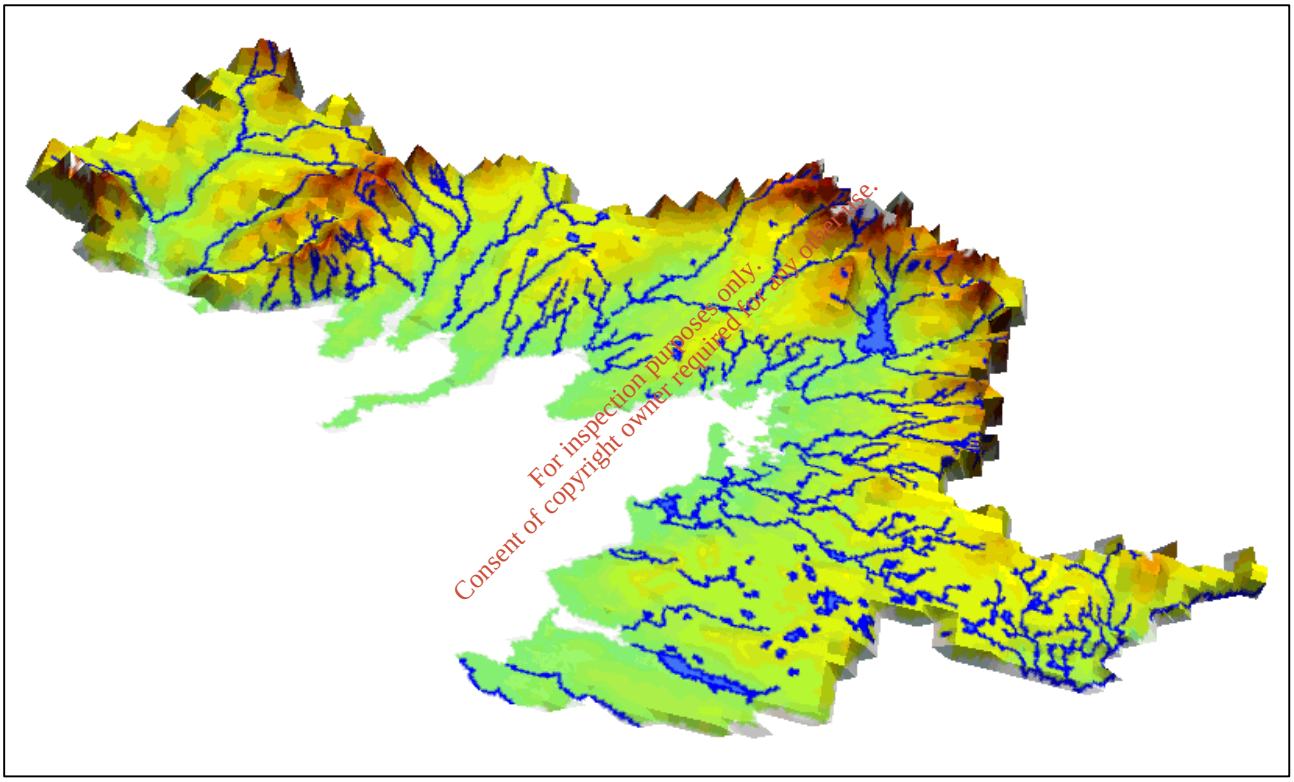
Donegal Bay
Water Quality
Management Plan

Executive Summary
Final Draft



Mr. J Holohan, B.E., C.Eng, MIEI, MIAT.
Director
Water, Environment, and Emergency Services
Donegal County Council
April 2002

SECTION H (1): DECLARATION

Declaration

I refer to the application for a waste water discharge licence/revised licence, pursuant to the provisions of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007).

I certify that the information given in the draft Water Quality Management Plan for the Donegal Bay which accompanies this application is truthful, accurate and complete.

I give consent to the EPA to copy this application for its own use and to make it available for inspection and copying by the public, both in the form of paper files available for inspection at EPA and local authority offices, and via the EPA's website.

This consent relates to this application itself and to any further information or submission, whether provided by me as Applicant, any person acting on the Applicant's behalf, or any other person.

Signed by : _____ **Date :** 11/12/07
(on behalf of the organisation)

Print signature name: PEADAR MAC RORY

Position in organisation: Acting Director of Service

Donegal Bay Water Quality Management Plan

Executive Summary

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A. INTRODUCTION

Catchment Planning

Catchment management plans represent a vision of the water environment. A catchment plan sets environmental objectives and guides all uses, and, indirectly, the water environment as a whole, to comply with these objectives. The existing status of the water environment is compared with the objectives and from this comparison, management options are developed.

The catchment is seen as the natural management unit for integration of the work programmes of all government agencies relating to water quality, water resources and ecosystem management. Catchment plans summarise relevant data and include an agreed action programme to optimise environmental protection. The catchment planning process is seen as a medium for promoting discussion, resolving conflict, assigning priorities, and setting targets by which progress on key issues can be monitored.

Ireland made statutory provision for catchment planning in the Water Pollution Act of 1977. The term used is water quality management plan. In County Donegal plans have already been conducted on two catchments; The Foyle and the Swilly. These more recent plans considerably widened the approach of the earlier plans to encompass all uses of the watercourses including amenities and habitat protection.

Objectives of Catchment Management

The objectives of the management plan for the Donegal Bay Catchment have been determined as follows:

1. To prevent and abate pollution of waters.

2. To safeguard public health.

3. To protect and, where necessary, improve the ecology of the waters.

4. To protect water quality such that many diverse uses may be possible. These may include:

- abstraction for domestic, industrial and general uses,
- fishery,
- recreation and tourism,
- wildlife conservation and habitat protection.

5. To identify and protect the major aquifers from pollution.

6. To provide a framework for water quality management on the basis of which the development of the catchment can proceed in a balanced and sustainable manner.

7. To identify monitoring and information requirements such that the resultant information is adequate and sufficient to support water quality management decisions.

8. To ensure that financing of pollution control programmes is based on efficient and effective strategies.

9. To identify the needs for investment in public and private waste water treatment facilities.

10. To facilitate the implementation of relevant EU legislation.

The Legislative Framework

The purpose of a water quality monitoring and management system is to provide a framework for the co-ordination of future environmental protection in the Donegal Bay catchment area, including the licensing of discharges and effluents, and to ensure that water quality standards are attained and maintained. Management systems contain objectives for the prevention and abatement of water pollution as well as any other provisions which are considered necessary by the local authorities. The objectives are formulated with reference to relevant environmental policy and legislation issued by relevant national and international institutions.

Water quality standards in Ireland originate from the EU legislative framework. Through a variety of directives a quality of water required for the differential beneficial use of waters has been established. The recently developed Framework Directive will co-ordinate all the legal aspects of EU water quality. Subsequently the Donegal Bay and previous management plans will be subsumed under the River Basin district management plans.

The standards presently in operation are being implemented through National Regulations issued by the Minister for the Environment which give legal effect to the directives. The Minister is free to issue regulations which contain higher, but not lower, standards than the directives. Areas where quality standards exist already enshrined in law, are in bathing waters, fresh waters for supporting fish life, the phosphorous regulations and in drinking waters.

The basis for the control of water pollution and the enforcement and monitoring of water quality is contained within several Acts and regulations:

(1) The Local Government (Water Pollution) Acts 1977-1990 ("Water Pollution Acts");

(2) The Fisheries (Consolidation) Acts 1959-1997 ("Fisheries Act");

(3) The Environmental Protection Agency Act, 1992;

(4) The Waste Management Act, 1996;

(5) The Local Government (Planning and Development) Acts 1963-1993;

(6) Urban Waste Water Treatment Regulations, 2001.

B. THE DONEGAL BAY CATCHMENT

Catchment Overview

The combined catchment of the Donegal Bay Area and its tributaries is 971.6 km^2. The base map of the area is shown in Map 1. The population density, including the urban area is low at approximately 46 persons/km^2. The present population of the Donegal Bay catchment is 28,500. Donegal Town is the largest town with around 3,500 persons as shown in Map 2. The other main urban area in the catchemnt include Killybegs, Ballyshannon, and Bundoran.

The major rivers in the Donegal Bay Catchment are shown in Map 3. The Glen River river system flows in a southerly direction from its source at Slievetooey Mountain to its mouth Carrick Village. The Glen river system includes a large number of small tributaries, which include the Crow River, and the Owenteskiny River.

The Bungosteen River rises in the Crockanpeast Mountains, northwest of Killybegs and flows into Donegal Bay at the most northerly point of Killybegs Harbour. The catchment of the Bungosteen River is greatly extended by a number of tributaries. The largest of which are the Stragar, Loughaderry, Roechrow, and Meengilcarry Rivers. Loughaderry Reservoir, which provides the water supply for Killybegs Town, is the only major lake on this river system.

The Corker river is supplied by two smaller tributaries which rise in the Cuskeraghan Bog and Tamur Lough, to the north of the catchment. It then feeds into the Oily river, along with The Tullintreane tributary, and exits into Donegal Bay at Bruckless Village.

The Eany Water is the largest sub-catchment in the Donegal Bay catchment area. It comprises of the Eany Beg River which rises in Bunnasruell Mountain, and the Eany More River which is supplied by the Sruell and Eglish Rivers. All the tributaries rise in the Blue Stack Mountains to the north of the Donegal Bay Catchment Area.

The Eske River flows from Lough Eske to Donegal Town. Lough Eske is in turn fed by a number of tributaries, which include the Clogher, Lewerymore, Clady, and Corabber Rivers. The southern area of the catchment is Drained by the Drowes River, which flows from Lough Melvin, and the Bradoge River which exits into Donegal Bay at Bundoran Town.

CATCHMENT GEOLOGY

The geology of County Donegal was first mapped and described in detail by the Geological Survey of Ireland in the latter part of the 19th century as presented in Map 4.

The landscape around Donegal Bay is gentler than that to the north for two main reasons: the bedrock consists of relatively soft shales, sandstones and limestones; and, the area was one of Ice Age glacial deposition, so that drumlins and tills blanket the area.

The geology of the Bay is varied and complex, with a history spanning almost 2000 million years. Five main subdivisions can be made of the bedrock preserved at the land surface; Dalradian rocks, Carboniferous sedimentary rocks, Quaternary geology, Silurian and Devonian rocks.

HYDROLOGY

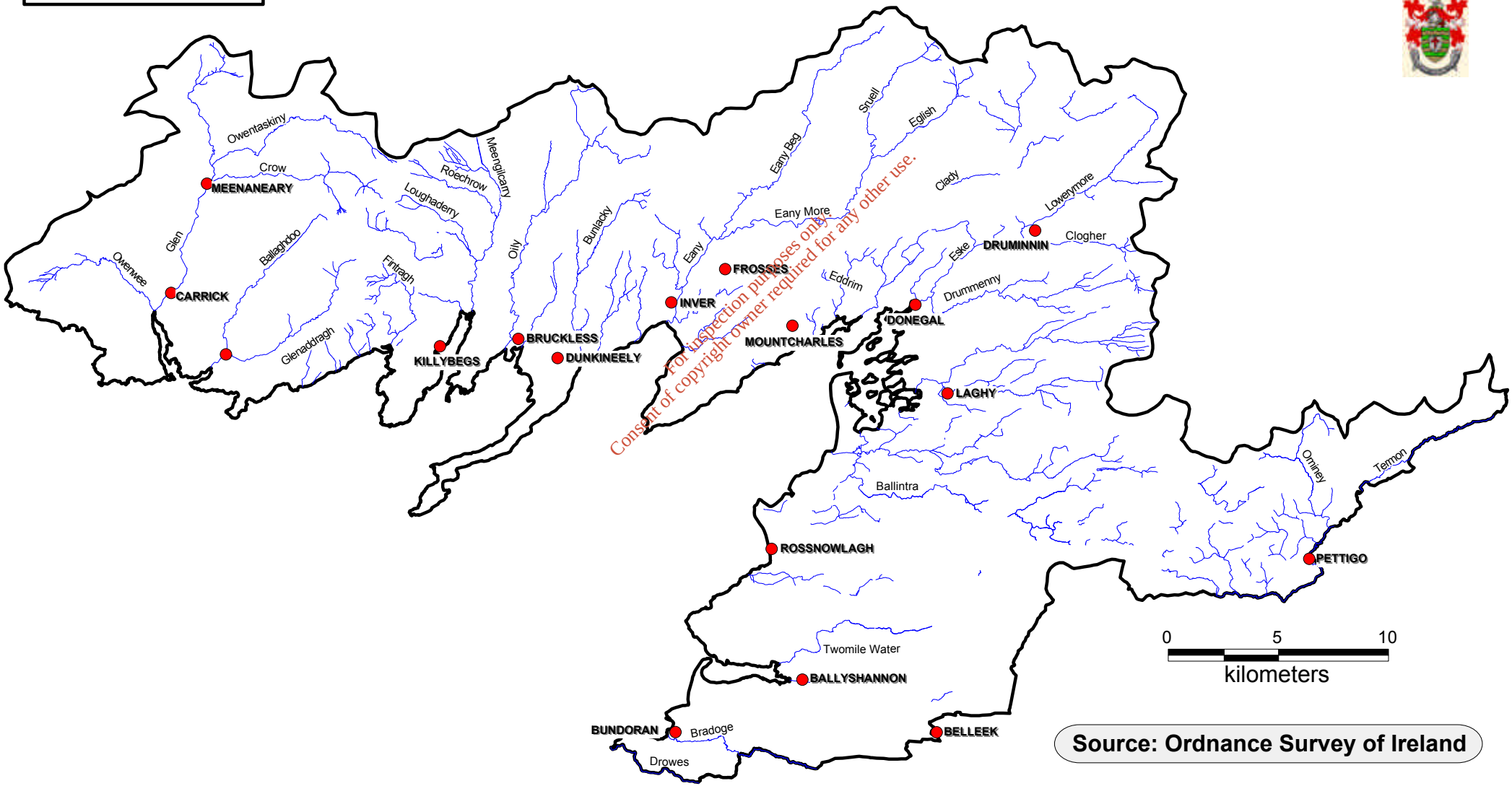
The river flows within the Donegal Bay catchment are presently monitored by the EPA at a much reduced rate than in previous years. The majority of the recording sites are currently inactive. Hydrological data of only three rivers was available from the catchment, namely the Rivers Glenaddragh, Eske and Erne. The results of the hydrological data of the Glenaddragh and Eske rivers are summarised in Table 1. The controlled flow rates from the Erne are given in Table 2.

River	Station	Mean Staff Gauge Reading (m)	Mean Flow Rate (m^3/s)
Glenaddragh	Valley Bridge	0.425	0.49
Eske	Lough Eske Bridge	0.348	2.96

Table 1. Hydrological data from the Glenaddragh and Eske Rivers.

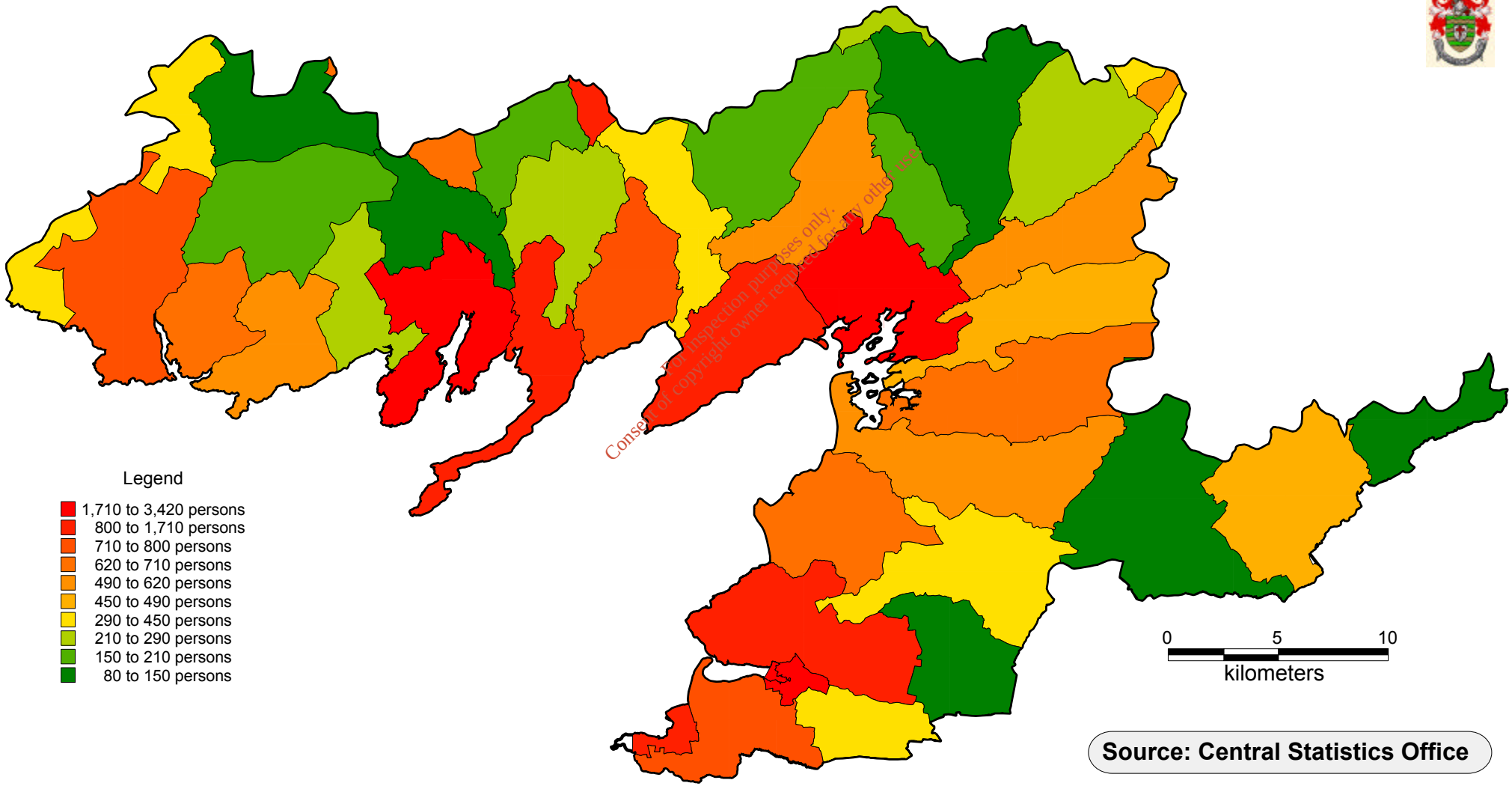
DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 1
The Base Map
of the Donegal Bay Catchment



DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

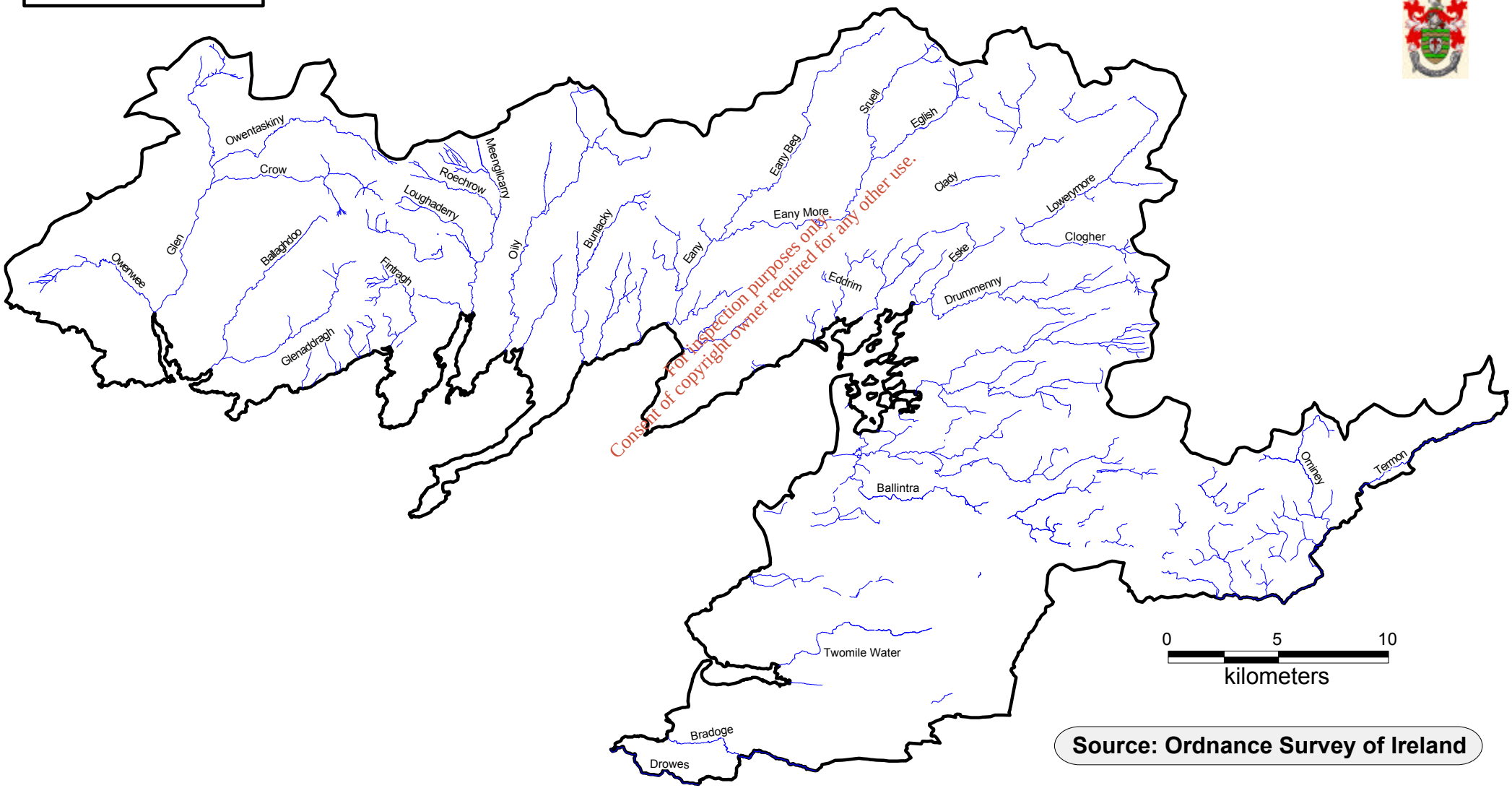
Map 2
The Population Distributions within the Donegal Bay Catchment



Source: Central Statistics Office

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 3
The Major Rivers in the Donegal Bay Catchment



Source: Ordnance Survey of Ireland

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 4
The Geology
of the Donegal Bay Catchment

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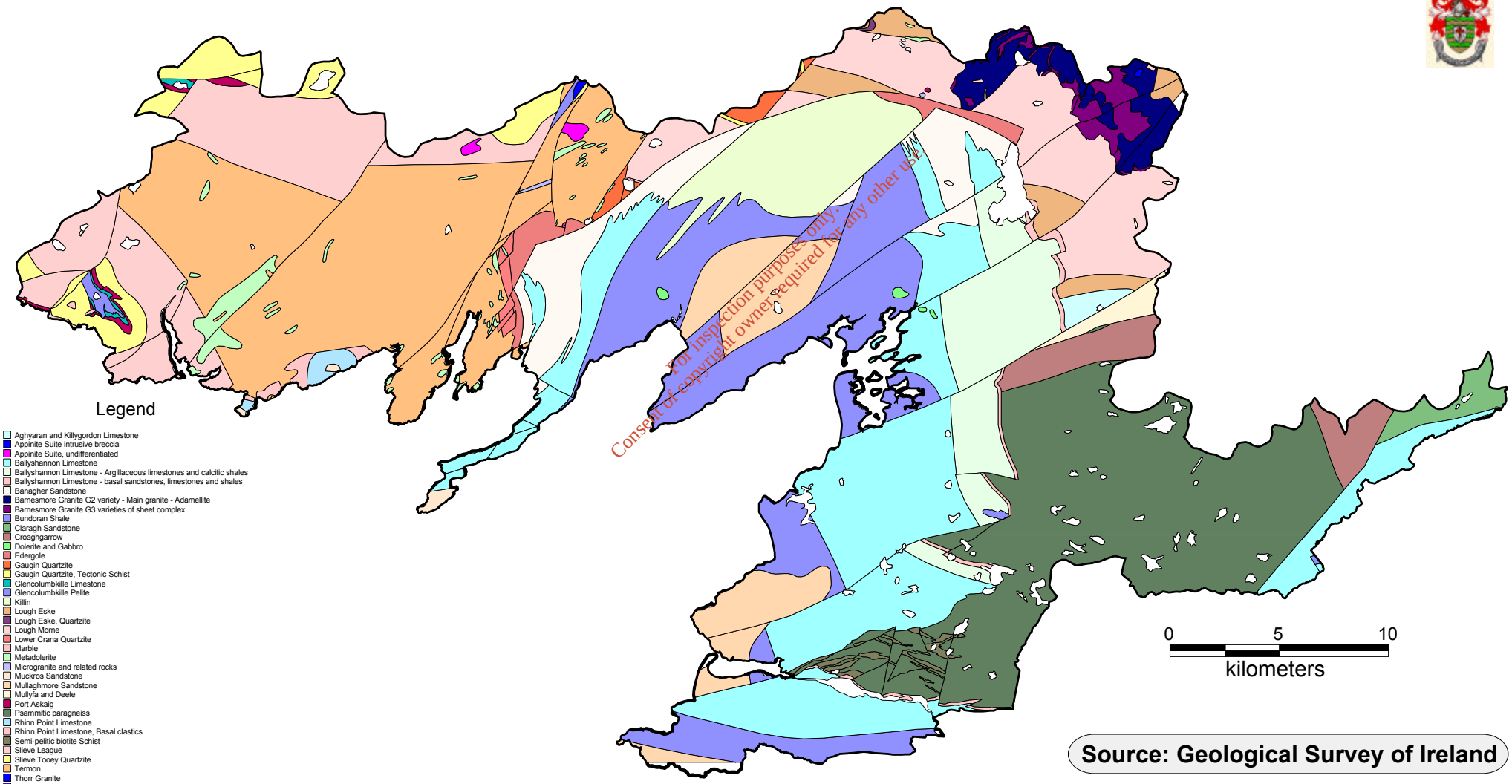


Source: Geological Survey of Ireland

	Average Monthly River Flow (M^3/Sec)	
MONTH	**2000**	**2001**
January	211	145
February	155	104
March	136	38
April	60	121
May	54	33
June	29	20
July	14	17
August	10	52
September	61	N/A
October	162	N/A
November	204	N/A
December	242	N/A

Table 2. Flow Rates of the River Erne at Cathleens Falls as Regulated by the E.S.B.

RAINFALL

The rainfall characteristics of the catchment are recorded the Meterological Office.

The rainfall characteristics recorded at three gauging stations within the catchment have been examined. These gauging stations were selected as they are representative of the entire catchment in their distribution. The average annual daily rainfall figures within the catchment were found to vary from 5.99mm (Lough Eske - Edergole) to 3.3mm (Ballyshannon), to 4.89mm (Kilcar). Such spatial variations are to be expected with the highest rainfall expected in upland regions (2725.9mm at Edergole) and the lowest within the south-eastern sector of the catchment (1500.3mm at Ballyshannon).

LAND USE

The land cover within the Donegal Bay Catchment was identified using Landsat Thematic Mapper satellite imagery data from 1989. The land cover identified within the catchment is presented in Table 3 and depicted in Map 5. The highest areas of land use are Peat bogs (35.149) and pastures (28.947) followed by a Diversity of Agriculture & Natural Vegetation (10.254%).

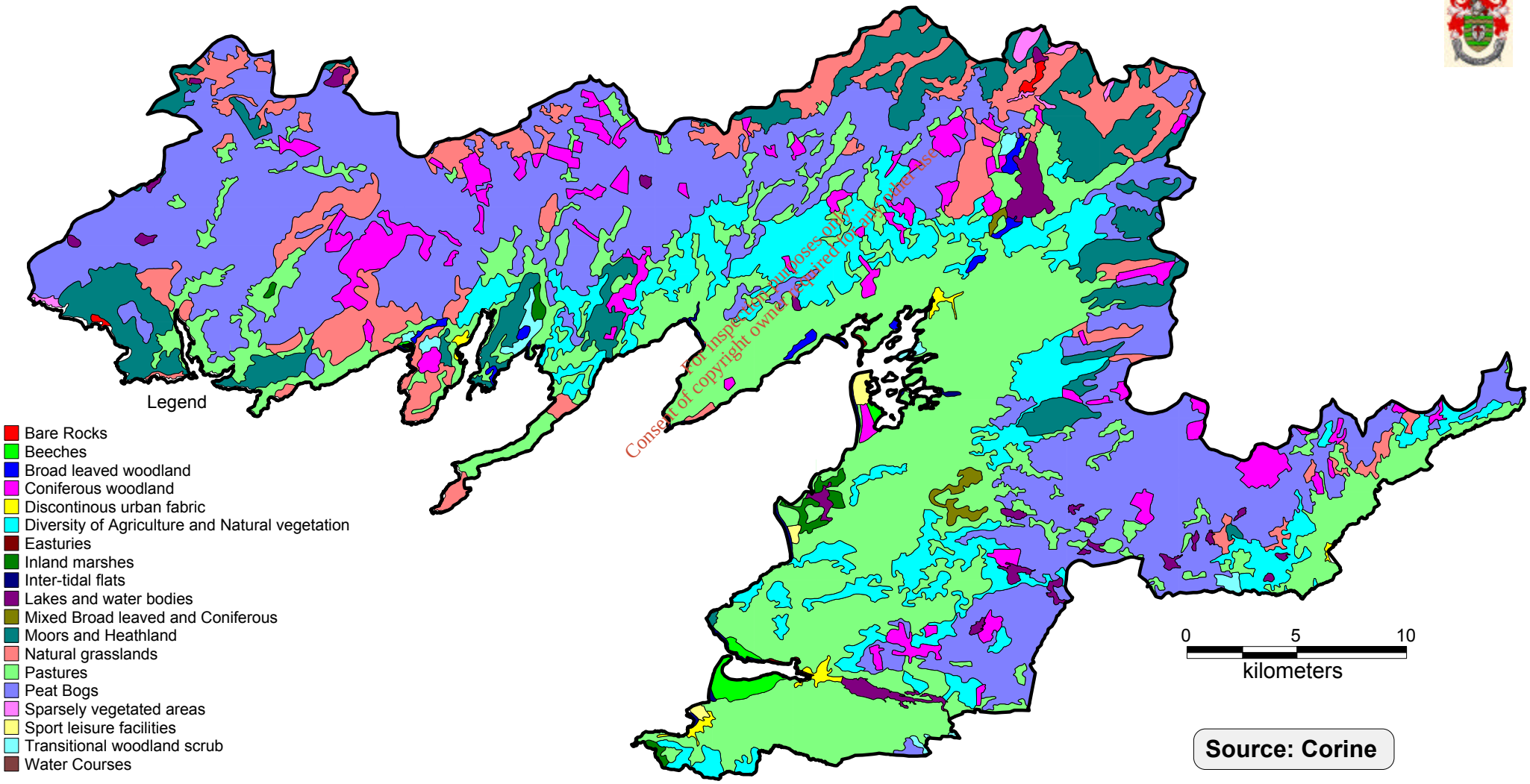
The land uses are related to soil distribution. Soil types vary considerably throughout the catchment. The General Soil Map of Ireland 1980 shows nine distinct soils with a predominance of Brown Podzolics and Peaty Podzols both of which are peaty soils with parent material of volcanic origin. The general soils map prepared by Geological Survey of Ireland is presented in Map 6.

Classification	Area %	Area (km^2)
Bare Rock	0.080	0.865
Beaches	0.406	3.954
Broad Leaved Woodland	0.336	3.269
Coniferous Woodland	4.585	44.557
Discontinuous Urban Fabric	0.296	2.877
Diversity of Agriculture & Natural Vegetation	10.254	99.636
Easturies	0.062	0.615
Inland Marshes	0.363	3.532
Inter-tidal Flats	0.441	4.292
Lake & Water Bodies	1.298	12.618
Mixed Broad Leaved & Coniferous Trees	0.281	2.735
Moors & Heathland	8.568	83.258
Natural Grassland	8.026	77.995
Pastures	28.947	281.275
Peat Bogs	35.149	341.532
Sparsely Vegetated Areas	0.260	2.533
Sport Leisure Facilities	0.184	1.793
Traditional Woodland Scrub	0.439	4.273
Water Courses	0.005	0.051
Total	**100%**	**971.66**

Table 3. Land Cover in the Donegal Bay Catchment, 1989.

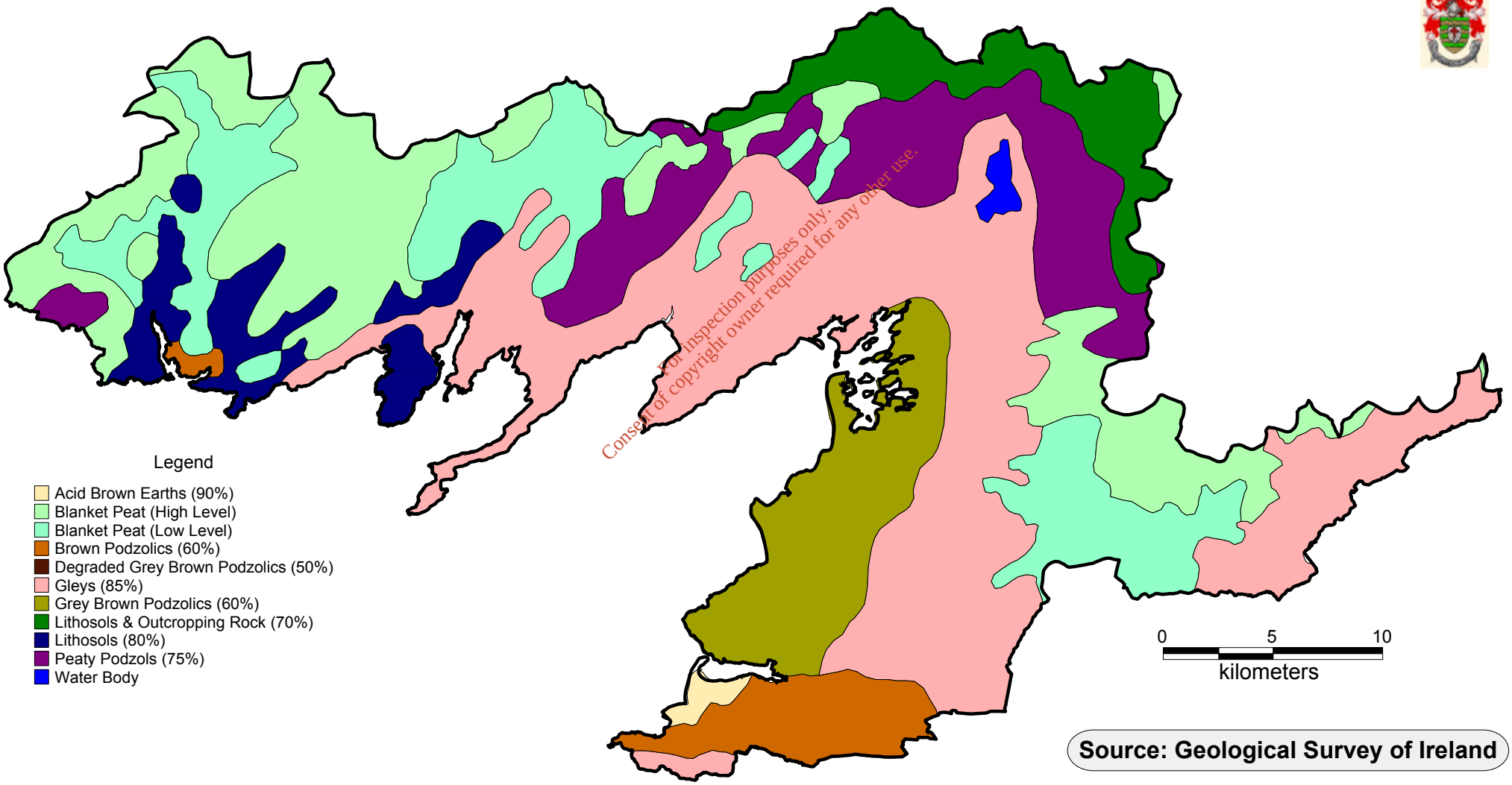
DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 5
The Land Cover
of the Donegal Bay Catchment



DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 6
The General Soils of the Donegal Bay Catchment



Source: Geological Survey of Ireland

C. USES

PUBLIC WATER SUPPLY

This use relates to the provision of water supplies from both surface and groundwaters. Donegal County Council has responsibility for the public water supply system. Group water supply schemes are significant sources for more remote regions and some industrial and commercial concerns have established private water supplies.

Donegal County Council is currently engaged in a County wide survey to identify its aquifers and to develop protection measures. This survey also includes the Donegal Bay catchment area. Where necessary, Donegal County Council will consider the enactment of bylaws to protect vulnerable zones from pollution threat.

There are four types of sources for water supply in the Donegal Bay catchment: groundwater including springs and boreholes; impoundments; rivers and loughs. The predominant sources in the catchment are lough abstractions.

The water supply catchments and locations of boreholes, abstractions, loughs and impoundments within the Donegal Bay catchment are presented in Map 7. The volumes of water supplied and the areas supplied are presented in Table 4. Loughs are the most common sources of public supply in the Donegal Bay catchment. Seven loughs throughout the catchment are used as sources of water supply. These are Lough Unshin, Lough Melvin, Glen Lough, Lough Gorman, Lough Glencoagh, St. Peters Lough and Croagh Lough.

The major river abstractions are from the Eske, Tullinteane and Glen rivers and also the Sliabh League stream.

The main impounding reservoir in the catchment is Loughaderry.

