LIFE Protection of Old-Growth Forests in Europe

LIFE PROGNOSES Project
Layman's Report



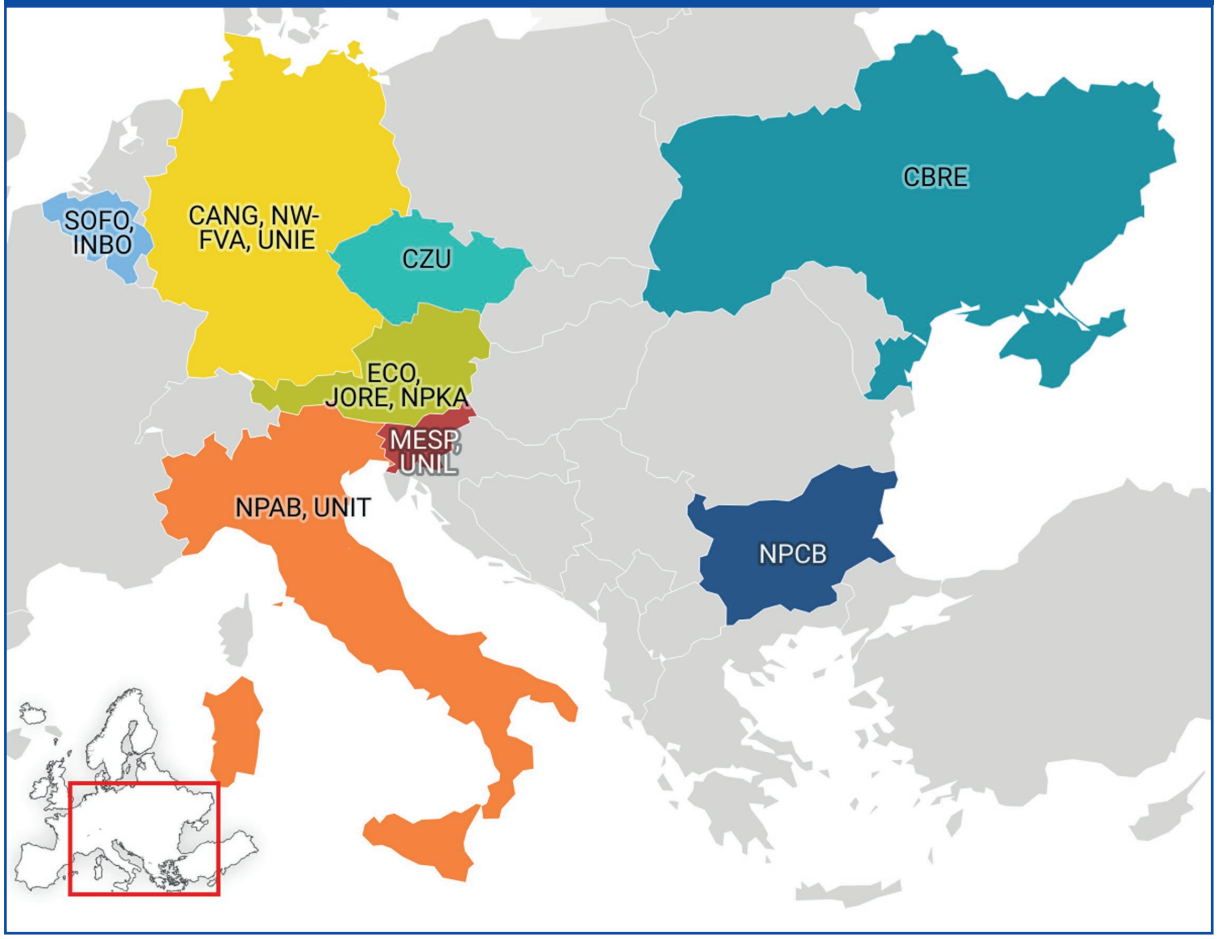
Sonian forest, Belgium © Yves Adams



1. The Life PROGNOSES Project

The Life Prognoses project was a Europe-wide preparatory Life project, implemented between January 2021 and June 2025 by a consortium of 15 partners in 8 European countries. The project was undertaken in the context of the EU Biodiversity Strategy for 2030 and the EU Forest Strategy for 2030: it supports the implementation of strict protection for all European old-growth forests by 2030.

