

Criterion 5: Maintenance and Appropriate Enhancement of Protective Functions in Forest Management (notably Soil and Water)

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Data sources **Indicators 5.1 and 5.2 - national reports on quantitative indicators**

Key findings by indicators

5.1 Protective forests - soil, water and other ecosystem functions

About one-fifth of the forest and other wooded land area in Europe is reported to serve the protection of water supplies, the prevention of soil erosion and the provision of other important ecosystem services. When including the Russian Federation the area devoted to protective functions in the FOREST EUROPE region is 11 percent. The importance of these functions is clearly recognized although the mechanisms for ensuring and safeguarding them may vary.

5.2 Protective forests - infrastructure and managed natural resources

Forests protect a wide range of infrastructures and managed natural resources against natural hazards in Europe. Protective functions for infrastructure are often difficult to separate from other protective functions of forests, such as soil and water, and they may overlap. Nineteen countries reporting on protective forests for infrastructure have mechanisms in place to either identify or designate forests for these protective functions. In Europe, including the Russian Federation, about 7 percent of forests are protected for infrastructure and managed natural resources. When excluding the Russian Federation, it amounts to 2 percent.

Introduction

Usually forests provide some sort of protective function. They may include the prevention and mitigation of erosion and loss of soil, the preservation of drinking water resources, the stabilization of stream banks or sand dunes, or the reduction of noise pollution. Forests in mountainous areas often fulfil specific protective functions and services. Besides erosion protection they can serve to protect infrastructures such as roads, railways, settlements and buildings from avalanches, landslides and rock fall. In northern Europe and in alpine areas near the timberline, fellings are often restricted by law to prevent the timberline from receding south or in elevation.

Most forests are regarded as multi-functional to some degree, thus they provide services other than protection, such as recreation and wood production. They also are managed to conserve or enhance biological diversity. Therefore forests may provide protective functions as an indirect benefit, even though such are not the principal management aim.

In the 'MCPFE'¹³ Assessment Guidelines for Protected and Protective Forests and Other Wooded Land," protective forests are described under Class 3 as having 'protective function' as the main management objective. The guidelines ask countries to report on forests that are designated for protective functions and that thus have a legal basis ensuring a long-term commitment. If management plans are used for classification and delineation of protective forest areas, they should also be based on long-term commitments for the protection regime. This illustrates that the emphasis is placed on policy and management decisions that ensure the maintenance and appropriate enhancement of the protective functions and not on the quantification of the potential of European forests to provide protective functions.

Due to overlapping functions it can become challenging to designate protective forest areas to either of the two Criterion 5 indicators. A number of countries have indicated that they were not able to assign data separately to Indicators 5.1 and 5.2, in which case data were reported collectively under Indicator 5.1, thus influencing the figures for the respective analysis. The heterogeneity of reporting due to different interpretations does not allow for full comparability among countries.

Indicator 5.1 Protective forests - soil, water and other ecosystem functions

Area of forest and other wooded land designated to prevent soil erosion, to preserve water resources, or to maintain other forest ecosystem functions, part of MCPFE Class "Protective Functions".

Forests are of vital importance for preventing the erosion of soil, protecting water supplies and maintaining other ecosystem functions. Measures are in place in countries to either recognize or safeguard these functions. Such measures may include the restriction or enhancement of certain management practices or zoning of forests. Designations of forests are administrative in nature or the result of decisions in the context of land use and forest management planning.

Status

In 2010, Thirty-seven countries provided information on forest and other wooded land addressing the prevention of soil erosion, preservation of water resources and maintenance of other ecosystem services. Four countries reported that 15-20 percent of their forests are considered protective and ten respectively indicated a share of more than 20 percent, together amounting to 42 million hectares (Figure 65). The Russian Federation reported 75 million hectares of protective forest or 8.5 percent of its total forest and other wooded land.

