

SHERKIN COMMENT

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The Tamer class lifeboat, "Alan Massey", arriving in Baltimore Harbour, Co. Cork, in February 2012, with the Beacon in the background.
Photograph © Robbie Murphy

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Editorial

We Must Grab the Opportunity

By Matt Murphy

THESE are very difficult times in Ireland, with vast unemployment and emigration. Like a personnel tragedy we as a people must rise from the ashes. We have so many positives that can and will bring us new beginnings.

This brings me to that hobbyhorse of mine for so many years – the seas around us. Over the past 40 years, it has been so frustrating to look out daily at this wonderful resource. Time and again political parties have included pious words in their pre-election manifestos, which sadly evaporate into cuckoo land once in power. However at last we may be seeing the beginnings of a new dawn. Two things give me hope: firstly, the Department of Agriculture are involved and are leading the way forward on fisheries since the Department of the Marine came under its wing. The second reason I have hope is that a senior Minister, the present Minister for Agriculture Simon Coveney, does recognise the importance of the sea in giving employment and if his present statements and commitments are to be believed we may see at last that new beginning.

However, if the Minister is to succeed many things must happen. Commercial fishermen must firstly look at themselves. At present there are at least five fishing organisations representing approximately 300 large fishing vessel owners. This is farcical to say the least. What is needed is one strong powerful organisation representing both the above 300 vessels and the 2100 small inshore fishing boats (normally operated by 1 or 2 people). The latter at present have little or no representation.

The model is there for fishermen. It is the Irish Farmers Association (IFA) which caters individually for a number of farming groups – dairy, beef, sheep, cereals to name but a few, and all under the one umbrella. Within a similar single fishermen's organisation one can have pelagic, whitefish, inshore and other groups, all speaking with one voice. The financial savings from the cost of running five organisations would mean the fishing industry could afford, among many other advantages, to have permanent representation in Brussels, which would lead to a much stronger voice for the industry. What must be so frustrating for both a Minister and Department officials is having to meet so many different groups and none of them singing from the same hymn sheet.

To me there is nothing more disheartening than hearing fishery leaders, past and present, issuing multiple contradictory statements on what our fisheries policies should be on the various stocks. There is much too much self-interest amongst fishermen. They should ask themselves what kind of an agriculture industry would we

have if the IFA solely represented the large dairy and tillage farmers? Very definitely most of rural Ireland would be divested of farmers. Inshore and offshore fishermen must speak with one voice. Unless there is unity, there is little hope of having a viable sustainable fisheries in our water for future generations.

Another important factor is the Marine Institute and its real role in the fishing industry. At present the Marine Institute has two research vessels the Celtic Explorer and the Celtic Voyager paid for by the taxpayer. What is so disturbing is to read the programme for each of the vessels in 2012. The Celtic Voyager has no fisheries research dates whatsoever and only a smattering of oceanographic research. The Celtic Explorer will spend 107 days on oceanographic research in the North Sea and 26 days in Eastern Canadian waters on a Fisheries Acoustic Survey, which includes 40 days passage to both places, giving a total of 147 days. The number of days on Fish Surveys in Irish waters is only 111. How will the Canadian and North Sea data help Irish fishermen? We have, according to the Marine Institute's Fish Stock Book 2011, 54 fish stocks of interest to Ireland. Reading through this massive book (494 pages) shows Ireland does not have the full picture on many of its stocks. Indeed on the Porcupine off our West Coast, there is no information on the prawn stocks, which are closed to Irish fishermen and all other European countries. The major question that must be asked: has the Marine Institute much interest of any value in what is happening with the fish stocks in our waters? Indeed it seems it is more interested in becoming a world player in Canadian and European marine research rather than in our humble Irish waters! One wonders also does it have notions to carry out research in other foreign waters such as the US and other faraway places? The Institute should be a vital component in the development of the Irish fishing industry. The management of our inshore waters is simply atrocious. Information on our inshore stocks of shrimps, crabs, whelks and lobsters is more or less unknown. The Marine Institute seems to have no interest in doing anything on these stocks.

The semi-state body Bord Iascaigh Mhara (BIM – the Irish Fisheries Board) with its 30ft-research vessel, which operates at a cost of around €30,000 annually, is beginning to do excellent work. Maybe small vessels are the way forward on the vital need to know the full extent of the above stocks in our bays? Indeed, the sustainability of one stock, the lobster, could be greatly helped just by the stroke of a pen. We have no regulations on the V notching of female lobsters, yet many in the industry have been voluntarily carrying it out for nearly 10 years. This is frustrating for the fishermen who cannot fathom the delay in

introducing such a regulation.

Rumours are rampant about the future of BIM. It is one of the few state bodies that have streamlined itself in the last five years. Numbers employed are down from 175 to 125 and state funding down from €28 million to €17 million. These cuts have been forced on them and yet it is much more aggressive in promoting and delivering new ideas to the industry, such as its seafood innovation centre at Clonakilty, which has already seen seafood companies create additional employment having availed of its facilities. Maybe the same accountability should be applied to the Marine Institute. Is it delivering to the fishing industry? The great speaker of the US Congress Tip O'Neill once said, "all politics is local". Maybe the Marine Institute's slogan should be "all research is local"? The Minister needs to have a hard pragmatic look at this body and its input into fish stocks and relevant national marine research.

It can be hard constantly to stress the importance of aquaculture. Whether one likes it or not the world needs and will need much more farmed fish in the future. Massive fishing vessels are plundering world oceans and have no interest whatsoever in conservation of fish stocks. We have the waters around our coast to build a great aquaculture industry with, I stress, good environmental practices. It would provide jobs in coastal areas. Some will say "but only a few". Mussel, oyster and salmon farming began with a few jobs and they are now the main source of work in many small coastal communities. The Minister and his officials must sort out the problems holding back the development of the industry. Emigration is rampant around our coasts. We must begin to stop the haemorrhaging of our people.

There is a huge opportunity to create dynamic commercial fisheries and aquaculture industries with many added values, which can realistically deliver jobs for our children and grandchildren in the years to come. Can it happen? Miracles do but it will take courage and some sacrifice. It will also take the realisation that coastal Ireland will only be occupied by the old and an annual influx of holidaymakers for a few weeks each year if nothing happens.

We have a young and very energetic Minister with responsibility for the Irish fishing industry and he can respond to the challenge where others have not succeeded. Will he be remembered in 30 years time for saving the fishing industry and developing its potential?

Matt Murphy, Director, Sherkin Island Marine Station, Sherkin Island, Co. Cork, Ireland.

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Greylag Geese in Ireland

By Oscar Merne

ON my weekly visits to Bray Harbour (very close to my home in Bray town) to check on the resident flock of Mute Swans, Mallard, Turnstones, and various species of gulls, I always notice the little group of farmyard or feral geese that has taken up residence there for the last few years. Six of these birds are clearly descended from Greylag Geese, but, through generations of selective captive breeding, the birds have evolved into a rather larger version of their ancestors, with a much more pronounced sternum to which their pectoral muscles ("breast meat") are attached. They are now so large and heavy that they can barely fly, and their plumage has changed from the all-grey of the wild birds to a motley patchwork of grey and white. Nowadays, most of their close cousins that are reared in farms for the market are completely white and therefore show less sign of their ances-

tral wild origins. But apart from appearances, both the domestic/feral birds and the wild migratory Greylags make the same loud honking calls.

I'm not sure where the little flock of Bray geese came from, but local people have suggested that they used to belong to an elderly small farmer living up the Dargle River, which flows into Bray Harbour, and when he was moved to a nursing home the geese left the farm and followed the river down to the harbour where they now enjoy the company of the Mute Swans and the food which the good people of Bray provide daily to feed the birds.

There are accounts of wild Greylag Geese breeding in Ireland in the eighteenth century, in the midland bogs and Co. Down, and it may be that some of the domestic geese in Ireland nowadays are descended from these wild birds. It would have been quite easy to propagate domestic geese from eggs collected in the wild or from



Above: "Feral" Greylag Geese at Arklow Pond, Co Wicklow.

Right: A two-week old gosling.

Far right: The "feral" Greylag Geese at Arklow Pond have become so large and heavy that they can barely fly.



Images courtesy of Oscar Merne

goslings or flightless moulting adult geese caught up in the wild.

Whatever about the origins of domestic and feral geese of Greylag type, it seems that in the nineteenth century there were probably less than 1,000 wild, migratory Greylag Geese coming to Ireland to spend the winter here. However, in 1898 Greylags "discovered" the Wexford Slobs, which had been empoldered about fifty years earlier on the north and south sides of Wexford Harbour. Numbers wintering on the Slobs rapidly built up to about 6,000 birds and the flock remained at this level until about 1950, when there was a sudden steep decline. There are two theories about the cause of this decline. The first is that increasing numbers of

Greenland White-fronted Geese from about 1910 displaced the Greylags through competition for space and food. The second is that post-war changes in agriculture in lowland Scotland, which brought about a very large increase in barley-growing, simply enticed the Greylags to new wintering grounds that were significantly closer to their Icelandic breeding areas.

Following the steep decline around 1950, the Irish wintering population appears to have

"bottomed out" at about 738 in January 1967 when a national census of the Greylags was carried out by the Irish Wildfowl Committee – one of the organisations that later formed BirdWatch Ireland. An increase in numbers began about 1975, coinciding with an overall increase in the Icelandic population to over 110,000 birds, and by the mid-1980s surveys were showing that over 3,000 Greylags were coming to Ireland. Numbers continued to increase slowly here in the 1990s, when nearly 4,000 birds were censused. The most recent estimates of numbers (autumn 2008) were of 4,761 migratory Icelandic, and 1,555 feral Greylag Geese in Ireland.

We know from recoveries of ringed birds that our wintering Greylags all come from the large breeding population in Iceland, which is currently estimated at 87,200 birds. Each autumn, when the goslings are big and strong enough and the adults have completed their annual feather moult (during which time they are flightless for several weeks), the Icelandic population migrates south-eastwards across the Atlantic Ocean to Britain and Ireland. The great majority spend the winter in Britain, mainly in Scotland. Nowadays, both the

wild Icelandic Greylags and the feral populations are closely monitored by the conservation organisations so in future we will be able to follow accurately any changes that occur in their distributions and numbers.

The main places in Ireland to see Greylags in the winter months (October to March) are Loughs Swilly and Foyle, and the Foyle River between Derry and Strabane; fields around Strangford Lough (feral birds); the shores of Lough Neagh (feral birds); saltmarshes and fields on the west and south sides of Dundalk Bay; coastal fields in north Co. Dublin; Broad Lough and the coastal marshes north to Kilcoole; Poulaphuca Reservoir in Co. Wicklow; the callows of the River Suir in the Portlaw area; Arklow Pond (feral birds), and Lady's Island and Tacumshin Lakes (feral birds) on the south coast of Co. Wexford. There are about 15 other sites around the country which are visited regularly by smaller numbers of Greylag Geese.

Oscar Merne retired from Ireland's National Parks & Wildlife Service in January 2004.

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OUT IN AFRICA



Submerged hippopotamuses protect themselves from the scorching sun during the day.



A Kudu (woodland antelope) grazes as baboons look on.

By John Gore-Grimes

KATE and I travelled to Botswana last November. We visited Zambia and trespassed into Zimbabwe. We concluded with a short stay in a game park some 200 miles to the north of Johannesburg. In all we spent eighteen days away from home. The nine days in Botswana were most certainly the highlight of our journey, particularly the visit to the Okavango delta in Botswana which is the world's largest inland delta where most of the water of the Okavango river is either absorbed by the sands and plants of the delta or it evaporates. The delta is almost completely flat with less than two metres variation in height across its 15,000km². There are no roads to the delta and we arrived by small plane which restricted our luggage to one small bag each weighing less than 12kg.

It is not too absurd to compare the Okavango delta with the vast untouched ice fields of the Arctic and Antarctic. The landscape and the water-scape are largely untouched by agricultural, industrial or residential development and

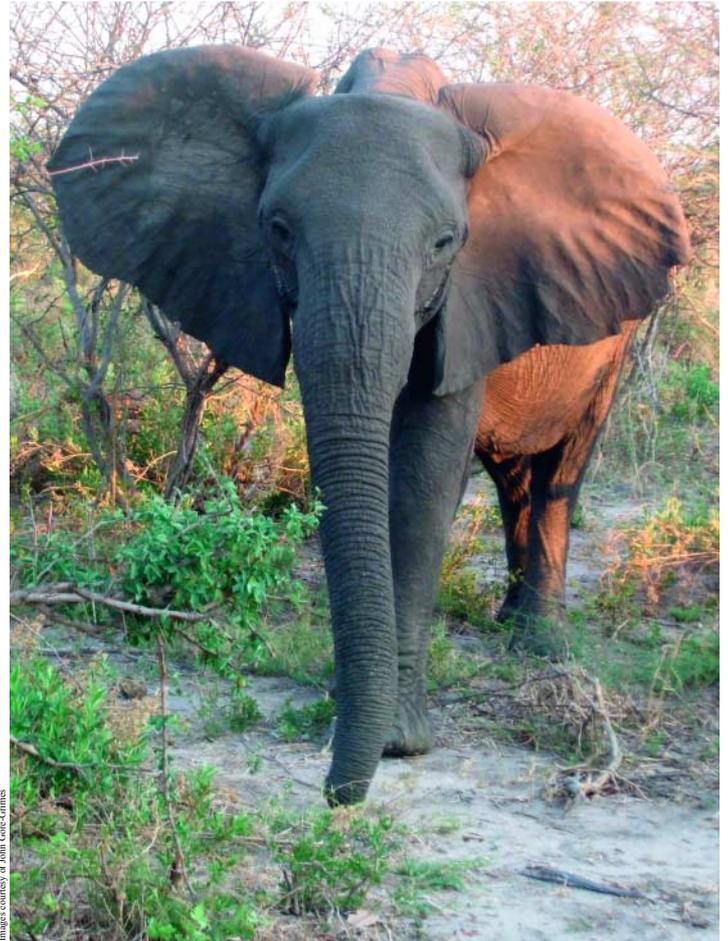
although, like the north and south caps of the Earth, this area is in retreat, it remains, for the moment, a distinctive and magnificent place where wild animals have space to roam without fear of competition from human development in terms of clearings, destruction of wild plants and water pollution. So far the delta has escaped the effects of synthesized ecosystems with their manicured forests and cultivated fields which have, as a matter of necessity, replaced natural wilderness.

It is rewarding to observe the seemingly chaotic natural landscape. It is essential that areas as unique as the Okavango delta are preserved. The conflict between natural landscape and synthesized ecosystems is an unequal struggle but our developed environment is already wounded by phosphates, pesticides and over-use. It may not survive. The seven billion+ people living on Earth today are the product of progress. In general the population explosion is a result of progressive industry and agriculture. It is also the result of spectacular progress in medical science which has doubled the life expectancy of a significant percentage of the

world's population. The progress is both natural and humane but it is, almost certainly, unsustainable. Nevertheless, it is impossible and morally unacceptable to resist the pleas of some 800,000 million people who still die and suffer from hunger. The problem is a human contradiction in that the developed nations consume more than 50% of the Earth's resources but they make up 20% of the world's population.

In the Okavango delta you will notice how well the animals are doing. There is no evidence of any over population in the animal world and in that sense the animal instinct allows for a more rational adjustment than human intelligence. But animals can only thrive in the environment of the Okavango delta for so long as humans do not require the transfer of this wilderness into another synthesized ecosystem.

We observed the "silver eyed" pride of lions resting under some bushes with bloated stomachs. Our guide told us that they had killed a buffalo the night before. The pride comprised of six lions, one adult male, two females and three growing cubs. They



The African Elephant is the largest living terrestrial mammal.

rested and panted with tongues outstretched in a watchful pose. They observed a herd of two hundred or more buffalo grazing about half a mile away. They were attentive and when an elephant approached to graze on tree-leaves they became apprehensive. They were prepared, at all times, to move off quickly and eventually they did move to more open ground with less cover. The elephants seemed content with the grazing and they clumped by without feeling any necessity to challenge the retreating lions.

The "silver eyed" pride lay down and continued to watch the buffalo but they had no intention of chasing them. In the first place their stomachs were still full but secondly they would not hunt until the buffalo had exhausted the grazing in the area where they were. The buffalo would then start to move on and as they move the lions scrutinise the herd carefully and pick out a young buffalo which is unprotected or an old or injured buffalo which is unable to keep up. When a potential meal has been identified and when the lions feel hungry again they will hunt. The pride was named "the silver eyed pride" after the



dominant female who is blind in one eye. The colour of that blind eye is clear silver.

Along the way we came upon a herd of elephants. There were two males, three females and four young. They were grazers and they picked up the grass with their trunk and fed it into their mouths. They also curled their trunks and skilfully skimmed off the leaves and dropped them into their mouths. If the grass which they picked up was

dusty, and it very often was, they would dust it off by shaking it and beating it against the ground.

Every kind of African animal is well represented in the Okavango delta. The variety and colours of larks, swallows, martins, king-fishers, rollers, weavers, bishops, waxbills and many others are a constant source of delight. The Creator clearly had run out of paint when it came to placing birds in Ireland. Although the Irish wild birds

are enchanting they are less exotic. Hippopotamuses are plentiful. Because their skin is sun sensitive they stay in the swamps and rivers during the day but emerge at sunset to feed and sleep at night. From their size and general disposition they are a good advertisement for the vegetarian way of life. They are protective and defensive without being too aggressive.

Rhinoceros, whose numbers have been greatly reduced in recent years, are now on the "critical" extinction list. The young South African guide told us that the "critical extinction" list is so extreme that he believed that by the time he had children they would never see a rhinoceros. They are hunted for their ivory horns. The guide told us that he has frequently seen rhinos lying on the ground badly wounded with the horns savagely removed by poachers who export them to the orient for an exorbitant price where they are ground down to gratify the sexual expectations of what can only be grossly inadequate and mis-informed oriental males. Rhino numbers have been reduced by 90% in their habitats during the past twelve years. The consensus view is that they will not survive much longer.

In Zambia we lodged on the banks of the Zambezi river which flows past with pace and with dignity. A few miles further on, it falls abruptly over the edge of an almost vertical chasm with a mighty roar and a cloud of spray. The mist, which rises up hundreds of feet, has given the falls the name of Mosi-oa-Tunya which means "The Smoke That Thunders". This is the real name of the place although it may be better known to many as the Victoria Falls. There is a large statue there to commemorate the

purported discovery of the falls by David Livingstone in November 1855. I would suspect that they may have been discovered many thousands of years before that by the people who named it "Mosi-oa-Tunya".

We swam in the Devil's Pool on Livingstone Island at the top of the falls. There is a challenging jump from the top of a rock into the pool below. Once in the pool you make your way to the edge which is only a few feet away. You are held by your ankles and let forward so that your head looks right down over the falls. It is definitely the very best view that you can get of this magnificent water cascade, albeit that the Irish Health and Safety regime would not approve.

A road bridge across the gorge was completed in April 1905. It is one hundred and twenty eight metres above the Zambezi River and you can jump from it with bungee ropes strapped to your ankles. As a first time bungee jumper I found the experience underwhelming. As I write this however I read that a young Australian woman, Erin Langworthy, survived the fall when the bungee jump cord snapped. This occurred on the 31st December 2011. Her survival was miraculous but her determination to free her ankles and swim to the shore demonstrated an outstanding courage. A newspaper report of this event describes her fall into the freezing, crocodile infested waters of the Zambezi river. The waters of the river are not cold and crocodiles, generally, prefer to walk around white water rather than to swim through it. We learned this first-hand when our white-water raft capsized twice on a long and very satisfying white water raft run on that river.

