

The Austrian Minerals Plan EU best practice

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Intro

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- ▶ Mineral resources are the basis for our industrial production and infrastructure development and maintenance
- ▶ Sufficient supply with mineral resources is an indispensable fundament for functioning and successful economies
- ▶ > 30 million jobs in the EU depend on the availability of raw materials
- ▶ Although the geological availability of raw materials is currently regarded unproblematic, yet shortages due to political (trade and geopolitical) factors and social demands are recorded

Intro

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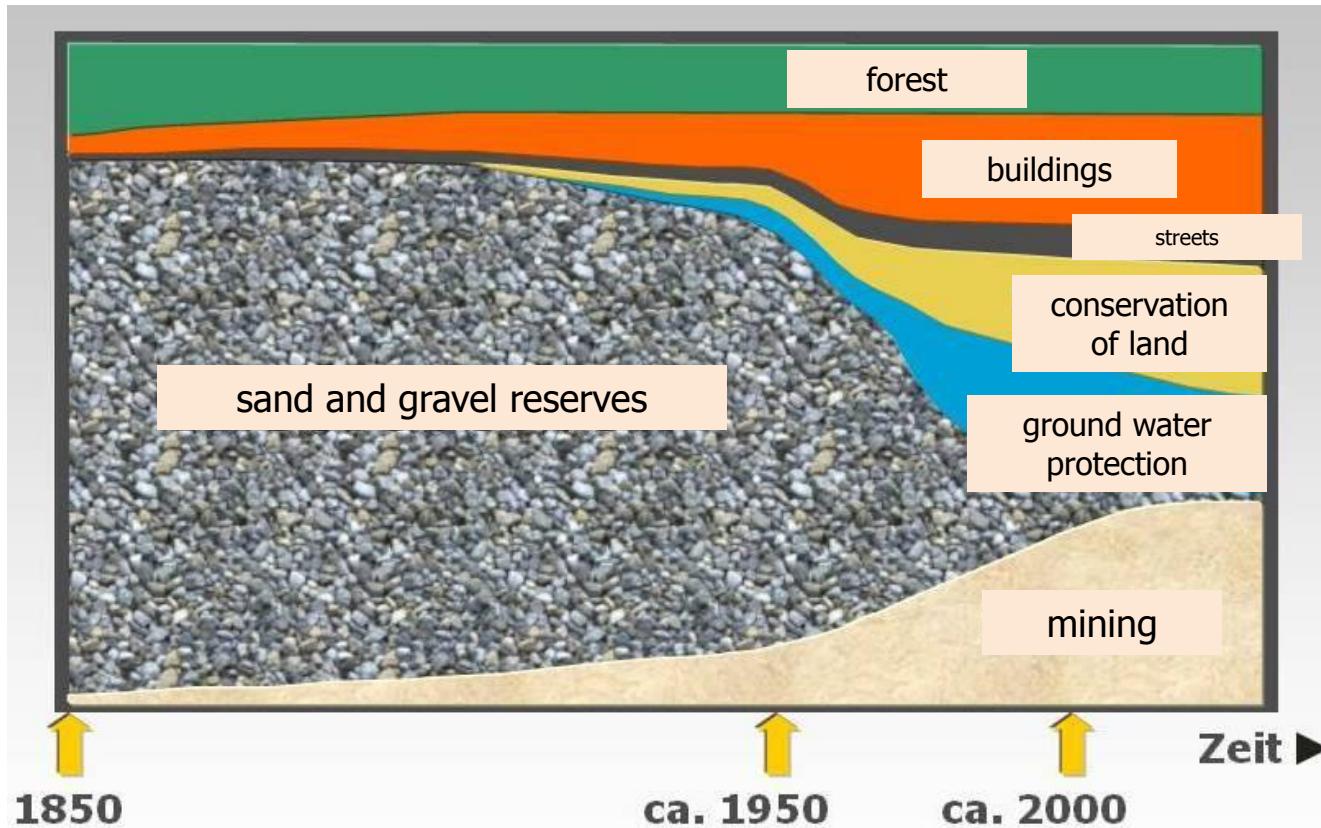
- ▶ finiteness of mineral resources
- ▶ site-dependency of mineral extraction

Main problem = access to deposits

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BGR (2008)

Examples for competing land claims

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EU (28)*	No.	km ²	% of country
Natura-2000	26.410	787.767	18

Austria	No.	km ²	% of country
Nature reserves (protected areas)**	1332	35.833	27

* http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm
** Quelle: Umweltbundesamt: Umweltsituation in Österreich – 10.Umwelt-Kontrollbericht 2013; overlaps substracted

Austria	No.	km ²	% of country
Forest roads*	ca. 260.000 km	1.040	1,20
Land requirem. for aggregate extraction (50 a)			0,14 – 0,2

* Quelle: www.wwf.de Erlebnisraum Alpen in Gefahr 14.3.2002;

- ▶ Resolution of Parliament E 106-NR/XXL GP of 21st November 2001
- ▶ "Federal Minister of Economy and Labour is invited to work out an Austrian Minerals Plan, which documents the deposits of mineral resources required.... (in a reasonable time)
- ▶ On the basis of this documentation a plan covering the whole nation has should be elaborated, in relation to the specific demand of the countries and communities. This plan should be a future basis for extraction permits."

Institutions on board

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- ▶ Lead BMWFW (BMWA, BMWFJ)
- ▶ Fed. Ministry of Agriculture, Forestry, Environment and Water Management
- ▶ Provinces (land use managm. authorities, geol. experts, water managm. authorities)
- ▶ Geol. Survey
- ▶ Universities (Leoben, Wien)
- ▶ Research organisations (Academy of Science, BVÖ)
- ▶ Advocacy, Mining Associations (S&K, B&S)
- ▶ Chamber of Commerce, Labour Assoc.
- ▶ NGO`s (WWF)

Phase 1:

baseline

WG 1	Geology and resources	(GBA)
WG 2	Mining, Mineral Economics	(MUL)
WG 3	GIS implementation	(BMWFW)
WG 4	Security of supply	(BMWFW)

Phase 2:

Adjustment of the results with the provinces

Phase 1:

baseline

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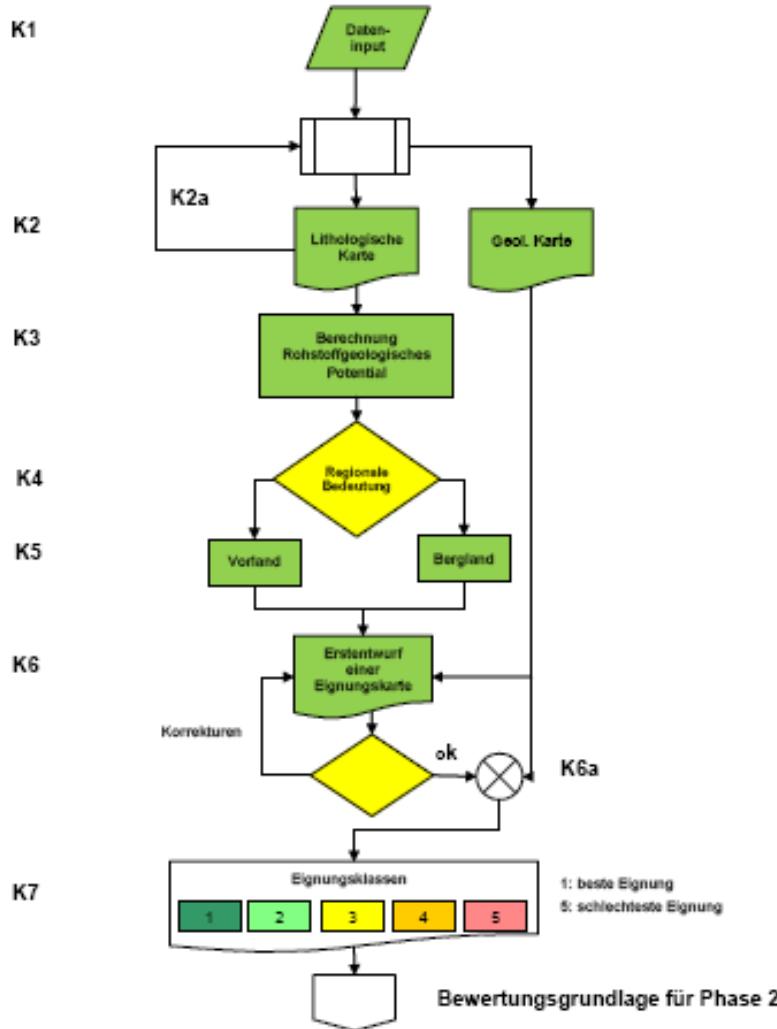
Evaluation scheme unconsolidated rocks

WV

Phase 1 - Ressourcenerhebung und Evaluierung:
Kiessande



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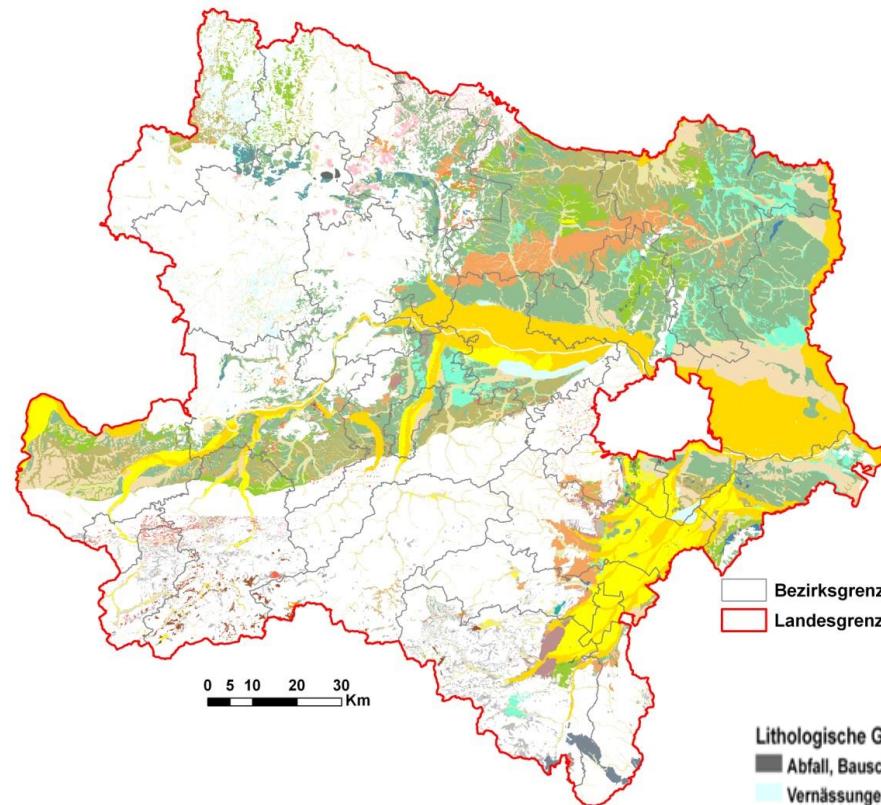


