

# **Coastal Zone Management**

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# I INTRODUCTION

## I.1 Study Context

This study is one of a series background research papers being undertaken as part of the preparation of the National Spatial Strategy (NSS).

1. The research papers constitute Stage 2, of a four stage approach and form an assemblage of key sets of data and information necessary to allow an analysis of current trends and spatial distribution of development in Ireland. In particular, the research papers will provide baseline data and basic material to evolve the preparation of Policy Papers in Stage 3.

## I.2 Study Objectives

A central feature of the NSS is recognition that to achieve more balanced regional development it is necessary to reduce the disparities between & within regions and to optimise the potential of all regions to contribute to the continuing prosperity of the country.

The Objectives of this study are *firstly* to identify coastal areas with special policy and management requirements in relation to coastal erosion, sea-level changes, amenity, tourism and aquaculture activities and *secondly* to highlight existing problems that occur as a result of the current level of development in those coastal areas.

## I.3 Approach & Methodology

No specific methodology was used other than the establishment of early and high level consultation with holders of key data and information close working with them for data assembly and identification of existing reports, papers and research material that were readily available. Only data and information from existing and reliably acknowledged sources were used.

Information was gathered in textual, tabular and graphic/map form, which enabled the study to:

*Identify of vulnerable areas of the coast, their protection needs and flooding risk factors.*

*Map/Quantify the vulnerable areas of the coast and establish their spatial distribution.*

*Identify the main land use issues affecting coastal zone management and their spatial distribution.*

*Identify/Quantify the existing problems and the implications of continuation of those trends on the coastal area.*

As set out in the study brief.



## 2 COASTAL ZONE – THE CONTEXT

### 2.1 Background

The physical diversity and dynamism of the coast has created an environment that is both highly productive and biologically diverse and which, in turn, is one of the main attractions of the zone for economic activity.

The diversity of resources in the coastal zone also provides the basis for a wide range of uses:

**Table 1: Coastal resources**

<b>Renewable</b>	Fishing (including shellfish) Aquaculture (including shellfish) Seaweed, (including kelp) Agriculture and Forestry Energy (wind energy in particular, both onshore and off-shore)
<b>Non-Renewable</b>	Oil and Gas Minerals, (including sands and gravel)
<b>Infrastructure and Built Development</b>	Industry , including on-shore and off shore and food processing Urban development Recreation and Tourism Transport, including ports and harbours Waste Disposal Defence Communications
<b>Heritage</b>	Nature conservation

### Demographic Trends

The Irish coast continues to attract human settlement due to its proximity to the ocean's resources, both living and non-living, the potential for marine transportation and the attractiveness and suitability of the coastal zone for tourism and recreation.

In 1996 an estimated 59% of the total population resided in coastal areas<sup>1</sup>.

The Greater Dublin Area, which extends well over 10 km inland, contains just under one-third of the total population, 2 1/2 times more than its nearest rival, Cork city and county.

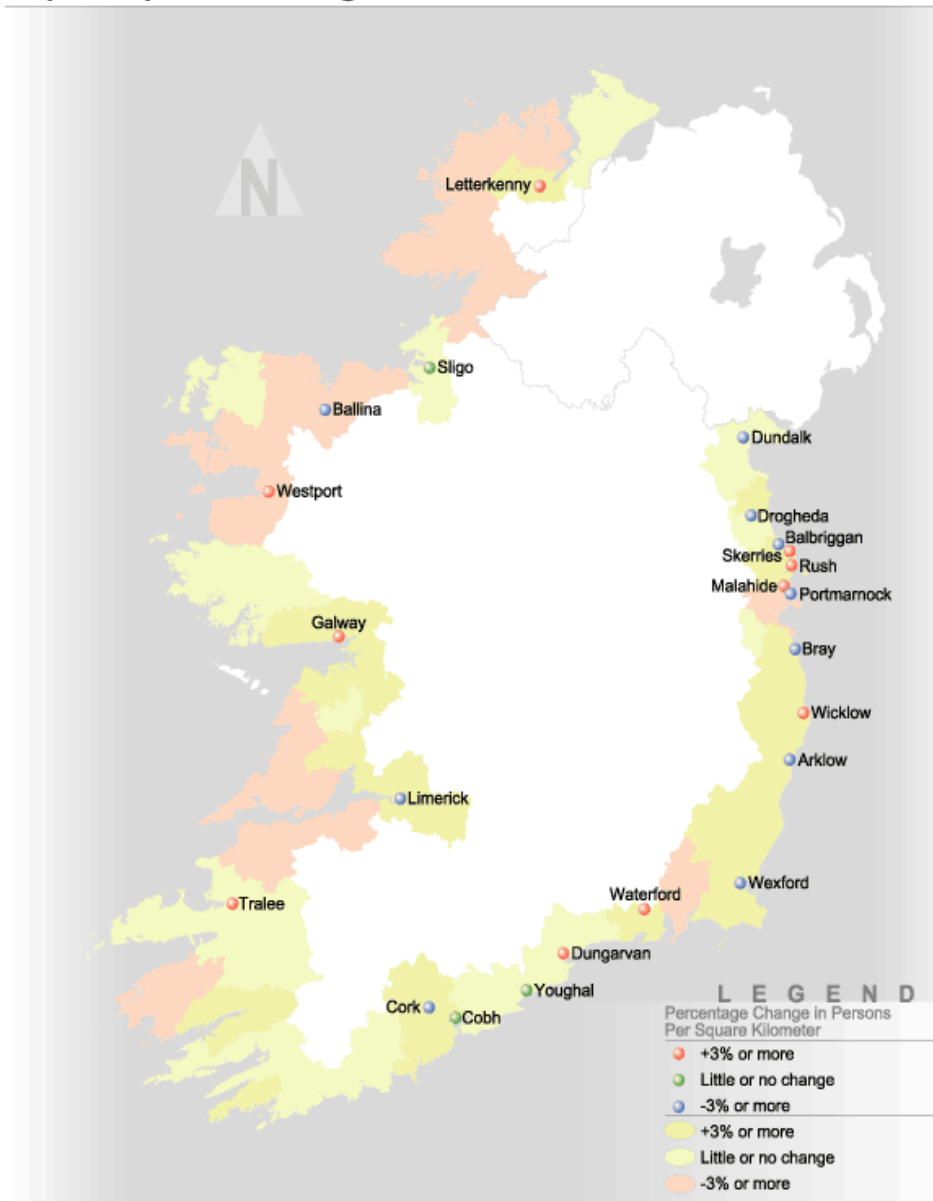
The most densely populated areas are found in counties Dublin and Wicklow, and the cities of Cork and Limerick. Population density along the coast varies from over 4000 inhabitants/Km<sup>2</sup> in the major urban areas to less than 20 inhabitants/Km<sup>2</sup> in parts of the west and north-west.

The population of coastal areas can vary considerably on a seasonal basis due to tourism and recreation. At some of the most frequented resorts, the populations may be up to 3 times greater in summer than in winter.

1. defined as Rural Districts, Urban Districts and Boroughs adjacent to the coast

All coastal counties have shown an increase in population in the 1991-96 period. While no data is available since 1996, the improved economic situation over the past 5 years and indicators of development (such as planning applications etc) suggest that the population in the coastal zone will have further increased since 1996.

**Map1 - Population Change in the Coastal Zone 1991 - 1996**





The greatest concentrations of population tend to be in those settlements associated with ports and harbours. The seven largest settlements in Ireland - Dublin, Belfast, Cork, Derry, Limerick, Galway and Waterford -all have port facilities which contributed to their historical growth.

**Table 2: Population Change n the Coastal Zone 1986-96**

County	1986	1991	1996
Louth	91,810 (84.4%)	90,724 (91.5%)	92,116 (84.6%)
Meath	103,881 (8.9%)	105,370 (9.0%)	109,732 (8.6%)
Dublin	1,021,499 (77.2%)	1,025,304 ( 76.0%)	1,058,264 (75.5%)
Wicklow	94,542 (73.2%)	97,265 (73.8%)	102,683 (74.2%)
Wexford	102,552 (58.4%)	102,069 (58.9%)	104,371 (59.3%)
Waterford	91,151 (79.1%)	91,624 (79.7%)	94,680 (80.8%)
Cork	412,735 (64.4%)	410,369 (64.2%)	420,510 (64.6%)
Kerry	124,159 (58.6%)	121,894 (58.9%)	126,130 (58.4%)
Kilkenny	73,183 (4.1%)	73,635 (4.0%)	75,336 (3.8%)
Limerick	164,569 (56.7%)	161,956 (56.9%)	165,042 (57.7%)
Clare	91,344 (73.1%)	90,918 (73.5%)	94,006 (74.0%)
Galway	178,552 (45.8%)	180,364 (48.1%)	188,854 (50.9%)
Mayo	115,184 (36.8%)	110,413 (36.9%)	111,524 (39.3%)
Sligo	56,046 (72.0%)	54,756 (73.5%)	55,821 (74.1%)
Leitrim	27,305 (5.7%)	25,301 (5.8%)	25,057 (4.6%)
Donegal	129,664 (79.4%)	128,117 (79.7%)	129,994 (79.6%)

( )= % of the total population living wwithin 10km of the coast

In some cases, especially in Dublin, city centre populations had been steadily declining as new housing in outlying areas, particularly in the "New Towns" to the north-west and south-west of the city, attracted a growing number of commuters. In the 10 years between 1986 and 1996, increases in population density in the 10 km wide coastal band to the north and south of Dublin ranged from 5% to 18% this had been mirrored by a 4.3% decline in the city of Dublin (Dublin County Borough). Greater development of urban renewal schemes in Dublin city since 1996 may see the previous trends reversed in the 2002 Census.

At a few locations, populations are expanding both within and outside city limits. In Galway, for example, both urban and suburban population densities show major increases (+18% and +12%, respectively) in the last 10 years.

Increasing population shift from the centre of coastal towns and cities to greenfield sites on both the inland periphery and coastal strip cause changes in the utilisation and amenity value of these areas. In addition, various financial incentives have led to an increasing number of holiday homes and other tourist amenities in rural coastal areas where the infrastructure may be unable to accommodate the increased seasonal population.

## **Conclusion**

The coastal zone is of great significance to the country, containing important resources that provide economic, recreational, aesthetic and conservation benefits. It is also a finite resource that requires to be carefully planned and managed to ensure that its value is sustained for the future

All of the main urban centres are located on the coast; Belfast, Dublin, Cork, Limerick Galway, Waterford and all are expanding rapidly in terms of population and economic development.

## **Future Trends**

The NDP Gateway cities, are all coastal, and as such their physical expansion will need careful consideration in the context of Sea-level change and Coastal erosion/protection (referred to below).

The development pressures on the coastal zone will increase as a result of both the physical development but also the social and economic driving forces behind this growth. There will clearly be a consequential pressure on the coastal environment, in all its forms.

## 3 ELEMENTS OF THE COASTAL ZONE EXAMINED

### 3.1 Sea Level Change

Isostatic change is already occurring on the Irish coastline. The sea level on the southeast coast appears to be rising about 0.3 mm pa while on the north coast at Malin Head in north Donegal there is evidence of a fall in sea level of up to 2.4mm/year.

The Intergovernmental Panel on Climate Change (IPCC), indicates that the temperature of the Earth could be up to 5.8°C warmer by the year 2100 if no preventative measures are taken. The projected rate of warming is much larger than the observed changes during the 20th Century and is very likely to be without precedent during at least the last 10,000 years. The resulting thermal expansion of the oceans supplemented by more rapid melting of glaciers and ice caps is expected to increase average sea level, globally, by 9 to 88 cm with the most probable figure being around 50 cm.

In Ireland the next 30 years is likely to see a rise in the order of 17-31cm in relative sea-level around the coast. Given the difficulty in predicting the effects on sea level of global climate change, the rise could be as little as 5cm and as high as 46cm. Even at the upper limit, 31cm (with a mean of 2 mm/yr between 1990 and 2030) the effect of sea level rise on the Irish coast will be minimal when compared to certain other parts of the globe.

The impact of sea-level change will take place in 2 ways: -

Firstly, low-lying lands will be subject to gradual inundation of, estuaries (e.g. Malahide, Wexford Harbour, Shannon, and Lough Swilly), bays (e.g. Dundalk, Dublin, Dingle, Tralee, Sligo etc.) or behind natural coastal barriers (e.g. between Wicklow and Bannow in the southeast, and north of Fenit in Co. Kerry).

Secondly, the increased frequency of major storms, and storm surges arising from climate change, which combined with high tides and wind direction can cause considerable damage. Even with a slight rise in sea-level rise flooding and storms that currently occur once every 100 years might by the year 2030, be expected to occur every 5 years, quite apart from the increased storminess, and severity of storms, expected due to climate change. The west coast, particularly those areas at the heads of estuaries may suffer most in terms of flooding, while dune coasts (especially common in counties Mayo and Donegal) may become unstable and release large amounts of wind-blown sand. The east coast, on the other hand, while experiencing lower wave energy levels, has far more potential for shoreline erosion due to the “softer” nature of the coast.

Coastal groundwater tables will rise as sea level rises, making drainage more inefficient. Climate change is expected to increase winter rainfall and to cause a decrease in summer rainfall. This alteration to the hydrological cycle is expected to add further to the stress caused by sea-level rise, with significantly increased winter river flows, and flooding, and reduced summer river flows, in the coastal zone. This can be expected to effect, inter alia, water quality in this zone, with potential impacts on fisheries relying on migratory fish from fresh to salt water – dealt with under the heading 3.3.1 Marine Industry.

While much of the Irish coast will be affected by sea-level rise, those areas with human activities will be most seriously at risk

Low-lying areas around the main cities of Dublin, Cork and Galway have seen spectacular increases in population density since 1971, much of it in housing estates along the shoreline. Key industries, notably energy and chemicals are also located in predominantly low-lying coastal locations. In several places, especially south of Dublin, transport routes follow the coast and could be endangered by increased erosion or flooding.

The 1991 Assessment<sup>1</sup> shows that approximately 176,000 hectares (176 square kilometres) or 2.5% of the Republic of Ireland are believed to be at risk from sea-level rise. The largest proportion of this land is in the west of Ireland, but perhaps the most vulnerable areas are in the east, where much of the shoreline has been developed.

### **Conclusion**

Sea level change around the coast of Ireland is estimated at 17-31cm over the next 30 years. The difficulty in prediction makes a wider range of anywhere between 5cm and 46cm. Sea level rise will continue thereafter to the end of the century at least.

The annual rise in sea-level is likely to be of the order of 0.2mm with an overall rise between 1990 and 2030 of 0.3m.

The rise in sea level would have serious effects on the coastline, increased erosion, flooding, breaching of coastal defences and loss of habitat and amenity. The country will not be affected uniformly; sea-level changes will impact on the south and southeast coast first the spreading northwards.

