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SHARED WATER INFORMATION IN AUSTRIA AND BEYOND

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Content

- Introduction
- Institutional setup in Austria
- Concept of WISA
- Different levels of data management
- ICPDR DanubeGIS
- Conclusions
- Plastics in the Danube River
- COVID19 in Urban Waste Waters

Purpose of water data management

- Water assessment: characterisation and status assessment of rivers, lakes, groundwater
- Water foresighting: prediction of impacts
- Water related measures: planning, implementation and assessment of effectiveness of the set measures
- Back ground information for decision makers, planning, the public, ….
- Fulfillment of reporting obligations (SDGs, WFD-reporting, INSPIRE,…) and information exchange

➔ Tool for river basin management planning

Types of water data

① Meteorological data: rainfall, humidity, temperature,…

② River Data: water level, discharge

③ Groundwater data: water level, aquifer thickness, groundwater age

④ Water storage data: storage volume, storage inflow/outflow, offtakes,…

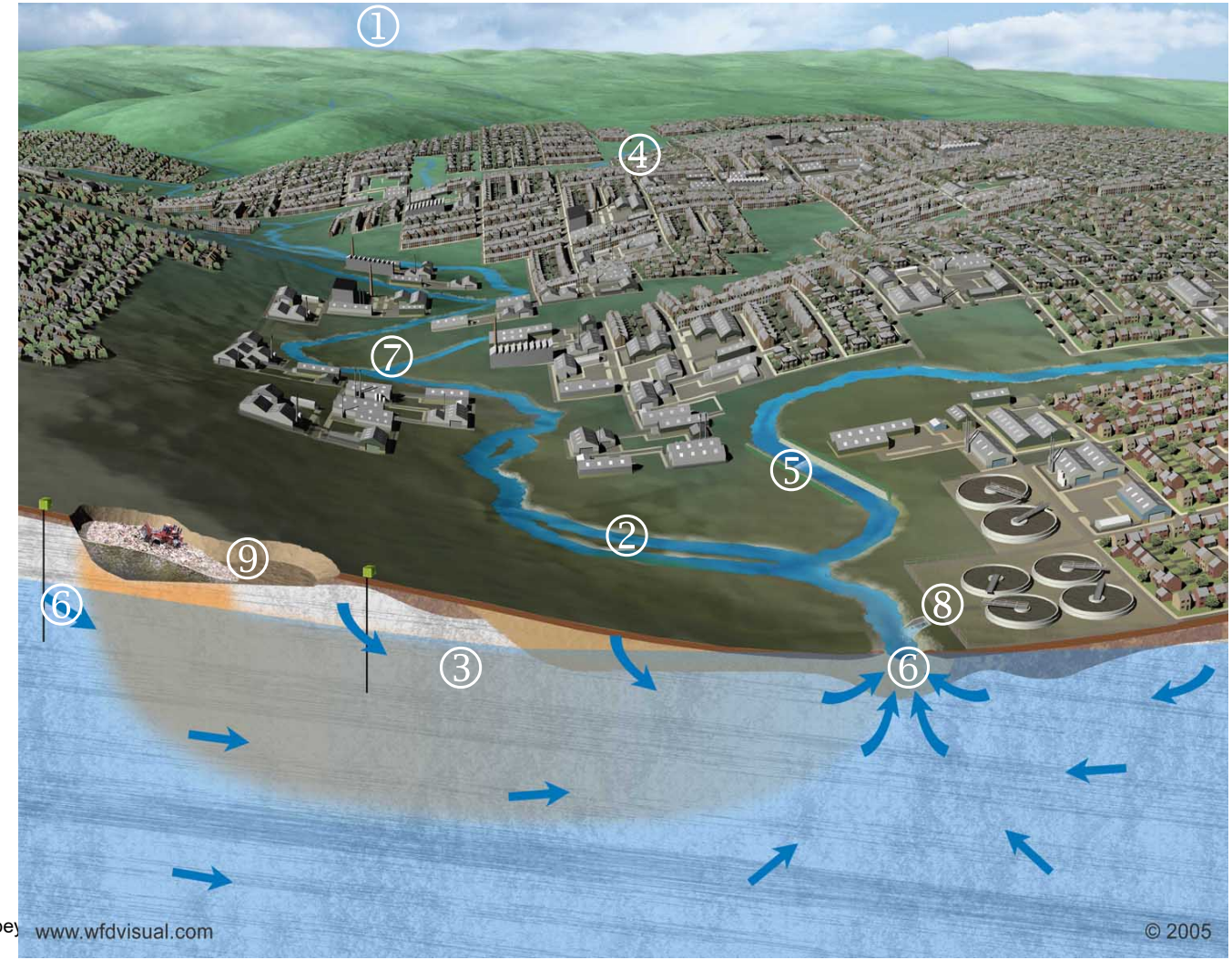
⑤ Water use data: water abstraction from rivers, groundwater and storages, water demand, available water,…

⑥ Water quality data: Electrical conductivity, temperature, pH, oxygen, biological quality elements, hydromorphological data,…