Lithological map of unconsolidated rock

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Lithologische Gliederung

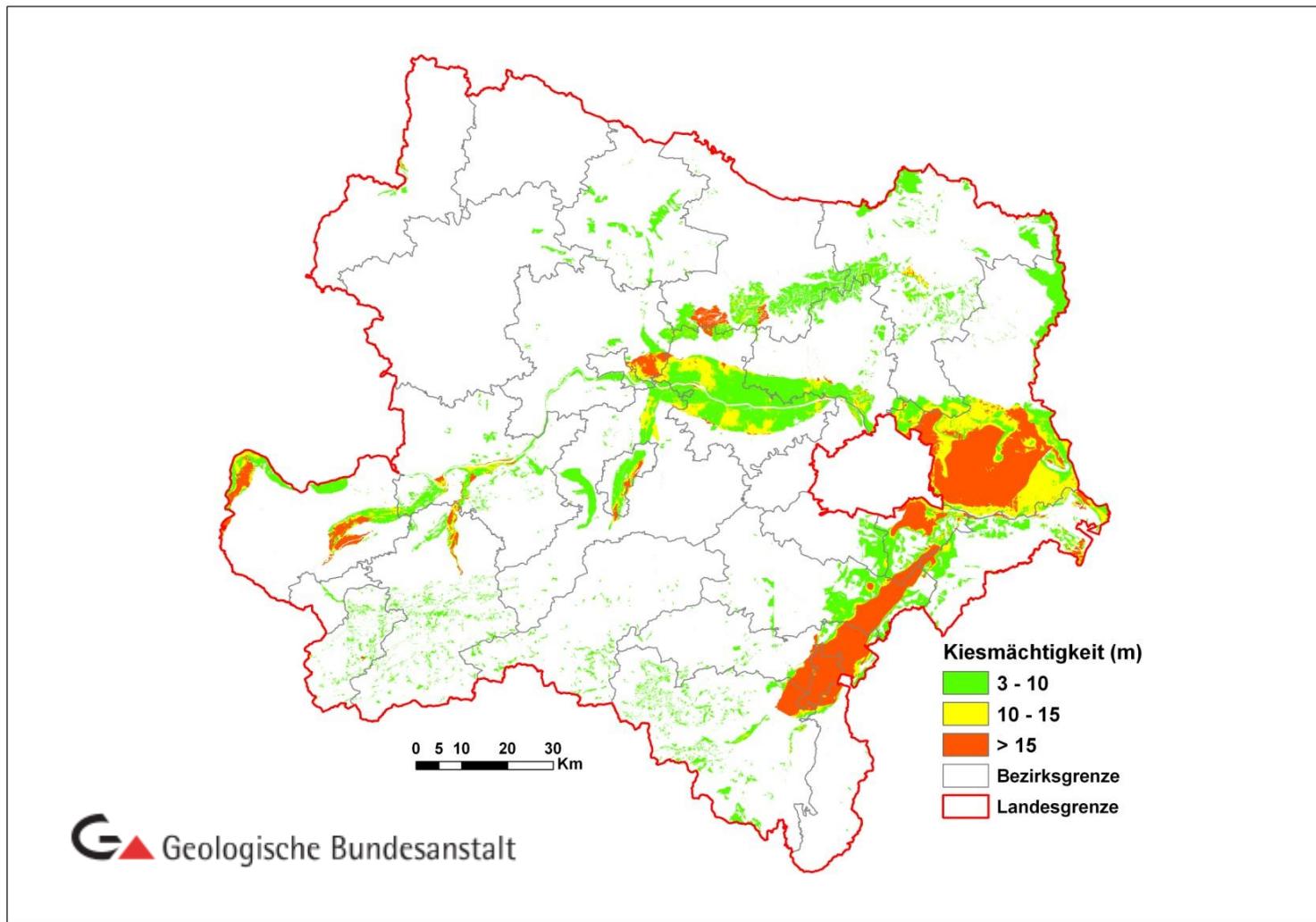
- Abfall, Bauschutt, Gesteinsbruchstücke variabler Zusammensetzung, Bergbauhalden
- Vernässungen, Sümpfe, Moore
- Massenbewegungen undifferenziert, Gleitschollen, Rutsch- und Sackungsmassen
- vorw. Grobkorn und Sand, gut sortiert, regional verfestigte Lagen: letztkaltzeitliche Schotterterrassen
- Grobkorn, gerundet; z.T. Sand, meist gut sortiert; regional Feinkornbedeckung (Aulehme); jüngste Talfüllungen breiter Täler
- vorw. Grobkorn, variable Rundung und Sortierung; z.T. Sand; regional Feinkornbedeckung (Aulehme); jüngste Talfüllungen schmaler Täler
- vorw. Grobkorn, gerundet, meist sandig, meist sortiert, z.T. verfestigt: neogene Grobsedimente

Evaluation of thickness

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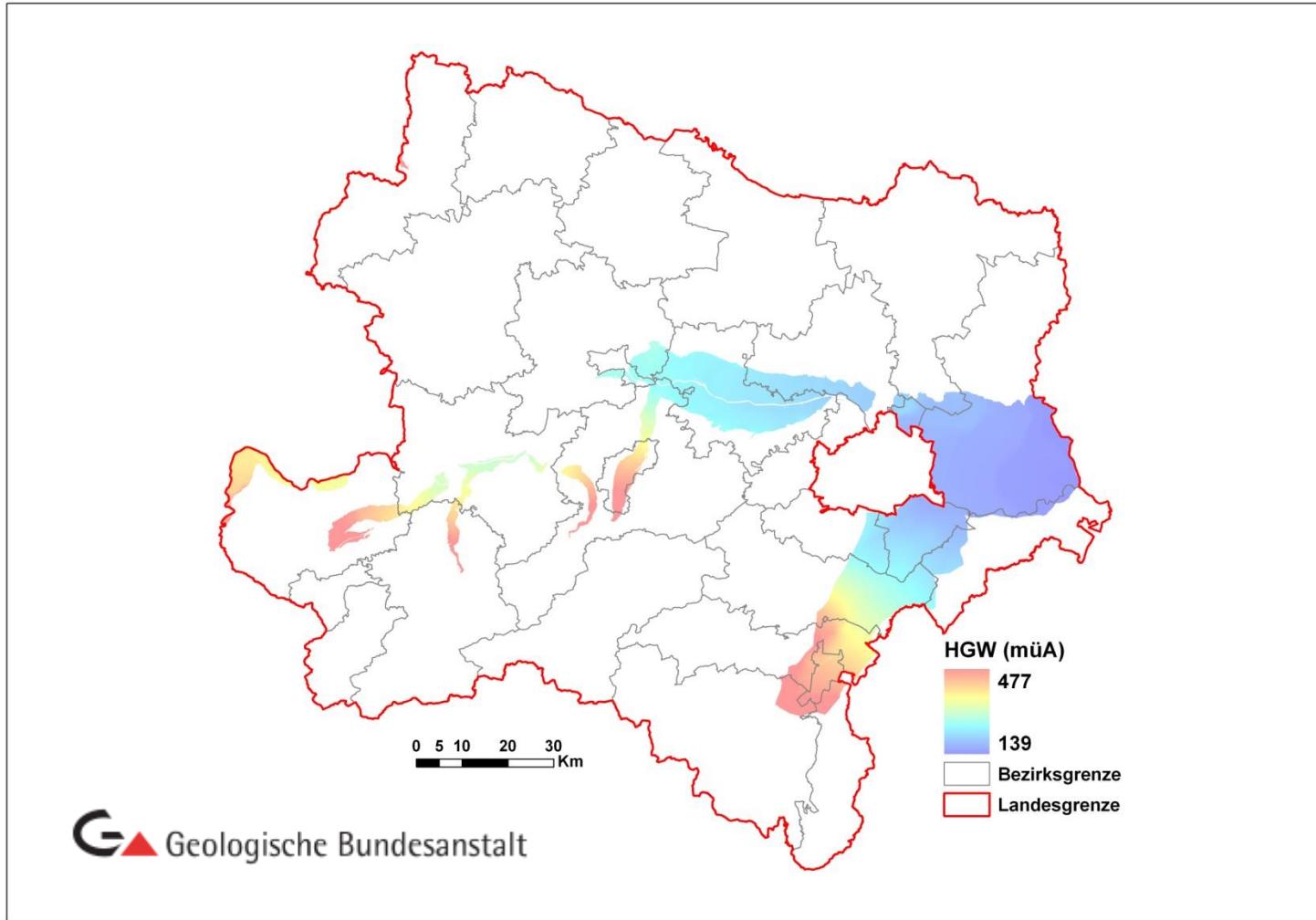


Identification HGWs

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Assessment of quality

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	Lithology	Use	Geol. representative
A	Well-washed gravels and sands without significant proportion of fines, loose	Concrete, Construction sand after sieving	Lower terraces, partly alluvial zones of large valleys
B	Gravels and sands partly with higher fines content, loose, partly consolidated/cem. gravels and sands	Concrete, Construction sand after sieving and ev. crushing	Lower terraces, high-terraces, alluvial zones of smaller side valleys, alluvial fans
C	Gravels and sands with high fines content, usually loose	Embankments, concrete after complex processing	High-terraces (brittle grains, friable agglom., Fe-content), interbedded with tertiary strata
D	Gravels and sands with high fines and blocks content	Embankments	Blocky gravel, blocky debris
E	Diamikton (mixture of clay, silt, sand, gravel and blocks)	Partly for embankments after processing, improper for use with high fines content	colluvium, solifluction layer

Assessment of quantity

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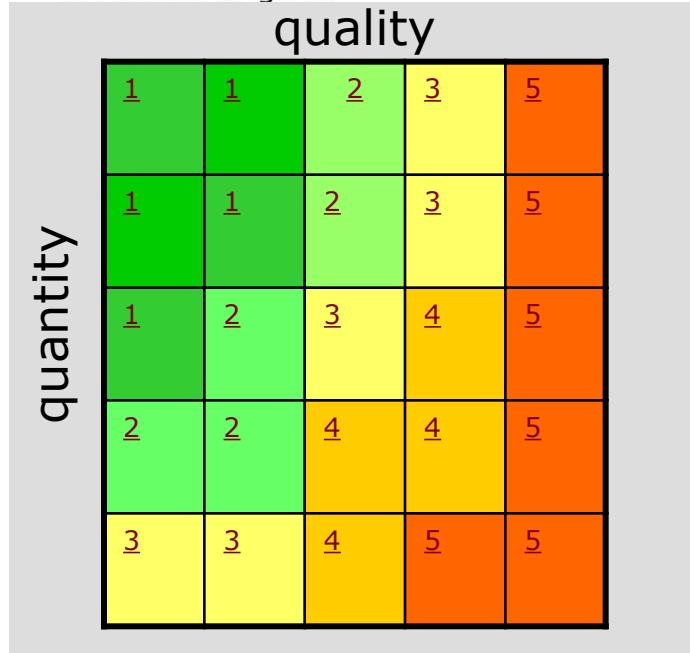
	Area (A)	Thickness (M)
AMM	> 1 km ²	> 10m
AM	> 1 km ²	> 3m
aM	< 1 km ²	> 3m
Am	> 1 km ²	< 3m
am	< 1 km ²	< 3m

Matrixcalculation

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Step 4: Matrix assessment
quality vs. quantity
(=productivity)

