



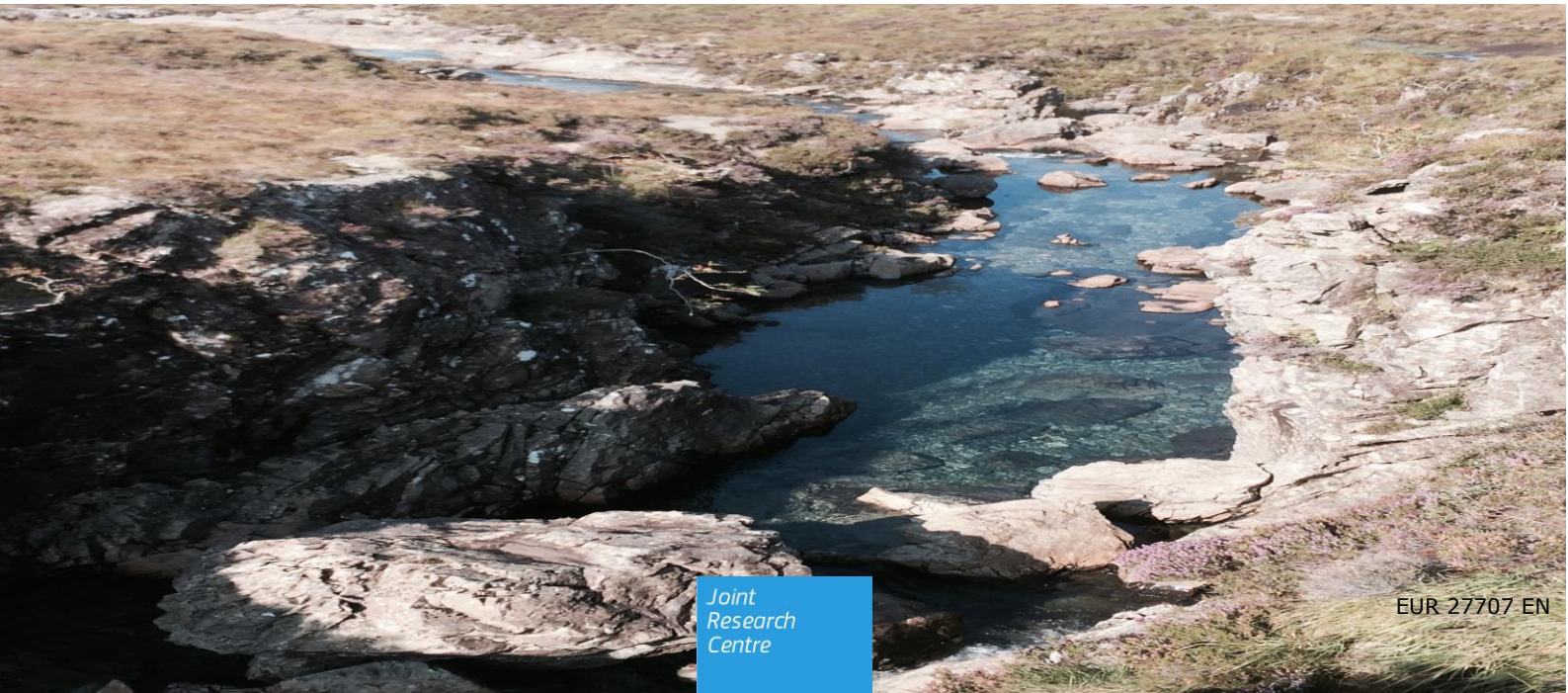
JRC TECHNICAL REPORTS

Water Framework Directive scientific and technical support related to ecological status

Summary report of JRC activities in 2015

Wouter van de Bund
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2015



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Abstract

This report summarises the scientific and technical contributions of DG JRC to the implementation of the Water Framework Directive (WFD) related to ecological status covering the year 2015. JRC is providing long-term support aimed at achieving a common understanding of good status and potential, the principal environmental objectives of the WFD.

An important aspect of this work is the WFD intercalibration exercise as required in WFD Annex V 1.4.1, ensuring that classification methods are compliant with the Directive's requirement and give comparable result, thus establishing a level playing field for the measures that need to be taken by Member States to achieve good status or potential.

JRC scientific and technical support is carried out in the framework of the WFD "common implementation strategy" (CIS) mandated by the EU Water Directors, where JRC is responsible for the working group on Ecological Status (ECOSTAT), working with experts from all Member States and key stakeholder organisations. Main issues covered in 2015 were intercalibration of good ecological status, intercalibration of good ecological potential, nutrient standards, typology, and hydromorphology.

A new CIS work programme has been agreed upon by the Water Directors in which the JRC will continue to play a key role in the ECOSTAT working group for the years 2016-2018.

1. Introduction

1.1. WFD CIS ECOSTAT: history and achievements so far

The agreement to start a Common Implementation Strategy (CIS) for the Water Framework Directive (WFD) in 2001 was seen as a milestone in working together towards successful implementation of the core water legislation at EU level.

The CIS work is carried out within the working groups. A working group on ecological status (WG ECOSTAT) was established in 2003 and remains one of the main WG of the whole CIS process, charged with tasks related to development and harmonisation of ecological assessment methods.

Since the beginning, JRC has taken a leading role in WG ECOSTAT. The main focus of this work has been the organisation and coordination pan-European Intercalibration exercise which has been recognised as one of the pillars of the WFD implementation. Ca. 240 methods have been intercalibrated so far, covering all water categories and ecoregions.