⑦ Water pollutant data: concentrations of plant protection products, pharmaceuticals, heavy metals,…

⑧ Waste water data: discharge point, emission load,…

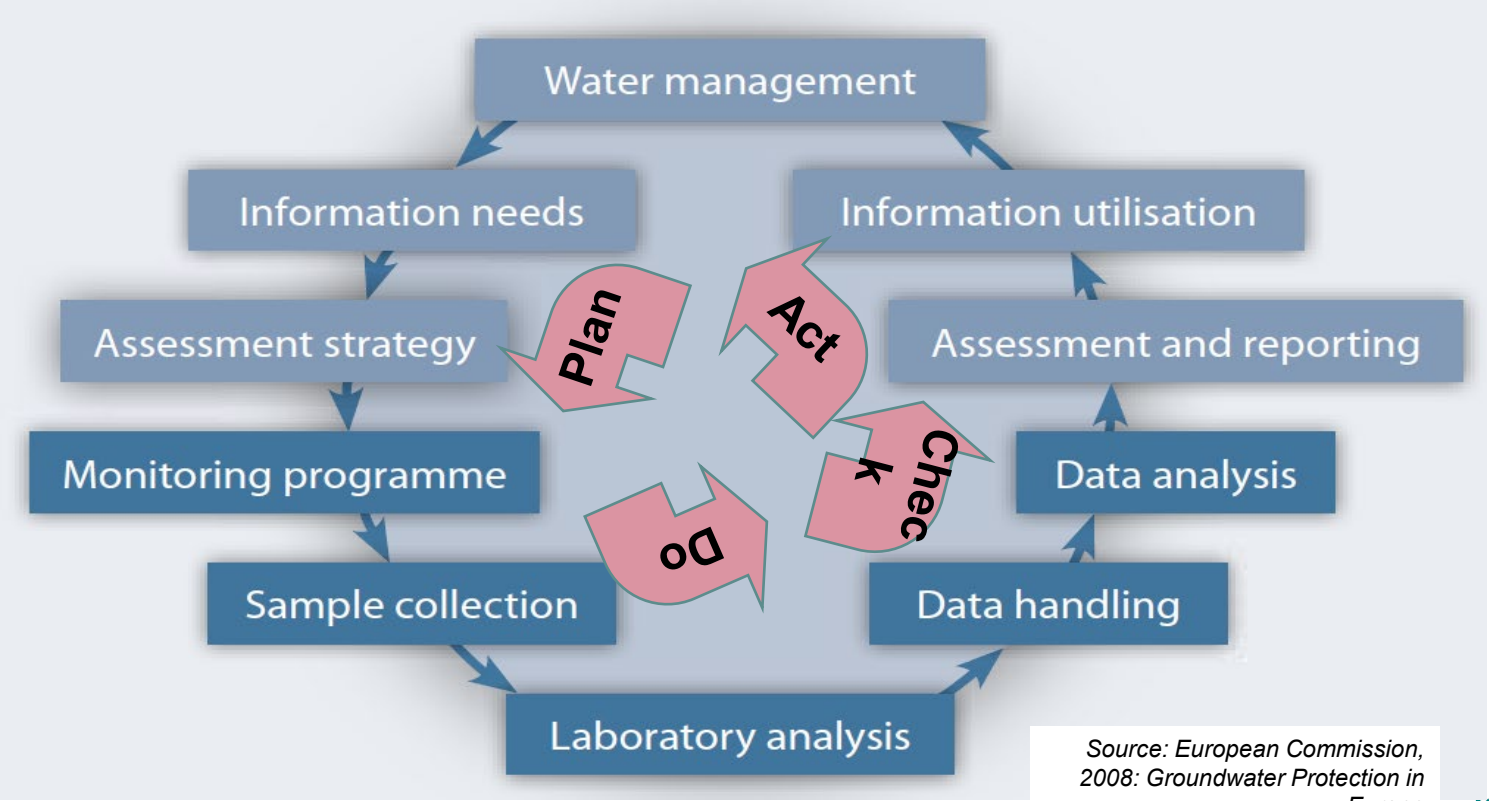
⑨ Water rights data: water permits,…



Legal Background

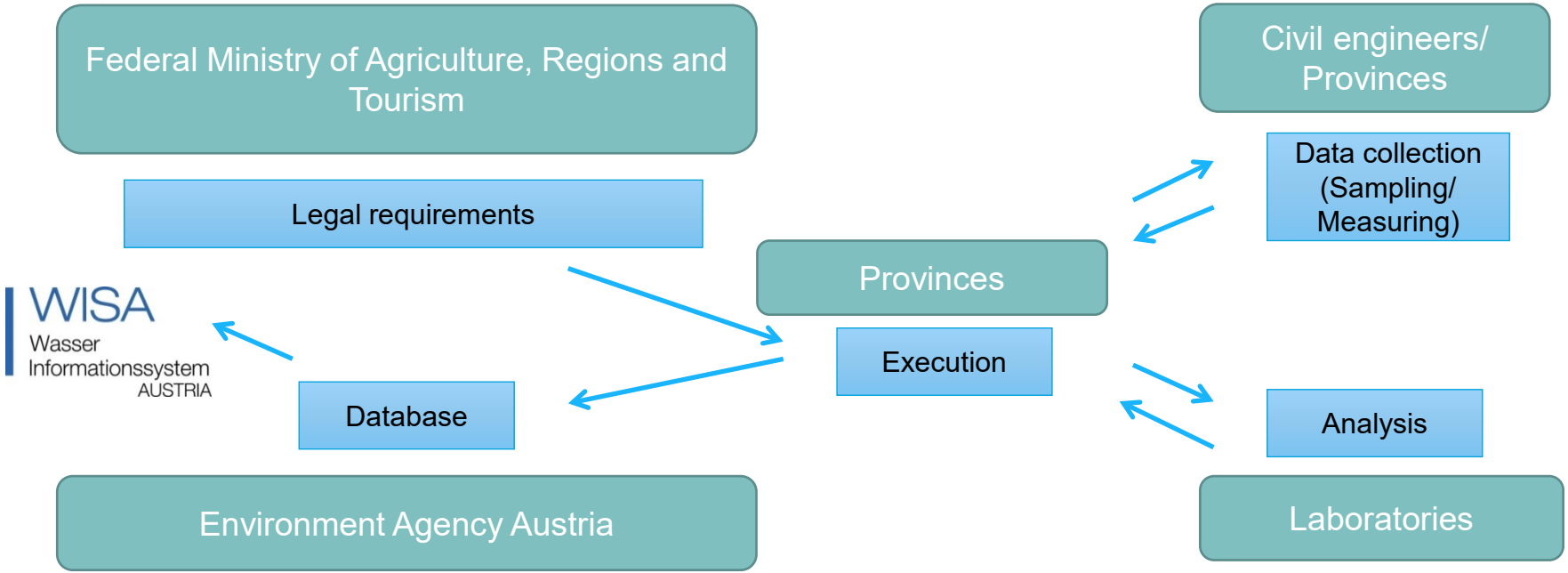
- Water Act (Federal legal gazette No. 215/1959 – in the current version) = legal basis for water management in Austria
  - WISA §59: purpose, content, stakeholder
  - River Basin Management Plan §55h (RBMP)
  - Flood Risk Management Plan §55l (FRMP)
- Complemented by Ordinances e.g.
  - Emission register
  - Water quality monitoring
  - Water quantity monitoring