The greatest impact of flooding would be felt in the urbanised east coast and in the 4 major cities located on the coast, Dublin, Cork, Belfast, Galway. On the west coast counties from Cork to Donegal and the Shannon Estuary, the likelihood is that some 150,000 Ha of land is vulnerable to loss by sea-level rise. Overall some 176,000 Ha of coastal land is at risk from sea-level change.

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1. Climate Change: Studies on the Implications for Ireland" (Brendan McWilliams editor, published by the Department of the Environment).

### **3.2 Coastal Erosion/Coastal Deposition**

There is firm evidence that rising sea-levels and increasing storm frequency and wave energy can increase the rate of erosion and the incidence of storm and flood-related events (e.g. land-ward incursion, wave damage, flooding). Over a period of decades, this will inevitably lead to loss or modification of some coastal habitats and interference with human use of the coastal zone.

The most recent review of the extent of coastal erosion on a country-wide basis was carried out following the severe storms that occurred during the winter of 1989/90 (National Coastal Erosion Committee, 1992)<sup>1</sup>. This study described the different landforms present around the coast and quantified the extent of the erosion problem.

The study showed that over 1,500 km of coastline are at risk from erosion and some 490 km need immediate action.

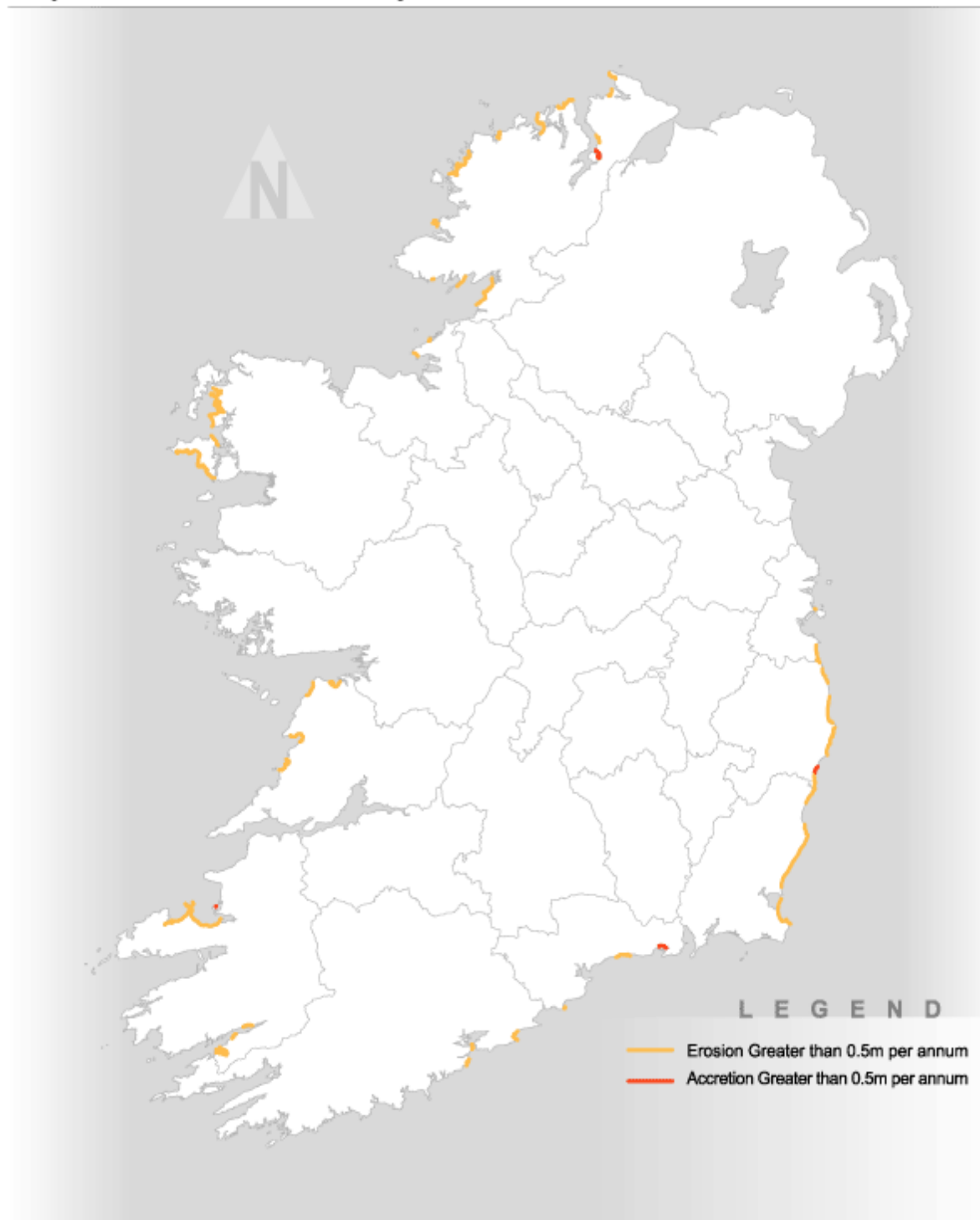
In the 1980s, it was estimated that between 130 and 160 hectares of land was lost each year through coastal erosion. The most serious problems are largely on the softer sections of the east coast in Co. Down (near Kilkeel, just north of Carlingford Lough), south of Dublin between Killiney and Bray and in Co. Wexford. There are also many smaller sites throughout Ireland where erosion problems occur such as Ballybunion in Co. Kerry and Enniscrone in Co. Sligo. Apart from natural causes, erosion is often exacerbated by human activities including dredging, sand mining, land reclamation, wash from large vessels and even by some shoreline protection measures.

Prior to the 1990s, it was calculated that almost 240 km of the Irish coastline had been protected by artificial constructions. Two-thirds of these involved embankments and dykes along estuaries (e.g. the Shannon estuary) and the remainder included groynes, sea walls and revetments.

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1. Coastal Management – A Case for Action. 1992 City and County Engineers Association.

## Map 2 - Coastal Erosion/Deposition



Since then, a large number of localised projects have been instigated to reinforce natural defences - especially stabilisation of sand dune systems - using a variety of techniques such as planting of marram grass, often in association with fencing to trap sand and to restrict access, has proved very successful on a number of beaches on the east (e.g. Brittas Bay in Co. Wicklow) and west (e.g. Bertra in Co. Mayo, Mullaghmore in Co. Sligo and Dog's Bay in Galway) coasts. Gabions and rock armour are currently being installed or reinforced to retain sand or to protect glacial cliffs, coastal roads and amenities. Many of these provide only temporary protection and some have accelerated erosion at the margins.

Estimates of the rates of erosion at Irish coast sites are predominantly within the range 0.2-1.6 m/yr with only minor variation between different materials and formations. The higher rates tend to be associated with the softest materials, usually sand dunes, particularly near the mouths of rivers and estuaries. Glacial cliffs generally show moderate rates (0.2-0.5 m/yr) of erosion but in some places, such as parts of the Blackwater-Cahore coast in Co. Wexford, this may rise to 1-2 m/yr.

Although the west coast is more vulnerable to increases in storm frequency and intensity, it is more resilient than the east coast by virtue of its harder physical structure and abundant sediments. The estimated 176,000 hectares of land at risk from sea-level rise includes areas that will be eroded, flooded, engulfed, or subject to environmental change. While the greatest area of land affected will be in the west, the most vulnerable areas are the developed shoreline in the east.

The NDP 2000-2006 recognises the importance of coastal protection and has allocated £35 Million to address coastal erosion. The NDP states the need to take an environmentally friendly approach and the need to ensure long term value for money. The programme will consist of £30 Million (£18 Million to the S&E Region, £12 Million to BMW) on works and an indicative £5 Million for research.

## **Conclusion**

Once climate change begins to accelerate, many parts of the coast will begin to experience the effects of increasing sea level. However, it is the increase in storm frequency and severity that will have greatest impact on the coast of Ireland.

Depending on the locality, such effects would include increased erosion, more frequent breaching of coastal defences and, in low-lying areas, increased flooding and the gradual loss (through erosion, inundation or siltation) of habitats and amenities.

Not all of Ireland would be similarly affected. From geological and tidal data, it is believed that Ireland is tilting slightly on a north-south axis so that the effects of sea-level rise will initially effect the south of the country most, and then spreading northwards.

Some 1500Km of the coastline are at risk from erosion, while some 490Km are in immediate danger.

The rate of erosion is currently estimated at 0.2-1.6 metres per annum although rates will vary according to the materials. Some 130-160 Ha of land was lost through coastal erosion in the 1980s.

Human activities such as sand/gravel removal from beaches, dredging, land reclamation and shoreline protection measures.

The areas most vulnerable to coastal erosion are the soft coastlines of the east coast between County Down and County Wexford.

There is a clear need to increase capacity at national and local levels to manage the cost at short (NSS time horizons) medium (20 – 50 years) and longer term time sales, particularly providing a focus on long-term coastal planning, as well as more detailed research on the potential impacts and adaptation measures to climate change.

### **Future Trends**

Given the economic importance of the coastal zone the most serious issue is the development of a rational and socially acceptable response to coastal erosion. Ireland will experience not only a loss of coastal land but also a gradual loss of coastal amenities and wildlife habitat. Public pressure will be for hard engineering solutions to mitigate the effects of coastal erosion, however experience shows that technical solutions are expensive and often not cost-effective in the long term.

The likely cost to society in general of sea-level rise is difficult to assess. The potential financial loss remains largely unquantifiable without information on replacement values, information that is not readily available. The cost of "protecting", by building sea-defences, is easier to calculate; 100 km of conventional protection would range from IR£50m to IR£450m, (1991 costing) depending on the type of structure and the degree of risk. To protect all the vulnerable Irish coast in this manner would cost about IR£270,000m (1991 cost). Prioritisation of such works within an overall strategic plans is essential.

Any national coastal management policy will also have to examine other strategic options, including abandonment of land, stronger planning control in coastal areas, fiscal or financial penalties for coastal developers and softer non-engineering protective measures. Strategic options other than coastal protection would avoid excessive costs but would require a strong programme for education of a public used only to protecting coastal land at any cost, usually through hard engineering solutions.



### 3.3 Land Use characteristics

#### 3.3.1 Marine industry

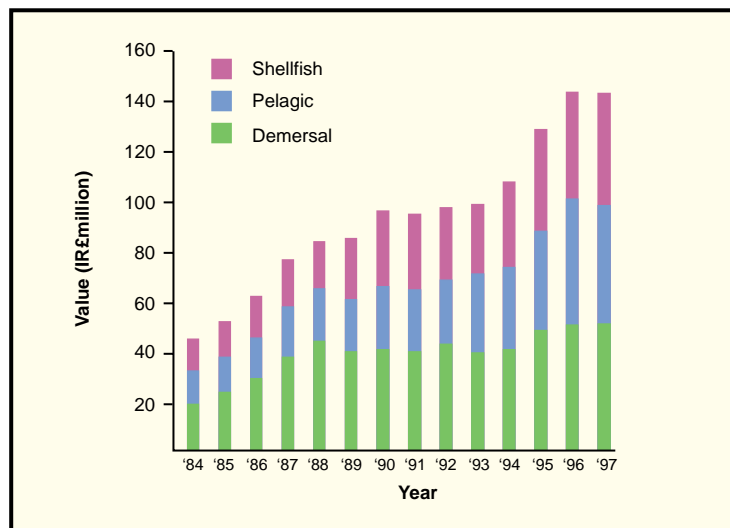
##### Fish Landings

Total landings by Irish boats more than doubled in the period from 1984-95, primarily due to a large increase in landings in the pelagic sector. Subsequently, from 1995-97 total landings decreased. Over the same period (1984-97), demersal landings have remained more stable despite decreased landings in the early 1990s. Declines in key commercial whitefish stocks have led to significant reductions in Total Allowable Catches (TAC) and quotas since 1998.

Shellfish landings increased by over two thirds from 1984 to 1997.

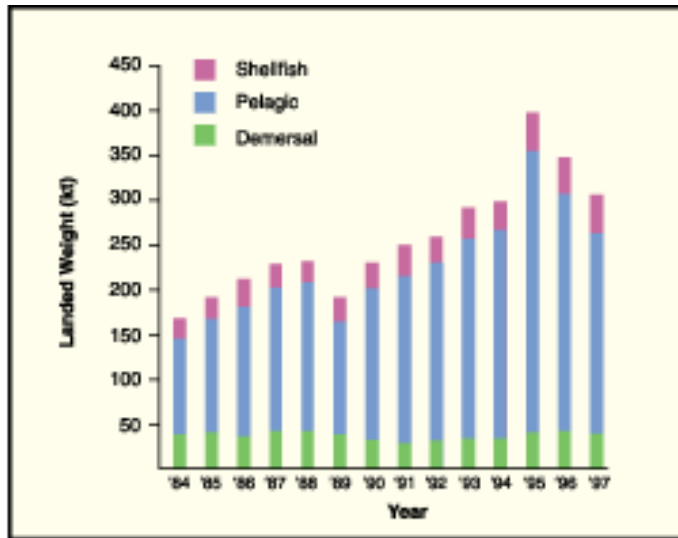
The make up of the catch has been fairly consistent with pelagic at 65-80%, demersal at 10-25% and shellfish landings 10-15% of total tonnage landed.

Figure 1: Fish Landings (Tonnage) 1986-97



The value of landings increased more than threefold from 1984 to 1997. The percentage contribution of demersal landings to the total landed value has decreased somewhat over the period 1984-97, whilst that of pelagic landings has increased.

Figure 2: Fish Landings (Value) 1986-97



The domestic fish landings in 1999 was in the order of 241 Kt. with a value of £133 million, continuing the trend of reducing volume and increased value evident since the mid-1990's.

### Fishing ports

There are 125 ports around the coast for which information is available. In 1999, the top 20 (ranked in terms of landed value) accounted for almost 73% of the value of domestic landings and 82% of the tonnage. The main ports dominate the national landings of pelagic and demersal fish, whilst shellfish landings are distributed more evenly amongst the medium and small ports.

