

Turning Geospatial Data into Audit Evidence

– Generating New Knowledge on Nature Loss in Norway

A performance audit perspective

National Audit Office of Norway

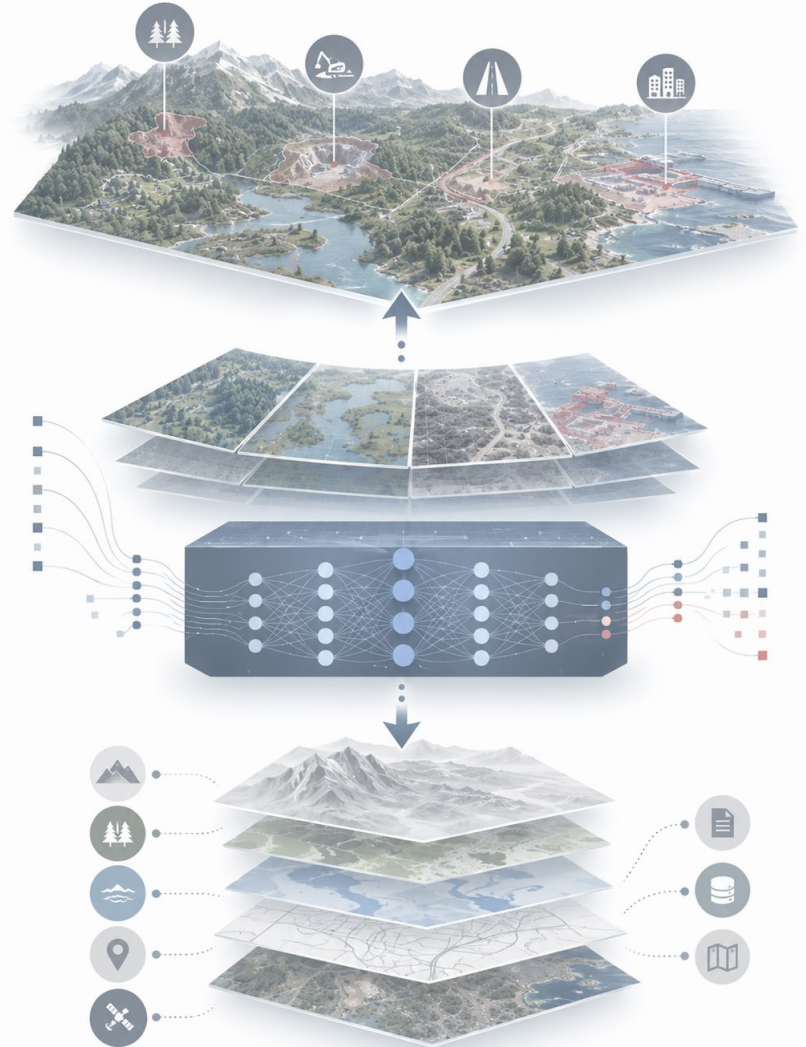
ESA-ESRIN, Frascati, Italy–Session 3: Institutional uptake & Operational platforms

Wednesday 30. September | Martin Orvim & Kristine Salvesen

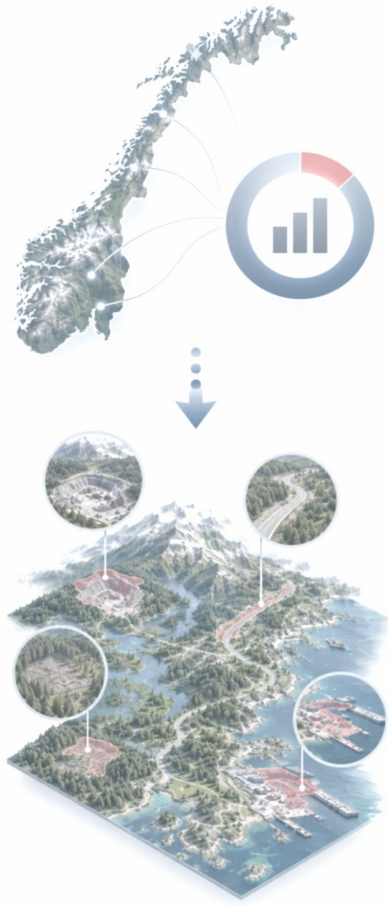


What makes geospatial data usable as evidence?