Assessment of regional importance

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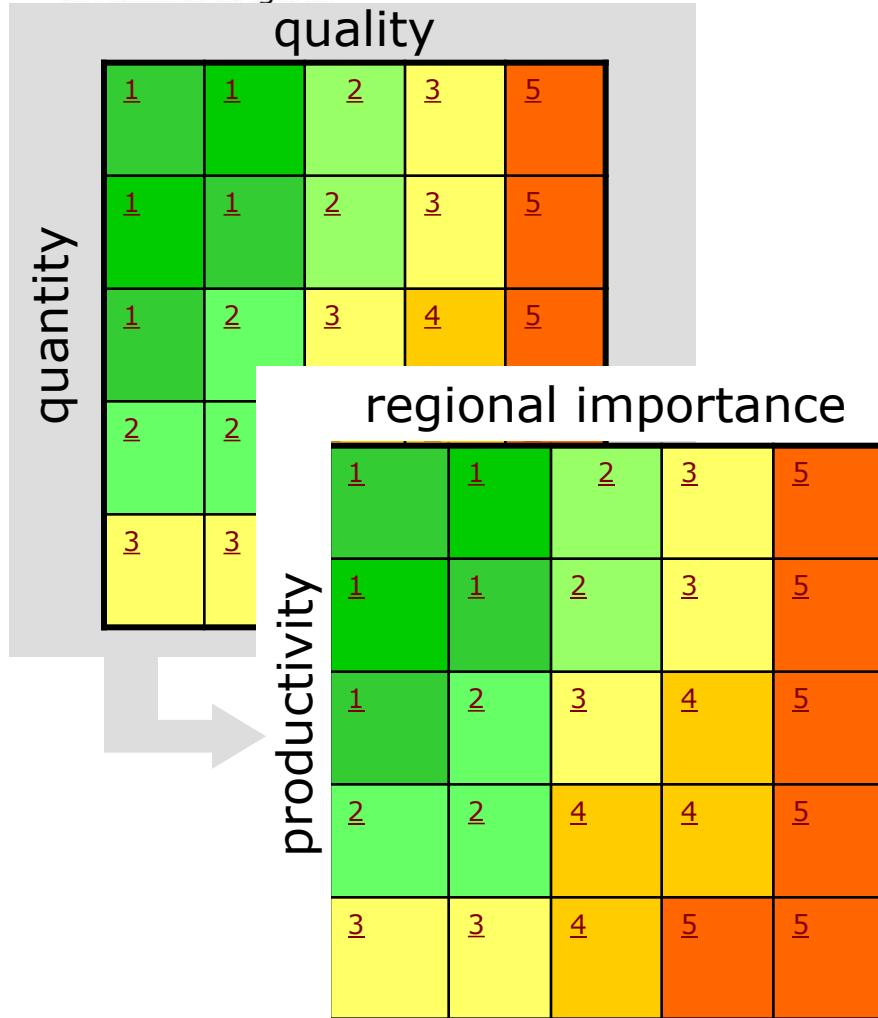


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	Importance (alpine foreland)	Mining sites
a	High (supraregional – regional)	many, large, active
b	High (regional – local)	few, active
c	Medium	some, inactive
d	Medium - low	few, inactive
e	Low	no sites known, geol. indications

Matrix calculation

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Step 4: Matrix assessment
quality vs. quantity
(=productivity)

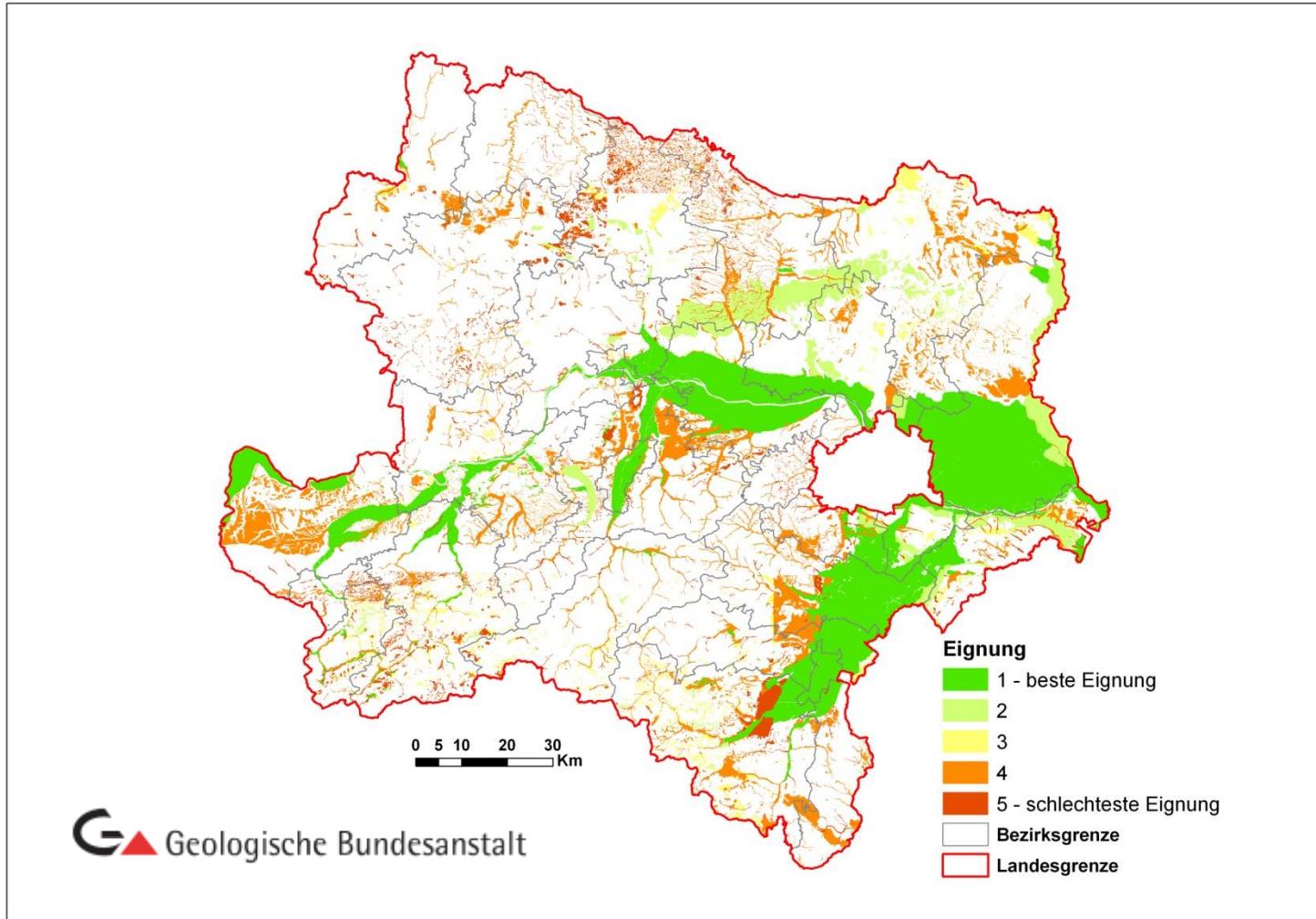
Step 6: Matrix assessment
productivity vs. regional
importance
(5 classes of suitability)

Suitability zones 1 - 5

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Phase 1:

AK 1	Geologie	(GBA)
AK2:	Bergwirtschaft	(MUL)
AK3:	GIS	(BMWFJ)
AK4:	Versorgungssicherheit	(BMWFJ)

Phase 2:

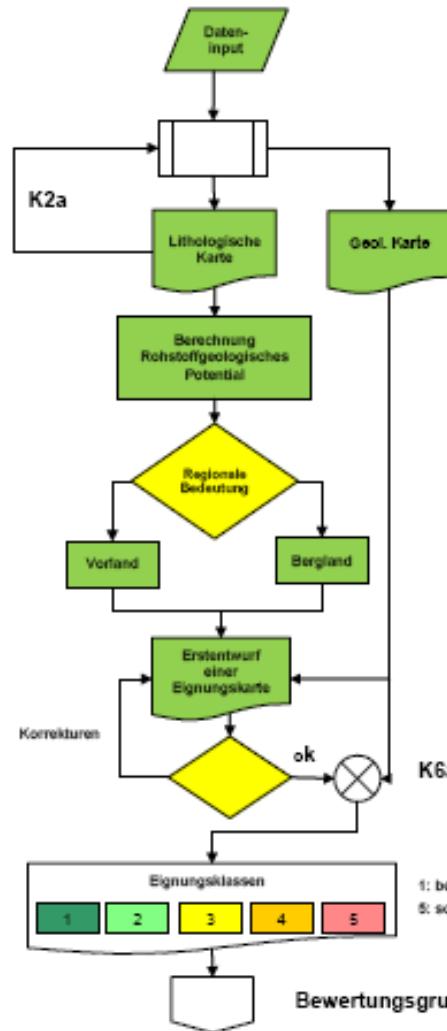
Adjustment of the results with the provinces

Evaluation scheme uncons. rocks

WV

Phase 1 - Ressourcenerhebung und Evaluierung: Kiessande

K1



K2

K3

K4

K5

K6

K7

Phase 2 - Kiessande Abstimmung mit den Bundesländern

K8

K8a

K9

K10

K11

K12

K13

K14



Ausscheiden von „Eignungsklassen“ 4,5

Weitere Beurteilung von Eignungsklassen 1,2,3

GIS - Verschneidung mit Konfliktgebieten Wasser, Boden, Verkehrswege, Naturschutz, Forst

K10d: Bei Konflikt mit wasserrechtlichen Schutzgebieten: Prüfung, ob zumindest Trockenbegrenzung möglich ist
K10a: Ausscheiden der Flächen, wenn mindestens eine Verbotszone betroffen ist

K10c: Ausscheidung

K10d: Weitere Verschneidung mit Konflikträumen (z.B. Natura 2000)

Residuarkarte

K12a: Volumetrierung der Klassendisketten
K12b: Bedarfsermittlung nach Region für mindestens 50 Jahre und spezifischem Pro-Kopfverbrauch

K13 a: Volumina nach Konfliktbereinigung ausreichend

K13 b: Volumina nicht ausreichend

Festgesteinswissen?

Feinabstimmung durch Raumordnung

Festgesteine: hochwertige Karbonate, Industrienährsteine, Tone, Erze, Energierohstoffe

Iterative Feinabstimmung (RO)

Konfliktbereinigte Rohstoffförderungsgebiete

Umsetzung durch die Raumordnungsbehörden der Länder

Einzelprüfung bei Konfliktflächen

K13c: ja
K13d: nein

Kompenstation durch Festgesteine

Iterative Feinabstimmung (RO)