**Table 3: Port Landings Fish 1999**

	Wet Fish		Shell Fish		Total All Fish		% of Total Value
	Landed Weight	Value £IR	Landed Weight	Value £IR	Landed Weight	Value £IR	
KILLYBEGS	113016.90	24313387.05	90.10	185005.16	113107.00	24498392.21	25.2662
CASTLETOWNBERE	11408.50	11821205.15	1257.00	1679195.00	12665.50	13500400.15	13.92352
DINGLE	7338.00	8312296.18	623.00	1723427.00	7961.00	10035723.18	10.35025
HOWTH	3018.80	4065646.50	1238.50	3493191.75	4257.30	7558838.25	7.79574
DUNMORE EAST	10298.10	5094499.72	837.20	1743283.95	11135.30	6837783.67	7.052087
ROSSAVEAL	4780.70	2530458.95	1106.70	2468453.40	5887.40	4998912.35	5.155583
GREENCASTLE	2919.40	3879285.95	1278.30	527687.00	4197.70	4406972.95	4.545092
KILMORE QUAY	1180.60	1962281.96	767.20	1451936.46	1947.80	3414218.42	3.521223
UNION HALL	2580.10	2155065.94	425.60	1041130.00	3005.70	3196195.94	3.296368
BALTIMORE	1323.50	1351732.00	1033.80	1307148.00	2357.30	2658880.00	2.742212
RATHMULLAN	15562.80	2370628.60	55.30	69362.00	15618.10	2439990.60	2.516462
SCHULL	804.20	1044005.00	367.00	628990.00	1171.20	1672995.00	1.725428
BURTONPORT	351.60	495077.00	740.30	1156063.60	1091.90	1651140.60	1.702889
KINSALE	748.30	937776.60	271.70	693722.50	1020.00	1631499.10	1.682632
DOWNINGS	63.10	99643.00	1083.90	1459384.80	1147.00	1559027.80	1.607889
MOVILLE	0.00	0.00	3515.00	1566500.00	3515.00	1566500.00	1.615596
SKERRIES	129.40	171810.30	507.20	1369120.00	636.50	1540930.30	1.589225
WATERFORD	760.00	1370232.65	16.10	34284.00	776.10	1404516.65	1.448536
WEXFORD	0.00	0.00	4980.00	1231639.80	4980.00	1231639.80	1.270241
VALENTIA	421.60	726611.50	172.30	429974.00	593.90	1156585.50	1.192834
<b>Total</b>	<b>176705.60</b>	<b>72701644.05</b>	<b>20366.20</b>	<b>24259498.42</b>	<b>197071.70</b>	<b>96961142.47</b>	<b>100</b>

In 1999 of the top twenty ports by landed value Killybegs, the primary fishing port, accounted for over 57% of the total landed tonnage (64% of wet fish landings), and 25% of monetary value. Castletownbere, Dunmore East, Dingle, Greencastle, Howth and Rossaveal are the following main ports, in terms of landed value.

Aside from the top 20 ports there are many others of local, socio-economic importance. On the east coast Kilmore Quay, Clogherhead and Arklow are important landing ports.

Along the south coast, Cobh, Union Hall and Helvick have important landings. In the southwest, landings at many of the medium and small ports are predominantly cultured mussels. Schull is an important port for mixed demersal landings. Along the west coast, high-value shellfish are landed at a number of small ports and Galway, Achill and Ballyglass have mixed demersal landings. In the northwest, Kincasslagh and Merville are locally important and many small ports are heavily dependent on landings of shellfish.

### Salmonid fisheries

The commercial salmon fishery is carried out in coastal and estuarine waters and normally accounts for 85-95% of the nominal salmon catch; recreational anglers account for the balance.

**Table 4: Salmon Catch by Fisheries Region 1997**

Region	Drift Net	Draft Net	Other Nets	Rod & Line	Total (%)
East	780	13,619	656	2,724	17,779(3.1)
South	35,622	1,247	8,544	16,369	61,782 (10.8)
Southwest	69,617	20,810	0	12,600	103,027(18.1)
Shannon	14,307	5,424	0	8,661	28,392 (5.0)
West	32,364	5,199	2,547	10,587	50,697 (8.9)
Northwest	90,270	3,042	10,251	28,891	132,454 (23.2)
North	1,136,335	28,165	0	11,473	175,973 (30.9)
Total	379,295	77,506	21,998	1,305	570,104
%	66.5	13.6	3.9	16.0	

Recent years have seen a decline in the commercial salmon catch. In 1997, the total declared nominal salmon catch was just over 570 tonnes, lower than in 1996 (685 tonnes) and 1995 (790 tonnes). The 1994 and 1995 nominal catches were about one half of those in the mid-1980s and the five-year running average for 1991-1995 was the lowest since 1964. There appears to be a decline in world salmon catches from a total of over 12,000 tonnes in 1973 to less than 3,500 tonnes in 1996.

Salmon conservation measures, as part of an overall national salmon management strategy have seen, since 1996, considerable restriction of the commercial drift-net fishing season and reduction from 12 to 6 miles of the fishing limits. Further enhanced conservation measures are being reviewed for both commercial and recreational sectors in the light of available data on salmon stocks.

### Port Landings

In 1999 Dublin port handled almost 15 million tonnes of the national port traffic throughput of 43 million tonnes ie. 34.5%. Two ports, Cork and Shannon/Foynes account for 44% of the total volume handled while the other 5 main ports (Bantry, Drogheda, New Ross, Rosslare and Waterford) account for 16%. The remaining 6% of volume is handled by 11 smaller ports around the coast which perform significant regional and sub-regional functions.

**Table 5: Port Landings Cargo 1999 - 2007**

	RoRo ('99)	RoRo ('07)	LoLo ('99)	LoLo ('07)	Bulk Liquid ('99)	Bulk Liquid ('07)	Bulk Solid ('99)	Bulk Solid ('07)	General ('99)	General ('07)
Arklow	0	0	0	0	0	0	108	153	0	0
Cork	148	442	892	1638	5233	8477	1685	2904	540	963
Drogheda	0	0	49	81	228	320	359	496	305	527
Dublin	6127	10426	3532	6100	3425	4790	1578	1917	279	453
Dundalk	0	0	0	0	29	41	234	353	5	8
Dun Laoghaire	554	1015	0	0	0	0	0	0	0	0
Foynes	0	0	0	0	309	400	952	1127	83	151
Galway	0	0	0	0	632	888	23	29	2	3
Greenore	0	0	0	2	39	55	252	292	226	354
Shannon	0	0	0	0	1787	2436	6886	9996	49	73
New Ross	0	0	0	0	358	499	754	997	0	0
Rosslare	1681	3829	0	0	0	0	0	0	0	0
Sligo	0	0	0	0	0	0	32	39	13	23
Waterford	0	0	1073	1587	275	382	498	630	196	335
Wicklow	0	0	0	0	0	0	29	37	153	276

The total number of cargo and passenger vessel arrivals at Irish ports increased by 40% between 1985-1995. In the same period the tonnage of cargo handled increased by over 60%, to more than 32 million tonnes. Just over 7.8 million tonnes of this consists of oil derivatives and chemicals and a further 2.2 million tonnes of crude oil.

In 1995, 37% goods handled at Irish ports in were traded with non-EU countries, one-third, Great Britain and Northern Ireland and just over 26% with other EU countries. This is in contrast to situation in 1985 in which trade was higher with Great Britain and lower with non-EU countries. Ports on Atlantic and Celtic Sea coasts have seen a significant increase in trade with non-EU countries -over 14% since 1985 - primarily through ports on the Shannon Estuary.

Three ports Dublin, Dun Laoghaire and Rosslare account for about 66% of all port traffic. A high proportion of all traffic is in the form of passenger ferries operating on fixed routes across the Irish Sea and carrying over four million passengers annually.

The number of passenger movements by sea between Great Britain and Ireland has increased by 36% since 1985 while accompanied cars, buses and trade vehicles have increased by over 40%.

Dublin Port handled 15 million tonnes of cargo in 1999 (35% of the national total) some 65% cargo from roll-on/roll-off and lift-on/lift-off vessels; 23% was made up of oil derivatives and chemicals, primarily imports of petroleum products and fuel oils. The main export (in terms tonnage) from Dublin is ore, with over 427,000 tonnes exported in 1995.

In 1999 Rosslare handled over 1.7 million tonnes of goods, all from roll-on/roll-off vessels. The smaller ports at Drogheda and Greenore handle mainly bulk goods.

In addition, Waterford and Rosslare are the main ports for the export of Cattle together they handled more than 260,000 animals in 1999. over 74% half of Ireland's total cattle exports.

Other important ports include Cork and Waterford on the south coast and the Shannon Estuary ports on the west coast. The port of Cork imported over 2.2 million tonnes of crude oil in 1995 for refining at Whiddy Island Ireland's only oil refinery; much of the refined product is subsequently exported. Chemicals made up 400,000 tonnes of the goods handled at Cork, which caters for the large pharmaceutical sector in the country. The total goods handled at Waterford in 1999, over 53% are containerised. Bulk cargoes such as ores, coal, fertiliser and feedstuffs made up over 78% of the goods handled at ports in the Shannon Estuary in 1999. Alumina the main export (over 1 million tonnes) is produced at Aughinish on the Shannon Estuary. Of the smaller ports New Ross on the south

coast, Foynes in the Shannon Estuary and Galway on the west coast handle mainly cargo and oil products.

### **The effects of Climate Change on the fishing industry**

The effects of climate change on fisheries are to an extent speculative and uncertain, but with the potential for significant impacts, – all the more so since Irish coastal waters tend to represent a transition zone, with many species at or near their southern or northern extremes.

A general warming of the coastal waters, would probably result in shifts in the range and distribution of commercial species, changes in their migration patterns and in predator/prey relationships. Some northern species such as salmon, cod, haddock, herring and mackerel are likely to show altered distribution and migration patterns in such circumstances, while more southern species such as pilchard and hake might become more abundant. Some flatfish species, like plaice, may also enjoy enhancement. Lobsters could be expected to thrive, since higher temperatures tend to extend their active feeding periods and to provide better conditions for the survival of lobster larvae.

Other factors – such as present fishing stresses and overall water quality – are also relevant. In the event of a change in the marine environment, it is more likely that species that are already stressed will be more severely and dramatically affected.

The changes in precipitation (wetter winters and dryer summers) may have important adverse consequences for the life cycle of anadromous species – those, which migrate from freshwater and feed in the oceans, such as salmon and sea trout. Increased winter precipitation combined with such transient effects as increased westerly storms and siltation, may result in the disruption of the gravel beds of redds used for spawning; it may also bring about excessive leaching of acid from carboniferous forests soils, causing increased acidity in rivers and lakes, which might be detrimental to salmon parr. A reduction in summer rainfall, on the other hand, may cause migration difficulties for smolts; moreover, the rise in average temperature, with consequent reductions in the dissolved oxygen content of rivers and lakes, may reduce the viability of salmonid fish, since they have high oxygen requirements.

The consequences for aquaculture will be varied. In the case of the salmonid species, higher sea temperatures might well cause an increase in sea or salmon louse infection and a potential risk of an increased rate of spread of various fish diseases. Salmon smolt production in freshwater hatcheries may show decreased productivity in a regime of higher average water temperature. Rainbow trout would be similarly affected.

In the case of shellfish, the consequences of climatic change might be expected to be generally beneficial. Exceptions may occur where a set of local conditions may elevate water temperature just beyond those suitable for critical stages of the life cycle of the species concerned, or where species are cultivated at their present geographic extremes.

The native oyster, for example, is at its northern limit of distribution in Irish waters, and a potential rise in temperature may enhance its growth and its potential for spawning in the wild. The production of mussels, clams and scallops should also be enhanced.

There are, of course, possible adverse consequences as well. Higher temperatures may increase the risk of the more rapid spread of potentially damaging diseases; changes in precipitation patterns may increase the sediment load in river run-off, which may disrupt beds and reduce yields; increased siltation rates may also clog the feeding apparatus of adult animals and lead to fatalities. Monitoring of red tides will become more important, as will the need for more efficient toxin detection techniques.

In the short to medium term, these constraints are likely to be greater than changes caused by climate change, but in the medium to long term, climate induced changes to fisheries and aquaculture are likely to be significant.

## **Conclusion**

### **Fishing**

The 20 top fishing ports dominate the demersal & pelagic sectors while shellfish and inshore fishery landings are distributed more evenly amongst the medium and small ports. The significant capital investment programme fishery harbours infrastructure in the NDP 2000-2006 is designed to address deficiencies in the main commercial centres as well as meeting the socio-economic needs of coastal communities.

### **Commercial & Regional Ports**

A more detailed examination of the commercial and regional ports is carried out in the transportation research papers. The main feature of this appraisal highlights the dominance of Dublin port, the high proportion of ro-ro and the distortion of data by dependence on several ports on one type of cargo, eg 23% of Dublin's trade is oil/petroleum products, more than 50% of Cork's trade is chemicals/chemical products.

### **Future Trends**

Development of the fishing industry takes place within the framework of the Common Fisheries Policy, due for review in 2002. The outcome of the review will influence future directions for the Irish fishing industry. Investment support strategies are designed to encourage integrated sustainable development of the seafood sector as a whole.



Declines in fish stocks and consequential reductions in quotas underline the imperative need for enhanced conservation and management strategies. Strategic objectives will focus on quality and value (as opposed to volume) to maximise competitive position in the commercial sea-fishing sector. Fishing infrastructure development around the coast must reflect these strategic objectives as well as improvement of the the socio-economic circumstances coastal communities.

### 3.3.2 Tourism

Coastal areas are locations of a variety of scenic landscapes, historic towns and harbours, and numerous options for beach and water-based recreation; as such they are a natural focus for tourism. Although impossible to quantify precisely, it is probable that coastal environments attract a higher proportion of tourists and holidaymakers than areas inland.

Tourism growth in Ireland over the last 7 years has demonstrated exceptional growth. From 1993 to 1999, the number of overseas visitors to Ireland increased by 77%, from to 3.3 million to 5.9 million. Domestic and Northern Ireland tourism have also grown but at a lower rate since 1993. Overseas tourism revenue earnings increased by 83% between 1993 and 1999 while domestic and Northern Ireland earnings increased by 42% and 30% respectively over the same period.

