



Manual for Natura 2000 Project Results Database

Content

1. Introduction
2. How to work with the Database?
3. Structure of the Database
4. Complete list of technical documents
5. Datasets – Methodological approach & Results

Introduction

The Natura 2000 Database is one of the main outputs of the project 'Establishment of Natura 2000 network, Montenegro' carried out in the country in between 2016-2019. Besides delivering some prerequisites and carrying out preparatory steps for Natura 2000 sites designation, the main goal of the project was to collect data about species (both bird and non-bird, and plants) and habitat types of Community interest (i.e., listed in the annexes of the EU Habitats Directive and in the EU Birds Directive) in the field. The data gathered both by field experts and other associated experts was used for the analysis and (in case of Special Protection Areas) the pre-selection of the future Natura 2000 sites. Thanks to different methodological approaches when comparing groups of species and habitats, each dataset has a specific structure that is described separately.

1. How to work with the Database?

The Database is a web application for accessing data collected during the project. It is divided on public part and part accessible with a permission of the database manager. Public part is accessible for anyone and contains downloadable documents as outputs the project.

Once you input your credentials into login form (email and password) you will see a welcome page.

The interface is divided on left (sidebar and navigation) and right (data) parts. In sidebar, you can access **Datasets**, **Archives** and **Photos**. In **Datasets** screen, you can choose which data you want to browse through by clicking on **View Data** or you can filter data and generate reports and download data if you click on **Generate Reports** for one of the forms of your choosing (Habitats, Species, SPA Birds).

View Data

In this screen, only basic data is listed for chosen form (**Observer**, **Date**, **KBA**, **Locality**, **Polygon**, **HD Type Codes**, **HD Quality Representativity**). All data is sortable and searchable by all columns. You can examine every record in details on the screen by clicking on an 'eye icon' in the last column. In the screen you can see map where record is made as well as the rest of the data and images collected for that record.



Generate Reports

In this screen, data is shown in the table similar to that in **View Data**. The main difference is filtering in table footer. You can filter data by multiple parameters. Once user filter data you can click on “**Download Data**”. It will open modal window with loader that will be closed once download is ready.

On **Archives** screen, you can find downloadable files with raw data exported from the Fulcrum app in seven different formats.

Photos are split to three sections (**Habitats, Species, SPA Birds**). In every section, you can find all photos recorded during the field mapping with basic background information.

2. Structure of the Database

The Database is split to two parts:

- 1) Technical documents linked to the Natura 2000 designation process in Montenegro (e.g., methodologies used for the field inventories, general or specific guidelines for site selection, and other technical documents developed within the project) (see Chapter 4).
- 2) Background datasets resulting from the field work (see Chapter 5)
 - a. Habitat types: Habitat Layer, Habitat Points Layer as a result of the field inventory (export from the Fulcrum database), Freshwater Habitat Types Analyses results (composed of several GIS layers and the final report).
 - b. Species: Species Points Layer as a result of the field inventory, Species Polygon Layer as a result of the analysis of sites for species.
 - c. Birds: Bird Species Points Layer as a result of the field inventory (export from the Fulcrum database), Desktop Study Points Layer as a result of the desktop analysis.

3. Complete list of technical documents

This Chapter lists all technical documents developed within the project (part 1 of the Database) with their short description:

Proposal for delineation of Biogeographical Regions in Montenegro

The document proposes the border between the Alpine and the Mediterranean biogeographical regions in Montenegro as a prerequisite for the right pSCIs selection. Besides the explanation of the process leading to the result, the zip file also contains GIS layer with the exact delineation in a fine scale (1 : 25 000).

Important note: The delineation should be also used in the EMERALD network implementation process, because it applies the same principles for the separation of both biogeographical regions in the country.



Habitat types

Reference lists of habitat types of Community interest separate for the Alpine and the Mediterranean biogeographical regions.

Catalogue of Habitat Types of the EU Interest in Montenegro

A classification manual was already available when the project was launched in 2016, but it needed to be amended as it lacked verified data from the field. Therefore, the Catalogue was completed (in March 2019) using relevant data gathered in the field during the 2017-18 seasons. The list of habitat types with regular occurrence in the country was significantly amended and their specification (indicator and dominant species for each of them) revised. Majority of habitat types are accompanied by illustrative photographs.

