BUNDESGESELLSCHAFT FÜR ENDLAGERUNG

# Summary
# Sub-areas Interim Report according to Section 13 StandAG

As per 28/09/2020

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In 2013, the German Bundestag and Bundesrat have passed a law to restart the search for the site with the best possible safety for a repository for the high-level radioactive waste produced in Germany. The “Commission on the Storage of High-level Radioactive Waste”, consisting of representatives of science, the German Bundestag and Bundesrat as well as associations, worked until 2016 on a concept for the site selection procedure based on the white map of Germany. For this purpose, the Commission developed rules, criteria and formulated requirements on a repository for high-level radioactive waste. The legislator passed the “Act on the search and selection of a site for a repository for high-level radioactive waste” (Site Selection Act – StandAG) in May 2017, which was based on the findings of the Commission.

The Site Selection Act describes the principles science-based, participative, transparent, self-questioning and learning. The search area will be narrowed down increasingly over the course of three phases: starting with the entire federal territory; then surface exploration regions and subsurface exploration of sites; and finally a proposal for a repository site offering the best possible safety to accommodate high-level radioactive waste. The Bundesgesellschaft für Endlagerung mbH (BGE) is responsible for the site selection procedure as the German Waste Management Organisation. In this Interim Report, the BGE is presenting first results outlining sub-areas in preparation for defining the site regions.

For final disposal, the BGE considers the host rocks rock salt, clay rock and crystalline rock within the framework of the work in accordance with section 13 StandAG and section 1(3) StandAG.

According to Section 13 StandAG, sub-areas describe the areas in Germany where favourable geological conditions can be expected for the safe final disposal of high-level radioactive waste in one of the three possible host rocks. They are identified by the application of the geoscientific requirements and criteria that are legally stipulated in Section 22 StandAG (exclusion criteria), Section 23 StandAG (minimum requirements) and Section 24 StandAG (geoscientific weighting criteria). With this Sub-areas Interim Report, the BGE makes a contribution to engender the necessary public interest in the issue of final disposal and the site selection procedure. The Sub-areas Interim Report provides the basis for the Conference on Sub-areas and encourages participation. Hence, publication of the Sub-areas Interim Report lays the foundation to start the formal public involvement process at a stage that is sufficiently early to enable influence on the work and the findings of the site selection procedure.

In order to ensure transparency in the decision-making process, this Interim Report and the supporting documents present the findings and all facts and considerations that are relevant to selection.

The site selection procedure was launched in September 2017, and the BGE has started to work on it. Enquiries were sent to the federal and state authorities to obtain the data sets required to apply the legally stipulated geoscientific requirements and criteria throughout Germany. This Interim Report and its supporting documents describe the

methods and their development. The general public and experts were involved in the process of preparing the application methods. In addition, the BGE discussed its application methods in public during online consultations that were held between November 2019 and August 2020. Some of the information obtained during these discussions prompted an adjustment of the application methods.

During the process of identifying the sub-areas, a first step involved excluding areas that are unsuitable as repository sites for high-level radioactive waste according to the legally defined exclusion criteria according to Section 22 StandAG. The exclusion criteria include large-scale vertical movements, active fault zones, influences from current or past mining activities, seismic activity, volcanic activity and young groundwater age. The rules set out in Section 22(1) StandAG state that an area is classified as unsuitable as soon as one of the defined exclusion criteria applies.

The next step involved an assessment of the remaining areas to determine which ones meet the minimum requirements of Section 23 StandAG. First of all, rock formations were identified which contain clay rock, rock salt and crystalline host rock types relevant to repositories. The minimum requirements refer to the hydraulic conductivity of the rock, the thickness of the effective containment area, the minimum depth of the effective containment area (i.e. its distance to the earth's surface), the assumed minimum area of the repository and the preservation of the barrier effect. "Identified areas" that satisfy none of the exclusion criteria according to Section 22 StandAG and all of the minimum requirements according to Section 23(2) StandAG were obtained as a result of these two steps.

