KEY FINDINGS: BIODIVERSITY
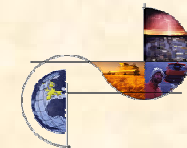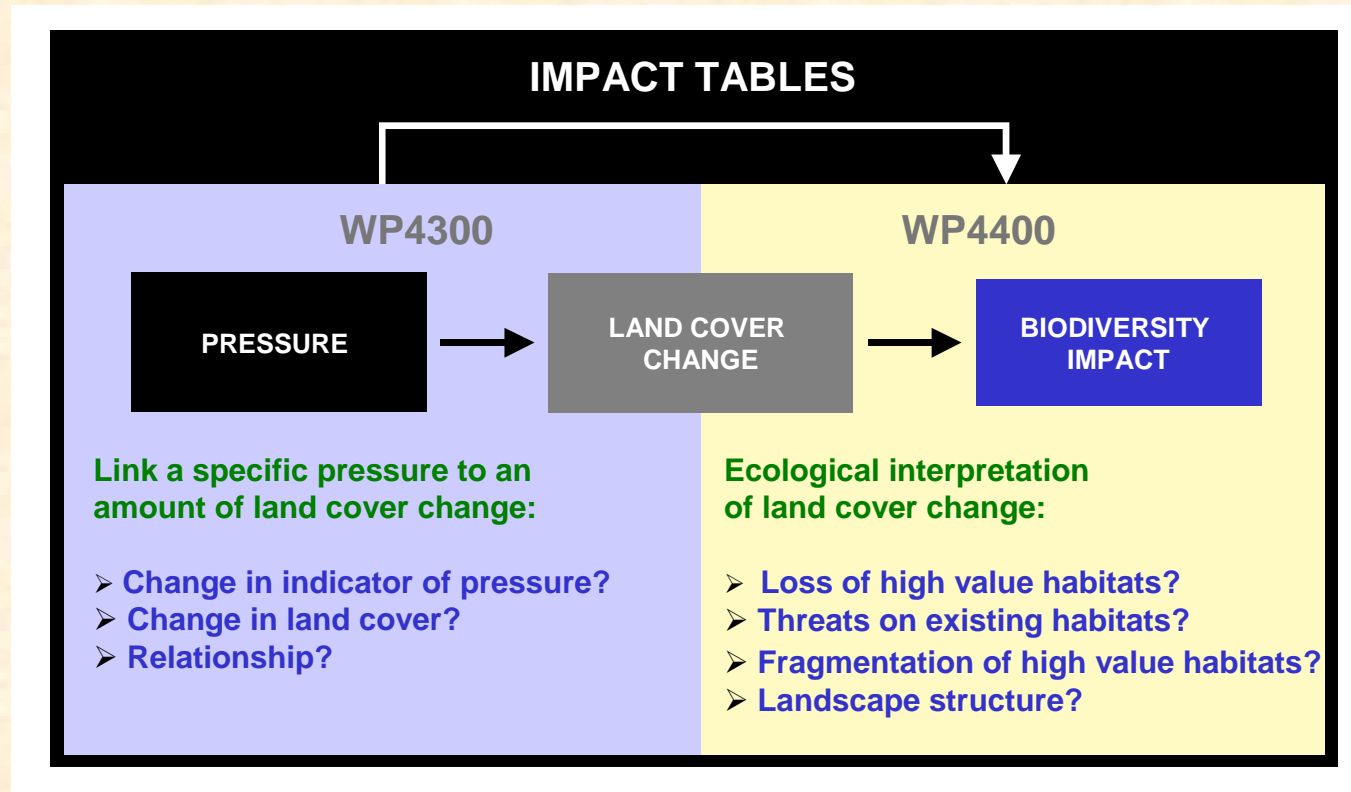
Sandrine Petit & partners
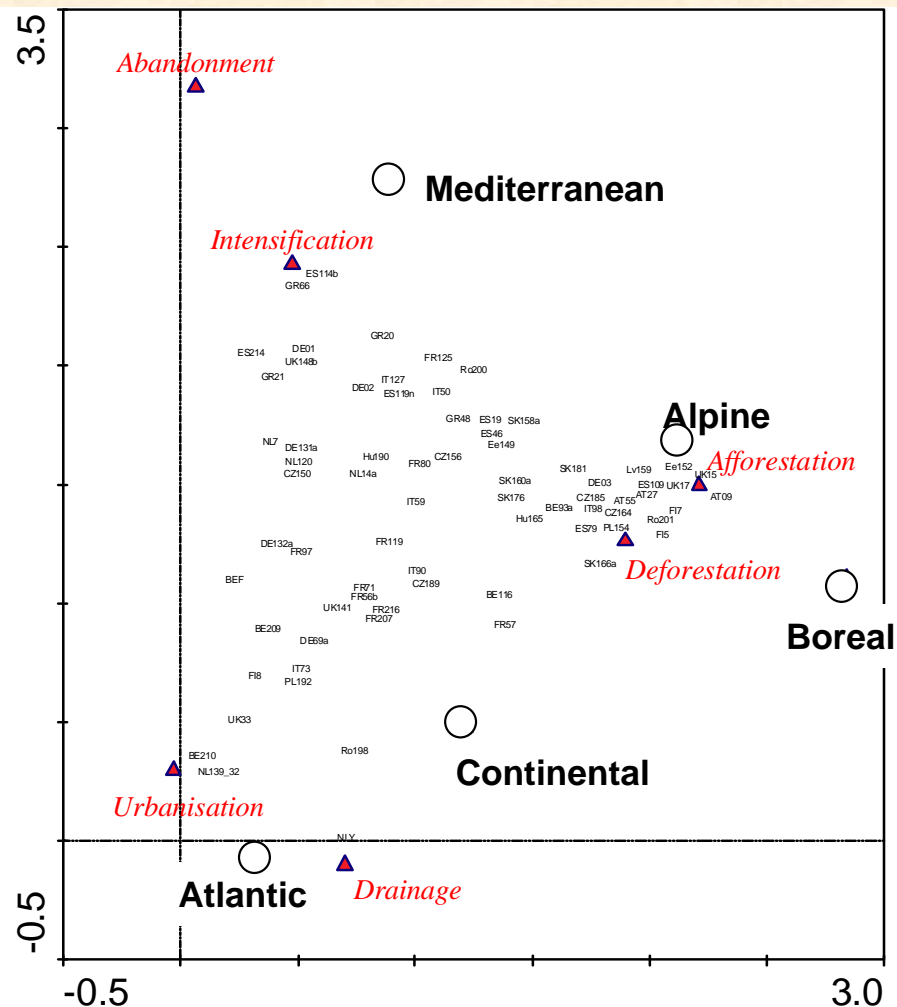
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Biodiversity in BIOPRESS

