

## Quality of non-tidal rivers and canals

Since 1978 the water quality of inland waters has been reported according to a classification system devised by the former National Water Council (NWC). Reaches of rivers and canals were classified from Good quality (Classes 1A and 1B) to Bad quality (Class 4) and broadly defined the suitability of water bodies for particular uses. The various NWC classes could be summarised as:

Class 1A	Water of high quality; suitable for potable supply and all other abstractions, game or other high class fisheries and of high amenity value.
Class 1B	Water of less high quality than Class 1A but usable for substantially the same purposes.
Class 2	Waters suitable for potable supply after advanced treatment, supporting reasonably good coarse fisheries; moderate amenity value.
Class 3	Waters polluted to an extent that fish are absent or only sporadically present. May be usable for low grade industrial abstractions. Considerable potential for further use if cleaned up.
Class 4	Waters which are grossly polluted and likely to cause nuisance.

The NWC classification was based on levels of dissolved oxygen, biochemical oxygen demand and ammoniacal nitrogen with additional determinants to take account of the water quality requirements for freshwater fish and abstraction for potable supply. The application of these additional determinands and the lack of strict rules for the overall application of the NWC scheme resulted in its inconsistent application across England and Wales and between individual surveys.

## Anlanwol ansawdd afonydd a chamlesi

Ers 1978 adroddir ar ansawdd dŵr dyfroedd mewndirol yn ôl system ddosbarthu a ddyfeisiwyd gan y cyn Gyngor Dŵr Cenedlaethol (NWC). Dosbarthwyd rhannau o afonydd a chamlesi o Ansawdd dda (Dosbarthiadau 1A ac 1B) i Ansawdd wael (Dosbarth 4) a diffiniodd y system yn fras briodoldeb dyfroedd at ddibenion penodol. Gellid crynhoi'r gwahanol ddosbarthiadau'r NWC fel a ganlyn:

Dosbarth 1A	Dyfroedd o ansawdd uchel; yn addas ar gyfer cyflenwadau dŵr yfed a phob echdyniad arall, helfilod neu bysgodfeydd safon uchel eraill ac o werth amwynder uchel.
Dosbarth 1B	Dŵr o ansawdd lai uchel na Dosbarth 1A ond sy'n ddŵr y gellir ei ddefnyddio i raddau helaeth at yr un dibenion.
Dosbarth 2	Dyfroedd sy'n addas ar gyfer cyflenwadau dŵr yfed ar ôl ei drin ymlaen llaw, ac sy'n cynnal pysgodfeydd breision sy'n rhesymol dda; gwerth amwynder cymedrol.
Dosbarth 3	Dyfroedd sydd wedi'u llygru i'r graddau nad oes pysgod ynddynt neu lle nas ceir ond yn achlysurol. Gellir eu defnyddio ar gyfer echyniadau diwydiannol gradd isel. Posibilrwydd sylweddol ar gyfer defnydd pellach os cânt eu glanhau.
Dosbarth 4	Dyfroedd sydd wedi'u llygru'n ormodol ac sy'n debyg o achosi niwsans.

Yr oedd dosbarthiad yr NWC yn seiliedig ar lefelau o ocsigen toddedig, y galw am ocsigen biocemegol a nitrogen amonaid gyda phenderfynyddion ychwanegol i gymryd i ystyriaeth ofynion ansawdd dŵr ar gyfer pysgod dŵr croyw ac echdyniadau ar

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These inconsistencies compromised the value of the NWC scheme for supporting the assessment of water quality on a national basis. Consequently a new water quality classification scheme was required.

The Water Resources Act (1991) provided the Secretaries of State for the Environment and for Wales with the power to introduce new water quality classification schemes. In accordance with its role in advising the Secretaries of State, the National Rivers Authority (NRA) proposed a new General Quality Assessment (GQA) scheme to replace the NWC scheme for the purpose of periodically assessing water quality. This was introduced by the Government in its consultation paper 'River Quality' in 1992.

It is designed to provide an accurate and consistent assessment of the state of water quality and changes in this state over time. The scheme consists of separate windows on water quality. The Chemical GQA describes quality in terms of chemical measurements which detect the most common types of pollution. It allocates one of the six grades (A to F) to each stretch of river.

