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The Geographic Information System Strategy for the Sava River Basin

2007 – 2012

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Title	Geographic Information Strategy for the Sava River Basin 2007 – 2012	
Abstract	<p>In December 2006 the ISRBC have taken steps to prepare a geographic information strategy for the Sava River Basin. The Geographic Information Strategy for the Sava River Basin focuses on describing principles, objectives and measures considered appropriate for the establish of a (geo)information system in the Sava River Basin. A successful implementation of the strategy will result in a more efficient and diverse use of the water management related geospatial data available in the ISRBC member states, the emergence of a new web and GIS services and better access to the information. The strategy also takes into account the INSPIRE directive (2007/2/EC) for the establishment of the European Spatial Data Infrastructure and WISE (Water Information System for Europe) as wider initiative to modernize and streamline the collection and dissemination of information related to European water policy.</p>	
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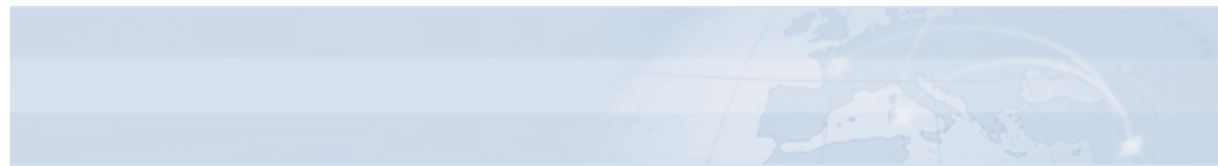


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Preface

A geographic information technology is based on the use and management of a geospatial data. As such, it provides a good example of a component of the information society involving activities across sectors at the local, national and international level.

The need to manage data as a shared international resource in a manner that focuses on the needs of end-users has not previously been recognized, nor has the challenge been undertaken in a serious and systematic manner. An information on the water resources are complex and variable as the data are obtained by diverse means, across a broad range of disciplines, for a variety of purposes, and by wide-ranging organizations such as researcher, public and private organizations; national governmental institutions and international community.

The Geographic Information System Strategy for Sava River Basin was prepared as part of the obligation results from the Framework Agreement on the Sava River Basin (FASRB). It is initiated by the ISRBC Secretariat and Permanent Expert Group for the River Basin Management (PEG RBM) in order to improve competitiveness and productivity, promote regional equal technical and informational opportunity, and improve the quality of the Sava River Basin management and planning through the utilization of information and communications technologies.

Through the use of various information sources and services, collaboration and work of the permanent and ad hoc expert groups of the ISRBC and Secretariat, can be significantly improved, facilitated, and efficiency of the administration increased in accordance with the ISRBC programs and plans.

The Geographic Information System Strategy for Sava River Basin (hereinafter Sava GIS Strategy) describes principles intended to guide the establishment and maintenance of the (geo) information system and spatial data infrastructure including related measures to be taken in the coming five years. The strategy also takes into account the INSPIRE directive (2007/2/EC) for the establishment of a European spatial data infrastructure and WISE (Water Information System for Europe) as wider initiative to modernize and streamline the collection and dissemination of information related to European water policy.

A spatial data infrastructure defines structures for cooperation, technical solutions, data management principles, data services and human resources. Combined, these structures allow core geospatial information to be efficiently maintained, disseminated and used throughout society. The spatial data infrastructure also harmonizes the international network of services, wherefore active collaboration on development at the international and, in particular, the European level is also imperative.

The Sava GIS Strategy promotes the objectives aimed at establishing an efficient and competitive water resources-related spatial data framework the Sava River Basin countries; the emergence of the new services that provide better access to the information and good framework for the future international basin-wide cooperation.



Introduction

Geospatial information is one of the most critical elements underpinning decision-making for many disciplines. It is also building blocks for the information and communications technology innovation.

In order to take the advantages offered by a new digital environment for efficiencies in the exploiting of various databases and provision of geospatial information, the new approaches are required to its collective management. In today's increasingly complex environment, the efficient and multiple use of datasets depends significantly on whether players and organizations across sectors are prepared to cooperate in a way to remove local, national and international barriers to increase efficiency in data sharing.

Geospatial information is used for a wide range of purposes and services, such as water management, environmental monitoring, agriculture and forestry management, land use planning, traffic and transport management, navigation, etc. Like the other digital content, it can be transferred over a worldwide data network and over a wireless network practically in real time.

