Cyfoeth Naturiol Cymru
Natural Resources Wales

Bathing Waters in Wales 2016

Harlech Beach

Contents

Crynodeb Gweithredol

Mae dyfroedd ymdrochi o ansawdd da yn bwysig iawn i gymunedau arfordirol, i ymwelwyr ac i economi Cymru. Yn 2016, llwyddodd 102 o'r 103 dŵr ymdrochi dynodedig yng Nghymru i fodloni'r safonau a bennwyd gan y Gyfarwyddeb Dŵr Ymdrochi. O'r 103 dŵr ymdrochi a aseswyd, yng Nghymru, roedd safon 84 ohonynt yn rhagorol, llwyddodd 13 ohonynt i gyrraedd safon dda a llwyddodd 5 i gyrraedd safon ddigonol. Methodd un o ddyfroedd ymdrochi Cymru i gydymffurfio â safonau'r Gyfarwyddeb a chafodd ei ddosbarthu fel gwael - sef Cemaes, ar Ynys Môn.

Llwyddodd dau Ddŵr Ymdrochi arall i gyrraedd y categori rhagorol o gymharu â'r canlyniadau yn 2015. Mae hyn yn adlewyrchu camau ar gyfer gwella a gymerwyd gan Cyfoeth Naturiol Cymru, gyda Dŵr Cymru, Awdurdodau Lleol, sefydiadau ffermio a pherchnogion tir i wella ansawdd dŵr. Cafodd gwelliannau eu gwneud yn lleol, megis gwelliannau i garthffosiaeth a gollyngfeydd; ac yn fwy eang, megis lleihau llygredd dŵr gwasgaredig o ffermdiroedd yn y cefn gwlad ehangach.

Mae'r Gyfarwyddeb Dŵr Ymdrochi yn cyflwyno system dosbarthu newydd gyda safonau ansawdd dŵr llymach ac yn rhoi pwyslais ar ddarparu gwybodaeth i'r cyhoedd. Rhaid i Aelod-wladwriaethau roi gwybod i'r cyhoedd am reoli dyfroedd ymdrochi, ansawdd dyfroedd ymdrochi ac iechyd y cyhoedd. Mae safonau ansawdd dŵr ar gyfer y dosbarthiadau newydd yn llawer uwch na'r rhai'r Gyfarwyddeb Dŵr Ymdrochi gwreiddiol. Fe ddosberthir dyfroedd ar samplau a gymerwyd am y pedair blynedd flaenorol er mwyn cydbwyso effeithiau sefyllfaoedd eithafol.

Cyfoeth Naturiol Cymru sy'n gyfrifol am fonitro a chymharu'r canlyniadau gyda safonau'r Gyfarwydd. Fe archwilir y samplau am ddau fath o facteria, sy'n dangos llygredd o garthion neu dda byw. Gall dŵr llygredig effeithio ar iechyd dynol, gan achosi poen stumog a dolur rhydd os caiff ei lyncu.

Cyflwynir canlyniadau'r gwaith monitro dyfroedd ymdrochi 2016 yn yr adroddiad hwn. Mae'n trafod sefyllfaoedd mewn dyfroedd ymdrochi unigol oedd yn effeithio ar ansawdd dŵr a'r camau gellid cael eu gwneud er mwyn eu gwella. Ein sialens yw diogelu a gwella ein hadnoddau naturiol ac felly cynnal y safonau uchel a gyflawnwyd yn ein dyfroedd ymdrochi eleni.

Executive Summary

Good quality bathing waters are very important for coastal communities, visitors and the economy in Wales. In 2016, 102 of the 103 designated Welsh bathing waters met the standards set by the Bathing Water Directive. Of the 103 bathing waters assessed, in Wales, 84 were of an excellent standard, 13 bathing waters achieved a good standard and 5 achieved sufficient standard. One Welsh bathing water failed to comply with the Directive standards and was classified as poor – Cemaes, on Anglesey.

Two more Bathing Waters achieved an excellent classification compared with the results in 2015. This reflects improvement actions taken by Natural Resources Wales, together with Dŵr Cymru, Local Authorities, farming organisations and landowners to improve water quality. Improvements have been made locally, such as sewerage and outfall improvements; and more broadly, such as reducing diffuse water pollution from farmland in the wider countryside.

