European Environment Agency

Bathing water results 2009 – Denmark

1. Introduction

This report gives a general overview of bathing water quality in Denmark during the 2009 bathing season. Denmark reported under the Directive 2006/7/EC in 2008 and 2009 bathing season.

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 is done. 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:

- 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 CI);
- 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 CG);
- Not compliant with the mandatory value of the Directive 76/160/EEC for *Escherichia coli* (class NC);
- Banned or closed (temporarily or throughout the season) (class B).

This year the interval between two samples during the bathing season should not be larger than 41 days. The interval is longer than 31 days as defined in the Directive 2006/7/EC, since we are approaching the year 2012 only when the assessment rules will be in full compliance with the rules of this Directive. Furthermore, the first sample that should be taken shortly before the start of the bathing season could be taken even 10 days after the start of the bathing season.

2. Length of bathing season and number of bathing waters

For all bathing waters the bathing season lasted free months, from 1 June to 1 September 2009.

A total of 1 204 bathing waters were monitored in Denmark during the 2009 bathing season, of which 1 087 were coastal bathing waters and 117 freshwater bathing waters on lakes. Five coastal bathing waters were insufficiently sampled.

With 1 204 bathing waters Denmark accounts for about 5.6% 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. The number of coastal bathing waters decreased since the start of the reporting from 1 189 in 1991 to 1 087 in 2009. There were 58 less coastal bathing waters in 2009 than in the previous year: five new bathing waters were added to the list, one was re-opened and 64 were de-listed. The number of freshwater bathing waters remained rather stable since the start of the reporting. It fluctuated from 108 in 1993 to 117 in 1991 and 2009. There were two more freshwater bathing waters in 2009 than in the previous year: three new bathing waters were added to the list and one was de-listed.

3. Results of bathing water quality

The results of the bathing water quality in Denmark for the period 1991-2008 as reported in the past reporting years and for the bathing season of 2009 are presented in Figure 1. The previous reports are available on the European Commission's bathing water quality website (http://ec.europa.eu/environment/water/water-bathing/index_en.html; Water and Health/Bathing Water/ 2005-2009 reports) and the European Environment Agency's bathing water website (http://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water; reports for 2008 bathing season).

The graphs show, for coastal and freshwater 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 freshwater bathing waters. Table 2 shows the bathing water quality results for 2009 season in Denmark for all bathing waters.

Map 1 shows the location of the reported bathing waters in Denmark. The location of the bathing waters is based on the geographic coordinates reported by the Danish authorities.

