European Topic Centre
Inland, coastal, marine waters

Guidelines on assessment under the New Bathing Water Directive and transition period – reporting for 2014 bathing season

28. October 2014

Prepared by / compiled by: ETC ICM
Organisation: TC Vode

EEA Project manager: Peter Kristensen

Version History

Version	Date	Author	Status and description	Distribution
1.0	**28/10/2014**	Lidija Globevnik		**ETC/ICM Water**

Contents

1 Introduction

The aim of this document is to describe the methodology for assessment of bathing water quality according to the rules of the Directive 2006/7/EC and during the transition period. The methodology described is the basis for assessment procedures for the 2014 season.

2 Assessment under Directive 2006/7/EC

The parameters to be taken into account for assessment according to the assessment rules of the Directive 2006/7/EC are intestinal enterococci (ConcIE) and *Escherichia coli* (ConcEC).

When a set of samples of intestinal enterococci and *Escherichia coli* for a bathing water for three or four preceding bathing seasons is available, the assessment is done according to assessment rules of the Directive 2006/7/EC.

To do assessment under Directive 2006/7/EC, a set of bathing water data used to carry out bathing water quality assessments shall comprise at least 16 samples or 12 samples in the special circumstances. When a bathing season is shorter than 8 weeks, the set of bathing water data shall comprise at least 8 samples. For bathing season shorter than 8 weeks, 3 samples per season are needed. For bathing season longer than 8 weeks, 4 samples per season are needed. Therefore, samples for four seasons are needed for the assessment under Directive 2006/7/EC. Nevertheless, only three bathing seasons can be used for the assessment under Directive 2006/7/ EC under special circumstances (Article 4.3 and 4.4).

MS can report samples of *Escherichia coli* and intestinal enterococci for the previous seasons (*Monitoring results of bathing waters* table) and be assessed under the Directive 2006/7/EC.

2.1 Percentage evaluation

Status calculation is done based on percentile evaluation. Standards are separate for inland waters and for coastal and transitional waters.

Percentile evaluation of the $\log_{10}$ normal probability density function of microbiological data acquired from the particular bathing water, the percentile value is derived as follows:

- Take the $\log_{10}$ value of all bacterial enumerations in the data sequence to be evaluated. (If a zero value is obtained, take the $\log_{10}$ value of the minimum detection limit of the analytical method used instead.)
- Calculate the arithmetic mean of the $\log_{10}$ values (μ).
- Calculate the standard deviation of the $\log_{10}$ values (σ).

The upper 90-percentile point of the data probability density function is derived from the following equation:

upper 90-percentile = antilog (μ + 1,282 σ).

The upper 95-percentile point of the data probability density function is derived from the following equation:

upper 95-percentile = antilog (μ + 1,65 σ).

Table 1: Classification standards for inland waters

Parameter name	Excellent	Good	Sufficient	Poor
Intestinal entero-cocci (cfu/100ml)	200 (95-percentile evaluation)	400 (95-percentile evaluation)	330 (90-percentile evaluation)	The set of bathing water quality data for the last assessment period, the percentile values for microbiological enumerations are worse than the 'sufficient' values.
Escherichia coli (cfu/100ml)	500 (95-percentile evaluation)	1000 (95-percentile evaluation)	900 (90-percentile evaluation)	

Table 2: Classification standards for coastal and transitional waters

Parameter name	Excellent	Good	Sufficient	Poor
Intestinal entero-cocci (cfu/100ml)	100 (95-percentile evaluation)	200 (95-percentile evaluation)	185 (90-percentile evaluation)	The set of bathing water quality data for the last assessment period, the percentile values for microbiological enumerations are worse than the 'sufficient' values.
Escherichia coli (cfu/100ml)	250 (95-percentile evaluation)	500 (95-percentile evaluation)	500 (90-percentile evaluation)	

2.2 Sampling frequency

No fewer than 4 (or 3) samples are to be taken and analyzed per bathing season including a sample to be taken shortly before the start of each bathing season. In addition, sampling dates are to be distributed throughout the bathing season, with the interval between sampling dates never exceeding one month.

Samples taken during short-term pollution can be disregarded if they are replaced by an additional sample taken seven days after the end of the short-term pollution. One additional sample shall also be taken to confirm that the incident has ended. This sample will not be part of the set of bathing water quality data.