The Bathing Water Directive introduces a new classification system with more stringent water quality standards and puts an emphasis on providing information to the public. Member States have to inform members of the public about bathing water management, bathing water quality, and potential threats to bathing water quality and public health. The water quality standards for the new classifications are much higher than those of the original Bathing Water Directive. Waters are also classified based on samples taken from the previous four years in order to even out effects of extreme situations.

Natural Resources Wales is responsible for monitoring and reporting against the standards in the Directive. Samples are analysed for two types of bacteria, which indicate pollution from sewage or livestock. Polluted water can have impacts on human health, causing stomach upsets and diarrhoea if swallowed.

This report presents the results of the 2016 bathing water monitoring. It discusses situations at individual bathing waters which had an impact on water quality and the improvement actions that can be taken. Our challenge is to protect and enhance our natural resources and so maintain the high standards achieved this year at our bathing waters.

Llyn Padarn

1. Bathing waters in Wales

Wales' bathing waters are of great importance for the economy, for local communities and for tourism. A study commissioned by WWF Cymru in 2012, 'Valuing Wales' seas and coasts' stated that "The coastal and marine environment is an incredible natural asset, contributing £6.8 billion to the economy of Wales and supporting more than 92,000 jobs. Over 60 percent of the population of Wales live and work in the coastal zone, with all our major cities and many important towns located on the coast. The stunning and varied coastline around Wales also helps to explain the importance of the tourism industry, which contributes over £700 million each year to the Welsh economy"[1]. Several of Wales' beaches such as Barafundle and Tenby, are regularly voted Britain's best. Swimming, surfing, angling and rockpooling are popular activities all around the coastline. When the Wales Coastal Path opened in 2012, Lonely Planet named Wales' coastline the top region to visit in the world[2].

The competitiveness of the Welsh tourism industry is dependent on the quality of tourist destinations, including the quality of bathing water. European water policy has played an important role in protecting water resources, and the quality of Welsh bathing sites is a good example of this. The first European bathing water legislation, in the form of the Bathing Water Directive[3], came into force in 1976. The revised Bathing Water Directive was adopted in 2006[4], and 2015 was the first year it was fully implemented in the UK. Management and surveillance methods for bathing waters have been changed and new tighter microbiological standards brought in. More detail on the differences between the original and revised Bathing Water Directives can be found in the Wales Bathing Waters Report 2014[5].

Provision of information to the public is a key part of the revised directive. Profiles have to be prepared and published for all bathing waters and made freely available. These profiles describe the physical and hydrological conditions of bathing areas and analyse potential impacts on (and potential threats to) their water quality. The bathing water profiles are both a source of information for citizens and a management tool.

In Wales, Natural Resources Wales is responsible for monitoring bathing waters and communicating the results to the public. All information, including the profiles is communicated to the public via the Bathing Water Data Explorer[6].

The bathing season begins in May and lasts until the end of September. During the bathing season, Natural Resources Wales monitors bathing water quality and provides information about possible health risks arising from issues such as short-term pollution episodes. At the end of each year, Natural Resources Wales sends data on bathing water quality and information on management measures to the European Commission (EC) and the European Environment Agency (EEA).

[1] WWF Cymru 2012. Valuing Wales' seas and coasts. http://assets.wwf.org.uk/downloads/marine_survey_report_final.pdf.
[2] Visit Wales 2015. Wales coastline and beaches guide. http://www.visitwales.com/explore/coastline-beaches
[3] Council Directive 76/160/EEC of 8 December 1975 concerning the quality of bathing water. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31976L0160&from=EN
[4] Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006L0007&from=EN
[5] Natural Resources Wales 2014. Bathing Waters Report 2014. https://naturalresources.wales/media/3880/wales-bathing-water-report-2014.pdf
[6] Natural Resources Wales http://environment.data.gov.uk/wales/bathing-waters/profiles/

2. Bathing water quality in 2016

103 designated bathing waters in Wales were sampled and classified during the 2016 bathing season. All but one of the designated bathing waters met the minimum water quality standards: Cemaes, on Anglesey, which was classified as poor. 84 achieved the highest classification of excellent, 13 achieved good and 5 achieved sufficient (Fig 1a). These results show a deterioration in overall water quality compared with the classifications at the end of the 2015 season, when all bathing waters achieved at least sufficient quality (Fig 1b).

