SHERKIN COMMENT

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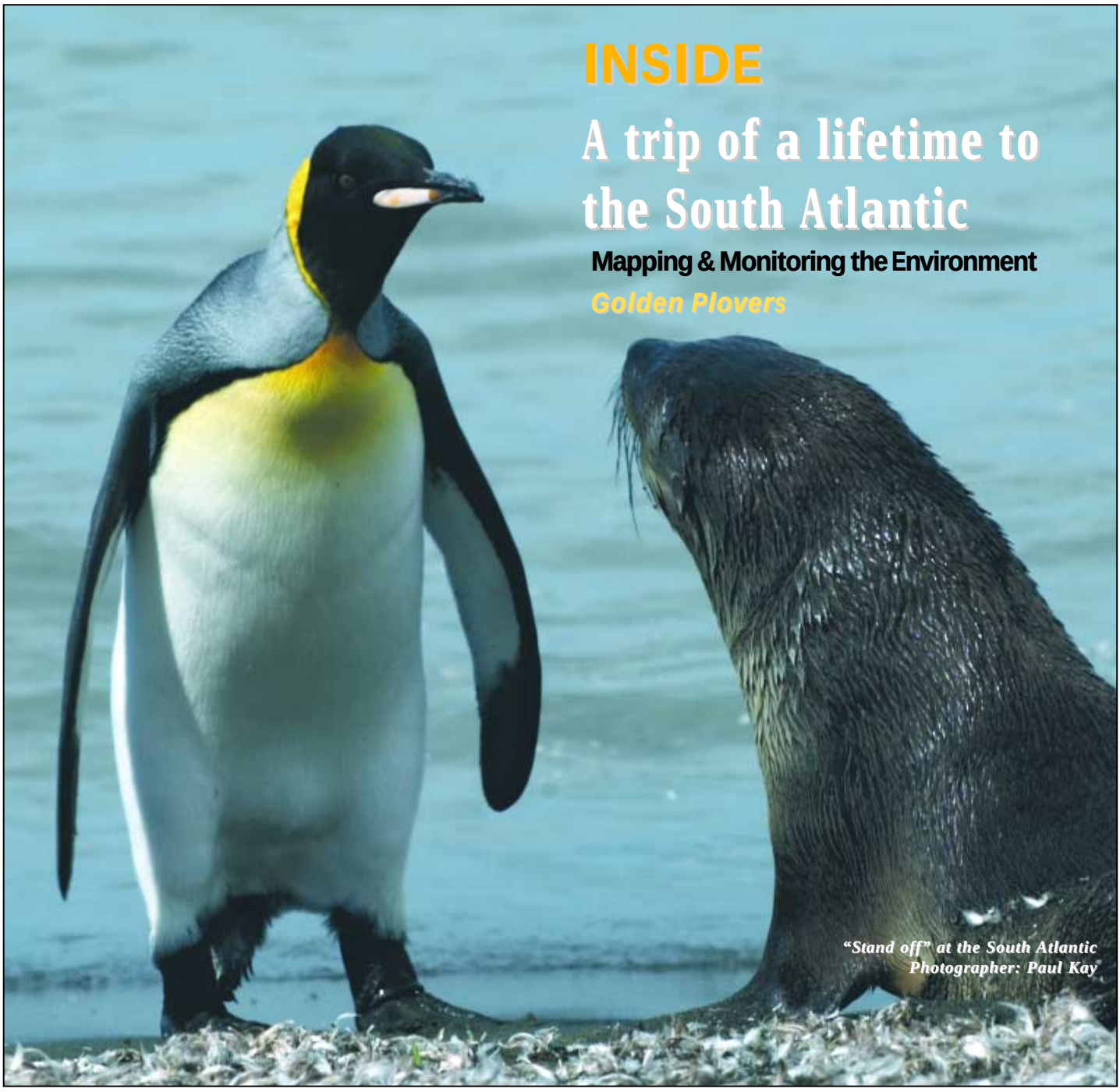
INSIDE



"Stand off" at the South Atlantic
Photographer: Paul Kay

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An Independent Review is Essential

Photo: © Paul Kay

By Matt Murphy

THE development of our marine resources offers considerable prospects for job and wealth creation at all levels: national, regional and local. Our marine resources offer unique opportunities for economic and social development, especially along our south-west and west coastal areas. As a nation we have failed miserably to develop these resources, especially when one makes a comparison with other European coastal countries, e.g. Norway.

We are at present seeing the decline in both fish landings and farmed salmon, the latter has declined by approximately 50% in the last few years. This is a matter of grave concern when account is taken of the level of state and EU financial support granted to companies in the industry over the years.

Aquaculture is a very intensive technology-led industry and R&D is essential for future development. The Norwegians have shown this to be so, yet here in Ireland, despite increased state support for Research and Development (R&D) there is little evidence of new species being farmed to offset the decline in farmed salmon output.

One must accept that our strategy is seriously deficient and not working; there is too much fragmentation in the whole aquaculture industry. A rethink is urgently needed in order to promote communication, co-ordination and partnership among the various bodies, government departments, state agencies, third level institutions, industry and tourism. There is so much to be done in all areas. R&D, education, training, administration and above all enterprise. Research institutions and the industry must work together. Links between business and academia must be strengthened; the latter must be more realistic and join the real world. This go it alone attitude with all agencies/institutions must stop. No one organisation has all the necessary expertise, knowledge, skills and resources to achieve the essential employment that could be generated along our southwest and west coastline.

Ireland's commercial fishing industry is now in free fall; decommissioning of trawlers is now a reality with the recent announcement by the government of financial incentives. Conservation areas have been introduced and more will come. The industry is critical of the scientists and want direct participation in how the research is carried out. They believe there has to be a partnership between fishermen and scientists. They want the Marine Institute and their European colleagues to get real in fish stock research. The process at the moment does not quantify the actual fish landings. Heads are in the clouds and some gale force winds are needed to clear the air! There is a strong belief that ICES (International Council for the Exploration of the Seas) in Copenhagen are calling the shots as to our fish stock resources. We need to show independence and think of our fishermen first and worry less about how many committees we chair.

It is time to review where we are and to decide where we want to be in 10 years time with regard to our marine resources. An independent review is needed to develop a policy with all those involved in the marine sector, such as fisheries, aquaculture, marine tourism, marine environment, role of government, state agencies and third level institutions.

A model for delivering a national strategy for the future development of our marine resources already exists for the non-marine sector throughout the country. This document, *Ahead of the Curve*, adopted by the Enterprise Strategy Review Group, was published in summer 2004. The marine sector would benefit greatly from a similar exercise. (www.enterprise-ireland.com)

It is imperative that the Marine Institute does not undertake such a review. They have a vested interest in marine research at Galway and Abbotstown. A review would need to be objective and independent in looking at all research within the State. Along with this the Marine Institute has lost the confidence of many and are looked on as being too self-centred and self-serving. They are being perceived as wanting to control and keep most of the funding for marine research and then divide the crumbs from the table between as many institutions as possible. This policy of spreading funding between so many is wrong. There is a huge waste in administration costs. The Marine Institute has been most successful in attracting EU funding to Ireland, but together with the huge annual sum from the exchequer, it is imperative that we get value for money. The state scientists, pre-Marine Institute at Abbotstown, most now in retirement, must be so envious. In the 1970s and 1980s they were often confined to their desks for long periods as there was not even travel money available to go around the country to carry out research. The industry, both commercial fishing and aquaculture, welcomed the then announcement of a new Fisheries Research Centre which is now being built at Oranmore, Co. Galway. However many query whether such a colossus was necessary at a cost of €50 million? Why the need for an auditorium (see website www.marine.ie)? Is there a hidden agenda? Are we seeing the foundations for yet another third level institution for higher degrees for Master and PhDs? Indeed, the upkeep of the two buildings under construction will be a very heavy burden on the Marine Institute's budget and could affect research funding.

The philanthropist, Dr. Tony Ryan has funded the building of the Martin Ryan Institute in UCG and is generously funding an extension. Let us have one marine research centre of academic excellence in the country. We cannot afford two. The government has recently introduced a special fund for efficiency in the universities – the Marine Institute should take notice.

The Marine Institute has been most successful in creating a link with the National Cancer Institute, Maryland US. One of their scientists visited Ireland in 2004 to discuss Biotech R&D using marine species, especially those found off our west coast, in the Porcupine Bank region. He visited various Universities to speak to their Biotech Departments and look at their facilities. We have many excellent scientists in our institutions involved in Biotech research, who can deliver if funding becomes available. The Marine Institute must resist the temptation of getting involved with such research at their new fisheries research centre. Why waste precious funding on a new facility when these facilities are already available elsewhere in the country? While the Marine Institute undoubtedly has major strengths it is vital at this urgent point that they identify their own weaknesses. We continually read of major multi-national companies divesting themselves of their non-core operations so as to concentrate on their core products. The Marine Institute should embrace this. Their core products are fish related – commercial and aquaculture. In doing so they should especially look at the transfer of their salmon research at Furnace, Co. Mayo to the Central Fisheries Board, who with the various fishery boards, has the responsibility for the management of our rivers and lakes, especially salmon and trout. This responsibility surely means that all research and management into these species should be under the auspices of the Central Fisheries Board, which is the body most suitably positioned to carry out this task.

The Marine Institute is central to the success of the development of our marine resources. The onus is on the Marine Institute to be successful in fulfilling its mandate. There are huge reservations in many quarters of the direction of their present strategies. I have made some observations on some of these. Regrettably there are others which must also be addressed before the Marine Institute regains the confidence of many in industry and academia.

Prior to the establishment of the Marine Institute the Minister for the Marine had a Chief Scientific Advisor. Maybe the time has come to give serious thought to creating such a position again. He/she would give independent advice to the Minister. This advice would be essential in the present climate when such immense pressure is on our fish stocks, fishermen and our future.

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GOLDEN PLOVERS

By Oscar Merne

I VIVIDLY recall back in the 1970s, when I was doing a lot of aerial surveys and censuses of wintering waterfowl in Ireland, flying north over the callows of the River Shannon and Little Brosna on a day in mid-October. Being quite early in the winter season the numbers of most waterfowl species were still fairly low, but the major exception was the huge flocks of Golden Plovers, which had probably just arrived from their breeding grounds in Iceland. There were several flocks of between 5,000 and 10,000 birds, totalling about 40,000 in all. It was a wonderful sight to see the tight flocks, like clouds, wheeling and twisting in the sky before settling again after the aircraft passed by.

Golden Plovers are one of the most numerous of our migratory wintering waterfowl. However, they are rather difficult to census as they often occur in very large flocks, and sometimes in areas well away from the wetlands which support a variety of other species. Nevertheless, counting of wintering waterfowl in Ireland since the 1970s has enabled us to build up a picture of their distribution here, and an estimate of total numbers. We now believe that at least 200,000 Golden Plovers spend the winter here, the first few arriving in late August, with major immigration occurring in October and November. The birds stay until April, with the last disappearing northwards in early May. On first arriving, very large flocks concentrate in a few places, such as the callows, and these then break up and disperse to about 45 main traditional sites, holding at least 2,000 birds each. The great majority of these sites (c.36) are coastal (estuaries, sheltered bays, polders, etc.), while the remainder are inland. At these sites observers generally find the Golden Plovers roosting in dense flocks, with little feeding activity evident. It's not clear when and where many of the flocks actually feed: they may engage in nocturnal foraging in grassland areas away from the wetlands. Several times at dusk, I saw c.5,000 Golden Plovers flying back and forth low over the sea off the north Co. Wexford coast near Cahore Point, but have no idea what they were up to. So there are still some things to be learnt about the behaviour of these birds!

Little Brosna Estuary, Cos. Offaly and Tipperary, where large flocks of Golden Plover can be seen wheeling and twisting in the sky.

River Shannon callows.

It is believed that at least 200,000 Golden Plovers spend the winter in Ireland. A major location is Bannow Bay, Co. Wexford.

Photos: © Oscar Merne

We know from looking at the recoveries of ringed birds that the vast majority of our wintering Golden Plovers breed in Iceland, where the population is estimated to be 300,000 pairs. That's 600,000 adults, plus their young in the autumn. If the estimate of 200,000 wintering in Ireland is correct, huge numbers must be moving elsewhere for the winter – perhaps south along the Atlantic coast to France, Spain and Portugal, and as far as Morocco, all countries where wintering Golden Plovers are known to occur.

The Golden Plover is divided into two distinct populations or sub-species. That which breeds in the southern part of the species' range is (not surprisingly) known as the Southern Golden Plover, the nominate sub-species *Pluvialis apricaria apricaria*, while the northern sub-species, which in summer has more intense black plumage from its belly up to its eyes, is *P. a. altifrons*. It is the southern sub-species which breeds in Ireland.

A hundred years ago Golden Plovers were recorded as breeding in fourteen counties in Ireland, and possibly in a further five. By 1968-72, when the first survey for the Atlas of Breeding Birds in Britain and Ireland took place, the range of the species had contracted considerably, with most of the remaining population confined to Connemara, West Mayo, the uplands of Sligo and Leitrim, Donegal and Antrim. At that time it was estimated that numbers were about 600 pairs, and it is believed that this small breeding population has declined further and may now number about 300 pairs. Currently, Birdwatch Ireland, funded by the National Parks & Wildlife Service, is carrying out a survey and census of upland breeding birds, including the Golden Plover, so we will soon have an accurate total for the present breeding population. The vulnerability of the relatively small breeding population of Golden Plovers in the European Union was the reason for including the species in Annex I of the EU Birds Directive in 1979. This classification highlights the importance of applying special conservation measures for the species and its habitat.

Golden Plovers are one of the most numerous of our migratory wintering waders.

The reasons for the decline in numbers of breeding Golden Plovers in Ireland, and the contraction of their range, are not fully understood. However, the great increase in forestry plantations in upland peatlands has probably contributed greatly. In addition, high stocking densities of sheep in the uplands has resulted in erosion and degradation of Golden Plover habitat, especially in the west. Increasing recreational disturbance in the uplands may also have caused desertion of some breeding areas. Avian and mammalian predation of eggs and chicks may also have contributed to the decline, while the impact of the growing number of upland windfarms has not yet been fully evaluated. Mortality due to collision with the windfarm structures is one possible hazard, but displacement of birds due to the presence of the turbines and the associated disturbance may also be a problem. In order to ensure the survival of the dwindling Golden Plover breeding population, effective conservation of the remaining nesting habitat is vital.

Oscar Merne recently retired as head of the Bird Research Section of National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government.

Irish Eyes on Nature

By John Akeroyd

THIS last winter the British Library in London held an exhibition on 'The Writer in the Garden'. It took a broad view of garden writing, from journalism to novels, and of landscape and styles of gardening – from aristocratic parks and pleasure gardens to modern suburban plots. Reviewing this remarkable assemblage of books, quotes and illustrations, it struck me anew just how gardens, gardening and nature writing have permeated English culture. Irish or Anglo-Irish writers might have dominated other literary exhibits, but not perhaps one on garden writing. This genre has been somewhat marginalised in Ireland, although Irish writers have a keen eye for landscape and countryside; even those Irish saints famously enjoyed close links with nature.

In fact, nobody can say that Ireland hasn't made a significant contribution to garden writing. The early 18th century, when Dean Swift held sway in Dublin with his mighty pen, saw the emergence of a strong Irish link with that English tradition. At my old school, Charterhouse, two great men of letters first met and became friends: quiet Englishman Joseph Addison (1672–1719) and fiery Irishman Richard Steele (1672–1729). They went on to found 'The Spectator' and other magazines, writing as a team, and both held government posts in Ireland; hence Addison's Walk, a double yew avenue at Glasnevin, and the nearby Addison Lodge pub (where friends and I planned many botanical excursions!). Addison probably never lived at Glasnevin but his younger friends Thomas Tickell and Patrick Delaney laid out informal grounds – radical for the time – on or near the site of today's National Botanic Garden, established in 1795. In gardening essays Addison promoted "Luxuriancy and Diffusion of Boughs and Branches" – rather than precise layouts, his own plot "a Confusion" of controlled wildness. He influenced too the garden of another friend, poet Alexander Pope ("All gardening is landscape painting"), by the Thames near London. Pope's friends included Delaney, Swift and the great landscape architect William Kent. The stage was set for the parks and gardens that so revolutionised 18th century landscapes.

Proceeding to another century, in 1861 the head gardener of a Leix estate, William Robinson, moved to England. His book 'The Wild Garden' (1870), in which he advocated bog, woodland and naturalistic rock gardens rather than formal bedding, caused a sensation in gardening circles. He would be a major influence on Edwardian garden guru Gertrude Jekyll, and together they would expand the English passion for 'cottage gardens', still fashionable – even in TV programmes and each May at Chelsea Flower Show. Nature in the garden well suits the English temperament, but better still it suits an Irish climate! Mount Usher, Dereen, Garnish Island and so many other great Irish gardens are the epitome of this

Photo: © Matty Murphy

Ilnacullin (Garnish Island), Co. Cork, together with so many other great Irish gardens are the epitome of the Robinsonian ideal.

Robinsonian ideal, as embellished with subtropical and warm-temperate exotica.

Back in Ireland, writers looked to wild nature rather than gardens. Robinson's career overlapped the pre-1916 half-century "heyday of Irish Botany" that I described in *Sherkin Comment 38*. This fertile period spawned modern Irish natural history writing, notably the genius of Robert Lloyd Praeger, his autobiographical 'The Way that I Went' (1934), a classic of evocative scientific journalism. Literary Ireland was absorbed elsewhere – although W.B. Yeats himself had been a keen naturalist in his youth, and a strong undercurrent of nature exists in his work and that of J.M. Synge and others. Even diehard freedom fighter Ernie O'Malley, travelling undercover on foot or bicycle during the Troubles of 1919–22, often by night, recalled evocative images of the Irish countryside for his memoirs. Irish writers have perhaps avoided the conventional garden and nature writing of their English counterparts, but possess their own special voice – from the pantheistic philosophy of John Stewart Collis to E. Charles Nelson's horticultural scholarship and Michael Viney's inspirational essays in *The Irish Times*.

Dr John Akeroyd, who has studied Irish plants for 25 years, edited The Wild Plants of Sherkin, Cape Clear and adjacent islands of West Cork (1996).

THERE'S MORE TO REED THAN MEETS THE EYE

By Jenifer Baker

Photos: © Jenifer Baker

Reed bed in high nutrient conditions, receiving agricultural run-off, south-west England.

THE common reed (scientific name *Phragmites australis*) is a variable member of the grass family and is widespread in most parts of the world. Once established, clumps and patches of reed may survive for a very long time if the environmental conditions are relatively stable; some patches have been estimated to be about 1000 years old. The most obvious traditional uses of reed beds are for thatch production and wildlife conservation, and in some places (notably the Netherlands) reed has also been used for stabilisation of mud flats on newly reclaimed polder land. Reed water consumption is high and it is grown for a few years to dry out the polder and render it fit for arable farming.

Its annual shoots, typically growing 1 to 2.5 metres tall, will be familiar to most people, but there's more to reed than meets the eye. Most of it – sometimes as much as 90% of it – consists of a perennial underground system of rhizomes (creeping underground stems) and roots. These can go down to 2 metres or more below ground level, though most of this underground biomass is usually contained within the top 20 – 30 cm of soil.

Reed can be found in a variety of habitats but it is most usually associated with areas subject to flooding, wetlands such as marshes and fens, estuaries and the edges of lakes. It tolerates a wide range of pH and nutrient values, and both fresh and slightly saline water. In static wet conditions the soil may be poorly oxygenated, but reed is well adapted to this with an oxygen diffusion pathway leading along air spaces down the shoots to the underground rhizome system and roots. Hence if shoots cannot grow above water level, or if ice or waves remove dead reeds in winter thus flooding the stubble, the subsequent reed growth may be limited because of poor oxygen supply.

Recent years have seen much interest in a new use for reed beds – treating sewage and other waste water. 'Root Zone Biotechnology' involving specially constructed reed beds was pioneered by Professor Reinhold Kickuth in Germany, and is now widespread, being used by organisations such as Water Authorities. Water purification is carried out by the combined action of physical, chemical and biological factors such as sedimentation, flocculation, consumption by micro-organisms, take-up by the growing plants and loss to the atmosphere. Thus the reed bed simultaneously acts as a trickling filter, a percolation filter and a settling and digestion basin. Three key features of the plants which make this possible are as follows:

- The processes of growth and natural die-back in the extensive underground system, create channels through which water can pass.
- The underground system introduces oxygen, so aerobic bacteria and other micro-organisms can flourish on the huge surface area provided by all the roots and rhizomes. These micro-organisms are essential for degrading the various compounds which may be found in waste waster.
- The plants can take up some of the waste water compounds or degradation products, for example nitrates resulting from bacterial oxidation of ammonia. Other pollutants (such as metal compounds) may be immobilised in the humic acid produced by the plants.

The excellent water cleaning capability shown by specially constructed reed beds really makes one appreciate what a good job natural reed beds have been doing all the time!

Dr. Jenifer Baker has worked all round the world as an environmental scientist, specialising in oil spill response, and is currently a theological student.

Measuring reed performance, south-west England.

Reed bed nature reserve, Netherlands.

Reed in brackish conditions, Humber Estuary. A recent high tide has left a narrow band of oil trapped at the base of the stems. Here it will eventually degrade, without killing the reed.

Reed in low nutrient acid conditions, south Wales.

The Fire Mountains of Lanzarote

Demonstration of geothermal energy – burning gorse cuttings at Islote de Hilario.

By Anthony Toole

WITH its rubble-strewn landscape, arid climate and sparse vegetation, Lanzarote looks like an island under construction, which indeed it is. While the landmass was created by volcanic activity over the past 17 million years, about a quarter of its present area grew out of a series of eruptions that occurred from 1730 to 1736. Much of the south-western end of the island owes its appearance to this period of volcanism, together with a smaller eruption that occurred in 1824.

