



Roadless areas: a tool to define strictly protected areas and expand the network of protected areas in Europe

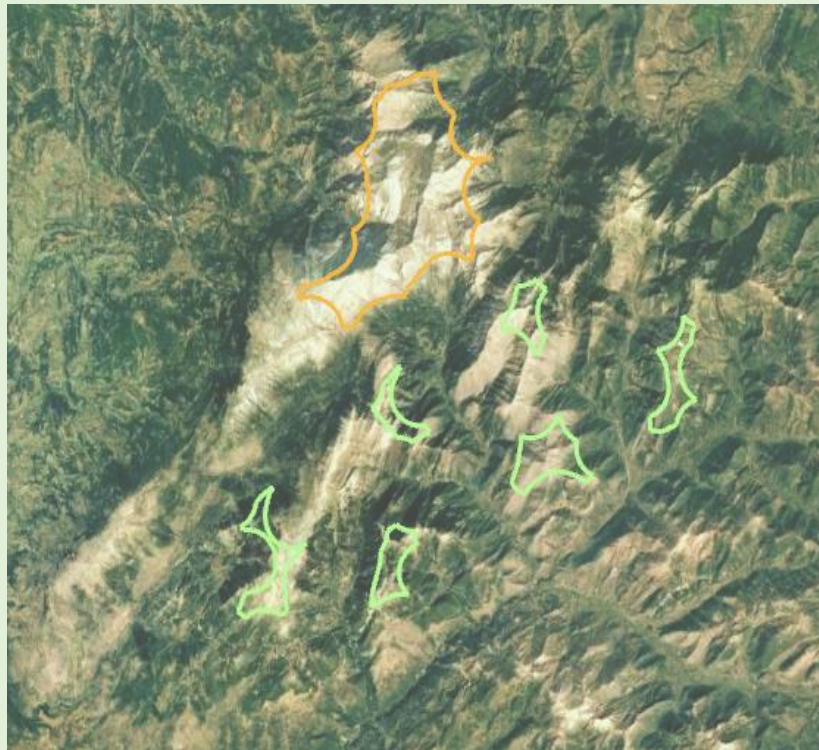


Prof. Vassiliki Kati, University of Ioannina, Greece

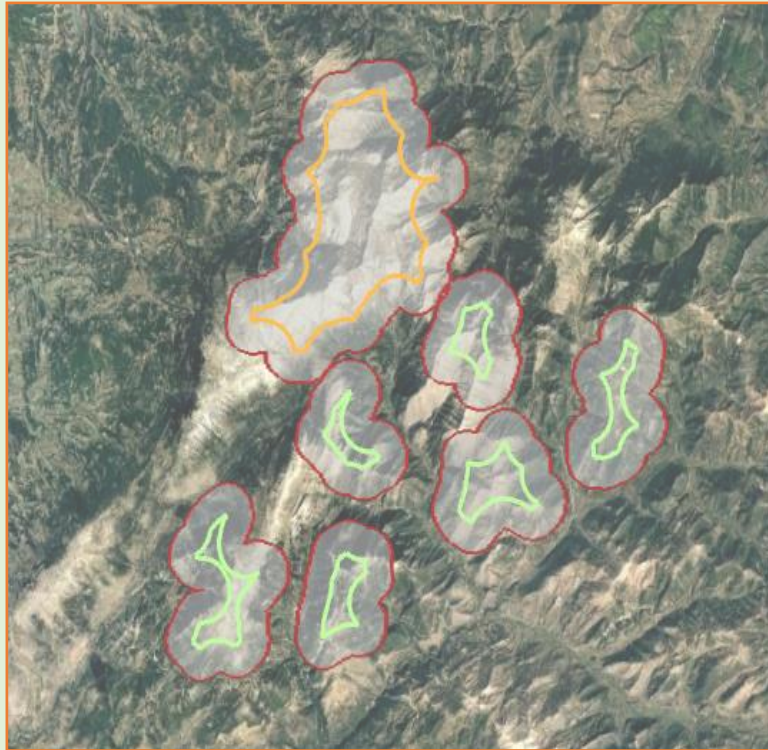
4th Natura 2000 Biogeographical Seminar for the Mediterranean Region
Theme 1: Pledges and strict protection. 18/4/2024



Roadless area definition



Roadless core area:
Land patch $> 1 \text{ km}^2$ that is at least 1 km from the closest road



Roadless area:
Land patch over 1 km^2 without roads
[Roadless core + 1 km buffer zone]



Roadless island:
An island fully deprived of roads



What are “strictly protected areas” in the 10% EU’s target?

“Strictly protected areas are fully and legally protected areas designated to conserve and/or restore the **integrity** of **biodiversity-rich natural areas** with their underlying ecological structure and supporting **natural environmental processes**. Natural processes are therefore left essentially **undisturbed from human pressures and threats** to the area’s overall ecological structure and functioning, independently of whether those pressures and threats are located inside or outside the strictly protected area” [1]

- many strictly protected areas will be “**non-intervention areas**” [1]
- active management **only** to sustain or enhance the natural processes, or to restore natural values [1]
- Link to IUCN categories: Ia- **strict nature reserve**, Ib - **wilderness area**, II- **national park** [2]

1: [SWD\(2022\)](#): Criteria and guidance for protected areas designations. Commission Staff Working Document.

2: [Dudely 2008](#): Guidelines for Applying Protected Area Management Categories. IUCN.

3. [EC 2013](#). Guidelines on wilderness in Natura 2000 – Management of terrestrial wilderness and wild areas within the Natura 2000 network



What should be allowed in terrestrial strictly protected areas by definition?

- **Research** under research permit
- **Ecotourism** under a maximum visitor annual capacity study
- **Paths** and path maintenance works
- **Environmental interpretation projects (AAS)**
- Mountaineering **shelters, camps and medical facilities** for visitors (under AAS without road access)
- Fire and natural disasters prevention works (AAS)
- Maintenance of existing infrastructures (AAS)



What should be banned in strictly protected areas by definition?

- **New artificial land generation** (new roads, new development projects, touristic and other infrastructures etc)
- **Projects of overriding public interest** should not be an exception (RES projects, energy & telecommunication lines etc).
- Human **activities disturbing natural processes** inside and outside the strictly protected area

The grey zone:

Active management needed for the benefit of biodiversity: Scientific evidence supporting the need for controlled farming, **hunting, fishing, woodcutting, livestock grazing** (special study).