Guidelines for the habitat inventory 2017-218

The systematic field habitat inventory conducted within the project was historically the first one held in Montenegro. The inventory was carried out during two field seasons: 2017 and 2018. As it was the first such activity in the country, the guidelines were revised after the first field seasons in order to take into account the lessons learnt. Therefore, the guidelines for 2018 season were amended accordingly. Explanation of what was modified for the 2018 season is provided in the introduction to the latter.

Freshwater habitat types analysis

Freshwater habitat types are one of the most important vegetation types (ecosystems) in Montenegro, but they are also challenging to be mapped properly in the field. Therefore, the project team contracted experts from the Belgrade University (Serbia) to conduct the study on occurrence, geographical coherence, and quality of freshwater habitat types using all data available. The result helped to complete the habitat layer for this group of habitats and to also build strong information background for the future research and GIS analyses.

The analysis is accompanied by GIS layers indicating the occurrence of indication species as well as verified polygons of freshwater habitats in Montenegro (not only in the project KBAs).

Caves – General report about their state

As well as freshwater habitat types, caves not accessible to public (habitat type 8310) are a very specific habitat type and thus require the inventory and assessment approach different from all other habitat types. The report gives a clear picture about the state of caves in the project KBAs and also proposes selection criteria for them.

Report on the Habitat Layer

The report giving an exact information about the process of creation of the Habitat Layer and its main characteristics including the analyses made separately for each KBA.



Species

Reference list of species

A list of species from Annex II of the Habitats Directive occurring in Montenegro separated for the Mediterranean and the Alpine biogeographical regions. The list is accompanied by the explanatory notes for species the taxonomy or nomenclature of which has changed since the Habitats Directive came into force.

Guidelines for the species inventory 2017-2018

The systematic inventory of species listed in Annex II of the Habitats Directive which took place during the seasons 2017 and 2018 represents the biggest coordinated effort in inventorying fauna at the Montenegrin territory ever, even though due to limited time and human capacities it was only performed within the limited Project area inside predefined KBAs. Although the methodologies for each particular species group differ, the experts were following general guidance in order to ensure the consistency in structure and format of collected data.

Species Polygon Layer report

Besides the occurrence data on Annex II species with attributes included in the Species Point Layer, the analysis of appropriate habitats for species in particular sites and evaluation of their importance to be included in the Natura 2000 network was performed by the species experts, and a Species Polygon Layer containing those sites was produced. The Species Polygon Layer report provides an overview of the process and an instruction of how to use the data contained in this layer.

Birds

1st draft Reference List of birds

Based on discussions within the bird team and relevant stakeholders, 1st draft Reference List of birds was produced, listing 167 species (+ 34 species that were kept on the list for further consideration) that are potentially important for the SPA selection in Montenegro. This national checklist provides a baseline, defining threatened (birds on the Annex I Birds Directive and birds threatened on the global IUCN Red List) and regularly occurring breeding, wintering or migratory bird species in the country.

National SPA selection criteria

National SPA selection criteria have been developed on national scale for Montenegro, taking into account criteria for Important Bird Areas (IBA) introduced by BirdLife International. IBAs are precursor of SPAs classified according to the Birds Directive (cf. the ruling of the European Court of Justice in Case C-3/96). Specifically, the criteria C, used for the designation of IBAs in European Union Member States as required by the 'Birds Directive' had to be considered.

List of qualifying species for SPA selection (criteria species)

Using the draft Reference list as a baseline, each species had to be cross checked with the IBA categories and criteria. As a result, the project experts' team agreed on a List of Qualifying species for SPA selection, which currently consists of 76 species which were the primary focus for research and remain so for the follow-up actions.



Draft SPA proposal – a monograph

The results of all the preparatory, field assessment and consultation activities a 1st draft of potential SPAs in Montenegro were produced in a form of a comprehensive monograph. The monograph encompasses results of the bird assessment and is organized in two main sections that present the core findings of the work performed in the framework of the Natura 2000 project:

- The **Species Account** section describes the comprehensive, up to date review of the knowledge on the distribution, occurrence and population state of all 72 qualifying species that were identified for the purpose of selecting the first inventory of potential SPAs in Montenegro.
- The **Site Account** section describes 33 identified potential SPAs, providing a general overview, map of the site, qualifying (criteria) species, main threats and general conservation guidelines. This assessment of SPAs is the first of its kind in Montenegro and is based on the best available experts' knowledge about selected bird species at the moment.