In the third step, these identified areas will be evaluated according to the geoscientific weighing criteria defined in Section 24 StandAG in regard to their favourable overall geological situation and hence their suitability as a repository site for high-level radioactive waste. The geoscientific weighing criteria described in Annexes 1 to 11 (to Section 24) StandAG are used as evaluation benchmarks. These eleven criteria refer to the

- transport of radioactive substances by groundwater movements in the effective containment zone;
- configuration of the rock bodies;
- spatial characterisability;
- long-term stability of the favourable conditions;
- geomechanical properties;
- tendency to form fluid pathways;
- gas formation;
- temperature compatibility;
- retention capacity in the effective containment zone;
- hydrochemical conditions; and
- protection of the effective containment zone by the overburden.

Generic repository concepts were taken into account during the stages of work to ensure that, in the final outcome of safety-related considerations, areas with an overall favourable geological situation are designated as sub-areas.

Within the framework of Section 13 StandAG, a total of 90 sub-areas with an area of approx. 240 874 km² are identified which are expected to have favourable geological conditions for the final disposal of high-level radioactive waste (cf. Figure 1). These sub-areas overlap in places, as they are located in different geological units. If the overlap in some sub-areas is taken into account, an area of approx. 194 157 km², i.e. 54 % of the national territory in Germany, is designated as a sub-area and constitutes the starting point for continued efforts in the site selection procedure.

In this context, nine sub-areas with a surface of approx. 129 639 km² are identified in claystone host rock (cf. Figure 2). A total of 74 sub-areas with a surface of approx. 30 450 km² were identified in salt host rock. Of these sub-areas, 60 are located in steep rock salt formations and 14 sub-areas are in stratiform, i.e. flat, rock salt formations (cf. Figure 3). A total of seven sub-areas with a surface of approx. 80 786 km² were determined in crystalline host rock (cf. Figure 4).

According to the application of the geoscientific weighing criteria (Section 24 StandAG), the salt stock Gorleben has not become a sub-area. This means that the provision of Section 36(1), p. 5 No. 1 StandAG applies, which states that the salt stock Gorleben is excluded from this procedure. Therefore, the BGE does not consider the salt stock Gorleben during their work regarding the proposals for the siting regions.

Within the framework of identifying sub-areas in accordance with Section 13 StandAG, all areas in Germany could be assessed in the necessary depth using the available geological data. Accordingly, there were no areas that cannot be classified due to insufficient geological data. A presentation of these areas and a recommendation for further action in this regard are therefore unnecessary.

The sub-areas represent – taking into account the findings of the Conference on Sub-areas – the search area for the BGE to prepare proposals for siting regions that are eligible for surface exploration. These siting regions will be proposed to the Federal Office for the Safety of Nuclear Waste Management (BASE). A decision on these proposals by the federal legislature then leads Phase I of the site selection procedure to a conclusion according to Section 15 StandAG.

