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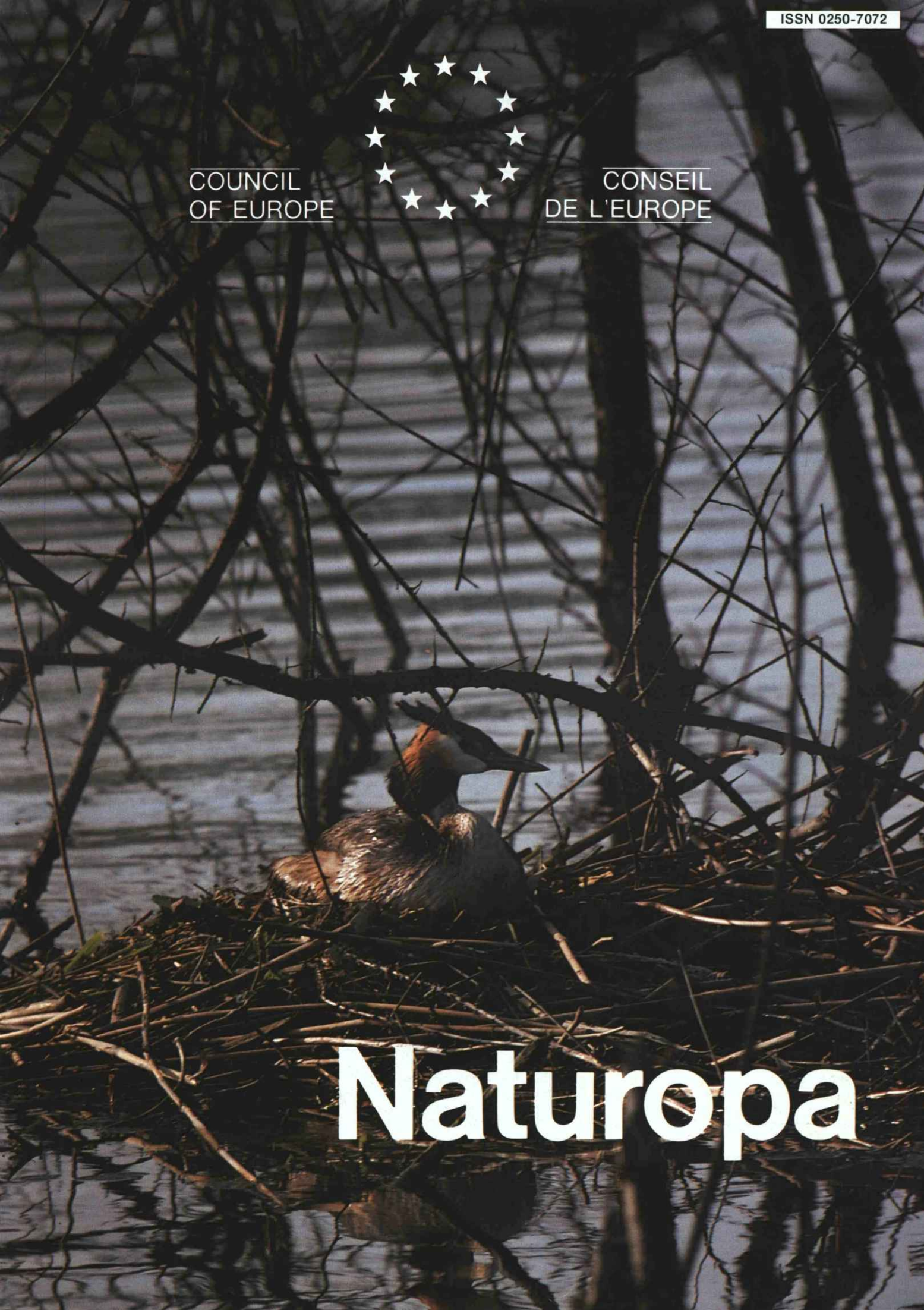

Naturopa

european information centre for nature conservation

Symbol for the Council of Europe's nature conservation activities.

Naturopa

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Back cover: The Rhine banks (Photo G. Lacoumette)

Captions to colour illustrations p. 16-17:
1-4. Monk seal (*Monachus monachus*) (Photo J. Trotignon - JACANA)

The water's edge

As long ago as 1973 the Committee of Ministers of the Council of Europe adopted a resolution on the protection of coastal areas, followed in 1977 by another on the protection of lake and river banks. In the spring of this year, 1984, Ministers, Senior Officials, and parliamentarians from the Council of Europe's member states will be meeting in Athens to discuss "coastal areas, river banks and lake shores: their planning and management in compatibility with the ecological balance".

These sensitive areas, which have been grouped together in the campaign mounted by the European Information Centre for Nature Conservation under the title "The water's edge", are among the most endangered habitats in our natural environment. After centuries of unchecked destruction, it is now a matter of preserving the plants and animals which depend for their survival on the last vestiges remaining intact. The beauty of these areas where land and water meet and the problems that have to be resolved in order to preserve them form the subject of this issue of *Naturopa*, making it one of the most important international contributions to the European campaign on the water's edge.

The next issue will deal from various angles with Europe's freshwater fish.

H.H.H.

(Photo G. Lacoumette)

Editorial

The water's edge is a very minor geographical feature in terms of area, but one that is vitally important to man and nature. This transitional zone between land and water comprises a variety of biotopes (lagoons, dunes, cliffs, beaches, marshes, river banks and lake shores, peatlands, etc.) exhibiting a multitude of plant and animal species. In addition to the permanent residents, there are numerous visitors: fish and amphibians come here to breed, migrating birds to nest or rest, and land mammals to quench their thirst. The combination of so many favourable conditions creates an environment in which nature appears in all its plenitude. Biogenetic capacity and diversity of species are high, and natural resources abound. It was here too that, hundreds of millions of years ago, two major evolutionary phenomena occurred: the emergence of life and its move from water to land.

In this privileged environment, competition to find a niche and survive there is intense. Despite this, the delicate ecological balance was preserved until recent times, when man's intrusion upset it. As long as small numbers of primitive men were carrying on their traditional activities—gathering, hunting, and fishing—the impact was negligible. With the advent of technology (boat and house building), things began to change. Nevertheless, the integration of human activities into the general pattern of nature contained the damage, enabling the ecosystem to recover quickly, and the advantages to man compensated amply for the drawbacks. The example of the ancient Greeks is enlightening: from earliest antiquity, our ancestors used the Mediterranean coasts for their commercial and demographic expansion. The periphery of the Mediterranean, from the Straits of Gibraltar to the Nile Delta and the Sea of Azov, was dotted with Greek colonies; Greek shipping hugged the coasts and hellenic civilisation followed the same course. Man's influence on the environment in the classical period was not inconsiderable. Witness the deforestation and subsequent soil erosion strikingly described in Plato's " Critias". The same was not true of coastal ecosystems, which stood up well to the onslaughts and remained virtually unaffected.

Europe's sea coasts, rivers and lakes now present a quite different picture. The pressures exerted on them by overpopulation, modern technology, the mechanisation of life and an excessively consumer-oriented society are unbearable. Several factors, including urban development, industrialisation, transport (harbour facilities, motorways, airports), leisure activities, tourism and major engineering projects, are contributing to changes in geomorphology and a deterioration of ecosystems. Wildlife has paid the highest price. Two typical cases bear testimony to this: the European otter and the Mediterranean monk-seal. The former, the symbol of our endangered fauna, is becoming extinct over the whole continent because its habitat has been largely destroyed; the latter, now extremely rare, has been dislodged from its favourite beaches by the thousands of tourists and has had to take refuge in caves.

The immediate consequences and future implications of this state of affairs seem to have taken a long time to impress themselves on the nations and governments concerned. Yet there were repeated warnings, first from nature-lovers, then from scientists. A salutary disquiet gradually spread. Nevertheless, even where regulations were introduced to control the exploitation of natural resources, the development of river banks, lake shores and sea coasts and the management of protected areas, they were cautious, inadequate and piecemeal measures. Urban sprawl continued, as did the building of pollutant-emitting factories and the all-out "development" of these areas, whose small size should be an argument for restraint. Environmental damage was compounded by aesthetic pollution. In many places the legendary beauty of Europe's sea coasts, lake shores and river banks is now but a memory.

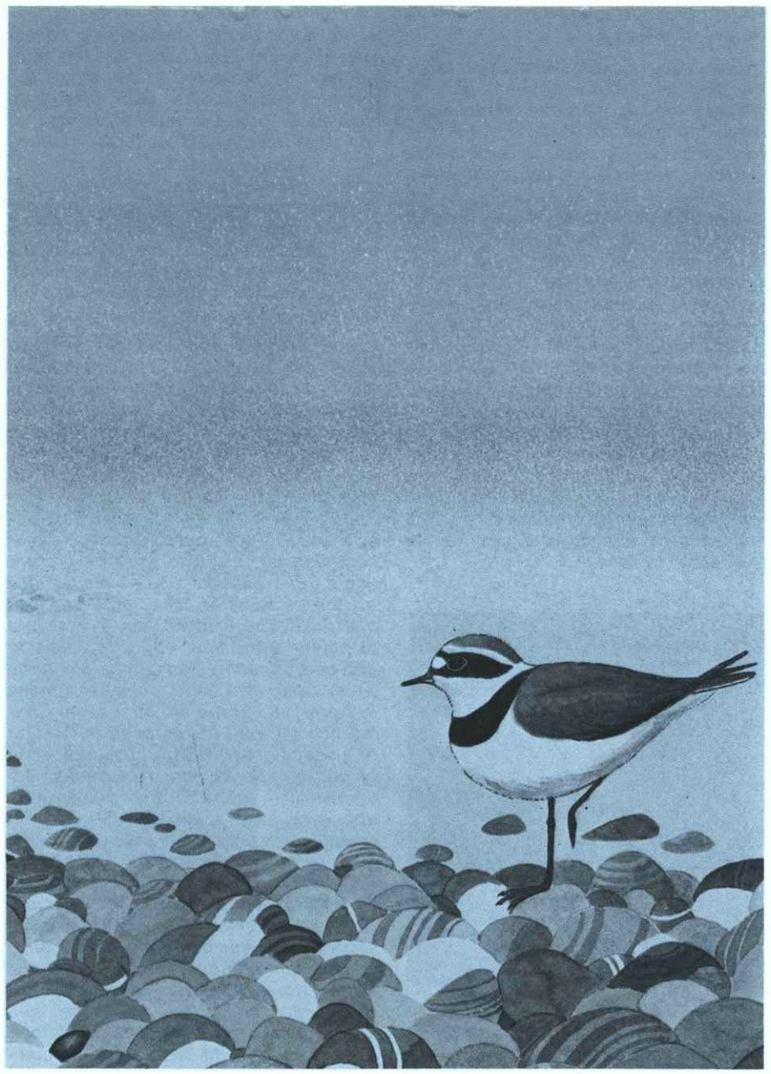
These are features whose ecological value and economic, social, aesthetic and even cultural importance are universally acknowledged. In view of the extreme sensitivity of the ecosystems in question and the damage which they have sustained over years of neglect, urgent action must be taken to revive and preserve them. Public and official awareness of these problems is the precondition for this. The work of international organisations such as the Council of Europe is of decisive importance in this field. The Council has a vital role to play in informing, educating, liaising and co-ordinating. The campaign on the water's edge, to be launched in Athens in April 1984 at the 4th Ministerial Conference on the Environment, is the first of a series of activities for the protection of coasts, shores and river banks. Responsibility lies with the public and, above all, with politicians. Our current scientific knowledge enables us to act effectively and discerningly. Let us act, then, and act quickly! While it may be illusory to want to restore the structure and ecosystems of Europe's coasts, shores and river banks to their original state, it is not impossible to reverse the trend towards deterioration, protect renewable biological resources and create biogenetic reserves for the future. That is the price to be paid for the quality of our life, and indeed our survival.

Vassili Kiortsis

President of the Hellenic Society for the Protection of Nature

Fragile ecosystems

Franz Karasek



Charadrius dubius, symbol of the Council of Europe's campaign on the water's edge

The water's edge, whether of the sea, lakes or rivers, is without a doubt, together with mountain regions, one of the most threatened natural environments of our continent of Europe; the reasons behind the threat are the same:

— the water's edge and mountain regions are particularly fragile ecosystems, extremely sensitive to outside influences and hence easily damaged;

— for some decades they have been subject to growing pressure by human societies in the form of systematic incursions into natural areas, with the construction of communication routes, the extension of inhabited areas (towns, villages and holiday homes), and the development of leisure areas (marinas and skiing areas), not to mention certain industrial developments.

