Experience on testing observatories and indicators for the coast and the land-sea interface

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ETC-LUSI /UAB

EEA coastal atlases conference, 9-10 July 2008, Copenhagen

Overview

1-EXPERIENCE IN EUROPE

1.1.Support to the ICZM Recommendation

- WG-ID (2002-2006)
- DEDUCE (INTERREG PROJECT) (2004-2007)

1.2. Development of the LEAC (land and ecosystem accounting methodology (EEA/ETC-LUSI since 2002)

2-EXPERIENCE IN THE MEDITERRANEAN SEA

2.1. The Observatory of Mediterranean wetlands (MEDWET): building spatial indicators from LEAC methodology

2.2.The ICZM Protocol in the Mediterranean Sea (January 2008), with the Mediterranean Action Plan UNEP-MAP, PAP-RAC and contracting parties)

2.3. FP7 proposal (2008) for the Mediterranean and the Black Sea

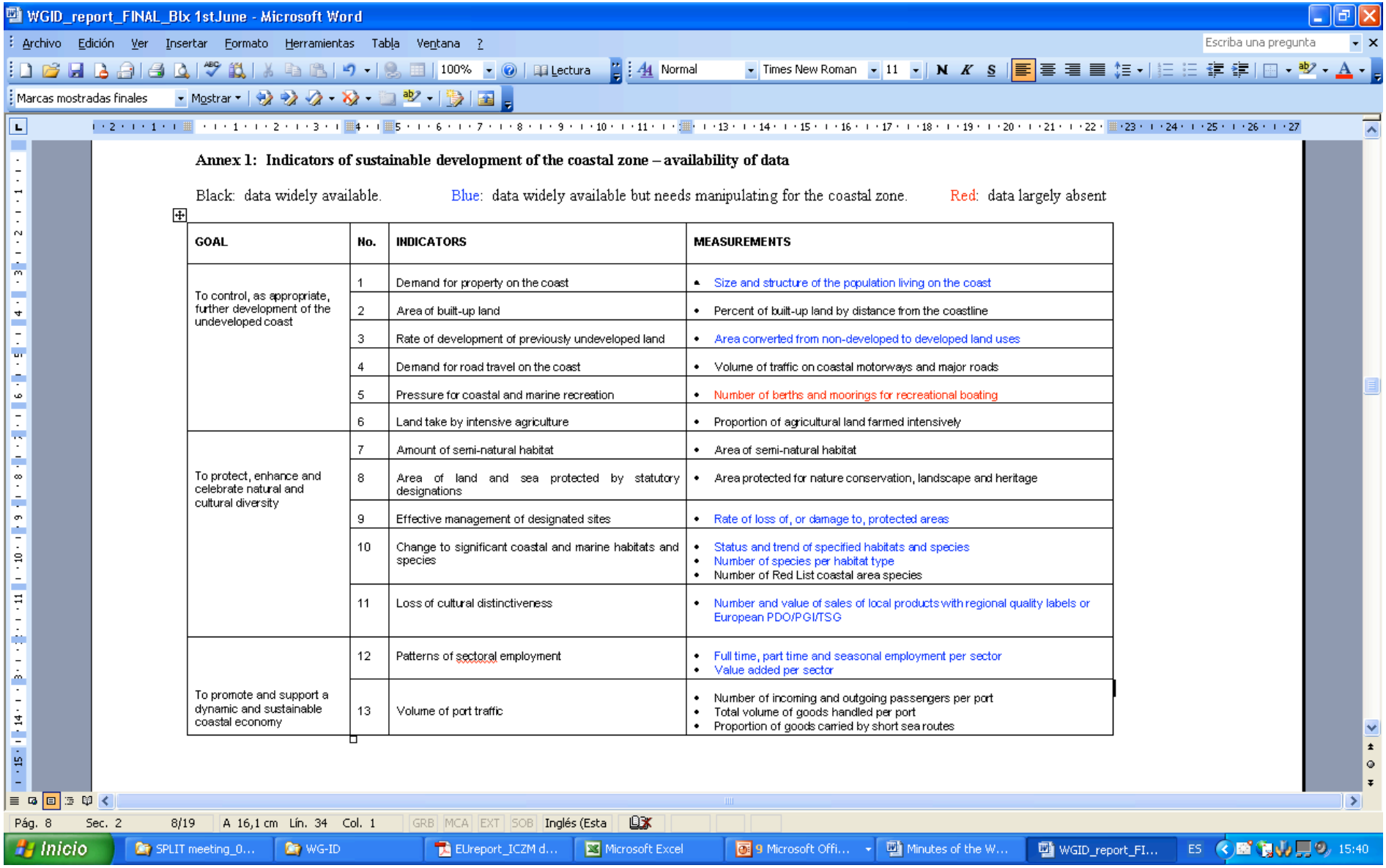
1. Experience in Europe

1.1. Support to the EU ICZM Recommendation (2002-2006)

- Participating in the EU ICZM Expert Group with the Member States representative (Chaired by DG-ENV)

- Chairing the Working –Group on Indicators and data (WG-ID) of the EU ICZM Expert Group

1.1.Support to the ICZM Recommendation



Annex 1: Indicators of sustainable development of the coastal zone – availability of data

Black: data widely available. Blue: data widely available but needs manipulating for the coastal zone. Red: data largely absent

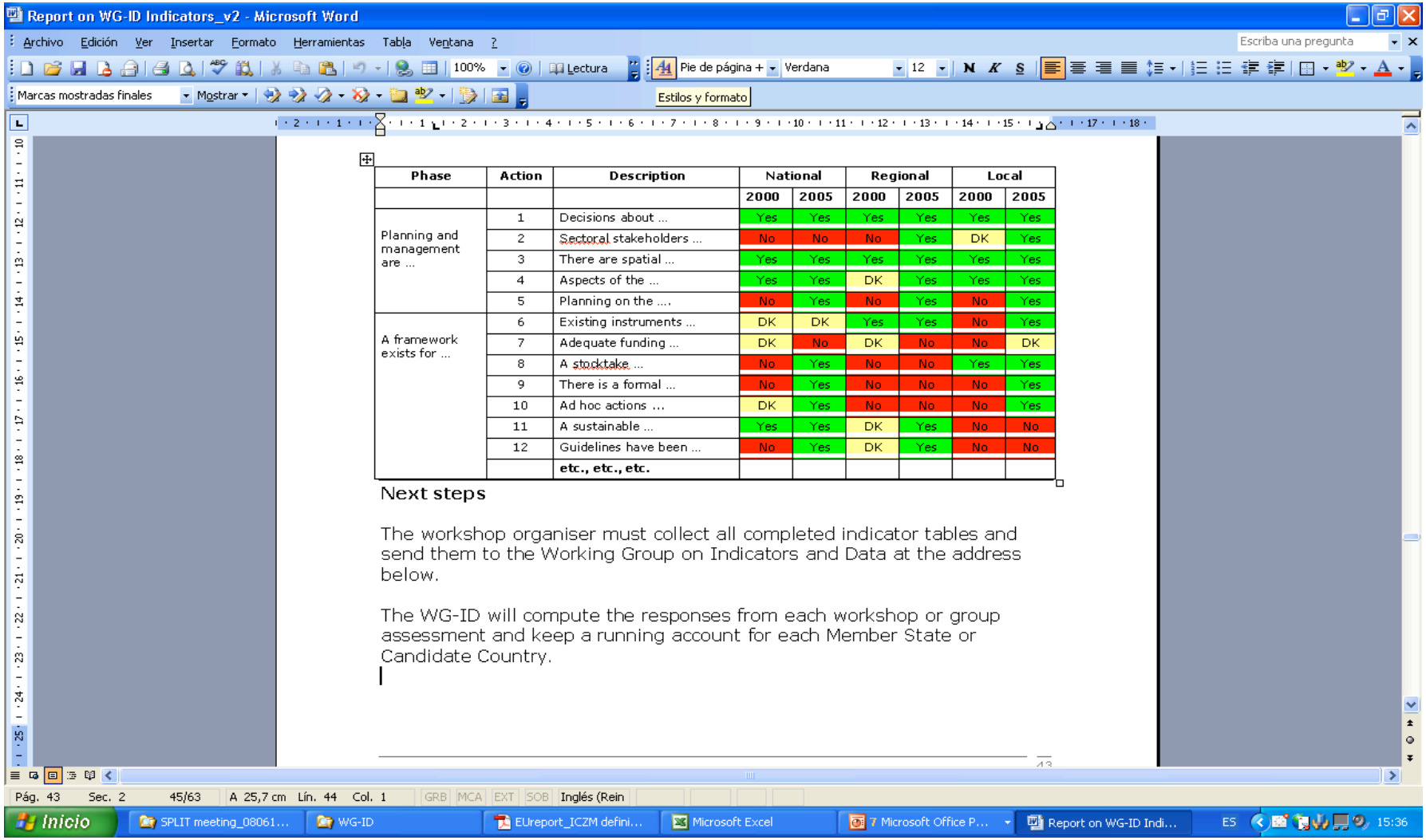
GOAL	No.	INDICATORS	MEASUREMENTS
To control, as appropriate, further development of the undeveloped coast	1	Demand for property on the coast	• Size and structure of the population living on the coast
	2	Area of built-up land	• Percent of built-up land by distance from the coastline
	3	Rate of development of previously undeveloped land	• Area converted from non-developed to developed land uses
	4	Demand for road travel on the coast	• Volume of traffic on coastal motorways and major roads
	5	Pressure for coastal and marine recreation	• Number of berths and moorings for recreational boating
	6	Land take by intensive agriculture	• Proportion of agricultural land farmed intensively
To protect, enhance and celebrate natural and cultural diversity	7	Amount of semi-natural habitat	• Area of semi-natural habitat
	8	Area of land and sea protected by statutory designations	• Area protected for nature conservation, landscape and heritage
	9	Effective management of designated sites	• Rate of loss of, or damage to, protected areas
	10	Change to significant coastal and marine habitats and species	• Status and trend of specified habitats and species • Number of species per habitat type • Number of Red List coastal area species
	11	Loss of cultural distinctiveness	• Number and value of sales of local products with regional quality labels or European PDO/PGI/TSG
To promote and support a dynamic and sustainable coastal economy	12	Patterns of sectoral employment	• Full time, part time and seasonal employment per sector • Value added per sector
	13	Volume of port traffic	• Number of incoming and outgoing passengers per port • Total volume of goods handled per port • Proportion of goods carried by short sea routes

1.1.Support to the ICZM Recommendation

- WG-ID Work :
  - Build a multi-index indicator to auto-evaluate “Progress in ICZM” (2002-2004)
  - Tests by countries and regions (2004-2006)

1.1.Support to the ICZM Recommendation

– WG-ID Work :