Life Prognoses Consortium





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2. Why old-growth forests need protection

Primary and old-growth forests in Europe, although occupying a very limited area, are crucial for biological diversity, carbon storage, hydrology, ecosystem adaptation to disturbances, and public health. Still, not all of them are fully protected against logging and other human interventions. Therefore, the European Biodiversity Strategy 2030 states that we must define, map, monitor and strictly protect all the EU's remaining primary and old-growth forests.



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3. Hurdles in the way of old-growth protection

Back in 2021, the locations of old-growth forests in Europe were unknown. Additionally, what would qualify as an old-growth forest in Europe was unknown as well, and so, it was impossible to identify and map these forests, let alone protect them.

4. The Life Prognoses approach: Europewide science and Capacity Building in a world heritage site

What the partners in the Life PROGNOSES project have in common: they are all active in component parts of the serial UNESCO World Heritage site 'Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe'. Based on their experience and knowledge, they contributed to the development of the scientific framework to identify and map European old-growth forests. Furthermore, they conducted measurements and analyses to further quantify the characteristics and added value of primary and old-growth forests. Finally, the project organised an impressive variety of awareness-raising actions at the local, national and European levels to increase public support for strict protection of these unique forests.

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Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe World Heritage since 2007



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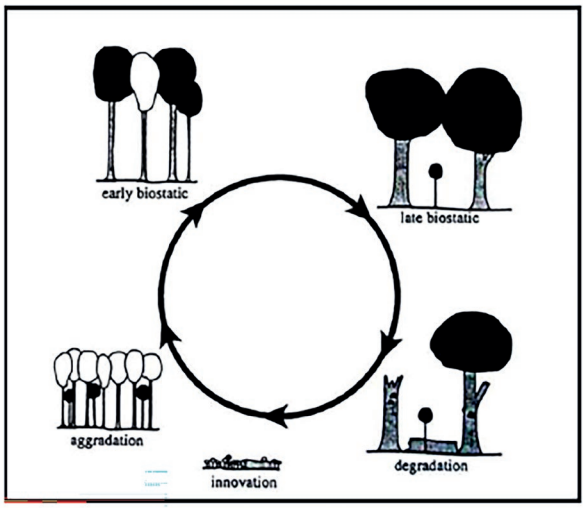
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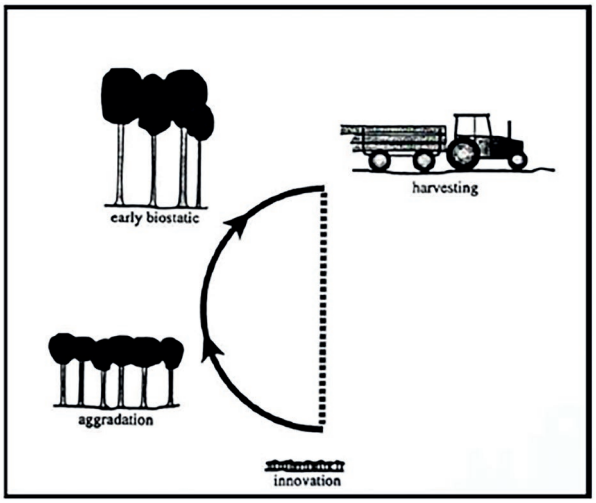


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5. Identification and mapping of old-growth in Europe

5.1. Old-growth versus primary





'Primary' tells us something about the history of the forest. Primary forests are forests that were never disturbed by people: no trees were ever cut, no roads have ever been constructed... They are very rare in Europe. Primary forests are unique: they have lots of very old trees, deadwood, and rare plants and animals. If a managed forest is taken out of management (set-aside), it can redevelop structures similar to those of primary forests. When this happens, we call it an 'old-growth' forest. Thus, 'old-growth' tells us something about the current structure of the forest.

