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European bathing water quality in 2010

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European Environment Agency

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Foreword

Diving into refreshing waters is one of the pleasures of summer for millions across Europe, and as temperatures rise, thoughts turn to the beach. But choosing between the many thousands of lakes, rivers and beaches across the continent can be difficult — so this report from the European Environment Agency (EEA) and the European Commission can help all water users find high quality bathing water across the region, whether they are swimmers, paddlers, snorkelers, kayakers or surfers.

This year's report assesses bathing water quality at more than 21 000 bathing sites in all 27 EU Member States in 2010. These assessments give an indication to where the best quality bathing is likely to be found this year.

More than nine out of 10 bathing waters met the minimum water quality standards in 2010, with 92.1 % of coastal and 90.2 % of inland bathing water bodies meeting these requirements. Only 1.2 % of coastal bathing waters and 2.8 % of inland bathing waters were found to be non-compliant. Nonetheless, bathing water quality has deteriorated since the previous year. This may be partly due to year-to-year variation, although it also indicates that further work is needed to continually improve the bathing water resource in Europe.

In addition to an overall assessment, the report also points at online tools including geospatial mapping programmes, which allow users to access data for a selected country or region and make comparisons with previous years. Some of these tools also allow for instant feedback from users, helping beachgoers get a more complete view of the bathing site in question.

The quality of bathing waters is essential not only for the bathers because of public health concerns. It is also a strong indication to the overall health of our coastal zones and inland water bodies. All efforts to improve the quality of bathing waters should therefore also be seen in the context of the good ecological and environmental status we aim for by 2015 in implementing the Water and Marine Framework Directives.

We encourage you all to make full use of all the information sources presented in this publication. We also encourage you to get more actively involved in protecting the environment and helping to improve Europe's bathing areas.

We wish you a nice summer!

Janez Potočnik

European Commissioner for the Environment

Jacqueline McGlade

Executive Director, European Environment Agency

1 Europeans demand safe bathing waters

Europeans care about water quality and rank bathing water quality as a priority when judging their local environment. Knowing that they have clean and safe water to swim or play in is an important factor in their choice of a holiday or weekend destination. For the tourism industry, clean and safe water is also a major factor in attracting visitors to an area.

To allow Europeans to make an informed choice of beach, the European Union (EU) publishes an annual report on the quality of coastal and inland bathing areas, as reported by EU Member States. Since 2009 the European Environment Agency (EEA) and its European Topic Centre on Inland, Coastal and Marine Waters have prepared the report in cooperation with the European Commission Directorate-General for the Environment.

This report provides a comprehensive synopsis of the quality of bathing waters in the Member States of the European Union in the 2010 bathing season. It thereby gives an indication of the areas where the quality of bathing is expected to be good during 2011. In addition, the report also shows the evolution of bathing water quality from 1990 to 2010.

The first European bathing water legislation, the 'old bathing water directive' ([1]) was adopted in 1975 and came into force in 1976. Its main objectives are to safeguard public health and protect the aquatic environment in coastal and inland areas from pollution. Bathing waters covered by the old bathing water directive can be coastal waters or inland waters (rivers, natural lakes, reservoirs and ponds) in which bathing is explicitly authorised by the competent authorities of each Member State, or not prohibited and traditionally practiced by a large number of bathers. Swimming pools and waters for therapeutic purposes are not covered. The period during which bathers can be expected in bathing areas depends largely on local bathing rules and weather conditions. A bathing season can also vary within a Member State. In the European Union it usually runs from the end of May until the end of September.

New European legislation on bathing water was adopted in 2006 ([2]). The 'new bathing water directive' updates the measures of the 1975 legislation and simplifies its management and surveillance methods. It also provides for a more proactive approach to informing the public on water quality and creates four quality categories for bathing waters — 'poor', 'sufficient', 'good' and 'excellent'. The classification of bathing water quality is determined on the basis of a four-year (or three-year) trend instead of a single year's result as for the old directive. Therefore, the procedure for assessing quality classes of bathing waters under the new bathing water directive gives more reliable and realistic results than the assessment under its predecessor.

The classification under the new bathing water directive is also less susceptible to bad weather or one-off incidents. Heavy rain or similar exceptional situations may cause pollution problems for a few days. In such situations authorities have to introduce immediate measures to lower the health risk to bathers. They are allowed, however, to exclude such events from their overall assessment of bathing water quality, as presented in this report.

The new bathing water directive is based on scientific knowledge on protecting health and the environment, as well as environmental management experience. It lays down provisions for more sophisticated monitoring, assessment and classification of bathing water quality. It also provides for better and earlier public information about bathing water quality and public participation, as well as for comprehensive and

([1]) Directive 76/160/EEC concerning the quality of bathing water.
([2]) Directive 2006/7/EC concerning the management of bathing water quality and repealing Directive 76/160/EEC.

modern management measures. It requires bathing water profiles to be drawn up describing bathing waters and potential impacts and threats to water quality. These serve both as information for citizens and as a management tool for the responsible authorities, and enable grouping of bathing waters.

The new European legislation was transposed into national law in 2008 but Member States have until December 2014 to implement it. Member States can choose to report either under the old or new bathing water directives until the 2012 bathing season when reporting under the new directive will become obligatory.

In some cases the required changes of the new bathing water directive have yet to be implemented, resulting in a late start date to sampling at some sites and/or insufficiently frequent sampling. As a late start and low frequency do not necessarily indicate unsatisfactory bathing water quality, for 2010 results reported under *less strict rules* have been deemed acceptable. From 2012, however, the stricter rules will apply.

Photo: © Peter Kristensen

2 EU bathing water legislation and its implementation in 2010

Reporting requirements under EU bathing water legislation

Local authorities monitor water quality in Europe, including sampling and analysing bathing water. Frequently during the bathing season they take samples from more than 21 000 coastal and inland bathing waters. The laboratories analysing the bathing water samples count the number of certain types of bacteria, which may indicate the presence of pollution, mainly from sewage or livestock waste. These samples are analysed against the values established by the bathing water directives. The bathing water results are used to provide warning in case of poor quality and often posted on local or national websites. The local results are then sent to the national responsible authorities.

Member States are obliged to provide the results of their samples to the European Commission before 31 December of the same year. In early June the following year, the Commission, together with the European Environment Agency, publishes an EU-wide report covering all 27 Member States, available in print and online.

As in 2009, Croatia and Switzerland also submitted reports on the quality of bathing waters during the 2010 bathing season. In addition, Montenegro also submitted a report for the first time.

The old bathing water directive from 1976 (Directive 76/160/EEC) sets out a number of physical, chemical and microbiological parameters against which the quality of bathing water is tested. Member States must comply with the mandatory values but may adopt stricter standards and non-binding guidance values. The new bathing water directive from 2006 (Directive 2006/7/EC) requires that EU Member States comply with even stricter requirements and implement effective management of bathing water, public participation and better information dissemination.

A country that monitors the state of bathing waters under the old directive reports the relevance of measured levels of at least five physical-chemical and microbiological parameters of the limit values given in Directive 76/160/EEC. Assessment of the status of bathing water in a specific year is made on the basis of adequacy parameters in that year.

Box 2.1 Microbiological indicators for pollution of bathing water

Escherichia coli

Escherichia coli (commonly abbreviated *E. coli*) is commonly found in the lower intestine of warm-blooded organisms. Most *E. coli* strains are harmless and are part of the normal flora of the gut. *E. coli* can cause several intestinal and extra-intestinal infections such as urinary tract infections, meningitis, peritonitis, mastitis, septicaemia and pneumonia. *E. coli* are not always confined to the intestine, and their ability to survive for brief periods outside the body makes them an ideal indicator organism to test environmental samples for faecal contamination.

Intestinal enterococci

Intestinal enterococci are a subgroup of the larger group of organisms defined as faecal streptococci. Intestinal enterococci are typically excreted in the faeces of humans and other warm-blooded animals and present in large numbers in sewage and water environments polluted by sewage or wastes from humans and animals, therefore the cocci group is used as an index of faecal pollution. The numbers of intestinal enterococci in human faeces are generally about an order of magnitude lower than those of *E. coli*, however they tend to survive longer in water environments than *E. coli*.

In accordance with the new directive (2006/7/EC), by 2012 all EU Member States will begin to monitor and report the measured values of concentrations of two microbiological parameters — intestinal enterococci and *Escherichia coli* — in all bathing waters. The Directive provides that assessment of the status of bathing water is based on the concentration of intestinal enterococci and *Escherichia coli* in the last four years.

Reporting under the old and new bathing water directives in 2010

In 2010, six countries, Bulgaria, the Czech Republic, Ireland, Poland, Romania and the United Kingdom, as well as the Flemish part of Belgium reported under the old directive. Assessment of the status of bathing water in 2010 in these countries is therefore made under the rules of Directive 76/160/EEC (see Box 2.2).

The other EU Member States and the Walloon region of Belgium monitored and reported the state of bathing water under the new directive. Assessing bathing water quality under Directive 2006/7/EC requires a data set of three or four consecutive years. While those data are being compiled, the rules for transition period are applied (see Box 2.2).

Luxembourg, Hungary and Malta have reported under the new directive since 2007, 2008 and 2009 respectively. Malta, Hungary, Sweden, Greece, Portugal and the Walloon region of Belgium also send historical data with the two microbiological parameters of the new bathing water directive.

Assessment of the status of bathing water in 2010 in Luxembourg, Malta and Hungary is made under the rules of the new directive (Directive 2006/7/EC).

The status of bathing water in Belgium was assessed according to the rules of the transitional period, as the Flemish part reported by the rules of the old directive. Similarly, the assessment of the status in Sweden and Portugal is done under the rules of the transitional period, since the data on microbiological parameters are incomplete.

Greece in 2010 first began to monitor the state of their bathing waters in late July. Assessment of the status of their bathing waters in 2010 under the rules of the new directive, which take into account the full four-year data set, is impossible. The assessment is made under the rules of the transitional period using the data starting end July for the 2010 bathing season.

For the purpose of generating an aggregated assessment of bathing water quality across the EU, the quality classes under the new bathing water directive are transformed to harmonise them with those under the old directive. Bathing waters that have 'excellent' quality are classified as compliant with the guide values; bathing waters that have 'good' or 'sufficient' quality are classified as compliant with the mandatory values; and bathing waters that have 'poor' quality are classified as not compliant with mandatory values.

Three non-EU countries — Croatia, Montenegro and Switzerland — reported bathing water quality results under the new directive. Switzerland sent data on *Escherichia coli* for all bathing waters but on intestinal enterococci only for some. Therefore the assessment is made using only limit values of *Escherichia coli.*

Table 2.1 Parameters used to assess bathing water quality during the transition period

Parameter in Directive 2006/7/EC	Corresponding parameter in Directive 76/160/EEC	Guide values	Mandatory values	Minimum sampling frequency
1. Intestinal enterococci (cfu/100 ml)	3. Faecal streptococci/100 ml	100	– ([a])	([b])
2. *Escherichia coli* (cfu/100 ml)	2. Faecal coliforms/100 ml	100	2000	Fortnightly ([c])

Note: ([a]) There is no mandatory standard for the parameter 'faecal streptococci' under Directive 76/160/EEC. This means that only the parameter 'faecal coliforms' is taken into account for evaluating the compliance of bathing water with mandatory values. Evaluation of compliance with guide standards is based on both parameters.

([b]) Concentration to be checked by the competent authorities when an inspection in the bathing area shows that the substance may be present or that the quality of the water has deteriorated.

([c]) When a sample taken in previous years produced results that are appreciably better than those in Directive 76/160/EC Annex and when no new factor likely to lower the quality of the water has appeared, the competent authorities may halve the sampling frequency.

Box 2.2 Assessment methodology for bathing water quality in 2010 season

Assessment under Directive 76/160/EEC

Based on the results of sampling for five parameters (total coliforms, faecal coliforms, mineral oils, surface-active substances and phenols), bathing waters are classified into the following classes:

- CI: bathing waters that comply with the mandatory values;
- CG: bathing waters that comply with the guide values;
- NC: bathing waters that do not comply with the mandatory values;
- NF: bathing waters that are not sufficiently sampled (frequency criteria not satisfied);
- NS: bathing waters that are not sampled due to external causes;
- B: bathing waters that are closed or banned (temporarily or throughout the bathing season).

Assessment during the transition period — reporting under Directive 2006/7/EC and assessment according to the limit values of Directive 76/160/EEC

Assessing bathing water quality under Directive 2006/7/EC requires a data set of three or four consecutive years. While those data are being compiled, the rules for transition period are applied. This means that the classification of bathing waters is defined on the basis of concentrations of intestinal enterococci and *Escherichia coli* reported under Directive 2006/7/EC but the limit values for the classification are those given in Directive 76/160/EEC. The parameter intestinal enterococci is evaluated according to the guide value for the faecal streptococci parameter given in Directive 76/160/EEC. The parameter *Escherichia coli* is evaluated according to the mandatory and guide values for the parameter faecal coliforms given in Directive 76/160/EEC. The bathing waters are classified into the following class: CI, CG, NC, NF, NS or B.

In the assessment of bathing water quality in 2010, the maximum interval between two samples taken into consideration should be 42 days. The interval is larger than that prescribed in Directive 2006/7/EC (which requires at least one sample every month) due to the fact that some countries are still adopting their monitoring system for the new directive. Furthermore, the new directive requires that the first sample must be taken shortly before the start of a bathing season. However, in the assessment of bathing water quality in 2010, the first sample could be taken not later than 10 days after the start of the bathing season. If this is the case, the second sample should have been taken no later than 41 days after the start of the bathing season.

Assessment under Directive 2006/7/EC

When samples of intestinal enterococci and *Escherichia coli* for a bathing water are available for three or four consecutive years, the assessment is done according to assessment rules of Directive 2006/7/EC. The frequency of sampling is set out in Annex IV of the directive. Including a sample to be taken shortly before the start of the bathing season, the minimum number of samples taken per bathing season is four. However, only three samples are sufficient when the bathing season does not exceed eight weeks or the region is subject to special geographical constraints. Sampling dates are to be distributed throughout the bathing season, with the interval between sampling dates never exceeding one month. However, the maximum interval between two samples taken into consideration should be 41 days in 2010 monitoring. If there is no pre-season sample in 2010 monitoring, the rule that the first sample, not taken later than 10 days after the start of the bathing season, can be treated as preseason sample has been applied. If this is the case, the second sample should have been taken no later than 41 days after the start of the bathing season.

Coastal and inland bathing waters are classified as 'excellent', 'good', 'sufficient' and 'poor' quality. Some bathing waters cannot be classified according to their quality but are instead classified as 'closed (temporarily or throughout the bathing season)', 'new' (classification not yet possible), 'changes' (classification not yet possible after changes) or 'insufficiently sampled'.

3 Monitoring of bathing water in 2010

Number of bathing waters monitored

In Europe more than 22 000 bathing waters were reported in 2010. The number of bathing waters reported by EU Member States during the last five years ranged between 21 000 and 21 500 (Figure 3.1).

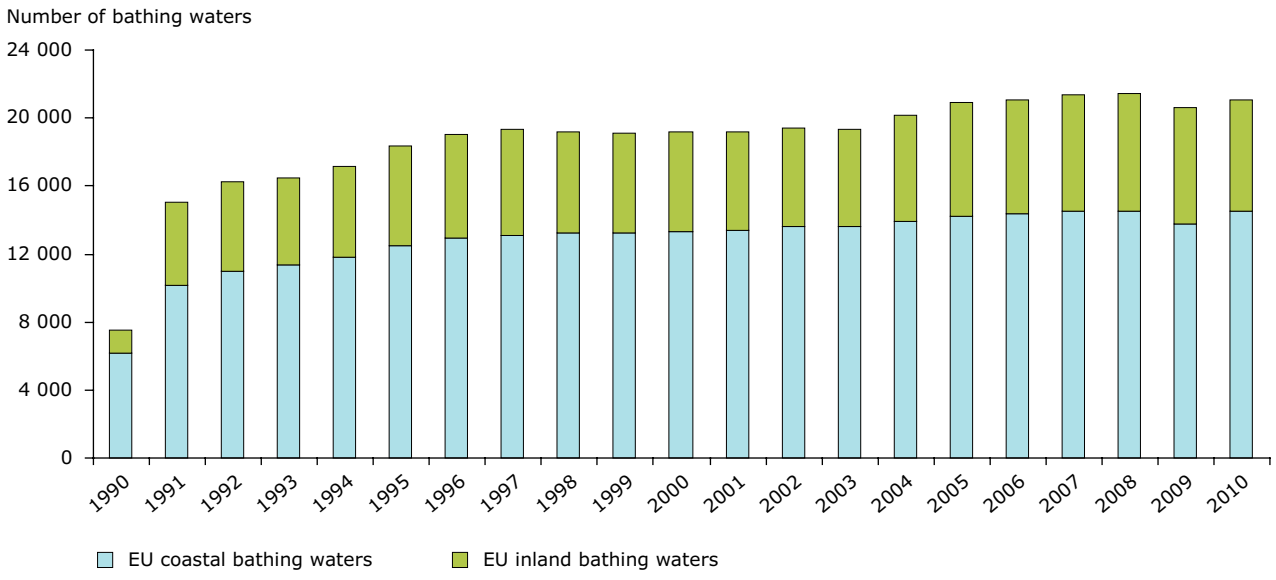
In 2010, the Member States reported 21 063 bathing waters, of which 70 % are coastal bathing waters. Almost half of all reported EU coastal bathing waters are located in Italy (33.7 %) and Greece (14.8 %), and almost half of inland bathing waters are in Germany (29.4 %) and France (20.1 %). The highest number of bathing waters are in Italy (almost 5 500) and France (more than 3 300).

