2.14 NATURAL AND TECHNOLOGICAL DISASTERS

This chapter presents information on the main natural disasters and technological accidents that have occurred in Spain in recent years. It monitors the number of fatalities due to natural disasters, analyses droughts and forest fires, and provides data on accidents deriving from the transport of dangerous goods (by road and rail), maritime accidents involving oil spills and accidents occurring at industrial facilities.

The term *natural disaster* refers to natural phenomena produced by the dynamics operating within the Earth's surface and atmosphere that result in extensive social, economic and environmental damage. They are qualified as "major" when they exceed the capacity of those affected to deal with them with their own resources and, as a result, outside aid becomes necessary. Technological accidents are characterised by their marked anthropic origin and mainly occur in relation to industrial activity and transport.

Natural phenomena should be included alongside technological accidents when considering potential social and environmental impacts. Recent years have seen a large number of natural disasters that have produced high numbers of victims.

The droughts seen in large parts of Spain in recent years have had a major impact. In order to address this phenomenon, the Spanish National Drought Monitoring

NO. OF DISASTERS AND FATALITIES WORLDWIDE

Year	Nº of events		Fatalities	
	Worldwide	Europe	Worldwide	Europe
2001	701	131	25,063	267
2002	698	136	10,576	459
2003	699	126	77,886	20,194
2004	641	124	183,000	371
2005	648	131	100,995	336

Source: Munich Reinsurance Company. "Topics Geo Annual review: Natural catastrophes 2005" (from website: www.munichre.com).

INDICATOR	GOAL	TREND
Deaths due to natural disasters	Reduce the number of fatalities due to natural disasters	Decrease in the number of fatalities in 2005 in comparison with 2004
Drought periods	Prevent the effects of drought	2005 had the lowest rainfall since 1947
Forest fires	Reduce the number and area affected	The number of fires continues to rise, whilst the area affected is decreasing
Road and rail accidents causing possible environmental damage	Reduce the number and the extent of their consequences	Involving dangerous goods has remained stable since 2000
Oil spills due to maritime accidents	Reduce the number and the extent of their consequences	Decrease in the number of accidents resulting in oil spills at sea (2003-2004)
Discharges of dangerous chemical substances due to industrial accidents	Reduce the number and the extent of their consequences	6 severe industrial accidents (Seveso II Directive) reported in the last three years

Centre (ONS - *Observatorio Nacional de la Sequía*) was created as a joint initiative between the Spanish Ministry of the Environment (*Ministerio de Medio Ambiente*) and the Spanish Ministry of Agriculture, Fisheries and Food (*Ministerio de Agricultura, Pesca y Alimentación*). It is intended to draw together all of Spain's authorities responsible for water management in order to create a knowledge network through which to anticipate, mitigate and monitor the effects of drought.

Monitoring Centre members include:

- The eight inter-regional River Basin Authorities reporting to the Public Administration,
- The seven intra-regional Water Authorities (Galicia-Coast, Basque Country, Catalonian Inland Basins, Andalusian Mediterranean Basin, Andalusian Atlantic Basin, Balearic Islands and Canary Islands),
- Spain's Autonomous Communities and the Autonomous Cities of Ceuta and Melilla.
- Local Corporations.

It therefore constitutes a genuinely nationwide Monitoring Centre, in which all of the agents with responsibility for and interest in water management have a role and where each one has the opportunity to contribute specific information so as to facilitate management and enable members to anticipate the effects of drought and mitigate its consequences in their corresponding environmental, social and economic contexts.

This initiative falls within the new policy to reinforce public control of water use and quality and to increase public participation and co-responsibility in combating water wastage, shortages and pollution.

Deaths due to natural disasters

Floods and terrestrial and maritime storms account for most fatalities (over 70% since 1995)

NUMBER OF FATALITIES DUE TO NATURAL DISASTERS 1995-2005

Type of natural disaster	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Floods	22	110	40	0	5	14	9	13	9	7	8	**237**
Storms	19	13	14	2	20	28	17	12	8	6	8	**147**
Forest fires	8	1	4	4	8	6	1	6	11	4	19	**72**
Landslides	7	8	2	0	0	0	1	1	2	0	0	**21**
Heatwaves	0	0	0	0	1	0	0	0	60	23	4	**88**
Avalanches	7	1	0	0	0	4	2	4	4	5	1	**28**
Snow and cold	0	2	5	1	0	2	4	0	0	3	3	**20**
Maritime storms	19	13	13	36	17	37	27	15	5	20	SD	**202**
TOTAL YEAR	**82**	**148**	**78**	**43**	**51**	**91**	**61**	**51**	**97**	**68**	**43**	**815**

Source: Directorate General for Civil Protection and Emergencies (Spanish Ministry of the Interior) and Maritime Safety and Salvage Agency (Ministry of Public Works)

Over the period 1995-2005, there were 815 fatalities as a result of the natural phenomena listed above. This is equivalent to a ratio of 0.0184 fatalities per thousand inhabitants(1) over the 11 aforementioned years. Floods and terrestrial storms claimed almost half of the victims (47.23%), followed by maritime storms.

