

Bathing water results 2010 – Greece

1. Reporting and assessment

This report gives a general overview of bathing water quality in Greece from 1990 with special attention to the bathing water quality in 2010. In 2010 Greece reported under the Directive 2006/7/EC and has monitored under this Directive since 2007.

Before the necessary data set for assessment of bathing water quality under the Directive 2006/7/EC is compiled (data for three or four consecutive years) the rules for transition period assessment are applied. This means that the classification of bathing waters is defined on the basis of concentrations of intestinal enterococci and *Escherichia coli* that are reported under the Directive 2006/7/EC. The limit values for the classification are taken from the Directive 76/160/EEC. For the conversion of reported parameters under the Directive 2006/7/EC, Article 13.3 of the Directive 2006/7/EC foresees that the parameter *Escherichia coli*, reported under the Directive 2006/7/EC, is assumed to be equivalent to the parameter faecal coliforms of the Directive 76/160/EEC. The parameter intestinal enterococci reported under the Directive 2006/7/EC is assumed to be equivalent to the parameter faecal streptococci.

The results are classified in the following categories:

- Class CI: Compliant with the mandatory value of the Directive 76/160/EEC for Escherichia coli
 and not compliant with the guide values of the Directive 76/160/EEC for Escherichia coli or
 intestinal enterococci;
- Class CG: Compliant with the mandatory value of the Directive 76/160/EEC for Escherichia coli and the more stringent guide values for the Escherichia coli and intestinal enterococci;
- Class NC: Not compliant with the mandatory value of the Directive 76/160/EEC for Escherichia
 coli:
- Class B: Banned or closed (temporary or throughout the season);
- Class NF: Insufficiently sampled;
- Class NS: Not sampled.

The new bathing water directive (2006/7/EC) requires Member States to start sampling shortly before the start of the bathing season. It also requires that the interval between sampling should not exceed one month. The bathing water is classified as insufficiently sampled or not sampled when the preseason sample is missing or when the samples are not equally distributed throughout the season. This means that two consecutive samples must be taken in one month period the latest.

In some cases these required changes in regard to the old bathing water directive (76/160/EEC) have not yet been implemented, resulting in a late start date of sampling at some sites and/or insufficiently frequent sampling. This is the reason that two rules in regard to sampling frequency are considered in the assessment of monitoring results in 2010. By the first rule, 41 days were taken as a maximum difference between two samples (less strict rule), whereas by the second rule the maximum days between two samples considered were 32 days (strict rule). For Greece we also applied the rule, that bathing water quality is assessed only for the period since late July when monitoring results are available.

2. Number of bathing waters and length of bathing season

A total of 2 155 bathing waters were reported in Greece during the 2010 bathing season, of which 2 149 were coastal bathing waters and six inland bathing waters on lakes.

With 2 155 bathing waters Greece accounts for about 10.2 % of the reported bathing waters of the European Union.

The evolution of the reported number of bathing waters since monitoring of the water quality began under the Directive 76/160/EEC and the Directive 2006/7/EC is presented in Table 1. Remarkably is

the increase in the number of coastal bathing waters since the start of the reporting from 683 in 1990 to 2 149 in 2010, when 48 new bathing waters were added to the list compared to the previous year. The number of inland bathing waters increased from four since 1992 to six in 2006. It remained the same afterwards.

The bathing season as reported for all bathing waters lasted five months, from 1 June to 31 October 2010.

3. Bathing water quality

The results of the bathing water quality in Greece for the period 1990-2009 as reported in the past reporting years and for the season of 2010 are presented in Figure 1. The previous reports are the European Commission's bathing available water (http://ec.europa.eu/environment/water/water-bathing/index_en.html; Water and Health/Bathing Water/ Environment 2005-2010 reports) and the European Agency's bathing water (http://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water; reports for the 2008 and 2009 bathing seasons).

The graphs show, for coastal and inland bathing waters separately:

- The percentage of bathing waters that comply with the guide values (class CG, blue line);
- The percentage of bathing waters that comply with the mandatory values (class CI, green line);
- The percentage of bathing waters that do not comply with the mandatory values (class NC, red line);
- The percentage of bathing waters that are banned or closed (temporarily or throughout the season) (class B, grey line).

