Scottish Environment Protection Agency

NATIONAL WATER QUALITY CLASSIFICATION 2005

Summary

This report summarises the results of SEPA's monitoring of water quality in Scotland's rivers, estuaries and coastal waters in 2005. It also provides longer-term trend information, particularly in respect of SEPA's water quality targets for 2006, which were set in 2000 on the basis of water quality in 1999.

Overall, the 2006 quality targets have been met ahead of schedule, and further improvements can be anticipated.

Rivers

The net length of poor quality rivers and streams in classes C and D remained little changed in 2005, giving a total reduction of **393 km** since 1999. There was some concern that the large improvement made in 2003 may have been significantly helped by the dry summer of that year, so to achieve and consolidate progress in subsequent years is particularly encouraging. Consequently, the improvement target for the period 1999 – 2006, a **351 km** reduction in class C and D waters, should be comfortably exceeded. Many of the improvements are a direct result of infrastructure investments made by Scottish Water, SEPA actions via Environmental Improvement Action Plans (EIAPs), and work with and through other organisations such as the Coal Authority and farming community.

Despite the very positive progress in improving river water quality made since 1999, substantial lengths of poor quality water remain. These include numerous stretches originally targeted to be improved by 2006, and work to achieve upgrades is continuing. Conversely, numerous improvements have been achieved for watercourses which, when the targets were set in 2000, were not expected to improve by 2006. These include very welcome Coal Authority work to intercept and treat previously polluting mine water arisings prior to their discharge to watercourses. Among the planned improvements seen in 2005 have been further significant upgrading of 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 or larger works elsewhere.

Estuaries

The net estuarine area in the unsatisfactory classes C and D also changed very little between 2004 and 2005, giving a total reduction of **10.6 km^2** since 1999. On a headline basis, these waters have therefore exceeded the improvement target for the period 1999 – 2006, which is to achieve a **6.5 km^2** reduction. However, in the Forth and Clyde estuaries, water quality is significantly dependent on river flow. The 2002 improvement was therefore assisted by the wet summer of that year, and as expected the dry weather of 2003 partly reversed this trend. The summer of 2004 again brought wet weather and this aided estuarine water quality. It is encouraging, therefore, that despite a return to slightly drier conditions in 2005, quality only deteriorated very slightly. Continuing investments by Scottish Water and industrial dischargers are delivering cleaner waters, with recent improvements in the Tay being particularly notable, and the long-term trend is clearly one of significant improvement.

Coastal Waters

The net length of unsatisfactory class C and D coastal waters was further reduced by 22 km in 2005, giving a total reduction of **209 km** since 1999. Quality in 2003 was undoubtedly helped by the reduced run-off resulting from the dry weather. Despite the generally wetter weather of 2004 – 2005, progress in improving water quality has been maintained and SEPA is now confident that the overall improvement target for the period 1999 – 2006, a reduction of **145 km** in poor quality waters, will be surpassed.

The major investments made by Scottish Water to improve the treatment of sewage discharges to coastal waters have clearly been of great benefit to water quality. On current classification measures, 113 km of poor quality coastal waters remain, and work to secure the upgrading of these is continuing. The occasional bacterial pollution of some coastal waters (including some bathing waters) due to diffuse pollution following substantial rainfall, will unfortunately continue for at least the next few years.

The Future

For 2007 and future years, new EU Water Framework Directive (WFD) classification measures will be applied to all water categories, and new higher default quality objectives will apply. A preliminary assessment of which Scottish waters may not meet these exacting standards without the intervention of management measures has recently been made and published by SEPA (http://www.sepa.org.uk/wfd/index.htm). Equivalent water characterisation reports are available for all other river basin districts throughout the EU.

1. Introduction: Water Quality Background Notes

Following its establishment in 1996, SEPA introduced a new rivers quality classification scheme, which included most elements and numeric standards already in use in England and Wales, but unlike there, the SEPA scheme (http://www.sepa.org.uk/data/classification/index.htm) results in a single classification class outcome incorporating biological, chemical and aesthetic elements. This provision of a single overall outcome is intended to be readily understood by casual observers, while actual causes of any downgrading can still be investigated and tackled by SEPA. Existing schemes for the classification of coasts and estuaries were maintained. On establishment, SEPA set itself water quality targets to be achieved by 2000.

SEPA has reported on the progress it made in the period 1996 – 2000. During this time, poor quality (classes C and D) rivers were reduced by 361 km and coastal waters by 25 km, but the extent of unsatisfactory estuarine areas increased by 2 km^2. Further new targets were set in 2000, on the basis of 1999 water quality; the aim is for these new targets to be achieved by the end of 2006, and they have been included in SEPA's Corporate Plans.

In conjunction with the new set of targets, an improved digital system for recording river and stream lengths was introduced in 1999/2000. The classification criteria remained unchanged, but are now expressed for a Digitised Rivers Network (DRN), which includes the same river systems as before plus islands' rivers and tidal waters, and which can be displayed using Geographical Information Systems (GIS). This enables river lengths to be automatically measured and river quality information to be more accessible (now available on SEPA's website at http://www.sepa.org.uk/rqc/map.asp). 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, sometimes seasonally dry, and generally remote headwater tributaries which have never been monitored. Also with the DRN, 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 WFD systems are in place in 2007. This is being done in two ways. The first of these is the further development of an extensive network of ecological quality monitoring sites in rural areas which will normally be only infrequently sampled. However, any of those new sites which are found to be not of good quality are then investigated. Monitoring of these waters will be continued on an annual basis until the cause of the downgrading is known and remedial action has been shown to be effective. Secondly, the current allocations of river stretches to monitoring sites for quality class assignment are reassessed, and extended where that is appropriate. By these means, in 2004 and 2005, almost 4,000 km more of river length was classified for the first time.