Figure 1: Results of bathing water quality in Denmark from 1991 to 2009

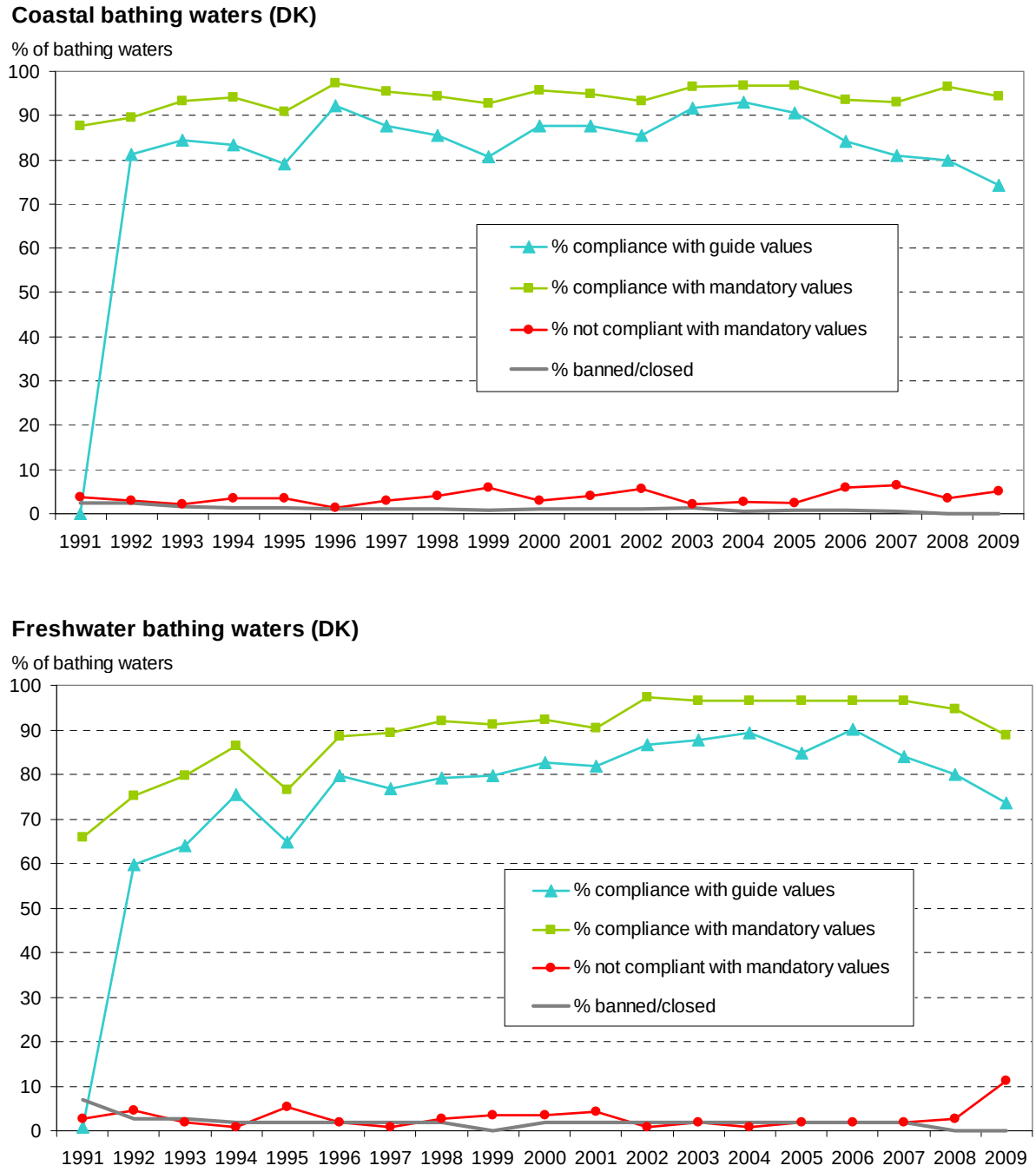


Table 1: Results of bathing water quality in Denmark from 1991 to 2009

DK										
		Total number of bathing waters	Compliance with guide values		Compliance with mandatory values		Not compliant		Banned/closed temporarily or throughout the season	
			Number	%	Number	%	Number	%	Number	%
Coastal bathing waters	1991	1189	0	0.0	1042	87.6	44	3.7	29	2.4
	1992	1172	953	81.3	1051	89.7	33	2.8	27	2.3
	1993	1179	996	84.5	1100	93.3	25	2.1	20	1.7
	1994	1189	991	83.3	1120	94.2	40	3.4	17	1.4
	1995	1187	940	79.2	1078	90.8	40	3.4	15	1.3
	1996	1195	1103	92.3	1162	97.2	15	1.3	14	1.2
	1997	1194	1046	87.6	1140	95.5	35	2.9	13	1.1
	1998	1194	1022	85.6	1126	94.3	49	4.1	12	1.0
	1999	1176	950	80.8	1090	92.7	70	6.0	11	0.9
	2000	1161	1018	87.7	1112	95.8	33	2.8	11	0.9
	2001	1159	1015	87.6	1101	95.0	46	4.0	12	1.0
	2002	1154	986	85.4	1077	93.3	64	5.5	13	1.1
	2003	1141	1045	91.6	1100	96.4	26	2.3	14	1.2
	2004	1136	1056	93.0	1100	96.8	30	2.6	6	0.5
	2005	1145	1039	90.7	1109	96.9	27	2.4	8	0.7
	2006	1146	965	84.2	1071	93.5	67	5.8	8	0.7
	2007	1158	937	80.9	1076	92.9	73	6.3	6	0.5
	2008	1145	914	79.8	1104	96.4	41	3.6	0	0.0
	2009	1087	808	74.3	1027	94.5	55	5.1	0	0.0
Freshwater bathing waters	1991	117	1	0.9	77	65.8	3	2.6	8	6.8
	1992	109	65	59.6	82	75.2	5	4.6	3	2.8
	1993	108	69	63.9	86	79.6	2	1.9	3	2.8
	1994	110	83	75.5	95	86.4	1	0.9	2	1.8
	1995	111	72	64.9	85	76.6	6	5.4	2	1.8
	1996	113	90	79.6	100	88.5	2	1.8	2	1.8
	1997	112	86	76.8	100	89.3	1	0.9	2	1.8
	1998	111	88	79.3	102	91.9	3	2.7	2	1.8
	1999	114	91	79.8	104	91.2	4	3.5	0	0.0
	2000	115	95	82.6	106	92.2	4	3.5	2	1.7
	2001	115	94	81.7	104	90.4	5	4.3	2	1.7
	2002	113	98	86.7	110	97.3	1	0.9	2	1.8
	2003	114	100	87.7	110	96.5	2	1.8	2	1.8
	2004	112	100	89.3	108	96.4	1	0.9	2	1.8
	2005	112	95	84.8	108	96.4	2	1.8	2	1.8
	2006	112	101	90.2	108	96.4	2	1.8	2	1.8
	2007	113	95	84.1	109	96.5	2	1.8	2	1.8
	2008	115	92	80.0	109	94.8	3	2.6	0	0.0
	2009	117	86	73.5	104	88.9	13	11.1	0	0.0

