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PROF. DR. SIEKER MBH

UBA Research Project FKZ 203 22 281

„Testing Innovative Approaches in the River Basin Management Plan of the Case Study Catchment Lausitzer Neiße/Odra in Accordance with the Water Framework Directive“

- Identification of Water Bodies -

Scientific Coordinator: Dr. B. Fritzsche (StUFA Bautzen)

Results presented by:

Consulting Team IPS & ube

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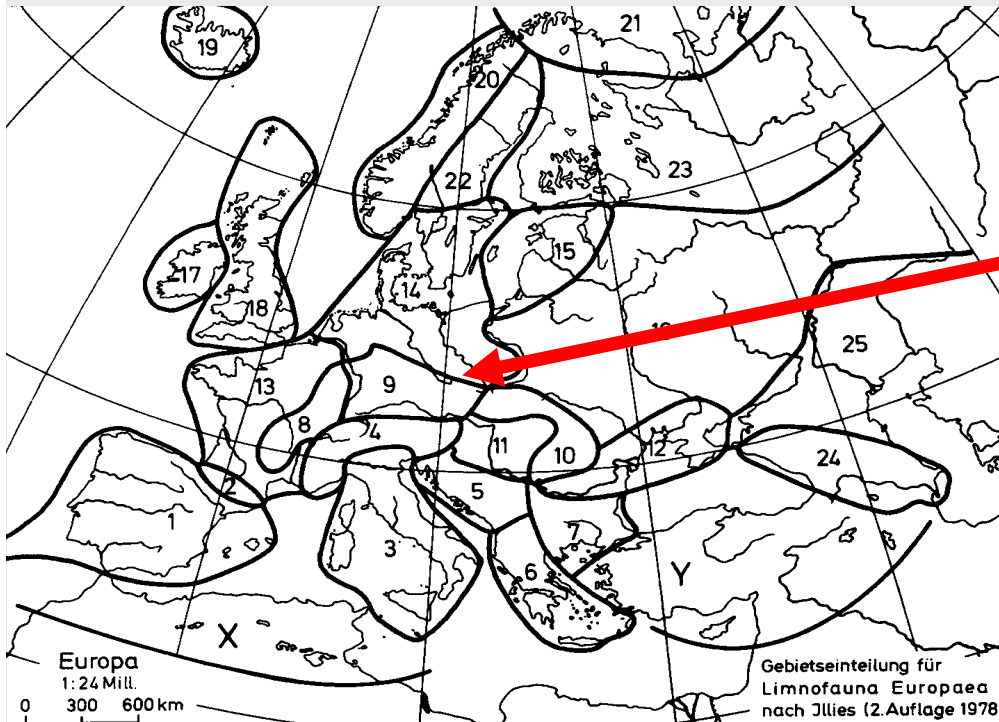
Ingenieurgesellschaft Prof.Dr. Sieker mbH (IPS)

Rennbahnallee 109 A 15 36 6 Dahlewitz- Hoppegarten

fon/fax +49 33 42 / 35 95 -(0)/ -29

www.sieker.de

Characteristics : Ecoregion



River Basin of the Lausitzer Neiße

(Part of the Odra catchment)

- central highland (9)
- central lowland (14)

Catchment area: 4403 km²
(= sensu WRRL: “large”)

Length of the Lausitzer Neisse: 254.6 km

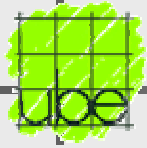


Pilot River Basin Testing: Lausitzer Neiße – a trans- boundary river basin

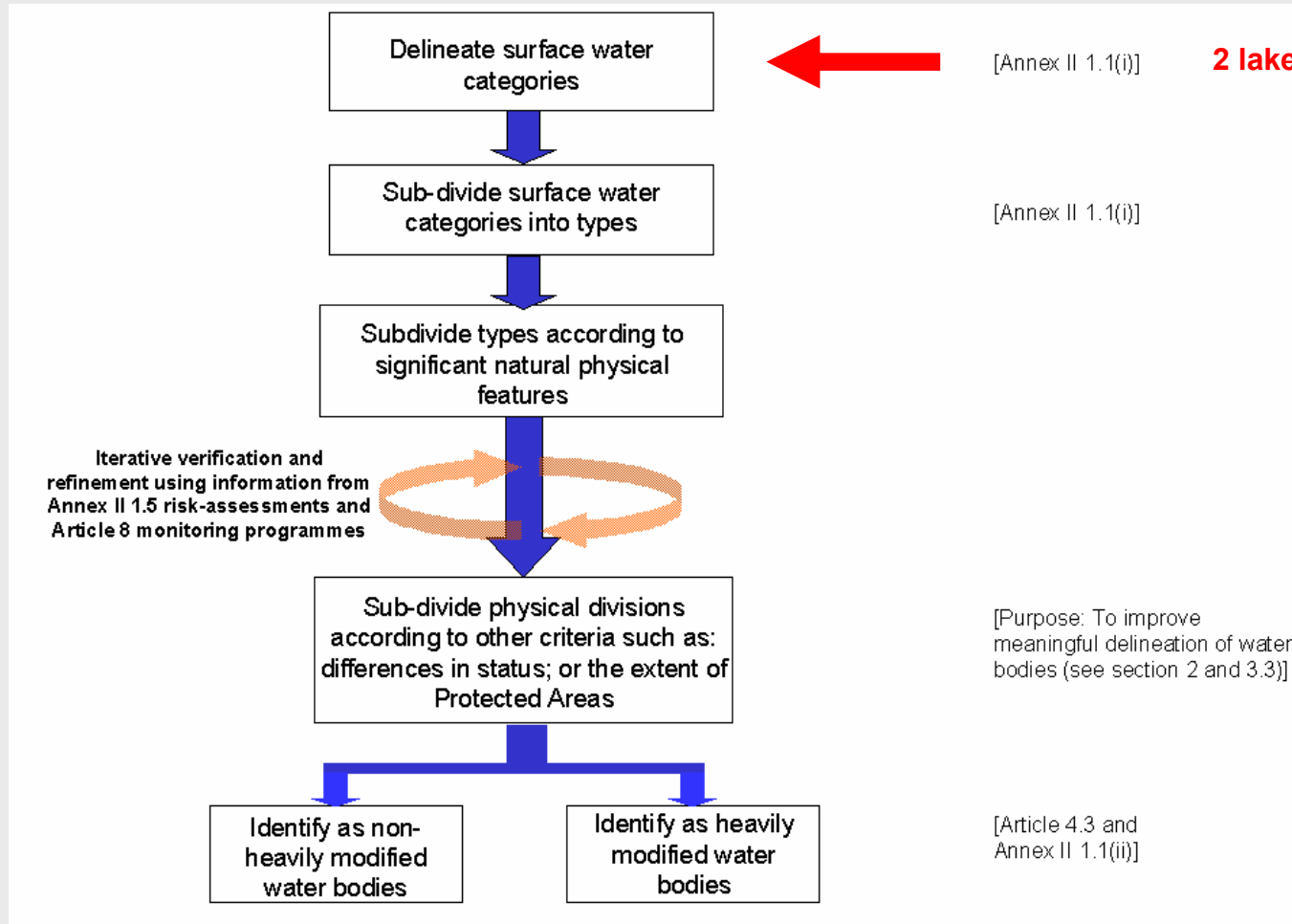
	Czech Republic	Germany	Poland	Sum
Catchment	455 km ²	1,411 km ²	2,537 km ²	4,403 km ²
Neisse River length	55.6 km	199 km		254.6 km

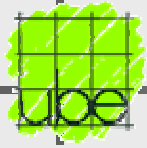


Identification of Water Bodies in the Saxonian Part of the PRB Lausitzer Neiße



Flowchart of the Identification Process (According to the Horizontal Guidance Document)





Stagnant Waters with Ground Water Bodies in the German River Basin of the Lausitzer Neiße

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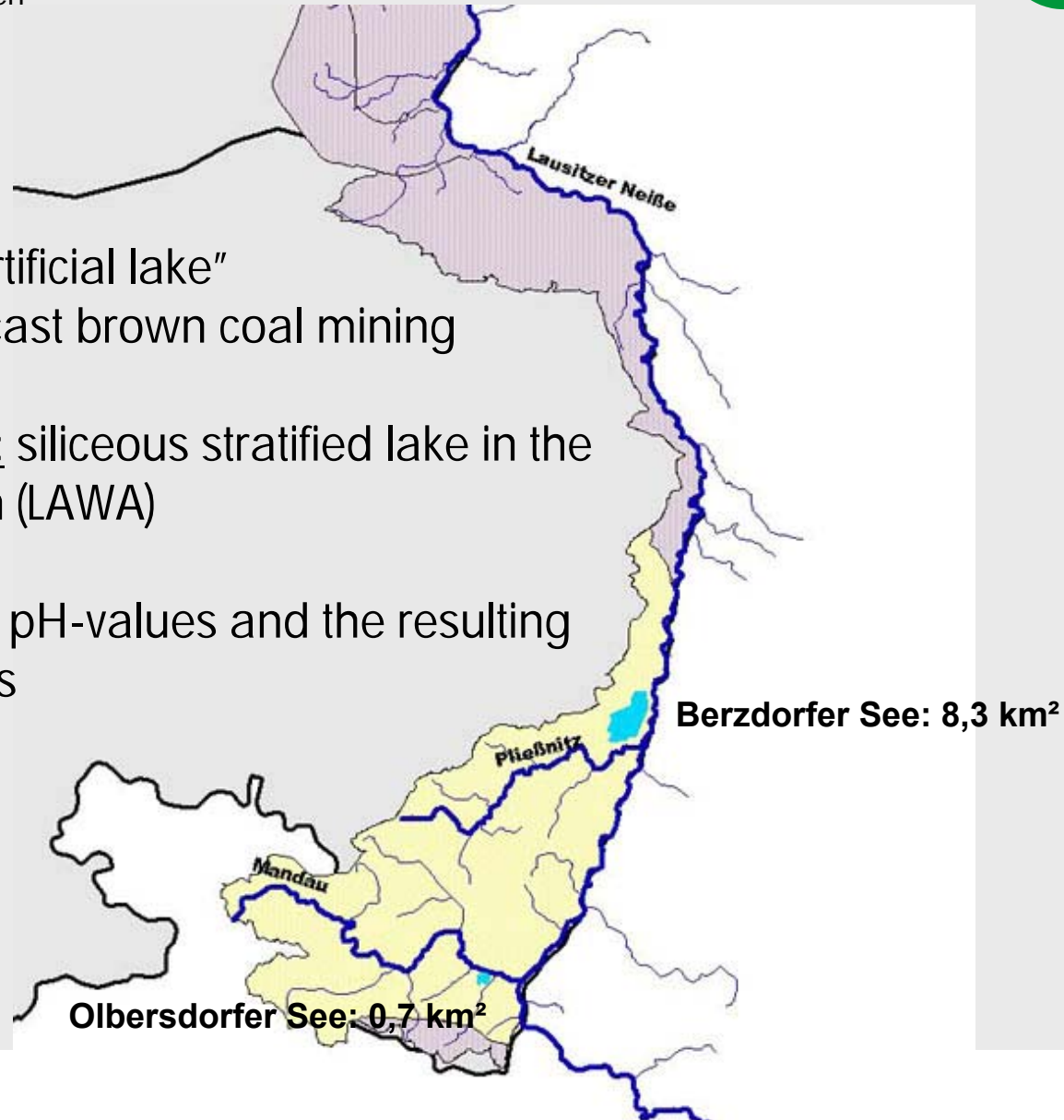


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Category: "artificial lake"
=> open cast brown coal mining

Reference condition: siliceous stratified lake in the mountainous region (LAWA)

+
information on low pH-values and the resulting aquatic communities



Identification of Water Bodies in the Saxonian Part of the PRB Lausitzer Neiße - Part 1: Tributary River Mandau -

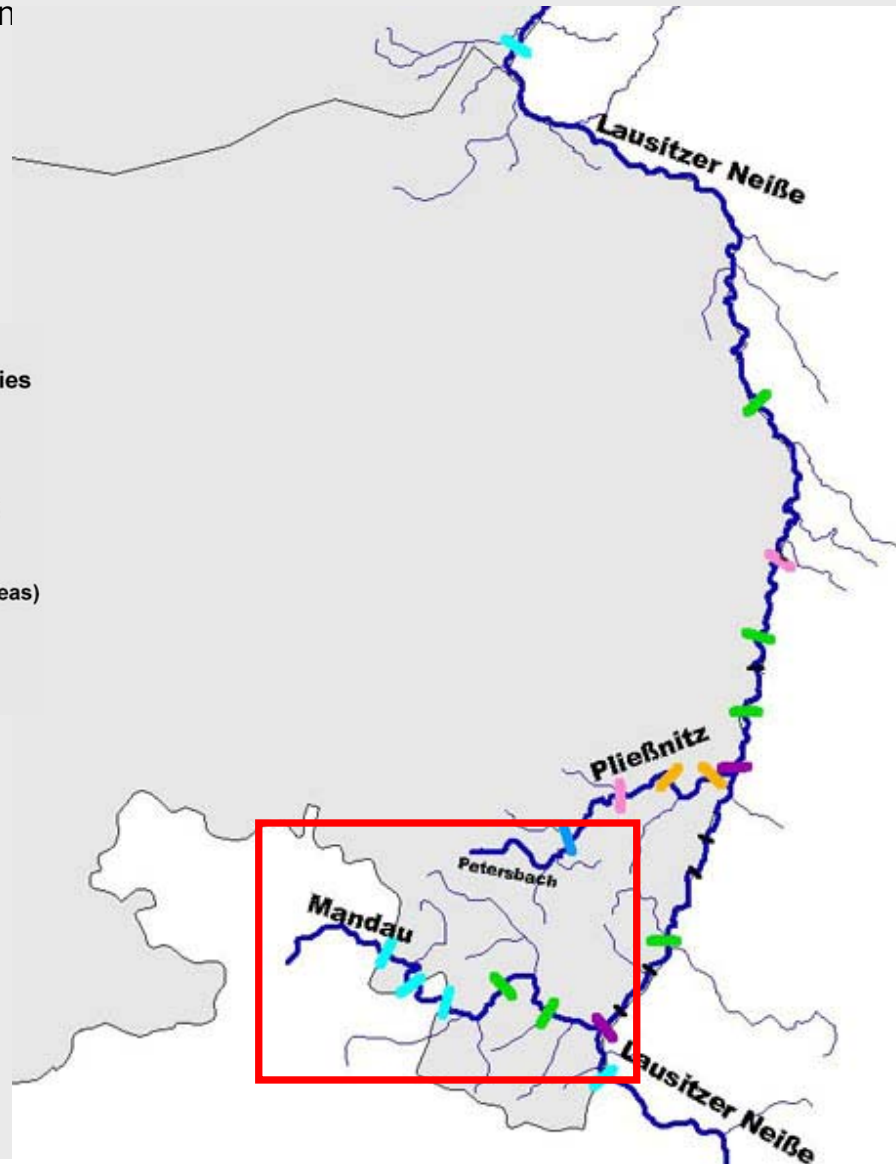


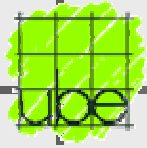
Overview



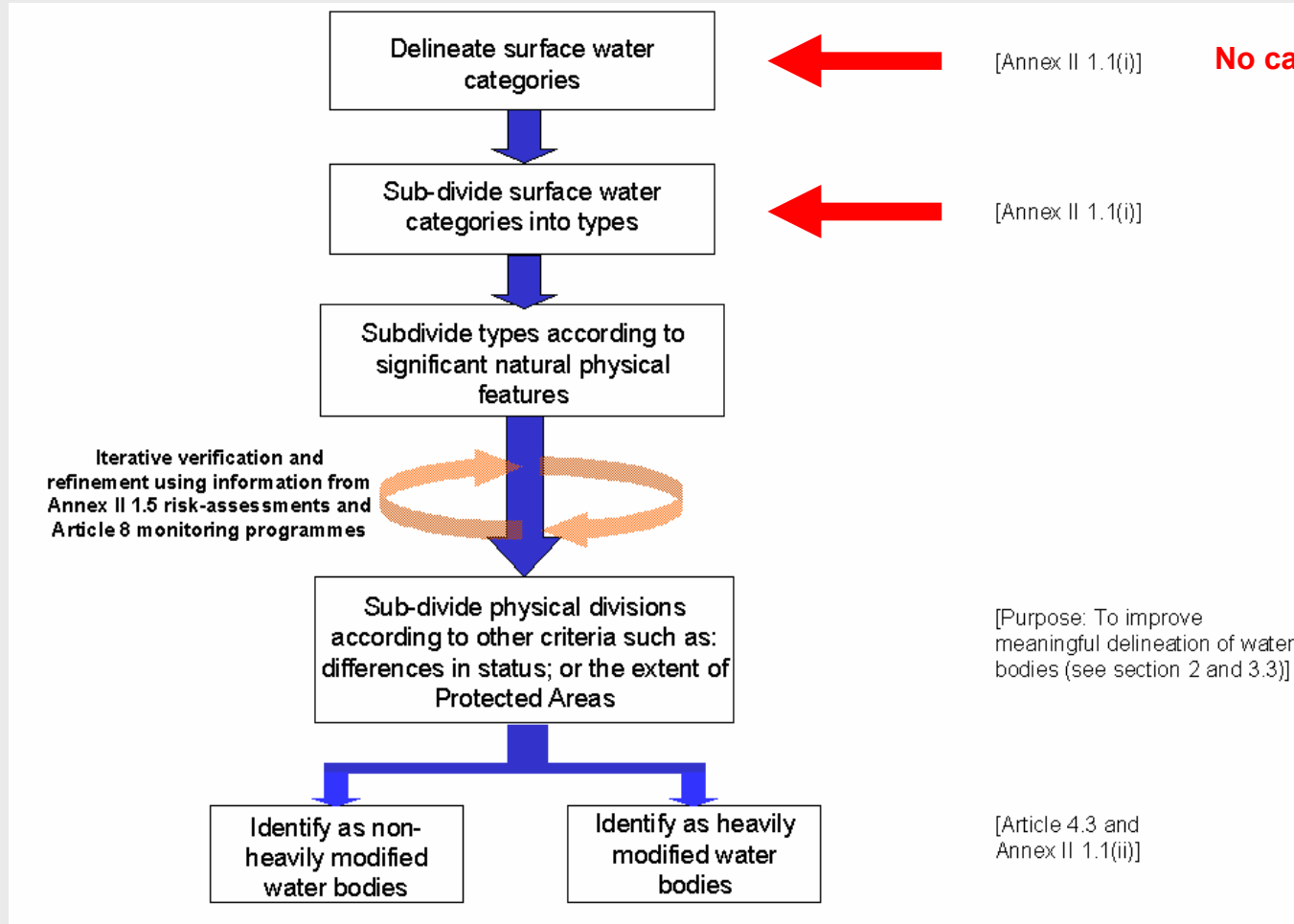
Dominant reason for the demarcation of the water bodies

