2.4 NATURE AND BIODIVERSITY

Ecosystems, which are part of our natural heritage, provide essential services for human development. Conserving and managing them properly are fundamental to achieving environmentally sustainable social and economic development. Protection and conservation of the environment and nature require co-ordinated global measures.

The IPCC (Intergovernmental Panel on Climate Change) presents a concerning outlook as regards the future conservation of numerous species of fauna and flora. The studies it has commissioned indicate that between 20% and 30% of the plant and animal species assessed to date would be at a higher risk of extinction if the global temperature were to increase by over 1.5–2.5 ºC.

2010 was a key year for the Convention on Biological Diversity (CBD). The United Nations declared it International Year of Biodiversity and held several major events and meetings, among them the conference titled 'Post-2010 Biodiversity Vision and Target – The Role of Protected Areas and Ecological Networks in Europe', which took place during the Spanish Presidency. The programme concluded with the 10th Conference of the Parties (COP) to the Convention on Biological Diversity, held in Nagoya, Japan. During this conference in Nagoya, far-reaching agreements were made, particularly on the post-2010 biodiversity targets.

Among other important initiatives, the Spanish Committee of the International Union for Conservation of Nature (IUCN) launched the International Year of Biodiversity project as part of the UN International Year of Biodiversity.

Coinciding with the International Year of Biodiversity, the IUCN Spanish Committee organised voluntary activities to raise public and political awareness about the

INDICATOR	GOAL	TREND
Protected areas	Increase and conserve the area protected to preserve Spain's natural wealth	Protected areas now account for 27.7% of Spain's total land area
Forest defoliation	Quantify forest defoliation and identify causes	Significant improvement and recovery in woodlands' state of health
Wooded area and other forest formations	Increase the area and quality of woodland and other forest formations	Wooded area in Spain is increasing at a rate of 0.7% per year
Trends in common bird populations	Monitor trends in bird populations in Spain	Populations of common birds in forest environments are still increasing moderately, but populations in agricultural environments are decreasing
Forest reproductive material	Guarantee the origin and quality of forest reproductive material	The Spanish National Catalogue of Basic Material now contains 7,280 units
Environmental monitoring	Prevent damage to the natural environment and reduce environmental offences	Slight increase in the number of criminal and administrative offences

importance of ecosystems and biodiversity and encourage public participation in their conservation.

The indicator measuring the number of threatened species catalogued in Spain suggests that of the taxa considered to be under threat, 76% of the mammals, 25% of the fish, 18% of the amphibians and 10% of the flora are now listed.

According to the indicators in this chapter, protected areas now account for 27.7% of Spain's land area, while forest area is continuing to grow at an average of 0.7% per year and now stands at over 18 million ha.
Forest state of health improved significantly in Spain over the year in both coniferous and broad-leafed forests following the poor results recorded in 2009. However, once again bird populations in agricultural environments declined, mainly due to habitat loss.

This year, a new indicator has been added: forest reproductive material. This is based on the 7,280 units in the Spanish National Catalogue of Basic Material, which guarantees the origin and quality of forest reproductive material. In this edition, the indicator measuring the cataloguing of endangered species in Spain has not been included, as the figures have not changed since previous publications.

Protected areas

In 2010, protected areas accounted for 27.7% of Spain's total land area

PAs AS A PROPORTION OF SPAIN'S TOTAL AREA (%)

1990	1994	1998	2001	2003	2004	2005	2007	2008	2009	2010
4.38	5.75	7.34	7.90	8.80	8.93	9.16	9.22	11.63	11.70	11.90

Source: MARM

PROTECTED AREA BY PROTECTION CATEGORY (2010)

PROTECTED AREA	PAs & NATURA 2000 NETWORK	PAs	NATURA 2000 NETWORK
Terrestrial (ha)	14,001,442.48	6,019,645.48	13,733,332.01
Marine (ha)	1,088,259.88	267,736.64	1,048,879.18
Total (ha)	15,089,702.36	6,287,382.12	14,782,211.19
Terrestrial area protected (%)	27.66	11.89	27.13

Source: MARM.

