TECHNISCHE UNIVERSITÄT DRESDEN

DRESDEN concept

Co-designing ecologically and economically efficient measures for conserving biodiversity at landscape level

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IALE 2022 European Landscape Ecology Congress
MAKING THE FUTURE, LEARNING FROM THE PAST

ECO²SCAPE: Co-design of ecologically and economically efficient policy instruments and measures for conserving biodiversity and ecosystem services in cultural landscapes

ECO²SCAPE

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FEdA https://www.feda.bio/de/

https://mloek.geo.tu-dresden.de/index.php/projects/eco2scape-en/
https://www.feda.bio/de/wissenschaft/projekte/eco2scape/

Science

TECHNISCHE UNIVERSITÄT DRESDEN

b-tu Brandenburg University of Technology Cottbus - Senftenberg

zalf

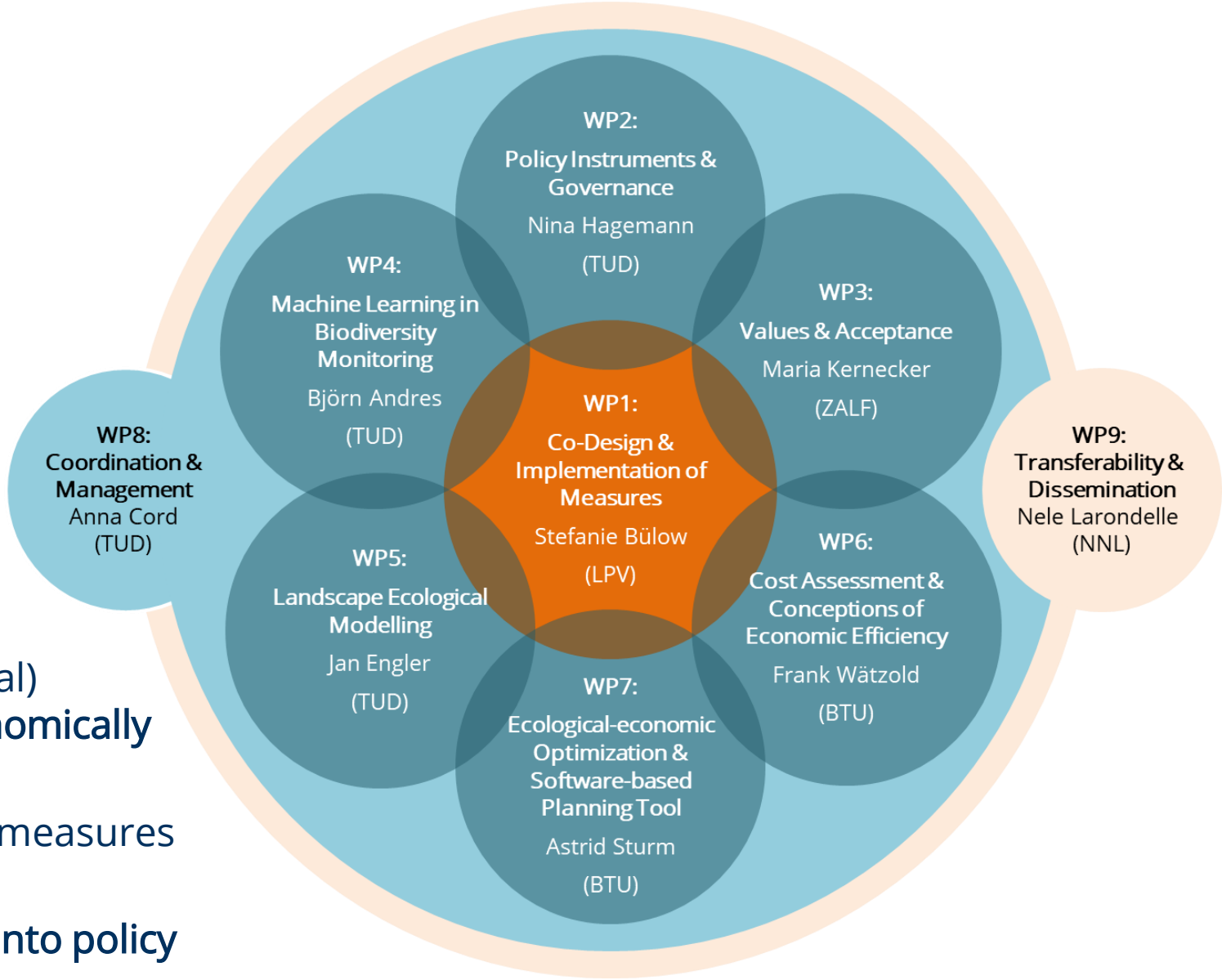
Practice

Landschaftspflegeverband Nordwestsachsen e.V.

Nationale Naturlandschaften

Disclaimer: Aims of this presentation

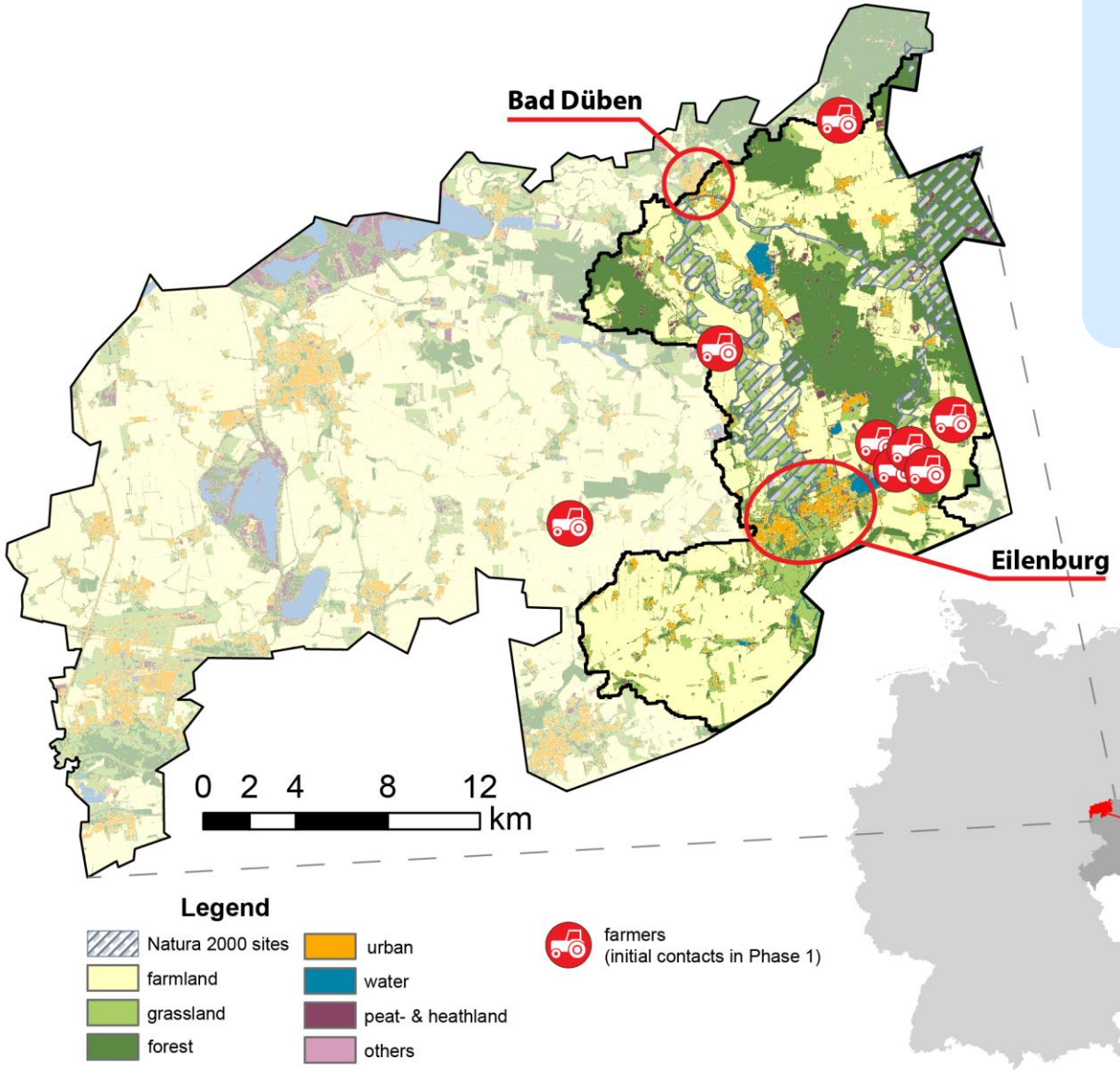
- Briefly outline project objectives and innovation
- Finding scientific synergies with other researchers or projects
- Get inspired by suggestions and new ideas