Over the years, JRC support to ECOSTAT has resulted in numerous outputs, including CIS Guidance documents, Commission Decisions on Intercalibration (EC, 2004, 2008, 2013, JRC Technical reports, and scientific papers.

1.2. CIS Work programme and ECOSTAT mandate 2013-2015

Throughout the WFD Common Implementation Strategy, all activities were mandated by 3-year work programmes agreed upon by the Water Directors of the Member States. The current Work programme 2013-2015 is based on the conclusions provided by the Water Blueprint (published by the Commission in November 2012) and the 3rd implementation report of the WFD. Key objectives of the 2013-2015 CIS work programme are:

- Improving the implementation of the WFD and coordination of other water-related directives and facilitating the implementation of the first cycle of the Floods Directive;
- Increasing the integration of water and other environmental and sectorial policy objectives, particular nature, agriculture, transport, energy, disaster and risk prevention, research and regional development;
- Filling in the few remaining gaps in the EU legislative an policy framework on water.

The Working Group on Ecological Status (Ecostat) has retained its key role in the CIS structure (Fig.1), and is co-lead by the JRC, UK and Germany. The tasks allocated to ECOSTAT were elaborated more in detail in ECOSTAT work plan 2013 – 2015:

- Intercalibration of good ecological status;
- Intercalibration of good ecological potential;
- Recommendations on standardisation of biological methods;
- Information exchange on the comparability of classification method, including nutrients;
- Improving assessment coherence.

CIS Organisation 2013-2015

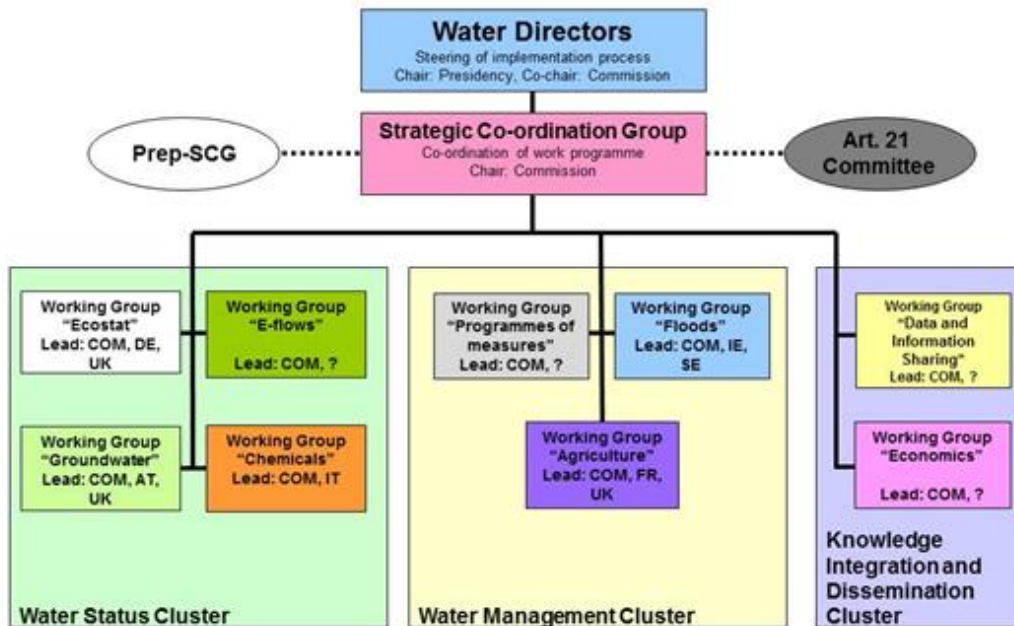


Figure 1. Organisational structure of WFD CIS 2013-2015.

1.3. Purpose of this report

The aim of this report aims is to summarise the contributions to WG ECOSTAT carried out under the JRC work programme 2015 within the project EURO-FRESHWATERS. The report is structured according to the tasks of the ECOSTAT work plan. Main issues covered in 2015 were intercalibration of good ecological status, intercalibration of good ecological potential, nutrient standards, typology, and hydromorphology.

2. ECOSTAT working group organisation and meetings

The JRC is acting as co-lead of the ECOSTAT working group, together with the United Kingdom and Germany, as mandated by the EU Water Directors carrying out the CIS work programme 2012-2015. The JRC has been responsible for the organisation of two plenary meetings of the ECOSTAT working group – including the practical organisation, the preparation of the agenda and meeting documents, preparation of the conclusions, chairing, and editing and finalising of the meeting minutes based on a first draft prepared by consultants for DG Environment.

The 29th ECOSTAT meeting took place 17-18 March in Brussels. The meeting was attended by ca. 70 participants from Member States and stakeholder organisations. Documents, Presentations, and meeting minutes are available on CIRCABC:

<https://circabc.europa.eu/w/browse/bb6565cb-d240-496f-bf33-b940d33374f9>

The 30th ECOSTAT meeting was held 14-15 October in Oslo, back-to-back with a workshop "Hydromorphology and WFD classification (see chapter 7). The meeting was

attended by ca. 70 participants from Member States and stakeholder organisations. Documents, presentations, and meeting minutes are available on CIRCABC:

<https://circabc.europa.eu/w/browse/7fa9be42-7766-480f-9ffa-ee14e67a4f03>

The WFD-CIS Strategic coordination group was informed about the main ECOSTAT activities, with two progress reports prepared by JRC in collaboration with DG Environment, in May and November. The progress reports are available on CIRCABC:

<https://circabc.europa.eu/w/browse/a41a81e6-321c-4ad0-9f81-c42659be68e9>

<https://circabc.europa.eu/w/browse/1e2f2c64-f6f3-4711-9af3-94a708bb362b>

The JRC has also participated in 2 “Prep-SCG meetings”, on behalf of all ECOSTAT co-leads. Purpose of these meetings is to discuss common issues with the other CIS working groups, and to provide input to the agenda and issues for discussion for the Strategic Coordination Group.

