

Spanish Standard

UNE 162002

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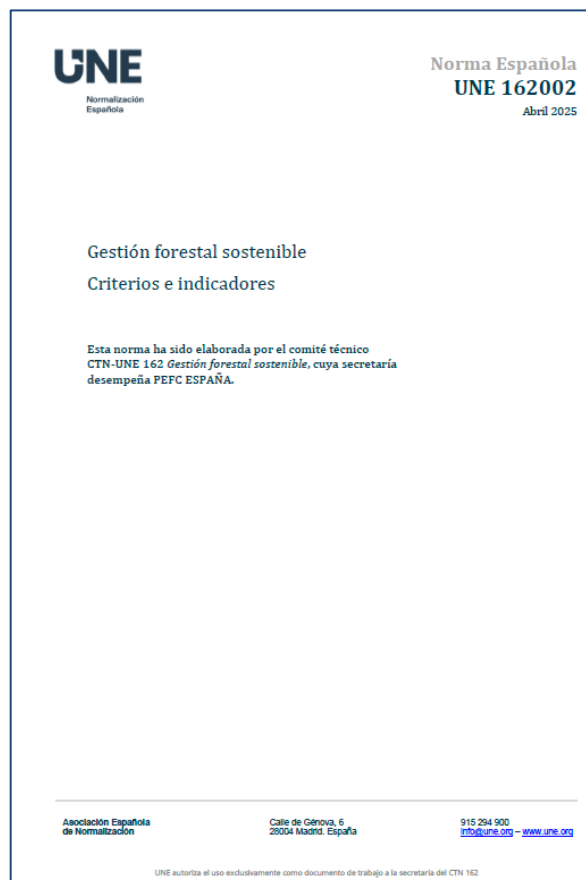
Sustainable Forest Management

Criteria and Indicators

This standard has been developed by the technical committee CTN-UNE 162 *Sustainable Forest Management*, with PEFC Spain serving as the secretariat.

This standard repeals and replaces the Standard UNE 162002:2023. The next revision will take place before May 2030.

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INDEX

0 Introduction	3
1 Scope and Field of Application	3
2 Reference Standards.....	4
3 Definitions	4
4 Criteria	8
5 Indicators	8
6 Bibliography.....	22

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0 Introduction

Since the development of the first pan-European indicators of sustainable forest management in the early 90s, experience has shown the importance of criteria and their respective indicators as tools for the development and implementation of forestry policies in European Union countries.

Sustainable forest management integrates the protection of forests and forest land ecosystems' long-term capacity to maintain and enhance their stability, vitality, resilience, and regenerative ability, adaptation and mitigation, as well as their potential to provide multiple goods and services, while fulfilling significant ecological, economic, and social functions.

Through various indicators, this standard aims to be a tool that provides an integrated view of the multifunctionality of forest lands and the benefits they offer society, with holistic approaches that include combating climate change, biodiversity, desertification, water, plant health, and the social and labor aspects of forest lands and forestry, enhancing synergies with other sectors such as energy, agriculture, rural development, construction, etc.

This revision of the standard, carried out between 2020 and 2021-2023, focuses on incorporating new features, aspects, and terminology that have been integrated and established in the forestry sector and among society, emphasizing a sustainable forest management standard that effectively contributes to sustainable development, ensuring resilient and multifunctional forest lands that provide numerous planned goods and services to society, including population retention in rural settings.

The standard aims to help increase work on adapting forests and forestry to climate change to prevent and mitigate the damages caused by changing conditions at local and regional scales, ensuring all forest functions.

Additionally, through effective communication, the standard shall contribute to improving the understanding and recognition of the economic, social, and environmental benefits derived from forests by society, emphasizing the contribution of sustainable forest management to recovery and transformation towards a green economy.

1 Scope and Field of Application

This standard aims to adopt Pan-European Criteria and adjust their indicators for application in sustainable forest management of Spanish forest land, and to incorporate other national and international regulations, guidelines, and substantive processes related to Spanish forests and their sustainable management, among others the Sustainable Development Goals 2030.

This standard covers actions or missions that are the responsibility of the manager, excluding those due to force majeure, catastrophes, or legal impositions.

2 Reference Standards

The documents listed below, in whole or in part, are indispensable reference standards for the application of this document. For dated references, only the cited edition applies. For undated references, the latest edition applies (including any amendments).

UNE 162001, Sustainable Forest Management. *Vocabulary, Terminology, and Definitions*.

3 Definitions

For the purposes of this document, the terms and definitions included in the UNE 162001 Standard apply, in addition to the following:

3.1 hunting activity:

Set of actions related to hunting that constitute another economic activity of the forest lands; these actions go beyond the purely forestry domain, unfolding across vast rural areas.

3.2 planted forest

Forest predominantly composed of trees established through planting and/or deliberate seeding, provided that the planted or seeded trees are expected to constitute more than 50% of the growing stock at maturity; it includes coppice from trees that were originally planted or seeded.

3.3 climate change:

Variation in climate directly or indirectly attributed to human activity that alters the global atmospheric composition, in addition to the natural climate variability observed over comparable time periods.

