

NATURE AND BIODIVERSITY 2.4



Over the last few decades, there has been an increase in environmental awareness and knowledge in Spain. At the same time, the demand for quality technical information on natural heritage and biodiversity, their condition, pressures, uses, impacts and improvement actions has escalated at both national and international level.

Royal Decree 556/2011 of 20 April for the development of the Spanish Inventory of Natural Heritage and Biodiversity came into force on 12th May, 2012. This inventory, together with the State Strategic Plan for Natural Heritage and Biodiversity and the Plans for Natural Resource Management, constitute the basic instruments for the knowledge and planning of heritage and biodiversity in Spain.

The Spanish Inventory of Natural Heritage and Biodiversity aims to provide objective, reliable and comparable information to design conservation, management and sustainable use policies, disseminate the values of Natural Heritage and Biodiversity among society and contribute towards addressing the information requirements stemming from international commitments.

In order to achieve these objectives, the Inventory incorporates three instruments. Firstly, the basic components (such as inventories, catalogues, records,



KEY MESSAGES

Protected Areas (PAs) accounted for 12.41% of the total land area of Spain in 2011, while the Natura 2000 Network covers 27.14%. Taking into account overlaps, protected areas represent 27.83% of the total terrestrial area.

The European Network on Forest Damage in Spain (Level-I Network) shows that the general state of woodland in 2011 is still in the process of recovering. In regard to the trees studied, 88.2% had a healthy appearance and only 10.2% of bases suffered from more than 25% defoliation.

Forest area in Spain covered slightly more than 27.5 million hectares in 2011 (55% of the country's total territory). Total wooded area exceeded 18 million hectares, which is the equivalent of 0.39 ha per resident.

Bird populations in forest environments displayed a moderately upward trend in 2011, while numbers continued to decline in agricultural environments.

The Spanish National Catalogue of Basic Material recorded an increase of 509 new units of approval in 2011, while the number of basic materials that can be used to obtain reproductive material with guaranteed quality and origin rose by 6%.

The number of administrative and criminal offences processed decreased in 2010, as did the number of arrests made by SEPRONA.

INDICATORS

- Protected areas
- Forest defoliation
- Wooded area and other forest formations
- Trends in common bird populations
- Forest reproductive material
- Environmental Monitoring

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listings and databases). Secondly, a system of indicators, that enables us to assess their status and developments synthetically . And finally, an annual report as a summary to disseminate the situation.

In order to summarise all the information included in the set of Inventory components, a system of indicators is established to provide a simple and direct portrayal of any relevant information regarding the state, variations and trends of the elements that are part of Spain's natural heritage and biodiversity. This chapter analyses a series of Indicators that bring us closer to the current state of and developments in nature and biodiversity in Spain.

Protected areas

Protected areas accounted for 27.83% of total terrestrial area in 2011

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

1990	1994	1998	2001	2003	2004	2005	2007	2008	2009	2010	2011
4.38	5.75	7.34	7.90	8.80	8.93	9.16	9.22	11.63	11.70	11.90	12.41

Source: MAGRAMA

PROTECTED AREA BY PROTECTION CATEGORY (2011)

PROTECTED AREA	PA and NATURA 2000 NETWORK	PAs	NATURA 2000 NETWORK
Terrestrial (ha)	14,088,043.83	6,282,727.17	13,739,769.06
Marine (ha)	1,085,313.96	499,516.90	1,042,436.51
Total (ha)	15,173,357.79	6,782,244.07	14,782,205.57
Terrestrial area protected (%)	27.83	12.41	27.14

Source: MAGRAMA

In 2011, Spain had 1,557 Protected Areas (PAs) covering an overall area (terrestrial and marine) of 6,782,244 ha. Therefore, these areas accounted for 12.4% of the country's total territory in 2011.

Adding the area in the Natura 2000 network to that in PAs covered by Spanish legislation reveals that 27.83% of Spain's total area was protected in 2011. 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.

The Natura 2000 Network, which is made up of Sites of Community Importance (SCI) and Special Protection Areas (SPAs) for wild birds, covered 27.14% of Spain's total land area in 2011.

