

5.0 EXISTING MONITORING PROGRAMMES

5.1 Introduction

This section describes the extent of monitoring currently being carried out of groundwaters, surface waters and “facilities” within the South Eastern River Basin District.

Facilities as defined in the Consultant’s Project brief include treatment plants, land uses such as agriculture, forestry and extraction operations, waste management facilities and other significant activities that might impact upon water status.

The Project team has collected data from these programmes for the full calendar year preceding study commencement, i.e. 2001, however it is recognised that some programmes were disrupted by foot and mouth disease precautions during this baseline year.

5.2 Groundwaters Monitoring Programmes

Groundwater Quality

The EPA and individual local authorities carry out separate groundwater monitoring in the SERBD. The data collected in the programmes are reported on an individual county basis rather than Hydrometric Area. The available data from the programmes includes the functional areas of eleven of the thirteen local authority areas within the SERBD. There is no information for the small portions of Counties Cork and Limerick that fall within the SERBD.

Existing groundwater monitoring points sampled by both the EPA relevant local authorities are presented in Map 5.5 and Register 5.5. An overview of the monitoring programmes carried out by the different agencies, including an evaluation of current water quality status on a county basis is presented in “The report on the Geology and Hydrogeology of the South Eastern River Basin District”.

EPA Groundwater Monitoring Programme

The EPA commenced a National Groundwater Quality Monitoring Programme in 1995. Monitoring is carried out twice yearly at times to coincide with groundwater levels being at their respective highest and lowest levels. The monitoring is broken into three categories: -

1) Representative or basic monitoring is operated on a national basis by the EPA to define the state of groundwater quality, to detect trends in groundwater quality and to determine the causes of changes in quality that are identified.

2) User-related monitoring consists of monitoring of those drinking waters originating in groundwater as required under European Communities (Quality of Water intended for Human Consumption) Regulations, 1988.

3) Pollutant-related monitoring is intended to detect possible pollutant emissions from landfill sites, septic tank clusters, factories and other waste sources. It includes the identification and mapping of potential sources of pollution.

The EPA employ groundwater sampling protocols for the collection of groundwater samples. Laboratory analysis has been undertaken primarily at the EPA laboratory in Kilkenny.

Geological Survey of Ireland Sampling

The Groundwater Section of the Geological Survey of Ireland (GSI) has prepared Groundwater Protection Schemes for eight of the constituent local authorities in the SERBD.

In the course of preparing the Schemes the GSI collected groundwater quality and quantity data for groundwater abstraction points within each Local Authority area, as part of the assessment of groundwater hydrochemistry. The data sets vary from county to county based on the degree of monitoring that was undertaken at the time of preparation of the Schemes. Where data has not been collected by the GSI they have undertaken evaluation of the validity of the data which includes consideration of the following elements: -

- Natural water quality data assessments are based on ionic balance calculations with an accuracy level of +/-10%,
- If it is unclear whether a groundwater source is treated data in relation to bacterial quality is not used.

The GSI considers that in many cases sampling protocols and the conditions of sampling (pumping rate, timing of sampling etc) are unknown and this can affect the concentration of certain parameters in a sample. Different laboratories may use different methods to establish chemical concentrations and older data may be less reliable because of changes in sampling techniques, accuracy and limits of detection achievable in more recent times. This issue is to be addressed by the Project's monitoring programme.

The GSI considers that human activities have had some impact on a high proportion of groundwater in Ireland and consequently most groundwater is contaminated to some degree, although it is not necessary polluted. It is also the view of the GSI that the assessment of groundwater quality often focuses on exceedances of EU Maximum Admissible Concentrations (MAC) as being indicative of pollution of groundwater, whereas there is the need to assess the degree of contamination of groundwater based on known background levels. In completing their groundwater quality assessments the GSI apply thresholds for certain indicator parameters to identify pollution trends which are shown in Table 5.1 and compared with the EU MAC limits.

Table 5.1 GSI Groundwater Quality Thresholds

Parameter	GSI Threshold* (mg/l)	EU MAC** (mg/l)
Nitrate	25	50
Potassium	4	12
Chloride	25-30 50 in Coastal Areas	250
Ammonia	0.15	0.23†
K/Na Ratio	0.3	-
Faecal Bacteria	0	0
Phosphate (as P)	0.02	2.2

* GSI Ground Water Protection Scheme Reports

**European Communities (Quality of Water Intended for Human Consumption, 1988)

†0.23mg/l as N

These parameters are considered to be indicators of domestic and agricultural sources of pollution, the most common sources of groundwater pollution nationally. Other useful indicator parameters include Ortho-phosphate, manganese and Iron.

