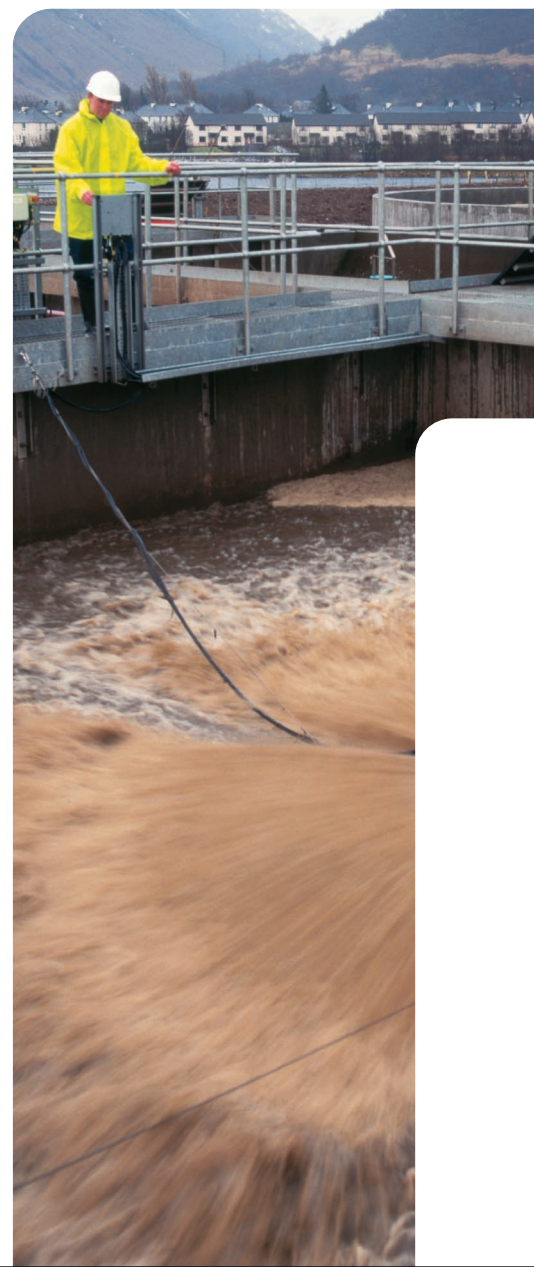


Sewage Treatment in the UK

UK Implementation of the EC Urban Waste Water Treatment Directive



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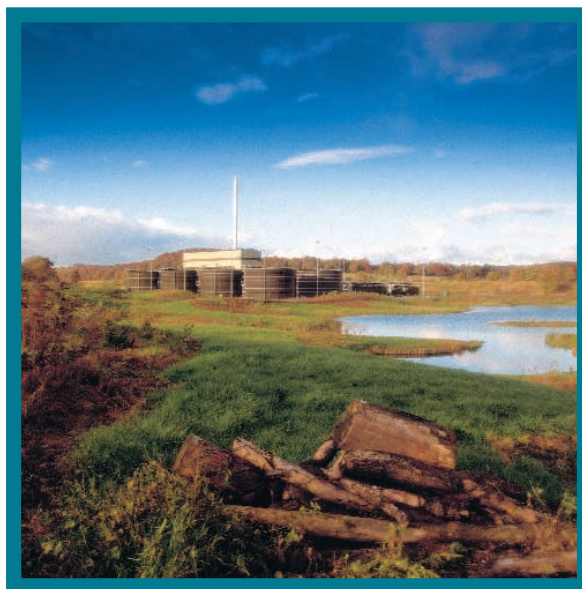
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This booklet explains how sewage is treated in the UK and what action is being taken to improve this. It can also be seen at the Department's website at www.defra.gov.uk/environment/water/quality/sewage It fulfils the UK's obligations under Article 16 of the European Urban Waste Water Treatment Directive to produce periodically national situation reports on the collection and treatment of waste water, and the re-use or disposal of the by-product of this treatment, sewage sludge. It updates the first UK report published in March 1996.

Introduction

Proper collection, treatment and discharge of waste water, and correct disposal or re-use of the resulting sludge helps to protect and improve water quality in the UK. This leaflet describes what the UK has done to improve waste water treatment and meet its commitments under the Urban Waste Water Treatment Directive. It provides a general description of the present situation, monitoring and investment, and explains how individuals can help to reduce water pollution.

Please look out for **KEYWORDS** that have a fuller explanation in the Glossary on page 14 and **INFOBOXES** that provide additional information.



Cooper Bridge – sludge incinerator

Background on urban waste water

Urban waste water, commonly referred to as sewage, is generally a mixture of domestic waste water from baths, sinks, washing machines and toilets, waste water from industry and rainwater run-off from roads and other surfaced areas.

Every day in the UK about 347,000 kilometres of sewers collect over 11 billion litres of waste water. This is treated at about 9,000 sewage treatment works before the treated effluent is discharged to inland waters, estuaries and the sea.

Without suitable treatment, the waste water we produce every day would damage the water environment and create public health problems. Untreated sewage contains organic matter (carbohydrates, fats, proteins), bacteria and chemicals. Bacteria naturally present in environmental waters do break these substances down, but in doing so they use the oxygen dissolved in the water. If there were large or continuous untreated discharges of urban waste water the result could be too little oxygen for fish and other aquatic life to survive. So the purpose of waste water treatment is to remove organic substances to protect the environment

2

from these effects. Sewage works therefore reproduce what would occur in the environment, settling out much of the solid matter (**PRIMARY TREATMENT**), and using bacteria that 'digest' and break down the organic substances (**SECONDARY TREATMENT**).



Eshalt – tertiary treatment plant

Sometimes, further treatment (**TERTIARY**) is required to protect sensitive water environments. Tertiary treatment can involve disinfecting the treated effluent to protect bathing or shellfish waters. It can also involve the removal of phosphorus or nitrates (nutrients present in sewage) to protect waters that are threatened by **EUTROPHICATION**. An illustration of the different treatment processes is on page 10.

Even untreated waste water is mostly water (less than 0.1% is solid material). Treatment allows this water to be returned to the environment. In this way, it can help to maintain river flows which is important for use of water, for example for abstraction, conservation and fishery interests. The re-use and disposal of the removed solid material, sewage sludge, is discussed later in this report.

The Urban Waste Water Treatment Directive

The Urban Waste Water Treatment Directive (the Directive) was agreed in 1991. It is one of a number of European Directives (laws) which protect both the water environment and our use of water for drinking, recreation or industry.

The Directive has requirements for sewerage (or collection systems) to be established and sets standards for sewage treatment. The general principle of the Directive is to provide treatment of sewage from the largest discharges first, and to protect sensitive waters. The maps on pages 11 to 13 show the main cities and towns and related waste water treatment across the UK.

Tables **A** and **B** on page 9 represent the number of **AGGLOMERATIONS**, their associated collecting systems, and the category of receiving waters in the UK for 1998 and 2000.