- category
- tributary
- stream type
- saprobic status classes
- german habitat survey
- concentration of salt
- nature reserves (FFH areas)
- national frontiers
- land utilization
- sub-water-body





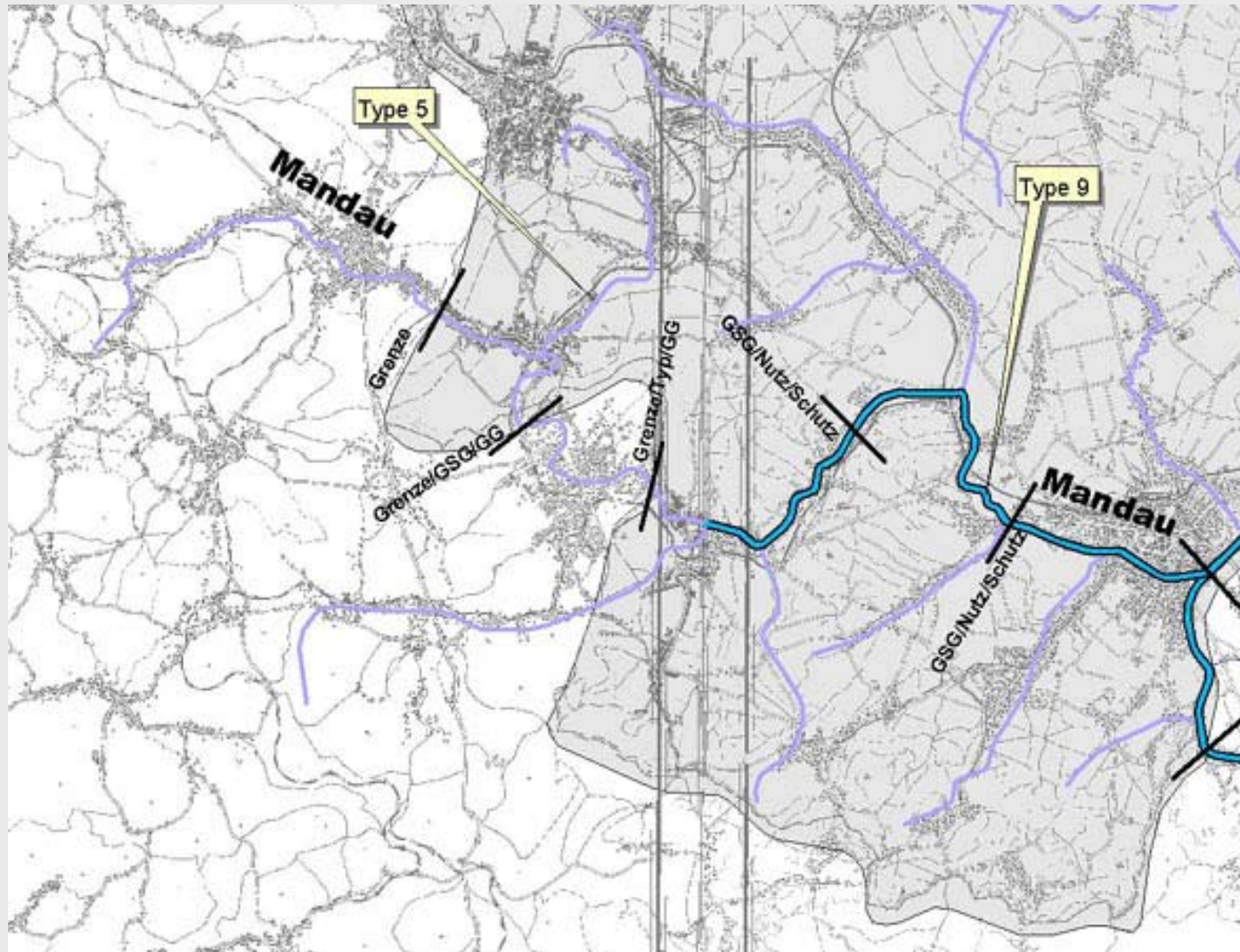
Flowchart of the Identification Process (According to the Horizontal Guidance Document)



No category changes along the river

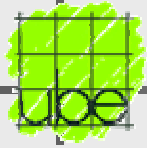


River Typology According to LAWA

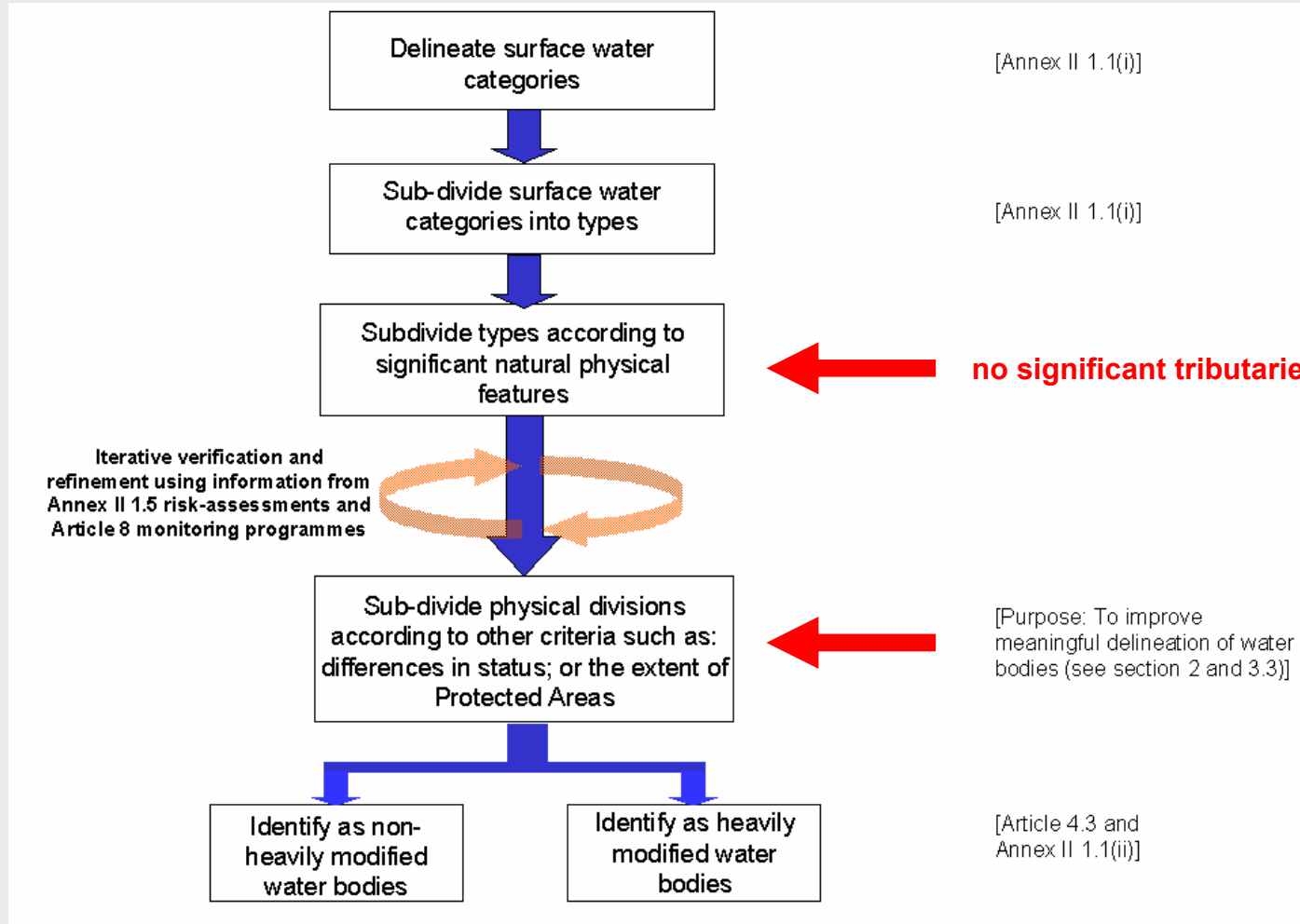


Reasons for the Demarcation of the Water Bodies

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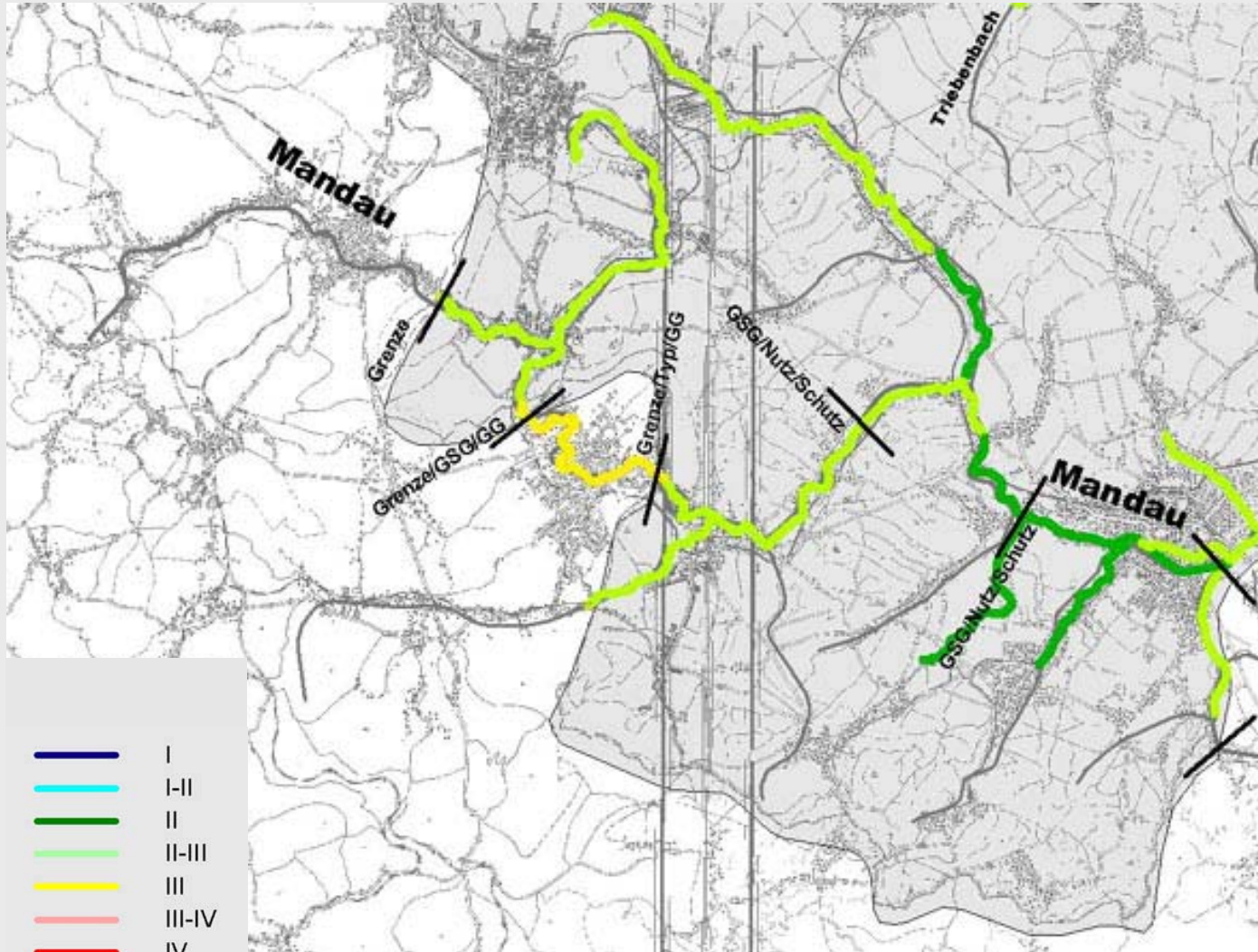


Flowchart of the Identification Process (According to the Horizontal Guidance Document)





Saprobic Status



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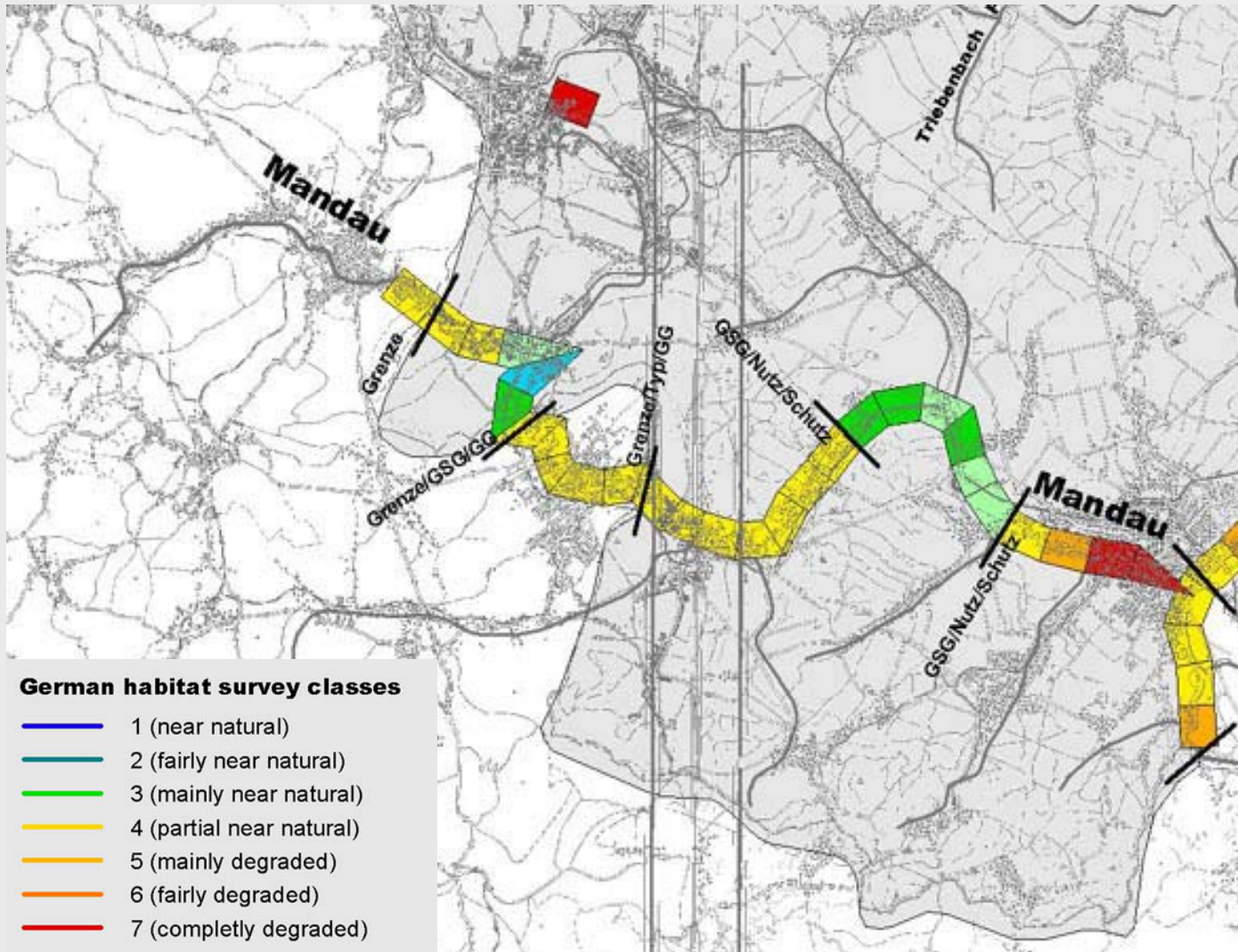


German Habitat Survey (Assessment of Stream Morphology)

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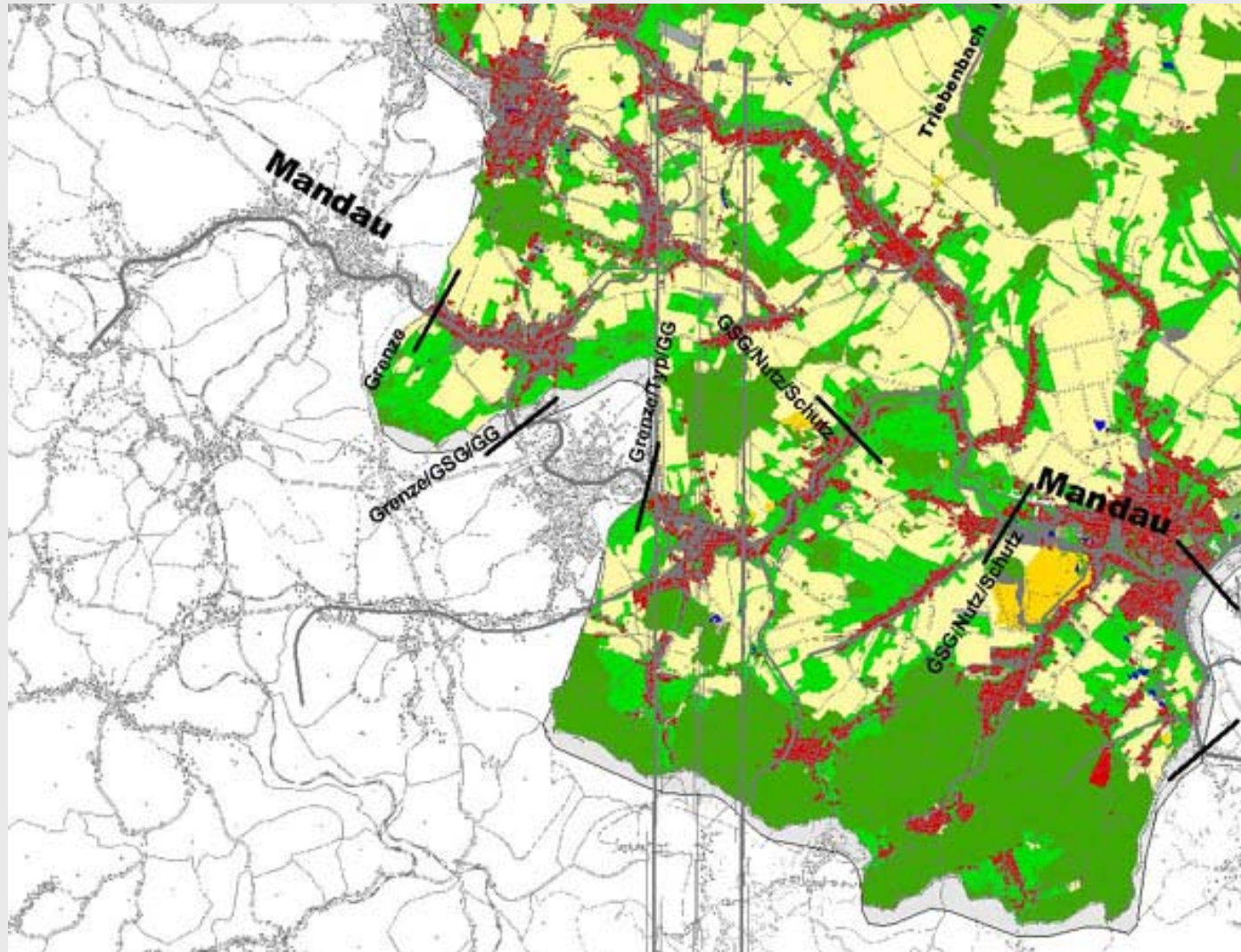