Along with the strategic opportunities offered by information and communication technology, significant benefits can also be gained from taking a coordinated approach to the governance of water related geospatial information resources such as:

- Better meet the Sava River Basin-wide water management needs by using common agreed standards for fundamental (i.e. priority) geospatial information.
- Reduce duplication of capture and maintenance processes of geospatial datasets.
- Enhance the discoverability of, and access to, the authorized sources of geospatial information.

The challenge for the ISRBC is establishment of the framework where the user experience will change fundamentally from the current process of locating, downloading, reformatting, and displaying to one of accessing information, browsing, and comparing data with standard tools, such as web GIS browsers, and visualization/analysis tools, without concern for data format, data location, or data volume.

The umbrella for the SAVA GIS establishment encompass:

- Framework Agreement on the Sava River Basin
- Strategy on implementation of the FASRB and protocols
- EU initiative:
 - Water Framework Directive,
 - INSPIRE
 - Danube River Basin GIS and Water Information System for Europe (WISE).



Aims of the strategy

Vision

The Sava GIS shall:

- Provide a good international communication channels for the ISRBC community in order to share and disseminate information and knowledge about protection of the water resources and water management activities in the Sava River Basin.
- Serve wider community of people dealing with water resources and environmental protection in their tasks with applications and information services that conform to the standards proposed by the INSPIRE legislation, that better streamline the flow of spatial and non-spatial (tabular) information from national to international levels through the definition and adoption of common data models and standards.

Value

Quality – By ensuring that core water related spatial and other complementary information needed by the ISRBC are available and of adequate quality, the basic preconditions for widespread data sharing and improved services will be established.

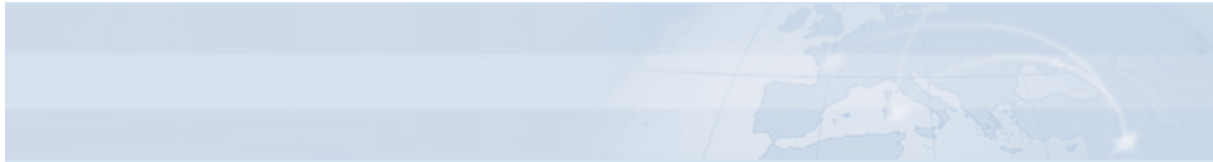
Cooperation – Through the implementation of an effective management structure that will ensure inter-institutional coordination of the effort in information sharing, the appropriate geospatial data infrastructure that promote efficient data compilation and emerge of effective geospatial information services will be established.

User satisfaction – The equal availability of geospatial services in the responsible water management institutions in the ISRBC member states have to be achieved, including maintenance, management and dissemination of water related geospatial and tabular information.

Principles

The main guiding principles for the Sava GIS are:

- The measure of success will be the ability of decision makers to access “stand-alone” or “integrated” spatial and non spatial data and information in a consistent and easily accessed format.
- There will be a single source for information i.e. simple venue for discover and access to the information for the ISRBC stakeholders, user experts and public.
- The added value will be integration - many types of water sector's related data from different national geographic information systems will be available in a manner consistent with the user requirements.
- The methods used to deliver data to the users will evolve with new technology and optimise benefits from national public investments in a geospatial infrastructure.



- The Sava GIS system will be based on an open design/standards process and responsive to the user feedback.

Objectives

The overall challenge of the Sava GIS establishment is to provide seamless, platform-independent, timely, and open access to integrated data, products, information, services and tools with sufficient accuracy and precision in order to address important water management issues in the Sava River Basin.

Water resources planners and decision makers need seamless access not only to the information produced by the ISRBC efforts, but also to the larger scope of information produced by other national and international programs and activities. These users should be able to focus their attention on the information content of the data, rather than how to discover, access, and use it.

The Geographic Information System Strategy for Sava River Basin aims to establish:

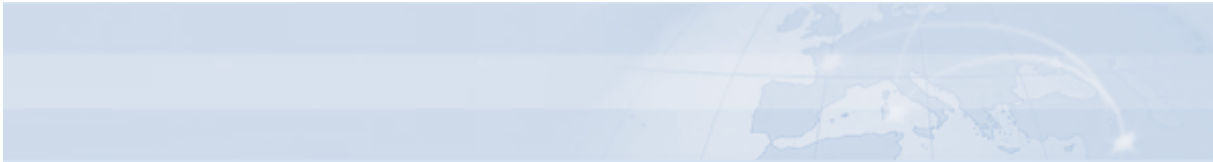
- An effective spatial data framework that integrate various spatial and tabular data collections across water and other related sectors and organisations in charge for their gathering and maintenance to ensure that needed geospatial information is available for use in multiple ways for the benefit of the ISRBC.
- An effective and efficient (geo) information system that supports a wide range of water management planning and supporting activities in the ISRBC.
- An integrated spatial information services based upon a distributed network of databases, linked by common standards and protocols to ensure compatibility of the national GISs.