While SEPA's work to the present time has been significantly aimed at eliminating the most seriously polluted class C and D waters, it has become clear in the context of the WFD that this Directive's standard target of attaining "good ecological status" will imply for rivers a quality target closer to the current class A2/B boundary. In this context it is sobering to note that in 2005, the total length of class B, C and D rivers is over 3,200 km of the 25,400 km total length.

Final assessment in relation to SEPA's 2006 water quality targets will be made early in 2007. Then, from 2007 onwards, entirely new WFD quality classification schemes will be applied to all waters. To enable some comparison of the 2007 WFD status assessments with classifications using the current classification schemes, it is envisaged that the SEPA classification schemes may be applied to a representative subset of the new WFD quality monitoring network sites, as well as applying the future WFD quality status criteria to historic data from a fixed set of representative sites.

In the following sections, 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). For the area (in square kilometres) of estuaries and for the length of coastal waters there are four quality classes; Excellent, Good, Unsatisfactory (fair/poor) and Seriously Polluted (classes A, B, C, D respectively). Examples are given to show where the more significant improvements or deteriorations have occurred and the actions SEPA is taking to address problems.

2. Rivers and Streams

Summary annual classification outcomes for rivers and streams are presented in Table 1 below. They indicate that SEPA is well on course to meet its 2006 river quality target. Some of the details for the most significant quality changes are then presented; starting in the North and working clockwise round the country.

Table 1: River classification for the years 1999 to 2005 (DRN)

	Year	Unclass-ified	A1 Excellent	A2 Good	B Fair	C Poor	D Seriously Polluted	Total
Length km	1999	N/A	N/A	N/A	2577.0	1077.7	91.2	25381.8
(%)					(10.1)	(4.2)	(0.4)	(100)
Length km	2000*	12815.6	3171.5	6087.2	2453.2	853.9	73.4	25454.6
(%)		(50.3)	(12.5)	(23.9)	(9.6)	(3.4)	(0.3)	100.0
Length km	2001	11960.1	3874.5	6324.9	2339.1	929.4	82.5	25510.5
(%)		(46.9)	(15.2)	(24.8)	(9.2)	(3.6)	(0.3)	(100)
Length km	2002	7987.9	5279.4	8655.5	2562.7	902.9	56.3	25444.7
(%)		(30.5)	(20.1)	(33)	(9.8)	(3.4)	(0.2)	(100)
Length km	2003	5903.3	6815.2	9540.4	2373.8	750.8	52.6	25436.1
(%)		(23.2)	(26.8)	(37.5)	(9.3)	(3.0)	(0.2)	(100)
Length km	2004	3806.5	7659.9	10612.5	2587.6	716.6	50.6	25433.8
(%)		(15)	(30.1)	(41.7)	(10.2)	(2.8)	(0.2)	(100)
Length km	**2005**	**2126.4**	**8003.9**	**12053.1**	**2469.8**	**723.6**	**52.3**	**25429.1**
(%)		**(8.4)**	**(31.5)**	**(47.4)**	**(9.7)**	**(2.8)**	**(0.2)**	**(100)**

Actual length of Classes C and D in 1999	**1169 km**
Actual length of Classes C and D in 2005	**776 km**
Target length of Classes C and D by end 2006	**818 km**
Actual change in length of Classes C and D 1999 to 2005	**- 393 km (-34%)**
Target change in length of Classes C and D 1999 to 2006	**-351 km (-30%)**

* Figures for 2000 are slightly amended from those previously reported due to inclusion of a toxic substances classification previously accidentally omitted in one area.

