- Co-ordinated proposition of LIFE projects
- Strong involvement of public authorities
- Large co-ordinated monitoring systems





# Conservation priorities and actions

6 LIFE projects for more than 21 M €



# Conservation priorities and actions

Main restoration actions :

Spruce cutting or milling



**1.800 ha  
restored**



# Conservation priorities and actions

## Main restoration actions :



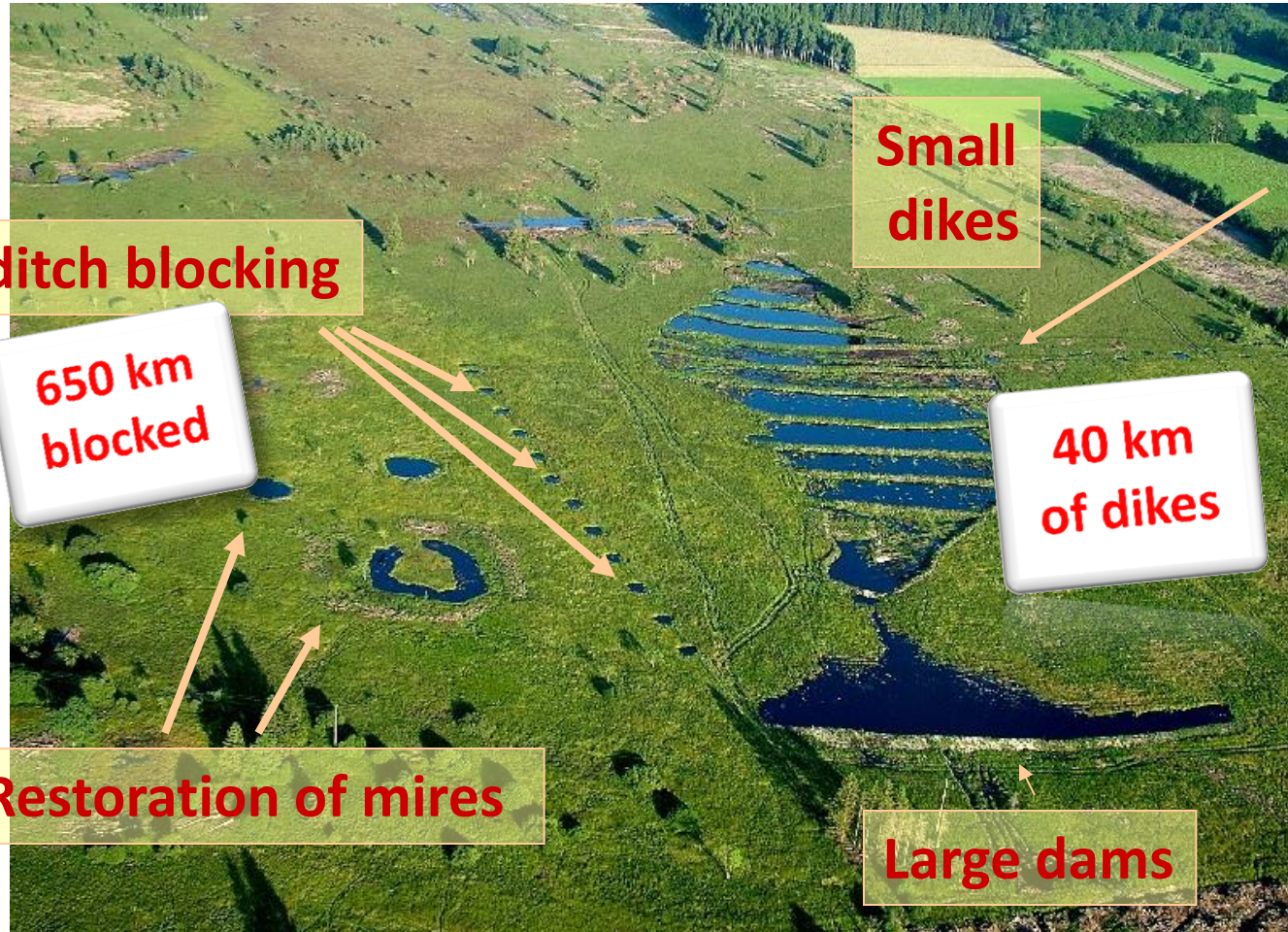
**400 ha  
restored**





# Conservation priorities and actions

## Main restoration actions :



**Rotovating vegetation and subsoil with water level control (heavily cut-over bogs with only *Molinia* vegetation)**





# Conservation priorities and actions

## Main restoration actions :



**10.000  
ponds**



# Conservation priorities and actions

## Main restoration actions :



Planting cottongrass and disseminating moss fragments ...





