V Congreso Ibérico de Ecología del Paisaje
V Congresso Ibérico de Ecologia da Paisagem
V Iberian Congress on Landscape Ecology

CHANGING LANDSCAPES AND SOCIETY

18-19 /11/2021

Resúmenes

Resumos

Abstracts

V Congreso Ibérico de Ecología del paisaje
18 y 19 de noviembre de 2021
Editado por: Asociación Española de Ecología del paisaje (IALE-España)

17 de noviembre de 2021

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V Congreso Ibérico de Ecología del paisaje/V Congresso Ibérico de Ecologia da Paisagem

PROGRAMA

WORKSHOP

Remote sensing for ecosystem monitoring at the landscape scale: from in situ data to Copernicus services Workshop organizado por el Grupo de Trabajo *Copernicus for landscape monitoring* de IALE España y el proyecto CopTRAIN de IH Cantabria, perteneciente al programa *Framework Partnership Agreement on Copernicus User Uptake* (FPACUP). Programa detallado en https://coptrain.ihcantabria.com/		
15 Nov 2021	10:00-12:00 h*	1. Copernicus data
16 Nov 2021	10:00-12:00 h 16:00-18:00 h	2. Landscape Mapping and Monitoring
17 Nov 2021	10:00-12:00 h	3. Management and Policy under Global Change
18 Nov 2021	17:45-19:45h	4. Final Session

* (GMT+01:00) Hora de Europa central - Madrid

CONGRESO

Dia 1 (jueves 18 de noviembre)		
	9:00 - 9:35 h*	Inauguración. Comité organizador AEEP y APEP, IALE EU, IALE Int. **MªJesús Pastor Llorca**. Vicerrectora de Transferencia, Innovación y Divulgación Científica UA.
Primera sesión	9:40 -10:20 h	Ponencia **Prof. Marc Metzger** (University of Edinburgh, Membership Secretary - IALE-UK) – "*Spatial modelling & landscape planning*".
	10:20 -12:55 h	Presentaciones (10 min. Presentación video+5 min. Preguntas). Pósters: Presentaciones cortas (video 3 min). Discusión final.
Segunda sesión	13:00 -13:40 h	Presentaciones (10 min. Presentación video+5 min. Preguntas). Pósters: Presentaciones cortas (video 3 min). Discusión final.
	13:40 -15:30 h	Descanso
Tercera sesión	15:30 - 16:05 h	Ponencia **Prof. Luis Quinta-Nova** (Instituto Politécnico de Castelo Branco) – "*A importância da implementação de um observatório da paisagem no contexto da mudança do modelo de governo no Parque Natural do Tejo Internacional*".
	16:10 -17:40 h	Presentaciones (10 min. Presentación video +5 min. Preguntas). Pósters: Presentaciones cortas (video 3 min). Discusión final.
	17:45 -19:45 h	Sesión final Workshop *Applications Copernicus for landscape monitoring.*

* (GMT+01:00) Hora de Europa central - Madrid

Dia 2 (viernes 19 de noviembre)		
Cuarta sesión	9:30-10:05 h*	Ponencia **Dr. Nuno Guiomar** (Universidade de Évora) – "*Prevenção de incêndios extremos: contributos para a implementação de um sistema de gestão sustentável do regime de fogo*".
	10:10-11:40 h	Presentaciones (10 min. Presentación video+5 min. Preguntas). Pósters: Presentaciones cortas (video 3 min). Discusión final.
Quinta sesión	11:45-12:10 h	Presentación de libro "*Fire Science. From Chemistry to Landscape Management*", **Dr. Francisco Castro Rego** (Instituto Superior de Agronomia, Lisboa). Autores: Francisco Castro Rego, Penelope Morgan, Paulo Fernandes, Chad Hoffman.
	12:15-13:30 h	Presentaciones (10 min. Presentación video+5 min. Preguntas). Pósters: Presentaciones cortas (video 3 min). Discusión final.
	13:30-15:30 h	Descanso
Sexta sesión	15:30-16:45 h	Presentaciones breves (10 min. Presentación video+5 min. Preguntas). Pósters: Presentaciones cortas (video 3 min). Discusión final.
	Simposio **Ecología del paisaje y planificación territorial**. 16:45-20:00 h*	
	16:45- 16:55 h	Inicio y presentación. Josep Lascurain (SGM) y Dr. José Muñoz-Rojas (U. Évora).
	16:55-17:40 h	Ponencia **Prof. Jianguo (Jingle) Wu** (Arizona State University, Editor in Chief - Landscape Ecology) – "*Landscape Sustainability Science*".
	17:45-20:00 h	Mesa redonda. Debate. Moderadores: Dr. José Muñoz-Rojas (U. Évora) y Josep Lascurain (SGM). • **Miguel Bugalho**, Coordenador do CEABN/InBio, Instituto Superior de Agronomia, Universidade de Lisboa. • **Marta Múgica**. EUROPARC España. Investigación y estudios técnicos al servicio de las áreas protegidas. • **João Alves**, Assessor do Departamento de Conservação da Natureza e Biodiversidade, ICNF (Instituto da Conservação da Natureza e das Florestas). • **Jose Manuel Álvarez Martínez**. Instituto de Hidráulica Ambiental "IH Cantabria". • **Catarina Grilo**, Diretora de Conservação e Políticas na ANP|WWF (Associação Natureza Portugal, em parceria com a WWF). Fila 0 • **Rosa Pardo Marín**. Directora General de Política Territorial y Paisaje. Generalitat Valenciana. • **Josep Mª Torrents Abad.** Jefe de Servicio de Planes y Programas. Generalitat de Catalunya.

		• **Salvador Palop Guillen**. Director – Conservador del Parque Natural Carrascal de la Font Roja. Generalitat Valenciana. • **Joan Pino**. Director del Centro de Investigación Ecológica y Aplicaciones Forestales (CREAF). • **Teresa Pinto Correia**. IALE Council representative e Diretora Instituto Mediterrâneo para a Agricultura, Ambiente e Desenvolvimento. • **Isabel Loupa-Ramos**. IALE-Europe; Instituto Superior Técnico de Lisboa.
	20:00-20:30 h	Presentación y adhesión en su caso al *Manifiesto en defensa de los paisajes europeos*. • **Juanjo Galán** (UNISCAPE). Conclusiones de Simposio.
Clausura del Congreso		

* (GMT+01:00) Hora de Europa central - Madrid

V Congreso Ibérico de Ecología del paisaje/V Congresso Ibérico de Ecologia da Paisagem

PROGRAMA

WORKSHOP

Remote sensing for ecosystem monitoring at the landscape scale: from in situ data to Copernicus services Workshop organizado pelo Grupo de Trabalho *Copernicus for landscape monitoring* da IALEEspanha e o projeto CopTRAIN de IH Cantabria, pertencente ao programa *Framework Partnership Agreement on Copernicus User Uptake* (FPACUP). Programa detalhado em https://coptrain.ihcantabria.com/		
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* Hora em Portugal

CONGRESSO

1º dia (quinta-feira 18 de novembro)		
	8:00 - 8:35 h*	Abertura. Comissão organizadora AEEP e APEP, IALE EU, IALE Int. **MªJesús Pastor Llorca**. Vice-reitor de Transferência, Inovação e Divulgação Científica UA.
Primeirasessão	8:40 -9:20 h	Apresentação **Prof. Marc Metzger** (University of Edinburgh, Membership Secretary - IALE-UK) – "*Spatial modelling & landscape planning*".
	9:20 -11:55 h	Apresentações (10 min. Apresentação video+5 min. Perguntas). Posters: Apresentações curtas (video 3 min). Discussão final.
Segunda sessão	12:00 -12:40 h	Apresentações (10 min. Apresentação video+5 min. Perguntas). Posters: Apresentações curtas (video 3 min). Discussão final.
	12:40 -14:30 h	Pausa
Terceira sessão	14:30 - 15:05 h	Apresentação **Prof. Luis Quinta-Nova** (Instituto Politécnico de Castelo Branco) – "*A importância da implementação de um observatório da paisagem no contexto da mudança do modelo de governo no Parque Natural do Tejo Internacional*".
	15:10 -16:40 h	Apresentações (10 min. Apresentação video+5 min. Perguntas). Posters: Apresentações curtas (video 3 min). Discussão final.
	16:45 -18:45 h	Sessão final Workshop *Applications Copernicus for landscape monitoring.*

* Hora em Portugal

2º dia (sexta-feira 19 de novembro)		
Quarta sessão	8:30-9:05 h*	Apresentação **Dr. Nuno Guiomar** (Universidade de Évora) – "*Prevenção de incêndios extremos: contributos para a implementação de um sistema de gestão sustentável do regime de fogo*".
	9:10-10:40 h	Apresentações (10 min. Apresentação video+5 min. Perguntas). Posters: Apresentações curtas (video 3 min). Discussão final.
Quinta sessão	10:45-11:10 h	Apresentação do livro "*Fire Science. From Chemistry to Landscape Management*", **Dr. Francisco Castro Rego** (Instituto Superior de Agronomia, Lisboa). Autores: Francisco Castro Rego, Penelope Morgan, Paulo Fernandes, Chad Hoffman.
	11:15-12:30 h	Apresentações (10 min. Apresentação video+5 min. Perguntas). Posters: Apresentações cortas (video 3 min). Discussão final.
	12:30-14:30 h	Pausa
Sexta sessão	14:30-15:45 h	Apresentações (10 min. Apresentação video+5 min. Perguntas). Posters: Apresentações curtas (video 3 min). Discussão final.
	Simpósio **Ecologia da paisagem e planeamento territorial**. 16:45-20:00 h*	
	15:45- 15:55 h	Inicio e apresentação. Josep Lascurain (SGM) e Dr. José Muñoz-Rojas (U. Évora).
	15:55-16:40 h	Apresentação **Prof. Jianguo (Jingle) Wu** (Arizona State University, Editor in Chief - Landscape Ecology) – "*Landscape Sustainability Science*".
	16:45-19:00 h	Mesa redonda. Debate. Moderadores: Dr. José Muñoz-Rojas (U. Évora) e Josep Lascurain (SGM). • **Miguel Bugalho**, Coordenador do CEABN/InBio, Instituto Superior de Agronomia, Universidade de Lisboa. • **Marta Múgica**. EUROPARC España. Investigación y estudios técnicos al servicio de las áreas protegidas. • **João Alves**, Assessor do Departamento de Conservação da Natureza e Biodiversidade, ICNF (Instituto da Conservação da Natureza e das Florestas). • **Jose Manuel Álvarez Martinez**. Instituto de Hidráulica Ambiental "IH Cantabria". • **Catarina Grilo**, Diretora de Conservação e Políticas na ANP|WWF (Associação Natureza Portugal, em parceria com a WWF). Fila 0 • **Rosa Pardo Marín**. Directora General de Política Territorial y Paisaje. Generalitat Valenciana. • **Josep Mª Torrents Abad.** Jefe de Servicio de Planes y Programas. Generalitat de Catalunya. • **Salvador Palop Guillen**. Director – Conservador del Parque Natural Carrascal de la Font Roja. Generalitat Valenciana

		• **Joan Pino**. Director del Centro de Investigación Ecológica y Aplicaciones Forestales (CREAF). • **Teresa Pinto Correia**. IALE Council representative e Diretora Instituto Mediterrâneo para a Agricultura, Ambiente e Desenvolvimento. • **Isabel Loupa-Ramos**. IALE-Europe; Instituto Superior Técnico de Lisboa.
	19:00-19:30 h	Apresentação e adesão ao *Manifesto em defesa das paisagens europeias.* • **Juanjo Galán** (UNISCAPE) Conclusões do Simpósio.
Encerramento do Congresso		

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SESIÓN

SESSÃO

1

V CONGRESO IBÉRICO DE ECOLOGÍA DEL PAISAJE
V CONFERÊNCIA IBÉRICA DE ECOLOGIA DA PAISAGEM

***Changing landscapes and Society*, November 18-19, 2021, online**

Mapping grassland types at a large scale by a combination of remote sensing and mechanistic modelling

Author(s): JM Álvarez-Martínez[1]; G Hernández-Romero[1]; I Pérez-Silos[1], P Barquin[1]

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Abstract:
Determining the conservation status of habitat types under the Habitats Directive requires knowing their distribution patterns to estimate regional extension, rarity and potential distribution, among other factors. Among all terrestrial habitats, grasslands are systems characterized by open vegetation dominated by herbaceous species and whose primary production is used directly by wild or domestic herbivores. Despite their economic and ecological importance, grasslands are one of the worst mapped natural and semi-natural systems in Spain. One of the main gaps relates on their distribution under different management regimes (mowing, grazing and intensity of use) which can be related to the corresponding carbon pools at geographic scales and future dynamics under global change.
Traditional techniques for mapping are based on field measurements collection, which results in a very laborious and time-consuming job not easy to extrapolate. Complementarily, remote sensing plays a very important role for collecting large amounts of information at different spatial and temporal scales. However, no works have been found that develop a specific methodology for grassland mapping at a large scale.
In this context, the main objective of this work is to apply a number of spatial modeling techniques based on remote sensing and mechanistic modelling for mapping the distribution of grasslands with different management regimes (natural, livestock and mowing) in the region of Cantabria and at a biogeographic scale. First, we created maps of natural and managed grasslands by using the values of intra-annual oscillation of the NDVI index obtained from S2 imagery since 2017 to 2021 and productivity values for grasslands according to the PUERTO model, a mechanistic approach that allow estimating green biomass production. One step beyond, we used data mining approaches to upscale in situ data of the different EUNIS grassland typologies collected from 2016 to 2020 by expert botanists by using predictor variables from topographic, climatic data and the time series of Sentinel 2 MSI images. The regional algorithm was afterwards extrapolated to the Eurosiberian biogeographic region. Results at the regional scale were validated with points derived from independents points of the in situ sampling and the distribution maps created by the time series of satellite imagery and the PUERTO model, with accuracy scores that reached in some cases 87% for managed grasslands types but significantly lower natural systems.

