

BioSpace25 - Biodiversity insight from Space
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Rethinking the role of Earth Observation in assessing nature-related economic and financial risks

Alessandra La Notte

Two key concepts in this short presentation:

The causality nexus:

what connects ecosystems to socio-economic systems

The risk formula:

the level of risk associated with a particular situation or decision

What connects ecosystems to socio-economic systems?



Ecosystems



Ecosystems Services

Ecological inputs



Pollution removal



Protection



Target achievement

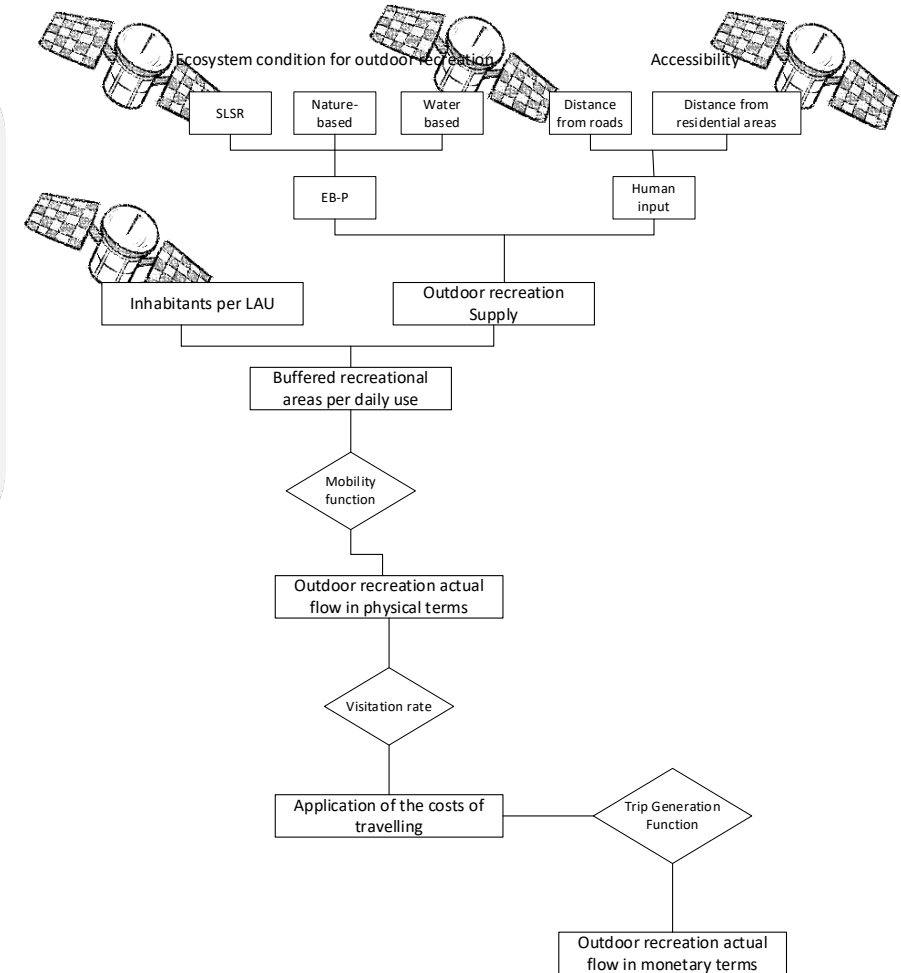


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Socio-economic systems

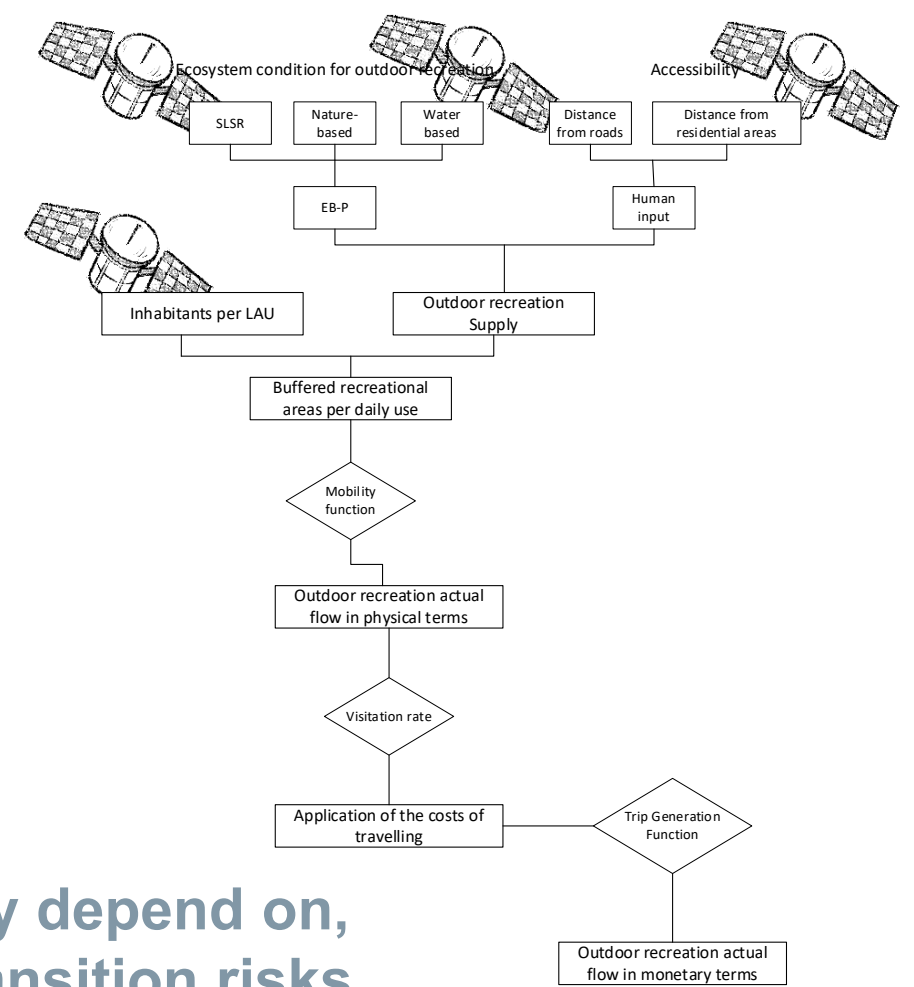
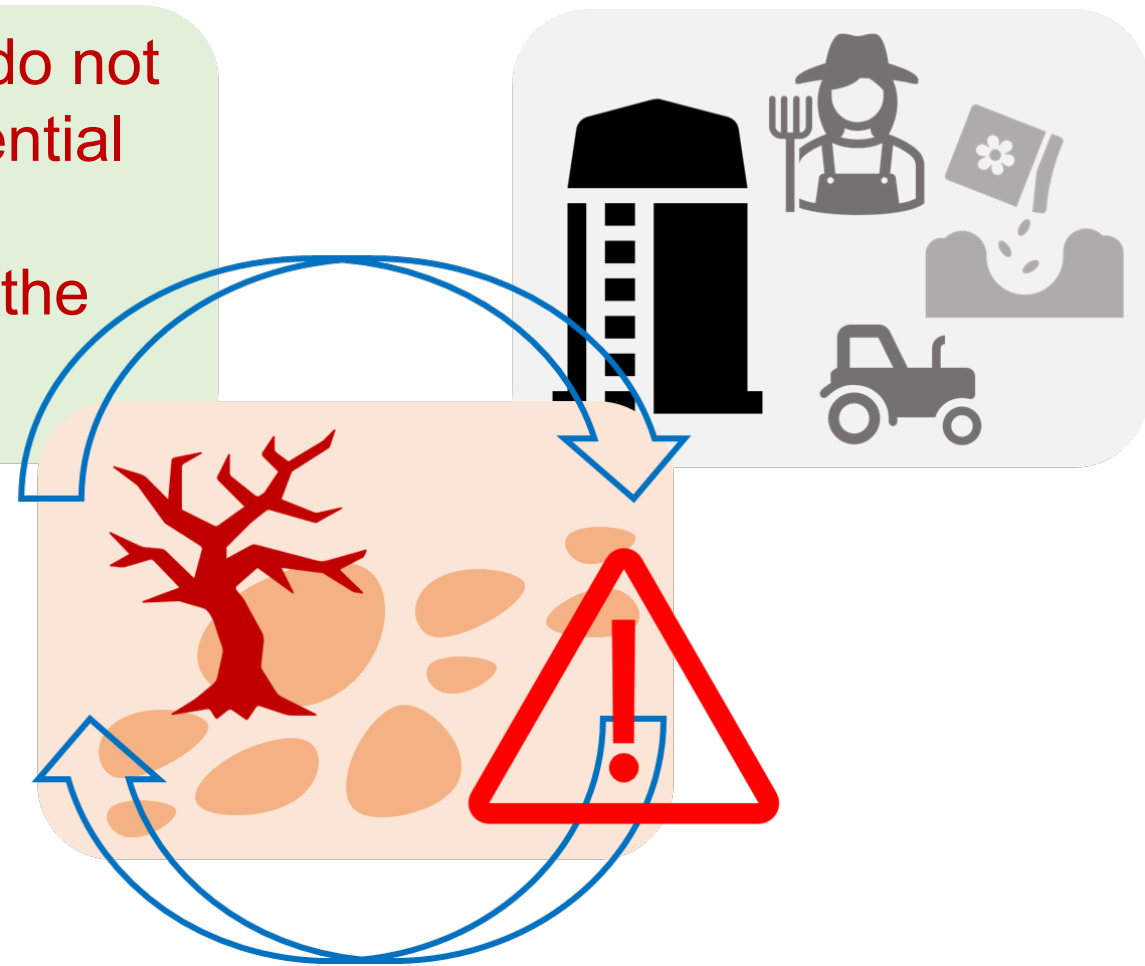
What determines the provision of an ecosystem service?



