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**LIFE13/NAT/HU388 Old-Drava**

**After-Life Conservation Plan including Monitoring Plan**

Even the realisation of project Old-Drava has been finalised on 30th April, 2019, the long term sustenance of the project results is important issue for all beneficiaries. Some of the project outputs don’t need further maintenance (e.g project brochures; printed or online promotion materials), but the most relevant project results should be managed in the future. These main results are listed below:

* water retention artefact
* water gauges
* newly planted trees
* angling platforms
* study trails
* Natura 2000 education park

**Water retention artefact:**

Within the planning procedure we took special attention for the maintenance free solutions. The core of the bottom weir is made of concrete, the coverage and the bottom fixation is made of gabions, where limestone and stainless metal wires were utilised. These part of the bottomweir no need regular operation or maintenance, only the status of structure shall be checked regularly, especially the after flood situation.

Only a small sluice, built into the middle of the bottomweir, need maintenance. The closing part of the sluice is made of iron, which is painted against corrosion and the lifting screw is properly greased. The painting and the lubrication can be renewed if necessary.

The maintenance and operation is task of Municipality of Pitomaca, as the holder of the valid operation permit. The permit is based on operation principles, prepared by the relevant beneficiaries involving water engineers. These principles are:

* TECHNICAL DESCRIPTION

The building consists of a overflow part and a fishing path (in the form of a bypass duct). The overhead partition consists of a central part which has the role of primary and secondary overflow, side wings acting solely as a secondary overflow and an earth embankment with the purpose of separating and short-term holding of high waters. Part of the partition is also arranged and a curb at the base of the central overflow. The fish path is designed to simulate natural waterways as much as possible. It has the form of a circumlocutory channel and allows the migration of fish species, at favorable flow conditions, upstream and downstream of the bulkhead.

* CONDITIONS FOR MAINTENANCE OF CONSTRUCTIONS

Construction Law ("Nn" 153/13): "The maintenance of a building provides for the execution of works that affect the fulfillment of basic building requirements, but which do not change the alignment of the building with the location conditions in accordance with which the building was constructed. The owner of the building is obliged to ensure the maintenance of the building so that during its lifetime the basic requirements for the building are preserved, it improves the fulfillment of basic building requirements and is maintained so as not to impair the properties of the building. "

Hydro-technical objects and water management measures determined by the main project were obtained on the basis of hydrological analyzes and hydraulic processes. Hydraulic process calculations are partly simplified for a simpler budget and contain assumptions due to the impossibility of accurate simulation of natural processes.

It is of great importance to foresee monitoring of the construction of facilities (regulations) in order to confirm the forecasts from the budget and to correct the solutions provided for in this major project if necessary. As a result of observed changes or injuries, an institution designated for the management of the facility must have a rehabilitation plan.

The regular maintenance of the building includes checking the correctness of the latching of the base discharge, visual inspection of the partition elements and the fish trails. Regular maintenance of the building should be done at least twice a year, in the spring before the arrival of high waters and in the fall. In addition to regular maintenance, it is necessary to perform an extraordinary field inspection after passing a larger water wave and determining whether there is damage to the building.

Project documentation, as well as all records and test certificates, must be kept by the investor (owner or user) for as long as the building concerned exists.

* PROJECTED DURATION OF USE OF CONSTRUCTIONS

The design life of the building is 50 years and is determined in accordance with the requirements of the General Technical Requirements for Water Works (Croatian Waters, March 2011, Zagreb), ie on the basis of the shortest expected life of all the materials and equipment used.

The overburden, trails and trenches are designed taking into account the action of the maximum amount of water with a 50-year return period.

**Water gauges**

The water gauges are situated at the “Csónakkikötő” on Hungarian side and fixed to the water retention artefact in Croatia. The material and design of these gauges are the same, which is used in the water management practice, the experiences proved, that these gauges resistant to weather and water more than a decade without any maintenance.

**Newly planted trees**

The beneficiary Duna-Drava National Park Directorate has planted more than 1000 seedlings of native tree individuals. To protect the young trees against red deer we had to erect fences around the seedlings, these fence need to be regularly checked and repaired, if necessary. The Danube-Drava National Park Directorate is the official landuser and forest manager and employ forest engineer, who is responsible for supervising the result of LIFE forest, also.

When the seedlings will grow up to that size, that the deer will not able to cause significant damage, the protective fence will be removed by DDNPD.

The cost of the maintenance and the demolishing of fence will be covered from own budget of DDNPD.

**Natura 2000 educational park**

Municipality of Pitomaca has established Natura 2000 educational park on the surface of the former military object. Park contains shelter for visitors, wooden paths and 10 info boards. Shelter for visitors is a massive and stable wooden structure with a concrete floor and a tile roof. It has been constructed for several decades with minimum maintenance. Maintenance will consist of an occasional coating of wood protection and cleaning of leaves from the roof.

The wooden path is made of wood that is long lasting in humid conditions (Siberian larch) so we expect a minimal replacement of the path boards. Around the paths, it is necessary to do grass cutting several times a year.

