

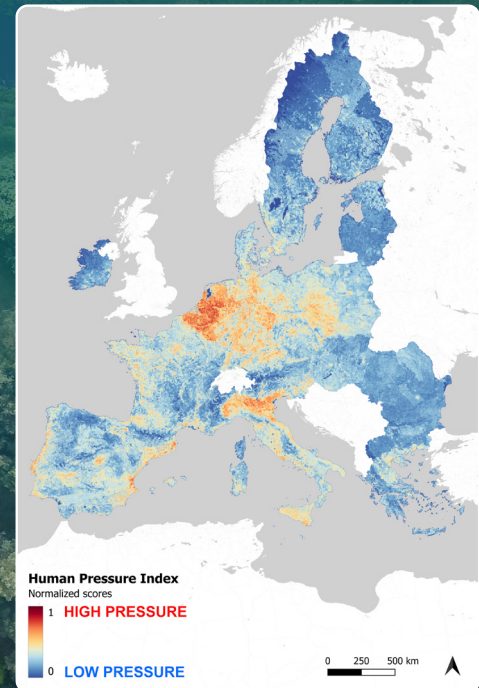


# Prioritising EU Environmental Action: The Human Pressure Index as a Spatial Decision-Support Tool

From fragmented data to targeted environmental action

## Highlights

- The Human Pressure Index (HPI) integrates land-use, pollution and invasive species into a standardised EU-wide map at 1 km<sup>2</sup> resolution.
- It identifies where cumulative pressures are highest and where interventions are most urgent.
- Deploying the HPI alongside ecosystem condition indicators strengthens policy coherence and accountability.
- Delivering 2027 and 2030 environmental targets requires spatially targeted actions.
- A large share of EU protected habitats remains in poor condition (81%) [1].



## Policy context

The EU's ambitious environmental objectives, from the Nature Restoration Regulation to the Biodiversity Strategy 2030, require targeted, evidence-based and spatially explicit action. Yet policymakers face two structural challenges:

- **Fragmented data on environmental pressures:** Monitoring remains sector-specific (e.g., agriculture, urbanisation, pollution), limiting comparability and coherence across EU Member States.
- **Limited spatial integration:** Without a harmonised EU-wide framework, prioritising where restoration and pollution reduction will be most effective remains difficult.

As a result, restoration funding may not always be optimally targeted, potentially slowing progress towards 2030 objectives.