Main quesions

- Which region-specific (agri-environmental) measures are **both ecologically and economically efficient and socially accepted**?
- How can the **ecological success** of these measures be best **monitored** and communicated?
- How can these measures be integrated **into policy instruments and governance structures?**

Study region



Transfer regions

Biosphärenreservat Oberlausitzer Heide- und Teichlandschaft

Biosphärenreservat Schorfheide-Chorin

Biosphärenreservat Schaalsee

Objective 1: Co-design and implement practical measures to conserve biodiversity and ecosystem services

- Definition of region-specific (biodiversity) goals (What do we want?) based on existing local nature conservation goals, expert knowledge, stakeholder interests
- Co-design of measures (esp. results-based and cooperative payments) with farmers, supported by regional farmers' association, based on experience from other projects, continuous advice from LPV

Individual meetings and consultations

Networking meetings/focus groups for farmers

Study region

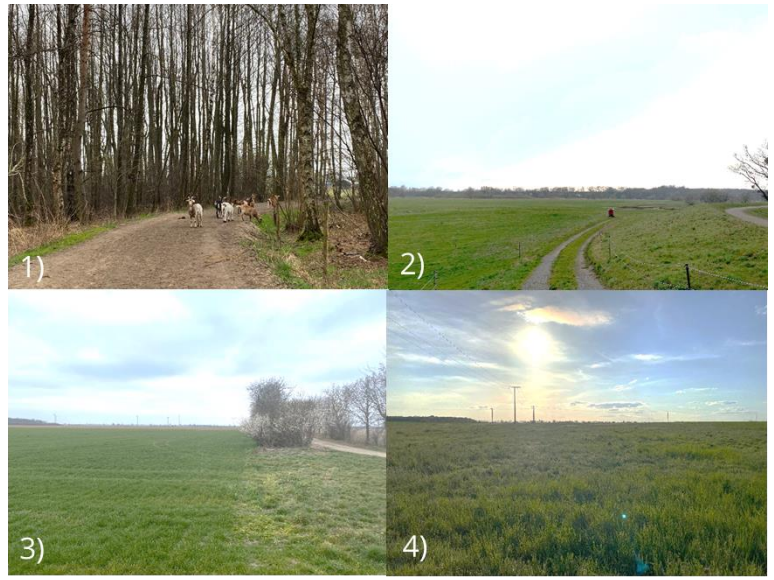
Biosphärenreservat Schorfheide-Chorin

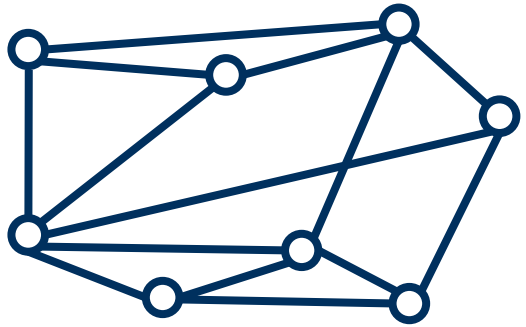
Biosphärenreservat Oberlausitzer Heide- und Teichlandschaft

