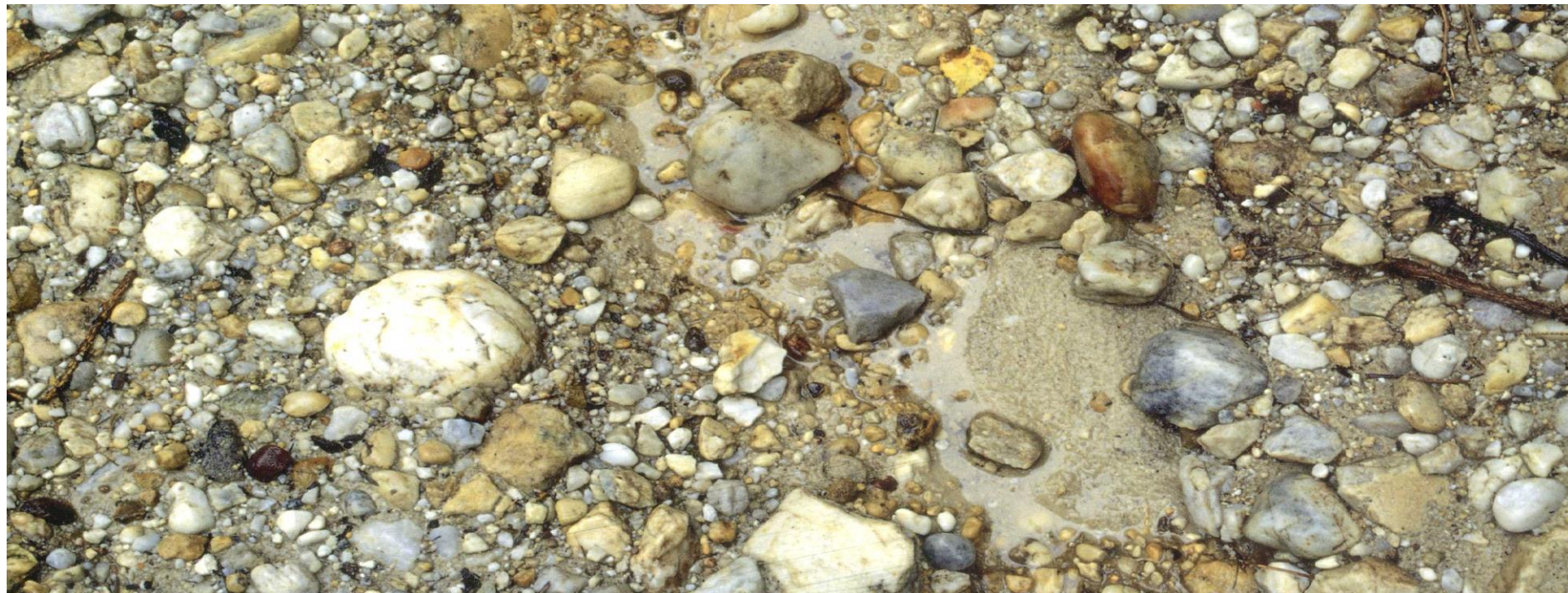


The Austrian Minerals Plan EU best practice – 7 years after

R. Holnsteiner



- 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
- EU is confronted with a number of challenges along the entire raw materials value chain to secure a **sustainable access** to non-energy non-agricultural raw materials
- EU raw materials industries provide ~ **280 billion € of added value**
- > **11 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
- **finiteness** of mineral resources
- **site-dependency** of mineral extraction
- future trends indicate that **global resource use could double** between 2010 and 2030
- Raw materials supply is a **core competence of the industry**
- Public administration has to provide **appropriate framework conditions** for a sufficient and sustainable supply with minerals resources

Austrian Minerals Strategy

Pillar 1:

Securing minerals supply from domestic resources (Mining Act, Austrian Minerals Plan)

Pillar 2:

Securing minerals supply from other countries (Raw Materials Partnerships)

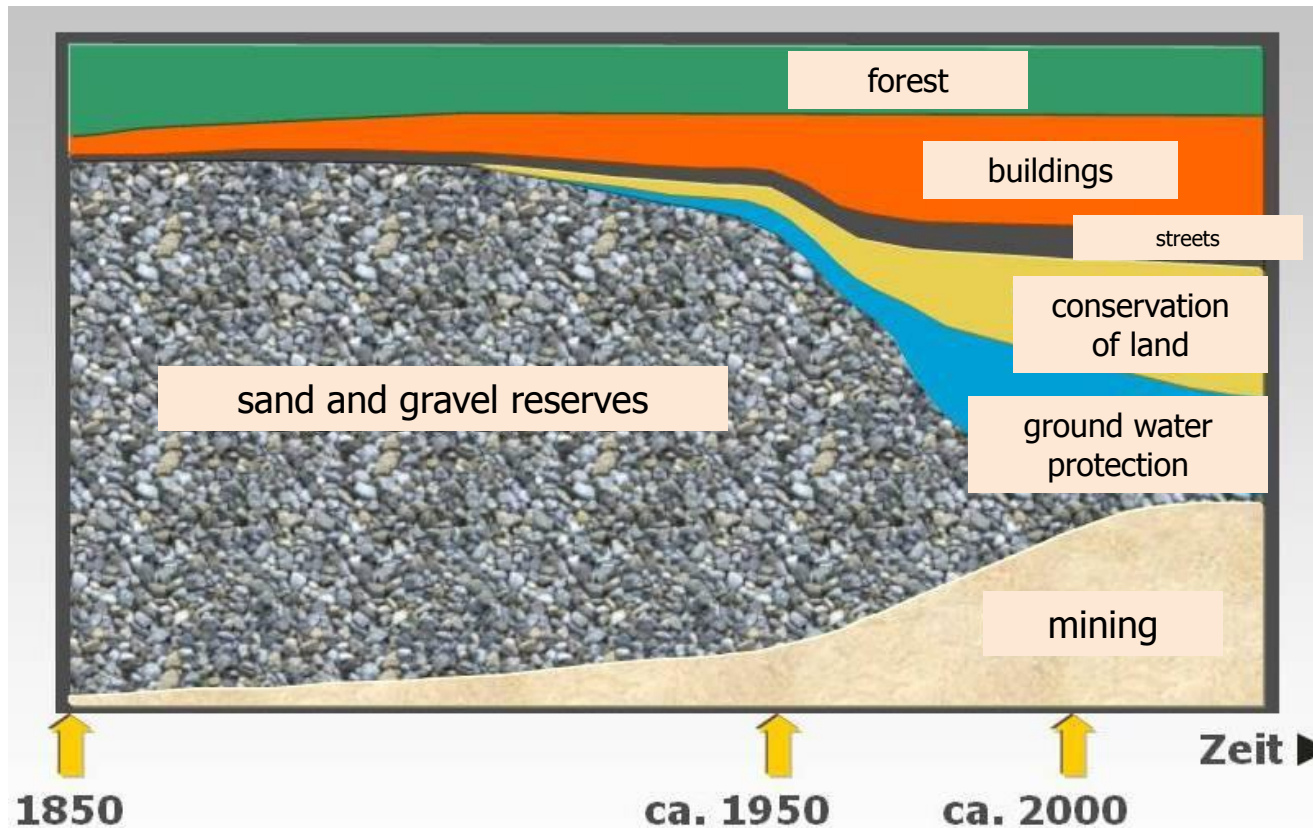
Pillar 3:

Promoting resources efficiency (substitution, recycling)

Horizontal Measures

Main problem = access to deposits

www.bmwf.wg.at



BGR (2008)

Examples for competing land claims

www.bmwfw.gv.at

EU (28)*	No.	km ²	% of country
Natura-2000	27.312	787.606	18

Austria	No.	km ²	% of country
Nature reserves (national parks, Natura-2000 and nature protected areas)**	666 (tot. 1.349)	17.670 (tot. 38.096)	21

* http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm
 ** Quelle: Umweltbundesamt: Umweltsituation in Österreich – 11. Umwelt-Kontrollbericht 2016

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

- 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

shallow deposits
(aggregates)

- demand-oriented
safeguarding process

deep deposits (ores,
industrial minerals)

- supply-oriented
safeguarding process

aggregates:

- expansion of existing extraction sites instead of green field (as far as possible)
- exploitation of deposit as complete as possible (avoid ruthless exploitation; dredging)
- safeguard sites where an environmental friendly exploitation is possible (hauling shaft - tunnel systems in case of hard rocks)
- consumer-near extraction sites to enhance economical efficiency (SME based RM-business) and reduce transport emissions
- safeguard conflict free best quality resources first
- consider multifunctional land use

ores/industrial minerals:

- operational facilities like processing plants should be situated underground as far as possible
- recommended for safeguarding: deposits with enough reserves which could be exploited economically
- conditionally recommended for safeguarding: deposits with enough reserves which could not be exploited economically currently (but with suitable development in commodity prices and/or technical developments)