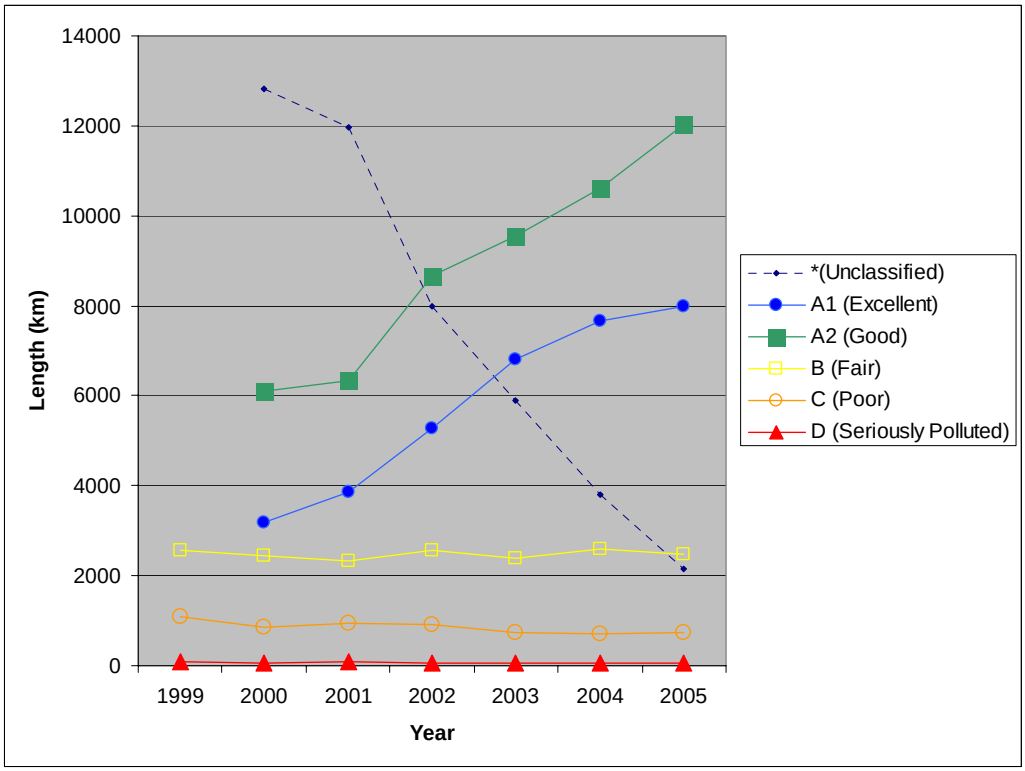

Figure 1: river lengths (km) 1999-2005

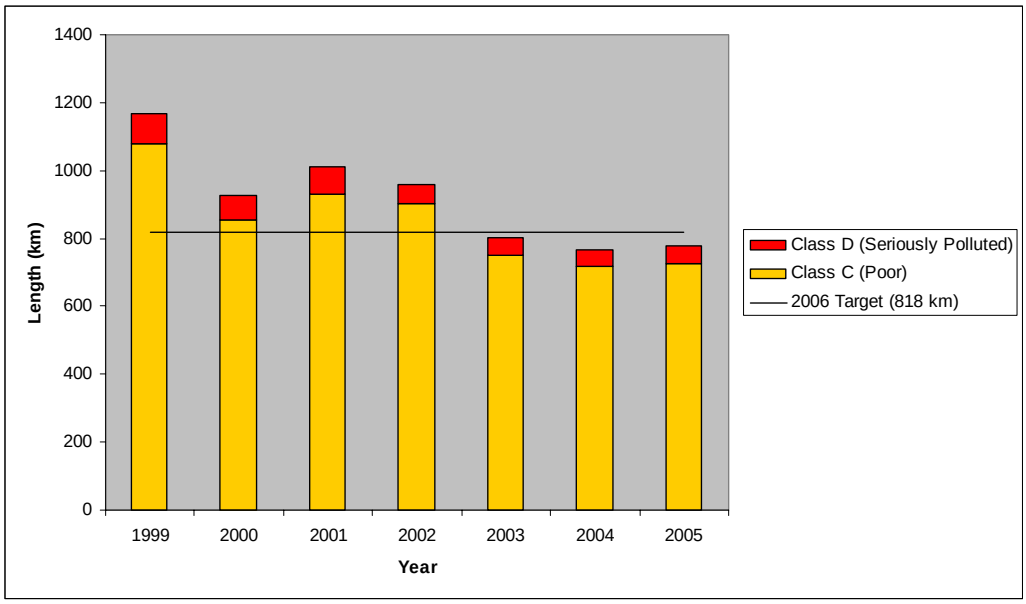

Figure 2: class C and D river lengths (km) by year and 2006 target

Throughout Scotland, the length of rivers classified has been extended by the addition of many new biology monitoring sites which are monitored on a once in three year basis unless problems requiring investigation are found. The total length of class B, C and D river waters remained virtually unchanged between 2004 and 2005, indicating that the majority of the 1,500 km of waters newly monitored in 2005 were of either excellent (A1) or good (A2) quality. This maintains the trend established in recent years, resulting in substantial increases in the length of class A1 and A2 waters. This is encouraging, since it is both a SEPA objective and WFD requirement to prevent the deterioration of high and good quality waters.

Freshwater Improvements

In Caithness, collection tanks that receive surface water from the Wick Airport runway and release it slowly to sewer have been constructed. Subsequently, gradual improvement has been seen in all three of the drainage channels surrounding the airport. The North Ditch at the north end of Wick Airport's runway has shown a marked improvement over previous years. In 1999 it was class D and is currently class B, with an upgraded length of 1.2 km.

In Aberdeenshire, closure of the Kintore Knackery has resulted in downstream water quality improvements. 2.8 km of the Tuach Burn has improved from class D in 2003 and 2004 to class A2 in 2005. The burn has also shown improvement further downstream at the A96 road bridge, with 5.3 km upgraded from class C in 2003 and 2004 to A2 in 2005.

In Aberdeen itself, 0.3 km of the West Tullos Burn at the entrance to the Dee has also shown steady improvement since 1999 when it was class D, achieving a class C in 2004 and class B for the first time in 2005. These upgrades may be due to ongoing regulation and improved working practices on the West Tullos Industrial Estate, but with continuing urban run-off pressures, there is no guarantee that the watercourse will remain at class B.

South of Aberdeen, on the Glasslin Burn, there have been improvements at a local farm and (to a lesser extent) at the Kineff Waste Water Treatment Works (WWTW). The combined effect of these improvements has resulted in a 0.9

km stretch of the Glasslin Burn downstream of Kineff improving from class C in 2004 to A2 in 2005.

Continuing south to Fife, reduced discharge of sewage from Ballingry Pumping Station helped improve 0.8 km of the Lochty Burn from class C to class B. The ageing pumps were replaced in 2004 and the new pumps work more effectively reducing storm overflows and discharges due to pump malfunction. Elsewhere in Fife, following improvements to the drainage systems at Bucklyvie Farm, 1.4 km of the East Bucklyvie Burn improved from class C to class B.

In the Falkirk and West Lothian area, 4.0 km of the River Carron improved from class C to class B following upgrades to the Larbert low level and Cauldhame sewer networks. Meanwhile, improved performance at Bathgate WWTW contributed to a 3.2 km upgrade from class C to class B on the Couston Water.