So recent was this activity that the colonisation of the lava by plants, and its conversion into soil, are at an early stage, and the land is still centuries away from a steady state. This makes it an ideal natural laboratory for the scientific study of land evolution.

In 1974, 5107 hectares (19.7 square miles) of the most pristine land around Timanfaya was declared a National Park. In 1993, UNESCO declared it a Biosphere Reserve, and the following year, the European Community made it a Special Protection Area for Birds.

Because of the fragility and importance of the landscape, 96% of the National Park area is reserved strictly for scientific use. Motorists entering the National Park from the main through road must leave their vehicles at the car park of the Islote de Hilario. Only by coach, can they see the real glories of the Montanas del Fuego – the Fire Mountains.

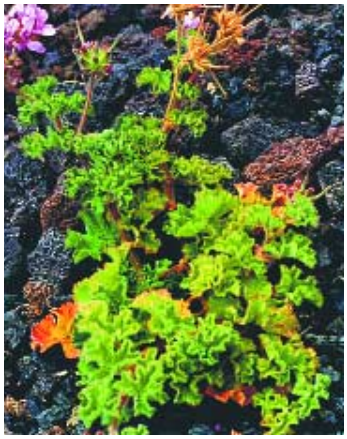
At the car park itself is the 'El Diablo' restaurant, where the highest temperature in the National Park has been recorded at 610°C, 13 metres beneath the surface rocks. Because of the intense heat, special foundations had to be laid to avoid overheating in the buildings.

A 5–metre-deep pit, inside the restaurant, serves as an oven. The temperature at the mouth of the pit reaches 200°C, whilst hot air entering from the side walls can rise to 350°C. Just outside the restaurant is a set of underground metal pipes into which water can be poured to create an artificial geyser. A further demonstration of geothermal energy is seen nearby, in the burning of gorse cuttings in a 1.5–metre-deep pit, where temperatures at the bottom have been measured at 245°C.

The Mancha Blanca Visitors' Centre stands outside the park itself, 4 km north of the boundary. Its true size is camouflaged by its being three-quarters submerged in the surrounding lava field. The building contains offices and an exhibition of the volcanology, flora and fauna of the area, explained with the aid of impressive video and interactive displays, with spoken and written text in Spanish, German and English. It has won several National prizes for its architecture.

A service offering guided walking trails was introduced in the Park in 1990 to give visitors a more intimate view of the geology and biology of Timanfaya. The shorter walk follows a 3.5-kilometre trail at the southern edge, and is suitable for school or family parties. A more demanding 9-kilometre walk takes a coastal path, where the lava meets the sea, and rapid colonisation by marine life is taking place.

The most important work in the National Park occurs out of sight of the tourist. In the late 1980s, a laboratory for scientific research was established at an old dromedary shed in the centre of the park. This is concerned largely with a study of volcanology and seismic processes, together with monitoring and the assessment of



Flower (*Pelargonium capitatum*) growing in volcanic ash.

Photos: © Anthony Toole

Opening into a volcanic tube.

Entrance to the National Park. Signpost designed by Cesar Manrique.

Lava field.

risks from possible future eruptions. In 1993, the first gravimeter, for measuring gravity variations was installed. Other instruments were added to study seismic events, land deformation and changes in the tilt of the land.

An important project, funded by the European Union as part of investigations into a long-term energy strategy, has involved a study of the geothermal fields to measure the rate of heat transfer from the underlying rocks to the surface.

A meteorological station holds complete weather data on the sub-Saharan climate of Lanzarote going back to 1990.

In the Mancha Blanca Visitors' Centre is a small library, which contains reference books, both of a popular and scientific nature, as well as many research papers concerning the volcanology, ecology, botany and zoology of Timanfaya.

The lack of human activity in this new landscape, together with its warm, dry climate, make Timanfaya ideal for the study, not only of volcanic phenomena, but of the natural processes of biological colonisation.

A recent research project by scientists from Oxford University compared the breakdown of lava by lichens with the physical weathering caused by wind and rain. The work is important because these processes bring about the first stage in the creation of soil from igneous material. The soils thus formed will, in a few more centuries, be necessary for the colonisation of the land by higher plants.

These particular investigations are also of significance as they can be compared with similar research carried out in the much wetter, but otherwise analogous environment of Hawaii.

Photos: © Anthony Toole

Cacti growing on the Timanfaya lava field.

Dromedary rides on the lower slopes of Timanfaya mountain.

The dominant plant forms on the lava fields are the lichens; 71 species have been catalogued, but the full population has been estimated at around 200. The aridity has led to only slow invasion by higher plants. Those that do survive here depend on dew and on water vapour rising through cracks from the hot rocks. These plants have evolved specialised root systems as well as hairy and globular leaves to conserve water.

There are 120 species of invertebrate, but the only terrestrial vertebrate animals are the Haria's lizard, the gecko, the Canary shrew, the rabbit and the hedgehog. 17 species of birds nest in the Park. These include Bulwer's petrel, Cory's shearwater, Leach's petrel and the Barbary partridge. Kestrel and peregrine falcon are also found here as well as a few pairs of Egyptian vulture.

The inevitable increase, over the coming years, in the tourism on which Lanzarote depends for its prosperity, will put severe pressures on Timanfaya National Park. The present system of management appears to be working well. Not only does it allow the tourist to enjoy the spectacle of a landform that is unique in Europe, but it preserves that landform in its pristine purity.

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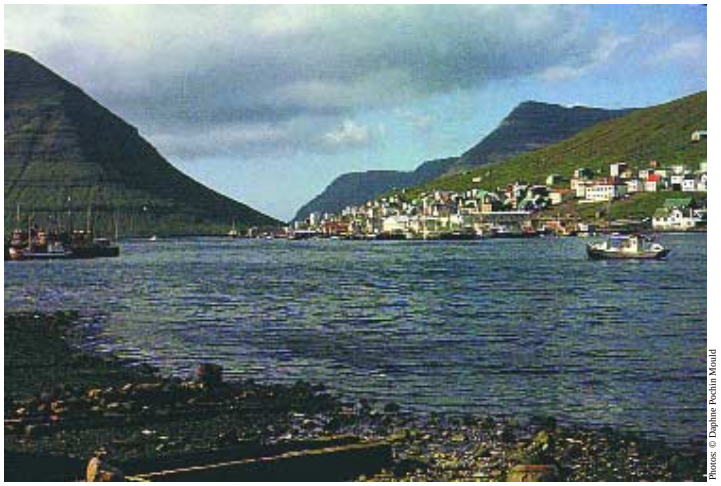
FAROE: The Unknown Islands



Photos: © Daphne Pochin Mould

Faroe mountains built of Tertiary period lavas – the same that gave us the Giants Causeway and Scotland, Fingal's cave.

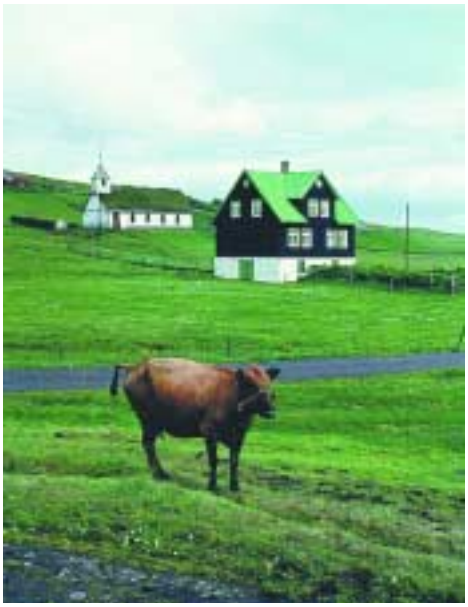
By Daphne Pochin Mould

IT is probable that all that most Irish people know of the Faroe Islands is that they sent a football team to play Ireland last summer (Faroes lost) and that the Irish played the return match on the islands at the beginning of June (Ireland won again). We do not holiday in the Faroes and so miss out on one of the world's most lovely island clusters.

Look at the map of the North Atlantic. There is Ireland, with its own little necklace of offshore islets. North, off Scotland's west coast, the Hebrides and the stormy Minch. North of Scotland the Orkney island and beyond them, the Shetlands. Go another 300 km (186 miles) further on and you arrive at the 18 Faroe Islands (all inhabited bar one).

Iceland is some 430 km (266 miles) further, bigger than Ireland, high tech, adventurous, splitting the water molecule to get hydrogen to run hydrogen powered buses as part of Reykjavik's public transport. But Iceland and Faroes share a common history: both were visited by Celtic monks who fled when Norse explorers appeared and began to settle. Icelanders joke that the Faroese were the ones who got sea sick en route and jumped ship!

The monks, or people with them, brought sheep to the islands and it is sometimes claimed that Faroe means the Sheep islands. The Danish word for sheep is "faar", but the Faroes called them "seydur" (Icelandic "saudfe"). Therefore one scholar thinks the name may be Gaelic, "fear an", far islands. Whatever the name came from, the sheep undoubtedly ate all the islands' original, much denser cover of plants and scrub, as they have still been doing in Ireland.



Faroese cow, with modern house and beyond the church with its traditional grass roof.

Every one of the 18 islands that make up the Faroe group, has its own special character and beauty. There is a marked north/south variation, the southern islands are lower and greener, the northern ones higher, rockier and with the mightiest sea cliffs in all Europe. Getting around means crossing water, though easier today with good roads, tunnels cut through ridges and car ferries. You can take your car to Faroes (Aberdeen to Lerwick, join Smyril Line's big car ferry ship there, which then goes on to Torshavn in Faroes and Seydisfjordur in east Iceland). Faroes have their own airline and an airfield on Vagar, but again nothing direct from Ireland.

It is a foggy part of the North Atlantic. Faroes joke about "Faroese sunshine" – mist, and that you can experience their entire climate in the changes of a single day. But when the sun shines, this is a world of the intense vivid colours of the North; a sparkling world of sea and rock, and grass as green as Ireland's. Mirages occur in these parts; I have seen them in the Hebrides, and an Icelandic seaman friend tells me he saw a mirage of the Faroes from a hundred miles away, in sharp detail, even to the communication masts on the hilltops.

Torshavn (Thor's harbour) claims to be the smallest capital city in the world. Faroes got home rule – at long last – in 1948, under the Danish crown. All but one little village is on the coast, for this is a nation of fishermen and small-scale farming. They have sailed and do sail far over the northern seas and pay the price; "not one man's grave on land" one Faroe woman told me of her extended family. You will find memorial crosses with slabs set round them, each engraved with the ship's name and its lost crew. Model ships hang in the (Lutheran) churches. Money was scarce in Faroes so when British fishermen began to replace their sailing smacks with engine powered vessels, the islanders bought the old smacks and went on using them. Many of these lived on and on, and were given engines. And Faroes, like Iceland, has kept careful records of these ships, their owners and history and published them. So I can tell you that "Gamla Pride" (Old Pride – there is a new one) which I saw still around in 1965, was built in Brixham (England) in 1898.

Presently there are some 47,000 Faroese people, bilingual in Faroese and Danish, and good at English. With regard to language they differed somewhat from their Icelandic neighbours. Iceland became a nation of writers and readers, of makers of poetry, history, stories, the written word keeping the old Norse language alive, so that modern Icelanders talking into their mobile phones would very nearly be understood by the first Viking longships to come exploring our shores. Faroese, however, starting from the same roots, was never written down and its complex grammar teased out until the last hundred years or so! It should have been swamped by the Danish of its long time rulers but these few people on their remote islands kept it alive by dancing round in a ring!

The ring dance ends every celebration. A singer stands central, knowing the long and ancient ballads by heart, and everyone else forms a ring round him, joining in the refrain, part acting out the story. You can join or leave the circle as you wish. And the old language lives on, now also in written form.

The old way of taking wool (sometimes called "Faroese gold" – was to wait till the natural moult and then pluck it off, as being done here. Sheep come in white, brown and black colours.

The mail boat unloading at Skuyov. This 1965 shot was taken as they were installing a power winch, for even for the few hours for postal delivery etc.., the boat had to be hauled ashore. But homes had a high standard of living and electricity.

The price of fish: Memorial to lost crews. Each slab records a boat and crew.

Faroes claim 250 species of birds, of which 70 nest there. Birds crowd the great cliffs and were a vital food source in the old days. They are still taken and enjoyed – it was on Mykines, the westmost island, that I first enjoyed the dark, tasty meat of the puffin, served with boiled potatoes, jelly and imported potato crisps. Pilot whales could be driven ashore in certain little bays – lookouts on the headlands spotting them and alerting all boats within reach to go out and herd them in. Everyone taking part, in boat or on shore, gets a share of the meat. Fish were dried on special shore side pavements; beef is still hung in special slate houses to dry to rock hard blocks, and then thinly sliced to eat: uncooked and very good.

A procession for the start of a festival.

Football, brassbands, regattas and the ring dance are all part of the enthusiasms of this ancient island people, now enjoying independence and the new life of the 21st century. Well worth the effort of getting there from our own island.

A Spotlight on World Environmental Matters

by Alex Kirby

Living Beyond Our Means

The world is living so far beyond its ecological means that attempts to reduce poverty are likely to be compromised, scientists say. The Millennium Ecosystem Assessment, compiled by 1,300 researchers from 95 countries over four years, says human activities now threaten the Earth's ability to sustain future generations. The report says the damage we are doing to the environment means efforts to halve poverty by 2015, as spelt out in the Millennium Development Goals agreed by world leaders five years ago, are in question. The assessment says an unsustainable rush for natural resources was triggered by the requirements of a growing world population after the second world war. More land has been converted to agriculture since 1945 than in the eighteenth and nineteenth centuries combined. More than half of all the synthetic nitrogen fertilisers ever used have been spread on farmland since 1985. The result of this pressure for resources, the scientists say, is a substantial and largely irreversible loss of the diversity of life on Earth. They estimate 90% of the total weight of the ocean's large predators has vanished in the last few years, with 12% of all birds, 25% of mammals and more than 30% of all amphibians thought to risk extinction by 2100.

Depletion of Fish Stocks

One illustration of the extent of the losses Nature is sustaining comes from researchers compiling the Census of Marine Life. They say a conservative estimate is that cod on the Scotian Bank off the east coast of North America have declined by 96% since the 1850s, from 1.26 million metric tons in 1852 to less than 50,000 metric tons today. They say just 16 small schooners of the pre-Civil War era could hold all adult cod currently estimated to be on the once-rich shelf. The researchers used New England schooner records of daily catch locations and fleet activity on the fishing grounds, which they say provide a solid, reliable basis for stock assessment. Other researchers using entirely different types of data and methods recently showed similar levels of depletion for North Sea fish stocks.

Long-lining in the Galapagos Archipelago

In the Galapagos archipelago, 600 miles off the coast of Ecuador, there are plans to introduce one of the most destructive fishing methods, long-lining. Globally this is blamed for the loss of about 300,000 seabirds a year, including many albatrosses. It's not only birds which are threatened: sea lions, dolphins, turtles and sharks may all fall victim to the hooks, according to the Galapagos Conservation Trust. It is a nice irony, and one that is probably lost on the plan's supporters, that the Galapagos are forever linked with the name of Charles Darwin. But with the islands' population up from fewer than 2,000 people in 1960 to nearly 27,000 today, the pressure for long-lining to start may prove irresistible.

The Cooling of the Gulf Stream

And there could be worse to come. A US scientist writing in the journal Nature says that if the Gulf Stream (which keeps north-west Europe warmer than it could reasonably expect to be were to switch off), this could mean a collapse of the North Atlantic plankton stocks to less than half their initial biomass. And that could have what he called "catastrophic" effects on fisheries and human food supply. The Intergovernmental Panel on Climate Change said in 2001 the Gulf Stream (properly known as the Atlantic thermohaline circulation) would weaken this century, but not stop. But another US researcher has put the chances of a switch-off by 2100 at 45%. The UK Met Office says the amount of fresh water entering the Arctic Ocean from its tributary rivers is increasing, and appears to be about 20% of the amount needed for the circulation to shut down.

Rabies Fear in Europe's Foxes

Some of the news on terra firma isn't much more encouraging. Europe's fox population has grown as much as eightfold in the past decade, and this has raised fears that rabies could easily get out of control. There's concern the disease is once again threatening western Europe, and emergency teams have been busy in four German states and neighbouring parts of France, trying to vaccinate enough foxes to stop rabies spreading. The reason for the flare-up appears to be patchy vaccination of wild foxes in the German state of Hesse. Officials at Germany's national rabies laboratory have said they will stamp out the infection this year. But their counterparts in France, Switzerland and Belgium are concerned that large areas of Europe where rabies had been eradicated could be reinfected.

Whale & Dolphin Strandings

Although size obviously matters, it probably won't help you that much in the waters round the UK. The Natural History Museum in London says the number of whale, dolphin and porpoise strandings in the UK has more than doubled in the past decade. It found that strandings had risen from 360 in 1994 to 782 in 2004. The biggest increase has been in the past five years, the NHM says. It attributes the increase to winter strandings of short-beaked common dolphins and harbour porpoises in south-west England. It says the figures are misleadingly conservative, as many dead cetaceans sink out at sea. The reasons for strandings include sickness, disorientation, natural mortality, extreme weather, or injury. One suggested cause of death is the accidental catching of animals in fishing nets, which has prompted efforts to ban pair trawling, where a large net is strung between trawlers, in British waters.

Population Increase of World's Rarest Birds

And from New Zealand comes news that the numbers of one of the world's rarest birds, the kakapo, have just increased, with the successful hatching of three chicks. The population of kakapo – fat, green, musty-smelling nocturnal parrots, which cannot fly but which can climb trees – now stands at 86. Spring has well and truly sprung.

The World's Most Endangered Feline

But it's not all doom and gloom. The Iberian lynx, described as the world's most endangered feline, is said to have the dubious distinction of being likely to be the first big cat to follow the sabre-toothed tiger into extinction. Lynx numbers have declined from 100,000 a century ago to around just 100–120 in the wild today. In captivity there are reported to be only 13 animals. But the good news is that one of them has recently produced three cubs, raising hopes that oblivion may be kept at bay. Dam building, road deaths, hunting and a decline in wild rabbits are believed to have led to the lynx's downfall.

Alex Kirby is a former BBC environment correspondent, now writing and broadcasting on environment and development.

information on the environment

Litter Action & Local Image

"Litter pollution degrades the Irish environment, spoiling the appearance of otherwise attractive areas. It imposes unnecessary clean-up and other costs on public and private bodies, which could be devoted to more productive purposes; it damages particular sectors of the Irish economy, including the tourist industry. In social terms, litter can be a symptom of deeper social problems confronting an area and its people; it can also accentuate these problems through the careless attitude it fosters. Litter pollution can be dangerous to human health through, for example, broken bottles and cans left strewn across play areas. Finally, litter presents the wrong image of Ireland and the Irish and is a serious embarrassment at a time when we have a lot to be proud of as a nation."

Extract from National Anti-Litter Forum Report, July 2000

This page outlines the various programmes of anti-litter action and initiatives already underway and in planning by local authorities (town, city and county councils), national government and others. It also provides information you need to stay within the litter laws and explains how you can get involved in helping combat our national litter pollution problem.

Double Standards when it comes to Litter

A national survey on the environment, "Attitudes and Actions", published in April 2000, shows that Irish people have double standards when it comes to litter. Over one third of Irish people spontaneously reply that rubbish on the streets is their top national environmental concern, yet almost half of us admit to having littered! Furthermore, around seven in ten people are fairly or extremely concerned with litter, graffiti and the appearance of their localities. Yet a similar proportion of the population have never joined with local groups to help clean-up! There is some good news, however, – the survey also shows that over six in ten people said they would like to do more to help the environment, demonstrating a positive public will to clean up our act.

Don't Litter and Don't Tolerate Those Who Do

Further information can be found on the campaign website www.10steps.ie

What litter costs the public purse

Local authorities spend about €60 million annually on their street cleansing and litter warden operations. Dublin City Council alone spent over €20 million in 2002 on these services.

If there was less litter and dirt to deal with, local authorities would have more money to spend on other public services in their areas.

Litter Law Enforcement by Local Authorities

The Litter Pollution Act, 1997 gives local authorities a wide range of powers to tackle litter more effectively and requires a more structured approach to litter management planning.

Make no mistake, local authorities are catching up with litter louts.

Since the introduction of the Litter Pollution Act to end 2001, there has been a significant improvement in local authority enforcement action generally.

Education & Awareness Action by Local Authorities

In addition to stepping up enforcement of the litter laws, local authorities are now more committed than ever to litter prevention through education and raising public awareness. Local authorities nation-wide are working with Tidy Town groups, National Spring Clean and the Green Schools programme, a European award scheme which acknowledges schools action on litter and waste. A number of innovative strategies have also been adopted, including:

- Local authority/local community anti-litter partnerships involving local area plans.
- County wide Anti-Litter League challenges.
- Litter Road signs.
- School theatre programmes.
- Freephone services to allow the public report instances of illegal dumping.

Further details of local authority "best practices" against litter are available on www.litter.ie.

Government Anti-Litter Action

Although there is a lot of anti-litter action underway, still more needs to be done! A Government programme to support more effective local authority action against litter is being pursued. Since 1997, grants totalling €3 million have been allocated to local authorities for local anti-litter initiatives; the 2002 provision was €635,000. Local authorities also use annual Local Government Fund money and other resources to intensify action against litter.

Your BUSINESS may suffer as YOU are breaking the law when ...

- You create litter in the carrying on of a business, trade, or activity or in loading, transporting or handling anything.
- You present your commercial/business waste for collection in a manner that creates litter
- Your premises occupy land along a public road, in a speed limit area, and you fail to keep footpaths, pavements or grass verges along the road in front of your property free of litter.
- You own or drive a vehicle used to transport goods or materials or you own or hire skips and you fail to take measures to prevent litter
- You place unauthorised articles or advertisements on and deface any structure or other land, door, gate, window, tree, pole or post visible from a public place.
- You operate a mobile outlet and you don't provide litter bins or don't clear up litter resulting from your activities.
- You put advertising leaflets on the windscreens of vehicles or distribute material in a public place contrary to a local authority bye-law.