Local Authority Groundwater Monitoring Programme

The local authorities monitor groundwater quality at abstraction points used for potable water supply and at points of supply to comply with the requirements of the European Communities (Quality of Water Intended for Human Consumption) Regulations, 1988. The new drinking water regulations (S.I. 439, 2000) come into force on January 2004. The Regulations address the following: -

- All waters for human consumption, whether in its original state or after treatment, regardless of origin, including water used in the food industry. Natural mineral waters or medicinal waters are excluded.
- Specific national quality standards, the legal limits which must not be exceeded are fixed for over 50 parameters.
- Establish minimum frequencies of sampling and analysis, for respective groups of parameters must be undertaken.

Groundwater Level

Groundwater level data was provided by the EPA and from the GSI. The EPA commenced groundwater level monitoring in 1995 and data in the South Eastern River Basin District has been collected in Carlow, Kildare, Kilkenny, Laois and Tipperary North. The GSI commenced monitoring of groundwater levels in Kildare and Laois in 1968 and regular monitoring was undertaken until the mid 1980's. Monitoring in the Nore Basin commenced in Kilkenny, Laois and Tipperary manually from 1971 to 1976. Between 1975 and 1981 autographic recorders were fitted to a number of boreholes with data being recorded at 8 such stations in the Nore Basin. It is understood from the GSI that much of this data has not been transferred to database but the graphical records are available. Level data is not available for all locations where chemical status monitoring is undertaken. In many

instances the level monitoring periods are too short be conclusive regarding declining water levels, but where there is at least a year long hydrographic record the data is useful in assessing groundwater body characteristics as a first pass.

Table 5.2 Groundwater Level Data Locations

Hydrometric Area	County	Monitoring Borehole Location	NGR	Aquifer Formation
14 River Barrow	Kidare	Eagle Hill	N748058	Ballysteen Lst Fm
		Martinstown	N773064	Ballysteen Lst Fm
		Tully Well 1	N736110	Boston Hill Lst Fm
	Laois	Tully Well 2	N730118	Boston Hill Lst Fm
		Vicarstown	N614002	Ballyadams Lst Fm
		Tomaclavin	S587901	Clogrenan Lst Fm
		Timahoe	S537902	Clogrenan Lst Fm
		Ballygormill	S526931	Clogrenan Lst Fm
	Carlow	Celtic Linen	S724768	Ballyadams Lst Fm
		Carlow SugarFactory	S720785	Ballyadams Lst Fm
		Landfill Site	S712742	Ballyadams Lst Fm
		Bagenalstown	S708614	Ballysteen Lst Fm
	15 River Nore	Laois	Attanagh	S440761
Cullahill			S374757	Ballyadams Lst Fm
Blue Gate			S429824	Durrow Lst Fm
Kilkenny		Ballyhale	S544353	Kiltorcan Sandst Fm
		Newmarket	S501358	Kiltorcan Sandst Fm
		Freshford (Johnstown Rd)	S313660	Durrow Lst Fm
		Lakyle Cross	S385465	Durrow Lst Fm
		Glanbia Ballyrraget	S438718	Ballyadams Lst Fm
		Kildranagh	S336598	Ballyadams Lst Fm
		Greatol	S409476	Aghmacart Lst Fm
		16 River Suir	Tipperary	Borrisoleigh Coolderry
Kilkenny	Borrisoleigh Co-Op		S030670	Ballysteen Lst Fm
	Silveroe		W653156	Carrigmaclea Sandst Fm

Groundwater Monitoring Programmes

The Project will provide sample collection and analysis resources to assist with groundwater monitoring programmes.

5.3 Surface Waters Monitoring Programmes

5.3.1 Rivers

Biological Programmes

Biological monitoring of rivers in Ireland is carried out nationally by the EPA on a three year cycle. The South Eastern River Basin District comprises seven discrete river basins i.e. hydrometric areas 11 – 17 which were last surveyed and reported on by the EPA biologists located at Kilkenny Regional Water Laboratory and Dublin Inspectorate as presented in Table 5.3.

