Screening and assessment of tailing mining projects in compliance with UNFC

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RESOURCE MANAGEMENT WEEK 2021

ENABLING SUSTAINABILITY PRINCIPLES IN RESOURCE MANAGEMENT

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How to Identify Potentials and Barriers of Raw Materials Recovery from Tailings

Similarities with Mining Projects

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- **Geological exploration** of mineral raw materials
  - Reconnaissance, prospection, general & detailed exploration
  - → with each phase the technical effort increases
- **Techno-economic** approach
  - → Parallel to geological exploration if it makes economic sense

https://www.lminingventures.com/wp-content/uploads/revslider/slaido_71/Explorers1-1.jpg?189db0&189db0

Resource potentials of mining waste

Differences to Mining Projects

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What is known

- Location / minerals to be expected
- Historical data / new information

Major differences to mining projects

- Environmental, social and legal aspects

→ Need for a comprehensive understanding of the potentials and barriers for the development of a raw material project

Monte Kali, Germany © Wolkenkratzer

Research Question

→ Systematic screening approach comparable to reconnaissance exploration

Quick and efficient UNFC-compliant approach

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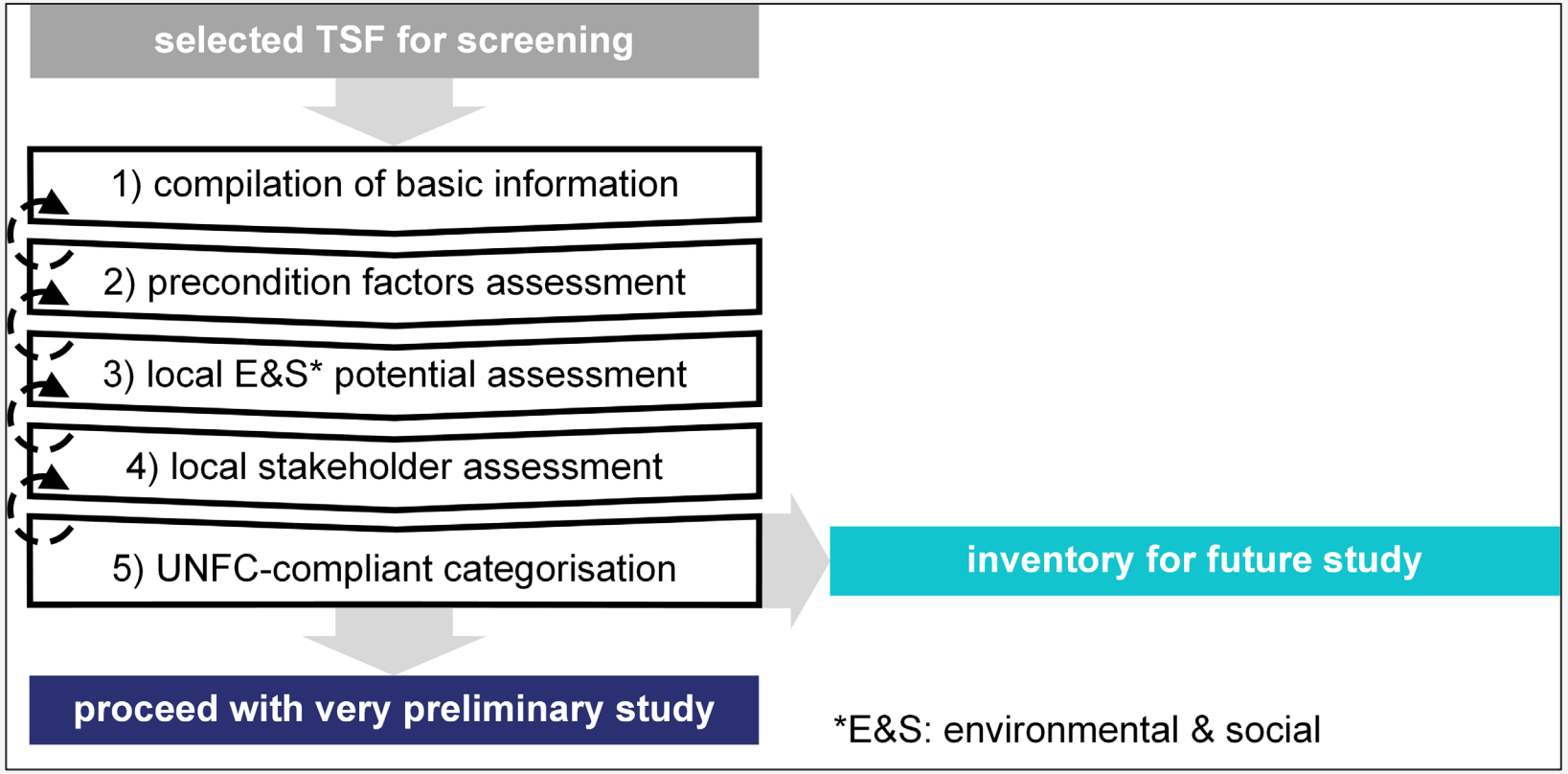
Systematic Screening

