

WATER QUALITY CLASSIFICATION 2002

1. Summary

This report summarises the results of SEPA's monitoring of water quality in Scotland's rivers, estuaries and coastal waters between 1999 and 2002.

The results for 2002 demonstrate improvements in rivers, coastal and estuarine waters since 2001. These improvements have been largely achieved as a result of improved effluent treatment, SEPA's environmental improvement Action Plans and, in particular, work aimed at reducing the effects of agricultural activities. There have been further significant improvements in wastewater infrastructures and industrial premises, with some step changes in water quality due to the closure of wastewater treatment works and diversion of effluent to newer/larger works elsewhere.

Deteriorations in water quality were largely due to pollution incidents (from both point and diffuse sources), poor sewage infrastructure, combined sewer overflows (CSO), and the effects of toxic substances. Examples are given to illustrate where the more significant improvements or deteriorations have occurred and the actions SEPA is taking to address problems.

The results are set out as tables showing the length (in kilometres) of rivers classified by SEPA as Excellent, Good, Fair, Poor or Seriously Polluted (classes A1, A2, B, C and D respectively). Coastal waters, and the area (in kilometres squared) of estuaries are classified as Excellent, Good, Unsatisfactory (fair/poor) or Seriously Polluted, (classes A, B, C, D respectively).

Targets have been set for reducing the length or area of class C and D waters. The 2002 results show:

- A reduction of **53 km in class C & D rivers for 2002, giving a total reduction of 210 km between 1999 and 2002**; these waters are, therefore, still on course to meet the improvement target for the period **1999–2006, which is a 351 km reduction**.
- A reduction of **9 km² in the area of class C & D estuaries in 2002, giving a total reduction of 17.1 km² between 1999 and 2002**; this has, therefore, already exceeded the improvement target for the period **1999–2006, which is a 6.5 km² reduction**. However, it is recognised that part of the 2002 improvement was assisted by the wet summer of that year, and may well reverse.
- A reduction of **28 km of class C & D coastal waters in 2002, giving a total reduction of 107 km between 1999 and 2002**; these waters are on course to meet the improvement target for **1999–2006, which is a 145 km reduction**.

A further significant achievement in 2002 was a reduction of almost 4000 km in the length of rivers regarded as 'unclassified'. It is intended that this category will be reduced almost to zero by 2006.

2. Background Notes

SEPA has previously reported progress towards targets for water quality improvements set for the period 1996–2000. Over this period, poor quality rivers were reduced by 361 km and coasts by 25 km, but the extent of unsatisfactory estuarine areas increased by 2 km². Further new targets were set in 2000, on the basis of 1999 water quality; these new targets are to be achieved by 2006. The purpose of this paper is to examine progress towards attainment of the 2006 targets.

In conjunction with the new set of targets, an improved system for describing river water quality was introduced in 1999/2000. The classification criteria remain unchanged, but are now expressed for a Digitised Rivers Network (DRN), which includes the same river systems as before, plus islands rivers. This can be displayed using Geographical Information Systems (GIS) and enables river lengths to be automatically measured and river quality information to be more accessible (this is currently only available to SEPA staff, but will ultimately also be available to the public). The apparent length of watercourses covered by the DRN is less than that of the earlier network because it does not include thousands of minor and generally remote headwater tributaries which have never been monitored. Another feature of the DRN is that waters which are not directly monitored are described and reported as being unclassified, rather than being assumed to be of good quality, which was the former practice. This revised approach to classification is more precautionary and considered to be consistent with future requirements.

It is SEPA's intention that the extent of unclassified rivers will be progressively reduced to near zero by the time EU Water Framework Directive systems are in place in 2006. This is being done in two ways: firstly, by further developing an extensive network of ecological quality monitoring sites in rural areas which will normally be infrequently sampled, however, if the new sites are found to be not of good quality, then the cause of downgrading will be investigated and action taken in the usual way. Secondly, the current stretch allocations to monitoring sites will be reassessed and extended where appropriate.

3. Rivers and Streams

Summary annual classification outcomes for rivers and streams, by SEPA area, are presented in Table 1 below. Reasons for the main significant quality changes are then presented for each of the areas.