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Ecosystems do not have the potential to meet (sustainably) the ES demand



(*)
When human activities are not supported by the ES they depend on, they become vulnerable with respect to physical and transition risks



The Risk Formula:

$$\text{Risk} = \text{Hazards} * \text{Exposure} * \text{Vulnerability} (*)$$

Is it related to Real Economy?

Is it related to Finance?

Potential occurrence of an event that may cause damages and losses

temperature variability, precipitation variability, wildfire, drought, sea-level rise, extreme rainfall, extreme heat, cyclones

Potential loss or harm that could result from the event

this depends on the risk: Real economy and Finance may look at different factors-> measurement of human presence, location of critical assets, financial hotspots

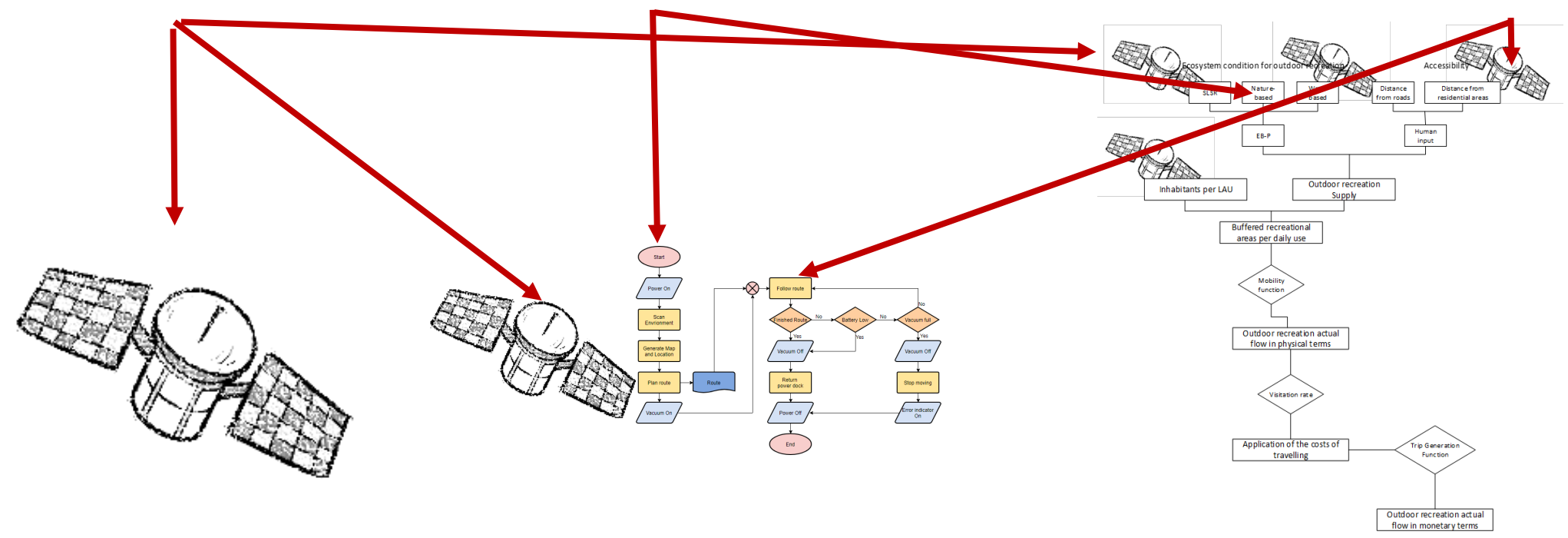
Susceptibility of the system to a particular threat/event

a socio-economic system fully supported by the ES from which it depends on is less vulnerable (and more resilient) than a system that lack the needed ES

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Δ in land cover/use Δ in economic policies Δ in management practices



Risk = Hazards * Exposure * Vulnerability



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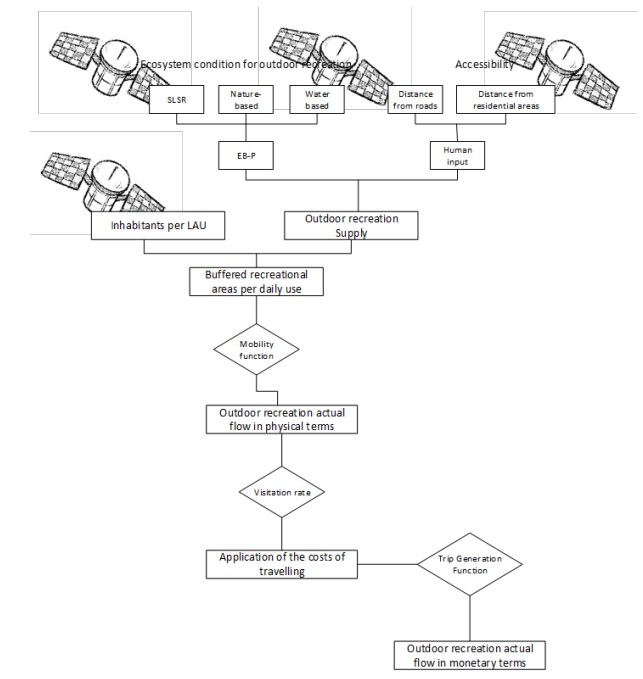
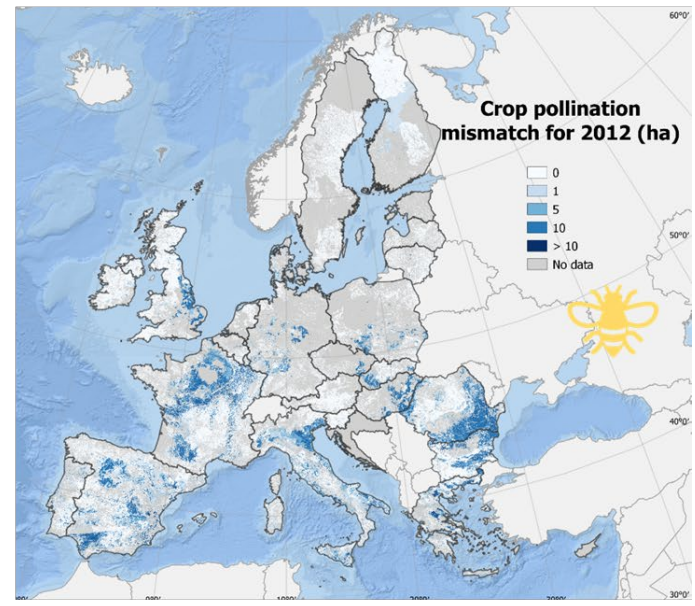
Physical risks:
lack of wild pollinators for pollination-dependent crops