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Land Utilization

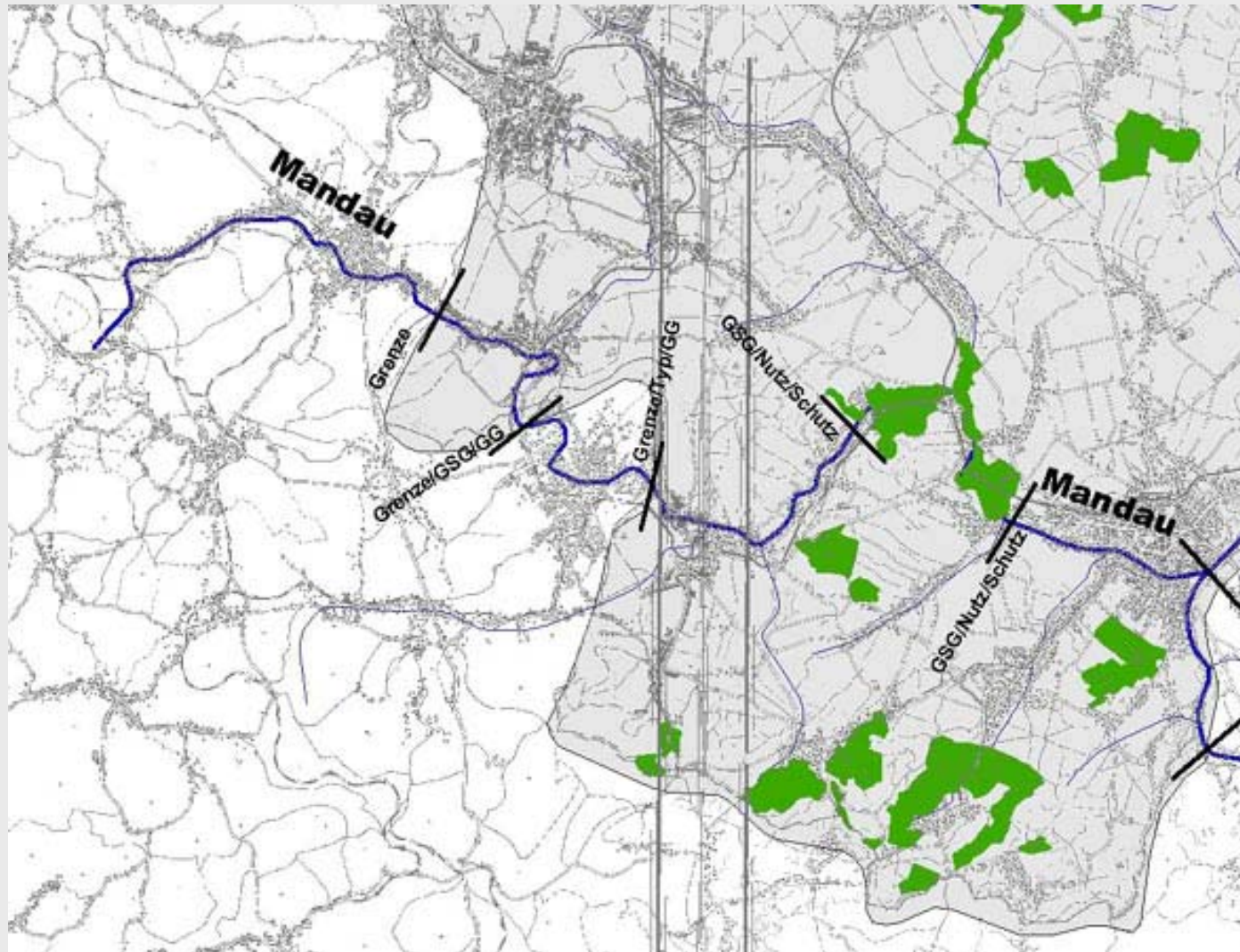


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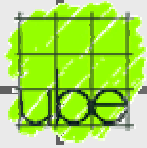


Nature Reserves (FFH Areas)

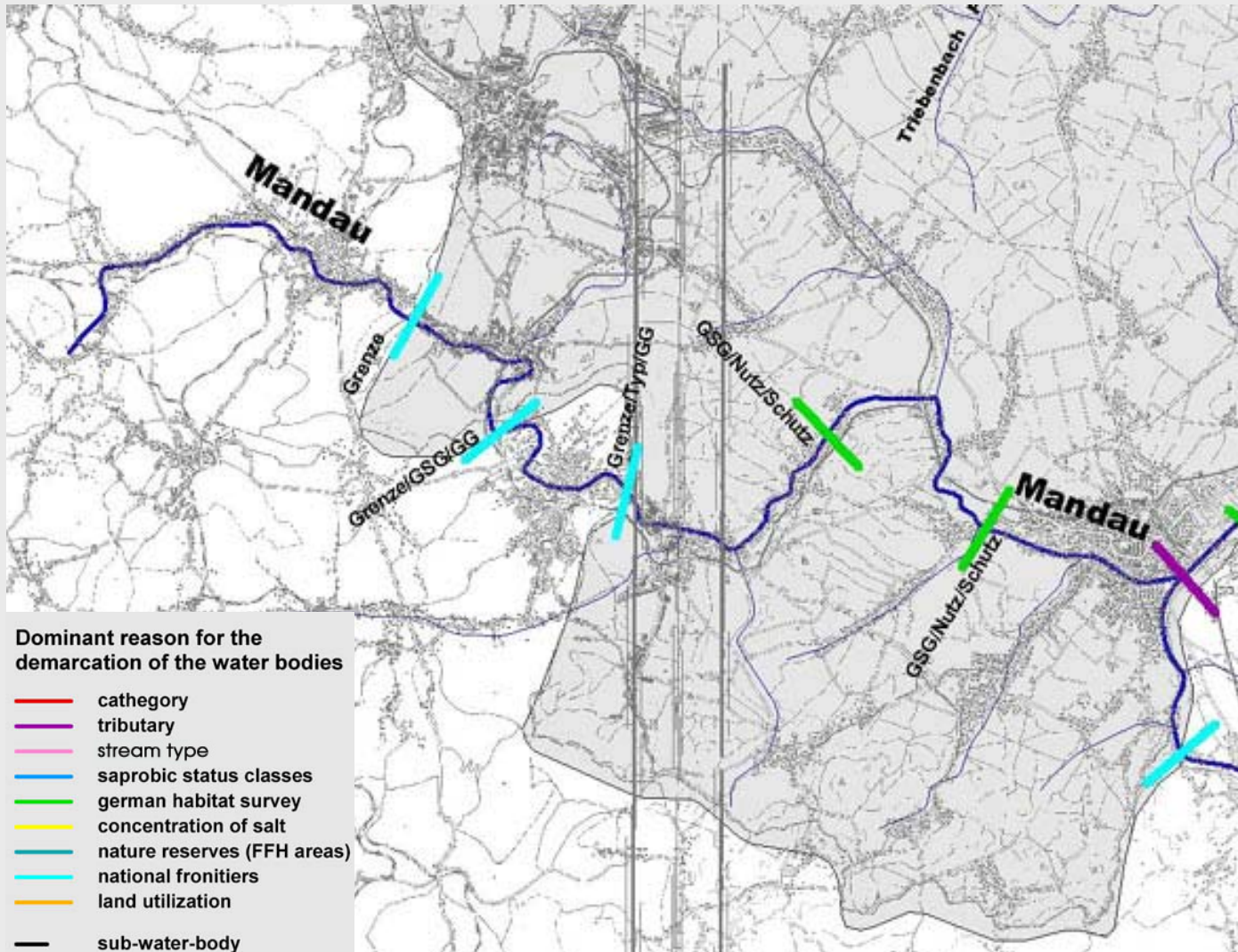


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Water Bodies of the River Mandau



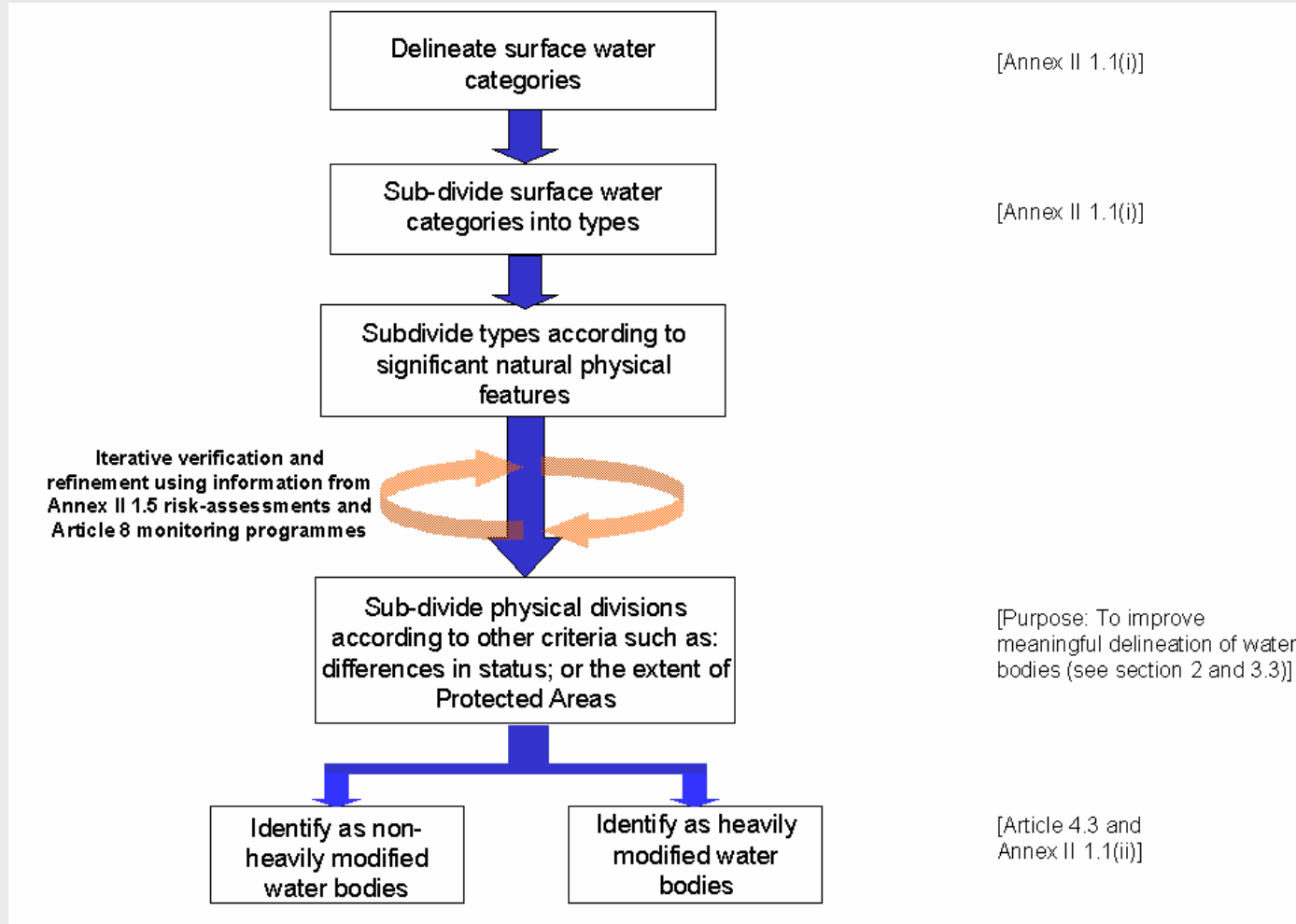


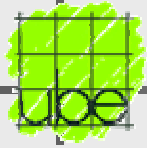
Results:

	River Neisse	Mandau River	River Pließnitz
Number of water bodies	8	4	5
mean size of water bodies	14.20 km	5.65 km	8.20 km
max. size of water bodies	45.98 km	6.47 km	2.13 km
min. size of water bodies	4.28 km	4.64 km	17.17 km



Flowchart of the Identification Process (According to the Horizontal Guidance Document)



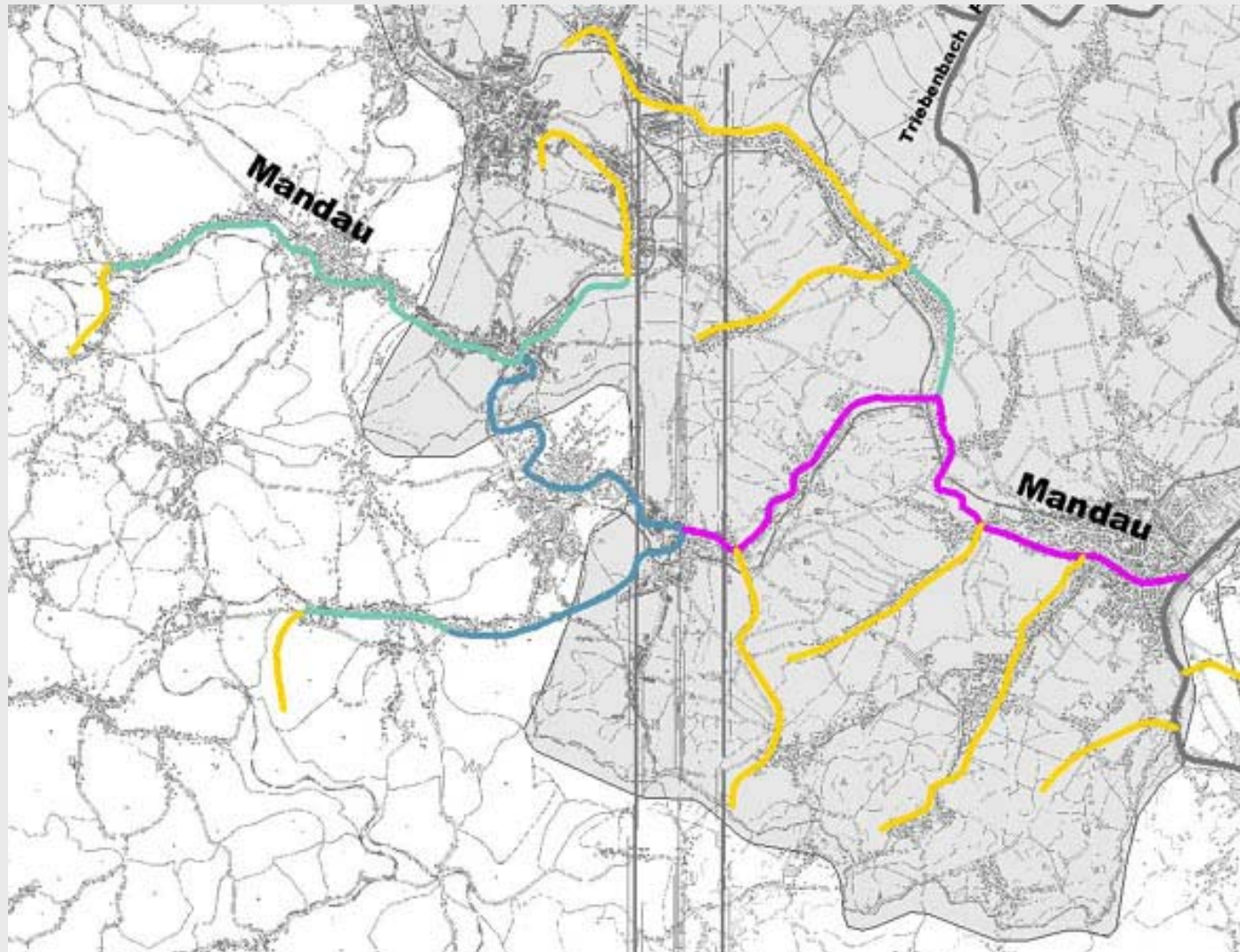


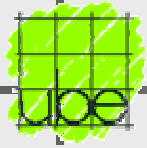
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Water Bodies in the Sub Basin River Mandau (According to the Strahler System – Used in Czech Republic)



