

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

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Frontenac Arch
Biosphere



UNESCO Chair – Biosphere Reserve

UNESCO etxea

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

Science  Management

Useful scientific knowledge emerges from the cooperation of scientists and practitioners

SPATIAL APPROACH

Trade-offs between biodiversity, carbon storage and water flow regulation were analysed in Urdaibai

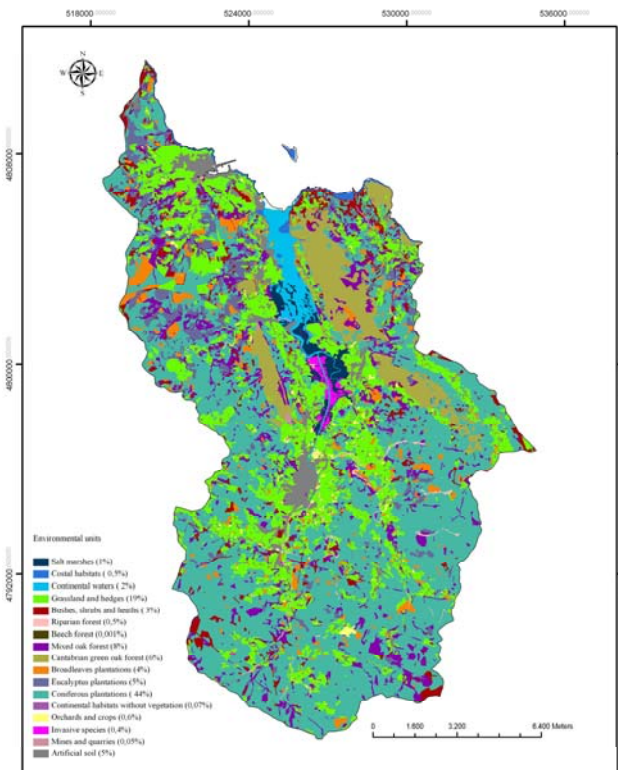
Aim: propose criteria for conservation that would include ecosystem services and biodiversity

Questions:

- 1- which ecosystems are the most important producers of biodiversity, carbon storage and water regulation?
- 2- to what extent the conservation of biodiversity will ensure the provision of other ecosystem services?

Mapping

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



Coniferous plantations 44%,
natural forests 15%

Biodiversity was calculated and valued as:

- $B = f(r) + f(q) + f(p)$
richness; habitat quality (succession); degree of legal protection

Carbon storage C (biomass and soil):

- Inventory of organic C stored in the soil and biomass
 $CB = V * BEF * (1 + R) * D * CF$
the root-to-shoot ratio; wood density; the carbon fraction of dry matter

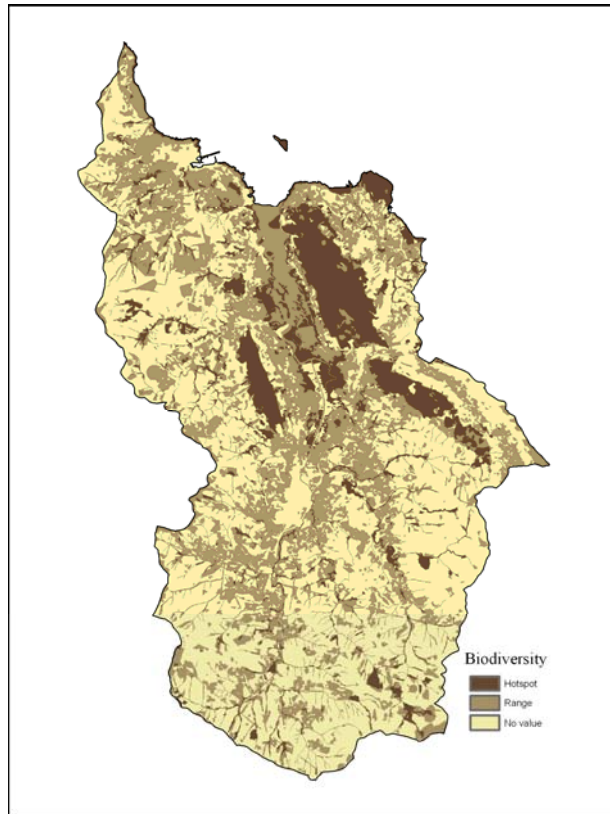
Water flow regulation was based on the TETIS model (WC) was calculated as (mm / year):

