INSPIREd practical examples of implementation of the directive in Slovenia

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Geodetic Institute of Slovenia and INSPIRE

- Geodetic Institute of Slovenia is involved in implementation of the INSPIRE directive in Slovenia since 2010.

- In the past three years, we were involved in two mayor projects of two different national ministries regarding transposition of several INSPIRE data specifications into national data models and products.

- I will present our approach and experiences with implementation of 8 INSPIRE data theme specifications into National topographic model (DTM) and national hydrography dataset.

National topographic model

- The project "**Modernization of spatial data infrastructure to reduce risks and impacts of floods„**

- 2013-2016

- Surveying and Mapping Authority (SMA) of Slovenia in co-operation with partners

National topographic model (DTM)

Državni **T**opografski **M**odel

- Modification of the existing topographic data model regarding INSPIRE data rules
- The design and establishment of the National topographic model (DTM)
- Migration of the existing data to DTM
- Geodetic transformation of data into new national Spatial Coordinate Reference System (D96TM)

8 INSPIRE themes

Hidrography

Geographical Names

Elevation

Buildings

Land Use

Transport Networks

Land Cover

Utility and Government Services

Existing national data

DTK5 – National Topographic Data 1: 5000

ESRI File GDB; object data model

REZI – Registry of Geographical Names

ORACLE database; object-relational data model

DMR – Digital terrain model

XYZ ASCII files

DTM - the vision

- DTM = object-relational data model that:
  - integrates existing data into a functional whole,
  - has connectivity to external databases (within SME, later gradually with other entities on national level)
  - has possibility of upgrade with additional content (modularity and scalability)

DTM-Basic principles (1/3)

- expanded the usage of the existing topographic data with **semantic enrichment** - ***„not only for cartographic visualization“,***
- resolved **redundancy** and **mismatches** in the existing data,
- included the full range of the existing national data (for the selected themes) and model them according to INSPIRE specifications and national requirements – „**no loses**“.
- included selected non topographic elements for a long term unification on national level (INSPIRE exceeds „topographic“ framework).

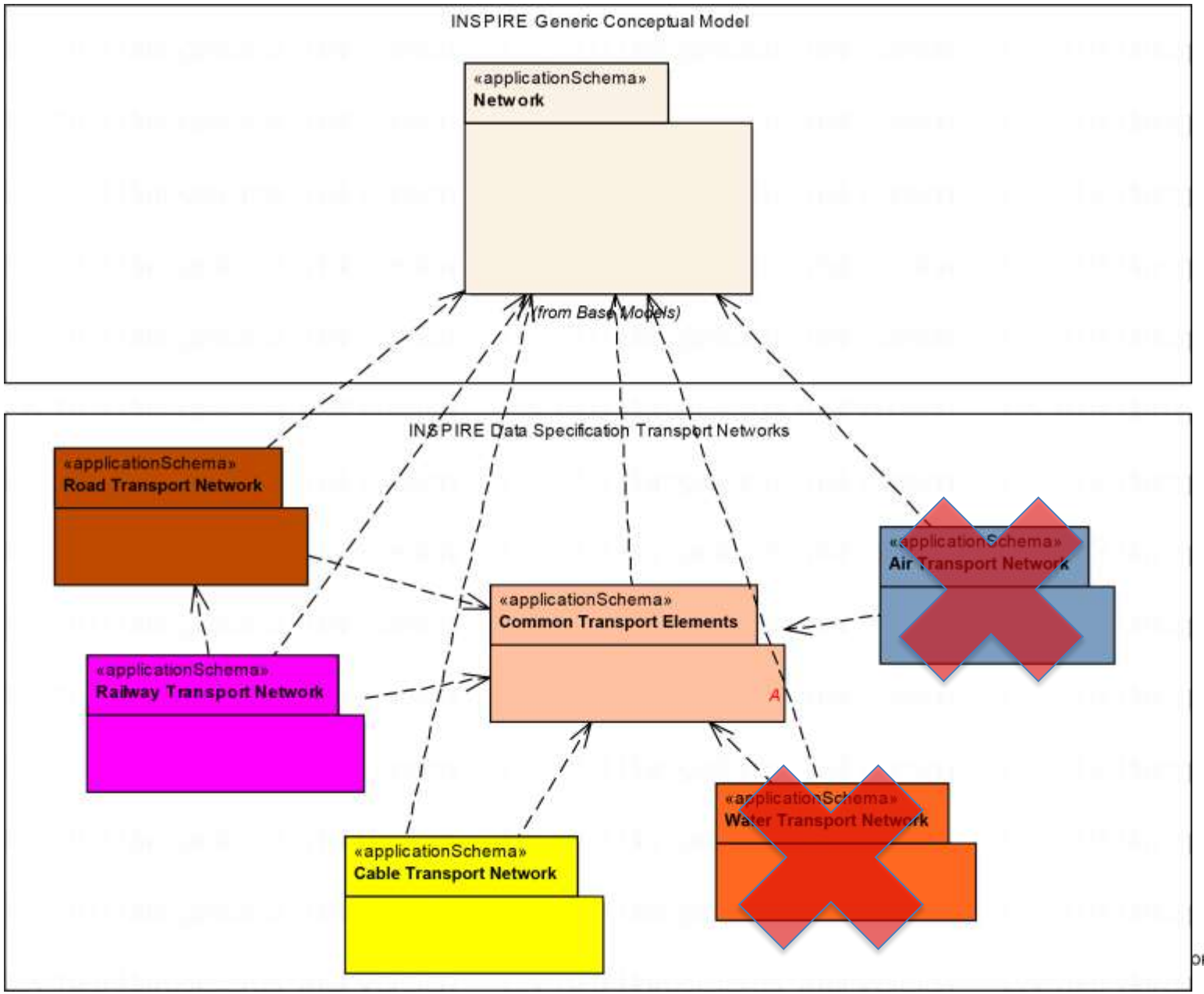
DTM-Basic principles (2/3)

- adopted the concepts and contents of INSPIRE data models, with exclusion of out of scope elements and inclusion of national additions