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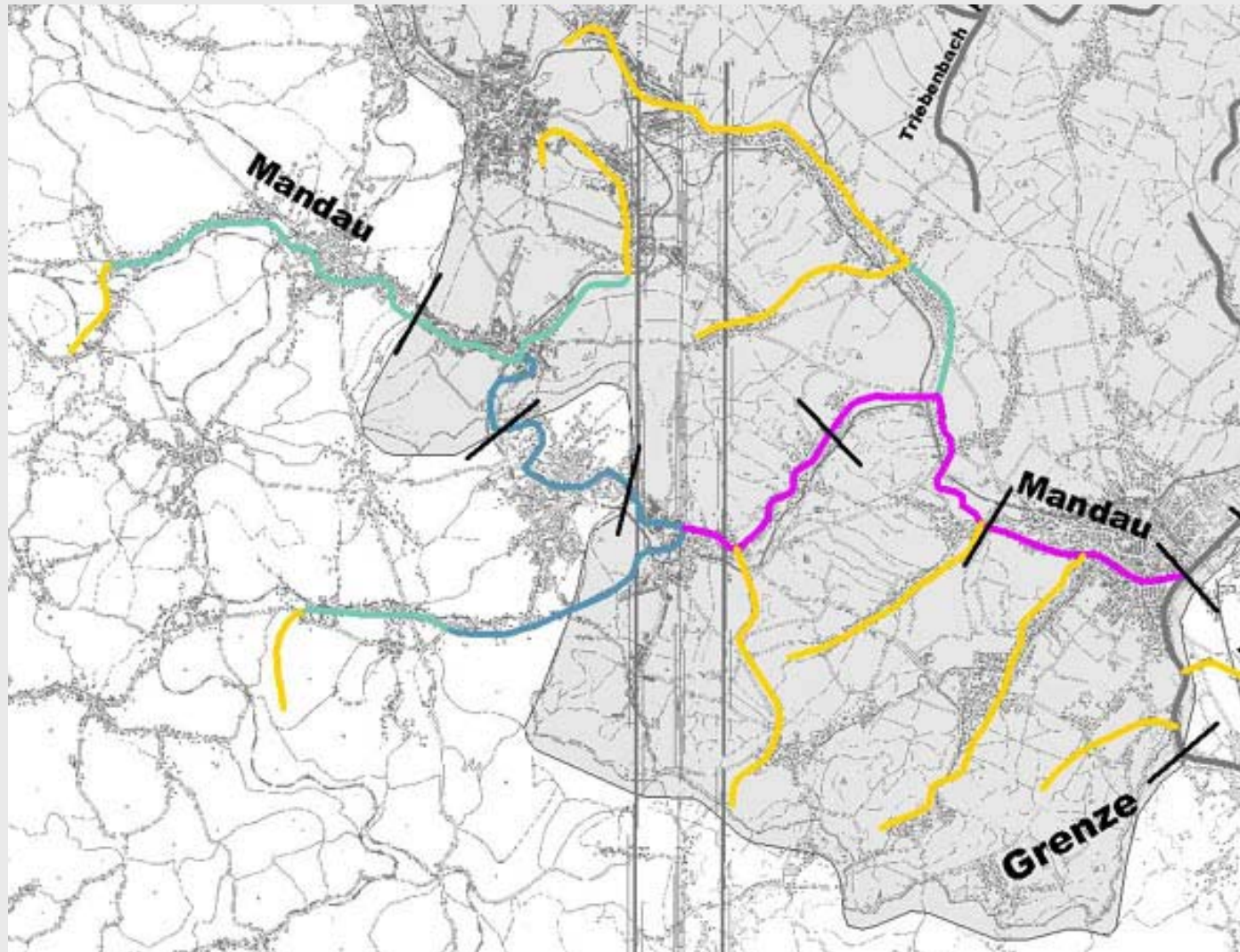


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Water Body Identification According to the Horizontal Guidance Document Compared to the Water Bodies Identified According to the Strahler System



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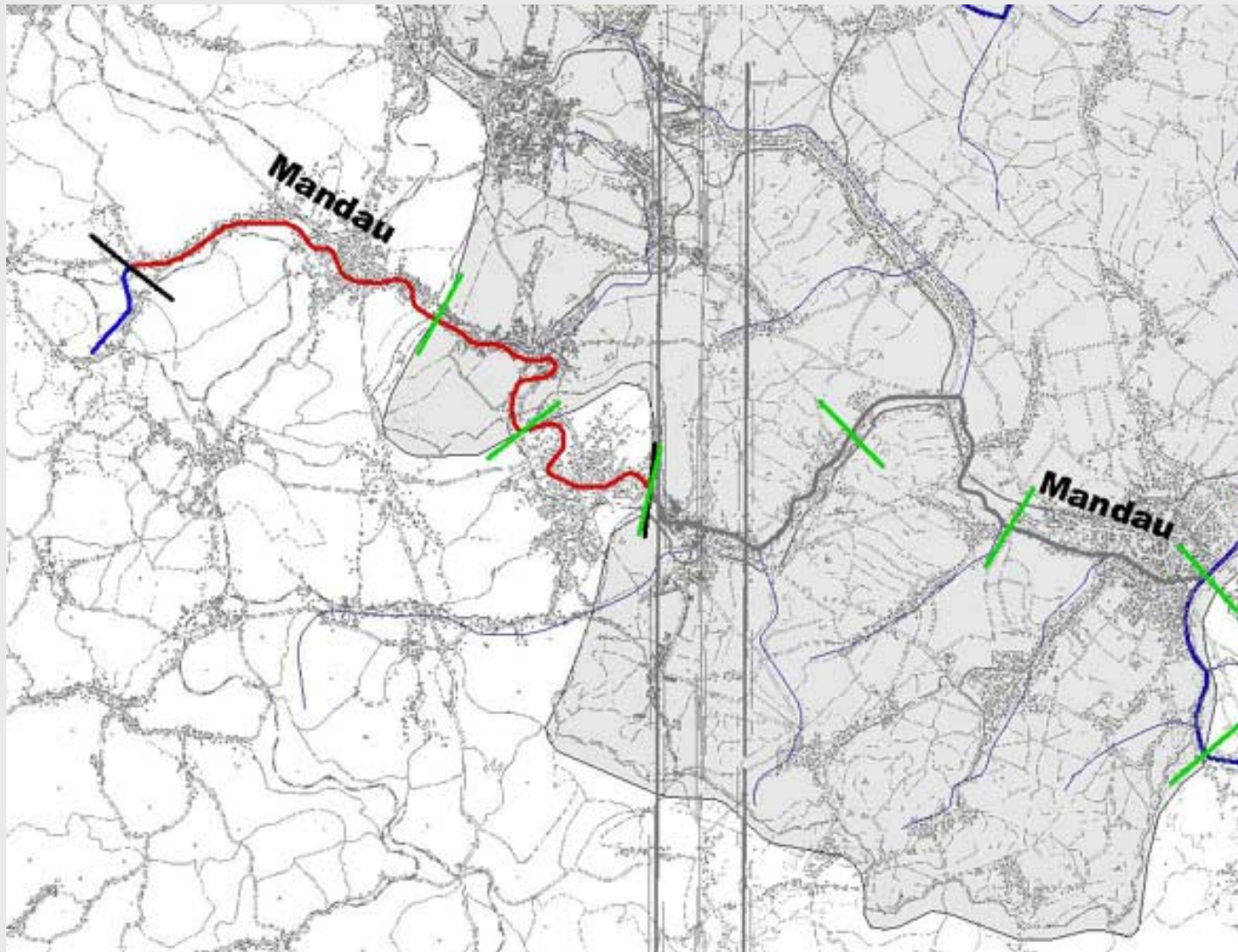
Czech Water Bodies According to STRAHLER (1957) and the Water Body Demarcations According to Horizontal Guidance (green lines)



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Identification of Water Bodies in the Saxonian

Part of the PRB Lausitzer Neiße

- Part 2: Tributary River Pließnitz -

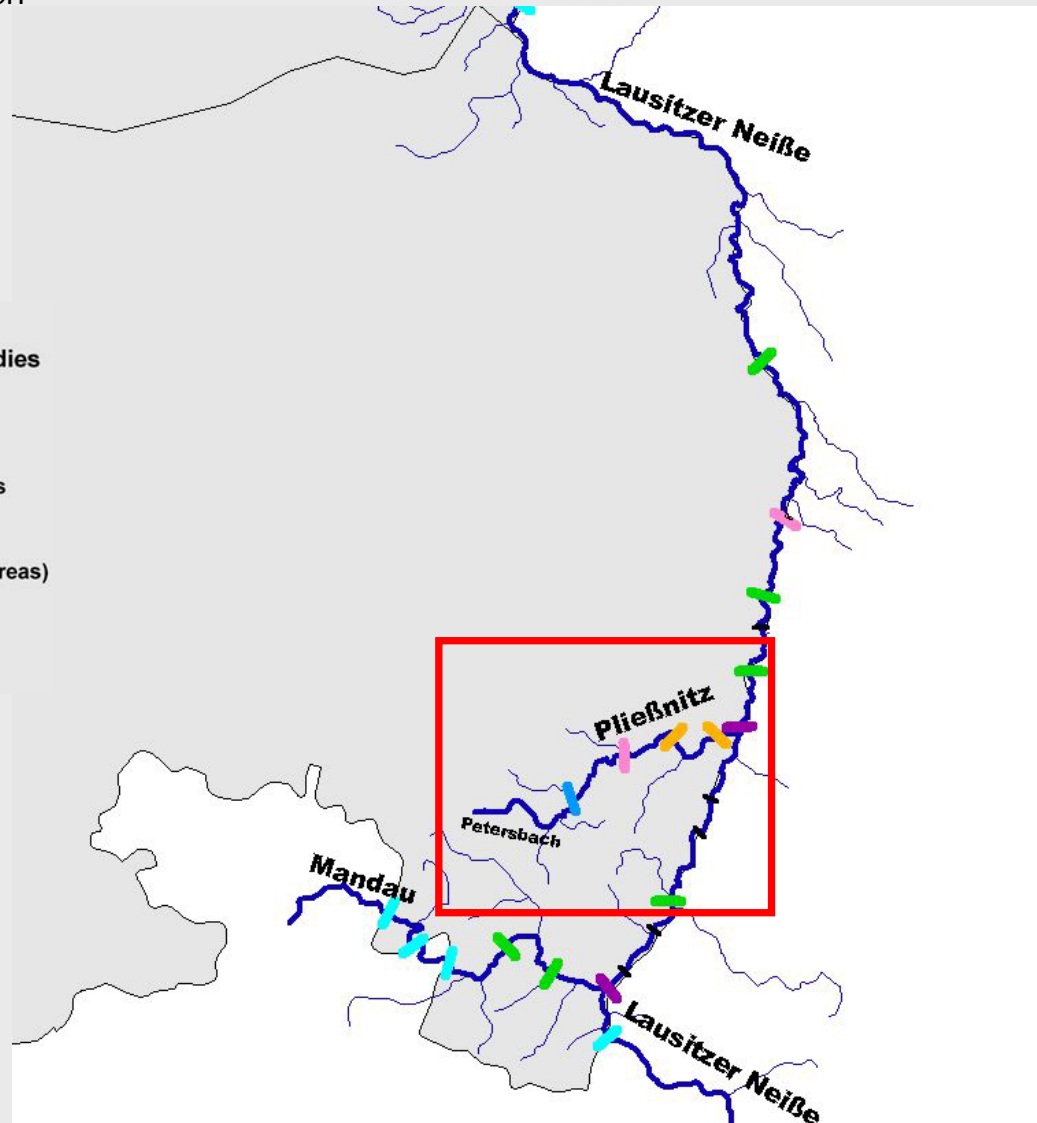


Overview



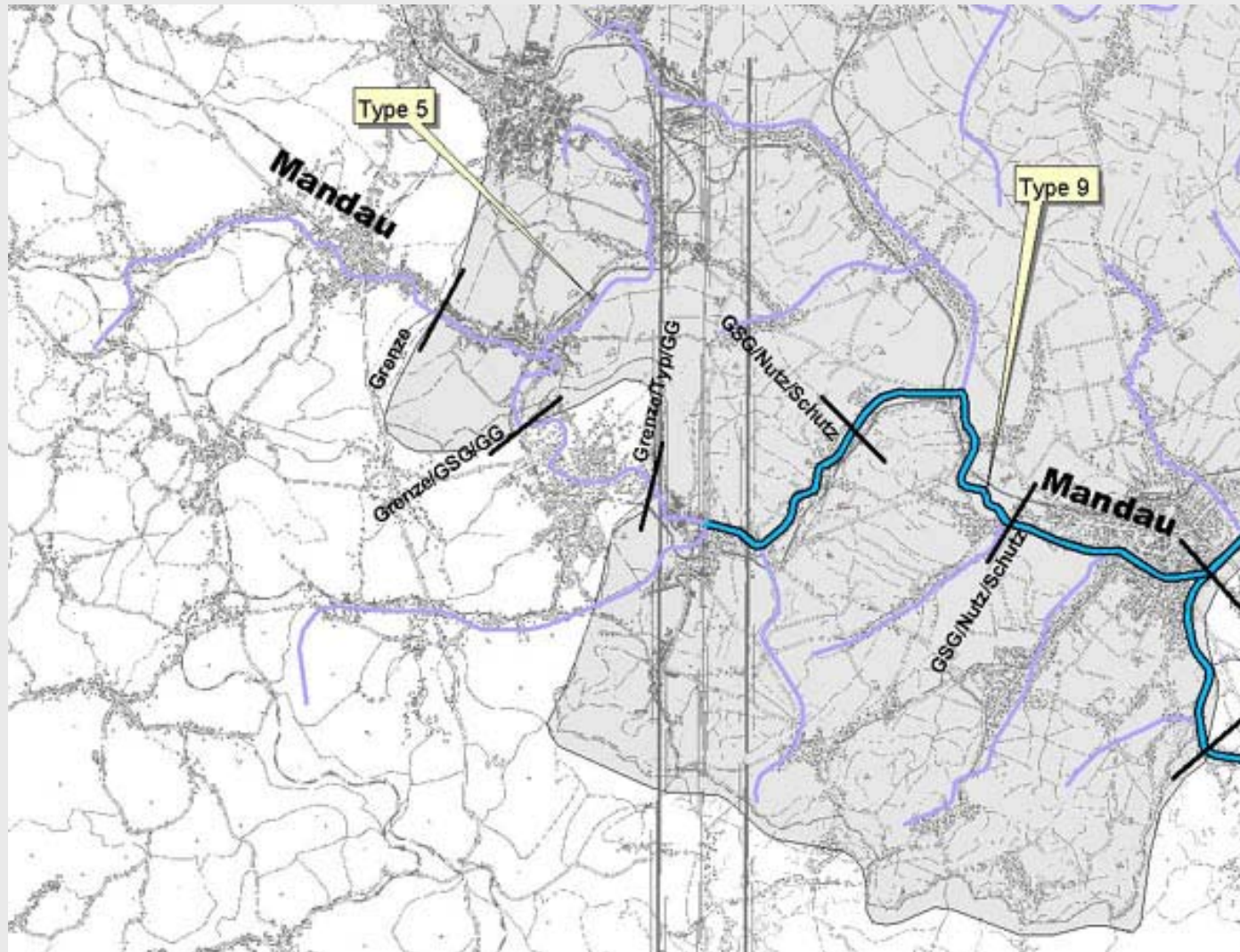
Dominant reason for the demarcation of the water bodies

- category
- tributary
- stream type
- saprobic status classes
- german habitat survey
- concentration of salt
- nature reserves (FFH areas)
- national frontiers
- land utilization
- sub-water-body