If the info table is damaged, they will need to be repaired.

The costs of the maintenance, grass cutting, and repairs will be covered from own budget of Municipality of Pitomaca.

**After LIFE monitoring plan**

To maintain and evaluate the result of the project we have to monitories the most relevant outputs. In one hand the infrastructural element (water retention artefact, study trail, water gauges) shall be checked regularly as it described above, in the other hand the effect on the biota of oxbow also should be regularly measured. Within this chapter the biological monitoring will be detailed.

The follow up monitoring could be two sort of outputs, it can help evaluate the result of conservation activities and, based on the results of monitoring , the operation regime of the water retention artefact could be modified. Furthermore, the results of the biological monitoring could be utilised within the design of upcoming restoration project.

During the implementation period a very detailed and accurate survey and monitoring were developed within the project area, which could be a proper basis for the future monitoring activities. These studies help us the select those elements, taxon which can indicate the ecological changes either in aquatic or in terrestrial habitats. Because the After LIFE monitoring shall be financed by the beneficiaries from own budge the cost-efficiency also have to take into consideration. As a result of discussion of nature conservation experts and researchers, who were involved into the project’s surveys, the following taxon has been selected for After LIFE monitoring:

* **Monitoring of fish communities:** During the project the survey of fishes has been developed and Natura 2000 species were also identified (*Romanogobio vladykovi*, *Rhodeus amarus*, *Cobitis elongatoides*). The After LIFE monitoring will focus on the presence and population of Natura 2000 species, but the monitoring of alien, invasive species (e.g. Lepomis gibbosus, Ameiurus melas) is also important. The survey is planned to realize in every two years, there will be sampling point above and under the water retention artefact.
* **Monitoring of amphibian communities:** Just like the fish communities the amphibian species can indicate the status of aquatic habitats. The monitoring will cover either the Urodella or the Anura species. The methodology will adopt to certain taxa, either traps or visual monitoring could be used. Besides the monitoring of frog species the survey will focus on newt species, also, because the ecological baseline study and the monitoring report declared, even the habitat could be suitable, any individual was detected. Within the After LIFE monitoring is should be clarified whether a small new population exists in the Old-Drava.
* **Monitoring of Odonata (dragonfly) species:**  The dragonflies are also a water-related taxa, so it can indicate the ecological status of the Old-Drava. The ecological baseline study and the monitoring report proved that 27 species exists within the project area, so the Old-Drava and its close surrounding has a mentionable rich Odonata fauna. The After LIFE monitoring will focus on the taxon composition of Odonata fauna, which will indicate the habitat types and qualities. The methodology will be visual identification of imago, in case of some questionable species the catching of individuals could be necessary.
* **Monitoring of ornithofauna (birds):** The bird fauna of the Old-Drava was monitorised during the project, several protected or Natura2000 species were identified. Because the birds can be monitorised relatively easily and important for nature conservation the monitoring will be continued in the frame of After Life monitoring. Regarding to the geographical shape of the Old-Drava, one transect is enough to survey either the water-related or the sylvan species. The After Life monitoring will focus on breeding species, which represent the typical bird fauna properly.
* **Monitoring of aquatic vegetation:** Within the project duration the aquatic vegetation was also surveyed. The Natura 2000 habitat type 3150 “Natural eutrophic lakes with Magnopotamion or Hydrocharition type vegetation” covers signifcant part of the oxbow and contains some plant association types. The coverage of the plants, the actual association and the species composition will provide important information about the status of the aquatic habitat of Old-Drava, so we intend to continue the monitoring after the finalisation of Life project. During the After Life monitoring the expert will use the same transects, which were designated during the project, so the results will be easily comparable.
* **Monitoring of terrestrial vegetation:** From the terrestrial vegetation the Natura 2000 forest 91E0 “Aluvial forest with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)” has been selected for After Life monitoring. This habitat was also surveyed during the project, and it was one of the target habitat of the proposal, that’s why the continuation of the monitoring is elementary. Within the After Life monitoring we will survey at least one of those quadrants, which were designated during the project. During the monitoring the species composition and the abundance of each species will be measured. The same place and same methods will allow to compare and evaluate the results easily.

During the After Life monitoring the results of the former surveys, which were realised within the project implementation period, shall be taken into consideration. For the better comparability the same methods and the same sampling places could be used, where it is possible. The collected data will be shared with project beneficiaries and also imported into the coordinating beneficiary’s data collecting system, so the archiving of monitoring result is provided for longer period also.

We are intend to use a standardized methodology, which either fit to international standard or the Hungarian National Monitoring System on Biodiversity ( NBmR). The monitoring survey will be developed by contracts expert with the participation of the staff of beneficiary, especially with the ranger service of DDNPD. Beside valid nature conservation permit, because of the crossborder situation, the researchers have to obtain a permit from relevant border police authorities.

The beneficiary WWF Hungary offered financial support for the first three years of monitoring. After this period the beneficiaries will finance the monitoring activity from own budget or using external resources.

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