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Forest ecosystems in France

Key messages for decision makers

APRIL 2019



The metropolitan French forest covers 16.4 million hectares and occupies nearly one third of the metropolitan territory. It is the fourth largest in Europe behind Sweden, Finland and Spain. 75% is privately owned. It is mainly concentrated in the southern half and the eastern part of the country. It is mostly located in the plains and hills, where broadleaf trees dominate widely. Planted areas have been stable since 1980, around 13% of the metropolitan forest. 95% of public forests and 31% of private forests have a sustainable management document. France also has more than 9 million hectares of forests in overseas territories, mostly tropical, diverse and rich in biodiversity, mainly in French Guyana.

This evaluation was conducted for the EFESSE program by a team from the *Groupeement d'Intérêt Public sur l'étude du fonctionnement et de la dynamique des écosystèmes forestiers et la gestion durable des forêts* (Gip Ecofor) with the support of a working group. It has been reviewed by the EFESSE Scientific and technical advisory board and the key messages for decision-makers on urban ecosystems were discussed and approved on 12 June and 6 November 2017 by the EFESSE National stakeholders committee. The level of consensus observed and cross-references to the detailed sections of the report are presented in the margins of the messages.

To access the full report (in French): <https://www.ecologique-solidaire.gouv.fr/EFESSE>

Ecological state, drivers and trends

1. Since a minimum reached around 1820, the metropolitan forest has doubled its surface¹. Per hectare, the average volume of wood in living trees increases at a rate of doubling in less than a century². Thus, the total volume of standing timber has almost doubled in the last fifty years. These changes are due first of all to the agricultural abandonment that has liberated land and enabled the growth of forests. The natural dynamics have been complemented by a proactive action of the public authorities to increase the wooded areas in France. Finally, the logging pressure that weighed on most forests until the nineteenth century has generally relaxed starting from the industrial revolution, notably because of the development of alternative energy sources³.

¹ Well established and accepted (§5.1.1)
² Well established and accepted (§5.1.2)
³ Well established and accepted (§5.1.1 et 5.1.2)

2. Despite the lack of monitoring for many species, available evidences show contrasting states of forest biodiversity in metropolitan France. On the one hand, the local richness in tree species is increasing¹ and we observe the maintenance or the recent improvement of several important characteristics for biodiversity (presence of very big trees and dead wood, low levels of forests fragmentation, largely predominant natural regeneration)². Overall, the assessment of habitats and species of community interest also shows a generally higher level of preservation than in other environments³. In addition, after an erosion phase in the late 1980s, the abundance of common forest birds has stabilized⁴. However, there are still warning points: more than 50% of the assessed forest plants, 17% of assessed forest birds and 7% of assessed forest mammals are considered threatened⁵. The evaluation also shows that some of the evaluated forest habitats of Community interest, mainly forests linked to aquatic environments, are in a poor state of conservation (alluvial forest, peat bogs, etc.)⁶.

¹ Well established and accepted (§5.2.1)
² Well established and accepted (§5.1.2 et 6.4)
^{3,4,6} Well established and accepted (§5.2.4)
⁵ Well established and accepted (§5.2.1)

3. The health of metropolitan forests has suffered from storms and droughts of the last two decades and remains fragile in a context of increasing risks. Thus, since the beginning of the 2000s, there has been an increase in tree leaves mortality and deficit, which is particularly pronounced in the south-eastern Mediterranean region¹. An increase in climate change related risks is expected : the projections made vary according to the scenarios and models, but show an increase in droughts affected areas during the growing season². Water stress also raises fears of a greater intensity and extension of fire risks³. In addition, damage from tree pests and diseases often worsens the consequences of weather accidents⁴. The state of health of metropolitan forests therefore requires vigilance.

^{1,2,4} Well established and accepted (§6.4)
³ Well established and accepted (§6.3)

4. Habitat degradation¹ and pollution² remain direct drivers of change. In addition, populations of large wild ungulates (deer, roe deer, wild boar, etc.) are increasing³, which sometimes weakens and compromises the regeneration of certain forests⁴.