- $WC = Hu/R$
water stored in the soil; annual rainfall; corrected annual potential evapotranspiration

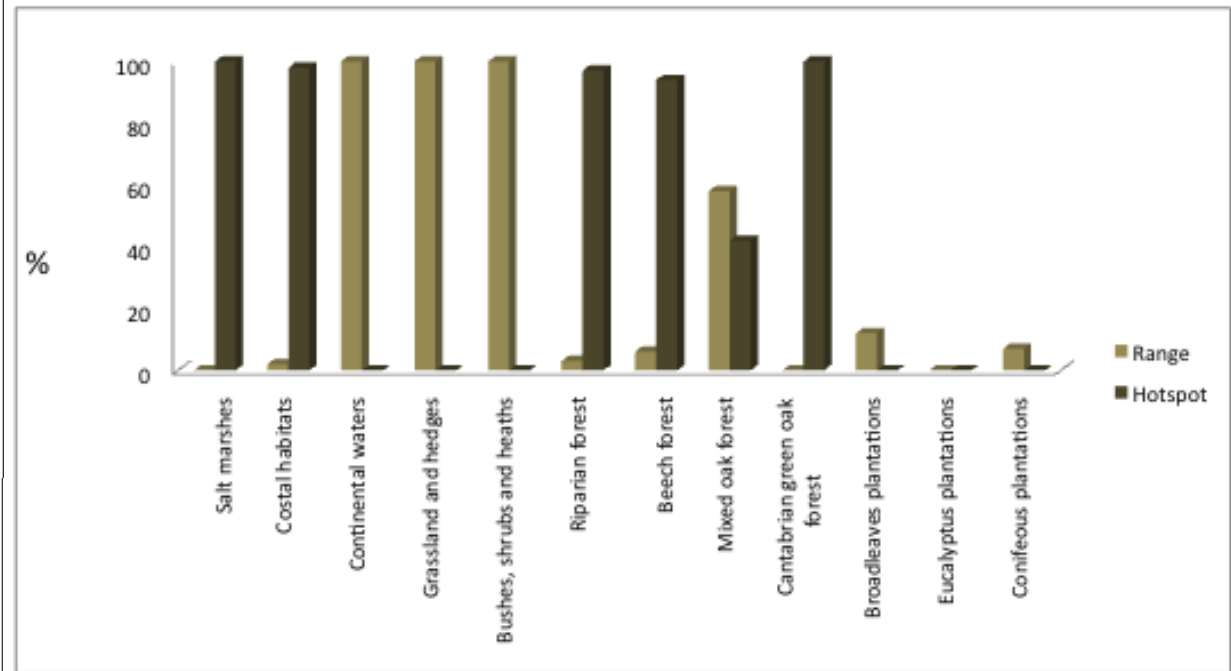
- A Geographic Information System-based approach was designed to estimate spatially the value of the biodiversity and ecosystem services. Spatial units were grid cells with a size of 4 m².