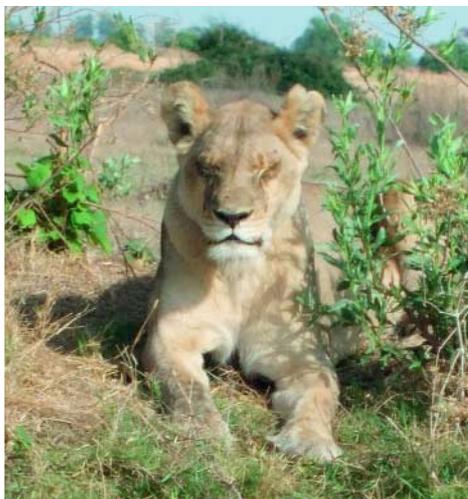
After the accident on New

Year's Eve, a Zambian Government Minister, Given Lubinda, made the following statement:- "The bungee has proven to be a very viable operation considering that more than 50,000 tourists jump on it every year. It has been in operation for ten years. This is the first time I am hearing of an incident. The probability of an incident is one in 500,000 jumps". Even with these odds I may have to re-assess the future of my bungee-jumping career.

*John Gore-Grimes,
Cavendish House, Smithfield,
Dublin 7.*



Huge herds of elephants can still be seen in the Okavango Delta, in Botswana.



Lions are unique among cats, as they form close-knit, social groups. Here a lioness is resting under some bushes, with a full stomach.



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Leading the Field in Sustainable Waste Management

The Changing Face of Waste Management in Ireland

A GOOD NEWS STORY

By Brendan Keane

In the last 15 years, waste management in Ireland has changed dramatically and fortunately this has predominantly been for the better. In 1995 almost all household waste and a very large proportion of commercial waste was simply being landfilled (municipal waste). Hazardous waste from large producers was predominantly incinerated with only a proportion of solvents being recycled or recovered. In terms of policy, at an EU level we have seen significant developments over the

same time. But while regulation has changed in Ireland, published policy has not yet undergone the same level of change. The current administration though has advised that this is in hand.

In contrast by 2010 the total recycling rate was 42% for municipal waste and this number continues to improve, but at a slower rate. In addition we appear to have decoupled the production rate of hazardous waste from actual manufacturing production levels. In addition Irish industry has started to realise that there is a real benefit in conserving resources

in terms of food, energy, water and raw materials. In 1995 landfill was the only solution available, today we have the capacity to incinerate 200,000 tonne of waste in Ireland's newest state of the art waste to energy facility and we can use over 200,000 tonnes of Solid Recovered Fuel (SRF) (a fuel made to specification from residual municipal waste) to replace over 120,000 tonnes of imported coal for Irish cement kilns. We have gone from almost 150 landfills in 1995 to less than 20 in 2012 (the 2010 confirmed number was 28). On the other hand we have gone

from a handful of civic amenity sites (mainly operated by local authorities and which are key to recycling certain wastes), in the 1990s to 107 in operation in 2010. Today, all serious waste management processors operate recycling plants and we have the potential to have a thriving recycling industry for certain materials in Ireland. At a household level, the level of generation of waste per head which grew massively through the early years of the first decade has definitely plateaued out and current indications are that our consumer society has started to reduce the level produced per head – probably due more to economic influence than changed human behaviour arising from education – the quantity recorded per person in the EPA's 2010 data set was 310kg / head for managed household waste.

So what has happened in Ireland in the intervening period to bring around these fundamental improvements. While there is no single answer there are a number of critical elements that have given rise to these changes. The primary driver being that the cost of landfill has now being significantly increased by the application of additional levies in September 2011, this will allow alternatives to become more competitive and the cost of landfill management has increased due to improved standards from the mid 90's. Escalations in the levy are planned for future years with a view to it standing at €75 / tonne within another two years. This has being further supported by the imposition of the EU landfill directive and the EPA redefining the parameters for material that can be landfilled, this will prevent a return to a landfill society. We have also seen that local authorities have now almost completely exited the collection and disposal of household waste market (they never really operated in the commercial waste market) (With the exit of all Dublin authorities from the market in the recent past, Galway City Council and Waterford County Council are the last ones engaged in waste collection), this has meant that some of the ridiculous restrictive practices and local politics of the process have been removed. It is now an open market where industry must compete on cost, service and initiative. While this has a number of drawbacks it has generally yielded positive environmental benefits. In this open market at the turn of the new century companies took a view that there was a commercial opportunity worth investing in and the largest manifestation of this was the opening



of a new 200,000 tonne waste to energy incinerator North of Dublin in late 2011 where approx €140 million was invested. On a more modest scale many commercial waste processors invested between €1 and €20 million on specific facilities that add value to the waste that they were collecting. Waste has been identified as a real resource. In total it is estimated that €500 million was spent by industry in the first 10 years of the new century. Today this sector employs over 6,000 people across the country. In addition to this rise in investment was the imposition of uniform licensing systems and application of standards for all facilities by the various competent authorities of which the EPA was the primary one. This standardisation coupled with enforcement at all levels is critical to achieving and maintaining these new standards of environmental protection. In the long-term it will yield to a higher cost per tonne of waste produced but coupled with waste prevention applied at source it will reduce cost or at worst be cost neutral.

The technologies now being used in Ireland to resolve our waste management needs are diverse and vary on a regional basis. For the household, who still requires a lot more education in the area, the decision tree starts right at the point of purchase for the goods; will I use all of this item (e.g. food purchasing)?; what can/will I do with the packaging from this item / is it recyclable (e.g. glass, cardboard, foam, timber, paper, metal)? How do I get rid of the residue or the product when I am finished with it?

Once the consumer has decided to discard the material the waste industry has to be properly engaged to deal with their decisions – which bin did they put it in? If it is in the dry recyclable bin the waste contractor should be geared up to optimally sort any form of packaging into its respective components – paper / cardboard / glass / metal and different plastics. Depending on how free of contamination these respective materials can be generated from the waste sorting process, they will command different prices on commodity markets. Plastics are probably the most diverse and difficult to reuse as

Table 1: Indicators (EPA National Waste Report 2010)

Indicator	2005	2006	2007	2008	2009	2010
Municipal Waste						
Municipal waste managed (t)	2,779,097	3,100,310	3,174,565	3,103,820	2,824,977	2,580,435
Municipal waste managed/person (t)	0.670	0.730	0.730	0.702	0.634	0.563
Municipal waste generated (t) ²⁸	3,040,714	3,384,806	3,397,683	3,224,279	2,952,977	2,846,115
Municipal waste generated/person (t) ²⁹	0.740	0.800	0.780	0.729	0.662	0.621
Disposal of managed municipal waste to landfill (t)	1,833,330	1,880,618	2,014,797	1,938,712	1,723,705	1,495,565
Disposal rate for managed municipal waste	66%	64%	64%	63%	61%	58%
Recovery of municipal waste (t)	945,767	1,119,692	1,159,767	1,165,108	1,101,272	1,084,870
Recovery rate for municipal waste	34%	36%	37%	38%	39%	42%
Number landfills accepting municipal waste for disposal	32	29	29	31	28	28
Number of bring banks	1,921	1,919	1,960	1,989	1,962	1,922
Number of civic amenity sites	79	86	90	96	107	107
Household waste						
Household waste managed (t)	1,543,468	1,773,242	1,625,490	1,556,879	1,498,469	1,420,706
Household waste managed/person (t)	0.370	0.420	0.370	0.352	0.336	0.310
Household waste generated (t)	1,746,408	1,978,716	1,761,167	1,677,338	1,626,469	1,696,387
Household waste generated/person (t)	0.420	0.470	0.410	0.379	0.365	0.368
Disposal of household waste to landfill (t)	1,198,504	1,379,246	1,200,980	1,155,567	1,056,267	843,842
Residual household waste disposal/person (landfill) (t)	-	-	0.277	0.261	0.237	0.184
Disposal rate for household waste	78%	78%	74%	74%	71%	59%
Recovery of household waste (t)	344,964	393,995	424,510	401,312	442,202	576,864
Recovery rate for household waste	22%	22%	26%	26%	30%	41%
Commercial waste						
Commercial waste managed (t)	1,235,629	1,327,068	1,549,075	1,477,395	1,299,807	1,141,015
Commercial waste managed/person (t)	0.300	0.310	0.360	0.330	0.291	0.249
Disposal of commercial waste to landfill (t)	634,826	601,372	813,817	758,176	640,737	633,010
Disposal rate for commercial waste	51%	45%	53%	51%	49%	55%
Recovery of commercial waste (t)	600,803	725,697	735,257	719,219	659,070	508,005
Recovery rate for commercial waste	49%	55%	48%	49%	51%	45%
Packaging waste						
Best estimate of total quantity managed (t)	925,221	1,028,472	1,055,952	1,026,759	972,458	836,714
Packaging waste managed/person (t)	0.220	0.240	0.240	0.232	0.218	0.189
Best estimate of packaging waste recovered (t)	545,368	589,519	671,630	664,043	668,733	636,933
Packaging waste recovered/person (t)	0.132	0.140	0.150	0.150	0.150	0.139
National recovery rate	58%	57%	64%	65%	70%	74%

²⁸ Generated municipal solid waste includes estimated uncollected household waste.

²⁹ Per person calculations based on CSO data (2010 data references 2011 census, i.e. 4,581,269 persons).

there are so many different types mixed together and all with different characteristics and possible uses. Single plastic types eg. HDPE free of significant contamination (e.g. soft drink / water bottles) do command premium prices for recycling back into new products, but variable mixed plastics are currently best utilised for their energy content. At present the optimum energy use is to turn it into 'diesel' for cars and trucks a process that was perfected by an Irish company and now being rolled out EU wide. However a very large proportion of the material is too expensive to process by this way so for the moment at least, it is better served being used as a replacement for fossil fuels such as replacing coal used in cement kilns to make cement. As outlined above two Irish cement manufacturers can now replace over 120,000 tonnes of coal imports annually by using 200,000 tonnes of this fuel which is supplied under tight specification from the waste industry, this number continues to grow and we would expect to see it doubled over the next 2 to 3 years. In the future we may see existing Irish coal power plants converting over to burn these types of materials which will reduce our dependence on imported fossil fuels. Modern waste to energy facilities such as the new plant in Duleek are built to incinerate all types of municipal wastes plus produce power and steam, and while we

need this process to serve aspects of the market we must be careful to get our regional and national incineration capacity correct as incineration, like landfill in the past, is not a panacea. In line with best practice in waste management residual by-products should be diverted to the 'best' route for reuse or recycling at the highest point on the waste hierarchy pyramid. This is one of the reasons why the Irish authorities have pushed the advent of the 'brown bin' which consumers can use to take food / garden / other specific organic waste that is best to compost. This will help reduce our dependency on peat based compost, the continuous harvesting of which degrades our natural bogs. Irish national policy has defined that we as consumers should have at least a three bin system - Dry recyclables (green/blue bin or clear bag), organic waste (brown bin) and residual (black bin) - we must now maximise what goes into the recyclable bins while minimising the black / residual bin use. The residual bin should be the most expensive but materials placed in the other bins must meet the appropriate specification otherwise they make the next process un-workable. For example consumers must be educated that plastic or glass placed in one brown bin on a collection route may make that entire batch in that collection truck un-processable for a composting operation, the waste company

Table 2: Summary data for a selection of National Waste Prevention Programme focussed Resource Efficiency programmes.

Programme	NWPP Investment (c. 2011)	Resource Efficiency	Actual and Potential Savings Identified (last 12 months)	Return on Investment (rounded)
Green Hospitality Award	€0.452M	6,400 t waste prevented 38,718,000 kWh energy saved 350,000,000 litres water saved 221 members 125 premises certified	€5.51M	12.1
Green Business Initiative	€0.371M	Water, energy & waste savings 178 active members 45 Resource Efficiency Assessments Typical savings of €40,000 per annum per company assessed	c. €4M	11.1
Green Retail	€0.031M	50 members 31 certified Average: >€5,000 savings per certified member	€0.19M	5.1
Green Healthcare Project	€0.150M	2,700 t waste could be prevented €80,000 potential savings in water use in three hospitals	€1.8M	11.1
SMIF	€0.108M	658 waste 'matches' made 6,800 t waste potentially diverted Numerous services & logistics loaded	€0.812M	8.1
Green Hotel	€0.05M	285 total savings achieved in energy, water & waste for 10 participant hotels	€0.142M	3.1
Green Home	€0.125M	11,000 participant households >40,000 visits to geotourism.ie website Est. 4000 saving potential saving per high performing household	€0.8M	8.1

may have to incinerate or landfill the material instead, thus depleting the resource and increasing costs for all producers.

Irish industry has started to realise that there is a real benefit in conserving resources in terms of food, energy, water and raw materials. Programmes such as fostered by the NWPC

(National Waste Prevention Committee) have yielded some very real and financially compelling savings.

Initiatives like this will bring real changes in resource management and the waste industry. The National Waste Prevention Strategy has made real progress in helping organisations and interested householders achieve

significant savings across all resources - water, energy, waste. Spearheaded by the EPA and delivered through various agencies, it is a model that if properly fostered can yield very significant long-term benefits.

It is evident from looking at this complex market web that there are many players - consumers, industry, educators, regulators, competent authorities and the waste industry - all of these must work in harmony to achieve the best environmental outcome. We are not at that zenith point yet but we should be proud of what we have achieved and we must all now work together to attain our next defined goals.

Suggested further Ref : EPA National Waste Report 2010 - Published March 2012 and available on line at www.epa.ie

Brendan Keane BSc, HDip Ed. Brendan has worked in the waste sector in Ireland for over 25 years and has established and ran a number of very successful niche companies in the market. He is currently a director of the Irish Waste Management Association and a member of the CIWM Irish branch. He represents the waste sector on the NWPC and was on the implementation committees for both the WEEE and Batteries directives.

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Sherkin Island Marine Station

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A Field Trip to Ecuador



View over the Santa Lucia Cloudforest reserve.

By Tom Kirby

IN August of last year I was fortunate enough to take part in a field trip to the Santa Lucia Cloudforest reserve in northern Ecuador. Organised by Sussex University, the trip took 25 undergraduates and faculty staff to the western slopes of the Andes. The reserve lies within the Chocó Andean Bioregion, an area recognised as a global biodiversity 'hotspot' that is rich in endemic plant and vertebrate species. Characterized by moist, high altitude rainforest (or cloudforest), the Chocó region has lost 70% of its original habitat and remains under continued threat of damage. In 1988 the Santa Lucia Reserve which covers 713 hectares of cloudforest was declared a protected area, offering hope to the many endangered species living within it. In the late 90s, having been affected by this new level of protection (which prohibited clear felling and 'slash and burn' agriculture) and further impacted by the inherently poor quality of forest soils, a local agricultural cooperative turned to ecotourism as an alternative, sustainable source of income. After some years spent creating trails in the surrounding forest, 1999 saw construction of the lodge (built entirely from fallen wood) completed and the Santa Lucia community was born.

After a four-hour bus journey from the Ecuadorian capital Quito, we battled our way on foot, up muddy forest trails. Two hours later, having climbed over 700 meters, we

emerged sweaty and breathless, to find ourselves on a small mountain top surrounded by a sea of cloud some metres below. The lodge that was to be our home for the next 10 days lay in front of us. Flagging spirits were instantly revived as the resident hummingbirds came to investigate the newcomers and much-needed refreshments emerged from the lodge.

After an introductory talk and a night spent acclimatizing to our surroundings, we spent the next four mornings walking the forest trails with faculty staff and local experts. We were trained to identify the common plant and animal families in the region, and received instruction in field sampling techniques. The afternoons saw thick rain clouds rolling up the hillsides from the valley below, sending us back to shelter in the lab where we could identify samples from the morning's walk and hear talks on the ecology of the area. The remainder of our time at Santa Lucia was spent in small groups conducting research projects of our own design. Along with two colleagues I took part in a study looking at the distribution of epiphytic plants (ie plants that grow on the surface of other plants in a non parasitic way) along an altitudinal gradient. Needless to say, this involved much hiking but we were suitably rewarded with spectacular views and the opportunity to explore the further reaches of the reserve. Other members of our party focussed on a range of studies, including hummingbird territorial disputes, leaf litter invertebrates,



A small saprophytic fungi.



Butterfly (*Heliconius* sp.).



Team members gather outside the lodge.

mosses and liverworts, butterflies and forest slope dynamics.

I don't want to give the impression, however, that life at Santa Lucia was all work. The lodge caters not only for visiting research groups, but for birders, honeymooners, volunteers and ecotourists of all kinds. So facilities are good, with solar-heated showers looking over the forest, comfortable cabins scattered around the



Our last sight of the forest before returning to Quito.

main lodge and a kitchen that serves delicious (and generous) portions of Ecuadorian cuisine. In keeping with its ecotourism philosophy, much of the food served at Santa Lucia is grown on site. The vegetable plot outside the lodge provides all sorts of organic fruit and veg. Coffee and sugar are both grown and processed on site using traditional methods. The small cane plantation provides not only sugar, but also the raw ingredient for a particularly potent spirit that was enjoyed by all on the final night of the trip, and regretted by many the next day.

In addition to studies carried out by visiting parties, the staff and volunteers of Santa Lucia are involved in a number of long-term projects. These include a camera-trapping study carried out in partnership with Sussex University and Rainforest Concern UK that aims to establish the range and activities of large mammals in the area. A number of rare mammals have been recorded on the traps including the Paramo Wolf, the Puma and the Andean Spectacled Bear. Conservationists hope that the charming though little known Spectacled Bear may be the ideal 'flagship' species needed to promote conservation efforts in the region. Other studies carried out at Santa Lucia include a long term survey of the local birdlife, projects focussing on the forest canopy and monitoring programs looking at the impacts of climate change carried out in close association with the environmental

charity Earthwatch. The ultimate goal of much of the work in the reserve is to build up a full species inventory of the area, a task that should be greatly helped by the completion, in 2012, of a new laboratory adjoining the lodge. Beyond their obvious benefits to the immediate locality, reserves such as Santa Lucia play an important role in large scale conservation by preserving representative areas of healthy, functioning ecosystems. Santa Lucia is working with nearby reserves to create a large protected block of forest that would allow free movement of the species within it.

Beyond its own environmental and scientific aims, Santa Lucia also works closely with local communities surrounding the reserve. In addition to promoting care of the natural environment, it has launched a number of initiatives to train local people in conservation, ecotourism and scientific study techniques. The reserve considers community participation as key to its sustainability and continued success.

I would happily recommend a visit to Santa Lucia to anyone with an interest in the natural world, a sense of adventure and a sturdy pair of legs. To find out more about the reserve you can visit their website at <http://www.santaluciaecuador.com/>.

Tom Kirby is an undergraduate studying Ecology and Conservation at the University of Sussex, UK.



Another long march through the forest.



Thick forest cover slowed the rate of field work.



Orchid (*Odontoglossum* sp.).

An appreciation of the botanist, Maura Scannell

Mary J. P. (Maura) Scannell R.I.P.
18 March 1924 – 1 November 2011

By Matthew Jebb

MAURA SCANNELL was a superb and thorough correspondent. Receiving a parcel from 43 Raglan Road was always a pleasure for the sheer diversity, topicality and insight that it contained. I received my last letter from Maura on very the day of her funeral, November 3rd 2011 in her beloved Cloyne. Earlier in the year she had told me in a letter how eager she was to “head to the South”, but was held up by her “books, pottery, art, textiles and others. I collect and must stop.” Maura was indefatigable, and her lengthy typed letters, with their characteristic worm font and careful proof-reading corrections in biro, typed on a recycled sheet of paper that often earned its own annotations on the back, always ended with a “No need to reply” and often a hand-written “Apologies for poor typing”. Such was Maura’s nature. She was someone who truly cared about botany, people and the world.

A year before her death Maura had begun delivering larger and larger parcels to the herbarium, sometimes by bus, sometimes taxi, and finally we would send the Garden’s van to bring back piles of her characteristic tied boxes, each carefully titled on the outside with a summary of the contents. Maura always gave the driver and other staff doing the collecting a packet of sweets or some other small token of thanks. This remarkable archive runs to hundreds of books, boxes and parcels containing many thousands of fascinating items, each carefully annotated with a brief comment or accompanied by a typed sheet – a remarkable assemblage of books, specimens, museum items and other ephemera associated with the Irish flora.

On her retirement in 1989, as Head of the National Herbarium, Maura Scannell had already established a

remarkable body of work. Her collections in the herbarium are among the largest by any single Irish botanist; all the more remarkable when one considers that most were obtained during her own leisure time. Since retiring she remained an active visitor to the herbarium, a field botanist and author, contributing specimens, answering queries and publishing papers.

