CORRIDORS AND ECOSYSTEMS:

PROJECT ON COASTAL AND MARINE AREAS

December 1999

EUCC International Secretariat, Leiden, The Netherlands

CORRIDORS AND ECOSYSTEMS: PROJECT ON COASTAL AND MARINE AREAS

Final Draft

by
Peter Heslenfeld, Johanne Liévin, Volker Mielchen,
Alan Pickaver and Albert Salman
at
EUCC International Secretariat, Leiden, The Netherlands

December 1999

This report has been prepared with the financial support of the Council of Europe

PREFACE

This report has been prepared by the European Union for Coastal Conservation (EUCC) at the request of the Council of Europe as part of the Work Programme of the Pan-European Ecological Network.

It will serve as a report for the Committee of Experts for the Development of the Pan-European Ecological Network and will be submitted to the Bureau of the Committee of Experts for the Development of the Pan-European Ecological Network.

The terms of reference of the report are as follows:
"The EUCC will focus on the methodology and criteria, used by national governments for the selection and maintenance of coastal and marine areas. Taking into consideration existing studies and methodology, EUCC will develop policy proposals, addressed to states implementing Pan-European Biological and Landscape Diversity Strategy, which will ensure that the concept of ecological corridors is better integrated into national policies on the maintenance of ecosystems (coastal and marine areas), and at the same time contributes to the overall process of setting up the Pan-European Ecological Network."

It is important to note that this report in no way aims to identify or designate new protected areas. Reservations appear to exist with regard to the identification of coastal & marine corridors although it is clear that the maintenance of ecological corridors can be through existing, integrated coastal & marine policies.

Leiden, December 1999

SUMMARY

The Council of Europe requested the European Union for Coastal Conservation (EUCC) to make a study to draw recommendations to the member states to improve the protection of coastal and marine ecological corridors.

To implement this study EUCC selected three types of migration corridors: (1) specific marine corridors, (2) specific coastal-aquatic corridors and (3) coastline corridors. The importance of these corridors for migratory species is illustrated with three selected cases: the Strait of Dover, Bosphorus and the Gibraltar Strait. Furthermore, dispersed marine migration is illustrated with the migration of whales.

To review the way that coastal and marine ecological corridors are taken into account in the nature conservation policies of European States, an analysis of relevant national policies was made of fourteen selected countries together with an analysis of international policies. Several good practice examples for the implementation of the conservation of ecological corridors are also given.

From these analyses, several conclusions can be drawn. Only some countries have specific national policies on ecological networks within their biodiversity policies. Legal regulations often do not refer to the network approach and therefore to corridors specifically. Marine areas are often strongly neglected. Efforts to integrate fisheries and hunting with conservation of animal migration are still weak. The lack of integrated platforms concerning ecological corridors at each administrative level leads to inefficiencies or to a deficit in the integration of administrative sectors. Furthermore, there are no separate funds available for the protection of corridors and there is still a significant lack of information on the behaviour, habitat and status of migrating animals and their migration patterns in Europe (especially in marine environments).

Finally, a set of recommendations has been made to the member states of the Council of Europe. The most important issues are: (1) to extend the Pan-European Ecological Network to marine areas, (2) to implement integrated planning and management in coastal and marine areas, (3) to discourage threatening developments in sea straits and river mouths, (4) to integrate fisheries policies with coastal and marine ecological corridors, (5) to take important ecological corridors into consideration within the existing policies and laws, and (6) develop and fund research programmes on migrating species.

TABLE OF CONTENTS

1. INTRODUCTION

The "Pan-European Biological and Landscape Diversity Strategy (PEBLDS) was elaborated under the auspices of the Council of Europe and endorsed at the third Ministerial Conference "Environment for Europe" in Sofia, October 1995. One of the priority actions of the PEBLDS is the development and implementation of the European Coastal and Marine Ecological Network (ECMEN).

The Executive Bureau of PEBLDS designated the EUCC as the responsible body for the elaboration of this action and two reports on ECMEN and a map of the coastal systems of Europe have since been published (Doody et. al. 1997, 1998). These reports highlighted the importance of migration for many species and the vital functions of core areas, stepping stones and ecological corridors.

Coastal & marine ecological corridors are an essential element in the Pan-European Ecological Network. Coastal corridors are important for migrating birds and include sea straits *e.g.* Sont (Denmark-Sweden), Gibraltar and Bosphorus. Shorebirds often move along the coast, itself one long corridor interrupted only by infrastructure and other developments. Many marine corridors form part of the migration route of a considerable number of mobile marine species and are often narrow stretches of water (*e.g.* sea straits and river mouths).

2. COASTAL & MARINE ECOLOGICAL CORRIDORS IN EUROPE AND THE NEWLY INDEPENDENT STATES

This chapter reviews the most important types of ecological corridors in the Pan-European coastal & marine environment, illustrated with examples of corridors and their importance for species.

2.1 Types of coastal and marine ecological corridors

Corridors are geographical features that are used by mobile species for migration between core areas. In this respect, the typology that is currently under preparation by IBN-DLO for the Committee of Experts for the Development of the Pan-European Ecological Network will be adhered to *i.e.* "corridors are defined in a broad sense as a linkage between resource habitat of a species consisting of a landscape structure that is different from the matrix surrounding it resulting in a favourable effect on the exchange of propagules of the species (individuals, seeds, genes)". This definition is based on the functionality of the corridor and implies that linear shaped habitat without the purpose of linking two areas at both ends will not be defined as a corridor. In general, for a corridor to be functional there always has to be at least one source and one target area" (Foppen et al, 1999). IBN-DLO distinguish three corridor types: (A) migration corridors, (B) commuting corridors and (C) dispersal corridors (Foppen et al, 1999). This report is concerned primarily with corridors which are important for mobile species when on migration *viz*. type A.

Some migration corridors also contain "stepping stones" (Foppen et al, 1999). Many migratory birds use coastline corridors to migrate and need stop-over places to rest and feed during their long journey *e.g.* the Lithuanian Nemunas delta which is important for many geese. Because of their importance during migration, stepping stones are considered as a part of ecological corridors for the purpose of this report.

Focus of this report:

This study focuses on three types of migration corridors that are most relevant for the coastal & marine environment. Furthermore, only vertebrate animal species are considered, because there is too little information to include the migration of invertebrates.

***Type 1*. Specific marine corridors** (under water) enabling species to migrate between core areas in different regional seas through sea straits.
Species groups: *e.g.* dolphins and many fish (tuna, swordfish).
Geographical examples: Sont, Pas de Calais, Straits of Gibraltar, Bonifacio and Messina, Dardanelles, Bosphorus and Azov Seas.

***Type 2*. Specific coastal-aquatic corridors** (under water) through river mouths and estuaries enabling species to migrate between river catchments and the sea.
Species groups: fish (salmon, eel, stickleback).
Geographical examples: River mouths of the Salaca (Latvia), Kamchia (Bulgaria) and Schelde (Belgium).

***Type 3*. Coastline corridors** (above water), zones at either side of the coastline, used by species that prefer to migrate either above land or above sea. A special example of this is the concentrated migration of birds over sea straits.
Species groups: migrating birds
Geographical examples: Coastlines in France, Netherlands, Russian Federation**.**

There is also **dispersed marine migration** (under water) between core areas in different parts of oceans and seas by cetaceans and various other species. This migration occurs over large areas and it is not considered as a specific migration corridor (see section 2.3. below).

2.2 Examples of corridors and their importance for species

Several examples of marine and coastal ecological corridors have been selected to illustrate their importance for migratory animals:

2.2.1 The Strait of Dover (France - United Kingdom)

The Dover Strait, also called Pas de Calais Strait, is a sea strait of about 30 km wide separating the North Sea from the English Channel and the Atlantic Ocean. It is used by a wide variety of migratory animals including many species of fish and birds. A small number of migrating cetaceans pass through the area, though most move along the west of the British Isles (following the Gulf Stream). The importance of the pathway is determined by the shallow and narrow characteristics of the channel, its geographical location and configuration. It is also an important shipping channel.

Species using the corridor

Under water migration (Corridor type 1): Fish, *e.g.* the horse mackerel, are the most important migratory animals using or passing through the Dover Strait although some scientists think that common dolphins, bottlenose dolphins and long-finned pilot whales also migrate using this corridor.

Above water migration (Corridor type 3): It is an important passage for many migratory (water-)bird species. In 1994, 70,000 individuals were counted representing 253 species. Especially numerous were gulls, terns (sandwich, little and arctic terns), waders and the common scoter. The last species is particularly significant as it migrates from its northern breeding grounds clinging to the coast as it migrates to its southern offshore wintering sites along the French coast and around the Gulf of Cadiz.

Human uses and their effect

Despite being a major shipping route with a high density of maritime traffic, there appears to be little direct evidence of conflict with migrating species. In fact, shipwrecks are important fish-spawning and nursery areas.

Policy and legislation

In general, infrastructural use and nature conservation interests are in conflict but there are no specific legislative instruments covering this corridor. However, sporadic initiatives exist at the local level *e.g.* in Le Touquet, a French tourist town, a revision of the *Land Use Plan* has recently been proposed in order to limit the height of all future shoreline construction to 12 meters to ensure a safe passage for birds.

Associated areas

The area from Platier d'Oye to Fort-Vert (Corridor type 3) is the only large-scale wetland in the region. Here intertidal mudflats and coastal wetlands are of major importance to migrating waterfowl. It is a nature reserve owned by the *Conservatoire* (178 ha) although it is not very well protected or managed due to relatively high levels of use (from hunting) and the problems associated with the adjacent residences for tourism and recreation. In the Boulogne-Bay of the Authie area (coastal plain), a number of relatively large-scale wetlands still exist. Unfortunately, the protection of the estuaries is relatively limited, partly due to the fact that the intertidal areas are public domain under the responsibility of the national government (Rijsberman for IUCN, 1998). The French Cap Gris-Nez (Corridor type 3) hinterlands, is also a site for migratory continental species (common, sandwich and arctic terns). It represents an important stepping stone on the migration pathway along the Northern Sea coast. Here the corridor is very broad and not limited to the sea strait and its surroundings (Flohart, 1995).

2.2.2 Bosphorus (Turkey)

The Bosphorus Channel, connecting the Black Sea to the Marmara and Mediterranean Seas, is 33 km long and 1.5 km wide.

Species using the corridor

Under water migration (Corridor type 1): It is more important for fish migrating from the southern Black Sea to wintering areas in the Marmara Sea (mackerel, Atlantic bonito and bluefish); than for marine mammals. These generally migrate between the southern Black Sea and the Western and northern Black Sea, but also occasionally pass through the Bosphorus Channel (isolated populations of Bottlenose dolphin, Harbour porpoise and especially Common dolphin) (Berrevoets, pers.com., 1999);

Above water migration (Corridor type 3): It is important for migratory birds (such as black stork, white stork, lesser spotted eagle and Yelkouan shearwater).

Human uses and their effects

Migratory species are threatened by the rapid expansion of Istanbul *e.g.* birds are forced to roost overnight, often several tens of kilometres from the strait, before undertaking the crossing of the Bosphorus (Magnin, 1997).