Table 1 shows the same information in absolute numbers and in percentages separately for coastal and inland bathing waters. The numbers and percentages of insufficiently sampled or not sampled bathing waters are also presented. Table 2 shows the bathing water quality results for the 2009 and 2010 seasons in Greece for all bathing waters.

Map 1 shows the quality of bathing water sites from late July on, when the monitoring has started. Since the monitoring has not been implemented from the start of the bathing season, all locations are missing pre-season sample and sample in June. If the strict rules are implemented for the assessment, the class for all locations would be "insufficiently sampled".

Coastal bathing waters

In Greece, 100 % of the coastal bathing waters met the mandatory water quality in 2010. This is a slight increase of 0.1% compared to the previous year. The rate of compliance with the guide values was 94.2 %, which is a decrease of 5.6 %. Since the start of the reporting in 1990, no coastal bathing water had to be closed during the season.

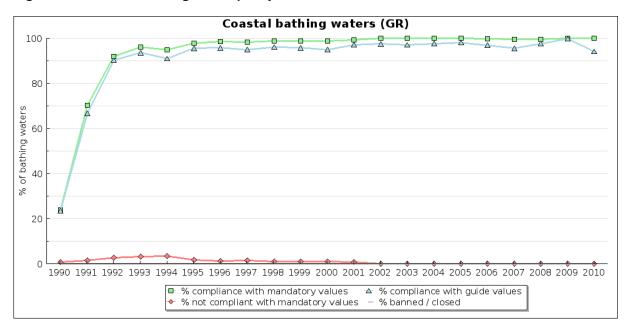
The compliance rate was low for the coastal bathing waters in the early 90's. The compliance with mandatory and even guide values was always higher than 90 % since 1992. The mandatory water quality was met in 98 % of the bathing waters since 1996 and since 2001 in over 99 % of the bathing waters. It took Greece till the 2002 bathing season to reach a level of non-compliant coastal bathing waters below 0.5 %.

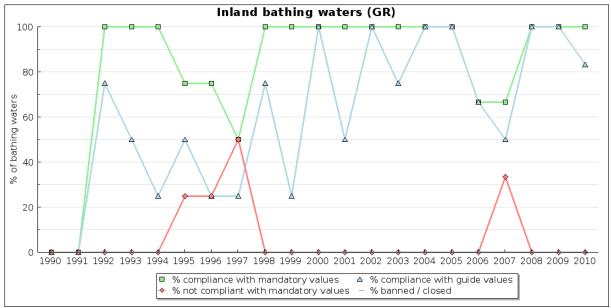
Inland bathing waters

All six inland bathing waters were in compliance with the mandatory water quality in 2010. The rate of compliance with the guide values decreased from 100 % in 2009 to 83.3 % in 2010, when five out of six bathing waters met the guide values. Since the start of the reporting in 1990, no inland bathing water had to be closed during the season.

Because of the low number of reported inland bathing waters, the compliance rate is fluctuating largely from year to year.

Figure 1: Results of bathing water quality in Greece from 1990 to 2010





Note: Assessment of bathing water quality for 2009 done for 1 277 bathing waters. A total of 830 bathing waters were not sampled for a part of bathing season due to delay in monitoring activities. Assessment of bathing water quality for 2010 done only for the period with monitoring results, that is from late July on.

