



Technical Report - 2014 - 081

Water Framework Directive (2000/60/EC)

*Technical Report Number 8
Technical Report on methodologies
used for assessing groundwater
dependent terrestrial ecosystems*

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1. Introduction

The European Water Framework Directive (WFD), which came into force in 2000, aims to protect inland surface waters, transitional waters, coastal waters and groundwater. For groundwater, objectives have been formulated for the quantitative status (table 2.1.2 in Annex V) and the chemical status (table 2.3.2). For both the quantitative and the chemical status, there is a relationship with terrestrial ecosystems. The most relevant fragments are underlined.

WFD Annex V, Table 2.1.2:

Elements	Good status
Groundwater level	<p>The level of groundwater in the groundwater body is such that the available groundwater resource is not exceeded by the long-term annual average rate <u>of abstraction</u>.</p> <p>Accordingly, <u>the level of groundwater is not subject to anthropogenic alterations such as would result in:</u></p> <ul style="list-style-type: none"> • failure to achieve the environmental objectives specified under Article 4 for associated surface waters, • any significant diminution in the status of such waters, • <u>any significant damage to terrestrial ecosystems which depend directly on the groundwater body,</u> <p>and alterations to flow direction resulting from level changes may occur temporarily, or continuously in a spatially limited area, but such reversals do not cause salt water or other intrusion, and do not indicate a sustained and clearly identified anthropogenically induced trend in flow direction likely to result in such intrusions.</p>

WFD Annex V, Table 2.3.2:

Elements	Good status
General	<p><u>The chemical composition of the groundwater body is such that the concentrations of pollutants:</u></p> <ul style="list-style-type: none"> • as specified below, do not exhibit the effects of saline or other intrusions • do not exceed the quality standards applicable under other relevant Community legislation in accordance with Article 17 • <u>are not such as would result in failure to achieve the environmental objectives specified under Article 4 for associated surface waters nor any significant diminution of the ecological or chemical quality of such bodies nor in any significant damage to terrestrial ecosystems which depend directly on the groundwater body</u>
Conductivity	Changes in conductivity are not indicative of saline or other intrusion into the groundwater body

Role in WFD planning cycle

Groundwater dependent terrestrial ecosystems (GWDTE) should be identified during the *initial characterisation* (Annex II): “This analysis (..) shall identify (..) those groundwater bodies for which there are directly dependent (..) terrestrial ecosystems.” If a groundwater body is at risk of failing the WFD’s objectives with respect to these GWDTE, within the *further characterisation* an inventory shall be made of all GWDTE with which the groundwater body is dynamically linked.

In case risk is identified that groundwater bodies are failing to achieve the good status objectives of the WFD resulting from significant damage of GWDTE, Member States have to derive and set threshold values for each relevant substance. These threshold values, together with groundwater quality standards, shall be used to assess chemical status of groundwater bodies where in case of exceedance of such values, an ‘appropriate investigation’ shall be carried out to determine the chemical status of the groundwater body.

See Guidance Document 18 for more information about GWDTEs and status assessment (EU, 2009).

Other relevant documents

In addition to CIS Guidance Document 18 about status and trend assessment, CIS Guidance Document 12 about wetlands is also relevant (EU, 2003) when considering GWDTE. In 2011, a draft document titled “Links between the Water Framework Directive and Nature Directives” was published by DG ENV (EU, 2011a). This document is considered to be still a ‘living document’.

Background and history of this document

During the first planning cycle of the WFD, Member States have experienced problems in implementing the provisions about GWDTEs. As a consequence, this topic was included in the Working Group C (WG C) Mandate 2010–2012. During the 18th WG C meeting in May 2010, it was decided that a special session would be held during the 19th WG C plenary meeting in October 2010 about this topic. Member States were invited to present their experiences and to learn from best practices. During this special session it was decided to prepare a Technical Report about this topic, which was finally approved and published in 2011 (EU, 2011b). This Technical Report No 6 (EU, 2011b) turned out to be the beginning of developments rather than the end, because in spring 2012 at the 22nd WG C meeting, it was decided to distribute a questionnaire whose responses were presented by Hans Schutten at the 23rd WG C meeting in October 2012. It was proposed to hold a special session at the 24th WG C meeting in April 2013 to start/continue developing threshold values for GWDTEs. At that session, seven Member States presented their approaches so far, answering seven questions formulated by the organisers. It was decided to prepare this report that should compile the answers and findings of all Member States, not just the initial seven who presented their approaches.

Chapter 2 summarises the results from the questionnaire and chapter 3 draws conclusions. The individual Member State contributions are listed in Annex I and Annex II provides the responses, grouped per question.

This report was distributed to the Member States before the 25th WG C meeting and agreed upon at this meeting in October 2013 by the plenary.

2. Results from the questionnaires

Overview

A total of 21 countries responded to the questionnaire; 19 Member States and two non-Member States, who indicated they have national GWDTE designations and have an interest in sharing knowledge on GWDTEs. Two countries indicated they have only just started work on GWDTE assessments, but responded on their plans for the future. Although a significant majority of Member States responded (19 out of 28 Member States), this compilation does currently not provide a complete overview of the situation in Europe.

Although the summary of responses focuses on what was submitted, it is clear that there are other useful pieces of information and assessment approaches that are being undertaken by countries, but this information has not been captured in this short questionnaire. The replies to the individual questions can be summarised as follows:

1. *How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's*

From the 21 countries who responded, all 19 Member States rely on the Natura 2000 designations when identifying GWDTEs. Approximately half of the countries indicated they had additional national wetland designations in addition to those declared under Natura 2000 and that these were also being considered for GWDTE assessments.

Seven countries identified the Annex I habitats typologies that they used when selecting GWDTEs for assessment and four countries indicated that they had already established common assessment criteria for evaluating whether a wetland should be considered for GWDTE assessments under the WFD.

2. *How has your country identified that the GWDTEs were groundwater (body) dependent; for example did you use expert knowledge or investigations?*

All countries indicated that expert judgement played a key role when determining groundwater dependence, and a few countries struggled to determine groundwater dependence, but included the wetlands in the countries' GWDTE assessments.