The reported share of protective forests - soil and water and other ecosystem functions in European countries ranges from 0 to more than 80 percent. The protective area is highest in Italy (83 percent) and above 35 percent in Norway, Germany¹⁴ and Romania. Besides the Russian Federation, South-West Europe shows noticeable areas of protective forests (Table A). In total about 120 million hectares are reported in the FOREST EUROPE region. This represents about 11 percent of the total area of forest and other wooded land area, or 19 percent when excluding the Russian Federation (Table 33).

Explanatory information provided by countries show that the assessment guidelines may have not been interpreted consistently as concepts of protective forests can vary widely. While the guidelines require a legal basis or designated management plans that ensure long-term commitment of protective functions, they are often exercised alongside others (e.g. production, recreation). The explanatory information from countries reveals that protective forests were identified either as having clearly distinguishable protective functions based on surveys (e.g. mapping of forest functions/services), given physical characteristics (e.g. slope; being above a certain elevation) or designations of some sort. Designation is often not formal being, for instance, rooted in management plans. This may then put descriptive figures alongside such figures which are based on legally designated protective forests.

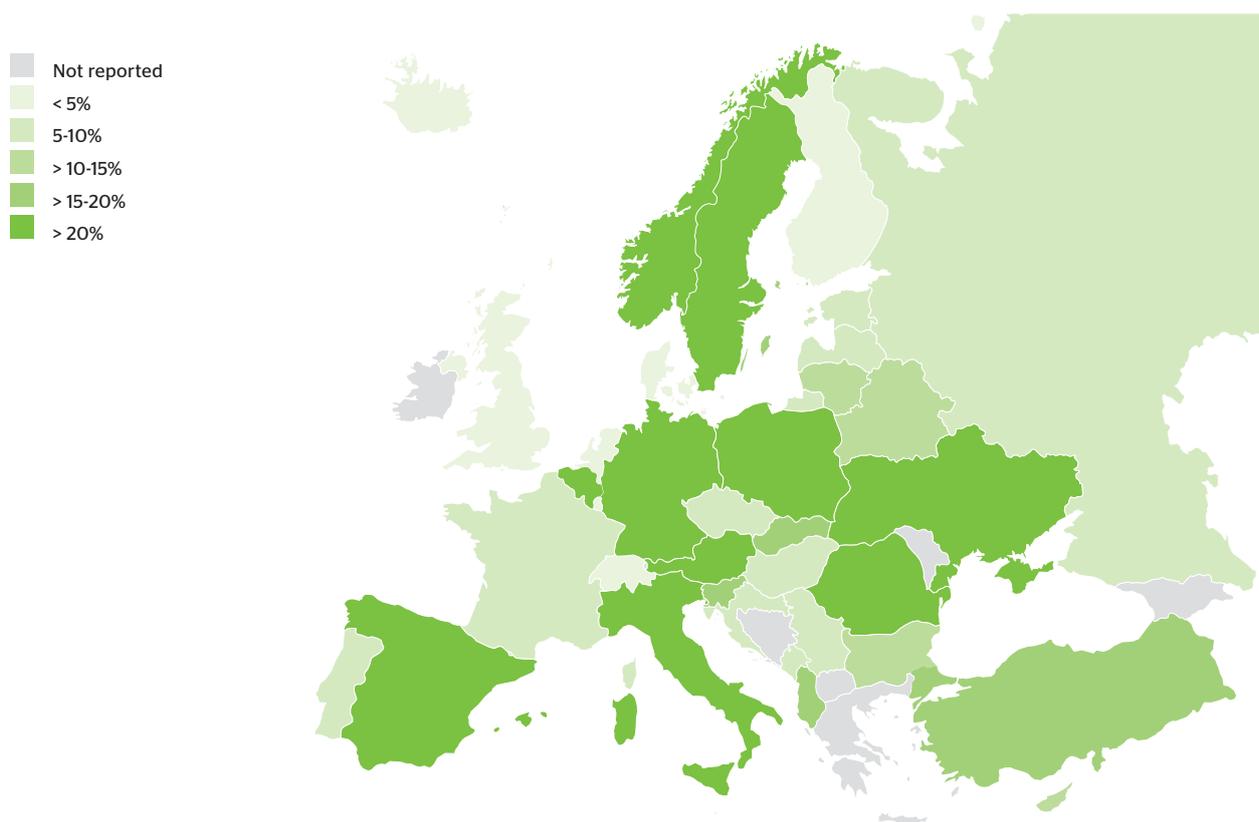
An example of a legal designation mechanism for protective forest exists for Austria. It clearly identifies the functions, rules in a legal way their enforcement and has in place a national designation category entitled 'site-protecting forest'.