A total of 25 countries reported inland bathing waters on lakes and rivers. There are no inland bathing waters reported from Croatia, Cyprus, Malta, Montenegro and Romania. The number of inland bathing waters is low (less than 15) in Bulgaria, Greece, Ireland, the United Kingdom and Latvia. The reasons for such low numbers vary. In the United Kingdom, there is a tradition of swimming in the sea. In Greece, there are very few rivers or lakes suitable for bathing compared to the high number of coastal bathing waters. In Bulgaria, there is a lack of interest in establishing and maintaining inland bathing waters due to no tradition of visiting such places.

Denmark, Malta, Croatia and Greece have the largest number of bathing waters per one million inhabitants, with around 200 (Figure 3.2). The EU average number of bathing waters is 42 per million inhabitants.

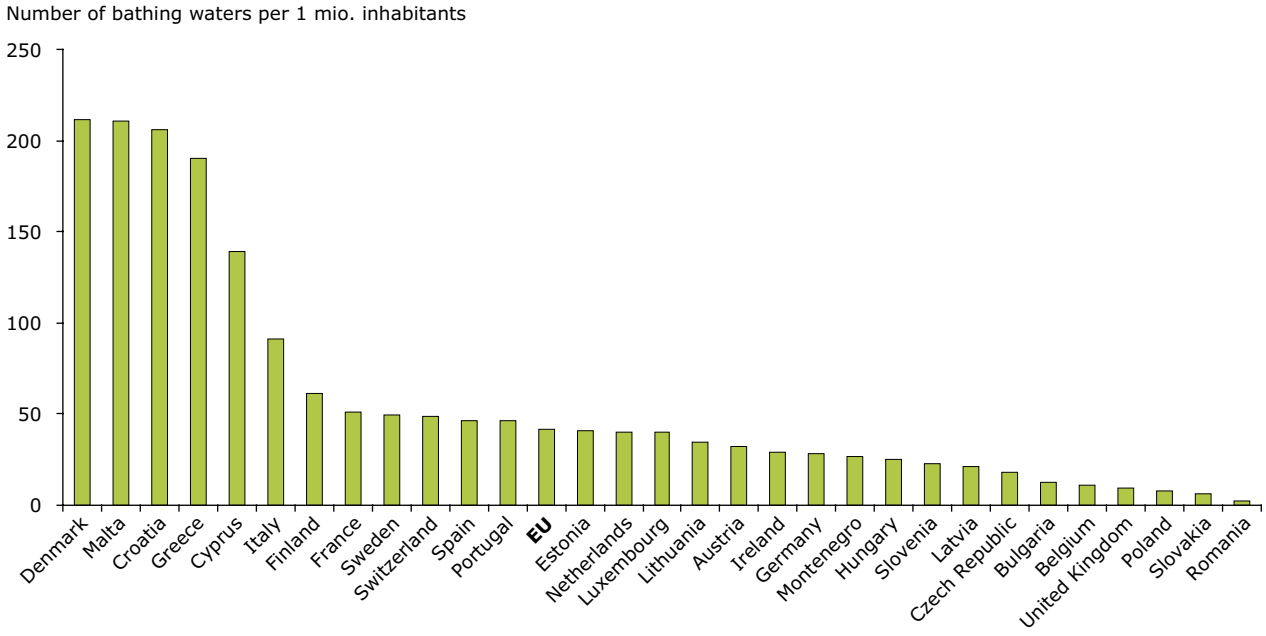
Italy and Belgium have the highest density of coastal bathing waters, with more than six bathing waters for every 10 kilometres of the sea coast, followed by Slovenia, Malta and France (Figure 3.3). The EU average is 2.2 coastal bathing waters per 10 kilometres of the coastline. The Netherlands has the most inland bathing waters compared to the country's area (13.9 bathing waters per 1 000 km^2), followed by Switzerland and Luxembourg. The EU average is 1.6 inland bathing waters per 1 000 km^2.

Figure 3.1 Total number of bathing waters reported in the European Union since 1990



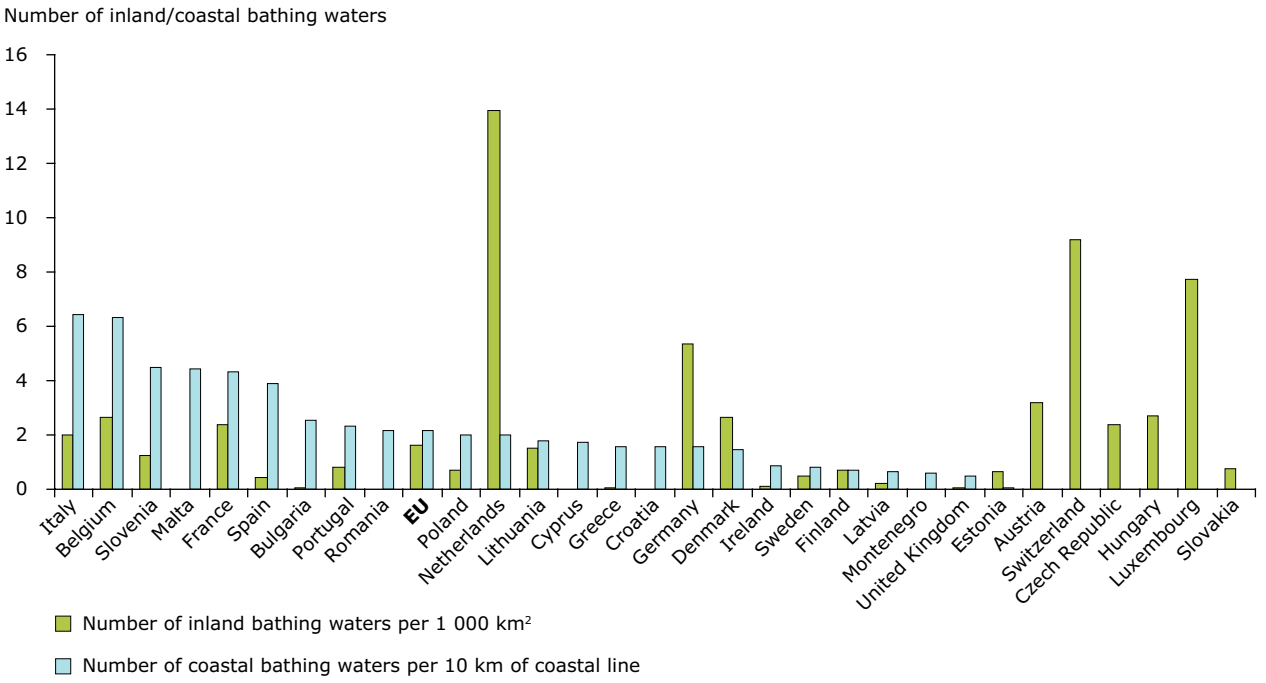
Source: WISE Bathing Water Quality database (data from annual reports by EU Member States).

Figure 3.2 Number of reported bathing waters in Europe per million inhabitants



Source: WISE Bathing Water Quality database (data from annual reports by reporting countries) and Eurostat.

Figure 3.3 Number of inland bathing waters per 1 000 km² and number of coastal bathing waters per 10 km of coastline



Source: WISE Bathing Water Quality database (data from annual reports by reporting countries) and http://europa.eu/abc/european_countries/eu_members/index_en.htm.

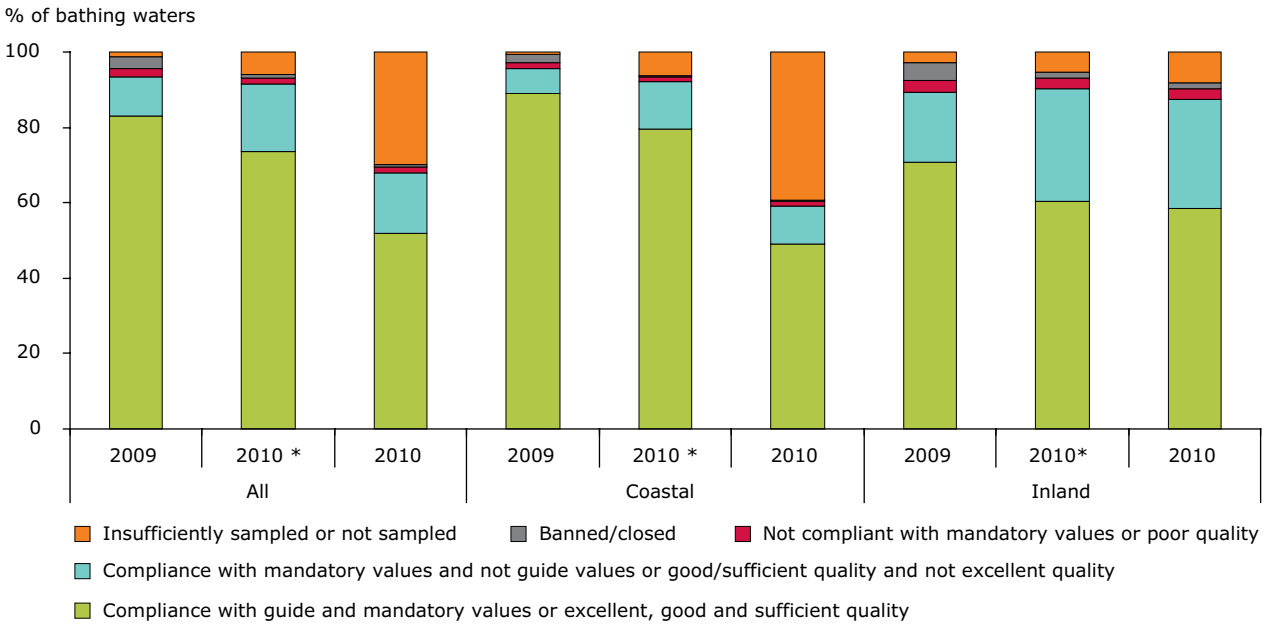
4 Bathing water quality and trends in the 2010 season

The new Bathing Water Directive (2006/7/EC) requires Member States to adjust their monitoring procedures. These adjustments include the requirement that sampling begin shortly before the start of the bathing season and that the interval between sampling should not exceed one month. In some cases these required changes have yet to be implemented, resulting in a late start date of sampling at some sites and/or insufficiently frequent sampling. As a late start and low frequency do not necessarily indicate unsatisfactory bathing water quality, for 2010 results reported under *less strict rules* ([3]) have been deemed acceptable. From 2012, however, the stricter rules will apply.

4.1 Overall bathing water quality

Overall in 2010, 92.1 % of Europe's coastal bathing waters and 90.2 % of inland bathing waters met the minimum water quality standards set by the bathing water directives (Figure 4.1). The bathing water quality decreased in 2010 compared to 2009. For coastal bathing waters, compliance with the mandatory values decreased 3.5 percentage points and compliance with the guide values decreased 9.5 percentage points. The share of inland bathing waters complying with the mandatory values increased slightly (0.8 percentage points), while compliance with the guide values fell

Figure 4.1 Bathing water quality in the European Union in the 2009 and 2010 bathing seasons



Note: (*) *Less strict rules* in regard to frequency are implemented, that is 42 days between two samples for reporting under Directive 2006/7/EC are allowed; and bathing water quality in Greece assessed only for the period since late July when monitoring results are available.

Source: WISE Bathing Water Quality database (data from annual reports by EU Member States).

([3]) Under the *less strict rules*, the assessment for Greece is based on a sampling period that begins at the end of July and runs to the end of the bathing water season. In addition, for all Member States results from monitoring at low frequency (less than 42 days between sampling dates) were accepted. With more than 42 days between sampling dates the bathing water was classified as insufficiently sampled or not sampled.

10.2 percentage points. The share of non-compliant bathing waters was low at 1.2 % for coastal bathing waters and 2.8 % for inland bathing waters.

When applying the *strict rules* ([4]), all bathing waters in Greece were insufficiently sampled, while 61.8 % of Italy's bathing waters were insufficiently sampled. Both countries have very high numbers of coastal bathing waters. The number of non-compliant bathing waters is still low at 155 (1.1 %) for coastal and 180 (2.8 %) for inland bathing waters.

4.2 Coastal bathing water quality in the European Union

Some 92.1 % of coastal bathing waters complied with the mandatory values and some 79.5 % of coastal bathing waters complied with the more stringent guide values during the 2010 bathing season. This is a decrease of 3.5 percentage points and 9.5 percentage points respectively compared to the previous year (Figure 4.2).

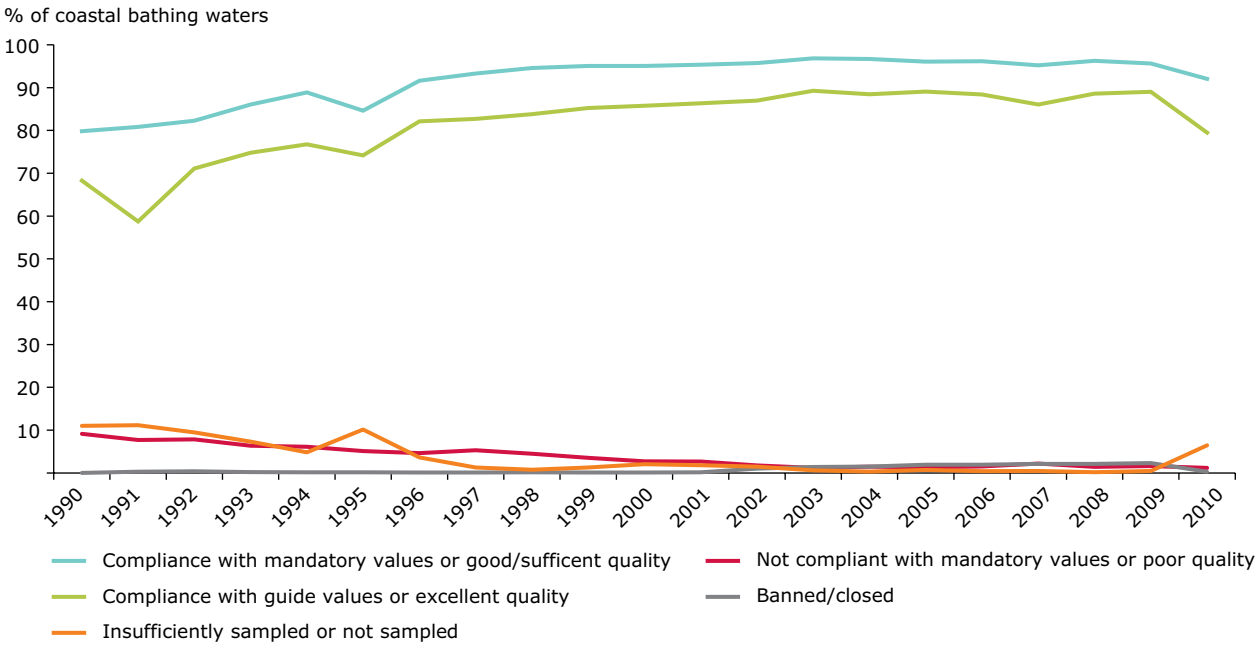
A small share of coastal bathing waters (1.2 %) did not comply with mandatory values in 2010, which is a 0.4 percentage point decrease from 2009. The number of bathing waters not complying with the bathing water directives' provisions decreased from 565 (9.2 %) in 1990 to 173 (1.2 %) in 2010 (Figures 4.2 and 4.3). Only 0.3 % of bathing waters were banned or closed during the season, which represents a 2 percentage point decrease from 2009.

Compliance with mandatory values increased from just below 80 % in 1990 to over 95 % in 1999, and has remained quite stable since then. Compliance with guide values likewise rose from over 68 % to over 89 % in 2003 and was then nearly constant but with a drop to 79.5 % in 2010.

Even with the *less strict* monitoring frequency criteria applied, in 2010 there was an increase in the number of insufficiently sampled or non-sampled sites. Some 937 (6.4 %) coastal bathing waters were insufficiently sampled or not sampled compared to 100 or less (below 1 %) since 2003.