ROLE OF MONITORING IN WATER MANAGEMENT

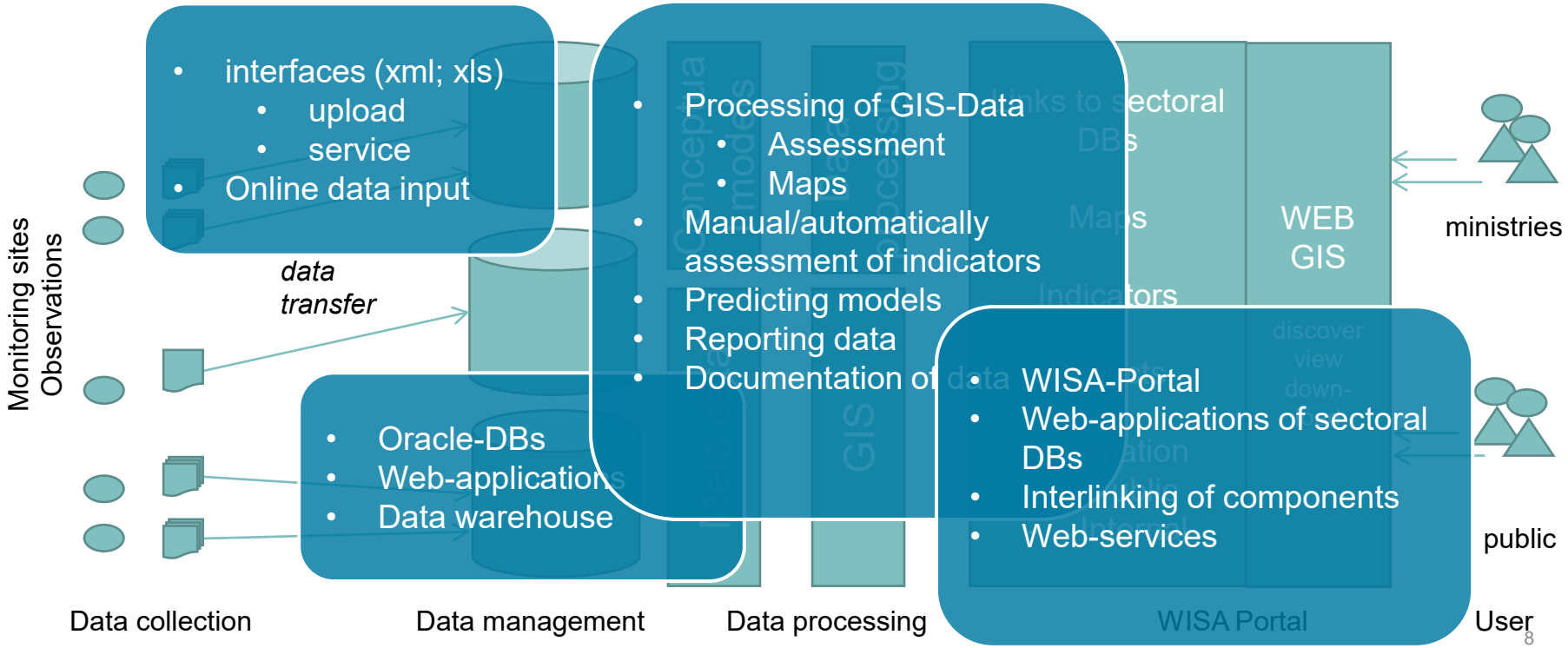


Source: European Commission, 2008: Groundwater Protection in Europe

Organisation & dataflow (generalized)



CONCEPT OF WISA



AUSTRIAN WATER DATA SYSTEMS – NATIONAL LEVEL

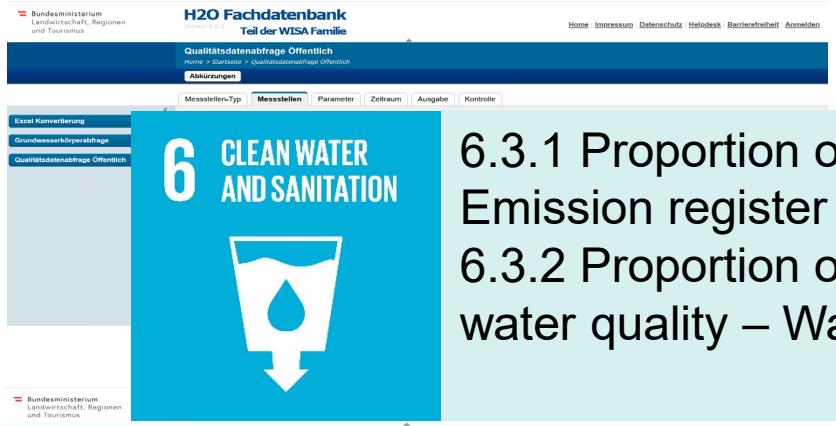
Water applications for data management and data assessment

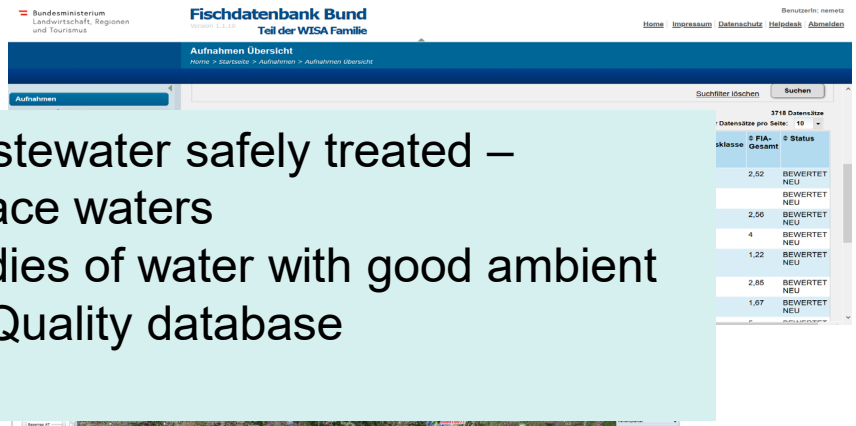
- Water quality database (Web application & services)
- Biological Databases
  - Fish Database (Web application & services)
  - Benthos Database (Web application & services)
  - Makrophytes Database (Web application & services)
- Emission register surface waters
- Austrian Water Graph (GIS)
- Surface water body Database (NGP-DB)
- Spatial Data Infrastructure (SDI) Water
- Floods Database (Web application & services)
- Hydrographic Yearbook
- Datawarehouse Water

WISA – Portal for Data access and presentation

- Access to Water Applications via links
- Publication and Web-GIS for
  - National River Basin Managment Plans
  - National Flood Risk Management Plans
  - Thematical interactive maps
- Information about Interfaces