Table 33: Forest and other wooded land reported for the protection of soil, water and other ecosystem services in 2010 by regions

Region	Total forest and other wooded land	Protective forest and other wooded land	Percent of total forest and other wooded land
	1 000 hectares		in percent
Russian Federation	882 310	74 948	8.5
North Europe	74 929	12 232	16.3
Central-West Europe	38 805	6 882	17.7
Central-East Europe	44 807	9 306	20.8
South-West Europe	42 291	15 902	37.6
South-East Europe	45 364	3 102	6.7
Europe	1 128 506	122 372	10.8
Europe without the Russian Federation	246 195	47 424	19.2
EU-27	178 314	36 590	20.5

Note: Countries that have reported only 'forest class' are included. Forest and other wooded land is used for percent calculation in regions. Missing data were replaced by duplicates of the nearest available reference year.

Figure 65: Percentage of forest and other wooded land reported for protection of soil and water and other ecosystem functions in 2010



Notes: (1) For countries that reported Indicator 5.1 in 2010 only under 'forest,' forest area in these countries was used to calculate the percentage; (2) France, Germany, Iceland, Montenegro, Norway, Spain and Ukraine reported data for Indicators 5.1 and 5.2 solely under Indicator 5.1.

¹³ The Ministerial Conference on the Protection of Forests in Europe has changed its brand name from MCPFE to FOREST EUROPE.

¹⁴ Germany and Norway reported data for Indicators 5.1 and 5.2 solely under Indicator 5.1.

Other countries commented that, while forests fulfil protective functions, their primary aim is “multiple use” and thus they do not qualify for being reported under Criterion 5.

The above should not minimize the fact that a considerable amount of the forest and other wooded land ensures the protection of water supplies and prevents soil erosion.

Trends

Thirty-nine countries are included in the presentation of time trends for the period 2000-2010. A slight increase in protective forest area can be observed from 2000 to 2010. There is an annual change rate in Europe

of about 0.6 percent (Table 34). The same annual change rate applies when excluding the Russian Federation. This corresponds to an annual increase of about 280 000 hectares excluding the Russian Federation. The annual change rate is highest in South-East Europe (4 percent). In the other regions it varies between -0.4 and 3 percent.

Due to the variability in interpretation of the indicator the above presentation of trends over time should be treated with caution as it cannot be transparently determined what the causes of change are. Change may be due to limited comparability between reference years, improvements of survey methodologies and intensity or find its origin in policy developments.

Table 34: Trends in area of forest and other wooded land reported for the protection of soil and water and other ecosystem services by regions (2000 - 2010)

Region	2000	2005	2010	Annual change (2000-2010)	Annual change rate
	1 000 hectares				in percent
Russian Federation	70 386	70 556	74 948	456	0.63
North Europe	12 529	12 335	12 232	-30	-0.24
Central-West Europe	5 053	5 951	6 882	183	3.14
Central-East Europe	9 697	9 981	9 306	-39	-0.41
South-West Europe	15 217	15 559	15 902	68	0.44
South-East Europe	2 087	2 765	3 102	101	4.04
Europe	114 950	117 077	122 372	740	0.63
Europe without the Russian Federation	44 564	46 521	47 424	284	0.62
EU-27	33 735	35 059	36 590	286	0.82

Note: Countries that have reported only under ‘forest class’ are included. Forest and other wooded land is used for percent calculation. Missing data were replaced by duplicates of the nearest available reference year.

Indicator 5.2 Protective Forest - Infrastructure and managed natural resources

Area of forest and wooded land designated to protect infrastructure and managed natural resources against natural hazards, part of MCPFE Class "Protective Functions".