3. Intercalibration of good ecological status

3.1. Background

3.1.1. Ecological status and Intercalibration in WFD

The Water Framework Directive (WFD) (EC, 2000) requires all rivers, lakes, transitional and coastal waters of the European Union to be in good ecological status in the near future.

The WFD is based on the following main principles:

Biological assessment uses numerical measurements of communities of plants and animals - phytoplankton, aquatic flora, benthic invertebrates and fish fauna, called Biological Quality Elements (BQEs) as stipulated in the Directive (e.g., biomass, taxonomic composition, diversity, etc.).

In biological assessment, the observed condition is compared with the reference status with the result given in five classes: 'high' status (no differences to reference conditions), 'good' status (slight differences), 'moderate' status (moderate differences), 'poor' and 'bad' statuses (major differences).

'Good' ecological status represents the target value that all surface water bodies must achieve in the near future. These values (expressed as 'good' status class boundaries) are compared and harmonised through the Intercalibration exercise, ensuring consistent management objectives across Europe.

3.1.2. Organization of the WFD Intercalibration

Intercalibration is performed separately for rivers, lakes, coastal and transitional waters, and the exercise is further stratified by different anthropogenic pressures, and by BQEs. Intercalibration exercises are carried out within larger geographical units termed Geographical Intercalibration Groups (GIGs, Table 1) consisting of Member States having waters of similar bio-geophysical types (termed 'common intercalibration types').

Intercalibration provides a mechanism to reconcile apparent differences in the good status boundaries of some Member States when they differ significantly from the classification boundaries of most other Member States within the same GIG. Through this process the divergent good status boundaries of some national assessment methods can be harmonized and, if necessary, adjusted upward or downward (EC 2011; Birk et al., 2013).

Table 1. Geographical Intercalibration Groups (GIGs) and participating countries. Note that some exercises (e.g. intercalibration of very large rivers or lake phytobenthos) were carried out across GIGs.

GIG	Water category	Member States included
Alpine	Rivers/ Lakes	Austria, France, Germany, Italy, Slovenia
Eastern Continental	Rivers	Austria, Bulgaria, Croatia, Czech Republic, Greece, Hungary, Romania, Slovakia, Slovenia
	Lakes	Bulgaria, Hungary, Romania
Central-Baltic	Rivers	Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Ireland, Italy, Latvia, Lithuania, Luxemburg, Netherlands, Poland, Slovakia, Slovenia, Spain, Sweden, United Kingdom
	Lakes	Belgium, Denmark, Estonia, France, Germany, Ireland, Latvia, Lithuania, Netherlands, Poland, United Kingdom
Mediterranean	Rivers	Croatia, Cyprus, France, Greece, Italy, Malta, Slovenia, Spain
	Lakes	Cyprus, France, Greece, Italy, Malta, Romania, Spain
Northern Baltic	Rivers/ Lakes	Finland, Ireland, Norway, Sweden, United Kingdom
	Coastal and transitional waters	Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Sweden
Black Sea	Coastal waters	Bulgaria, Romania
Mediterranean	Coastal and transitional waters	Croatia, Cyprus, France, Greece, Italy, Malta, Slovenia, Spain
North-East Atlantic	Coastal and transitional waters	Belgium, Denmark, France, Germany, Ireland, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom

3.1.3. Intercalibration Guidance documents

Inevitably, the Intercalibration is a highly complex procedure due to high biogeographical and methodological variability, different approaches taken by Member states, lack of reference sites and other factors (e.g., insufficient amount of data or delays of development of assessment methods).

Several generations of IC Guidance documents reflect this complexity:

- 1) Guidance document N6 "Towards a guidance on establishment of the intercalibration network and the process on the intercalibration exercise" (2003) provided basic understanding of the IC process;
- 2) Guidance document N14 "Guidance on the intercalibration process 2004 – 2006" provided description of the whole Intercalibration procedure and different options;
- 3) Guidance document N14 "Guidance on the intercalibration process 2008 – 2012" (2011) provided harmonised comparability criteria and several improvements;
- 4) Guidance document N30 "Procedure to fit new or updated classification methods to the results of a completed intercalibration exercise" (2015) provided guidance how to intercalibrate new or revised classification methods according to the finalised intercalibration results.

3.1.4. Intercalibration Decisions

So far, the results of the WFD intercalibration exercise have been formalised in two Commission Decisions on Intercalibration.

1) The first intercalibration phase was completed with the publication of a Commission Decision in 2008, although limited results were reached (e.g., only chlorophyll-a values intercalibrated for lakes). Moreover, comparability was not considered well-demonstrated and adequate in all cases. Nevertheless, publication of this Decision was an important milestone: *2008/915/EC Commission Decision of 30 October 2008 establishing, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, the values of the Member State monitoring system classifications as a result of the intercalibration exercise;*

2) In 2013, the second Decision was published: *2013/480/EU: Commission Decision of 20 September 2013 establishing, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, the values of the Member State monitoring system classifications as a result of the intercalibration exercise and repealing Decision 2008/915/EC (notified under document C (2013) 5915) T);*

<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013D0480>

3.2. Gaps remaining and way forward

The intercalibration is a scientific exercise that involved hundreds of scientists from 28 countries over the past eight years, trying to ensure comparability between assessment methods. Now, most of the ecological assessment methods have been intercalibrated and included in the Intercalibration Decision (EC, 2013), especially for lakes and rivers. Still, there is a considerable number of methods which are not intercalibrated.

