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Οικολογικά Δίκτυα Προστασίας της Φύσης και Προστατευόμενες Περιοχές στην Ελλάδα

Προβλήματα Διαχείρισης, Περιβαλλοντικής Προστασίας και Βιοποικιλότητας

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Περίληψη

Η Ελλάδα άρχισε το 1937 να αναγνωρίζει περιοχές με ειδικό οικολογικό ενδιαφέρον (δάση, ορεινοί όγκοι, ποτάμια, λίμνες, υγρότοποι, ενδιαιτήματα, παραθαλάσσιες περιοχές) και να τις θέτει υπό καθεστώς περιβαλλοντικής προστασίας. Αρχικά στις προστατευόμενες περιοχές έγινε ο αποκλεισμός των ανθρώπινων δραστηριοτήτων, αλλά στην πορεία επιτεύχθηκε η ενσωμάτωση τους στον περιβάλλοντα χώρο και της στενής σύνδεσης της προστασίας τους με την αειφορική χρήση των φυσικών πόρων. Περιοχές φυσικού κάλλους και υψηλής βιοποικιλότητας αναγνωρίσθηκαν ως προστατευόμενες με βάση την ισχύουσα εθνική νομοθεσία αλλά και στο πλαίσιο διεθνών συμβάσεων ή Ευρωπαϊκών πρωτοβουλιών για το φυσικό περιβάλλον. Η καταγραφή των περιοχών που πληρούν τα κριτήρια της παρουσίας τύπων οικοτόπων και των βιολογικών ειδών τους (Οδηγίας 92/43/ΕΚ) στη χώρα μας έγινε από ομάδες επιστημόνων στο πλαίσιο του ευρωπαϊκού προγράμματος LIFE (1994-1996). Το δίκτυο Natura 2000 είναι ένα πανευρωπαϊκό δίκτυο προστασίας των ειδών των ενδιαιτημάτων. Το δίκτυο στην Ελλάδα περιλαμβάνει οικοτόπους υψηλής περιβαλλοντικής σημασίας και ποικιλία ειδών χλωρίδας και πανίδας.

Η Ελλάδα είναι στο επίκεντρο σημαντικής Μεσογειακής βιογεωγραφικής περιοχής που φιλοξενεί μεγάλη ποικιλότητα οικοσυστημάτων, από το ημιερημικό της νοτιοανατολικής Κρήτης μέχρι των ψυχρόβιων δασών της σημύδας, της δασικής πεύκης και της ερυθρελάτης, στη Ροδόπη. Η μεγάλη αβιοτική ποικιλομορφία των μικροκλιματικών τύπων αντικατοπτρίζεται στην παρουσία μεγάλης ποικιλότητας χλωρίδας, πανίδας και οικοσυστημάτων. Ποτάμια, δέλτα ποταμών, υγρότοποι, λίμνες και παραθαλάσσιες περιοχές καλύπτουν μεγάλες εκτάσεις και τα ελληνικά δάση καλύπτουν το 30% του εδάφους της χώρας. Επίσης ένα ενδιαφέρον χαρακτηριστικό της Ελλάδας είναι τα 15.000 χιλιόμετρα παραθαλάσσιων περιοχών και 3.000 νησιά. Ειδικές υποχρεώσεις για την προστασία της φύσης απορρέουν από τις σχετικές Διεθνείς Συμβάσεις που δημιούργησαν το Συμβούλιο της Ευρώπης, η Ευρωπαϊκή Ένωση και η UNESCO. Υγρότοποι Διεθνούς Σημασίας από τη Σύμβαση Ραμσάρ, τα Μνημεία της Παγκόσμιας Κληρονομιάς (UNESCO), τα Αποθέματα Βιόσφαιρας (UNESCO, Άνθρωπος και Βιόσφαιρα), οι Ειδικά Προστατευόμενες Περιοχές (Σύμβαση Βαρκελώνης), τα Βιογενετικά Αποθέματα (Συμβούλιο της Ευρώπης) και οι Περιοχές στις οποίες έχει απονεμηθεί Ευρωδίπλωμα (Συμβούλιο της Ευρώπης). Η ανασκόπηση αυτή καλύπτει όλες τις πλευρές των προστατευόμενων περιοχών, διαχείριση και προστασία μέσα από πληροφορίες επιστημονικών εργασιών των τελευταίων 20 χρόνων και με πλούσια; εικονογράφηση.

Πλήρες κείμενο της εργασίας στα αγγλικά [32 σελίδες]:αρχείο PDF, 2 MB

<Επιστροφή στη λίστα επιστημονικών θεμάτων και ανακοινώσεων>

Ecological Network for Nature Protection and Protected Areas in Greece

Problems of Management, Environmental Conservation and Biodiversity

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Abstract. Protected environmental areas for the safeguard of national parks and areas of environmental importance and high biodiversity in Greece was initiated in 1937. In the following decades Greece initiated statutory designated ecological areas, such national and marine parks, aesthetic forests, protected natural monuments and wetlands Ramsar sites. Initially the protected areas were closed to anthropogenic activities but later the situation changed and protected areas were integrated with the surrounding environment and their protection became part of sustainable use of natural resources. In 1992 the European Union initiated the Natura 2000 network of protected areas of ecological significance (Habitat Directive 92/43) following an integrative approach The listing of the protected areas that cover the conservation requirements was performed by scientific committees based on the type of habitats and their biodiversity (Directive 92/43/EU) that were regulated under the framework of the European programme LIFE (1994-1996).The Natura 2000 network is the most important conservation effort being implemented in Europe and specified an integrated approach, recognizing the essential contributions of different stakeholders responsible for and interacting with Europe's rich biological diversity of environmental areas and ecological sites

Greece is in the middle of a very important Mediterranean biogeographical region, with ecosystems ranging from semi-desert and maquis, to cold climate mountain forests of birch, scots pine and spruce. The semi-desert areas of southeastern Crete and the cold forests of Rodopes. The great abiotic variety and microclimatic types in Greece is represented by a rich biodiversity. Rivers, estuaries, deltas, lagoons, lakes, coastal marine formations and wetlands cover a relatively wide area and Greek forests cover nearly 30% of the country's territory. An important characteristic of Greece's landscape is an extensive coastline of about 15.000 kilometres and. 3.000 islands Apart from the national legislation, special commitment on the protection of the natural environment derives from international conventions, ratified by the country, and from Greece's participation in international organizations such as the Council of Europe and UNESCO. The following categories :Wetlands of international importance according to the Ramsar Convention, (UNESCO), Biosphere Reserves (UNESCO, Man and Biosphere), Specially Protected Areas according to the Barcelona Convention, Biogenetic Reserves (Council of Europe), Eurodiploma Sites (Council of Europe). This review covers all aspects of protected areas in Greece, problems of management and conservations through scientific projects and research papers of the last 20 years.

Introduction: Natural Environment and Biodiversity in Greece

Greece's natural environment and landscape is characterised by great biodiversity and a variety of climates, due to the interaction between the weather systems and the country's complex topography and the distribution of land and sea areas. Greece is characterized by an extremely fragmented, rugged landscape hosting a great diversity of ecosystems and an outstanding biodiversity. Almost 5% of its extensive coastline consists of ecologically sensitive wetlands. Greece is embedded in the Mediterranean biogeographical region, with ecosystems ranging from semi-desert and maquis, to cold climate mountain forests of birch, scots pine (*Pinus sylvestris*) and spruce. Rivers, estuaries, deltas, lagoons, lakes, coastal marine formations and wetlands cover a relatively wide area (210.000 hectares) and forests cover nearly 30% of the country's territory. An important characteristic of Greece's landscape is an extensive coastline of about 15.000 kilometres and. 3.000 islands, which represent 20% of the land area.

Greek flora are among the richest in Europe with more than 5.500 plant species (of which a large number of endemic species). Among over 900 endemic and rare vascular plants there are species such as the Dittany of Crete *Origanum dictamnus*, Baker's Tulip *Tulipa bakeri*, a chamomile *Anthemis glaberrima*, Cretan Zelkova *Zelkova abelicea*, *Crocus oreocreticus*, the Greek Fir *Abies cephalonica*, the Cretan Ebony *Ebenus cretica* etc. Endemic plant genera include *Jankaea*, *Hymenonema*, *Petromarula.* There are numerous publications on the subject : Greek Mountain Flora, Northern Greece, vol. 1 and vol.2, 2011, Greek Mountain Flora, Peloponnese, by Klaaskam, 2012, Greek Mountain Flora, Central Greece, 2012, Greek Mountain Flora Lowland Flora, 2012 , by Kamstra Klaas, http://www.greekmountainflora.info/ website and in book form http://www.blurb.com/books/3062997-greek-mountain-flora-peloponnese. Also, Strid, Arne: *The Greek Mountain Flora*, with special reference to the Central European element. - *Boeeonea* 5: 99-112.1995. , Strid Arne, *Mountain Flora of Greece,* vol. 1, Cambridge University Press, 1986, Strid A, Tan K, *Mountain Flora of Greece*, vol. 2, Edinburgh University Press, 1991.

Figure 1. Greek flora, is among the richest in Europe with more than 5.500 plant species

Greece is part of the Mediterranean Basin biodiversity hotspot. Greece has important terrestrial ecoregions for endemic species that include the Crete Mediterranean Forests and the Pindus Mountains Mixed Forests. Important freshwater ecoregions include the Ionian Drainages and the Southeast Adriatic Drainages.