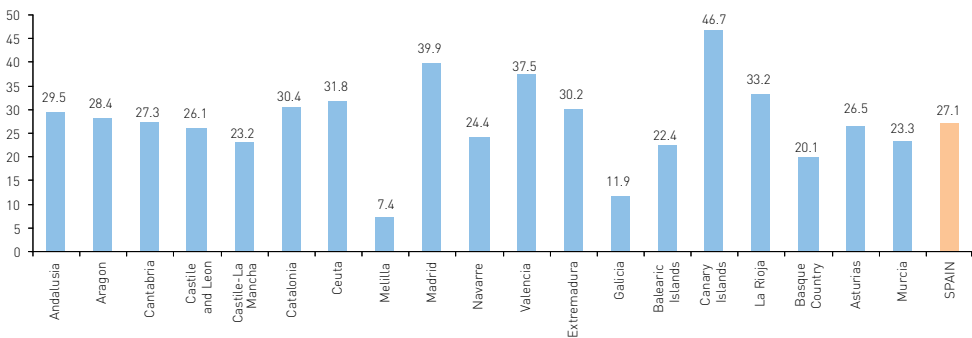
On 31 December 2011, Spain had 1,446 designated and European Commission approved SCIs covering a total area of 12,622,990.69 ha (11,598,635.14 terrestrial ha and 1,024,355.55 marine ha). These accounted for 22.91 % of the country's total land area.

Spain had a total of 595 SPA for wild birds in 2011. These SPAs covered a total of 10,360,361.87 ha, of which 10,082,251.43 ha were terrestrial and 278,110.44 marine. This protection category covers 19.92% of the country's total land area.

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The Autonomous Communities with the most land area protected by the Natura 2000 Network are Andalusia, Castile-Leon and Castile-La Mancha, essentially due to their size as regions. However, the Canary Islands (46.74% of its area), Madrid (39.88%) and Valencia (37.48%) were the autonomous communities with the highest percentage of land area included in the Network. In contrast, those with the lowest percentages were Galicia (with 11.88% of its surface area), the Basque Country (20.06%), the Balearic Islands (22.37%) and Castile-La Mancha (23.16%).

NATURA 2000 NETWORK AS A PROPORTION OF TOTAL AREA 2011 (%)



Source: MAGRAMA

* The 'ES0000085, RIBADEO' SPA for wild birds straddles two regions, namely Galicia, with 28% of the total surface area, and the Principality of Asturias, with the remaining 72%.

Preparation: Nature Database Area. Sub-Directorate General of Natural Environment. Directorate General for Quality and Environmental Assessment and Natural Environment.

NOTES

- Spanish legislation (the Natural Heritage and Biodiversity Act 42/2007 of 13th December 2007) defines protected areas 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."
- The Natura 2000 Network is a European ecological network that consists of Sites of Community Importance (SCI) and Special Areas of Conservation (SAC) designated in accordance with the Habitat Directive (Directive 92/43/EEC), as well as by Special Protection Areas (SPAs) for wild birds established under the terms of the Bird Directive (Directive 2009/147/EC). Its purpose is to ensure the long-term survival of the species and types of habitat most under threat in Europe and it is the most important policy tool for the conservation of biodiversity in the European Union. In order to be designated a SAC, Member States must put forward to the European Commission the areas that noticeably contribute to maintaining or, where applicable, recovering the favourable state of conservation of natural habitats and the habitats of species of community interest, and where the necessary tools are used to manage those areas, for approval as SIC.
- 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.