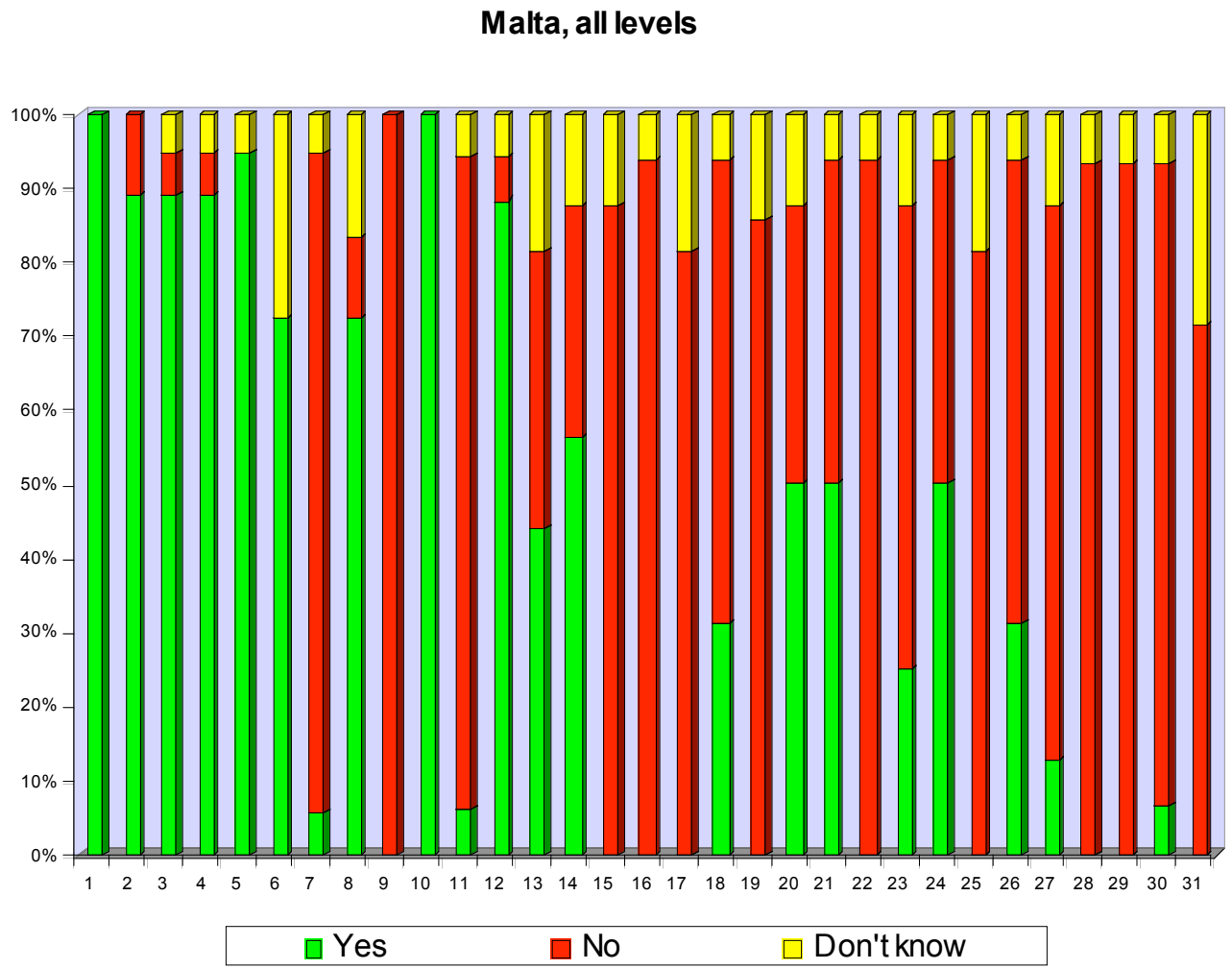
Phase	Action	Description	National		Regional		Local	
			2000	2005	2000	2005	2000	2005
Planning and management are ...	1	Decisions about ...	Yes	Yes	Yes	Yes	Yes	Yes
	2	Sectoral stakeholders ...	No	No	No	Yes	DK	Yes
	3	There are spatial ...	Yes	Yes	Yes	Yes	Yes	Yes
	4	Aspects of the ...	Yes	Yes	DK	Yes	Yes	Yes
	5	Planning on the	No	Yes	No	Yes	No	Yes
A framework exists for ...	6	Existing instruments ...	DK	DK	Yes	Yes	No	Yes
	7	Adequate funding ...	DK	No	DK	No	No	DK
	8	A stocktake ...	No	Yes	No	No	Yes	Yes
	9	There is a formal ...	No	Yes	No	No	No	Yes
	10	Ad hoc actions ...	DK	Yes	No	No	No	Yes
	11	A sustainable ...	Yes	Yes	DK	Yes	No	No
	12	Guidelines have been ...	No	Yes	DK	Yes	No	No
		etc., etc., etc.						

Next steps

The workshop organiser must collect all completed indicator tables and send them to the Working Group on Indicators and Data at the address below.

The WG-ID will compute the responses from each workshop or group assessment and keep a running account for each Member State or Candidate Country.

1.1.Support to the ICZM Recommendation



1.1. ICZM implementation: results

- 8 countries out of 20 coastal countries of the EU, have tested the ICZM Progress indicator making their auto-evaluation, (40% of participation) + 4 regions

- During the process, guidance and questionnaire have been translated in Flemish, Polish, French and Spanish.

- Results show that between 2000 and 2005 there is a general trend of progress in ICZM implementation.

1.1. DEDUCE

- WG-ID planned task:

  Production of fact-sheets for the 27 SD indicators

  - Searching for available data at different scales, identifying standard data for comparison and gaps
  - Establishing methodology for measurements and resulting figures and maps
  - Presentation of results in a multi-scale format , assessment and main messages

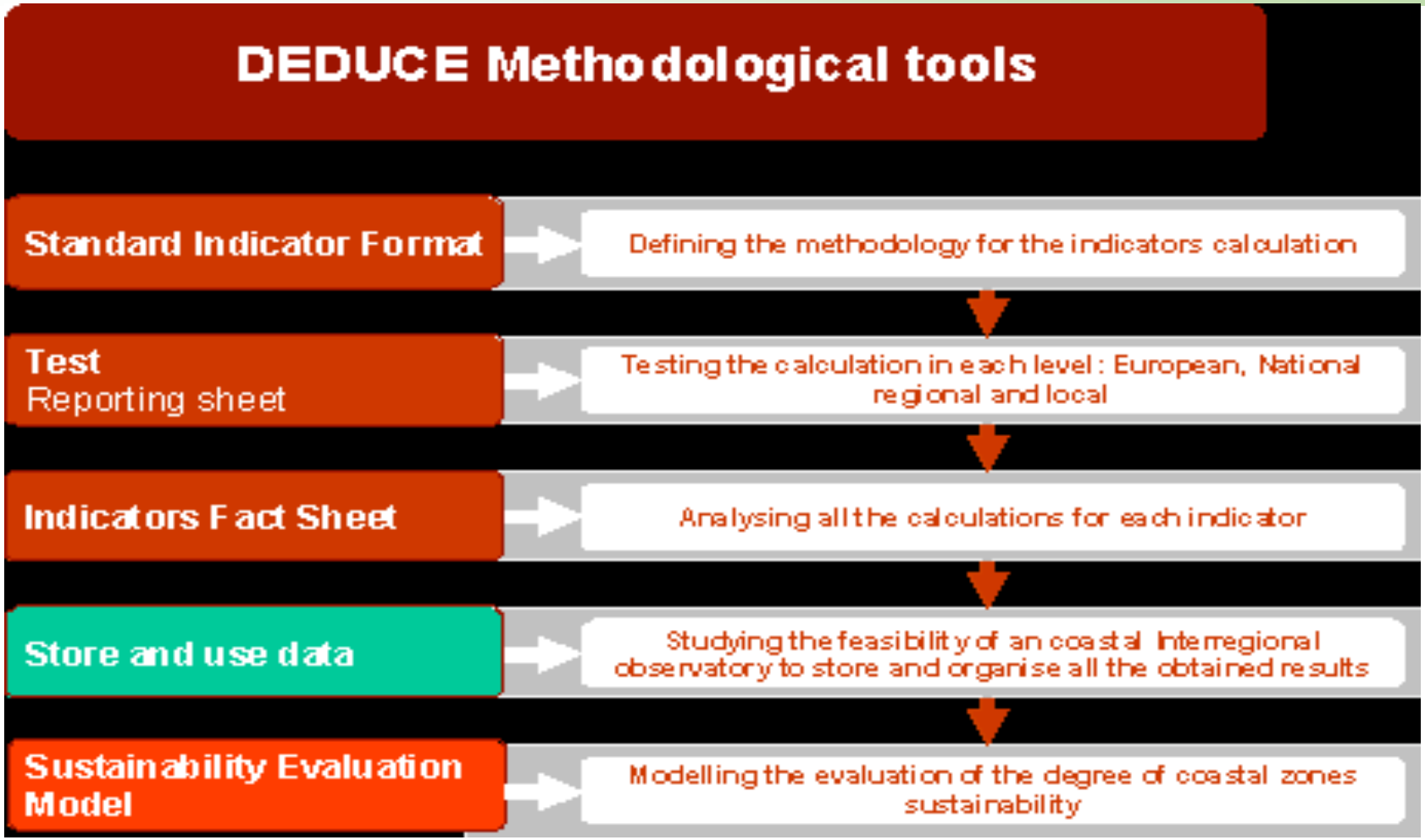
As it is time and effort consuming WG-ID partners decide to apply for an INTERREG fund : DEDUCE project (DEveloppement Durable pour les Cotes Européennes) (2004-2007)

-Partners:

FRANCE, SPAIN/Catalonia, MALTA,

POLAND, LATVIA,BELGIUM/Flanders,

1.1.DEDUCE objectives (2004-2007)



Additional goals: -Common reporting format

1.1.DEDUCE products

- Example: Area of build up land
- Indicator fact sheet

2.- Area of built-up land

Key message

- Over recent decades, built-up areas have been steadily increasing all over Europe.
- In Western European countries, built-up areas have been increasing faster than the population.
- There is intensive development near the coastline which is touching the most interesting coastal biotopes that represent an important barrier to the fluxes between land and sea.
- The constraints of these developments to the sea implies extreme vulnerability of settlements with regard to sea storms, floods and other exceptional events.

Why monitor the area of built-up land?

The increase in built-up areas has the highest impact on the environment due to the sealing of soil as well as disturbance resulting from transport, noise, resource use, waste dumping and pollution. Transport networks that connect cities add to the fragmentation and degradation of the natural landscape. The intensity and patterns of urban sprawl are the result of three main factors - economic development, demand for housing and extension of transport networks. Although subsidiarity rules assign land and urban planning responsibilities to national and regional levels, most European policies have a direct or indirect effect on urban development.

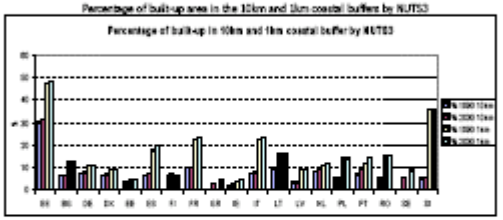
This indicator belongs to the set of six indicators that monitor progress towards achieving the first goal for coastal sustainability set out in the EU Recommendation concerning the implementation of ICZM - to control further development of undeveloped coast as appropriate.

The indicator has one measurement - the percentage of built-up land by distance from the coastline.

What does the indicator show from European to local level?

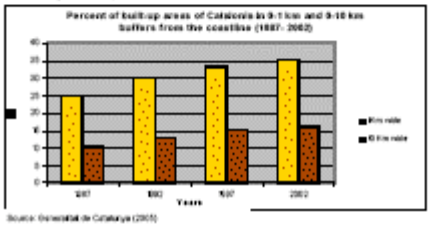
During the last decade, significant land use and land cover changes can be observed in the 10 kilometer coastal strip in the five European regional seas. In general terms, the artificial use of the coastal zone has grown intensively especially on the Mediterranean (804km²) and on the Atlantic (690km²) coasts. The North Sea coast shows a smaller growth of built up area (238km²), together with the Baltic Sea (142km²) coast and the Black Sea coast, with the lowest value of change (11km²). However, in relative terms, in relation to the total area of the assessed coastal zone, the change to artificial surfaces is almost 15% on the Atlantic coast, 10% on the Mediterranean, 8% on the North Sea and 5% on the Baltic Sea coast. On the Black Sea coast, changes to built-up land represent ca 2.5%. Gains in built up area represent the highest individual and cover change in the coastal zones of regional sea catchments.