Evaluation scheme unconsolidated rocks

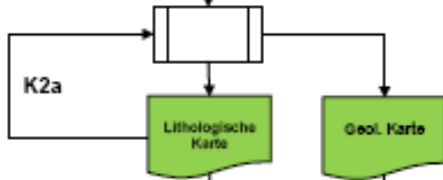
WV

Phase 1 - Ressourcenerhebung und Evaluierung:
Kiessande

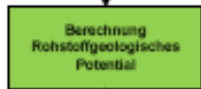
K1



K2



K3



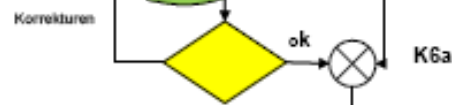
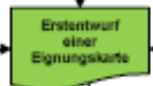
K4



K5



K6



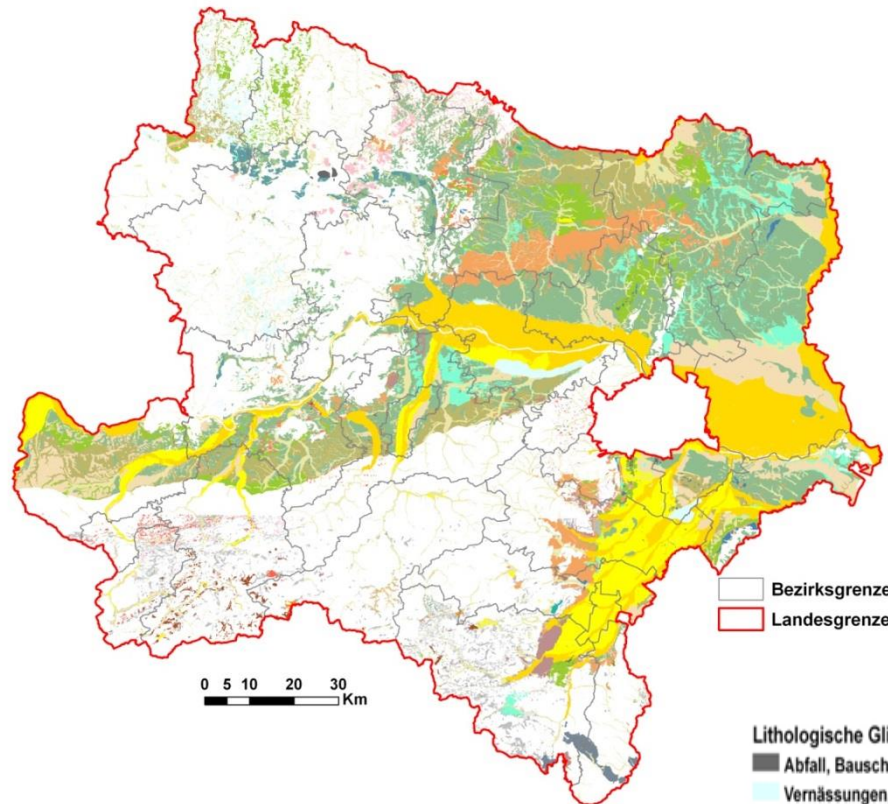
K7



1: beste Eignung
5: schlechteste Eignung

Bewertungsgrundlage für Phase 2

Lithological map of unconsolidated rock



Lithologische Gliederung

- Abfall, Bauschutt, Gesteinsbruchstücke variabler Zusammensetzung, Bergbauhalden
- Vermässungen, 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

Assessment of quality

	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

	Area (A)	Thickness (M)
AMM	$> 1 \text{ km}^2$	$> 10\text{m}$
AM	$> 1 \text{ km}^2$	$> 3\text{m}$
aM	$< 1 \text{ km}^2$	$> 3\text{m}$
Am	$> 1 \text{ km}^2$	$< 3\text{m}$
am	$< 1 \text{ km}^2$	$< 3\text{m}$

www.bmwfw.gv.at

quality

<u>1</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>5</u>
<u>1</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>5</u>
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>2</u>	<u>2</u>	<u>4</u>	<u>4</u>	<u>5</u>
<u>3</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>5</u>