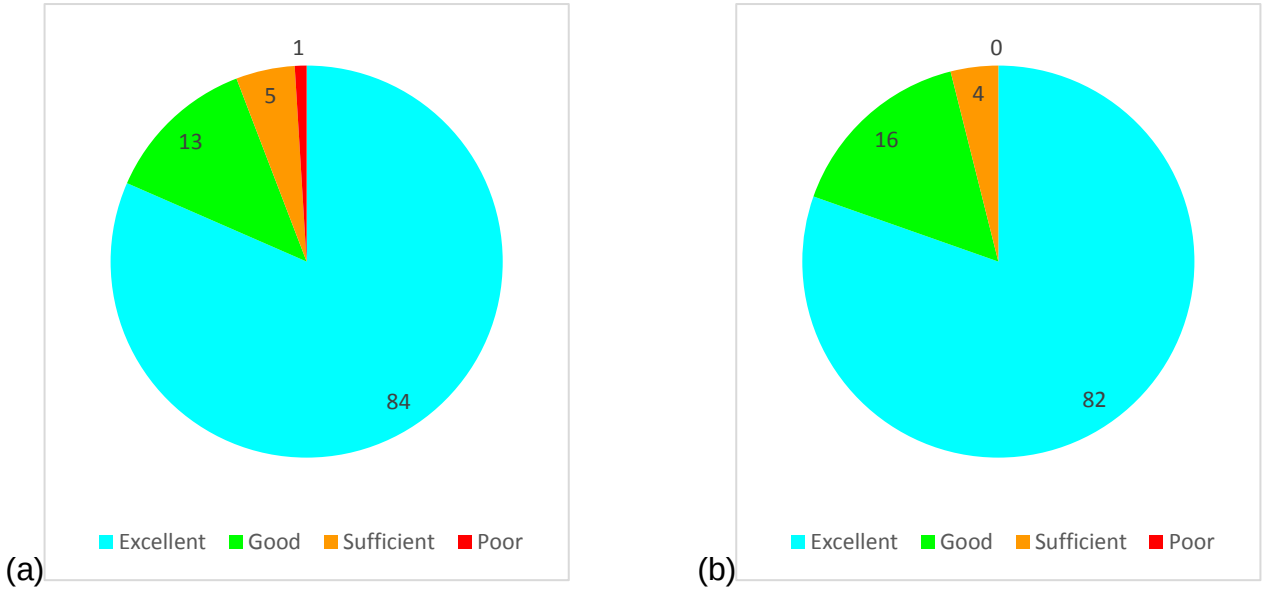

Figure 1. Classifications of Bathing Waters in Wales (a) in 2016 and (b) projected in 2015.

The Bathing Water Directive classifications in 2016 are based on two microbiological parameters: *Escherichia coli* (*E. coli*) and intestinal enterococci. They are calculated from four years of sample data (2013-2016).

For details of the location of the Bathing Waters across Wales see Figure 2 and for details of the results of the analysis and classifications see Annex I.

2.1 Non-compliant bathing waters

Cemaes was the only non-compliant bathing water in 2016. Cemaes failed in 2016 due to two samples with high bacterial values. The first of these was during wet weather and was predicted using a model. Although the public had been warned about the risk of poor water quality online and by a sign at the beach, the sample was not eligible to be discounted from the dataset due to the pollution event lasting longer than the 72-hours defined as “short-term” in the Directive. The second of these did not coincide with heavy rainfall and we do not know why we had the second bad result – investigations around Cemaes bathing water are ongoing. The other 14 samples taken in 2016 were fine, but the impact of the two poor samples on the mean and standard deviation of the data was enough to bring Cemaes narrowly below the threshold for compliance on the intestinal enterococci determinand, which caused the bathing water to be classified poor overall.

