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European Bathing Water Quality in 2017

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European Environment Agency

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European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark

Tel.: +45 33 36 71 00
Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

Contents

Foreword

The European Union is a global leader when it comes to environmental protection. This year's bathing water report reflects the strong and continued commitment made by Europeans to safeguard our coastal and inland bathing water sites and ensure they are safe to use.

In 2017, 96 % of bathing sites met the minimum quality requirements and 85 % of bathing water sites met the Bathing Water Directive's most stringent 'excellent' quality standards. This will give a good indication of good quality bathing water for the summer ahead.

While it is great news that our bathing waters are getting cleaner for human use, we cannot sit back, or be complacent. Water is an essential part of our well-being. That is why we at the European Commission and the European Environment Agency (EEA) are this year focusing on water to ensure our rivers, lakes and coastal waters are clean and safe to use. Europe's waters face many challenges, like coastal erosion, climate change, pollution, urbanisation and litter.

Since the adoption of the EU's Water Framework Directive in 2000, we have taken an integrated approach to the management of our river basin waters with an ambitious goal to ensure all EU waters achieve good status. The Commission will publish its report on the assessment on EU Member State progress in implementing River Basin Management Plans and has started the process of evaluating the Water Framework Directive and the Urban Waste Water Treatment Directive. It will also publish its assessment on Member States' programmes of measures under the Marine Strategy Framework Directive. Complementing this process, the EEA will publish this summer its assessment on the state of Europe's waters. The Commission and the Austrian EU Presidency will also organise the 5th EU Water Conference in September.

From governments to citizens we all have a role to play to keep our waters clean, including bathing areas which many of us will want to enjoy this summer. We would also encourage you to do your part in helping to keep our beaches and inland bathing sites clean and free from litter, especially plastic waste. Acting locally while thinking globally has never been more important. Working together we can make a real difference and improve the quality of our water for generations to come.

Best wishes for the summer bathing season ahead!

Karmenu Vella,

European Commissioner for the Environment, Maritime Affairs and Fisheries

Hans Bruyninckx,

Executive Director, European Environment Agency

Executive summary

Heading for your favourite beach? You'll want to know if the bathing water is clean. Europe has a great diversity of beautiful beaches and bathing areas, and each year millions of Europeans spend their weekends at their local beach or their holidays cooling off by the water. As this year's bathing season approaches, many citizens begin to take a keen interest in the quality of bathing waters.

The European Union's efforts to ensure clean and healthy bathing water began forty years ago with the first Bathing Water Directive. Today Europe's bathing waters are much cleaner than forty years ago when large quantities of untreated or partially treated municipal and industrial waste water were discharged into water.

For the last ten years, the European Environment Agency (EEA) and its European Topic Centre on Inland, Coastal and Marine Waters in cooperation with the European Commission's Directorate-General for the Environment have prepared an annual report on the quality of bathing areas, as reported by the 28 EU Member States, Albania and Switzerland. Each year, the report is published before the start of the bathing water season.

Local authorities collect water samples at officially identified bathing sites throughout the bathing season. The samples are then 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. Depending on the levels of bacteria detected, the bathing water quality is classified as 'excellent', 'good', 'sufficient' or 'poor'.

This report gives an overview of the 2017 bathing water quality thereby also indicating where the best quality bathing sites are likely to be found this year. In the 2017 season, almost 22 000 bathing waters were monitored throughout Europe.

As in recent years, the vast majority of bathing water sites have good quality bathing water. In 2017, 96.0 % of sites met the minimum quality requirements set out in the EU's Bathing Water Directive ([1]).

Moreover, 85 % of bathing water sites satisfied the directive's most stringent 'excellent' bathing water quality standards. The share of bathing water sites in the EU with excellent water quality has generally increased from 82.6 % in 2013 to 85.0 % in 2017.

In 2017, 294 (1.4 %) EU bathing water sites were rated as having 'poor' water quality, which is similar to 2016 figures. Swimming at bathing sites where water quality is poor can result in illness. Bathing water sites classified, as 'poor' have to be closed during the following bathing season and must have measures in place to reduce pollution and eliminate hazards to the health of bathers.

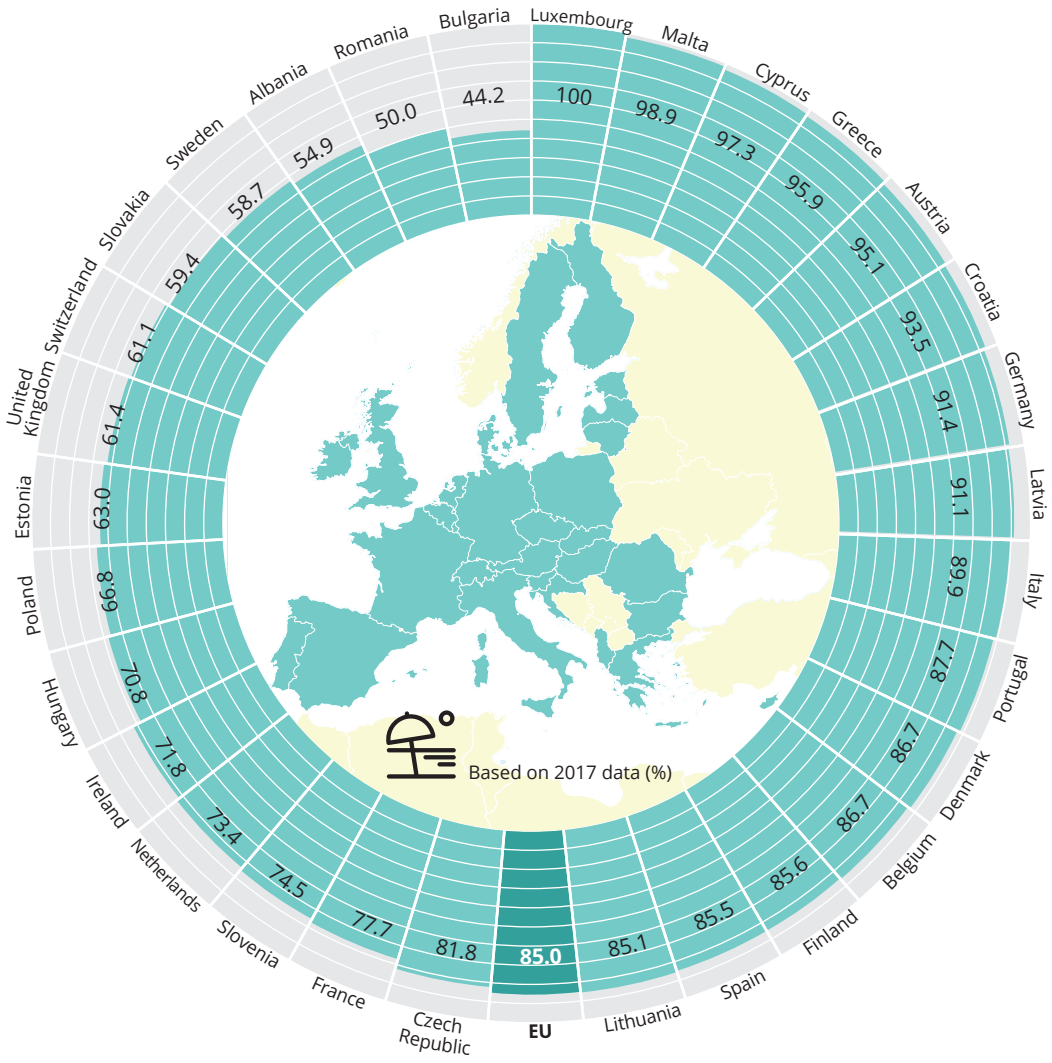
Bathing must be permanently prohibited or permanent advice against bathing must be put in place at bathing water sites that have been classified as poor for five consecutive years. In 2017, 76 bathing water sites were poor or non-compliant for five years; 44 in Italy, 24 in France, four in Spain and one in Bulgaria, Denmark, Ireland and the Netherlands, respectively.

All reported bathing water sites in Austria, Belgium, Croatia, Cyprus, Greece, Latvia, Luxembourg, Malta, Romania, Slovenia and Switzerland achieved at least sufficient quality in 2017 (according to minimum quality standards set by the Bathing Water Directive). In five countries, 95 % or more of bathing waters were assessed as being of excellent quality: Luxembourg (all 12 reported bathing waters), Malta (98.9 % of all sites), Cyprus (97.3% of all sites), Greece (95.9 % of all sites) and Austria (95.1 % of all sites).

Besides calling for more effective monitoring and management of bathing waters, the revised Bathing Water Directive also requires greater public participation and improved information dissemination. Today, countries have national or local websites with detailed information on each bathing water site. These websites usually include a map search function and allow public access to monitoring results, both in real time and for previous seasons.

([1]) EU, 2006, 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, (OJ L 64, 4.3.2006, p. 37) (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006L0007).

Figure ES1 Proportion of bathing water sites with excellent water quality in European countries



At the European level, bathing water information is made available to the public through the EEA's bathing water web pages ([2]), which allows users to view bathing water quality at the nearly 22 000 coastal beaches and inland sites across Europe. Users can check bathing water quality on an interactive map, download data and individual country reports. They can also make comparisons with the water quality in previous years.

Today, the public has access to high-quality information on bathing water quality, and can thus become more actively involved in protecting the environment and helping to improve Europe's bathing areas.

In addition to the good quality of bathing waters, we need clean and healthy water for our ecosystems.