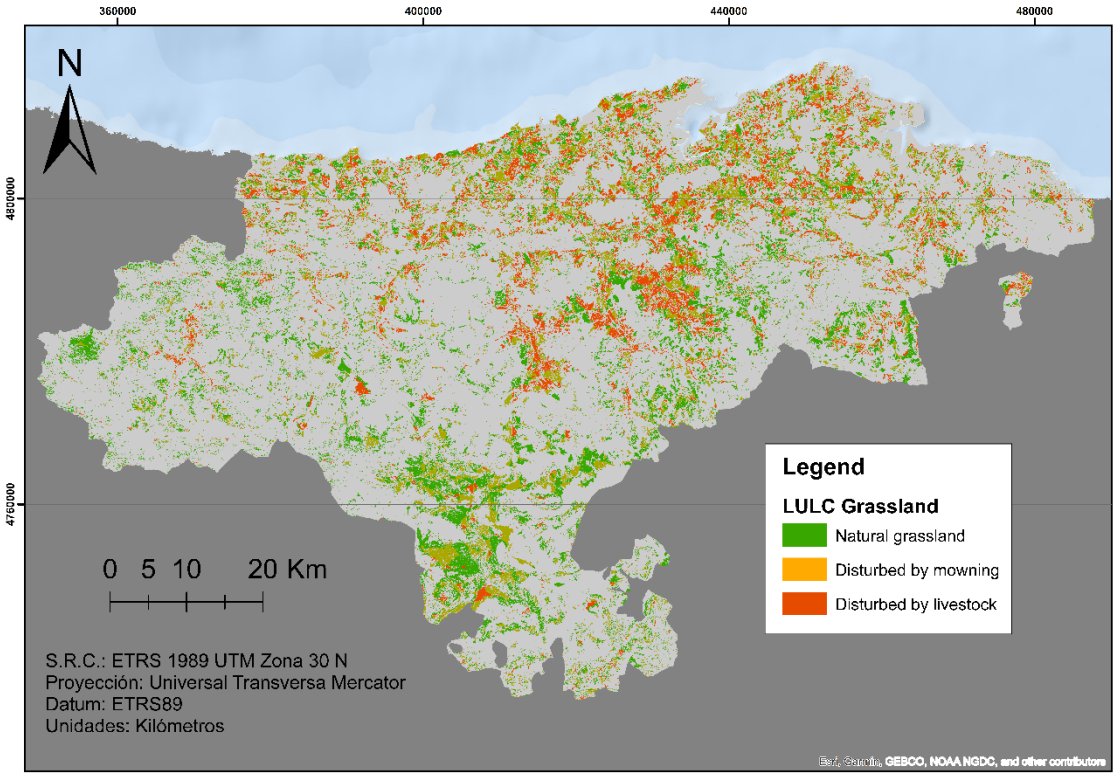

Fig. Distributional maps of grasslands in Cantabria classified by management and land use regimes

V CONGRESO IBÉRICO DE ECOLOGÍA DEL PAISAJE
V CONFERÊNCIA IBÉRICA DE ECOLOGIA DA PAISAGEM

Changing landscapes and Society, November 18-19, 2021, online

Land use determines Mediterranean ecosystems´ multifunctionality more than plant richness or habitat configuration

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Affiliation(s): *[1]Department of Ecology, University of Alicante, Alicante, Spain; [2]Institute of Integrative Biology, ETH Zurich (Swiss Federal Institute of Technology), Universitätsstrasse, Zurich, Switzerland., [3]Conselleria d'Agricultura, Desenvolupament Rural, Emergència Climàtica i Transició Ecològica, Generalitat Valenciana, SS. TT. d'Alacant., Alacant, Spain*
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Abstract: Anthropogenic disturbances include local and landscape diversity loss, habitat fragmentation and land-use changes. Whereas all these changes commonly co-occur and impair ecosystem multifunctionality, they are often studied separately. Therefore, we ignore the relative importance of these drivers of ecosystem change or whether or not they interact to determine ecosystem functioning. Here we present the results on the response of the functioning of Mediterranean ecosystems to changes in local and landscape diversity, land use and habitat size. We aimed to answer two main questions: i) which are the most important local and landscape-level drivers of ecosystem functioning? ii) does the relative importance of these different drivers depend on the function studied? We sampled, within Serra de Mariola and Font Roja Natural Parks (SE Spain), 49 plots with different land use: cropland, shrubland, pine forest, oak forest and mixed forest. For each 5x5m plot, we measured landscape diversity around (Shannon diversity across habitat-types within a 500 m radius), habitat size (proportion of the same land use) and local diversity (plant species richness in each plot). In addition, we studied the response of 14 above- and below-ground functions, related to nutrient cycling, provision of habitat for other organisms, biotic interactions or habitat productivity, and their collective response using a multifunctionality metric. Although the relative importance of local and landscape attributes varied slightly depending on the target function, overall, we found that land use was by far the strongest predictor of most functions and multifunctionality, with weaker effects of local plant richness and habitat size on some of the functions studied. Croplands were the least multifunctional sites, although the functions they provide are complementary to those supplied by other land use types. Our results highlight that oak and mixed forests should be a priority for conservation, as they show the highest multifunctionality levels.

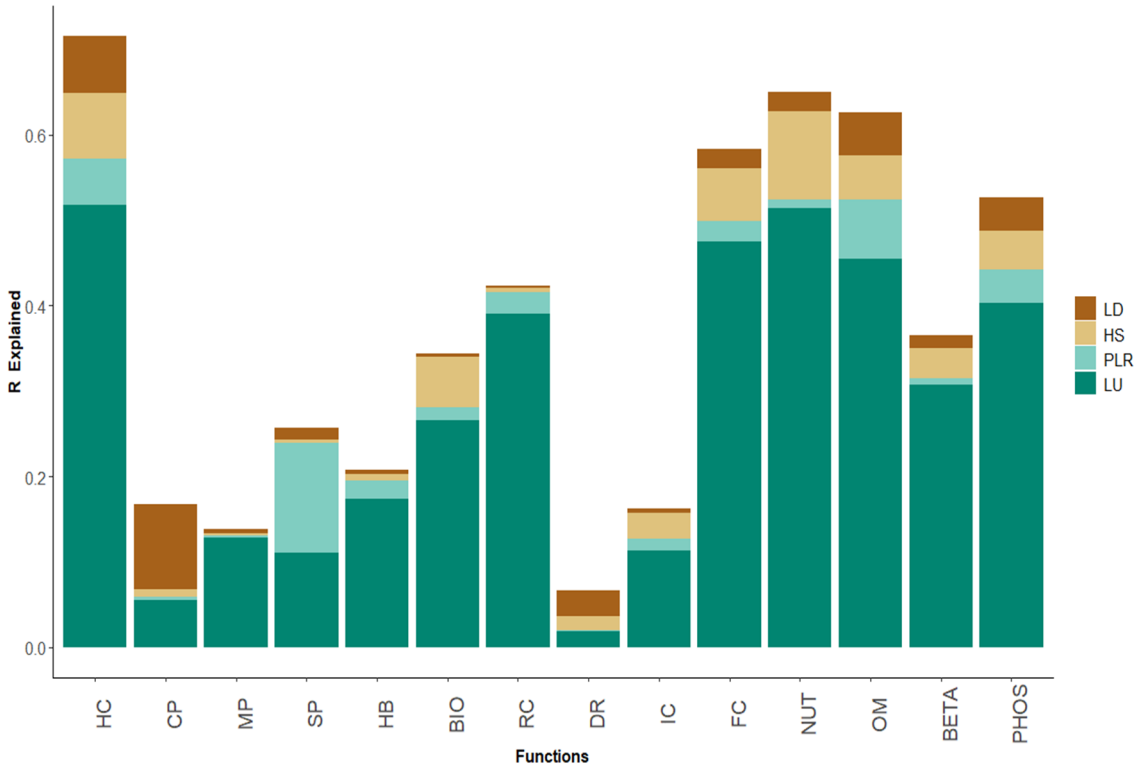

Fig. 1 Relative importance of landscape diversity (LD), habitat size (HS), local diversity as plant species richness (PLR) and land use (LU) on each one of the measured functions [HC: Habitat Complexity; CP: Caterpillar Predation; MP: Mouse Predation; SP: Seed Predation; HB: Herbivory; BIO: Biomass; RC: Regeneration Capacity; DR: Decomposition Rate; IC: Infiltration Capacity; FC: Field Capacity; NUT: Nutrient Cycling; OM: Organic Matter; BETA: Betaglucosidase Activity; PHOS: Phosphatase Activity].

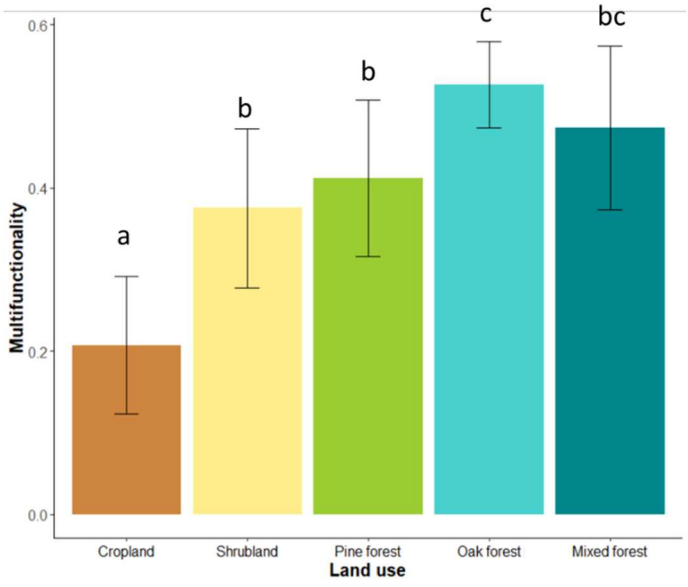

Fig. 2. Mean multifunctionality in each land use. Different letters mean significative differences

V CONGRESO IBÉRICO DE ECOLOGÍA DEL PAISAJE
V CONFERÊNCIA IBÉRICA DE ECOLOGIA DA PAISAGEM

Changing landscapes and Society, November 18-19, 2021, online

Opportunities (and barriers) for the implementation of Landscape Approaches in land uses of Mediterranean Iberia

Author(s): Muñoz-Rojas, J[1].

Affiliation(s): [1]*Mediterranean Institute for Agriculture, Environment and Development, University of Évora, Portugal*

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Abstract:

Landscape approaches (LAs) aim to foster sustainable strategies that reconcile agriculture, nature conservation and competing land-uses. LAs have been advocated as strategic tools for institutional and actor-network coordination and cooperation. Ten principles for the operationalization of LAs are identified. Testing of LAs is still scarce across the Mediterranean, including in Iberia. This is despite the region being a hotspot for the Sustainable Development Goals of the UN, that condense the majority of the challenges for which the Landscape Approach may be relevant.

In this paper we will argue and discuss how adopting a LA may help resolve some key land-use challenges faced in Mediterranean Iberia, and the main barriers to be encountered.

Methods

Firstly, we identified 5 key land-use trends in Mediterranean Iberia and examined the opportunity to tackle them via the 10 Landscape Approach principles. To test this, we examined the scientific and grey literature for each of these 5 trends. Based on this same body of literature, the key barriers were also identified.

Results and discussion

A synthesis of the results obtained on the analysis of the opportunities are condensed in the following table.

Key land-use trends in Mediterranean Iberia/ Key land-use trends in Mediterranean Iberia	Urban sprawl	Land Abandonment	Agricultural Intensification	Desertification and Land Degradation	Landscape & Biodiversity Decline
1: Continual learning and adaptive co-management.	x	x		x	x
2: Common concern entry point.	x	x		x	x
3: Multiple scales.			x	x	x
4: Multifunctionality.	x		x	x	x
5: Multiple stakeholders.	x	x	x	x	x
6: Negotiated and transparent change logic.	x	x	x	x	x
7: Clarification of rights and responsibilities.	x	x	x	x	x
8: Participatory and user-friendly monitoring.		x		x	x
9: Resilience.	x	x	x	x	x
10: Strengthened stakeholder capacity.	x	x	x	x	x

As it becomes obvious from the results in the previous table, there is ample potential to apply the 10 principles of a Landscape Approach to help resolve key land-use challenges in Iberian Mediterranean land-use systems. The following barriers could also be identified:

i. Cultural barriers towards innovation, cooperation and mutual trust may prove especially tough to overcome,
ii. Land property structures and related inequalities do not facilitate the implementation of negotiated and transparent negotiation mechanisms for the resolution of land-use related conflicts,
iii. Administrative procedures are largely inflexible, hampering implementation of LAs and related principles

V CONGRESO IBÉRICO DE ECOLOGÍA DEL PAISAJE
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Changing landscapes and Society, November 18-19, 2021, online

Assessing the trade-offs among ecosystems' condition and services in agricultural landscapes using a farming system approach

Author(s): Silva, J.F. [1]; Santos, J.L. [2]; Ribeiro, P.F.[2]; Magalhães, M.R. [1]; Marta-Pedroso, C. [3]; Moreira, F.[4, 5]

Affiliation(s): *[1] LEAF, Linking Landscape, Environment, Agriculture and Food Research Centre, Instituto Superior de Agronomia, Universidade de Lisboa, Portugal; [2] Centro de Estudos Florestais, Instituto Superior de Agronomia, Universidade de Lisboa, Portugal; [3] MARETEC/LARSyS, Instituto Superior Técnico, Universidade de Lisboa, Portugal; [4] CIBIO/InBio, Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairão, Portugal; [5] CEABN/InBio, Centro de Ecologia Aplicada "Professor Baeta Neves", Instituto Superior de Agronomia, Universidade de Lisboa, Tapada da Ajuda, 1349-017 Lisboa, Portugal*

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Abstract: Farming systems supply vital goods such as food, fiber, energy, and support for biodiversity which are fundamental for human well-being. However, in recent decades, landscapes where these systems are embedded have become more homogeneous due to agricultural expansion and specialization. This results in conflicts between human livelihoods, biodiversity conservation and the delivery of ecosystem services. To effectively plan agricultural landscapes, where several objectives (e.g., food production, control of erosion rates) overlap, it is necessary to identify potential trade-offs.

The aim of this study was to analyse the relationships between the composition of agricultural landscapes in farming systems with ecosystems' condition (EC) and services (ES) and the trade-offs among them. The study area is Alentejo region, located in the south of Portugal and covering an area of about 31545 km^2.

The identification of the different landscape spatial compositions resulted from a classificatory analysis based on agricultural data from several sources, which resulted in the classification into 22 farming systems (e.g., sheep grazing in holm oak montado).

Five indicators were considered to assess ecosystems' condition: Bird diversity (Farmland Birds and Forest Specialist Birds), Plant Diversity, Soil Organic Matter and Burnt Area. Control of Erosion Rates was considered to assess ecosystem services. To standardize all spatial datasets, these were generalized to 10x10 km resolution UTM cells, the same spatial resolution of Atlas of Breeding Birds in Portugal.

Six Random Forest regression models were developed to explore relationships between landscape compositions and EC and ES. A trade-off analysis based on principal component analysis was performed to explore correlations between spatial indicators of EC and ES. The results show that there are differences in the condition and ecosystem services provided in different landscape compositions and that, as it is not possible to obtain all the benefits simultaneously, it is necessary to define priorities for action.