If *strict rules* for monitoring frequency and start date were applied, then all coastal bathing waters in Greece, 65.6 % of Italian coastal bathing waters and some bathing waters elsewhere would be classified as insufficiently sampled. Since this comprises almost 40 % of all EU coastal bathing waters, only

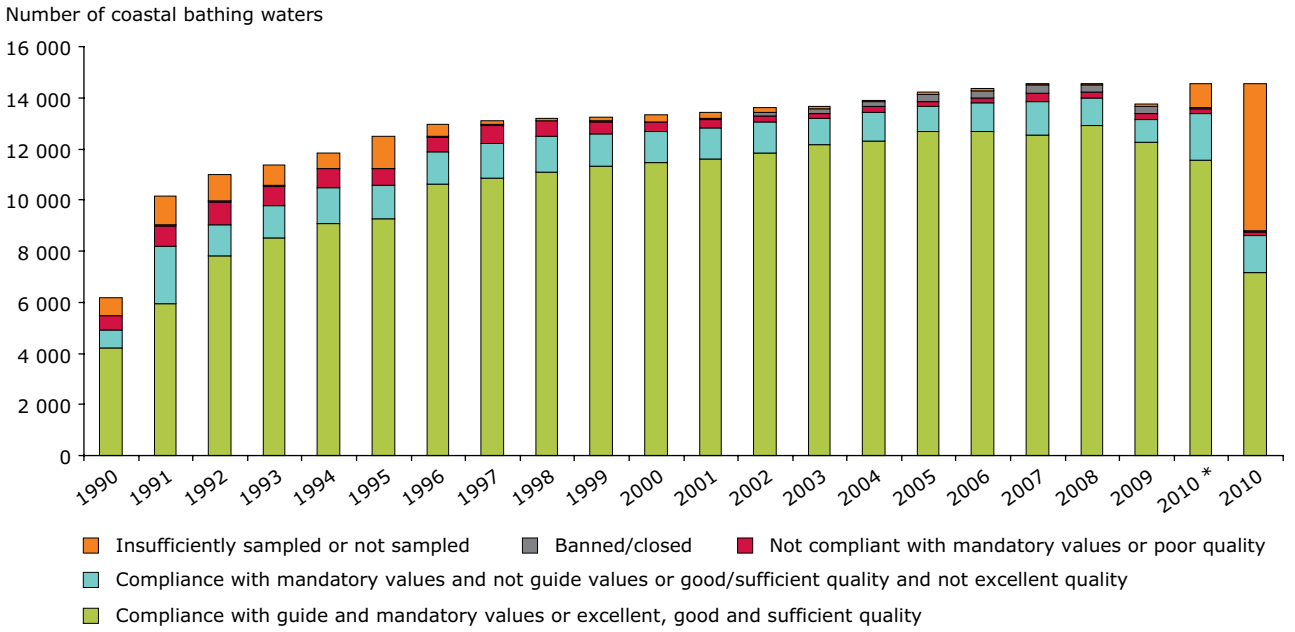
Figure 4.2 Percentage of coastal bathing waters in the European Union per compliance category



Source: WISE Bathing Water Quality database (data from annual reports by EU Member States).

([4]) Under the *strict rules* the first sample should be taken not later than 10 days after the start of the bathing season; and the interval between sampling should not exceed one month.

Figure 4.3 Number of coastal bathing waters in the European Union per compliance category



Note: (*) Less than 42 days between samples for reporting under Directive 2006/7/EC and bathing water quality in Greece assessed only for the period with monitoring results.

Source: WISE Bathing Water Quality database (data from annual reports by EU Member States).

59.2 % of coastal bathing waters would comply with the mandatory values and 49.1 % with the more stringent guide values if the *strict rules* were applied.

4.3 Inland bathing water quality in the European Union

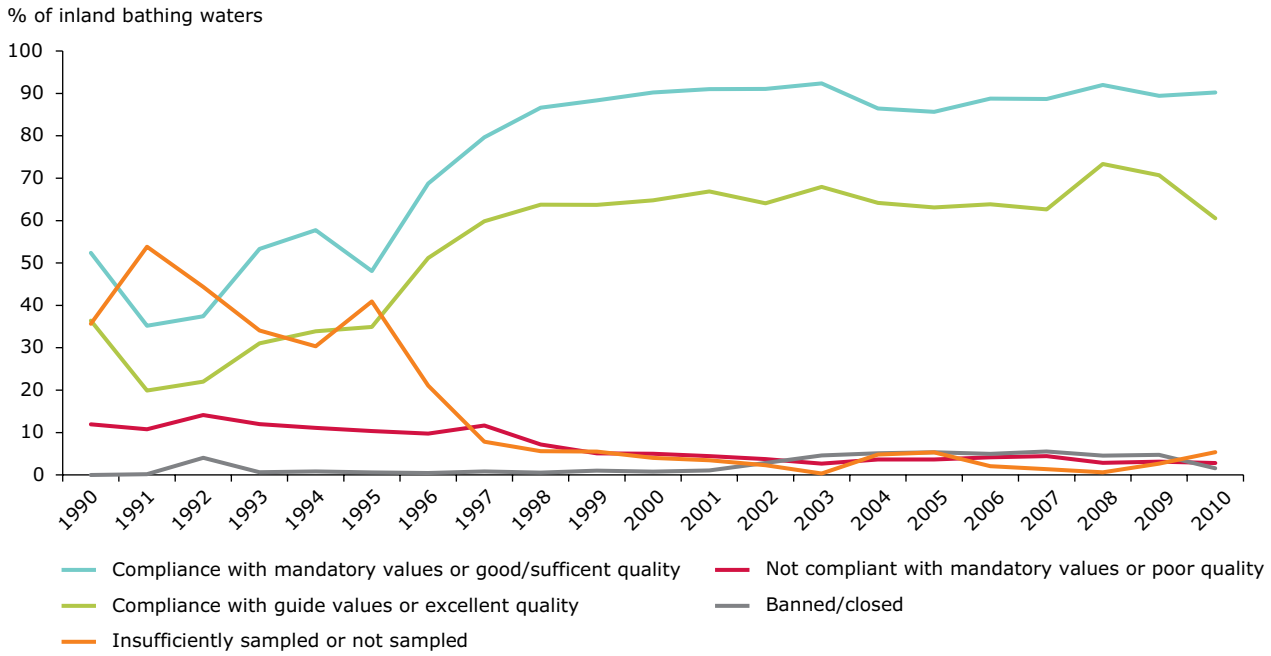
In 2010, 90.2 % of inland bathing waters in the European Union were compliant with the mandatory values during the bathing season, a figure 0.8 percentage points higher than in the previous year (Figure 4.4). The number of inland bathing waters complying with the more stringent guide values decreased by 10.2 percentage points compared to 2009, reaching 60.5 % (Figure 4.5).

Only 2.8 % of inland bathing areas in the European Union did not comply with mandatory values, which represented a 0.3 percentage point decrease. The share of bathing waters that were banned or closed during the season in 2010 was 1.6 %, a decrease of 3.1 percentage points in comparison to 2009. Some 5.4 % of bathing waters are classified as insufficiently sampled (meaning more than 41 days between sampling dates) or not sampled.

The overall quality of inland bathing areas in the EU has markedly improved since 1990 but with greater variations than coastal bathing waters. In 1990, some 52 % of inland bathing areas complied with mandatory values. This number reached 90 % by the early 2000s and decreased slightly afterwards before recovering to 92 % in 2008. Similarly, the rate of compliance with guide values changed from 36.4 % in 1990 to over 70 % since 2008. More recently, the percentage of bathing waters complying with guide values dropped again. Nevertheless, the number of inland bathing areas not complying with mandatory values decreased from 11.9 % in 1990 to 2.8 % in 2010, which is among the lowest levels to date.

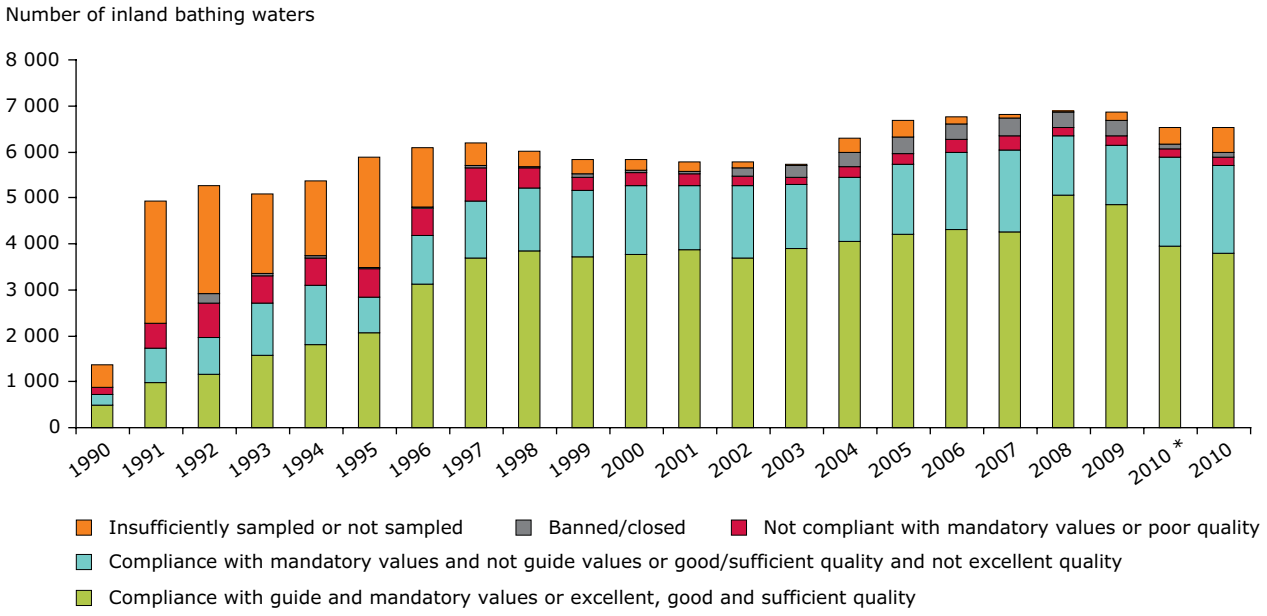
Applying the *strict rules*, 8.1 % of inland bathing waters were insufficiently sampled or not sampled in 2010, a figure 2.7 % higher than that derived when applying the *less strict rules* and the highest share since 1997. Under the strict rules, 87.5 % of inland bathing waters in the European Union complied with the mandatory values and 58.4 % of inland bathing waters complied with the more stringent guide values during the 2010 bathing season.

Figure 4.4 Percentage of inland bathing waters in the European Union per compliance category



Source: WISE Bathing Water Quality database (data from annual reports by EU Member States).

Figure 4.5 Number of inland bathing waters in the European Union per compliance category



Note: (*) Less than 42 days between samples for reporting under Directive 2006/7/EC and bathing water quality in Greece assessed only for the period with monitoring results.

Source: WISE Bathing Water Quality database (data from annual reports by EU Member States).

4.4 Bathing water quality by country

European bathing water quality results for the 2010 bathing season are shown in Map 4.1. The bar charts represent the quality assessment for the bathing water of each Member State and other countries with bathing water quality results. Inland and coastal bathing areas are displayed using separate bar charts. Quality assessments for each country are set out in Figures 4.6–4.9 and in Table 7.2 in this report.

Map 4.1 Bathing water quality in the European countries

Bathing water quality in EU Member States and other countries with results

- Total number of bathing waters
- Compliant with mandatory values
- Compliant with guide values
- Not compliant with mandatory values
- Closed (temporarily or throughout the season)
- Inland bathing waters
- Coastal bathing waters
- EU Member States and other countries with results

Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

Source: National boundaries: EEA.

Comparison of bathing water quality by country is done with integration of three types of assessments. For six countries and the Flemish part of Belgium the assessment is done under Directive 76/160/EEC. The overall assessment under Directive 2006/7/EC could be done for three countries. The assessment under the others is done under the transition period rules. The quality classes under the Directive 2006/7/EC are jointed with compliance categories under Directive 76/160/EEC.

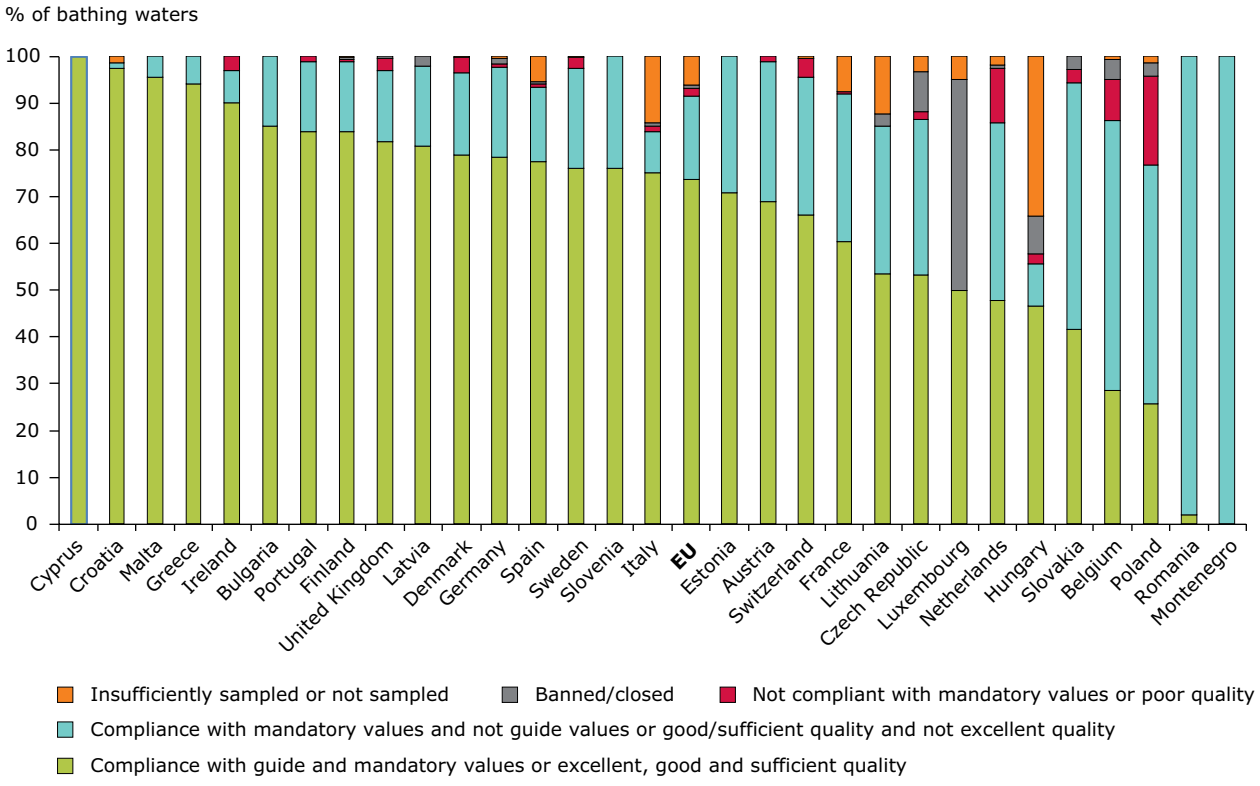
Ten countries reached more than 80 % compliance with the guide values (Figure 4.6). These are Cyprus (100 %), Croatia (97.3 %), Malta (95.4 %), Greece (94.2 %) Ireland (90.1 %), Bulgaria (85.1 %), Portugal (83.9 %), Finland (83.8 %), the United Kingdom (81.7 %) and Latvia (80.9 %). All bathing waters complied with mandatory values in eight countries: Cyprus, Malta, Greece, Bulgaria, Slovenia, Estonia Romania and Montenegro.

A total of 18 countries had at least one non-compliant bathing water. Countries with significant proportions of non-compliant bathing waters in 2010 are Poland (19 %), the Netherlands (11.8 %) and Belgium (8.9 %).

Under the *strict rules* regarding sampling frequency, countries with more than 10 % of bathing waters insufficiently sampled or not sampled are Greece, Italy, Hungary, Luxembourg, Estonia and Lithuania.

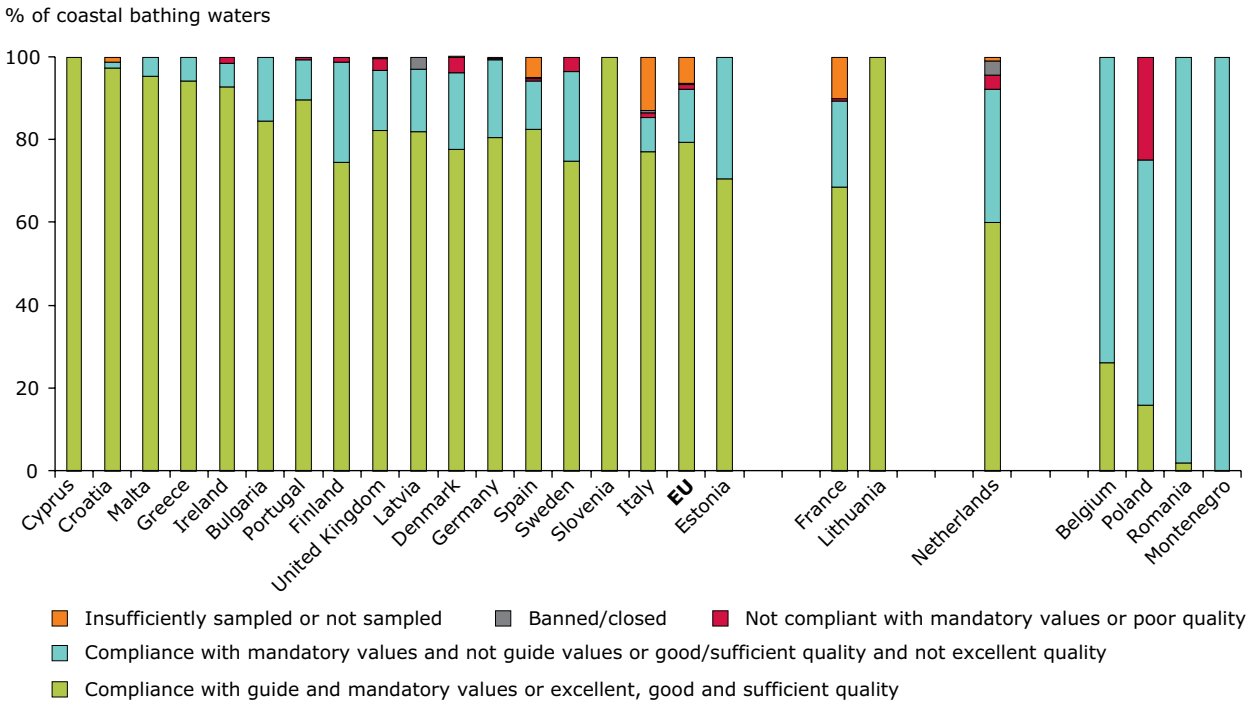
Generally the proportion of bathing waters in the countries complying with the stricter guide or mandatory values was higher for coastal waters than inland waters (Figures 4.7 and 4.8). Cyprus, Slovenia and Lithuania achieved total compliance with the guide values of coastal bathing waters, and many countries achieved more than 90 % compliance with guide or mandatory values at coastal waters. Only Poland had a relatively high proportion of non-compliant coastal waters. For inland waters, Ireland, the Netherlands, Poland and Belgium had a high proportion of non-compliant bathing waters.