5 Steps



R Suppes & S Heuss-Aßbichler(2021) *How to Identify Potentials and Barriers of Raw Materials Recovery from Tailings? Part I: A UNFC-Compliant Screening Approach for Site Selection*. Resources 10.3, 26. DOI: 10.3390/resources10030026

Case Study

TSF Bollrich near Goslar / Germany

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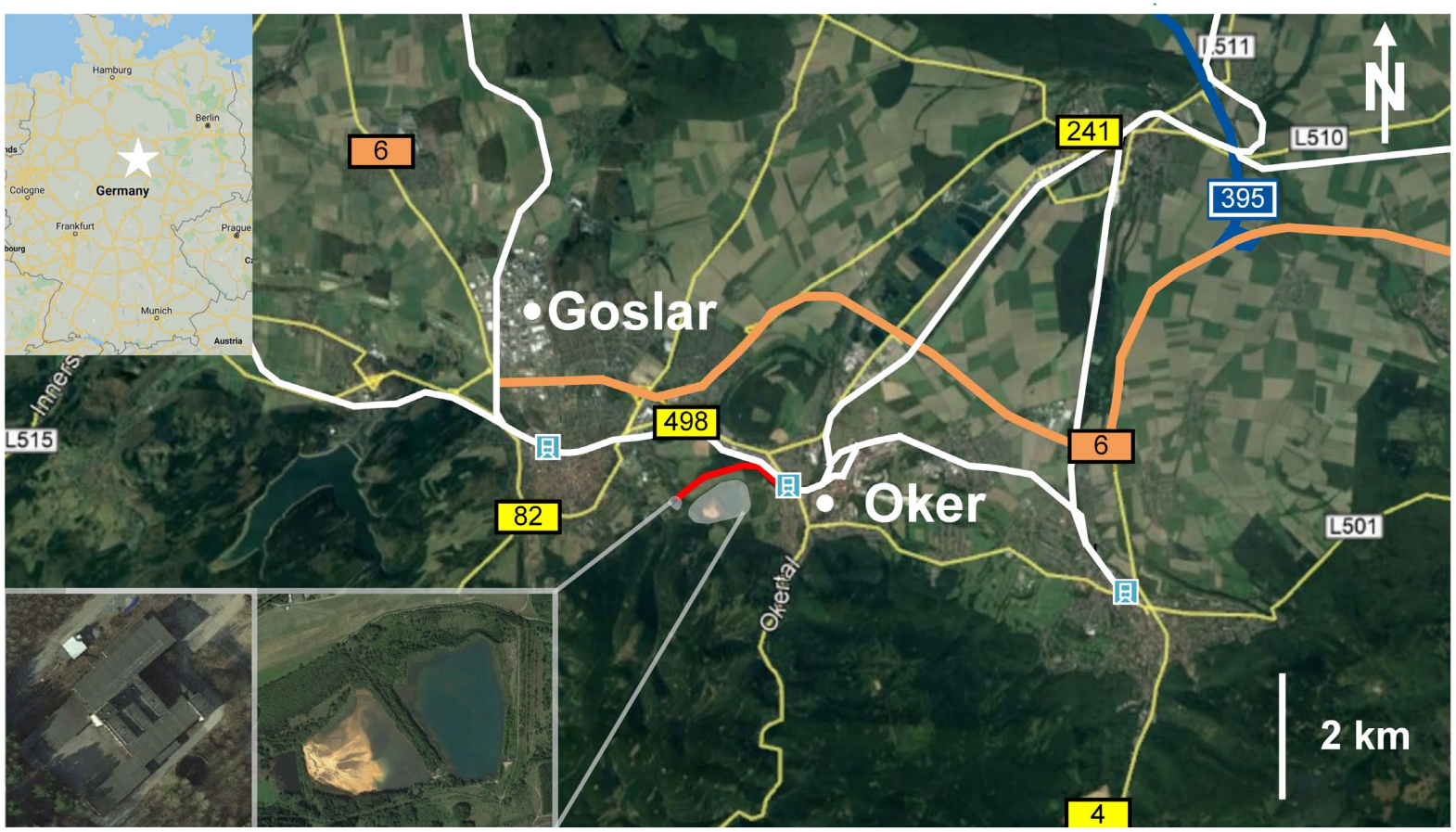
Tailings Storage Facility (TSF) Bollrich