Always immaculately turned out, a fount of knowledge and a remarkable conversationalist, Maura Scannell has been a central figure in Ireland’s botanical world for over 60 years. A skilled horsewoman in her youth, Maura graduated from University College Cork and became Assistant Keeper of the Natural History Division of the National Museum in 1949. It was there that she developed her deep and thorough understanding of the importance of plants in Irish culture and history.

To both young and old, Maura was supremely generous with her time and energy, and a tireless correspondent. She was never too busy to be diverted by an interested schoolboy or schoolgirl visiting the museum, and had a long association, as a respected judge since the 1960s, of the annual Irish Young Scientists Exhibition. Many of today’s leading Irish botanists owe their love of botany to the remarkable adult who took the time to impart her enthusiasm for the plant world. Her fostering of scientists was shared with young and old – she assisted Evelyn Booth, then at the age of 82, to collate hundreds of records and to publish the *Flora of County Carlow* in 1979.

In 1970 she oversaw the transfer of the National Herbarium from the National Museum to the National Botanic Gardens, beginning a 20-year re-establishment of science at the Gardens. Last minute arrangements nearly resulted in major collections being disbursed, until Maura’s

strength of will ensured they were moved in their entirety to the National Botanic Gardens.

She was able to make full use of the gardens as a centre for taxonomic understanding. The nursery staff at Glasnevin were well used to her returning on a Monday morning with living plants to be grown on. A singular example was her dogged determination to resolve the identity of the ‘Renvyle Hydrilla’. Leading taxonomists in Britain had identified this plant as an *Elodea*, but when Maura finally flowered the plant in the Garden greenhouses she was able to prove that the plant was, as she had always suspected, *Hydrilla verticillata*. Her great interest in history and books gave her the foresight to enable the Herbarium to acquire one of its more remarkable treasures – a bound collection of specimens dating from the 1690s and once owned by Thomas Molyneux, a founder of the Dublin Society – this was bought from the library at Moore Abbey, in Monasterevin. Her other hunch, to purchase the only known portrait of one of the Garden’s founders – Walter Wade – was sadly ignored by the authorities at the time.

The sum of her many specimens, publications and manuscripts represent a vast repository of knowledge about the plants that fill our landscape. Her dedication and assistance meant that she contributed more to the published work of others than to her own, through her thorough attention to correspondence, identification of samples and her intimate and eclectic knowledge of Irish history, geography, ethnography, zoology, geology and botany. From 1963 to 1994 she had remained a constant and active member of the Irish regional committee of the Botanical Society of the British Isles, and in 1995 she was made an Honorary Member of the society.

Maura was presented with the National Botanic Gardens



Maura Scannell on the occasion of her being awarded the National Botanic Gardens Medal on the 14th May 2008

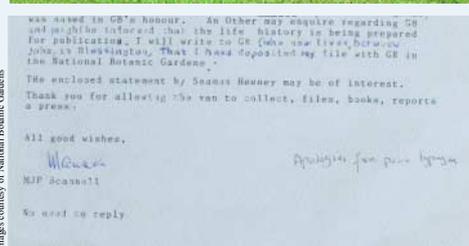
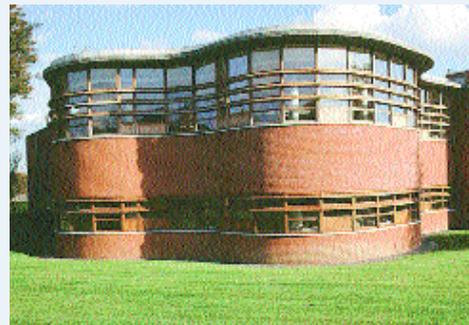


Image courtesy of National Botanic Gardens



Top: The Herbarium and Library at the National Botanic Gardens; Above and right: A selection of the papers sent to the National Botanic Gardens by Maura Scannell.

Medal in May 2008, in acknowledgment of her truly remarkable contributions to Irish botany. At the presentation she gave a spirited talk about her delight in the scale of botany, from the microscopic fungi she had discovered, new to science, in the grounds of the Botanic Gardens (*Dothiorella davidiae* on the fruits of the Handkerchief tree, *Davidia involucreta* in 1976), to exploring for plants in the west of Ireland.

Maura produced over 200 scientific publications as well as several important floras and



catalogues, besides her thousands of specimens and tens of thousands of field observations she has left a thorough record of her correspondence in the National Herbarium. She remained intellectually agile and fascinated by all around her to her dying day.

She will be greatly missed by her colleagues, the staff at the gardens and botanists both at home and abroad.

Matthew Jebb, Director,
National Botanic Gardens,
Glasnevin, Dublin 9.
www.botanicgardens.ie

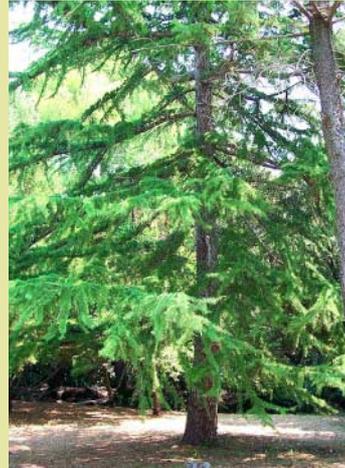
An Indian Cradling in Wiltshire

By Daphne Pochin Mould

I WAS born under an Indian tree, a huge deodar, with great branches and close-packed green-silver needles. It was a home birth and the exotic ivory white flowers of a magnolia peeked in the window. My folks had never been to India, though Kipling – “poet of the Empire” – was part of my infant reading. Next door, was an immensely tall, skinny tree, reaching for the clouds. I now know it was an American redwood and had crossed the Atlantic. However, we called it a Wellingtonia in honour of the victor of Waterloo. It was 1920, memories of World War I were all too close and bloody, as were older eighteenth and nineteenth century battles and conquests. The Raj was the great power, her ships ruled the waves and suburban villas were named after old, hard fought battles. But the British and their vanished Empire were only the last in a long series of successful raiders and ravagers from Norse Vikings on, who explored the planet and all that was in it. They mapped it, studied its plants and animals, exploited its riches (with no thought of “conservation” then) and killed or enslaved many of its old resident people. We think of Columbus as the first to go to the New World, but the Norse – the Icelanders – were in North America in the year 1000. They made no

permanent settlement however – the natives were many and unfriendly. The Icelanders settled in Greenland but we think of Columbus as the start of European “pirate raids” on the New World, which brought new territories, jewels, gold and silver, mineral resources, tobacco, potatoes and assorted diseases. From Portugal, Spain, France, Holland and Britain came new fruits, flowers, trees and shrubs to glorify our gardens. As a Wiltshire kid I could swing on a swing hung on the great branches of the Indian deodar and sing English songs of my own making. In our little garden we had raspberries and gooseberries, including the early golden drop plum. We planted a loganberry and a dessert blackberry, grew sweet peas, green peas, runner beans, shallots, potatoes and two “Irish” yews, the conical mutation which has appeared at Florence Court in the north of the country.

“The boar’s head in hand I bring, bedecked with bay and rosemary”: in the old song, and re-enacted at today’s “medieval banquets”, our ancestors feasted on meat, mutton, beef, venison and birds, such as chicken, peacocks, swan, grouse, ducks and exotic dishes like larks’ tongue. There was plenty of alcohol to drink and good honest bread, with no additives – just with flour, yeast, a little salt and water – but no spuds to eat with your meat, no chips with the fish, no after dinner coffee. Sir Walter Raleigh,



Deodar Cedar, *Cedrus deodara*.



Young Norfolk Island Pines, Norfolk Island, Pacific Ocean.

may or may not have been the first importer of potatoes and tobacco, when he returned to Ireland and his estate in Youghal from one of his piratical raids to the New World. These Elizabethans were clever and adaptable – brave men. Human life was cheap, danger accepted and slowly we got to know the whole world. No modern instruments and no radio, only little wooden ships powered by sail alone. There was no link with land or human contact till the next port or they met another ship and hailed her. They learned the great prevailing winds that swept around the globe and how to link up with others to carry the cargo for sale or import. So they named them the Trade winds and these winds swept monkey puzzles into Irish gardens, tea and coffee onto Irish menus, and sugar – when only honey had been available. Bananas, melons, pineapples arrived as technical advances were made by growing exotic things in hot houses. The great 18th century gardens were full of colourful fruit and vegetables and guarded against a hungry peasantry by 10ft walls. South facing inside walls were often faced with brick to warm up the sun’s heat and ripen the fruit trained against them.

Now small wooden, sail powered ships were sailing the world – exploring, mapping and describing. Zoologists met new animals and botanist new trees and plants. There was no photography, only drawings, paintings and the hand-written word the only record. Coal fires were the only heat and long voyages ran through tropical heat and arctic cold. It was not easy importing new plants, seeds and roots but they did it. Some fruits would stand long journeys – oranges and lemons, nuts, coconuts and grapefruits – these were sour to 18th century taste, but they liked to have one or two to bulk up a bowl of fruit.

1789 marked the first convict settlement on Norfolk Island from Botany Bay. “Pines grow here amazingly fast, some measured by the ship’s carpenter were 350 feet high and some 6 feet in diameter”. I imagine that they thought here were ready-made masts till they learned that the Norfolk Island pine is very flexible, bowing to every breeze. The British called it “the Monkey Puzzle” and planted it widely. The now restored gardens at Woodstock (Inisteege, Co. Kilkenny) even has an avenue of them, equally dull to walk along or fly over – they are not avenue trees. Most of the incomers to Ireland came gradually over the centuries from Europe and nearby islands, culminating in imports from South America and Australia.

Ancient Ireland had a quite limited range of trees. Only one species of oak – no beech, though it looks so natural here. But by the 18th century foresters and gardeners had a dazzling display of plants and shrubs in their nurseries. As for orchards, an early 19th century volume



Knightstown, Valentia Island.

lists some 200 different sorts of apple, including cider apples. Judging by advertisements even quite small houses had “orchards in full bearing”. Our little garden had 6 apple trees, all different and fruiting.

The Knight of Kerry planned a great garden on Valentia Island with many of the new plants. But the salt laden gales which sweep over the island were not kind to tender plants, so he wrote to the Olden Times of the virtues of a new South American shrub the Fuchsia (named for Dr. Fuchs) as a shelter belt. Well, we all know what happened. The little plant took off and is now almost a symbol for Ireland, with the Irish naming it “The tears of God”. In Valentia the Knight’s cuttings grew and grew, one becoming an immense shrub, so big that each year the whole family was gathered around it to measure its ever-increasing girth. You can have the same, just plant a nice cutting in fertile soil in a good spot and leave it alone. The rhododendron, a mountain plant of the Himalayas, must have delighted landscape gardeners, with its quick-growing, glossy masses of foliage and great gaudy flowers. But it has become a pest. Nothing grows under its canopy of leaves and it is a danger to our ancient oak. Killarney now wages war on it. In some southern parts of Kerry, the handsome Giant Rhubarb has become too invasive (Gunnera), while the Zebra mussel has got into our waterways where it is not wanted, possibly off visiting ships’ keels. So, take thought before introducing new plants or beasts. Australia does not want rabbits, nor Ireland mink and grey squirrels.



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Estuarine and Coastal Water Monitoring

By Dr Robert Wilkes

Introduction

The EPA has been monitoring and assessing the estuarine and coastal status of our waters since the early 1990s. Following the introduction of the Water Framework Directive (WFD) the monitoring programme has intensified and the EPA now monitors over 120 water bodies up to four times per year. In addition to more traditional monitoring, such as nutrient and oxygen concentrations, the assessment now covers a wide range of biological elements such as seaweeds, phytoplankton and seagrass. This holistic ecological assessment is an essential part of the WFD and, in conjunction with the Marine Institute and Inland Fisheries Ireland programmes, we are now in a position to provide a comprehensive overview of the ecological status of our tidal waters.

2007-2009 WFD Assessment

To allow for assessment of Ireland's ~15,000 km² of Coastal and Transitional waters the EPA has designated 113 Coastal and 196 Transitional waterbodies. These water bodies can be either a whole estuary or part of a large area broken into smaller units to allow for the practical implementation of a monitoring plan. A subset of these water bodies were then selected for monitoring to cover the wide range of pressures and environments encountered in Irish waters.

Ecological status is assessed on a 'one-out-all-out' basis. Overall ecological status of a water body is based on the biological quality element or physico-chemical standard with the lowest status. For example, if all the elements in a particular water body are at or near pristine conditions then the status of that water body is considered to be 'high'. However, if any

single biological quality element or chemical parameter is of lesser status then classification is based on that element.

The biological tools used for WFD monitoring have been specifically developed to allow for an ecologically relevant assessment that is practically and efficiently applied. Although relatively new, these assessment protocols are providing innovative ways of recording change in the environment. All the tools are designed to give a water body assessment on the WFD scale of High, Good, Moderate, Poor or Bad status. To ensure that we are using similar methods to other European countries, each tool has undergone a process of intercalibration which compares biological monitoring techniques across the EU.

Two tools are now in use to assess seaweed communities. One looks at the species diversity of rocky shore seaweed populations and measures their species richness and composition. A second seaweed tool is used in estuarine areas to measure the extent and impact of large accumulations of opportunistic green algae, commonly known as sea lettuce.

The phytoplankton communities are assessed by looking for changes in their natural cycles. Their abundance and composition are monitored seasonally and deviations from the expected cycles can point to increased environmental pressure.

Intertidal seagrass communities are assessed for their size and composition. These ecologically important protected communities have never been used as indicators previously.

In addition to the EPA monitoring the IFI and Marine Institute use new WFD biological tools, to assess the fish and benthic faunal communities.

More traditional physico-chemical parameters are also collected and these include concentrations of nitrogen and phosphorus, dissolved oxygen and biochemical oxygen demand (BOD).



Measuring water quality parameters such as conductivity, temperature, oxygen and pH.



EPA hovercraft, used for safely accessing soft intertidal muddy areas, after a survey of sea lettuce accumulations in Co. Cork.



Intertidal seagrass beds in Co. Kerry. These ecologically-sensitive protected habitats are now included as environmental indicators in the WFD monitoring programme.



Rocky shore seaweed communities, now used as indicators of environmental status.

Trophic Status Assessment

In addition to the WFD assessment the EPA must assess our waters for other obligations. The Urban Waste Water Treatment and Nitrates Directives require a measure of the degree of nutrient enrichment, or eutrophication.

Eutrophication is assessed using the EPA's Trophic Status Assessment Scheme (TSAS). This assesses the state of a waterbody based on a number of criteria namely nutrient enrichment (measurement of nitrogen and phosphorus concentrations), accelerated plant growth (phytoplankton/algal blooms and seaweed

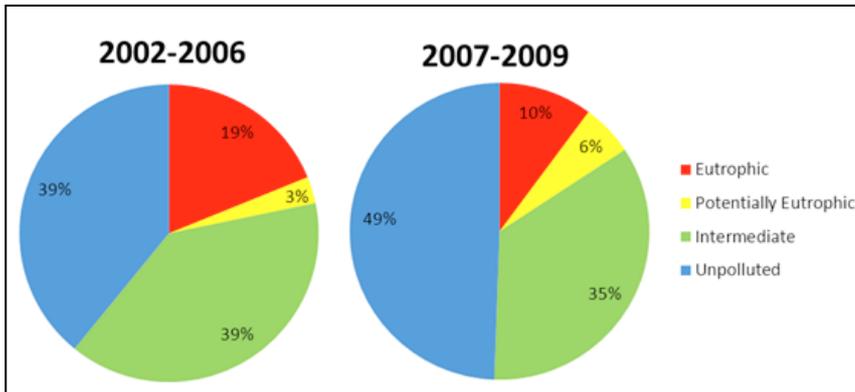
growths such as sea lettuce accumulation), and undesirable disturbance to the level of dissolved oxygen normally present.

- **Eutrophic** water bodies are those in which criteria in each of the categories are breached, i.e. where elevated nutrient concentrations, accelerated growth of plants and undesirable water quality disturbance occur simultaneously;
- **Potentially Eutrophic** water bodies are those in which criteria in two of the categories are breached and the third falls within 15 per cent of the relevant threshold value;
- **Intermediate** status water bodies are those which breach one or two of the criteria;
- **Unpolluted** water bodies are those which do not breach any of the

criteria in any category.

Overall the EPA's monitoring and assessment of the coastal and transitional waters points to generally unimpacted water quality. Only 5% by area is classified as eutrophic and, from an ecological assessment, over 64% of our surface waters currently meet WFD requirements of good status or better. However, challenges remain in preventing these high status waters from deteriorating and also for improving some badly impacted estuarine areas. Many areas continue to be directly impacted from municipal discharges and elevated diffuse nutrient inputs.

Dr Robert Wilkes, Environmental Protection Agency (EPA), John Moore Road, Castlebar, Co. Mayo, Ireland. www.epa.ie



Trophic status of Irish waterbodies in 2007-2009 (89 areas) and 2002-2006 (69 areas).

For more go to <http://www.epa.ie/downloads/pubs/water/coastal/>

Does the environment suffer in a recession?

By Alex Kirby

RECESSIONS ARE miserable affairs for most of us. But that's not to say they don't have their positive points – though you may have to strain pretty hard to see them.

Recently Natural England, the UK Government's advisor on the natural environment, issued a bleak statement which read in part: "Our 2011–2014 settlement involved a £44.2m reduction in our grant-in-aid over the next four years. We introduced a new organisational structure in April 2011 involving a programme of voluntary redundancy (through which 400 members of staff have opted to leave the organisation) and a tighter focus on our delivery work..."

But it stands to reason that there will be some winners. If the economy slows down, then pollution is likely to follow. It happened in 2009, when greenhouse gas emissions in the European Union fell for the fourth year in a row. The European Environment Agency said then that emissions from the 15 EU member states that signed up to the Kyoto Protocol fell by 1.3% in 2008, compared with 2007. The EU environment commissioner, Stavros Dimas, said: "...part of the reduction... is due to the economic slowdown", a view endorsed by Greenpeace Europe.

But the recession did little to lessen the world's over-consumption of resources, according to the London-based New Economics

Foundation (Nef). It calculates the day each year when the world goes into what it calls ecological debt – the date by which the world's people have used the amount of natural resources that should last an entire year if used sustainably. In 2009, Nef said, "ecological debt day" fell on 25 September – just one day later than in 2008. This showed, it said, that the biggest recession for nearly a century had made very little difference to global consumption. Nef noted that one US citizen would, by four o'clock on the morning of 2 January, already have been responsible for emitting as much carbon as someone living in Tanzania would generate in the whole year, while a Briton would take until seven o'clock on the evening of 4 January to

reach the same position.

In 2010 the Mostly Economics blog described a paper written by Matthew Kahn and Matthew Kotchen of the US National Bureau of Economic Research. Mostly Economics says the main thought of the paper, entitled *Environmental Concern and the Business Cycle: The chilling effect of recession*, is this: "...as recession deepens and hits unemployment, people become less worried over global warming and environmental concerns. The worries instead shift to unemployment and job issues." This leads in turn, the authors argue, to increased media coverage of the recession and less reportage and analysis of the environment. They conclude: "...effective environmental policy in general and climate-change policy in particular is more likely during economic booms."

More evidence of the impact of the recession on the US came in a report from its Energy Information Administration, which said that electricity generation in the US fell by 4.1% in 2009, the biggest fall in 60 years. As coal costs rose and natural gas prices dropped steeply, industrial demand for electricity declined by 9.1%. Further pressure on some traditional fuels came from wind, solar and biomass, which together grew by 14% that year. But continuing low natural gas prices were another factor altogether. If today's hopes of a shale gas boom are realised – and even more, if carbon capture and sequestration proves commercially possible – the prospects for renewable energy sources may need radical reappraisal.

In 2008 *Scientific American* published a podcast entitled *Is a Global Recession Good for the Environment?* (if you don't want to listen to the whole thing, the sub-head hints at the argument by answering the headline's question: "Seems like when the economy's bad, the environment improves, but history shows otherwise." The author argued that recessions damage the



environment by limiting the economic activity which could pay for improvements. He also blamed over-farming and drought for helping to cause the 1930s Mid-West dust bowl, worsening the Great Depression, and caused in part by it. The World Bank also blamed the economic crises which affected south-east Asia in the 1990s for increasing environmental damage like illegal logging and fishing with cyanide.