The national biological sampling points located in the South Eastern River Basin District and the programmes to which they contribute data are presented in Register 5.1 and Map 5.1 (extracted from

McGarrigle et al EPA National Monitoring Programme 2002). There are some 743 biological sampling stations within the South Eastern River Basin District, these sites participate in various monitoring programmes.

Table 5.3 Biological Monitoring Programme

Hydrometric Area	Name	Year Surveyed
11	East County Wexford	2001
12	Slaney	2001
13	South County Wexford	1998
14	Barrow	2000
15	Nore	2001
16	Suir	1999 (2002 results survey not yet available)
17	South County Waterford	2001

Physico – Chemical Programme

The EPA Regional Laboratory at Kilkenny has been commissioned by several of the Local Authorities to undertake physico-chemical water quality monitoring of surface waters. The monitoring programme is designed to fulfill the general requirements of various EU and national legislation, however, some of these authorities also undertake supplementary water quality sampling programmes to provide data for specific requirements such as the implementation of the measures under the Phosphorus Regulations (1998).

Local Authorities falling within the Suir Catchment were also supported by monitoring undertaken by the Three Rivers Project laboratory at Clonmel during the 2001 baseline year.

Other local authorities retain responsibility for collecting and analyzing surface water samples within their individual counties.

The physico-chemical sampling sites within the South Eastern River Basin District are presented in Map 5.2 and Register 5.2.

All Local Authorities additionally retain responsibility for sampling incidents of water pollution.

There were some 584 physico-chemical sampling stations within the South Eastern River Basin District in 2001. The EPA Kilkenny Regional laboratory were commissioned by Local Authorities to sample 526 sites, Wicklow Co Co sampled 25 sites and Kildare Co Co sampled 33 sites. The frequency of sampling varied depending upon reporting requirements.

Table 5.4 Participation in Physico-Chemical Monitoring Programmes (2001)

Local Authority	River Basin within SERBD	Participants
Carlow	Barrow, Slaney	EPA
Kilkenny	Nore, Barrow, Suir	EPA, Three Rivers Project
Laois	Barrow, Nore	EPA, Laois Co Co
South Tipperary	Suir	EPA, South Tipperary Co Co, Three Rivers Project,
Waterford	Suir, South County Waterford	EPA, Waterford Co Co, Three Rivers Project,
Wexford	Slaney, Barrow, East Co Wexford, South Co Wexford	EPA
Kildare	Barrow	EPA (main channel), Kildare Co Co
Limerick	Suir	Limerick Co Co
Offaly	Barrow	EPA
North Tipperary	Nore, Suir	EPA, Three Rivers Project
Waterford City	Suir	EPA, Three Rivers Project
Wicklow	Slaney	Wicklow Co Co

Bacteriological Survey

In 2001 the EPA Kilkenny Regional laboratory undertook a one off pilot project to enumerate the total coliforms and faecal coliforms in the rivers of the south east region. The Project was undertaken from July to December 2001 inclusive involving analysis of 1,616 river water samples using the Colilert™ System which is based on a ‘most probable number’ test.

Hydrometric Programme

The current hydrometric network comprises river level/flow gauging stations monitored by the EPA, on behalf of various local authorities, OPW, ESB, local harbour authority and others including private industries. There are a total of 261 hydrometric gauging stations within the South Eastern River Basin District (Map 5.3 and Register 5.3).

5.3.2 Lakes

The 1998-2000 EPA Water Quality report notes that relatively few lakes are located in the southern and eastern areas of the Country. Under the EPA’s National Lake Monitoring Programme (NLMP) thirteen lakes are monitored within the South Eastern River Basin District (Ballyscanlon, Ballyshonock, Belle, Carrigavantry, Coumalocha, Coumduala, Coumfea, Coumshingaun, Crotty's, Deelish, Knockaderry, Mohra and Sgilloge). All of these lakes are within County Waterford. Table 5.5 and Map 5.4 identify the 13 monitored lakes within the South Eastern River Basin District.

Lady’s Island Lake and Tacumshin Lake are the only lakes in the river basin district which exceed 0.5 km² in size however these are coastal lagoons and therefore are dealt with as transitional/coastal water under the Water Framework Directive.