Industrial discharges (not to sewer)

The Directive also sets requirements for the treatment of biodegradable waste water from industries that discharge directly to the water environment. The Directive does not set standards for these industrial discharges, but does require that discharges greater than 4,000 **POPULATION EQUIVALENT** (pe) comply with their discharge authorisations by 31 December 2000. The **INFOBOX** on page 3 sets out the industrial sectors covered by the Directive and the size of these sectors in the UK in Population Equivalent terms.

INFOBOX**Table of industrial sector discharges not to sewer in the UK**

Industrial sector	Total organic load (in PE)	Number of plants	Total organic load meeting required standards at	
			31.12.2000 (in PE)	Full compliance
Milk-processing	1,464,380	30	644,880	Dec-2003
Manufacture of fruit and vegetable products	1,144,564	9	1,144,564	Dec-2000
Manufacture and bottling of soft drinks	–	–	–	–
Potato-processing	302,037	3	302,037	Dec-2000
Meat industry	623,348	18	573,348	Dec-2001
Breweries	94,000	1	94,000	Sep-1997
Production of alcohol and alcoholic beverages	1,930,727	23	1,930,727	Dec-2000
Manufacture of animal feed from plant products	476,000	3	476,000	Dec-2000
Manufacture of gelatin and of glue from hides, skin and bones	13,315	1	13,315	Dec-2000
Malt-houses	206,666	9	206,666	Dec-2000
Fish-processing industry	18,000	2	5,000	Feb-2001
Total	6,273,037	99	5,390,537	

Improvements on the collection of waste water

The sewage treatment service providers in the UK are responsible for maintaining and improving the public sewers which serve most of the UK population. About 96% of the UK population is connected to sewers leading to sewage treatment works. Most of the remainder are served by small private treatment works, cesspits or septic tanks.

All sewerage systems that also collect rainwater (combined sewers) need overflow outlets (combined sewer overflows) to deal with the extra water collected during some rainstorms. Without these safety valves both domestic, other properties, and sewage treatment works would be at risk of flooding. The Directive recognises that although sewage in these overflow discharges is diluted with significant amounts of rainwater, it can affect the environment. The legislation therefore requires that pollution from these

overflows is limited. In the UK we have the necessary regulatory controls and design criteria to limit pollution from combined sewer overflows. For example, in England and Wales for the five years to 2000, 1,200 unsatisfactory combined sewer overflows were improved. Furthermore, between 2000 and 2005 another 4,700 overflows will be brought up to standard in England and Wales.

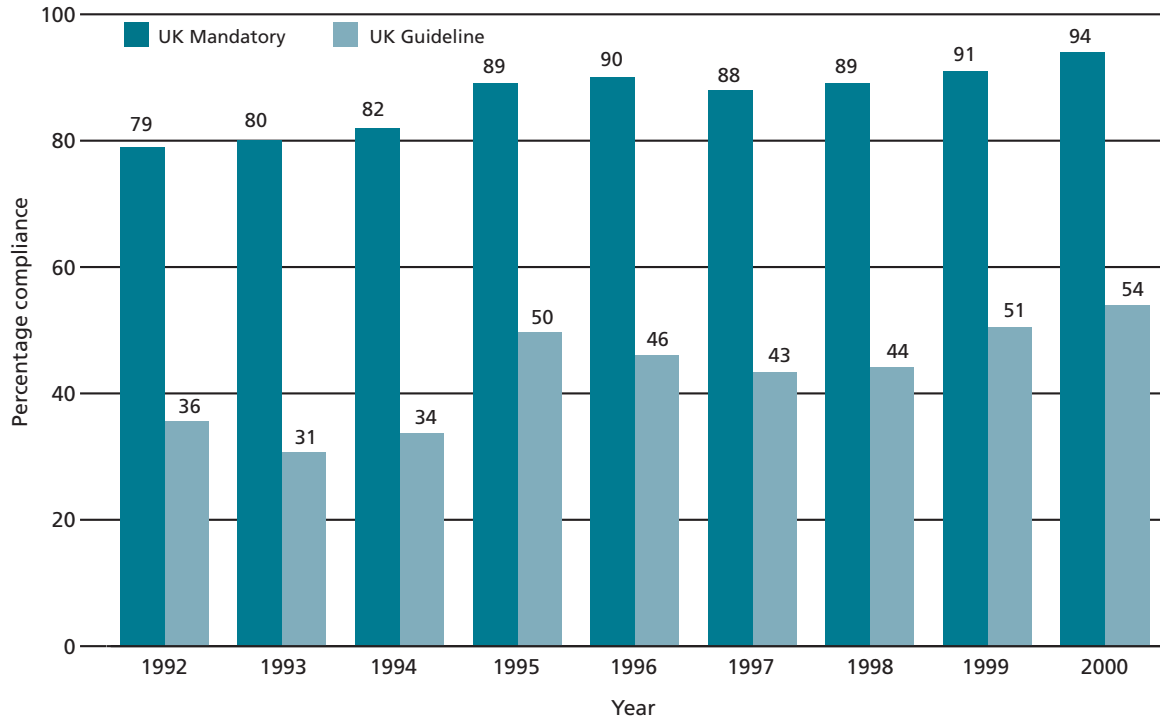
Improvements in the treatment of waste water

The Directive specifies sewage treatment deadlines that are linked to the size of the communities (agglomerations) served by a sewerage network and the nature of the water receiving the treated effluent. It sets secondary treatment as the normal standard, but requires tertiary treatment where qualifying discharges affect **SENSITIVE AREAS** identified under the Directive.

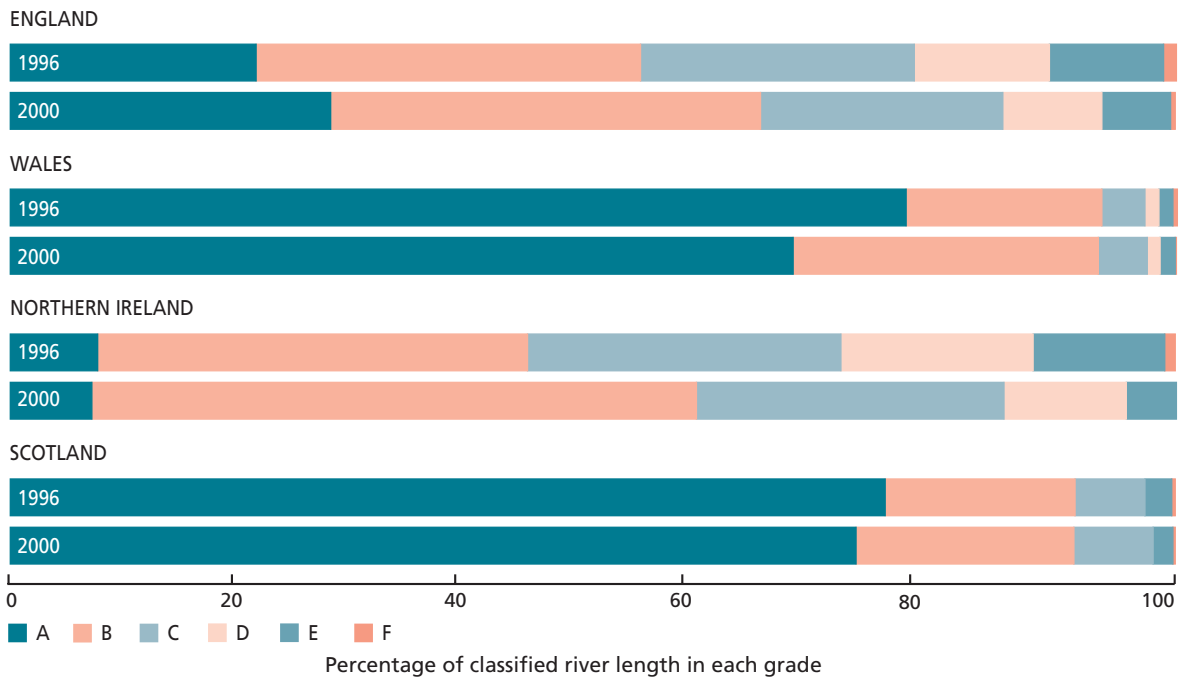
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UK Coastal Zone Percentage Compliance with Bathing Water Directive 76/160