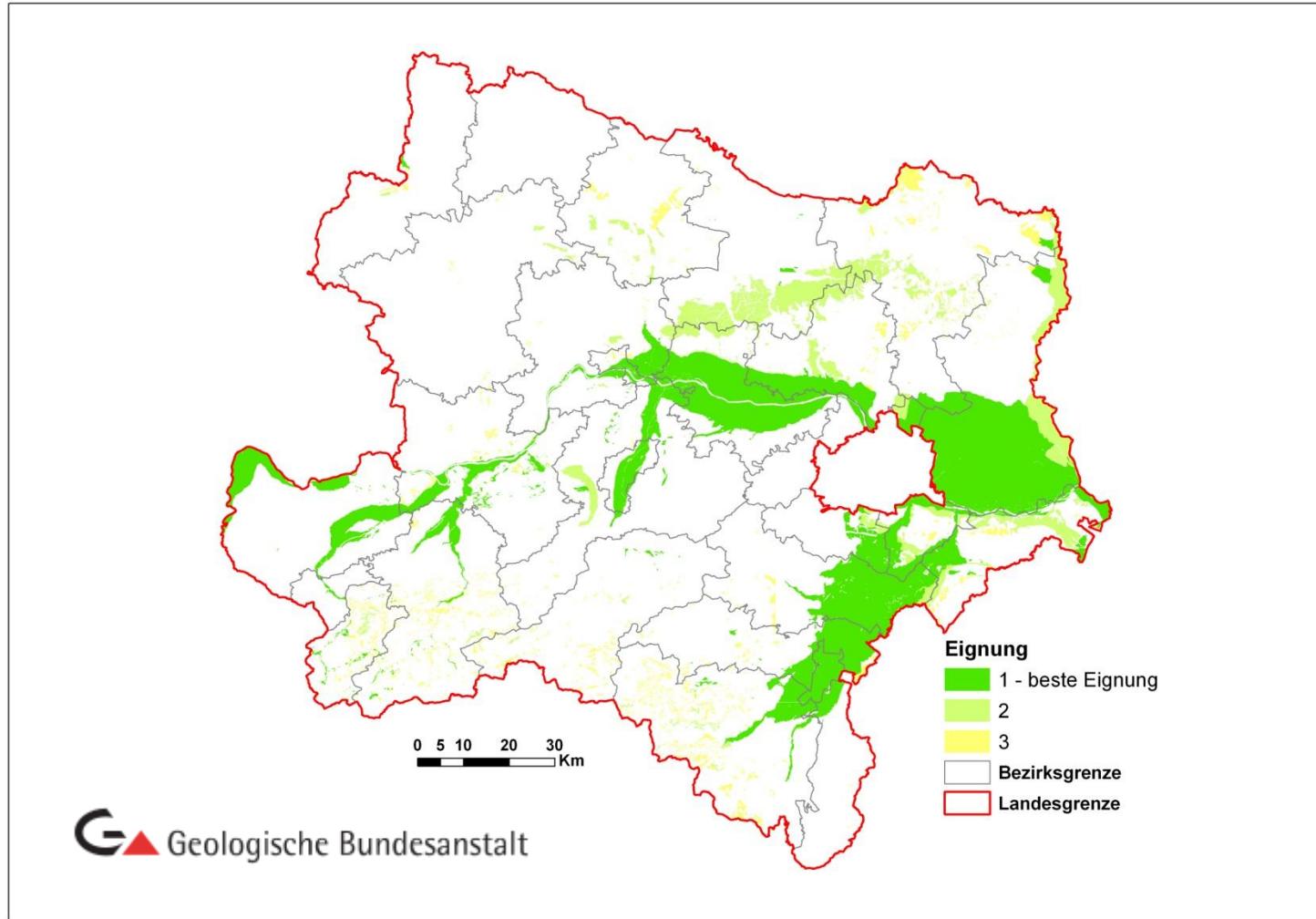
Bewertungsgrundlage für Phase 2

reduction to suitab. zones 1 - 3

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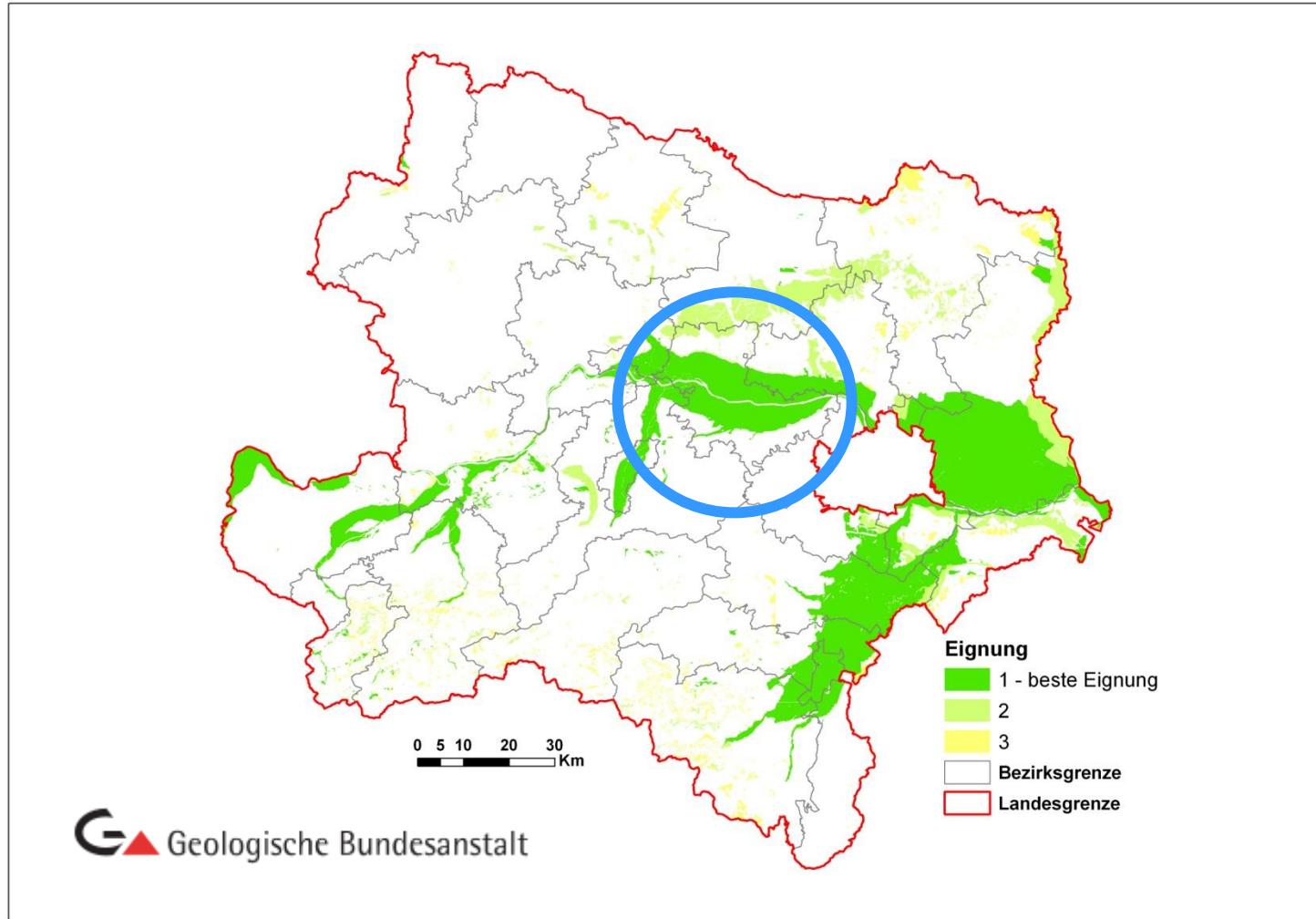


Conflict elimination e.g.: district of Tulln

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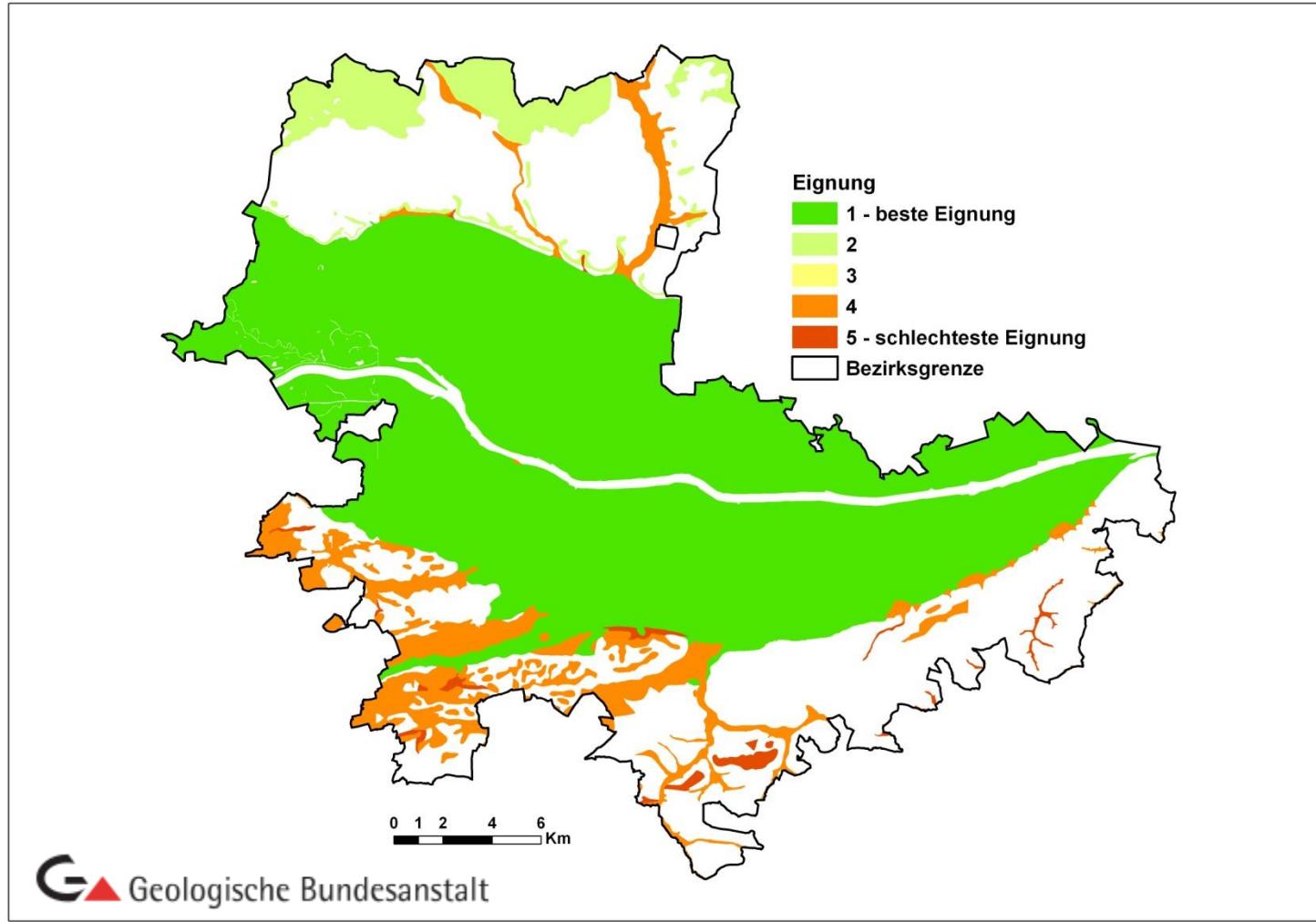
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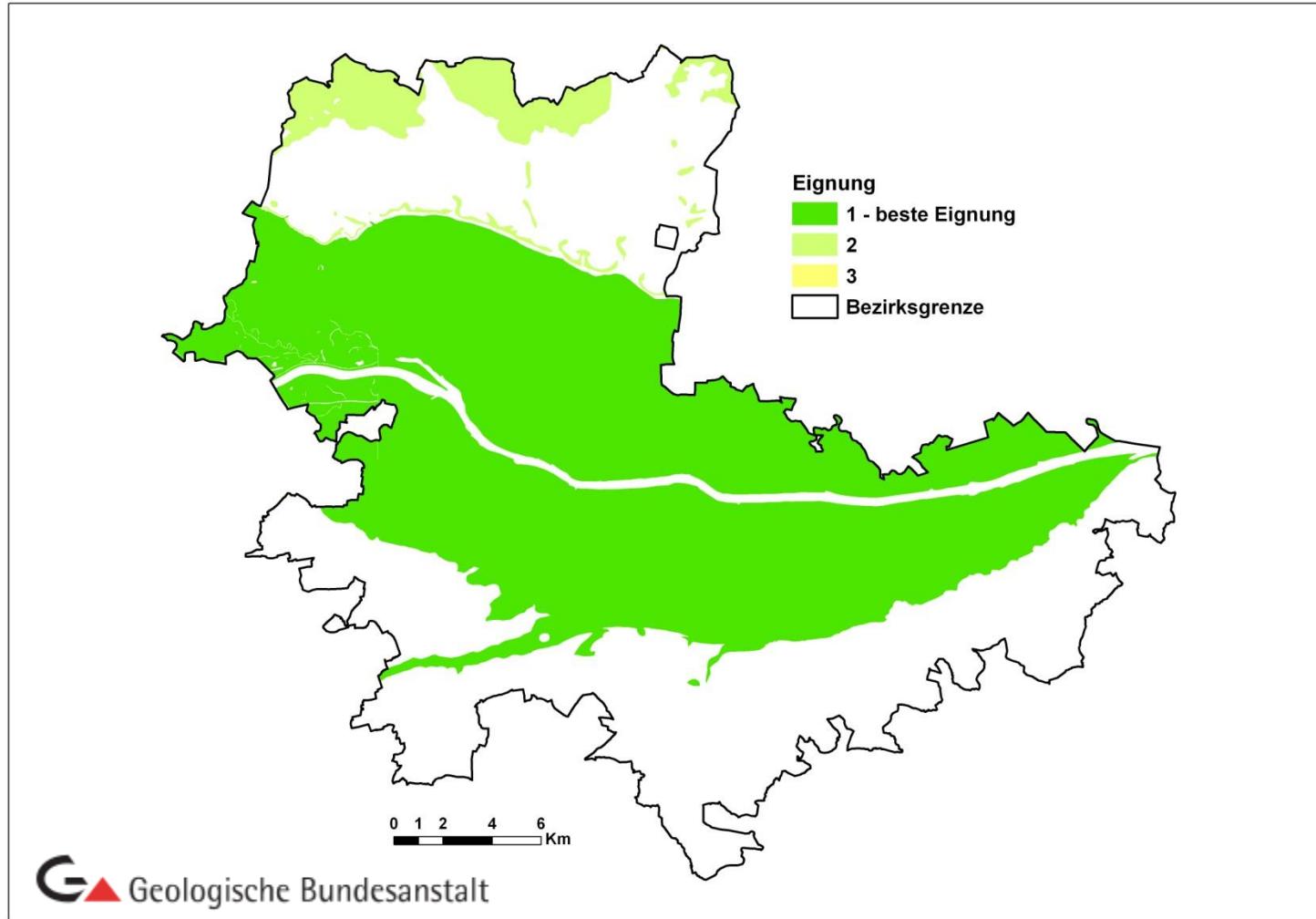
Conflict elimination e.g.: district of Tulln, suitab. class. 1 - 5