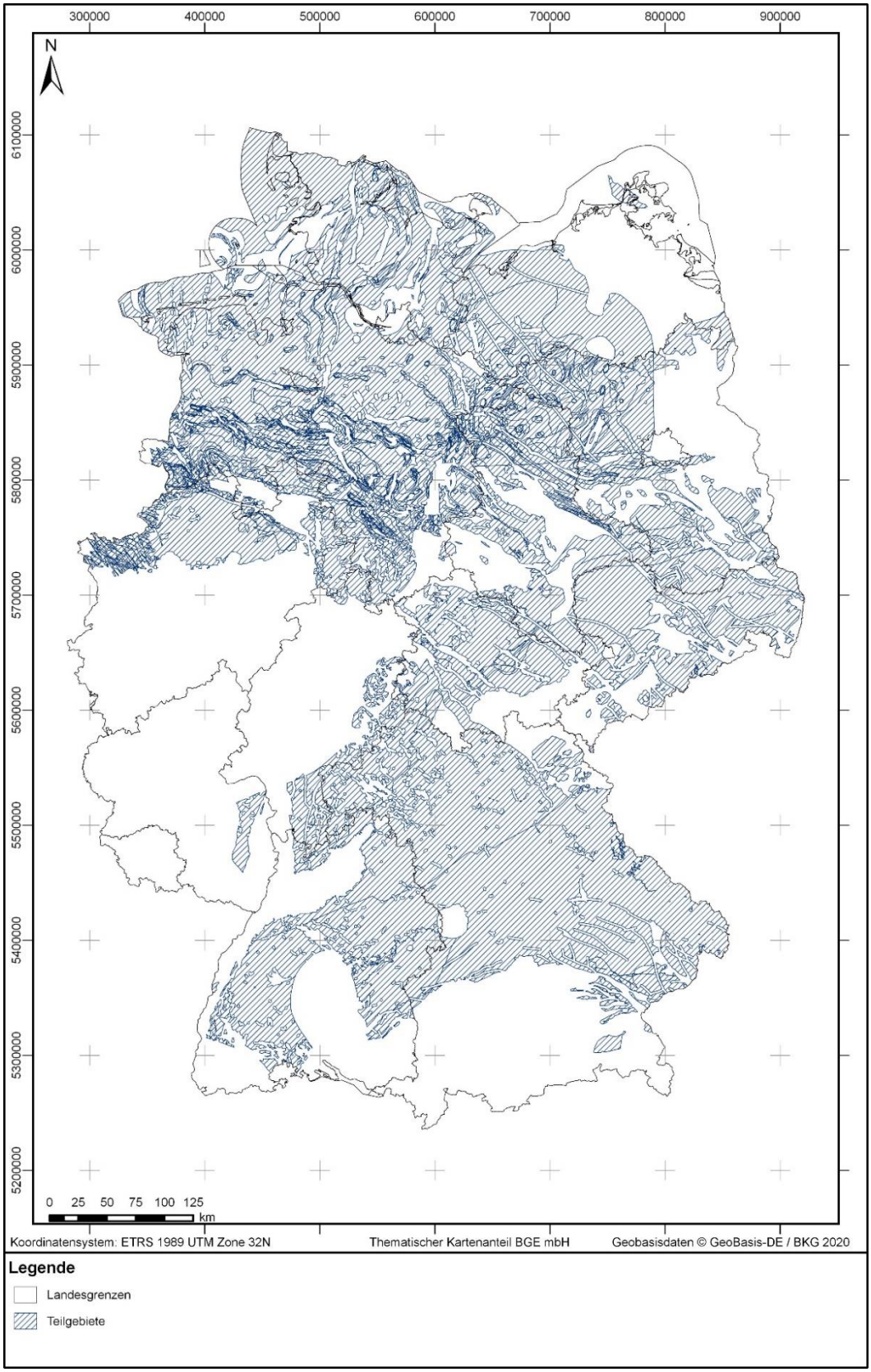


*Figure 1: General map of the sub-areas.*
*The sub-areas were identified according to stratigraphic units, therefore this map representation shows a partial overlapping of several sub-areas.*

