Bioinvasion and Global Environmental Governance: The Transnational Policy Network on Invasive Alien Species

Spain's Action on IAS

Description[4]

Spain enjoys a 4,964km coastline with the Mediterranean Sea, the Strait of Gibraltar, and the Bay of Biscay. It shares a border with Portugal and France, as well as close proximity to Morocco and Algeria to the south. In addition to mainland Spain, its territory encompasses several islands, including the Canary Islands off the coast of the Western Sahara, the Balearic Islands in the Mediterranean, and the islands of the Plaza de Soberania among others. The Plaza de Soberania territories include three coastal segments of north Africa east of Spain.

Since 1975, Spain has been a constitutional monarchy with an impressively growing economy. Its current president, Jose Luis Rodriquez Zapatero, was elected in 2004 and has pursued traditional socialist policies such as education and immigration reform. Spain has Europe's fifth largest economy with a population of 20.5 million; it's main trading partners are France, Germany and Italy. Spain's chief industries include tourism, which has steadily grown since the 70s, as well as metals and metal manufactures, textiles, apparel and chemicals. While Spain has been a huge source of livestock production, particularly in poultry, cattle, and sheep, it has in recent years surged to one of the foremost producers of fish in Europe.

Overview of Biodiversity

The biological diversity of Spain is considered one of the highest in the European Union. Its heterogeneous climate, lithology and topography have favored the development of a great variety of vegetation types, with different associated fauna communities. For example, regarding habitats as defined by the Habitats EU Directive, more than 65% of European habitat types are present in Spain.

- CBD Country Profile
- Earth Trends Country Profile on Biodiversity and Protected Areas

Legislation relating to IAS

- Law 42/2007 (December 13, 2007) of the Natural Heritage and Biodiversity[2]

Government Agencies/Departments/Ministries dealing with IAS

- Ministry of Environment and Rural and Marine Affairs
  - Biodiversity Foundation
- The Ministry of Foreign Affairs and Cooperation
- The Ministry of Health
- Ministry of Science and Technology
  - Spanish Biodiversity Platform

Major Invasive Alien Species[1 & 9]

Acipenser baerii (fish)
Aedes albopictus (insect)
Ageratina adenophora (plant)
Amandava amandava (bird)
Ambrosia artemisiifolia (herb)
Aphanomyces astaci (fungus)
Branta canadensis (bird)
Carassius auratus (fish)
Carpobrotus edulis (succulent)
Caulerpa taxifolia (algae)
Cyprinus carpio (fish)
Dreissena polymorpha (mollusc)
Eichhornia crassipes (aquatic plant)
Elodea canadensis (aquatic plant)
Estrilda astrild (bird)
Esox lucius (fish)
Ficus rubiginosa (tree, shrub)
Gambusia holbrooki (fish)
Gomphocarpus fruticosus (shrub)
Gobio gobio (fish)
Hucho hucho (fish)
Impatiens glandulifera (herb)
Lasius neglectus (insect)
Micropterus salmoides (fish)
Mustela vison (mammal)
Myiopsitta monachus (bird)
Myocastor coypus (mammal)
Oncorhynchus kisutch (fish)
Ophiostoma ulmi sensu lato (fungus)
Oxyura jamaicensis (bird)
Phasianus colchicus (bird)
Perca fluviatilis (fish)
Pistia stratioides (aquatic plant)
Psittacula krameri (bird)
Phytophthora ramorum (fungus)
Sander lucioperca (fish)
Silurus glanis (fish)
Scardinius erythrophthalmus (fish)
Tradescantia fluminensis (plant)
Ulex europaeus (tree, shrub)

Native Species Exported/Introduced to Non-Native Environments[1]

Acer platanoides (tree)
Columba livia (bird)
Centaurea melitensis (herb)
Columba livia (bird)
Cynoglossum officinale (herb)
Cytisus scoparius (shrub)
Didymosphenia geminata (algae)
Euphorbia esula (herb)
Frangula alnus (shrub)
Hydrocharis morsus-ranae (aquatic plant)
Hylastes ater (insect)
Landoltia punctata (aquatic plant)
Lotus corniculatus (herb)
Melilotus alba (herb)
Mustela erminea (mammal)
Onopordum acanthium (herb)
Orthotomicus erosus (insect)
Ostrea edulis (mollusc)
Polysiphonia brodiei (algae)
Rhamnus cathartica (tree)
Sabella spallanzanii (annelid)
Salmo trutta (fish)
Salsola tragus (shrub)
Setaria verticillata (grass)
Sirex noctilio (insect)
Trapa natans (aquatic plant)

Table 1 Actions to prevent, detect and manage IAS categorized into three themes: biodiversity, human health, and economic

Note: Actions (such as projects, publications and programs) are classified according to the most obvious theme but may also fit into the dimensions of another.