If monitoring during abnormal situations is suspended, new samples shall be taken as soon as possible after the end of the abnormal situation to replace missing samples (Article 3.7).

If, for any reason, it is not possible to take the sample at the scheduled date, there is an acceptable delay of four more days (Article 3.4). MS are advised to report monitoring calendar to allow checking of sampling dates and delays. The following rule will be used: the interval between two samples in year 2014 should not exceed 31+4 days and interval between three samples should not exceed 66 days (2*31 + 4 days). All bathing waters will be also checked for a pre-season sample in 2014 season. If these rules are satisfied, the monitoring is considered as adequate. To be compliant, both requirements need to be satisfied. When these requirements are met, the bathing water is categorised as 'frequency of sampling satisfied'. If these criteria are not met, the bathing water is categorised as 'frequency of sampling not satisfied'.

Bathing waters are then classified according to their quality. They can be classified as 'excellent', 'good', 'sufficient' or 'poor' if they have at least 4 (if the bathing season is less than 8 weeks long, then 3) samples distributed throughout the 2014 season, and 16 (if the bathing season is less than 8 weeks long, then 12) samples are available for the assessment period. The samples should be distributed throughout bathing seasons. Technically this means the interval between samples not exceeding 40+4 days is still acceptable for this purpose.

Some bathing waters will most probably not be classified according to their quality, but classified as 'closed' (temporarily or throughout the bathing season), 'new' (classification not yet possible), 'changes' (classification not yet possible after changes that affect or could have affected bathing water quality). If the required amount of samples will not be provided a bathing water will be classified as “not enough samples” for classification.

2.3 Assessment with BW groups

By the Directive 2006/7/EC, bathing waters can be grouped if they have similar physical, hydrological and geographical characteristics and same risk of pollution and bathers exposure to health damage. For that purpose BW profiles should be established.

When a bathing water is a member of a group and not monitored, it can get the quality classification from a representative bathing water. In the assessment, the samples obtained during the season from any of bathing waters in the group will be treated as one set of samples for the group. The classifications is done on the basis of this sample set. Each bathing water in a group gets this classification. The statistics and visualisation in WISE (map and data viewer) is done with all bathing waters in the group.

2.4 Status definition

"New" bathing water is a bathing water with note yet complied necessary data set. A bathing water gets category "changes" if necessary data set is not available yet since the occurrence of changes that affects bathing water quality. Bathing waters that are reported as "closed" will be further analysed according to reasons for closing. If a bathing water is closed due to poor quality, it needs to be sampled (monitored) and samples reported.

Bathing water may not operate due to renovation, bathing facilities constructions or cannot be accessible due other obstacles nearby. If such a water is not under prohibition or advice against bathing to prevent bathers' exposure to pollution (part of season or whole season) and cannot be sampled, the monitoring can be suspended. These works should be reported to EC in advance, so that a bathing sites can be compliant to BWD provisions. When constructions last for a whole expected bathing season, such a season is not part of a four-year bathing seasons needed for the assessment. Bathing season for such a site can also be shorten for a construction period. Monitoring calendar should be adopted accordingly. Such a bathing water will be either classified according to its quality or classified either as "closed" or "not enough samples for classification". It may also be excluded from a list of identified bathing waters in 2014 season, if these works have been be reported in advance.