3. River Water Quality

Table 1: River classification for the years 1999 to 2002 (DRN)

Area	Year	A1 Excell ent km	Unclass- ified km	A2 Good km	B Fair km	C Poor km	D Ser. Poll. km	Total km
HIG	1999	N/A	N/A	N/A	477.6	153.3	29.0	11404.2
HIG [▼]	2000	960.9	8259.3	1645.8	385.7	138.0	14.6	11404.2
HIG	2001	1421.0	7950.3	1560.9	384.6	85.9	21.8	11424.6
HIG	2002	2019.6	5143.7	3482.8	658.4	86.1	13.2	11403.8
South East	1999	1120.0	2701.6	1892.8	902.8	450.8	19.7	7087.7
South East	2000	1427.4	2119.0	2271.9	919.4	393.0	24.8	7155.3
South East	2001	1524.0	1666.9	2446.7	996.1	520.1	17.1	7170.9
South East	2002	2257.4	609.5	2798.3	977	510	6.3	7158.3
South West	1999	575.1	2340.0	2262.1	1196.6	473.6	42.5	6889.9
South West	2000	783.2	2437.3	2169.5	1148.1	322.9	34.0	6895.1
South West	2001	929.5	2342.9	2317.3	958.4	323.4	43.5	6915.1
South West	2002	1002.4	2234.7	2374.4	927.3	306.8	36.78	6882.4
TOTAL	1999	N/A	N/A	N/A	2577	1077.7	91.2	25381.8
(%)					(10.1)	(4.2)	(0.4)	(100)
TOTAL	2000	3171.5	12815.6	6087.2	2453.2	853.9	73.4	25454.6
(%)		(12.5)	(50.3)	(23.9)	(9.6)	(3.4)	(0.3)	100.0
TOTAL	2001	3874.5	11960.1	6324.9	2339.1	929.4	82.5	25510.5
(%)		(15.2)	(46.9)	(24.8)	(9.2)	(3.6)	(0.3)	(100)
TOTAL	2002	5279.4	7987.9	8655.5	2562.7	902.9	56.3	25444.7
(%)		(20.1)	(30.5)	(33)	(9.8)	(3.4)	(0.2)	(100)
CHANGE (+/- %)	99 to 00				-4.8	-20.8	-19.5	-
CHANGE (+/- %)	99 to 01				-9.2	-13.8	-9.5	-
CHANGE (+/- %)	99 to 02				-0.6	-16.2	-38.3	-
Actual change in length of Classes C and D 1999 to 2002		-210 km (-18%)						
Target change in length of Classes C and D 1999 to 2006		-351 km (-30%)						
Target length of Classes C and D 2006		818 km						

▼HIG figures for 2000 amended from those previously reported due to inclusion of toxic substances classification.

South East Scotland

Improvements

Action plans within the Perth and Dundee areas are contributing to water quality

improvements. In Perthshire, sheep dip inspections are likely to have contributed to the upgrading of 11 km of the River Garry from class B to class A. A significant improvement has been on the Dighty Water, Dundee where 3.4 km have changed from class C to class A2.

The Buddon Burn, Dundee has shown a 3.5 km improvement from class C to class B and a 5.5 km improvement from class B to class A2. A reduction in diffuse inputs, which may be a result of raising awareness during farm visits, has contributed to these improvements.

Upgrading of sewerage infrastructure in South East Area has led to several improvements in water quality: 5 km of the Cockburnpath Burn, Borders, previously class C is now classified class B; 2 km of the Cambusmichael Burn, Perth rose from class C to class B; 1.7 km of the Niddry Burn, West Lothian improved from class B to class A2; and 1.2 km of the Wading burn, Midlothian rose from class C to class B.

In West Lothian, almost 4 km of the Lochshot Burn has been upgraded from class D to class B and just under 1 km from class B to class A2, as a result of improvements to the leachate water treatment system at Seafeld Bing.

Deterioration

A significant downgrade occurred on the Water of Leith where 10 km of watercourse were downgraded from class B to class C due to a pollution incident in March 2002. The insecticide permethrin was found in the burn and traced to Katesmill surface water outfall serving Redford Army Barracks.