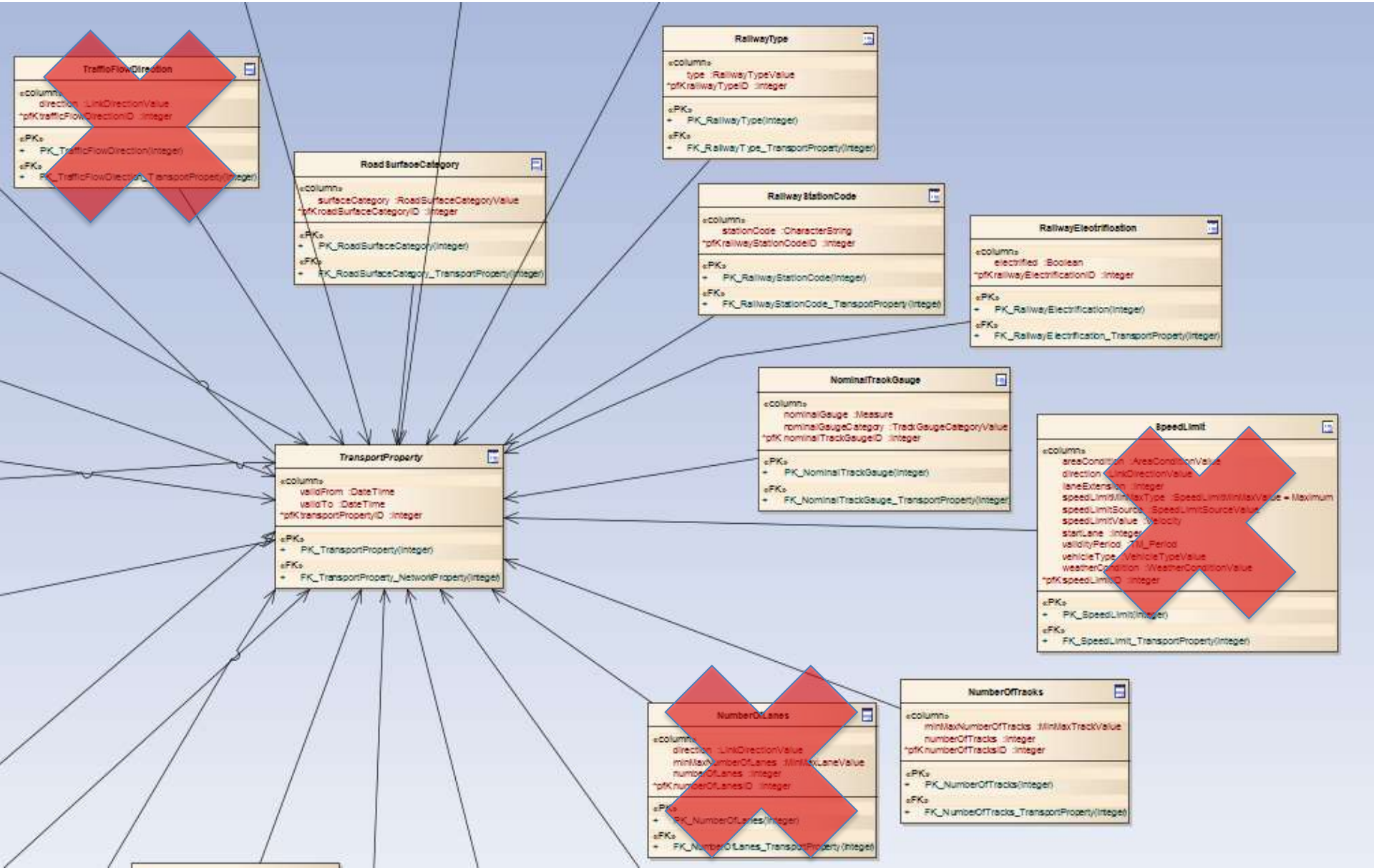
- Criteria used for exclusion of INSPIRE contents from DTM:
  - not present in our geographical space,
  - out of scope of the SMA,
  - entirely non topographic usage.

- modification was carried out in a way to preserve the integrity of INSPIRE data model(ing) and following the standards.