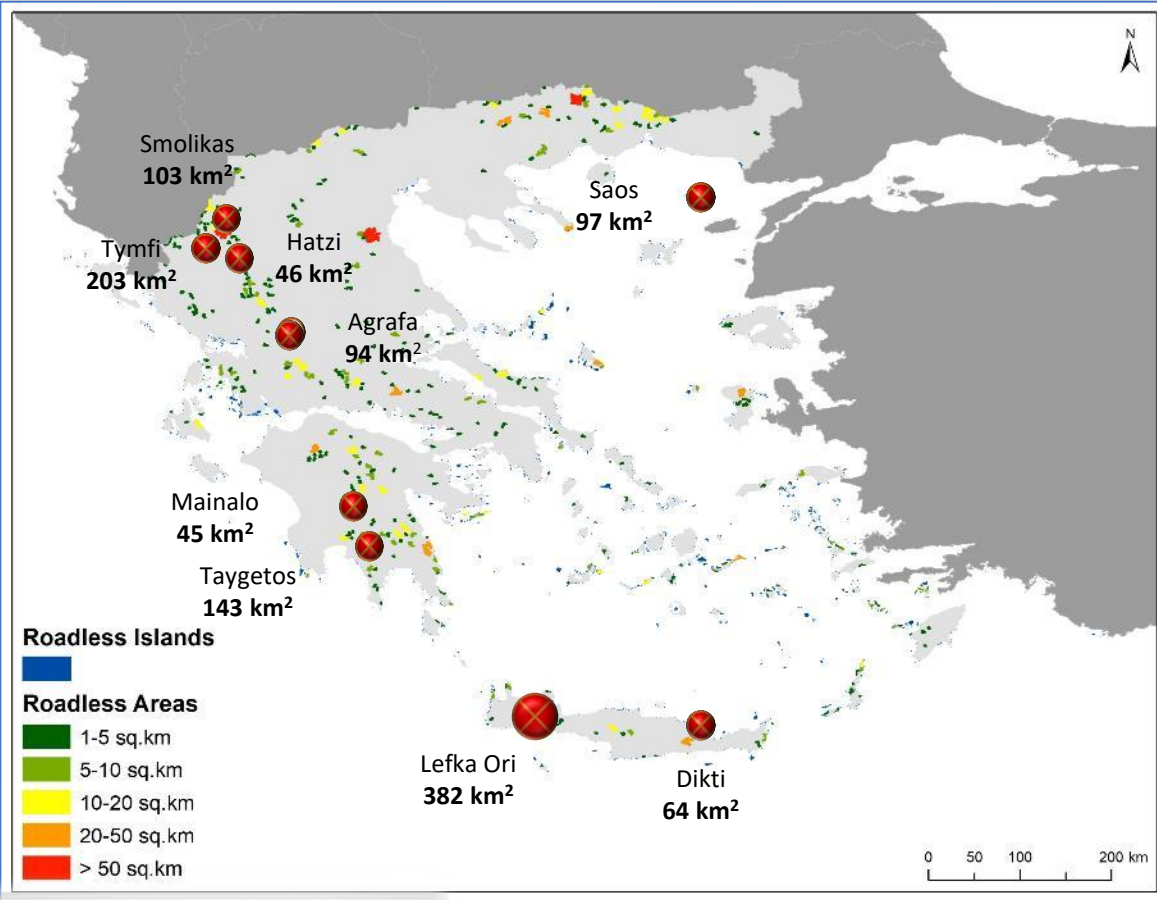
Distorted picture of “strict protection” concept in Greece

What is “strictly protected areas” in Greek legislation? **Not defined**

Zone A-absolute nature protection [16 land uses] and “**Zone B-nature protection zone**” [56 land uses]

Examples of incompatible land uses potentially allowed in strictly protected areas

- Houses:** Residence for security personnel and workers ^{A-B}
- Centers:** Research centers for the protected area, data centers, Wildlife Care Centres ^B
- Refreshments shops** up to 50 sqm ^B
- Transport and parking facilities:** **roads**, cycle paths, paths, marine waterways ^{A-B} and **airports**, helicopters, railway stations, tram and tram stations, parking facilities ^B
- Agricultural facilities:** warehouses and greenhouses, livestock **poultry farms, pumping plants**, aquaculture, multifunctional farms, livestock parks, salt flats, equestrian centers etc ^B
- Agricultural activities:** farming, livestock grazing, woodcutting, fishing, **hunting, irrigation projects, collection** of plants, fungi etc ^B
- Constructions** in public common areas ^{A-B} : **infrastructure networks of public interest** (? electricity transfer networks, renewable energy infrastructures}, stations measuring air pollution, noise and meteorological data
- Projects for the prevention or treatment of groundwater or soil contamination ^{A-B}
- Works to protect against erosion, landslides and soil support ^{A-B}
- Lighthouses^{A-B}.



Governmental policy: “Untrodden Mountains” project announced in COP26 (11/2021).



Ministerial decisions banning road construction and any artificial land expansion in **9 roadless mountains** for 2+2 years: **1180 km²** (2022-2023)

2024: No progress from the new government

Roadless legislation content

Roads & artificial land are banned to:

- Halt land-use change
- Halt expansion of artificial land, fragmentation
- Conserve species and habitats
- Preserve landscape values
- Maintain mild human activities
- Promote ecological tourism
- Promote mild and sustainable development

Article 1 of Ministerial Decisions (Objectives):

<https://bc.lab.uoi.gr/en/research/projects/roadless/>

Presidency of the Hellenic Government
GREECE

Voluntary National Review 2022

ON THE IMPLEMENTATION OF THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT



- Commitment to legally protect 55 roadless areas in SDGs report.
- Conflict: Local communities & social pressure for more RAs # pressure against RAs from investors



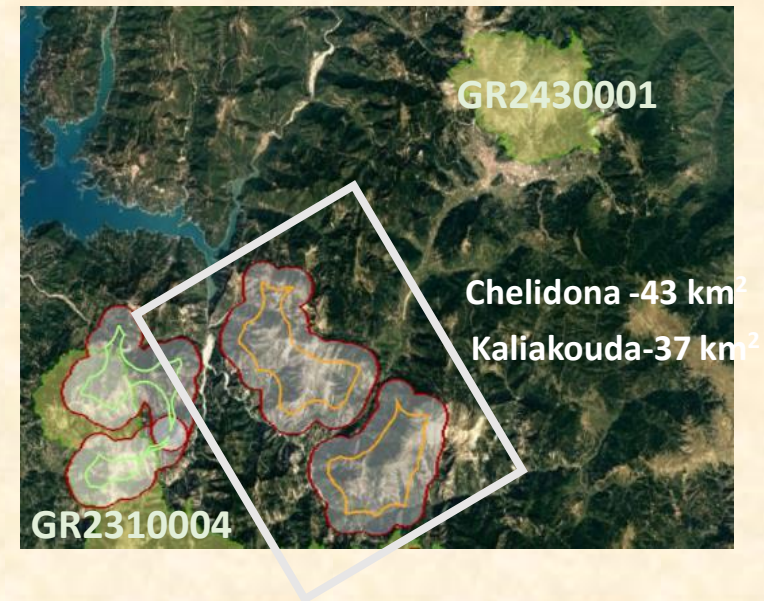
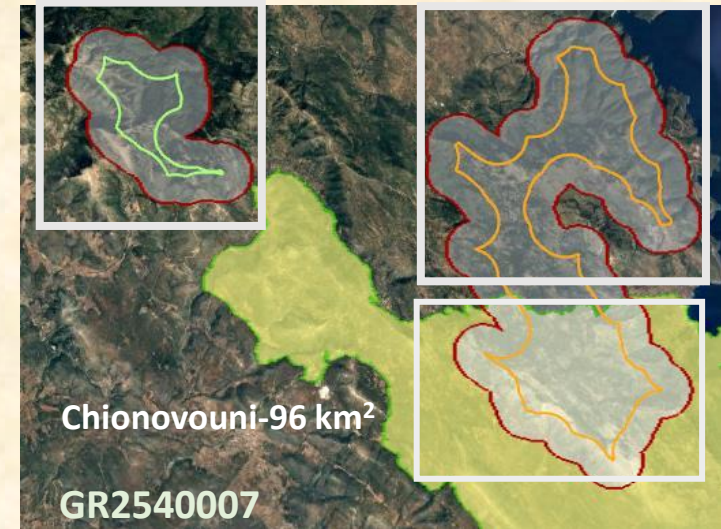
Fund research and **map RAs** at national and European scale

