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CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

**Bern Convention Group of Experts
on European Island Biological Diversity**

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**Groupe d'experts de la Convention de Berne
sur la Diversité biologique des Iles européennes**

Svalbard, Norway, (26-27 July 2010)

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Svalbard, Norvège (26-27 juillet 2010)

**COMPILATION OF NATIONAL REPORTS
ON ACTIVITIES RELATED TO
EUROPEAN ISLAND BIOLOGICAL DIVERSITY**

*Document prepared by
the Directorate of Culture and of Cultural and Natural Heritage*

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1. CROATIA / CROATIE

WRITTEN CONTRIBUTION ON ISLAND BIODIVERSITY IN CROATIA FOR THE 2ND MEETING OF THE BERN CONVENTION GROUP OF EXPERTS ON EUROPEAN ISLAND BIOLOGICAL DIVERSITY, SWALBARD (NORWAY), 26-29 JULY 2010

Prepared by the State Institute for Nature Protection and the Ministry of Culture, Nature Protection Directorate, July 2010

General characteristics

Even though Croatia is not an island state, it has 1 185 islands which are geographically classified into 718 islands, 389 islets (peak above sea level) and 78 reefs (peak below sea level). They all together represent just 5.8% of the Croatian territory, but they make up about 70% of the total Croatian coastline. Only 47 islands are inhabited, while 100 islands are considered to be occasionally inhabited. The 30 largest Croatian islands cover as much as 92.2% of the total island area. The largest islands are Krk and Cres (405.78 km²).

Biodiversity and endemism

Plant species richness for all Croatian islands has been estimated to 1807 plant species on the basis of floristic study of 106 Croatian islands (Nikolić et al. 2008). On these islands there were 89 circum-Adriatic endemic and 35 narrow endemic plant taxa recorded. Some of the narrow endemics include taxa from genera *Asperula*, *Brassica*, *Centaurea*, *Limonium* etc. which are mostly confined to South-east Adriatic islets.

Regarding the vertebrate fauna, almost 200 species inhabit Croatian islands (Tvrtković (ed.) 1997). Of the mammals especially interesting is the only island population of European mole (*Talpa* cf. *europaea*), which was found on the island of Cres and is considered to belong to a discrete taxon. It is classified as Endangered in Red Book of Mammals of Croatia (Tvrtković (ed.) 2006).

Croatian islands present important nesting place for many endangered bird species as Cory's Shearwater (*Calonectris diomedea*), Eleonora's Falcon (*Falco eleonora*), Griffon Vulture (*Gyps fulvus*), Audouin's Gull (*Larus audouinii*) and Little Tern (*Sterna albifrons*).

Among reptiles, the most interesting are 13 endemic taxa of Dalmatian wall lizard (*Podarcis melliselensis*), each restricted to a single island.

Invertebrates as a whole are poorly researched in Croatia. Although data on some groups of invertebrates on particular islands exist, general surveys on all Croatian islands have not been conducted yet.

Threats and problems

Main threats and problems on Croatian islands include: littoralization (concentration of economic activities and population along the coast), lack of integrated coastal zone planning and management, illegal building, tourism and urban development (including infrastructure and recreational activities), depopulation (the most prominent process on some islands), land abandoning (abandoning of traditional extensive grazing and mowing), unsustainable fishing, poaching, inadequate use of speleological objects, untreated waste waters, fires etc. Invasive alien species (IAS) also present one of the major threats to islands' biodiversity. Silver-leaved nightshade (*Solanum elaeagnifolium* Cav.) on the island of Plavnik, eastern mosquitofish (*Gambusia holbrooki*) in ponds of several islands, small Indian mongoose (*Herpestes auropunctatus*) on some Dalmatian islands and wild boar (*Sus scrofa*), fallow deer (*Dama dama*) and mouflon (*Ovis aries musimon*) which have been introduced to some islands as game species represent just some of the most prominent IAS problems on Croatian

islands. Furthermore, two invasive algae of the genus *Caulerpa* have been found in the Croatian part of the Adriatic Sea: *Caulerpa taxifolia* and *Caulerpa racemosa*.

Protection of island biodiversity

Legislation

The Regulation on Protected Coastal Area Development and Conservation (Official Gazette 128/04) defines 'protected coastal area' consisting of all the islands and a 1 000m wide mainland and a 300m wide marine belt measured from the coastline, which stands for tidal wave line on the coast.

The Islands Act (Official Gazette Nos. 34/99, 149/99, 32/02, 33/06) prohibits the introduction and breeding of alien game species, which do not inhabit the island naturally.

The Nature Protection Act (Official Gazette Nos. 70/05 and 139/08) does not address island biodiversity as a separate subject, but regulates the protection of species and habitats, as well as the protection and use of natural assets.

In the Strategy and Action Plan for the Protection of Biological and Landscape Diversity of the Republic of Croatia (Official Gazette No. 143/08) the following action plans specifically address the island biodiversity issues:

- Protection of ecosystems and habitats - Establish and implement protection of habitats on islands hosting endemic taxa and/or on nesting sites, resting places during migration, sand beaches, ponds and springs.
- Elimination of invasive species - Scientifically determine the population count of introduced game on the islands, develop and implement elimination programmes.

The Ordinance on Proclamation of Wild Taxa as Protected and Strictly Protected (Official Gazette No. 99/09) and the Ordinance on the Sorts of Habitat Types, Habitat Map, Endangered and Rare Habitat Types as well as Safeguard Measures for Conservation of Habitat Types (Official Gazette No. 119/09) contain the lists of protected species and habitats.

The Regulation on Proclamation of the Ecological Network (Official Gazette No. 109/07) established the Croatian Ecological Network on the 47% of the land and 39% of the marine territory. Ecological Network covers 86,88% of the total island area in Croatia.

On the COP9 of the Convention on Biological Diversity in 2008, the Republic of Croatia committed to GLISPA Partnership that brings together island nations and nations with islands to ensure the conservation and sustainable livelihoods on islands.

Croatia is also dealing with the island biodiversity issues in the scope of the activities and incentives under the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) (Barcelona, 1976, 1995) and the appertaining Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, 1995).

Action plan for eradication of wild boar (*Sus scrofa*) on the islands of Krk and Cres has been prepared in the May 2010 under the coordination of Center for the sustainable development of north Adriatic islands. This document is non-legally binding.

Protected areas

There are three National parks on islands (IUCN category II; Brijuni, Kornati, Mljet) and two island Nature parks (IUCN category V; Telašćica and Lastovo Archipelago), which consist of land territory and the adjacent sea.

Process of the permanent protection of the Lošinj-Cres archipelago as a Regional park (IUCN category V) is ongoing, since this area has been identified as one of the critical habitats for bottlenose dolphins (*Tursiops truncatus*) in the eastern Adriatic.

Croatian Ecological Network

Croatian Ecological Network was proclaimed in 2007 in accordance with the Nature Protection Act, with defined areas of national and international importance. It includes Areas important for wild taxa (except birds) and habitats, which correspond to NATURA 2000 proposed Sites of Community Importance (pSCIs), and Areas internationally important for birds, which correspond to NATURA 2000 Special Protection Areas (SPAs).

Areas important for wild taxa (except birds) and habitats comprise in total 27.49% of the island territory in Croatia while areas internationally important for birds cover as much as 81.26% of the island territory in Croatia.

Ongoing and planned projects

Project Blue Corridor

As a part of a large-scale Conservation planning project initiated by World Wildlife Fund for Nature (WWF) 12 hot spot marine biodiversity areas for conservation in the Mediterranean region have been identified. One of 12 sites is in the Adriatic Sea, Dalmatian coast and represents a 'blue corridor' for biodiversity conservation, which specifically recognizes islands Svetac, Brusnik, Biševo, Vis, Lastovo, Mljet, Sušac and Jabuka pit. WWF and Sunce (non-government organization from Split, Croatia) are advocating implementation of the 'blue corridor' project that would help establish an MPA network in the Adriatic Sea.

Project COAST

The main goal of the UNDP/GEF project Conservation and Sustainable Use of Biodiversity in the Dalmatian Coast through Greening Coastal Development (COAST) is to ensure that the development path of the Croatian Coast is environmentally friendly, with the conservation of landscape and biological diversity central to that development path. Project areas are four Dalmatian counties rich with biological and landscape diversity, including the following islands: Pag, Mljet, Vis, Biševo, Svetac, Jabuka, Brusnik and Palagruža, identified as of national, Mediterranean and global values. The project is to remove barriers to mainstreaming and implementing environmentally friendly practices of the key economic sectors in Dalmatia: tourism, fisheries, mariculture, agriculture and banking/finance.

The project results so far are: inventory of fauna, inventory and mapping of flora, habitat mapping, inventory of coastal fisheries resources and recommendations for sustainable coastal fisheries in Vis aquatorium, creation of the technical/expert basis as prerequisites for management of the Biševo and SE Vis marine areas as a part of the Croatian Ecological Network. In the year 2008 the book "The flora of Adriatic coast and islands" has been published, also in the frames of COAST project.

Identification and setting-up of the marine part of Natura 2000 network in Croatia - Marine NATURA 2000 Republic of Croatia

This project aims at the identification of the marine part of NATURA 2000 network with the main goal – detailed program of work for finalizing marine NATURA 2000. This programme of work is to be prepared through consultations with relevant stakeholders and scientific community and will also contribute to further development of the national biodiversity monitoring system through capacity building for the inventorying of marine biodiversity and monitoring and reporting according to provisions of Habitats Directive. The project should start in autumn 2010.