Most of the mammal species recorded in the Greek territory are indigenous, and almost 85% of freshwater fish species. Greece hosts a large variety of Mediterranean habitats: from open sea, tidal areas and sea dunes, to several types of shrubs and grasslands and Mediterranean mountainous forests of coniferous trees. The Greek list of Natura 2000 sites, which are mostly wide areas and scattered throughout of the Greek territory includes 241 Sites of Community Importance (SCI) and 202 Special Protection Areas (SPA). Numerous publications have been published in the last decade and albums with photographs of Greek landscapes and spectacular natural features in various islands, forests, mountainous areas, rivers, lakes of Greece and the rich biodiversity of plants and animals that inhabit these places.[1-12]

Figure 2. An important characteristic of Greece's landscape is an extensive coastline of about 15.000 kilometres and. 3.000 islands, which represent 20% of the land area.

Natural forests comprise 25% of the total area of Greece. They are characterized as Mediterranean and their ecosystems have adapted to dry, hot summers and cold winters. Oak trees have developed in the Mediterranean and Circum Mediterranean zone, while acorns grow in the Thessaly plain where the soil is more fertile. Other types of forest's trees in Greece are the ones that spread throughout Europe, such as the pine (*Pinus halepensis*, *Pinus silvestris*), the spruce (*Picea abies*), and the beech (*Fagus sylvatica*). The fauna in the Greek forests are characterized by high biodiversity. Forests preserve numerous kinds of birds, reptiles, insects, and a remarkable variety of rare endemic plants.[9]


Figure 3. Greek forests preserve a great variety of plants, butterflies, mammals and birds.

The forests in Greece, because of its geographic position, the climate, the intense relief, the geology and the human activities, play a multifunctional role, especially a very important hydrological, recreational, hygienic and environmental role for the country's economy and the inhabitants' quality of life. The deforestation, caused by forest fires, insects and diseases during drought periods, is counterbalanced by the natural afforestation of abandoned agricultural lands, the natural rehabilitation of degraded forest ecosystems, as well as the afforestation activities as part of rural development and afforestation programmes, resulting in a stable proportion of forests in the country, with a tendency to increase. Forests contribute to the protection of the mountainous mainland of Greece from erosion phenomena. The new forest law that was adopted by the Greek Parliament in 2003, special emphasis is given to the protection of forests.[13]

In addition, Greek forests is the habitat of interesting mammals, with the most notable being the brown bear (*Ursus arctos*), the wildcat (*Felis silvestris*), the jackal (*Canis aureus*), the wolf (*Canis lupus*) and the badger (*Meles meles*), fox, wild hog and mountain antelope. Also forests accommodate rare bird species such as the golden eagle (*Aquila chrysaetos*) and the black stork (*Ciconia nigra*) as well as reptiles.

Greece is a country with great variety of birds. Studies and scientific discoveries in Greece recorded 425 bird species, 243 of those species breed in the country, making Greece very important for European bird life and a great place for bird watching in a variety of habitats and forests. Several species that breed in Greece are globally threatened, including Dalmatian pelican**,** Lesser kestrel**,** Pygmy cormorant**,** Black vulture and Cinereous bunting**.** Greece also holds the largest breeding population of Dalmatian pelican outside of the Former Soviet Union and two thirds of the world's population of Eleanora's Falcon breed in Greece.

Greece with its numerous mountains, lakes and rivers is home to around 6,000 different plant species and over 700 of those are endemic, meaning they occur nowhere else in the world. That equates to about 15% endemism – the highest in the whole of Europe**.** This

diversity of plant life means that when you go for a walk in the countryside of Greece there is almost always something new to see. The mountainous topography of Greece has provided isolation for plants to evolve separately and sanctuary for all kinds of wildlife, helping to preserve a great biodiversity from the pressures of human intervention.

Brown bear

Kri Kri (Crete)

Wildcat Pineos delta

Jackal

Golden eagle

Black stork

Figure 4. Some of the rare wildlife animals endemic species of Greek forests.

Greek environmental landscape and forests are adorned by 235 species of butterfly, more than half of the total number of species in the whole of Europe. These living jewels are a colourful feature of any excursion in Greece and the sheer numbers of them can be quite extraordinary, usually a feature of the most mountainous regions.[14]

Papilio machaon

Anthocharis cardamines

Figure 5. The Mediterranean ecosystems preserve a great variety of butterflies.

Studies have recorded numerous reptiles and amphibians**.** Greece has around 70 different species of reptiles and amphibians (more than other European countries, like for example France).These species include many endemic species, such as the Milos Viper (Macrovipera schweizeri), the Peloponnese Wall Lizard (southern Greece), the Levant Skink (Rhodes).[15]

Milos vipera (*Macrovipera schweizeri*)

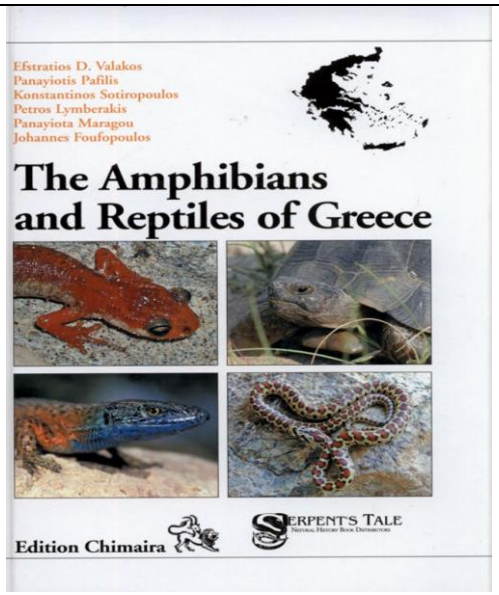


Figure 6. Greece has a great variety of reptiles and amphibians. (Recent publication: The Amphibians and Reptiles of Greece. Edition Chimaira, vol. 32, Frankfurt Contributions to Natural History, 2008).[15]

Environmental Legislation and Protected National Parks in Greece

Climatic conditions and Mediterranean geomorphological and biogeographical aspects in Greece support ecosystems with high landscape diversity. Two-thirds of the Greek territory is covered by a hilly or mountainous terrain, with the typical landscape being rugged and steep. The coastline is mainly rocky and sandy with about 5% wetlands Greek flora and fauna are among the richest in Europe with a large number of endemic species, due to the isolation of mountains and islands. In Greece there is a large variety of Mediterranean habitats from open sea, tidal areas and sea dunes, to several types of shrubs and grasslands and Mediterranean mountainous forests of coniferous trees.[16]

The first protected natural park in Greece was declared in 1938, namely the highest Greek mountain Olympus. The aim was the preservation of the natural environment; of the flora, fauna and natural landscapes, as well as of its cultural and other environmental values. The law prohibited any kind of exploitation in the east side of the Olympus and the wider area around it was designated as “peripheral zone of the National Park” so that its management and exploitation won’t affect negatively the protection of the core. The Olympus National Park Management Agency (a non profit organisation) is a body governed by private law and was

established in 2002, by the Law 3044/2002, in accordance with the Law 1650/15-10-1986 and Law 2742/1999. It is responsible for the systematic monitoring of the environmental parameters of the protected region, collaboration with the competent authorities to ensure control and enforcement of the environmental legislation. The agency also must inform and educate the public regarding the protected area. The Agency is supervised by the Ministry of Environment and is financed by the operational programme «Environment».

Figure 7. The Olympus National Park was declared protected in 1938.

In Greece the term is National forest park (εθνικός δρυμός) because the majority of national protected parks involve forests of oak trees (δρυμός-δρυς-βαλανιδιά). The final list of protected areas is twenty seven. The most important national forest and sea parks.

- National (Forest) Park Olympus (Εθνικός Δρυμός Ολύμπου) (Government Gazette, ΦΕΚ 248/A/1938)
- National Park Parnassos (Εθνικός Δρυμός Παρνασσού) (ΦΕΚ 286/A/38)
- National Park of Parnitha (Εθνικός Δρυμός Πάρνηθας) (ΦΕΚ 155/A/1961)
- National Park Vikos-Aoos (Εθνικός Δρυμός Βίκου Αώου) (ΦΕΚ 198/A/1973)
- National Park Oitis (Εθνικός Δρυμός Οίτης) (ΦΕΚ56/A/1966)
- National Park Samaria, Crete (Εθνικός Δρυμός Σαμαριάς) (ΦΕΚ200/A/1962)
- National Park Kefallonia (Εθνικός Δρυμός Αίνου Κεφαλληνίας) (ΦΕΚ 199/A/1962)
- National Park of Sounion (Εθνικός Δρυμός Σουνίου)(ΦΕΚ 80/A/1974)
- National Park of Prespes (Εθνικός Δρυμός Πρεσπών (ΦΕΚ 19/A/1974)
- National Park Pindos (Εθνικός Δρυμός Πίνδου) (ΦΕΚ 120/A/1966)
- The National Sea Park of North Sporades (1992 Presidential decree, Sporades is member of MedPAN, Network of Marine Protected Areas in the Mediterranean Basin).