Policy and legislation

Many instruments exist for nature protection in general which (directly and indirectly) affect habitat and species *e.g.* the 1983 Bosphorus Law deals exclusively with the strait including the planning and control procedures for the development of the *IBA5* (Important Bird Area of the Bosphorus Channel). A long term action programme has also been suggested concerning the protection of dolphins consisting of 4 main elements:

- a research and monitoring program (*e.g.* determination of the migration routes and times between the Black Sea and the Marmara Sea);
- the establishment of specially protected areas (including a regulation and/or banning of large-scale fisheries during migration and reproduction periods in certain areas; and regulation and monitoring of sea traffic along the migration path, i.e. Canakkale and Istanbul Strait);
- the enforcement of fisheries regulations;
- a public awareness campaign.

Associated areas

There are several important bird areas associated with the coastal strip of the Bosphorus, such as a permanent wildlife reserve, a nature park, the Belgrade forest (Corridor type 3) and numerous *SITs* (natural protected areas declared by the Turkish *Ministry of Culture*). *SIT* status can be quickly granted to any site by regional committees, without consent of other ministries, and it can trigger rapid legal action against construction and other developments. However, as soon as pressure against the protection status mounts, it can easily be cancelled or weakened: an example is the *IBA5* (Magnin, 1997).

2.2.3 Gibraltar Strait (Spain - Morocco)

Although only 15 km wide at its narrowest point, it is crucial for one of the three major north-south corridors (coastline corridor, type 3) for migrating birds (*e.g.* raptors, storks) in Europe. Gibraltar Bay acts as the only important foraging area for these transient seabirds in the strait.

Species using the corridors

Under water migration: Although much scientific knowledge is still missing it is already evident that various cetaceans (sperm whale, humpback whale, killer whale, false killer whale, long fin pilot whale, common dolphin, striped dolphin and bottle nosed dolphin) use the strait for migration (corridor type 1). The same is the case for fish populations (*e.g.* tuna, swordfish) and seabirds (*e.g.* Cory's shearwater). It is possible that some Mediterranean populations of Cory's shearwater would become extinct without genetic exchange with Atlantic populations. For some whale species *e.g.* fin and sperm whales, as well as marine turtles (Hashmi, 1999), similar exchanges may also be important as their effective population sizes are not very large.

Above water migration: There is a large movement of raptors (*e.g.* buzzards) from north to south in spring and vice-versa in autumn.

Human uses and their effects

Wind energy along the Spanish coast is developing rapidly although no large-scale fisheries occur in the sea strait neither does air traffic or shipping seem to have strong negative effects on bird or cetacean migration.

Policy

The Nature Protection Ordinance (1991) protects all cetaceans and turtles in the territorial waters of Gibraltar (UK). Fishing with nets and seabed raking within this three mile zone are

also forbidden. There is, moreover, complete legal protection for birds. A large area of the upper rock of Gibraltar, which is a staging post for hundreds of thousands of migrating birds, has been designated as a nature reserve. The law in Spain, however, is different. Although some species of birds are protected, and there are plans for some protected areas as designated Natura 2000 sites along the Spanish shore of the Straits, there is not the blanket protection afforded by law in Gibraltar. Regarding offshore waters in the Strait there does not seem to be any regulations (Cortes, 1999).

EXAMPLE of GOOD PRACTICE

Since 1984, a group of Italian nature conservationists have organised seasonal work camps of international volunteers to observe crucial hills and to campaign against the illegal hunting around the Strait of Messina during bird migration. The Messina Strait is used by more than 240 bird species as a migration corridor. This migration covers large areas on both coasts, including some urban areas like Messina and Calabria. Hunting is forbidden during the very concentrated spring migration but there has been strong poaching even of protected species like raptors or storks.

After many years of campaigning, poaching on the Sicilian side of the strait has now decreased. The continuous efforts have successfully raised awareness of the special importance of the strait as a migration corridor among the local population and the police force (Giordano, 1999).

2.3 Examples of dispersed marine migration in the Atlantic Ocean

Marine corridors are much less well known and more difficult to define than coastal corridors. In the case of whales, although their migrations are well documented, specific corridors have not been identified. Therefore, the term 'dispersed marine migration' has been used for this type of migration..

Though widely scattered, whales often have very distinct life cycles that involve migration between breeding and feeding areas. Some species may migrate vast distances (Doody et. al., 1998). The status, abundance and distribution of many whale species in the north-east Atlantic Ocean is uncertain. Almost all data on movements of whales rely on sighting surveys, (by)catches and counts of strandings on coastlines (Moscrop, 1996).

The migration patterns of whales are probably rather dispersed although, currents, edge situations (such as the edge of the continental shelf, underwater banks, sea straits and connection lines between sites of major food sources) may result in fixed migration patterns (Moscrop, 1996). For example, the continental shelves around Spanish, British, Irish, Norwegian and Icelandic waters are relatively rich in whales as these waters are highly productive due to mixing resulting in high plankton productivity (Evans, 1990).

The continental shelves are widely accepted to be an important migration route along which many of the great whales travel during their long migrations from breeding areas to the south and west of Britain to feeding areas to the north. The bathymetry of the area with deep waters, trenches, ridges and island platforms and a wide variety of bottom topographical features mean that a variety of pelagic species are present in the area either during migration or for more extended periods. High productivity and food resources such as plankton, fish and cephalopods, support a large marine community, including seabirds as well as seals and cetaceans. Many cetacean species are known to favour areas with steep bottom topography (Moscrop, 1996).

Analysis of cetaceans sightings indicates that the Hebrides appear to be an area of high cetacean density throughout the year, and high seasonal concentrations of some species occur around Orkney and Shetland and in the waters between the Shetland and Faroe Islands (Northridge et al., 1995; Bloor et al., 1996). Incidental sightings from around Britain and Ireland, and recent (as yet unpublished) acoustic data indicate that some large baleen whales such as fin, sei, humpback and even blue whales may be returning to former breeding grounds and migration routes (Evans 1992; Evans and Scanlan 1989)

Therefore, several places are known which are important during the migration of whales but they are not clearly enough defined to be called marine migration corridors. Only more research will indicate the importance of marine corridors for whales.

3. ANALYSIS OF NATIONAL POLICIES

The following is a review of the ways that coastal & marine ecological corridors are taken into account in nature conservation policies of selected European States.

3.1 Description of the policy concerning the protection of ecological corridors in the individual countries

It was not possible to review all of the 34 coastal countries in the UN-ECE region in the time allocated. Therefore, fourteen countries were selected based upon (i) their geographical location, with at least one country per regional sea, (ii) their political distribution (*e.g.* EU and non-EU member states), (iii) their size, and (iv) the ready availability of information.

3.1.1 The Caspian Sea

The Caspian Sea coast of is a key north-south migratory corridor for terrestrial mammals, as well as an important stepping stone during bird migration (corridor type 3). Ninety per cent of the world's sturgeon stock is still preserved in the Caspian Sea. However, pollution of the main rivers and the Caspian Sea, especially by the oil industry, is a very serious problem.

Turkmenistan

Introduction. The coast of Turkmenistan (corridor type 3) is home to five sturgeon species and the Caspian seal. The Atrek is the only river connected to the Caspian Sea and is used for migration by a number of fish species (corridor type 2). Semi-migrating fish in this region have decreased sharply due to the adjustment of the river and subsequent decrease in water flow. A connection to the sea now exists only 4-5 times a year (Salnikov, 1999). The narrow Karabogazgol strait connects the Caspian sea with the bay of Karabogazgol.

Policy. A *National Biodiversity Strategy and National Action Plan for Biodiversity* is under elaboration.

Laws and regulations. The 1991 *Nature Conservation Act*, the 1992 *Act on State Strictly Protected Natural Areas* as well as the 1992 *Law on the Protection and Rational Use of the Animal World* influence ecological networks. However, there are no specific regulations on coastal areas or ecological corridors. Reserves cover 19,971 sq. km (4.1%) of the total territory but the system of reserves still has deficits and does not yet represent an integrated system or network. There are two coastal reserves: Khasar Zapovednik (mainly for bird protection) and the Ogurchinskii Zakaznik (island).

Organisations. The Ministry of Nature Protection is responsible for ecological corridors. However, local and regional authorities are responsible for the Atrek-Caspian region in the period of spawning migration.

The Russian Federation
See Baltic below.

Azerbaijan
Policy. There are no policies specifically set up to protect ecological corridors but a number of sites are protected. So far only three out of ten important resting-places for migrating birds are strict nature reserves. Five protected areas were established for the preservation and restoration of wintering and migrating birds and many other animals. Four marine, or partly marine, reserves exist, which help to protect corridor type A1 and A3.
Laws and regulations. Azerbaijan has adopted a *National Environmental Action Plan*, which includes a rather weak biodiversity section. A network of specially protected natural areas has already been established to guard Azerbaijan's most valuable and undisturbed habitats. However, there are no specific conservation measures for migrating animals (*e.g.* sturgeon in river mouths, corridor type 2). The protection of ecological corridors and migrating species is regulated only indirectly through general legislation (*e.g. Law On Environmental Protection and Use of Natural Resources*, 1992). There are no regional or local acts or plans concerning environmental protection of river mouths (Lucius, unpublished 1999). Preparations are being made for the ratification of the *Ramsar Convention* (one former USSR reserve exists) and Azerbaijan is about to sign the *Bonn Convention*.
Organisations. The key environmental agency is the *State Committee of Ecology and Control of Natural Resource Utilisation (SCE).*

3.1.2 The Black Sea

Georgia
Introduction. Georgia has a coast of approximately 316 km. A number of bird and fish species (*e.g.* five sturgeon species, bonito and mackerel) migrate along its coast (corridor type 3) or even enter inland waters for reproduction (type 2). However. dams in rivers and industrial development impede fish migration because there are no functioning fish ladders.
Policy. There are a number of small, protected areas along the coast, some of which include marine areas. A recent government decision aimed to establish a marine reserve in the Poti-Ochamshire region, which contains the major part of the sturgeon population. Georgia signed the *ACCOBAMS (Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area*, 1996) agreement to protect cetaceans.
The government of Georgia has declared it will put one fifth of the country's territory under protection status by the year 2000, amounting to a total of 1.4 million hectares (Gabunia, 1999).
Laws and regulations. The *Law of Protected Areas* has an umbrella function for protection whilst a *Law for Endangered Species* is in preparation. However there are no laws specifically addressing the migration of animals.
Organisations. The *Ministry of Environment and the State Department for the Protected Areas, Nature Reserves and Hunting Management* are responsible for the development and implementation of policies concerning ecological corridors and protected areas.

The Russian Federation
See Baltic below.

Ukraine
Introduction. The migratory route of hundreds of birds species from Eastern, Central and Northern Europe (*e.g.* Europe's largest colony of nesting spoonbills, glossy ibis, pygmy

cormorant and Dalmatian pelican) crosses and uses the wetlands of the north-western Black Sea coast (type 3 corridors). The Strait of Azov (type 1 corridor) is also essential for fish migration (Bosch, pers.com., 1999). It follows that the protection of these wetlands is a crucial issue in coastal conservation in Ukraine.

Policy. The *Pan-European Biological and Landscape Diversity Strategy* and the *Concept on the Conservation of Biological Diversity in Ukraine* has been adopted by a Decree of the Cabinet Ministers. The general structure of the *Concept* is harmonised with PEBLDS, and one of the directions is the development of an ecological network to be a component of the PEEN. The latter is included in the *Program on the Conservation of Biological Diversity* currently subject to approval by the Ukrainian Parliament. The general scheme foresees at least 7 ecological corridors crossing Ukraine, one being along the coastline (Domashlinets, pers.com., 1999).

