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Supplementary Material

SUITABILITY MAPPING FOR SUBSURFACE FLOODWATER STORAGE SCHEMES

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1. GEOLOGICAL MAP OF SWABIA (GERMANY)

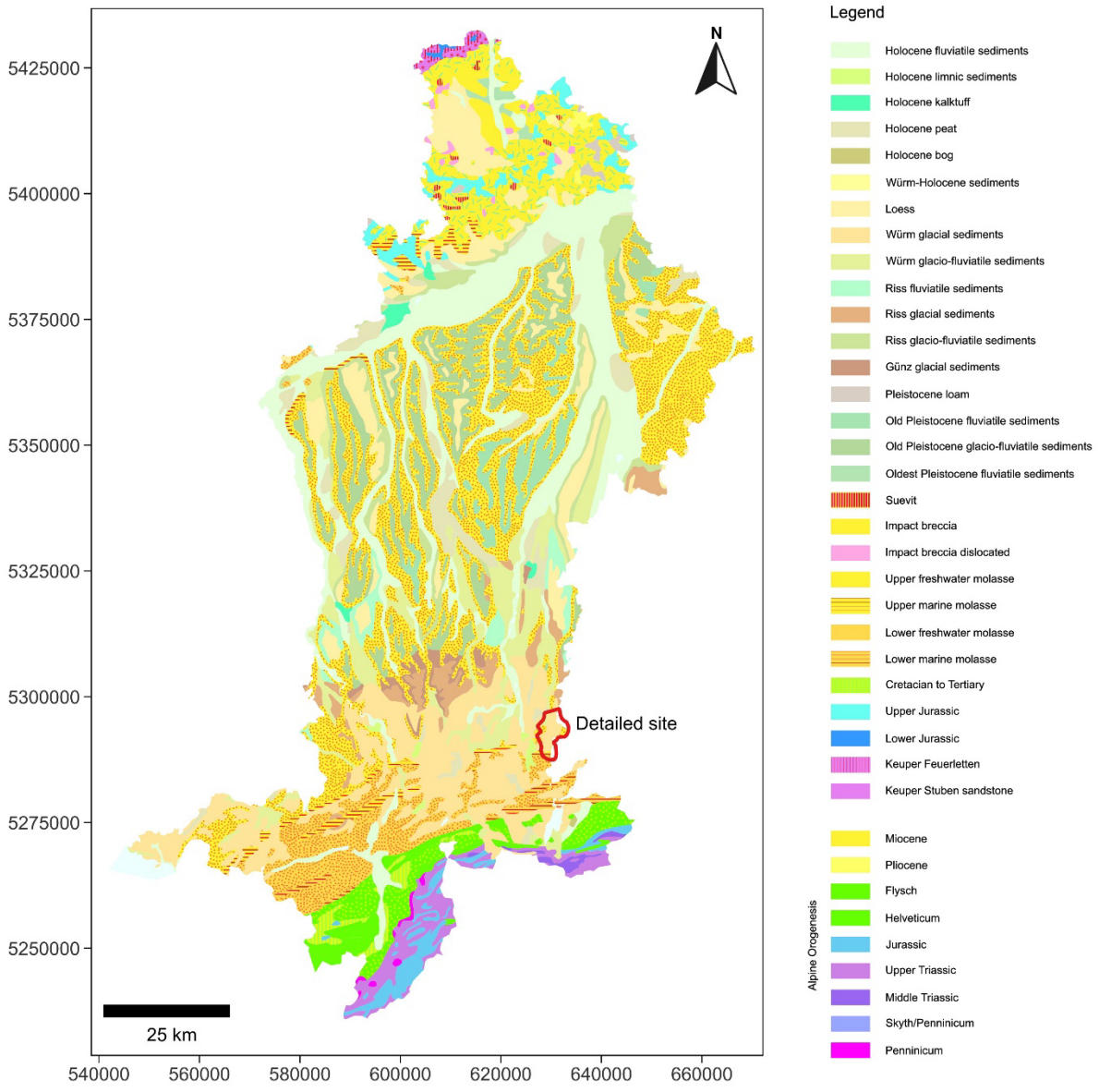

Figure 1 Geological map of Swabia, Germany (2).

2. EXEMPLARY SITE DESCRIPTION

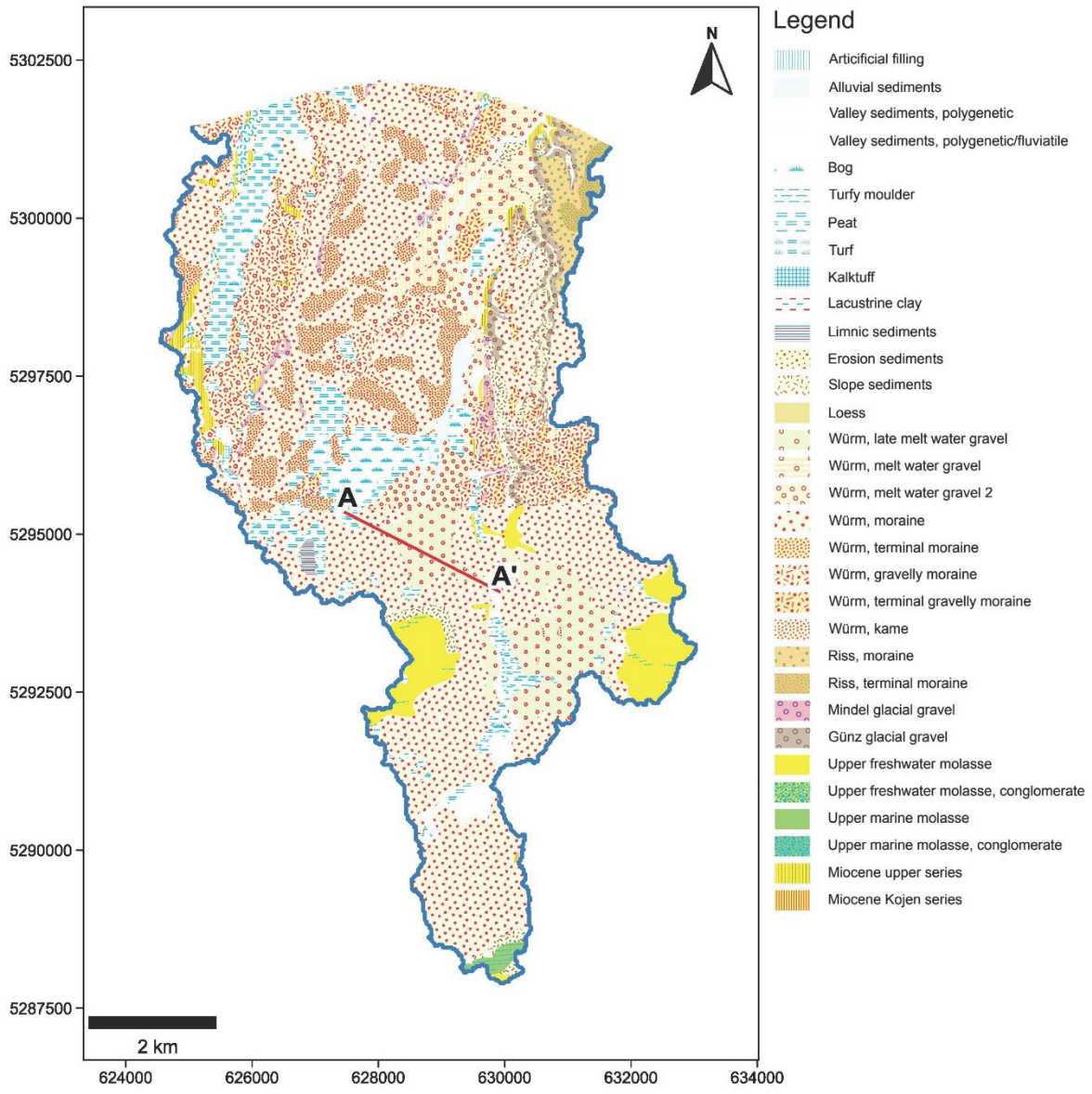

Figure 2 Geological map of one exemplary study site (1). The red line denotes the cross-section A–A' shown in **Figure 4**.