3.4 carrying capacity:

Number (or weight) of organisms of a particular species or quality that can survive in an ecosystem without deteriorating it, under the least favorable conditions presented over a defined period.

3.5 criterion:

Category of condition or process by which sustainable forest management can be assessed.

3.6 sustainable development:

Meeting the needs of people without jeopardizing the ability of future generations to do the same.

3.7 forestry guidelines:

Set of guidelines, recommendations, silvicultural models, instructions, or standards for sustainable forest management at a scale higher than the management unit. These may address aspects related to the silviculture of forest species and others, such as health, conservation of biological diversity, exploitation, etc.

3.8 biological diversity:

The total specific, taxonomic, or genetic richness contained within the management unit. It encompasses intra-specific, inter-specific, and ecosystem diversity.

3.9 protected area:

Area legally declared as such.

3.10 significant species:

Species present in the management unit that stands out due to its abundance, rarity, or because it is endemic, or because it is listed in catalogs of threatened or protected species.

3.11 afforestation:

Repopulation, through seeding or planting, of land that was agricultural or dedicated to other non-forestry uses.

3.12 information source:

Baseline data utilized by the forest manager for document preparation.

3.13 extensive livestock farming:

Management system of a livestock farm that uses tooth exploitation of pastures derived from meadows, grasslands, herbs, shrubs, and stubble; whether owned, foreign, or communal, permanently or temporarily, with livestock primarily outdoors, and that does not substantially force either the feed or the reproductive regime of the animals.

NOTE: Extensiveness is a relative concept that depends, among other things, on the carrying capacity of the environment and the period the livestock spends outdoors.

3.14 sustainable forest management:

The organization, administration, and use of forest lands in a manner and intensity that allows maintaining their biodiversity, productivity, vitality, potentiality, and regenerative capacity to meet now and in the future the relevant ecological, economic, and social functions at the local, national, and global levels, without causing harm to other ecosystems (Ministerial Conference Helsinki, 1993 and Forest Law 43/2003, of November 21, on Forests, article 6).

3.15 integrated pest and disease management:

Careful consideration of all available techniques to combat pests and diseases, followed by the integration of appropriate measures that decrease their development and maintain the use of pesticides and phytosanitary products and other interventions at economically justified levels, minimizing risks to human health, animal health, or the environment.

3.16 Forest manager:

Natural or legal person, individually or through shared or coordinated management, responsible for resource management operations.

3.17 unique habitat:

Forest land area of ecological importance that:

- a) contains protected, rare, sensitive, or representative forest land ecosystems;
- b) contains significant concentrations of endemic species and habitats of threatened species, as listed in reference lists;
- c) contains in situ threatened or protected genetic resources;
- d) contributes to the creation of significant landscapes globally, regionally, and nationally with

a natural distribution and abundance of native species.

3.18 indicator:

A quantitative, descriptive, or mixed parameter that, when monitored periodically, indicates the direction of change.

NOTE: An indicator objectively and unambiguously describes the content of the criterion and can be obtained directly or indirectly from existing information.

3.19 forest inventory:

Recognition to determine quantitative and/or qualitative forestry variables in a given area, among other things, for forestry planning purposes.

3.20 log wood:

Felled and delimbed wood separated at the crown, unprocessed, whether cut into sections or not.

3.21 degraded forest land:

Forest land with a significant long-term reduction in its potential to provide benefits, including carbon storage, forest products, biodiversity, and other ecosystem goods and services.

3.22 natural Forest Land:

An area that exhibits a natural dynamic in terms of species composition, presence of dead trees, age class structure, and regeneration processes. It also covers a sufficiently large area to maintain its natural characteristics, and where no significant human intervention is known, or if there was, it was long enough ago to allow the natural composition of species and processes to be restored.

3.23 protective Forest Land:

Forest land designated as such according to current legislation.

3.24 semi-natural Forest Land:

Forest formations that are neither natural forest land nor plantations, in addition to cases of planted forests in the process of naturalization due to their lack of intensive management.

3.25 forest land:

Any land on which tree, shrub, scrub, or herbaceous species grow, either spontaneously or resulting from seeding or planting, fulfilling or potentially fulfilling environmental, protective, productive, cultural, scenic, or recreational functions in accordance with the exceptions and casuistries established by current state and regional legislation.

3.26 landscape:

Any part of the territory as perceived by the population, whose character results from the interaction of natural and/or human factors.

3.27 management plan:

Document or set of documents that individually or collectively establish forest management for a management unit or group of management units over which the manager(s) has control.

3.28 plantation forest:

Planted forest that is intensively managed and meets, at planting and stand maturity, all the following criteria: one or two species, even age class, and regular spacing. It includes short rotation plantations for wood, fibre and energy, and excludes forests planted for protection or ecosystem restoration, as well as forests established through planting or seeding which at stand maturity resemble or will resemble naturally regenerating forests.