The action of the Council of Europe

The importance of the problems has not escaped the Council of Europe. Its Parliamentary Assembly was looking into the matter as early as 1971, when it adopted Recommendation 627 on the protection of Europe's coastal areas. This called for a study on the means of protecting coastal areas by a coherent regional planning policy. The appeal did not go unanswered; in 1973 the Committee of Ministers adopted Resolution (73) 29 on the protection of coastal areas, which made 16 recommendations to the governments, including:

— drawing up inventories of the coastline;

— making use of integrated planning;

— conserving wild flora and fauna.

The Standing Conference of Local and Regional Authorities of Europe has also taken a number of interesting initiatives, beginning with the first Conference of Peripheral Maritime Regions, held in Galway in 1975. Another was the European Island Regions Conference held in Puerto de la Cruz in 1981 which concluded with the adoption of the "Tenerife Declaration", setting out the special requirements of the European island regions and stressing their specific nature.

The most substantial work has nevertheless been carried out by the European Committee for the Conservation of Nature and Natural Resources, which has given these regions high priority almost since its creation in 1962. Its main studies cover:

— catchment basins (1968);

— the influence of natural vegetation on water courses (1968);

— the protection of coastal areas (1974) and legislative steps taken or to be taken to achieve this (1974).

Much of its work involves a thorough analysis of the main water-linked biotopes: alluvial forests, halophile and dune vegetation, marine biocenoses. In each case a description is given of the features, functions and diversity of the environment under investigation; its distribution is studied and a suggestion made as to a list of sites to be included in the European network of biogenetic reserves.

Among political and legal achievements, mention should be made of Resolution (77) 8 on the protection of lake shores and river banks and the corresponding resolution in respect of coastal areas (Resolution (73) 29, mentioned above).

The Ministerial Conference of Athens

An important step towards improving coastal area management will be taken at the 4th European Ministerial Conference on the Environment which is to be held in Athens from 25 to 27 April 1984. The main theme will be "coastal areas, river banks and lake shores: their planning and management in compatibility with the ecological balance". The legal aspects of these complex problems will be covered in a supplementary report. On this occasion the European Information Centre for Nature Conservation will launch the European campaign on "the water's edge", which is intended to make the people of Europe aware of the importance of the rational management and preservation of the irreplaceable capital constituted by sea and lake shores and the banks of rivers and mountain streams.

An action guide will propose a wide range of measures which could halt the depreciation and degradation of these habitats.

The Conference could refer to the conclusions of the 6th Session of the European Conference of Ministers responsible for Regional Planning, held in Torremolinos in May 1983, whose Resolution No. 1 concerned planning policies in maritime regions.

Honesty bids us say that it would be wrong to expect miracle solutions. Any measure may indeed be refined, improved and tailored to suit local conditions, but in the end the decisive factor is without a doubt the political will which those responsible—and in the first instance the Ministers for the Environment—bring to bear on the protection of genetic potential; in many cases this means daring to look to long-term rather than short-term solutions. This choice raises enormous problems, particularly in the present economic crises where the preservation of jobs is the basic priority.

The Convention

One last initiative should be mentioned; although not specifically related to the water's edge it has considerable potential nonetheless; it is the Convention on the Conservation of European Wildlife and Natural Habitats, also called the Berne Convention. It came into force on 1 June 1983, and to date has been ratified by 12 Council of Europe member states and by the European Community. As its title indicates, this legal instrument covers the entire natural heritage, thereby distinguishing itself from other conventions already in existence which deal with single aspects of the problem: wetlands (Ramsar Convention), international trade (Washington Convention), migratory species (Bonn Convention). The Berne Convention stresses endangered migratory species and habitats. From this viewpoint all banks, estuaries and intertidal areas play a decisive role, since they constitute the ideal biotope for a large number of endangered species such as Limicolae, an important group of small waders including dozens of species which migrate in their hundreds of thousands. Anatidae (ducks, geese, etc.) are another category of migratory bird connected with the water's edge and the water itself. A large number of these species are declining at the moment, just as coastal flora and fauna are declining. Contrary to an opinion which is still widespread, it is not—or rather it is no longer—hunting which is the main reason for the disappearance of species, but well and truly the degradation of natural environments as a result of the pressure of human activities.

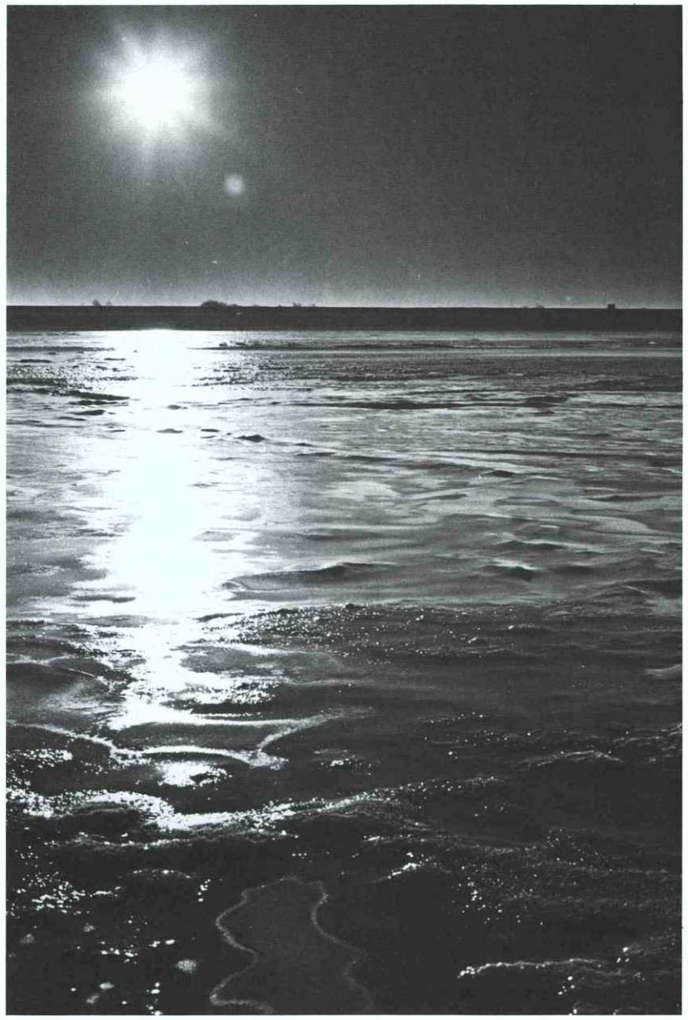
Conserving threatened habitats, protecting the most fragile among them, and guiding development in other cases are all objectives of the Convention which will certainly not be easy to attain.

The support, encouragement and even the demands of public opinion are vital in meeting the challenge of safeguarding our natural wealth. That is why information and public awareness campaigns, such as the campaign on the water's edge, are essential. Only the combined action of citizens and administrators can guarantee its success.

F. K.

Tidal mud flats

J. J. Beukema



(Photo J. J. Beukema)

Among the three main types of sea shore—rocks, sand beaches and tidal mud flats—the latter are outstanding owing to their vast expanse and their biological riches. The wave-swept beaches with their movable sands are too hard an environment for a real variety of plant and animal life. Rocky shores do offer a suitably stable substrata and at least locally also sufficient shelter for a manifold community of algae and marine animals to develop. However, such rich rocky belts of sea-shore are invariably of limited width only.

Biological richness

No such limitations for tidal mud flats. Sheltered from heavy wave action by barrier-islands, sand-bars or land-projections, vast stretches of sandy or muddy sediments offer abundant living space to both plants and animals. Twice daily, tidal flats completely change appearance. At high tide, the flats are submerged and thus disappear under sea water. Only a few hours later the water recedes and a vast bare land emerges. The fishes recede with the falling water to the creeks and gulleys and wading birds now invade the exposed area to feed on the benthic fauna. This bottom fauna is of a true marine nature, living actively at high tides and staying alive during low tides in the damp sediment.

In Europe, the main coastal area of the tidal flat type is found along the west coast of Denmark and the northern coasts of Germany and Holland, together forming the Wadden Sea, with a total area of more than 6,000 km², half of which is tidal flat. Similar, though less extensive areas are found in England (e.g. The Wash), in the south-west of the Netherlands (the Delta area) and in France (e.g. the Baie du Mont St. Michel and the Baie de Bourgneuf).

Birds

The most conspicuous clue to the riches of the tidal flats ecosystems is the ordinary presence of clouds of birds. Migrating wader birds using the European tidal flat areas are to be counted by the million. They use these areas as indispensable feeding grounds and resting places during their long journeys between the wintering places in the south (southern Europe and Africa) and the breeding places in the north (Siberia, northern Russia, Scandinavia). In addition, hundreds of thousands of breeding and wintering birds (including great numbers of waders, ducks and geese) stay for longer periods, with particularly large numbers in autumn and winter.

Two factors specially contribute to the great value of tidal flat areas for bird life, viz. rest and food. The limited accessibility and the uninviting character of mud flats ensure rest, though increasing pressure from adventurous tourists strolling over the flats and intensive shooting by sportsmen are real dangers. Disturbance by shooting is rendering several tidal flat areas in France useless and risky for birds.

The presence of superfluous amounts of food is not obvious on a superficial view. At first sight mud flats look barren and devoid of life. Only when the mud is sieved are high numbers of worms and shellfish visible. They live well-buried in the sediment, hiding from the visually hunting predators as most fishes and birds are. Figures of tens of thousands of bottom fauna per m² are no exception. Such densities mean that an average of one sizeable animal is present on an area of less than an adult finger nail. In units of weight very few types of ecosystems carry higher amounts of animal life. As compared to the world-wide average for the amount of animal tissue per m², the mean for tidal flats is nearly ten times higher. It is this exceptional affluence that makes tidal mud flats such an attractive feeding ground for birds, enabling migrating birds to recover and fatten rapidly during and before their long expeditions.

The bottom fauna

Why are tidal flats so abundantly populated by bottom fauna like worms and shellfish? The high productivity of such areas in the form of bottom fauna will originate in the first place from a high supply of food for such organisms. This basic food of the tidal flat ecosystem consists of microscopically small cells of algae. Like all plants, algae rapidly grow and reproduce under conditions of bright sunlight and high availability of nutrients. Fertilising nutrients as nitrogen compounds and phosphate are present in high concentrations in most coastal areas, being constantly supplied by rivers as well as being released by mineralisation processes on the spot. A high productivity of algae results, both in the water column by suspended algae and at the bottom by algae attached to sand grains. Production at the bottom is high at low tide, when the sun has direct access to the top layer of the sediment that is often covered by a brown layer of micro-algae.

In addition to the algal production on the spot, tidal streams supply algae from the open sea to be trapped in the shallow coastal areas. In this way the already productive tidal flats are being subsidised as well with food that is produced elsewhere.

Bottom fauna feed on the microscopically small cells of algae in a number of different ways. Bivalves like oysters, mussels and cockles filter suspended algae from the water, using the large surface areas of their gills as a sieve. Other bivalves are equipped with long siphons, being operated as the tube of a vacuum cleaner to suck in algae deposited at the bottom. Several worms swallow the enriched surface layer of the sediment and snails feed on the algal surface cover. All these animals are—by growing—in fact converting algal material into animal tissue. The algae are of microscopical size and are therefore unavailable to birds and other large animals as most fishes. Thus the bottom fauna occupy a key place in the food chains of the tidal flat environment by converting the high basic primary production of the very small algal cells into manageable food pieces for birds and fishes. It is only by the existence of dense populations of bottom fauna that the millions of birds and fishes can benefit from the high productivity of the tidal flat ecosystem.

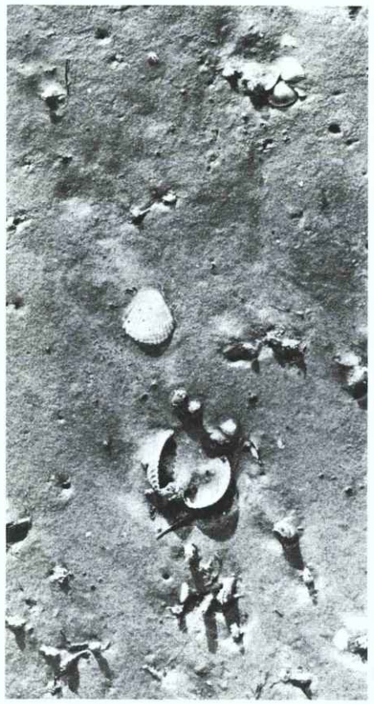
Bottom fauna is not really an inexhaustible food stock. Though the food organisms are able to compensate for losses by death by means of reproduction and growth, this ability is not unlimited. After reproduction it takes some time before the new generation of bottom fauna has reached the appropriate size to be a suitable prey for a bird. Reproduction in the tidal flat environment is highly variable and may fail for some years in succession in several of the important species. It is at the end of winter, when growth has stopped for nearly half a year and several species even lost weight by using up their reserve material, stocks of bottom fauna are each year at a minimum.