Scheme	Source	Yield m^3/Hour	Treatment
Ballyshannon/Rossnowlagh	Lough Unshin	60	chlorination/D.A.F./slow sand filtration
Ballintra	Glen Lough	20	Slow sand filtration/chlorination
Ballymagroarty	Lough Gorman*	20	Chlorination
Donegal Town	River Eske	150	Settlement rapid gravity filtration/chlorination/ flouridation
Cullionbuoy	Cullionbuoy Lough	22	Pressure filtration/chlorination
Mountcharles	St. Peters Lough	22 & 8	Two schemes; The 8 m^3/Hr supply receives Slow sand filtration, the 22 m^3/Hr receives Pressure filtration
Frosses/Inver	Lough Glencoagh	45	Settlement rapid gravity filtration/chlorination/ flouridation
Dunkineely	Croagh Lough*	15	Pressure filtration/chlorination
Tullinteane	Croagh Lough*	8	Slow sand filtration. No current treatment following boil notice
Killybegs	Loughaderry Lough Aroshin	225 70	2 x settlement rapid gravity filtration/chlorination
Largymore	Spring source*	15	Slow sand filtration. No current treatment following boil notice
Kilcar	Glen River	20	Slow sand filtration/chlorination
Carrick	Sliabh League Stream	20	Slow sand filtration/chlorination

Table 4. Public water schemes within the Donegal Bay Catchment (* indicates a group scheme).

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 7
The Location of Water Boreholes, Abstractions, Loughs and Impoundments within the Donegal Bay Catchment

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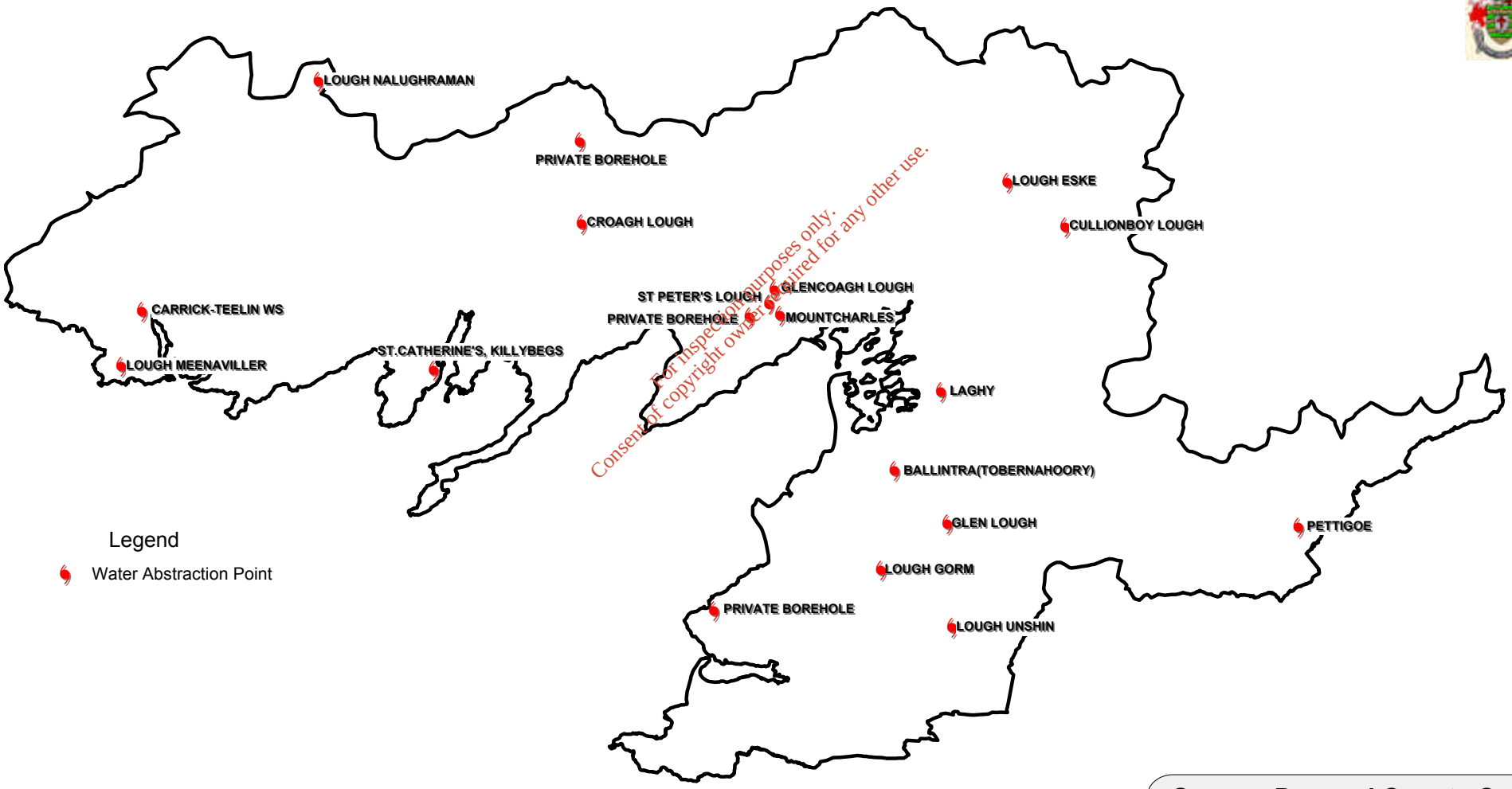

Source: Donegal County Council

WATER SUPPLY SCHEMES FOR INDUSTRY, AGRICULTURE AND TOURISM

Water supply for industry and agriculture includes, process water and stock watering. The other increasing use within the catchment is for the generation of hydro-electric power.

In addition to the significant hydro-electric installation on the Erne there are now newly established schemes on the Eanybeg, Edergole and Lowerymore rivers.

There are a number of industrial borewells located throughout the catchment supplying farms industry and tourism. The most significant of these boreholes are given in Table 5.

Location	Industry	Yield (m^3/Hour)
Kilcar	Wool/tweed factory	Minor
Kilcar	Luach Bressie Teo, fish factory	Minor
Killybegs	Glenstone quarry	2-3
Murvagh	Murvagh Golf Club	Minor
Laghey	Roadstone quarry	2-3

Table 5. The most significant boreholes within the Donegal Bay catchment.

There is very little abstraction from rivers for agricultural use. Irrigation occasionally takes place in the catchment especially in dry summers, most notably at the Murvagh Golf Club. Other agricultural uses, such as water supply to dairy sheds, are generally supplied from the mains.

FRESHWATER FISHERIES

The Central Fishery Board in association with the Northern Regional Fishery Board conducted a comprehensive assessment of the freshwater fisheries within the Donegal Bay catchment area. Several representative fishery assessment points were selected as identified in Map 8.

Three substantive salmonid fisheries, the Glen, the Eany and the Eske have been identified as the key fisheries in Donegal Bay. The Northern Regional Fisheries Board has invested considerable resources in upgrading the angling facilities in each having identified each as the prime fisheries in this part of Donegal. All of the relevant data, including biological data, supports their designation as prime salmonid angling waters particularly for salmon. The Erne

estuary is an extremely important sea trout fishery which is very well regarded by anglers.

Other important salmonid fisheries in the area include the Bungosteen, the Oily, the Laghy, the Bridgetown, the Ballintra, Durnesh Lake, and the Abbey River. Within this category of fishery there is a waters of different angling quality. In some cases the infrastructure is limited but each has significant potential as a fishery in the medium to longer term once the different problems (access, instream enhancement requirements etc.) affecting these fisheries have been addressed. Despite their potential many of these channels are underutilized.

A third category of fishery, which includes the remaining waters like the Ballaghdoo/Glenaddragh complex, the Fintragh, Cunlin Lough outflow, the Bunlacky, the Eddrim, and the Bradogue, have limited angling value because of their size. The lower reaches of the Ballaghdoo/Glenaddragh complex, the largest of these catchments, could be enhanced but this probably better regarded as a long-term proposal. The remaining channels may contribute to sea trout production in the Donegal Bay area but this would be difficult to ascertain. All of these channels (apart from the Eddrim) supported populations of juvenile brown trout which may, in some cases, be juvenile sea trout as the life stages are indistinguishbale in the juvenile stage. Production of juvenile sea trout to the pre-migration stage (smolt) is an important and significant beneficial use to the Donegal Bay area as a whole.

Apart from valuable salmonid fisheries this part of Donegal also has pike and coarse fisheries. Coarse fish and pike are found in the Bridgetown, Ballintra, Abbey and the Lower Erne systems. Many small to medium sized lakes are situated in these subcatchments (apart from the lower Erne which is dominated by Assaroe Lake). Fish quality is variable in the small to medium sized lakes but for the most part the fish tend to be small and the fisheries under-exploited. The fisheries are generally not well developed but they can offer good sport angling. The exception is Assaroe Lake on the Lower Erne where excellent quality coarse fish and pike are available together with good angling facilities.

Several “conservation fish” species are present in the Donegal Bay catchments. From well-sourced anecdotal and some factual data it seems that sea lamprey and char occur but have a limited distribution within the Donegal Bay catchments. In contrast, juvenile salmon, an EU Habitats Directive species, is widely distributed being recorded in twelve of the seventeen catchments investigated.

Several environmental pressures on these fisheries have been identified. Many different studies have shown the impact of poor water quality,

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

MAP 8
FRESHWATER FISHERIES ASSESSMENT POINTS

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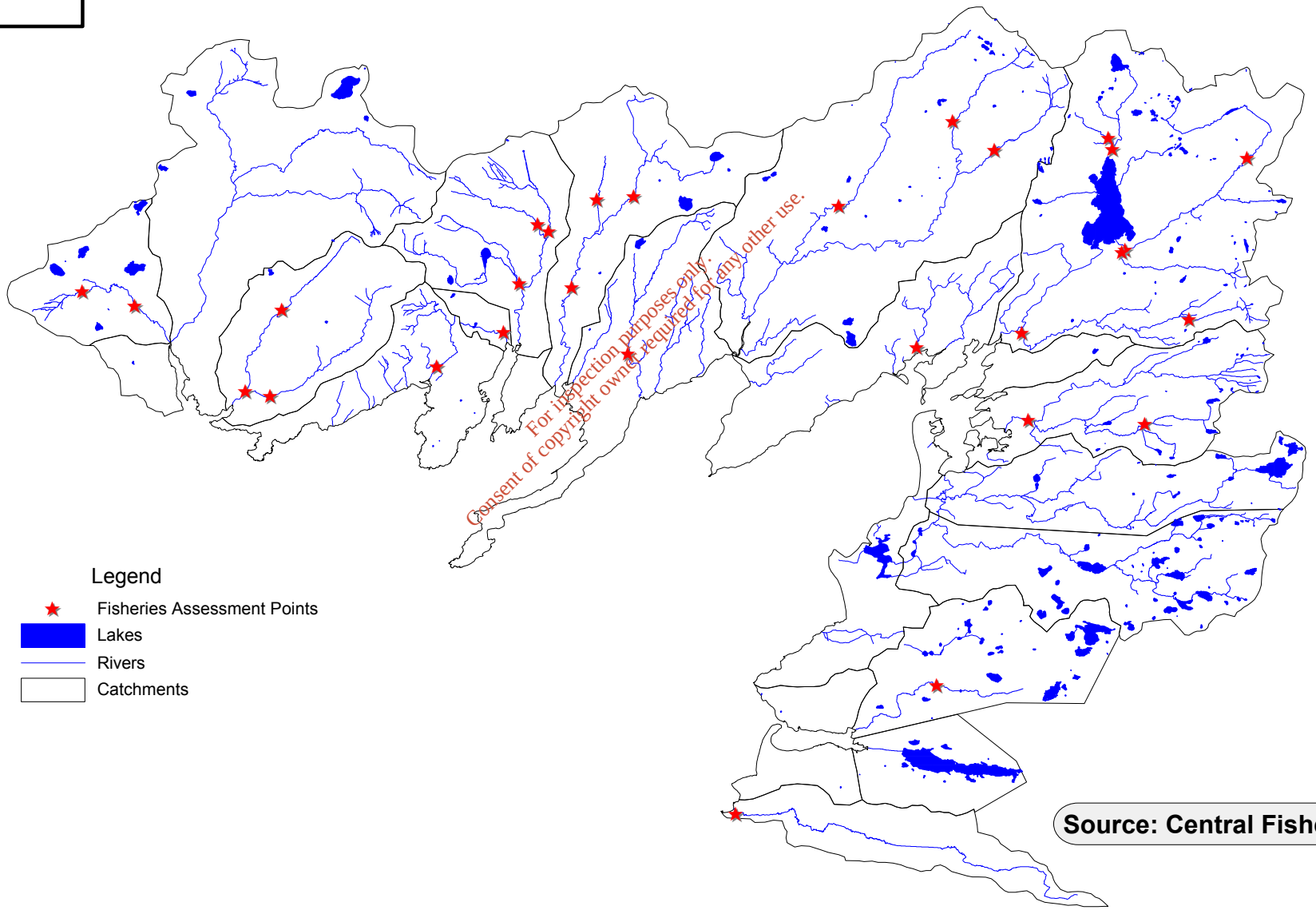


Source: Central Fisheries Board

acidification, afforestation and overgrazing with associated bank erosion on juvenile salmonids principally in rivers. Coarse fish are less susceptible to poor water quality and quality standards are substantially lower for these species.

Infestation of sea trout by sea lice has been shown to be a problem for sea trout populations in the Eany and to a lesser extent in the Eske, both of which are monitored annually. Sea trout populations in the west of Ireland close to marine salmon aquaculture sites have collapsed over the past decade.

Commercial activity is primarily related to salmon netting which is contributing to the local economy. The Erne eel fishery requires additional management based on sound scientific principles to render it more productive and attention to after-processing and added value product. Salmon aquaculture is intensive in two bays.

Urban pressures and industrial developments appear to have a limited effect on fisheries in the Donegal Bay area presently although several problem point sources are monitored regularly. A watching brief will have to be maintained in relation to water abstraction and small hydroelectric schemes which have been proliferating in recent times.

It is evident that there are several excellent fisheries within the confines of Donegal Bay currently and that there is considerable scope to advance other fisheries which are, to date, largely an untapped resource. This project has provided an opportunity to collate existing data from various sources and to generate additional supporting data for seventeen different catchments in the Donegal Bay areas. This will provide a good baseline for future studies and a means of gauging any changes that may occur in these systems in the future.

AQUACULTURE

There are 19 aquaculture operations in Donegal Bay, as described in Table 6 and identified in Map 9.

In 1999 Donegal Bay accounted for over one-fifth of the value of national aquaculture production with an output of 3,449 tonnes was produced.

Species Farmed	***No. of Farms/Operations***
Salmon	*3*
Sea Trout	*1*
Fresh Water Hatchery	*1*
Rope Mussels	*3*
Gigas Oysters	*10*
Urchins	*1*

Table 6. Species and Numbers of Fish Farms in Donegal Bay 1999.

The most dominant aquaculture sector in Donegal Bay is the Salmon/Sea Trout Farming industry.

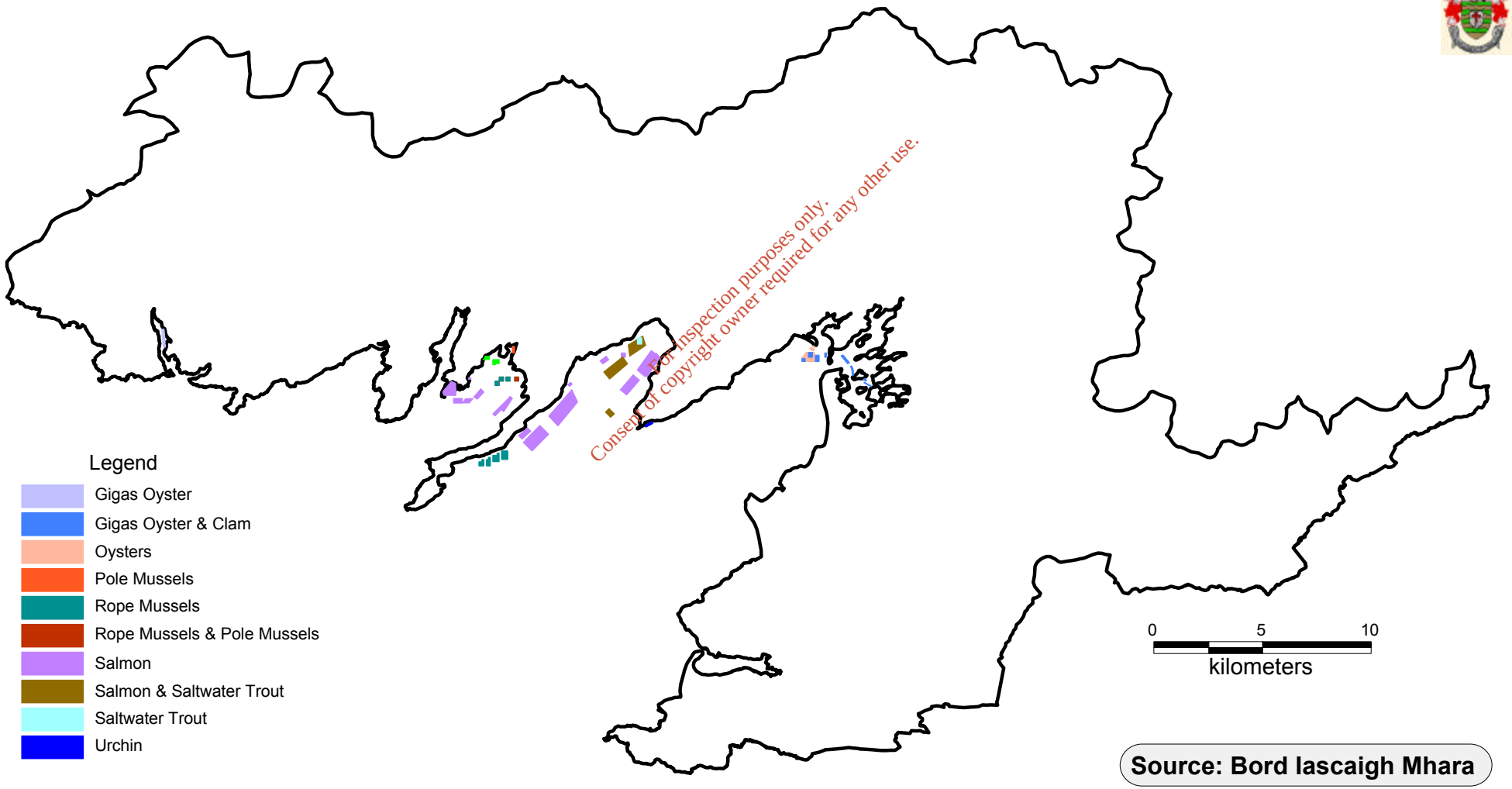
There are ten Pacific oyster farms this sector is now poised to develop further with the recent granting of up to three new licences, which have been pending over the last number of years.

In the past, the rope mussel industry in Donegal has been restricted to sheltered bays and inlets (e.g. Mulroy Bay). However developments in offshore technology has allowed farms in some of the more exposed bays such as Bruckless Bay to develop.