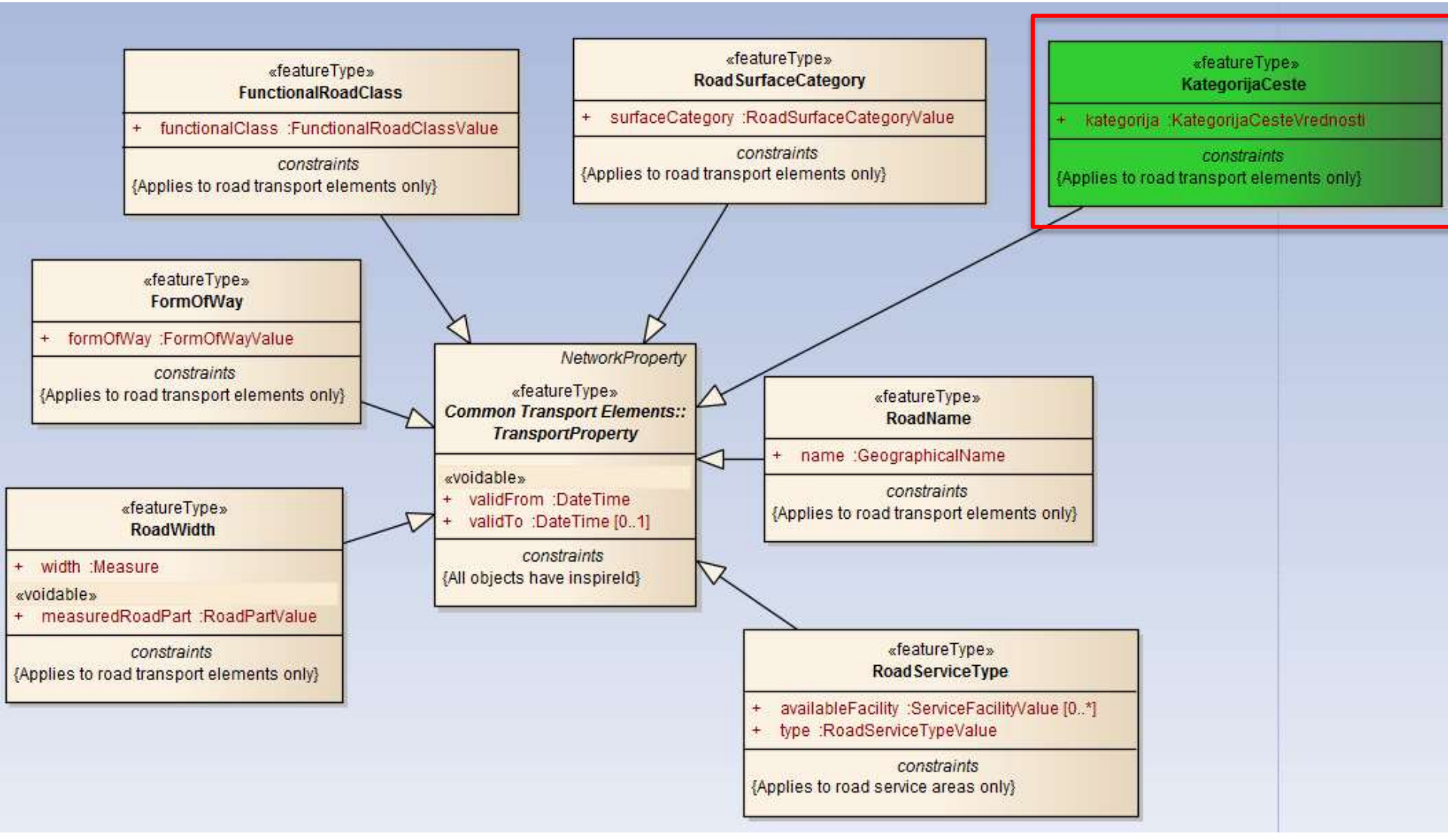
DTM-Exclusion of non-topographic Application Schemas



DTM-Exclusion of content



DTM-Adding national content



DTM-Basic principles (3/3)

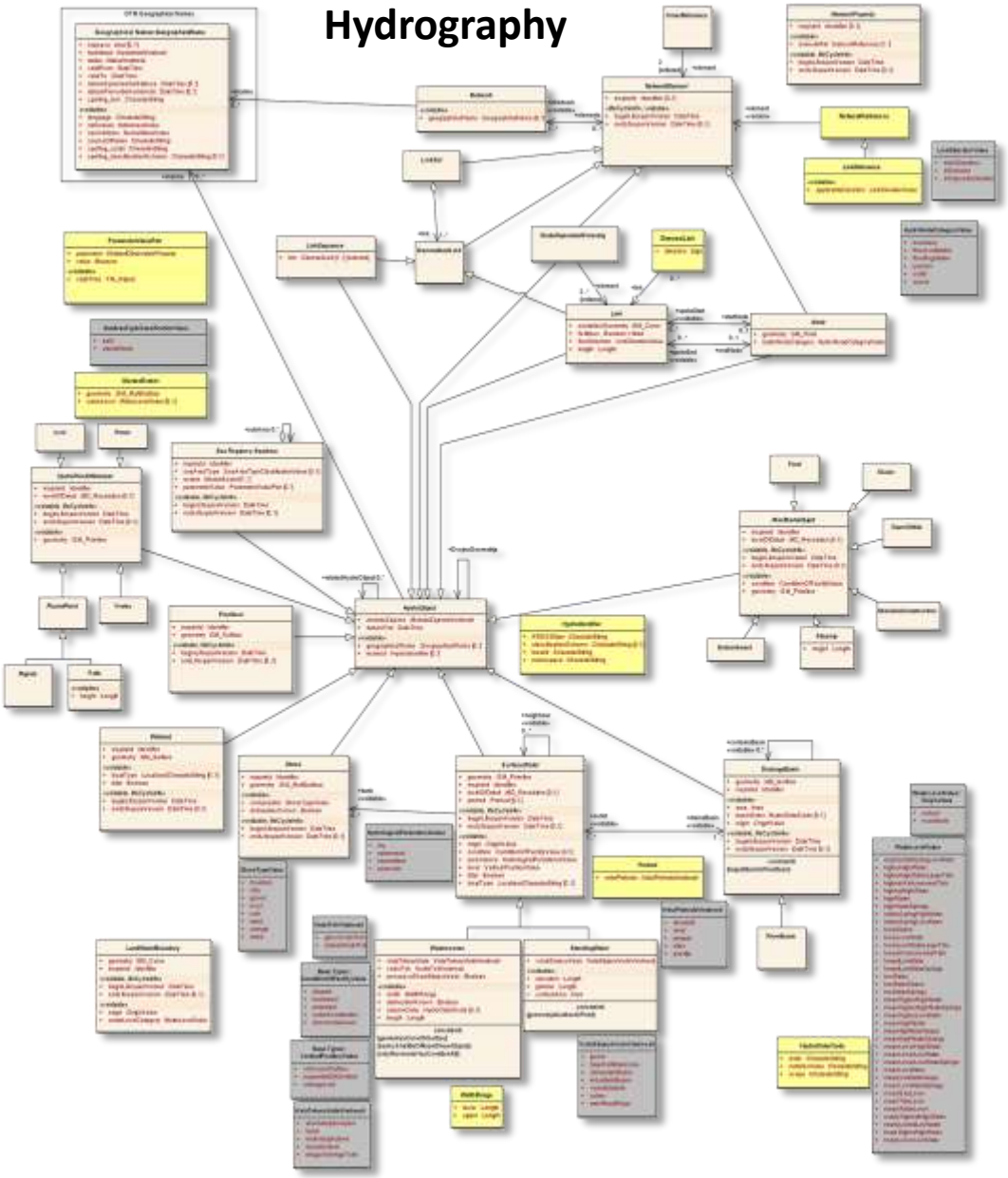
- Names of the components in the data model (logical, phisical) are in English