Efforts to improve the quality of bathing waters should therefore not be seen in isolation but in the context of the good ecological and environmental status we aim for in implementing the Water Framework Directive ([3]) and Marine Strategy Framework Directive ([4]). More information on European waters is available in WISE-Freshwater https://water.europa.eu/freshwater.

Water is essential for human life, nature and the economy. The EU's water policy has been successful in helping to protect water resources and the ecosystem services they provide. The improved quality of EU bathing sites over the last 40 years is a good example of this. Many years of investment in the sewerage system and better waste water treatment have led to Europe's bathing waters being much cleaner today.

([2]) EEA bathing water webpages available at https://www.eea.europa.eu/themes/water/europes-seas-and-coasts/thematic-assessments/state-of-bathing-water

(3) EU, 2000, Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1-73) (http://eur-lex.europa.eu/eli/dir/2000/60/oj).

([4]) EU, 2000, Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1-73) (http://eur-lex.europa.eu/eli/dir/2000/60/oj).

1 Bathing waters in Europe

Every summer, millions of Europeans use water for swimming, recreation and relaxation. For example, they may spend their weekends at the local beach, or go on holiday by the water. The start of the bathing season in spring is, therefore, an appropriate time to draw attention to the quality of bathing waters.

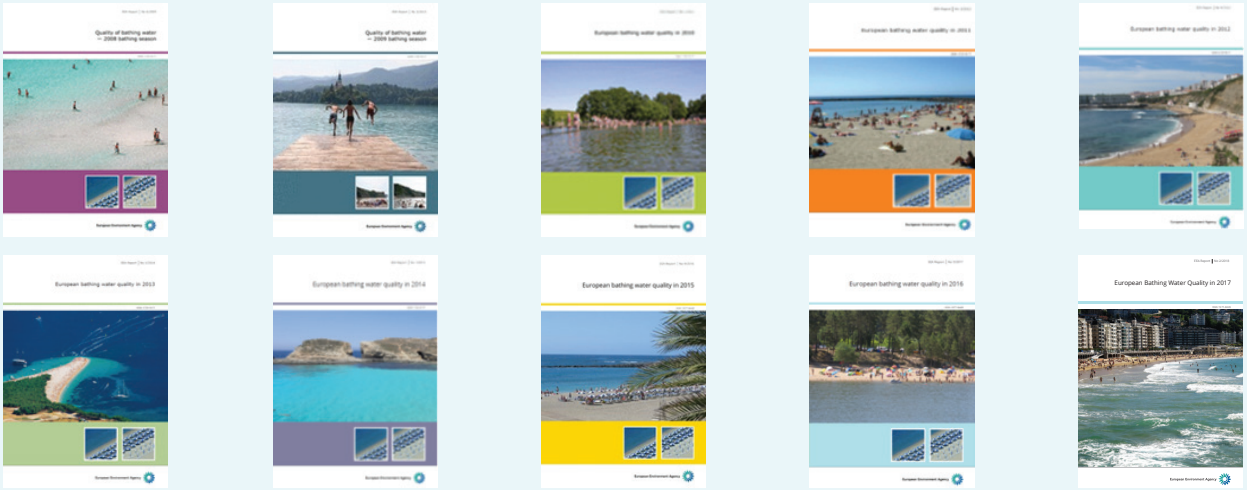
For the last ten years, the European Environment Agency (EEA) and its European Topic Centre on Inland, Coastal and Marine Waters and together with the European Commission have prepared an annual report on the quality of bathing areas. The present report assesses bathing water quality in 2017, thereby indicating where the best quality bathing sites are likely to be found this year and enabling Europeans to make informed choices about the bathing sites they plan to visit.

Over forty years ago, before Europe's first bathing water legislation was introduced, large quantities of mostly uncontrolled, untreated or partially treated

Box 1.1 Ten years of bathing water reports

As well as presenting an annual overview of and trends in bathing water quality, over the 10 years of its existence, the EEA's annual bathing water report has also included thematic sections focused on:

- Main sources of pollution resulting in poor bathing water quality (several years);
- Short-term pollution events and other management measures (several years);
- Flooding at bathing water sites (2014);
- Littering at coastal bathing water sites (2014);
- New symbols for informing on bathing water quality (2012);
- Forty-year anniversary of the first bathing water directive (2016);
- Case studies for improving bathing water quality (several years).



Note: Earlier versions of EEA bathing water reports are available here online at https://www.eea.europa.eu/publications#c7=en&c11=5&c14=&c12=&b_start=0&c13=bathing+water+quality

municipal waste water were discharged into many of Europe's surface waters. An increasing number of beach visitors, combined with dirty beaches, concerns over the health of swimmers and growing environmental awareness paved the way for the first Bathing Water Directive (76/160/EEC) ([5]), which was adopted in 1976. The overall quality of bathing water has steadily improved since then. A revised version of the directive followed in 2006 ([6]), updating the measures in the 1976 legislation and simplifying its management and surveillance methods. This revised directive also provides for better and more timely public information about bathing water quality.

The assessment of bathing water quality under the Bathing Water Directive makes use of the values of two microbiological parameters: intestinal enterococci and *Escherichia coli*. All officially identified bathing waters must be sampled in accordance with monitoring requirements ([7]) set out in the Bathing Water Directive. These include sampling bathing water on at least a monthly basis during the bathing season, with a minimum of four samples per season, and the compilation of a 4-year dataset for the assessment of bathing water quality. If the sampling frequency of bathing water is not satisfied, it can still be quality assessed if at least four samples per season ([8]) are available and are more or less equally distributed throughout the season, and if the bathing water dataset contains an adequate amount of samples. Bathing water sites are then accordingly classified in one of the bathing-water quality classes (excellent, good, sufficient or poor). More information regarding bathing water legislation, monitoring and management provisions can be found in the 2016 EEA report 'European bathing water quality in 2015' (chapters 1 and 2) ([9]) and on the European Commission website ([10]) dedicated to bathing water.

There were 21 801 bathing water sites monitored in Europe in 2017, of which 21 509 were in the 28 EU Member States. Albania and Switzerland also monitored and reported on the quality of their 292 bathing water sites. In 2017, 69 % of all sites were coastal bathing waters (including transitional waters), while 31 % were situated at rivers and lakes.

1.1 Water pollution and bathing water quality

Pollution enters water from many sources and takes many forms. One of the most prevalent is faecal contamination from sewage and animals. Faecal contamination is of concern for public health and can lead to poor quality bathing water. Pollution from sewage is often the result of storm water overflows of sewage, or of water draining from farms and farmland or from poorly maintained cesspits and septic tanks. Badly connected plumbing — where foul water, e.g. from toilets, enters directly into surface waters — constitutes another potential source of pollution. Such pollution usually increases during heavy rainfalls and floods, when pollution is washed into rivers and seas, or when sewerage networks overflow. Swimming in contaminated water can result in illness. The most frequent adverse health outcome associated with exposure to faecally contaminated recreational water is intestinal illness. *Escherichia coli*, when transmitted to the human body through contaminated water, can cause diarrhoea and other illnesses of the intestinal tract. Acute febrile respiratory illness (AFRI), which is a more severe health outcome than gastroenteritis, can also occur in some cases ([11]).

Many years of investment in sewerage systems and better waste water treatment have led to Europe's bathing water being much cleaner today than it was decades ago. Nevertheless, as the results show, there are still bathing water sites with poor quality. The Bathing Water Directive specifies measures to be taken when a bathing water has been classified as 'poor' ([12]). These measures must include management measures

([5]) EC, 1976, Council Directive 76/160/EEC of 8 December 1975 concerning the quality of bathing water (OJ L 31, 5.2.1976, p. 1-7) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1523968314336&uri=CELEX:31976L0160).

([6]) EU, 2006, 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, (OJ L 64, 4.3.2006, p. 37) (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006L0007).

([7]) These requirements include: (i) taking a pre-season sample, (ii) a minimum of four samples per season (three samples are sufficient if the season does not exceed eight weeks or if the region is subject to special geographical constraints) and (iii) a minimum of one sample per month. If these rules are satisfied, the bathing water is categorised as 'sampling frequency satisfied'. If at least one monitoring requirement is not fulfilled the bathing water is categorised as 'sampling frequency not satisfied'.

([8]) Only three samples are required if the season does not exceed eight weeks or the region is subject to special geographical constraints.