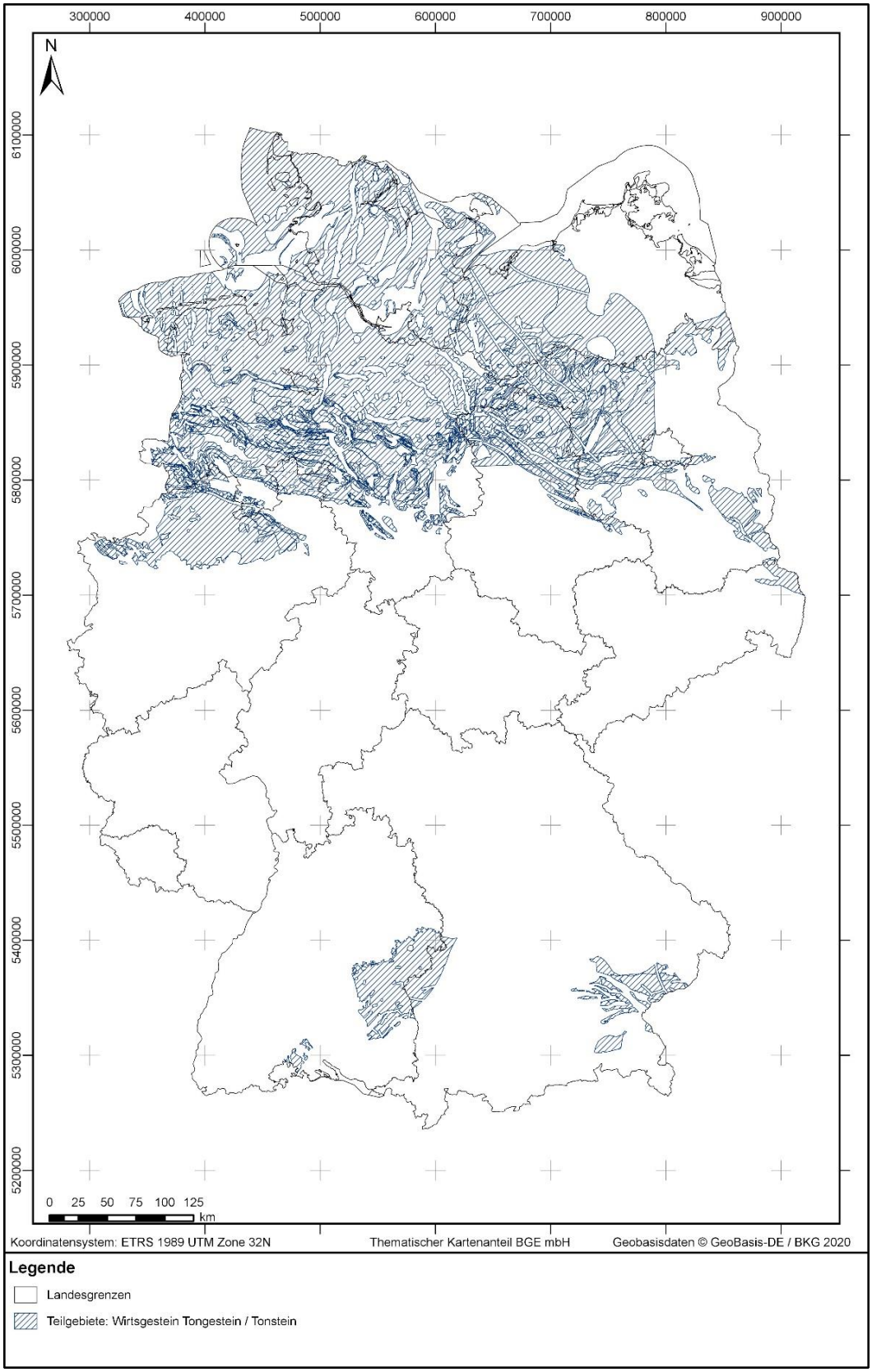


*Figure 2:* *General map of the sub-areas in the host rock clay.*
*The sub-areas were identified according to stratigraphic units, therefore, this map representation shows a partial overlapping of several sub-areas in some cases.*