A fresh water hatchery with a licensed capacity of 25 tonnes per annum is situated on the river Erne just up stream from the town of Ballyshannon. This hatchery was set up by the ESB primarily to enhance the salmon stocks on the Erne system. The hatchery's licence also allows for the production of Salmon (*Salmo salar*)Smolts, Rainbow Trout *(Oncorhynchus mykiss)* and Arctic Charr *(Salvelinus alpinus)* in the past has produced Salmon smolts for the purpose of ongrowing at sea and rainbow trout for the table market.

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 9
The Aquaculture Operations within the Donegal Bay Catchment



Source: Bord Iascaigh Mhara

MARINE FISHERIES

The most successful pelagic fisheries within Donegal Bay are for; Mackerel (*Scomber scombrus*), Scad (*Trachurus trachurus*), Herring (*Clupea harengus*) and Sprat (*Sprattus sprattus*).

The varying types of whitefish that have been traditionally caught in the Bay are Cod (*Gadus morhua*), Haddock (*Melanogrammus aeglefinus*), Whiting (*Merlangius merlangius*), Pollack (*Pollachius pollachius*), Plaice *(Pleuronectus platessa*), Monkfish (*Lophius piscatorius*), Black Sole (*Solea solea*), Lemon Sole (*Microstomus kitt*), Turbot (*Scopthalmus maximus*).

The two main crustacean species that have been commercially fished within the bay are Lobster (*Homarus gammarus*) and Brown Crab (*Cancer pagarus*). Prawns also exist in the upper part of the Bay and have been fished from St Johns Point up to Bundoran on a commercial basis.

The emergence of blue fin tuna (*Thunnus thynnus*) within Donegal Bay may be developed both commercially and has the potential to become a huge attraction as a big game fishery.

TOURISM AND RECREATION

Donegal Bay is well established as a key tourist location in the County. The long coastline, the sheltered coves, lakes and excellent blue flag beaches of Donegal Bay are ideal for enthusiasts of all types of water sports. There are four Blue Flag beaches within the Bay at Bundoran, Rossnowlagh, Murvagh and Fintragh (Map 10). Water quality is a paramount consideration for tourism and the status of beaches in the Donegal Bay catchment is likely to have an impact on the numbers of tourists visiting the area.

Surfing at Rossnowlagh and Bundoran where there are competition Surf clubs and particularly reliable Surf have a growing worldwide reputation.

Game and Sea Angling are currently the focus of a concerted tourism development programme.

Diving, Sailing, Sea and River Kayaking and Canoeing are proving increasingly attractive to tourists in the area in addition to its Maritime Heritage, Hiking, Waterside and Coastal Walking, Equestrian Centres and Golf courses.

NATURE CONSERVATION

Nature conservation in the Donegal Bay catchment is an essential element in the protection of the natural environment. In particular the aim is to conserve remaining natural habitats, native plant and animal species and communities and to maintain biodiversity.

The traditional wetlands, particularly peat bogs and naturally poorly drained land are under threat. Some are used as tip sites for rubbish, others are exploited for peat or drained to provide productive farmland.

Nature conservation is the responsibility of central government in the Department of Art, Heritage, the Gaeltacht and the Islands. The Environmental Protection Agency also has an important role in environmental protection.

The National Parks and Wildlife Division of Duchas is charged with the conservation of a range of ecosystems and populations of flora and fauna in Ireland. The Division is responsible for the implementation of a large body of legislation both domestic (Wildlife Acts) and international (EU Habitats and Birds Directives) and for the management and development of National Parks and Nature Reserves. The Division also oversees the issuing of licences under the Convention on International Trade in Endangered Species and the Wildlife Acts.

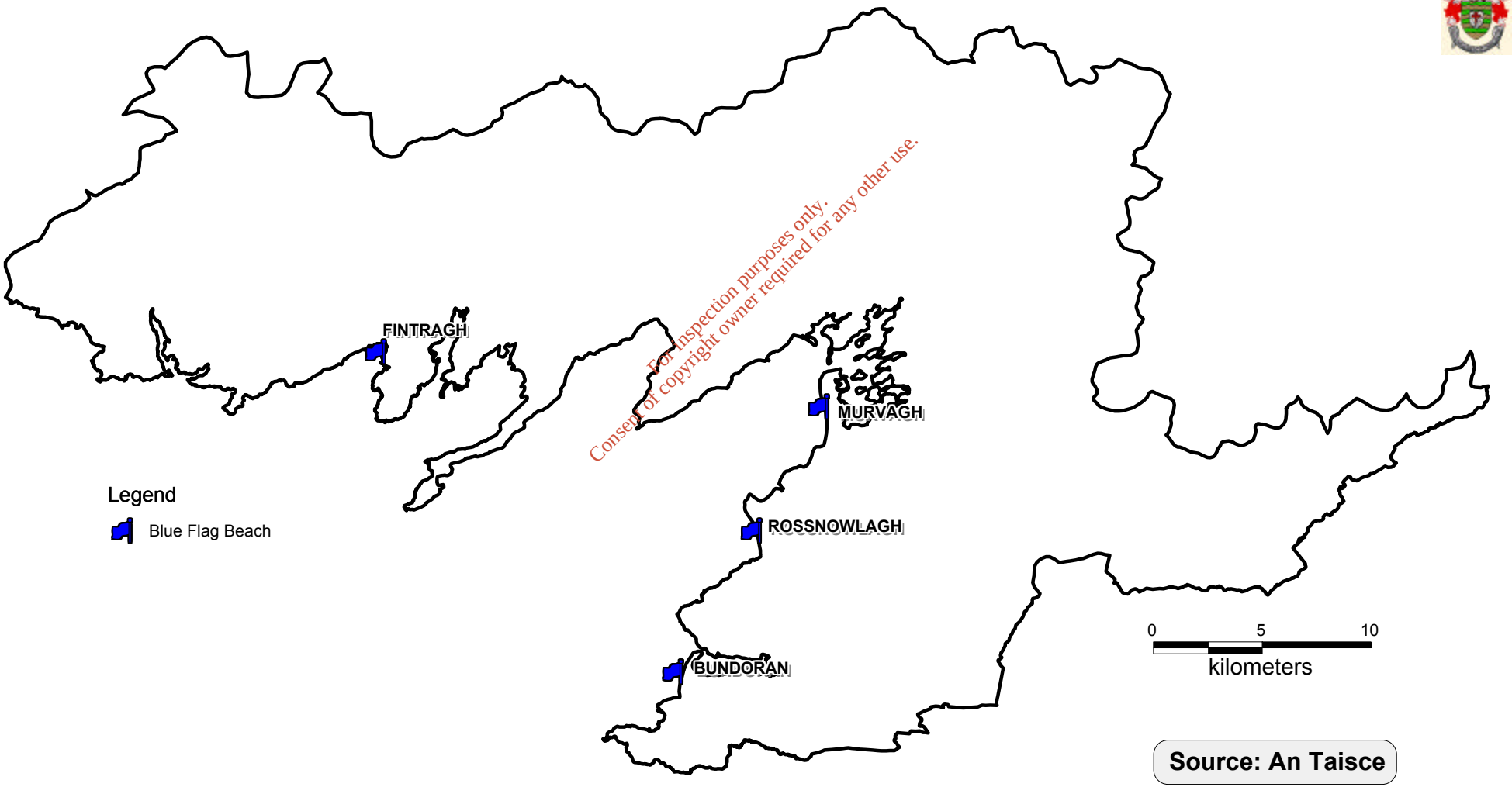
The Development Applications Section of Duchas provides an important service in relation to the assessment of the impact of proposed developments on the built and natural heritage. A particular responsibility of this Division is the designation and protection of Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Natural Heritage Areas (NHAs). Consultation with interested parties is an integral element of the performance of these activities.

The Wildlife Amendment Act (2000) contains provisions for designation of NHAs, including requirments for notification of landowners and means for objection to proposed designations. There are 20 NHA's within the catchment (Map 11).

It is the responsibility of each member state to designate Special Areas of Conservation (SAC's) to protect habitats and species, which, together with the Special Protection Areas (SPA's) designated under the 1979 Birds Directive, form Natura 2000. There are 19 SAC’s and 3 SPA’s within the Donegal Bay Catchment as identified in Map 11.

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

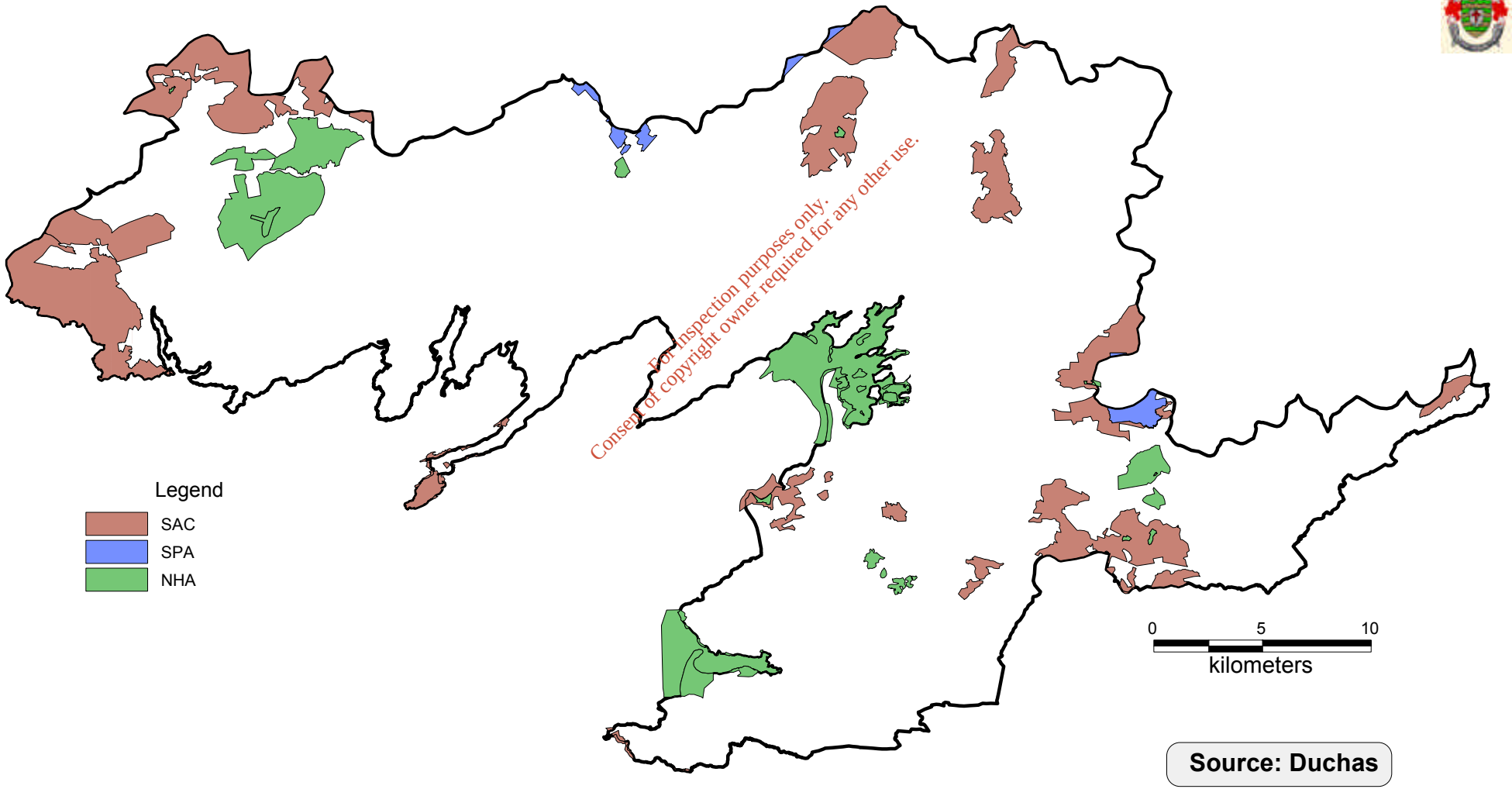
Map 10
The Blue Flag Beaches within the Donegal Bay Catchment



Source: An Taisce

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 11
The SAC's, SPA's and NHA's within the Donegal Bay Catchment



Source: Duchas

Specific diverse protected species such as the Pearl Mussel and the bottle nose dolphin have been recorded within the Donegal Bay catchment and are dependant upon good water quality for their survival. Conversely, the pest zebra mussel is invading the catchment and its spread must be monitored if not curtailed.

BUILT HERITAGE

The Cultural Heritage aspect of the Water Quality Management Plan involves the preservation and protection of historic and archaeological sites within the Donegal Bay catchment area.

There are a range of sites and features which occur in, or beside, or across watercourses, and whose existence needs to be acknowledged in devising watercourse management strategies and individual schemes.

Throughout the catchment area there are sites and structures of archaeological, historical, architectural and industrial interest. Some heritage sites are visually impressive, others are not visible at all, even to the trained eye, but all of them can contribute to our understanding of the past, and may provide resources for use in education, tourism and recreation.

Dredging, channel-widening and other activities associated with watercourse management can have a significant impact on such features, and can also lead to the discovery of new objects, sites or features and thus increase our knowledge of the past, and enhance the man-made heritage.

The majority of the sites within the Donegal Bay catchment comprise ringforts, enclosures, cashels, holy wells and standing stones. The locations of these monuments are identified in Map 12.

EFFLUENT DISPOSAL

In accordance with the policy of the Department of Environment and Local Government Donegal County Council has decided to advance the procurement of main pumping stations, rising mains, waste water treatment plants and outfalls in key locations throughout the Donegal Bay catchment area. These locations (shown in Map 13) are; Donegal Town, Rossnowlagh and Ballyshannon under one contract (Group A) and at Killybegs and Bundoran under another contract (Group B). The Group A contract also includes for a Sludge Treatment Centre for South West Donegal to be located at Donegal Town waste water treatment plant. Both contracts will be implemented using the design, build and operate arrangements. The initial operating phase will be for a period of twenty years. All such developments are to be welcomed and will contribute greatly to improved water quality within the Donegal Bay catchment area.

SOLID WASTE DISPOSAL

Solid waste management is currently the most rapidly developing field in the environmental and public health sectors as a range of policy and legislative measures are enacted at European, National and Regional levels. The recent trend of increasing waste production has been identified as an area of concern within the European Union and has led to the adoption of a range of policy and legislative measures which are set to transform waste management practices in the coming years.

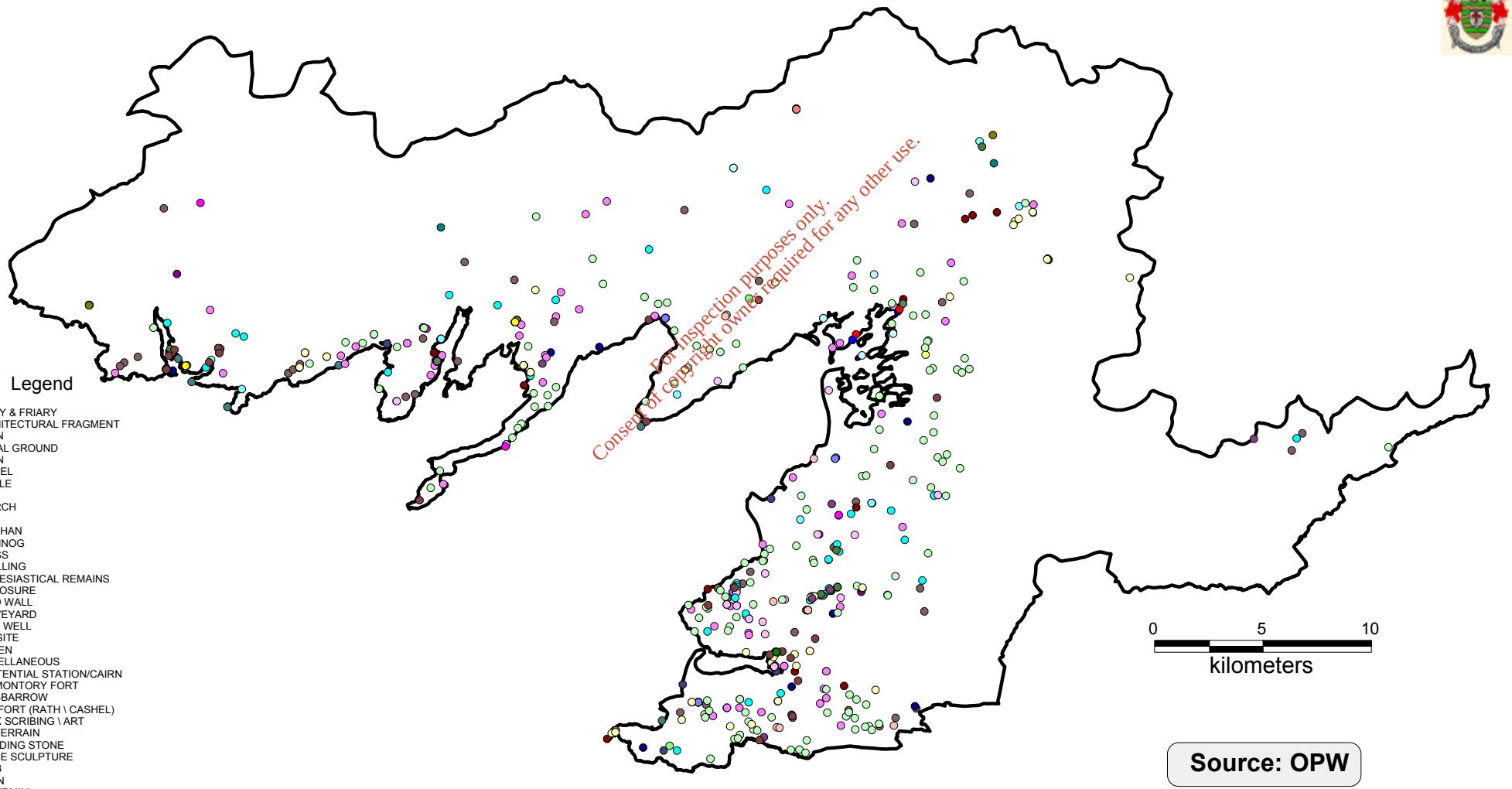
Local authorities have been under a legal obligation to introduce waste management plans since the commencement of the Waste Management Act in July, 1996. Donegal County Council compiled a new Waste management Plan in October 2000. The new Waste Management Plan commits Donegal County Council to a number of actions over the next 5 years.

The current systems, techniques and technologies available within the County and catchment area to implement the Waste Management Plan by the Donegal County Council are discussed with reference to the Waste Management hierarchy:

1. Prevention;
2. Minimisation;
3. Reuse;
4. Recycling;
5. Recovery of Energy;
6. Environmentally sustainable landfill of waste which cannot be prevented or recovered.