Figure 4.6 Overall bathing water quality by country for the 2010 bathing season — ranking by percentage of bathing waters compliant with guide values



Source: WISE Bathing Water Quality database (data from annual reports by reporting countries).

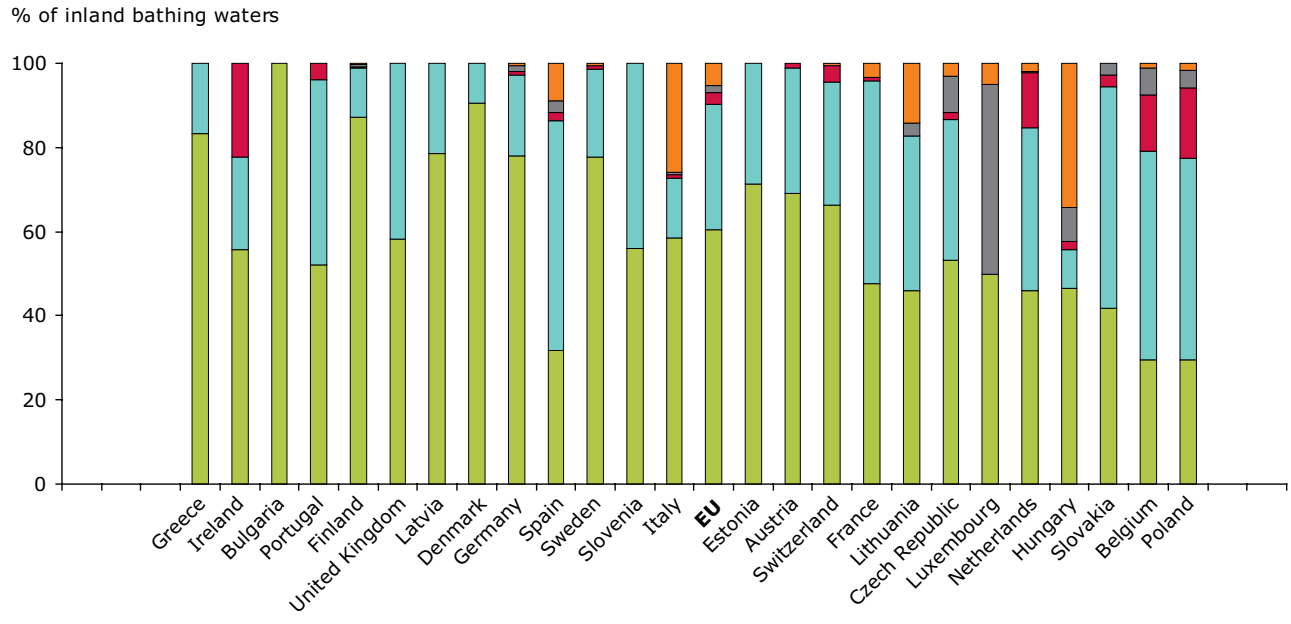
Figure 4.7 Coastal bathing water quality by country



Note: Countries ordered by the percentage compliance with guide values for all bathing waters.

Source: WISE Bathing Water Quality database (data from annual reports by reporting countries).

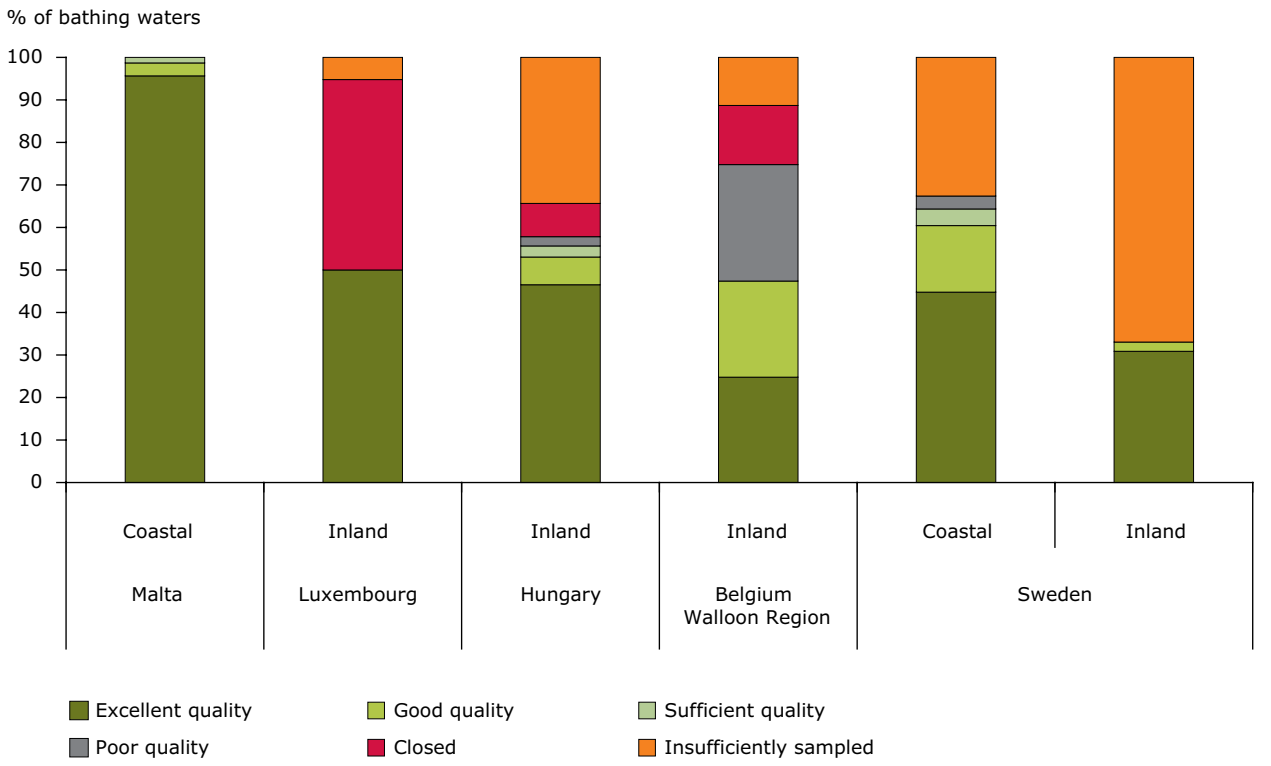
Figure 4.8 Inland bathing water quality by country



Note: Countries ordered by the percentage of compliance with guide values for all bathing waters.

Source: WISE Bathing Water Quality database (data from annual reports by reporting countries).

Figure 4.9 National bathing water quality under the new directive in 2010 (based on data for the period 2007–2010)



Source: WISE Bathing Water Quality database (data from annual reports by EU Member States).

Countries assessed under the new Bathing Water Directive (2006/7/EC)

Few countries have reported sufficient years to be assessed under the new Bathing Water Directive (2006/7/EC). The results from these countries are presented in Figure 4.9 and discussed below.

Most coastal bathing waters in Malta reached excellent quality for the second year (95.4 % compared to 93.1% in 2009).

In Luxembourg, nine out of 20 inland bathing waters were closed in 2010 since they were classified as poor quality in 2009. In addition, one bathing water (5 % of the total) was insufficiently sampled. The 10 bathing waters classified were of excellent quality.

In Hungary, more than one third (34.3 %) of bathing waters were insufficiently sampled and 8 % of bathing waters were closed. The majority of bathing waters that could be evaluated under the new directive were of excellent or good quality and 2 % were of poor quality.

Bathing waters in Belgium's Walloon region, Sweden and Portugal can also be partly assessed under the new directive. In the Walloon Region of Belgium (accounting for 36 of Belgium's 123 bathing waters) almost 75 % could be assessed under the new directive, with almost half being of excellent and good quality and almost 30 % having poor quality.

In Sweden, two thirds of the coastal bathing waters and one third of inland bathing waters can be assessed under Directive 2006/7/EC. For the coastal bathing water most were of good or excellent quality but 2.8 % of the bathing waters were of poor quality. Most of the inland waters were of excellent quality.

One tenth of reported Portuguese coastal bathing waters had sufficient data to be assessed under the new directive and all were of excellent quality.

4.5 Bathing water quality by sea regions and their catchments

This section presents bathing water quality results by the following sea regions and their catchment areas in Europe:

- the Mediterranean Sea and the catchment area of the Mediterranean Sea ([5]), divided into four sub-regions: the western Mediterranean Sea; the Ionian Sea and the central Mediterranean Sea; the Adriatic Sea; and the Aegean-Levantine Sea;
- the Atlantic Ocean and the catchment area of the Atlantic Ocean ([6]);
- the North Sea and the catchment area of the North Sea;
- the Baltic Sea and the catchment area of the Baltic Sea;
- the Black Sea and the catchment area of the Black Sea.

One bathing water in northern Finland located in the Barents Sea catchment area and French bathing waters in the Indian Ocean are not shown on maps and included in regional statistics.

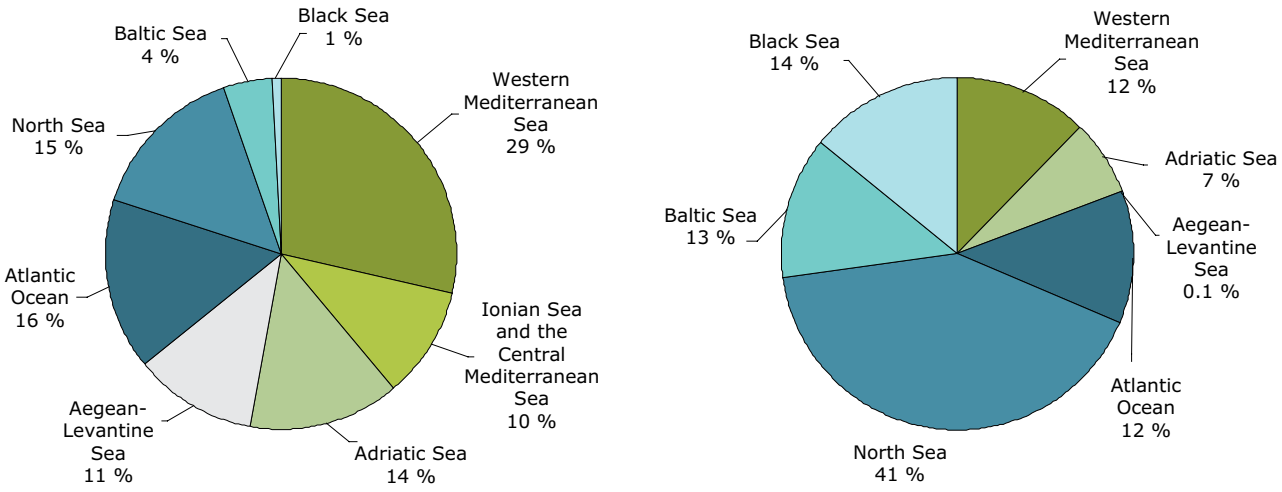
The delineation of sea regions and their catchments is based on the Water Framework Directive and the Marine Strategy Framework Directive sea delineation. The aggregation of bathing water quality data for the 2010 season is slightly different to the 2009 season report for the Atlantic Ocean, the North Sea and the Baltic Sea.

The majority of coastal bathing waters are located on the Mediterranean Sea coasts (about 9 900), representing almost two thirds of all reported coastal bathing waters in Europe. Almost half of the Mediterranean coastal bathing waters are located on the western Mediterranean Sea coasts, followed by the Adriatic Sea coasts. The number of coastal bathing waters is more than 2 400 on the Atlantic Ocean coasts and more than 2 200 on the North Sea coasts. This number is much lower for the Baltic Sea and Black Sea coasts (about 660 and 140 respectively). Figure 4.10 (left) shows the regional share of coastal bathing waters in Europe.

The North Sea catchment area covers the highest number of inland bathing waters in Europe (more than 2 800), accounting for about 40 % of all reported inland bathing waters in Europe. The share of inland bathing waters in other sea region catchment areas is similar, ranking from 12 to 19 %.

There are more than 1 300 bathing waters in the Mediterranean Sea catchment area. About two thirds of the Mediterranean inland bathing waters are located in the western Mediterranean Sea and one third in the Adriatic Sea catchment area.

Figure 4.10 Regional shares of the total number of European coastal (left) and inland (right) bathing waters



Source: WISE Bathing Water Quality database (data from annual reports by reporting countries).

([5]) In the catchment area of the Mediterranean Sea, overseas territories of Spain are included.
([6]) In the catchment area of the Atlantic Ocean, overseas territories and islands of France, Portugal and Spain are included, but not shown on maps.

Less than 10 inland bathing waters are located in the Aegean-Levantine Sea, while no inland bathing waters were reported in the Ionian Sea and the Central Mediterranean Sea catchment area. The number of inland bathing waters is more than 950 in the Black Sea and about 860 in Baltic Sea and Atlantic Ocean catchment areas. Figure 4.10 (right) shows the regional share of inland bathing waters in Europe.

Compliance of coastal bathing areas with mandatory water quality values is generally high for all eight hydrographic regions, with all coastal waters complying with the mandatory values for the Aegean-Levantine Sea and the Black Sea. Compared to the other seas, the Mediterranean has a higher proportion of coastal bathing waters complying with the more stringent guide values.

For inland bathing areas, the North Sea, Atlantic Ocean and Baltic Sea, and the western Mediterranean and Aegean-Levantine Sea perform above average in meeting the mandatory values. Only the inland bathing areas of the Black Sea and Adriatic Sea fall below the European average in complying with the mandatory values.

Photo: © Pia Schmidt

4.5.1 Mediterranean Sea

Coastal bathing waters

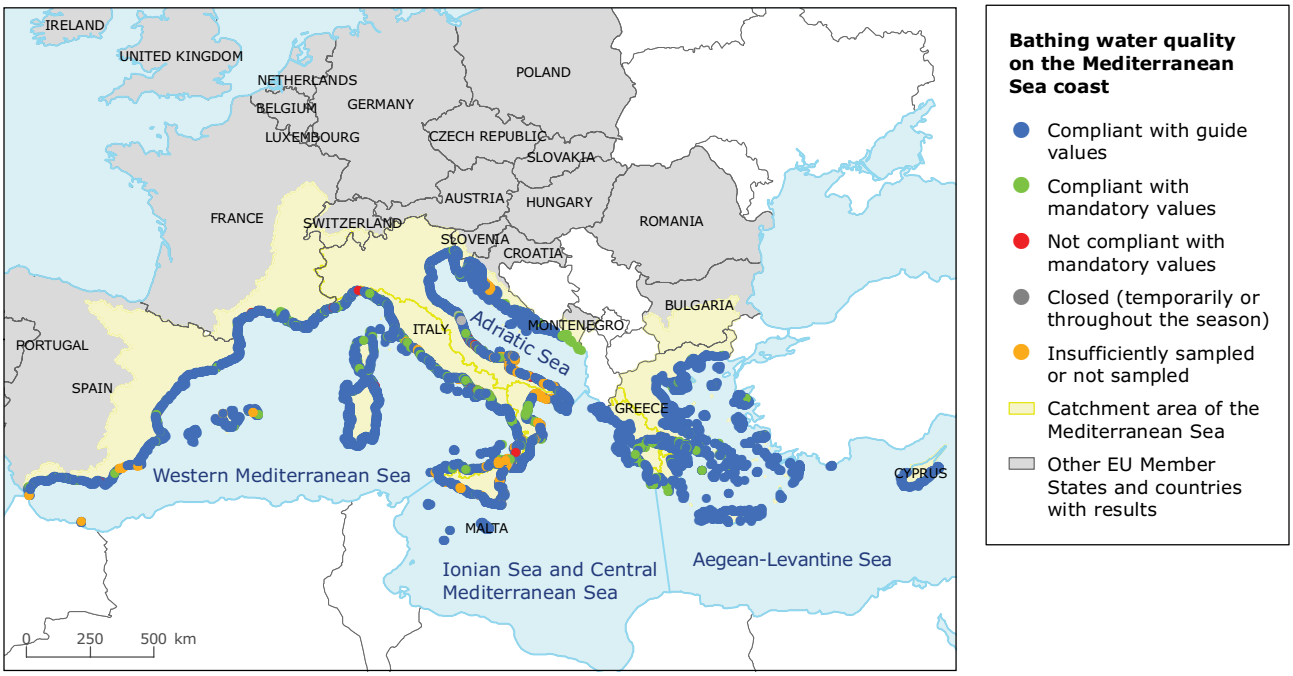
Ten countries reported bathing waters on the coasts of the Mediterranean Sea. The assessment of the Mediterranean Sea is divided into four sub-regions:

- the western Mediterranean Sea encompasses Spain, the United Kingdom (Gibraltar), France and western Italy;
- the Ionian Sea and the central Mediterranean Sea cover coastal bathing waters in the southern part of Italy, Malta and western Greece;
- the Adriatic Sea covers coastal bathing waters in the eastern part of Italy, Slovenia, Croatia and Montenegro;
- the Aegean-Levantine Sea covers a large part of Greece and Cyprus.

