

Deriving long term land cover change from aerial photography to assess pressures on biodiversity

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Abstract:

Aerial photography is the only means of deriving long term (~50 years) spatially detailed land cover change information. Historical satellite remote sensing is still relatively coarse spatially (~30 m) when addressing subtle land cover changes and the record only goes back to the mid 1970s.

The Global Monitoring for the Environment and Security (GMES) programme aims to identify the strengths and the weaknesses of the current European capacity for monitoring and information production. This current capacity must be viewed in the light of the ability to derive useful information now and thus to guide the development of future systems. To this end, the BIOPRESS (Linking Pan-European Land Cover Change to Pressures on Biodiversity) project, being undertaken by a consortium of 7 European partners, is providing decision makers with quantitative information on how changing land cover and land use has affected the environment and biodiversity in Europe over the second half of the 20th century.

The project is currently at the midway point having produced historical (1950 – 2000) land cover change information in and around a selection of Natura2000 sites. The sites were selected to represent the range of landscapes and habitats in Europe. The change statistics are produced by means of two parallel activities: (i) the backdating of CORINE land cover 1990 with aerial photography of the 1950's for 75 windows of 30 km by 30 km each centred on a Natura2000 site and, (ii) the detailed interpretation of aerial photography from 1950, 1990 and 2000 for 65 transects of 2 km by 15 km along

gradients from the centre of a Natura2000 site towards a source of environmental pressure. The windows and transects are interpreted manually against the CORINE land cover classification to a minimum mapping unit of 25 ha and 0.5 ha respectively.

This work has produced interesting results for land cover change across Europe. It has also identified a range of issues that must be considered when attempting to map land cover change in such a way. These have included the availability and quality of data, the spectral format (panchromatic / colour), the adaptability of the classification and the variability of interpretation across Europe. The change information will be analysed in the context of 'Driver, Pressure, State, Impact, Response' modelling framework to assess pressures on biodiversity with all results extrapolated to the European level through a bio-geographical stratification.