V CONGRESO IBÉRICO DE ECOLOGÍA DEL PAISAJE
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Changing landscapes and Society, November 18-19, 2021, online

Participatory cost-effectiveness analysis in semiarid landscape restoration planning

Silva, E.[1]; Naji, W.[1], Salvaneschi, P.[1];Climent,E.[2]; Derak, M.[3]; López, G.[1], Bonet, A.[1], Aledo, A.[2], and Cortina-Segarra, J.[1]

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Planning landscape ecological restoration often relies on the use of participatory processes to make management decisions in the face of uncertainty. Prioritization models are powerful decision-making tools in landscape management. The quantification of diverse agent opinion can be difficult, especially when stakeholders are not in agreement. Subsequently, models often fail to integrate multi-stakeholder perspectives and multiple socio-ecological criteria. We designed a methodology to determine critical areas for landscape restoration based on a multi-platform participatory cost-effectiveness analysis that integrates various ecosystem services selected by the stakeholders. We tested this methodology in a Mediterranean semiarid landscape mosaic in SE Spain (Crevillente Management Unit, Alicante). Restoring the whole 181.000 ha area would enhance the supply of ecosystem services by 40% at a cost of 191 million EUR. Restoring the least degraded areas would be more cost-effective than restoring the most degraded areas or a random selection of sites. Moreover, the cost-effectiveness of restoration actions differs substantially depending on the ecosystem type and the degradation state. Ecological restoration of pine forests, abandoned and irrigated crops, was more cost-effective than restoring other landscape units, like wetlands, sand dunes or riverbanks. Prioritization maps based on financial costs and current and potential supply of ecosystem services can help stakeholders define alternative restoration scenarios and visualize their outcomes. Our participatory prioritization protocol can be used as working framework in adaptive landscape management.

V CONGRESO IBÉRICO DE ECOLOGÍA DEL PAISAJE
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***Changing landscapes and Society*, November 18-19, 2021, online**

From forest distribution to wetlands functionality: NBS and ecosystem services in mountainous landscapes.

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Abstract: The anthropic effect on ecosystems has caused a shift in their functionality and the services they offer to society. The impacts caused on regulating ecosystem services are related to land use and cover changes (LUCC). Landscape mosaic must be planned to ensure multifuncionality for a range of ecosystems and stakeholders interests. We define a workflow based on the implementation of forest nature-based solutions (NBS) to reduce the vulnerability of lentic ecosystems in current and future LULC scenarios in relation to soil erosion and sediment transport and deposition. So we used Sentinel-2A/B (S2) images for mapping and monitoring both forests and wetlands distribution in the Picos de Europa National Park. RS-based models were fed with photointerpretation and fieldwork campaigns information. Current LC maps were obtained by applying Support Vector Machines (SVM). Past LC maps were realized from an annual time series of Landsat imagery that allowed assessing reliable landscape trajectories and changes until 1989. Comparing LULC, a forest growth rate of 2,334 ha/year was defined and validated. In addition, we applied the InVEST model "Scenario Generator" to derive a 30-year future LC map. Wetland maps was derived from the same S2 mosaic by applying the SVM classifier over a combination of fieldwork campaigns data and topography surrogates such as slope and TWI. On the other hand, potential erosion from surface runoff was obtained using the NETMAP software, based on geomorphological criteria, which allowed to identify those areas with a larger contribution to sediment production, transport and deposition across the study area.

With this information, we applied a multi-criteria analysis to identify a NBS related to the conservation/rewilding of forests in slopes and riverbank areas sensitive to reducing the risk of soil erosion affecting wetlands and their ecological properties. The results show a network pattern of NBS across space and time related to the concept of Blue and Green Infrastructure Network (BGINs) formed by 950 ha of conservation and 857 ha of rewilding. This would effectively allow reducing erosion effects in relation to wetland ecosystems at three ways: reducing the load that would occur upslope in the mountains in the absence of forest cover, intersecting runoff at watercourses related to sediment transport and trapping sediments nearby the receiving lentic systems and main rivers and their own contributing streams.

Multi-objective forest restoration planning: balancing landscape connectivity and ecosystem service provisioning with sustainable development

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Abstract: Degradation, fragmentation and loss of tropical forests has exponentially increased in the last decades leading to unprecedented rates of species extinctions and loss of ecosystems functions and services. Forest restoration is key to recover ecosystems health and achieve Sustainable Development Goals. However, restoring forests at the landscape scale presents many challenges, since it requires balancing conservation goals and economic development. In this study, we used a spatial planning tool (Marxan) to identify priority areas for restoration satisfying multiple objectives across a biological corridor in Costa Rica. Biological corridors are critical conservation instruments promoting forest connectivity while acknowledging human presence. Increasing forest connectivity requires restoration initiatives that will likely conflict with other land uses, some of them of high national economic importance. Our restoration plan sought to maximize the provision of forest-related services (i.e., seed dispersal, tourism, and carbon storage) while minimizing the impact on current land uses and thus avoiding potential conflicts. We quantified seed dispersal and tourism services (birdwatching potential) using species distribution models. We used the carbon sequestration model of InVEST to quantify carbon storage potential. We tested different restoration scenarios that differed in whether land opportunity costs of current uses were considered or not when identifying potential areas for restoration, or how these costs were estimated. When planning blindly to land opportunity costs, our results suggested landscape-scale forest restoration plans could lead to potential socio-economic impacts and management conflicts across the corridor (selection for restoration units with the highest opportunity costs such as highland pastures or croplands). Scenarios accounting for land opportunity costs were the most cost-efficient at identifying optimal areas for forest restoration at no expenses of connectivity. Spatial planning tools can assist at designing cost-effective landscape-scale forest restoration plans, identifying priority areas where forest restoration can maximize ecosystem provision and increase forest connectivity. Special care must be paid to the use of adequate estimates of opportunity cost, to avoid potential conflicts between restoration goals and other legitimate land uses.

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***Changing landscapes and Society*, November 18-19, 2021, online**

Effects of the COVID pandemic on the dynamics and structure of social-ecological systems along urban rural gradients in Madrid (Spain)

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Abstract: Sars-CoV-19 pandemics has behaved as a driver of change of social-ecological systems, triggering population migration from urban to rural areas. This may have resulted in an increase of part-time exploitations, defined as “the combination of a small amount of farming with an occupation not connected with the farming”. This transformation of land uses may have changed the configuration of landscapes and the balance between the supply and demand for ecosystem services along urban-rural gradients. We used public data of socioeconomic variables (Almudena database), and land use (SIOSE cartography) as well as questionnaires to test this hypothesis in Madrid Autonomous Community (Spain). Results show that there has been a significant movement of population from urban to rural areas enabled by teleworking, and it is perceived as an opportunity for rural development. However, the public data available do not allow to detect LULC changes because of their temporal or spatial resolution. We conclude that a special effort from administrations must be made to detect through questionnaires and interviews population trends derived from a crisis that can turn into an opportunity for rural recovery.

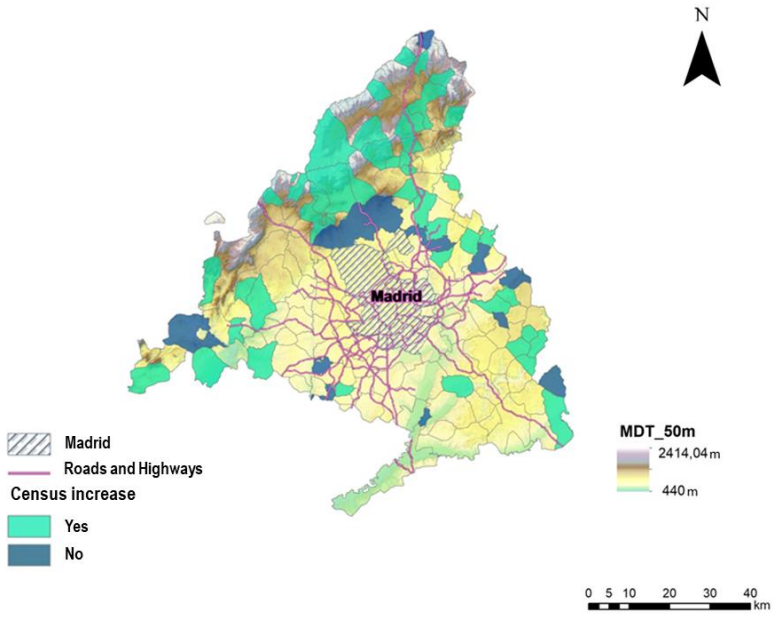

Fig. 1 Spatial representation of the results obtained from the effect analysis of the Covid-19 pandemic along the urban-rural gradient studied on the variation of the population census data in the participating municipalities

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Changing landscapes and Society, November 18-19, 2021, online

Evaluating the conservation status of Madrid's drove roads, within the Life Cañadas ecological restoration project

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Abstract: Drove roads (DRs) are the traditional routes used by herders and livestock for their seasonal movements in search of the most productive pastures. Spanish DRs have suffered a progressive abandonment and ecological degradation, threatening their relevant role as ecological corridors. Life Cañadas project aims to restore and recover the functionality of some DRs to enhance their role as providers of connectivity between Natura 2000 sites, within a predominantly agricultural matrix. Our study area comprises the DRs network of Madrid, which is mostly characterized by the lack of use by transhumant livestock and the subsequent deterioration.

Prior to the development of the restoration actions, we performed an initial diagnosis and sampling. Three categories of DRs were established according to their ecological state: (i) reference (adequately grazed and maintained) (ii) abandoned (no livestock use, with biomass accumulation) and (iii) eroded drove roads. DRs were sampled during 2020, to determine plants and arthropods diversity, but also soil physical-chemical characteristics, litter decomposition rate and enzyme activity.

The main actions to restore those drove roads categorized either as abandoned or eroded involve ploughing, limiting access, as well as the use of local sheep and goat herds to graze and defecate in both degraded plots. Several stone walls were also installed to promote habitat heterogeneity, and native species seeds were sown.

Our preliminary results, regarding the initial ecological conservation status of soil, which is the base that sustains transhumant activity, show that eroded plots tend to have significantly lower mean values of enzyme activity than reference and abandoned DRs, as well as significatively different values of C, N or P. Litter decomposition rate is also being measured through the Tea Bag Index experiment, and together with enzyme activity and physical-chemical parameters, will be monitored throughout the development of the project.

SESIÓN

SESSÃO 2

V CONGRESO IBÉRICO DE ECOLOGÍA DEL PAISAJE
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Changing landscapes and Society, November 18-19, 2021, online

Canopy Gap patterns of Mediterranean forests: a spatio-temporal characterization using airborne LiDAR data

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Abstract:

European forests have experienced an increase in tree damage and mortality in the last century due to natural disturbances, and is expected to continue due to global change. Disturbances generally creates canopy gaps, which lead to succession resulting in species changes and landscape mosaic transformations. Remote sensing technologies are an important tool for analysing spatial patterns and their relationship to ecological processes. LiDAR technology provides detailed 3D forest characterization and therefore, it is useful for canopy gap detection.

Canopy gap dynamics studies have been performed in tropical, temperate and boreal forests, but Mediterranean forests have not been studied yet. We characterised gap forest structure and dynamics of a Mediterranean forests in a large region (Madrid, Spain, 1732.72 km^2) ranging from monospecific conifer and broadleaved to mixed forests. We used low density multitemporal airborne LiDAR data between 2010 and 2016 and identified hotspots of gap openings and closings in forest types. The temporal patterns of gap structure slightly differed between forest types, with the greatest differences in conifers. We quantified a temporal decrease in the number and area of gaps, but an increase in mean gap size for all forest types. Regarding the net temporal changes, most of the study area remained unchanged (65% of forests between 2010 and 2016), with a greater number closing than opening hotspots.

Our results characterize for the first-time the large-scale structure and dynamics of gaps in a variety of Mediterranean forests, improves our understanding of the characteristics of recent gaps and their spatial distribution, which have clear consequences for forest management and Mediterranean landscapes.

Escenarios de futuro para la alondra ricotí y los paisajes del páramo soriano

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Abstract: El análisis de las percepciones de la población local sobre los problemas de conservación de las especies y hábitats amenazados resulta esencial para poder desarrollar estrategias eficientes de gestión. Conocer las percepciones de los actores sociales permite identificar los potenciales conflictos en torno a las acciones de conservación y por tanto facilitar la toma de decisiones para su resolución. Esto resulta especialmente relevante cuando la conservación de una especie o hábitat amenazado depende en buena medida del mantenimiento de los usos tradicionales del territorio.

En este trabajo se analizan las distintas cosmovisiones de la población local sobre el estado y problemas de conservación de la alondra ricotí (*Chersophilus duponti*) y los páramos del sur de Soria en los que habita. Para ello, diferentes actores sociales vinculados a la gestión del páramo soriano fueron invitados a participar en un taller de planificación participativa orientado a construir escenarios plausibles de futuro, entendido como una serie de relatos o descripciones de los posibles futuros del páramo sobre la base de una serie de asunciones coherentes sobre los impulsores de cambio que están afectado a este paisaje.

Como resultado del taller se construyeron tres posibles escenarios de futuro: un primer escenario de corte muy conservacionista en el cual la conservación del páramo y la alondra Ricotí como especie emblemática cobran un papel protagónico, apoyado por el turismo rural y de naturaleza; un segundo escenario en que la conservación de páramo se garantiza por el mantenimiento de actividades tradicionales, especialmente fomentando la ganadería extensiva; y un tercer escenario, más “desarrollista” y poco favorable para la conservación del páramo, en el que priman actividades económicas como la instalación de molinos eólicos o granjas de porcino.

Finalmente, el proceso de exploración retrospectiva (*backasting*) permitió a los participantes poner en común distintas propuestas de medidas que potenciasen los aspectos positivos de cada escenario y contrarrestasen los negativos. Sobre la base de estas propuestas se construyó un escenario de consenso que permitiría la conservación de ciertas actividades económicas y de los paisajes de páramo que sustentan a las poblaciones de alondra Ricotí.