About 92.3 % of coastal bathing areas on the Mediterranean Sea coasts complied with the mandatory quality values in 2010, with the western Mediterranean Sea and the Aegean-Levantine Sea reaching above average compliance rates in the region. Some 85.3 % of bathing sites complied with the more stringent guide values. Only the Ionian Sea and the central Mediterranean Sea coasts achieved less than 80 % compliance.

A total of 66 bathing sites (0.7 %) did not comply with mandatory values, of which 39 were located on the western Mediterranean Sea coasts (0.9 %). No bathing waters failed to comply with the mandatory values on the Aegean-Levantine Sea coasts. Bathing was banned or closed during the season at 33 bathing sites (0.3 %). The majority of closed bathing waters (23) were located on the Adriatic Sea coasts (1.1 %).

Map 4.2 Bathing water quality on the Mediterranean Sea coast



Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

Source: National boundaries: EEA. Bathing water data and coordinates: reporting countries' authorities.

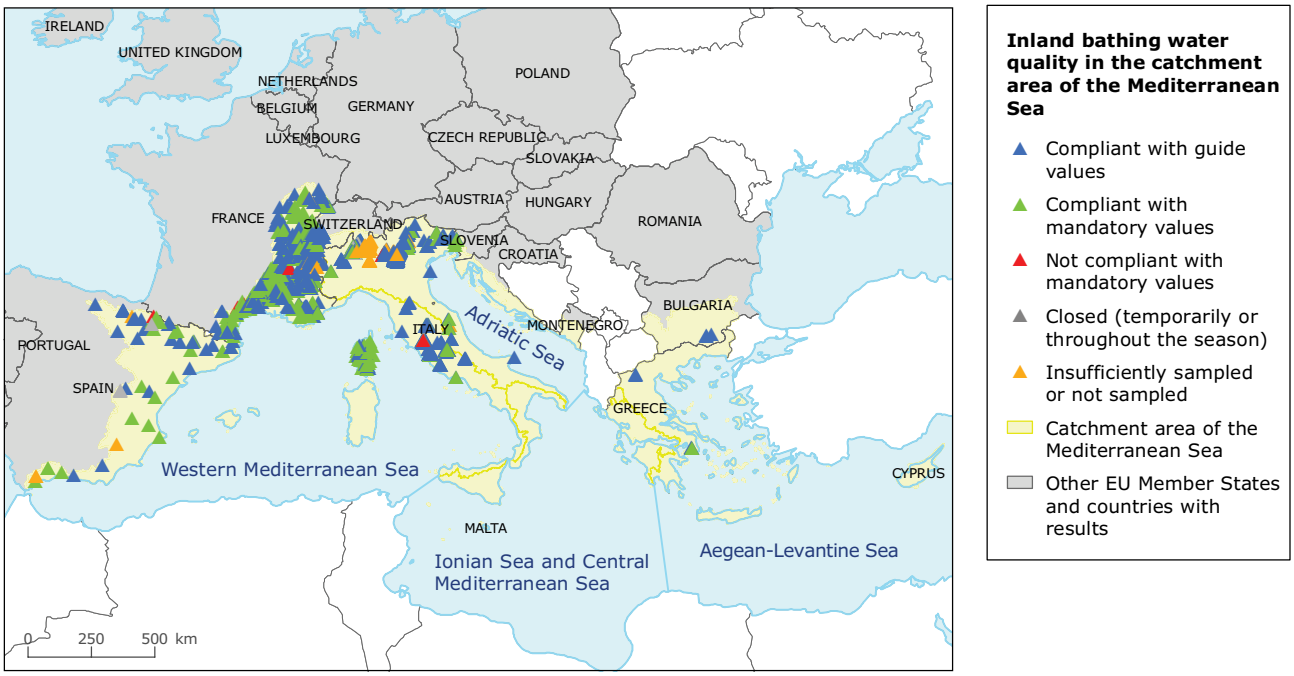
Inland bathing waters

The western Mediterranean Sea catchment area covers part of the inland waters of Spain, France, Switzerland and Italy. Inland waters in parts of Italy, Switzerland and Slovenia belong to the Adriatic Sea catchment area. The Aegean-Levantine Sea catchment area includes all Greek inland waters and some of those in Bulgaria.

About 89.3 % of inland bathing areas in the Mediterranean Sea catchment area complied with the mandatory values in 2010. Some 55.9 % of bathing sites complied with the more stringent guide values. Compliance rates with mandatory water quality values was below the regional average only in the Adriatic Sea catchment area (76.2 %), while the guide water quality was lowest in the western Mediterranean Sea catchment area (54.1 %). All nine inland bathing waters in the Aegean-Levantine Sea catchment area complied with the mandatory values.

A total of 12 bathing sites (0.9 %) did not comply with mandatory values, of which nine were located in the western Mediterranean Sea (1.1 %) and three in the Adriatic Sea catchment area (0.6 %). Bathing was banned or closed during the season at eight bathing sites (0.6 %) in the Adriatic Sea and the western Mediterranean Sea catchment areas.

Map 4.3 Inland bathing water quality in the catchment area of the Mediterranean Sea



Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

Source: National boundaries: EEA. Bathing water data and coordinates: reporting countries' authorities.

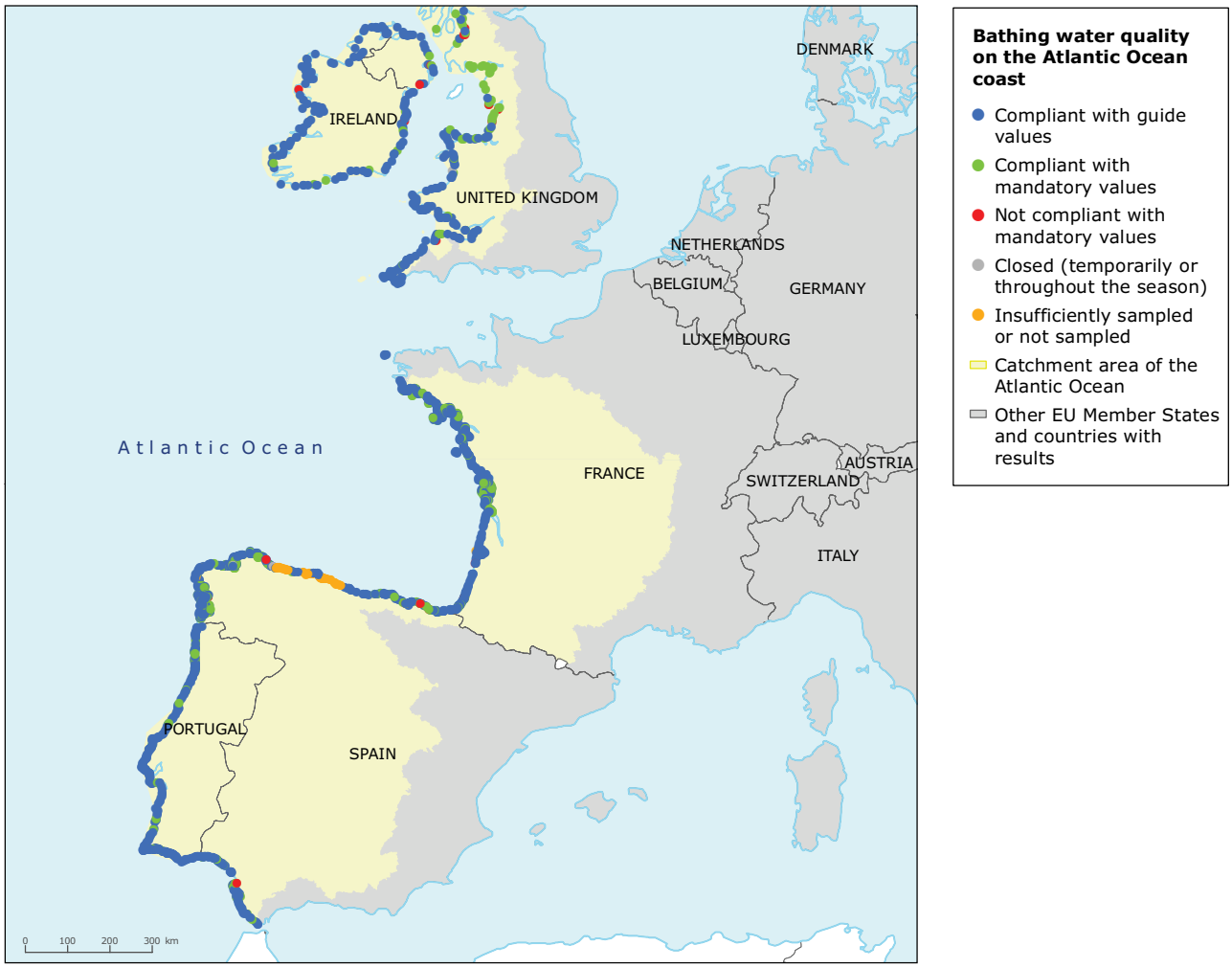
4.5.2 *Atlantic Ocean*

Coastal bathing waters

Five EU Member States have coasts on the Atlantic Ocean — Portugal, Spain, France, Ireland and the United Kingdom.

About 88.4 % of the coastal bathing waters complied with mandatory values in 2010. Compliance with the more stringent guide values was 73.5 %. Some 24 bathing areas (1.0 %) did not meet mandatory values and bathing was banned or closed during the season at eight bathing sites (0.3 %).

Map 4.4 Bathing water quality on the Atlantic Ocean coast



Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

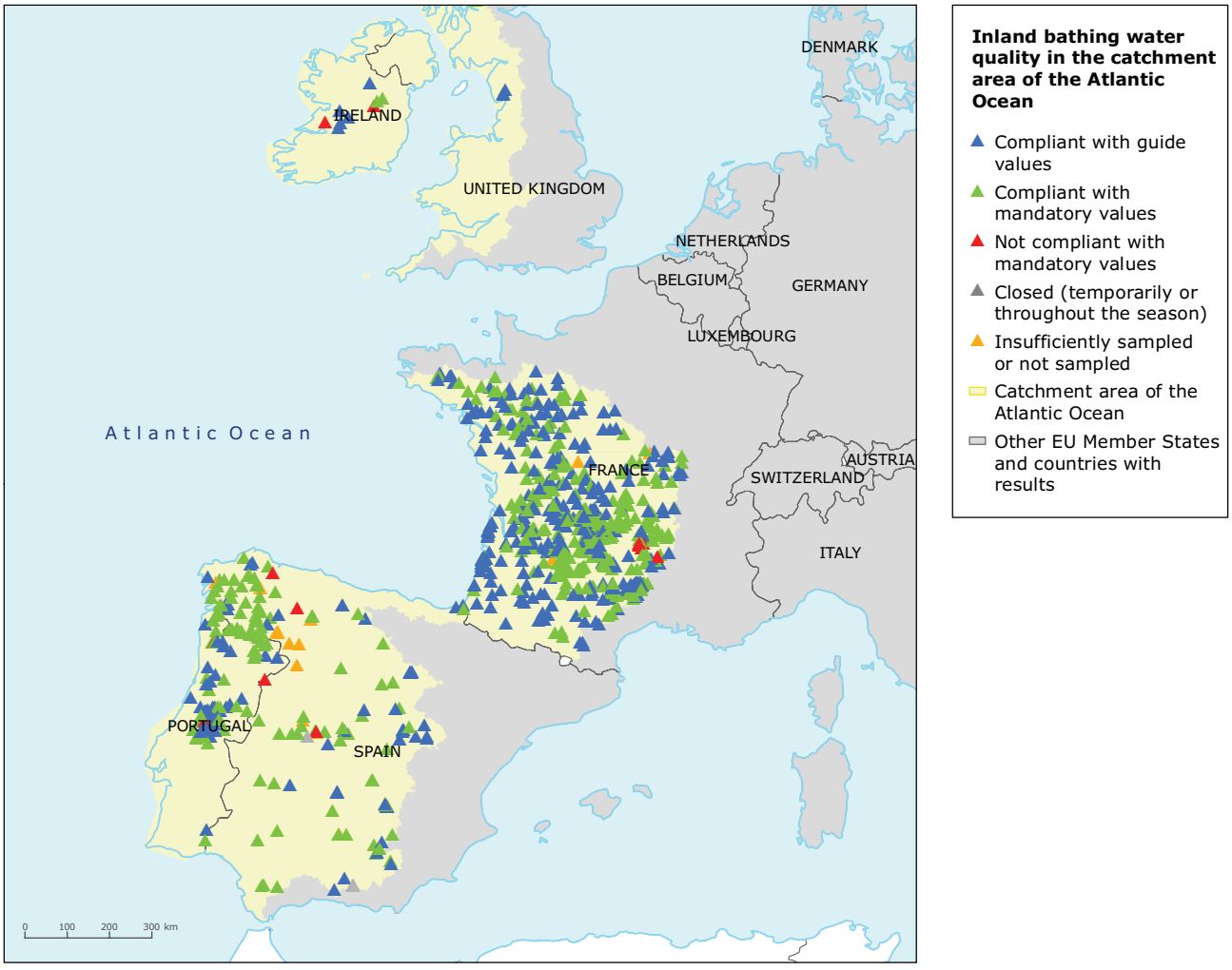
Source: National boundaries: GISCO. Bathing waters data and coordinates: Member State authorities.

Inland bathing waters

The Atlantic Ocean catchment area covers part of the inland waters of Spain, France and the United Kingdom, and all of the inland waters of Portugal and Ireland.

Some 92.4 % of inland bathing waters complied with mandatory values and some 46.2 % of inland bathing waters complied with the more stringent guide values in 2010. A total of 15 bathing waters (1.8 %) did not meet mandatory values and three bathing waters were banned or closed during the season (0.4 %).

Map 4.5 Inland bathing water quality in the catchment area of the Atlantic Ocean



Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

Source: National boundaries: EEA. Bathing water data and coordinates: reporting countries' authorities.

4.5.3 North Sea

Coastal bathing waters

Seven Member States have coasts on the North Sea: the United Kingdom, France, Belgium, the Netherlands, Germany, Denmark and Sweden.

Some 97.7 % of coastal bathing waters complied with mandatory values in 2010. The share of bathing areas complying with the guide values stood at 73.5 %. Some 42 bathing waters (1.8 %) did not meet mandatory values, while bathing was banned or closed during the season at four bathing sites (0.2 %).

Map 4.6 Bathing water quality on the North Sea coast

Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

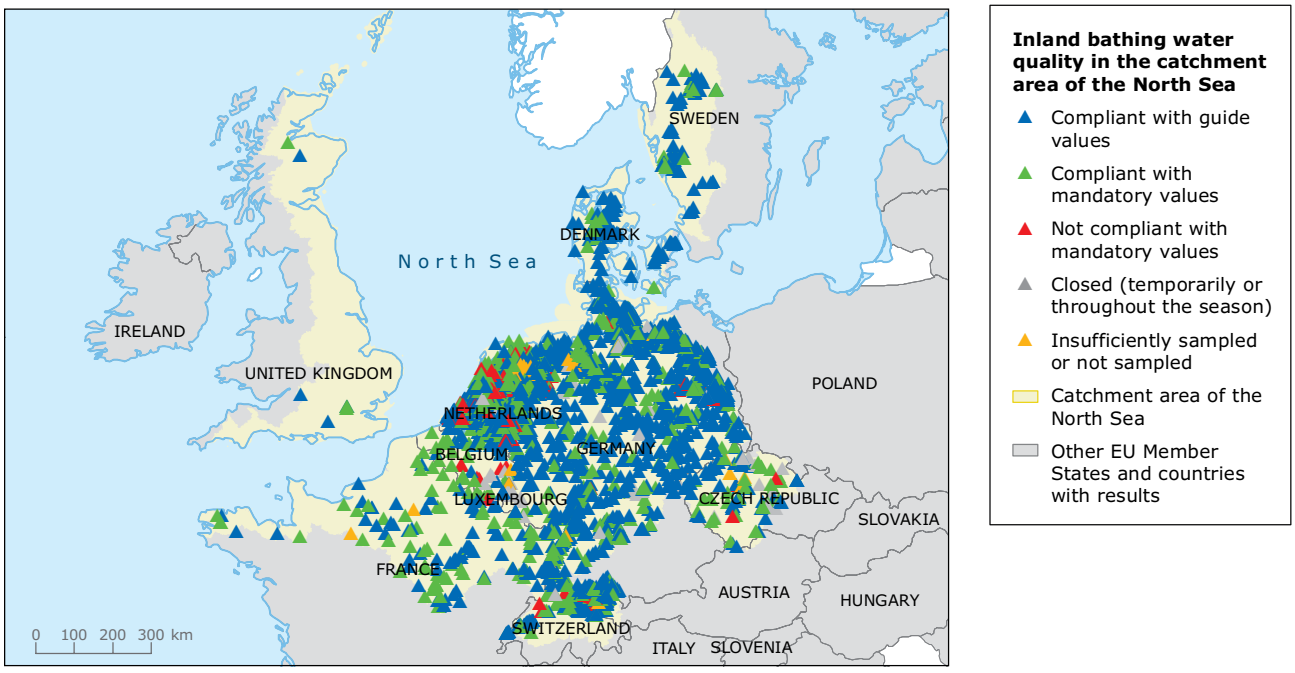
Source: National boundaries: EEA. Bathing water data and coordinates: reporting countries' authorities.