In 2010, Spain had 1,542 Protected Areas (PAs) covering an overall area (terrestrial and marine) of 6,287,382 ha — 11.9% of the country's total territory.

Adding the area in the Natura 2000 network to that in PAs reveals that 27.7% of Spain's total area was protected in 2010. It should be noted that part of the area designated as PA also forms part of the Natura 2000 network. Consequently, adding the two totals together does not produce the total area protected (duplicated areas should first be removed when calculating the total protected area).

The Natura 2000 network, which is made up of Sites of Community Importance (SCIs) and Special Protection Areas (SPAs) for wild birds, rose to 27.1% of Spain's total land area in 2010.

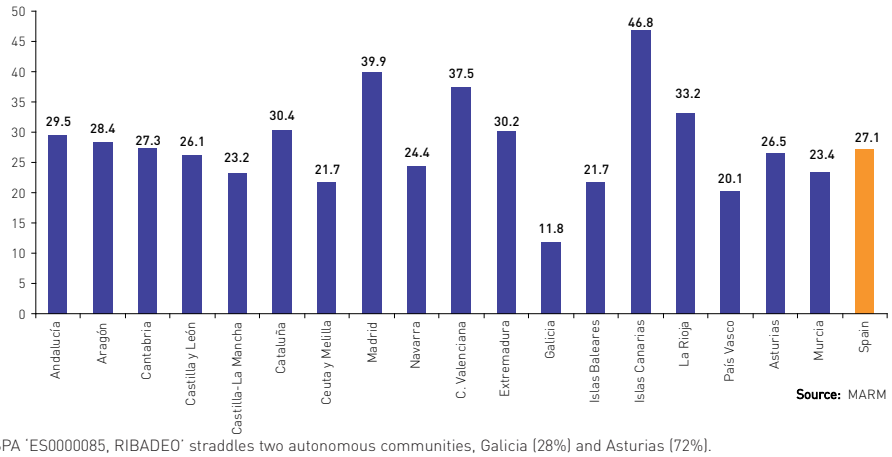
On 31 December 2010, Spain had 1,446 SCIs (11 more than the previous year) covering a total area of 12,622,994.2 ha (11,592,488.6 terrestrial ha and 1,030,505.6 marine ha). These accounted for 22.9% of the country's total land area.

A new Special Protection Area for wild birds was established in 2010, bringing the total number of SPAs as at 31 December 2010 to 595. These SPAs' total area now stands at 10,360,369.2 ha, of which 10,076,015 ha are terrestrial and 284,354.2 ha are marine. 19.9% of Spain's total land area is now covered by this protection category.

It is important to recall that adding together the areas designated as SCIs and SPAs does not produce the total area covered by the Natura 2000 network, as these two categories overlap.

The autonomous communities with most land area protected by the Natura 2000 network are also the biggest ones — Andalusia, Castile-Leon and Castile-La Mancha. Nevertheless, the Canary Islands (46.8% of its area), Madrid (39.9%) and Valencia (37.5%) were the autonomous communities with the greatest percentage of land area included in the Natura 2000 network. In contrast, those with the lowest percentages were Galicia (11.8%), the Basque Country (20.1%), the Balearic Islands (21.7%) and Castile-La Mancha (23.2%).

NATURA 2000 NETWORK AS PROPORTION OF TOTAL AREA 2010 (%)



Note: SPA 'ES0000085, RIBADEO' straddles two autonomous communities, Galicia (28%) and Asturias (72%).

NOTES

- The Natura 2000 network is a European network of biodiversity conservation areas. It includes Special Areas of Conservation (SAC), designated in accordance with the Habitat Directive (Directive 92/43/EEC), and Special Protection Areas (SPA), established under the terms of the Birds Directive (Directive 2009/147/EEC). Its purpose is to ensure the long-term survival of Europe's most endangered species and habitats, thereby helping to halt biodiversity loss resulting from adverse human impact. Establishment of an SAC requires completion of a process of application and approval that begins with proposal of an SCI by a Member State. Following assessment of the application by the EU, the area may then be declared an SAC.
- Spanish legislation (Law 42/2007, of 13 December 2007, on natural heritage and biodiversity) defines PAs as."... areas within Spain's national territory, including inland and marine waters (...) that meet at least one of the following requirements and are declared as such:
  a) Contain natural elements or systems that are representative, unique, fragile, endangered or of special ecological, scientific, scenic, geological or educational interest.
  b) Are specifically intended to protect and preserve biological diversity, geodiversity and associated natural and cultural resources."