Laws and regulations. There is no special legislation concerning protection of coastal and marine ecological corridors although a number of relevant legal acts do exist: the *Law on Environmental Protection* where general principles of environmental protection are laid down; the *Law on Nature Reserve Fund of Ukraine* where classification of protected areas is characterised, conservation guidelines outlined and responsibilities of the different authorities defined; the *Law on Animal Kingdom* (Fauna) which regulates animal protection and use; the *Forest Code of Ukraine*, the *Water Code of Ukraine* and the *Land Code of Ukraine* regulate relevant aspects of human activity including the coastline. A new proposal for a *Coastal Law* is also currently under development (Bosch, pers.com., 1999). Moreover, a number of environmental conventions, which can promote the development of the ecological corridors idea within the country, and play an active role in the *Black Sea Environment Program (BSEP)* have been ratified (Domashlinets, pers.com., 1999).

Implementation. Several programmes are expected to start in the near future *e.g. Conservation of Biodiversity in the Azov-Black Sea Ecological Corridor*. These are aimed to protect the main components of the biodiversity (mostly birds) and the habitats in the Azov-Black-Sea coastline area, to create ecological corridors and to alter relevant policies where necessary. Other examples include the TACIS project *Transcarpathian Ecological Network* (started in 1999), the draft project *Establishment of Galytsko-Sloboshansky Ecological Network*, and the European initiative *Emerald Network* (Domashlinets, pers.com., 1999).

Organisations. In general, the Ministry for Environmental Protection and Nuclear Safety of Ukraine is responsible but co-operation with other governmental bodies (*e.g.* the *State Committee for Fishery*, the *State Committee for Forestry*, the *Ministry of Agro-industrial Complex*) as well as both national and international NGOs is also important.

EXAMPLE of GOOD PRACTICE

The Dnester wetlands (corridor of types 2 and 3), support a great number of important bird species on their migration route. An EUCC project in this area is restoring the hydrology of the riverbed. An important problem is the lack of water from the river which is cut off the surrounding wetlands by a joint Moldovian-Ukraine road. Furthermore, agricultural development on the Moldovian side has lead to increased flooding of this road. The project will restore the water flow thus reducing the economic costs of road management whilst restoring the corridor and breeding areas for many species *e.g*. spoonbill, glossy ibis, squacco heron & purple heron and increasing the spawning grounds and habitat for fish.

Bulgaria

Introduction. Bulgaria provides an important type 3 corridor for the 'Via Pontica", a main European migration route for birds. The Lakes Bourgas Complex is the most important site for bird migration in Bulgaria. Unfortunately, it has very limited seawater inflow (Ministry of

the Environment, 1995). Fish migration pathways between sea and river catchment (corridor type 2) exist in Bulgaria's larger rivers Kamchia, Ropotamo, Veleka and Resovska.
Policy. The *National Biodiversity Strategy* (1993) was followed by the *Action Plan for the Conservation of Biodiversity* (1999), which pays particular attention to the protection of ecological corridors. (Iankov, 1999)
Laws and regulations. The 1967 *Nature Protection Act* regulates the protection of habitats and species. It has been amended by some articles in the 1998 *Protected Areas Act*, which provides legal protection for migrating species. This new act obliges the government to ensure management bodies and plans for most coastal wetlands reserves. Bulgaria has ratified the Ramsar, Bonn and Bern Conventions including the African- Eurasian Migratory Water Birds Agreement.
Implementation. A number of initiatives have been taken to ensure long-term preservation of the important wetlands on the coast of the Black Sea. There is a national programme for biological monitoring, including during migration, within the *Bulgarian-Swiss Biodiversity Conservation Programme* and several management plans have been prepared. In the Poda Protected Site, an education programme has been initiated and an Information Centre built (Apostoleva, 1999).
Organisations. The *Ministry of Environment and Water* is the most important governmental institution responsible for the protection of migrating coastal and marine animals. There are 7 national institutions (among them the MoE's *Water Protections Department*) responsible for water.

3.1.3 The Mediterranean Sea

France
See Atlantic below

3.1.4 The Baltic Sea

Finland
Finland has a very long Baltic Sea coastline with many small islands and rivers (corridor types 2 and 3).
Policy. There are special programmes for protection of certain habitat types and species, for example the 1982 Waterfowl Habitats Conservation Programme (84,000 ha) and the 1990 Shore Conservation Programme (128,000 ha).The Land Use and Building Act (1999) requires that development on a narrow coastal strip (100-200 m) be based on a master plan. In practice, these plans allow a lot of summer houses on the shore. A current research project (1997-2000) aims to assess the effectiveness of the existing protected areas network. Coastal and inland waters are a special topic. A National Action Plan for the Environment exists but corridors are only weakly addressed (Ministry of the Environment, 1997).
Laws and regulations. Among others, the 1996 Nature Conservation Act is regulating species and habitat protection. Generally, shore front development is controlled by land use planning. Seven more important coastal and marine protected areas exist (*e.g.* Saaristomeri National Park, 18,000 ha). In addition, many small islands and skerries are protected during the nesting and rearing period of birds. Finland plans to establish six seal protection areas in its territorial waters.
Implementation. Finland is in the process of implementing the Natura 2000 network of the EU and the Baltic Sea Protected Area network of HELCOM which are to a great extent identical. These networks pay only a slight attention to the need of ecological corridors. Based on a HELCOM recommendation there is a special conservation programme for wild salmon.

This includes fishing restrictions during certain periods of the year. Fish stairs have been built in several rivers (Nordberg, pers. comm., 1999).

Russian Federation

Introduction. Russia's sea coast measures about 60,000 km. There are a number of regional seas bordering Russia (*e.g.* the Baltic Sea, the White Sea, the Barents Sea, the Black Sea and Sea of Azov, and the Caspian Sea). All three types of corridors occur. The migrating routes of valuable stocks of anadromous fish in the Black, Azov and Caspian Seas have been disturbed significantly due to a number of dams that have been constructed on the rivers (*e.g.* the Don and Volga rivers), at Lakes Ladoga and Ilmen (the Volkhov river) and also in the Kola Peninsula (the Tuloma, Teriberka and Voroniya rivers).

Policy.

Russia has a number of national parks and strict nature reserves (zapovedniks) in coastal regions although the protected areas are distributed unevenly. They do not yet present an integrated system to ensure animal migration and, moreover, many of the protected areas are currently under increasing economic pressure. There are, furthermore, no marine protected areas in the Black Sea and the Caspian Sea (Chebakova, 1997).

A federal plan proposes to protect 3% of the country's territory by the year 2005 which would result in 72 new strict protected areas and 42 new national parks (The World Bank/GEF, 1995).

Laws and regulations. The basic legislative act in the field of nature conservation is the *Federal Law About The Protection Of The Natural Environment* (1991*)*. The main law regulating the protection and use of fauna and their habitats is the *Federal Law on the Animal World* (1995). The basic law regulating the relations in the field of protection and use of habitats is the *Federal Law on Specially Protected Natural Areas* (1994) which provides categories for protecting corridors. Although there are no special national acts devoted to the protection of migrating animals, a new *Federal Law About The Arctic Zone Of The Russian Federation* has been proposed foreseeing restrictions over sites of regular mass aggregations of animals and their migration routes. A *Federal Law About The Exclusive Economic Zone Of Russian Federation* (1998) and a corresponding *Decree About Measures On Strengthening Of State Management Of Water Biological Resources* have also been issued.

Implementation. In general, implementation of the existing laws and protected areas is difficult. However, Russia and the Ukraine intend to agree on the co-ordination of conservation policies for dolphins in the Black and the Azov Sea, especially on their migration routes (Öztürk, 1994). With respect to marine mammals, there are extensive scientific programs aiming to study distribution patterns and migration routes.

Organisations. The Government of the Russian Federation has assigned the co-ordination of all functions for environmental conservation, including strict nature reserves, to a special institution, *Goskomecologia*. The *Scientific Committee of the Russian Federation on Environmental Protection (SCEP)* and its regional divisions is currently the most important federal body concerned with the implementation of environmental legislation. Regional boards deal with specifically urgent matters.

EXAMPLES of GOOD PRACTICE

• In autumn 1997, the strict regulations protecting Vrangel and Herlad islands (strict nature reserves since 1976) were extended to include 14,300 sq. km of surrounding marine habitats. Although the preservation of key polar bear habitats was the main reason for this step, safeguarding these marine areas will serve a wide range of ecosystems including migrating seabirds and walruses. The establishment of a 12 nautical miles **(**N.M.) protected zone adjacent to the islands avoids the danger of oil and gas exploration

· The Volga delta, the largest delta in Europe, is an important habitat for many migrating species (stepping stone in type 3 corridor). *Euronature* (NGO), in collaboration with the Regional Committee for Ecology, is protecting the Volga delta by increasing the present 1,250 sq. km of protected area and by improving the enforcement of the protection through rangers. Electric power lines have been modified to ensure safety for birds.

Latvia

Introduction. Latvia still has extensive natural areas which are comparatively unchanged by human activities making it one of Europe's most biologically diverse regions *e.g.* the Gulf of Riga and the Irbe Strait are internationally important waterfowl wintering sites (corridors of type 3).

Policy. The *National Environmental Policy Plan* (1995) is very general and has no specific policy concerning migratory species although they are indicated as one of the priority themes. The concept of coastal and marine ecological corridors is nowadays strengthened by the chain of protected areas located along the coast of the Baltic Sea and the Gulf of Riga (*Slitere State Nature Reserve, Engure Nature Park, Kemeri National Park and North Vidzeme Biosphere Reserve*) (Urtans, pers.com., 1999).

Laws and regulations. There is not yet specific legislation dealing with the establishment of corridors. Nevertheless, in the coastal *Law on Protected Belts* (1997), Article 6 declares strict protection for two 300 meter wide belts in on- and off-shore directions, and a 5 km restricted business operation belt. Article 7 determines protective zones for other water bodies which help protect migratory fish in rivers and river mouths (Urtans, pers.com., 1999). A new *Law on Protection of Species and Habitats* is expected to be passed by the parliament and includes "in the planning process of roads, electro-lines, communication lines, wind mills as well as canals, dams and other hydrotechnical constructions, an environmental impact assessment (EIA) should be undertaken. If building of these constructions is allowed, the responsible authorities and building participants should make plans and realise measures to ensure conservation of local and seasonal migration routes of animals." (Blanca, pers.com., 1999). Moreover, the draft *National Program on Biological Diversity Strategy* states that natural rivers and their valleys are important dispersal routes (corridors) and that the building of hydro-electrical dams obstructs fish migration, threatening their natural spawning populations. It defines the aims and actions to ensure the functions of ecological corridors along rivers, the development of an ecological network plan integrated into territorial planning, protection of fish migratory routes along rivers and renewal of important fish migration routes.

Implementation. Several pilot projects are designed to deal with the analysis of the state of the protective belt along the coastal and inland water bodies and the marine coast. The aim is to define the essential activities needed to be undertaken in order to maintain the functions of these areas, which includes corridors.

Organisations. The Ministry of Environmental Protection and Regional Development is responsible for all species, including migratory ones, and consequently will supervise any ecological corridors' development. Local authorities, the State Forest Service, the Regional Environmental Protection Boards and the administrations of the coastal protected areas also intervene at a more site-specific and implementational level.

EXAMPLE of GOOD PRACTICE

Latvia is one of the four countries in the Baltic Sea region where salmon spawning rivers have been preserved and the River Salaca (type 2 corridor) is a national indicative river for salmon. Salmon is a protected species and is not allowed to be caught. Sea trout on the other hand is authorised for fishing with a license up to 15 km from the coast, but more land inwards it is completely protected.