Inland bathing waters

The North Sea catchment area covers part of the inland waters of the United Kingdom, France, Switzerland, Austria, Germany, the Czech Republic, Denmark and Sweden, and all of the inland waters of Luxembourg, Belgium and the Netherlands.

About 93 % of inland bathing waters complied with mandatory values and about 65.5 % of inland bathing waters complied with the more stringent guide values in 2010. A total of 115 bathing waters (4.0 %) did not meet mandatory values and bathing was banned or closed during the season at 54 bathing sites (1.9 %).

Map 4.7 Inland bathing water quality in the catchment area of the North Sea



Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

Source: National boundaries: EEA. Bathing water data and coordinates: reporting countries' authorities.

4.5.4 Baltic Sea

Coastal bathing waters

Eight EU Member States border the Baltic Sea: Denmark, Germany, Poland, Lithuania, Latvia, Estonia, Finland and Sweden.

Around 93.5 % of coastal bathing areas complied with mandatory quality values in 2010. Regarding the more stringent guide values, the compliance rate stood at 64.9 %. A total of 41 bathing waters (6.2 %) did not meet the mandatory values, while one bathing water was closed during the season (0.2 %).

Map 4.8 Bathing water quality on the Baltic Sea coast

Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing

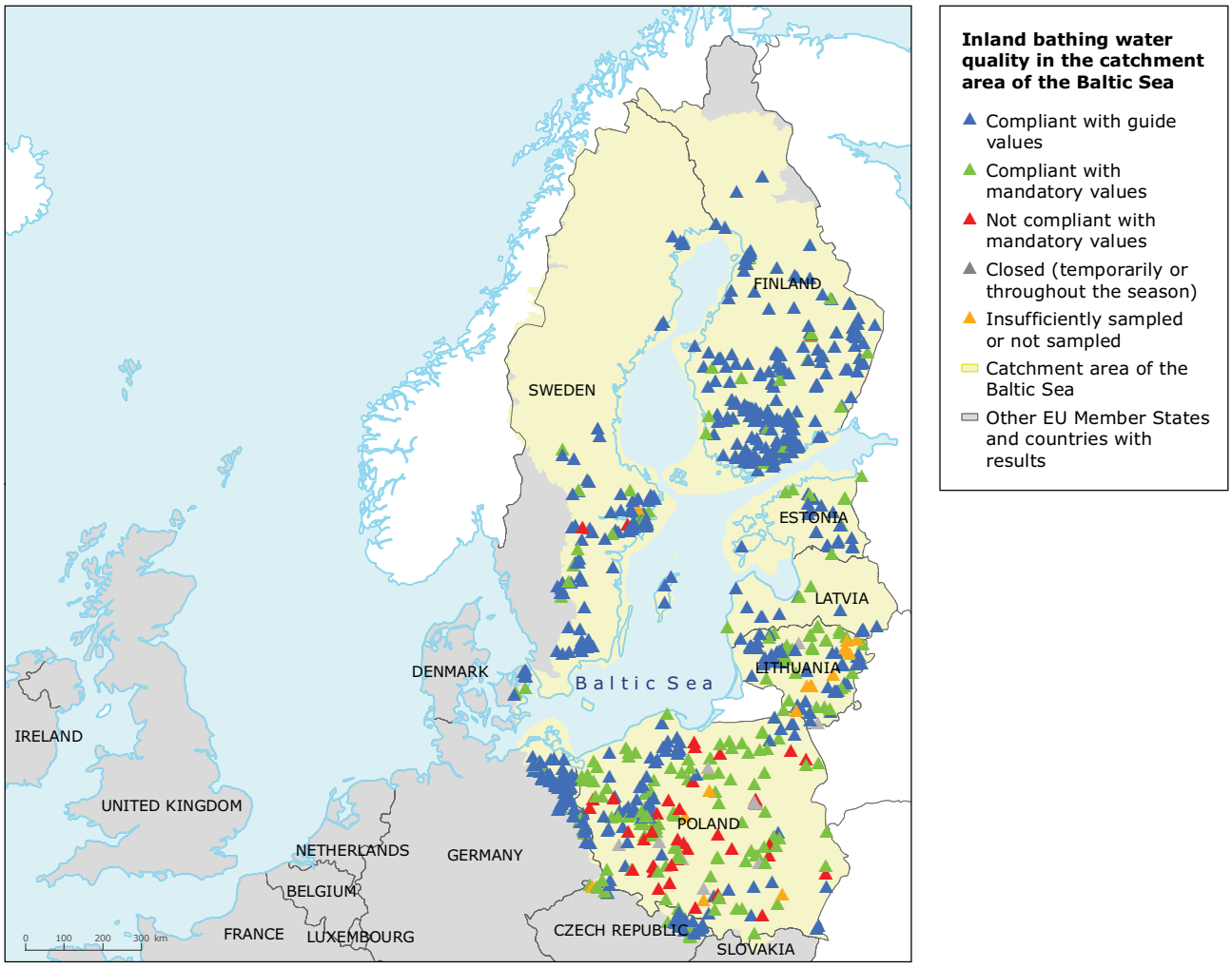
Source: National boundaries: EEA. Bathing water data and coordinates: reporting countries' authorities.

Inland bathing waters

The Baltic Sea catchment area covers part of inland bathing waters of the Czech Republic, Germany, Denmark and Sweden, and all of the inland bathing waters of Poland, Lithuania, Latvia, Estonia and Finland.

Some 91.2 % of inland bathing waters complied with mandatory values and some 64.6 % of inland bathing waters complied with the more stringent guide values in 2010. There were 41 bathing sites non-compliant with mandatory values (4.7 %) and 14 bathing sites that were banned or closed during the season (1.6 %).

Map 4.9 Inland bathing water quality in the catchment area of the Baltic Sea



Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

Source: National boundaries: EEA. Bathing water data and coordinates: reporting countries' authorities.

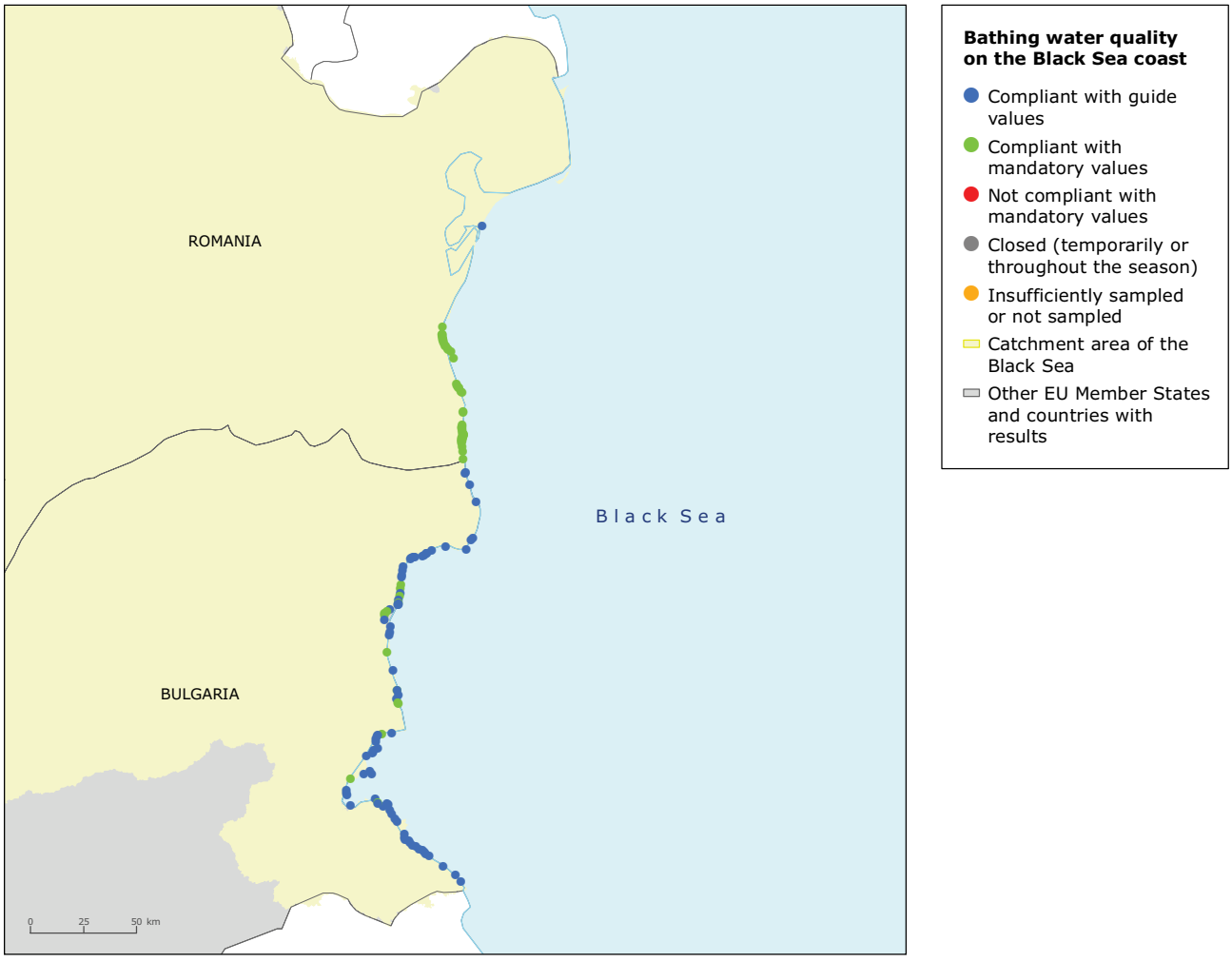
4.5.5 Black Sea

Coastal bathing waters

Only two EU Member States are located on the Black Sea: Bulgaria and Romania.

All coastal bathing areas complied with the mandatory quality values in 2010, while compliance with the more stringent guide values stood at 55.4 %. No bathing water was therefore non-compliant with mandatory values or closed during the season.

Map 4.10 Bathing water quality on the Black Sea coast



Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

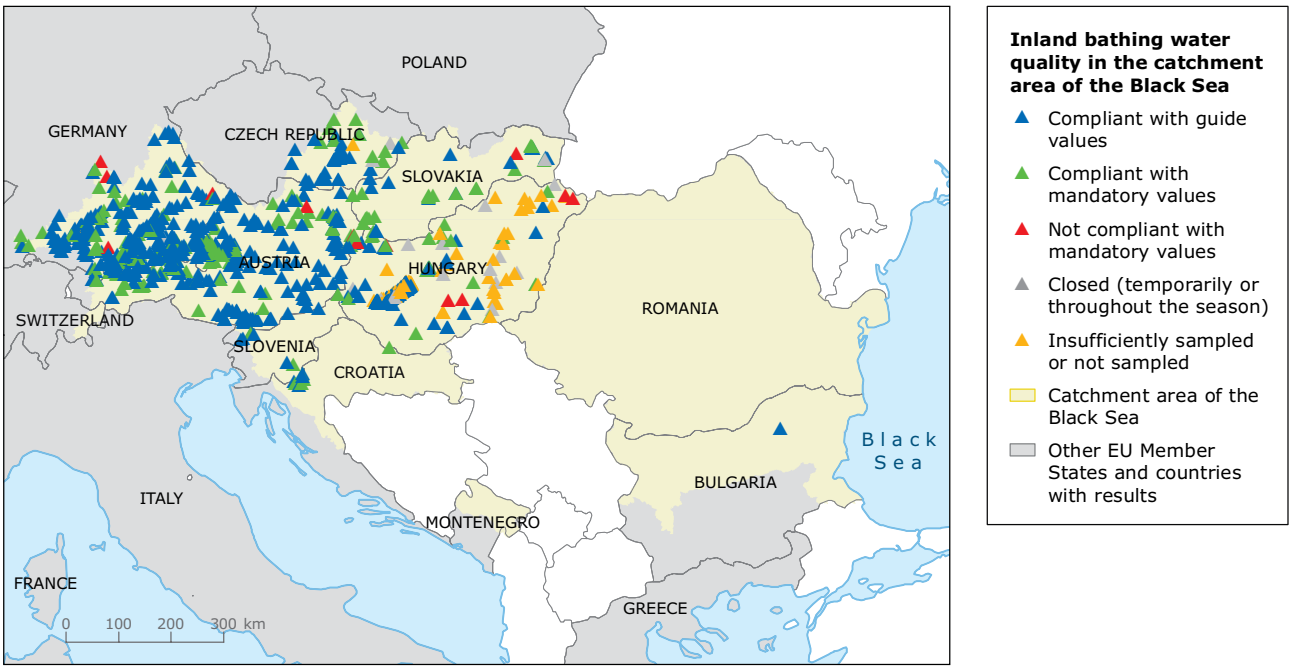
Source: National boundaries: EEA. Bathing water data and coordinates: reporting countries' authorities.

Inland bathing waters

Seven Member States have inland bathing waters in the Danube River basin, stretching from the Black Sea inland (Bulgaria) to Hungary, Slovakia, the Czech Republic, Slovenia, Austria and Germany. Romania and parts of Montenegro, Croatia and Switzerland also belong to the Black Sea catchment area but did not report inland bathing waters.

Some 86.6 % of inland bathing waters complied with the mandatory values in 2010. Compliance with the guide values stood at 66.2 %. A total of 15 bathing waters (1.6 %) did not meet the mandatory values. Bathing was banned or closed during the season at 25 bathing areas (2.6 %).

Map 4.11 Inland bathing water quality in the catchment area of the Black Sea



Note: More data on bathing water quality are available at http://www.eea.europa.eu/themes/water/interactive/bathing.

Source: National boundaries: EEA. Bathing water data and coordinates: reporting countries' authorities.

5 Short-term pollution and closed bathing waters

Regulating the quality of bathing water through the bathing water directives has led directly to an improvement in the state of the environment and reduced the impact of faecal pollution on human health. The Urban Waste Water Treatment Directive (Directive 91/271/EEC) has also contributed significantly to the improvement of surface water quality, including bathing waters. In addition other measures have often been effective (Box 5.1).

5.1 Short-term pollution

Existing waste water collection (sewerage) systems are often 'combined' in that they receive foul sewage from homes and commercial premises, as well as surface water following rainfall. After periods of heavy rain a mixture of surface water and foul sewage can be discharged to the environment via Combined Sewer Overflows (CSOs). If these were not provided the overloading of the sewer may result in surface flooding or the receiving treatment works would be overloaded.

There are thousands of CSOs in Europe and they must be properly protected by upstream measures and managed to prevent flooding and minimise adverse impact on the environment and public health. Discharges from CSOs may impact bathing water quality and affect human health. Where short-term pollution occurs at bathing waters, Directive 2006/7/EC requires appropriate management measures to prevent bathers' exposure to poor water quality.

Box 5.1 Copenhagen: from sewer to harbour bath

In Copenhagen, Denmark, many years of investments in the sewage system have revitalised the harbour. For decades, the discharge of wastewater from sewers and industrial companies had a major impact on the water quality in Copenhagen harbour. The water was heavily polluted.

In 1995, 93 overflow channels fed wastewater into Copenhagen harbour and the adjacent coastlines. Since then, the municipality has built rainwater reservoirs and reservoir conduits, which can store wastewater until there is space again in the sewage system. This has resulted in the closing of 55 overflow channels. Today, wastewater is only discharged to the harbour during very heavy rainfall.

Municipal investments in modernising the sewage system and expanding the city's wastewater treatment plants has revitalised the harbour of Copenhagen. In 2002, the first public harbour bath opened and today there are four harbour baths. An established on-line warning system calculates and monitors the water quality in the harbour ([7]). If the water quality is poor, the swimming facilities are immediately closed.

Today, Copenhagen harbour is almost as clean as the water in the sound that separates the city from the nearby Swedish coast. The high water quality and the popular recreational bathing facilities along the harbour front are some of the elements in the city's vision to become the global capital with the best urban environment by 2015.

Source: http://sustainablecities.dk/en/city-projects/cases/copenhagen-from-sewer-to-harbour-bath.

([7]) http://www.kk.dk/Borger/ByOgTrafik/GroenneOmraader/BadeVand.aspx.

Box 5.2 Short-term pollution

Directive 2006/7/EC introduces the term 'short-term pollution', meaning a predictable microbiological contamination in terms of intestinal enterococci and *Escherichia coli*. Short-term pollution normally affects bathing water quality for no more than approximately 72 hours. It has clearly identifiable causes that the competent authority has established procedures to predict and deal with. This includes adequate management measures to preventing bathers' exposure (warning or bathing prohibition) and to prevent, reduce or eliminate the causes of pollution. The information on short-term pollution should be made available to the public at the bathing water and in the media. In the event of short-term pollution, one additional sample is to be taken to confirm that the incident has ended. If replaced sample is taken in seven days after the end of the short-term pollution, sample(s) taken during short-term pollution are not included in the assessment of bathing water quality.

During the 2010 bathing season, nine countries reported 86 events of short term pollutions at 77 bathing waters lasting one to eight days (Table 5.1). Concentrations of intestinal enterococci or *Escherichia coli* are not high in all reported cases. Therefore, the status of these bathing waters is mostly compliant with mandatory or guide values even if no replaced sample is taken.

Most countries with such events are located in the Mediterranean region. The country with the highest number of such event in 2010 was Italy (38), followed by Cyprus (11) and Belgium (9). Replaced samples were taken in 47 cases, representing 55 % of all reported events.