WWF Thousand islands - Contribution to the implementation of NATURA 2000 in Croatia

As a follow up project of PHARE 2005 (Implementation of NATURA 2000 in Croatia) - The consultation process launched by the PHARE project was very successful but incomplete in a sense that it did not address the relevant sectors that take part in management and use of the sea (fisheries, maritime transportation, tourism, energy, etc.). The proposed project will assist the SINP in extending the NATURA 2000 consultation process to all public and private groups that have an interest in the management and use of marine resources and areas, in order to prepare the ground for the future effective management of the identified marine NATURA 2000 sites. The improvement of scientific

knowledge on relevant marine biodiversity features provided by the IPA project should be coupled with a consultation process with all groups that have an interest and stake in the management of marine areas and resources (e.g. Ministry of Agriculture, fishery sector, etc.), both at national and county level.

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem - Pilot-project for Croatian marine protected areas (MedPan)

The aim of the project is to enlarge effectiveness of biodiversity conservation of valuable coastal and marine areas by creating coherent network of protected marine areas and development of management plans for selected marine parks: national parks Kornati, Mljet and Brijuni, as well as nature parks Telašćica and Lastovo archipelago.

Croatia Nature Protection Investment Project (NPIP)

Project aims to support preparations of Croatia for entering the European Union in the segment of nature protection. The main aim of the project is to support establishment and implementation of NATURA 2000 network. It is going to encompass investments in the ecological network, investments in local community to raise nature protection and revitalization of rural areas as well as institutional capacity building.

Improved marine protected area system in Republic of Croatia for better conservation of globally important biodiversity reservoirs and maintenance of carbon pools

The main project goal is to enable sustainable conservation of marine biodiversity through supporting capacity building of protected areas and regional/local public institutions located at targeted pilot sites (Brijuni area, Kornati and Telašćica area, nature park Lastovo Archipelago, Mljet area). This will enable them to effectively mitigate and monitor human impact and climate change risks, as well as raise awareness on the importance of Posidonia meadows among developing (economic) sectors and local community.

2. FRANCE / FRANCE

Contribution de la France



BIODIVERSITE DES ILES FRANCAISES METROPOLITAINES. BILAN ET PERSPECTIVES Bernard RECORBET¹ et Jean Philippe SIBLET²

RESUME

La France métropolitaine compte un nombre très important d'îles et d'îlots (près de 1300) situés pour un part importante en Bretagne et en Méditerranée, la Corse représentant à elle seule plus de 90% des surfaces insulaires françaises de métropole.

La biodiversité de ces îles est particulièrement remarquable et est mise en évidence par de nombreux outils d'inventaires et de protections :

- l'inventaire de Zones Naturelles d'Intérêt Ecologique Faunistique et Floristique (ZNIEFF). 80% des îles françaises sont couvertes pour cet inventaire ;
- Natura 2000 : 10% des surfaces couvertes par ce dispositif sont des îles ;
- Les parcs naturels régionaux : la Corse et la Bretagnes sont concernées
- Les parcs nationaux : Port Cros
- Les parcs marins (l'Iroise)
- Les réserves naturelles : 15 concernent en tout ou partie des îles
- Les arrêtés préfectoraux de biotope : 67 concernent en tout ou partie des îles

Il faut souligner le rôle particulier joué par le Conservatoire des Espaces Littoraux et de Rivages Lacustres dont la vocation est d'acheter des terrains pour les soustraire aux aménagements et à la spéculation foncière. Cet organisme à acquis, depuis sa création en 1975, près de 21000 hectares sur des îles.

Le rôle des conservatoires botaniques nationaux est également très important et porte principalement sur des actions d'acquisition de la connaissance sur la flore, avec un point focal sur la flore remarquable, un travail de veille/sensibilisation sur les espèces exotiques envahissantes et enfin un travail de recensement et de cartographie des habitats.

D'autres outils tels que les réserves de biosphère du programme MAB, les zones humides « RAMSAR », le parc international des Bouches de Bonifacio en Corse, le sanctuaire PELAGOS pour les cétacés en Méditerranée.... viennent compléter le dispositif.

La biodiversité de ces îles est fragile et elle est menacée par différents facteurs dont deux font l'objet de développements particuliers :

- les espèces exotiques envahissantes. Ce problème est particulièrement inquiétant en milieu insulaire et le rapport fait la synthèse des actions de contrôle, d'éradication et de suivis qui sont actuellement mise en œuvre sur les îles françaises ;

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- les impacts du réchauffement climatiques.

Face à ces menaces le constat de la nécessité de renforcer la protection de la biodiversité insulaire est posé, en accord d'ailleurs avec les politiques issues du Grenelle de l'environnement : stratégies de création d'aires protégées, trame verte et bleue, atlas de la biodiversité communale ou ou plus anciennes tels que les plans nationaux d'action.

Pour les Bouches de Bonifacio, site écologique particulièrement riche, les ministres italien et français ont signé le en juin 2010 à Palau (Sardaigne) deux déclarations, l'une relative à la création du parc marin international des Bouches de Bonifacio et l'autre relative à une demande à l'ONU d'interdire le passage dans les Bouches de Bonifacio des navires transportant des marchandises dangereuses. Dans l'attente de cette interdiction, ils ont transmis à l' Organisation Maritime Internationale le 25 juin dernier une demande de désignation des Bouches de Bonifacio comme Zone Maritime particulièrement Vulnérable (ZMPV).

A l'avenir plusieurs piste d'études et d'actions sont à mettre en œuvre telles que :

- l'étude des conséquences du développement du tourisme
- l'approfondissement des connaissances sur les invertébrés
- l'étude des conséquences des changements climatiques sur les espèces endémiques
- les conséquences du développement des énergies renouvelables sur la biodiversité insulaire.

Et un certain nombre de mesures spécifiques à la Corse qui concentre de nombreux enjeux du fait de son taux d'endémisme élevé :

- créer au moins 2 réserves naturelles en montagne ; si le littoral constitue un espace particulièrement sensible et menacé par les activités touristiques, les zones de montagne insulaires soumises à une pression touristique croissante et jusque là épargnées sont à surveiller, en Corse en particulier.
- consolider le réseau des réserves sur le littoral, au Cap Corse et entre le golfe de Porto (aire du site du patrimoine mondial) et Calvi.
- -délimiter de toute urgence le Domaine Publique Maritime sur l'ensemble des plages et arrières plages, lieux d'enjeux de conservation très importants , afin de mettre en place une gestion réelle des formations végétales associées (*Anchusa crispa*, *Linaria flava*, *susp. Sardoia*, *Limonium strictissimum*, *Euphorbia peplis*, etc...)
- - renforcer la réglementation et les contrôles sur l'introduction d'espèces exogènes à la Corse.

SUMMARY

There is an important number of Island and Islets in Metropolitan France (almost 1300), principally situated in Brittany and Mediterranean Sea. Corsica count for more than 90% of this superficies of French metropolitan island.

The island biodiversity is specially important and covered by numerous assessments and protection tools :

- Natural Areas of Ecological, Faunistical and Floristical Interest (ZNIIEFF) census. 80 of the French islands are covered by this assesement ;

- Natura 2000 : 10% of the French sites are situated on islands ;
- Regional Naturel Parks: Corsica and Brittany
- National Parks : Port Cros
- Marine Parks (l'Iroise)
- Natural Reserves : 15 are situated on islands
- Biotop Prefectoral : 67 are situated on islands

We should mention the particular task of the Costline Spaces Conservatory who buy in order to protect them from urbanisation plans. Since 1975, this institution have bought approximately 21000 hectares on islands.

The National Botanical Conservatories job is also very important. They manage botanical surveys with special interest on rare and threatened plants, monitoring on invasive species, and habitats mapping.

Other tools like Biosphere Reserves (MAB project), RAMSAR wetlands, International Park of Bonifacio Mouths in Corsica, PELAGOS cetacean sanctuary in Mediterranean sea.... Are involved on island biodiversity protection.

Island biodiversity is sensitive and threatened by several factors including two which are specially discussed :

- Invasive species. This is a specially frightening problem for island ecosystems. This report make a synthesis on regulation, eradication ans monitoring actions actually conducted in french islands ;
- Climate change impacts.

Facing these threats, it seems necessary to reinforces island biodiversity protection. Some plans are already in action, following the "Grenelle of environnement" like : protectect areas creation strategy, Green and Blue framework, communal biodiversity atlas, and some more ancient like species national action plans.

For the Mouths of Bonifacio, particularly rich ecological site, the ministers Italian and French signed in June 2010 in Palau (Sardinia) two declarations, the one relating one to the creation of the international marine park of the Mouths of Bonifacio and the other relative one to a request with UNO to prohibit the passage in the Mouths of Bonifacio the ships carrying dangerous goods. In waiting of this prohibition, they transmitted to the Maritime Organization International last on June 25 a request for designation of the Mouths of Bonifacio like Maritime Zone Particularly Vulnerable (MZPV)

Some studies and actions could be explored for the future :

- impacts of tourism on biodiversity ;
- studies on invertebrates ;

- Impact of climate change on endemics species
- Impact of « green energy » on island biodiversity

And specific measures in Corsica who concentrates many stakes because a rate of high endemism :

- to create at least 2 natural reserves in mountain; if the littoral constitutes a space particularly sensitive and threatened by the tourist activities, the insular mountainous areas subjected to an increasing tourist pressure and until saved there are to be supervised, in Corsica in particular.
- to consolidate the network of the reserves on the littoral, in the Corsica Cape and between the gulf of Porto (surface of the site of the world heritage) and Calvi. ·
- - to urgently delimit the Maritime Domain Public on the whole of the beaches and back beaches, places of very important stakes of conservation, in order to set up a real management of the associated vegetation formations (*Anchusa crispa*, *Linaria flava*, *susp. Sardoia*, *Limonium strictissimum*, *Euphorbia peplis*, etc...) ·
- to reinforce the regulation and controls on the introduction of exogenic species to Corsica ·

3. IRELAND / IRLANDE

ISLAND BIODIVERSITY IN IRELAND

Background

Ireland's biodiversity is a product of its glacial history, complex geology and oceanic climate coupled with a long history of human influence. Owing to geographic isolation, Ireland has a depauperate flora and fauna by European standards, with few endemics (table 1). However, the mild, wet climate and relatively unpolluted atmosphere mean that many of the habitats in Ireland are of international importance (e.g. machair, turloughs, raised bogs, limestone pavement) due to their scarcity and the unique species communities found on them (e.g. species characteristic of alpine and Mediterranean communities co-occurring in the Burren; species-rich Atlantic bryophyte communities in the south-west; hepatic mat communities in the uplands).