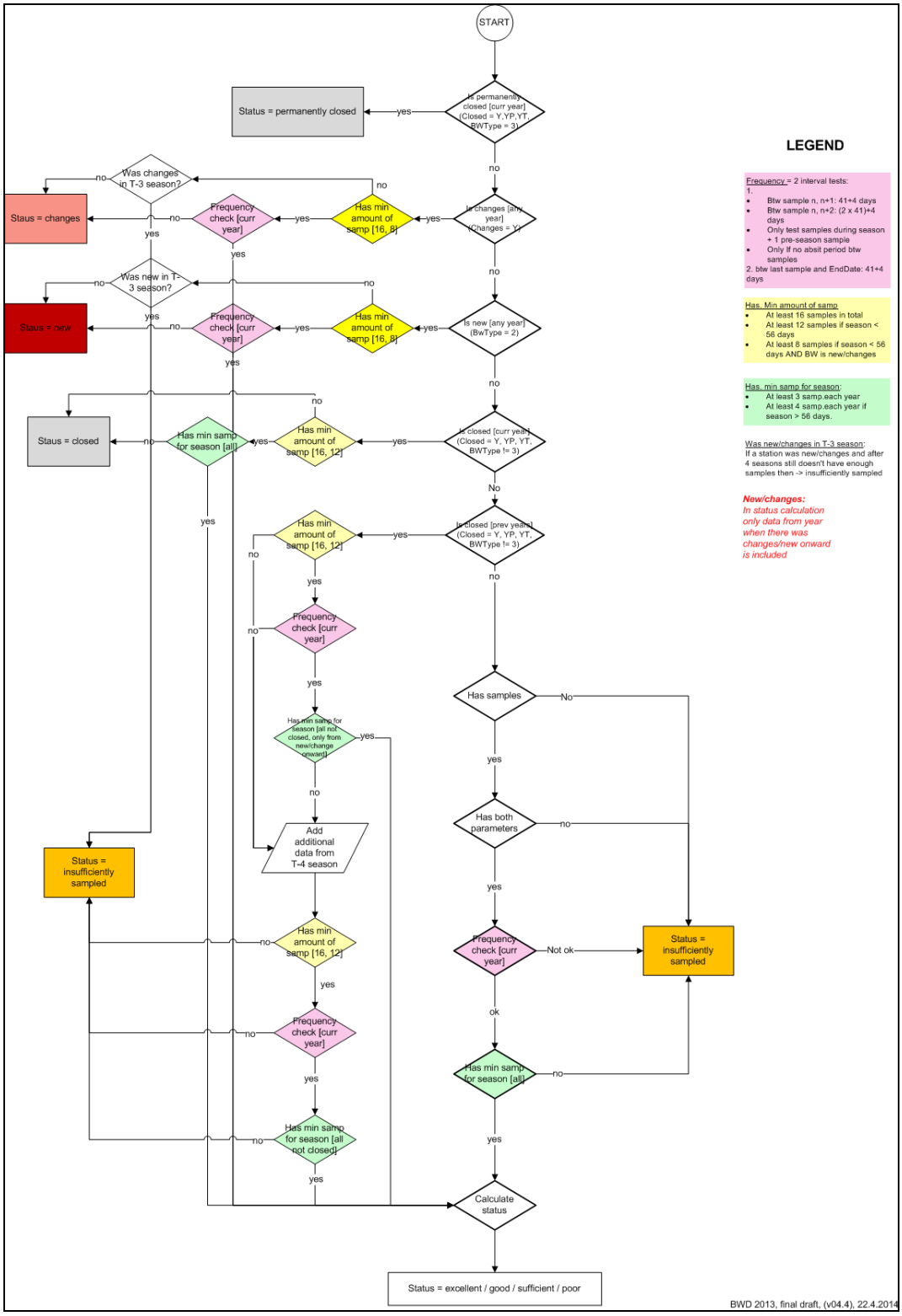
Table 3: Status definition of bathing waters

Par. No. (2006/7/EC)	**parameter status**						
IE	excellent	excellent	excellent	excellent	good	good	good
EC	excellent	good	sufficient	poor	good	sufficient	poor
status	excellent quality	good quality	sufficient quality	poor quality	good quality	sufficient quality	poor quality

Par. No. (2006/7/EC)	**parameter status**		
IE	sufficient	sufficient	poor
EC	sufficient	poor	poor
status	sufficient quality	poor quality	poor quality

Par. No. (2006/7/EC)	**parameter status**					
IE	good	sufficient	poor	sufficient	poor	poor
EC	excellent	excellent	excellent	good	good	sufficient
status	good quality	sufficient quality	poor quality	sufficient quality	poor quality	poor quality

2.5 Algorithm for assessment of bathing water quality under the Directive 2006/7/EC



3 Transition period: reporting under Directive 2006/7/EC, assessment according to limit values of Directive 76/160/EEC

The parameters to be taken into account for assessment are Intestinal enterococci (ConcIE) and *Escherichia coli* (ConcEC).

3.1 Parameter conversion and percentage evaluation

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.

Intestinal enterococci (equal to faecal streptococci) has no mandatory value according to the Directive 76/160/EEC.