# Conservation priorities and actions

## Main restoration actions :



Life project  
Plateau des  
Tailles

Rotovated  
Vegetation  
and dikes

Many impressives pictures on metaproject web pages

# Conservation priorities and actions

## Main restoration actions :



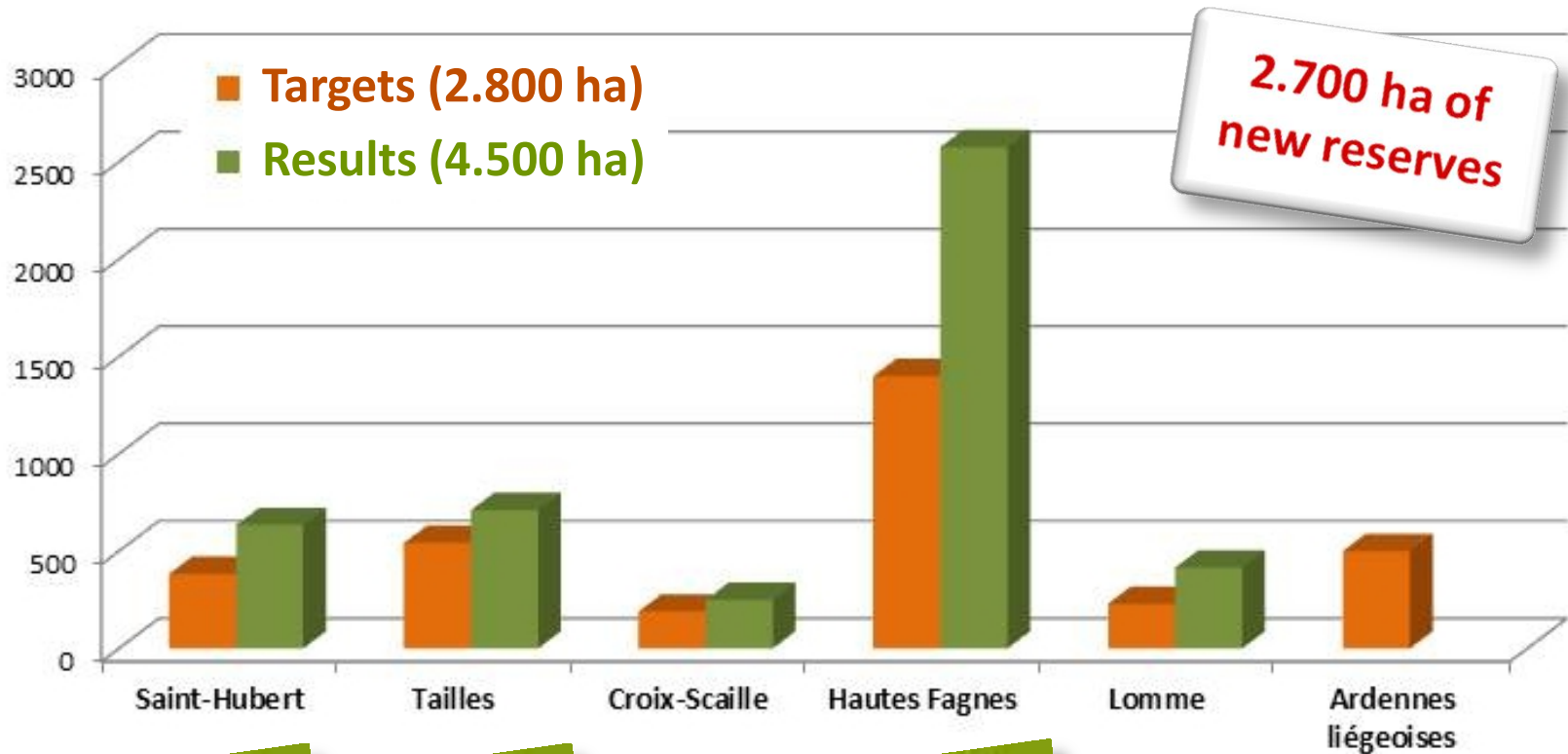
Using cows and sheep  
flocks to manage restored  
vegetation