¹ Well established and accepted (§6.4)
³ Well established but disputed (§6.4.2)

5. Climate change is already affecting and will longly affect French forests¹. Changes in forest tree species areas are difficult to predict but could lead to a real modification of forest landscapes, as well as to significant changes in the structure and functioning of ecosystems, particularly as a result of changes in practices². A global average increase of 2 ° C since the pre-industrial era could extend the Mediterranean area to the Loire³. The increase and combination of associated natural hazards (droughts, fires, pests and

¹ Well established and accepted (§6.3)
² Well established and accepted (§6.3)
³ Partially established but accepted (§6.3)

Forest ecosystems: key messages

pathogens) could result in a decline in net productivity of forests after several decades of increase⁴.

⁴ Partially established but accepted (§8.1.4)

Ecosystem goods and services, natural heritage

6. The French society benefits from its many forest goods and services. These include many non-market goods and services, the values of which may be much higher than the value of commercial goods¹.

¹ Well established and accepted (§7, 8 and 9)



Maritime pine logs exploited in the Landes de Gascogne (Nouvelle Aquitaine), on the left and Loading of a logging truck after operating a thinning cut in a mountain forest, on the right ©

Jean-Luc Peyron

7. Wood is the main commodity produced in metropolitan forests. Its post-harvest commercial value is estimated at nearly €3 billion in 2014¹. About two thirds of this value correspond to commercialised wood, mostly timber, but with an increase in wood for energy uses, the level of which is in line with that of industrial wood for paper mills and panels². Non commercial wood, mainly firewood, accounts for the remaining third³. Wood, a renewable material when it comes from sustainably managed forests, provides many benefits to the French society, especially when it is recycled and is part of a cascade of uses⁴. It supplies a sector that contributes 0.5% to 0.6% of gross domestic product and provides 230,000 direct jobs⁵, or 0.9% of the active population⁶.

^{1,3} Well established and accepted (§8.1.4)

² Well established and accepted (§8.1.2.2 or 8.1.4)

⁴ Well established and accepted (§7.1.2.2)

^{5,6} Well established and accepted (§8.1.2.2)

8. In French metropolitan forests, timber harvest is significantly lower than biological growth¹. Thus, on average, the available resource continues to grow, offering development opportunities for sustainable logging (including the maintenance of soil fertility²) in part of the territory³. However, this average masks very large disparities according to the regions, species, structure and types of forest properties⁴.

¹ Well established and accepted (§8.1.2 8.1.4 and § 8.1.3.2)

² Well established and accepted (§8.1.2.1)

^{3,4} Well established and accepted (§8.1.2)

9. Beyond wood, the French forest provides a multitude of other goods: game, mushrooms (truffle, cep, etc.), chestnuts, other fruits and berries, honey, herbs, fodder for livestock, cork, decorative objects, etc. At least 77 species are exploited in metropolitan France by the pharmaceutical and cosmetic industries (perfumery, essential oils)¹. Among this multitude of goods taken from forests, only a fraction is commercialised and represents a turnover of several tens of millions of euros per year² while the economic value of non commercialised goods is estimated at several hundred millions of euros a year, but is more difficult to perceive³. Beyond their economic value, these non-timber forest products are also a major stake from a cultural and heritage point of view⁴.

^{1,2} Well established and accepted (§8.3)
³ Well established and accepted (§8.2)
⁴ Well established and accepted (§10.3.3)

10. The French forest and wood products contribute significantly to the fight against global warming¹. In metropolitan France, the forest-wood sector currently represents a "net sink" of carbon estimated at around 130 million tCO_{2eq} / year, or nearly a quarter of French annual emissions². This "net sink" results mainly from the current increase in carbon stock in forest ecosystems, for nearly 100 million tCO_{2eq} / year³. It also includes emissions avoided by the use of wood instead of competing energies and materials that are difficult to evaluate but important to consider and estimated at about 30 million tCO_{2eq} / year⁴. Finally, it takes into account additional carbon sequestration in wood products, currently negligible⁵. The overall consideration of this assessment is important to properly assess the consequences of an increase in wood removal. If such an increase limits the accumulation of carbon in the forest, it can transfer some of it to wood products and in return makes it possible to avoid certain emissions from the industrial and energy sectors in the short term⁶.

