

The role of ecosystem services in conservation and management. Urdaibai Biosphere Reserve

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1- Implementation of the ecosystem services approach in the Master Plan for Use and Management of Urdaibai

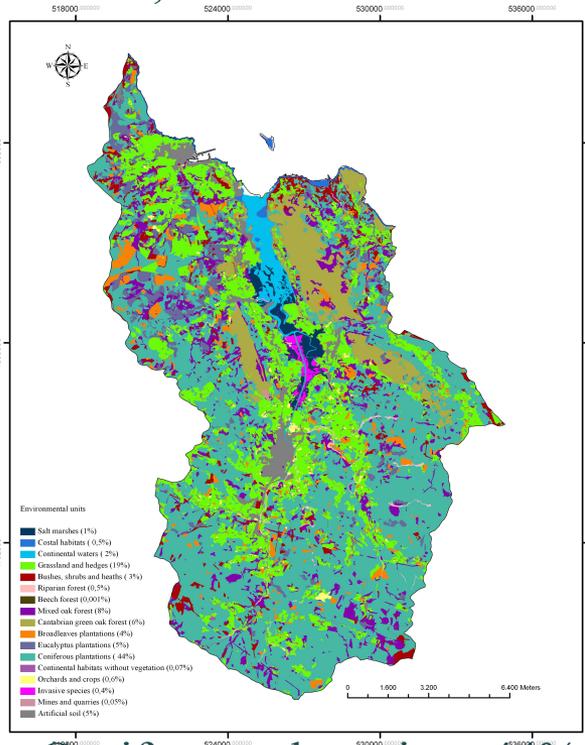
Aim: Identify areas for multiple ecosystem services (ES) to enhance sustainable land management in Urdaibai

Questions:

- which ecosystems are the most important for multi-functionality: habitat maintenance, water flow regulation, carbon store, recreation, aesthetic value
- to what extent ES overlap/hotspot?

Methodology

- **Study area:** watershed in northern Spain: Urdaibai B.R.
- Costal and mountainous landscapes. 220km² ; 44,000 inh.



Coniferous plantations 44%,
natural forests 15%

Biodiversity was calculated and valued:

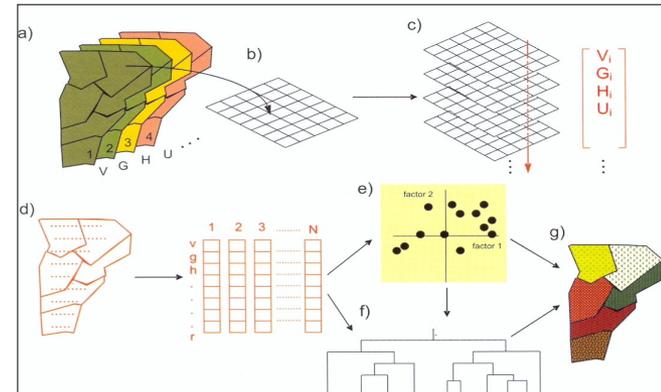
$$B = f(r) + f(q) + f(p)$$

Carbon storage C (biomass and soil) was valued as (IPCC, 2003):

Water flow regulation was based on the TETIS model (Vélez et al., 2009) (WC) was calculated as (mm / year):