Specific goals

The specific goals of the Sava GIS are:

Goal 1: Preparation and implementation of a common recommendations related to the national GIS and spatial data infrastructure's issues

- A prerequisite for the effective use of geographic information at the Sava River Basin level is that the datasets are comprehensive and mutually interoperable, possess integrity in logical and technical terms and, above all, are readily available. To achieve interoperability common standards and recommendations need to be applied to the maintenance and management of geographic data-sets in widespread use.
- The efficient and effective use of geospatial information will depend on whether common standards and recommendations are applied to a data collection, maintenance procedure and information products and services. The standards should promote data sharing both on a national and international scale. In addition, management of data resources must also adhere to the principles governing and guiding the information in the ISRBC and society in large.



- General descriptive metadata for locating geographic datasets should be made available through a general national metadata services conforming to the agreed standards. If possible, the service should provide more extensive descriptions of available databases.

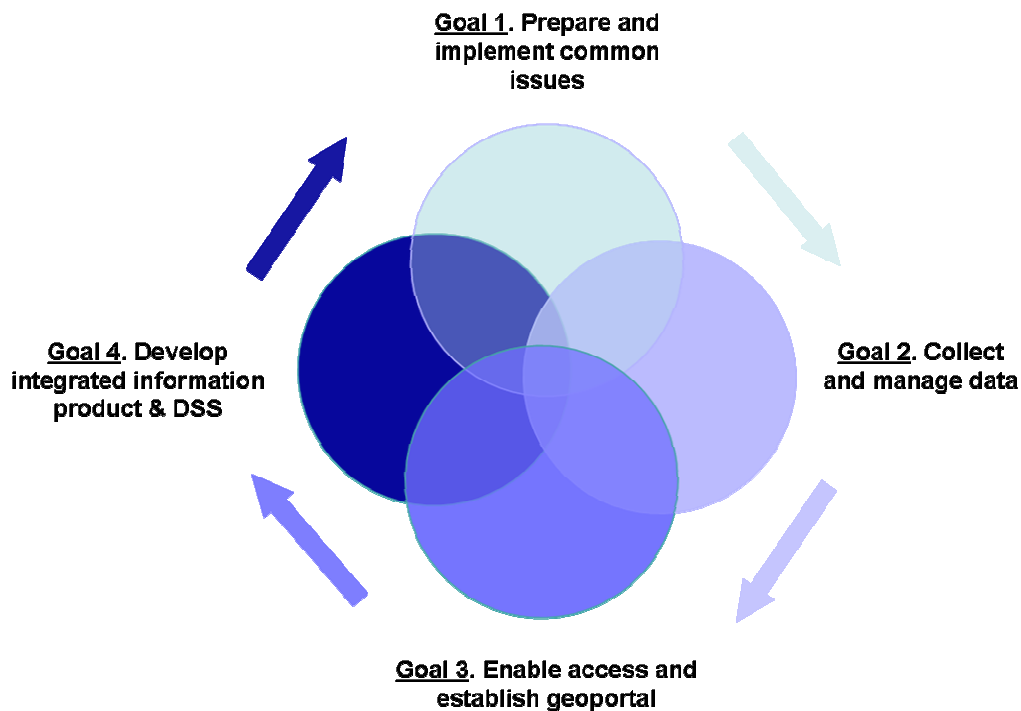
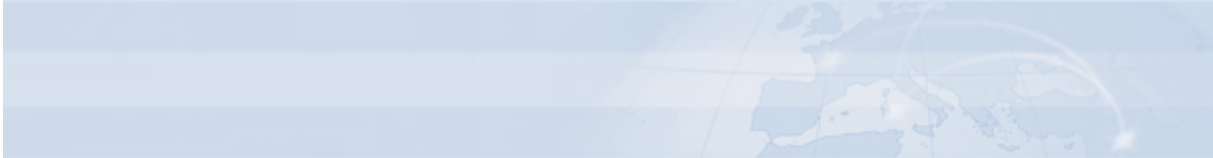


Figure 1. Specific goals of the Sava GIS

- The emerging web GIS technology and metadata services should be used to allow users to locate and access coincident geospatial data of interest from the national GIS systems. This will require implementation of water quality data and metadata documentation, standards, and formatting policies that will make possible the combined use of targeted data products taken at different times, by different means, and for different purposes.