micro economy- business

- changing demand and costs

macro economy

- shifts in prices
- productivity changes
- labour market frictions
- impacts on international trade



Risk = Hazards * Exposure * Vulnerability

Example of a chronic risk

Ref. <https://www.sciencedirect.com/science/article/pii/S2950370124000130>

Data source: <https://data.jrc.ec.europa.eu/dataset?pw=1&q=MAES&sort=modified>



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Physical risks:
protection against the risk of flooding

micro economy- business

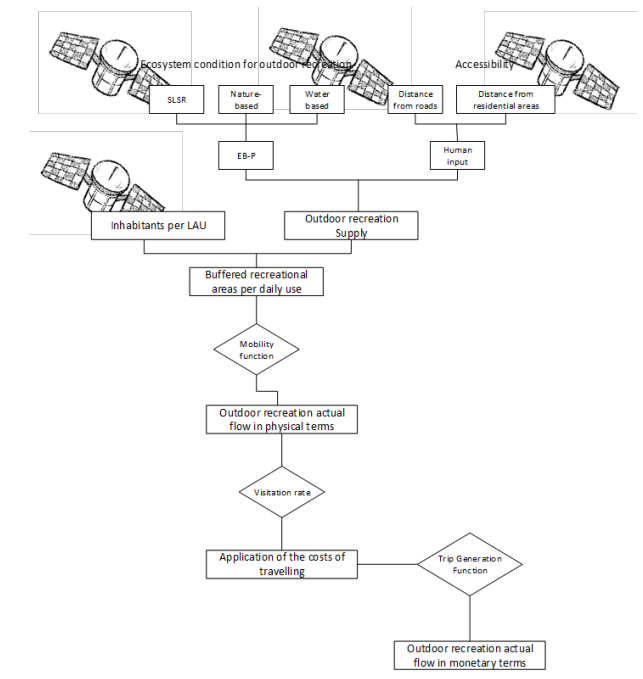
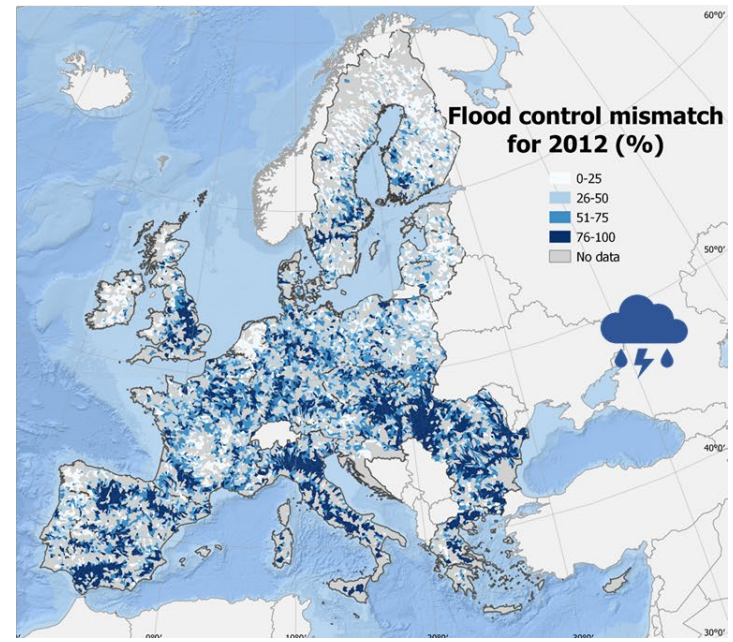
- property damage and business disruption