A number of factors contributed to the failure at Cemaes. Cemaes beach is affected by the Afon Wygyr and whatever drains down from the catchment. We have looked at possible sources of pollution and are aware of a number of issues in the area such as

cattle accessing the river, dogs accessing the beach, septic tanks and elevated bacterial levels in a couple of drains in the village of Cemaes. An action plan has been drawn up with various partners (including Isle of Anglesey County Council and Dŵr Cymru Welsh Water) to deal with these issues.

There has been significant investment by Dŵr Cymru Welsh Water (DCWW) at Llanfechell sewage treatment works. This sewage works discharges into the Afon Wygyr upstream of Cemaes designated European bathing water. The discharge contributed significantly to the bacterial levels in the Afon Wygyr and the bathing water. In order to improve bathing water quality at Cemaes, Dŵr Cymru have invested £800,000 at Llanfechell sewage works over the last couple of years. The works were completed by the end of March 2015, before the start of the 2015 season. Work involved the installation of ultra-violet light banks to kill bacteria in the effluent, plus improvements to the storm water storage facilities and replacement of storm pumps with variable speed pumps. Bacterial samples taken by Natural Resources Wales have shown that the ultra-violet disinfection system has made a big difference in the bacterial concentration in the final effluent from the sewage works.

Fencing to keep cattle out of the river is also planned for 2017 and 2018.

