





## **Digital Water Book**

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- 1. Introduction**
  - 1.1. Good Practice**

A Good Practice of the Saxon State Office for Environment, Agriculture and Geology (LfULG) is the Digital Water Book ([www.wasserbuch.sachsen.de](http://www.wasserbuch.sachsen.de)). The Digital Water Book is a web-based information system for existing water management uses and facilities as well as water protection areas. The Digital Water Book is based on the water books of the Saxon main catchments. These water books contain the existing water rights associated with the water bodies in Saxony. The linkage of this information to aerial images gives a good and quick overview of the local conditions. Since this is a free web tool, qualified water management information is generally accessible, for governmental institutions as well as for citizens and non-governmental organisations. All persons or parties interested can obtain online information e.g. on water rights, surface waters, groundwater, drinking water protection areas and flood zones. This general transparency in water management measures is the basis for the sustainable management of both groundwater and surface water resources.

- 1.2. Background and history of the (Digital) Water Book**
  - 1.2.1. Water Law and Water Book**

In Germany, the protection and use of surface waters and groundwater is laid down in the Federal Water Resources Act (WHG). As early as in the middle of the 19<sup>th</sup> century, first attempts were made to introduce a law regulating the use of water bodies. The main concern was to find a balance between the protection of water as public property on the one hand and the supply of sufficient amounts of water as a vital resource on the other. On 12 March 1909, the Water Law of the Kingdom of Saxony stipulated for the first time that "flowing water shall not be left to the unrestricted control of



individuals, especially of those having the natural advantage of easier access, but its use shall be regulated in the public interest of general welfare and be subjected to a higher-level regulatory power" (SächsWG 1909). Water-related regulations before 1909 were placed in different laws and therefore Article 50 of the Saxon Water Law of 1909 introduced the following provision: "The administration authority shall hold and maintain lists of the flowing waters in its jurisdiction and of authorised uses or equivalent use rights in the form of clear schedules – Water Books." (SächsWG 1909). The format or appearance of the Water Books has changed at several occasions since their introduction – whether thick books, paperboard, or card files. In the course of time, the entries of water rights showed more and more gaps and some information was lost. It was not until the 1<sup>st</sup> of July, 1990 that the Federal Water Resources Act entered into force and restored the legal significance of the Water Book. The Water Resources Act requires Water Books to be maintained in Germany. Water Books shall list the existing water bodies and summarise their legal status.

The currently applicable federal German water law requires the following information to be entered into the Water Books (Art. 87 of the Water Resources Act [WHG]):

- permits granted under the Act for other than just preliminary purposes;
- water use rights;
- old rights and authorisations;
- planning inquiry decisions;
- plan approvals;
- water protection areas;
- risk areas;
- defined flood zones.

The foregoing pieces of information are minimum requirements.

In Germany, the legislative competence in terms of water resources management is split between the federal German government and the regional states. In addition to the federal Water Resources Act, which is applicable to Germany as a whole, each state has its own Water Act, which is fully based on federal German law while regulating specific regional or local features. The Free State of Saxony passed the Saxon Water Act. It contains precise rules regarding the Water Book. So the Saxon Water Act stipulates that the supreme authority shall, by way of statutory ordinance, regulate how water books are to be maintained by the competent water authority.

German states may have a two-level or three-level system. The general distinction is:

- supreme water authorities (ministries of the German states),
- higher water authorities (state offices or regional councils), and
- lower water authorities (offices in rural districts and independent municipalities).



Pursuant to the Saxon Water Act, the purpose of the Water Books is to outline and document all and any decisions related to water law. The state is given the power to issue ordinances with the aim to ensure that not only the legal information mentioned by the Federal Water Resources Act is registered, but also any other provisions or facts significant for the legal status and relationships of the water bodies and water management facilities, where required in the public interest. This includes decisions made by the water authorities or agreements entered into in terms of:

- construction and conversion of water bodies;
- maintenance of water bodies;
- use and operation of water bodies;
- flood control facilities;
- wastewater & sewage facilities;
- water supply facilities;
- piping systems;
- facilities for handling water hazardous substances;
- regulations by the water authorities in terms of district water supplies;
- water and wastewater easements or rights-of-way;
- registration of healing springs and protective buffer strips;
- definition of flood generation areas.