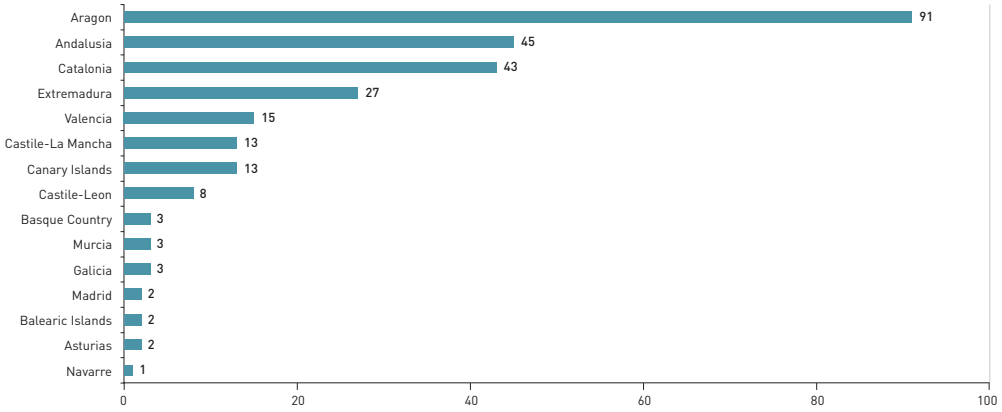
The 2005 figure of 19 fatalities due to forest fires is particularly tragic, 11 of the victims being members of the Cogolludo Fire Brigade who lost their lives fighting the forest fire started on 16 July in Riba de Saelices (Guadalajara).

Over the period 1990-2005, the total number of fatalities in Spain due to floods stood at 237 (29% of the total, excluding victims of maritime storms in 2005). The highest number of flood fatalities (110) was produced in 1996. This year is followed by 1997 and 1995, with 40 and 22 fatalities, respectively.

Among these tragic events, the most dramatic flood-related disaster of recent years took place in Biescas (Barranco de Arás, Huesca) in August 1996, which claimed 87 of the 110 fatalities produced that year.

(1) In relation to the existing population at 1 January 2006 of 44,395,286 (provisional Municipal Register figures. INE).

FATALITIES DUE TO FLOODS AND SPATES. 1990-2005
(Total 271 fatalities)



Source: DGPCE. Spanish Ministry of the Interior

The European Flood Alert System (EFAS) is an EC initiative aimed at preparing riverside environments in anticipation of flooding. Created in response to the floods caused by the rivers Elba and Danube in August 2002, it is currently under development.

It is designed to simulate possible flood scenarios in the immediate future, thereby providing the European Commission with the information needed to prepare and manage aid in the case that flooding is produced. This information may also be used by affected countries to establish suitable prevention measures. For further information see: http://natural- hazards.jrc.it/index.html

NOTES

- When calculating the number of fatalities, the following types of natural disaster have been considered: floods and spates, storms and gales (including fatalities due to lightning and strong winds), forest fires, landslides, heatwaves, avalanches, snow and cold and maritime storms. Deaths caused by landslides in Spain are closely linked to heavy rains, which also cause flooding and spates. The large majority of landslides have occurred at the same time as rain or a short time after heavy rainfall.
- Volcanic eruptions, droughts and earthquakes have been excluded from the analysis, since although these are phenomena that can occur in Spain (drought recurrently and earthquakes at regular intervals in certain areas), they have not caused any deaths in the period under consideration. The Canary Islands are the only part of Spain with active volcanoes, and are thus the only area where risk of volcanic eruption exists. The last eruptions were that of Chinyero (a lateral volcano on the Pico del Teide) on Tenerife in 1909; and those of Nambroque in 1949 and Teneguía in 1971 on the island of La Palma.

SOURCES

- Figures provided by the Sub-Directorate General for Planning, Operations and Emergencies (*Subdirección General de Planificación, Operaciones y Emergencias*). Directorate General for Civil Protection and Emergencies (*Dirección General de Protección Civil y Emergencias*). Spanish Ministry of the Interior (*Ministerio del Interior*).

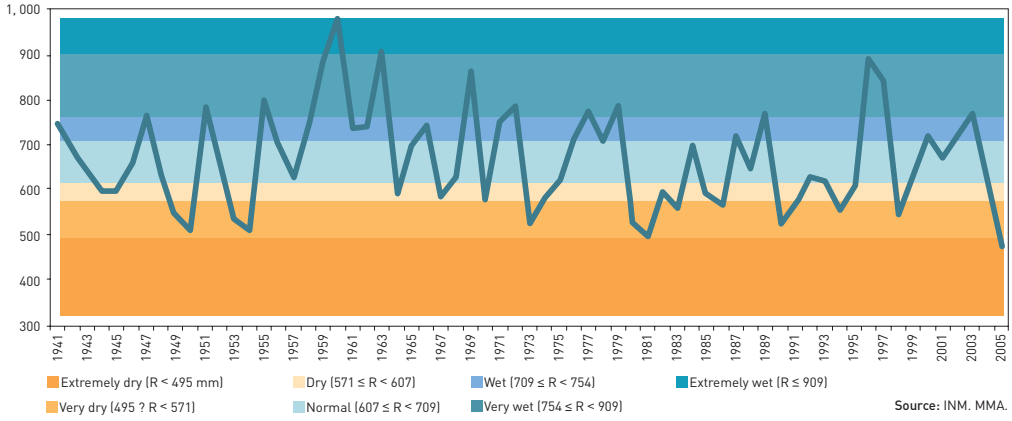
FURTHER INFORMATION

- www.eea.europa.eu
- www.proteccioncivil.org/
- http://natural-hazards.jrc.it
- Natural and Environmental Disasters Information Exchange System (NEDIES). http://nedies.jrc.it/
- www.unisdr.org

Drought periods

2005 saw the lowest rainfall since 1941

AVERAGE ANNUAL RAINFALL IN SPAIN (mm)