Percentage of built-up area in the 10km and 1km coastal buffers by NUTS3



Growth of urban artificial surfaces on the coastal zone of Europe has continued. Projected on the basis of annual growth rate observed during 1990-2000, by 2014 the 1990 levels are exceeded by 12%. In this period, the fastest development has occurred in Portugal (34%), Ireland (27%), Spain (18%), followed by France, Italy and Greece. The most affected regional sea coast is the Western Mediterranean. Inside the 10km coastal zone, urban surfaces are dominant in the first kilometer from the shoreline. In several coastal regions of Belgium, Italy, France and Spain the coverage of built-up areas in the first kilometer coastal strip exceeds 45%. In these areas further development is sprawling to the coastal hinterland. In 2000 the share of area covered by artificial surfaces was 25% higher on coasts than inland. During 1990-2000, trends in European coastal zones show that the growth rate of built up areas at the coast have been about 1/3 faster than inland.

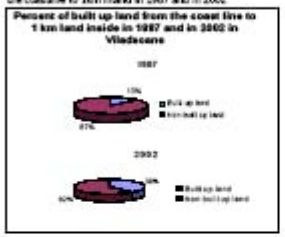
Percentage of built-up areas of Catalonia in 1km and 10km buffers from the coastline



Source: Universitat de Catalunya (2005)

Analysing the built-up land by distance from the coastline in the Deduce regions, it becomes apparent, that urban surfaces are far more present on 1km from the coastline than in the 10km land area from the coast.

Percentage of built-up land in Viladecans from the coastline to 1km inland in 1987 and in 2002

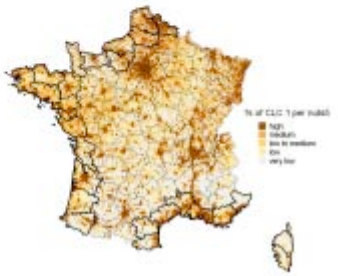


Therefore, the immediate coastal strip (first kilometer from the coastline inland) is the area receiving most pressure, which is really intense on some areas of the coast, especially on the Mediterranean (Catalonia, Viladecans and Malta, where the rate of increase in built-up land for the 0-1km for 1990 and 2000 period was 3%).

On the Atlantic coast, a significant part of the French coastline is also intensively occupied, including even the wild coast of Brittany. However, trends show that new construction is sprawling further from the coastline, provoking a shift of more occupation of the second and third development front of the coast. The immediate coastline is reserved for the seasonal tourist while the coastal hinterland becomes the home location of the yearly residents, most of who continue to work in the coastal cities or in tourist activities.

Many North Sea coasts are also very intensively built up. The coastal zone of the southern North Sea is on average more urbanised than the inland areas (16% versus 10%) in 2000. There a considerable difference between sub-regions. Essex and Zeeland are the less urbanised (10% and 4% respectively).

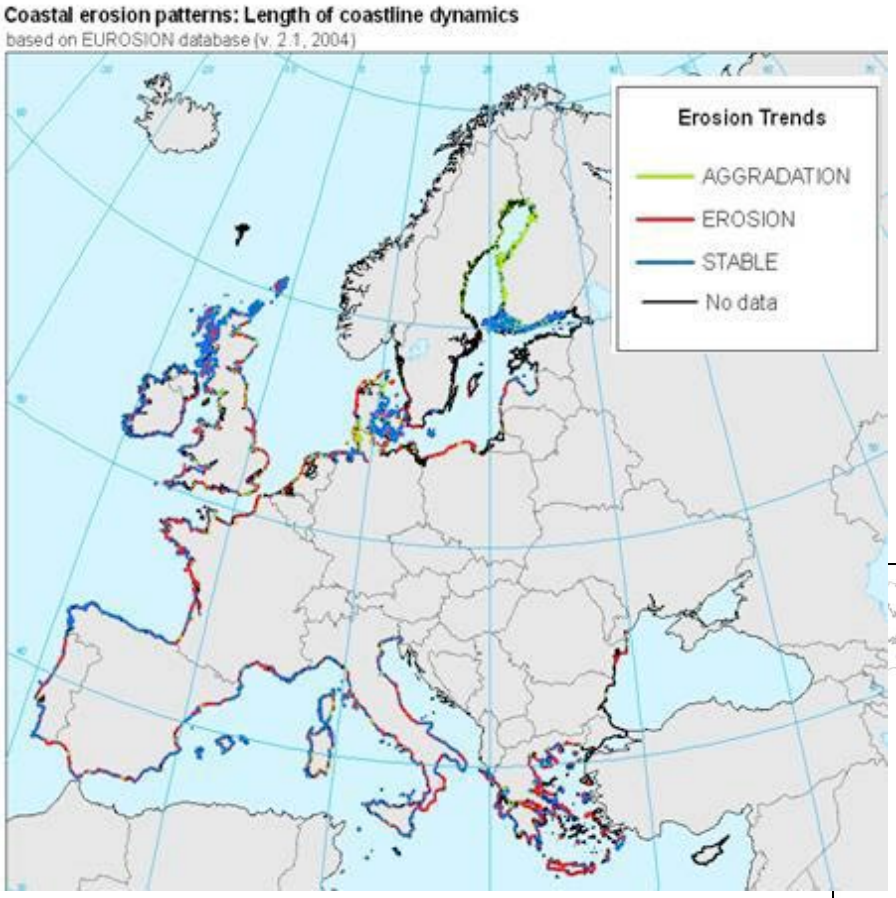
Built up land in France in 2000

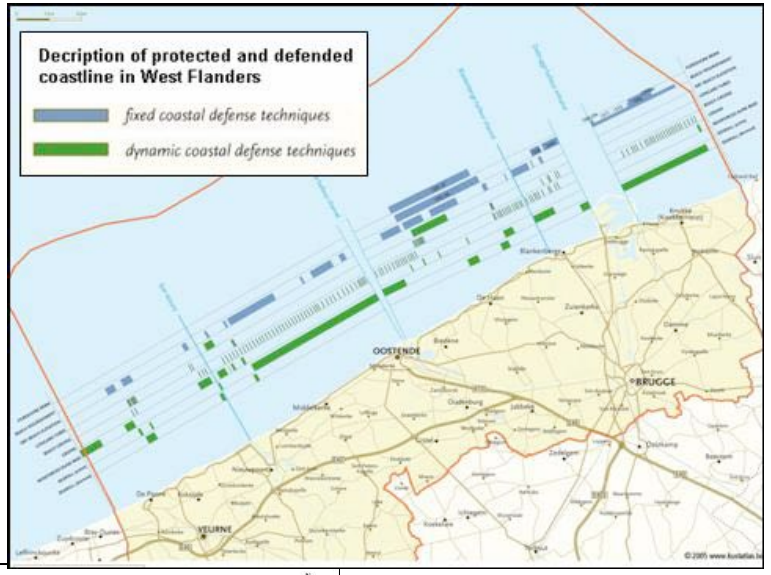


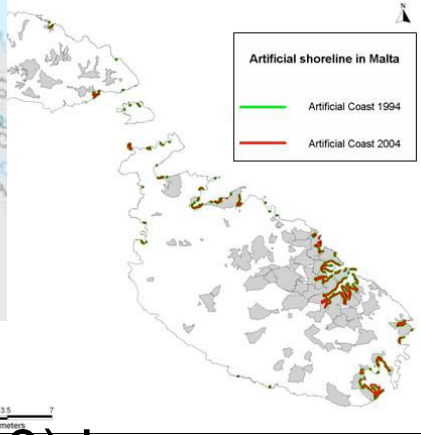
Source : UE, IFEN, CORINE Land Cover 2000, Observatoire du littoral

- www.deduce.org

1.1.DEDUCE: Results at different scales





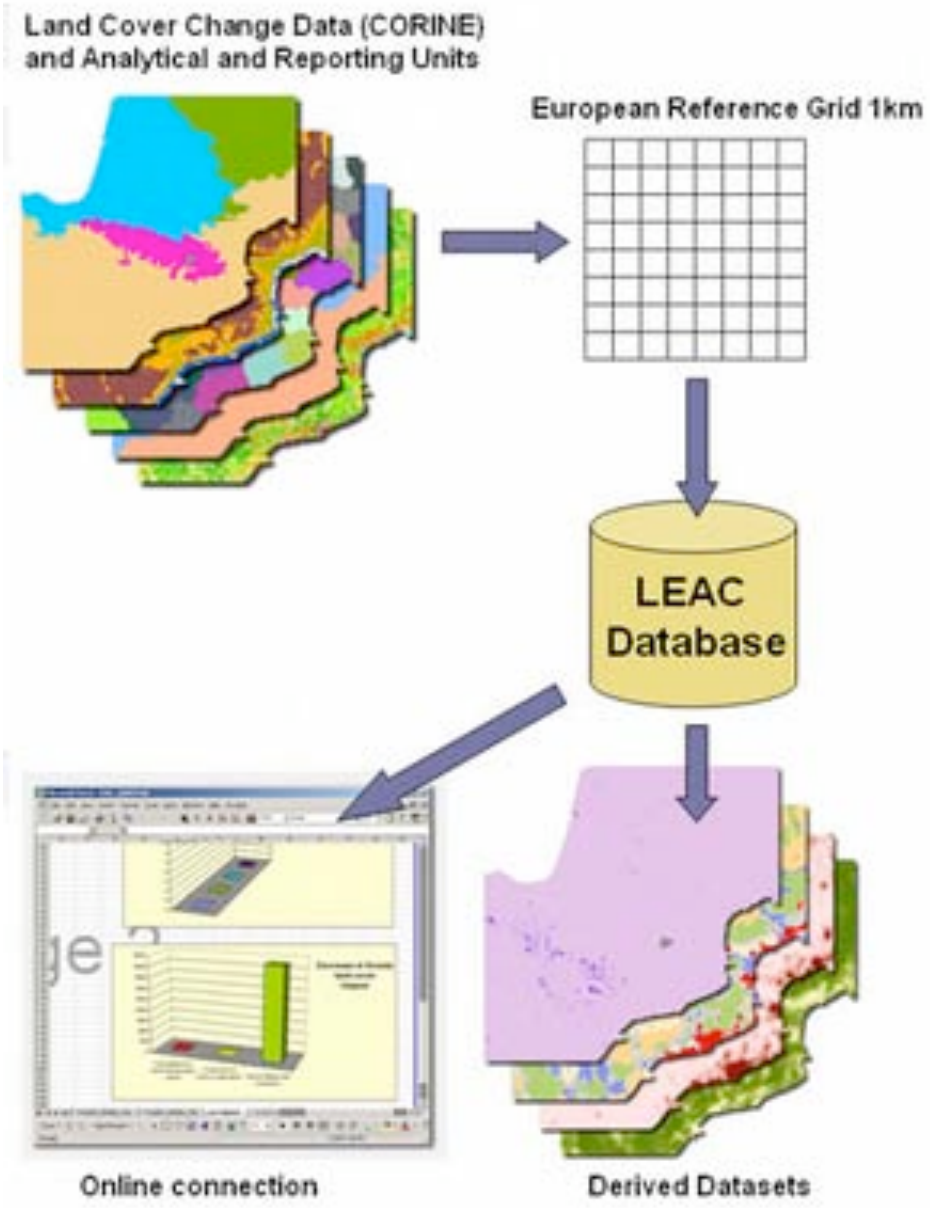


- In 2006, 14 countries (out of 20) have used a SD indicator in their national ICZM Strategy (70%of the countries)

1.2. Development of the methodology on land and ecosystem account (LEAC)

Land cover is an (ex-post) image of land use and ecosystems condition

DO GAINS COMPENSATE LOSSES?
DOES QUALITY OF STOCK CARRIED OVER CHANGE?
WHICH ARE THE PROCESSES IN QUESTION?