The GQA scheme assesses the chemical results against standards expressed as percentiles. These are values which the chemical determinand should not exceed, or fall below in the case of the dissolved oxygen (NRA 1994). There are standards for biochemical oxygen demand (BOD), ammonia and dissolved oxygen (DO).

gyfer cyflenwadau dŵr yfed. Arweiniodd defnydd y penderfynyddion ychwanegol hyn a'r diffyg rheolau caeth ar gyfer defnydd cyffredinol cynllun yr NWC at ddefnydd anghyson o'r cynllun ledled Cymru a Lloegr a rhwng arolygon unigol. Rhagfarnodd yr anghysondebau hyn werth cynllun yr NWC ar gyfer cynnal yr asesiad ansawdd dŵr yn genedlaethol. O ganlyniad yr oedd angen cynllun dŵr newydd ar gyfer dosbarthu ansawdd.

Rhoes Deddf Adnoddau Dŵr (1991) bŵer i Ysgrifennydd Gwladol Cymru a'r Ysgrifennydd Gwladol dros yr Amgylchedd gyflwyno cynlluniau dosbarthu ansawdd dŵr newydd. Yn unol â'i swyddogaeth o gynghori'r Ysgrifenyddion Gwladol, cynigiodd yr Awdurdod Afonydd Cenedlaethol gynllun Asesu Ansawdd Cyffredinol (GQA) newydd i ddisodli cynllun yr NWC er mwyn asesu ansawdd dŵr o bryd i'w gilydd. Cafodd hwn ei gyflwyno gan y Llywodraeth yn ei phapur ymgynghori 'River Quality' ym 1992.

Fe'i cynlluniwyd i ddarparu asesiad cywir a chyson o gyflwr ansawdd y dŵr ac unrhyw newidiadau yn y cyflwr hwn dros gyfnod o amser. Mae'r cynllun yn cynnwys golygon ar wahân ar ansawdd dŵr. Mae'r GQA Cemegol yn disgrifio ansawdd yn nhermau mesuriadau cemegol sy'n canfod y mathau mwyaf cyffredin o lygredd. Mae'n clustnodi un o chwe gradd (A i F) i bob darn o'r afon.

Mae'r cynllun GQA yn asesu'r canlyniadau cemegol yn erbyn safonau wedi'u mynegi fel canraddau. Mae'r rhain yn werthoedd na ddylai'r penderfynydd cemegol fynd drostynt, neu ddisgyn odanynt yn achos ocsigen toddedig (AAC, 1994). Mae yna safonau ar gyfer y galw am ocsigen biocemegol (BOD), amonia ac ocsigen toddedig (DO).

Ammonia and BOD are indicators of pollution which apply widely to rivers because of the potential risk of pollution from sewage or farms. Dissolved oxygen is essential to aquatic life. A grade is assigned to each river length according to the lowest standard achieved by any of the three chemical determinands. There is a degree of error in assigning grades because of the practical constraints on the number of samples that can be taken. This can be calculated and is taken into account in interpreting the results.

### The Chemical Component of the GQA for Rivers and Canals

Details of the chemical component of the GQA for rivers and canals can be found in the 1990/92 River Quality Survey report (Ref: NRA 1994a) which presents the results of applying the Scheme to data collected for the 1990 River Quality Survey and the following two years. The table below summarises the grade limits for the new scheme.

#### Table - Chemical Component of GQA Scheme for Rivers and Canals

Chemical GQA grades can be summarised as follows:

Grade	GQA	Dissolved oxygen (% saturation) 10 percentile	BOD (ATU) mg/l 90 percentile	Total ammonia as N mg/l 90 percentile
A	Good	80	2.5	0.25
B	Good	70	4	0.6
C	Fair	60	6	1.3
D	Fair	50	8	2.5
E	Poor	20	15	9.0
F	Bad	<20	-	-

Mae amonia a BOD yn ddangosyddion llygredd sy'n gymwys iawn i afonydd oherwydd y risg posibl o lygredd o garthion neu ffermydd. Mae ocsigen toddedig yn hanfodol ar gyfer bywyd dyfrol. Rhoddir gradd i bob darn afon yn ôl y safon isaf a gyrhaeddir gan unrhyw un o'r tri phenderfynydd cemegol (Atodiad). Mae yna rywffaint o gyfeiliornad wrth ddyrannu graddau oherwydd y cyfyngiadau ymarferol ar nifer y samplau y gellir eu cymryd. Gellir cyfrifo hyn a'i gymryd i ystyriaeth wrth ddehongli'r canlyniadau.