Biosphärenreservat Schaalsee

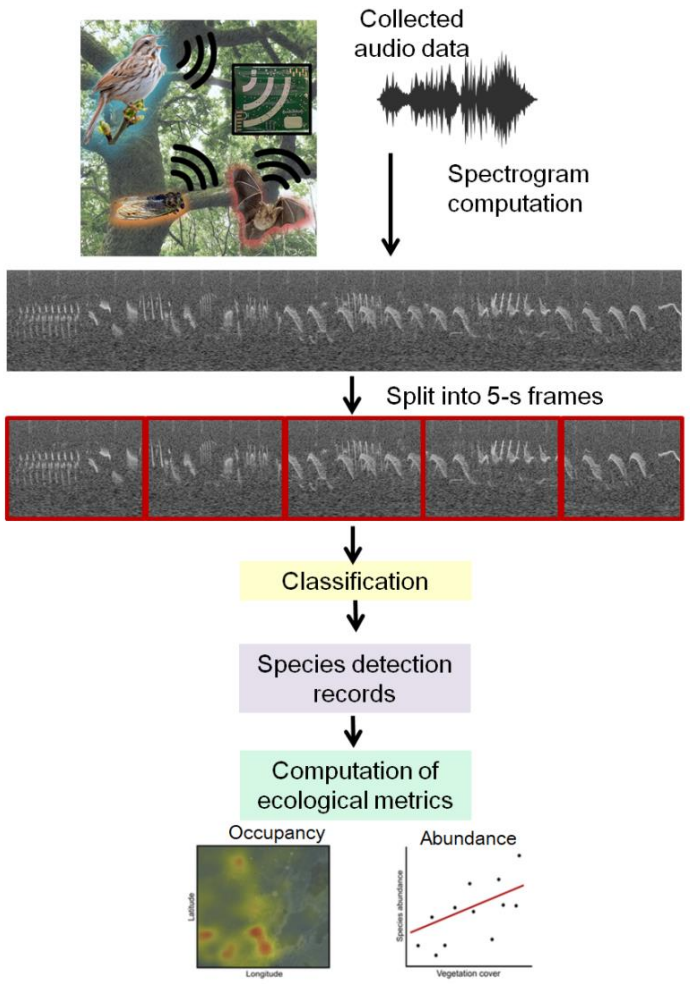
Objective 2: Investigate social acceptance and increase transparency and participation regarding conservation measures

- Semi-structured interviews/transect walks with farmers to explore their values and perceptions on biodiversity, ecosystem services, landscapes and agriculture
- Stakeholder mapping, social network analysis and surveys to understand how information and resources related to biodiversity, landscape and agriculture flow between individuals and social groups in the study region
- Survey for the general public to understand how different actors perceive their own and other roles and responsibilities in relation to biodiversity conservation in the study region
- Engagement with different groups of civil society
- Education (tailored concepts and formats) informing about biodiversity conservation in agriculture in the study region and beyond