1.2.Land and Ecosystem Accounting (LEAC)

- **Databases**

  The core data of the LEAC project have been structured in a relational database model in order to allow quick and easy analyses. These databases have been made publicly accessible through the Internet

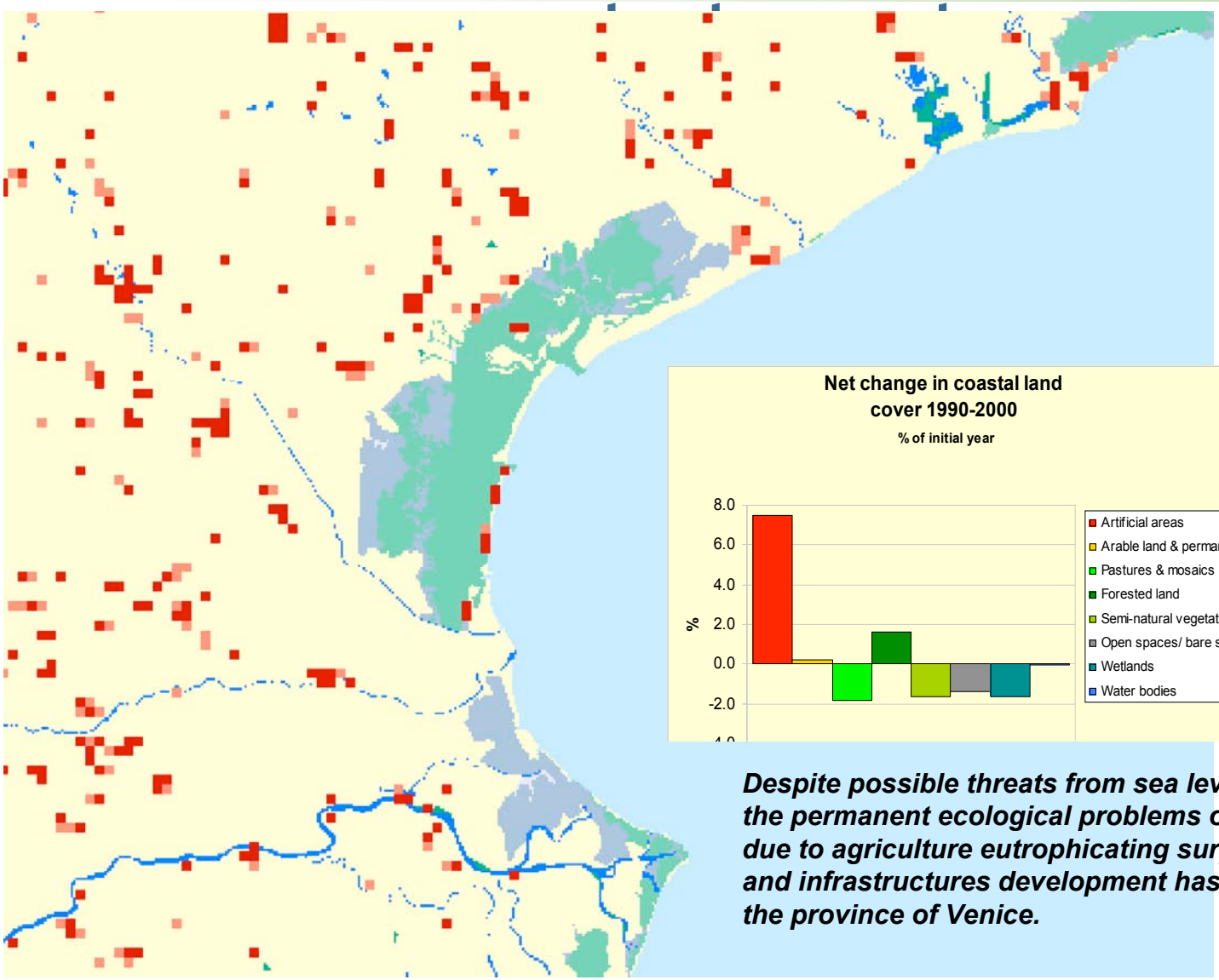
- **LEAC map layers**

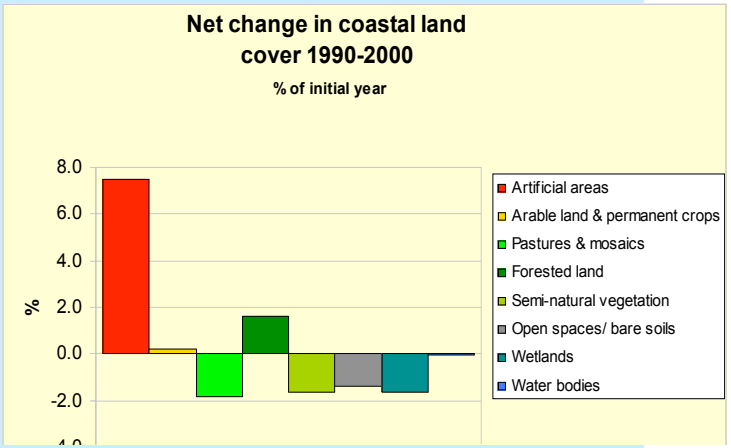
  From the LEAC database, various geographical layers have been derived such as land cover flows, Corilis, the green potential background layer and the dominant land-cover types

- **Interactive tools**

  Online Analytical Processing (OLAP cube) pivot applications and methodological guidebook

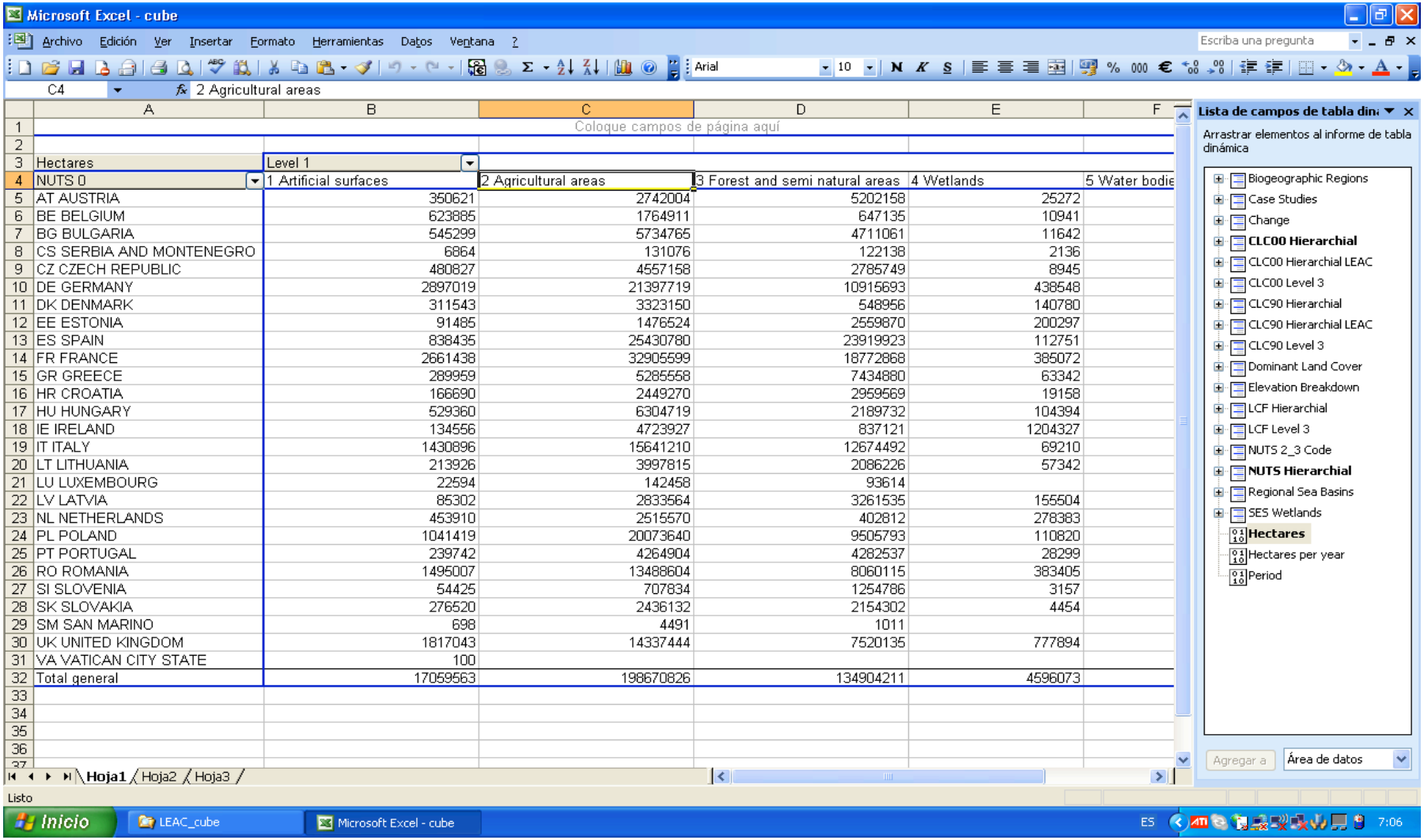
1.2.Urban sprawl in the province of Venice, 1990-2000, cells of 1 km x 1 km - wetlands in the





Despite possible threats from sea level rise and the permanent ecological problems of the lagoon due to agriculture eutrophicating surpluses, urban and infrastructures development has continued in the province of Venice.