Table 1 – Species diversity for major groups, in Ireland.

Taxonomic Group	Approximate number of species	Number of legally protected species
Vascular plants	c. 900 native; c. 1,108 established aliens	68
Bryophytes	c. 584 mosses; 228 liverworts; 3 hornworts	19
Algae	700-1,000 freshwater; 579 marine	4
Lichens	c. 1,000	1
Lichenicolous fungi	150	
Fungi	>3,500	
Mammals	c.35 terrestrial; 2 seals; 24 cetaceans	26 terrestrial+ all seals & cetaceans
Birds	c.450 observed	All
Reptiles	2; 1 turtle, but 3 others occasionally observed	1 + all turtles
Amphibians	3	3
Freshwater fish	28	11
Invertebrates	c.18,107 documented	8

Ireland is an important staging post and destination for migratory birds of conservation importance (e.g. Greenland White-fronted Geese (*Anser albifrons flavirostris*), and holds significant populations of birds rare elsewhere in Europe as well as internationally important wetland bird communities.

Much of Ireland's biodiversity is in the marine environment, with important cetacean populations, cold water coral communities and many species at the northern or southern limit of their distributional range.

The 'All-Island' approach to biodiversity conservation is important in Ireland, as species and habitats do not observe political boundaries. Many projects are run as a co-operation between the National Parks and Wildlife Service (of the Department of the Environment, Heritage and Local Government) in the Republic of Ireland, and the Northern Ireland Environment Agency.

Endemism

Ireland would have been rendered almost sterile biologically during the last glacial maximum, and virtually all of the island's species have colonised since the ice retreated (c. 10,000BP). As a result Ireland has much lower rates of endemism than would be expected on an island. However, there is increasing genetic evidence that some species may have survived the last glaciation *in situ*, and it is in these species that we primarily see some endemism (e.g. Irish Hare (*Lepus timidus hibernicus*), Killarney Shad (*Alosa fallax killarnensis*), Arctic charr species complex (*Salvelinus alpinus* agg.)). Endemic plant species are also found in the speciose Hawkweed (*Hieracium*), Dandelion (*Taraxacum*), Bramble (*Rubus*) and Whitebeam (*Sorbus*) genera. An endemic variety of Bumblebee (*Bombus muscorum* var. *allenellus*) is found on the offshore Aran Islands. The sea anemone (*Edwardsia delapii*) is an example of a marine endemic.

An unusual feature of some Irish species is the breadth of niche occupied here, the depauperate biota meaning that competition with con-generic species is often limited or even absent. For example the white-clawed crayfish (*Austropotamobius pallipes*), the only crayfish species in Ireland, occurs in

both rivers and lakes here, but elsewhere in its range is limited to rivers. Similarly the common frog (*Rana temporaria*) is the only frog species in Ireland and occurs from sea-level to mountain tops. Elsewhere in its range, where this frog competes with several other frog species, this frog occupies a more confined niche.

State of Ireland’s Biodiversity

A recent comprehensive assessment of the conservation status within Ireland for the species and habitats listed on the EU Habitats Directive [92/43/EEC] showed that the majority of the island’s important habitats have an unfavourable conservation status, including raised and blanket bogs, dune systems, fens and mires, natural grasslands and woodlands (figure 1). Many protected species have a moderately satisfactory status but some, particularly those that occur in wetland and aquatic environments, are also reported to be of bad conservation status, such as the Atlantic salmon and freshwater pearl mussel (figure 2).

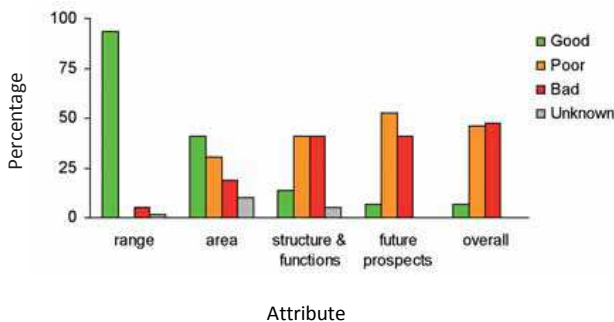


Figure 1 - Summary of conservation status for all Irish Habitats Directive habitats

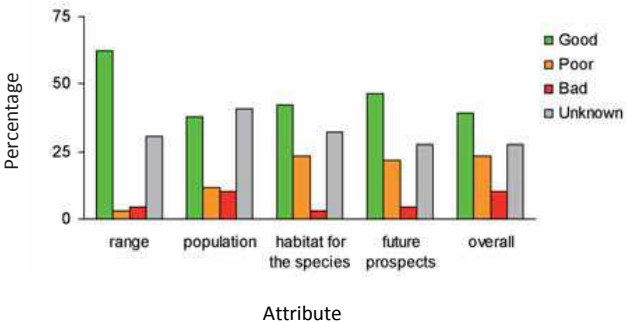


Figure 2 - Summary of conservation status for all Irish Habitats Directive species

These results can be taken as an indicator of the status of Ireland’s biodiversity in general, as Habitats Directive listed habitats and species are found throughout Ireland, and cover most of Ireland’s biodiversity hotspots. Indeed, the assessment is backed up by recent IUCN regional red list assessments for water beetles and non-marine molluscs, which also show that a relatively high percentage of wetland species are threatened.

The list of Birds of Conservation Concern for Ireland, which assesses species using a system similar to the IUCN, places 25 species on the red list (i.e. of most conservation concern), 85 on the amber list, with only 89 on the least concern green list. However, there is also evidence that many of the more common breeding birds in Ireland have fared quite well over the last ten years (figure 3).

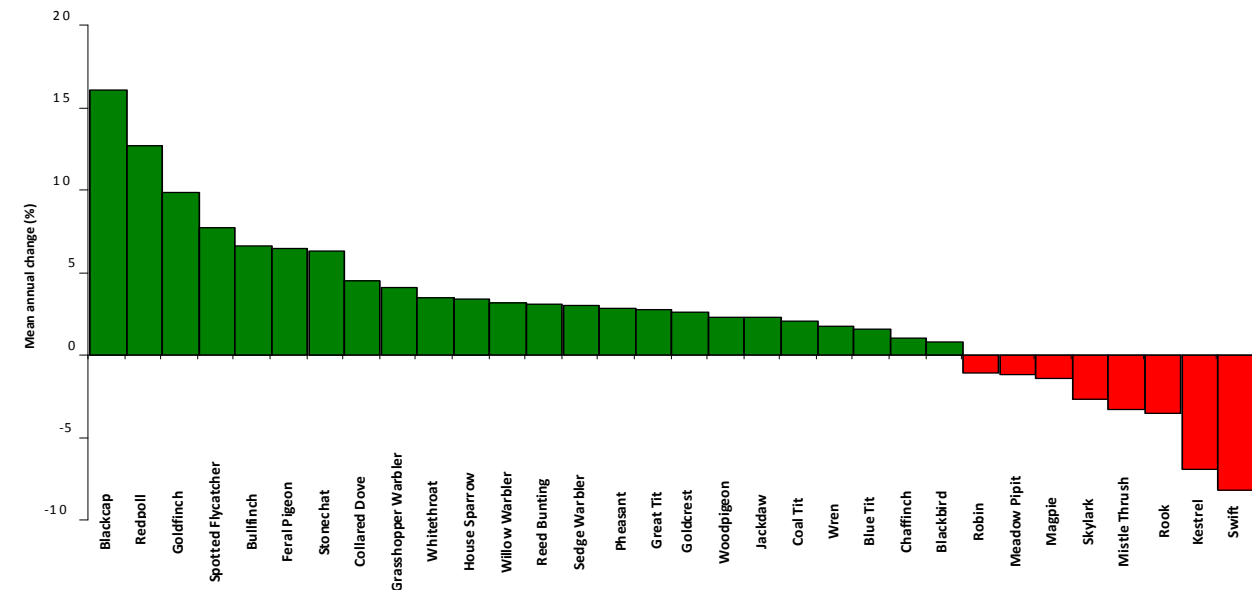


Figure 3 - Annual percentage change of selected countryside birds 1998-2007

Economic benefits of biodiversity

A recent study to identify the nature and scale of the benefits that Irish society derives from biodiversity presented an assessment of the benefits of selected ecosystem services in the principal social and economic sectors (Table 2). Based on a preliminary estimate, the value of Ireland's ecosystem services in terms of their productive output and human utility to be over €2.6 billion per annum. This estimate omits other significant services including waste assimilation provided by aquatic biodiversity and benefits to human health.

Policy costs are estimated to be €370m per year, but only a proportion of these are truly incurred on protecting biodiversity. For example, the National Parks and Wildlife Service spends around €35m per year directly on biodiversity protection.

Table 2 – Policy costs and likely benefit values of ecosystem services in Ireland, listed by sector.

Sector	Policy costs (per annum)	Value (per annum)	Comments
Agriculture	€180 mill.	€1,200 mill.	Potentially significantly greater benefits from more sustainable agriculture
Forestry	€15 mill.	€55 mill.	Non-market benefits increasingly being recognised
Marine	€30 mill.	€230 mill.	Potentially significantly greater benefits from more sustainable resource management.
Human welfare	€260 mill.	€920 mill.	Selected benefits only
Health	Negligible	Unknown	Probably tens of millions
Water quality	€65 mill.		Catchment management expenditure likely to increase
Roads (mitigation)	€40 mill.		