Poor performance of sewerage infrastructure and discharges from septic tanks has been a contributory factor in the 4.3 km downgrade from class A1 to class B of St. Martins Burn, Borders, and deterioration of 1.2 km of the West Peffer Burn, East Lothian, from class B to class C.

In the Borders, diffuse pollution from agriculture has contributed to downgrades from class A2 to class B in both a classified tributary of the Leet Water (10 km), the Otter Burn (4 km) and the Glensax Burn (11 km). A tributary of the Turford Burn has been downgraded from class A2 to class B for 3.5 km.

In the upper reaches of the River Tay catchment almost 9 km of watercourse were downgraded from class A1 to class C. The stretch is an EC Freshwater Fisheries Directive (FWF) monitoring site and is, therefore, monitored for zinc and copper. The stretch passes the requirements of the FWF directive, but in 2002 was classified for toxic substances. The stretch failed to meet the UK Environmental Quality Standard (EQS) of 8 ug/l for zinc, so was classified class C. This is likely to be the result of the natural mineralisation in the headwaters of this catchment.

South West Scotland

Improvements

The River Gryfe in Renfrew has improved from class B to class A2 throughout most of its length (13.4 km) and from class C to class A2 at Kilmacolm (9.4 km). The class C quality that was reported at Kilmacolm in 2001 was primarily due to the effects of effluent discharges from agricultural land. SEPA staff carried out a series of chemical and biological sampling surveys, visited a number of farms in the upper Gryfe catchment and advised on improved practices that should be adopted to minimise polluting run-off. SEPA staff will continue to monitor the situation during 2003 with a view to maintaining this improvement.

A number of sewage treatment works (STW) in the Kelvin catchment closed in late 2001/early 2002. This has now resulted in improved water quality in some parts of the catchment. At the end of 2002, the upper Kelvin remained class B. However, the first two monitoring sites downstream of the Luggie Water have improved from class B to class A2 (overall length 4 km), which may be due to closure of Deerdykes STW in January 2002. Unfortunately, at the foot of the Luggie Water water quality remains class C (4.2 km).

The closure of Auchengeich STW in March 2003 should improve the chemical, and eventually the ecological quality of the Bothlin Burn. SEPA is planning to collect representative post-closure samples of the burn during 2003. Dissolved oxygen concentrations at many sites have improved significantly in the last 2 years, however, the catchment is still affected by sporadic high concentrations of nitrogen in the form of ammonium ion, which is an indicator of human or farm waste.

2.8 km of the Carmel Water, Ayrshire has upgraded from class C to class B. This watercourse is in a very intensive agricultural catchment. In the past the classification of this watercourse has 'swung' frequently between classes B and C. The local SEPA team have and are carrying out farm visits in the catchment as part of the Bathing Water Action Plan work, and it is hoped that following resulting improvements to farm practices, the water quality improvement will now be maintained.

The Glazert Water, Glasgow, has shown a 3.4 km upgrade from class C to class B, due to biological quality improvement.

Deteriorations

Two sites on the Machrihanish Burn in Argyll deteriorated in 2002 from class A1 to class C, overall length 7.5 km. This river has suffered from low dissolved oxygen (DO) in recent years, usually in the summer months. As part of an ongoing investigation, SEPA staff are examining possible point source farm pollution as the cause, but diversion of minor sewage effluents from this catchment to Campbeltown STW early in 2003 should help long-term water quality improvement.

The Kitch Burn at Stroud Road (East Kilbride) has deteriorated from class C to class D. Over 7.5 km of the East Kilbride Burns remain either class C or class D despite the installation of sewer switches and major de-dualling work by Scottish Water in recent years, which should reduce the discharge of sewage contaminated surface water.

The Lugton Water in Ayrshire is badly affected by the poor performance of Uplawmoor sewage treatment works. This watercourse also suffers from low dissolved oxygen, sometimes as low as 40% saturation. The monitoring site downstream of Uplawmoor sewage treatment works deteriorated in 2002 from class B to class C; SEPA is investigating the performance of the works.