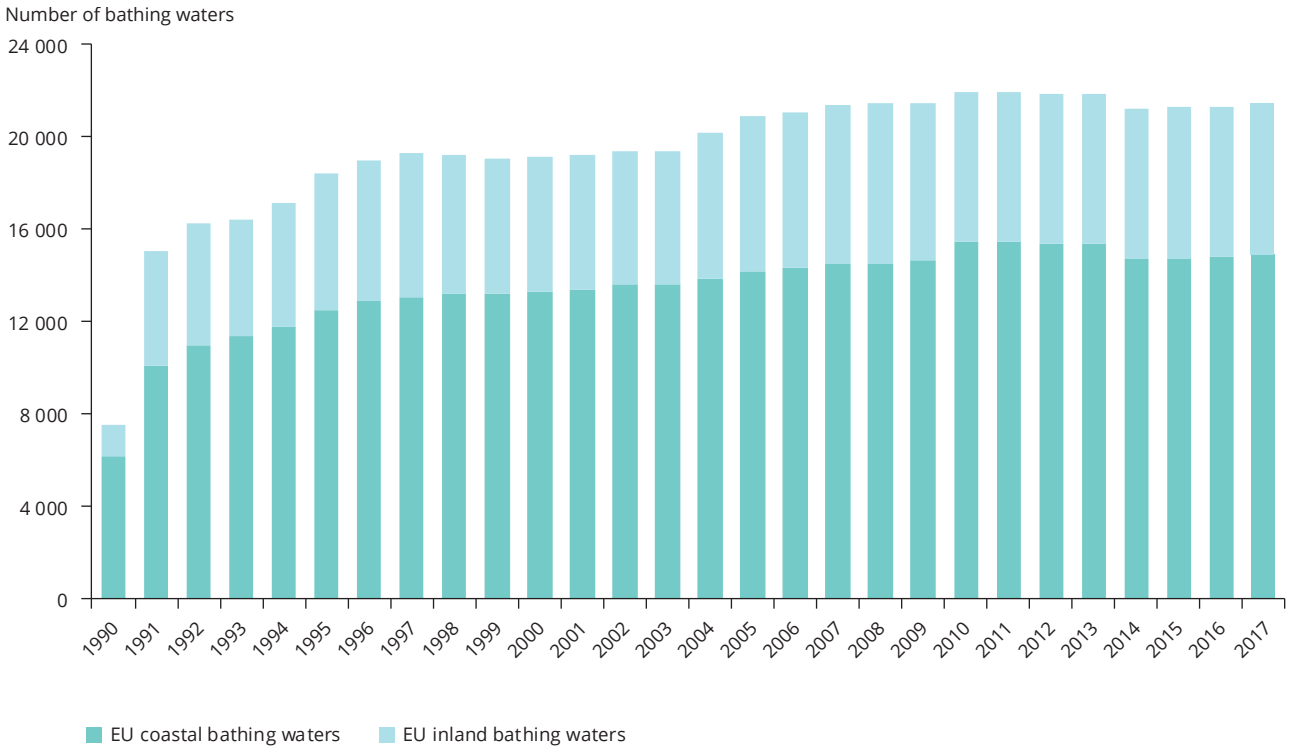
([9]) EEA, *2016, European bathing water quality in 2015*, EEA Report No 9/2016, European Environment Agency (https://www.eea.europa.eu//publications/european-bathing-water-quality-2015).

([10]) EEA, 2017, *European bathing water quality in 2016*, EEA Report No 5/2017, European Environment Agency (https://www.eea.europa.eu/publications/european-bathing-water-quality-in-2016).

([11]) WHO, 2003, *Guidelines for safe recreational water environments*, Volume 1: Coastal and fresh waters, World Health Organization (http://www.who.int/water_sanitation_health/publications/srwe1/en/).

([12]) See Article 5(4) of Directive 2006/7/EC.

Figure 1.1 Total number of bathing waters reported in the European Union since 1990



Source: WISE bathing water quality database (data from annual reports by EU Member States).

(including bathing prohibition or advice against bathing). In addition:

- where bathing water quality is poor, it is imperative to assess the sources of pollution;
- bathing water profiles required by Article 6 of the Directive should provide an up-to-date indication of pollution sources in the bathing catchment area and, together with historical data on rainfall, stream flow and sea currents, should also include information on the sources to be targeted with management measures;
- at the bathing sites where the causes of poor quality are not known in detail, special studies to explore the sources might be needed.

Management measures are primarily expected to be implemented at those bathing water sites that have only sufficient or poor water quality. These include:

- implementation of the Urban Waste Water Treatment Directive (UWWTD) and a focus on reducing sewer overflow, which have successfully led to reduced pollution and improved quality at several low quality bathing water sites. However, for some bathing water sites, upgrading of waste water treatment, for example with ultraviolet light disinfection, may still be needed to ensure good bathing water quality;
- detailed inventories of bathing waters affected by water draining from farms and farmland, and from scattered houses with misconnected drains, to help find and stop the sources;
- at bathing waters affected by large numbers of dogs or resting birds it may be necessary to restrict access to, or the number of, animals or change the location of the bathing water site; and
- effective modelling and warning systems to advise bathers against entering the water after short-term pollution events at bathing waters affected by heavy rains and storm water overflows. This is in addition to measures to reduce pollution at source and at rainwater storage basins.

2 Bathing water quality and trends in 2017

During the 2017 bathing season, all EU Member States managed their bathing waters according to the provisions set out in the Bathing Water Directive. Before the beginning of the bathing season, countries identified national bathing water sites, established respective monitoring calendars and defined the length of the bathing season. They ensured that the sampling and analysis of bathing water during the season took place in accordance with the reference methods specified in the Directive.

The EEA checked whether all reported bathing water sites met the monitoring/sampling requirements set in the Bathing Water Directive. Bathing water sites that had not met the criteria were categorised as 'sampling frequency not satisfied'. Sampling frequency was not satisfied at 579, 67 and 18 bathing water sites in the EU Member States, Switzerland and Albania respectively (see Annex 1). There has been a marked drop in the proportion of EU bathing water sites with 'sampling frequency not satisfied', from 5.8 % in 2011 to 2.7 % in 2017.

The most common reasons for not meeting the sampling frequency criteria are insufficient intervals between samples (longer than one month) and/or lack of the pre-season sample that should be taken shortly before the start of the season. The highest number of such bathing sites have been noted in Italy (312 bathing sites), Greece (108 bathing sites), Switzerland (67 bathing sites) and Sweden (31 bathing sites).

The objective of the bathing water directive is that all bathing water sites should have at least 'sufficient' bathing water quality. This minimum water quality standard was met by 96.0 % of all EU bathing water sites for the 2017 bathing season, which constitutes a minor drop compared with 2016 (96.3 %). The share of bathing water sites in the EU with excellent water quality has generally increased from 82.6 % in 2013 to 85.0 % in 2017.

Some 1.4 % of bathing water sites had poor water quality in 2017. Between the 2016 and 2017 bathing seasons, the number of poor quality bathing waters

Photo: San Sebastián, Spain ©Peter Kristensen, EEA

in Europe remained almost the same (it dropped from 316 to 306).

Overall, bathing water quality has been improving over time. It is encouraging to observe that more and more bathing water sites have reached minimum quality standards. Furthermore, it is reassuring to note that more and more bathing water sites have improved their quality to the highest 'excellent' quality standard.

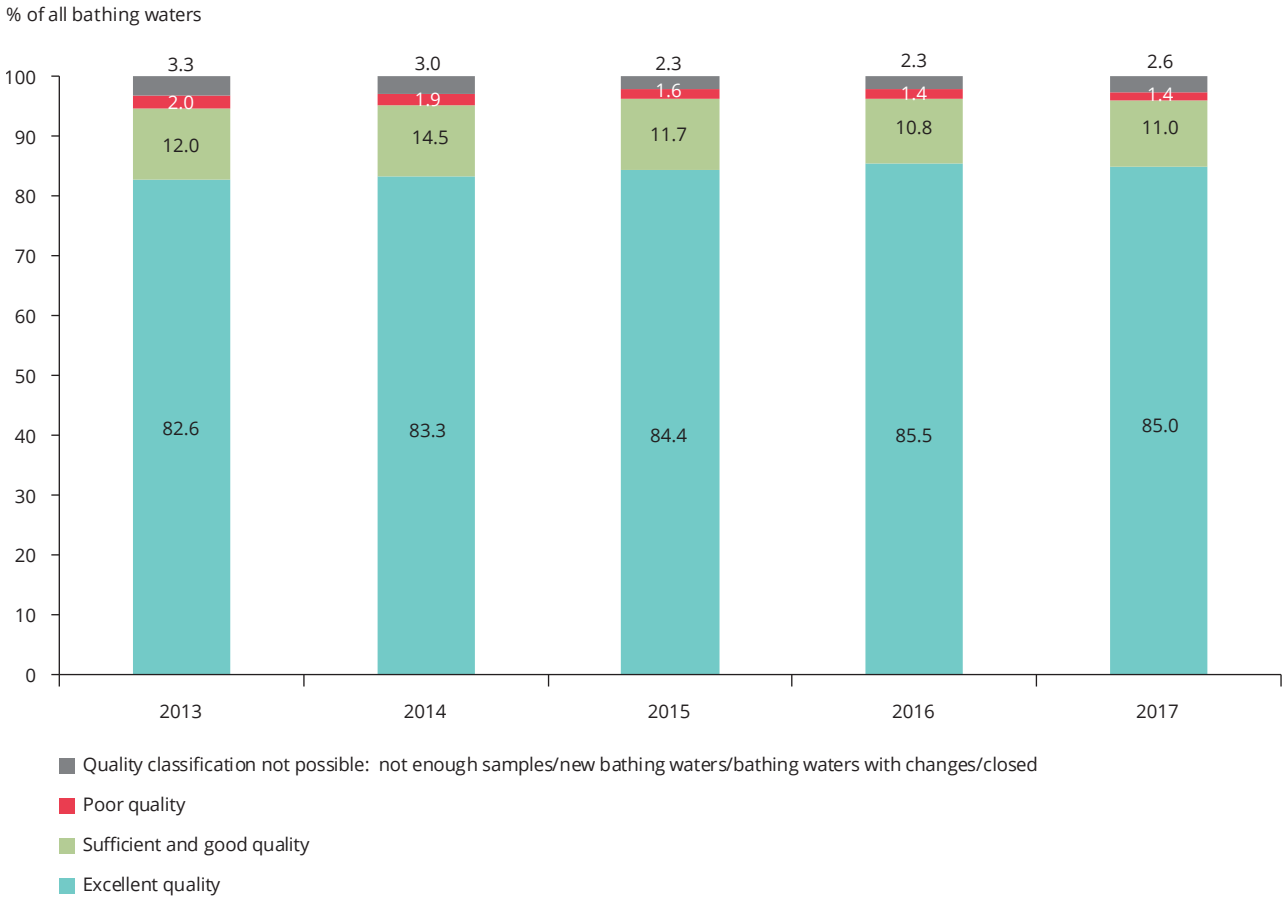
2.1 Coastal and inland bathing water quality

In 2017, 14 935 coastal and 6 574 inland bathing water sites (situated on rivers and lakes) were monitored in the EU. All 23 EU Member States with access to the sea had coastal bathing water sites, whereas inland site where monitored in 26 EU Member States. No inland bathing waters were identified in Cyprus and Malta.