1992 – 2000



Changes in chemical river quality for UK countries



Classification in the UK

England, Wales and Northern Ireland GQA classes: A-Very Good; B-Good; C-Fairly Good; D-Fair; E-Poor; F-Bad

*Scotland does not use the same classification system as in the rest of the UK, the key is for presentational purposes only:

For Scotland: A1-Excellent; A2-Good; B-Fair; C-Poor D-Seriously polluted

Classifications in Scotland are not comparable with other UK areas as it combines chemical, biological, nutrient and aesthetic assessments, but is predominantly chemical.

At 31 December 2000 the UK was 90% compliant with the requirement of the Directive to provide secondary treatment for discharges from agglomerations of more than 15,000 pe.

By the end of 2002 the UK expects to be 98% compliant as a further 59 discharges, including all those in Scotland, will then receive secondary treatment. Work to provide secondary treatment for the remaining discharges will be completed as soon as practicable.

At the end of 2001 92 Sensitive Areas were identified in the UK. All except the three new sensitive areas (eutrophic) in Northern Ireland (Inner Belfast Lough, tidal River Lagan and Quoile Pondage) which were announced in December 2001 are shown in the maps from pages 11 to 13. More sensitive areas are expected to be identified in 2002 following reviews in 2001. More stringent treatment (than secondary) at qualifying sewage treatment works affecting identified areas (as at end 2000) has either been provided, or is to be in place at the latest by end 2004.

The Directive also allows the option of identifying **LESS SENSITIVE AREAS**, where at least primary treatment of discharges to coastal and estuarine waters is considered sufficient to protect these waters. In 1994 76 of these areas were designated around the UK. However, in 1998 most of these designations were revoked and work put in hand to provide secondary treatment for discharges to these areas. Northern Ireland has recently revoked its last two less sensitive areas, at Bangor and at Portush/Portstewart. Scotland has three less sensitive areas at Kirkwall, Lerwick and Stornoway.

Further improvements to come

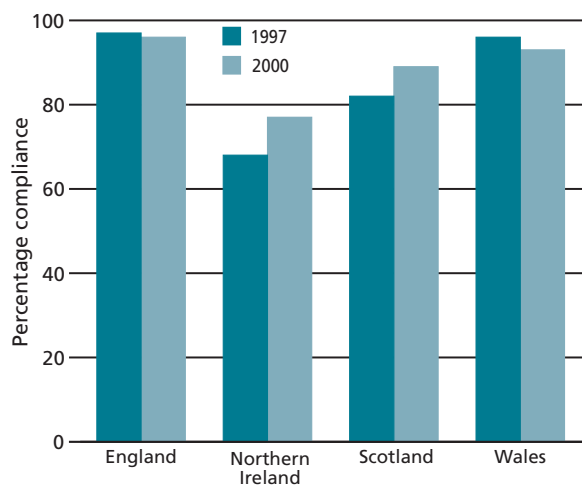
Progress in the UK in meeting the standards of the Bathing Water Directive from 1992 to 2000 can be seen in the chart on page 4. The Government has however, set a target to consistently achieve a minimum of 97% compliance with the Bathing Water Directive's **MANDATORY** standards in England and Wales by 2005, and to achieve a significant improvement in compliance with **GUIDELINE** standards, particularly at major holiday resorts. In Scotland, the water authorities are aiming for 100% compliance in bathing water quality, funded by massive investment of £7.5bn over the period 1999 to 2006. In Northern Ireland improvements are being made where possible towards meeting the guideline standards at identified bathing waters.

Over the last decade, general river quality in England, Wales, Scotland and Northern Ireland has either improved or remained high. The chart on page 4 shows the situation on river quality with 1996 and 2000 compared. This shows that the poor quality categories make up a small proportion of the river lengths classified. Both England and Northern Ireland also show net improvements in river quality over the period, whilst the quality of rivers in Scotland and Wales remain high. This situation is expected to improve even further when improvements arising from additional action required under the Urban Waste Water Treatment Directive takes effect.

6 Monitoring to ensure protection of the environment

The Environment Agency, the Scottish Environment Protection Agency and the Environment and Heritage Service of the Department of the Environment for Northern Ireland are the environmental regulators of the water industry for the UK. For example they regulate discharges from waste water treatment works and combined sewer overflows, which cannot be made without conditional **DISCHARGE CONSENTS**, or in Northern Ireland **REGISTERED STANDARDS** being issued. These authorisations and conditions are set to minimise the adverse effects of pollution on the receiving waters, and

Percentage of sewage treatment works compliant with their numeric consents*



Source: EA (England and Wales) EHS (Northern Ireland) and SEPA (Scotland)

*Northern Ireland compliance measured on 95 percentile basis

meet standards of European Directives. The chart above illustrates that compliance with these standards has improved.

Re-use and disposal of sewage sludge

Sewage treatment is essentially about removing polluting organic material from waste water. This can be removal of solid waste and other substances, for example ammonia, which can be harmful to fish. The result is much cleaner water being returned to the environment, and sludge that contains the organic matter and dead bacteria from the treatment process. The sewage sludge **INFOBOX** shows the quantity of sludge produced in 1996/97 and 1999/00 compared with 1992. Higher standards of treatment generate more sludge, so we can expect the amount to continue rising as a result of Directive requirements and timetables being met.