- All national additions in the data model are in Slovene

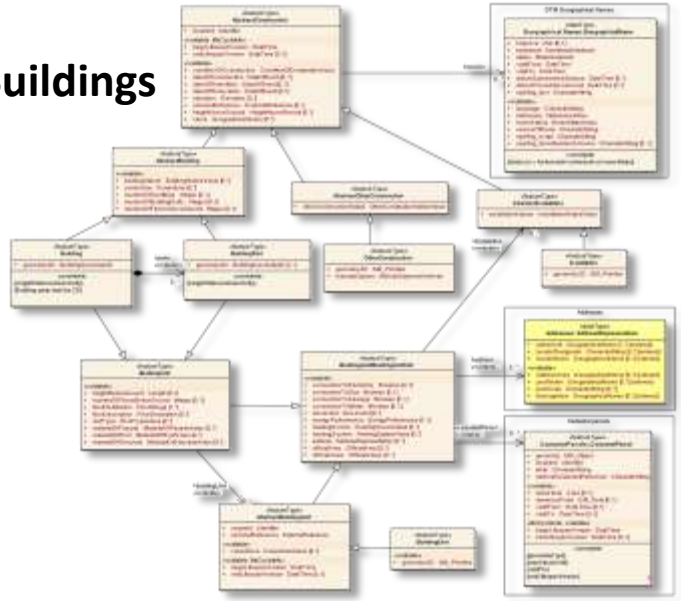
- During the migration we enriched the existing contents with:
  - additional features,
  - additional attributes,
  - establishement of some relationships in the data

DTM-UML diagrams

Hydrography



Buildings



Geographical names

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National hydrography dataset (HIDRO5)

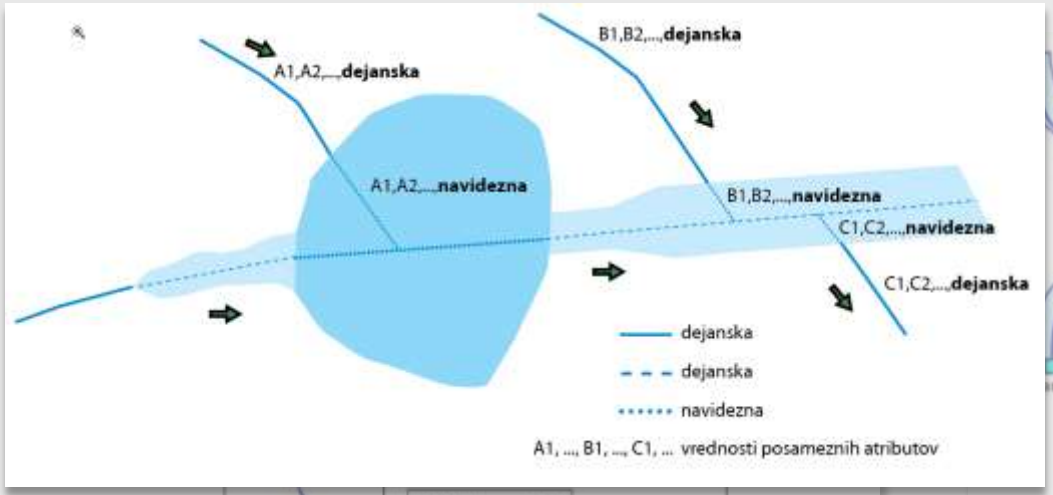
- Data capturing of hidrography data for the entire territory of Slovenia
- Slovenian Ministry of Environment and Spatial Planning
- Level of detail = 1 : 5000 scale
- Following the INSPIRE Technical Guidelines for Hydrography in HIDRO5 product specification

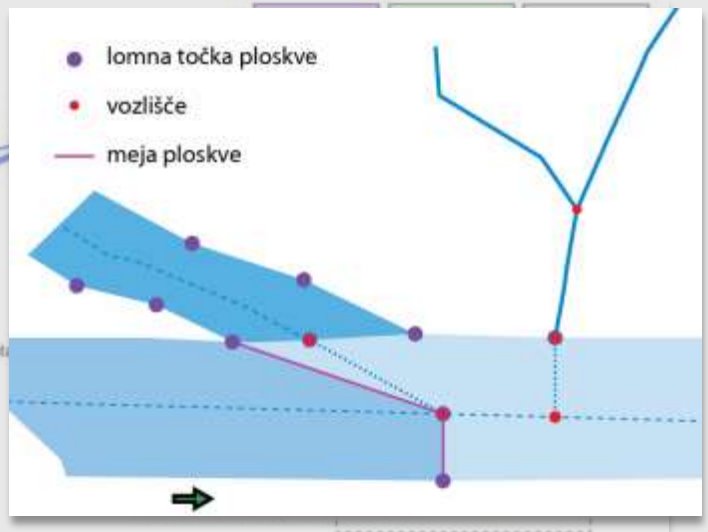
National hydrography dataset (HIDRO5)