Get your free copy of the, "Litter and the Law" leaflet available from the website www.environ.ie/press/litter.html, your local public library, council office or from Enfo.

What you can do to help put an end to litter ...

Litter does not simply happen – it is caused.

- **Think tidy**

Make a habit of thinking tidy from now on and you take the first step towards lessening litter.

- **Pick up**

A little effort can make a lot of difference to the appearance of your home, your school, your workplace and their surroundings. It only takes a moment to pick up a piece of litter and put it in the bin.

- **Take home**

The only proper place for refuse is in the bin. But if you are out and about and no bin is available, take it home for disposal.

- **Speak out**

It is your environment that is being damaged so you are entitled to speak out. If you see someone dropping litter, comment politely but firmly. If you come across illegal dumping then report it to your local authority.

- **Get involved**

If there is a tidy town competition, National Spring Clean event or anti-litter campaign in your area – support it! If there is none, perhaps you can get one going with your neighbours or community association.

It's easy to make a difference

For further information: Contact your local authority litter control section for information on what is happening in your area.
Anti-Litter Unit, Department of the Environment and Local Government, Custom House, Custom House Quay, Dublin 1. Tel:01 888 2060/ L Call 1890 200 021 Fax:01 888 2691 Website:www.environ.ie
ENFO Information on the Environment, 17 St Andrew St, Dublin 2. Tel:01 888 2001/LoCall 1890 200 191. Fax:01 888 3946 Email:info@enfo .ie Website:www.enfo .ie
Issued by: ENFO – The Environmental Information Service, 17 St.Andrew Street, Dublin 2, Ireland. Tel:1890 200191 Fax:(01)888 2946 e-mail:info@enfo.ie www.enfo.ie

THE FISHING INDUSTRY MUST CHANGE

By Jason Whooley

THERE is no doubt that the fishing industry in Ireland is going through one of it's most difficult periods ever. Everyone involved in the sector feels isolated and frustration is the most common sentiment around the coast. Fishermen's representatives are running from one problem to the next. This fire brigade management is characteristic of our fishing industry with short-term problems dictating work schedules and agendas. We are failing to address the trends that are developing in our sector and are not differentiating between the immediate and the more important long-term problems. Our short-term focus is hindering the industry's long-term development.

To put this industry on a solid footing, we need, over a period of 6 to 12 months, to develop a long-term plan. It must be driven by the fishing sector with total political involvement and support. The hard issues facing the sector will have to be discussed and difficult decisions will have to be taken. If we take on that task however, we can secure a viable future.

A discussion on the long-term future of the industry needs to be wide ranging. Every aspect of our industry from the "net to the fork" must be critically examined. One of the key areas that needs to be covered is resource management. This in itself is a huge subject but one that Ireland inc. has failed to tackle. It is true that many of our resource issues are driven by the EU and are largely outside our control. Fishing has become overshadowed by EU rules and regulations, some of them nonsensical. We, as a country, have been too eager to implement many of these regulations, often to the detriment of our industry only. Unfortunately, whether we like it or not, Brussels is here to stay and so is the Common Fisheries Policy (CFP). With the advent of Regional Advisory Councils (RAC), we will have an opportunity to address some of the problems with the CFP. The RAC's in my view represent the best chance for the industry across Europe to introduce a degree of realism into the CFP.

Leaving aside the EU element, the question must be asked, are we fully utilising our resources/quotas? I don't think we are. Our system of quota management needs to be reviewed. Without some degree of management by the producers it is difficult to achieve the kind of market led fishing patterns that will deliver the best return on our resource.

As part of a discussion on resource management, we need to look at alternatives to our present quota management system. Everything should be on the agenda including Individual Transferable Quotas (ITQ's). There is no doubt that ITQ's are controversial but they could play a role in our future. We may find that the current system is the most favourable but it may not be. Without this discussion we will continue with the current uncertain situation regarding track records and participation in already pressurised fisheries. Right now, if a fishery becomes profitable, it attracts more and more effort/participation. This is detrimental from a stock point of view but also from a marketing perspective where additional supply nearly always decreases returns. The hake fishery of the early nineties is a classic example of the gold rush mentality. Our future direction should address this situation, should we have more restricted access to fisheries? Should vessels be confined to certain categories? The ability to drift from one fishery to another can make short term economic sense but does it lend itself to long term planning and management?

Photo: © Paul Kay

The rising costs of operating a fishing vessel combined with quota restrictions and poor prices for fish has seen an increase in the number of boats going out of business.

My view is simple; decommissioning has to form part of our future. There are many fishermen who would like to get out of fishing and this will give them an option. For those who are left, there should be larger quotas for distribution.

FIFG funding is an area where we have a certain amount of national discretion in how and where it's spent. We need to discuss how we prioritise this spending in relation to a long-term strategy. Recently, new vessel buildings have absorbed a large amount of this budget and rightly so. In the future, with the moratorium at EU level on the grant aid of new vessels, other areas need to be examined. A priority funding area needs to be decommissioning. Any such scheme needs to be focussed on fleet sectors, stocks that are being targeted excessively should see fleets reduced.

What you've read above is one man's view, there are many other views out there, we need to hear them. At present, our industry is not having these discussions, we are too busy fire fighting. As an industry, we need to look to the future, we need to develop strategies that will enable us to deal with the challenges we will undoubtedly face in the long term. If we don't undertake this task soon at a national level, we will be doing the industry we represent a serious dis-service.

Jason Whooley, Manager, Irish South & West Fish Producers' Organisation Ltd, The Pier, Castletownbere, Co. Cork.
www.irishsouthandwest.ie

Fisheries & Hydroelectric Schemes

A Fisheries Environmental Perspective

Restored Corn Mill, Macroom, Co. Cork.

Photos: © SWRFB

Restored Mill Site.

By Patricia O'Connor

WATER for power generation has been used in Ireland since the early 18th Century, initially through the mechanical use of waterwheels to turn millstones and drive shafts. These were replaced by turbines producing electricity and were then used in some instances for the generation of electricity for domestic supply; e.g. Ashgrove Mills on the Sheen River in County Kerry supplied electricity to Kenmare Town.

Traditionally hydroelectric schemes were located in lowland areas, abstracting water from rivers through the use of weirs with diversion of river flow to a millrace or millpond and from there to the turbine house, sometimes located a distance downstream with water returned to the river below the turbine house through a tailrace.

More recently, a number of these schemes have been redeveloped with the introduction of modern more efficient turbines with higher generating capacities. The utilisation of modern technology has also opened the way for the generation of energy from high head sites in upland mountain areas, with pipelines servicing turbines extended distances downstream.

The generation of electricity from hydro power is also supported by various EU funded schemes such as the Valoren Programme and more recently Alternative Energy Resources (AER) and ALTENER schemes. This funding has made hydro-generation more attractive to developers and with the advances in turbine and pipeline technology has made small high head schemes more lucrative.

In principle, the Central and Regional Fisheries Boards supports the generation of energy from renewable resources as an aid to the reduction in fossil fuel usage and carbon emissions. However, hydro developments have the potential to significantly impact on the fishery resource and it is essential that such schemes are permitted only where it can be demonstrated that the fishery can be protected, i.e. without interference to fish movement, habitat, flora and fauna and water quality.

In the South West of Ireland there are several differing types and size of hydro schemes operating in lowland main channel and upland headwater rivers. The following lists some of these and describes environmental issues associated with these operations. This paper identifies some issues to be addressed in a more comprehensive assessment of impacts and mitigation which will assist developers and help to insure future hydro scheme developments have minimal interference on fisheries.

Hydroelectric schemes on lowland main river channels include the impoundment of the Lee River at Carrigadrohid and Inniscarra by the Electricity Supply Board to generate electricity, the operation of turbines at the Cork City Waterworks originally as a water pumping station and more recently for electricity generation, the restoration of the old mill sites such as those on the Bandon River in Bandon, the Sheen River at Ashgrove Mills, Kenmare and Baelick Mill near Macroom now a Heritage site. There are also many disused corn, woollen and shovel mills throughout the region with potential for development.

In upland sites, high head schemes either utilise water drawn directly from the river with "run of river" intakes or through abstraction from lakes modified to create additional storage or from man-made impoundments. Additional flow has also been provided by transferring water from one system to another.

Potential for hydro developments to impact on fisheries is generally determined by their scale, nature and location within a river system and on the nature of the fishery present. For example; schemes on lowland main river channels have the potential to totally or partially obstruct movement of migratory fish, interfere with fishing and fish spawning and nursery areas, affect water quality; create poaching venues by holding and congregation of salmon below return points and cause physical damage and mortalities in fish. Equally, schemes at high head locations can interfere with aquatic fauna and flora, salmonid spawning and nursery areas, angling, water quality, and obstruct movement of fish stocks. Additional impacts can occur if high head schemes include impoundments.

Such impacts can have serious consequences for the respective fisheries and the Fisheries Board's must assess these implications together with mitigation proposals at the scoping and planning stages of any proposed development. Up to now guidelines were unavailable to provide information to prospective developers or planners on fisheries requirements. Guidelines are currently being prepared by the Fisheries Boards in conjunction with the Engineering Division of the Department of Communications, Marine and Natural Resources to address issues including the following.

- Are there locations within catchments which are acceptable for the development of hydro schemes? For example: above extremes of spawning limits, above impassable falls, on rivers which have no salmonid migration due to manmade impasses, on rivers where flow availability significantly exceeds generation capacity.
- Are there unacceptable locations where development should not be permitted? For example: those with potential impacts on spawning, nursery areas and aquatic habitat, where sustained low flows are proposed, on spring salmon fisheries, on exceptional angling waters. Where the creation of a lake Impoundment is proposed

The answer to some of the above questions are relatively straightforward however there is also a dearth of knowledge on the impact of some aspects of hydroelectric schemes on fisheries and further consideration must be given to issues such as the quantification of compensation flows required to maintain aquatic habitats and wetted perimeter, the impacts of extended sustained low flows on aquatic habitats. The water flow required satisfying effective fish passage; is it acceptable to have fish movement curtailed because of reduced flows caused by generation? What specific flow regimes are acceptable to provide for protection of spawning and juvenile fish? Will periodic cessation of abstraction facilitate spawning escapement, etc.?

In addition other aspects must also be addressed. Is there a requirement to amend Fisheries Legislation to improve protection for fisheries? Should cost/benefit analyses include the costs of environmental impact mitigation and grant aid? Is there a requirement for the precautionary principal to be adopted where sufficient information is currently unavailable on potential impacts on fisheries, etc etc..?

The principles of sustainable development require protection of the natural resource, however the type and extent of mitigation required for fisheries protection can only be made when there is sufficient information available on which to base an assessment. Questions raised above include a range of issues to be addressed when assessing potential impacts of hydro schemes on fisheries and there are obviously many more questions requiring answers. The preparation of guidelines will be the first step in addressing these informational requirements.

Note: A consultation document prepared by the Fisheries Boards and Engineering Division of the Department of Communications, Marine and Natural Resources will be available shortly

For further information contact Patricia O'Connor, Senior Fisheries Environmental Officer, South Western Regional Fisheries Board, Macroom, Co. Cork, Ireland.

AIR POLLUTION: Asking the Questions

By Alex Kirby

EVERY TIME I come to a Sherkin conference I learn a lot. I remember at one conference someone saying: "The environment is what we do to where we live." That's relevant to us at this conference on air pollution, because we all live under the one sky, sharing the Earth's one atmosphere — and what we do to it may not be quickly undone. The other Sherkinism I think is especially relevant was someone saying: "When it comes to throwing our rubbish away, we have to remember there's no such place as 'away'." The other side of that, of course, is that there's no such person as The Other. The stranger, the unknown, the alien is you and me. But that's a road to follow another time.

There are some environmental problems we're pretty confident we've solved. Ozone depletion is one: acid rain is probably another. And I guess a third problem most of us believe we've largely cracked is air pollution. Yet air pollution is a problem not just for the chronically sick, but for all of us. Its cost is measured in lives stunted, foreshortened and stopped dead in their tracks.

We know the nature of the problem has changed over the past 40 years or so. The smoke and sulphur dioxide associated with the smogs of the past, which were such a feature of my Liverpool childhood, have declined. But pollution from vehicles has increased, and is increasing. Although engines are becoming more efficient and fuels cleaner, the number of vehicles is still growing faster. The Earth Policy Institute in Washington has calculated that if Chinese car ownership were to reach the US level of 0.77 cars per person, China would have a fleet of 1.1 billion cars in 2031— well beyond the current world fleet of 795 million. If the Chinese used oil at the same rate as Americans now do, by 2031 they would need 99 million barrels of oil a day. The world currently produces 79 million barrels a day.

We know the individual pollutants which are to blame. The key ones are particulates, from road vehicles, especially diesels; nitrogen dioxide; low-level ozone; sulphur dioxide; volatile organic compounds like benzene; carbon monoxide; lead; and toxic organic micro-pollutants (TOMPS): polycyclic aromatic hydrocarbons, PCBs — polychlorinated biphenyls — dioxins and furans. Large amounts of dioxins are released on and around bonfire night. In my home town, Lewes in Sussex, you wouldn't want to know what happens on November the fifth. Yet there's massive protest at the prospect of an incinerator five mile away. If we really are worried about dioxins, we might do away with bonfire night. Tobacco smoke is also a source of TOMPS.

Air pollution causes not only short term ill-effects, but long-term damage and even premature death. For example, brief exposure to high levels of nitrogen dioxide can cause immediate temporary discomfort, while repeated exposure to asbestos or lead can lead to chronic illness, because their effects are cumulative.

For people with problems already — bronchitis, perhaps, asthma or heart disease — or the very young or old, air pollution can be significant. At very high levels, or over long periods of time, it can also cause some conditions which did not exist before.

And it is a serious killer. UK government researchers have found that acute effects may cause from 24,000 to 32,000 premature British deaths every year. Many will be people who are already very ill, but some at least are preventable. Experts think the impact of chronic exposure is many times worse. A European Commission study found all forms of air pollution caused 310,000 premature deaths annually across the EU. The least affected country was Finland, with Ireland next — loss of life expectancy here was 3.9 months, with 13.6 months lost in worst-hit Belgium.

In April the World Health Organisation said particulates alone shorten the life of everyone in the European Union by an average of 8.6 months. Particulates irritate the eyes, nose and throat. Larger ones, like PM10, are filtered out in the nose or throat, but the smallest ones that reach deep into the lung may be absorbed into the blood stream or cause lung problems. Particles smaller than 2.5 micrometers (two-and-a-half-millionths of a meter across, known as PM2.5) come mainly from vehicles, and are the most dangerous. Today, with the decline of coal burning, it is diesel vehicles that are the main source of urban particulates, some of which are linked to cancer and poisoning.

Air pollution can even harm infants before they are born. Last year the WHO reviewed the latest research on the effects of pollution on children's health and development, and concluded that exposure to particulates in the womb could lead to impaired lung growth. Significantly, the WHO says no-one has been able to identify a threshold below which particulates have no effect on health.

A number of cities are tackling the problem on an area basis, reducing or banning traffic in congested districts at peak hours or when the weather intensifies the pollution. This can bring temporary relief to the hotspots, but often simply shifts the problem somewhere else.

And one country's emissions often cause its neighbours problems too. Only 41% of the PM2.5 pollution in Germany is estimated to be home-produced. But German emissions represent 21% of Denmark's total and 20% of the Czech Republic's. This operates over national frontiers, and across oceans as well. Last year an international experiment began to track and sample the polluted air crossing the Atlantic from the US to Europe. "There's no such place as 'away'."

Air pollution harms other forms of life. Sulphur dioxide hinders photosynthesis, and nitrogen oxide stimulates plants on heathland, moors and blanket bogs to prolong their growing phase. Some plants in habitats like these depend on soil poor in nutrients, so the pollution can alter the composition of species found there, and of butterflies and other insects that rely on them.

I haven't mentioned one of the worst sorts of air pollution — that which happens indoors, mainly because of smoky stoves and cooking fires. It's not really a European problem. But as it's estimated to kill more than one-and-a-half-million people a year in the developing world, it does help to put our own problems in perspective.

If we do finally succeed in reducing air pollution, we may ironically only intensify an even greater threat — climate change. The pollution so far has helped to protect us from the effects of rising global temperatures, and to conceal or confuse the evidence that the world is warming. If the air is cleaner, scientists say, then the effects of the warming will be increasingly plain.

Scientists have found that between the middle and the end of the twentieth century the amount of sunlight reaching the Earth declined by one or two per cent every decade. They suggest this process of global dimming is caused as pollution from burning fuel reflects sunlight back into space and also makes clouds more reflective than normal, again reflecting the solar radiation away from the Earth's surface. So by shielding the oceans from the Sun's full power, the pollution may be disrupting the pattern of global rainfall. Even more seriously, it may be exerting a cooling effect which has offset the warming caused by greenhouse gases and has misled experts into thinking the climate was robust enough not to show much response to huge quantities of carbon dioxide. But without the cooling, climate sensitivity could be enough, some scientists believe, to allow global average temperatures by 2100 to be 10 degrees Celsius higher — more than twice the difference in temperature between the last Ice Age and today.

So here are some of the questions we may need to ask about air pollution:

How far do we want to go to protect some of the most vulnerable members of society — the young, the old, the chronically sick, the unborn?

Is it in the interest of the wider society to give them any special protection against the effects of pollution, when this is likely to mean a financial penalty for the rest of us?

The German city of Munster has imposed a 30 kph speed limit on 85% of its streets. This means it is much safer to cycle, and many people ride their bikes instead of using cars. Could we cut the damage air pollution does to health by learning to move around more slowly, or even to forgo some of our assumed right to be as mobile as we want?

Will governments start to give greater priority to public than private transport? And if they do, will we make use of it? How much do we love our own cars? I remember once hearing the then British Environment Secretary, John Gummer, on the subject. Someone had arrived late at a press conference, and said they'd been caught in the traffic. But Mr Gummer replied: "It's no use blaming the traffic. You are the traffic."

What will we do to slow the onset of climate change?

How far are we prepared to go to help people in the developing world to save their health and their lives by enabling them to find ways of cooking that will not choke them?

By now, perhaps, some at least of you may be feeling the need for a reviving smoke. Be very careful. An Italian study found the smoke from a single cigarette produces as much particulate matter as running a diesel engine for a hundred minutes.

Alex Kirby is a former BBC environment correspondent, now writing and broadcasting on environment and development. This article is a shorter version of a paper presented at the Sherkin Island Marine Station conference on "Air Pollution", held in Carrigaline in April 2005.

Chairperson of An Bord Pleanála strongly defends the Board's independence

AT the publication of Bord Pleanála's Annual Report, 2003, on 25th November 2004, the Chairperson of the Board, John O'Connor, strongly refuted accusations from some sources questioning the independence of the Board. He regretted that there was an increasing tendency for some people, when they did not get the decision they wanted from the Board, to cast aspersions on the Board's independence. He said that it was necessary to deny this kind of allegation in the strongest possible terms since, left unanswered, it could damage public confidence in the Board as well as morale within the organisation.

The Board was set up in law as a completely independent arbiter of planning appeals and major local authority projects. It is obliged to operate in a quasi-judicial manner. It is a legal offence for anybody to attempt to improperly influence the outcome of any case before the Board. Systems and procedures, designed to protect the decision making process from external influence other than through the process are laid down by law. The membership of the Board is governed by detailed legislation to ensure a proper balance of interests. Members, staff and consultants engaged by the Board are all subject to a detailed code of conduct and there are procedures to ensure that any potential conflicts of interest are avoided. The Board's procedures are very open, the full file is available to the public after each decision is made and each decision is accompanied by the reasons for the Board's decision and, where appropriate, the reason for not accepting the recommendation of the inspector in the case. The core principles of independence, impartiality and openness are fully respected by everyone in the Board.

The Chairperson said he wanted to state categorically that in his experience there has never been any attempt to interfere with the independent exercise by the Board of its discretion. He fully respects the right of anyone to disagree with a decision of the Board on the merits of the case but attempts to denigrate decisions by impugning the independence of the Board are an entirely different matter and are irresponsible.

Referring to the general performance of the Board, he said that he was pleased that the decision times on appeals and other cases continue to improve despite the substantial increase in the Board's workload this year. The following facts give an indication of the current state of affairs in the Board.

- The intake of planning appeals and infrastructure cases in 2004 is showing an increase of 12% over 2003 and is heading for over 5,300 cases.
- The improvement in the timeliness of decision making recorded in 2003 has continued in 2004 to date with the percentage of cases being decided within the 18 week statutory time objective increasing from 74% in 2003 to 82% in 2004 to date. The average time to dispose of cases has come down from 16 to 14 weeks.
- Reflecting the increase in the intake of cases, the number on hands at the end of October 2004 was 1513.

It is the Board's overall strategic objective to dispose of 90% of cases within the 18 week period. This recognises the fact that there will always be a certain element of cases that, for one reason or another, often outside the Board's control, it is not possible to decide within this time frame. However, the Board is constantly striving to further improve the timeliness of decisions by reviewing the reasons for delays and the efficiency of operations.

General Trends

The following general trends in normal planning appeals in 2003 may be of interest:

- The percentage of local planning decisions appealed continues to be fairly constant at 7%.
- The share of local decisions appealed which are reversed by the Board was 30%, down from 33% in 2002.
- First party appeals against refusal fared better in 2003 with 22% resulting in grants of permission compared to 20% in 2002.
- Third party appeals against grants of permission were somewhat less successful resulting in 41% refusals compared to 45% in 2002.