SOURCE

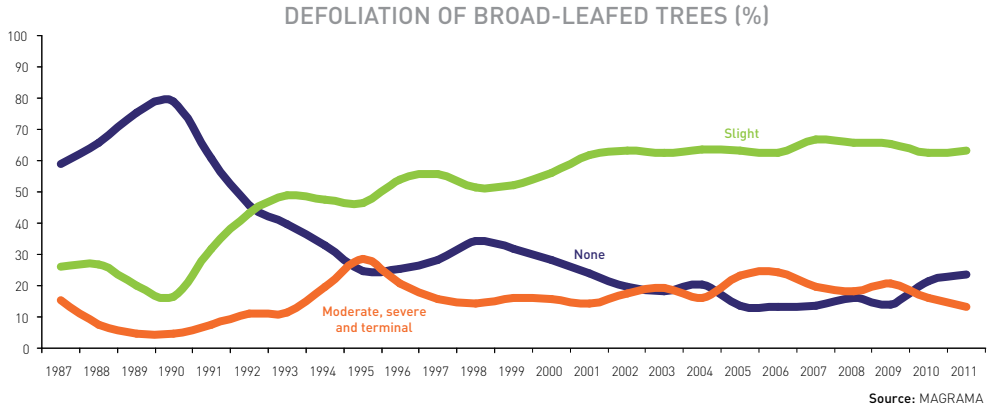
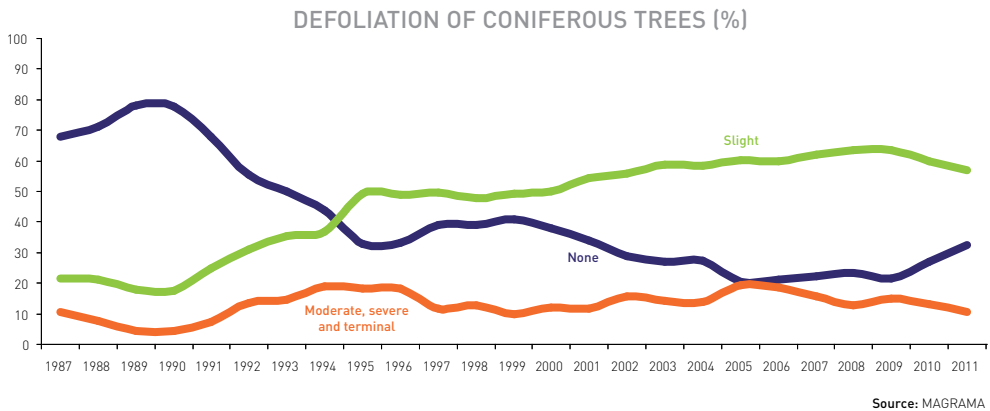
- Nature Database. Sub-Directorate General of Natural Environment. Directorate General for Quality and Environmental Assessment and Natural Environment. Ministry of Agriculture, Food and Environment.
- Surface area calculations were made using the regional boundaries and coastal limits (generated by the Nature Database and updated in April 2010) and cover mainland Spain and the Balearic Islands: EPSG 25830 and for the Canary Islands EPSG: 32628.

FURTHER INFORMATION

- <http://www.magrama.es>

Forest defoliation

In 2011, 88.2% of the trees studied had a healthy appearance

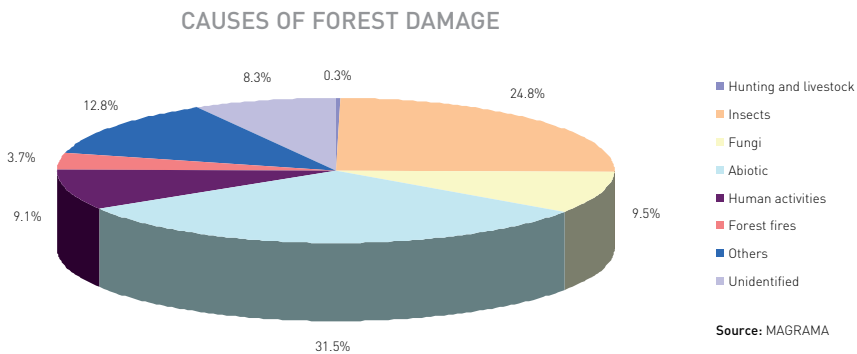


In 2011, the European Network on Forest Damage in Spain (Level I Network) shows that the general state of woodland continues to recover. In regard to the trees studied, 88.2% had a healthy appearance, compared to 85.4% the previous year. Only 10.2% of trees are in excess of 25% defoliation.

There has been a slight decrease in the number of trees damaged, while the number of dead trees fell much more appreciably, to a low of 1.6%, decreases being recorded in the case of both conifers and also broad-leafed trees. This

widespread improvement is more relevant in the case of coniferous trees, 89.6% of which are healthy, than in the case of broad-leafed trees (86.8% this year).

Most of the dead woodland is due to preventive felling, the result of forestry and declines owing to isolated water shortages.



As regards other possible causes of damage, there has been a clear decrease in abiotic damage and that caused by insects and fungi. Fieldwork notes appear to indicate a general decrease in the importance of phytophagous insects, with drastic reductions in both processionary and also spring defoliators of broad-leafed trees. There has also been a general decrease in coniferous tree perforators, linked to the smaller number of trees suffering abiotic damage (drought mainly).