Over half of the countries rely on a combination of field studies and overarching wetland characterisation criteria to determine groundwater dependency. However four countries indicated that their initial evaluations of groundwater dependency were primarily based on field assessments (bottom up approach) and four countries have clear assessment criteria that must be satisfied prior to the wetlands being characterised as being groundwater dependent.

3. *How has your country assessed if the GWDTEs were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?*

Many countries indicated that the appraisal of significant damage was difficult and in many cases was subjective, with differing views and approaches adopted. Eight countries have developed specific "damage" criteria for wetland assessments, whilst others rely on the conservation status from the Habitats Directive reporting, site-specific assessments of damage or expert judgement.

Five countries indicated that they were not in a position to determine significant damage, and four other countries have considered abiotic factors (pressures/trends) to determine if groundwater has the potential to cause damage to a GWDTE, rather than focusing on damage at the wetland itself.

4. *How has your country organised the gathering of GWDTE data for WFD purposes; did you use site-specific studies, or did you rely on national ecological and hydrogeological monitoring networks?*

Over half of the countries indicated that a national approach is adopted with regard to gathering information on GWDTEs, often with a single lead public authority or linkages between a few public authorities.

Four countries indicated that specific habitats research studies are the main approach used to gather data, whilst four countries indicated that they did not have any specific programmes for gathering GWDTE data.

5. *How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations have carried out the various aspects of the monitoring and how were they combined to assess significant damage to GWDTE's?*

As with the gathering of GWDTE data, the assessment coordination is primarily undertaken at a national level in the majority of countries. However seven countries indicated that the assessments are often undertaken by working groups, which operate at a local level (with local authorities) and focus on local knowledge of the GWDTE and coordination of strategies that consider the interests of the local authority. Three countries indicated that they did not have any specific coordinated approach.

6. *Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?*

It was very apparent that for the majority of countries the assessment of GWDTEs is in its infancy and further work is required with regard to:

- Developing significant damage and groundwater dependency criteria;
- Improving GWTDE “condition” assessment methodologies and developing abiotic threshold criteria;
- Gathering additional monitoring data;
- Improving knowledge of the pressure source and groundwater pathways to the wetland and then linking this back to measures;

However it was clear that the process will take a long time, to initially determine which wetlands require assessment, to gather sufficient data to assess the wetland and then to implement measures to mitigate the pressures impacted on GWDTEs. The relative uncertainty and the lack of data for GWDTEs mean that there is an inherent lack of confidence in GWDTE assessments at the present time.

7. *What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?*

Only two countries thought that there was sufficient information and guidance already in place at an EU level, such that additional guidance was not required by WG C/DG Environment. There was a clear indication that better linkages are required, firstly between ecologists and groundwater experts and secondly at EU level, with greater linkages and sharing of knowledge between countries.

Specifically there were requests for sharing information on how GWDTEs were selected, criteria for determining groundwater dependence and significant damage and the overall assessment approaches and the use of screening criteria and monitoring data for GWDTE assessments.

In particular there were requests for the establishment of baseline conditions for GWDTEs i.e. what are the reference conditions in terms of ecology and the abiotic factors that countries should achieve. There were also a number of requests for sharing of knowledge and the development of

approaches on the linkages between pressures and GWDTE conditions, ultimately developing criteria that could be linked to measures.

Overall, it is very clear that whilst there does not seem to be a need for extensive input from WG C/DG Environment, there does seem to be a need for high level support from these groups to facilitate further discussion on GWDTEs and in particular to provide a common forum for sharing information and experience. This inventory clearly demonstrates that there is a need to further discuss and decide upon issues such as criteria for selecting GWDTE, significant damage, reference conditions, threshold values etc., as these criteria are all interpreted and applied differently across Europe.

The responses to this questionnaire clearly show a gap in the implementation of the WFD when it comes to comprehensive consideration of the interaction between groundwater and GWDTE, probably because it is considered such a difficult topic. Meeting the WFD requirements on this subject will probably take further time and efforts where the second cycle is for many Member States only the start of the process.

Results summarised

This summary table gives an overview of the main answers. It is not exhaustive but detailed answers for each question can be found in Annex I and II. Note that this was not a multiple-choice questionnaire and the consolidated figures below are only included to give a broad indication of the responses to each question. Consequently the percentages usually do not add up to 100%.

1. How has your country identified GWDTEs?	<ul style="list-style-type: none"> • Using Natura 2000: 90% (19 respondents) • Using additional protected sites: 48% (10 respondents)
2. How has your country identified that the GWDTEs were GWB dependent?	<ul style="list-style-type: none"> • Expert judgement: 100% (21 respondents)
3. How has your country assessed if the GWDTEs were damaged and what criteria did you use to determine the magnitude of the damage?	<ul style="list-style-type: none"> • Difficult with no common criteria or not done: 57% (12 respondents) • Development of specific damage criteria: 43% (9 respondents)
4. How has your country organised the gathering of GWDTE data for WFD purposes?	<ul style="list-style-type: none"> • Use of national monitoring network: 71% (15 respondents) • Specific Habitats research studies: 19% (4 respondents)
5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country?	<ul style="list-style-type: none"> • Using information coming from different organisation: 76% (16 respondents) • Local level: 33% (7 respondents)
6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?	<ul style="list-style-type: none"> • Developing significant damage, groundwater dependency and prioritisation criteria and/or assessment methodologies: 43% (9 respondents) • Gathering additional monitoring data: 33% (7 respondents) • Better coordination: 19% (4 respondents)
7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?	<ul style="list-style-type: none"> • Lack of shared methodologies: 52% (11 respondents) • Exchange of experience within WG C: 52% (11 respondents) • No additional guidance/support from WG C needed: 9% (2 respondents)

3. Conclusions

Selection of relevant ecosystems

Of all the difficulties reported by Member States, selection of the relevant ecosystems did not seem to be a dominant one. Most countries used Natura 2000 sites, sometimes supplemented with other ecosystems designations.