Water applications for Data Management and data assessment in WISA

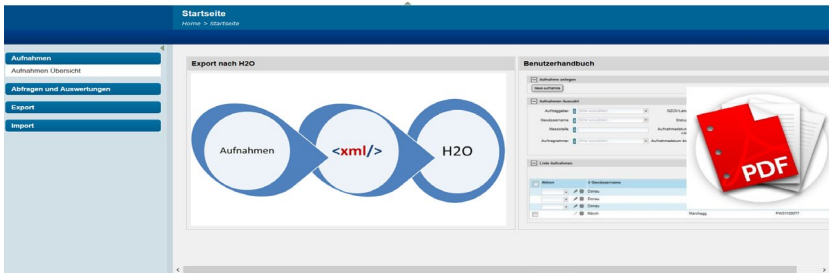




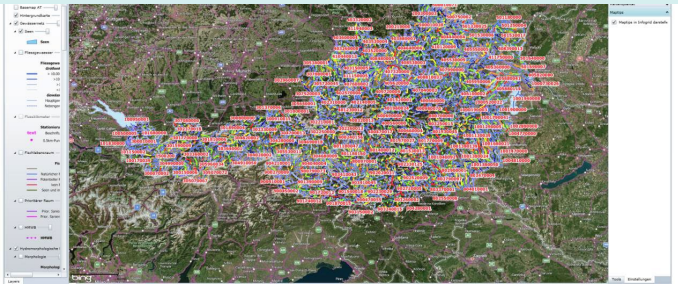
6 CLEAN WATER AND SANITATION

6.3.1 Proportion of wastewater safely treated – Emission register surface waters

6.3.2 Proportion of bodies of water with good ambient water quality – Water Quality database



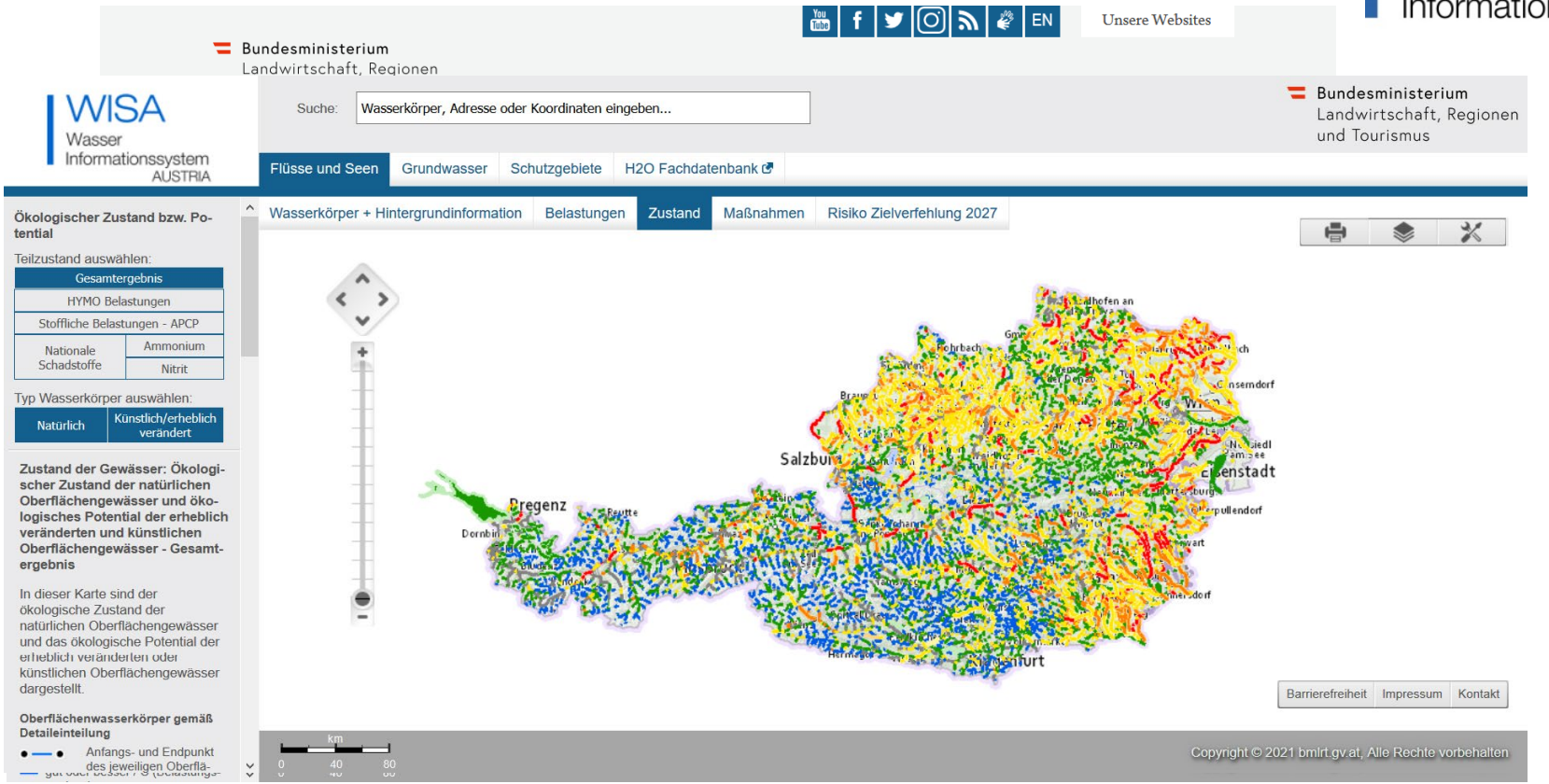
Federal Benthos Database



NGP-DB (SWB-DB)