Following a farm inspection survey by SEPA and a successful programme of remedial works, 9.2 km of the Caldons Burn in Galloway improved from class C to class B. On the same burn, the Stoneykirk WWTW was recently replaced under Scottish Water's Q&S II investment programme, and the new reedbed has just been commissioned. SEPA expects further water quality improvements to accrue in light of this work.

Also in Galloway, SEPA completed a detailed inspection survey of all farms within the Sandmill Burn catchment area. Inputs to the burn ranged from small dairy washing drains to large courtyard runoff from hardstanding areas to poor farm management. All farms were contacted with agreed remedial programmes with all identified work having been completed by spring 2006. This work secured an upgrade from class B to class C for 8.7 km of watercourse.

The catchment has been heavily modified via land drainage works and the burn riparian zone is small. However, in the lower sections there are wetlands and marshland areas that will hopefully seed the ecology in the catchment and lead to further ecological improvements. Officers will re-inspect the farms during summer 2006 to gauge improvement.

In Renfrewshire, as part of Scottish Water's Q&S II investment programme, both Johnstone WWTW and Linwood WWTW closed in December 2004 with both effluents being diverted to the Clyde Estuary via the new Erskine WWTW. Downstream chemical water quality had shown an immediate improvement and now ecological improvements are beginning to be seen. 2.4 km of the lower reaches of the Black Cart Water improved considerably from class C to class B and A2 in 2005.

The Mouse Water catchment in the Clyde Valley has historically been affected by ferruginous (iron bearing) mine water from abandoned mines. The existing minewater adit on the site discharges ochreous waters to the river. The very small iron-rich particles cause a pronounced turbidity in the water, and in severe cases can coat the riverbed, smothering invertebrates. In previous years Iron levels in the catchment averaged over 2.0mg l^{-1}, which resulted in SEPA classifying the river as class C (poor).

A mine water treatment system was completed by the Coal Authority in November 2004, as part of a programme being implemented across Scotland. The treatment system is completely passive with no pumping arrangement required to lift the water to the surface. Minewater is picked up at source from the existing adit from where it first broke out, and is then channelled to a large

settlement lagoon (8500m^3). During its time in the lagoon, the concentration of iron in the minewater is reduced to less than 10mg l^{-1}. This is approximately the maximum concentration in which reeds can grow and survive.

After primary treatment in the lagoon, the minewater passes via a channel and into the secondary treatment phase. This takes the form of two reedbeds which together have a surface area of 0.8 hectares. The partially treated minewater passes through the two reedbeds undergoing further treatment and final polishing before the remediated water is passed into the Mouse Water itself.

As a result of this work and SEPA's continued Environmental Improvement Action Plan, 6 km of the Mouse Water has improved from class C to class B, and further improvements are anticipated.

In Sutherland, a clean-up of the Clachan Burn at Bettyhill by the Highland Council has resulted in an upgrade of 3.5 km of class C watercourse in 2004 to class A2 in 2005.

Poor Quality Freshwaters, and Downgrades

Not all recorded water quality changes were positive. Numerous streams of borderline quality inevitably fluctuate between adjacent classes, but other changes are due to identified causes. This section describes some specific pollution problems and also notes some continuing issues.

In the Inverness area, 0.6 km of the Allt na Frithe downstream of Tomatin Distillery was downgraded from A2 in 2004 to C in 2005 due to a breach of the Environmental Quality Standard (EQS) for copper. The reasons for this are unclear as all spent lees and pot ale are tankered off site and spread to land. It is possible that the watercourse has been contaminated by an unknown source or that there may be high background copper levels in the water.

In Aberdeenshire, 1.3 km of the Blackwater downstream of Total Oil Marine was downgraded from class B in 2004 to C in 2005 due to poor dissolved oxygen results. This watercourse had been class B for the previous few years, but its quality is known to fluctuate.

Further south, 5.3 km of the River Ore in Fife deteriorated from class A2 to class C. It is possible that this was due to a leakage of sewage from the Ore Valley Sewer. The sewer is in a very poor condition due to corrosion at a number of points along the river and depending on the river flow, this leakage is having a detrimental effect on water quality. A contract has recently been let by Scottish Water for extensive refurbishment of the sewer starting in mid 2006.

Also in Fife, 6.6 km of the Lochgelly Burn downstream of Cowdenbeath remained at class D. Scottish Water have frequent overflow problems at Cowdenbeath Pumping Station which are likely to take several years to resolve, hence the classification of this burn is not likely to improve in the near future.

In West Lothian, SEPA has been examining flow data from the River Almond downstream of East Calder WWTW. This is to determine whether the works are the cause of a 5.2 km downgrade from class B to class C. Further downstream on the same river, another 2.2 km were downgraded from class B to class C, and SEPA will assess the performance of Newbridge WWTW to ascertain whether this is contributing to this downgrade.

Just to the south of Edinburgh, 3.5 km of the Swanston Burn were downgraded from class B to class C. The quality of this burn fluctuates, and Scottish Water have taken action to rectify two identified wrong connections in the Swanston Estate area. Furthermore, there are proposals to divert the Swanston Burn out of its culvert across a field to the east and in doing so to connect a septic tank to the adjacent foul sewer. These developments will make a positive contribution to the quality of the burn.

Moving to the south west, 5 km of the Black Grain Burn in Dumfries were downgraded from class A2 to class D. This followed a pollution incident in which farm slurry was allowed to enter a surface water drain. Although the farmer moved to rectify the situation very quickly, this is a good example of how, in any one year, significant lengths of watercourse are affected by acute, short-term incidents.