Table 1: Results of bathing water quality in Greece from 1990 to 2010

Table 1: Results of bathing water quality in Greece from 1990 to 2010 GR												
		Total number of bathing	Compliance with guide and mandatory values***		Compliance with mandatory values		Not compliant		Banned/closed temporarily or throughout the season		Insufficiently sampled or not sampled	
		waters	number	%	number	%	number	%	number	%	number	%
Coastal bathing waters	1990	683	161	23.6	164	24	5	0.7	0	0	514	75.3
	1991	1096	731	66.7	770	70.3	16	1.5	0	0	310	28.3
	1992	1203	1086	90.3	1105	91.9	31	2.6	0	0	67	5.6
	1993	1250	1170	93.6	1201	96.1	39	3.1	0	0	10	8.0
	1994	1281	1165	90.9	1214	94.8	43	3.4	0	0	24	1.9
	1995	1526	1458	95.5	1494	97.9	25	1.6	0	0	7	0.5
	1996	1690	1619	95.8	1666	98.6	20	1.2	0	0	4	0.2
	1997	1701	1616	95	1674	98.4	24	1.4	0	0	3	0.2
	1998	1733	1666	96.1	1710	98.7	17	1	0	0	6	0.3
	1999	1816	1740	95.8	1795	98.8	17	0.9	0	0	4	0.2
	2000	1858	1765	95	1835	98.8	16	0.9	0	0	7	0.4
	2001	1887	1833	97.1	1875	99.4	12	0.6	0	0	0	0.0
	2002	1914	1866	97.5	1912	99.9	2	0.1	0	0	0	0.0
	2003	1933	1876	97.1	1931	99.9	2	0.1	0	0	0	0.0
	2004	1965	1918	97.6	1964	99.9	1	0.1	0	0	0	0.0
	2005	2006	1967	98.1	2005	100	1	0	0	0	0	0.0
	2006	2047	1983	96.9	2040	99.7	0	0	0	0	7	0.3
	2007	2049	1957	95.5	2039	99.5	0	0	0	0	10	0.5
	2008	2089	2040	97.7	2079	99.5	2	0.1	0	0	8	0.4
	2009*	1273	1270	99.8	1272	99.9	0	0	0	0	1	0.1
	2010**	2149	2024	94.2	2149	100.0	0	0.0	0	0.0	0	0.0
Inland	1990	6	0	0	0	0	0	0	0	0	6	100.0
bathing	1991	6	0	0	0	0	0	0	0	0	6	100.0
waters	1992	4	3	75	4	100	0	0	0	0	0	0.0
	1993	4	2	50	4	100	0	0	0	0	0	0.0
	1994	4	1	25	4	100	0	0	0	0	0	0.0
	1995	4	2	50	3	75	1	25	0	0	0	0.0
	1996	4	1	25	3	75	1	25	0	0	0	0.0
	1997	4	1	25	2	50	2	50	0	0	0	0.0
	1998	4	3	75	4	100	0	0	0	0	0	0.0
	1999	4	1	25	4	100	0	0	0	0	0	0.0
	2000	4	4	100	4	100	0	0	0	0	0	0.0
	2001	4	2	50	4	100	0	0	0	0	0	0.0
	2002	4	4	100	4	100	0	0	0	0	0	0.0
	2003	4	3	75	4	100	0	0	0	0	0	0.0
	2004	4	4	100	4	100	0	0	0	0	0	0.0
	2005	4	4	100	4	100	0	0	0	0	0	0.0
	2006	6	4	66.7	4	66.7	0	0	0	0	2	33.3
	2007	6	3	50	4	66.7	2	33.3	0	0	0	0.0
	2008	6	6	100	6	100	0	0	0	0	0	0.0
	2009* 2010**	4 6	4 5	100 83.3	4 6	100 100.0	0	0.0	0	0.0	0	0.0
							otal of 828		_			

^{*}Assessment done for 1 273 coastal and four inland bathing waters. A total of 828 coastal and two inland bathing waters were not sampled for a part of bathing season due to delay in monitoring activities.

**Bathing water quality assessed only for the period with monitoring results that is from late July on.

**Bathing waters which were compliant with the guide values were also compliant with the mandatory values for five

parameters under the Directive 76/160/EEC (1990-2009) or the mandatory value for Escherichia coli (2010).

Table 2: Results of bathing water quality for all bathing waters in Greece in 2009 and 2010

GR												
		Total number of bathing	Compliance with guide and mandatory values***		Compliance with mandatory values		Not compliant		Banned/closed temporarily or throughout the season		Insufficiently sampled or not sampled	
		waters	number	%	number	%	number	%	number	%	number	%
All	2009*	1277	1274	99.8	1276	99.9	0	0.0	0	0.0	1	0.1
bathing waters	2010**	2155	2029	94.2	2155	100.0	0	0.0	0	0.0	0	0.0

^{*}Assessment done for 1 277 bathing waters. A total of 830 bathing waters were not sampled for a part of bathing season due to delay in monitoring activities.

