Sustainable Forest Management: Progress on finalization of the Inventory of Virgin Forest

Marco Trombetti, Emanuele Mancosu, Dania Abdul Malak, Ana Marín (University of Malaga, ETC/ULS)
Annemarie Bastrup-Birk (EEA)
The Carpathian Mountains are one of the most important forest ecosystems in Europe due to their *high concentration of virgin forests*

The “*protocol for sustainable forest management*”, signed by the Carpathian Convention Parties is formalising the *need to preserve the richness and ensure sustainable use of the Carpathian forests*

In this framework, EEA signed a partnership agreement with the Carpathian Convention Secretariat in July 2012 and included a work plan that is being implemented by one of its European Topic Centres (actually ETC/ULS) represented by the University of Malaga (UMA)
identification and protection of natural forests, with a special focus on virgin forests

Since 2014, EEA and ETC/ULS support the Forest WG of the Carpathian Convention in setting the basis to locate, monitor, and prioritise virgin and HNV forest areas:

- Developing Carpathian-wide indicators supporting sustainable management efforts
- Support in the virgin forest inventory for better conservation
- Develop an Integrated Data platform to host data
EEA and SCC signed a cooperation agreement (WG on Forest for the implementation of the protocol on sustainable forest management)

Definition and delimitation of a study area (KEO), collection of available datasets to populate a virgin forest inventory

Gathering relevant available datasets, indicators from the Parties to support the identification of virgin forests

Development of regional indicators based on the EEA HNV forest indicator

Creation and publication of a first Inventory of Carpathians Virgin Forest (Member Parties data)

Virgin Forest inventory improvement, Forest typology harmonization (EUNIS), Integrated data platform

Finalization of the Virgin Forest Inventory
Criteria for the selection of Virgin Forest in the Carpathians

A1 Criterion: Naturalness

A1.1. Species composition
Forests formed of native/autochthonous tree species according to potential natural forest types.

A1.2 Structure
Cyclic ecosystems with complex structures, which include all stages of small development circles in a mosaic structure (horizontal) and vertically layered, according to the natural type of forest.

A1.3 Deadwood
Presence of deadwood (lying and standing) at all stages of degradation and all over the forest surface.

A1.4 Human activities which influenced the development, structure and dynamic of the ecosystem
1) Infrastructure, 2) Felling, 3) litter removal, 4) Grazing and 5) Recreation /education infrastructure

A2 Criterion: Area & Delimitation

A2.1 Area of forest plot
Minimum 20 ha

A2.2 Shape of forest plot
Minimum distance between any two opposite boundary points does not decrease below 200 m.

Source: SCC webpage
<table>
<thead>
<tr>
<th>No.</th>
<th>Name of the virgin forest</th>
<th>Forest management plan, edition (year)</th>
<th>Study, edition</th>
<th>Type of property</th>
<th>Latitude N</th>
<th>Longitude E</th>
<th>minimum</th>
<th>maximum</th>
<th>County</th>
<th>Owner, administrator</th>
<th>Production Unit</th>
<th>basic forest unit (compartment) n.a.</th>
<th>Type of forest: Czech site classification (Vréggh et al. 2003) / Habitat directive classification</th>
<th>Area (ha)</th>
<th>of which surfaces that do not meet the criterion of naturalness</th>
<th>the level of the forests protection (fully protected, in progress, not protected)</th>
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<tbody>
<tr>
<td>244</td>
<td>Mionší</td>
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<td>state</td>
<td>49.5333275N</td>
<td>18.6615444E</td>
<td>720</td>
<td>950</td>
<td>Frydek-Místek</td>
<td>Frýdek-Místek State Environmental Conservation Agency of the Czech Republic</td>
<td>5B6 / 9130</td>
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<td>National Nature Reserve</td>
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<td>38.96</td>
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<td>38.96</td>
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<td>81.14</td>
<td>Nature Reserve</td>
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</tbody>
</table>
Virgin Forest Inventory: Need for Harmonization

- Incomplete thematic data
- Different data format (Tabular, Spatial)
- Description of forest types according to local schemes, classifications, languages
- Mixture of spatial and tabular data, different reference systems
- Missing or heterogeneous information about ownership or protection status