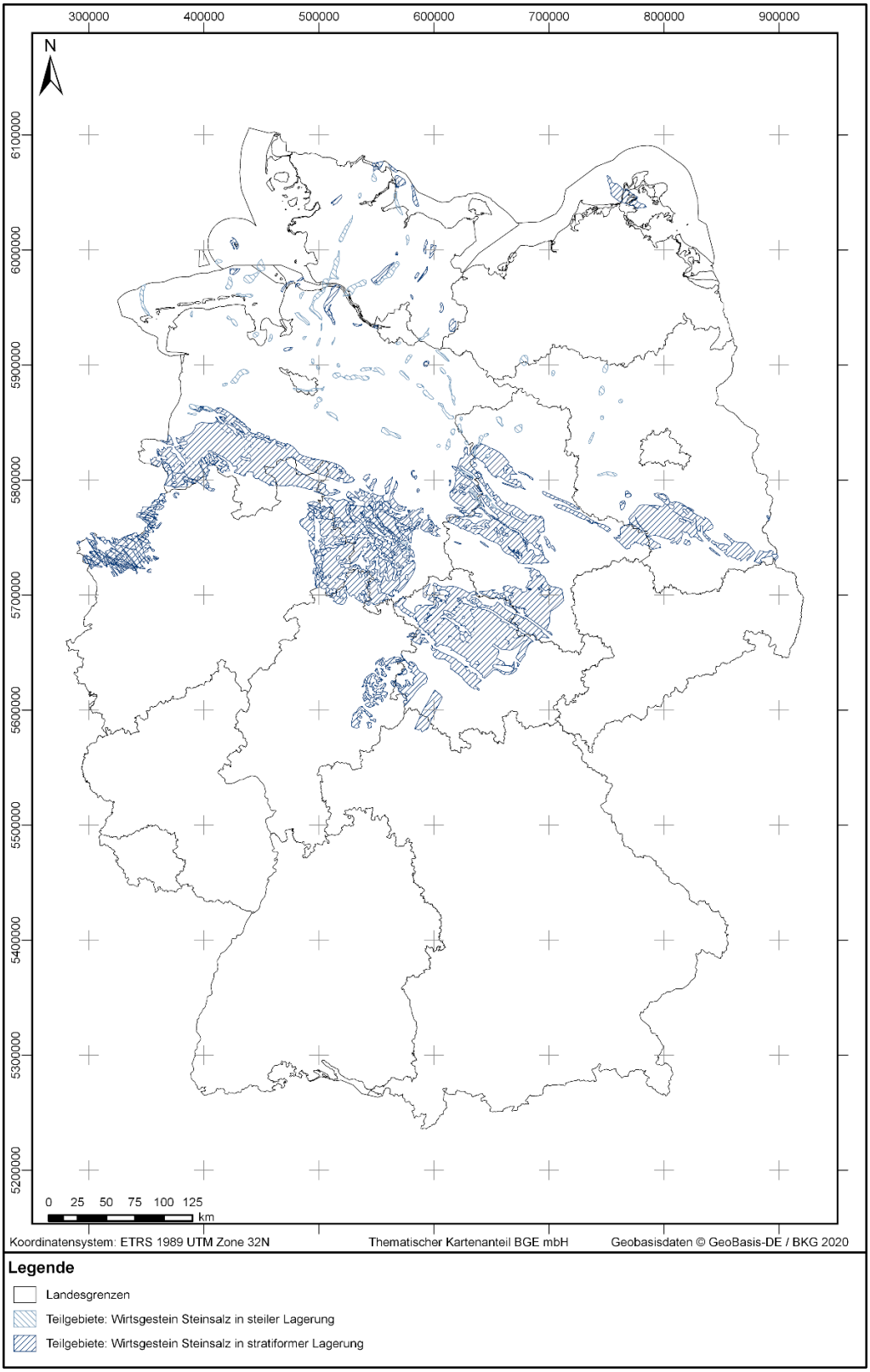


*Figure 3:* *General map of the sub-areas in the host rock salt.*
*For sub-areas in stratiform rock salt, the map representation shows a partial overlapping of several sub-areas in some cases, as they were identified separately according to stratigraphic units.*