IMPACT TABLES

WP4300	WP4400
PRESSURE → LAND COVER CHANGE	→ BIODIVERSITY IMPACT

Link a specific pressure to an amount of land cover change:

➢ **Change in indicator of pressure?**
➢ **Change in land cover?**
➢ **Relationship?**

Ecological interpretation of land cover change:

➢ **Loss of high value habitats?**
➢ **Threats on existing habitats?**
➢ **Fragmentation of high value habitats?**
➢ **Landscape structure?**

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Phase I LCC : pressures in regions

- DCA on % window cover change described as 6 main processes
- First ordination plan = 50% variation

- Abandonment and intensification are close together (polarisation) and relate to Mediterranean region

- Afforestation and deforestation close together and relate to Boreal and Alpine regions

- Urbanisation / Atlantic
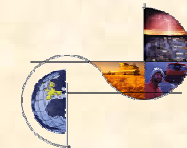
Biodiversity in BIOPRESS

To what extent can Phase I LCC improve existing Pan-European Biodiversity assessments?

(1) Ecological value of a Land Cover Types in a regional context?

Regional analysis of the links between CLC classes and habitat classifications
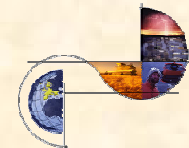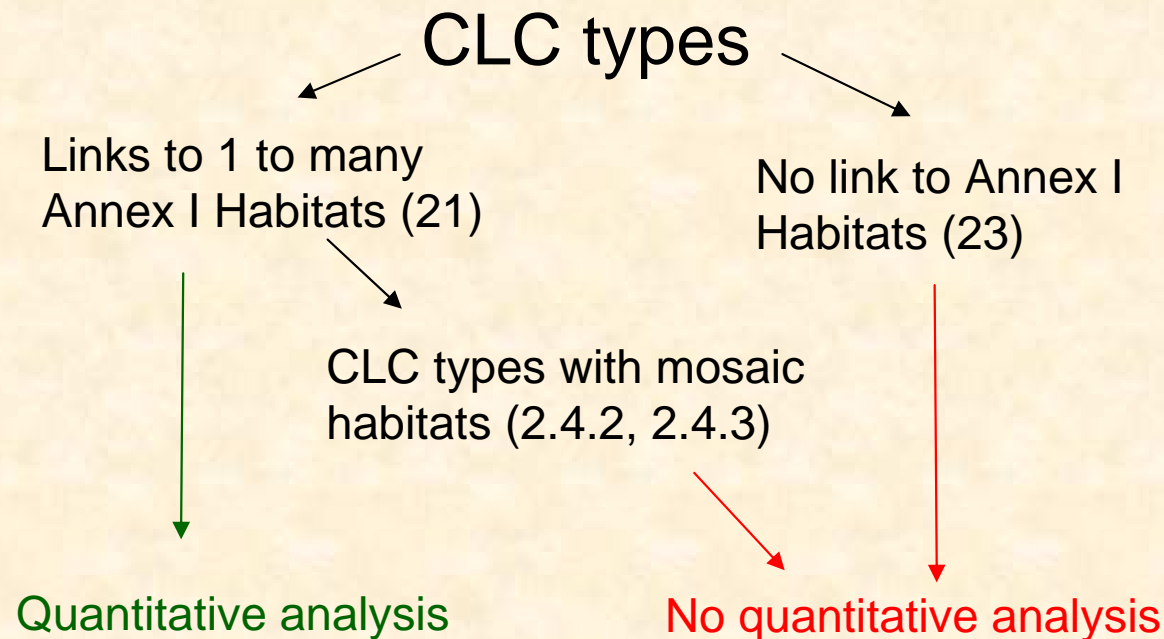
(2) Changes in the spatial distribution of Land Cover Types?

Ecological indicators directly derived from Phase I LCC
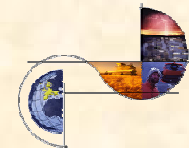
Ecological value of Land Cover Types

Regional analysis of spatial coincidence between land cover types in CLC1990 and Annex1 habitat types recorded in Natura 2000 sites
+ translation from Annex 1 habitats to EUNIS habitat types

CLC types

Links to 1 to many Annex I Habitats (21)

No link to Annex I Habitats (23)

CLC types with mosaic habitats (2.4.2, 2.4.3)

Quantitative analysis

No quantitative analysis

Ecological value of Land Cover Types

A regional approach results in more specific links between CLC types and EUNIS habitat types

Example: links between CLC 3.2.2 and EUNIS

	EUNIS habitats
No regional approach (From Moss & Davies, 2002)	B1.5, B1.6, B2.5, B2.6, , B3.3, E5.3, F2.2, F2.3, F2.4, F3.1, F3.2, F4.1, F4.2, F4.3, F5.2, F5.4, F6.7, F6.8, F9.1, F9.2, F9.3, G5.6, G5.7
D45 analysis - Atlantic	**F4.2** Wet heath (49%) **F7.4** Hedgehog heath (27%) **F2.2** Alpine and subalpine heath (11%)
D45 analysis – Continental	**F3.1** Temperate ticket and scrub (54%) **F2.2** Alpine and subalpine heath (18%) **F9.1** Riverine scrub (9%)
D45 analysis - Alpine	**F2.2** Alpine and subalpine heath (75%) **F2.3** Subalpine and oroboreal bush communities (10%) **F2.4** *Pinus mugo* scrub (9%)
D45 analysis – Mediterranean	**F5.1** Arborescent mattora (36%) **F7.4** Hedgehog heath (31%)