4. Important information as provided by the Greek authorities

Monitoring and assessment

The quality of bathing waters in Greece is systematically monitored since 1988, according to EU Directive 76/160/EEC. The selection of monitored bathing waters was done by the Special Secretariat for Water of the Hellenic Ministry for the Environment, Energy and Climate Change, in cooperation with the central and prefectural competent services of the country. The monitoring program is repeated every year during the bathing season from May to October. The results are reported to European Commission.

The bathing water quality in Greece was monitored during the 2010 bathing season within the framework of a program conducted by the Ministry for the Environment, Energy and Climate Change which reported the list of bathing waters before the start of the 2010 bathing season.

The Greek authorities informed the European Commission that the official monitoring started after 15 July 2010 due to delayed allocation of the necessary funds. In recognition of this shortcoming the Greek authorities increased the sampling and analysis frequency for 2010 to three samples per month and implemented all the necessary arrangements to start monitoring of the 2011 bathing season as set by the Directive 2006/7/EC. Although the start of the monitoring in 2010 season was delayed, a set of data with more than nine samples were collected for all 2 155 bathing waters. The Greek authorities pointed out that information on bathing water quality in Greece for the 2010 bathing season is therefore adequate. The report on bathing water quality prepared by the Greek authorities is done according to the Directive 2006/7/EC and disseminated by hard copies and through the internet.

The report as presented here does not reflect the Greek authority's position.

The position of Greece is presented by a relevant report, which can be found on: http://cdr.eionet.europa.eu/qr/eu/nbwd/envte3h q.

Analytical methods

During 2010 the microbiological parameters "Total coliforms", "Escherichia coli" and "Intestinal enterococci" were measured according to the methods described in the Directive 2006/7/EC. Either the "Membrane Filter Method" or the "Multiple-Tube Fermentation Technique for members of the Coliforms Groups" was used for analytical purposes. With respect to the physicochemical parameters 7 (colour), 8 (mineral oils), 9 (surface-active substances), 10 (phenols) and 13 (floating materials), these were assessed by visual inspection.

^{**}Bathing water quality assessed only for the period with monitoring results that is from late July on.

^{***}Bathing waters which were compliant with the guide values were also compliant with the mandatory values for five parameters under the Directive 76/160/EEC (2009) or the mandatory value for *Escherichia coli* (2010).

Map 1: Bathing waters reported during the 2010 bathing season in Greece



Note: " banned or closed (temporarily or throughout the season)

More data on bathing water quality on: http://www.eea.europa.eu/themes/water/mapviewers/bathing

Public information

During the 2010 bathing season, information to public was performed through the national environmental network in the website of the Ministry: www.e-per.gr, press releases (www.ypeka.gr), leaflets, articles and national reports (cdr.eionet.europa.eu/gr/eu/nbwd and www.ypeka.gr/Default.aspx?tabid=253&language=el-GR).

During the 2009 bathing season, as in previous years, the Ministry informed the public about the monitoring results and contributed in raising public awareness in environmental issues. The citizens are in a position to contact the Ministry for detailed information or complaints.

More specifically the following steps were undertaken:

- The results of the fortnightly analyses of bathing waters during the 2009 bathing period were available via the Internet site: http://iason.minenv.gr. Managers of all beaches awarded with the 2008 Blue Flag Award were able to print them and then present them at a discrete site on each beach
- Information on the situation of bathing areas is also made available via the Internet (www.edpp.gr and http://iason.minenv.gr/akti).
- The Ministry responded by phone or by post to all requests from citizens or tourists regarding information on the bathing water quality.

Treatment of waste water

With respect to the implementation of the 91/271/EEC Directive concerning urban wastewater, a large number of WWTPs have been constructed or are under construction.

The agglomerations of A and B priority (with equivalent populations above 10 000 discharging in sensitive areas and 15 000 discharging in normal areas respectively) located in coastal areas are almost fully served by waste water treatment plants (WWTPs), most of them involving advanced treatment, thus contributing to the improvement of bathing water quality of these areas.

More specifically, totally forty-seven agglomerations of priority A and B (including six large cities with PE of more than 150 000 inhabitants: Athens, Thessaloniki, Metamorphosis, Patra, Iraklio and Volos) discharge their effluents in coastal areas and are served by WWTPs.