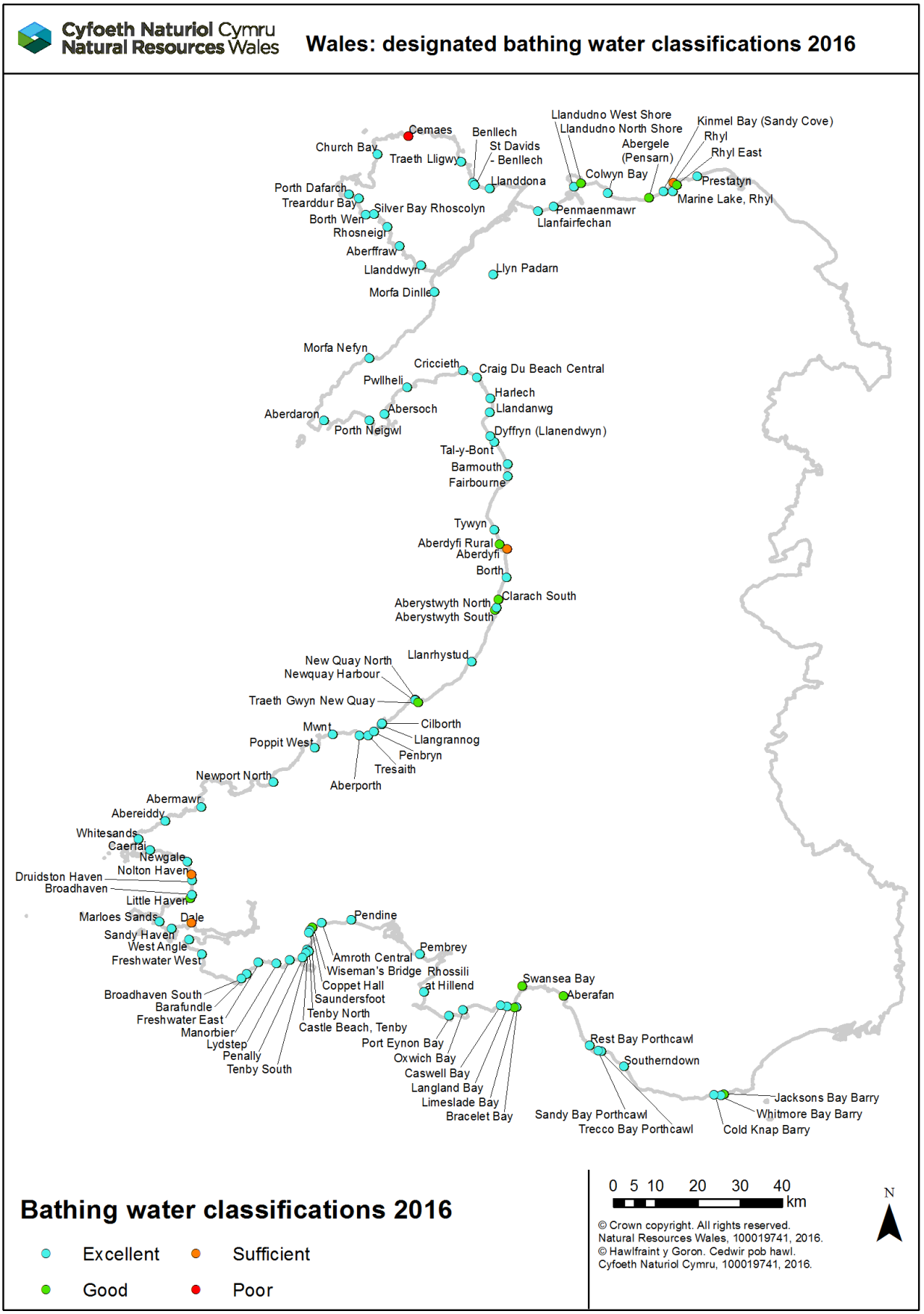

Figure 2. Location and classification of designated bathing waters in Wales 2016

3. Monitoring and classification in 2016

3.1 Monitoring

In Wales the bathing season runs from 15th May to 30th September each year. Monitoring begins from 1st May as each bathing water has one pre-season sample taken. There may also be a pre-season inspection to identify any issues. Throughout the bathing season, Natural Resources Wales collects water samples at designated bathing sites. The samples are analysed for two types of bacteria, *Escherichia coli* (*E. coli*) and intestinal enterococci.

Bathing water sampler at Marloes Sands

Samples are taken according to a monitoring calendar set out in advance of the season. Each sample must be taken on the specified date or up to four days afterwards or the sampling opportunity is lost because samples taken outside that five day window do not count for the compliance dataset. This calendar can be suspended if abnormal situations occur which could affect bathing water quality.

Abnormal situations

There were two Abnormal Situations during the 2016 season; details are in Annex II. There was no need to postpone any bathing water quality samples due to Abnormal Situations in 2016.

3.2 Classification

Sampling for the revised Bathing Water Directive began in 2012 and since classifications are now based on four years of data, 2015 was the first year that the new classifications were used for calculating and reporting. New or recently designated bathing waters may be classified on less than four years data, but with a minimum number of 16 samples. The Directive standards use two microbiological parameters - *E. coli* and intestinal enterococci – and are based on 95th and 90th percentile values (Annex III and Annex IV).

Samples are classified according to four categories: excellent, good, sufficient and poor. An objective was set in the Directive for all bathing waters to achieve sufficient status by 2015, which they did. The classifications will also be used in the periodic reviews of the bathing water profiles required by the Directive: every two years for poor bathing waters, every three years for sufficient and every four years for good.

Short-term pollution, prediction and discounting

At some bathing waters short-term pollution may be predicted by models. Beach operators then update a sign at the bathing water stating whether good or poor water quality is predicted that day. The prediction information is also shared online. If the model has predicted poor quality, the public have been informed and a confirmation sample is taken to show if that pollution lasted less than 72 hours, then a scheduled bathing water sample taken that day may be discounted from the four year dataset. This is possible up to a maximum of 15 percent of samples provided for in the monitoring calendars established for that period, or no more than one sample per bathing season, whichever is the greater. Bathing waters where short-term pollution has been predicted during the season can only be classified as sufficient, good or excellent quality if adequate management measures are being taken.

At the end of the 2016 season Welsh Government decided to discount and replace one sample each from Rhyl and Rhyl East and to discount two samples from Swansea Bay which met all the criteria. This did not affect the classifications of any of these bathing waters.

Step change

Major changes at bathing waters such as sewerage improvements may mean that data from before the changes are no longer representative of the current bathing water quality. Data from before such changes can be excluded from classification calculations under a provision commonly known as step change.

In 2015, Natural Resources Wales and Welsh Government chose to apply a step change at Cemaes due to the significant investment by Dŵr Cymru at Llanfechell sewage treatment works, discussed in section 2.1. This means that only the 2015 and 2016 data were used to calculate the classification for Cemaes at the end of the 2016 season, rather than the full four years of data. No other bathing waters in Wales were affected by step change in the 2016 season.

Annex I: Results of 2016 sampling and analysis of water quality at designated bathing water sites in Wales against the revised Bathing Water Directive.