Major Projects

Major infrastructure projects come before the Board either by way of planning appeal where they are privately sponsored or by way of direct approval where they are local authority sponsored. The Board is keenly aware of infrastructure deficiencies and their impact on social and economic development. Recognising the importance of avoiding delays at the planning stage of these projects the Board continues to improve systems of processing these cases. For example, this year in 22 of the 26 local authority project cases oral hearings were commenced within six weeks of the expiry date for objections. 14 major national road schemes were approved by the Board from the start of 2003 to date. At the present time there are only 4 national road cases awaiting determination by the Board and the oral hearings have been held in 3 of these. This year 90% of private infrastructure planning appeals were reported on to the Board within 17 weeks of the appeals being received. Priority is also accorded to housing schemes of 30 or more units and a special team of Inspectors is concentrating on these cases. Overall, the Board considers that it would be difficult to improve significantly on present timescales within the parameters of existing legislation. There is a strong tendency for infrastructure cases (particularly in the waste area) to be challenged by way of judicial review after the Board's decision.

Customer Service

As part of its ongoing programme to improve service to customers and stakeholders the Board has adopted a detailed customer service action plan which states clearly the level of service its customers can expect. This includes an improved system for dealing with complaints from customers. The Board also continues with its programme of meeting major stakeholder interests on a regular basis to ensure that it is aware of their concerns.

Design Standards

The Chairperson referred to concerns he expressed previously about the design standards for many new developments across the country. He acknowledged that design standards had improved over recent years, particularly in the larger urban areas, and paid tribute to the efforts being made by the architects' and planners' professional bodies in this regard. However, too many developments coming before the Board still exhibited poor design standards. Lack of design quality at planning stage can result in developments that offer a poor living environment to future occupants and the general acceptance of aesthetic mediocrity. Where the Board considers design to be substandard it may refuse permission or if the development is amenable to being redesigned within the parameters of the planning application it may request the developer to upgrade the design. The Chairperson said that additional resources put into the design phase of a development will always pay dividends for the developer in terms of the amount and value of development that can be achieved, as well as facilitating planning permission.

Rural Housing

As requested by the Minister at the time of their publication, the Board has regard to the draft planning guidelines on Sustainable Rural Housing in deciding appeals in relation to one-off houses in rural areas. Generally, in line with the guidelines, the Board takes a positive attitude, subject of course to observation of site specific good planning principles, to rural generated housing needs or housing for people with genuine links to the local rural community. A survey of appeals relating to one-off rural housing developments decided since the guidelines were published shows that 47% of the 350 cases decided were located in areas under strong urban influence, with only 17% being in weak rural areas. The survey also shows that drainage and settlement policies are the most common reasons for refusal (27% each) with traffic hazard (18%) and landscape (17%) also prominent.

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The Argentinian port of Ushuaia seen from the east along the Beagle Channel. Many Antarctic bound vessels leave from Ushuaia, the most southern town in Argentina.

A trip of a lifetime to the South Atlantic

By Paul Kay

WE all too often take our cosy and generally safe world for granted, and this extends to all aspects of our highly organised and cosseted lives. So it can be a shock when not everything goes according to plan.

In January of 2005 my wife, father-in-law and I were fortunate enough to be able to take a trip to the South Atlantic where we were to visit the Falklands, South Georgia and the Antarctic Peninsula. A trip of a lifetime! And one accompanied by members of the Scottish Royal Geographical Society and the Tom Crean Society.

The Falklands proved to be windy, hilly and virtually treeless but beautiful and with much wildlife. Although we spent only a couple of days there and scuba dived once in the amazing giant kelp found around the islands, the Falklands were a place that I would very much like to revisit.

South Georgia on the other hand was a complete contrast. Two days sailing to the east of the Falklands, the island appeared before us as mountainous, desolate, cold but incredibly beautiful. The overall impression, though, was one of isolation.

If anything this sense of isolation was reinforced when we stepped ashore. We manoeuvred amongst icebergs in our ship (an icebreaker) into King Haakon Bay on the south side of the island and landed in Cave Cove – the same spot where Shackleton made landfall after his epic voyage in the "James Caird". We were greeted by fur seals (of which we had to be a little wary) and climbed up through the deep and dense tussock grass to see albatrosses on their nests. Later we used the Zodiac inflatables to run up to the top of the bay to see more seals and some penguins. The scenery was spectacular; glaciers (we saw Shackleton's Gap, mountains and rivers of glacial melt water.

All too soon it was time to go back to our icebreaker. An amazing day, to be followed by an unforgettable evening. The conversation in the dining room was buzzing with what everyone had seen, but was interrupted when our vessel graunched noisily to a sudden stop. As if we didn't already know that something was seriously wrong, the list that the ship now took on confirmed this.

In fact we had struck a rock pinnacle and were stuck on it. Our situation was now worrying. The nearest habitation was at Grytviken, on the north side of the island, where there are no rescue facilities. We were aware of a British destroyer within two days sail of us but beyond that knew of no other vessels in the vicinity – South Georgia is isolated! As the island is below the Antarctic convergence, the water temperature was no more than 5 degrees Centigrade and whilst the lifeboats were covered, the nearest viable landfall would have meant negotiating icebergs and shallow reefs in twilight or at night. The potentiality of the situation was far from good.

Our captain did the only thing he could. He managed to corkscrew the vessel off the rock using his engines in a series of thrusts and counterthrusts. Fortunately, the ship was a very toughly built icebreaker with a double hull and it was this which probably saved us. During the night we motored around the island to Grytviken to find a salvage tug with divers, working to raise the two sealing ships sunk in the whaling station harbour.

Our trip had effectively ended when we hit that rock (which is now accurately shown on the Admiralty chart!) but we spent several days in Grytviken where the wildlife was incredibly tame, and even a glorious day visiting St Andrew's Bay where vast numbers of penguins, together with fur and elephant seals allowed us to view and photograph them with no fear whatsoever.

It was possible to watch young fur seals plaguing the penguins by nipping at them out of a devilish sense of fun (just like naughty children), adults balancing on chunks of washed up iceberg, and elephant seals cooling themselves with scoops of damp sand thrown over their backs as it was a sunny (although not hot) day. Sitting on the gravely beach would often result in a penguin wandering up to within a few feet, totally unconcerned about the strange visitor. Many penguins were young and still had their brown covering. Others stood in the icy waters of a milky glacial melt river, fully adapted to its cold.

This day was one we had whilst the ship underwent checks, having had holes temporarily repaired by the hardy wetsuited Chilean divers from the salvage tug. As we set sail away from St Andrew's Bay amidst an unprecedented number of icebergs, we were treated to a spectacular display of low sun, snow capped mountains and icebergs. This is perhaps my most enduring memory of the trip.

But the voyage was over. We sailed straight back to Ushuaia in Argentina for the vessel to be inspected (she was finally extensively repaired in Falmouth) and spent a few days there. We managed to dive in the Beagle Channel, which was remarkably like diving in a Scottish sea loch but with slightly different marine life, before flying home.

The Antarctic Peninsula still beckons. If we ever get the chance to go again it will be in an icebreaker – nothing else will now do!

Photos: © Paul Kay

An elephant seal enjoying the sun at St Andrews Bay.

Paul Kay BSc FRPS is a professional photographer, specialising in marine wildlife photography and the sale of underwater photographic equipment. Stock Underwater Photography www.marinewildlife.co.uk. Suppliers of Seacam Silver Underwater Photo Equipment www.underseacameras.co. Tel. 0044 1248 681361 or 0044 7702 411614.

A trip of a lifetime to the South Atlantic

Photographs by Paul Kay

(see article on previous page)

A Falkland curra-curra – mischievous eyes do not lie, they are thieves and will steal most things that they can carry including hats!

The sun is lovely but hot and cooling down means a shower of damp sand flicked over your back with an handy kick.

St Andrews Bay – penguins and sea – for all the world as if they are on a family outing!

An unprecedented number of icebergs floated off the north coast of South Georgia.

An albatross chick in the Falklands.

Fur seals on the beach at the top of King Haakon Bay, made famous as Shackleton's landing place after his epic sail.

Fur seals apparently like a challenge. It took ages for this one to climb onto a precariously balancing iceberg remnant which had washed up. Once achieved the aim was boring and after a few seconds of triumphant balancing the seal hopped down and away.

Up to half a million penguins can be seen in St Andrews Bay.

Standing as if on sentry duty – two juvenile penguins lean against each other as they stand in steaming, smelly water.

Mapping & Monitoring the Environment

THE Geological Survey of Ireland is one of the most important state bodies in the field of research. I put questions to the Director of the GSI, Dr Peadar McArdle, so that readers would get an understanding of some of the work carried out by him and his staff.

***Matt Murphy:* Can you describe what the GSI does?**

Peadar McArdle: The GSI mission, stated coldly, is to provide geological advice and information relating to Ireland in support of national and local objectives. Our bedrock and its overlying subsoil define our physical environment – they control where we live and work and spend our leisure time. During our conversation we will look at some examples of the influence of geology on our lives and the ways in which GSI adds value to the quality and safety of our communities.

***Matt Murphy:* What staff do you have?**

Peadar McArdle: Currently we have less than 90 staff and this is remarkably lean when you consider the range of tasks we carry out. Our geological staff work for a wide range of sectors, including groundwater protection, mining and quarrying, construction and transport routes, hydrocarbons, fisheries, navigational safety, heritage and education. So we have quite a range of geological, geographical and scientific skills. We also have information management skills, which are key to our mission. We are also fortunate in that we have superb support services – administration, for example, runs our one-stop Customer Centre, Technical Service manages drilling services and Cartography the production of our publications.

***Matt Murphy:* How do you help the ordinary person?**

Peadar McArdle: Your question implies that much of our work is geared towards organisations rather than individuals – and that is correct. However we have considerable contact with ordinary members of the public. We receive over 4,000 queries each year by phone, fax, mail or personal callers. These may be from persons wishing, for example, to sink a water-well on their property, or seeking additional information on the underground of their locality – perhaps with construction in mind. We realise that sometimes people find it difficult to reach the right information within GSI and we have set up the Customer Centre to facilitate access to all they need.

***Matt Murphy:* I want to ask you about the contribution of the various GSI Programmes to the Nation, starting with Groundwater?**

Peadar McArdle: Groundwater is the unseen part of the water cycle and yet on a national basis it provides 25% of our water supplies. We have important aquifers – areas of water-bearing ground – such as the limestones of the Midlands, the sandstones in the south and the extensive areas with sand and gravel deposits. The EU Water Framework Directive has ensured that groundwater is considered as an integral part of water resources and GSI has worked with the EPA and other partners to ensure successful river basin district management. In addition we do Groundwater Protection Schemes on a county basis, where we outline important aquifers and determine which parts of the aquifers are vulnerable to pollution – in other words areas where the aquifer is not overlain by an impermeable cover of rock or subsoil. This allows us to assist local authority planners by describing appropriate responses to various planning applications and development plans.

***Matt Murphy:* What about your Minerals Program?**

Peadar McArdle: Mining and mineral development are activities that GSI has always been associated with. Companies undertaking exploration in Ireland lodge reports with our parent Department (of Communications, Marine and Natural Resources) and we have built a substantial database which assists not only future mineral exploration but also a range of other activities. Modern mining meets strict environmental and safety standards and generates important foreign reserves and employment opportunities. Accordingly it is important that the potential for mineral discoveries is understood not only by mining companies but also by local authorities. GSI undertakes a methodology – Minerals Potential Mapping – that ensures the mineral potential is understood and that areas with high potential are not sterilised through competing land uses.

Another dimension of mineral extraction is the availability of aggregates to support construction and infrastructure development, such as transport routes. Aggregates may be derived either from crushed rock or sand and gravel deposits. Aggregates are assessed through Aggregates Potential Mapping, a methodology to assist planners make land use decisions while being conscious of the distribution of important aggregates resources. The methodology delineates the probability that aggregates exist within an area and assigns relative potentials to each area. Factors such as overburden thickness, nature of rock type, proximity to market and accessibility are all evaluated. The resulting map shows areas categorised on the basis of aggregate potential, ranging from very high to very low.

***Matt Murphy:* Does GSI do any work on natural hazards?**

Peadar McArdle: The stability of our physical environment is central to our quality of life. For example, it is only recently we all became conscious of the risk of landslides. Working with its partners, GSI has built a database containing almost 100 historical landslide events on the island of Ireland and these claimed a total of 32 lives. We intend to undertake susceptibility mapping to identify areas at risk, particularly from bogflows which are relatively prevalent in Ireland. There are additional hazards, such as mine hazards, surface subsidence, contaminated land and water, where GSI has had an involvement. We need to carry out systematic baseline and repeat surveys in order to monitor our environment. Many of these would be airborne or satellite-based and very cost-effective as a result.

***Matt Murphy:* GSI also runs geological mapping programmes?**

Peadar McArdle: While GSI uses a variety of remote sensing techniques to survey both offshore and onshore, there is an ongoing need for field-based mapping, including Bedrock and Subsoil Maps. Bedrock maps at a scale of 1:100,000 are now available for the whole country and each has an explanatory booklet. These maps are rapid compilations of existing information but show the local geology in some detail – for example, the distribution of rock types – and illustrate the rich variety of bedrock throughout the country. They are used by a whole range of people including engineers, planners, prospectors and students. We have now started a new series of 1:50,000 maps, based on modern mapping but showing point data such as outcrops and boreholes. These will allow users to estimate the accuracy of maps and are urgently needed by many.

In parallel we produce a map series showing the distribution, approximate depth and nature of subsoils. These are called Quaternary Maps after the geological age in which the Ice Age prevailed because many deposits result from the development and melting of the ice sheets, which once covered our countryside. We are currently mapping in Louth and Westmeath, backed up by systematic drilling, and the resulting maps are used not only by students but also by engineers, local authorities and industry interested in sand and gravel deposits and heritage features.

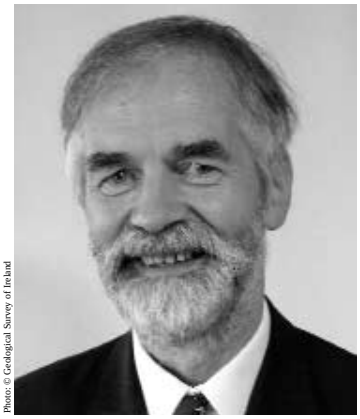

Photo: © Geological Survey of Ireland

Dr Peadar McArdle

***Matt Murphy:* You mentioned heritage features. What heritage role does GSI have?**

Peadar McArdle: Many people are unaware of the importance of landscape and geological heritage. They will look at, say, the Burren and appreciate its unique flora and fauna, and its remarkable historical and archaeological heritage without realising that none of these would exist were it not for the underlying foundation of those beautiful limestone pavements that make the Burren so unique. We work with both the National Parks and Wildlife Service and local authorities to identify and prioritise features of geological heritage on both a national and county basis. This is done on a thematic basis and involves good science and peer services. We are fortunate that in every part of Ireland, not just the Burren or the Giant's Causeway, there are remarkable stories in our landscape and its bedrock. On Valentia Island, for example, are the preserved footprints of one of the world's earliest known salamanders and the locality is greatly appreciated by local residents.

***Matt Murphy:* Do you find that local communities are interested in your work?**

Peadar McArdle: Many communities maintain contact with us particularly in relation to landscape tourism and the associated opportunities to establish sustainable economic enterprises, which deliver real benefits locally. We began this process of engagement some years ago by preparing walking and driving guides, often in co-operation with our colleagues in the Geological Survey of Northern Ireland. Now we tend to be partners in multi-disciplinary projects, which are underpinned by European funding. The Breifne project, for example, is a Cross-Border initiative centred on the uplands of the northwest, which is developing a new tourism brand, based on the integrated resources of its landscape. A similar project is underway along the Waterford coast, the Copper Coast Geopark, one of a network of European Geoparks. These are exciting projects where we can add value to the commitment and contribution of vibrant local communities and done in collaboration with local authorities and additional partners.

***Matt Murphy:* How do local authorities benefit, especially with planning applications?**

Peadar McArdle: We regard the local authorities as being among our key customers. Many of the products we undertake for them assist in making decisions regarding competing land uses, in establishing county development plans and ultimately, of course, in deciding on planning applications. Groundwater Protection Schemes and Aggregate Potential Mapping will in future be available on our website so that individuals as well as local authority officials have easy access to them. In addition, GSI is routinely consulted in relation to a variety of planning issues, including environmental impact assessments.

***Matt Murphy:* How does GSI assist in road building by the National Roads Authority?**

Peadar McArdle: While we do not work directly with the National Roads Authority at present, we do make significant inputs to support transport routes and other construction infrastructure. We have already spoken about Aggregate Potential Mapping which is important here. We also maintain a database – called the Geotechnical Database – which provides systematic information on the nature and depth of overburden especially in urban areas. Our database is built from engineering and geological reports received from consulting engineers, site investigation companies and local authorities – and these are also the customers for this database. With more than 50,000 records, it is now being transformed digitally for ease of use.

***Matt Murphy:* What maps do you produce and is the whole country up to date?**

Peadar McArdle: Our main map product is the 1:100,000 scale bedrock map series and this is available for the whole country. However, work on the more detailed 1:50,000 scale map series with site-specific information, has only just started and it will take a generation to complete. It is being done on a prioritised basis, wherever there are complexities or the level of the existing data is weak. For subsoils, or Quaternary, maps, we have only 50% coverage and, again, we are proceeding on a prioritised basis, with emphasis on supporting the National Spatial Strategy. We do not publish other onshore maps but there are a total of 55 digital databases available in GSI, including the various layers of the Groundwater Protection Schemes, Aggregates Potential Mapping, distribution of bedrock exposures and boreholes. Every effort is made to respond pragmatically to customer needs but we have to recognise that, in many cases, countrywide coverage is a long-term commitment.

***Matt Murphy:* Can Ireland gain economically from the Seabed Survey?**

Peadar McArdle: Readers of Sherkin Comment will already be familiar with the work of the Seabed Survey. The Survey of the deepwater seabed was outsourced to the private sector and, since 2002, the shallow water area has been surveyed by the Marine Institute, as our strategic partner. The two organisations have a Joint Working Group to ensure maximum benefit is derived from these surveys. Our seabed classification maps, when combined with fish stock data, are used to prepare fish habitat maps, which not only assist fisheries but can also inform national and European policy. The edge of our continental shelf is marked by an internationally-recognised spectacular development of cold-water coral. Located in topographically distinct carbonate mounds, their distribution has been extended and their shape detailed by our surveys – activities that are important in terms of both biodiversity and heritage. This summer we have the exciting prospect that the Integrated Ocean Drilling Program, a world-class initiative, will drill some boreholes at these mounds and this is an important opportunity for Irish Science. Working with our partners, we have also done some deep seismic surveys on the remote Hatton Bank which will provide a framework for future hydrocarbons exploration.

***Matt Murphy:* Are the results readily available to the public?**

Peadar McArdle: GSI has made considerable investment in its information management system to ensure the results are readily accessible. A major data storage system has been built, currently holding in excess of 3.5 terabytes of data on the Seabed Survey. We have placed a copy of all this data on the Marine Grid of NUI Galway. This is essentially a supercomputer which ensures we have a valid copy of all data should difficulties arise with the GSI system. The NUI Galway Marine Grid is also an effective information delivery system for our customers in the state agencies, the third level research sector and many schools.

Information management is equally critical for customers of our onshore data. Customers want integrated datasets, which are customised to their needs and delivered in a user-friendly way. In response we have developed a digital Document Management System with over 500,000 scanned records. At the same time, we are developing a geographical information system and a unified database system. These are essential stepping-stones to eventually making our information system web-enabled. We want customers to be able to do business with us remotely, so that the quality of our service is independent of our location. This is important as we plan our relocation to Cavan. We realise that we have some distance to travel still, but we were pleased to have 175,000 visits to our websites in 2004.

***Matt Murphy:* Most of the charts available for bays and harbours around Ireland are up to 150 years old. Can you comment?**

Peadar McArdle: Shipping in Irish waters has had to rely on maritime charts which, in the absence of an Irish Hydrographic Office, have been maintained and updated by the UK Hydrographic Office. Some of these charts are based on information collected as early as the mid-nineteenth century. The Seabed Survey has provided modern and accurate survey data for some areas, including Clew, Killala and Dublin Bays. The new Clew Bay chart, based on a recent airborne laser survey, has significantly updated the older chart. In Dublin Bay, shipboard surveys have documented the delicate sand waves of the Burford Bank, for example, and other high-resolution features. These new charts contribute to improved navigational safety and can be a basis for new shipping developments.

***Matt Murphy:* What about all the other bays and harbours?**

Peadar McArdle: These will not be completed before the end of 2005 when this phase of the Seabed Survey comes to an end. At present GSI and MI are preparing a case for Government Funding beyond 2005 to allow the completion of these and other shallow water surveys. Soon after the Seabed Survey started in 1999 it was acknowledged that all its objectives, especially inshore surveys, could not be completed with the available budget. But the Government would want to be convinced of the value and efficiency of surveys to date before it would sanction further expenditure. That is our task at present.

***Matt Murphy:* Do you have an educational page on your website for schools?**

Peadar McArdle: We have a number of features on our website which are of interest to schools. There are teacher notes to support the video/DVD versions of the TV series "Written in Stone". We are in discussion with the Association of Geography Teachers of Ireland and others concerning the provision of training resources to support teachers involved in the new Leaving Certificate Geography Syllabus and some are likely to be web-enabled. Our "Geology for Everyone" page is well worth a visit – it features landscape images from across Europe ("Europe's Living Landscapes") which marked the accession of new EU member states during the Irish Presidency last year. Having said all this, we recognise that we could provide more materials for schools on our website and we will be looking for new opportunities to do so.