- **Provenance**
 - *Where did the data come from?*
- **Uncertainty**
 - *How well does the data represent reality?*
- **Reproducibility**
 - *Can the process be repeated?*
- **Traceability**
 - *Can findings be traced back to input data and methodological assumptions / choices?*

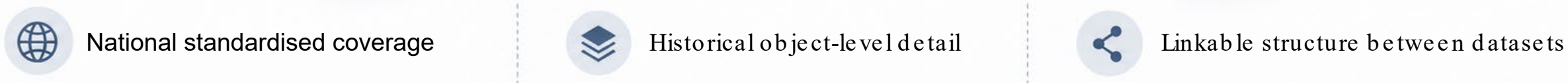
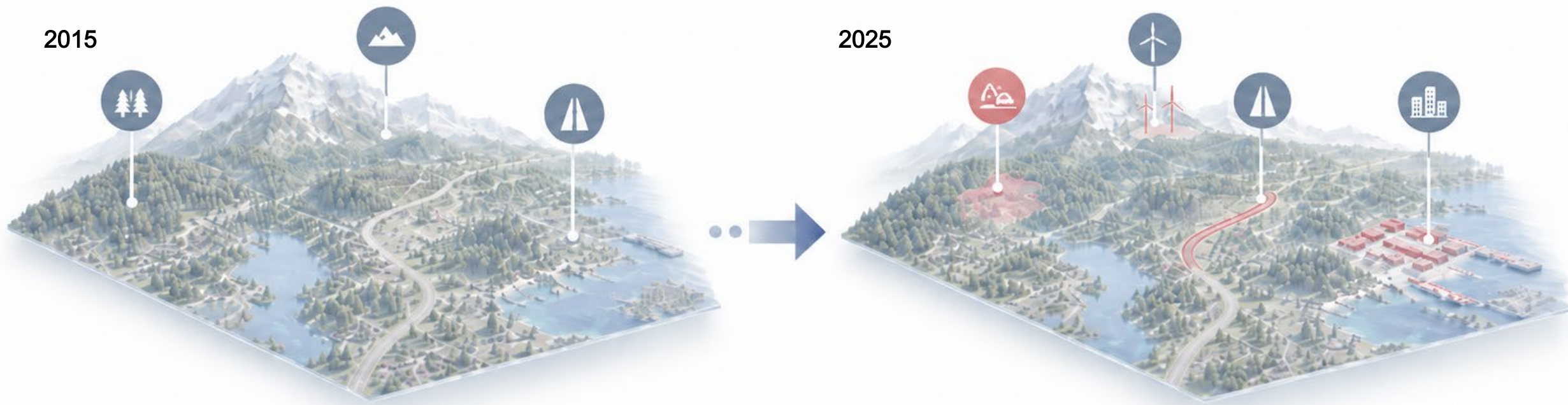


The audit questions:



- How much nature had been lost through land conversion?
- Did existing mapping provide a sufficient knowledge base for sustainable land-use decisions?