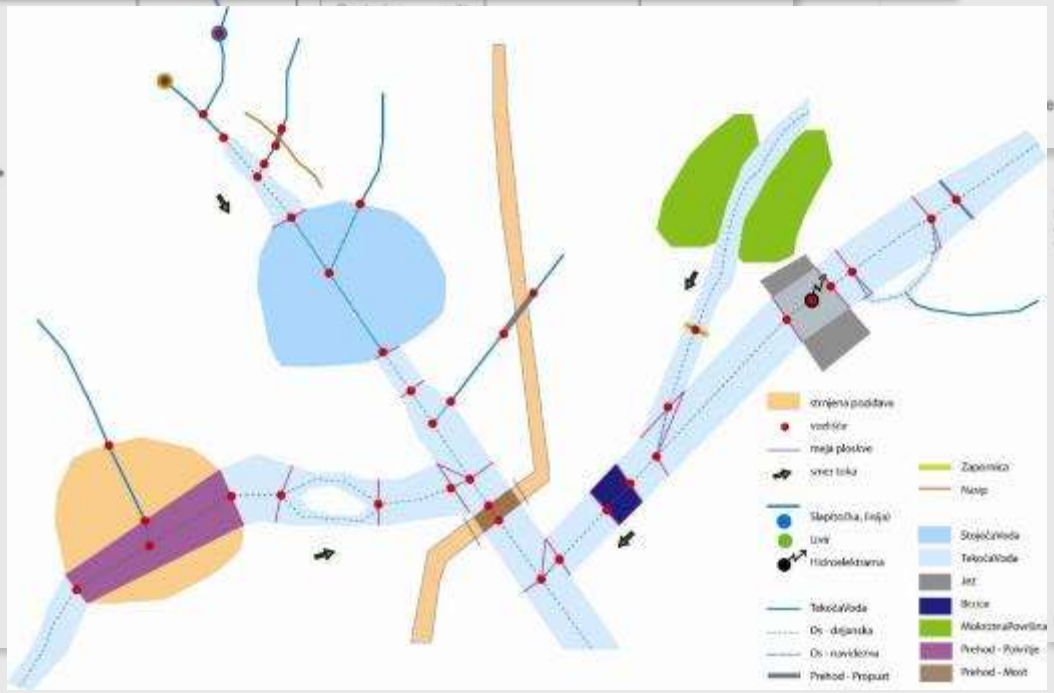
Hidrografija					Dejanska raba
1 Točkovni	2 Linijski PV	3 Linijski	4 Ploskovni PV	5 Ploskovni	6 Dejanska raba -VZ
Slap	Struga vodnega toka	Slap	Struga vodnega toka	Jez	Vodotok
Izvir	Kanal	Zapornica	Kanal	Obalna Konstrukcija	Nasip
Ponor	Akumulacijsko jezero	Nasip	Akumulacijsko jezero	Zapornica	Jezero ali vodni zbiralnik
Hidroelektrarna	Prehod – Akvadukt	Jez	Prehod – Akvadukt	Brod	Morje
Jez	Prehod – Most	Stopnja	Prehod – Most	Brzice	Ostalo
Zapornica	Prehod – Prepust		Prehod – Prepust	Mokrotna Površina	
Stopnja	Prehod – Sifon		Prehod – Sifon	Morje	
	Prehod – Pokritje		Prehod – Pokritje	Prodišče	
	Obcestni jarek		Jezero		
	Melioracijski jarek		Bajer, kal, mlaka, loka		
			Rekreacijski bazen		
			Industrijski bazen		
			Vodni zbiralnik		
			Soline		
			Mrtvi rečni rokav		
			Melioracijski jarek		

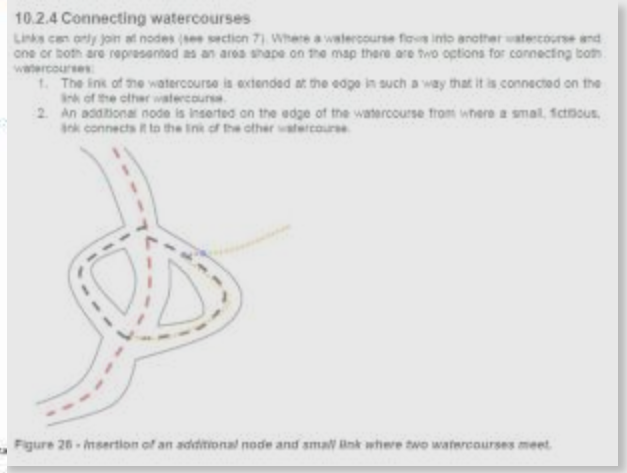
Addoption of certrain INSPIRE feature types

National hydrography dataset (HIDRO5)