However, the entries in the Water Book do not establish or change any rights. The Water Book is nothing but an official register of existing water rights and protection areas falling under the water law.

13 Water Books are maintained for Saxony (**Table 1**).

**Table 1: List of Water Books of the Free State of Saxony**

River Basin Code	Main basin
537	Elbe
532	Eger (Ohře)
536	Polzen (Ploučnice)
538	Schwarze Elster
582	Spree
542	Freiberger Mulde

River Basin Code	Main basin
541	Zwickauer Mulde
549	Vereinigte Mulde
566	Weisse Elster
561	Saale from the source to Loquitz
565	Saale from Unstrut to Weisse Elster
567	Saale from Weisse Elster to Bode
674	Lausitzer Neisse

### 1.2.2. Digital Water Book

The Water Book is not limited to authorities, but available to the general public. To ensure public accessibility, the Saxon state government decided to publish the Water Books in a digital form on the Internet. The background of this transparency approach is the fact that water, whether on the surface or underground, is a very important public good and that its use and protection is a matter of general public interest and concern.

## 2. General background

### 2.1. Provisions of water law

The following definitions are cited for better understanding of key terms in the German water law.

#### **Wastewater**

Wastewater (sewage) refers to water that changes its properties due to its use and that runs off built-up or paved surface areas and is collected (stormwater).

#### **Water hazardous substances**

Water hazardous substances (also referred to as water polluting or water endangering substances) refer to substances modifying the physical, biological and chemical nature of water. The substances can be sub-classified according to the degree of danger to water. There are three water hazard classes (WGK):

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- Class WGK 1: slightly hazardous to water;
- Class WGK 2: hazardous to water;
- Class WGK 3: very hazardous to water.

### **Water protection areas**

There are specific regulations on what to do and not do in water protection areas. The Saxon Water Act gives the competent water authorities the power to establish, modify or cancel the status of water protection areas by way of statutory ordinance. In Saxony, this task is fulfilled by the lower water authorities. On request of the lower water authorities, the Saxon State Office for Environment, Agriculture and Geology (LfULG) will prepare an expertise forming the basis for the legal status procedure. In most cases, the application for establishing a water protection area to be filed with the lower authority is made by the holder of the public water supply network, by legal owners of the water intake facilities, by water supply corporations, or by the Saxon State Reservoir Administration.

The water protection areas are divided into protection zones. There are three protection zones for drinking water protection areas, groundwater catchments and reservoirs:

- Zone I is the immediate area around the water extraction point. It is set to a minimum of 10 metres. It guarantees for absolute protection of water production and implies a general modification ban.
- The boundary of Zone II is the line from which groundwater takes 50 days to flow to the extraction point. This is to ensure full degradation of microbiological contaminations. Also, it is prohibited to apply liquid manure, dung water, silage seepage water or soil contaminants, or to build structures or lay sewage pipes in Zone II.
- Zone III extends from the boundary line of Zone II to the boundary of the catchment area. In this zone, the handling of water hazardous substances should be minimised and the groundwater cover should be maintained to the largest possible extent.