Administrative geodata → Observations of change



≈ 3 million **objects**

Database differences → conservative estimates

1. Candidate changes:

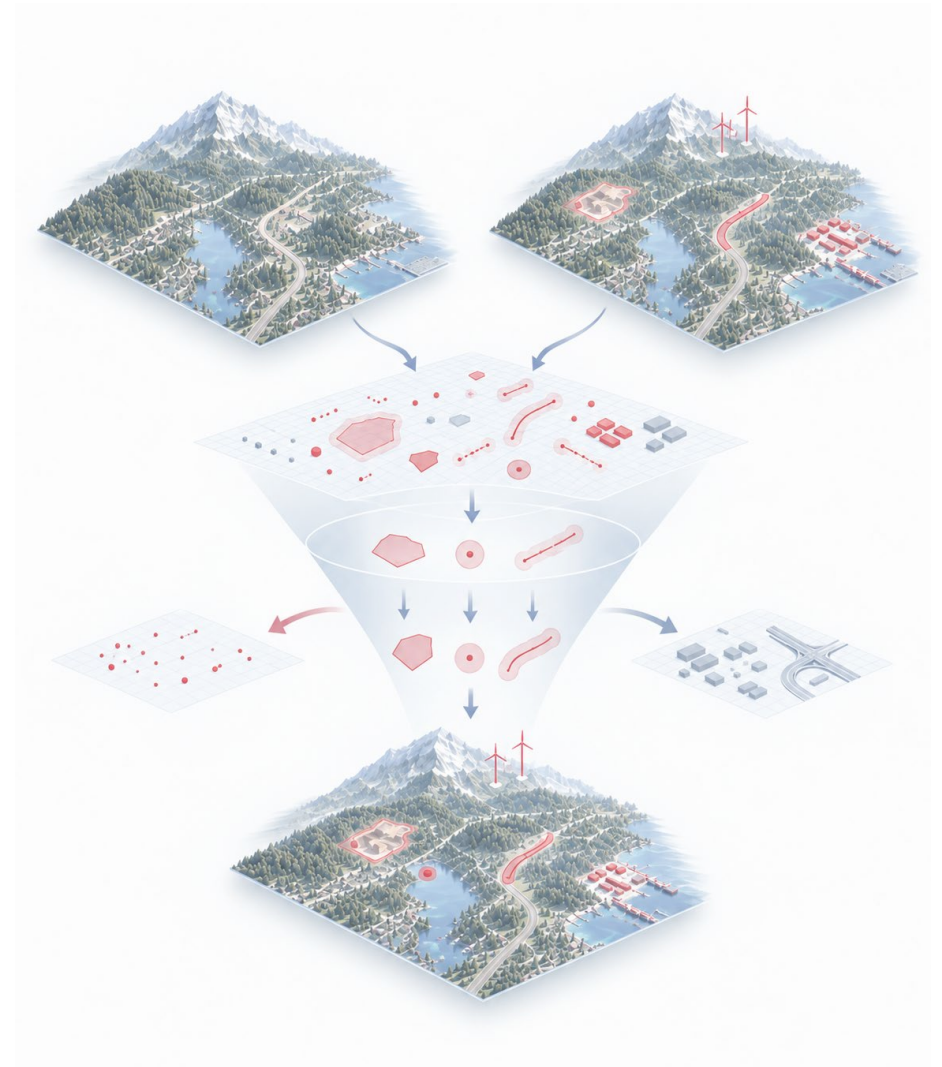
- *Not assumed to represent real-world change*

2. Estimate affected area:

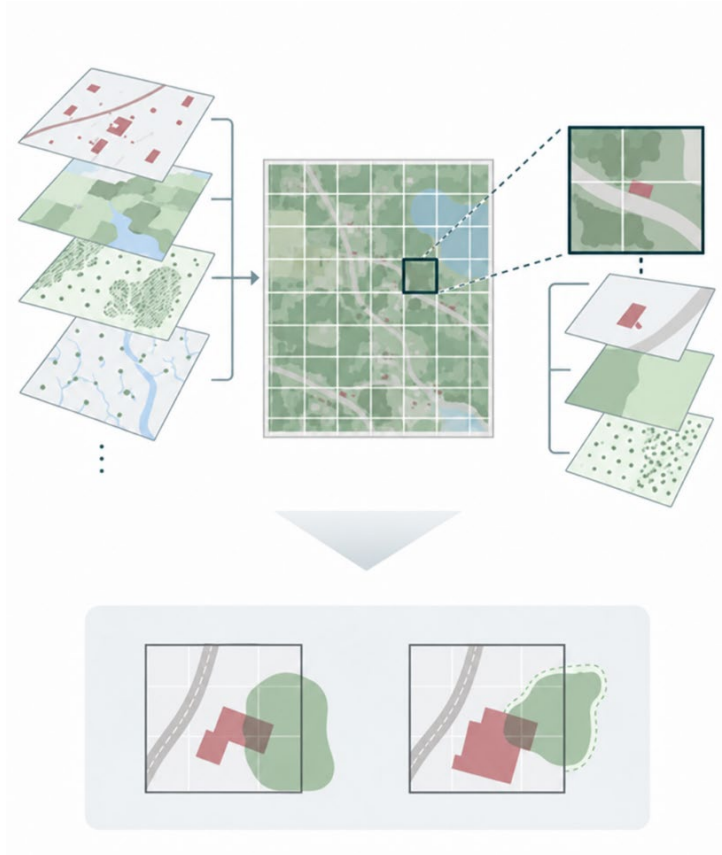
- *Polygons directly, lines and points by buffers*