Groundwater dependent wetlands that were included in the first RBMP or are proposed to be included in the second RBMP are all based upon ecological interest. The ecosystem that is identified as 'representative' of the groundwater body status after a prioritisation phase, and thus is included in the groundwater body chemical and quantitative status assessments, is predominantly a groundwater dependent wetland habitat. Most countries have identified GWDTE using Natura 2000 habitats or a country adaptation / analogy of this.

Selection of relevant ecosystems does not seem to be a major issue at this moment, compared to other issues. Member States should indicate which Natura 2000 ecosystems have been identified as GWDTEs and how many of these present a risk to the connected groundwater body of failing its WFD objectives. This inventory should be collated by WG C to act as a basis to facilitate collaboration of Member States that have identified similar Natura 2000 ecosystems as GWDTE.

Put into practice the concept of 'directly dependent'

Annex II of the WFD speaks about compiling 'directly dependent' terrestrial ecosystems. Currently there is no clear common methodology that identifies if a GWDTE is directly dependent upon a groundwater body, and is for example directly hydrologically linked to the groundwater body. Most countries use expert judgement to ascertain such linkage by comparing/overlaying different types of information (sometimes using GIS), and some countries have carried out, or are carrying out site investigations to quantify and qualify the linkage between the groundwater body and the GWDTE.

It is recommended to collate and share among WG C the widespread judgment criteria on which the aforementioned experts made decisions on whether or not a GWDTE / Natura 2000 ecosystem was identified as directly dependent upon the groundwater body. This will then help to form the basis of any future common methodology in either reaching an expert conclusion or develop a method for identifying groundwater dependency of Natura 200 ecosystems. If such an approach works, it could be considered to apply it to other GWDTE as well.

Put into practice the concept of 'significant damage'

Knowledge of the status of the groundwater dependent terrestrial ecosystem is critical; because where the ecology is significantly damaged (and the cause of this damage is due to the condition of the supporting groundwater body) it can cause a groundwater body to be in poor status. There are no standard approaches across the respondents in defining how this condition is assessed. However there are extensive Natura 2000 habitat assessments available that could be used as a guideline in developing such assessments. Currently, there is no level playing field within the EU with respect to this aspect.

It is recommended to further elaborate on the supporting condition/status assessment aspect, preferably in cooperation with the biodiversity colleagues in DG environment and Member States' experts on nature conservation.

Monitoring

For Natura 2000, Member States have to assess priority natural habitat types and priority species (Art. 11, Habitats Directive). This could imply monitoring of abiotic parameters like groundwater level, pH or nutrient concentrations in groundwater. Most countries have different agencies or organisations that are responsible for the monitoring of the status of the GWDTE and the status of the GWB. This has resulted in limited consideration and exchange of the monitoring of GWDTE and GWB monitoring. Especially where monitoring of chemistry and quantity are carried out by separate organisations, the linkages between groundwater level and groundwater chemistry are difficult to assess.

The results of the questionnaire clearly identify that there is very limited monitoring across the EU that is aimed to understand the hydrological linkage (let alone quantify) between groundwater bodies and terrestrial ecosystems, and thus the base information to assess status of groundwater bodies often is missing. It is obvious that in such a situation selecting appropriate measures is extremely difficult. *Member States should put more effort in the monitoring design within the framework of the WFD. This should include better selection of the location and depths where to monitor. In addition, guidance may have to be developed specifically focussing on topics such as (a) addressing if potential pressures on the groundwater body could affect a GWDTE, and (b) confirming that the GWDTE and GWB are hydrogeologically linked. Furthermore, Member States should check whether information which is collected for Natura 2000, can be useful for implementation of the WFD, in particular the requirements concerning GWDTE.*

Step towards criteria values and threshold values

To be able to include GWDTE in status assessment, criteria values should be developed, as laid down in Guidance Document No 18 (EU, 2009). These criteria values can then be used, together with criteria values for other receptors, to derive groundwater threshold values. There are currently no EU-wide agreed criteria values available that can be used in the status assessment. One reason is the above mentioned limited monitoring specifically aiming at understanding the interaction between the groundwater body and a GWDTE. Thus the base information to include GWDTE in the status assessment is relatively poor. A second reason is that there is no consistent manner of identifying or categorising GWDTEs across the EU that is ecologically sound enough to develop meaningful criteria values for GWDTE categories. Additionally, there is a real difficulty defining ‘significant damage’. A few Member States recently made considerable progress in quantifying the groundwater-requirements of GWDTE in terms of groundwater level and/or chemical parameters. However, to translate these site specific requirements into criteria for an entire groundwater body remains a challenge.

It is recommended to investigate whether it is possible to derive EU-wide abiotic requirements, e.g. per habitat-type, that Member States can apply in a first step. The current groundwater threshold values and the methods for their derivation in relation to GWDTEs should be collated and shared across WG C. Subsequently a common method/framework should be developed on how to derive a threshold value for GWDTEs (especially in the absence of sufficient scientific data) and finally further guidance is required on how to extrapolate the requirements at GWDTE scale to groundwater body scale.

Continuation of sharing best practice

Most countries have identified that they are further developing the GWDTE assessment into the 2nd cycle of the RBMP process and it is thus important that current practise is shared (as through this questionnaire) and a communication platform is established so that countries can learn from each other.

It is highly recommended that GWDTEs still remain on the agenda of WG C, developing and providing further guidance on many of the topics highlighted above.

DG ENV role

Most countries have clearly identified that they see a significant role of DG ENV in facilitating the linkage between GWDTE ecologists and GW experts to further enhance information sharing and exchange and developing best practice.

References

- EU (2003). Guidance Document No 12. Horizontal Guidance on the Role of Wetlands in the Water Framework Directive.
- EU (2009). Guidance Document No18. Guidance on groundwater status and trend assessment.
- EU (2011a). Links between the Water Framework Directive and Nature Directives. Links between the Water Framework Directive (WFD 2000/60/EC) and Nature Directives (Birds Directive 2009/147/EC and Habitats Directive 92/43/EEC). Frequently Asked Questions.