11 km of the Glengonnar Water, South Lanarkshire, was reported as downgraded (class C) due to exceedence of environmental quality standards for lead and zinc. This tributary of the River Clyde is contaminated with lead and zinc originating from derelict lead mines and spoil heaps in the vicinity of the village. In the upper reaches of the river,

the concentration of lead is at a level that causes chronic lead poisoning in the resident trout population. Many fish have blackened fins and tails, which is a recognised symptom of exposure to high concentrations of these metals. Further downstream, dilution and adsorption reduces the lead to a safe level.

A number of small watercourses around the Cambuslang/Rutherglen area of Glasgow suffered a downgrade in 2002. This was attributed to high biochemical oxygen demand (BOD) results. SEPA will investigate the reasons for these downgrades.

The water quality of the Pow Burn catchment in Ayrshire fluctuates between class B and class C. There have been a number of watercourses in South West Scotland that follow this trend, most notably the lower River Clyde, lower reaches of the South Calder Water and the Piltanton Burn in Galloway. SEPA will endeavour to stabilise the class of these watercourses and aim to achieve their best possible quality.

Highlands, Islands & Grampian

Improvements

Between 2001 and 2002 the length of class C river stretches stabilised following two years of significant improvements. Ten stretches including the Gillock Burn in Thurso area, the Linkwood Burn in Elgin area, and the Diney Burn, south of Aberdeen, and covering 25.7 km improved from class C to class B or A2. Most of these stretches, however, have been fluctuating in class from 1996 onwards and it is possible that this fluctuation will continue.

There was a net decrease of 8.6 km of Class D river from 2001 to 2002. Four stretches covering 9.0 km improved from class D to class C between 2001 and 2002. The Tyock Burn, Arkland Burn and an unnamed tributary downstream of Kilmallie sawmills are expected to maintain these standards, particularly as sustainable urban drainage systems are (SUDS) planned for the latter site. The Tyock Burn, however, has fluctuated between class C and D since 1996 and this is not expected to change in the near term.

Deteriorations

Six stretches covering 11.4 km deteriorated from class A2 or B to class C between 2001 and 2002. On the Glasslin Burn 2.6 km had been consistently class C before 2001. The other five, including the Milton Burn in Thurso area, the Farrochie Burn south of Aberdeen and the Burn of Savoich in Fraserburgh area, still have a quality close to the class boundary, and have also fluctuated in class since 1996.

Near Thurso, the Murkle Burn was not monitored prior to 2000, but since that time a 5 km stretch has been downgraded from class A2 in 2000, to B in 2001 and now class C in 2002. Investigations into the causes of this downgrading are continuing.

4. Estuarine Water Quality

Table 2: Estuarine classification for the years 1999 to 2002

Region/ Area	Year	A Excellent km ²	B Good Km ²	C Unsatis. km ²	D Seriously Poll. km ²	Total km ²
NORTH	1999	235.9	26.3	4.8	0.0	267.0
NORTH	2000	253.1	10.9	2.9	0.0	266.9
HIG	2001	255.6	8.4	2.9	0.0	266.9
HIG	2002	257.93	6.14	2.85	0.0	266.9
EAST	1999	101.9	89.7	14.2	0.3	206.1
EAST	2000	97.5	91.8	16.8	0.0	206.1
South East	2001	101.9	89.7	14.2	0.3	206.1
South East	2002	102.9	97.1	6.1	0.0	206.1
WEST	1999	295.5	27.6	12.6	0.6	336.3
WEST	2000	286.4	30.2	18.5	1.2	336.3
South West	2001	311.1	18.4	6.2	0.8	336.5
South West	2002	292.4	37.5	5.7	0.8	336.5
TOTAL	1999	633.3	143.6	31.6	0.9	809.4
(%)		(78.2)	(17.7)	(3.9)	(0.1)	(100)
TOTAL	2000	637.0	132.9	38.2	1.2	809.3
(%)		(78.7)	(16.4)	(4.7)	(0.1)	(100)
TOTAL	2001	668.6	116.5	23.3	1.1	809.5
(%)		(82.6)	(14.4)	(2.9)	(0.1)	(100)
TOTAL	2002	653.2	140.7	14.6	0.8	809.5
(%)		(80.7)	(17.4)	(1.8)	(0.09)	(100)