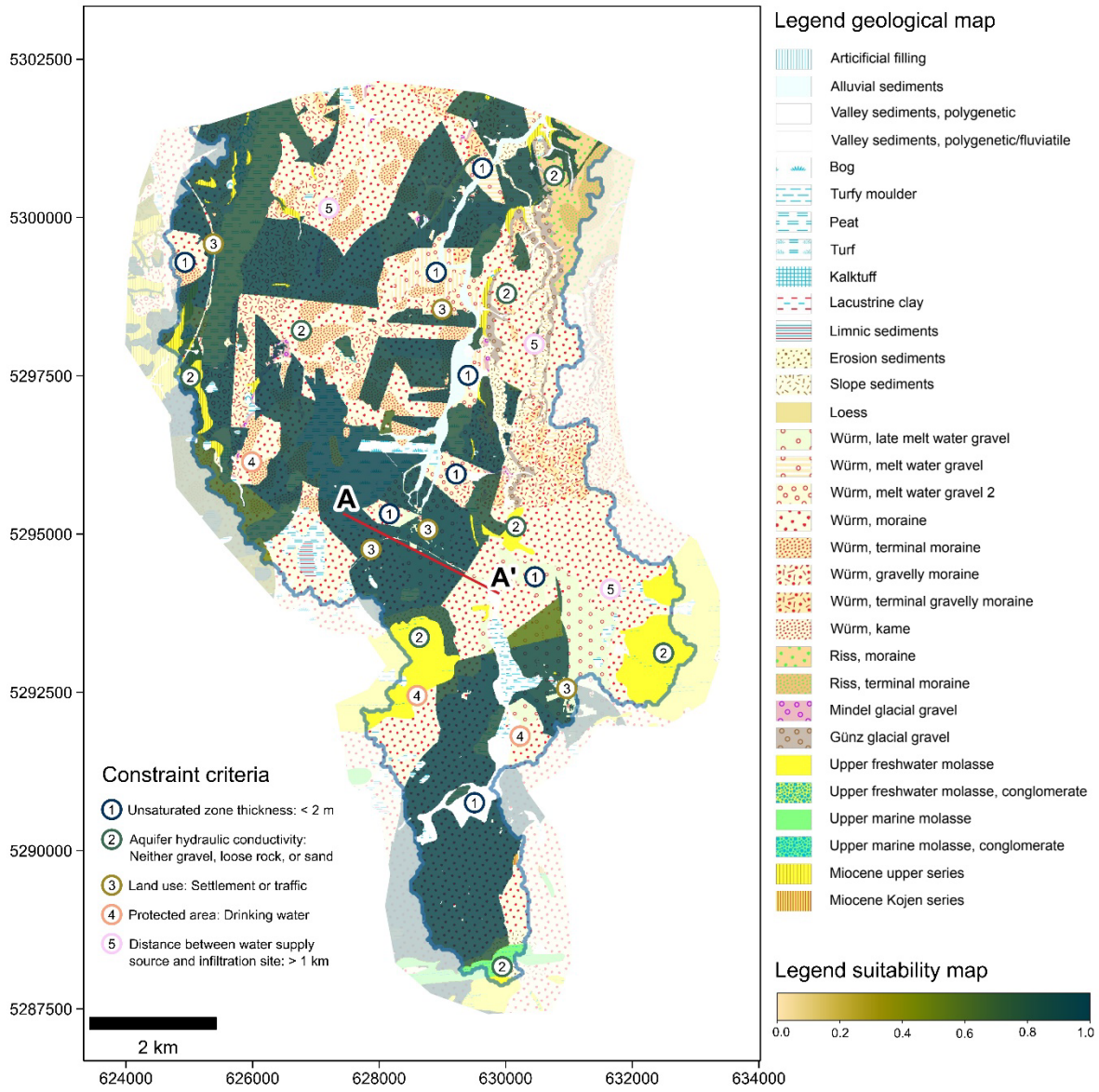

Figure 3 Geological map of one exemplary study site highlighting the constraint criteria responsible for excluding sites (1). The red line denotes the cross-section A–A' shown in **Figure 4**.

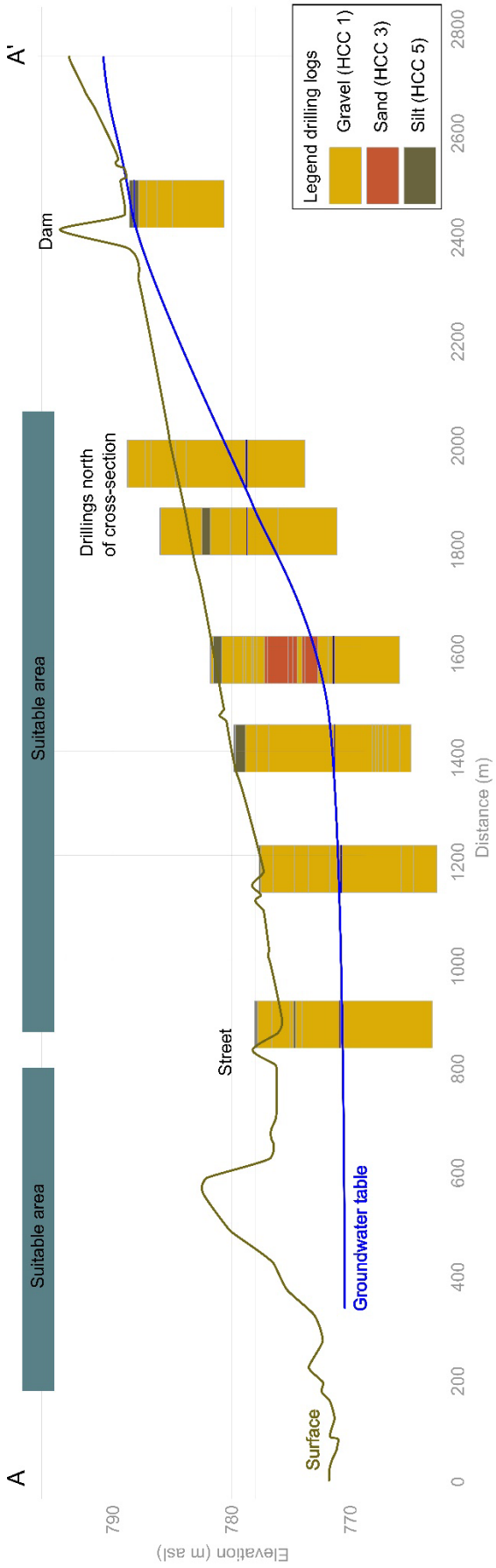

Figure 4 Geological cross-section along line A-A'. Note that for some off-center boreholes, the onset elevation and groundwater levels are higher than those along the line. Groundwater levels were recorded at different times with different general groundwater levels.

https://doi.org/10.69631/ipjv1i2nr20

3. SUITABILITY MAPPING: SUITABILITY MAPS FOR INDIVIDUAL CRITERIA

The following images correspond to **Figure 6**, parts A to G, in the main text of the paper.

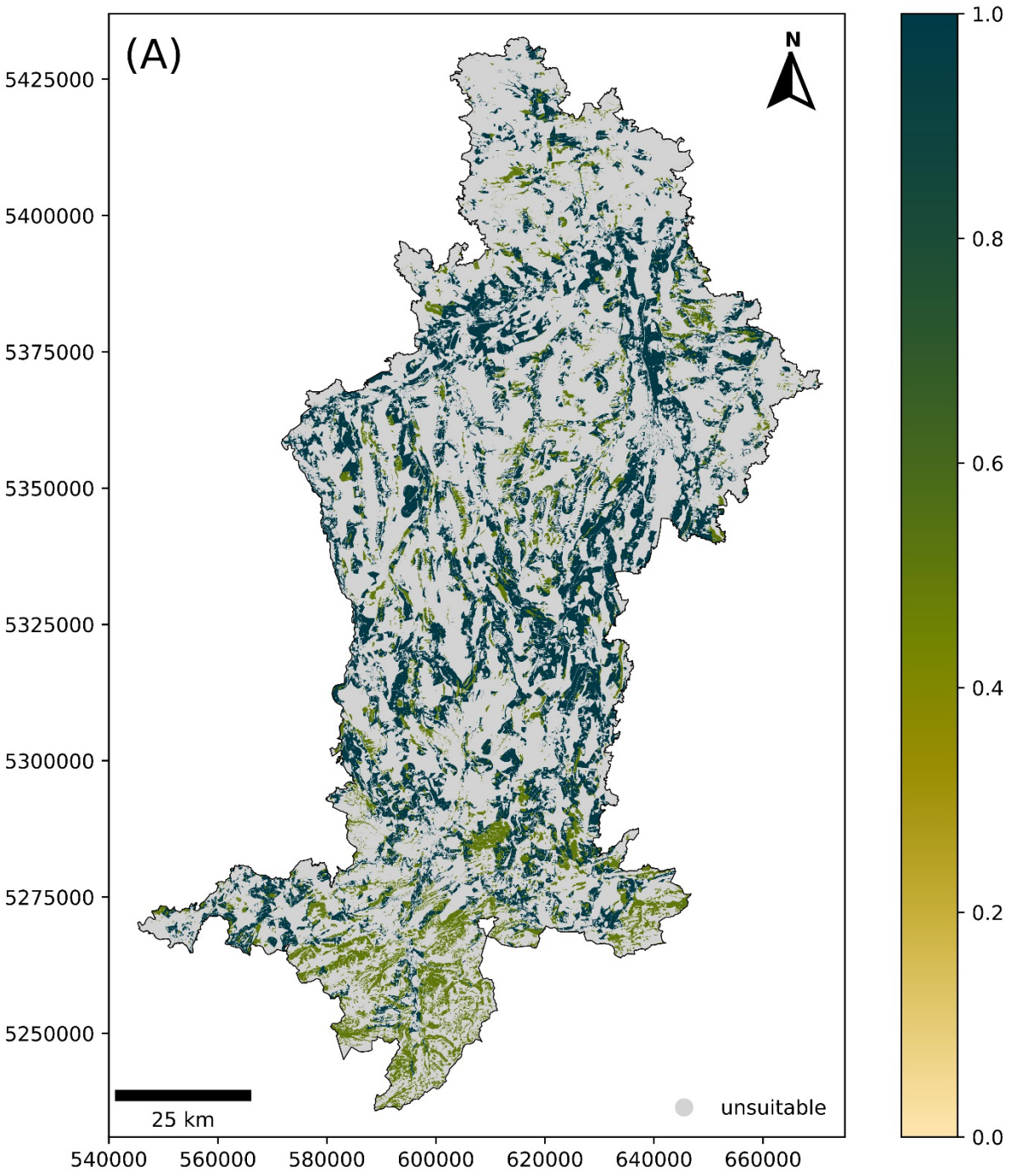

Figure 5 Suitability map for the unsaturated zone thickness criterion resulting from applying the respective suitability function based on the constraint mask. Color map ranging from 0.0 (least suitable) to 1.0 (highest suitable).