SOURCES

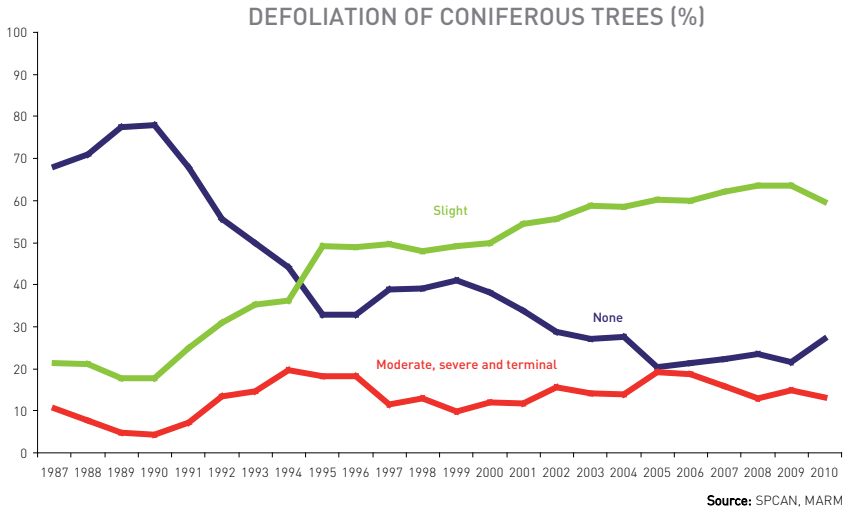
- PAs: Nature Database. Sub-Directorate-General for the Natural Heritage and Biodiversity Inventory. Directorate-General for the Natural Environment and Forestry Policy. MARM.
- Natura 2000 network. Sub-Directorate-General for Biodiversity. Directorate-General for the Natural Environment and Forestry Policy. MARM.

FURTHER INFORMATION

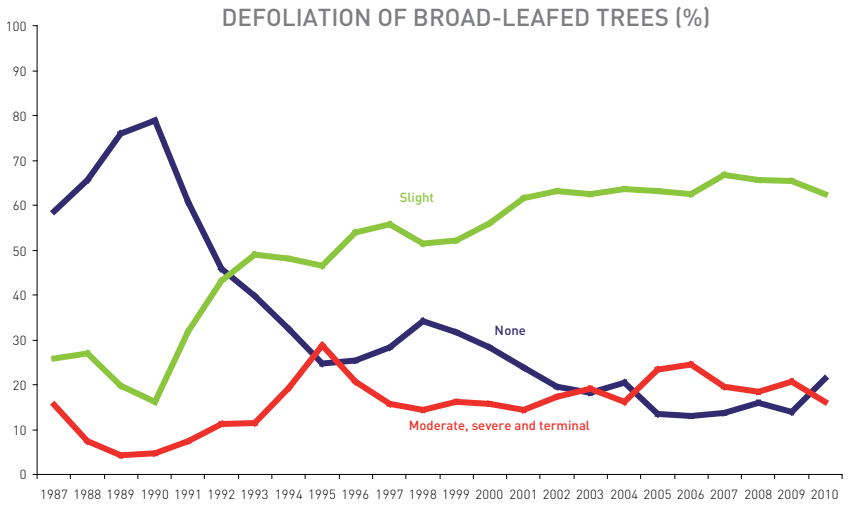
- **http://www.marm.es**

Forest defoliation

In 2010, woodlands' general state of health improved, recovering significantly in comparison with 2009