CHANGE (+/- %)	99 to 00	(0.6)	(-7.5)	(+20.9)	(+33.3)	-
CHANGE (+/- %)	99 to 01	(+5.6)	(-18.9)	(-26.3)	(+22.2)	-
CHANGE (+/- %)	99 to 02	(+3.1)	(-2.0)	(-53.8)	(-11.1)	-

Actual change in area of Classes C and D 1999 to 2002 -17.1 km² (-53%)
Target change in area of Classes C and D 1999 to 2006 -6.5 km² (-20%)
Target area of Classes C and D 2006 26 km²

South East Scotland

Improvements

The most significant improvement has been within the Forth Estuary where 6.2 km² has been upgraded from class C to class B. The 5.7 km² area from the Black Devon to Longreach has improved due to a reduction in the discharge of organic waste to the estuary and relatively high river flows during the summer of 2002.

A 0.1 km² area of the Carron Estuary has been upgraded to class B as there is now no failure of the Lindane environmental quality standard due to effective reduction of its discharge from Falkirk STW. At Grangemouth (from Kinneil mudflat to Carron) an upgrade of 0.4 km² from class C to class B since 2001 reflects improving fauna since the BP refinery commissioned its effluent treatment plant in 1991. This is in addition to the improvements recorded in 2000 and 2001.

There may be further improvements in the Forth Estuary to class B around Grangemouth if waste discharges continue to decrease.

The Firth of Tay is mainly class A with a section in the vicinity of Dundee downgraded to class B. An area of class C on the north shore was due to the influence of sewage solids in the vicinity of combined sewer overflow outfalls. The Tay Wastewater Scheme was operational throughout 2002 and has led to a significant improvement in water quality brought about by the installation of fine screening on all storm sewage overflows on the north shore of the estuary. This resulted in the removal of significant amounts of sewage debris and a 1.5 km² area of class C has been upgraded to class B.

Montrose basin remains class A. The new secondary treatment plant and screened combined sewer overflows at Montrose are now operational and the previous discharges of unscreened sewage have ceased. As a result the narrow neck (1 km²) of the South Esk has been upgraded to class A in 2002.

Deteriorations

No downgradings were recorded in 2002. Of the remaining small unsatisfactory areas, Inverkeithing Bay may remain class C for some time, despite the introduction of secondary treatment at Caldwell's Paper Mill, due to long-term sediment contamination from historic discharges, which will be slow to self-purify, although long-term improvement is anticipated.

South West Scotland

Improvements

A small area of the Clyde Estuary, near Glasgow city centre and at Dalmuir was upgraded to class B.

The small estuaries of the White Cart, Black Cart, Leven, Garnock, Irvine, Ayr, Girvan and Stinchar, remained virtually unchanged except for a small area of the Leven which was upgraded to class A, because the discharge of distillery wastes has ceased.

Deteriorations

The reduction in area of class A waters was primarily due to seasonal low dissolved oxygen (DO) concentrations for a short period during the summer of 2002. Waters of the Clyde estuary are subject to these fluctuations especially in deep waters, which can lower the depth averaged DO concentration.

A further 5 km² area of the Gareloch was downgraded to Class B, due to a single measurement of low dissolved oxygen in deep waters in July of 2002.

Class D waters in the Clyde Estuary are consistently impacted by sewage derived debris from storm events and more frequent overflows from unsatisfactory combined sewer overflows (CSO).

Waters of the Rough Firth in the Solway have been reclassified to reflect the position of the bathing water, which is presently class B, and also impacts from the unsatisfactory septic tank at Auchencairn, which result in a localised class C area due to low DO and fungal growth.

Class A waters of the inner Solway have been slightly reduced due to the designation of a 'new' area of 0.2 km² near Carsethorn as Class C, due to occasional severe pollution with sewage solids from CSO at Dumfries.

Highlands, Islands & Grampian

Improvements

In the Cromarty Firth, near Invergordon, a total of 2.1 km² in the vicinity of the harbour and the pier, which served the former Alcan aluminium smelters, were upgraded from class B to class A. This is due to reductions in the tributyl tin (TBT) concentrations which remain from historic sources of this anti-foulant compound.