INFOBOX

Re-use and disposal of sewage sludge

In 1999 the UK produced 1,130,066 tonnes of sludge dry solids. This averages to about 20kg generated by each person. Dry sludge tonnage breakdown by UK area is set out below

	¹ 1992	² 1996/97	³ 1999/00
England	844,284	942,700	957,569
Northern Ireland	32,480	32,000	34,000
Scotland	87,209	117,100	96,597
Wales	33,700	23,300	41,900
Total	997,673	1,115,100	1,130,066

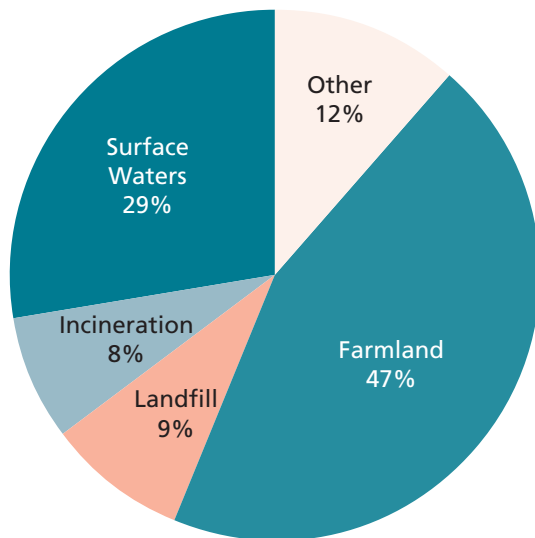
- 1 Article 17 Report made to European Commission in April 1998
- 2 1996/97 Sewage Sludge Survey covering the fiscal 1996/97
- 3 OFWAT, Scottish Executive and DOE Northern Ireland

Historically, about a quarter of sludge was either dumped at sea or discharged to surface waters. This was banned from 1998 under the Directive because it was considered environmentally unacceptable. The changes in UK sludge disposal can be seen in the two pie charts overleaf. Use of sludge as a soil conditioner and fertiliser on agricultural land remains

the environmentally favoured option and is regulated under the Sludge (use in Agriculture) Regulations 1989 (as amended). There is also a voluntary agreement known as the *Safe Sludge Matrix* which ensures that sludge is only recycled to certain crops and vegetations.

FIGURE 1

Sewage sludge disposal outlets 1996 and 1997



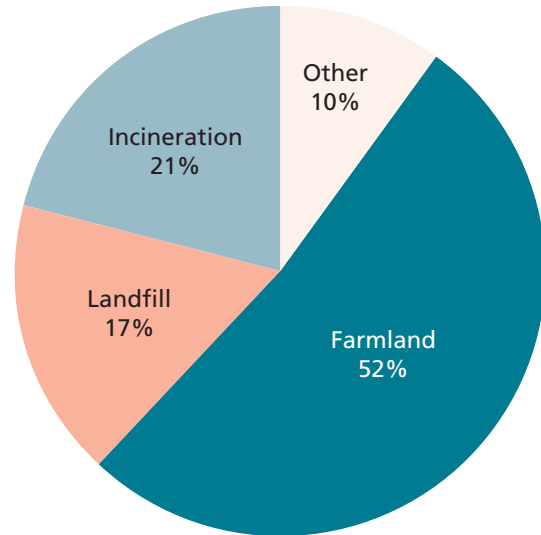
*Source: Sewage Sludge Survey covering the two years 1996 and 1997

Investment

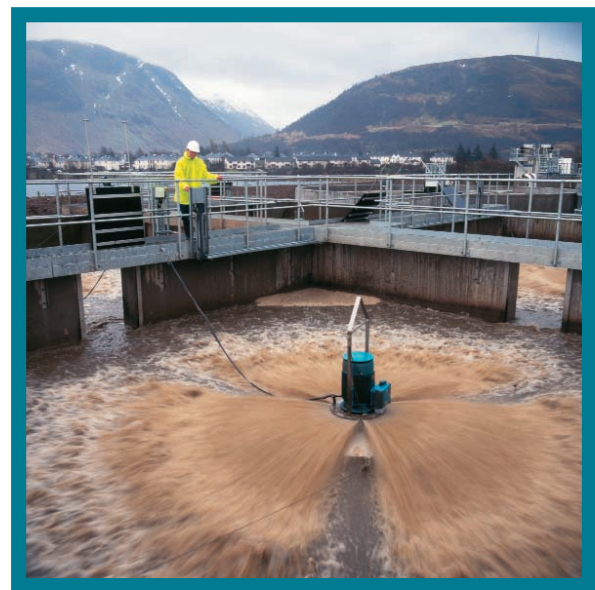
The big improvements in sewage treatment and maintaining the collecting systems detailed in this report require large amounts of ongoing investment. In England and Wales this is provided through the five-yearly water company price review carried out by the Office of Water Services (Ofwat). Between 1990 and 2000 over £9.2 billion was invested in the sewerage service in England and Wales. A large proportion of the £5.3 billion to be spent between 2000 and 2005 on the sewerage service is to improve treatment standards, storm overflows, and sludge disposal. This investment will deliver significant additional improvements in river and bathing water quality. Over the same period £3.1 billion is to be spent on maintaining the sewerage service assets.

FIGURE 2

Sewage sludge disposal outlets 1999/00



*Sources: OFWAT, Scottish Executive and DOE Northern Ireland



Secondary treatment – activated sludge process

In Scotland, funding of improvements is achieved through the Water Quality and Standards process. Between 1996 and 2000, over £1 billion was invested in sewerage and waste water treatment. A further £1.17 billion will be invested in these area between 2000 and 2005.

8

are you doing **your bit?**

What you can do ...

We all contribute to the pollution of the water environment, so protecting and improving it depends on each of us trying to reduce our part. For example, we can dispose of cotton buds, condoms, disposable razors and sanitary ware by putting them in bags and disposing with other household rubbish, rather than flushing them down the toilet. The *Bag It & Bin It Campaign* aims to encourage people to do just that and is supported by the UK water industry. *Think before you flush* is a similar campaign being undertaken by the water authorities in Scotland, and has been successful in changing public awareness and actions particularly in schools and local communities.

You can also help by disposing of rubbish in litter bins when visiting the seaside, or by taking it home and by not allowing pets to foul the beach. The *Clean Coast Scotland* initiative has been set up to raise public awareness of the Scottish coastline as a resource by changing attitudes and activities when using the water and beaches around Scotland. The initiative also helps communities to gain awards, such as the *Blue Flag* or *Seaside Award*, where appropriate.

TABLE A**Table of agglomerations and collecting systems in the United Kingdom at 1998**

Receiving water class type	Normal areas				Sensitive areas (Article 5 (1))				Less sensitive areas (Article 6)				Total for all areas	
	A. Freshwaters and estuaries		B. Coastal waters		A. Freshwaters and estuaries		B. Coastal waters		A. Freshwaters and estuaries		B. Coastal waters			
Size class of agglomeration	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.
from 2,000 to 10,000 pe	956	4,380,525	69	324,101	51	252,518	0	0	2	8,200	0	0	1078	4,965,344
from 10,000 to 15,000 pe	143	1,747,935	27	314,404	37	446,348	0	0	0	0	0	0	207	2,508,687
from 15,000 to 150,000 pe	406	18,312,818	73	3,952,473	120	4,855,192	0	0	0	0	9	304,050	608	27,424,533
> 150,000 pe	75	33,527,086	10	4,491,892	11	2,811,199	0	0	0	0	6	614,400	102	42,058,977
Total for categories	1580	57,968,364	179	9,082,870	219	8,365,257	0	0	2	8,200	15	918,450	1995	76,957,541

