Figure 36: Eastern RBD/GDSDS Relationship
5.6 Natural Resource Management

5.6.1 Introduction

Natural resource management represents a potentially ideal means of implementing many of the recommendations not only of this Regional Policy in Environmental Management but also of the Governments Agenda 21 plan. A major challenge however is to effectively co-ordinate the activities of different stakeholders, particularly when a resource crosses administrative boundaries or exhibits different landuse or ownership patterns. This section will discuss how this challenge can be met through the establishment of independent management groups and with the aid of an agreed management plan.

5.6.2 River Basin Management

River basin management is one of the more familiar types of resource management, which aims to understand environmental processes and to sustainably manage human activities within the chosen river basin. It is also known by different names depending on the country e.g. total or integrated catchment management in Australia, watershed management in the USA or river basin management in the EU.

River Basin Districts

Seven River Basin Districts (RBDs) have been established within Ireland, as introduced in Section 2.3.3. The focus to date has been on addressing water quality in accordance with the WFD, although DoEHLG has noted the comprehensive nature of the RBD projects and the need for participation in the areas of agriculture, fisheries, habitat protection and flood management. The range of inputs to the final RBD Management Plans will be clarified after RBD management groups have been established and the preparation of plans get underway.

The Eastern RBD is the relevant RBD for the Greater Dublin area. This basin district comprises four, EPA-designated hydrometric areas, of which the River Liffey catchment is the principal one in the Greater Dublin region. Figure 36 shows the spatial relationship between the hydrometric areas, local authority boundaries, GDSDS study boundary and some of the other river catchments within Greater Dublin.

The GDSDS and Eastern RBD

As is evident from Figure 36, the work of the GDSDS will contribute to that of the Eastern RBD. The two projects share an important goal of protecting water quality, through the implementation of measures to improve runoff quality and to minimise point and diffuse source discharges. With its focus on urban drainage, the work of the GDSDS will help the RBD to meet its objectives in urban areas.

There is good opportunity to merge much of the output of the GDSDS into the RBD project, particularly with regard to flooding, GIS and policy development. Under the GDSDS, floodplain mapping will be prepared for six rivers within the River Liffey hydrometric area and two rivers within the East Wicklow hydrometric area. Data sets collected and contained in the GDSDS GIS, such as planning and landuse data, would also be of value. Finally, it is envisaged that the Greater Dublin regional policies can be applied to urban areas across the entire Eastern RBD.

Recommendations

16. Planning and drainage authorities to make the assessment of environment impacts and provision of stormwater management plans a requirement of the planning approval and taking in charge process.

17. Planning and drainage authorities to establish guidelines for the preparation of stormwater management plans.

18. Planning authorities to consider upgrading stormwater management plans to integrated urban water management plans or total site-based management plans.

19. Planning authorities to undertake SEAs of their strategic and Developments Plans.
It is expected that the output from other previous and ongoing projects will also be quickly integrated into the Eastern RBD project once operational. These would include water quality studies the management systems recommended by Three Rivers Project and the floodplain mapping currently being prepared by the OPW.

5.6.3 Sub-Basin/Catchment Management

**Catchment Management Plans**

The WFD provides the option of supplementing the strategic RBD Management Plans with sub-basin plans. Sub-basin planning deals with particular aspects of water management either at a smaller geographical scale or in respect of a particular issue, and could play a key role in securing participation at a local level.

There is potential for using individual river catchments as a convenient unit for sub-basin management. This was practiced in the UK where, prior to the introduction of the WFD, numerous catchment management plans were prepared. Both the Environment Agency in England and Wales and the Scottish EPA (SEPA) have subsequently recognised the importance of these existing plans in the RBD process, particularly when engaging local stakeholders to deliver environmental improvements (Hutchings 1999 & SEPA 2001). Sub-basin management is likely to continue in the UK e.g. as Local Environment Agency Plans (LEAPs) or flood management strategy plans in England and Wales, although the nature and extent of these plans will vary with local conditions. Similarly in Ireland, the Three Rivers catchment studies developed monitoring systems and management strategies for the restoration and conservation of the Boyne, Liffey and Suir river systems. Sister projects, namely the Lough Ree-Derg and Lough Leane, primarily address lake catchment systems.

Individual river catchments have also been utilised in Greater Dublin, most notably with the selection of the River Camac catchment as an urban pilot study area under the Three Rivers project (MCOS 2002). The water quality monitoring network developed for the Camac could form a foundation for a future catchment management plan, which in turn can support the Eastern RBD project. The current Tolka River Flood Study and 1995 Tolka River Draft Water Quality Management Plan are two other projects that can be input to a single catchment management plan.

Figure 37 below highlights graphically how the stormwater management process and other studies can be nested within a Catchment Management Plan for the Camac River catchment. It also shows how, in the Three Rivers Project, the catchment was split into three subcatchments to allow a more detailed investigation into landuse and water quality. A synopsis of the Camac study can be found in Appendix C1.