Rammelsberg
closed in 1988 after more than 1000 years of mining

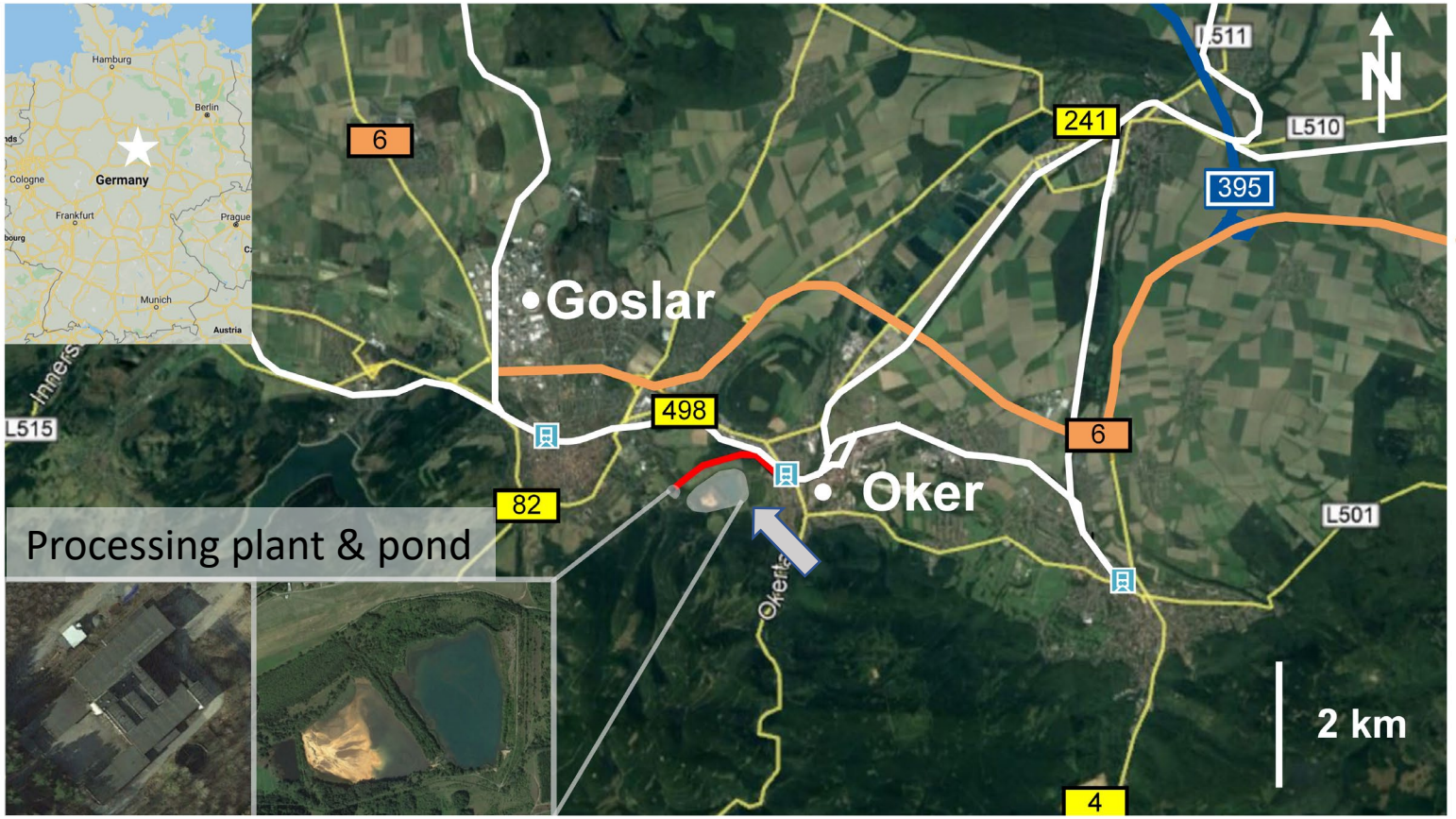
Step 1

Compilation of Basic Information

- Geological evidence
  $BaSO_4$, Cu, Pb, Zn
  Ag, Au, In

- Variations expected in
  - mineral quantity,
  - quality,
  - distribution

- Infrastructure
  Public roads and railway



Step 2

Precondition Factors Assessment