micro economy- households

- property damage

macro economy

- capital depreciation
- productivity changes



Risk = Hazards * Exposure * Vulnerability

Example of an acute risk

Ref. <https://www.sciencedirect.com/science/article/pii/S2950370124000130>

Data source: <https://data.jrc.ec.europa.eu/dataset?pw=1&q=MAES&sort=modified>



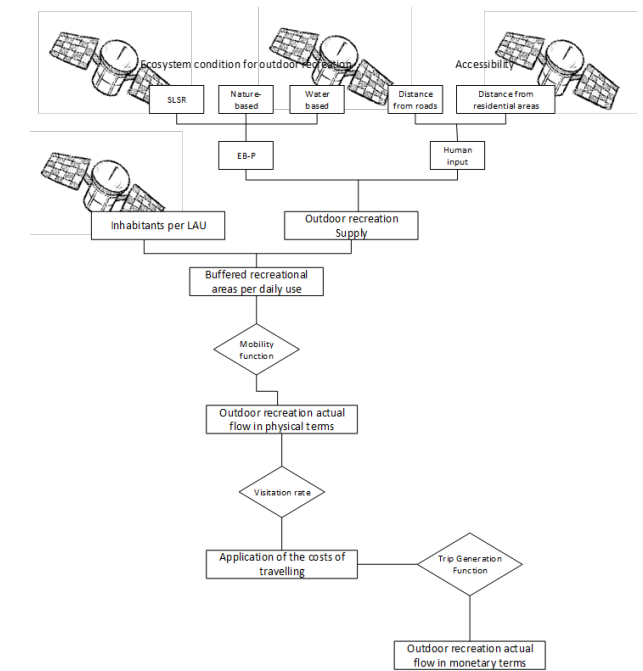
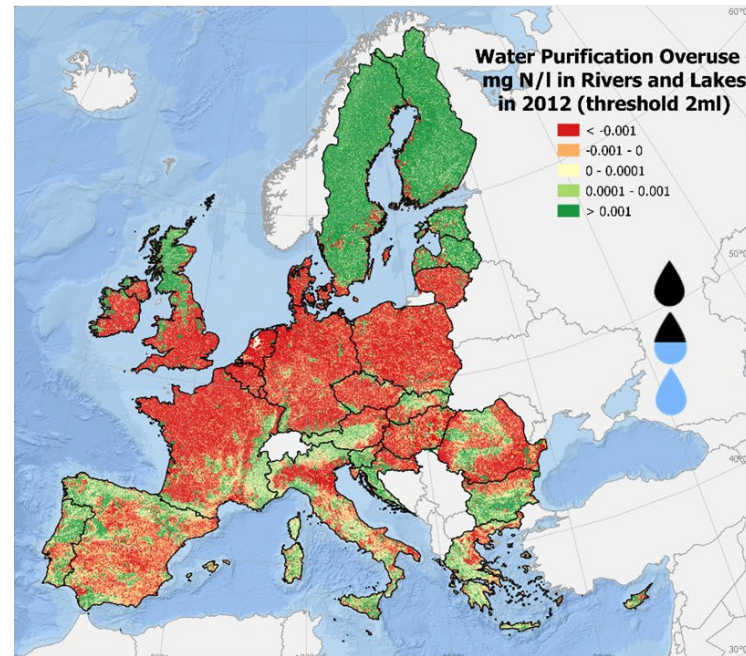
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Transition risks:
purification of water needed because of unsustainable management practices

- micro economy- business**
- changing demand and costs
 - legal liability
- micro economy- households**
- loss of income (health impacts)

- macro economy**
- capital depreciation
 - decreased investments
 - shifts in prices
 - productivity changes
 - socioeconomic changes from changing consumption patterns



