

## **Pilot project:**

# **Establishment of the hydromorphological monitoring program ("Hydromorphological monitoring from episodic into operational")**

Compiled by Yurii Nabyvanets and Alexei Iarochevitch, October 2018

## **1. Background information, activities and results to be achieved**

### **1.1. Background information on the situation in the sector**

According to the EU-Ukraine Association Agreement "establishment of programs for monitoring water quality" (including biological elements, chemical and physico-chemical elements and hydromorphological elements) should be conducted within 6 years (November 2020 latest) of its entry into force. Amended Water Code of Ukraine makes provisions hydromorphological monitoring to be officially included in the state water monitoring programme, followed by the designation of the competent authority for it, secondary legislation and methodology development, relevant capacity building and trainings.

The State Emergency Service of Ukraine has been designated to be responsible for hydromorphological (HYMO) monitoring in Ukraine. The leading organization dealing with practical aspects of HYMO monitoring is Ukrainian Hydrometeorological Centre; HYMO monitoring is included in the Centre legal document. Accordingly, the HYMO monitoring has been included in legal documents of all respective regional hydrometeorological organisations (Centres of Hydrometeorology and Regional Centres of Hydrometeorology).

It was decided that Ukrainian Hydrometeorological Institute of the State Emergency Service of Ukraine and National Academy of Sciences of Ukraine provides scientific and methodological support of HYMO monitoring on a permanent basis.

### **1.2. Project objective**

The project purpose was to support introduction of hydromorphological monitoring into the state water monitoring system. The beneficiary is the Ukrainian Hydrometeorological Center.

### **1.3. Project activities**

The project comprised three main activities, namely:

- Activity 1: Assigning of the hydromorphological monitoring to the water monitoring agency;
- Activity 2: Elaboration and adoption of the Methodology / Guidance for hydromorphological monitoring of the rivers;
- Activity 3. Pilot testing of the methodology / guidance.

Supervision of all activities was done by KE 3. Activities were implemented by Hydromorphology STE Yurii Nabyvanets. The expert's specific tasks were stated in the relevant ToR.

### **1.4 Results to be archived**

The following results were expected at the end of the pilot project:

- Amendments to the current regulations of the monitoring agencies in Ukraine, assigning

responsibilities for the hydromorphological monitoring adopted.

- Methodology / Guidance for hydromorphological monitoring of rivers developed and adopted.
- At least 100 specialists of the beneficiary are trained on hydromorphological monitoring.
- Hydromorphological monitoring conducted within two selected medium size river basins (100 – 1 000 km<sup>2</sup>), mountainous and plain region.
- Programs of hydromorphological monitoring developed taking into account delineated surface water bodies and responsibilities of regional hydrometeorological centers
- Web-based database (information system) for hydromorphological data collection, storage, processing and visualization developed.

## 2. Results achieved

### 2.1 Activity 1: Assigning of the hydromorphological monitoring to the water monitoring agency

Based on information collected and analyzed a report was prepared explaining why Ukrainian Hydrometeorological Center (UHC) should be responsible for implementation of hydromorphological monitoring in Ukraine.

As a result of consultations between APENA and water stakeholders, Ukrainian Hydrometeorological Center is designated as a competent authority for hydromorphological monitoring. The necessary amendments have been included into its provisions (Regulations on Ukrainian Hydrometeorological center) and provisions of its 19 regional hydrometeorological centers.

<b>Status:</b> Completed
--------------------------

### 2.2 Activity 2: Elaboration and adoption of the Methodology / Guidance for hydromorphological monitoring of the rivers

Draft version of Methodology/Guidance for hydromorphological monitoring of rivers and lakes based on the following European standards

- Standard BS EN 15843:2010 Water quality – Guidance standard on determining the degree of modification of river hydromorphology;
- Standard BS EN 16039:2011 Water quality. Guidance standard on assessing the hydromorphological features of lakes;
- Standard BS EN 16870:2017 Water quality — Guidance standard on determining the hydromorphological conditions of lakes

has been developed.

In order of improvement of methodological approaches and entire text the draft of Methodology was circulated to regional hydrometeorological organizations; collected questions, remarks etc. were elaborated, the text was amended accordingly. In general there were 3 rounds of the draft methodology revise; respective letters are presented in **Annex 1**.

Draft Methodology was arranged according to the basic rules of preparation such a documents to be submitted for official approval. As it is mentioned, approval of the draft Methodology was envisaged by

the Order of the Ministry of Interior of Ukraine. Draft Methodology ready for approval is presented in **Annex 2**.

The process of the draft methodology approval was organized in such a way that the document is to be submitted to the Legal office of the State Emergency Service of Ukraine via Hydrometeorology office. That was done in June 2018. However, according to the note of Legal office, there was no official legal official basis for approval of the document since the HYMO monitoring was not legally bound to the State Emergency service of Ukraine.

Such an official basis has appeared since the Cabinet of Ministers of Ukraine issued a Decree No 758, 19.09.2018 [“On approval of the Order of the state monitoring of waters”](#) where the State Emergency Service of Ukraine is officially designated as being responsible for HYMO monitoring. Currently, the process of approval of the draft Methodology is ongoing with envisaged completion by the end of 2018.