Table 4: Parameter conversion for assessment of bathing water quality during the transition period and corresponding classification standards under Directive 76/160/EEC

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

Table 5: Classification standards for parameters 2 and 3 under Directive 76/160/EEC

Parameter	**Mandatory values**	**Guide values**
2 - Faecal coliforms (cfu/100ml)	2000 (95% of samples)	100 (80% of samples)
3 - Faecal streptococci (cfu/100ml)	/*	100 (90% of samples)

*Directive 76/160/EEC does not set limit mandatory value, therefore all bathing waters get »compliant with mandatory values« automatically.

3.2 Sampling frequency

According to Annex IV of the Directive 2006/7/EC, no fewer than four (or three) samples are to be taken and analyzed per bathing season including a sample to be taken shortly before the start of each bathing season. In addition, sampling dates are to be distributed throughout the bathing season, with the interval between sampling dates never exceeding one month.

Samples taken during short term pollution and abnormal situations are not be taken into account if replaced samples are reported. In such a case the replaced samples is included into the assessment.

3.3 Assessment with BW groups

By the Directive 2006/7/EC, bathing waters can be grouped if they have similar physical, hydrological and geographical characteristics and same risk of pollution and bathers exposure to health damage. For that purpose BW profiles should be established.

When a bathing water is a member of a group and not monitored, it can get the quality classification from a representative bathing water. In the assessment, the samples obtained during the season from any of bathing waters in the group will be treated as one set of samples for the group. The classifications is done on the basis of this sample set. Each bathing water in a group gets this classification. The statistics and visualisation in WISE (map and data viewer) is done with all bathing waters in the group.

3.4 Status definition and codes

The bathing waters are classified in the following categories:
0 – status can not be computed (no data available) (NS)
5 – insufficiently sampled (NF)
8 – 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)
9 – 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 (CI)
10 – not compliant with the mandatory value of the Directive 76/160/EEC for *Escherichia coli* (NC)
11 – banned or closed (temporarily or throughout the season) (B)

The bathing water is CG and CI, respectively if the following rules are applied:

- rule no.1: bathing water is CG if: EC is CG and IE is CG
- rule no.2: bathing water is CI if: EC is CG and IE is not CG
- rule no.3: bathing water is CI if: EC is CI and IE is CG
- rule no.4: bathing water is CI if: EC is CI and IE is not CG

The mandatory value for parameter EC have to be considered in the class CG because for the guide value for EC there is the 80 % of samples rule and for the mandatory value there is the 95 % of samples rule which is in this respect stricter. This means that a bathing water can fail because of one single high value above the mandatory value, although it complies with the rules for the guide values depending on the number of samples.

Bathing waters that are reported as “closed” will be further analysed according to reasons for closing. If a bathing water is closed due to bad quality, it needs to be sampled (monitored) and samples reported. If a bathing water is closed due to other reasons (e.g. renovation, not accessible due to construction activities nearby and can not be sampled), the monitoring is not needed.

4 References

Assessment of bathing water quality under new BWD 2006/7/EC – Draft, 04.09.08
Url: http://eea.eionet.europa.eu/Public/irc/eionet-circle/wwdr/library?l=/bathing_directive/reporting_bathing_2008/reporting_20067ec/assessment_040908pdf/_EN_1.0_&a=i

European bathing water quality in 2013.
Url: http://www.eea.europa.eu/publications/european-bathing-water-quality-in-2013/

Methodology for bathing water quality transitional assessment_Final draft_22Dec08
Url: http://eea.eionet.europa.eu/Public/irc/eionet-circle/wwdr/library?l=/bathing_directive/reporting_bathing_2008/reporting_20067ec/methodology_assessmentpd/_EN_1.0_&a=i

Guidelines on assessment under the New Bathing Water Directive and transition period. 5. November 2010.
http://forum.eionet.europa.eu/x_wise-reporting/library/bathing_directive/reporting_bathing_2010/data_dictionaries/assessment_season2010_1

BWD_Assessment_Issues_2012season, 19.September 2013.
Url: http://forum.eionet.europa.eu/x_wise-reporting/library/bathing_directive/reporting-bathing-season-2012/bwd_assessment_issues_2012season

Guidelines on assessment under the New Bathing Water Directive and transition period – reporting for 2013 bathing season. 23.october 2013. Url: http://forum.eionet.europa.eu/x_wise-reporting/library/bathing_directive/reporting-bathing-season-2013/bwd_guidance-assessment_season2013.