Threats

Ireland has experienced nearly a century of commercial afforestation, some 40 years of agricultural intensification and a decade of economic boom, which has put extreme pressure on its native biodiversity. The key threats to Ireland's biodiversity have been identified as:

- Direct damage, such as peat cutting, drainage and infilling; buildings and infrastructure; reclamation of wetlands such as bogs and fens; and removal of sand and gravel.
- Over-grazing and under-grazing of grasslands, peatlands, and coastal habitats.
- Pollution of both surface water and groundwater by nutrients or silt.
- Unsustainable exploitation of water, sand, peat, fish and other natural goods and services.
- Invasion by alien species of plants and animals.
- Recreational pressure in areas which were previously undisturbed.

Additional pressures on a number of species and habitats are likely to arise if Ireland undergoes climatic changes according to predictions.

Conservation measures

Biodiversity in Ireland is protected by national legislation (in particular the Wildlife Act, 1976, Wildlife (Amendment) Act, 2000, Flora (Protection) Order, 1999 and Whale Fisheries Act, 1937), EU directives (in particular the Birds Directive [79/409/EEC], Habitats Directive [92/43/EEC] and Water Framework Directive [2000/60/EC]) and numerous international agreements (e.g. CITES, CBD, RAMSAR, Bern Convention, Convention on Migratory Species, OSPAR).

Biodiversity areas are protected by several designations, primarily Special Areas of Conservation (423 sites), Special Protection Areas (147 sites) and Natural Heritage Areas (148 sites designated; 600 sites under consideration). State owned lands are designated as National Parks (6 sites) and Nature Reserves (78 sites).

Conservation management plans are in preparation for designated areas. In addition, agri-environmental schemes and native woodland schemes have been available for land managers to sign up to. An active programme of bog acquisition is underway, with the ultimate aim of reducing or eliminating turf-cutting, and expanding the programme of bog restoration.

Extensive species and habitat monitoring programmes are underway. In 2010 the primary focus is on grasslands, uplands, turloughs, juniper scrub, limestone pavement, sea cliffs, various rare bryophytes, various birds species, the otter (*Lutra lutra*), frog (*Rana temporaria*) and freshwater pearl mussel (*Margaritifera margaritifera*).

A key goal of Ireland's National Biodiversity Plan is to integrate biodiversity concerns into all sectoral activities, and to increase public awareness of the importance and economic value of biodiversity. Ireland's public awareness campaign 'Notice Nature' was the winner of the 2007 EU award for best practice in communicating environmental issues (<http://www.noticenature.ie>).

The lack of an organised framework for the management of biodiversity data in Ireland, has been a key bottleneck for conservation programmes. However, a National Biodiversity Data Centre is now in place (since 2007) and acts as a central repository for handling biodiversity, and other relevant, data from a large number of sources and stakeholders (e.g. Government departments and agencies; NGOs, private collectors). The centre is working to provide checklists for all species groups in Ireland, as well as compiling inventory data about their distributions and habitats through a state of the art online mapping system. This improved access to biodiversity data will ensure that future policies and decision makers, that impact on biodiversity, have access to the best available information. See <http://www.biodiversityireland.ie> for more information.

A red listing programme aims to assess the conservation status, using IUCN categories and criteria, for Irish species, particularly for those groups that are currently under-represented on the national legislation or EU Directives. In 2010 red lists will be compiled for bryophytes, dragonflies, butterflies, fish, amphibians and reptiles.

Reintroduction programmes are in place for several raptor species, such as the golden eagle (*Aquila chrysaetos*), red kite (*Milvus milvus*) and white-tailed sea eagle (*Haliaeetus albicilla*).

Invasive species

As is the case in any island state, the threat posed by alien invasive species is significant and the impacts are already in some cases almost irreversible (e.g. *Rhododendron ponticum* invasion of native forest; Zebra mussel (*Dreissena polymorpha*) in lakes and rivers). Most of the problematic invaders have arrived as escaped ornamentals, deliberate introductions for fisheries, or in ballast waters. Invasive species are a particular threat to aquatic habitats, especially rivers, lakes and canals.

An All-Ireland invasive species project has been in place since 2004 (<http://www.invasivespeciesireland.com>). This project provides detailed information on the most unwanted species, as well as advice on how to deal with some of the established invaders. A web-based reporting tool provides an early warning system for dealing with new invaders as soon as they are identified (see <http://invasives.biodiversityireland.ie/asian-clam/>). This project has already shown some success stories, with the eradication of chub (*Leuciscus cephalus*) and the development of methods for eradicating curly waterweed (*Lagarosiphon major*).

Climate change

The presence of so many species at the extreme of their range in Ireland, means that the island is uniquely placed for monitoring the impacts of climate change. The effects of climate change are already evident, such as the rapid spread of the warmth-loving little egret (*Egretta garzetta*), breeding first in Cork but now common and spread as far north as Louth. However there are contradictions, with the snowy owl (*Bubo scandiacus*), a species at home on the tundra, nesting in Donegal, and the great skua (*Stercorarius skua*), which nests in the Shetlands and far north, nesting recently in Ireland. The migrant hawk dragonfly (*Aeshna mixta*), which was first recorded in Ireland 2000, has now spread north and west along the coast (figure 4). Other native species likely to benefit from include the lesser horseshoe bat (*Rhinolophus hipposideros*), Kerry slug (*Geomalacus maculosus*) and natterjack toad (*Bufo calamita*).

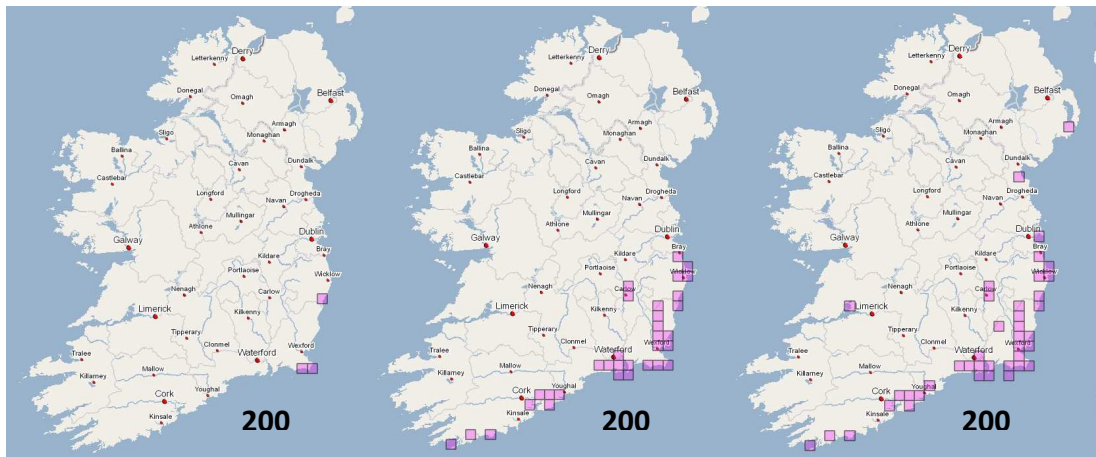


Figure 4 – Spread of the migrant hawker dragonfly across Ireland.

There are still no fully satisfactory models showing how climate change will impact on Irish biodiversity, given the complex range of habitats, geomorphology and the uncertainty over changes that will occur in the oceanic currents that drive the Irish climate. However, recent research has identified Ireland's internationally important peatlands (active raised bog, blanket bog, fens) and turloughs as being at particular risk.

CASE STUDIES

Conservation management of the natterjack toad (*Bufo calamita*)

The natterjack toad, a Red Data Book and EU Habitats Annex IV species, is the only toad species in Ireland. It has a biogeographically interesting distribution, and is sometimes referred to as an example of a lusitanian species (one that links the south-west of Ireland and the north of Spain). It has been declining steadily in Ireland from the early 20th century up to the present day, mainly due to loss of breeding ponds following land drainage. The natural range is confined to a small number of coastal sites on the Dingle and Iveragh peninsulas in Co. Kerry. Recent surveys put the population at c.12,000 adults. A study carried out between 2004-2006 indicated that the range is at risk of contracting further, with very poor and irregular breeding activity recorded at the most westerly part of the current range, despite the creation of two additional pools there in 2003.

In 2008, the NPWS launched a scheme to encourage farmers to conserve toads on their land. Farmers were invited to enter a 5 year agreement with the NPWS and in return receive annual payments related to the number of ponds they dig and for maintaining the ponds (e.g. through hand clearance of vegetation) and the surrounding sward (through grazing) in a suitable condition for natterjacks. €500 was paid for the first two ponds in each hectare, and there has been an encouraging take-up for the scheme. In 2008, the first year of the programme, 25 farmers joined and 49 new ponds were dug. Ten additional farmers joined in 2009, bringing the total number of new breeding sites to 69.

Roseate Tern Conservation (*Sterna dougallii*) (NBP Action 26]

The Roseate Tern, (*Sterna dougallii*), is the rarest breeding seabird in northern Europe and is listed in Annex I to the EU Birds Directive, in Appendix II to the Berne Convention on the Conservation of European Wildlife and Natural Habitats (1979) and in Appendix II to the Bonn Convention on the Conservation of Migratory Species of Wild Animals (1979).

In 1988, Rockabill Island, located off north County Dublin, was designated a Special Protection Area under the Birds Directive, and a Statutory Refuge for Fauna under the Wildlife Act, 1976. When the lighthouse keepers left the island in 1989, a conservation NGO and the State cooperated to secure the Island for the terns. BirdWatch Ireland now carries out wardening and scientific seabird monitoring of Rockabill with funding from NPWS.