Table 5.5 EPA Lakes Monitoring Programme

Lake Name	Lake Code	Altitude (mOD)	Depth m	Geology	Size km ²
Ballyscanlon	55	61		Ordovician Volcanics	0.06
Ballyshonnock	56	88-89	4.6	Ordovician Volcanics	0.20
Belle	61	32		Cambrian Sediments and Metamorphics	0.35
Carrigavantry	83	80		Ordovician Volcanics	0.11
Coumalocha	103	520		ORS Conglomerates	0.05
Coumduala	104	468		ORS Conglomerates	0.05
Coumfea	105	520		ORS Conglomerates	0.05
Coumshingaun	106	385		ORS Conglomerates	0.17
Crotty's	111	419		ORS Conglomerates	0.06
Deelish	120	110		ORS Sandstones, Siltstones and Shales	0.05
Knockaderry	209	66	Shallow	Ordovician Volcanics	0.40
Mohra	228	462		ORS Conglomerates	0.05
Sgilloge	279	467/501		ORS Conglomerates	0.06

5.3.3 Coastal and Transitional Waters (Map 5.4)

Within the South Eastern River Basin District the quality of coastal and transitional waters is monitored by a number of government and regulatory authorities, including the EPA, Marine Institute, Department of Communications, Marine and Natural Resources and Local Authorities.

Western Irish Sea and Celtic Sea Monitoring

The Winter Nutrient Monitoring Programme conducted by the Marine Institute has recently been incorporated into the Irish Marine Monitoring Programme. The Irish Marine Monitoring Programme is designed to comply with national, EU and OSPAR monitoring Requirements. The OSPAR Convention requires when biological nutrient uptake is at a minimum and levels of remineralised nutrients are high. This occurs during the winter period.

The Irish Marine Monitoring Programme includes the Western Irish Sea and since the 98/99 study period the studies were extended to cover the Celtic Sea to the south of Carnsore point and to the west of Waterford Harbour. The Marine Institute published in October, 2002 a report on its Winter Nutrient Monitoring of the Western Irish Sea to cover the period from 1990 -2000.

Bathing Waters

Beaches designated under the Bathing Waters Regulations and those identified as recreational areas are sampled in Wexford by the Wexford County Council Laboratory and in Waterford by Waterford County Council and the South Eastern Regional Health Board (SERHB). Register 5.4 lists the designated beaches within the South Eastern River Basin District (Map 5.4).

Sampling is required every two weeks from mid May to the end of August according to the regulations. Sampling frequencies may be reduced to a total of 4 samples if the water quality is of sufficiently high quality at the site for the previous 2 years.

Coastal Lagoons

Lady's Island (2.98 km²) and Tacumshin Lake (3.25 km²) are coastal lagoons located in County Wexford. Wexford County Council periodically commission the EPA to carry out a water quality surveys on Lady's Island. The most recent survey of Lady's Island Lake was completed in 2001.

Estuary Studies

Slaney Estuary and Wexford Harbour, Dungarvan Harbour and the Suir/Barrow/Nore Estuary have had Water Quality Management Plans adopted by the associated Local Authorities. The EPA are contracted by the associated Local Authorities to carry out biennial monitoring. Samples are tested for a range of physico-chemical parameters, faecal coliform bacteria and sediment samples are tested for a range of trace metals.

5.3.4 Dangerous Substances

The Dangerous Substances Regulations set water quality standards for surface waters for 14 substances. Under these Regulations Local Authorities will be required to set-up monitoring programmes, however, the initial exercise involving establishing an inventory of potential users of listed substances is underway however programmes have generally not yet commenced.

Dangerous Substance Programmes

Local Authorities are developing an inventory of where dangerous substances may occur within Ireland and identifying specific monitoring programmes. The Project will assist Local Authorities with dangerous substance monitoring programmes.

An INTERREG funded project is under development to provide National guidance on the monitoring of Priority/Dangerous Substances that would be required under the Water Framework Directive and other Regulations.

Surface Water Classification Systems and Monitoring Programmes

Classification systems relating to biological, physico-chemical and hydromorphological status are currently being defined. A number of elements not provided by existing monitoring programmes will be incorporated necessitating collation of further datasets:

- River physical properties;
- River flow controls;
- Water bodies subject to dredging;
- Fish species baseline.