In the Cromarty Firth, near Balintraid (a small village just a few km to the NE of Invergordon), 0.1 km² have been upgraded from class B to class A, due to reductions in TBT levels in the harbour.

In the Inverness Firth, near Allanfeearn, 0.1 km² have been upgraded from class B to class A, following improvements in the discharge from the sewage treatment works that serves Inverness.

The area of class C estuary, 2.85 km², remains the same as in 2001. There are 2.33 km² of class C water in the River Ythan estuary due to nutrient enrichment causing excessive algal growth. Improvement in this estuary is not expected in the short term, despite identification of the whole catchment as an EC recognised nitrate vulnerable zone. Within the River Dee estuary, 0.52 km² are class C due primarily to oil spills in the harbour. It is hoped that an action plan scheduled for 2003–2004 will deliver improvements. If this action plan is successful, the 2006 target will be achieved.

5. Coastal Water Quality

Table 3: Coastal waters classification for the years 1999 to 2002

Region/ Area	Year	A Excellent km	B Good km	C Unsatis. km	D Seriously Poll. km	Total km
NORTH	1999	8119.1	225.7	136.2	21.6	8502.6
NORTH	2000	8178.0	206.9	104.6	13.6	8503.1
HIG	2001	8190.3	204.0	93.1	16.0	8503.8
HIG	2002	8208.7	196.1	83.1	14.15	8502.0
EAST**	1999	130.5	137.6	36.0	12.1	316.2
EAST**	2000	144.7	132.6	26.8	12.1	316.2
South East	2001	147.4	133.3	34.2	1.0	315.9
South East	2002	159	131.9	24.0	1.0	315.9
WEST	1999	2656.8	206.1	99.1	16.6	2978.6
WEST	2000	2657.1	216.8	93.3	11.4	2978.6
South West	2001	2658.2	222.4	90.2	7.8	2978.6
South West	2002	2664.7	221.6	84.5	7.8	2978.6
TOTAL	1999	10906.4	569.4	271.3	50.3	11797
(%)		(92.4)	(4.8)	(2.3)	(0.4)	(100)
TOTAL	2000	10979.8	556.3	224.7	37.1	11798
(%)		(93.1)	(4.7)	(1.9)	(0.3)	(100)
TOTAL	2001	10995.9	559.7	217.5	24.8	11798
(%)		(93.2)	(4.8)	(1.8)	(0.2)	(100)
TOTAL	2002	11032.4	549.6	191.6	22.9	11796
(%)		(93.5)	(4.7)	(1.6)	(0.2)	
CHANGE (+/- %)	99 to 00	(+0.7)	(-2.3)	(-17.2)	(-26.2)	-
CHANGE (+/- %)	99 to 01	(+0.8)	(-1.7)	(-19.8)	(-50.7)	-
CHANGE (+/- %)	99 to 02	(+1.2)	(-3.5)	(-29.4)	(-54.5)	-
Actual change in length of Classes C and D 1999 to 2002					107 km (-33%)	
Target change in length of Classes C and D 1999 to 2006					-145 km (-45%)	
Target length of Classes C and D 2006					176 km	

1999 figures for HIG have been corrected relative to some earlier SEPA publications.

**Relative to previous annual reports, length of class A reduced by 4.8 km, and class B by 1.5 km to eliminate double counting of Tyne estuary.

South East Scotland

Improvements

There have been significant improvements in coastal waters quality classification status between 2001 and 2002, including an increase of 11.6 km of class A waters and a 10.2 km decrease in class C waters. Five EC identified bathing waters were upgraded during 2002: Carnoustie, Dunear East, Kingsbarns, Pease Bay and St. Andrews West Sands.

The stretch of shoreline between Craigmill Burn and Barry Sands, encompassing the Carnoustie bathing water, has been upgraded from class C to class B as a result of improvements attributed to the new Hatton treatment plant.