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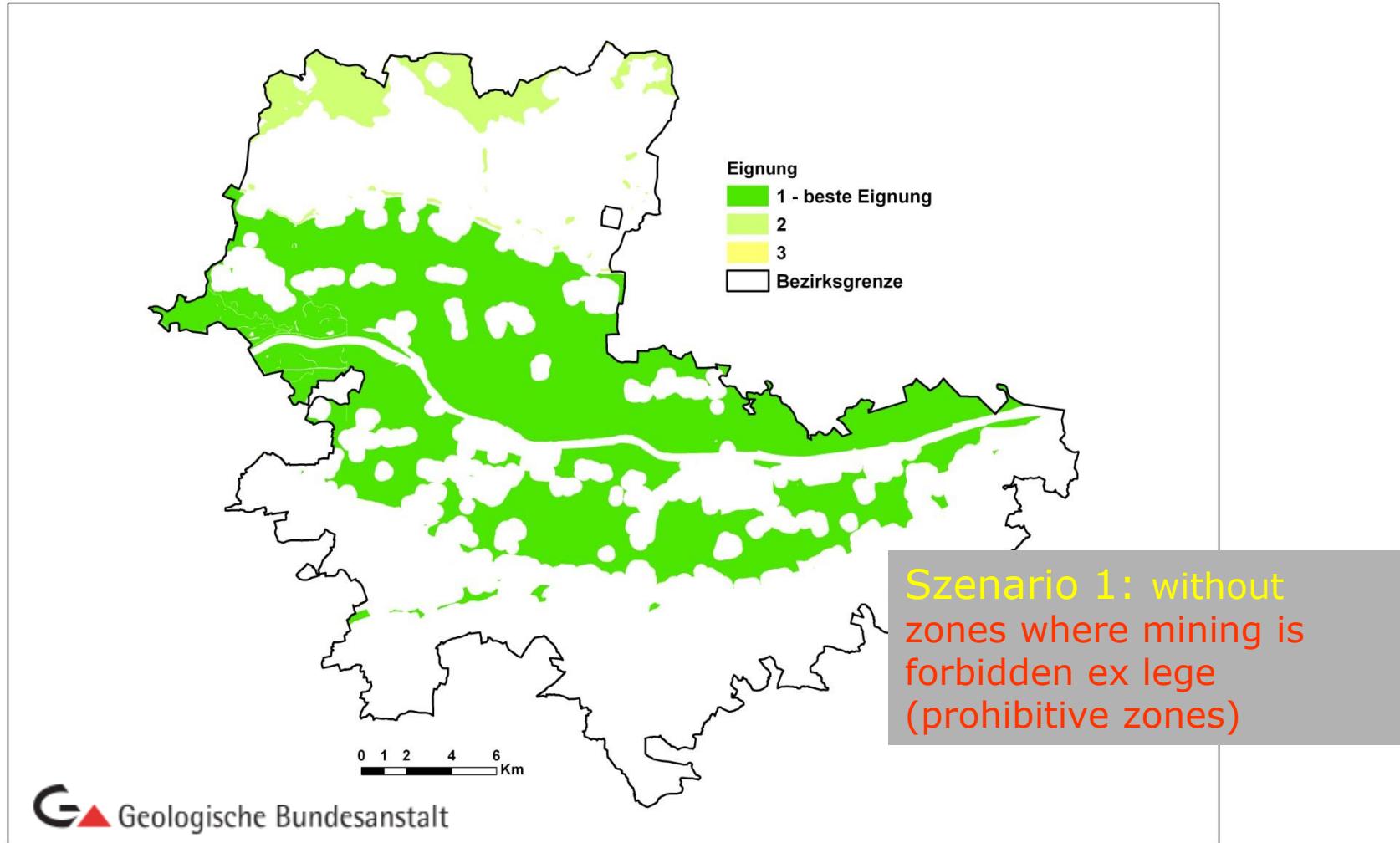
Conflict elimination e.g.: district of Tulln, suitab. class. 1 - 3

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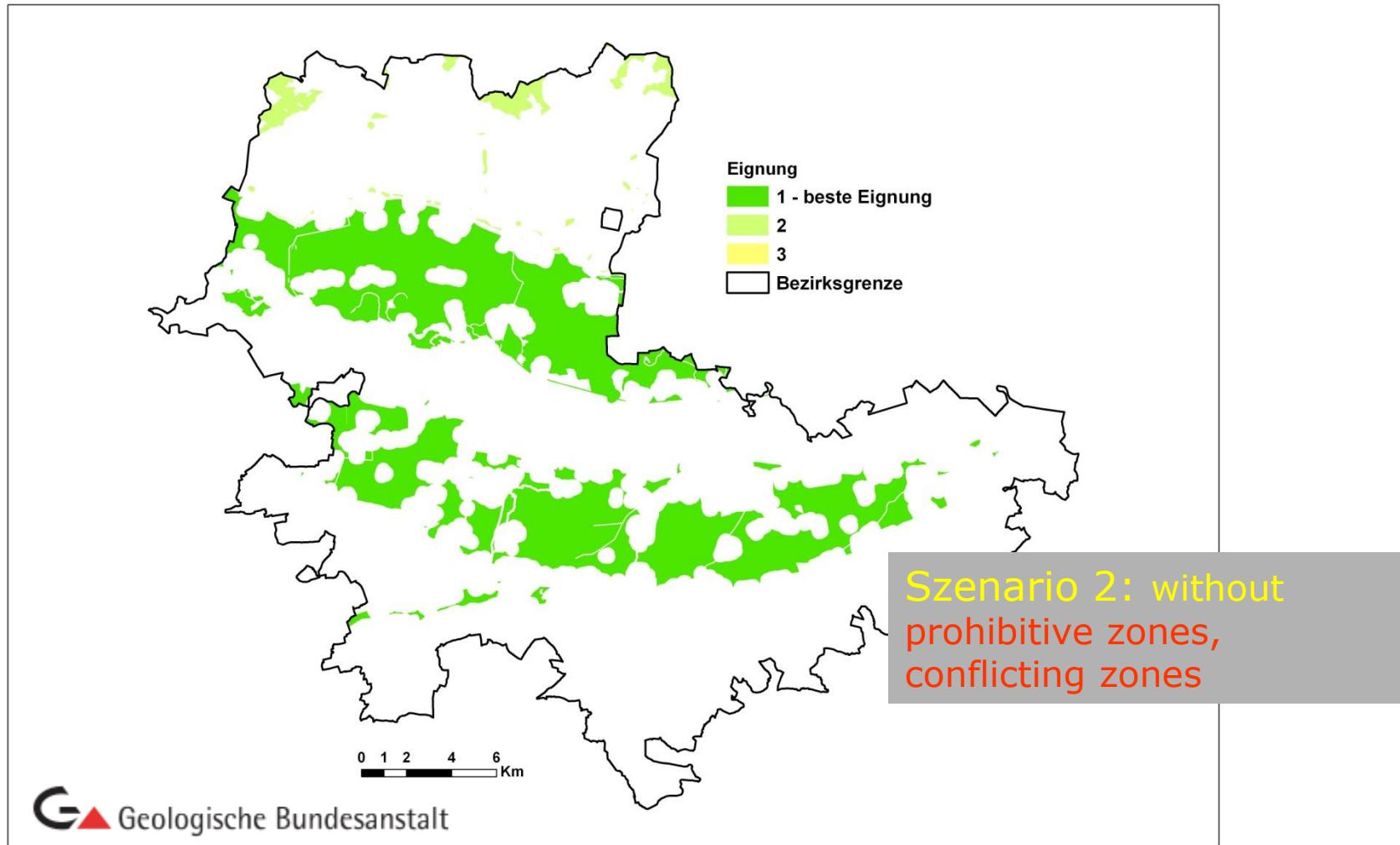
Conflict elimination e.g.: district of Tulln, suitab. class. 1 - 3