For the agglomeration of Elefsina-Aspropyrgos the WWTP and the corresponding sewerage system are completed and are anticipated to be in operation in June of 2011.

Treatment of diffuse sources of pollution

For the purposes of the Nitrates Directive (91/676/EEC), eight vulnerable zones have been designated:

- 1) Area of Thessaloniki Kilkis;
- 2) Area of Strymonas river;
- 3) Area of Arta Preveza:
- 4) Area of Thessalia;
- 5) Area of Pinios river;
- 6) Area of Argolida;
- 7) Area of Kopaida.
- 8) Area of Asopos river

Action plans have been undertaken for the seven of the eight vulnerable zones (the action plan for the Asopos river basin will be published soon), which are expected to contribute in a positive way to the bathing waters' quality of the following gulfs: Thermaikos, Stymonikos, Amvrakikos, Pagasitikos, Argolikos, North and South Evoikos.

5. More information on bathing water quality in Europe

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, majority of Member States have adjusted their monitoring programmes to meet the requirements of the new bathing water directive (2006/7/EC). Luxembourg was the first country to report under this Directive in 2007. Cyprus, Denmark, Estonia, Finland, Germany, Hungary, Latvia, Lithuania, Slovakia, Spain and Sweden started to report under the new directive in 2008. Malta and the Netherlands started to report in 2009, while Austria, Belgium - Walloon Region, France, Greece, Italy, Portugal and Slovenia reported under this Directive for the first time in 2010. Historical data of two microbiological parameters, *Escherichia coli* and intestinal enterococci were sent by Sweden (since 2005), Luxembourg and Malta (since 2006), Belgium - Walloon Region, Greece, Hungary and Portugal (since 2007), and France (since 2009). To conclude, 20 Member States and the Walloon Region of Belgium monitored and reported under the new directive (Directive 2006/7/EC) in 2010.

Assessment of the status of all bathing waters in 2010 under the rules of the new directive (Directive 2006/7/EC) is made for Luxembourg, Malta and Hungary. Assessment of the bathing water quality on a country level for the other countries that reported under the new directive has been done using transition rules. Bathing water quality for individual bathing waters having four year set of data can be seen on the interactive maps and data viewer that are described below.

Three non-EU countries, Croatia, Montenegro and Switzerland have reported monitoring results under the new directive. Switzerland sent data on *Escherichia coli* for all bathing waters but only for some data on intestinal enterococci.

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 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.

More information on bathing water quality in the European Member States, including the EU summary report, the reports for 27 Member States, Croatia, Montenegro and Switzerland, can be found on the European Commission's bathing water quality website (http://ec.europa.eu/environment/water/water-bathing/index_en.html) and the European Environment Agency's bathing water website (http://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water). The Institute for Water of the Republic of Slovenia (IWRS), a partner in the EEA European Topic Centre on Inland, Coastal and Marine Waters (ETC/ICM) has produced the reports for the bathing seasons from the 2008 bathing season on. Countries have collaborated in the assessment of bathing water quality and supplied additional information when needed.

Interactive information on bathing water quality

The bathing water section of the Water Information System for Europe (WISE), which is accessible at the EEA bathing water website, allows users to view the quality of the bathing water at more than 22 000 coastal beaches and inland bathing waters 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 (http://www.eea.europa.eu/themes/water/interactive//bathing) 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 (http://www.eea.europa.eu/themes/water/status-and-monitoring/bathing-water-data-viewer) combines text and graphical visualisation, providing a quick check on locations and statistics on the quality of coastal and freshwater 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 (http://www.eea.europa.eu/data-and-maps/explore-interactive-maps/eye-on-earth) 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. The Czech Republic, Estonia, Finland (one municipality), Hungary, Lithuania, Luxembourg, Malta, the Netherlands, Norway (one municipality), Slovenia, Slovakia and England and Wales were also sending near real time information on bathing water quality to the Eye On Earth application. The bathing water quality from Austria, Belgium, Bulgaria, Croatia, Denmark, France, Germany, Ireland, Italy, Poland, Portugal, Spain, Sweden and Scotland and Northern Ireland was also presented on Eye on Earth Water Watch.

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 site. 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. More on the new legislation can be found on the European Commission's websites and on http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:064:0037:0051:EN:PDF.