Bathing water	Classification	
	2016	2015
Aberdaron	EXCELLENT	EXCELLENT
Abereiddy	EXCELLENT	EXCELLENT
Aberffraw	EXCELLENT	EXCELLENT
Abermawr	EXCELLENT	EXCELLENT
Aberporth	EXCELLENT	EXCELLENT
Abersoch	EXCELLENT	EXCELLENT
Aberystwyth North	EXCELLENT	EXCELLENT
Amroth Central	EXCELLENT	EXCELLENT
Barafundle	EXCELLENT	EXCELLENT
Barmouth	EXCELLENT	EXCELLENT
Benllech	EXCELLENT	EXCELLENT
Borth	EXCELLENT	EXCELLENT
Borth Wen	EXCELLENT	EXCELLENT
Bracelet Bay	EXCELLENT	EXCELLENT
Broad Haven (Central)	EXCELLENT	EXCELLENT
Broad Haven (South)	EXCELLENT	EXCELLENT
Caerfai	EXCELLENT	EXCELLENT
Castle Beach, Tenby	EXCELLENT	EXCELLENT
Caswell Bay	EXCELLENT	EXCELLENT
Church Bay	EXCELLENT	EXCELLENT

Cilborth	EXCELLENT	EXCELLENT
Cold Knap Barry	EXCELLENT	EXCELLENT
Colwyn Bay	EXCELLENT	EXCELLENT
Coppet Hall	EXCELLENT	EXCELLENT
Craig Du Beach Central	EXCELLENT	EXCELLENT
Criccieth	EXCELLENT	EXCELLENT
Dale	EXCELLENT	EXCELLENT
Druidston Haven	EXCELLENT	EXCELLENT
Dyffryn (Llanendwyn)	EXCELLENT	EXCELLENT
Fairbourne	EXCELLENT	EXCELLENT
Freshwater East	EXCELLENT	EXCELLENT
Freshwater West	EXCELLENT	EXCELLENT
Harlech	EXCELLENT	EXCELLENT
Kinmel Bay (Sandy Cove)	EXCELLENT	EXCELLENT
Langland Bay	EXCELLENT	EXCELLENT
Llandanwg	EXCELLENT	EXCELLENT
Llanddona	EXCELLENT	EXCELLENT
Llanddwyn	EXCELLENT	EXCELLENT
Llandudno West Shore	EXCELLENT	EXCELLENT
Llanfairfechan	EXCELLENT	EXCELLENT
Llangrannog	EXCELLENT	EXCELLENT
Llanrhystud	EXCELLENT	EXCELLENT
Llyn Padarn	EXCELLENT	EXCELLENT

Lydstep	EXCELLENT	EXCELLENT
Manorbier	EXCELLENT	EXCELLENT
Marine Lake, Rhyl	EXCELLENT	EXCELLENT
Marloes Sands	EXCELLENT	EXCELLENT
Morfa Dinlle	EXCELLENT	EXCELLENT
Morfa Nefyn	EXCELLENT	EXCELLENT
Mwnt	EXCELLENT	EXCELLENT
New Quay Harbour	EXCELLENT	EXCELLENT
Newgale	EXCELLENT	EXCELLENT
Newport North	EXCELLENT	GOOD
Oxwich Bay	EXCELLENT	EXCELLENT
Pembrey	EXCELLENT	EXCELLENT
Penally	EXCELLENT	EXCELLENT
Penbryn	EXCELLENT	EXCELLENT
Pendine	EXCELLENT	EXCELLENT
Penmaenmawr	EXCELLENT	GOOD
Poppit West	EXCELLENT	EXCELLENT
Port Eynon Bay	EXCELLENT	EXCELLENT
Porth Dafarch	EXCELLENT	EXCELLENT
Porth Neigwl	EXCELLENT	EXCELLENT
Prestatyn	EXCELLENT	EXCELLENT
Pwllheli	EXCELLENT	EXCELLENT
Rest Bay Porthcawl	EXCELLENT	EXCELLENT