**Table 6: Growth in Tourism Visitor revenue 1993-1999**

Market	1990 £M	Growth(%)
Britain	796.9	112.4
Mainland Europe	496.6	23.6
N.America	437.2	140.1
Other	114.3	108.9
Total Overseas	1845	82.0
Northern Ireland	89.4	29.6
Domestic	879.3	41.6
Total	2813.7	65.2

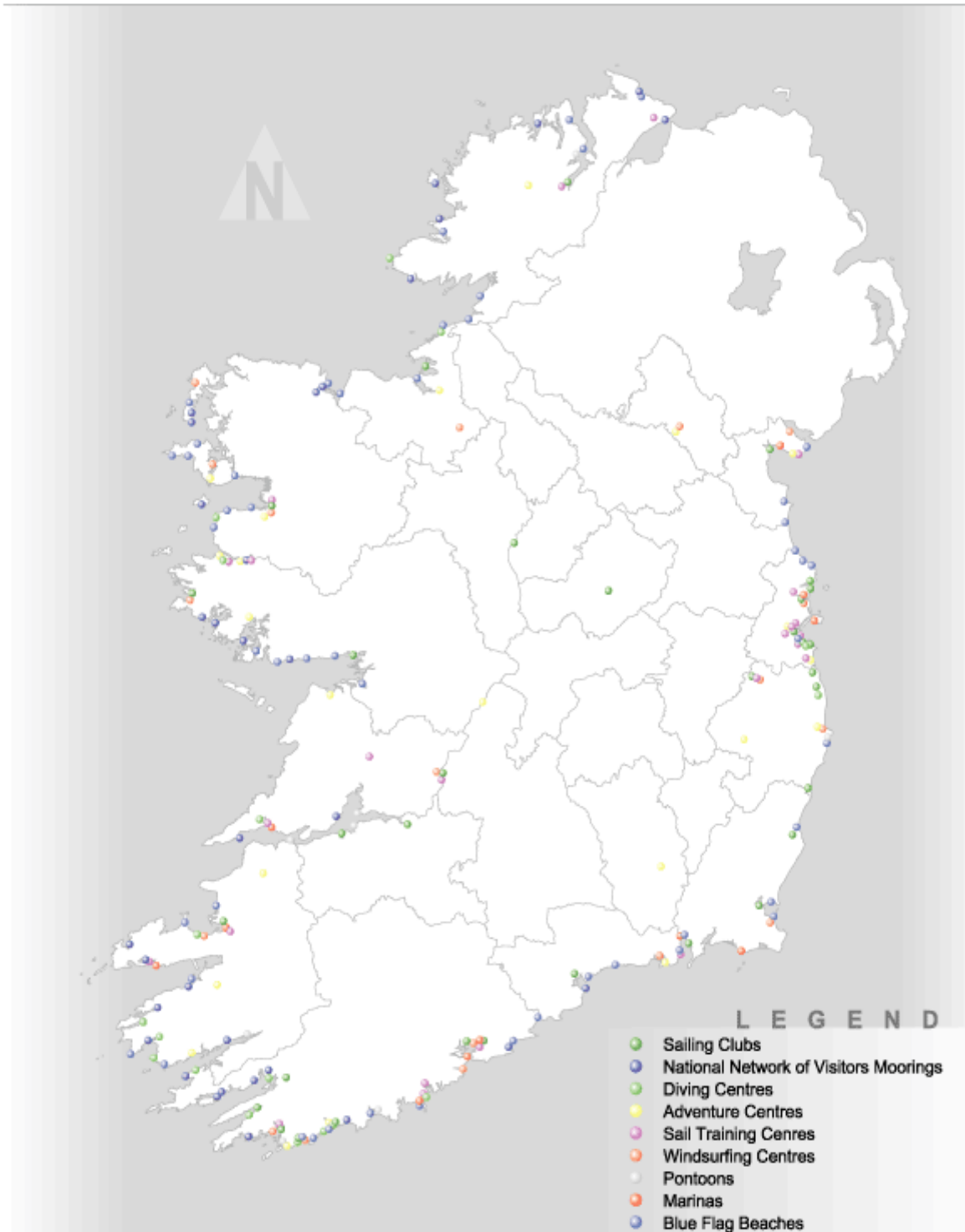
**Table 7: Growth in Tourism Revenue by region 1993-99**

	1999 £M		Growth 1993-99 (%)	
	Overseas	Domestic	Overseas	Domestic
<b>Dublin</b>	577	130.5	99.1	7.5
<b>South-east</b>	122.9	154.0	48.6	40.3
<b>South-west</b>	389.6	198.5	90.7	53.2
<b>Shannon</b>	224.2	97.1	92.4	17.1
<b>West</b>	241.1	167.8	59.3	46.0
<b>North-west</b>	112.9	113.7	49.1	47.6
<b>Midland-East</b>	177.3	107.1	90.0	46.7
<b>Total</b>	1845	968.7	82.0	36.7
<b>East</b>	877.2	391.6	88.3	28.7
<b>West</b>	967.8	577.1	76.7	42.7

There are regional disparities in tourism growth with a clear shift in the distribution of overseas tourism. Overseas revenue earned in Dublin, the South-East and Midlands-East combined, has grown by over 88% since 1993, compared to 77% for the four western tourism regions. Dublin's increase in tourism can be accounted for by its popularity as a short-break urban destination,. There is also an element of "catch-up" in relation to Dublin because historically, Dublin's share of the market has been less than might be expected for a capital city. Domestic and Northern Ireland tourism revenue has to a degree compensated the western regions for the greater relative increase in overseas business to the East. About 60% of domestic/Northern Ireland business was attributable to the four western regions in 1999, compared to 57% in 1993.

In 1996 some 240,000 overseas visitors spent £89 million on water-based tourism and leisure activities, representing 29% of the total outdoor activities market. 6% of total overseas revenue earnings from tourism.) About 160,000 of these visitors were specialist water-based tourism and leisure participants, spending £58 million. Sea angling, which attracted about 40,000 overseas visitors in 1995, occurs all around the coast of Ireland and the number of Irish residents participating has increased by more than 50% since 1988.

### Map 3 - Marine Tourism & Leisure Activities



Sailing and cruising are popular coastal sports especially in the vicinities of Dublin Bay and Cork Harbour. Sailing and boating are also popular among overseas visitors; about 56,000 of these visitors engaged in some form of boating during 1996. Almost half of the marinas (out of a total of 16) are located along the south and southwest coasts of the country and these provide the majority of visitor berths.

Worldwide, islands have become one of the most attractive destinations for tourists. Inis Mór on the Aran Islands is probably Ireland's most visited offshore island and, in 1999, it is estimated that it had 104,000 visitors, of whom an estimated 65,000 were day visitors. The majority of visitors go to Inis Mór during the summer period and this places pressure on the island's infrastructure.

A consultants' report entitled *Creating a Sustainable Tourism Strategy for Árainn (Inis Mór)* was completed in 1999. Preparation of the report was one of the 22 projects supported under an EU-funded Tourism and the Environment Pilot Initiative. The report provides a basis for the future sustainable development of tourism on the island and clearly it will be essential to mainstream best practice in this regard with regard to other offshore islands.

Given the current rate of increase in tourist numbers (averaging of 6.5% per annum since 1988), there are major implications for coastal environments. In addition to overseas tourists, it is estimated that domestic residents took 7.3 million holidays in Ireland in 1999.

The first National Coastline Study (1972) predicted that the east, south and south Galway coasts would experience severe difficulties in meeting future demands for recreational activities. In the mid-1990s a similar pattern was evident. For the 40% of Irish holidaymakers originating in the Dublin region, the nearby southeast coast was the most popular destination, followed by the southwest (21%) and west (19%).

Traditional seaside resorts have declined since the 1960s and 1970s, in part because of the attraction and increasing availability of low cost holidays in warmer and sunnier locations. In addition, many holidaymakers prefer the superior facilities offered by newer rented accommodation and caravan parks, often located on greenfield coastal sites away from traditional resorts. These developments can detract from the natural attributes of the coastal fringe.

Recently, development in traditional resorts was given an impetus through the "Pilot Tax Relief Scheme for Certain Resort Areas" (examined in detail in Section 3.5 below). The scheme was designed to encourage investment to refurbish and update tourist amenities and facilities. This pilot scheme has now terminated and there are no plans to re-activate it.

EU funding has facilitated the rapid development of tourist-related facilities such as marinas and golf courses. For example, over 70 golf courses have been developed since 1990, 20 of which are located on the coast. Despite increased capacity many established coastal golf courses have experienced excessive demand from visiting golfers and have had to restrict entry (e.g. Galway Golf Club and Ballybunion, Co. Kerry).

'Eco-tourism' has also increased in recent years. Even with limited facilities for visitors at coastal nature reserves e.g. Wexford Wildfowl Reserve, Lough Hyne (Co. Cork), approximately 116,000 domestic residents visited these areas or participated in bird watching during 1995/96. Initiatives such as the Wexford Coastal Path have improved access to the coast as well as encouraging people to explore Ireland's rich coastal ecology.

Whale & dolphin watching is growing in popularity especially along the south west coast and in the Shannon estuary. An estimated 150,000 people annually visit Dingle, to see a wild and sociable bottlenose dolphin called "Fungie".

Poorly planned holiday developments in addition to increased tourist numbers can put severe strain on local infrastructure (water, wastewater disposal, rubbish collection etc.) which in turn can cause local pollution and other forms of environmental degradation. In many Irish coastal areas the existing sewage systems are unable to cope with seasonal increases in population. This is the case on the Aran Islands where, in addition to water shortages throughout the summer, inadequate provision for sewage disposal and seepage from septic tanks into groundwater have been documented.

With the advent of the European Urban Waste Water Treatment Directive, provision has been made for the improvement of wastewater treatment plants to take account of these increased seasonal loads. However, individual dwellings in rural coastal areas that rely on septic tanks for wastewater disposal are not under the remit of this directive. Under certain conditions such sources have the potential to contaminate coastal waters. Tourists and recreational users are also responsible for an estimated 18% of the litter deposited along the coast.

Recreational activities may conflict with commercial uses of the shoreline such as seaweed and shellfish harvesting and with commercial operations around landing facilities and working fishery harbours. Activities such as jet-skiing can disturb wildlife and beach users, create noise and exacerbate local erosion.

## **Conclusion**

As a consequence of the increasing mobility and prosperity of the human population, some coastal habitats and amenities are under pressure from a growing influx of visitors.

There is a serious shortage of quantitative information on trends in tourism and recreational activities in coastal areas. There is also insufficient factual information on the effects of current levels of tourism and recreation on the coastal environment including its landscapes, habitats, beaches, nearshore waters, resort towns and associated infrastructures. These deficiencies preclude a proper assessment of the existing and future impacts of these activities on the coastal zone.

Nevertheless, the use of coastal areas for recreation is increasing rapidly. This raises the possibility that, in the absence of assessments of the carrying capacity of particular sites and attractions, and of mechanisms to limit activities where this is clear warranted, further environmental damage may result.

The impacts of tourist-related developments on the coast are numerous. In recent years, the increased availability of funding for tourism-related enterprises has aided a rapid expansion of facilities such as golf courses, holiday homes and marinas while the cumulative effects of these developments on coastal environments have not always been foreseen or adequately managed.

The benefits of tourism have been actively promoted by Irish state agencies and tourism organisations. However, greater awareness of the potential negative effects of tourism has initiated a re-appraisal of the industry.

Some coastal tourism developments restrict access to, or use of, the coast while others are visually obtrusive, alter the natural attributes of the areas or place strain on the infrastructure of small coastal communities.

## **Future Trends**

Although coastal tourism is dependent upon the quality and variety of the coastal environment, it has been shown in many European countries that increases in tourist numbers (especially during the peak summer season) may threaten areas of high ecological and resource value.

There is a need to develop integrated planning and management for the coastal zone that is a necessary basis for environmentally sustainable tourism in coastal areas.

### **3.3.3 Urban development**

The LACOAST Project examined an area of 2,535,707 ha. consisting of a 10 km wide strip around the coast and quantified changes in land use in the coastal zone over a 15-year period (1975-1990).

The study showed that the discontinuous urban fabric increased by 10.3% over the 15-year period.

The counties showing the greatest increases in artificial areas are Cork, Dublin, Limerick and Wicklow i.e. those counties containing major urban areas.

More recent data on the increase in housing stock confirms the trend to increasing urbanisation of the coastal zone. Between 1990 and 1992 the housing stock increased by just 15% but in the 5 years preceding 1997 housing increased by 82%. As all the cities and major towns Ireland are located along the coast, much of this development has involved the expansion of coastal conurbations. In areas to the north and south of Dublin, house completions increased by over 74% between 1994 and 1997. Other coastal cities (Cork, Galway, Limerick and Waterford) have also seen major increases during this period (as high as 176%). All coastal counties (with the exception of Dublin County Borough) have experienced growth in the number of new houses, ranging from 47% to 180

In Dublin, where there is a shortage of land for housing, there is trend towards urban renewal and many apartments are now being built in the city centre.

Resort and rural development sites affording sea views are highly valued for the building of hotels and private residences. Accordingly some stretches of the coast have been extensively developed. This is particularly noticeable along coast roads on the outskirts of towns and villages. One of the most striking instances of this type of 'ribbon development' is to the west of Galway City.

Poorly planned holiday developments combined with increased tourist numbers can put severe strain on local infrastructure (water, waste disposal, rubbish collection etc.) which in turn can cause local pollution and other forms of environmental degradation. In many Irish coastal areas the existing sewage systems are unable to cope with seasonal increases in population. This situation will be remedied under the Urban WasteWater Treatment Programme of the National Development Plan 2000-2006, which includes the coastal cities Dublin, Cork, Waterford, Limerick and smaller coastal towns.

### **Conclusion**

Almost all of the coastal towns of 2000+ population have increased population in the period 1991-96.

The urbanised area in the coastal zone increased by 10.3%. The number of houses in the coastal counties increased by between 47% and 180% in the period 1994-97. The amount of industrial land increased by 16.6% over the 1975-90 period.

### **Future Trends**

The development pressures on the coastal zone will increase as a result of both the physical development but also the social and economic driving forces behind this growth. There will clearly be a consequential pressure on the coastal environment, in all its forms.

#### **3.3.4 Holiday Homes**

An indication of the increasing development pressure on the coastal zone is the often visually intrusive proliferation of second/holiday homes, fuelled by a strong economy and tax incentive schemes such as the "Pilot Tax Relief Scheme For Certain Resort Areas" (examined in Section 3.5 below).

It is estimated that 1:3 housing completions in the country is taking place in the open countryside with profound implications for the environment and landscape. It would appear that current volume, location, scale and design of such developments is increasing.

It is estimated that there are in the region of on the landscape. There are some 15,000 second and holiday homes in the maritime counties, including their inland areas. The majority of these second homes are located in the coastal zone or inland scenic areas.



**Map 4 - Proportion of Rural/Urban House Building 1996 - 1999**



The development of holiday homes is often speculative i. e. supply led rather than demand led.

More importantly the intensive development of holiday homes has the sociological effect of driving land and property prices out of the range of local inhabitants, calling into question the viability of rural communities. A recent study which examined second home development (mainly holiday homes / apartments) in rural northwest Connemara (County Galway) showed that non-residents owned second homes accounted for 40% of the housing stock.

There is increasing concern about the pace and scale of holiday houses in the coastal zone. Tourists have expressed the view that what made these areas special was the scenery, including its wild and unspoilt nature with significant numbers citing water, beaches and the uncrowded quiet, uncommercialised character of the area as marking it as special. In certain cases holiday home development has left an indelible mark on the landscape, with suburban clusters appearing on some previously remote and pristine parts of the coast.

### **Conclusion**

Extensive stretches of the coastal zone have been developed for holiday homes particularly on the outskirts of towns and villages. The development of second/holiday homes is accelerated by the buoyant economy and to an extent by tax incentive schemes (discussed below). The effect is not only to create a visually intrusive form of development in the landscape but also to distort the availability of local housing supply. One study shows that up to 40% of housing supply in rural NW Connemara was owned by people not resident in the area and in some individual townlands the incidence was as high as 60%.