The quality of coastal bathing waters is in general better than that of inland bathing waters. This is mainly because the capacity for self-renewal of coastal areas is higher than that of inland bathing waters. Moreover, many central European inland bathing water sites are situated on relatively small lakes and ponds as well as low flow rivers, which, especially in the summer, are more susceptible to short-term pollution caused by heavy summer rains than coastal areas.

In 2017, 96.9 % of all coastal and 94.1 % of all inland bathing water sites in the EU achieved at least 'sufficient' quality. The share of coastal bathing waters meeting the excellent quality criteria (the highest quality standard) was 86.3 %, whereas the share of inland bathing waters meeting the excellent quality criteria was 82.1 %. In comparison with 2014, the share of coastal bathing waters of excellent quality increased by 0.8 percentage points in 2017 and the share of inland bathing waters of excellent quality was 4 percentage points higher.

Figure 2.1 Overall bathing water quality in the European Union between 2013 and 2017



The share of coastal bathing waters of poor quality decreased from 1.7 % in 2014 to 1.2 % in 2017, while the share of inland bathing waters of poor quality decreased from 2.4 % in 2014 to 1.8 % in 2017. The share of bathing waters with poor quality is decreasing for two reasons. Either water quality has improved at some sites, or bathing sites with poor water quality have been excluded from the monitoring programme because permanent bathing prohibition was introduced.

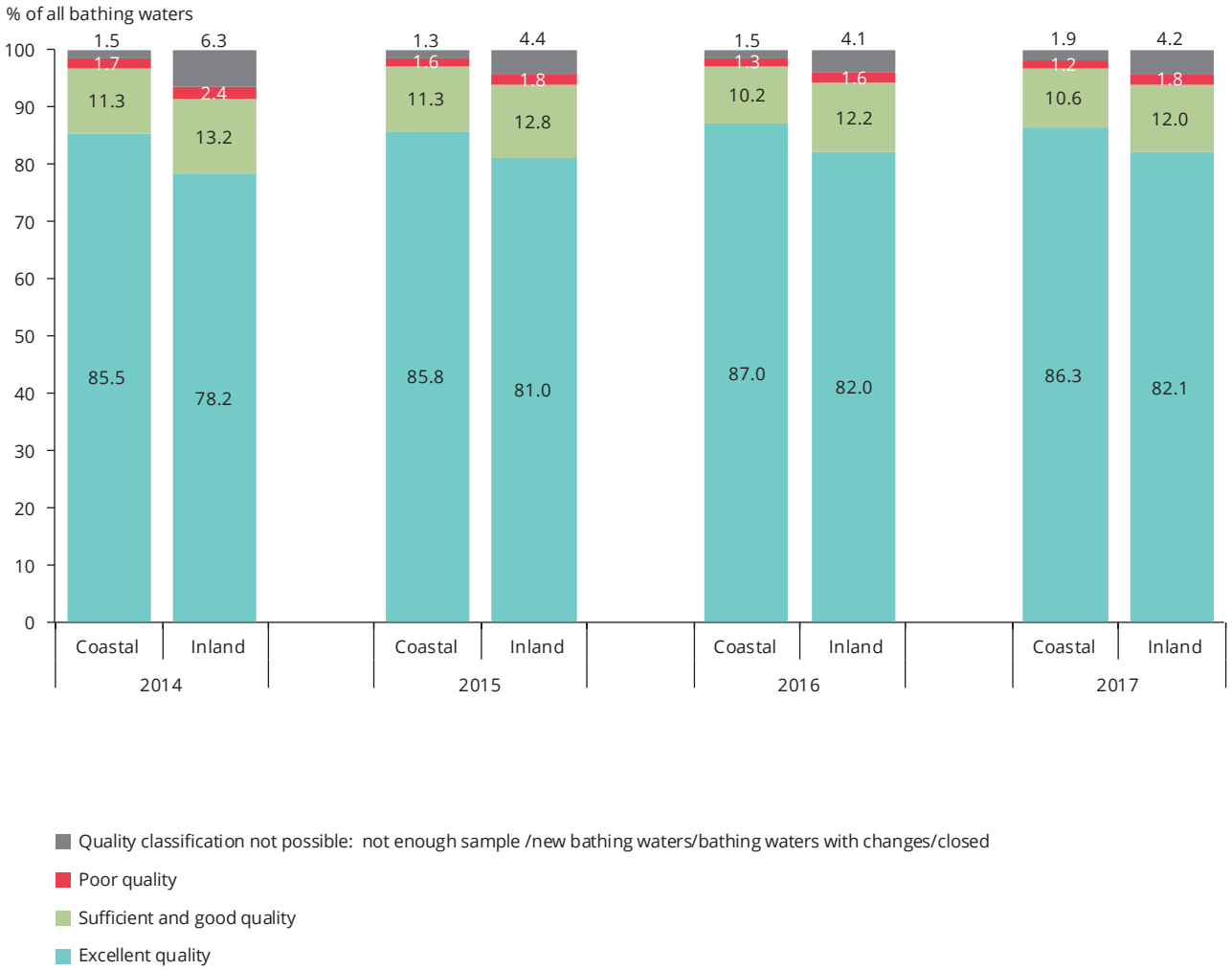
2.2 Bathing water quality by country in 2017

Bathing water quality results for each country for the 2017 bathing season are shown in Figure 2.3 below.

Tabular information regarding 2017 bathing water quality in Europe by country is available in Annexes 2-4. In five countries, 95 % or more of bathing waters were of excellent quality: Luxembourg (all 12 reported bathing waters), Malta (98.9 % of all sites), Cyprus (97.3 % of all sites), Greece (95.9 % of all sites) and Austria (95.1 % of all sites). All reported bathing water sites in Austria, Belgium, Croatia, Cyprus, Greece, Latvia, Luxembourg, Malta, Romania, Slovenia and Switzerland were of at least sufficient quality in 2017 (according to minimum quality standards set by the Bathing Water Directive).

The three countries with the highest numbers of bathing water sites where water quality is classified as poor are Italy (79 bathing water sites or 1.4 %), France (80 sites

Figure 2.2 Coastal and inland bathing water quality in the EU between 2014 and 2017