The number of Roseate Tern nests has increased from 152 in 1989 to reach a peak of 1,052 nests in 2009. Rockabill is an internationally important breeding site, supporting ca 78% of the NE Atlantic breeding population. Other nesting sites are in Wexford in Ireland and in small scattered colonies in the UK and Brittany in France.

Similarly numbers of breeding Common Tern (*Sterna hirundo*) have also been increasing in recent years, peaking in 2007 with 1,411 nests. Arctic Terns (*Sterna paradisaea*) have also bred at Rockabill in low numbers since 1992. This breeding population had increased to 200+ pairs by 2004 and has remained relatively stable since. Other seabirds that are also included in the annual seabird monitoring programme at Rockabill are Kittiwake (*Rissa tridactyla*) and Black Guillemot (*Cephus grille*).

4. MALTA / MALTE

MALTA'S SHORT WRITTEN CONTRIBUTION ON ISLAND BIODIVERSITY

(2nd Meeting of the Expert Group on European Island Biodiversity, Norway, July 2010)

The present contribution provides an update on the developments and the state of play on the conservation of biodiversity in Malta.

Malta's State of the Environment Report (SOER) 2008

Building on the previous efforts and achievements found in past editions of the State of the Environment Reports for Malta (1998, 2002 and 2005), the Environment Protection Directorate within the Malta Environment and Planning Authority (MEPA) has launched this year the 2008 SOER. The latter report highlights the situation in a number of environmental areas including biodiversity, air, waters, climate change, and policy responses to environmental issues. The current report aims to communicate key environmental issues and trends to policymakers and civil society in a clear and concise way. It seeks, to increase awareness and understanding of key environmental trends, to provide a sound evidence base for policy and decision-making, and to facilitate the measurement of environmental performance and progress towards sustainability. Moreover, the 2008 SOER takes a broader approach when analysing environment sectors and indeed explores more closely how environmental issues impact our daily lives in terms of health and the economy.

Results published in the 2008 SOER show that Malta has managed to achieve positive results in a number of key areas. For example, the Report looks at the progress made in the designation of terrestrial protected areas. As at 2008, Malta had designated 27 terrestrial Special Areas of Conservation (SACs) covering 41km² (13.06% of land area), one marine SAC of 8.5km², and 13 Special Protection Areas (SPAs; often overlapping with SACs) occupying 16.34km² or 5.18% of land area, all forming part of the EU Natura 2000 Network. Indeed, Malta has reached 93% sufficiency with respect to the proportion of habitats and species for which an adequate number of terrestrial Natura 2000 sites have been proposed under the Habitats Directive. It is noteworthy that such Natura 2000 sites also cover land area that falls within the Emerald Network.

On the other hand, the Report also highlights a number of issues that need further attention. It delves into a number of key environmental challenges in areas such as further protection of Malta's biodiversity, waste management, water management, the control of traffic emissions, as well as the ongoing pressures on land and the marine environment. Looking at the conservation status of protected species and habitats, the Report draws attention to the findings of the assessments carried out by Malta in line with requirements of Article 17 of the Habitats Directive. The status of 29% of Maltese habitats and 36% of Maltese species listed in this Directive is still unknown, of which a significant amount relates to the marine environment. In addition, 64% of habitats and 44% of species have a bad or inadequate conservation status. When considering the species in question ([Figure 1, chart 2](#); see also [Habitat and Species Checklist - Malta](#)), some of these are also covered by the Bern Convention. The 2008 SOER states 'Stringent measures are required for these to attain favourable status, while further surveys are needed to assess those with unknown status'.

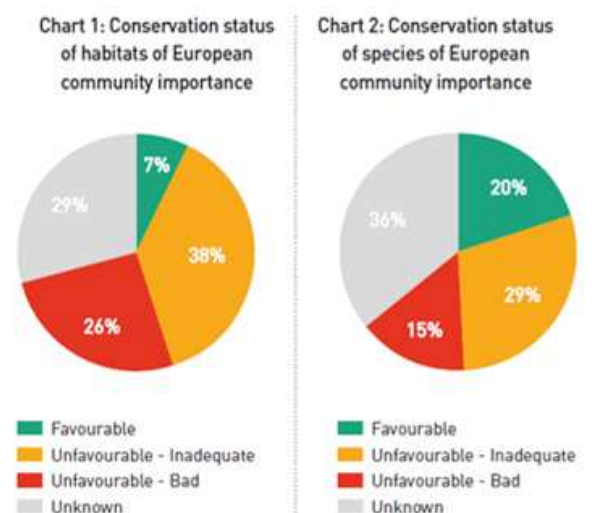


Figure 1 - Conservation Status of Species and Habitats of European Community Importance

In the context of climate change, the Report states that climate change adaptation needs to be addressed through the development of a wide-ranging adaptation plan that addresses actions across sectors as diverse as land-use, health and tourism, as well as impacts across a range of social groups. Moreover, it emphasises the requirement to mainstream climate change measures across all policy sectors, whilst striving for enhanced climate change adaptation through increased resilience.

The Report concludes by *inter alia* stating that while Malta has already made significant progress in upgrading its environmental policy capacity, its institutional capacity still needs to improve in terms of human resources and funding, as well as public and private sector investments to upgrade operations and infrastructure.

The International Year for Biodiversity (IYB)

Malta has joined other countries in celebrating the International Year for Biodiversity. Celebrations at a national level were officially launched on 18 May 2010. Prior to this day, activities aimed at raising awareness on biodiversity primarily included biodiversity-related articles written by the Malta Environment and Planning Authority, amongst which those published under the section entitled “One World” in a local newspaper. The aim of these articles is to provide the general public with information related to biodiversity, such as on the various habitats and species present locally, invasive alien species and marine protected areas. The “One World” articles published to date are listed in Table 1.

Article Series	Title of Article	Date when issued in local newspaper
Threatened Protected Plants	Maltese Rock Centaury	06/03/2010
	Maltese Everlasting	09/03/2010
	Maltese Cliff-Orache	11/03/2010
	Endemic Flora	13/03/2010
	Orchids in Malta	16/03/2010
	Trees in Malta	18/03/2010
Marine Protected Areas	Habitats and Species under Threat	20/03/2010
	What are the benefits of marine protected areas?	23/03/2010
	What can I do for marine protected areas?	25/03/2010
Threatened Protected Animals	Painted Frog	30/03/2010
	The Maltese Wall Lizard	01/04/2010
	The Maltese Freshwater Crab	03/04/2010
	Status of Selected Vertebrates	06/04/2010
	Bats in Malta	08/04/2010
	Some Species of Butterflies and Moths are scarce	10/04/2010
Invasive Alien Species	What are they and why are they a concern?	13/04/2010
	The Kaffir or Hottentot Fig	15/04/2010
	Prevention is better than cure	17/04/2010
Habitats of the Maltese Islands	Introduction	20/04/2010
	Terrestrial Habitats – An Overview	22/04/2010
	Terrestrial Habitats - Steppe	24/04/2010
	Terrestrial Habitats - Garrigue	27/04/2010
	Terrestrial Habitats - Maquis	29/04/2010
	Habitats - Woodland	01/05/2010
	Coastal Habitats – Saline Marshlands	04/05/2010
	Coastal Habitats – Rainwater Rockpools	06/05/2010
	Coastal Habitats – Sand Dunes	08/05/2010
	Freshwater Habitats - Watercourses	11/05/2010
	Rupestrial Habitats – Caves and Cliffs	13/05/2010
Other	Biodiversity Day Today	22/05/2010

Table 1 – Articles published under “One World” as part of IYB celebrations

Malta will be holding a number of events to celebrate IYB, which are expected to include the publication of posters, and of action plans, a biodiversity photo exhibition/competition, setting up billboards at specific protected areas, open lectures, awareness-raising to NGOs and journalists, and clean-up activities. Selected legislation and policy documents related to biodiversity are also expected to be issued in the coming months. Some of these activities might actually be addressed beyond 2010.

Other Issues

Work has continued on the development of Malta's 'National Biodiversity Strategy and Action Plan' (NBSAP). Management of protected areas has also continued. *Ad hoc* discussions and management issues at a number of sites have also been carried out. In this respect, an application for a project proposal to develop a framework for the management of terrestrial Natura 2000 sites in the Maltese Islands has been submitted for funding under the European Agricultural Fund for Rural Development (EAFRD). As a concluding note, in conjunction with the increased efforts towards broader communication and awareness-raising, the MEPA website (www.mepa.org.mt) was completely revamped with a drive to improve public access to information (sections related to biodiversity are being updated from time-to-time).

References:

1. MEPA (2006). *State of the Environment for Malta 2005* [Online] Available at: www.mepa.org.mt/soer2005-intro; The SOER 2005 sub-report on biodiversity is available at: www.mepa.org.mt/file.aspx?f=2132
2. MEPA (2007). *State of the Environment Indicators 2006* [Online] Available at: www.mepa.org.mt/soe2006-intro
3. MEPA (2008). *State of the Environment Indicators 2007* [Online] Available at: www.mepa.org.mt/soe2007-intro
4. MEPA (2010). *Environment Report for Malta 2008* [Online] Available at: <http://www.mepa.org.mt/ter>; The sub-report on biodiversity is available at: <http://www.mepa.org.mt/ter08-biodiversity>
5. *Article 17 Reporting to the Habitats Directive – Malta Habitats and Species Checklist* - [Online] Available at: http://circa.europa.eu/Public/irc/env/monnat/library?l=/habitats_reporting/reporting_2001-2007/ms-reports_checklists/malta-checklistpdf/ EN 1.0 &a=d

5. NORWAY / NORVEGE

Tasks for Group of Expert on Island Biodiversity:

- To identify conservation problems in European islands
- To identify inventory of threatened endemics
- To identify species and habitats at risk from climate change
- To identify and network regional experts
- To contribute to the CBD agenda with conservation solutions for European islands

1. Are there any specific conservation activities focused on island biodiversity in your state?

For Norway it is mainly the Arctic and Antarctic islands that display biodiversity of special conservation concern. In Europe this is mainly the Svalbard archipelago (65.000 km², and 90.700 km² sea) and Jan Mayen Islands (377 km²). Both areas are situated in the Arctic region with extreme climatic conditions and being very isolated from other land masses, but very influenced by sea ice and the Atlantic Sea current that especially makes the Western coast of Spitsbergen (the largest island in the Svalbard archipelago) exceptionally “warm” in relation to its far North latitude. The special climatic conditions have in its own way reduced the impact from alien species, as well as the impact from humans. However, centuries of expeditions and exploitation has reduced the populations of many species. In particular this applies to the large baleen whales and the walrus. While the largest predator in the world, the polar bear, has recovered after its protection and establishment of a circumpolar agreement on conservation of polar bear (1973). The population in Svalbard is a part of the Barents Sea population that also includes the Franz Josef Land and Novaya Zemlya, and is estimated to be about 3000 animals.