After the presentation of the main outputs of the project, the publication looks also to some other issues, such as the international importance of Montenegro for birds, current and future threats.

4. Datasets – Methodological approach & Results

Data about **habitat types** was collected in the field *via* the Fulcrum application, using tablets. All the data from Fulcrum were imported to the Full Habitat Dataset (FHD) that is available in the Database as a core dataset on habitats. The dataset was for both field seasons verified by the verification expert (Prof. Dmtar Lakušić) and based on his findings corrected by the authors of the records. Attributes of the dataset are explained in detail in the guidelines for the habitats inventory (version 2018).

Besides the Full Habitat Dataset, the project team developed the so called Habitat Layer (GIS layer). It covers fully all 9 project KBAs by polygons of the habitat types of the Community interest and non-Natura polygons. Therefore, the layer provides comprehensive information about the distribution of target habitat types and their quality, and allows future analyses leading not only to the Natura 2000 implementation but also utilizable for other nature conservation purposes. Additional information can be found in the Report on the Habitat Layer.

The FHD contains more data than the Habitat Layer due to the fact that not all data was used for the creation of the layer. The Dataset is composed of geo-referenced points. If there were more points in the habitat polygon, only one of them was used for linking attributes to the polygon (due to the GIS restrictions). The Habitat Layer allows geographical analyses while the FHD provides useful additional information. It is possible to combine analyses of the Habitat Layer with the FHD because all records in the FHD contain geographical coordinates.

Data on **Annex II species** was collected and uploaded in point format in the Fulcrum application using tablets following the methodology provided in the **Guidelines for the species inventory**. The application automatically recorded the coordinates of the sites and experts were able to insert information on species, population estimation, habitat quality parameters, threats in the site and any additional notes, if relevant. The photos of recorded species and surrounding habitat were taken by tablets and uploaded to Fulcrum database. The data was subsequently verified by the members of the Verification board in order to reveal any potential misidentifications or



other inconsistencies. All the data on Annex II species collected in the field and uploaded to Fulcrum database is available in the **Species Point Layer**.

After the finalization of the field season 2018 all species experts made an overview of collected data (both field data and existing literature data where sufficient level of quality was available) and provided their final species reports. In these reports a qualitative analysis of particular sites for species and evaluation of their importance to be included in the Natura 2000 network was performed. The described sites were roughly delineated and prioritized in order to be usable for spatial analysis in the process of Natura 2000 site selection and delineation in the future, and they are contained in the **Species Polygon Layer**. Additional information can be found in the Species Polygon Layer report.

Birds

Desktop Study analysis

A comprehensive desktop study analysis of existing published and non-published data was carried out in 2017. 215 records of historical data and 393 records of recent ornithological data were collected from 58 published sources (more than three times more sources were examined), from 23 different professional and non-professional bird experts. In addition, 2.161 data inputs from three on-line bird watching platforms were assessed. All the 2.769 data records were geo-referenced in Geographic Information System (GIS). These datasets are presented as Desktop Study Points Layer, geo-referenced in the GIS.

Field data collection

Field work was conducted focusing at Annex I and Globally threatened species (qualifying species). The most comprehensive and focused field survey of birds of Montenegro ever was carried out in all regions of the country, trying to understand the distribution and population status of target species. The nationwide surveys are necessary due to the specificity of the SPA selection criteria: for the majority of the species, the five most important areas need to be selected. In order to reach that goal, a full comprehensive knowledge on their distribution and population sizes are necessary. Field work was done using selected methodologies. In total, 10 bird experts were engaged for this work, 7 international and 3 national experts. A total of 419 work days were devoted to the field work by the 10 bird experts. In addition to that, 334 work days were carried out by volunteers. In total, 112 volunteers took part in the field work. As a result of this activity, an additional 3.943 records were collected, making a total of 6.712 records being used to assess the bird data for the selection of the first inventory of SPAs in Montenegro. These datasets are presented in the Bird Species Points Layer.



MONTENEGRO
MINISTRY OF SUSTAINABLE DEVELOPMENT
AND TOURISM



Abbreviations

FHD – Full Habitat Dataset

KBA – Key Biodiversity Area (9 project areas in which habitat and species inventories were held)

pSCI – potential Site of the Community Importance (Natura 2000 site for species or / and habitats)

SPA – Special Protection Area

IBA – Important Bird Area