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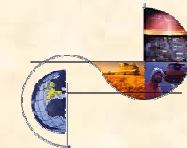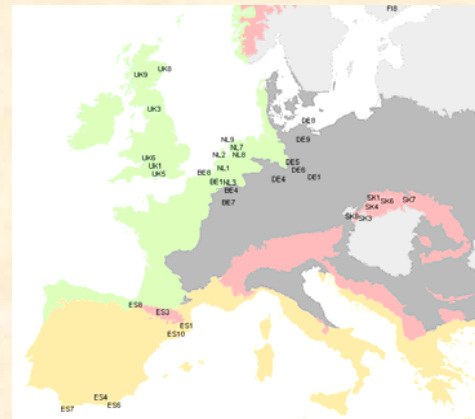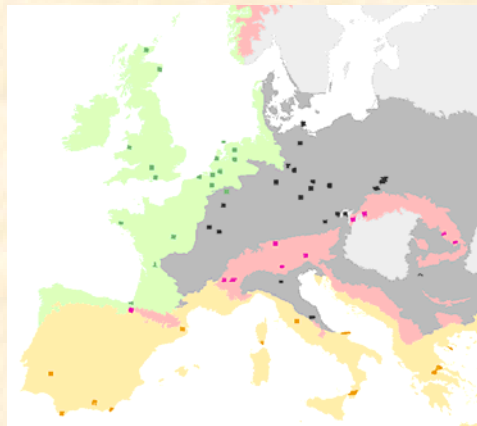NATURAL ENVIRONMENT RESEARCH COUNCIL
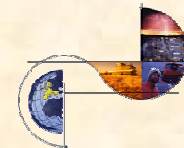
Spatial distribution of Land Cover Types