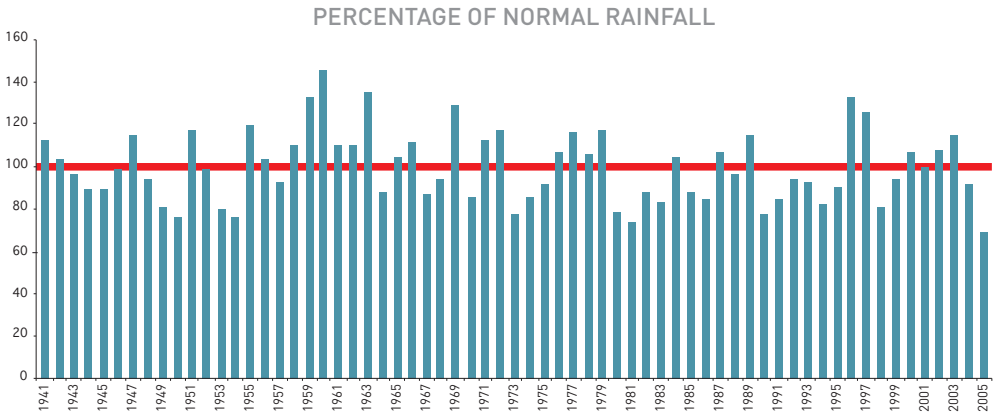


Source: INM. MMA.

Spain is particularly affected by drought. In relation to the figures for the period 1961-1990 (see notes), more than half of the years between 1980 and 2000 are considered dry or very dry. 2005 stands out as the driest year, recording accumulated rainfall of just 468 mm, the lowest since 1941. Moreover, in 2004 accumulated rainfall stood at just 611 mm.

Looking at average annual rainfall over the period 1941-2005 (65 calendar years), and in relation to the classification based on average rainfall in the reference period (1961-1990), just 2 years were classified as “Extremely dry”, 12 as “Very dry”, 9 as “Dry”, 18 as “Normal”, 10 as “Wet”, 12 as “Very wet”, and only 2 as “Extremely wet”. According to the classification by rainfall, 35% of the years within this period were considered dry (this includes the “Dry”, “Very dry” and “Extremely dry” categories), 28% were normal and 37% were considered wet (this includes the “Wet”, “Very wet” and “Extremely wet” categories).

Looking at the Percentage of Normal Rainfall over the period 1941-2005, 45% of the years (29 out of 65) recorded rainfall above the average figure for the period.



Source: INM. MMA

By hydrological year, from October 2005 to September 2006 the rainfall deficit remained, above all in the Tagus, Guadiana, Guadalquivir, Segura and Júcar river basins, which have entered a dry cycle and in which the situation is exacerbated by the fact that the drought began the year before. Drought conditions are found mainly in the southerly two-thirds of Spain, which receive rainfall well below average. In some areas rainfall is below 75% and in others it is as much as 50% below average.

Rainfall in the 2005-2006 hydrological year amounted to 595 mm, 11% less than the normal average (669 mm), classifying it as a dry year and, moreover, the second in succession as 2004-2005 produced a 250 mm deficit nationwide.

NOTES

- In calculating the indicator, a year or several years are classified as drought years when average annual rainfall is significantly below the average for the period. Under the Spanish Water Information System (Hispagua - *Sistema Español de Información sobre el Agua*), the Percentage of Normal Rainfall is one of the indicators used to study drought. It is calculated as the ratio between accumulated rainfall in a year and average annual rainfall for a particular region and period and is expressed as a percentage. Average annual rainfall is also referred to as normal rainfall and is obtained by averaging annual rainfall over a period of no less than 30 years.

In this regard, the World Meteorological Organisation considers the period 1961-1990 (30 years) representative of the rainfall regime. Applying these criteria to Spain enables us to establish the following bands and create a generic classification within which to place each year in accordance with its average annual rainfall:

  - Extremely dry: Rainfall does not exceed the minimum amount recorded in reference period 1961-1990 (495 mm).
  - Very dry: Rainfall is less than or equal to the 20 percentile and is greater than the minimum amount recorded in the reference period (495 mm < R ≤ 571 mm).
  - Dry: Rainfall is greater than the 20 percentile and less than or equal to the 40 percentile (571 mm < R ≤ 607 mm).
  - Normal: Rainfall is greater than the 40 percentile and less than or equal to the 60 percentile (607 mm < R ≤ 709 mm), in other words, it is around the median.
  - Wet: Rainfall is greater than the 60 percentile and less than or equal to the 80 percentile (709 mm < R ≤ 754 mm).
  - Very wet: Rainfall is greater than the 80 percentile and less than the maximum amount recorded in the reference period (754 mm < R ≥ 909 mm).
  - Extremely wet: Rainfall is equal to or greater than the maximum amount recorded in the reference period 1961-1990 (909 mm).

- A period of drought is taken to mean a dry period that is sufficiently long enough to cause a substantial decrease in river flow, water levels in lakes and/or exhaustion of soil moisture, as well as a decrease in groundwater levels to below normal values. Such a situation of reduced rainfall and, therefore, restricted water availability, may be considered a natural disaster and is exacerbated when accompanied by an increase in demand. This situation has a range of repercussions on natural systems and human activity and generates major social and economic impacts.
- Drought is a phenomenon that forms part of climate systems and, as such, should not be considered an abnormal event in itself. It should also not be confused with "aridity", a characteristic of regions in which rainfall is habitually scarce.
- Drought types: Meteorological: rainfall deficit when compared to normal values (for example, average values) over a specific period of time in a specific region. Agricultural: soil moisture deficit following meteorological drought, producing negative impacts on crop production and/or natural vegetation growth. Hydrological: decrease in input into surface and underground hydrological systems. There is usually a gap between hydrological drought and earlier meteorological and agricultural drought. Socio-economic: impact of water shortages on individuals and economic activity.