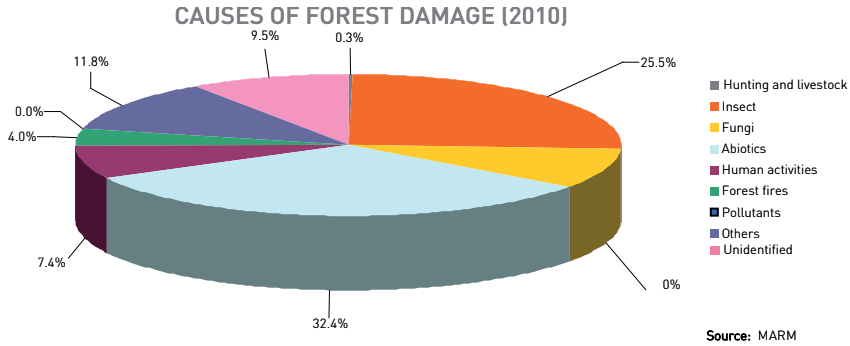
Source: SPCAN, MARM



Source: SPCAN, MARM

Analysis of Spain's Level I points on the European Forest Damage Monitoring Network shows that the general state of the country's forests improved in comparison with previous years. There was a general increase in the percentage of measurements showing no or slight defoliation (healthy woodland), together with a decrease in the percentage showing moderate, severe or terminal defoliation. This improvement was less pronounced in coniferous trees than in broad-leafed trees. There was also an

increase in the percentage of dead woodland as a result of preventive felling and forestry, followed by abiotic damage and damage by bark beetle (*Scolytidae*).



There was a decrease in woodland killed directly by insects, and an increase in dead woodland due to abiotic damage. The trees in question are likely to be have been those weakened by the 2009 drought.

NOTES

- Forest defoliation is the process by which a plant species loses its leaves as a result of pathological or climatic stress that provokes premature or abnormal leaf fall. The degree of forest defoliation indicates forests' state of health. It is analysed in terms of foliage loss from the tree crown at a series of sampling points. The results are classified into the following categories:

Loss of needles/leaves	Degree of defoliation
0–10%	None
> 10-25%	Slight
> 25%	Moderate, severe and terminal

- Under the International Co-operative Programme on the Assessment and Monitoring of Air Pollution Effects on Forests, the Level I network is an international large-scale systematic network consisting of over 5,700 monitoring points distributed on a 16x16-km grid covering all of Europe. It was set up in 1986 from a random start point. This network annually analyses forest health and assesses the main factors that have a negative impact on the same. The number of sampling points in the Spanish Network currently stands at 620. Furthermore, and within the framework of the previous Forest Focus EC Regulation and the current Life+ financial instrument (FutMon Project), its design allows for monitoring of other issues, such as the effects of climate change on forests, sustainable management and preservation of forest biodiversity.

SOURCES

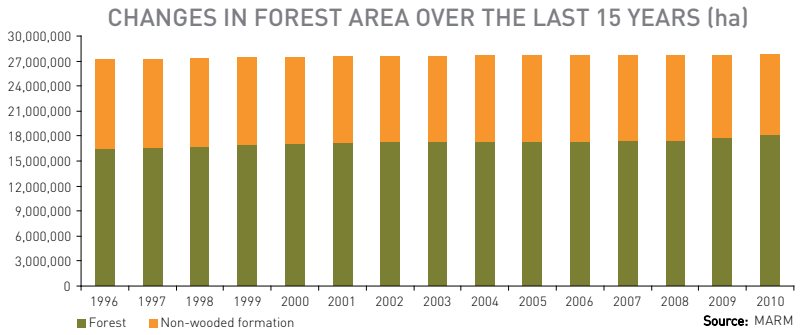
- Service for Protection of Forests Against Harmful Agents (SPMCAN). Directorate-General for the Natural Environment and Forestry Policy. MARM.