# Results of the five projects

## Surface of restored and protected habitats



2.700 ha of  
new reserves



## Results of the five projects

### Analysis of permanent vegetation stands :

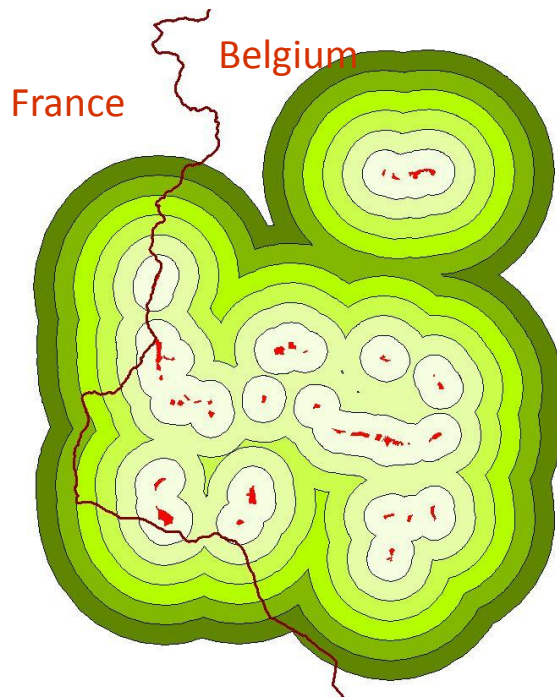




# Results of the five projects

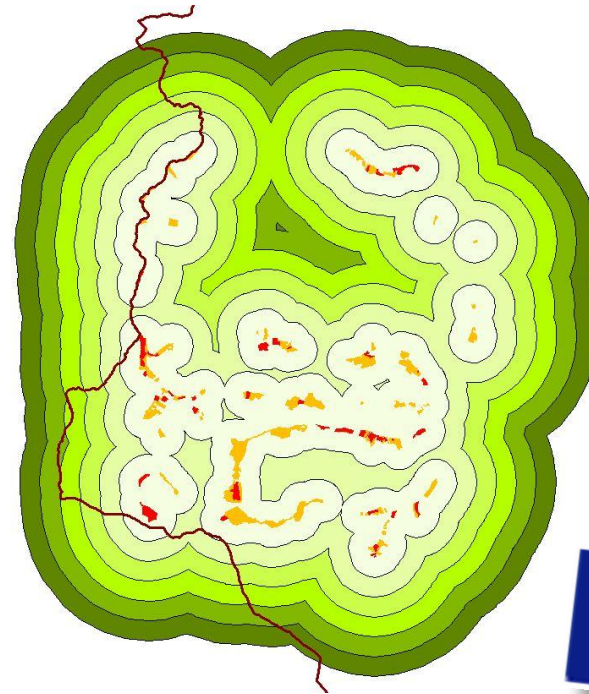
## Within project connectivity – Croix Scaille

### Old network



Existing site area = **66 ha**  
All sites connected at **2000 m** level  
Buffer 500 m = **2600 ha**

### New network



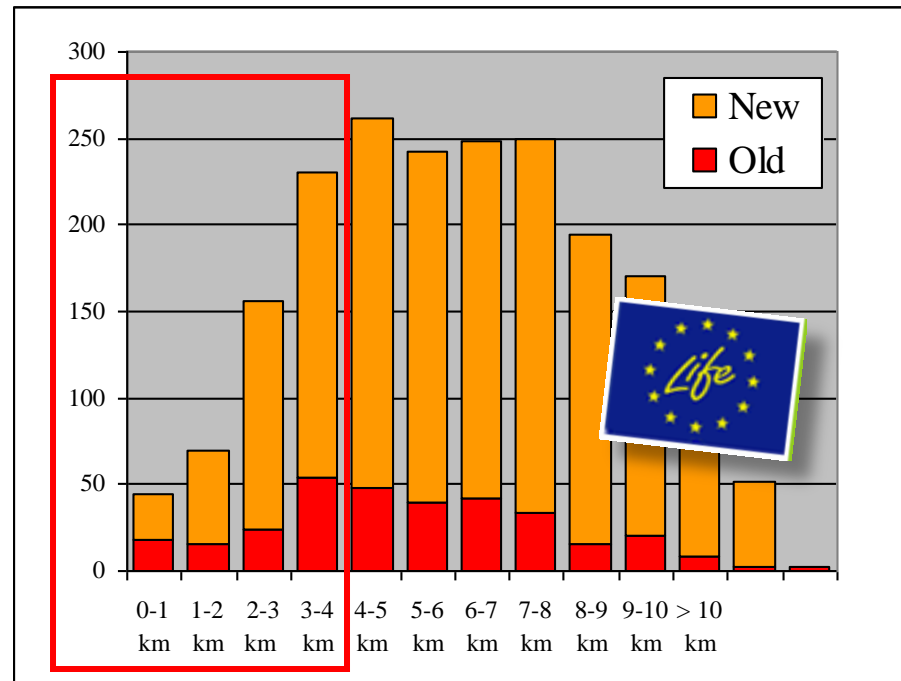
... multiplied by **4.5**  
... at **1000 m** level  
... multiplied by **1.8**



# Results of the five projects

## Within project connectivity – Croix Scaille

### Number of potential links between sites



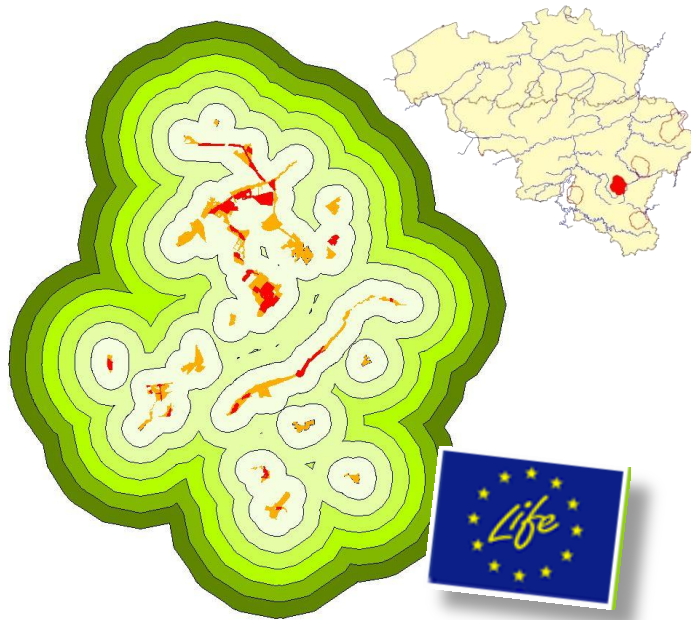
**A lot of new links :**  
**(4.5 times more exchange possibilities below 4 km level)**