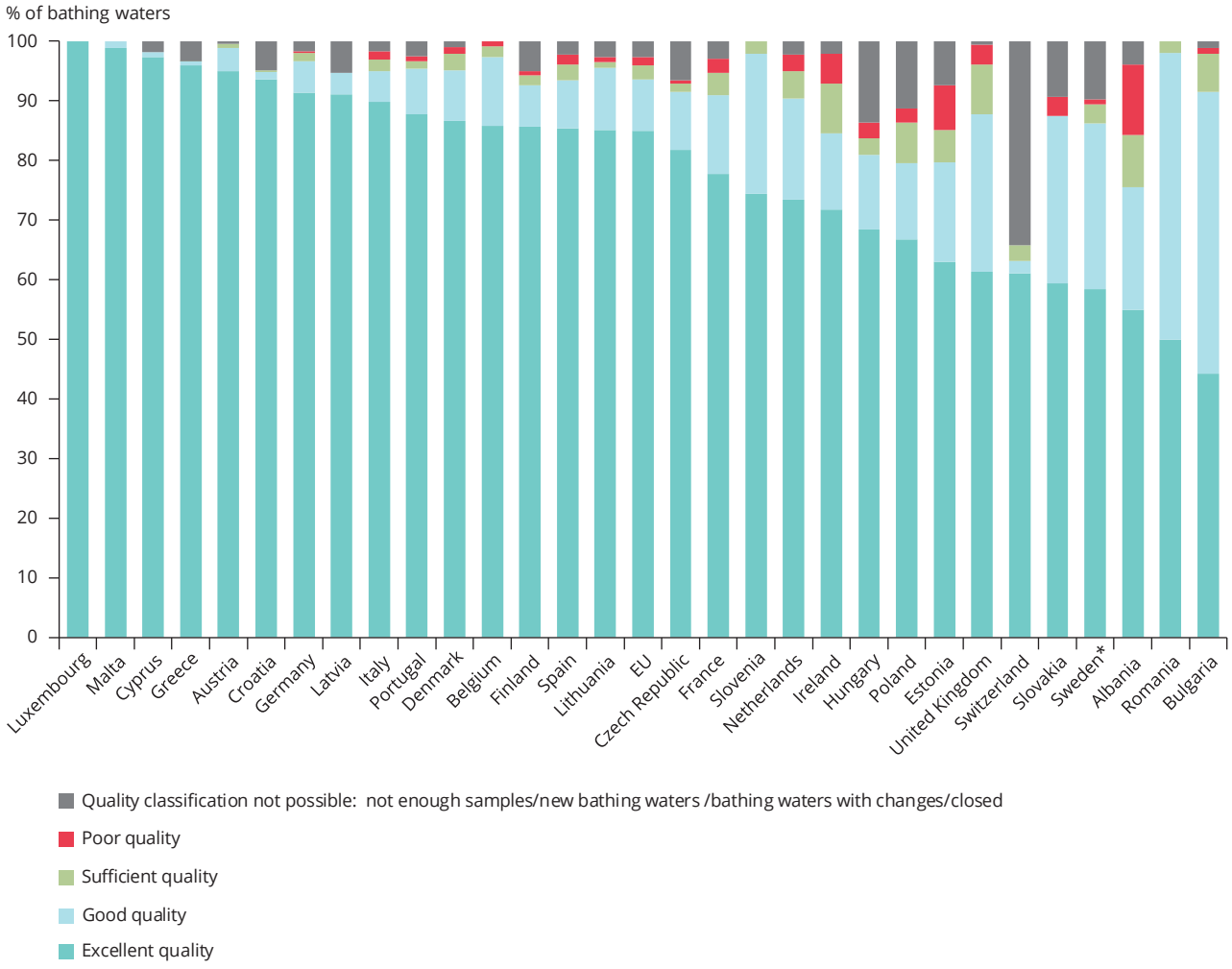


or 2.4 %) and Spain (38 sites or 1.7 %). In comparison with the 2016 season, the number of poor quality bathing waters in Italy decreased by 21 (from 100 in 2016 to 79 in 2017). In the EU Member States, the countries where the highest proportion of bathing waters where water quality is poor were found are Estonia (four bathing waters or 7.4 %), Ireland (seven bathing waters or 4.9 %) and the United Kingdom (21 bathing waters or 3.3 %).

In Albania, assessed under the provisions of the Bathing Water Directive for the third time, 12 bathing water sites (or 11.8 %) were classified as poor, which is 2.3 percentage points less than in 2016. Since 2015, when 31 bathing water sites (or 39.1 %) were quality assessed as 'poor', the number of bathing water sites classified as poor has decreased significantly. This improvement can be associated with the five waste water treatment plants constructed in recent years, which provide waste water treatment for almost half a million residents and contribute to better bathing and overall water quality.

Some countries had a large share of bathing waters where quality classification was not possible because bathing waters were either newly opened, closed, not yet assessed due to changes, or because the required amount of samples for assessment had not been provided. More than 10 % of bathing waters could not be quality assessed in Switzerland (34.2 %), Poland (11.2 %) and Hungary (10.5 %).

Figure 2.3 Bathing water quality in 2017 for the 28 EU Member States, Albania and Switzerland



Note: (*) Methodology problems by Sweden have affected the results; see also the Swedish country report.

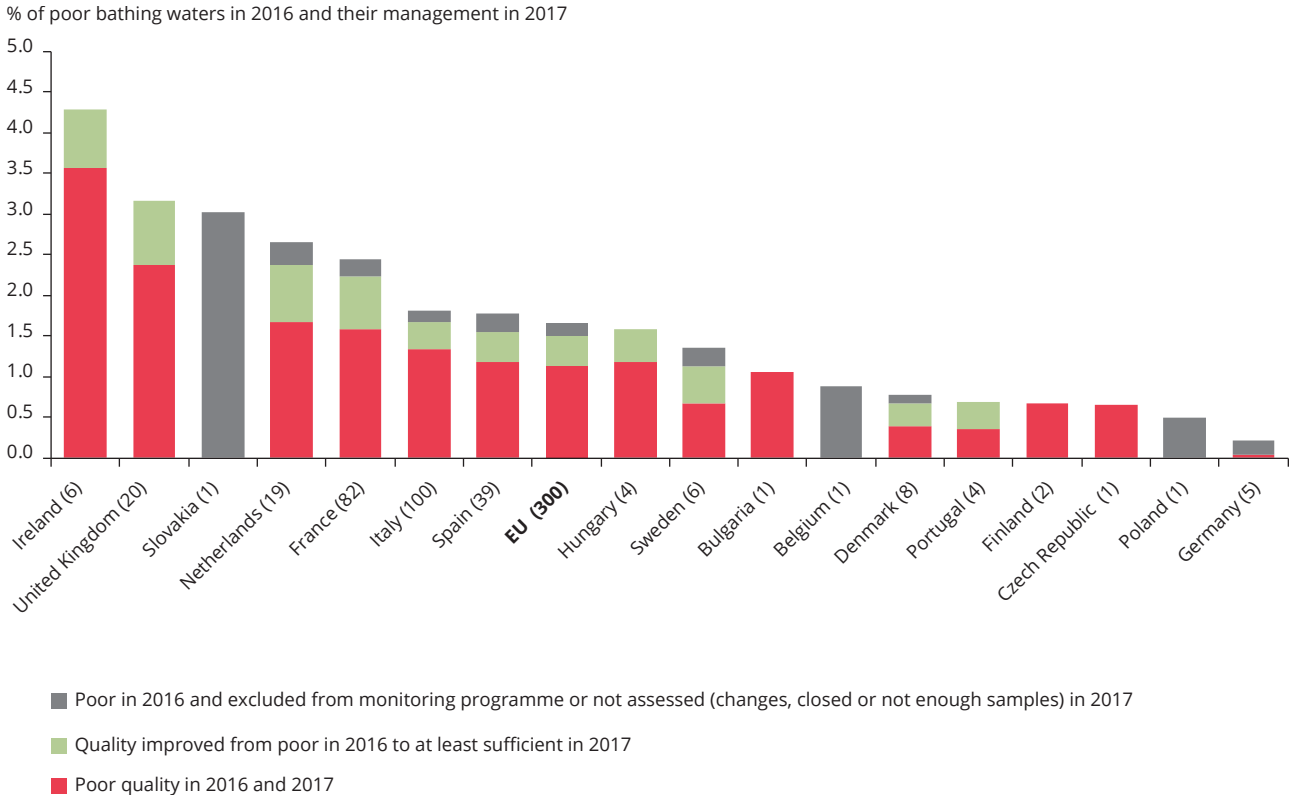
2.3 Improvement and deterioration in bathing water quality

In 2016, 300 bathing water sites in the EU were of poor quality. A total of 201 bathing waters (or 1.2 % of all bathing waters) remained poor in 2017. Some 68 bathing waters (or 0.4 % of all bathing waters) improved their water quality to at least sufficient, while 31 bathing waters (or 0.2 % of all bathing waters) were either excluded from the monitoring programme (10) or could not be assessed due to changes (15), closure (5) or not having enough samples (1).

Between 2016 and 2017, 72 bathing water sites in Europe changed status from poor quality to sufficient quality or better. The countries with the highest number of bathing water sites where the water quality improved from poor to at least sufficient are France (22 sites), Italy (21 sites) and Spain (eight sites).

However, in the same period, 75 bathing water sites changed their status from at least sufficient quality to poor quality. The deterioration of the quality of individual bathing water sites was most significant in France, where water quality at 26 bathing water sites changed from at least sufficient to poor. Deterioration in quality is also significant in Spain (seven sites), Denmark, the Netherlands and the United Kingdom (six sites each), Germany and Italy (five sites each). The largest share of total reported bathing waters

Figure 2.4 Status of bathing waters assessed as poor in 2016



downgraded to poor quality is in Estonia, where 7.4 % of all bathing water sites have deteriorated (from zero to four bathing water sites were classified as poor).

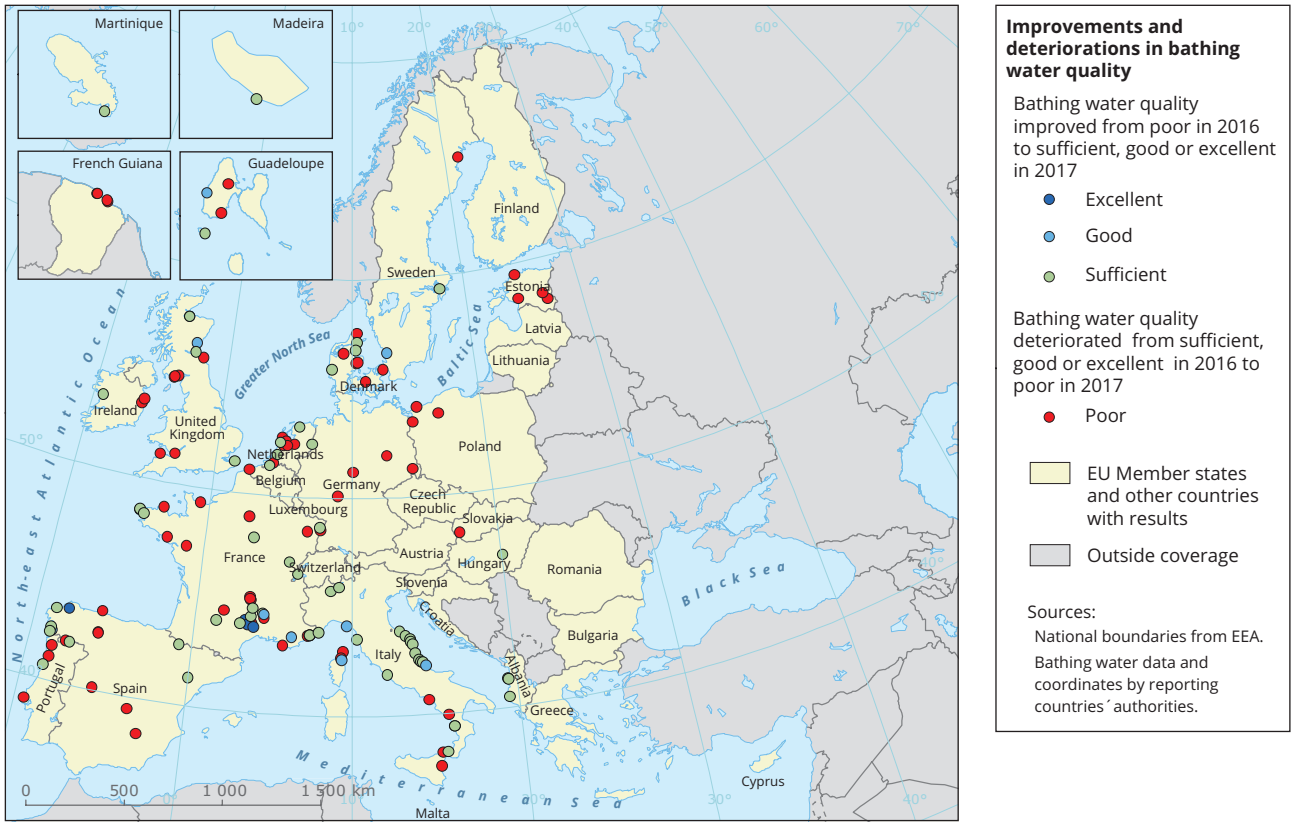
Swimming at bathing sites with poor water quality can result in illness. Bathing water sites classified, as 'poor' have to be closed throughout the following bathing season and must have measures in place to reduce pollution and eliminate hazards to the health of bathers.