EU (2011b). Technical Report No. 6. Technical Report on Groundwater Dependent Terrestrial Ecosystems.

Annex I. Contributions from Member States

This Annex contains the original responses of Member States (as well as Iceland and Switzerland), in alphabetical order.

1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?
2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?
3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?
4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?
5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?
6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?
7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

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1. Austria

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

The identification of WFD relevant GWDTEs in Austria started with Natura 2000 sites and followed a stepwise strategy:

- Identification of all national groundwater dependent habitats listed under the Habitats Directive. (see next question for the criteria)
- Identification of all national groundwater bound species listed under the Habitats Directive and the Birds Directive. (see next question for the criteria)
- Selection of all WFD relevant and GW dependent Natura 2000 sites based on the following criteria:
 - For habitats: 'representativeness' & 'area': A GWDTE is WFD relevant when the sum of all GW dependent habitats of representativeness classes A (excellent) and B (good) exceed 5 Hectare; with 2 exceptions: special sites and priority habitats.
 - For species: 'population rate': at least one species with a population value B (at least 2% of total national population) or at least ten species with a population value C (less than 2%) are present in the Natura 2000 site.

The preliminary selection was verified and checked for plausibility by comparison with scientific literature and Austrian Red Lists and the estimation of the ecological status of ecosystems, special protection needs and the role of the sites in the improvement of water status. Finally, from the 204 Natura 2000 sites in Austria (219 Natura 2000 sites in 2013) 104 sites were identified to be GW dependent and WFD relevant.

The Ministry has coordinated the identification of WFD relevant GWDTEs by elaborating the identification method and by drafting a first selection of relevant GWDTEs based on the information available at Federal level. In a second step, the Federal provinces ("Bundesländer") verified and corrected the selection based on the expert knowledge of the local experts and the data available from the site projects.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

Groundwater dependency was identified for habitats and for species.

- For habitats – hydrological criteria:
 - Frequent (at least annual) raise of GW into the fine soil (covering layer);
 - Groundwater table is permanently in fine soil (hydromorph soil);
 - Special sites: Indirectly influenced by groundwater or located close to such waters (e.g. tuff springs).

Explicit 'threshold values' for these criteria were not specified allowing for certain site specific flexibility. Finally, the application of these criteria led to the identification of 19 habitats under the Habitats Directive to be GW dependent.

- For species:
 - Expert judgment based on the Birds Directive and Annex II of the Habitats Directive and scientific literature.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

The definition of 'significant damage' according to the WFD is set in relation to the favourable conservation status under the Habitats Directive. A method for assessing the conservation status was developed and published based on indicators and threshold values – details are laid down in the following report:

http://www.umweltbundesamt.at/fileadmin/site/umwelthemen/naturschutz/Berichte_GEZ/Band_3_FFH-Lebensraumtypen.pdf (in German). The assessment frequency is according to Art. 17 FFH Directive every six years, the latest report submitted in summer 2013, but the results are not yet published.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

GWDTE specific inventories and monitoring activities are performed mainly on a project basis – predominantly for mires. The projects are contracted by the Federal provinces as the competent authorities for nature conservation.

An inventory of the Austrian riparian wetlands provides an overview of the most important areas.

<http://www.lebensministerium.at/wasser/wasser-oesterreich/fluesse-und-seen/aueninventar.html>

However, as most of our GWDTEs are wetlands, former wetlands or riverside forests along our rivers and thus located within our porous groundwater bodies, quite a comprehensive set of data on the physical and chemical environment of those groundwater bodies is gathered within our national networks monitoring groundwater and surface water quality, groundwater tables, temperature and precipitation.

The competent institution for physical data (groundwater levels, temperature and precipitation) is the “Central Hydrological service”, unit VII 3 of the Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna.

The competent institutions for chemical data are the “Unit National Water management”, unit VII 1 of the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Environment Agency Austria, both in Vienna.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

As already mentioned under question 4, a considerable amount of physical and chemical data on precipitation, groundwater and surface water is gathered by national monitoring networks of the Federal Ministry of Agriculture, Forestry, Environment and Water Management. Although the networks are not always tailored to the specific GWDTEs, these data are available at regional level are a valuable basis for the assessment of GWDTEs.

Geological and hydrogeological information is available at a national level as well, provided by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, the Environment Agency Austria and the Geological Survey of Austria.

To fulfil the reporting obligation according to Art. 17 of the Habitat Directive Austrian provinces have in 2012 started a monitoring for a selection of habitats and species.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

The inventory which was reported in the first cycle will be updated by the Federal provinces. The selection criteria and method will not be changed for the 2nd cycle.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

- There is a need that ecologists identify the GW related needs of GWDTEs for achieving favourable conservation status in order to e.g. enable the derivation of groundwater threshold values or favourable groundwater levels and to enable the correct assessment of groundwater quantitative and chemical status.

- The establishment of GWDTE types could relieve the administrative burden in the consideration of GWDTEs in the WFD implementation, especially when deriving groundwater threshold values.
- Main shortcoming in the status assessment procedure is the lack of identifying cause-effect-relationships. What are the effects on GWDTEs caused by changes of quality/quantity of groundwater and what is the contribution of human activity to such changes?
- What is the baseline of the assessment and hence a target for remediation.

2. Belgium

From Belgium, the Brussels Region responded to the questionnaire.

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

The GWDTE's have been identified on basis of Natura 2000 habitat typology localised for Habitats Directive (92/43/CEE)

Our GWDTE's categories identified are :

- 6430 Hydrophilous tall herb fringe communities of plains
- 7220 * Petrifying springs with tufa formation (Cratoneurion)
- 9160 *Sub-Atlantic and medio-European oak or oak-hornbeam forests of the
- Carpinion betuli
- 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Other habitats could be identified on the knowledge provided by hydrogeological modelling of groundwater bodies.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

Expert knowledge.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

Since the GWDTE identification is based on Natura 2000 habitat typology, assessment of damage can be seen as a part of monitoring the conservation status of these habitats.

