

Plate 1.3 Index of Rivers and Lakes

Introduction

In view of the growing conflict of interests regarding river and lake waters (use of land and water, and ecological concerns), there is an increased demand today for a better data background for decision making. Information is in fact sought which combines at the same time specialised material information and spatial data. Thanks to the use of electronic data processing and Geographical Information Systems, it is possible today to merge material and spatial data. The aim of the GEWISS project is to assemble important information concerning waters throughout Switzerland in such a way that it can be evaluated on a uniform basis. The foundation for this is a clear definition of waters which is independent of both representation and scale. For this reason the Federal Office for Water Management, together with the Federal Office of Environment, Forests and Landscape, has drawn up a uniform, coded network [2], the Digital Swiss Hydrographic System, at a scale of 1:200 000 (DGN200). This system serves as a reference base for detailed representations and allows the information available to be combined with the hydrographic system so that the flow patterns can be used to provide answers to questions concerning the impact of increasing or reducing the volume of water, etc.

Basis for the digital hydrographic system

The digital hydrographic system was drawn up on the basis of the 1:200 000 Ordnance Survey map of Switzerland. Precision concerning location of waters thus follows cartographic aspects: on any Ordnance Survey map the precision concerning roads, for example, is given higher priority than that for rivers and lakes, which means that on a 1:200 000 scale map the location of waters may differ from reality up to 100 m. For overview representations though the topologically correct order (right or left bank or shore, order of tributaries) is more important than the precise location. The fact that the hydrographic system corresponds to the Ordnance Survey map is an advantage in that no discrepancies occur when the DGN200 is superimposed on this Ordnance Survey map, be it for data processing on a screen or preparing documents for printing.

The hydrographic system on a 1:200 000 scale was chosen for the reference base because:

- at this scale the number and location of the waters indicated on this map will change very little, which provides the required degree of stability for the reference system;
- it allows a sufficient degree of detail; the DGN200 includes around 5000 rivers and lakes which are divided into approximately 10 000 sections (one section thus covers an area of around 4 km² on average);
- it allows the map to be digitised in a reasonable time with uniform precision.
- Larger scale maps can be digitised and integrated with the GEWISS data model at any time.

The division of the waters into sections

A river or lake is divided into sections, using confluences and cantonal borders. The sections go upstream (from the mouth up to the source) [1]. Each river or lake has been individually numbered (GEWISS number, see tables). For reasons of presentation a system of auxiliary numbers had to be used for smaller rivers. The section numbers are not shown in the «Hydrological Atlas». The GEWISS numbers are entirely arbitrary and were allotted in the order in which the waters were dealt with. Lakes have numbers over 9000. No attempt has been made to number the waters logically since such logic can only be consistently maintained in a definitive, unchanging system. Logical numbering would sooner or later be upset by diversions and other hydrological engineering projects which change the hydrographic system. In consequence, a renumbering with its negative effects would be necessary. Furthermore, a logical numbering system is of far less importance in electronic processing than in manual evaluation.

Names of the waters

The names of rivers and lakes are never definite: there are often several names or different spellings for the same river or lake, which are treated as synonyms in the GEWISS system. The names included in the tables correspond in general to those used on the 1:25 000 Ordnance Survey maps. Where no name was given and no official name could be supplied by the cantonal authorities, a blank has been left. In such cases the waters can be identified only through the GEWISS numbering system.

Lengths of the rivers

The lengths of the rivers were ascertained using the 1:200 000 Ordnance Survey map. For this reason they are systematically shorter than in reality. A random check of the 1:25 000 scale Ordnance Survey map using digitisation showed relative errors of between 5 and 10 % in the 1:200 000 scale map. The extent of deviation between the 1:25 000 scale map and the «real» lengths of natural rivers (question of channel flow) must remain unanswered in view of the varying dynamics of the rivers.

Further information

The Digital Swiss Hydrographic System is available from the GEOSTAT Division of the Federal Office for Statistics, which also answers to enquiries. The data is managed by the Federal Office for Water Management, which can also provide further information on the contents and methodology of the System.

References

- [1] **Bundesamt für Wasserwirtschaft (1992):** Gewässerkataster Schweiz. Bern.
- [2] **Geo7 (1993):** Digitales Gewässernetz 1:200 000 (DGN200), Datenbeschrieb. Bern.