Amounts of food needed

The amounts of food birds and fishes need annually have been estimated for the Dutch tidal flats in the Wadden Sea. Daily food intake in the more important bird and fish species is known, both from direct observation in the field and from experiments. Numbers of birds in various tidal flat areas have been counted frequently and numbers of fishes have been estimated by netting. From these two sets of data, viz. daily intake and number of eating-days, total annual food consumption by bird and fish populations can be estimated. These populations were found to take a heavy toll of the bottom community of the tidal flats. High proportions of the most preferred prey types were found to be withdrawn annually from the tidal flats. Especially the areas with dense prey populations, where birds and fishes tend to concentrate, are frequently thinned out at a high rate.

Haematopus ostralegus (Drawing NCC)

In late spring and in summer, when the bottom fauna is reproducing and growing rapidly, their stocks are increasing, flourishing under oppression of consumption by birds and fishes. During autumn and winter, however, the stocks of bottom fauna invariably decline to levels of only about half of the summer maxima or even less when there is additional mortality from freezing temperatures. Although birds and fishes have developed efficient ways to locate and exploit their prey, they can feed profitably only in areas where prey numbers exceed a certain threshold level. Below such levels they would spend more energy in searching than they could possibly gain by eating the finally encountered prey. Particularly in late winter, densities of prey populations have declined over vast areas to such unprofitable levels. Thus, notwithstanding the fact that the amounts of food available on tidal flats are generally high, these amounts are not really superabundant in the sense that every year unused reserves of significant magnitude are left. Therefore, any further reduction of tidal flat areas by reclamation works or further deterioration by pollution could endanger the populations of migrating birds.



Abundant offer of food
(Photo J. J. Beukema)

The case of fishes

As for the fishes, economic interest is also involved. Some of the major fish species in the North Sea, and probably also in similar continental shelf seas, spend part of their early life in tidal flat areas. Plaice are the most typical example. Suspended in the water, their larvae are transported passively by currents to shallow coastal areas. On arriving there, the normally fish-shaped larvae change into the flat creatures like their parents, leaving at the same time the water column to settle at the bottom. Only bottoms rich in suitable food are selected for a longer stay. For young plaice the suitable areas are almost exclusively tidal flats, whereas young sole appear to concentrate mostly in flat areas just below the low-water mark. The young plaice soon develop a tidal migration pattern, leaving the flats with full stomachs with the receding tide and swimming back hungry during the rising tide.

After a stay of some two years in the well-supplied shallow nurseries, the juvenile fishes join their parents in the deeper seas on the continental shelf, having almost reached at that time a size that makes them attractive to the commercial fisheries. As nearly 100 % of the young plaice and sole have grown up during their childhood at or near the tidal flats, the recruitment to the adult stock almost completely depends on nurseries like the Wadden Sea and other shallow coastal seas with tidal flats.

Without any doubt it is the rich supply of bottom food that enables the populations of young fish to grow rapidly in the tidal flat areas. Beds of deeper seas generally offer less food. The bottom fauna at tidal flats are roughly ten times as plentiful as in the deeper seas in the surroundings. The milliards of young flat-fish growing up on tidal flats would not be able to find any equivalent feeding ground.

The nursery function of tidal flat areas is not limited to flat-fish. Similar patterns of a juvenile life at tidal flats followed by migration to deeper water at near-adult size have been observed in such species as brown shrimp (again important for commercial fishing), shore crab, lugworm and a shell fish species. In all of these species the adult populations in deeper waters largely depend on the success of the juveniles on tidal flats. In this way, the rich shallow edges of the sea are a source of life for much larger areas, which would definitely be poorer when tidal flats near the coast would be lacking.

Thus tidal flats are not only rich and productive areas in themselves, but are also disseminating their riches over broad surroundings. Their function appears to be indispensable for bird life from the extreme north of Europe to Africa as well as for sea life up to tens of kilometres off shore. J. J. B.

Preserving the dune thistle

Dominique Legrain

The French coastline bounds 11 regions, 25 départements, 275 cantons and nearly a thousand municipalities, not counting the French coastlines of America and the Indian Ocean: Martinique, Guadaloupe, Guyane and La Réunion. Over 7,000 kilometres of coastline in all.

Over half of the sea coast is extensively developed. The coast of some départements (Nord, Loire-Atlantique, Pyrénées-Atlantiques, Alpes-Maritimes) is over 80 % built up. The fall in farmed area during the decade 1970-80 was over 9 % on the coast, as compared with 1.4 % for France as a whole.

There is no denying that building on a natural site transforms it irreversibly, whereas protection measures are short-lived and always open to reconsideration. It is a one-way trend.

An inalienable heritage

A Nature Bank was needed to preserve the most fragile and most threatened parts of nature from the greedy and covetous, the destructive and the negligent.

The idea came from the example of the British National Trust, founded in 1895 by three philanthropists who were disturbed by the destruction of their natural heritage. Since then, the National Trust has become Britain's largest private land owner. Ownership in its land cannot be transferred.

France is not Great Britain, and France's equivalent of the body set up across the Channel in the form of a private association is a state institution. Yet the purpose is the same: to acquire, manage and open to the public the most precious natural spaces and to preserve the heritage thus constituted in perpetuity.

The French Sea and Lake Shore Conservancy (Conservatoire de l'espace littoral and des rivages lacustres) established under an Act of 10 July 1975 is empowered to pursue "a policy of conservation of shore areas, respect for natural sites and ecological equilibria". It can acquire full ownership in important or endangered natural sites; its powers extend to coastal cantons and municipalities adjoining the banks of lakes and stretches of water with an area of 1,000 hectares or more. It can acquire land by negotiation under private law, exercise the pre-emptive right conferred upon it by the Town Planning Code within "sensitive perimeters", effect expropriations on grounds of public interest, receive legacies and donations and private property of the State.

Eight years after its foundation, the Conservancy has acquired 25,000 hectares of land, including 160 sites and 280 kilometres of coast and lake-shore. The area of the sites acquired varies from one to several thousand hectares. On average, the Conservancy signs one deed every two working days. Its medium-term objective is to acquire ownership of 50,000 hectares, which would be equivalent to establishing protection over 500 kilometres of shoreline by 1990.

Decentralised organisation

The Conservancy's Governing Board draws up acquisition programmes. It is made up of persons holding electoral office (members of both Houses of Parliament and of département and regional councils), representatives of the Ministers with an interest in shore protection, and qualified individuals chosen from among the leaders of environment groups. The state, though amply represented, is nevertheless in a minority on the Board. The Conservancy operates in a decentralised manner and constantly relies on the assistance of local councillors and authorities.

Shore Boards made up of département and regional councillors consider all acquisition proposals before they are submitted to the Governing Board. There is one Shore Board for each of the following areas: Channel/North Sea; Atlantic/Brittany; Mediterranean; Corsica; Lakes; French American coasts; French coasts in the Indian Ocean.

Municipal councils are asked to pronounce on any operation concerning the territory for which they are responsible. The opinions of the Shore Boards and the municipal councils are advisory.

At the upper level, co-ordinated land action programmes are drawn up jointly by the Conservancy and the coastal départements to determine priorities. The Conservancy's land holdings are managed under general agreements between the Conservancy and the départements, and specific agreements between the départements and the local authorities concerned.

The Conservancy's budget, which is funded out of the state's general budget, has for several years been in the region of 100,000 million francs per years. This represents taxation of 1.85 francs per inhabitant per year and enables 4 to 5,000 hectares of land to be acquired annually. It should not be forgotten that between 12 and 13 million French people and several million foreigners spend their holidays on the coast every summer.

In addition to the Director, the Conservancy has a relatively small administrative staff of 32, of whom 18 are mainly responsible for conducting land negoti-

ations and co-ordinating management programmes. There are permanent local offices of the Conservancy in seven large coastal towns.

Management of natural spaces

The Conservancy's function is to protect the most precious natural spaces. Once a site has been acquired, it can do one of three things:

— allow developments to take their natural course, accepting whatever consequences this may have;

— "freeze" the natural evolution of the environment, if the site is of exceptional quality and spontaneous development might result in decline;

— embark upon a process of rehabilitation in the case of the most damaged sites.

For every site acquired, an ecological survey is made and a development programme drawn up with a view to protecting the environment and opening the site to the public. Protection may lead to the maintenance or re-introduction of pastoral or agricultural activities: vines or pasture to assist fire control, extensive stock farming in water meadows to maintain the diversity of fauna and flora.

The restoration of natural environments can be expensive and often has to spread over several years: 50,000 francs per hectare in the case of some particularly badly damaged dune areas. Restoration work is done by the Conservancy itself: dune fixation, fencing, access ways, peripheral parking facilities.

Management proper is mostly handled by the département or municipality as the case may be. In the case of dunes, which are heavily visited in the summer, one warden is needed per 100 hectares and the annual cost runs at about 550 francs per hectare. Wardens are usually recruited by the municipalities and paid by the départements.

The assistance of scientists and environment conservation associations is indispensable for the purpose of drawing up site management programmes and providing regular checks.

The Conservancy at present spends 10 % of its investment budget (10,000 million francs) on restoring sites it has acquired.

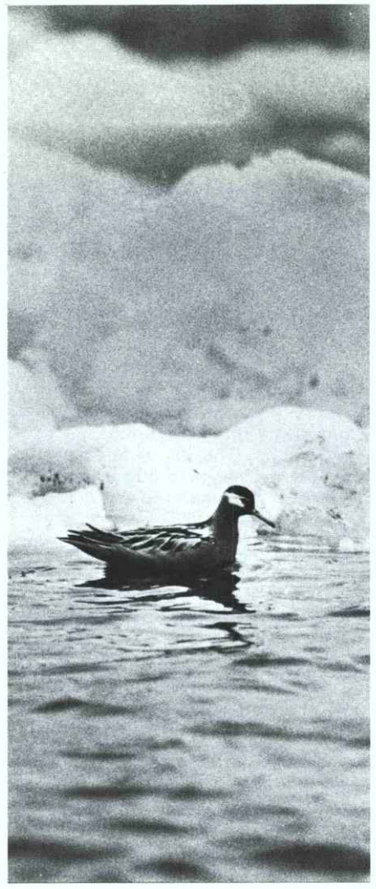
International co-operation

Under the European Communities Council Directive of 2 April 1979 on the protection of migratory birds' resting and nesting areas, the Conservancy has embarked upon the acquisition of outstanding ornithological sites: Marais de Brouage (Charente-Maritime), Bay of Canche (Pas-de-Calais). The Conservancy has also acted to protect sites listed by UNESCO as part of the world heritage: Gulf of Porto (South Corsica). Ecology and environment conservation cannot be confined within national frontiers. For this reason, the Conservancy welcomed the European Coastal Charter drawn up by the Conference of Peripheral Maritime Regions and is watching with interest the initiatives of the Council of Europe and the European Economic Community in this sphere.

The Conservancy fervently hopes that the Year of the Water's Edge proclaimed by the Council of Europe for 1984 will afford an opportunity to learn more about—and to learn from—foreign, mainly European, experiments which have proved effective.

The President of the French Republic, Mr François Mitterand, attended a sitting of the Conservancy's Governing Board in person to demonstrate his interest in protection of the water's edge. He said on that occasion that our generation bore a historic responsibility for the water's edge and added: "All nature preserved in the end gives an exceptional dimension not only to the eye that beholds it, but to the very air we breathe... Persevere, tell people what you are doing, tell people about nature", and concluded: "Let us preserve our communal heritage. This goes much further than one thinks, it affects the very depths of our being, our fundamental equilibrium, that is why I set such store by it".

In this spirit, the Conservancy has chosen as its emblem the dune thistle, at present threatened with extinction, in order that it may become a symbol of protection of the water's edge. D. L.



Phalaropus fulicarius (Photo G. Lacoumette)

Protection of the water's edge: a poll that says a great deal

Concerned by a decline in public interest in the problems of the environment and more particularly the protection of the water's edge, the Conservancy commissioned an opinion poll of a representative sample of the French population in May 1983. The results are surprising:

84 % of the population consider coastal protection an important or very important objective, 53 % consider present measures inadequate, 52 % think that endangered seaside land ought to be taken into public ownership, 63 % think that the issue is important enough to justify action by a specialised body. Among the reasons given for protecting the water's edge, 64 % of people questioned assert the need to protect the national heritage and 58 % are prepared to take part in action to preserve the water's edge.