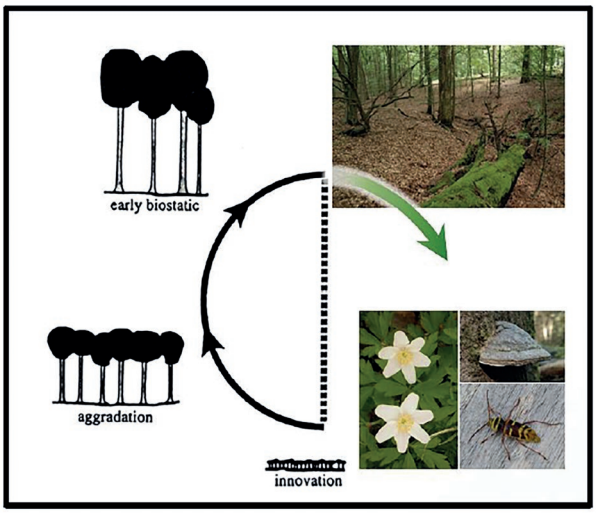


Figure adapted from Christensen, M. & Emborg, J. (1996) Biodiversity in natural versus managed forest in Denmark. Forest Ecology and Management 85, 47-51.

5.2. Old-growth revised

Is this an old-growth forest or not? Such a question assumes that there only exist forests that are fully old-growth and forests that are not at all. However, in the absence of management, forests redevelop structures similar to those of primary forests gradually. So, in reality, old-growth is rather something gradual than black-or-white. Therefore, we say that forests have a certain level of old-growthness.

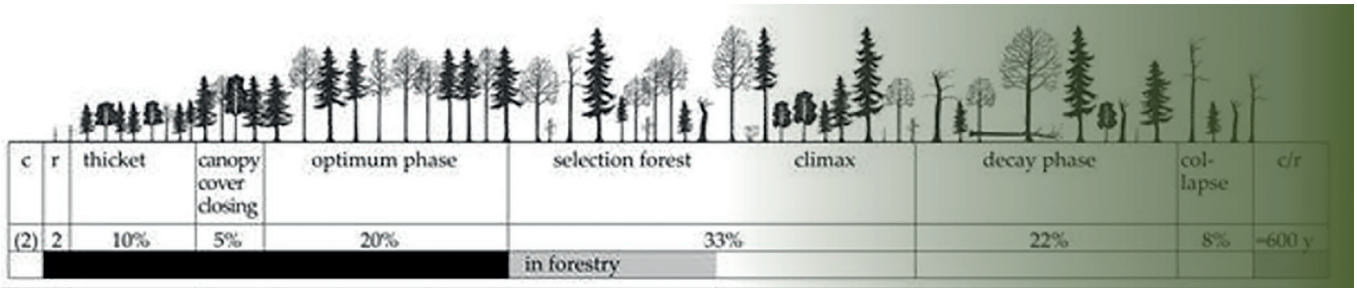


Figure adapted from Scherzinger, W. (1996) Naturschutz im Wald - Qualitätsziele einer dynamischen Waldentwicklung. Ulmer-Verlag, Stuttgart.

5.3. Criteria for primary and old-growth forests

The main characteristic of a primary forest is that there are no traces of human intervention. In the case of old-growth forests, we look for large amounts of standing and lying deadwood and very large and old trees. They often have a diverse structure with different layers of vegetation and gaps due to fallen trees. There are some so-called habitat trees, with rot holes, loose bark, etc., where specific species find their homes.



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5.4. The old-growth indicator (OGI)

High up in the mountains, very large trees are extremely rare; old-growth forests there consist of small, curvy trees. If the presence of very large trees is a necessary condition to identify a forest as old-growth, a lot of valuable old-growth forests will be overlooked. Old-growth forests, and forests in general, look different depending on the regional climate, soils, etc. You cannot use one general threshold value (like for volume of dead-wood) for all forests. Therefore, it is better to look at multiple characteristics and score them by comparing them to reference forests. The single indicator pooling the scores is called the Old-Growth Indicator, or OGI.