Traditionally the prevention of imports of new species (including new diseases and parasites) has been the focus of the authorities. Strict regulation applies for the import of any live fauna, and a ban on pet animals (except dogs) has been introduced. Concerning flora the prevention of introduction of new species was not focused until recently, when a new legislation was introduced in 1999 to prevent introduction and requiring a risk assessment by the nature conservation authorities. Prior to this it was commonplace to repair landscape damage (eg from roadbuilding or mining) using alien seeds (mainly from the Norwegian mainland, Russia and Arctic Canada).

Generally the main focus for both areas regarding conservation of native fauna and flora has been to introduce legislation and to collect data on biodiversity to uncover emerging risks. The nature protection regime is very good, with a total of 65% of the terrestrial part of the Svalbard archipelago protected and 85% of the territorial waters off Svalbard out to 12 nautical miles, and the entire Jan Mayen Islands is protected. While the control of imports of goods and personnel- traffic still poses a huge risk for accidental import and spread of alien species. As on the mainland it is debated to change tactics in relation to accidental imports, to better prevent this. The nature conservation authorities of Norway has the main responsibility for conservation areas and activities related to threatened species in the two areas, see www.dirnat.no The local management authority is the Governor of Svalbard. General information on local regulations etc can be found at www.sysselmannen.no

The initiative on Conservation of Arctic Flora and Fauna (CAFF) under the Arctic Council aim to conserve arctic biodiversity and promote sustainable practices. Monitoring and networking of experts is important and a number of initiatives have been undertaken to this end. This include the following three expert groups: CAFF Flora Expert Group (CFG), Circumpolar Protected Area Network (CPAN) and Seabird Expert Group (CBirds.), see <http://caff.arcticportal.org/> The Arctic Climate and Impact Assessment (ACIA) report (2005), see <http://acia.cicero.uio.no/> This report concluded with a need for more capacity to monitor and understand changes in the Arctic. The program Circumpolar Biodiversity Monitoring Program (CBMP), se <http://cbmp.arcticportal.org> is one response to this. The CBMP seek to establish an international network of researchers, community experts and managers to detect, understand and report on Arctic biodiversity trends.

2. State of knowledge of threatened endemic island flora and fauna

The knowledge is quite good, and inventories has been published on the status of all species of fauna and flora, including red lists (the most recent in 2006, see www.artsdatabanken.no). Due to the last ice age-period ca. 10.000 years ago probably most of the immigration and/or spread of species is quite recent on these islands. Nunataks at North-west Spitsbergen may have given space for some species to overwinter the ice-age period, but endemisms on species level are not found. However, on subspecies level some endemics do occur. Among the fauna the Arctic char *Salvelinus alpinus* is recognized with distinct genetic populations (ca. 100 watercourses), the Svalbard ptarmigan *Lagopus mutus hyperborea* is much larger than its cousin on the mainland and the Svalbard reindeer *Rangifer tarandus platyrhynchus* is a small version of the reindeer in other parts of the world. All of these species are recognized as distinct and confined to the Svalbard archipelago.

Threatened species, in particular flora has been given a high degree of protection through both specifically designed nature protection areas and through improved monitoring of their status. This is also linked to the increased efforts on red listing analysis of all species, including marine species.

The Norwegian Polar Institute has the main responsibility to conduct environmental monitoring in the two areas, including the atmosphere, and both terrestrial and marine habitats, see more on <http://mosj.npolar.no>

3. Available information on island IAS and their effect on endemic species

Among the most famed accidental introductions to Svalbard is the sibling vole *Microtus rossiaemeridionalis*, which took place sometime between 1919 and 1960 in the Russian settlement Grumant City. This alien species in Svalbard today mainly survive in close association with bird cliff areas localized between Longyearbyen and Grumant due to the availability of lush vegetation and shelter in scree beneath bird cliffs, but some animals are frequently observed among the Longyearbyen settlement too. This species is a vector for the parasite *Echinococcus multilocularis* which is a serious problem for humans. There seem to be no solution to eradicate this parasite. It is not known if this parasite causes problems for other mammals or fauna in Svalbard.

Both the grouse and the reindeer are subject to regular monitoring, upon which an annual bag quota is set.

The spread of king crab *Paralithodes camtschaticus* and snow crab *Chionoecetes opilio* (both introduced from the Bering Strait-area) and their effects on the marine ecosystem is debated. The king crab was released in the Murmanskfjord in the 1960ies and is now numerous along the Barents sea coasts and the snow crab was first discovered in the Barents Sea in 1996 and is quickly spreading. Information regarding the king crab from the mainland demonstrates its capability of impacting negatively the benthos and other bottom dwelling species. Little information is available yet on the effects of these two species in Arctic waters. None of these two invasive alien species have spread to Svalbard yet.

4. Expected effects of climate change

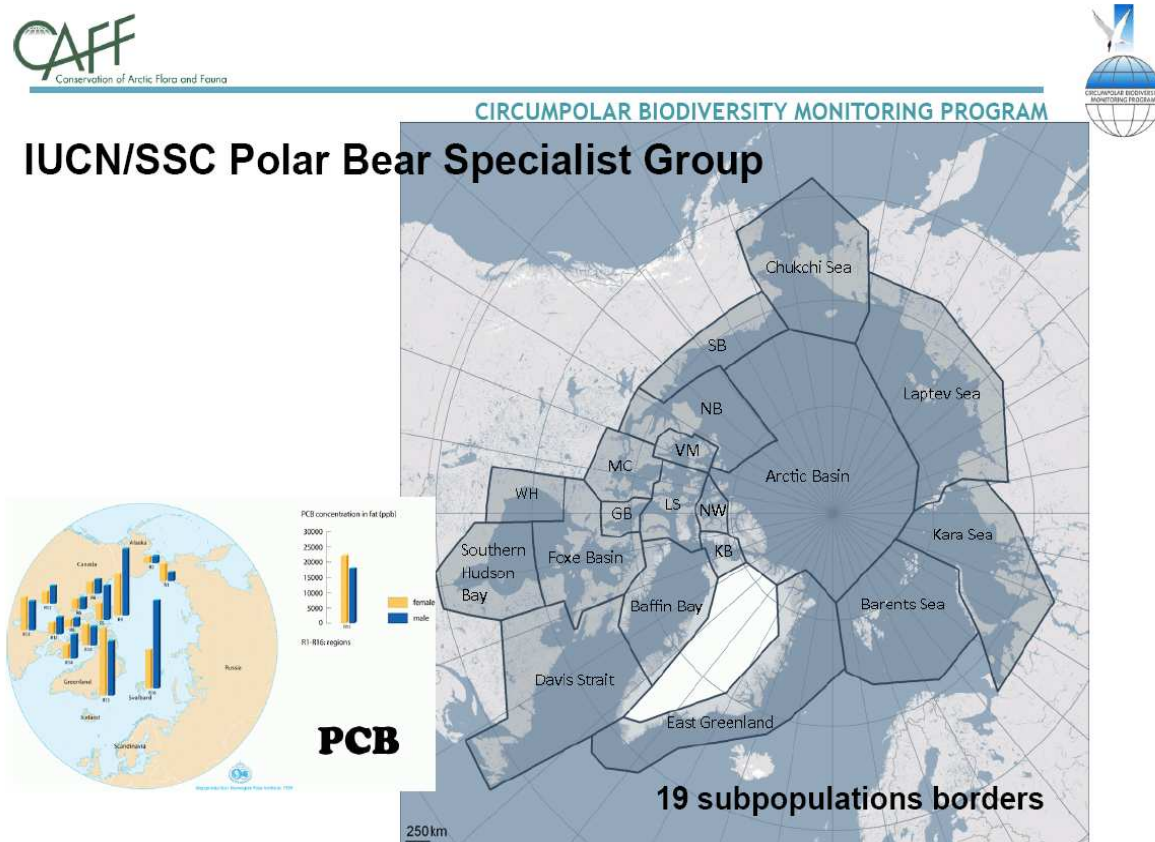
Monitoring shows that both precipitation and temperatures are now steadily increasing in the Arctic. This has a direct impact on the occurrence of sea ice coverage and changes of glaciers, see more on <http://svalbard.miljostatus.no>

Marine changes

Increase in temperatures, both at sea and of the air temperature has been registered in the high latitude areas. Research programmes has uncovered significant changes in the climate in these areas, se ACIA (<http://acia.cicero.uio.no/>). It is expected that dramatic changes in the composition of marine fauna (eg plankton, squid and fish) will have a major impact on fish stock distribution and eg seabirds. Less sea ice also impacts marine species like seals and polar bear. In recent years more polar bear individuals have been observed landlocked in summertime, obviously due to less sea-ice, causing starvation and bad condition of the bears. Annual monitoring of seabird breeding on the islands is a part of a wider monitoring

programme, covering the North Atlantic <http://caff.arcticportal.org/expert-groups/seabird-group-cbird>, see national monitoring programme www.seapop.no. The CAFF programme on seabirds aim to harmonise conservation, management and research and identify emerging needs. Changes in seawater temperatures is creating significant change in breeding success of seabirds in the southern part of the North-Atlantic.