***Matt Murphy:* What values drive your work programme in GSI?**

Peadar McArdle: A key value of GSI is that its work is knowledgeable and based on sound defensible science. We expect that as a result our products can be used in an authoritative and impartial way. A second value for us is our emphasis on customer needs. We take many opportunities to listen to our customers and to discuss how best to meet their needs, taking account of international best practise. We do this both formally and informally. Every four years we carry out a marketing survey, called "Mapping the Customer", and we are careful to take account of the results. Another value is our commitment to work in co-operation with a range of partners, including state agencies and local authorities, in order to maximise the national benefits. And underpinning these values is a commitment to the continued development of our own staff in order to meet the evolving challenges we face.

***Matt Murphy:* Finally, what are the challenges facing GSI?**

Peadar McArdle: GSI is committed to providing relevant services to key sectors of Irish life. As Irish society changes so does the nature of services it requires and so GSI must evolve to provide them. During the 1990s, we expanded the range of sectors we serve, embraced digital technology as a means of delivering services and worked hard to become customer-responsive. Looking to the future, we need to deliver products and services over the web, complete the Seabed Survey, undertake targeted surveys in priority areas to support the security and health of our communities, develop monitoring services to support our environmental partners and provide scientific validation for our work programmes through support of third level research. In conclusion, I would like to thank Sherkin Comment for this opportunity to talk about the work of GSI.

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Origins of the Acid Rain Problem in North America and its Effects on Aquatic Ecosystems

By Thomas A. Clair

IN North America, acid rain is produced in large part by the combustion of coal for electrical production in the Ohio Valley and the East Coast of the United States, and metal smelting and refining in central Canada (Figure 1). These industries produce sulphur dioxide (SO_2) which is converted to sulphuric acid (H_2SO_4) in the atmosphere. Nitric acid (HNO_3) is also produced by the combustion of gasoline in transportation, and contributes approximately 20% of total atmospheric acidity.

Large-scale SO_2 emissions began in North America early in the 20th century, and peaked in the late 1970's when health and environmental damage began to be reported. Legislation was enacted in both Canada and the United States which reduced SO_2 by almost 50% in 20 years. Currently, acid emissions in North America are back to levels not seen since the 1920's (Figure 2) which have resulted in large-scale changes in sulphate deposition patterns.

Many soils in eastern North America have been depleted of buffering substances from a century of acidification abuse. As rain water is filtered through these damaged soils on its way to streams and lakes, it encounters little buffering material and thus remains high in acidity and low in calcium and magnesium. We applied the Model of acidification of groundwater in catchments (MAGIC) (Cosby et al. 1985) to 410 lakes scattered across a 3000 km stretch of eastern Canada (Figure 3) to assess how their chemistry has changed over the last century and a half. We estimated pre-acidification conditions, the period of the worst deposition (mid-1970's), current day, and into the future. We estimated future water chemistry, based on current Canadian agreements and proposed United States reductions.

The pH distribution (ie acidity of water, the higher the pH, the lower the acidity) of lakes in each of the study regions shows that water chemistry was very much influenced by acid rain in each part of eastern Canada. We show that pH decreased significantly all over eastern Canada from 1850 to 1975 (Figure 4). The greatest changes occurred in central Ontario which contained the world's largest single sulphur pollution source in the INCO nickel smelter. Acidity conditions have improved significantly in all regions, but not to pre-acidification levels. Based on our modelling, we predict that pH values will still not return to pre-acidification in the next 25 years, even with a further 50% reduction in sulphur emissions.

We then narrowed our focus to a number of rivers in Nova Scotia (located on the east coast far from pollution sources) and found that a number of rivers which used to contain Atlantic salmon (*Salmo salar*) populations have lost them due to acidification. Application of the MAGIC model has shown that water chemistry conditions will not be suitable for salmon survival for another 100 years in a number of rivers, even with very aggressive acid rain reductions (Clair *et al* 2004). This result is the legacy of decades of acidification on highly sensitive soils. As with many other environmental problems, even when the source of the problem has been dealt with, the effects will continue to be felt for a long time to come.

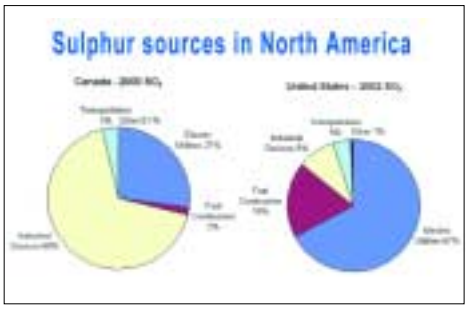

Figure 1. Sources of sulphur in North American air pollution. Industrial sources include mostly metal smelting and refining.

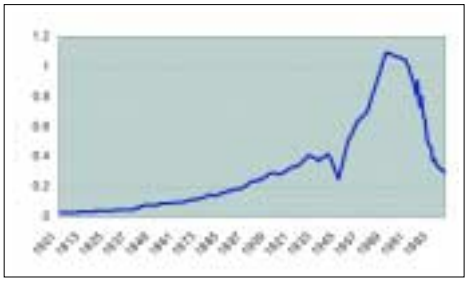

Figure 2. Historical sulphur emissions in North America. Values are in relative units. (from Belanger *et al.*)

Figure 3. Location of 410 lakes in eastern Canada where geochemical modelling was conducted.

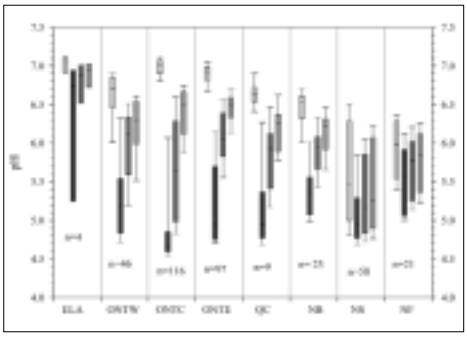

Figure 4. Distribution of modelled and measured pH values at the study sites. Within each regional block, the 1st box shows the distribution of modelled pre-acidification values, the 2nd shows 1975 (worst case) distribution, the 3rd shows year 2000 values, while the 4th box describes expected values under further agreed-to Canadian and currently proposed US emission reductions. The number of sites in each region is given. Lines within the boxes are median values, box limits are 25 and 75 percentiles, and whiskers show the 10 and 90 percentile values.

Reference

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Cosby, B. J., Hornberger, G. M., Galloway, J. N., and Wright, R. F.: 1985, 'modelling the effects of acid deposition: Assessment of a lumped parameter model of soil water and streamwater chemistry', Water Resour. Res. 21, 51–63.

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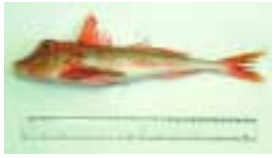
Gurnards (Triglidae)

in Irish and European Atlantic Seas

By Declan T.G. Quigley

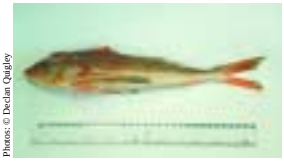
GURNARDS (Triglidae) or Sea Robins as they are known in North America, belong to a moderately large family of demersal marine fishes comprising about 14 genera and 100 species in tropical and temperate seas worldwide. In European Atlantic seas the family is represented by 4 genera including 9 species, only 5 of which have been recorded from Irish waters to date (Table 1). The Flying Gurnard (*Dactylopterus volitans*) which belongs to a separate family (Dactylopteridae), has only recently been recorded (4 records) from Irish waters.

All gurnards have the lowest three (2 in Peristedion) rays of each pectoral fin thickened and separate. In life these rays are used as tactile organs to search the sea-bed for food and also to raise the fish off the bottom, thus increasing its range of vision. Gurnards have heavily armoured heads with strong spines and rows of sharp spines along the back and each side of the dorsal fins. They are gregarious fish, which form loose shoals. The name "gurnard" is thought to derive from the French "grogner" (to grunt). Gurnard can produce audible growls or grunts by muscular contractions acting on the swim bladder. Sound production is thought to help keep shoals in contact during feeding and spawning and may also be used as a form of aggressive behaviour. Gurnards spawn during the summer months. After hatching, the young remain pelagic for a short period (6–10 weeks) before assuming a demersal mode of life.

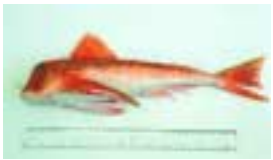


Red Gurnard – *C. cuculus*

Grey Gurnard – *C. gurnardus*



Tub Gurnard – *C. lucerna*



Streaked Gurnard – *C. lastoviza*

Photos: © Declan Quigley

Red Gurnard *Chelidonichthys cuculus*

The Red Gurnard can be found from shallow inshore waters down to moderate depths (250m), over a wide variety of substrates, including sand, mud, gravel and even rock. It is distributed from the British Isles (rarely in the North Sea and S Norway) southwards via the Azores, Madeira and the Mediterranean Sea (rarely in northern and eastern parts) to Mauritania, north of 15°N. Although the species is relatively common in Irish waters, it appears to be particularly abundant off the SW (Co Kerry, 14.7%), NW (Co Mayo, 20.4%), N (Co Donegal, 41.4%) and NE (Co Antrim, 16.7%) coasts where >90% of all rod & line caught specimens (weighing >907gm) have been recorded by the Irish Specimen Fish Committee (ISFC) – (Figure 1). The Irish record, weighing 1.63kg, was captured off Belmullet, Co Mayo in 1968 and exceeds the UK rod & line record of 1.295kg, captured off Sark Island, English Channel, in 1995. It grows to a maximum length of *c*.50cm. The snout ends in three short spines each side and the pectoral fins only just reach the vent in this species.

Grey Gurnard *Chelidonichthys gurnardus*

The Grey Gurnard is an inshore species, living at depths of 20–50m, exceptionally from 10 to 140m, commonly on sandy bottoms but also with decreasing frequency on mud, shell and rocky bottoms. It is also frequently caught near the surface at night. The species is distributed from Iceland, Norway and the southern Baltic southwards to southern Morocco, Madeira and the Mediterranean, including the Black Sea. It is perhaps the most common and widely distributed gurnard species found in Irish waters. Like the Red Gurnard, it appears to be particularly abundant off the SW (Co Kerry, 13.2%), NW (Co Mayo, 16.2%), N (Co Donegal, 26.9%) and NE (Co Antrim, 25.7%) coasts where >80% of all rod & line caught specimens (weighing >680gm) have been recorded by the ISFC (Figure 1). The Irish record, weighing 1.39kg, was captured off Rosslare, Co Wexford in 1967 and exceeds the UK rod & line record of 1.105kg, captured off Caliach Point, Mull, Scotland, in 1976. It grows to a maximum length of *c*.50cm. The pectoral fins are short and do not reach the vent in this species.

Tub Gurnard *Chelidonichthys lucerna*

The Tub Gurnard is a relatively abundant species in inshore waters of 20–150m, extending in decreasing frequency to depths of 300m. Large specimens tend to be solitary, but smaller specimens often live in small schools on mud and muddy-sand or gravel bottoms. It is sometimes found in surface waters and penetrating into estuaries. The species is distributed from Norway to West Africa (Cape Blanc), including the Mediterranean and Black Seas, but excluding Madeira and the Azores. This is the largest of the gurnards found in Irish waters (maximum length *c*.75cm). The current ISFC rod & line record, weighing 5.547kg (Achill, 1973) marginally exceeds the UK record of 5.528kg (Langlan Bay, Wales, 1976). Although the species is found all around the Irish coast, it appears to be particularly common off Co Mayo (72.1%) and Co Donegal (16.7%) where almost 90% of the ISFC specimens (weighing >2.268kg) have been recorded (Figure 1). The pectoral fins reach well past the vent in this species.

Streaked Gurnard *Chelidonichthys lastoviza*

The Streaked Gurnard can be found from shallow inshore waters down to moderate depths (150m), over sand and muddy ground interspersed with rocky patches. It is distributed from the British Isles southwards via the Azores, Madeira and the Mediterranean Sea (except the Black Sea) to the Cape of Good Hope (South Africa) and northwards to Mozambique. However, the species is generally regarded as rare north of the English Channel, and not common even there. Indeed, it is considered to be an occasional late summer migrant in northern European waters; rare in the North Sea, with only one record from Sweden. Until recently, the species was regarded as scarce in Irish waters, but recent evidence would suggest that it may be relatively common, at least in some areas (e.g. SW Kerry & NW Donegal) where it may have been previously confused with the Red Gurnard. A relatively small gurnard (maximum length *c*.40cm), it is characterised by the near vertical head profile and a body covered with distinct traverse ridges of skin originating at the lateral line. It feeds exclusively on crustaceans, especially swimming crabs, which may explain its observed gregarious behaviour near the surface. Although it is not currently recognised by the Irish Specimen Fish Committee, specimens weighing up to 976gm (Broadhaven Bay, Co Mayo, 1970) have been recorded on rod & line in Irish waters. The latter specimen significantly exceeds the current UK rod & line record of 637gm (Loch Goil, Scotland, 1971).

Piper Gurnard – *Trigla lyra*

The Piper Gurnard is primarily a deep-water species, normally found on the upper continental slope (300–700m) but occasionally closer inshore (10m). It is distributed from north of the British Isles and North Sea, southwards to Walvis Bay (South Africa), including Madeira and the Mediterranean Sea, but absent from the Black Sea. Although there are very few records from Irish waters where it has no commercial value, the species may be more common in deeper offshore waters. It reaches a maximum length of about 60cm. The opercular spine is very long, reaching backwards to the middle of the pectoral fins. Its biology is virtually unknown.

Long-finned Gurnard *Chelidonichthys obscura*

The Long-finned Gurnard inhabits shallow inshore waters (15–55m), mainly over rocky ground. It is distributed from the southern coast of the British Isles to Mauritania, including the Azores, Madeira, and the Mediterranean, but it is absent from the northern Aegean and Black Seas. The species is extremely rare in northern European waters. Indeed there are only about six records from the western English Channel, all dating from the mid 19th century. There are no confirmed Irish records to date. A relatively small gurnard (maximum length *c*.40cm), the second dorsal fin spine is greatly elongated and twice as long as the remaining spines. Its biology is virtually unknown.

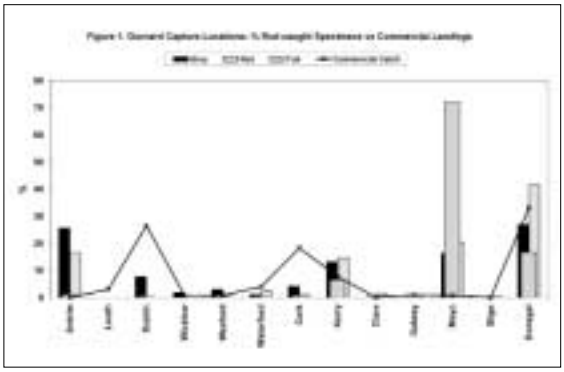
Armed Gurnard *Peristedion cataphractum*

The Armed Gurnard is essentially a deep-water species, usually found on soft sand and muddy bottoms at depths down to 500m, but occasionally at 30–80m (particularly juveniles). This species is common in the Mediterranean and the Atlantic from Biscay southwards via Morocco to Angola. The species is extremely rare in northern European waters; there are only about 6 records from as far north as the English Channel, all dating from the 19th century. Although there are no Irish records to date, it may occur in deep offshore waters off the Irish coast. The species is easily distinguished by its enormously long snout extended into two flattened projections. The body is completely covered with hard scutes, each with a backward pointing spine and there are a number of fine barbels on the lower jaw. It grows to a maximum length of *c*.40cm.

Commercial Landings

Gurnards have long been regarded as an epicurean fish in several European countries, particularly France and Spain. The total annual European catch is estimated at 8–9,000 tonnes. Over the last decade, gurnards have become an increasingly important commercial species in Irish waters with annual live weight landings averaging about 90 tonne, valued at *c*.€735k. The main commercial gurnard species in Irish waters are grey, red and tub, estimated to represent 75.6%, 19.9% and 4.2% of the total catch in the Irish Sea respectively. Counties Donegal (33.1%), Dublin (26.5%) and Cork (18.2%) appear to account for almost 80% of all the Irish landings (Figure 1).

Declan T.G. Quigley, Dingle Oceanworld (Mara Beo Teo), The Wood, Dingle, Co Kerry. Mobile: 087-9080521; Email: declanquigley@eircom.net



Utilising manure and slurry while protecting human health

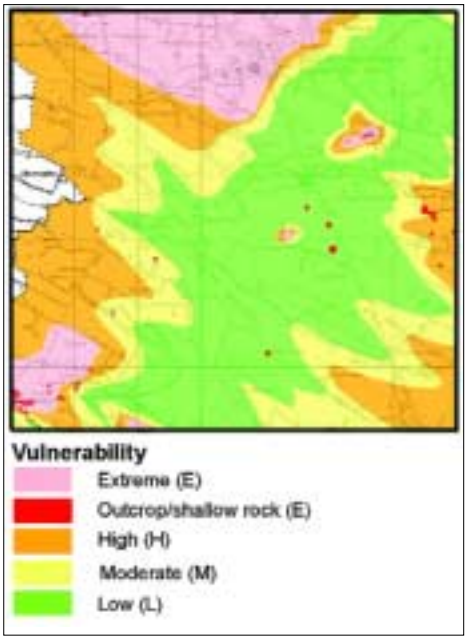
Photo: © Geological Survey of Ireland

Subsoil overlying bedrock protects wells from microbial pathogens

THE EPA has produced a booklet to assist farmers, farm managers, advisors, etc., develop a scope of work for the assessment of risk to groundwater under lands where it is intended to recover organic wastes, through controlled landspreading procedures. It also explains the reasons why a groundwater risk assessment is required. Certain soils/subsoils as a result of natural earth-forming processes may be shallow or highly permeable. Such soils render underlying groundwaters vulnerable to pollution from surface activities. These areas of groundwater vulnerability must be identified and documented so that appropriate landspreading strategies can be devised/implemented. Animal wastes contain large numbers of microbial pathogens (faecal bacteria, Cryptosporidium and viruses). These microbial pathogens pose a significant risk to human health and if they enter groundwater, render it unsuitable for drinking. Soils and subsoils provide protection to groundwater by filtering out and slowing down the movement of microbes, which have a limited survival time in this type of environment. The longer the microbes are retained in the soils/subsoils, the more groundwater is protected as the microbes have more time to die off. The degree of protection depends on the type and thickness of the soils/subsoils with greater protection being afforded by thick soils/subsoils with a high clay content. Microbes are known to survive in soils and groundwater for up to 100 days. Microbes can move considerable distances in the subsurface under the right conditions. Movement of microbes can range from negligible distances in compact clay soils/subsoils to 20 m/day in sand and gravel and up to kilometres in karstic areas. So, when determining the suitability of land for the acceptance of slurry from off-farm sources, the type and thickness of the soil/subsoil needs to be determined. It is acknowledged that organic fertilisers and wastes, such as animal slurries/manure from intensive farm enterprise, sewage sludges, poultry litter and industrial waste water treatment plant sludges are, and will continue to be spread on agricultural land and provide beneficial nutrients to crops. However, many of these materials are also potentially polluting if not properly managed and can pose a risk to groundwater and surface water quality.

The risks to groundwater and surface water quality are influenced by:

- The chemical and microbiological content of the waste
- The method, timing and rate of application
- The groundwater vulnerability
- The proximity of a groundwater source (water supply, i.e. Local Authority Supply, Group Water Scheme, Private borehole or spring)
- The groundwater resource (the aquifer underlying the proposed spreadlands)
- The type and state of vegetation
- The weather



Example of part of a groundwater vulnerability map (courtesy of Geological Survey of Ireland)

Table 1 outlines some of the key guidance elements for groundwater protection in relation to landspreading activities. In summary there should be no landspreading over Regionally Important Aquifers where the soil cover is less than 2m, and no spreading over other aquifer classes where the soil cover is less than 1m. The Best Practice Guidance in the document will help one identify and document areas where groundwater is at risk from – vulnerable to – pollution from landspreading activities.

"Landscaping of Organic Waste – Guidance on Groundwater Vulnerability Assessment of Land" Produced by the Environmental Protection Agency, PO Box 3000, Johnstown Castle, County Wexford, Ireland. www.epa.ie ISBN: 1–84095–110–9 Price: €7.00

Table 1: Summary of sampling requirements.

GWPS exists	**Vulnerability**	**Sampling Requirements**
(GWPS Groundwater Protection Scheme)	LOW MEDIUM HIGH	Simple walkover survey to confirm what has been established in the GWPS, i.e., no evidence of outcrop, depth to bedrock information from wells, etc.[1] If walkover survey indicates that the lands do not have sufficient thickness of subsoil (i.e. rock outcrops) then site specific information may be required.
	EXTREME[2]	Regionally Important Aquifers - Prove that 2m depth of soil/subsoil cover exists. Minimum of 1 data point per hectare is required. Locally Important and Poor Aquifers – Prove that 1m depth of soil/subsoil cover exists. Minimum of 1 data point per 5 hectares is required.
GWPS does not exist	**Aquifer Type**	**Sampling Requirements**
	Locally Important / Poor Aquifers	Prove that 1m depth of soil/subsoil cover exists. Minimum of 1 data point per 5 hectares is required. Site investigation points can be based on existing information. New information only required where existing information is insufficient.
	Regionally Important Aquifers	Prove that 2m depth of soil/subsoil cover exists. Minimum of 1 data point per hectare is required. Site investigation points can be based on existing information. New information only required where existing information is insufficient.
Source Protection Areas[3]	**Source Protection Zone**	**Sampling Requirements**
	Outer	A minimum thickness of 3m of subsoil should be demonstrated at a minimum depth to rock data point frequency of one point per hectare.
	Inner	It is not generally acceptable to landspread unless there is no alternative area available and that the area has been defined as having moderate vulnerability (i.e. > 10m of moderate permeability subsoil or > 5m of low permeability subsoil) overlying the aquifer. The depth to rock should be demonstrated at a minimum frequency of one point per hectare.