Lithuania

Introduction. The Nemunas river and the Curonian Lagoon are wetlands especially important as a type 3 corridor for bird migration between the Arctic regions and central and western Europe and as a type 2 corridor.

Policy. Lithuania has a *National Environmental Strategy* and a *Biological Diversity Conservation Strategy and Action Plan* (1996) which take migration into consideration. An action plan for the protection of coastal and marine ecosystems has also been developed. Recently, a policy to establish a national ecological network has been adopted at the national level. Territorial plans are being prepared for the national level and for the provinces Vilnius and Klaipeda. However, there are no special provisions for coastal ecological networks.

Laws and regulations. The *Law on Environmental Protection* (1992) is the core law. The *Law on Protected Areas* (1993), the *Law on Wildlife* and the *Law on Protected Plant and Animal Species and Communities* (1997) deal with biodiversity issues. Neither coastal nor marine corridors are addressed by specific laws. Protected areas cover a large part of the Lithuanian coast (*e.g.* Pajuris Regional Park, Kursu Nerija National Park, Nemunas Delta Regional Park).

Implementation. Lithuania will start implementing the national ecological network in the Klaipeda and Silute Districts. This will cover nearly all the coast. The project will designate core areas and corridors (Mierauskas, 1999). Several projects on landscape and biodiversity conservation in protected coastal areas have already been started *e.g.* a management plan for the Nemunas River Delta, the implementation of the Curonian Lagoon regional management plan and the comprehensive management of other Lithuanian coastal areas. The pumping system for the polders in the Nemunas delta have been adapted to fish migration (Mierauskas, pers. comm. 1999). Training programmes are being developed for the protection of biodiversity and rational use of fish resources in the sea and the lagoon.

Organisations. The Ministry of Environment is primarily responsible with protected areas under the *Department of Cultural Values Protection***.**

EXAMPLE of GOOD PRACTICE

Since 1994, the Rusne island project in the Lithuanian Nemunas delta, by *EUCC and Rusne Fund for Nature*, serves an excellent example of how nature protection can respond to needs of local populations and how conservation can occur hand-in-hand with an improved economy for communities through sustainable agriculture and tourism. Located in the delta of the river Nemunas, the wet meadows of the 5 sq. km Rusne island is of major importance as a stepping stone for migratory birds. However, due to the collapse of the state farms after 1991, the meadows were quickly overgrown due to lack of management and the required habitats for the migratory birds disappeared.

A management plan for the island defined the natural and cultural values so that they could be incorporated into conservation management. The local farmers organised themselves to implement the management plan themselves and began to make silage without the use of artificial fertilisers and pesticides and conducted their first mowing after the bird-breeding

season. Geese began to use the restored meadows again during the first winter. (www.eucc.nl.)

Germany

See the North Sea below.

Denmark

Introduction. The very high degree of indentation of the coasts, often sheltering shallow waters, contributes to making the Danish waters suitable as staging and wintering grounds for a great number of Europe's migrating waterfowl (corridors type 3). Also numerous harbour seals and harbour porpoises live and breed in the shallow Danish waters.

Policy. In Denmark, it is important for the counties to establish and protect ecological corridors.

Laws and regulations. There is specific legislation for the protection of ecological corridors *e.g. Danish fisheries legislation* puts certain general restrictions on fisheries in rivers and in areas adjacent to rivers and narrow fjord and lagoon outlets aiming to ensure the safe passage of anadromous fish (Andersen, pers.com., 1999). Moreover, very strict rules in the *Nature Protection Act* protect most types of natural and semi-natural habitats (*e.g.* lakes, water courses, wet meadows, dry grassland, heath land and coastal meadows) against any deliberate alteration. In addition, similar restrictions are in place with regard to coastal areas and zones along major water courses and around lakes. Other areas are protected by means of specific conservation orders. Along the western coastline of Jutland, as well as in other parts of Denmark, there has gradually been established a network of nature reserves which serve as an important corridor for migrating birds. These reserves will constitute an essential part of the *Danish Natura 2000 network*, including 194 sites covering 10,260 km² (2,880 km² land areas and 7,380 km² marine areas).

Implementation. In connection with the construction of the *Great Belt Link* (between two main islands) and the *Øresund Link* (between Denmark and Sweden), a so-called zero-solution was chosen according to which the transport of water of different salinities to, and from, the Baltic Sea should not be altered (corridors of type 1). Although not specifically stated, this would also imply no change in the possibilities for marine species to migrate. Denmark also attempts to avoid placing *e.g.* windmills, and puts restrictions on hunting, in important bird areas such as the Wadden Sea (type 3 corridor) which constitutes an important part of the "West European Flyway" (Andersen, pers.com., 1999). Measures have, furthermore, been taken to facilitate the passage of anadromadous fish around dams and turbines. Many such obstructions have been abolished in recent years by counties alone and by counties in co-operation with state authorities (Corridors of type 2). Such initiatives will continue to be taken in the future.

Organisations The *National Forest and Nature Agency* under the Ministry of Environment and Energy is the national authority responsible for nature protection in coastal and marine areas.

EXAMPLE of GOOD PRACTICE

- From 1994 to 1997, the Danish Institute for Fisheries Research conducted an investigation of salmonoid stocks and fishing in the Wadden Sea area in collaboration with the counties of Ribe and Southern Jutland. As a result, a series of concrete technical measures for the restoration of the watercourse habitats (Corridors of type 2) have and will be taken: careful maintenance of the watercourses, limiting sand movement in watercourses, establishing new spawning areas for salmonoids, improving conditions of passage for fish, reducing pollution from fish farms, reducing other pollution, limiting by-catches and sub-legal size sea trout in

trap and fyke nets in the Wadden Sea, closely evaluating the effects of anglers' catches of immature sea trout evaluating the effect of river mouth releases of sea trout smolt and releases in general.

3.1.5 The North Sea

Germany

Introduction. Germany borders both the North and Baltic Seas. Both coastlines and the islands in the Wadden Sea (the largest intertidal mud plains in Europe) are of great importance for biodiversity (type 3 corridor). There are no big river deltas and for centuries human activities have significantly altered the river mouths (corridor type 2).

Policy. Germany is partner to *HELCOM* which aims at establishing a system of Baltic Sea Protected Areas (http://www.helcom.fi). Animal migration in the North Sea is dealt with through the *Wadden Sea Plan* (1997), a trilateral agreement with Netherlands and Denmark. It also aims to improve the habitats of migrating fish, especially in the coastal area (http://cwss.www.de). There are also conservation programmes for migrating birds. Within the framework of the *Bonn Convention*, a seal agreement which resulted in a trilateral Seal Management Plan, applies in the Wadden Sea. Germany has signed *ASCOBANS (Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas*, 1991) to protect cetaceans in the North and Baltic Seas. Almost the entire North Sea coast and most of the Baltic Sea coast is protected by national parks or other reserves which specifically include migrating species *e.g.* in the Hamburg National Park areas are closed off during passage of rare bird species (*e.g.* Little Tern) (Janke, 1999).

Laws and regulations. Nature protection in general is regulated by the *Federal Nature Protection Act*. Except for species conservation, this law sets a framework for legislation of the individual States. The same is the case for the *Federal Water Act* and the *Federal Act on Waterways*. There is no law on the national or state level dealing specifically with the conservation of marine and coastal corridors. This subject is addressed through the general legal structure. The *Schleswig Holstein State Act on Nature Conservation* will create a sanctuary for harbour porpoise east of the islands of Sylt and Amrum (up to 12 N.M.) (Roesner, 1999; Kossmagk-Stephan, 1999). A special law regulates industrial and commercial installations in the EEZ and on the high seas (by German owners) except for mining and shipping installations.

Implementation. The states are responsible for implementing nature conservation. In Lower-Saxony a river conservation programme is trying to create rivers without barriers for migration to the sea. It is being implemented successfully except in the coastal areas. There are several regional and local efforts to remove migration barriers for fish in the main rivers, including estuaries, and also in their smaller tributaries (Sellheim, 1999). Several efforts for protecting or re-introducing species (like salmon) exist. In many places the functioning of fish ladders is monitored and often improved as a result (Brunken, 1999). There is a pilot-study to determine the potential for restoration of brackish habitats and the technical improvement of sluices and tidal pumps which are important for (small-scale) migration patterns in the coastal areas (Schirmer, 1999).

EXAMPLES of GOOD PRACTICE

In Germany, in 1996, an action programme for nature conservation in the floodplain of the river Weser and its two tributaries Werra and Fulda was adopted (Ministry of Environment of Lower Saxony et al. (eds.), 1996). It included a survey and monitoring of species, biotopes, types of land uses and conflicts and resulted in a comprehensive ecological concept for the river and its tributaries and their floodplains. This concept is detailed, complex and

comprehensive (Ministry of the Interior and Senator for Environmental Protection and City Development of the City of Bremen (eds.), 1993). It has already resulted in an improvement of the rivers as a corridor for fish and a stepping stone during bird migration. Apart from improving the habitats and the natural dynamics of the rivers, the concept also demands an improvement in the permeability of all dams in the rivers. Implementation will, however, be a challenge for several decades to come.

Netherlands

Introduction. The Wadden Sea, the Delta area, the Ijselmeer and the major rivers of the Netherlands are of international ecological importance, *e.g.* for migrating waterfowl and as breeding areas for fish (corridors of type 2 and/or 3).

Policy. The *Nature Policy Plan (NPP*) was launched in 1990 to set up an ecological structure for the Netherlands. Emphasis was initially on nature reserves but with progress in its realisation corridors started to be developed in 1997. Unfortunately it should be noted that the coastal and marine aspect is not yet considered as a priority issue.

Laws and regulations. Although there is no specific legislation for corridor protection as such, the *Bird Act*, the *Flora and Fauna Act*, and especially the *Nature Protection Act* are relevant regulations. At a more species-specific level, measures for the Atlantic salmon (protecting their pathways and opening their migration routes) are undertaken to increase their population in the Rhine and Meuse (type 2 corridors). Similarly, the Wadden Sea ecological corridor is a very important nursery zone for juvenile fishes, with 60% of the total North Sea population of plaice. One of the main threats is the shrimp fishery because of juvenile bycatch although, through the *Fisheries Act*, vessels are obliged to have a machine on board which splits the catch and releases the juvenile flatfish back into the sea. (Lanters, pers.com., 1999)

Implementation. Several specific measures have been taken as a result of the NPP varying according to the species taken into consideration *e.g.* pipes, tunnels, wetlands, bushes, and trees connecting two terrestrial habitats (Karelse and Hine, pers.com., 1999). Other independent initiatives aimed at facilitating migration are the re-opening of the dam in the Haringvliet -Delta area and the installation of two sluices in the Ijselmeer.

Organisations. There are three levels of competence in this plan: the national government, responsible for defining the guidelines for the policy; the provincial government, responsible for translating the policy into a regional plan and co-ordinating local governments actions; and the local government, responsible for realising the plan. A discussion platform also exists and is made up of representatives from the relevant ministries, provinces, water boards, nature conservation organisations and the related projects (Tekke, pers.com., 1999).