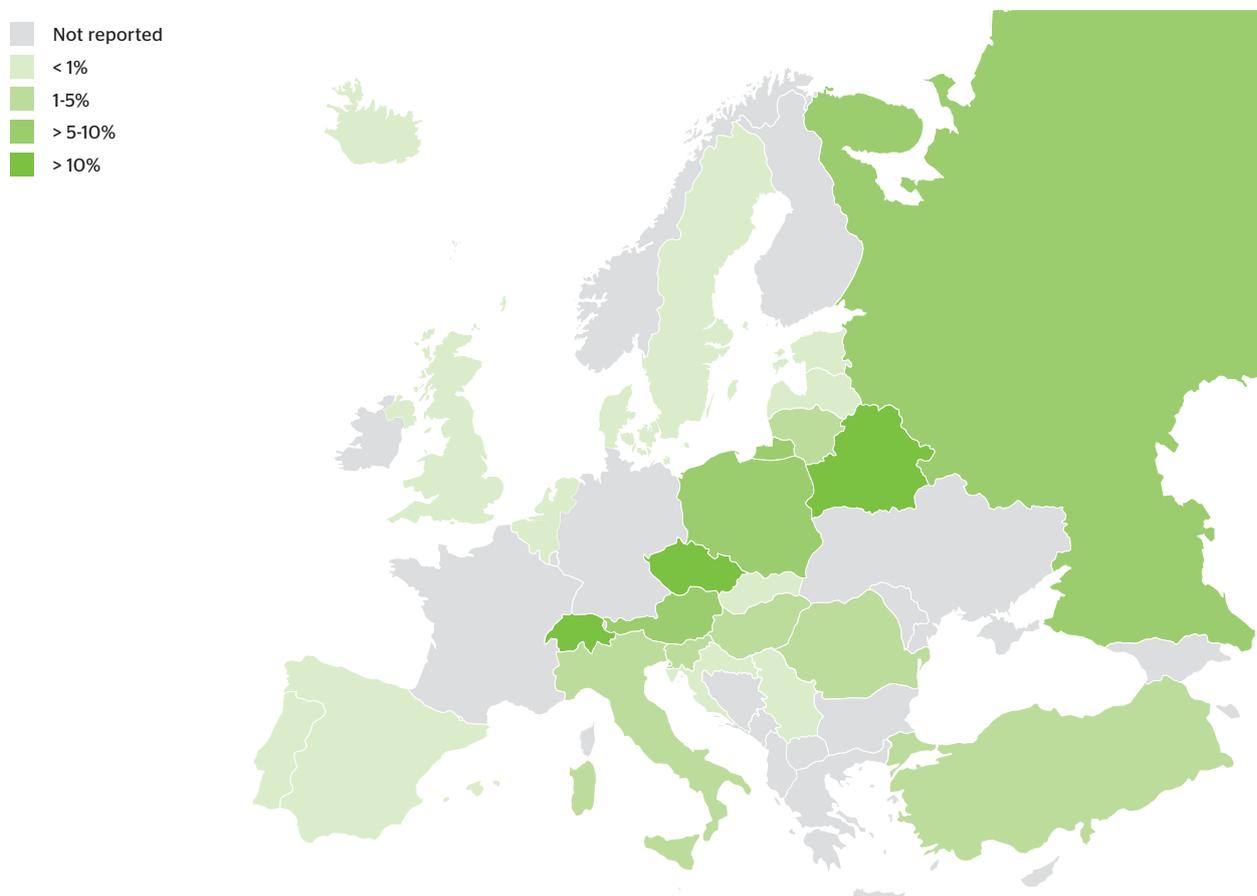
Forests protect a wide variety of man-made infrastructures. These protective functions are most evident in mountainous areas or areas with extreme climates. Countries reported forests protecting roads and railways, human settlements and other facilities, health resorts, cultivated soils and forest stands of special value and acting as shelter belts. Forests offer protection from various impacts, including rock fall, avalanches, wind, sand drift, noise, emissions and climate. Adapted regimes have been

developed for the specific needs of particular types of protective forests.