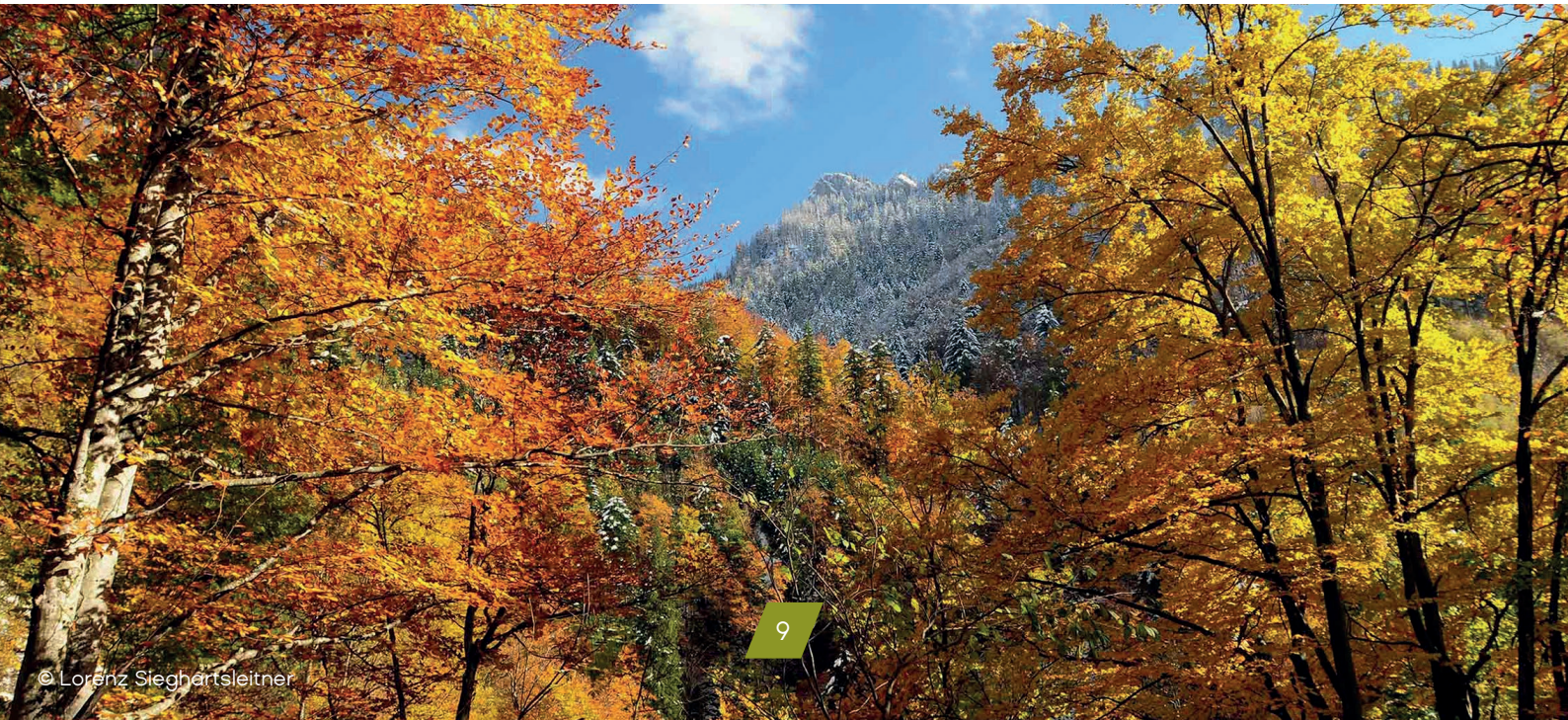

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5.5. Remote sensing for old-growth identification

Remote sensing means gathering information using aeroplanes and satellites. You can get a lot of information over large areas. We checked if we could recognise the old-growth forests from other forests using such data. With the remote sensing algorithm developed by Life Prognoses, forests with a high degree of old-growthness can be distinguished with sufficient accuracy to identify patches as 'potentially old-growth'. For a final identification, the remote sensing assessment must always be complemented with a field assessment.