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Changing landscapes and Society, November 18-19, 2021, online

Cork oak decline in Southern Portugal: spatial patterns and factors associated to tree mortality

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Abstract:

Cork oak woodlands represent a remarkable component of the Mediterranean landscape.
Starting from the 1980's cork oak forests have been experiencing a severe decline and degradation in the Mediterranean basin. Significative reductions have been recorded in the south of Portugal, representing a major concern given the socio-economic and ecological importance of the species. Prolonged drought periods, pathogens outbreaks, and intensive human management have been recognized as the principal causes of tree mortality. However, the relative importance of these various environmental factors is still unclear.
To understand the dynamics of cork oak mortality and the factors associated with the decline, we have performed a spatial analysis for an area located in Serra do Caldeirão, Portugal. We processed aerial images of 2015 in eCognition and Qgis to obtain precise coordinates of declining and alive trees and to calculate a cork oak mortality index. Locations of trees were used to generate Kernel density maps of tree mortality and to detect spatial patterns and dependency (clustering or segregation) in both dead and alive trees populations. Spatial autoregressive models were used to investigate the influence of several environmental and landscape factors on cork oak decline (slope, aspect, topographic wetness index, wildfire occurrence, land-use).
The analysis showed that Cork oak decline is not a homogeneous process; in fact, some areas were identified as hotspots of mortality. Pronounced clustering of dead and high-defoliated trees indicated strong positive interactions suggesting that biotic agents can be one of the underlying causes of the widespread dieback. Based on the spatial autoregressive models, cork oak decline was positively associated with south-eastern exposures and the presence of pastures, whereas slopes and wildfire occurrence were negatively correlated. These results show that the risk of cork oak tree loss is very patchy

and concentrated on sites with adverse site conditions and high human pressure. Here continual monitoring and conservation efforts should be focused.

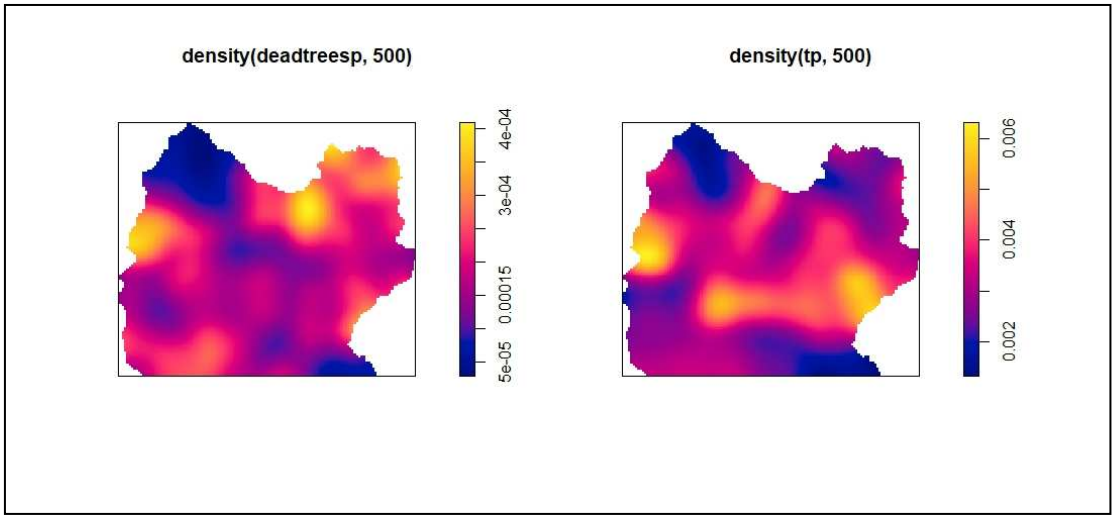

Figure 1. Kernel density estimation for alive cork oak trees (right panel), and declining cork oak trees (left panel) using a bandwidth of 500 meters.

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Changing landscapes and Society, November 18-19, 2021, online

Propagation distance of woody Brazilian savanna species in pasture matrix

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Abstract: Functional landscape connectivity for plants can be influenced by a combination of effects, as the landscape structure, individual ability, relationships among plants, dispersion vectors, and environment. Landscape functionality is a relevant issue in the Cerrado, a biome historically reduced by the expansion of livestock production in Brazil. This study aimed to test and measure the distance thresholds for the propagation of woody plants of the Cerrado in pasture matrices. We based on the hypothesis that there is a decreasing habitat-matrix gradient for the richness, structure, and composition of woody species, potentially influenced by soil compaction and propagule dispersal strategies in the matrix. We found significant differences for most variables between habitat and matrix. There is no relationship regarding matrix-habitat distances for structural variables, and the composition species was limited to the first 10 m distance. We discuss the difficulty in determining clear distance thresholds considering the potential effects of landscape structure and pasture matrix characteristics on plant establishment. Pasture did not prevent plant establishment but might act as an environmental filter. The pasture matrices modify the composition and diversity of the plant community, which becomes predominant by resprouting, autochory, and grassland species. The regenerating plants from the propagule bank of the matrix showed the potential of natural regeneration of Cerrado areas in the pasture as a restoration strategy since it has adequate management.

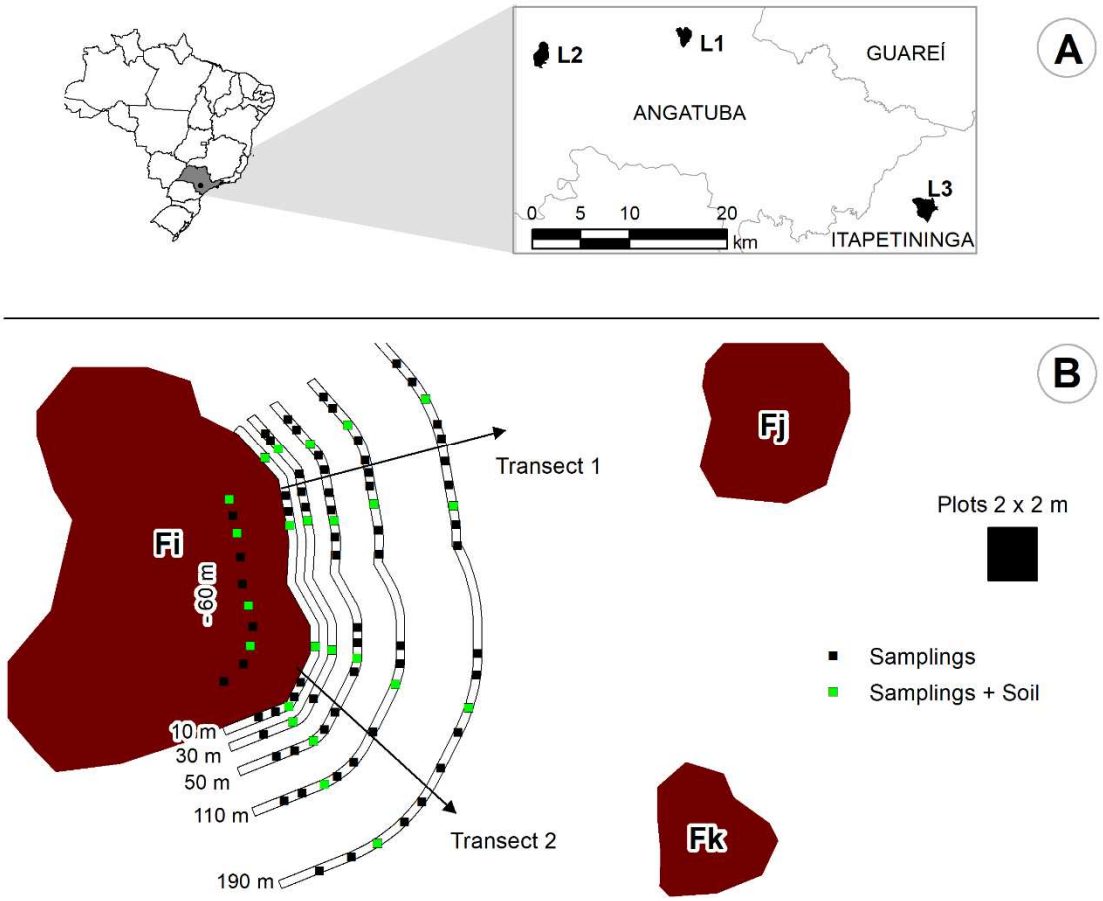

Fig. 1 A: Studied landscapes (L1, L2, and L3) in municipalities of São Paulo – Brazil. B: Sampling design (F_i, F_j, and F_k) of plants and soil in fragments F_i of each landscape.

SESIÓN

SESSÃO 3

V CONGRESO IBÉRICO DE ECOLOGÍA DEL PAISAJE
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Changing landscapes and Society, November 18-19, 2021, online

Coherencia eco-cultural como condición para la sostenibilidad en el paisaje.

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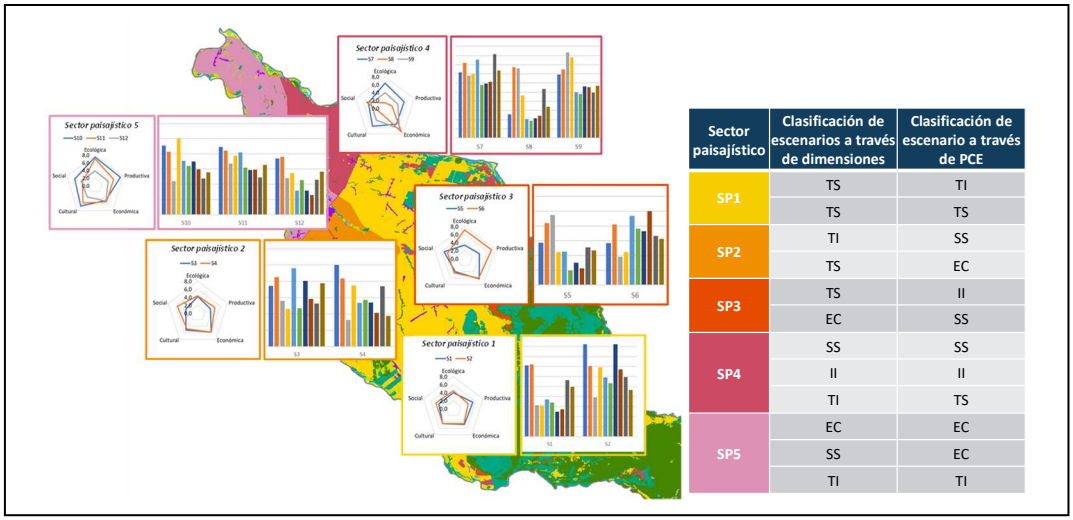
Abstract:
La cultura rural relacionada con vida campesina es aún el principal soporte del paisaje agrario de Longaví (región del Maule, Chile central). Sin embargo, el ingreso de la agricultura convencional constituye un elemento de presión que conduce a la homogenización de los paisajes y a la erosión del patrimonio cultural. Por lo tanto, el conocimiento local, reflejo de la conexión de la comunidad con su entorno natural, juega un papel preponderante en la configuración del paisaje. En este estudio se analiza, con un enfoque multicriterio, la sustentabilidad de los modelos de producción agrícola de Longaví y su relación con la calidad y contenidos del paisaje agrario. Para ello se seleccionaron 12 unidades de producción representativas de los principales sectores paisajísticos (SP). Para cada uno de los casos, se evalúan las dimensiones de desarrollo y el perfil de conocimientos que se consideran esenciales para un manejo sostenible. El análisis comparado de ambos resultados permite apreciar la coherencia entre los sistemas de producción y los conocimientos que dirigen las dinámicas de transformación del paisaje.

Se reconoce que en los SP estudiados predominan sistemas tradicionales sustentados por conocimientos ecológicos locales. Sin embargo, se detectan casos con sistemas de manejo que conducen a la degradación y fragmentación de los agroecosistemas y el paisaje. El grado de sustentabilidad guarda relación con condiciones biofísicas. En los SP con mayores limitaciones debidas al suelo, se incorporan en mayor medida procesos de intensificación.

Longaví tiene el potencial de avanzar hacia escenarios de sustentabilidad fuerte, al presentar valores altos en la dimensión cultural, reflejados en la riqueza del conocimiento ecológico local y la diversidad en el paisaje, expresándose como una relación coherente entre los sistemas de producción y la naturaleza. Los resultados muestran, no obstante, que el paisaje cultural de Longaví se encuentra en una disyuntiva respecto a su viabilidad. Por un lado, se mantienen los conocimientos y prácticas socioculturales que sustentan el acoplamiento de los usos agrarios respecto al ecosistema. Por otro el territorio afronta la convencionalización de la agricultura y el abandono rural provocados por el mercado agroexportador. Los resultados ponen en

cuestionamiento el actual modelo de no-gestión territorial a escala de paisaje, evidenciado por las transformaciones que se desarrollan en el territorio.



Sector paisajístico	Clasificación de escenarios a través de dimensiones	Clasificación de escenario a través de PCE
SP1	TS	TI
	TS	TS
SP2	TI	SS
	TS	EC
SP3	TS	II
	EC	SS
SP4	SS	SS
	II	II
	TI	TS
SP5	EC	EC
	SS	EC
	TI	TI

Fig. 1. Caracterización de los sectores paisajísticos (SP) mediante las dimensiones de desarrollo y el perfil de conocimientos esenciales(PCE). Se analiza la coincidencia entre resultados procedentes del análisis de sostenibilidad y del PCE, para cinco SP estudiados.

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***Changing landscapes and Society*, November 18-19, 2021, online**

El papel de las áreas protegidas frente a la pérdida y fragmentación del hábitat natural en Andalucía, España. Más allá de los límites de protección

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Abstract:
En la actualidad, la fragmentación y la pérdida de hábitat natural causada por los cambios de uso de suelo son dos de las principales amenazas para la conservación de la naturaleza. El presente trabajo propone un análisis de la efectividad de las áreas protegidas frente a ambos procesos en el largo plazo. El ámbito de estudio la comunidad autónoma de Andalucía (España), territorio con una de las redes regionales de áreas protegidas más extensa del contexto europeo. Se desarrolla para este ámbito un análisis de la cobertura natural mediante cuatro métricas de paisaje, adoptándose un enfoque multiescalar -que abarca toda la región, la red regional de áreas protegidas, el conjunto de Parques Naturales de Andalucía y diez Parques individuales-. El estudio cubre un lapso de aproximadamente 50 años dividido en dos períodos temporales (1956-1984, 1984-2007); ello permite evaluar el efecto de la implantación de las áreas protegidas en la región. Los resultados muestran que la pérdida de hábitat tiene en términos generales una incidencia relativamente baja y se distribuye de manera irregular en la región. Por el contrario, la fragmentación del hábitat muestra una incidencia significativa a diferentes escalas. A través del análisis de la métrica *Effective Mesh Size* (Jaeger, 2000; Moser et al., 2007) se observa que los Parques Naturales no presentan un elevado grado de fragmentación dentro de sus límites; sin embargo, las pérdidas de continuidad que se producen fuera de los límites de protección afectan indirectamente a los hábitats protegidos. Estas pérdidas contribuyen a una progresiva desconexión de amplias zonas de hábitat natural a escala regional. A partir de estos resultados, se plantea la necesidad de reforzar las conexiones entre las principales áreas protegidas y de adoptar criterios ecológicos en la planificación territorial de los entornos no protegidos, con una especial atención a la matriz del paisaje.