SOURCES

- Rainfall figures provided by the Sub-directorate General for Climatology and Applications (*Subdirección General de Climatología y Aplicaciones*), Spanish National Institute of Meteorology (*Instituto Nacional de Meteorología*). Spanish Ministry of the Environment.

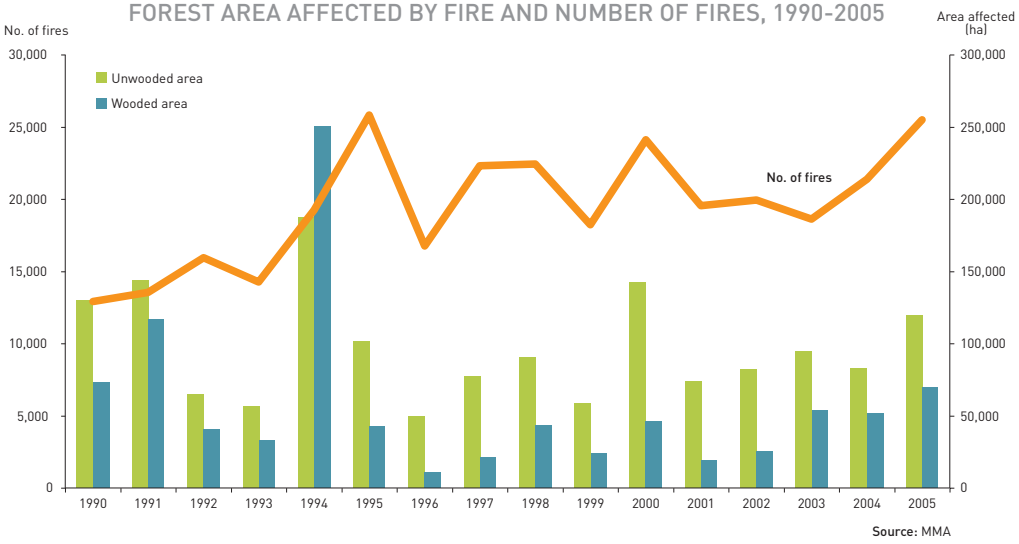
FURTHER INFORMATION

- Spanish Ministry of the Environment. Spanish National Institute of Meteorology. Annual Climatological Summary (*Resumen Anual Climatológico*). Years 2004 and 2005.
- Spanish Ministry of the Environment. Drought Status Report: Diagnosis of the situation at 29-09-2006 (*Informe de situación de la sequía: Diagnóstico de la situación a 29-09-2006*).
- www.mma.es
- www.inm.es
- www.eea.europa.eu
- www.cedex.es/hidrograficos
- http://natural-hazards.jrc.it
- www. sequia.edu.mx
- www. tecnociencia.es/especiales/sequía/indices.htm
- http://hispagua.cedex.es/documentacion/especiales/sequia/indicadores_sequia.htm

Forest fires

2005 was one of the worst years on record in terms of number of forest fires (close to 25,500), which destroyed 188,672 ha of forest

FOREST AREA AFFECTED BY FIRE AND NUMBER OF FIRES, 1990-2005



Source: MMA

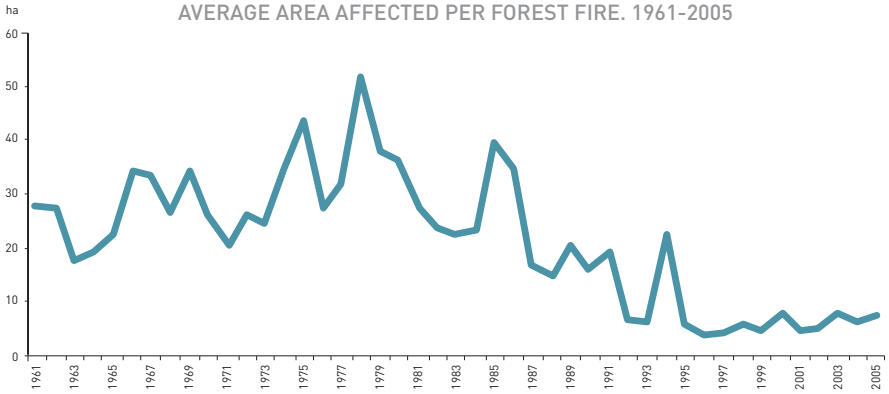
There has been an upward trend in number of forest fires in recent years, rising from 12,913 in 1990 to 25,492 in 2005, a 97% increase. This latter year was one of the worst on record and saw the second-ever-highest number of forest fires (the highest was 1995 with 25,827 fires). The adverse meteorological conditions, characterised by little rainfall over the year, played a large part in this phenomenon. The annual average for the period 1990-2005 is 19,413 forest fires per year, significantly lower than the number recorded in recent years.

Likewise, the area affected in 2005 was one of the largest, also reversing the previous downward trend. The figure of 188,672 ha of forest area affected make 2005 the third-worst-ever year since 1990 (437,635 ha in 1994, 260,318 ha in 1991 and 203,032 ha in 1990), exceeding the average for the period of 154,598 ha (141,152 ha if the figures for the highest and lowest years are excluded).