### **Future Trends**

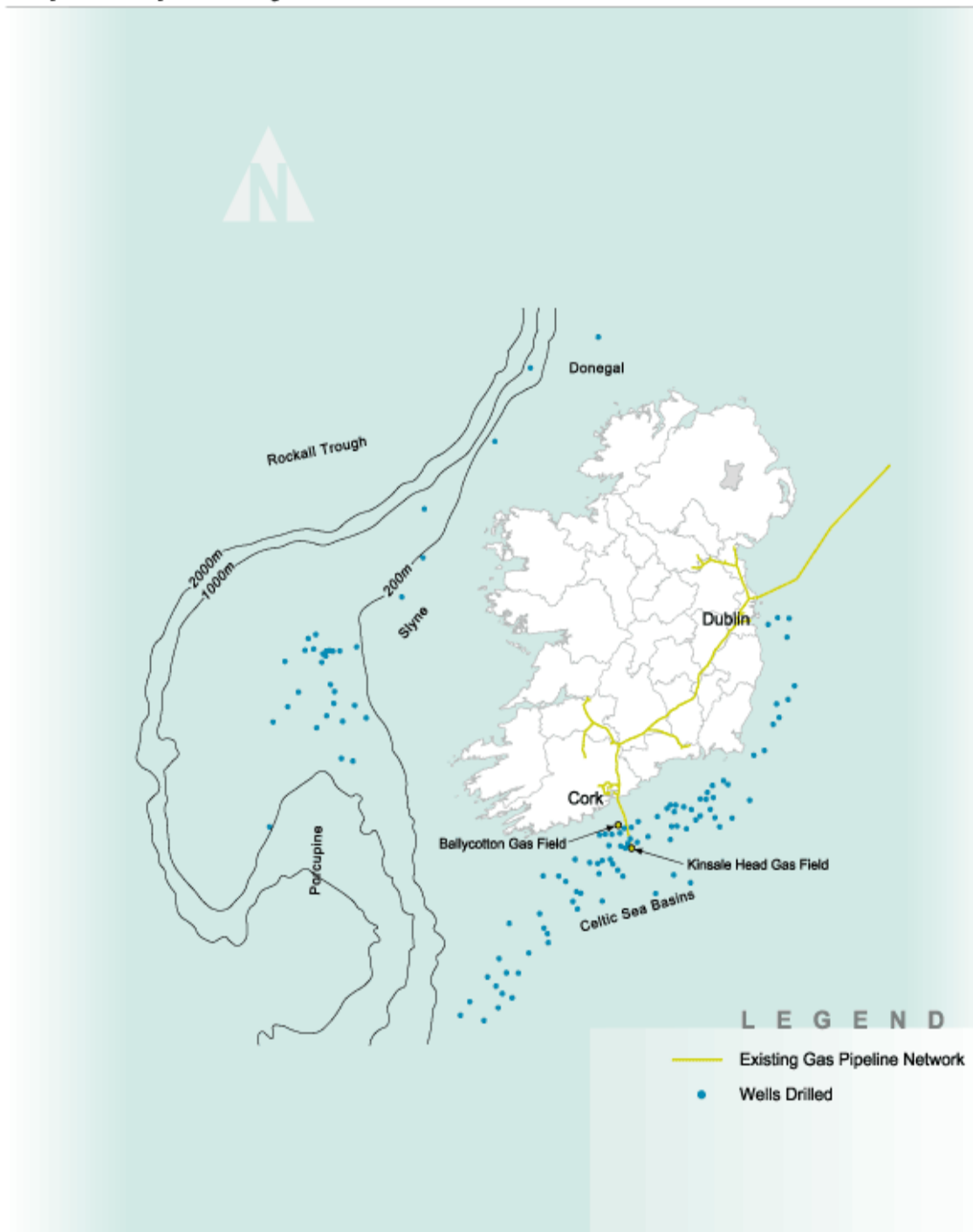
The coastal zone will remain under pressure from second and holiday homes given the buoyant economy. It is clear however that continuation of current trends will lead to deterioration in the coastal environment, both visually and physically.

## **3.3.5 Energy Resources**

### **Oil/Gas installations**

Offshore exploration began in the late 1960s that led to the discovery of the Kinsale Head Gas Field in 1971 and the Ballycotton field in 1989; these fields came on stream in 1978 and 1991 respectively.

**Map 5 - Exploratory Wells 1991 - 1997**



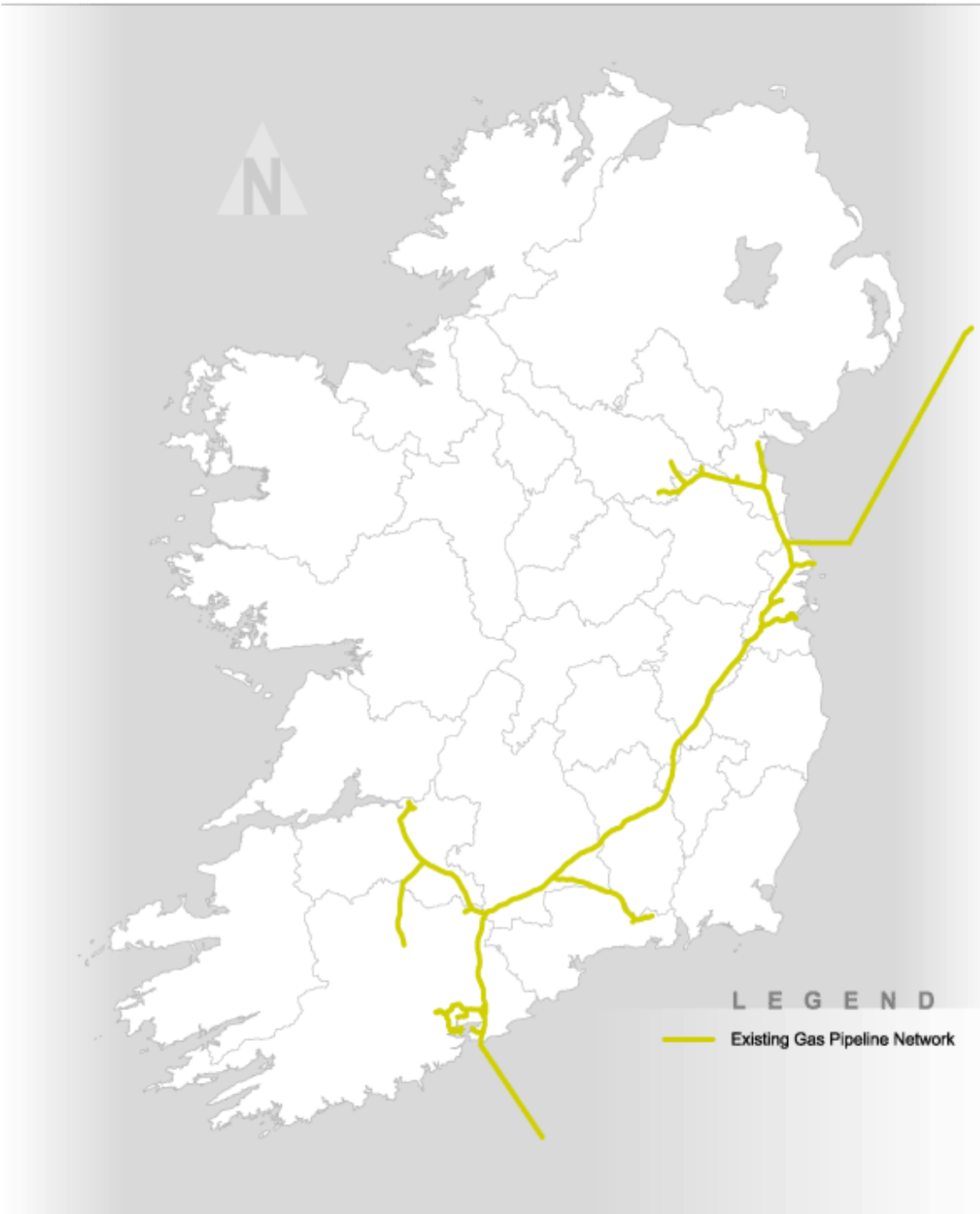
Since the discovery of the Kinsale and Ballycotton gas fields, oil and gas exploration has continued in Irish offshore waters. At January 2001 there were 21 petroleum exploration licences and 11 petroleum prospecting licences operating. A number of sub-commercial discoveries of oil and gas have been made of which the Helvick and Seven Heads fields show the highest potential yields. Basins west of Ireland are only lightly explored, wells have been drilled in the deep Porcupine basin and in the NW offshore basins of Slyne Trough, Erris Trough and Donegal basin. While some of these wells have shown the presence of good quality oil or gas only the Corrib Field in the Slyne Trough has yielded commercially extractable quantities.

At present exploration interest is being shown in the Irish offshore sector, this resurgence has also been stimulated by the discovery of important oil reserves to the northwest of the Shetland Islands. Ireland's western offshore sedimentary basins could also yield significant quantities of hydrocarbons.

### **Existing Natural Gas Network**

Gas from the Kinsale Head and Ballycotton fields, is landed on the south coast and yields, on average, 239 million cubic feet of gas per day. The Bord Gais network, which comprises the Cork-Dublin Pipeline and spur lines, distributes gas to most major population centres in Ireland, supplying approximately 120,000 domestic and commercial customers.

**Map 6 - Existing Gas Network**



The existing natural gas network is located primarily in the south and east of Ireland with no infrastructure in the north or west to support gas production or transmission at present.

The reserves of Kinsale gas are estimated at approximately 242 billion standard cubic feet (BCF), and will be depleted in the next decade.

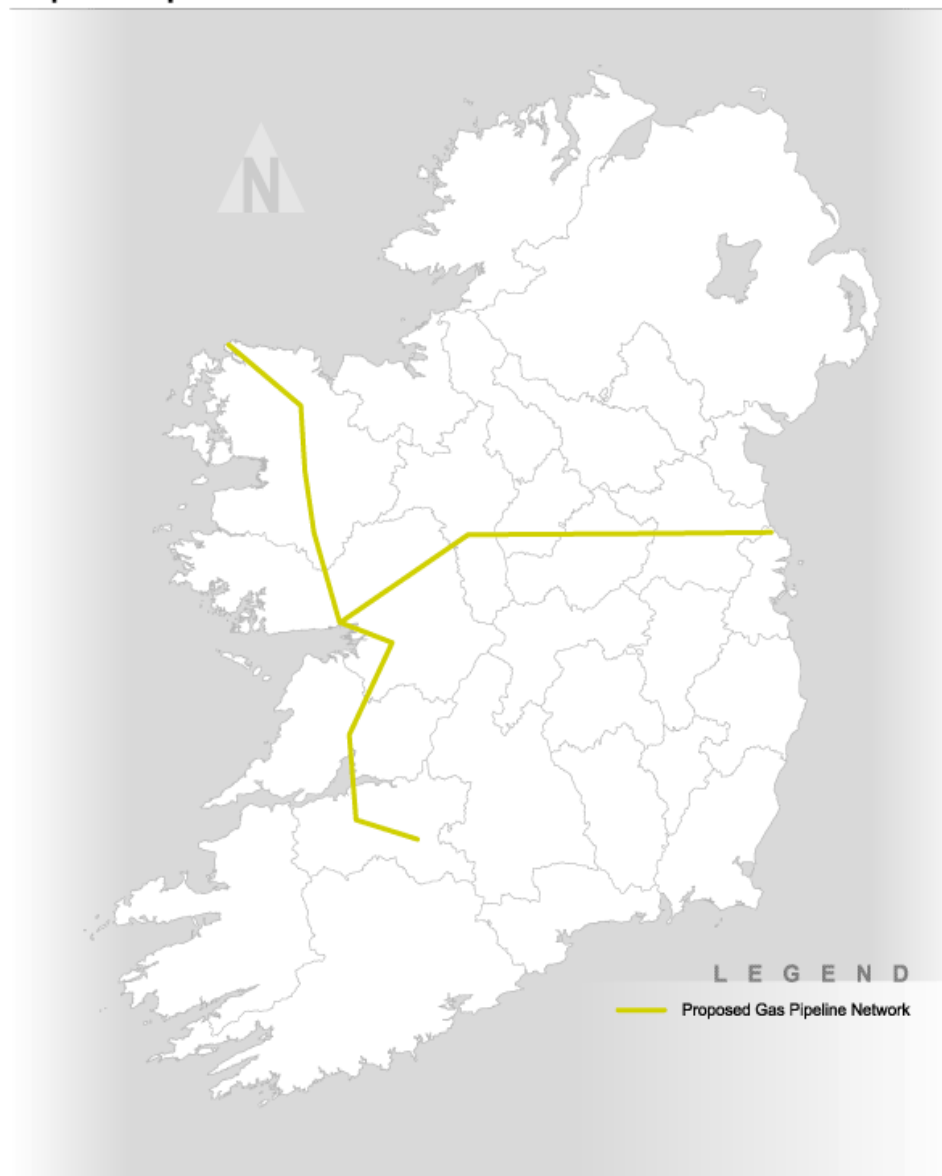
In 1993 to ensure long-term security of gas supply a 290 km gas inter-connector pipeline was constructed between Ireland and Scotland. Imported gas is being used in the Dublin area and will help to augment the diminishing supply of Kinsale gas.

Bord Gais plans to extend the gas network westwards to Galway, which would also serve the Midlands. A proposed pipeline between Galway and Limerick serving Ennis and Shannon is also proposed by Bord Gais and would complete a loop of the network.

### **The Corrib Gas Field**

The Corrib natural gas field is located some 70km west of the nearest coastline, the Mullet peninsula, in County Mayo and lies in 350 metres of water.

**Map 7 - Proposed Gas Network**



The life of this gas field is estimated at approximately 15-20 years with first gas scheduled to come ashore in early 2003.

The potential market for the Corrib gas is considered to be mainly in the Republic of Ireland, in areas served by the Bord Gais gas distribution system.

From the Corrib Field Terminal the processed gas will be transported onwards through the new pipeline to Craughwell in Galway to the proposed national gas main connecting Cork, Galway and Dublin.

### **Offshore Wind Farms**

Wind, tidal and wave energy sources have the potential to produce substantial amounts of totally “green” electricity- more than the State could conceivably use - without contributing to the greenhouse gas effect which is projected to adversely impact on our climate and environment generally. Abstraction of wind, wave and tidal energy contribute positively to environmental protection.

Exploration of the wind energy potential of a number of sites off the East coast, Co. Wicklow in particular, is currently proceeding. Proposals for at least one site are expected in 2001.

### **Conclusion**

The ESRI report 'National Investment Priorities for the period 2000-2006'. recognises that commercial pressures combined with the need to meet environmental standards have raised the dependence on natural gas, which in turn has raised issues concerning security of supply and delivery of gas and electricity in Ireland.