The new sewage treatment plant (STW) at St Andrews is now operating at Kinkell Ness and large storm tanks in the town now give better protection to the bathing waters during heavy rainfall. The STW provides UV disinfection treatment and effluent is discharged via a long sea outfall. The result of these improvements is an upgrade from class B to class A.

The Kingsbarns STW provides primary treatment and screening and the discharge was chlorinated during the 2002 bathing season, resulting in a return to attainment of satisfactory bathing water quality and consequent upgrading from class C to class B.

The completion of Levenmouth STW in 2001 has led to ongoing improvements in the quality of Largo Bay, Lower Largo and Leven East and these bathing waters have been upgraded from class C to class B shoreline.

In Angus, the stretch of coast from Scurdie Ness at the mouth of the Esk Estuary to Sillo Craig has been improved from class B to class A, due to the new secondary treatment plant and screened CSOs at Montrose. In Fife, the coastal stretch from Ruddons Point near Shell Bay to the Cocklemill Burn in Largo Bay has been upgraded from class C to class B as the improvements from the Levenmouth treatment plant continue. Anstruther Castle Sands has also been upgraded from class C to class B bringing it up to the same standard as the adjacent shoreline.

Deteriorations

Arbroath West Links, which unexpectedly failed the bathing waters mandatory standard despite the new Hatton sewage treatment complex, has been downgraded to class C. This failure is attributed to CSO on the Angus coast spilling more frequently than predicted by the scheme model. It is possible that average dry weather flows passed to some pumping stations were higher than anticipated due to the exceptionally wet summer in 2002. This is currently being investigated with Scottish Water.

The coast at Cramond also failed to meet basic EC bacteriological standards, and although it is not a bathing water, it has been downgraded to class C in accordance with the SEPA classification scheme. Sewage debris was also present here on 9 out of 20 visits during the season. Again, exceptionally wet weather almost certainly contributed to this failure.

The shoreline at Largo East remains class C due to problems with the short outfall at Lower Largo.

South West Scotland

Improvements

Revisions of existing and new biological survey data have resulted in 5.1 km being upgraded to class A. Survey work in Loch Creran indicated no sublittoral impact from the fish processing plant discharge and shoreline impacts in the area appear to have been greatly reduced (3.9 km).

At Hunterston, 1.2 km have been upgraded to class A. This stretch was previously downgraded as a result of research work on thermal impacts from the power station. Such effects are not now detectable via routine biological monitoring. Preliminary results indicate a rich fauna of polychaetes and oligochaetes in Southannan sands with some *Capitella* sludgeworms in a soft muddy area in the southwest corner of the bay. The fauna indicates some natural freshwater influx and fine sediments deposition within the bay.

In 2002, 12 km of SW coastline were upgraded to class B from class C. Most of these changes, including 1.9 km at Ayr (S), 2.1 km at Girvan, 1.3 km at Millport, 1.2 km at Saltcoats, 1.2 km at Troon (S) and 1.2 km at Pan Rocks, all in Ayrshire; plus 0.2 km at Sandyhills, and 1.0 km at Southernness in Galloway and Dumfries were due to improved microbiological classification following the extensive work carried out to reduce pollution of coastal waters from both sewage treatment works and diffuse agricultural sources.

0.1 km of offshore coast was also upgraded to class B due to cessation of discharge at Greenan, removing both EC dangerous substances and benthic impacts.

Deteriorations

3 km of coastline were downgraded to class B from class A on microbiological data obtained from Troon Harbour Rocks, Turnberry Bay. A new stretch near Carrick has been identified and downgraded on the basis of microbiological data. Similarly, new benthic biological data from a survey of Rothesay Creamery outfall and STW outfall at Bogany Point has been used to record a downgrade. The survey data indicated significant biological impact at least to a radius of 100 m from the discharge.

A further 7.4 km of coastline have been downgraded to class C on the basis of microbiological monitoring at Doonfoot, Fairlie and Stevenston in Ayrshire and new stretches at Mossyard and Sandhead beaches in Galloway.

A number of public complaints have been received regarding sewage and plastics debris around the Solway foreshore and in particular around Carsethorn. This has had the effect of downgrading this part of the coastline. SEPA will carry out increased sampling in this area in 2003 in order to ascertain the source of the problem.