In Spain, the wooded area affected has always been greater than the unwooded area. In fact, over the period 1990-2005, only 37% of the total forest area affected was wooded whilst 63% was unwooded. Only in 1994 was this situation reversed, with more wooded area than unwooded area being burnt (57% and 43%, respectively).

Fortunately, the average area affected per fire has fallen appreciably since 1978, the year in which the highest figure was recorded, almost 52 ha per fire, dropping to 3.6 ha in 1996. The average area affected per fire stands at 14.8 ha for the period 1961-2005, and at 8.0 for the period 1990-2006. In 2005, the average area affected per fire was 7.4 ha. There can be no doubt that faster response speeds and improvements in fire-extinguishing equipment and techniques have contributed to this trend.

AVERAGE AREA AFFECTED PER FOREST FIRE. 1961-2005



Source: MMA

As regards the causes of forest fires, the breakdown for the period 1991-2004 is as follows:

BREAKDOWN OF FOREST FIRES BY CAUSE (%)
Average for the period 1991-2004

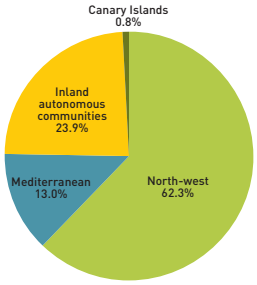
	Deliberate	Negligence	Natural causes (lightning)	Other causes	Re-ignition	Unknown
By forest area affected	48.6	16.7	10.7	7.1	0.6	16.4
By number of fires	59.2	13.9	3.9	2.7	1.1	19.2

Source: MMA

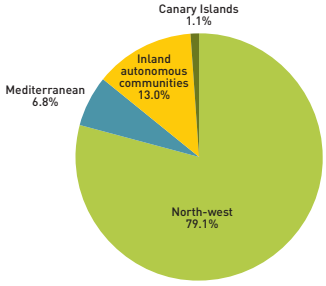
In 2006, and only taking into consideration the period 1 January to 30 September, the number of forest fires reached 15,305, affecting 143,991 ha. These figures are appreciably lower than those for 2005 despite both spring and summer having been particularly dry that year. However, the area affected per forest fire was greater in this period than in previous years (9.4 ha per fire). Particularly significant was the damage suffered in the Autonomous Community of Galicia, where there were almost 2,000 forest fires affecting more than 77,000 ha (this figure is yet to be officially confirmed and varies according to source).

The number of fires and forest area affected varies across the different geographical regions into which, for the purpose of this analysis, Spain is divided, with the percentages in the North-west region standing out particularly due to the above-mentioned fires in Galicia.

NO. OF FIRES (%) BY REGION (Provisional 2006)



FOREST AREA AFFECTED (%) BY REGION (Provisional 2006)

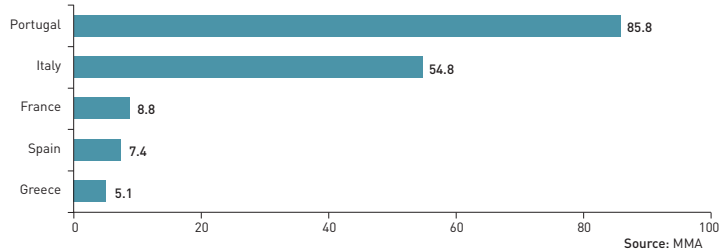


Source: MMA

NORTH-WEST: Comprises the Autonomous Communities of Galicia, Asturias, Cantabria and the Basque Country and the provinces of Leon and Zamora.
MEDITERRANEAN: Comprises the Autonomous Communities on the Mediterranean coast, including their inland provinces.
CANARY ISLANDS: Includes the entire archipelago.
INLAND AUTONOMOUS COMMUNITIES: Comprises the provinces, except for Leon and Zamora, of the remaining non-coastal Autonomous Communities.

Within the European Mediterranean region (Spain, Greece, Italy, Portugal and part of France), the *risk index*, calculated as the number of forest fires per 10,000 ha of forest area, ranges from 85.8 in Portugal to 5.1 in Greece (average value for the period 1991-2005). The average value in Spain is 7.4, with 2005, when there were 9.77 forest fires per 10,000 ha of forest area, being the worst year.

NO. OF FOREST FIRES PER 10,000 HA OF FOREST AREA IN SOUTHERN EUROPE. Average values for the period 1991-2005



Source: MMA

NOTES

- The category "other causes" includes burning of rubbish dumps, fires started by suspected property speculators, vandalism, etc. In short, all of the other causes not included in the existing categories.

SOURCES

- Spanish Ministry of the Environment, 2004. Forest fires in Spain. Degree of danger and implementation of the 2003 campaign (*Los incendios forestales en España. Condiciones de peligro y desarrollo de la campaña 2003*).
- Spanish Ministry of the Environment. Directorate General for Nature Conservation (*Dirección General de Conservación de la Naturaleza*), 2003. Forest fires in Spain. Decade 1991-2000 (*Los incendios forestales en España. Decenio 1991-2000*).
- Figures for 2005 provided by the Forest Fire Defence Department (*Área de Defensa contra Incendios Forestales*). Directorate General for Biodiversity (*Dirección General para la Biodiversidad*). Spanish Ministry of the Environment.