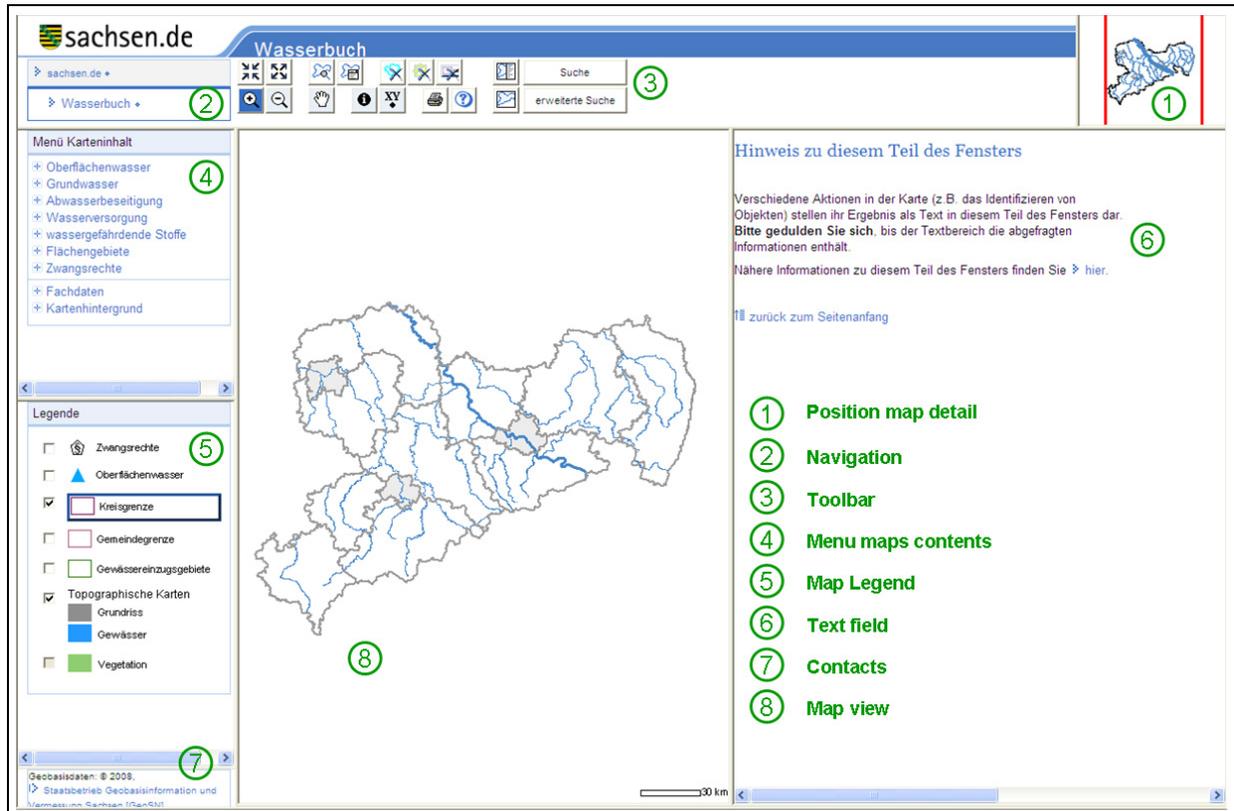
### **Restrictive law**

The law provides for restrictions to and interference with private property rights. The affected party cannot avoid such interference, but must be indemnified appropriately. Restrictions under the water law include:

- transferring private water bodies to the public sphere;
- imposing an obligation to accept preparatory works;
- expropriation;
- imposing certain rights of use.

## **2.2. Application and structure of the Digital Water Book**

The user interface of the interactive map of the Digital Water Book is divided into several sections (**Fig. 1**).



**Figure 1: Interactive Map of the Digital Water Book**

The **Maps Contents menu** contains the whole set of viewable map contents. A mouse click on one of the menu items gives access to a list of map themes available for selection. The selected map themes will then appear as active themes in the legend and be represented in the map. The **Map Legend** adds a word description (map theme) to each representation in the map. The user can decide to view or mask the map theme by selecting or unselecting the checkbox in front of the legend item. If the checkbox is disabled (greyed out), the map theme cannot currently be displayed, because the map scale is too small or too large. Further map themes can be inserted via the Maps Contents menu. The "active map theme" can be declared in the legend. The **toolbar** offers all functions and tools required for interactive map operation. There are two basic types of functions:

- All white buttons trigger an immediate action, e.g. the "search" button will open the search form for inquiries of the water book.
- Coloured buttons are tools for use in the map view section.

Only one of these tools can be used at a time. The currently active tool is highlighted in a darker shade. The interactive map is automatically loaded with the zoom-out tool being active. **Table 2** gives an overview and a description of all function buttons and tools.