A specific method has been developed for surveying and assessing the conservations status, hence ecological quality and eventual damage of Natura 2000 habitats. Parameters and criteria for determining the conservation status are currently taken from the publication "T'jollyn, F., Bosch, H., Demolder, H., DeSaeger, S., Leyssen, A., Thomaes, A., Wouters, J., Paelinckx, D. & Hoffmann, M. (2009). Criteria voor de beoordeling van de lokale staat van instandhouding van de NATURA 2000 habitattypen, versie 2.0. Rapporten van het Instituut voor Natuur en Bosonderzoek 2009 (46). Instituut voor Natuur- en Bosonderzoek, Brussel.)".

You can also find it on the website (<http://www.vlaanderen.be/nl/publicaties/detail/criteria-voor-de-beoordeling-van-de-lokale-staat-van-instandhouding-van-de-natura-2000-habitattypen>).

Specific ecological threshold values have been established for each habitat to assess the status of conservation.

Criteria to determine the magnitude of the ecological damage are actually in elaboration and will take in account the urban specificities of Brussels area.

The cause-effect-relationships between changes of quality/quantity of groundwater dependent and ecological damage must be investigated.

Specific groundwater quality threshold values for GWDTEs must be determined and a hydrogeological model to study the link between groundwater bodies and GWDTEs is in elaboration.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

For GWDTE's, groundwater quality/quantity data and ecological data are collected in two departments within the same regional organisation (IBGE_BIM) for the purposes of WFD and Habitats Directive. These monitoring networks are regional and are implemented by a multidisciplinary team (ecologists and hydrogeologists).

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

There aren't real collaborations in our country to gather and exchange ecological and hydrogeological information between regions and Belgian federal state but it exists a working group who coordinate the European reporting for WFD and Directive Habitats.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

The methodology to assessment ecological quality of habitats would be improved to take in account the urban specificities of Brussels area and the criteria to determine the magnitude of the ecological damage would be developed.

The cause-effect-relationships between changes of quality/quantity of groundwater dependent and ecological damage would be investigated.

The groundwater quality/quantity monitoring networks GWDTE's would be extended.

Specific groundwater threshold values for each category of GWDTEs concerned would be established and a hydrogeological model to study the link between groundwater bodies and GWDTEs would be finalised to improve knowledge in hydrogeologic characterisation.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

Exchange of experiences between states members.

3. Bulgaria

Bulgaria provided a separate answer for each river basin. For some questions, not all river basins provided answers.

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

Black Sea River Basin Directorate

"The lists with protected areas, according to the Protected Areas Act (Article 8 (1) The parks of national significance, listed in Annex 1 hereto, and the nature reserves, listed in Annex 2 hereto, which serve to meet public needs of nation-wide import) and Biological diversity Act (Art.6 (1) Special areas of conservation shall be designated for:

1. conservation of natural habitats listed Annex1 hereto;
2. conservation of habitats of plants and animals (excluding birds) listed Annex 2 hereto;
3. conservation of habitats of birds listed Annex 2 hereto.).

These lists were actual to 2008 - 2009. They were included the protected areas under Natura 2000. By using GIS analyses are covered the a.m. protected areas and the areas with shallow groundwater and thus the groundwater dependant protected areas have been identified."

East Aegean River Basin Directorate

GWDTE's have been identified on the basis of expert judgement, considering the specific habitats and species - subject to conservation in the protected areas and the aims of designation of a protected area in the territory of the EARBD. Second criteria for identification of GWDTEs is availability of shallow groundwater in the place of TE.

West Aegean River Basin Directorate

GWDTE's have not been identified in WARBD till now because lack of methodologies for their identification.

Danube River Basin Directorate

Identification of the terrestrial ecosystems has been done under the project "Development of river basin management plans ", in Priority Axis 1 of OPE (Operative programme on Environment) 2007-2013. It was financed by the EU Cohesion Fund and with national co-financing. One of the project subjects is "Determination of thresholds values to measure the extent of contamination of groundwater and development of a classification system for the chemical status of groundwater bodies."

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

Black Sea River Basin Directorate

Under a Public Procurement the project 5 has been implemented with a subject: "Determination of threshold values of contamination of groundwater and development of a classification system for the chemical status of groundwater" (it has been implemented at the frame of the Operative Programme on environment) - the GWDTE's have been identified and attached to the corresponding GW bodies. The monitoring points have been included for them and all the information was included and reported in RBMP to the EC.

East Aegean River Basin Directorate

Under a Public Procurement the project 5 has been implemented with a subject: "Determination of threshold values of contamination of groundwater and development of a classification system for the chemical status of groundwater" (has been implemented at the frame of the Operative programme on environment) - the GWDTE's have been identified and attached to the corresponding GW bodies.

Danube River Basin Directorate

Identification of the terrestrial ecosystems has been done under the project "Development of river basin management plans ", in Priority Axis 1 of OPE (Operative programme on Environment) 2007-2013. It was financed by the EU Cohesion Fund and with national co-financing. One of the project subjects is "Determination of thresholds values to measure the extent of contamination of groundwater and development of a classification system for the chemical status of groundwater bodies."

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

Black Sea River Basin Directorate

Damaged GWDTE's have not been established in the first RBMP.

East Aegean River Basin Directorate

Damaged GWDTE's have not been identified, because of lack of assessment methodology.

Danube River Basin Directorate

There has not been made an assessment whether GWDTE's are damaged and has not been used criteria to determine the extent of damages.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

Black Sea River Basin Directorate

The GWDTE data (Incl. for the First RBMP) have been gathered from the implementing plans for management of the protected areas and from the national ecological and hydrogeological monitoring networks.

East Aegean River Basin Directorate

No specific monitoring programme for GWDTEs are available. We rely mainly on the national monitoring programmes.