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

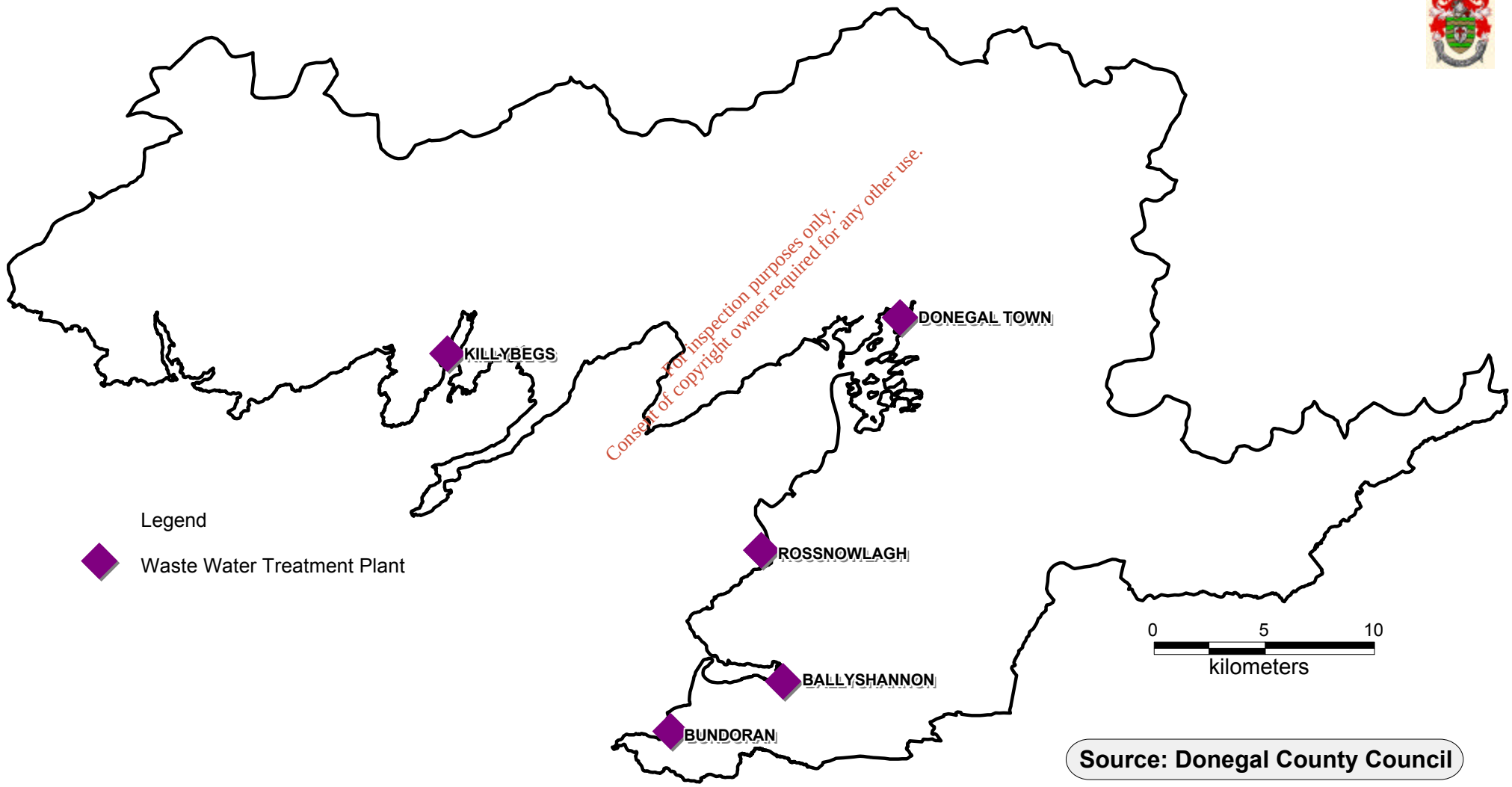
Map 12
The Locations of the Historical Monuments within the Donegal Bay Catchment



Source: OPW

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 13
The Locations of the Key Waste Water Treatment Plants of the Donegal Bay Catchment



Source: Donegal County Council

The provision of bottle/can banks has increased significantly throughout the County, since the adoption of the Waste Management Plan by the Council. The distribution (number and location) of Civic Amenity Sites and Bring Centres is recognised as the most significant factor in their use and hence their ability to contribute to the sustainable management of wastes. There are presently five recycling centres within the Donegal Bay catchment area.

In broad terms there are two main composting systems that can be considered in Donegal; home composting, and centralised composting. At present there is no centralised composting centre within the Donegal Bay catchment.

The Waste Plan established that landfill represented the most appropriate, secure long-term method of waste disposal to ensure that the needs of the County continued to be serviced. It also identified the approach by which this policy objective could be met, recognising the high environmental standards that would be demanded in the future, and the significantly increased costs.

In recognition of the importance of providing cost-effective collection services the Waste Plan also proposed that a supporting network of transfer stations would be developed in association with the phased closure of the existing landfill sites.

Landfill has been the traditional approach in Ireland to the management of wastes. The old generation of landfill sites were based on a “dilute and disperse” approach. These are being phased out and are superseded by fully engineered sites with multi-layer containment systems, leachate collection and treatment and landfill gas collection and flaring, for new developments.

Within the waste management hierarchy there is increasing pressure to reduce the amount of waste being disposed of at landfills. However irrespective of any alternative waste management systems being introduced there will always be a need for landfill in which to dispose of residual wastes.

The waste from the Donegal Bay area currently goes to two landfills Ballinacarrick in Ballintra and Balbane in Killybegs (Table C8.4) as shown in Map 14.

Site	Waste Input (Tonnes)	Date of Licence Application	Cost of Licence Application	Anticipated Closure
Ballinacarrick	24,000	1/3/98	£13,000	2003
Balbane	4,000	1/3/99	£5,000	2003/04

Table 7. Donegal Bay landfill sites.

AGRICULTURE

Agricultural activity can be a source of pollution and destruction for watercourses, habitats and wildlife. Large farming enterprise by the very size have greater potential to cause environmental damage. The accumulation of large quantities of high-strength organic waste, usually in slurry form, is a particular risk for surface waters and groundwaters. Environment policy must be adapted to minimise these risks.

Agriculture within the catchment area was not deemed as a major direct threat to water quality as borne out by the farm survey with the vast majority of farms surveyed classified as low risk.

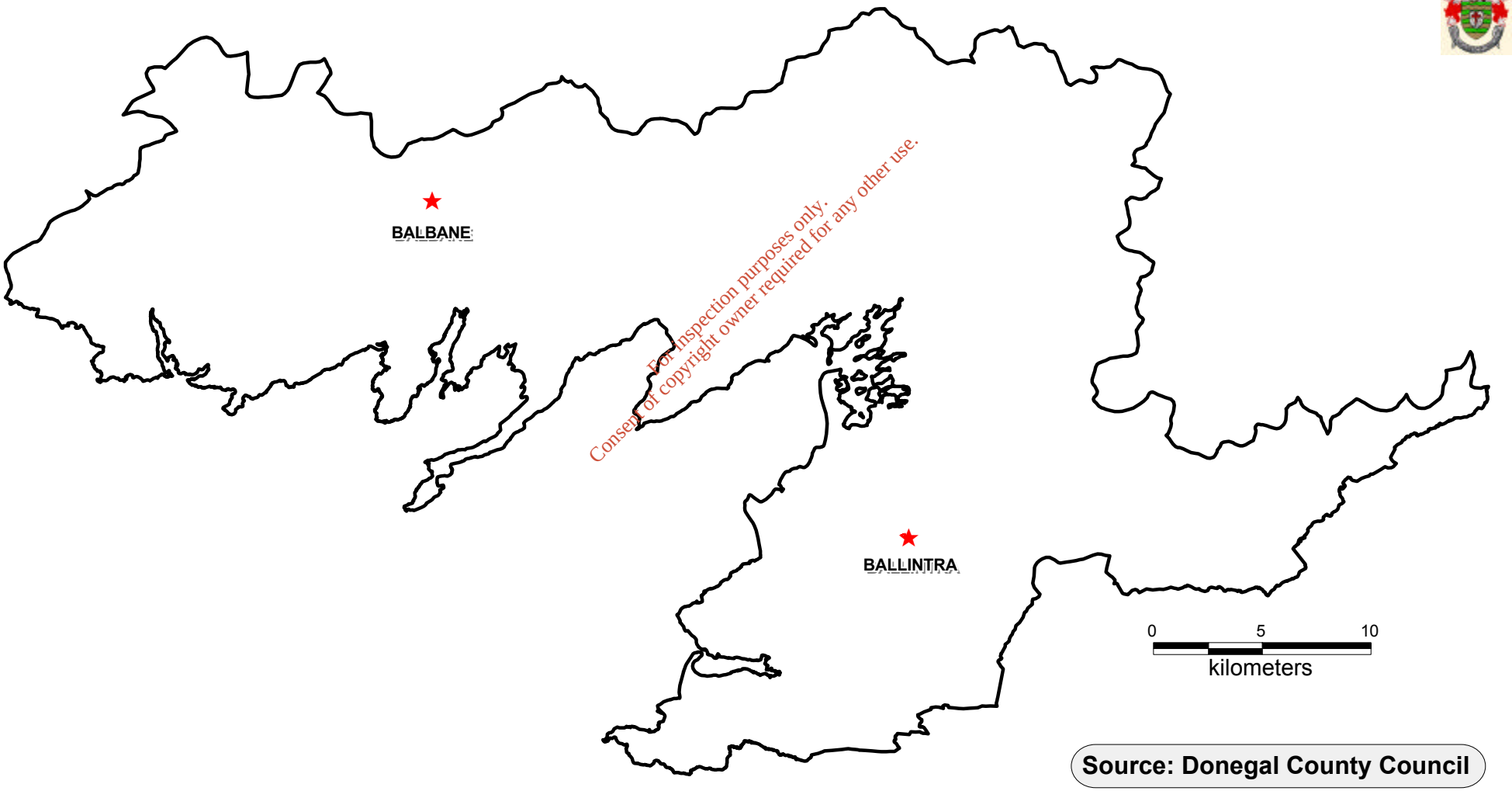
Over the past decade the Donegal Bay catchment area, as elsewhere in County Donegal, has seen a noticeable decline in the area of tillage land. This trend has been much influenced by EEC policies, particularly those relating to pork, dairy and land production. Virtually no tillage now occurs north of Donegal Town. Teagasc estimates suggest that since 1991 there has been an 8-10% decrease in cattle numbers and an increase of sheep numbers of 40% has occurred within the catchment.

The increasing concern with environmental pollution has seen a change in emphasis in CAP policy from production to environmentally driven incentives, including the Control of Farmyard Pollution Scheme (CFP), the Farm Improvement Programme (FIP) the Dairy Hygiene Scheme and the Agri-Tourism Scheme, the Rural Environment Protection Scheme (REPSII) and a Farm and Countryside Enhancement Scheme operated under the Peace Initiative.

The REPS scheme has gone some way to improve land management practices, however this is a voluntary scheme. The more intensive farmers in the catchment are unlikely to consider REPS incentives adequate. The implementation of the REPS scheme along riparian zones of the Donegal Bay catchment which requires the fencing off of rivers and the provision of alternative water sources, would assist the rural landscape through enhanced riparian management and a reduction in nutrient loading. While no figures are available for the Donegal Bay catchment area specifically, County Donegal has been one of the busier participating counties in the country both in the original and REPS II.

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 14
The Locations of the Landfills within the Donegal Bay Catchment



Source: Donegal County Council

The EU Directive Concerning the Protection of Waters Against Pollution Caused by Nitrates from Agricultural Sources (91/676/EEC) will influence slurry spreading practices on lands draining to waters affected by or vulnerable to nitrate pollution. Member States are required to have identified such vulnerable zones. Needs in this respect are being assessed at present. Specific Codes of Practice for landspreading of slurries are to be prepared and implemented in these zones.

The Teagasc publication "Guidelines for Phosphorus Use on Soils" (1991), recommends that, even in a disposal situation, the maximum soil P level for mineral soils should not exceed 30ppm.

From soil samples taken in the catchment it can be seen that soil phosphorus levels where available, are everywhere below 10ppm. This indicates that additional spreading of phosphorus from time to time is recommended in these areas. However, there are cases of continued use of fertiliser at high application rates even when the soil no longer requires it. Concern has been expressed at the marked increase in nutrient enrichment of watercourses in recent years arising directly from fertiliser application.

A 1986-1996 soil sampling survey of major and selected trace element concentrations showed most soils to have higher phosphorus and potassium status compared with early survey results available in 1950, however, recorded levels of elements are generally low in County Donegal compared to national averages.

Within the Donegal Bay catchment two river sub-catchments were examined in relation to pollution threats from agriculture. These sub-catchments were the rivers Corabber and Clogher. These rivers were selected owing to their offering a range of varying terrain. This terrain includes hill ground, lower lying pasture, and an S.A.C. Both rivers also ultimately drain to Lough Eske which is an important game fishery and a source of a public water supply.

A total of 25 individual farms within the Clogher catchment were identified and examined (1 high risk, 1 medium risk, 22 low risk) and 6 farms within the Corabber catchment (0 high risk, 1 medium risk, 5 low risk).

The majority of land use is grazing for the farm animals which are generally dry cattle and sheep. Only one pig farm was present.

The one high risk and one moderate risk farm detected had threats of spillage of slurry into nearby watercourses. However, overall these farms were in the minority. The results of this survey are indicative of the state of agricultural practices within the Donegal Bay catchment as a whole.

FORESTRY

At present the forest cover of the Donegal Bay catchment amounts to just under 11% of the total area with the species distribution dominated by sitka spruce and lodgepole pine. Table 8 summarises the area covered by the varying species within the catchment while Map 15 outlines the forestry positions relative to the various fresh water systems.

Species	Area Covered (Ha.)	% Cover of Catchment
Oak	0.64	0.00065
Beech	1.26	0.00128
Larch	21.5	0.0219
Other Conifers	292.5	0.2978
Other Broadleaves	728.64	0.7423
Pine/Spruce Mix	855.82	0.87187
Pine	1096	1.11655
Unknown	3237.2	3.29791
Spruce	4411.98	4.4947

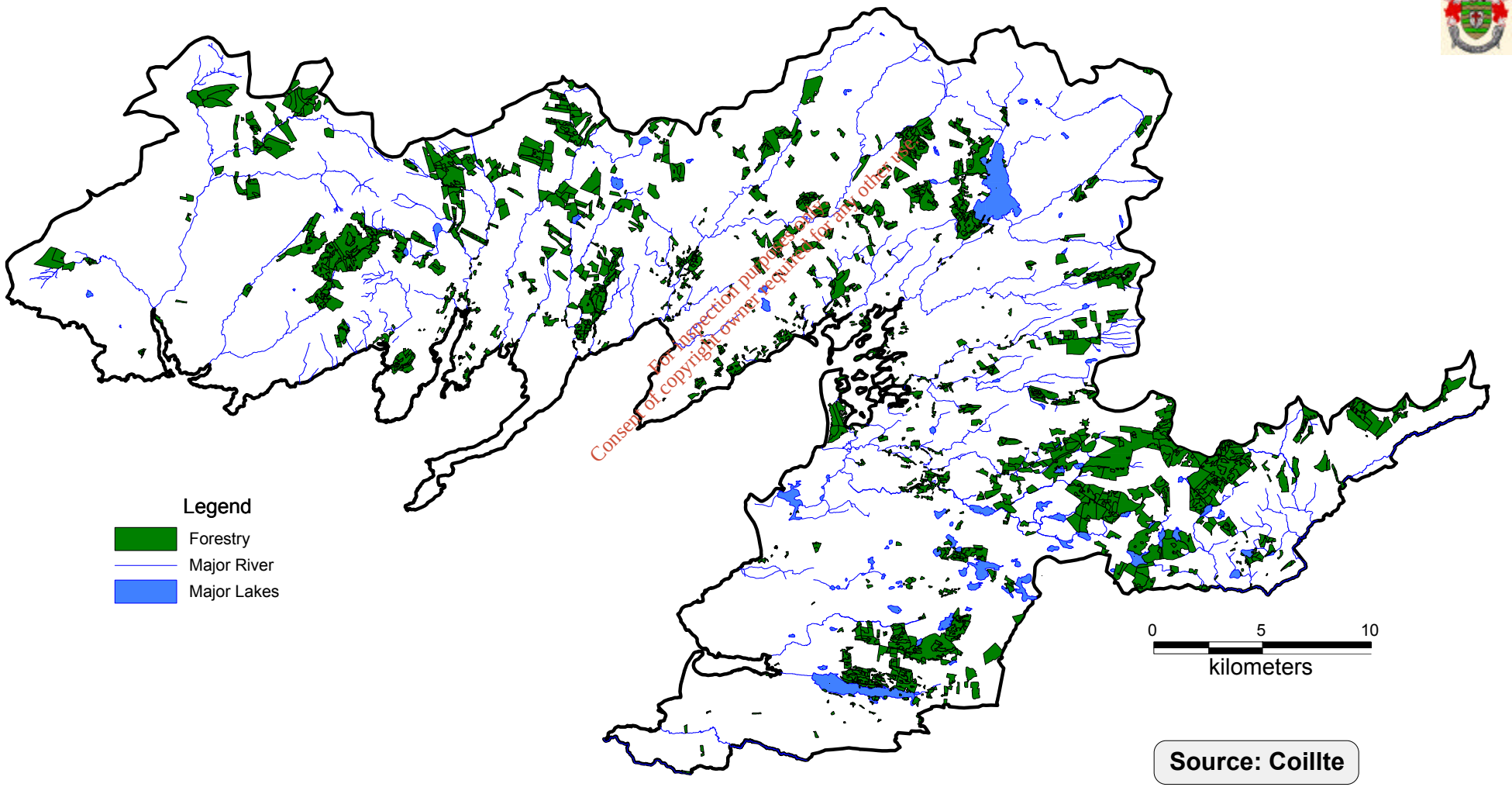
Table 8. The Areas covered by the varying tree species grown within the Donegal Bay catchment area.

With increased environmental awareness the Forest Service's Code of Best Practice was produced in 2000. These guidelines relate to the entire forest cycle, including ground preparation, fertiliser and chemical application, thinning and harvesting for sensitive and non-sensitive areas.

Final harvesting and fertilisation are two elements of any forestry development with potential detrimental influence on the aquatic zone. Forest harvesting and extraction have the potential to adversely impact on water quality through sedimentation, pH influence and increased erosion rates. Any such impact of harvesting the Fintragh Forest on the Glenaddragh River was assessed over a twelve month period. Similarly, without proper management, fertiliser application always carries a threat to water quality and aquatic life by water eutrophication. The Stragar and Roechrow Rivers were assessed for any influence following the application of differing fertilisers to two upstream forestry developments. Both studies found no deterioration in water quality in the short term.

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 15
The Various Forests within the Donegal Bay Catchment relative to the Various Fresh Water Systems



Source: Coillte

The Forest service is currently drawing up new Forest Pesticide Guidelines which will be completed by April 2002. The purpose of these guidelines is

- To ensure that pesticides are handled, stored and applied in such a way that public health, soil and lands, wild life, aquatic habitat and water quality will not be put at risk
- That pesticide usage forms part of an integrated forest establishment and management system which ensures that pesticides are used only when necessary at the correct time and at the minimum quantities and rates required for effective treatment.

D. WATER QUALITY CLASSIFICATION SYSTEMS

In previous WQMPs chemical monitoring was only useful for determining the extent to which a river is suffering from significant pollution stress, from routine sources macro-invertebrates provided a more sensitive means of classification. Thus, we considered the macro-invertebrate part of the classification system to provide a more important means of classification than purely chemical data. However in this Donegal Bay WQMP through the phosphorous regulations the chemical influence of phosphates on a watercourse's Environmental Quality has been incorporated to produce an integrated water quality classification system.