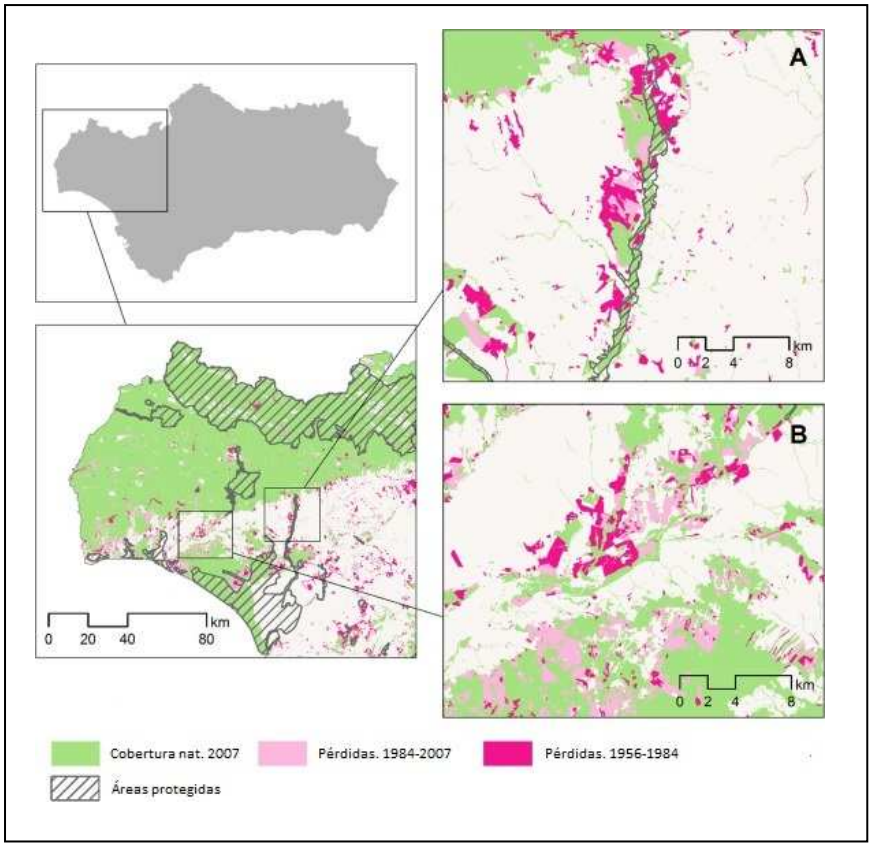

Fig. 1 Pérdida de hábitat natural y conectividad en las proximidades del Espacio Natural de Doñana (Andalucía, España)

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Changing landscapes and Society, November 18-19, 2021, online

Evaluación de los túneles como paso de fauna en el Parque Natural Font Roja, Alicante.

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Abstract: La fragmentación y el aislamiento de los Espacios Naturales Protegidos supone un gran problema en la conservación de la Biodiversidad y en la gestión del Medio Natural. Las estructuras antrópicas lineales como carreteras y vías férreas son un claro ejemplo de infraestructuras que dificultan la conectividad entre hábitats contribuyendo en gran medida a esta problemática.

Este trabajo se centra en la evaluación de la efectividad de un paso de fauna superior que conecta el corredor biológico existente entre el extremo Este del Parque Natural Carrascal de la Font Roja, con las masas forestales del Alt de Sant Antoni y del Puig d'Alcoi, en el término municipal de Alcoy, en el norte de la provincia de Alicante, España.

En este caso, el paso superior del túnel que atraviesa la orografía del Alt de Sant Antoni, permite evitar la carretera nacional N-340 y la autovía A7. Para analizar la conectividad funcional del corredor, se ha utilizado la técnica del fototrampeo con el objetivo de evaluar su eficacia para el tránsito de fauna por dicho paso superior. A través de este muestreo, se han observado 12 especies diferentes de vertebrados que utilizan este paso de fauna, destacando por su frecuencia, un mayor uso por ungulados y carnívoros.

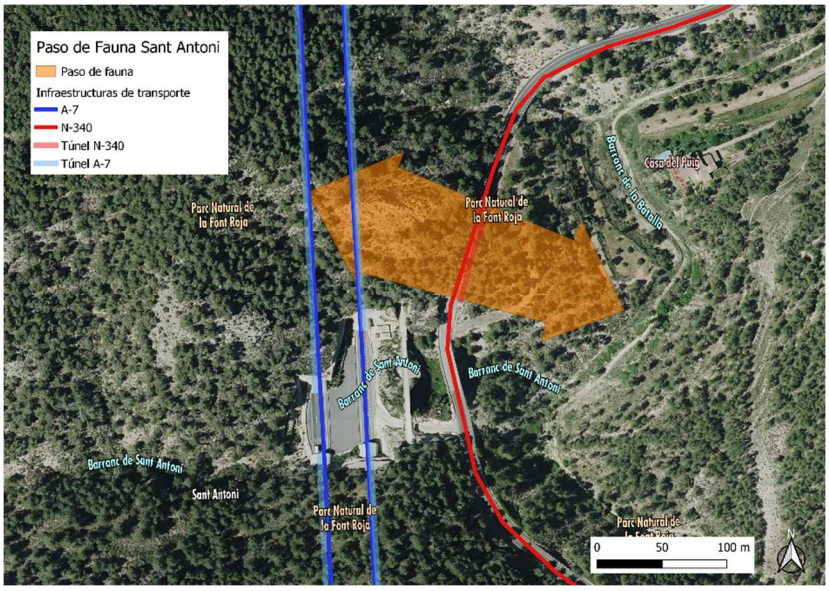

Fig. 1. Vista aérea del paso de fauna del túnel de Sant Antoni y las carreteras que atraviesa, en el límite Este del Parc Natural del Carrascal de la Font Roja, Alcoy, Alicante, España.

Landscape mosaics as a reference for payment for environmental services: a case study in Brazil

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Abstract: In Brazil, a Payment for Environmental Services (PES) is been developed to aim landowners in conserving water provision ecosystem services. There are specific criteria to receive the payments, such as conservation areas with forest remnants, springs, watersheds for public water supply, among others. That is, are based on landscape patches composition. Nevertheless, some services depend on ecological processes based on patterns and magnitudes of spatial interactions between patches, on which spatial pattern of boundaries between patches have an important role as regulators of type, direction, and magnitude of exchanges between patches, including species survival, primary production, and water and nutrient flows. Therefore, PES should be based also on the spatial pattern of patches or landscape configuration.
A useful way for describing landscape integrating landscape composition and configuration, that is, patches and boundaries, is considering that a landscape is made up of different mosaics, each one being a different set of patches and the boundaries between them. Therefore mosaics, rather than patches, should be the basis for the payment scheme.
To demonstrate this, the mosaics of the municipalities of Alto Piquiri and Mariluz, located in the state of Parana, have been identified based on their typology of boundaries. Subsequently, they have been valued considering the contribution of this typology of boundaries to the water regulation service. The results indicate that mosaics containing the largest boundaries between rivers/floodplains-native forest, rivers/floodplains-pasture and native forest-pasture would be the best valued to receive the PES.

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LIFE Vía de la Plata

ADAPTACIÓN AL CAMBIO CLIMÁTICO EN LA CIUDAD PATRIMONIAL DE SALAMANCA: SERVICIOS DE LOS ECOSISTEMAS, INFRAESTRUCTURA VERDE Y BIG DATA

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Abstract:

El LIFE Vía de la Plata es un proyecto piloto elegido por la Comisión Europea en su convocatoria 2020 del programa de Cambio Climático (LIFE *Climate Change Adaptation*) que pretende crear un nuevo corredor de infraestructura verde a través de los 6,9 kilómetros del trazado de esta antigua vía romana en el municipio de Salamanca. La iniciativa engloba diferentes elementos claves, cuya unión es pionera en un ámbito urbano para el desarrollo sostenible: adaptación al cambio climático, implementación de la infraestructura verde en una ciudad Patrimonio de la Humanidad, recuperación de servicios de los ecosistemas (SE), *marchine learnig* e implicación y participación ciudadana. Salamanca será la primera Ciudad Patrimonio en establecer una red de infraestructura verde proveedora de múltiples SE. Hasta finales de 2023, el proyecto va a desarrollar 41 actuaciones tipo en diferentes en aspectos relacionados con la flora, la fauna, el agua, la ciudadanía y la cultura y el patrimonio. Todo este proceso se realizará en las 6 zonas de actuación que van desde zonas urbanas del municipio (ensanche y zona histórica) hasta la conexión con el río Tormes, la vaguada del Zurguén o la zona de monte bajo del sur de la ciudad que conecta con la dehesa.
Este proyecto piloto se enmarca en el *Plan Especial de PEIVB de Salamanca* (PEPIVB), que tiene por objeto la salvaguarda de los valores naturales y el fomento de los SE. Para ello, se han definido más de 40 SE y se emplearán más de 70 indicadores para cuantificar su evolución y como se comportan ante las diferentes actuaciones que se van a llevar a cabo en el proyecto. También se van a definir modelos de utilidad relacionados con la gestión de la infraestructura verde urbana y como adaptar la ciudad de Salamanca al Cambio Climático.

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Spatial distribution of green filters with different nitrate retention potential in the Tordera river basin (NE Spain)

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Abstract: Pollution of inland waters caused by excess fertilisers in agricultural runoff has become a serious environmental problem. The mitigation of this diffuse source of pollution is challenging, but it is of great importance because nutrient excesses contribute to ecosystem degradation and the associated risk to human health. There are various ecosystems with the intrinsic capacity to act as green filters, which contribute to reduce nutrient loads to rivers and aquifers by intercepting surface and sub-surface water flows and capturing dissolved nutrients such as nitrate. In this paper, we first assessed the presence and distribution of terrestrial and aquatic habitats that can act as green filters for nitrate in the Tordera basin, an agricultural-forested Mediterranean catchment in NE Spain (xx km^2). Second, we conducted a meta-analysis of published data to estimate the potential of these green filters to reduce nitrate loads based on their main features and location within the basin. Based on various sources of geographical information, we established 5 categories of green filter and quantified 2,180 green filter elements within the basin. Green filters occupied 2.4% of the catchment area and were mostly riparian forests (80%), with a minimal contribution (20%) of aquatic green filters (lagoons and ponds). The spatial distribution of green filters and their potential to retain nitrate varied from headwaters to lowlands, depending on the prevailing environmental conditions and anthropogenic pressure. In the upper and middle parts, terrestrial green filters predominated (>99%), and their potential to reduce nitrate input loads averaged 31.6% and 44.6%, respectively. In the lower part, where aquatic green filters accounted for 43.8% of the area, this potential increased to 57.2%. Most of the aquatic green filters (71%) were associated with anthropogenic activities and disconnected from the river network (>23 m away). We conclude that green filters occupy a very reduced area, but are of great value from an ecological and environmental point of view, and thus, it is critical to protect them legally and to disseminate their socio-ecological value.

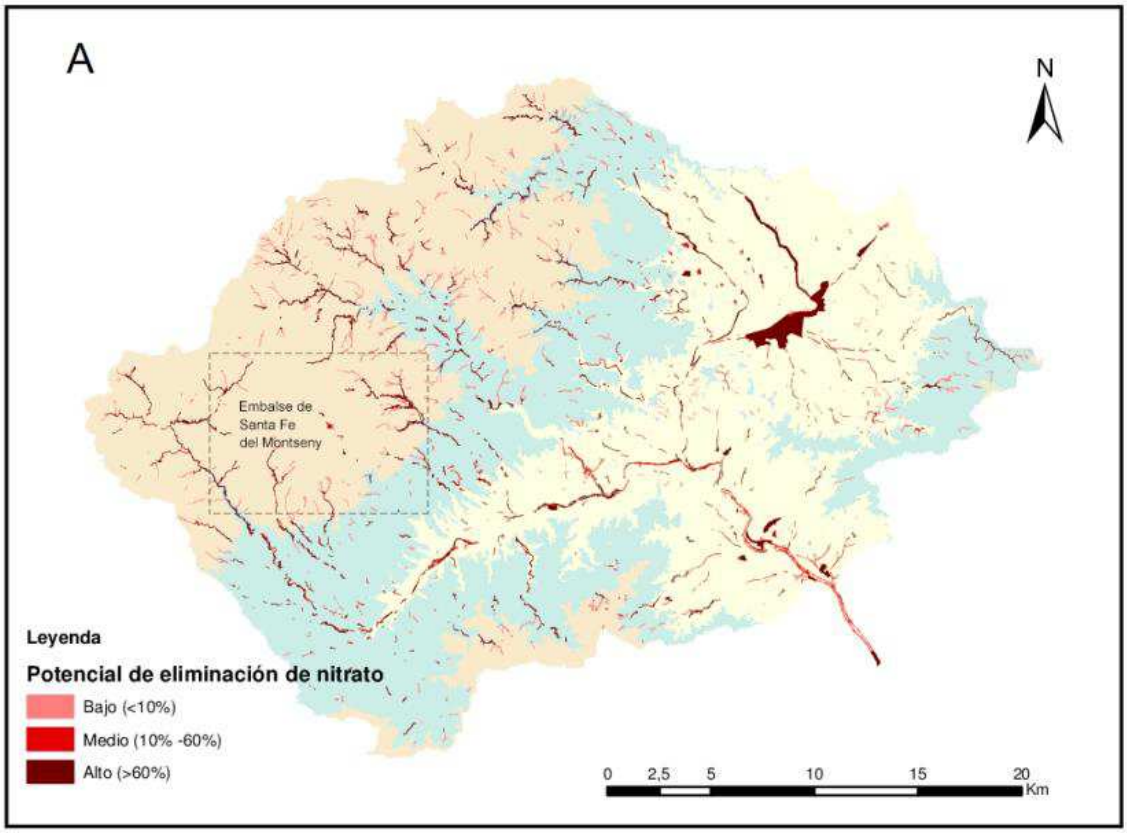

Fig. 1. Representation of the green filters present in the Tordera catchment according to their nitrate retention potential (percentage of reduction of the input load) established in 3 categories; high, medium and low potential. The potential for nitrate retention was based on a meta-analysis including 56 previous studies of riparian and wetland plot sites.