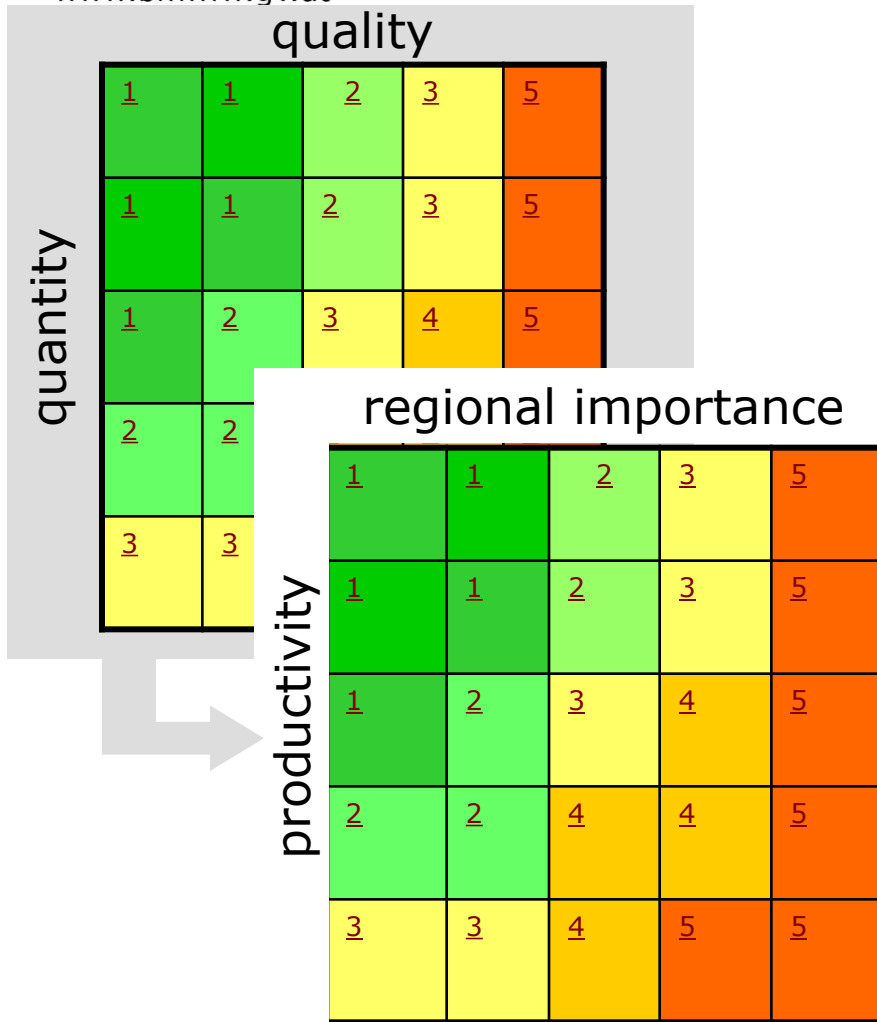
quantity

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

Assessment of regional importance

	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

www.bmwfw.gv.at

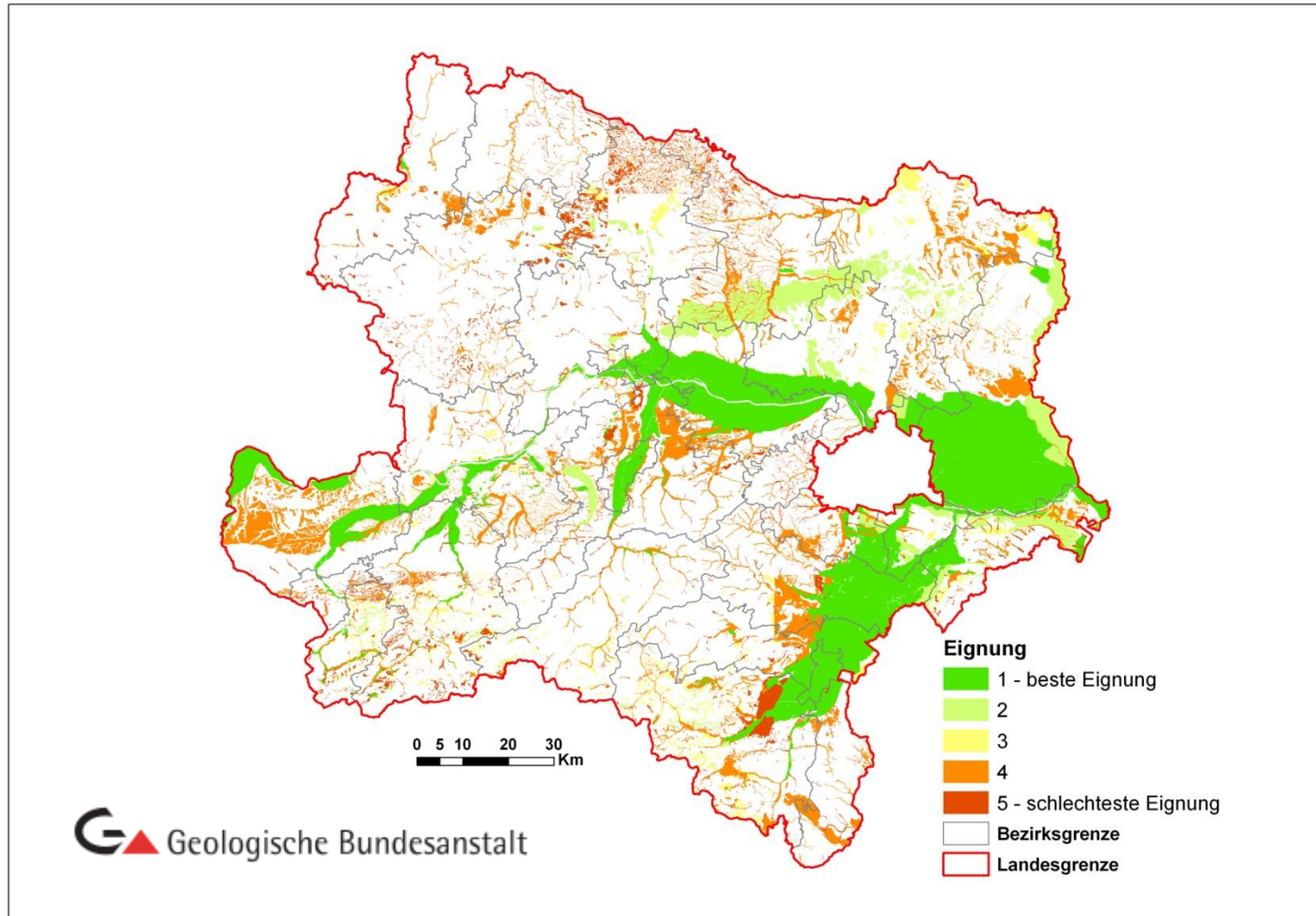


Step 4: Matrix assessment
quality vs. quantity
(=productivity)

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

Suitability zones 1 - 5

www.bmwf.gv.at



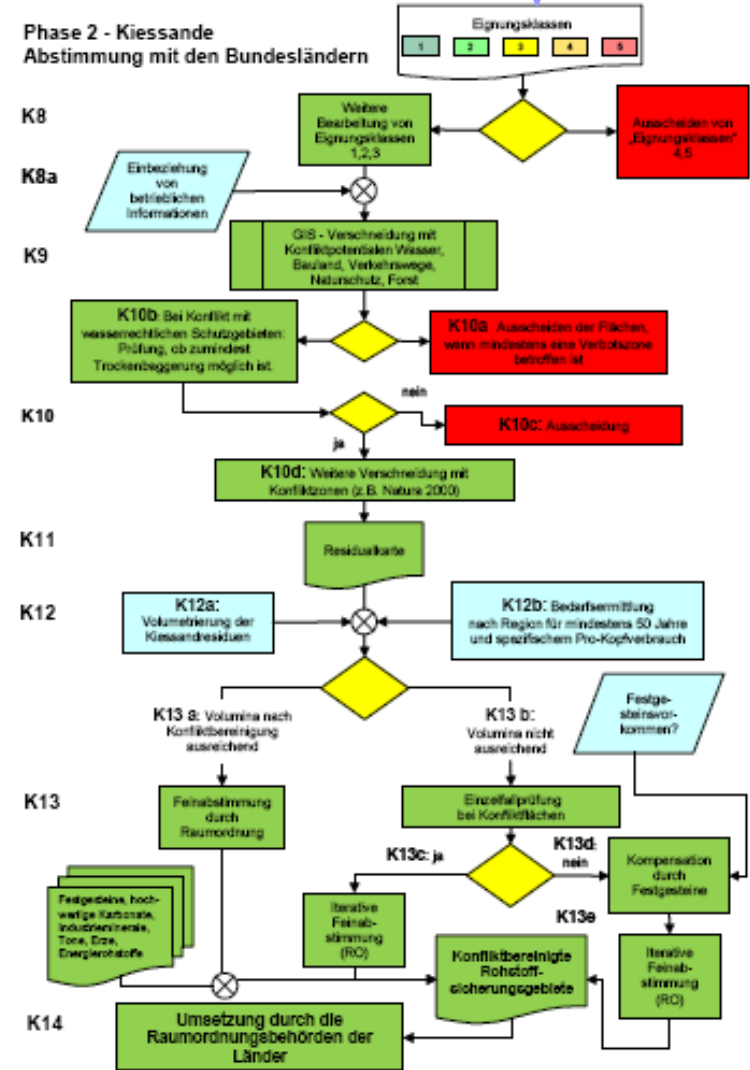
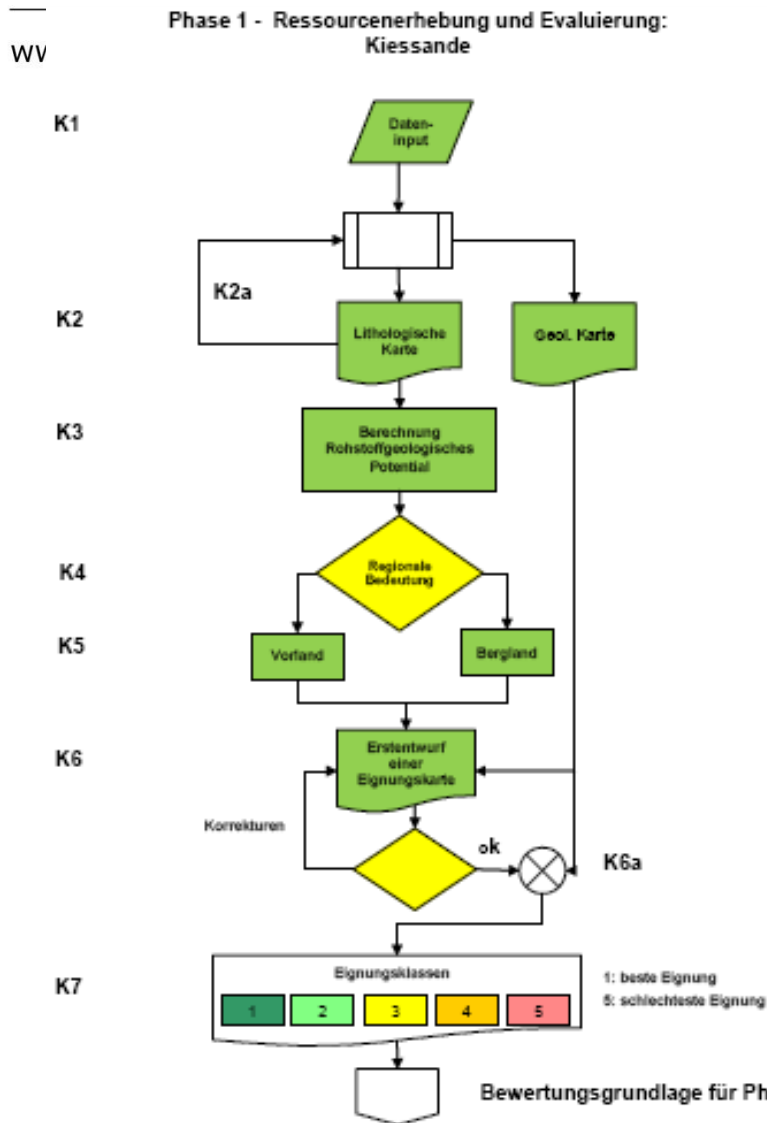
Phase 1:

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

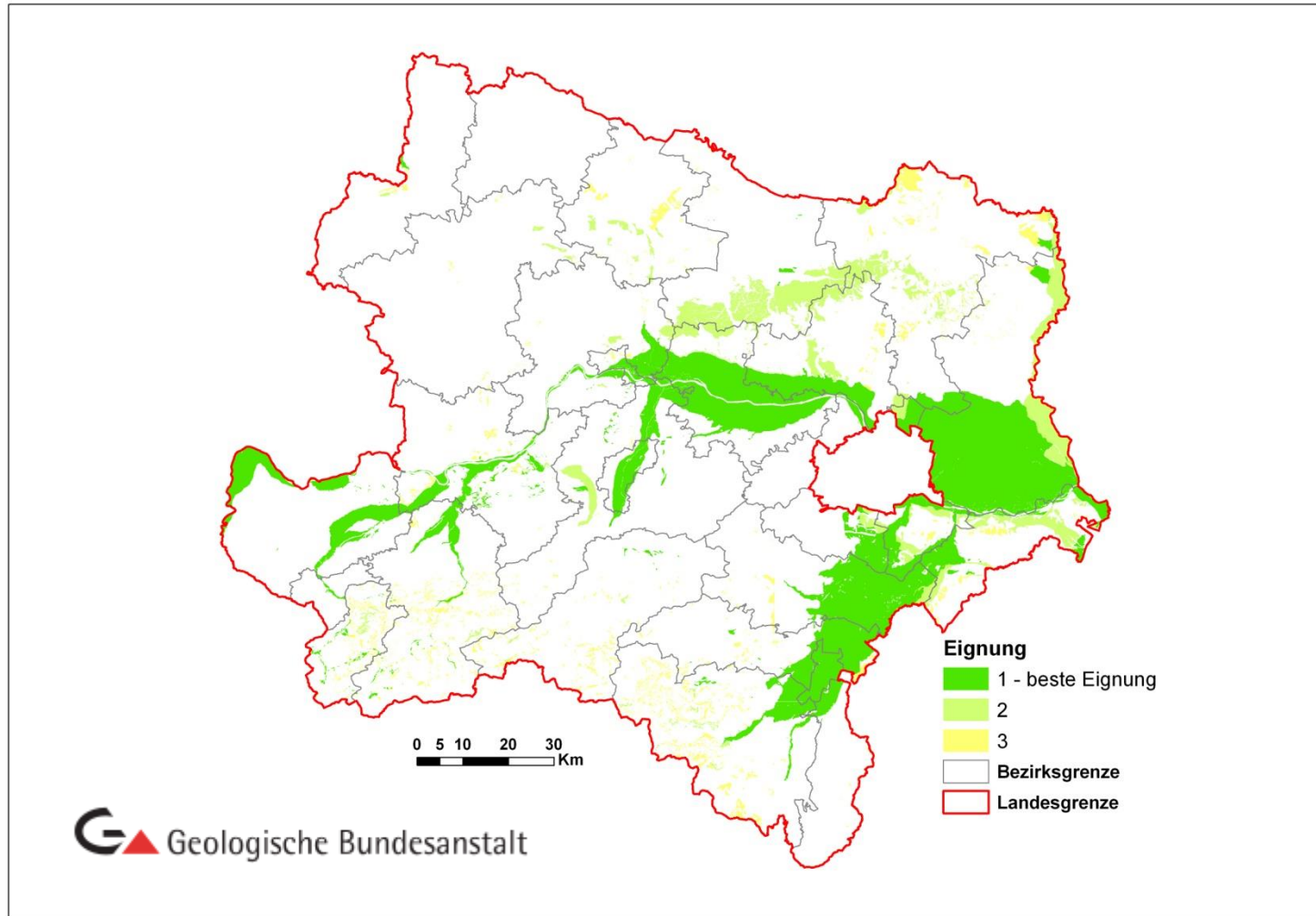
Phase 2:

Adjustment of the results with the provinces

Evaluation scheme uncons. rocks

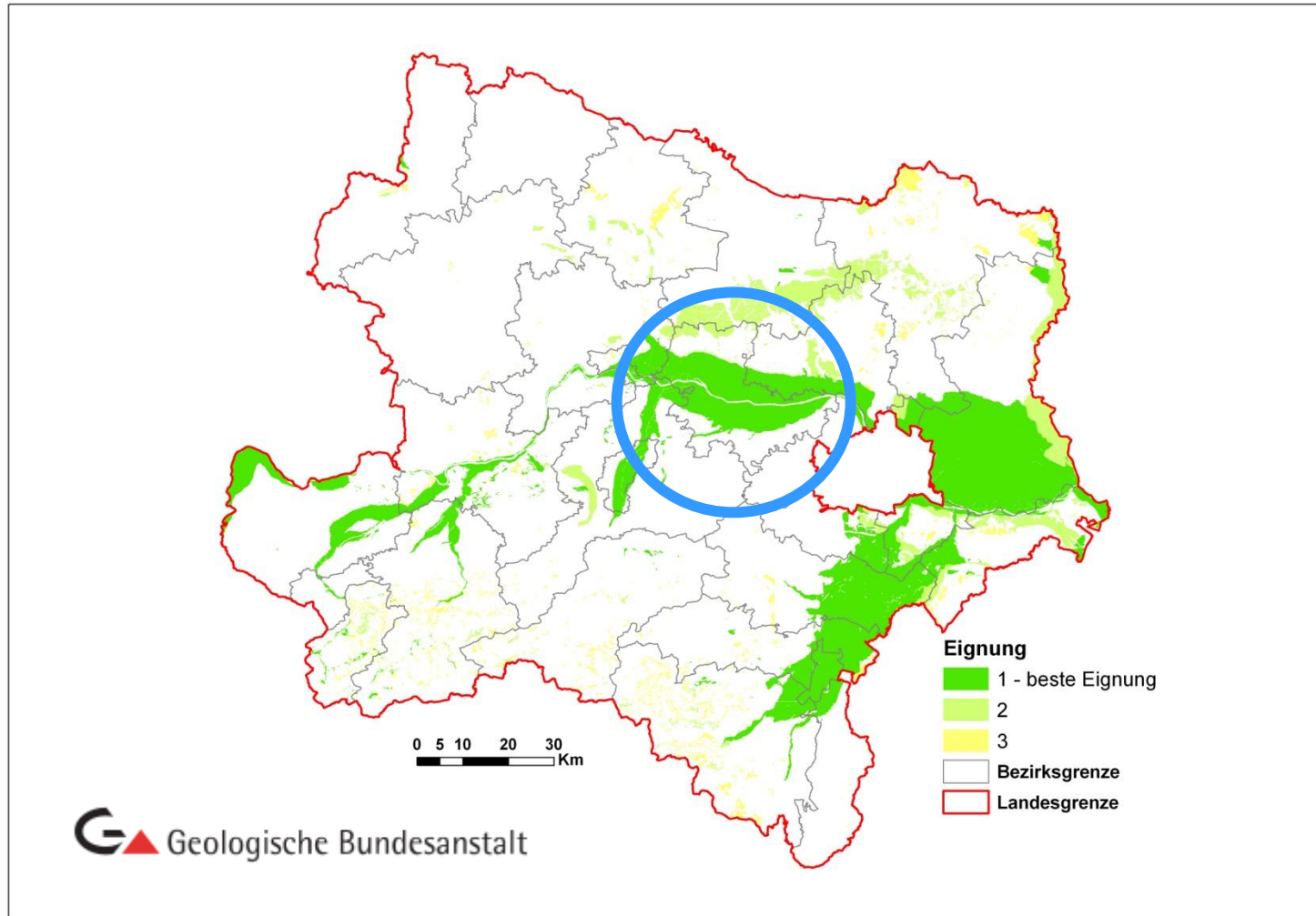


reduction to suitab. zones 1 - 3



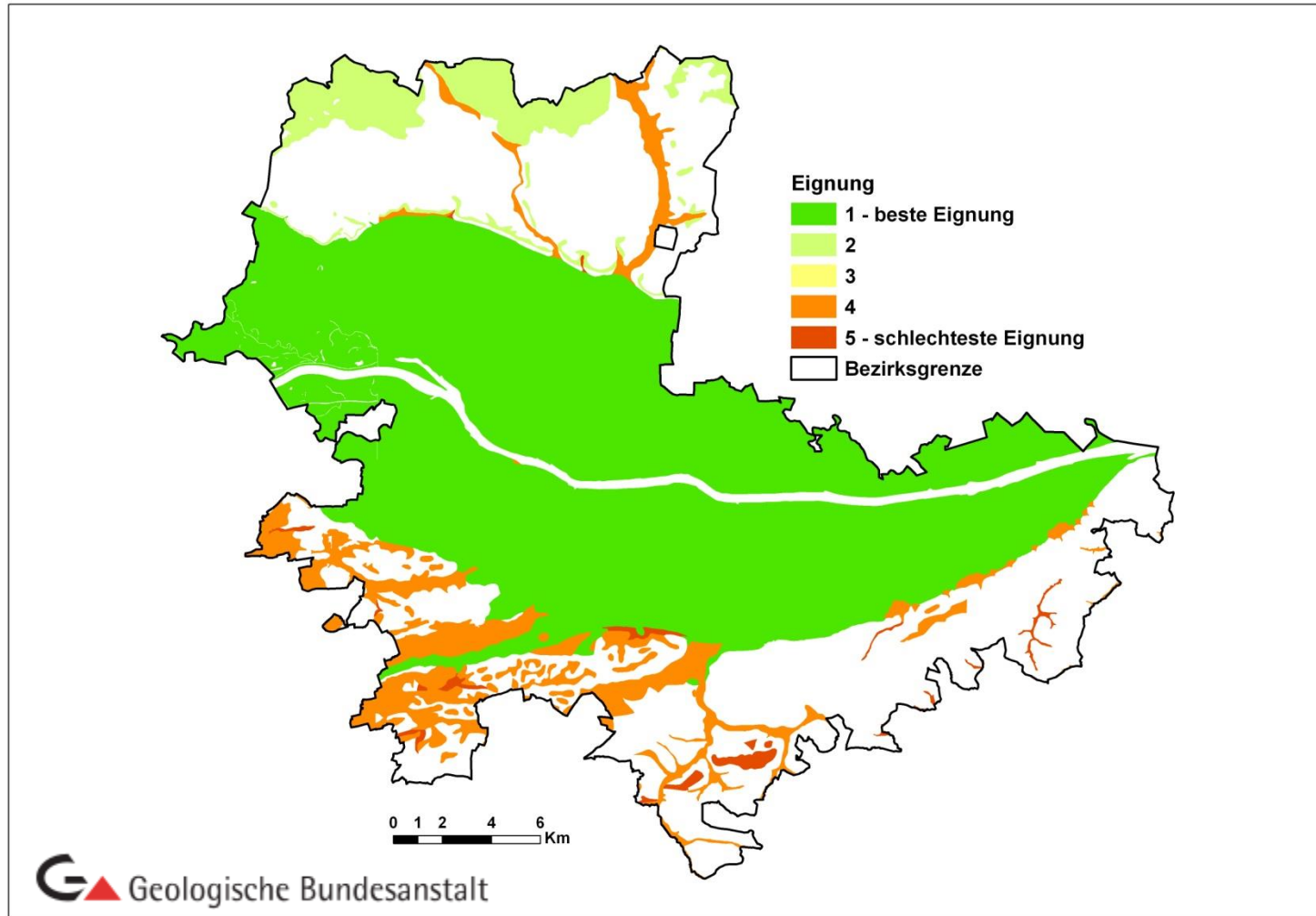
Conflict elimination e.g.: district of Tulln