The target environmental quality objectives for phosphorus as set out in Phosphorous Regulations National Implementation Report (2001) are Q4 or higher. This, coupled with the target Q values set for the majority of river reaches within the catchment area in the County Councils Measures Report (1999) gives a common classification system by which to judge the status of the catchment's rivers.

"Q" Quality Biological Classification

The pollution status of a stream is determined by comparing the relative proportions of the organisms collected from a stream or river with the expected ratios in similar, but unpolluted habitats. This system takes into account the physical characteristics of the sample site that influence the macro-invertebrate community, such as water depth, bed material and current speed. The results of the biological assessment are then converted into a five point biotic index, Q5-Q1, where the status of each class is as shown in Table 9.

Biotic Index or 'Q' Value	Community Diversity	Water Quality
Q5	High	Good
Q4	Slightly reduced	Fair
Q3	Significantly reduced	Moderate
Q2	Low	Poor
Q1	Very Low	Bad

Table 9. Biotic Index for Expressing Quality of a Freshwater System

In Ireland the invertebrates are sampled every few years, with the period between sampling varying between sampling sites. The most recently EPA published Q values for the Donegal Bay catchment was 1999. Unpolluted sites are sampled less frequently than polluted sites.

In view of the critical role which phosphorus plays in the eutrophication process environmental quality objectives/standards for phosphorous have been prescribed. Local authorities are obliged to take all necessary steps to ensure that phosphorus concentrations in freshwaters do not exceed stated levels.

In the case of rivers the overall objective is to eliminate seriously, moderately and slightly polluted stretches i.e. to achieve a 'Q' 4 rating or higher. Targets have been set to avoid any future deterioration in river water quality with a timeframe of 10 years (up to 2007) set for the achievement of the following:

- elimination of seriously polluted river stretches;
- incremental improvements in river channels currently slightly polluted or moderately polluted.

The quality standards which represent minimum targets are set out in Table 10.

Orthophosphate Median Concentration* (mgP/L)	Corresponding Q Rating	EPA Classification
≤0.015	5	Satisfactory
0.016-0.020	4-5	Satisfactory
0.021-0.030	4	Satisfactory
0.031-0.050	3-4	Satisfactory/Unsatisfactory
0.051-0.070	3	Unsatisfactory
>0.070	2-3	Unsatisfactory
>0.070	≤2	Unsatisfactory

*Median concentration to be determined using as a minimum ten samples taken at intervals of four weeks or longer in any twelve consecutive month period. Where the requisite number of samples has not been taken within such period, the median concentration shall be determined from sampling conducted over such period not exceeding twenty four months, as required to obtain a minimum of fifteen samples taken at intervals of four weeks or longer.

Table 10. Phosphorous regulations target values for Irish rivers - EQO's

For convenience the Donegal Bay catchments rivers and key tributaries were divided into a number of reaches which can then be classified. The reaches have been chosen such that they are representative of an existing sampling site within that reach, and it is assumed that the site is typical of conditions throughout the reach. Map 16 indicates the location of the sampling sites on each of the rivers sampled.

Freshwater Lakes

Environmental quality objectives have been set in Ireland with an objective to eliminate hypertrophic and eutrophic conditions. Where lakes were previously oligotrophic the aim will be to restore them to that condition. These objectives are intended to ensure lake conditions suitable for water quality sensitive species such as salmon and trout. They cater for conservation and protection of high ecological quality conditions as well as providing for waters of the quality required to meet all potential beneficial uses. These interim objectives are to be met by the year 2007.

A small number of lakes may be naturally eutrophic and thus their condition may be irreversible, consequently exemptions may have to be provided with respect to generally applicable target status for lakes.

Table 11 sets out the interim statutory standards which apply (by 2007 at the latest) to phosphorus levels in clear rivers and other lakes.

Existing Trophic Status	Target Trophic Status 2007	Total P annual average (ugP/l) 2007
Clearwater Lakes		
Ultra-Oligotrophic	Ultra-Oligotrophic	<5
Oligotrophic	Oligotrophic	5-10
satisfactory	Mesotrophic (or	10-20
Mesotrophic	Oligotrophic*)	(5-10)
	Mesotrophic	10-20
Eutrophic		
unsatisfactory	Eutrophic	20-50
Hypertrophic		
Other Lakes		
Oligotrophic	Oligotrophic	≤10
Mesotrophic	Mesotrophic (or	10-20
satisfactory	Oligotrophic*)	(≤10)
	Mesotrophic	10-35
Eutrophic		
unsatisfactory	Eutrophic	35-100
Hypertrophic		

*in the case of lakes which were originally of that quality

Table 11 Phosphorus Standards - EQO's

Estuarine and Coastal Waters

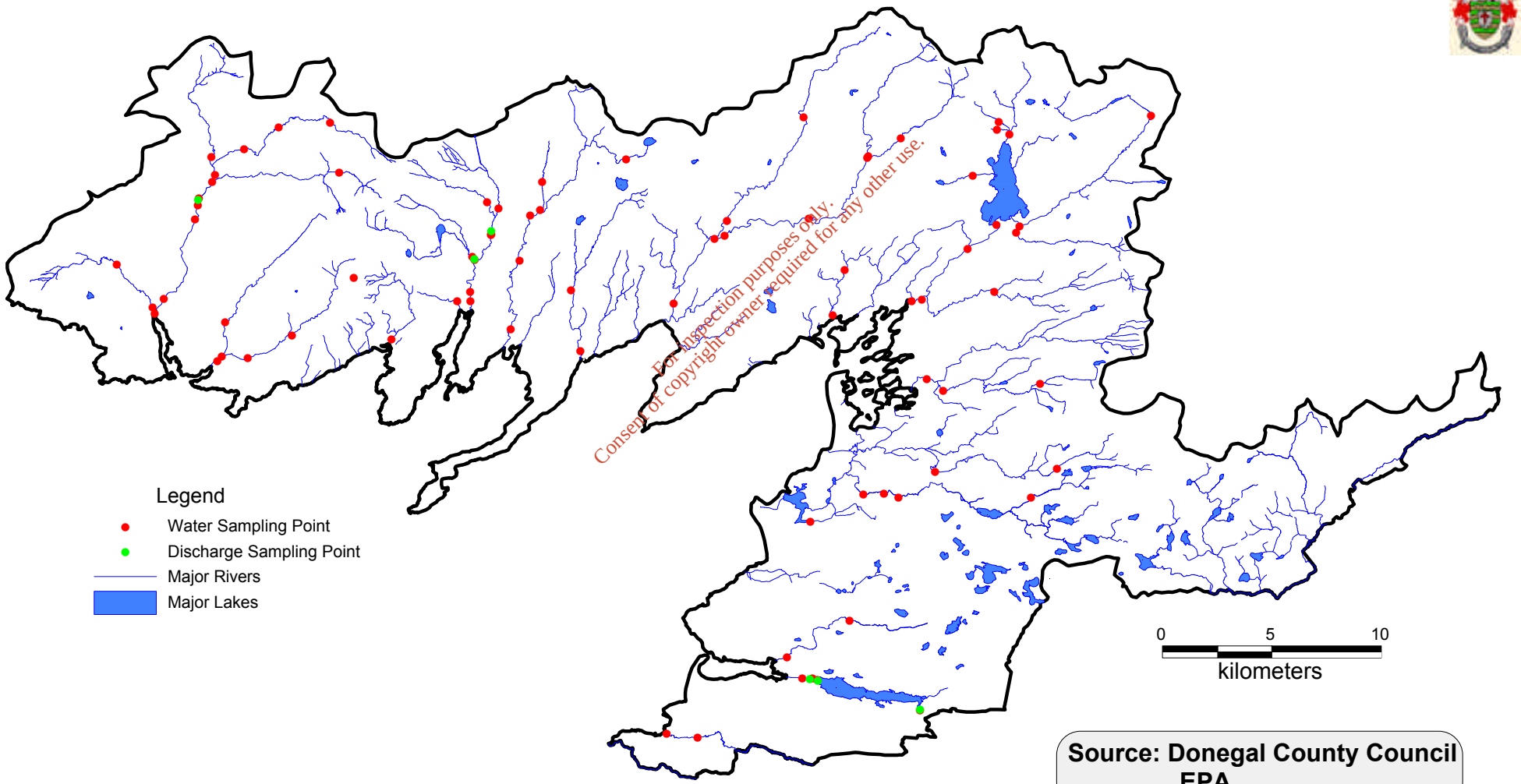
Estuarine conditions are extremely difficult to quantify in any detailed classification system. The interaction of salt and fresh water produces variable salinity environments, both in the short term due to tidal movements and seasonally with river flow fluctuations. The change in chemical composition of the water causes flocculation of sediment particles and adsorption of pollutants such as metals (if present) onto them. The flocculated sediment particles tend to settle out of the water column, typically producing the muddy substrates associated with estuaries.

The classification systems proposed for the Donegal Bay estuarine regions are therefore not based entirely on rigorous numerical standards but are partially subjective.

The proposed classification systems are consistent with those currently adopted for the Foyle and Swilly estuaries, which have been developed by the Association of Directors of River Inspectors in Scotland (ADRIS) as described in Table 12.

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 16
The Location of the River Sampling Points within the Donegal Bay Catchment



Source: Donegal County Council EPA

For an integrated classification system the truly coastal waters classification is shown in Table 13. Both of the schemes are default based, that is, an area of estuary or a stretch of coastal water is classified by allocating it to the highest class to which all of its condition criteria conform.

Class	Description	Aesthetic Condition	Fish Migration	Resident Biota and/or Bioassay	Resident Fish	Persistent Substances (Biota)	Water Chemistry	
							Dissolved Oxygen (DO)	UK Red List and EC Dangerous Substances
A	Excellent	Unpolluted	Water quality allows free passage	Normal	Resident fish community normal	<twice national background	Minimum DO >6 mg/l	100% compliance of samples with EQS
B	Good	May show signs of contamination	Water quality allows free passage	Normal	Resident fish community normal	>or = twice national background but <substantially elevated	Minimum DO< or = 6 mg/l but > 4 mg/l	Annual compliance of samples with EQS
C	Unsatisfactory	Occasional observations or substantiated complaints of pollution	Water quality restricts passage	Modified	Resident fish community modified	>or = substantially elevated but grossly elevated	Minimum DO< or = 4 mg/l but > 2 mg/l	One or more List II substances fail to comply with EQS, List I and Red List all comply
D	Seriously polluted	Frequent observations or substantiated complaints	Water quality allows NO passage	Impoverished or severely modified	Resident fish community impoverished	> or = grossly elevated level	DO <2 mg/l	One or more List I or Red List substances fail to comply with EQS

Table 12 Adris Estuarine Classification Scheme

Class/Description	Aesthetic Condition	Biological Condition	Bacteriological Condition	Chemical Condition
A Excellent	Near pristine	Flora and fauna normal	Likely to meet quality standards no less stringent than the guideline standards for EC designated bathing waters.	
B Good	Unpolluted, but may show traces of contamination	Flora and fauna normal	Likely to meet quality standards no less stringent than the mandatory standards for EC designated bathing waters.	
C Unsatisfactory	Occasional observations or substantiated complaints of sewage solids, smell, nuisance or oil	Flora and/or fauna modified by effluent discharges	Likely to occasionally fail to meet quality standards no less stringent than the mandatory standards for EC designated bathing waters	Likely to meet all quality standards applied as a consequence of the EC Dangerous Substances Directive.
D Seriously Polluted	Frequent observations or substantiated complaints of sewage solids, smell, nuisance or oil	Flora and/or fauna impoverished or absent	Likely to frequently fail to meet quality standards no less stringent than the mandatory standards for EC designated bathing waters.	Likely to fail any one or more of quality standards applied as a consequence of the EC Dangerous Substances Directive.

Table 13. Adris Coastal Waters Classification Scheme

Additional water quality standards recommended by the Central Fisheries Board which are presented in Table 14. These standards have been developed to ensure that the coastal and estuarine waters within the Donegal Bay catchment achieve compliance with relevant EU Directives.

Parameter	Units	Standards	Comments
Temperature	^{o}C	<21.5	Except for natural occurrences
Dissolved Oxygen	mg/l 0_2	>7 for 50% of time	General Standard
Dissolved Oxygen		>5 for 95% of time	General Standard
Dissolved Oxygen		>4 for 100% of time	General Standard
Dissolved Oxygen	% Saturation	>80%	Guideline for shellfish areas
Dissolved Oxygen		>70%	Mandatory for shellfish areas
Dissolved Oxygen		70 - 120%	Bathing Areas
BOD	mg/l 0_2	<4 for 95% of time	
PH		6.5 - 8.5	
Total Ammonia	mg/l N	<0.3 for 95% of time	Guideline
		<0.8 for 95% of time	Mandatory
Nitrate	mg/l N	<1.0 for 95% of time	Guideline for outer Estuary
Total Coliforms	counts/100 ml	<5,000 for 80% of time	Bathing Areas
Faecal Coliforms	counts/100 ml	<1,000 for 80% of time	Bathing Areas
Faecal Coliforms	counts/100 ml	<300 for 75% of time	Shellfish Waters
Chromium	mg/l Cr	<0.05	Mariculture Areas
		<0.10	Elsewhere
Lead	mg/l Pb	<0.10	
Copper	mg/l Cu	<0.05	
Zinc	mg/l Zn	<0.10	
Cadmium	mg/l Cd	<0.005	
Mercury	mg/l Hg	<0.0001	

Table 14. Central Fisheries Board Coastal and Estuarine Water Quality Standards.

Shellfish Harvesting Waters

The European directive 91/492/EEC lays down conditions for the production and placing on the market of live bivalves molluscs and other shellfish (such as gastropods) intended for immediate human consumption or for further processing before consumption. Regulation S.I. No. 147 of 1996 gave legal status to the directive in Ireland and superseded previous national regulations. All designated bivalve mollusc production within the Donegal Bay catchment area are currently Category B. Shellfish from these areas must undergo purification in an approved plant for 48 hours prior to sale for human consumption.

E. TARGETS

Freshwater Targets

The water quality targets currently in place are those devised under the 1998 Local Government Measures Report, which relates to Q values. Coupled with these targets are phosphate standards corresponding to the target Q values. Overall, the target set for all rivers is of Q4 rating or higher.

The classification system should take account of special ecological features. Under this criteria it is suggested that particular attention is paid to the freshwater mussel *Margaritifera margaritifera*.

Estuarine Targets

Target Class A status of both Donegal Bay coastal and estuarine waters is recommended in order to protect the area's significant value in terms of commercial fishery, recreation and amenity uses.

These targets also reflect the importance of the use of the catchment by migrating salmonids.

Bathing Water Quality

The growth of coastal communities and seasonal increases in population due to tourism continue to present difficulties for the management of sewage in coastal areas. Demand for water-based recreational activities ensures substantial public interest in the quality of beaches and bathing waters as well as health risks associated with contamination of these amenities by pathogens and sewage solids. The microbiological quality requirements for bathing water as described in Table 15 should be met to protect the catchments recreation and amenity uses.

	EU Mandatory[1] Limits C(I)	EU Guideline Limits[2] C(G)	National Limits NLV's
Comupulsory Parameters			
Total coliforms /100 ml	10,000***	500*	5,000*
Faecal coliforms /100 ml	2,000***	100*	1,000*
Discretionary Parameters			
Faecal streptococci /100 ml	-	100**	300***
Salmonella /l	0	-	0
Enteroviruses PFU /10 l	0	-	0

1.EU Mandatory limits: limits which must be achieved.
2. EU Guideline limits: limits which member states should endeavour to achieve.
*=80% compliance required.
**=90% compliance required.
***=95% compliancerequired.

Table 15. Microbiological quality requirements for bathing water.

Shellfish Producing Waters

In the interests of shellfisheries in the Donegal Bay catchment the target is to improve the water categorisation from B to A in order that shellfish can be collected for direct human consumption.

Aesthetic Quality

The aesthetic quality of the Donegal Bay catchment relates to its scenic beauty. This may be detracted from by a variety of factors, including the following:-

- Litter on river banks, beaches and in the water
- Odour
- Noise
- Oils and other chemicals
- Foam on the water
- Discoloured water
- Dead animals
- Unsightly buildings

The target is to eliminate these particular problems in order to protect the scenic beauty of the catchment.

Control of Intermittent Pollution

The ability of the water environment to support uses, including basic ecology, can be affected significantly by intermittent pollution, i.e. events of relatively short duration (typically of a few hours) but which can have a marked impact on the river and, in extreme cases, result in fish kills.

These events are normally the result of poor management of potentially polluting substances, for example the leakage from slurry or oil receptacles. The target is to minimise the the impact of intermittent pollution events in the catchment to a level where they do not cause lasting environmental damage.

Control of Diffuse Pollution

Diffuse pollution can be a major cause for failures to achieve water quality targets. In the context of this report, diffuse pollution mainly concerns increased pollutant load contained in run-off from non-urban areas. The basic target for the control of diffuse pollution is that it should not lead to the failure of the river to meet any of its other targets. However this is somewhat vague and a more direct target is to ensure that codes of good practice are available and implemented.

The key provisions of the Code of Good Agricultural Practice to Protect Waters from Pollution by Nitrates relate to:

- Storage and management of farm wastes
- Spreading rates and dates for organic and mineral fertilisers
- Management practices on the farm to reduce nitrate losses

having regard to such matters as crop requirements, weather, soil type, soil nutrient status etc.

River Flows

There are no specific objective targets for river flows within the Donegal Bay catchment. However we suggest as a general target there should be no significant diminution of natural flow regime and in particular the passage of fish should not be impeded as a result of insufficient flow related to abstractions or construction developments. This applies to the river as a whole or to any individual reach within it.

River Topography

It is suggested that the following general and specific requirements are considered to be targets for the catchment; relevant to water quality:

- The river should be of a width and depth appropriate to the flow regime.
- Encourage the presence of uncultivated bank-side vegetation alongside the river to provide habitats, shade and cover for fish, a buffer against diffuse pollution; and to enhance the quality of the landscape.
- Preserve the natural river features such as emergent vegetation, meanders and pool-riffle sequences for conservation of the river corridor and to enhance the quality of the landscape.
- Limit access to the river for livestock to minimise damage caused by trampling.
- Ensure new development does not reduce the conservation value of the river corridor.

Flood Defence and Land Drainage

- Undertake an Environmental Impact Assessment of new developments to ensure that full consideration is given to drainage aspects of the development.

Mineral Extraction

- Ensure the restoration of all mineral extraction sites to an acceptable environmental standard.
- Maintain of the integrity of the river banks and channel adjacent to mineral extraction sites.
- Enforce strict control of discharges from extraction sites.

Fisheries

- Ensure barriers are passable by migratory fish at low river flows (95 percentile).
- Clean and suitable gravel beds for salmonid spawning.

Recreation and Amenity

- Maintain existing footpaths and access points.
- Promote new facilities where they are consistent with the Foyle and Swilly catchment objectives.