In Dalbeattie, 7.7 km of the Buittle Burn were downgraded from class B to class C due to the presence of large amounts of sewage fungus. It is likely that this fungus comes from an agricultural source, and SEPA is planning further farm inspections in the catchment.

The presence of sewage derived debris, burnt cars and shopping trolleys resulted in 7.4 km of the Wellshaw Burn in Hamilton being downgraded from class A2 to class C. Biological monitoring indicates that if this detritus were removed, the burn would be of reasonably good quality.

An un-named Tributary of the Rhiconich Burn in Sutherland exhibited increased ammonia levels throughout 2004 causing a downgrade of 0.3 km from class B in that year to a class C in 2005. This is thought to be attributable to the fact that 2002 and 2003 were dry years and ammonia did not leach out from the landfill site so readily. The wet weather of 2004 has caused leaching of ammonia despite the landfill having been capped 4 years ago. It is likely to take several years before the ammonia levels stabilise.

In the Western Isles, 0.1 km of the burn downstream of North Uist Fisheries Langass Hatchery was downgraded from class B in 2004 to C in 2005. Prior to this the watercourse had been consistently A2. This downgrade may be due to increased stocking density at the site and installation of a recirculation unit in 2005.

SEPA will continue to investigate all significant instances of deterioration in water quality. Once the cause(s) is established, then appropriate regulatory, monitoring or 'environmental improvement plan' actions will be taken with a view to delivering recovery. SEPA has developed strong partnerships with a number of stakeholders and external organisations to raise awareness of water quality issues. The help of others is often required to devise or implement solutions to improve the water quality for specific stretches where the work required is non-regulatory.

3. Estuarine Water Quality

Overall estuarine water quality data for 1999 – 2005 is shown in Table 2 below. The outcome in 2005 was similar to that in 2004, which is encouraging given that the weather was generally drier in 2005, particularly for the Clyde estuary. Wetter weather results in higher river inflows to the major estuaries and consequent higher dilution and greater mixing, which in turn improves oxygen

levels. Warning was given with the 2002 results that they were exceptionally good due to the wet weather that year. It is because of these clearly weather induced changes that a three year average figure is now included, as this gives a clearer picture of the overall trend of gradual improvement. The sediments of Scotland's major industrialised estuaries will continue to carry a burden of organic matter and some toxic contaminants from historic discharges for many years to come.

Table 2: Estuarine water quality classification for the years 1999 to 2005

	Year	A Excellent	B Good	C Unsatis.	D Seriously Polluted	Total
Area km^2	1999	633.3	143.6	31.6	0.9	809.4
(%)		(78.2)	(17.7)	(3.9)	(0.1)	(100)
Area km^2	2000	637.0	132.9	38.2	1.2	809.3
(%)		(78.7)	(16.4)	(4.7)	(0.1)	(100)
Area km^2	2001	668.6	116.5	23.3	1.1	809.5
(%)		(82.6)	(14.4)	(2.9)	(0.1)	(100)
Area km^2	2002	653.2	140.7	14.6	0.8	809.4
(%)		(80.7)	(17.4)	(1.8)	(0.09)	(100)
Area km^2	2003	658.6	122.9	27.0	0.9	809.4
(%)		(81.4)	(15.2)	(3.3)	(0.1)	(100)
Area km^2	2004	696.1	92.3	20.9	0.2	809.5
(%)		(86)	(11.4)	(2.6)	(0.02)	(100)
Area km^2	**2005**	**692.4**	**95.0**	**21.7**	**0.2**	**809.5**
(%)		**(85.5)**	**(11.7)**	**(2.7)**	**(0.02)**	**(100)**

Actual area of classes C and D in 1999	**32.5 km^2**
Actual area of Classes C and D in 2005	**21.9 km^2**
Target area of Classes C and D by end 2006	**26 km^2**
Actual change in area of Classes C and D 1999 to 2005	**-10.6 km^2 (-33%)**
Target change in area of Classes C and D 1999 to 2006	**-6.5 km^2 (-20%)**

If estuary class C and D totals are presented as a three-year rolling average total, to smooth over the effect of single wet or dry years, the overall improvement trend is clearer (see Fig. 3):