- Presence of
  - buildings,
  - transportation
  - utilities infrastructure

Step 3

Local Environmental and Social Potential Assessment

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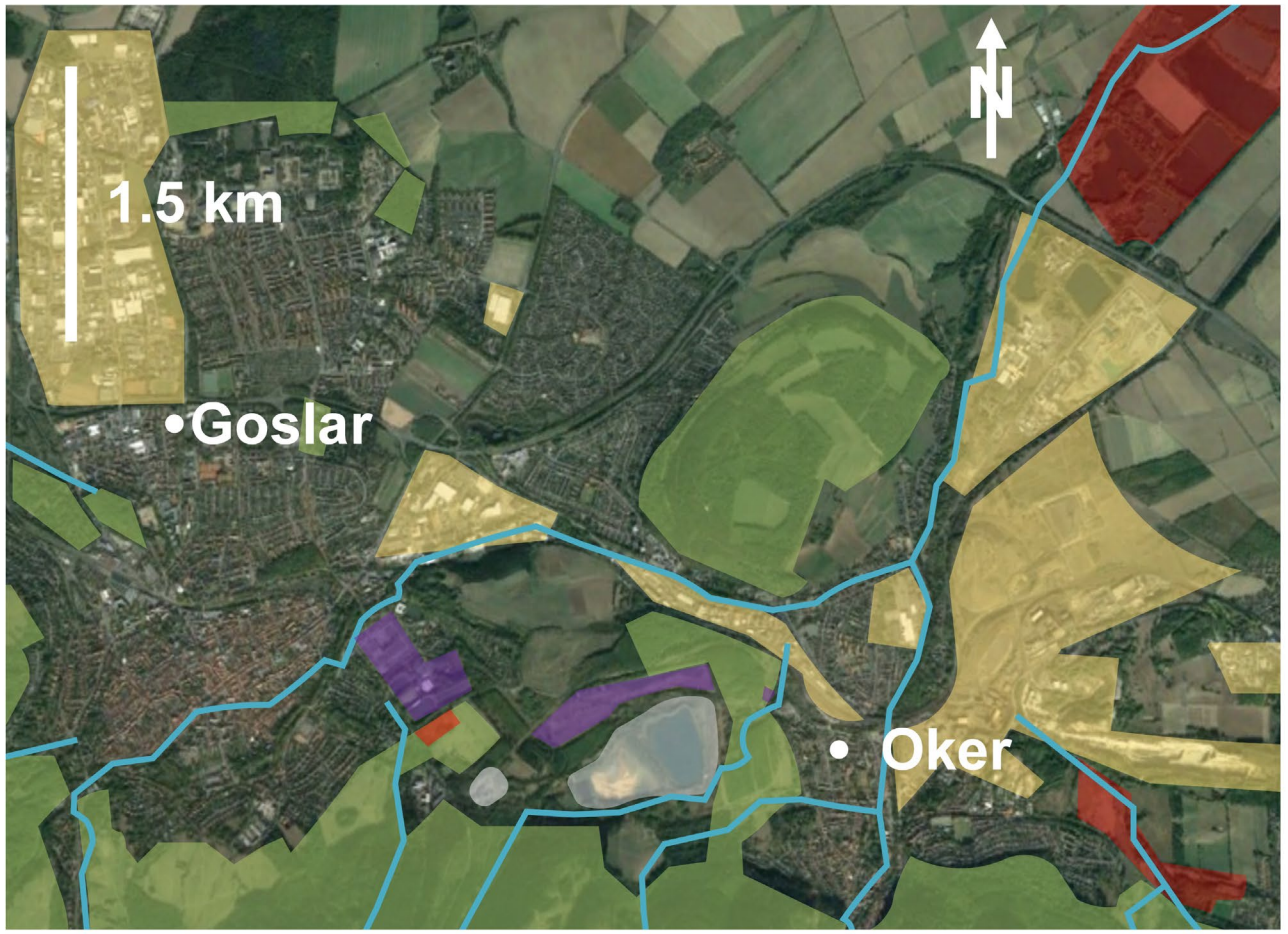
Environment of TSF Bollrich

- Protected landscape areas
- Nature conversation areas
- Rivers
- Industrial & commercial areas
- Sports areas