Designate RAs as **strictly protected zones within** N2000 network

Expand current N2000 sites by adding vicinal RAs

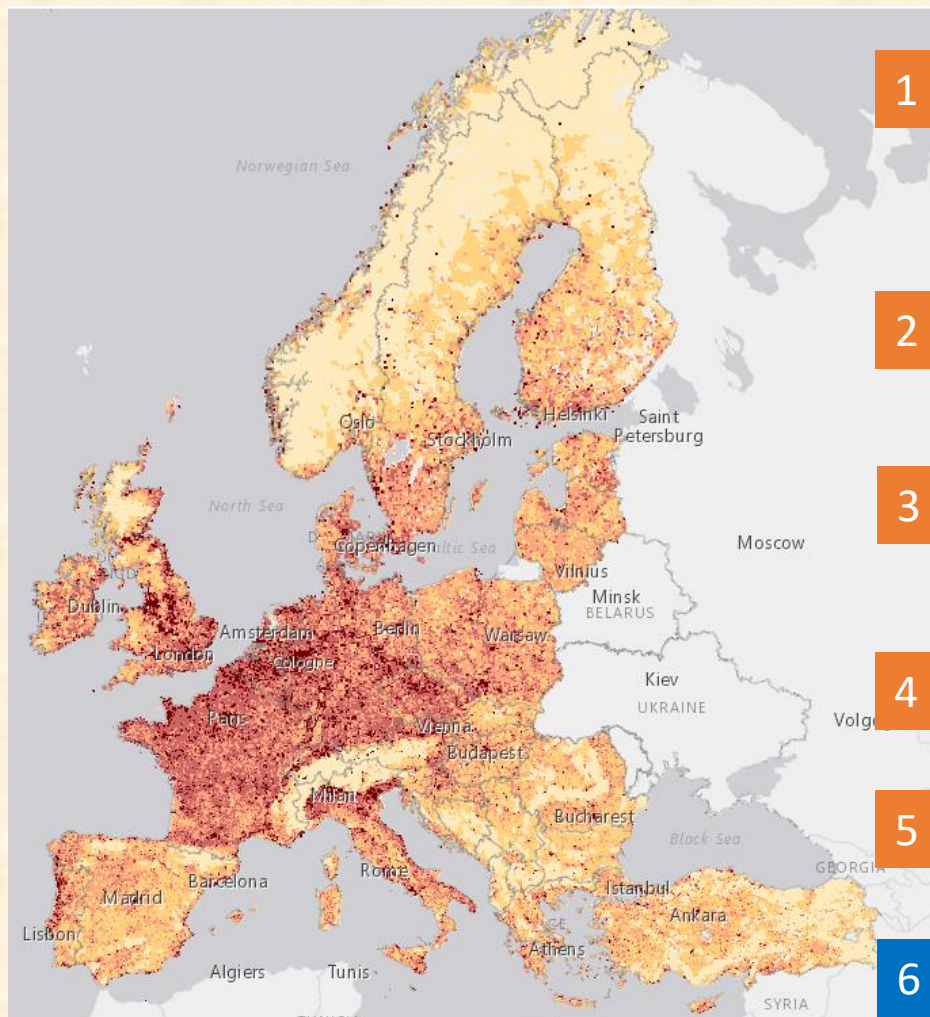
Gap analysis – to enhance N2000 **connectivity**

Gap analysis – to discover, map and protect **old-growth woods**





The fragmentation map of Europe



1 Natura 2000 – strictly protected zones & connectivity ^[1]

- Map RAs at national scale and designate them as strictly protected zones
- Exclude new road construction from land uses in these zones (10%)
- Use RAs as a criterion for N2000 expansion and connectivity

2 Nature Restoration Law ^[2]

Fund road removal or controlled road access as restoration activity

3 RES Directive ^[3]

Exclude roadless areas from the priority areas for fast renewable development the so called “renewables go-to areas”

4 Spatial planning

Roadless areas /wilderness areas; “non-go-to” areas

5 Horizon & 8th Environmental Action Programme

EU Roadless map- wilderness indicator for monitoring (SEBI13-fragmentation)

6 Kunming-Montreal Global Biodiversity Strategy

Initiating wilderness areas maintenance as an indicator for the first goal

Beneficiaries of roadless policy: countries in Scandinavia, eastern Europe, Balkans, Mediterranean basin and the Alps

[EEA. 2019.](#) Landscape fragmentation Effective Mesh Density time-series: major and medium anthropogenic fragmenting elements (FGA2-S)

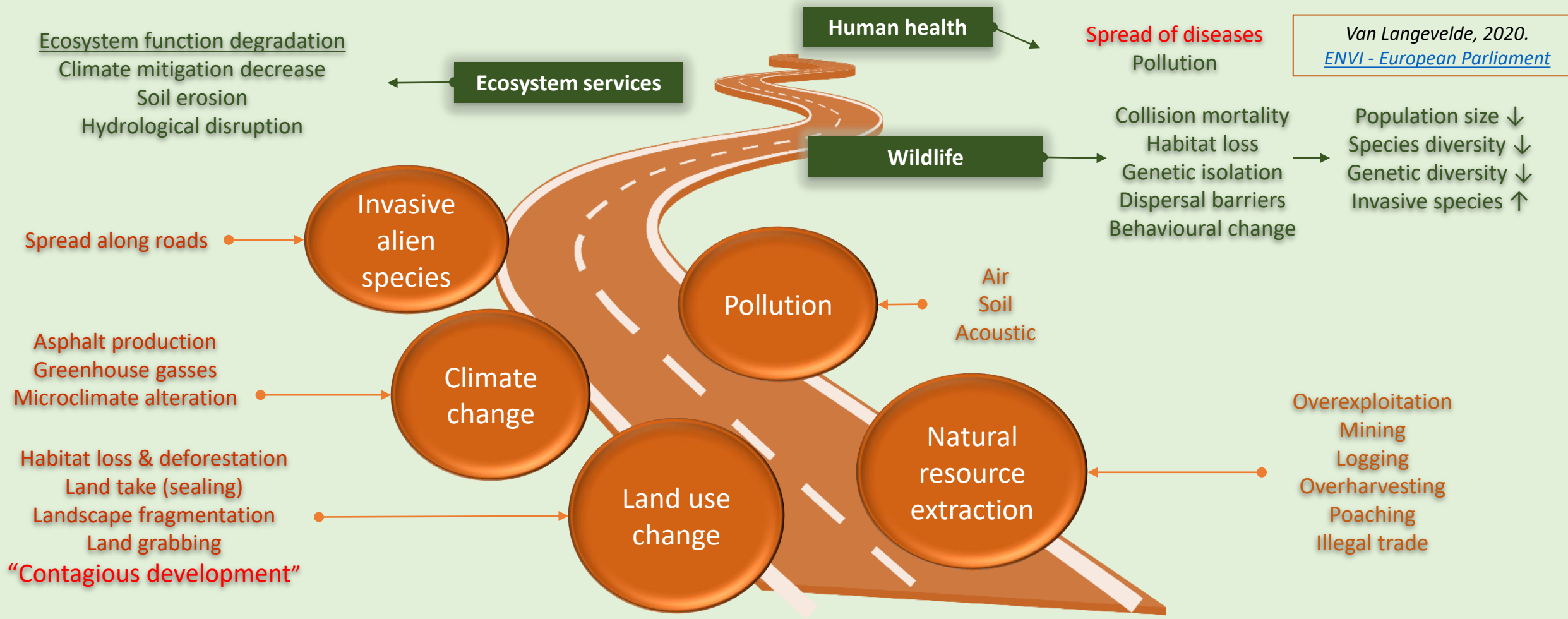
[1] [EC 2022:](#) SWD (2022) 23 final – Guidance document linked to EU Biodiversity Strategy