It is worth highlighting the stability of broad-leafed tree perforators and a slight isolated and localised increase in specific defoliators. The same trend is appreciated in fungal entries, particularly foliar fungi, which affect broad-leafed and vascular trees. However, there has been a slight upturn in the fungi that affects coniferous tree needles, particularly *Sirococcus*. Damage due to mistletoe and degenerative processes that affect junipers and scale-leaf junipers remains largely stable in relation to the previous year.

Specific conditions that had been noticed in previous years on alders do not appear to have increased, while there has not been an upturn in the damage caused by holm oak and cork oak branch dieback.

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 Cooperative Programme on the Assessment and Monitoring of Air Pollution Effects on Forests, the Level-I European Network on Forest Damage is an international large-scale systematic network consisting of more than 5,700 monitoring points spread across 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 it. The Spanish Network currently has 620 sampling points. Furthermore, and within the framework of the previous *Forest Focus* EC Regulation and the current *Life+ financial instrument (FutMon Project)*, its design makes it possible to monitor other aspects, such as the effects of climate change on forests, sustainable management and the preservation of forest biodiversity.

SOURCES

- Service for the Protection of Forests against Harmful Agents (SPFHA). Directorate General for the Natural Environment and Forest Policy. Ministry of Agriculture, Food and Environment.

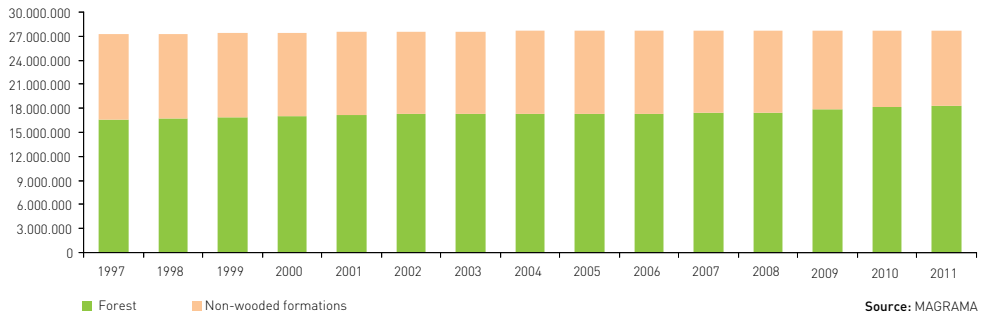
FURTHER INFORMATION

- <http://www.magrama.es>
- <http://www.icp-forests.org>
- <http://www.futmon.org>

Wooded area and other forest formations

Spanish forests cover more than 18 million hectares. Oak woods are the most common

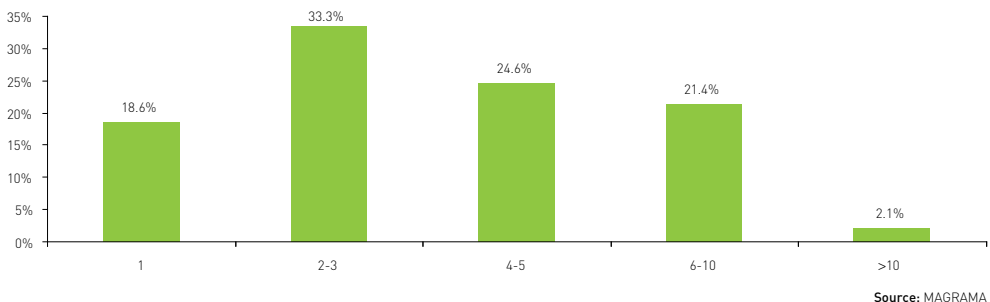
CHANGES IN FOREST AREA OVER THE LAST 15 YEARS (ha)



Spain's forest area, comprising woodland and other non-wooded forest formations, covers slightly more than 27.5 million hectares, 55% of Spain's total land area. Total wooded area exceeded 18 million hectares in 2011, which is the equivalent of 0.39 ha per resident.

The diversity of Spain's forests shows in both the quantity of species present and also in the variety of wooded formations. According to data from the National Forestry Inventory, more than 80% of forests contain two or more species of trees.