Nature Conservation

- Retain and augment wetland areas within the catchment.

Cultural Heritage

- Maintain valuable features.

River Management

It is suggested that the following general and specific requirements are considered to be targets for the catchment.

General

- Co-operate with local authorities and riparian landowners to ensure banks and surrounding areas are free from litter.
- Carry out river corridor surveys to determine the conservation value and management requirements of river reaches.

Flood Defence and Land Drainage

- Carry out weed control in a way that provides adequate flood protection but that ensures the continued survival of healthy aquatic vegetation.
- Maintenance and clearance of ditches in a way which encourages rather than diminishes ecological diversity.

Fisheries

- Where necessary, carry out appropriate fish stocking to augment natural stocks, especially where these stocks have been reduced by pollution. Due regard should be given to maintaining the genetic integrity of the natural stocks.
- Identify, maintain and improve spawning gravels.
- Carry out weed control at appropriate intervals to provide open water for angling.
- Monitor reaches which are designated as sensitive in respect of forestry development.

Conservation

- Maintain valuable conservation features.

Implementation

As a prerequisite to the future implementation of the Donegal Bay Management Plan, it is essential to ensure that monitoring and information systems are adequate to support water quality management decisions.

A Geographical Information System (GIS) has been developed for the Donegal Bay Catchment in order to organise, analyse and present the results of the monitoring programme. The GIS provides water quality managers with a powerful facility for monitoring environmental change and provides baseline data with which to assess future development. It is also of key importance to ensure that GIS is regularly updated.

The number of sampling stations regularly monitored was increased for the duration of the study. It is therefore necessary to secure funding on an annual basis in order to continue the monitoring at its current level. Further funding will also be required to encompass estuarine water monitoring for the advent of the River Basin Management Strategies.

F. STATE OF THE CATCHMENT

The state of the catchment was assessed by comparing water quality conditions with the proposed targets.

Freshwater River Quality

The County Council's Measures Report river target Q values for 2007 within the Donegal Bay catchment are presented in Map 17. Where no individual reach targets were set in the Measures Report they have been introduced consistent with knowledge of the catchment and the policy as indicated in Section E. The individual status assessment of each river with reasons for failure to comply with targets is outlined below.

The Abbey River

The Abbey River had not previously been assessed for either chemical or biological parameters and therefore has no Q value history. While this river was not set a 2007 target under the Measures Report, from a chemical aspect, the results of this sampling regime indicated the water to be of satisfactory condition.

The Ballaghdoo River

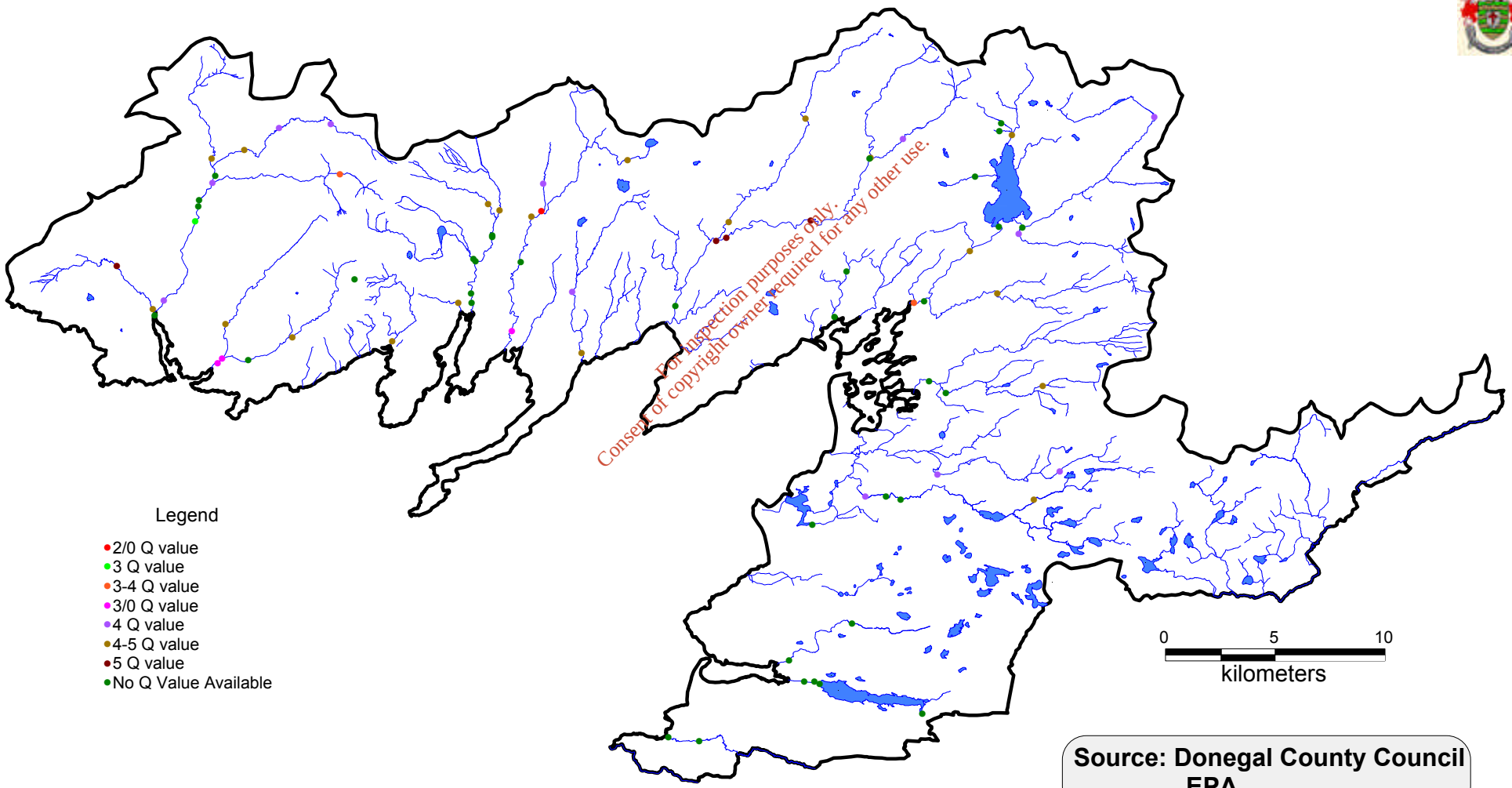
In 1992 the Ballaghdoo River was designated as an acid sensitive river. From a chemical aspect, the results of this sampling regime indicated the water to be of satisfactory condition. The upper reaches of the Ballaghdoo River are in a satisfactory Q rating but deteriorated in the town. Discharges of a toxic nature have been suspected as the cause of this deterioration and a successful court prosecution by D.C.C. of a local factory is hoped to see an improvement of water quality. With this improvement the Q target will be more readily achieved.

The Glenaddragh River (tributary)

From a chemical aspect, the results of this sampling regime showed the water to be of satisfactory condition. The upper reaches of the Glenaddragh River are in a satisfactory Q rating. Downstream of the Ballaghdoo confluence however the quality becomes unsatisfactory. As mentioned above the lower reaches of the Ballaghdoo River a successful court prosecution by D.C.C. of a local factory is hoped to see an improvement of water quality. Those Q targets set for each sample point

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 17
The County Council's Measures Report (1999)
River Target Q Values Set
within the Donegal Bay Catchment



Source: Donegal County Council
EPA

on the Glenaddragh river should be met with the end of the illegal discharges to the lower reaches of the river.

In 1992 this river was designated as an acid sensitive river.

The Ballintra River

The results of this sampling regime indicated the water to be of satisfactory condition. All stretches of the Ballintra River have a satisfactory Q value.

The Bradoge River

The Bradoge River had not previously been assessed for either chemical or biological parameters and therefore has no Q value history. From this current sampling regime the water was found to be generally satisfactory.

The Bridgetown River

The results of this sampling regime indicated the Bridgetown River to be of satisfactory condition. All stretches of the Bridgetown River have a satisfactory Q value.

Bungosteen River

This river has previously been named and classified by the EPA as the Stragar River. The higher reaches of this river are indeed called the Stragar. However, to avoid confusion, these lower stretches are referred to as the Bungosteen River. These stretches of the Bungosteen River have a satisfactory Q value. No target Q value has been set. From this current sampling regime the water was found to have an orthophosphate annual median of 0.15mg/l and 0.45mg/l at the upper and lower sample stations respectively. Both values would correspond to Q ratings of 1 which are unsatisfactory.

The Loughaderry River (tributary)

The Loughaderry River had not previously been assessed for either chemical or biological parameters and therefore has no Q value history or targets. From this current sampling regime the water was found to be generally satisfactory.

The Roechrow River (tributary)

All stretches of the Roechrow River have a satisfactory Q rating. The results of this sampling regime also found the Roechrow River to be of satisfactory condition.

The Stragar River (tributary)

This section of the Stragar River had not previously been assessed for either chemical or biological parameters and therefore has no Q value history.

The site downstream of the previously unlicenced Killybegs Fish Sales factory repeatedly had marked ammonia concentration elevations. The discharge by this company to the Stragar River is currently under negotiation following their recent installation of a waste water treatment system. Nitrate concentrations further upstream at the Meentullynagarn Bridge site were also markedly elevated and may have been sporadically influenced by local agriculture or a nearby forestry development.

In 1992 this river was designated as an acid sensitive river.

The Bunlacky River

The results of this sampling regime showed the water to be of satisfactory conditiom. All stretches of the Bunlacky River have a satisfactory Q value.

Durnesh Lake – Birra Stream

The Birra stream feeding Durnesh Lake had not previously been assessed for either chemical or biological parameters and therefore has no Q value history or target. From this survey ammonia concentrations were found to be elevated on a number of occassions. The NRFB has previously investigated this stream for repeated contamination by slurry but despite extensive examinations failed to source the pollution due to the underground nature of the stream.

Cunlin Lough Stream

The Cunlin Lough Stream is in good condition, with a satisfactory Q value.

The Eany Water

The results of this sampling regime showed the water to be of satisfactory condition. Where previously given a Q rating, the Eany Water was found to be of the highest quality.

The Eanybeg Water (tributary)

The results of this sampling regime showed the water to be of satisfactory condition. All stretches of the Eanybeg Water have a satisfactory Q value.

The Eanymore Water (tributary)

The results of this sampling regime showed the water to be of satisfactory condition. All stretches of the Eanymore Water have a satisfactory Q value.

The Eglish River (tributary)

The Eglish River has a satisfactory Q rating and this sampling programme found the water to be of good quality.

The Sruell River (tributary)

The Sruell River had not previously been assessed for either chemical or biological parameters and therefore has no Q value history or target. Over the course of this sampling programme the water quality was consistently satisfactory.

The Eddrim River

The Eddrim River had not previously been assessed for either chemical or biological parameters and therefore has no Q value history or target. Nitrate concentrations at the Eddrim Bridge site were occasionally high. However, this site is influenced by tidal mixing and therefore not truly representative of the river.

The River Erne

The River Erne falls under the Erne Catchment Management Plan.

Lough Eske

The three small tributaries to Lough Eske, rivers Clady, Greenan and Edergole have not previously been assessed for either chemical or biological parameters and therefore have no Q value histories or targets. Over the course of this sampling programme the water quality was consistently satisfactory at all three rivers.

The Clogher River (tributary)

The Clogher River has a satisfactory Q rating. The results of this sampling regime indicated the river to be of satisfactory condition.

The Corraber River (tributary)

This Lough Eske tributary, the Corraber River, has a satisfactory Q rating.

The Drumenny River (tributary)

The Drumenny River has a satisfactory Q rating and this programme found the river to be of satisfactory quality.

The River Eske (tributary)

The Q rating of the upper reaches of the River Eske is satisfactory but deteriorates in Donegal Town. Slurry entering the river via a nearby stream from the Donegal mart is suspected as being the cause of this deterioration.

The Lowerymore River (tributary)

The Lowerymore River has a satisfactory Q rating. Over the twelve month sampling programme the river suffered from siltation due to the Barnesmore-Clar road development scheme and subsequent landscaping. This work has now been completed.

Both the sample site downstream of the Lowerymore/Clogher River had an annual median orthophosphate result bordering the satisfactory/unsatisfactory classification when the corresponding Q value is considered.

Fintragh River

The Fintragh River has a satisfactory Q rating and the results of this sampling regime showed the water to be of satisfactory condition.

The Glen River

Where previously classified the upper reaches of the Glen River had a satisfactory Q designation which deteriorated downstream of the fish factory at Meenaneary (Errigal Eisc) and improved again below Carrick village. On almost each date the Glen river was sampled the site d/s Errigal Eisc showed grossly elevated readings for almost every parameter examined when compared to the sample station u/s Errigal Eisc.

In 1992 the Glen river was designated as an acid sensitive river.

The Crow River (tributary)

The Crow River had previously suffered from siltation by new forestry plantations resulting in borderline water quality classification. However, the results from this sampling programme would suggest that the forestry siltation problem on this river has stabilised. The annual median orthophosphate concentration of 0.05 mg/l at the site u/s Glen River Confl. corresponds to a borderline satisfactory/unsatisfactory Q value of 3-4 otherwise the site S. of Crove is of a satisfactory standard.

The Owentskiny River (tributary)

All stretches of the Owentskiny River have a satisfactory Q rating. Concerns have previously been expressed over the level of surrounding afforestation. An orthophosphate annual median of 0.04 mg/l corresponding to a borderline satisfactory/unsatisfactory Q value was recorded at the uppermost S. of Durlough site. This site is the closest of all examined to the forestry development.

The Owenwee River (tributary)

All sections of the Owenwee River have a satisfactory Q rating and the results of this sampling regime showed the water to be of satisfactory condition. In 1992 this river was designated as an acid sensitive.

The Laghey River

All sections of the Laghey River has a satisfactory Q rating. This sampling programme found sporadic anomalies in water quality but overall the water was of satisfactory quality.

The Oily River

The Oily River generally has a very high Q value. However, when last classified in 1999, the lower river quality deteriorated at the Bridge at Milltown. This deterioration was explained by a toxic effect however no such effect was evident from this sampling programme.

In 1992 this river was designated as an acid sensitive river.

The Tullinteane River (tributary)

In 1999, when last classified, the upper reaches of the Tullinteane River were of a satisfactory Q value which deteriorated just upstream of its confluence with the Oily River due to a serious toxic pollution incident. However, no such effect was evident from this sampling programme with all stretches being of satisfactory quality.

Donegal Bay River Phosphorous Quality

In their 2001 Phosphorous Regulations National Implementation Report the EPA noted a widespread decline in river water quality compared to baseline reports. This decline was most apparent at high quality Q5 stations where water quality was found to have decreased. In County Donegal this deterioration in quality was affected by the increase in forestry developments which have had no large scale detrimental impact within the Donegal Bay catchment.

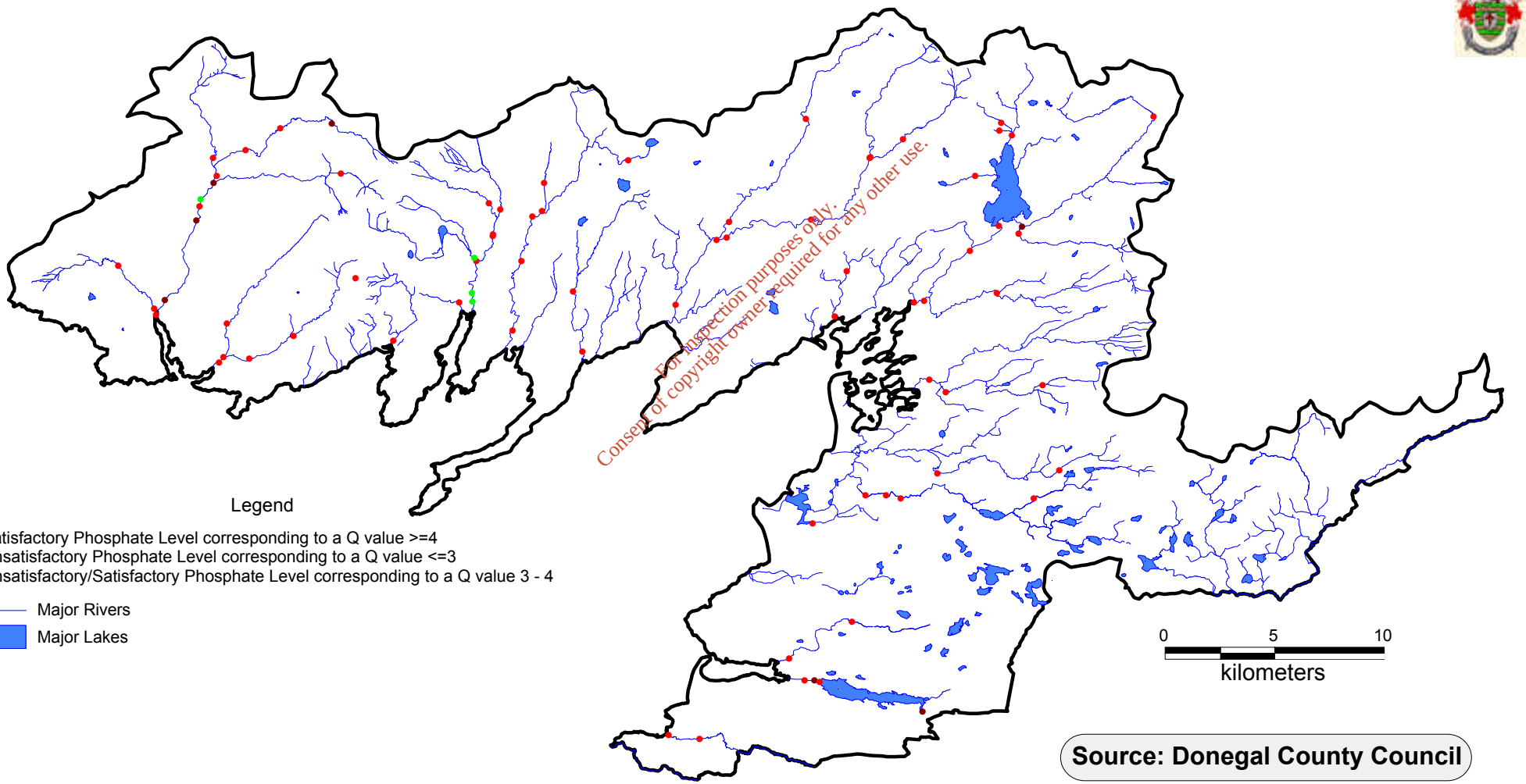
Over the twelve month river sampling programme a comprehensive analysis of each sample point for phosphorous was possible. From these results Map 18 presents the river orthophosphate levels within the Donegal Bay catchment corresponding to Q values.

Of the 79 river sample points examined over the 17 river catchments, 69 (87.2%) were found to have satisfactory orthophosphate annual medians corresponding to their target Q ratings. 87.2% of stations sampled reaching satisfactory orthophosphate levels is above the County average of 75% based on Q values.

The three sample points which had annual orthophosphate median values corresponding to unsatisfactory Q ratings were situated on two rivers, namely the Bungosteen River (Br. W of Ardara Station and Br. W of Tullaghacullion) and the Glen River (d/s Errigal Eisc).