TABLE B**Table of agglomerations and collecting systems in the United Kingdom at 2000**

Receiving water class type	Normal areas				Sensitive areas (Article 5 (1))				Less sensitive areas (Article 6)				Total for all areas	
	A. Freshwaters and estuaries		B. Coastal waters		A. Freshwaters and estuaries		B. Coastal waters		A. Freshwaters and estuaries		B. Coastal waters			
Size class of agglomeration	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.	N°	t.p.e.
from 2,000 to 10,000 pe	958	4,388,725	69	324,101	51	252,518	0	0	0	0	0	0	1078	4,965,344
from 10,000 to 15,000 pe	143	1,747,935	27	314,404	37	446,348	0	0	0	0	0	0	207	2,508,687
from 15,000 to 150,000 pe	406	18,312,818	77	4,061,173	120	4,855,192	0	0	0	0	5	195,350	608	27,424,533
> 150,000 pe	75	33,527,086	16	5,720,692	11	2,811,199	0	0	0	0	0	0	102	42,058,977
Totals for categories	1582	57,976,564	189	10,420,370	219	8,365,257	0	0	0	0	5	195,350	1995	76,957,541

Notes on Tables A and B above

Table B reflects the removal of all Less Sensitive Areas (LSAs) from the British mainland, where agglomerations discharging into the previously designated LSAs now appear under normal waters. The 5 remaining agglomerations in the LSAs columns relate to discharges into the remaining UK LSAs in the Scottish Isles and in Northern Ireland.

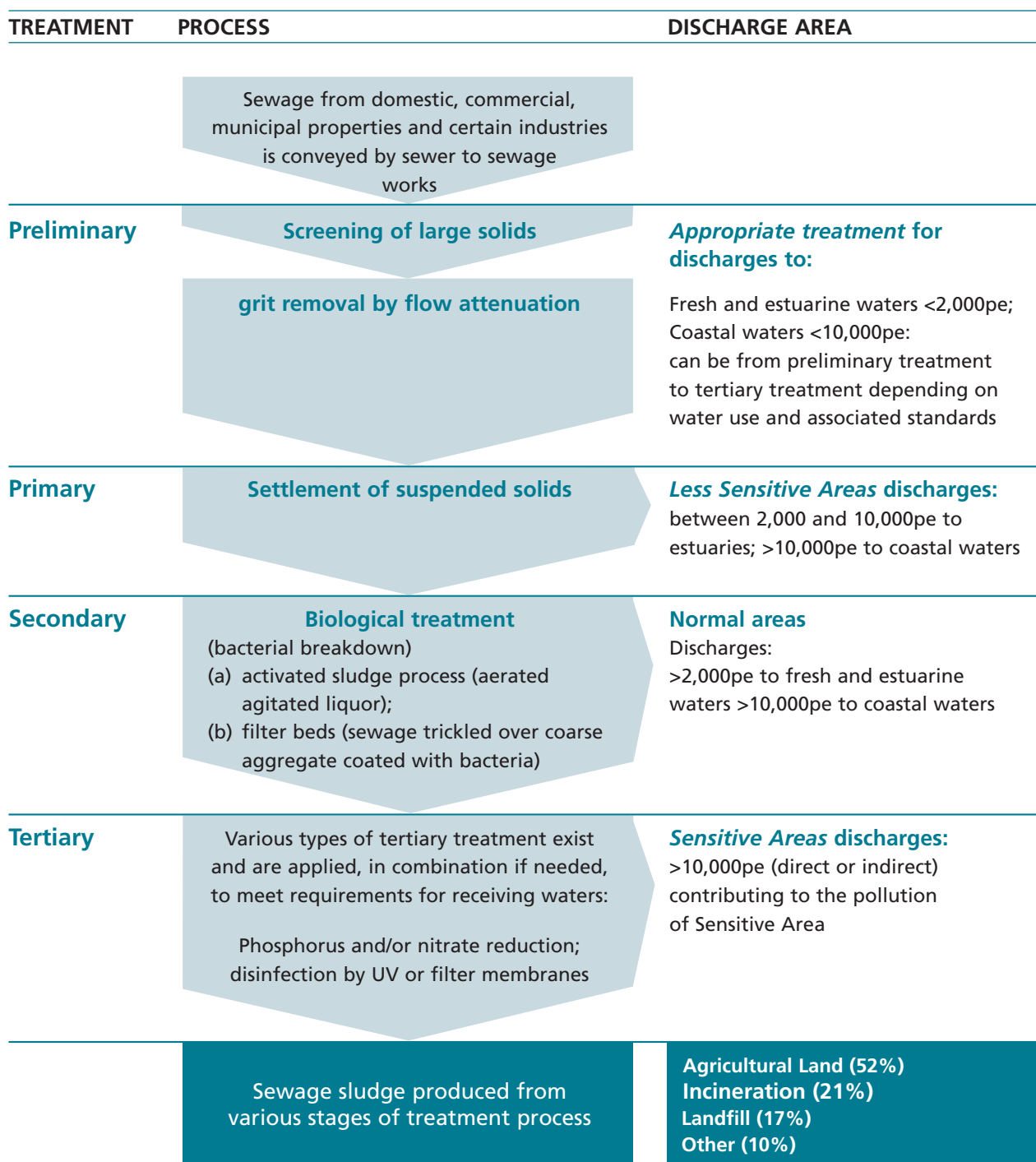
N° number of agglomerations/collecting systems in the size and receiving water type class. With a very few exceptions, an agglomeration is the community served by a shared sewer network and served by the same treatment works.

t.p.e. total population equivalent for all the agglomerations/collecting systems in the size and receiving water type class.