Vikos-Aoos National Park

Great Prespes National Park

Figure 8. National Park, Vikos-Aoos and Great Prespes (*Thomais Vlachogianni, Flickr*).

Protected areas in Greece were designated and protected initially by national legislation (initial Law, 1650/86 and additional changes 3937/2011) and from Greece's participation in international organizations (Council of Europe and UNESCO). Greece ratified international regulations for special commitment on the protection of the natural environment derived from international conventions. These conventions cover a) Wetlands of international importance according to the Ramsar Convention, b) World Heritage Sites (UNESCO), c) Biosphere Reserves (UNESCO, Man and Biosphere), d) Specially Protected Areas according to the Barcelona Convention, e) Biogenetic Reserves (Council of Europe) and f) Eurodiploma Sites (Council of Europe).

Convention on the conservation of European wildlife and natural habitats (Bern Convention) is a binding international legal instrument in the field of nature conservation, which covers the whole of the natural heritage of the European continent and extends to some States of Africa. Its aims are to conserve wild flora and fauna and their natural habitats and to promote European co-operation in that field. It was adopted and signed in Bern (Switzerland) in September 1979, and came into force on 1st June 1982. It counts among its Contracting Parties 40 member States of the Council of Europe, as well as Burkina Faso, Morocco, Senegal, Tunisia and the European Community. The protection of migratory species lends the Convention a distinct dimension of North-South interdependence and co-operation. The Bern Convention co-ordinates the action of European States in adopting common standards and policies for the sustainable use of biological diversity, thus contributing to the improvement of the quality of life of Europeans and the promotion of sustainable development. The Convention is a fundamental treaty at European level for biological diversity. It is co-ordinated by a Standing Committee that meets every year, has adopted 90 recommendations and seven resolutions, and organises many seminars and technical groups. In the past decades the Council of Europe through the Bern Convention put in place a very effective monitoring system and develops a very comprehensive work. Greece

as a ratifying state signed the convention in 19/9/1979, ratified the convention in 13/6/1983 and entry into force in 1/10/1983.[17]

In 1992 the European Union adopted legislation designed to protect the most seriously threatened habitats, animal and plant species across Europe. The adopted legislation was called Habitats Directive **(**Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora) and complimented the Birds Directive (1979). The Habitats Directive and the Birds Directive forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all the directive protects over 1.000 animals and plant species and over 200 so called "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance. The directives established special protection areas for birds and special areas of conservation for other species and habitats. All European Union member states are participating to contribute to the conservation of network sites in a Europe-wide partnership. The Special Areas of Conservation are classified and provide increased protection and management which are important to birds, other animals, plants and ecosystems.[18]

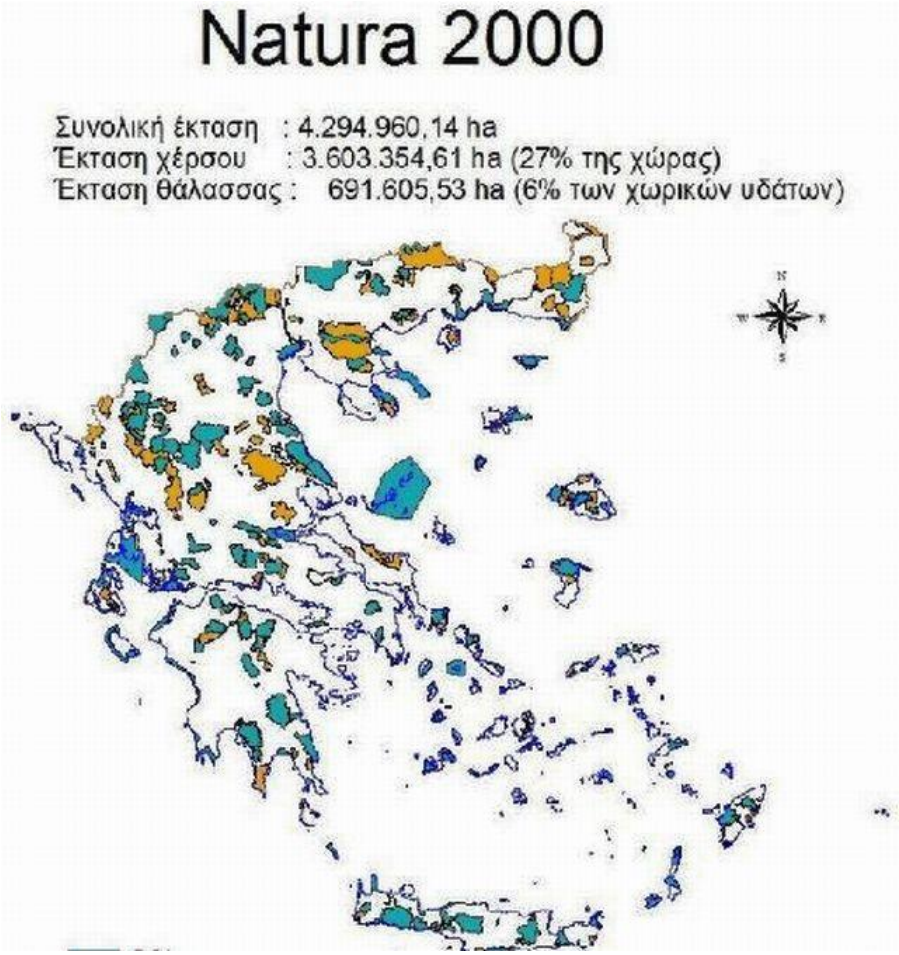


Figure 9. A map of the Natura 2000 sites in Greece

Under Natura 2000 the Greek territory has been included in the European Ecological Network. The National Greek List includes 163 Special Protection Areas (SPAs) according to Directive 79/409/EEC and 239 Sites of Community Importance (SCIs) according to Directive 92/43/EEC. The surface area of the network in Greece, excluding overlaps, is approximately 3.4 million hectares and occupies 21% of the land. These areas include the National Parks, the Wetlands of International Importance under the Ramsar Convention, as well as other important areas such as Aesthetic Forests and Natural Monuments and Landmarks. The Natura 2000 sites are mostly wide areas and are scattered throughout the country. From the total of Greek Natura 2000 sites 14% are agricultural areas, 10% grazing ground, 23% forests, 24% maquis, 16% sea areas, 4% wetlands.[19,20]

The Natura 2000 network in Greece includes 419 areas out of which: 241 have been designated as Sites of Community Importance – Special Areas of Conservation, (SCIs – SACs), out of which 239 are SAC and 2 SCI, 202 are Special Protection Areas (SPAs), while 24 areas are at the same time SCIs and SPAs. The area of SCIs is 2.807.512 ha which cover 16,3% of the terrestrial area of the country and 5,7% of the territorial waters. The area of the SPAs is 2.952.476 ha and covers 21,1% of the terrestrial area and 1,4% of the territorial waters. In total the surface of the Network Natura 2000 in Greece is 4.294.205 ha and covers 27,2% of the terrestrial area and 6,1% of the territorial waters of the country. Based on the surface of the Greek network Natura 2000 which corresponds to 4,5% of the surface of the European ecological network, Greece is ranked in the 10th place in relation to the 28 member-states of the European Union. The average coverage of the national terrestrial area of Europe is 17,5%, hence Greece is ranked in the 6th place among the 28 member-states (after Slovenia, Bulgaria, Slovakia, Cyprus and Spain).[21]

Economic Developments and Environmental Protection in Greece

Environmental protection and legislation for environmental issues in Greece was very limited in the 1960s and 1970s. With the 1974 return to parliamentary democratic rule and joining the European Economic Community (EEC) in 1981, environmental policy became very important due to numerous European Union Directives and a need for integration of national environmental legislation. Despite progress Greece still needed to be put in place new legislation and gradually streamlining and updating environmental legislation with other European countries.

Environmental legislation was initiated with great urgency under the auspices of the Ministry for Environment, Physical Planning and Public Works (Υπουργείο Περιβάλλοντος, Χωροταξίας και Δημοσίων Έργων, ΥΠΕΧΩΔΕ). In the period 1974-1985 there were two ministries, Ministry of Public Works and Ministry of Physical Planning, Housing and Environment. In the period 1985-2009 became YPEHODE and from 2009 the Ministry was named Ministry of Environment, Energy and Climate Change (YPEKA) (Υπουργείο Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής, ΥΠΕΚΑ).