DONEGAL BAY WATER QUALITY MANAGEMENT PLAN

Map 18
The River Orthophosphate Levels within the Donegal Bay Catchment corresponding to Q Values



Source: Donegal County Council

Estuarine and Coastal Water Quality

Eske Estuary

The river Eske discharges to inner Donegal Bay (inside Murvagh pt.) through a shallow estuary that is sheltered from the Atlantic. The two main freshwater influences are the Eske and Ballintra rivers.

Water quality studies of inner Donegal Bay in November 1999 found that BOD levels were satisfactory throughout much of the bay, being generally in the range 1-2mg/l. An exception to this was in the upper estuary where a number of samples exceeded 4mg/l in the vicinity of the outfall. Dissolved oxygen concentrations during the winter survey were satisfactory. The benthic environment of the bay has also been studied and the faunal composition in the area north east of Ballyboyle Island was indicative of slight to moderate organic enrichment. Coliform measurements also showed that sewage contamination was prevalent throughout much of the inner estuary. Initial modeling of BOD dispersion in the bay, found that BOD concentrations would be maintained below 2.5 mg/l near the outfall with lower values being achieved further afield. Further modeling based on the proposed introduction of secondary treatment for Donegal sewage indicates that further reductions will occur. Thus, water and sediment quality will improve when the plant comes on stream.

Killybegs Harbour

Killybegs Harbour is a small sheltered inlet approximately 4 km in length with an area of 10 km^2, located at the head of Mc Swyne's Bay. The Stragar River is the main freshwater influence in the bay. There are a number of fish processing factories in Killybegs. Their inputs are likely to vary considerably over the year in response to seasonality in the fisheries.

The harbour is known to have poor flushing characteristics. It can be concluded that although organic input to the bay may have been reduced, some deterioration in water quality around the discharge points may still occur during periods of slack water. The bay is also likely to be nitrogen limited due to lack of a local riverine source. Consequently, strongly elevated chlorophyll a levels are unlikely to be a persistent problem. Nevertheless, given the poor flushing characteristics of the bay, some phytoplankton accumulation may occur during productive periods.

Donegal Bay Blue Flag Award Scheme

The EU Bathing Water Directive has substantially increased public awareness of coastal pollution and has focussed attention on the problems involved in monitoring bathing water quality.

Donegal Bay has four Blue Flag beaches; Bundoran, Rossnowlagh, Murvagh and Fintragh.

The results from the Donegal Bay Blue Flag beaches are extremely encouraging. 100% pass rates on all counts were achieved at the beaches except Fintragh which had an 86.6% pass rate for the Faecal coliform counts. This dip in standards was due to heavy rainfalls prior to sampling and therefore was not truly reflective of the coastal water's status.

Donegal Bay Marine Survey

As part of the Donegal Bay catchment management plan eleven marine sites were examined. These sites were situated from Fintragh Bay to Bundoran.

On both sample dates the bacterial analysis at each site gave results corresponding to waters of blue flag standard except at Rough point and Tullan Strand. The elevated counts at Rough Point are not unexpected as this is the current location of the Killybegs sewage discharge. The Tullan Strand site, while meeting the 1988 national limit values for bathing water, was just over the blue flag target for faecal coliforms of <100/100ml at 146. Similarly, this site is where the River Erne - carrying the sewage discharge of Ballyshannon - mixes with the Atlantic.

With only two samples taken over a 16 month period, bacterial result categorisation in relation to the US National Shellfish Sanitation Programme was not possible. It must also be noted that these results were merely from a solitary surface spot check. A comprehensive sampling programme would be required to truly categorise any site in relation to bacteriological criteria with depth profiling.

Key Issues

A brief description of each key issue is given below, commencing with chemical and biological water quality issues and concluding with catchment wide usage issues.

Key Issue 1: Water Quality in The Ballaghdoo and Glenaddragh Rivers

The Ballaghdoo and Glenaddragh rivers fail to meet the targets set in reaches around Kilcar village (Br. in Kilcar and 500m d/s Ballaghdoo, respectively). The problem is likely to be related to a localised industrial discharge.

Key Issue 2: Water Quality in The Bradoge River

While without any previously set targets, the lower reaches of the Bradoge River (Bundoran Bridge) suffers from sporadic releases of sewage seepage via the storm overflow during periods of adverse weather conditions.

Key Issue 3: Water Quality in The Bungosteen River

While without any previously set targets, the Bungosteen River (Br. W of Tullaghacullion site) was found to suffer from unsatisfactory elevated phosphate concentrations. The cause is uncertain and may be exaggerated due to one irregularly high recording

Key Issue 4: Water Quality in The Stragar River

While without any previously set targets, the Stragar River was found to suffer from unsatisfactory elevated concentrations in ammonia at the site d/s Fish Sales. This stretch of the river received the discharge of a previously unlicenced fish processing factory.

Key Issue 5: Water Quality in The Birra Stream

While without any previously set targets, the Birra Stream which flows to Durnesh lake was found to suffer from sporadic elevated concentrations in ammonia. Agriculture is suspected of contaminating the stream and causing these elevations.

Key Issue 6: Water Quality in the River Eske

The lower reaches of the River Eske fail to reach the set targets (Br. E Donegal Town). The present sewage system in the Town coupled with the discharges of the agriculture mart are the main reasons for this failure.

Key Issue 7: Water Quality in The Glen River

The upper reaches of the Glen River are of a satisfactory chemical and biological quality and meet their set targets. However, water quality deteriorates in the middle reaches of the river (d/s Errigal Eisc and E. of Croaghstraleel) and targets are not met. The lower reaches of the river improve as the water quality subsequently recovers. The cause of the deterioration in water quality is the discharge to the river of the Errigal Eisc fish processing factory.

Key Issue 8: Effluent Disposal in the Donegal Bay catchment

Effluents from sewage works, industry, principally at Donegal Town, Killybegs, Ballyshannon and Bundoran are discharged directly to Donegal Bay. Aquaculture cages are also present in Donegal Bay. Ongoing monitoring is required to assess the impact, if any, of these uses in particular with regard to designated Bathing Beaches.

Key Issue 9: Impact of Forestry

Acidification due to forestry may be a possible factor in causing stress to the headwaters of rivers within the catchment. The Oily, Stragar, Glenaddragh, Glen and Ballaghdoo rivers have been designated as acid sensitive by the NRFB in 1992.

Key Issue 10: Data on Point Source Discharges

There is a need to ensure point discharges are monitored at a frequency adequate to ensure targets set within the water quality management plan are complied with.

Key Issue 11: Water Supply

Water supply improvements are required in the Ballyshannon/Rosnowlagh region. Further extension of the Frosses/Inver network is required to include Mountcharles. The Killybegs network must also be extended to include Fintragh.

Key Issue 12: Accidental Discharge

Accidental discharge such as oil spills and farmyard runoff potentially contribute to deterioration of biological water quality.

Key Issue 13: Groundwater Quality

There is a growing dependence of the catchment water resource upon abstraction from boreholes. Control of diffuse/agricultural practices in the immediate vicinity of these sources is required to maintain the water quality of abstracted supply.

Key Issue 14: Road Developments

The impact of road development works on any bordering waterways must be monitored and kept to a minimum.

Key Issue 15: Industrial Licenses

Sampling of industrial discharges must be of a frequency which will indicate repeated breaches of licence conditions.

Key Issue 16: Agriculture

Certain sections of the catchment appear to be impacted by agriculture. Practices could be improved in various areas by measures to reduce direct impact of livestock waste to watercourses. Implementation of strategies such as Nutrient Management Plans, REPS and better information dissemination should also be considered.

Key Issue 17: *Magaritifera magaritifera*

The freshwater pearl mussel appears to be limited within the Donegal Bay catchment. This protected species appeared to have been disturbed in the Tullinteane River due to gravel extraction.

Key Issue 18: Waste Management

Improved maintenance at landfill sites has been implemented to halt the spread of wind blown debris into watercourses at both the Ballintra and Killybegs landfill sites. The proposed leachate collection system for the Ballintra facility must be implemented to prevent the migration of leachate to adjacent watercourses. The development of extra capacity at the Ballintra site is a priority.

Key Issue 19: Aquaculture

Careful control of aquaculture practices is needed to control usage of chemical pesticides, reduce escapees and prevent impact on general water quality. Further applications for fish farming developments will be supported by Environmental Impact Assessment. Disposal of fish wastes needs to be strictly monitored.

Key Issue 20: Bathing Beaches

Preservation of blue flag status of bathing beaches including control of bacterial pollution from effluent discharges and aesthetic standards such as beach buggies and jet skis use is important in the context of the tourism potential of the catchment.

Key Issue 21: Fisheries

The maintenance of good water quality and satisfactory habitat are essential components in protecting and promoting fisheries. The Donegal Bay catchment is faced with water quality and habitat problems previously identified. The problems identified e.g. poor quality discharges from STWs and industry, and acid sensitive waters, are by no means unsurmountable and can be addressed in the context of the management plan. These problems must be challenged on an individual basis using combined effort and measures to ensure that the future catchment ecology will be the fundamental concern for sustainable development.

Key Issue 22: Chemical and Biological Monitoring Data

It is essential to ensure that monitoring and information systems are adequate to support water quality management decisions. Monitoring should be increased from its present level particularly in rivers where there are problems identified. The results of the monitoring programme, through the use of GIS, should also be regularly updated and the information disseminated to water managers.

Key Issue 23: Coastal Zone Management

The DCC Community and Enterprise Unit has recently proposed the development of a pilot coastal zone management model in County Donegal. The Unit concluded that Donegal Bay is a suitable location in which to base a pilot project because of its commercial importance to the catching, processing, aquaculture and tourism sectors and because the stakeholders there are influential at both county and national level. It is suggested that if these stakeholders buy into the project, the lessons learned will be acted upon and replicated elsewhere.

Key Issue 24: Implementation

It is recommended that a management committee be established to implement the Donegal Bay Water Quality Management Plan at a catchment level. The management committee should address all issues which may impact on water quality including proposed industrial, sewage treatment and drainage works, with a view to enabling sustainable development within the catchment whilst safeguarding the ecology of the rivers.

G MANAGEMENT OPTIONS

A series of management options have been proposed to address the key issues identified by the Donegal Bay WaterQuality Management Plan. It should be emphasised that the management options do not represent government policy, but are a list of ideas put forward to stimulate discussion.

The following tables list the appropriate management options, the bodies who will probably be responsible for carrying them out, and the "pros and cons" of each option. The reference number does not represent any form of ranking the importance of the issues identified.

The options are intended to form the basis for a plan for the improvement of the rivers to meet the requirements of all its users. Inevitably this will involve many bodies and individuals working together to fulfil the common strategy represented by the Donegal Bay Water Quality Management Plan.

Table 16. Management Options

Key Issue No. 1	**Water Quality in the Ballaghdoo and Glenaddragh Rivers**		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Increase monitoring of licensed industrial discharges and outfalls to waters	**DCC/EPA**	Identifies polluters	Cost /laboratory resources
Identify any illegal discharges to rivers	DCC	Identify and control polluters	

Key Issue No. 2	Water Quality in The Bradoge River		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Infrastructure improvement to Bundoran STW and storm overflows	DCC	Eliminate sewage discharge	Cost
	DCC	Significant improvement to water quality	Cost
Increase sampling of river and establish water quality targets	DCC/EPA	Establishes records	Cost /laboratory resources

Key Issue No. 3	Water Quality in The Bungosteen River		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Implementation of joint agricultural schemes, ie REPS, Codes of Practice, Nutrient management Plans etc	DCC/Teagasc/IFA/Dept. of Agriculture	Reduces agricultural pollution	
Improved education of agricultural industry	DCC/Teagasc/IFA/Dept. of Agriculture		
Increase sampling of river to ascertain phosphate status of river	DCC/EPA	Establishes water quality records	Cost /laboratory resources

Key Issue No. 4	Water Quality in The Stragar River		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Licence unauthorised discharge to river	DCC	Controls quality of discharge	
Increase sampling of river and establish water quality targets	DCC/EPA	Establishes water quality records	Cost /laboratory resources

Key Issue No. 5	Water Quality in The Birra Stream		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Implementation of joint agricultural schemes, ie REPS, Codes of Practice, Nutrient management Plans etc	DCC/Teagasc/IFA/Dept. of Agriculture	Reduces agricultural pollution	
Increase sampling of river and establish water quality targets	DCC/EPA	Establishes water quality records	Cost /laboratory resources

Key Issue No. 6	Water Quality in The River Eske		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Infrastructure improvements to Donegal STW.	DCC	Reduces pollution	Cost
Complete improvements at Donegal Mart	Donegal Livestock Co-Operative Society	Reduces pollution	Cost

Key Issue No. 7	Water Quality in The Glen River		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Improve waste water treatment plant at Errigal Eisc factory	Errigal Eisc	Returns discharge to within licence requirements	Cost
Increase sampling of river and industrial discharge to it	DCC/EPA	Monitors water quality	Cost /laboratory resources
Prosecute breaches of discharge licence	DCC		

Key Issue No. 8	Effluent Disposal in the Donegal Bay Catchment Area		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Improvements of STW	**DCC**	Estuarine water quality improvements at shellfish waters, bathing beaches and amenity areas	Cost
Ongoing monitoring of licensed industrial discharges and outfalls to waters	DCC / EPA		Cost/lab resources

Key Issue No. 9	Impact of Forestry		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Implement forestry monitoring	**DCC / NRFB**	Fishery Improvements	
Restrict development in Acid Sensitive Areas and ensure strict compliance with Forestry and Fishery guidelines	Coillte / Department of Energy, Forestry Service	Pollution Prevention	

Key Issue No. 10	Data on Point Source Discharges		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Extend sampling programme to ensure adequate monitoring	**DCC**	Provide more information to make decisions	Laboratory resources

Key Issue No. 11	Water Supply		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Reduce wastage by resource management	DCC		
Improve network to the Ballyshannon/Rosnowlagh areas	DCC	Improved supply. Attracts industry. Complies with DCC policy of improved rural schemes. Comply with EU legislation. Sustain rural communities.	Time period required for works
Extend Lough Eske network to include Mountcharles	DCC	Improved supply. Attracts industry. Complies with DCC policy of improved rural schemes. Comply with EU legislation. Sustain rural communities.	

Develop Lough Glencoagh and investigate the need for supply augmentation by borehole	DCC	Improved supply. Attracts industry. Complies with DCC policy of improved rural schemes. Comply with EU legislation. Sustain rural communities.	
Extend Killybegs network to include Fintragh	DCC	Improved supply. Attracts industry. Complies with DCC policy of improved rural schemes. Comply with EU legislation. Sustain rural communities.	

Key Issue No. 12	**Accidental Discharge**		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Implementation of joint agricultural schemes, ie. REPS, Codes of Practice etc	Department of Agriculture/ DCC	Reduces agricultural pollution	
Improved education of agricultural industry	Department of Agriculture/ DCC		

Key Issue No. 13	**Groundwater Quality**		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Develop aquifer/groundwater protection plans	DCC	Provides data to allow resource management	Cost

Key Issue No. 14	Road Developments		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Promote a Code of Practice for all roads contractors	**DCC**	Prevent pollution	
Increase monitoring of major road developments	DCC/NRFB	Prevent Pollution	Cost

Key Issue No. 15	Industrial Licences		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Ensure adequate monitoring	DCC / EPA	Compliance with EU Directives	Cost

Key Issue No. 16	Agriculture		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Implement good practice strategies REPS, NMPs, etc	Department of Agriculture	Pollution Prevention	
Improved education of agricultural industry	DCC	Pollution Prevention	
Better dissemination of information	DCC	Pollution Prevention	
Improve risk farms identified in farm survey	DCC/Teagasc	Pollution Prevention	

Key Issue No. 17	*Magaritifera magaritifera*		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Designate special protection areas to conserve existing sites	NRFB	Protect current population of species	
Further investigate disturbance of site at the Tullinteane River	Duchas	Prevent further damage to species	Cost

Key Issue No. 18	Waste Management		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Implementation of Waste Management Plan including better operation of existing sites i.e. Ballintra and Killybegs	DCC	Reduces pollution	
Provide new facility to modern engineering standards including proper disposal of leachate	DCC	Reduces pollution	
State-of-the-art monitoring for contamination	DCC	Reduces pollution	

Key Issue No. 19	Aquaculture		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Ensure adequate monitoring	Department of the Marine and Natural Resources, DCC, Duchas	Protect marine environment	Cost
Implement new regulations in relation to licensing i.e. EIS preparation	Department of the Marine and Natural Resources, DCC, Duchas	Pollution Prevention	Cost
Dispersal of fish waste to be strictly monitored	DCC	Prevent pollution of surface and ground waters	

Key Issue No. 20	Bathing Beaches		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Improve STW where appropriate	DCC	Protect environment	Cost
Ensure adequate monitoring	DCC		Laboratory resources
Coastal resource protection by hinterland planning control i.e. provision of septic tanks at caravan parks etc	DCC		-

Key Issue No. 21	Fisheries		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Ensure adequate monitoring of landfills, STW, water abstractions and industrial discharges	**DCC**		
Implement fishery improvement schemes	NRFB / DCC		
Protection of sensitive reaches	Forestry Service/Coillte/NRFB		

Key Issue No. 22	Chemical and Biological Monitoring Data		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Undertake regular and adequate monitoring regimes	DCC / EPA		
Provide data to the public	DCC		
Ensure quality of data by accreditation	DCC		

Key Issue No. 23	Coastal Zone Management		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Establish pilot Coastal Zone Management project	DCC / NRFB/ Teagasc/ Department of the Marine and Natural Resources / Department of Agriculture/ Department of Energy, Forestry Service / Department of Arts, Heritage, the Gaeltacht and the islands	**1. General** a. Conservation of fish stocks b. Secure incomes c. Establishment of Inshore Fishery Development Committees d. Infrastructure (harbours, piers, slips, marinas, roads etc.) e. Global image of Donegal Bay as a quality "brand" f. Increased value-added business g. Business networking and clustering **2. Catching Sector** a. Input to planning process b. Diversification possibilities c. Fleet modernisation d. Research into stocks	

		e. Conservation backdrop to review of Common Fisheries Policy **3. Processing Sector** a. Continuity of supply / quality of fish b. Better regulation of fishing c. Global marketing d. New business links **4. Aquaculture Sector** a. Cross-sector agreement on CLAMS b. Recognition of importance of aquaculture to economy c. Improvement of public relations and development of positive image d. Seen to act in concert with the natural environment e. Greater scale and value added f. Research and business links g. Global brand image h. Reduction of threats to industry, e.g. water quality, navigation, change of government policy via public/political/EU pressure **5. Tourism / Leisure Sector-** a. Development of quality water-based leisure product b. Development of global brand image c. Beach management strategy d. Marina development / investment in boats e. New business links / marketing.	

Key Issue No. 24	Implementation		
Management Options	**Responsible Bodies**	**Pros**	**Cons**
Establish catchment based management committee	DCC / NRFB/ Teagasc/ Department of the Marine and Natural Resources / Department of Agriculture/ Department of Energy, Forestry Service / Department of Arts, Heritage, the Gaeltacht and the islands		