10 Urban Waste Water Treatment Directive

Diagram of sewage treatment process cycle

Level of treatment for areas indicated



1 There are no Less Sensitive Areas in England and Wales.

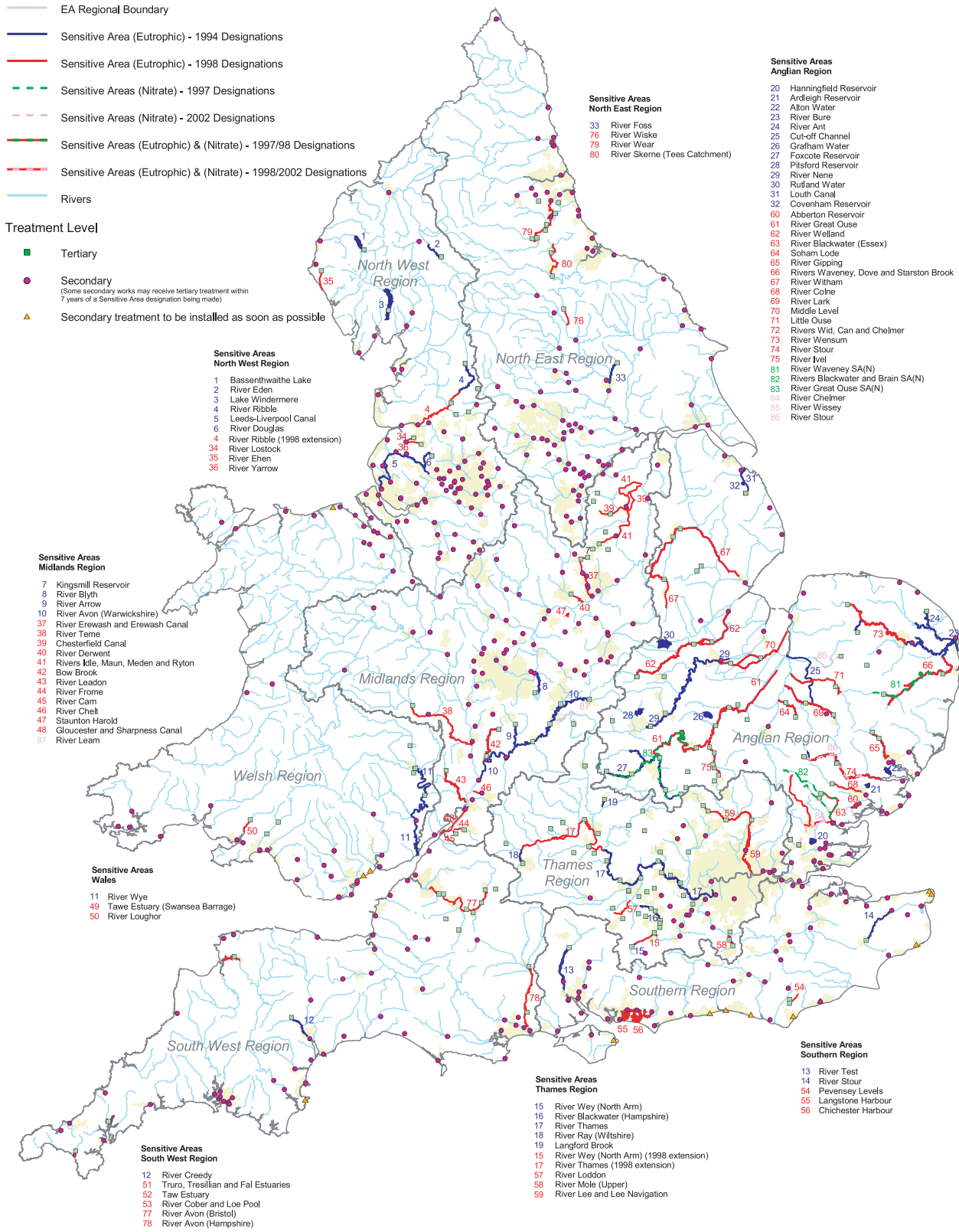
2 Secondary treatment will be applied to coastal discharges down to 2,000pe in England and Wales (rather than the 10,000pe specified in the Directive). This will enhance protection of the environment.

3 There are no mainland Scotland Less Sensitive Areas – it has three in the Islands.

4 Northern Ireland has two Less Sensitive Areas.

5 Higher levels of treatment than those specified under the UWWTD may be required to meet relevant quality objectives and other Community Directives, such as the Bathing Water Directive or Shellfish Waters Directive.

Urban Waste Water Treatment Directive: Implementation of Secondary Treatment as at 31-12-2001 and Tertiary Treatment in Place or Planned by 31-12-2004 England and Wales



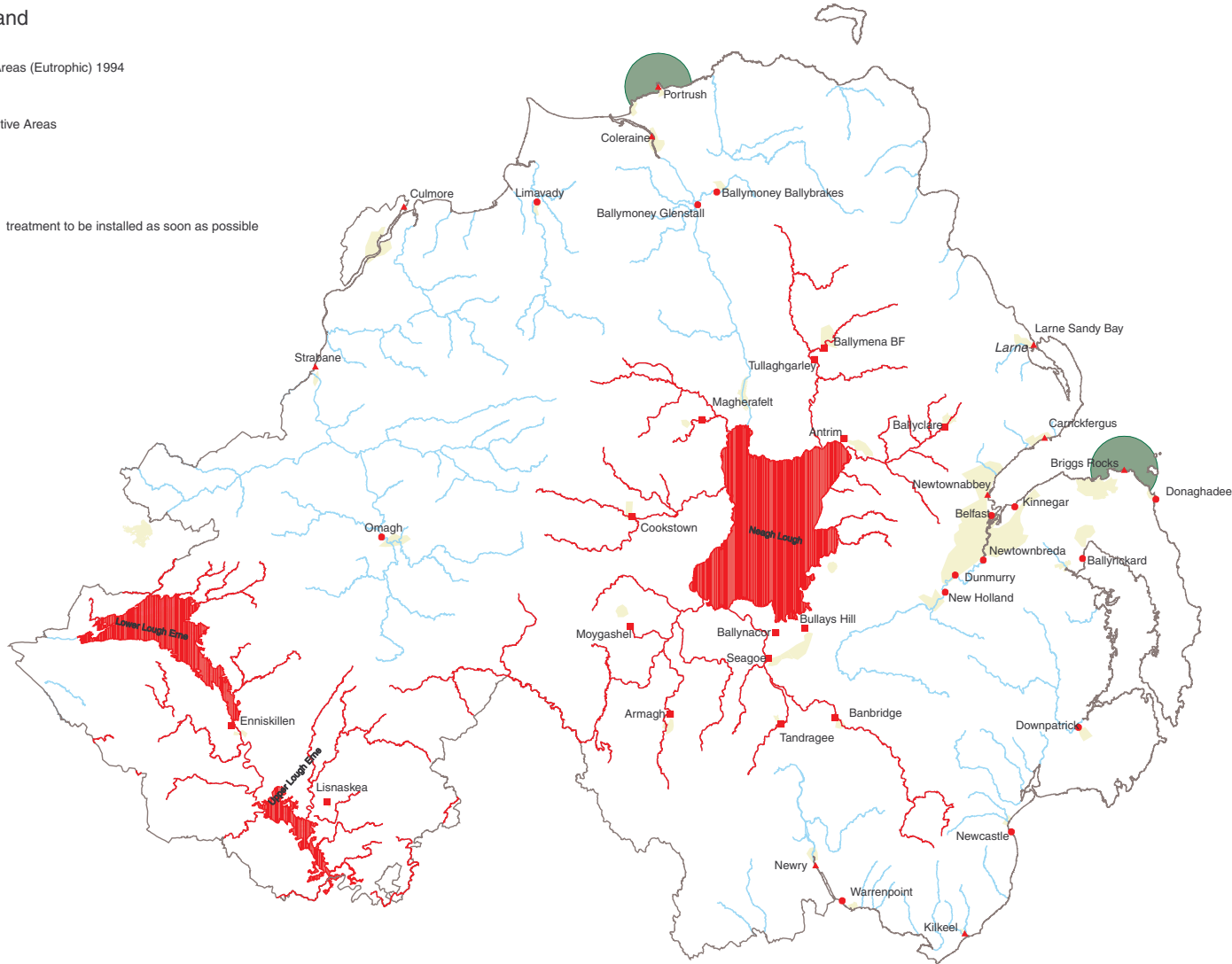
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Urban Waste Water Treatment Directive: Secondary Treatment as at 31-12-2001 and Tertiary in Place or Planned by 31-12-2004 Northern Ireland