Goal 2: *Collect and manage water related data from multiple locations*

- A distributed Sava GIS system requires exploiting advances in information technology that enable development of a distributed data and (geo)information system in which data will be collected and managed in multiple locations including local, national and international institutions. The ability to provide water management data and information to the ISRBC and wider community will depend on the interoperability of the national GIS system and metadata standards.
- The ad hoc Sava GIS expert group should explore possibilities of collaboration between the ISRBC and the national data centres. This collaboration should be build on the strong foundation provided by existing distributed systems, encompassing the data centres established by national agencies, such as the National Mapping Agencies,



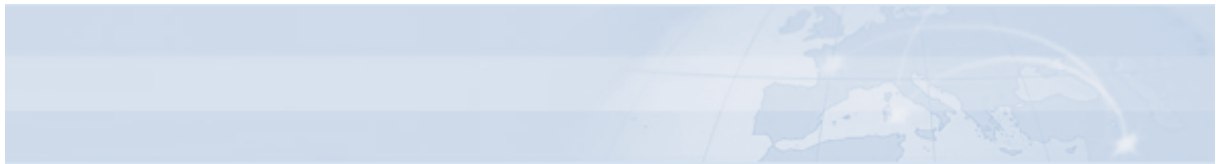
State Geodetic Administration, Institutes for Waters, Ministries for Waters, Ministries for environment, Public water management agencies, etc.

Goal 3: *Enable ISRBC users to discover and access water related information via the Sava River Basin Geoport*

- This goal will require a greater emphasis on the development of a framework to respond to the need for integration and communication of information across the disciplines and among policymakers.
- The existing systems will require upgrades to include the implementation of tools that enable communication among multiple data locations. The process of identifying the data requirements, including visualization, analysis, and modelling requirements, will require strengthening. Human resources will be required to perform these tasks, particularly individuals with the technical expertise to support user requirements.
- Geographic information services refer to the functions for transferring geographic information or any content changes to systems or applications at the user end. The service can be realized in the form of an automatic service that can be used directly through a software interface or as service that deliver data on a storage medium. The ad hoc Sava GIS expert group should consolidate Sava River Basin wide- information into one special, tailored geoport for data products of interest to the various expert groups of the ISRBC and public.
- The Sava GIS geoport should encompass applications that enable all users, without exception, to easily view and browse the collection of general-purpose maps and the integration of the maps, on common principles, into various public services provided to the user at Sava River Basin level. The general map view service, the metadata service and the online spatial data lending facility should be interconnected to form a geoport that appears seamless to the users.

Goal 4: *Develop integrated information products for the ISRBC decision makers and user*

- The results of analysis and interpretation of information should be built into integrated information products in order to support water management related decision processes at the Sava River Basin level. The links between data quality and information products on one hand and need to provide a more effective translation of user requirements into information products should be established.
- Ad hoc Sava GIS expert group should work on ensuring data quality and their preservation by enhancing the importance of the data/information management as an integral part of any water related monitoring or data collection process. The decision support needs will set the priorities for integrated information products and help to define and address data/information management issues associated with the integrated products.
- The data analysis will draw on and promote further advances in data-processing automation, data visualization techniques, and web-GIS-based data delivery mechanisms. Activities under this objective include:



- Creating a link on the ISRBC website where decision makers can search for, locate, and link to data and information products identified by the ISRBC working groups as potentially of significant utility.
- Developing a prototype of the provision of support services for decision support systems. Provide an initial operational capability that interfaces one or more national GIS systems to one or more decision support systems.
- Implementing procedures to solicit water resources related information requirements.