Stream Typology According to LAWA

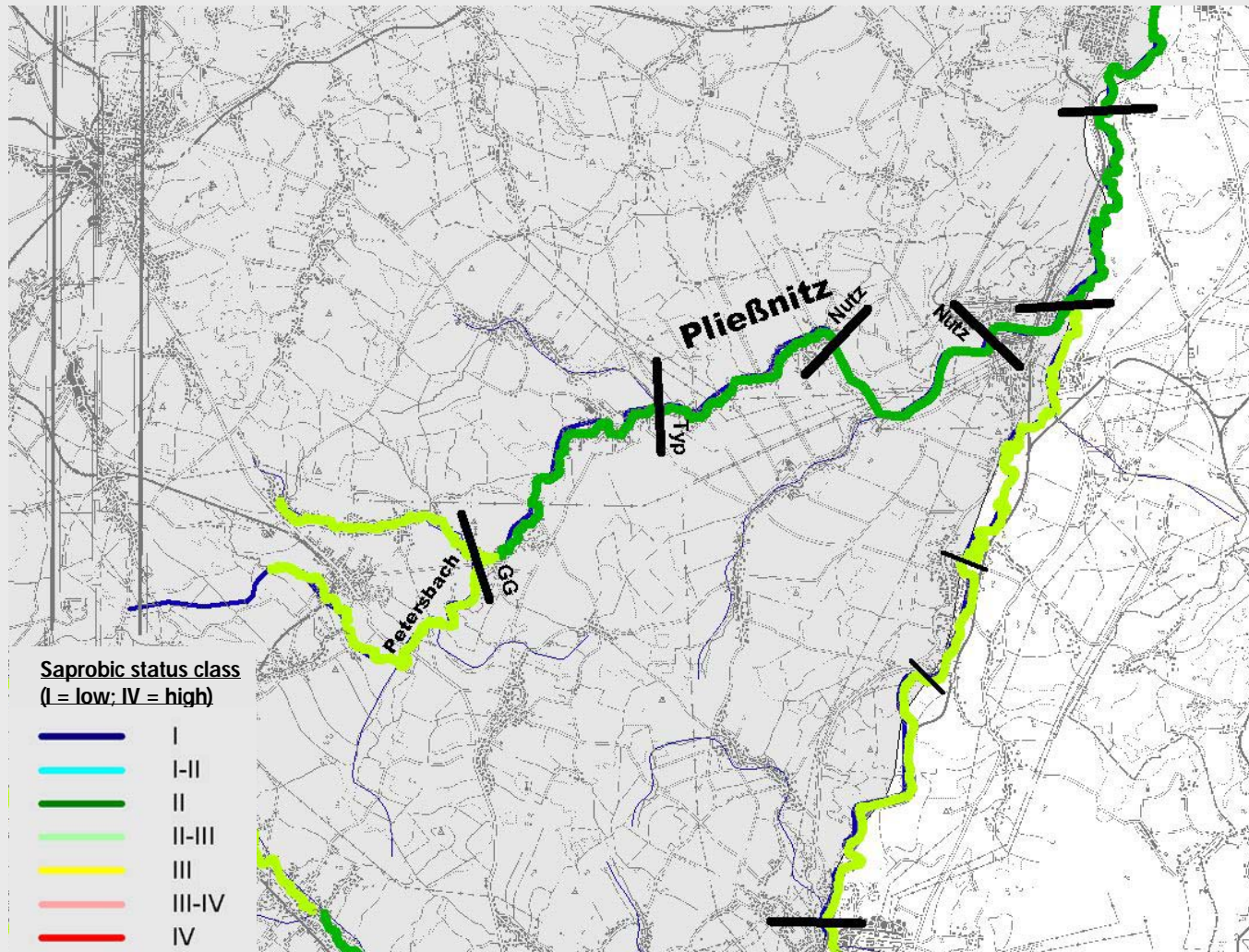


Reasons for the Demarcation of the Water Bodies

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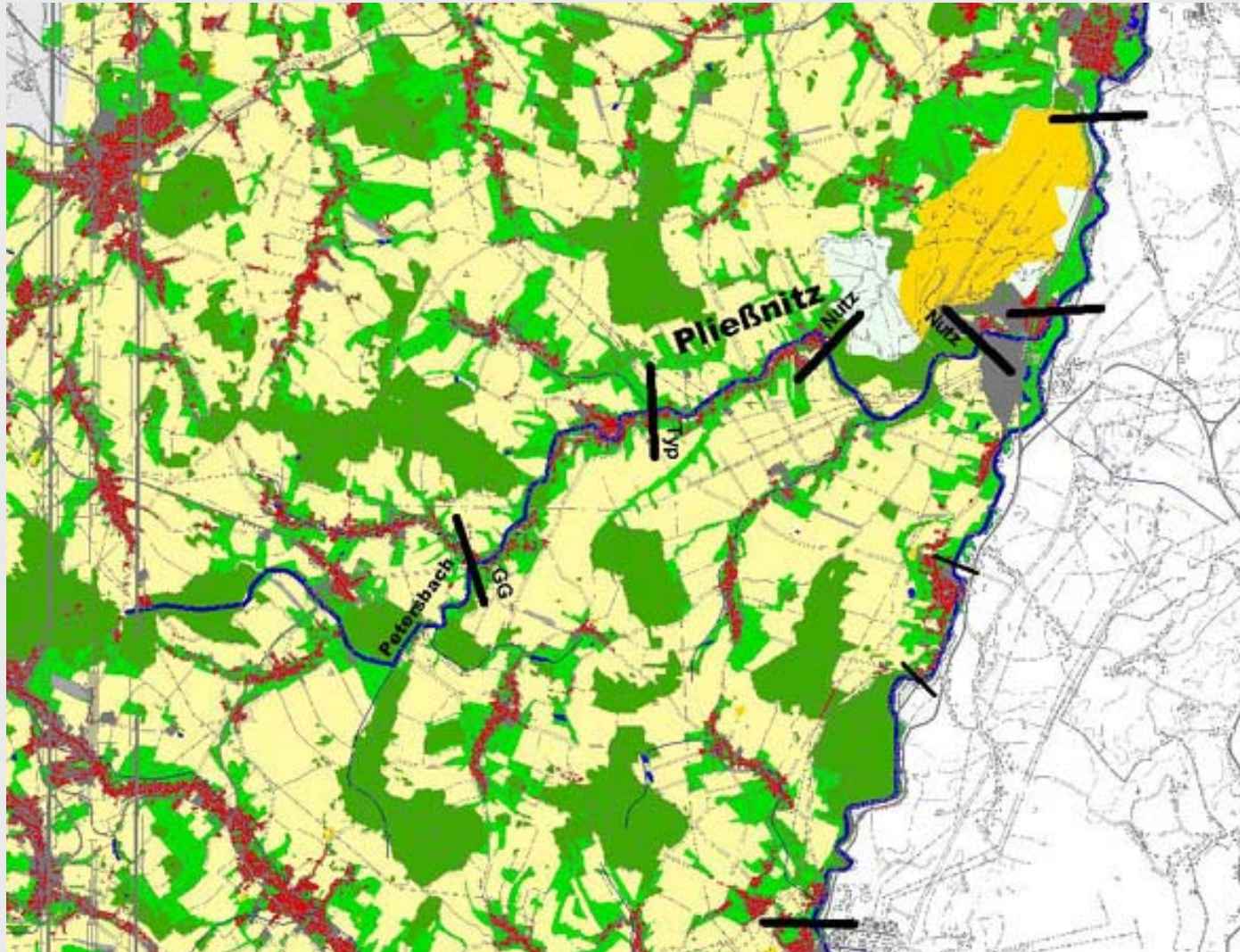


Saprobic Status





Land Utilization

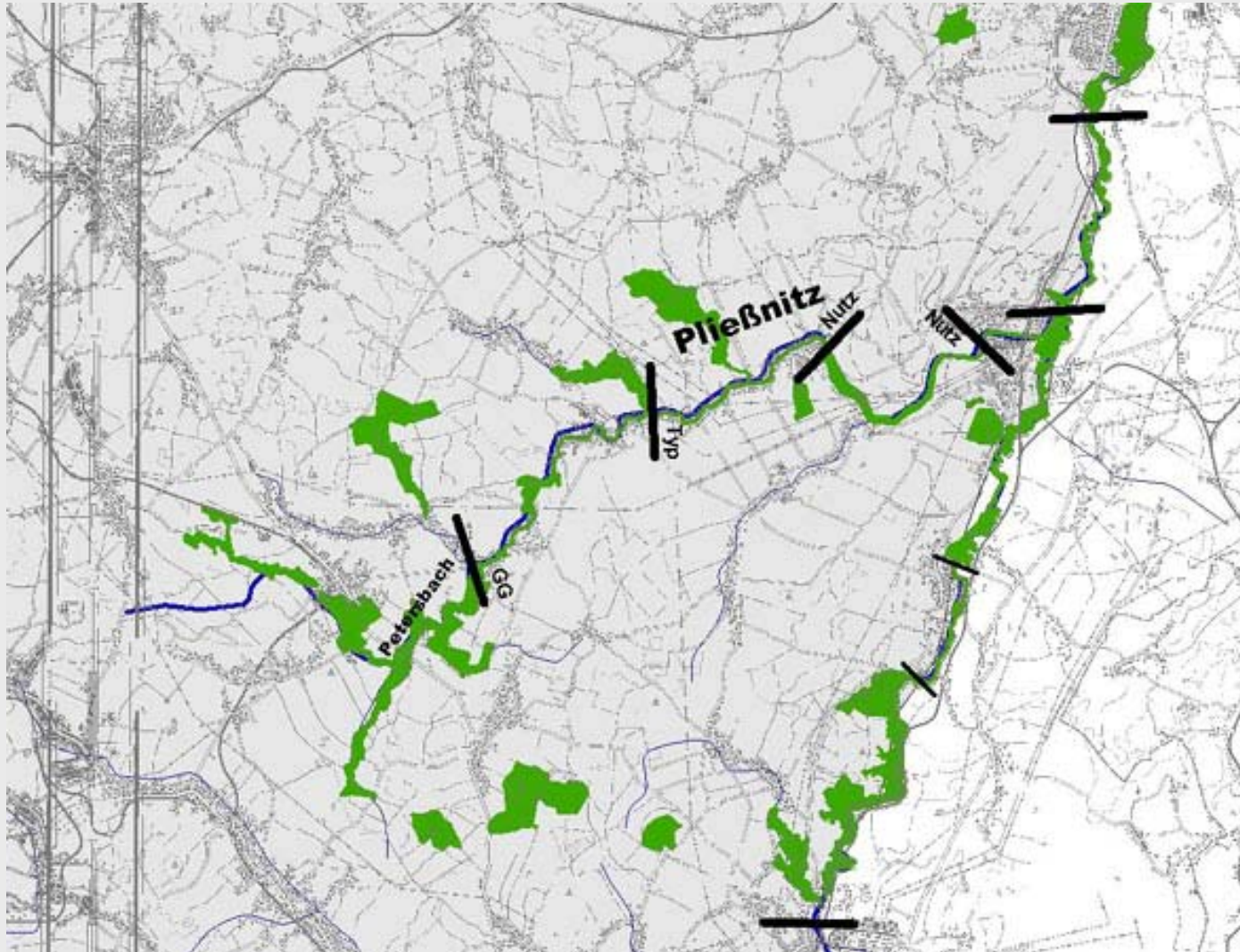


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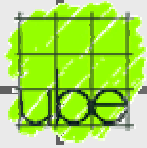


Nature Reserves (FFH Areas)



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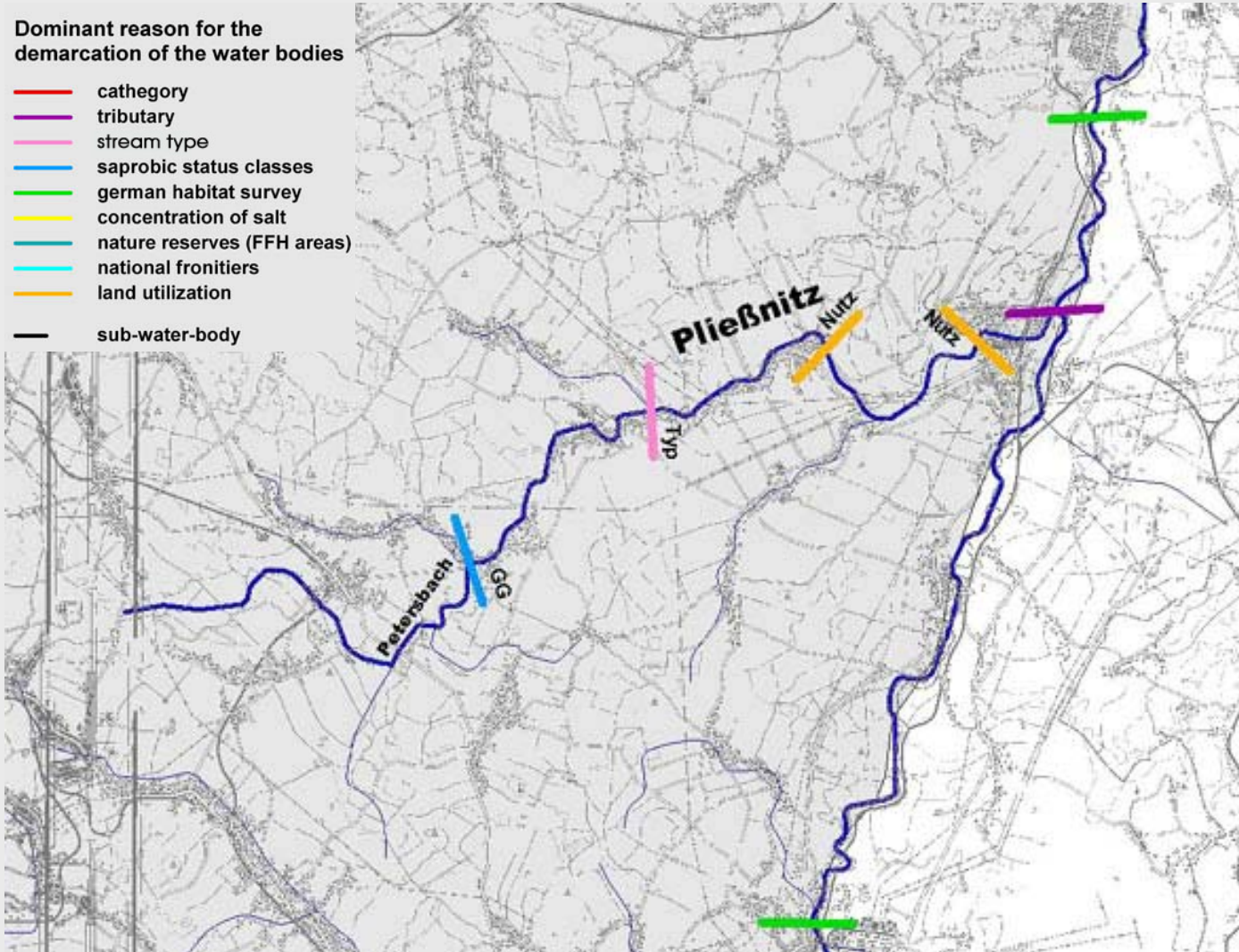


Water Bodies of the River Pießnitz



Dominant reason for the demarcation of the water bodies

- category
- tributary
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- concentration of salt
- nature reserves (FFH areas)
- national frontiers
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Identification of Water Bodies in the Saxonian Part of the PRB Lausitzer Neiße - Part 3: Lausitzer Neiße -



Overview



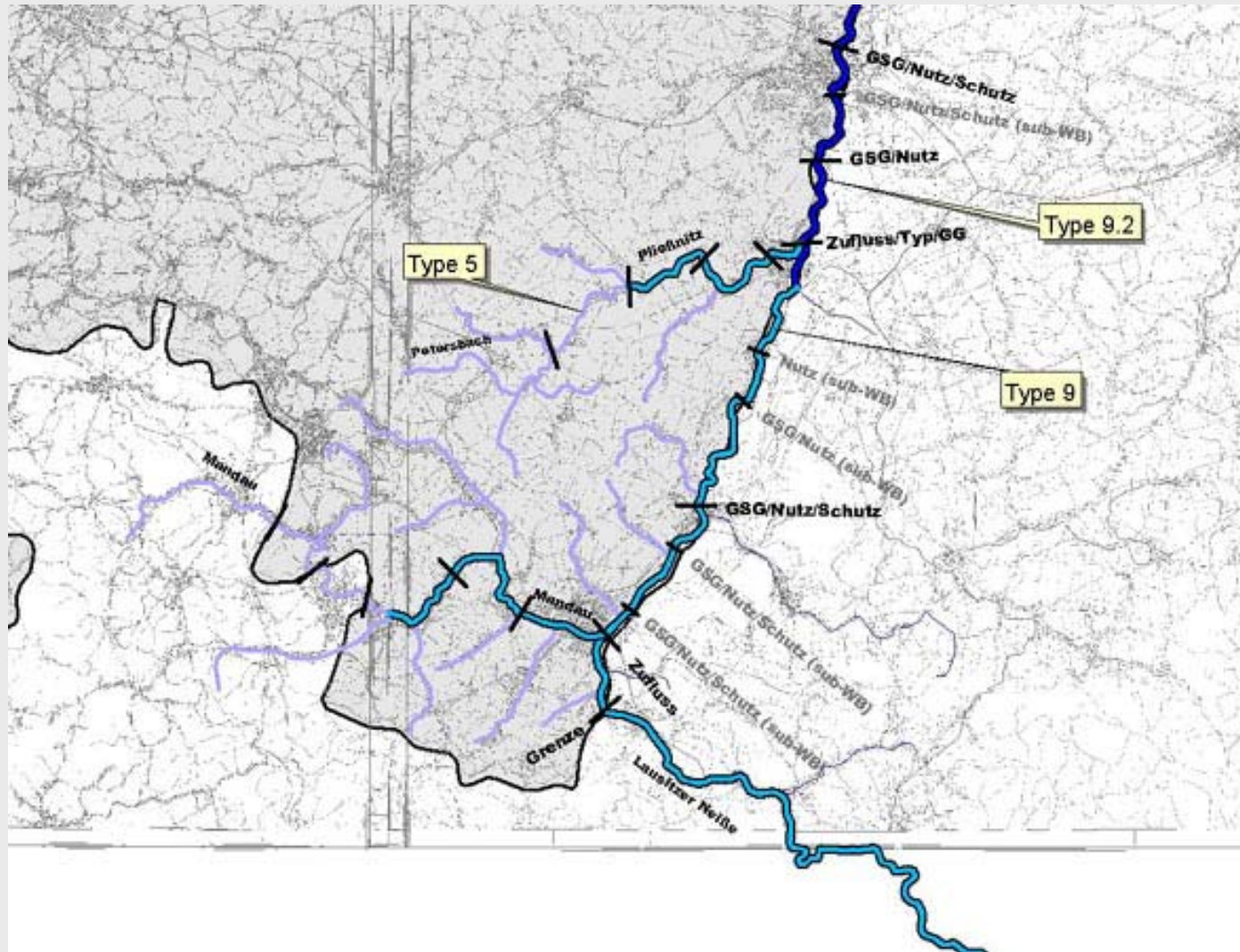
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Stream Typology According to LAWA