FURTHER INFORMATION

- www.mma.es
- www.incendiosforestales.org
- www.eea.europa.eu

Road and rail accidents causing possible environmental damage

Over the last three years there have been an average of 63 road and rail accidents involving dangerous goods causing possible environmental damage

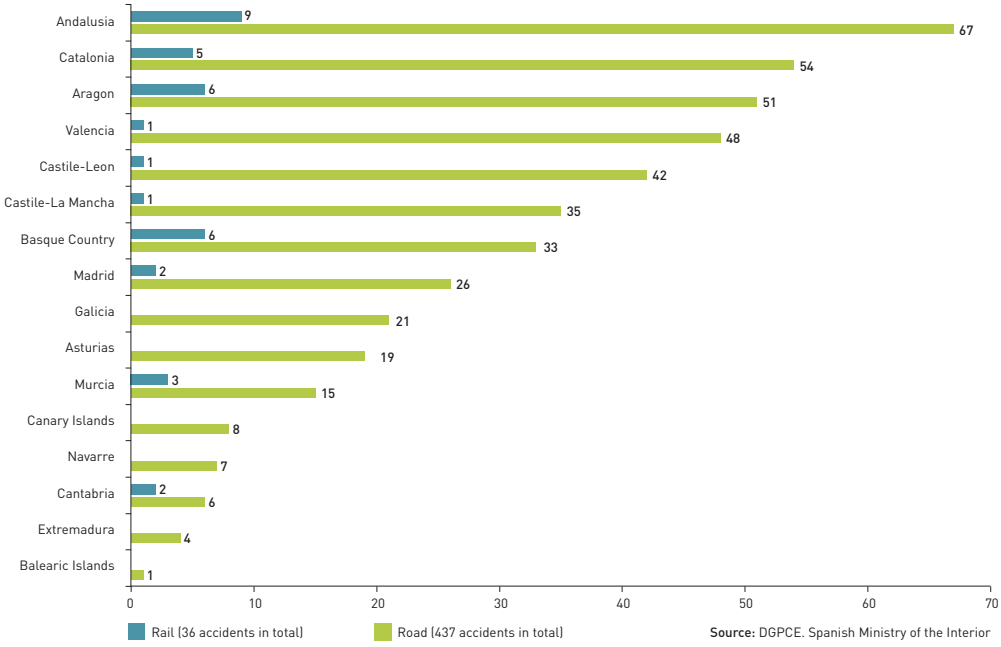
NUMBER OF ACCIDENTS IN THE TRANSPORT OF DANGEROUS GOODS CAUSING POSSIBLE ENVIRONMENTAL DAMAGE. 1997-2005

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Road	29	50	34	53	44	47	55	64	61	**437**
Rail	10	8	s.d.	4	2	1	5	4	2	**36**

Source: Directorate General for Civil Protection and Emergencies. Spanish Ministry of the Interior, 2006

Over the period 1997-2005, there were a total of 473 accidents causing possible environmental damage, of which number 437 occurred on roads and 36 on railways. While there is an appreciable downward trend in accidents occurring in rail transport, the opposite is the case for road transport despite the fact that in 2005 there were 3 accidents fewer than in 2004.

NUMBER OF ACCIDENTS IN THE TRANSPORT OF DANGEROUS GOODS BY ROAD AND RAIL CAUSING POSSIBLE ENVIRONMENTAL DAMAGE, 1997-2005



Source: DGPCE. Spanish Ministry of the Interior

The greatest number of road accidents causing possible environmental damage (76) occurred in Andalusia, followed by Catalonia (59) and Aragon (57). The length of the transport network in these Autonomous Communities, along with their strategic location, may well have contributed to these results.

Possible environmental damage caused by such accidents most frequently affects soil, followed by water and the atmosphere. In many cases, a single accident can affect two or even all three environments. For example, it is possible that a spillage or leak first affecting soil may then reach a river course or, if the pollutants evaporate, the atmosphere.

NO. OF INCIDENTS IN THE TRANSPORT OF DANGEROUS GOODS CAUSING POSSIBLE ENVIRONMENTAL DAMAGE, 1997-2005

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Atmospheric pollution	5	3	2	4	3		8	8	17	**50**
Water pollution	7	11	6	9	5	5	4	14	9	**70**
Soil pollution	36	49	29	51	41	46	57	55	49	**413**

Source: Directorate General for Civil Protection and Emergencies. Spanish Ministry of the Interior, 2006

Of the total number of incidents recorded, just over three out of every four caused possible damage to soil (77.5%). This was followed by possible water pollution (13.1% of the total) and atmospheric pollution (9.4%).

NOTES

- When categorising road and rail accidents, dangerous goods are considered those substances that, in the case of an accident during transport, may represent a hazard to the population, property and the environment. Possible environmental damage is considered to occur when the existence of a leak or spillage (on land, in water or into the atmosphere) with a potentially pollutant effect is reported.

SOURCES

- Spanish Ministry of the Interior. Directorate General for Civil Protection and Emergencies. "Statistics on emergencies produced in the transport of dangerous goods. Years 1997-2004." ("*Estadística de las emergencias producidas en el transporte de mercancías peligrosas. Años 1997-2004*"). Provisional data for 2005.