¹ Well established and accepted (§7.1)
² Well established and accepted (§7.1.4)
³ Well established and accepted (§7.1.2.1)
⁴ Partially established but accepted (§7.1.2.2)
⁵ Partially established but accepted (§7.1.2.1)
⁶ Well established and accepted (§7.1.4)

11. By their nature and their biophysical functioning, forests intervene on local environmental conditions in many ways (evapotranspiration, albedo, filtering foliage, physical obstacle to horizontal air movements, etc.). Services to human societies are important, in particular the resorption or filtering of particles and pollutants¹, the windbreak effect², the increase in the availability and circulation of water³ and the regulation of temperature (refreshing effect)⁴.

^{1,2,3,4} Well established and accepted (§7.2.2.1)

12. Some forests play a major role in conserving soil and protecting people and assets against natural hazards (avalanches, landslides, falling rocks and floods), especially as their composition, structure and management are adapted to these objectives¹. In the mountain areas, the forests installed on the slopes, some of which are the result of major reforestation projects undertaken since 1860, make it possible to limit soil erosion, superficial landslides, falling rocks, avalanches, torrential floods, thus protecting populations and downstream economic interests². Today, these forests are however weakened and their renewal is not guaranteed³. The forest also plays a protective role on the coast, not only overseas, where the mangrove provides protection against coastal risks, but also in mainland France, where forests contribute to the stabilization of dunes⁴. The economic values of avoided damages and allowed activities by this protection are difficult to quantify, extremely variable according to the situations⁵, and can reach up to several tens of thousands euros per hectare and per year⁶.

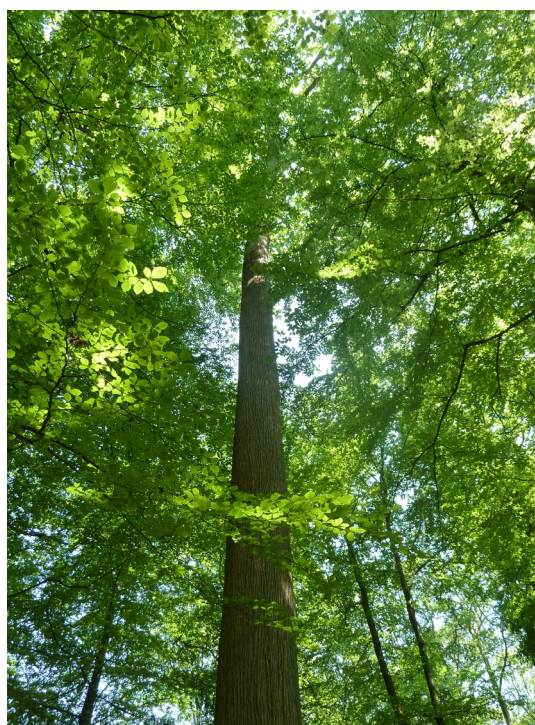
¹ Well established and accepted (§7.3 et 7.6)
² Well established and accepted (§7.3)
³ Partially established but accepted (§7.3.3.2)
⁴ Partiellement établi mais accepté (Box 2.5)
⁵ Well established and accepted (§7.4)
^{6,7} Well established and accepted (§7.3.4)

13. The metropolitan forests interact strongly with the water cycle: they contribute to the global availability of water¹, the regulation of floods² and the mitigation of groundwater and surface water pollution (nitrates, phosphates, pesticides)³. In addition, by limiting soil erosion, especially when species and practices are adapted, forests reduce the turbidity of surface waters⁴. It contributes to the good quality of the bathing waters. It also improves the living environment of the French⁵ while limiting the costs of water treatment and thus the water bill of the households⁶.

¹ Partiellement établi mais accepté (§ 7.2.2.1)

² Partiellement établi mais accepté (§ 7.6)
3,4,5,6

Partiellement établi mais accepté (§ 7.5)



Source of water in Camors State Forest (Bretagne), on the left and Remarkable oak in the Bercé State Forest (Pays de la Loire), on the right © Jean-Luc Peyron

14. The metropolitan forest offers a space of recreation often free and of great value for many French people who seek a natural environment and practice various activities: healing, well-being, naturalistic observation, sports activities, hunting and picking or artistic inspiration. Half of the French declare to go into a forest at least once a month¹. Hunting leases represents a revenue of about €110 million per year for forest owners². For other practices, forests located near populated areas host these recreational activities for free, whether these forests are public or private (with free access for 85% of properties). However, the travel cost method makes it possible to estimate the French total willingness to pay to visit the forest at nearly €10 billion per year³.