**Management Approach**

An important issue for consideration is the top-down/bottom-up approach to catchment management. Essentially, the government-instigated, strategic approach of RBDDs, while necessary, needs to be complemented by a bottom-up approach, focussed on engendering “catchment consciousness” within the local community (Lovell et.al. 2002). At present in Ireland, there appears to be little public awareness of hydrological boundaries or processes but, as identified throughout these policies, there is enormous scope for raising awareness and promoting participation within individual river catchments at the local level (refer Cuff 2001). Within the Three Rivers Project however, the importance of stakeholder involvements at all levels was recognised with the inclusion of the farming community, angling clubs, schools and community groups such as the tidy towns who have an increasing focus on environmental sustainability.

Another consideration is shifting from hierarchical catchment management to more horizontal, network-based management, as is occurring in the USA and Australia. This represents a partnership role rather than a hierarchical one. Such networks require a dedicated co-ordinator, who can build local relationships and keep the emphasis on desired outcomes, rather than on adherence to just policies or regulations. Government authorities can then assume a partnership role in offering technical, education and financial assistance (US EPA 1997). Issues of community participation are discussed in greater detail in Section 5.12.
5.6.4 Catchment Management Strategy

**Overall Approach**
A catchment management strategy is a framework for putting these approaches into action. Figure 38 below shows how such a strategy could work and should be applied at the larger river basin scale i.e. those designated by the EPA as hydrometric areas.

The advantage of a strategy for individual river catchments are numerous:

- Plans can be prepared quickly, especially when viewed in terms of the rate of new development and the long timeframe for preparing the RBD Management Plans;
- Plans act as pilot schemes to help guide the implementation of the RBD Management Plan;
- Visible environmental improvements can be made without the need for baseline, water quality studies; and
- Local networks and partnerships can start to be established.

**Figure 38: Conceptual Catchment Management Strategy**

(N.B. The inputs, outputs and relationships shown are not exhaustive)
**Catchment Management Groups**

The strategy requires some type of Catchment Management Group (CMG), which is an organisation usually tasked with preparing a management plan and subsequently, for co-ordinating water-related processes/activities, such as water quality protection, floodplain management, riparian habitat conservation, urban development, infrastructure provision, amenity etc, within the sub-basin / catchment. The establishment of such a management body is currently being examined for the Lough Erne catchment under the Wise Use of Floodplains project (Oates 2001).

CMGs are often led by a Local Authority but do require broad stakeholder representation, especially from non-governmental organisations, to be successful (Cuff 2001). For example, a Tolka River CMG could be formed and led by Dublin City Council, with representatives from the OPW, EPA, the County Councils of Fingal and Meath, community groups and environmental organisations. The CMGs therefore provide a forum for drawing different parties together to discuss issues that cannot be dealt with solely at an individual level.

CMGs could be established within the organisational structure of the RBD authority but operate from Council offices. Depending on catchment size and issues, they could be structured as part-time committees / forums or alternatively as full-time, independent bodies able to raise funding and employ staff. The need for legislative and departmental support to fund and enforce the operation of such groups will need to be examined. Consideration should also be given in the long-term to matching current administrative functions and boundaries with those of the CMG.

### 5.6.5 Coastal/Estuary Management

**Overview**

The coastline of Greater Dublin is one of the Region's premier natural assets and is highly valued for its scenery, habitat, recreational amenity and range of commercial activities. It is estimated for example, that there are some 230,000 people living within just one kilometre of a 200 km length of the region’s coastline, and that over half of Dublin’s population participate in various water-related activities every year (ESRI 1997). As such, the sustainable management of all coastal resources is a major priority for coastal councils and central government authorities.

The Greater Dublin coastline has been progressively modified over the last few centuries. The most significant impacts probably occurred with the gradual infill and protection of the Liffey / Tolka / Dodder River estuary and creation of the present day arrangement at Dublin Port. Building upon the natural dune systems to the north of Dublin Port and the establishment of protection measures would also have had an impact.

Like all coasts, the present-day Greater Dublin coastline is subject to a number of pressures, some natural but most anthropogenic. The Greater Dublin coastline is fortunate in that it does not suffer greatly from storm seas and has few significant coastal hazards compared to other parts of Ireland, although coastal erosion and tidal inundation is a problem in some areas. The most significant issue however is water quality which will be addressed under the RBD framework. Changes in land-based activities are likely to be sought under the Eastern RBD project to bring about improvements in coastal/estuarine water quality.

The EC is now promoting a strategy of Integrated Coastal Zone Management (ICZM) within the EU (EC 2001) and is encouraging members to prepare their own national strategies. Coastal management for Ireland was first examined in 1997 (Brady Shipman Martin 1997), and will continue with the upcoming National Coastal Protection Study being overseen by the Department of Communication, Marine and Natural Resources (DCMNR). DCC has also initiated the Dublin Coastal Risk Assessment Study, which will examine cost effective coastal protection works and recommend a longer term coastal management strategy for County Dublin.

RPS-MCOS are involved in a study being undertaken by UCD under INTERREG into the impact of riverine inputs on bacteriological load/quality in Dublin Bay.