[2] [EC 2022.](#) Nature restoration law linked to the EU Biodiversity Strategy. Forthcoming.

[3] [EC 2022.](#) COM (2022) 222 final. Proposal for a new Directive relevant to RES Development. Forthcoming



Roadless Areas pinpoint natural areas of high ecological integrity

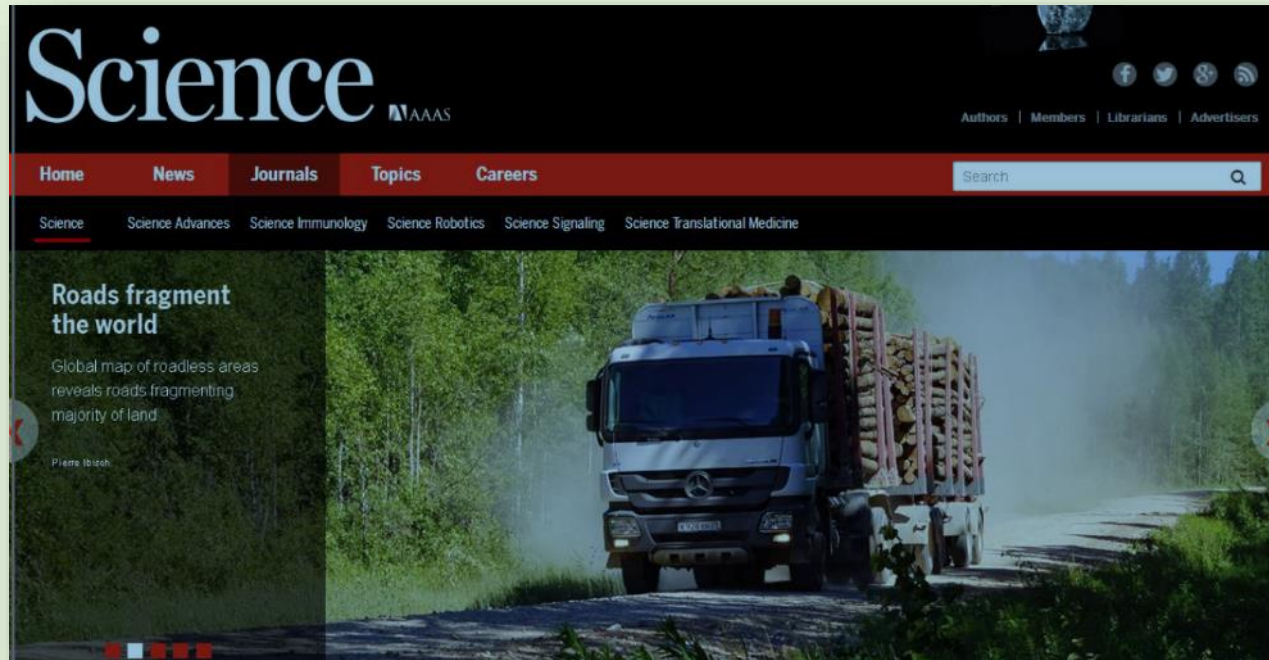


*Van Langevelde, 2020.
ENVI - European Parliament*

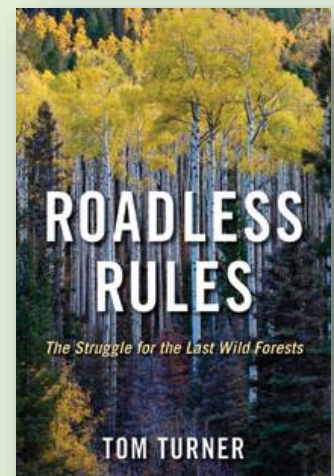
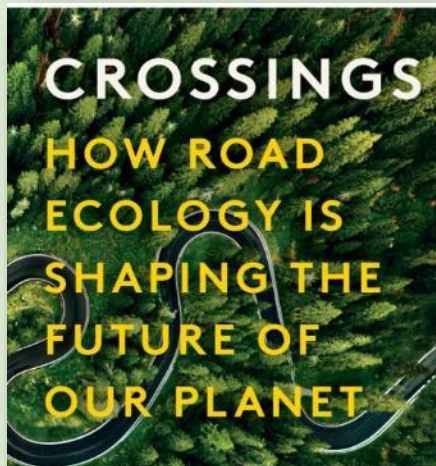
RAs is a cost-effective and straightforward tool to hamper land industrialization and maintain naturalness
Roads are related to all 5 top threats for biodiversity, including land use change –the top threat to biodiversity
RAs preserve wildlife, ecosystem services and human health



Strong scientific movement supporting roadless areas preservation



- **Society for Conservation Biology- European Section**–Policy Committee → [Roadless initiative](#)
- **Rio+20**: SCB, IUCN, UNEP, Conservation International, Tebtebba, MEP K. Arsenis (2012).
- **The IENE declaration**: Protect the remaining roadless areas (2014).
- **NEMOR**-Network of European Mountain Research – *WG or roadless mountains* (2024)





The Greek case

Greece is a biodiversity hotspot

6600 vascular plant taxa -endemic 22%

30,000 animal species -endemic 17.1%



Greek mountains and islands are centers of endemism but currently prone to fast nature destruction by RES development.