Harmonized Dataset

- Local Forest Type classification schemes
- Point shaped features
- Validation with independent vegetation plot data
- Consistent thematic information
- EUNIS classification

Description of forest types according to local schemes, classifications, languages.
**Virgin Forest Inventory: Outlook**

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Plots</th>
<th>Area [ha]</th>
<th>% Protected areas</th>
<th>% Private property</th>
</tr>
</thead>
<tbody>
<tr>
<td>CZ</td>
<td>15</td>
<td>855</td>
<td>93,6</td>
<td>21,5</td>
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<tr>
<td>HU</td>
<td>1</td>
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<td>100</td>
<td>0,0</td>
</tr>
<tr>
<td>PL</td>
<td>57</td>
<td>9098</td>
<td>99,9</td>
<td>0,6 *</td>
</tr>
<tr>
<td>RO</td>
<td>609</td>
<td>6947</td>
<td>100</td>
<td>2,7</td>
</tr>
<tr>
<td>RS</td>
<td>49</td>
<td>1902</td>
<td>100</td>
<td>0,0</td>
</tr>
<tr>
<td>SK</td>
<td>123</td>
<td>8932</td>
<td>82,7</td>
<td>9,2</td>
</tr>
<tr>
<td>UA</td>
<td>39</td>
<td>16120</td>
<td>100</td>
<td>0,0</td>
</tr>
</tbody>
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*Ownership not reported for 55% of the area*
Virgin Forest Inventory: Czech Republic

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- Reporting: completed
- Harmonization with EUNIS 2012
  - Proposed based on the crosswalk between Annex I habitats and EUNIS classes
  - Validated (Ministry of the Environment)
Virgin Forest Inventory: Hungary

- Reporting: completed
- Harmonization with EUNIS 2012: Validated at level 3

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</table>
Data reported through a research project on Forest and CO$_2$ (Prof. Szwagrzyk/Sabatini)

Data not based on the reporting template

Review currently carried on by WWF Poland

Harmonization with EUNIS 2012:
- Proposal based on the described dominant species
- Validation is missing

Official database from the Ministry not available yet

Virgin Forest Inventory: Poland

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<tr>
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<td>0.6 *</td>
</tr>
</tbody>
</table>

* Ownership not reported for 55% of the area
Virgin Forest Inventory: Romania

<table>
<thead>
<tr>
<th>Country</th>
<th>Forest</th>
<th>Number of Plots</th>
<th>Area [ha]</th>
<th>% Protected areas</th>
<th>% Private property</th>
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</thead>
<tbody>
<tr>
<td>RO</td>
<td>Virgin</td>
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<td>6947</td>
<td>100 **</td>
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</tr>
<tr>
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<td>1430</td>
<td>22116</td>
<td>100 **</td>
<td>17,2</td>
</tr>
</tbody>
</table>

- Reporting: completed (05/2019)
- Harmonization with EUNIS 2012
  - Proposal based on:
    - Correspondance Romanian Tip Padure
      - Habitat Natura 2000
    - Correspondance Romanian Tip Padure
      - Palaearctic habitats - PalHab
  - Validated (National Institute for Research and Development in Forestry “Marin Dracea”)
- Ministry of Water and Forests is currently preparing the studies for the inclusion of at least 15000Ha more in the Catalogue (many private forests)
Virgin Forest Inventory: Serbia

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</table>

- Reporting: completed
- No information on private forests
- Harmonization with EUNIS 2012
  - Proposal based on provided phytosociological classes
    - Not validated
Virgin Forest Inventory: Slovakia

- Reporting: completed
- Harmonization with EUNIS 2012
  - Proposal based on
    - Atlas biotopov Slovenska
    - ForestPortal SK
  - Validated
    (State Nature Conservancy of the Slovak Republic)

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Virgin Forest Inventory: Ukraine

• Virgin forest project to be launched at the National level
• Support of Dr Prots and Dr Cherniavskyi to review and harmonize the forest typology
• Work in progress, to be reviewed by the State Forest Agency and eventually accepted as official

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<tr>
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<td>39</td>
<td>16120</td>
<td>100</td>
<td>0,0</td>
</tr>
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</table>
Only **2.9%** of the sites included in the inventory are privately owned and less than 2% have mixed ownership.

