# Executive summary

The sustainable management of Metropolitan French forests is assessed by examining the following six criteria:

- Criterion 1: Forest resources - timber and carbon
- Criterion 2: Forest health and vitality
- Criterion 3: Productive functions of forests
- Criterion 4: Biological diversity of forests
- Criterion 5: Protective functions of forests
- Criterion 6: Socio-economic functions of forests

These, so-called, Helsinki criteria were defined following the United Nations Conference on Environment and Development in Rio in 1992.

Deserted agricultural and rural land, like the development of fossil energies, has over the last century led to the abandonment of the least profitable cultivated land, its spontaneous reforestation and less coppicing for heating purposes. The result has been the expansion of high forest structures. Characterized by this on-going transition, the **forest resources** show an increase in wooded areas which have grown from 14.4 to 16.4 million hectares in twenty years and an increased volume of timber per hectare, from 129 to 161 cubic meters per hectare in thirty years. The dynamics propelling these increases in volume and area, especially natural expansion and conversion into high forest, encourage broadleaved species in particular. The pioneering broadleaved species (ash, birch, locust tree, maples, pubescent oak, holm oak) are those where the volume increases the most in proportion. The location of geographical areas marked by natural expansion also influences the identity of favored species: the extensive expansion of surface areas seen in the last thirty years in the South of France no doubt explains the spectacular growth in volume of pubescent oaks and holm oaks. Conifers expand more slowly than the broadleaved species (+ 35% compared with 53% in volume) and changes also vary between species. Stands of maritime pine were seriously affected by storms in 1999 and 2009 whilst certain softwood species have volumes that are expanding hugely due to post-war plantings (Laricio Pine and Douglas Fir). Under these conditions, which continue to be very favorable to forest resources, metropolitan forests are a significant carbon sink, with additional storage in trees of close to 14 million tons of carbon a year on average over the last thirty years.

Forest ecosystems are, however, subject to a variety of constantly-changing attacks. Acidifying atmospheric pollution has been dropping regularly for the past twenty years. Attacks on trees by pathogens fluctuate wildly, with outbreaks followed by a return to the endemic state and also with the arrival of new pathogens. Wild ungulates apply herbivory pressure and their population has increased over the last forty years; the storms in 1999 and 2009 affected the forests whereas fires are overall controlled better than in the past, except in years of exceptional climatic conditions (2003). **Forest ecosystem health and vitality** are likely to be affected by these pressures. Trees react in different ways depending on the species, the stations and the intensity of the phenomenon. Drought and heatwaves have, for example, affected the defoliation of numerous species in recent years, especially in 2003 and in the Mediterranean area. Changes in ground quality in public forests have been noted during the last fifteen years, including a tendency towards acidification of the most acid soils, carbon sequestration and a drop in stores of nitrogen. There is no reason for these unexpected changes to be specific to the public forests, but this still has to be confirmed.

Forests provide **productive functions**: timber, non-woody forest products, hunting and fishing permits, etc. Forest production is however hampered in several ways: for example, logging is deemed difficult to very difficult in 30% of volumes. Also, over 50% of forest areas have no management document, linked to the small size of a huge number of properties. Thus, only 50% of the volume of timber produced every year is exploited, causing a constant increase in growing stock. Felling rates nevertheless vary between species[1] and geographical areas (linked to the local species and potential logging difficulties). However, in 2014, the value of harvested timber reached nearly 3 billion euros (including one billion for self-consumed firewood) whilst venison, mushrooms, cork, honey, forest seedlings and seeds and Christmas trees account for the other major forest productions. Hunting is without question the marketable service that brings in the most income, with about 110 million euros in 2012.

Forests also shelter a **biological diversity** that can be threatened by the pressures placed on the ecosystem. Land pressure is low, but not necessarily nil locally, given the increase in surface areas and the size of massifs (68% of

surface areas are part of massifs of more than 100,000 hectares). Silviculture, which reduces the duration of the silvogenetic cycle[2], tends to reduce the diversity of species at the oldest stages. There are in fact few very old stands in metropolitan France (2% of areas planted with pedunculate oak and 5% with beech), although standing deadwood nevertheless accounts for 6 cubic meters per hectare (compared with 1.6 cubic meters in 1999). However, there is little pressure to alter the status quo, with only 7% of surfaces seeing the introduction of a main species. Of the 194 tree species (including some exotic and accidentally present) listed by the forest inventory in the metropolitan forests, three are endangered species whereas the threatened species among the forest birds, mammals, amphibians and reptiles are 17%, 7% and 8% of species respectively. Lastly, the local wealth of species tends to increase with on average nearly five species on 20 ares, despite the main species accounting for a major share in the basal area (64% in broadleaved stands and 80% in conifer stands).

The forest ecosystem protects soils and water, natural resources that are the basis for its operation; it also helps to **protect** infrastructures, men and agricultural resources from natural risks. Some forests are allocated a protective role as a priority. This is especially true of protective forests, forests in areas covered by protection agencies and State-owned forests within the drinking water catchment perimeters or the mountain land restoration perimeters - they account for 350,000 hectares. However, all metropolitan forests also protect the ecosystem functions without particular official legal status.

The **socio-economic benefits** of ecosystems for society are enormous. They include production and consumption of the raw material, protection services, wellbeing of populations and development of rural regions. The forest-timber-paper-furniture supply chain, in the strict sense, accounts for about 230,000 full time equivalents whereas there are an estimated 800,000 forest- or timber-related jobs within more general branches (including, for example, timber construction and transport of timber products). Jobs in the sector involving the rural economy and regional forest initiatives are expanding. The added value of the forest-timber-paper-furniture sector was 12 billion euros in 2012 but the sector showed a trade balance deficit of 4.5 billion euros in 2014 (for a negative balance of 6.8 million cubic meters). Forests are more than just the forest-timber-paper-furniture supply chain. They are also landscapes and services rendered to society which the State, along with other players, helps to protect through financial support for sustainable management, preventing and fighting fires, post-storm canopy restoration, biodiversity, etc. Wood and its by-products also play a part in circular economy dynamics, with the introduction of recycling, the salvage of associated products and the production of renewable energy. Lastly, three quarters of French forests are privately owned and one quarter publicly owned. They are without question a leisure area and 85% of private owners state that they authorize access to their forests, whilst at the same time the cultural and spiritual value of some forests is acknowledged officially by allocating a label or classification (World Heritage Site, historic forest monuments, biosphere reserves, etc.).

Lastly, although this summary provides a concise overview of forests and the services they render, it does not reflect all information in the Indicators for the Sustainable Management of Metropolitan French Forests. Perusing the summaries by criteria and political issue or the detail on each indicator will undoubtedly prove additionally useful to each reader.

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1. Over 100% for maritime pine, 50% for spruce, poplar, Scots pine, sessile oak and beech and under 30% for ash and pubescent oak.
2. The silvogenetic cycle is the natural evolution cycle of a wild forest (not exploited by Man).
3. Difference between the exported and imported timber volumes.