

COST Action FP1301 EuroCoppice

Innovative management and multifunctional utilisation of traditional coppice forests –
an answer to future ecological, economic and social challenges in the European forestry sector

National Regulations Affecting Coppice Management in 27 EuroCoppice Member Countries

Editors Jennifer Mills and Peter Buckley





COST is supported by the
EU Framework Programme
Horizon 2020

COST (European Cooperation in Science and Technology) is a pan-European intergovernmental framework. Its mission is to enable break-through scientific and technological developments leading to new concepts and products and thereby contribute to strengthening Europe's research and innovation capacities. www.cost.eu

Published by:
Albert Ludwig University Freiburg
Gero Becker, Chair of Forest Utilization
Werthmannstr. 6
79085 Freiburg
Germany



Printed by:
Albert Ludwig University Freiburg Printing Press

Year of publication: 2017

Editors: Jennifer Mills (UK) and Peter Buckley (UK)

Contributors: Abdulla Diku, Luljeta Mine and Vasillaq Mine (AL), Kris Vandekerkove (BE), Ivailo I. Markoff (BG), Miljenko Zupanic (HR), Radim Hédl (CZ), Pieter D. Kofman and Kjell Suadicanani (DK), Katrin Heinsoo (EE), Jyrki Hytönen (FI), Philippe Ruch (FR), Christian Suchomel and Patrick Pyttel (DE), Ian Short (IE), Paola Mairota, Rodolfo Picchio, Francesco Neri, Pier Giorgio Terzuolo and Pietro Piusi (IT), Kristine Štikane and Dagnija Lazdina (LV), Marius Aleinikovas and Mindaugas Škema (LT), Patrick Jansen (NL), Ljupco Nestorovski (MK), Abel Rodrigues, Mário Costa and Helder Viana (PT), Valeriu-Norocel Nicolescu (RO), Keith M Little (ZA), Mario Beltrán, Eduardo Tolosana and Míriam Piqué (ES), Magnus Löf (SE), Josephine Cueni (CH), Murat Ertekin (TR), Iryna Matsiakh and Volodymyr Kramarets (UA), Jennifer Mills and Peter Buckley (UK)

Corresponding author: Peter Buckley, peterbuckleyassociates@gmail.com

Reference as: Mills, J., Buckley, P. (2017). *National Regulations Affecting Coppice Management in 27 EuroCoppice Member Countries. COST Action FP1301 Reports*. Freiburg, Germany: Albert Ludwig University of Freiburg.

Copyright: Reproduction of this document and its content, in part or in whole, is authorised, provided the source is acknowledged, save where otherwise stated.

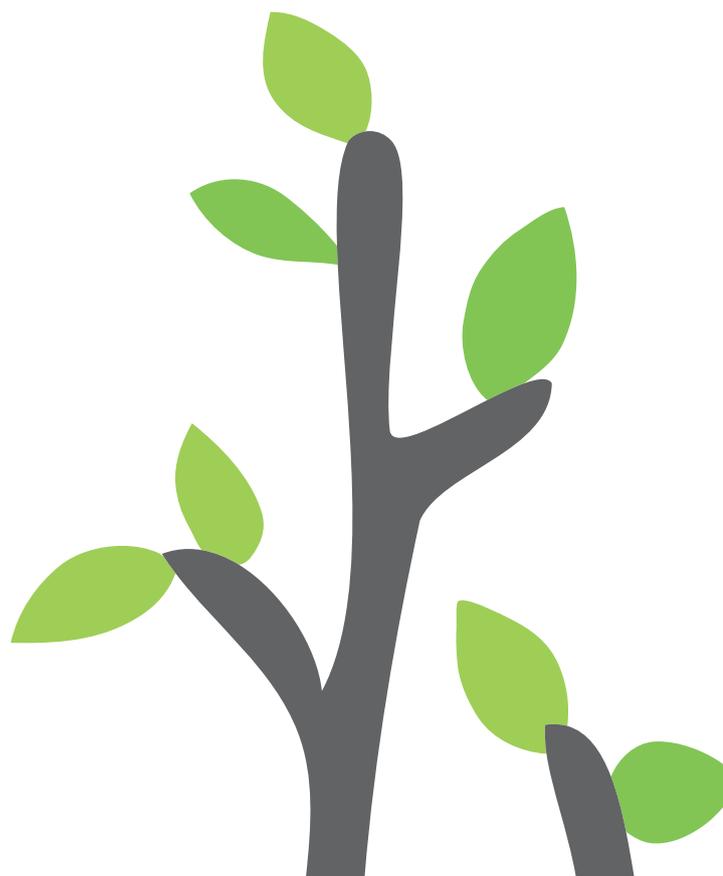
Design & layout: Alicia Unrau

Cover acknowledgements: Simple coppice (grey) based on a drawing by João Carvalho;

Leaf vectors originals designed by www.freepik.com (modified)

Disclaimer: The views expressed in this publication are those of the authors and do not necessarily represent those of the COST Association or the Albert Ludwig University of Freiburg.

**National Regulations Affecting
Coppice Management in
27 EuroCoppice Member Countries**



CONTENTS

Introduction.....	7
ALBANIA.....	8
AUSTRIA.....	13
BELGIUM.....	16
BULGARIA.....	22
CROATIA.....	24
CZECH REPUBLIC.....	26
DENMARK.....	29
ESTONIA.....	32
FINLAND.....	35
FRANCE.....	38
GERMANY.....	42
IRELAND.....	46
ITALY.....	48
LATVIA.....	54
LITHUANIA.....	56
LUXEMBOURG.....	59
NETHERLANDS.....	61
MACEDONIA, REPUBLIC OF.....	63
PORTUGAL.....	64
ROMANIA.....	69
SOUTH AFRICA.....	71

SPAIN..... 74

SWEDEN 77

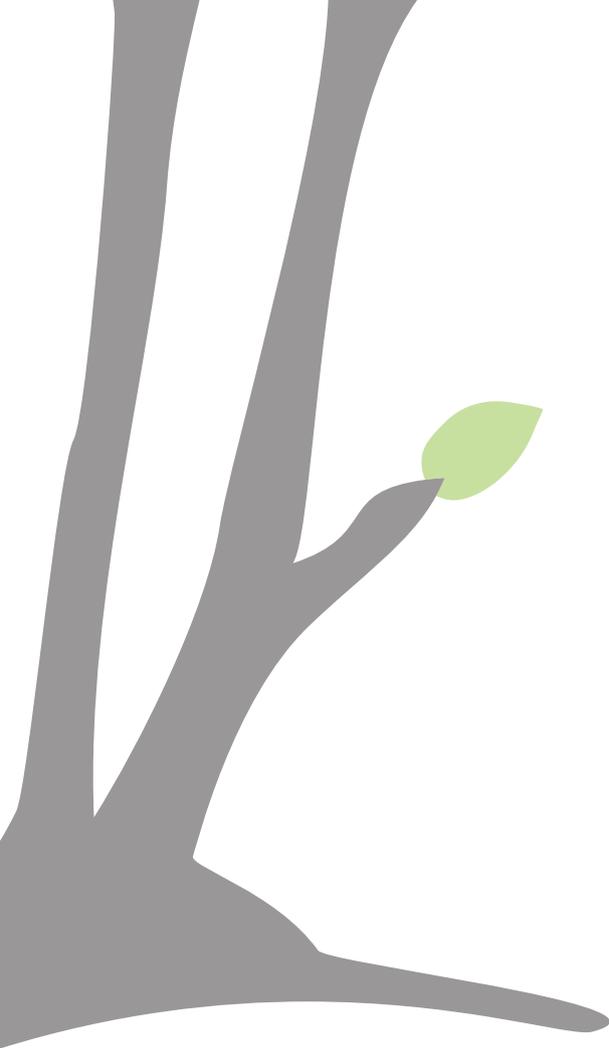
SWITZERLAND 82

TURKEY 84

UKRAINE 87

UNITED KINGDOM..... 91

Acknowledgements 94



INTRODUCTION

This document is the result of a task by COST Action FP1301 EuroCoppice Working Group 4 “Services, protection and nature conservation”. It is a compilation and evaluation of legal documents relating to the specific rules and legislation affecting coppice forests, including conservation and biodiversity issues. Most countries distinguish short-rotation coppice of willow, eucalyptus and poplar in their legislation from traditional coppice, considering it to be a form of agriculture. There is no specific legal framework for coppice in many countries (e.g. Austria, South Africa, Spain, Sweden, Switzerland and the UK) but in many eastern European countries traditional coppice rotations are not recognised and high forests are advocated, as in the Czech republic, Romania, Serbia and Slovakia, although in all cases there are exceptions depending on the tree species.

ALBANIA

Abdulla Diku¹, Luljeta Mine² and Vasillaq Mine³

Albania represents a country with limited forestry resources, due to the overuse of forests, damage caused by fires and illegal cutting over the years. According to the European Environmental Agency, losses of forestry stock volume in Albania during the period 1990-2010 were 2-5 times higher than the natural growth of forests.

The forest area in Albania is 1.05 million hectares, comprising 55.25 million cubic meters. Forests cover 37% of the country's territory. Forest areas consist of:

- (i) 36% high forests,
- (ii) 28% coppice forests and
- (iii) 36% shrubs.

We would like to highlight the fact that the majority of shrubs in Albania are managed as coppice forests. Taking this fact into account, coppice forests in Albania represent over 60% of the national forest area. In terms of forest volume, high forests represent 78% of the stock, coppice forests 15% and shrubs 7%. If we analyze the volume per hectare according to forest management forms, the situation is as follows: high forests have 114 m³/ha, coppice forests 28 m³/ha and shrubs 9 m³/ha. Over the period 1961-2015 the national forestry area was reduced by 300,000 hectares, or approximately 25% of the total.

The Code/Canon (XV-XX centuries)

represents the oldest “law” in the country, which was applied in the central and northern part of the country in that period. It constituted the main legal basis for various issues of the communities’ social and economic life. The Code states that “Every house with a smoking chimney shall have its own property”. With regard to forests, there was a forestry area in the vicinity or surrounding a village known as “*kujrija*”, which was used jointly by the village. Private forests or property were divided by boundaries. “*Kujrija*” was not divided, and all the households of the village were equally entitled to use it. “*Kujrija*” was mainly used for fire wood production, building materials, livestock food, grazing and hunting. Each village had its own forests (“*kujri*”). “*Kujrija*” represented irregular coppice forests, mainly oak and hornbeam trees. In addition to “*kujrija*” the village had access to its own *mountain* and pastures. The *mountain* was composed of forests located further away from the village, in its most mountainous part, mainly as high forests that were used for only for the timber.

¹ Diava Consulting. Corresponding author; adiku@hotmail.com

² Agriculture University of Tirana. Faculty of Economy and Agribusiness

³ Agriculture University of Tirana, Faculty of Forestry Sciences

Law on “Forests and pastures” (1923)

Three major forms of forestry ownership were acknowledged:

- (i) State-owned,
- (ii) Communal and
- (iii) Private.

This Law provided a complete framework for the organization and management of the forestry and pasture sector management in the country, placing the emphasis on their sustainable use.

An important element of this law was the care that should be taken with coppice forests used to produce charcoal or firewood, particularly with regard to their natural regeneration. Livestock were prohibited after cutting firewood and charcoal for ten years, as well as preventing grazing outside the defined area by official permit. This allowed the forest the necessary time to regenerate. Firewood collection, logging and grazing took place in the coppice forests (oak trees, hornbeam trees, shrubs, etc.) that were located near the villages. In the high forests located further away from the village than the coppice forests, only the cutting down of trees for building materials was allowed. Deforestation for the purposes of opening land for agriculture or pastures was not allowed. The law also prohibited the pruning of trees for the purpose of providing fodder for livestock. The law also stated that “...in the case of coppice forest composed with rare trees, or in slopes, cutting down of trees is not allowed”, since these trees should be given the necessary time to produce seeds, in order to guarantee the forest’s regeneration.

Law no. 3349 “On forests protection” (1961)

This law was aimed at converting coppice forests into high forests. Coppice forests could be maintained only to meet the needs of the rural population. Coppice forests would be also kept in case the necessary ecological conditions were in place. The exploitation of coppice forests under the age of 10 was prohibited. They could only be cut during the period from October 1 to March 31. Grazing of livestock was prohibited until the saplings regenerated naturally would have reached the height of 1.5 m from the ground, and grazing of goats was prohibited.

Law no. 4407 “On forests” (1968)

This law underlined a major role of forests in providing firewood for the development of the industry, for the construction of the country, and for their paramount role in moderating climate and protecting the land from the erosion. Pruning of forest trees was allowed only in certain areas defined in advance. Agricultural cooperatives were allowed to exploit coppice forests to meet their own needs for firewood and building materials. Due to the low level of industrialization in Albania over the period 1960-1990, the national forestry stock was reduced by approximately 300,000 ha because of the deforestation of forest areas to open agricultural land. These were coppice forests (oak trees, hornbeam trees and shrubs) near and surrounding villages. Also, firewood represented the only energy source available to Albanian households for heating and cooking, cutting down every year more forest trees than their natural growth.

Law no. 7623 on Forests and Forest Service Police (13.10.1992)

The law envisages:

- (i) the overall preservation of forestry stock for its economic function, its special value in environmental protection, in water reserves and cleaning of the atmosphere, in land fertility, in its landscape role, in agrotourism and infrastructure;
- (ii) control over the cutting down of timber at a sustainable level, so that it balances the normal growth of forests, defined through growth projects drawn up in compliance with this law;
- (iii) control over the development of the whole forestry sector; and
- (iv) ensuring the balance between the whole society's interests and the interests of people's legal entitlement.

To increase the forest stock and its production capacities, the forest service is obliged to undertake afforestation. In such cases, fast-growing and highly economic varieties/strains have to be used. The law highlights that "it is prohibited to cut down or uproot trees in very steep places, in a strip of land 100 m wide at the upper boundary of vegetation; it is prohibited to cut down and uproot rare varieties of trees and shrubs, as well as the trees on both sides of national roads with an inclination over 30% and in a strip of land of 20 m above and below roads...".

Grazing is prohibited in the new forests, in forests during their regeneration, and in coppice forests under regeneration....

Law no. 9385 on "Forests and Forestry Service" (2005)

Pursuant to this law, the management of the national forestry stock is based on the principles of sustainable and multifunctional use of forests. This law classifies the ownership of forests as:

- (i) public or
- (ii) private.

Rehabilitation and usage of national forestry stock requires protection and regeneration works to prevent or restrict harmful exploitation. Increases in the productivity of the national forestry stock should be accomplished through regeneration of exploited forests and improvement of existing forests by taking silvicultural measures. Also the afforestation of abandoned lands, barren and eroded plots, is the duty of the administrators and users of these lands. Pursuant to this law, grazing and the transfer of livestock to public forests, newly afforested lands, exploited forest plots or under regeneration, in the newly coppiced forests, etc., is only allowed in compliance with defined rules. As above, the law also stipulates that: "it is prohibited to cut down or uproot trees and shrubs in very steep places, in a strip of land 100 m wide at the upper boundary of vegetation; it is prohibited to cut down and uproot trees and shrubs and rare and endangered varieties of trees and shrubs, as well as the trees on both sides of national roads with an inclination over 15 % and in a strip of land of 20 m above and below roads, as well as in forests that have a protective and special function."

Strategy for the development of forestry and pasture sector in Albania (2004)

The Strategy aims to ensure the sustainable and multifunctional development of forestry and pasturage resources. One of the objectives of the strategy is: "...the establishment of several forestry entities with regular oak coppice forests and their scientific growth as a basis for the conservation and preservation of valuable species of oak trees and their conversion into high forests..." The actions required to accomplish this objective are:

- Selection of areas with oak trees (irregular coppice forest) with the proper size and species contents, suitable for their conversion into regular coppice forest.
- Drawing up technical projects for these forestry entities and for the commencement of their implementation.
- Calculation of current and future annual productivity (when the entities will consist entirely of regular coppice trees) and conducting a study for the conversion of these entities into high forests.

To meet the needs of rural population for firewood and building materials, the strategy envisages: "Establishment of regular coppice trees within the territories of communal forests with sufficient area in order to meet the needs of communes for fire wood and building materials and their unification into regular coppice forests entities for purposes of growth with short rotations." Also, another important activity to be undertaken is "the definition and separation of forests for producing firewood and building materials (from the regular coppice forests)."

Cross-cutting Environmental Strategy (2015-2020)

Its strategic objectives are:

- (i) approximation and implementation of *acquis communautaire* in the field of forests and pastures;
- (ii) increase of communal forest management capacities;
- (iii) improvement of forestry information systems and databases;
- (iv) strengthening forest-related research systems, technological development and innovation;
- (v) improvement of regional relations and unification of technologies and methodologies;
- (vi) applications to ensure support for the development of forestry in the country;
- (vii) inclusion of various climate issues in forestry stock management aspects.

The strategy also aims:

- By 2020, to achieve the full transposition of *acquis communautaire* in the field of forests
- To adopt a new law on forests
- To draw up a national program for forests' revitalization
- To increase economic effectiveness and energy efficiency through the sustainable use of forests
- To afforest with short-rotation species to produce biomass and reduce the adverse effects of extreme natural events (floods), etc., in pilot areas.

National strategy for development and integration (2015-2020)

As a forest-related strategic objective, the strategy values the strengthening of management and preservation of forest and pasture resources through:

- Reduction of illegal cutting of forests by 2020;
- Drawing up of growth plans for all forestry entities in the country;
- Rehabilitation of degraded areas.

Forestry literature regarding coppice forests

In Albania, *Forest Growth and Silviculture* represents the basic literature about forest management and handling. They provide the major alternatives concerning sustainable forest handling and management, including coppice forests. Clear cutting should be restricted in the case of coppice forests with a density below 70% and on slopes, and their conversion into high forests should be an objective.

References

Ligji per “Pyjet dhe Kullotat” date 27.01.1923

Ligji 3349, viti 1961 “Mbi mbrojtjen e Pyjeve”

Ligji 4407, viti 1968 “Ligji mbi Pyjet”

Ligji 7623 date 13.10.1992 për “Pyjet dhe Shërbimin pyjor”

Ligji 9385 per “Pyjet dhe Shërbimin pyjor”, i ndryshuar.

Strategjia ndërsektorale e mjedisit (2016-2020), draft

Strategjia Kombëtare për Zhvillim dhe Integrim (2015-2020)

Strategjia për zhvillimin e sektorit të pyjeve dhe kullotave në Shqipëri (2004)

INSTAT 2015

<http://agrbes.freehostia.com/KanuniiLekeDukagjinit.pdf>

<https://www.eea.europa.eu/data-and-maps/indicators/forest-growing-stock-increment-and-fellings/forest-growing-stock-increment-and-4>

<https://www.eea.europa.eu/data-and-maps/indicators/forest-growing-stock-increment-and-fellings/forest-growing-stock-increment-and-4>

AUSTRIA

Jennifer Mills¹ and Peter Buckley¹

Austria's first comprehensive forest law in 1852 introduced the obligation to manage forests sustainably. The 1975 **Forest Act**, amended in 2002, includes general rules for sustainable forest management applying to publicly- and privately-owned forest and gives executive directives for the nine Austrian provinces.

Clearcuts of more than 2 ha are not permitted except under certain circumstances. In protection forests the maximum clearcut area permitted is 0.2 ha. Final cuts of immature trees of less than 60 years are forbidden, although a lower limit may be given for fast-growing trees. All clearcuts of more than 0.5 ha have to be approved by the Forest Authority regardless of forest type, to limit detrimental effects on the soil and adjacent forest stands. Reforestation through natural regeneration should take place within 10 years, but can be extended in adverse conditions.

In addition to the Forest Act some Federal Provinces have **forest ordinances**, which include regulations for timber production. There is **no national act on the protection of nature**, which is regulated through a separate Act for each of the nine provinces.

National Park Laws and **Hunting and Fishery Laws**, and the **Environmental Liability Law** also impact on forestry and biodiversity.

Austria's **Forest Development Plan (FDP)** covers all the country's forests and is used to assess forest functions in the public interest in terms of its key functions:

- economic
- protective
- beneficial
- recreational

The Plan is revised every 10 years by the forest authority and includes requirements for the treatment of forests during that period.

There is no general obligation for public or private forest owners to prepare a **Forest Management Plan (FMP)**, but most publicly-owned forests are likely to have an FMP. All forest enterprises of over 1,000 ha need to submit an FMP if they want a subsidy from the rural development programme. FMPs are also required for public and private areas with special protection such as Natura 2000 sites, national parks and conservation areas. About 43 % of the Austria's **Natura 2000 sites** are in forest areas.

Both **FSC and PEFC certification systems** operate in Austria, but by far the largest area is certified under the PEFC scheme.

The Alps cover about three-quarters of Austria's total area. The Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (Bundesministerium für Land- und

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

Forstwirtschaft, Umwelt und Wasserwirtschaft, BMLFUW) estimates that 19.3 % of Austrian forests serve a protection role.

Protection against torrents and avalanches is included in the Austrian Constitution as a responsibility of the Federal Government. The Forest Act ensures that this task is dealt with by the **Forest Engineering Service in Torrent and Avalanche Control** (Forsttechnischen Dienstes für Wildbach- und Lawinenverbauung, WLW, also known as die.wildbach), an office of BMLFUW, which analyses and assesses hazards and risks, plans and conducts preventive and protective measures.

A **Protection Forest Strategy** was adopted in 2002. The ‘Protection through Forests Initiative’ (Initiative Schutz durch Wald – ISDW) was started in 2007. Tasks required by the Forest Act include the preparation of hazard zone plans describing the intensity and extent of all hazards due to torrents and avalanches as a basis for control measures. Engineering techniques are only used if necessary to ensure the success of the silvicultural methods adopted.

The 2002 amendments to the Forest Act redefined the term **‘schutzwälder’ (protection forest)** into two types:

‘Standortschutzwälder’, which protect the location on which they stand from erosion by wind, water or gravity and therefore require special treatment to protect the soil and vegetation and to ensure reforestation. These areas include forests on shifting sand, on karst or sites liable to serious erosion or landslides, and forests on rocky ground or

shallow soils where tree regeneration may be difficult.

‘Objektschutzwälder’ are forests which protect people, human settlements, infrastructure or agricultural land against natural hazards, such as avalanches, rocks, stones, landslides, or damaging environmental influences and which require special treatment in order to achieve and secure their protective effect.

The owners of ‘standortschutzwälder’ have to manage them in accordance with local conditions so that their preservation and stability is ensured. This can be financed by timber production whereas the cost of the necessary management measures in ‘objektschutzwälder’ is financed by public funds or payments from those who benefit from the protection.

References

- https://www.jusline.at/1_Nachhaltigkeit_ForstG.html (Forest Law)
- Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (2009) *Der österreichische Wald*. http://waldspiele-stmk.at/wp-content/uploads/2014/04/der-oesterreichische-wald_infobroschuere_deutsch-englisch_lebensministerium.pdf
- European Commission (2014) *Forest Management Plans or equivalent instruments. Summary of Member States' replies to the DG ENV questionnaire*. http://ec.europa.eu/environment/forests/pdf/fmp_table.pdf
- Hangler, J. (2012) *Governance and forest law enforcement – experiences and lessons learned in Austria*. <http://www.foresteurope.org/sites/default/files/S3-3%20Johannes%20Hangler%20FE%20Workshop%20FLEG%20Budapest.pdf>
- Hochbichler E., (2008) *Case studies on structure, production and management of coppice with standards in the eastern part of Austria (Weinviertel)* Forstliche Schriftenreihe, Universität für Bodenkultur, Wien; Bd. 20, 246 S., Hrsg.: Österr. Gesellschaft für Waldökosystemforschung und experimentelle Baumborschung an der Univ. f. Bodenkultur. https://www.wabo.boku.ac.at/fileadmin/data/H03000/H91000/H91200/Schriftenreihe/Band_20.pdf
- Ministerium für ein lebenswertes Österreich *Schutzwald-Aktivitäten - Rückblick*. <http://www.bmlfuw.gv.at/forst/schutz-naturgefahren/schutzwald/Schutzwald6.html>
- Quadt, V. van der Maaten-Theunissen, M., & G. Frank (2013) *Integration of Nature Protection in Austrian Forest Policy*. INTEGRATE Country Report for Austria. EFICIENT-OEF, Freiburg. <http://www.eficient.efi.int/files/attachments/eficient/projects/austria.pdf>

BELGIUM

Jennifer Mills¹ Peter Buckley¹ and Kris Vandekerkove²

Flanders

1990 Forest Decree (Bosdecreet)

The law on Flemish forest management and is valid both for state and private forests.

1997 Nature Decree (Natuurdecreet)

Aims to maintain, restore and develop the natural environment through protection and management measures.