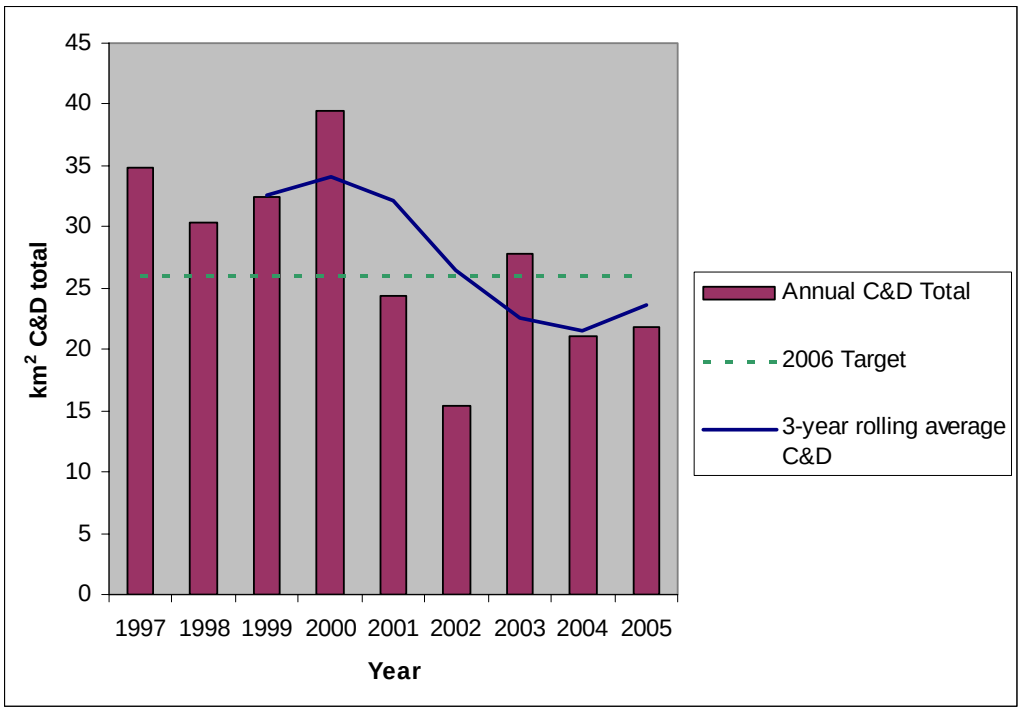

Figure 3: Annual totals and three year rolling average for class C and D estuarine waters.

Improvements

On the west coast, good oxygen levels in the Gareloch resulted in 9.4 km^2 being upgraded from class B to class A. Otherwise, there were no improvements in estuarine waters in 2005.

Poor Quality Waters, and Deteriorations

In the North, a small portion of the Cromarty Firth (0.1 km^2) adjacent to the Dalmore Distillery in Alness was downgraded from class A to class C. This was due to contamination of the distillery cooling water discharge with effluent from other sources on the site. The issue is currently being addressed.

On the east coast, the Montrose Basin remained class A although there are concerns that the extensive coverage of the basin by opportunistic green algae may result in downgrading under the Water Framework Directive. The physical characteristics of the basin make it susceptible to algal growth. The River South Esk is the main source of the nitrate which promotes algal growth, but concentrations in the river should decrease following designation of the catchment as a Nitrate Vulnerable Zone.

In 2002, sand was added along Montrose Beach front and at the mouth of the South Esk estuary to build up the beach level. This reduced the biodiversity in the area, with the result that 0.1 km^2 were downgraded to class B. The last Montrose Beach and South Esk estuary survey in September 2003 reported a slight recovery of the intertidal fauna. SEPA waits to see evidence of further recovery and stabilisation of the fauna before upgrading to class A. Therefore, 0.1 km^2 of the South Esk remains at class B.

Further south on the East coast, all of the unsatisfactory 11.7 km^2 of class C estuarine area is within the Forth Estuary. Most of this estuary is Class B, but some intertidal areas are downgraded to class C as a result of historic discharges. There is also an area of class C in the upper estuary resulting from occasional low dissolved oxygen concentrations during summer months.

The Forth Estuary is not expected to achieve class A because of its inherently turbid nature and the large number of industrial and domestic waste discharges it receives. However, there are areas where improvements may be achieved. These are:
(i). The upper estuary, where there is evidence that the dissolved oxygen status is improving as a result of the decrease in discharges of organic waste. Future nitrification at Stirling WWTW is also expected to improve dissolved oxygen concentrations.
(ii) 6 km^2 of mudflat around Grangemouth remains at class C. Recent evidence suggests that the rate of improvement of the biology has slowed, and one-year changes are now within the range of natural variability.
(iii) The closure of Caldwells Paper Mill may lead to improvements in the future, but Inverkeithing Bay remains in class C at present.

In the west, the Cart Estuary remains heavily impacted from benthic disturbance, aesthetic problems from Paisley WWTW and Combined Sewer Overflow (CSO) discharges. An oil spill in 2004 further stressed the White Cart Estuary resulting in Classes C and D persisting.

Water quality in the Clyde estuary was slightly poorer in 2005 than the previous year. 12.2km^2 were downgraded from Class A to Class B and 0.71km^2 from B to C due to seasonally lower dissolved oxygen (DO) levels and aesthetics complaints, particularly between Erskine and Ardmore. Historical chromium contamination manifested itself in some high levels being recorded although the Environmental Quality Standard arising from the EU Dangerous Substances Directive has not been breached.

The seasonal and weather dependent flushing of the Clyde system is unlikely to change. The Glasgow Strategic Drainage Plan (GSDP) Water Quality report confirms that even with **all** sewerage inputs removed, the estuary would still struggle to meet Class B consistently due to the poor flushing mechanism of the upper estuary.

4. Coastal Water Quality

As shown in Table 3 below, the headline length of unsatisfactory coastal water has been reduced by almost two thirds since 1999. This substantial improvement is primarily due to the big improvements in treatment of sewage discharges delivered and being delivered by the Scottish Water capital investment programmes Q&S1 and Q&S2, and work to reduce diffuse inputs. Further quality improvements arising from these programmes will be delivered and the overall improvement target for 2006 will be surpassed. The summer of 2005 was particularly notable for the good results achieved at designated bathing waters, it being the first season ever that all waters in the south west met mandatory European standards. More details are given in SEPA's Bathing Waters Monitoring Report (http://www.sepa.org.uk/publications/bathingwaters/index.htm).