Danube River Basin Directorate

We are going to collect data from: 1) The current Management plans for protected areas and established there long-term monitoring for conservation and maintenance of biodiversity in the relevant protected area; 2) The current management plans of protected areas under Natura 2000 network and 3) The developed national groundwater monitoring plan;

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

Black Sea River Basin Directorate

The gathered data are as follows:

1. provided for this purpose monitoring points in the surveillance monitoring programme for the chemical status of groundwater under the Order N-182 / 26.02.2013 of the Minister of Environment and Water.
2. The self-monitoring , carried out by the holders of the permits for water use from groundwater or from surface water , including data of the rates of water abstraction;
3. Agricultural data - use of fertilizers and plant protection chemicals (pesticides), livestock breeding etc.
4. The data have been gathered in RBMP according to the ecological assessment;

5. Data gathering from the new plans for management of the protected areas and draft stage plans for management of the protected areas;
6. Other information that has been included in the hydrological and hydrogeological reports attached to the documentation of water abstraction permit and also to the reports for investment intentions.

BSRBD expects to receive from the MoEW in future:

- hydrological data from the National Institute of Meteorology and Hydrology (precipitation, groundwater levels, evapotranspiration, river flow) - these all data are needed for determination of the groundwater part in the water balances. These data are receiving by MoEW in compliance with the Water Act and the Contract between MoEW and the NIMH.
- Data from the Nature Protection Service Directorate from the project "Mapping and identification of the conservation status of habitats and species"., where are available data on the status of organisms and needs of protection of the GWDTE's.

East Aegean River Basin Directorate

The available in EARBD data is information on the chemical status of groundwater. There is needed to gather the following data:

1. Data on groundwater quantity status - from NIMH, considering the developed methodology in MOEW for evaluation of resources of the groundwater bodies.
2. Data from Mapping and identification of the conservation status of habitats and species, subject of conservation in the protected areas in the ecological network Natura 2000 - data are available in MoEW.
3. Data from the monitoring of biological diversity from the National System for Monitoring of biological diversity - data are available in the Executive Environment Agency.

Danube River Basin Directorate

1. Data under the competency of RBD authority:
 - Data of groundwater levels from the self-monitoring have been required under the water permits issued by BDWMDR (Basin Directorate for Water Management – Danube region);
 - Data of groundwater levels from the National Monitoring Network on groundwater quantity - are provided from the NIMH through the MoEW;
 - Data from the monitoring stations for chemical groundwater status under an Order of the Minister of EW, have been received as hard copy protocols from the laboratories of the ExEA and electronically - through direct access to the information system of the ExEA;
2. Data from the competent authorities in the frame of the structures of MoEW - the Nature Protection Service Directorate and Regional Inspectorates of Environment and Water:
 - Environment information and data we could get from the results of the project for Mapping and assessment of the conservation status of the species and the habitats in the protected areas within the Natura 2000 network,
 - as well as in the implementation of the measures in the National Priority Action Framework developed under Natura 2000. These measures are related with monitoring and research - development of methodologies for systematic collection, evaluation, monitoring and exchange of data on biodiversity, development and implementation of a unified national plan / monitoring program for assessment of the status, structure and functions of biological component and biological monitoring of species and habitats within and outside Natura 2000 network.
3. Data from other institutions

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

Black Sea River Basin Directorate

Measures and monitoring points will be included in the second RBMP, on the base of results from TE's status and GW status analyses.

East Aegean River Basin Directorate

The following activities have to be carried out:

1. To develop and to approve methodology for identification of GWDTE's. To implement this methodology and update the list with GWDTE's in RBMP.
2. To develop and approved methodology for assessment of status of GWDTE's.
3. To develop programmes and methodologies for monitoring of the parameters needed for assessment of the status of GWDTE's.

West Aegean River Basin Directorate

The identification of GWDTE's will be one of the main tasks in the project under a Public Procurement with a subject: "Exploration and evaluation of quality status of groundwater bodies".

The following activities have to be implemented under the project:

1. To identify the GWDTEs, which have a high ecological and socioeconomic importance in compliance with the requirements and procedures in the european technical report.
2. To evaluate that maximum decrease in the groundwater level in the relevant GWB, which will not have negative effects on GWDTEs.
3. To assess if even the groundwater level changes do not have negative effects on GWDTE's, nevertheless the related GWB is identified to be in bad status.

Danube River Basin Directorate

Update the wetlands in the region of BDWMDR;

Update the monitoring programs;

Use the results under the project for Mapping and assessment of the conservation status of the species and the habitats in the protected areas of the Natura 2000 network in accordance with the Guidelines № 12 of CIS of the WFD.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

East Aegean River Basin Directorate

The main problem is the lack of developed and approved methodologies for monitoring and assessment of GWDTE and consequently impossibility to carry out the real activities for implementation of monitoring and assessment.

Danube River Basin Directorate

1. Constraints:

- Lack of methodology, including approved criteria for assessment of GWDTE's;
- Lack of methodology to assess whether the GWDTE's are damaged and the extent of damages;
- Lack of scientific works for the evaluation of groundwater dependent terrestrial ecosystems;

2. Proposal to DG "Environment":

- Provide scientific works, sharing the experience of other countries on approaches to determine the groundwater dependent terrestrial ecosystems.

4. Czech Republic

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

The whole process is on-going now, but we know the main steps: Natura 2000 and relevant nature protection areas are the base for water (surface and groundwater) dependent ecosystems according natural characteristics and habitats categories (we do not know yet the precise approach). These protection areas will be included in the list of protected areas according WFD Art. 6. Then GWDTE's will be identified from this list by expert knowledge.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

See Q1.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

The damaged GWDTE's were identified from several specific studies (however, the studies were done for few sites only). No common approach was used for the identification, the possible damage was decided in the specific studies case by case.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

No specific gathering GWDTE data for WFD were organised in the CR.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

See Q3 and Q4.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

The main change is the identification of GWDTEs – no systematic identification of GWDTEs was prepared in the 1st cycle. However, the assessment of GWDTEs and their monitoring were not changed yet.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

The systematic monitoring of GWDTEs and assessment of damaged GWDTEs (systematic approach and criteria) and monitoring) are the main gaps. We appreciate every guidance focused on these issues.