While the forest management regulation of the Forest Decree still applies, the 1997 decree embodies principles which mean that the government will not authorise or accept any management operation or plan that will degrade either the quality or quantity of the natural environment. These 'stand still' precautionary principles are embodied in the guidelines for forest management plans (bosbeheerplannen) and felling permits (kapmachtiging) issued by the **Agency for Nature and Forest (Agentschap Natuur & Bos - ANB)**, which are applicable to all forests. In all planned operations the possible conservation impact must be assessed and avoidable damage prevented.

The Nature Decree deals with nature reserves, Natura 2000 Special Areas of Conservation, and also sets up the Flemish Ecological Network (Vlaams ecologisch netwerk - VEN) and Integral Interweaving

and Supportive Network (Integraal Verwevings- en Ondersteunend Netwerk - IVON), an ecological network of linked, protected and other valuable areas to facilitate species migration. Although the main management aim is nature conservation, other activities, such as recreation, agriculture, forestry, military activities or the extraction of drinking water, are allowed in the VEN and IVON provided they do not jeopardise conservation.

In 2003 the Flemish Government established the **Criteria for Sustainable Forest Management** that include various goals and restrictions which are mandatory for all public and private forests within the VEN.

There are three levels of restrictions:

1. A basic level that applies to all forests

These restrictions are included in the directives for the evaluation of felling permit applications and management plans:

- Deforestation is forbidden (unless with special exceptional permit and procedure).
- No felling or harvest operations are allowed unless described in an approved management plan or in a felling permit authorised by the ANB. For an owner of several scattered small areas which collectively do have an area exceeding

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com
² (Flanders) Research Institute for Nature and Forest (INBO). Gaverstraat 4, 9500 Geraardsbergen, Belgium. e-mail: kris.vandekerkove@inbo.be

five hectares, but are each individually less than 5 ha, there is no obligation to draw up a management plan, but one can be drawn up voluntarily.

- Forest ownerships of >5 ha should have a (limited) management plan covering a 20-year period.
- Clearcutting is to be avoided. Where necessary, the maximum size of clearcuts for poplar and exotic tree species is 3 ha. For native broadleaved woodland, the maximum size is 1 ha, unless transforming homogeneous stands to more mixed stands, when the area may be enlarged to 3 ha.
- Clearcuts should be spread over the forest, at least 100 m apart.
- No felling and harvesting can take place from April 1 - June 30. (This can be extended, shortened or cancelled depending on local ecological conditions.)
- In thinning operations, maximum thinning intensities (in % of stem number or basal area) can be imposed.
- Thinning which leads to degradation of the stand quality or structure (removing all quality trees) will not be allowed.
- Coppicing is allowed in appropriate stands and species, with a minimum rotation time of 8 years.
- Specific measures to prevent soil damage may be imposed in the conditions of the felling permit (e.g. fixed skidding tracks, avoiding certain areas).
- Other preconditions can be connected to the felling permit by the forest admin-

istration such as certain valuable trees or species to be spared.

- Successful regeneration must be established within 5 years after final felling. This can be by natural or artificial regeneration (to be planted within 3 years after final felling).

All regeneration and transformation should follow the 'stand-still' principle:

- Native trees cannot be replaced by exotics.
- Native broadleaved cannot be replaced by native coniferous forest (Scots pine).
- Mixed stands cannot be replaced by homogeneous stands.
- The owner is encouraged to keep and increase levels of dead wood and old trees, but there is no strict target.
- Planting subsidies are given to switch to indigenous tree species and there is a subsidy scheme for public access.
- When applying for a kapmachtiging, ANB decides if felling is permitted within sixty days of submission and under what conditions. If there is no reply within that period, the kapmachtiging is considered granted.
- In private forests, fellings can take place for urgent safety reasons without a kapmachtiging, but ANB must be notified in writing within 24 hours. If felling is necessary for sanitary reasons, a fortnight's notice should be given. Within 6 months after these types of felling, a proposal for rehabilitation measures must be submitted to ANB.

2. The ‘Criteria for Sustainable Forest Management’

This is compulsory for all forests (both state and private) inside the VEN. Outside VEN areas, forest owners can decide to join voluntarily, in which case they are also eligible for financial incentives and other opportunities (certification) related to CSFM.

In CSFM forests the basic level restrictions are still in force, but some points are more stringent: it aims for ‘continuous improvement’ on some points, rather than ‘stand-still’.

The following requirements and restrictive measures are applied:

- An extensive management plan is required, with a detailed inventory of valuable elements for nature conservation and specific management operations to conserve them (e.g. old habitat trees, streams, archaeological sites)
- Choice of tree species: ‘stand still’ plus a long-term goal for conversion of exotic stands to mixed indigenous on 20% of the surface area.
- Change all homogeneous stands to mixed stands (at least 30% admixture).
- Size of clearcuts: 1 ha, unless the plan is for transformation towards more mixed stands from homogeneous exotic plantations.
- Dead wood: A clear target, 4% of total stock, plus quality requirements: all sizes, standing and lying.

- Overmature trees: a certain number of trees/ha should be selected to be left unharvested.

- 5% of the forest should consist of, or be developed towards ‘key habitats’. These can be ecologically valuable open spaces and/or semi-natural stands of mixed native woodland (a selective harvest of high timber value trees not detrimental to the quality is still allowed).

These CSFM criteria are very demanding and for many owners obligatory, but they also give the owner a certain legal security and other opportunities.

The CSFM are considered to be in accordance with the requirements for Natura 2000 habitats and also with FSC and PEFC(*)-certification standards, which makes all forests managed according to CSFM automatically eligible for individual or group-certification.

Some extra financial incentives are also provided:

- The owner is excepted from certain taxes and succession rights.
- Subsidy (per ha) for key-habitats and management of valuable open spaces.
- Subsidies for the production of an extensive management plan.

(*) No official Flemish PEFC-standard exists at this moment, but the CSFM is in accordance with global PEFC-standards, and the official standards of neighbouring countries or regions like the Netherlands and Wallonia.

3. The 'Management Vision for Public Forests'

This is applied to all public forests and is compulsory for State-owned Domianial forests and includes very high standards of forest management, particularly for nature conservation, which are comparable to CSFM but which go further for some elements. In particular, there are higher targets for tree species composition.

- The basic principle is close-to-nature forestry, with small-scale interventions, selective thinnings and abandoning of final cuts. Clearcuts (1 ha or more) are only allowed in exceptional cases.
- In the long term, the majority of forest stands in public forests should consist of mixed, uneven aged, indigenous forest stands and 80% of all stands should consist of indigenous species. There should be at least a 30% admixture of indigenous species in the remaining exotic stands.
- All stands must be mixed, meaning that no species should cover over 90% of the basal area.
- New afforestations are to be of indigenous species. Poplar clones may be used as a 'pioneer' generation, at most on 50% of the area.
- Natural regeneration is used in all cases where possible.
- Special attention and appropriate management is given to valuable non-forest biotopes in the forest complex (heathland, ponds, etc.). These permanent open spaces, together with transient open

spaces with high conservation value, should cover at least 5-15% of the total forest area.

- Special attention is also given to rare and vulnerable species (hollow trees with bat colonies, breeding areas of rare bird species, etc.).
- Also special attention is given to rare local genotypes of trees and shrubs.
- No commercial harvesting (with heavy machinery) is allowed in valuable and vulnerable riparian forests and swamp forests.
- Changes in natural hydrology should be restricted to the absolute minimum.
- Old trees: some trees are spared to become old and die naturally. They can be spread over the stand or grouped. If spread over the stand: at least 10 trees/ha are to be spared (for very large trees and low stem numbers: at least 10% of the stand basal area). If clustered, areas of at least 5% of the stand are selected and remain unharvested.
- On dead wood, the same threshold is set as in CSFM: at least 4% of the standing stock, both standing and lying, in all decay classes, and representative for the species composition and size distribution of the stand.

As public forest management is not privatised (as in other countries), the forest administration is not eligible for any subsidies. They receive a yearly budget in order to realise these and other services such as recreational infrastructure.

Forests within the Natura 2000-network

For forests within SACs there are no clear restrictions, but from the executive orders on Natura 2000 targets, it is clear that forests that adhere to a certain habitat type should at least comply with the CSFM if they want to reach the required favourable status of conservation.

A new nature management plan (natuurbeheerplan)

The ANB is working on the integration of the Forest and Nature decrees. When this new legislation comes into force, management of different types of natural areas will be covered by one conservation plan. Individual management plans will continue with some revisions to thresholds, limits, etc. This will not change current rules for specific points related to coppice, so coppice

can be applied in ‘appropriate’ stands: the evaluation of the appropriateness will be done by the local official of ANB. In practice, this means that approval will be given in cases of ‘continuation’ or ‘restoration’ of previous coppice stands, and may be approved for young stands of broadleaved forest that are able to resprout to coppice (so all except for beech). For old, well-structured broadleaved high forest stands, conversion to coppice may be regarded as a degradation of present natural values and a violation of the ‘stand still principle’, so may be refused. If these old mixed stands are previous coppice-with-standards stands, permission will most probably be given for restoration of this type of management, under the prerequisite that ecologically valuable standard trees are to be spared.

References

- Vandekerkhove, K. 2013. *Integration of Nature Protection in Forest Policy in Flanders (Belgium)*. INTEGRATE Country Report. EFICIENT-OEF, Freiburg.
- ANB website pages: <https://www.natuurenbos.be/beleid-wetgeving/natuurbeheer/beheerplan/het-nieuwe-natuurbeheerplan>
- <https://www.natuurenbos.be/beleid-wetgeving/natuurbeheer/beheerplan/wetgeving>

Wallonia

A new Forest Code (Code Forestier), covering private and public forests, was adopted in 2008 by the Walloon Parliament. It replaced the former Code which dated from 1854. Amongst other objectives are the production of wood of increased quality and quantity, to fight against global warming, to safeguard biodiversity, to fight against fragmentation, to diversify the forests, and to ensure the social, recreational and educational role of the forest. The Code encourages the use of tree species adapted to soil conditions, genetic conservation (rare tree species and local ecotypes), natural regeneration, an uneven-aged structure, and soil and water protection (limitation of clear-cutting, drainage, etc.) Inheritance tax on standing timber has been abolished to encourage planting of species such as oak or beech rather than conifers.

Some of the regulations are:

- Except in urgent authorized cases, it is forbidden to clearfell coupes of more than 5 ha in forests with more than 50% conifers. For areas with more than 50% broadleaves, the maximum clearfell allowed is 3 ha. This applies to all felling which leaves less than 75m³/ha for standards and at least 25m³/ha for coppice-with-standards of strong shoots of woody material.

References

Code forestier. <http://environnement.wallonie.be/legis/dnf/forets/foret025.htm>

Ministère de la Région wallonne: Direction générale des Ressources naturelles et de l'Environnement.
Le nouveau Code forestier. <http://environnement.wallonie.be/publi/dnf/codeforestierfr.pdf>

- All requests for urgent and non-urgent coupes have to be submitted to a section of the Department of Nature and Forests (Département de la Nature et des Forêts).
- The use of pesticides, herbicides and fungicides are prohibited, except in certain cases specified by the Government in order to fight against specific diseases or invasive species.
- All public forests contiguously larger than 20 hectares must have a management plan.
- Management plans are optional for small private forests. A simple management plan (document simple de gestion) is fixed for a 20-year period.
- In public forests, at least one tree of exceptional biological interest (a dead or damaged trees) must be retained for each 2 ha.
- In broadleaved stands, up to 2 dead or windthrown trees per ha with a diameter of 40 cm must be retained unless dangerous or of high economic value.
- In conifer stands, 2 stumps of broken or dead trees should be retained per hectare, including those in clearfell areas.

BULGARIA

Ivailo Markoff¹

Bulgarian coppices occupy 2,000,000 ha or 48% of the total forest area. Nobody plans to protect coppices or coppicing. However, an important part of these coppices is protected under the Natura 2000 network, which covers 60% of Bulgarian forests. Most coppices are state-owned (70%) or municipal (15%); the private ones consist of very small plots belonging to millions of owners.

The tree species within the coppices comprise oaks (*Quercus* spp. 60%), beech (*Fagus* spp. 10%), hornbeam (*Carpinus betulus* 6%), oriental hornbeam (*Carpinus orientalis* 8%), black locust (*Robinia pseudoacacia* 9%) and small areas of all other broadleaved species. Most coppices (74%) are old coppices being converted into high forest, while the rest is maintained as coppice. Half of the latter are black locust plantations managed on rotations of 20 years, and the remainder are oriental hornbeam stands which are indeed abandoned. Oriental hornbeam is more of a shrub than a tree, with a DBH of < 7 cm.

The main regulations affecting coppices are the:

- Forestry Act + Implementation Rules
- Forest Management Ordinance
- Ordinance on Felling

They can all be downloaded from the web site of the Executive Forest Agency.

Forestry Act

The act was issued in 2011 and amended many times afterwards. It has following texts affecting coppices:

Art. 13. (1) For state forests and municipal forests, forest management plans shall be elaborated with the exception of the territories provided for the needs of the national security and defense. ... (3) Forest management plans or programs are developed for the forests owned by natural persons, legal entities and their associations. ... (4) The forestry plans and programs shall determine the permitted use of the forest resources and the guidelines for achieving the management goals of the forest territories for a period of 10 years.

Art. 88. (1) The forests shall be managed as high forest, coppices for conversion into high forest or coppices (Niederwald). ... (5): ...2. Plantations of wood or shrub species created for the purpose of accelerated production of biomass are not considered to be forests.

Art. 102. Final cuts shall be carried out at an age of not less than: ... 2. 50 years in the coppice forests for transformation into high forest; 3. 15 years for black locust plantations and 20 years for the other coppice forests.

¹ Forest Research Institute (FRI) of the Bulgarian Academy of Sciences (BAS), 132, Kliment Ohridski blvd, 1756 Sofia, Bulgaria. +359 887 74 27 64, e-mail: imarkoff@abv.bg

Art. 104. (1):1. Clearcuts are prohibited in all forests except for poplar, willow and low-stem forests.

Art. 124. 3. Grazing is prohibited in forest plantations, young forest stands regenerated by seed, and coppices until they reach a height of 3 m;

§ 1. ... 9. “Clearcut” is a final cut where, for a period of not more than one year, all the trees of the mature stand on a given territory are cut. ... 54. “coppices” are forests of black locust, oriental hornbeam, manna ash (*Fraxinus ornus*) and *Gleditsia triacanthos* regenerated by shoots.

(Forestry Act) Implementation Rules

The Implementation Rules state the following usages:

Art. 89. ... (3) The use of wood after paying the stumpage price ... may be effected in: ... 4. cutting of coppice forests for conversion into high forest and coppice forests maintained as coppices.

Art. 109. The number of animals grazing in forests shall be determined according to productivity and conditions of the pastures and the grass cover, in compliance with the following limitations: ... 2. for coppices: up to 1 cow per hectare , and up to 1 sheep or pig per 0.2 hectares.

Ordinance on Felling

The Ordinance on Felling gives many details about conversion.

Forest Management Ordinance

The Forest Management Ordinance regulates the elaboration of forest management plans and programs (a program is a simplified plan made for a small property). It gives details about rotation ages in managed forests (covered by management plans), while the minimal cutting ages specified above are valid in all forests. The common rotation ages for the high forest conversions are: 100 years for the best (site index I and II), 80 for the middle (III) and 60 for the poor (IV and V). Lower rotation ages are set for Turkey oak, 60, 40 and 40 correspondingly. The rotation age for black locust is 20.

CROATIA

Miljenko Zupanic¹

There is a more than 250-year long tradition of forestry and organised sustainable forest management in Croatia. Most of the forest in Croatia is in state ownership (77 %) and during the past it was always regulated at the national level.

At present, forest management and other forestry activities are regulated by several **laws and legal acts**, such as the:

- Law on Forests
- Forest Management Rulebook
- Laws on Physical Planning & Building
- Nature Protection
- Forest Planting Material
- Law on Fire Protection

In the actual management of state forests, the state-owned company **Croatian Forest Ltd.** (in Croatian, Hrvatske sume d.o.o.) has a key role. The company is obliged by Law to make detailed **Forest Management Plans** and to keep precise book-keeping records of growing stock for every **Forest Management Unit**.

Coppice is mentioned only in forest management plans or the management plans of protected areas.

All forest areas in Croatia are split into management units, which usually cover 2000-3000 ha and are divided according to ownership (state or private). Forest management plans are made for each unit

for 10 years. State units have had these plans for 50 years, while around 70% of private units are covered in practice by **Advisory service** (state agency) plans. The Advisory service is also responsible for all administration in private forests. Forest management plans are made by licensed companies, during which all stakeholders are invited to share their opinions. Private owners may also have an input into management rules that form part of the plan (including coppice management), because these rules underlie applications for various projects and subsidies. Private owners who own more than 20 ha of forest can have single ownership management plans. Each forest management plan must be approved by the Ministry, which may involve public discussion on the process of approval.

Currently, the most important policy document affecting coppice management is the **Law on Forest** at the national level. Coppice is only mentioned in subordinate regulations – the **Forest Management Rulebook**, as silvicultural forms and rotation periods are defined according to the management goals. These regulations incorporate EU timber regulation and Pan-european criteria and indicators for sustainable forest management.

¹ Croatian Forest Research Institute, email: zupanicm@sumins.hr

According to these regulations, private owners must have permission for cutting coppice as well as all other types of forest. Permission for cutting is given by the forest extension service on the basis that tree marking is done by a forester from a licensed company, and proof of ownership given to court. After cutting, if owners have to transport the wood products on public roads, they must obtain special delivery authorization issued also by the licensed company, even if the owner uses the wood for themselves. All these administrative procedures have some financial cost, so most new owners who don't need wood for themselves are not interested in cutting, as profits are not guaranteed.

For private forests which are included in protection areas, subsidies may be available to compensate limitations in management, but only when managed according to the protection rules included in management plan.

The main challenges in private forests are their small scale, the heterogeneity of silvicultural forms, poor cadastre and land-registry records, indistinct parcel borders and degradation of forests (Cavlovic, 2004). However, property rights remain the most important challenge, because this presents an obstacle to the consolidation of smaller properties.

References:

- Croatian forests Ltd. (2006) General forest management Plan of the Republic of Croatia, 2006-2015, (in Croatian: Sumskogospodarska osnova podrucja za razdoblje 2006-2015 – Knjiga I). Zagreb: Croatian forests Ltd.
- Cavlovic, J. (2004) Advancement of the State and Management of Private Forests in the Area of the City of Zagreb. Forestry Faculty of the University in Zagreb
- Cavlovic, J. (2010) The First National Forest Inventory of the Republic of Croatia. Zagreb: Ministry of Regional Development, Forestry and Water Management and Forestry Faculty of the University in Zagreb
- Zupanic, M. (2011) Country report for the Forest Products Marketing Workshop. p.10. Bled, Slovenia, 30.November - 1. December 2011.
- Forest Management Rulebook (Pravilnik o uredivanju suma), OG 111/2006 (amended in 141/2008)
- Law on Forests (Zakon o sumama), OG 140/2005 (amended in 82/2006, 129/2008, 80/2010, 124/2010, 25/2012, 18/2013, 94/2014)
- Law on Nature Protection (Zakon o zastiti prirode), OG 80/2013

CZECH REPUBLIC

Radim Héd1¹

Forests cover about 34% of the area of the Czech Republic. The long history of forest use in the Czech Lands has been paralleled by regulations applied from local to whole-country levels. Examples of popularly known historical milestones are laws imposed by the emperors Charles IV (14th century) and Maria Theresa (18th century). Countless regulations were historically applied within particular domains and properties, at least since the Middle Ages. After a long period of „traditional“ forest management, the eventually prevailing trend was towards „modern“ forestry since the end of 18th century. Originally from Germany, this rational concept aimed to produce the maximum yields of timber while securing the sustainable production of forest stands by applying strict measures protecting soil fertility and tree regeneration.

Consequently, all types of forest use interfering with timber-oriented forestry were suppressed and were gradually replaced with highly standardized approach. This meant an end to the three formerly widespread non-timber forest uses, which were coppicing, wood-pasture and litter raking. Tree species composition shifted from mostly mixed and broadleaved stands to the currently prevailing plantations of Norway spruce (52%) and Scotch pine (17%), while broadleaved tree species make up

only about 25% of forest composition in the Czech Republic.

The **Czech Act on Forests from 1995** declares its purpose as follows: „The purpose of this Act is to determine conditions for the preservation, tending and regeneration of forests as national riches forming an irreplaceable part of the environment, to enable the fulfillment of all their functions and to support sustainable forestry.“ An important rule is the 80-year limitation on forest stand felling: „It is prohibited to carry out planned main felling in forests under 80 years of age...“ (Art. 33). However, the same article follows: „...in justified cases, during the course of approving the plan or preparing the guidelines or at the request of the forest owner, the relevant state forest administration body may grant exemptions from this rule.“ The exceptions from the 80-year rule are issued by the Ministry of Agriculture or Regional councils, based on the request of forest owners or on its own initiative.

The **Decree 83/1996 of the Czech Ministry of Agriculture**, provides recommendations on forest management in forest stand categories defined by dominant tree species and habitat conditions. Coppicing with a cutting period of 30 to 40 years is mentioned among recommended management types for several forest categories. Exceptions

¹ Institute of Botany of the Czech Academy of Sciences, Zámek 1, 252 43 Pruhonice, Czech Republic. e-mail: radim.hedl@ibot.cas.cz

from the 80-year rule can therefore be plausibly applied in the form of coppicing. In still broader terms, **Article 8 of the Act on Forests** defines three main forest classes from the management perspective. „The class of Special Purpose Forests can be also applied to forests in relation to which a general interest in the improvement and protection of the environment or any other valid interest in the fulfillment of non-wood-producing functions of the forest is superior to the wood-producing functions.“ One category of **Special Purpose Forests** is defined as „forests necessary for the preservation of biological diversity“, cf. letter f) of the same article.

The Law is simple, its application difficult. Exceptions allowing shorter cutting periods required for active coppicing are granted on stands of fast-growing trees, such as willows, poplars or non-native Black locust. In case of slow-growing species such as oaks, exceptions are given very reluctantly. It is largely because of historically-conditioned resistance of the great majority of forestry authorities and practicing forest managers towards short-cutting systems including coppices. The reasons should be sought in the historical development of forestry in the Czech Republic.

In the lowland areas, coppicing yielded most of the wood production in the past. Coppices („low forest“, adopted from German term *Niederwald*) and coppices-with-standards („middle forest“, from German *Mittelwald*) were very common both in hardwood and softwood stands. Coppicing was gradually abandoned during the 19th century,

partly because of shift to fossil fuels, and completely ceased after the WW II. In the 1950s, during the early communist period of the then Czechoslovakia, coppicing was considered by many influential forestry researchers a „capitalist“ method, targeting at maximum wood production at the cost of depleting of soil nutrients and sustainable wood production capacity. This view basically conformed to the transformation from multiple-use towards timber-oriented forestry during the preceding century.

The second half of the 20th century witnessed transfer of the remaining inactive coppices to high forest by the means of singling-out of the most dominant stems. This process was far from perfect, hence many today's forests still bear the original coppice structure. The area of these partially converted stands cannot be reliably established from the forestry log books, because the record on the management form is strongly biased towards high forest. Data on the current extent of coppice forests in the Czech Republic is therefore more or less a rough estimate. However, the tireless efforts of the past two hundred years have eventually led to the complete elimination of active coppices in the country.

Current revival of coppicing in the Czech Republic follows the development in western Europe. Relaxation of timber-oriented forestry and greater acknowledgement of ecological values of forests in the past two to three decades creates opportunities for return of traditional management forms including coppicing. It is generally considered suitable for small- to mid-size

owners, who would appreciate regular production of fuel wood. Another important argument for coppicing reintroduction is to provide support for biological diversity. It has been shown in many studies both from abroad and directly from the Czech Republic that coppicing abandonment has led to the decline of several groups of light-demanding organisms, including insects

and vascular plants. Coppicing is therefore a relatively recently emerging strategy of nature conservation; it has been applied in several nature reserves. These forests are mostly protected in reserves established under the Czech law, or more recently, as a part of the EU Natura 2000 network.

References

- Act on Forests, Law No. 289/1995 of the Czech Republic. Available at http://www.uhul.cz/images/ke_stazeni/legislativa_jazyky/Lesni_zakon_en.pdf
- Decree No. 83/1996 of the Czech Ministry of Agriculture.
- Lesnictví (Forestry), 1957, volume 3, issue 2; special focus on coppice transformation.
- Müllerová, J., Hédl, R., & Szabó, P. (2015). Coppice abandonment and its implications for species diversity in forest vegetation. *Forest Ecology and Management*, 343, 88-100.
- Müllerová, J., Szabó, P., & Hédl, R. (2014). The rise and fall of traditional forest management in southern Moravia: A history of the past 700 years. *Forest Ecology and Management*, 331, 104-115.
- Szabó, P., Müllerová, J., Suchánková, S., & Kotařka, M. (2015). Intensive woodland management in the Middle Ages: spatial modelling based on archival data. *Journal of Historical Geography*, 48, 1-10.