**Implications for Sustainable Drainage**

The construction and operation of drainage infrastructure in coastal / estuarine areas must be carefully examined because of the unique nature of these environments. In this regard, the application of sustainable drainage, EIA, rehabilitation and long-term management offers many benefits. An objective of drainage strategy should be that any development should not impair the amenity, habitat and landscape values of the coastal environment.
Undertaking drainage-related works may require EIA and/or obtaining a DCMNR foreshore licence. For example, large drainage outfalls, submarine pipelines, pumping stations, artificial wetlands/lagoons, dredging and tidal protection at river mouths are likely candidates for EIA / licensing. Under the EIA, the development must examine impacts on the coastal environment e.g. short term coastal erosion, long term coastal recession, longshore sediment erosion/deposition, high tides, sea level rise, etc.

There is much scope for rehabilitation of drainage infrastructure in coastal/estuarine areas using environmentally sensitive and visually sympathetic designs. For example, the many stormwater outfall pipes that emerge from revetments or back-beach areas, greatly affect the visual amenity of the foreshore onto which they discharge. Sustainable drainage measures such as rerouting flows, creating lagoons and installing erosion protection are some solutions, although many more can be found in the international literature on coastline management.

Sensitive rehabilitation is especially warranted where sites are located within or near to an NHA, SPA or SAC. For example, Booterstown Marsh NHA and the adjacent unused land would greatly benefit from measures to improve water quality and habitat. However it should be noted that this site is managed by An Taisce, not the local Council. The estuaries of Baloyle, Malahide and Rogerstown could also be examined for potential improvements.

Finally, drainage in coastal areas will form one aspect of ICZM. The principles of ICZM are gradually being applied in Ireland, notable examples being the Bantry Bay Charter and the Great Blasket Island Forum, and there is now scope to use these principles in creating independent management units based on coastal “cells”. A coastal cell for Greater Dublin, extending from Wicklow Head to Skerries has already been identified (Brady Shipman Martin 1997).

The actual process of preparing a management plan could be similar to the catchment management process discussed above. For example, the bringing together of stakeholders in Dublin Bay and the input of the Dublin Bay Water Quality Management Plan could form the foundation for a Dublin Bay Estuary Management Plan. Notwithstanding this, the framework under which these plans are prepared must have regard to any finalised Coastal Policy for Ireland. It is worth noting that ICZM is also being applied in the UK with the preparation of non-statutory management plans for shorelines, estuaries, coastal habitats and harbours (DTLGR 2001).

**Recommendations**

20. Planning authorities to consider formulating a catchment management strategy for individual river catchments, with a view to establishing independent catchment management authorities and preparing management plans.

21. DCC and SDCC to build on the work completed for the Camac River catchment by initiating a pilot catchment management strategy.

22. The adoption of ICZM as the principle of coastal management in Dublin Bay.

## 5.7 Flooding

### 5.7.1 Overview

Flooding is a natural phenomenon of the hydrological cycle. While there are different types and causes of flooding, the most common in Greater Dublin are flooding of rivers and stormwater pipe networks in response to extreme rainfall events. There are many factors, both natural and anthropogenic, that influence flood behaviour and the degree of risk that it poses.

Like other natural processes flooding cannot be eliminated, however its impacts can be minimised with proactive and environmentally sustainable management. This section examines some of the issues concerning flooding and floodplain management specifically. Sustainable drainage measures, as one important element of floodplain management, is covered in detail in the next chapter.
5.7.2 Floodplain Management in Greater Dublin

Historical Management

The historical development of the Greater Dublin region, like settlements the world over, originally began on the floodplains. The risk of periodic flooding was seen to be outweighed by the many benefits of being close to rivers, such as having defensible sites, natural water supplies and a means of transport. The impacts of flooding however became more pronounced as development of the floodplains was consolidated in the 18th to 20th Centuries and stormwater runoff rates increased with an expanding Dublin City.

The response to flooding of Dublin's larger rivers, as noted in Chapter 3, focussed mainly on increasing flow capacity by undertaking structural works in the urbanised, lower reaches. An instructive example is the River Dodder where this approach has continued up until 1986, when the largest flood on record caused extensive damage. Mitigation measures such as wall raising and channel modification were subsequently examined, although technical, socio-economic and aesthetic ramifications were identified as major impediments to their implementation (O'Donnell 1986).

Flood defence works such as wall raising and embankments have not been widely used in the Greater Dublin Region, compared to other regions internationally. Several flood studies and some floodplain maps were however prepared throughout the 20th Century, most notably by the OPW for agricultural lands but also by Local Authorities for urban rivers. Unfortunately there was not an extensive coverage of floodplain maps nor were the maps widely applied in assessing risks to new development.

Flood studies undertaken following the serious flood event in the River Tolka catchment in November 2002, now forms the basis of Historical Floodplain maps which can be used for land-use planning and development. An example is given on Figure 39.

Figure 39: Tolka River Floodplain Map