www.bmwf.gv.at



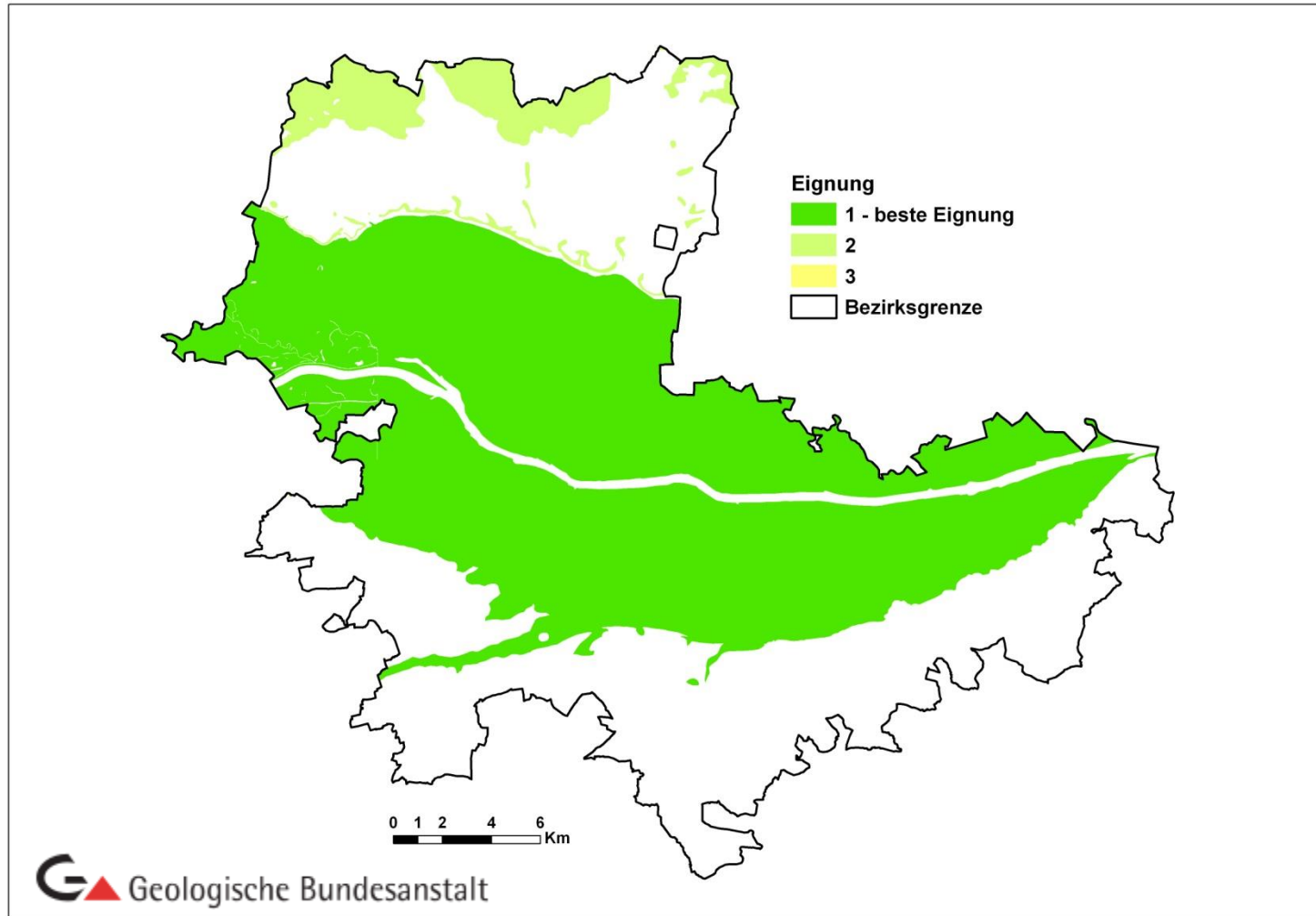
Conflict elimination e.g.: district of Tulln, suitab. class. 1 - 5

www.bmwfw.gv.at



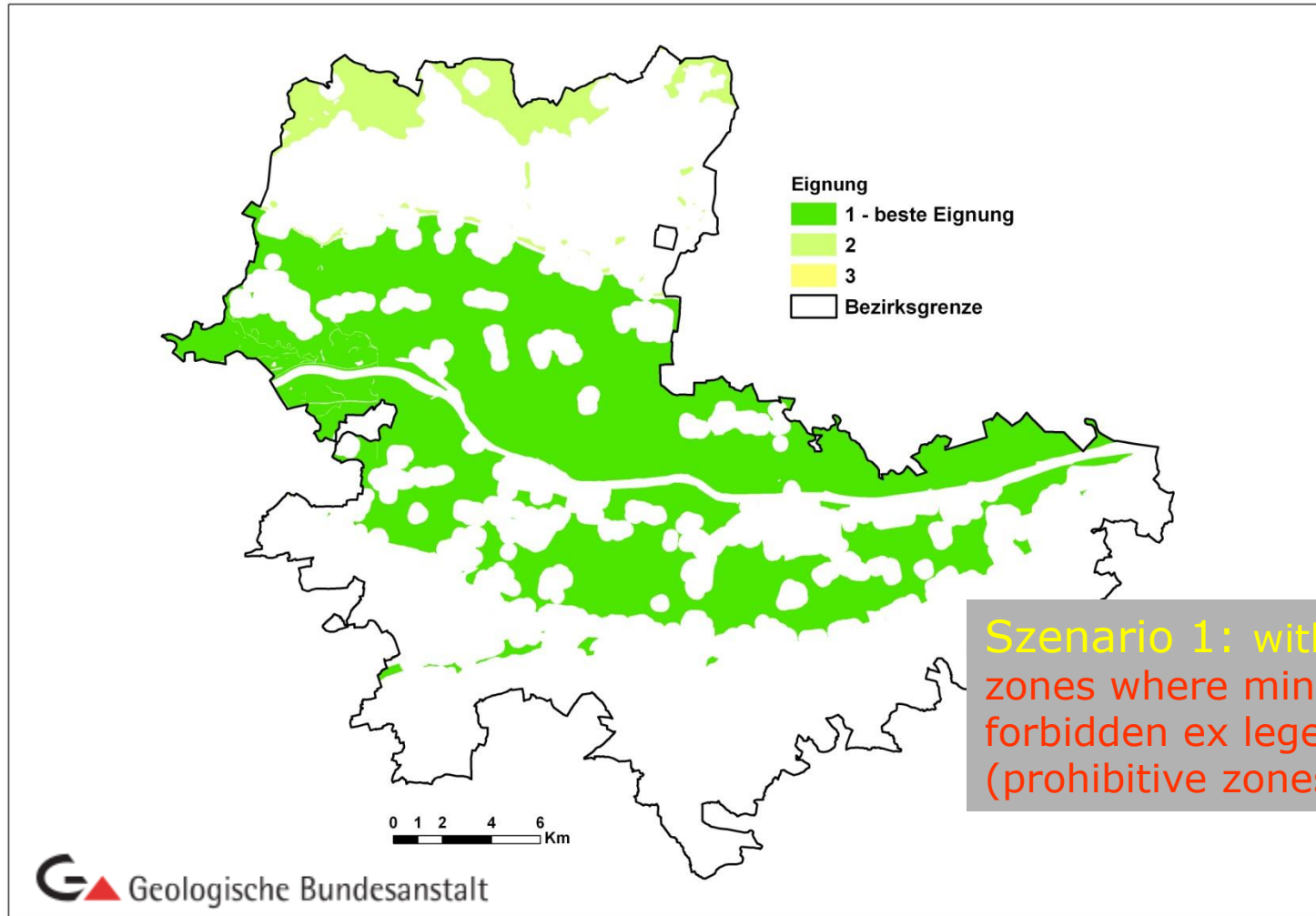
Conflict elimination e.g.: district of Tulln, suitab. class. 1 - 3