Greece from the beginning of the 1990s has been implementing a comprehensive policy towards sustainable development. Sustainability was introduced in the development policies of the country and sustainable practices were integrated in sectors such as energy, tourism, transport, agriculture and industry. The Ministry of the Environment has developed a co-ordination mechanism for sustainable development and the implementation of Agenda 21, in order to mobilise the interest and involvement of all the competent ministries and other public sectors and to cooperate with local authorities, environmental organizations and all relevant groups. Under this mechanism, the Ministry undertook the preparation of the annual reports for submission to the United Nations Commission on Sustainable Development (CSD) in order to assess the progress towards the principles of Agenda 21. Effective environmental governance comprises a cycle of issue identification, stakeholder involvement, sound policy making and efficient implementation. Environmental institutional development and governance procedures in Greece were very slow because highly corrupted attitudes, such as illegal house building in forests, forest fires, illegal municipal waste, rapid increase of tourism without plans, agricultural expansion with excessive use of water and fertilizers, animal grazing, and anarchic urbanization in coastal areas.[22]

In the last 30 years Greece has been undergoing major economic and social developments with an annual economic growth on average by more than 4% (especially after 1974 with the fall of junta). As a major beneficiary of the European Union funds and other economic incentives, Greece modernized its infrastructure (motorways, bridges, port facilities, etc), upgraded its competitive industries and services and invested generously in higher education of its human resources. Tourism and construction (house building, schools, stadiums, hospitals, etc) became important sectors (contributing around 30% of the GDP).[23]

The rapid economic changes of the last 30 years, consumer trends and commercial developments in Greece gave a false sense of economic wellbeing and strong increase of GDP (sustained by high levels of borrowing, because of the lower interest rates that government bonds in euros could command) without plans for a sustainable future and protection of natural resources. Increased number of cars and municipal waste increased air pollution in the urban areas. Also, excessive air pollution was produced by electricity power stations using as fuel lignite. In the same period excessive use of fresh water for agriculture was recorded and nitrogen pollution in farming areas increased. Developments in industry, energy, agriculture, transport, tourism, construction (houses, offices, commercial buildings and roads), urbanization and tourist developments of coastal areas, strongly influenced environmental pollution and degradation of natural resources. These fast changes diminished the benefits of environmental policies, technological progress and investment in environmental infrastructure. Although Greece has still untouched natural environment and rich cultural heritage, recent developments put increased environmental pressures, especially from unplanned/illegal urbanization and expansive housing construction in forested areas and coastal zones (in particular to small islands) and near protected areas.[24,25,26]

Greece's major efforts towards economic and social convergence to other developed European countries have been only partially matched by environmental control of various forms of pollution. Environmental legislation encountered numerous difficulties for implementation involving local interests and resistance to environmental taxes and fines. Greece received every year €2.5-3 billions for farming subsidies (Common Agricultural Policy, CAP), the largest per capita beneficiary among the EU countries. Corrupted practices in farming subsidies from Greek farmers is still endemic. Greek people lived in the last decade in a state of "corrupt legality", meaning that the law often condones or even foster corrupt practices. The Transparency International has an annual list of corruption perception index based on research and statistics. Greece (scored 40) is seen as the most corrupt nation in the European Union, far below the best-performing Denmark, which scored 91. Greece ranks in the 80th spot among the 177 countries, below Bulgaria, Senegal and Tunisia. Seven of the 28 EU member states scored below 50. Spain dropped to 59, compared to 65 in 2012. Germany also slipped one point from last year to a score of 78, though it still ranks in the top 12. (Transparency International, 2012. "*Corruption in Greece--a crisis of values*", blog.transparency.org/2012/04/03/corruption-in-greece-a-crisi-fo-values/, Transparency International, Corruption Perceptions Index, 2004, http://www.transparency.org/cpi2014).

These trends in Greece affected environmental vigilance and application of legislation and fines for degradation of fragile ecosystems and the diminution of flora's and fauna's biodiversity. A major problem for Greek forest ecosystems is the lack of ktimatologio (National Cadastre), illegal building activities, forest fires, unregulated animal grazing, etc. Despite the aerial photographs of forests, forest inspections and special fire-fighter brigades (with aeroplanes and helicopters) and increased vigilance, forest fires and still persist in the summer months. So far, the National Cadastre and Mapping Agency S.A. (NCMA S.A). has carried out studies for the development of forest maps that cover 477 regions. These regions expand over 12.2 million stremmas (1 stremma=1.000 m^2) which is 9,26% of Greek territory. The land in Greece is highly fragmented and due to the strong urbanisation of the last 50 years, most of the population is concentrated in few big cities, coastal areas, while great extents of rural and mountainous areas have been abandoned.[27]

The lack of forest cadastre encourages the process of illegal settling and building as well fly-tipping of rubbish on the areas of forest which have been burnt. After the 2007 disastrous forest fires, a huge effort has been launched with the cadastral survey of the country. According to the Greek Constitution the reforestation of the burnt forests and forest areas is obligatory while any change in the forest land use is prohibited.

In the period 200-2010, the Ministry for the Environment (YPEHODE) undertook various environmental initiatives. launched the National Programme for Sustainable Development of Greek Coastal Areas and Islands (protection and development of its coastal areas have been "presented" in the law 2971/2001 that regulates the limits of the seashore and beach zones and related matters) to address the problems of environmental degradation of coasts and islands. Furthermore, actions have been taken within the framework of the

Greek Operational Environmental Programme for the Protection of Marine Environment, aiming at the development of the necessary infrastructure for oil spill treatment and reception facilities for oil and chemical residues from ships. Cleaning and restoration projects have been carried out as well. The inadequate land and urban planning during 1950-80 resulted in the gradual degradation of the natural and urban environment in many areas of the country. The National Action Plan for Cities and Housing (1996-2000), which Greece has developed as part of its participation to the HABITAT II International Conference of the United Nations on Human Settlements (Instanbul 1996) has two main objectives: the creation of cities which provide safe, healthy, equal and sustainable living conditions and the guarantee of adequate housing for all.

The national strategy for ecological networks in Greece (1999) was the main component of the National "Master Plan for the Protection of Nature". The Greek Ministry started the procedure for the elaboration of the revised master Plan in 2001 with the creation of an ecological network of all areas with a high ecological, biodiversity or aesthetic value. It included SPA's (Special Protection Areas, according the Birds Directive 79/409/EC) and pSCI's (proposed Sites of Community Interest, according the Habitats Directive 92/43). These became the future Natura 2000 sites in Greece. Other areas either designated from Public Services (e.g. National Forests or the ex "game reserves", renamed now as "wildlife refugees", established and managed by the Ministry of Agriculture). Protected areas in Greece are classified in two categories, a) Areas included in the "National Protected Areas Network", and b) Areas of regional and local importance. Using mainly geographic criteria, the protected areas were grouped in 162 unified Areas of Protection (AP's). According to their spatial continuity, the Master Plan proposed for the creation of 40 Management Bodies (or Management Authorities) that will cover 79 of the 162 AP's in total. These Management Bodies should manage the majority of the pSCI's in Greece.[28,29,30]

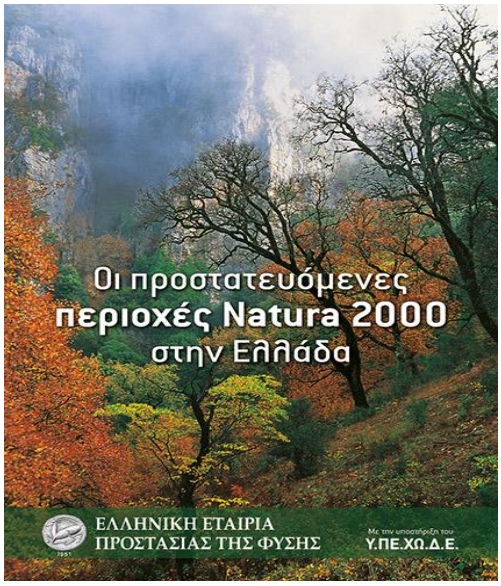


Figure 10. The protected areas of Natura 2000 in Greece are wide agricultural, forests and sea areas scattered throughout the country.

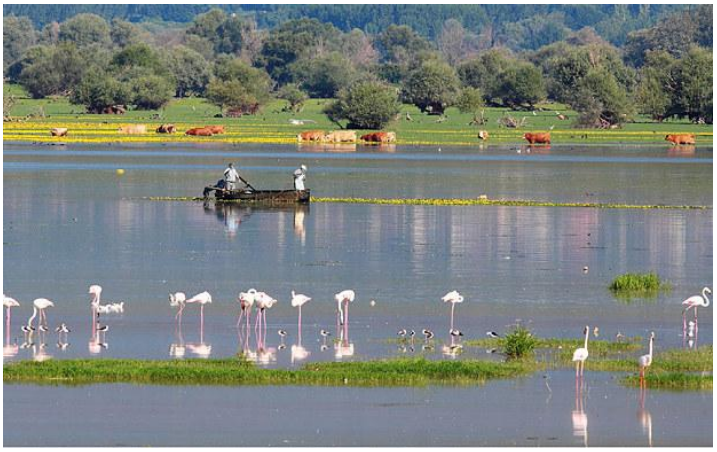
National Parks and Protected Areas in Greece

In 2002, with Law 3044/02, the Greek Government decided the creation of twenty five (25) new Management Bodies and 2 Marine National Parks.

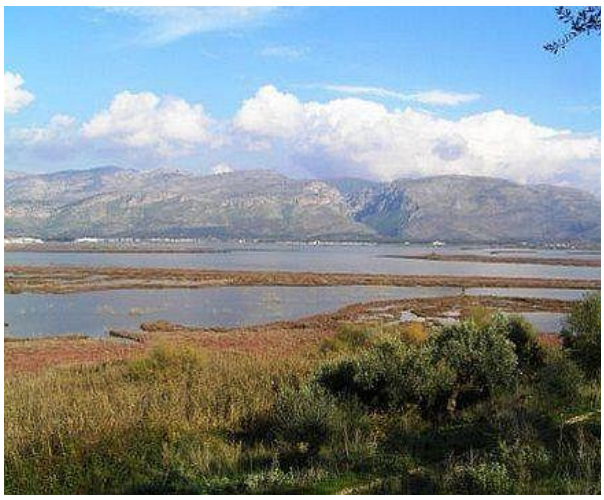
1) **Delta of Evros River National Park** (is an important wetland on a national, European and international level. Environmental area, with rich wildlife. In Evros Delta hundreds of thousands of birds find shelter and food all year round. The Evros Delta constitutes a very important natural resource for the local community, because of his value for fishing, stock breeding, agriculture, climate, flood protection, education, recreation, etc).