Status

Data provided for Indicator 5.2 'Protective Forest - infrastructure and managed natural resources' are fragmentary: Twenty-nine countries reported data for 2010, ten of which provided "0" values, while in four protective forest areas are below 1 percent of the total forest area. Seventeen countries did not report (Figure 66). No data were reported for other wooded land. The Russian Federation and Austria provided data only for forest and other wooded land combined and have been included in the further analysis.

Figure 66: Forest area reported for the protection of infrastructure and managed natural resources in 2010 (% of forest area)



Notes: (1) For Austria and the Russian Federation, forest and other wooded land data is used. (2) France, Germany, Iceland, Montenegro, Norway, Spain and Ukraine reported data for Indicators 5.1 and 5.2 solely under Indicator 5.1. (5.2 either reported as '0' or 'not reported').

Good coverage is observed for countries in the alpine area which also yield the highest percentage figures. They are namely Switzerland and Liechtenstein (Figure 66), which reported that more than one-third of their forests protect infrastructures. In addition, Belarus (17 percent) and Czech Republic (11 percent) have shares of more than ten percent. The largest area of protective forest for infrastructure and managed natural resources is located in the Russian Federation with more than 71 million ha. FOREST EUROPE region without the Russian Federation reported about 4 million ha. That represents about 2 percent of the total forest area. When including the Russian Federation, it amounts to 7 percent. Central-East Europe provided the most complete set of country data for 2010 (Table 35).

Comments provided by countries emphasize the difficulty of separating areas between Indicators 5.1 and 5.2. It was also observed that data reported for Indicator 5.2 in most cases are not based on formal designations. In some cases, detailed surveys on the protection of infrastructure and managed natural resources have been carried out which find their application in management plans. Formal

designations can be found, for example, in Serbia where protective forests are designated through general and special management plans (e.g. Code 53: road protection forest; Code 43: protection forest against noise) and in Austria where a legal mechanism is in place for designating protective forests for infrastructure and managed natural resources ("Object protecting forests").

Trends

Eighteen countries provided trend data on protective forests - infrastructure and managed natural resources (Table 36). This excludes countries that reported "0" values. Due to the low amount of information available, a trend analysis at a regional level is very limited. The most complete information was provided for Central-East Europe where six out of nine countries provided data for the time series 2000 to 2010. An annual decline of 86 000 ha is observed between 2000 and 2010 in that region with the main negative trend taking place from 2000 to 2005. A decline is also observed in the Russian Federation. A slight increase can be observed during the last ten years in the Central-West Europe region.

Table 35: Forest reported for the protection of infrastructures and managed natural resources in 2010 by regions

Region	Total forest area	Protective forest area	Percent of total forest area
	1 000 hectares		
Russian Federation	882 310	71 343	8.1
North Europe	69 278	22	0.0
Central-West Europe	37 016	821	2.2
Central-East Europe	43 959	2 785	6.3
South-West Europe	30 795	62	0.2
South-East Europe	29 936	291	1.0
Europe	1 019 940	75 324	7.4
Europe without the Russian Federation	210 850	3 982	1.9
EU-27	157 328	1 933	1.2

Note: For Austria and the Russian Federation, forest and other wooded land data were used

Table 36: Trends in area of forest reported for the protection of infrastructure and managed natural resources by regions (2000 - 2010)

Region	2000	2005	2010	Annual change (2000 - 2010)	Annual change rate
	1 000 hectares			in percent	
Russian Federation	99 573	99 398	71 343	-2 823.0	-3.28
North Europe	13	22	22	0.9	5.40
Central-West Europe	589	724	821	23.2	3.37
Central-East Europe	3 641	2 871	2 785	-85.6	-2.64
South-West Europe	62	62	62	0.0	0.00
South-East Europe	437	270	291	-14.6	-3.98
Europe	104 315	103 348	75 324	-2 899.1	-3.20
Europe without the Russian Federation	4 743	3 950	3 982	-76.1	-1.73
EU-27	1 767	1 848	1 933	16.6	0.9

Note: For Austria and the Russian Federation forest and other wooded land data were used; missing country data were substituted by nearest neighbour