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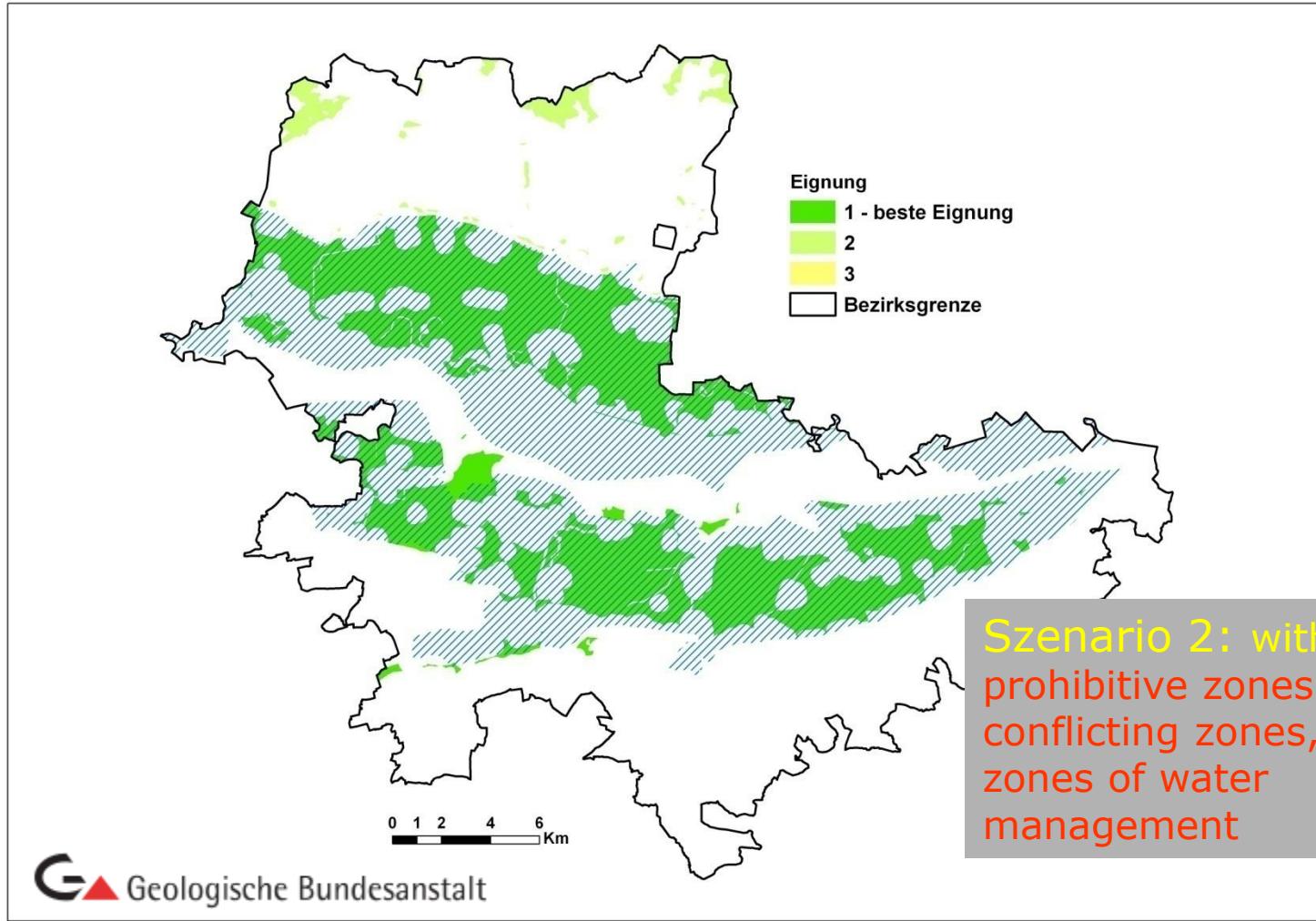
Conflict elimination e.g.: district of Tulln, suitab. class. 1 - 3

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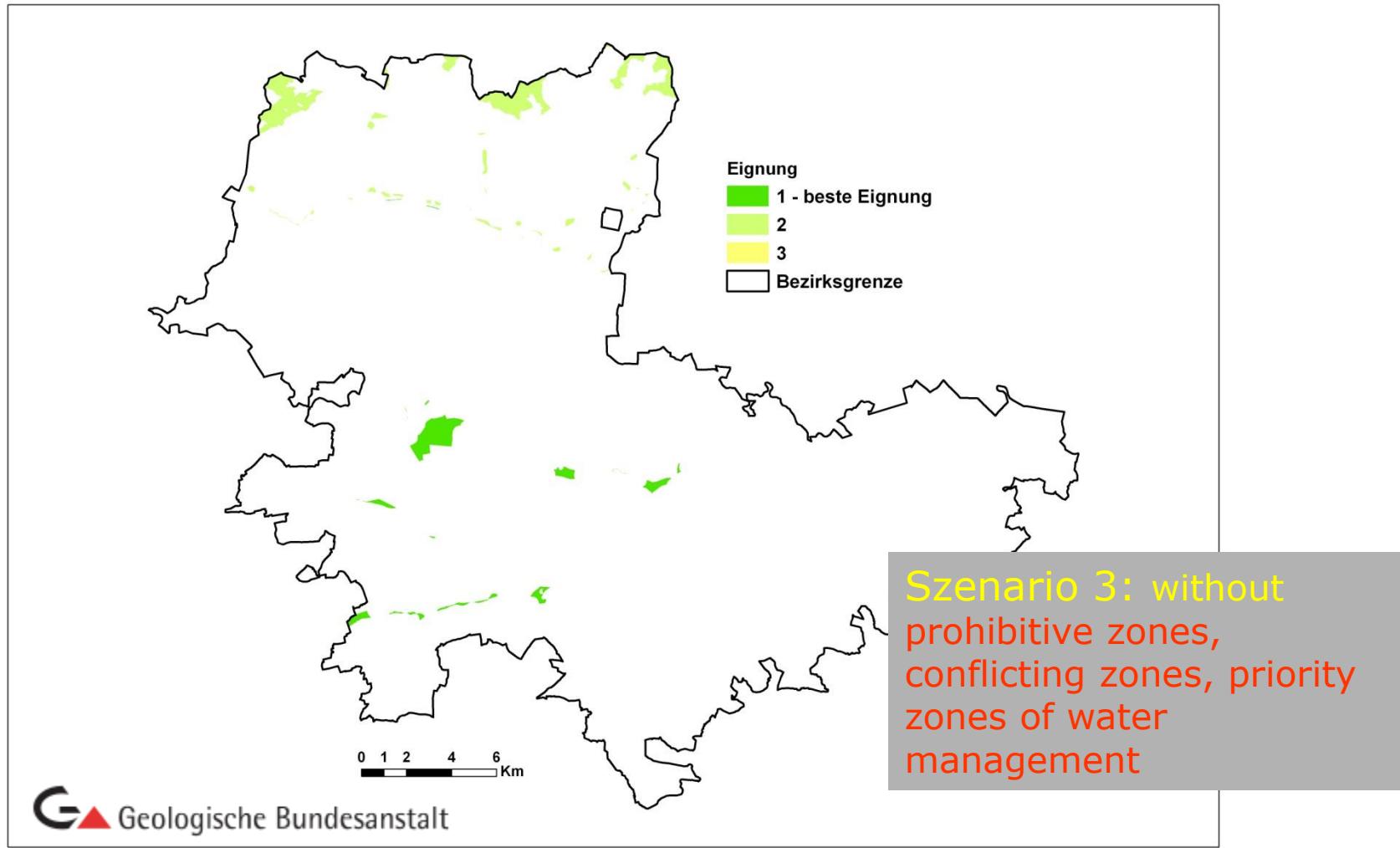
Conflict elimination e.g.: district of Tulln, suitab. class. 1 - 3

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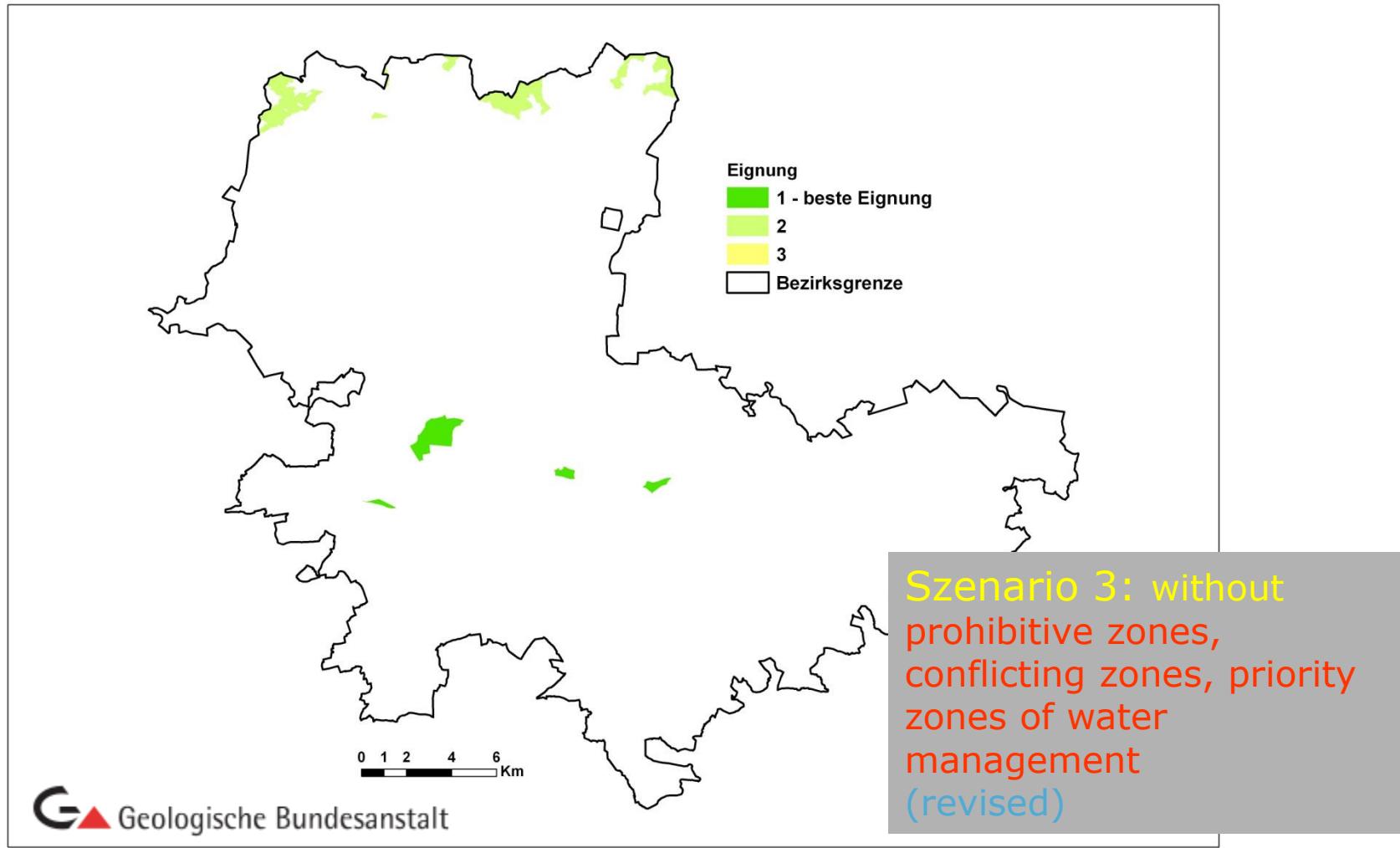
Conflict elimination e.g.: district of Tulln, residual zones