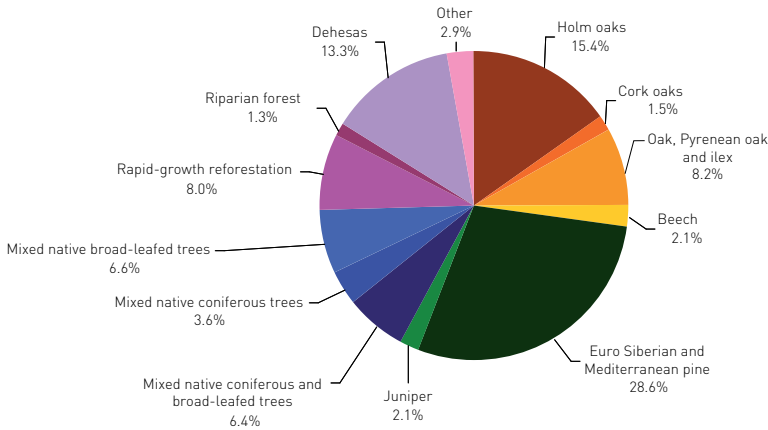
BREAKDOWN OF FOREST AREA BY NUMBER OF SPECIES



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In terms of forest variety in Spain, 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 (15.4% of the country's total forest area). The most frequent conifer formation is Aleppo-pine wood, which covers 2 million hectares and accounts for more than 11% of the total forest area.

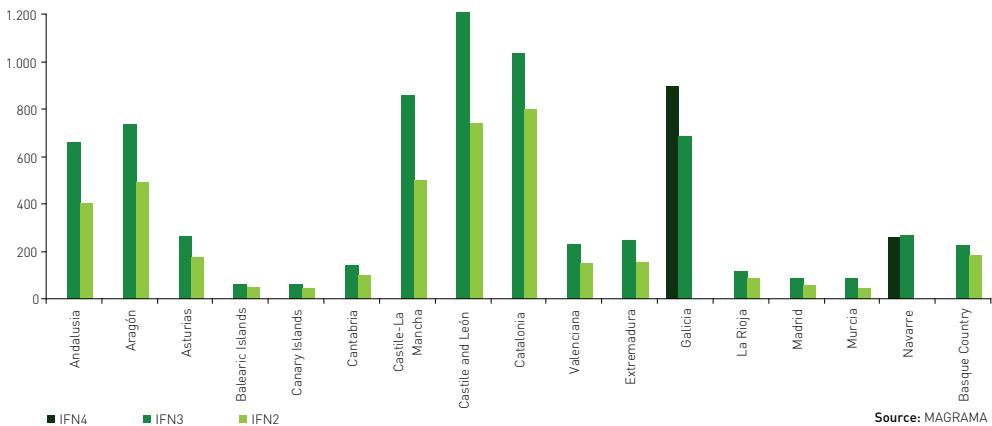
BREAKDOWN OF WOODED FORMATIONS (%)



Source: MAGRAMA

Another indicator of the favourable state of health of our forests is the number of trees. There has been an increase of more than two billion trees over the last 20 years, from almost five billion in 1990 to nearly 7.2 billion in 2010. The growth rate exceeded 50% in seven Autonomous Communities (Andalusia, Castile-La Mancha, Castile-Leon, Valencia, Extremadura and Murcia).

NUMBER OF TREES (Million) BY FOREST INVENTORY (2011)



Source: MAGRAMA

NOTES

- According to international criteria, forest is considered wooded area in which the forest cover fraction is greater than 10%.
- The graph on the number of trees only includes those with a diameter of more than 7.5 cm.

SOURCES

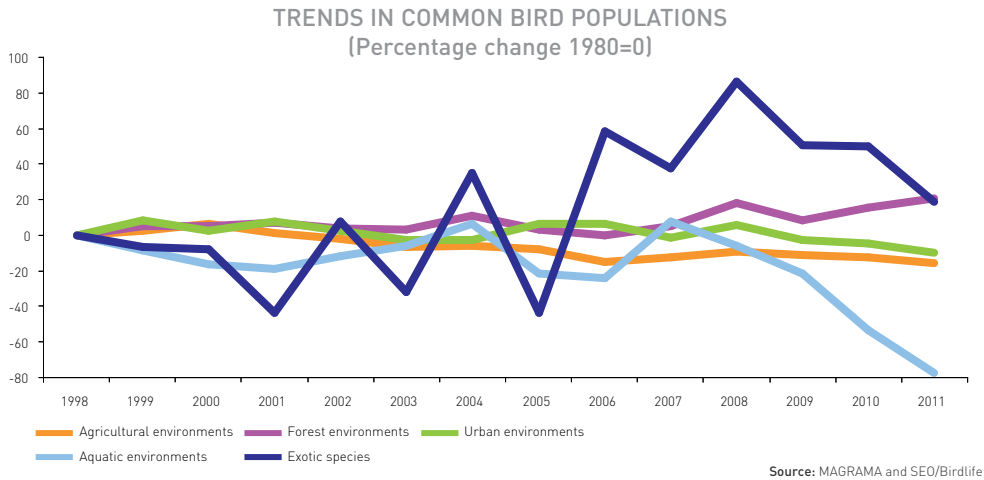
- Spanish Forestry Inventory (SFI) and its base cartography Forest Map of Spain (FMS), both produced on a provincial scale and on a 10-yearly basis. SFI2 (1986- 1996); SFI3 (1997-2007); SFI4 (beginning in 2008); FMS50 (1997-2007). FMS25 (beginning in 2007).
- National Data: Navarra and Galicia: SFI4 and FMS25; Asturias, Cantabria, the Balearic Islands and Murcia: SFI3 and FMS25; Rest of Regions SFI3 and FMS50.
- Sub-Directorate General for Forestry and Woodlands. Directorate General for Rural Development and Forestry Policy. MAGRAMA.