EXAMPLES of GOOD PRACTICE

- The migration of the stickleback from the sea-water to the polder area of the Wadden Sea (in that case, type 2 corridor) became endangered due to the closing of the freshwater sources by a sluice. To overcome this, pumping stations have been installed so that fish, swimming in, are pumped up without being injured and transferred to the other side (and vice-versa if needed). Since these fish are also a main source of food for birds, especially spoonbills, it helps maintaining two kinds of population at the same time. (Tekke, pers.com., 1999)
- The Dutch Society for Dune Conservation (an NGO) developed a plan for the local implementation of the ecological network, including several coastal corridors, for a coastal dune area in the province of South Holland (regional government). The plan was tuned to the existing national and provincial ecological networks and aims to improve the migration of micro fauna and flora. The plan has shown the most important bottlenecks for migration and proposes concrete solutions to solve them.

Belgium

Introduction. The Belgian coast being close to the Dover Strait (see 2.2.1) functions as a stepping-stone and type 3 corridor for internationally important concentrations of nine seabird species (particularly sea-ducks) (Seys 1999). As the only large estuary (partly), the Schelde is important (corridor type 2) for a number of migrating and wintering birds(*e.g.* Gadwall, Teal) and fish species (*e.g.* flatfish, eel). However, it is still very polluted by domestic and industrial wastewater (Brussels has no wastewater treatment facilities) which, together with port development and related activities, threaten the estuary's habitats. A sluice complex currently blocks the smaller Ijzer estuary.

Policy. No specific policies exist to protect ecological corridors in marine areas. However, bird migration routes and river mouths receive highest priority in the general environmental policies which reflect relevant international laws. The Belgian government aims to improve the Schelde ecosystem, in co-operation with the Netherlands and France, and under the umbrella of the International Commission for the Protection of the Schelde. Belgium intends to establish at least one marine protected area, extending 3 miles seaward, within the framework of the EU-Habitat Directive. Based on seabird distribution data, two more areas, both within the 12 N.M. zone, may be proposed in the future (Haelters, 1999).

Laws and regulations. No separate legal regulations for ecological corridors exist but in 1999 Belgium adopted an innovative framework *Law On The Protection Of The Marine Environment (*www.staatsblad.be**)**. Among other issues, it includes the possibility to establish marine protected areas and aims at a better protection of marine species.

3.1.6 The Atlantic Sea

France

Introduction. France has coastline on both the Atlantic Ocean and Mediterranean Sea. Estuaries of the French Atlantic Coast (*e.g.* Seine, Loire and Gironde) can be considered as coastal ecological corridors (both types 2 and 3). The Seine estuary, partly protected (but not as an ecological corridor, Paskoff, pers.com., 1999) is a vast humid zone located along a coastal migration route of an abundant and diversified avifauna (*e.g.* redshank, knot and 1% of the avocet population). It is also a favourable area for juveniles of various fish species (*e.g.* plaice). Unfortunately, because of conflicts with shipping, large migratory fishes are absent compared to other North-European estuaries like the Gironde (IFREMER, 1999).

Policy. The *Scheme of Service for the Natural and Rural Areas* fixes the economic, environmental and social orientation of the natural and rural areas including the concepts of ecological networks. Its implementation will be done in a contractual way (via *Planning Agreements*), and a consultation process conducted by the state government in association with all interested parties. The *Funds for Natural Areas' Management*, launched with the new *Orientation Law for the Sustainable Planning and Development of the Territory* (*LOADDT*) of 1999, could also be used for the preservation of biodiversity.

Laws and regulations. There is specific legislation for the protection of ecological corridors. If the *Coastal Law* (1986) aims at preserving the *remarkable natural areas* without having in mind the concept of ecological corridors, the, *LOADDT* does. It plans to re-orientate the strategic planning through eight *Schemes of Collective Service* (approved by decree for 20 years) aimed at the implementation of strategic choices from the national policy of spatial planning and development.

Implementation. Guidelines are defined at the national level and applied at the regional level through two de-centralised ministerial departments: the *Regional Direction for the Environment* (*DIREN*) and the *Regional Direction for Agriculture* (*DRAF*).

Organisations. The *Department of Nature and Landscape* (*DNP*) of the *Ministry of*

Environment and Spatial Planning, advised by the *Institute for Ecology and Biodiversity Management*, is the official responsible governmental body. However, all organisations having competencies in spatial planning participate in the process.

EXAMPLE of GOOD PRACTICE

The Adour estuary (corridor of types 2 and 3) is a series of unconnected wetlands with tourist and industrial zones. Migratory fish species like the sturgeon and the salmon have been reported to be fished in large quantities but the water quality is nowadays insufficient, due to nitrate pollution, to allow the necessary conditions for a sustainable equilibrium of the resident populations and for the migration of other species. This situation has been aggravated by the diminution of the wet areas and the lack of care of *barthes* (dikes with irrigation channels communicating with the river channel constructed in the XVII century to protect the agricultural areas from flooding).

The estuary and catchment area was famous for Atlantic salmon; it is still the only river in France where individuals of more than 1 meter and more than 10 kg can be observed. Since the 60's, the construction of dams and dikes has led to a strong diminution of the stock. From the beginning of the century until now the catches decreased from 60-70 tonnes/yr to 5-20 tonnes/yr.

This decline in the anadromous fish stocks was of such concern that the fishermen decided to stop fishing during the migration period in 1993 and are willing to do it again for a one or two month period from 1999. This is being combined with a research unit currently offering information to policy-planners and decision-makers, especially within the *Committee for the Management of the Migratory Fishes* and the *Water Agency* for its catchment basin policy to improve the fish stocks.

As can be seen, few countries have specific policies regarding corridors. However, a large number of individual sites are protected as stepping stones and/or core areas which also provide corridors for more transitory species. This has important consequences for the identification and definition of an ecological corridor which is discussed further below. A more detailed description of the organisations responsible for policy in the individual countries is given by Jongman (1999). More details concerning protection of corridors in Denmark, France, Latvia, Netherlands and Ukraine are given by Lievin (2000).

3.2 Analysis of international policies

There are no specific policies or international legislation which deals specifically with the protection of corridors although by definition these areas are obligatory and/or potentially vulnerable to the species which use them. Site specific protection may partly cover some aspects of corridor conservation *e.g.* a protected estuary may provide a corridor for migrating fish or a stepping stone for migratory birds. The following section looks at international policy issues and other initiatives and assesses the extent to which they cover the needs of corridors as defined above.

3.2.1 UN/CLOS and EEZ

In 1982, international efforts for the protection of the marine environment resulted in the *United Nations Convention on the Law of the Sea (UNCLOS)*. This legal order came into force in November, 1994 after the 60th country ratified the Convention. *UNCLOS* balances the right of States to use the ocean and its resources with the duty to protect and preserve the marine environment and living resources. It divides the sea into internal waters, territorial seas, contiguous zones, continental shelf, Exclusive Economic Zones (*EEZ*), and high seas. The declaration of an *EEZ* is a means to extend the jurisdictional zone of territorial seas from

the former maximum 12 N.M. to a maximum of 200 N.M. Hereby coastal states gain sovereignty over all natural resources (living and non-living) including the research needed to access them (Ducrotoy, 1996). However, they also take responsibility to protect the environment and sustainably use the resources. Several countries (*e.g.* Belgium, Germany, Russian Federation) have implemented *UNCLOS* through specific legal regulations.
While the Convention does not specifically provide for the establishment of marine protected areas, it envisages the possibility of protecting clearly defined areas of the marine environment from certain maritime activities. It does not, however, state what kind of measures States should take to conserve living resources within areas under national jurisdiction and beyond, and to protect and preserve rare or fragile ecosystems, habitats of depleted, threatened or endangered species and other forms of marine life (www.un.org/depts/los/). Although it deals with the regulation and enforcement of conservation of highly migratory species (through Total Allowable Catches), marine mammals, anadromous and catadromous fish species, it does not primarily serve nature conservation since its primary goal is the sustainable use of resources, particularly stocks of fish (Weiss, 1999). The conservation of ecosystems and endangered species' habitats is addressed although an ecosystem approach is missing and the definition of conservation remains vague. Nonetheless, the EEZ can serve as a legal basis for national policies and regulations for nature conservation and thus also for ecological corridors.
Some disagreement still exists whether the *EU Birds and Habitats Directives* include *EEZ*'s. They mention a number of marine species as having special status of protection, therefore Weiss (1996) and Nordberg (1999) argue that *Natura 2000* should include them where scientific evidence demands a selection as prescribed in the directives annexes. Accordingly, an impact assessment should be conducted during the application procedure of a project in a *Natura 2000* area. Sweden has explicitly mentioned that its *Hunting Act* applies within the EEZ and Denmark has declared *SPA's* in the *EEZ*. Great Britain, however, has explicitly stated that certain regulations do not apply to an *EEZ* arguing that it is not EU territory (Nordberg 1999).

EXAMPLE of GOOD PRACTICE

RAMOGE is a trilateral agreement signed in 1976 by France, Monaco and Italy to foster a dialogue and co-operation in research and implementation of coastal and marine protection and management. Several coastal and marine protected areas have been established in the experimental zone of 7,450 sq. km and 4.4 million inhabitants stretching from the mouth of the river Rhône to that of the river Magra in Italy. A recent project has been the creation of a sanctuary for marine mammals covering about 100,000 sq. km in the Ligurian Sea between Hyeres, La Spezia and Sardinia, which is particularly rich in aquatic life and thus important for cetaceans. It aims to improve fishing techniques (e.g. no drift net fishing), pollution control, fast boat traffic and marine tourism thus ensuring the migration patterns in the area. (van Klaveren, 1999)

There are intentions to define target species for nature conservation and to establish protected areas in the North Atlantic, including the North Sea, through the *OSPAR* process (www.ospar.org). In 1998, OSPAR was amended with a section concerning marine nature conservation. The *EEZ* is to be considered in the definition of offshore *Baltic Sea Protected Areas* and Poland has already selected ecologically important areas in its *EEZ* for offshore *BSPA's* (www.helcom.fi).

3.2.2 Bonn Convention

The *Convention on the Conservation of Migratory Species of Wild Animals (CMS)*, the *Bonn Convention* (1983) aims to conserve those species of wild animals that migrate across or outside national boundaries by developing and implementing co-operative agreements, prohibiting the taking of endangered species, conserving their habitats and controlling adverse impacts. Since the *CMS* has legally-binding provisions and since "the States are and must be the protectors of the migratory species of wild animals that live within or pass through their national boundaries", it could act as legislation at the governmental level for ecological corridor. As an example, one requirement of the *ASCOBANS* and *ACCOBAMS*, both part of the *CMS*, is to enforce legislation. Furthermore, the *Conference of the Parties to the Bonn Convention* (Nov 6-16, 1999) will address the issue of translation of the *CMS* into national legislation.