(1) Focus on land cover types that are known to be important for biodiversity and have changed drastically in extent between 1950 and 1990
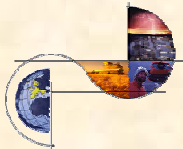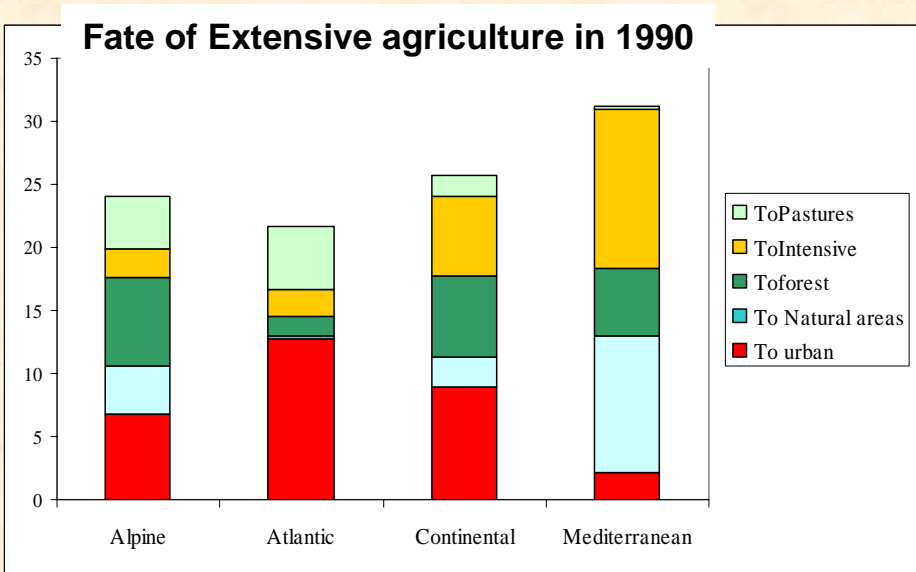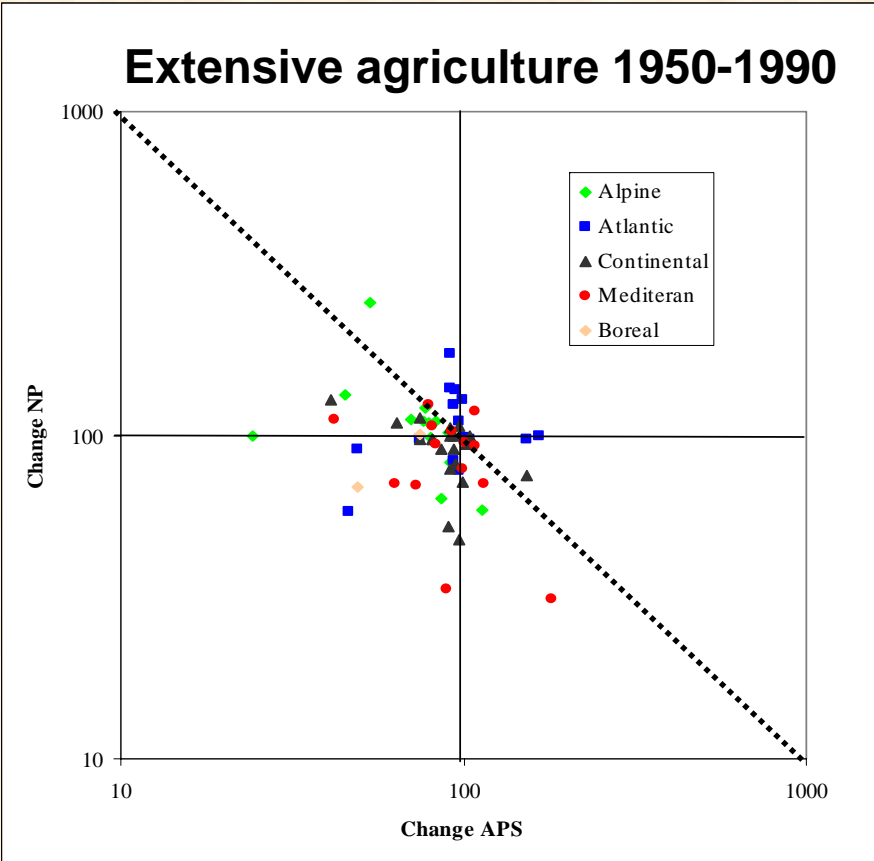