The available information is mostly in areas under N2000 regulation (less than 4% are not protected)

**Finalization of the Harmonization and Validation of the Virgin Forest Inventory**
- Publication of the final version (v2019) of the Virgin Forest Inventory
- Non-official data to be added when available (RO, UA)

<table>
<thead>
<tr>
<th>Country</th>
<th>Forest Type Harmonization</th>
<th>Tabular Data</th>
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</thead>
<tbody>
<tr>
<td>CZ</td>
<td>✔️</td>
<td>✔️</td>
</tr>
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<td>HU</td>
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</tr>
<tr>
<td>UA</td>
<td>✗️</td>
<td>✔️</td>
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</table>

**Legend**
- ✔️ Complete
- ✔️ Partial
- ✗️ None
Conclusions and next steps

- Development of the indicator on forest with other degrees of naturalness
- Integration of Carpathians forest data in a European framework: possible integration into the Forest Information System for Europe (FISE) (under development)
- CC common integrated platform: possible integration of the Carpathian Countries Integrated Biodiversity Information System (CCIBIS) http://geoportal.ccibis.org/, created and developed under EU Interreg Programme Projects, into EU/EEA information systems
- Preparation of a regional fact-sheet on the Carpathian region in cooperation with EEA, to promote and raise awareness on specific aspects of the region
  - Indicators suggested for the implementation of the Forest Protocols (WG Forest)
    - Forest (e.g. VF cover)
    - Nature (e.g. Wetland sites, Protected areas)
    - Biodiversity (e.g. Capercaillie, Large carnivores)
Thank you for your attention!

Marco Trombetti

marco.trombetti@uma.es

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Country name

Forests are intimately linked to the country’s cultural, economic, social and historical development. The country is located in the continental temperate region, with a varied relief ranging from seacoast to mountains. There are more than 15,000 ha of forest land.
The EUNIS habitat classification is a comprehensive European system to facilitate the harmonised description and collection of data across Europe through the use of criteria for habitat identification. It is hierarchical and covers all types of habitat from natural to artificial, from terrestrial to freshwater and marine.

### Harmonization of the Forest Type classification

**Virgin Forest Inventory**
- Virgin Forest Inventory plots
- Virgin forest plots with same forest type classified according to the EUNIS scheme

#### EUNIS G1.61
**Medio-European acidophilous [Fagus] forests**

#### FT
- Carpathian oak-hornbeam forests
- Thermal submediterranean oak forests
- Tilio-Acerion forest of slopes, screes and ravines
- Asperulo-Fagetum beech forests
- Luzulo-Fagetum beech forests
- Medio-European subalpine beech woods with Acer and Rumex arifolius
- Medio-European limestone beech forests
- Western Carpathian calcicolous Pinus sylvestris forests
- Relict lime pines forest and spruce forests
- Bog woodland
- Alluvional Alder Forest
- Abies forests, Abies and Picea forests
- Acidophilous spruce forests (Vaccinio-Piceetea)
- Submerged spruce forests
- Alpine Larix decidua and/or Pinus cembra forests

#### G3.4
- [Pinus sylvestris] woodland south of the taiga
- Spring heath Pinus sylvestris forests

#### G3.1
- [Abies] and [Picea] woodland
- Alpine and Carpathian subalpine [Picea] forests
- Acidophilous spruce forests (Vaccinio-Piceetea)
- Submerged spruce forests
- Alpine Larix decidua and/or Pinus cembra forests

### Map

- CZECH REPUBLIC
- AUSTRIA
- HUNGARY
- SLOVENIA
- SLOVAKIA
- POLAND
- ROMANIA
- BULGARIA
- SERBIA
- MONTENEGRO
- ADRIATIC SEA
- PRISTINA
- PODGORICA
- PRAGUE
- VIENNA
- BRATISLAVA
- VIENNA
- BRATISLAVA
- BUDAPEST
- OSCAR
- CLUJ-NAPOCA
- CHISINAU
- TIRANA
- SARAJEVO
- SOFIA
- BUCHAREST
- BELGRADE
- BELGRADE
- OSLO
- BRUSSELS
- PARIS
- LONDON
- MILAN
- MUNICH
- BERLIN