Note: Bathing waters which were insufficiently sampled or not sampled according to the Bathing Water Directive or the New Bathing Water Directive were not included in this table. Therefore, in some cases, the sum of the different categories will not be equal to the total number of bathing waters. 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 (1991-2007) or the mandatory value for *Escherichia coli* (2008, 2009).

Table 2: Results of bathing water quality for all bathing waters in Denmark in 2009

DK										
		Total number of bathing waters	Compliance with guide values		Compliance with mandatory value for *Escherichia coli*		Not compliant		Banned/closed temporarily or throughout the season	
			Number	%	Number	%	Number	%	Number	%
Bathing waters	2009	1204	894	74.3	1131	93.9	68	5.6	0	0.0

Note: Bathing waters which were insufficiently sampled according to the New Bathing Water Directive were not included in this table. Therefore the sum of the different categories is not equal to the total number of bathing waters. Bathing waters which were compliant with the guide values were also compliant with the mandatory value for *Escherichia coli.*

4. Development of bathing water quality

Coastal bathing waters

In Denmark, 94.5% of the coastal bathing waters met the mandatory water quality in 2009. This is a decrease of 1.9% compared to the previous year. 74.3% of the bathing waters met the more stringent guide values, which is a decrease of 5.5%. The number of non-compliant bathing waters with the mandatory value for *Escherichia coli* increased from 41 (3.6%) to 55 (5.1%). No coastal bathing water had to be closed during the season, the same as in 2008.

From 1991 Denmark, as most of the Members States at that time, had to take measures to improve the overall water quality. These measures resulted in the improving water quality as can be seen in the increasing compliance results from 1992 onwards. Since then, we see a fairly stable overall bathing water quality with a dip in 2009 for the guide water quality (below 75%). Closed coastal bathing waters were reported from 1991 to 2007. The number of closed bathing waters decreased from 29 (2.4%) to six (0.5%) in that period and reached zero in 2008 and 2009.