(Poll by Louis Harris - France, of a sample of 1,000 persons by the quota method applied to the French population aged over 18.)

(Photo M. F. Broggi)

Mario F. Broggi

Rivers and streams: neglected habitats

Non-reflected drainage: a danger for the balance of nature
(Photo M. F. Broggi)

Nature has endowed Central Europe with heavy precipitation creating a dense network of watercourses. For thousands of years, rivers and streams chose their own courses. This profusion of waterways has been significantly reduced since the beginning of the 19th century. Flooding was averted by rectifying the course of rivers and building high embankments, while nearby areas were drained to obtain more arable land for the growing population. In the 20th century, even fairly small streams were canalised and piped to meet the utilitarian requirements of our "civilisation". Man has too long been marked by this struggle against water, seeing watercourses merely as rainwater drainage channels and a dilutionary medium for all kinds of effluent. Our tendency to help ourselves to water as a free resource has met its first obstacle in connection with hygiene and we are now having to clean up our rivers and lakes, at enormous expense. However, in many respects we still lack an ecological frame of reference regarding water and its importance as a plant and animal habitat, so it is no wonder that there are now only remnants of the diversity which once existed. Keeping them alive and restoring watercourses which have already been regulated to a near-natural state are among the most urgent concerns of nature conservation and landscape preservation. The current Council of Europe campaign will therefore be dealing with inland areas adjacent to lake shores and above all the lifelines represented by running water.

The nature of watercourses

Running water removes quantities of sediment, carrying material away and depositing it elsewhere such that its movement entails a high degree of instability for watercourses and their marginal areas. At the same time, this process creates a large number of sometimes ephemeral biotopes such as shingles and sandflats, backwaters, shrubberies, perpendicular impact banks etc., and is thus reciprocally linked not only with the bankside area itself but also with the rest of the environment.

These drainage systems, forming a network at every stage, go largely unnoticed by man. We also tend to assign every piece of ground a hard and fast utilitarian purpose. This increasing stabilisation of the landscape consequently precludes further transformations leading to the emergence of the new habitats which are nevertheless vital to many animal and plant species. Not surprisingly, this is one of the reasons why our Red Lists of endangered species are growing longer all the time. The landscape dynamics element should therefore receive still more emphasis in nature conservation work and must wherever possible be allowed to operate.

The adverse effects of regulation works

Any form of human interference with the biotic and abiotic factors of a watercourse triggers a great many different reactions. Human intervention has for too long—however necessary—been conducted without moderation or any regard whatsoever for the ecological implications. Water engineering has been developed to perfection from the human safety angle alone. Any rectification or regulation of a watercourse basically produces a considerable degree of uniformity—replacing the former natural diversity of the banks, bed, flow and course. The more monotonous the configuration of a regulated watercourse, the less favourable are its conditions for the development of profilic and varied plant and animal life. Such alterations can also lower the level of the surrounding water table, usually causing severe damage to adjacent wetlands.

This life-destroying aspect is growing in intensity as the smallest streams and brooks are lined with concrete slabs, isolating them from interaction with the landscape, cutting them off from the groundwater and depriving them of most of their self-purification capacity so that they become practically lifeless drainage channels. The long-standing rule was that water should be drained away as rapidly as possible, but the need for its retention in the ground for as long as possible is now increasingly recognised. Retention prevents normal rises in water level from causing floods, the main reasons for which are the draining of wetlands with loss of their absorption capacity and the growing practice of straightening of every watercourse of any size with the result that the terrain becomes useless as a storage area and the water has to be drained away all the faster.

Increasing sealing-off of the catchment areas by building has the effect of preventing the seepage of rainwater, which instead is channelled with all possible speed into overloaded watercourses. This tendency is also furthered by industrialised forms of agriculture with the surfacing of roads to carry farm produce, extensive drainage and soil compaction by heavy farm machinery. The inevitable vicious circle of engineering works to prevent further flooding leads to still higher water levels in next-large streams. New approaches to hydraulic engineering are endeavouring to allow for this factor as well as others by building artificial storage basins on upper reaches wherever possible so as to cut down peak flooding.

Moreover, no stream or river dies alone. Watercourses must be seen in the total context of their surrounding. Above all, they are frequently involved in a hydrological exchange with wetlands, which have become rare. Any interference with running water thus also affects the living environment around.

Putorius putorius (Photo B. Seger)

Imminent and existing damage

We all know about the "Red Lists". They are intended to alert us to the danger threatening our flora and fauna. The Council of Europe has had such inventories drawn up for all threatened vertebrates and vascular plants. The member states are also producing more and more national surveys to make their citizens realise the threat to their environment. It is clear that nature's lines of junction have special importance as ecological niches, and they include the numerous land-water transitional areas. In view of the tough treatment which these vulnerable areas have so far received, their increasing plant and animal losses are not surprising. For instance, 41 of the 55 freshwater fish species which are generally endangered in the Federal Republic of Germany rely on running water for the completion of their life cycle—a whole 75 %! Hydraulic engineering measures are identified as the gravest threat to 38 of them. The danger list on this basis could easily be extended as far as the state of knowledge allows: 62 % of all threatened molluscs in the Federal Republic of Germany live in running water, 88 % of waterborne dragonfly species in Switzerland are on the appropriate Red List, and so on.

Anglers have long been aware that hardly any more good catches are to be had in built-up rivers and streams. Austrian scientists now have qualitative proof of the fact after studying 34 watercourses according to various criteria and establishing that reaches still in a natural state are approximately 4-10 times better stocked than developed ones. In a word, concreted rivers drive fish away!

Research on the protection of individual species also confirms the unnatural state of watercourses which frequently prevails. The otter, though protected in Switzerland since 1952, is now on the point of extinction even without hunting. A direct cause of its decline is the lack of suitable habitats, for which structural alterations to bankside areas are once again the main culprits. The relevant 1976 Swiss study classed only three of the 16 waters researched as suitable otter habitats. As a bio-indicator, the otter is thus a poor reflection on hydrological and environmental conditions in Switzerland.

What should be done?

We want bankside areas which are as near-natural as possible, but they can only be obtained by prohibiting hostile construction measures. While regulation and concreting are still prevalent, hopeful signs can be noted elsewhere. In some countries government directives for water engineering consistent with nature have recently been issued. They are generally needed, and even more so their everyday enforcement. In this respect, cooperation between water engineering and nature conservation officials is essential. The following requirements may be put forward with a view to improving the situation from the nature conservation and landscape protection angle:

— making inventories of the biological condition of watercourses;

— making provision for the preservation of all parts of watercourses recognised as being in need of protection;

— prohibiting further rectification and canalisation of watercourses;

— rehabiliting normalised streams at every opportunity, i.e. as far as possible avoiding bank consolidation with inanimate materials in favour of biotechnical measures and reconstituting natural, varied cross-section features by means of contoured and sloping banks;

— maintaining and reconstituting natural riparian vegetation with the broadest possible intermediate strips between the bankside growth and the open space beyond (for instance by sowing wild grass fringes);

— regulation (control and limitation) of recreational traffic, particularly in surviving natural river areas and meadowland.

M.F.B.

Gallinula chloropus (Photo G. Lacoumette)

Inland wetlands

Wolfgang Schmitz

The term "wetlands" has been commonly used in English for a long time (the German term "Feuchtgebiete" has only very recently gained currency). Wetlands are said to be particularly threatened by the effects of civilisation and also particularly deserving of protection because of their biological diversity and rich variety of species.

Wetlands are parts of the earth's surface whose characteristic feature is the constant or periodic presence of water. They are borderlands between aquatic and terrestrial biotopes, this combination being important for certain terrestrial and aquatic, but above all amphibious, species. How far bodies of water themselves are to be regarded as wetlands is a matter of some doubt among scientists, although their shores certainly do have biotopes which deserve that name and possess a characteristic stock of plant and animal species.

In the long term, wetlands can only exist if they are provided with a regular supply of water, whether from precipitation, from stagnant or flowing surface water, or from groundwater. The form that wetlands take is therefore determined by all the factors that influence the quantity and nature of water in its various manifestations. If the biotopes of wetlands are not to be doomed to destruction, these relationships must be taken into consideration and studied as carefully as possible. Let us now illustrate them with a few examples.

The natural instability of wet biotopes

Nature conservation's overriding concern is to preserve the stock of natural ecosystems. In many cases, however, the fact that many natural ecosystems do not have a stable, long-lasting existence is overlooked. This is particularly true of many aquatic biotopes and wetland habitats.

Most lakes in the northern hemisphere are subject to constant change, due mainly to sedimentation and natural eutrophication. Of course, these are usually slow processes, but there have recently been cases of more rapid changes. River beds shift at regular intervals, and this has serious implications for the biological population. Constant fluctuations of the water level in rivers and many lakes mean that the wetness of their banks and shores is constantly changing and that ecological conditions in the wet biotope are very variable. In extreme cases a wet biotope consists merely of a temporary accumulation of water in a hollow in the ground which completely dries up again after a short period.

The fact that such unstable biotopes nevertheless have a typical population is accounted for by the following circumstances:

— the organisms present in these biotopes are ecologically adapted to changing water levels and temporary drying up of the biotope;

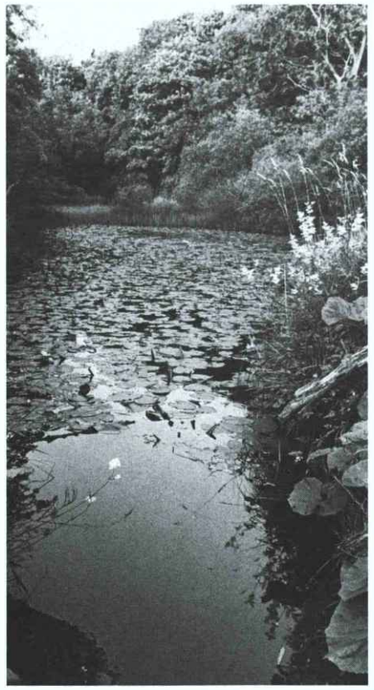
— large numbers of wet biotopes lying in close proximity to one another and intercommunicating are commonly found in the terrestrial environment. As a result, organisms are able to escape in the event of unfavourable conditions in the biotope;

— many organisms are amphibious and therefore satisfy the conditions for life in such a variable biotope.

The greatest threat to the existence of wetland ecosystems comes from interference with the water regime, i.e. the water supply is obstructed or shut off completely. This is a less frequent occurrence where the wetness of the biotope depends on precipitation. The most common wetland ecosystems in Europe with a hydrological system of this kind are high moors and melt-water pools.

High moors

The characteristic feature of the vegetation of high moors is the extensive occurrence of sphagnum moss. This type of moss has many cells that are capable of absorbing water. As a result, it stores rainwater and stabilises the water budget of these wetlands. Even if the layer of vegetation gradually rises above the actual ground level owing to the continued growth of sphagnum moss, the system's ability to retain water is not affected. A further prerequisite for a stable water budget in these high moors is that the underlying rock should be largely impermeable. Sphagnum moss has a high absorption capacity for dissolved ions. It acts as a cation exchanger, thereby reducing the pH value of rainwater, which is acidic anyway. It also absorbs plant nutrients present in the water. Decompositon processes in the lower levels of the moss layer draw heavily on the water's oxygen. The decomposition of the vegetation produces humus and leads to the formation of loose peaty soil. The accumulation of humus gives the water a brown colouring. The aquatic life in these surface waters, which, because of their low pH value and low oxygen and nutrient content, are ecologically extreme, is exceptionally poor. Many animal groups, e.g. molluscs, amphibians and fish, are absent. The flora of high moors exhibits a number of varieties characteristic of such habitats, including rare insect-eating plants.



(Photo G. Lacoumette)

High moors are very common in North European mountain ranges. There are far fewer biotopes of this kind in Central Europe, where they are usually confined to mountain ranges with impermeable rocks and altitudes that guarantee the necessary precipitation, e.g. in Germany, the Black Forest and Harz mountains.

Many of these relatively rare biotopes are now in danger. Most high moors discharge water into lower-lying land, where this process is frequently intensified by drainage and soil improvement measures. This can have adverse effects on the moorlands up above and cause them to dry up.

Pools and springs as wet biotopes

Arctic and subarctic melt-water pools in permafrost regions are further examples of small bodies of water resulting from precipitation. They are short-lived, regularly occurring phenomena. As a result of the impermeability of the permafrost, melted snow gathers in hollows in the ground in the form of shallow pools and does not dry up again until the late summer. Because of the shallowness of these pools, the water warms up considerably from the spring onwards and thus forms a favourable medium for rapid biological development. The huge mosquito population of Lapland and climatically similar regions of Northern Asia and North America is due to the existence of such pools, in which young mosquitoes hatch out relatively quickly.