DENMARK

Jennifer Mills¹, Peter Buckley¹, Pieter D. Kofman² and Kjell Suadicani³

There are approximately 610,000 ha of forest in Denmark covering about 14.5% of the land area (FRA 2015). Conifers take up 50% of total forest land and deciduous species just over 46%; the remaining forest land remains bare of trees or the types of trees are unspecified. Sixty-eight percent of the forest area is privately owned and there are about 29,000 forest owners in Denmark. A survey in 2000 showed that 91 % of properties are less than 20 ha in size. Danish state forests (110,000 ha) are managed by the **Nature Agency (Naturstyrelsen)**, which is part of the Danish Ministry of Environment and Food (Miljø- og Fødevareministeriet). It also manages 90,000 ha of light, open areas such as meadows and moors. It has 18 regional offices that supervise private forests to ensure compliance with the Forest Act and to administer grant schemes.

Uncontrolled felling reduced forest cover to 2-3% in Denmark by the early 1800s. A **Forest Act** was adopted in 1805 which banned forest clearance and encouraged afforestation. A forest reserve obligation (fredskov) was introduced to secure future wood supplies. This led to the majority of private forests and all public forests in Denmark being designated as forest reserves, in total about 90% of Danish forests. These are regulated by the Forest

Act under a sustainable forest management regime that pays regard to economic, ecological and social factors. The 2002 **National Forest Programme** advocated close-to-nature management and this has been the practice in all Danish state forests and many municipal ones since 2005, replacing the previous age-class forestry management method. However this type of management has not been so readily accepted in privately-owned forests. State-owned forests are **certified** according to both the FSC and PEFC standards.

In the transition to close-to-nature management, **19 ‘forest development types’** have been described that set objectives for the composition and structure of individual stands. These include **4 historic types**:

- coppice forest
- forest pasture
- forest meadow and
- unmanaged forest

There is a tradition of coppicing and pollarding in eastern Denmark, particularly on Funen, Langeland, Lolland and Als where there are different types of very species-rich coppice forests. Hazel coppice occurs frequently but over 40 species of trees and shrubs can be found. In Jutland, oak scrub with some aspen has been used in the past for grazing and pollarding. Many oak forests were cut down during WW2 and no

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

² Senior Consultant, Danish Forestry Extension A/S, Bredsten, Denmark e-mail: pdkofman@gmail.com

³ University of Copenhagen, Rolighedsvej 23, 1958 Frederiksberg C, Denmark, email: kjs@ign.ku.dk

felling has since taken place although there is some scrub that is still pollarded.

The latest version of the Forest Law (Legislative Decree no. 678 of 14 June 2013 with changes imposed by § 3 of Law no. 86 of 28 January 2014) prescribes the use of forest reserve land. Guidance on the interpretation of the Law is given on Naturstyrelsen's website (<https://www.retsinformation.dk/forms/r0710.aspx?id=175267>). The Law does not require forest management planning at the level of individual properties, although this will, presumably, be carried out when applications are made for PEFC or FSC certification. Owners are not required to apply for logging permits or to notify the authorities before logging begins.

Some of the Forest Law provisions are:

- Areas must be stocked with trees that form, or within a reasonable period of time (up to 10 years) will form, a connected forest of standard trees. This excludes areas needed for forest management, such as roads, storage spaces, loading docks, firebreaks, forest nurseries, etc. and the other exceptions mentioned below.
- Harvesting, except thinning, may not take place before the vegetation or the individual tree has reached the age or dimension where it is mature and ready to harvest. This applies to single trees in uneven-aged forests or to stands of even-aged trees. Exceptions to this rule are mentioned below. Clear-cuts should be avoided where possible. A border of deciduous trees and shrubs on the external edges of forest reserve areas must

be preserved; the width of these will vary depending on local circumstances. Safety considerations will dictate treatment of forest which also has a role as 'protection forest', e.g. for railways and roads.

- Coppicing can be carried out on up to 10% of a forest reserve without a derogation. Animal husbandry is prohibited, but forest grazing is permitted on 10% of a forest reserve provided any fencing does not prevent public access where the Nature Protection Act allows it. It is expected, although not required by the Law, that such operations are carried out where there is a historical tradition for this type of forestry or for cultural reasons. This applies to species, such as hazel, alder, ash and oak but also to other suitable species where they have been traditionally coppiced locally and also includes pollarding of willow.

The 10% is calculated from the total area of each forest reserve including any non-vegetated areas. One owner's property may contain several forest reserve areas and in such cases the 10% applies to each individual area. However, if they are physically separated from each other, the 10% areas cannot be aggregated and the coppicing or grazing carried out in only one of them.

A dispensation to allow coppicing or forest grazing on more than 10% of a forest reserve area may be given if traces of this type of management can be found on the forest reserve area. This could be the case for many properties with old coppice that dates back hundreds of years and where it is desirable for whole forest areas of, typically, 1 to 5 ha to be coppiced.

The 10% rule also applies to growing Christmas trees and other greenery, as long as this is short-term, i.e. the trees must not be grown to maturity. The area to be planted must not affect valuable or vulnerable habitats and they must be surrounded by a belt of hardwood trees.

In addition to the areas that can lawfully be without woodland, **open natural areas** can be established for up to 10% of a forest area in order to promote nature and landscape values, cultural and biological diversity. This could include forest meadows or protected natural areas, and areas under natural succession but it excludes areas planted with agricultural crops, fruit trees, berry bushes, flower production, etc. Any deforestation necessary to open a natural area may be subject to an **Environmental Impact Assessment** if it might significantly affect important habitat areas. There is an obligation to report any proposed deforestation for EIA screening, regardless of whether it is on a forest reserve or not. Other open areas may be permitted if required by the **Nature Protection Act** or the **Buildings Preservation Act**.

The Forest Law includes provisions to conserve oak scrub forest (4,725 ha), which

is found especially in central and western Jutland. Alder carrs may be subject to the Nature Protection Act and designated as a priority habitat under the EU Habitats Directive. Also, lakes, bogs, heaths, salt marshes, meadows and biological commons that belong to the forest reserves and are not covered by the Nature Conservation Act must not be drained, planted or otherwise altered.

The Forest Act and Nature Protection Act require that some operations in **Natura 2000** areas, which would otherwise be allowed under the Forest Act, be notified to the relevant authorities before implementation, so that an assessment can be made as to whether they could lead to habitat deterioration or disturbance to species for which the site has been designated. This includes coppicing. If necessary, conditions will be agreed with the owner if possible or imposed if not. The obligation to notify is independent of whether there is a Natura 2000 plan or management plan. Activities that require a derogation from the Forest Act or other legislation need not be notified because an assessment in relation to Natura 2000 protection will be made when the derogation application is processed.

References

- Act on forests <https://www.retsinformation.dk/forms/r0710.aspx?id=175267>
- Ministry of Environment & Food of Denmark Agency for Water & Nature Management Facts on Danish Forests <http://eng.svana.dk/nature/forestry/>
- Jensen, C. L. (2012) Forests and forestry in Denmark – Thousands of years of interaction between man and nature. <http://www.nordicforestresearch.org/wp-content/uploads/2012/07/ForestandforestryinDenmark.pdf>
- Larsen, J. B. (2012) Close-to-Nature Forest Management: The Danish Approach to Sustainable Forestry 3. Close-to-nature forest management in Denmark. In: Sustainable Forest Management - Current Research (eds. J. Martin Garcia and J. J. Diez Casero) InTech <http://cdn.intechopen.com/pdfs/36975.pdf>

ESTONIA

Jennifer Mills¹, Peter Buckley¹ and Katrin Heinsoo²

The area of Estonia is 45,227 km². Just over half of the country is covered with 2.2 M ha of forest of which 1.6 M ha is manageable forest. Deciduous trees account for 51% of stands; 49% are conifers. The most common tree species are Scots pine, Norway spruce, Silver and Downy birch, aspen, Black alder and Grey alder. 47% of the forest area is in private ownership, the state owns 41% and 12% is still “subject to privatization”. State forests are managed and marketed by the State Forest Management Centre (Riigimetsa Majandamise Keskus, RMK) and overseen by the Ministry of the Environment (Keskkonnaministeerium). A forestry development plan is prepared every 10 years and approved by the Estonian Parliament (Riigikogu). The principal goals of the ‘**Estonian Forestry Development Program until 2020**’ are to safeguard forest productivity and viability and ensure the varied and effective use of forests. At least 10% of forest land is under strict protection.

Coppice management is not practiced, except in Short Rotation Coppice willow, poplar and alder plantations, but it has been used in the past in traditional wooded meadows, which are species rich and classified as a **European priority habitat** (6530 Fennoscandian wooded meadows). As well as hay harvesting and collection of wood for

fuel, branches with leaves were coppiced or pollarded and dried for winter fodder. It is estimated that wooded meadows covered nearly 19% of Estonia’s surface area at the end of the 19th century, but only approximately 8400 ha now remain of which about 2700 ha are protected.

Since the early 1990s there have been several **Forest Acts**, each with amendments. The current Act does not apply to detached plots of forest land of less than 0.5 ha, or land where the average age of trees does not exceed 10 years and is not registered as forest land - even though it may comply with other definitions of forest land (at least 0.1 ha with woody plants at least 1.3m high and with canopy density of at least 30%). Estonian forestry is supervised by the Environmental Board of the Ministry of the Environment who give consent for felling operations.

Some of the provisions of the most recent Act are:

- A forest survey is carried out to receive data on the condition of forest and the volume of growing stock, to advise forest owners and to plan long-term forest management activities. The guidelines give the requirements for forest mapping; the objectives and methods of forest inventory; requirements for planning forest manage-

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

² Department of Botany. Estonian University of Life Sciences, Kreutzwaldi 1, Tartu 51014, Estonia. e-mail: katrin.heinsoo@emu.ee

ment; the methods of calculating the prescribed cut and the requirements for preparation of forest management plans. The inventory data in force is mandatory for an improvement cutting, thinning and selective cutting. A forest management plan will be prepared for a forest owner together with forest inventory, unless the forest owner does not wish it.

- The following types of cutting are permitted: regeneration cutting, including clear cutting, and shelterwood cutting; improvement cutting, including cleaning in stands with the average DBH of up to 8 cm, thinning in stands with the average DBH of 8cm and larger, and sanitary cutting; track cutting, including the cutting of 'quarter' or boundary lines; the cleaning of an existing ride or road shoulder, ditch bank or ditch shoulder from trees with the average DBH of more than 8cm; formative cutting in a protected area to attain a goal complying with the protection management plan, action plan for the protection and control of a species, or for the purpose of preservation and improvement of the status of the protected area or key habitat.

- A forest owner must replant clear-cut areas over 0.5 ha within 2 years after cutting, although this is not necessary if natural regeneration with a suitable species composition and number of plants on the whole area is sufficient.

- Regulation of the water and nutrition regime of forest soil is permitted, but fertilisation of forests, except forest nurseries, with mineral fertilisers is prohibited.

- The minister responsible will establish the rotation age at which clear cutting is permitted per tree species and quality classes, making certain that it is: 90-160 years for pine and hard broadleaved tree stands; 80-120 years for spruce; 60-80 years for birch and black alder; 30-50 years for aspen.

- When clear cutting, all trees should be cut from the cutting area within 1 year after the beginning of the cut except for: 20 to 70 pines, white birches, ashes, oaks, black alders, European white elms or Scots elms per hectare, dispersed or in small groups, which are left as seed trees, and viable undergrowth. Seed trees will not be left if there are no trees suitable or if viable undergrowth of the tree species suitable for the forest site type exists in the cutting area for reforestation and is preserved when cutting.

- Old crop trees, i.e. trees necessary to ensure biological diversity, or the preserved standing parts of such trees, should be left so there is a total volume of stem wood of at least 5 solid cubic metres per hectare, or in the case of a cutting area sized over 5ha, at least 10 cubic metres per ha.

- Key habitats: areas up to 7 ha needing protection and where there is a high probability of finding endangered or rare species. In state forests, the state forest manager organises the protection of key habitats in accordance with a ministerial directive. Protection of a key habitat is by a contract with the owner which gives the Ministry of the Environment a right of use for 20 years which may restrict economic

activities. The forest owner must ensure its preservation. About one third of forests are covered with management restrictions.

- **Protective forest:** In forest designated by a plan for the protection of a settlement or residential building against air pollution, noise, strong wind or snowstorm or for reducing the fire risk or prevention of the spread of forest fire, the local authority may, by agreement with the landowner, establish restrictions as to the type of cutting for regeneration cutting and to the size of the cutting area and the rotation age in the event of clear cutting.
- A cutting right (*raieõigus*) is necessary to prove the legality of cutting, delivery of timber, etc. The right is established by an entry in the land registry, a transfer deed for the cutting right or timber, permission from the Environmental Board or a forest notification in the state register of the forest resource and an identity document.
- A forest owner, or his representative, must submit a forest notification to the Environmental Board concerning planned cuttings, except cleaning; or serious forest damage. The Environmental Board verifies the compliance of the planned cutting

with the legislative requirements, valid inventory data or data about the condition, age, basal area and forest resources if the inventory data does not reflect the actual situation. If the planned activity does not comply with the legislation, the Environmental Board has the right to ban the activity, and making recommendations for bringing the activity into compliance with the legislation.

- A forest owner may cut, without submitting a forest notification or without registering with the state register of the forest resource, up to 20 solid cubic metres of wood per 'immovable' per year.

Forest certification

Both PEFC and FSC schemes are used in Estonia. PEFC is most commonly used in private forests; about 110,000 hectares of private forests are certified. State forests are certified by both PEFC and FSC.

Natura 2000

N2000 sites in Estonia are protected under the 2004 Nature Conservation Act. Management plans are compiled and approved by the Environmental Board (*Keskkonnaamet*). About 18% of total forest area is covered by Natura 2000.

References

- Forest Act from the 2015 English translation: https://www.riigiteataja.ee/en/compare_original/525032015010
- Marek Sammul, Kaili Kattai, Kaire Lanno, Vivika Meltsov, Merit Otsus, Liggi Nõuakas, Dora Kukk, Meeli Mesipuu, Silja Kana and Toomas Kukk (2008) Wooded meadows of Estonia: conservation efforts for a traditional habitat. *Agricultural and Food Science* 17: 413-429.
- Republic of Estonia Environmental Board: <http://www.keskkonnaamet.ee/eng/acivities/forestry/>
- <http://www.keskkonnaamet.ee/eng/acivities/nature-conservation/>

FINLAND

Jennifer Mills¹, Peter Buckley¹ and Jyrki Hytönen²

About 20% of the total growing stock volume in Finland (2 357 mill. m³) is of broad-leaved species, the other 80% is composed of Norway spruce and Scots pine. Birches (Silver birch and downy birch) constitute 83% of the growing stock of broadleaved species. There are no traditionally-managed coppice forests in Finland today, although coppicing was historically carried out on a very small scale in the south of the country. However, some trees of coppice origin can still be found in normal forests.

New forest legislation to ensure sustainable forestry came into force in 2014 including amendments to the 1996 **Forest Act** (metsälaki) and provisions for protected forests in the **Nature Conservation Act** (luonnonsuojelulaki). The amendments to the Forest Act aim to increase the freedom of choice of forest owners in managing their own forest property, to improve the profitability of forestry and operating conditions of the forest industry, and to enhance the biodiversity of forests. One important objective in the reform was to have less detailed regulation on the treatment of forests and to clarify the legislation. The most important changes include allowing uneven-aged forest stands, abolition of age and diameter limits in regeneration, a more diverse range of tree species, and an increase in habitats of special impor-

tance. Notification of the establishment of seedling stands is no longer required and supervision is targeted to the results of regeneration, for which new minimum limits have been specified.

The **Finnish Forest Centre** (Suomen metsäkeskus), a state-funded organisation, enforces forestry legislation. It also promotes forestry and related livelihoods, advises landowners on how to care for and benefit from their forests and ecosystems, and collects and shares data related to Finland's forests. The Finnish Forest Centre operates under the guidance of the Ministry of Agriculture and Forestry (Maa- ja metsätalousministeriö).

The Ministry of Agriculture and Forestry prepares a **National Forest Programme** the objective of which is to promote diverse use of forests in line with the principle of sustainable development. The Forestry Centre prepares a **Regional Forest Programme** in its own territory and monitors its implementation. The programme contains objectives for sustainable forest management, objectives to be set for measures referred to in the legislation on the financing of sustainable forestry and general objectives for the development of forestry in the region. Both processes are participatory and a wide range of interest groups are involved in them.

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

² Natural Resources Institute Finland (Luke), Natural Resources and Biodevelopment, Silmäjärventie 2, FI-69100 Kannus, Finland. e-mail: jyrki.hytonen@luke.fi

Some regulations of the Forest Act:

- When intending to carry out felling, the landowner should send a forest use declaration (Metsänkäyttöilmoitus) to the Forestry Centre no later than 10 days, but no sooner than 3 years, prior to the date on which felling or other operations are due to start.
- A forest use declaration is not needed for subsistence felling for household use, for small-sized trees of a mean diameter of up to 13 cm or if they are in the marginal zones of power lines and railways or felling for a ditch, water pipe or sewer line, small areas of road, electricity or other similar lines, unless the fellings are in a habitat of special importance.
- There are seven types of habitats of special importance for biodiversity mentioned in the Forest Act, but which are small in area. Forests in these habitats must be managed and utilised cautiously so that the characteristic features of the habitats are preserved or reinforced. Among others, these include habitats near streams and ponds, various mire, fen and flooded habitats, herb-rich forest patches which include natural or semi-natural tree and shrub stands and heathland forest located in undrained peatlands or peatlands where the natural water economy has for the most part remained unchanged. Actions that must not be taken in habitats of special importance include regeneration felling, forest road construction, treatment of the soil surface that may damage vegetation characteristic to the site, ditch drainage, cleaning of brooks and rivulets and use of chemical pesticides.
- In habitats of special importance, cautious fellings can take place by choosing individual

trees which preserve the stand in its natural or semi-natural state so that the natural or semi-natural water economy of the habitat does not change. No wood harvesting may be done in steep bluffs and the forest lying directly underneath. In sandy soils, exposed bedrock and boulder fields, cautious fellings can take place by choosing individual trees so that old, as well as dead and decaying trees, are preserved.

- Intermediate felling for the purpose of growing the remaining tree stand or that promotes the creation of new seedling material shall be done such a way that after the intermediate felling a sufficient and evenly distributed stand with growth potential is left in the treatment area. Matters to be taken into account in assessing the sufficiency of the stand to be left include the geographical location of the treatment area, site, method of implementing the intermediate felling and dominating height, which means the arithmetic mean of the one hundred thickest trees within a hectare. Intermediate felling involves a forest regeneration obligation if the volume and status of the remaining stand is not sufficient to create a new stand.

- Regeneration felling resulting in an open area except for the retention of seed or shelter trees to produce a new tree stand, involves a forest regeneration obligation if the exposed area exceeds 0.3 hectares. In forest regeneration, a seedling stand may be established with seedlings or seed of pine, spruce, silver birch, aspen, Siberian larch, maple, common alder, oak, European white elm, Scotch elm, small-leaved linden, ash and hybrid aspen suitable as regards their origin and the site. According to the Decree on Sustainable Management and

Use of Forests (1234/2010), regeneration of aspen and hybrid aspen by sprouting is also allowed. A seedling stand may be established with seedlings or seed of downy birch only in peatland, paludified sections of mineral soils and compact soils dominated by clay or silt. In other sites downy birch may be used as a supplementary tree species depending on its site and the geographical location of the area.

The Forestry Act is not applicable in, among other places, protected areas established under the Nature Conservation Act, areas purchased by the State for nature protection purposes, or other State-owned areas managed in accordance with a protection decision of the state forest administration, Metsähallitus, or other authority administering State lands, or in areas referred to in the Act on Wilderness Reserves other than the seven habitats of special importance mentioned above. The majority of nature reserves are located on state-owned land and maintained by Metsähallitus.

The **Ministry of the Environment** (Ympäristöministeriö) guides and monitors nature conservation in Finland. It prepares legislation to maintain biodiversity and is responsible for the general monitoring of the implementation of this legislation. The Ministry also prepares nature conservation programmes and establishes nature reserves under these programmes. Furthermore, it approves the management and use plans of

major nature reserves. The Finnish Environment Institute (Suomen ympäristökeskus) researches and assesses biodiversity, serving various public bodies and agencies, businesses and communities. It assesses the endangered status of organisms and habitats, conducts research on the management and restoration of different habitats, and on the importance of ecosystem services and their interaction with biodiversity.

Centres for Economic Development, Transport and the Environment (Elinkeino-, liikenne- ja ympäristökeskukset - ELY Centres) promote and supervise nature conservation and landscape protection in their respective regions. They safeguard biodiversity, for example, by establishing nature reserves on privately owned land, acquiring areas for the state, for the purpose of nature conservation, approving proposals for protected areas and management and use plans for these areas, safeguarding natural values in land use planning and planning the management and use of Natura 2000 areas. If a felling operation is to be carried out in a Natura 2000 site, or in its vicinity, which could significantly damage the natural value of the area, a declaration must be made to the area's ELY Centre.

About 18% of Finland's forestry land is **protected** or under restricted forestry use. The share of strictly protected forests is almost 14%. About 95% of commercial forests are PEFC certified.

References

- Centres for Economic Development, Transport and the Environment (ELY Centres). <https://www.ely-keskus.fi/web/ely-en/environment;jsessionid=756C1339A1CDC83BEBF92D2B4ACBB69F>
- Ministry of Agriculture and Forestry. <http://mmm.fi/en/forests/legislation>
- Ministry of Agriculture and Forestry. Forest Act. <http://www.finlex.fi/fi/laki/kaannokset/1996/en19961093.pdf>
- Natural Resources Institute. <http://www.metla.fi/metinfo/sustainability/SF-2-forestyr-and-environmental.htm>
- Nature Conservation Act. <http://www.finlex.fi/en/laki/kaannokset/1996/en19961096.pdf>
- Finnish Forest Association. <http://www.smy.fi/en/forest-fi/>

FRANCE

Jennifer Mills¹, Peter Buckley¹ and Philippe Ruch²

The Code Forestier contains the laws regulating French forests. Interpretation and implementation of the Code filters down through various levels of Government documentation including les Orientations Régionales Forestières (ORF) which describe the sustainable management objectives of forestry policy for regional administrative areas taking into account economic, environmental and social issues. They specify the broad guidelines to be followed by the entire forest industry and concern all public and private forests and sector participants (foresters, forestry companies, manufacturers and wood processors). The ORF sets forest policy at a regional level as well as a general action programs for the DRA (Directive Régionale d'Aménagement des forêts domaniales), SRA (les Schémas Régionaux d'Aménagement des forêts communales), and, for private forests, SRGS (le Schéma Régional de Gestion Sylvicole).

If a forest-owner has an approved sustainable management document, then planned coupes and other management operations do not usually need separate authorisation. For public or community forests, the “aménagement” constitutes the sustainable management document.

In private forests, there are 3 principal types of sustainable management documents depending on the size of the forest and the owner's choice:

PSG (le plan simple de gestion)

Obligatory where the cumulative area of the owner's forest plots located in the same municipality is equal to or greater than 25 hectares (a continuous area or the sum of fragmented patches over 4 ha in nearby municipalities). The plan lasts for 10 - 20 years and is approved by the CRPF*. A voluntary PSG can be carried out for properties between 10 and 25 hectares.

*Centre Régional de la Propriété Forestière France is divided into 18 CRPFs, delegated from the Centre National de la Propriété Forestière, a public advisory and management service for forestry owners. They are administered by elected forest owners and run by a team of forestry engineers and technicians. They direct and promotes improved management of private forests.

RTG (le règlement type de gestion)

An optional management document which is intended to define management arrangements for owners of forest of between

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

² Institut technologique FCBA, Equipe Exploitation forestière & Approvisionnement Bois, 60, route de Bonnencontre, 21170 Charrey-Sur-Saône, France. e-mail: philippe.ruch@fcba.fr

10 and 25 hectares. It is overseen by an 'organisme de gestion et d'exploitation en commun' (OGEC*) and leads to at least 10 years of commitment.

*An OGEC is an organisation of proprietors for communal forestry management and exploitation. It can be a cooperative or management syndicate or an association of forestry proprietors as defined by a specific law.