3.29 forest roads:

Forest land's specific road infrastructure designed specifically to serve it through non-specific forestry vehicles (cars, trucks, etc.) whose layout has been the subject of a prior study, executed according to it, typically requiring earth movement and periodic maintenance by the forest land owner.

NOTE: This definition excludes logging roads made for timber extraction by vehicles specifically designed for this task (skyder, loader) and temporary access points resulting from the ease of access to certain terrains (ruts, vices paths, etc.).

3.30 non-timber Forest Products: Physical and tangible goods, biologically sourced and other than wood, obtained from forest lands.

3.31 road network: All those communication infrastructures usable by motorized four-wheel vehicles (cars, trucks, etc.) that serve the management unit, open to the public, and can be used by its owner: roads (national, regional, provincial, etc.), paths (neighborhood, rural, municipal, etc.).

NOTE: Those intended for use by pedestrians, cyclists, etc., whose primary purpose is recreational, are not included.

3.32 reforestation:

Reintroduction of forest species, by seeding or planting, on lands that were previously forested until recent times but were cleared due to logging, fires, storms, pests, diseases, or other reasons.

3.33 non-forestry waste:

Remnants of products or materials left after their use or application in the forest land and that were used during forestry processes and activities.

NOTE: Properly forestry wastes, such as those resulting from thinning, clearings, prunings, felling, etc., are not included in this category.

3.34 ecosystem services:

Benefits obtained from ecosystems. These include provisioning services, such as food, water, wood, and other forest products; regulating services affecting the climate, floods, diseases, waste, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services, like soil formation, photosynthesis, and nutrient cycling.

3.35 cork stripping surface:

Surface that, on a cork oak trunk and branches, is exposed after stripping.

NOTE: It is individually limited by setting a cork coefficient or stripping intensity in advance.

3.36 regeneration area:

Area designated for regeneration in the management plan.

3.37 growth rate:

Measure of the variation in dendrometric values, such as height, diameter, volume, etc., over a specific period.

3.38 management unit:

An area subject to sustainable forest management, required to meet the indicators outlined in UNE 162002 Standard, either at its own level or at a higher level encompassing it.

3.39 multiple use; multifunctionality:

Intrinsic characteristic of forest systems to simultaneously provide different ecosystem services: provisioning, regulating, cultural and supporting.

4 Criteria:

The six PanEuropean Criteria are:

CRITERION 1: Appropriate maintenance or enhancement of forest resources and their contribution to the Global Carbon Cycle.

CRITERION 2: Maintenance or enhancement of the health and vitality of forest land ecosystems.

Criterion 3: Maintenance and enhancement of the productive functions of forest lands (wood and other forest products).

Criterion 4: Appropriate maintenance, conservation, and enhancement of biodiversity in forest land ecosystems.

Criterion 5: Appropriate maintenance or enhancement of the protective function in forest land management (primarily soil and water).

CRITERION 6: Appropriate maintenance or enhancement of other socio-economic functions and conditions.

5 Indicators:

The criteria are expanded into indicators that can be quantitative (Q), descriptive (D), or mixed (M).

CRITERION 1: Appropriate maintenance or enhancement of forest resources and their contribution to the Global Carbon Cycle.

1.1 Indicator: Area (Q)

Justification: Description of the management unit and monitoring of changes.

Objective/Goal: Maintain or increase forest land area, especially wooded areas, except for reductions due to forest land defense actions (e.g., fires), adaptations to current legislation, or other efforts aimed at enhancing its multifunctionality.

Parameters:

- Total forest land area, both wooded and non-wooded;
- Area per species or vegetation formations.

Information Sources: Inventories, cartography (forest maps, regional crop and utilization maps, etc.), aerial photos, satellite images, LIDAR data, land registries, national forest inventories, forestry statistics, agricultural census, catalogues.

1.2 Indicator: Timber or cork stock (M)

Rationale: Estimating timber or cork stock as one of the primary characterizing elements and indicators to measure management quality and sustainability.

Objective/Goal: Achieve stock levels in line with management objectives and regional forestry guidelines, if any.

Parameter: Stock or cork stripping area.

Information Sources: Regional forestry guidelines, reference figures (cubing tables, production tables, local empirical data, etc.), inventories.

1.3 Indicator: Forest Stand Structure (M)

Rationale: Description of the wooded area encompassing the management unit and the structure of the existing stands (age classes, diameter classes, stand forms, or others).

Objective/Goal: Adjust the structure to the management objectives.

Parameter: Wooded area by structure type.

Information Sources: Inventories, cartography, national forest inventory, forestry statistics, forest map.

1.4 Indicator: Carbon Sequestration (C)

Rationale: Forest lands and their products are known for their carbon sequestration capabilities, making them essential tools for climate change mitigation and adaptation. Forest management aimed at producing long-life cycle products or substitutes for more polluting products multiplies this effect.

Objective/Goal: Maintain or enhance the mid and long-term sink effect of forest lands and their woody products.

Parameter: Estimated carbon sequestered in above-ground tree biomass, at least for the main species.

Information Sources: The management plan itself and related indicators. National forest inventory, forestry statistics, research, specialized literature.