# Results of the five projects

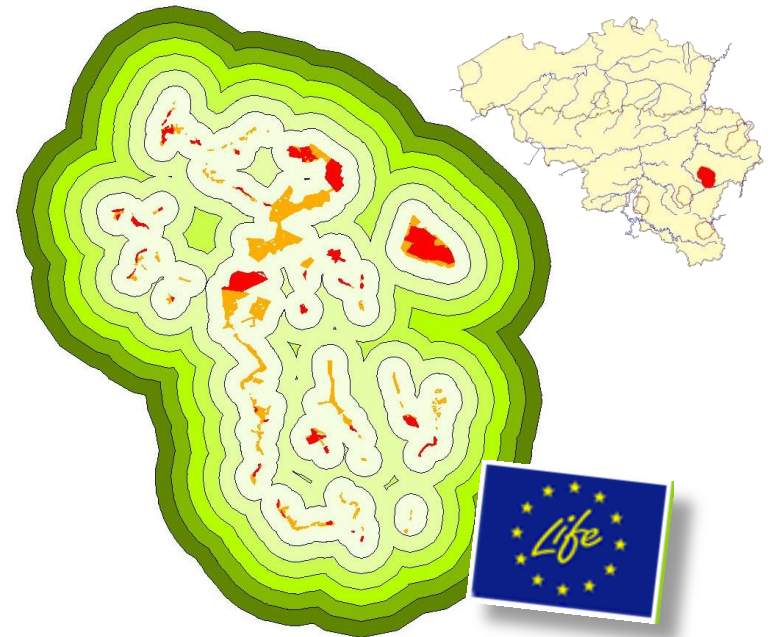
## Within project connectivity

### Saint-Hubert



135 ha multiplied by 3.9  
1500 m => 1000 m level  
2400 ha multiplied by 2.0  
< 4 km dist. multiplied by 2.9

### Plateau des Tailles



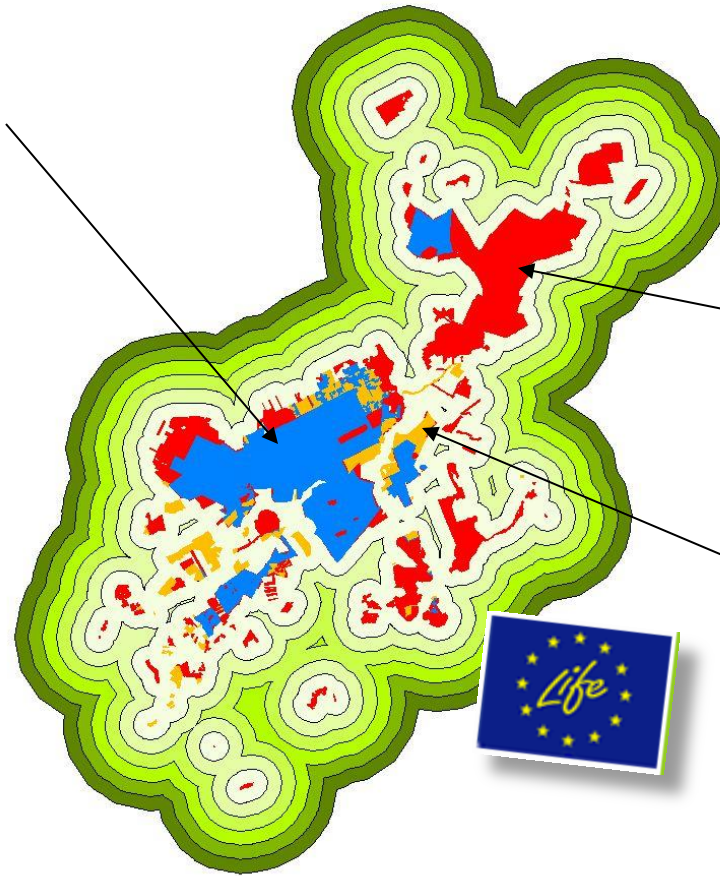
295 ha multiplied by 2.6  
2000 m => 1000 m level  
3800 ha multiplied by 1.8  
< 4 km dist. multiplied by 3.3

# Results of the five projects

## Within project connectivity – Hautes-Fagnes

Restoration  
works  
(> 2.800 ha)

Very large  
drained site,  
priority on  
restoration



Existing sites  
(5700 ha  
natural  
reserves)

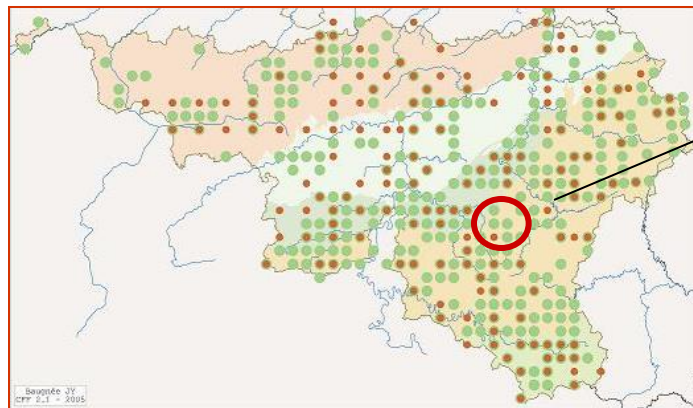
New sites  
(785 ha)