### Cydran Gemegol y GQA ar gyfer Afonydd a Chamlesi

Mae manylion cydran gemegol y GQA ar gyfer afonydd a chamlesi i'w cael yn adroddiad Arolwg Ansawdd Afonydd 1990/92 (Cyf: AAC 1994a) sy'n cyflwyno'r canlyniadau a gafwyd wrth gymhwyso'r Cynllun at ddata a gasglwyd ar gyfer Arolwg Ansawdd Afonydd 1990 a'r ddwy flynedd canlynol. Mae tabl isod yn crynhoi cyfyngiadau'r graddau ar gyfer y cynllun newydd.

#### Tabl - Cydran Gemegol Cynllun GQA ar gyfer Afonydd a Chamlesi

Gellir crynhoi graddau Cemegol GQA fel a ganlyn:

Gradd	GQA	Ocsigen toddedig (% trwythiad) canradd 10	BOD (ATU) mg/l canradd 90	Cyfanswm Amonia fel N mg/l canradd 90
A	Da	80	2.5	0.25
B	Da	70	4	0.6
C	Gweddol	60	6	1.3
D	Gweddol	50	8	2.5
E	Gwael	20	15	9.0
F	Gwael iawn	<20	-	-

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**Index of River sampling Station numbers**

**Mynegai o rifau Gorsafodded samplu  
afonydd**

	Monitoring station	River	Gorsaf monitro	Afon
1	Glan Alwen Ford	Alwen	Rhyd Glan Alwen	Alwen
2	Ithels Bridge	Alyn	Pont Ithel	Alun
3	Pont Dafydd, St Asaph	Clwyd	Pont Ddafydd, Llanelwy	Clwyd
4	Pickhill Bridge	Clywedog	Pont Pickhill	Clywedog
5	Overton Bridge	Dee	Pont Owrtyn	Dyfrdwy
6	Gipsy Lane	Elwy	Gipsy Lane	Elwy
7	Canaston GS	E. Cleddau	GS Canaston	Cleddy Ddu
8	Prendergast GS	W. Cleddau	GS Prendergast	Cleddy Wen
9	Penybont Bridge	Rheidol	Pont Ben-y-bont	Rheidol
10	Clog-y-fran GS	Taf	GS Clog-y-frân	Taf
11	Llechryd Road Bridge	Teifi	Pont Llechryd Road	Teifi
12	Nantgaredig GS	Tywi	GS Nantgaredig	Tywi
13	Rhydyfelin Road Bridge	Ystwyth	Pont Rhydyfelin Road	Ystwyth
14	Ponthir Weir	Lwyd	Cored Bont-hir	Llwyd
15	Rhiwderin GS	Ebbw	GS Rhiwderin	Ebwy
16	Chain bridge	Usk	Pont grog	Wysg
17	Betws y Coed	Conwy	Betws-y-coed	Conwy
18	Dolbenmaen Bridge	Dwyfor	Pont Ddolbenmaen	Dwyfor
19	Maentwrog Road Bridge	Dwryd	Pont Maentwrog Road	Dwryd
20	Machynlleth	Dyfi	Machynlleth	Dyfi
21	Pont-y-Garth Llanegryn	Dysynni	Pont-y-garth, Llanegryn	Dysynni
22	Pont Croesor Prenteg	Glaslyn	Pont Groesor, Pren-teg	Glaslyn
23	Bontnewydd	Gwyrfa	Bontnewydd	Gwyrfa
24	Ganllwyd	Mawddach	Ganllwyd	Mawddach
25	Talybont	Ogwen	Tal-y-bont	Ogwen
26	Dolgellau	Wnion	Dolgellau	Wnion
27	Merthyr Mawr	Ogmore	Merthyr Mawr	Ogwr
28	New Gauging Weir	Clywedog	Cored Fesur Newydd	Clywedog
29	Glyn Footbridge	Elan	Pont Gerdded Glyn	Elan
30	Caersws	Severn	Caersws	Hafren
31	Dolwen Bridge	Severn	Pont Ddolwen	Hafren
32	Llandrinio	Severn	Llandrinio	Hafren
33	Llanidloes	Severn	Llanidloes	Hafren
34	Llanymynech	Vyrnwy	Llanymynech	Efyrnwy
35	Bridge Sollars	Wye	Bridge Sollars	Gwy
36	Redbrook Railway Bridge	Wye	Pont Reilffordd Redbrook	Gwy
37	St Fagans	Ely	Sain Ffagan	Elai
38	Llanedeyrn	Rhymney	Llanedern	Rhymni
39	Blackweir	Taff	Blackweir	Taf
40	Ynys Llŵchwr GS	Loughor	GS Ynys Llŵchwr	Llŵchwr
41	Aberdulais	Neath	Aberdulais	Nedd
42	Morrison Road Bridge	Tawe	Pont Morrison Road	Tawe