Table 3: Scottish coastal waters classification for the years 1999 to 2005

	Year	A Excellent	B Good	C Unsatis.	D Seriously Polluted	Total
Length km (%)	1999*	10906.4 (92.4)	569.4 (4.8)	271.3 (2.3)	50.3 (0.4)	11797 (100)
Length km (%)	2000†	10979.8 (93.1)	556.3 (4.7)	224.7 (1.9)	37.1 (0.3)	11798 (100)
Length km (%)	2001	10995.9 (93.2)	559.7 (4.8)	217.5 (1.8)	24.8 (0.2)	11798 (100)
Length km (%)	2002	11032.4 (93.5)	549.6 (4.7)	191.6 (1.6)	22.9 (0.2)	11796 (100)
Length km (%)	2003	11080 (94.0)	566.5 (4.8)	127.7 (1.1)	22.3 (0.2)	11796 (100)
Length km (%)	2004	11091.1 (94.0)	568.3 (4.8)	123.6 (1.0)	11.6 (0.1)	11794.6 (100)
Length km (%)	**2005**	**11102.9 (94.1)**	**579.0 (4.9)**	**101.6 (0.9)**	**11.2 (0.09)**	**11794.8 (100)**

Actual length of Classes C and D in 1999	**322 km**
Actual length of Classes C and D in 2005	**113 km**
Target length of Classes C and D by end 2006	**176 km**
Actual change in length of Classes C and D 1999 to 2005	**-209 km (-65%)**
Target change in length of Classes C and D 1999 to 2006	**-145 km (-45%)**

*1999 figures have been corrected relative to some earlier SEPA publications to take account of data for some islands which was unavailable at that time.
†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.

Presenting coastal waters quality trends as a three-year rolling average total smoothes out the obvious influence of particularly wet or dry years as shown below in Figure 4:

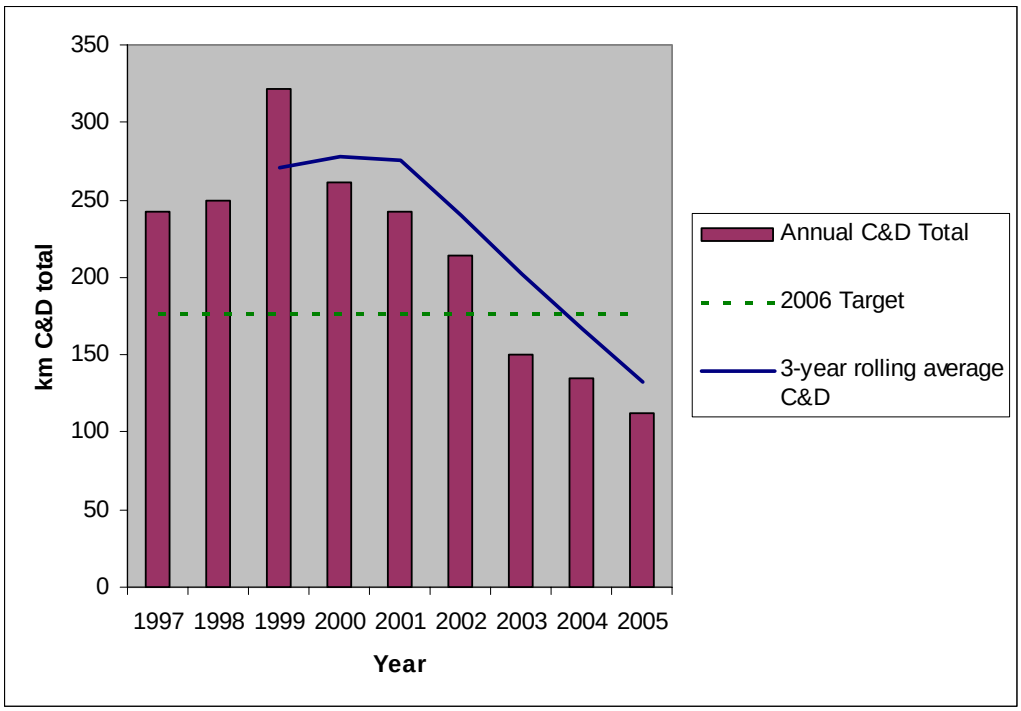

Figure 4: Annual totals and three year rolling average for class C and D coastal waters.

Improvements

In Shetland, following improvements to sewage discharges at Scatness and Weisdale Houses, 1 km of the coastline was upgraded from class C to class A.

In southwest Scotland, there has been particular emphasis on reducing diffuse pollution from agriculture. One notable success was the first time achievement of EU bathing water standards at Ettrick Bay (Isle of Bute), resulting in its upgrading to a Class B (1.3 km). Continuing investments by Scottish Water, such as the long-awaited commissioning of waste water treatment at Millport on Cumbrae also helped. Subsequent improvements in bacteriological quality at Ayr, Heads of Ayr, Doonfoot, Irvine Beach, Millport Bay, Culzean and Croy gave an upgrading of 21.8 km of the Ayrshire coastline into Class B .

A marked improvement in microbiological and aesthetic quality was also recorded at a number of recreational stretches in Ayrshire and Arran. Most of the downgrades attributed to the wet weather of 2004 were reversed in 2005. On the Isle of Arran, upgrades were recorded at; Brodick, Blackwaterfoot, Lamlash, Corrie, Lochranza, and Pirnmill. Improved aesthetics at Rothesay Bay, Craignure, Ardrishaig and Garroch Head shore resulted in a further 0.3 km going into Class B, while Lingerton returned to Class A.

The welcome statutory phasing out of Tributyl Tin (TBT) as an anti-foulant on ships is giving positive environmental benefits. Improvements have previously been noted elsewhere, and for 2005 in northwest Scotland, 2 km of the coastline around Lochinver Harbour was upgraded from class C to class B.

