

# Biodiversity Multi-Source Monitoring System: From Space To Species (BIO\_SOS) - GA 263435



BIO\_SOS

## Main Objective is

*The development of a pre-operational multi-modular ecological modelling system suitable for multi-annual monitoring of NATURA 2000 sites and their surroundings.*

## BIO\_SOS Consortium

**P1\_CNR Italy**  
blonda@ba.issia.cnr.it

**P2\_UOI Greece**  
pdimopoul@hol.gr

**P3\_CE.R.T.H. Greece**  
petrou@iti.gr

**P4\_Alterra Netherlands**  
rob.jongman@wur.nl

**P5\_ATREE India**  
nagendra@indiana.edu

**P6\_PKI Italy**  
daniela@planetek.it

**P7\_ALTAMIRA Spain**  
pepa.sedo@altamira-information.com

**P8\_UNIBA Italy**  
p.mairota@agr.uniba.it

**P9\_CIBIO Portugal**  
jhonrado@fc.up.pt

**P10\_UNIMIB Italy**  
emilio.padoaschioppa@unimib.it

**P11\_ABERY UK**  
rml@aber.ac.uk

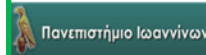
**P12\_IRD France**  
laurent.durieux@ird.fr

**P13\_PKH Greece**  
bollanos@planetek.gr

**P14\_ASI Italy**  
laura.candela@asi.it

**P15\_BACRES Italy**  
andrea6311@gmail.com

**P16\_UPS\_CESBIO France**  
jordi.inglada@cesbio.cnes.fr



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15 Sept 2011

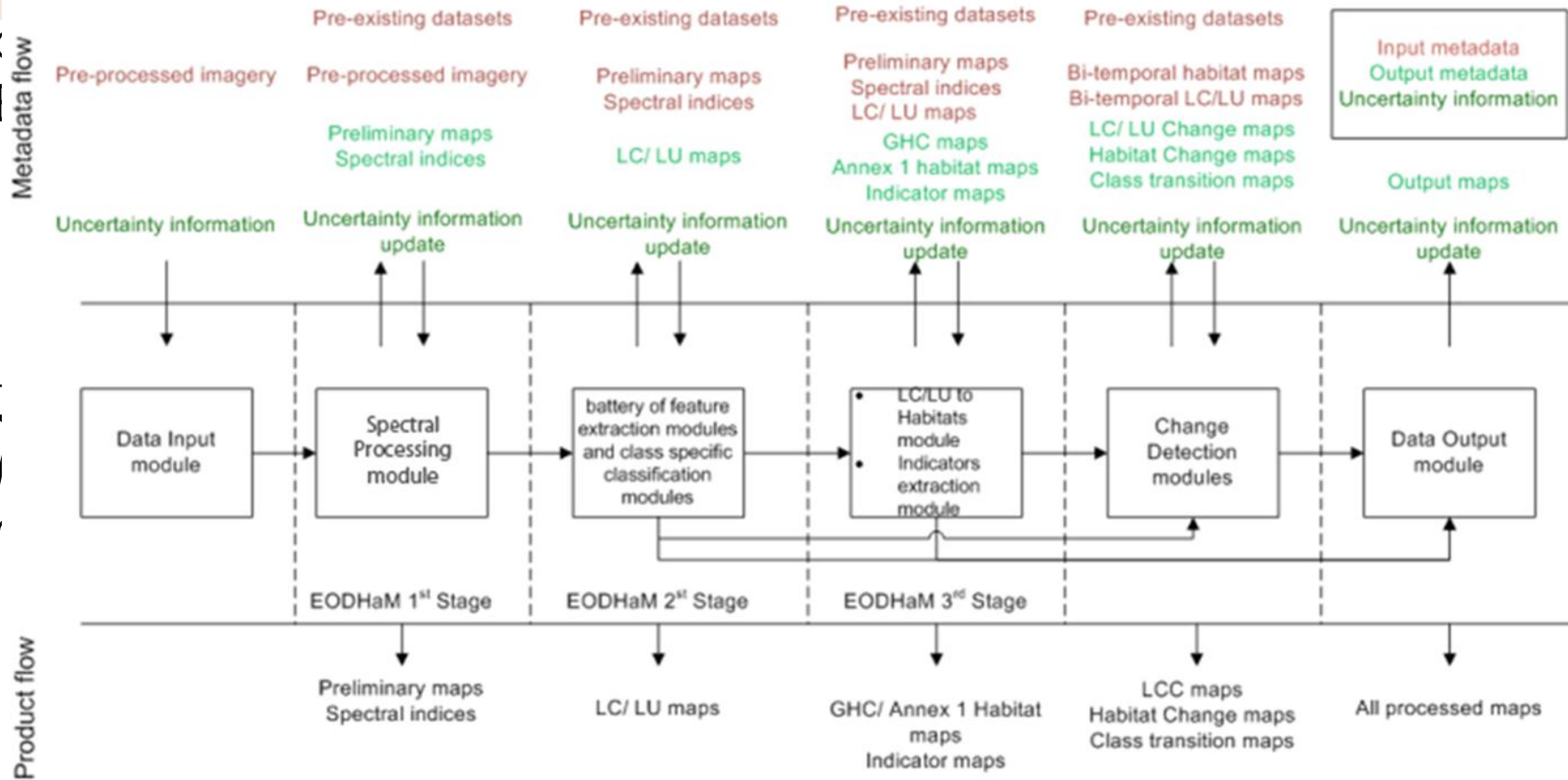




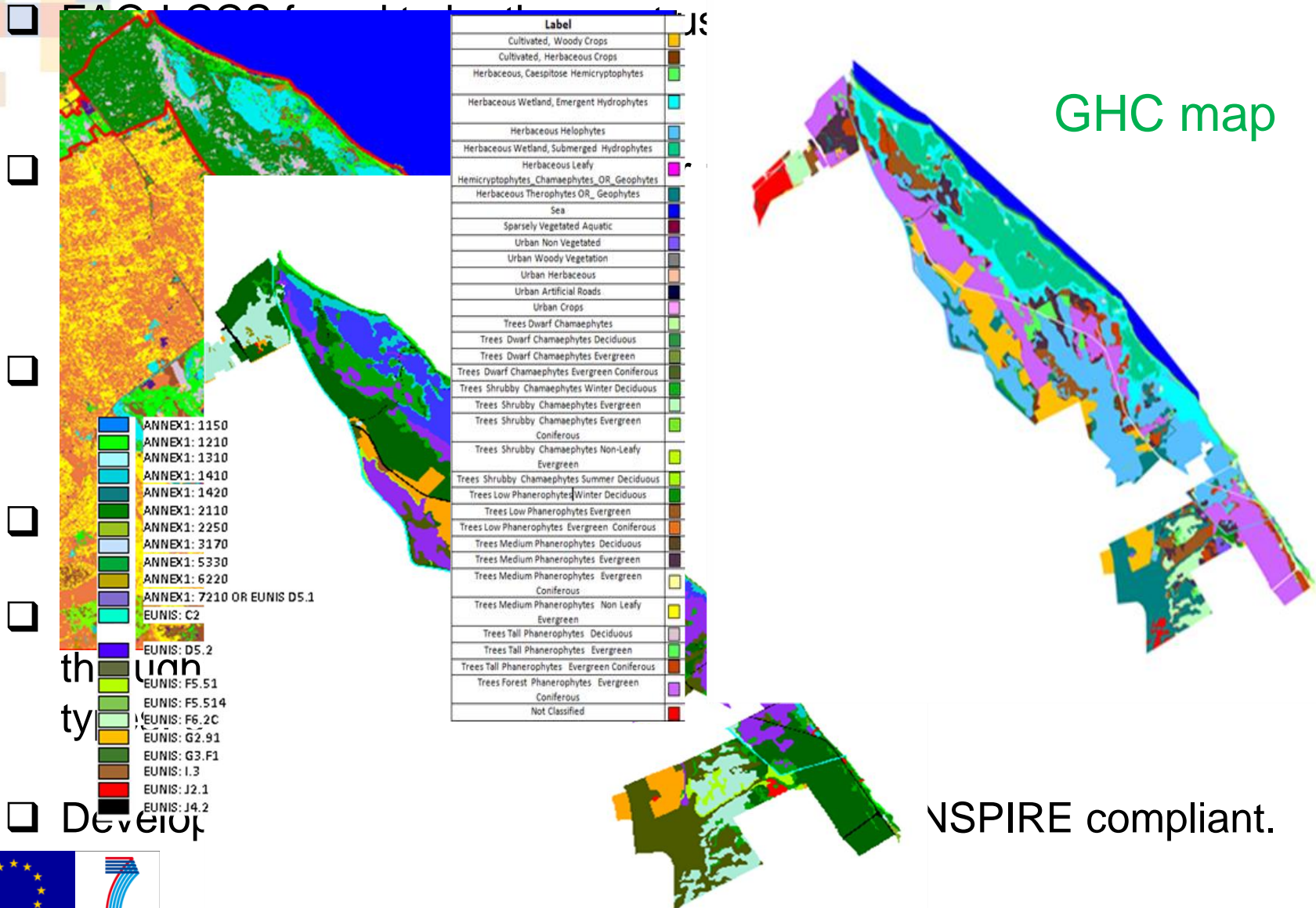
# Earth Observation Data for Habitat Monitoring (EODHaM) system peculiarities

- ❑ The system adopts **deductive learning** schemes (i.e., it based on expert knowledge elicitation to fill the gap between domains)
  
- ❑ **Ontologies and semantic networks** are used:
  - ✓ *Domain ontologies* for Land Cover and Land Use (LC/LU) and Habitat class description and LC/LU to Habitats translation;
  - ✓ *Task ontologies* for data processing tools description;
  - ✓ *Unified Modeling Language UML* language used
  