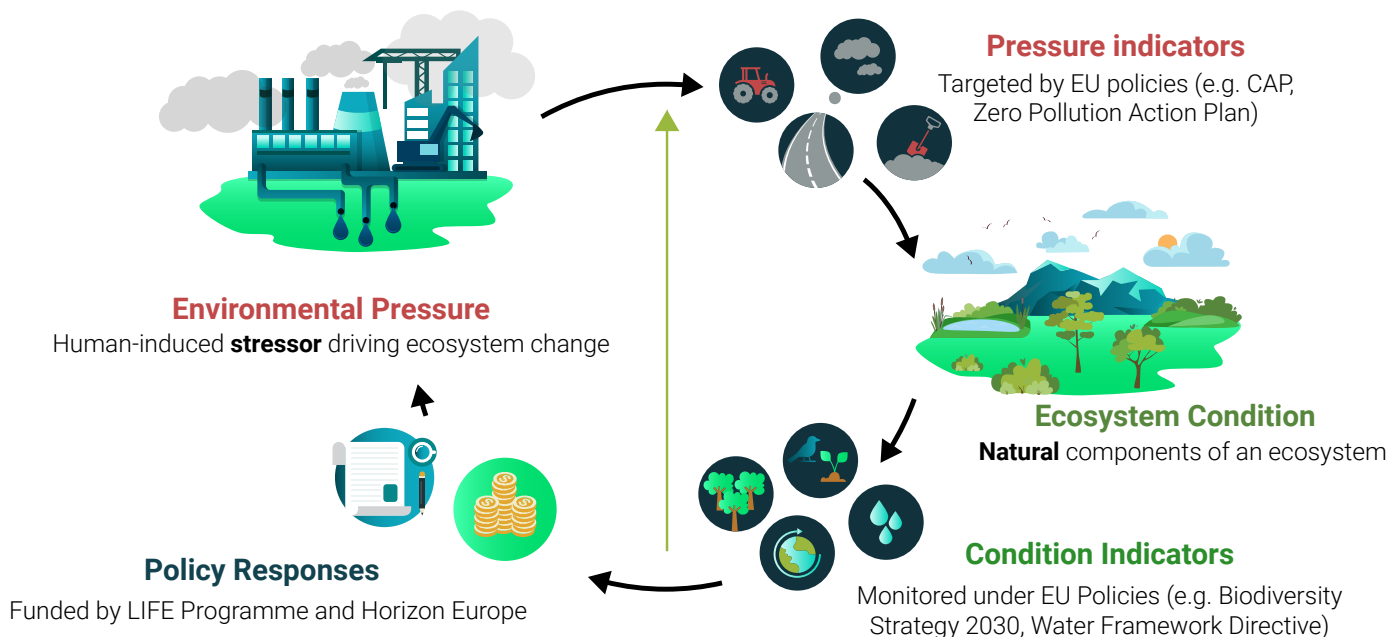
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This policy brief was developed within the **Horizon Europe project SELINA** (Science for Evidence-based and sustainable decisions about NATural capital), and builds on the work carried out in **Work Package 3, task 3.2 (Derive a minimum set of key ecosystem condition indicators per ecosystem type)** (GA 101060415 / coordination: Leibniz University, Hannover, Germany). It complements a companion brief on condition indicators [5], together providing a coherent framework for monitoring ecosystem pressures and recovery in EU environmental policy.

# What is the Human Pressure Index (HPI)?

The HPI provides a harmonised and spatially explicit representation of anthropogenic pressures, complementing ecosystem condition monitoring within an integrated pressure–condition framework (Fig. 1).

**Definition:** The HPI is a **spatially explicit composite index** (1 km<sup>2</sup> resolution) that synthesises 16 harmonised indicators on anthropogenic pressures (e.g., land-use intensity, chemical pollution, invasive species, imperviousness) to identify where ecosystems are most at risk [2].



**Figure 1: Pressures vs. Ecosystem Condition.** The HPI focuses on anthropogenic pressures on ecosystems, while ecosystem condition measures states of nature. This separation ensures policies address root causes (e.g., land-use intensity, pollution) rather than just symptoms (e.g., biodiversity loss), leading to more effective and sustainable interventions.

## KEY FEATURES

- SEEA-EA compatible:** Aligned with the *System of Environmental-Economic Accounting – Ecosystem Accounting (SEEA-EA)*, the HPI framework organises pressure indicators according to a typology that distinguishes abiotic, biotic and landscape pressure characteristics, ensuring consistency with ecosystem condition assessments and a clear separation between pressures and ecological condition.
- IPBES-aligned:** Structured according to the three major drivers of biodiversity loss identified by the *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)* – land-use change, pollution and invasive alien species – reinforcing scientific credibility and policy relevance.
- Modular design:** Pressure domains can be weighted differently for ecosystem-specific assessments (e.g., prioritising pollution for aquatic systems, fragmentation for terrestrial habitats).
- EU-wide consistency:** Integrates harmonised datasets from Copernicus, the EEA, the JRC and national monitoring programmes, ensuring comparability across ecosystems and Member States.
- Policy-ready:** Designed for integration into existing EU monitoring, reporting and spatial planning frameworks.

# Policy applications of the HPI

Many EU environmental policies require identifying where human pressures undermine environmental objectives. By translating fragmented pressure data into an integrated spatial index, the HPI provides a common pressure layer that enhances coherence, comparability and accountability across EU Member States and directly supports policy implementation (Box 1).