2) **Dadia Forest**, **National Park of Dadia Forest-Lefkimi-Soufli** (Dadia is situated on the western edge of the lower Evros valley, at the foot of wooded hills. The forests of Dadia are a well known nature reserve, in which endangered species of birds of prey, including *Aquila heliaca* and *Aquila pomarina*, find refuge). It is renowned as one of 2 remaining European feeding and breeding grounds for rare raptors such as the black and griffin vultures. The forest provides protection for the vultures' long reproduction period).

3) **Kerkini Lake National Park** (In the north-west part of Serres Prefecture, just 40 Km from the town of Serres and about 100 Km from Thessaloniki, one of the most beautiful places in Greece, Lake Kerkini. Its unique wetland has been declared as National Park according to Ramsar Convention and it is one out of ten wetlands of International Importance of Greece.
The man's intervention caused the formation of this heaven. In 1932 the first dam was constructed in the waters of river Strymonas and gradually lake Kerkini took shape. The riparian plantations consisting of riparian forests of wild willows, the suspended water-lilies expanded in a surface of thousands hectares, the fish high diversity, the buffalos swimming in lake's calm water and the great mountainous areas of Belles and Krousia give a unique grace to this land).



4) Mesologgi Lagoon National Park [Messolonghi Lagoon National Park-Aitoliko estuary Acheloos / Evinos and Echinades Islands (Kleisoyra). The area hosts a large number of threatened and/or endangered species, among which 185 species of birds, 5 species of mammals and more than 15 species of amphibians, reptiles, fish, invertebrates and plants. Field survey in coastal lagoons is performed with small boats provided by the Management Body of Messolonghi or by the local fishing cooperatives).



5) **Delta of Axios, Loudias & Aliakmon Rivers (**The Axios - Loudias - Aliakmonas National Park, is short distances from Thessaloniki, Katerini and Veria. Each season has something different to offer: in winter, huge flocks of water birds and birds of prey congregate at Nea Agathoupoli, in spring, the forest glades are alive with birdsong and the wild horses come down to the riverbanks, in the summer the coastal area is pleasantly cool and ideal for walking, while autumn is the time to see great flocks of shorebirds in the Kalohori lagoon and the Alyki Kitrous salt works).

6) **Koroneia and Volvi Lakes** National Park (These shallow lakes are north of the Halkidiki Peninsula and southeast of Thessaloniki. Volvi**,** the larger, is one of the largest natural lakes in Greece. Koroneia is also known as Langhadha**.** Though both are designated Ramsar sites, both have suffered severely from conversion of former marshland to farmland and from pollution. Many birds breed **i**n the reedbeds and marshland of both lakes, and, as with other wetland, many visit outside of breeding season, including both white and Dalmatian pelicans, and greater flamingos. Vast numbers of grebes have been recorded in winter here).

7) **National Marine Park of Alonissos** – **Northern Sporades** (The National Marine Park of Alonnisos and Northern Sporades was the first designated marine park in Greece and is currently the largest in Europe. One of the most important protected animal in the area is the Mediterranean monk seal *Monachus monachus and its unique ecosystem).*

8) **Delta Nestou & Vistonida – Ismarida Lakes.** (The National Park includes the protected areas of wetlands D. Nestos Av. Vistonida, Av. Ismarida and the wider the area by land and water a total area of about 930,000 acres. The wetland complex of the National Park is one of the most important in Greece, due to the large surface area and high biological, aesthetic, scientific, geomorphological and pedagogical value. The purpose of the National Park is the effective protection of habitats and rare species of flora and fauna that inhabit and breed in the area. The Delta Management Body Nestos Vistonidas- Ismarida (F.D.) is a private legal entity, non-profit organization and was established in April 2003 by CMD of the Ministries of Environment, Agriculture and Development, as an established management body of the National Park of Eastern Macedonia and Thrace).

Pamvotis Lake National Park

Delta Nestou National Park

Amvrakikos Gulf wetlands

Parnitha Mt National Park

Figure 11. Protected areas in Greece are unique environmental sites with rich biodiversity.

9) **Parnon Mt. and Wetland of Moustos** (Mount Parnon was famous, from "the old times", for its extensive forests. Naturally, the long-term human presence has significantly altered the original character of the region, but the vegetation, the types of habitats and flora maintain even today, a high ecological value. In the region of Parnon Mt there are more than 15 of habitat types. Some of them are unique or particularly noteworthy for the Hellenic and European region, such as extensive woodlands of *Pinus nigra***,** forests with *Juniperous drupaceae*, the chestnut trees in Kastanitsa, the coastal wetland of Moustos, south of Astros, the ravine of Dafnonas**).**

10) **Pamvotis Lake** (Lake Pamvotida is the largest lake of Epirus, located in the central part of the city of Ioannina, in northern Greece. The lake is situated at 470 m elevation, south of the Mitsikeli mountains. It is fed by several small rivers. It has no surface outflow, but it is drained through karstic sinkholes towards the rivers Arachthos, Louros and Kalamas. In 1960 a tunnel and ditch were constructed that drain from the northern end of the lake to the river Kalamas).

11) **Amvrakikos Wetlands National Park** (The Amvrakikos wetlands form one of Greece's largest wetlands of International Importance, covering over 220 square km within the unique Amvrakikos embayment, on Greece's west coast. The area is also famous for a local monastery's unique ecotourism venture (Rodia Wetland Center). Sadly this protected-area has recently seen extensive degradation and severe impacts on wildlife, include an unusual human-wildlife conflict involving persecution of endangered birds such as Dalmatian Pelicans and Ferruginous Ducks. The issue is fishermen against fish-eating birds (especially the

increasing Great Cormorant populations), and the problem of dealing with hunting and poaching pressures, that has created serious tensions in this National Park recently).

12) **Kotychi & Strofylia Wetlands** (The Kotychi – Strofylia Wetlands National Park meanders along the coastal zone of the North-west Peloponnese from Araxos Lagoon down to Lehaina salt-marshes. It comprises significant habitats with rare species of flora and fauna, and rich natural beauty. The coexistence of all these natural and human activities in the area within raises major management challenges. Due to its exceptional geomorphology, spatial and natural features, this area can serve as both a shining example of harmonious coexistence between the wild nature, human activities and rational use of natural resources with beneficial results for residents, visitors and the natural environment).

13) **Northern Pindos National Park** (The protected area of Northern Pindos is one of the most important areas at both national and European levels. It combines natural and man-made environments and geographically unifies the pre-existing National Forests of Pindos (Valia Kalda) and Vikos-Aoos. The Pindos national park is rich in natural resources, with numerous religious and cultural monuments. The region brings together the development of traditional villages into centers of touristic attraction. The Northern Pindos National Park is the largest terrestrial National Park in our country, with an area of 2.000 km2, constituting unique ecologic and environmental values at national, European and global levels. The Vikos-Aoos and Pindos (Valia Calda) National Forests, are two out of the 11 areas of the EU-wide network of "Natura 2000" protected areas).

14) **Prespes Lakes National Park** (Great and Minor Prespe, Prespes lakes are important wetlands of Greece and Southern Europe with a very rich flora and fauna.The region was established as a National Park in 1974, and is the biggest park in Greece covering 256 square kilometers. In the Prespes lakes have been recorded 1400 plant species, 270 bird species, 46 mammals and 22 reptile species and a large number of fishes and insects. The lakes host an important breeding colony of Dalmatian and White Pelicans among other rare birds such as herons and Pygmy Cormorants).

15) **Ainos Mt. National Park (**The Ainos Mountain is the only National Park situated on a Greek Island of Kefalonia.The park stretches over 3,000 hectares and its highest peak is Megas Soros that reaches 1,628 m. The Park is unique (endemic) for the species of fir called *Abies Cephalonica* that grows at altitudes of 600-1,600 metres and covers ⅔ of the park's area. It is an impressive forest with the small semi-wild horses (*Equus caballus*). Mt. Ainos was first declared as a National Park in 1962 and houses the heart of Kefalonia's biodiversity).

16) **Olympos Mt. National Park** (Olympus is internationally known for its important ecological characteristics and natural beauty but also for its strong relationship with ancient Greek mythology. The importance of the National Park has been recognized not only in Greece and

Europe but all over the world. In 1981 UNESCO declared **"**Olympus a Biosphere Reserve**"**. The European Community has included Olympus in the list of "The Most Important Bird areas of the European Community". Mount Olympus is located on the border of Macedonia and Thessaly between the prefectures of Pieria and Larissa. The highest point of Mount Olympus, is Mytikas (2918 m)**.** Olympus Mt expands over approximately 500 km^2 and covers an essentially a circular area with a width of approximately 25 km and a circumference of 80 km. The Olympus National Park covers an area of 238,411,000 m^2).