Results: Biodiversity

Range and hotspot



Percentage of each ecosystem that is included in the ranges and hotspots



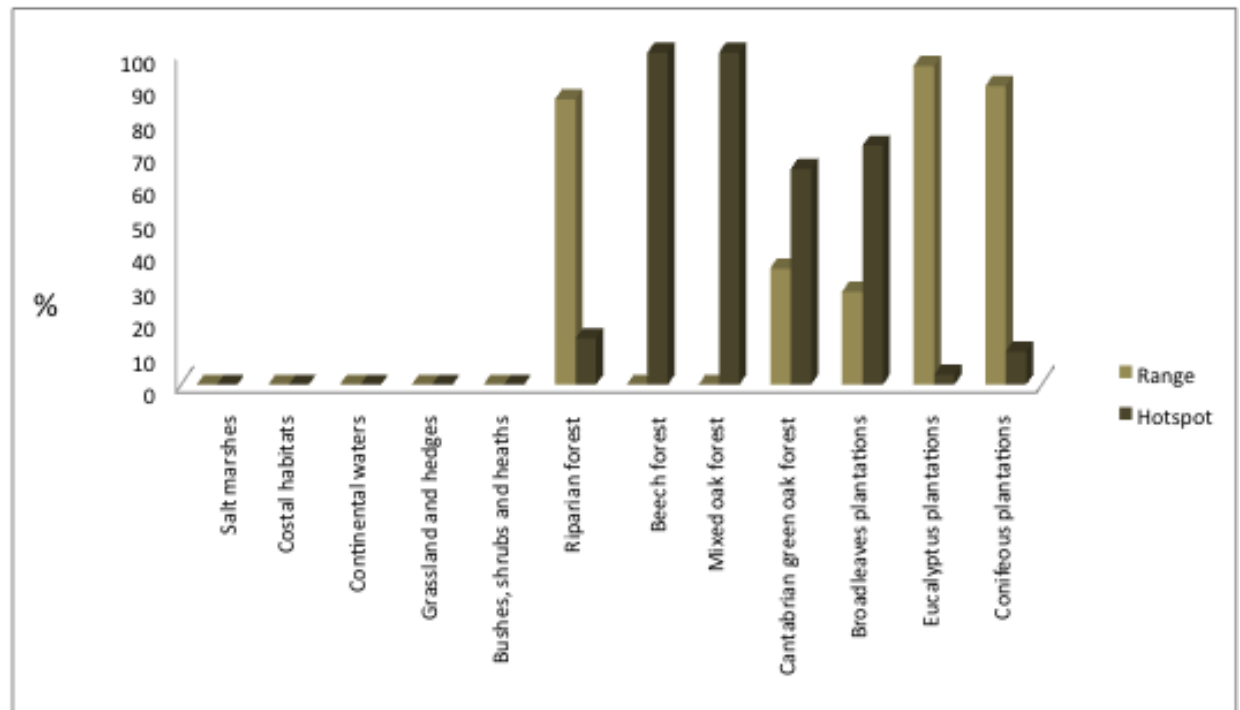
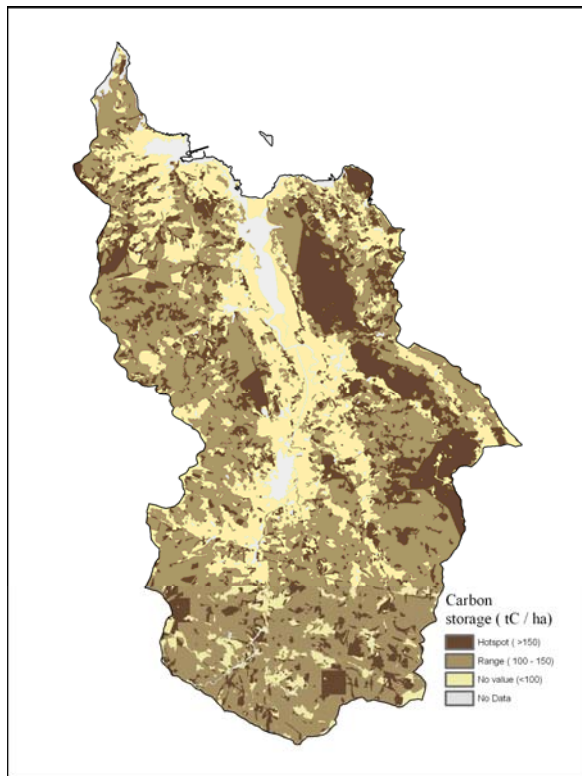
The total area of marshes, coastal habitats and natural forests are included as biodiversity hotspots. The coniferous and eucalyptus plantations did not contribute to the biodiversity.