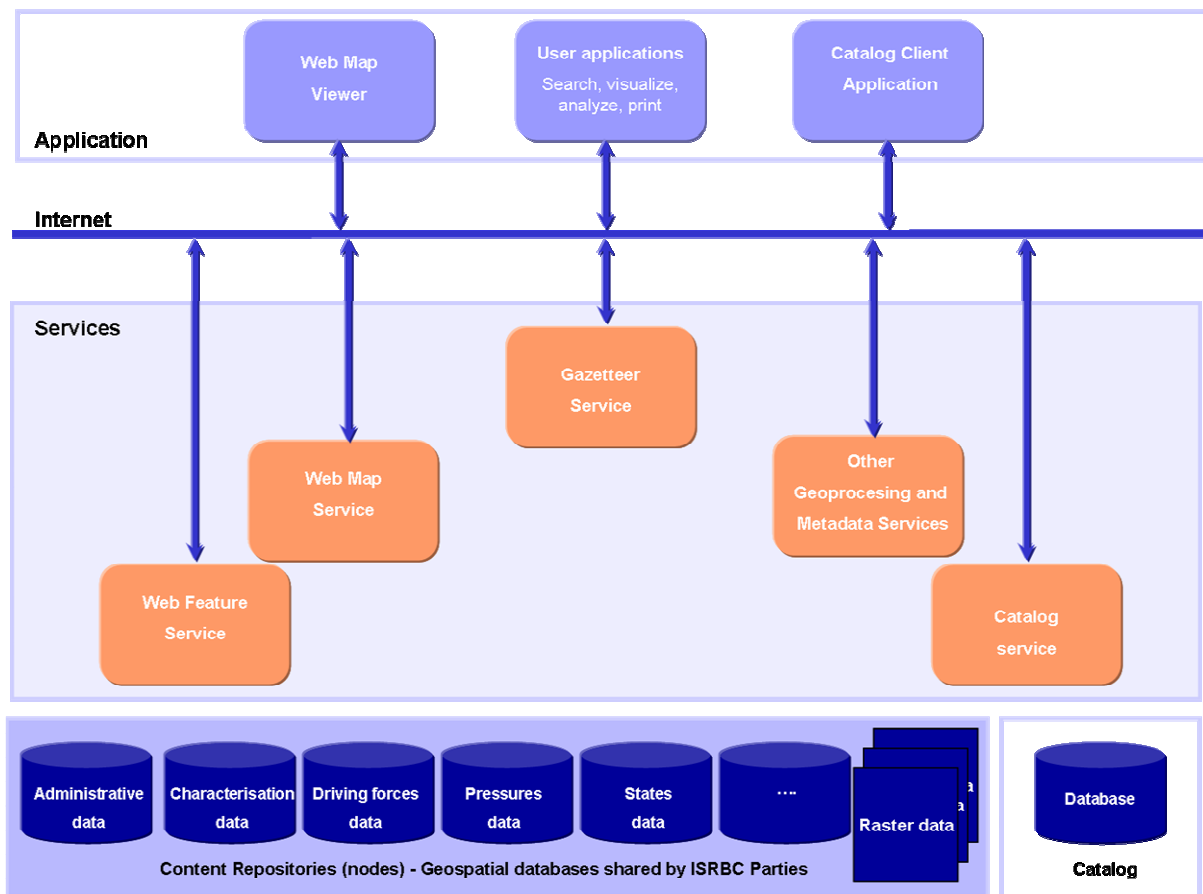


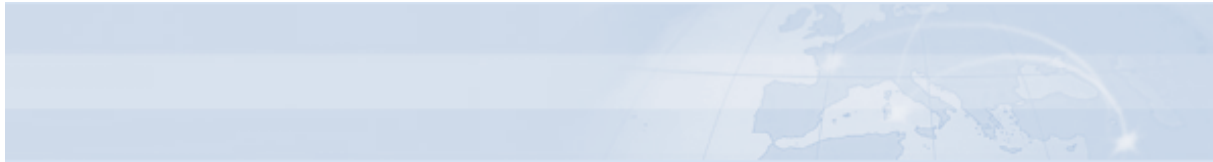
Figure 2. Conceptual model of the Sava GIS

To facilitate the implementation of the strategy, a development program for quality management and standardization has to be prepared.

Progress Evaluation

Criteria and indicators

The criteria and indicators that will enable progress towards achieving the vision for the Sava GIS include:



- Core geospatial datasets are clearly identified.
- Information about the geospatial datasets, services, standards, policies, guidelines, and initiatives is readily available and is actively promoted.
- Core geospatial datasets are easily obtained.
- A single authoritative source exists for each core dataset.
- Core datasets are maintained to consistent, defined specifications that meet collective needs.
- When a water management institution in the ISRBC member states needs an existing or a new source of geospatial information, or when starts to collect a new dataset, there is a clear process to determine whether the new geospatial dataset will be considered core.
- State governmental institution and the ISRBC can readily share geospatial information.
- Significant government functions/services interoperate with core geospatial data without the need to copy or duplicate that data.
- Organizations that produce or maintain geospatial information are aware of and follow all relevant standards and guidelines.