The Bonn Convention framework could be applied to protect migratory animals along their whole migratory route.
That means at a global level:
- development of recommendations for economic mechanisms towards sustainability in using coastal and marine resources, especially in areas important for animal migration;
- development of new, international agreements aimed at regional conservation of specific groups of animals and creation of a network of important habitats for such animals;
- raising public awareness with regards to the conservation of migratory animals utilising the ecological network approach;
- dissemination of the best available practice on the conservation of migratory animals along corridors;
- establishment of an international co-ordination body to review current activities in, and develop proper recommendations of, range States.
And at national level (example from Ukraine):
- development of regional programmes and action plans to preserve migratory animals along their migratory routes. Within the country, every oblast (province) has been instructed by central government to develop regional action plans for the conservation of migratory animals and their habitats focusing first of all on the species included in the appendices of the CMS, and local, nominated CMS focal points;
- changing human activities in migratory areas using economic and legislative instruments under the framework of the Bonn Convention and following relevant commitments by means of local government decisions and acts;
- applying relevant recommendations and resolutions of the Conferences of the Parties to the CMS as a basis for the development of national legislation or research;
- identifying important habitats for migratory species listed in the appendices to the Bonn Convention and creating a national network of such places with monitoring and research. Such a network can be legally endorsed by the Ministry or other relevant authority as a network of sites of special conservation interest and this network then has special conservation status (Domashlinets, pers.com., 1999)

3.2.3 Bern Convention

Apart from coastal species, the *Convention on the Conservation of the European Wildlife and Natural Habitats (Bern Convention)* lists marine mammals, reptiles, birds and a number of threatened non-vertebrate species, including their habitats, and other endangered habitats. Due to a lack of information about marine species, however, marine species and habitats are generally reflected disproportionately in the lists. Nonetheless, it stresses the importance of protecting areas of importance for migratory species and includes EEZs.

The convention has promoted leadership in the field of nature conservation through protected areas. Its *Emerald Network* extends a trans-national nature conservation system of protected areas to central and eastern Europe. In the future, it can help to provide an improved methodology for conserving the coastal and marine environment and to create a truly pan-European perspective.

3.2.5 The European Union

The European Union has produced important policy instruments like the *EU-Habitats and Bird Directives*. *The Habitat Directive* designates the establishment of an ecological network, Natura 2000 in which every member state has to nominate Special Areas of Conservation. Thus far, only core areas have been taken into consideration. There is no special policy on the protection of ecological corridors although certain articles are concerned with the ecological coherence of the Network. This allows the opportunity for new policy which could affect ecological corridors and an expert team is currently drafting such guidelines. These will be published towards the end of 1999 (pers. comm. Lauri Nordberg).

EXAMPLE of GOOD PRACTICE

The EU Habitat Directive has, generally, not been implemented in marine areas. This might now change as the British government has been forced to implement the Directive in the marine Exclusive Economic Zone (EEZ). This may have implications for other coastal EU States.

A full High Court hearing took place in London, in November 1999, as Greenpeace challenged the UK Government for failing to protect whales, dolphins and deep-sea coral reefs from the impacts of oil exploitation in the Atlantic Frontier, West of Scotland.

This area is a vital breeding and feeding ground and has also been described as a "whale motorway" because it is recognised as an important migration route for many species. The UK Government attempted to limit the harm done to these animals using only guidelines to oil companies. However, little protection was given.

The outcome of the court case was that all future offshore oil licensing would be declared illegal until the Directive is properly implemented; and this would apply equally to all other European countries when claiming the rights to exploit oil and gas up to 200 nautical miles (EEZ) offshore. As from now, it would effectively mean that with those "rights" comes responsibility: the responsibility to conserve the marine habitat for the EEZ (www.greenpeace.org.uk). This means that important marine core areas or marine ecological corridors can be protected by the Habitat Directive.

The EU is responsible for fisheries in its waters, including the EEZ's. *The Common Fisheries Policy (CFP)* is, to a certain degree, integrated with efforts for nature conservation. There are regulations concerning the abolishment of driftnet fishing and special regulations for salmon and sea trout. Some (seasonal) limitations for fishing apply to certain fish species in certain areas.

4. CONCLUSION

This report, which has attempted to examine the importance of corridors to the conservation of a wide variety of migrating animals which inhabit the land and/or the sea, has highlighted a number of important issues.

Policy Development

Many European countries have developed a general legal framework which helps to protect

ecological corridors. There are also already some protected sites with importance for animal migration in coastal areas and, in some cases, legislation even protects the majority of the coast and there are ambitious intentions for the increase of protected areas within the coming years.

Nonetheless,

- there is a lack of an overall and consistent policy and legal approach towards corridors in Europe,
- specific legislation for protecting coastal and marine ecological corridors is missing, in other cases, laws are overlapping,
- the Pan European Ecological Network (PEEN) is in different stages of development in different European countries and marine areas are being neglected,
- few countries have specific, national policies on ecological networks within their biodiversity policies,
- the amount of marine protected areas remains highly disproportional and is mostly restricted to coastal and territorial waters only, and
- not all countries have joined and ratified all relevant international conventions.

In most cases, the development of corridors is still considered to be secondary to the development of core areas. This has lead to a great policy deficit with regard to the protection of corridors, particularly for marine species and their connection to coastal corridors. Whilst there are, various sectoral efforts to protect or even re-introduce endangered, migrating species, efforts to harmonise fisheries and hunting with animal migration remains weak.

Implementation

Implementation of protective measures for corridors is rather sporadic and *ad hoc* giving a patchwork approach to solving the problem. Implementation suffers from a lack of funding, especially in Central Europe and the NIS. In contrast to core areas there are no separate funds available for corridors. This lack of funding means that implementation is often not enforced or controlled. Nonetheless, there are several initiatives to preserve or improve the status of protection of migrating animals and their habitats. These efforts range from better management plans for protected areas, awareness and training to the removal of physical migration barriers in river mouths and migration-friendly technologies. Successful implementation often relies on the active support of several sectors, other than just nature conservation, especially agriculture, fisheries, industrial and infrastructural development

Although the responsibility for policy on migrating animals is generally assigned to one institution, the responsibility for implementation and enforcement is often split up among many institutions and co-ordination is often missing. The lack of integration at an administrative level further leads to inefficiency and lack of sectoral integration. An international, integrated co-operation is particularly crucial in marine areas. Many valuable initiatives, with working structures, exist in regional seas (North Sea, Baltic Sea, Black Sea, Mediterranean, Northeast Atlantic) and for some estuaries and river catchment areas transboundary and multi-sectoral approaches exist. However, harmonisation and co-ordination between these different multi-national approaches is not strong enough to give an effective pan-European coastal and marine strategy.

Information

All legitimate approaches to the corridor concept are hampered by a real lack of information on the behaviour, habitat and status of migrating animals and their migration patterns in

Europe, especially in marine environments. Long-term studies are missing and biodiversity monitoring and updating of Red Data Books could be improved. Since many core habitats are not clearly defined, migration corridors are also difficult to define.

5. Recommendations

Taking into consideration the examples of corridors (chapter 2), the analysis of national and international policies (chapter 3) and their conclusions (chapter 4), several recommendations have been drawn up for States to improve the protection of their ecological corridors.

First priority recommendations:

States are recommended to:

1. Adapt, and further develop, the concept of the Pan-European Ecological Network (PEEN) to marine areas, including the Exclusive Economic Zone (EEZ) and the continental shelf. The conventions of the regional seas could be used as platforms to implement PEEN and to protect ecological corridors. Existing instruments and structures (like the EU-Birds and Habitats Directives, the Bern and Bonn Conventions, etc.) should be used to achieve integrated protection and management of coastal and marine ecological corridors.
2. Further develop, conduct and implement integrated planning and management such as Integrated Coastal Zone Management (ICZM) in coastal and marine areas (including the EEZ and the continental shelf) to achieve coherent ecosystem approaches.
3. Discourage developments that threaten ecological corridors in sea straits and river mouths, through planning, regulation and financial instruments. Particularly high standards should apply during planning and project application procedures (e.g. Environmental Impact Assessment). Actions that could be taken in river mouths are the use of bird-compatible power transmission lines, retreating defence lines (dikes) to allow for more natural dynamics in estuaries, and more natural flooding regimes near river dams (including fish ladders); and in seas straits, certain industrial developments *e.g.* windmills, airports, power lines and power stations should be avoided or limited.
4. Integrate fisheries policies with coastal and marine ecological corridors to avoid over fishing of migrating fish, encourage species-specific fishing and minimise by-catches. Closures of areas for fishing, obligatory changing of catch areas and specially adapted technologies should be applied during peak migration of all animals in ecological corridors.
5. Take important ecological corridors into consideration, especially in marine areas, within the existing policies and laws by developing and implementing higher standards of pollution control and stricter codes of good practise for these areas.
6. Develop and fund research programmes on migrating species in coastal and marine areas to determine both species specific core areas and types of corridors between them, particularly for endangered species.

Second priority recommendations:

States are further recommended to:

1. Technically elaborate the concept of ecological corridors at each level of administration in order to fit it effectively into their individual administrative structures and spatial planning policy.
2. To approach PEEN in an integrated way by combining the corridor function with other functions (e.g. flood control when wetlands are concerned; taking into consideration the land/coast/sea system as a whole instead of as three separated sub-systems e.g. in the case

of anadromous fish; vertical integration of administrative bodies to avoid a lack of uniformity among the different levels; and public participation and information.

3. To initiate or further elaborate international co-operation on migrating animals in all regional seas and transboundary sea straits.
4. To establish or strengthen awareness among policy makers on the importance of ecological corridors, especially in marine environments.
5. To establish or strengthen rules for hunting animals during migration, especially seasonal restrictions in specific areas (e.g. fish in estuaries and birds and fish in sea straits).

It is important for the member states of the Council of Europe to consider the implementation of these recommendations now. Key approaches will include understanding the nature of the corridors and identifying them as part of the Pan-European Ecological Network linking the core elements together. For restricted corridors such as straits between land masses and river corridors between the land and sea special measures need to be adopted. These should be looked at in such a way as they are seen to complement existing more traditional approaches filling in at least some of the gaps in species protection. Other corridors such as "flyways" for birds or open sea migratory routes for cetaceans policies specific to certain areas will be more difficult to enact. However, an internationally agreed policy concerning the development, implementation and protection of coastal and marine ecological corridors is needed to enable members states to go further with establishment of the Pan-European Ecological Network. Populations of migrating animals are nearly all declining because of habitat destruction, fishing and by-catches, competition for food resources, pollution and physical barriers to migration. Lack of action in the development of ecological corridors will push many species to the brink of extinction.

CORRIDORS AND ECOSYSTEMS:
PROJECT ON COASTAL AND MARINE AREAS

ANNEXES

December 1999

EUCC International Secretariat, Leiden, The Netherlands

ANNEX 1: REFERENCES

Literature

ADDINK, M.J. & SMEENK, C (1999), The Harbour porpoise Phocoena phocoena in Dutch coastal waters: analysis of stranding records for the period 1920-1994. In: Lutra, vol. 41.

BAKKER, J. & SMEENK, C. (1987), Time-series analysis of Tursiops truncatus, Delphinus delphis and Lagenorhynchus albirostris strandings on the Dutch coast. In: the European cetacean society report of the 1987 meeting, Hirtshals, Denmark. ECS Newsletter no. 1.

BLOOR, P.D., J.B. REID, A. WEBB, G. BEGG and M.C. TASKER (1996). The distribution of seabirds and cetaceans between the Shetlands and Faroe Islands. JNCC report No. 226.

CHEBAKOVA, I. V. (1997), National Parks of Russia – A Guidebook, Biodiversity Conservation Center, Moscow

CLARK, J. (1975), Coastal ecosystems: ecological considerations for management of the coastal zone.
Washington: Conservation Foundation.

CLARK, J.R. (1977), Coastal ecosystem management. Washington: Conservation Foundation.

COLLAR, N.J., CROSBY, M.J. & STATTERSFIELD, A.J. (1994), Birds to watch 2: the world list of threatened birds. Cambridge: Birdlife international.