Well, that was then. We're four years on from 2008: what's happening now? Fast-forward to 5 December 2011 and an article published in the UK daily *The Independent*. Headlined "Recession did not lower CO2 emissions", it read:

"...Latest figures on CO2 emissions show that the global financial crisis of 2008–2009 has had virtually no impact on the long-term increase in greenhouse gases released from the burning of fossil fuels, deforestation and other industrial activities. The amount of man-made carbon dioxide released in 2010 reached a record 10 billion tonnes, nearly 6 per cent higher than in 2009. It has returned the world to a path of ever-higher emissions that will make it increasingly difficult to keep within the 2°C target that most experts believe is necessary to avoid dangerous climate change. Unlike previous global recessions, which caused long-term dips in carbon dioxide emissions lasting several years, the recent recession caused just one year's fall of 1.9 per cent, which was quickly reversed by a dramatic rebound of 2010 and 2011, said Professor Corinne Le Quééré of the Tyndall Centre for Climate Change Research at the University of East Anglia."

You might expect some of the non-governmental organisations campaigning for the environment to be feeling the pinch now. But that's certainly not the case for them all. Craig Bennett is director of policy and campaigns at Friends of the Earth UK. He told me:

"With FoE's income, the

picture is fine at the moment. Many NGOs which have relied for funding on foundations have suffered a lot, but we're lucky as around 75% of our income comes from our individual supporters. It's difficult to increase their number and the contributions they make, but most of them are staying loyal. In some places abroad, though, funding has been a real problem, especially in central and eastern Europe.

"But money isn't the whole picture, and what the economic crisis has changed is the context in which we campaign. The chancellor, George Osborne, believes the environment could restrain economic development, saying: 'We are not going to save the planet by... exporting valuable jobs.' He's said we should not go further or faster than other countries in trying to cut greenhouse gases. In a recession many politicians are happy to treat the environment as a scapegoat."

The head of media at the UN Environment Programme, Nick Nuttall, struck a similarly upbeat note when we spoke: "There have been some reductions in the core budget as a result of belt-tightening among some key supporting nations. But it has not been as severe as among some multilateral organisations. And in terms of UNEP's other financial flows – trust funds earmarked for specific projects – some countries, notably from northern Europe, have actually increased support. Overall, from UNEP's perspective, there is a recognition that the environment is becoming an increasingly important issue reflected in current funding levels at a time of austerity measures in many nations."

You pays your money and you makes your choice then. But do be sure you really do pay your money: green is never cheap.

Alex Kirby is a former BBC News environment correspondent.



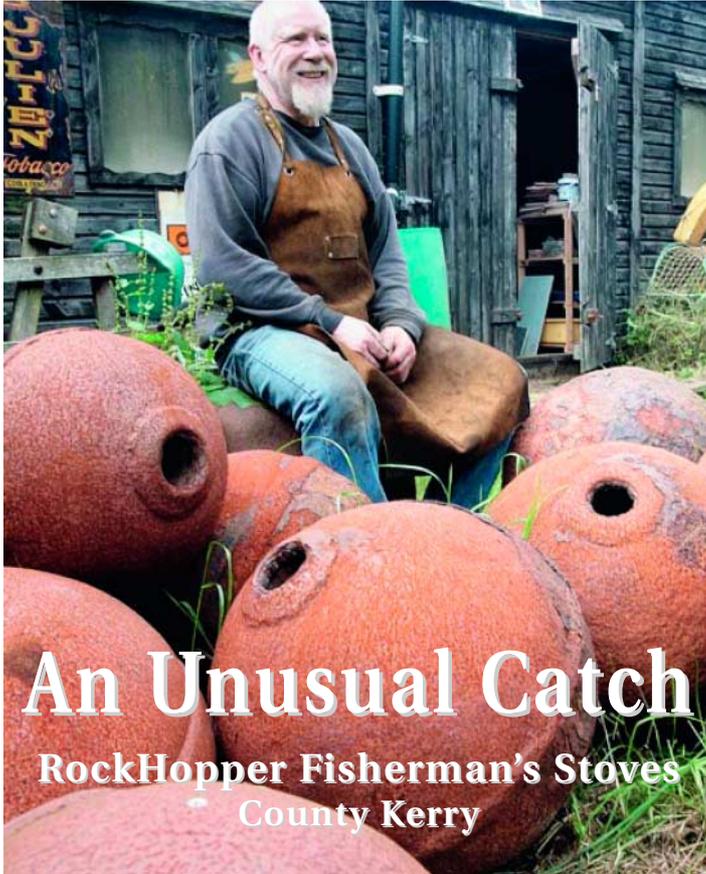
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Words: Farrin Foster
 Pictures: Kate Elmes

WHEN Piet Van Den Hove and his family sailed to Ireland about 30 years ago he had little money, and little else. Housed in an old ruin he had bought on some land in the craggy mountains of County Kerry, his wife and children shivered in the Celtic cold. Among the family's mottled possessions was a symbol of Piet's seafaring past – a rockhopper.

The rockhopper is a heavy circular weight which was attached to trawling nets and sunk to the bottom of the ocean, where it was dragged along behind a fishing boat.

Now mostly considered defunct and too destructive, the rockhopper is washed up on shores and abandoned. But when Piet needed a way to warm his new Irish home, he also found a way to give life to the ocean relic. He transformed his rockhopper into a combustion stove, and it gave instant and lasting heat which spread into the corners of the house.

Soon, Piet and his son Bart were making RockHopper Fisherman's Stoves for others in the area. When Martin Davies married into the family, the skill was passed along to him.

Now Piet is retired, and Bart has sadly passed away, but the Van Den Hove creative tradition lives on in the same workshop with Martin at the helm.

"I think it's a fantastic form of recycling as the rollers, or bobbins as they are called, cause so much damage to the seabed," says Martin.

"This is a much better use for them. Also, they come from the cold environment of the sea, and then go on to produce this fantastic heat."

Martin now has a friend who sources the rockhoppers for him when they wash up on a beach in Clifton, County Clare. Every rockhopper led a different life on the



Images courtesy of Kate Elmes

An Unusual Catch

RockHopper Fisherman's Stoves

County Kerry

Martin with a fresh catch.

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seabed, which makes its shape and size unique, leading to every product sold also having its own special characteristics.

The tradition has a limited life, as there is no knowing when the sea will stop providing materials for the craft, but while it carries on, every rockhopper stove built tells the story of human ingenuity.

RockHopper Fisherman's Stoves, Castlecove, Co. Kerry.
www.rockhopperstoves.com

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MACKERELS, BONITOS & TUNAS

(Family Scombridae) in Irish & Northern European Waters

By Declan T. Quigley

MACKERELS, Bonitos & Tunas belong to a small albeit commercially important Family of marine fishes (Scombridae) composed of 2 Sub-Families (*Gasterochismatinae* & *Scombrinae*), 15 genera and 51 species. The Sub-Family *Gasterochismatinae* contains only one aberrant species, the Butterfly Kingfish (*Gasterochisma melampus*), which is restricted to temperate waters circum-globally in the Southern Hemisphere. Although a total of 7 genera and 11 species belonging to the Sub-Family *Scombrinae* have been recorded from Northern European waters, including 5 genera and 9 species from Irish waters, most of these species only occur as rare vagrants (Table 1).

A number of other Scombrid species have occasionally been found in Southern European & Mediterranean waters, including the West African Spanish Mackerel (*Scomberomorus tritor*), Wahoo (*Acanthocybium solandri*), Narrow-barred Spanish Mackerel (*Scomberomorus commerson*) and Indian Mackerel (*Rastrelliger kanagurta*). The latter two species are normally found in the Indo-West Pacific, but entered the Mediterranean through the Suez Canal.

Several more species occur in the Western Atlantic, including 3 species of *Scomberomorus*, King Mackerel (*S. cavalla*), Atlantic Spanish Mackerel (*S. maculatus*), Cero (*S. regalis*) and Black-fin Tuna (*Thunnus atlanticus*). Due to their highly migratory epi-pelagic habits, it is always possible that any of these species could turn up as vagrants in Northern European waters, particularly in view of currently increasing trends in climatic warming and the specific ability of tunas (tribe *Thunnini*) to maintain elevated body temperatures by metabolic means (endothermy).

Atlantic Mackerel (*Scomber scombrus*)

The Atlantic Mackerel is a common, indigenous, cool temperate, species. It supports one of the most

economically important commercial fisheries in Irish & Northern European waters; c. 61,500 tonnes were landed by Irish vessels during 2009. The species attains a maximum weight of about 3.4kg.

Atlantic Chub Mackerel (*Scomber colias*)

Although the Atlantic Chub Mackerel is found world-wide in tropical and warm temperate waters, it has only been recorded on 7 occasions from Irish inshore waters (<200m). However, due to its overt similarity to the Atlantic Mackerel, it is possible that the species may not always be recognized. Indeed, it is relatively common in the Bay of Biscay and there were numerous reports of its presence in the English Channel during 2001. Unlike the common Atlantic Mackerel, the Atlantic Chub Mackerel does not have a swim bladder. The species attains a maximum weight of about 2.17kg.

Plain Bonito (*Orcynopsis unicolor*)

Although the Plain Bonito is endemic to the Eastern Atlantic, it is only locally common off the North African coast (southwards to Senegal) and in the southern Mediterranean. There are only 3 records from Northern European waters, all from southern Scandinavia (Skagerrak-Kattegat). The species attains a maximum weight of about 13kg.

Atlantic Bonito (*Sarda sarda*)

The Atlantic Bonito is found in tropical and warm temperate waters throughout the North & South Atlantic and is a moderately regular visitor to Northern European waters. Several specimens were recorded from southern UK and Irish waters during 2011. It is easily recognized by the numerous dark oblique stripes on the dorsal surface. The species attains a maximum weight of about 11kg.

Bullet Tuna (*Auxis rochei rochei*)

Although the Bullet Tuna is found world-wide in tropical and warm temperate waters, it has only been recorded on 5 occasions from Irish inshore waters. However, it is relatively common in the Bay of Biscay and it is possible that the species may be more common in Irish offshore

waters (>200m), particularly off the SW coast, but it is probably rarely recognized or recorded due to its small size – the species attains a maximum weight of about 3kg.

Little Tunny (*Euthynnus alletteratus*)

The Little Tunny is found in tropical and warm temperate waters throughout the North & South Atlantic. However, there are only 4 records from Northern European waters, 3 from southern Scandinavia (Skagerrak-Kattegat) and one from SE Scotland. It is easily recognized by the presence of several distinctive dark spots below the pectoral fin. The species attains a maximum weight of about 16.5kg.

Skipjack Tuna (*Katsuwonus pelamis*)

Although the Skipjack Tuna is found world-wide in tropical and warm temperate waters, it has only been recorded on 10 occasions from Irish inshore waters. However, since it is mainly occurs in offshore oceanic waters, it is possible that the species may be more common in Irish waters, at least seasonally, particularly off the SW coast. It is easily recognized by the lateral strips on the belly. The species attains a maximum weight of about 34.5kg.

Albacore (*Thunnus alalunga*)

The Albacore is found world-wide in tropical and warm temperate waters. Although there are only 6 records from Irish inshore waters, since 1990 the species has been increasingly exploited by Irish pelagic trawlers during the summer and autumn in offshore waters to the SW of Ireland; c. 3,550 tonnes were landed during 2011. It is easily recognized by the exceptionally long pointed pectoral fins. The species attains a maximum weight of about 60.3kg.

Yellow-fin Tuna (*Thunnus albacares*)

The Yellow-fin Tuna is found world-wide in tropical and warm temperate waters, albeit not known from the Mediterranean. Although it has never been recorded from Irish inshore waters, small numbers have been taken in offshore waters as a by-catch in the Albacore fishery.

Adults are easily recognized by the yellow, exceptionally long, pointed 2nd dorsal and pelvic fins. However, juveniles are sometimes confused with Albacore because of the relatively long pectoral fin, but the tip is rounded (rather than pointed) in the Yellow-fin Tuna. Sub-adults may also be confused with Big-Eye & Atlantic Blue-fin Tunas. Definitive identification involves an examination of the

number of gill rakers on the first arch (26-34) and the ventral surface of the liver which is striated in both Big-Eye & Atlantic Blue-fin Tunas but smooth in the Yellow-fin Tuna. The species attains a maximum weight of about 200kg.

Big-Eye Tuna (*Thunnus obesus*)

The Big-Eye Tuna is found world-wide in tropical and warm temperate waters, albeit not known from the Mediterranean. Although it has never been recorded from Irish inshore waters, small numbers have been taken in offshore waters as a by-catch in the Albacore fishery.

The species is often confused with Yellow-fin & Atlantic Blue-fin Tunas. Definitive identification involves an examination of the number of gill rakers on the first arch (23-31) and the ventral surface of the liver which is striated in both Big-Eye & Atlantic Blue-fin Tunas but smooth in the Yellow-fin Tuna. The species attains a maximum weight of about 210kg.

Atlantic Blue-fin Tuna (*Thunnus thynnus*)

The Atlantic Blue-fin Tuna ranges widely throughout the North & South Atlantic, including the Mediterranean and Black Sea. Although small numbers are recorded from Irish inshore waters during most years, the species is more frequently encountered in offshore waters, most recently as a relatively small by-catch in the Albacore fishery. The species is generally regarded as endangered throughout its range due to years of poor regulation and intensive commercial over-exploitation but there is increasing evidence that the status of at least some stocks may be improving due to increased monitoring, control and enforcement in recent years. The species is highly valued in Japan for making the finest sushi; a single fish weighing 269kg was sold for \$736,000 in January 2012.

The species is often confused with Yellow-fin and Big-Eye Tunas. Definitive identification involves an examination of the number of gill rakers on the first arch (34-43) and the ventral surface of the liver which is striated in both Atlantic Blue-fin & Big-Eye Tunas but smooth in the Yellow-fin Tuna. The pectoral fin is also comparatively short (<80% of head length). The species attains a maximum weight of about 679kg.

Declan T. Quigley, Dingle Oceanworld (Mará Beo Teo), The Wood, Dingle, Co Kerry. Mobile: 087-6458485 Email: declanquigley@eircom.net



Chub Mackerel (*Scomber colias*) [top] & Atlantic Mackerel (*Scomber scombrus*) [bottom] 14.09.2011, SW Ireland.



Plain Bonito (*Orcynopsis unicolor*).



Atlantic Bonito (*Sarda sarda*) Plymouth Fish Market 20 09 2010.



Bullet Tuna (*Auxis rochei rochei*).



Little Tunny (*Euthynnus alletteratus*).



Skipjack Tuna (*Katsuwonus pelamis*).



Albacore (*Thunnus alalunga*).



Yellow-fin Tuna (*Thunnus albacares*).



Bigeye Tuna (*Thunnus obesus*) Central Atlantic.



Atlantic Blue-fin Tuna (*Thunnus thynnus*) MFV Pacelli, Killybegs, NW Ireland 13.10.1999.

Tribe	Common Name	Scientific Name	European Status			Rod & Line Records (kg)	
			Ireland	UK	Scandinavia	IGFA (World)	Irish
Scombrini (Mackerels)	Atlantic Mackerel	<i>Scomber scombrus</i> L.	common	common	common	1.20	1.87
	Atlantic Chub Mackerel (Spanish Mackerel)	<i>Scomber colias</i> (Gmelin, 1789) [= <i>S. japonicus</i>]	rare	rare	no records	2.17	
Sardini (Bonitos)	Plain Bonito	<i>Orcynopsis unicolor</i> (Geoffroy Saint Hilaire, 1817)	no records	no records	rare		
	Atlantic Bonito	<i>Sarda sarda</i> (Bloch, 1793)	regular	regular	scarce	8.30	
Thunnini (Tunas)	Bullet Tuna (Frigate Mackerel)	<i>Auxis rochei rochei</i> (Risso, 1810)	rare	rare	rare	1.84	
	Little Tunny	<i>Euthynnus alletteratus</i> (Rafinesque, 1810)	no records	rare	rare	16.32	
	Skipjack Tuna (Oceanic Bonito)	<i>Katsuwonus pelamis</i> (L.)	rare	rare	no records	20.54	
	Albacore (Long-fin Tuna)	<i>Thunnus alalunga</i> (Bonnaterre, 1788)	seasonal	seasonal	no records	40.00	29.96
	Yellow-fin Tuna	<i>Thunnus albacares</i> (Bonnaterre, 1788)	rare	rare	no records	176.35	
	Big-eye Tuna	<i>Thunnus obesus</i> (Lowe, 1839)	rare	rare	no records	197.31	
	Atlantic Blue-fin Tuna	<i>Thunnus thynnus</i> (L.)	scarce	scarce	scarce	678.58	444.00

DAINTREE

the World's Oldest Rainforest

By Anthony Toole

IN 1770, when Captain James Cook ran aground on a coral reef, while surveying what is now the coast of North Queensland, he named the headland he had mapped earlier in the day, Cape Tribulation, for this, he recorded, was where his troubles began.

On our visit, in 2010, tribulations were far from our minds. For we stood on a pristine, curved beach, of that white perfection that conjures the popular image of a south sea paradise. Fewer than half-a-dozen people shared the beach with us. Above the high-tide line, and completely covering the steep slopes of the cape, was a forest of ferns, pandani, vines and mangroves of a density that defied penetration. There was hardly a ripple on the sea, which was indeed the colour of turquoise crystal.

The forest was the Daintree, which spreads down to the edge of the Coral Sea, where it meets Australia's Great Barrier Reef, making this the only place in the World where two UNESCO World Heritage Sites touch.

Until quite recently, the Daintree tropical rainforest was thought to be merely an extension of those in South-east Asia, and hence comparatively unimportant. This led to the danger of its being exploited by loggers and land developers. However, the discovery of its enormous diversity of life forms, some of them extremely ancient, coupled with an acceptance of the reality of continental drift, have brought the realisation that this is the oldest continuously evolving rainforest in the world. It is a survivor of the break-up of the supercontinent, Gondwanaland, and at 135 million years old, is two-to-three times as old as the Amazon rainforest.

Within its 1200 square kilometres, less than 1% of Australia's land area, is one of the most complex ecosystems on earth. It contains the richest diversity of plants in Australia, with upward of 1000 species. Its 430 species of bird represent 20% of the continent's total. It has 30% of its frogs, reptiles and marsupials, 65% of its bats and more than 12000 species of insect.

At the southern end of Daintree is Mossman Gorge, and though not as pristine as the forest to the north, allows a glimpse of what it contains. A boardwalk runs for a kilometre through tall trees that provide some relief from the sun's heat. At intervals, short side tracks run down to the Mossman River, where deep pools fill the gaps and hollows among enormous, water-smoothed boulders.

We spent a little time sunbathing on almost unbearably hot rock slabs

before leaping into the water and retreating to a cooler sandy patch beneath the trees. Above us, a yellow-bellied sunbird flew back and forth, busily constructing a hanging nest from leaves, grass and cobwebs. A bush turkey scavenged through the undergrowth, occasionally venturing closer, to peck at a bag or pile of clothing in search of food. Dragonflies settled on branches, and vivid, blue Ulysses butterflies flew through the trees and out over the pools.

There were large numbers of jungle perch in the quieter pools, juvenile fish that had swum here to mature, from their birthplaces in the sea. Also found here, though we did not see any, are saw-shelled turtles, which are one of the few predators capable of eating, without being poisoned, Australia's environmental scourge, the cane toad.

The barrier to northward progress through the forest is the Daintree River, which can only be crossed by ferry. Close to the ferry are a number of small companies that provide short boat trips up the river. We chose 'Nice-n-Easy' that offered what proved to be a 90-minute, very personalised cruise, rather than the usual one-hour trip.

We drifted across to the far shore, where mangroves grew out of the mud, and dense jungle vegetation overhung the water. We spotted an amethyst python coiled on a thick branch. Elsewhere, an estuarine crocodile rested on the mud beneath the trees.