<b>Status:</b> Completed from the side of the APENA project
---

### **2.3 Activity 3. Pilot testing of the methodology / guidance**

#### ***Trainings conducted***

The aim of the trainings was to test the Methodology in a field studies at mountain and plain rivers since the approaches and characteristics are a bit different. It was a strong request from the specialists of regional hydrometeorological organizations to pay much attention to the field exercises to let them get more familiar with practical issues of filling up the protocols etc. The problem rose during the discussion and revision of the draft methodology was dealing with complexity of methodological approaches to HYMO monitoring since this type of monitoring is new for the local specialists. Taking notes of comments and questions of the regional hydrometeorological organizations specialists the supportive materials (Guidance) of using the Methodology was developed (**Annex 4**). This Guidance has been distributed to the trainings participants prior the field exercises.

In total five trainings were conducted:

- Seminar in Kyiv in Ukrainian Hydrometeorological Institute during September 11-15, 2017. Total number of participants was 46 representing specialists from Regional Hydrometeorological Centers, observatories, Ukrainian Hydrometeorological Institute and APENA experts. Participants were given theoretical information regarding hydromorphological monitoring, national legislation, requirements of respective EU directives, standards on hydromorphological assessment of rivers and lakes. Participants performed field studies at the test objects including plain river (river Stugna) and lake (lake Kruglyk).
- The first field workshop was dedicated to the pilot testing of Methodology/guidance on *mountain river* and took place in Uzhgorod during 1-3 October. The first day of the seminar/pilot testing was spent in searching of the most representative pilot basins involving APENA experts while the next two days were dedicated mostly to the practical exercises. Total number of participants was 18; among them 13 participants represented Regional Hydrometeorological Centres which area of responsibilities covered generally mountain river basins.

- The second field workshop took place in Kyiv during 9-11 October and was dedicated to the pilot testing of Methodology/guidance on *plain river and lake (reservoir)*. Total number of participants was 47; among them 41 participant represented Regional Hydrometeorological centres with areas of responsibilities covering both mountain and plain river basins.

Such a representation was decided considering the fact that certain number of Regional Hydrometeorological Centres in future will provide hydromorphological monitoring in different river basins according their areas of responsibilities. The seminar ended with ceremony of awarding participants by special Certificates confirming that they have passed training in hydromorphological assessment of surface water bodies successfully. Certificates were handed to participants by the Head of UHC.



- The third field workshop took place in Ivano-Frankivsk Oblast, September 11-12, 2018); at mountain river (Lymnytsya). In total, 11 participants representing regional hydrometeorological organizations participated to the training (*Annex 6*).

- The forth field workshop took place at Kilycheny, Dnipropetrovska Oblast, September 24-25, 2018) at plain river. In total, 30 participants representing regional hydrometeorological organizations participated to the training (*Annex 7*).

In order of getting the comprehensive overview of the test water objects the desktop exercises were performed before going to the field meaning collection of all related information (satellite images, etc.) and drafting of the trainings Agendas. These materials are presented in **Annex 5**. All participants received supported materials as handouts before going to the field. On the other hand, there was an obvious need of conducting preliminary field surveys of the test water objects to make a final decision whether selected water objects and related water bodies are suitable for efficient field exercises and if necessary, to make last moment changes in Agendas. Preliminary field surveys were done and changes were made.

Trainings consisted of two modules: field studies and post-field discussions. During the field studies participants performed surveys of delineated survey units and filled up protocols; during the post-field discussions participants presented their results, discussed them with trainers and made respective amendments in their scoring.

Participants underlined the usefulness of trainings especially the field study modules. It was noted that such trainings serve as an effective tool of capacity building of regional hydrometeorological organizations. However, the need of further support both from methodological and practical point of view still

remains critical as there are organizational problems dealing, for instance, with local specialists' turnover. Also some of the practical aspects remain difficult especially regarding delineation of survey sites.

### ***Programs of hydromorphological monitoring developed***

It is quite obvious that successful implementation of HYMO monitoring requires not only well developed and clear Methodology, but also a Program. Basically, all of Environmental monitoring programs address 4 main questions:

- i) what parameters to be monitored?
- ii) what are the objects to be monitored?
- iii) who is responsible?
- iv) what are the time frames? The Program of HYMO monitoring has been designed on the basis of this concept.

HYMO monitoring parameters were compiled in a list based on the draft Methodology. In line with WFD the HYMO monitoring should be performed at respectively delineated water bodies. Delineation of water bodies at the main river basin districts of Ukraine was out of the scope of this assignment, consequently information provided by other Component was used. Water bodies for the Siversykyi Donets River Basin District were available by the end of current assignment reporting period; the total number of water bodies is 694.

Responsible regional hydrometeorological organizations were selected taking into account the list of organizations with the names of rivers attached to each of them as zones of competency (**Annex 3**). Finally, HYMO Monitoring Program was arranged as an inclusion to the whole surface water monitoring program which further will serve as an Annex to the Order of the state monitoring of waters mentioned above. HYMO Monitoring Program is presented in attached Excel file (HYMO Program.xls).