CBPS (le code des bonnes pratiques sylvicoles)

An optional document for small properties, drafted by the Centre Régional de la Propriété Forestière (CRPF) and validated by the Prefect of the region, which includes the essential recommendations by type of stand consistent with sustainable management. The owners adhere to it for a period of at least 10 years.

What regulations must be followed if wood is to be harvested? In privately-owned forests, whatever the size of the property, 2 cases may apply depending on whether a management plan has been established or not.

i) If such a plan exists, its compliance with the regional directives has been approved by the authorised administration and a harvesting operation need only comply with the plan (i.e. it meets the management objectives).

ii) If there is no management plan, then the harvesting operation will fall under specific regulation. The most common situations are:

- If the size of the future operation is > 4ha and more than half of the volume of the standing standards are to be harvested: the operation needs to be authorised by the regional administration (DDT - la Direction Départementale des Territoires)

- If the operation is a final felling (or clearcut) > 1ha in a forest larger than 4ha: the stand must be re-established (regeneration or plantation) at the latest 5 years after harvest

- Moreover, some forests may fall under municipal jurisdiction: they are classified in EBC (Espaces boisés classés), areas that need to be preserved (no clearcuts, every operation has to be approved by the municipal council).

+ Independently of the existence of a management plan, the location of the forest can also be subject to specific environmental regulation due to the nature of the area (specific protection status such as Natura 2000, water, waste management, etc.).

...

An exception is made for cuts which are for the owner's own domestic use for firewood or for his agricultural fencing requirements, but not for timber. Where the firewood is sold or more than a third of it is given away, authorization is necessary. The relevant article in the Code Forestier (L312-10) does not indicate what quantity or diameter of wood can be cut for the owner's domestic use.

Cutting of poplar plantations is not affected by these regulations. Thinning necessary to the good management of softwood stands will be authorized.

From a general point of view, clear-cuts or stand regeneration will be allowed where the stand has reached or exceeded the minimum age of exploitability defined for that type of stand in the Scheme of Regional Woodland Management (SRGS). For younger stands, an analysis is made on a case by case basis.

Penalties

Cutting without authorisation is illegal according to articles L313-11 et L362-1 of the Code Forestier. The agent or proprietor will receive a fine of €20 000 per hectare for the first two hectares and €60 000 for each supplementary hectare.

Obligatory renewal after clearcutting

All stands of 1 ha or more in one piece located in a forest larger than 4 ha, regardless of stand type (standards, coppice-with-standards or simple coppice), belonging to one owner or tenant, must be restocked. This can be by regeneration or planting.

Zones where other legislation can apply

Some logging may also be subject to other regulations, for example, in wooded areas classified as an EBC*, and in, or near other protected environmental (including Natura 2000 sites), historical or architectural sites.

*Under Article L. 130-1 of the Town Planning Code (Code de l'urbanisme), a 'plan local d'urbanisme' (PLU) can classify a site as an 'Espace boisé classé' in order to protect or create woods, forests, parks, individual trees, hedges and plantations. This also takes account of the 'Grenelle II' laws relating to the national commitment to the environment. Cutting of mature coppice can be exempt from prior notification in an EBC as long as renewal is satisfactory and other restrictions on cutting of the standards observed.

Natura 2000 sites

There are no supplementary formalities for Natura 2000 sites for felling or woodland management, but must be in accordance with existing regulations relevant to the site. Each Natura 2000 site has a 'document d'objectifs' (DOCOB); which among other things sets out the management objectives for the site and how they are to be achieved.

A PSG or RTG cannot be approved for a Natura 2000 site if the coupes or forestry work affect the site's conservation status. The CRPF has the responsibility of assessing if the types of management proposed in the PSG or RTG are likely to have a significant effect on the Natura 2000 site. It is they who have to decide whether or not to approve the PSG or the RTG.

If the owner asks the CRPF if he can benefit from Article L.122 of the Code Forestier* and if there is no significant effect on the habitat of the Natura 2000, a PSG will be approved.

If it is judged by the CRPF that the Natura 2000 site will be significantly affected by the proposals, the CRPF will ask the owner to amend his felling and management plan, but if the owner does not want to comply with the amendments, the owner will, at his own cost, be required to carry out an environmental impact assessment. If not, the CRPF will refuse to approve the PSG.

* In the past an owner had to ask permission for every type of management which could make an environmental impact on the various types of environmental and other zoning. Articles L 122-7 and 8 of the Forestry Code now allows an exemption from this during the time a PSG is valid for all the management and coupes specified in it providing an application requesting this is attached to the PSG application.

References

Le Code Forestier. <https://www.legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000025244092>

CRPF Midi-Pyrénées Réglementation des coupes de bois et Obligation de reconstitution après coupe rase. La réglementation au service de la gestion durable des forêts. http://www.lot.gouv.fr/IMG/pdf/PlaqueTechniqueCoupes_DDT46_CRPF-MidiPyrenees.pdf

Demander une autorisation administrative de coupe de bois. http://mesdemarches.agriculture.gouv.fr/demarches/proprietaire-ou-operateur/obtenir-un-droit-une-autorisation-43/article/coupe-du-bois-pour-les-forets-sous?id_rubrique=43

GERMANY

Christian Suchomel¹ and Patrick Pyttel²

German forest law gives the framework for forest management in Germany. More specific laws are given by the federal states. Historic management forms are mentioned in the context of German forest law where it is stated that cultural heritage and heritage conservation should be taken into account (Bundesministeriums der Justiz und für Verbraucherschutz 1975).

The **federal laws** regulate that clear cuts or heavily thinned stands should be reforested as appropriate. Within individual federal states, forest laws the maximum clear cut size varies between 0,3 and 2,0 ha. Three states do not have a specific maximum clear cut size. But coppice is not really considered as clear cutting: more as a method of regeneration. This interpretation of the federal laws can be found in in the paragraphs below.

In the **German National Strategy of Biodiversity**, which is a declared intention and not legally binding, historic management systems like coppice, coppice-with-standards and forest pastures are explicitly mentioned for their high value in conservation and recreation. The aim of the strategy is to continue to manage in this way and expand it if possible. Historic relicts of forest management (for instance

coppice) are intended to be preserved (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2007). Another Strategy at country level is the **German forest strategy 2020**. Here, also, unique historical management systems such as coppice, coppice-with-standards and wood pastures are confirmed as important habitats for flora and fauna, relying on their traditional and special management. The strategy places a high emphasis on conservation (Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz 2011).

To go into the rules and regulations of the federal states, we selected the six (out of 16) federal states with the highest percentage of coppice and coppice-with-standards on the whole coppice area in Germany: Bavaria (37%), Rhineland-Palatinate (17%), Mecklenburg-Western Pomerania (9%), North Rhine-Westphalia (8%), Thuringia (8%) and Hesse (5%) (Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz 2005) .

Specific guidelines about felling heights, maximum size of coppice areas or the number of standards are not regulated in either German or federal state law.

¹ Chair of Forest Operations, Albert-Ludwigs-University of Freiburg, Werthmannstr. 6, D-79085 Freiburg i.Br., Germany e-mail: christian.suchomel@foresteng.uni-freiburg.de

² Chair of Silviculture, Albert-Ludwigs-University of Freiburg, Tennenbacherstr. 4, D-79106 Freiburg i.Br., Germany. e-mail: patrick.pyttel@waldbau.uni-freiburg.de

Select Federal States

Bavaria

In the Bavarian forest law, coppicing or other historical forms of forest management are not specifically covered. The federal strategy for the conservation of biodiversity only refers to regulations concerning voluntary contractual nature conservation measures (Bayerisches Staatsministerium für Umwelt und Gesundheit 2009). Here the establishment and maintenance of coppice and coppice-with-standards forests, as well as the resumption of coppicing, is permitted as a so-called compensatory measure. The same strategy refers to the need for action in forests. In the relevant paragraph, coppice and coppice-with-standards are mentioned as examples of forms of forest management which should be facilitated due to their special importance for biodiversity.

Rhineland-Palatinate

Rhineland-Palatinate is a federal state with the highest share of forest area. In this part of Germany especially, aged oak coppice forests are a substantial and omnipresent part of the forested landscape. Inventories in public forests, together with estimations in private forests, show that more than 160,000 ha are still covered by aged coppice forests. So it is all the more surprising that neither historical forms of forest management, nor coppice or coppice-with-standards forests, are considered in the federal forest law. However, coppice forests are explicitly mentioned in the federal strategy for the conservation of biodiversity (Ministerium für Umwelt, Landwirtschaft, Ernährung, Weinbau und Forsten Rheinland-Pfalz

2015). In this strategy coppice forests are considered as special habitats. In the context of management their high nature conservation value should be given special consideration.

Mecklenburg-Western Pomerania

The north eastern part of Germany belongs to the federal state of Mecklenburg-Western Pomerania. In the forest law of this federal state, coppice forests are only mentioned indirectly in the context of the of so-called protection forests. Forests can be designated as protection forests if they are of importance for research, conservation of genetic diversity or the conservation of meaningful historical forms of forest management (Ministerium für Landwirtschaft, Umwelt und Verbraucherschutz Mecklenburg-Vorpommern 2011). Hence, coppice and coppice-with-standards could potentially gain specific protection status, but the selection criteria for these forests were not specified. The federal forest law is flanked by one governmental program for the conservation and development of biological diversity, where specific attention to historical forms of forest management is expressly requested until the year 2020 (Ministerium für Landwirtschaft, Umwelt und Verbraucherschutz Mecklenburg-Vorpommern 2012). In the relevant paragraph coppice and coppice-with-standards forests are specifically mentioned in parenthesis. Both political instruments (Ministerium für Landwirtschaft, Umwelt und Verbraucherschutz Mecklenburg-Vorpommern 2011 and 2012) are presumably influenced by the federal forest development program published

by the Ministry for Agriculture, Food and Forestry in the year 2002. This program requires the promotion of historical forms of forest management together with the conservation of native tree species and rare plants (Ministerium für Ernährung, Landwirtschaft, Forsten und Fischerei Mecklenburg-Vorpommern 2002).

North Rhine-Westphalia

In North Rhine-Westphalia in the north-west of Germany, 6,000 ha of historical forests (coppice and wood pastures) are still actively managed. In the Biodiversity strategy it is mentioned that these forests contribute in an important way to the preservation of biodiversity. An aim is to develop an immediate concept for the coppice area and a concept for forest edges which will be managed as coppice-with-standards to develop light- and warmth-demanding species (Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen 2015). Coppice regeneration can be allowed by the administrators as a method by the forest law of North Rhine-Westphalia. Other clear cuts (max. 2 ha) have to be reforested within 2 years (Ministerium für Ernährung, Landwirtschaft und Forsten des Landes Nordrhein-Westfalen 1980).

Thuringia

The Free State of Thuringia is located in central Germany. The forest law of this state explicitly mentions coppicing. Firstly, in the context of clear cutting, the relevant article allows clear cuts in coppice and aged coppice forests, independent of their

age. In all other broadleaved forests clear cuts are not allowed until the age of 80 years. Secondly, in the context of fee-based management services of governmental employees in private and community owned forest, the article literally says, that fees for the management of coppice forest (excluding aged coppice and coppice-with-standards forests) are reduced by two thirds (Thüringen Forst 2015). These articles are supplemented by the federal strategy for the conservation of biodiversity (Thüringer Ministerium für Landwirtschaft, Forsten Umwelt und Naturschutz 2012). The strategy proposes the conservation of historical forest management types to reinforce specific forest structures and compositions.

Hesse

Hesse is in the centre of Germany. The Hessian Biodiversity Strategy does not mention coppice, coppice-with-standards or any other historical management systems (Hessisches Ministerium für Umwelt, Klimaschutz, Landwirtschaft und Verbraucherschutz 2015). The maximum clear cut size is 1 ha which is allowed by the state's forest law. Coppicing is explicitly mentioned in the context of clear cutting. The relevant article allows clear cuts in coppice and aged coppice forests independent of their age. In all other broadleaved forests clear cuts are not allowed until the age of 80 years (Hessisches Ministerium für Umwelt, Energie, Landwirtschaft und Verbraucherschutz 2013).

References

- Bayerisches Staatsministerium für Umwelt und Gesundheit (2009): Strategie zum Erhalt der biologischen Vielfalt in Bayern [Bayerische Biodiversitätsstrategie]. 18 p.
- Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (2011): Waldstrategie 2020: Nachhaltige Waldbewirtschaftung – eine gesellschaftliche Chance und Herausforderung. 35 p.
- Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (2005): Die zweite Bundeswaldinventur – BWI?: Der Inventurbericht. Bonn. 231 p.
- Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (2007): Nationale Strategie zur Biologischen Vielfalt. 178 p.
- Bundesministeriums der Justiz und für Verbraucherschutz 1975: Gesetz zur Erhaltung des Waldes und zur Förderung der Forstwirtschaft (Bundeswaldgesetz).
- Hessisches Ministerium für Umwelt, Energie, Landwirtschaft und Verbraucherschutz (2013): Hessisches Waldgesetz (HWaldG).
- Hessisches Ministerium für Umwelt, Klimaschutz, Landwirtschaft und Verbraucherschutz (2015): Hessische Biodiversitätsstrategie 29 p.
- Mairota P, Buckley P, Suchomel C, Heinsoo K, Verheyen K, Hédl R, Terzuolo PG, Sindaco R, Carpanelli A (2016). Integrating conservation objectives into forest management: coppice management and forest habitats in Natura 2000 sites. *iForest* 9: 560-568 . – doi: 10.3832/ifor1867-009
- Ministerium für Ernährung, Landwirtschaft und Forsten des Landes Nordrhein-Westfalen (1980): Landesforstgesetz für das Land Nordrhein-Westfalen (Landesforstgesetz LFoG).
- Ministerium für Ernährung, Landwirtschaft, Forsten und Fischerei Mecklenburg-Vorpommern (2002): Gutachtliches Waldentwicklungsprogramm für Mecklenburg-Vorpommern. 44 p.
- Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen (2015): Biodiversitätsstrategie Nordrhein-Westfalen – Die Biodiversitätsstrategie des Landes Nordrhein-Westfalen. 153 p.
- Ministerium für Landwirtschaft, Umwelt und Verbraucherschutz Mecklenburg-Vorpommern (2011): Waldgesetz für das Land Mecklenburg-Vorpommern (Landeswaldgesetz – LWaldG). 50 p.
- Ministerium für Landwirtschaft, Umwelt und Verbraucherschutz Mecklenburg-Vorpommern (2012): Erhalt und Entwicklung der Biologischen Vielfalt in Mecklenburg-Vorpommern. 170 p.
- Ministerium für Umwelt, Landwirtschaft, Ernährung, Weinbau und Forsten Rheinland-Pfalz (2015): Die Vielfalt der Natur bewahren - Biodiversitätsstrategie für Rheinland-Pfalz. 67 p.
- Thüringen Forst (2015): Das Thüringer Waldgesetz. 47 p.
- Thüringer Ministerium für Landwirtschaft, Forsten Umwelt und Naturschutz (2012): Thüringer Strategie zur Erhaltung der biologischen Vielfalt. 93 p.

IRELAND

Jennifer Mills¹, Peter Buckley¹ and Ian Short²

The **Forestry Act 1946**, administered by the **Forest Service** (Department of Agriculture, Food and the Marine), outlines the legislative requirements for tree felling in Ireland. Under Section 37 of the Forestry Act, 1946, it is illegal to uproot any tree over ten years old or to cut down any tree of any age (including trees which form part of a hedgerow), unless a **Felling Notice** has been lodged at the Garda Station nearest to the trees at least 21 days before felling commences.

On receipt of a completed Felling Notice, an **Order prohibiting the felling of the trees** is issued. This protects the trees in question while consideration is given to the issuing of a felling licence. This remains in force pending the issue of a Felling Licence, which can include environmental and replanting conditions.

There are **two types of Felling Licences**. The type of licence required depends on the forest operation being proposed:

- A **General Felling Licence** is usually valid for five years and tends to be used for fellings on larger areas and all grant aided plantations. Replanting must take place on the same area that has been clear felled. A management plan outlining all fellings for

the entire rotation can be submitted, and resubmitted at the end of a 5 year period if no changes are required.

- A **Limited Felling Licence** is valid for two years and is mainly used for small fellings. This type of Licence must be used if the applicant is requesting not to replant or if nominating an alternative area to replant.

The requirement for a felling licence for the uprooting or cutting down of trees does not apply where:

- The tree in question is a hazel, apple, plum, damson, pear, or cherry tree grown for the value of its fruit or any ozier;
- The tree in question is less than 100 feet from a dwelling other than a wall or temporary structure;
- The tree in question is standing in a County or other Borough or an urban district (that is, within the boundaries of a town council, or city council area).

Other exceptions apply in the case of local authority road construction, road safety and electricity supply operations.

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

² Teagasc Forestry Development Department, Ashtown Food Research Centre, Dublin 15, D15DY05, Ireland. e-mail: Ian.Short@teagasc.ie

Penalties for illegal felling can be severe, ranging from fines of up to a maximum of €63.49 per tree to imprisonment for up to 2 years. In addition to any fine which may be imposed by the Court, the Minister may, by Order, require the person convicted to replant.

References

<https://www.teagasc.ie/crops/forestry/advice/timber-harvesting/felling-of-trees---legal-requirements/>

ITALY

Paola Mairota¹, Rodolfo Picchio², Francesco Neri³,

Pier Giorgio Terzuolo⁴ and Pietro Piuksi⁵

In Italy, as from the 1970s (Law n. 382 of 1975 and subsequent modifications), responsibilities for forest regulation are transferred to 19 administrative regions (NUTS2) and 2 autonomous provinces (NUTS3) (regions hereafter) for what concerns organization and management matters and delegated to these for what concerns landscape and environmental matters. National forest guidelines indicate important goals for the regions to consider in order to develop sustainable, multifunctional forestry, which include environmental protection, conserving and enhancing biodiversity and the forest's protective function, while promoting productivity and improving socio-economic and educational aspects of forestry. To achieve these goals forest and land use planning is required at the regional, provincial and municipal levels.

The national legal framework relating to forestry consists of **Law n. 3267 of 1923, 'Reordering and reform of legislation on forests and mountainous terrain'** (Riordinamento e riforma della legislazione in materia di boschi e di terreni montani), and

of its **related Ordinance (Regio Decreto) n.1126 of 1926**, which were enacted for hydrological and soil-protection reasons. By this framework, **forest management plans** ('Piani economici dei beni silvo-pastorali') became mandatory for public estates. **Law n. 431 of 1985, the so-called 'Galasso law'** (later integrated within, and somewhat altered by Ordinance (D.lgs.) n. 490/1999), imposed constraints on various and larger areas for landscape and environmental reasons and *ope legis* included land covered by forests and woods. These two sets of norms greatly differ in the way forests and silviculture are considered (Abrami 2009). In L. 3267/1923 forests are considered (and therefore forest activities need to be regulated) in relation to their crucial role in soil-protection and watershed stability. L. 431/1985 bears the legacy of a previous Law n. 1497 of 1939, aimed at protecting natural beauty and landscape from an aesthetic point of view, and considered forests as "good" per se. That is, forests (and indeed large chunks of the country's territory of relevance for their environmental features) are worth protec-

¹ Department of Agro-Environmental and Territorial Sciences, University of Bari "Aldo Moro", Via Orabona 4, 70125 Bari, Italy, email: paola.mairota@uniba.it

² Department of Agriculture and Forest Sciences, Tuscia University, Via S. Camillo de Lellis, 01100 Viterbo, Italy

³ Department of University of Florence, Department of Agricultural and Forest Economics, Engineering, Sciences and Technologies, Via S. Bonaventura 13, 50145 Florence, Italy

⁴ Institute for Timber Plants and the Environment (IPLA), Corso Casale 476, Torino Italy

⁵ Former Professor of Silviculture, University of Florence, Via San Bonaventura 13, 50145 Florence, Italy

tion in the light of the services (*sensu lato*) they can provide to the human communities. Despite this stronger and wider “environmentalist” rationale, it has been recognized (Abrami 2009) that this regulation is not actually intended to impede or prohibit silviculture.

Further national level rules are provided by **Ordinance (D.lgs.) n. 227 of 2001 ‘Orientation and modernization of the forestry sector’** (‘Orientamento e modernizzazione del settore forestale’). This act was passed in compliance with international and EU conventions, and recognised the need for sustainable forestry management. It provided the definition of “bosco” (woodland-forest) where the terms woodland and forests are made equal (similar to the French Code forestier). Further details were introduced to this definition by L 35/2012 (art 26). D.lgs.) n. 227 of 2001, which also reaffirms the competence and the duties of the regions in structuring forest strategic and tactical planning.

Finally, the **Ministry of the Environment’s Ordinance DM of 16-06-2005** (‘Linee guida di programmazione forestale’) stipulates guidelines meant to assess the conservation status of forests with regard to biodiversity, delineating forest planning strategies and criteria to be implemented by the NUTS2 and the NUTS3 regions in charge at different scales (e.g., regional, territorial, local-estate).

Analysis of the laws and regulations issued by the individual regions in compliance with national rules reveals considerable differences. Some regions have not legislated at

all with regard to forests and forestry (e.g., Valle d’Aosta, although this autonomous region has a primary authority on these matters), others have enacted framework rules and others partial rules.

Even in the deficiency or absence of regional rules, planning has been developed by most of the regions on the basis of national standards, sometimes supplemented by regional guidelines, issued without the support of a forestry law or drafted for specific public funding schemes.

Forest plans at the regional scale are in fact just broad programming tools describing forests, strong and weak points, objectives and in part the resources available for the advancement of the sector. Some regions also have a separate document on the state of forests, updated periodically. This planning level is prescribed by 17 NUTS2 regions. Almost all of these have actually developed such a plan, many have approved it and some have already revised it after its natural expiration. The duration of the regional forest plan varies from 3 to 15 years, and in some cases it coincides with the duration of the regional legislature (5 years).

The second level of territorial planning, developed for **sub-regional homogeneous areas** (e.g., mountain valleys, sub-provincial areas), includes a discussion on forests and their functions, regardless of ownership. It is provided for by 8 regions, which have carried it out on part of the territory, rarely all (Piemonte), on an experimental basis and sometimes enforcing it as binding instrument.

Forest planning at the **estate level, individual or associated**, is provided by all the regions that have legislated on these matters, and also at least partially developed by the others. This is called a forest management plan, business plan, forestry-pastoral plan, forest estate plan etc., terms which can be considered synonymous.

For some of the regions/provinces, namely Valle d'Aosta, the Provinces of Trento and Bolzano, Veneto, and Friuli Venezia Giulia, forest planning instruments also cover all or most of the **communal or collective estates**, or at least significant portions of the territory. These instruments are devoted to large public (seldom private) estates or, more recently, to those pertaining to associated parties favored by rural development programs (RDP).

Forest planning in **protected areas** (nature parks and reserves) and in the **Natura 2000** sites is a complex issue, often not addressed at the legislative level, neither as part of the forest framework law, nor as regulations for the conservation of biodiversity. The latter, if enacted, sometimes explicitly provide for a Site Management Plan (PDG) (e.g., Piemonte provides it for all sites), in compliance with the Habitats Directive and the national implementing rules. Some regions/provinces have drawn up the local equivalent, for many or all of the sites, in some cases already approved, while others have prepared them for some sites, or in other cases, approving site-specific Conservation Measures ('Misure di conservazione' MdC). This regulatory process should have been completed by 2016, at least at the level

of site-specific conservation measures.

In any case, the forest management plans involving Natura 2000 sites must comply with such conservation measures and, according to article 6 of the Habitats Directive, must undergo Appropriate Assessment (AA) procedures.

Technical prescriptions

With regard to silviculture (including coppice silviculture), enacted regional regulations either directly provide technical prescriptions or refer to province (NUTS 3) level regulations 'Prescrizioni di Massima e Polizia Forestale' (PMPF). These have been issued for all the provinces under the national framework law (Law n. 3267 of 1923) according to national level guidelines originally (1927) defined by the Ministry of Economy (then Ministry of National Economy) and revised in 1957 and then again in 1963 by a panel of technicians and jurists (cf. Fiorucci, 2009). Such technical prescriptions for coppice silviculture mainly concern the number of standards to be released in coppice with standards and in compound coppices. It is interesting to note (cf. Zanzi Sulli, 1995) that the rationale for the definition of the number and the age distribution of standards differs greatly between the earlier (1927) and later version (1963) of the national guidelines for PMPF, reflecting motivation for the release of standards (animal raising/timber production vs dead stool replacement, respectively). This in turn was mostly due to the need to improve the state of coppice woodlands by preventing traditional side-practices (e.g., grazing, litter collection)

as well as the need to define strictly coded systems (i.e. coppice-with-standards vs compound coppice).