Bathing must be permanently prohibited or permanent advice against bathing must be put in place at bathing water sites that have been classified as poor for five consecutive years. In 2017, 76 bathing water sites were poor or non-compliant for five years; 44 in Italy, 24 in France, four in Spain and one in Bulgaria, Denmark, Ireland and the Netherlands, respectively. Out of these, 33 bathing water sites have been poor or non-compliant for more than five years and still operating: 20 in Italy, eight in France, four in Spain and one in the Netherlands.

2.4 Informing the public about bathing water quality

The Bathing Water Directive requires public participation in the implementation of the Directive and active information dissemination. Today, countries have national or local websites ([13]) with

Map 2.1 Improvement and deterioration in bathing water quality



([13]) National or regional websites for bathing water quality available at http://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water/state/national-or-regional-pages

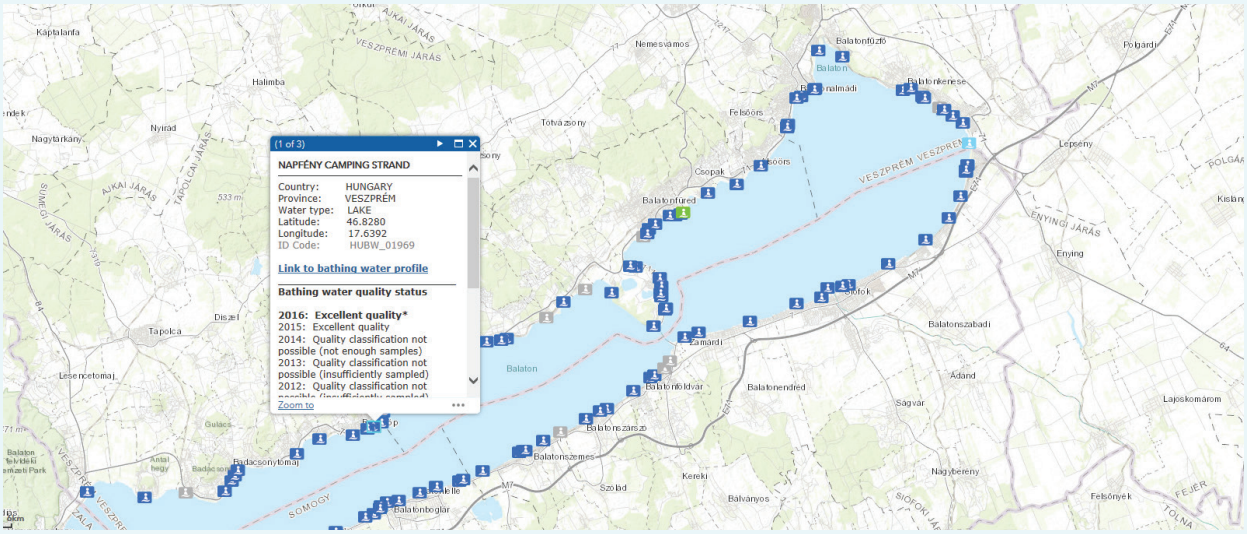
detailed information on each bathing water site. These websites generally include a map search function and allow public access to monitoring results, both in real time and for previous seasons.

At the European level, bathing water information is made available to the public through the EEA's bathing water web pages ([14]), which allow users to view bathing water quality at nearly 22 000 bathing water sites across Europe. Users can check bathing water quality on an interactive map, download data and individual country reports, explore details through a link to the national online bathing water profile and make comparisons with previous years.

By means of information technologies, the public can access illustrative information, understand bathing water management and the current situation, and ultimately become more actively involved in protecting the environment and helping to improve Europe's bathing areas.

Box 2.1 Bathing water quality near you

Why not take a few minutes to find out how clean the bathing water is near you or your summer holiday location? Visit the interactive map viewer on bathing water quality and simply enter your geographical area of interest (http://www.eea.europa.eu/themes/water/interactive/bathing/state-of-bathing-waters) or use one of the national or regional websites for bathing water quality (https://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water/state/national-or-regional-pages). More information on European waters is available in WISE-Freshwater https://water.europa.eu/freshwater.



([14]) EEA bathing water webpages available at http://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water/state

3 Monitoring and management of bathing water pollution

The Bathing Water Directive lays the ground for the regular monitoring of two bacteria (intestinal enterococci and *Escherichia coli*), hence its focus is on microbiological pollution. Nevertheless, other aspects of pollution are also addressed, as well as criteria for dealing with short-term pollution events and abnormal situations. Pollution is the presence of microbiological contamination or other organisms or waste affecting bathing water quality and presenting a risk to the health of bathers. This includes proliferation of cyanobacteria, macro-algae, marine phytoplankton, glass, plastic, rubber or any other waste. In order to increase the efficiency of European water quality legislation and to promote a systemic approach to environmental issues, the Directive is also coordinated with legislation on urban waste water treatment, on the protection of waters against pollution caused by nitrates from agricultural sources ([15]) and the Water Framework Directive.

3.1 Management of cyanobacteria blooms

Cyanobacteria, also known as blue-green algae, can be harmful if swallowed and can cause skin rashes. Proliferations of cyanobacteria can occur when environmental conditions are favourable, i.e. when there are high levels of nutrients in water, there is a high stability of the water column, temperatures and light are favourable and conditions are calm and windless.

If a blue-green algae bloom occurs, the public must be informed and advised not to bathe. When bathing water profiles indicate the potential for cyanobacterial proliferation, appropriate monitoring must be carried out to enable the timely identification of health risks.

Each year, hundreds of bathing water sites are affected by cyanobacteria blooms that decrease water quality and can affect the health of bathers. Information available from European countries indicates issues in Central European inland bathing waters in the Czech Republic, Germany, and Poland, but also in other countries. Although cyanobacteria are not subject to quantitative monitoring prescribed by the Directive, the blooms frequently create the need for temporary advice against or prohibition of bathing.

3.2 Short-term pollution events and sampling frequencies

Short-term pollution means microbiological contamination that has clearly identifiable causes and is normally expected to affect bathing water quality for less than 72 hours after the first impact. The causes of short-term pollution events are weather events — primarily excessive precipitation and consequent surface runoff as well as waste water overflow; technical malfunctions of sewerage systems and waste water treatment plants; and spillage of waste waters from ships. In most cases, according to the analysis of the information provided in the bathing water profiles of the affected sites, short-term pollution occurs after periods of heavy rain when a mixture of surface water and foul sewage can be discharged to the environment via combined sewer flows.

Based on the characterisation of pollution sources, the local authorities should implement remedying measures. The Bathing Water Directive requires that local authorities take management measures such as early warnings, bathing prohibitions and measures to prevent, reduce or eliminate the causes of pollution.

([15]) Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources; OJ L 375, 31.12.1991, p. 1-8 (http://data.europa.eu/eli/dir/1991/676/oj).

In the last assessment period (2014 to 2017), 3 130 distinct short-term pollution events were reported throughout Europe. While the reported number of events was fairly stable between 2014 and 2016 — between 726 and 741 each season — it increased to 933 short-term pollution events in the 2017 season. The increase may also be an indication of better use of the management approach resulting in a larger number of events reported.

Although short-term pollution events are reported within all four quality classes, there is an evident correlation of reported events with quality classification. For the 2017 season, short-term pollution occurred at 14 % of 'poor' bathing waters, at 10 % of 'sufficient' quality bathing waters, 4 % of 'good' quality bathing waters and only 1 % of 'excellent' quality bathing waters.