(2) Measure ecological indicators directly derived from Phase I LCC
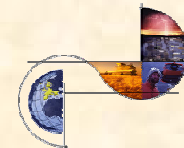
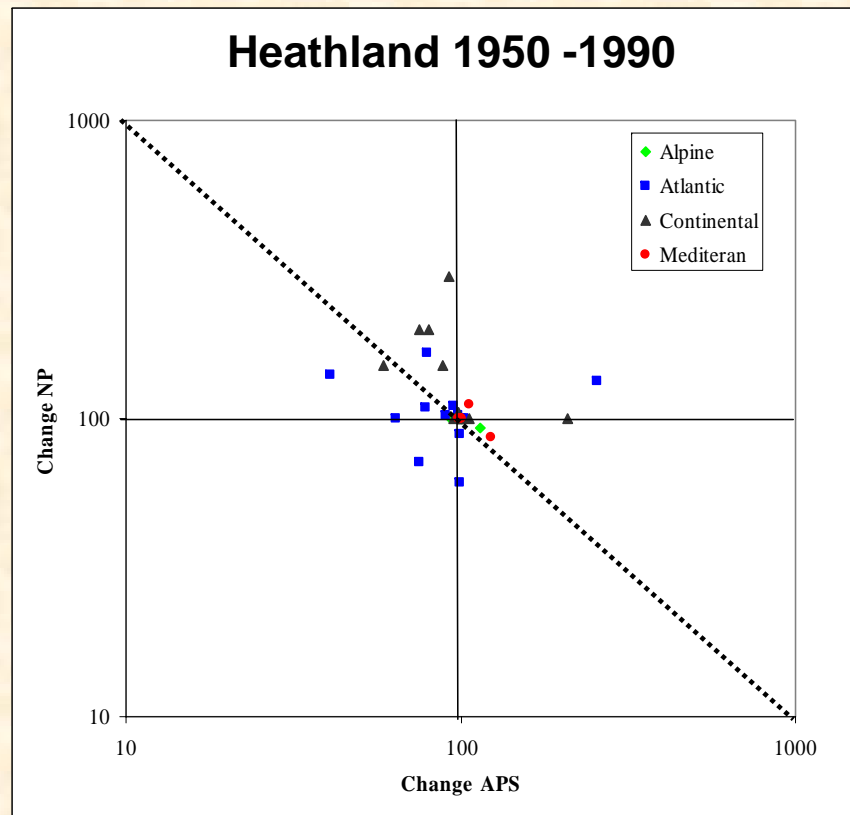Dissolve on CLC for windows and transects $\longrightarrow$