Freshwater bathing waters

88.9% of the freshwater bathing waters met the mandatory water quality in 2009. This is a decrease of 5.9% compared to the previous year. The rate of compliance with the guide values was 73.5%, which is a similar decrease of 6.5%. The number of non-compliant bathing waters with the mandatory value for *Escherichia coli* increased from three (2.6%) to 13 bathing waters (11.1%). No freshwater bathing water had to be closed during the season, the same as in 2008.

Overall there was no major change in the situation for the freshwater bathing water quality in Denmark lately. As for the coastal bathing waters, measures were taken to improve inland water quality of rivers and lakes from 1991 onward. We see an overall increase in the water quality, but it took Denmark till the 2002 bathing season to reach a constant level of non compliant freshwater bathing waters below 2%. The mandatory water quality was met in more than 90% of the bathing waters since 1998 and since 2002 in over 96% of the bathing waters. In 2008 and 2009, the percentage of bathing waters that met the mandatory value, however, decreased below 96% and the percentage of non compliant bathing waters increased above 2%. Since 2000, the number of bathing waters compliant with the more stringent guide values is fluctuating between 80% in 2008 and 90.2% in 2006, except for 2009 (73.5%). Since 1994, two bathing waters were closed during the season (1.7-1.8%), except for the 1999, 2008 and 2009 season.

5. General information as provided by the Danish authorities

The bathing water season in Denmark runs from 1 June to 1 September. Sampling generally starts one month before the start of the bathing season. Samplings for the evaluation of the bathing water are taken at places that are normally used for bathing, including areas, which are reserved specifically for bathing in accordance with regional and local planning. Moreover, samples must to the extent required be taken to demarcate known pollution sources, e.g. harbours, sewage discharges and mouth of rivers.

During the inspection the parameters coloration, mineral oils, surface-active substances and phenols have been checked. The analytical methods used to assess the compliance with the Directive are based on membrane filtration and are the EN/ISO methods (9301-1 and 7899-2).

De-listing of bathing waters

A total of 65 bathing waters (64 coastal and one freshwater) were de-listed in 2009 bathing season. The main reason for de-listing is change to monitoring site for 50 bathing sites. For 29 bathing sites the reasons for the change are reported:

- sewer discharge (12);
- WWTP discharge and from farms without sewer (Knudshoved Fyr, Giber Å 50 N, Giber Å 50 S, Kettrup Bjerge);
- discharge from area with seweraged farms, salt meow (Skæring Strand (Strandtoften), Giber Å M., Ajstrup Strand);
- sewer discharge from water purifying plant (Kløverhage N, Stavreshoved S, Stavreshoved N);
- household sewer discharge and from farms without sewer (Varbjerg str,50mNØ, Varbjerg str,100mSV);
- situated on both sides of a marine sewer, regional plan prohibit bathing (Reden, Aulby Mølleå 125m Ø);
- bathing not recommended because of stream mouth nearby (Gjøl v. Isbakkevej);
- situated within 150 m from a stream where bathing is forbidden (Gjøl Havn s.v. for mole);
- the area is not designated for bathing according to regional plan (Korshavn O Sejlklubs bro SV).

Other bathing sites were de-listed due to the following reasons:

- not used by bathers (Drejet, Gerå Strand, Nord for Aså Havn, Slette Å 100 m øst, Slette Å 100 m vest);
- a monitoring site - within 150 m from a stream where bathing is forbidden (Vrå, Borgnæs, Vitsø N, Vitsø S);
- the site is not used as bathing site (Ballen ud for havledning, Bjælkerenden v. udløb, Nordby ud for havledning);
- the camping site is closed and the site is no longer used for bathing (Slette Å udløb, Kolby Kås ud for havledning);
- the site is seldom used (and only by few), hard to access, soft ground (Risemark).