The existing gas network does not extend into the west of the country and is almost exclusively within the S&E Region with only a small part of the network serving Dundalk and Drogheda in County Louth and a spur to Baileborough in County Cavan.

The development of the Corrib Field will bring to the economy of Ireland a much-needed additional natural gas supply.

The current proposal and other planned extensions to the national network will provide an opportunity for many areas in the BMW region to be connected to the national gas network.

Development of the Corrib Field increases the economic viability of extending the gas network into the west and particularly into areas such as County Mayo, which are otherwise unlikely to benefit from this resource.

The use of natural gas as a fuel source delivered from the gas reception Terminal in Mayo will permit industry and possibly domestic users in Mayo and Galway to benefit from a clean fuel other than electricity. The opportunity to replace other fuels with gas in power stations is also an important factor.



### **Future Trends**

Natural gas is an adaptable clean energy resource, has the lowest levels of greenhouse gas emissions per unit of energy of fossil fuels and is consistent with the need for sustainable planning and development.

The 'Green Paper on Sustainable Energy' predicts a dramatic increase in the contribution of natural gas to the electricity supply mix. From a base of 30% in 1998, natural gas is projected to account for 56% of the fuel mix for electricity generation by 2010. Under the National Climate Change Strategy, this percentage is likely to rise further. In the context of increasing dependency on natural gas in power generation, measures such as liquid natural gas storage and pipeline construction will be required to protect the security of supply to the national gas network.

The development of offshore wind farms will be a significant new marine activity with important CZM and national energy supply implications.

The introduction of Natural Gas will contribute to the regional development of the western region and County Mayo, in particular, by acting as a catalyst to economic development and encouraging investment in industry and commerce and thereby promoting migration into the region.

While a number of Circulars and Guidelines relating to Planning Policy and Development Control have been issued by the Department of the Environment and Local Government, none of these address the subject of oil and gas development or the wider issue regarding the siting of large scale energy/ industrial installations or the routing of pipelines.

### **3.3.6 Aquaculture**

#### **Finfish**

Finfish aquaculture began in Ireland in the 1970s. The salmon farming industry developed rapidly in the 1980s following a change from small inshore cages to large offshore structures and production has risen steadily since then, although in world terms the volume of production is still small. The main finfish farming areas are located in the southwest (Bantry and Kenmare Bay), northwest (Donegal Bays and Lough Swilly) and the west (Connemara and Mayo Bays). In recent years there has been considerable research into cultivation of new finfish species, notably turbot and halibut.

## **Shellfish**

Cultivation of shellfish was traditionally focussed on native flat oysters and mussels on managed natural beds and is still carried out at a number of locations around the coast. The tonnage of rope-cultured mussels harvested over the past decade has consistently increased whereas annual yields of bottom-cultured mussels have been highly variable. Since the appearance of *Bonamia* affecting the native oyster (*o.edulis*), oyster production has shifted to intensive cultivation of the Pacific oyster (*c.gigas*). In the period 1980-95 the native oyster sector has shown little growth compared to the Pacific oyster sector. 50-100 tonnes pa. of clams have been produced commercially since the early 1990s, primarily in Sligo and Donegal.



In June 2000, on foot of the Circa Report, The Department of the Marine and Natural Resources published a plan for the period 2000-2015 which envisages an increasing aquaculture production by over 300% from 1997 levels.

**Table 8: Mariculture Production**

Species	1997	2006	2010	2015
Salmon/Sea trout	16,139	37,639	55,000	70,000
Mussels	15,957	26,852	40,000	50,000
Gigas & edulis Oysters	4,313	16,243	18,000	21,200
Sub-total	36,409	80,734	113,000	141,200
% of projected output	96.1	84.9	87.5	89.1
Other species including freshwater trout	1,394	14,326	16,000	17,250
TOTAL	37,803	95,060	129,000	158,450
% Growth		185	35.7	22.8

The expansion will see production rise from 38,000 tonnes in 1997 to 160,000 tonnes in 2015. The value of production will rise from £59 million to over £450 million in 2015. It is estimated that some 6,000 additional jobs (full-time & part time) will be required to support that level of production, with an additional 3,000 downstream jobs. The primary target for production will be the export market. Given that aquaculture is almost completely coastal, there is a spatial element and an opportunity to develop employment prospects and social cohesion in disadvantaged coastal communities.

## Conclusion

Aquaculture is spatially concentrated along the south, west and northwest coasts with the main finfish areas being southwest (Bantry and Kenmare bays), the northwest (the larger bays in Donegal) and the west coast (the larger bays in Connemara and Mayo). There are important shellfish production areas in the northeast (Carlingford) and the southeast (Waterford/Wexford).

Over the period 1980-96 finfish production rose from 181 to 14,750 tonnes, shellfish production increased from 5,200 to 19,000 tonnes.

## Future Trends

The future trend will be significantly increased production levels in aquaculture which will have an impact on-shore in terms of infrastructure provision to serve often isolated piers and harbours.

Aquaculture will continue to expand as an ever-increasing component of seafood supply and economic contributor to coastal communities. There are however coastal management issues such as SPAs, increasing tourism developments, holiday homes, infrastructure limitations (access to smaller piers & harbours etc) which have an impact on aquaculture development and the integration of aquaculture itself as a key issue in coastal management debate.

### 3.3.7 Recreation

Water based recreation/tourism is totally dependent on a key sustainable natural resources, 4000miles of high quality coastal waters, 4000 lakes (168,000 Ha or 2% of total surface area of the country) 75 major river catchments, 450 miles of navigable waterways. Development of the water based recreation sector depends on environmental protection and sustainable development of water resources.

**Table 9: Water based Tourism and Leisure Sector 1996 (Overseas No. & Spend)**

Activity	Visitors	Specialists	Visitor Spend (£mn)	Specialist Spend (£mn)
Angling	170000	97000	68.0	39.0
Sailing <sup>a</sup>	14000	7000	4.3	2.2
Cabin Cruising <sup>b</sup>	35000	35000	10.9	10.9
Watersports	18000	18000	5.6	5.6
<b>Total</b>	<b>237000</b>	<b>157000</b>	<b>88.8</b>	<b>57.7</b>

Note: Excludes carrier receipts.

- a. Bord Failte does not provide revenue estimates for sailing. As a proxy, a revenue figure has been derived on the basis of average overseas visitor spend in 1996. A significant proportion of sailing spend would not be captured by Bord failte's 'Survey of Travellers' (SoT) because it derives from visiting yachts that access the country at points other than the main ports of entry.
- b. Bord Failte do not provide revenue estimates for cabin cruising. As a proxy, a revenue figure has been derived on the basis of average overseas spend for 1996. Cabin cruising visitor numbers are taken from statistics available from the Irish Boat Rental Association (IBRA), which has estimates for the vast majority of the cabin cruising sector in Ireland. Bord Failte estimates for cruising visitors are somewhat lower.

Source: Marine Institute (derived from Bord Failte and the Irish Boat Rental Association)

The ESRI 'National Survey of Water-based Leisure Activities', carried out on behalf of the Marine Institute in 1996 estimates domestic spending on water-based leisure activities at £303 million pa. About 46% of this spend (£138 million) derives from water-based activity holidays, i.e. 18% of the total domestic tourism markets of £751 million is water-based. Coastal recreation (i.e. trips to the beach/seaside) and swimming make up 70% of total domestic spend (£214 million), followed by angling (£27 million), sailing/cruising (£24 million), general boating (£19 million), nature-based tourism and water-sports (£9 million each).

**Table 10: Domestic Spend on Water-based Tourism and Lesiure Activities**

Activity	Day Trip/Equipment Spend (£mn)	Holiday Spend	Total Spend
Angling	23.7	3.3	27
Sailing	10	1.5	11.5
Cabin Cruising	4.8	8.1	12.9
General Boating	16.1	3.3	19.4
Watersports	5.1	3.5	8.6
Nature-based Tourism	4.2	4.9	9.1
Coastal Recreation/ Swimming	100.7	113.7	214.4
Total	164.6	138.3	302.9

Note: Holiday spend includes total national expenditure during over night trips on water-based leisure activities

Source: Marine Institute

Over 50% of the adult population engage in at least one water-based pursuit, the most popular being trips to the beach/seaside and swimming (at about one million participants). Many Irish people also engage in activities such as angling (190,000) and various types of boating (144,000). About 31,000 people engage in other water-sports, while significant activity is also recorded for visits to coastal nature reserves (85,000), bird watching (31,000) and dolphin/whale watching (16,000).

Over the past decade, the water-based tourism and leisure sector has received increased levels of investment in the areas of product development and infrastructure. In real terms, nearly £130 million had been invested in the Sector since 1989. Nearly half of this spend has come from the EU or IFI, 18% has been contributed by national Government with private enterprise contributing over 30% of total funding.

It has been estimated that water-based tourism and leisure contributed £301 million to GNP (1.15%) The most significant sectors were Coastal recreation £123 million, £71 Angling, £47 million Boating. 14,500 jobs are supported annually however “value-added” benefits arise due to the spatial distribution of the employment. Water-based tourism and leisure typically provides employment where there are few other employment opportunities or where it provides supplementary income.

An additional 1.5 million Irish adults (16yrs +) participated in water-based activities (55.7% of total population), giving rise to 29 million day trips and over 1.3 million overnight stays.

Conservative estimates indicate that the number of day trips to coastal areas increased by an estimated 600% in the period 1970-95.

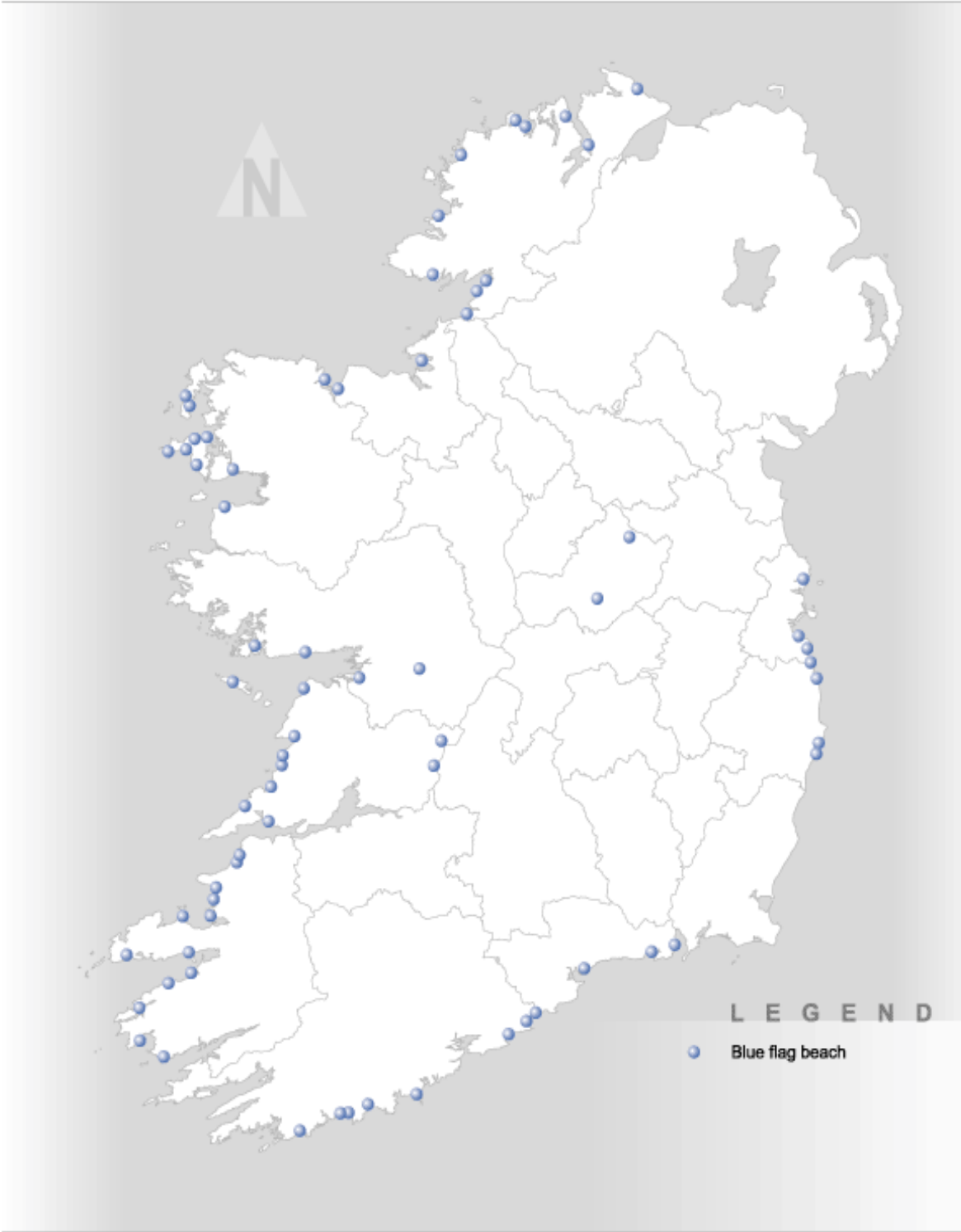
**Table 11: Percentage (%) of total population of Ireland engaged in Various sea water and coastal based activities**

Activity	% of total population (numbers participating)
Activity	% of total population (numbers participating)
Trips to the beach/seashore/swimming	60.2 (1,586,600)
Visit to coastal nature reserves/bird watching	4.4 (116,000)
Boating/Sailing	4 (114,000)
Sea Angling (from boat/shore)	3.3 (88,000)
Other sea ports	1.2 (31,000)

Source ERSI, 1996 - report is based on responses from approximately 4,166 interviews from people over 16 years of age and over a three month period. Note: Figures are not discrete as responders may have engaged in more than one activity

By far the most common water-based pursuits of the domestic population are trips to the seashore and bathing. It has been estimated that in upto 20,000 adults could be expected on the beaches of Dublin Bay in summer.

**Map 9 - Blue Flag Beaches (2000)**





A 1992 study of the Areas of Scientific Interest (ASIs) surveyed in four Irish coastal counties showed that 37% were damaged and a further 16% under immediate threat. Of the 13 principal causes of damage to ASIs, recreation pressure was cited the most frequently.

Probably the most seriously affected areas on the Irish coast are sand dunes that, when subject to unmanaged access can experience severe vegetation damage followed many instances, by soil and sediment erosion. This leads to losses both of wildlife habitats and sites of amenity value. In some areas the cumulative pressures of vehicles, pedestrians and caravan use have caused serious deterioration of vegetation and increased risk to the stability of dune systems (e.g. Brittas Bay).