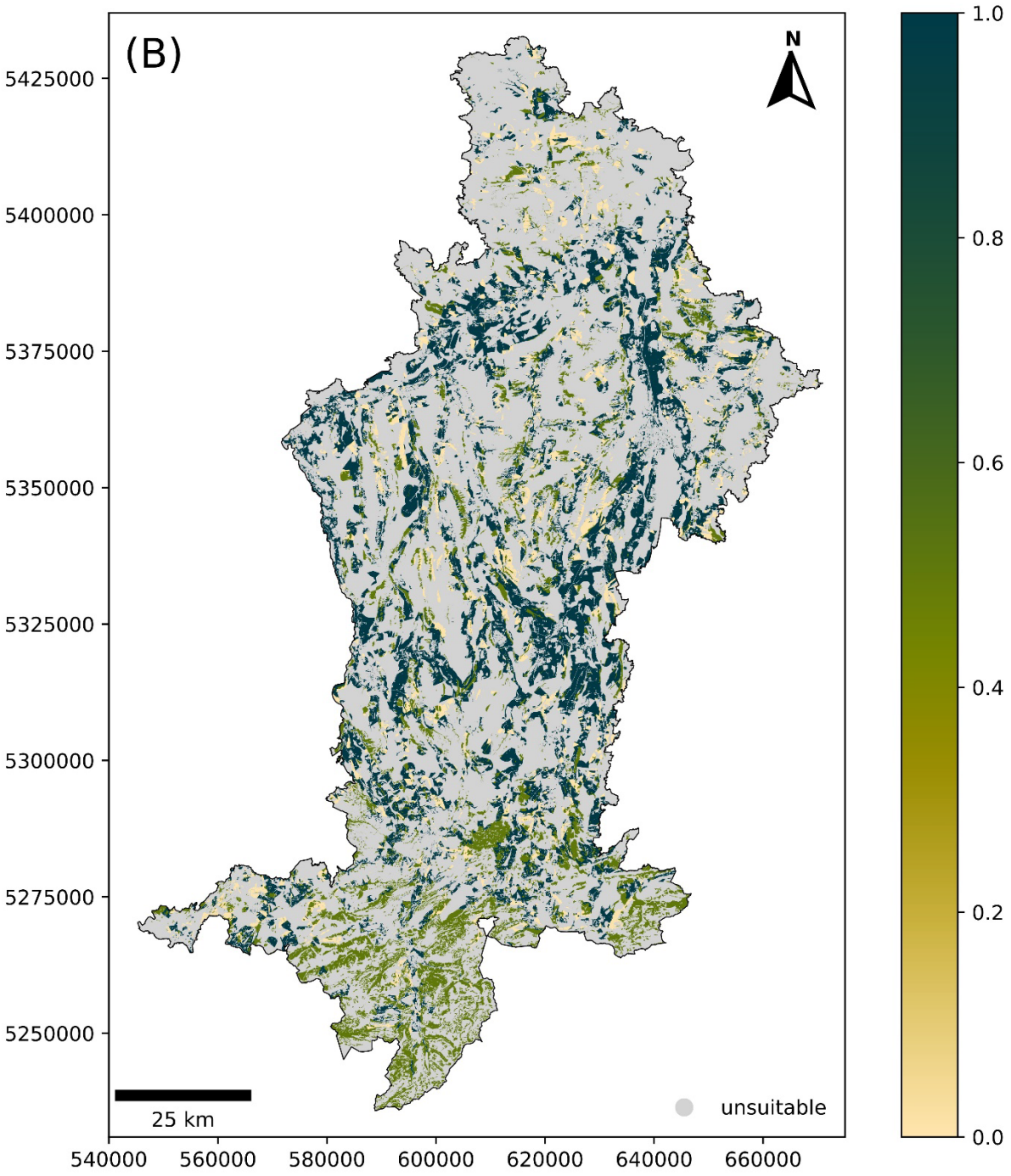

Figure 6 Suitability map for the aquifer thickness criterion resulting from applying the respective suitability function based on the constraint mask. Color map ranging from 0.0 (least suitable) to 1.0 (highest suitable).

 https://doi.org/10.69631/ipjv1i2nr20

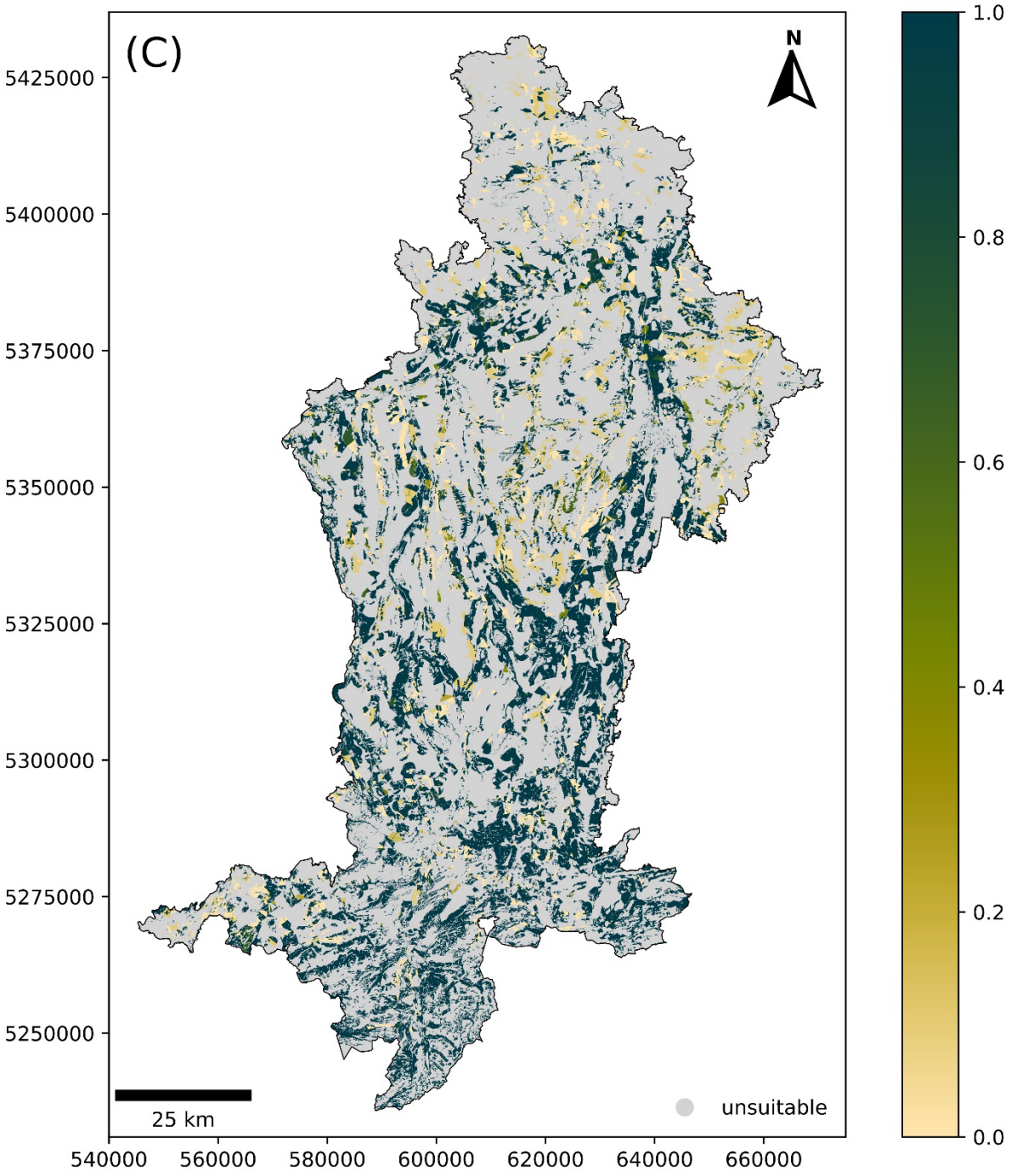

Figure 7 Suitability map for the aquifer hydraulic conductivity criterion resulting from applying the respective suitability function based on the constraint mask. Color map ranging from 0.0 (least suitable) to 1.0 (highest suitable).