The polar bear the population in the Barents Sea (including Svalbard, Franz Josef Land and Novaya Zemlya) was in 2005 estimated to be ca. 3000 individuals. More information on polar bears from the Norwegian Polar Institute (<http://npweb.npolar.no/tema/Arter/isbjorn>) the IUCN polar bear specialist group has a coordinating role for the Polar Bear Agreement (1973), see <http://pbsg.npolar.no/en/index.html> WWF International Arctic Programme are also engaged in polar bear research, see http://wwf.panda.org/what_we_do/where_we_work/arctic/area/species/polarbear/polar_bear/



Polar bear populations and PCB levels, Norwegian Polar Institute.

Observation of birds

Birds are quick to react to climatic changes and a steady flow of new bird species have been registered to Svalbard. The wider public has been encouraged to report on birds in the area and show a great interest in doing so. The nature conservation authorities has sponsored the establishment of a network of field biology interested people and a club house, see www.loff.biz. More on birds can be found on www.svalbardbirds.com. A new field guide on Svalbard birds has recently been published and an English version will follow.

Flora changes

For terrestrial ecosystems it is at the moment more difficult to detect changes. However, it is expected that longer growing periods will make new areas available for the spread of existing species as well as new alien species. To monitor this situation a new research programme was initiated and the first report of this programme was published in 2010 (NINA report 579: <http://www.nina.no/archive/nina/PppBasePdf/rapport/2010/579.pdf>). The programme has established ten monitoring areas, where all vegetation will be mapped at regular intervals.

6. SPAIN (Canary Islands) / ESPAGNE (Iles Canaries)

CANARY ISLANDS (SPAIN)

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The Canary Islands are an archipelago located in the Eastern Atlantic off the NW coast of Africa that includes seven major islands and several islets. They have a total area of 7.446,95 km² and a population of 1.672.689 inhabitants.

The Canaries have the status of an autonomous region within the Spanish state, with its own government and parliament. The Island Councils (the local government of each island) are responsible for managing the protected natural areas and conserving biodiversity.

Together with the Azores and Madeira (Portugal), French Guyana, Guadeloupe, Martinique and Reunion (France) the Canaries form part of the Outermost Regions of the European Union.

Biodiversity of the Canary Islands

According to the Canary Islands Biodiversity Data Bank, so far a total of 3965 species are known in the marine environment, of which only 164 are endemic. On land, there are 11.628 native species (7956 non-endemic and 3642 endemic) and 1348 alien, making up 90% native and 10% alien. The table shows the proportions of each group.

Terrestrial species			
	Native species		Exotic species (%)
	Endemic (%)	Non-endemic (%)	
Vascular flora	14	11	46
Fungi	3	14	4
Bryophytes	0	4	0
Lichens	1	12	0
Vertebrates	2	1	3
Arthropods	55	55	40
Molluscs	5	2	2
Other invertebrates	0	1	5

<http://www.gobiernodecanarias.org/cmayerot/medioambiente/medionatural/biodiversidad/especies/bancodatos/index.html>

The Canary Islands Catalogue of Protected Species

Once there is expert information that recommends it, the recently enacted Law 4/2010 of 4 June will include species, subspecies or populations where biodiversity is threatened or are of special interest for the ecosystems, classified into: endangered species (in danger of extinction or vulnerable), priority species for Canary ecosystems, and those requiring special protection. It currently includes 419 species.

<http://www.gobiernodecanarias.org/cmayerot/medioambiente/medionatural/biodiversidad/especies/catalogodeespeciesamenazadas/index.html>

Plans for recovery of threatened species

Currently there are 19 recovery plans affecting 25 species: four vertebrates (two birds and two reptiles), and the rest are for flowering plants.

PHANEROGAMS	<i>Lotus kunkelii</i>
<i>Atractylis preauxiana</i>	<i>Lotus maculatus</i>
<i>Bencomia sphaerocarpa</i>	<i>Lotus pyranthus</i>
<i>Caralluma burchardii</i>	<i>Onopordon nogalesii</i>
<i>Cheirolophus duranii</i>	<i>Salvia herbanica</i>
<i>Crambe sventenii</i>	<i>Silene sabinosae</i>
<i>Echium acanthocarpum</i>	<i>Solanum vespertilio doramae</i>
<i>Helianthemum bramwelliorum</i>	<i>Stemmacantha cynaroides</i>
<i>Helianthemum juliae</i>	REPTILES
<i>Helianthemum tenerifae</i>	<i>Gallotia bravoana</i>
<i>Helianthemum gonzalezferreri</i>	<i>Gallotia simonyi</i>
<i>Kunkeliella canariensis</i>	BIRDS
<i>Lotus berthelotii</i>	<i>Fringilla teydea polatzeki</i>
<i>Lotus eremiticus</i>	<i>Neophron percnopterus majorensis</i>

http://www.gobiernodecanarias.org/cmayerot/medioambiente/medionatural/biodiversidad/especies/catalogodeespeciesamenazadas/planes_especies_amenzadas.html

Protected areas

The Canary Network of Protected Natural Areas consists of 146 zones, which together constitute about 40% of the area of the archipelago. Currently, most of them have approved management plans. The Spanish state recently transferred to the Canary Islands Government the responsibility for managing the four National Parks.

<http://www.gobiernodecanarias.org/cmayerot/ordenacion/index.html>

The Natura 2000 Network

Natura 2000 in the Canary Islands consists of a total of 208 sites (165 Special Areas Conservation (SACs) and 31 Special Protection Areas for birds (SPAs) which represent between 42% and 58% of the area of each island. Most of the areas on land are covered by the Canary Network of Protected Natural Areas.

Of the 168 natural habitats listed in Annex I of the Habitats Directive, about 24 are present in the Canary Islands. Two are marine: seagrass meadows (*Cymodocea nodosa*) and coastal lagoons, while the remaining 22 are terrestrial.

73 taxa are registered in the Habitat Directive for the Canaries. Of these, two are mosses, 4 are ferns, 60 higher plants, 4 reptiles and two mammals. However, the invertebrates are not represented, despite being the largest group and among those with highest endemism. On the other hand, about 44 birds found in our islands are included in the Birds Directive.

<http://www.gobiernodecanarias.org/cmayerot/medioambiente/medionatural/rn2000/index.html>

Biosphere reserves

There are five biosphere reserves in the Canary Islands: La Palma, Gran Canaria, El Hierro, Fuerteventura and Lanzarote.

http://www.mma.es/secciones/el_ministerio/organismos/oapn/oapn_mab_redreservas.htm

Climate change

In the Canaries, an Agency for Sustainable Development and Climate Change operates to promote policies and measures which contribute to more sustainable forms of development and address global warming. It also coordinates policies in the sector that may affect these objectives and works to favour both public and private initiatives with these ends. It also provides administrative and economic support to the Canary Forum for Sustainable Development and the Sustainable Development Observatory.

The "*Canary Island Strategy to Combat Climate Change*" is an operational tool acting as a framework for addressing the challenges facing the Canary Islands as a result of climate change; so as to be consistent with their greater wealth and vulnerability, and their responsibility and border situation.

<http://www.gobiernodecanarias.org/agenciasostenible/index.aspx>

Control of invasive alien species

At least 150 exotic species are believed to be invasive. The Island Councils and the Government of the Canaries are involved in numerous actions to control invasive plants in protected natural areas.

Recently the California King's snake (*Lampropeltis getula*) has become established in Gran Canaria, the result of an illegal release. It is subject to major control efforts by various public administrations.

A database of introduced species has been built up and over the next four years, a major program will take place to map and assess the impact of exotic species.

http://www.gobiernodecanarias.org/cmayerot/medioambiente/medionatural/biodiversidad/especies/bancodatos/bd_introducidas.html

7. UNITED KINGDOM / ROYAUME-UNI

ISLAND BIODIVERSITY WORK IN THE UK.

*Prepared for the second meeting of the
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1 BIODIVERSITY ON THE UK'S ISLANDS

The mainland of the United Kingdom is an island itself, although current UK biodiversity legislation and policy does not have a specific focus on islands; more it reflects the six main work programmes of the CBD. The UK also includes a large number of smaller islands (over 700 vegetated islands and around 70 populated islands), and there are four main archipelagos (Shetland, Orkney, the Outer and Inner Hebrides) and a number of other island groups across the UK, although the great majority of the islands are within Scotland. There are a large number of initiatives that work on the islands of the UK. Most of these are carried out by the devolved administrations.

A significant number of the UK's 257 Special Protection Areas (SPAs) are located on offshore islands³, however listings are currently by site and country – the 'island' classification is not included.

1.1. Internationally-important populations

A review of UK SPAs⁴ highlights that the UK is of major international importance for several groups of birds. These include a number of groups that are especially reliant on the UK's islands: breeding seabirds, breeding and wintering waders and passage and wintering wildfowl.

UK is one of the richest areas in the world for seabirds. Just under 8 million seabirds of 25 species breed in Britain and Ireland, including 90% of the world's Manx shearwaters (*Puffinus puffinus*), 68% of Gannets (*Morus bassanus*) and 60% of Great Skuas (*Stercorarius skua*), as well as almost all of Europe's Leach's petrels (*Oceanodroma leucorhoa*). The UK SPA network holds over 4,946,000 breeding seabirds, and protection has recently been extended into inshore waters around the breeding colonies in many cases. 31 of the UK SPAs are on offshore islands. These protect some 3,788,000 breeding seabirds- a substantial proportion of all the seabirds breeding in the north-east Atlantic and North Sea areas.