The Project will provide sample collection and analysis resources to assist with surface waters monitoring programmes.

5.4 Facilities Monitoring Programmes

There are a variety of activities defined as facilities (largely point source based) which are monitored by existing sampling programmes.

Table 5.6 summarises the participants involved in existing facility sampling programmes. The EPA have been commissioned by a number of Local Authorities to assist within various programmes.

Table 5.6 Participation in Facilities Sampling Programmes within South Eastern River Basin District

County	WWTP	Industry	Waste Management	Drinking Water	Agriculture
Carlow	Carlow	EPA	Carlow, EPA	Health Board, Carlow, EPA	
Kilkenny	Kilkenny	Kilkenny, EPA	EPA	Health Board, Kilkenny, EPA	
South Tipperary	South Tipperary	South Tipperary, EPA	South Tipperary, EPA	South Tipperary, Health Board, EPA	South Tipperary, Three Rivers
Waterford	Waterford	Waterford, EPA	Waterford, EPA	Waterford, Health Board	Waterford
Wexford	Wexford	EPA	Wexford, EPA	Wexford	
Laois	Laois	Laois, EPA	Laois, EPA	Laois, EPA	Laois
Wicklow	Wicklow	Wicklow, EPA	Wicklow, EPA	Wicklow, Health Board	
Kildare	Kildare	Kildare, EPA	Kildare, EPA	Kildare, Health Board	
Offaly	Offaly	Offaly, EPA	Offaly, EPA	Offaly, Health Board	
North Tipperary	North Tipperary	North Tipperary, EPA	North Tipperary, EPA	North Tipperary, Health Board, EPA	Three Rivers
Limerick	Limerick	Limerick, EPA	Limerick, EPA	Limerick	
Waterford City		EPA	Waterford City, EPA	Health Board Waterford Co, EPA	

5.4.1 Wastewater Treatment Plants

Wastewater Treatment Plants are sampled in accordance with the UWWT Regulations. The Local Authority generally undertakes the monitoring and reports to the EPA.

5.4.2 Industries

Local Authorities issue licences to industries discharging to waters under Section 4 of the Water Pollution Act. The conditions of these licences require the industries to supply monitoring data for prescribed parameters and frequency with Local Authorities undertaking check surveys as necessary.

A similar structure exists for Section 16 industries i.e. discharging to sewers.

The EPA is responsible for licensing, auditing and compliance monitoring of IPC licensed industries. IPC licensed industries provide monitoring data to the EPA.

5.4.3 Waste Management

Major landfill sites are licensed by the EPA to ensure compliance with the Waste Management Act. Local Authorities undertake monitoring with EPA responsible for annual audits. The EPA also undertake compliance monitoring at licensed landfill sites.

5.4.4 Water Abstractions

Local Authorities are responsible for ensuring the testing of raw water for Drinking Water Treatment Plants and of drinking waters for Public Water Supply under the Drinking Waters Regulations.

5.4.5 Agriculture

Some Local Authorities have developed water quality monitoring programmes to quantify agricultural pollution risk particularly under initiatives to implement measures identified by the Phosphorus Regulations programmes.

Special and pilot studies were also set-up to investigate agricultural practices by the Three Rivers Project.

The locations of the agricultural mini-catchments are indicated on Map 5.6.

Table 5.7 Agricultural Monitoring Programmes

Local Authority	Study
Laois Co Co	Pilot agricultural studies (Donaghmore & Guilie mini catchments)
South Tipperary Co Co	Ara Catchment Special Study
North Tipperary Co Co	Clonmore Catchment Special Study
Waterford Co Co	Ballyshonnock Pilot Study

Laois County Council are also undertaking sampling in the headwaters of the Barrow and Nore Basins in conjunction with education and awareness programmes.

Facilities Monitoring Programmes

The Project will provide sample collection resources to assist Local Authorities with facilities monitoring programmes.

The Project may establish agricultural studies and support existing Local Authority projects. These studies would provide information on representative practices within the South Eastern River Basin District and assist with implementing the proposed National Action Programme under the Nitrates Directive. The Project would also propose to pilot soil nitrogen tests and report on the effectiveness of agricultural measures as part of the EMS approach.

The Project will also support Local Authorities with implementing Labinfo/Catchment Envisage.