¹ Well established and accepted (§ 9.1.2.2)

² Well established and accepted (§ 8.2)

³ Well established and accepted (§ 9.1.4.1)



Hiking in the Ermenonville Forest (Hauts-de-France) © Antonin Vergez

15. Beyond their utilitarian values, the French forests of metropolitan France and overseas territories are a biological, cultural and identity heritage to be transmitted to future generations. Reflecting this heritage value, many forest areas and remarkable species are under specific protections, regulatory or contractual, which can not simply be justified by their utilitarian value¹. 1.7% of the surface in metropolitan France is subject to strong regulatory protections, while the Champagne and Burgundy National Forest Park, dedicated to lowland hardwood forests, is currently acquiring such a protection². In addition, a large part of the surface area in metropolitan France is given special recognition through its inclusion in the European Natura 2000 network, for 25%, and in ecological inventory zoning, for 40%³. In addition, many labels distinguish remarkable forests⁴. More generally, the socio-cultural importance of forest uses (hunting, gathering, etc.), the importance of forests in the collective imagination, the strong attachment expressed by forest owners, show the strong heritage values attached to these areas⁵.

¹ Well established and accepted (§ 10.2)

² Well established but disputed (§ 10.2)

³ Well established and accepted (§ 10.2.3 et 10.3.1)

⁴ Well established and accepted (§ 10.3)

⁵ Well established and accepted (§ 10.4.3)

Knowledge and data gaps

16. Monitoring and existing knowledge remain incomplete. Inventories and monitoring of metropolitan forests remain mainly restricted to trees, hunted ungulate mammals and birds in metropolitan France (i) and do not cover ultramarine forests(ii), certain species fulfilling a major functional role (fungi, mosses, lichens, arthropods, forest soil biodiversity, carnivore guild, herbivore guild, etc.), (iii) old-growth forests and some remarkable habitats such as old-growth stands, (iv) intermediate formations (groves, heaths, wastelands), forest edges¹. Finally, the evaluation of many essential regulatory services and their national mapping require a substantial research and modeling effort, which is essential to take them into account in decision making².

^{1,2} Well established and accepted (§ 12.3)

Stakeholder comments

Comment of the *Office national des forêts* (ONF) on message 4 :

« The increase in large ungulate populations has been considerable for several decades. It is proven and such an evolution, whatever the consequences and whatever we think, must be underlined.

Article L425-4 of the Environment Code states that "The agro-sylvo-cynegetic balance consists in making compatible, on the one hand, the sustainable presence of a rich and varied wild fauna and, on the other hand, the sustainability and economic profitability of agricultural and forestry activities. [...] The sylvo-cynegetic balance tends to allow the regeneration of forest stands under satisfactory economic conditions for the owner [...] ". The key message on this topic should refer to this definition.

In this respect, situations of imbalance between the level of populations of large ungulates and the objectives of sustainable forest management, including the economic valuation of goods and services, are not marginal, as the current key message suggests. During the relocation of hunting leases in the state forest in 2015, a contradictory notation of the state of the balance between the forest and the large fauna was carried out with regard to the regeneration of the forest stands. The equilibrium is thus degraded or compromised on 34% of the surfaces of state forests, with a much higher prevalence in the large north-east quarter. This situation, representative of French forests, can not be ignored or minimized in key messages. »

Office national des forêts

Comment of the *Centre national de la propriété forestière* (CNPFF) on message 4 :

« As seen in session, I insist on the importance to share in the key messages of the sylvo-cynegetic balance, whose definition is in the Environment Code. Not mentioning it does not reflect the reality of forestry problems, which are also included in the Forest and Wood National Program, which emphasizes this current imbalance in metropolitan forests.