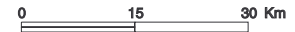
- Sensitive Areas (Eutrophic) 1994
- Rivers
- Less Sensitive Areas

Treatment Level

- Secondary
- Tertiary
- ▲ Secondary treatment to be installed as soon as possible



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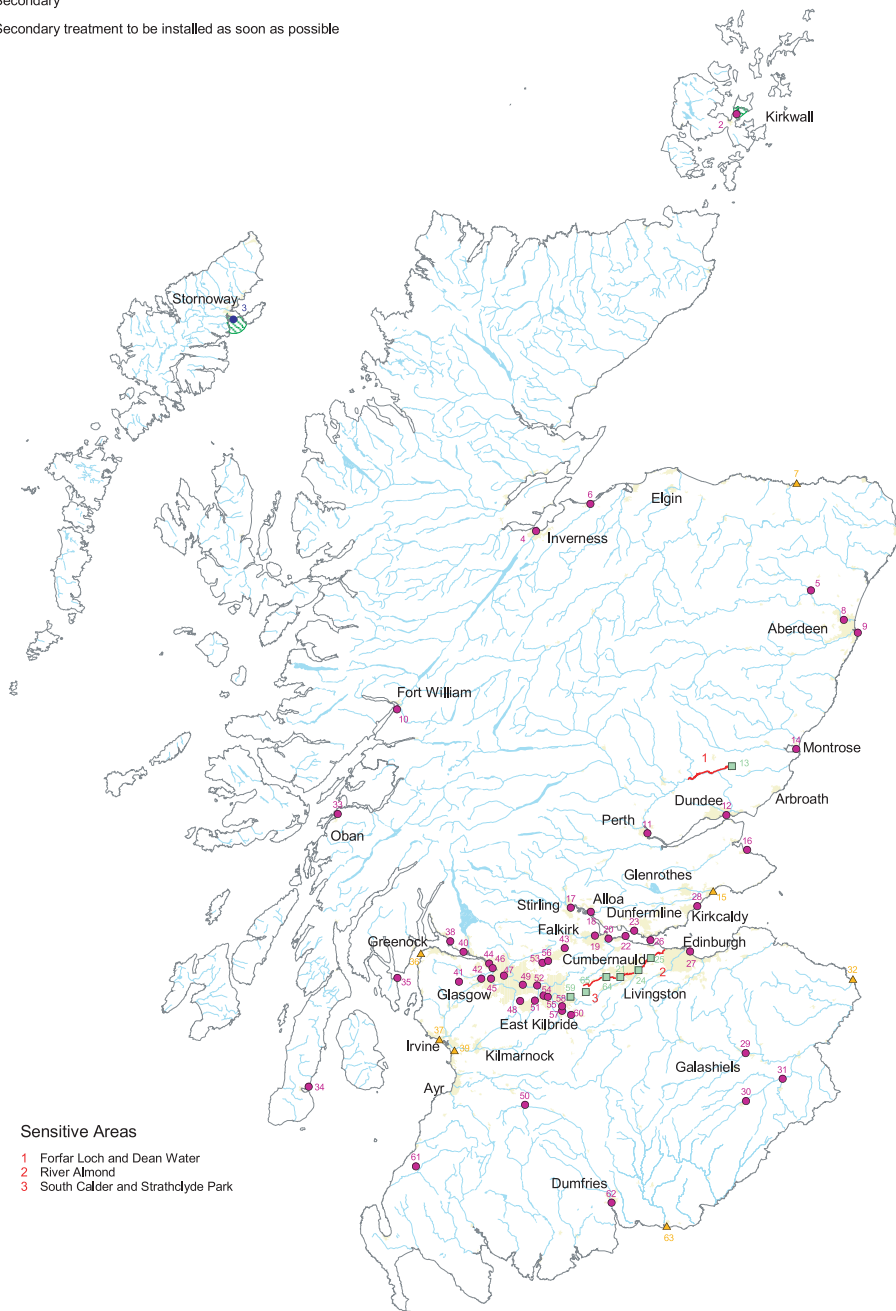
Urban Waste Water Treatment Directive: Secondary and Tertiary Treatment as at 31-12-2001 and Primary Treatment in Place or Planned by 31-12-2002

Scotland

- Sensitive Areas (Eutrophic) 1998
- Rivers
- Less Sensitive Areas

Treatment Level

- Primary in less sensitive areas
- Tertiary
- Secondary
- ▲ Secondary treatment to be installed as soon as possible



- "Number", "Agglomeration"
- 1, Lerwick
 - 2, Kirkwall
 - 3, Stornoway
 - 4, Inverness
 - 5, Inverurie
 - 6, Nairn
 - 7, Moray Firth
 - 8, Persley
 - 9, Aberdeen
 - 10, Fort William
 - 11, Perth City
 - 12, Tay
 - 13, Forfar, Tertiary
 - 14, Montrose
 - 15, Levenmouth
 - 16, St Andrews
 - 17, Stirling
 - 18, Alloa
 - 19, Dalkeith; Forth Valley
 - 20, Kinnell Kerse
 - 21, Blackburn; Lothian
 - 22, Bo'ness
 - 23, Ironmill Bay; Fife
 - 24, East Calder
 - 25, Newbridge; Lothian
 - 26, Dunfermline
 - 27, Edinburgh; Seafield
 - 28, Kirkcaldy
 - 29, Galashiels
 - 30, Hawick
 - 31, Jedburgh
 - 32, Eyemouth
 - 33, Oban
 - 34, Campbeltown
 - 35, Rothesay
 - 36, Inverdyke
 - 37, Stevenston (GVS)
 - 38, Helensburgh (Ardmore)
 - 39, Meadowhead (IWS)
 - 40, Dumbarton (Ardoch)
 - 41, Johnstone
 - 42, Linwood
 - 43, Cumbernauld (Dunnswood)
 - 44, Dalmuir
 - 45, Paisley
 - 46, Erskine
 - 47, Shieldhall
 - 48, East Kilbride (Philipshall)
 - 49, Dalrnarnock
 - 50, Cumnock
 - 51, East Kilbride (Allers)
 - 52, Daldozie
 - 53, Auchengiech
 - 54, Bothwellbank
 - 55, Hamilton
 - 56, Cumbernauld (Deerdykes)
 - 57, Larkhall (Skellyon)
 - 58, Motherwell (Carbars)
 - 59, Swinzie (Cleland)
 - 60, Carluke (Mauldsdie)
 - 61, Girvan
 - 62, Troqueer
 - 63, Annan
 - 64, Whitburn
 - 65, Shotts

- Sensitive Areas
- 1 Forfar Loch and Dean Water
 - 2 River Almond
 - 3 South Calder and Strathclyde Park

Glossary (References to “the Directive” are to the Urban Waste Water Treatment Directive)