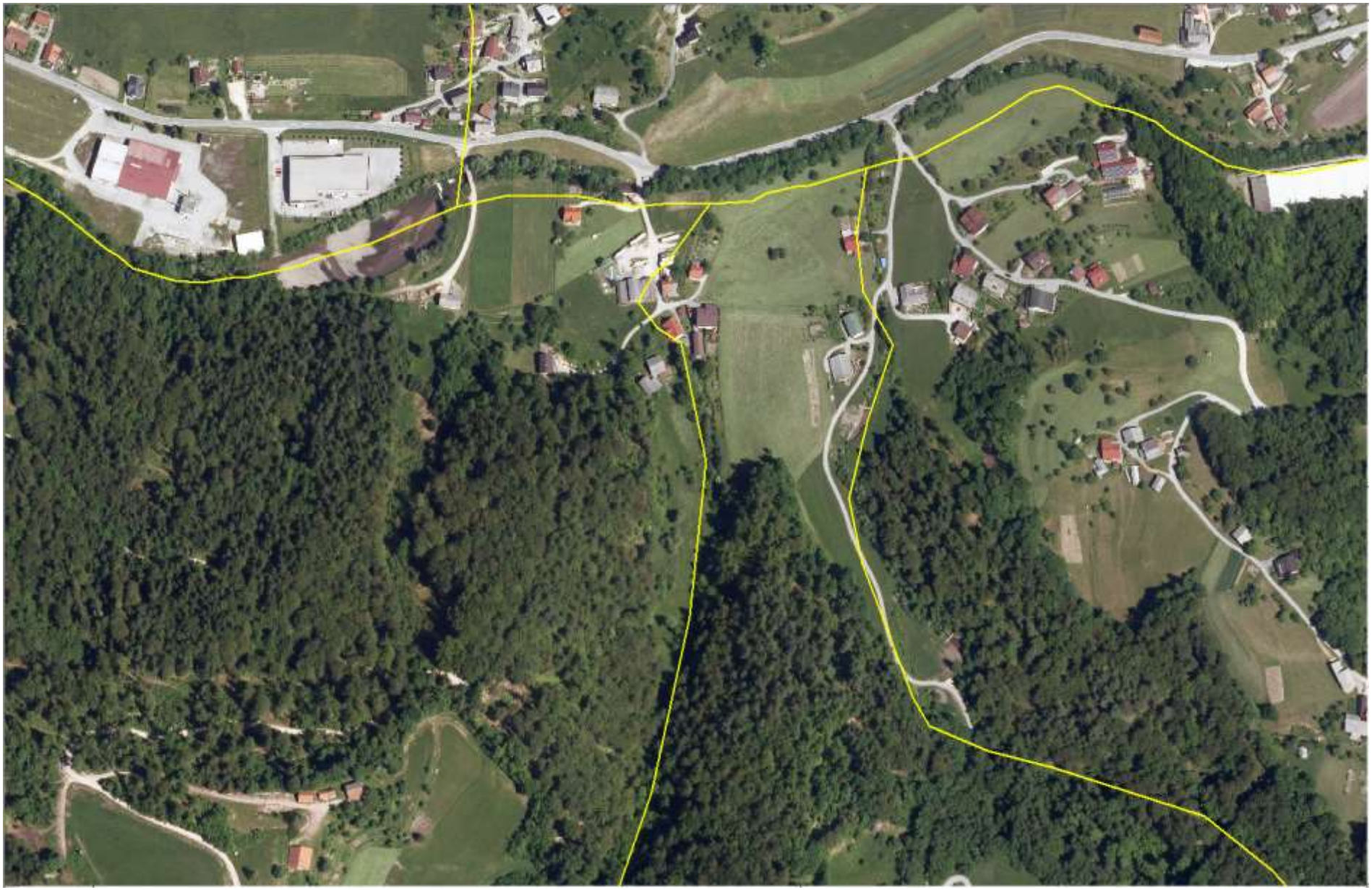






Addoption of certrain capturing rules regarding topology of the data

National hydrography dataset (HIDRO5)



National hydrography dataset (HIDRO5)