The technical prescriptions in force with respect to coppice silviculture as per the effect of the implementation of either regional or province level (NUTS 3, PMPF) regulations greatly differ across the country and in particular for what concerns:

- Possibility of avoiding standard release for some forest types (simple coppices);
- Minimum and maximum number of standards (coppices-with-standards);
- Minimum and maximum length of rotation;
- Prescriptions for biodiversity in coppices and/or in Natura 2000 sites.

Simple coppice silviculture is allowed in most regions for (e.g.) *Alnus*, *Robinia*, *Corylus*, *Populus*, *Salix*, *Genista*, *Eucalyptus* and allochthonous/invasive forest types with the exception of Valle d'Aosta, Piemonte, Emilia Romagna, Marche, Umbria and Basilicata.

With regard to the **minimum and maximum number of standards**, regions can be arranged in four groups:

1) Regions in which PMPF derived from the 1957-1963 scheme are still in force (Valle d'Aosta, Molise, Puglia, Sicilia). In these regions, on average a minimum 60 and a maximum of 120 standards ha⁻¹ (median values) have to be released for most forest types. These average values are close to the reference values provided in the scheme (50-140 ha⁻¹, as reported by Zanzi Sulli, 1995), where the maximum

values are the threshold representing one of the attributes discriminating between coppice-with-standards system from the compound coppice system in which there are up to three standard tree age classes.

2) Regions in which PMPF have been revised between 1980 and 2003 (Veneto, Emilia Romagna and Campania) and in which, on average, a minimum 70 and a maximum of 140 standards ha⁻¹ have to be released for most forest types, with the minimum being 40% higher than the 1957-1963 reference value for the PMPF scheme, as reported by Zanzi Sulli (1995);

3) Regions in which prescriptions are dictated by regional regulations (Friuli Venezia Giulia, Liguria, Toscana, Umbria, Lazio, Abruzzo and Calabria) in which, on average, a minimum 60 and a maximum of 140 standards ha⁻¹ have to be released for most forest types, with the minimum being 20% higher than the reference.

4) Regions in which prescriptions are dictated by regional regulations (Lombardia, Trentino, Marche, Basilicata and Sardegna) where, on average, a minimum 100 and a maximum of 200 standards ha⁻¹ have to be released for most forest types, with the minimum and maximum exceeding the reference values by 100% and 43% respectively.

The sole exceptions are Alto Adige and Piemonte. In the first one no prescriptions are in force for coppices due to the very small share of forest cover under coppice (less than 3.5%). Piemonte's recent regulations have introduced the criterion of minimum forest cover provided by standards instead

of their number to define standard density. This is deemed more effective for the purpose of a variety of ecosystem services (cf. also Fiorucci 2009).

For particular forest types such as sweet chestnut and beech all regions, on average, prescribe the release of a minimum of 40 and 100 standards ha⁻¹ respectively. In addition, Friuli Venezia Giulia prescribes a minimum of 120 standards for *Carpinus* forest types and Umbria a minimum of 100 standards ha⁻¹ for *Quercus ilex* forest types.

The situation is even more varied concerning the **minimum and maximum length for a coppice rotation**, which differs across both regions and forest types. For beech, deciduous oaks and sweet chestnut, for example, these values are on average respectively: min 24±3, max 40±7 years; min 18±3, max 36±7 years; and min 12±2, max 33±13, well above the very low values of the past (8-12 years), thus overcoming one of the main drawbacks of the coppice system, that is the over-exploitation of soil and stools due to the high frequency of the rotations. On the other hand, maximum values are nowadays more sensible values, as in most regions these by law discriminate between coppice and high forest systems and once the threshold is overcome, all regulations prohibit to maintain the coppice management and force the stand to be managed as a high forest, that is to resort, at the right time, to reproductive regeneration.

Finally, in the majority of regions ad hoc regulations concerning **nature conservation** dictate additional, and yet varied, prescriptions (e.g., coupe size and spatial arrangement, dead wood and ageing trees retention). As an example, for Natura 2000 sites in Puglia (DGR 2250/2010), silvicultural operations are allowed between October 1st and March 15th to avoid impacts on nesting habitats of protected bird species; the cumulative size of three consecutive years coupes must not exceed 10 ha; 120 standards ha⁻¹ have to be released in all forest types; and sporadic tree species (less than 10%) must be preserved. In another example, for Natura 2000 sites of Lazio, (Regulation 1/10, modification to article 53 of the Regulation 07/05), the appropriate assessment (AA) of plans and projects significantly affecting Natura 2000 sites, is explicitly prescribed in the absence of approved management plans and regardless of the ownership type (i.e. public or private). In particular, this is always required in the case of old coppices, and for regular coppices when coupe size exceeds 10 ha (20 ha Sweet Chestnut) or 0.4 ha in the case of forest habitat types 9180, 9210, 9220, 9340 of the Habitats Directive.

References

- Abrami A. (2009) Legge Galasso e legislazione forestale [Galasso law and forest legislation] *Aestimum* 17:221-229 [in Italian]
- Fiorucci E, 2009. Le matricine nei boschi cedui: le attuali regole di rilascio sono ancora valide? [Standards in coppice woodlands. Are current release prescriptions still effective?] *Forest@* 6: 56-65 [In Italian summary in English] [online: 2009-03-25] URL: <http://www.sisef.it/forest@/>.
- Zanzi Sulli A (1995). Parliamo ancora una volta di cedui e matricine [Once again on coppices and standards]. *Sherwood Foreste e Alberi Oggi* 7:7-11 [In Italian].

LATVIA

Kristine Štikane¹ and Dagnija Lazdina¹

Latvia occurs in the boreo-nemoral zone, transitional between the temperate and boreal forest zones where mixed forests of broadleaves and conifers are common. Forests cover about 50% of the area of Latvia.

Basically, the three dominant tree species in the forests of Latvia are pine (*Pinus sylvestris*), spruce (*Picea abies*) and birch (*Betula pendula*). According to the 2010 National Forest Inventory (NFI) data, potential coppice species making up of the forest area of Latvia include birch (27.9%) aspen (*Populus tremula* 7.7%), black alder (*Alnus glutinosa* 5.1%), grey alder (*Alnus incana* 9.8%), ash (*Fraxinus excelsior* 0.8%) and oak (*Quercus* spp. 0.7%). There is no data available for willow (*Salix* spp.) because it is not widely planted as the main species in the forest.

Since the restoration of Latvia's independence in 1990, the forestry sector has become one of the most important sectors in the country's economy. Since then the forest area in the country has increased by around 60,000 hectares a year. That was the first time when representatives of the timber industry began to gather together in associations so as to be able to defend their interests more successfully, not only in Latvia, but also in export markets. Exports of forestry products in the last 20 years have

increased more than 70 times. Meanwhile a list of specially protected environmental territories (IADT) was established in 1993. On April 28, 1998, the government of Latvia adopted the **Forest Policy**, which has been developed to reach a compromise among all stakeholders interested in the forestry. Prerequisites of a sustainable forest management are the targets defined and principles established in Latvia's Forest Policy. In 2000 the **Latvian Forest Industry Federation** was established to assist in the development and coordination of the activities of the various associations, in order to agree on fundamental principles aimed at preserving the national forest for future generations, as well as representing the interests of the timber industries at the international level. Since 2000, the **Ministry of Agriculture** performs the regulatory function laid down in the Forest Policy while monitoring function is done by the State Forest Service. The major part of the forest area possessed by the State is managed by the State-owned business operator – the State stock holding company “Latvijas valsts meži” (Latvian State Forests). In 2004, when Latvia joined the European Union, it automatically became part of the unified **Natura 2000** network of protected territories in the EU.

Among the species and biotopes that are listed in the EU's bird and biotope direc-

¹ Latvian State Forest Research Institute Silava, Riga Street 111, Salaspils, Latvia, LV2169
email: kristine.stikanek@gmail.com, dagnija.lazdina@silava.lv

tives, Latvia protects 60 types of biotopes. There are several protected forest biotopes in Latvia which are listed in the relevant EU directive – boreal forests, primary forests along meandering curves of rivers, certain coniferous forests, stands of oaks, forests on hillsides and in valleys, swampy forests, wet broadleaf forests, forests on river banks with oak and elm trees, dry fields of heather along seashore lowlands, wet fields of heather with crossleaved heath (*Erica tetralix*), dry fields of heather, as well as stands of juniper in calcified meadows.

There are many **forest habitats in Latvia protected by the EU directive** which includes territories where coppice tree species are common:

9010* Western taiga, which typically is dominated by pine, spruce, aspen and birch, or their combination.

9020* Fennoscandian hemiboreal communities of natural, old broad-leaved deciduous forests (of *Quercus*, *Tilia*, *Acer*, *Fraxinus* or *Ulmus*), rich in epiphytes. The tree layer typically is dominated by an admixture of ash, elm (*Ulmus* spp.), willow, lime (*Tilia* spp.), oak and aspen in different combinations, but with none of them dominant. A minor admixture of spruce, birch, pine is possible.

9080* Fennoscandian deciduous swamp forests are typically dominated by alder,

ash, birch or in admixture.

9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli community, typically dominated by oak, hornbeam and lime, or in mixture.

9180* Tilio-Acerion forests of slopes, screes and ravines where the tree layer is dominated by lime, ash, oak, elm, willow and maple (*Acer* spp.), or in admixture.

91D0* Bog woodlands are typically dominated by one or more species of pine, spruce and birch; occasionally aspen or alder are found in admixture, but these rarely dominate.

91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-padion*, *Alnion incanae*, *Salicion albae*) are protected under the EU habitat directive where the main species are ash, alder, elm (*Ulmus* spp.), willow, grey alder and bird cherry (*Prunus padus*); these are distinguished by an underlayer of brush and other various trees in a mixture with a canopy dominated by aspen or birch.

91F0 Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (*Ulmion minoris*) typically dominated by oak, elm, willow, or ash, or in different combinations of these species.

References

https://www.zm.gov.lv/public/ck/files/ZM/mezhi/buklets/MN_20_EN.pdf Latvia's Forests

<https://www.zm.gov.lv/en/mezi/jaunumi/the-land-forest-are-major-natural-resources-in-latvia?id=4100>

https://daba.gov.lv/upload/File/Publikacijas/ROKASGR_biotopi_EN.pdf European Union protected habitats in Latvia

LITHUANIA

Marius Aleinikovas¹ and Mindaugas Škema¹

Lithuanian forests are a natural element of the Lithuanian landscape offering biodiversity, productivity and sustainability, providing timber, green energy, food products and opportunities for healthy recreation of the urban and rural people. According to data from the Lithuanian Statistical Yearbook of Forestry (2016), the total forest land area is 2,186,000 ha and covers 33.5 % of the country's territory. The total growing stock volume is 537 million m³, while the gross annual increment is 19.3 million m³. Deciduous trees account for 56% of stands; 44% are conifers. The most common tree species are Scots pine (*Pinus sylvestris*), silver and downy birch (*Betula pendula* and *B. pubescens*), Norway spruce (*Picea abies*), black and grey alder (*Alnus glutinosa* and *A. incana*), aspen (*Populus tremula*) and oak (*Quercus* spp).

After the restoration of Independence in Lithuania, forest property rights were restored. The structure of **forest ownership** has changed due to an ongoing land reform process. All forestland was first transferred to the countrywide network of 43 state forest enterprises under the Ministry of Forestry. Currently, the private forest sector consists of 249,000 private forest owners managing a total of 873,000 ha (LSYF, 2016), which is 39.9% of the total forest area. In addition,

Forests of State importance cover 49.8 % and forest areas reserved for restitution amount to 10.3%.

State forest managers and private forest owners are obliged to manage and use their forests according to the **Forest Law** describing regulations on the management and use of forests, as well as other legal acts related to forest management, e.g.:

- Regulations for Forest Regeneration and Establishment (2008)
- Rules for Forest Sanitary Protection (2007)
- Rules for Forest Felling (2015)
- Rules for Forest Improvement Cuttings (2002), etc.

Forest management, reforestation and use are regulated in more detail in legal acts approved by the Minister of Environment. The main legal act is the **Law on Forests** adopted in 1994. It regulates reforestation, protection and use of forests and specifies the legal preconditions for managing all forest ownership types upon equal sustainable forestry principles. According to the Law on Forests, the state forestry policy trends are defined by Seimas (Parliament of the Republic of Lithuania) by adopting appropriate laws. The state forestry strategy and state forestry programmes are prepared by the Ministry of Environment.

¹ Institute of Forestry, Lithuanian Research Centre for Agriculture and Forestry, Tel: +370 37 547221, Fax: +370 37 547446, E-mail: marius.aleinikovas@mi.lt; mindaugas.skema@mi.lt

Forest sector development targets are guided through the **National Forestry Sector Development Programme for 2012–2020**, which was approved by the government in 2012. The document describes development trends and targets for the forestry sector. The major ones are: to preserve Lithuanian forests and increase their area and resources; and to preserve the efficiency and the sustainability of forest ecosystems, taking account of their ecological and social role and the impact from climate change.

At the beginning of 2016, the distribution of forests by functional groups was as follows.

- Group I (strict nature reserves): 26,500 ha (1.2%);
- Group II (ecosystem protection and recreational): 266,500 ha (12.2%);
- Group III (having protection status with regard to geology, geomorphology, hydrological and cultural merit): 333,400 ha (15.2%);
- Group IV (commercial): 1,560,300 ha (71.4%).

Group IV commercial forests are split into:

- a) commercial forests of normal cutting age, forming form productive forest stands and supplying wood continuously, following the requirements of environmental protection; and
- b) forest plantations, where the objective is to grow as much wood as possible in the shortest period of time.

The latter are forests which consist of stands of fast-growing tree species with a

cutting age of at least 15 years. Only stands with the same age class can be attributed to forest plantations. It is prohibited to plant forest plantations in non-plantation forest cutting areas. Coppice management is not practiced, except in short-rotation plantations of willow or poplar.

According to the Forest Law, forest managers and owners are obliged to follow certain mandatory parts of a **forest management plan** (i.e. the amount of wood allowed to be cut over a period of 10 years, and reforestation and environmental protection requirements). Internal forest management projects for private forest holdings of less than 10 ha may be prepared for 20 years. If over 10 years, the private forest owner does not cut all the permitted quantity of wood, the validity of the project can be extended for a further 5 years. The preparation of an internal forest management project is not obligatory for the following cases:

- 1) final felling of grey alder, aspen and other low value stands;
- 2) private forest holdings of less than 3 ha.

Lithuanian Law requires mandatory reforestation of clear-cuts and the expansion of the forest area through afforestation of abandoned lands. Clear-cut areas should be reforested within 3 years after cutting. Unsuccessful natural and artificial regeneration should be reforested within 2 years. During the past 10 years natural forests have expanded rapidly by about 65,000 ha of new forest, resulting from both natural growth and planting on abandoned agricultural land. Furthermore, since Lithuania joined the EU, afforestation of agricultural

land has been introduced using support from EU rural development funds and national funds.

The rotation age at which clear cutting is permitted is established in the **Rules of Felling**. For group IV it is:

- 101 years for pine, larch, ash, maple, beech and elm
- 71 years for spruce
- 121 years for oak
- 61 years for birch, black alder, lime and hornbeam
- 41 years for aspen
- 31 years for grey alder, sallow and willow

In private forests for grey alder, aspen, willow and sallow the age of felling in group IV forests is not prescribed. Within forest groups II-IVa, at least 7 live trees/ha (of which at least 3 must be older or thicker than average trees in the forest) and at least 3 dead trees must be left, with

a thickness of more than 20 cm in diameter at 1.3 m above ground, to ensure biological diversity.

Certification Schemes for forest products in State Forest Enterprises are certified under the rules of the Forest Stewardship Council (FSC) forest management and chain of custody. According to the United Nations Economic Commission for Europe (UNECE), State Forest Enterprises produce about 3.8 million m³ of FSC certified round wood, 50 % of all the round wood volume produced in Lithuania. Lithuania has its very own system of protected areas, and long-standing traditions for the protection of natural and cultural heritage. Protected areas are established not only for the protection of natural and cultural values, but also for their adaptation to allow public use and access, be it for educational, recreational or other purposes. The Natura 2000 network covers about 13 % of the total country territory.

References

- The Republic of Lithuania Forestry Law. Available at <http://extwprlegs1.fao.org/docs/pdf/lit38225.pdf>
- Ministry of Environment of the Republic of Lithuania. <http://www.am.lt/VI/en/VI/index.php#r/206>
- Directorate General of State Forests at Ministry of Environment of the Republic of Lithuania. <http://www.gmu.lt/en/>
- Mizaraitė, D., Mizaras, S. (2015) Forest Land Ownership Change in Lithuania. COST Action FP1201 FACESMAP Country Report, European Forest Institute Central-East and South-East European Regional Office, Vienna. 35 pages. [Online publication]. <http://www.europarc-nb.org/protected-areas/lithuania>

LUXEMBOURG

Jennifer Mills¹ and Peter Buckley¹

Forests in Luxembourg cover approximately 91,400 hectares, about 35% of the country, of which 68% is broadleaved trees, mainly beech and oak. The main softwood species are spruce (19 %) and Douglas fir (3 %). 52% of the forest is privately owned and the rest is owned by the State and other public bodies. 70% of private proprietors own less than 2 ha. The two main forested regions, which differ considerably in their geology and climate, are Ösling, in the north, a rugged, plateau area of the Ardennes with heights up to 559 m, and Gutland, a lower, warmer and more fertile area in the south.

In addition to a requirement for wood to produce charcoal to power blast furnaces, oak bark was also needed for an extensive leather tanning industry in Ösling during the 18th and 19th centuries. This led to much high forest being converted to oak coppice, known in Luxembourg as 'Lohhecken', which was cut on cycles of between 15-30 years. Due to the importation of bark from South America and utilisation of new chemical compounds, the area of coppice declined. Around 1900, there was still 25,725 ha of oak coppice, but much was converted to spruce after the 2nd World War. Today only 13,300 ha remain, the major part of which is overaged (40 years and over). 90% of coppice forest is owned privately.

The Nature and Forestry Agency (l'Administration de la nature et des forêts), part of the Environment Department of the Ministry of Sustainable Development and Infrastructure (Département de l'environnement du Ministère du Développement durable et des Infrastructures), manages about 40,000 ha of state and publicly-owned forests. Among other tasks, it also enforces the legal provisions and regulations that protect nature, forests and hunting rights. The Agency also ensures implementation of and compliance with management plans for Natura 2000 sites.

Under the terms of a law to protect forests, before a wooded area of more than 2 ha can be cleared, or a cut made that is considered to be excessive, approval must be sought by making a declaration to the Agency with a description of the area in which the operations are to take place and the volume of timber involved. Excessive exploitation is considered to be a cut that does not leave standing per 'are':

- a) in high forest at least 1.50 m³ of wood with a minimum of 7 cm in diameter at the top ('au fin bout') and consisting of the main rejuvenating species;
- b) in coppice-with-standards at least 0.50 m³ of wood of 7 cm diameter, not including the coppice. However, it is

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

permitted at all times to remove fallen, dead and diseased wood.

Extraction without notification can take place in broadleaved high forests or coppice-with-standard forests of less than 2 hectares in one holding belonging to the same owner (but not in a detached subdivision of a larger forest if this has been divided for less than 10 years); conifer stands over the age of 50 years; simple coppice or coppice-with-standards where the standards are less than 0.25 m³ per are; and in young woodland during the first ten years after sowing or planting, except for woods reforested pursuant to the Act.

A law to protect nature and natural resources forbids destruction or change of use of forests unless authorised in the public interest. If allowed, compensatory

afforestation in the same or a neighbouring commune at least equal to that lost will be required. After all clearcutting, the owner of the forest must, within a period of 3 years from the start of felling, replant or regenerate the forest stand so that it is equivalent to that which was cut from the production and ecological point of view.

The National Forestry Programme includes the aims of identifying the flora and fauna of forest areas which are suffering from declining populations and developing protection programmes. The hazel grouse (*Bonasa bonasia*), a Birds Directive Annex I species, which is reliant on a habitat of regularly exploited oak coppice, is specifically mentioned. Some conservation coppicing is carried out, for instance, in the Parc Naturel de la Haute-Sûre.

References

The following websites of Le Gouvernement du Grand-Duché de Luxembourg:

<http://www.environnement.public.lu/forets/index.html> http://www.environnement.public.lu/forets/dossiers/foret_lux/

http://www.environnement.public.lu/forets/dossiers/pfn/revision_fc/1_docs_synth/Rapport_Etat_Lieux_Foret_2014_V1_0_sec.pdf Rapport Etat des Lieux del Foret et du secteur forestier G-D Lux 2014 v1

<http://www.guichet.public.lu/entreprises/fr/urbanisme-environnement/construction-amenagement-site/travaux-bois-eau-zone-protegee/permis-deboisement-defrichement/index.html> Permission de déboisement / défrichement

http://www.gouvernement.lu/3593388/20140326_inventaire_forestier_national_communique_long_FR.pdf+&cd=13&hl=en&ct=clnk&gl=uk

http://www.legilux.public.lu/leg/textescoordonnes/compilation/code_environnement/VOLUME3/FORETS/FORETS7.pdf includes:

Loi du 30 janvier 1951 ayant pour objet la protection des bois, (Mém. A - 7 du 30 janvier 1951, p. 137) modifiée par: Loi du 16 juin 1989. (Mém. A - 41 du 26 juin 1989, p. 774; doc. parl. 2958) Texte coordonné au 18 juin 2009 Version applicable à partir du 21 juin 2009. Loi du 19 janvier 2004 concernant la protection de la nature et des ressources naturelles. (Mém. A - 10 du 29 janvier 2004, p. 148; doc. parl. 4787) Extraits

<http://www.environnement.public.lu/forets/dossiers/pfn/contributions/PFNpublifin.pdf> Programme Forestier National - Rapport Final 2005.

NETHERLANDS

Jennifer Mills¹, Peter Buckley¹ and Patrick Jansen²

Some 10% (360,000 hectares) of the Netherlands consists of woodland, which is protected under the 1961 **Forestry Act** (the Boswet).

The legislation in the Act applies to planting areas greater than 1000 m², or when there are more than 20 trees in a row. Trees in urban areas are excluded; these are regulated under municipal law.

One month before felling is due to take place it must be reported, either by the owner or the contractor, to the Ministerie van Economische Zaken (Ministry of Economic Affairs) by means of a **kapmelding** notification. A topographic map (minimum scale 1: 25.000) on which the trees are marked must also be submitted. Only 5 plots can be entered on each kapmelding and a separate one must also be sent for each municipality in which the trees are growing. Felling must take place with a year of submitting the kapmelding, otherwise it has to be re-submitted. An additional permit may be required under other legislation.

A receipt is given after submission of the kapmelding. If there is no response one month after submission, then the trees can be felled.

If the cut is prohibited (kapverbod), the owner is notified within a month of submission and this is also published in

the Government Gazette. The reasons are always given. If the owner disagrees with the decision, an objection can be filed within 6 weeks. An appeal decision will be given within 6 weeks of the objection being made. When a landscape of exceptional natural beauty is threatened, the Ministry of Economic Affairs can prohibit felling, but this rarely happens.

After felling, there is a duty to **replant** (herplantplicht) within three years of felling. This also applies if trees have been lost through fire, windthrow or disease. This obligation is attached to the property and, if sold, the new owner has a duty to replant. High fines can be imposed if replanting does not take place. The Forest Act allows planting on a parcel other than that which was felled, but it must occur in a silviculturally acceptable way on a similar-sized area. Natural regeneration is not officially considered to be replanting, but in practice it is allowed if successful (within 6 years).

Thinning and coppicing do not usually include a duty to replant and therefore do not need to be notified by a kapmelding.

A judge adjudicates the difference between thinning and felling: if the canopy cover is reduced to below 60%, it is considered to be a felling.

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

² Stichting Probos, Hollandseweg 7g - Postbus 253 - 6700 AG Wageningen. e-mail: patrick.jansen@probos.nl

A kapmelding notification is not required under the following circumstances:

- the trees to be felled are in urban areas and therefore under local authority regulations
- the trees are in gardens and other domestic areas
- the felling is to promote the growth of the remaining trees (thinning)
- coppice or withies are being cut periodically
- felling is taking place as part of an approved development plan
- an exemption has been granted in the Regulations on notification and replanting
- roadside plantations and single-row plantings of poplars and willows on, or alongside agricultural land.

Felling does not have to be reported for the following species: Poplar (*Populus spp.*), lime (*Tilia spp.*), horse chestnut (*Aesculus hippocastanum L.*) and willow (*Salix spp.*), fruit trees and windbreaks around orchards, spruce up to 12 years old intended as Christmas trees. However, municipal legislation may still apply.