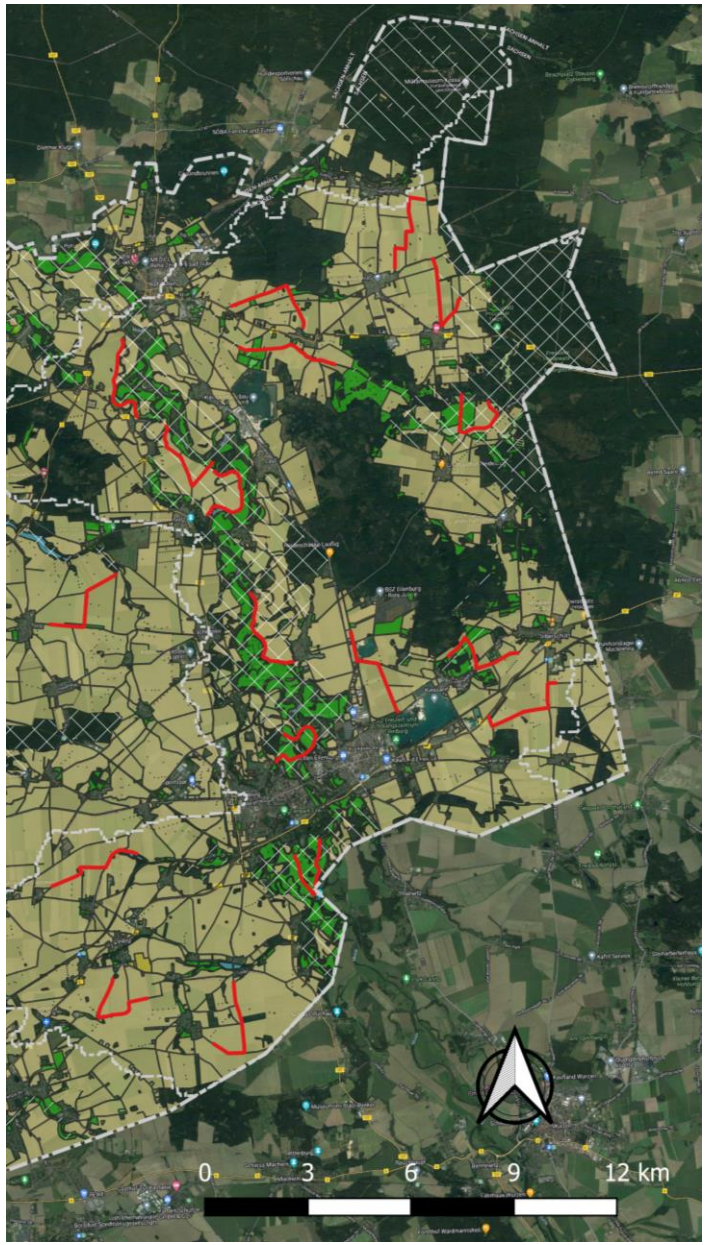
Objective 3: Testing and further development of new, cost-effective technologies for ecoacoustic monitoring



BirdNet
(Cornell lab of Ornitho-logy, TU Chemnitz)

- Deep Learning and cheaper devices → major performance improvements in ecoacoustics
- Insufficient recognition accuracy to be used e.g. in results-based payments

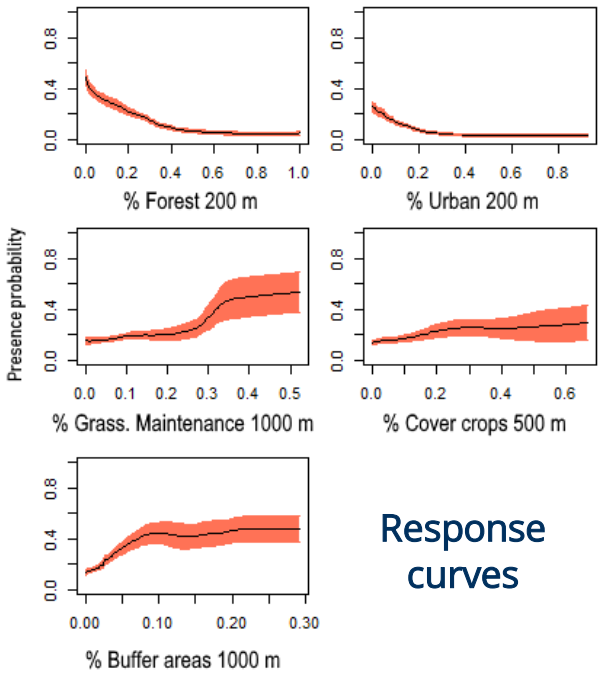
→ **Aim:** transfer algorithms developed in other Machine Learning fields to the problem of ecoacoustics to set up a reliable and robust monitoring system