1. The classification to Low/Medium/High class as part of GWPS indicates that minimum of 3m soil/subsoil depth can be anticipated.
2. To give a rough picture of 'extreme vulnerability' areas we can use: GSI Outcrop data & Tengasc Shallow Rock data.
3. In general landspreading of organic wastes should not be carried out within the source protection area (SPA) of a water supply. However, there are cases where if the subsoil is sufficiently thick it may be deemed acceptable subject to conditions.

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ISSN 0791–2447 © 2005
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Danes see light at end of Irish waste tunnel

Photos: © Kommunekemi a/s

The integrated Danish Waste Management Solution – Kommunekemi.

By Brendan Keane

AN existing facility under expansion at Foynes in Co. Limerick will soon change the way solvent waste generated in Ireland is dispatched from Ireland and disposed of elsewhere.

In September 2004, Irish Bulk Liquid Storage (IBLS) received a licence from the EPA to receive and process waste solvents.

The existing facility has for the last 20 years stored new solvents in bulk tanks prior to distribution by road tankers to the Irish chemical and pharmaceutical industry. The new expanded facility simply operates in reverse. Once the user of the solvent has finished with the material it can be safely re-dispatched to the newly licensed plant at Foynes. Here the material will be carefully analysed to check its composition prior to its transfer into one of two 1,000m³ storage tanks.

Once these tanks have been filled the mixed solvent is pumped out of these vessels into the hold of a waiting ship. These ships are the same as those already delivering the new solvents and are loaded across the same custom designed jetty.

From Foynes the ship departs to Denmark and at the port of Nyberg it is off-loaded into a newly built quay-side facility that can accept up to 10,000 tonnes of solvents at a time.

This large storage facility feeds directly into the integrated Danish Waste Management Solution – Kommunekemi.

In 1974 a far thinking Danish government established the first integrated National Waste Management Solution. Kommunekemi handles all of Denmark's Hazardous Waste. Since its establishment, it has become a centre for excellence in hazardous waste management, and in 1996 it started to receive hazardous waste from Ireland.

But our Danish colleagues don't just safely dispose of this material, they get a beneficial re-use of the material and use its energy value to heat and light the homes of the local community of 25,000 people. While Kommunekemi's three waste incinerators safely turn hazardous materials into carbon dioxide and water vapour they also provide all of the district heating and electricity for the nearby town. This is done by recovering as much of the heat as possible from the burning of the waste and utilising this heat/ energy to benefit the community. Current Irish imports provide all of the heating needs for 2,500 houses and electricity for 1,250 homes – all from waste material that Irish producers need to safely dispose of.

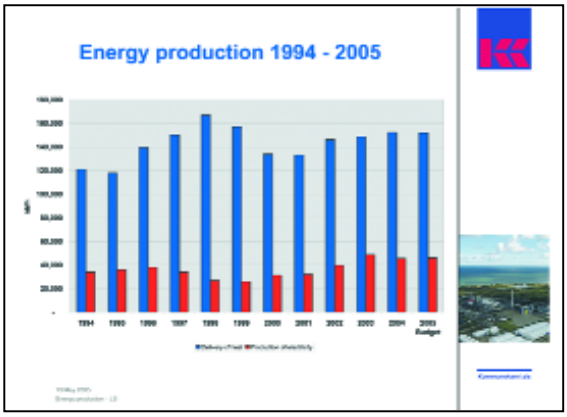
In time it as estimated that the Foynes facility could provide enough material to heat 13,000 houses and electricity for 8,000 – all through the expansion of the already existing facility at the port of Foynes.

As the existing storage tanks of Foynes are already used for distribution of solvent, its re-export through the expanded facility is not expected to significantly change the traffic in the area, especially as it now has access through the newly opened port road which avoids the picturesque town of Foynes. Through the use of state of the art handling systems no solvent laden vapours will be allowed to escape from the operation ensuring that the local community and environment are fully protected. Finally, as the whole operation operates under an EPA licence, it will always operate within strictly defined standards designed to minimise any risk for the environment or community.

IBLS itself has a long history of working safely within the community without incident. This expansion of the facility will operate with the same team of professionals bolstered with an expanded team which will include on-site chemists for testing and checking material prior to arriving on site in road tankers.

So even though our Danish friends get most of the benefit of this 'discarded' material, some benefits will also apply in Ireland. For example:

- Less tanks of material will ply up and down the main Dublin Cork road and while this might only seem to be less congestion, it also means less valuable diesel being used.
- The transport in one large specially designed double hulled vessel from Ireland also reduces the risk on sea voyages in container ships.
- The beneficial re-use of the material in Denmark and transport in bulk ship provides significant financial savings to hard pressed Irish industry in its fight to provide jobs and stay competitive while staying at the forefront of environmental compliance.
- The expansion at Foynes will ensure that valuable jobs are retained in the area while the community prospers from a port with a future.
- The final benefit of Foynes also helps the Irish nation. Last year solvent waste amounted to almost 80% of Ireland's hazardous waste exports. Through expanding an already existing operational facility and applying the right controls via an EPA licence Ireland becomes almost totally self-sufficient. As a consequence there is no need to build and operate another expensive resource similar to that which has taken the Danes over 20 years to get to the level of excellence that it now enjoys with its nearby contented community.



Energy production at the Kommunekemi facility.

Some Facts

- Kommunekemi operates at greater level of efficiency than a standard peat powered generator station.
- The local Nyberg community enjoys the lowest charges in Denmark for heat and electricity.
- Kommunekemi currently processes 150,000 tonnes of waste annually and generates approximately 46.000MWh of power.
- On average 4 tonnes of Irish waste will heat 1 home in Denmark and provide half its electrical need for the whole year.
- Irish industry could save up to 40% of its hazardous waste costs when this facility is operational.
- Increasingly across Europe this type of bulk blending is being used to get hazardous waste ready to use its energy value.

Brendan Keane, Managing Director, Cedar Resource Management Ltd, Cedar House, Greenogue Business Park, Rathcoole, Co. Dublin. Tel: 01– 4010250 Fax: 01– 4010260

Publications of Interest

The New Encyclopaedia of Birds

Edited by Christopher Perrins

Oxford University Press,
www.oup.co.uk

ISBN: 0-19-852506-0

Price: £35.00stg / 2003

What we have here is quite simply the ultimate single volume guide to the planet's birds. After a concise introduction dealing with classification and the evolution and biology special, we are taken on a tour through the dazzling array of creatures that constitute the order Aves. Over the span of six hundred beautifully illustrated pages, each of the worlds 172 families is dealt with in turn, drawing on the knowledge and skills of many of the world's leading ornithologists and bird photographers. Each chapter is sub-divided into headings covering breeding biology, diet, conservation and environment, distribution and form and function, alongside a factfile for each family. Throughout the book, these are interspersed with photo-stories and articles of special interest. Anyone remotely interested in birds should buy this book – your passing interest could quite easily become a lifelong fascination.

Rehabilitation & Restoration of Degraded Forests

By David Lamb & Don Gilmore

IUCN
www.iucn.org

ISBN: 2-8327-0668-8

Price: £12.00stg / 2003

This book aims to inform of the problem of degraded forests and provide approaches for restoration and rehabilitation. Based soundly on the principles of the Convention on Biological Diversity, it uses figures, tables and photographs to compliment the text. Socio-economic and ecological changes are explored in context using a range of worldwide case studies to highlight the theories presented. A very thorough and well presented text.

Change
Adaptation of water resources management to climate change

By Ger Bergkamp, Brett Orlando & Ian Burton

IUCN
www.iucn.org

ISBN: 2-8317-0702-1

Price: £10.50stg / 2003

Global warming and climate change, two phases not often used when discussing water resource management. An area of science and engineering not often considered, or talked about by the general public. As this small but informative book shows, the impact of climate change on the management of our limited water resources has begun to shift. Using colour photographs, clear concise graphs and interesting case studies. The authors show how a changing world requires a new adaptive approach to the problem of how to manage the water resources for an increasing population, while maintaining the balance between our needs and an increasingly unsettled environment.

Energy Law and Sustainable Development

IUCN Environmental policy and Law paper No. 47

Edited by Adrian J Bradbrook & Richard L. Ottinger

IUCN
www.iucn.org

ISBN: 2-8317-0726-9

Price: £15.00stg / 2003

The biggest question in sustainable development is "how to most effectively implement the Kyoto Protocol". This book's aim is to provide some of this much-needed information. To help guide the key members in the energy debate, towards the development of renewable energy sources. By using detailed scientific data and analysis, this complex and detailed book outlines methods of renewable energy production. That could help all nations develop sustainable development. By explaining how the use of energy legislation can influence nations environmental constraints on energy production, and therefore bring about the development of alternative energy technologies.

Complete Irish Wildlife

By Paul Sterry
Introduction by Derek Mooney

HarperCollinsPublishers Ltd
www.collins.co.uk

ISBN: 0 00 717629 5

Price: £14.00stg / 2004

Another title in the Collins range of photo-field guides, this book does an admirable job of presenting the entire spectrum of Irish wildlife in just one volume. The range of species covered is truly impressive including around 650 vertebrates and over 650 plants – indeed, the non-specialist would have to dig pretty deep to find a plant or animal from these shores which is not included here. The quality of the photos is such, that given goods views (in the case of mobile species) identification should always be possible. The choice of plant photos is equally thoughtful. All in all, this would be the perfect companion anyone with a casual interest in natural history and planning a visit to Ireland.

Irish Hedgerows
Networks For Nature

Edited and compiled by David Hickey

Networks for Nature,
PO Box 9184, Churchtown,
Dublin 14.

ISBN: 0-9549060-0-4

Price: €12.50 / 2004

This is a beautifully illustrated and informative guide to the hedgerows which are so symbolic of the Irish countryside. Their history, folklore and importance in terms of biodiversity are all explained. This book illustrates that hedgerows form a vital living network linking habitats that have become fragmented as a result of modern development, particularly since Celtic Tiger and the resultant urban development. We are shown how to plant and manage hedgerows and the ensuing benefits to wildlife in general. Suitable for novice wildlife enthusiasts and experts alike, this publication is a timely reminder of how vital these wildlife corridors really are.

Field Guide to the Bumblebees of Great Britain & Ireland

By Mike Edwards & Martin Jenner

Ocelli Limited
www.ocelli.co.uk

ISBN: 0-9549713-0-2

Price: £9.99stg / 2005

This field guide uses colour photographs and easy to use keys making it simple even for the beginner bumblebee enthusiast to identify species in the field. Each species has it's own page which provides information on habitat, distribution and flight times. The layout means that all information about any particular species can be accessed without having to flick to different sections of the book as is so often the case with field books. While easy to read, this book also provides information on the physiology, habitat and conservation of bumblebees for those with a more in depth interest in these insects.

Climate Change

By Guy Jacques & Herve Le Treut

UNESCO Publishing
www.unesco.org / publishing

ISBN: 92-3-103938-5

Price: €14.50 / 2005

This interesting book should have this sub title: *Everything you wanted to know about Climate Change but were afraid to ask.*

It covers the subject from every possible angle from the climate in the past and how it effected historical views, to the modern era where it focuses on the complex process that are and may have been the causes of climate change. It explains how these processes, once studied, can be used to make models of the complex systems giving useful predictions, which can be used to aid future environmental decisions. Despite being only 139 pages long the book covers a difficult and complex subject well with a stimulating and informative style accessible to the non-specialist.

El Nino
Fact and Fiction

Bruno Voituriez
& Guy Jacques

UNESCO Publishing,
www.unesco.org / publishing

ISBN: 92-3-103649-1

Price: €16.80 / 2000

Water and air, two of the most fundamental components of the planet, are the subjects of this small yet stimulating book. *El Nino Fact and Fiction* seeks to enlighten the reader to the truth behind this most elusive phenomenon. By using clear and precise language, together with colour photographs and diagrams, the book explains that El Nino is neither a "mysterious" force nor the wrath of ancient Aztec gods, but a drastic displacement of weather systems that causes the desert to become a flood and the marsh to turn to dust. El Nino at present still deifies prediction, but as this book shows it is beginning to yield its secrets. Secrets that give us enormous insight into the "climate machine" that is the planet Earth.

Ocean Sciences
Bridging the millennia
A spectrum of historical accounts

Edited by an IOC-FIO panel

UNESCO Publishing and
China Oceanic Press (COP)
www.unesco.org / publishing

ISBN: 92-3-103936-9

Price: €45.00 / 2004

The History of the oceans is a vast and deep subject, as the seas are themselves. But it is also the topic of this volume of works that were presented at the sixth international congress, on the history of oceanography in 1998. The variety of papers presented is extensive, ranging from the lives and achievements of the founders of biological oceanography, to the rise and fall of the tide mill, with special focus on the papers provided by the host country, China. All are carefully written in a style easily understood by the scientist and lay person alike. Overall this volume provides insight and discovery for any reader interested in history or the oceans.

Beyond Tropical Deforestation

Edited by Didier Fabin

UNESCO Publishing / Ciarad
www.unesco.org / publishing
www.cirad.fr

ISBN: 92-3-103941-5

Price: €59.80 / 2004

This is a collaboration of original research papers written by specialists from around the world, including ecologists, forest researchers, geographers and environmental engineers. The contributors cover issues of deforestation, forest cover dynamics and forest development and are separated into sections based on changes in forest cover estimates, the range of human/forest interactions and forest area dynamics in relation to land use and development. New prospects for research are explored, and principles are illustrated using both colour and black & white figures. The topical subject of deforestation is covered in depth, and the range of disciplines and nationalities ensures a well-rounded and balanced approach.

Marine Protected Areas
For Whales, Dolphins and Porpoises

A World Handbook for Cetacean Habitat Conservation

By Erich Hoyt

Earthscan
www.earthscan.co.uk

ISBN: 1-84407-064-6 (s)
ISBN: 1-84407-063-8 (h)

Price: £24.95stg / 2005

As befits a publication by the WDCS this is the definitive handbook to the status and conservation needs of the world's cetaceans. The major part of the book consists of a region by region site gazetteer, listing in detail the measures being taken at marine sanctuaries across the planet. Included in this section are case studies and a comprehensive contact list, making this an invaluable source for students and workers alike.

The first four chapters highlight the conservation strategies, problems and concerns facing the marine environment in general and the 84 known cetacean species in particular. These features combined with superb coloured plates, which include a simple but effective ID guide makes this a most attractive volume.

World Water Actions
Making Water Flow For All

By F. Guerquin, T. Ahmed, M. Hua, T. Ikeda, V. Özbilen & M. Schuttelaar

Earthscan
www.earthscan.co.uk

ISBN: 1-84407-078-6 (h)
ISBN: 1-84407-085-9 (s)

Price: £25.00stg / 2003

This report is a result of an inventory of water actions and implementation of commitments of governments and organisations, from the international to the grassroots level, since the Second World Water Forum in The Hague, the Netherlands, in 2000. It demonstrates how this world water community has progressed in the better use and management of water and water resources. There has been significant progress in creating a more enabling environment for water use and management. Much is happening at the community level.

The book has three major sections. The first Assessing Challenges, Initiating Change, includes topics such as financing water infrastructure and services, and water management. The second section Focusing on Key Areas, Promoting Change, covering water supply and sanitation, water for energy, health and agriculture. The final section, Taking Stock, is a timely reminder that water must be managed. A book to recommend for decision makers.

Strategic Environmental Assessment in Action

By Riki Therivel

Earthscan
www.earthscan.co.uk

ISBN: 1-84407-042-5

Price: £24.95stg / 2004

This book is intended as a manual to help people to set up good strategic environmental assessments. It focuses in particular on the implementation of the EU Directive 2001/42/EC and the United Nations Economic Commission for Europe Protocol. It explores what the strategic actions and SEA are and the benefits and constraints, together with examples. The people who should be involved, How to describe the baseline environment, Different types of alternatives to strategic action, How to predict, evaluate and mitigate impacts. The final chapter revisits the concept of SEA quality and how to assure it, together with how long it takes. A book essential for consultants and planners, especially in local government.

The Burren and the Aran Islands
Exploring the Archaeology

By Carleton Jones

The Collins Press, West Link Park, Doughcloyne, Wilton, Cork.

ISBN: 1-903464-61-7 (h)
ISBN: 1-903464-49-8 (s)

Price: €35.00(h) / €25.00(s) / 2004

One so often reads of the importance of the flora of the Burren but not so about the equal importance of its archaeology. This book gives a fascinating insight into both the Burren and Aran Islands monuments and their people over the past 5,000 to 6,000 years. In his introduction the author has so aptly said "When we visit a megalithic tomb we can touch the same stones that were quarried, split, heaved and hammered into place by other hands long before our time and it is well to remember these monuments were built by individuals. In their time they were as real as we are today. The descriptions, photographs and drawings of the artefacts excavated make it a superb guide to two of Ireland's most precious areas.

Books reviewed by: Ann-Marie Barnard, Matt Murphy, Riann Sheehy, Ben Tinker, Fergal Twomey, Jessica Wiegand, Julian Wyllie

The Ten Steps of Catching Specimen Fish

IN 1976 The Irish Specimen Fish Committee decided to recognise the achievement of an angler who has authenticated specimen claims for 10 different species of fish. Bill Ryan, who describes himself as an "ordinary angler", tells us how he achieved this specimen angling milestone.

I am an ordinary angler who has had extraordinarily good fortune. Any angler who puts some thought and time into the sport will succeed! Most of the information one needs is in the Irish Specimen Fish Committee Reports which contain a mine of information. I have had many great adventures on my quest and the journey has been an enjoyable one. I hope you have as much fund in your angling endeavours as I have had so far and always be mindful of the words of Izaak Walton, "Tis not all of fishing to fish".

1958 – the beginning

Growing up by the sea in Kilkee, West Clare I was destined to be bitten by the sea angling bug. After all the Atlantic was outside the hall door and sometimes in winter, inside as well! As a young lad growing up in the sixties I watched as the fishermen in summer returned with their currachs laden with mackerel which they had caught on hand lines and mackerel spinners – no Ugly Sticks, multiplier reels and feathers then! Great shoals of mackerel would boil in the bay in summer and my late father would take us fishing with mackerel spinners, light spinning rods and fixed spool reels. I still get the same thrill catching mackerel today on light gear as I did then.

One day, my father, who was a very successful salmon angler, mentioned salmon bass! When the salmon were not running he fished for bass on the local beach in Kilkee. Eight years of age, armed with a hand line, and lugworm mounted on hooks dangling from a brass paternoster I threw it into the surf at the east end of Kilkee and caught a 5 lbs. bass! My father helped me land it and he was rewarded by being spiked by the bass! That was the start of my great adventure!

July 1978: bass (10 lbs 1 oz)
Brandon Bay, Co. Kerry.

I caught many bass from the West Clare beaches of Kilkee, Doughmore and The White Strand during the sixties before I heard of a specimen bass and the magic weight of 10 lbs. By 1968 I had moved to Dublin to work, but for the next ten years I dragged my wife Jacinta to Castlegregory in Kerry every autumn, to fish the storm beaches for bass. I had heard of the great bass fishing exploits of Inland Fisheries Trust staff, namely the late Des Brennan and his angling partner, the late Kevin Linnane, and was determined to get some of the action! Though I caught many good bass in Kerry and my wife had read a library of books, the ten pounder eluded me! Then in the summer of 1978 Jacinta announced that we were going to Kerry in the summer for a change.

On the first day of this summer holiday in Kerry, the sun was shining, Brandon Bay was flat from The Magharees to Brandon Pier and I despaired. Sometime during the day I managed to dig lug and when the question was asked that evening, "would you like to go fishing for a while?" I jumped at the opportunity. More in hope than anything else I tried opposite the Grotto at the Fahamore end of Brandon Bay. Putting eight lug on a 6/0 hook I cast out and waited.

I could see the bottom for yards out and there wasn't a hint of a wave. "Autumn surf where are you now?" I thought. Suddenly the rod buckled and I was into a good fish.

After a decent scrap I beached my best bass ever which I estimated to be about 9 lbs. An angler fishing nearby thought it was bigger and told me to get it weighed quickly. I went to a shop in Castlegregory and had the weight confirmed at 10 lbs 1 oz. My first specimen, a bass, out of the blue!

Lesson 1: Specimen fish can be caught in all the wrong conditions!

Photo: © Irish Specimen Fish 2004

Specimen trigger fish of 3.28 lbs taken by Bill Ryan in September 2004

October 1978: flounder (2 lbs 10.75 ozs)
Kilkee Bay, Co. Clare.

Flounder fishing can be very good at the western end of Kilkee Bay in September and October. It was the day after a wedding and I was suffering badly. My younger brothers borrowed my fishing gear and my bait and went fishing. Later in the day I decided to see how they were doing. They had a few nice flounder. "Have a cast yourself", one of them offered. I did not feel too good but had a go anyway. It was not long before the rod tip nodded vigorously and the line dropped before tightening up again. I struck and was into a good flounder which planed its way along the bottom in zig zag fashion before being beached! It looked good and weighed in at 2 lbs 10.75 ozs. Specimen number two and two in one year!

Lesson 2: Never pass up a chance to fish!

July 1979: painted ray (11 lbs 8 oz)
Doughmore Beach north of Doonbeg, Co. Clare.

Lesson 3: Set targets and experiment.

January 1981: lesser spotted dogfish (3.26 lbs)
Doughmore, Co. Clare.

Winter sea fishing was unheard of in Kilkee when I was growing up and when I came to Dublin in 1968 I left all my fishing gear at home in Clare. I was then introduced to winter Cod fishing and my fishing season was extended to cover the whole year! Back to Clare late January I decided to fish Doughmore in winter.

Frozen mackerel was all I had and again out of the blue I catch a lesser spotted dogfish which looks a bit bigger than usual. It weighed in at 3.26 lbs.

Lesson 4: Fish never look at a calendar!

August 1981: wrasse (5.42 lbs)
Baltard, near Doonbeg, Co .Clare.

Lesson 5: Follow up good tips and be prepared to explore!

April 1984: twaite shad (2 lbs)
St. Mullins on the River Barrow

Lesson 6: Rest up sometimes and soak in the scenery!