Box 3.1 Short-term pollution management in Portorož, Slovenia and Northern Ireland

An example of a short-term pollution event in Portorož, Slovenia shows a chain of management actions that led to the re-establishment of the normal state of the bathing water, which had been classified as excellent quality since monitoring began. When detecting extremely high concentrations of the monitored bacteria in a sample taken on 1 August, the authorities prohibited bathing at the site and informed the media.

Subsequent investigations showed a technical malfunction in the sewerage system, which led to the waste water spilling into the sea. The authorities solved the malfunction within a day and applied microbiological sampling every day thereafter, until the end of August. The samples indicated that excellent conditions had been reestablished and thus the bathing water was safe for the users.

In Northern Ireland, the EU System for bathing Water quality Modelling (SWIM) project implements short-term pollution prediction models. These are developed on the basis of pre-existing microbiological quality data for bathing water made available by the Directive, other relevant environmental data, citizen engagement, predictive modeling with multivariate and other models, and intelligent orchestrated sensing.

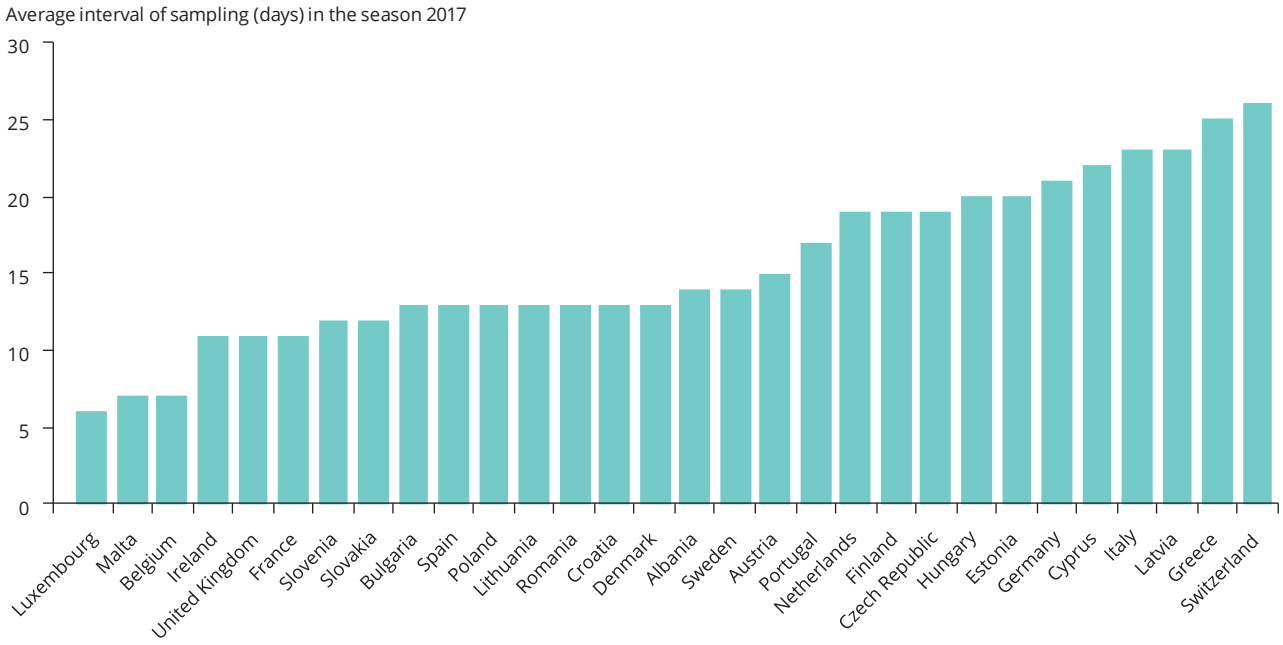
Dr Mark Wyer, of the EU funded 'Smart Coasts' project, holding one of the Swansea Bay signs giving real-time public information on water quality at Swansea Bay bathing water. ©Sam Naylor, Swansea Council

The most frequent reasons for short-term pollution are weather events, primarily excessive precipitation and consequent surface runoff as well as waste water overflow, technical malfunctions of sewerage systems and waste water treatment plants, and spillage of waste water from ships.

In general, the Directive requires at least one sample per month to be taken at each bathing water site, however this may leave a long monitoring window that can accommodate unspotted short-term pollution. It is therefore important to take samples frequently and take additional unscheduled samples in anticipation of short-term pollution.

Figure 3.1 shows the average number of days between samples taken at each bathing water site, averaged per country. Samples are taken most frequently in Luxembourg (one sample every 6 days on average), Malta and Belgium (every 7 days). All reporting countries take samples within the sampling frequency required by the Directive and most bathing water sites are sampled more often than once per month, the minimum required by the Directive.

Figure 3.1 Average sampling interval (days) in the 2017 season



Annex 1 Number of bathing waters in the 2017 season with the requirement on sampling frequency satisfied and not satisfied

Country	Total number of bathing waters in 2017	Bathing waters with sampling frequency satisfied ([16])	Bathing waters with sampling frequency not satisfied ([17])	Bathing waters that are new, changed or closed ([18])		
				Closed	New	Changes
AT (Austria)	263	262	0	0	1	0
BE (Belgium)	113	112	1	0	0	0
BG (Bulgaria)	95	93	1	0	1	0
CY (Cyprus)	113	111	1	1	0	0
CZ (Czech Republic)	154	144	2	4	4	0
DE (Germany)	2 287	2 248	3	10	20	6
DK (Denmark)	1 029	989	27	5	5	3
EE (Estonia)	54	50	4	0	0	0
ES (Spain)	2 219	2 171	7	3	34	4
FI (Finland)	299	284	13	0	2	0
FR (France)	3 379	3 267	30	27	48	7
GR (Greece)	1 598	1 437	108	1	52	0
HR (Croatia)	976	915	17	0	44	0
HU (Hungary)	257	230	5	1	21	0
IE (Ireland)	142	139	0	0	3	0
IT (Italy)	5 531	5 147	312	4	35	5
LT (Lithuania)	114	107	5	0	2	0
LU (Luxembourg)	12	12	0	0	0	0
LV (Latvia)	56	46	7	0	3	0
MT (Malta)	87	87	0	0	0	0
NL (Netherlands)	719	703	0	2	13	1
PL (Poland)	205	182	1	1	21	0
PT (Portugal)	603	588	0	0	15	0
RO (Romania)	50	50	0	0	0	0
SE (Sweden)	441	396	35	0	6	4
SI (Slovenia)	47	47	0	0	0	0
SK (Slovakia)	32	29	0	3	0	0
UK (United Kingdom)	634	630	0	2	2	0
EU	**21 509**	**20 476**	**579**	**64**	**332**	**30**
AL (Albania)	102	80	18	0	1	3
CH (Switzerland)	190	113	67	0	10	0
Europe	**21 801**	**20 660**	**677**	**60**	**343**	**33**

([16]) These bathing waters have been monitored according to Bathing Water Directive provisions (monitoring frequency satisfied and pre-season sample carried out), are not new, have not changed and were not closed in 2017. Such bathing waters have been quality-classified (excellent, good, sufficient, poor).

([17]) These bathing waters have either not been monitored according to Bathing Water Directive provisions (monitoring frequency not satisfied), are not new, have not changed or were closed in 2017. They may be quality-classified if there is a reasonable volume of samples available.

([18]) These bathing waters are closed, new, or have been subject to changes that could affect bathing water quality (see Box 2.1).

Annex 2 Bathing water quality results in 2017

Country	Total number	Excellent quality		Good quality		Sufficient quality		Poor quality		Quality classification not possible (*)	
	2017 (2016)	Number	%	Number	%	Number	%	Number	%	Number	%
AT (Austria)	263 (264)	250	95.1	10	3.8	2	0.8	0	0.0	1	0.4
BE (Belgium)	113 (113)	98	86.7	12	10.6	3	2.7	0	0.0	0	0.0
BG (Bulgaria)	95 (94)	42	44.2	45	47.4	6	6.3	1	1.1	1	1.1
CY (Cyprus)	113 (113)	110	97.3	1	0.9	0	0.0	0	0.0	2	1.8
CZ (Czech Republic)	154 (154)	126	81.8	15	9.7	2	1.3	1	0.6	10	6.5
DE (Germany)	2 287 (2 292)	2 090	91.4	121	5.3	30	1.3	8	0.3	38	1.7
DK (Denmark)	1 029 (1 036)	892	86.7	87	8.5	28	2.7	10	1.0	12	1.2
EE (Estonia)	54 (54)	34	63.0	9	16.7	3	5.6	4	7.4	4	7.4
ES (Spain)	2 219 (2 191)	1 897	85.5	178	8.0	59	2.7	38	1.7	47	2.1
FI (Finland)	299 (301)	256	85.6	21	7.0	5	1.7	2	0.7	15	5.0
FR (France)	3 379 (3 359)	2 627	77.7	446	13.2	129	3.8	80	2.4	97	2.9
GR (Greece)	1 598 (1 542)	1 533	95.9	11	0.7	1	0.1	0	0.0	53	3.3
HR (Croatia)	976 (949)	913	93.5	13	1.3	2	0.2	0	0.0	48	4.9
HU (Hungary)	257 (253)	182	70.8	34	13.2	7	2.7	7	2.7	27	10.5
IE (Ireland)	142 (140)	102	71.8	18	12.7	12	8.5	7	4.9	3	2.1
IT (Italy)	5 531 (5 518)	4 970	89.9	286	5.2	104	1.9	79	1.4	92	1.7
LT (Lithuania)	114 (114)	97	85.1	12	10.5	1	0.9	1	0.9	3	2.6
LU (Luxembourg)	12 (11)	12	100.0	0	0.0	0	0.0	0	0.0	0	0.0
LV (Latvia)	56 (56)	51	91.1	2	3.6	0	0.0	0	0.0	3	5.4
MT (Malta)	87 (87)	86	98.9	1	1.1	0	0.0	0	0.0	0	0.0
NL (Netherlands)	719 (718)	528	73.4	122	17.0	33	4.6	20	2.8	16	2.2
PL (Poland)	205 (201)	137	66.8	26	12.7	14	6.8	5	2.4	23	11.2
PT (Portugal)	603 (579)	529	87.7	46	7.6	8	1.3	5	0.8	15	2.5
RO (Romania)	50 (50)	25	50.0	24	48.0	1	2.0	0	0.0	0	0.0
SE (Sweden**)	441 (444)	259	58.7	123	27.9	14	3.2	4	0.9	41	9.3
SI (Slovenia)	47 (47)	35	74.5	11	23.4	1	2.1	0	0.0	0	0.0
SK (Slovakia)	32 (33)	19	59.4	9	28.1	0	0.0	1	3.1	3	9.4
UK (United Kingdom)	634 (631)	389	61.4	167	26.3	53	8.4	21	3.3	4	0.6
EU	**21 509 (21 344)**	**18 289**	**85.0**	**1850**	**8.6**	**518**	**2.4**	**294**	**1.4**	**558**	**2.6**
AL (Albania)	102 (92)	56	54.9	21	20.6	9	8.8	12	11.8	4	3.9
CH (Switzerland)	190 (231)	116	61.1	4	2.1	5	2.6	0	0.0	65	34.2
Europe	**21 801 (21 667)**	**18 461**	**84.7**	**1 875**	**8.6**	**532**	**2.4**	**306**	**1.4**	**627**	**2.9**