 https://doi.org/10.69631/ipjv1i2nr20

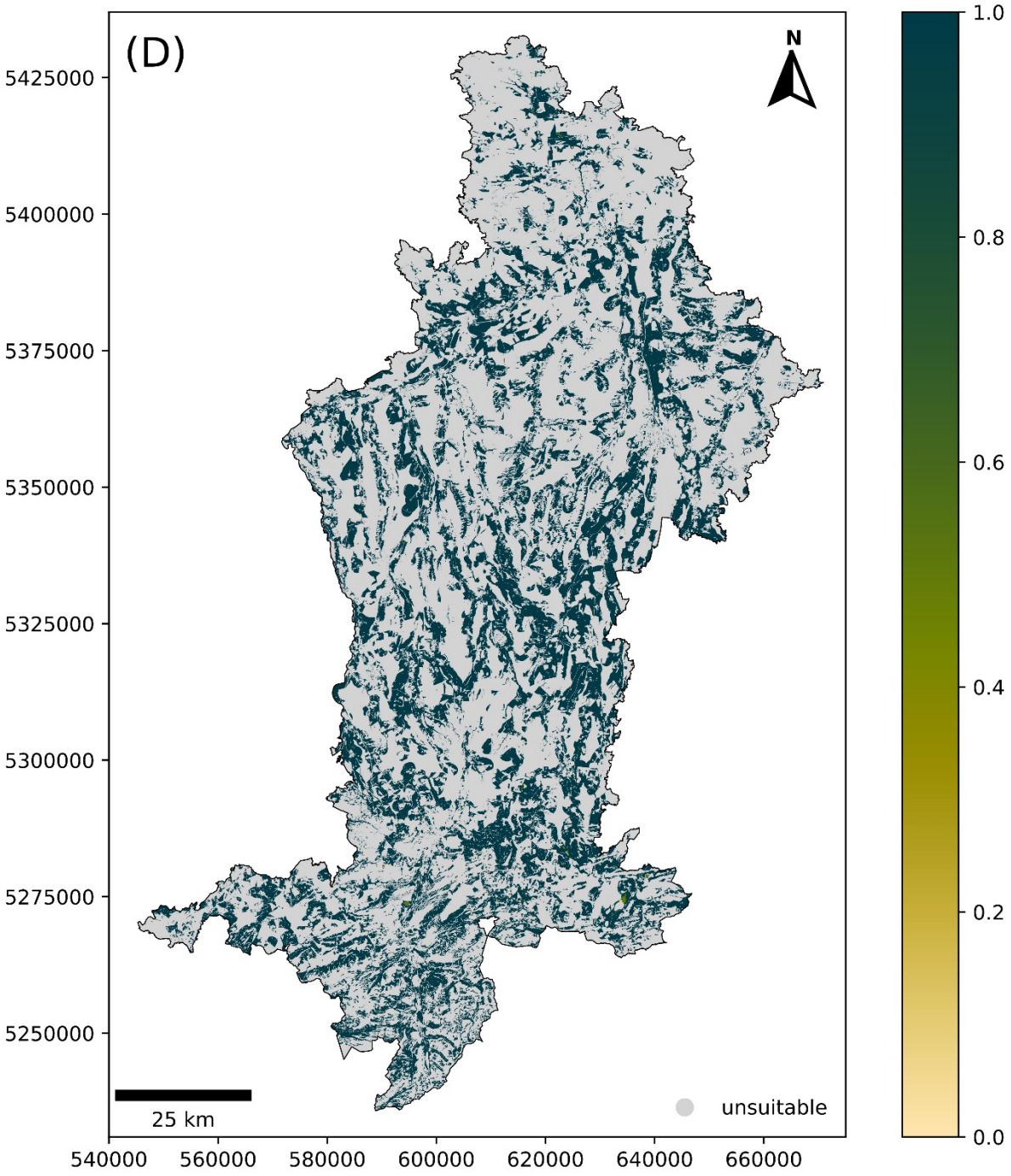

Figure 8 Suitability map for the land use criterion resulting from applying the respective suitability function based on the constraint mask. Color map ranging from 0.0 (least suitable) to 1.0 (highest suitable).

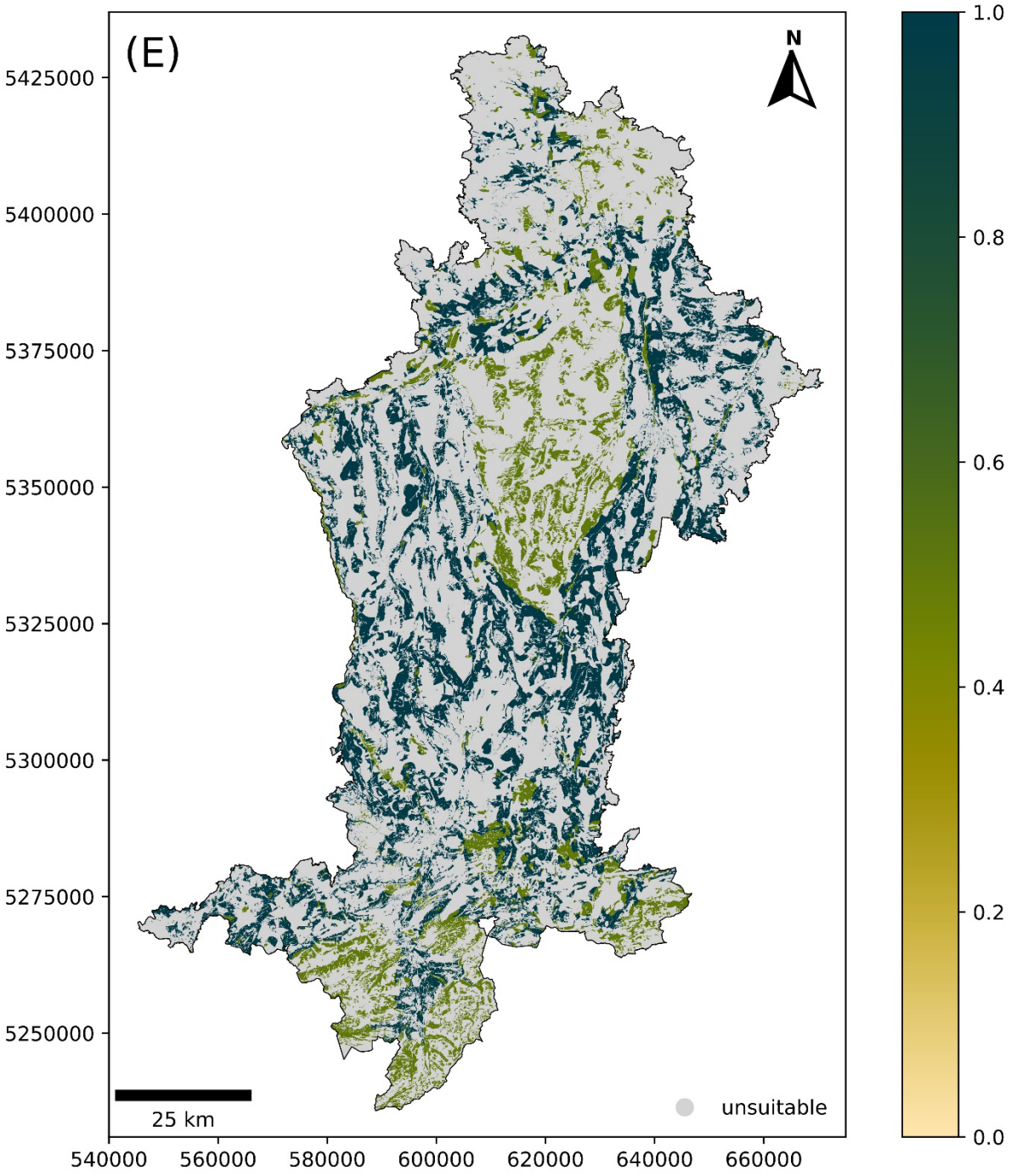

Figure 9 Suitability map for the protected areas criterion resulting from applying the respective suitability function based on the constraint mask. Color map ranging from 0.0 (least suitable) to 1.0 (highest suitable).