Objective 4: Spatial analysis of suitable areas and modelling of expected ecological effects of measures at landscape level

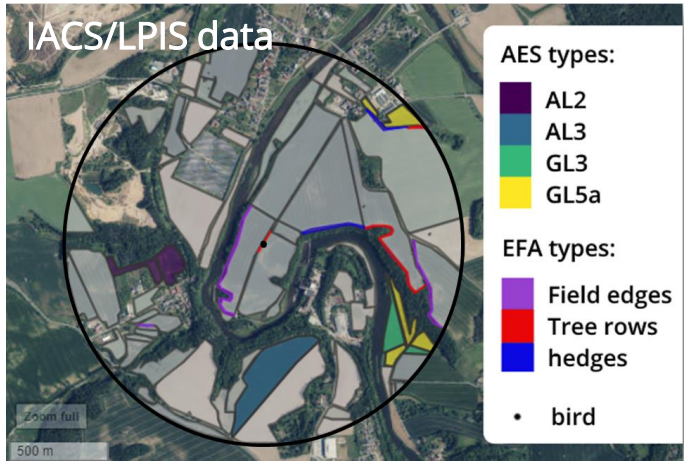
- Predict current status beyond monitoring sites
- Consider spatial context

Skylark (*Alauda arvensis*)



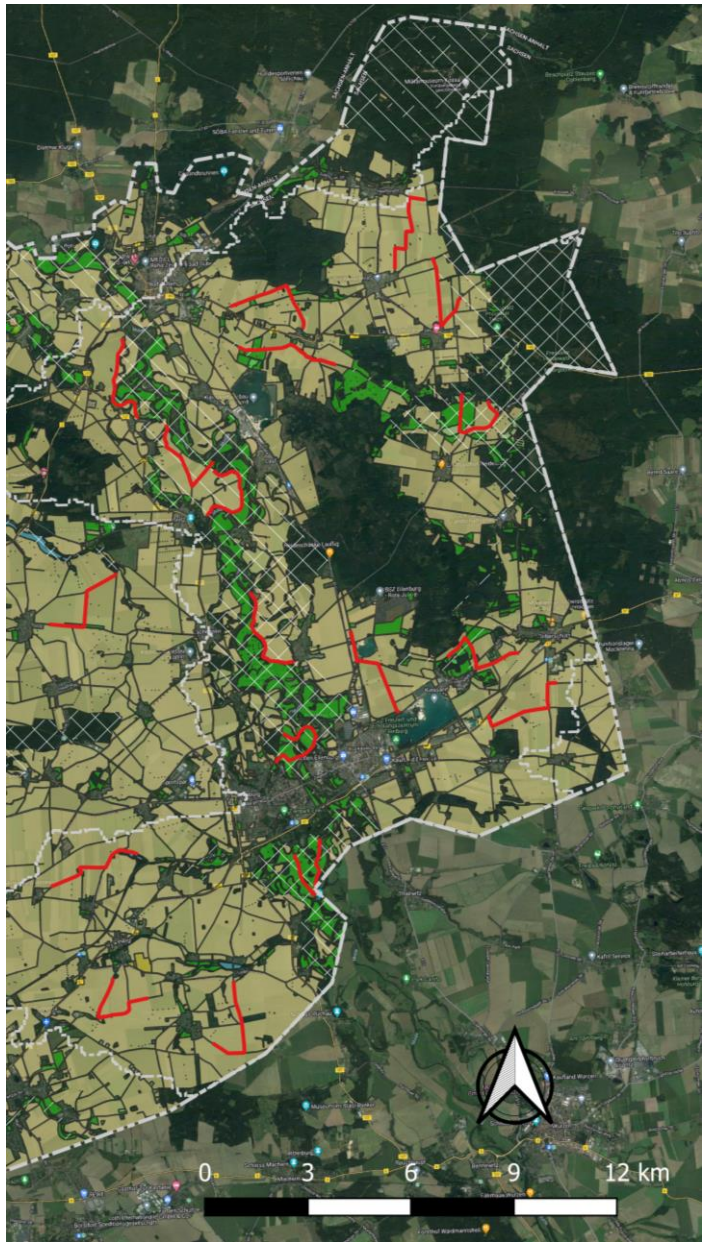
Response curves

Multi-scale ensemble modeling framework

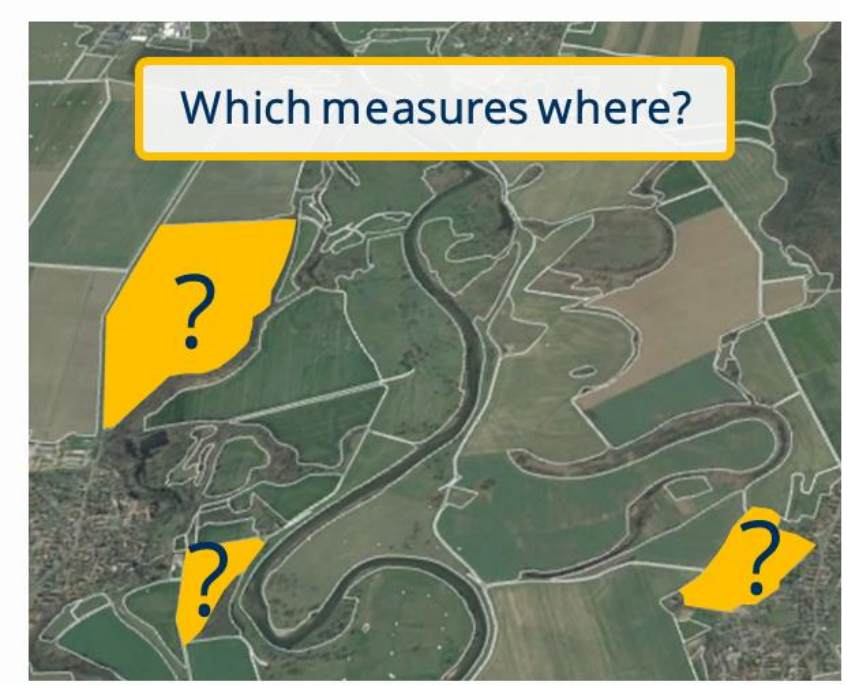


3 buffer sizes: 200 m, 500 m and 1000 m

Roilo et al. (2022), *Ecological Applications*



Objective 5: Spatial optimisation of measures using economic-ecological models and a software-based planning tool



Objective 6: Develop an innovative policy mix by integrating biodiversity measures into policy instruments and governance structures

- Considering economic instruments, regulatory instruments (especially sectoral legislation) and informational instruments (e.g. new forms of information dissemination)
- To what extent can alternative governance structures for developing, implementing and financing of measures be supported?

Summary: Intended impact

TRANSFERABILITY: Determine conditions for transferability

PLANNING: Software-based planning tools for simulation and spatial optimisation of measures

INNOVATIVE POLICY MIX through integrated design of governance, instruments and corporate activities

TECHNOLOGICAL INNOVATION: Development of new methods in landscape ecological modelling and machine learning

ACCEPTANCE, TRANSPARENCY & PARTICIPATION: Actively engage stakeholders; increase appreciation of biodiversity and ecosystem services

FURTHER DEVELOPMENT OF MEASURES: Reward design (esp. results-based remuneration), flexibility, cooperation, ...

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Thank you!

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