https://www.bmlrt.gv.at/english/water/water-and-data-wisa.html

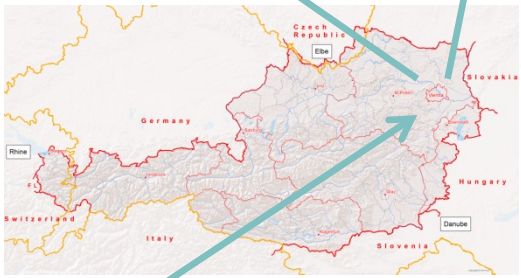
WISA
Wasser
Informationssystem
AUSTRIA



ENVIRONMENT AGENCY AUSTRIA umweltbundesamt

LEVELS OF DATA EXCHANGE

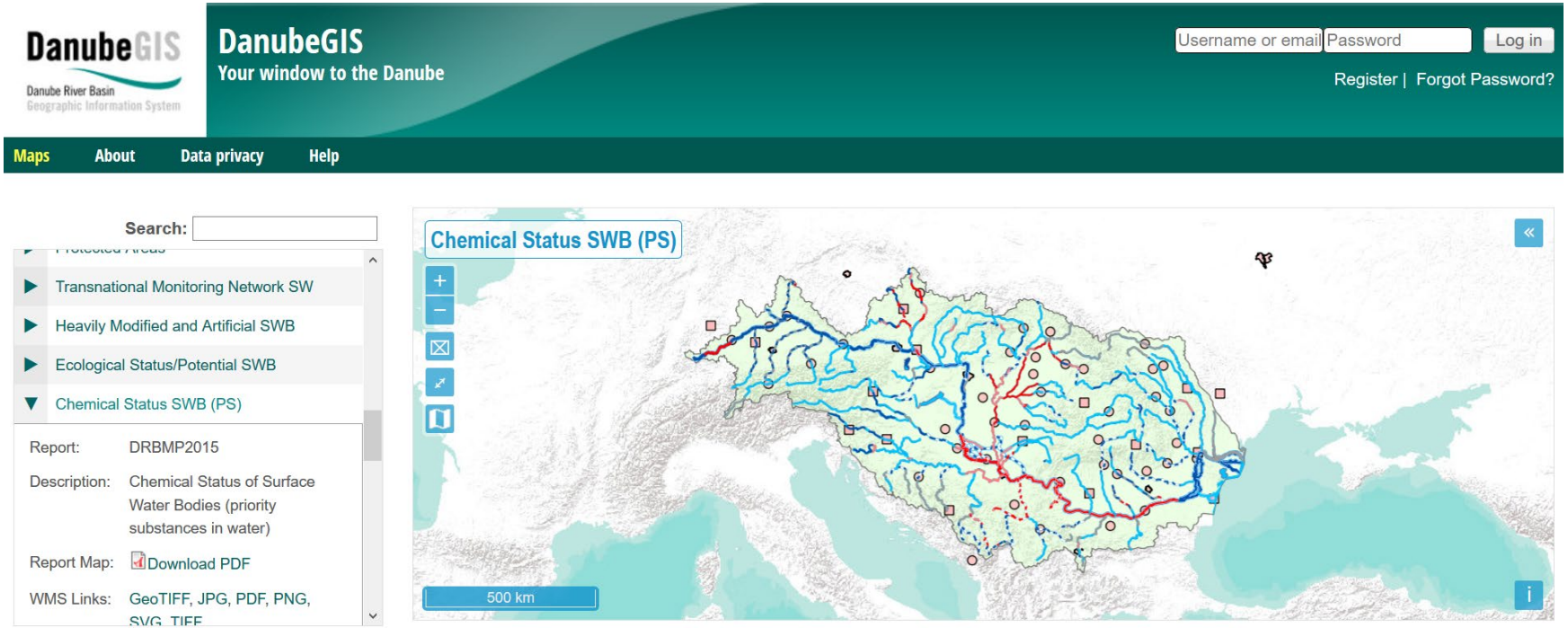
- European Commission (European level)
  - Water Information System Europe (WISE)
  - State of environment (SOE)
  - Compliance check
  - Revision of European water policy
- International river basin commissions
  - Bilateral and transboundary coordination
- Federal State of Austria (National level)
  - National River Basin Plan (RBMP; FRMP)
  - Water Information System Austria (WISA)
  - Reporting to EC/EEA
- 9 Provinces of Austria (Provincial level)
  - Have their own competencies according to the Water Act (data collection, permitting water rigths)
  - Water information systems of the Provinces
  - Reporting to the Federal State



ICPDR DanubeGIS

- Support countries in the data collection, analysis and visualisation required for the **WFD and FD reporting** on the Danube River Basin-Wide scale
  - Rivers: catchment areas >4000 km²
  - Lakes: surface area >100 km²
  - Important transboundary groundwater bodies >4000 km²
- Support work of any ICPDR **Expert Groups**, e.g. Accident Risk Sites, Transnational Monitoring Network (TNMN)
- Support **sub-basin activities** (Tisza, Sava, Prut, Danube Delta) on sub-basin scale (rivers >1000 km², …)