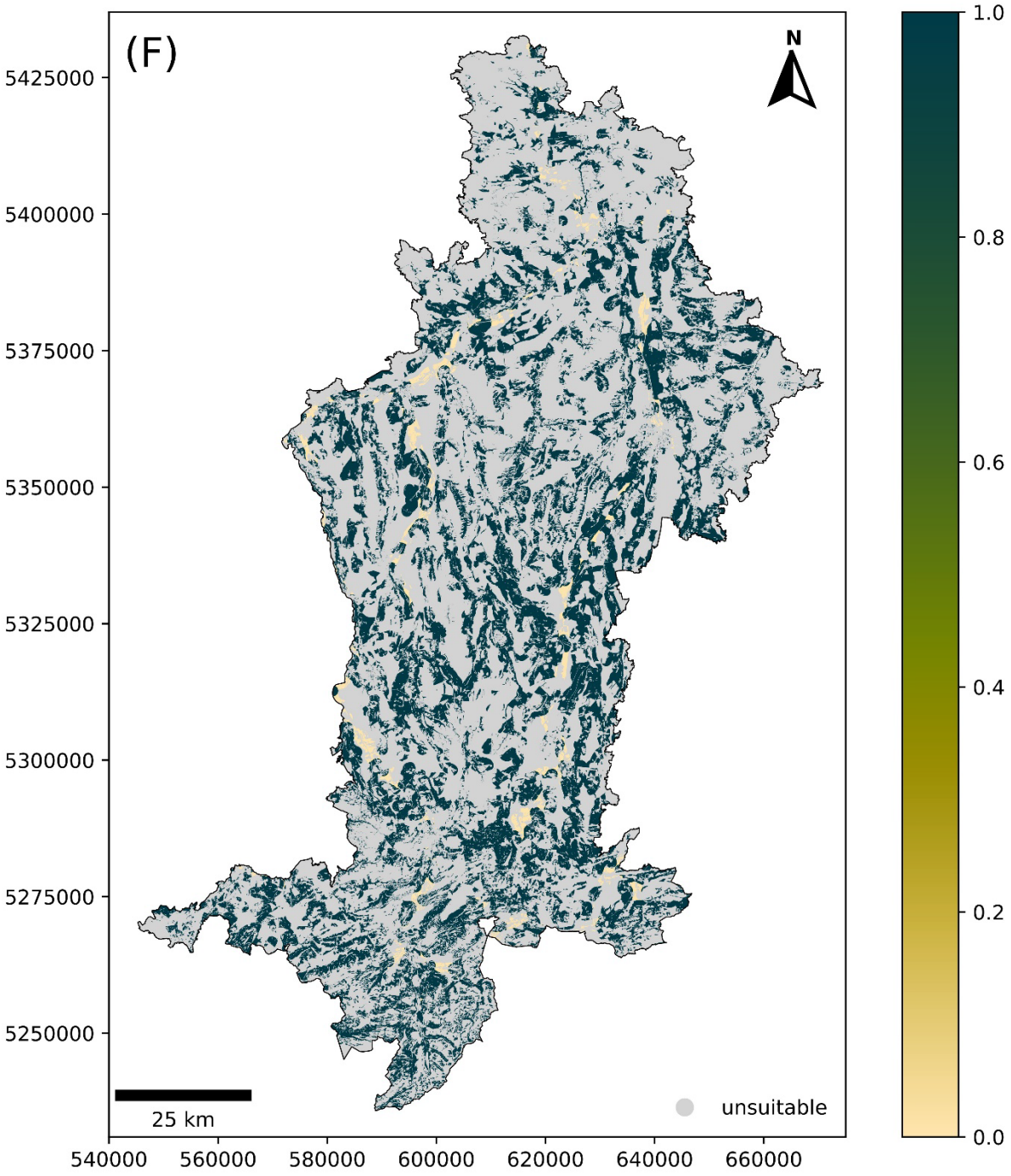

Figure 10 Suitability map for the flood dynamics criterion resulting from applying the respective suitability function based on the constraint mask. Color map ranging from 0.0 (least suitable) to 1.0 (highest suitable).

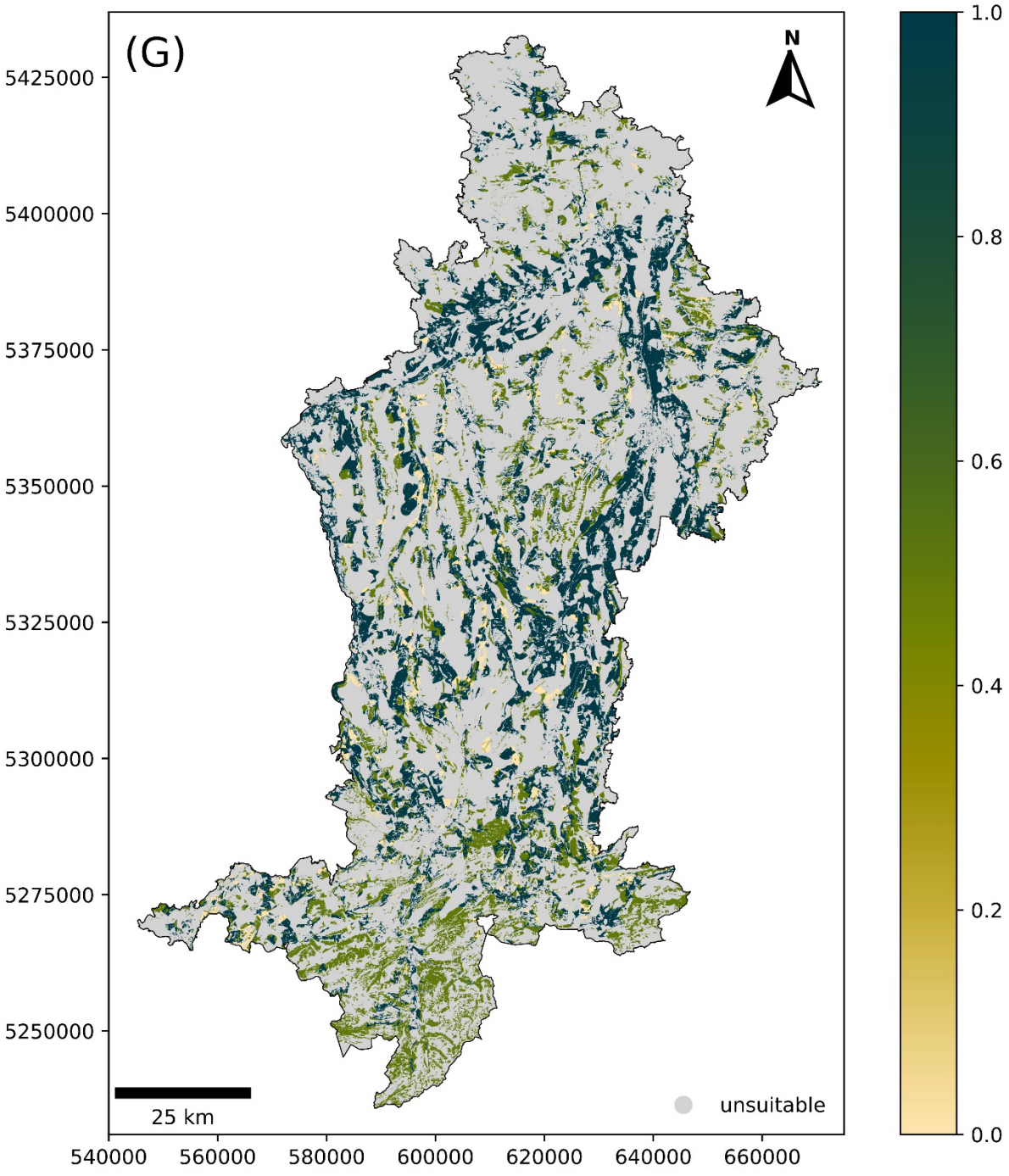

Figure 11 Suitability map for the elevation from water level to groundwater level criterion resulting from applying the respective suitability function based on the constraint mask. Color map ranging from 0.0 (least suitable) to 1.0 (highest suitable).

 https://doi.org/10.69631/ipjv1i2nr20

4. SENSITIVITY ANALYSIS: DIFFERENCE MAPS FOR INDIVIDUAL CRITERIA

The following figures correspond to **Figure 8**, parts A to G, in the main text of the paper.