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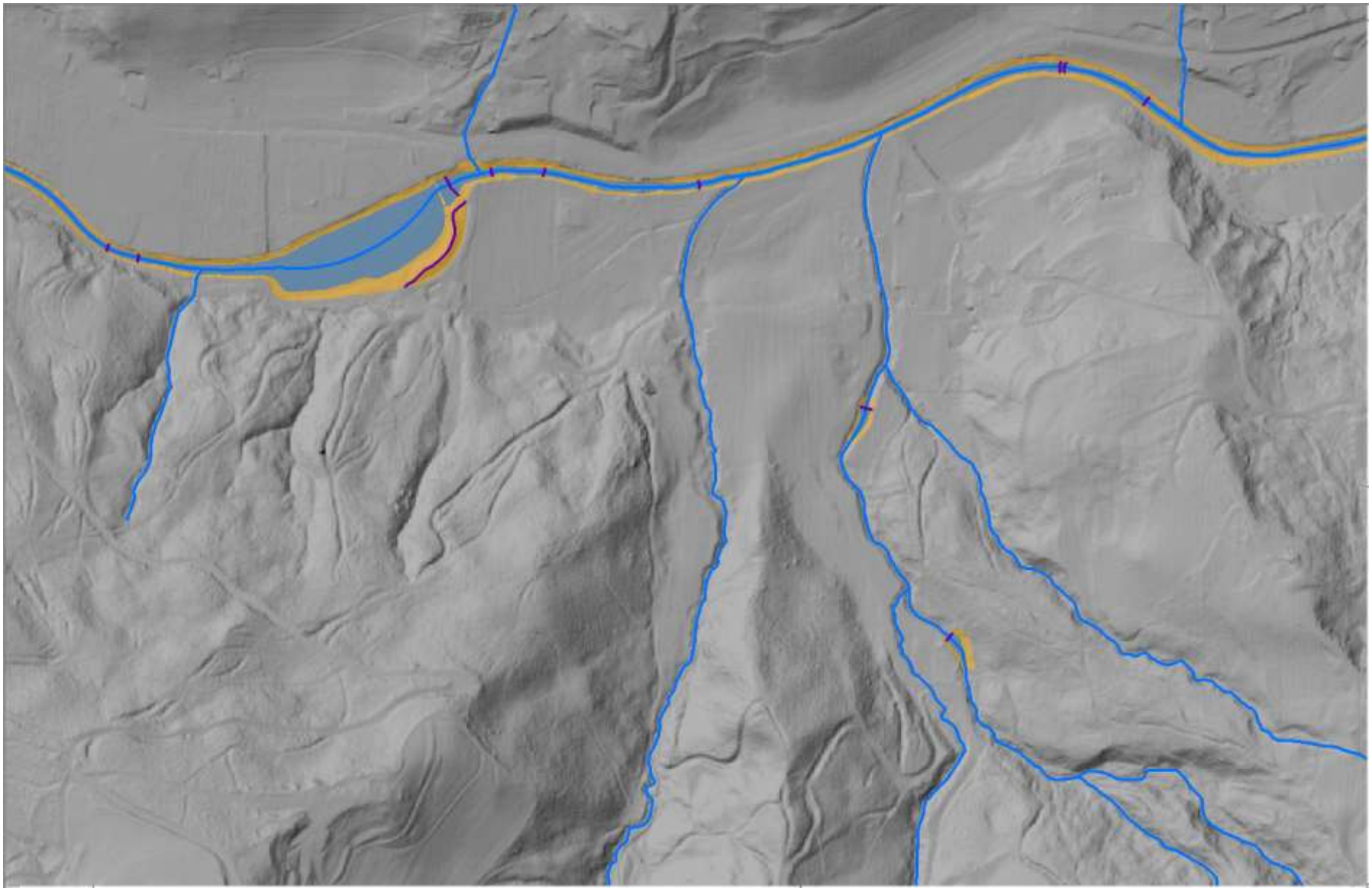
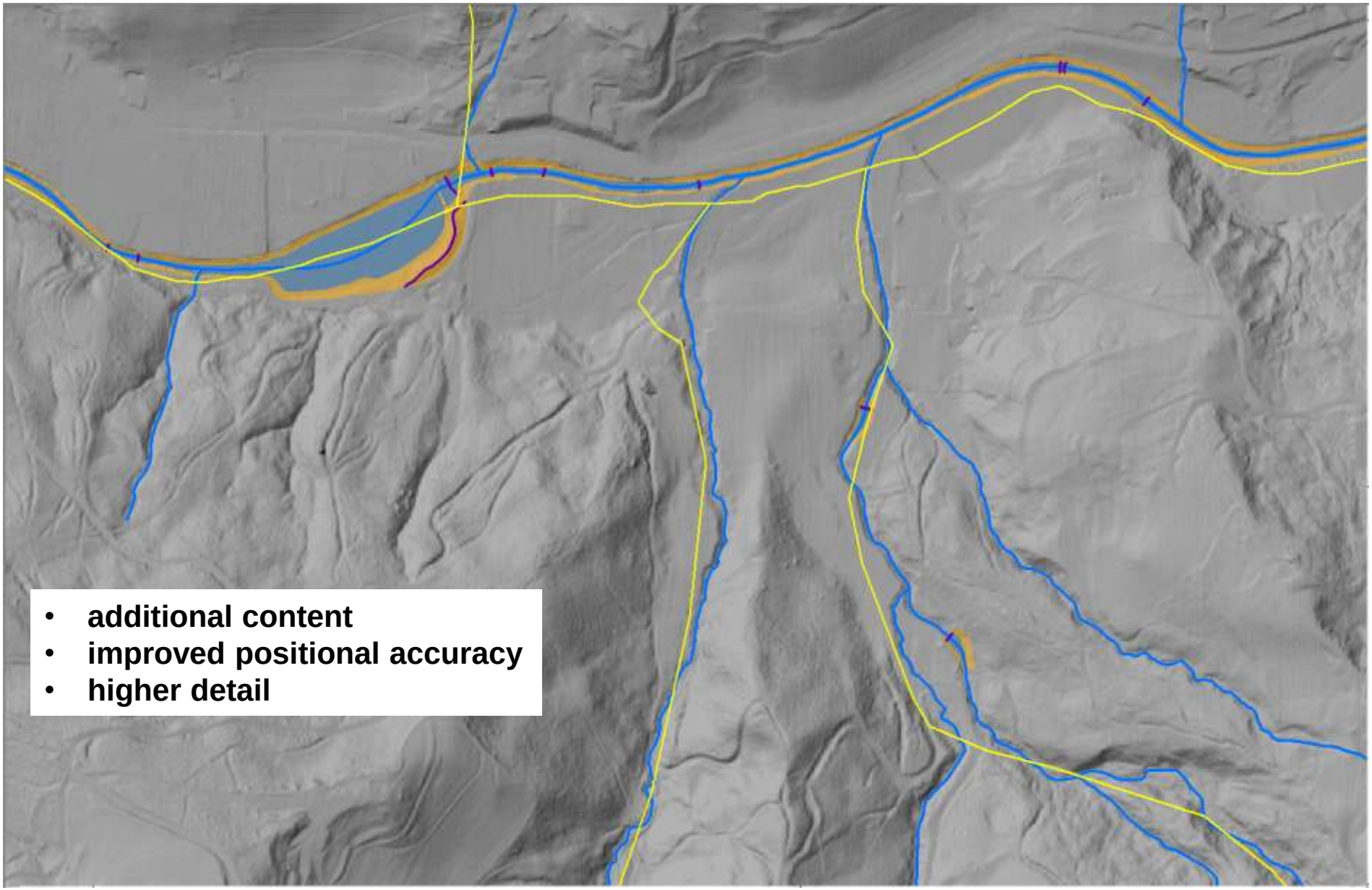
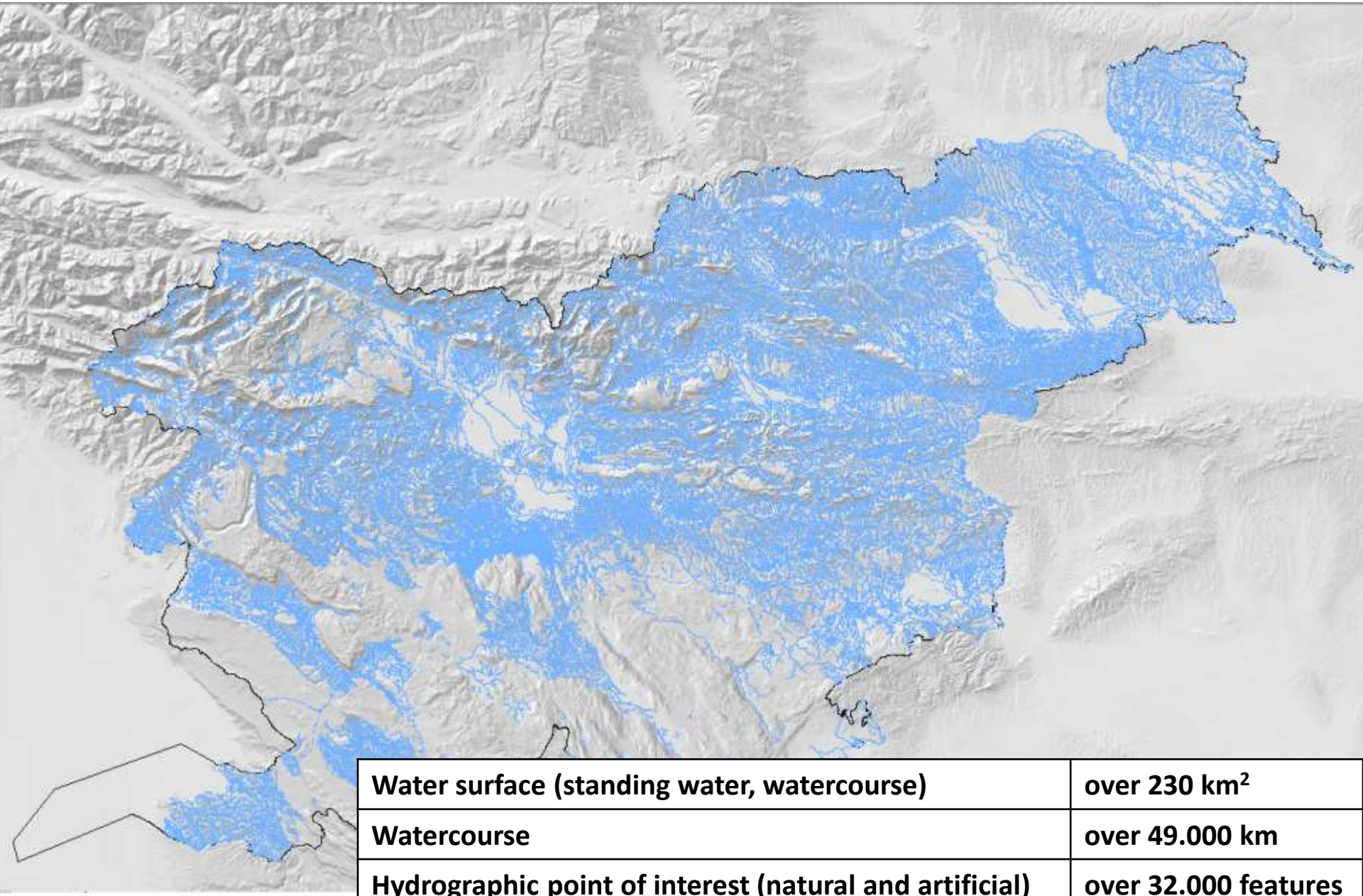