Bans

In Denmark bathing is prohibited when pollution cannot be reduced to a level which is acceptable from the point of view of public health. Furthermore is the bathing water deemed not to be acceptable from the point of view of public health if the water does not comply with the microbiological parameters in three successive bathing seasons. This means that bathing is prohibited unless the pollution can be eliminated before the next bathing season starts.

Waste water treatment

In 1987 the Danish Parliament agreed on an Action plan for the aquatic environment. For wastewater treatment plans, tertiary treatment was demanded for all plants bigger than 5 000 person equivalents (PE). The extension of the treatment plans to tertiary treatment was finalized in 1995. Today all treatment plants above 5 000 PE have tertiary treatment and the discharge from these plants has no impact on the bathing water quality. Industrial discharges are mainly connected to the public tertiary wastewater treatment plants and only a minor number of industries have a direct discharge to the aquatic environment. The few direct discharges of treated industrial wastewater have no impact on the bathing water quality.

In 1997 a national plan for improvement of untreated discharge of waste water from scattered settlement was agreed. In 2004 it was estimated that 90 000 estates/household should have improved treatment. Of these around 15-20 000 have been improved. It is expected that 90 000 of the households in the countryside that are not connected to public wastewater treatment will have to improve the wastewater treatment facilities. This action plan will in the near future contribute to improvements of the general water quality in rivers, lake and coastal waters and thereby also contribute to improvements of the bathing water quality.

6. More information on bathing water quality in the European Union

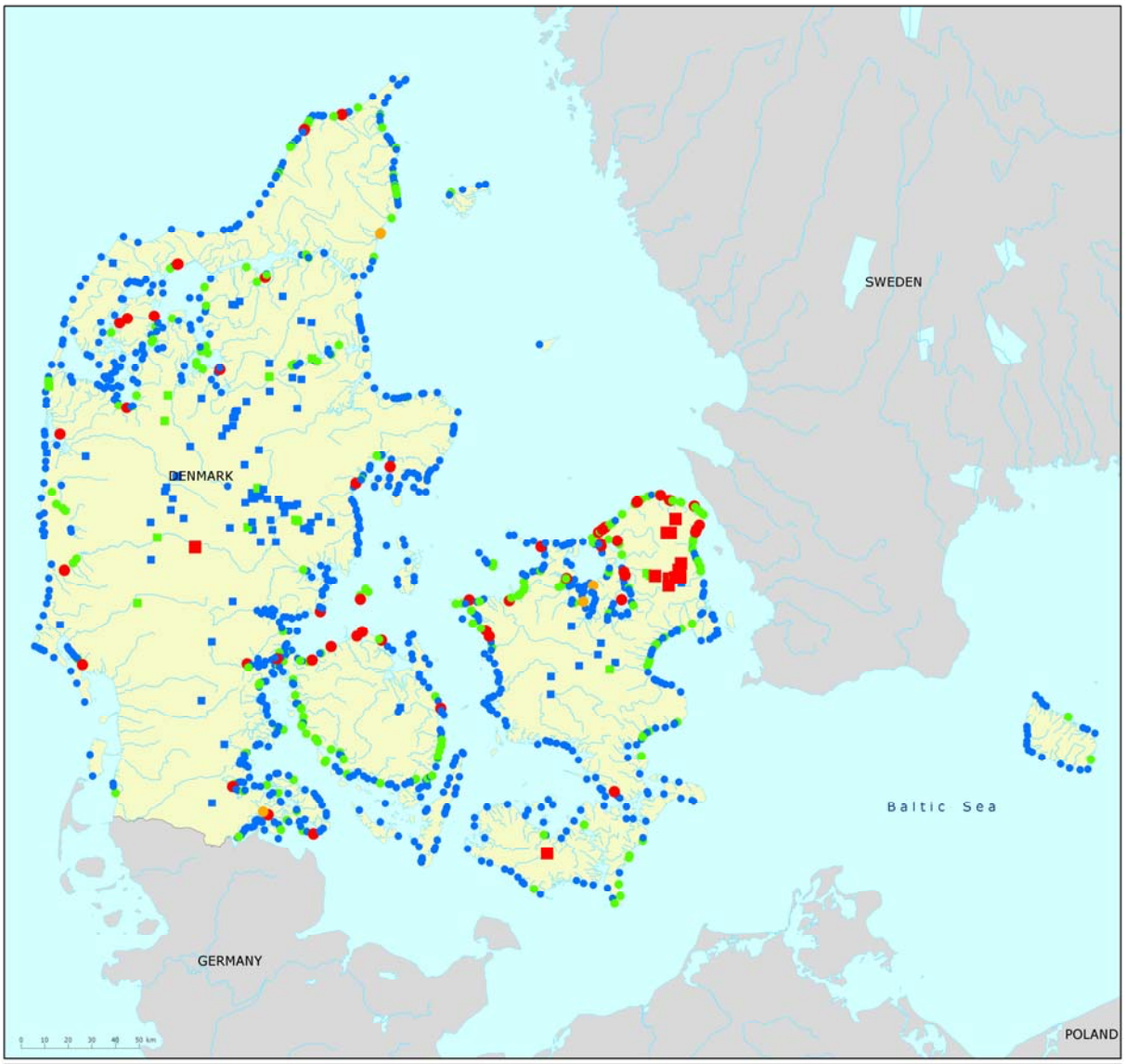
More information on bathing water quality in the European Member States, including the EU summary report, the reports for 27 Member States, Croatia and Switzerland, can be found on the European Commission's bathing water quality website (http://ec.europa.eu/environment/water/water-bathing/index_en.html) and the European Environment Agency's bathing water website (http://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water). The reports for the bathing seasons of 2008 and 2009 have been produced by the Institute for Water of the Republic of Slovenia (IWRS), a partner in the EEA European Topic Centre on Water (ETC/W). Countries have collaborated in the assessment of bathing water quality and supplied additional information when needed.