ICPDR DanubeGIS



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ICPDR DanubeGIS

- Web-based system providing a centralised database
- Data collection
  - Upload into file repository using shape file and Excel templates
  - INSPIRE-compliant Metadata editor and validation tool
- Data storage
  - File repository with all uploaded datasets
  - Geodatabase with separate schemas for latest/final basin-wide data
- Data validation, analysis and retrieval tools:
  - 1st and 2nd level data quality checking
  - Stored queries to produce tables, graphs and views as basis for layers
  - Layers and maps accessible via OGC-compliant web services

Conclusions for water data management

- Data should be collected only once and should be kept where it can be maintained most effectively
- Share the data with many users and applications
- Use the water data for different purposes (collect once and use more than once)
- Establish common interfaces – combine data from different sources - harmonisation of data
- It should be possible for information collected at one level to be shared with all levels;
  - detailed for thorough investigations, general for strategic purposes
- Interlink your information systems

Examples for new emerging issues in Austrian Waters

- Plastics in the Danube River

- Wastewater Epidemiology using viral RNA

  COVID19 in Austrias urban wastewater

  – first results and future perspectives

Coron-A

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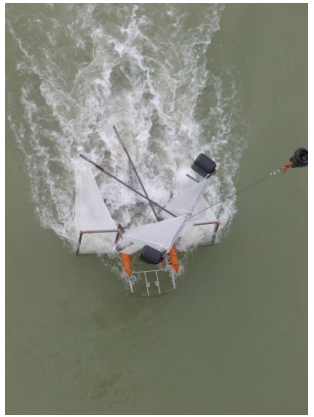
PLASTICS IN THE DANUBE RIVER

- Study 2014 in the Austrian stretch of the Danube River
- Development of tailormade sampling method to investigate the dispersion characteristics of plastic particles in the flow
- Addressing depth and lateral stratification
- Sampled particle sizes: >250 µm/>500µm
- Exposure time: min 20 minutes (depending on season)
- Preparation, manual sorting, IR identification



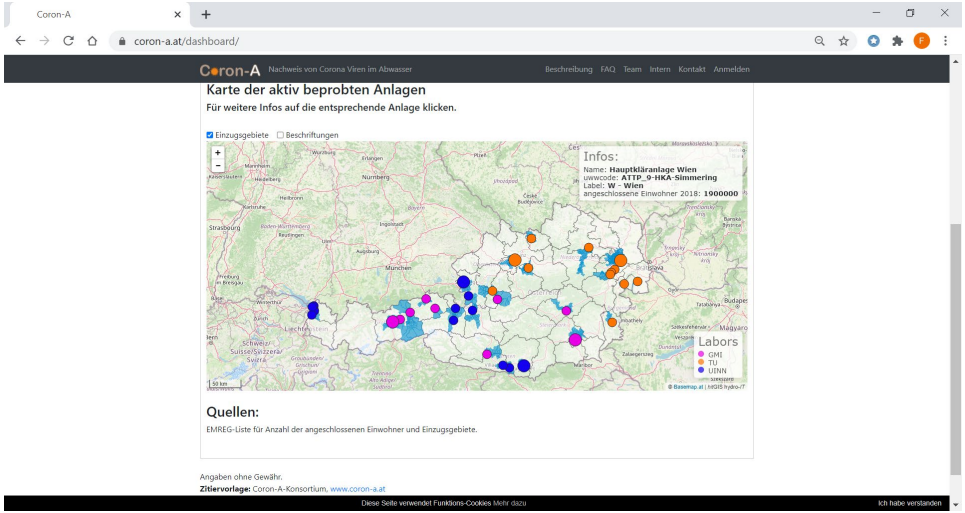
PLASTICS IN THE DANUBE RIVER - RESULTS

- Similar transport at both sites at low water
- Significant increase of plastics transport with water flow
  - 2 to 3-fold difference Aschach/Hainburg
- Transport Aschach
  - 6-40 kg/d (Plastics < 5 mm)
  - 10 – 59 kg/d (total plastics)
- Transport Hainburg
  - 6 – 66 kg/d /Plastics < 5 mm)
  - 7 – 161 kg/d (total plastics)
- Annual load at Hainburg
  - < 17 t/a (micro plastics)
  - < 41 t/a (total plastics)

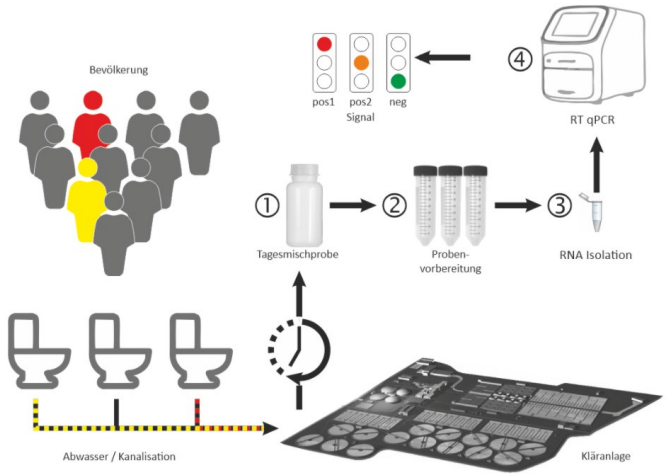
- <41 t/a in Danube river at Hainburg
- 873.000 t/a: plastic treatment within the Austrian waste management
- More than 2.300 t/a of plastics are recovered from water bodies
  - Sewage treatment, power plants, cleaning of sewers etc.
- Tyre wear is estimated to be 6.700 t/a in AT