Certain recreational developments such as golf courses have resulted in ecological damage at sites of international conservation value especially machair dune systems e.g. Magheraclogher, Co. Donegal. The artificial maintenance of grasslands for golf courses can result in structural and ecological alterations to the dune systems, which can reduce or destroy the value of the habitat. One such example is Castlegeorgory, Co. Kerry where a study of the site revealed significant ecological changes since development of the golf course have resulted a reduction of plant diversity in almost half of the consolidated dunes. Golf courses along the north Dublin coastline and at the Old Head of Kinsale (Co Cork) have removed public access to the shore and placed increasing pressure on adjacent coastal lands.

Excessive human activity in coastal areas can exclude seabirds from large areas of their natural habitat denying them feeding opportunities. On more easily accessible and frequented shores, human presence and recreational activities can disturb roosting and nesting seabirds. This has led to the initiation of protection schemes, especially along the east coast, to minimise disturbance and reduce the impact of predation on roosting sites.

Further adverse impacts from excessive recreational use are shown in Bannow Bay, Co. Wexford (designated a Special Protection Area for Birds), where motorbike scrambling has weakened the dune systems and shooting has disturbed roosting birds.

## **Conclusion**

The use of the coastal zone for recreation (all waterbased sports) is increasing substantially. One estimate puts the increase in daytrips to the coastal area at 600% in the period 1970-95. Domestic sea angling has increased by 50% since 1988 and in 1995, 40,000 overseas visitors were attracted to Ireland for sea angling. Sailing is spatially concentrated with half of the marina berths being located on the south and southwest coasts.

## Future Trends

Recreation in the coastal zone will continue to expand as leisure time increases in society in general.

The increasing demand for recreation space is taking place in a policy vacuum. There appears to be no national strategy for the provision of recreation space, there is no clear hierarchy of recreation needs or provision established for the country relating to the continued growth of urban centres on a regional basis.

## 3.4 Environmental Designations

The coastal zone in Ireland is the location of a significant number of sites that are protected because of their natural heritage and biodiversity.

The natural heritage is protected under a number of Domestic and EU legislative instruments. Primarily they are EU Birds Directive (SPA), EU Habitats Directive (SAC), and Wildlife Act (NHA) (to be enacted).

There is a serious commitment to conservation by the Department of Arts, Heritage, Gaeltacht & Islands. Expenditure, of which a substantial amount is for farmer's compensation, has risen from £7 million in 1993 to £25 million in 1998, indicating the importance now placed on protection and conservation of the natural environment.

Some 10% of Ireland is considered to be important from the nature conservation point of view with approximately 4-5% located in coastal areas.

An indication is given below of the main categories of protected areas.

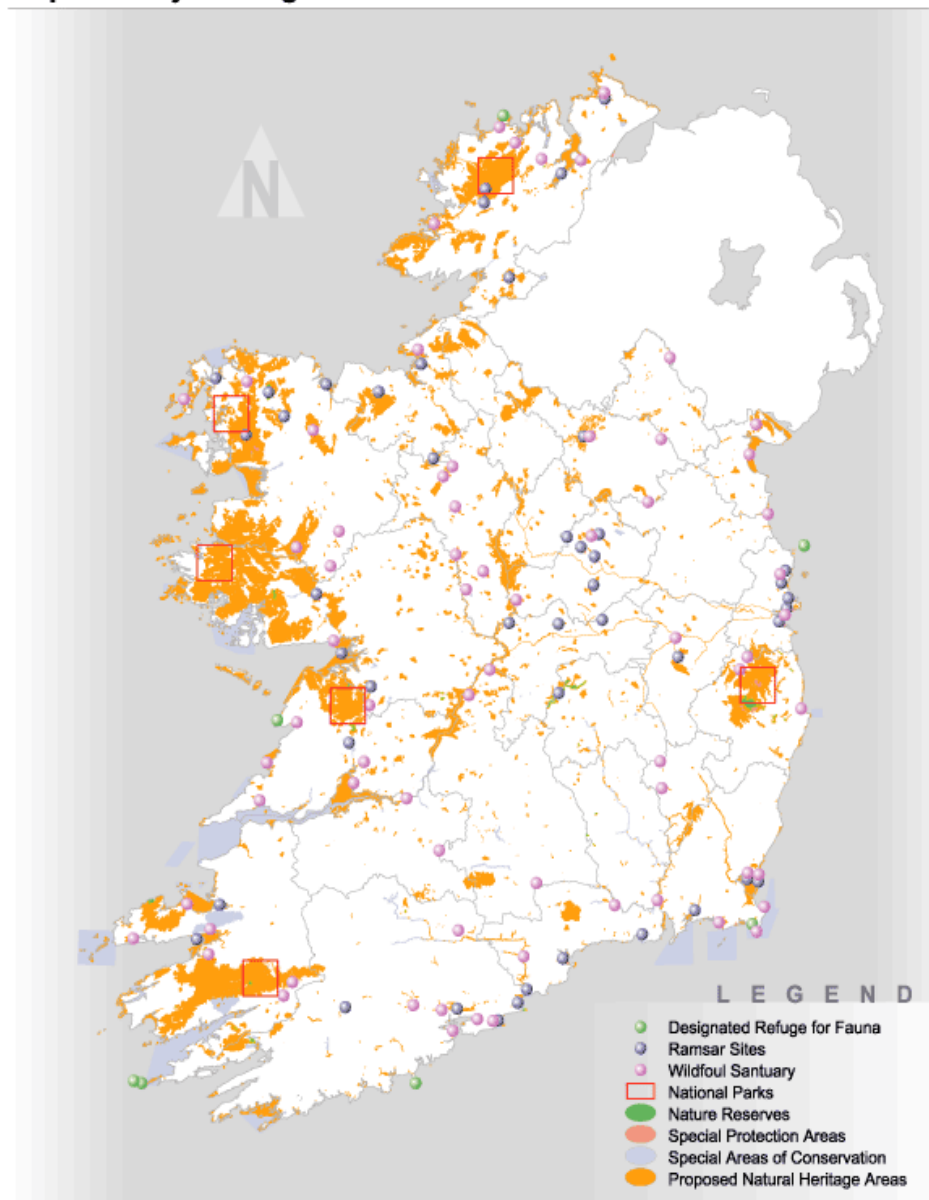
**Table 12: Types of Protected Areas**

Category	Objectives	No. Sites	Area Ha.
<b>Nature Reserves</b>	Conservation of flora/fauna/habitats	78	18,095
<b>National Parks</b>	Nature conservation and public use	5	47,287
<b>SAC</b>	Conservation of flora/fauna/ habitats of European importance	400	650,000 ca
<b>NHA (proposed)</b>	Protection of flora/fauna/ habitats & geological sites of national importance	1000+	750,000 ca
<b>SPA</b>	Conservation of bird species/habitats of European importance	109	230,000
<b>Ramsar</b>	Conservation of wetlands of international importance under the Ramsar Convention	47	70,550
<b>UNESCO Biosphere</b>	Nature conservation & sustainable use	2	11,500

### Special Areas of Conservation (SAC)

Approximately 400 sites extending to some 650,000 Ha of land & water have been designated as SACs. Most of the SACs are located in the west, primarily Mayo, Galway, Donegal and Kerry. The EU Commission has not yet approved the full list of SAC sites and some sites are still on appeal. The first phase of SAC concentrated on those sites of “priority” habitats which in the coastal area are sand dunes & machair, estuaries mudflats, sandflats, salt-water marshes etc.

**Map 10 - Major Designated Sites**



### **Natural Heritage Area (NHA)**

Natural Heritage Areas cover sites of national importance or higher. There are about 1100/1200 proposed NHA sites covering 750,000 Ha. 90% of which are also SACs. Although not law at present the NHAs will be given statutory protection with the passing of the Wildlife Amendment Act, currently at Committee Stage, in the near future. NHAs are protected de facto because they are SACs.

### **Special Protection Areas (SPA)**

Sites, which meet the criteria of the EU Birds Directive, have been designated as Special Protection Areas (SPAs). In 1997 there were 109 SPAs covering 230,000 Ha.

Many SPAs located in estuaries and bays are also suited to shellfish farming leading to potential conflict through loss of feeding areas, effect on food supply and disturbance.

In order to reduce any conflicts the National Parks and Wildlife Service is developing a zonation of bays and estuaries designed to protect the birds and facilitate aquaculture.

### **Ramsar Sites**

The Ramsar Convention on Wetlands of International Importance affords recognition and conservation on internationally important wetland sites. 47 Ramsar sites have been designated covering 70,550 Ha. 25 estuaries and bays around the Irish coast qualify as wetlands of international importance. 21 were designated upto 1999. All Ramsar sites are Nature Reserves, National Parks or SPAs.

### **Conclusion**

The area of land in the coastal zone covered by Natural Heritage Designations is extensive and greater protection than before is being given to areas of natural heritage and biodiversity.

By and large the various areas designated for nature conservation are also of importance from the point of view of landscape conservation. Those coastal sites coincide with areas under pressure from development in the form of tourism, holiday home developments aquaculture, etc.

### **Future Trends**

By 2020 the number of designated SAC sites will not change dramatically due to comprehensive nature of list submitted to the EU Commission and currently being processed.

Land use management plans are to be put into place where current use is not compatible with SAC/SPA/NHA Protection.

Conservation Plans which specify what is acceptable or not are being prepared with the landowners. 200 Draft Plans have been prepared.

The Department of Agriculture, the IFA and Duchas have agreed Habitat Prescriptions at National Level for protection of the Sand Dunes/Machair.

The potential for conflict will increase as pressures in the form of built development increase in the designated areas and around their margins.

### 3.5 Impact of Fiscal Policies: the “Pilot Tax Relief Scheme for Certain Resort Areas”

The stated objectives of the Pilot Tax Relief Scheme for Certain Resort Areas were: -

- (i) to provide the tax incentives necessary to help stimulate private sector investment in the renewal of the 15 designated resort areas and
- (ii) to renew and update the tourist amenities and facilities in those resort areas.

The Pilot Tax Relief Scheme for Certain Resort Areas ran from 1995 to 1999 and on termination was subject to comprehensive Inter-departmental/Agency Review, chaired by the Department of Tourism, Sport and Recreation. The Scheme has terminated and there are no plans to renew it.

**Table 13: Resort Areas were designated under the Scheme:**

County	Town
Co. Clare	Kilkee Lahinch
Co. Cork	Youghal Clonakilty
Co. Donegal	Bundoran
Co. Galway	Salthill
Co. Kerry	Ballybunion
Co. Louth	Clogherhead
Co. Mayo	Achill Westport
Co. Meath	Laytown/Bettystown/Mosney
Co. Sligo	Enniscrone
Co. Waterford	Tramore
Co. Wexford	Courtown
Co. Wicklow	Arklow

In some locations extensive areas of countryside around the actual towns and villages were designated. Clearly, this had implications, subsequently, for the nature of visual and environmental impact of developments undertaken.

An extremely broad range of works (new build or improvement) were eligible under the Scheme.

The list of 9 accommodation categories and 15 non-accommodation categories, were significantly broader than was envisaged when the Scheme was first proposed. The rationale for broadening of the Scheme was that, given the state of dereliction of many of the resorts, together with the likely reluctance of investors to direct resources to those resorts, an attractive package was required.

**Table 14: Eligible Development under the Scheme:**

Accommodation	Non-Accommodation
Hotels	Leisure/sports facilities ( e.g. swimming, water sports, tennis, squash, golf, angling, equestrian)
Guesthouses	Marina, mooring and breakwater facilities
Caravan and camping sites	Indoor/outdoor adventure and amusement centres/ parks
Holiday & Youth Hostels	English/Irish language schools
Holiday Camps	Theme/Interpretative Centres/Parks
B & B Establishments	Tourist Information facilities
Holiday Cottages	Craft exhibition and demonstration centres
Holiday Apartments	Entertainment facilities e.g. theatres, bowling alleys, amusement arcades
Other Self-catering accommodation	Restaurants/cafes
	Licensed premises,
	Car hire operations
	Car parks
	Retail outlets which are an integral part of and located in tourist buildings
	Heritage buildings with public access (improvements to)
	Existing activities licensed under the Gaming ,and Lotteries Act 1956 (improvements to)
The above accommodation must be registered or listed under the Tourist Traffic Acts, 1939- 1995.)	

## Extent of physical development

The amount of development which has taken place in the 15 resorts, since 1995, has been very substantial and it can be assumed that it was almost all driven by the tax relief scheme. However, while this may well be the case, it would be wrong to assume, that no development would have taken place given that the economy is buoyant.

**Table 15: Summary of planning approvals within all 15 designated resorts**

Category	Total
Hotels	55
Guesthouses	20
Caravan & Camp Sites	10
Holiday and Youth Hostels	12
Holiday Camps	Nil
B&Bs	103
Self catering Units (Holiday Cottages and Holiday Apartments)	5,300
Leisure/Sports Facilities	15
Marinas	Nil
Indoor/Outdoor adventure centres	1
English/Irish Language Schools	1
Theme/ Interpretative Centres/Parks	1
Tourist Information Facilities	5

**Table 15: Summary of planning approvals within all 15 designated resorts (continued)**

Category	Total
Craft Exhibition and Demonstration	4
Entertainment Facilities	14
Restaurants/Cafes	52
Licensed Premises	41
Car Hire	Nil
CarParks	Nil
Retail Outlets	99

The table clearly illustrates two main points:

- (i) the bulk of development has occurred in the accommodation sector
- (ii) most of that development has been in the self-catering sub-sector (houses/ cottages and apartments), with over 5,000 units in that category i.e. an average of nearly 350 units per resort. (Note: this figure is very much higher than when the 4 resorts where a low level of development has occurred are excluded.)

The level of development must be viewed in relation to the size of the resorts. While none of the resorts would constitute a large urban area but they do vary greatly in population size, from approximately 400 to over 8,000. In the smaller resorts, therefore, the impact of, say, 500 self-catering units would clearly be very significant, under a variety of headings (visual impact, house prices, infrastructure, etc.).

**Table 16: Comparison of Population & Self-catering Accommodation**

Town	Population	Self-catering
Kilkee	1331	427
Lahinch	580	221
Youghal	5943	779
Clonakilty	2750	179
Bundoran	1796	652
Salthill	2559	411
Ballybunion	1470	100
Clogherhead	775	33
Achill	2718	275
Westport	4520	410
Laytown/Bettystown/Mosney	3678	140
Enniscrone	692	379
Tramore	6536	366
Courtown	364	890
Arklow	8557	122

In almost all cases, the scale of development has had a very tangible and visible physical impact. There are four resorts where development has been on a relatively modest scale: Clogherhead, Laytown/Bettystown/Mosney, Arklow and Ballybunion. At the other end of the spectrum are, for example, Courtown, Bundoran, Youghal and Kilkee.

#### **Level of investment**

The estimated total value of investment under the Scheme was £600-£700m of this total, approximately 90% (£540-£630m) was invested in accommodation with 80% of the total (£480-£560m) in self-catering accommodation.