www.bmwf.gv.at



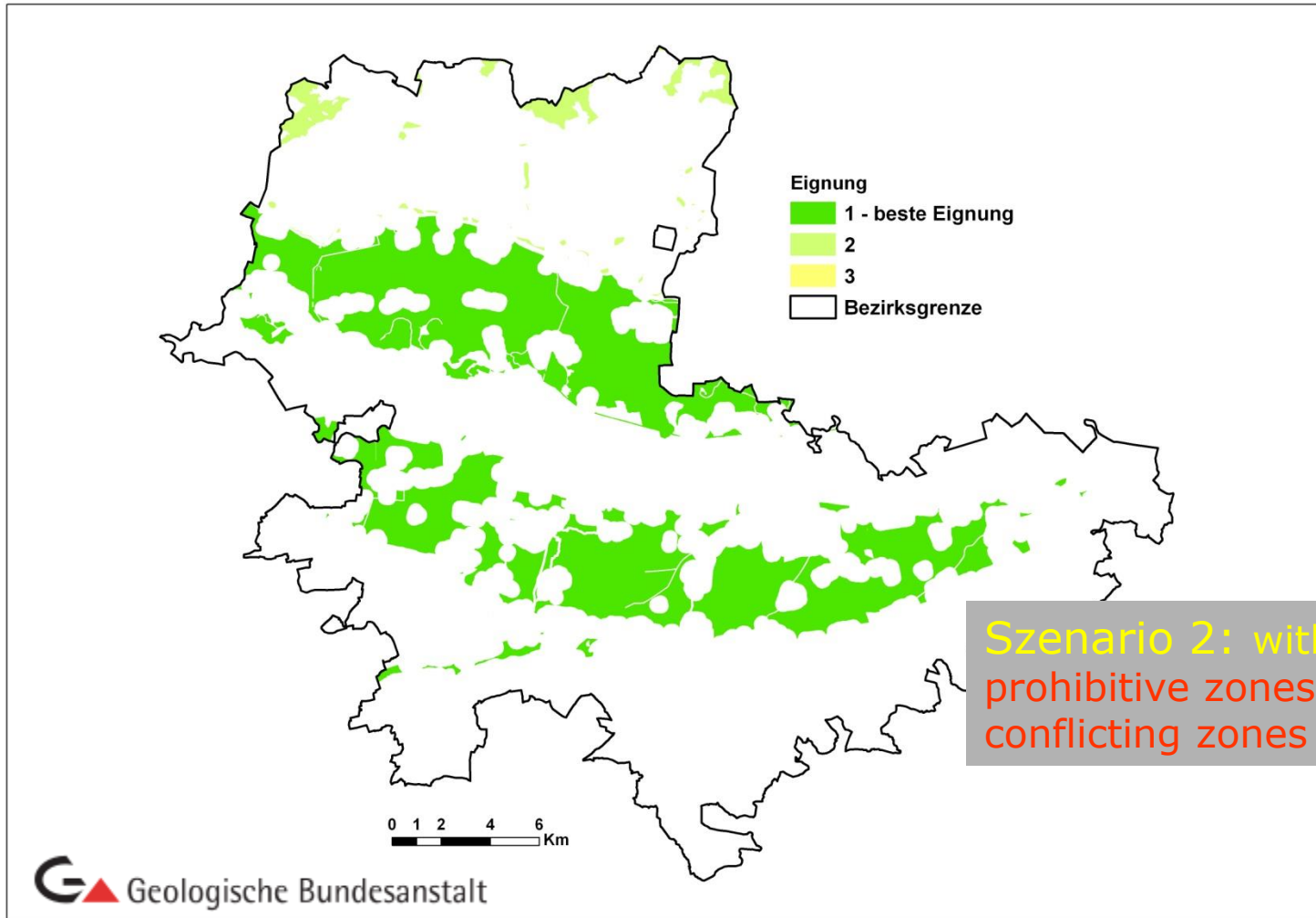
Conflict elimination e.g.: district of Tulln, suitability class. 1 - 3

www.bmwfw.gv.at



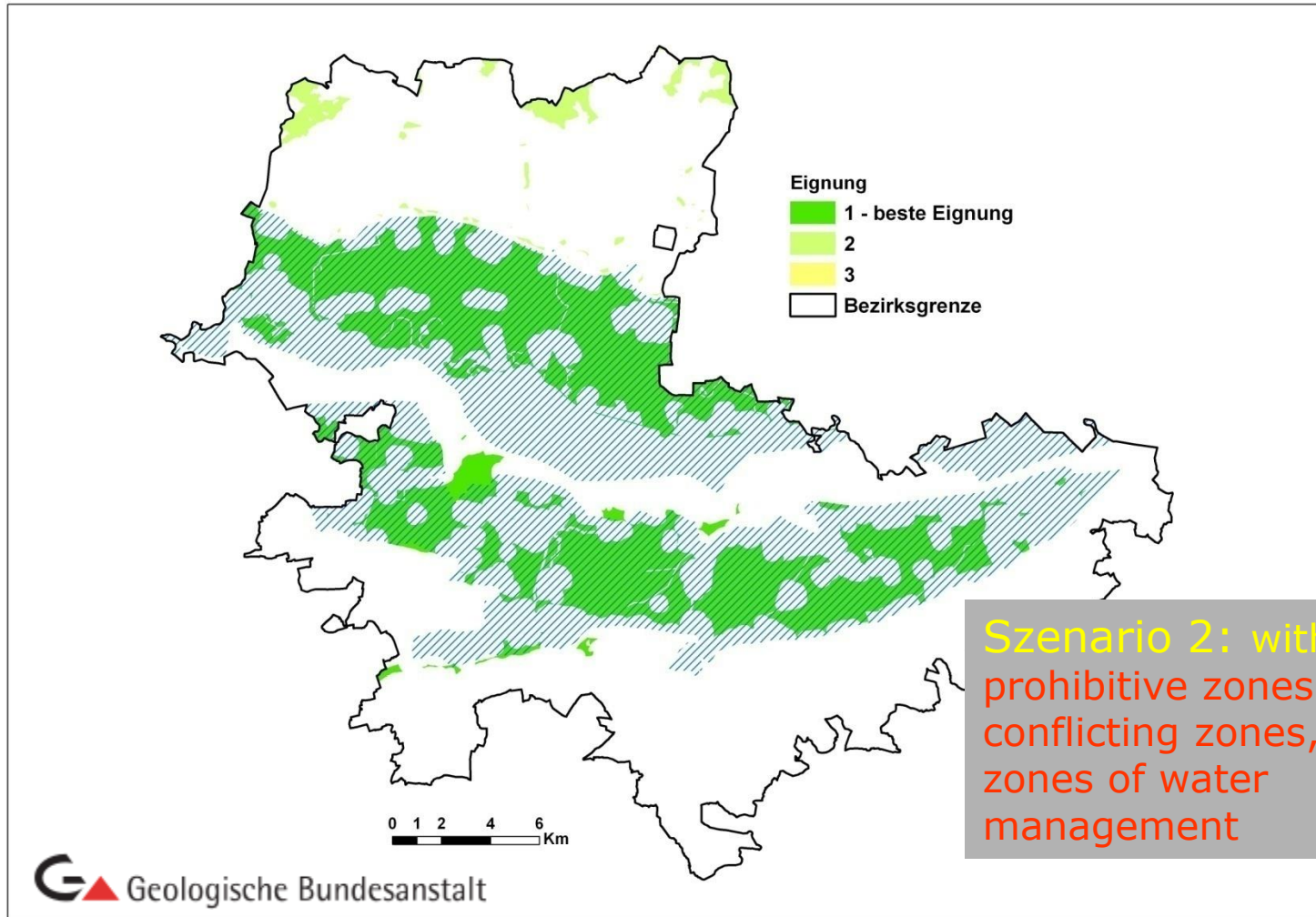
Conflict elimination e.g.: district of Tulln, suitab. class. 1 - 3