**Box 1. How the Human Pressure Index supports key EU environmental policies.**

Policy	HPI Application	Example
Nature Restoration Regulation	Identifies high-pressure zones where restoration efforts will be most effective.	 <b>Wetlands:</b> Target pressures (agricultural pollution, imperviousness, water exploitation) to restore biodiversity and hydrological functions.
Biodiversity Strategy 2030	Prioritises conservation investments in areas exposed to high cumulative pressures.	 <b>Natura 2000 network:</b> Identify sites under high external pressure to prioritise mitigation measures alongside site-based conservation.
Zero Pollution Action Plan EU Soil Strategy for 2030	Maps pollution hotspots (e.g., heavy metals, pesticides, nutrients) to guide regulatory actions.	 <b>Drinking water catchments:</b> Identify catchments where cumulative pressures increase risks to groundwater and surface water used for drinking water supply.
Common Agricultural Policy	Highlights agricultural pressure hotspots affecting soil health and biodiversity.	 <b>Farmlands:</b> HPI merges pressures to inform CAP greening measures and agroecological transitions.
Water Framework Directive	Evaluates terrestrial land-use and pollution pressures on water bodies to support river basin management.	 <b>Rhine Basin:</b> HPI identifies pollution hotspots to prioritise critical runoff areas for water quality improvement.
Marine Strategy Framework Directive	Maps cumulative human pressures affecting coastal and shelf ecosystems.	 <b>Baltic Sea basin:</b> Synthesises pollution runoff (agriculture, industry, urban) to prioritise coordinated mitigation actions.
Environmental Impact Assessment (EIA) Strategic Environmental Assessment (SEA)	Provides harmonised baselines ensuring cumulative pressures are considered.	 <b>Infrastructure projects:</b> HPI provides a pre-project pressure map to assess added impacts of new developments.
SEEA-Ecosystem Accounting	Provides a standardised pressure accounting, complementing condition assessment.	 <b>EU-wide accounting:</b> HPI enables consistent reporting of human pressures across ecosystems and Member States.

# Policy recommendations

## Primary recommendation

Adopt the Human Pressure Index (HPI) as the EU's standardised spatial pressure layer and deploy it alongside harmonised ecosystem condition indicators (see SELINA report D3.2 Policy Brief 2 [5]). Together, these tools establish an integrated pressure–condition framework that allows policymakers both to identify where human pressures are highest and to assess whether policy interventions effectively lead to ecosystem recovery.

## Supporting actions

### 1 Pilot the Human Pressure Index

- Initiate pilot implementation of the HPI in 3–5 representative regions, leveraging existing EU instruments, including the LIFE programme and Horizon Europe, as a first step towards EU-wide deployment by 2030.

### 2 Integrate HPI into EU monitoring and accounting frameworks

- Incorporate HPI as a standard pressure layer in Natura 2000 reporting, SEEA-EA accounts, and Environmental Impact Assessments by 2027, ensuring harmonised pressure assessment across Member States.

### 3 Use HPI outputs for prioritisation and evaluation

#### Apply the HPI to guide:

- Restoration funding allocation,
- Pressure reduction strategies,
- Spatial planning and green infrastructure investments.

### 4 Establish iterative governance for pressure and condition indicators

- Mandate a technical coordination mechanism (e.g., via the European Environment Agency) to update the HPI and associated indicators, integrate new data sources, and ensure continued alignment with evolving EU policy needs.

## References

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**Recommended citation:** Lecomte, X., Nicholson-Thomas, I., Grêt-Regamey, A., Burkhard, B., Santos-Martín, F., Roche, P. (2026). Prioritising EU Environmental Action: The Human Pressure Index as a Spatial Decision-Support Tool – From fragmented data to targeted environmental action. SELINA project, D3.2 Policy Brief 1