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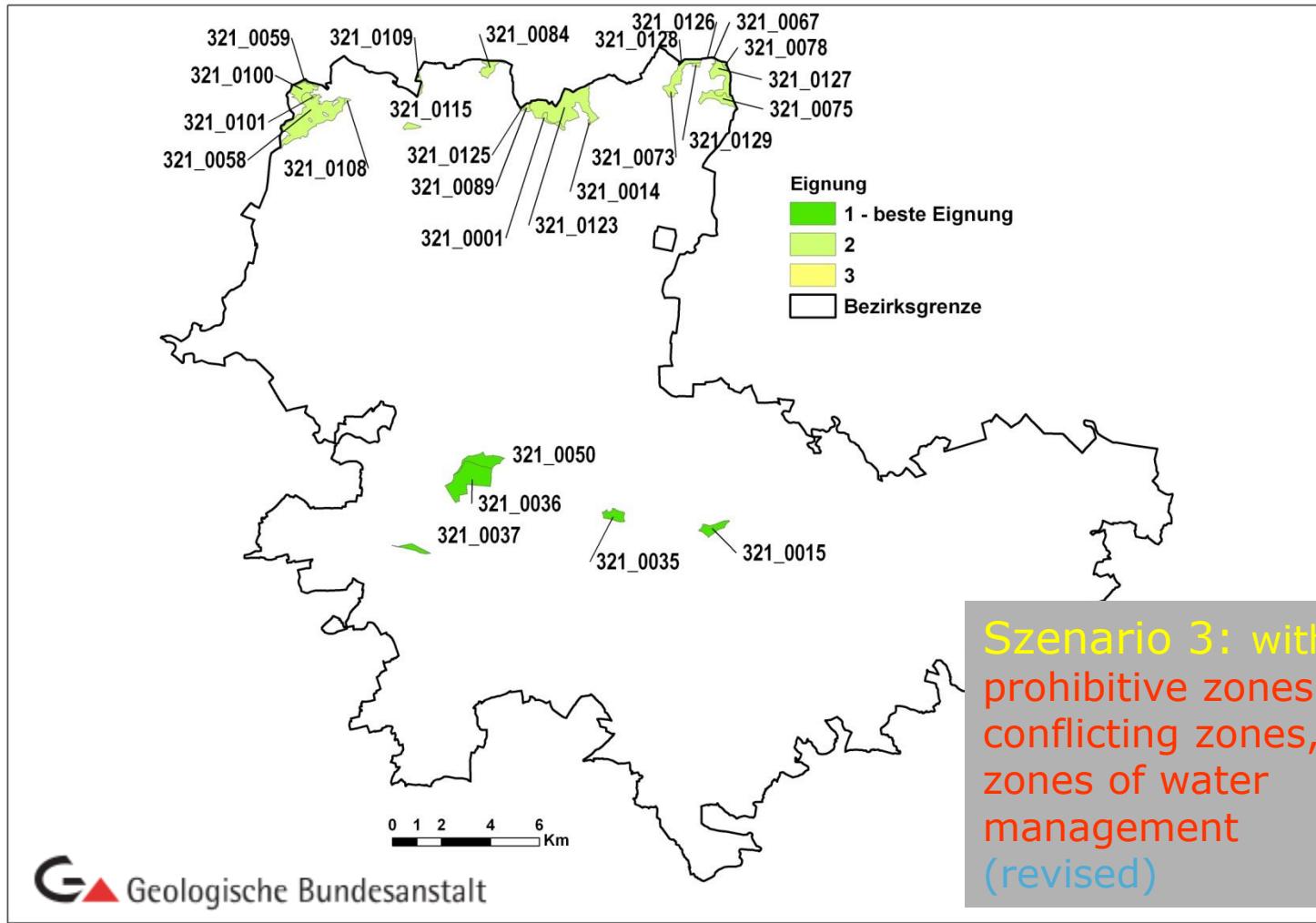
Conflict elimination e.g.: district of Tulln, residual zones

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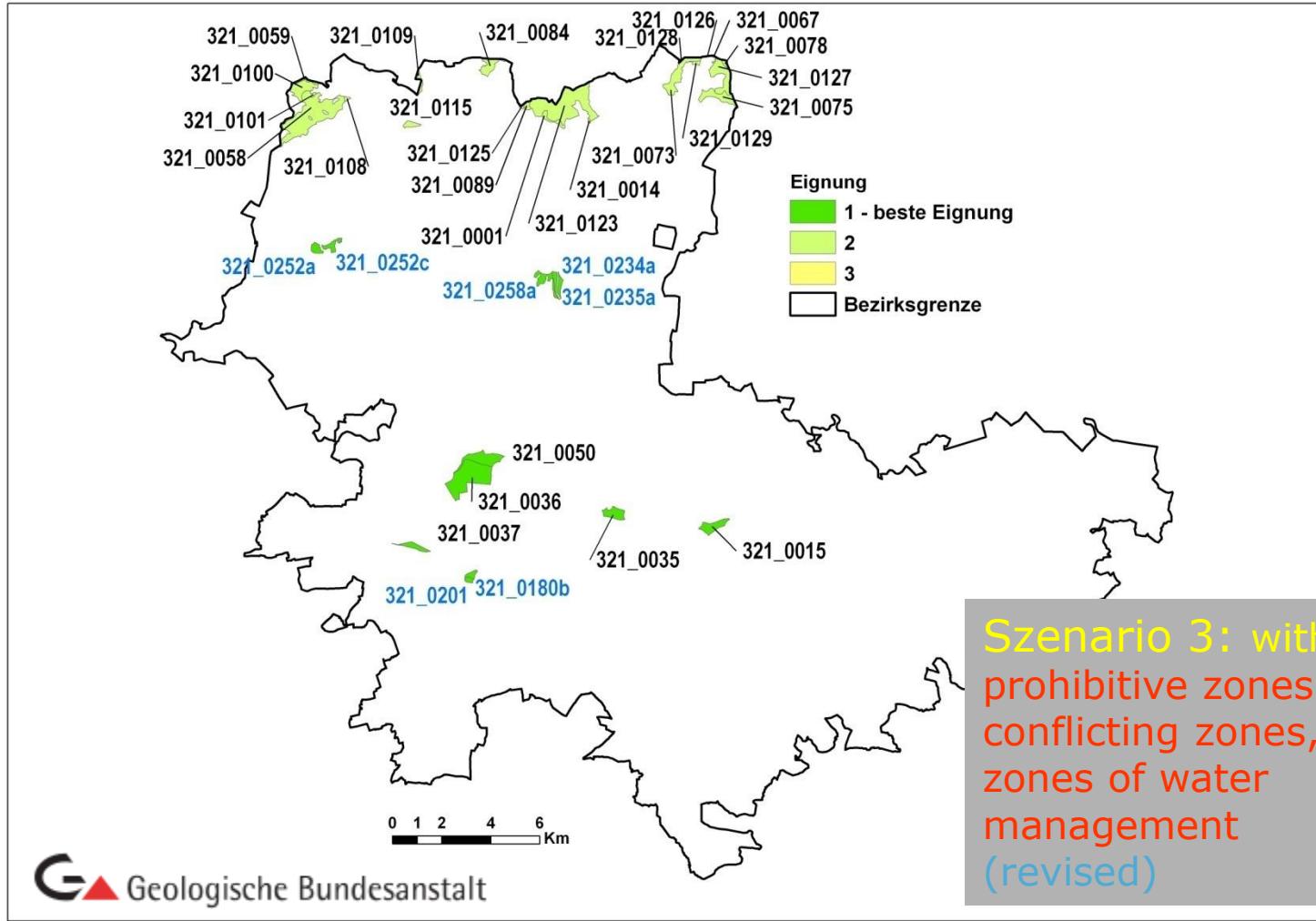
Conflict elimination e.g.: district of Tulln, E 1 – 3, revised

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Conflict elimination e.g.: district of Tulln, E 1 – 3, revised

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Assessment of regional demand

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estimated demand for the district of Tulln
(annual demand per capita: ca. 7 m³)

50 years:
ca. 22,6 Mio m³

estimated demand for the district of **Tulln +**
NW urban catchment of Vienna

(annual demand per capita: ca. 17,4 m³)
50 year:

ca. 60 Mio m³

Assessment of regional demand

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gross volumes
Lower Austria tot.:
38.105 Mio m³ E 1
4.265 Mio m³ E 2

gross volumes
district Tulln
2.916 Mio m³ E 1
278 Mio m³ E 2

conflict free volumes
district Tulln:
31 Mio m³ E 1
71 Mio m³ E 2

reduced volumes due to mining
losses
district Tulln:
ca. 55 Mio m³

Assessment of regional demand

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estimated demand for the district of Tulln
(annual demand per capita: ca. 7 m^3)

50 years:
ca. 22,6 Mio m^3

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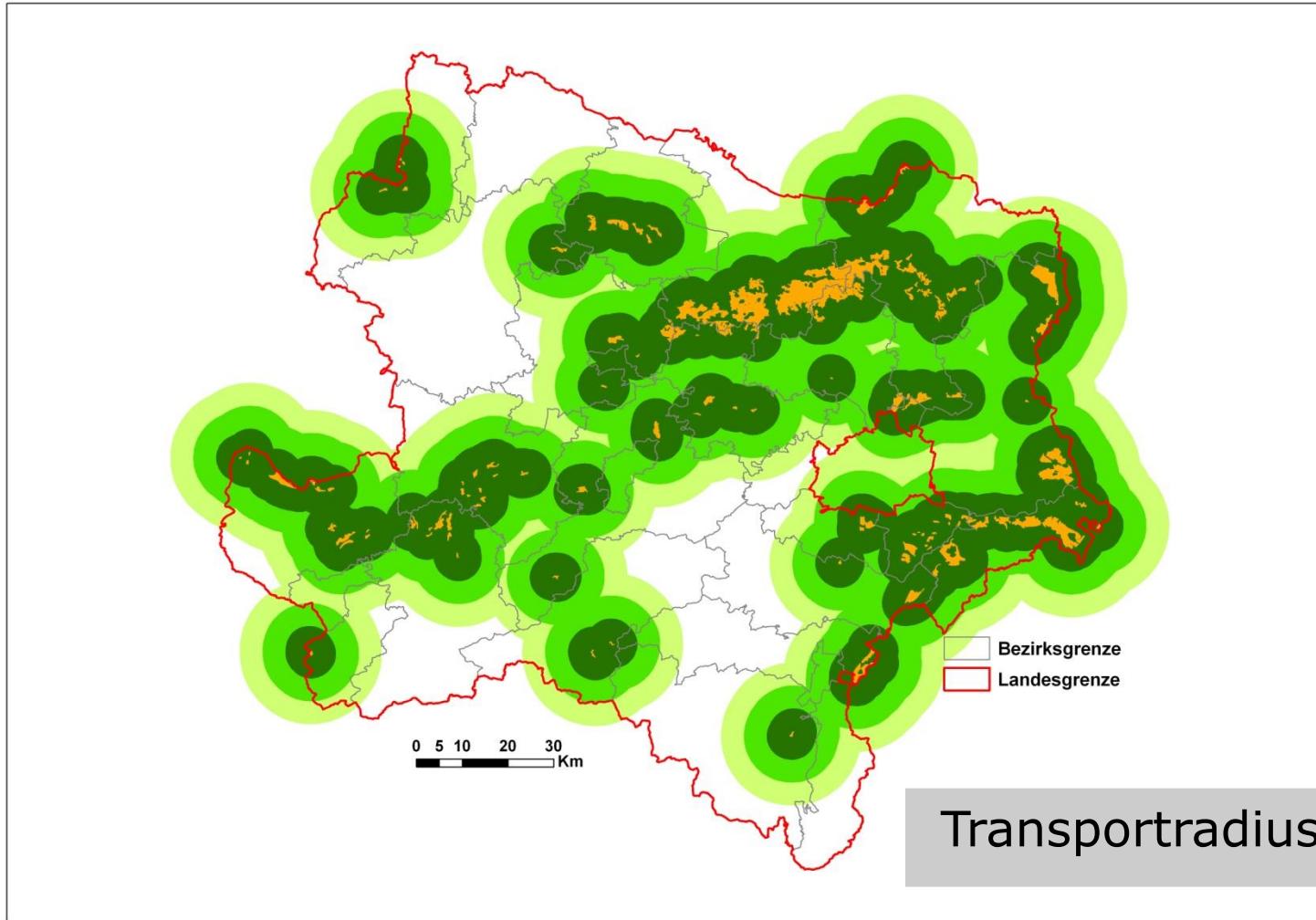
(dem. p. cap.: ca. $17,4 \text{ m}^3/50 \text{ y}$: **ca. 60 M. m^3**
supply: 102 Mio m^3 (not reduced vol.)
supply: 55 Mio m^3 (reduced volumes due
to mining losses)