COSTELLO, M. J. (year unknown), Conservation of marine habitats and species in Europe. EcoServe, Dublin, Ireland

CZYBULKA, D. (1997), Gutachten zum Sand- und Kiesabbau in der Ostsee, im Auftrag des BfN/INA

DE GROOT, R.S. (1992), Functions-of-nature, evaluation of nature in environmental planning, management and decision-making. Groningen: Wolters-Noordhoff.

DE GROOT, R.S. (1997), Functions and economic values of coastal protected areas: a methodology for assessing the benefits of protected areas to human society, with special references to coastal ecosystems in the Mediterranean Sea. In: Economic impacts of the Mediterranean coastal protected areas. pp.67-83. Proceedings of the Ajaccio meeting, Corsica, 26-28 Sept. 1991.

DE GROOT, R.S. (1997), Valuing natural ecosystems: from local services to global capital. In: Proceedings of the European symposium on environmental valuation, Domaine des Vaux de Cernay, France, 4-7 October 1997.

DELBAERE, B.C.W. (1999), Facts and figures on Europe's biodiversity: State and trends 1998-1999. Tilburg: ECNC.

DOODY, J.P. & SALMAN, A.H.P.M. (1997). European Coastal and Marine Ecological Network - Phase 1, Ecological Assessment Study. EUCC (UK), National Coastal Consultants, Brampton and EUCC, Leiden.

DOODY, J.P., HESLENFELD, P., PICKAVER, A., SALMAN, A. & VALENTIJN, L. (1998), European Coastal and Marine Ecological Network (ECMEN) phase II report. Leiden: EUCC, NCC.

DUCROTOY, J-P. (1996), Marine Scientific Research and Environmental Pollution: The Implications of the Ratification of UNCLOS III. The Marine Forum for environmental issues, report number 3 (24 p.).

EPCEM & UBM (1993). Nature Protection Plan for North Vidzeme, Latvia. Leiden: EPCEM & UBM (report).

EPCEM (1997). Conservation and use of the Dniester delta wetlands, Ukraine. Conflict analysis and recommendations for an action plan towards wise use. Wageningen: EPCEM (report).

EUCC (1998), Management and conservation of the Northern-Western Black Sea Coast, Proceedings of the EUCC international symposium, Odessa, Ukraine, 1996. Odessa: EUCC.

EUCC (1998, unpublished), Draft of Report about the Integration of the Principles and Guidelines of the Coastal Code in the Kingisepp District, Russia

EURONATURE (year unknown), information brochure

EVANS, PGH and SCANLAN, G. (1989). Historical review of cetaceans in British and Irish waters. A report to Greenpeace Environmental Trust.

EVANS, PGH. (1990). European cetaceans and seabirds in an oceanographic context. Lutra 33(2): 95-125.

EVANS P.G.H & PARSONS, E.C.M. (eds) (1999), European research on cetaceans – 12. Proceedings of the twelfth annual conference of the European Cetacean Society, Monaco, 20-24 January 1998. Valencia: Artes Graficas Soler.

FEDERAL MINISTRY OF AGRICULTURE, AND FORESTRY and FEDERAL MINSTRY OF THE ENVIRONMENT, NATURE PROTECTION AND NUCLEAR SAFETY (1997), Bericht ueber die Umsetzung der Beschluesse der Minister-Zwischenkonferenz zur Intergration von Fischerei und Umweltfragen, 13. –14. Maerz in Bergen.

FIFTH INTERNATIONAL CONFERENCE ON THE PROTECTION OF THE NORTH SEA (1997), Statement of conclusions. Bergen: Intermediate Ministerial Meeting on the Integration of Fisheries and Environmental Issues.

FINLAYSON (ed.) 1992: A Strategy and Action Plan to conserve the wetlands of the Volga Delta

FLOHART, G. (1995), Points chauds: le Cap Gris-Nez (Pas-de-Calais). Unknown.

FOPPEN, R.P.B. (1999), I.M. Bouwma, J.T.R. Kalkhoven, J. Dirksen and S. van Opstal. Corridors of the PAN-European Ecological Network: concepts and examples for terrestrial and freshwater vertebrates (draft). Report prepared in the framework of the Committee of Experts of the Pan-European Ecological Network under co-ordination of the European Centre for Nature Conservation. IBN-DLO, Wageningen, Netherlands.

FREESTONE, J. (1996), "The Precautionary Principle and the Law of the Sea Convention"; in: DUCROTOY, JEAN-PAUL (1996), Marine Scientific Research and Environmental Pollution: The Implications of the Ratification of UNCLOS III. The Marine Forum for environmental issues, report number 3 (8-27)

GAVRILO, M.; KREYSCHMAR, E. & KUDERSKIY, L. (1999 unpublished), Protection of Migration Corridors of Coastal Animals in Russia, as a part of current system for wildlife conservation. Baltic Fund for Nature, Saint-Petersburg

GRIMMETT, R.F.A. & JONES, T.A. (1960). Important bird areas in Europe. Cambridge: International Council for Bird Preservation.

GROOMBRIDGE, B. (1993), 1994 IUCN red list of threatened animals. Gland & Cambridge: International Union for Conservation of Nature and Natural Resources.

HAGEMEIJER, W.J.M. & BLAIR, M.J. (1997), The EBCC atlas of European breeding birds, their distribution and abundance. London: T & AD POYSER for the European Bird Census Council.

HEINZEL, H., FITTER, R. & PARSLOW, J.F. (1972), Gids Europese vogels. London & Glasgow: Collins.

HEREDIA, B., ROSE, L. & PAINTER, M. (1996), Globally threatened birds in Europe: action plans. Strasbourg: Council of Europe.

INSTITUT FRANCAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER (1999), Recherches Marines: estuaires. Issy-les-moulineaux: IFREMER.

IUCN Newsletter 1999 Central and Eastern Europe

JACQUES, T.G. & LAMBERTSEN, R.H. (1997), Sperm whales deaths in the North Sea: science and management. Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Biologie vol. 67 suppl.

JONGMAN, R.H.G. and D.A. Kamphorst. (1999). Organisation of nature conservation and nature policy in the European Union member states and the Accession countries. Wageningen Agricultural University.

KINZE, C.C. (1995), Danish whale records 1575-1991 (Mammalia, Cetacea). Review of whale specimens stranded, directly or indirectly caught along the Danish Coasts. Steenstrupia 21: 155-196. Copenhagen.

KONSULOV (1998), Black Sea Biological Diversity – Bulgaria. United Nations Publications, New York

LANTERS, R.L.P., SKJOLDAL, H.R. & NOJI, T.T. (1999), Ecological quality objectives for the North Sea. Den Haag: RIKZ.

LIEVIN, J.E. (2000, in prep.). Towards integrated management of coastal and marine ecological corridors at the Pan-European level (draft title). M. Sc. Thesis. Wageningen University and Research Centre.

LOSEKOOT, N. (1998), Nature Conservation in the Russian Federation – A Country Profile. Ministry of Agriculture, Nature Management and Fishery (The Netherlands) and State Committee of the Russian Federation for Environmental Protection, The Hague/Moscow

MAGNIN, G. & YARAR, M. (1997), Important bird areas in Turkey. Istanbul: DHKD.

MINISTRY OF THE ENVIRONMENT (1995), National Action Plan for the conservation of the most important wetlands in Bulgaria. Sofia

MINISTRY OF THE ENVIRONMENT OF LOWER SAXONY ET AL. (eds.) (1996), Oekologische Gesamtplanung Weser. Hannover

MINISTRY OF THE ENVIRONMENT (1997), National Action Plan for Biodiversity in

Finland 1997-2005. Helsinki
MINISTRY OF THE ENVIRONMENT OF LITHUANIA (1992), National Report to UNCED 1992.
MINISTRY OF THE ENVIRONMENT OF LITHUANIA (1996), Biodiversity Conservation Strategy.
MINISTRY OF THE INTERIOR AND THE SENATOR FOR ENVIRONMENTAL PROTECTION AND CITY DEVELOPOMENT OF THE CITY OF BREMEN (eds.) (1993), Rahmenkonzept zur Renaturierung der Unterweser und ihrer Marsch, Teil 1 und Teil 2.
MOSCROP, A. (1996). Cetaceans of the North-east Atlantic Fringe. International Fund for Animal Welfare. UK.
NORDBERG, LAURI (1999), Applicability of the Habitats Direcetive and the Birds Directive to the Marine Environment, Vierter Warnemuender Naturschutzrechtstag
NORDIC COUNCIL OF MINISTERS (1993): The Nordic Environment
NORTHRIDGE, S.P., M.C. TASKER, A. WEBB and J.M. WILLIAMS. (1995). Distribution and relative abundance of harbour porpoises (Phocoena Phocoena L.), white-beaked dolphins (Lagenorhynchus albirostris Gray) and mink whales (Balaenoptera acutorostrata Lacepede) around the British Isles. ICES Journal of Marine Science 52:55-66.
OZTURK, B. (ed.) (1996), Proceedings of the first international symposium on the marine mammals of the Black Sea, 27-30 June 1994, Istanbul, Turkey. Istanbul: Acar Matbaacilik A.S.
PATRICIA, B. (1996), “Implications for Marine Scientific Research of the Entry into Force of the UNCLOS 1982”; in: Ducrotoy, Jean-Paul (1996): Marine Scientific Research and Environmental Pollution: The Implications of the Ratification of UNCLOS III. The Marine Forum for environmental issues, report number 3 (4-7)
PERRIN, W.F., DONOVAN, G.P. & BARLOW, J. (eds) (1994), Gillnets and cetaceans. Cambridge: International Whale Commission.
PETERSON, R.T., MOUNTFORT, G. & HOLLOM, P.A.D. (1994), Petersons vogelgids. London: Collins.
RAUDONIKIS, L. SHVASHAS, S. (1991). A Short Note on Geese Migration in Lithuania. Vilnius
REEVES, R.R. & LEATHERWOOD, S. (1994), Dolphins, porpoises and whales: 1994-1998 action plan for the conservation of cetaceans. Gland: IUCN.
RIJSBERMAN, F. (1998), Evaluation of coastal conservation in Nord-Pas-de-Calais. IUCN.
SALMAN, A.H.P.M. (1993), EECONET et les zones cotieres et les zones humides : la bordure doree de l’Europe. In : La conservation du patrimoine naturel de l’Europe : vers un reseau ecologique europeen. Maastricht : International Environmental Law and Policy Series.
SONNTAG, R. P. ET AL. (1999), “Breeding ground of Harbor Porpoises in the North Sea off Schleswig-Holstein (Germany) and its implications for management”. In EVANS, P.G.H and PARSON, E.C.M. (eds.), European research on Cetasecans – 12. Valencia
STAM, M.S., WIEGERINCK, J.A.M., WESTERINK, H.J. & DE JONG, H.B.H.J. (1999), Biologische monitoring zoete Rijkawateren. Samenstelling van de visstand in 1998 op basis van vangsten met fuiken en zalmsteken. Agricultural Research Department, Netherlands Institute for Fisheries Research.
STATE COMMITTEE ON ECOLOGY AND CONTROL OF NATURAL RESOURCES UTILIZATION (1998), National Environmental Action Plan. Baku
STRA-CO (1998), Council for the Pan-European Biological and Landscape Diversity Strategy: progress report on the implementation of the Pan-European Biological and Landscape Diversity Strategy 1996-1998. Strasbourg and Geneva: Council of Europe and UNEP Secretariats.
STRA-REP, Committee of experts for the development of the pan-european ecological network (1999), Development of an approach to a Pan-European Ecological Network: concept and criteria (project STRA-REP 3A). Strasbourg: Council of Europe.
STRA-REP, Committee of experts for the development of the pan-european ecological network (1999), Guidelines for the development of the Pan-European Ecological Network (project STRA-REP 5). Strasbourg: Council of Europe.
UNITED NATIONS (year unknown), State of the Environment Report Azerbaijan.
TEN PROJECT, PARTNERS OF THE (1999), 1. and 2. Quarterly Report of the TEN Project. ARSU GmbH Oldenburg
THOMPSON, P. & WILSON, B. (1994), Bottlenose dolphins. Grantown-on-spey: Colin Baxter Photography.
TUCKER, G.M. & HEATH, M.F. (1994), Birds in Europe: their conservation status. Cambridge: BirdLife International.