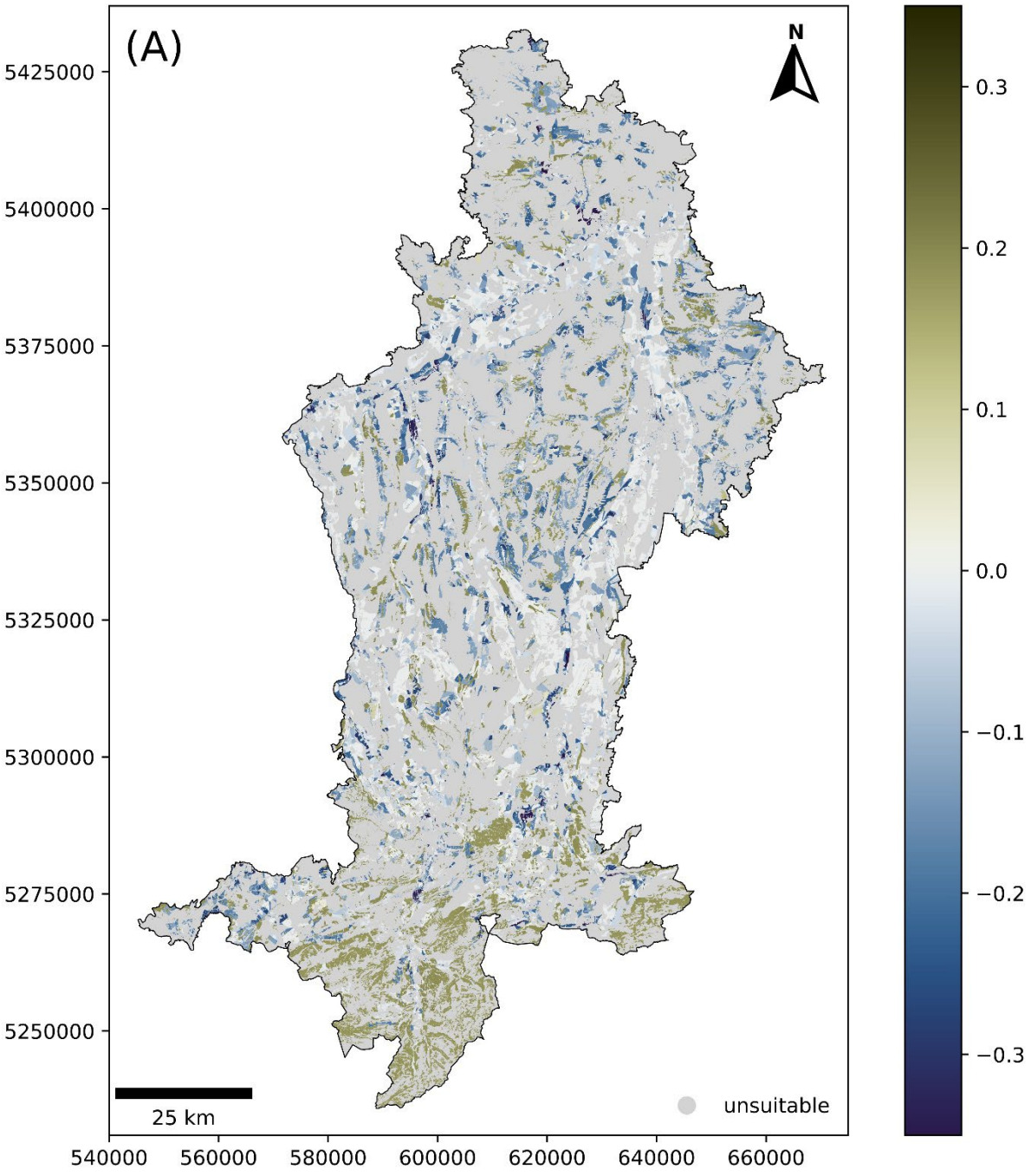

Figure 12 Difference map for the unsaturated zone thickness criterion between the base map and the sensitivity analysis scenario excluding the respective criterion. Color map ranging from + 0.35 (higher suitable compared to base) to - 0.35 (lower suitable compared to base).

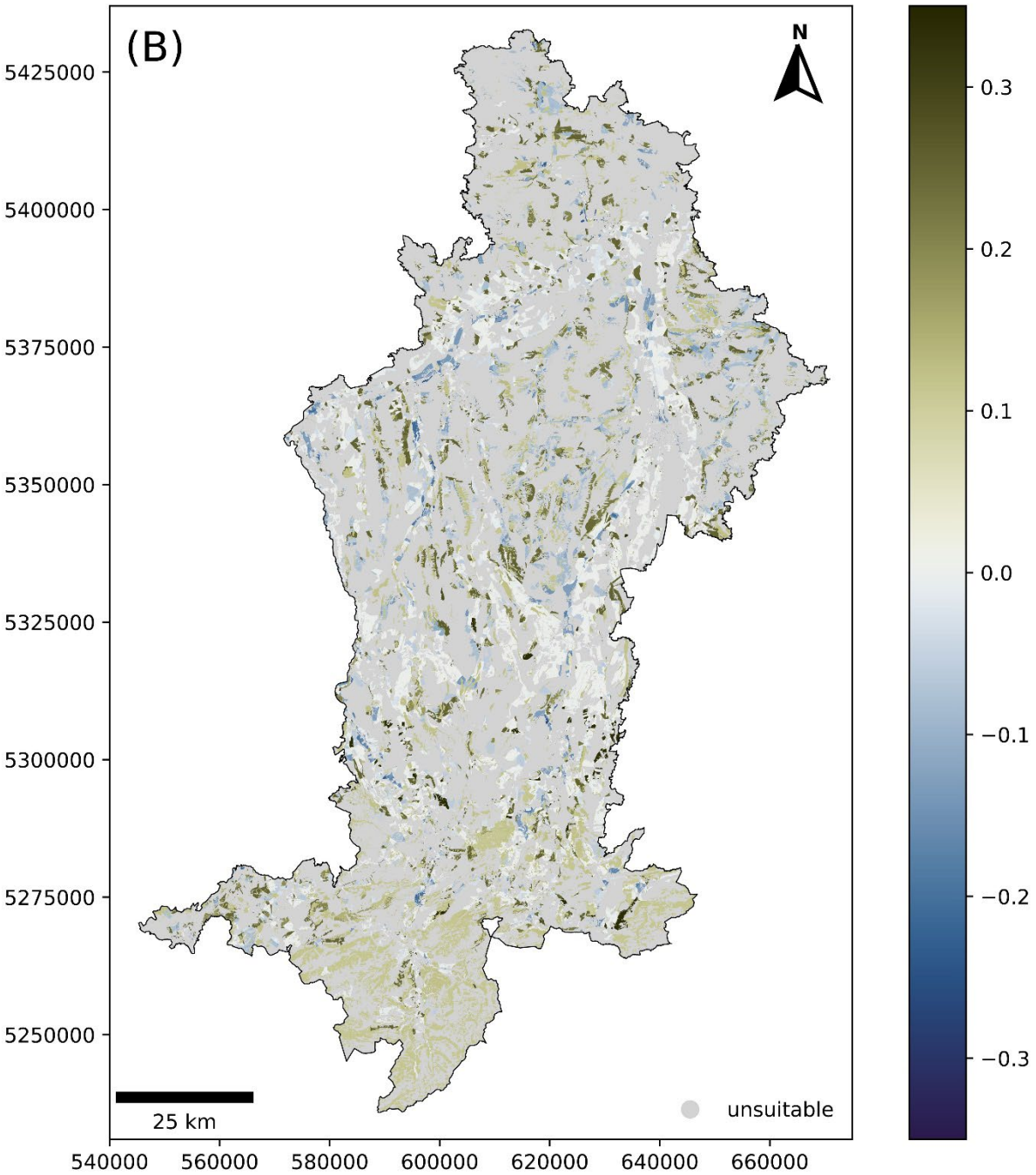

Figure 13 Difference map for the aquifer thickness criterion between the base map and the sensitivity analysis scenario excluding the respective criterion. Color map ranging from + 0.35 (higher suitable compared to base) to - 0.35 (lower suitable compared to base).

 https://doi.org/10.69631/ipjv1i2nr20

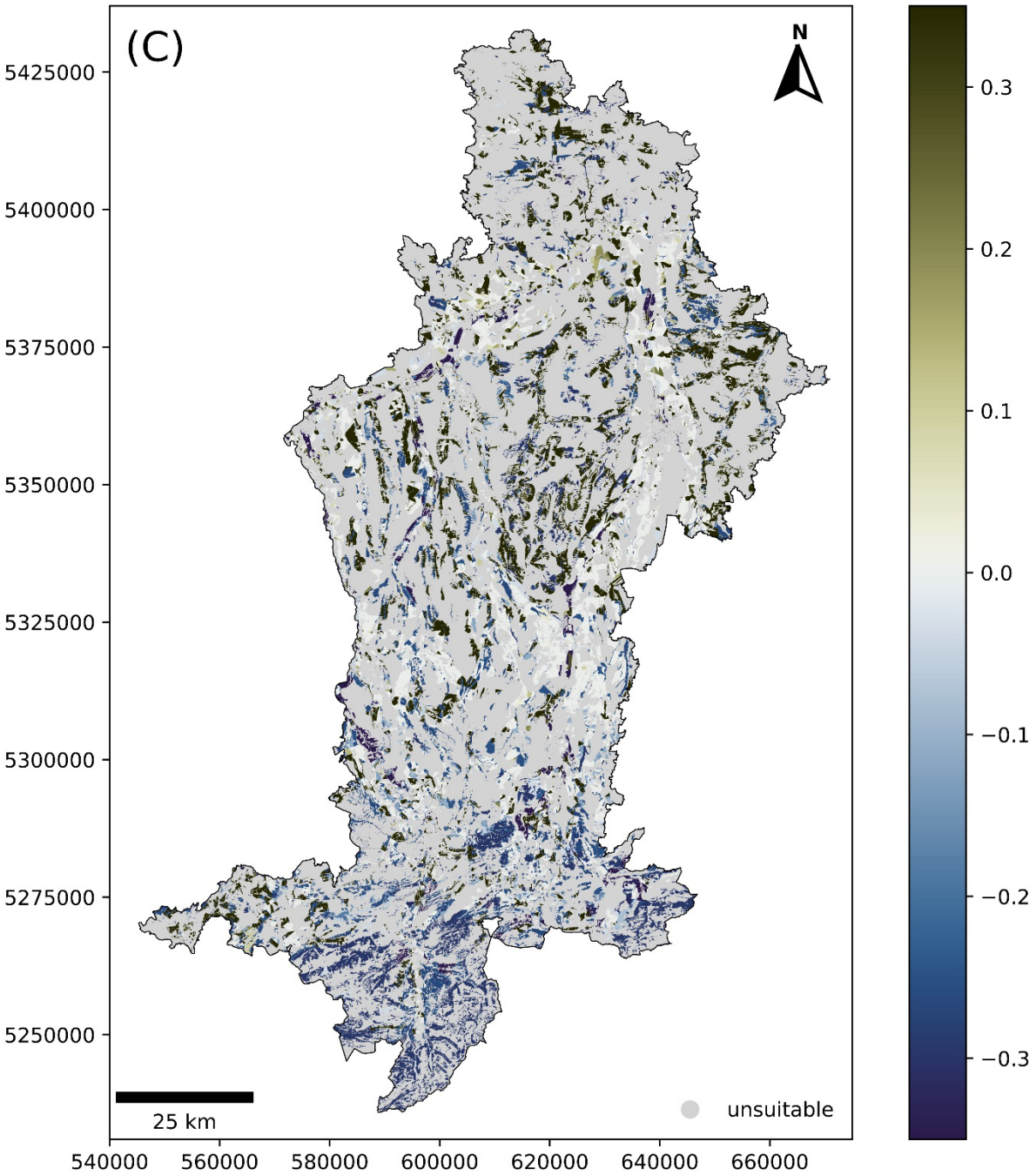

Figure 14 Difference map for the aquifer hydraulic conductivity criterion between the base map and the sensitivity analysis scenario excluding the respective criterion. Color map ranging from + 0.35 (higher suitable compared to base) to - 0.35 (lower suitable compared to base).