Step 3

Local Environmental and Social Potential Assessment

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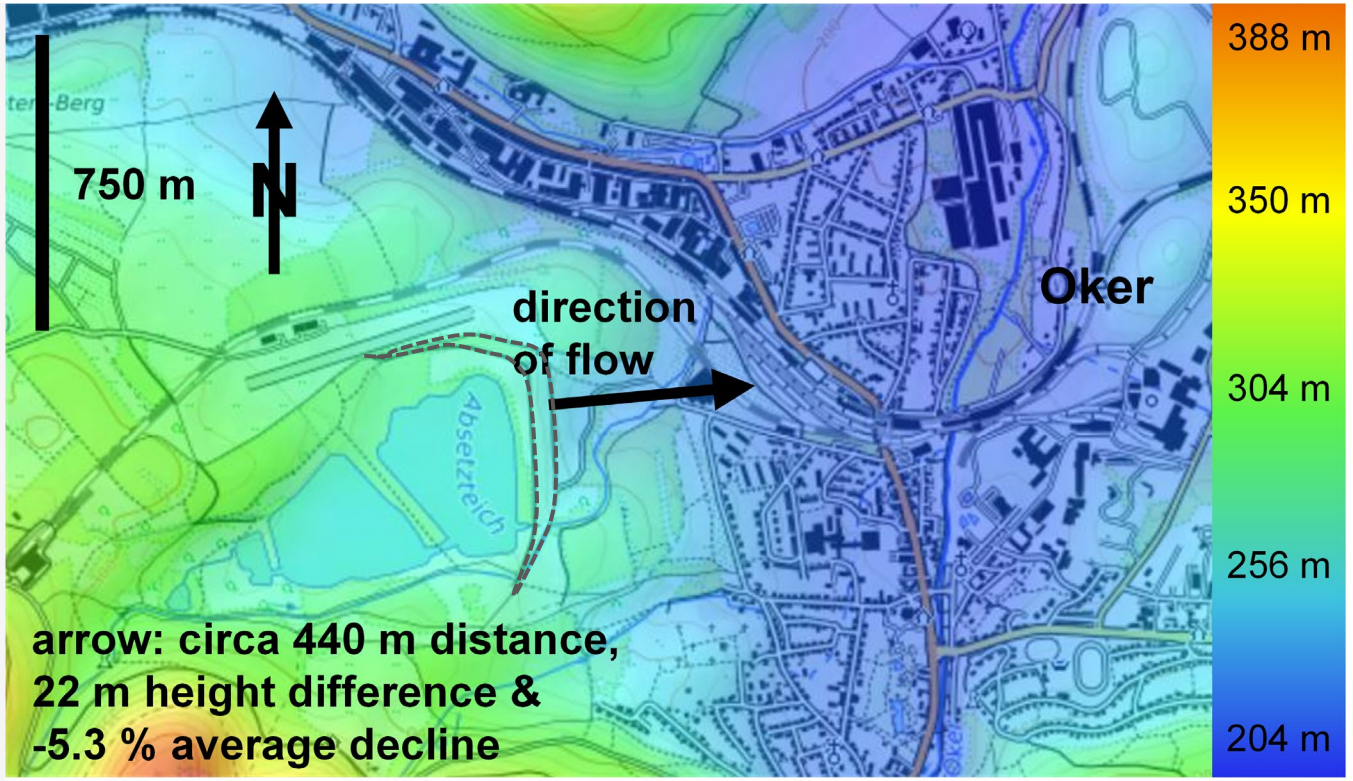
- **Risk assessment** → Oker
  Failure of the TSF dam
- **Human activity** around the TSF