By 2015, Member States will have to comply with the stricter and more ambitious requirements laid out in the New Bathing Water Directive (Directive 2006/7/EC). This Directive requires more effective monitoring and management of bathing waters, greater public participation and improved information. More information on the new Directive can be found on the bathing water quality website and on http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:064:0037:0051:EN:PDF.

Cyprus, Denmark, Estonia, Finland, Germany, Hungary, Latvia, Lithuania, Slovakia, Spain and Sweden started to report according to more stringent new requirements in 2008 bathing season. Malta and the Netherlands started to report in 2009 bathing season under the new requirements. Sweden and Malta also sent data for three previous bathing seasons under the new requirements. Luxembourg started to monitor under the new requirements in 2006 bathing season, while reported for the first time in 2007 bathing season.

WISE - Water Information System for Europe (www.water.europa.eu) is a gateway to all water related information. Among other water related data, information on individual bathing water quality can be found in the WISE map viewer and WISE Bathing Water Quality data viewer through interactive maps and graphs (http://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water).

Map 1: Bathing waters reported during the 2009 bathing season in Denmark



Bathing water quality

Bathing waters on rivers	Bathing waters on lakes	Coastal/transitional bathing waters	
Compliant with guide values	Compliant with guide values	Compliant with guide values	No data
Compliant with mandatory values	Compliant with mandatory values	Compliant with mandatory values	Outside data coverage (data available, not presented on the map)
Closed*	Closed*	Closed*	
Insufficiently sampled or not sampled	Insufficiently sampled or not sampled	Insufficiently sampled or not sampled	
Not compliant with mandatory values	Not compliant with mandatory values	Not compliant with mandatory values	

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

Source: National boundaries: GISCO; Large rivers and lakes: EEA, WFD Article 3; Bathing waters data and coordinates: Danish authorities