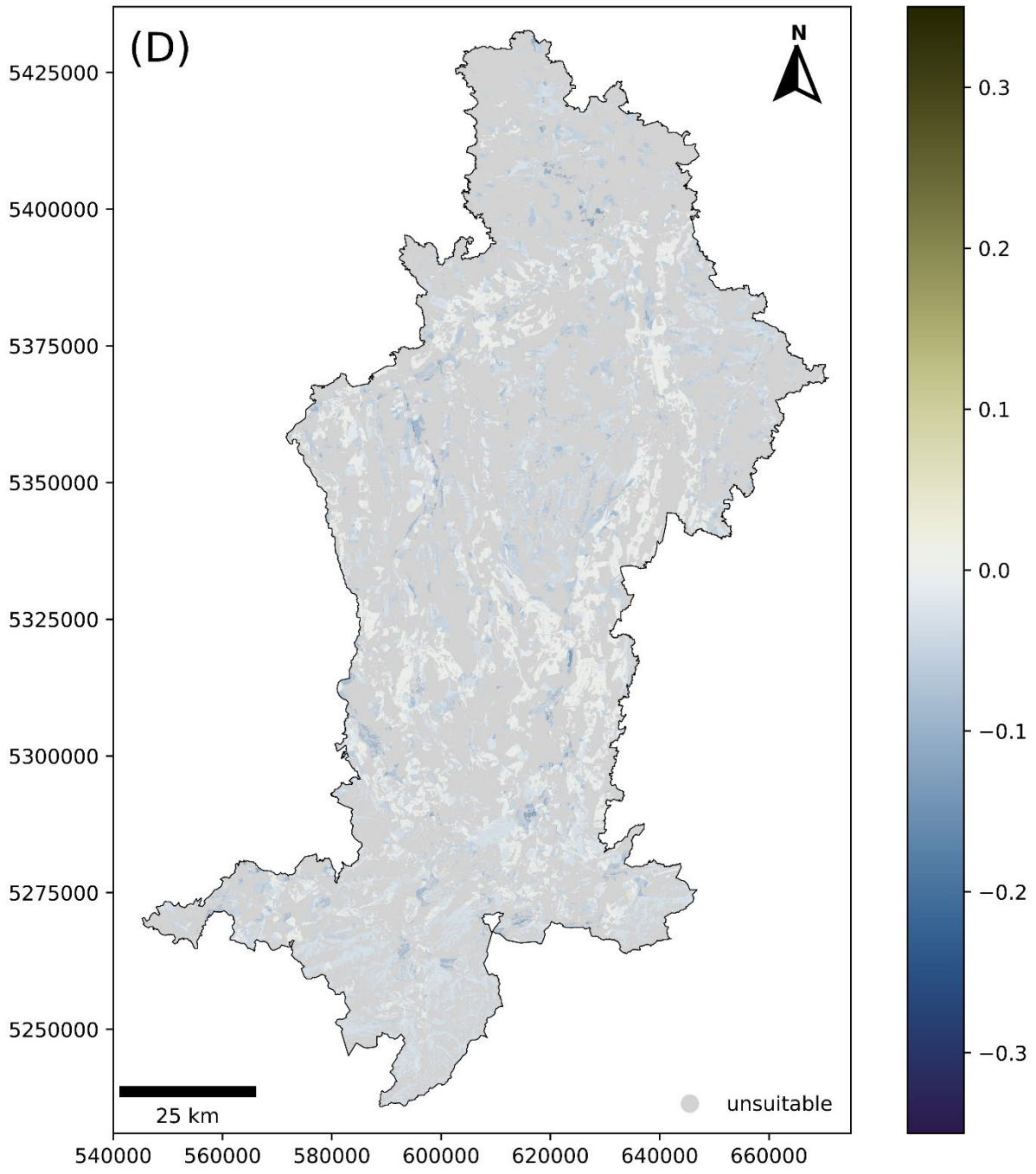

Figure 15 Difference map for the land use criterion between the base map and the sensitivity analysis scenario excluding the respective criterion. Color map ranging from + 0.35 (higher suitable compared to base) to - 0.35 (lower suitable compared to base).

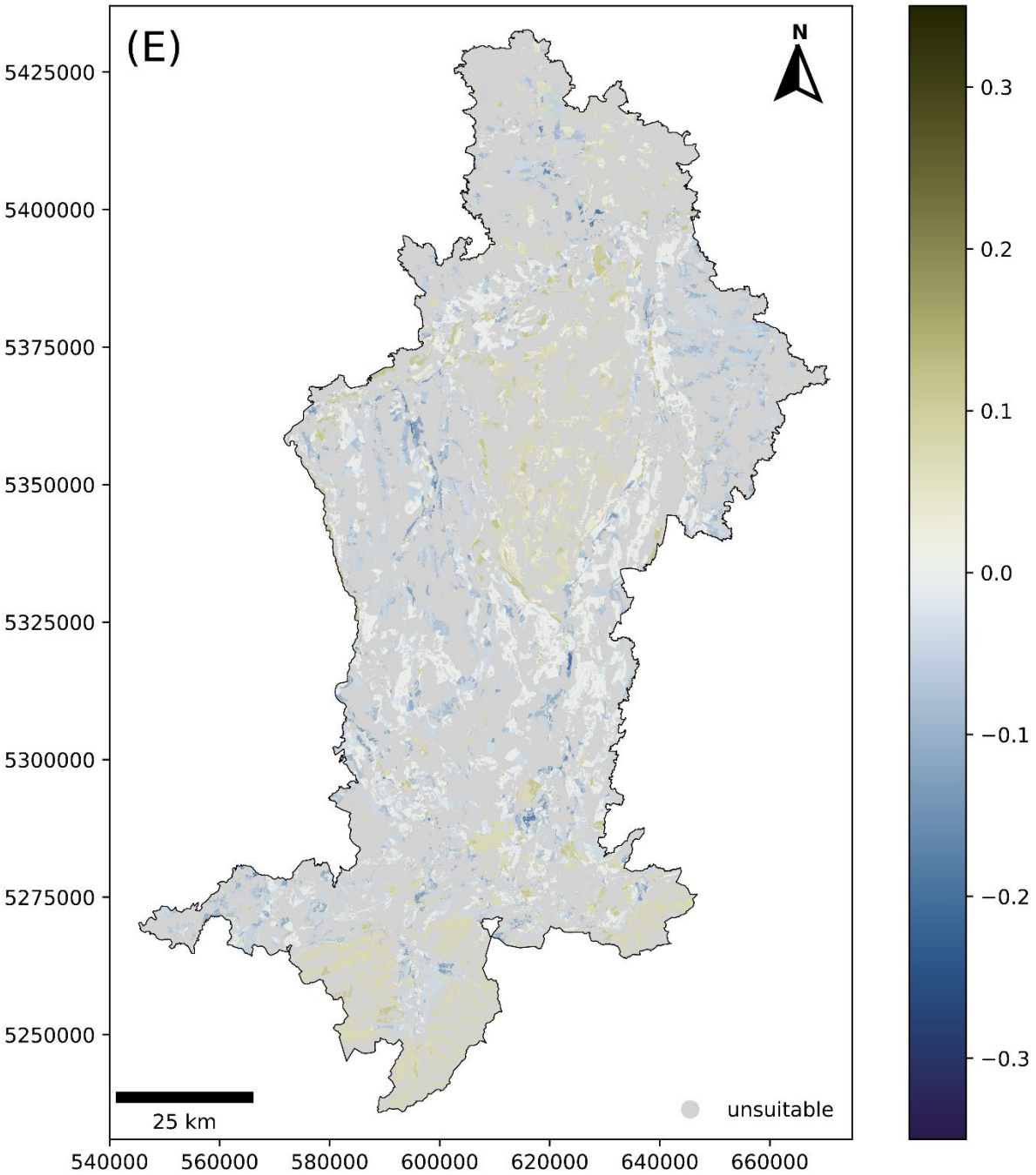

Figure 16 Difference map for the protected areas criterion between the base map and the sensitivity analysis scenario excluding the respective criterion. Color map ranging from + 0.35 (higher suitable compared to base) to - 0.35 (lower suitable compared to base).