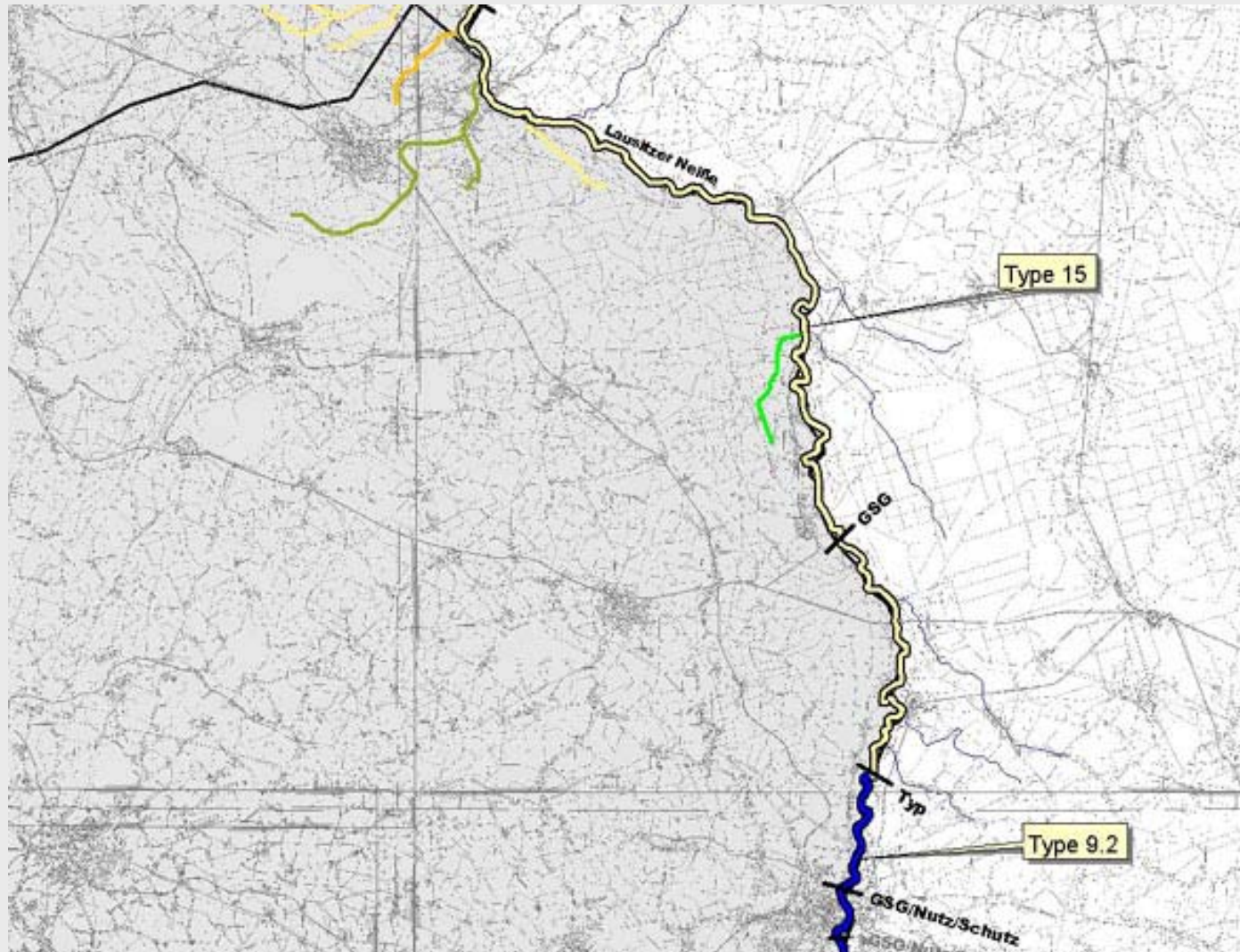


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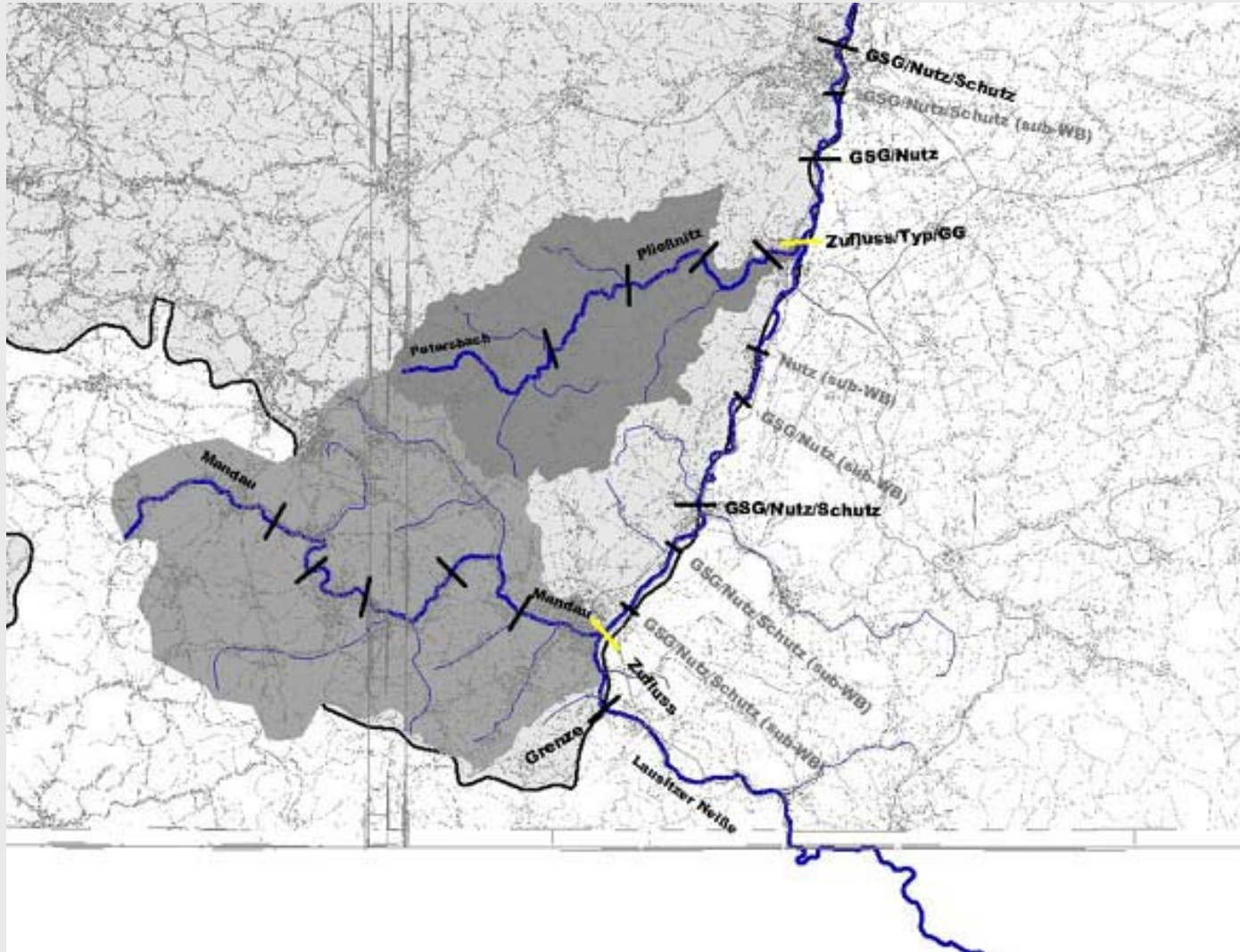


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Significant Tributaries

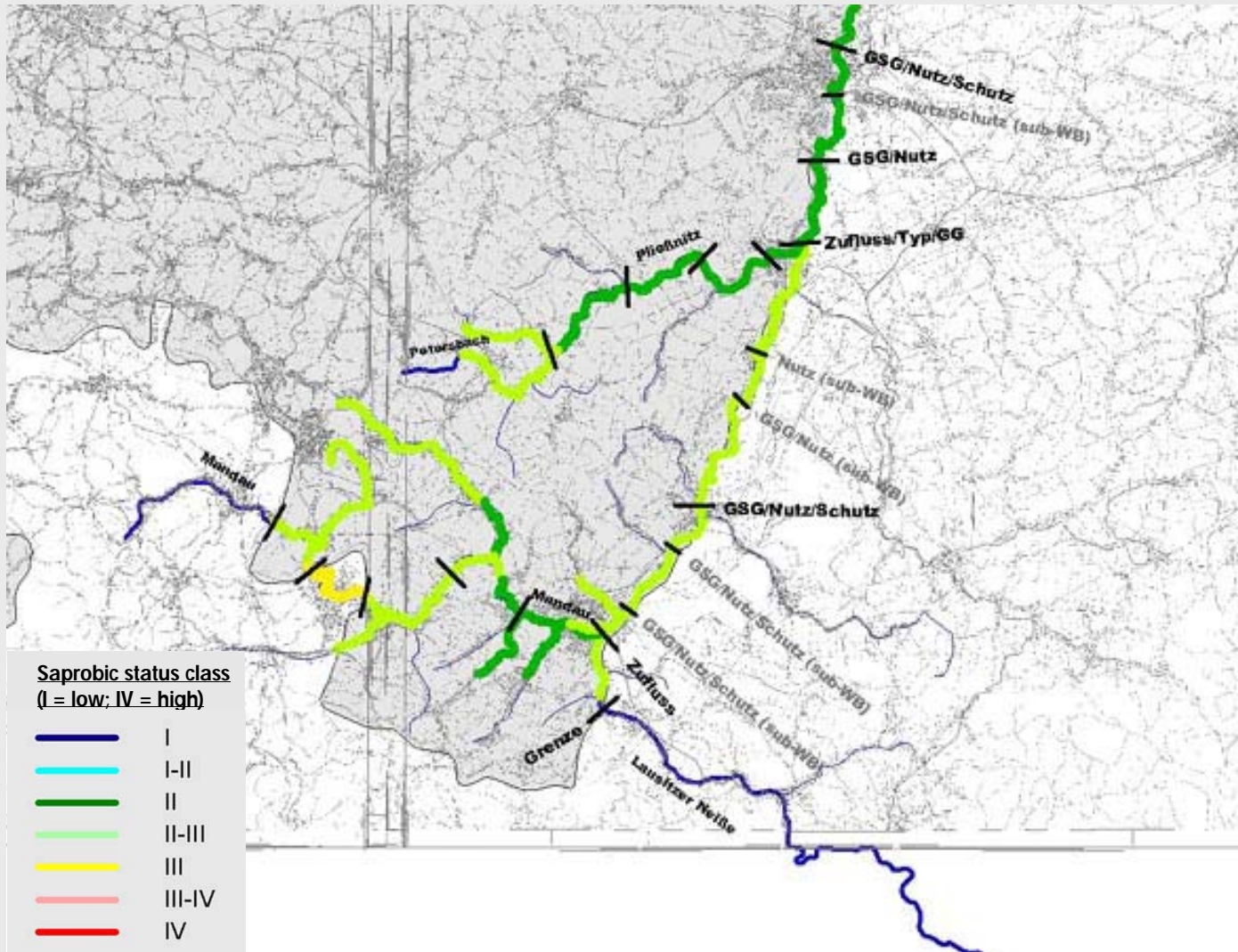


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Saprobic Status

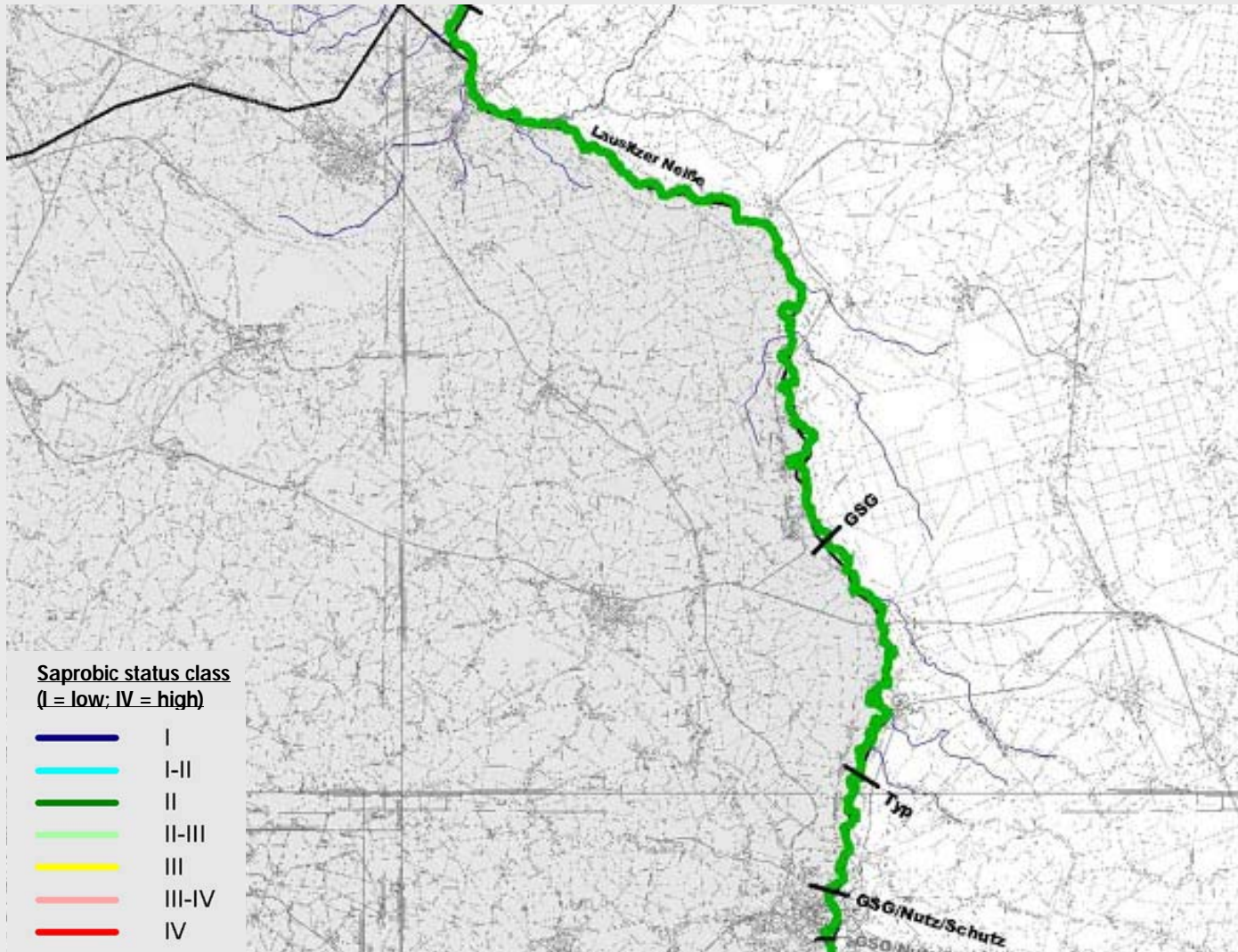


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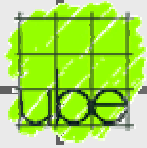


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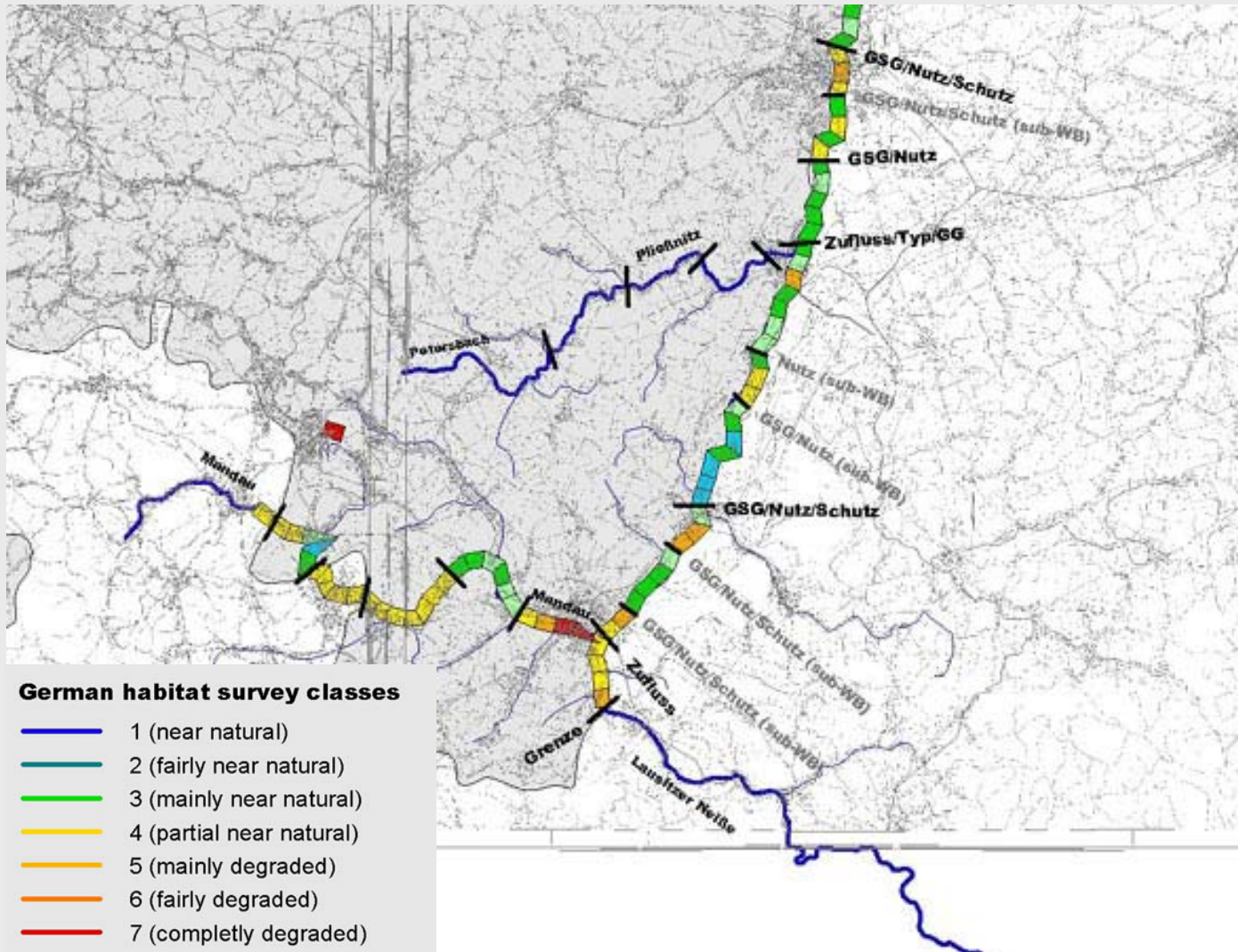


German Habitat Survey (Assessment of Stream Morphology)

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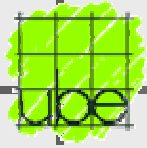


German habitat survey classes

- 1 (near natural)
- 2 (fairly near natural)
- 3 (mainly near natural)
- 4 (partial near natural)
- 5 (mainly degraded)
- 6 (fairly degraded)
- 7 (completely degraded)

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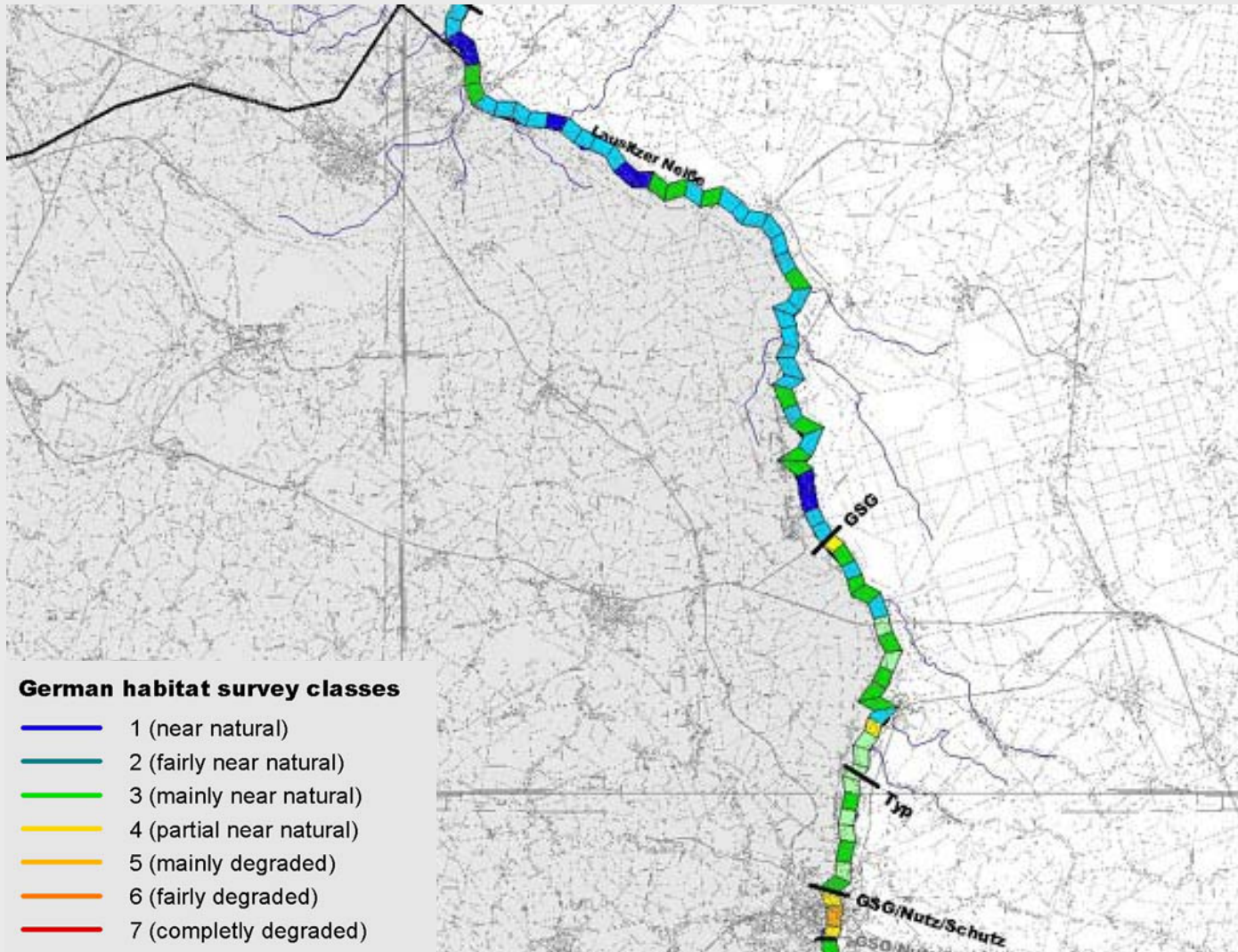