### ***Web-based database (information system) for hydromorphological data collection, storage, processing and visualization developed***

Development of web-based database of HYMO monitoring data collection, storage, and processing is a crucial task from the point of view of ensuring sustainability of HYMO monitoring as such and providing modern tool for the local specialists aiming at automation of their routine work. Considering the absence of HYMO database prototype in Ukraine and lack of local expertise in development of such databases the work started with elaboration, presentation and discussion of the concept of database and formulation of its' general principles.

For this purpose, two meetings were organized in Ukrainian Hydrometcenter.

First meeting was held in May 21, 2018 with participation of the Head and Deputy Head of Ukrainian Hydrometcenter, IT specialists, and HYMO specialists representing Ukrainian Hydrometeorological Institute. Conceptually, it was agreed that HYMO database will be placed at the server of Ukrainian Hydrometcenter and basically comprise of digitized HYMO protocols. Regional hydrometeorological organizations will be allowed to create their own workspace for filling up the HYMO protocols.

The system will provide automatic check of input data filtering evidently wrong inputs and misprinting. Also system will do automatic scoring and displaying of HYMO monitoring results. System should be open for further build up which means providing of possibility to transfer data to the webpage of the State Agency of Water Resources of Ukraine with the aim of presenting results of HYMO monitoring as a maps of water bodies colored according to HYMO classification.

The second meeting took place at Ukrainian Hydrometcenter in July 12, 2018. Meeting was devoted to detailed presentation of HYMO protocols and discussion on potential links and cross references within the system. It was also concluded that filling up of paper versions of HYMO protocols is important from the point of view of authorized documentation of HYMO monitoring results. So, local HYMO specialist will fill up the protocols directly at the field, and then, when returning to office, transfer data online to the digital forms of the protocols in the system. Systems performs all calculations needed, deduce the HYMO quality class of studied water body and sends results in visualized form to the server of the State Agency of Water Resources of Ukraine (tight collaboration with IT persons of the Agency is critical).

Finally, extended ToR for HYMO database was elaborated (**Annex 8**).

Database is available at <https://db.meteo.gov.ua/gm/login>. Login: admin; Password: admin123!@#. When entering a database simple page appears with a menu buttons asking step-by-step insertion of information. Important note: system is organized in such a way that regional administrators create their workspace with information regarding specific areas of responsibility (regions, river basins, water bodies). Simple example of starting table for further filling up is presented on Figure below. Accesses to the regional workspaces have regional administrators only. Regional workspaces can be also administrated by the head administrator of the system.

УНМС ГМ

https://db.meteo.gov.ua/gm/admin/massifs/add

[Масиви обстеження] [База адмін-рів] [База регіон. адмін-рів] [База модераторів] [Регіони] [Періоди] [Вийти] yurii@wheel

Створити Масив обстеження, регіон - харківська область,  
адміністратор - **юрій**

**ОПИС МАСИВУ**

Номер Масиву:  Назва водного об'єкту:

Код річки:  Номенк-ра карти:  Назва річкової с-ми:  Порядок річки:

Координати Масиву початок: ш.  д.  кінець: ш.  д.

Тип масиву поверхневих вод (МПВ)

*Figure displaying starting table for the water body description. Once this table is filled and “Зберегти” (“Save”) button is pressed, then other table pops up where the characteristics of HYMO survey units should be inserted.*

Preliminary revision and testing of HYMO database by the specialists of Ukrainian Hydrometeorological Institute has shown that in principle system is functional. However, it should be noted that HYMO database is rather complicated product requiring specific skill to use. Despite it was designed in user friendly manner some of the interfaces and drop down menus need attraction of users and careful work on data input. Certainly, while using the system practically some bugs and malfunctions may appear meaning additional improvements.

**Status: Completed**

### 3. Expenses

### 4. Lessons learned / recommendations

In principle, with APENA project support Ukraine is ready to launch HYMO monitoring starting from the year 2019. Methodology for hydromorphological monitoring of rivers and lakes is developed and ready for approval by the Order of the Ministry of Interior of Ukraine (it is envisaged by the end of 2018). Specialists of regional hydrometeorological organizations are trained to perform HYMO monitoring according to Methodology and HYMO Monitoring Program. HYMO database (information system) is practically ready.

At the same time there is a need of permanent scientific and methodological support of HYMO monitoring to be provided by the scientists of Ukrainian Hydrometeorological Institute. Also practical use of HYMO database (information system) obviously would need providing additional trainings for the local HYMO specialists in order of assuring smooth data collection, storage and processing. HYMO Monitoring Program needs to be extended in a sense of adding delineated water bodies of the rest of Ukrainian River basin Districts.

## **5. Annexes**

Annex 1 – Methodology revision

Annex 2 – draft Methodology

Annex 3 – Zones of competencies

Annex 4 – HYMO guidance

Annex 5 – Desktop materials

Annex 6 – Ivano-Frankivsk

Annex 7 – Dnipro

Annex 8 – HYMO database ToR