Environmental Protection of
International River Basins Project
Contract No. 2011/279-666

This project is funded by
The European Union

A project implemented by a Consortium
led by Hulla& Co. Human Dynamics KG

Terms of Reference

of EPIRB pilot project "Water Body Identification in the selected river basin of Upper Dnieper"

I. Background and Objectives

The EPIRB project targets the improvement of water quality in the trans-boundary river basins of the wider Black Sea region and Belarus. It supports the move towards modern management tools and compliance of the EU Water Framework Directive (WFD) by building capacities, learning-by-doing, and through the development and implementation of River Basin Management Plans for selected pilot river basins according to the requirements of WFD.

The basis for the implementation of the aforementioned assignment is the 'Plan of implementation of EU Water Framework Directive into the legislation of Ukraine' according to the decree of Cabinet of Ministers of Ukraine in 2015.

The assignment will contribute to "Preparation of the river basin management plans for the selected river basins of the Dnieper Basin" under the EPIRB project and in particular water body identification and typology in the selected river basins. The activity is a precursor to the River Basin Analysis and Pressure and Impact and Risk assessments which lead to the development of the River Basin Management Plans in accordance with the requirements of EU WFD.

Currently such approaches of WFD in the water body identification (based on the catchment area of rivers and the water table area of lakes) are absent in the normative documents of existing Ukrainian legislation and there is no clear typology of the water bodies within specified hydrographical areas.

The State Water Agency of Ukraine has officially asked for assistance from the EPIRB to support their proposal for continuation of work on the identification of water objects in the Dnieper basin. This work corresponds to the Plan of implementation of the WFD into national legislation of Ukraine ordered by Resolution of the Cabinet of Ministry of Ukraine. The Ministry of Environment of Ukraine supported the request of the Agency as a result of negotiations with the agency and the project.

The specific objectives of the assignment will be to help beneficiaries identify the water bodies in the selected basins, namely the water bodies with the catchment area more than 10 km^2, lakes with an area more than 0,5 km^2, artificial and significantly modified water bodies with the catchment area more than 0,5 km^2 (ponds and reservoirs) and with length more than 10 km (canals) using GIS analysis and other tools (remote Sensing of aerial and spectral imagery by use of radar, or lidar technologies) for fulfilment of the following sub-tasks:

- preliminary identification of water bodies by categories of WFD and their digitalization in a GIS format;

- final identification of water bodies and ground verification of locations, when necessary;
- presentation of GIS layers and thematic maps, as well as feature data bases to the project beneficiary.

II. Scope of work

The area of the study will be the Pripyat River Basin. The Pripyat River is the largest tributary of the EPIRB pilot in terms of area, length and water volume in the western part of the Upper Dnieper basin. The Pripyrat basin is located on the territory of the Republic of Belarus and Ukraine (Volyn, Rivne and Zhytomyr regions). The total river length is 775 km, of which 261 km is in Ukraine. The basin aria is 121,000 km^2. The Pripyat flows across the Polesie in the lower reaches in the basin south-east. The Catchment is very well-developed river network - about 10.5 thousand rivers. Most tributaries are completely or partially canalized due to extensive land reclamation andflood management. Among right-bank tributaries flowing through Ukraine are the Turia, Stokhid, Styr, Gorin, Stvyha, Ubort, Slovechna, Solon and Uzh rivers. In 1986on the Pripyat lower reaches, tens of kilometres of dikes were built to protect the river from radioactive pollution in connection with the accidental the Chernobyl nuclear power plant.

Map of Pripyat river basin

III. Implementation and deliverables

The abovementioned activities should be guided by such documents as the EU Water Framework Directive and Common Implementation Strategy (CIS) namely the CIS guidance document No 2 – *"Identification of Water Bodies"* and CIS guidance document No 9 –*"Implementing the Geographical Information Systems (GIS) of the Water Framework Directive".* It will be necessary to assess all information that is available and analyse it for getting three main groups of GIS maps: basic information, characteristics of the river basins and protected areas.

According to the provisions of WFD the surface water bodies are all continental water bodies, including rivers, canals, lakes, reservoirs and ponds.

The following approaches of WFD will be used for the water body identification:

Rivers depending on catchment area	Lakes depending on the water table area
small: 10 – 100 km^2	0.5 – 1 km^2
average: > 100 – 1.000 km^2	1 – 10 km^2
large: > 1.000 – 10.000 km^2	10 – 100 km^2
very large: > 10.000 km^2	> 100 $km^{`2}$

The final outcome of the GIS database and GIS maps is recommended to be suitable to the map scale of 1:50,000 in shape files and geo databases (GDB) computable file formats and standard projection GCS_WGS_1984 (paper based old Soviet topographic maps (if any), satellite and areal imagery, geodetic plans etc.) (The system of geographical coordinates of the World Geodetic System) of UTM coordinates system (Universal Transverse Mercator). GIS layers within three aforementioned groups should include:

1. Raster image (map) and digital elevation model (DEM) of the basin area;
2. GIS layers of the river basins and sub-basins;
3. GIS layers of the surface water bodies: rivers, lakes, reservoirs and ponds.

All maps and data base will be create using licensed ArcGIS.