Shallow pools in low-lying riverside woodlands offer equally favourable conditions for the development of young mosquitoes. They are filled with water by the periodic overflowing of the main river and do not dry up until the groundwater level has fallen substantially, mainly as a result of evapotranspiration from the low-lying woodland vegetation. Consequently, their life is usually long enough for the complete development of young mosquitoes. The number of mosquito breeding-grounds can vary greatly from year to year depending on the extent to which the main river overflows.

Biologists have made a close study of this phenomenon in the Upper Rhine Valley because of the constant demands from residents for effective action to combat the "mosquito scourge". Various techniques have been proposed for this, such as the use of insecticides designed, in theory, to kill mosquitoes only, the spreading of fatty substances on the surface of the breeding waters, or the spraying of a wide area with bacteria that are lethal to young mosquitoes. The mosquito population would not be significantly reduced unless such measures were carried out over a wide area. But the possible ecological consequences cannot be evaluated accurately enough to justify their immediate introduction, especially as the economy and development of the Upper Rhine Valley are not suffering any lasting damage from mosquito infestation. The mosquitoes of the Upper Rhine Valley do not transmit malaria.

In springs, i.e. places where groundwater emerges from the earth, water and land come into close contact in a confined space. A usually slow current and a water temperature that remains constant throughout the year are the characteristic features of this biotope. Land animals occur here together with surface and groundwater animals. Species occurring only in cold water, which were very common in Europe in the Ice Age, are now confined to springs because of the water temperatures obtaining there.

The number of natural springs in populated areas has decreased steadily because many springs have been tapped and diverted to provide water supplies.

Riverside habitats in the Upper Rhine Valley

The Upper Rhine is a particularly good illustration of the fact that the protection of wet biotopes is closely bound up with the problem of the conservation of natural landscapes in general. Land improvement in river valleys is concerned with the opportunities for agricultural use offered by irrigation and the removal of the dangers to human settlement from flooding. Such concerns also underlay the engineering work carried out at the beginning of the 19th century to straighten the course of the Upper Rhine. At the time, the waters of the Rhine flowed slowly throughout the entire floodplain in numerous branches and in wide meanders that frequently changed their position. Alongside the system of flowing water, many pools of stagnant water formed in the channels abandoned by the river. This led to a considerable build-up of the groundwater flowing down to the Rhine from the mountainsides. Everywhere the water level was so high that even moderate high waters caused the river to flood large areas of the low-lying land surrounding it. Under these hydrological conditions a system of zones developed in the floodplain, each zone corresponding to a position relative to the water level and comprising certain plant communities. These zones were, beginning with the lowest-lying: aquatic vegetation, the river-bank, rushes, reeds, softwood and hardwood. The precondition for the continued existence of these types of vegetation is regular flooding of the land in all the zones mentioned.

Phytosociologically, the softwood zone is white willow woodland and the hardwood zone oak, elm and white poplar woodland. The latter accompanies all Europe's large rivers and is the most complex woodland community in the low-lying areas of the Upper Rhine Valley, with at least 140 species, and often more.

The monk seal

(*Monachus monachus*)

a symbol of
Europe's threatened
fauna

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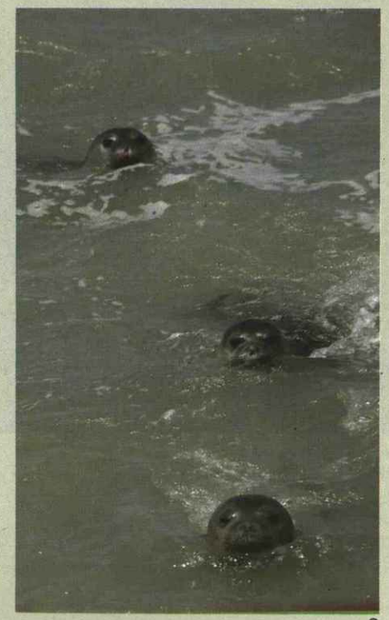

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Anas platyrhynchos
(Photo G. Lacoumette)

It is extremely variable as the vegetation responds to the slightest ecological changes. The field elm, ash, common oak and white poplar predominate in the canopy. Various other species form the understorey. As a rule, the shrub layer is highly developed too, and creepers are a characteristic feature of the vegetation.

The purpose of the engineering work carried out during the 19th century was to straighten the course of the Rhine by cutting off the branches and meanders. This meant that the river was made shorter and that its gradient and rate of flow were increased. As a result, it carved out a deeper bed and the frequent destructive floods were largely stopped. As time went on, the deepening caused by the thrust of the faster-flowing Rhine went farther than had been intended.

Considerably lower groundwater levels in the low-lying areas bordering the river were the consequence. Flooding seldom occurs now and water levels in the branches still connected to the main river have dropped. Many branches that have been cut off from the main river dry up for long periods of the year and are no longer completely filled even when the main river is in flood.

The luxuriance and richness in species of the riverside woodlands are changing because of the reduced flooding.

Further engineering projects, such as the building of the Grand Canal d'Alsace alongside the southern Upper Rhine or the use of weirs to prevent further deepening of the river bed, combined with the construction of very high, flood-proof dams, have made the continued existence of the original riverside wetlands even more uncertain.

Wetlands under the influence of eutrophication

Many wetlands are also threatened today by rapid eutrophication of the water, i.e. excessive propagation of aquatic plants due to increased concentrations of plant nutrients, especially phosphates, in the water. Domestic waste-water contains these substances in concentrations of about 10 mg phosphorous/l, roughly a thousand times the concentrations occurring naturally in bodies of water. Normal sewage treatment is insufficient to remove phosphorous from waste-water. Special techniques are required. So far they have only been used in a few areas, specifically for the protection of lakes. The harmful effects of eutrophication are not confined to the open waters of the lake and the phytoplankton found there, but extend to the wetlands on the lake's shores. A very thorough study of the changes due to eutrophication has been made on Lake Constance through regular mapping of the vegetation around its shores. In the last 20 years, during which time phosphorous concentrations in the lake have risen from 10 to 80 mg/m³, striking changes have occurred in the species making up the flora of the lake's shores.

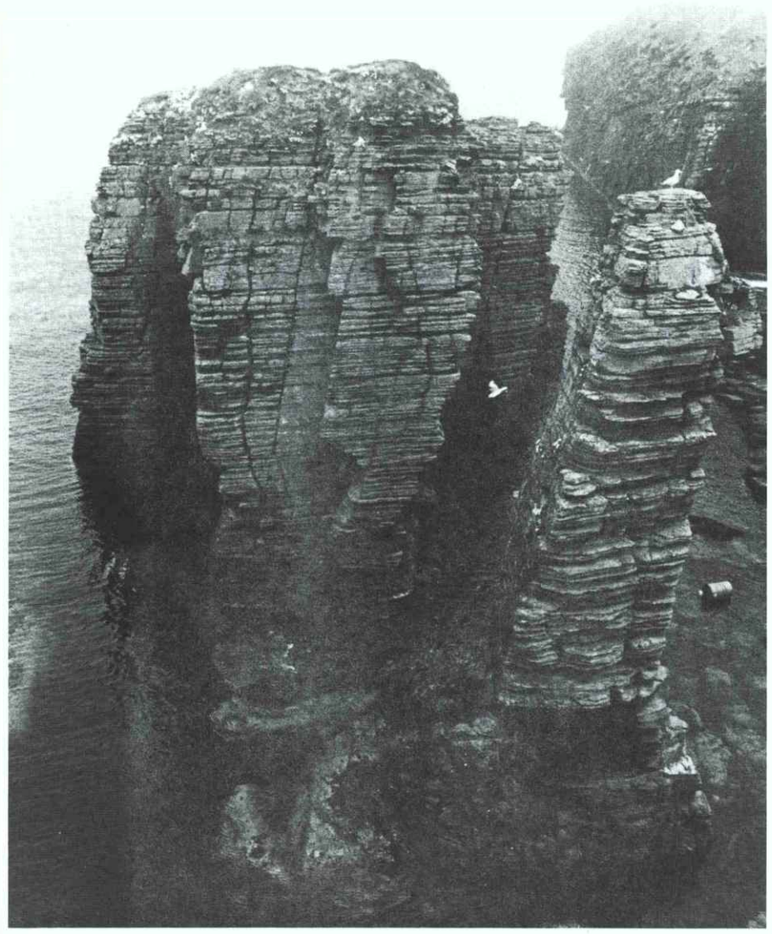
Eutrophication has particularly harmful effects on the reeds of Lake Constance. Reeds cover large areas of the lake part of the Untersee and are a home and breeding place for many species of waterfowl. Over the past few years these reeds have been declining at an increasingly fast rate. Because of the higher nutrient concentration in the water, they now grow much more densely than before, but with weaker stems, so that many of them break and clog the water with the remains. Large quantities of filamentous green algae have recently appeared in the reed-covered areas, impeding the flow and aeration of the water and leading to severe oxygen loss and anaerobic reduction phenomena in the sediment around the shores, and hence to the formation of sapropel and hydrogen sulphide. Under these conditions the reeds die and their stocks are not renewed. Controlled cutting of reeds in the biotope provides better spatial conditions for their growth. Many nature conservationists oppose this practice, however, on the grounds that it is harmful to bird life. As the example shows, the causes of damage to wetlands, in this case discharges of waste-water over a wide catchment area, often lie far outside their immediate environment.

Wetlands are threatened

Wetlands are particularly threatened in densely populated areas where human activity is intense. The significant developments as far as wetlands in the Neckar region are concerned have been the complete canalisation of the Neckar, the building-up or afforestation of many wet, meadowed valleys and the filling up of small bodies of water in order to increase land use.

The canalisation of the Neckar also did severe damage to bird life in this area. The white stork population on the Neckar was destroyed, as were the common heron colonies somewhat later on. The region has a whole series of flooded gravel pits resulting from the excavation of gravel for the building industry. These were initially accepted by wetland species as alternative biotopes. Unfortunately, many of these artificial lakes were short-lived. Out of a total of 75, 41 have been completely and 11 partly filled in. Because of the various uses to which they are put, such as angling and other recreational activities, the few that remain are usually unsuitable as sanctuaries for endangered plant and animal species.

The examples given show how difficult it is to preserve wet biotopes and biocenoses in their natural state. Protective measures usually have to extend farther afield than the actual sites of these ecological units. In particular, any interference with the water budget of the immediate and less immediate environment can have harmful effects. Simply declaring a wetland a protected area is often not enough to preserve it. The demands placed on the land by human activities (increased population density, land use etc.) are such that wetlands are among the earth's most endangered ecosystems and some of the most difficult to preserve. W. S.



(Photo G. Lacoumette)

Cliffs

Roger Goodwillie

Cliffs occur where high land meets the sea: that much is obvious to everyone. But the type of cliff depends on the rock from which it is made. As waves pound the base of a cliff they cut out a notch or cave. If the material above is soft, it cannot stay there without foundation, and it crumbles into a sloping profile, stable only until storms again undercut the base. Cliffs like this, of shale, sand or glacial drift, can retreat one metre a year and offer few niches to wildlife because of their instability. By contrast, a rock such as chalk, sandstone or basalt has the strength to maintain a vertical surface. The resulting cliffs are an essential part of the scenery of Europe from the Mediterranean to the coasts of Ireland, Britain and Norway.

Wildlife sites

Wildlife, as well as scenery, respond to the local geology. If a cliff is built of layers of sedimentary rock like the Cliffs of Moher in Ireland, or the Orkney Islands, there are a multitude of nesting ledges for seabirds such as guillemots and razorbills. Kittiwakes like an overhanging site or cave, black guillemots the fallen boulders at the cliff base, and the largest species such as cormorants and gannets, as well as the gulls, prefer wide ledges or cliff tops. Seabird "cities" are one of the most impressive sights that nature can offer. There is colour and movement everywhere, birds are gliding and wheeling on the updraughts, their calls echoing from every rock and surging as incidents happen below, there is the constant coming and going of adults bringing food to their young, all against the background of a dark blue heaving sea. A few birds, like the gulls and fulmar, notice the intruder, but most of the frantic activity goes on regardless, a source of wonder to the casual observer and of frustration to the ornithologist attempting a census.

By a happy coincidence the most productive fishing waters in Europe occur close to the rocky coasts of Brittany, Ireland, north-west Britain, Iceland and Norway, so the bird life is well placed in terms of food and nesting sites. The northern coasts are subject to few recreational pressures and now that human consumption of the birds has all but ceased, there are few impacts on the cliff-nesting species by man, except the direct competition for the fish they eat and marine pollution. For this reason these birds remain almost as numerous as they were in the past, and some, like the gannet and fulmar, have actually increased.