3. Remove likely artefacts:

- *Previously densely developed areas*
- *Small observations ($<35 \text{ m}^2$)*



Creating a common analytical unit

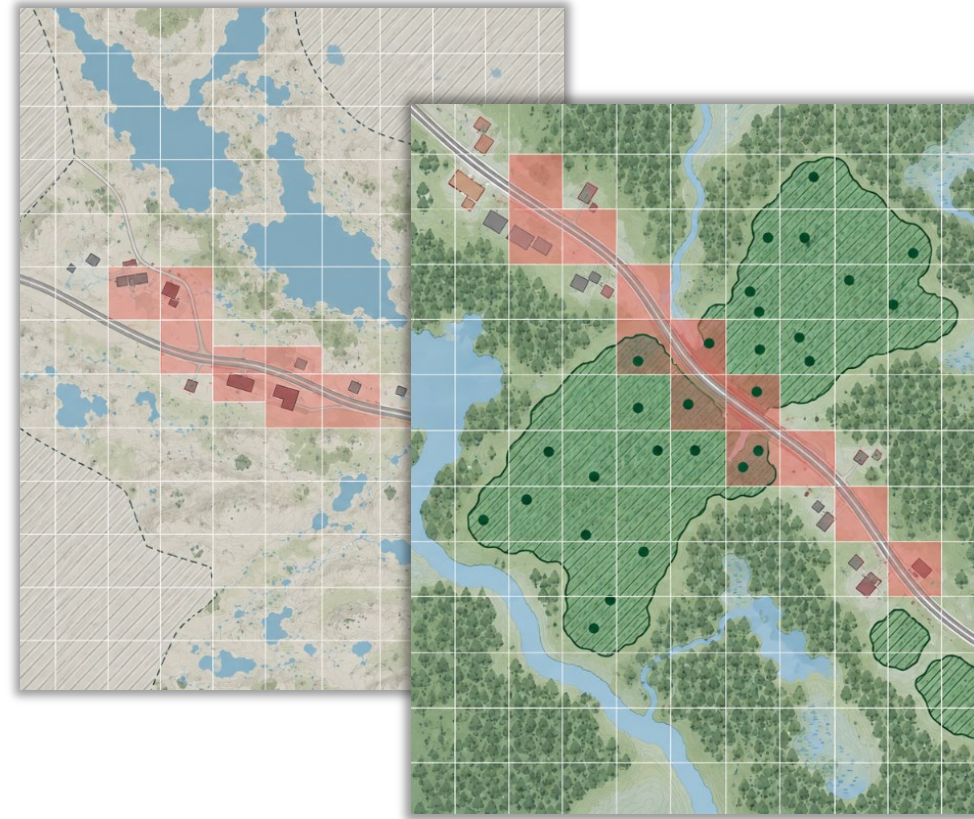


Spatial generalisation

- $31.6 \times 31.6 \approx 1000\text{m}^2$ per cell
- Change objects + land cover + biodiversity
- Area of change + type of intervention + land / nature affected
- Cell-level overlap $\neq$ exact geometric overlap