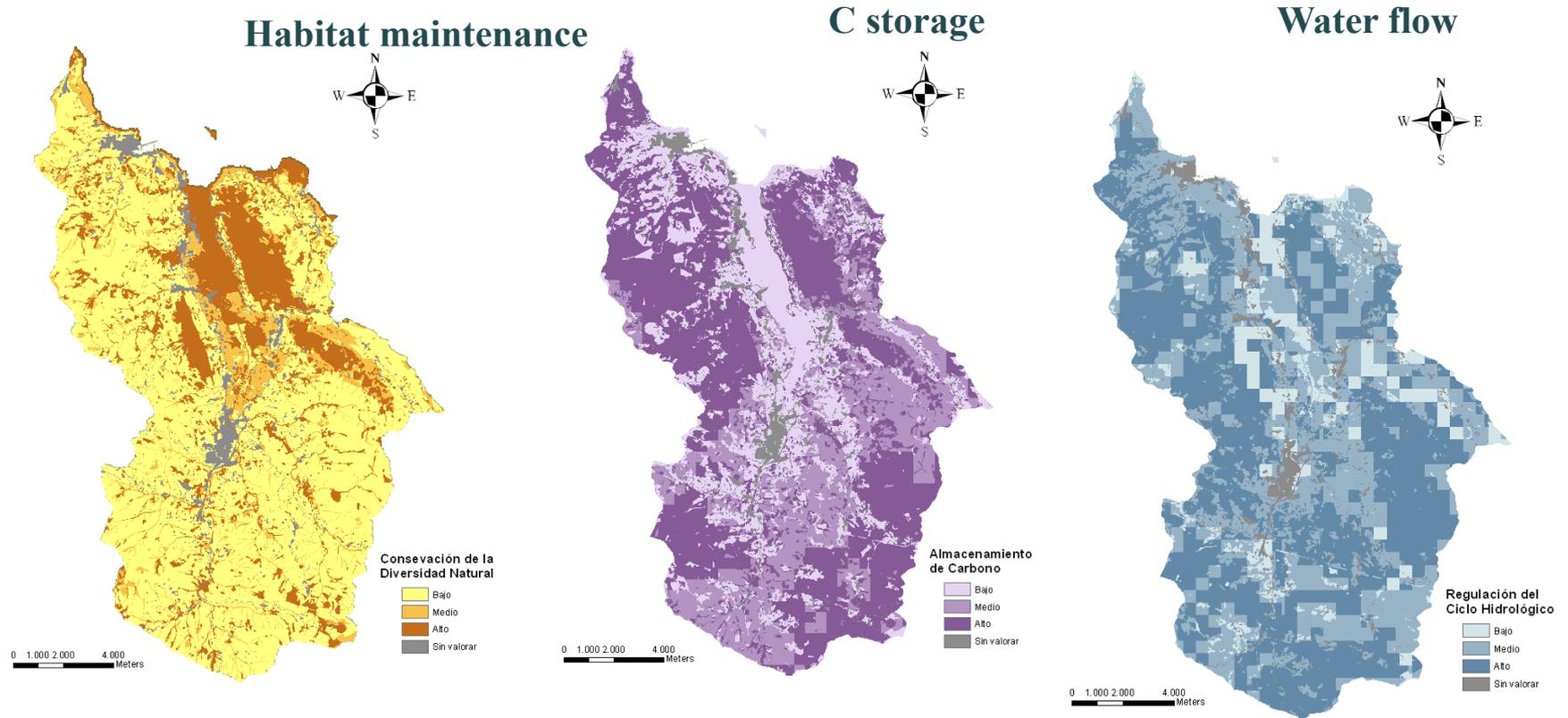
Aesthetic value and recreation: people's perception

The overlap between the services was calculated using a proportional overlap as the area shared between two services.



- A Geographic Information System-based approach was designed to estimate spatially the value of the ecosystem services. Spatial units were grid cells with a size of 4 m².

Maps of habitat maintenance, C storage, water flow regulation, recreation and aesthetic value (hotspots overlapping)



Conclusion for management

- The actual protected areas/CORE (salt marshes, coastal ecosystems and Cantabrian evergreen-oak forests) were found to be important for ES (**ES overlaped /hotspot**)
- The currently non-priority areas of natural forests, such as the mixed-oak forest, beech forests and riparian forests, are **hotspots for ES**; thus, even though these areas are small and fragmented (5%-15%), their inclusion as priority areas of conservation should be considered.
- **The inclusion of these forests in CORE areas**, would contribute to an increase of nearly 33% of the habitat/biodiversity hotspot, more than 40% of the carbon storage and almost 13% of the water flow regulation.
- **Trade-offs:** Pine and eucalyptus plantations contribute to some ecosystem services but have very low biodiversity (and some negative environmental effects)
- **Integrative management is needed.** Conservation based only in one ecosystem service might be detrimental to habitat/biodiversity.

2- A “multiple ecosystem services” index as a tool for socio-economic compensations at municipality level

The contribution of the municipalities to the provision of ecosystem services should be considered (multifunctionality)

The indicator is a tool to develop a system of socio-economic compensation for the provision of ecosystem services at municipality level

What has worked well?

- A space for coordination and dialogue between scientist, managers/politicians and stakeholders
- Implication of technicians

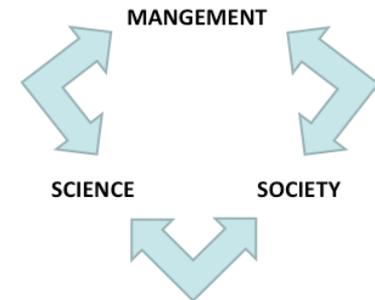
What have been the challenges?

- Development of technical tools: mapping, others
- Spatially explicit accurate information
- Inertia of the systems: lack of policy coordination



What are the needs?

- Coordination of politics
- Stakeholders' participation and collaboration with technicians and politicians
- An integrative approach to enhance the link between science, policy-making and society.



Thank you very much

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