#### **Environmental Impact**

The examination of tourism impacts above raises the question as to whether the development, which is occurring under the Scheme, is '*environmentally sensitive*'. *Bord Failte has stated that: 'the quality of the environment is fundamental to the success of all other elements of the product. Sustainable development involves a concern for the impact of the industry on the host community as well as on the physical environment'*. ~ Developing Sustainable Tourism, Bord Failte.

Appreciation of environmental quality is a major factor in holiday choice and the future of Irish tourism is inextricably linked to Ireland's perceived high environmental quality. Up to now, the superior Irish environment has been due to a significant extent on the historically low level of development and low population density (especially relative to European patterns).

The open-ended nature and extent of development occurring in the designated areas naturally gives rise to concern on environmental grounds and this has been strongly articulated in media reportage and representations made to Government Departments.

Given that the relatively unspoilt nature of the Irish countryside is a significant attraction for many overseas tourists, the intrusion on the landscape, in certain locations, of large tracts of housing, is not a positive development.

A negative environmental impact can result in further costs to the Exchequer as tourist dissatisfaction can result in loss of repeat business and negative publicity. However, it needs to be borne in mind that, much of this kind of development is happening anyway in many other, non-designated, resorts albeit at a generally slower rate, regardless of the existence of the Scheme.

In addition, while acknowledging that many of the designated resorts are in areas which will not impact significantly on the holiday experience of the overseas visitor, they are close, in some cases, to touring routes or, in the case of Achill, they are part of a general Western Wilderness area, where the primary selling-points (remoteness, small scale of urban development) may be undermined.



## **Conclusion**

The Inter-departmental/ Agency Review of the Pilot Tax Relief Scheme for Certain Resort Areas chaired by the Department of Tourism, Sport and Recreation arrived at the following conclusions.

The Scheme, which, in retrospect, had certain flaws (e.g. lack of clear criteria for resort selection, too broad a range of eligible works, inadequate post-introduction monitoring mechanisms), has made a very significant impact, especially in pure physical terms, in almost all of the 15 designated resorts and has achieved, therefore, in simple terms, one of its original objectives i.e. it has stimulated private sector investment in the 15 areas.

Opinion on the merit or otherwise of this impact is heavily polarised, with neither the local communities, local authorities, nor outside commentators having internally unified views. These views relate, almost exclusively, to the self-catering accommodation dimension of the Scheme, which dominates nearly all debate by virtue of the fact that (a) it consumed possibly as much as 80% of the total investment and (b) it had a highly visible and, in many cases, what has been called a character-altering effect on the resorts.

The physical impact, especially through the proliferation of suburban- style estates, has been on a very major scale. For instance, 400 new self- catering units have clearly had a very visible impact on a town the size of Kilkee (population 1,300). Or, in the case of Tramore, one development alone has comprised Over 200 units.

The Scheme has contributed to the regeneration of the resorts but, because of its broadly-defined nature, has not encouraged investors to focus on the upgrading of existing buildings and facilities, resulting in the continued existence of dereliction and the 'ring-doughnut' effect.

While suggestions were made that there was infrastructure overload in some of the resorts, particularly at peak times such as the Summer months and bank holiday weekends, the position is that there was a targeted investment programme in place to ensure that local authorities would have the resources available to them to upgrade infrastructure in line with the expansion of resorts. In some cases, development levies have been applied to help finance these infrastructure requirements.

Land prices and new house prices have escalated in the resorts and made purchase by local people more difficult. The impact identified here is also much in evidence in non-designated resorts, particularly as the new economic climate has made the holiday home option less dependent on tax incentives.

The Scheme has divided local communities in many of the resorts, with beneficiaries of the investment (e.g. traders) often in the 'pro' lobby with the 'anti' lobby comprising those concerned about perceived damage being done to the scale and character of the resorts, upward pressure on land and house prices and pressure on the local environment and infrastructure services.

The Scheme does not contribute, in any significant way, to the achievement of a key tourism policy objective -the attraction of overseas tourists -since most of these resorts are clearly developing, primarily, as destinations for domestic tourists (whose spending, although valuable, is less so than that of overseas tourists, in national economic terms).

The Scheme has probably assisted in the achievement of regional spread in domestic tourism terms, and the wider dispersal of the spin-off effects of economic growth, but holiday home purchase by urban dwellers would have occurred anyway, especially as the economy became increasingly buoyant towards the end of the 1990s. It appears likely, however, that the regenerated resorts may have assisted in retaining, within the national economy, spend which might otherwise have occurred in overseas holiday destinations.

It is highly likely that there has been some displacement, in terms of potential investment being diverted from adjacent resorts (the 'suction' effect). This is largely unavoidable in a scheme based on geographical areas, rather than particular product sectors. However, it is not possible to quantify such displacement and its impact may have been mitigated in any event by the now buoyant investment climate nationally.

The accommodation stock in the resorts has been dramatically enhanced which, in the medium-to-long term, must inevitably assist, to some degree, in the underpinning of new or revived visitor attractions which, in turn, should help to secure the survival of the resorts and strengthen the local economies.

The overall conclusion must be that the Scheme has not achieved its objectives in the manner envisaged i.e. the Scheme was an expensive one from the Exchequer's point of view, that perceptions of it have been very mixed, that it cannot be said to represent an optimal use of the tax incentive intervention mechanism when placed in the context of the overall tourism policy objective of securing additional overseas visitors, and that, in the light of the actual impact which it has had, it would have benefited from more careful planning, design and monitoring.

### **Future Trends**

With the expiry of the Scheme pressure will renewed in tourism areas that depend on high quality landscapes. Even areas that do not benefit under this scheme have come under increasing pressure of development.

## 4 SUMMARY AND POLICY IMPLICATIONS

### Coastal Erosion/Coastal Deposition

There is firm evidence that rising sea levels, increasing storm frequency, and wave energy can increase the rate of erosion and incidence of flood-related events (e.g. landlord incursion, wave damage flooding etc) in some areas of the coast.

Some 1500Km of the coastline are at risk from erosion, while some 490Km are in immediate danger.

The rate of erosion is currently estimated at 0.2-1.6 metres per annum although rates will vary according to the materials. Some 130-160 Ha of land was lost through coastal erosion in the 1980s.

Human activities such as sand/gravel removal from beaches, dredging, land reclamation and shoreline protection measures.

The areas most vulnerable to coastal erosion are the soft coastlines of the east coast between County Down and County Wexford.

### Sea Level Change

Sea level change around the coast of Ireland is estimated at 17-31 cm. over the next 30 years. The difficulty in predicting such change means a wider range of anywhere between 5cm and 46 cm is possible.

The mean annual rise in sea level is likely to be of the order of 0.2mm with an overall rise between 1990 and 2030 of 0.3m.

The rise in sea level would have serious effects on the coastline, increased erosion, flooding, breaching of coastal defences and loss of habitat and amenity. The country would not be affected uniformly; sea-level changes will impact on the south and southeast first then spreading northwards. The greatest impact of flooding would be felt in the urbanised east coast and in the 3 major cities located on the coast, Dublin, Cork and Galway. On the west coast counties from Cork to Donegal and the Shannon Estuary, the likelihood is that some 150,000 Ha of land is vulnerable to loss by sea-level rise. In addition to loss of land through gradual inundation, the increased storminess and severity of storms expected as the climate changes will exacerbate the potential for coastal damage. The 100-year return period for incidences of extreme levels of water can be expected to be reduced to 5 years.

Overall some 176,000 Ha of coastal land is at risk from sea-level change.

The foregoing assessment arises out of an analysis in 1991 of the outcome of the First Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). The EPA is currently undertaking a fresh assessment of the impacts of climate change on the basis of the Third Assessment Report of the IPCC. While the 1991 assessment has a time horizon to 2030, the current predictions of the IPCC are that the change in sea levels will continue leading to an expected global sea-level rise of between 0.1 and 0.9 metres by 2100.

## **Land Use Characteristics**

The LACOAST Project examined changes land use in a 10km strip around the coast of Ireland (including NI) over the period 1975-1990. In 1990 55% of all land in the coastal zone is agricultural a fall of 0.53% from 1975 and due primarily to urbanisation around the periphery of coastal cities and towns.

The biggest change in land use was the large-scale expansion in land under afforestation which showed a 38.3% increase (probably due to planting on the west coast).

The urbanised area in the coastal zone increased by 10.3%. The number of houses in the coastal counties increased by between 47% and 180% in the period 1994-97. The amount of industrial land increased by 16.6% over the 1975-90 period.

## **Marine Industry**

The Irish fleet landed 300 Kt of fish with a value of £144 million. In 1996 the top 20 of the 129 ports accounted for 86% of the tonnage and 75% of the value. These 20 ports dominate the demersal & pelagic sectors while shellfish landings are distributed more evenly amongst the medium and small ports. Killybegs accounts for 50% of the total landed tonnage. Castletownbere and Killybegs are the main demersal ports. On the east coast Carlingford Clogherhead and Arklow are the most important ports. Cobh, Union Hall and Helvick are the landing points. Ports in the southwest land mostly shellfish dominated by cultured mussels. Along the west coast shellfish landings predominate.

## **Tourism**

Tourism in the coastal zone depends quality and variety of the coastal environment yet over-development, increases in tourism numbers threaten areas of high ecological and resource value. There is a wide range of tourism development impacts in the coastal zone, holiday homes, caravan parks, golf courses etc.

## **Urban development**

Almost all of the coastal towns of 2000+ have increased population in the period 1991-96.

The urbanised area in the coastal zone increased by 10.3%. The number of houses in the coastal counties increased by between 47% and 180% in the period 1994-97. The amount of industrial land increased by 16.6% over the 1975-90 period.

## **Holiday Homes**

Extensive stretches of the coastal zone have been developed for holiday homes particularly on the outskirts of towns and villages. The development of second/holiday homes is accelerated by the buoyant economy and to an extent by tax incentive schemes (discussed below). The effect is not only to create a visually intrusive form of development in the landscape but also to distort the availability of local housing supply. One study shows that upto 40% of housing supply in rural NW Connemara was owned by people not resident in the area and in some individual townlands the incidence was as high as 60%.

## **Offshore Energy**

There is extensive exploration off the coast for oil, gas and petroleum. The Kinsale Gas field is nearing the end of its economic life and will be exhausted by 2010. A new gas find off 7 km west of the Mayo coast in the Corrib Field will be exploited over the next 15 years. Landfall for the gas supply will be Bellanaboy near Pollatomish. Exploration in the vicinity of the Corrib field continues. There is also a gas inter-connector with Scotland and investigation is being made into a further connection and connection with Northern Ireland.

The development for offshore wind generation offers considerable potential given the wind resource and the more complex issues affecting land based wind farms.

## **Aquaculture**

Aquaculture is spatially concentrated along the south, west and northwest coasts with the main finfish areas being southwest (Bantry and Kenmare bays), the northwest (the larger bays in Donegal) and the west coast (the larger bays in Connemara and Mayo). There are important shellfish beds in the northeast and southeast also.

It is planned to expand aquaculture production from the 1997 level of 39,000 tonnes to 160,000 tonnes by 2015.

## **Recreation**

The use of the coastal zone for recreation (all waterbased sports) is increasing substantially. One estimate puts the increase in daytrips to the coastal area at 600% in the period 1970-95. Domestic sea-angling has increased by 50% since 1988 and in 1995 40,000 overseas visitors were attracted to Ireland for sea-angling. Sailing is spatially concentrated with half of the marina berths being located on the south and southwest coasts.

## **Environmental Designations**

The coastal zone contains a high proportion of areas protected under various natural heritage designations SAC/SPA/NHA. Land use conflicts with tourism-related development, recreation, agricultural practices, second home development etc. persist. A study in 1992 identified that 37% of the ASIs (the precursor to SAC/SPA/NHA) in four coastal counties had been damaged and 16% under immediate threat as a result of tourism and recreation pressure.

## **Impact of fiscal policies Seaside Tax Scheme**

The Pilot Tax Relief Scheme for Certain Resort Areas was introduced in 1995 for a number of seaside towns that were traditional holiday resorts. The scheme was designed to regenerate the resort's attractiveness as holiday destinations.

The Scheme had major implications for the towns involved. Investment polarised on self-catering accommodation, 80% of the investment went to new build development of this type. The scale of development adversely impacted on many of the resorts, 400 new self-catering units in the town of Kilkee (pop. 1300), similarly in Tramore one development alone consisted of over 200 units. The Scheme tended to raise land prices above the means of local people, in the same way as in the undesignated areas where holiday home proliferate. The Scheme may have aided a regional spread of domestic tourism.

## **Coastal Zone Management**

The need for Integrated Coastal Zone Management (ICZM) is accepted by Government as a commitment in its Action Programme for the Millennium and the Department of the Marine and Natural Resources, as lead Department, is charged with preparing (after consulting all relevant Departments etc.) policy and legislative proposals for Government consideration. This very complex task which has an all-Ireland dimension requires time and resources. The Department of the marine and Natural Resources aims to make substantial progress in preparing such proposals in the first half of 2001.

## POLICY IMPLICATIONS

- *Coastal Zone Management: A Draft Policy for Ireland* published in 1997 is still only a discussion document it is not yet official policy.
- A Coastal Zone Management policy is required urgently to guide Local Authority Development Plans. CZM policies may be included under the 2000 Planning Act.
- Coastal Erosion/Coastal Deposition.
- Public pressure will be to implement hard engineering protection measures. Such mitigation is costly and not cost effective in the long term.
- Sea Level Change.
- Management of the change in sea level will present policy issues and choices, Abandonment, Managed retreat (Accommodation), Protection are the main options to be considered.
- Land use characteristics.
- Marine Industry.
- It is essential that ports have good connection to/from national transportation system and that the ports are properly integrated into the national system, focussing on the rail network where possible.
- Greater emphasis must be put on the development of a sustainable transport system and integration of marine transport within the total transport chain needs to be examined.
- Expansion of aquaculture will have significant on-shore infrastructure requirements.
- There is no clear CZM structure however CZM will need better co-operation between Local Authorities similar to Waste Management Strategy co-operation i.e. viable/logical groupings of Local Authorities.
- EU Water quality (Framework) Directive requires the preparation of River Basin Plans which have to include Estuaries and Coastal waters up to 1Km from shore. Cross-Border catchments must be managed as an International Basin District. NI is treated as 1 basin but some Cross-Border RBDs may included as NI.
- Ireland is a signatory to the OSPAR Convention. Ireland & UK have X-Border responsibility in the Celtic Sea.
- The UK has Coastal Zone Fora at National level for England/Scotland/Wales and Northern Ireland. There is currently no Irish equivalent to which the UK For a can respond to in relation to OSPAR.





## **5 COASTAL ZONE MANAGEMENT**

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