FURTHER INFORMATION

- <http://www.magrama.gob.es/es/biodiversidad/temas/Default.aspx>

Trends in common bird populations

Trends in common bird populations show a moderate increase in forest areas in 2011, while in agricultural areas they continued to decline



Trends in populations of common birds have been monitored in Spain since 1998. 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 period 1998-2011 are summarised in the table below, which breaks down some of the environments considered in order to provide greater detail:

Bird populations by environment	TREND	
	Average annual growth	% change in regard to 1998
Agricultural environments	-1.1	-15.7
Tree plantations	-1.1	-15.7
Cereal plantations	-1.4	-19.8
Northern agricultural environments (grasslands)	-1.5	-21.1
Forest environments	1.8	20.5
Euro-Siberian forests	0.5	12.2
Mediterranean forests	0.8	12.3
Birds linked to urban environments	-0.7	-10.0
Birds linked to wetlands (passeriformes)	-0.6	-77.4
Introduced birds	5.4	18.7

Urban bird populations, recording significant annual fluctuations, have declined markedly in recent years. The general trend seems to be negative, despite not being statistically significant. This indicates that more attention must be paid to the natural environment where these bird populations live, the same environment in which most of the human population in Spain resides.

The population of Passeriformes linked to wetlands has maintained a similar trend to that of urban bird populations. Following a period of certain stability, the trend has turned negative in recent years (albeit not statistically significant throughout the time series). Nevertheless, and even though there may be a wide variety of causes for this decline, attention must be paid to this trend because Spain's rivers and wetlands are home to a very large percentage of the country's biodiversity, while also being providers of basic goods and services.

Forest bird populations maintained the moderate growth recorded in previous years in both Mediterranean (sclerophyllous) and Euro-Siberian (deciduous) forests, in keeping with the recovery of these environments in Spain in recent times.

Bird populations in agricultural environments continued to display a negative trend, recording a statistically significant decline. Bird populations in these environments continue to decline. This suggests that agricultural practices are not yet sufficiently compatible with the conservation of the valuable biodiversity these environments host.

Finally, an indicator is included to evaluate the increase in populations of three exotic bird species in Spain (*Myopsitta monachus*, *Psittacula krameri* and *Phasianus colchicus*). These species are currently expanding (one of them is fostered for hunting), although nobody knows exactly how they might affect the natural environment.

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 to assess fulfilment of its goals and strategic plans in the area of biodiversity. To monitoring bird populations, 10x10-km UTM grids have been set up across the Iberian Peninsula and Balearic Islands and samples are taken annually using a standard method. There are more than 900 grids, covering approximately 15% of Spain's territory.
- Population data are obtained by standardised census for more than one hundred reproductive bird species throughout Spain. In addition, those sharing common characteristics, such as being present in a certain environment, are grouped together, obtaining grouped trend indicators.
- The bird populations monitored by this indicator are grouped as follows:

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

SOURCES

- Sub-Directorate General of Natural Environment. Directorate General for Quality and Environmental Assessment and Natural Environment. Ministry of Agriculture, Food and Environment.
- SEO/Birdlife.