Fragmentation in Greece is half as in Europe but increasing [\[1,2\]](#) and the country was ranked in the **first position of land take increase** in EU28 [\[3\]](#)

[\[1\] SOER 2018](#), [\[2\] EEA 2019](#) [\[3\] Eurostat 2017](#)



Greece is one of the most biodiversity-rich EU countries but most threatened by artificial land and road expansion



The Greek roadless policy: the science behind the scenes



ROADLESS project: 2019-20 & 2021-22. 10 researchers. ~125.000 €. Green Fund.

<https://bc.lab.uoi.gr/en/research/projects/roadless/>



ΠΡΑΣΙΝΟ ΤΑΜΕΙΟ

2020

Biological Conservation 252 (2020) 108828

Contents lists available at [ScienceDirect](#)

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Policy analysis

Conservation policy under a roadless perspective: Minimizing fragmentation in Greece



2023

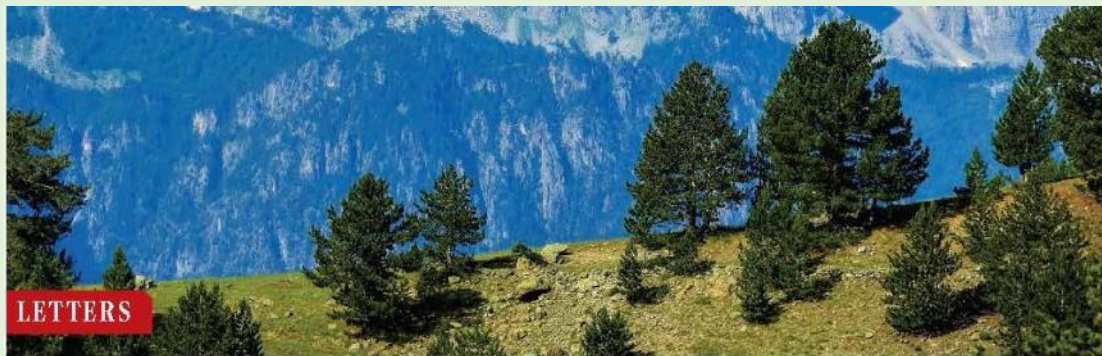
Biological Conservation 291 (2023) 110015

Contents lists available at [ScienceDirect](#)

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

How much wilderness is left? A roadless approach under the Global and the European Biodiversity Strategy focusing on Greece

Greece has banned the construction of new roads in some of its mountainous areas, a policy that can proactively protect vulnerable habitats and species.

Edited by Jennifer Sills
**Greek roadless policy:
A model for Europe**

of 30% of the EU's land area but does not address road fragmentation (9). The plan will allocate billions of euros for planting trees and restoring degraded environments but leave natural ecosystems vulnerable to new roads and land-

REFERENCES AND NOTES

1. Biodiversity Conservation Lab, University of Ioannina "Roadless" (2022); <https://bc.lab.uoi.gr/en/research/projects/roadless/>.
2. S. Diaz et al., *Science* **366**, eabb3100 (2019).
3. W. F. Laurance et al., *Nature* **513**, 229 (2014).
4. P. L. Ibisch et al., *Science* **354**, 1423 (2016).

Society for Conservation Biology
A global community of conservation professionals

Wilderness and Large Natural Areas

WILD EUROPE

SCB Europe Section Press Release: Greece gives legal protection to roadless areas

27 January 2022

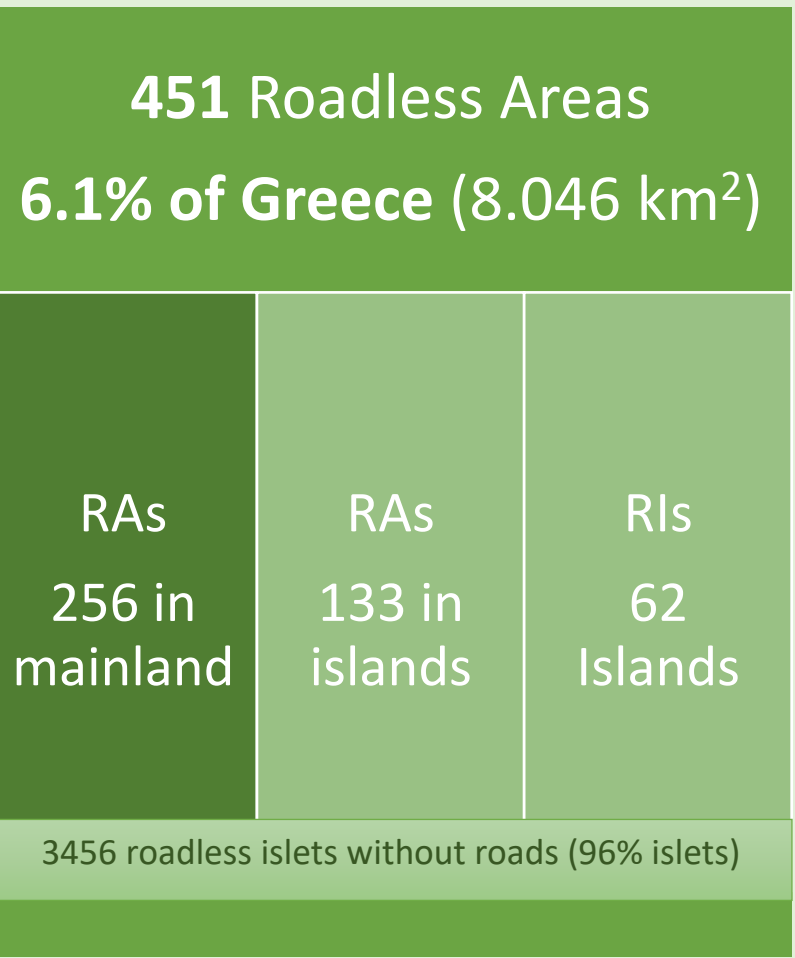
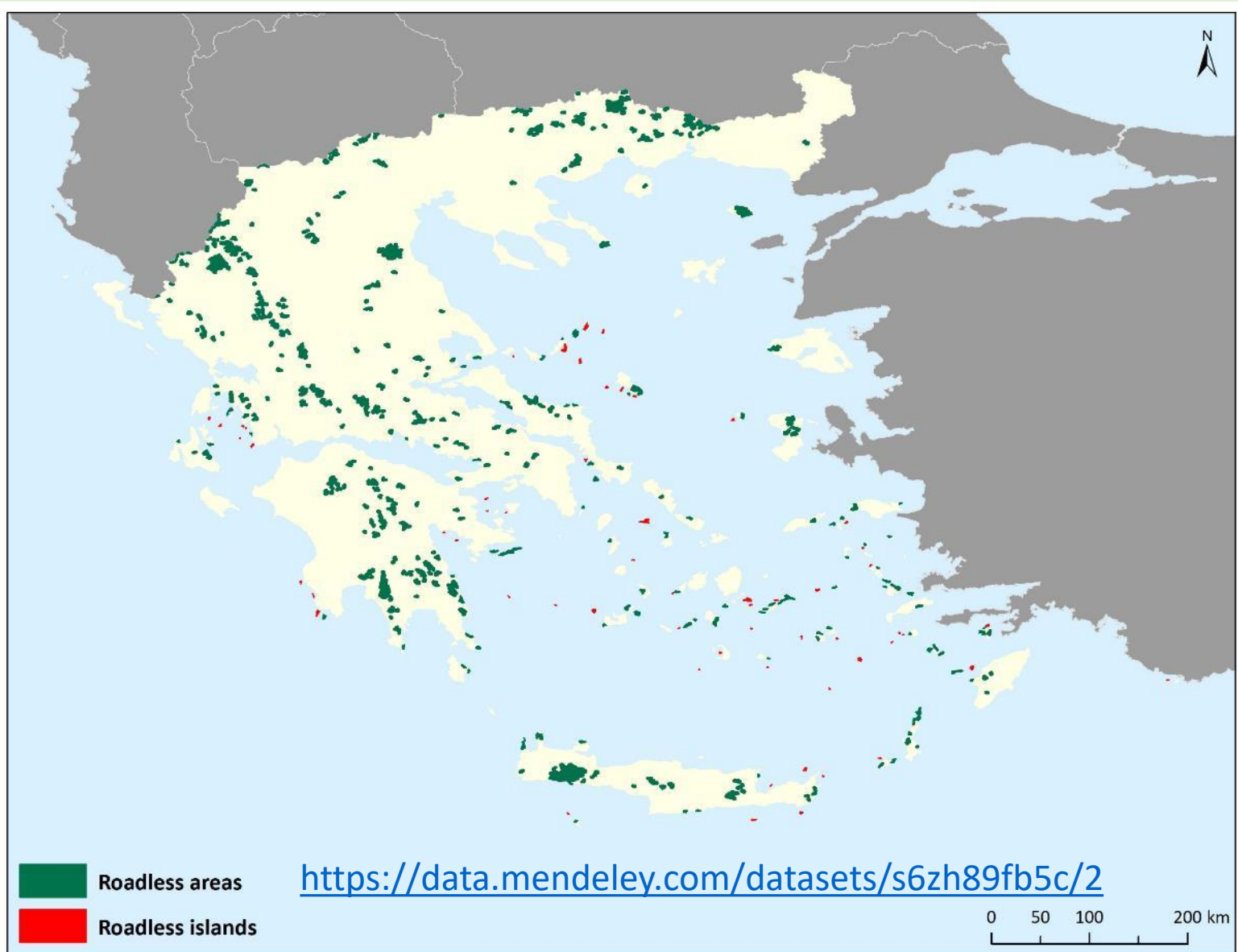
Greece leads the way to roadless protection