Risk = Hazards * Exposure * Vulnerability

Example of a transition policy & legal risk

Ref. <https://www.sciencedirect.com/science/article/pii/S2950370124000130>

Data source: <https://data.jrc.ec.europa.eu/dataset?pw=1&q=MAES&sort=modified>



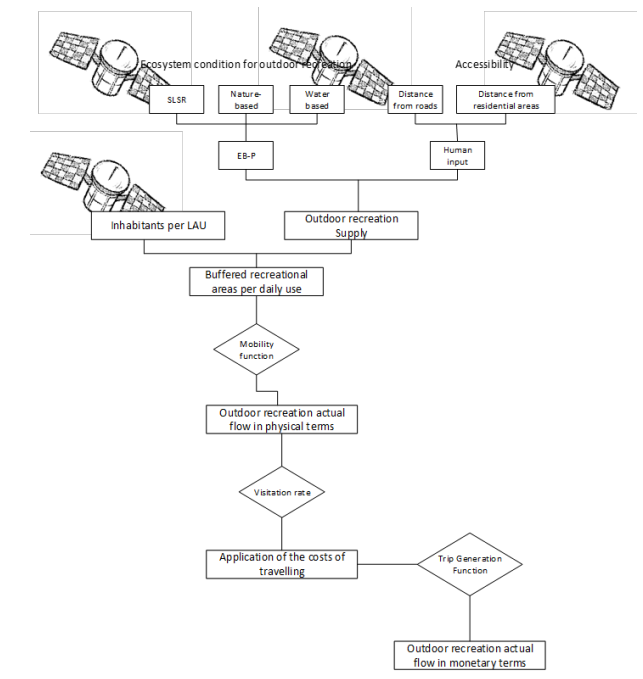
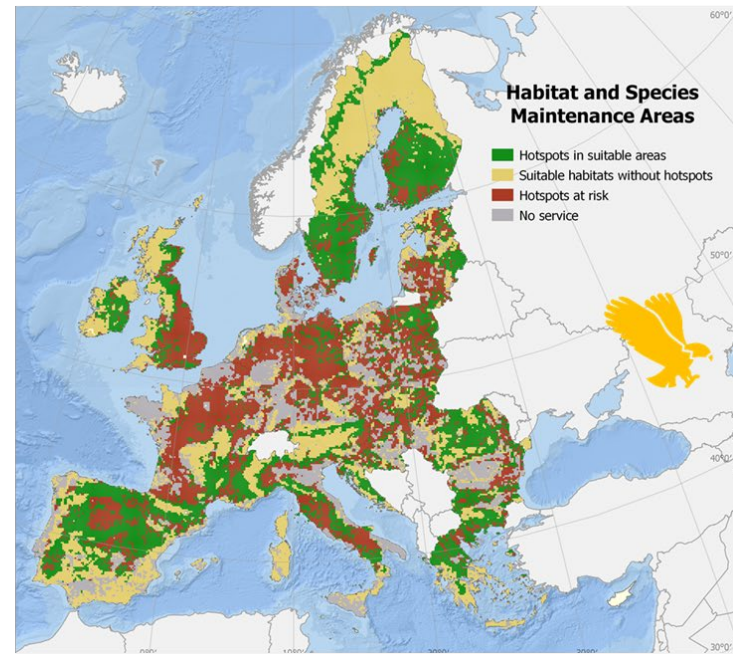
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Transition risks:
policy and regulation: halt biodiversity loss

micro economy- business
• legal liability
micro economy- households
• restrictions

macro economy
• capital depreciation
• decreased investments
• shifts in prices
• productivity changes
• socioeconomic changes from changing consumption patterns



Risk = Hazards * Exposure * Vulnerability

Example of a transition reputational risk

Ref. <https://www.sciencedirect.com/science/article/pii/S2950370124000130>

Data source: <https://data.jrc.ec.europa.eu/dataset?pw=1&q=MAES&sort=modified>



Future work

Identify a set of nature-related economic risks

Identify a set of nature-related financial risks

Run pilot exercises to test a selected sub-set

**Thank you for
your attention**

Recommendations for R&D activities

Link with ES accounts->both the official ES Supply and Use tables and the complementary ES vulnerability accounts