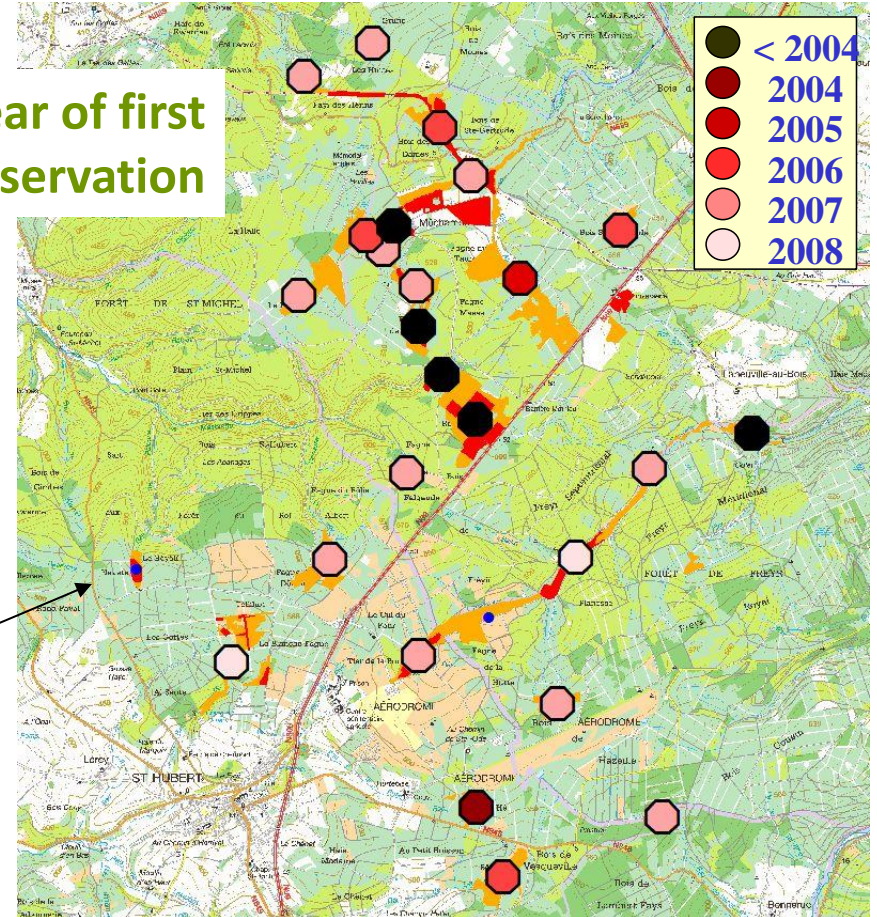
# Examples of species responses

## Species response to restoration of ecological networks

### *Libellula depressa*



Year of first observation

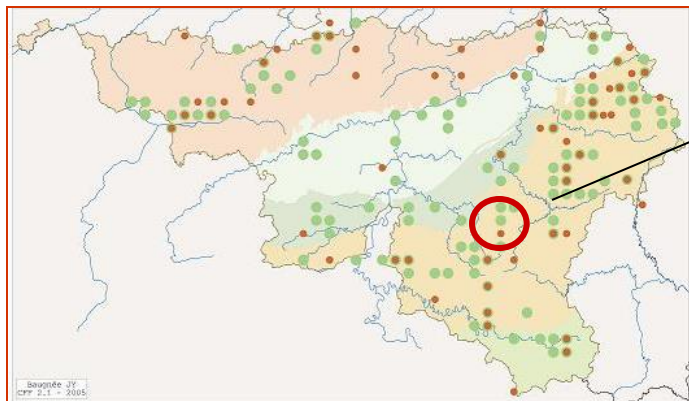




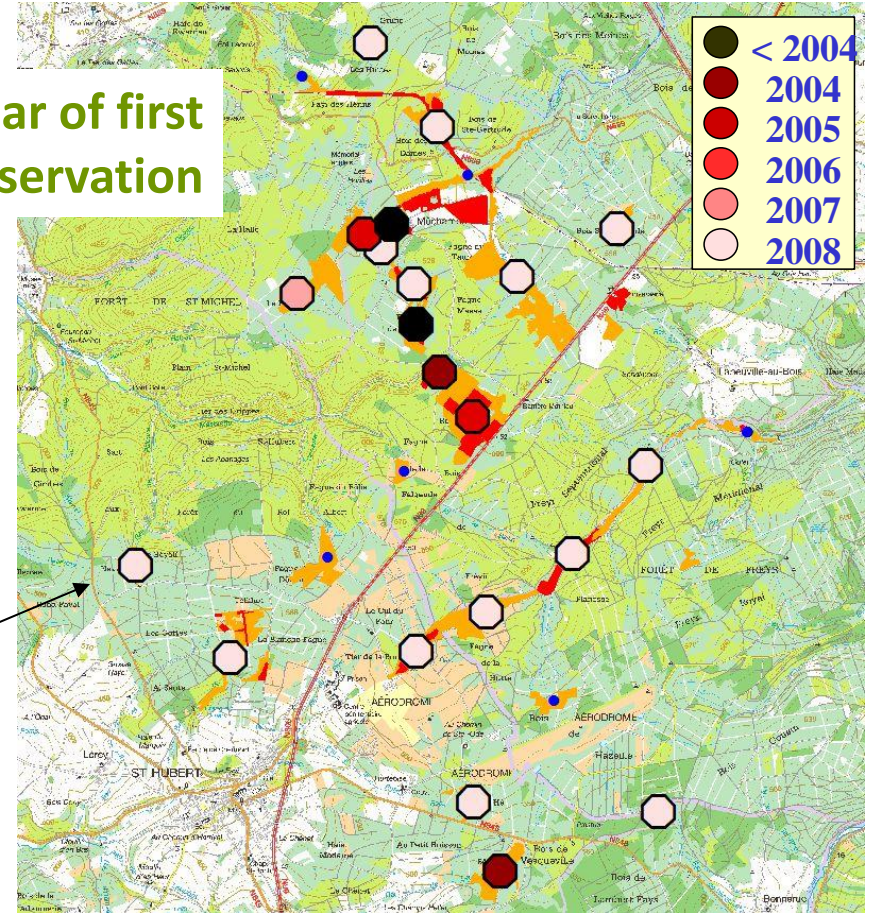
# Examples of species responses

## Species response to restoration of ecological networks

### *Sympetrum danae*



Year of first observation

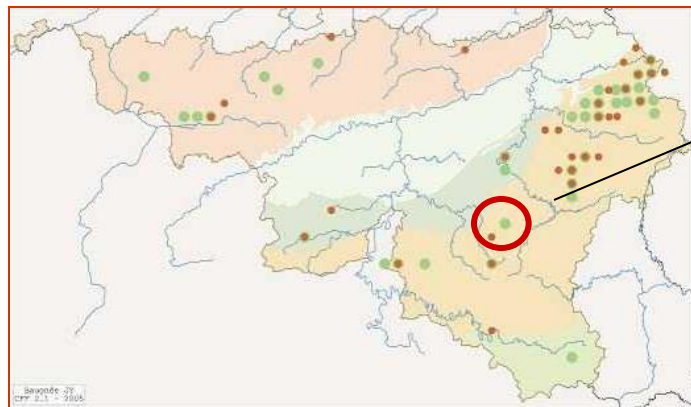