June 1984: Smoothound (8.27 lbs)
Tinnebearna, Co. Wexford

Lesson 7: If you are not a distance caster, a big bait in close sometimes works!

July 1985: Homelyn Ray (5 lbs 9 ozs)
Killoughter, Co. Wicklow

My friends and I had taken a number of good thornback ray from the shore at Killoughter, Co. Wicklow. One night I had a ray which looked different! I had it checked out at the Central Fisheries Board by biologist Dr. Paddy Fitzmaurice and it turned out to be a specimen Homelyn Ray of 5 lbs 9 ozs.

Lesson 8: Learn to identify your fish – if its looks odd, consult an expert!

August 1995: trigger fish (4.23 lbs)
The Bridges of Ross, Co. Clare

Lesson 9: You never know what might turn up – be alert!

August 1996: grey mullet (5.06 lbs)
River Liffey, Dublin.

How I tried and tried to catch a specimen grey mullet! I have chased this fish all over the country from Clare to Lough Furnace in Co. Mayo, to Cork and Kerry and finally caught it at a train station in Dublin!

I had to bring my daughter Jennifer to Dublin one day and, like all anglers, as I neared Heuston Station, I just had to check the Liffey! There, under the wall, were two huge grey mullet cruising idly by. As I travelled everywhere with the mullet gear and fresh white bread I was armed in a minute! I placed some bread on the surface ahead of my target and tackled up! As the mullet were feeding on my offerings I introduced my bread with the sting and one got stung! What a fight! It tried to go under the bridge and when I turned it, it skimmed the Liffey wall where line snagging weeds and briars were growing out. Finally I had it on the surface and ready for the drop net. I got my daughter to hold the drop net just under the surface as I steered the mullet over it. "Pull", I shouted, to be heard all over the city and we had it safely in the net! A specimen grey mullet at 5.06 lbs. Ten different specimens after an 18-year quest.

Lesson 10: Perseverance pays off!

In achieving my goal of ten different Specimen Species I acknowledge the support and patience of my family and friends and a special thanks to the staff of the Central Fisheries Board for all their help, advice and tips and the Irish Specimen Fish Committee for setting targets for us anglers!

My next target 50 specimens. I have 5 to go!

Bill Ryan, 9th December 2004

From the Irish Specimen Fish 2004 – Annual Report of The Irish Specimen Fish Committee. Unfortunately room does not allow us to reproduce Bill Ryan's adventures for all ten specimen fish. His full story is available in the Annual Report which is available on the web www.irish-trophy-fish.com.

ISBN: 1-87-049296-X

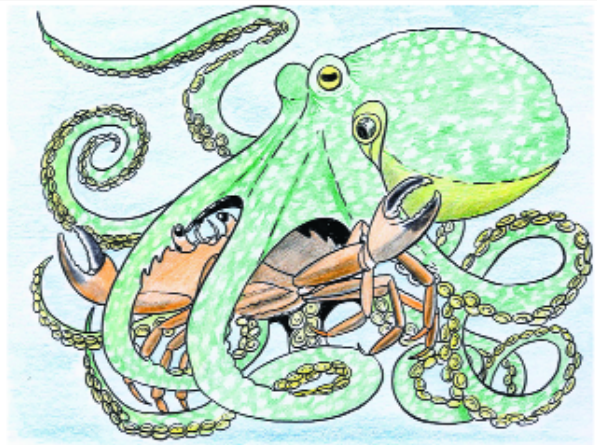
Junior Pages Junior Pages

The Marvellous Molluscs . . .

The molluscs are a very successful class of animal, with some 60,000 living species and at least 35,000 fossil species. They include, slugs and snails on land and winkles, whelks, oysters, scallops, squid and octopi in the sea.

Molluscs are invertebrates – which means that they have no skeleton or backbone. They do however have a single muscular foot which, in snails and slugs is used for sliding and gripping and in octopi and squid for far more complex tasks, including mating and catching prey.

Of all the invertebrates, octopi and squid are the most intelligent, with brains capable of moving their eight arms, searching out prey, darting after it at high speed by "jet propulsion" or manipulating their skin colour and texture to blend in with their surroundings completely.



Stop Press

World Ocean Festival

Tramore – June 8th

World Oceans Day will be celebrated by the Irish Wildlife Trust and T-Bay Surf and Wildlife Centre in association with the Waterford Chamber of Commerce at Tramore, Co. Waterford over the weekend of June 8th this year. This is a real fun event of activities, exhibitions and demonstrations. Check it out on:

http://www.worldoceansfestival.com/festival_wodsay.htm

Invasion of the Molluscs . . ?

The idea that octopi and squid might have evolved to be even more intelligent than humans, had they lived on other worlds, might have been the inspiration for H.G. Wells' famous sci-fi novel "The War of the Worlds", which has just been filmed and is due for release this summer.

H.G. Wells was himself a student of biology and suggested what a race of Martian super-molluscs might have been able to do had they thought of a way to overcome the problem of not having a rigid skeleton with which to move about quickly on land.

Wells' mighty Martian molluscs built themselves three-legged "fighting machines" which they used to Victorian England. But even these marvellous molluscs failed to take into account the tiny germs they might encounter on Earth and were all killed by nothing more deadly than the common cold.

Captain Cockle's Log

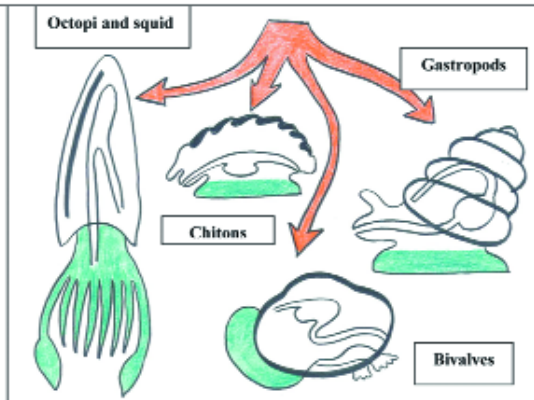
Welcome aboard shipmates! Together, we'll be taking a look at the world's greatest natural resource -- the sea!

Words & pictures by John Joyce
www.cockle.com © John Joyce 2005

Murderous Molluscs

The blue-ringed octopus is no bigger than a golf ball, but has poisonous saliva capable of killing a human being in minutes. The blue rings only glow when it is about to attack. Luckily for us in Ireland, it is only found in Australia.

Other deadly natives of tropical waters are the beautifully coloured cone shells. These marine snails prowl about coral reefs in search of small fish to eat. Their poison, which can be injected with harpoon-like teeth, acts on the nervous system to cause paralysis and even death.



Eye – Eye . . .

If you think that wearing glasses is a problem, spare a thought for the scallop, whose shell is lined with dozens of tiny simple "eyes".

These are very useful for avoiding predators such as starfish, which scallops evade by snapping their shells and flapping off like a pair of flying false teeth!

The Molluscs' Family Tree . . .

Biologists think that modern molluscs probably evolved from a simple worm-like creature into four distinct groups, each with a distinctive muscular foot (shown in green above).

These groups are the Chitons (or coat of mail shells), the Gastropods (stomach feet!) or snails, whelks and winkles, the Bivalves (two shells) including oysters, clams and scallops, and the most advanced group the Cephalopods (head-feet) or octopi and squid.

Check out these websites:

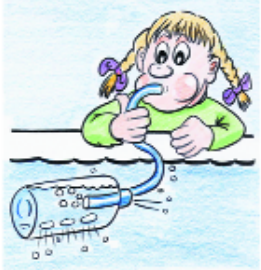
www.fortuncity.com/emachines/e11/86/cephpod.html

www.eyedesignbook.com/ch3/eyech3-b.html

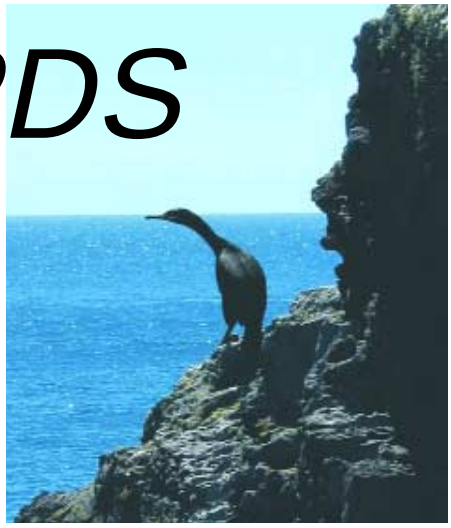
www.didyouknow.cd/animals/octopus.htm

How a submarine works

Submarines surface by pumping air into "ballast tanks" to increase their buoyancy.
Fill a plastic drinks bottle with water and put it carefully in a bowl of water. This is like a submarine with its ballast tanks flooded and the bottle sinks.
Put a piece of plastic tube into the end of the bottle and gently blow in air. This is like a submarine filling its tanks with air. The water is pushed out and the sub surfaces.



SEABIRDS



By Declan Murphy

IRELAND is very fortunate in having a long and varied coastline, which combined with the rich feeding grounds of our inshore waters provide for a variety of seabirds to breed and rear their young. The waters around Ireland are fed by the warm Atlantic Gulf Stream which brings nutrients across the Atlantic and these provide the building blocks for a complex food chain upon which our seabirds feed.

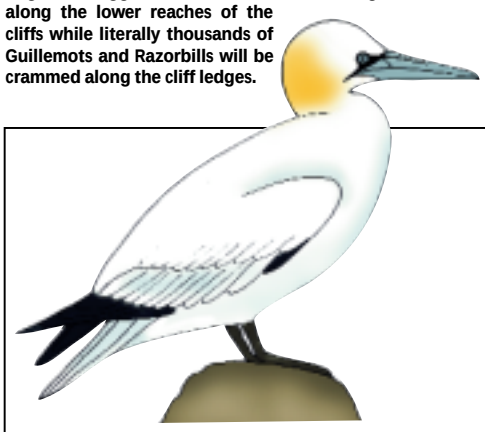
One of the highlights of any birdwatchers year is a visit to one of the many seabird colonies around the coast. Some of the offshore colonies are easily accessible by ferry such as Skellig Michael off Co. Kerry, Great Saltee off Co. Wexford and Irelands Eye off Co. Dublin. Other colonies such as the Cliffs of Moher in Co. Clare are easily viewed from the mainland.

The noise (and smell!) at these colonies is often amazing, with many thousands of birds all nesting within a few feet of each other. The first birds seen will most likely be Gulls especially the Kittewake, which nest in large colonies on cliff ledges. These are amongst the most vocal of our seabirds and their name comes from the sound of their calls – Kit-i-wake! Other Gulls such as Herring and Great Black Backed can be seen patrolling the cliffs ready to snatch an unguarded egg or chick. Cormorants and Shags can be seen along the lower reaches of the cliffs while literally thousands of Guillemots and Razorbills will be crammed along the cliff ledges.

Bird Quiz

Where do Puffins make their nests?

The first five correct answers drawn will each receive a copy of *'The Usborne Spotter's Guide to Birds'* Answers on a postcard to *'Sherkin Comment'*, Sherkin Island Marine Station, Sherkin Island, Co. Cork.



The Gannet

The Gannet is our largest and most impressive seabird with a massive six foot wingspan. They are striking birds with a pure white body and jet black wingtips. During the breeding season they develop a light buff colour on their heads. They have long dagger like bills which are off-white in colour.

Their method of feeding is equally impressive – scanning the sea below them for fish, they will suddenly fold their wings and plunge like an arrow into the sea. They often do this from a height of up to 30 metres. By plunging from such heights they are able to catch fish at a depth of several metres. To protect them from the shock of the impact their foreheads are specially reinforced with bone while their dagger like bill helps to streamline their bodies so as to lessen the shock. They feed chiefly on Herring and Mackerel and also sprat and sand-eel.

Gannets like to nest in large colonies called Gannetries. Some of these can be enormous – the Gannetry on the Skelligs off Co. Kerry is estimated to have almost 30,000 pairs of Gannets. It is amongst the top five most important Gannetries in the world. On Great Saltee off Co. Wexford you can get quite close to the Gannets and watch them as they go about their business of raising their broods.

Gannets build a substantial nest consisting mostly of seaweed and often adorned with bits of 'rubbish' such as plastic, rope and whatever else they find floating in the sea around the colony. They lay a single egg which they incubate for 44 days. Both parents take turns to incubate the egg under their webbed feet. The chick leaves the nest after 90 days whereupon it learns to fish for itself.

The Puffin

The Puffin is one our most colourful seabirds with its huge multicoloured bill giving it a clown-like appearance. Like other members of the Auk family (Razorbills and Guillemots) it is black above and white below. However, its distinctive bill quickly separates it from other auks, even when seen at a distance. Puffins use their colourful bills during their elaborate courtship displays and can sometimes be seen on the cliff tops bowing and shaking their bills at each other.

Unlike other auks which nest on cliff ledges, Puffins prefer to nest underground, usually in a disused rabbit burrow. Because of this Puffins can usually be seen on the grassy slopes on the cliff tops, where there are frequently many rabbit burrows, and not lower down on the cliff faces. The single egg is incubated by both parents for 40 days and the chick remains in the burrow for a further 40 days until it flies down to the sea and learns to fend for itself. The adult Puffins can be seen throughout the breeding season bringing fish to their young in the burrows. They can carry several fish at the one time in their large bills and feed mainly on sand-eels, sprats and young herring.

Puffins can be seen on many of our offshore islands such as Great Saltee and The Skelligs. They can also be seen quite well on the Cliffs of Moher.

Sketches: © Audrey Murphy

Learn about birds with BirdWatch Ireland

Migration Leaflet

Learn about the important phenomena of migration – the movement of birds between different areas, at different seasons, in order to increase their chances of survival. It explains why birds migrate, when they migrate, which birds and routes taken.:

Download this leaflet from the Learn about Birds section on BirdWatch Irelands website at www.birdwatchireland.ie

Learn how to identify the birds in your garden with our **Free Garden Bird Charts**. Send a SAE to: *BirdWatch Ireland, Rockingham House, Newcastle, Co. Wicklow.*

BirdWatch Ireland has over 10,000 members and has branches throughout the country which organise events and outings in your area. Why not get your school to join? Write to us or visit our website for details: www.birdwatchireland.ie

BirdWatch Ireland has two educational web sites, catering for learning about birds in schools.

- Visit the Migration web site to learn about the fascination of bird migration
- Visit the Working with Birds web site to learn about watching and feeding birds

Simply go to **www.birdwatchireland.ie** and go to the 'learn about birds' section

BirdWatch Ireland, Rockingham House, Newcastle, Co. Wicklow. Tel: 01-2819878 Fax: 01-2819763 Email: info@birdwatchireland.org

Website: www.birdwatchireland.ie

Snappy Puzzle

Edible Crab

Cancer pagurus

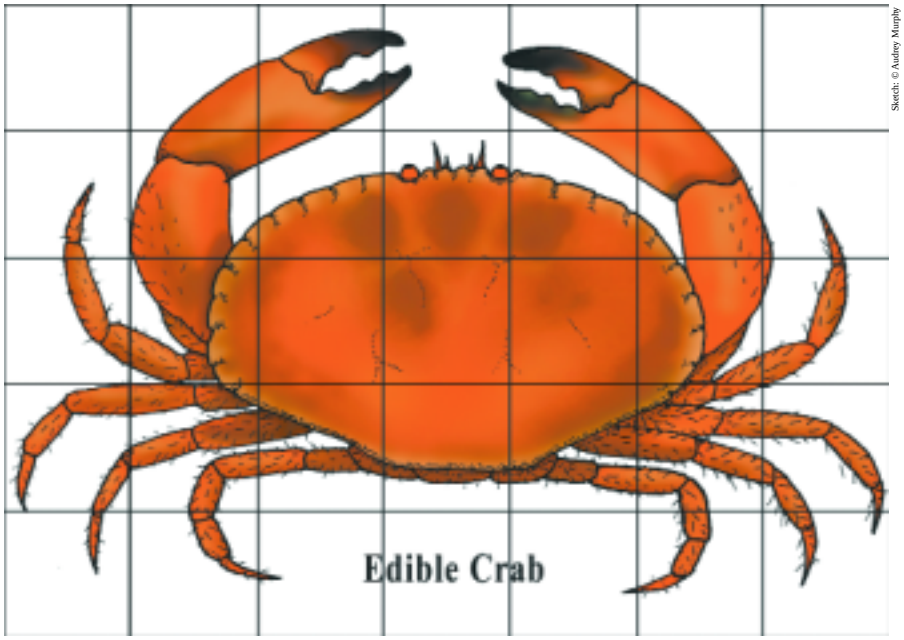
Portán dearg

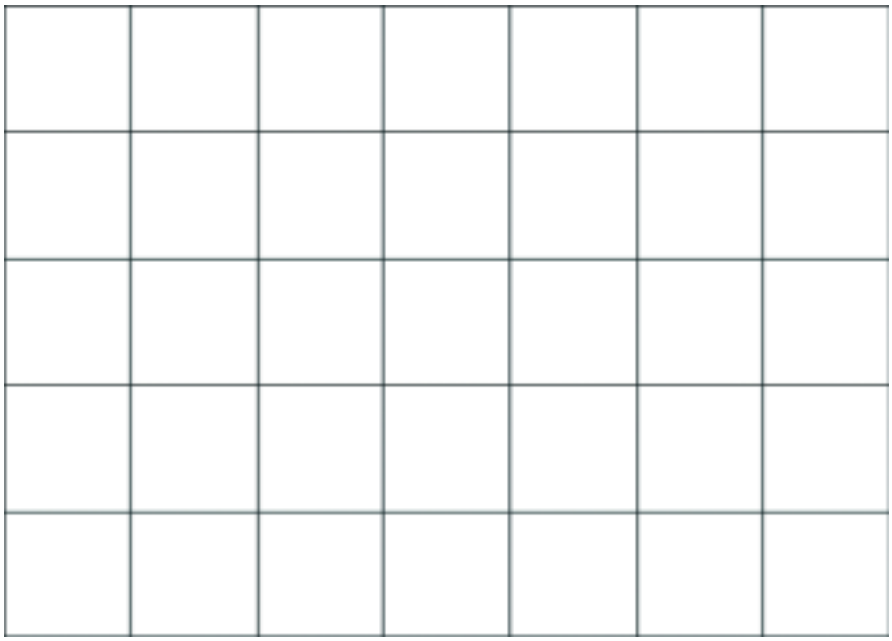
THE edible crab is one of the largest crabs found around our coast. It's shell with a pie-crust edge and black tipped pincers make it easy to recognise. Its two pincers are very powerful but the creature often pretends to be dead to avoid being captured. There are 8 legs used for walking, which have hairs on them. Some edible crabs have been known to live over 20 years.
Colour: Reddish brown with black tipped pincers.
Size: Usually up to 15cm but can reach sizes of over 25cm.
Habitat: In rocky cracks and crevices and mud from the lower shore to deep waters.
Diet: Other crabs, fish, shrimps and starfish.

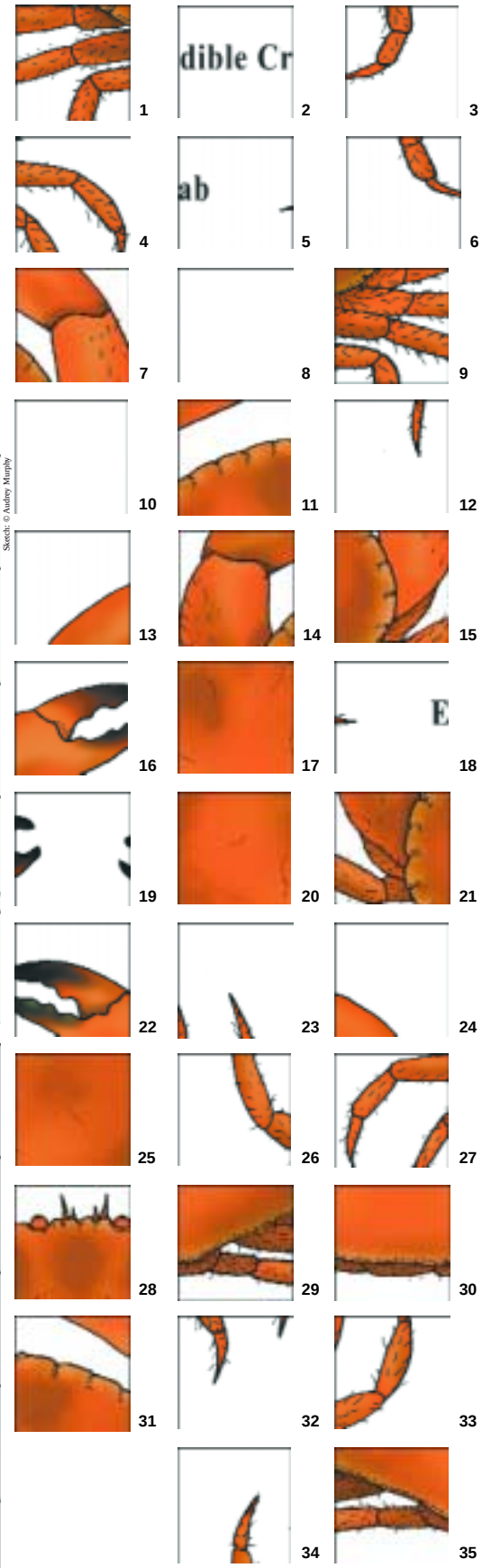
Here you have a chance to make your own jigsaw! You can cut out the pieces (make sure you have permission to use the scissors) and place each piece in its proper box.

If you don't want to cut out the pieces then you could place the appropriate piece number in its box. The first number is in place to start you off.

Or if you feel like being creative draw the picture into the box square by square and then colour it in! ***Answers on page ??***







NATURE ACTIVITIES

"Where does the water in lakes and rivers come from?"
"How strong are ants?" "Do fallen trees serve a purpose?"