1.2.OLAP-CUBE prototype for LEAC



2-EXPERIENCE IN THE MEDITERRANEAN SEA

2.1.Partner of the Observatory on Mediterranean wetlands with MEDWET (since January 2007)

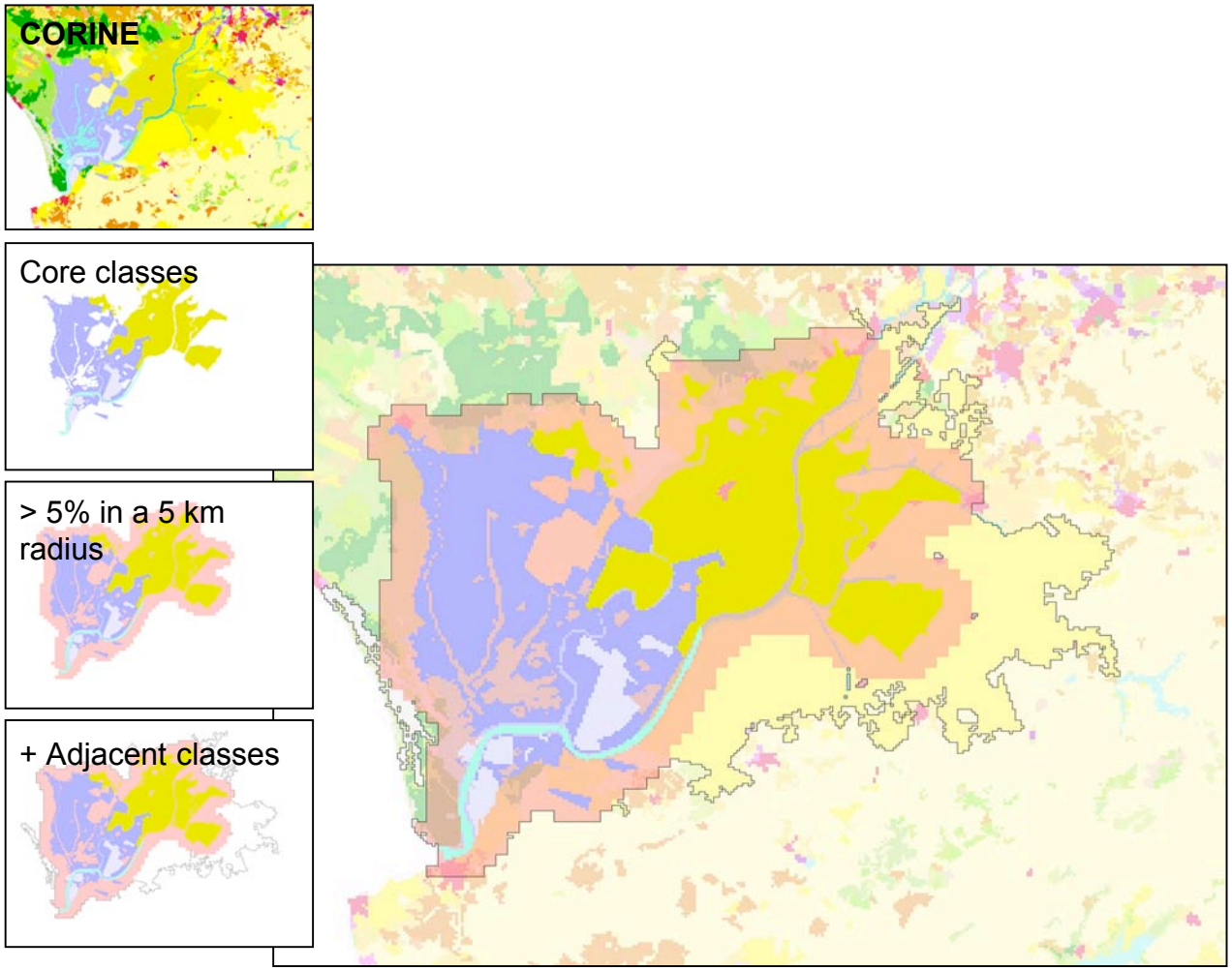
-Mapping the Mediterranean wetlands

-Developing methodology for Ecosystem's accounts (LEAC): New spatial modeling techniques for mapping biodiversity potential

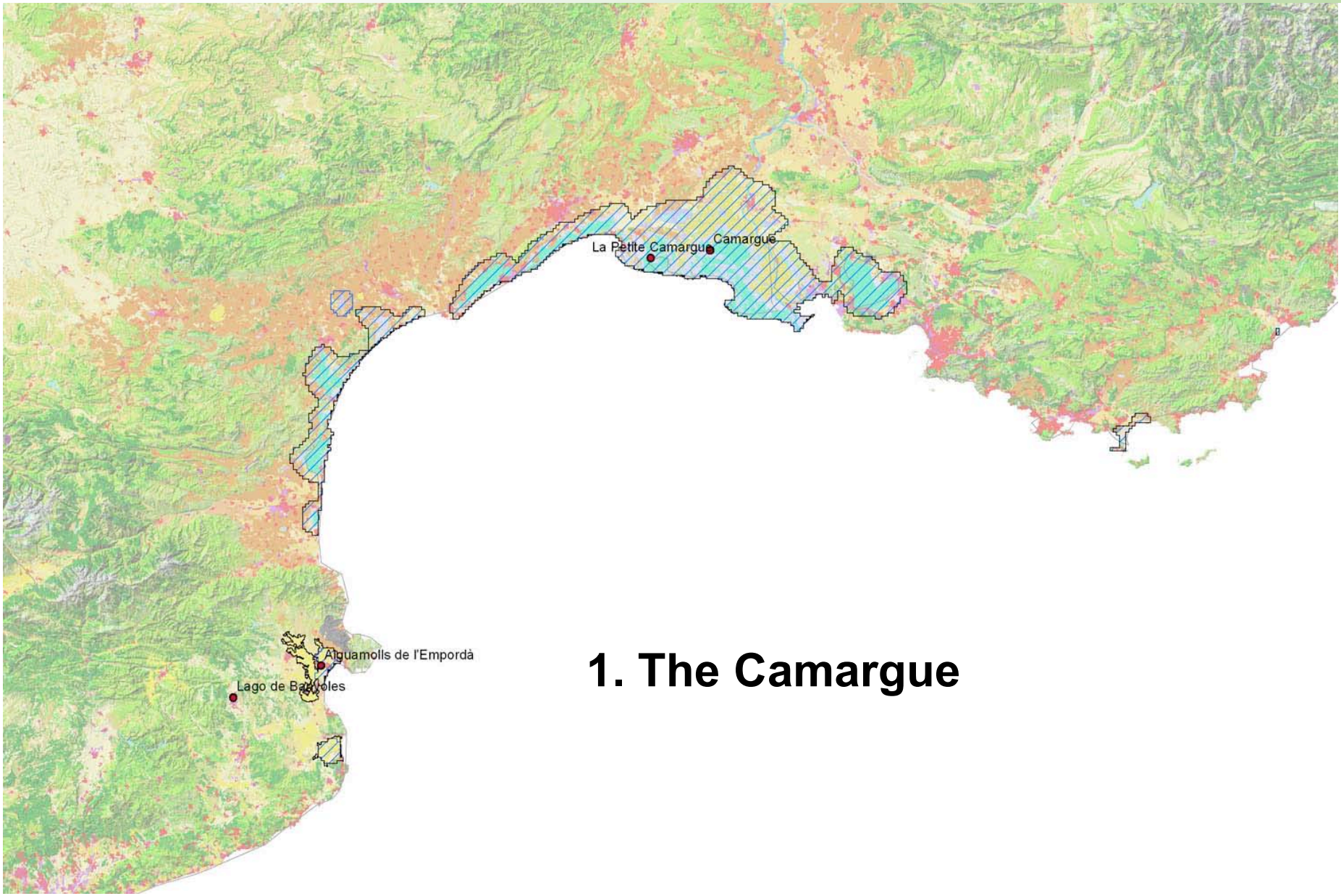
-Accounting for Biodiversity in the Mediterranean coasts and wetlands