- Spatial extent
- Number of patches (NP)
- Average size of patches (APS)

Drastic decreases …

Extensive agriculture 1950-1990

Fate of Extensive agriculture in 1990

Loss of semi-natural habitats

Heathland 1950 -1990

Converted to …

Urban area 1950-1990

Intensive agriculture 1950-1990
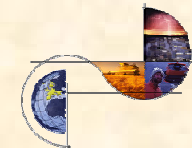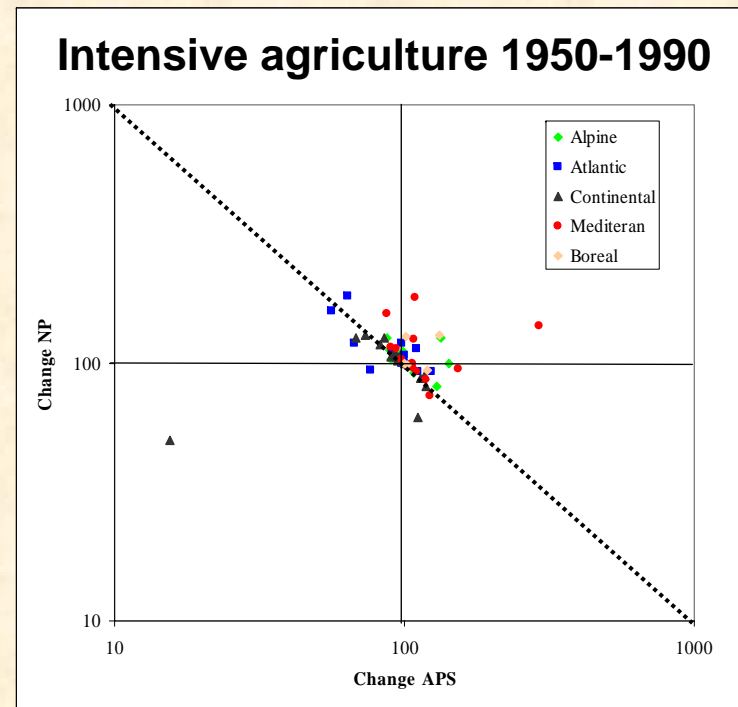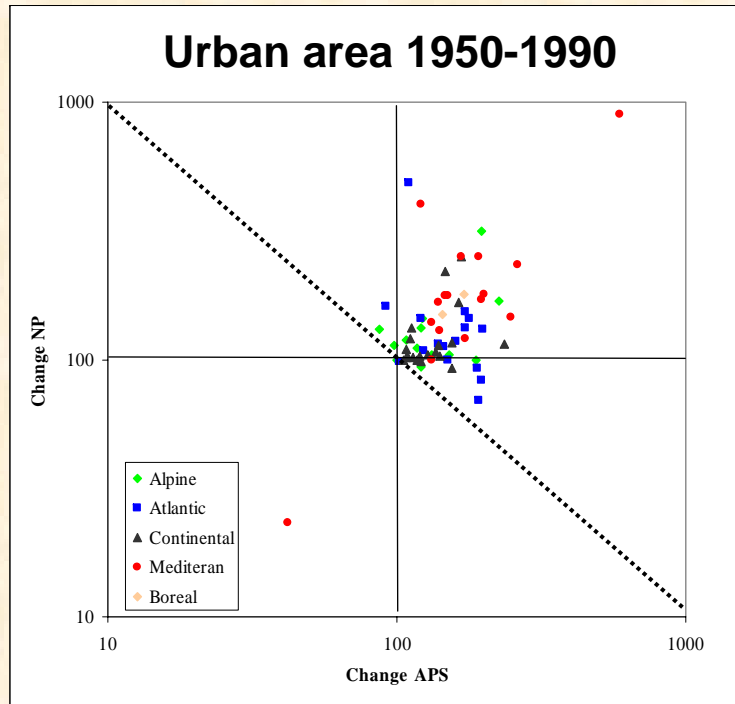
General findings

Good agreement between window and transect levels

BIOPRESS provides quantitative evidence for well-known land cover change processes.