17) **Samaria Gorge National Park** (White Mountains' National Park is the only national park in Crete. It centres around the Samariá gorge, at an altitude of 1,200m and continues down to Ayia Rouméli, on the shores of the Mediterranean Sea. Along with the surrounding slopes and a number of smaller gorges branching off from it, Samaria Gorge forms the whole of the area designated as a national park, a status that offers protection to over 450 species of plant and animal, 70 of which are endemic to Crete. The Samaria gorge is the longest in Europe (total length 16km), and one of the most impressive gorges in Greece. It starts from Xylóskalo, at an altitude of 1,230m. The width of the gorge is 150m at its widest point and 3m at its narrowest).

18) **Parnassos Mt. National Park** (Parnassos National Park was initially established in 1938 in order to protect its scenic beauty, by institutionalizing its core zone as protected area. In 1976 became a wildlife refuge "Asprochoma- Psilo- Prontoli – Kelari (Arachova)" In the years that followed, the European Union perceived the ecological, aesthetic and economic importance of habitats and of wild flora and fauna, thus creating the «Natura 2000» ecological network. One of the Directives that "Natura 2000" subjects to is the EU Birds Directive 79/409/EEC (which has been revised to 2009/147). This set of instructions describes the integration process of important birds' breeding areas and residences in protection status, called Special Protection Areas or SPAs. On Mt. Parnassos there has been institutionalized the SPA "Oros Parnassos" (GR 2410002), the largest part of which is supervised and protected by the Parnassos National Park's Management Body).

19) **Parnitha Mountain, National Park** (is located in central Greece and the highest mountain in the vicinity of Athens. In 1961 the entire mountain (25,000 hectares) was declared National Park. The mountain is covered with firforest, 90% by *Abies cephalonica* and the rest with *pinus halepensis*. The Parnitha National Park commands particular ecological interest and can constitute a reserve for the protection and preservation of Southern Greece's flora and fauna. The Parnitha flora is one of the richest in Greece, boasting 818 recorded plant species, certain among which are endemic or listed as critically endangered. The area's fauna includes many species protected under law both at national and international level. Indicative is the fact that Parnitha is the only area in Southern Greece where the red deer (*Cervus elaphus*) still survives. Parnitha's proximity to Athens, coupled with its great aesthetic and ecological importance is very important asset for Athens-Piraeus urban conurbation).

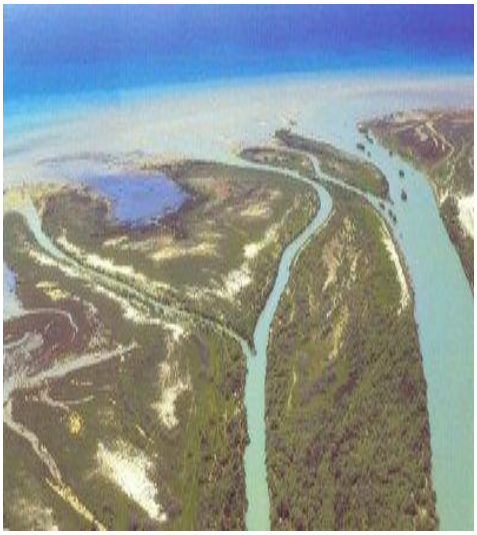
20) **Oiti Mountain National Park** (Oiti is kown as the mountain of flowers and of legendary hero Hercules. It is a mountain of unique beauty with fir forests, rare plant species, rish fauna and abundant waters with beautiful and steep gorges. It is located in the boundaries of the prefectures of Pthiotis and Phocis and its highest peak is Pyrgos (2,152 m). The management body of the national park was established by law 3044/2002).

21) **Helmos Mt. & Vouraikos Gorge** (The Helmos national park is 54,400 ha. It has been characterised as National Park through the implementation of the Special Environmental Study for the Chelmos Mt-Vouraikos Gorge area. The protected area consists of 4 sites of community importance (SCI, Natura 2000 areas). 1. Mount Chelmos Styx Waters, 2. Vouraikos Gorge, 3. Aesthetic Forest of Kalavryta, 4. Kastria Caves. It also includes the Special Protection Area on the Conservation of Wild Birds. The ecological value of the region's flora is immense. The fauna consist of large numbers of insects, amphibians, reptiles, birds and mammals).

22) **Rhodope Mountain. Range National Park** (North East Greece nearby the Greek – Bulgarian borders. Surface area**:** 173.150ha. Establishment of the park**:** 2009. Seven areas of the Rhodope Mountain Range National park have been integrated into the Natura 2000 network according to the Habitats Directive 92/43/EEC and the 2009/147/EC. Two SPA and five SCI, two areas have been characterized as Preserved Natural Monuments, seven areas as Wildlife Reserves according to the Greek law and three regions which have been characterized by the European Council as Biogenetic Stocks. Inside the Rodopi Mountain Range can be found a rich variety of ecosystems of the Balkan Peninsula. Almost 60% of the European species can be met here and this consist the main reason that the Rodopi Mountain Range is one of the most important regions of Europe.

23) **Kalamas River-Acherodas River & Estuary** (The national park is located in Northern Greece, in the Epirus region, the outfalls of the rivers Acherontas and Kalamas into the Ionian Sea together with the marsh of Kalodikiou form the National Park of Kalama-Acherontas Rivers. It is an area with unique aesthetic and ecological value, as well as historical as according to Greek mythology. The beautiful canyon that crosses the river Acheron with the steep slopes and dark green clear water is an area of exceptional biogeographical interest which contains remarkable habitats that host many rare or endangered species of fauna and flora. It is also an area with unique natural features, such as marshes, coves with dunes, magnificent coastal ecosystems with steep cliffs covered with pine forests, which provide to the area a distinct biological landscape and aesthetic value. The whole area has been declared by UNESCO as World Cultural Heritage).

Acherodas river



Kalamas river delta

24) **Karpathos & Saria Islands** (The Regional Marine Park of Northern Karpathos Saria and Astakidonision is located in the island of Karpathos and is managed by the Management Agency of Karpathos and Saria Protected Area. The Park covers 346 km2 of land and sea of North Karpathos, in the southern Aegean sea. This includes the corresponding Natura 2000 site, classified as a Special Protection Area and a Site of Community Importance according to the respective European directives (92/43/EC and 2009/147/EC). The area, due to its paleogeography, covers a variety of habitats and hosts rare and endemic species on a national and European level. In addition the surrounding sea has been identified as a habitat of the most endangered marine mammal of Europe, the Mediterranean monk seal (*Monachus monachus*). Furthermore the traditional villages of Olympos and Avlona, located in the hinterland of the Marine Park, contribute to the area's unique rural character).

25) **Karla – Mavrovounio – Kefalovrysso of Velestinou National Park** (Lake Karla, located in the Region of Thessaly, within the Pinios river basin, and adjacent to the mountains Pelion and Mavrovouni, occupied the lower depression plain of the region until the year 1962. The first name of the lake was Voivis **(**από Βοιβηίς έγινε Κάρλα), also the name of the nearby

ancient city, the area where today the village of Kanalia settles. Lake Karla was not only one of the most important wetlands in Greece, but also a natural reservoir, which provided very significant water storage, with more than 1,000,000 waterfowl hibernating in the lake's greater area. The basin surface runoff and the floodwaters of the Pinios river supplied it with great quantities of fresh water).

26) **Marine National Park of Zakynthos** (The first national park in the Mediterranean to protect sea turtles was established on the island of Zakynthos, Western Greece. The Marine Park encompasses the marine area of the Bay of Laganas, the sea turtle nesting beaches and a zone of land adjoining them, the wetland of Keri Lake and the two small islands of Strophadia, which are 50 miles south from the island of Zakynthos. It is worth noting that Greece is the only European country where the loggerhead sea turtles *Caretta caretta* nest, with Zakynthos being the most important nesting area in Mediterranean. This was the result of longstanding efforts made by NGOs, the Greek Government, the European Union, the Council of Europe (Bern Convention) and other concerned parties. The primary aim of the Park is to provide the appropriate nesting conditions for the most important known loggerhead (*Caretta caretta*) nesting population in the Mediterranean).

27) **Schinias National Park in Attiki** (The area of the national park encompasses 13.84 square km^2 and includes a wetland, a coastal pine forest, a freshwater spring, a peninsula, a hill and a magnificent bay and is the most important coastal ecosystem of Attica and belongs to the Natura 2000 network. The Park also includes the Olympic Rowing and Canoeing Center**.** The main element here is water and the wildlife that finds refuge here. At the National Park of Schinias one can encounter foxes, badgers, hedgehogs, rabbits, reptiles, turtles, frogs, 115 bird species with a potential diversity of 215 species while there are threatened species of freshwater fish, amphibians and reptiles).