JRC has identified different types of gaps and the way forward (agreed at ECOSTAT). Ongoing work is aimed at filling the remaining gaps by the end of 2016.

In short, **four types of open issues can be discerned** (Figure 2):

Gap 1. Method included in the current GIG work, results expected by 2016

There are some GIGs where results have not been finalised by 2012 or where results have to be improved (Annex 2). These GIG are actively working to finalise the results by 2016, led by JRC.

Gap 2. MS has new/updated method, GIG work has been finalised; it is possible to IC the method according to the final IC results.

There are many cases when the relevant GIG has finalized results but MS has not intercalibrated the method due to some reason, e.g., France in the Alpine Lake Phytoplankton GIG.

It has been agreed that in this case Member States have to show that (1) their methods are compliant with the WFD normative definitions and (2) that their class boundaries are in line with the results of the intercalibration exercise. To achieve this, a workflow has been established for Member States to follow, taking into account the different intercalibration options and procedures followed in different GIGs (see Guidance document No. 30). Member state has to submit finalised Intercalibration report, following procedure described in the IC Guidance. The reports have to be submitted to JRC, latest by 1st July 2016.

Gap 3. GIG work has been finalised, it is not possible to IC the method according to the final results.

Still, there are some method **not** possible to intercalibrate according to the finalised GIG results, e.g.:

- Methods address different pressure (e.g. Swedish lake fish method);
- Methods following a different assessment concept (French lake fish method);

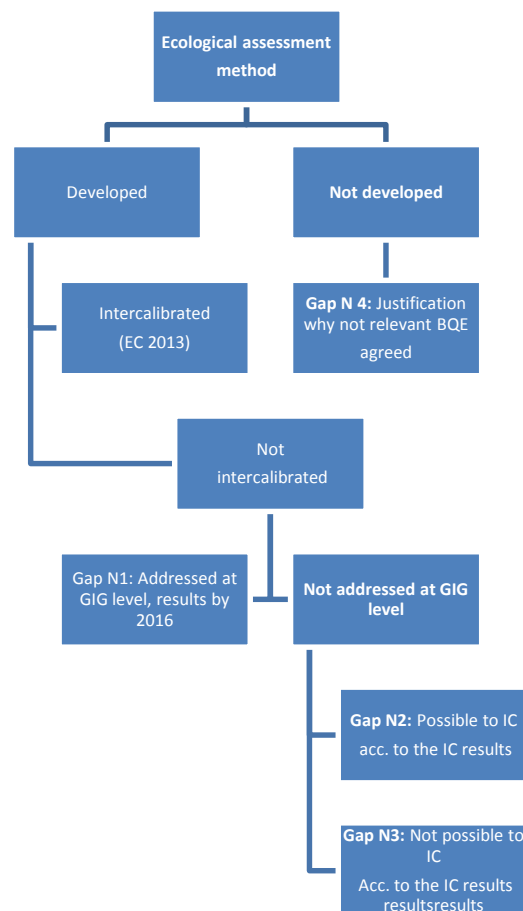
The way forward has been established: Member States have to show that their methods are compliant with the WFD normative definitions, and why the Intercalibration is not attainable.

The reports have to be submitted to JRC, latest by 1st July 2016.

Gap 4. MS has not developed method as BQE is considered not relevant for the given water body type.

There are some cases when method has not been developed as the given BQE has been considered. In this case the Member state has to provide a detailed justification explaining why the development of the WFD compliant method was not feasible (e.g., high variability, no response to anthropogenic pressures). These justifications have to be discussed and agreed by the GIG.

Figure 2. Scheme of the gaps of the method development and intercalibration



3.3. Intercalibration work in the geographical intercalibration groups (gap 1)

3.3.1. Overview and Intercalibration work program

The intercalibration work is organized in the geographical intercalibration groups (GIGs). Most of these groups (especially for rivers and lakes) have finalised the intercalibration work. Still, many of groups are still working to produce results by 2016. This work is coordinated by JRC.

Tables 2-4 below list **the active Intercalibration groups** and the coordinating Member states.

Detailed work programmes for the ongoing work and progress reports can be found on CIRCABC:

<https://circabc.europa.eu/w/browse/a4c946c8-4c34-4ab0-ae76-8e0f274e7da9>

Table 2. List of the active River Intercalibration groups and coordinating Member states (general coordination: Wouter van de Bund, EC-JRC)

Name of the group	Coordinating MS
Large Rivers (general coordination)	Germany
Large Rivers - Benthic Invertebrates	Germany
Large Rivers Phytoplankton	Germany
Large Rivers Macrophytes	-
Large Rivers Fish	Germany
Northern Macrophytes	Finland

Table 3. List of the active Lake Intercalibration groups and coordinating Member states (general coordination: Sandra Poikane, EC-JRC)

Name of the group	Coordinating MS
Central/Baltic Fish GIG	Germany
Eastern Continental Phytoplankton GIG	Hungary
Eastern Continental Macrophytes GIG	Hungary
Eastern Continental Benthic invertebrate GIG	Romania
Mediterranean Fish GIG	Italy, France

Table 4. List of the active transitional and coastal Intercalibration groups and coordinating Member states (general coordination: Fuensanta Salas Herrero, EC-JRC)