Poor Quality Waters, and Deteriorations

In the Moray Firth, 1.0 km of the designated bathing water at Nairn East beach was downgraded from class A to class C, following a failure to meet the mandatory

standards of the Bathing Waters Directive. Recent years have seen considerable improvements to Nairn WWTW, and to works located further inland that discharge to the River Nairn. Bathing water quality in this area is usually very good, so the occurrence of this failure was therefore a disappointment. SEPA is investigating the suspected occurrence of unauthorised sewage discharges during the early part of the bathing season.

Another failure to meet bathing waters standards occurred at Stonehaven, resulting in 0.7 km being downgraded from class B to class C. Here, improvements to the local public sewerage infrastructure, to comply with the EU Urban Waste Water Treatment Directive, were planned to be completed by 2004. Sewage effluent from Stonehaven was to be pumped to the main Aberdeen treatment plant and long sea outfall at Nigg Bay. However, there have been delays in securing planning permission for the required pumping station. The matter was eventually resolved in January 2006 following a public planning enquiry, but it is unlikely that the pumping station will be ready until the start of the 2008 bathing season. In order to provide some protection of the bathing waters prior to the completion of the connection to Nigg, Scottish Water will continue to disinfect the sewage effluent discharged via the Stonehaven outfall on incoming tides during the bathing water season. The disinfection, using hypochlorite solution, is not carried out on the ebb tide, as this could deter salmon from running up the adjacent rivers.

In the Firth of Forth, unsatisfactory discharges at Lower Largo and St. Cyrus should be dealt with by Scottish Water under Q&S2. This should lead to upgrades in these areas within the next few years. Unfortunately, the construction of the new WWTW at Dunbar (Belhaven) has been delayed due to land acquisition problems and is now unlikely to be completed before the end of the 2007 bathing season. This should bring improvements here to the designated shellfish waters which are currently failing to meet guideline values for bacteriological quality. The only stretch of class D water in the south east, 0.2 km at Granton Point in Edinburgh, is expected to improve as the Shanks works are now closed and the site is being remediated.

Further south at Eyemouth, 0.3 km were downgraded from class B to class C following the failure of the designated bathing water to meet mandatory standards for the first time since 2000. SEPA is investigating potential sources of bacteriological contamination to both the Eye Water and the North Burn, which flow into the bathing water. These sources include storm overflows from Eyemouth's sewer network, and runoff from surrounding grazing land.

Moving round to the west coast, downgrades to class D persist offshore at Holy Loch (2 km) and Garroch Head on the Isle of Bute (also 2 km), both due to historical impacts on sediments from spoil dump grounds. The sewage discharges at Campbeltown still lead to complaints in Campbeltown Loch where 1.0 km remains Class D. In South Ayrshire, 0.5 km are downgraded to class D due to the aesthetic impact of untreated sewage discharges at Dunure, whilst at Tobermory on the Isle of Mull a further 0.1 km are similarly downgraded. Construction of sewage treatment works at Tobermory, and other sites on Mull, will be completed during 2006.

Although all EU designated bathing waters in south west Scotland met mandatory standards in 2005, poor microbiological quality at Barassie, Seamill and Inverkip meant that 5.6 km of coastline deteriorated to class C.

5. Conclusions

2005 saw further improvements in coastal water quality across Scotland, while river and estuarine water quality remained little changed from that in 2004. Looking beyond the one-year changes and classification fluctuations, some of which are affected by

uncontrollable factors such as rainfall, good long-term improvement continues to be evident. More new 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 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. Current EU Common Agricultural Policy (CAP) reform proposals also appear likely to eventually deliver some environmental quality improvements. 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 European Water Framework Directive (WFD). This Directive will increasingly influence all water and water habitat improvement programmes. It has already resulted in the introduction of new regulatory regimes for abstractions and engineering works, thereby bringing under control many activities which impact on ecological quality, but which have not previously been subject to direct regulation. Scotland's 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.

6. Future Quality Assessments

Future water quality work will be increasingly dominated by continuing implementation of the WFD. However, it is intended to maintain the existing water quality assessments as reported here until at least 2006, for reporting in 2007. The rivers and coastal results reported here are now all available via SEPA's web-site GIS which includes location search facilities (see: http://www.sepa.org.uk/rqc/map.asp). Reports outlining the first WFD "characterisation" of all relevant Scottish waters are also available on the web-site, backed up by database search facilities (see: http://www.sepa.org.uk/wfd/index.htm). It is inevitable, for various reasons, that the characterisation reports present an apparently less rosy view of the quality of our water environment.

The most significant reason for this less positive view is the wider range of pressures which have to be considered for the purposes of the WFD. The assessments reported in this and previous SEPA water quality reports concentrate mainly on the effects of discharges and diffuse inputs of potential pollutants. For WFD characterisation, account is also taken of water abstractions, impoundments and engineering works such as river straightening, which may also impact overall ecological quality in ways not measured by the current classification schemes.

Also very significant is the fact that characterisation is a risk assessment, rather than a classification (though the two are linked), and that the WFD "good status" quality target is defined by the Directive as being well up the quality spectrum. It is appropriate that a slightly precautionary estimate of this quality target has been taken at the characterisation stage, particularly in respect of the currently unregulated and less well understood hydrological and engineering pressures.

Finally, characterisation assessment by water bodies, rather than by the stretches currently classified has some effect. The current stretches are sometimes quite short (perhaps between a discharge point and confluence with a cleaner or larger stream), whereas the WFD water bodies are mostly larger, and take the overall quality of the poorest stretch within them. This implies that a 3 km poor stretch could result in the whole of a 10 km water body being regarded as failing to meet WFD quality standards.

Ends.
June 2006.