1.5 Indicator: Forestry Legislation (D)

Rationale: Sustainable forest management requires a legal framework that, among other things, defines the rights and obligations of forest land owners and other users and sets conservation and defense standards for forest heritage.

Objective/Goal: Accessibility to current forestry legal framework and alignment of forest management with it.

Parameter: Existence of a mechanism to be informed about applicable legal requirements in forestry.

Information Sources: Forestry and complementary legislation, international agreements, and relevant web pages.

1.6 Indicator: Forestry Information (D)

Rationale: The growing complexity of forestry demands and their temporal and spatial scope necessitate transparent, accessible, and efficient information systems, significant research activity, and effective participation mechanisms.

Objective/Goal: Availability of information sources (internal information, inventories, statistics, R&D, etc.) and the presence of participation mechanisms.

Parameters: Existence of a mechanism for accessing available information, such as:

- Forest inventories;
- Forestry statistics (harvests, damages, reforestations, investments, etc.);
- Forestry R&D;
- Participation forums;
- General or sectoral studies.

Information Sources: Regional entity information, forest inventories, forestry statistics, forestry legislation, relevant web pages.

CRITERION 2: Maintenance or improvement of the health and vitality of forest ecosystems.

2.1 Indicator: Deposition of Atmospheric Pollutants (Applicable at the national level only)

Rationale: The deposition of atmospheric pollutants, such as nitrogen, sulfur dioxide, ozone, or other heavy metals, poses a threat to the forest land ecosystem, either directly or through soil acidification or eutrophication. Atmospheric pollution can lead to reduced resilience of forests against external factors like drought or forest pests.

Objective/Goal: Understand the influence and evolution that the deposition of atmospheric pollutants may have on forest land area, particularly on the health and vitality of forest ecosystems.

Parameter: Quantification (Kg/ha) of the annual deposition of primary atmospheric pollutants: ammonia, chlorine, ozone, nitrogen oxides, and sulfur oxides.

Information Sources: European Forest Damage Inventory (ICP Forests), Level II Network, other Environmental Information Networks of the Autonomous Communities.

2.2 Indicator: Soil Nutritional Status (D)

Not developed, integrated into 2.3 and 2.4.

2.3 Indicator: Forest Canopy Condition (M)

Rationale: Biotic, abiotic, and anthropogenic damages¹ to the forest system can be crucial for the stability and growth of the stand. Understanding these is essential for high-quality management.

Objective/Goal: Understand the health status of the forest canopy through monitoring, with special attention to key biotic, abiotic, and anthropogenic factors that impact the health and vitality of forest ecosystems, in order to act accordingly.

Parameter: Identification and extent of damages, their causative agents, and incidence level.

Information Sources: National forest inventory, forestry statistics, health status monitoring networks, pest/disease registry, stand health sample/inventory, laboratory analysis, other custom documents defined by the manager.

2.4 Indicator: Preventive and Remedial Measures for Forest Damages (D)

Rationale: Forest management shall incorporate timely measures (preventive, corrective, or palliative) in its planning and execution to minimize degradation of forest land ecosystems caused by biotic, abiotic, and anthropogenic agents. Proper management practices, utilizing natural structures and processes, and correct execution of forestry operations (for example,

avoiding spills of polluting substances such as oils or fuels, promoting the reduction of greenhouse gas emissions and properly managing non-organic waste) enhance forest vitality and resilience, minimizing potential damages. Proper soil nutrient management must be carried out to maintain balance and promote ecosystem health. In cases where fertilizers are used, their application must be controlled. The misuse of chemicals or inappropriate silvicultural practices influencing water quality degradation shall be avoided. Degraded/damaged forest land ecosystems shall be rehabilitated, prioritizing comprehensive management using appropriate silvicultural techniques and biological measures.

¹ **Biotic agents** include, among others: pests, diseases, game species, and extensive livestock. **Abiotic agents** encompass elements such as: fire, storms, wind, snow, drought, land movement, and avalanches. **Anthropogenic damages** include, but are not limited to, damages originating from forest land exploitation and operations, the development of extensive livestock and hunting activities, damages caused by intensive tourism and recreational activities, including soil nutrient deficiencies due to intensive management, and the handling of non-forest waste.

Objective/Goal: Integrate measures into forest management to minimize ecosystem degradation and damage risks, including integrated pest and disease management, in accordance with general recommendations or guidelines on forest health, where available. Establish measures to control the pressure of animal populations on forest regeneration and growth, as well as on biodiversity. Prioritize biological measures, minimizing the use of fertilizers and pesticides. If necessary, they shall be applied by trained and properly equipped personnel, following manufacturer's guidelines and current regulations. Promote practices that positively contribute to combating climate change, as well as the efficient resource use and the collection, storage, and disposal of non-organic waste and litter.

Parameter:

- Existence of preventive and corrective measures, if necessary, and their description.
- Procedure for emergency actions in the event of spills and discharges of polluting substances.
- Description of techniques and/or fertilizers/phytosanitary products used by the manager (dosage, composition, application period).