Name of the group	Coordinating MS
Baltic all BQEs GIG	There are no BQE leads. MS of the same type share the lead tasks. The GIG coordinated by Germany
North-East Atlantic CW-TW phytoplankton GIG	For the types NEA 1/26a, NEA 1/26b, NEA 3/4, NEA 11: experts leads have been contracted by joint funding. For the types NEA 1/26e, NEA 7, Nea8a,9,10 and NEA 8b: the MS share the lead tasks
North-East Atlantic CW-TW benthic invertebrates GIG	For the types NEA 1/26, NEA 3/4, NEA 11: experts leads have been contracted by joint funding. For the type NEA 7: the MS will share the lead tasks
North-East Atlantic CW-TW opportunistic macroalgae GIG	Ireland
North-East Atlantic CW-TW seagrasses GIG	Portugal
North-East Atlantic CW-TW saltmarshes GIG	Portugal
Mediterranean CW phytoplankton GIG	Croatia
Mediterranean TW phytoplankton GIG	MS of the same type share the lead tasks.
Mediterranean TW benthic invertebrates GIG	MS of the same type share the lead tasks.
Mediterranean TW fish GIG	MS of the same type share the lead tasks.
Black Sea Benthic invertebrates GIG	Bulgaria, Romania
Black Sea Macroalgae GIG	Bulgaria

JRC has a central role in the process of the intercalibration of ecological assessment work. The following tasks were carried out by the JRC team:

- Coordination of the Geographical Intercalibration Groups;
- Organization of the Intercalibration review;
- Presentation and agreement at ECOSTAT;
- Drafting Intercalibration Technical reports;
- Preparation of the results for inclusion in the EC Decision on Intercalibration.

3.3.2. Intercalibration work finalised in 2015

Thirteen Intercalibration groups have **finalised the Intercalibration work** in close collaboration with JRC. This is a major achievement that will lead to the European Commission Decision of Intercalibration results (planned in 2017). The groups which have finalised the IC work in 2015 are as follows:

1. Lakes Central-Baltic Fish;
2. Coastal waters Black Sea GIG Benthic invertebrates;
3. Coastal waters Black Sea GIG Macroalgae and Angiosperms;
4. Coastal and Transitional waters NEA GIG Opportunistic macroalgae;
5. Coastal waters NEA (7) benthic invertebrates;
6. Coastal waters NEA (1/26) benthic invertebrates;
7. Coastal waters Baltic macroalgae and angiosperms (type BC5);
8. Coastal waters Baltic Phytoplankton report (type BC5);
9. Coastal waters Baltic macroalgae and angiosperms report (type BC4);
10. Coastal waters MED GIG phytoplankton (types shared by ES, FR, IT, HR and SI)
11. Transitional waters MED GIG phytoplankton;
12. Transitional waters MED GIG benthic invertebrates;
13. Transitional water Fish (new method developed by UK-IE).

JRC carried out checking and reviewing of the final results (in collaboration with the IC review panel). JRC presented the final results at ECOSTAT and organized discussions and approval of the final results.

The final reports and reviews are available at CIRCABC:

<https://circabc.europa.eu/w/browse/a4c946c8-4c34-4ab0-ae76-8e0f274e7da9>

The final reports will be published by JRC next year, once the IC work will be finalised.

3.3.3. Ongoing intercalibration work to be finalised in 2016

JRC is responsible for coordination of several groups where the work is ongoing and the **IC results are expected in 2016:**

- Lakes Eastern Continental Phytoplankton, Macrophytes and Benthic fauna;
- Very large rivers Benthic fauna, Phytoplankton and Fish fauna;
- CW NEA Phytoplankton, Seagrasses and Saltmarshes;
- CW NEA Benthic invertebrates (type NEA 3/4);
- CW MED GIG phytoplankton (type III-E);
- TRW NEA Phytoplankton, Benthic fauna, Seagrasses and Saltmarshes;
- TRW MED Fish fauna.

JRC has been involved in solving technical problems and steering the work, ensuring communication between these groups and ECOSTAT, as well as reporting the progress to SCG and Water Directors.

3.4. Intercalibration of individual methods (gap 2)

There are many cases when GIG has finalized results but MS has not intercalibrated the method due to some reason (e.g., method was not developed in time). Now these methods can be intercalibrated according to the guidance No 14 which was developed by JRC (in collaboration with MS experts).

JRC has established the process of the intercalibration of these methods, comprising the publication of detailed guidance document, reporting of the methods, organizing of the review of the results, and acceptance of these results by ECOSTAT.

Several methods have been intercalibrated already following this procedure:

- Italian phytobenthos lake method;
- German river macrophyte method;
- Lithuanian river benthic invertebrate and lake phytoplankton method;
- Latvian phytoplankton method.

Reports on Intercalibration of these methods and the relevant reviews available here:

<https://circabc.europa.eu/w/browse/2b8dccb2-8b81-4156-a149-7d293db58f71>

3.5. Remaining issues – methods not intercalibrated (gap 3 and 4)

Most of the ecological assessment methods have been / will be intercalibrated and included in the Intercalibration Decision. Still, there is a considerable number of methods not intercalibrated:

One category includes methods not possible to intercalibrate due to different reasons; still not developed).

In several cases MS have opted exclude specific BQE from the ecological assessment.

JRC has collected information and provided (1) an overview of the remaining open issues and (2) the way forward for filling these gaps.