UNEP (1995), Protocol concerning specially protected areas and biological diversity in the Mediterranean. Athens
VAZQUEZ, M.B.S. (1998), Feeding ecology of harbour porpoises, common and bottlenose dolphins and sperm whales in the Northeast Atlantic. Ph.D.
VIKSNE, J. (1993), Important bird areas in Latvia. Cambridge: International Council for Bird Preservation.
WEISS, A. (1999), Moeglichkeiten der Regelung der Fischerei, des Bergbaus und der Schifffahrt in 'Baltic Sea Protected Areas' (BSPAs) in der Aussschliesslichen Wirtschaftszone (AWZ) der der Bundesrepublik Deutschland vorgelagerten Ostsee. Bundesamt fuer Naturschutz, BfN-Skripten 5, Bonn
WORLD BANK/GEF (1995), Immediate Action Plan for Protected Area System of Russia.
ZAITSEV, YU. & MAMAEV, V. (1997), Marine biological diversity in the Black Sea, a study of change and decline. New York: United Nations Publications.
ZANDBERG, M. (1998), Plan Eekhoorn. Leiden: Stichting Duinbehoud.

Contact persons

ALARDI, J – Fisheries division, WRD, Ministry for Environment and Spatial Planning (*France*)
ANDERSEN, O.N. – Ministry of Environment and Energy (*Denmark*)
APOSTOLEVA, I. – Institute of Botany, Bulgarian Academy of Sciences (*Bulgaria*)
AUDIBERT, M. – Spatial planning division, NLD, Ministry for Environment and Spatial Planning (*France*)
BAPTIST, H. - RIKZ (*the Netherlands*)
BASSET – Coastal division, NLD, Ministry for Environment and Spatial Planning (*France*)
BENTZ, G. – Ornithological Station (*Dover Strait*)
BERREVOETS, C. - RIKZ (*the Netherlands*) – 10/08/1999, Middelburg, the Netherlands
BLANCA, L. – ELLE (Estonia, Latvia, Lithuania Environment), Ministry of Environment Protection and Regional Development (*Latvia*)
BOSCH, R. – TACIS Black Sea and Caspian Sea (*Russia/Ukraine*)
BRUNKEN, H. - F+N Environmental Consulting (*Germany*)
CORTES, J. - Gibraltar Ornithological and Natural Historic Society (*Gibraltar Strait*)
CRIGNON, P. – Inter-departmental Direction of Maritime Affairs (*France*)
DEHAYE, D. – Boulogne Developpement (*Dover Strait*)
DE OUDE, G. – Stichting Nordzee (*the Netherlands*)
DEPREZ, L. – Deputy of the Pas-de-Calais, Commission Production and Exchange, Regional Councillor (*France*)
GABUNIA, M. - Georgian Protected Areas Programme (*Georgia*)
GAVRILO, M. – Arctic and Antarctic Research Institute (*Russian Federation*)
GIORDANO, A. – WWF Italia (*Gibraltar Strait*)
GUETERBORCK, R. - Greenpeace, UK (*EEZ*)
GUYOT – CROSS Gris-Nez (*Dover Strait*)
HAGEMEIJER, W. – SOVON (*Bosphorus*)
HAELTERS, J. - Management Unit of the North Sea Mathematical Models (*Belgium*)
HASHMI, D. - Research Institute for Ornithology of the Max-Planck-Society Andechs and Radolfzell (*Germany*)
HONDET, M. – Regional Direction for Agriculture and Fisheries (*Dover Strait*)
IANKOV, P. – Institute of Botany, Bulgarian Academy of Sciences (*Bulgaria*)
JANKE, K. - Environmental Agency City of Hamburg (*Germany*)
JEPSEN-LODZINA, I. – Division for Nature conservation, Ministry of Environment Protection and Regional Development (*Latvia*)
KAMPHORST, D. – Wageningen Agricultural University (*Denmark*)
KARELSE, D. & HINE, H. – Ministry of Agriculture, Nature and Fisheries (*The Netherlands*)
KOESTER, V. – Ecological division, National Forest and Nature Agency (*Denmark*)
KONTAUNAS, A. - Klaipeda University (*Lithuania*)
KOSSMAGK-STEPHAN, K. - National Park Office Schleswig Holstein (*Germany*)
KUINDERSMA, W. – IBN-DLO (*The Netherlands*) – 20/08/1999, Wageningen, The Netherlands
LAFITTE, J-J. – Ministry of Spatial Planning and Environment, Direction of Nature and

Lanscape (*France*) – 19/08/1999, personal communication
LANTERS, R. –Fisheries and ecology, RIKZ (*the Netherlands*)
LEFEUVRE, J-Cl. – Director of IEGB (*France*)
LE NEVE, A. – Coordinator LIFE Nature Project "Waterfowl Stopovers along the Atlantic Seaboard" (*France*)
LUCIUS, I. - TACIS (*Azerbaijan*)
MAGNIN, G. – WWF (*Bosphorus*)
MAIRE, P. – Coastal Division, WRD, Ministry for Environment and Spatial Planning (*France*)
MEINIGER, P. - RIKZ (*the Netherlands*)
MIERAUSKAS, P. - Lithuanian Fund for Nature (*Lithuania*)
NIKOLEISHVILI, D. - NGO 'POSEIDON' (*Georgia*)
NORDBERG, L. – EUCC member (*Finland*)
OPERMANIS O. – EUCC contact person (*Latvia*)
PASKOFF, R. – University of Lyon, President of EUCC-France (*France*)
ROESNER, H.U. - WWF Wadden Sea Office (*Germany*)
SALNIKOV. V. - National Institute of Deserts, Flora and Fauna, Ministry of Nature Protection (*Turkmenistan*)
SCHIRMER, M. - Institute for Ecology and Evolution Biology, University of Bremen (*Germany*)
SELLHEIM, H. - Nature Conservation State of Lower Saxony (*Germany*)
SEYS, J. - Instituut voor Natuurbehoud (*Belgium*)
SKEIVERIS, R. - Pajuris Regional Park (*Lithuania*)
SOUTANOV, E. – EUCC contact person (*Azerbaijan*)
TEKKE, R. – Provincial Government of Noord-Holland (*The Netherlands*)
URTANS, A. – Participant EC Nature 9/99 (*Latvia*)
VALLET, J-M. – Regional Direction for the Environment (*Dover Strait*)
VAN KLAEVEREN, M-C. - RAMOGE Secretariat (*Monaco*)
VAN OJNEN, C. – National Museum of Natural History Naturalis (*The Netherlands*)
VAN WESTRIENEN, R. – Wetlands International (*Ukraine*)
VEEN, J. – IBN-DLO (*The Netherlands*)
VELDMAN, J. – Wadden Society (*The Netherlands*)
VON NORDHEIM, H. - Bundesamt für Naturschutz (Germany)

Web sites

Black Sea Environment Program (BSEP): http://www.dominet.com.tr/blacksea
EUCC: http://www.eucc.nl
EU Birds Directive 79/409/CEE: http://www.ecnc.nl/doc/europe/legislat
EU Directive 92/43/CEE – Faune-Flore-Habitat: http://mrw.wallonie.be/dgrne/sibw/legislations
LIFE-Nature projects: http://europa.eu.int/comm/life/nature
Ministry of Agriculture and Fisheries of France: http://www.agriculture.gouv.fr/
Ministry of Environment and Energy of Denmark: http://www.mem.dk
Ministry of Environment of France: http://www.environnement.gouv.fr
Ministry of Environmental Protection and Regional Development of the Republic of Latvia: http://www.vkmc.vdc.lv
Ministry of Equipment, Transport and Sea of France: http://www.equipement.gouv.fr/
HELCOM: http://www.helcom.fi
United Nations: http:// www.un.org/depts/los/
OSPAR: www.ospar.org
Greenpeace United Kingdom: http://www.greenpeace.org.uk
Wadden Sea Secretariat: http://cwss.www.de
BSEP web-page
Whale and Dolphin Conservation Society: http://www.wdcs.org
http://www.staatsblad.be
World Conservation Monitoring Centre: http://www.wcmc.org.uk

ANNEX 2: LATIN NAMES OF THE ANIMAL SPECIES MENTIONED IN THE REPORT

Birds:

English name	**Latin name**
Arctic tern	*Sterna paradisaea*
Avocet	*Recurvirostra avosetta*
Black stork	*Ciconia nigra*
Buzzard	*Buteo buteo*
Common scoter	*Melanitta nigra*
Common tern	*Sterna hirundo*
Cory's shearwater	*Calonectris diomedea*
Dalmatian pelican	*Pelecanus crispus*
Gadwall	*Anas strepera*
Glossy ibis	*Plegadis falcinellus*
Knot	*Calidris canutus*
Lesser spotted eagle	*Aquila pomarina*
Little tern	*Sterna albifrons*
Purple heron	Ardea purpurea
Pygmy cormorant	*Phalacrocorax pygmaeus*
Redshank	*Tringa totanus*
Sandwich tern	*Sterna sandvicensis*
Spoonbill	*Platalea leucorodia*
Squacco heron	Ardeola ralloides
Stork	*Ciconia spec.*
Teal	*Anas crecca*
White stork	*Ciconia ciconia*
Yelkouan shearwater	*Puffinus puffinus yelkouan*

Fish:

English name	**Latin name**
Bluefish	*Pomatomus saltatrix*
Bonito	*Katsuwonus* spec.
Eel	*Anguilla anguilla*
Flatfish	orders *Pleuronectiformes* and *Heterosomata*
Horse mackerel	*Trachurus trachurus*
Mackerel	*Scomber scombrus*
Salmon	*Salmo salar*
Salmonoids	*Salmonifores*
Sea trout	*Salmo trutta*
Stickleback	fam. *Gasterosteidae*
Sturgeon	*Acipenser* spec.
Swordfish	*Xiphias gladius*
Tuna	*Thunnus thynnus*

Mammals:

English name	Latin name
Blue whale	*Balaenoptera musculus*
Bottlenose dolphin	*Tursiops truncatus*
Caspian seal	*Phoca caspica*
Common dolphin	*Delphinus delphis*
False killer whale	*Pseudorca crassidens*
Fin whale	*Balaenoptera physalus*
Harbour porpoise	*Phocoena phocoena*
Harbour seal	*Phoca vitulina*
Humpback whale	*Megaptera novaengliae*
Killer whale	*Orcinus orca*
Long-finned pilot whale	*Globicephala melas*
Polar bear	*Ursus maritimus*
Sei whale	*Balaenoptera borealis*
Sperm whale	*Physeter macrocephalus*
Striped dolphin	*Stenella coeruleoalba*
Walrus	*Odobenus rosmarus rosmarus*