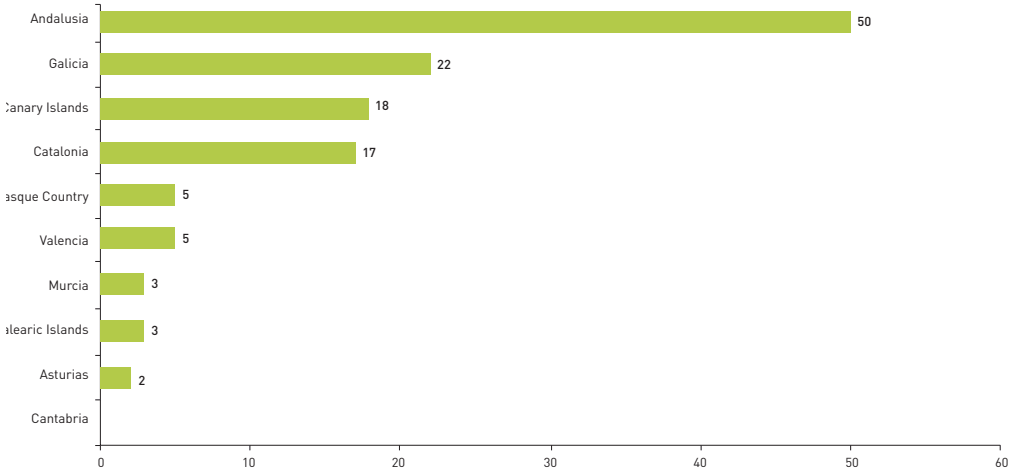
FURTHER INFORMATION

- www.proteccioncivil.org/
- http://mahbsrv.jrc.it/ (Major Accident Hazards Bureau –MAHB. European Commission).
- www.eea.europa.eu

Oil spills due to maritime accidents

Only 2 accidents involving oil tankers occurred off Spanish coasts in 2005

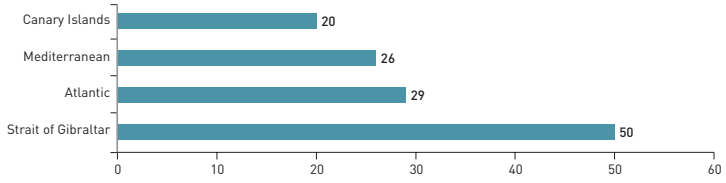
ACCIDENTS INVOLVING TANKERS TRANSPORTING DANGEROUS SUBSTANCES OR GOODS OVER THE PERIOD 1991-2005 (125 IN TOTAL)



Source: Directorate General for Merchant Shipping. MF

In 2005 there were only 2 oil tanker accidents involving oil spills, taking the number of accidents involving oil spills over the period 1991-2005 to 125. Andalusia (Strait of Gibraltar) and Galicia continue to suffer the greatest number of accidents, followed by the Canary Islands and Catalonia. The length of their coastlines, their location on heavily used routes and the local meteorological conditions, which can occasionally be extreme, combined with the construction features, age and level of maintenance of the oil tankers themselves, are the main causes of these accidents. The consequences may spread from the accident site to other coastal areas, affecting other Autonomous Communities and even other countries far from the place where the accident occurred. The graph below shows the breakdown by maritime search and rescue zone for the period 1991-2005. The Strait of Gibraltar, which receives a huge volume of maritime traffic, stands out as being the site of the greatest number of accidents.

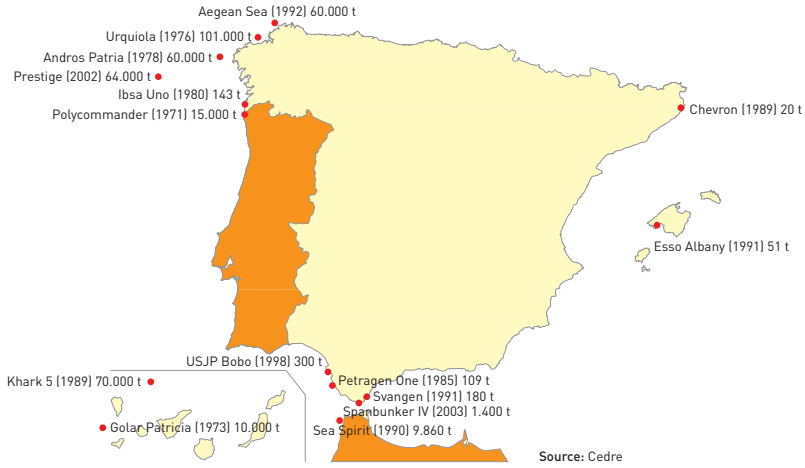
ACCIDENTS INVOLVING OIL TANKERS IN MARITIME SEARCH AND RESCUE ZONES OFF SPANISH COASTS, 1991-2005



Source: Directorate General for Merchant Shipping. MF

The map below, based on the one published on the website of the Centre of Documentation, Research and Experimentation on Accidental Water Pollution (CEDRE - *Centre de documentation de Recherche et d'expérimentation sur les pollutions accidentellles des eaux*), shows the approximate sites of the major maritime accidents that have occurred in Spanish waters since 1950.

OIL TANKER ACCIDENTS RESULTING IN SPILLS OF MORE THAN 7 TONNES



NOTES

- Maritime accidents involving oil tankers, and those transporting chemical substances, are those that cause greatest damage to the environment. Oil spills cause enormous damage to marine ecosystems, affecting every aspect of the same. Moreover, clean-up processes and operations can also be very harmful to marine habitats, fauna and flora. Nevertheless, they are necessary as natural recovery is extremely slow.
- The number of accidents that occur is not proportional to the severity of their consequences, since the negative environmental effects of maritime accidents involving dangerous goods are far higher than those of road or rail accidents. Some of the reasons for this are: the greater amount of dangerous substances discharged in each accident, water's higher mobilisation capacity, and the difficulties encountered in working on clean-up operations in marine environments (tides, winds, waves, etc.). Moreover, it is important to highlight that Spain has a large number of ports along its almost 8,000 km coastline and is strategically positioned between two seas. This results in intense freight traffic and the corresponding risk of accidents.
- Created in 1978, the Centre of Documentation, Research and Experimentation on Accidental Water Pollution, which is based in Brest (France), is responsible for documenting, researching and performing experiments on pollutant products, their effects and the methods and means required to treat and dispose of them. Its remit covers both marine and inland waters.
- Remains of oil spills not related to tanker accidents are also often discovered. These are usually the result of leaks from coastal industrial plants, maintenance operations, unloading of vessels in ports, or vessels spilling oil whilst sailing.
- According to the International Tanker Owners Pollution Federation (ITOF), the majority of maritime accidents (84%) result in oil spills of less than 7 tonnes, meaning that the majority of oil spilt is produced by a small number of accidents.