2.1.Mapping of Mediterranean Wetland

← *Methodology for automatic mapping*

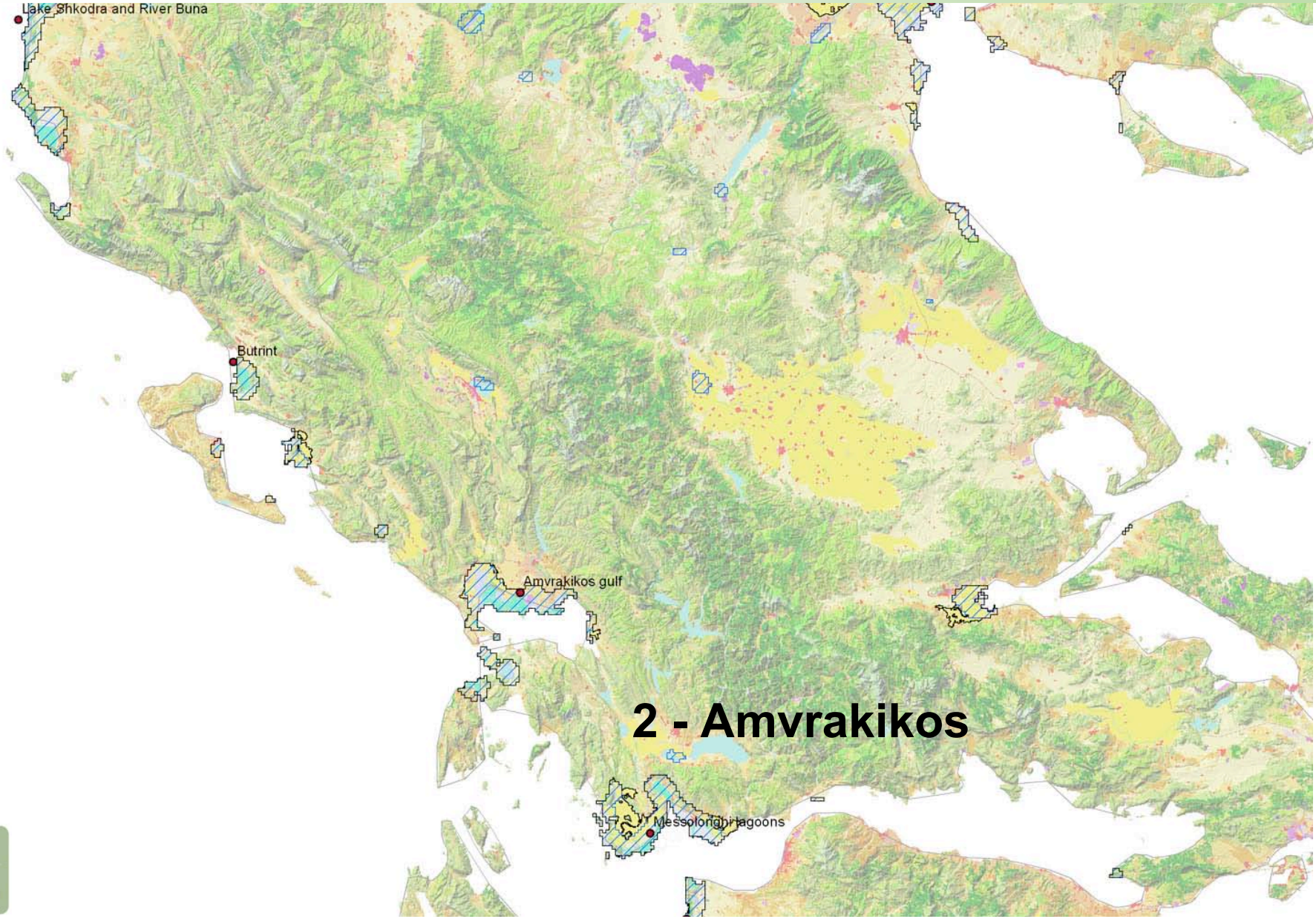


2.1.Mapping Mediterranean wetlands with CLC

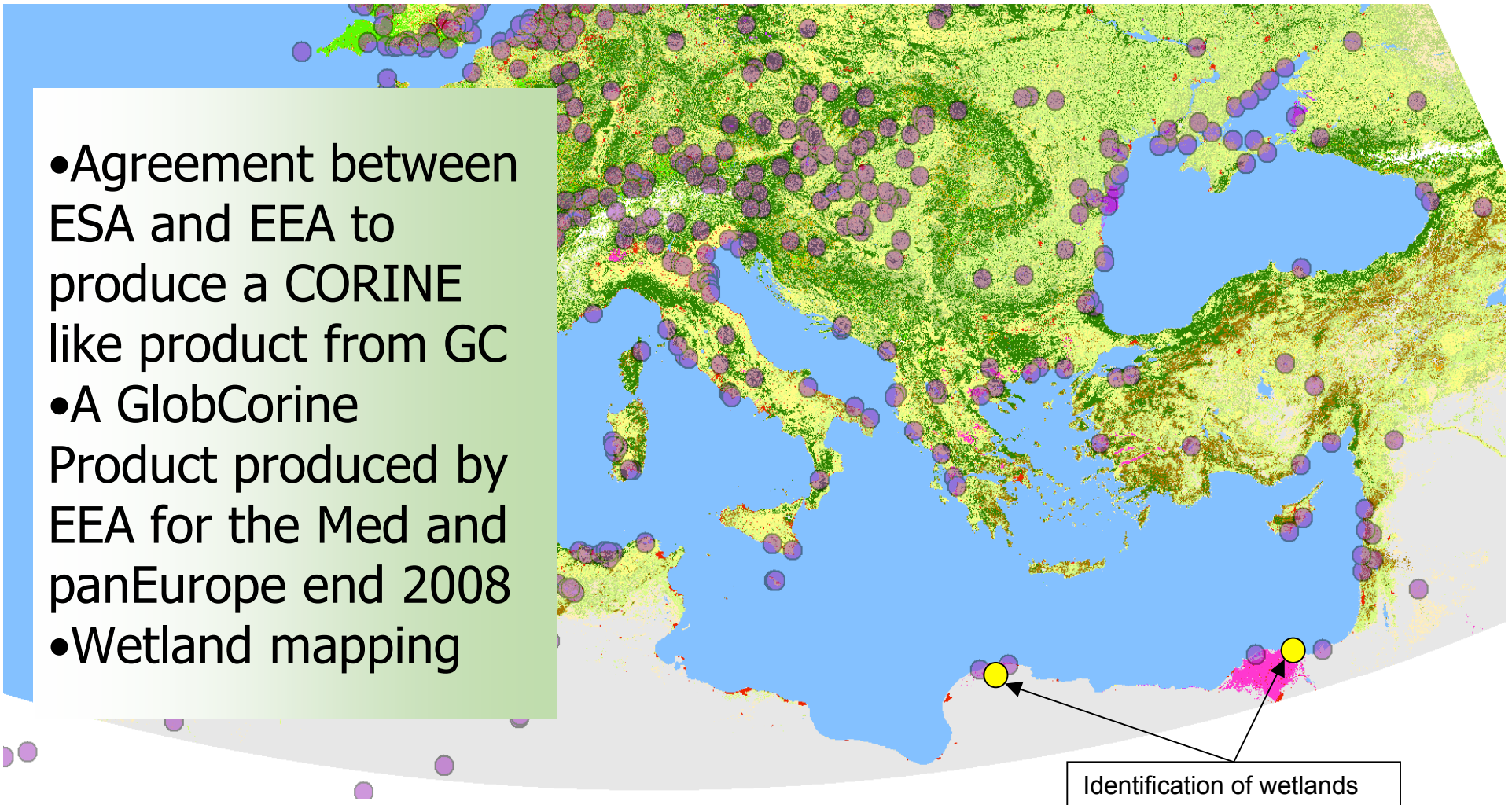


1. The Camargue

2.1.Mapping Mediterranean wetlands with CLC

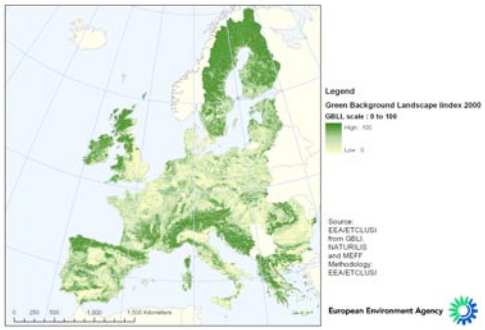


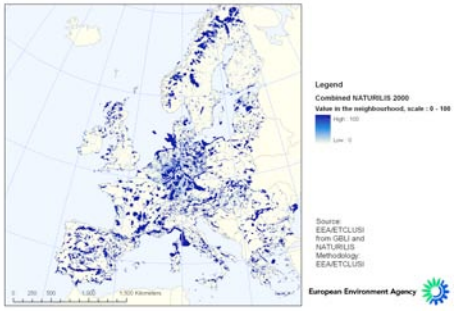
2.1.The macro scale picture with Globcover (v2.ESA July2008)

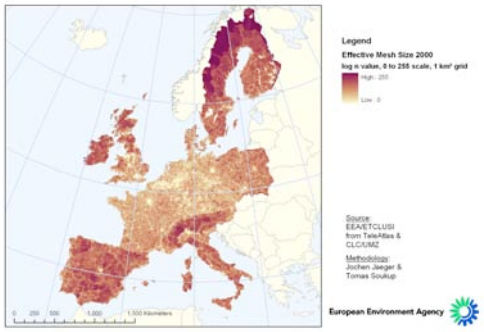


Sources:
GlobCover2005 – courtesy European Space Agency
Ramsar database – courtesy Wetlands International

2.1.New spatial modeling techniques for mapping biodiversity potential





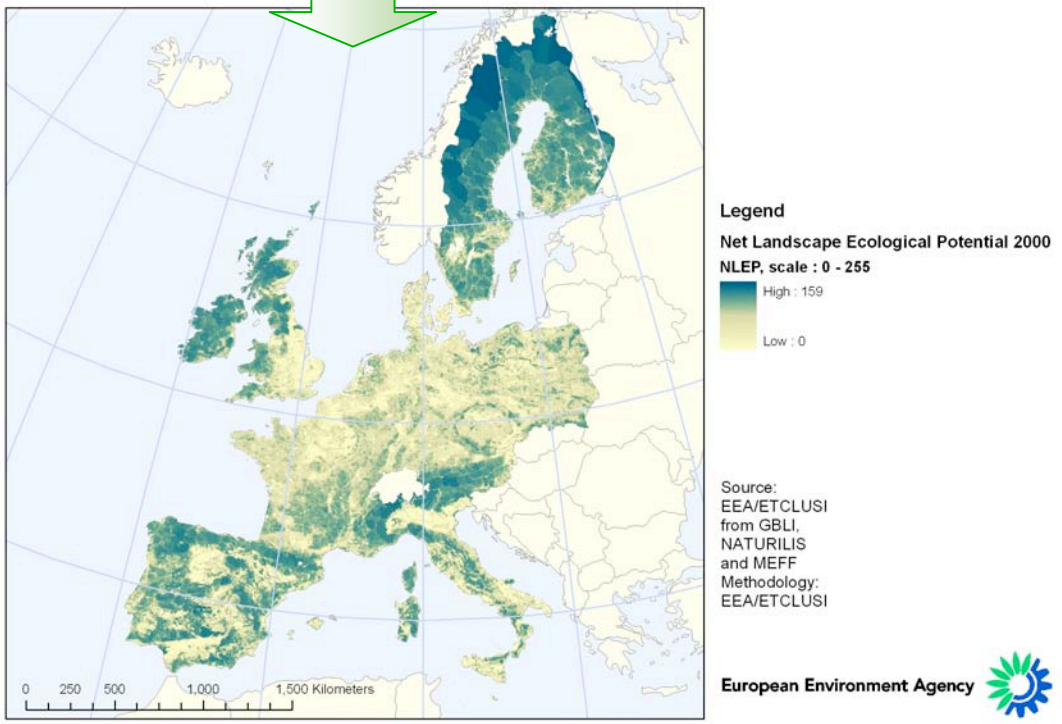


1.The Green Background Landscape index

2. Naturilis (N2000+CDDA) index

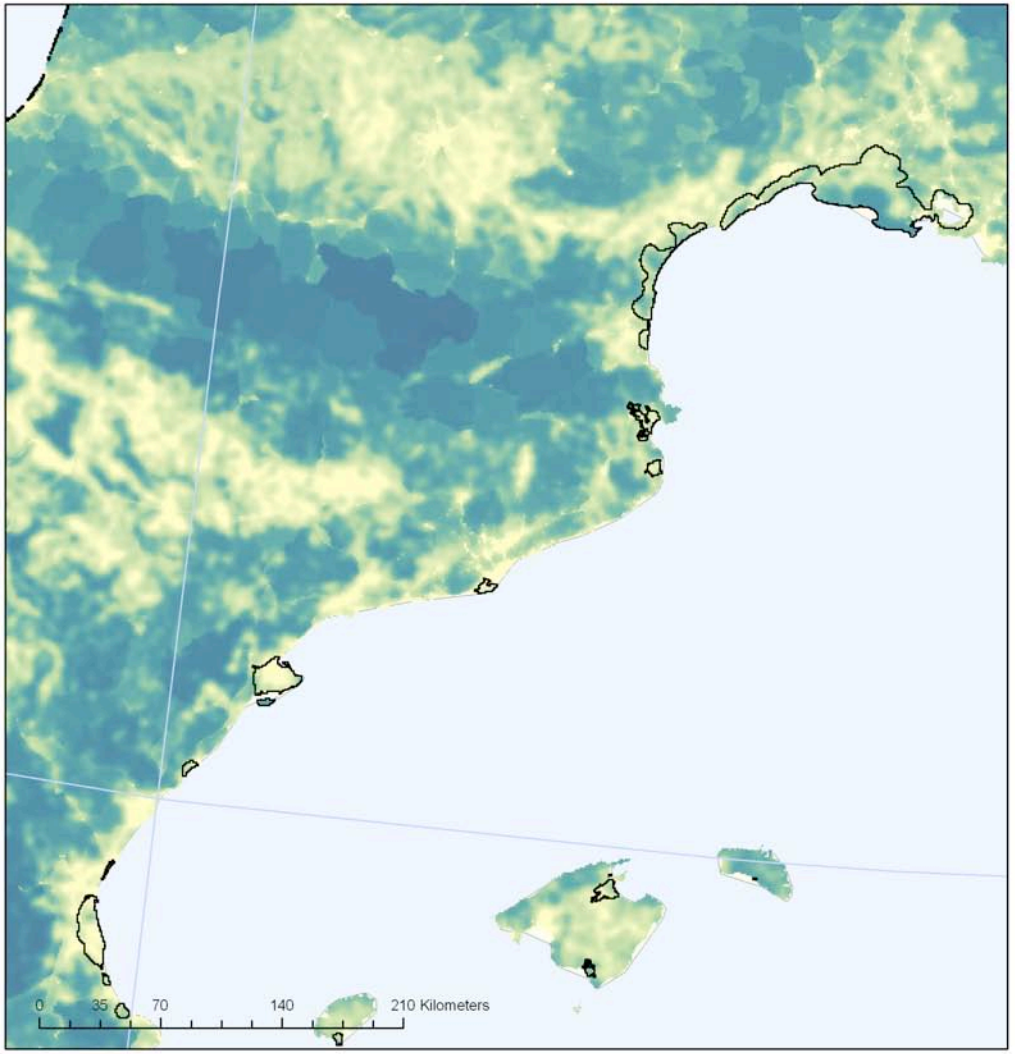
3. MEFF, Mesh size index

4. The Net Landscape Ecological Potential Index



2.1.Land cover change accounts 90-2000

- Change in Landscape Ecological Potential of SES Wetlands,
  ES,FR, IT, GR – 10 km strip



2000

Legend

Net Landscape Ecological Potential 2000

NLEP, scale : 0 - 255

High : 147.743

Low : 0

Source:

EEA/ETCLUSI from GBLI, NATURILIS and MEFF

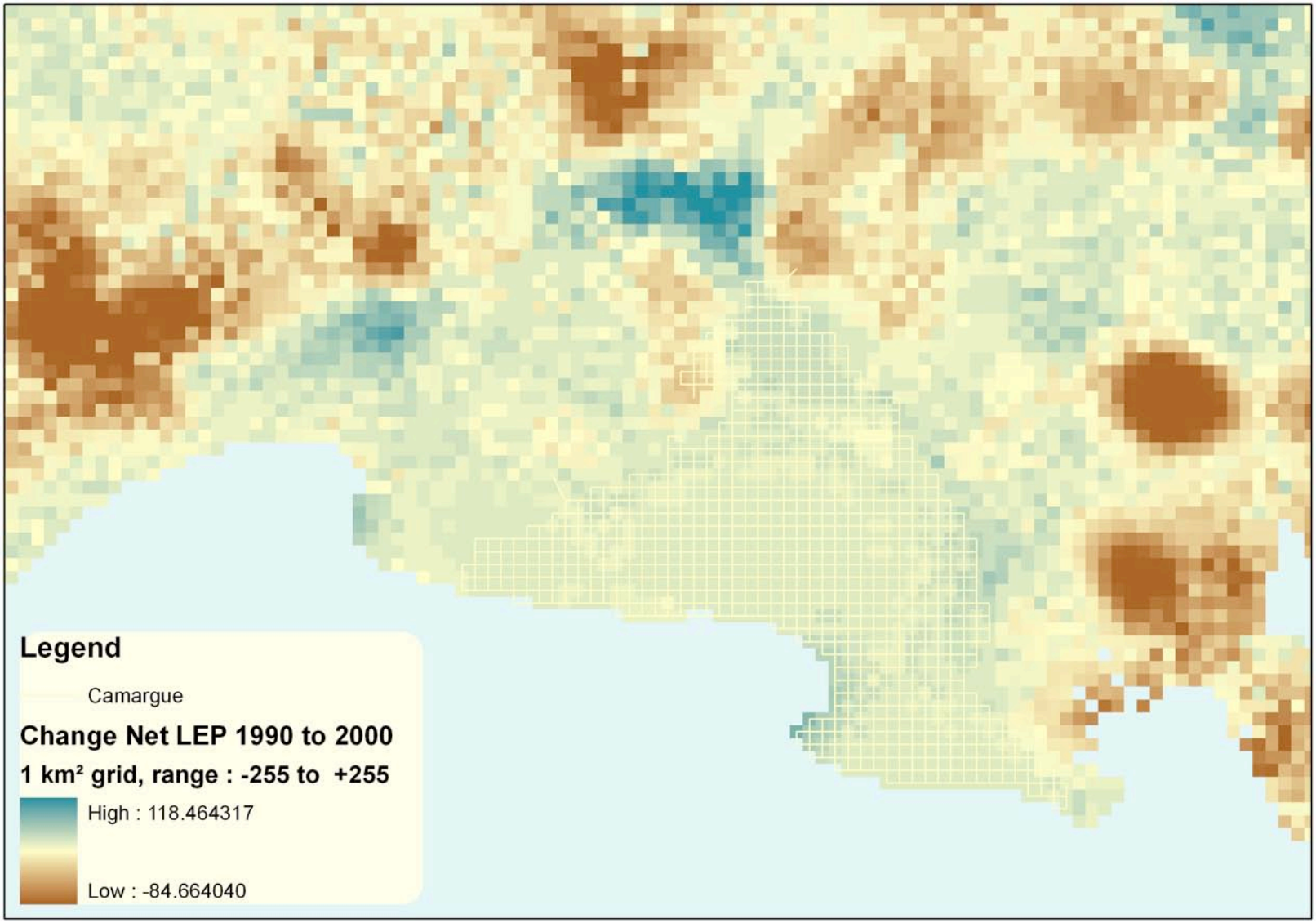
Methodology:

EEA/ETCLUSI

Provisional results – February 2008

European Environment Agency

2.1.Accounting for Biodiversity in the Mediterranean coasts and wetlands



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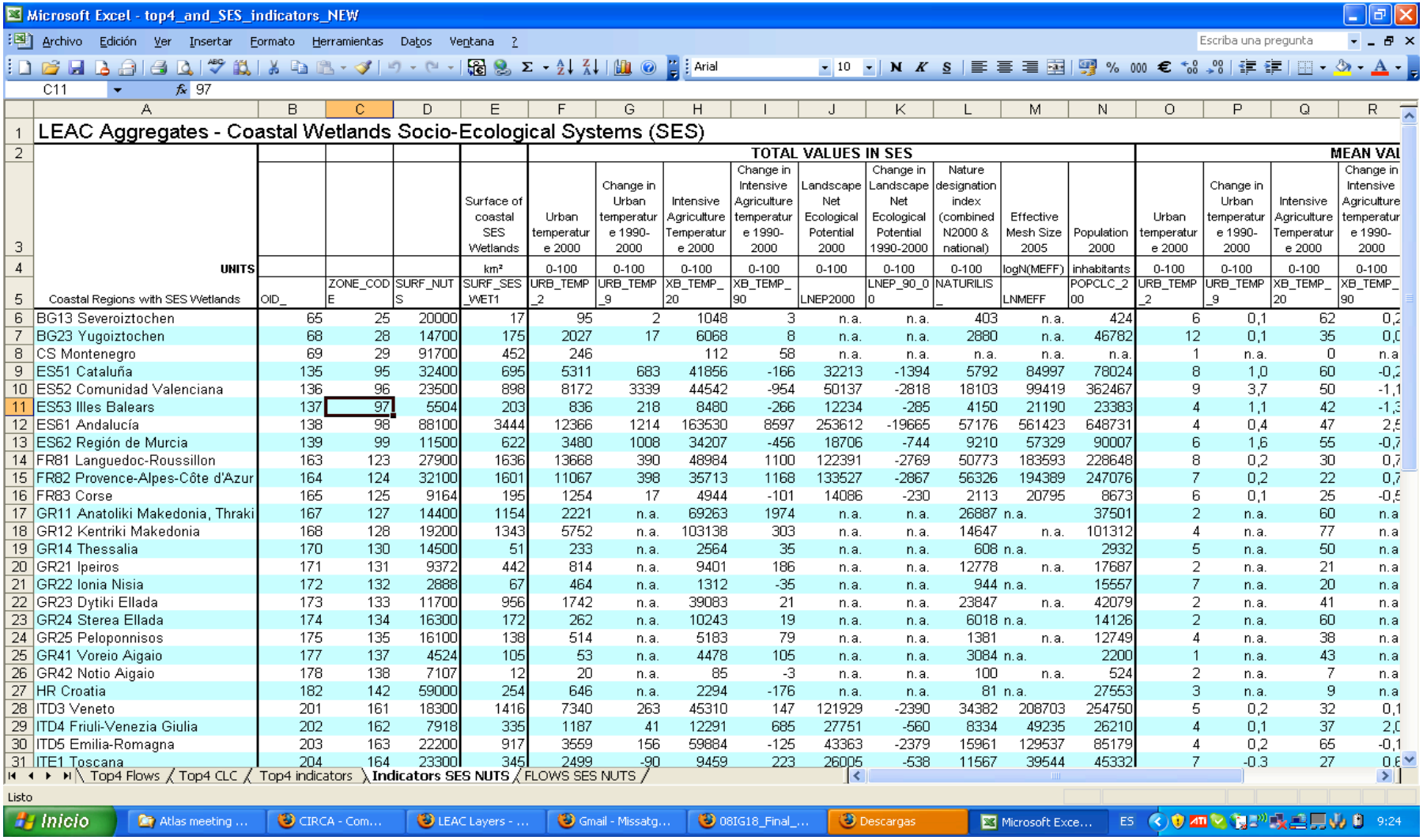

Microsoft Excel - top4_and_SES_indicators_NEW

Archivo Edición Ver Insertar Formato Herramientas Datos Ventana ?

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LEAC Aggregates - Coastal Wetlands Socio-Ecological Systems (SES)