Untrodden Mountains



How much wilderness is left?

There is still roadless land remaining in Greece (6.1%) **located in mountains and islands**



- Half of RAs extent is above 1 000m



Are roadless areas wilderness areas & candidate strictly protected areas?

Wilderness criteria [1-2]	Roadless areas	Non-roadless in N2000	Non-roadless outside N2000
1. undevelopedness	<i>No infrastructure</i>		
CLC: Artificial land(%)	0	1.1	4.2
2. undisturbedness	<i>No industrial, construction, mining, woodcutting and other major disturbances</i>		
CLC: Agricultural land (%)	0,9	24.5	47.4
Mean Human Influence Index (1-100) [3]	8.9	14.1	19.0
3. naturalness	<i>Integrity, undisturbed natural processes</i>		
CLC: Forests & seminatural areas(%)	99.1	72.6	48.3
Landscape Fragmentation Index (LFI)	9	165.2	1101.4
4. size	<i>Large enough areas of min size : 5 – 30 km² (Europe)</i> 55 Roadless areas over 30 km² and 302 over 10 km²		

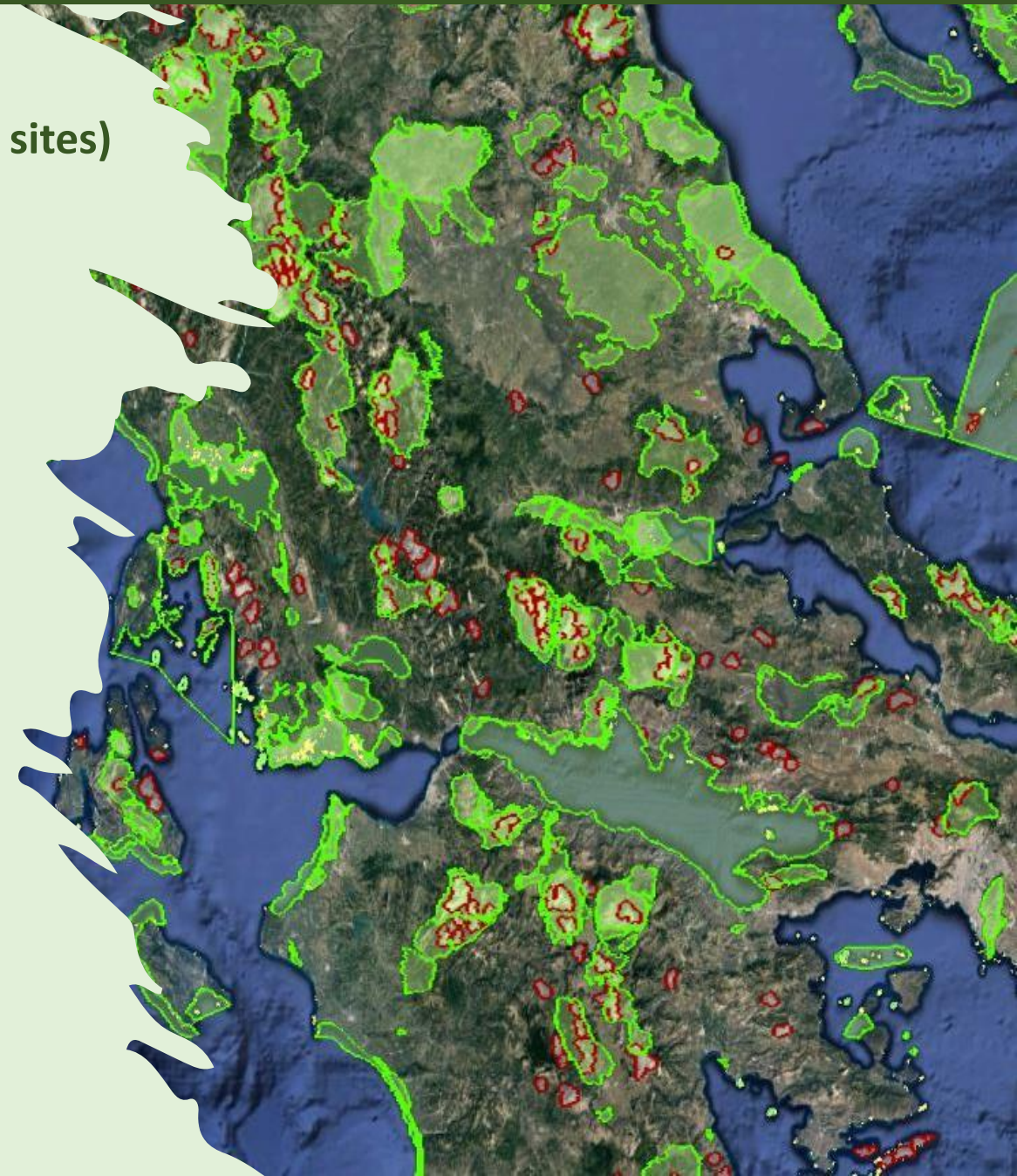
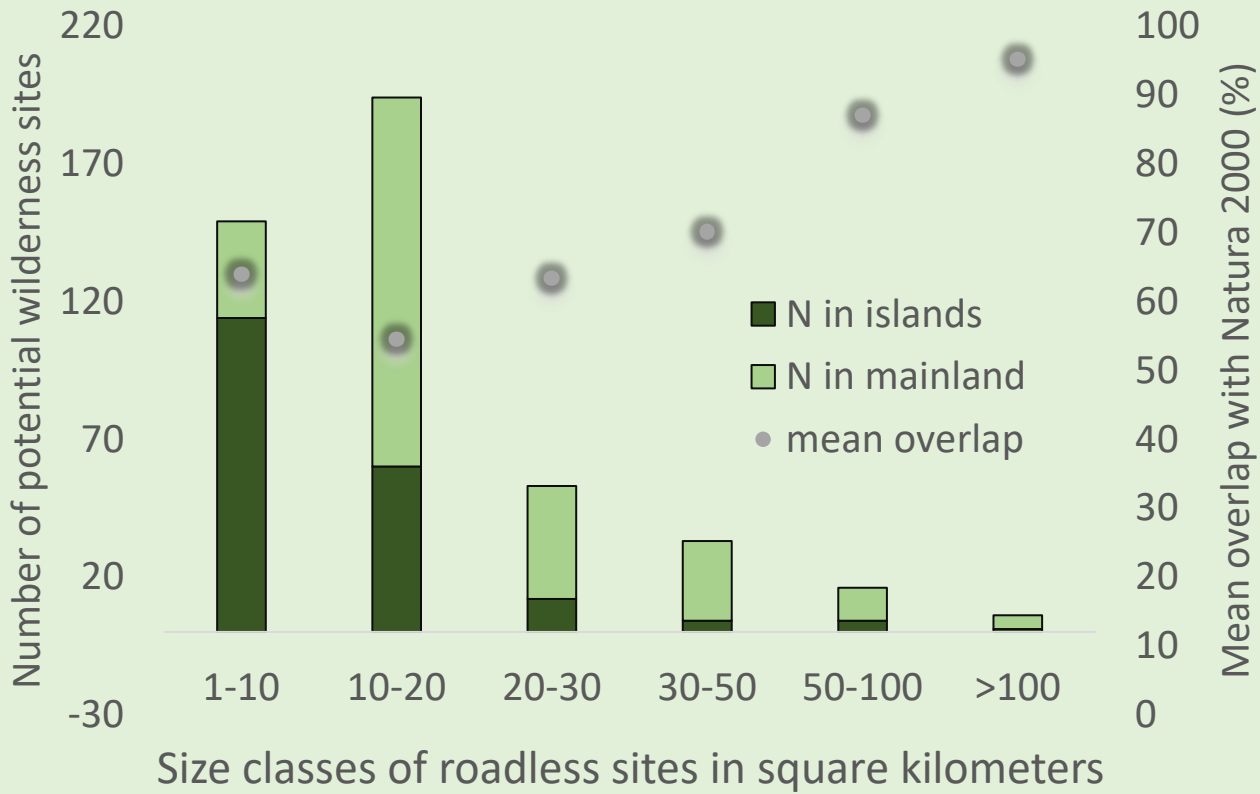