Further applicable legislation:

The 1988 **Nature Conservation Act** (De Natuurbeschermingswet) regulates the protection of areas that the Government has designated as protected natural monuments. It also protects areas in accordance with international agreements

References

- Rijksdienst voor Ondernemend Nederland (RVO.nl) <http://www.rvo.nl/onderwerpen/agrarisch-ondernemen/beschermde-planten-dieren-en-natuur/natuur-en-landschap/bomen/bos-en-bomen-kappen>
- Van der Maaten-Theunissen, M. & Schuck, A. (2013) Integration of Nature Protection in Forest Policy in the Netherlands. INTEGRATE Country Report. EFICIENT-OEF, Freiburg.

such as the Birds Directive (Vogelrichtlijn) and Habitats Directive (Habitatrichtlijn) and the Ramsar Convention, which protects wetlands. In 2005, the Act was amended to better integrate legislation on nature protection, forestry policy and obligations under the Habitats Directive.

For **Natura 2000** areas, special management plans must be developed, including an inventory listing the habitats to be protected. The management plan then provides an overview of the measures that will be taken to protect these habitats. Measures that are included in the management plan may be carried out without a licence, but permission from the province is needed for other activities if they have an impact on protected habitats or species.

The 2002 **Flora and Fauna Act** (Flora- end faunawet) protects designated species. Management, development, hunting, etc., only take place under strict conditions.

As from January 1st 2017 a new **Nature Protection Act** (Wet Natuurbescherming) replaces the Flora and Fauna Act, the Forest Act and the Nature Conservation Act. This will make it easier to apply the law to protect the Netherlands flora and fauna, Natura 2000 sites and forests. Implementation and controls under the Act will mainly be carried out by each individual Province rather than the Government.

REPUBLIC OF MACEDONIA

Ljupco Nestorovski¹

In the Republic of Macedonia, the **Law on Forest** (Official Gazette no. 64/09, and subsequent modifications from 24/11, 53/11, 25/13, 79/13, 147/13 and 43/14) give the directions and guiding responsibilities to different stakeholders managing forests. These guidelines cover the most important goals for the state and privately owned forest in order to preserve and further develop sustainable, multifunctional forestry as well as socio-economic welfare to the stakeholders. The environmental protection and promotion of other forest functions and values are partly covered with the same Law, and partly in the **Law on Nature Protection** (Official gazette no.53/05 and its modifications). Both Laws have several provisions concerning different areas such as forest management, forest planning, protection and silviculture.

Following a chain of historical, economic and political events, an organized forest management and planning system for the forests in the Republic of Macedonia started after the Second World War, and in 1949 the first Law on Forests was adopted in former Yugoslavia. This Law was revised several times (1956, 1974, 1986), and after independence, in 1991, the new law on forestry was adopted in 1997, and operational in 1999.

There are no special issues in this Law that treat coppice separately from high forest.

Coppicing is a regular way of managing coppice forests. The rotation depends on tree species (mostly different types of oak, ash, beech and hornbeam), and usually is done every 30-50 years. The most common treatment is traditional coppicing. There is still no national inventory in existence, but forest management plans are made for every unit (limited to a maximum of 5,000 ha). There are no differences in the treatment of private and state-owned forests. Private owners with area of forest greater than 100 ha are obliged to make a **Forest Management Plan** (FMP) which must be approved by the Ministry of Agriculture, Forestry and Water Economy. This also applies to the Public enterprise “Makedonski sumi” that manages state-owned forests, in accordance with the provisions in FMP of the surrounding forests. The **Ministry of Agriculture, Forestry and Water Economy** is also responsible for licensing forest engineers to be able to plan activities in private owned forests.

References

- Ministry of Agriculture, forestry and water economy, Skopje, Republic of Macedonia
- Ministry of Environment and physical planning, Skopje, Republic of Macedonia
- UKIM, Faculty of Forestry, Skopje Republic of Macedonia
- Trajkov P, Nestorovski L, Tralanov Z.: National Forest inventories, Assessment of Wood Availability and Use, Chapter 36, The republic of Macedonia, Springer 2016.
- Law on Forestry, Official Gazette 64/09
- Law of Nature protection, Official gazette 53/05

¹ University “Ss Cyril and Methodius”, Faculty of Forestry, Skopje Republic of Macedonia.
email: nestorovski@sf.ukim.edu.mk, nestorovskil@hotmail.com

PORTUGAL

Abel Rodrigues¹, Mário Costa² and Helder Viana³

The forest public service was first institutionalized in 1824, under the aegis of the Navy Ministry, with the creation of the **Royal Forest Administration** which was subsequently transferred to the Ministry of Industry, Trade, and Public Infrastructures. In 1886, the first public institution was created, which aimed to reforest the Gerês and Estrela Mountains in Northern Portugal. In 1901, the forest regime code was implemented in a law which included the main legislation concerning the forest sector. In 1919, the **Forest Services** were put under the General Direction of Aquaculture and Forests (DGRFA), which developed forest engineering works such as torrent mitigation and the forestation of coastal dunes through the **Law of Forest Settlement** in 1938. Nowadays, the Forest Service's Extension is consolidated within the **Institute for Conservation of Nature and Forests** (ICNF), resulting from the merger of the former Nature Conservation Institute, part of the Environment Ministry, with the General Direction of Forest Resources from the Agriculture Ministry.

In Portugal, the forest area occupies about 35% of the territory (3.2 Mha), with an additional 1.5 Mha occupied by shrubland. Historical circumstances have dictated

that more than 90% of the forest area is in private ownership, a very high percentage compared with privately-owned forest areas in other countries e.g. 70% in Spain, Finland and Sweden; an average of 60% in the EU 27 countries; 55% in the USA and 8% in Canada. The main forest species in Portugal are managed or are potentially manageable under the coppice regime. Indeed, nowadays, the main forest species is eucalyptus (*Eucalyptus globulus*) with an area of 812,000 ha, managed intensively as coppice for pulp production. These coppices run for 4 or 5 rotation cycles, with 8-12 years per cycle. On burnt sites the ability of eucalypts to re-sprout from stumps enables their partial recovery. After maritime pine (*Pinus pinaster*) high forest, grown only for wood production, the third species in terms of area occupied is cork oak (*Quercus suber*), with 730,000 ha, followed by holm oak (*Quercus rotundifolia*), occupying around 330,000 ha. Other oaks (*Quercus faginea*; *Quercus rotundifolia*; *Quercus robur*; *Quercus pyrenaica*), and chestnut (*Castanea sativa*) cover around 66,000 ha, and 40,000 ha, respectively. The latter species is mainly managed for fruit as high forest, but only an area of around 3,000 ha of chestnut is managed as coppice for wood production.

¹ NIAV, IP DTQ, Av. República, Qta. Marquês 2780-159, Oeiras, Portugal; email: abel.rodrigues@iniav.pt

² IST, IDMEC, Mechanical Engineering Department, Instituto Superior Técnico, Universidade de Lisboa, 1049-001, Lisboa, Portugal. email: mcosta@tecnico.ulisboa.pt

³ IPV, Escola Superior Agrária (ESAV), Quinta da Alagoa, Estrada de Nelas, Ranhados, 3500-606 Viseu, Portugal. email: hviana@esav.ipv.pt

The aforementioned forest regime code of 1901 was replaced by the **Forest Code** under a law of September 2009, but revoked in 2012. Nowadays, in addition to the 1901 regime, forestry legislation includes the following:

- 1996 law on the basis of national forest policy;
- legislation from 1999 and 2009 concerning regional forestry plans (PROF),
- plans of forest management (PGF)
- specific plans of forest intervention (PEIF), which can be adapted to county, district and national levels
- legislation from 2001 for the protection of cork oak and holm oak
- legislation from 2005 about forest intervention zones (ZIF)
- 2013, the regulation of the juridical regime of forestation and reforestation.

The **National Strategy for Forests** (ENF), approved in 2015, is a vast document emphasizing biotic and abiotic risks in forestry, the economic relevance of the main forestry clusters and forecasting scenarios of resource allocation and forest diversification until 2030. In 2017, the urgent need for reform in the forest sector, stimulated by political pressure to control forest fires, resulted in 13 legislative acts, with three awaiting ratification.

These **new acts enhance and complement previous forest legislation** with regard to the following relevant topics:

(i) The ENF, reviewing estimates of scenarios for climate change in Portugal, suggested a **reduction of the area suitable for eucalyptus** leading up to the end of the 21th century. Taking into account the versatility of this species for production of goods and services, the ENF came up with a proposal to stabilize the actual area of 812,000 ha until 2030. In this context, legislation in 2017 imposed a strict control of eucalypt forestation, limiting the expansion of eucalypt coppices and allowing new plantations only in compensation for former areas of eucalypt previously abandoned, on condition that these abandoned areas should be cleared and left in a suitable condition for either agricultural or forest use. Moreover if the total eucalypt area surpasses the ENF's threshold, an intervention for reducing the total area is made, prioritising projects or stands abridging existing eucalypt areas higher than 100 ha.

(ii) the establishment of the so-called **Entities of Forest Management** (EGF), which are corporations of forest owners or private agents operating within a specific juridical regime, aiming to manage forests larger than 100 ha, wherein 50 % of land assets should consist of areas smaller than 5 ha. The main objective is to promote professional management in small forest properties, creating economies of scale under good practice codes, which allow for economic and sustainable feasibility of the available land assets to be achieved. In this context, the EGF is entitled to fiscal benefits and other forms of public support.

(iii) simplifying the process of establishing **forest intervention zones (ZIF)**, defined in 2005 as continuous and delimited areas, subject to a plan of forest management approved by ICNF. Also, if necessary, ZIFs can define specific plans of forest intervention, regulated by ICNF, aimed to control biotic or abiotic risks such as soil erosion, biodiversity, phytosanitary conditions or fire protection. ZIFs are managed by a single private entity, with the necessary technical expertise and a commitment to follow the guidelines and objectives established for the ZIFs, scrutinized by the forest owners' council. Legislation in 2017 simplified the creation of ZIFs, establishing both maximum and minimum areas of 20,000 ha and 500 ha respectively, with no more than 25 necessary associates and 50 forest land properties within each intervention zone. There were provisions for consolidating forest properties from different counties. The ZIFs are covered by fiscal benefits which consider the specific kind of goods and services delivered by forests and agro-forest farms, and the long-term returns from forest investment. The philosophy of the ZIFs and EGFs was to consider the prevalence of small private forests and to provide incentives for amalgamating forest and agro-forest farms and to promote professionalization in forestry and forest management.

(iv) the 2017 legislation changed the **juridical status of regional forestry plans (PROFs)**, by delegating to municipal authorities the capacity to intervene on soil use, by transferring of some elements

of the regional forestry plans to Municipal Directory Plans (PDMs). Municipalities will henceforward be able to include mandatory forestry components in their PDMs. Legislation of 1996 and 1999, actualized in 2009, allocated to ICNF the responsibility of forest planning. The objective was to establish a continuous process of decision-making over the use and conservation forest areas and resources, and to achieve medium and long term targets laid down in national strategies, particularly the National Strategy for Forests (ENF). Forest planning was designed to operate at three levels:

- 1) regional or supra-municipal, where the PROFs are elaborated in coordination with other public priorities of the regions
- 2) local, where plans for forest management (PGF) are coordinated with local practices of forest management
- 3) at a lower operational level, through specific plans for forest intervention (PEIF), dealing with local constraints such as biotic and abiotic risks, recovery of degraded soils, forest diseases, forest fires and improved water retention.

The preparation and execution of PGFs is obligatory in situations such as:

- public and community forests or agro-forestry farms
- private forests or agro-forestry farms with areas equal or greater than those defined in the respective PROFs
- candidate forest or agro-forestry farms for national or EU financial support, aimed to benefit forest production and commercially valorize the ZIF areas.

In the latter context, forest owners and economic agents who are committed to PGFs within ZIFs are exempt from the obligation of making their own PGF.

From 1996, national forest policy laws strictly regulate the cutting of trees, so that forest owners must communicate to ICNF the type and extent of scheduled tree cuttings. The **juridical regime of forestation and reforestation** of 2013 (RJAAR) requires forestation and reforestation operations with forest species be referred to ICNF. This legislation controls and evaluates forestation and reforestation operations that do not apply to urban or transport matters, which are regulated by other legislations. The RJAAR also exempts control operations in areas of less than 5000 m², with a width greater than 20 m.

In Portugal, the premier cork producer in the world, cork oak stands are traditionally managed as high forest, although the coppicing system operates in other Mediterranean countries. Indeed, as early as 1950, “Subericultura (Cork oak cultivation)”, the *magnum opus* of Vieira de Natividade, promoted the environmental advantages of cork oak and holm oak coppice in protecting soil, using cycles of 10-15 years. This is no minor issue in the southern part of the country, where low fertility soils are prone to erosion; cork oak coppicing is then directed towards biomass production with a theoretical density of about 1000 stumps/ha. The legislation concerning cork oak and oak dates from 2001, and allows for conversion to coppice from high forest when thought necessary for technical

and environmental reasons. Noteworthy additions to this legislation emphasize the need to protect these indigenous species, citing definitions of stand density (number trees/ha), i.e. 50 trees/ha for trees taller than 1 m, with a perimeter at breast height (dbh) of less than 30 cm; 30 trees/ha, when the average dbh is between 30 cm and 79 cm; 20 trees/ha, when the average dbh of the trees is between 80 cm and 129 cm; and 10 trees/ha, when the average dbh is greater than 130cm. These trees can be rejuvenated when new poles grow from the stumps. An authorization from the ICNF is mandatory when cutting cork oak or holm oak trees. This includes thinning, when the operation must be notified within a period of 30 days. Conversion from high forest to coppice, or phytosanitary pruning, also needs prior authorization. In cork and holm oak stands deep soil cultivation is forbidden, since this may affect tree root systems and natural regeneration. Soil cultivation is also prohibited on slopes between 10% and 25% and above 25%, if not carried out along the contour lines. Among the remaining forest species (e.g. *Quercus pyrenaica* and chestnut) which are manageable as coppice, these are candidates for the necessary diversification of the Portuguese forest landscape. These species are subject to the common principles and objectives of the National Strategy for Forests, which aims to protect forest species with special ecological importance and vulnerability.

References

- List of the Portuguese forest legislation [on-line] at: <http://www.icnf.pt/portal> (assessed at 24/07/2017)
- Goes, E., 1991: A Floresta Portuguesa, 251 pps. Edt. Portucel (in Portuguese).
- Pereira, J., 2014: O Futuro da Floresta em Portugal, 110 pps. Edt.FFMS (in Portuguese).
- Louro, V., 2016: A Floresta em Portugal, um apelo à inquietação cívica, 268 pps. Ed. Gradiva (in Portuguese).
- Natividade, J., 1950: Subericultura, 387pps. Ed. Direcção Geral das Florestas (in Portuguese).

ROMANIA

Valeriu-Norocel Nicolescu¹

Legal framework in relation to coppice

1. Law no. 133/2015 for the modification of Law 46/2008 (Forest Law)

Art. 28.

(2) The high forest regeneration system is applied to the regeneration of all forests.

(3) The exception from (2): stands of native poplars (black, white) and willow, in the floodplain areas, and black locust stands, where the application of a coppice regeneration system is allowed.

Art. 29

(1) The size of clear-cutting (including coppice) coupes is a maximum of 3 ha.

2. Ministry of Waters, Forests and Environmental Protection 2000: Technical norms for the choice and application of silvicultural systems 3 (*Norme tehnice privind alegerea si aplicarea tratamentelor* 3). Ministerul apelor, padurilor si protectiei mediului, Bucuresti, 78 pp.

Low coppice

Its application is allowed only in black locust stands, poplar and willow stands in the floodplain areas as well as alder (*Alnus* spp.) stands.

Regeneration is by coppice stools or root suckers.

Cutting is only during the dormant season, preferably close to its end.

Size of coupes: max. 3 ha. Interval between the cuttings in the same compartment: 2-3 years.

Cutting with axes (tree diameters less than 15 cm) or a saw (bigger diameters or stools originating from old stumps); height of stump: max. 5 cm.

The variant with regeneration by root suckers, after the removal of stumps and levelling of the ground: not allowed in sites with mobile sand dunes and with erosion problems.

After 3-4 generations of coppice (by stump stools), the stumps are removed and replaced with plants to avoid the degradation of low coppices.

Pollarding

The system is used for willow stands affected by repeated flooding = in the Danube Delta and Danube floodplain area.

Stumps are cut high: above the highest flooding levels over a long chronosequence, to avoid the stump being covered by the flood waters.

The old high stumps are removed after 2-3 generations of pollards and replaced by plantations with seedlings or rods (tall cuttings).

Size of annual coupes: 10 ha. Rotation of cuttings in the same compartment: 1 year.

¹ Faculty of Silviculture and Forest Engineering, University "Transylvania" of Brasov, Sirul Beethoven 1, 500123 Brasov, Romania, e-mail: nvnicolescu@unitbv.ro

Arrangement of coupes: perpendicular to the watercourse.

Coppice selection system

Can be adopted experimentally in some small-size black locust stands, in stands located on ravine banks or on degraded lands.

Can be taken into account in small-sized private forests.

Note: even though part of the technical norms, this system is NOT included into the table used to choose the silvicultural systems for different forest vegetation formations/types!

3. Ministry of Waters, Forests and Environmental Protection 2000: Technical norms for forest management 5 (*Norme tehnice pentru amenajarea padurilor*). Ministerul apelor, padurilor si protectiei mediului, Bucuresti, 163 pp.

They include:

(i) Calculation of annual allowable cut for management units treated as coppice: for black locust stands (10-year period) as well as native poplar (black, white) and willow stands (5-year period)

(ii) 10-year management plans for compartments treated as coppice, for:

- exploitable coppice stands, reaching the rotation age (coppice cuttings)
- non-exploitable or pre-exploitable coppice stands, with tending operations
- coppice stands to regenerate artificially.

(iii) Rules for the conversion to high forests of coppice forests:

conversion by coppice ageing (total cessation of coppice cuttings)

conversion by coppice replacement and planting

(iv) Technical rotation age in stands/ compartments treated as coppice, depending on the species and yield class:

Species	Technical rotation age for yield class...				
	I	II	III	IV	V
Black locust	35	30	25	25	20
Native poplars (black, white)	35	35	30	25	25
Willow (pollard)	30	25	20	20	15

(v) Intensity of thinning (% of standing volume) in coppice stands with canopy cover 90-100%, depending on the species and mean stand age:

Species	Mean stand age (years)	
	11 - 20	21 - 30
	Thinning intensity	
Black locust	35	35
Native poplars (black, white)	30	25

SOUTH AFRICA

Keith M Little¹

Background

Within South Africa, the forestry sector contributes 1.2% to the Gross Domestic Product of South Africa. Of the total land area, ca. 1% (1.224 million ha) is planted to exotic plantation forests, with less than 0.9% occupied by indigenous forests. The main tree species planted for commercial purposes include pines (51%), eucalypts (42%) and wattle (7%) which supply timber products (sawlogs, veneer, pulpwood, mining timber, poles, matchwood, charcoal and firewood) to both the local and export markets.

Most of the plantation forests are located along the eastern seaboard of South Africa, with the various species and/or their hybrid combinations matched to site. The most commonly planted eucalypts are *Eucalyptus nitens*, *E. macarthurii* and *E. smithii* in the cooler temperate regions, *E. grandis*, *E. dunnii* and *E. grandis x E. nitens* in the warmer temperate regions, and *E. grandis x E. urophylla* in the sub-tropical regions. These eucalypts are grown over short rotations, predominantly for pulpwood production, and to a lesser extent for mining timber, poles or sawtimber. Intensive silvicultural regimes are practised to maximise volume production, and dependent on site quality, mean annual

increments range from 15 to 60 m³ ha⁻¹ annum⁻¹. Although eucalypts are planted at various inter- and intra-row distances, the target density at felling age falls between 1,300 – 1,600 sph.

One of the notable attributes of eucalypts is their ability to survive and produce new growth following adverse environmental conditions, which is largely a function of their bud systems being able to coppice. This survival mechanism is exploited in commercial plantations for re-establishment following felling, where the coppice shoots are selectively thinned over time and managed as a coppice stand for the production of pulpwood (7 - 10 years), poles (up to 15 years), and sawtimber (> 18 years). Increasingly, rurally-based small-scale growers in South Africa are also managing eucalypt coppice stems for multiple products (fuelwood, droppers, laths, poles and pulpwood), with a higher management intensity in terms of repeat visits to remove product, and over a shorter rotation (ca. 3 - 7 years).

Legal framework

As eucalypt stands regenerated via coppicing are generally managed for commercial timber production, the same legal framework that applies to all exotically grown tree species in South Africa would

¹ Nelson Mandela Metropolitan University, George Campus, Private Bag X6531, 6530 George, South Africa, e-mail: keith.little@mandela.ac.za

apply. Thus there is no coppice-specific legislation that applies to the manner in which coppice stands are managed. Within South Africa, the protection of natural forests and the sustainable development of commercial timber is governed by a legal framework that covers a range of sector activities. This policy and legal framework is extensive, and includes structures and policies that range from International Conventions to Government Acts that give effect to these, and the Regulations passed in terms of the Acts that enable their implementation. In general, these policies and supporting guidelines (in terms of criterion, indicators and measures) ensure sustainable forestry management in terms of:

- the protection of biodiversity within forest management units,
- the management of impacts such as erosion and alien invasive plant species,
- the management of outputs that reduce environmental quality such as waste,
- fair and appropriate labour practice,
- ensuring the health & safety of labour,
- the protection of heritage resources,
- the regulation of land tenure & rights

Although the two most relevant acts governing forest practices in South Africa are the National Forests Act (Act No. 84 of 1998) and the National Water Act (Act No. 36 of 1998), sections relating to forestry are contained within other National Governmental Departments (for example Environmental Affairs, Labour, Rural Development and Land Reform, etc.).

Decisions as to whether to coppice or replant

Dependent on a number of factors, felled eucalypt stands may be coppiced once (seldom more than twice) before being replanted. Although stand regeneration through coppicing is more cost-effective than replanting, decisions as to coppice or replant specific stands takes into consideration a number of different factors, some of which include determining:

- whether the planted eucalypt has the ability to coppice (there is a range in terms of different eucalypts and their coppicing ability),
- whether the correct species is growing on the site (for example is the species the best in terms of potential yield, genetic improvement, disease resistance, drought tolerance, frost tolerance, snow tolerance etc.),
- trees were planted at the correct spacing (matching stand density to site productivity), or
- if rotation-end stocking of the originally planted is adequate.

Challenges

Current challenges in terms of coppice management centre mainly around issues associated with increased mechanisation of forest operations, the incidence of pests and disease, and change in land ownership.

- Until recently, South Africa made extensive use of manual labour for both silvicultural and harvesting (motor-manual) operations. Planting densities

(especially between tree spatial arrangements), thinning (reduction) operations, and the remaining number of stems per hectare (based on manual operations), will need to be optimised for mechanisation. This will ensure that the currently higher harvesting costs associated with felling coppiced stands is optimised.

- The impact of recently introduced pests and disease into South Africa has meant that many of the susceptible eucalypts have been replaced with more resistant, alternative eucalypts and/or hybrid combinations. The coppicing potential and subsequent silvicultural management of these eucalypts will need to be tested.
- Changes in the South African land reform policies has meant that ca. 50% of commercially afforested land is under “land claim”. This will result in a change

in ownership of existing areas under plantations from larger corporate companies to that of small-scale timber growers. In contrast to commercial companies, where maximising rotation-end product at lowest input cost is important, rurally based, small-scale timber growers require constant product throughout the rotation, either for personal use and/or cash-flow (for example droppers and poles for fencing, laths and poles for building, or as a source of firewood). Although the average size of each of these planted areas is small (ca. 1.5 ha), collectively the large number of growers provides an important source of timber to the commercial companies. Best management practices will need to be tested that support the needs of these small-scale growers, whilst still securing timber for South Africa’s pulp-wood needs.