Highlands, Islands & Grampian

Improvements

At Loch Portree on Skye, a 2 km length of coastline has been upgraded from class C to class B, following the connection of an unsatisfactory sewage discharge to the main sewer system.

At Thurso Bay, Pentland, 2.3 km have been upgraded from class C to class B. This follows improved bacteriological results from the local beach, which achieved the equivalent of an EC Bathing Waters Directive pass in 2002.

Also in Caithness, in Dunnet Bay (Castlehill), what was previously 3.2 km of class C quality was reduced to just 0.4 km of class B in 2002, due to a reduction in the impact

from the untreated sewage discharge from Castletown. This discharge will be removed entirely when the new treatment plant for Thurso is built (expected completion 2005).

At Wick Harbour, Wick, a 0.2 km stretch of class C was improved to class B following reduction in the frequency of oil spills and rubbish in the harbour.

At Fraserburgh, a 1.5 km length has improved from class D to class B. This follows improved results from the EC identified bathing water, which failed in 2001, but achieved a mandatory pass in 2002, following sewerage improvements.

At Lossiemouth, a 1 km length has improved from class C to class B following provision of oil interceptors at RAF Lossiemouth and an upgrade of the Coularbank surface water sewer.

At Johnshaven, a 2 km length has been improved from class C to class B following the provision of sewage screens.

Deteriorations

In the Western Isles, three 0.1 km stretches (Ashdail Cottages, Bayhead and Leverburgh) were newly downgraded to class C following the observation of sewage debris on the shore. A 0.3 km stretch in West Loch Tarbert was newly downgraded to class C due to gross accumulations of litter.

At Loch Leven, Lochaber, 24 km of the loch coastline remains class C due to elevated concentrations of polyaromatic hydrocarbons (PAH) in sediments. The next survey will be conducted in 2004, so this stretch will remain class C in 2003.

At Peterhead Lido, a 0.3 km length was downgraded from class B to class C following failure of the identified bathing water to meet required standards in 2002. Investigation into the cause of this non-compliance showed that accidental spillages during engineering works were the most probable cause of this failure. These works, which are now completed, were designed to reduce overflow spill frequency. Quality problems at this site should, therefore, not recur.

There have been many improvements in sewage treatment around the HIG coastline following completion of Public Private Partnership schemes (PPPs). These will continue to deliver environmental quality improvements, and should assure attainment of the 2006 quality targets throughout the area.

6. Conclusions

2002 saw further improvements in water quality across Scotland. Looking beyond the one-year changes and classification fluctuations, some of which (particularly in estuaries) are affected by uncontrolled factors such as rainfall totals, good long-term improvement is still evident. Further sewerage infrastructure and sewage (and other effluent) treatment schemes are being built or are planned, which will provide further quality benefits. SEPA is also maintaining its programme of environmental quality improvement action plans, many of which are directed at problems arising from more diffuse, currently unregulated sources. These will also produce environmental quality improvements. Other initiatives such as improvements in, and better implementation of, codes of best practice such as the "Prevention of Environmental Pollution from Agricultural Activity" (PEPFAA) code, "Forest and Water Guidelines" and the Scottish Executive's 4-point plan to minimise pollution from livestock are helping to reduce rural impacts. Equally importantly, pollution from new urban area developments is being minimised from their inception by the planning and incorporation of "Sustainable Urban Drainage Schemes" (SUDS), to avoid the problems caused by both combined sewer overflows and contaminated surface water run-off.

It is recognised that much remains to be done to bring the quality of all waters up to desired standards, and this ongoing work is being given fresh impetus by the current implementation of the requirements of the EU Water Framework Directive. This directive will increasingly influence all water and water habitat improvement programmes. It will also introduce new regulatory regimes, bringing under control many activities which impact on ecological quality, but which have not previously been subject to direct regulation. Scottish waters remain a valuable resource for fish and wildlife, recreation, the transport of well-treated wastes, abstraction and power generation. SEPA aims to ensure through its policies and actions that the future for the quality of all waters and aquatic environments remains positive, and that current improvement trends are maintained, for the enhancement of all uses and benefit of users.