Coverage of supply

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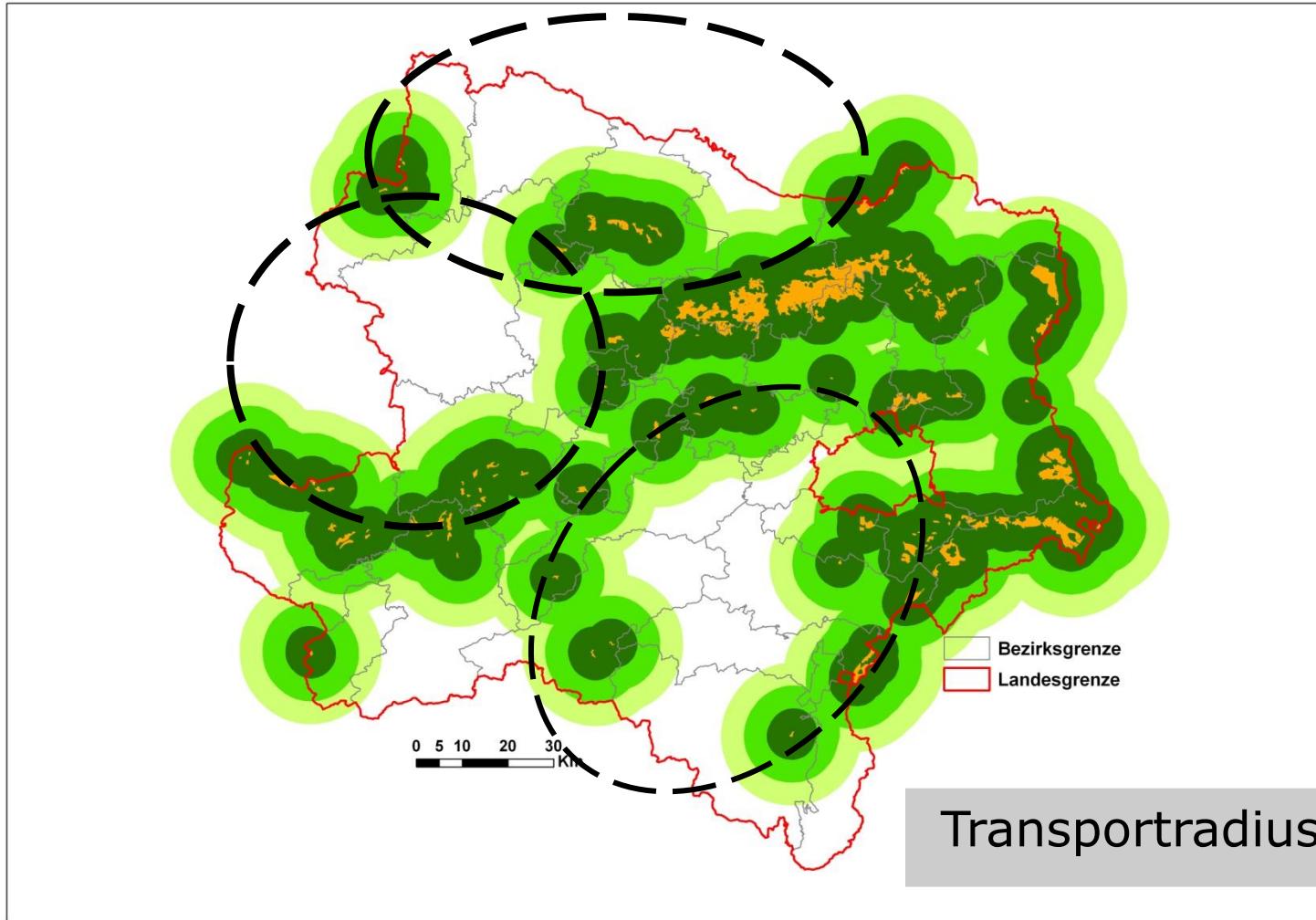


Coverage of supply

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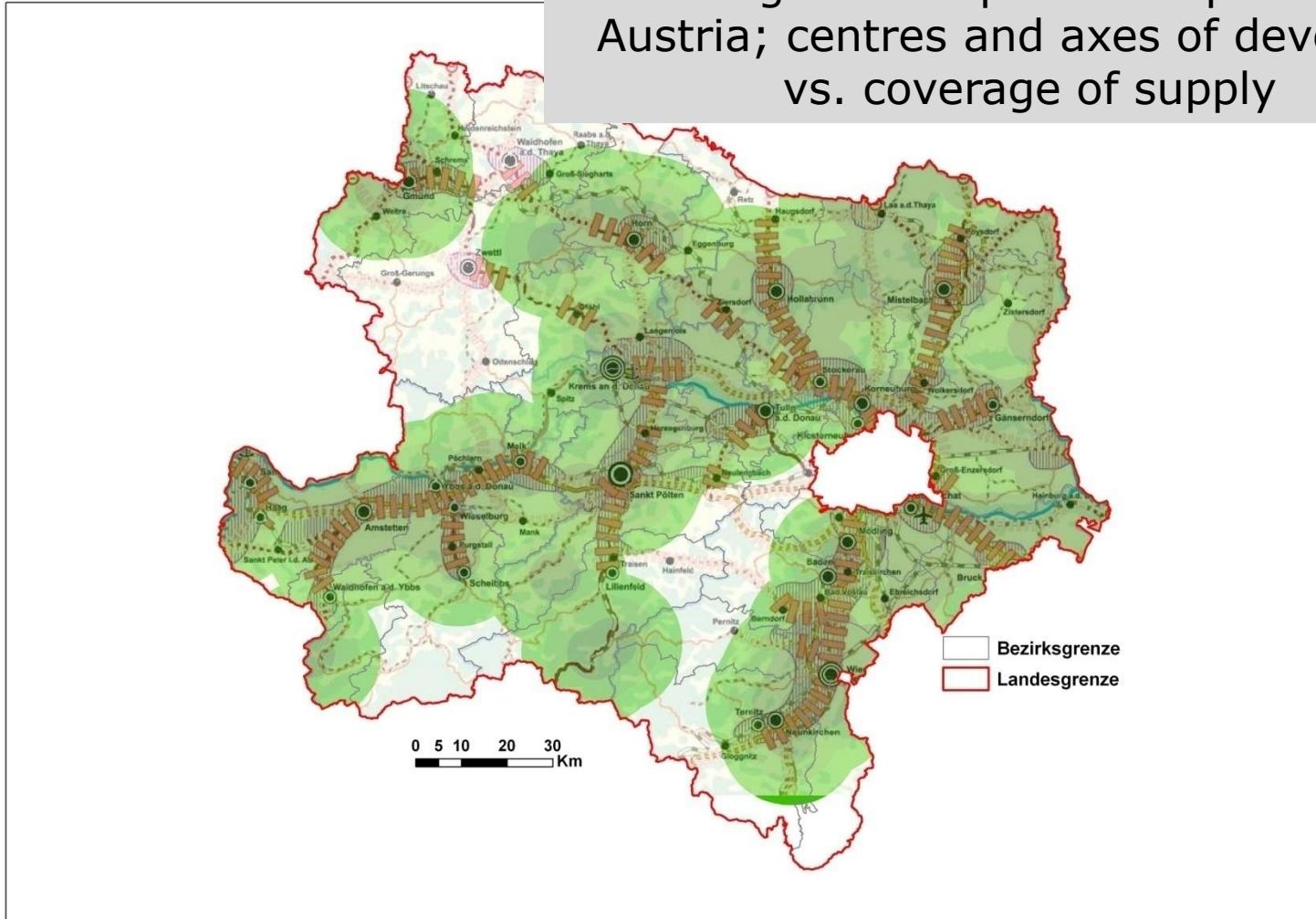
Coverage of supply

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Strategic development map of Lower Austria; centres and axes of developm. vs. coverage of supply



Results

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Supply with aggregates, Austria in tot. conflict free, without reduction of vol. (Mio m³)

Vers.-raum	E1, gesamt (Locker)	E2, gesamt (Locker)	E3, gesamt (Locker)	E1, trocken	E2, trocken	E3, trocken	Fest-gestein	Mindest-Bedarf	Lockergest. in % der Landes-fläche
B	534	187	221	316	47	221	33	98	3,11
K	685	28	25	577	26	12	18	196	0,51
N	1.946	2.230	179	707	39	0	532	1.145	3,12
OÖ	1.309	3.814	13	583	3.489	13	197	493	2,38
S	292	83	137	156	77	128	718	179	0,95
ST	1.000	243	503	518	241	497	1.154	415	1,09
T	280	52	0	186	52	0	265	248	0,15
V	162	419	312	--	0	0	70	134	4,23
W	84	0	0	32	0	0	0	578	1,46
Summe	6.292	7.056	1.380	3.075	3.971	871	2.987	3.486	

- ▶ Work of BMWFW in 2010 "completed"
- ▶ Results were submitted to the planning authorities of the regions for further implementation
- ▶ Implementation accompanied by expertise of BMWFW
- ▶ periodic update is necessary due to developments in land use planning or legal affairs (eg water management, nature prot. & conservation.....)
- ▶ AMP as an impetus for a rethinking of spatial planning relevant expulsions on the basis of water management act (re-dimensioning of protection and conservation areas)

- ▶ AMP as an impetus for a research project on the impact of dredging on the quality of surface and ground waters and other R & D projects
- ▶ AMP as a "best practice model" for minerals planning in the Raw Material Initiative of European Commission

- ▶ Implementation of AMP results in regulatory instruments of land use planning in Vorarlberg, Tirol, Burgenland
- ▶ Ongoing coordination with regions concerning implementation of AMP results in regional development programs
- ▶ No implementation in Upper Austria

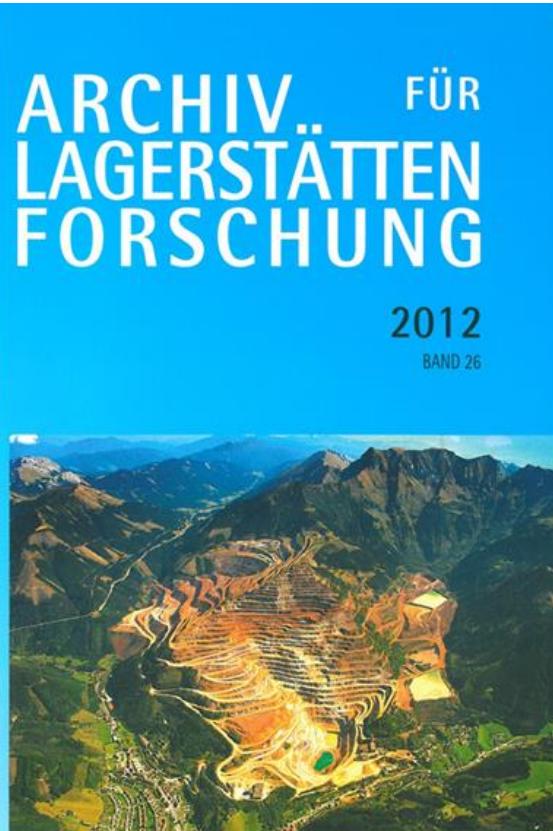
Austrian Minerals Plan - Methodology

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Leopold Weber (Hrsg.)
DER ÖSTERREICHISCHE ROHSTOFFPLAN



Geologische Bundesanstalt

Securing raw materials supply = securing the future

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Irrit Euch es ist ein
Gangwerk entstanden, Alleluja.



The Austrian minerals plan is a contract
for generations securing raw materials
supply