La Custodia del Territorio como herramienta para gestionar espacios naturales. El caso de la Finca Buixcarró (Comunidad Valenciana)

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Abstract: En la actualidad nos encontramos ante un creciente interés científico y técnico por el estudio del paisaje, así como por su protección y puesta en valor. De forma que, la participación privada en la conservación del territorio y de los espacios naturales se concibe como una herramienta complementaria de la protección pública de los mismos. La custodia del territorio es una herramienta cuya finalidad básica es la de lograr la adhesión voluntaria de los propietarios privados a las estrategias de conservación de organizaciones sin ánimo de lucro. La Finca Buixcarró está situada en el sector sur-este del P.N. Serra de Mariola (UTM 702000N-4288000E), entre los términos municipales de Bocairent (Valencia) y Alcoy (Alicante). En 2003 se creó una fundación para recuperar ambientalmente Buixcarró, después de la sucesión de varios incendios y desde entonces se trabaja en la mejora de los ecosistemas y la preservación de hábitats y especies. El objetivo principal de este trabajo es describir la situación actual de una finca privada gestionada por medio de una entidad de custodia (gestor responsable). Se analizan las diferentes actividades que se desarrollan en la misma y enfocadas hacia la autogestión, mejorando la situación ecológica del medio y fomentando la investigación científica y las tareas de formación y divulgación. De este modo, se han inventariado y cuantificado las diferentes actuaciones en relación con el mantenimiento de la finca (vallado, accesos, etc.), la gestión forestal sostenible, la preservación y mejora de la biodiversidad, la gestión cinegética sostenible, el diseño de un plan de apicultura medioambiental y el mantenimiento de campos de cultivo. Por otro lado, se identifican las tareas relacionadas con la formación y la divulgación medioambiental, como Itinerarios de educación ambiental para escolares, las actividades de interpretación de naturaleza, servicios y cursos de fotografía de naturaleza, las actividades de formación de profesionales, las prácticas de campo con alumnos universitarios y de estudiantes de módulos específicos.
La Fundación persigue la recuperación ambiental de los ecosistemas y de sus flujos ecológicos, la recuperación del paisaje y el fomento de la biodiversidad, y desarrollar programas y actuaciones compatibles con estos objetivos principales.
En todas estas actuaciones se ha tenido en cuenta que la evolución del medio, de los ecosistemas y de sus flujos en este entorno tiene mucho que ver con la acción humana, la recuperación de los campos de cultivo y la actividad agroecológica, los muros de piedra en seco, la conformación de las masas forestales (aprovechamientos como el carboneo o la producción de cal) la ganadería, la introducción de ungulados

herbívoros, y la capacidad de carga de uso público, son aspectos contemplados por la Fundación a la hora de ordenar y gestionar. 2000 personas año máximo, 130-150 muflones, 125 hectáreas de bosque con tratamientos de resalveo y conversión de monte bajo o monte bravo, 45 hectáreas de bosques maduros con aprovechamiento de biomasa, 8 hectáreas de campos de cultivos de apoyo a la biodiversidad, 300 metros de muros de piedra en seco restaurados, 13 hectáreas de siembras anuales para pastos, 22 hectáreas de áreas cortafuegos, son algunos de los números que caracteriza la propiedad y el modelo de gestión.

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Agricultural land use change in southern Spain

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Abstract:
Almost a quarter of the Spanish territory is covered by agricultural land. In the regions of Andalusia and Murcia this number rise to 35%, representing 41% of agricultural work in Spain. Its activity accounts for 5.1% of the Andalusia gross domestic product and 5.3% of Murcia, doubling the national average. Despite this, between 2006 and 2012 these two regions have lost more than 232,000 hectares dedicated to agriculture.
Using the CORINE Land Cover cartography for the years 2006 and 2018, a cartographic and statistical model is carried out in order to observe differences in land use changes that have occurred in the last decade in southern Spain. Emphasis is placed on the main processes that affect their agricultural ecosystems: abandonment, expansion, intensification and conversion to other uses, showing exposed pressures. Results shows a remarkable growth of irrigated land and a more moderate increase of olive groves and fruit trees. On the other hand, land use change losses are registered in dry arable crops and agroforestry areas (meadows). Abandonment of mixed agricultural areas and of non-irrigated herbaceous crops affect appropriately 12% of the total area of change, while forest successions affect more than 10%. Results can be useful to policy makers and managers working in agricultural and environmental policies and management.

SESIÓN

SESSÃO 4

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Changing landscapes and Society, November 18-19, 2021, online

Landscape connectivity and fire size in a Spanish Mediterranean region

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Abstract: Planning for sustainable and resilient landscapes requires the integration of measures that diminish the spread and impact of large wildfires. However, how the connectivity of flammable vegetation patches at the landscape scale influences the spread of fire is still not clear, and so the appropriate management for fire risk reduction.

In this study, we present the application of the graph theory and the percolation theory to test the relationship between forest functional connectivity and fire size in a Mediterranean region (Catalonia, NE Spain, ~32000 km2) and under different weather conditions. We used 554 fires classified according to weather conditions in which they took place: (windy, arid or regular days, and dry or non-dry conditions) with the hypothesis that the capacity of fire to "read" the forest landscape differs according to weather variables. Forest functional connectivity inside each fire was described according to the Equivalence Index of Conefor® and using different interpretations of forest-land cover maps and at different fire dispersal distances (10-, 100- and 2000-meters fire spotting capacity).

We found that a forest percolation threshold existed for most types of fires: forest connectivity had a positive influence on fire size until a threshold at which the landscape becomes continuous and other processes govern fire spread and cease. This percolation threshold is about 0.40 for fires occurring under arid conditions. Under regular weather conditions, the threshold is non-existent and forest connectivity always exerts a positive effect on fire size. Notably, forest connectivity has no influence on fire size on windy- and dry-weather days. All these results are of paramount relevance for forest and landscape management aimed at reducing wildfire risk, since for fires driven by extreme weather conditions (more prone to happen in the future), landscape offers less opportunities to stop them.

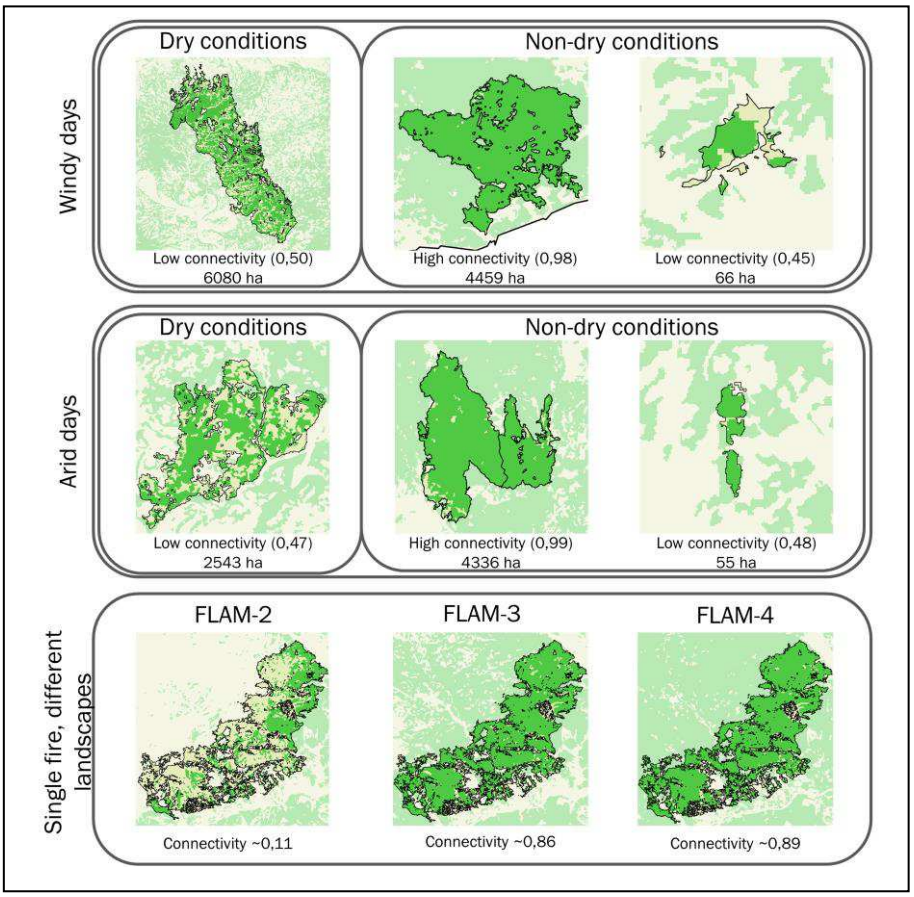

Fig. 1 First two rows: examples of forest connectivity values in different fires and weather conditions. Third row: Different and landscape flammability interpretation for the same fire

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Influência das estruturas lineares e dos usos do solo na progressão do fogo na paisagem

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Abstract: O estudo do comportamento do fogo na sua progressão pela paisagem é importante no apoio ao planeamento, gestão e ordenamento da paisagem. Para além das condições meteorológicas e condicionantes intrínsecas do território, também a estrutura e a composição da paisagem interferem na progressão dos incêndios. Esta progressão é influenciada quer pela descontinuidade, constituindo barreiras que podem ser lineares ou em mancha, quer por serem facilitadores de progressão de um incêndio (e.g. uma área de mato pirófilo ou um pinhal abandonado).

O objetivo deste estudo foi caracterizar a relação entre as estruturas (lineares e mosaicos) e as áreas ardidas, de modo a compreender como as mesmas influenciaram a progressão ou paragem do fogo na paisagem. Considerou-se a totalidade das áreas ardidas em Portugal continental entre 2014 e 2019, e relacionaram-se estas áreas ardidas com as estruturas lineares (linhas elétricas, linhas de água, vias de comunicação e faixas de gestão de combustível) e com manchas de uso do solo, através da aplicação de métodos de Ecologia da Paisagem, baseados em análise estatística. Com esta análise foi possível identificar os tipos de uso do solo que constituíram barreira à propagação do fogo, comparar o efeito barreira associado aos diversos tipos de estruturas lineares, o qual é simultaneamente influenciado pelo uso do solo adjacente. Identificou-se de forma clara que estruturas como rios de maior dimensão, autoestradas e itinerários principais foram as que mais influenciaram a paragem do fogo. Confirmou-se também de modo geral a importância dos mosaicos de uso do solo como as estruturas mais significativas no contexto da propagação dos incêndios.

A consideração destes resultados é fundamental para a correta priorização do investimento a efetuar no território, infraestruturando-o de forma que a progressão do fogo não seja sinónimo de risco para pessoas e bens.

A remotely sensed view of freshwater ecosystems

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Abstract: Large river systems and their associated habitats (floodplains, shallow lakes and wetlands) support an ample fraction of the human population needs. However, the large biodiversity and natural complexity of these aquatic ecosystems have been dramatically reduced all around the world, and so is the provision of their ecosystem services (e.g., water purification, flood regulation and recreation). These ecosystems are suffering some of the highest projected extinction rates on the planet, being their major threats dam construction along with changes in climate and land use. There is therefore an urgent need to understand how these ecosystems function, interact and respond to changes in order to warrant the conservation of their biodiversity, ecosystem functioning and services. Remote sensing capability to track changes in different Earth resources (and surface water in particular) at a wide range of time and space scales has become a relevant source of information. The combined use of such techniques with more traditional survey methods and predictive modelling approaches can improve and re-write the way to deal aquatic ecosystem monitoring and management. The Pantanal wetland, one of the largest and most valuable freshwater systems worldwide, represents a unique study model of a large complex freshwater system. Its current near pristine conservation status allows understanding the role of different biophysical components on maintaining biodiversity and providing crucial ecosystem services at different spatial scales (local, regional and global). This large freshwater system represents one of the best possible examples in the world to illustrate nearly natural conditions and complex river-floodplain interactions. This study illustrates the serious conservation risks that the Pantanal faces in the near future, given the current climate-change scenario and the accumulation of dam building projects in this region.

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Effectiveness of planning tools at local and basin scale in the conservation and restoration of water-linked ecosystems in the landscape of Alto Vinalopó (Alicante)

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Abstract: The Alto Vinalopó landscape is characterized by an alternation of mountains and valleys parallel to each other through which the hydrological network of the Vinalopó River runs. Although the dominant pattern of the depressions follows a Northeast-Southwest direction, the tectonic fracture of these Cretaceous materials, due to the fault that allowed the Triassic materials to emerge, generated a very rich environmental heterogeneity. This natural framework has been strongly modified by the exploitation of aquifers since 1913, which reached overexploitation, that still remains, since the 1970s.

This communication analyzed the changes that have occurred in the water cycle, in the Alto Vinalopó sub-basin, and the effects on the environmental heterogeneity of these landscapes. The consequences on the associated biodiversity from the species to ecosystems level were analyzed. Special attention was paid to the effectiveness of the planning tools on the spatial land use classification, in ecological protection aspects, at municipality and Basin scales. Based on the analysis of the Plan General de Ordenación Urbana (PGOU) (1992) and Landscape Plan (2019) of the municipality of Villena, as well as the Basin Plan of the Júcar (BPJ) (2016-2021) the main benefits and limitations were identified. Aspects that have been beneficial in the proper management of biodiversity were identified; as well as the deficiencies. Ecological descriptions, disturbances identification and control, and proactive actions (infrastructures, territorial action plans ...) to be included in the future planning tools were discussed. The main risks of the disconnection between planning at the two administrative scales, Basin and Municipalities, were evaluated to better implement the objectives of the European Union Water Framework Directive.

Keywords: Land Use Design, Desertification, Ecosystem Management, Water Use Integration.

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IMPACTO DE LAS INFRAESTRUCTURAS DE CONTROL DE AVENIDAS EN LA PÉRDIDA DE ECOSISTEMAS RIPARIOS EN EL TRAMO FINAL DEL RÍO SEGURA (ALICANTE): ¿CÓMO RECUPERAR LOS BIOTOPOS ORIGINALES ANTE LA PERSPECTIVA DEL PLAN VEGA RENHACE?

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Abstract: La comarca de la Vega Baja, en el sur de Alicante, es una zona de intensa actividad agrícola y gran relevancia socioeconómica. Refleja la relación entre actividad humana y paisaje mediterráneo. La transformación de la llanura de inundación, del tramo final del Río Segura, y los biotopos asociados a los gradientes ambientales, entre zonas inundables y campos dunares, ha sido constante desde mediados del siglo XVI. Sin embargo, las transformaciones de los últimos 50 años, justificadas por el impacto socioeconómico de las inundaciones, ha impactado negativamente en el estatus ecológico de estos paisajes. Es imprescindible modificar los proyectos de infraestructuras para que no se conviertan en agente de desertificación y degradación ecológica.

Se analizan las repercusiones ecológicas de las obras realizadas, a finales de los años 1970, en las infraestructuras de control y prevención de avenidas, centradas en la modificación del trazado natural y los perfiles transversales del río Segura en su tramo final. Los resultados evidencian una pérdida sustancial de ecosistemas riparios, asociados al río, junto a un diseño inadecuado de los terrenos del Dominio Público Hidráulico abandonados. Estos espacios, que podrían ser “islas de biodiversidad”, mantienen un limitado valor ecológico, fruto de un inadecuado análisis y ejecución de las actuaciones de restauración ecológica.