FURTHER INFORMATION

- <http://www.seo.org>
- <http://www.magrama.es>

Forest reproductive material

The number of units in which forest reproductive material of guaranteed quality and origin can be obtained rose by 6% in 2011

The National Catalogue of Basic Material (NCBM) is a register managed by the Ministry of Agriculture, Food and Environment, which contains the selected stands, seed sources, seed orchards and clones that constitute the so-called basic material or units of approval, which have been authorised by the Spain's regional governments.

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 marketing of these materials is 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 2011, 509 new units were added to the Catalogue. After subtracting the units withdrawn, the total number stood at 7,711 units, 6% more than the previous year.

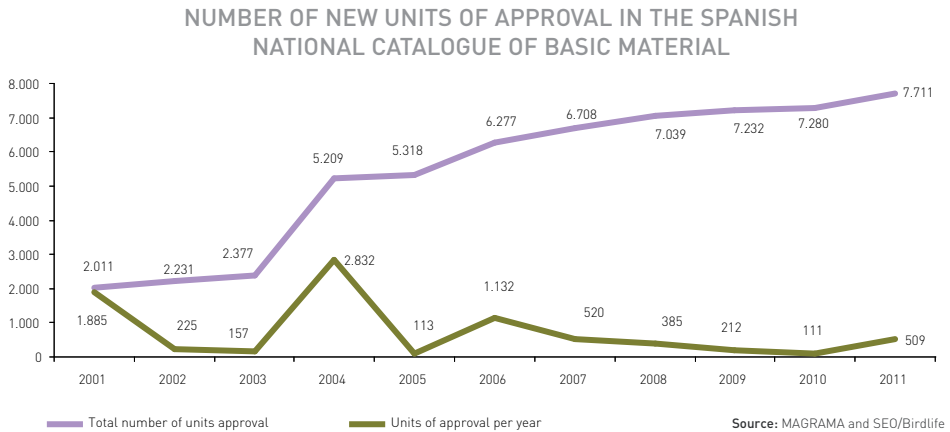
The breakdown of the units of approval by type and category is shown in the following table:

Type of basic material	Category	Nº of units of approval (2011)	Land area* (ha) of the units of approval
Seed sources and stands	Identified	7,215	5,569,963.57
Selected stands	Selected	338	17,935.66
Seed orchards	Qualified	25	79.64
	Monitored	2	19.20
Parents of families	Qualified	31	Not quantifiable in terms of area
	Monitored	4	
Clones	Qualified	55	
	Monitored	41	
TOTAL		7,711	5,587,998.07

* 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, 7,215 units of approval are categorised as identified (seed sources stands), 338 as selected (selected stands) and 111 as qualified and 47 as monitored, respectively. These units of approval occupy more than 5.5 million hectares, approximately 30% of Spain's total wooded area.

The graph below shows the growth in the number of units of approval since 2001:



NOTES

- Basic material comprises populations, plantations and clones from which reproductive material (seeds and plants) are obtained for use 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 Sources: trees within an area from which seed is collected.
 - Stands: Delineated population of trees possessing sufficient uniformity in composition.
 - Seed Orchards: 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).
 - Clones: 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 Rural Development and Forestry Policy (MAGRAMA) in collaboration with regional governments. New basic materials are published in the Official Gazette (BOE) and are part of the European common catalogue.

SOURCES

- Genetic Material Service. Planning and Forestry Policy Department. Sub-Directorate General for Forestry and Woodland. Directorate General for Rural Development and Forestry Policy. Ministry of Agriculture, Food and Environment.

FURTHER INFORMATION

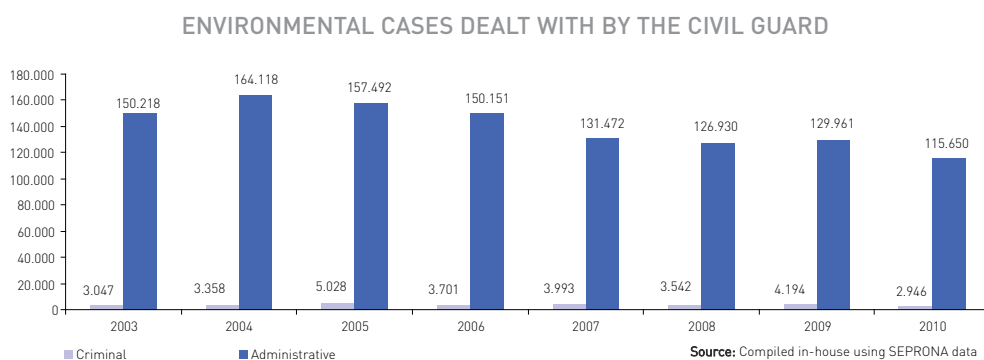
- <http://www.magrama.gob.es/es/biodiversidad/temas/montes-y-politica-forestal/recursos-geneticos-forestales/default.aspx>

Environmental monitoring

The number of administrative and criminal offences and arrests decreased in 2010

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.