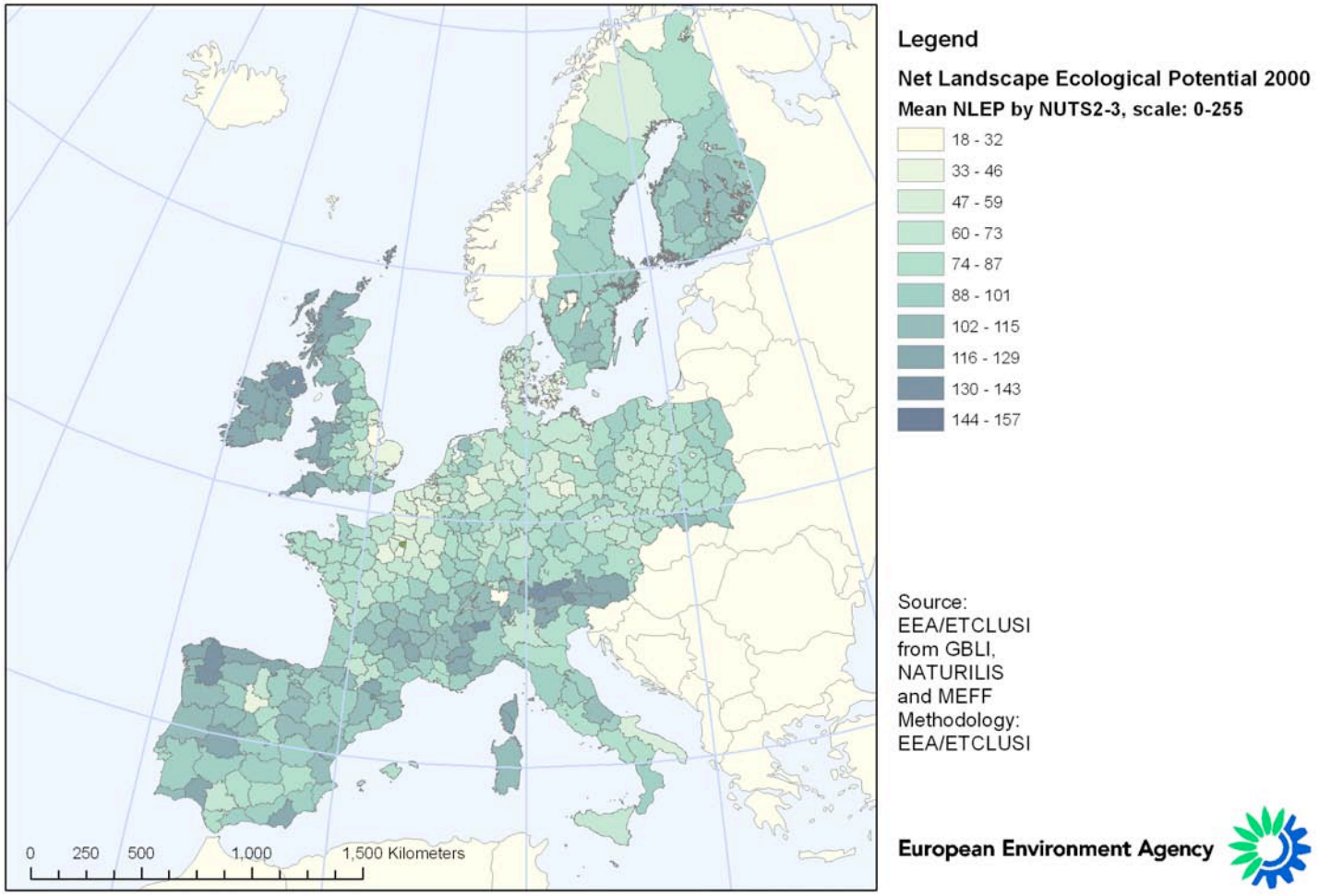
					TOTAL VALUES IN SES									MEAN VAL			
				Surface of coastal SES Wetlands	Urban temperature 2000	Change in Urban temperature 1990-2000	Intensive Agriculture Temperature 2000	Change in Intensive Agriculture temperature 1990-2000	Landscape Net Ecological Potential 2000	Change in Landscape Net Ecological Potential 1990-2000	Nature designation index (combined N2000 & national)	Effective Mesh Size 2005	Population 2000	Urban temperature 2000	Change in Urban temperature 1990-2000	Intensive Agriculture Temperature 2000	Change in Intensive Agriculture temperature 1990-2000
	UNITS			km²	0-100	0-100	0-100	0-100	0-100	0-100	0-100	logN(MEFF)	inhabitants	0-100	0-100	0-100	0-100
Coastal Regions with SES Wetlands	OID_	ZONE_CODE	SURF_NUTS	SURF_SES_WET1	URB_TEMP_2	URB_TEMP_9	XB_TEMP_20	XB_TEMP_90	LNEP2000	LNEP_90_00	NATURILIS_	LNMEFF	POPCLC_200	URB_TEMP_2	URB_TEMP_9	XB_TEMP_20	XB_TEMP_90
BG13 Severoiztochen	65	25	20000	17	95	2	1048	3	n.a.	n.a.	403	n.a.	424	6	0,1	62	0,2
BG23 Yugoiztochen	68	28	14700	175	2027	17	6068	8	n.a.	n.a.	2880	n.a.	46782	12	0,1	35	0,0
CS Montenegro	69	29	91700	452	246		112	58	n.a.	n.a.	n.a.	n.a.	n.a.	1	n.a.	0	n.a
ES51 Cataluña	135	95	32400	695	5311	683	41856	-166	32213	-1394	5792	84997	78024	8	1,0	60	-0,2
ES52 Comunidad Valenciana	136	96	23500	898	8172	3339	44542	-954	50137	-2818	18103	99419	362467	9	3,7	50	-1,1
ES53 Illes Balears	137	97	5504	203	836	218	8480	-266	12234	-285	4150	21190	23383	4	1,1	42	-1,3
ES61 Andalucía	138	98	88100	3444	12366	1214	163530	8597	253612	-19665	57176	561423	648731	4	0,4	47	2,5
ES62 Región de Murcia	139	99	11500	622	3480	1008	34207	-456	18706	-744	9210	57329	90007	6	1,6	55	-0,7
FR81 Languedoc-Roussillon	163	123	27900	1636	13668	390	48984	1100	122391	-2769	50773	183593	228648	8	0,2	30	0,7
FR82 Provence-Alpes-Côte d'Azur	164	124	32100	1601	11067	398	35713	1168	133527	-2867	56326	194389	247076	7	0,2	22	0,7
FR83 Corse	165	125	9164	195	1254	17	4944	-101	14086	-230	2113	20795	8673	6	0,1	25	-0,5
GR11 Anatoliki Makedonia, Thraki	167	127	14400	1154	2221	n.a.	69263	1974	n.a.	n.a.	26887	n.a.	37501	2	n.a.	60	n.a
GR12 Kentriki Makedonia	168	128	19200	1343	5752	n.a.	103138	303	n.a.	n.a.	14647	n.a.	101312	4	n.a.	77	n.a
GR14 Thessalia	170	130	14500	51	233	n.a.	2564	35	n.a.	n.a.	608	n.a.	2932	5	n.a.	50	n.a
GR21 Ipeiros	171	131	9372	442	814	n.a.	9401	186	n.a.	n.a.	12778	n.a.	17687	2	n.a.	21	n.a
GR22 Ionia Nisia	172	132	2888	67	464	n.a.	1312	-35	n.a.	n.a.	944	n.a.	15557	7	n.a.	20	n.a
GR23 Dytiki Ellada	173	133	11700	956	1742	n.a.	39083	21	n.a.	n.a.	23847	n.a.	42079	2	n.a.	41	n.a
GR24 Sterea Ellada	174	134	16300	172	262	n.a.	10243	19	n.a.	n.a.	6018	n.a.	14126	2	n.a.	60	n.a
GR25 Peloponnisos	175	135	16100	138	514	n.a.	5183	79	n.a.	n.a.	1381	n.a.	12749	4	n.a.	38	n.a
GR41 Voreio Aigaio	177	137	4524	105	53	n.a.	4478	105	n.a.	n.a.	3084	n.a.	2200	1	n.a.	43	n.a
GR42 Notio Aigaio	178	138	7107	12	20	n.a.	85	-3	n.a.	n.a.	100	n.a.	524	2	n.a.	7	n.a
HR Croatia	182	142	59000	254	646	n.a.	2294	-176	n.a.	n.a.	81	n.a.	27553	3	n.a.	9	n.a
ITD3 Veneto	201	161	18300	1416	7340	263	45310	147	121929	-2390	34382	208703	254750	5	0,2	32	0,1
ITD4 Friuli-Venezia Giulia	202	162	7918	335	1187	41	12291	685	27751	-560	8334	49235	26210	4	0,1	37	2,0
ITD5 Emilia-Romagna	203	163	22200	917	3559	156	59884	-125	43363	-2379	15961	129537	85179	4	0,2	65	-0,1
ITE1 Toscana	204	164	23300	345	2499	-90	9459	223	26005	-538	11567	39544	45332	7	-0,3	27	0,8

Top4 Flows / Top4 CLC / Top4 indicators / Indicators SES NUTS / FLOWS SES NUTS

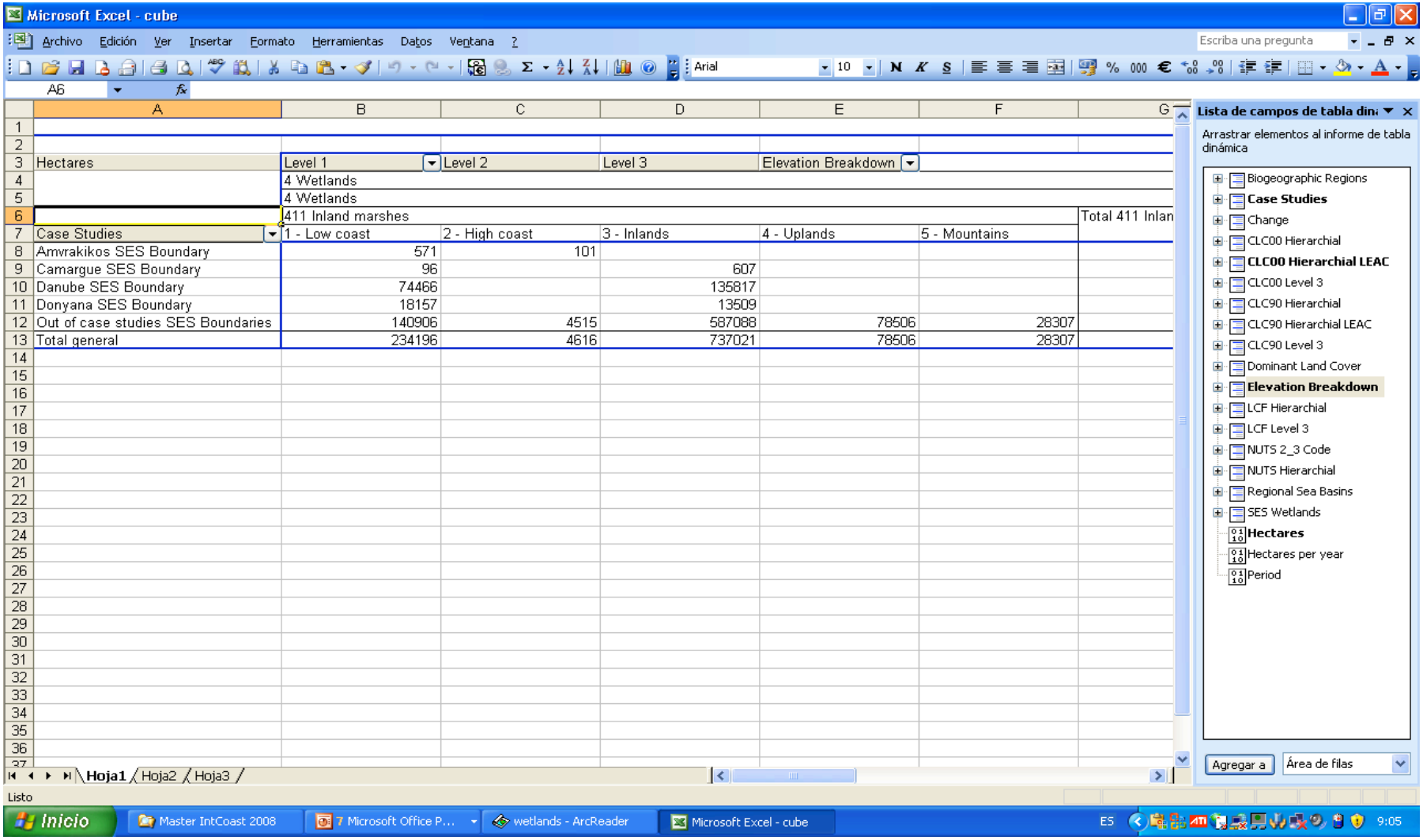
Listo

Inicio | Atlas meeting ... | CIRCA - Com... | LEAC Layers - ... | Gmail - Missatg... | 08IG18_Final_... | Descargas | Microsoft Exce... | ES | 9:24

2.1.Accounting for Biodiversity by regions



Acounting tables for wetlands using the OLAP-CUBE prototype for LEAC



Hectares	Level 1	Level 2	Level 3	Elevation Breakdown		
	4 Wetlands					
	4 Wetlands					
	411 Inland marshes					Total 411 Inlan
Case Studies	1 - Low coast	2 - High coast	3 - Inlands	4 - Uplands	5 - Mountains	
Amvrakikos SES Boundary	571	101				
Camargue SES Boundary	96		607			
Danube SES Boundary	74466		135817			
Donyana SES Boundary	18157		13509			
Out of case studies SES Boundaries	140906	4515	587088	78506	28307	
Total general	234196	4616	737021	78506	28307	

2.2.The ICZM Protocol in the Mediterranean Sea (January 2008)

New paradigm: land/sea/river interface; maritime activities; new “integrated”way of doing

Work with the 22 Med countries

2.2. Supporting ICZM Protocol

- Program under preparation between the Regional Activity Center on ICZM (PAP/RAC Split) and the EEA to work together in 2009 and following years

1. Stocktake:
   -Identify what countries will need to implement the Protocol
   -Data and indicators needed for ICZM Protocol implementation

2. Awareness, capacity building and training
   -meeting with people doing the job
   -network development
   -process facilitating construction of a common Information system

2.3. FP7 proposal (2008) for the Mediterranean and the Black Sea

- Vehicule to implement our methodology/Long term objective vision
- Developping assessment tools
  - EU Indicators and their adaptatio to the Mediterranean
  - Land accounts for coast and sea
    - land cover, Sea bed mapping; Maritime uses;
  - Ecosystem accounts for coastal and sea units,
  - Scenario and outlook
- Organizing data/SDI
- Tests in local sites, in coastal cities & regions, and in all Mediterranean basin (nested information)
- Network building: Validation of results/participation, capacity building and training by stakeholders→implementation

Conclusions

- Experience in Europe and in the Mediterranean
  - ICZM process
    - Support to policy needs
    - Network development
    - Data flows and indicator production
    - Working with stakeholders on training & capacity building
    - Sense of ownership by decision makers
  - Developing LEAC methodology
    - CLC/GlobCorine
    - Mapping specific areas
    - Accounting methodology for land, ecosystems and water
    - Production of indicators e.g new spatial modeling techniques for mapping biodiversity potential
    - Validation and implementation by stakeholders
  - Both activities will contribute to the development of the European and Mediterranean coastal atlas

Thank you!