Information Sources: Damage-affected area sampling/inventory, pest/disease registry, current forestry legislation, forest management plan, Sustainable Forest Management specifications. For fertilizer/phytosanitary treatments: current regulations, bibliography, treatments carried out by official bodies, product safety data sheets, manufacturer recommendations. Forestry works: logging permits, forestry best practices.

2.5 Indicator: Prevention and Defense Against Forest Fires (D)

Rationale: Forest fires are one of the most significant threats to the forest land ecosystem. Among the variables affecting fire risk are the type and amount of biomass accumulated as fuel, including residues from harvests and operations, their characteristics, and structure. In regions where fire is a management tool for regeneration or forest fire protection, adequate control measures shall be taken.

Objective/Goal: Control fire risk through fire prevention and defense measures.

Parameter: Existence and application of fire prevention and defense measures. If fire is used as a management tool, existence of established management and control measures.

Information Sources: Current legislation, cartography, management plan, forest fire defense plan, infrastructure inventory (tracks, water points, etc.), forest inventories, specifications.

2.6 Indicator: Hunting Activity and Extensive Livestock Farming (Applicable only if the forest manager is responsible for these activities) (M)

Rationale: Hunting activity and extensive livestock farming can be decisive for the stability of faunistic biodiversity and the persistence of endangered species. It also complements the forest land's income. Proper grazing management aims for fire prevention, maintaining the productive utilization over time, thus promoting natural soil fertility and the conservation and enhancement of biodiversity, always preventing signs of erosion, contamination, or overgrazing.

Objective/Goal: Maintain hunting and livestock activities compatible with ecosystem stability. Control animal population pressure on growth, regeneration, and biodiversity.

Parameters:

- Animal population inventory or census;
- Existence of current hunting or livestock planning, if any;
- Evaluation of the load's suitability for the territory;
- Monitoring of animal health;
- Existence of livestock/pasture management/control measures (rotational, deferred, temporary fencing, etc.)

Information Sources: Technical hunting plans, livestock censuses, vegetation observation (status and indicator plants), current animal health legislation.

2.7 Indicator: Pest and Disease Control Techniques (M)

Not developed, integrated into indicators 2.3 and 2.4.

CRITERION 3: Maintenance and enhancement of the productive functions of the forest lands (timber and other forest products).

3.1 Indicator: Timber Growth and Harvests (C)

Rationale: Monitoring and assessing timber growth in relation to executed harvests provides valuable insight into the features of the forest management within the management unit.

Objective/Goal: Monitor and evaluate the overall production in both qualitative and quantitative terms and its long-term correlation with its growth. Align the harvest level with the growth rate or biological production, duly justifying exceptions.

Parameters:

- Timber and/or firewood production: units;
- Relationship between timber harvest and growth or harvest-to-biological production ratio;
- Quantity of marketed timber products (timber and/or firewood).

Information Sources: Management plan. Other related indicators. Forest statistics and forest inventories.

3.2 Indicator: Roundwood (C)

Not developed, integrated into 3.1.

3.3 Indicator: Non-Timber Forest Products (C)

Rationale: Non-timber forest products, marketed by the owner or manager, diversify the revenues of the management unit and contribute to sustainable forest management.

Objective/Goal: Monitor and assess non-timber forest products marketed by the owner or manager in quantitative terms.

Parameters:

– Quantification of the units or value of the non-timber forest products marketed by the manager, and if an initial estimate exists, calculate its proportion relative to that.

Information Sources: Management plan, surveys and/or sectoral information sources. Forestry statistics. Permits, authorizations, leases.

3.4 Indicator: Services (C)

Rationale: Valuation and marketing of services by the owner or manager can diversify the revenues of the management unit and access new markets.

Objective/Goal: Monitor and evaluate services marketed within the management unit.

Parameter: Services marketed by the owner or manager, units or value.

Information Sources: Management plan. Surveys and/or sectoral information sources. Forestry statistics, literature.

3.5 Indicator: Management Plan (D)

Rationale: Sustainable forest management shall be executed in a planned, orderly, and technical manner to ensure ecosystem services. Proper sustainable management of the management unit is the basic element to ensure its persistence and maintain and optimize its long-term functions.

Objective/Goal: Have an active management plan that helps maintain or enhance the economic, ecological, cultural, and social values of forest resources.

Parameter: Existence of a current management plan, approved, validated, or authorized by the competent forestry administration or endorsed by a professional forestry college.

Information Sources: PORF (Regional Forest Operational Plan) and other planning documents.

3.6 Indicator: Road Network (M)

Rationale: An appropriate road infrastructure is essential for achieving management objectives, uses, and forest land defense. Such a network can consist of public-use infrastructures that service it and the forest roads within the forest land itself.

Objective/Goal: Have a suitable road network (density, condition, etc.) serving the management unit based on uses, harvesting activities, protection needs, etc. The construction of access routes and other infrastructures shall be planned, established, and maintained in a way that minimizes negative environmental impacts, such as potential erosion and soil input to water channels, having the right drainage systems in place in such cases, as well as to impact on the biological cycles and migratory patterns of listed fauna and other species that may be essential for maintaining ecosystem balance.