References

- Edwards MBP. 2012. Introduction. In: South African Forestry Handbook. Eds. BV Bredenkamp and SJ Upfold. The South African Institute of Forestry, Menlo Park, South Africa. Pgs. 3-7.
- Louw W. 2012. Brief History of the South African Forest Industry. In: South African Forestry Handbook. Eds. BV Bredenkamp and SJ Upfold. The South African Institute of Forestry, Menlo Park, South Africa. Pgs. 9-17.
- Forestry South Africa. 2015. South African Forestry & Forest Products Industry Facts (1980 - 2015). Available from: <http://www.forestry.co.za/statistical-data/> [Accessed 30 July 2017]
- Forestry South Africa. <http://www.forestry.co.za/> [Accessed 30 July 2017]
- Department of Agriculture Forestry and Fisheries: <http://www.daff.gov.za/> [Accessed 30 July 2017]
- Little KM. 2000. Eucalypt Coppice Management. ICFR Innovation 2000/01. Institute for Commercial Forestry Research, Pietermaritzburg, South Africa.
- Three websites that link directly to the Acts and Legislation regarding forests within South Africa.
- <http://www.daff.gov.za/daffweb3/Branches/Forestry-Natural-Resources-Management/Forestry-Regulation-Oversight/Sustainable-Forestry/Principles-Criteria-Indicators> [Accessed 30 July 2017]
- http://www.nda.agric.za/docs/media/Revision%205_Sept%202015_Draft%20Final.pdf [Accessed 30 July 2017]
- <http://www.forestry.co.za/government/> [Accessed 30 July 2017]

SPAIN

Mario Beltrán¹, Eduardo Tolosana² and Míriam Piqué¹

The forest legal framework in Spain is characterized by the division of competencies between the Central State and the Autonomous Communities. The general regulation is made by the Spanish Ministry in charge of forests, while the 17 Communities develop specific regulations adapted to their own characteristics. Besides, environmental issues are in charge of the Communities in a broad sense and the State is only responsible for basic regulation, coordination and support.

Despite that division, the Spanish forest policy is usually introduced as a wide common framework subscribed to by all the public bodies of the forest sector, as a group. In that sense, the Spanish Forest Programme comprises Legal regulations, Forest planning tools and some general Sustainable forest management tools. The main elements are the Spanish Forest Act (created in 2003 and revised twice in 2006 and 2015), the Forest Act of each Community (where it exists), the Spanish Forest Plan (2002) and some of the Forest Plans of each Community.

The aim of the different Forest Acts is to ensure the sustainability and conservation of forests. They establish a system of administrative guardianship concerning forest management, both in private and

public ownership. The Spanish Forest Act makes the preparation of Forest Management Plans compulsory in certain cases for protective forests (private) and public utility forests. In all cases, the different administrations are charged to enhance and promote forest planning. However, the Regional Forest Acts may extend the obligation to have a management plan in other cases, such as public forests larger than a certain area (depending on the region). The supervision of forest management actions is done through the management plans, but also with specific administrative procedures where plans are absent.

Regarding coppice forest management, there is a lack of specific regulation and it is usually regulated as any other type of forest management. Nevertheless, the coppice system is described through different guidelines developed for certain species which are mainly managed as coppice (*Quercus ilex*, *Q. pyrenaica*, *Q. pubescens*, *Q. faginea*, *Castanea sativa*, *Fagus sylvatica*, *Eucalyptus* spp. among others); hence, coppice management is allowed as a valid system for certain species. Some other regulations could affect coppice, especially those in relation to clear-cuts. In many regions, these clear-cuts are limited by areal extent and require a special administrative procedure.

¹ Sustainable Forest Management Unit. Forest Sciences Centre of Catalonia (CTFC). Crta. Sant Llorenç de Morunys, km 2. E25280. Solsona, Spain. e-mail: mario.beltran@ctfc.cat, miriam.pique@ctfc.cat

² Escuela Técnica Superior de Ingeniería de Montes, Forestal y del Medio Natural. Technical University of Madrid (UPM). Ciudad universitaria, s/n. E28040 Madrid, Spain. e-mail: eduardo.tolosana@upm.es

As the regulation and descriptions of best practice for coppice forests in Spain are linked to certain species, the Autonomous Community has the direct responsibility for administering forest management. We describe below the case for two representative regions in Spain with managed coppice forests: Catalunya and Galicia. There are big differences between them concerning species, ownership characteristics and forest management systems, since Galicia is situated in the very humid NW of Spain, while Catalunya is situated in the Mediterranean basin.

Catalunya

The Catalan Forest Act was published in 1988 and revised several times. In 2014 the Catalan Forest Plan was approved. These two elements form the main reference for the Catalan forest sector, and coppice is treated as any other management system. Since 2011 some planning tools are available in order to ensure a common technical basis for forest management, known as the Sustainable Forest Management Guidelines for Catalunya (ORGEST). These include coppice management guidelines and provide silvicultural information for different coppice forests. Silvicultural models describe the treatments and management actions to achieve different objectives based on different environmental conditions, always applying sustainable principles. Guidelines referring to resprouting species are focused on the coppice system, mainly oaks and chestnut. In Catalonia forest practices related to plantations of short rotation broadleaved species are very uncommon.

Galicia

The Galician Forest Act, published in 2012, makes no direct reference to coppice management or to coppice species. Nonetheless, every domestic hardwood species, including those which are commonly coppiced (oak, holm oak, deciduous oak *Quercus pyrenaica*, beech and chestnut) are mentioned in an Annex and declared as priorities when planting in public forests. Forest owners asking for felling licenses for these species have to wait longer than Eucalyptus or softwood plantations' owners to get a specific licence prior to harvesting. In the stands composed of domestic hardwood species, planting with Eucalyptus is banned, even after harvesting or wildfire.

Galician forest administrators have to check and list every domestic hardwood stand greater than 15 ha, which in turn are obliged to have an approved management plan prior to their harvesting. To write these management plans, the administrators may sign temporary agreements with the owners.

In 1992 the Galician Forest Plan was approved, but is presently under revision. In 2014 the Galician forest administration created forest management guidelines and a code of best practice for Galician forests, again focused on the dominant species. Guidelines aimed at resprouting species are focused in coppice system. In the Galician case, plantations of broadleaved species are very common, particularly of Eucalyptus or birch.

References

- Spanish Forest Policy introduction. Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente. <http://www.mapama.gob.es/es/desarrollo-rural/temas/politica-forestal/planificacion-forestal/politica-forestal-en-espana/index.aspx>
- Spanish forest Act. Ley 43/2003, de 21 de noviembre, de Montes (BOE 280, 22/11/2003). <http://www.boe.es/buscar/act.php?id=BOE-A-2003-21339>
- Catalan forest Act. Llei 6/1988, de 30 de març, forestal de Catalunya (DOGC 978, 15/04/1988). http://portaljuridic.gencat.cat/ca/pjur_ocults/pjur_resultats_fitxa/?action=fitxa&documentId=28548&language=ca_ES&textWords=forestal%2520catalunya&mode=single
- Galician forest Act. Llei 7/2012, do 28 de xuño, de montes de Galicia (DOG 140, 23/07/2012). http://www.xunta.gal/dog/Publicados/2012/20120723/AnuncioC3B0-050712-0001_gl.html
- Spanish Forest Plan, 2002. http://www.mapama.gob.es/es/biodiversidad/publicaciones/pfe_tcm7-30496.pdf
- Catalan Forest Plan, 2014. <http://agricultura.gencat.cat/ca/ambits/medi-natural/gestio-forestal/planificacio-forestal/pla-general-politica-forestal-public/index.html>
- Galician Forest Plan, 1992 (under review). http://mediorural.xunta.gal/es/areas/forestal/ordenacion/plan_forestal_de_galicia/
- Catalan Forest Management Guidelines, 2011-2017. ORGEST. http://cpf.gencat.cat/ca/cpf_03_linies_actuacio/cpf_transferencia_coneixement/cpf_orientacions_gestio_forestal_sostenible_catalunya/
- Galician Forest Management Guidelines, 2014. https://www.xunta.gal/dog/Publicados/2014/20140605/AnuncioG0165-280514-0001_es.html

SWEDEN

Jennifer Mills¹, Peter Buckley¹ and Magnus Löf²

In Sweden nearly 70% of the land area is covered by 28.1 million hectares of forest, 23 million hectares of which are productive. The forests are mainly of spruce and pine (82%). The remaining percentage includes broadleaf species such as birch, aspen, alder, willow and poplar, and, in the south, oak and beech. Even-aged forestry is the norm. Traditional simple coppice management and pollarding, which were very common in the past, are now rarely practiced and then only on very small areas of conservation interest. Pollarding is also still practiced near farms and in villages to keep the traditional scenery.

The **Forest Act** was first enacted in 1903 and covered only privately-owned forests, in 1979 it was revised to include all forests. The main forest policy of maintaining high levels of industrial wood production was amended in 1993 to include ecological provisions concerning environmental improvement and biodiversity and later to give regard to social values. The aim of Swedish forest policy is also to ensure sustainable forest management in line with international agreements. A **National Forest Programme** was established in 2014.

The **Swedish Forest Agency** (SFA, Skogssstyrelsen) is responsible for enforcing the

Forestry Act and the 1999 Environmental Code where it affects forestry. On their website (<http://www.skogsstyrelsen.se/en/forestry/The-Forestry-Act/The-Forestry-Act/>) some of the provisions of the Act are summarised:

Reforestation

New forest must be planted or naturally generated after felling when the land's capacity to produce timber is not fully exploited. Planting or measures for natural regeneration must have been completed by the end of the third year after felling, or by the fifth year in northern areas where regeneration is slower.

Disused agricultural land must be reforested within three years of the land falling into disuse. This does not, however, apply to land to be protected for its natural characteristics or its cultural heritage.

Reliable methods and suitable species of trees must be used in the forestation work. Natural regeneration can be a good method if the site is suitable. Otherwise, the land must be sown or planted. Mechanical soil scarification is often a prerequisite for good results.

If there are insufficient numbers of seedlings, supplementary planting must take place before it is too late. Subsequent weeding and thinning may be necessary.

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

² Department of Southern Swedish Forest Research Centre, Alnarp, Sweden. e-mail: Magnus.Lof@slu.se

Felling

Thinning encourages forest development. Timber stocks after thinning must be large enough to utilise the production capacity of the land.

After thinning the trees must be evenly distributed on the area. Damage to trees and the ground must be avoided as far as possible.

Regeneration felling must not be carried out until the forest has reached a certain age. For predominantly coniferous forests, the age varies between 45 and 100 years, although this is much debated as it does not really apply to continuous cover forestry practices.

Regeneration felling is restricted on forest holdings larger than 50 hectares. Up to half of the land may be made up of finally felled areas and of stands less than 20 years old. Additional rules apply to holdings larger than 1 000 hectares.

Notification of regeneration felling

Regeneration felling of stem wood on ‘productive forest land’* sites larger than a half hectare must be notified to the Swedish Forest Agency at least six weeks in advance of harvesting.

(*Defined as land outside protected areas and other than mountainous forest, and forest with noble broad leaved trees and that can produce no less than 1 m³ year⁻¹ stem wood including bark and which is not used for any other purpose such as agriculture, buildings or infrastructure.)

‘Regeneration felling’ replaces the term ‘final felling’, and includes all felling with

the exception of thinning and cleaning. Notification is made on a special form (Timber Harvesting Notification, TFN*) available from the Swedish Forest Agency. The area to be felled and the regeneration methods to be used must be specified. A copy of a forestry map must be attached. A description of the intended natural consideration measures to be used, and measures to protect existing cultural heritage within the area, must also be stated.

*The SFA inspects TFNs within a 6-week period using the Forest Agency’s processing system comparing the notifications to maps and register data. Local knowledge and the expertise of the staff is also used. A proportion of the notified areas are inspected in the field before harvesting begins.

Notification must also be given if the land is to be used for purposes other than timber production, i.e. if forest fuel is to be removed, if foreign tree species are planned to be used, or in the event of protective ditching.

A permit is required for regeneration felling in mountainous areas in the interior of northern Sweden. Details of measures planned to secure regeneration and to safeguard the balance of nature, the cultural heritage and reindeer husbandry, must be given.

A permit is required for regeneration felling in forests that contain so-called ‘noble broad leaved trees’, i.e. stands of temperate broadleaved tree species of which at least 70 % of the basal area consists of broad leaved trees and at least 50 % consist of oak, beech, ash, lime, elm, cherry, maple and hornbeam. Regeneration and conserva-

tion measures to be taken must be stated. Normally, felled hardwood stands must be regenerated with a new hardwood species stand.

Insect damage

Insect pests breed in the bark of newly felled coniferous wood. Insect damage is controlled by removing damaged trees if they exceed 5 cubic metres per hectare. Unbarked conifers must not be stored in the forest or at the roadside during the summer.

Nature consideration & cultural heritage

Biological diversity in the forests must be preserved. At the same time, the cultural heritage must be safeguarded and social aspects must also be taken into consideration. Therefore, it is important that due care and attention is paid to all forestry measures. The conservation requirements must not be so far-reaching that they make on-going forestry activities significantly more difficult. Where there is a choice of methods to be used, the promotion of biological diversity must always be given priority.

Reindeer husbandry

The size and locations of felling areas in northern Sweden must be decided with due regard to reindeer husbandry. Further consideration can be shown by leaving groups of trees standing on felling sites and on non-productive land, such as migration routes.

Forest Management Plans (FMP)

These are voluntary in Sweden. In a response to a questionnaire from the EU's

Directorate-General for the Environment in 2013 (http://ec.europa.eu/environment/forests/pdf/fmp_table.pdf), Sweden reported that: "The obligation of having a FMP was taken away from the Swedish Forest Act in 1994. Instead a nationwide GIS database was established. The information in the database covers all forest properties and is available for forest owners and authorities, free of charge through the internet. The database includes information on Natura 2000 and other protected areas as well as other ecosystems with biodiversity and social values. All forest land is covered by regularly updated satellite imagery and aerial photography.

All past and planned (for the following 2 years) harvest activities are shown for each individual property, including the regeneration method used/planned, outtake of bioenergy, scarification method, environmental and cultural protection activities, etc. Forest owners must send harvest notifications to the Swedish Forest Agency, which is possible through the database. As the GIS database integrates data on Natura 2000 areas, other nature reserves, and areas with special considerations (hydrological, historical, biological, etc.), the SFA system for monitoring the implementation of the forest legislation is highly interactive and automated.

Most of the forest owners in Sweden have their own FMP, often offered by timber-buying companies as a service to the forest owners. FSC- and PEFC-certified forest owners are obliged to have a FMP due to certification requirements. An estimation is that for family forestry, approximately

8.5 M ha are covered by FMPs and for productive forest land 22.5 M ha, half under FSC, half under PEFC, with some overlap because of double-certified forest owners. An overall expert estimation is that >95% of forest land is covered by some sort of management plan in Sweden. In Sweden FMPs are considered a tool for forest owners and managers to plan their business activities in the medium-term (normally 10 years) and to plan environmental care in detail for each stand.

Adoption of Natura 2000 forest management plans in forests designated as Natura 2000 sites

In Sweden the County Administrative Boards have the overarching responsibility, at regional level, for Natura 2000 areas. Forest management plans are not normally used for Natura 2000 forest areas. The management of these areas are regulated through conservation plans as most Natura 2000 forest areas in Sweden are nature reserves. Currently, the Swedish Environmental Protection Agency is preparing guidelines for updating the existing Natura 2000 conservation plans.

The SFA is the responsible authority when it comes to forestry measures that could affect the environment in Natura 2000 areas. Consideration is given to forestry measures within designated areas and measures adjacent to, or in the vicinity of, designated areas. The County Administrative Boards are the competent authority for measures other than forestry operations taken in forested and other types of Natura 2000 areas. Permission needs to

be obtained from the County Administrative Boards for measures that are likely to have a significant effect on the environment in Natura 2000 areas. In cases where the SFA is the competent authority – i.e. concerning forestry operations – the SFA evaluates whether or not a planned activity or operation needs permission. Thus, the SFA ensures that forestry operations that might affect a Natura 2000 area are not taken without prior consent from the County Administrative Board. The operator must evaluate if the planned activities need prior consent and seek permission from the County Administrative Board.

All forest owners have to notify the SFA when planning a final felling. The SFA then has six weeks to respond by – i.e. giving detailed instructions on how and where certain activities should be conducted or if they are prohibited. In cases when a notification is received that concerns a Natura 2000 area or its vicinity, the SFA evaluates the planned activity regarding prior permission. The management restrictions included in the conservation management plans form the basis for that decision. If the planned activity does not need prior permission, it is treated like any other notification to the SFA. If it needs prior permission, the operator is informed in writing. An activity might be partially allowed or allowed under specific preconditions. If the County Administrative Board gives permission under certain preconditions, the SFA is responsible for checking that they are followed.

References

- Swedish Forest Agency <http://www.skogsstyrelsen.se/en/forestry/The-Forestry-Act/The-Forestry-Act/>
- The Royal Swedish Academy of Agriculture and Forestry (KSLA). Forests and Forestry in Sweden. http://www.ksla.se/wp-content/uploads/2015/08/Forests-and-Forestry-in-Sweden_2015.pdf
- European Commission (2014) Forest Management Plans or equivalent instruments. Summary of Member States' replies to the DG ENV questionnaire. http://ec.europa.eu/environment/forests/pdf/fmp_table.pdf
- K. B. Lindahl et al. (2016) The Swedish forestry model: More of everything? Forest Policy and Economy <http://www.sciencedirect.com/science/article/pii/S1389934115300605>

SWITZERLAND

Jennifer Mills¹, Peter Buckley¹, Josephine Cueni¹ and Patrick Pyttel²

A third of Swiss territory is forested, but coppice and coppice-with-standards now covers only small areas. However, the guidelines issued by the Swiss Federation BAFU in 2015 concerning biodiversity in forests indicates that there are noteworthy remnants of coppice-with-standards in the cantons of Baselland, Aargau, Zurich, Schaffhausen and Thurgau, where projects are taking place to boost coppice-with-standards management. Areas of relict coppice are located mainly in the canton of Fribourg, along the River Sarine, in the canton of Vaud along the foot of the Jura, in the canton of Bern along the Old Aar river, in the Grisons, and in the Rhine valley around Chur. The guidelines suggest that traditional coppice management to increase biodiversity could be reintroduced in a sustainable way in former coppice stands or be newly established in other places.

At the national level, the Swiss Confederation has passed a **Federal Act on Forest** and a **Forest Ordinance** among other laws which relate to the environment. The aims of the Federal Act are to conserve the forest area and its spatial distribution; to protect the forest as a near-natural community, to ensure that the forest can fulfil its functions and to promote and maintain the forestry sector. One particularly vital forest

function in Switzerland is the protection of human life and important material assets against avalanches, landslides, erosion and rockfall.

The **26 cantons which make up the Federation define plans and enact regulations** taking into account the forest functions, the requirements of wood supply, near-natural silviculture and respecting the federal law for nature protection and cultural heritage. They also have to take into account the **Swiss Biodiversity Strategy**, which was adopted in 2012 by the Federation.

Each canton therefore has its own forest law in compliance with the Federal Forest Law and the Forest Ordinance and, while also respecting other environmental laws and guidance, makes cantonal forestry plans, forestry development plans and maintains a forestry service. For ecological or landscape reasons, forest management does not always have to be carried out, but where the forest serves a protective function, the cantons must ensure a minimum level of management. Forest owners (corporations, private owners, political communes, cantons) must carry this out and in return they receive federal and cantonal subsidies.

Silvicultural measures are defined as all maintenance interventions that contribute to the conservation or restoration of the

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

¹ Pro Natura, Basel, Switzerland, e-mail: josephine.cueni@pronatura.ch

² Chair of Silviculture, University of Freiburg, Germany, e-mail: patrick.pyttel@waldbau.uni-freiburg.de

stability and quality of a stand. Measures to be carried out as part of young forest maintenance include maintaining regrowth in selection forests, in other multi-layered forests, in coppice-with-standards and coppice forests as well as in multi-layered forest margins; protective measures against damage caused by game; and path creation in areas difficult to access. Thinning and regeneration measures are slash removal and creation of new stands with the necessary accompanying measures, wood harvesting and transport. For protective

forests, interventions are restricted to ensuring the long-term stability of the stand; felled wood is used locally to improve the protection function or left on site, as long as it does not pose a risk.

Deforestation is prohibited but, exceptionally, permits may be issued by the Federal or cantonal authorities with reference to the Federal Office for the Environment (FOEN/BAFU/OFEV/UFAM) where necessary. Compensation in kind must usually be made for any deforestation but can also lead to revaluation measures in other ecosystems.

References

- Federal Act on Forest (Forest Act, ForA). <https://www.admin.ch/opc/en/classified-compilation/19910255/index.html>
- Ordinance on Forest (Forest Ordinance, ForO) of 30 November 1992. <https://www.admin.ch/opc/en/classified-compilation/19920310/201503010000/921.01.pdf>
- Imesch N., Stadler B., Bolliger M., Schneider O. (2015) *Biodiversité en forêt: objectifs et mesures. Aide à l'exécution pour la conservation de la diversité biologique dans la forêt suisse*. Office fédéral de l'environnement OFEV, Berne. L'environnement pratique no 1503: 190 p.
- Landolt, D., Zimmermann, W., Steinmann, K. (2015) *Forest Land Ownership Change in Switzerland*. COST Action FP1201 FACESMAP Country Report, European Forest Institute Central-East and South-East European Regional Office, Vienna. 24 pages. [file:///C:/Users/User/Downloads/FP1201_Country%20Report_SWITZERLAND%20\(1\).pdf](file:///C:/Users/User/Downloads/FP1201_Country%20Report_SWITZERLAND%20(1).pdf)

TURKEY

Murat Ertekin¹

Forests in Turkey cover an area of approximately 21.68 M ha (million hectares), 27.8% of the surface area of the entire country, 53% of which is productive forest land (FS 2012). The productive and high forest area, where woody biomass could be produced, accounts for 10.3 M ha within the total forest land. The total growing stock accounts for 1.49 billion m³ among the forest resources. The annual increment in the productive forestland is 40.02 M m³ (million cubic meters), 89% of which is from high and productive forest and the rest (11%) is from coppice. Generally, wood procurement is harvested from productive forest lands (10.3 Mha) but in addition there is conventional wood procurement that is realized through commercial harvesting (27,263 ha), thinning (466,427 ha), rehabilitation (320,525 ha) and conversion operations (81,416 ha), and fuel reduction in firebreaks and forest roadsides (GDF 2012a).

The **General Directorate of Forestry** (GDF) was established in 1869. From this date, forests seen as a source of income were protected by the law; the forests began to be sold to domestic and foreign traders by GDF. Forestry directorates were established in the countryside with the aim of protecting forest and regulating sales. **Forestry Law No.3116**, enacted in 1937, was revolutionary in that private

sector forest management was ended and management by the state began. In this context, forestry directorates were subject to a new assessment: these were named as “forest directorate” (32 units) in 1937 and “forest infirmity authority” in 1944. Since 1937 “**Forest Sub-District Directorates**” known as “forest district chieftaincy” have been created under different forest directorates. The **State Forest District Directorate** was initiated within the framework of Law No.4767, enacted in 1945, in the provincial organization (Gümüs, 2013).

In 1956, the **present Forest Law (numbered 6831)** was enacted and has been modified many times since then. It defines the principles of forest land use and types of ownership and quality: forests are defined as State Forests, forests belonging to the public legal entities and private forests according to type of ownership. In the Republic of Turkey, all affairs concerning State Forests or the places regarded as State Forests are handled or organized by the GDF. All forests owned by parties other than the State are subject to the inspection of the GDF in accordance with the provisions of **Turkish Forest Law 6831**. Articles 26 to 44 state that production and harvesting in forests can only be done by the State itself in State Forests and only in compliance to management plans.

¹ Necmettin Erbakan University, Faculty of Fine Arts, Meram, Konya, Turkey. email: murartertekin@hotmail.com

General forest ownership for Turkey:

- Publicly owned forest: 21,678,134 ha (99.9 %)
- Privately owned forest: 18,000 ha (0.83 %)
- Publicly owned traditional coppice forest: 4,417,542 ha
- Privately owned traditional coppice forest: 18,000 ha

Turkey has some short rotation coppice forests of different species:

- 2,500 ha *Eucalyptus camadulensis* and *E. grandis* (publicly owned)
- 6,500 ha Poplar plantation (Privately owned)

(1) **Coppice Forests:** even-aged stands consisting of trees and shrubs (mainly: *Quercus* spp., *Carpinus betulus*, *Castanea sativa*, *Alnus glutinosa*), which regenerate wholly or mainly vegetatively (as sprouts or root shoots) and are harvested in small clear cuts (0.5-1 ha) in short rotations of 20-40 years.

(2) **Short rotation coppice:** plantations of fast-growing trees or shrubs (mainly *Populus* spp., *Salix* spp., and *Eucalyptus* spp.), with the aim of producing wood as a renewable resource in several short rotation periods (5-15 years each).

Legal framework in relation to coppice

1. Notification no. 298/2014 (Technical principles of Silvicultural applications) prepared according to the Turkish Forest Law (Law 6831)

Art. 298. Ministry of Forestry and Water Affairs, General Directorate of Forestry: Technical principles of Silvicultural applications

(1.1.2.2) The high forest (monoculture or mixed forest) regeneration system is applied to the natural regeneration of all forests.

(1.1.4) Exceptions to 1.1.2.2 are stands of short rotation coppice with fast-growing species, stands on floodplain areas, and other coppice forest types regeneration system, are applied to artificial regeneration or the clear cutting system. The size of clear-cutting (including coppice) coupes is a maximum of 3-5 ha.