1950 → 2000

Spain – ES10

© BIOPRESS
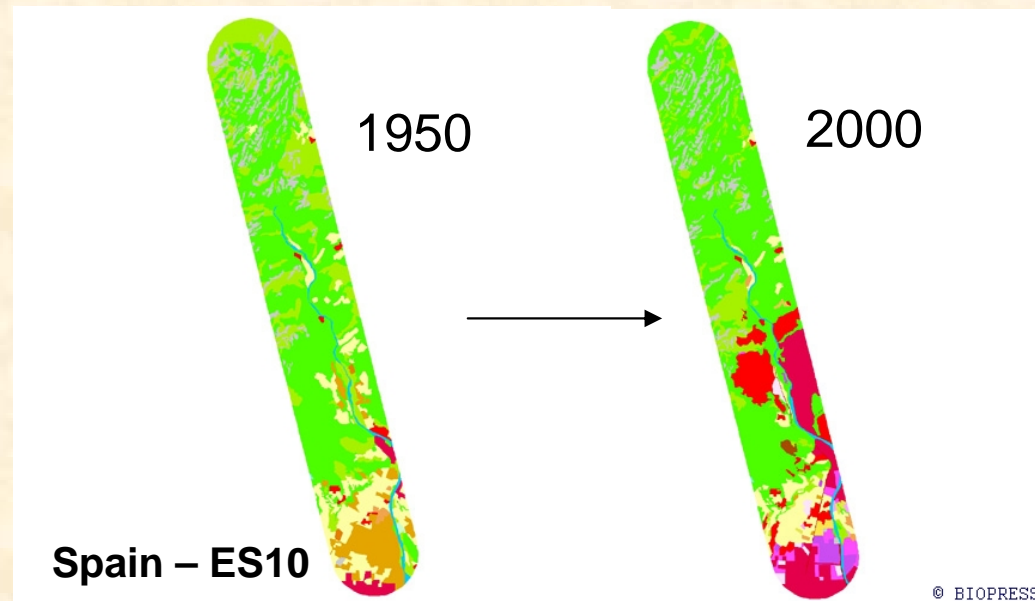
Synthesis: the Regional Assessment

Contribution of Phase I LCC to the MIRABEL
Pan-European Biodiversity assessment?
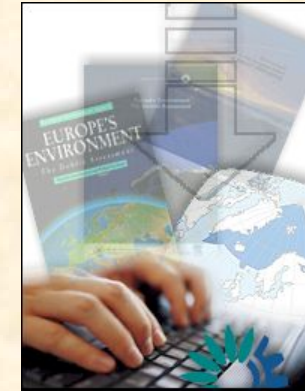
MIRABEL = Regional Impact tables
based on literature and expert knowledge

Petit, S., et al.. 2001. AMBIO, 30: 81-88.

EUNIS Habitats

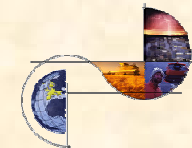|	A1	A2	B1
Pressures			

**Intensification
Afforestation …**

**Impact = extent and condition
of EUNIS habitat type
Low to strong, local to widespread**

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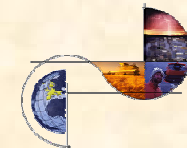
MIRABEL impact tables e.g. Mediterranean region