- ❑ An **object oriented** approach is adopted within e-Cognition and then translated to open source code along with image pre-processing, segmentation and feature extraction software.

# BIO\_SOS achievements



# BIO\_SOS main achievements



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# Conclusions and lessons learnt

- ❑ The BIO\_SOS products will be more familiar to the End Users since they are built on their *expertise* and can be improved as they further engage with the process.
- ❑ Multi-spectral/multi-temporal EO data are more effective and less costly than available single-date hyper-spectral data from aerial platforms for habitat mapping.
- ❑ *Multi-temporal VHR (and particularly WorldView2) data and LIDAR are optimal for classification and retrieval of biophysical attributes.*
- ❑ More research is needed for biodiversity indicator extraction from VHR imagery
- ❑ Protocols for in-situ data collection must be harmonized with ecological modeling and agree with management authorities

# Outlook and potential issues for the future

- ❑ EODHaM system operationalization:
  - ✓ Image driven input parameter extraction and preprocessing
  - ✓ Task ontologies development for data processing tools description
- ❑ Multi-sensor data fusion based on expert-knowledge elicitation
  - ✓ SAR data (Northern Europe sites).
  - ✓ Sentinel data exploitation
- ❑ *Temporal change* (e.g., *Phenology*) key to detect habitats and species: low cost tools (e.g., drones) for timely detection at high resolution.
- ❑ Model based long-term collection of both *in-situ* environmental data and *multi-resolution* EO data for NK2 sites (*as hotspots*) for:
  - ✓ Biodiversity indicators and their trend evaluation to be used in following up the impact of existing policies and new policy making.