www.bmwf.w.gv.at



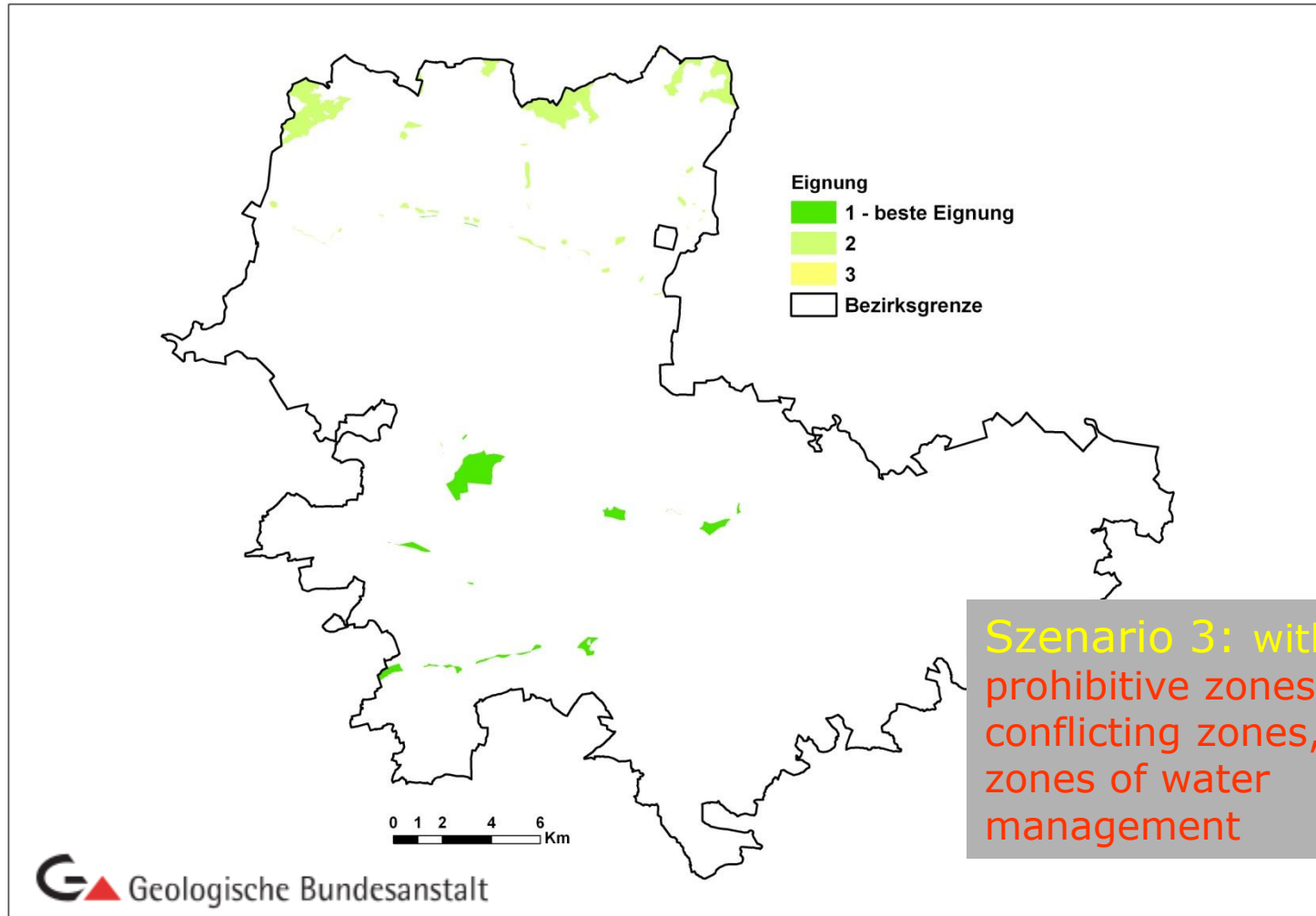
Conflict elimination e.g.: district of Tulln, suitab. class. 1 - 3

www.bmwfw.gv.at



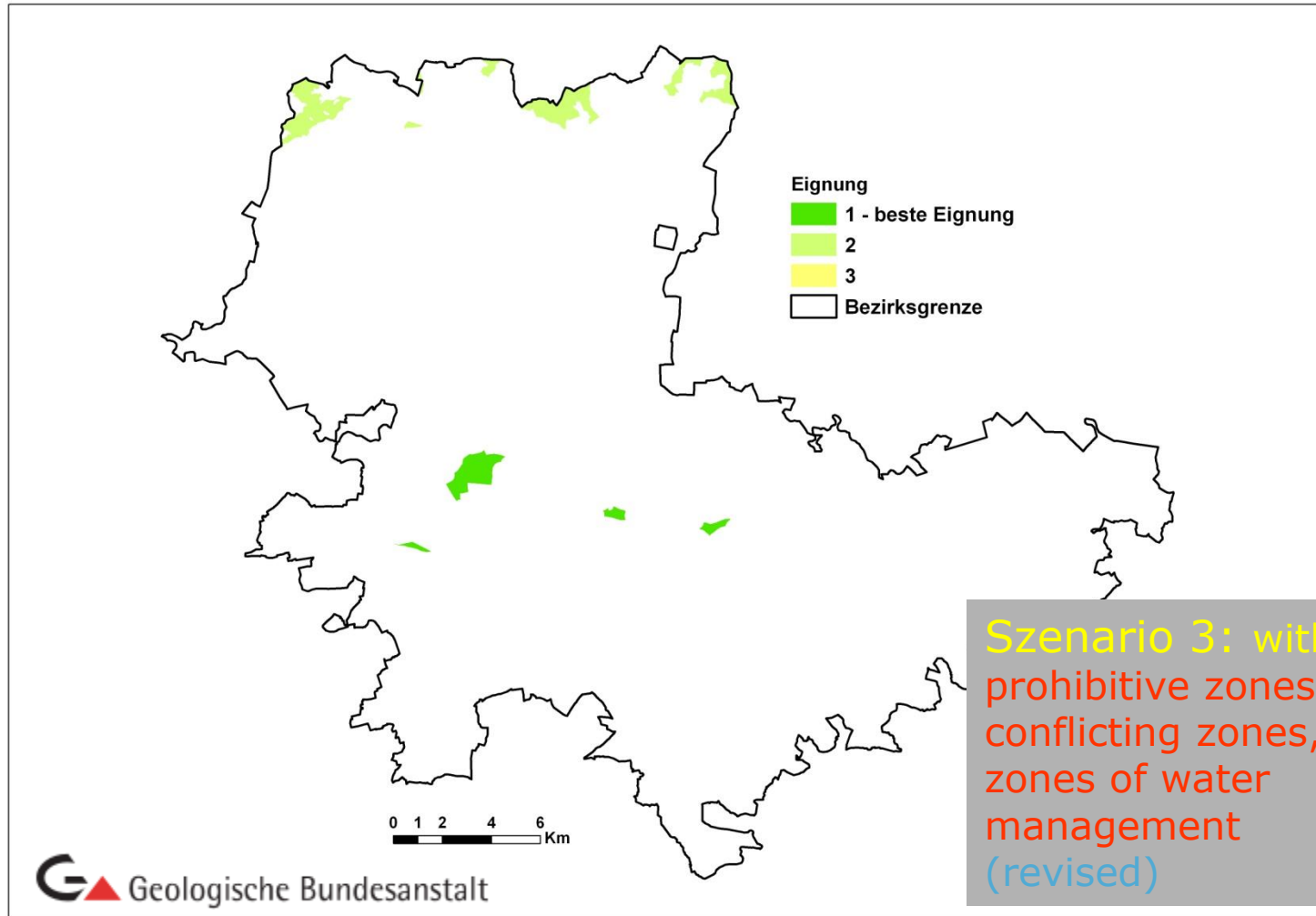
Conflict elimination e.g.: district of Tulln, residual zones