SOURCES

- Figures provided by the Maritime Pollution Department (*Área de Contaminación Marítima*). Sub-Directorate General for Maritime Traffic, Safety and Pollution (*Subdirección General de Tráfico, Seguridad y Contaminación Marítima*). Directorate General for Merchant Shipping (*Dirección General de la Marina Mercante*). Spanish Ministry of Public Works (*Ministerio de Fomento*).

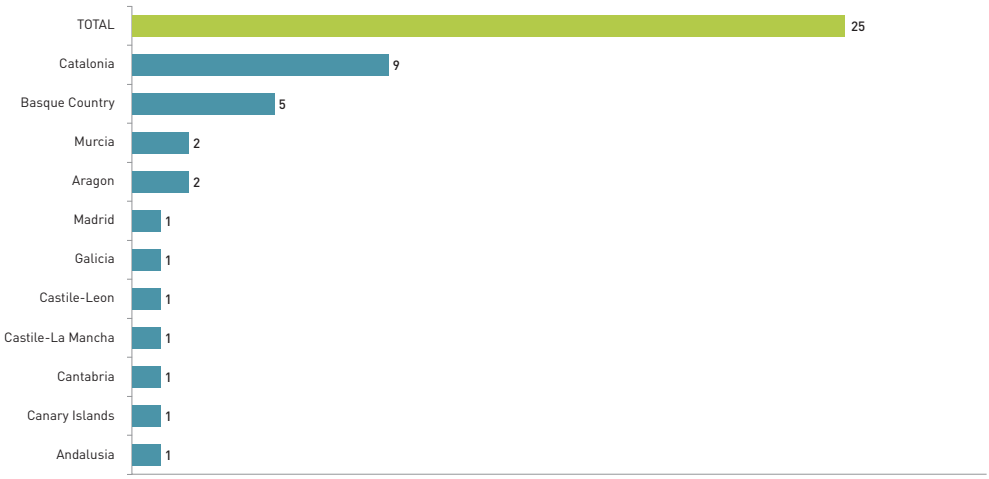
FURTHER INFORMATION

- www.mfom.es
- www.eea.europa.eu
- www.itopf.com/
- www.le-cedre.fr/index_es.html

Discharges of dangerous chemical substances due to industrial accidents

2005 was free of major accidents at facilities covered by the Seveso Directive

ACCIDENTS DUE TO INDUSTRIAL ACTIVITIES COVERED BY THE SEVESO DIRECTIVE, 1987-2005



Source: DGPCE. Spanish Ministry of the Interior

2005 was free of major accidents at facilities covered by the Seveso Directive. Over the period 1987-2005, there were a total of 25 major accidents at such facilities. The greatest number of major accidents occurred in the chemical (40%) and petrochemical and oil refining (32%) industries. These were followed by the plastics and rubber industries (12%). The remaining 4% occurred in the pesticide, food additive and warehousing and distribution industries. As regards the causes, problems with plant or equipment were the most common (36%), followed by human error (28%).

In human terms, these accidents caused 15 fatalities, 41 injuries and 200 cases of poisoning. The consequences that had greatest impact on the environment were: toxic clouds (12), of which number 2 were considered severely toxic and 10 slightly toxic, as well as pollutant discharges (4), one of which was considered severely toxic.

NOTES

- The accidents analysed are those covered by the Seveso Directive, i.e. accidents occurring in industry (chemical, pharmaceutical, energy industry, etc.), and include storage, distribution and sale of dangerous substances or products.
- Directive 96/82/EC on the control of major-accident hazards involving dangerous substances (Seveso II), is intended to prevent major accidents and reduce their consequences for human health and safety and the environment. It replaces Directive 82/501/EEC (Seveso I).
- Major Accident: any incident, such as emissions in the form of leaks, spills, fires or major explosions, that is the consequence of an uncontrolled process during operation of any facility to which Royal Decree 1245/1999 (*Real Decreto 1245/1999*) is applicable and that represents a major-accident hazard, of either immediate or delayed effect, to the population, property or the environment, whether inside or outside the facility, and in which one or more dangerous substances are involved.
- Other types of accident not covered by the Seveso Directive, but just as serious, also exist. These include mining accidents, such as the one in Aznalcollar in April 1998.
- In September 2006 there was a pollutant discharge into the river Umia as a result of a fire at the Brenntag Química factory in the town of Caldas de Reis in Pontevedra (Galicia).

SOURCES

- Spanish Ministry of the Interior. Directorate General for Civil Protection and Emergencies, 2004: Study and statistical analysis of accidents under the Seveso Directive, 1987-2004 (*Estudio y análisis estadístico sobre accidentes en el ámbito de la normativa Seveso 1987-2004*).

FURTHER INFORMATION

- www.proteccioncivil.org
- www.eea.europa.eu