Cliffs in the Mediterranean

Cliffs in the Mediterranean are much more frequented by small boats for fishing or pleasure, and the few species that choose this habitat, such as Audouin's gull and Eleonora's falcon are very vulnerable unless they are nocturnal.

The Mediterranean cliffs have a great importance for plant life, however, that has been denied to more northern regions by the Ice Age. At the maximum extent of the ice, Europe's flora was concentrated in the south where isolation and evolution over thousands of years created numerous new species, unique and endemic to small areas. So joining the maquis vegetation on precipitous coasts we sometimes find a swarm of endemic plants, especially on the Greek islands, in Spain and in Italy. R. G.

Dunes

Pat Doody

Ammophila arenaria (Drawing NCC)

Sand dunes develop in the coastal areas of western Europe where there is a build-up of sand, blown inland from an intertidal sand flat which dries out at low tide. Instability of the sand and the extreme drought in the early stages of development create conditions which few species can tolerate. Despite this, specialist plants such as *Agropyron junceiforme* are important in initiating accretion at the top of the shore.

Stages of formation

Behind this *Elymus arenarius* and *Ammophila arenaria* are the main dune builders around much of the Atlantic coast. The last species grows best when repeatedly covered by sand and can survive accretion rates of 80-100 cm per annum, forming dunes up to 30-40 metres high which may stretch several kilometres inland.

These dune ridges vary enormously in size and shape, depending on the volume of sand supply, wind strength, direction and duration and the profile of the shore. Adjacent landforms including barrier islands and shingle bars facilitate deposition, and create a series of transitions to other habitats including saltmarshes.

Although there is some geographical variation in the foredune communities, it is in the more stable, older dune landscapes that the diversity of plant and animal life is most fully expressed. On calcareous (shell sand) dunes a succession of communities develops on the "dry" ridges and "wet" hollows. These are rich in plant species which reflect the prevailing edaphic and climatic conditions. Northern dunes can include elements of a sub-arctic flora, such as *Dryas octopetala.* Over much of the rest of Europe the vegetation has many species characteristic of inland chalk and limestone grasslands. The wetter areas are particularly rich in rare plants, including many orchids.

On acid (silica sand) dunes a heathland typically develops with species such as *Calluna vulgaris, Empetrum nigrum* and *Erica spp.* This is most frequently found in north western areas. Succession to heathland vegetation may also occur on very old calcareous dunes where leaching has resulted in "acidification" of the soil surface.

The final stage of succession is from scrub to woodland. This may include birch and oak in the Netherlands, oak and pine forest in France and juniper in the Mediterranean.

Plants and animals

The richness of animal life on dunes mirrors that of the plant life. Some species are dependent on the specialised dune plants, whilst populations of many more are restricted to this habitat because of the destruction of wild places elsewhere. Invertebrates, notably butterflies, moths, bees and wasps, are well represented. Amongst the other animals, several reptiles and amphibians have their most important populations in dunes. In Great Britain these include, notably, the natterjack toad. Bird species use dune scrub for nesting, feeding and resting while on migration. In addition many mammals are found there and in northern France wild boar live in the dune forest.

Although in the past large amounts of sediment have been available for dune building, today active accretion occurs on only a limited number of sites. Many dunes are fossilised and some are eroding on a wide front owing to major changes in sediment patterns. Against this background, the increasing recreational use of dunes, development for housing and industry, water abstraction and changes in management have resulted in large-scale destruction of this valuable wildlife habitat.

The prevention of further encroachment onto the dunes through industrial and housing development and afforestation is essential if the remaining important sites are to survive. Controlled use for recreation is possible, but needs to take account of the inherent instability of the systems. In those areas where traditional management practices, such as grazing, have helped create important wildlife areas their continued sympathetic treatment is required.

Finally, if sand dunes are to continue to provide important areas for the study and enjoyment of wildlife, to fulfil recreational and agricultural needs and to perform their sea defences function, then a concerted European programme of protection and management is essential.

P. D.

Exploitation or over-exploitation?

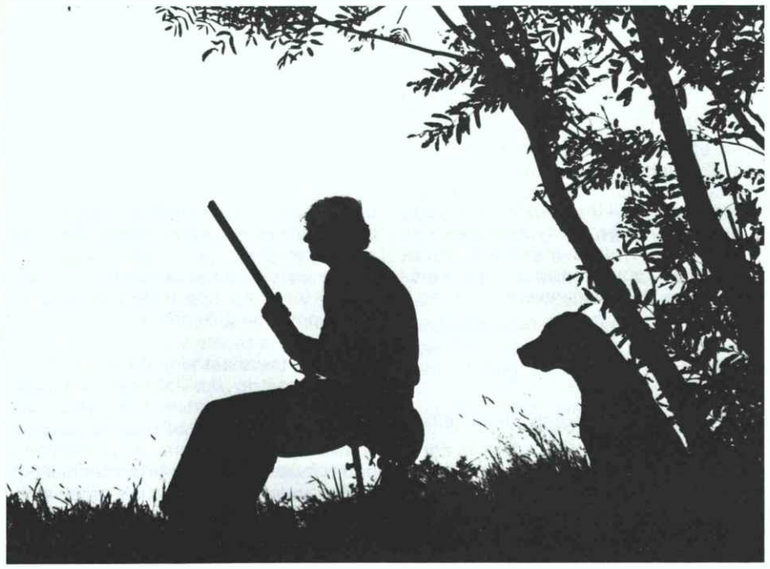
Hans Skotte Møller

Over most of Europe water edges are today important places where natural resources of fish, birds and mammals, dependent on the wetlands, are exploited by man, either through fishing or hunting. This has in some areas yielded a substantial supply of food. However, today the recreational aspects of fishing and especially hunting are generally much more significant than the dietary supply provided by these activities. A debateable question is whether the "harvest" of the different animal populations through hunting and fishing is reasonable, or whether it directly or indirectly causes an over-exploitation of the populations.

The problem

There are of course no simple answers, though most people will agree that over-exploitation takes place if the hunting or fishing has a magnitude or form which results in the decline of naturally occurring populations, which prevents these from re-establishing themselves at natural self-sustaining levels, or which changes their behaviour radically. In many European countries over-exploitation has led or contributed to the decline and even extinction of populations, and in some cases species, for example the otter, the beaver, egrets, pelicans, other waterfowl and also the sturgeon. Particularly in the last two decades, governments and authorities have taken conservation measures in order to regulate the exploitation of the populations. Sometimes these have been successful, but in other cases they have come too late or their possible effects have been blurred by negative influences of other anthropogenic factors (i.e. habitat destruction, pollution and disturbance). The positive effects of conservation measures in some countries, especially for migratory species, have been reduced by the lack of co-ordination in other countries hosting the same populations. In these cases the need for international co-operation and co-ordination is obvious and tools for such co-operation now exist, such as the Council of Europe Convention on the Conservation of European Wildlife and Natural Habitats (the Berne Convention).

(Biofoto S. Agger)



Hunting

Lake shores, river banks, marshes and bogs and other permanent or temporary wetlands are hunting grounds in most parts of Europe. The game here is primarily waterfowl, i.e. geese, ducks and coots and in some countries also waders and gulls. Aquatic mammals are today of lesser importance, but seals, otters and European mink were formerly hunted and trapped intensively. Today they are totally protected in most of the countries where they occur.

The International Waterfowl Research Bureau has during the last 20 years provided much data on the sizes of the different European waterfowl populations, on important sites for resting and breeding as well as information concerning the hunting seasons, methods and number of waterfowl hunters in Europe and other parts of the world.

Most of the exploited species are migratory birds. As a consequence the protection and management of these populations is a matter of international policy, a fact which is also recognised and stressed in the Berne Convention, where a separate chapter gives special provisions for migratory species.

It is calculated that within Europe 40-45 % of the autumn populations of all duck species are shot each autumn and winter, whereas in North America the

figure is less than 20 %. Thus there is clearly a need for action which in Europe could contribute to a reduction in the pressure on these species which are too intensively hunted. Initiatives are especially needed in France and Italy.

Other negative factors

The need for conservation measures should also be considered in relation to a number of natural and anthropogenic factors which now contribute to the deterioration of living conditions and possibilities of healthy and self-sustaining waterfowl populations. Many water's edge species are seriously hit by habitat destruction due to drainage, land reclamation, changes in traditional farming practices, eutrophication of lakes and shallow coastal waters, oil pollution and introduced species (i.e. the American mink), as well as increased disturbance by tourism and new recreational activities such as wind-surfing, which scares the birds away from otherwise suitable localities.

Apart from these aspects, it must also be stressed that hunted birds become shy. This is an indirect and negative effect of hunting which is especially important in the more densely populated countries where the birds are thus forced to keep mainly inside reserves with strict regulations on hunting and public traffic.

Another negative effect of hunting is the fact that quite a large number of birds are wounded and crippled without being killed and retrieved. Thus, in European populations of geese and larger duck species, 25-30 % are carrying pellets in their body tissue due to shots (and even up to 34 % in rare species such as the Bewick swan, which is totally protected within its whole range).

However, there are also some positive aspects: in many places the interest in having hunting grounds is an important impetus for landowners to preserve and manage, and in some cases even to create or re-establish, wetland habitats. Furthermore hunting has important recreational aspects and provides possibilities for closer contact with the natural environment.

It should also be mentioned that in at least one species, the mallard, many individuals are introduced into nature by hunters; on a European scale it is estimated to be 1/2-1 million birds annually.

Fishing

Through millenia man has obtained a significant supply of food by fishing in watercourses, lakes and shallow coastal waters. This is still the case in some parts of Europe, but generally speaking this aspect is today less important, especially when you consider freshwater fishing. This is due to several reasons:

— large quantities of the most attractive freshwater fish (trout, carp, etc.) are now artificially bred and managed in fishponds;

— off-shore fishing has been effectively developed;

— during the last 100-150 years enormous areas of the freshwater fish habitats have been destroyed or degraded by management of watercourses, pollution by chemicals and eutrophication by fertilisers or acidification due to acid precipitation in many lakes. Furthermore, the building of locks and weirs on the watercourses destroys the possibilities for many migrating fish to reach their spawning grounds.

However, there has simultaneously been an upsurge in the interest in fishing as a leisure-time activity and today angling is one of the most popular outdoor activities, which from a recreational point of view is very important for millions of Europeans. Angling is the most widespread, but fish-traps are also used for recreational fishing in many localities.

(Adi / Biofoto)

This trend has many positive aspects: the anglers and their associations are often very active in combating pollution, arguing for better water quality and fighting against destruction of the aquatic environments. Another positive factor is that anglers in many places are restocking depleted fish populations. From an ecological point of view, restocking and introduction of fish should be considered carefully before they are carried out, especially when non-indigenous fishes are concerned. Otherwise naturally occurring populations and local environments might be negatively influenced with damage to the indigenous fish and underwater vegetation.

Compared to the impact of hunting on populations of mammals and birds, the direct effects of inland fishing rarely have such a character that the fish populations are over-exploited and destroyed. Here, habitat destruction is more important.

However, it has in many cases been necessary to have legal provisions, which could regulate the methods and intensity of fishing, for example by means of closed seasons, rules for fishing gear and minimum sizes for legally caught fish. In the report "Threatened freshwater fishes of Europe" issued by the Council of Europe in 1980 the need for such measures is also pointed out for a number of European fish species, i.e. the sturgeon (*Acipenser sturio*), salmon (*Salmo salar*), Danube salmon (*Hucho hucho*), charr (*Salvelinus alpinus*), wels (*Silurus glanis*), pikeperch (*Lucioperca lucioperca*) and flounder (*Platichtys flesus*).

More attention should also be paid to the effect of inexpedient fishing, for example with nets and traps in places where they obstruct the passage of salmon and other migrating fish using spawning grounds far up the watercourses.

Habitat conservation and improvement of the fish environment should be given highest priority and international cooperation should be strengthened in order to solve common problems such as water pollution, for instance due to acidification. In this context it is also recommended that fish be included in the Berne Convention, which today only covers the other vertebrates (mammals, birds, reptiles and amphibians) and plants. However, many European fish populations need the protection which could be provided by the Convention as much the other groups of animals.