**Yes roadless areas fulfill the wilderness criteria, especially the larger RAs.
We showed that they can be used to achieve the 10% target of strictly protected land.**

[1] EC, 2013. Guidelines on Wilderness in Natura 2000. Management of terrestrial wilderness and wild areas within the Natura 2000 network. [2] Perez-Hammerle et al. 2023 . [3] Sanderson et al., 2022



How much of RAs coincides with the Natura 2000 network?

- **15% of Natura 2000 land is included in RAs (204 N2000 sites)**
- 68% of the RAs extend lies within Natura 2000
- **Larger RAs are better covered by N2000**





Are forests in RAs threatened by fires ?

Forest and seminatural areas (CLC3): 2008-2022	Roadless Areas	Roaded Land	Greece
Number of fires per 100 km ²	1.37	1.59	1.49
Total (cumulative) burnt areas (km ²)	126 (128)	2877 (3034)	3033 (3162)
Total (cumulative) burnt areas (%)	1.6 (1.7)	4.3 (4.6)	4.0 (4.3)

Yes but less!
First indication that roadless areas are less vulnerable to fires

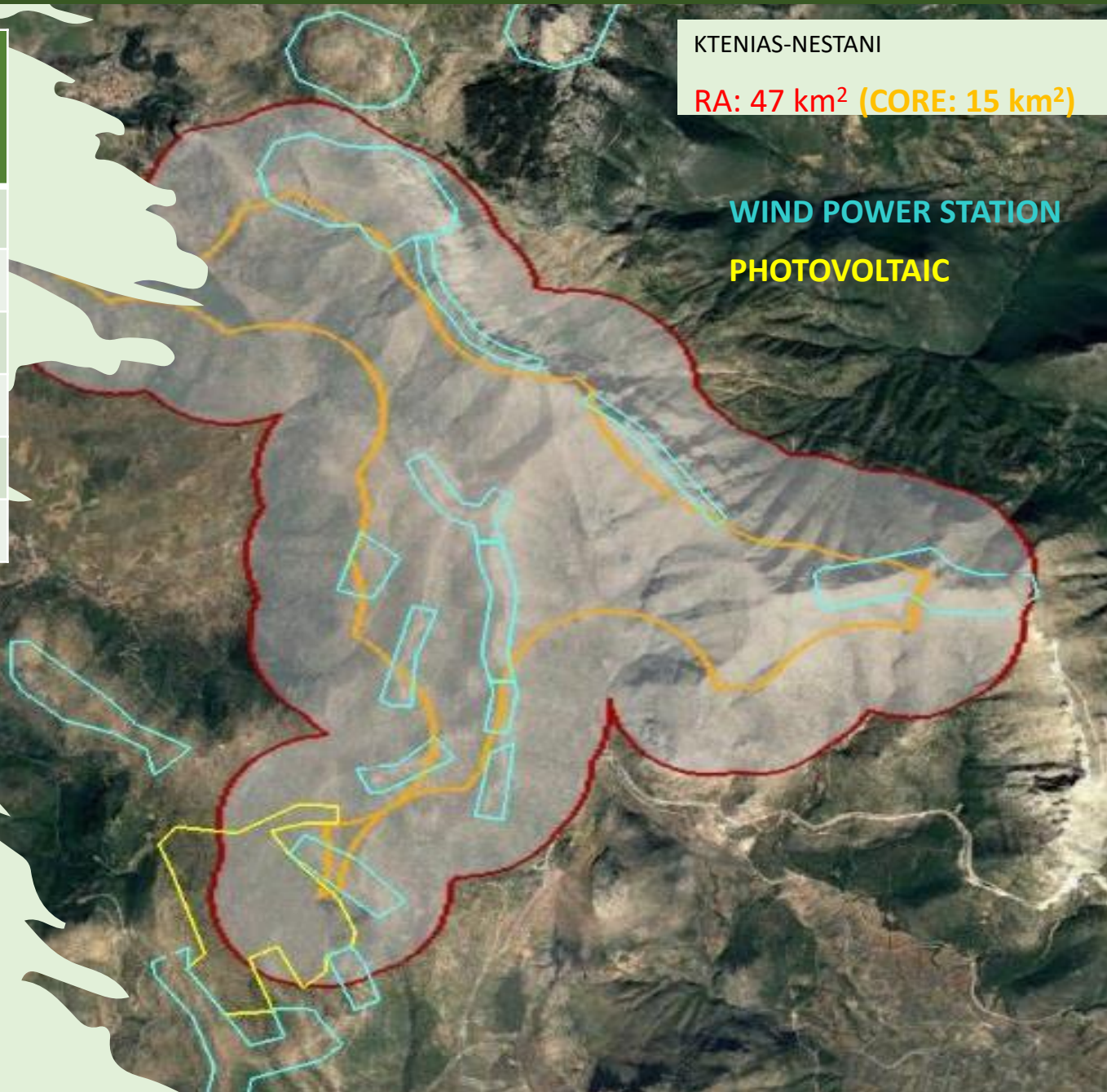
- Less frequent fires.
- Fires burnt 1.6% of roadless land extent, but the respective proportion was **2.7 higher** in the roaded land