5. Denmark

As a prerequisite please be aware of the fact that Denmark has not identified GWDTE's within the frame of the first cycle of the RBMP. Hence, the answers supplied are related to the work that we expect to perform as part of the revised, i.e. second cycle of the RBMP.

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

We suppose to use both data from Natura 2000 and additional vegetation maps

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

The Assessment will presumably be based on a comparison of the location of GWDTE's, soils maps, results of hydrological model applications for current conditions, supplemented with additional analytical methods, if necessary and possible.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

We intend to compare, on the one hand old topographic maps, and maps on soils types, particularly lowland soils to identify areas where GWDTE's previously have been abundant as well as results of hydrological model applications for pristine conditions, with, on the other hand current vegetation mapping results and results of hydrological model applications for current conditions. The main goal is then to identify the impacts from groundwater abstraction, which might be traced back to the related well field.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

To start with, we will rely on national ecological and hydrogeological monitoring networks

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

Most probably much of the works will involve cooperation between the Ministry of the Environment, Universities and the geological survey.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

Since we did not gather experience from the first cycle, there were no "lessons learnt".

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

Scaling problems: It's a dilemma that the assessment has to be performed nationwide on a scale which on the one hand is rather detailed with respect to the location of the GWDTE and where impact assessments should be based on modelling. The models to be applied, however, are comparably coarse scale.

It would be perfect, if the Working Group C / DG-Environment can contribute to the development and test of a catalogue on methods to be applied by the national and regional authorities in Europe.

6. Finland

Q1. How has your country identified GWDTE's? for example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?;

Finland used Natura 2000 areas. Mainly used habitat categories were “Fennoscandian springs and springfens” and “Oligotrophic waters containing very few minerals of sandy plains”. Also one case with “Calcareous fens with *Cladium mariscus* and species of the *Carex davallianae*”

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

The river basin districts selected from the Natura 2000 areas the ones that were overlapping groundwater bodies and had groundwater related protection values. Groundwater flow directions, expert knowledge and groundwater dependent species (e.g. *Cladium mariscus* and *Najas tenuissima*) were also used as background information.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

The impacts to GWDTE's need to be assessed on the permit process before the permit can be granted. This is mostly applied in water abstraction permits, but it is also applied in other activities that need a permit. Monitoring obligations are also included in the permit based on the possible impacts.

This has been assessed in some cases, where enough data has been available. 85 GWB's are linked to Natura 2000 areas, of which 14 GWB's are at risk of failing to meet the objectives but GWDTE's were not found damaged. The status of the GWDTE's in these 14 GWB's has been more or less estimated by looking at the quantitative status of the GWB. Other criterion to evaluate the magnitude of the possible damage is yet lacking.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

In the GWDTE data gathering Finland has relied on ecological and hydrogeological monitoring networks but there is still need to further develop the level of monitoring in order to get better level of knowledge about the GWDTE in Finland and to develop the assessment.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

Site specific habitat data from springs and springfens with evaluations are in the database of Metsähallitus (“Forrest Administration”). Hydrogeological data is in the database of Finnish Environment Institute (SYKE). Combining this data needs to be developed. SYKE has the habitat sites (without evaluations) and this data can be used in recognising possible GWDTE's.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

Hopefully more site specific research can be done in the 2nd cycle. In the future new methods and indicators should be developed and in addition to Natura 2000 areas include other areas as well.

Preliminary status assessment for the 2nd cycle is almost done so very little changes can be made in this schedule although the status assessment can be updated after this if new information is available.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

Co-operation with groundwater experts and ecologists should be developed in the future. Also species and habitat specified data, criteria and methods need to be developed. Co-operation especially with countries that have similar geological conditions (such as Sweden and Norway) would be beneficiary but also any material or information concerning criteria and methods from WG C/DG-Environment is welcome.

7. France

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

For the first WFD cycle, expert knowledge at river basin district level was used, taking into account Natura 2000 and other relevant nature protection area (wetlands defined as remarkable because of outstanding biodiversity). The identification needs to be improved based on national methodology and clear and shared definition of what is a terrestrial ecosystem and a GW dependent one. Hydrogeologists and ecologists do not always agree on definition.

For the 2nd WFD cycle, first test of a national screening approach on Natura 2000 zones has been carried out by BRGM, based on the WGC technical report and British experience (water table depth/ecological list).

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

For the first WFD cycle, expert knowledge at river basin district level or a more local scale (GWB or site specific) was used for GW dependence. It has not been addressed in a consistent manner in France due to a lack of national methodology and the difficulty to define what is dependence to GW for a terrestrial ecosystem.

Prioritization was based on pressures and vulnerability to select sites where more detailed characterisation is needed.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

No standard method of surveying GWDTE ecological quality exists in France. For the first WFD cycle, expert knowledge was used on some specific sites.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

There is no specific GWDTE monitoring network in France. We rely on site specific studies, expert knowledge, national survey of 150 wetlands every 10 years (6 categories: alluvial, plain, interior wetlands, Atlantic swamps and estuaries, Mediterranean lagoons and deltas), results of other inventories and hydrogeological network: quality and quantity (national website with all the GW monitoring results: <http://www.adeseafrance.fr>).

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

For the first WFD cycle, coordination between ecologists and hydrogeologists and combination of ecological and hydrogeological information was done at RBD or more local level on specific sites. Hydrogeological information is well structured with national organisation (dataset dictionaries, etc) and all monitoring results online.

Unlike for hydrogeological information, there is no shared data structure at national level for ecological information.