Parameter: Assessment of the appropriateness of the existing road network, with special focus on forest tracks and their drainage systems.

Information Sources: Mapping, inventories, aerial photographs.

CRITERION 4: Maintenance, conservation, and appropriate enhancement of biodiversity within forest ecosystems.

4.1 Indicator: Biodiversity (D)

Rationale: Biodiversity is directly correlated with the type and characteristics of the vegetation and fauna present, and the primary function of the management unit is characterized, among other aspects, by species variety. Forest management shall contribute to the maintenance, conservation, or enhancement of biodiversity at the landscape, ecosystem, species, and genetic levels.

Objective/Goal: Conservation or qualitative enhancement of biodiversity, both in horizontal and vertical structures, in line with the purpose of the management unit.

Parameters:

- Forest habitats/vegetation formations of ecological significance or importance within the management unit (relation or quantification);
- List of the most significant species (plants and fauna found within the management unit).

Data Sources: Cartography, literature, inventory (species and frequency), national habitat inventory, catalog of endangered species, forest map.

4.2 Indicator: Regeneration (D)

Rationale: Among the variables influencing the biodiversity of forest stands is the type of regeneration employed. The most appropriate regeneration method for each situation shall be reflected. Natural regeneration, when suitable, shall be prioritized. In afforestation and reforestation, efforts shall be made to contribute to the improvement and restoration of ecological connectivity.

Objective/Goal: Use the type of regeneration most suitable for the environment, the forest species involved, and the management goals, taking into account higher-level planning instruments or regional guidelines, if available. Ensure the quality and viability of the regeneration. For reforestation and afforestation with native species, provenances that are well adapted to local conditions shall be prioritized.

Parameter: Relation and description of areas undergoing natural and artificial regeneration.

Information Sources: Forestry statistics, literature (monographs on provenance regions, etc.), regional forest guidelines, inventory of regeneration areas (quantitative and qualitative).

4.3 Indicator: Degree of Naturalness (C)

Rationale: Non-intensive management is closer to natural dynamics and processes than intensive management. Abandoning a forest land area can lead to forest land ecosystem degradation and increased risks to its conservation.

Objective/Goal: Maintain or increase the area of natural and semi-natural forest spaces within the management unit.

Parameters: Quantification of natural and semi-natural forest spaces within the management unit.

Information Sources: Management unit history (knowledge of previous actions), inventory, and forest map.

4.4 Indicator: Conservation of Unique Habitats (D)

Rationale: The specific ecological characteristics of certain forest biotopes (high diversity, special vulnerability, representativeness, presence of endemic, rare, protected or endangered species, genetic reserves, etc.) make them unique habitats either at the management unit level or above, prompting their conservation, whether or not specific legislation dictates it.

Objective/Goal: Maintain the unique habitats existing within the forest management unit.

Parameter:

- Identification in the management plan and cartographic record of unique habitats;
- Existence of measures within the management unit aimed at conserving unique habitats.

Information Sources: Aerial photographs, cartography, literature, current legislation, national habitat inventory, sampling, and inventory.

4.5 Indicator: Deadwood (M)

Rationale: The presence of standing or fallen deadwood in the forest land can contribute to increased biodiversity. However, excessive presence can promote fires or pests or pose a risk of falling branches or trees in frequently visited forests, factors that might necessitate its removal.

Objective/Goal: Presence of deadwood in appropriate quantity, dimensions, and distribution, in line with guidelines and scientific advancements, except in justified exceptions such as fires, pests, or specific forest uses.

Parameters:

- Consideration in the management plan for the need for deadwood presence in mature and natural areas of the forest;
- In management units or areas where the need to maintain deadwood has been established: estimate the number, percentage over existing units or area, and if possible, state (standing/fallen) and alignment with the objectives of the management plan.

Data Sources: Guidelines, scientific advancements, national forestry inventory, inventory, specifications, literature.

4.6 Indicator: Forest Reproductive Material (M)

Rationale: The conservation and sustainable use of genetic resources shall be considered in forest stand management to contribute to maintaining forest genetic diversity and obtaining more resilient forest stands. The reproductive forest material directly affects forest genetic diversity, so its use shall be controlled, including its external quality.

Objective/Goal: Select the forest reproductive material in line with management objectives, aiming for stability, vitality, and recovery capacity of the forests against adverse environmental factors.

Parameter: Origin of the reproductive forest material used in reforestations or artificial regeneration.

Data Sources: Technical standards for the use of reproductive material, regions of origin, national catalog of basic material, strategy for the conservation and sustainable use of forest genetic resources, guides or catalogs of substitute species compatible with various uses, including agroforestry use.

4.7 Indicator: Forest Landscape (D)

Not developed, integrated into 6.11.

4.8 Indicator: Threatened Forest Species (D)

Rationale: Threatened species that inhabit or depend on the forest land shall be identified and subject to conservation measures. The presence of species classified as threatened within the management unit shall be considered in forest management. Forest management plans must be compatible with the conservation plans of threatened species.