Detailed information regarding all water categories, MS and BQEs is available on CIRCABC:

<https://circabc.europa.eu/w/browse/fa9dd70e-da9d-42a8-8610-7d9df303eafc>

The following issues were addressed:

- Fish fauna in the Mediterranean GIG (Spain, Portugal): Spain and Portugal have submitted justifications for not using fish BQE in lakes and reservoirs. JRC has organized GIG discussion on this topic, has organized review of these opinions, have presented these issues at ECOSTAT meetings.
- Phytobenthos in lakes: Many countries have submitted justifications for not using phytobenthos sub-BQE in lakes. JRC has organized review of these opinions (including large-scale data analysis of the phytobenthos and macrophyte data), have presented these issues at ECOSTAT meetings.
- Benthic invertebrates in lakes: Austria and Denmark have submitted justifications for not using benthic invertebrate BQE in lakes. JRC has organized review of these opinions. Now we need to discuss this issue at ECOSTAT and develop more detailed guidance: at which cases BQE can be excluded from ecological assessment?

3.6. Common understanding on the use of single parameters or metrics: use of chlorophyll-a in the classification of coastal and transitional waters

The WFD requirement for assessing ecological status of the phytoplankton quality element includes **taxonomic composition, abundance and biomass of phytoplankton as well as bloom frequency** to be taken into account for transitional and coastal water bodies. Still, most of the MS assessment systems include **only chl-a metrics**, omitting taxonomic composition and bloom metrics.

JRC has led discussion on this issue, organized the drafting of the cross-GIG joint position paper, organized review of this paper, and led the final discussions. Agreed cross-GIG joint review paper available at CIRCABC:

<https://circabc.europa.eu/w/browse/241fb6ac-aea0-40e3-9ef8-0531f834ca35>

Experts acknowledge that indicators of phytoplankton bloom frequency and community composition indices may potentially add more information to the phytoplankton quality element than Chl-a/biovolume alone, but so far proposed indicators of these sub-elements have only been suggested in some very small parts of the intercalibration area but their wider applicability have not been demonstrated across broader regions. For the overall WFD intercalibration and status assessment the inclusion of these sub-elements have never been successful despite large efforts in various research projects.

In the most intensively monitored regions in Europe where the phytoplankton data, have been thoroughly analysed to investigate the potentials of various indicators for phytoplankton blooms and community structure, experts have observed that the uncertainty associated with these indicators is disproportionately large relative to the responses of these indicators to pressures. Consequently, the use of these indicators to achieve a status classification with a reasonable precision would require unrealistic monitoring efforts, rendering these indicators non-operational as decision support for river-basin management plans.

This position paper presents scientific arguments for the use of the biomass parameter measured as chlorophyll a as the main operational phytoplankton indicator for the majority of the countries at present.

4. Intercalibration of good ecological potential

As one of the core activities for the CIS working group on Ecological Status (ECOSTAT) from 2013, a harmonized understanding of good ecological potential for heavily modified water bodies has been on the agenda. An ad-hoc group consisting of experts from Member States and JRC-IES has been working on harmonizing GEP related to the following main usages: water storage, floods and drainage, coastal and transitional water bodies, involving experts on ecological potential and hydromorphology from most Member States.

The aims have been to 1) exchange experience on good ecological potential (GEP) starting from the identification (hydromorphological alteration assessment, significance of hydromorphological alteration, etc.) and designation of HMWBs (economic considerations, e.g. significant impact on use) and 2) find suitable methods for assessing comparability (intercalibration) of the above mentioned stages, (identification of HMWB, designation of HMWB, selection of measures to define and reach GEP 3) learn from each other to ensure common understandings and 4) sort out good management practise and 5) possibly define a common set of effective mitigation measures for heavily modified water bodies, due to the different usages, across Europe.

To achieve this, information exchange has been initiated focusing on the following related questions for HMWBs;

- A. Do we look at similar impacts, regarding type and scale?
- B. Do we have a similar understanding of significant impacts on water use?
- C. Do our national mitigation measure libraries contain similar measures for these impacts?
- D. Do we use comparable criteria to select/rule out mitigation measures?
- E. Do countries have common standards for GEP, and hence are there a uniform ecological minimum across Europe?

Several information exchange templates have been circulated between Member States and EEA countries to exchange data on general definitions and approaches to HMWBs designation and GEP identification in terms of available mitigation measures. Workshops based on the template results have been arranged to clarify terms and definitions, highlight where there is alignment, and where there are differences in approaches, to start to explore the reasons behind these. Presentations and documents related to the group's work are available on [CIRCABC](#).

5. Harmonisation of nutrient standards

The Water Framework Directive requires Member States (MS) to follow an intercalibration process to ensure comparability of status class boundaries (specifically the Good/Moderate boundary) for biological quality elements (BQEs). This process is well established, and has been successfully followed by many MS for a range of BQEs. However, concerns have been raised that an apparently wide range of nutrient boundary values have been established by MS to support good ecological status.

Therefore, ECOSTAT has initiated a project to investigate this issue. The work is being led by UK (Freshwaters), Germany (Saline waters) and JRC. The aim of the work is to investigate and establish the reasons for any differences between MS in the development and application of nutrient boundaries, leading to the production of best practice guidance.

In 2015, the following work has been carried out:

- 1) Information collection on nutrient standards (nutrient boundary values, information on how the standards are developed and how they are used);
- 2) Comparison of freshwater and saline water boundaries were drafted (freshwater report and saline water report, will be finalised by the end of 2015).

Additionally, JRC has organized work on setting nutrient boundaries using pressure-response relationships:

One of the recommendations from the work on freshwaters was to compare boundary values with pressure response relationships using information gathered during the intercalibration exercise and this report addresses this issue;

Therefore, the drafting group was established with the aim to determine ranges of potential nutrient (N & P) boundary concentrations at the intercalibrated boundaries for high/good and good/moderate biological status;

The final result is the report proposing several approaches how to define nutrient boundaries supporting "good" ecological status;

Pressure response relationships provide an objective method for determining nutrient boundary values. The use of regression methods allows uncertainty to be determined and thus provides a method of determining a range of potential boundary values which would represent different levels of precaution of the supporting element. Further work is needed to develop this approach.