The Scottish islands hold some of the densest populations of breeding waders in Europe. 30% of the biogeographic population of southern dunlin (*Calidris alpina schinzii*) breeds on the machairs and peatlands of the Outer Hebrides. There are important breeding populations of nine other species, including ringed plover (*Charadrius hiaticula*) redshank (*Tringa totanus*) and Snipe (*Gallinago gallinago*) on the grasslands and Golden plover (*Pluvialis apricaria*) and Greenshank (*Tringa nebularia*) on the peatlands. Internationally important wintering populations of Curlew (*Numenius arquata*), Sanderling (*Calidris alba*), Turnstone (*Arenaria interpres*) and Purple sandpiper (*Calidris maritima*) occur on the islands rocky and sandy shores. The habitat protection provided for these birds is a major contribution to their international conservation.

The UK's islands hold around 200,000 grey seals (*Halichoerus grypus*); 85% of Europe's and 45% of the world population (of which 90% are in Scotland). There are also 46,000 harbour seals (*Phoca vitulina*); representing 30% of Europe's population (of which 85% breed in Scotland).

³ <http://www.jncc.gov.uk/page-2598>

⁴ <http://www.jncc.gov.uk/page-1415>

1.2 Grassland systems and species

Grassland systems and the species associated with them are also an important element of island biodiversity in the UK. Much island grassland is managed traditionally with little modern agricultural intensification, and hence it has a high wildlife value. Machair, a shell-enriched dune grassland, found extensively in western Scotland, is a classic UK habitat holding a wide range of threatened flora and fauna. Most of the UK's corncrake (*Crex crex*) population occurs on the Scottish islands, in the machair grassland. Breeding numbers have risen from 480 in 1993 to almost 1300 in 2008; due to direct intervention activities influencing island farming (crofting) management. It is likely that corncrakes will continue to be largely restricted to Scottish islands, but their recovery is a success story.

Machair also supports endangered insects such as the great yellow bumble bee (*Bombus distinguendus*); which is now restricted to the western and northern islands and the north Scottish coast. The slender Scotch burnet moth (*Zygaena loti scotica*) is found only on Mull on grazed coastal turf, though the nominate subspecies of this moth is found across mainland Europe.

Another widespread European bird species, the chough (*Pyrrhocorax pyrrhocorax*), is largely restricted to island grasslands in the UK, and requires special habitat management for its conservation.

1.3 Endemism

There is relatively little UK island endemism, but *Primula scotica* is a coastal heath and grassland species restricted to northern Scotland and Orkney; the Shetland mouse ear (*Cerastium nigrescens*) is endemic to north Shetland, and the Lundy cabbage (*Coincya wrightii*) is endemic to Lundy Island off south-west England, and also hosts an endemic flea beetle. Maintenance of grassland through appropriate grazing levels (and in the case of the Lundy cabbage, control of rhododendron (*R. ponticum*)) are vital for these species.

2 MANAGEMENT ISSUES THAT AFFECT BIODIVERSITY IN THE UK 'S ISLANDS

There are a number of important management issues affecting island biodiversity in the UK.

2.1 Farming management

The Scottish islands hold important populations of both breeding and wintering geese. For much of the twentieth century, breeding greylag geese (*Anser anser*) were confined to the Outer Hebrides, and the population declined to around 50 breeding pairs. A range of protection measures led to their recovery and there are now around 40,000 birds spread across the western and northern Scottish islands. These are seen as causing conflict with farming management and may have effects on traditional farming which is beneficial to a range of other species.

In winter, the Scottish islands host large populations of Greenland white-fronted geese (*Anser albifrons flavirostris*) and Greenland barnacle geese (*Branta leucopsis*); around half of the world population of each species occur here. Almost all the Icelandic greylag goose population winters in Scotland; 80% (80,000) now winter on Orkney, having vacated the central Scotland mainland in the last decade. These also cause management conflict with farming interests, and several local goose management schemes have been in place on Scottish islands for the last ten years. There is currently a major review of these schemes by the Scottish Government. It is also recognised, however, that these goose populations also provide major tourism income from both birdwatching and shooting.

On a number of the UK's islands, there is overgrazing from deer and sheep, severely impacting habitat. As a consequence of difficulties in managing sheep on remote islands, a lack of grazing is also an issue on some islands. There are examples of how a lack of grazing has given rise to vegetation that is unsuitable habitat for threatened species: eg for Barnacle geese (*B. leucopsis*) which depend on short-cropped turf.

White-tailed sea eagles (*Haliaeetus albicilla*) have been reintroduced to Scotland over last 35 years (with grateful thanks to Norway for providing the birds). There are now around 40 breeding pairs, mostly on Scottish islands. These are providing major tourism income to the islands of Mull

and Skye. There is however, some perceived conflict with sheep farming, which continues to require efforts to resolve, though two recent scientific studies suggest there is little predation of lambs.

2.2 Marine renewables

The next substantial issue is likely to be the development of marine renewables around the UK coasts. Major developments of offshore wind, tidal and wave power devices are proposed. The latter two are likely to be largely around the Scottish islands where the largest natural wave and tidal resources occur. It will be vital to assess what effects these developments may have on the marine environment and to develop strategies and methods to minimise these effects.

2.3 Genetic conservation

Islands have an important role to play in genetic conservation; several Scottish islands hold endemic subspecies of mice (eg *Apodemus sylvaticus hirtensis* on St Kilda) and birds (eg *Troglodytes troglodytes zetlandicus* on Shetland). Some islands act as genetic refugia for widespread species. Several Scottish islands hold genetically-pure populations of red deer (*Cervus elaphus*). On the mainland, hybridisation with Sika deer (*C. nippon*) is widespread, and legislation is forthcoming to protect the island deer populations' genetic integrity. There has been a major study of red deer population genetics and demography on Rum for thirty years.

Machair management on the Scottish islands is partly-dependent on traditional local races of cereals, such as bere barley (*Hordeum vulgare*) and black oats (*Avena strigosa*); this represents important genetic conservation of farmed crop species.

In England, the Isle of Wight and in Wales, Anglesey act as refugia for populations of red squirrels (*Sciurus vulgaris*) threatened elsewhere by the spread of grey squirrels (*Sciurus carolinensis*) and the pox virus they carry.

2.4 Invasive non-native species

Invasive non-native species are a critical issue for the UK's island biodiversity, as is the case across much of the world. On the Outer Hebrides, hedgehogs (*Erinaceus europaeus*), which are native to mainland UK, were introduced in the 1970s by misguided individuals wishing to control slugs (*Arion* spp) in gardens. These are now having major effects on the internationally-important breeding wader populations, by their predation of wader eggs. A major removal programme is under way, and hedgehogs have now been almost cleared from North Uist. The American mink (*Mustela vison*) also causes serious problems to ground-nesting terns, gulls and waders, and a major removal programme⁵ is under way on Harris and Lewis.

The most widespread non-natives issue is that of rats on islands with important seabird populations. These are mostly brown rats (*Rattus norvegicus*) but there were also black rats (*Rattus rattus*) on Lundy Island in south west England. Predation of seabird eggs and chicks has been a widespread problem. Over the last 50 years, twelve islands around the UK have had rat eradication programmes. There have been some excellent results in terms of seabird responses: Manx shearwaters (*P. puffinus*) numbers have trebled on Ramsey and Lundy in the 5-10 years since rat eradication.

The rat eradication projects have become increasingly large and ambitious. The project on Canna (off west Scotland) has been the largest to date. Canna is a 1300 ha, farmed and populated island, owned by the National Trust for Scotland. A grid of thousands of poison bait tubes was set in 2005-06. The project needed to remove and maintain a population of Canna fieldmice (*Apodemus sylvaticus*), which were held and bred by the Zoological Society of Scotland for over twelve months, and reintroduced after the poisoning process was complete. The project was apparently effective but NTS continues a monitoring programme, of both the rat absence and seabird population responses.

Scottish Natural Heritage is also trialling rat control on Rum; an 11,000 ha island, which holds 61000 pairs, 25% of the world's Manx shearwaters (*P. puffinus*). These nest on mountain-top slopes. This project will consider whether all-island control is necessary in this case.

⁵ <http://www.snh.org.uk/pdfs/scottish/wisles/minknov05.pdf>

Quarantine vigilance is also needed in regards of rat invasions. A recent case of a shipwrecked Scottish fishing vessel on St Kilda brought the threat of rat introduction to the most important seabird islands in the UK. This resulted in a programme of rat monitoring work, both after the wreck and during the ship-breaking operations. A similar protocol is needed for all rat-free seabird islands.

3 BIODIVERSITY IN THE UK CROWN DEPENDENCIES

The UK also has three Crown Dependencies; Jersey, Guernsey (and their archipelago of smaller islands) and the Isle of Man. These have many biogeographical similarities with mainland UK. The Channel islands are notable for holding a range of species whose range does not extend to mainland Britain; and insular forms of some species, such as the Guernsey form of the common vole *Microtus arvalis*) which also occurs on Orkney, its sole area in the UK. The Isle of Man holds important populations of breeding birds (e.g. seabirds, chough and hen harrier (*Circus cyaneus*); similar to some Scottish islands, and they hold a range of marine and terrestrial habitats which are significant in a UK and regional context.

4 CONCLUSIONS

A number of island biodiversity issues are very similar across islands, regardless of species, habitats, or geographical location. One of the key lessons learnt from experiences on inhabited UK islands is that the local people (local ownership and local involvement) are pivotal to the success of any conservation initiative. It is also important that conservation initiatives are appropriately scaled to the size of the populations of the islands to ensure long term sustainability and continuity.

Information-sharing across islands is important. For example, access to good quality scientific data about eradication or control of non-native invasive species on small islands (including costs, benefits, probability of success and how to maximise this) will help make the case for island-specific proposed actions.