We sailed up what appeared to be a narrow creek, but turned out to be a channel, separated from the main flow by a substantial island. Up a tiny tributary creek, we caught a glimpse of the back of Fat Albert, at five metres in length, the biggest crocodile in the Daintree River.

While returning to the jetty, we passed a muddy bank, on which numerous fiddler crabs scurried into and out of holes. A white-lipped green tree frog clung to a nearby sapling.

About ten kilometres north of the Daintree ferry, the forest achieves its greatest accessibility to visitors in the Daintree Discovery Centre. This is not a zoo, but a natural part of the forest, through which the animals and birds roam freely. It is designed with a view to minimal environmental impact, and gives the deepest insight into the full diversity of the Daintree Rainforest. An audio guide can be hired at Reception, which gives information about what can be seen at each numbered station on the trails, as well as the ways in which the Aboriginal people of the area made use of the plants to be found here.

From Reception, we followed the Aerial Walkway, through the middle of the forest, passing a huge variety of trees with names like



Mangroves, Cape Tribulation.



Daintree River.



Bush turkey.

Image courtesy of Anthony Toole

Daintree Hickory, North Queensland rosewood, Noah's walnut and black palm. Many were decorated with spiders' webs or contained hollows, visible from the walkway, which provided homes for birds, bats, snakes, possums and other forest creatures. Vines twisted around many of the trunks, which also supported epiphytes, such as basket fern and birds nest fern, which clung to the trees and obtained sustenance from the capture of falling leaves and the water trickling down the trunks.

The walkway curved round to the Theatre and Interpretive Centre. This contains displays of rainforest timbers, fungi and seeds as well as trays of beetles, moths and butterflies. There are also charts showing the invertebrates, snakes, lizards, birds and mammals that dwell in the rainforest, and large posters illustrating the geological history of the area and its climate. These are supplemented by audio-visual displays, six in number, which run from 11 to 45



Fiddler crab.

minutes, and can occupy a significant, though highly informative portion of a visit.

The Cassowary Circuit runs from, and returns to the Theatre. A cassowary is a large, flightless bird, which evolved, along with the emu, 80 million years ago. It is a solitary, and somewhat shy bird, and one perhaps needs a little luck to see one stalking through the undergrowth. Also breeding here is the orange-

footed scrub fowl, which builds the largest nest of any bird, consisting of a huge pile of dead leaves, inside which it lays up to two dozen eggs, which are incubated by heat from the rotting vegetation.

Plants that can be seen on this trail include idiot fruit, an extremely rare tree, the seeds of which are so toxic that nothing will eat them. They are so little dispersed that they grow only in a limited number of places. Also found here is the cassowary plum, the fruit of which can only be digested by the cassowary.

The Bush Tucker Trail also follows a circuit from the Theatre, but has some side trails, one of which leads back to Reception. It concentrates mainly on the various plants that can be eaten, or which contain pharmaceuticals, or have other uses, many arising from Aboriginal culture: scrub breadfruit, Davidson's plum, native figs.

An interesting plant seen here is the strangler fig, which grows, vine-like up the trunk of a host tree, which eventually dies, leaving the fig standing by itself. One of these strangler figs is the particular one that appeared in David Attenborough's television series, 'The Private Life of Plants'.

The dominating feature of the Discovery Centre, rising 23 metres above the forest floor, is the Canopy Tower. This has five platforms at various heights, which together afford unparalleled views over the forest. As well as the trees themselves, and the epiphytes they support, one is most likely, from here, to get the best sightings of the many forest birds: sunbirds, double-eyed fig parrots, Torres Strait imperial pigeons, Wompoo pigeons, or perhaps the flying foxes that roost here.

The Daintree Discovery Centre is not a place to visit in a hurry. We came twice, spending a number of hours here each time. To encourage this, the admission price allows further visits within a week at no additional cost.

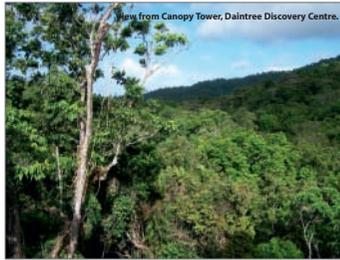
On our return to the ferry from Cape Tribulation, though the road was good, we were continually reminded that we were in a wilderness. An hour spent on the Mardja Botanical Walk told us something of the evolution of the Daintree. Somewhere near Cooper Creek, we had to slow down to allow a lace monitor to cross the road.

Then just before we reached the ferry, the forest presented us with an unexpected free gift. At the roadside, not quite hidden by the vegetation, stood a cassowary and its chick. I stopped the car not three metres from them and photographed them through the open window. After a couple of minutes, and quite unconcerned by our proximity, they slowly stepped out onto the road, calmly walked round behind the car, and crossed over, to disappear into the forest.

Anthony Toole, 65, Cheswick Drive, Gosforth, Newcastle upon Tyne, NE3 5DW, U.K. E. anthonytoole@fsmail.net W: <http://myweb.tiscali.co.uk/anthonytoole>



Yellow-bellied sunbird and nest.



View from Canopy Tower, Daintree Discovery Centre.



Beach at Cape Tribulation.



Torres Strait Imperial pigeon.



Amethyst pythia



White-tipped green tree frog.



Boyd's forest dragon.



Hibiscus, Cape Tribulation.

DAINTREE

the World's Oldest Rainforest

Photography by Anthony Toole
 (See article on page 15)



Mossman Gorge.



Basket fern epiphyte.



Strangler fig, Mossman Gorge.

Waking up to the Potential of Aquaculture

Richie Flynn, IFA Aquaculture Executive Secretary, speaks to Matt Murphy about the present state of the aquaculture industry in Ireland and the way forward for the industry....

Are you pleased that the potential of aquaculture is at last being recognised by government?

I am pleased that both the Government and the EU Commission are finally waking up to the potential and necessity of aquaculture. It is a pity that it took the economic crisis to reveal that the emperor of service industries, call centres and mobile transitory industries really had no clothes in comparison to the food sector.

Can the industry respond to the challenge?

Without a doubt. Despite the years of frustrating apathy at regulator and political level, the industry could never afford to lose hope. On our own, we kept developing better ways of farming fish and keeping competitive while our services and supports were being kicked one by one from under us by successive ministers and administrations who saw no value in keeping coastal communities thriving.

Much blame for the lack of development of the industry is the lack of licensing. Can you explain the problem?

It is a situation most sane people refuse to believe could occur. Through the ineptitude and bureaucracy of our own civil servants and politicians, the country was walked into a trap. Failing to see the consequences of not implementing the Habitats Directive, Duchas, the Dept of Environment and the Depts of Marine and Agriculture have had to spend countless hours and resources digging themselves out of a legal hole with Brussels since a 2007 European Court of Justice judgement on the implementation of the Habitats Directive. Today, jobs and exports are the only game in town – everything else is an unnecessary luxury that we cannot afford. Governments have spent too many years pandering to single issue, egotistically driven anti-aquaculture voices but now is the time for the industry to make its voice heard and produce jobs and exports.

Is licensing the only problem?

Any sector which is regulated by over 400 different pieces of legislation in the EU, has five different agencies monitoring and duplicating red tape, has to deal with a media and

public who don't want to know the facts about what needs to happen to grow fish sustainably, will have problems. Consider the madness of Leitrim County Council closing Lough Allen Fish Farm – a perfectly run small smolt producer with the loss of 8 jobs – and now the same council is considering allowing fracking in the same area? Was this a cynical move to take out the only industry in north Leitrim that regularly monitored the environment? And as for the completely ridiculous policy of decentralisation which put any hope of making progress on hold for almost two years and removed the corporate memory from the Department, it would have been far more pleasurable to literally bang one's head off a brick wall.

The reason the industry keeps going is because our products are in demand and we produce the best quality possible.

At present we only farm two shellfish species, oysters and mussels. These are mostly being exported in bulk. Are there added value opportunities?

Well I would add clams, scallops and abalone to that list firstly. Some markets demand bulk supplies of live shellfish such as oysters and bottom grown mussels, and are willing to pay for it. More value can be added to live exports through investment in quality systems, training, and increasing our understanding of the impacts of handling and machinery on the stocks. BIM in Clonkilty has begun an exciting period of work with IFA members on new products for mussels and Bord Bia will also be rowing in this year to promote greater consumption of locally grown shellfish on the domestic tourism market.

Over 180,000 tonnes of Chilean mussels are being exported to European markets. Is this effecting Irish Producers?

Undoubtedly. The import of Chilean frozen seafood meats has damaged the European market and has had a domino effect of forcing product out of its traditional marketing zones, causing havoc further down the line. The Spanish, French, Danish and Dutch industries are similarly impacted. It looks like Chile is

using Europe as a dumping ground while selling at much better prices in the United States. The Commission must wake up to this crisis and through our European organisation EMPA, based in Paris, IFA will fight with our EU colleagues to challenge these imports.

The mussel industry is under severe pressure due to the closing of the processing factory at Bantry. What are these producers doing with their mussels?

The closure of Bantry was a body blow for the sector and one which I hope will be reversed in the near future for the sake of the industry, the locality and the state. Producers have had to find alternative markets, which is tough with so much pressure on prices. There is still a lot to learn from the PWC report on the rope mussel sector carried out a number of years ago and opportunities for entrepreneurs to put a marketing push behind Irish mussels to differentiate them in the market in the same way our salmon industry has successfully achieved.

For over 20 years funding has been given for abalone and sea urchin hatcheries, yet we have little to show. Why?

These alternative species are high value but both of them need scale and marketing to achieve their potential, as well as the ever present challenge of sourcing quality juveniles.

Are you worried that French oyster companies have already purchased over 60% of Irish oyster farms?

I don't know where that figure comes from. However I am not surprised that French producers are looking to Ireland to spread their potential risk, given what has happened in France in the last 4 years with summer mortalities. Irish producers need to be aware of the value of the sites they are sitting on and not give them away lightly but that being said, we have a very symbiotic relationship with France – we purchase seed there and it is our main market for fully grown oysters. There are commercial realities to be faced and sectors, which have been under the government's development radar, have been forced to look elsewhere for development.

Table 1: Production and Value of Irish Aquaculture Products 2012

Spp	T. tonnage	T. value (€)
Abalone	0.4	13000
Urchin	1.5	15000
Novel Shellfish Total	1.9	28,000
Bottom Mussel	13168	9192310
Clam	175.2	1082000
Gigas Oyster	6942.5	20301874
Native Oyster	218.5	877000
Rope Mussel	8765.5	6397856
Scallop	58.5	347200
Total Shellfish	29,330	38,226,240
Total Seaweed	2.1	1050
Freshwater Trout	668	1959860
Sea Reared Trout	434.4	1932793
Salmon	15690.8	70585601
Smolt	358.6	2011500
Novel Finfish Total	64	459500
Total Finfish	17215.8	76949254
Char	40	280000
Perch	24	179500
Turbot	0	0
Total Aquaculture	46548.0	115176544

Source: BIM

What is your view of the new proposal by BIM to apply for offshore fish farming licences off the Aran Islands?

IFA welcomes this initiative by Minister Coveney and BIM as it raises the profile of the sector, has the potential to create jobs and poses questions regarding investment and scale which to date have been largely ignored by officialdom. We have been consistent in saying to the Minister that the project must not distract or take the foot off the gas in terms of the 500+ existing licence applications sitting in his Department – they must get priority. It is important too that marketing of the resulting product is well-researched in advance.

Why are we only farming salmon and not turbot and halibut, which can be farmed at landbased units?

Well we are farming turbot and have successfully done so in the past. However unlike Spain and other countries our water temperatures require heating at certain times of the year thereby increasing our energy costs. In addition, the establishment of a pump-ashore or recirculation unit is an expensive task but I am sure the ingenuity of operators will overcome these challenges and we will see other species being pulled along to commercial production in the wake of successful mainstay species such as salmon.

What is the present value of aquaculture products being farmed and

what is a realistic figure for 2020?

The past number of years have seen volumes fall but overall value increase. Today's value at the farm gate is over €115 million and while salmon prices have eased dramatically, Irish organic salmon is holding its own and oysters are still experiencing a very strong trade. So, because you cannot magic up a farmed fish in a few months (despite what some may think) I would hope that on quality and price we can add a good few million euro to that figure in 2012.

Finally, are there any species, other than those already mentioned, being farmed abroad which could be commercially farmed here in Ireland?

The key to successful aquaculture is 1) choosing the right species – one that is not going to be exposed to the unpredictable peaks and troughs of wild caught stocks of the same species and 2) cracking the ever present juvenile problem. Cod is a good fit for this, with a good deal of expertise gleaned over the years. Personally I'd like to see breakthroughs in the juvenile production stages of species such as eel or freshwater crayfish. More work could be done on re-establishing native oyster beds and of course the potential for seaweed production for a range of food and non-food applications is tremendous.

A Look at Long Island

JOHN AKEROYD introduces another Roaringwater Bay island



WEST CORK'S Roaringwater Bay is always full of interest and variety. During the last 20 years, with other botanists working at Sherkin Island Marine Station, I've had the good fortune to visit the Bay's remoter, less populated and seldom visited islands. So far in *Sherkin Comment* I've described West, Mid and East Calf, West and East Skeam, Castle and Horse. Now I shall look at Long, the third largest of the islands, which lies off Schull on the northern shore of the Bay – the sea adjacent to the Mizen Head peninsula is often called Long Island Bay. Although less studied botanically than some other islands, Long has a known flora of 332 species, and has yielded some of our most interesting plant records, including four plants listed in the Red Data Book of rare Irish species.

Geologically, Long Island or Inishfada and the other islands in Roaringwater Bay are of Upper Devonian age (350 million years ago), formed largely of purplish mudstone rocks of the Castlehaven Formation. Long, Castle and Horse form an island chain and may once have been a single island, reputedly rent apart in the mid-9th century in a huge storm. Like Castle and Horse, Long is low-lying, no more than 31m at its highest point. The island is just under 5 km long but is less than 1 km wide, and has a somewhat indented rocky coast with some shingle strands. A road runs most of the island's length, fading into a path towards the eastern end – where a small amount of copper was mined from time to time during the mid-19th century, and where today stand a small

beacon and landing stage. The island was occupied by the Normans in the early Middle Ages, later passing to the O'Mahonys (who built the castle on nearby Castle Island) and then the Earls of Cork.

Long has few trees, other than some shrubby willows and planted aspen and poplars, also elder, gorse and hedges of fuchsia and Japanese spindle. The island soil, derived from eroded rock and glacial drift, and traditionally improved with seaweed, is fertile enough for tillage. In the 19th century, Long was a farming and fishing community of over 300 inhabitants, and at the western end of the island you can still see the grassed-over ridges of former lazy beds that extend right down to the strand. A century and a half of famine, poverty and emigration had by the 1990s reduced this number to 20, but today it is just 6, although augmented by holiday visitors in summer.

Much of the island is pasture, grazed by cattle and sheep, and at the western end are species-rich heath and coastal grassland. The rich grassland flora includes much of interest to the botanist, including orchids, sedges and five species of pearlwort. The heath flora includes Bitter-vetch, at one of its few sites on the islands, and the little clover-like Bird's-foot, Red-listed in Ireland, on rockier ground. Boggy places support several interesting plants such as the insectivorous plants Pale Butterwort and, in pools, yellow-flowered Greater Bladderwort. Along the tracks, stone and grass-covered walls provide good habitats for plants such as



Top: Long Island. Above: Spotted Rockrose (*Tuberaria guttata*), a Roaringwater Bay speciality, first discovered in June 1994 on Long Island by botanists from Sherkin Island Marine Station.



Musk Storks-bill (*Erodium moschatum*) (top) is a decreasing plant of waysides. Sea Spurge (*Euphorbia paralias*) (middle), rather scarce in Roaringwater Bay, is locally common on sandy shingle strands towards the western end of Long Island, as is Yellow Horned-poppy (*Glaucium flavum*) (bottom).

the tussocky Prickly-sedge, and a wall at the west end of the village has a flourishing population of a rare crane's-bill, Little Robin. Until 1993 it was thought to be restricted in Ireland to old walls in Cork City and Dungarvan, Co. Waterford. Little Robin also grows on an adjacent shingle strand, with Yellow Horned-poppy and other more typically coastal plants.

Towards both the western and eastern ends of Long there are small populations of Spotted Rock-rose, a tiny yellow-flowered annual found here only in 1994 (towards the west end in 1996, and on Castle in 1999), but known on East Calf and Heir since the 1930s. A West Cork floral speciality, it is Red-listed in Ireland. Not far from this site, an un-mortared wall has a fine population of an elegant little fern, Lanceolate Spleenwort, also Red-listed. This occurs on Cape Clear and has been recorded also on Sherkin and Castle. Both rockrose and fern – and Little Robin – are plants more typical of the Mediterranean region, but which extend up along Atlantic coasts of Europe and are able to thrive in the mild climate of West Cork.

The few potato patches still hold rare weeds of tillage, relics of when there were more people: these include the rare Purple Fumitory and Sharp-leaved Fluellen, the last Red-listed and restricted to Counties Cork, Dublin and Wexford. Here and there on waysides grow escaped mints and the stately yellow daisy Elecampane, an old

medicinal plant. A more recent find was Knotted Hedge-parsley, a diminutive carrot and parsley relative, always rare and sporadic in Roaringwater Bay. No doubt Long will long continue to yield botanical interest and surprises!

John Akeroyd, who has been visiting Roaringwater Bay since 1986, edited *The Wild Plants of Sherkin, Cape Clear and adjacent islands of West Cork (1996)* and co-authored its Supplement (2011).

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A Cat and Mouse Game

By Ciaran Byrne

In a recent article I outlined in detail the kinds of situations which are regularly faced by IFI officers when carrying out their protection duties, and while there is a significant and growing body of anglers and commercial nets men who are acutely aware of the finite nature of the inland fisheries resource, there are still those who flout the laws of the land at every available opportunity. In this regard it is incumbent upon IFI officers to catch offenders and deal with them robustly. IFI faces similar challenges to practically every other enforcement agency in Ireland and throughout the world, and that is the age old game of 'cat and mouse'. The warning printed boldly on the literature for my house alarm captures it nicely, it says that "this alarm will not stop a person breaking into your house" so while it might put the burglar off a while, and it may even put him off for good, if a burglar really wants to break into my house he will. A similar situation is faced by enforcement agencies gener-

ally, and IFI specifically, in that if a person wants to engage in illegal fishing of any sort he may be put off by the enforcement activities of IFI, or even the laws in place to prevent such actions, but if he really wants to engage in illegal fishing, he will, and to a large extent there is little that can be done to stop him in such situations.

I recall a very senior member of An Garda Síochána setting out the situation very clearly in an interview on crime and crime statistics, what he said was that "the criminal only has to get it right once but the Gardai have to get it right 100% of the time" this statement is true of all types of enforcement activity. So the question is what are IFI doing about it? And the answer is IFI is innovating, using new modern technologies to ensure that the enforcement effort is targeted at the places most likely to yield results and also at the people most likely to engage in illegal fishing activity. This might seem like a statement of the blindingly obvious, however it has been IFI's

experience that many stakeholders do not understand that IFI staff are constantly out there patrolling our rivers, lakes and coastline and just because you do not see the officers it does not mean they are not there, it is highly likely that the officers were engaged on a stakeout operation during the night or on a night kayak patrol. As a nation we have grown used to the idea of covert Garda operations, and most of us who drive have witnessed the incredibly successful Garda Traffic Corps, stopping aberrant cars on our roads, using their unmarked vehicles. Well the situation at present is that a significant amount of IFI's enforcement activity is done on a covert basis, as interestingly, criminals tend to watch their backs and they do not keep regular hours.