All three reports are available at CIRCABC:

<https://circabc.europa.eu/w/browse/8f58d96c-bf13-41e2-8178-4a26e0d2bf9c>

JRC in collaboration with DE and UK organized ECOSTAT nutrient meeting 18-19 November, Berlin with the main aims: to discuss the work done so far and decide on the future directions.

Presentations from the meeting available:

<https://www.fresh-thoughts.eu/FreshEvents-80-Material>

The main outcomes of this work can be summarized as follows:

There are large variability between MS nutrient boundaries, also within common types, one of the main factors behind these differences is different approaches to boundary setting used by MS:

The harmonised approach to set boundaries using pressure-response relationship constitutes the fruitful approach.

The work will be continued to draft the *Guidance on setting of good status nutrient boundaries*.

6. Typologies

The aim of the typology work is to define broad types at European scale, by grouping national types with high similarity, as well as to collect detailed information on national types and clarify the links between the national and intercalibration types.

In 2015, the freshwater work has been finalised:

20 broad river types and 15 broad lake types Broad European types were defined;

Links between national types and broad European types were established and checked with the Member States (in several repetitions).

These common types will be incorporated in the reporting guidance and will allow type-specific analysis and presentation of water data in WISE (SoE, RBMP evaluation and compliance checking).

The final report (co-authored by JRC), was published, available at CIRCABC:

<https://circabc.europa.eu/w/browse/f94f35e6-5edc-4426-baf3-0a306bb7c68a>

For coastal and transitional waters typology work has started recently. JRC has carried out the collection of information on national typologies. In 2015, first analyses have been made in collaboration with the European Marine Topic centre (EEA), establishing the links between national and intercalibration types, and identifying 14 coastal waters broad types.

A draft report was completed, available at CIRCABC:

<https://circabc.europa.eu/w/browse/29ae1a7e-1a41-42cd-9faf-51b43a75436d>

7. Hydromorphology

JRC was the main organiser and moderator of the ECOSTAT workshop “Hydromorphology and WFD classification” on 12-13 October 2015 in Oslo, Norway, back-to-back with the 30th ECOSTAT meeting. Main purpose of the workshop was to present and discuss best practices from selected Member States in the light of new scientific insights and recommendations - mainly from the FP7 REFORM project, but also from recent research carried out at JRC. Meeting documents and presentations of the workshop are available at CIRCABC:

<https://circabc.europa.eu/w/browse/a704c790-ae6c-4a01-9de4-ce6c0084971c>

The workshop attracted ca. 70 participants from almost all Member States, as well as from the scientific community and various stakeholder organisations.

A key discussion topic at the workshop was the use of remote sensing information in hydromorphological classification for the WFD. JRC made a key scientific contribution to the workshop presenting the results of new scientific work on this issue, as published in Bizzi et al. (2015).

The following main conclusions were agreed upon during the workshop:

1. There are many good examples of biological indicators responding to hydromorphological pressures.
 - All biological quality elements may respond but the strength of the response depends on the choice of metrics.
 - Fish, macrophytes, macroinvertebrates and (more rarely) diatoms are the biological quality elements most used to detect effects of hydromorphological pressures. Phytoplankton is used in specific cases (impounded rivers and reservoirs).
 - Many of the intercalibrated WFD methods are generic multi-metric indices responding weakly to specific hydromorphological pressures because they were not originally designed to be specifically sensitive to such pressures. This can be improved by using more targeted indicators. There are already good examples of Member States using such targeted indicators in their biological assessment systems
 - Hydromorphological pressures affect BQEs through morphological process shaping habitat quality and structure. Riparian vegetation usually plays an important role. There is a need to better characterize and quantify the links between hydromorphological alteration and biological impact using appropriate data and targeted indicators. This requires that spatial and temporal scales of monitoring of biological quality elements are in line with hydromorphological processes
 - There is a need to quantify hydromorphological pressures and their effects on the biology under a multi-stressor environment in order to separate different causes of the alteration and to design appropriate measures.
2. River typologies should reflect natural variability in hydromorphological characteristics and processes. This is crucial because differences in natural hydromorphology result in different reference conditions for the biological quality elements.
3. BQE assessments need to be supplemented with information from the supporting elements in order to identify inconsistencies between hydromorphological and biological assessment, to diagnose problems and to identify effective restoration

measures. A clear understanding of what is meant by “supportive element”, how it should be used, how it is reported is needed.

4. Hydromorphological assessment is crucial for the designation of HMWB, the development of methods to quantify ecological potential, and for the design and monitoring of mitigation measures. It will not be possible to achieve this if information on hydromorphology is available for “high status” only.
5. Hydromorphological processes occur at different spatial and temporal scales. Hydromorphological assessment methods are needed to account for variations in time and space (multi-scale methods).
6. Until recently, there were few shared and standardized multi-scale hydromorphological assessment methods. This has been an obstacle for a proper analysis of the linkages with BQEs so far. Recent scientific work (including the REFORM project) has resulted in new and better approaches and tools, which could now be used and further standardised.
7. To achieve real progress on this topic it is necessary that experts on hydromorphology and biology need to work together at different levels – scientifically, within Member States, and also within the WFD common implementation strategy.
8. Data from remote sensing are increasingly available from many sources, including EU space programs. This data has a great potential to be used in hydromorphological assessments at different scales, in combination with field data and other existing relevant information. The main challenge is not data availability and acquisition, but to solve issues with data processing and interpretation.