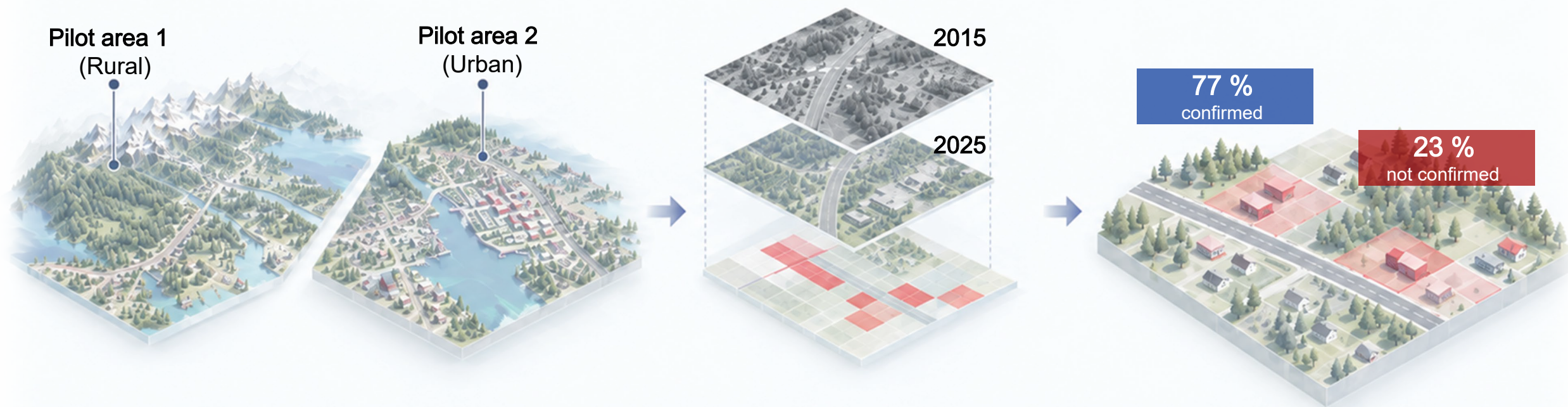
Linking change to spatial ecological knowledge

- Detailed ecological mapping/
nature values:
 - Coverage $\neq$ findings
- Change could have affected:
 - Documented nature values
 - Areas with limited ecological knowledge



No recorded findings $\neq$ no ecological value

Validation and mitigation of methodological uncertainty



Validation findings:
Lower confirmation rates



Small recorded
changes



Limited historical
imagery

Main methodological adaptations to data:



Grid size



Thresholds



Exclusions



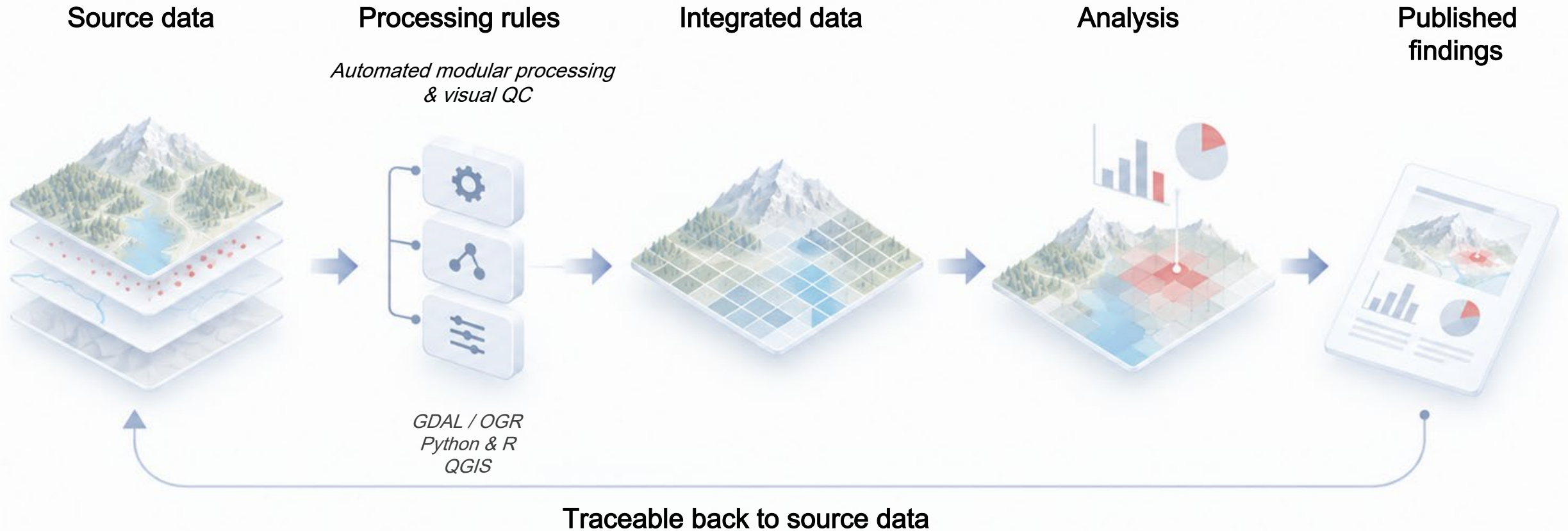
Interpretations



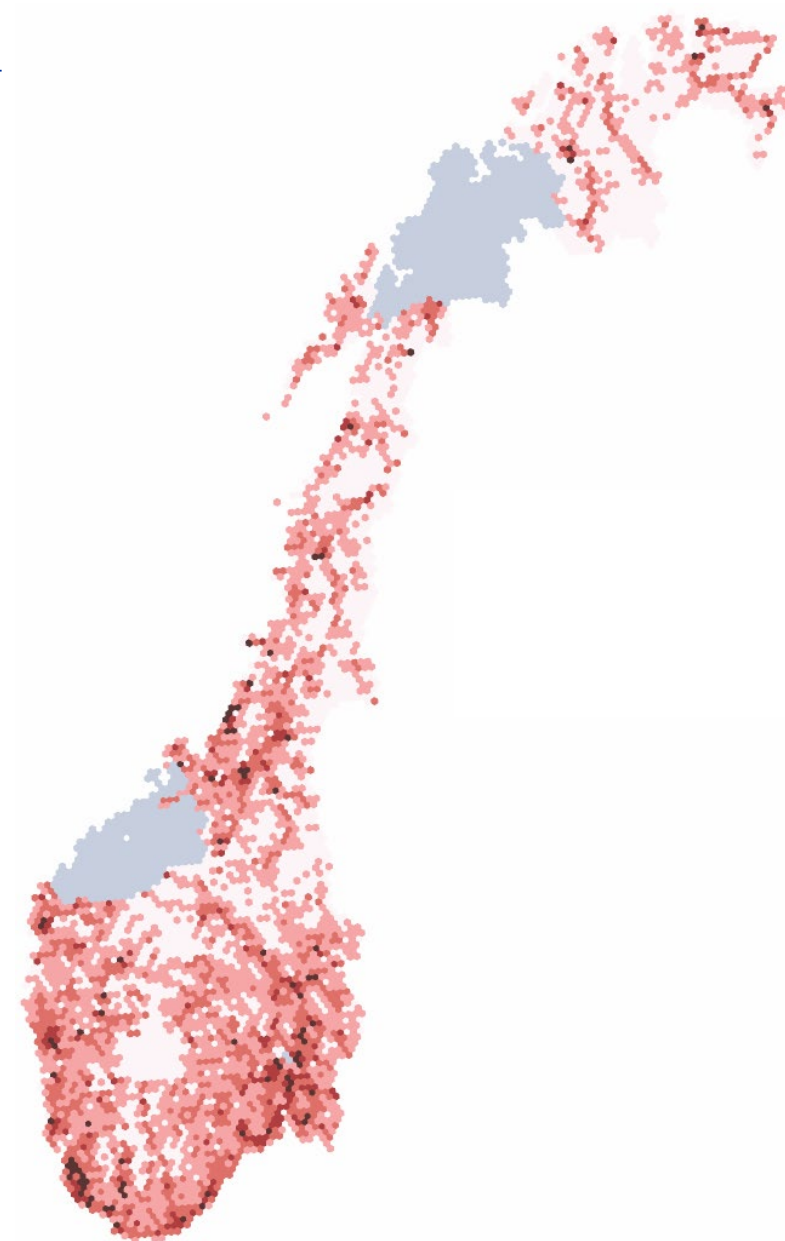
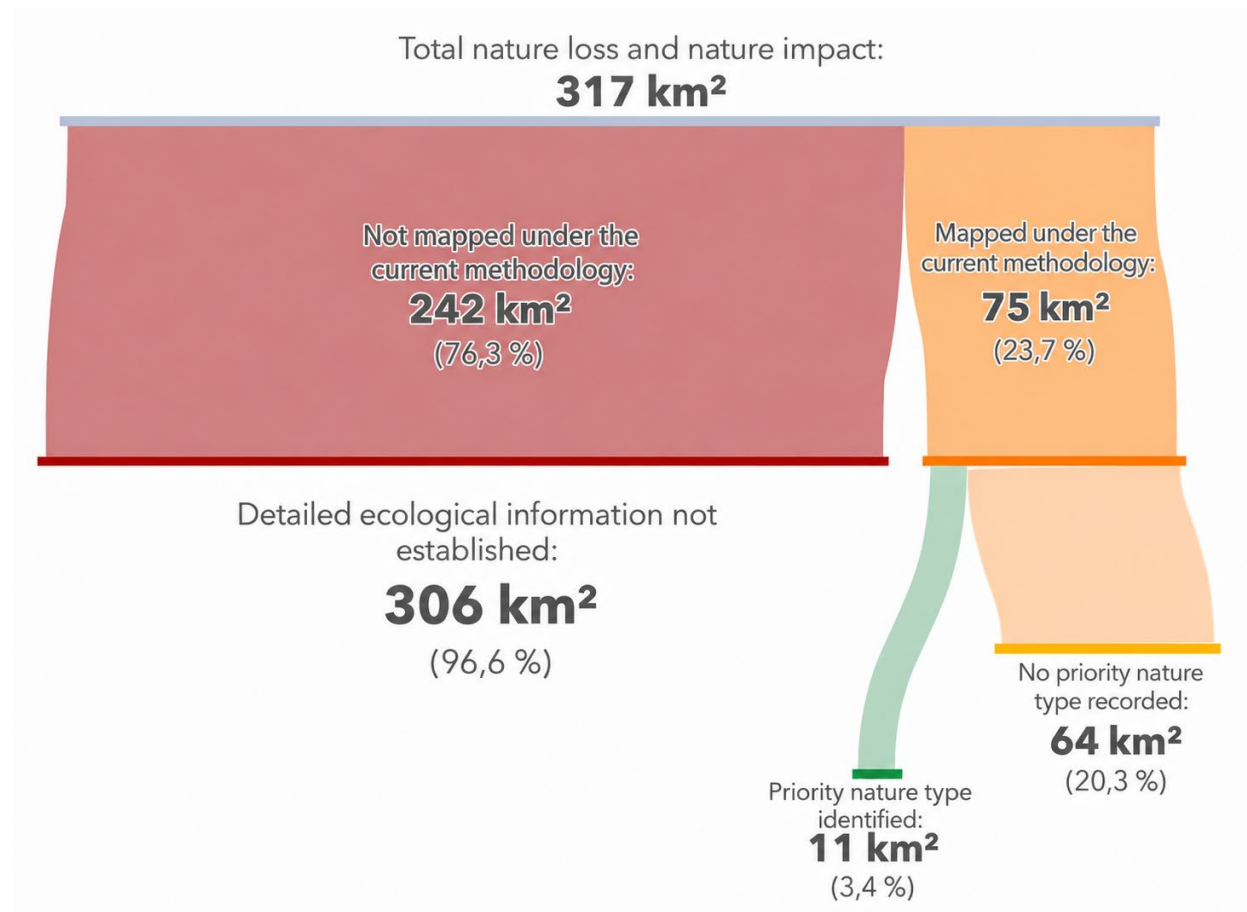
Outcome:

Mitigated known weaknesses
Documentation of the
remaining uncertainty

Reproducibility and traceability



What the analysis could establish



From audit evidence to other applications

1. Strategic screening

- I.e. Change data + environmental + regulatory data

2. Identify patterns, hotspots, areas for scrutiny

3. Case selection (candidate changes)

4. Case level evidence

- I.e. Original geometry / imagery / records / field observations



Preserve provenance and traceability. Document uncertainty and ensure reproducibility

Thank you for your attention

- We are happy to answer any questions.
- Further details: [Document 3:9 \(2025-2026\)](#) – *Mapping of nature values and climate impacts as a basis for decisions in land-use management*

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