Most recent in the long line of new technologies being used by IFI is remote web based camera systems to focus on particular illegal fishing hot spots. Recently profiled on national and international news networks, IFI have commenced using these small,



Images courtesy of Inland Fisheries Ireland

mobile, covert cameras to focus on specific problem areas throughout the country. The small camera technology per se is not that new, as similar devices have been used previously, what is new and innovative is the additional functionality and military grade encryption security built into the process of recording and transmitting images. These cameras are tiny, they can be placed in a very covert location, aimed at the particular weir or pool, they have excellent optics and can work in the lowest of light levels using infrared technology, they have a fantastic battery life, and most importantly of all, they have built in motion detectors which will send the IFI protection officers a text to their mobile phone when they detect movement. Rather than immediately launching the 'cavalry', the officer can then, using the data end of the mobile phone login to the camera and watch live footage of what is going on. This allows the officer to separate events of concern such as poaching from random events like the movement of animals. Our officers are usually called to these events at times of darkness. Using other specific technologies such as night vision cameras, which allow officers to operate in very low light conditions and thermal



Top: Illegally caught pike. Above: Siezed fishing items.

imaging cameras, which allow officers to operate in complete darkness, they can quickly assess the situation and determine the best approach to the incident.

This technology allows IFI to have eyes in many places and directs the reducing manpower compliment in a more effective and efficient manner. IFI aim to continually harness the power of modern technologies and are already examining the use of high definition functionality in our cameras for roll out in 2012. However, with all of this being said the most effective deterrent to illegal fishing is you! There is no substitute for clear concise intelligence which IFI officers can act on, and in this regard officers have excellent relationships with a huge range of stake-

holders in their local areas. Notwithstanding such local arrangements IFI also run a 24 hour confidential hotline in which you can report any incidences or concerns which you may have in relation to illegal fishing, pollution offences and also the occurrence of invasive species (1890 34 74 24). Finally, I again want to reiterate that illegal fishing is an environmental crime and will not be tolerated, and the only way we can effectively eliminate this scourge on our rivers and lakes is with your help and assistance.

Dr Ciaran Byrne, Chief Executive Officer, Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin, Ireland.
Web: www.fisheriesireland.ie

"A Guide to Coarse Angling in the Erne and South Donegal" & "A Guide to Sea Angling on the East Coast"

Inland Fisheries Ireland

Inland Fisheries Ireland have just published these two publications. The Erne guide is by Michael Fitzpatrick and Shane O'Reilly, two of the foremost experts on coarse angling in IFI. The sea angling guide is by Norman Dunlop the renowned sea angler. Both publications contain detailed information on angling venues, methods, seasons for various fish species and bait availability. There is also essential contact information on angling guides, chartered boat skippers, fish species and safety regulations. Each of these 70 paged guides contains excellent maps of areas to fish and many colour photographs of fish. They are invaluable reference books for those new to the sport and especially to tourists who can plan their visits to numerous angling locations featured in these guides. Both guides are available for free from Inland Fisheries Ireland Tel: 01-8842600, www.fishinginireland.info and www.fisheriesireland.ie



A Guide to Sea Angling on the East Coast



A Guide to Coarse Angling in the Erne & South Donegal

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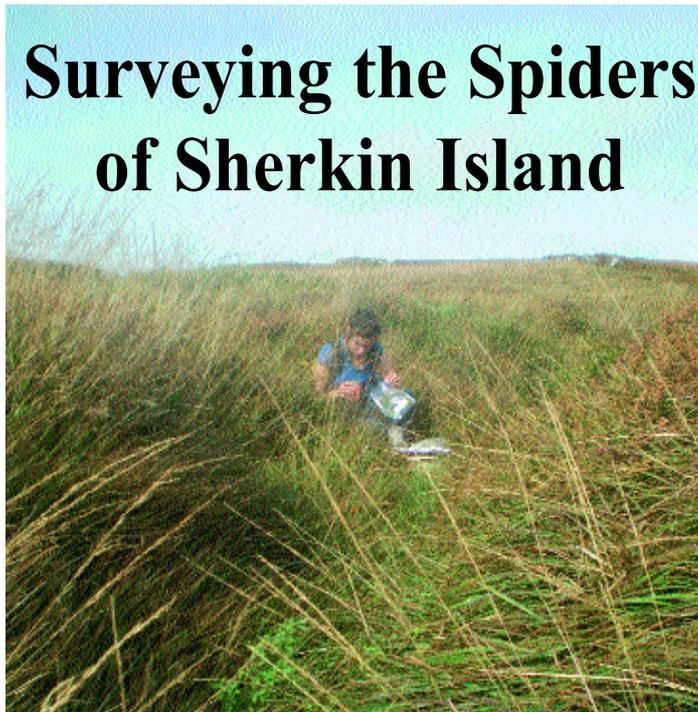
By Kristi Leyden

YOU don't have to look too hard to spot a spider's web, yet this group is very often overlooked. As is the case globally, spider fauna data in Ireland is limited. To the best of our knowledge there are over 410 species currently on record here, but more survey work is required. The present study focussed on measuring species richness, abundance and habitat association on Sherkin Island during mid and late summer 2011.

Survey methods and identification

While spiders can occur in almost all situations and any time of the year, most Irish spiders mature in spring and early or late summer. This survey was conducted during four separate visits to the island during July and September. Eleven habitats were selected to represent Sherkin's main habitats encompassing: coastal grassland; wet grassland; agricultural grassland; deciduous woodland; coniferous woodland; bracken; flush; heath; roadside hedgerows; human-associated habitats; and a wooded area bounding farmland.

Spiders are well known predators of fellow arthropods, mainly insects, that use a number of different mechanisms which include hunting, lying in wait and/or snaring prey on a web. Several surveying techniques were employed in this survey to exploit these predation traits. The main surveying method was trapping, using pit-fall traps for hunters or web-weavers at ground level. This was augmented with targeted collecting in the form of pootering, sweeping, beating and sieving aimed at web-weavers above ground level. Efforts were made during targeted sampling to avoid juveniles and previously identified species. The pitfall



Collecting pitfall traps on Sherkin.

catches and unidentified spiders were labelled, and stored in 70% ethanol in plastic vials for later identification under a light microscope using identification keys. A number of species were sent to Myles Nolan (Natural History Museum) for expert verification and/or identification.

Surveying the Spiders of Sherkin Island

Survey findings

35 species were identified representing ten families. In all, 490 spiders were collected during this survey 322 of which were identifiable mature spiders, and 168 were unidentifiable juveniles. Of the mature specimens, 142 were male and 180 were female.

Notes on some of the spiders found

Araneus diadematus (Family: Agelenidae)

This beautiful spider, one of Ireland's largest was seen in its orb web amongst hedgerows and bracken on Sherkin. The species has a large abdomen which can vary in colour. Those recorded, had a bright orange-red colour with the species distinctive white cross marking the dorsal side of the abdomen.

Linyphia triangularis (Family: Linyphiidae)

This species was abundant throughout Sherkin, particularly in September amongst bracken and hedgerows. They are distinctive in that they hang from their horizontal sheet web with the ventral side of their abdomen facing up.

Pardosa pullata (Family: Lycosiade)

This was the second most abundant species in the survey. 24 males and 42 females were caught in total, with the vast majority collected in July with pitfall traps. This species was found in coastal and wet grassland.

Pholcus phalangoides (Family: Pholcidae)

Commonly referred to as daddy-long-legs, this spider was extremely abundant in human-associated habitats seen mainly in room corners in its open loose web. An interesting observation of this species was made while on a separate visit to Sherkin in mid-summer 2010. Here a large number of crane fly (Family: Tipulidae) undertaking an annual mating swarm became readily available prey for *P. phalangoides* when they found themselves trapped in buildings.

Metellina mengi (Family: Tetragnathidae)

This spider was observed on the island where its web was found in the corners of external windows. The family Tetragnathidae is

easily identifiable due to one segment of their web being left vacant.

Pachygnatha degeeri (Family: Tetragnathidae)

This species had the highest abundance in the survey, accounting for approximately 40% of the mature identifiable spiders collected. *P. degeeri* can occur in a wide variety of situations. On Sherkin, it was found in coastal, wet, and agriculture grassland, along with flush and heath.

Discussion

There were 35 species of spiders identified in this survey, approximately 9% of the total Irish spider fauna. Those species found are all relatively common and widespread or else locally abundant in their particular habitats. A similar spider survey carried out on Tory, Co. Donegal between 2002 and 2006 (Martin Cawley) listed 110 species. While overall recorded species richness and abundance in this survey was lower than expected, the data collected sets an important baseline. In light of findings and expert advice, the author would recommend future surveyors of Sherkin Island's spider fauna to increase sampling periods to include spring and early summer, along with extending the trapping and targeted collecting period.

Additional spider information

Sources of general reading on spider identification and ecology include the British Arachnological Society (www.britishtspider.org.uk) and Collins field guide to spiders of Britain and Northern Europe (HarperCollins Publishers).

Acknowledgements

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Kristi Leyden was formerly a volunteer at Sherkin Island Marine Station.

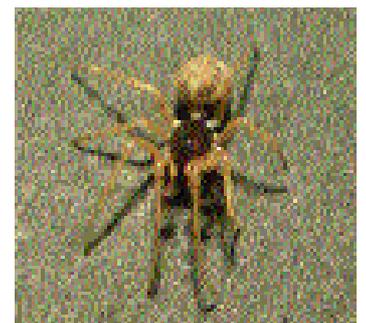
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Female *Araneus diadematus*.Male *Pachygnatha degeeri*.

Cleaning up the Mess We Made

Part 2 of a 3-Part Series

By Walter Muggan¹

IN my previous article I wrote about some of the industries that have, over the span of the past two or three centuries, contributed much to our prosperity, comfort and convenience ... but have also churned out stunning amounts of toxic industrial wastes. These wastes have increasingly been made up of “unnatural” chemicals – chemicals that never existed in nature, and to which humans and other organisms therefore never had a chance to evolve any tolerance.

Solvents are among the most important and widely-used industrial chemicals. From paint thinners to cleaning agents to manufacturing intermediates, solvents are ubiquitous in the industrial world. Two of the most common solvents are trichloroethylene (TCE) and tetrachloroethylene (also known as perchloroethylene, PCE or “perc”). The former has uses in a wide variety of industries from extraction of vegetable oils to medical anesthesia, but is most commonly used as a degreaser and cleaner for metals and electronics. The latter is most commonly used as dry cleaning fluid. Both are probable human carcinogens, and are frequently found at toxic waste sites. (In the U.S., TCE is a contaminant at over half of all sites on the federal “Superfund” list of the worst toxic waste sites in the country.)

Polychlorinated biphenyls – PCBs – are a group of chemicals invented early in the 20th century. With superior characteristics as dielectric and hydraulic fluids, and with numerous other useful properties, millions of pounds were in use by the middle of the century, in a wide range of industrial and commercial applications ranging from capacitors and transformers to paint, caulk, cement, and even fabric. By the 1970s it was widely recognized that PCBs are probable human carcinogens and have a variety of other adverse health effects, and were therefore banned in the U.S. and elsewhere. Unfortunately, one of the characteristics that made PCBs so useful also makes them a most troublesome environmental contaminant: they are extremely resistant to breakdown or degradation; thus, they persist in the environment for a long, long time. They also “biomagnify,” which means that concentrations in living organisms tend to increase as one moves up the food chain. As humans, we are at the top of the food chain, and by now populations literally everywhere on earth – no matter how remote – have PCBs in their body tissues.

Virtually every industry has its signature waste products. The paper industry, without which modern life would be unimaginable, is the third largest source of pollution in North America, with chlorinated wastes including dioxins – some of the most dangerous substances known. The automobile industry, a major driver of the world economy, is also one of the major sources of lead and mercury pollution. The lead is primarily from batteries, while the mercury is from certain kinds of switches (now being phased out). The cement industry manufactures the second most widely used product on earth (after only water), but is also a major source of mercury and cadmium pollution (and, now incidentally, is also responsible for 5% of world greenhouse gas emissions).

No overview of dangerous waste products from industrial processes would be complete without including radioactive wastes. They are not only dangerous but – depending on the form – can be extremely long-lasting, with decay times measured in the millions and even

billions of years. These wastes come from nuclear power plants and nuclear weapons manufacture, of course; but other industries also use and discard radioactive materials, from medical diagnostics to smoke detectors to food sterilization. Today, radioactive waste disposal is highly regulated, but it was not always so. For example, early in the 20th century a company called U.S. Radium extracted radium from ore, and used it for painting luminescent numbers on the dials of watches. A large amount of ore waste was left over, which still contained radioactive elements. The company gave this waste material away free to builders who used it as fill for home construction. Decades later, the yards of hundreds of homes had to be excavated to remove the dangerous radioactive materials.

An estimated 100,000 different chemicals are in commercial use today, the vast majority of which never existed in nature. All of these can and do end up as wastes. We know that many of these chemicals are dangerous, some of them extremely so. What we don’t know is perhaps even more worrisome: most of these chemicals have never been tested for toxicity. Even the ones that have been tested have usually been considered on their own, without analysis of possible synergistic effects from exposures to multiple chemicals.

And what have we done with this vast assortment of unnatural industrial wastes? The same as we have done with our wastes since the dawn of civilization – we have simply thrown them away. We have dumped them into rivers and lakes and into the ocean; we have dumped them into wetlands; we have dumped them into old mine shafts and into any other handy hole or depression in the ground. We have soiled our communal nest with barely a thought for the consequences. No industry is without blame; and as individuals we are all complicit in the toxic legacy of global industrialization.

In the United States during the 1960s, public concern over environmental problems began to grow dramatically. It was spurred on by such events as the shameful spectacle of a major river on fire due to industrial pollution; and by Rachel Carson’s seminal book *Silent Spring*, a grim but scientifically credible view of a soon approaching springtime devoid of the sounds of birds and animals, decimated by chemical pollution. The public demanded increased regulation, and it was obvious that action was called for at the national level.

The result was the *Environmental Decade*, an extraordinary period of legislative action starting at the very beginning of 1970 and extending to the very end of 1980. This eleven year period saw the enactment of all the major U.S. environmental statutes – laws that created the regulatory and remedial programs in operation today. Air pollution, water pollution, and the management of hazardous and toxic wastes were the subject of laws passed during this time. Since then, many of these laws have been amended and expanded, but no new legislation of similar scope and consequence has been forthcoming.

Meanwhile, many other countries have followed America’s lead in enacting environmental legislation; indeed, the European Union has lately eclipsed the U.S. in some areas of environmental protection. One arena, however, where America remains arguably pre-eminent is toxic waste site remediation – with respect to both the legal structure that compels cleanups, and the technology to carry them out.

America’s Environmental Decade culmi-



Illegal dump in the Coyote Creek Watershed.



PCB laden debris, removed from the Hudson River in New York.



Drums of coal tar contaminating the soil.

Courtesy of US EPA

Courtesy of US EPA

Courtesy of Potomac EPA USA

nated on December 11, 1980 with the enactment of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). While the laws passed earlier during the Decade created regulatory programs to control future pollution activities, CERCLA looked backward to the environmental problems caused by past practices. The law established a special fund of money, paid for through taxation on the chemical industry, for use by the Environmental Protection Agency (EPA) to clean up toxic sites created by bad waste handling practices in the past; it is this element that gives the law its colloquial name of *Superfund*.

The Superfund law also created a radical new liability scheme to help pay for these costly cleanups. Those persons or companies who generated the hazardous substances in question, or who transported them to the site being cleaned up, or who owned or operated that site, can all be compelled to carry out the cleanup themselves, or to reimburse the government for the costs of cleanup. This liability is without regard to fault; that is, even if the disposal of the hazardous chemicals was in full conformance with then applicable law – as it typically was – the enumerated parties must pay.

The Superfund law has probably had as dramatic an effect on American business as all the other environmental laws combined. Because its imposition of liability appears to be retroactive, not merely prospective, it strikes most business people as highly unfair. (In legal terms, it is not really retroactive. Rather, liability is imposed today for past acts which have created a mess that is still present and that needs to be cleaned up today.) Cleanups can often cost tens or even hundreds of millions of dollars; some cost billions. The huge sums of money involved guarantee attention from senior corporate officials.

Since liability under the law is without regard to fault or culpability, it has also had a profound impact on virtually all commercial land transactions: no buyer wishes to purchase property which may subsequently prove to be an enormous financial burden rather than an asset. Indeed, sophisticated businesses involved in property transactions and other financial dealings, such as corporate mergers or acquisitions, now routinely rely upon the par-

ardous wastes. The reasoning is simple, and sensible: there can be no future liability for wastes that were never generated in the first place. If wastes must be generated, wise corporations will take care that they are disposed of in a responsible manner, also to limit possible future liability.

Soon after the Superfund law was passed, EPA started identifying high priority toxic waste sites around the country for inclusion on a special list that Congress directed the Agency to prepare. The notorious Love Canal site, which more than any other was the reason for the law having been enacted, was placed on the list, along with several hundred others. About 1700 sites have been listed during the past 30 years. Cleanup work has been finished at about two thirds of these (including Love Canal); but among those where work has not yet been completed are some of the most technically complex, expensive and controversial sites.

Identifying sites that cried out for attention was comparatively easy; the hard part has been figuring out how to clean them. Starting in the early 1980s environmental professionals had to more-or-less invent the science of toxic waste site remediation out of whole cloth. It simply hadn't been done before, at least not to any meaningful extent. And the complexities were staggering.

The many different kinds of contaminants pose different kinds and degrees of risk to humans and other organisms; they behave in different ways in the soil, in groundwater, in surface water, or in the air; they respond differently (or not at all) to different treatment methods; and if they degrade naturally, they do so at different rates in different environments.

Many of these contaminants present health or environmental risks at extremely low concentrations – parts per billion (e.g., PCBs, benzene, TCE) or even parts per trillion (e.g., dioxin). To illustrate how small such concentrations are, consider this: one part per billion (ppb) is equivalent to a single second of time over a period of 30 years; and one part per trillion (ppt) is like a single second of time over a period of 30,000 years! In some cases the laboratory equipment needed to detect contaminants at such incredibly low levels didn't even exist yet, or wasn't widely available.

To complicate matters further, much of the toxic waste problem was underground and out



Love Canal was a neighborhood in Niagara Falls, New York, which in the mid 1970 became the subject of national and international attention when it was discovered that an entire neighbourhood, including a school, had been built on a toxic dump.

cracks that run in unpredictable ways in bedrock.

One of the greatest difficulties in the early days of the cleanup program was determining “how clean is clean?” If one molecule of a contaminant remains at a site after remedial work is done, is that too much? How about one gram? Or one kilogram, or ten or a hundred or a thousand kilograms? What level of risk is presented by such residual contamination? How does that level of risk compare to other risks that day-to-day life presents, or that people voluntarily take upon themselves (like smoking)? Is that level of risk acceptable to society? Not unexpectedly, citizens' views

differ wildly about the answer to this key question.

In my final column of this series (in *Sherkin Comment No. 54*), I'll talk about answering the “how clean is clean?” question, and finding ways to clean toxic waste sites.

¹Any opinions expressed herein are the authors own, and do not necessarily reflect the views of the U.S. Environmental Protection Agency.

Walter Mugdan, Director,
Emergency & Remedial Response Division,
U.S. Environmental Protection Agency,
Region 2, New York City, New York, USA.
October, 2011



Aerial view of the US Magnesium facility, in Tooele County, Utah. In 2009, the US EPA, with support from the Utah Department of Environmental Quality (UDEQ), added the facility to the National Priorities List (NPL) of Superfund sites.

ticipation of environmental lawyers and consulting engineers to review the potential environmental liabilities of a prospective purchase, a business partner, or a takeover target.

More importantly, the Superfund law has spurred American businesses to find ways to reduce or eliminate the production of haz-

ardous wastes. The reasoning is simple, and sensible: there can be no future liability for wastes that were never generated in the first place. If wastes must be generated, wise corporations will take care that they are disposed of in a responsible manner, also to limit possible future liability.

Cara Partners wish continued success to Matt and his team at Sherkin Island Marine Station

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Webb's An Irish Flora (8th edition)

John Parnell & Tom Curtis
Cork University Press
www.corkuniversitypress.com
ISBN 978-185918-478-3

Price: €35.00/2012, 560 pp



David Webb (1912–94) dominated Irish botany for half a century. One of his most enduring achievements

was the concise *An Irish Flora*, originally a slim volume published during the early 1940s soon after polymath Webb switched from zoology to botany. This straightforward guide to Ireland's wild plants has long made botanical identification and basic data on Irish plants widely accessible. Retaining the spirit of its creator, this 8th edition is in the hands of a new generation of authors, who have expanded it for the 21st century, incorporating both recent molecular research and our increased knowledge of the Irish flora. Simple colour diagrams clearly show obscure botanical features and a glossary explains any terms. The text follows Webb's plain, no-nonsense presentation (it is not aimed at the enthusiast), succinct descriptions, avoidance of most subspecies or varieties, and healthy suspicion of alien plants apart from those that are well and widely naturalized. It keeps ecology and plant geography to a minimum, but does provide the necessary clear keys and descriptions that should enable anybody to identify any wild Irish plant with confidence.