FURTHER INFORMATION

- *Anuario de Sanidad Forestal 2009*. Service for Protection of Forests Against Harmful Agents (SPMCAN). Directorate-General for the Natural Environment and Forestry Policy. MARM, 2010.
- **http://www.marm.es**
- **http://www.icp-forests.org**
- **http://www.futmon.org**

Wooded area and other forest formations

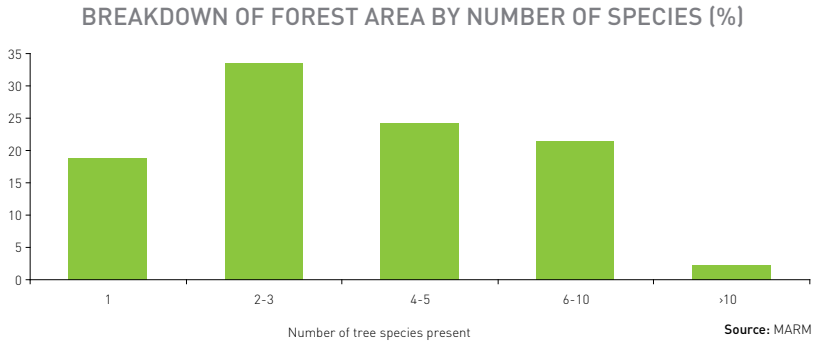
Spanish forests increased by 0.7% per year over the last decade



Spain's forest area, comprising woodland and other non-wooded forest formations, covers over 27.5 million ha, 55% of Spain's total land area.

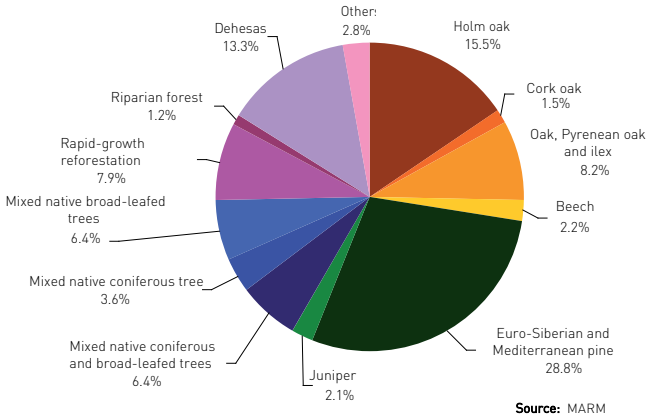
Total wooded area in 2010 stood at over 18 million hectares, or 0.39 ha per resident. In the last decade (2001–2010), forests grew by 0.7% per year, producing an average annual increase of 118,500 ha. The rise is mainly due to a reduction in agriculture and livestock farming, afforestation of agricultural land and reforestation of non-wooded forest areas.

The diversity of Spain's forests can be seen in the quantity of species and in the variety of wooded formations. According to data from the Third Spanish National Forest Inventory (IFN3), over 80% of forests contain two or more species of tree.



In terms of forest variety in Spain, according to the Forest Map of Spain (MFE50), holm-oak wood is the most common formation. Without including the area covered by *dehesas* (grasslands with scattered oak trees), holm-oak woods occupy 2.8 million ha (15.5% of the country's total forest area). The most frequent conifer formation is Aleppo-pine wood (*Pinus halepensis*), which covers 2 million hectares and accounts for just over 11% of the total forest area.

BREAKDOWN OF WOODED FORMATIONS (%)



Source: MARM

The results of the IFN3 show that forest area is increasing in all Spain's Autonomous Communities.

NOTES

- Started in 1966, the Spanish National Forest Inventory is a statistical survey designed to generate the most comprehensive information possible on Spain's woodland. It operates at provincial level and, as a continuous inventory, the same measurements are taken across the whole country every 10 years. The Forest Map is the cartographic basis of the IFN and is produced with the same frequency.
- The Second Spanish National Forest Inventory (IFN2) was taken between 1986 and 1996. The Third Spanish National Forest Inventory (IFN3) was taken between 1997 and 2007, as was the MFE50. The Fourth National Forest Inventory (IFN4) and the creation of the Spanish Forest Map 1:25,000 (MFE25) are currently under way.
- According to international criteria, forest is considered wooded area in which the forest cover fraction is greater than 10%.