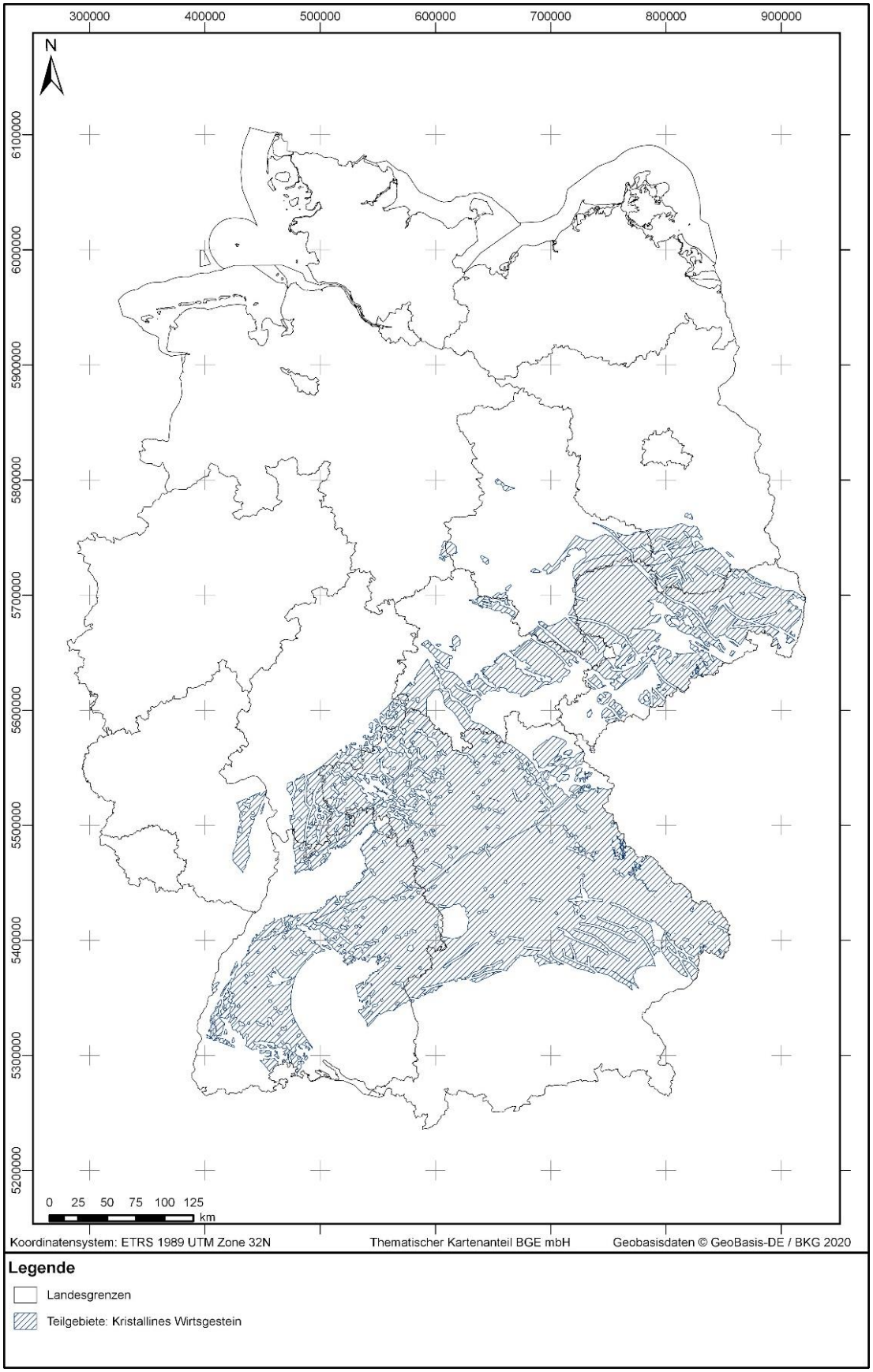


*Figure 4: General map of the sub-areas in the crystalline host rock on the territory of the Federal Republic of Germany.*

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