Dr John Akeroyd

Irish Specimen Fish 2011

Irish Specimen Fish Committee

Available for free download:
www.irish-trophy-fish.com

The annual report of the Irish Specimen Fish Committee catalogues only the bigger fish of each species captured by fair angling, in and around the island of Ireland during the preceding twelve months. In 2011, the ISFC ratified 587 claims including four new records. The latter are a 2.1kg Roach/Rudd Hybrid, 1.33kg Blackmouthed Dogfish, 10.6kg Spur Dogfish and a 2.83kg Thin-lipped Mullet. It is interesting to read that visiting anglers from outside of Ireland feature well in the listings. It is great to see photographs of young anglers featured with their specimen fish. Sarah Lynch and her carp at the Lough in Cork City, Derick O'Brien with the heaviest Rudd of 2011 at the Lee Reservoir near Cork City. Lucy Jackson and her 3.18kg Tench from Blackies Lough. Liam Millerick with the Thick-lipped Mullet at Rosscarbery, Co. Cork, Brian Lombard with a Golden Grey Mullet in Clonakilty, Co. Cork. This report is a gem and will appear to fish and marine anglers alike.



Matt Murphy

Lough Swilly: a living landscape

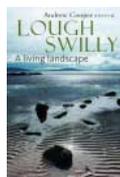
Andrew Cooper (Editor)

Four Courts Press
www.fourcourtspress.ie
ISBN: 978-1-84682-307-7

Price: €35.00/2011

Lough Swilly: a living landscape is an excellent compilation of stunning photography, science and the general history of one of Ireland's largest sea loughs. The combination of a simple writing style and in-depth scientific study ensures that the material appeals on every level. The wide range of contributors (University of Ulster, University College Cork, Donegal County Council, the National Parks and Wildlife service and biological consultants) is noticeable throughout.

The first 3 chapters introduce the reader to the stunning landscape and coastline surrounding the lough, including the habitats they encapsulate. Despite the initially complex appearance of the charts and tables, the overall text accommodates both the academic and enthusiast. Chapters 4, 5 and 6 detail the history surrounding the areas inhabited and look at the events that have left a lasting impression upon



the lough. Chapters 8, 9 and 10 look at the modern uses of the lough ranging from commercial and recreational fishing to water-sports. They also touch upon the challenge of balancing the different interests of these areas along with conservation work. Chapter 7 and 11 focus on the ongoing conservation effort, outlining how Donegal County Council is attempting to manage the lough to preserve its natural beauty.

Whether a conservationist, geologist, biologist or someone with an interest in all of the areas covered, this book provides an excellent starting point for all levels of involvement in Lough Swilly. The references and statistics throughout provide a good basis for further reading and analysis whilst the written text satisfies those with a casual interest. Overall, a great addition to the bookshelf.

Stuart Sheldon

Stone, Water and Ice A Geology trip through the Burren

Compiled by Dr. Ronán Hennessy, Dr. María McNamara & Zena Hoctor.

The Burren Connect Project
www.burrenconnect.ie

ISBN: 0-9567204-2-9

Price €7.00 / 2010

Stone, Water and Ice is the result of a joint effort between The Burren Connect Project and the NEED (Northern Environmental Education Development) project to generate interest and promote education of the geology and beauty surrounding one of Ireland's most iconic landmarks. In this aim they have excelled. The book begins by exploring the processes that have led to the formation of the Burren and then goes on to take the reader on a guided tour of 9 sites around North



Clare, including directions to each site. The text is short and informative whilst the note and quest boxes are ideal for grabbing the attention of interested youngsters. Overall it is an ideal companion to begin exploring the Burren and the surrounding geological gems.

Stuart Sheldon

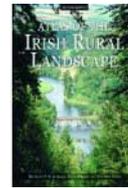
Atlas of the Irish Rural Landscape (Second Edition)

Edited by F.H.A. Aalen, Kevin Whelan & Matthew Stout
ISBN: 978-185918-459-2

Price: €59.00/2011

Atlas of the Irish Rural Landscape is a well-balanced collection of informative maps and diagrams along with flowing text and evocative photography. The early chapters cover almost every aspect of Irish history that has left a lasting mark on the landscape; from early

Bronze Age settlements, through the growth of agriculture during the middle ages up to the house building boom in the 1990's. Later chapters focus on key components of the Irish landscape, geographical, cultural and industrial, looking at their changing forms and uses. The closing chapters look at specific case studies from every corner of Ireland and look at how the a-fore mentioned area's have touched and shaped these islands, valleys and villages. Every page of the book is filled with a wealth of information that bear's testament to the contributions from 26 leading experts in their fields. Along with the constant geographical orientation provided by the miniature map on every page, the reader is always well informed on both the subject being covered and it's position in relation to the rest of the country.



Overall the book encapsulates a breathtaking range of topics whilst maintaining a level of accessibility and detail that make it an excellent addition to household and academic bookshelves alike.

Stuart Sheldon

Galway's Living Landscape Part 1: Eskers

Ronán Hennessy, Martin Feely, Christy Cunniffe & Caitriona Carlin

Available from the
Heritage Officer
Galway County Council
www.galwaycoco.ie
ISBN: 987-0-9567825-0-2

Price: €10 plus p+p/2010

This book succeeds, with flair, in producing an informative, inspiring and holistic account of the hidden riches of County Galway's integral esker landscape. Six sites carefully selected by a multidisciplinary team of experts review the geological, ecological and socio-economic aspects of interest, reflecting the great diversity of the eskers. The sumptuous quality of photographs diagrams and maps instill an overwhelming aesthetic and cultural appreciation of these land formations.

The Irish text can be read alongside the English, complementing the heritage roots of this publication. The appendix of Latin and Irish names of the common flora mentioned and a diverse list of recommended further reading truly caters for a wide-audience of readers. This publication re-kindles an important connection with the simple but irreplaceable beauty of this Irish landscape; a triumphant book for encouraging heritage conservation.

Jessica Richardson



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(see page 7)

As sixty nations head for these shores, where lies Ireland on green law implementation?

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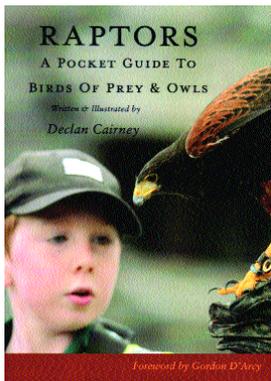
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Raptors

A Pocket Guide to Birds of Prey & Owls

Written & Illustrated by Declan Cairney

DECLAN CAIRNEY is 11 years old and lives in County Galway with his family. He wrote and illustrated "Raptors – A Pocket Guide to Birds of Prey and Owls" to celebrate Irish raptors. Published by *Original Writing* the book retails at €7.50 and all profits from the sale of the book go to The Golden Eagle Trust Ltd. The Trust is a registered charity dedicated to the restoration and conservation of Ireland's native birds and their habitats, in particular declining and extinct species.

The guide can be enjoyed by children of all ages and adults alike. In his Foreword, Gordon D'Arcy says "Raptors, a pocket guide to Birds of Prey and Owls, written and illustrated by Declan Cairney, is a remarkable piece of work. It is the culmination of months of hands-on experience working with raptors in the Burren Birds of Prey Centre, by a birdman who is not yet a teenager! Declan's knowledge and enthusiasm comes through in his writing. His artistic talent is evident in the dramatic poses of his bold illustrations. This pocket guide is thus a handy reference for the many people who, like Declan, admire these noble birds and who look for them both in captive circumstances and in the wild.

Though falcons, hawks and eagles are his first love, Declan has affection for all birds and indeed all nature. Despite his tender years he has, through this book, declared his adult intentions and is clearly well on his way to becoming a fully fledged naturalist."

For more information on the Golden Eagle Trust, including the Red Kite Re-introduction project, visit www.goldeneagle.ie.



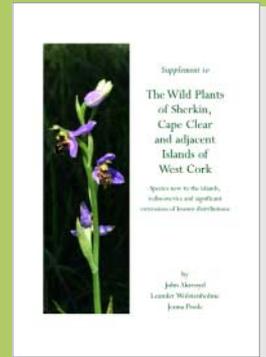
Golden Eagle
Aquila chrysaetos
Iolar Firéan
(Illustration by Declan Cairney)

"Raptors – A Pocket Guide to Birds of Prey and Owls" can be purchased directly from Declan Cairney, Campsie House, Caberglassaun, Gort, Co. Galway. The price is €7.50 plus postage (€2.70 for 1, €5 for 2, €7.50 upto 10). ISBN: 978-1-908477-76-7

Supplement to The Wild Plants of Sherkin, Cape Clear and adjacent Islands of West Cork

SHERKIN and the other islands of Roaringwater Bay, S.W. Cork, have emerged as an area extraordinarily rich in wild plants – a significant hotspot of Irish botanical diversity. The Wild Plants of Sherkin, Cape Clear and adjacent Islands of West Cork, published in 1996 by Sherkin Island Marine Station, recorded a total of 592 flowering plants, conifers, ferns and stoneworts, including several plants new to the Irish flora. Most of these plants, native and introduced, were recorded since 1975 by botanists working at the Marine Station. In the 15 years since, our Marine Station botanists have added another 35 new plants to the flora, alongside a remarkable number of major rediscoveries and important extensions of known local and Irish distributions. Not only have these researchers now refound almost all the botanical rarities that the famous botanist Oleg Polunin had noted on Sherkin and other islands in the late 1940s, and added three other plants to the Irish flora, but also they have tracked down several plants long thought to be extinct. The Supplement shows how Sherkin and the adjacent islands in Roaringwater Bay remain the botanically richest 10-kilometre square in Ireland, with 14 Red-listed Irish species (although three of them are unfortunately apparently extinct) and over 40 other significantly rare Irish plants.

The three authors of the *Supplement* are Dr John Akeroyd, a former student of Oleg Polunin, a plant taxonomist with extensive experience of the Irish and European floras, who has been visiting Sherkin for 25 years; Dr Leander Wolstenholme, who was a volunteer field botanist at Sherkin Island Marine Station in 1996 and 1997, followed which he was



a senior plant taxonomist at Liverpool and Manchester Museums; and Jenna Poole, a volunteer field botanist at the Marine Station during the summers of 2007–2009, who added many new records and consolidated the extensive data and collections of previous researchers. The book derives from their work and that of numerous other individuals who have each made their unique and valuable contributions to this exciting recording project. Sherkin Island Marine Station is proud to present this latest publication that puts on record the results of one of the long-term recording projects that lie at the heart of our work and mission.

Supplement to The Wild Plants of Sherkin, Cape Clear and Adjacent Islands of West Cork. Species new to the islands, rediscoveries and significant extensions of known distribution. By John Akeroyd, Leander Wolstenholme & Jenna Poole. ISBN: 978-1-870492-58-4 Price: €5.00 (inc. p&ep) 36pp. 246mm x 170mm. 2011. A Sherkin Island Marine Station Publication.

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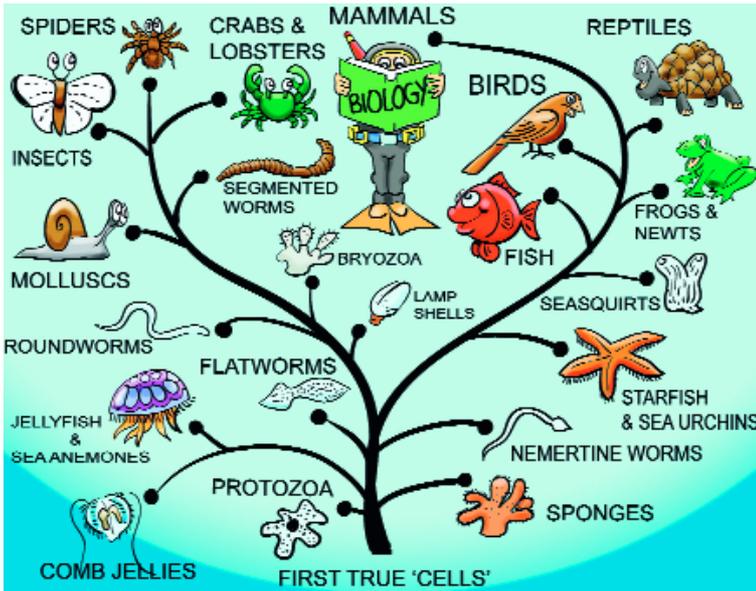
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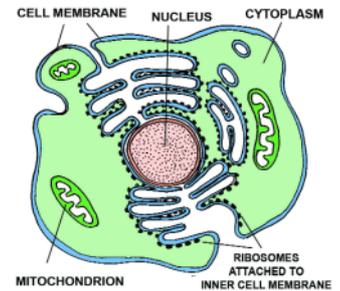
JUNIOR PAGES

Life is Just a Bag of Chemicals



Life on Earth Began in the Sea

Scientists believe that life on Earth began over 3,000 million years ago when individual atoms of four elements - oxygen and hydrogen (present in water) and carbon and nitrogen (present in the atmosphere) were combined together either in shallow pools at the edge of the ocean, or around deep-sea volcanic vents. The energy that brought them together could have been volcanic heat or lightning and it linked individual atoms of these four elements together into three sorts of long-chain molecules called proteins, carbohydrates and fats - the basis of life on Earth.



Life did not begin however until these molecules combined to form a simple bag or 'cell membrane' to contain them. This was the basis of the 'cell' structure that makes up all living things. Each cell contains a 'nucleus' in which all the genetic 'blueprints' needed to reproduce the cell are stored, energy generators called 'mitochondria' and 'ribosomes' that make the proteins needed to repair the cell.

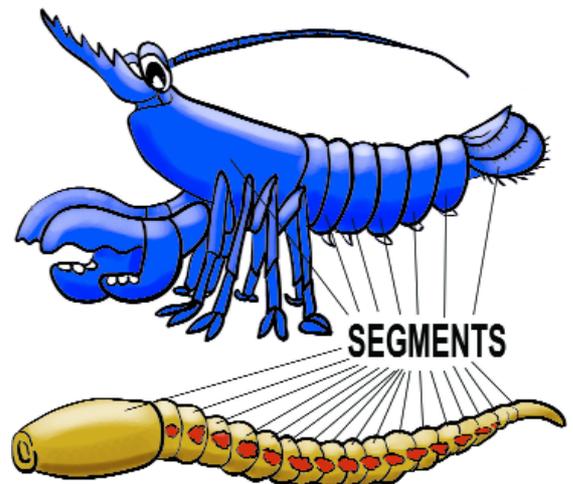
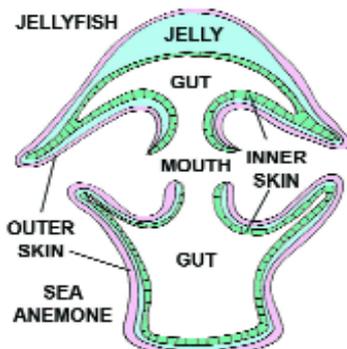
The Tree of Life

THIS is one possible version of how the main animal groups evolved from the first primitive 'true cells'. At the base of the tree simple single cell animals develop into animals formed of sheets of cells working together in layers - such as jellyfish and sea anemones (see below). As millions of year pass, these simple animals become more complex - with specialist organs and nervous systems.

To the left of the tree animals develop with no backbone (invertebrates) and to the right of the tree animals gradually evolve a backbone and an increasingly complex nervous system. Many of the invertebrate animals - such as the insects, spiders, lobsters, crabs and worms have bodies that are divided into segments (see right). While to the right of the tree, the first appearance of a 'backbone' is seen in the free-swimming larva of the sea squirt.

Jellyfish and sea anemones share the same basic design and are closely related. In fact, a juvenile sea anemone is free swimming and looks exactly like a tiny jellyfish, while a juvenile jellyfish looks like a pile of cup-like sea anemones stacked one on top of the other.

Both animals share the same deadly stinging cells (nematocysts) that line their tentacles, although the sting of a jellyfish is far more powerful than that of an anemone.



Captain Cockle's Log
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BirdWatch Ireland, P.O. Box 12, Greystones, Co. Wicklow.
Tel: 01-2819878 Fax: 01-2819763
Email: info@birdwatchireland.ie

Website: www.birdwatchireland.ie

Drawing Maps of Bird Activity in your School

from BirdWatch Ireland



The Map

Use your map to plot the following:

- Places where birds are seen feeding.
- Places where birds preen their feathers or dust-bathe.
- Places where birds are seen or heard singing.
- Places where birds are seen perching or resting.

BIRDS can use your school grounds to feed, bathe, rest, attract a mate and even nest

You can show how they use your school grounds by plotting (marking on a map) the places where these things happen. You may be able to make maps of the school grounds for Mathematics or Geography.



Robins mainly sing from September to May, usually perched on an exposed branch.

MAPPING BIRDS' SINGING PLACES

Many male birds sing to attract a mate and to tell other birds where their territories are (the places they will breed). They sing from trees, rooftops, street lights or other high points. These are called the birds 'song posts'. The songs also warn other birds of the same kind against trying to take over the territories for themselves.

Making a Song Post Map

Discover which birds are singing around the school (If it is difficult to identify the birds, concentrate on one kind, such as the Blackbird. If you study several birds, use a separate map for each, or use different colours or symbols on one map).

On your map mark:

- Where the birds are singing.
- The name of the bird at each song post they are using.
- The height of the song post, if possible (an estimate will do!)

Plot the song posts on to the map every day for a week, preferably for two. Some birds will be singing in the same area on most of your visits, others will be there only once or twice.

After a while, the plots on the map may begin to show patterns. You may notice that a particular bird is often found singing in the same place. These patterns can be used to find out about how birds live.



Blackbirds tend to sing from the beginning of February to the end of June.

An ideal gift!

Free DVD

Discover the magic of birds with your DVD Guide to 'Common & Garden Birds' - **FREE** when you join BirdWatch Ireland

Now members will receive this superb 130 minute DVD featuring 90 different bird species; a free Garden Bird Information Pack; Wings, our quarterly magazine (only available to members); free participation in BirdWatch Ireland branch events all around the country; and a chance to take part in our popular Garden BirdWatch Survey.

BirdWatch Ireland is the largest and most active conservation organisation in Ireland, with over 10,000 members and supporters, a nationwide network of more than 20 local branches and a growing number of nature reserves around the country. Our primary objective is the conservation of Irish wild birds and their habitats.

Join now

- by post (see form below);
- by telephone - simply call 01-281 9878;
- online at www.birdwatchireland.ie

To join, simply complete and cut out this Membership Form and send it along with your membership payment to:

BirdWatch Ireland DVD Order, P.O. Box 17, Greystones, Co. Wicklow

Or, please contact this form from Major/Car/Postal Card no.:

Expiry Date: This is a gift for someone else: Yes No

Yes, I wish to join BirdWatch Ireland. Please send me my gift of a FREE DVD (I include a cheque/postal order) (made payable to BirdWatch Ireland) for:

€40 - One year's Individual Membership

€50 - One year's Family Membership

€10 - One year's School/Group Membership

From DVD only website order please tick:

Cardholder's Signature: _____

Please attach address if different from below:

Member's Name: _____

Address: _____

USING SONG POST MAPS

You can show information about song posts as graphs. For example the heights from which most birds sing:

- Make your own graph from the information you have gathered.

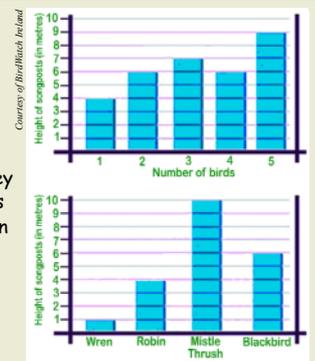
Looking at the Maps

Are the song posts of any particular bird grouped together? If so, they are probably inside that bird's territory. It may have other song posts outside the school grounds, so the whole territory may not be shown on your map.