SOURCES

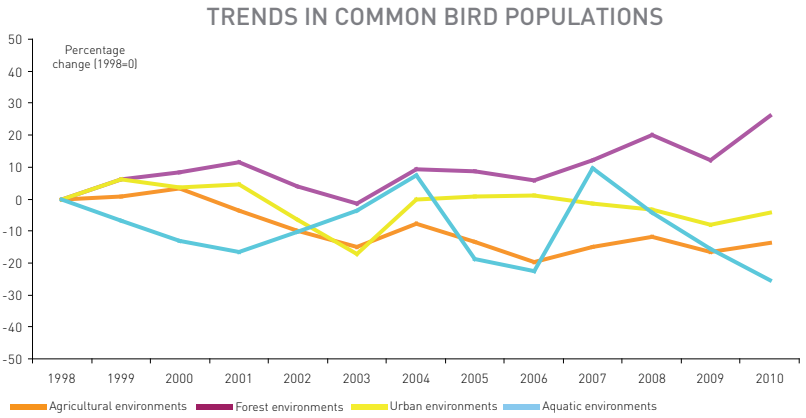
- Spanish National Forestry Inventory and Forest Map of Spain. Sub-Directorate-General for the Natural Heritage and Biodiversity Inventory. Directorate-General for the Natural Environment and Forestry Policy. MARM.

FURTHER INFORMATION

- **http://www.marm.es/portal/secciones/biodiversidad/inventarios/ifn**

Trends in common bird populations

The moderate increase in bird populations in forest environments was maintained, while populations in agricultural environments continued to decline



Source: MARM and SEO/BirdLife

Trends in populations of common birds have been monitored in Spain since 1998. A standardised census methodology is used to obtain demographic data on over 100 species of reproductive birds throughout Spain. Information on each species is collected and, by grouping together species with common characteristics, such as presence in a particular environment, it is possible to produce trend indicators. As birds are excellent biomarkers, analysis of this data provides valuable information with which to assess trends in Spain's most important ecosystems and, subsequently, to assess the country's biodiversity.

The main results observed over the 1998–2010 period are as follows:

Environment	Trend	Classification
Agricultural environments	-1.1	Moderate decline
Forest environments	2.1	Moderate increase
Wetland environments (Passeriformes only)	-0.3	Stable
Urban environments	-0.5	Stable

Analysis of bird populations by the type of environment they inhabit reveals that urban bird populations and those of Passeriformes in aquatic environments remained similar to previous year's figures.

Forest bird populations maintained the moderate growth recorded in previous years in both Mediterranean (sclerophyllous) and Euro-Siberian forests (deciduous).

However, bird populations in agricultural environments continued to show a negative trend, recording a moderate and statistically significant decline. This indicates that the causes of these trends remain in place. These causes include intensification and homogenisation of agricultural environments due to loss of traditional forms of land use; fragmentation and alteration of natural steppes; and pollution due to excessive use of pesticides and fertilisers. Maintaining the extensive biodiversity found in agricultural environments continues to mean addressing serious conservation issues. Mainstreaming biodiversity conservation into the activities performed by this prominent productive sector in Spain is imperative.

Finally, analysis of other aggregated indices shows that populations of common sedentary and migratory sub-Saharan birds remained stable, while those of trans-Saharan migratory birds increased slightly. Analysis by diet shows that populations of insectivorous birds remained stable, whilst those of granivorous birds experienced moderate decline, as in 2009.

NOTES

- The trend indicators employed are used internationally within the framework of the Convention on Biological Diversity and have been adopted by the European Union in its SEBI 2010 programme to assess compliance with its target for 2010 (i.e. halting biodiversity loss within the EU and slowing it globally by 2010). They will continue to be used for the post-2010 goals established.
- To monitor bird populations, a 10x10-km UTM grid has been set up across the Iberian Peninsula and Balearic Islands and samples are taken annually within each unit. There are over 800 squares within the grid, covering 14–15% of Spain's territory.
- The system monitors populations of the most common species (i.e. not those that are subject to specific censuses or monitoring).
- The bird populations monitored by this indicator are grouped as follows:

By environment inhabited	Urban environments	
	Forest environments	Euro-Siberian
		Mediterranean
	Agricultural environments	Cereals
		Northern
		Wooded
	Aquatic environments	
By migratory behaviour	Sedentary birds	
	Migratory birds	Sub-Saharan
		Trans-Saharan
By diet	Granivorous birds	
	Insectivorous birds	

SOURCES

- Sub-Directorate-General for Biodiversity. Directorate-General for the Natural Environment and Forestry Policy. MARM, 2010.
- SEO/BirdLife, 2010.