**Bacterial quality of bathing waters in  
Wales**

The quality of bathing waters in Wales is monitored in accordance with the EC Directive, 76/160/EEC, which sets out mandatory values for selected aspects of the bacterial quality of water and requires samples to be taken regularly at identified sites during the bathing season, mid-May to

**Ansawdd facterol dyfroedd ymdrochi  
Cymru**

Caiff ansawdd dyfroedd ymdrochi Cymru ei monitro'n unol â Chyfeireb 76/160/EEC y GE, sy'n nodi gwerthoedd gorfodol ar gyfer agweddau detoledig ar ansawdd facterol dŵr ac sy'n ei gwneud yn ofynnol cymryd samplau yn rheolaidd mewn safleoedd a nodwyd yn ystod y tymor ymdrochi, sef o

October. Monitoring is carried out by the National Rivers Authority (NRA) having previously been conducted by the Water Authorities; results are reported to the Department of the Environment and the Welsh Office.

### EC identified bathing waters

Following surveys throughout the UK, in 1986 the Welsh Office identified 47 bathing waters in Wales as coming within the scope of the EC Bathing Waters Directive. A further bathing water was added in 1988 and two more in 1990. In 1991, West Kirby was designated by the Department of the Environment: this site falls within the NRA Welsh Region but is on the English coast and is excluded from Wales totals in the tables. A further five bathing waters were designated in Wales in 1995, another one in 1996, eight in 1997, four in 1998 and two in 1999. The bathing waters are listed in Table 8.13 and their locations are shown on Map 7.

From 1988 the method of compliance has been as follows: to comply with the *E. coli* standard 95 per cent of all samples taken must contain no more than 2,000 *E. coli* per 100ml of water, to comply with the total coliform standard 95 per cent of all samples must contain no more than 10,000 total coliforms per 100ml.

In 1999, 99 per cent of EC designated bathing waters on the Welsh coastline met the European standards. This compares with 94 per cent in 1998 and 94 per cent in 1997.

ganol mis Mai hyd at fis Hydref. Yr Awdurdod Afonydd Cenedlaethol (AAC) sy'n gwneud y gwaith monitro, a wnaed o'r blaen gan yr Awdurdodau Dŵr; adroddir ar y canlyniadau i'r Swyddfa Gymreig ac Adran yr Amgylchedd.

### Dyfroedd ymdrochi a nodwyd gan y GE

Yn dilyn arolygon ledled y DU, nododd y Swyddfa Gymreig 47 o ddyfroedd ymdrochi yng Nghymru ym 1986 a oedd yn dod o fewn cwmipas Cyfeireb Dyfroedd Ymdrochi'r GE. Ychwanegwyd un dŵr ymdrochi pellach ym 1988 a dau arall ym 1990. Ym 1991, dynodwyd West Kirby gan Adran yr Amgylchedd: mae'r safle hwn yn dod o fewn Rhanbarth Cymru'r AAC ond mae ar arfordir Lloegr a heb ei gynnwys yng nghyfansymiau Cymru yn y tablau. Cafodd pum dŵr ymdrochi pellach eu dynodi yng Nghymru ym 1995, un arall ym 1996, wyth ym 1997, pedwar ym 1998 a dau ym 1999. Mae'r dyfroedd ymdrochi wedi'u rhestru yn Nhabl 8.13 a dangosir eu lleoliadau yn Map 7.

O 1988 ymlaen mae'r dull cydymffurfio wedi bod fel a ganlyn: er mwyn cydymffurfio â'r safon *E. coli* rhaid i 95 y cant o'r holl samplau beidio â chynnwys mwy na 2,000 o *E. coli* ym mhob 100ml o ddŵr; er mwyn cydymffurfio â safon gyfanswm y coliformau, rhaid i 95 y cant o'r holl samplau beidio â chynnwys mwy na chyfanswm o 10,000 o goliformau am bob 100ml.

Ym 1999, bodlonodd 99 y cant o ddyfroedd ymdrochi dynodedig y GE ar arfordir Cymru y safonau Ewropeaidd. Mae hyn yn cymharu â 94 y cant ym 1998 ac 94 y cant ym 1997.