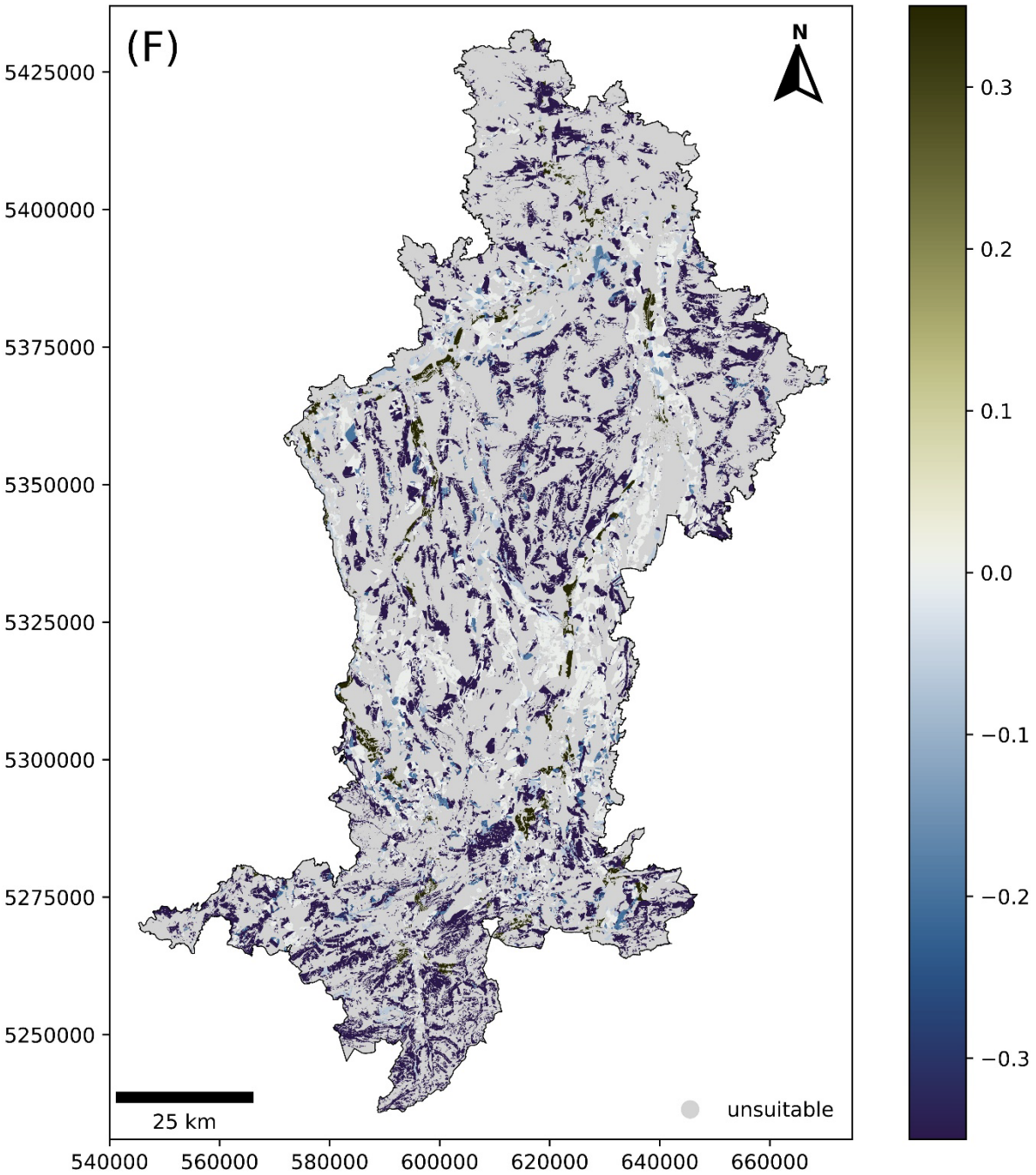

Figure 17 Difference map for the flood dynamics criterion between the base map and the sensitivity analysis scenario excluding the respective criterion. Color map ranging from + 0.35 (higher suitable compared to base) to - 0.35 (lower suitable compared to base).

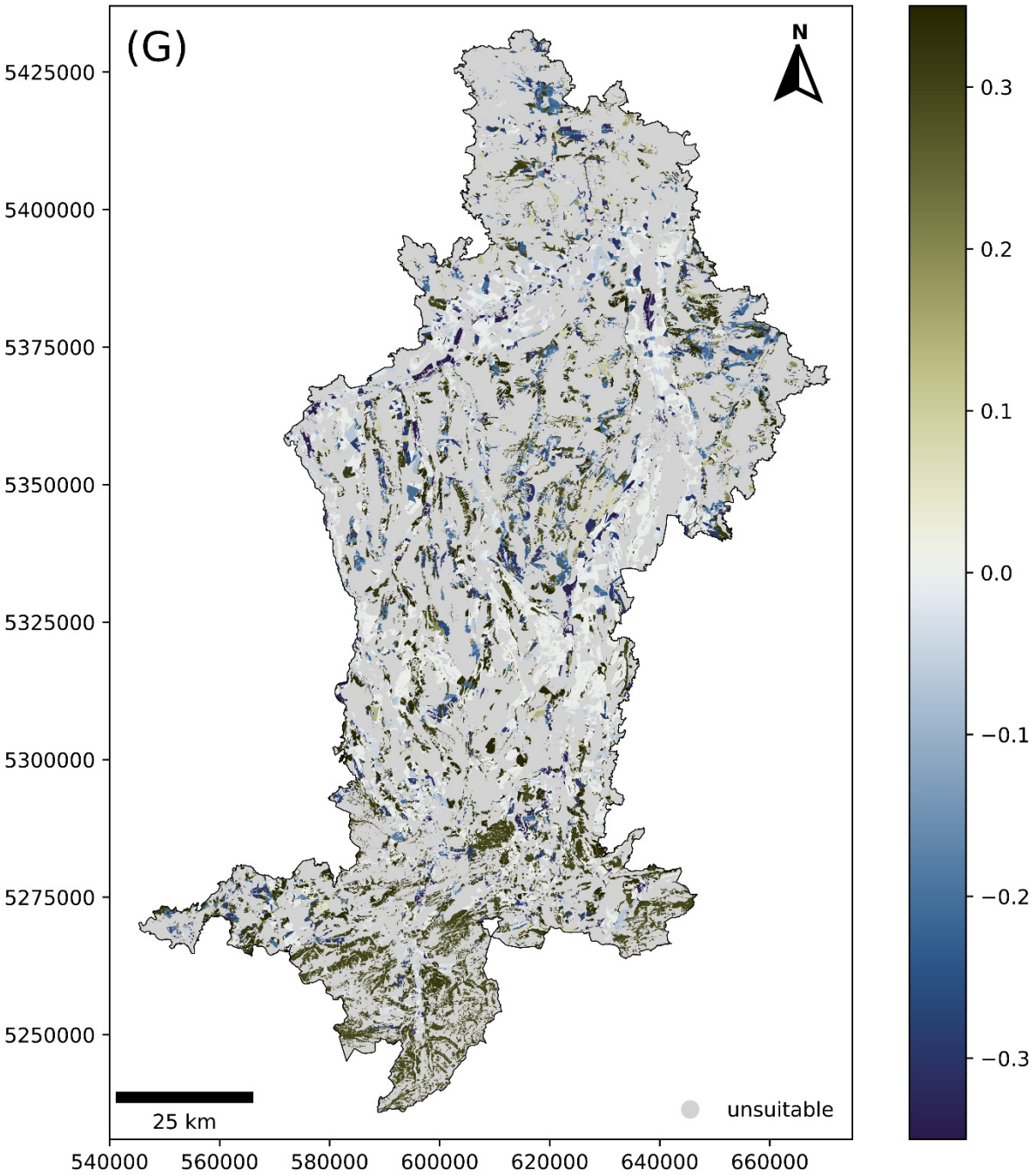

Figure 18 Difference map for the elevation from water level to groundwater level criterion between the base map and the sensitivity analysis scenario excluding the respective criterion. Color map ranging from + 0.35 (higher suitable compared to base) to - 0.35 (lower suitable compared to base).

REFERENCES

1. Bayerisches Landesamt für Umwelt. (2023). Digitale Geologische Karte von Bayern 1:25000. Retrieved April 5, 2024, from https://www.lfu.bayern.de/geologie/geo_karten_schriften/dgk25_uab/index.htm
2. Voges, A., Toloczyki, M., Zitzmann, A., Wittekindt, H., & Trurnit, P. (2006). Geological Map of Germany 1:1000000. Retrieved April 5, 2024, from https://gdk.gdi-de.org/geonetwork/srv/api/records/1C60DDA9-EF73-47B9-9ED7-FCD22B3226C1