As can be seen in the chart, the number of environment-related interventions made by the Civil Guard decreased every year over the period 2004-2010, with the exception of 2009, when a slight increase was recorded.



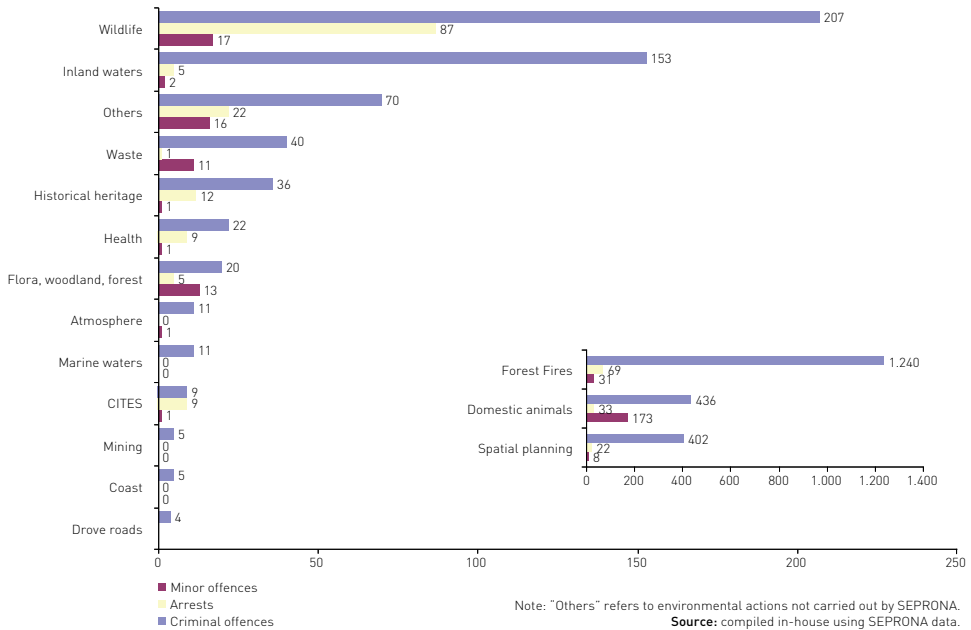
In 2010, SEPRONA intervened in 118,596 cases, down by 11.6% on the 134,155 interventions made the previous. This figure is also 11.8% lower than the average number of offences recorded over the past five years, which is evidence of a certain amount of stability in the number of interventions made over that period. Of the total number of offences, 97.5% were administrative, while only 2.3% were criminal and the remaining 0.2% were minor.

ENVIRONMENTAL CASES DEALT WITH BY SPAIN'S CIVIL GUARD

		2006	2007	2008	2009	2010
Offences	Criminal	3,701	3,993	3,542	4,194	2,946
	Administrative	150,151	131,472	126,930	129,961	115,650
Arrests		930	366	330	399	274

Source: Own calculations with data from SEPRONA.
Note: Only includes action by SEPRONA on environmental offences.

NUMBER OF ENVIRONMENTAL OFFENCES AND ARRESTS (2010)



As in previous years, by type of offence, forest fires accounted for largest number of cases reported, despite dropping in number by 40,7% from 2,086 to 1,240 offences in 2010. The next largest group was crimes against domestic animals, which recorded a slight increase of 0.5% to 436 cases, exceeding the number of land use offences, which fell markedly by 30.5% to 436 cases.

To analyze the figures, it must be taken into account that inspection campaigns are sometimes conducted in a specific area which lead to an increase in the number of offences recorded in that area.

In 2010, SEPRONA arrested 274 people in relation to environmental offences, 31.3% less than the previous year in which there were 399 arrests. As regards those arrested, 69% committed offences against wildlife (31.8%), set forest fires (25.2%) or committed offences against domestic animals (12.8%).

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.
- Nature Protection Service (SEPRONA). Directorate-General for the Police and Civil Guard. Ministry of the Interior.

FURTHER INFORMATION

- <http://www.guardiacivil.org>