FURTHER INFORMATION

- **http://www.seo.org**
- **http://www.marm.es**

Forest reproductive material

The number of units in which forest reproductive material of guaranteed quality and origin can be obtained totalled 7,280,111 more than the previous year

The Spanish National Catalogue of Basic Material is a register managed by the Ministry of the Environment and Rural and Marine Affairs. It categorises the selected stands, seed sources, seed orchards and clones that constitute the basic materials, or units of approval, authorised by Spain's regional governments.

NUMBER OF NEW UNITS OF APPROVAL IN THE SPANISH NATIONAL CATALOGUE OF BASIC MATERIAL

Source: MARM

In these units of approval, forest reproductive material (seeds, fruits and parts of plants) is gathered and used for reforestation of the country's main forest species. Certified production and commercialisation of these materials are regulated by Royal Decree 289/2003, on the sale of forest reproductive material.

The Catalogue's main objective is to guarantee the origin and quality of forest reproductive material and so, based on the characteristics of the area where the reforestation trees will be planted, help users select species from appropriate origins.

In 2010, 111 new units were added to the Catalogue. After subtracting the units withdrawn, the total number stood at 7,280 units, 0.7% more than the previous year.

The breakdown of the units of approval by type and category is shown in the following table:

Type of basic material	Category	Nº units of approval (2010)	Land area* (ha) of the units of approval
Seed sources and stands	Identified	6,803	5,183,212.56
Selected stands	Selected	324	17,773.48
Seed orchards	Qualified	21	95.65
	Monitored	2	
Parents of families	Qualified	27	Not quantifiable in terms of area
	Monitored	4	
Clones	Qualified	55	
	Monitored	44	
TOTAL		7,280	5,201,081.69

*It should be noted that the areas included in the calculations sometimes overlap other areas containing different species. Also, entire municipal districts are sometimes registered, even though their land area may not coincide fully with that of the forest.

Of the total number, 6,803 units of approval are categorised as identified (seed sources and stands), 324 as selected (selected stands), 103 as qualified and 50 as monitored. These units of approval occupy over 5 million hectares, approximately 28% of Spain's total wooded area.

NOTES

- Basic material comprises populations, plantations and clones from which are obtained forest reproductive material (seeds and plants) used in reforestation. The approved types of basic material, as per Royal Decree 289/2003 of 7 March, on the sale of forest reproductive material, are as follows:
  - –Seed source: Trees within an area from which seed is collected.
  - –Stand: Delineated population of trees possessing sufficient uniformity in composition.
  - –Seed orchard: Plantation of selected clones or families which is isolated or managed so as to avoid or reduce pollination from outside sources, and managed to produce frequent, abundant and easily harvested crops of seed.
  - –Parents of family: Trees used to obtain progeny by controlled or open pollination of one identified parent used as a female, with the pollen of one parent (full-sibling) or a number of identified or unidentified parents (half sibling).
  - –Clone: Group of individuals (ramets) derived originally from a single individual (ortet) by vegetative propagation, for example by cuttings, micropropagation, grafts, layers or divisions.
  - –Clonal mixture: A mixture of identified clones in defined proportions.
- Management of the Catalogue implies ecological and phenotypic characterisation of each of the approved materials. This task is performed by the Directorate-General for the Natural Environment and Forestry Policy (MARM) in collaboration with regional governments. New basic materials are published in the BOE and form part of the European common catalogue.

SOURCES

- Genetic Material Service. Sub-Directorate-General for Forestry Policy and Desertification. Directorate-General for the Natural Environment and Forestry Policy. MARM. 2010

FURTHER INFORMATION

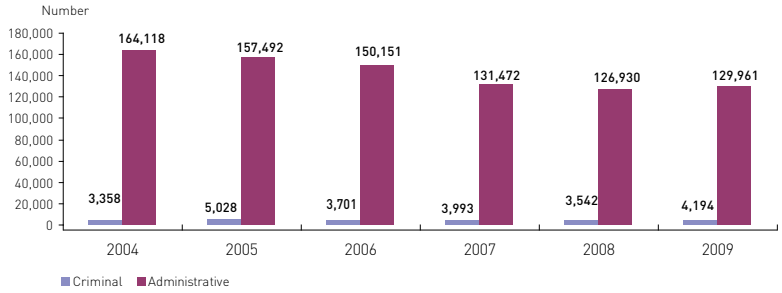
- **http://www.marm.es/es/biodiversidad/temas/montes-y-politica-forestal/recursos-geneticos-forestales/default.aspx**