Table 5.1 Data reported on short-term pollution in 2010

Country	Number of bathing waters with short-term pollution in 2010	Number of events of short-term pollution in 2010	Number of replaced samples
Belgium — Walloon region	9	9	7
Croatia	7	8	5
Cyprus	11	11	10
Germany	1	4	1
Estonia	1	1	1
Italy	38	43	19
Malta	3	3	3
Sweden	1	1	1
Switzerland	6	6	0
9 countries	**77**	**86**	**47**

5.2 Closed bathing waters

In spite of national efforts to reduce and eliminate point and diffuse sources of pollution, problems of poor water microbiological quality or cyanobacteria can persist. Affected bathing waters must be closed to eliminate the hazard to bathers' health. Several other reasons, e.g. construction works can also lead to the closure of bathing waters.

Closed bathing waters were reported by 11 countries for the 2009 season and 14 countries for the 2010 bathing season (Table 5.2). The closure problem was far lower in 2010 than in 2009, with only 150 bating waters closed (0.7 % of the total number). The largest improvement occurred in Italy, where 583 bathing waters closed in 2009 but only 38 in 2010.

In Luxembourg no bathing water was closed in 2009 but nine were in 2010 (45 % of the total). The bathing waters were closed for the entire bathing season 2010 as the assessment under the rules of the new bathing water directive for the period 2006–2009 classified these waters as not reaching sufficient quality. Article 5 of Directive 2006/7/EC provides that if this occurs then bathing in these waters should be prevented for the following season.

The Czech Republic had a significant number of closed bathing waters in 2010. Sixteen inland bathing waters were closed due to cyanobacteria.

Box 5.3 Cyanobacteria

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. These factors are high levels of nutrients in water; high stability of the water column; favourable temperature and light; and calm, windless conditions.

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

Source: http://ec.europa.eu/environment/water/water-bathing/pdf/profiles_dec_2009.pdf.

Table 5.2 Number of closed bathing waters during 2009 and 2010 bathing season per country

	2009		2010	
	Number	**%**	**Number**	**%**
Belgium	4	3.2	5	4.1
Czech Republic	8	4.3	16	8.6
Germany	20	0.9	27	1.2
Spain	7	0.3	12	0.6
Finland	1	0.3	1	0.3
Hungary	2	1.1	20	8.0
Italy	583	10.2	38	0.7
Lithuania	0	0.0	3	2.6
Luxembourg	0	0.0	9	45.0
Latvia	1	0.4	1	2.1
Netherlands	0	0.0	5	0.7
Poland	6	1.9	9	2.9
Portugal	9	1.7	0	0.0
Slovakia	1	2.8	1	2.8
United Kingdom	0	0.0	3	0.5
EU	**642**	**3.1**	**150**	**0.7**

6 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 location? Visit the interactive information on bathing water quality available on the internet and simply enter a geographical area or the name of a beach.

The present report sets out the results and trends in bathing water quality in 2010. More information on bathing water quality in EU Member States — including the reports for 27 EU Member States and Croatia, Montenegro and Switzerland — can be found on the European Environment Agency's bathing water website ([8]) and the European Commission's bathing water quality website ([9]).

Interactive information on bathing water quality — WISE and Eye On Earth

The bathing water section of the Water Information System for Europe (WISE), which is accessible at the EEA bathing water website ([8]), allows users to view the quality of the bathing water at more than 22 000 coastal beaches and inland sites across Europe. Users can check bathing water quality on an interactive map or can download data for a selected country or region and make comparisons with previous years.

The WISE map viewer is an online map viewer for visualisation of European spatial water data. It includes a lot of interactive layers, allowing water themes to be visualised at different scales. Broad resolutions display the aggregated data by Member State. At finer resolutions the locations of monitoring stations are displayed.

The WISE Bathing Water Quality data viewer combines text and graphical visualisation, providing a quick check on locations and statistics on the quality of coastal and inland bathing waters. It also documents how bathing waters have changed throughout Europe in recent years and provides a full summary of Europe's bathing water quality. Users can search information at three spatial levels — country, region and province — and observe specific bathing water locations on the Google Earth, Google maps or Bing maps.

The Eye On Earth — Water Watch application allows users to zoom in on a given section of the coast, riverbank or lake, both in street map or, where available, bird's eye viewing formats. A 'traffic-light' indicator (red, amber, green) of bathing water quality, based on the official bathing water data, is put alongside the ratings of people who have visited the bathing site, including any comments users wish to make. For historical data Water Watch uses a simplified index of bathing water quality data. During 2011, the Eye On Earth application will be updated with online bathing water quality results, providing an indication of the current quality.

National and local information on bathing water quality

In order to make information to the public more effective, all EU countries have national or local web portals with detailed information for each bathing water. Websites generally include a map search function and public access to the monitoring results both in real time and for previous seasons.

Information on EU bathing water legislation

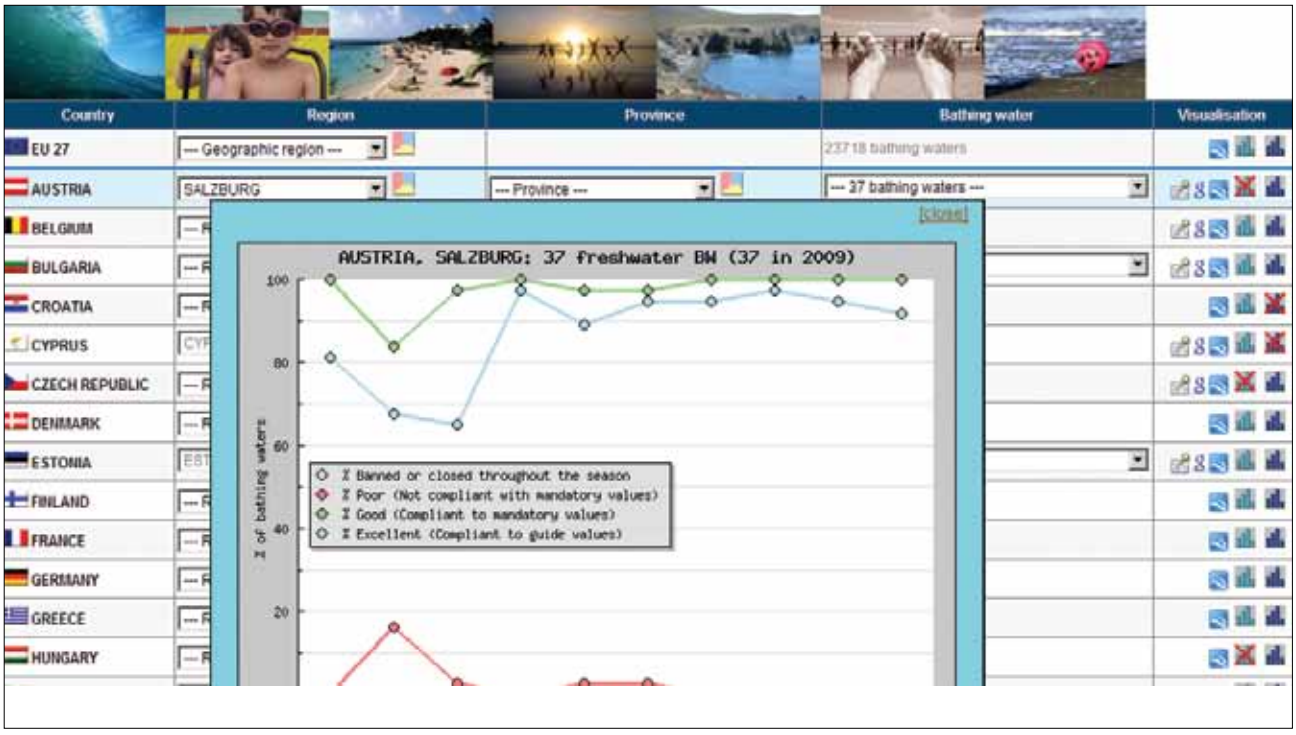
EU Member States will have to comply with the stricter and more ambitious requirements laid out in Directive 2006/7/EC by 2015 at the latest. The new legislation requires more effective monitoring and management of bathing waters, greater public participation and improved information dissemination. By March 2011, Member States have to have established bathing water profiles (Box 6.1) More on the new legislation can be found on the European Commission's websites ([10]).

([8]) http://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water.
([9]) http://ec.europa.eu/environment/water/water-bathing/index_en.html.
([10]) http://ec.europa.eu/environment/water/water-bathing/index_en.html and http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:064:0037:0051:EN:PDF.

Figure 6.1 WISE Bathing water map viewer

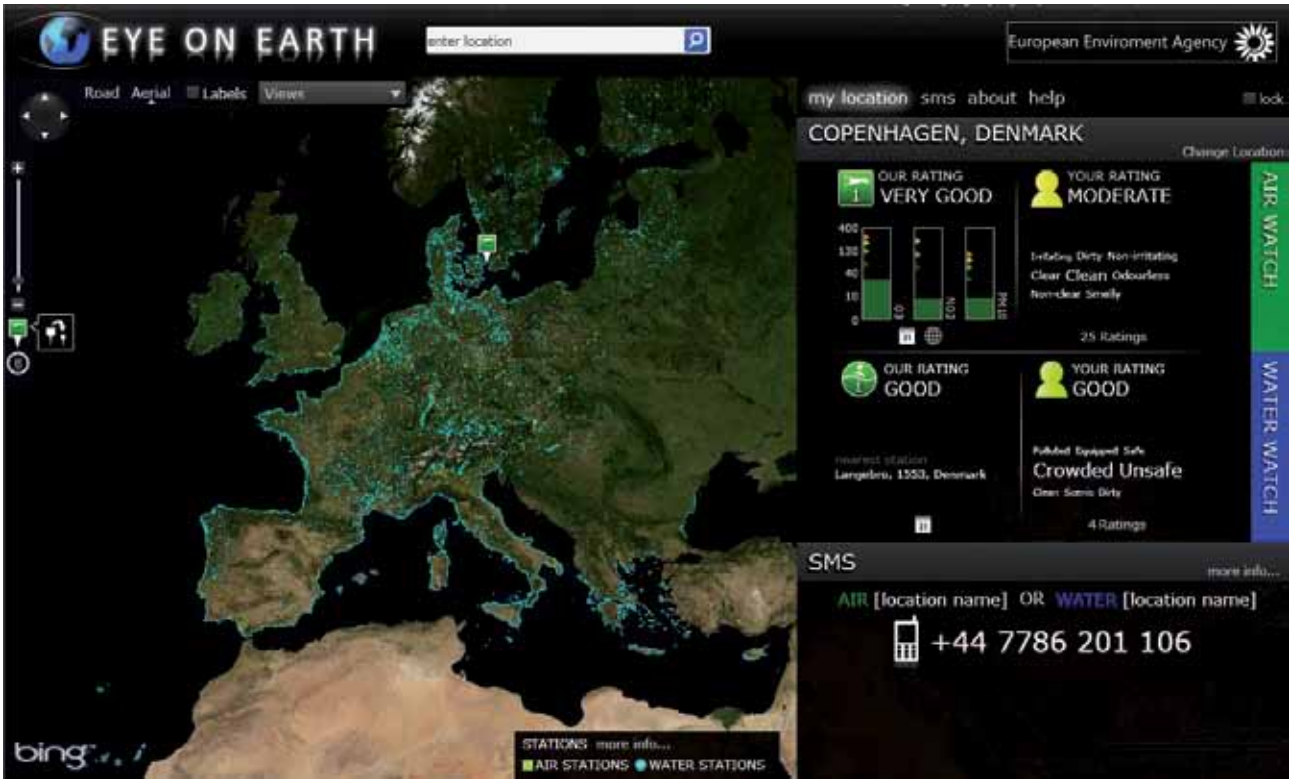
Note: The WISE map viewer is available at http://www.eea.europa.eu/themes/water/interactive//bathing.

Figure 6.2 Bathing water data viewer



Note: The bathing water data viewer is available via http://www.eea.europa.eu/themes/water/status-and-monitoring/bathing-water-data-viewer.

Figure 6.3 Eye On Earth — Water Watch



Note: The Eye On Earth — Water Watch application is available via http://www.eea.europa.eu/data-and-maps/explore-interactive-maps/eye-on-earth.

Box 6.1 Bathing water profiles

Directive 2006/7/EC requires bathing water profiles to be established in March 2011. A bathing water profile is primarily intended to gain an understanding of the faecal sources and routes of pollution, focusing on the indicators for faecal pollution. The bathing water profile can be used to substantiate chosen management measures efficiently, and can also ultimately lead to a better bathing water quality. It may cover a single bathing water or two or more contiguous bathing waters.

The bathing water profile consists of:

- a description of the physical, geographical and hydrological characteristics of the bathing water, and of other surface waters in the catchment area of the bathing water concerned, that could be a source of pollution;
- an identification and assessment of causes of pollution that might affect bathing waters and impair bathers' health;
- an assessment of the potential for proliferation of cyanobacteria;
- an assessment of the potential for proliferation of macro-algae and/or phytoplankton;
- if there is a risk of short-term pollution, the information on an anticipated nature, frequency and duration of expected short-term pollution is given and details of any remaining causes of pollution, and management measures taken during short-term pollution with the identity and contact details of bodies responsible for taking such action;
- the location of the monitoring point.

Profiles are updated in the event of significant construction works or changes in infrastructure and give all other relevant information the competent authority considers appropriate. Summary of information is displayed on notices at bathing waters and on the internet. Some profiles can be already found on the web, for example:

- The United Kingdom, England and Wales: http://www.environment-agency.gov.uk/homeandleisure/recreation/127626.aspx;
- Germany — Hessen:http://badeseen.hlug.de/badegewaesser.html;
- Estonia (five bathing waters): http://www.terviseamet.ee/keskkonnatervis/vesi/suplusvesi/suplusvee-profiilid.html:
- Cyprus http://www.moa.gov.cy/moa/agriculture.nsf/all/807DB3B3579CA382C22573C2005FDF42OpenDocument.

Source: http://ec.europa.eu/environment/water/water-bathing/pdf/profiles_dec_2009.pdf.

7 Summary of results

Twenty to forty years ago, large quantities of largely uncontrolled, untreated or partially treated municipal and industrial wastewater were discharged into many of Europe's waters. Thankfully, due to EU and national water policies and actions to reduce pollution and treat wastewater, Europe's bathing waters are today much cleaner.

Europeans have a keen interest in knowing the quality of bathing waters at bathing sites. Knowing that they have clean and safe water to swim or play in is an important factor in their choice of a holiday or weekend destination. For the tourism industry, clean and safe water is also a major factor in attracting visitors to an area.

This report provides a comprehensive synopsis of the quality of bathing waters in the Member States of the European Union in the 2010 bathing season. It thereby gives an indication of the areas where the quality of bathing is expected to be good during 2011. The report also shows the evolution of bathing water quality from 1990 to 2010. In addition, as requested by the new bathing water directive, the Commission has consulted Member States and stakeholders to develop clear and simple signals to inform the public of the status of bathing waters and of any relevant prohibition or advice against bathing.

The first European bathing water directive was adopted in 1975 and came into force in 1976. The new bathing water directive was adopted in 2006. The new directive updates the measures of the 1975 legislation and simplifies its management and surveillance methods. The new European legislation should have been transposed into national law in 2008 but Member States have until December 2014 to implement it. During the bathing season 2010, 20 Member States monitored and reported bathing water quality according to the new Bathing Water Directive (2006/7/EC).

Of the more than 21 000 bathing areas monitored throughout the European Union in 2010, two-thirds were in coastal waters and the rest in rivers and lakes. The largest number of coastal bathing waters can be found in Italy, Greece, France, Spain and Denmark, while Germany and France have the highest number of inland bathing waters.

During recent years, including the 2010 bathing season, Member States have adjusted their monitoring programmes to meet the requirements of the new Bathing Water Directive (2006/7/EC). In some cases these changes have resulted in a late start date to sampling at some sites and/or insufficiently frequent sampling. As a late start and low frequency do not necessarily indicate unsatisfactory bathing water quality, for 2010 results reported under *less strict rules* ([11]) have been deemed acceptable. From 2012, however, the stricter rules will apply.

Overall in 2010, 92.1 % of Europe's coastal bathing waters and 90.2 % of inland bathing waters met the minimum water quality standards set by the bathing water directives. During recent years there has been a deterioration in bathing water quality but still more than nine in ten bathing waters meet the minimum quality standards. The share of non-compliant bathing waters was 1.2 % for coastal bathing waters and 2.8 % for inland bathing waters. The decrease reflects in part year to year variation but also indicates that further work is necessary to ensure that the quality of bathing waters is constantly improved and maintained.

The overall quality of bathing waters in the EU has also markedly improved since 1990. The number of coastal bathing waters not complying with the bathing water directives' provisions decreased

([11]) Under the *less strict rules* the assessment for Greece is based on a sampling period that begins at the end of July and runs to the end of the bathing water season. In addition, for all Member States results from monitoring at low frequency (defined as less than 42 days between sampling dates) were accepted. With more than 42 days between sampling dates the bathing water was classified as insufficiently sampled or not sampled.

from 565 (9.2 %) in 1990 to 173 (1.2 %) in 2010. The number of inland bathing areas not complying with mandatory values decreased from 11.9 % in 1990 to 2.8 % in 2010, which is among the lowest percentages to date.

Ten countries reached more than 80 % compliance with the guide values. These are Cyprus (100 %), Croatia (97.3 %), Malta (95.4 %), Greece (94.2 %) Ireland (90.1 %), Bulgaria (85.1 %), Portugal (83.9 %), Finland (83.8 %), the United Kingdom (81.7 %) and Latvia (80.9 %). All bathing waters complied with mandatory values in eight countries: Cyprus, Malta, Greece, Bulgaria, Slovenia, Estonia, Romania and Montenegro.