Art. 298. (1.1.4.1) and (1.1.4.2)

Specifications include:

(i) Calculation of annual allowable cut for management units treated as coppice: for *Quercus* spp., *Carpinus betulus*, *Castanea sativa*, *Alnus glutinosa* stands (20 year period) as well as poplar, eucalyptus and willow plantation (5-10 year period)

(ii) 20-year management plans for compartments treated as coppice for: exploitable coppice stands, reaching the rotation age (coppice cuttings), or non-exploitable or pre-exploitable coppice stands, with tending operations for coppice stands to regenerate artificially.

(iii) Rules for the conversion of coppice forests to high forests: conversion by coppice ageing (total cessation of coppice cuttings) and conversion by coppice replacement and planting.

References

- Anon., 2012. Orman Varlığımız (In Turkish), (Forests of Turkey) Booklet, Year: 2012 Published by: Orman idaresi ve Planlama Dairesi Başkanlığı Yayın No: 115 Envanter Serisi No. 17, General Directorate of Forestry, Ankara, Turkey
- ÇOB, 2004: Türkiye ulusal ormancılık programı (National forestry program of Turkey) (2004–2023). Ministry of Environment and Forestry, Ankara, 95 p.
- FS, 2012: Forestry Statistics, Republic of Turkey Ministry of Forestry and Water Affairs. A Publication of Official Statistics Programme, Publication Number – 01, Ankara 84 p.
- GDF, 2012a: 1980–2012 Yılları Asli Orman Ürünleri Üretim Programı ve Gerçekleşmeleri (Timber Harvesting Program and Realizations Between 1800 and 2012). General Directorate of Forestry <http://web.ogm.gov.tr/birimler/merkez/isletmepazarlama/>
- GDF (2012b) The inventory of Turkish Forests. General Directorate of Forestry in Turkey, Ankara, p 36
- Gümüş, C., 2016. Historical development of forestry education in the context of forest resources management in Turkey. Turkish Journal of Forestry, 17(1): 93-98.
- Law 6831. Http://www2.ormansu.gov.tr/osb/Libraries/Dok%C3%BCmanlar/6831_say%C4%B1l%C4%B1_Orman_Kanunu_1.sflb.ashx
- Notification 298. Technical principles of Silvicultural applications. <https://www.ogm.gov.tr/ekutuphane/Tebliğler/Silvik%C3%BClt%C3%BCrel%20Uygulamalar%C4%B1n%20Teknik%20Esaslar%C4%B1.pdf>

UKRAINE

Iryna Matsiakh¹ and Volodymyr Kramarets¹

The forests of Ukraine are located in different natural zones: Polesia, forest steppe, steppe, and in mountainous regions (Carpathians and Crimea). The different topographical, edaphic and climatic conditions determine the main forest tree species distribution, their age, spatial structure and their productivity. Forests in Ukraine are not uniformly spread. The vast majority are concentrated in the Carpathians and Polesia regions. The largest forests areas are located in Trans-Carpathia (51.1% of total land), Ivano-Frankivsk (41.0%), Rivne (36.4%), Zhytomyr (33.6%), and Volyn (31.0%) oblasts (the types of administrative divisions of Ukraine). The smallest forest areas occur in eastern-southern regions: Kherson (4.1%), Mykolayiv (4.0%) and Zaporizhya (3.7%) oblasts.

Generally, Ukrainian forests are in state and communal ownerships; only 0.1% of the total forest area is found in private ownership. Forests are managed by institutions and enterprises that are subordinated to **more than 30 different Ministries and Departments**. The main forest users in Ukraine are the State Forest Resources Agency (65.2 % of the total forest area), the Ministry of Food and Agrarian Policy (5.5%), and the Ministry of Environment and Natural Resources (1.6%). Communal

forests (within local governments) comprise 12.5% of the forest area.

Forests in Ukraine have long been exploited and still undergo intensive economic impacts. As a result, forest plantations dominate (51.5% of the total forest area), while natural, seed-originating forests occupy 32.0% and coppice forests cover 16.5% of the forest area. The largest areas of coppice forests (155,800 ha, 67.8% of the total area of such forests) are found in the Autonomous Republic of Crimea. Coppice forests are also distributed in the Zhytomyr (111,600 ha), Volyn (93,500 ha), Kharkiv (92,300) and Rivne (90,200 ha) regions.

The eastern part of Ukraine (Luhansk, Kharkiv and Poltava regions) has the greatest distribution of coppice forests - in each of those oblasts more than 30% of the total forest area is of coppice origin. Compared with the western part of the country, there are small parts of coppice in Lviv, Ivano-Frankivsk and Trans-Carpathian regions, where coppice forests occupy only 3.8%, 3.7% and 2.0% respectively of the total forest area. Mature and over-mature coppice stands dominate, occupying 47.2% of all coppices, compared with only 8.3% in young categories.

¹ Institute of Forestry and Park Gardening, Ukrainian National Forestry University, Pryrodna St. 19, 79057, Lviv, Ukraine. Corresponding author: iramatsah@ukr.net, phone +380952291087

Coppice forests in Ukraine developed without any clear intention to grow this type of forest. After World War II, part of the felled area remained as coppice, providing a fairly rapid supply of wood for heating and timber. In order to provide the best growing conditions for the main tree species (e.g. pedunculate oak, European beech, common ash, etc.), thinning of minor tree species such as hornbeam, silver birch and aspen was carried out. According to forest management plans, these stands are of seed origin, whereas they can contain up to 5-6 secondary tree species of coppice origin. This situation is typical in the forest enterprises of Poddilya and Lisostep (Tkach and Golovach 2009). Thinning favoured the main tree species, removing the secondary ones. Although a portion of these stands include a significant amount of coppice, unfortunately this factor is ignored in forest management activities.

Recently, it has been shown that the cultivation of coppice tree stands can have a number of advantages. In studies conducted in the Poltava region, comparisons of oak coppice forests with artificially planted oaks (Bojko 2006) indicated that: the time period of forest formation is decreased in coppices; a more complex structure develops than in oak forest plantations; coppices have higher productivity and a greater contribution to biodiversity conservation; and they reduce erosion and promote environment-specific functions (water and soil protection). Mature coppice oaks possessed a larger stock and a greater yield of small and medium-size wood than planted oaks. At the same time, the

condition of coppice forests was often poor and a large share was affected by root and stem rot pathogens (Tkach 1999; Ustskiy and Bugayov 2014).

Usage of coppice stands for firewood production has a long tradition in Ukraine. Various species of willows were used, along with smaller amounts of poplar or other tree species. These willows were vegetatively regenerated using cut branch lengths, which quickly rooted up, on rich, wet soils along rivers or ponds. These were then periodically cut at 1.5-2.5 m above ground to aid the development of brushwood and sprouting. Once in several years, the willow branches were cut and used as firewood. Even nowadays, in many regions of Ukraine, local populations plant lines of willows along roads or in private gardens for firewood and heating, especially in the lowlands of Ukraine and in the Pre-Carpathian and Carpathian regions with a high forest cover. After the World War II, considerable attention was also paid to the selection of fast-growing poplar plantations (Shevchenko 1958), but this tree species is rarely used. Currently, biomass plantations to generate industrial energy are the subject of experimental research, but there are none on the territories of Forests Enterprises of the State Forest Resources Agency of Ukraine. Nevertheless, both the natural and economic conditions do allow fast-growing plantations for energy purposes to be established (Fuchylo et al. 2007).

Due to the problems concerning gas supplies from Russia and the war in the eastern part of Ukraine, where the coal mines are concentrated, our country faces the acute

problem of finding alternative sources of energy. Thus, the **National Action Plan for Renewable Energy 2020**, approved by the Cabinet of Ministers of Ukraine on 01.10. 2014, includes measures to promote bio-energy (National Action Plan 2014). The most realistic of these is the production of biomass for heating of private households, and for public, industrial and commercial consumers. There is also the prospect that biomass for energy production might be grown on an industrial scale. Private companies (i.e., Rika Biopalyvo, Eco-Energy) have made a commercial offer to establish energy plantations (Rakhmetov 2017), and the agro-energy company “SalixEnergy” is successfully planning the cultivation of willow biomass for thermal and electric energy. On 1.05. 2016, this company established 1,700 ha of energy plantations in the western part of Ukraine (Gnap 2016).

The growing and cultivation of energy crops requires support from the state and legislative regulators. The **Law of Ukraine “On Amending Certain Laws of Ukraine Concerning Ensuring Competitive Conditions for the Production of Electric Power from Alternative Energy Sources”** was adopted (04.06. 2015) for the promotion of renewable energy, in particular:

- The “green tariff” for electricity generated from alternative sources (including wood) is approaching average world prices;
- If components of Ukrainian production are used to design and construct alternative energy sources, the remuneration is set as an allowance for the “green tariff”;

- Stimulation of bioenergy is provided by setting the “green tariff” rate for electricity generated from alternative energy sources (including biomass).

The **Law of Ukraine “On Amendments to the Law of Ukraine “About Heat Supply” on Stimulation of the Production of Thermal Energy from Alternative Energy Sources”** (21.03 2017) promotes the production of energy for heating from alternative sources at local level. Moreover, domestic and foreign investments are guaranteed on the return of their investment, and can adjust the bioenergy tariff depending on the current gas tariff.

The tariffs for biological energy produced from alternative sources, including renewable resources (wood) for the local population and the state institutions, are set at 90% of the current tariff of heat produced from gas. Licensing activities for producing heat energy from alternative sources and setting tariffs is done at the local level, which allows for varying conditions in different regions within Ukraine and aims to stimulate small and medium businesses. In the new version of the **Law of Ukraine “About the Electricity Market”** (13.04. 2017) considerable attention is paid to stimulating the production of electricity from renewable and alternative energy sources.

To summarize, the coppice forests of Ukraine result from a lack of effective forest management, especially after the World War II. However, there is a growing interest in the cultivation of fast-growing coppice tree species, plantations of which could become an important source of

renewable energy in modern Ukraine. In addition, as shown above, domestic and foreign investors are given guarantees on returns from their investments in producing thermal energy from biomass, which in the future will further stimulate the cultivation of fast-growing coppice plantations.

References

- Law of Ukraine “On Amendments to Some Laws of Ukraine Concerning Ensuring Competitive Conditions for the Production of Electricity from Alternative Energy Sources” (04.06. 2015). Information from the Verkhovna Rada, 2015, No. 33:324. <http://zakon4.rada.gov.ua/laws/show/514-19/page>. In Ukrainian.
- The Law of Ukraine “On Amendments to the Law of Ukraine” About Heat Supply “on Stimulating the Production of Thermal Energy from Alternative Energy Sources” (21.03. 2017). Information from the Verkhovna Rada, 2017, No. 17:207. <http://zakon2.rada.gov.ua/laws/show/en/1959-19>. In Ukrainian.
- The Law of Ukraine “On the Electricity Market” (April 2017, No. 2019-VIII). Information from the Verkhovna Rada. 2017. No. 26-27. <http://zakon4.rada.gov.ua/laws/show/2019-19/page>. In Ukrainian.
- Bojko S. V. 2006. Comparative ecological & economical evaluation of coppices and artificial oak forests of river Sula water basin. *Forestry and forest melioration*, 110: 67-71. [Бойко С. В. Порівняльна еколого-економічна оцінка природних порослевих і штучних дубових лісів на водозборі р. Сула. Лісівництво і агролісомеліорація. 2006. Вип. 110. С. 67-71]. In Ukrainian.
- Fuchylo YA.D., Sbytna M.V., Derkach D.F. 2007. The perspective of using of species of *Salix* L. for planting on energy plantations in Ukraine. *Ukrainian Phytosociological Collection*. Kyiv, vol. 25: 97-102. [Фучило Я.Д., Сбитна М.В., Деркач Д.Ф. Перспектива застосування видів *Salix* L. для створення енергетичних плантацій в Україні. Український фітоценологічний збірник. Київ, 2007. Сер. С, вип. 25. С. 97-102]. In Ukrainian.
- Gnap I. Energy plantations: theory and practice in Ukraine. [Енергетичні плантації: теорія і практика в умовах України]. <https://www.salix-energy.com/energetichni-roslini>. In Ukrainian.
- National Action Plan for renewable energy for the period till 2020. Order of the Cabinet of Ministers of Ukraine No. 902-r dated October 1, 2014. <http://zakon2.rada.gov.ua/laws/show/902-2014-%D1%80#n10>. In Ukrainian.
- Rakhmetov D. B. 2017. Scientific and innovative potential of mobilization and use of new plant resources. *Bulletin of the National Academy of Sciences of Ukraine*, 1: 73-81. [Рахметов Д. Б. Науково-інноваційний потенціал мобілізації та використання нових рослинних ресурсів. Вісник Національної академії наук України. 2017. No. 1. С.73-81]. In Ukrainian.
- Shevchenko S. V. 1958. Poplar and its cultivation in the western regions of the UkrSSR. Lviv, 108 pp. [Шевченко С. В. Тополя та її культура в західних областях УРСР. Львів, 1958. 108 с.]. In Ukrainian.
- Shilin I.S., Maurer V.M. 2015. Some Features of Establishing Poplar Plantations in Western Polissya and Opillya. *Scientific Bulletin of Ukrainian National Forestry University*, 25.6: 112-118. [Шилін І. С., Маурер В. М. Особливості закладання тополевих плантацій у Західному Поліссі та Опіллі. Науковий вісник НЛТУ України. 2015. Вип. 25.6. С. 112-118]. In Ukrainian.
- Tkach V. P. 1999. *Plane forest in Ukraine*. Kharkiv: Law, 368 pp. [Ткач В. П. Заплавні ліси України. Харків: Право, 1999. 368 с.]. In Ukrainian.
- Tkach V. P., Golovach R. V. 2009. Modern condition of natural oak stands in the Left-bank Forest-steppe of Ukraine. *Forestry and forest melioration*, 116: 79-84. [Ткач В. П., Головач Р. В. Сучасний стан природних лісостанів дуба звичайного Лівобережного Лісостепу України. Лісівництво і агролісомеліорація. 2009. Вип. 116. С. 79-84]. In Ukrainian.
- Ustskiy I. M., Bugarov S. M. 2014. Distribution of forest-pathological processes in the alder woodlands of Ukraine. *The Bulletin of Kharkiv National Agrarian University named after V.V. Dokuchayev. Seria “Soil science, agrochemistry, farming, forestry, ecology of soil”*. No. 2: 106-111. [Усцький І. М., Бугайов С. М. Поширення лісопатологічних процесів у вільхових деревостанах України. Вісник ХНАУ ім. В. В. Докучаєва: Серія «Ґрунтознавство, агрохімія, землеробство, лісове господарство, екологія ґрунтів». 2014. No. 2. С. 106-111]. In Ukrainian.

Acknowledgement

We would like to thank M. Popovych, the Chief Specialist of the Department of Forest Protection from State Forest Resources Agency of Ukraine for information included in this report.

UNITED KINGDOM

Jennifer Mills¹, Peter Buckley¹

England, Scotland and Wales

There are 3.16 million hectares of woodland in the UK according to national forestry statistics published in 2016. This represents 13% of the total land area in the UK, 10% in England, 15% in Wales, 18% in Scotland and 8% in Northern Ireland. 1.35 million hectares of woodland in the UK is independently certified as sustainably managed. Conifers, mainly Sitka spruce and Scots pine, cover around 51% of the UK woodland area, although varying from 26% in England to 74% in Scotland. The main broadleaf species are oak, beech, sycamore, ash, birch, alder, sweet chestnut and hazel.

UK forestry statistics define woodland as land under stands of trees with a canopy cover of at least 20% (or having the potential to achieve this), including integral open space, and including felled areas that are awaiting restocking. There is no minimum size for a woodland or minimum height for trees to form a woodland at maturity; the definition therefore includes woodland scrub but not areas with only shrub species. During the 20th century, the area under coppice in the UK greatly decreased; the last official estimate in 2003 was 24,000 ha.

The **Forestry Act 1967** and subsequent amendments regulate forestry in England, Scotland and Wales. Responsibility for administration and enforcement is vested in the Forestry Commission, Forestry Commission Scotland and Natural Resources Wales.

Under the Forestry Act, it is illegal to fell trees in the UK without prior approval, apart from the exemptions listed below. **Felling licences** are usually granted subject to restocking and maintenance for a period not exceeding 10 years. The Forestry Commission will discuss any proposed restocking condition with the applicant before a licence is issued. However, licences without the requirement to restock are issued for silvicultural thinning operations. They may also be issued if there are overriding environmental considerations, e.g. to restore important habitats, and such applications are assessed under the **Environmental Impact Assessment (Forestry) Regulations 1999**. It is recommended that a felling licence application is made at least 3 months before felling is planned to take place.

¹ 8 Long Row, Mersham, Ashford, Kent, TN25 7HD, United Kingdom e-mail: peterbuckleyassociates@gmail.com

In England, Scotland and Wales, a felling licence is not required if the owner wishes:

- to fell less than 5 cubic metres in a calendar quarter, but only 2 cubic metres of this can be sold per quarter (i.e. can fell 20 cubic metres a year, but sell only 8)
- for trees that have the following diameters when measured 1.3 metres from the ground: 8 cm or less; 10 cm or less for thinnings; 15cm or less for cutting coppice

A licence is not needed if the owner has a current permission under an approved **Dedication Scheme** plan or planning permission granted under the Town & Country Planning Act.

A licence is not needed to fell dangerous or nuisance trees, diseased trees in accordance with a notice served by a Plant Health Officer, to comply with an Act of Parliament or to undertake duties as a statutory service provider (gas, water, electricity).

No licence is required for lopping, topping, pruning or pollarding unless the tree is covered by a **Tree Preservation Order** or by **Hedgerow Regulations**, in which case permission must be sought from the Local Planning Authority and they also have to be consulted if a tree is to be felled in a historical **Conservation Area**.

Application for a felling licence can be made on its own or as part of a management plan submitted to the Forestry Commission, Forestry Commission Scotland or Natural Resources Wales. An application to fell trees can be made as part of a grant scheme application. A separate felling licence appli-

cation is not required as a felling licence will be issued with the grant scheme contract.

An offence under the **Wildlife & Countryside Act** (1981) may be committed if felling, and in particular, clear felling, is carried out during the breeding season of protected species, including all wild birds. A **European Protected Species** (EPS) licence may be required from Natural England under the **Conservation of Habitats and Species Regulations** (2010) if felling operations could adversely affect any EPS.

Natura 2000 sites in the UK are also designated as Sites of Special Scientific Interest (SSSIs). Consent for forestry operations, which include afforestation, planting, clear and selective felling, thinning, coppicing, modification of the stand or underwood, changes in species composition and the cessation of management, on these designated sites is required from Natural England, Scottish Natural Heritage or Natural Resources Wales as well as the Forestry Commission, unless statutory permission has been received from another public body such as the Environment Agency who have already consulted the national environmental body.

Within SSSIs, and so by association in all SACs, lists of damaging operations notified by the above conservation organisations include the cessation of tree or woodland management, which in the case of coppice, could mean keeping the coppice within rotation. However, Natural England is not aware of any action being taken for sites where coppice is being neglected, even if it was being actively coppiced when listed.

Northern Ireland

The **Forestry Act (Northern Ireland)** passed in 2010 applies in this part of the UK. Owners of private woodlands of 0.2 hectares or more need a licence to fell trees from the Forestry Service of the Northern Ireland Department of Agriculture and Rural Development. They are required to re-establish the woodland under an approved felling management plan. The exemptions from the requirement for a felling licence are similar to the rest of the UK.

References

Forestry Act 1967 <http://www.legislation.gov.uk/ukpga/1967/10>

Forestry Commission. Forestry Statistics 2016 [http://www.forestry.gov.uk/pdf/Ch1_Woodland_FS2016.pdf/\\$FILE/Ch1_Woodland_FS2016.pdf](http://www.forestry.gov.uk/pdf/Ch1_Woodland_FS2016.pdf/$FILE/Ch1_Woodland_FS2016.pdf)

Forestry Commission (2007) Tree Felling: Getting Permission. [http://www.forestry.gov.uk/pdf/trefellingaugust.pdf/\\$FILE/trefellingaugust.pdf](http://www.forestry.gov.uk/pdf/trefellingaugust.pdf/$FILE/trefellingaugust.pdf)

ACKNOWLEDGEMENTS

This article is based upon work from COST Action EuroCoppice FP1301, supported by COST (European Cooperation in Science and Technology).

COST Action FP1301 EuroCoppice kindly received further support from the Eva Mayr-Stihl Stiftung.



COST is supported by the
EU Framework Programme
Horizon 2020

COST (European Cooperation in Science and Technology) is a pan-European intergovernmental framework.

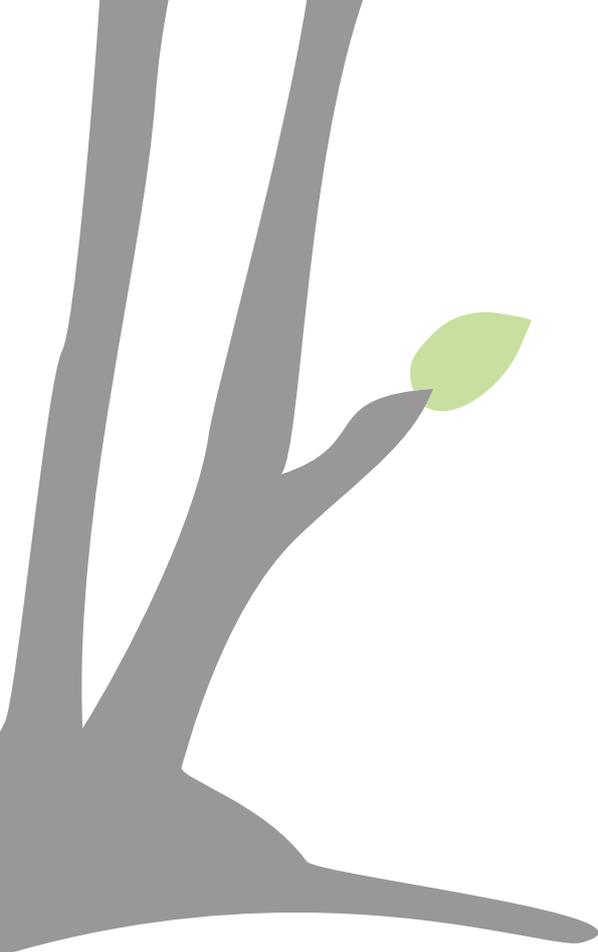
Its mission is to enable break-through scientific and technological developments leading to new concepts and products and thereby contribute to strengthening Europe's research and innovation capacities.

It allows researchers, engineers and scholars to jointly develop their own ideas and take new initiatives across all fields of science and technology, while promoting multi- and interdisciplinary approaches.

COST aims at fostering a better integration of less research intensive countries to the knowledge hubs of the European Research Area.

The COST Association, an International not-for-profit Association under Belgian Law, integrates all management, governing and administrative functions necessary for the operation of the framework.

The COST Association has currently 36 Member Countries. www.cost.eu



Albania	Croatia	Italy
Austria	Czech Republic	Latvia
Belgium	Denmark	Lithuania
Bosnia & Herzegovina	Estonia	Netherlands
Bulgaria	Finland	Norway
	France	Poland
	FYR Macedonia	Portugal
	Germany	Romania
	Greece	Serbia
	Hungary	Slovakia
	Ireland	Slovenia
	Israel	South Africa
		Spain
		Sweden
		Switzerland
		Turkey
		Ukraine
		United Kingdom

EuroCoppice - COST Action FP1301 2013 - 2017

Over 150 experts, researchers and practitioners from **35 European and partner countries** came together to collect and analyse information on coppice forests and their management. A broad range of topics were addressed in five **Working Groups**: (1) Definitions, History and Typology, (2) Ecology and Silvicultural Management, (3) Utilisation and Products, (4) Services, Protection and Nature Conservation, and (5) Ownership and Governance.

Action Members have produced reports and publications for science, policy and practice, raised awareness for important coppice-related issues, highlighted findings at numerous conferences and supported the careers of young researchers. Further information can be found at:

www.eurocoppice.uni-freiburg.de

Chair of FP1301 EuroCoppice

Gero Becker, gero.becker@fob.uni-freiburg.de

Vice-Chair of FP1301 EuroCoppice

Raffaele Spinelli, spinelli@ivalsa.cnr.it

Further Contacts: EuroCoppice initiated a long-term platform for coppice-related topics within IUFRO (www.iufro.org), the global organisation for forest research: Working Party 01.03.01 "Traditional coppice: ecology, silviculture and socio-economic aspects".

Coordinator: Valeriu-Norocel Nicolescu, nvnicolescu@unitbv.ro