**Table 2: Function buttons and tools of the Digital Water Book**

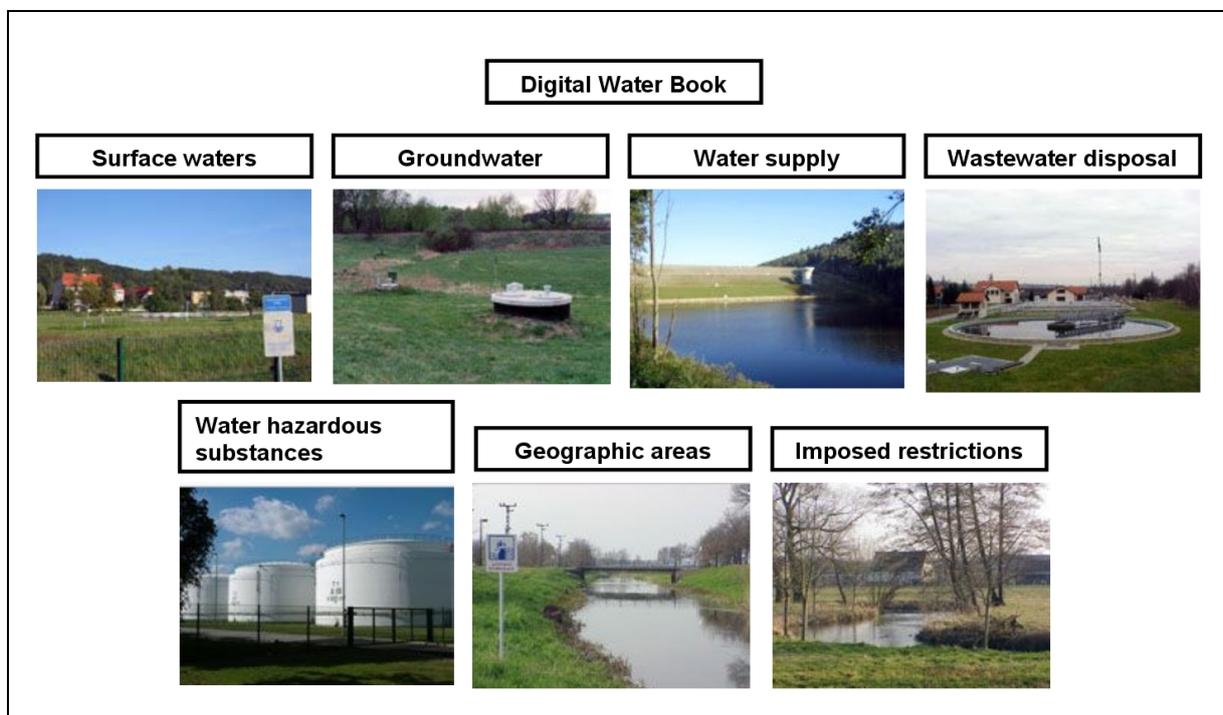
Button icon	Description
	Zoom in
	Zoom out
	Initial zoom
	Select zoom
	Print
	Unselect
	Remove coordinate mark
	Remove active theme
	Split view (map and text)
	Map only
Suche	Search
erweiterte Suche	Extended search
	Zoom-in magnifier
	Zoom-out magnifier
	Free move
	Identify objects
	Determine coordinates

A general **Survey Map of Saxony** is shown in the top right corner of the window. A red square indicates the region currently displayed in the map view section. This is for better orientation in the interactive Water Book map. The **Map View** contains the map with the themes shown in the legend. The right bottom section of the map shows a scale bar meant to give the user a better idea of mapping distances. The current underlying map (topography) is indicated in the middle of the bottom section.

When being loaded, the interactive map view shows a survey map with predefined contents. Certain actions in the map (such as the identification of objects) cause the main window to be split into: the map view and the **Text Field**. The text field is not generally visible. It opens automatically when a function delivers a plain text result. The split view causes the map section to be re-loaded with the text field showing the requested information.

### 2.3. Information content

The Digital Water Book is divided into various categories, which are summarised in **Figure 2**.



**Figure 2: Overview of Categories contained in the Digital Water Book**

**Table 3** shows the information registered for each mapped entry in the Digital Water Book.

**Table 3: Digital Water Book – Information**

Main information	Content
General	Main river basin, type, content, status, brief description, purpose, legal basis, competent authority
Right holder	Name, address
Facility (site)	Number, designation, address

Main information	Content
Legal decision under water law	Decision date, public announcement, authority making the decision, reference number, competent water authority, reference number, effective date, limitation in time, reservation of revocation, condition precedent/subsequent, comments on legal effect, expiry of objection period, objection procedure pending?, comments on the objection, remarks by the water authority
Water Book entry	Date of entry, date of most recent modification, type of entry, legal validity, remarks, Water Book recorder, Water Book authority
Extent	Extraction volume
Water hazardous substance	Type of handling, water hazard class, danger potential

It is possible to directly access an individual sheet of the Water Book, if required.