5.6. Protect old-growth forests now: rapid assessment

2030 is four and a half years ahead; by then, all European old-growth forests ought to be strictly protected. Nonetheless, old-growth mapping is still incomplete. Field assessment is a rigorous method, but too time-consuming for the period we have left. To address this practical issue, Life Prognoses proposes a rapid assessment: first, a pre-selection is made using the remote sensing method, followed by an evaluation in the field using only the most important old-growth indicators. Rapid assessment can speed up the mapping and get us to 2030 with fully protected old-growth forests.


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6. The importance of old-growth for critical ecosystem services

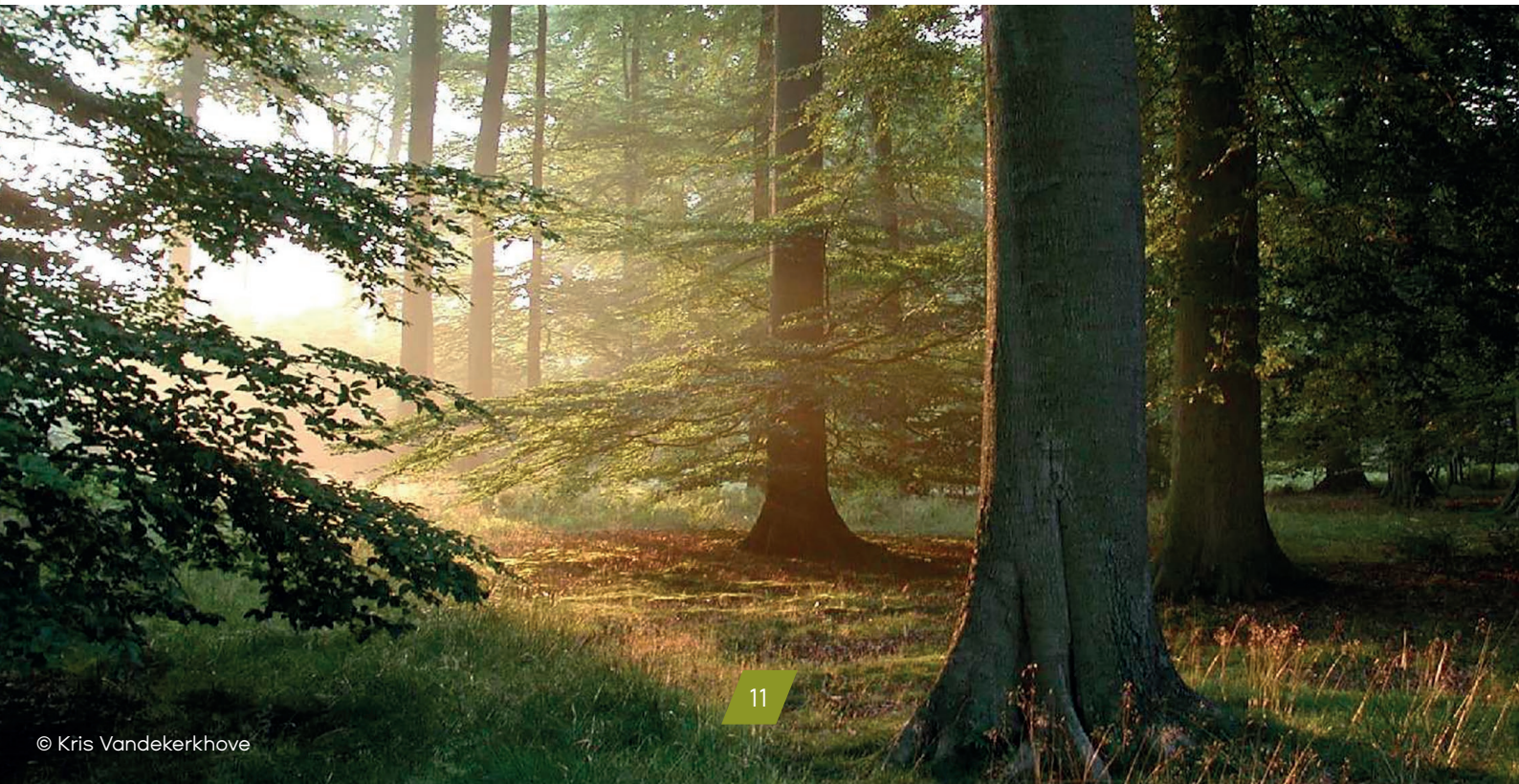
Old-growth forests have developed structural elements similar to those of primary forests (very old trees, large dead trees,...). More forest structures mean more habitat for rare species.
But these forests are also important for us humans: they give us all kinds of services that we often take for granted: they regulate our climate, store carbon,... We call these eco-system services.