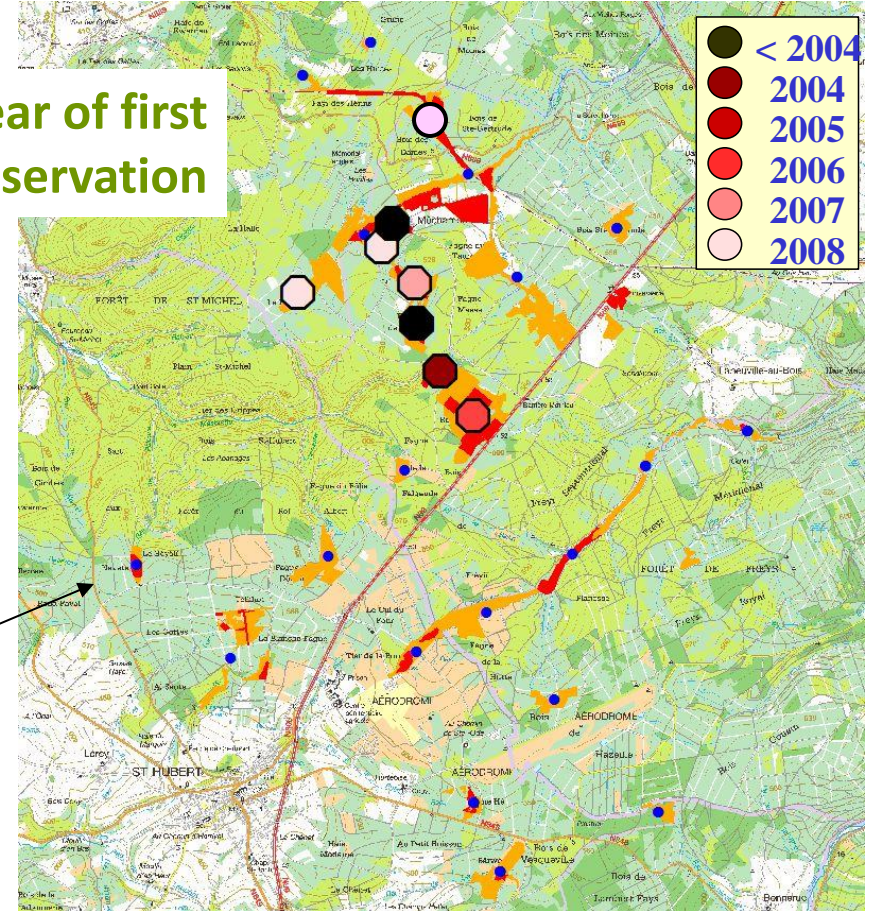
# Examples of species responses

## Species response to restoration of ecological networks

### *Leucorrhinia dubia*

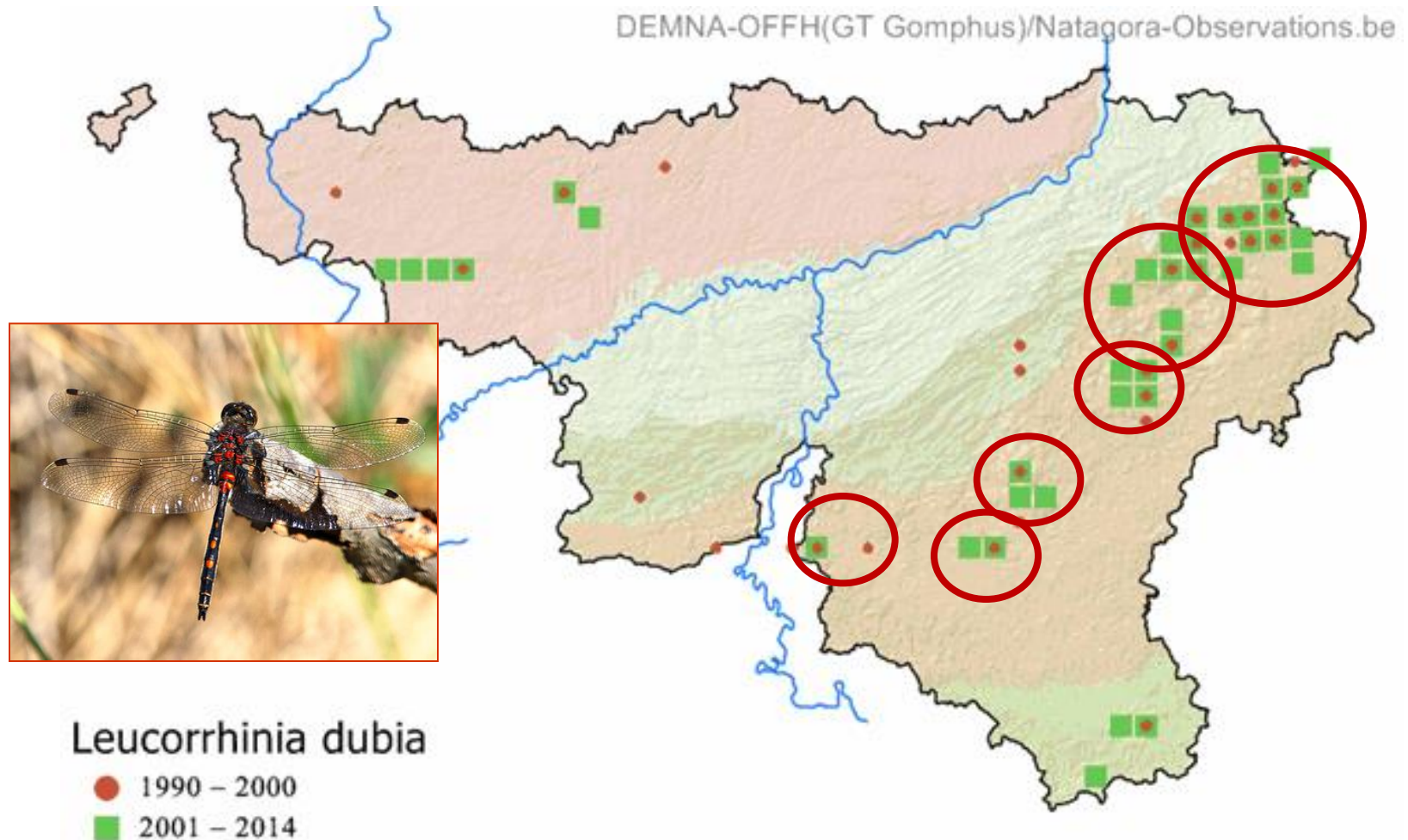


Year of first observation



# Examples of species responses

## Species response to restoration of ecological networks





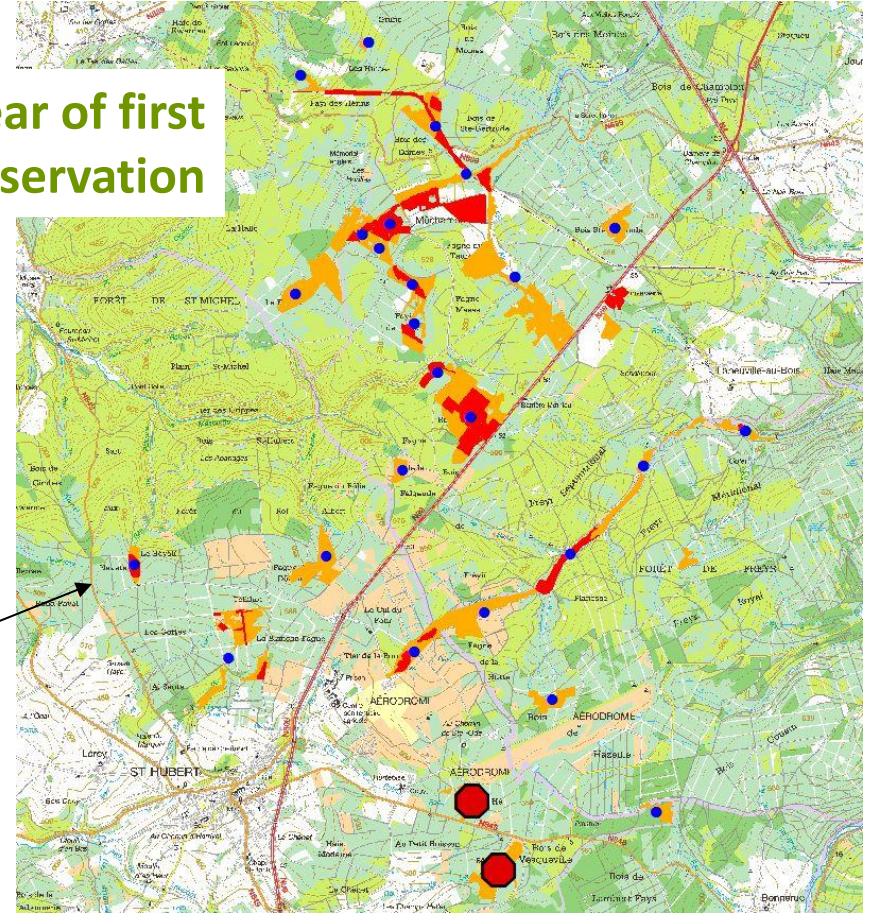
# Examples of species responses

## Species response to restoration of ecological networks

### *Somatochlora arctica*



Year of first observation