Salt marshes

Finding a reasonable balance between exploitation and over-exploitation is also relevant for certain habitats of the water's edge, for example the salt marshes. Scattered along the coastline of Europe from the Evros delta in Greece to the Baie du Mont-St-Michel in France and to the north in the Baltic Sea are stretches of low-lying marshes dominated by characteristic vegetation of halophilic plants which tolerate the seawater's salt content. These sites have for centuries been extensively used for agriculture, especially for cattle and sheep grazing and for hay production. This utilisation has very often created optimal conditions for a variety of breeding and resting waterfowl, and the marshes and meadows furthermore shelter many rare plants and insects. These areas are also very often of high scenic beauty providing smooth green transitions between the sea and the hinterland.

Many salt marshes have, however, in recent years been destroyed by land reclamation and been developed for urbanisation, industrialisation or intensive agricultural purposes. Recent analyses from the study on European salt marshes and salt steppes performed on the initiative of the Council of Europe revealed that 20-40 % of the salt marsh area in Scandinavia, Germany, the Netherlands, western France, Great Britain, Portugal and Italy are threatened by reclamation. The total area of salt marsh in Europe covers only approximately 3,200 km² distributed over 519 registered sites.

Less than half of the salt marsh area is protected by the nature conservation laws and efforts to preserve this habitat are needed. At least one country, Denmark, has introduced a general rule affording nature protection to all salt marshes of more than 3 hectares. But even if such rules came into force in other countries there would still be management problems, which should be solved in order to preserve the habitat. The main problem here is to maintain its traditional, extensive agricultural use. If this exploitation ceases, the salt marshes will rapidly change into reed swamps and shrubs, which are considerably less attractive to many wildfowl. The maintenance of the salt marshes by grazing and haycutting, perhaps through subsidies, may soon be an important task for conservation bodies all over Europe. H. S. M.

(Photo Michaud - Rapho)

The effects of tourism

Alfonso Alessandrini

The all-embracing and total defence and conservation of natural resources should be part and parcel of our everyday life. In this sector, too, the laws should give formal expression to standards already deeply rooted in our convictions and types of behaviour, whilst general and specific standards, both rigorous and flexible, adopted by local, national and international authorities should be adjusted to specific needs in different places and at different times.

Nature forms a whole

However praiseworthy a campaign for the defence of one natural system or another may be, it is not the right approach, since a study of the facts of nature teaches us that everything is interrelated and that our own divisions are based solely on conventions or expedients which we adopt in order to highlight isolated aspects of the situation around us.

But the main reason that prompts us to face up piecemeal to the overall problem of conservation is the need to make a list of areas most exposed to harm, in relation to the urgency of the interventions or precautions, as an instrument with which to make the authorities and the individual citizen alive to the problems and persuade them to act immediately.

But if this partial approach is to be worthwhile, it is necessary to identify and constantly bear in mind the links connecting every single ecological system with those around it and with the biosphere as a whole.

As far as coasts are concerned these links are immediate and obvious because such areas are the meeting place between the sea and the land and they epitomize the need to protect both, in geographical, territorial and above all ecological terms.

Along the coasts we find concentrated all the most delicate problems affecting both the land and marine environment. The effects of the meeting and clash between the two systems are bound up with a multiplicity of interacting factors such as climate, geographical situation, altimetry, the flow of water from the hinterland and, as far as the sea is concerned, the bathymetric trend, currents, tides, etc.

Transformation of coasts

Human settlements have been concentrated along the coasts from time immemorial because of the more favourable climatic conditions; because the most extensive and fertile plains are generally to be found there; and also because of easy communications and the desire to exploit fish resources. Over the last hundred years tourist and sports activities have been added to these traditional motives.

This has led to the far-reaching transformation of the coasts and, above all, the disappearance or marked reduction of natural coastal environments, such as forests, wetlands and dunes. The main factors making for change have been:

— the extension of residential and industrial settlements;

— the development of communications and the associated facilities (such as airports and ports);

— the extraction of sand and other materials;

— the development of infrastructures and tourist activities such as balneotherapy, pleasure navigation and underwater fishing.

Further consequences of increasing human pressure, often due to excessive tourism, are pollution, eutrophication, wind and marine erosion, and the gradual disappearance of groundwater.

All these factors call for the adoption of effective coastal protection systems. The following may be listed among the possible courses of action:

— an inventory and study of coastal natural resources and landscapes;

— the use of impact studies for major transformation schemes;

— monitoring and the assembly of data to combat pollution, eutrophication, marine and wind erosion;

— master plans for coastal areas including, where possible, river basins near coasts;

— the establishment of protected areas to safeguard coastal ecosystems and habitats which have not yet been seriously harmed by man;

— the adoption of special standards or specific restrictions with regard to:

- the provision of new roads and other communication systems and traffic on those already existing;
- the extraction of sand and other materials;
- the protection of habitats, vegetation, coastal wetlands, etc.;
- hunting, fishing and underwater fishing;
- commercial navigation connected with fishing and sport;

— the adoption of standards to prevent and abate pollution and eutrophication along seacoasts and all waterways;

— education and information for the citizens;

— co-ordination of services operating along the coasts.

An invaluable capital

Many of these incentives presuppose in some countries, including Italy, the adoption of more rigorous and effective legal instruments than those at existing present. In any case, if it is not entirely wrong to approach the defence of coasts as a local, isolated and random task, it is none the less restrictive as compared to the comprehensive view of defence which must be farsighted and take into consideration the two systems which meet along the coastline. That line is not uniform; it may be thin or thick, and it changes according to the geomorphological features; but it is also above all the result of all the forces and disturbances which have their point of impact there.

(Photo P. Pougnet - Rapho)

Tourist centres with their related infrastructure requirements such as roads, drainage systems, ports and activities bound up with the building industry may lead to far-reaching imbalances in both the land and marine systems.

Indeed it is fair to say that although the deterioration of the coasts may be ascribed to local causes such as tourism, it is considerably aggravated by outside factors such as the pollution of rivers flowing into the sea, the deforestation of the mountains, the excavation of minerals from the seabed and the pollution which comes from the sea itself. All these are equally serious and not immediately recognisable causes of damage which is not localised but widespread and therefore even more serious.

Just as in the human body the heart is the organ which suffers as a result of diseases and other outside factors, so the coasts suffer from and reflect the errors made at sea and on land. And yet they remain a source of immense wealth; even from the exclusive point of view of tourism, for a number of Mediterranean countries they constitute a productive asset superior to any other natural resource.

But tourist assets along the coast depend on the beauty and salubrity of the coastal territory itself. Tour operators should thus be the ecologist's main ally; an information campaign directed at that category of professionals would produce excellent results in the struggle to secure the more effective management of the coastal heritage. Indeed, in order to continue to derive profits from tourism it is necessary to conserve the integrity of sites still in their natural state and restore those which have been harmed. The protection of the coasts thus becomes a productive investment in terms of the tourist economy.

The truth of that affirmation can easily be established in many islands, beset by industrial or infrastructure development which for that very reason have become gold mines for the tourist industry.

Nowadays the success of tourist schemes is measured by the rigour with which natural resources are protected. A protected coast becomes exclusive or rare and thus a source of high returns for small investments. The alliance between nature protection and retreats for tourists is already a reality which has been understood by the most alert operators. Since in every country society thinks only in economic terms, if we demonstrate that the failure to adopt coastal protection provisions results in economic harm, it will also be easier to achieve results in terms of the conservation of natural resources.

For instance, in Italy the red algae which appear during the summer season on a number of beaches may perhaps not horrify the ecologists as much as it does the economic operators; thus the ecological solution becomes imperative when it is bound up with the scheme of market economy. The earth is based on ecological laws and human society on economic laws. When ecology casts aside the fetters and rules of economics then earth, water and air acquire an economic value and become wealth which has to be husbanded.

But the strategy of nature conservation is also an individual matter which concerns each one of us. It is easy to go on accusing the authorities of today and yesterday and it is all too easy for the authorities to justify environmental disturbances by referring to economic and social priorities which have been considered imperative at a particular time.

Necessary measures

Nevertheless there is still an urgent need for a number of measures to protect coasts which are possible from the practical point of view:

— prevent the further use of coastlines for building purposes in order to maintain the vital equilibrium between sea, sand and dunes;

— prohibit parking on dunes in order not to damage the vegetation which constitutes the first line of defence for all the plant systems further inland (including cultivated crops);

— make provision in major tourist areas for gangways across the dunes in order to protect them from indiscriminate trampling;

— restrict further tourist installations and the building of new roads along rocky coastlines. Footpaths should be provided to enable visitors to reach beauty spots in areas still in their natural state;

— provision should be made for the more effective use of structures already existing by educating the citizens and tourists in general to plan their holidays in a different way so as to reduce the tourist burden which is particularly heavy during a number of months in the year and curb subsequent urbanisation;

— direct part of the efforts of tourism towards areas further inland in order to relieve the pressure along the coasts and provide for a more effective distribution of incomes derived from tourism;

— plan developments while respecting local ethnic groups which have helped to give the various landscapes their typical features thanks to their culture and traditions;

— support information campaigns, such as the present one sponsored by the Council of Europe, to make the citizens aware of the important and fundamental part played by environments in the delicate balance between land and water.

Every civilised country has legal systems which watch over life in society and to some extent protect its territory. There are both human rights and environmental rights. It is difficult to unite man and the environment in rights, but it is even more difficult to unite them when obligations are at stake.

If that is true of a country, on a world scale, with the different legal systems involved, the task is almost impossible. Very specific standards are needed and since coasts are exposed to international impact, their defence is impossible without the appropriate agreements between all nations.

A. A.

(Photo P. Pougnet - Rapho)

The coastline in Turkey

Hasan Asmaz

Turkey occupies an important place in tourism among the Mediterranean countries.

If we evaluate the natural beaches of the western Anatolian coasts giving a wide range of tourist possibilities, the data on quality and quantity would be as shown in the following table:

Regions	Beaches								Coastline
	Nbr.	Length (m)	Width av.	Width max.	Width min.	Quality fine	Quality mixed	Quality hard	Length (km)
Mediterranean	62	325	100	1,000	3	X	X		1,700
Aegean coast	108	285	40	1,000	3	X	X	X	2,450
Marmara	80	289	70	400	5	X	X	XX	1,400
West Black Sea	42	156	100	300	10	X			825

Conservation of coasts and effects of tourism

Coasts in Turkey are protected by the rules and regulations specified in housing and tourism laws, and the breaking of these laws is severely punished. Special attention has been given to the context of such laws, especially in the 15 years pertaining to physical planning and master plans in various areas.

In general, one should accept the existence of some problems regarding the conservation of coastal areas which are created by tourism. However, these problems, i.e. pollution caused by extensive developments in foreign tourism, are still far from the danger line.

Among the negative effects of tourism, beaches are being polluted and vegetation coming down to the shore line is being destroyed. Fires outside camping sites sometimes lead to the destruction of the plant cover, which in turn negatively affects wildlife. Land is subject to various climatic conditions and also exposed to the danger of soil erosion, especially on the sloping side of burnt forest areas, and these factors make reforestation very expensive. Dense utilisation of coastal zones also leads to pollution of the sea; thus it is essential that serious preventive measures be taken, particularly at coastal camping sites. Moreover, pollution has also been caused by yachting, which has developed especially in the Mediterranean and Aegean Seas. This form of pollution is mostly concentrated around bays and yachting ports.

Various efforts

The Ministries of Tourism and Culture, Housing and Settlement and Agriculture and Forestry have been jointly studying the conservation measures required with regard to structural settlement and landscape. Additionally, positive results are being obtained from the research on various effects of human activities on coastal areas carried out by the Turkish Scientific and Technical Research Institute and universities. As a result of all these efforts, emphasis is placed on the necessary measures to be taken to prevent certain effects of tourism on the coastline, or at least to minimise such effects.

The municipalities and local administrations are responsible for the protection of coasts in Turkey with regard to tourism. In rural areas, the local police force is responsible for such conservation. In spite of this, the best measure is education, not only in Turkey, but in all the countries of the world. It has been observed once again that prohibitive laws and police enforcement are measures that have not been effective in environmental protection, and instead people should be trained. Thus, the Council of Europe information campaign on the water's edge is of major importance.

People should not only benefit from, but also protect these beautiful coasts granted to us all, because the passing on of these natural beauties to future generations is our responsibility.

H. A.

(Photo W. Braga - Rapho)

The water's edge and its diseases

Joaquín Ros

The banks of our rivers and the shores of our lakes and seas are exposed to and sometimes suffer from a number of diseases which endanger their integrity and sometimes even their very existence. These diseases are due to pollutants which, in general, may well be the same for all types of banks and shores, although some of them are more dangerous for seashores than for river banks or vice versa.

These pollutants can be classified according to their origin into:

1. Land (telluric) pollutants.
2. Marine pollutants.

1. Pollutants originating on land (telluric pollutants) can be broken down into :

— urban pollutants;
— industrial pollutants;
— agricultural pollutants;
— physical nuisances.