The concept of the Management Authorities was that they would be private legal entities. The powers of the Management Authorities are such that they would not be able to intervene directly (e.g. policing) at a local level, but indirectly through other advising services such as the Forestry services who may manage these protected areas on a day-to-day basis. The Management Authority could advise but they would have no executive power. The funding of these Management Authorities were on a basis that the government would give an initial amount of money to set up the Management Authority and the Natura 2000 Strategy in the protected area, after that it was considered that the Management Authorities could be self financing, for example via funding from projects. The start up money was allowed for certain activities which did not involve setting up management plans or monitoring plans for the protected area. However, the way of funding the MAs, as far as their operational costs is concerned, has not been yet secured by the Greek State. The law also provided for a Committee to work at the national level that would coordinate all of the Management Authorities of protected areas. The National Committee is responsible for the coordination and evaluation of the Management Authorities, as well as for consulting the Minister of Environment for financial and technical support that the Greek state should provide the Management Authorities with. 6 representatives of six different Ministries, 6 academics and experts, 2 representatives of Environmental NGOs, and the President of the Committee (appointed by the Minister of Environment) constitute the Committee. Each member of the committee has his/her deputy.

Problems of Management and Status of Protected Areas in Greece

There are various articles and reviews in the scientific literature on the status and the problems of the protected areas system in Greece. In 2005, seven Non Governmental Organizations in Greece (NGOs) which are active in environmental protection and conservation compiled a brief report on the status of protected areas in Greece.[31]

The NGOs were: Archelon, Hellenic Ornithological Society, Hellenic Society for the Protection of Nature, Hellenic Society for the Protection of the Environment and Cultural Heritage, Mediterranean S.O.S. Network, MOm-Society for the Study and protection of Mediterranean Seal, and WWF Hellas (ΑΡΧΕΛΩΝ, Σύλλογος για την προστασία της θαλάσσιας χελώνας, Δίκτυο ΜΕΣΟΓΕΙΟΣ S.O.S., Ελληνική Ορνιθολογική Εταιρεία, Ελληνική Εταιρεία Προστασίας του Περιβάλλοντος και της Πολιτιστικής Κληρονομιάς, Ελληνική Εταιρεία Προστασίας της Φύσης , MOm – Εταιρεία για τη Μελέτη και Προστασία της Μεσογειακής Φώκιας, WWF Ελλάς: Αναφορά για την Κατάσταση του Συστήματος Προστατευόμενων Περιοχών στην Ελλάδα, Αθήνα, Μάιος 2005. The authors of the report can be contacted for additional information : Karavella D (WWF Greece), Gaethlich M (Hellenic Society for the Protection of Nature), Dimopoulos D (Hellenic Society for the Protection of the Environment and Cultural Heritage), Kappas X (Hellenic Ornithological Society).
[http://politics.wwf.gr/images/stories/docs/05may%20rpt-common%20ngos%20pas-gr.pdf].

The majority of issues addressed in this report were delivered in advance to the competent national authorities for the protection of protected areas from September 2004. The NGOs were concerned with the deterioration of natural habitats of protected areas and the conservation status. The 27 management bodies were established in 2002-2003 (Law 2742/1999) but initially they lacked both the funds and the political support to become operational. In the beginning, with the exception of 5 sites, the management bodies have been set up but they continue to lack a clear delineation of boundaries and zoning system with appropriate measures for each zone. De4spite the clear obligation to stipulate the Habitats Directives, Greece continued to lack and overall framework or binding policy for nature conservation. Adequate funding for conservation remains a big problem. The Greek government has utilized a variety of European funding sources (Structural Funds, Cohesion Funds, INTERREG, Leader, Life, etc) but the overall allocated budget for management bodies of protected areas has been minimal. The 3rd Community Support Framework (CSF) has been one the basic funding sources for the environment. In Greece only a disappointing 1,8% of the total CSF budget has been allocated to related activities. In 2002, the environmental NGOs presented to the Ministry specific priorities for actions in the conservation and management of protected areas (national strategy, conservation issues, status, etc) but the lack of political will and interest continued. The summarized conclusions of the report stated that at a national level the planning for protected areas is extremely problematic and they are concerned with the deterioration of the conservation status of specific sites. The financial support of management bodies with adequate funds is very important. The report had additional information for case studies Zakynthos and Koronea lake.

Protected Areas: Surveys, Reports and Papers on Perceptions, Monitoring and Conservation Issues

From the 1980s the problems of management, monitoring and conservation of natural landscape, mountains, lakes and forests in Greece were main issues of research, conference discussions among scientists of forestry, agricultural research and policy on environmental protection. Many scientists from the NAGREF (National Agricultural Research Foundation, ΕΘ.Ι.ΑΓ.Ε, Εθνικό Ίδρυμα Αγροτικής Έρευνας, Dr. Konstantinos Kassioumis, forestry expert was very prominent among the scientists in promoting the policy of national parks in Greece) published various papers on the subject. The papers in this section of the review are presented in chronological order.[32- 37]

National parks all over the world have always been used for recreation and tourist activity (e.g. Yellowstone Park, 1872). After 1945 scientists recognised the immense value of national parks as protected areas to tourism but also their significance for environmental conservation, sustainability of natural resources, development of rural environment, biological diversity and protection of plants and animals. The Vikos-Aoos national park in Greece and its environmental significance was used as a case study for management planning framework based on ecological importance and economic value.[38]

Another study investigated local people's perceptions on national parks. The Prespes lakes national park was used as an example (24 years after designation). Respondents were contacted by systematic sampling, which resulted in 201 cases for analysis. Poor knowledge of aims associated with education of people was revealed and the managing authority (the Forest Service) as source of information was mentioned in only one case. Forest recreation facilities and improvement of accessibility were considered of high priority, as means of possible tourism development of the area. A policy of non-intensive agriculture with compensation for loss of income, if the wetlands of the park were in danger, seems acceptable, younger ages accepting it more easily. The results of the study indicated that the information derived from such research could help managers of protected areas to resolve arising conflicts with the local people.[39]

The social, cultural and economic impacts of marine protected areas in the local communities in Greece were presented in a study of 2002 in comparison with existing data of cases in Spain, Italy and France. The study observed increased tourist activities in the marine protected areas (MPAs) of the Mediterranean Sea. The large increase of divers and boats and other activities had impacts on natural benthic communities as a result of mooring and the feeding of large fish by divers. Some MPAs promoted public awareness of these damages The researchers concluded that multidisciplinary approach and planning of MPAs should be conducted to inform the tourists and the local people and the management bodies must emphasize the social, cultural and economic impacts at the same time with conservation efforts of MPAs.[40]

Beriatos Elias (professor of University of Thessaly) has been active in the subjects of sustainable development and planning and the management of natural environment. In a

paper in 2003 presented how planning and management of protected areas becomes very important for natural environment. The paper referred to the situation of the network of protected areas in Greece giving special emphasis on the main problems and causes of malfunction and inefficiency characterizing this network. The paper presents a critical examination of the developments regarding the completion of the institutional framework and especially the scientific, technical and administrative procedures required for the establishment of the appropriate managing authorities of the most important protected natural areas. Also, the paper investigated the role of the main institutional and organizational components as well as the socio-political parameters, which have influenced these developments. Finally, there is an attempt to elaborate the strategic guidelines and priorities not only for the establishment but also for the assurance of a continuous and appropriate operation of these areas in the framework of the national environmental policy and the policy for spatial planning and development in Greece.[41,42]

Local people's perceptions in 32 communities neighbouring four Ramsar wetlands in northern Greece were the subject of a study in 2004. This research on the local residents' attitude regarding the ways of management and exploitation of the wetlands and their sociological features used opinion poll methodology (1600 questionnaires were distributed). The aim of this investigation was the evaluation of findings for planning of effective management and conservation policy of wetlands, incorporating the opinions of local residents. Further protection of the wetlands, awareness of local residents of the value of wetlands, tourism or agriculture development (in some cases), as well as more governmental support, became obvious results from this research.[43] Another paper examined the influence of visitors' profile, information sources, environmental dispositions, and visit evaluation on visitors' willingness to pay (WTP) for the National Marine Park of Zakynthos. Regarding WTP amounts pledged, parameters of visit evaluation were the most significant predictors. The estimated annual revenue that could be gained could cover the operating costs of the Protected Area Management Body. Visitor and visit characteristics were not significant determinants of visitor responses to the payment principle question, while they explained a relatively small amount of variation in the WTP. Greek visitors showed more signs of pro-environmental attitudes than foreign visitors.[44]

A paper addressed the public involvement and inter-sectoral coordination as major procedural elements of integrative management of the newly designated areas in Greece from the implementation of Natura 2000. Also, evaluated the nature and strength of their negative or positive influences on the fulfillment of an integrative vision of nature conservation. The analysis has shown that the selected network of Natura 2000 sites has been superimposed upon the existing system and resulted in duplication of administrative effort and related legislation. As a result the overall picture of protected areas in the country appears complex, confusing and fragmented. Major failures to integrated conservation perspective can be traced to structural causes rooted in politico-economic power structures of mainstream policy and in a rather limited political commitment to conservation. It is concluded

that greater realization of integrated conservation in Greece necessitates policy reforms related mainly to sectoral legal frameworks to promote environmentalism as well as an increased effort by the managing authorities to facilitate a broader framework of public dialogue and give local communities incentives to sustainably benefit from protected areas.[45]