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6.1. Old-growth micro- and mesoclimate

The characteristic processes of old-growth forests regulate the temperature and humidity by evapotranspiration, casting shade, breaking wind, etc. This effect can be noticed inside the forest (microclimate) and nearby the forest (mesoclimate). Our research shows that old-growth forests regulate the temperature effectively: on the hottest summer days, the maximum temperature went up to almost 40 °C in the beech forests while going up to more than 46 °C in the adjacent non-forested area. Furthermore, better-connected old-growth patches remain more vital when temperatures are high. So, it is important that old-growth forests are large enough.



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6.2. Carbon stocks in old-growth forests

Old-growth forests are crucial carbon stocks. Because their growth is not restricted by harvest, the vegetation can develop into many more dense layers with larger trees. Moreover, deadwood remains in the forest where it can break down slowly and become part of the soil. Therefore, old-growth forests have a large carbon storage capacity in their living biomass, in aboveground dead biomass (deadwood) and belowground, in the soil!



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6.3. Old-growth associated biodiversity

Our research shows that the longer a forest is unmanaged, the more different structures it has, such as loose bark, holes in the stem, etc. Former research showed that specific species depend on specific forest structures. Therefore, the more different structures, the more different species and the higher the biodiversity of the forest. Thanks to their structural diversity, old-growth forests can harbour many more specialised species than homogeneous (managed) forests.



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6.4. Old-growth for tourism and recreation

Old-growth forests appeal to the broad public. Based on a scenario experiment, visitors reported being willing to pay between 2,1 and 4,1 euros more access fee per person per day to support conservation management, resulting in an additional old-growth patch in the forest. Visitors who visited the old-growth parts were willing to pay more than others.



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7. Awareness raising about old-growth importance and capacity building for old-growth protection

7.1. Awareness-raising for the broad public

The partners of Life Prognoses organised over 100 activities, thanks to which at least 1.711.340 people have been reached.
751 partners outside of the project got involved in the development of the awareness-raising activities. The project offered unique opportunities to improve the quality and creativity of awareness-raising activities: even virtual reality and theatre were explored as ways of environmental education.







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7.2. Events for policymakers

The insights and results of the project were shared with policy-makers at regional, national and European levels on at least 16 occasions.


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7.3. Communicating the scientific results

On at least 18 occasions, the scientific insights of the project were communicated to fellow scientists. 8 scientific articles were drafted, of which 2 have been published in peer-reviewed journals within the project implementation period, and 5 scientific reports have been published. More publications will follow after the implementation period.



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8. Conclusions and continuation

The Life Prognoses project reached the end of its implementation period and provides Europe and the member states with

- a set of old-growth indicators and a method to calculate the level of old-growthness (OGI),
- a field assessment and remote sensing approach that complement each other, making rapid old-growth assessment possible,
- a Europe-wide database from which thresholds for the indicators can be extracted,
- a Europe-wide database from which ecosystem services in old-growth and managed forests can be compared.

Detailed information about these products can be found on the Life Prognoses website: https://lifeprognoses.eu/outputs-of-the-project/

The Life Prognoses project is finalised, but our work is not: by the end of 2030, all European old-growth forests must be strictly protected. The partners of Life Prognoses are determined to continue working towards this ambitious goal.



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