The outcome of the workshop will be the starting point for further work on hydromorphology in the CIS work programme 2016-2018, where hydromorphology will be one of the key topics (see Chapter 8).

8. Outlook for future work

Following an extensive discussion involving DG Environment, Member States and other key players involved including JRC and EEA, a new work programme for the Common Implementation Strategy has been agreed upon by the EU Water Directors covering the years 2016-2018. The work programme is available on CIRCABC:

<https://circabc.europa.eu/w/browse/dd9b4484-2935-4ee8-b3ce-72f844f3644c>



Figure 3. Organisational structure of WFD CIS 2016-2018.

Compared with previous work programmes, the CIS working group structure has been simplified, with fewer working groups focusing on the most crucial issues (Figure 3). The JRC will continue to co-lead ECOSTAT, together with Italy, Germany, and the United Kingdom. JRC is expected to have a strong involvement in all tasks, but the main focus is on those issues that are linked with achieving comparability in the environmental objectives.

Main tasks:

- Intercalibration of Good Ecological Status;
- Work on intercalibration of Good Ecological Potential;
- Continuation of Hydromorphological work. Information exchange on the comparability of classification methods;
- Continuation of the work on nutrients, establishment of consistent and comparable boundaries.

Main deliverables:

- Technical reports on intercalibration and contribution to update of Commission Decision (finalisation of intercalibration in Q4 2016, deliverables in Q2 2017);
- Technical report on the intercalibration of Good Ecological Potential (Q4 2016);
- Technical report on the harmonisation of nutrients standards;
- Best practice on the use of supporting elements for the assessment of ecological status (hydromorphology and physico-chemical parameters including river basin specific pollutants).

Other tasks:

- Comparability of presentation of ecological status results;
- Contributions to the update of the Commission's Decision on MSFD Good Environmental Status;
- Recommendations on biological monitoring methods, including on biological monitoring methods for which harmonisation is needed and where standardisation is possible, and on which standardised methods should be added to Annex V 1.3.6 of the WFD (development of new WFD relevant standards through the work of the CEN Technical Committee 230 Working Group "Biological and Ecological Methods);
- Information exchange with WG Chemicals on links between chemical and ecological status and taking into account river basin specific pollutants in the classification of ecological status;
- Issues specific to coastal and transitional waters. Linkage between MSFD and WFD;
- Scaling/delineation of water bodies: Issue related to status monitoring and assessment, but also critical impact assessment, non-deterioration and exemptions;
- Work on innovative methodologies (e.g., environmental DNA).

References

- Poikane S., Johnson R.K., Sandin L., Schartau A.C., Solimini A., Urbanic G., Arbaciauskas K., Gabriels W., Miler O., Pusch M., Timm H., Böhmer J. (2016) Benthic invertebrates in lake ecological assessment: review of methods, intercalibration and practical recommendations. *Science of the Total Environment*
- Poikane S., Birk S., Carvalho L., Böhmer J., de Hoyos C., Gassner H., Hellsten S., Kelly M., Lyche Solheim A., Olin M., Pall K, Phillips G., Portielje R., Ritterbusch D., Sandin L., Schartau A.K., Solimini A.G., van den Berg M., Wolfram G., van de Bund W. (2015) A hitchhiker's guide to European lake ecological assessment and intercalibration. *Ecological Indicators* 52: 533-544.
- Poikane S., Zampoukas N., Borja A., Davies S., van de Bund W., Birk S. (2014) Intercalibration of aquatic ecological assessment methods in the EU. Lessons learned and way forward. *Environmental Science and Policy* 44: 237-246.
- Birk S., Willby N.J., Kelly M.G., Bonne W., Borja A., Poikane S., van de Bund W. (2013) Intercalibrating classifications of ecological status: Europe's quest for common management objectives for aquatic ecosystems. *Science of the Total Environment* 454-455: 490-499.
- Birk S., Bonne W., Borja A., Brucet S., Courrat A., Poikane S., Solimini A.G., van de Bund W., Zampoukas N., Hering D. (2012) Three hundred ways to assess Europe's surface waters: an almost complete overview of biological methods to implement the Water Framework Directive. *Ecological Indicators* 18: 31-41.
- Bizzi, S., Demarchi, L., Grabowski, R.C., Weissteiner, C.J., van de Bund W. (2015) The use of remote sensing to characterise hydromorphological properties of European rivers. *Aquat. Sci.* DOI 10.1007/s00027-015-0430-7
- [EC] European Commission 2000. Directive 2000/60/EC of the European Parliament and of the Council of 23rd October 2000 establishing a framework for Community action in the field of water policy. Official Journal of the European Communities, L327/1. European Commission, Brussels.
- [EC] European Commission 2003. Common Implementation strategy for the Water Framework Directive (2000/60/EC). Guidance Document 06. Towards a guidance on the establishment of the intercalibration network and the process on the intercalibration exercise. Luxembourg, Office for Official publications of the European Communities.
- [EC] European Commission 2011. Common Implementation strategy for the Water Framework Directive (2000/60/EC). Guidance Document 14. Guidance on the Intercalibration process 2008-2011. Luxembourg, Office for Official publications of the European Communities.
- [EC] European Commission 2013. Commission Decision of 20 September 2013 establishing, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, the values of the Member State monitoring system classifications as a result of the intercalibration exercise. Official Journal of the European Communities L266/1. European Commission, Brussels.
- [EC] European Commission 2015. Common Implementation strategy for the Water Framework Directive (2000/60/EC). Procedure to fit new or updated classification methods to the results of a completed intercalibration exercise. Luxembourg, Office for Official publications of the European Communities.

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