www.bmwf.gv.at



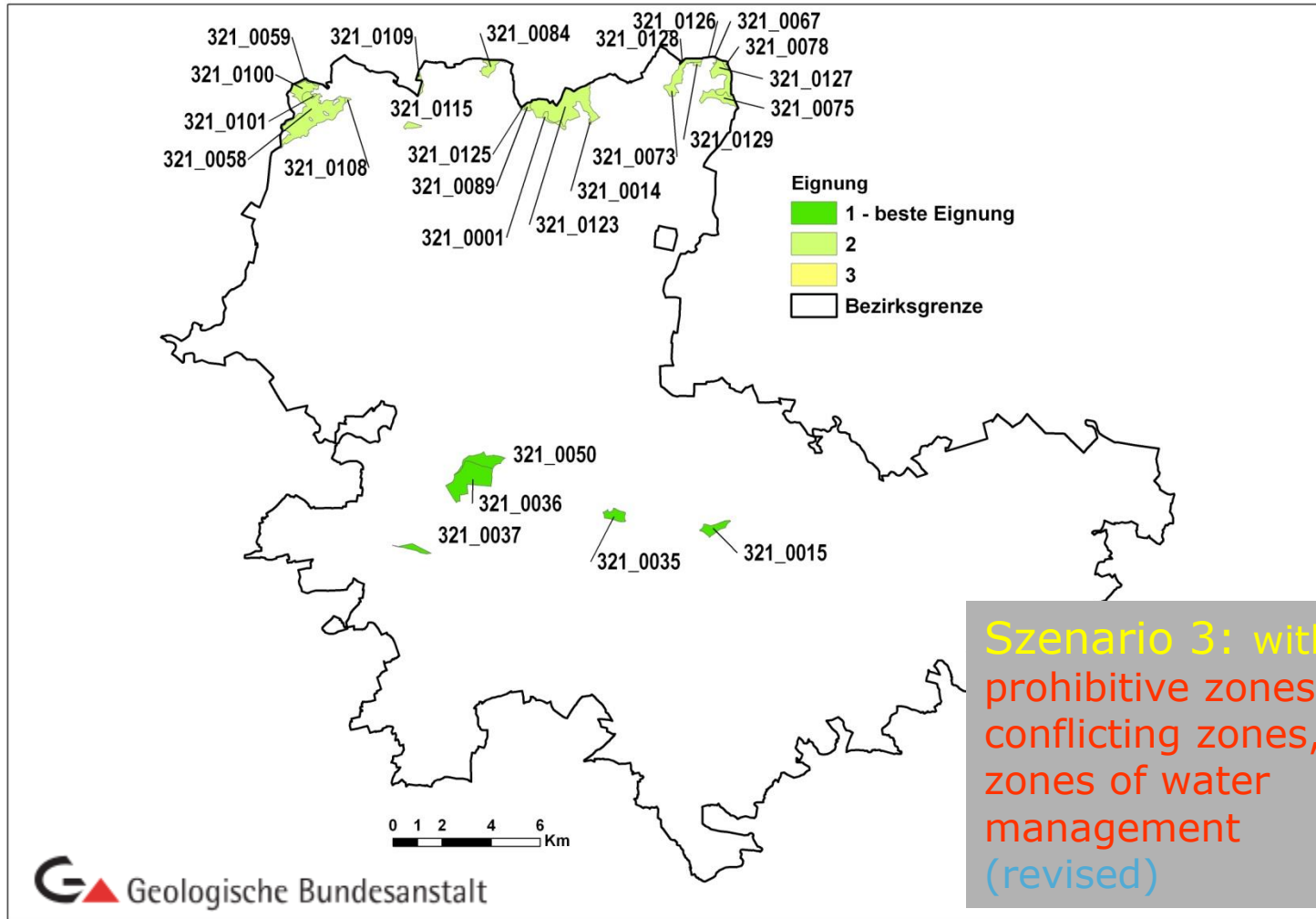
Conflict elimination e.g.: district of Tulln, residual zones

www.bmwfw.gv.at



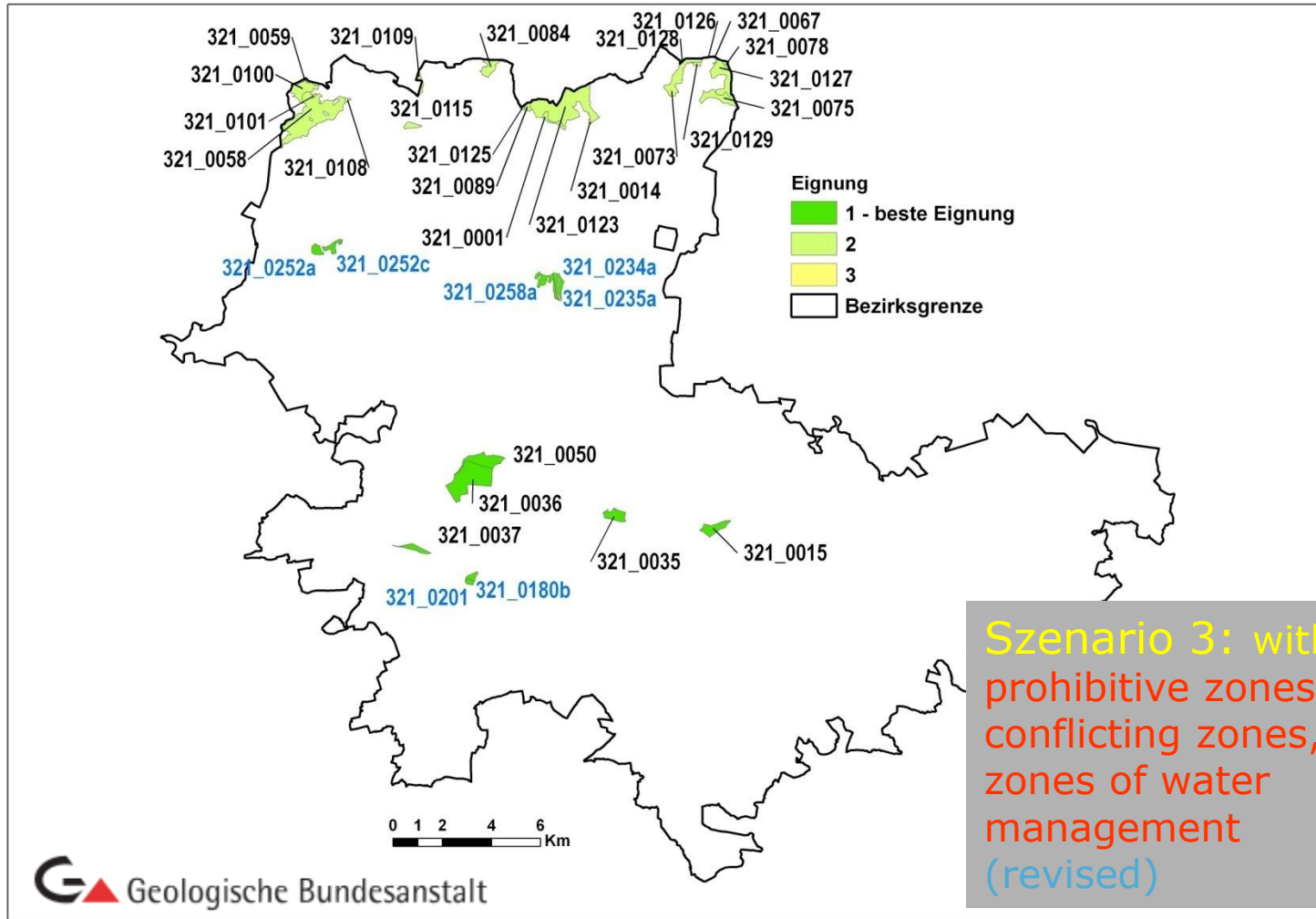
Conflict elimination e.g.: district of Tulln, E 1 – 3, revised

www.bmwfw.gv.at



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

www.bmwfw.gv.at



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

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

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

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**

(dem. p. cap.: ca. 17,4 m³/50 y: **ca. 60 M. m³**)

supply: 102 Mio m³ (not reduced vol.)

**supply: 55 Mio m³ (reduced volumes due
to mining losses)**

Results

www.bmwf.wg.at

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	

Assuming that the identified areas are safeguarded by means of land use management, a demand coverage for aggregates in the periods regarded can be ensured.

Sand, gravel, hard rocks: The demand can be provided, in compliance with transport distances <30 km for at least 50y /100y from a conflict-free surfaces with complete respect for the environment and groundwater protection.

Claiming conflicting areas (e.g. Natura 2000 areas) for securing long term supply with aggregates is not required.

- soft and hard rocks could be safeguarded in a demand driven approach in a balanced amount.

- ➡ 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, legal affairs or reserve development (eg water management, nature prot. & conservation; mining information system for reserve monitoring.....)
- ➡ 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

- inconsistent position of industry and regions concerning implementation
- No implementation in some regions, e.g. Upper Austria
- AMP is currently a legally non-binding planning instrument
- currently “minerals planning” (AMP) is checked by Austrian Court of Auditors (BMWFW, Tyrol, Upper Austria, Lower Austria)

Securing Raw Material Supply:

- multidimensional matter (3-D land use management, variations in supply and demand with time and region, technological developments, variations in required minerals /commodities)
- Protection of deposits by means of minerals economics (optimal and complete extraction of deposits, supply/demand)
- Protection of deposits by means of spatial planning (securing access to deposits)
- Economical and efficient use of raw materials (resource efficiency)
- Multifunctional use of land

Securing Raw Material Supply:

- methodology is appropriate but extensive
- results could be applied „everlasting“ (improvements by progress of science)
- political consensus for transposition of minerals safeguarding at an early stage is the prerequisite for success (municipial, regional and federal level)
- conviction of raw materials industry is prerequisite for political consensus

Securing raw materials supply = securing the future

www.bmwf.gv.at



*Freud Euch, es ist ein
Bergwerk entstanden, Alleluja.*