Governance

The first step towards achievement of the vision is to establish the governance structures required to enable the delivery of its goals and actions. Clarity around the roles and responsibilities for the coordination of the Sava GIS activities will help to make the Sava GIS Strategy happen. The governance structure proposed to drive the implementation of the Sava GIS Strategy includes:

- **International Sava River Basin Commission**, consisting of the high-level representatives from ISRBC Parties, approves Sava GIS Strategy and monitor that the wider IT and GIS related interests of the ISRBC are addressed.
- **Permanent expert group for River Basin Management** advises the Sava GIS expert group and facilitate the inter-institutional implementation of the Sava GIS Strategy.
- **Ad hoc Sava GIS expert group (AHEG GIS)** leads policy and Sava GIS Strategy development; provides inter-institutional governance; makes decisions in order to achieve the Sava GIS vision. Each member of the ad hoc Sava GIS expert group is responsible for executing the group's collective decisions by incorporating them into the ISRBC's work program; sharing best practice geospatial information management approaches across the ISRBC countries and institutions.

AHEG GIS works with the national institutions responsible for the implementation of the INSPIRE directive to evaluate initiatives, considers and coordinates financial initiative proposals that affect the delivery of the work program and reports annually to the PEG RBM on progress towards achieving the Sava GIS Strategy's goals.

Work Program

The work program developed to implement the Sava GIS Strategy will initially be focused on developing a more coordinated approach to the management of government's and water management institutions' GIS information resources. However, the work program will take into account the importance on active engagement of each representative from ISRBC Parties (water management institution) in the and the desirability of expanding the work program over time to meet wider national and international geospatial information requirements.

Figure 3 shows high level work program for the implementing Sava GIS strategy. Whilst developing work program, timetable referred in points (a) and (b) of Article 6 of the INSPIRE directive, were considered. According to this article, the EU Member States shall create metadata not later that two years after adoption of implementing rules (no later than 15th May 2009) in the case of spatial data sets corresponding themes in Annexes I and II, and not later than five years after adoption of implementing rules (no later than 15th May 2012) in the case of the spatial data sets corresponding to the themes listed in Annex III.

Therefore, due to extended deadlines for the developing and establishing implementing rules, the ISRBC together with the AHEG GIS should seek for intermediary solution that will lead toward achievement of the goals defined by this strategy and follow principles defined by INSPIRE directive.

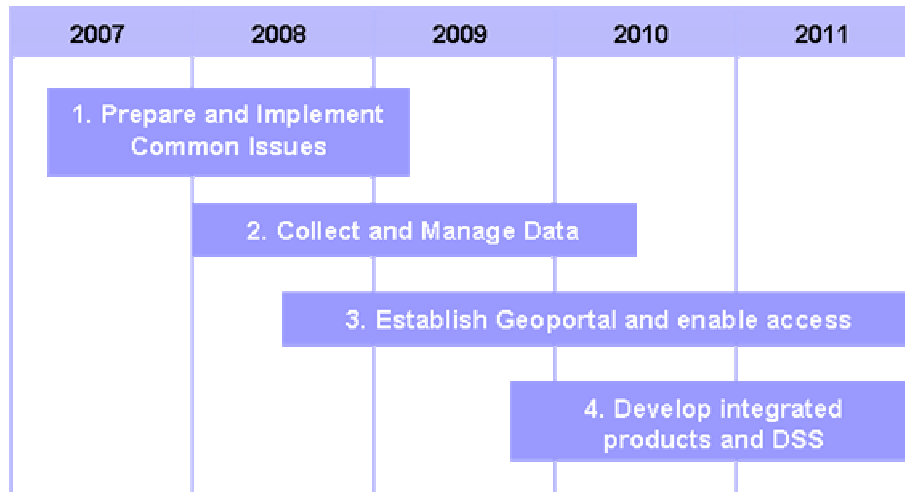


Figure 3. High level work program



List of abbreviation

Abbreviation	Description
AHEG	Ad hoc Expert Group
FASRB	Framework Agreement on Sava River Basin
GI	Geographic Information
GIS	Geographical Information System
ICPDR	International Commission for the Protection of the Danube River
INSPIRE	Infrastructure for Spatial Information in Europe
IS	Information System
ISRBC	International Sava River Basin Commission
IT	Information Technology
OGC	Open Geospatial Consortium
PEG	Permanent Expert Group
RBM	River Basin Management
SRB	Sava River Basin
WISE	Water Information System for Europe
WFD	Water Framework Directive (EU)