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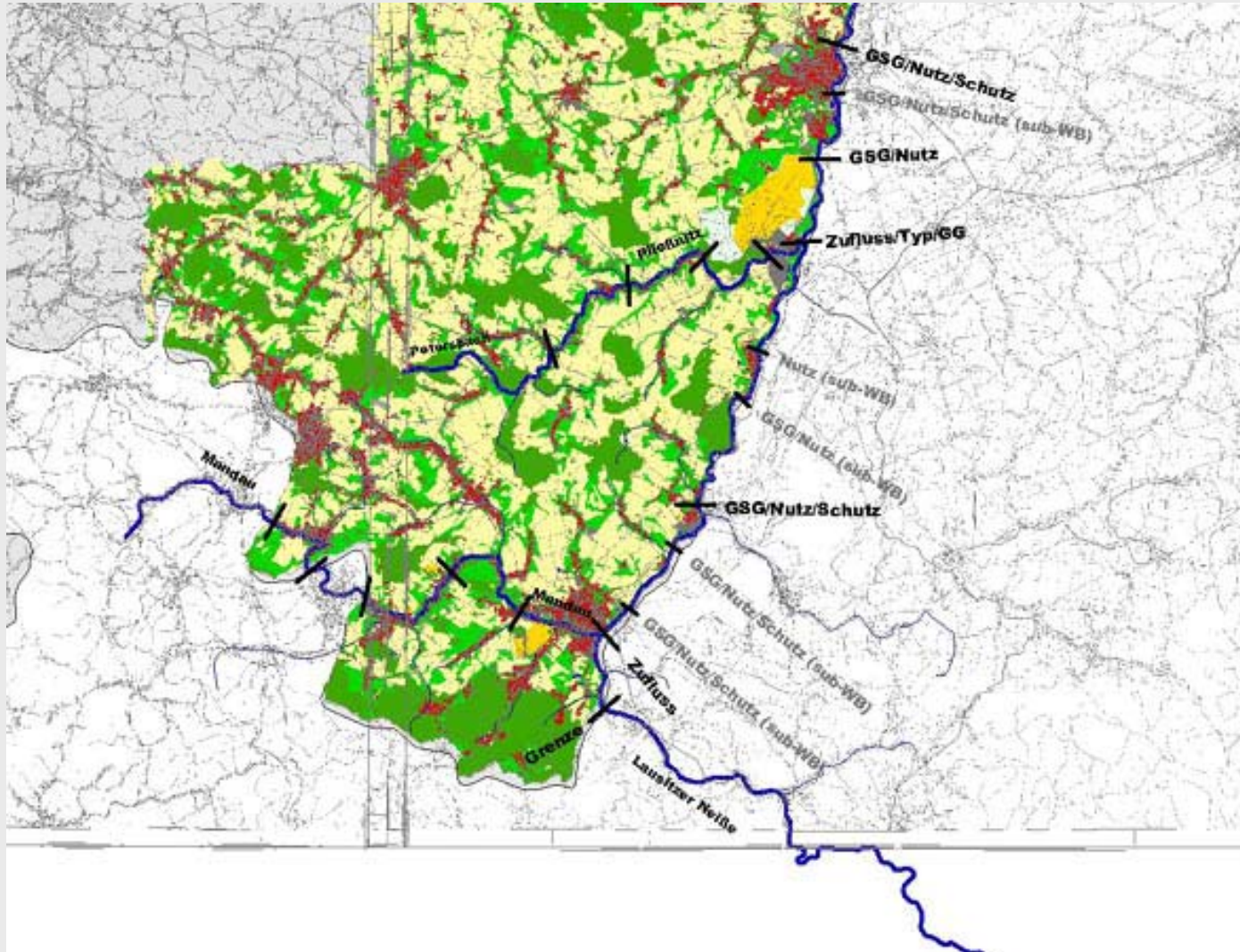


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Land Utilization

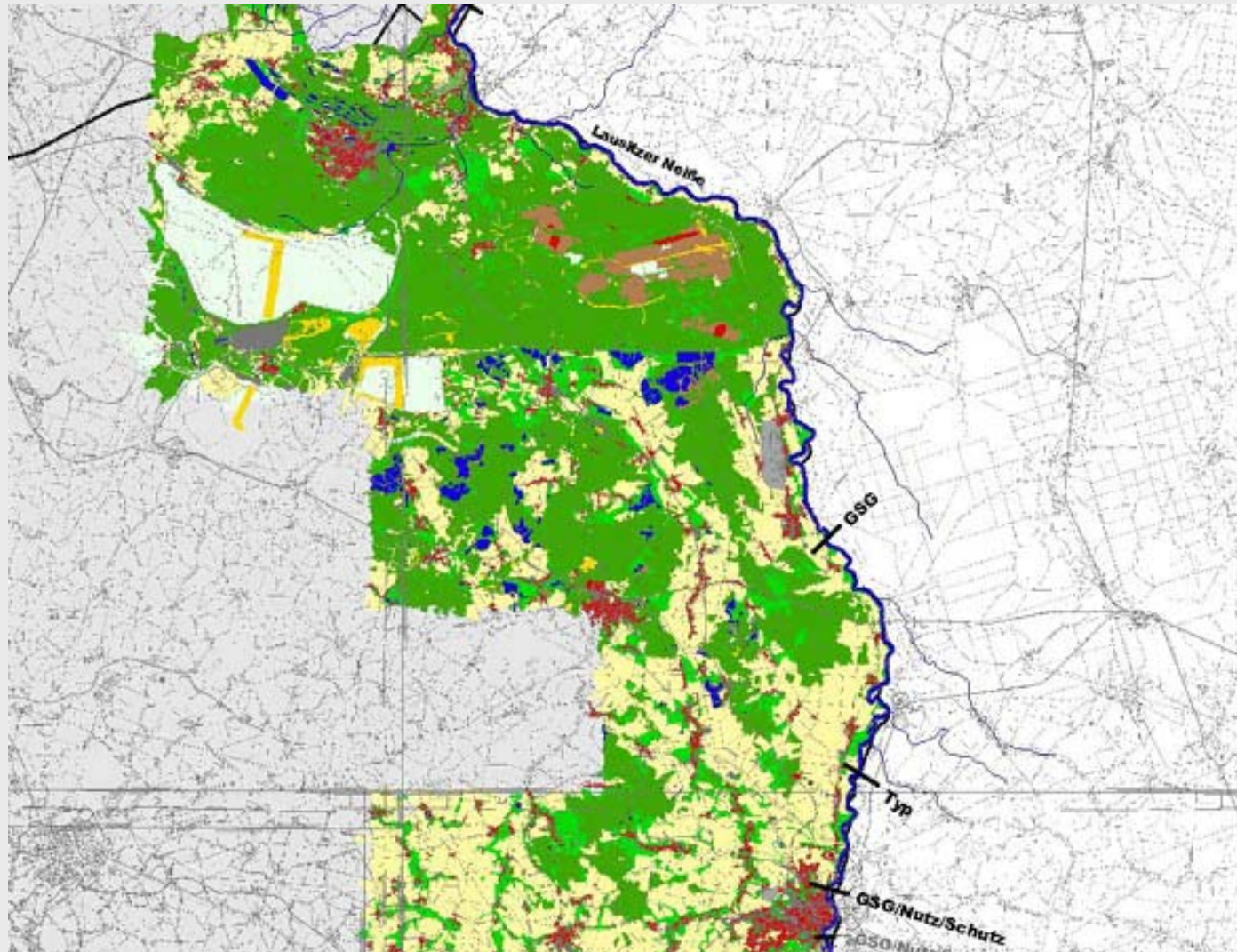


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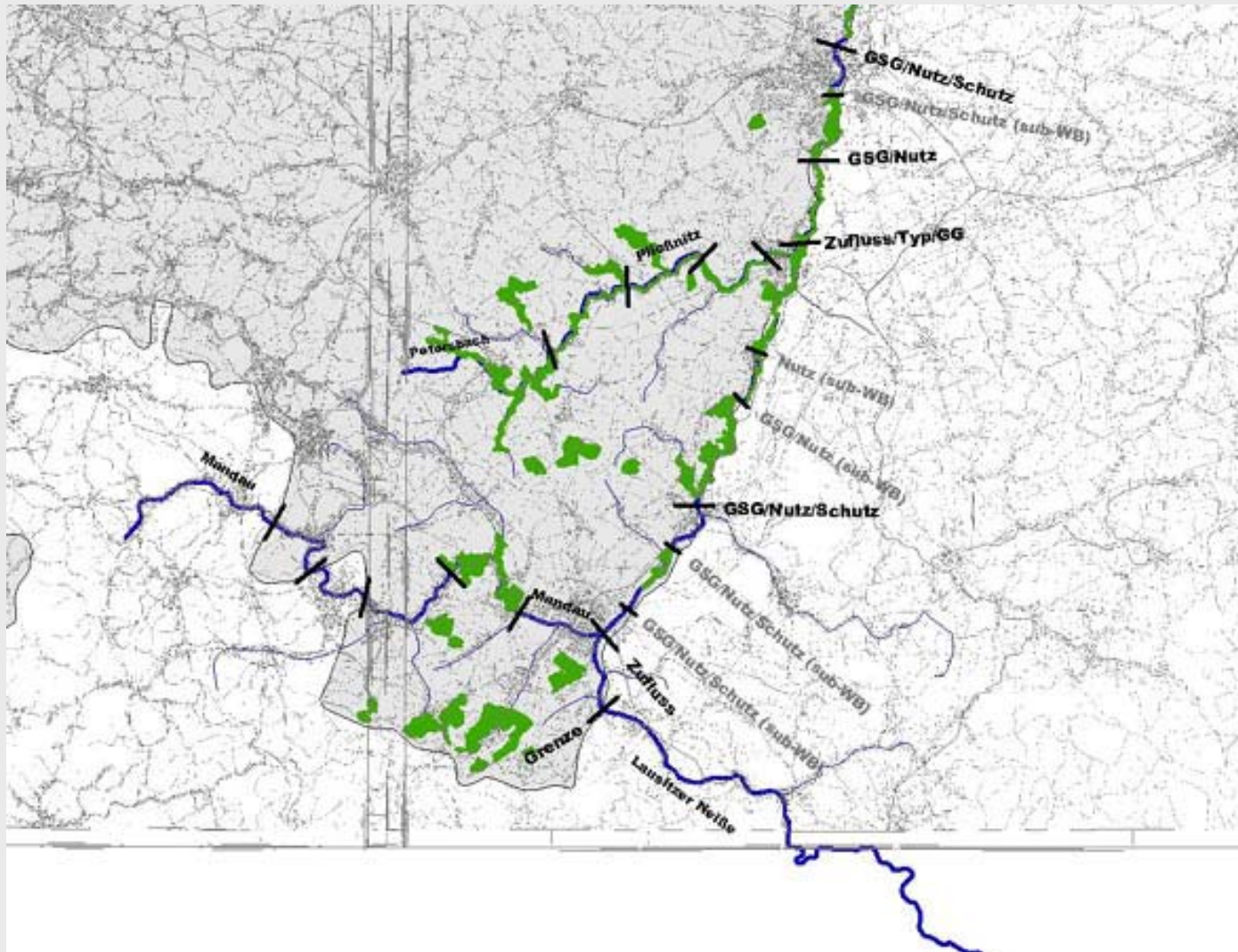


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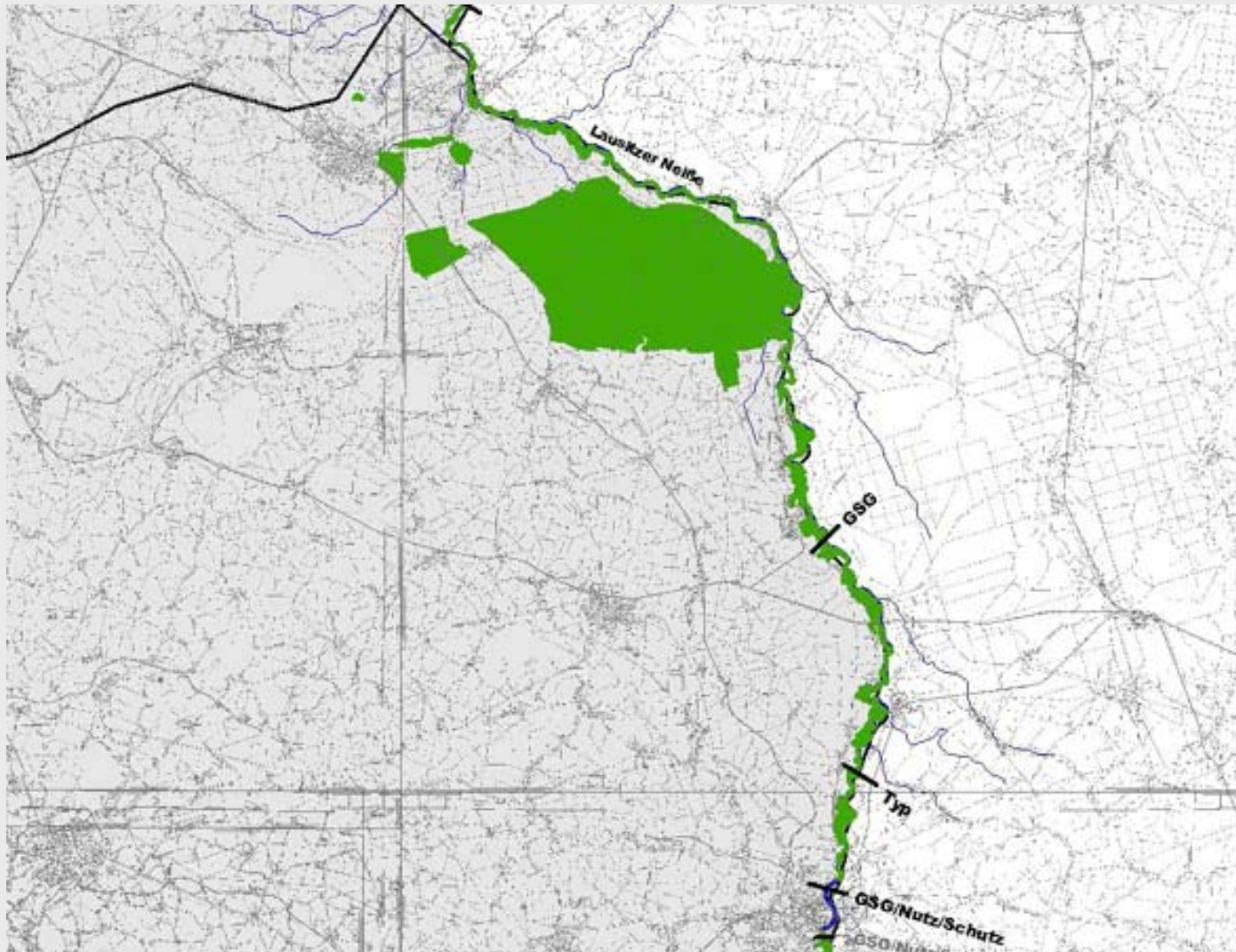


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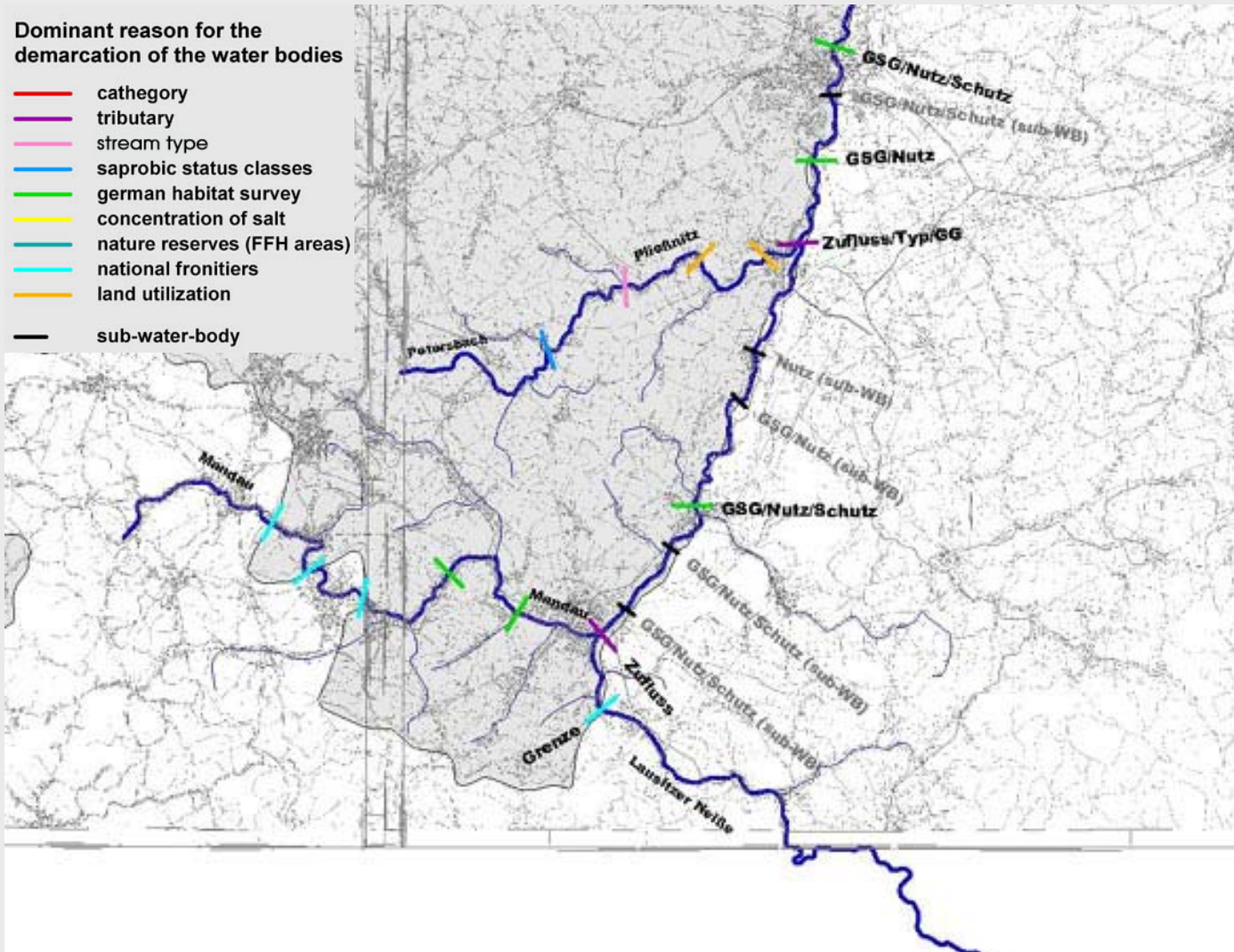