A review in 2008 was published on the protected areas in Europe. The review covered the steps taken on the planning process and how it was applied in different regions of Europe. The findings of this study showed that there is a continuing mismatch between spatial resolution at which data coverage is adequate and that of habitat fragmentation. Quantitative goals for the representation and persistence of biodiversity were largely lacking. Assessment of the effectiveness of existing protected area systems is patchy and rather ill developed. Despite these problems there has been an extraordinary program to select additional protected areas and although it has taken longer than originally envisaged, this program is resulting in a substantial expansion of the protected area system. Finally, the study showed that there are significant concerns over the extent to which existing protected area systems can maintain their biodiversity values, particularly given the small size of many of these areas and likely impacts of climate change.[46]

A study in 2009 investigated the effectiveness of the Greek state's policy in protected areas. Researchers contacted 91 semi-structured interviews with state and non-state actors involved in the Greek conservation policy process towards protected areas and national parks. The study observed incomplete intelligence, ineffective promotion, irrational prescription and non-independent appraisal that led to a break down in implementation and to policy failure. Lack of clear goals, and divergences between stated and actual goals that led to bureaucratic interpretations of conservation objectives and distortion of decision processes in favour of satisfying economic and development interests. The scientists argued for the need of specific actions at both member state and European level and, in particular, the formulation of a conservation strategy as an official part of an integrated Greek conservation policy, and the establishment of independent institutions staffed by qualified reviewers to evaluate and monitor member states conservation policies.[47]

Perceptions and awareness of Greek citizens for protected areas were studied in 2010. The survey explored perceptions and awareness of citizens in the National Park of Eastern Macedonia and Thrace, the Wetland of Kalloni, and in the Lake Tavropou. The questionnaire asked for perceptions of individuals on environmental issues and alternative management scenarios, funding sources, and management schemes for the conservation of biodiversity. Differences between the three research areas were also explored. The results showed that citizens are in general supportive of protected areas and presented relatively high levels of knowledge of environmental issues, although active participation is limited. By exploring differences between the three research areas, it is revealed that the provision of information significantly influences individuals' perceptions on relevant issues. Also, a significant finding of the study is that citizens are supportive of some forms of participatory management.[48]

An important issue for environmental protection in Greece around the period of the Olympic Games (2004) was the Schinias wetland natural reserve. The area encompasses 13.84 square km and includes a wetland, a coastal pine forest, a freshwater spring, a peninsula, a hill and a magnificent bay and is the most important coastal ecosystem of Attica and belongs to the Natura 2000 network. The Park finally included the Olympic Rowing and Canoeing Center. Initially, the local communities resisted this idea and there were many protests. The scientists and environmentalists argued that area of Schinias is valuable for nature conservation education, environmental sensitization and outdoor for people living in the Attica region. The Olympic installations did not damage the area but offered many benefits. The national park if managed properly it could become, without a high cost, an attractive place for hundred of thousands nature lovers. They will find there a tasteful and functional space for mild activities such as hiking, cycling and swimming. Six years after the Games, mainly due to the physical changes made by the technical works, significant improvement of natural landscape has been achieved. In fact, the technical aspects of the project have proved to be reliable and, consequently, the environmental outcomes of the intervention in Schinias have proved to be very positive.[49-51]

A review in 2010 underlined Greece's importance for very important protected areas in Europe. Greece contains a wide diversity of landscapes, including mountains, Mediterranean scrub, oak woodlands, and freshwater and saltwater wetlands. The country's landscapes and geographical position underline Greece's importance for birds and other wildlife, both within the European Union and globally. Greece hosts a large proportion of the range-restricted Eleonora's falcon and is home to several species of birds found nowhere else in the European Union.[52]

An empirical survey in 2012 in National Parks of Greece in Eastern Macedonia and Thrace, explored the knowledge and perceptions of different interest groups concerning environmental issues, awareness and restrictions imposed my management framework and wiliness to pay as visitors. The designation and management of protected areas (PAs) is a challenging task significantly influenced by numerous parameters, both economic and social. In this paper, these issues are explored by means of an empirical survey in a PA of international importance in Greece. The results revealed a low level of awareness, indicating that further efforts should be conducted, both by the state and non-governmental organisations, to inform the local community and visitors about the existence of the PA and also the social and economic benefits resulting from its creation. The survey showed that the level of knowledge and perceptions of individuals about the national parks varies according to the social groups examined. Finally, individuals are willing to pay for the protection of the park, although there was also a high percentage of protest responses.[53]

A research group contacted an empirical survey, drawing on work conducted in two National Parks including river delta ecosystems designated as Ramsar wetlands in northern Greece, that examined local residents' perceptions of three hypothesized policy options (regulatory, market-based and participatory) for Park management. The findings of the study

revealed a high degree of importance attached by resident communities to Park designation in both Protected Areas, though residents' perceptions of the proposed management options varied. The regulatory option was regarded as the least restrictive, while the most restrictive was perceived to be the market-based option. However, greater benefits were identified by residents from the market-based option, while the fewest benefits were considered to arise from the proposed regulatory option. Furthermore, local residents' perceptions were significantly shaped by the proposed management and decision-making structure offered under each policy option.[54]

A large scale, cross level analysis for Greek Natura 2000 sites was contacted. The researchers investigated the nature and role of participation in Greek biodiversity governance by exploring general opinions as well site-specific opinions regarding 3 case studies of Natura sites. Meanwhile, the governance of protected areas has experienced rapid advancement over the last two decades with regard to the inclusion of stakeholders and local communities into the management process. The survey analyzed the results of 96 interviews, conducted with national, regional and local level stakeholders and 734 questionnaires conducted with local communities. Results indicated with non-significant difference among governance levels, or between case study sites, that stakeholders' participation exists mainly on paper whereas community participation is practically absent. Stakeholder engagement seems to take place through administrational documentation across levels and to be locally confined based mainly on personal contacts and initiatives. Interviewees and survey respondents indicated a preference towards improving stakeholders' participation and the community's engagement in the management of Natura 2000 sites. Overall, the results of this study revealed the urgent need for policy initiatives towards adopting meaningful, fair and collaborative two-way forms of participation through the development and implementation of facilitation, participation and engagement guidance and training programs.[55]

In 2014 scientists presented a study for the evaluation of the first co-management framework and performance that has been adopted and implemented in Greece over the last 10 years for the management of 28 protected areas. The study was conducted via a questionnaire dealing with issues of financing and administration, environmental management and guarding, and connection with the local community. Decentralization of the power of management requires capacity building locally and active involvement of the local community; these have been addressed and achieved only to a limited degree. Most importantly, the support and commitment to conservation of state actors were often missing. Funding discontinuities, delays in responding to needs associated with biodiversity monitoring and protection and inefficient guarding were the major problems resulting from the inadequacies detected. Despite its weaknesses, the co-management framework contributed considerably to the conservation of environmental values of Greece.[56]

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πληροφορίες και χάρτες εξάπλωσης σε εθνικό ή κοινοτικό επίπεδο για την εξάπλωση, την κατάσταση, και τις τάσεις των οικότοπων και ειδών που περιλαμβάνονται στα παραρτήματα της Οδηγίας των Οικότοπων.

19. **The IUCN Red List of Threatened Species** http://www.iucnredlist.org/ περιγραφικές πληροφορίες και χάρτες εξάπλωσης για όλα τα είδη φυτών και ζώων που χαρακτηρίζονται ως απειλούμενα με εξαφάνιση. Online Information for Large **Carnivores in Europe** http://www.kora.ch/sp-ois/πληθυσμιακά δεδομένα, χάρτες εξάπλωσης και τάσεις για τα μεγάλα σαρκοφάγα της Ευρώπης λύγκα, αρκούδα και λύκο, με στοιχεία και για την Ελλάδα.
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22. **Fresh Water Ecoregions Of the World** (FEOW) http://www.feow.org/ χάρτες, βάση δεδομένων και GIS δεδομένα σχετικά με τη βιοποικιλότητα των υγρότοπων (λίμνες, ποτάμια, έλη, λιμνοθάλασσες κλπ) σε επίπεδο οικοπεριοχής (στην Ελλάδα αναγνωρίζονται 7 διαφορετικές). Για κάθε οικοπεριοχή σταδιακά προστίθεται περιγραφή και πληροφορίες σχετικά με τον αριθμό ειδών, τον ενδημισμό, και τις απειλές.
23. **Δάση**. **Τήλαφος** http://tilaphos.blogspot.com/ Ιστολόγιο κοινωνικών και περιβαλλοντικών πληροφοριών και εξειδικευμένες ιστοσελίδες
    Τήλαφος-αναδασωτέα http://tilaphos-reforest.blogspot.com/
    Τήλαφος-φωτιές http://tilaphos-fires.blogspot.com/
24. **European Forest Institute** http://www.efi.int/portal/virtual_library/ βάσεις δεδομένων και χάρτες σχετικοί με τα δάση της Ευρώπης.
25. **European Forest Portal** http://forestportal.efi.int/ πύλη για τα δάση της Ευρώπης με περιγραφική και χωρική πληροφορία.
26. **Θαλάσσια οικοσυστήματα. Ελληνικό Κέντρο θαλασσίων Ερευνών, ΠΟΣΕΙΔΩΝ, [**http://www.poseidon.hcmr.gr/index_gr.php] , Σύστημα παρακολού-θησης,πρόγνωσης και πληροφοριών για την κατάσταση των ελληνικών θαλασσών (Monitoring, forecasting, information system of the Greek Seas) , http://www.poseidon.hcmr.gr/ecological_forecast_gr.php