Note: (*) Not enough samples/new bathing waters/bathing waters with changes/closed.

(**) Methodology problems by Sweden have affected the results; see also the Swedish country report.

Source: EEA.

Annex 3 Coastal bathing water quality results in 2017

Country	Total number of bathing waters	Excellent quality		Good quality		Sufficient quality		Poor quality		Quality classification not possible (*)	
	2017 (2016)	Number	%	Number	%	Number	%	Number	%	Number	%
BE (Belgium)	42 (42)	40	95.2	2	4.8	0	0.0	0	0.0	0	0.0
BG (Bulgaria)	91 (90)	41	45.1	42	46.2	6	6.6	1	1.1	1	1.1
CY (Cyprus)	113 (113)	110	97.3	1	0.9	0	0.0	0	0.0	2	1.8
DE (Germany)	366 (367)	303	82.8	39	10.7	14	3.8	1	0.3	9	2.5
DK (Denmark)	915 (921)	786	85.9	83	9.1	25	2.7	10	1.1	11	1.2
EE (Estonia)	27 (27)	14	51.9	6	22.2	3	11.1	2	7.4	2	7.4
ES (Spain)	1 960 (1 949)	1 773	90.5	119	6.1	37	1.9	11	0.6	20	1.0
FI (Finland)	77 (77)	53	68.8	11	14.3	4	5.2	2	2.6	7	9.1
FR (France)	2 065 (2 066)	1 651	80.0	290	14.0	73	3.5	40	1.9	11	0.5
GR (Greece)	1 595 (1 540)	1 531	96.0	11	0.7	1	0.1	0	0.0	52	3.3
HR (Croatia)	949 (922)	909	95.8	10	1.1	1	0.1	0	0.0	29	3.1
IE (Ireland)	133 (131)	94	70.7	17	12.8	12	9.0	7	5.3	3	2.3
IT (Italy)	4 864 (4 864)	4 371	89.9	255	5.2	88	1.8	75	1.5	75	1.5
LT (Lithuania)	16 (16)	14	87.5	2	12.5	0	0.0	0	0.0	0	0.0
LV (Latvia)	33 (33)	31	93.9	1	3.0	0	0.0	0	0.0	1	3.0
MT (Malta)	87 (87)	86	98.9	1	1.1	0	0.0	0	0.0	0	0.0
NL (Netherlands)	93 (93)	75	80.6	13	14.0	2	2.2	0	0.0	3	3.2
PL (Poland)	97 (89)	47	48.5	18	18.6	11	11.3	2	2.1	19	19.6
PT (Portugal)	480 (464)	435	90.6	29	6.0	5	1.0	3	0.6	8	1.7
RO (Romania)	49 (49)	25	51.0	23	46.9	1	2.0	0	0.0	0	0.0
SE (Sweden**)	244 (245)	102	41.8	96	39.3	13	5.3	3	1.2	30	12.3
SI (Slovenia)	21 (21)	21	100.0	0	0.0	0	0.0	0	0.0	0	0.0
UK (United Kingdom)	618 (615)	378	61.2	164	26.5	51	8.3	21	3.4	4	0.6
EU	**14 935 (14 821)**	**12 890**	**86.3**	**1 233**	**8.3**	**347**	**2.3**	**178**	**1.2**	**287**	**1.9**
AL (Albania)	102 (92)	56	54.9	21	20.6	9	8.8	12	11.8	4	3.9
Europe	**15 037 (14 913)**	**12 946**	**86.1**	**1 254**	**8.3**	**356**	**2.4**	**190**	**1.3**	**290**	**1.9**

Note: (*) Not enough samples/new bathing waters/bathing waters with changes/closed.

(**) Methodology problems by Sweden have affected the results; see also the Swedish country report.

Source: EEA.

Annex 4 Inland bathing water quality results in 2017

Country	Total number of bathing water sites	Excellent quality		Good quality		Sufficient quality		Poor quality		Quality classification not possible (*)	
	2017 (2016)	Number	%	Number	%	Number	%	Number	%	Number	%
AT (Austria)	263 (264)	250	95.1	10	3.8	2	0.8	0	0.0	1	0.4
BE (Belgium)	71 (71)	58	81.7	10	14.1	3	4.2	0	0.0	0	0.0
BG (Bulgaria)	4 (4)	1	25.0	3	75.0	0	0.0	0	0.0	0	0.0
CZ (Czech Republic)	154 (154)	126	81.8	15	9.7	2	1.3	1	0.6	10	6.5
DK (Denmark)	1 921 (1 925)	1 787	93.0	82	4.3	16	0.8	7	0.4	29	1.5
DK (Denmark)	114 (115)	106	93.0	4	3.5	3	2.6	0	0.0	1	0.9
EE (Estonia)	27 (27)	20	74.1	3	11.1	0	0.0	2	7.4	2	7.4
ES (Spain)	259 (242)	124	47.9	59	22.8	22	8.5	27	10.4	27	10.4
FI (Finland)	222 (224)	203	91.4	10	4.5	1	0.5	0	0.0	8	3.6
FR (France)	1 314 (1 293)	976	74.3	156	11.9	56	4.3	40	3.0	86	6.5
GR (Greece)	3 (2)	2	66.7	0	0.0	0	0.0	0	0.0	1	33.3
HR (Croatia)	27 (27)	4	14.8	3	11.1	1	3.7	0	0.0	19	70.4
HU (Hungary)	257 (253)	182	70.8	34	13.2	7	2.7	7	2.7	27	10.5
IE (Ireland)	9 (9)	8	88.9	1	11.1	0	0.0	0	0.0	0	0.0
IT (Italy)	667 (654)	599	89.8	31	4.6	16	2.4	4	0.6	17	2.5
LT (Lithuania)	98 (98)	83	84.7	10	10.2	1	1.0	1	1.0	3	3.1
LU (Luxembourg)	12 (11)	12	100.0	0	0.0	0	0.0	0	0.0	0	0.0
LV (Latvia)	23 (23)	20	87.0	1	4.3	0	0.0	0	0.0	2	8.7
NL (Netherlands)	626 (625)	453	72.4	109	17.4	31	5.0	20	3.2	13	2.1
PL (Poland)	108 (112)	90	83.3	8	7.4	3	2.8	3	2.8	4	3.7
PT (Portugal)	123 (115)	94	76.4	17	13.8	3	2.4	2	1.6	7	5.7
RO (Romania)	1 (1)	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0
SE (Sweden**)	197 (199)	157	79.7	27	13.7	1	0.5	1	0.5	11	5.6
SI (Slovenia)	26 (26)	14	53.8	11	42.3	1	3.8	0	0.0	0	0.0
SK (Slovakia)	32 (33)	19	59.4	9	28.1	0	0.0	1	3.1	3	9.4
UK (United Kingdom)	16 (16)	11	68.8	3	18.8	2	12.5	0	0.0	0	0.0
EU	**6 574 (6 523)**	**5 399**	**82.1**	**617**	**9.4**	**171**	**2.6**	**116**	**1.8**	**271**	**4.1**
CH (Switzerland)	190 (231)	116	61.1	4	2.1	5	2.6	0	0.0	65	34.2
Europe	**6 764 (6 754)**	**5 515**	**81.5**	**621**	**9.2**	**176**	**2.6**	**116**	**1.7**	**336**	**5.0**

Note: (*) Not enough samples/new bathing waters/bathing waters with changes/closed.

(**) Methodology problems by Sweden have affected the results; see also the Swedish country report.

Source: EEA.

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European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark

Tel.: +45 33 36 71 00
Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

Publications Office

European Environment Agency