En la actualidad, el incremento del riesgo de inundación, intensificadas en frecuencia y magnitud por los escenarios de cambio climático, aconsejan revisar los planes de prevención y control de estos fenómenos naturales. El actual Plan Vega RenHace representa una oportunidad para rectificar aquellos diseños. Así, analizamos las alternativas que podrían plantearse dentro de las líneas de actuación propuestas en él, desde una perspectiva ecológica. El objetivo principal es conseguir conservar y potenciar la biodiversidad riparia histórica, tanto a nivel de especies, como de hábitats y ecosistemas. Es decir, conseguir diseñar los paisajes que en los próximos 30 años serán prueba de una planificación y gestión territorial verdaderamente sostenible, donde la pérdida neta de biodiversidad habrá sido nula, a pesar de la fuerte artificialización.

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Análisis del estado ecológico del Mar Menor mediante series temporales con Sentinel-3

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El Mar Menor es una laguna hipersalina situada en el SE de la Península Ibérica, la cual se ha visto transformada a lo largo de los años alterando así las condiciones ambientales de la zona. Tiene 170 km^2 de superficie, siendo una de las lagunas costeras más extensas de Europa y la mayor en España. Está separado del Mar Mediterráneo mediante una restinga de 22 km de longitud con una anchura que varía desde 0,1 a 1,5 km en las que se abren cinco golas o canales de comunicación, mantenidas abiertas naturalmente o artificialmente, por donde intercambia agua con el Mar Mediterráneo. Tiene una profundidad máxima de 7 m, y cabe destacar que la evaporación es más intensa que la aportación de agua. Se estudia el estado ecológico del Mar Menor durante el verano de 2021 mediante imágenes de satélite Sentinel-3 (S3). Las variables a analizar son los sólidos en suspensión (tsm), la clorofila *a* (chl *a*) y la transparencia, los cuales son productos automáticos de Sentinel Application Platform. Durante el período establecido de julio a septiembre de 2021, se han conseguido un total de 23 imágenes. Los resultados obtenidos han mostrado una evolución de la calidad de las aguas que ha ido empeorando conforme la temperatura ha aumentado en la zona, llegando a obtener medidas de chl *a* de 30,50 mg/m^3 y tsm 289,32 g/m^3 a finales de julio, siendo preocupante la disminución de la transparencia del agua, debido al escaso intercambio entre el Mar Mediterráneo y el Mar Menor y al crecimiento del fitoplancton. Aun habiendo una tendencia negativa todo el verano, a finales de septiembre se empieza a percibir una leve recuperación. Es de gran importancia analizar el estado ecológico de nuestras lagunas y en concreto la del Mar Menor por ser una de las mejor conservadas a pesar de la situación actual.

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Changing landscapes and Society, November 18-19, 2021, online

Title. El rol de la edad y el tipo de bosque en las relaciones bosque-agua

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Abstract: Los bosques constituyen importantes sumideros de carbono y son un instrumento esencial en las estrategias de mitigación contra el cambio climático. También juegan un rol importante en la regulación de procesos hidrológicos y térmicos clave en el funcionamiento del ciclo del agua. Sin embargo, la literatura publicada sobre las relaciones Bosque-Agua contiene incertidumbre sobre la dirección de estas relaciones. Algunos de los aspectos más descuidados son el papel de la edad y el tipo de bosque. Aquí mostramos conclusiones generales de una revisión que vincula estos aspectos. Se realizaron búsquedas con las palabras clave "Forest AND Water" y sub-búsquedas que involucraron la tipología de bosque ("natural-forest", "Planted-forest"), el estado de madurez ("Young-medium-mature-Forest") y variables hidrológicas ("temperature", "streamflow", "Infiltration", "interception", "evapotranspiration", "runoff" y "soil moisture). Se revisaron 1,509 artículos (desde 1961-2021). Los estudios seleccionados cubren todos los continentes del mundo, siendo más significativos en Asia y Europa. Los resultados evidencian una clara deficiencia en el estudio del rol del tipo y edad del bosque. Se descarta el 95% de los artículos revisados, porque estudiaban otras variables (Nutrientes, Materia Orgánica, Fauna, otras), eran descriptivos (política-gestión) o porque no había una descripción consistente sobre los bosques, generando dificultades para clasificar su composición y edad. Este resultado evidencia la falta de un marco conceptual que defina las propiedades clave de un bosque para caracterizar las relaciones bosque-agua. Los artículos que contemplan la tipología de bosque natural y bosque plantado es similar (87 y 83, respectivamente), sin embargo, el número de datos son significativamente mayores para bosques plantados. Las variables hidrológicas más estudiadas fueron: evapotranspiración, temperatura y humedad del suelo. Los resultados obtenidos evidencian incertidumbre sobre cómo la composición o estado de madurez del bosque puede afectar a las variables seleccionadas. Estos vacíos en el conocimiento pueden enunciar actuaciones o prácticas de gestión contraproducentes.

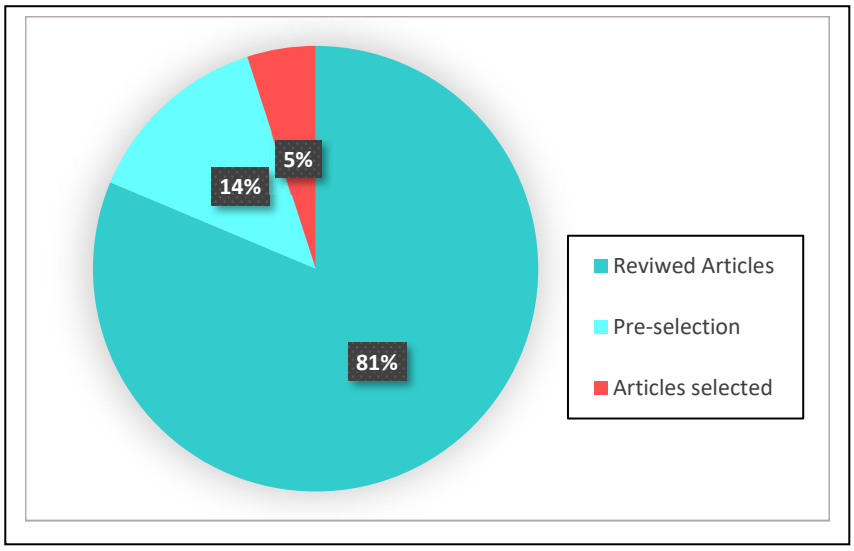

Fig. 1 Literatura científica revisada, descartada y finalmente seleccionada.

Title: El paisaje de las lagunas endorréicas de la Mancha Oriental.

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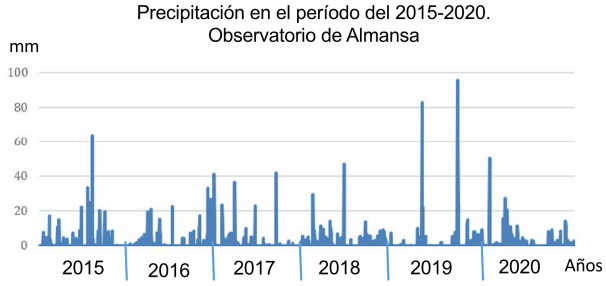
Resumen: Se analiza la situación actual de las lagunas endorreicas de la Mancha Oriental (provincia Albacete), en concreto sus fluctuaciones de nivel ocasionadas por las lluvias acontecidas en los últimos cinco años. Estas lagunas sufren importantes incrementos del nivel de sus aguas, ocasionados por los procesos de lluvia más intensos. Como consecuencia de ello las poblaciones asociadas de aves y otras especies, encuentran en ellas un área de refugio. Muchas de estas lagunas son de origen antrópico, resultado de extracciones de áridos o canteras a cielo abierto abandonadas, presentan generalmente un carácter salobre y su biodiversidad es de gran interés y de fácil conservación por estar alejadas de la presión humana.



El gráfico de lluvias recogidas presenta una clara dispersión, en otoño, primavera e invierno, no siendo posible observar un patrón definido. Algunas son lagunas temporales, que se inundan en lluvias intensas y se secan unos meses después. Este estudio analiza en primer lugar el incremento de la superficie de las lagunas en los períodos de lluvias, evidenciando el valor paisajístico y natural de estas zonas húmedas permanentes y temporales, aportando elementos para que puedan ser declaradas zonas húmedas temporales de especial protección.

SESIÓN

SESSÃO 5

V CONGRESO IBÉRICO DE ECOLOGÍA DEL PAISAJE
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Changing landscapes and Society, November 18-19, 2021, online

Agronomic indices as conservation estimators of agricultural olive-growing landscapes in the Iberian Peninsula

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Abstract: Olive groves consolidate multifunctional Mediterranean landscapes in the Iberian Peninsula, representing more than 2.8 M ha. Due to their contribution of ecosystem services, it is essential to assess their sustainability. Taking as a study area the Protected Designation of Origin (PDO) Norte Alentejano (Portugal), where its 1350 ha of olive groves are managed in a traditional, integrated and intensive way, agronomic indices on soil loss tolerance (SLTI) as a function of erosion were implemented, developing specific models for olive groves (SLTIog), and on soil productivity (SPI), oriented to estimate the conservation of these landscapes in different time projections (i. e. 1, 10, 25, 50 and 150 years). The results showed higher soil loss tolerance values for integrated olive groves of up to 20.20% and 53.74% compared to traditional and intensive cropping in immediate projections, the latter being unsustainable in long-term simulations. Similarly, integrated management showed higher soil productivity. Taking into account the differences in olive grove management between Spain, where olive groves are monocultures, and Portugal, where olive groves are a developing crop, the results were compared with previous studies carried out in the PDO Estepa in Seville (Andalusia, Spain) on integrated and organic olive groves. The integrated olive groves in Portugal showed a higher soil loss tolerance, while organic olive groves in Spain showed higher productivity. Both agricultural management and the magnitude of erosion processes are key factors determining the sustainability of olive groves as farming systems. For this reason, the development of specific tools of high precision at a regional scale, such as the above indices, should be encouraged in order to propose erosion mitigation and agricultural restoration measures to maximise the multifunctionality and sustainability of olive groves as socio-ecological landscapes.

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Changing landscapes and Society, November 18-19, 2021, online

Effects on passive habitat rewilding and agroecosystems maintenance on population dynamic of a low-movement species

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Abstract: Rural abandonment occurred throughout Europe during the second half of the 20th century and has had enormous socio-economic and environmental consequences. In general, rural landscapes have recovered the vegetation cover, which in the particular case of the southeast of the Iberian Peninsula, these abandoned lands have evolved to scrubland or to pine forest. In this work, we analyzed the consequences of these land-use changes on a faunistic element characteristic of transition areas between sclerophyllous forests and scrub, the spur-thighed tortoise (*Testudo graeca*). The main objective of this study is to evaluate the effects of the recovery of natural vegetation (crop-scrub and crop-pine forest transitions) on the population dynamics of tortoises. For this, we developed GIS layers representing real landscapes dynamics during the last 70 years and used them on a spatially explicit individual-based model (STEPLAND), which simulates the movement and demographic processes of individuals in space over time.

The population dynamics of *T. graeca* depended on the type of transition: population sizes increased in landscapes in which abandoned lands were revegetated by scrubland, while decreased in those with transitions to pine forest. In the case of crop-pine forest transition, the population size of *T. graeca* showed a time-lag response of three decades, and an extinction debt pattern of 30% with a time-lag response of approximately 110 years (Fig.1). These results should be considered when making decisions about the maintenance of agroecosystems and habitat regeneration policies in ecotone areas.

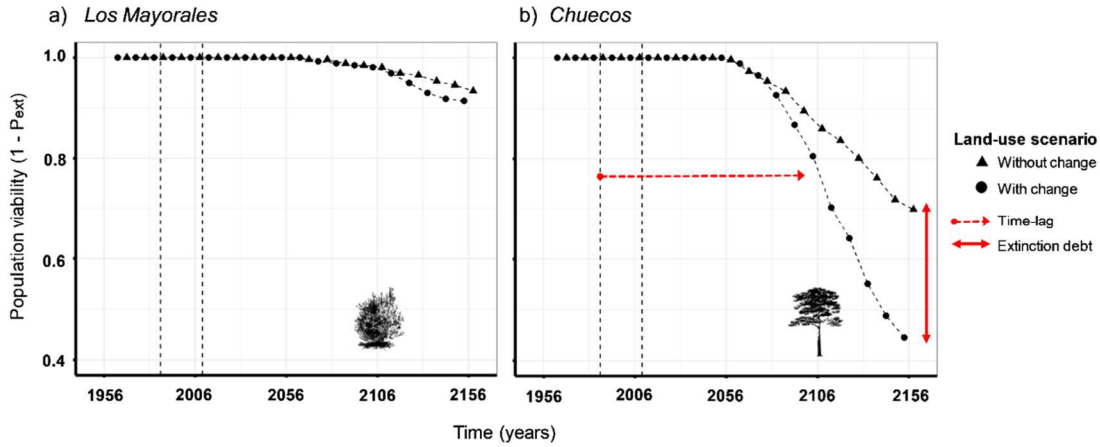

Fig. 1. Population viability (1 – proportion of extinct replicates) considering both study areas: a) *Los Mayorales* (crop – scrub forest transition) and b) *Chuecos* (crops-pine forest transition) over 200 years. The red solid arrow in panel b) depict the extinction debt, calculated as the difference in the proportion of viable populations between the "without change"/ "with change" scenarios. Each simulation was repeated 256 times. Triangles (▲) denote the "without change" land-use scenarios (i.e., control scenarios, with no change in land-use cover during the simulation period); circles (●) depict the "with change" land-use scenarios, i.e. impact scenarios, with a change in land-use cover during the simulation period (a) crop- scrub transition and b) crop – pine forest transition for each study area, respectively). Vertical dashed black lines represent the two land-use change periods of the "with change" scenarios in 1987 and 2010.