Carbon storage

Range and hotspot

68% overlap with Biodiversity

Percentage of each ecosystem that is included in the ranges and hotspots

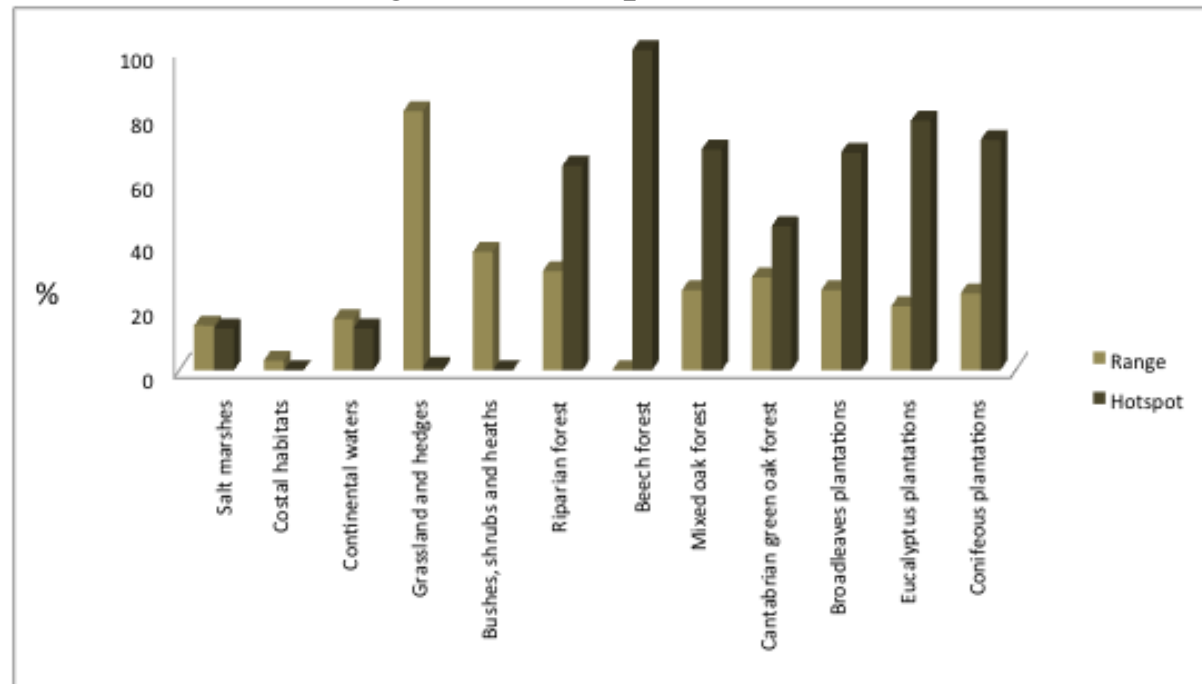
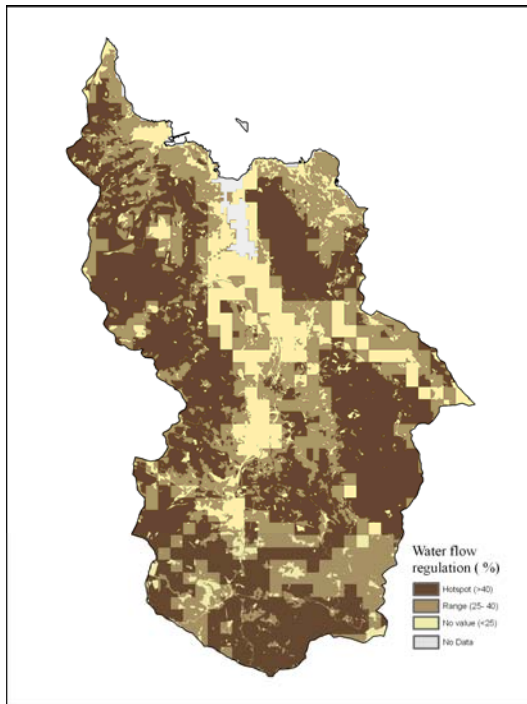


Nearly the total area of the natural forests contributes to the carbon storage hotspot. 10% of the coniferous plantations are included in the hotspot and 90% are include in the range.

Water flow regulation

Range and hotspot
49% overlap with Biodiversity

Percentage of each ecosystem that is included in the ranges and hotspots



The entire area of natural forests contribute to the hotspot. More than half of the area of forest plantations, are also included in the hotspot.

Results for management

- Natural forests are the ecosystems that most contribute to biodiversity, carbon storage and water flow regulation (overlap areas)
- **Conservation and restoration of biodiversity would ensure the provision of some important portions of other ecosystem services**
- Pine and eucalyptus plantations contribute to ecosystem services but have very low biodiversity (some negative effects)
- **Conservation based only in one ecosystem service might be detrimental to biodiversity. Integrative management is needed.**

NETWORKS

Networking gives the opportunity for working from local to global and vice versa



- Ecosystem Service Partnership, ESP
- Sub Global Assessment network, SGA
- Intergovernmental Platform on Biodiversity and Ecosystem Services, IPBES
- **Man and Biosphere, MaB**

CONCLUSIONS

- The perspective of ecosystem services can contribute to develop sound land-use policies and planning actions in Biosphere Reserves
- **Important issues:**
 - Stakeholders' participation and collaboration with technicians and politicians
 - Development of technical tools: mapping, others (spatially explicit accurate information).
 - Engagement in Networks

THE TEAM

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Thank you very much

Merci beaucoup

Muchas gracias

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