  → Human Footprint Index 60 - 80%
- City Goslar Administration
  → **recreation area**



Step 4

Local Stakeholder Assessment

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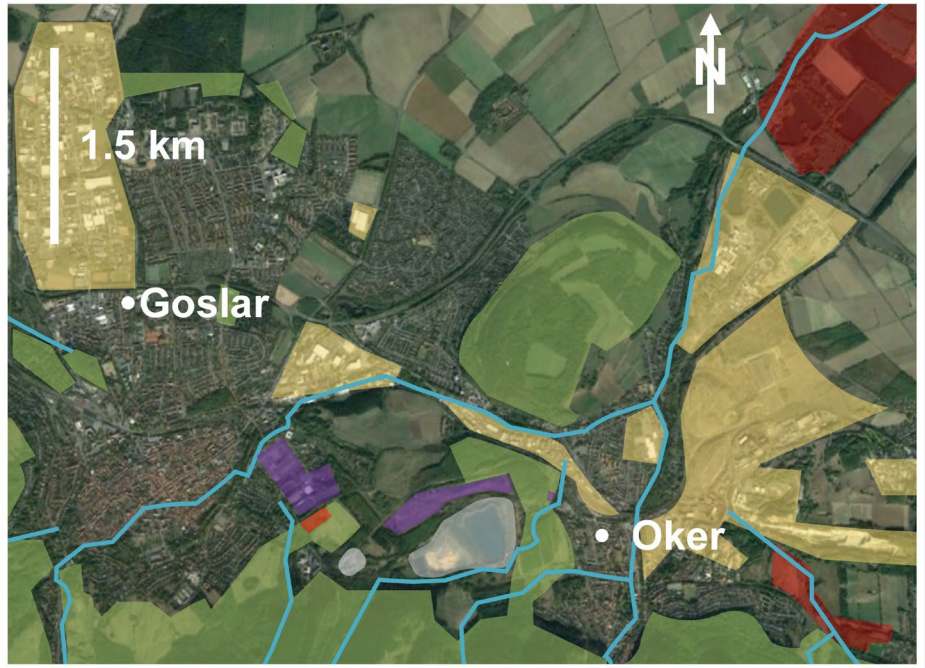
17 stakeholder groups