National hydrography dataset (HIDRO5)



National hydrography dataset (HIDRO5)

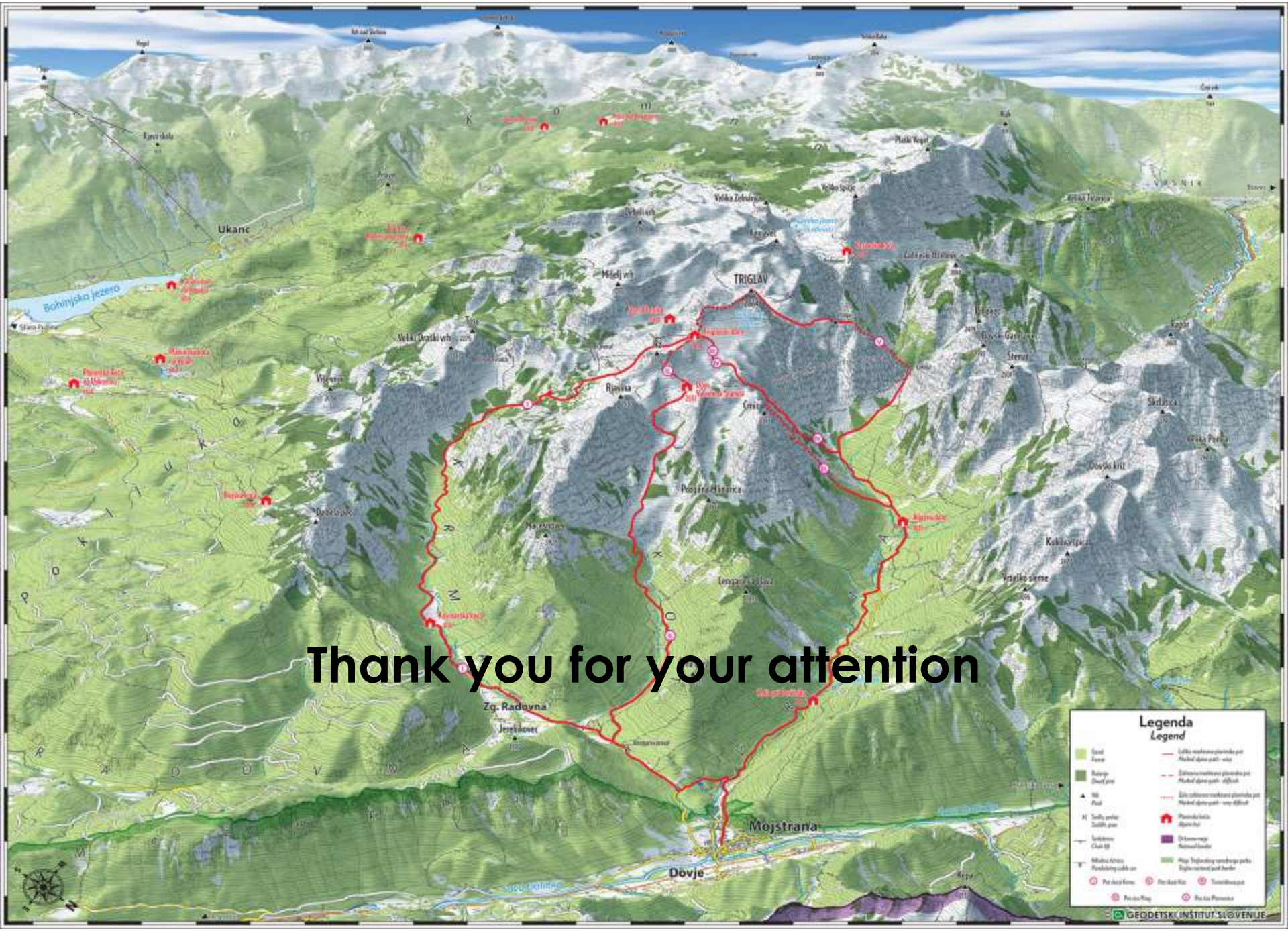


Water surface (standing water, watercourse)	over 230 km^2
Watercourse	over 49.000 km
Hydrographic point of interest (natural and artificial)	over 32.000 features

Lessons learned and future work

- Implementation of INSPIRE directive involves technology (services) **and contents** (semantics, features, attributes ..) adaptation on national level
- The complexity of semantics and data modeling in INSPIRE was (and still is) a big step forward but also a great challenge for steakholders in Slovenia

- Envisaged long term unification with DTM, will have an impact on contents, organisation, procedures, proceses and legislation on national level



Thank you for your attention