Area	Action
Biodiversity	• Law 42/2007 (December 13, 2007) of the Natural Heritage and Biodiversity: Chapter 3 of Title 3 legislates the creation of a *Spanish*

	Catalogue of IAS that will include those non native species and subspecies that pose a threat to native species, habitats, ecosystems, agronomy or economic resources linked to the use of the natural heritage,. A subsequent Article (74) legislates the creation of a fund for protecting biodiversity, which includes combating invasive species.[2&3] • In a summary of Spain's Views and Experiences on IAS, a document entitled *Invasive Alien Species in Spain: Diagnosis and Basis for Prevention and Management*, edited by the Ministry of Environment, was published, which includes a full review of IAS in Spain as well as measures to mitigate their impact.[3] • In a summary of Spain's Views and Experiences on IAS, the Second National Congress on IAS took place in León from 19-22 September 2006. The meeting was attended by ca. 300 specialists and there were numerous oral and poster presentations. One of the most outstanding issues that came out is the relevance that the subject of IAS is gaining from a research perspective. There are now many Universities and research centres that are developing IAS programs in the field, to evaluate their impact on native species and ecosystems. As a consequence there are a number of Ph.D. theses that are being prepared as well as scientific reports and publications.[3] • In a summary of Spain's Views and Experiences on IAS, the a *National Strategy for the Control and Management of the Zebra Mussel* was approved in September 2007. This document contains an overview of the situation of this species in the Ebro and Jucar basins, as well as measures to prevent its expansion to other river basins in the Iberian Peninsula.[3] • Spanish Biodiversity Platform: The goal of this platform is to support Spanish research on biological diversity, to promote and facilitate interaction and exchange of information among those involved in conservation programmes (the scientific community, managers, and policy makers), and to promote participation in European workgroups and other international institutions. • Spanish authorities have chosen to eradicate the beaver upon its discovery along the River Aragon and River Cidacos between La Rioja, Aragon and Navarra. This eradication effort is unique due to the fact that it is targeted against a species that, up until the 17th Century, was populous within the region, before seeing its population dwindle by excessive trapping and hunting. The rationale behind the eradication of this relatively harmless species is to avoid setting a legal precedent of turning a blind eye to a species' illegal reintroduction into its former habitat, lest that may carry unforeseen consequences into the future.[6] • The Green Party of Sevilla has proposed the creation of an invasive species centre; an insulated habitat where citizens may safely release

	species that are alien to the local environment of Sevilla. This move would be part of a larger campaign to raise awareness on the threat of invasive species to the natural environment.[8] • In 2001 it is published the "Atlas and Red Book of the Continental Fish of Spain" (Doadrio, I (Ed), carried out by the National Museum of Natural Sciences (Upper Counsel of Scientific Investigations) and that includes data on 28 families, 68 common species (33 brackish and 35 continental) and 24 exotic species.[9] • In the **Atlas de las Plantas Alóctonas Invasoras en España** (Sanz Elorza M., Dana Sánchez AND.D. & Nephew Vesperinas E. eds. 2004) it is indicated that 48% of the species and subspecies introduced into gardens have escaped from cultivation and have become naturalized with different degrees of success. Furthermore, about 18% of agricultural species have followed. It is estimated that about 16% of introduced species are a result of unintended commercial transactions. [9] • According to **the Atlas and Red Book of the Continental Fish of Spain** (Ignacio Doadrio (Ed) 2001) most of the exotic species were imported in Spain during the 20th century for mostly sports fishing. The last introductions of new species with official character were those of the pike (*Esox lucius*) in 1949, the blacblás (*Micropterus salmoides*) in 1955 and the huchón or salmon of the Danube (*Hucho hucho*) in 1968. In the last 30 years, alien species arrived due to the actions of individuals.[9] • Spain has endeavored to control the expansion of diverse invading species, such as the *Oxyura jamaicensis* (since 1982), the mussel zebra (in the river Ebro since 2001), the tortoise of florida (Valencia, The Rioja) and the Argentina parrot (Madrid, Catalonia). Also measures are being taken to protect to the indigenous species of these invasions, among others to the European mink (in The Rioja) and the meadows of Posidonia (in the Islands Balearic islands).[9] • In the two last decades, action plans for the control of alien species invading various National Parks was developed and carried out. For example, in Garajonay the control of *Tradescantia fluminensis*, in the Kettle of Taburiente the control of *Ageratina adenophora*, in Doñana the control of *Gomphocarpus fruticosus* and grey-green tobacco plant, in Timanfaya the control of grey-green tobacco plant and in the nature reserve of the Delta of the Ebro the control of *Eichhornia crassipes*.[9] • As a result of multiple introductions into fish communities, aquatic ecosystems have been very altered by the arrival of these exotic species. In large peninsular basins the proportion of native species in relation to exotic ones varies from 71% in Galicia (the region less altered) to only 41% in Duero (the most modified basin); while the national average of this index of integrity is about 63%.[9] • The Department of Environment at the Meeting of Andalusia, in the