2. Marine pollutants can be divided into:

— pollutants due to navigation, to the loading and unloading of vessels;
— pollutants due to accidents at sea.

Urban pollutants

Waste water and domestic refuse are urban pollutants.

The effects of and damage caused by the discharge of urban waste water to inland and sea water are well known and need not be described here; I shall merely point out that waste water in lakes and lagoons causes very serious problems which frequently result in the total destruction of the ecosystem.

Domestic refuse has been the subject of far fewer studies although it nevertheless gives rise to numerous health, ecological and aesthetic problems. In many towns, domestic refuse is discharged along river banks and sea and lake shores with considerable local repercussions; solid waste is carried over considerable distances in rivers and at sea and affects the shores and river banks of towns and countries far distant from its place of origin.

A good illustration of this problem is the solid urban waste—particularly plastic waste—of Spanish origin which can be found on the French coasts around the Bay of Biscay, more than 600 kilometres from its place of origin.

Industrial pollutants

Industries discharge enormous quantities of widely differing pollutants which I shall group as follows in order to try to approach the matter systematically:

— ***Solid waste:*** the categories which have the greatest effects on banks and shores because of their volume consist of waste from mines, from factories manufacturing phosphate-containing fertilisers and from coal-fired power stations.

Very frequently, this waste is discharged into the estuaries and marshy areas and seriously damages the ecosystems, sometimes resulting in the total drying up of wetlands. The energy crisis has forced many European countries to use large amounts of coal to produce electricity and this has resulted in large quantities of ashes which, together with the mud caused by the desulphurisation of the coal, present a serious problem in respect of their subsequent elimination.

— ***Waste water containing easily oxidisable organic matter.*** These substances produced by a large number of industries concerned with the making of paper, the production of sugar and beverages etc. have similar effects to those of urban waste water.

— ***Waste water containing stable, toxic and bioaccumulable substances.*** This category of pollutants is the most dangerous in the long term and can be found everywhere; the pollutants most frequently encountered are heavy metals, mercury, lead and cadmium, as well as organo-chlorinated compounds, particularly PCB and DDT.

The harmful effects and potential dangers of these substances to public health and the environment are well known and have been described at length in scientific literature.

Cleaning-operation of polluted beaches (Photo M. Follorou - Rapho)

Agricultural pollutants

— ***Agricultural waste:*** This category includes solid and liquid waste from farming and harvesting and the subsequent processing of agricultural products as well as waste resulting from forestry activities such as the felling or thinning out of forests.

Chemical fertilisers, weed-killers and pesticides of all types are increasingly used in intensive agriculture and this leads to pollution due to the diffusion of these products in the surrounding environment and the ensuing damage which can be seen in many delta areas.

The growing of fruit and vegetables protected by plastic sheets is now developing apace. All too frequently the wind carries off these sheets into the sea where they create problems for shipping before they are brought back to the coasts.

In the same category—closely associated with industrial waste—we find the waste water from factories manufacturing sugar, wine and oil. The common denominator for these three major sources of pollution is their high organic matter content and consequently the high consumption of oxygen they generate in the water which receives them.

In Spain, as in other countries of southern Europe, wine production results in some two and a half million cubic metres of residual liquor and olive oil production in one and a half million cubic metres of residual liquid which seriously pollute many of our waterways.

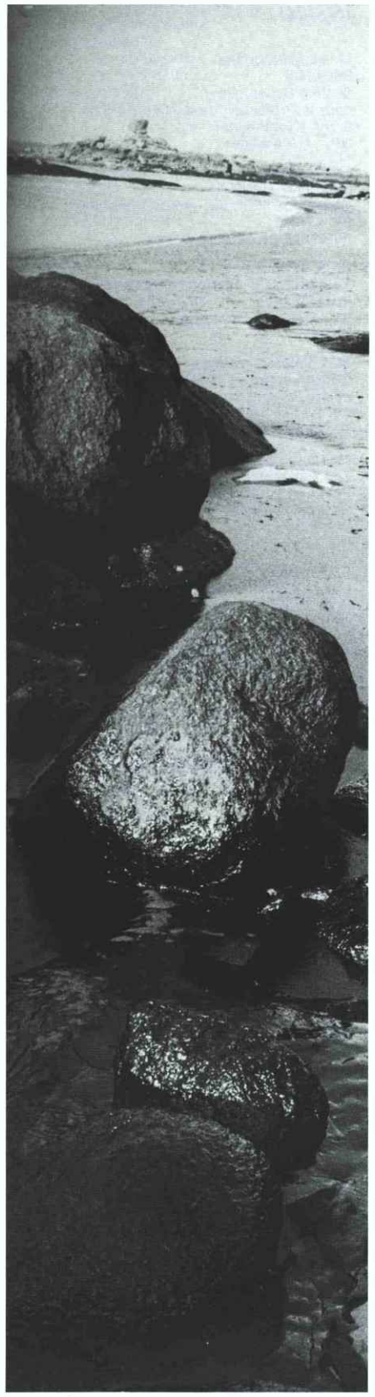
For some years now research has been in progress on the re-use of these waste liquids and at the present time work is well advanced on the construction of two processing plants for the appropriate treatment of these liquids in order to be able to use them again as fertilisers.

— ***Waste matter from cattle breeding***
The use of the stalling system for cattle breeding together with a reduction in that of organic fertilisers in intensive agriculture has resulted in cattle breeding waste differing from the traditional type which until recently could be recycled naturally, and thus creates a considerable pollution problem affecting many rivers and streams.

Physical nuisances

I use the term physical nuisance to cover a series of actions which although they are traditionally regarded as pollutant can indeed be deemed to be so if we bear in mind the damage they cause.

These physical nuisances range from the building of a port or an artificial beach to the filling-in of marshes and other wetlands. Unfortunately this type of nuisance is increasing daily and account must be taken of the fact that the contact area between water and land is of major ecological importance and should be protected at all costs.



(Photo M. Follorou - Rapho)

Pollutants due to shipping and the loading and unloading of vessels

Sea transport deals with a large number of substances and materials which can all be discharged in smaller or greater quantities either during the voyage or during loading and unloading operations. Among such substances that which is most frequently transported and causes most problems is oil and its derivatives.

According to a study by the International Maritime Organisation the quantity of hydrocarbons derived from oil discharged into the sea as a result of sea transport is 2.22 million tonnes per year. To this must be added the quantity resulting from accidents and discharge from the coasts as well as that produced by offshore drilling, oil from natural sources and fallout from the air: in all almost 5 million tonnes of oil which enter the sea every year. This total is not distributed evenly; obviously the northern hemisphere is most affected (and Europe with a consumption of some 700 million tonnes of crude oil out of a world consumption of 3,000 million tonnes is one of the continents most affected) and, in Europe, the Mediterranean is one of the most seriously affected regions in the world, since every year more than 1,500,000 tonnes of these products are discharged (IMO-1979).

Most of this oil evaporates and the rest remains for a long time in the form of balls of tar which are washed onto our beaches and dirty them whilst causing serious problems for bird populations and other organisms.

Obviously this situation can and must be remedied; the entry into force of the MARPOL Convention, which involves the recognition of the Mediterranean as a "special area" calling for specific and urgent measures, may alleviate the problem.

There is another type of pollutant which originates in navigation: namely waste produced by the crews and passengers of vessels; it seems fairly obvious that the waste produced by a person on a ship is more considerable than on land, particularly in respect of metal, plastic or glass containers, and naturally the quantity of packaging per person can be multiplied considerably in the case of cruise liners. Glass containers sink to the bottom of the sea, but those made of metal (e.g. sprays) and plastic float until they are washed up on the beaches, thus seriously spoiling the aesthetic qualities of these areas.

Pollutants resulting from accidents at sea

Accidents at sea can involve vessels transporting goods of all types (but as I have already said, oil is the main offender) and also fixed structures at sea: oil or gas drilling platforms.

Owing to the increase in size of tankers which may now be as large as 500,000 tons accidents resulting in the large-scale discharge of oil may indeed be dramatic in nature. Experience has shown that the immense majority of disasters involving oil tankers and resulting in pollution occur in ports, estuaries or other areas in coastal waters.

The damage caused by such accidents is considerable and very difficult to estimate, but in order to convey some idea of their number and importance, I shall quote data published by P. and I.: between 1970 and 1981 there were 16,353 cases of oil discharge, of which 99 % caused damage amounting to less than 250,000 dollars—which means that this was relatively insignificant operational discharge—and a total of 99.4 million dollars in damages, whilst the remaining accidents, i.e. 1 % caused damage totalling 312.5 million dollars.

It should be pointed out that spectacular accidents such as the wreck of the Amoco Cadiz off the coasts of Brittany, the Ixtoc oilwell disaster in the Gulf of Mexico or that of the well in the Persian Gulf cause such extensive damage that they are not covered by normal insurance and are not included in the figures referred to above.

Therefore it is obvious that appropriate measures must be taken to reduce the risk of accidents of this type. J. R.

Rissa tridactyla (Photo G. Lacoumette)

The European Coastal Charter

Georges Pierret

It was Pancrazio de Pasquale, Chairman of the Committee on Regional Policy, speaking shortly before the European Assembly made the European Coastal Charter official by its unanimous vote on 18 June 1982, who said that this was the first time in the history of the European Parliament that an initiative from the grass-roots European organisations had achieved such an important result.

In fact careful preparation of the Charter by the Conference of Peripheral Maritime Regions (CPMR) began in 1978, partly as a result of the repeated catastrophes suffered by member regions (particularly the major oil slicks such as the one caused by the Amoco-Cadiz). The EEC's Directorate-General for the Environment provided vital support.

The document—which has also been taken up by the Council of Europe and the European Conference of Ministers responsible for Regional Planning—is original in that it proposes, for the sensitive threatened coastal zones, concerted action at four levels: the European, national, regional and local authorities, in an attempt to reconcile the irreconcilable—the protection and development of coastal regions by means of integrated planning.

It is in fact a "Programme-Charter" whose actions have been in hand since the beginning of 1982, based on ten specific objectives:

1. Developing a selective coastal economy (seeking to make use of potential);
2. Protecting and exploiting the originality of each coastal zone (identification of sites);
3. Organising the coastal space (plans and development schemes);
4. Administering the coastal areas (land-ownership policy);
5. Guarding against hazards (natural and accidental);
6. Controlling tourism (in particular preventing over-crowding);
7. Wide dissemination of information (to decision-makers and the public);
8. Developing scientific research (specially coast-oriented);
9. Harmonising European law (which is far too inconsistent on this point);
10. Developing international co-operation (conventions).

After setting out these objectives, the Charter goes on to explain how the four levels of power are brought to work together. This is followed by the strategy of the programme, characterised by three essential features: selectivity, adaptibility, progressiveness. The "corpus" of the Charter ends there, for the action programme properly speaking is contained in three documents appended to the Charter: they may be adapted subsequently in the light of experience.

Among the actions embarked on there is, notably, a "Coast Impact" operation which gives the regions the initiative to prepare and present model topical projects (pilot operations) referring specifically to the objectives of the Charter. Several dozen of these projects are already being studied or carried out, with the assistance of the European Fund; it is a test of the regions' ability to act on their own initiative which the regions must now be allowed within the European institutions. G.P.

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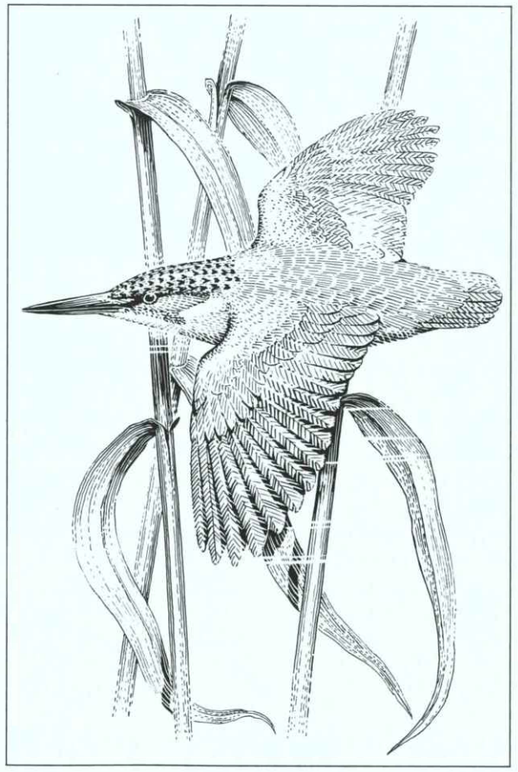

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