# Examples of species responses

## Species response to restoration of ecological networks

### *Butterflies*



Slower response but *Boloria aquilonaris*, is now recovering at Saint-Hubert (where it was extinct in 2000) and colonizing new sites at Plateau des Tailles.

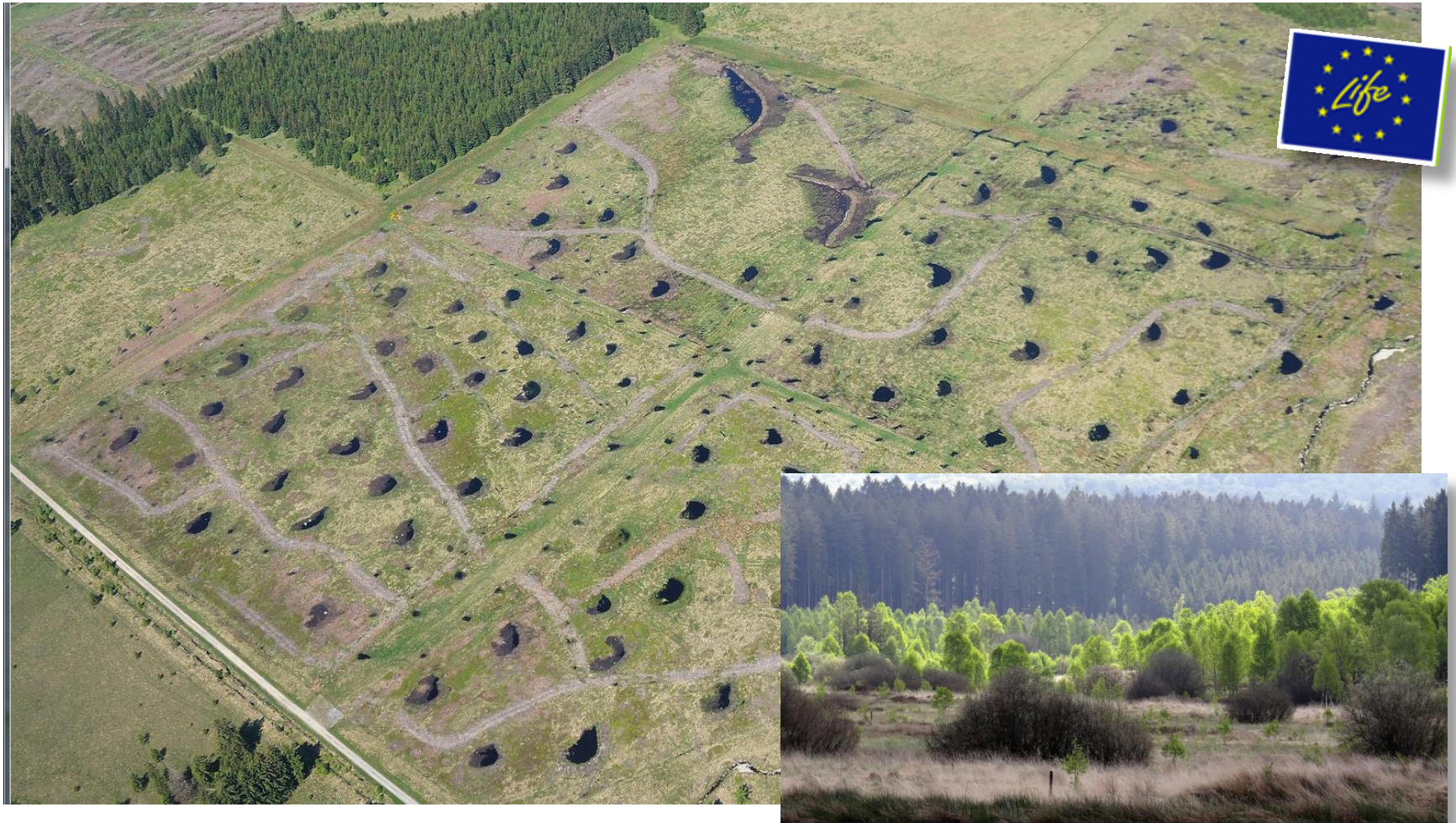
### *Birds*



Return of migratory of *Grus grus*, increase density of *Lanius excubitor*, *Falco subbuteo*, *Ciconia nigra*, *Aegolius funereus*, *Saxicola torquatus*, *Locustella naevia*, ...



## LIFE projects have changed the landscapes in Ardenne





## Developing nature manager teams : not really operational for administration ...





# Evaluation ex-post

Connect people with nature : could be really enhanced with more permanent activities



Site connectivity is well enhanced but it could be improved in some places and between projects