	south of the Iberian peninsula, has created the Andalusian Plan for the control of invading exotic species. The plan aims to identify the foreign species that are present in Andalusia and then carry out control or eradication measure of these species. In the eradication phase of the plan (budget is two million euro), eradicates include the Lettuce of water (*Pistia stratioides*) in the drains of Sanlúcar of Barrameda (Cadiz), Nail of cat (*Carpobrotus edulis*) in zones of the coast of Cadiz and Huelva and in the systems dunares of the nature reserve of the Strait, and Carpio) in the Gap d and Zóñar (Cordoba).[9] • Spain has established a total of 63 Ramsar sites covering a total area of 281,768 hectares. Spain is working to develop legislation that would strictly prohibit and prevent the introduction of non-native species in wetlands, and to promote measures to control and/or eliminate exotic species that have already been introduced.[10] • Actions have been taken to prevent, to reduce or to control the factors that threaten or that are a probable threat to migratory marine mammals, including the strict control of the introduction of exotic species as well as the monitoring and elimination of the ones that already have been introduced. In addition, a program has been established to eradicate the ruddy duck.[11]
Human health	• In preparing for the arrival of Avian bird flu, the Spanish government "created a permanent inter-ministerial commission" on the movement of bird flu, as well as establish high-risk zones.[5]
Economic	• There are some mechanisms that control possible introductions through ballast water in accordance with recommendations of the IMO's BWM Convention.[9]

Table 2 Action on IAS in cooperation with other countries

Agreement/ Organization	Countries/ Member	Action
The Convention for the Protection of the Mediterranean Sea against Pollution, (16 February 1976) Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (hosted by the Ministry of Foreign Affairs and Cooperation)	Albania, Algeria, Croatia, Cyprus, Egypt, European Community, France, Greece, Israel, Italy, Libyan Arab Jamahiriya, Malta, Monaco, Morocco, Slovenia, Spain, Syrian Arab Republic, Tunisia, and Turkey	Article 13 INTRODUCTION OF NON-INDIGENOUS OR GENETICALLY MODIFIED SPECIES 1. The Parties shall take all appropriate measures to regulate the intentional or accidental introduction of non-indigenous or genetically modified species to the wild and prohibit those that may have harmful impacts on the ecosystems, habitats or species in the area to which this Protocol applies. 2. The Parties shall endeavour to implement all possible measures to eradicate species that have already been introduced when, after scientific assessment, it appears that such species

		cause or are likely to cause damage to ecosystems, habitats or species in the area to which this Protocol applies..Specially Protected Areas Protocol

Case Studies

Control of black rats *Rattus rattus* increases breeding performance of Cory's shearwater *Calonectris diomedea* Congreso Island, Chafarinas Archipelago, Spain[7]

Igual J.M., Forero M.G., Gomez T., Orueta J.F. & Oro D. (2005)

Background

Due to their burrow-nesting habits and long fledging period, island breeding procellid seabirds such as Cory's shearwater *Calonectris diomedea* are particularly vulnerable to introduced predators. Introduction of rats *Rattus* spp. has resulted in a number of bird extinctions on islands, and black rats *R.rattus* have been responsible in the Mediterranean for reducing numbers of Cory's shearwater due to predation on the nesting grounds. However, little is known about the extent of the reduction or the breeding stage (incubation and/or chick) most affected. The results of a study comparing breeding performance prior to and after rat control are presented.

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