Objective/Goal: Identify and conserve the threatened species within the management unit.

Parameter:

- Record of threatened species present within the management unit;
- Alignment with the conditions specified in the conservation plans for threatened species and the regulations to the management described in the management plans.

Information Sources: Conservation plans for threatened species, catalog of threatened species, literature, protected species legislation, inventory, specifications.

4.9 Indicator: Protected Forest Areas (D)

Rationale: Sustainable forest management in forest lands included in protected areas shall be conducted in accordance with applicable regulations and the area's management objectives.

Objective/Goal: Manage the forest land in accordance with the regulations and objectives of the protected area.

Parameter:

- Identification and cartographic record of protected areas within the management unit;
- Management alignment with the regulations and objectives of protected areas, including PORN (Master Plans for Use and Management), PRUG (Natural Resources Management Plans),

and similar instruments.

Information Sources: Regulations for protected natural areas, cartography of protected areas, specifications for forestry work, management plans for Natura 2000 network.

CRITERION 5: Maintenance or appropriate enhancement of the protective function in forest land management (primarily soil and water).

5.1 Indicator: Protective functions of forests: soil, water, and other ecosystem functions (D)

Rationale: Forest management planning must consider maintaining or enhancing the protective functions of forests related to soil (erosion control and prevention of soil property deterioration) and water (hydrological cycle regulation, stabilization of watercourses, protection of riverbanks, defense against floods, provision of water resources, and maintenance of the quality of surface and groundwater). Additionally, it shall consider other regular ecosystem services.

Objective/Goal: Maintain or enhance the protective role of forests, adopting preventive, mitigative, or corrective measures for potential soil, water, and other ecosystem degradation processes and their medium and long-term effects.

Parameters:

- Identification of potentially sensitive areas;
- Existence of preventive measures and, if sensitive areas are present, corrective measures adopted.

Data Sources: Cartography, inventory, literature, record of areas affected by erosion, national forest inventory, national soil erosion inventory, forestry statistics, aerial photography, specifications or forestry work contracts, regional guidelines, other specific documents defined by the manager.

5.2 Indicator: Forests protecting infrastructures (M) applicable to officially designated areas

Rationale: Planning of forest management in protection forests or analogous due to infrastructural reasons must align with this function and promote stability and regeneration, avoiding actions that endanger it.

Objective/Goal: Adapt forest management to the forest's protective function.

Parameters:

- Quantification in area of zones designated as infrastructure protective;
- Existence of preventive or corrective measures implemented.

Data Sources: Declaration of protective forest, record of protective forest, catalog of public utility forests, cartography, aerial photography, forest statistics and national forest inventory, watershed hydrological plans.

CRITERION 6: Maintenance or appropriate enhancement of other functions and socio-economic conditions.

6.1 Forest Property (M)

Rationale: Recognizing and respecting the legal and traditional rights of property and land tenure is key for sustainable forest territory management. It's also a significant social indicator, especially for sustainable rural area development.

Objective/Goal: Understand the number of forest properties and the typology of the property.

Parameter: Typology² of the property based on property categories and sizes.

Information Sources: Property registry, land registry, SIGPAC, private agreements.

6.2 Contribution of the forestry sector to GDP (Only applicable at the national level)

Rationale: The contribution of forestry activity, encompassing silviculture and forestry, along with the forestry industry, which includes the manufacturing of wood products, paper, pulp, and cardboard, characterizes the macroeconomic importance of the forestry sector at a national and/or regional level.

Objective/Goal: Quantify the direct contribution of the forestry sector to the country's or regional economy.

Parameter:

- Gross Added Value (GAV) or Gross Domestic Product (GDP) generated by forestry activity and the forestry industry, either at a national or regional scale.
- Percentage of GDP generated by the forestry sector compared to national or regional GDP.

² Example: Classification of forest property according to TBFRA 2000 (Temperate and Boreal Forest Resources Assessment):

a) Property Categories: Public, Private, or Other.

b) Sizes (ha): < 10, 11 to 100, 101 to 500, 501 to 10,000, and > 10,000.

Information Sources: National Classification of Economic Activities (CNAE: A-02, C-16, C-17): Eurostat, National Institute of Statistics, MAGRAMA Forestry Statistics Yearbook, regional statistical yearbooks.

6.3 Indicator: Net Profit (C)**

Rationale: The net profit, derived from the economic balance of forest management, is a significant indicator of its economic sustainability level. However, in many cases, the most important benefits aren't quantifiable from a financial perspective. It encompasses all sources of income and expenses directly related to the forest, including subsidies, before taxes.

Objective/Goal: Improve the economic sustainability of forest management in the long run.

Parameter: Quantification of the predicted or actual net profit, income, and expenses derived from forest management.

Information Sources: Economic documentation of the forest.

6.4 Indicator: Investments in Forest (M)**

Rationale: Forest management requires funds to produce the ecosystem goods and services society demands. These goods and services are a significant contribution to the quality of life and the reduction of natural risks.