Even with the less strict monitoring frequency criteria applied, in 2010 there was an increase in the number of insufficiently sampled or non-sampled sites. In 2010 some 6.4 % of coastal bathing waters and 5.4 % of inland bathing waters were insufficiently sampled or not sampled. This is high values compared to the previous years. The reason for the relative high numbers are uncertain, and the explanation will be further explored.

As reported in Chapter 6 of this report, interested citizens now have access to more bathing water information than ever. In addition to annual bathing water report like this one, online tools allow users to access data for a selected country or region and make comparisons with previous years. The data can also be visualised in geospatial mapping programs such as Google Earth and Bing maps. This information allows the public to get more actively involved in protecting the environment and helping protect and improve Europe's bathing areas.

Clean unpolluted water is essential for our ecosystems and economic activities such as tourism. Plants and animals in freshwaters react to changes in their environment caused by changes in water quality. We need to manage our water resources well to sustain human and economic development and improve the essential functions of our water ecosystems. The solutions lie in more integrated and sustainable water resource management, including full implementation of the Water Framework Directive, with the aim that all water bodies should have achieved 'good status' by 2015.

Table 7.1 European Union bathing water quality from 1990 to 2010

		Total number of bathing areas	Compliance with guide values		Compliance with mandatory values		Not complying		Banned/closed temporarily or throughout the season	
			number	%	number	%	number	%	number	%
Coastal bathing waters	1990 (a)	6 165	4 208	68.3	4 920	79.8	565	9.2	0	0
	1991 (a)	10 152	5 963	58.7	8 208	80.9	782	7.7	30	0.3
	1992 (b)	10 996	7 821	71.1	9 048	82.3	865	7.9	42	0.4
	1993 (b)	11 386	8 518	74.8	9 800	86.1	726	6.4	25	0.2
	1994 (b)	11 813	9 067	76.8	10 500	88.9	725	6.1	19	0.2
	1995 (c)	12 500	9 271	74.2	10 575	84.6	640	5.1	18	0.1
	1996 (c)	12 948	10 636	82.1	11 865	91.6	598	4.6	14	0.1
	1997 (c)	13 114	10 847	82.7	12 232	93.3	699	5.3	17	0.1
	1998 (c)	13 210	11 070	83.8	12 496	94.6	596	4.5	19	0.1
	1999 (c)	13 255	11 300	85.3	12 599	95.1	471	3.6	16	0.1
	2000 (c)	13 346	11 446	85.8	12 689	95.1	365	2.7	16	0.1
	2001 (c)	13 428	11 594	86.3	12 806	95.4	359	2.7	23	0.2
	2002 (c)	13 625	11 851	87	13 046	95.8	238	1.7	140	1
	2003 (c)	13 641	12 180	89.3	13 208	96.8	159	1.2	191	1.4
	2004 (d)	13 901	12 297	88.5	13 441	96.7	206	1.5	209	1.5
	2005 (e)	14 234	12 676	89.1	13 673	96.1	188	1.3	272	1.9
	2006 (e)	14 340	12 678	88.4	13 787	96.1	217	1.5	283	2
	2007 (f)	14 552	12 526	86.1	13 855	95.2	318	2.2	313	2.2
	2008 (f)*	14 548	12 889	88.6	14 006	96.3	208	1.4	307	2.1
	2009 (f)**	13 741	12 235	89.0	13 139	95.6	221	1.6	316	2.3
	2010 (f)	14 541	11 557	79.5	13 385	92.1	173	1.2	46	0.3
Inland bathing waters	1990 (a)	1 374	500	36.4	720	52.4	164	11.9	0	0
	1991 (b)	4 923	981	19.9	1 733	35.2	531	10.8	10	0.2
	1992 (b)	5 264	1 159	22	1 970	37.4	744	14.1	214	4.1
	1993 (b)	5 076	1 575	31	2 706	53.3	609	12	32	0.6
	1994 (b)	5 368	1 819	33.9	3 100	57.7	596	11.1	44	0.8
	1995 (c)	5 894	2 059	34.9	2 834	48.1	612	10.4	36	0.6
	1996 (c)	6 078	3 111	51.2	4 177	68.7	593	9.8	27	0.4
	1997 (c)	6 189	3 702	59.8	4 930	79.7	721	11.6	52	0.8
	1998 (c)	6 012	3 833	63.8	5 209	86.6	434	7.2	33	0.5
	1999 (c)	5 838	3 719	63.7	5 157	88.3	299	5.1	59	1
	2000 (c)	5 833	3 778	64.8	5 262	90.2	291	5	46	0.8
	2001 (c)	5 784	3 867	66.9	5 264	91	257	4.4	63	1.1
	2002 (c)	5 774	3 701	64.1	5 258	91.1	217	3.8	165	2.9
	2003 (c)	5 729	3 893	68	5 291	92.4	154	2.7	263	4.6
	2004 (d)	6 295	4 039	64.2	5 440	86.4	229	3.6	323	5.1
	2005 (e)	6 677	4 214	63.1	5 720	85.7	244	3.7	357	5.3
	2006 (e)	6 753	4 312	63.9	5 995	88.8	281	4.2	338	5
	2007 (f)	6 816	4 270	62.6	6 044	88.7	302	4.4	378	5.5
	2008 (f)*	6 896	5 059	73.4	6 342	92.0	196	2.8	315	4.6
	2009 (f)**	6 867	4 856	70.7	6 140	89.4	216	3.1	326	4.7
	2010 (f)	6 522	3 947	60.5	5 884	90.2	183	2.8	104	1.6

Note: Bathing areas insufficiently sampled or not sampled according to the Bathing Water Directive or the New Bathing Water Directive were not included in this table. In some cases the sum of the different categories will not be equal to the total number of bathing areas. Bathing waters compliant with guide values were also compliant with mandatory values.

* Changes after official EU report for 2008 bathing season.
** Delays in commissioning the monitoring programme meant that Greek 830 bathing waters were not adequately monitored.

(a) 7 Member States; (b) 12 Member States; (c) 14 Member States; (d) 21 Member States; (e) 25 Member States; (f) 27 Member States.

Table 7.2 Bathing water quality results in 2010 for the 27 EU Member States and other countries with bathing water quality results

			Total number of bathing areas	Compliance with guide values		Compliance with mandatory values		Non complying		Banned/closed temporarily or throughout the season		Insufficiently sampled or not sampled	
				number	%	number	%	number	%	number	%	number	%
Coastal bathing waters	Belgium	BE*	42	11	26.2	42	100.0	0	0.0	0	0.0	0	0.0
	Bulgaria	BG*	90	76	84.4	90	100.0	0	0.0	0	0.0	0	0.0
	Cyprus	CY*	112	112	100.0	112	100.0	0	0.0	0	0.0	0	0.0
	Germany	DE*	370	298	80.5	368	99.5	1	0.3	0	0.0	1	0.3
		DE	370	292	78.9	362	97.8	1	0.3	0	0.0	7	1.9
	Denmark	DK*	1 054	819	77.7	1 013	96.1	39	3.7	0	0.0	2	0.2
		DK	1 054	814	77.2	1 004	95.3	39	3.7	0	0.0	11	1.0
	Estonia	EE*	27	19	70.4	27	100.0	0	0.0	0	0.0	0	0.0
		EE	27	16	59.3	22	81.5	0	0.0	0	0.0	5	18.5
	Spain	ES*	1 930	1 594	82.6	1 816	94.1	12	0.6	6	0.3	96	5.0
		ES	1 930	1 590	82.4	1 811	93.8	11	0.6	6	0.3	102	5.3
	Finland	FI*	86	64	74.4	85	98.8	1	1.2	0	0.0	0	0.0
	France	FR*	2 012	1 377	68.4	1 799	89.4	8	0.4	0	0.0	205	10.2
		FR	2 012	1 371	68.1	1 791	89.0	8	0.4	0	0.0	213	10.6
	Greece	GR*	2 149	2 024	94.2	2 149	100.0	0	0.0	0	0.0	0	0.0
		GR	2 149	0	0.0	0	0.0	0	0.0	0	0.0	2149	100.0
	Ireland	IE*	122	113	92.6	120	98.4	2	1.6	0	0.0	0	0.0
	Italy	IT*	4 896	3 779	77.2	4 174	85.3	57	1.2	33	0.7	632	12.9
		IT	4 896	1 433	29.3	1 608	32.8	40	0.8	33	0.7	3215	65.7
	Lithuania	LT*	16	16	100.0	16	100.0	0	0.0	0	0.0	0	0.0
	Latvia	LV*	33	27	81.8	32	97.0	0	0.0	1	3.0	0	0.0
	Malta **	MT*	87	83	95.4	87	100.0	0	0.0	0	0.0	0	0.0
	Netherlands	NL*	90	54	60.0	83	92.2	3	3.3	3	3.3	1	1.1
	Poland	PL*	88	14	15.9	66	75.0	22	25.0	0	0.0	0	0.0
	Portugal	PT*	417	374	89.7	414	99.3	3	0.7	0	0.0	0	0.0
		PT	417	348	83.5	386	92.6	3	0.7	0	0.0	28	6.7
	Romania	RO*	49	1	2.0	49	100.0	0	0.0	0	0.0	0	0.0
	Sweden	SE*	254	190	74.8	245	96.5	9	3.5	0	0.0	0	0.0
		SE	254	189	74.4	242	95.3	9	3.5	0	0.0	3	1.2
	Slovenia	SI*	21	21	100.0	21	100.0	0	0.0	0	0.0	0	0.0
	United Kingdom	UK*	596	490	82.2	577	96.8	16	2.7	3	0.5	0	0.0
	EU	*	**14 541**	**11 556**	**79.5**	**13 385**	**92.1**	**173**	**1.2**	**46**	**0.3**	**937**	**6.4**
			14 541	**7 135**	**49.1**	**8 606**	**59.2**	**155**	**1.1**	**46**	**0.3**	**5734**	**39.4**
	Croatia	HR*	913	888	97.3	901	98.7	0	0.0	0	0.0	12	1.3
	Montenegro	ME*	17	0	0.0	17	100.0	0	0.0	0	0.0	0	0.0
	Europe	*	15 471	12 444	80.4	14 303	92.5	173	1.1	46	0.3	949	6.1
			15 471	8 023	51.9	9524	61.6	155	1.0	46	0.3	5746	37.1

Note: Bathing waters compliant with guide values were also compliant with mandatory values.
* Less strict monitoring frequency criteria.

Notes by countries:
** For Luxembourg, Malta and Hungary, classification under the New Bathing Water Directive is adapted to classification during transition period.
*** For Switzerland, sampling frequency criteria and intestinal enterococci are not considered.

Table 7.2 Bathing water quality results in 2010 for the 27 EU Member States and other countries with bathing water quality results (cont.)

			Total number of bathing areas	Compliance with guide values		Compliance with mandatory values		Non complying		Banned/closed temporarily or throughout the season		Insufficiently sampled or not sampled	
				number	%	number	%	number	%	number	%	number	%
Inland bathing waters	Austria	AT*	268	185	69.0	265	98.9	3	1.1	0	0.0	0	0.0
	Belgium	BE*	81	24	29.6	64	79.0	11	13.6	5	6.2	1	1.2
	Bulgaria	BG*	4	4	100.0	4	100.0	0	0.0	0	0.0	0	0.0
	Czech Republic	CZ*	186	99	53.2	161	86.6	3	1.6	16	8.6	6	3.2
	Germany	DE*	1 915	1 495	78.1	1 862	97.2	17	0.9	27	1.4	9	0.5
		DE	1 915	1 482	77.4	1 844	96.3	17	0.9	27	1.4	27	1.4
	Denmark	DK*	115	104	90.4	115	100.0	0	0.0	0	0.0	0	0.0
	Estonia	EE*	28	20	71.4	28	100.0	0	0.0	0	0.0	0	0.0
		EE	28	20	71.4	25	89.3	0	0.0	0	0.0	3	10.7
	Spain	ES*	214	68	31.8	185	86.4	4	1.9	6	2.8	19	8.9
		ES	214	67	31.3	183	85.5	4	1.9	6	2.8	21	9.8
	Finland	FI*	242	211	87.2	239	98.8	1	0.4	1	0.4	1	0.4
		FI	242	209	86.4	237	97.9	1	0.4	1	0.4	3	1.2
	France	FR*	1 314	627	47.7	1257	95.7	13	1.0	0	0.0	44	3.3
		FR	1 314	627	47.7	1255	95.5	13	1.0	0	0.0	46	3.5
	Greece	GR*	6	5	83.3	6	100.0	0	0.0	0	0.0	0	0.0
		GR	6	0	0.0	0	0.0	0	0.0	0	0.0	6	100.0
	Hungary **	HU*	251	117	46.6	140	55.8	5	2.0	20	8.0	86	34.3
		HU	251	112	44.6	132	52.6	5	2.0	20	8.0	94	37.5
	Ireland	IE*	9	5	55.6	7	77.8	2	22.2	0	0.0	0	0.0
	Italy	IT*	596	348	58.4	433	72.7	4	0.7	5	0.8	154	25.8
		IT	596	240	40.3	311	52.2	2	0.3	5	0.8	278	46.6
	Lithuania	LT*	98	45	45.9	81	82.7	0	0.0	3	3.1	14	14.3
	Luxembourg **	LU*	20	10	50.0	10	50.0	0	0.0	9	45.0	1	5.0
		LU	20	7	35.0	7	35.0	0	0.0	9	45.0	4	20.0
	Latvia	LV*	14	11	78.6	14	100.0	0	0.0	0	0.0	0	0.0
	Netherlands	NL*	579	266	45.9	490	84.6	76	13.1	2	0.3	11	1.9
		NL	579	265	45.8	488	84.3	75	13.0	2	0.3	14	2.4
	Poland	PL*	227	67	29.5	176	77.5	38	16.7	9	4.0	4	1.8
	Portugal	PT*	75	39	52.0	72	96.0	3	4.0	0	0.0	0	0.0
	Sweden	SE*	207	161	77.8	204	98.6	2	1.0	0	0.0	1	0.5
		SE	207	158	76.3	197	95.2	2	1.0	0	0.0	8	3.9
	Slovenia	SI*	25	14	56.0	25	100.0	0	0.0	0	0.0	0	0.0
	Slovakia	SK*	36	15	41.7	34	94.4	1	2.8	1	2.8	0	0.0
	United Kingdom	UK*	12	7	58.3	12	100.0	0	0.0	0	0.0	0	0.0
	EU	*	**6 522**	**3 947**	**60.5**	**5884**	**90.2**	**183**	**2.8**	**104**	**1.6**	**351**	**5.4**
			6 522	**3 806**	**58.4**	**5709**	**87.5**	**180**	**2.8**	**104**	**1.6**	**529**	**8.1**
	Switzerland ***	CH	381	252	66.1	364	95.5	15	3.9	0	0.0	2	0.5
	Europe	*	6 903	4 199	60.8	6248	90.5	198	2.9	104	1.5	353	5.1

Note: Bathing waters compliant with guide values were also compliant with mandatory values.
* Less strict monitoring frequency criteria.

Notes by countries:
** For Luxembourg, Malta and Hungary, classification under the New Bathing Water Directive is adapted to classification during transition period.
*** For Switzerland, sampling frequency criteria and intestinal enterococci are not considered.

Table 7.3 Bathing water quality results in 2010 for European sea regions and their catchments

		Total number of bathing areas	Compliance with guide values		Compliance with mandatory values		Not complying		Banned/closed temporarily or throughout the season	
			number	%	number	%	number	%	number	%
Coastal bathing waters	*Western Mediterranean Sea*	4 416	3 771	85.4	4 157	94.1	39	0.9	2	0.0
	Ionian Sea and the Central Mediterranean Sea	1 603	1 208	75.4	1 363	85.0	13	0.8	8	0.5
	Adriatic Sea	2 122	1 773	83.6	1 853	87.3	14	0.7	23	1.1
	Aegean-Levantine Sea	1 771	1 702	96.1	1 771	100.0	0	0.0	0	0.0
	Mediterranean Sea	9 912	8 454	85.3	9 144	92.3	66	0.7	33	0.3
	Atlantic Ocean	2 458	1 806	73.5	2 172	88.4	24	1.0	8	0.3
	North Sea	2 281	1 676	73.5	2 229	97.7	42	1.8	4	0.2
	Baltic Sea	658	427	64.9	615	93.5	41	6.2	1	0.2
	Black Sea	139	77	55.4	139	100.0	0	0.0	0	0.0
	Europe	15 471	12 444	80.4	14 303	92.5	173	1.1	46	0.3
Inland bathing waters	*Western Mediterranean Sea*	827	447	54.1	802	97.0	9	1.1	3	0.4
	Adriatic Sea	487	284	58.3	371	76.2	3	0.6	5	1.0
	Aegean-Levantine Sea	9	8	88.9	9	100.0	0	0.0	0	0.0
	Mediterranean Sea	1 323	739	55.9	1 182	89.3	12	0.9	8	0.6
	Atlantic Ocean	855	395	46.2	790	92.4	15	1.8	3	0.4
	North Sea	2 861	1 875	65.5	2 661	93.0	115	4.0	54	1.9
	Baltic Sea	865	559	64.6	789	91.2	41	4.7	14	1.6
	Black Sea	953	631	66.2	825	86.6	15	1.6	25	2.6
	Europe	6 903	4 199	60.8	6 248	90.5	198	2.9	104	1.5

Note: Bathing waters compliant with guide values were also compliant with mandatory values.

European Environment Agency

European bathing water quality in 2010

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