We have the recent national figures produced by the ONF in their *Asset report on State Forests* saying: "34% of the surfaces of state forests have an unsatisfactory forest-game balance, especially in productive areas." Established within the framework of hunting and forestry contracts, these data have been validated by hunters locally. The qualification of balance was made for each lot and included in the contract signed by both parties (ONF and hunter).

It is true that this data is not in the Gip Ecofor reference document due to the recent publication of the report. However, it is the only reliable and shared data that is available at the national level on the state of sylvo-cynegetic balance. »

Centre National de la Propriété Forestière

Comment of *Fédération Fransylva* on messages 4 and 15 :

« Without questioning the report produced by the Gip Ecofor, now used as the only reference document that can be used to write key messages for decision-makers on the evaluation of French forest ecosystems and their services, we wish to express the fact that this report has omitted (and we assume some of the responsibility as we were involved in writing it) important topics related to this evaluation. I will mention only two: the subject of the fauna of large animals and that concerning management documents.

To return to our remark concerning [message 4], we express a very strong disagreement on this message, especially since during the discussion we agreed to supplement it with an insertion on this subject in another message and that this was not done.

We consider that the increase in the populations of large ungulates is truly considerable (ONCFS scientific data on the hunting plans allocated and on the location of presence of these animals on the metropolitan territory and on the simultaneous presence on the same territory of more than one but of three or four of these species, report of the Galliformes Observatory (GMO) on the possible causes of regression of these animals, establishment of enclosures for the observation and monitoring of botanical diversity).

This increase has consequences not only for productive forests disrupting the production of quality timber, which seems to be of no importance in the key messages to decision-makers in the EFSE assessment of French forest ecosystems, but also on botanical and faunistic diversity through the disappearance of animal species and vegetal species that may be potential habitats for biodiversity.

As a reminder for decision makers, I will mention the article 425-4 of the Environmental Code, which specifies the sylvo-cynegetic balance. It seems that the key message of this topic should at least mention it.

In the message 13 the mention at the National Forest Park of Champagne and Burgundy seems incongruous in a message to decision makers as this park does not have a formal reality in administrative terms. We therefore express a strong reservation about mentioning this territory in a similar way to the forest areas that are already subject to strong regulatory protections. »

Fédération Fransylva



The EFESÉ is a program and a science-policy-society platform led by the Ministry for an Ecological and solidarity transition. It aims at revealing the multiple values of biodiversity in order to facilitate their

integration in public policies and private decisions in France. The program builds on a shared conceptual framework and a national governance that brings together experts, policy makers and stakeholders. After a first phase ending with the publication of six broad assessments covering French ecosystems, EFESÉ is starting a second phase whose operational and strategic character will be reinforced in order to develop the tools required to foster the ecological transition of the French society.

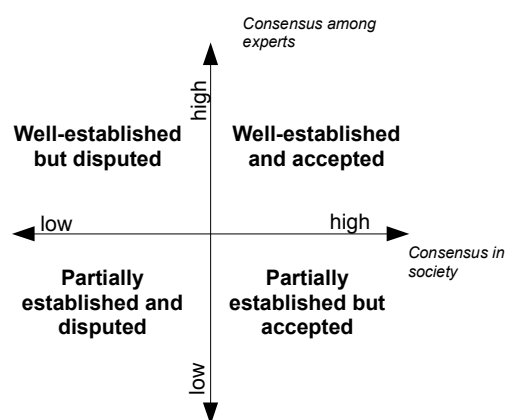
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The key messages for decision makers

The key messages for decision-makers are co-written by the EFESÉ project team of the Ministry for an Ecological and solidarity transition and by the authors of the studies. In order to enhance their scientific credibility and their legitimacy in the eyes of decision-makers, they are subject to scientific advice and stakeholder approval.

Every assertion composing these messages is qualified on two dimensions. The **scientific consensus**, first, is informed on two levels. It is proposed by the authors of the study and submitted to an arbitration by the EFESÉ Scientific and technical advisory board. The **societal consensus**, on the other hand, is informed on two levels. Unless opposition is expressed, the level of consensus is considered high. It is degraded as soon as a stakeholder disputes the assertion and makes the reasons for its disagreement explicit. This gives rise to the four qualifications which are presented opposite and indicated in the margin of the messages.



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