Are RAs threatened by Renewables' infrastructures?

Renewable type	Number of RAs & RIs	% of RAs and RIs
wind	149	33.0
hydroelectric	38	8.4
photovoltaic	21	4.7
hybrid	17	3.8
storage	2	0.4
TOTAL	199	44.1



KTENIAS-NESTANI
RA: 47 km² (CORE: 15 km²)

WIND POWER STATION
PHOTOVOLTAIC

**Yes! 44% of RAs will be lost.
One-third of RAs are
threatened by the
wind industry!**



Mediterranean urgency: Windfarms threaten mountains and forested lands

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LETTER

Renewables in Spain threaten biodiversity

[Serrano et al. 2020](#)

Contents lists available at ScienceDirect

Science of the Total Environment

ELSEVIER journal homepage: www.elsevier.com/locate/scitotenv

The biodiversity-wind energy-land use nexus in a global biodiversity hotspot

[Kati et al. 2021](#)

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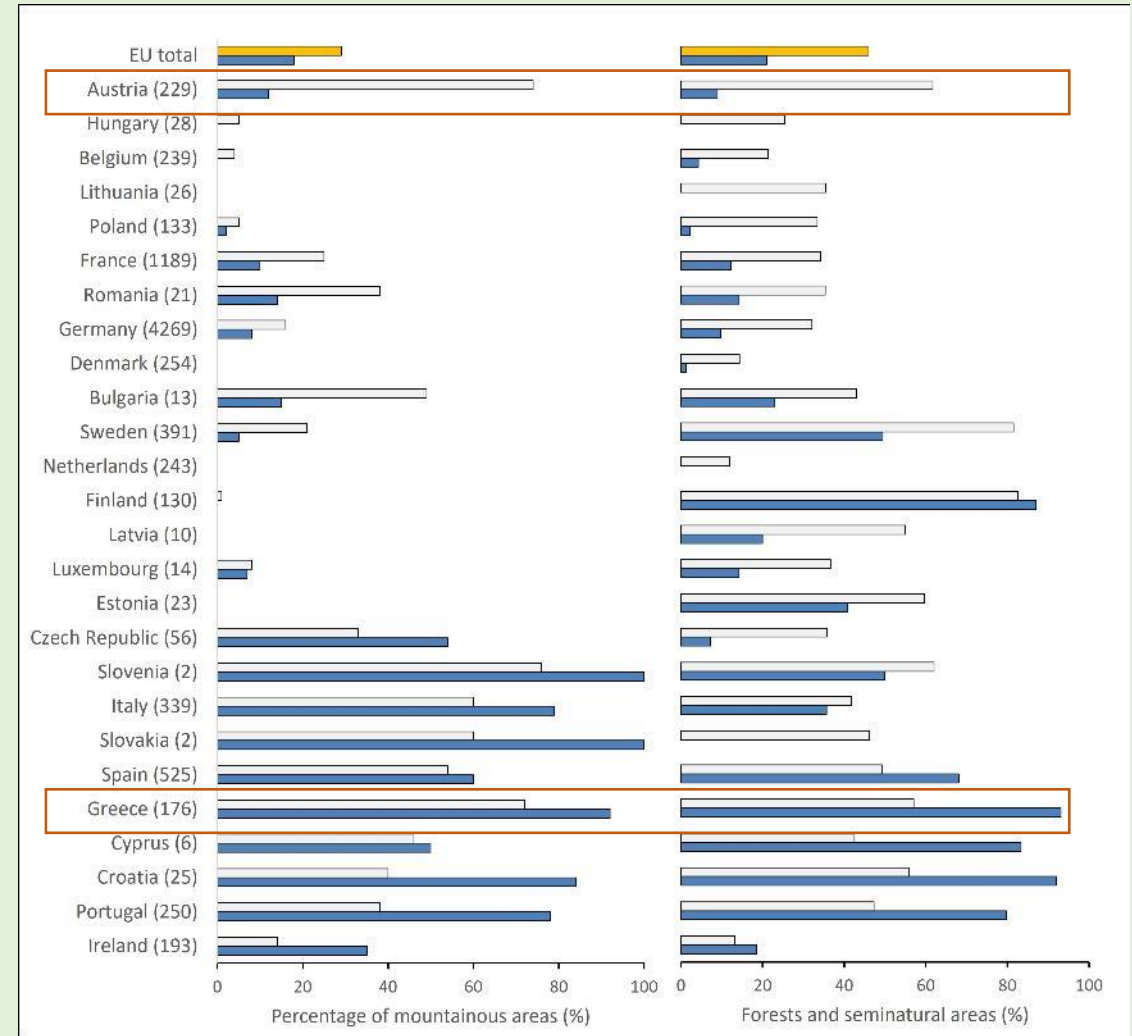
Journal of Environmental Management

ELSEVIER journal homepage: www.elsevier.com/locate/jenvman

Research article

The overlooked threat of land take from wind energy infrastructures: Quantification, drivers and policy gaps

[Kati et al. 2023](#)



Wind power stations are planted more in mountainous and forested zones in the Mediterranean than in the rest of Europe



Feel free to contact me for assistance

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Thank you

ROADLESS : <https://bc.lab.uoi.gr/>

Dragon Lake. Timfi roadless area