Rhosneigr	EXCELLENT	EXCELLENT
Rhossili	EXCELLENT	EXCELLENT
Sandy Bay Porthcawl	EXCELLENT	EXCELLENT
Saundersfoot	EXCELLENT	EXCELLENT
Silver Bay Rhoscolyn	EXCELLENT	EXCELLENT
Southerndown	EXCELLENT	EXCELLENT
St Davids - Benllech	EXCELLENT	EXCELLENT
Tal-y-Bont	EXCELLENT	EXCELLENT
Tenby North	EXCELLENT	EXCELLENT
Tenby South	EXCELLENT	EXCELLENT
Traeth Lligwy	EXCELLENT	GOOD
Trearddur Bay	EXCELLENT	EXCELLENT
Trecco Bay Porthcawl	EXCELLENT	EXCELLENT
Tresaith	EXCELLENT	EXCELLENT
Tywyn	EXCELLENT	EXCELLENT
West Angle	EXCELLENT	EXCELLENT
Whitesands	EXCELLENT	EXCELLENT
Whitmore Bay Barry Island	EXCELLENT	EXCELLENT
Aberafan	GOOD	GOOD
Aberdyfi Rural	GOOD	NOT DESIGNATED
Abergele (Pensarn)	GOOD	GOOD
Aberystwyth South	GOOD	GOOD
Clarach South	GOOD	GOOD
Jackson's Bay Barry Island	GOOD	GOOD

Limeslade Bay	GOOD	GOOD
Little Haven	GOOD	GOOD
Llandudno North Shore	GOOD	GOOD
Rhyl East	GOOD	GOOD
Swansea Bay	GOOD	GOOD
Traeth Gwyn New Quay	GOOD	EXCELLENT
Wiseman's Bridge	GOOD	GOOD
Aberdyfi	SUFFICIENT	SUFFICIENT
New Quay North	SUFFICIENT	SUFFICIENT
Nolton Haven	SUFFICIENT	GOOD
Rhyl	SUFFICIENT	SUFFICIENT
Sandy Haven	SUFFICIENT	GOOD
Cemaes	POOR	SUFFICIENT

Annex II: Details of abnormal situations at designated bathing water sites in Wales during the 2016 bathing season.

The information below is derived from the water quality data section of Natural Resources Wales' Bathing Water Explorer[7].

Bathing Water	Start-End Date	Abnormal Situation Description	Comment
Prestatyn	17/06/2016 – 18/06/2016	Potential contamination from sewage	Emergency sewage discharge from Rhyl Coast Road sewage pumping station into bathing waters between Rhyl and Prestatyn.
Colwyn Bay	15/07/2016 – 18/07/2016	Potential contamination from sewage	Bathing Water Quality potentially affected by ongoing issues at Church Road sewage pumping station, Rhos on Sea. Avoidance of bathing was advised. Signs were removed once the risk had passed.

[7] Natural Resources Wales http://environment.data.gov.uk/wales/bathing-waters/profiles/

Annex III: Parameters used for classification of coastal waters and transitional waters (such as estuarine bathing waters) under the revised Bathing Water Directive.

Parameters measured are *E.coli* and IE (intestinal enterococci). Percentiles are values that should theoretically be complied with 90 or 95percent of the time (based on the distribution of the data). They do not refer to values complied with by 90 or 95 percent of samples.

Classification	Parameter			
	E. coli* 95th percentile	**IE 95th percentile***	***E. coli* 90th percentile***	**IE 90th percentile***
Excellent	250	100		
Good	500	200		
Sufficient			500	185
Poor	Fails to meet any of the above standards			
Not classified	Does not have enough samples in the four year calculation window			

* Colony forming units (cfu)/100ml

Annex IV: Parameters used for classification of inland waters under the revised Bathing Water Directive.

Parameters measured are *E.coli* and IE (intestinal enterococci). Percentiles are values that should theoretically be complied with 90 or 95percent of the time (based on the distribution of the data). They do not refer to values complied with by 90 or 95 percent of samples.

Classification	Parameter			
	E. coli* 95th percentile	**IE 95th percentile***	***E. coli* 90th percentile***	**IE 90th percentile***
Excellent	500	200		
Good	1000	400		
Sufficient			900	330
Poor	Fails to meet any of the above standards			
Not classified	Does not have enough samples in the four year calculation window			

* Colony forming units (cfu)/100ml

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