Coron-A - DETECTION OF COVID19 IN AUSTRIAN URBAN WASTE WATERS

- **Main Objective ► Development of the basics of a wastewater epidemiological early warning- and de-warning system for viral RNA in Austria (National Umbrella project "Coron-A")**
- **Start 04/2020 - Partners: EAA is Coordinating Partner, 3 Universities (Sampling, Laboratories, Modelling), 1 Health Agency (Prognosis-Modelling), 1 IT-company (Data processing), Funding support by 2 Federal Ministries (Water & Research), 8 Provincial governments, Austrian Association of towns and municipalities**
- **Sentinel monitoring** (33 facilities/2.200 samples):



- **Detection Process:**



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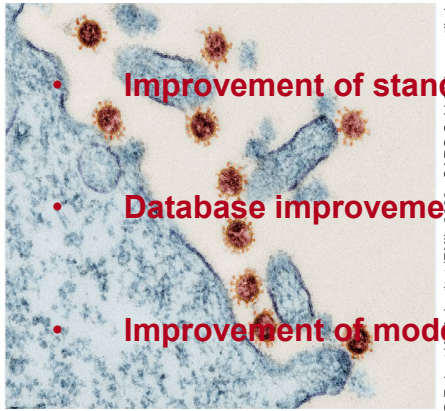
Coron-A Results & Outlook

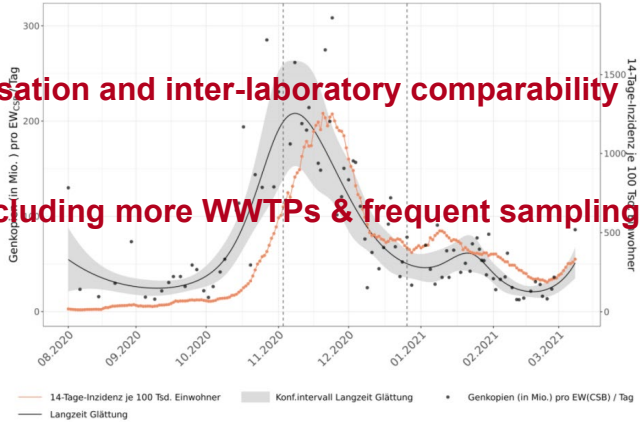
First Results :

+ Proven feasibility of a time advantage (approx. 3 - 6 days) for virus detection in wastewater compared to clinical diagnostics
+ Advantage to observe non invasive the entire population in the catchment area of a wastewater treatment plant - as opposed to only the sample of the population tested
+ Sample logistics/analytics established
+ Sample database operative
+ First input- and prognosis models
+ Successful mutation detections
+ Visualisation: internal Dashboard available & Heatmap of the progressions for Public Health information



© Robert Koch-Institut (RKI), 2020 - SARS-CoV-2-Partikeln auf der Oberfläche., Quelle: Tobias Hoffmann, Marina Jahnke

- Improvement of standardisation and inter-laboratory comparability
- Database improvement including more WWTPs & frequent sampling
- Improvement of models



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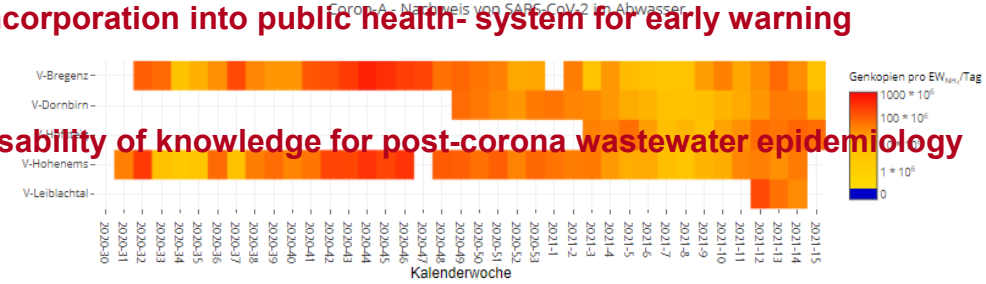
- Publicity of data & scientific publications

- Incorporation into public health- system for early warning



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- Usability of knowledge for post-corona wastewater epidemiology

Thank you for your attention!

Stephan Nemetz
Florian Wolf-Ott
Philipp Hohenblum
Team Surface Waters

Thomas Rosmann
Team Groundwater

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