EUNIS 2 code	C1	C2	C3	D4	E1	E2	E3	E4	F1	F2	F4	F5	G1	G2	G3	G4	H	I1	I2
EUNIS 2 name																			
E - Urbanisation, transport	●●	●●●	●●●	○○				□□		□□		□□		○○	○○	○○	○○	□□□	□
	E2	E2	E2	E3										E4	E4	E4	E5	E6	E6
F - Farming intensification	○○	○○		○○	○○	○○	○○		○○	○○	○○	○○				●●		●●	
	F2	F2		F2	F3	F3	F3		F4	F4	F4	F4				F5		F6	
G - Drainage - irrigation	○○		●●	○○		●●										●●		●●	
	G1		G1	G2		G1										G3		G4	
H - Land abandonment					●●●	●●●	●●		●●●	●●			●●	●●	●●●	●●			
					H1	H1	H1		H1	H1			H1	H1	H1	H1			
I - Afforestation									●●●	●●●	●●		●●	●●●	●●●	●●			
									I1	I1	I1		I2	I2	I2	I1			
J - Habitat fragmentation	□□	□□	□■		□■									□□	○○	●●		○□	
	J2	J2	J3		J4									J5	J5	J6		J7	

	I.1 Arable / gardens I2 Cultivated gardens X7interspersed	I1 Arable / gardens X08 Rural mosaics	E1.3 Xeric grassland E1.4 Tall grass E1.5 Montane grassland	F5.5 Mediterran. shrub F5.1 Arboresc. matorral,	G5 Lines of trees X1 Land sparsely wooded	B1 Coastal dunes E1Dry grasslands F3 Medit. scrub
CLC class	2.4.2	2.4.3	3.2.1	3.2.3	3.2.4	3.3.1
Net change 1950-90	↓ 20-30 %	↓ 20-30 %	- 5 % →	↓ 5-10 %	↓ 10-20 %	↓ 10-20 %
Urbanisation	⇓	↓				↓
Afforestation		⇓ (red)	↓	↓	⇓	⇓ (red)
Deforestation			↑		⇑	
Conversion to Agriculture				⇓ (red)	⇓	⇓ (red)
Intensification	⇒ (red)	⇓ (red)	⇓			
Extensification Abandonment		⇓	⇑		⇑	⇑

Arrows represent the amount of habitat lost (going down) or gained (going up) as a result of a specific pressure. Small arrows represent 1 to 3% conversion, medium arrows 3 to 10% and large arrows 10 to 20%. In red, change of major biodiversity concerns

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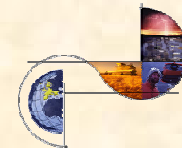
# A Positive contribution of BIOPRESS to MIRABEL

Overall, a good agreement between BIOPRESS and MIRABEL
- no major difference in interpretation
- Discrepancies could be explained

Both methods identified the same key pressures in each region

In most instances, BIOPRESS estimates confirmed the
semi-quantitative MIRABEL assessment i.e.
provide quantitative evidence
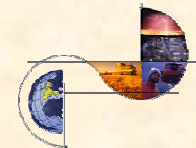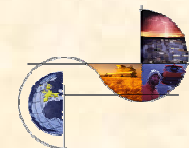
The contribution of BIOPRESS

Urbanisation

- Identified as a key pressure in BIOPRESS
- Quantitative estimates
- Conversion matrices i.e. what was lost to urbanisation

Afforestation / deforestation

- Accurate quantitative estimates
- Difficult to interpret in terms of pressure (plantation, natural regeneration, etc ..)
- Lack of knowledge about the ecological value of forests

Recommends: more work on the period 1950 to 1990 and the use of ancillary datasets for ecological interpretation of processes
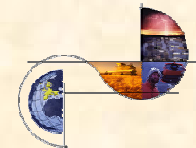
The contribution of BIOPRESS

Land abandonment

- Issue of definition – overlap with afforestation
- Underestimation compared to existing biodiversity assessments

Recommends: more work on the period 1950 to 1990 to enable an accurate identification of pressures at play

Farming intensification

- Accurate quantitative estimates
- Change in CLC is only a small part of the "intensification" process

Conclusions

• BIOPRESS has provided quantitative estimates for CLC change that are useful for biodiversity assessments

• Good agreement between BIOPRESS / MIRABEL with very positive contribution of BIOPRESS estimates for some pressures

• The value of Phase I product to assess the impact of some pressures could be increased by additional work