Which birds have territories that include part of the school grounds?

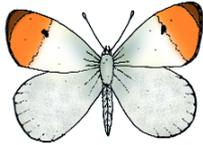
How scientists use territory maps

BirdWatch Ireland's annual Countryside Bird Survey (CBS) uses territory maps to count bird territories in farmland and woodland all over the country. Their conservation scientists use this information to discover how the populations of birds in Ireland are changing and what threats and dangers they face. You can read the latest CBS news at <http://www.birdwatchireland.ie/Default.aspx?tabid=114>





Peacock
Inachis io
Péacóg



Orange Tip
Anthocharis cardamines
Barr buí



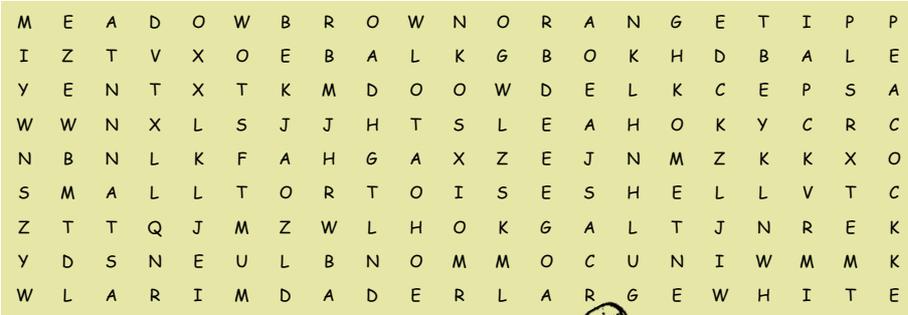
Red Admiral
Vanessa atalanta
Aimiréal dearg



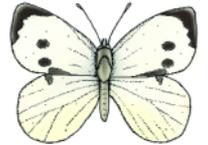
Speckled Wood
Pararge aegeria
Breacfhéileacán coille

Butterfly Search

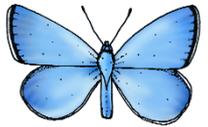
Find these eight butterflies in the wordsearch below and then discover which butterfly is missing in the group of drawings by studying the markings and colouring in each butterfly.



Images courtesy of Shutterstock, iStockphoto, Science Photo Library, Mandy



Large White
Pieris brassicae
Bánóg mhór



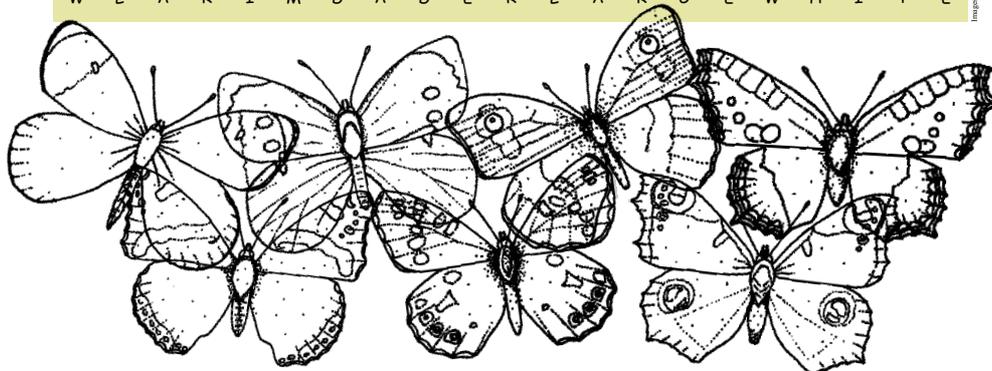
Common Blue
Polyommatus icarus
Gormán coiteann



Small Tortoiseshell
Aglais urticae
Ruán beag



Meadow Brown
Maniola jurtina
Donnóg fhéir



ANSWERS (Over/Down, Direction): Peacock (21,1,S); Red Admiral (11,9,W); Red Admiral (11,9,W); Meadow Brown (1,1,E); Orange Tip (12,1,E); Speckled Wood (20,3,W); Speckled Wood (20,3,W); Small Tortoiseshell (1,6,E); Large White (14,8,W); Common Blue (12,9,E); Common Blue

Cork County Council
Veterinary Department



CLEAN UP!



**PROTECT
PUBLIC HEALTH
BE RESPONSIBLE**

Environmental Awareness & Research Unit

Be a responsible dog owner AND a responsible member of your community – we all love dogs, but your dogs’ “business” is your business!!



Under Section 22 of the Litter Pollution Act 1997 it is an offence to fail to clean up if a dog in your charge fouls in any of the following place:

- Public roads and footpaths
- Schools/Sports Grounds
- Beaches
- Gardens and property attached to a person’s house
- Green spaces
- Walkways and Amenity Areas

If your dog fouls in these places – clean it up and dispose of it in a hygienic manner.

If you fail to do so you may be issued with a €150 “ON THE SPOT” fine or prosecution proceedings, maximum fine €3,000.

Caterpillars and Butterflies

The caterpillars and butterflies want you to play their version of "Snakes and Ladders". Place one coin for each player on the Start square. Takes turns to roll the dice and then moves along that number of squares; land on the large butterfly and climb to the square with the small butterfly; land on a toadstool and miss a turn. The first player to reach the Finish square is the winner!

100 FINISH	99	97	96	95	94	93	92	91
82	84	85	86	87	89	90		
80	79	78	77	76	75	74	72	71
62	64	65	66	67	68	69	70	
59	58	57	56	55	53	52	51	
41	42	43	44	45	46	48	49	50
40	39	37	36	34	33	32	31	
22	21	25	26	27	29	30		
20	18	17	16	15	13	11		
1	2	3	4	5	6	7	8	9
START								

Gaisce - the President's Award

Introduction by Stephen Peers

GAISCE - the President's Award had an outstanding year which saw 20,563 young people enter for the Gaisce Award in 2011. An important part of the work we do is to provide young people with ideas and opportunities to get involved with activities on a local and national level that are accessible. We have close working relationships with many organisations, for the benefit of our young participants and our one thousand volunteer President's Award Leaders (PALs) who support our young Participants and maintain our high standards around the country. We have listed the organisations with which we have had great long-term relationships and some very exciting new pilot projects in 2011. In 2012 Gaisce - The President's Award will see the role out of our new on-line registration process, a new website and the upgrading of our social media tools to make the Award even more accessible for young people, all over Ireland. On behalf of our Participants, President Award leaders and staff at Gaisce we wish our new Patron and President of Ireland Micheal. D. Higgins an enjoyable experience and relationship with Gaisce in the coming years.



ECO-UNESCO - Conserving the environment, empowering young people

ECO-UNESCO has linked with Gaisce over the past number of years through a variety of ECO-UNESCO's programmes and youth activities all of which aim to recognise and reward young people who take part in environmental and community programmes and action projects. ECO-UNESCO is Ireland's Environmental Education and Youth Organisation, affiliated to the World Federation of UNESCO Clubs, Centres and Associations (WFUCA). Young people have been achieving their Gaisce Awards through a number of programmes with ECO-UNESCO: The Youth for Sustainable Development Programme, The ECO-Youth Choices programme and the

Young Environmentalist Awards Nationwide Programme.

In 2011, a group who were participating in ECO-UNESCO's ECO-Youth Choices Programme from Ballymun Regional Youth Resource Centre completed a local environmental intergenerational action project. The group took an environmental and social approach to conserving and enhancing their local environment. They came together on a Sunday to clean and garden a local older persons housing area that had become unkempt. The group washed windows, weeded and planted whilst engaging and involving the older persons to build relationships between generations. Their project along with over 150 others will be entered into the annual ECO-UNESCO Young Environmentalist Awards 2012 which aims to build environmental awareness and provide the groups with recognition for the work they have done. 'ECO-UNESCO's goals of youth empowerment and environmental protection fits so well with the Gaisce programme' states Elaine Nevin, National Director of ECO-UNESCO. 'Young people who engage in many of our programmes are involved with the Gaisce programme and are delighted that their involvement in ECO-UNESCO can go towards achieving their award.' For further information contact www.ecounesco.ie / e. yea@ecounesco.ie / t. (01) 662 5491.

Prevention of Hearing Loss Awareness Campaign



Gaisce - The President's Award worked with DeafHear.ie on a pilot scheme in which 10 schools that operate Gaisce with great results and much interest in

the pilot project around the country. The project was specific to the community involvement section of the Award and the personal skills section outlined below

Community Involvement: The main area was a survey of young people and hearing loss including an ear plug exercise, how loud is too loud, newspaper articles and a questionnaire.

Personal Skill: Gaisce Award Participants, as part of their personal skill, took a sign language course, a social media exercise to set up ooVoo/Skype account and communicate with a tutor or designated person. Communicating with someone who is HOH was also part of this project. For more information contact www.gaisce.ie or www.deafhear.ie



Active School Flag

The Department of Education and Skills wishes to recognise schools (primary, post primary and special schools) that strive to achieve a physically active and physically educated school community by awarding them with an Active School Flag. An

Active Centre Flag will launch in early 2012 for Youthreach Centres.

In order to be awarded the Active School Flag schools must:

1. Commit to a process of self evaluation in terms of the PE programmes and physical activity opportunities that they offer.
2. Plan and implement a series of changes that will enhance PE and extracurricular provision and promote physical activity.

The initiative encourages a partnership approach. It empowers schools to become more proactive in approaching groups like National Governing Bodies (NGBs), Local Sports Partnerships (LSPs), the HSE, Education Centres and the Professional Development Service for Teachers (PDST) to help and support them to develop their PE programmes and to promote physical activity

Students working towards achieving their Award with Gaisce - President's Award can play a significant role in helping their school achieve Active School Flag status. For more information visit www.activeschoolflag.ie and through the link you will find ways that young people taking part in Gaisce can get involved.



Ben Quinlan Killarney Co Kerry, using his skill playing music in a nursing home to the elderly as part of his community involvement part of his Gaisce Award.



Sunday 29th May 2011. Presentation of Bronze Awards at half time during the Ireland versus Scotland Game. Twenty young participants from Gaisce - The President's Award, from St Ita's football club Donabate Co Dublin successfully achieving their Awards as part of the Gaisce/ FAI Youth initiative 2010-11.

SAORVIEW

SAORVIEW is currently rolling out an important national public information campaign in respect of Analogue Switch Off (ASO), the switch to digital and how people can continue to access their free-to-air Irish television services in digital format. It is imperative that people are fully informed of the requirement to switch their television reception method, and the timelines and practicalities of same to ensure that no-one is left behind in the switch to digital. To further this objective SAORVIEW has partnered with the Gaisce Award programme. The Gaisce youth volunteers will work towards raising awareness of ASO and helping older and vulnerable members of the community with digital switchover as part of their community involvement activities.

For detailed information on the suggested activities young people can get involve with as part of the community involvement section of their Award please contact Gaisce - The President's Award or www.saorview.ie



An Taisce - The National Trust for Ireland



Gaisce - The President's Award has been actively promoting An Taisce's Green-schools programme over the last 14 years. Promoting conservation is something Gaisce feels strongly about and young people really enjoy this activity and also creating their environmental awareness in the process, and the feel good factor that goes with it. For more information contact <http://www.greenschoolsireland.org>

Interested? If your school or youth group is not involved with Gaisce - The President's Award you should contact:

Head Office: Dublin,
Gaisce - The President's Award,
Ratra House, North Road, Phoenix
Park, Dublin 8. Tel: 01 617 1999
Fax: 01 670 7060
Email: mail@gaisce.ie
Web Site: www.gaisce.ie

For more information on these specific projects contact Gaisce - The President's Award, Development Officer, Stephen Peers at the above address.

WELCOME HOME!

Baltimore RNLI's new Tamar class lifeboat *Alan Massey* arrives home to huge welcome

THE people of Baltimore welcomed a new addition to their community on Wednesday 15 February 2012 when the RNLI delivered a €3 million Tamar class to the west Cork village. It has replaced the *Hilda Jarrett* Tyne class lifeboat, which served Baltimore since 1988. The new lifeboat left RNLI Headquarters in Poole on Saturday 11th February, calling at a number of lifeboat stations along the way before undertaking the final leg of the journey from Crosshaven to Baltimore Harbour.

Onboard the lifeboat was Baltimore RNLI crewmembers, Coxswain Kieran Cotter, mechanic Cathal Cottrell, Jerry Smith, Ronald Carthy and Patrick Collins along with RNLI Training Divisional Inspector Owen Medland and Deputy Divisional Engineer Michael Carmody.

Ferry operators brought passengers out to escort the new lifeboat home and the harbour was full of local school children and residents in various crafts. The new lifeboat, which is named *Alan Massey* (ON 1302) was largely funded through a legacy from Mrs Dorothy May Massey from Watford in England, and has been named in memory of her late brother Alan, who it is understood had a love of the sea.

It was a proud day for Baltimore RNLI Coxswain Kieran Cotter who said, "We have been looking forward to this moment for a long time and we wish to acknowledge our volunteer lifeboat crew both past and present. The arrival of a new lifeboat to a station is an occasion of great pride and excitement. The *Hilda Jarrett* has served us well for over twenty years but as a Coxswain you look forward to receiving the newest lifeboat model with all the latest developments and technology onboard. We will spend the next month or so training all the volunteer

Courtesy of Robbie Murphy



The "Alan Massey" passing the Wallis in Baltimore Harbour.



Huge crowds welcomed Baltimore's new lifeboat at Baltimore Pier.

lifeboat crew on her before we say goodbye to our Tyne class lifeboat, which will be returned to the relief fleet in Poole.

We have so many memories onboard that old lifeboat, one of the highlights being the *Rambler* rescue last August. However along with the

successful rescues there have also been tragedies and most recently we witnessed this with the search for

the missing crewmen from the *Tit Bonhomme* in Glandore Harbour. Our thoughts are with their families today."

The new Tamar class lifeboat is 16.3 metres in length with a maximum speed of 25 knots compared to the 14.3 metres of Baltimore RNLI's current Tyne class lifeboat which has a maximum speed of 18 knots. The lifeboat is self-righting in the event of a capsize and is fitted with an integrated electronics systems and information management system, which allows the lifeboat crew to monitor, operate and control many of the boats systems from shock mitigating seats.

The Tamar also carries a Y boat (an inflatable daughter boat) which is housed under the aft deck and deployed from a hinged door in the transom. The lifeboat has room for 44 survivors.

RNLI Training Divisional Inspector Owen Medland who made the journey with the lifeboat crew added, "I have been involved with this project for the last few years and today is a great day for everyone in Baltimore. This lifeboat represents a significant investment in safety along the west cork coastline. I wish the crew the very best and I know this lifeboat will go on to be a vessel that will save many lives and be a symbol of safety and protection for all those who venture out to sea."

Niamh Stephenson, Divisional Media Relations Manager, RNLI, Airside, Swords, Co. Dublin. T: 01-8900460. E: nstephenson@rnli.ie Websites: www.rnli.co.uk www.baltimorelifeboat.ie



A flotilla of boats waited at the mouth of Baltimore Harbour to greet the new lifeboat.



In the days following the lifeboat's arrival, the "Alan Massey" visited a number of communities along the coast, including Sherkin Island.

Courtesy of Susan Murphy Wickens

Courtesy of Susan Murphy Wickens



Dredging and Seasonal Constraints in the US

By Michael Ludwig

ESTUARIES are places where freshwater and saltwater meet and mix. These areas are also places where sediments eroded from the land settle to the bottom of the waterway. Beginning in the 1970s, dredging and its associated resuspension of sediments began to be a focus of attention for estuarine researchers. The impacts of dredging had always been recognized for their removal of seafloor habitat but it became apparent that suspended sediment could have a significant impact on aquatic resources. This came under scrutiny by regulatory agencies initially when considering the dragline form of dredging. A dragline dredge casts an openmouth bucket out from the crane and pulls it back laden with sediment. The bucket recovery resuspends large amounts of sediment which is carried from the dredge site by the prevailing currents. The dispersion of those suspended sediments creates a zone of redeposited materials radiating outward from the dredging and across a far larger than removed by the dredging. Early lifestages of aquatic

resources frequently rely on estuarine habitat and these areas are often the site of port and terminal facilities. These uses can create conflicts between protecting resources and expeditiously prosecuting necessary dredging projects. Invoking the work of researchers investigating the impact of suspended sediment on commercially important shellfish such as the eastern oyster (*Crassostrea virginica*) and the northern quahog (*Mercenaria mercenaria*) regulators were able to determine specific values for the impact initiation levels. Understanding the amount of energy expended to separate food from sediment and the cessation of feeding by those shellfish opened the door to managing dredging impacts.

It was not long after those shellfish studies were embraced that finfish egg and larval investigations revealed similar results for benthic and pelagic forms as well. As a result the first seasonal constraints on dredging were invoked targeting those summer spawning and early lifestage activities period. These seasonal constraints sought to address the main spawning and nursery

period but also took into account that dissolved oxygen in water is temperature sensitive (declining as water warms) and public use of coastal waters is at its maximum levels in summer. Simply, dredging was an unwelcome competitor with other, on-going, higher valued activities in estuarine environments. To some degree and fortunately, the summer period had proven to be difficult for dredging because of the nature and extent of those competing human activities. Sediment laden waters and dredging equipment obstructing channels had made the work difficult. As a result, dredging in summer has become prohibited, generally, except in special situations.

While most finfish spawn during warmer seasons, the winter flounder (*Pseudopleuronectes americanus*) spawns in mid-winter and their eggs settle to the bottom. Beginning in mid January and extending into April the eggs mature, hatch, the larvae grow then metamorphosis into the bottom dwelling, adult form. The maturation process takes far longer than most other species. In the late 1980s, researchers discovered that winter flounder egg development could be



In the US, the Northern quahog, *Mercenaria mercenaria*, thrives in the muddy sands of estuaries.

impeded or terminated by partial to complete burial with clean or contaminated sediments. This implied that the species was not well adapted to conditions in estuaries. As the species is in decline throughout its range, regulatory agencies moved to create a new, protective, no dredging period that applied the research insights to known and presumed winter flounder spawning areas where dredging was being planned.

The addition of this second seasonal constraint has had a profound impact on dredging. The dredging season has been significantly reduced to as little as four months. To overcome this situation, a wide variety of equipment and dredging techniques have been created. "Envi-

ronmental buckets" that limit sediment loss, allowing "barge overflow" of surplus water to make dredging more efficient, "piggybacking" or bundling dredging projects in an area to limit the number of times it is disturbed and sequential dredging (moving to areas where resources are not present) are all techniques that have enabled dredging projects to proceed.

Perhaps two of the most valuable insights obtained from the investigations are the extent of a dredge's resuspended sediment field and the use of local conditions to allow dredging to occur without significant impacts to nearby aquatic resources. Sediment characteristics, dredge equipment and the operator are human components that are as important as water flow, local currents and wave sizes. By understanding the local conditions, dredging and aquatic resources can peacefully coexist, usually, and allow the continued use of coastal ports. With the coming of ever larger ships and the upgrading of the Panama Canal, Ports throughout the world are considering or building new facilities. In most instances, that requires dredging and possible impacts to fishery resources. Creating a Dredged Material Management Plan that protects natural resources as it allows the improvements to progress can make the project a successful experience.

Michael Ludwig, Ocean & Coastal Consultants, Inc. 35 Corporate Drive, Trumbull, CT, 06611, USA.



24HR HOTLINE

Inland Fisheries Ireland

now has a 24 hour confidential line.

The line should be used only to report emergency incidences of:

POLLUTION, POACHING OR INVASIVE SPECIES

If you do discover any of the above please call this number immediately:

1890 34 74 24

For non-emergency reports or general information please call your local IFI office at the following numbers:



Swords:	+353 (0) 1 8842600	Limerick:	+353 (0) 61 300238
Blackrock:	+353 (0) 1 2787022	Galway:	+353 (0) 91 563118
Clonmel:	+353 (0) 52 6180 055	Ballina:	+353 (0) 96 22788
Macroom:	+353 (0) 26 41222	Ballyshannon:	+353 (0) 71 9851435