1 POPULATION EQUIVALENT	The unit of measure used to describe the size of a waste water discharge. 1 population equivalent is the biodegradable load (matter) in waste water having a 5-day biochemical oxygen demand (BOD) of 60g of oxygen per day. Population equivalent doesn't necessarily reflect the actual population of a community (or <i>Agglomeration</i>).
AGGLOMERATION	An agglomeration is a community of homes, shops hospitals and certain industries which are sufficiently concentrated for the waste water to be collected for treatment at a sewage treatment works. With a very few exceptions, an agglomeration is the community served by a single sewerage collection network and served by a single treatment works, its catchment.
APPROPRIATE TREATMENT	Term used in the Directive to refer to treatment of waste water discharges below the size thresholds in the Directive. It can be any process and/or disposal system* that ensures receiving waters meet water quality objectives set by pollution control authorities and can therefore be from no treatment to tertiary treatment *eg septic tank, rotating biological contactor, trickling filter, activated sludge process, reed beds etc.
BATHING WATER DIRECTIVE	Introduced in 1975 to protect the environment and public health. Sets microbiological and physico-chemical quality requirements for all identified bathing waters.
BIOCHEMICAL OXYGEN DEMAND (BOD)	A widely used measure of polluting potential – BOD is a measure of oxygen use, or demand, by bacteria breaking down the biodegradable load in sewage treatment plants or environmental waters. BOD is the basis for deriving the <i>Population Equivalent</i> of a catchment of a sewage works.
DISCHARGE CONSENT/REGISTERED STANDARDS	An authorisation issued by an environmental regulator to allow discharge of treated water. Consents are set to minimise pollution of receiving waters and may include the requirements of Directives, national legislation or local water quality objectives. Consents specify the discharge location, total volume of treated water permitted and the quality conditions of the discharged water, such as the biochemical oxygen demand, limits for suspended solids, ammonia, metals and toxic substances.
EUTROPHICATION	The process where excessive nutrients, especially nitrogen and/or phosphorus compounds, cause an accelerated growth of algae and higher forms of plant life. The result of eutrophication is an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned. This can result in low biodiversity with reduction and changes in the range of species of water invertebrates and fish species present in eutrophic waters.
GUIDELINE STANDARDS	Under the Bathing Water Directive: The more stringent water quality standards Member States should endeavour to observe. See also Mandatory standards.
LESS SENSITIVE AREA	Estuarine or coastal water designated under the Directive as having characteristics of good water and oxygen exchange, not subject to eutrophication or oxygen depletion and that will not be adversely affected by primary treatment discharges. Discharge of primary treated effluent into a Less Sensitive Area is permitted if a study shows the discharge would not adversely affect the LSA.

MANDATORY STANDARDS	Under the Bathing Water Directive: The minimum water quality standards Member States are required to observe and against which the performance of Member States is principally assessed.
MORE STRINGENT TREATMENT	<p>Term used in the Directive to describe tertiary treatment of discharges affecting Sensitive Areas (SAs). More stringent treatment means:</p> <ul style="list-style-type: none"> ● Removal of phosphorus and/or nitrates for SAs designated under the (a) “eutrophication” criterion; ● Means removal of nitrates for SAs designated under the (b) “drinking water source” criterion ● Whatever treatment is needed for SAs designated under the (c) “other Directives” criterion – to meet the standards of other Directives, such as the Bathing Water Directive, Shellfish Waters Directive.
NORMAL WATERS	Waters that are not either designated as <i>Less Sensitive Areas</i> or <i>Sensitive Areas</i> . They can be inland, estuarine or coastal waters. Large discharges into normal waters receive secondary treatment.
PRELIMINARY TREATMENT	Simplest treatment that waste water can have. It can involve screening to remove rags and other similar large solids and/or maceration to reduce the size of solids. It can also involve grit removal.
PRIMARY TREATMENT	Primary treatment involves a physical and/or chemically-enhanced settlement of suspended solids that is not removed by preliminary treatment. The Directive sets percentage reduction figures for biochemical oxygen demand of the influent by at least 20% and a reduction in total suspended solids in the influent by at least 50% before discharge to receiving waters.
SECONDARY TREATMENT	The treatment provided after preliminary and primary treatment. Secondary treatment involves “biological” treatment – using bacteria to break down the biodegradable matter in waste water. After secondary treatment there is further settlement. Secondary treatment should comply with the standards of the Directive.
SENSITIVE AREAS	An area designated under the Directive according to three criteria: (a) waters that are, or have the potential to become, eutrophic if no protective action is taken. (b) drinking water sources that contain or could contain more than 50mg/l of nitrate if no protective action is taken. (c) waters in need of protective action to meet the requirements of other Directives. Waste water discharges over 10,000 PE that pollute Sensitive Areas need treatment that relates to the designation criterion or criteria. See <i>More Stringent Treatment</i> .
TERTIARY TREATMENT	Treatment provided after Preliminary, Primary and Secondary Treatment. Tertiary treatment can involve disinfection (to reduce pathogenic bacterial and viral organisms), eg by treating waste water with ultra violet light (UV treatment) and/or nutrient removal to help prevent eutrophication and/or removal of specific toxic substances. See <i>More Stringent Treatment</i> .

16 Further information sources: websites and documents

Useful publications, web addresses and contact information

Website address

Government Departments

Department for Environment, Food and Rural Affairs
 Department of the Environment for Northern Ireland
 Scottish Executive
 National Assembly for Wales

www.defra.gov.uk
www.doeni.gov.uk
www.scotland.gov.uk
www.wales.gov.uk

Environmental Regulators

Environment Agency for England and Wales
 Environment and Heritage Service
 Scottish Environment Protection Agency

www.environment-agency.gov.uk/
www.ehsni.gov.uk
www.sepa.org.uk

Umbrella body for UK water and sewerage service

Water UK

www.water.org.uk

Useful information and publications

Raising the Quality (September 1998) – *Guidance to the Director General of Water Services on the Environmental and Quality Objectives to be Achieved by the Water Industry in England and Wales 2000/2005*

www.defra.gov.uk/environment/wqd/waterquality/index.htm

Are you doing your bit

www.doingyourbit.org.uk

Water Quality (April 2000) – a guide to water protection in England

www.defra.gov.uk/environment/wqd/guide/water.htm

Cleaner Seas

www.defra.gov.uk/environment/cleanerseas/index.htm

Digest of Environmental Statistics

www.defra.gov.uk/environment/statistics/index.htm

Bag It & Bin It Campaign: UKCEED on telephone 01733 311644 or visit their website

www.ukceed.org

European Union website of text of Directives

www.europa.eu.int/eur-lex/en/index.html

Stationery Office website of Statutory Instruments (SIs): (Searches can be made for SIs transposing Directives into domestic legislation)

www.hmsso.gov.uk

- State of the Environment, Water Report (1999) (Scottish Environment Protection Agency)
- Scottish Bathing Water Reports (Scottish Environment Protection Agency)
- Water Quality and Standards consultations (Scottish Executive)

www.sepa.org.uk