All entries in the Digital Water Book are categorised in terms of surface water or groundwater, wastewater disposal, water supplies, water hazardous substances, surface areas and imposed restrictions. **Table 4** outlines the water rights associated with each of the categories.

**Table 4: Digital Water Book – overview of available information**

<p><b>Surface waters</b></p> 	<ul style="list-style-type: none"> <li>• raising or lowering surface water levels;</li> <li>• dykes;</li> <li>• discharge of (clean) water (not falling under the Waste Water Charges Act) into receiving water bodies;</li> <li>• water extraction/drainage;</li> <li>• solids removal;</li> <li>• waterway construction and conversion of water bodies;</li> <li>• care and maintenance of water bodies;</li> <li>• other facilities in/on/above/below surface water bodies;</li> <li>• other uses of surface water bodies;</li> <li>• material input into surface water bodies;</li> <li>• dams, reservoirs, water detention basins;</li> <li>• weirs.</li> </ul>
<p><b>Groundwater</b></p>	<ul style="list-style-type: none"> <li>• raising, lowering, bypassing of groundwater;</li> <li>• abstraction, pumping, piping, discharge of groundwater;</li> <li>• borehole drilling and excavation;</li> <li>• other uses of groundwater;</li> <li>• material input into the groundwater;</li> </ul>

	<ul style="list-style-type: none"> <li>• heat production.</li> </ul>
<p><b>Wastewater disposal</b></p> 	<ul style="list-style-type: none"> <li>• wastewater piping system;</li> <li>• municipal sewage treatment plant;</li> <li>• industrial effluent treatment plant;</li> <li>• direct discharge;</li> <li>• indirect discharge;</li> <li>• transfer of wastewater disposal obligation.</li> </ul>
<p><b>Water supply</b></p> 	<ul style="list-style-type: none"> <li>• water treatment plant;</li> <li>• water raising plant;</li> <li>• water production plant;</li> <li>• water storage facility;</li> <li>• water distribution system;</li> <li>• district water supply;</li> <li>• transfer of water supply obligation;</li> <li>• water extraction.</li> </ul>
<p><b>Water hazardous substances</b></p> 	<ul style="list-style-type: none"> <li>• handling of water hazardous substances.</li> </ul>

<p style="text-align: center;"><b>Geographic areas</b></p> 	<ul style="list-style-type: none"> <li>• measures taken in geographic areas;</li> <li>• water protection areas;</li> <li>• healing source protection areas;</li> <li>• flood zones;</li> <li>• flood generation areas.</li> </ul>
<p style="text-align: center;"><b>Restrictive law</b></p> 	<ul style="list-style-type: none"> <li>• Imposed restrictions</li> </ul>

### 3. Summary

The Digital Water Book has proven successful not only in Saxony, but also in other German states. A Digital Water Book is also maintained in Rhineland-Palatinate. There are Digital Water Books also in Austria (Salzburg, Kärnten and Steiermark).

The advantage of this type of information system is to have a geographic overview of water rights. So it is possible to get an idea of how strong the human impact is in certain areas, where protection areas are located and where additional groundwater protection is required. Since the Digital Water Book allows for direct inquiries, it reduces the amount of administrative work otherwise required for answering requests for information addressed to the competent authorities.

Furthermore, the Digital Water Book is a dynamically growing system. It is constantly possible to make new entries or record modifications of existing water rights or add updated information. Internet provides easy access for the interested public. So the general public is enabled to use the information recorded in the Water Books and gain an understanding of legally required water management measures.



The method of making water law-related data publicly available is well transferable. However, the above described method can be rather complex and require a high input for setting up such a web-based system and for digitising the analog data (depending on the degree of digitisation of the existing water rights and geodata basis). Especially in the 21<sup>st</sup> century, with the Internet having emerged as one of the most important media, this tool should be used to make specialist data publicly available.

This approach is highly recommendable, because surface waters as well as groundwater are very important public goods. Their use and protection are of general public interest.

#### References:

WHG, § 87; [http://bundesrecht.juris.de/whg\\_2009/\\_87.html](http://bundesrecht.juris.de/whg_2009/_87.html) (version downloaded on 17.03.2011)

SächsWG 1909, Königlich Sächsischen Wassergesetzes von 1909 (Royal Saxon Water Act)

Digital Water Book of Saxony: [www.wasserbuch.sachsen.de](http://www.wasserbuch.sachsen.de)