Objective/Goal: Maintain or enhance the services provided by the forest through executed investments.

Parameter: Description of the investments and, if information is available, quantification of the cost.

Information Sources: Economic documentation of the forest.

6.5 Indicator: Employment in the Forestry Sector (M)**

Rationale: Conducting activities and works in the forest generates direct and indirect employment in the forestry sector, making it a vital indicator of its social benefits, especially for its contribution to sustainable rural development. At the same time, quality employment is essential, requiring qualified, adequately equipped staff in the right numbers.

Objective/Goal: Estimate the direct employment generated by forest works conducted in the management units and promote theoretical/practical training in sustainable forest management.

Parameters:

- Quantification or estimation of direct employment (number of workdays or employees).

Additionally, only in the case of dedicated staff exclusive to the management unit:

- Training and awareness in sustainable forest management;
- Staff qualifications and professional certification;
- Job stability (% of temporary and permanent employment).

Data Sources: Existing legislation, records, documentation, collective agreements, training programs, official statistics, etc.

NOTE: According to the International Labour Organization, one job equivalent corresponds to 220 workdays.

6.6 Indicator: Occupational Safety and Health (C)

Rationale: The forestry sector exhibits one of the highest accident rates, exacerbated in situations of precariousness and high seasonality. Accident and occupational disease prevention in the forestry sector is a pivotal aspect of Sustainable Forest Management.

Objective/Target: Reduction of occupational accident rates within forestry activities and consistent monitoring of relevant statistics.

Parameter:

- Trend analysis of accidents within the management unit and their classification (serious and fatal).

If the personnel is exclusively associated with the management unit:

- Evidence of compliance with Occupational Risk Prevention regulations and health monitoring.

- Proof of specific training in Occupational Risk Prevention.

Information Sources: Logs maintained by the manager, prevailing legislation, forest work tender documents or contracts, regional guidelines, accident reports and logs, official documentation, official statistics, and so forth.

6.7 Indicator: Consumption of Timber and Cork (C) (Only applicable at the national scale)

Rationale: Sustainable Forest Management impacts the production of forest products that are subsequently consumed by society. Timber and cork are two primary forest products from Spanish forest lands, and assessing their per capita consumption provides insights into their utilization levels.

Objective: Measure the per capita consumption of timber and cork at the national scale.

Parameters:

- Consumption of roundwood equivalent (cubic meters) per 1,000 inhabitants.
- Consumption of cork (tonnes) per 1,000 inhabitants.

Sources: MAGRAMA Forest Statistics Yearbook; Regional forest statistics yearbooks, External trade statistics (Tax Agency).

6.8 Indicator: Timber Trade (Only applicable at the national scale)

Rationale: The consumption of timber products affects the domestic and international trade of these products, facilitating the quantification of the extent to which Spanish forest lands meet the demand for timber and its derivatives.

Objective: Understand the timber flow (extractions, production, exports, imports) at the national level in a reference year and observe its progression compared to preceding years.

Parameters:

- Quantification (cubic meters or tonnes) and economic estimation (euros) of timber and its derivatives exported by Spain, differentiated between conifers and broadleaves.
- Quantification (cubic meters or tonnes) and economic estimation (euros) of timber and its derivatives imported by Spain, differentiated between conifers and broadleaves.

Sources: Timber balance from the Ministry Forest Statistics Yearbook, external trade statistics (Tax Agency), Eurostat.

6.9 Indicator: Energy from Forest Biomass (C)

Not elaborated, integrated into 3.1 (firewood).

6.10 Indicator: Recreational Values (D)

Rationale: The growing societal demand for recreation in forest lands suggests, where appropriate, the establishment of areas to regulate and organize this activity, while ensuring its sustainability. The quantity and quality of such infrastructures serve as metrics for the recreational values of the management unit.

Objective/Goal: Adapt management and access to recreational areas highlighted in the management plan, provided it's consistent with the functions assigned to the management unit, doesn't detrimentally impact forest resources or ecosystems, and adheres to prevailing

regulations regarding forest land access and other proprietary and third-party rights.

Parameters:

-Identification and location of recreational areas assigned a recreational use in the management plan.

-Existence of management measures for the appropriate use of the recreational areas proposed by the manager.

Information Sources: Inventories, regional plans, PRUG (Resource Management Plans), PORN (Master Plans for Use and Management), PORF (Forest Resource Management Plans) or similar.

6.11 Indicator: Cultural and Spiritual Values (D)

Rationale: Forest lands are imbued with cultural and spiritual values due to aesthetic, religious, artistic, historical reasons, among others. Often intangible or personal, occasionally these values manifest in specific places, which are then recognized and, if deemed necessary, protected.

Objective/Goal: Forest management that respects identified cultural and spiritual values.

Parameter:

-Cultural and spiritual values identified in the management plan.

-Guidelines or measures for the preservation of cultural and spiritual values if deemed necessary for their protection.

Information Sources: Cultural assets inventory or equivalent, inventory or registry of unique trees and remarkable surroundings.

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