Environmental monitoring

In 2009, the number of criminal and administrative offences increased slightly

The Nature Protection Service (Seprona) of the Spanish Civil Guard is responsible for enforcing compliance with legislation to conserve Nature and the environment, water resources, game, fish, forests and all other natural and related resources, thereby ensuring appropriate enjoyment of the natural environment while respecting it and preventing its degradation.

ENVIRONMENTAL CASES DEALT WITH BY THE CIVIL GUARD



Note: Only includes action by SEPRONA on environmental offences

Source: Compiled in-house using SEPRONA data

In 2009, Seprona intervened in 134,155 cases, 2.8% more than the previous year. However, this figure is 6.4% less than the average number of offences over the preceding five years. Of the total number of offences, 96.9% were administrative, 2.9% were criminal and the remaining 0.2% were minor.

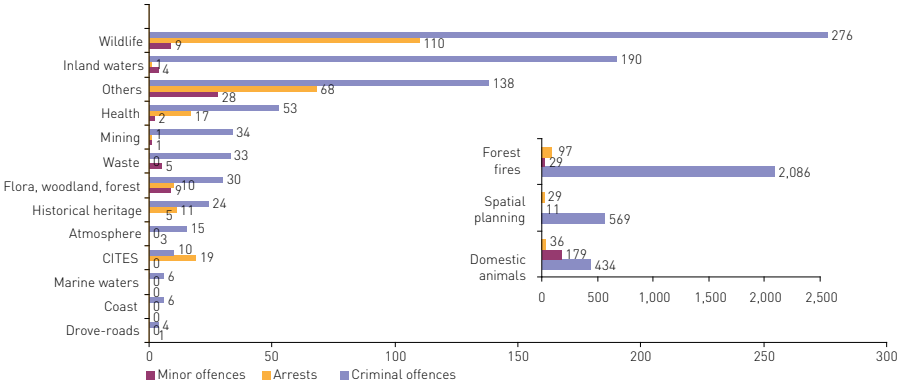
ENVIRONMENTAL CASES DEALT WITH BY SPAIN'S CIVIL GUARD

		2005	2006	2007	2008	2009
Offences	Criminal	5,028	3,701	3,993	3,542	4,194
	Administrative	157,492	150,151	131,472	126,930	129,961
Arrests		883	930	366	330	399

Source: Compiled in-house using SEPRONA data
Note: Only includes action by Seprona on environmental offences.

As in previous years, by type of offence, forest fires accounted for the largest number of cases reported. In 2009, there was a substantial increase in the number of forest-fire offences, which rose by 45.6% on 2008, bringing the total to 2,086.

NUMBER OF ENVIRONMENTAL OFFENCES AND ARRESTS (2009)



Note: "Others" refers to environmental actions not carried out by SEPRONA

Source: Compiled in-house using SEPRONA data

The next-biggest group of offences were spatial-planning crimes, which decreased by 10.9% in 2009 in comparison with the year before.

When assessing the figures, it should be borne in mind that inspection campaigns focusing on particular areas are carried out from time to time and these result in an increase in the number of offences reported in that particular field.

In 2009, Seprona arrested 399 people in relation to environmental offences, 20.9% more than the previous year, when there were 330 arrests. Of those arrested, 24.3% were arrested for forest fire offences and 27.6% for offences against wildlife.

NOTES

- When calculating the indicator, this edition only takes into account environment-related cases dealt with by the Civil Guard.

SOURCES

- Civil Guard Public Information Office. Directorate-General for the Police and Civil Guard. Ministry of the Interior, 2010.
- Seprona. Directorate-General for the Police and Civil Guard. Ministry of the Interior, 2010.

FURTHER INFORMATION

- **http://www.guardiacivil.org**