For this purpose, and as a second part of this ToR, it is envisaged that **3 licenses of ArcGIS software** shall be purchased and installed by local representative and authorised dealer of ESRI (Environmental Systems Research Institute, a company producing ArcGIS software). The new software is to be used by the specialist of Ministry of ecology and nature recourses (MENR), State Water Agency (SAWR) and Dnieper River Basin Authority (Dnieper RBA).

Ukrainian law requires the use by state organizations licensed software. Due to the deficit budget organizations cannot buy the software themselves. The project will support the creation and operation in the future of these institutions to develop the RBMP to officially basis.

The ArcGIS will be installed on three computers in:

1) Water Ecosystems and Resources Division of the Natural Resources Protection Department of the Minister of Ecology and Natural Resources of Ukraine

2) Crisis Centre of State Water Agency

3) Monitoring Division of the Dnieper river basin authority under State Water Agency of Ukraine

IV. Transferring data

All data will be transferred to the MENR, SAWR and the Dnieper RBA in the form of layers of digital map in "layers" format that will be recorded on DVD media and posted on the web space that is available to the project team and beneficiaries. The attributive information of GIS layers and final report in English and Ukrainian languages will be presented too. The proposed geospatial data will not contain information about the confidential or secret objects of the information of national security. The proposed GIS layers may be used only for the purpose of water resources management and environmental protection of the river basins as well as the flood risk analysis.

V. Duration and schedule and deliverables

Deliverable 1: Development of the research methodology, especially in cases of lack of information on rivers with a total catchment area from 10 km^2 and lakes from 0.5 km^2;
Deliverable 2: Collection of existing information on water objects in the selected river basin, including paper and/or digital vector maps of a minimum 1:10,000 to 1: 50,000 scale and raster maps of approximately 5 to 10 m per-pixel resolution;
Deliverable 3: Digitalization/processing of the collected paper and/or digital vector & raster maps and creation of database in GIS format with the ground verification field works for the locations where clarification is necessary;
Deliverable 4: Creation of database of the identified water bodies, their mapping and preparation of final report, as well as hands-on initial training of 2-3 representatives from each beneficiary institution listed in Section III (MENR, SAWR and Dnieper RBA) on essential skills for operation, maintenance and update of developed GIS database in ArcGIS software.

ArcGIS Supplier Company, representing ESRI in Ukraine, will install the software and provide initial GIS training for relevant specialists from MENR, SAWR and Dnieper RBA.

Duration of the assessment will be 7 months and will commence on April 07, 2016, with the expected completion date of September 15, 2016. The assignment is divided into three phases respectively:

PHASE A		
Phase 1	11 Apr/16 – 25 Apr/16	Development of the research methodology and inception report
Phase 2	11 Apr/16 – 25 Apr/16	Collection of existing paper and/or digital vector maps of a minimum 1:10,000 to 1: 50,000 scale and raster images of approximately 5 to 10 m per-pixel resolution
Phase 3	25 Apr/16 – 29 Jul/16	Digitalization/processing of the collected paper and/or digital vector & raster maps and creation of database in GIS format and interim progress report
Phase 4	01 Aug/16 – 15 Sep/16	Creation of database of the identified water bodies, their mapping and final report and hands-on training in ArcGIS for up to 9 representatives of beneficiary institutions

VI. Qualifications and requirements to the service provider/local contractor

The contractor is required to fulfill the actual work, including collection and digitizing of data in GIS format, creation of Database and initial training of the beneficiary staff in GIS & database skills, and thus should have the following expertise to be considered as eligible:

- Experience in environmental and water resources assessment, database development and data visualization;
- Demonstrated experience and ability of working with different environmental databases, as well as practical knowledge of processing and maintenance of different environmental datasets in GIS format, including hydrological data;
- Experience in basin planning and demonstrated working relationship with the main beneficiary
- Demonstrated knowledge of WFD and IWRM principles, especially delineation water objects and typological classification, and experience of implementing these principles in the country/region
- Existence of qualified staff able to fulfill above mentioned tasks and as minimum i) one Senior GIS/DB developing specialist, also with the good record of GIS trainer/instructor; ii) two GIS analysts/practitioners able to digitize and amylase large volume of spatial data; and iii) one Database specialist, experienced in environment and/or water database infrastructure development
- Demonstrated commitment to involve other national professional consultants.

VII. Remuneration and payment schedule

The total budget available for this assignment is **EUR 20,800 Euro**. It will be divided into two contracts as per above scope of work – (1) Contractor for water body identification, GIS database development and initial training for max **15,760 Euro** and (2) authorised dealer of ArcGIS software in Ukraine, who will install the purchased software for max **5,040** Euro.

The two contractors will report to the project Team Leader, Timothy Turner, and on a day-to-day basis to the river basin management expert for Ukraine, Nataliia Zakorchevna. All deliverables will be reviewed by the project team and approved by the Team Leader prior to payment. Invoices will be checked against delivered outputs as per the contracts signed by Human Dynamics backstopping services.

Payment will be made in Euro in as described below.

Contractor 1: Water Body identification
Tranche 1: Report on research methodology and collected data: layers, paper maps, digital vector maps, raster images and inception report – after acceptance of Deliverable 1 and Deliverable 2 - 20%
Tranche 2: Report on completed works - digitalization/processing of the collected data and map layers, development of initial database of water bodies in GIS format and database in GIS format – after acceptance of Deliverable 3 and Deliverable 4 - 50%
Tranche 3: Final pilot project report and printed and electronic version of all created thematic maps, as well as initial hands-on training completed – 30%