Water Bodies of the Lausitzer Neiße



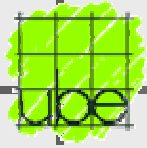
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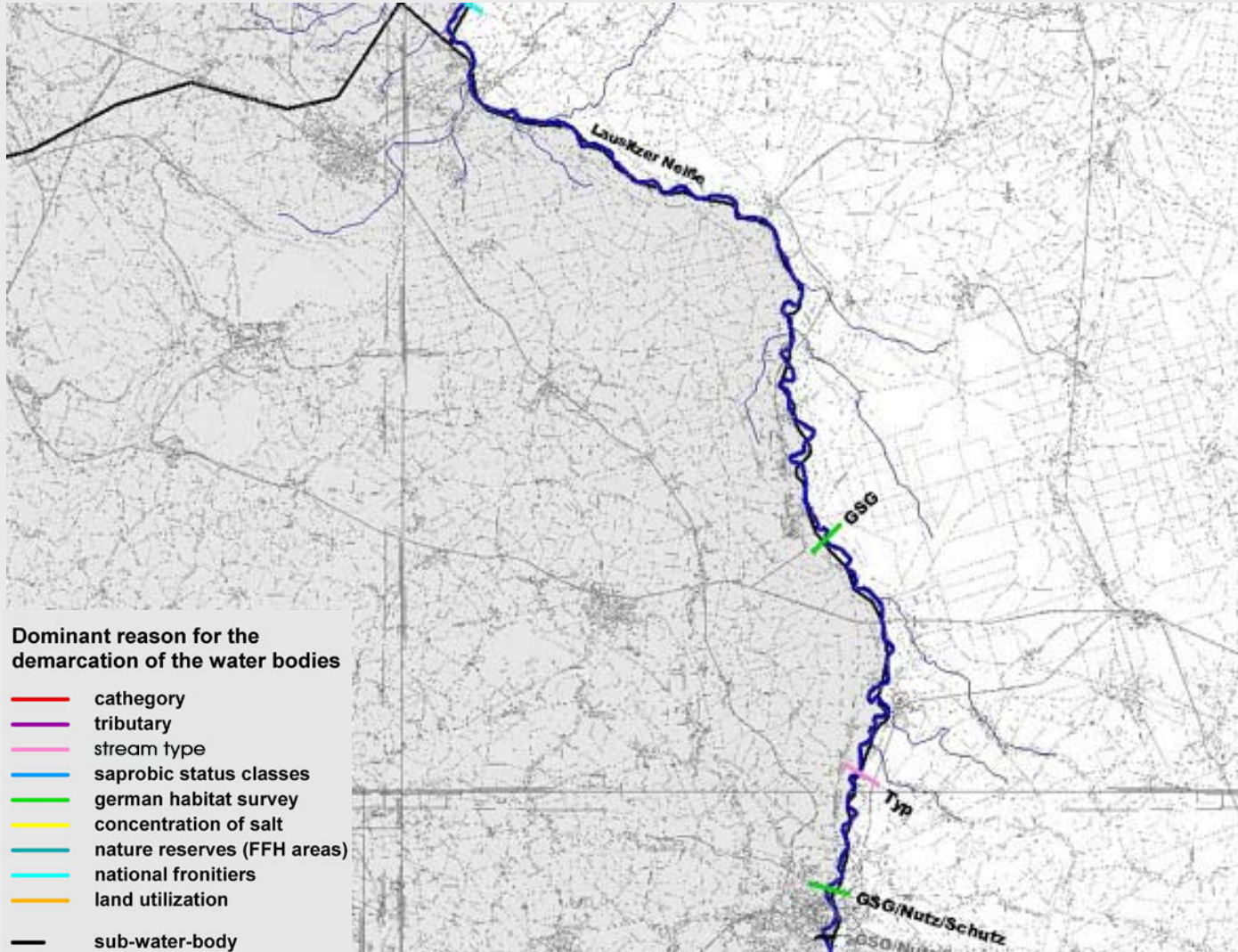


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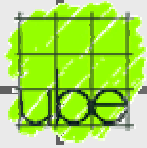
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Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	1	Surface Waters: Status of aquatic ecosystems in the river basin	Does the Water bodies identified permit you to provide an accurate description of the status of aquatic ecosystems in your river basin?	Define the status of aquatic ecosystems

Suggestions for improvement	Selecting the criteria used for water body identification we intend to be able defining the ecological status of the aquatic ecosystem in future. Actually basing on the macroinvertebrate community only the saprobic status is classified.
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Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	5	Surface Waters: Very Small Water bodies	Which approach have you taken for very small water bodies?	How to deal with very small water bodies.

Suggestions for improvement	Following the <i>'Horizontal guidance document on the application of the term „water body“ in the context of the Water Framework Directive'</i> small tributaries were regarded as a part of the major water body. Exception: the tributary (> 10 km²) is significantly effected by human activity.
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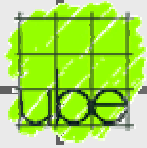
Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	6	Surface Waters: Types	Is your typology process finalized? How many Water bodies have you identified regarding this typology?	Define types and criteria used.

Suggestions for improvement	In Germany there is a stream typology system with a stream type map covering the whole country. This system was used identifying the water bodies. The German stream typology uses elements of system A as well as elements of system B. The German stream type system is basing on a landscape system defined by Dr. Briem considering important hydromorphological and geochemical parameters, describing near-natural (potentially natural) conditions and the resulting aquatic community. The major parameters used, are: ecoregion, shape of the valley, slope, meandering form, stream bed substrate, hydrology, hydraulic regime, vegetation, and geochemistry.
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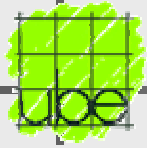
Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	7	Surface waters: Iterative process Information from article 5 analyses and reviews	Which problems/uncertainties have you identified?	Practicalities when implementing article 5. Uncertainties reported

Suggestions for improvement	<p>Following step 4 of the horizontal guidance paper (subdivide physical divisions) we mainly used data on land utilization, results from the German river habitat survey, and data on the saprobic status. Not to get too small water bodies, which could not be managed in future, we tried to aggregate the data to classes and we summarized neighbouring reasons for water body identification by selecting the most important reason. This was necessary because of very local changes in land utilization and morphological structure (=> German habitat survey). We aim to define water bodies as homogenous as possible, but in most cases not smaller than 4 km (never < 2 km). In general we conclude: the larger the river is, the larger also should be the water body. In case following the procedure described above, significant parameters changed in a water body, we divided into sub-water-bodies. After pressures and impacts analysis more subdivision s into sub-bodies are possible.</p>
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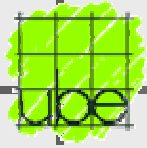
Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	9	Surface waters: Pristine waters	Have you identified water bodies with pristine waters?	

Suggestions for improvement	In the River Basin of the Lausitzer Neisse there are no natural region, which can be used as reference. So we used the stream type definition of the German stream type system as reference and scale for assessment. So we don't have water bodies with reference conditions. Information on the definition of reference conditions, see 2.3.6.
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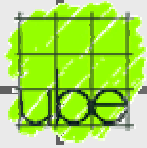


Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	10	Surface Waters: Status of aquatic ecosystems in the river basin	Does the Water bodies identified permit you to provide an accurate description of the status of aquatic ecosystems in your river basin?	Define the status of aquatic ecosystems Please provide indication on the average quality of status.

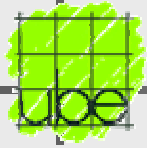
Suggestions for improvement	See Question 1) Preliminary information on the ecological status of the water body are given by the saprobic status. The assessment system using 7 saprobic classes must be transferred to the WFD classification system using 5 classes and it was adapted to the specific stream type conditions. (Research project: ‚Entwicklung eines leitbildorientierten Saprobienindex für die biologische Fließgewässerbewertung‘; UBA 2003; Forschungs- vorhaben 20024227).
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Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	11	Surface waters: Aggregation of water bodies	Which criteria have you applied when aggregating water bodies?	
Suggestions for improvement	See Question 5))			

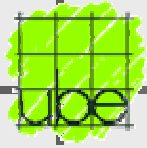


Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	12	Surface waters: Sub-division of water bodies	How have you considered sub-division and which criteria have you used?	
Suggestions for improvement	After analysing pressures and impacts a water body may be subdivided into sub-water-bodies. Also small tributaries belonging to the water body of the main stream can be defined as sub-water-body, but should not be subdivided any more. We also believe, that several tributaries should not be summarized to one sub-water-body.			



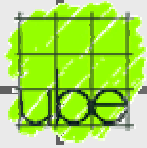
Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	13	Surface waters: Physical features	Which physical (geographical and hydromorphological) features have you used when identifying discrete elements of surface water bodies?	

Suggestions for improvement	Separating categories (GIS): <ul style="list-style-type: none">• River and lake shape (Saxony);• Stream types: German stream type shape (Saxony);• Major tributaries: DLM 1000 W;• Additional criteria: German habitat survey, saprobic status, land utilization (Saxony)			
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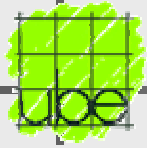


Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	14	Surface waters: Protected areas	How have you considered protected areas (e.g. Natura sites, or drinking water sources)?	

Suggestions for improvement	FFH-areas were considered. Smaller natural reserves and protection areas were ignored.
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Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	15	Surface waters: Wetlands associated to water bodies	Have you considered wetlands associated to your water bodies? How have you considered the relationship?	Wetlands related to surface waters.
Suggestions for improvement	Wetlands were not considered.			



Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	16	Ground Waters: Number of water bodies	How many water bodies have you identified?	
Suggestions for improvement		5 groud water bodies		

Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	17/ 18	Ground Waters: Minimum/Maximum size	Which is the minimum/maximum size you have identified?	
Suggestions for improvement		Minimum size: 24 km² Maximum size: 557 km²		



Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	24	General issues: Local and regional circumstances	Which local and regional circumstances have you considered when identifying water bodies?. How have you done it?	

Suggestions for improvement	The national frontier is also a criteria for separating water bodies.			
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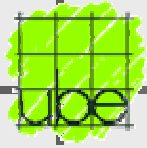
Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	8	Surface waters: Review of the water bodies identification process	Will you review the water bodies identification following the article 5 analysis or after the establishment of the monitoring programme?	Revision after the fulfillment of article 5 requirements or after the monitoring.

Suggestions for improvement	We believe that it will be necessary to review the water bodies identification following the article 5 analysis as well as after the establishment of the monitoring programme.			
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Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	25	General issues: Recommendations General issues to raise Experience	Which general problems/experiences/reco mmendations have you encountered when identifying water bodies in your river basin?	General Comments and Suggestions

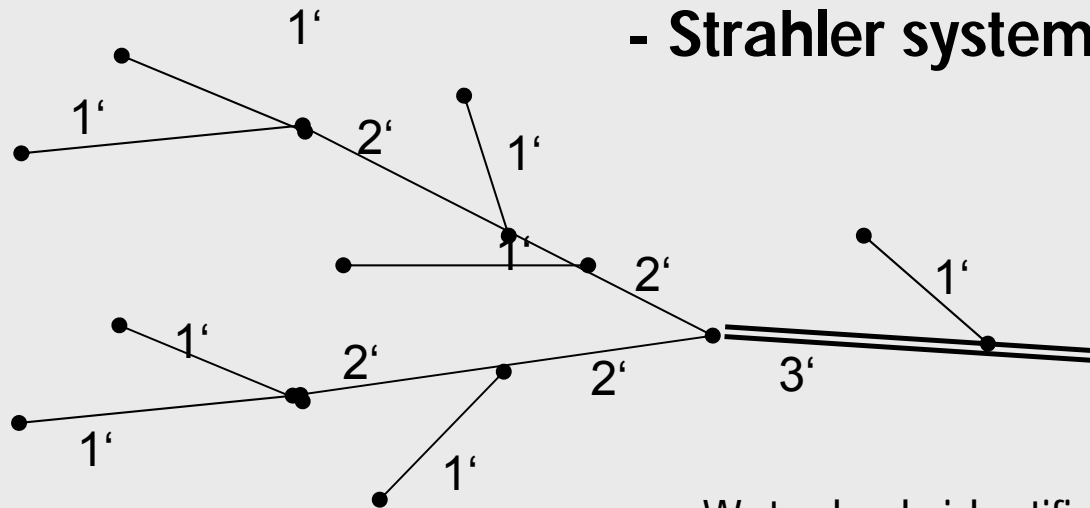
Suggestions for improvement	Following the guidance-papers the results may be different depending on the person using it, because in these papers a wide scale of interpretation is possible. The results are also depending on the data available. Also following different strategies in identifying water bodies we hope that the results will be comparable at the end. In the PRB Lausitzer Neisse we have the problem of a catchment belonging to three different states (Czech Republic, Poland, Germany) with the frontiers defining the borders of the water bodies.
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Guidance	ToR No	Key issues	Specific question	Clarification
2.0 Identification of Water Bodies	5	Surface Waters: Very Small Water bodies	Which approach have you taken for very small water bodies?	How to deal with very small water bodies.

Suggestions for improvement	Following the <i>'Horizontal guidance document on the application of the term „water body“ in the context of the Water Framework Directive'</i> small tributaries were regarded as a part of the major water body. Exception: the tributary (> 10 km²) is significantly effected by human activity.
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Water body identification in the Czech Republic



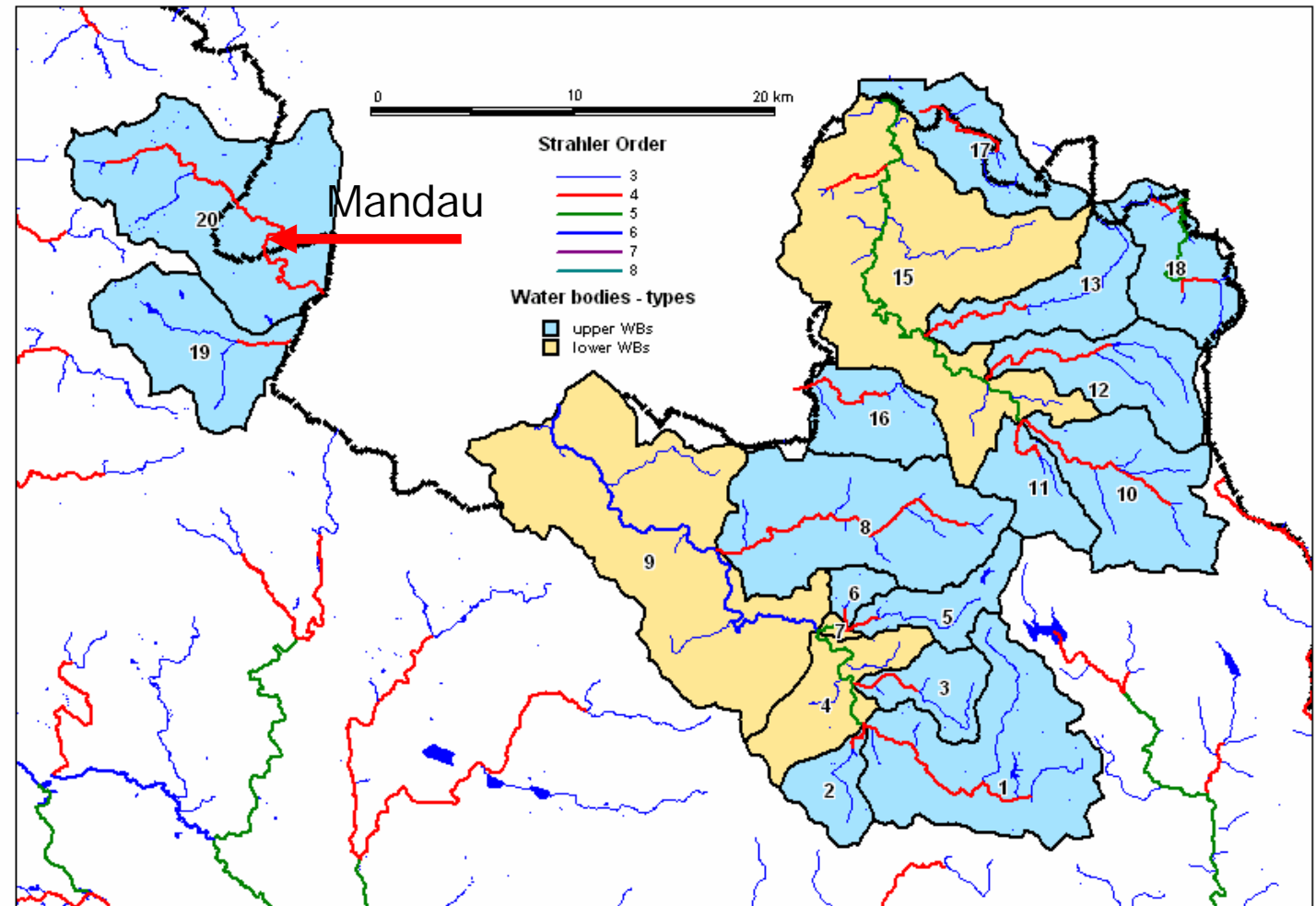
Water body identification by using system "B" including elements of system "A"

- Area
- Altitude
- Strahler order
- Geology / Geochemistry (calcareous /siliceous)
- Ecoregion

Czech results: Definition of surface water bodies

20 water bodies:

- 16 upper WB
(Basins of 1' – 4' order)
- 4 lower WB
(Basins $\geq 5'$ order)





Summary and Conclusions

1. Different water body identification strategies in the German (acc. to Horizontal Guidance) and the Czech (acc. to Strahler) PRB L. Neisse
2. Comparable results concerning the number of water bodies respectively the mean size
3. Differences in the locations of demarcations and size distributions
4. Compared to the common practise in most German federal states the water body mean sizes are significant smaller
5. Whether this is a problem or an advantage has to be proved when all iteration steps are finished
6. Merging of water bodies are always possible if the first demarcations should not prove as useful