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Changing landscapes and Society, November 18-19, 2021, online

O papel dos agentes da paisagem no desenvolvimento de um modelo de ordenamento do território sustentável

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Abstract

Um dos maiores desafios à implementação efectiva de acções de valorização e restauro dos ecossistemas consiste no envolvimento dos agentes intervenientes na construção da paisagem, desde as comunidades locais às instituições governamentais, nas várias fases deste processo.
No projecto de investigação SCAPEFIRE (PCIF/MOS/0046/2017), em curso, pretende-se desenvolver um modelo de Ordenamento do Território com uma equipa multidisciplinar que, além de outras funções, contribua para uma maior resiliência da paisagem aos incêndios rurais, através da integração da estrutura ecológica/infraestrutura verde e da aptidão ecológica a diferentes atividades (silvicultura, agricultura, etc.).
A construção deste modelo, designado por FIRELAN, é alicerçada na participação de vários tipos de agentes da paisagem (*stakeholders*), cujas percepções relativamente ao território e ao risco e prevenção de incêndios rurais permitem a cocriação de soluções para a implementação das acções de transformação da paisagem, tornando-a mais resiliente ao fogo e sustentável do ponto de vista ecológico e socioeconómico.
Neste trabalho pretende-se apresentar os resultados da aplicação do modelo FIRELAN ao concelho de Leiria, bem como os primeiros resultados do processo de participação pública que incluíram a realização de 21 entrevistas semiestruturadas a agentes locais. Os resultados desta fase de participação demostram que a maioria dos entrevistados valoriza a sustentabilidade ecológica da paisagem, compreende a importância de um correcto ordenamento do território para a resiliência da paisagem aos incêndios e identifica grandes constrangimentos à implementação de acções de restauro dos ecossistemas. A estrutura da propriedade fundiária, a desadequação das políticas de financiamento face às acções de transformação da paisagem bem como as dinâmicas demográficas e socioeconómicas são referidas como os principais factores que condicionam a valorização da propriedade rural. Por outro lado, a aplicação do modelo de ordenamento do território permitiu planear, de forma estruturada, quais os locais prioritários para o desenvolvimento de acções de transformação e restauro da paisagem

identificadas pela consulta aos *stakeholders*. O planeamento da paisagem deverá garantir a conservação do solo, da água e da biodiversidade, a par com a criação de uma paisagem diversificada, com maior resiliência aos fogos rurais.

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Changing landscapes and Society, November 18-19, 2021, online

Plant biodiversity in vineyard landscapes: effect of cover crop management and landscape composition.

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Abstract: Crop management (conventional or organic) may influence plant biodiversity in crop fields. Moreover, composition at landscape or field scale may affect weed diversity and its ecosystem services, such its benefits as food or refuge for fauna. In vineyards there is an increasing use of organic practices by reducing tillage or using cover crops to improve soil structure and avoid erosion.
This study evaluates the weed diversity of vineyards in Catalonia (NE peninsula) and its importance for birds, pollinators and other invertebrates, in relation to soil and cover crop management and landscape composition at field and farm scale.
In 2018 and 2019, 111 inventories were conducted in vineyard in 30 farms in the DO Penedès region, by two 20 m x 2m transects in separate inter-lines of vine crop. 30 conventional (frequent tillage) and 81 organic fields were analysed: 33 fields with frequent tillage, 24 with short-term cover crop (1-8 years), and 24 fields with long-term cover crop (>8 years). Moreover, land use composition from SIGPAC database, field density, and the distance to the next forest were calculated in circular sectors of 500 m radius.
Weed species richness and abundance were significatively higher in organic vineyards than in conventional ones. The use of crop covers, exclusive of organic viticulture, increased richness and abundance up to 3 and 4 times. Organic vineyards with long-term cover crops showed a significative increasing of important species for fauna groups.
At the landscape scale, the higher proportion of anthropic land use and vineyard crops reduced weed biodiversity but at small scale, farm implies anthropic influence: the higher distance to the next forest and higher density of surrounding fields also reduced weed flora biodiversity.
We remark the importance of retaining patches of cover crops in vineyard farms in intensively cultivated landscapes of the Penedès region to enhance flora and fauna biodiversity.

Fig. 1 Cover crop in vineyards in the D.O. Penedès region (Catalonia, Spain).

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Changing landscapes and Society, November 18-19, 2021, online

Cambios espaciotemporales y pérdida de ecosistemas en el sector sur del LIC Dunas de Guardamar (Alicante), e implicaciones para su recuperación

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Abstract: La delimitación de los espacios protegidos de la Red Natura 2000 se ve condicionada por la historia de cambios y perturbaciones en un amplio marco temporal. No obstante, no siempre se conserva toda la heterogeneidad ambiental y la biodiversidad asociada. Cuando la capacidad de regeneración de su biodiversidad es lenta, o los regímenes de perturbación son demasiado frecuentes, o destructivos, son frecuentes las pérdidas de biodiversidad irrecuperables.

El campo dunar y la desembocadura del Río Segura se han visto sometidos a actuaciones humanas tanto regenerativas, como destructivas, que han afectado de forma diferente a los biotopos originales.

Esta contribución analiza los principales cambios en estos ambientes, en el margen derecho del Río Segura, en todo el sector sur del actual LIC “Dunas de Guardamar”. Examinamos, en la documentación histórica disponible del “Proyecto de Defensa y Repoblación de las Dunas de Guardamar” del Ingeniero Mira, todo el espacio que, a finales del siglo XIX, no se encontraba transformado a terrenos agrícolas, ni urbanos. El objetivo fue analizar las tendencias de cambio, biotopos que han permanecido, poco o fuertemente transformados, y aquellos que han desaparecido. De igual modo, se identificó qué relación ha existido entre las herramientas o planes de ordenación territorial y los cambios en los ecosistemas existentes. Se valoró la eficacia en la conservación, potenciación y restauración de los biotopos existentes, con el fin de maximizar su valor ecológico. El objetivo principal fue promover la biodiversidad en todas sus facetas, e identificar qué componentes deben incluirse en futuras herramientas de planificación.
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Changing landscapes and Society, November 18-19, 2021, online

Transformación del paisaje agrario tradicional y pérdida de elementos relevantes de la estructura del paisaje mediterráneo semiárido de Monóvar (Alicante)

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Abstract: La actividad agrícola tradicional, en los paisajes mediterráneos semiáridos de la península ibérica, se ha visto fuertemente modificada como consecuencia de la intensificación de la agricultura y de las transformaciones a regadío por limitaciones de disponibilidad hídrica. Los cambios no planificados en la composición y estructura del paisaje muestran graves afecciones en biotopos y biocenosis que favorecen la desertificación. Resulta imprescindible identificar las transformaciones más impactantes, así como los límites máximos tolerables, por unidad espacial, con el objetivo de asegurar la permanencia de un mínimo de biotopos. Esto podría contribuir a la regeneración de los ecosistemas, ante cambios socioeconómicos o naturales, que favorecen la desertificación silenciosa, y la erosión genética de la biodiversidad de estos territorios.

En esta contribución se analizan, cuantitativamente, las transformaciones de las parcelas agrícolas y su mosaico. Se caracteriza, de forma preliminar, la pérdida de biotopos y de biocenosis asociadas a márgenes y arbolado aislado, en el municipio de Monóvar (Alicante), mediante la comparación de fotografías aéreas de 1956 y 2016.

De manera generalizada, se observan cambios en la estructura del paisaje debidos a la transformación del secano tradicional a regadío, pues se ha duplicado la superficie en el regadío de herbáceas y se cuadruplica la abundancia de pies arbóreos, con una pérdida de vegetación arbustiva. Así, el abandono de los campos de cultivo, en el mejor de los casos, supone una recuperación de las formaciones vegetales naturales, aunque, al parecer, dominan los efectos negativos.

SESIÓN

SESSÃO 6

Conectividad ecológica para mamíferos carnívoros e Infraestructura Verde en la Comunidad Valenciana.

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La Ley 5/2014, de 25 de julio, de Ordenación del Territorio, Urbanismo y Paisaje, de la Comunitat Valenciana (LOTUP), define la Infraestructura Verde de dicha comunidad, estando formada por espacios naturales protegidos, zonas forestales gestionadas y Paisajes de Relevancia Regional, entre otras áreas con diferente grado de gestión, siendo actualmente la principal herramienta de gestión territorial de la Comunidad Valenciana. El 79% de la superficie terrestre de la Comunidad Valenciana se encuentra dentro de alguna de las figuras que engloba.

El objetivo de este estudio es analizar el papel de la Infraestructura Verde en el mantenimiento de la conectividad ecológica para mamíferos carnívoros en la Comunidad Valenciana.

Se han desarrollado modelos de conectividad ecológica utilizando el cálculo de rutas de mínimo coste y el índice de conectividad PC (Saura & Pascual-Hortal, 2007) para evaluar el estado actual de la conectividad funcional para cinco especies de mamíferos carnívoros presentes en la Comunidad Valenciana (*Felis silvestris*, *Genetta genetta*, *Vulpes vulpes*, *Martes foina* y *Meles meles*), así como para determinar las rutas de mínimo coste más importantes tanto para mantener como para restaurar la conectividad. Se han cruzado estos resultados con la Infraestructura Verde, para analizar su papel en la conservación de la conectividad.

Entre los resultados obtenidos cabe destacar que los Paisajes de Relevancia Regional son la figura que engloba una mayor superficie de las rutas de mínimo coste relevantes para los mamíferos (entre un 46 y un 80%, dependiendo de la especie y la tipología de la ruta), aunque también se trata de una figura de ordenación que ocupa el 60% de la superficie terrestre de la comunidad.

Sin embargo, los corredores territoriales, ocupando un 13% de la superficie de la comunidad valenciana, cubren entre un 18% y un 46% de la superficie de las rutas de mínimo coste.

En cuanto a las figuras de protección, cabe destacar el papel de los LIC (cubren entre un 9% y 20% de las rutas) y las ZEPA (cubren entre un 9% y 34%) por su importancia para la conectividad.

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Dinâmicas de uso do solo na área de Rede Natura em Portugal, antes e depois da classificação (1960 - 2018).

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Abstract:

Os Sítios de Importância Comunitária (SIC) que constituem a Rede Natura 2000 foram estabelecidos com vista à conservação de habitats naturais e seminaturais. Para o efeito, foram cartografadas áreas que correspondem às tipologias de Habitat da Diretiva 92/43/EEC. No entanto, os SIC abrangem áreas públicas e privadas, que, no caso de Portugal, têm mais 80% de terrenos privados. Isto constitui um desafio para a política de ordenamento do território e para os objetivos de conservação da natureza.
Tendo em conta a cartografia de uso do solo de 1960/70, 1995 e 2018, e considerando que a classificação dos SIC se iniciou na década de 1990, avaliou-se a dinâmica da alteração de uso do solo (a) nas áreas dos 61 SIC de Portugal continental, (b) na zona envolvente imediata e (c) numa segunda envolvente imediata, já fora da influência da área de conservação. A dinâmica do uso do solo foi avaliada e comparada nos períodos compreendidos: entre 1960 e 1995, e entre 1995 e 2018, de modo a abranger os períodos antes e depois da designação dos SICs. A análise foi detalhada de seguida de acordo com o tipo de paisagem de cada SIC.
Os resultados mostram claras diferenças tanto a nível temporal (entre os dois períodos) como a nível espacial (dentro e na envolvente das áreas de SIC). A agricultura tem diminuído e as áreas florestais têm sofrido decréscimos na plantação de algumas espécies, no entanto, espécies como o eucalipto continuam a aumentar em algumas áreas de SIC. Entre os diferentes tipos de paisagem há casos particulares menos dinâmicos, derivados da sua natureza mais estável. No entanto, os resultados permitem também identificar um grande crescimento de áreas abandonadas embora o mesmo também ocorra fora das áreas classificadas. Sugere-se a realização de estudos comparativos entre regiões e entre estados-membros, como forma de melhorar a conciliação entre os objetivos de conservação e as atividades humanas, dentro de SIC e em particular nas áreas privadas.

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Green Infrastructure – a landscape planning tool at a national level

Portugal case study

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Abstract

The multiple changes in the landscape lead to a reduction in biodiversity and the decline of ecosystem quality. Ddespite growing awareness of Green Infrastructure (GI) importance, the EU GI strategy failed its 2020 targets. At a strategic level regarding nature conservation, a commitment to 2030 is to legally protect at least 30% of the EU's land area, to more areas of high biodiversity value, or potential can be safeguarded. Simultaneously, the EU GI strategy points out that GI is only implemented at a small scale, not giving due recognition to the potential economic and social benefits of GI solutions at the landscape scale. This confirms the urgent need to integrate landscape scale in national and regional planning.

The National Ecological Network (EN) map for mainland Portugal developed in the LEAF /ISA [PTDC/AUR-URB/102578/2008] established the theoretical framework of the GI. This EN map identifies and maps the essential areas with high ecological value and sensitivity, due to high biodiversity and ecosystem stability, which equally means they are more vulnerable to anthropogenic activity e.g. valley bottoms, significant soil fertility, and productivity (soil quality), natural vegetation of high conservation, etc. The results of EN show that the existing protected areas in Portugal, namely Natura 2000 and classified protected areas, are insufficient to ensure landscape ecological balance and avoid fragmentation. Within this, the EN assumed a holistic view of land-use planning and biodiversity conservation as the core of the wider GI framework.

Based on this study, the LANDGI nexus project is being developed and represents an attempt to map the GI at the national level and some ecosystem services associated. This study developed a mapping criteria and prioritization of those essential areas in order to facilitate its translation into potential land uses and ecosystem services maps. It included: 1) An evaluation/prioritization of the NEN; 2) identification and selection of the GI components; 3) Identification of critical landscapes and ecological linkages; 4)

"sensitive areas" defined by IUCN as vital or critical regions due their natural vulnerability; 4) border connections. In addition, this research will contribute to updating the collaborative e-platform EPICWebGIS (2017).

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Doñana National Park: 50 years of success?

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Abstract: Doñana National Park is one of the most emblematic natural areas in Europe. It is characterised by vast wetlands (saltmarshes and ponds), an extensive system of mobile dunes, and scrublands, and it is home to several endangered species such as the Iberian lynx and the imperial eagle. This work aims to study the changes in the ecosystems and plant communities of Doñana since the creation of the National Park, to gain a deeper understanding of the processes that shaped them. The main types of land use/land cover have been mapped from detailed interpretation of historical aerial images in five representative plots (2 Km^2) of the Doñana sands. All the aerial image series were georeferenced, interpreted and normalized, and then uploaded into a Geographical Information System to analyze the changes that have occurred in land use/land cover. The results show a generalized decrease in the most hygrophytic communities (heaths and ponds), an increase in the more xeric mature communities (pinewoods and Phoenician juniper woodlands), and the colonization of mobile dunes by vegetation, although there were differences between the plots according to their location and initial composition. The causes of most of these processes appear to be a generalized descent of the water table due to the extraction of groundwater from the aquifer for irrigation and urban supply, a decrease in fresh sand supply to the dunes because of the construction of coastal infrastructures, and an inadequate forest management. Many of the documented changes have their origin outside the boundaries of the protected area and they had led to a significant loss of the values that led to the protection of Doñana, fifty years ago. It is, therefore, urgent to address the restoration of Doñana's ecosystems from a broader perspective, such as that provided by landscape ecology.