THESE are some of the questions that you might expect to hear in a classroom or during a trip through a forest. Instead of answering them directly, the handbook ***A Day of Adventure in the Forest – Environmental Activities for Protected Areas*** offers suggestions for activities to develop guided excursions into forests, protected areas and other natural spaces, and encourages participants to discover the answers for themselves by experiencing nature using all their senses.

The handbook is designed to support and promote new and creative activities related to environmental education within the protected areas of Panama, Central America. Though it presents various alternatives and suggestions for guided excursions within Panama's forests, these can be easily adapted for many different situations.

The handbook has the following objectives:

- ❑ To share values
- ❑ To generate happiness about and interest in the forest
- ❑ To promote admiration for the forest
- ❑ To broaden consciousness and awareness about life
- ❑ To encourage relationships with the friends of the forest
- ❑ To pass on knowledge about forest ecology
- ❑ To create a desire to get to know the forest
- ❑ To promote behavioural changes
- ❑ To highlight the job of nature guide
- ❑ To present forest sustainability as a model

On the right is an activity adapted for the environment in a rockpool...

The handbook is available, free of charge plus postage & packing from IUCN Publications – www.iucn.org/bookstore ISBN: 9962-8806-0-2

EVERYONE DEPENDS ON ONE ANOTHER

Contents: To experience the interdependence of all living things in the rockpool.

Objective: to recognise that living organisms are interrelated and depend on each other.

Type of activity: thoughtful

No. of participants: maximum 20 people

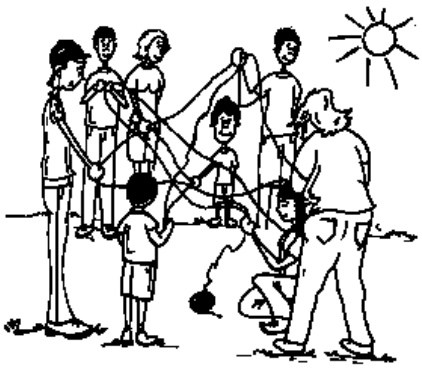
Age: 7 years and older

Time limit: minimum 15 minutes

Materials: postcards of animals and plants. Cord or wool string

Preparation: not applicable

Weather conditions: not applicable



Sketch: "A Day of Adventure in the Forest"

DEVELOPMENT:

- ❑ Distribute the postcards of marine animals or plants.
- ❑ Everyone forms a circle and each person assumes the role of the animal/plant shown on his postcard.
- ❑ The guide, who should act as the rockpool, using the corresponding postcard, joins the circle with a ball of woollen string in hand, and begins with a question, "Who provides shelter under which animals live?" You, as the rockpool, hold one end of the string in one hand and throw the rest to the person who acts as the seaweed.
- ❑ Now it is a question of finding out who lives under the seaweed. It could be the blenny, and the string is thrown to that person. The string continues and continues until all the animals are united by the string and have formed a web.
- ❑ Each time an animal or plant is added to the web that has formed, the string is lifted. Similarly, when a species has been eaten, that person must stoop. This demonstrates which animals are interconnected and also which animals eat how many other animals and what kind. For example, if the dogwhelk eats barnacles, the barnacle population decreases; and when there are few barnacles, the dogwhelk population decreases and the number of barnacles increases because they are not being eaten by the dogwhelk.

SUGGESTIONS AND POSSIBILITIES FOR FURTHER DEVELOPMENT:

- ❑ Obviously, the game can be played using other species of flora and fauna such as micro-organisms living in the soil.
- ❑ The guide must imagine the web before beginning the game in order to guarantee the logical sequence.
- ❑ If there is a species that could cease to exist in the rockpool, such as the seaweed that provides shelter and food, the player lets go of the string and the web disintegrates.
- ❑ What happens if the rockpool dries out?
- ❑ This activity is ideal as a follow-up after an excursion to the seaside.
- ❑ The interdependences are not limited to 'eat or be eaten'. The game can be played taking into account other aspects such as:
  - **The habitat:** the hermit crab living in the empty dogwhelk shell.
  - **Parasitism:** barnacles living on limpet shells; sponge living on the backs of crabs.
  - **Other relationships:** periwinkles preserving themselves from water loss by closing up; seaweeds that can withstand drying out.

EXAMPLE OF INTERDEPENDENCE IN A ROCKPOOL (for a group of eleven people):

Postcards/drawings needed: *rockpool, seaweed, blenny, crab, plankton, mussels, starfish, barnacles, dogwhelk, hermit crab, limpet.*

ROCKPOOL ➦

- ➥ **Seaweed:** Seaweed grows in rockpool providing shelter and food for animals.
- ➥ **Blenny:** Blenny lives under seaweed.
- ➥ **Crab:** Crab eats blenny.
- ➥ **Plankton:** Crab produces babies which is part of plankton in the water.
- ➥ **Mussel:** Mussel feed on plankton.
- ➥ **Starfish:** Starfish eats mussel.
- ➥ **Crab:** Crab attacks starfish and eats arm.
- ➥ **Starfish:** Starfish arm sends particles into water.
- ➥ **Barnacles:** Barnacles eat particles.
- ➥ **Dogwhelk:** Dogwhelks eats barnacles.
- ➥ **Hermit Crab:** Empty dogwhelk shell provides home for hermit crab.
- ➥ **Crab:** Hermit crab kills small crab.
- ➥ **Blenny:** Blenny fishes on crab meat.
- ➥ **Barnacles:** Barnacles filter feed on blenny's eggs.
- ➥ **Limpet:** Barnacles settle on limpets.
- ➥ **Seaweed:** Limpets lives on large seaweed.

This is a very limited example of some of the interdependence that exists in a rockpool. There are many other plants and animals playing an active role in the life of the rockpool. Think of other animals, plants or aspects that can be taken into account.

Gold President Awards 2005

Remarks by President Mary McAleese at the Presentation of the Gold President's Awards – Gaisce, Dublin Castle. Tuesday, 22nd February 2005.

Dia dhíbh go léir tráthnóna. Tá mé iontach sásta bheith anseo libh ar an ócáid speisialta seo agus ba mhaith liom mo bhuíochas a chur in iúl díbh as an fáilte fíorchaoin.

It is good to be here with you all this afternoon at what is a double celebration – the presentation of Gold Awards to well-deserving young women and men and also the twentieth year of the Gaisce awards. Last year the awards attracted a record eleven and a half thousand young people and this year we hope that record will be matched and, better still, beaten.

I can think of few if any of my functions as President that give me as much pleasure as learning about the experiences of the many, many young people who undertake either a Gold, Silver or Bronze Gaisce challenge. That challenge involves a journey of self-discovery, a journey which reveals so much about yourself to yourself and others. I think you'll agree that Brendan Kennelly put it well when he presented Silver Gaisce Awards a few years ago. He said that 'you are not comparing yourself with anyone; you are not competing with anyone; what you are actually doing is creating yourself.'

Gaisce, the President's Award, is the best of pursuits for young people who seek adventure that is matched with a wish to contribute something to society. The young people in this room, you the award recipients, have set for yourselves demanding challenges, tough tests that have stretched you to your emotional, intellectual and physical limits and you haven't just scraped a pass in those tests, you have done so with flying colours. No-one can now doubt that you have those most important of skills to take you through life – perseverance, self-discipline, leadership ability and, most importantly, caring skills. These are things that no-one else can give you nor can money buy. But they are hugely important gifts for a decent civic society. A decent society does not happen by accident. People have to make it happen and keep on making it happen day in and day out. The more people committing to these awards, the better the future we all have to look forward to. You have challenged yourselves to achieve personal excellence. You have challenged yourselves physically and mentally. But you have also challenged yourselves to contribute in turn to the betterment of the community.

Gathered here are people who have engaged in some wonderful pursuits – one worked as a volunteer for more than a year with the Alzheimer Society of Ireland; another set up a folk group in Cashel and then undertook a 90km expedition in France; another helped in a Romanian orphanage and then went to India as a lay missioner. One young man cycled through the Pyrenees to raise funds for the National Council for the Blind of Ireland, another who holds another Gold – that one in the World Special Olympics – hiked 80km from Killarney to Bantry and raised thousands for charity in the process. And there are many, many more stories that have lifted my heart and make me feel privileged to be amongst such a fine group of young people – not one of who was

Lt. Andrew Shinnick from Fermoy, Co. Cork, receiving his Award from President McAleese.

John Murray from Ballinhassig, Co. Cork, receiving his Award from President McAleese.

under any compulsion to undertake the President's Award but who volunteered themselves to be tried and tested.

You are part of a long established vibrant spirit of adventure and discovery amongst the people of Ireland. Our history is full of inspiring people – some more famous than others. One lesser recounted story and a favourite of mine is about the Old Countess of Desmond, who is reported to have travelled to London in 1604 at the age of 140, pushing her ninety-year-old daughter in a cart, to petition James I for the return of her home. Now there's perseverance! Or the feat of the young Ulster princes, O'Neill and O'Donnell, escaping from this very Castle in the depths of a vicious winter. The spirit of Tom Crean and Ernest Shackleton, too, lives on, encouraging a new generation to goals of physical effort and mental stamina.

From those and so many other inspirational achievements through the past, new generations of young people have learned the complementary lessons of self-reliance and co-operation. The ability to plan and execute a task requires enterprise and imagination. It also demands the flexibility to respond to a challenge while recognising the needs and strengths of others. Leadership and the moral fibre to take decisions and accept the consequences are the products of reflection on personal performance, acceptance of failings, learning about and building on our strengths.

It is often said that you should test your friends before you need them. The young men and women in this room have, without

Damien O'Donovan from Bantry, Co. Cork, with his PAL, Robert Shannon receiving his Award from President McAleese.

Photos: © Gaisce

any compulsion, submitted themselves to the toughest of tests. They have triumphed and their investment in the President's Awards has been a huge investment in tomorrow's Ireland. These are the backbone of family, community, workplace, society – young people who are transcending life's ups and downs with a spirit of "can do".

Today these 67 admirable young men and women, each with an utterly unique story to tell, will receive the highest accolade this country offers to any citizen – the President's Gold Award. When you wear the pin, when you write of it on your CVs, others will know the calibre of person they are dealing with – for you went out and deliberately sought life's challenges before they tripped you up – you made yourselves uncomfortable, set yourselves deadlines, pushed yourselves to the limit. You earned the right to be here.

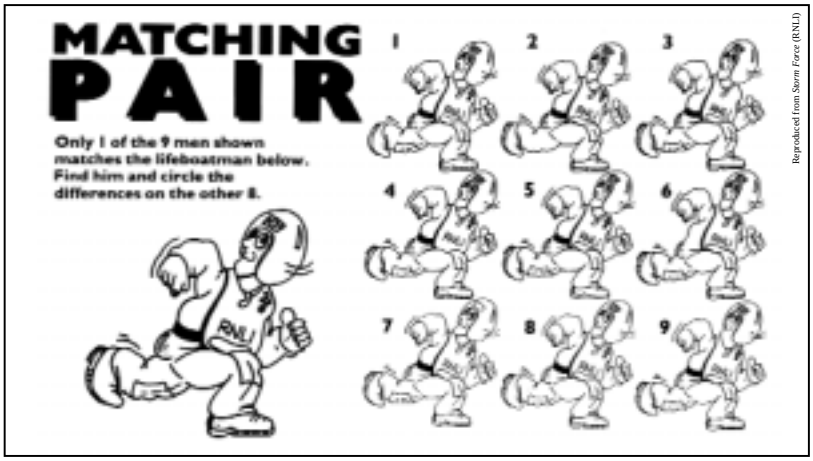
Gaisce would not have reached its very high standards without a huge support structure which embraces sponsors, fundraisers, schools, families, employers, the remarkable President's Award Leaders, teachers, youth leaders, Gardai and designated persons in third-level colleges and centres like Activity Ireland. I would like to thank them and everyone who has helped to make this great adventure possible for so many.

The President's Award is very much a team effort but particular thanks are due to Ned Sullivan, Chairman of the Awards, the Council, and the Award Staff team so ably led by John Murphy. We all owe a particular debt to Paschal Taggart who has been instrumental in supporting the development of the award in Northern Ireland.

Looking at the enthusiasm and dedication of this year's Gold Award recipients before me, it is fair to say that the generosity and faith demonstrated by everyone associated with the Awards has been truly repaid. The future is in good hands. We are incredibly proud of you and full of faith in you.

Comhghairdeas libh arís inniu. Go raibh míle maith agaibh go léir.

For further information about the awards contact Mr. John Murphy, Chief Executive, The President's Award – Gaisce, Dublin Castle, Dublin 2. Tel: 01–4758746 Email@p-award.net or Website: www.p-award.net



Reproduced from *Storm Force* (RNLI)

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Tel: (01) 2845050 Fax: (01) 2845052 Email: info@rnli.org.uk Web: www.rnli.org.uk

Answer from Snappy Puzzle on page 28:

10	3	16	19	22	24	8
14	4	11	28	31	7	23
26	21	20	17	25	15	33
27	1	35	30	29	9	4
12	6	18	2	5	3	32

Answer from RNLI puzzle
Matching Pair: No. 8

Sole Benedictine

Photo: © BIM

A dish for special times, sophisticated but simple.

Ingredients

- 8 medium fillets lemon sole
- 55g/2ozs hazelnuts
- 55g/2ozs butter
- 2 tablespoons Benedictine or liqueur/liquor of choice
- 2 tablespoons lemon juice
- 2 tablespoons dill or herb of choice
- Salt and freshly milled pepper

Method

- Roast hazelnuts in pan – remove.
- Melt butter, add liqueur/liquor, lemon juice, seasoning and herbs.
- Add fish and hazelnuts, cover and cook for 8–10 minutes.
- Spoon juices gently over fish occasionally and serve with sprinkling of dill.

** You can substitute plaice, brill, megrim, black sole.*

Serves 4.

BIM
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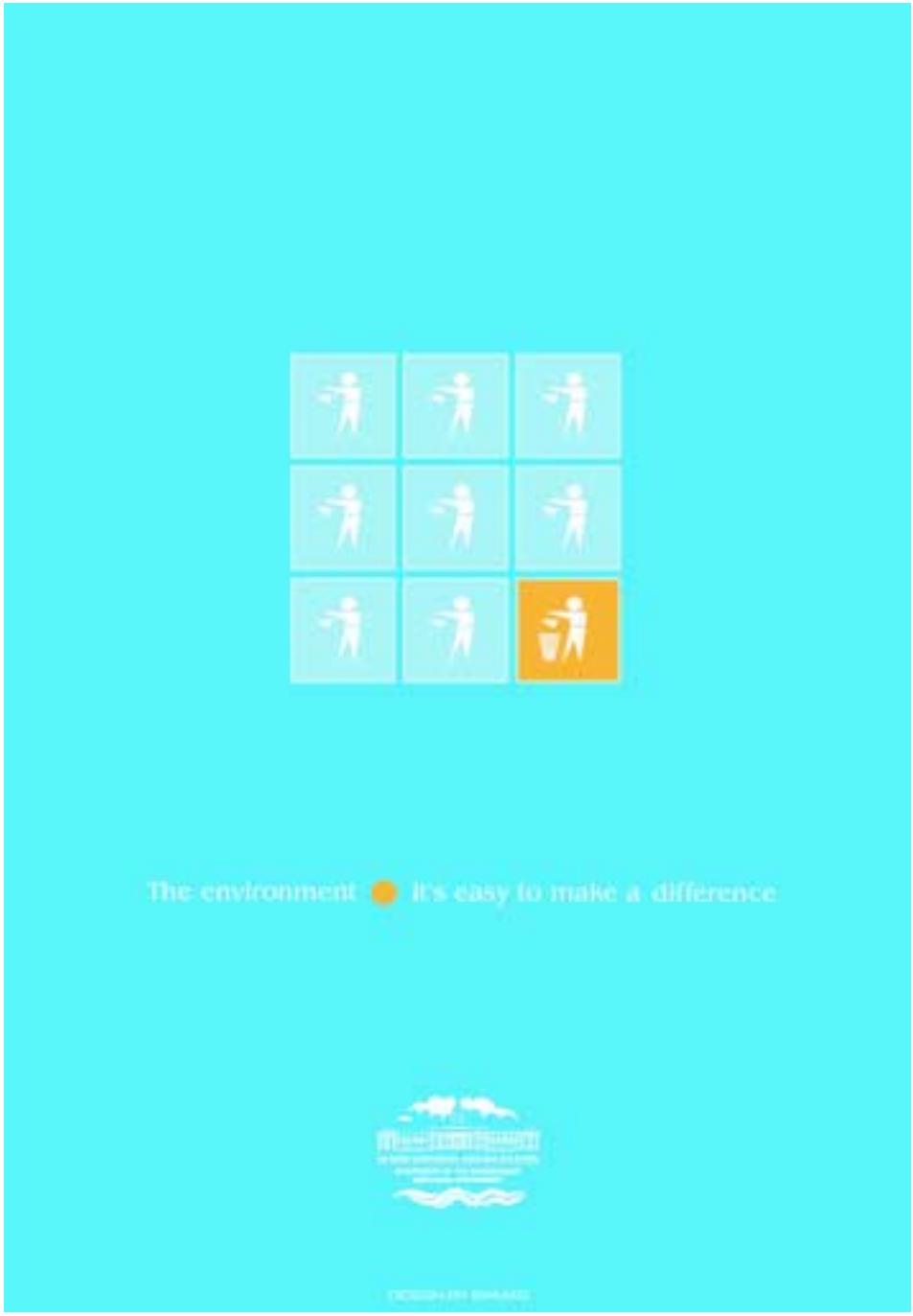
Irish Sea Fisheries Board



Trusting Science

By Michael Ludwig

DO you believe statements made by scientists? A growing number of people no longer trust scientific results. Apparently scientific credibility is in trouble and it is getting worse. This problem seems to be related to expectation and the certainty of uncertainty. From the early part of the twentieth century science has been moving from absolute certainty, to probable certainty, to relative certainty in an effort to be more accurate. At the same time, the need to have answers supported by absolute certainty has risen, dramatically. Error is unacceptable. This situation has created problems for everyone looking for "answers" to environmental issues. For instance, the argument over whether global warming is occurring rages on in the halls of government even as climate and natural resources are adapting to the changes. The majority of the scientific community has moved on to determining how dramatic the changes will be, rather than trying to convince those demanding or using the lack of absolute certainty.

In recent years the understanding of what "science" is and does seems more and more lost on more and more people. To many people, anything but absolute certainty is inaccuracy and unacceptable in decision making. Because science usually cannot provide answers with absolute certainty, it seems to be failing us. But, perhaps we ask too much of it? Accurately predicting natural events is difficult. Consider weather prediction – how often have you looked out the window to see something different than was predicted? When assessing environmental situations, recognising the variability of the natural world is an important component of the process. No matter how hard we try to eliminate uncertainty, it remains a part of virtually every statement and decision dealing with natural events. Characterising uncertainty with probability of certainty or relative certainty simply recognises that there are occasions when inaccuracy occurs, not that the fact is incorrect. Curiously, recognition that inaccuracy exists is often used as "proof" that existing conclusions are "wrong" and, by inference, science is undependable. Whether talking about the impact of human activities, or the likelihood that Florida would be hit by four hurricanes in a single summer, natural variability limits certainty but it shouldn't obstruct reasonable actions. Incidentally, real estate values in Florida are increasing.

> *"No matter how hard we try to eliminate uncertainty, it remains a part of virtually every statement and decision dealing with natural events."*

Unfortunately, the lack of absolute certainty has become such a concern that some decisions are being postponed or burdened with restrictions which neither improve understanding nor resolve issues. This becomes a problem when the concern focuses on the uncertainty rather than certainty aspects of a situation. During a dredging project somewhere between 2 and 5 percent of the sediment being moved cannot be accounted for. Should the project be stopped because it "lost" that material or should we consider the implications of the loss but focus on the 95 to 98 percent that can be tracked? The question becomes more complicated if the sediment is polluted.

The application of scientific methods can address uncertainty by providing the probability that an unexpected outcome will occur. Weather forecasters rely on probability when they report "there is a 20 percent chance of snow." Giving us the probability of an event not an absolute certainty lessens expectation. For relative certainty, the amount of variation is used to describe the outcome. Doing 50 flips of a coin might get 27 heads and 23 tails. That is close to the expected result but there is a 4 percent error (54 % are heads and 46 % are tails). With that error, should we discard the general hypothesis that the results are equally likely to be heads or tails? And, by focusing on the 4 percent discrepancy, has the focus been shifted from the 96 percent accuracy?

An interesting example of the problems created by focusing on the uncertainty and error is a power cable under Long Island Sound that connects Long Island and Connecticut. One of the concerns was that northern lobster (*Homarus americanus*) would be confused by the electromagnetic field (EMF) created by the direct current passing through the wires. EMFs represent one of the most common and fastest growing environmental influences, about which anxiety and speculation are spreading. Northern lobsters are one of the species that use variations in the earth's magnetic fields to navigate around their habitat and might be influenced by unnatural EMF emissions. The opponents to the cable argued that the cable's EMF would interfere with lobster migration and cause them to walk back and forth along the cable. EMF experts were brought in but because of natural variability, they could not state, unequivocally that "no northern lobster would be affected" only that it was highly unlikely. Although research has shown that EMFs a thousand times stronger that those generated by the cable had no impact, natural variability precluded absolute certainty. The lack of one hundred percent certainty was used to argue that the available science was wrong or at best incomplete and a problem existed. You'll be happy (?) to learn that three years of monitoring has revealed that cable induced EMF do not appear to cause northern lobsters to congregate over one. Is the issue addressed? Probably not because there are a lot of different voltage cables and lobsters out there. Who knows, maybe there are some individuals that like walking near cables.

This is the best of times and the worst of times: both the power and corruption of science are presented daily for our consumption. This is not new: in 1883, with tongue firmly in cheek, Mark Twain wrote in Life on the Mississippi (p.120): "There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact."

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