- **Citizens** of Goslar & Oker (50,000 inhabitants)
- **Authorities:**
  City administrations / State Office for Mining
- **Companies** (Oker Chemie, German Railway DB)
- **Farmers, foresters**, & **air sports** community
- **NGO**s (3)
- **Rammelsberg mine** → UNESCO cultural heritage
- **No information** could be retrieved on the TSF's owner among others



Step 5

UNFC-Compliant Categorisation

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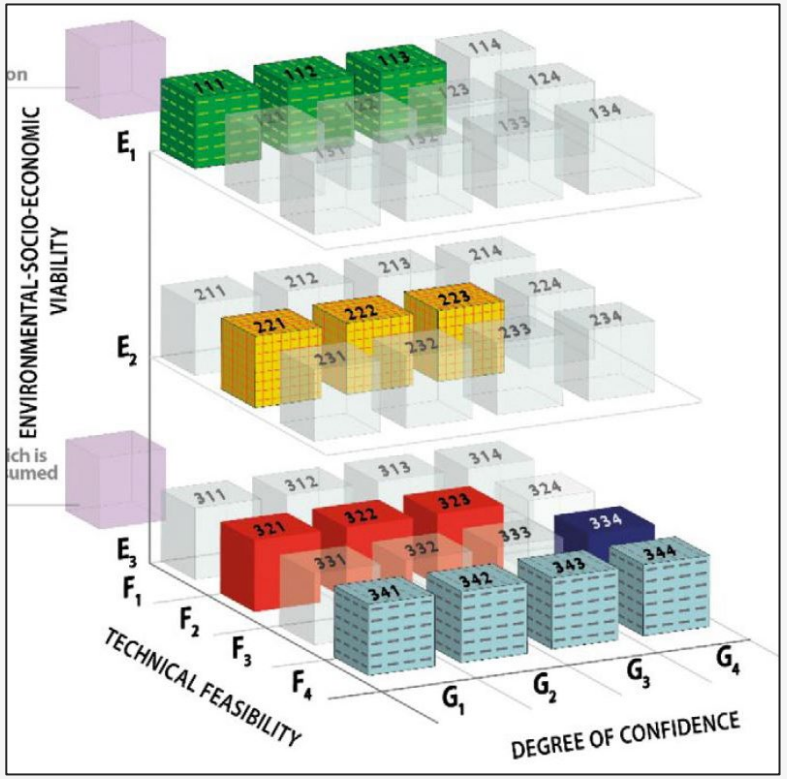
Prospective Project: E3F3G4

- assumed presence of CRMs, $BaSO_4$ & economically highly important metals
- assumed sufficiently large TSF volume
- favorable regulatory & infrastructure conditions

Driving factors

- Reduction of the environmental risk potentials
- Benefits of environmental rehabilitation
- Potential to reduce land use-related social tension



Source: Update 2019 of the UNFC, by United Nations Economic Commission for Europe (UNECE) Expert Group on Resource Management (EGRM), ©2020 United Nations

Conclusion

Systematic Screening Approach

- Case study → Importance of sustainability aspects / legal aspects / interests of stakeholders (local population)
- Systematic approach → Identification of the potentials and barriers for the development of a recovery project
- UNFC-compliant approach → Inclusion of environmental and/or social aspects in addition to economic viability
- Need for → Differentiation of economic, environmental, social & legal aspects on the E-axis
  → Guidance for rating data quality and uncertainty ranges

Thank you!

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