The coordination, combination of information and working with different experts at a national level still needs to be organised for the next cycles.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

For next cycles, we will try to develop discussions and share objectives and definitions with experts on ecosystems in order to work on methodologies and data organisation to include better WFD purposes in implementation of nature directives and in works on wetlands (inventories, indicators, monitoring...). We need shared definitions of what a dependence to GW is for a TE and how it is characterised, what significant damage to GWDTE is and a method of surveying GWDTE ecological quality. It is also necessary to make sure that ecological inventories include WFD and GW items so that they can be used for WFD purposes

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

- GW impacts on terrestrial ecosystems are not always considered as an important issue for ecosystems and wetlands in France, so efforts are diverted to other topics by ecologists (change in land use, drainage, definition of compensation...)
- WFD requirement for GWDTE is seen as theoretical and filling in of a reporting table and is not fully understood by ecologists or wetland experts on site
- Lack of shared definition, practical methodology, specific monitoring and data structure (GWDTE, data and monitoring required, GW dependence, assessment criteria, deterioration due to GW...)
- Lack of general water quantity requirements of GWDTEs.

8. Germany

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

Natura 2000 sites (pursuant to Habitats Directive of 21 May 1992 and Birds Directive of 2 May 1979), nature conservation areas designated under national law and water body-related landscape reserves were taken into account. In some cases GWDTEs were determined based on current maps of biotopes or types of biotopes, pedological or vegetation maps that included limnological testing. The German Guidelines¹ on recommended procedures for taking into account GWDTEs in risk analyses are the basis for the methodological approach to identifying GWDTEs in Germany and part of the assessment on the status of groundwater bodies.

¹ Handlungsempfehlungen zur Berücksichtigung grundwasserabhängiger Landökosysteme bei der Risikoanalyse und Zustandsbewertung der Grundwasserkörper. LAWA-Ausschuss Grundwasser und Wasserversorgung (29.02.2012).

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

The method for identifying GWDTEs is to overlay parameters and data of nature conservation (ecology), water management and hydrogeology. Relevant areas are, for example, designated after overlaying the above-named spatial data with information about depth of groundwater levels. Potential GWDTEs were assumed for depths of groundwater levels between 0 and 5 metres under ground surface. In individual cases the ecological sensitivity of groundwater dependent areas and potential damages due to groundwater abstraction may be documented.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

Impacts on the natural balance caused by groundwater abstraction can be identified on the basis of the results of regular hydrogeological and ecological landscape monitoring. In order to establish direct correlations, areas for ecological monitoring and hydrogeological monitoring stations are designated and operated in the same zones. In addition, reference areas in similar biotopes and habitats outside the area where groundwater abstraction has led to lower levels can be used for comparison. This allows for the identification and documentation of changes in the ecological status of GWDTEs.

Generally hydrogeological monitoring focusses on determining and analysing impacts on GWDTEs through measuring groundwater levels and analysing the trend of groundwater levels at monitoring stations. Downward trends in the depths of groundwater levels are also indicators for potential negative effects.

Individual assessments and reviews are then carried out for the specific case area.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

Data is gathered from landscape ecological and hydrogeological monitoring networks. In certain cases, monitoring is supplemented with specified monitoring stations within and beyond the area of impact of groundwater abstraction (representative areas, unburdened reference areas for comparison or permanent monitoring areas and activities).

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

The competent water authorities of the Länder carry out the review of landscape ecological and hydrogeological parameters. Nature conservation authorities have to be included in the procedures under water law for groundwater abstraction. Water and nature conservation authorities aim to realise environmentally sound and sustainable groundwater abstraction that allows the conservation of wetlands and groundwater dependent terrestrial ecosystems. Potential for regeneration of damaged GWDTE's can be determined in the course of procedures under water law, taking into account the principle of proportionality and decisions taken on tapping that potential. The technical and enforcement authorities of the Länder assess the results and coordinate the reviews.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

In some cases the network of monitoring stations and the integration of landscape ecological data (historical data, soil data, limnological data etc.) need to be improved. Exchange of information and

data between the different authorities and institutions can generally be further improved and automated.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

The current CIS guidelines are sufficient. The national Guidelines and recommendations for action (see earlier footnote 1) already take into account the relevant CIS documents such as the Technical Report on Groundwater Dependent Terrestrial Ecosystems of 2011.

The technical report only addresses GWDTEs. A consideration of groundwater dependent aquatic ecosystems is lacking.

9. Hungary

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

For the Art. 5 Report 34 habitat types have been identified as potentially groundwater dependent (GWD), i.e. groundwater may have a significant role in their water supply. The General National Habitat Classification System (Á-NÉR) was the background material for the selection.

Regarding localisation, Natura2000 sites have been considered as basis only, since usually not all habitats are GWD inside a NATURA2000 site. On the other hand, important occurrence of the selected habitats is possible outside NATURA2000 areas as well. For the preparation of the RBMP a standard national habitat map was not available yet, making it impossible to produce a reliable GWDTE map. (Regional or local scale maps facilitated the evaluation.)

From another approach, potential areas have been delineated where soil and groundwater conditions are suitable for GWDTEs. (According to criteria on mean groundwater depth depending on soil type and depth of root zone.) These areas should be considered in the estimation of the water demand of GWDTE, even if the present land use is agriculture.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

The above mentioned 34 habitat types have been selected by ecologists based on expert knowledge. (No specific investigation has been carried out.) Majority of these habitats needs supply from both surface and groundwater. The dominant source depends mainly on the habitat type but on the given location (occurrence) as well. So, except some obvious cases, significance of GWD is to be evaluated considering local circumstances and to decrease this lack of knowledge is one of the future tasks (see later).

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

According to a standard definition, damage can be stated if the habitat differs from its good status more than 30% in one growing period, or more than 20 % in general. However, this definition has not been applied in practice for the status assessment in RBMP; instead, damage of the ecosystems (not only GWDTE) have been characterised based on the expert judgement of the responsible persons of the National Park Directorates.

In the next phase of planning the results of a regular survey (with standard methodology) can also be used. It is included in the recently developed habitat database (MÉTA, 1.0), which characterises the occurrence and the status of the habitats by hexagons of 35 ha. Of course, this generally available information cannot replace the local assessment and expert judgement still needed especially in damaged areas.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

CORINE habitat map (major categories), results/maps of regional or local studies, potential GWDTE areas were/are available at the national institute responsible for RBMP. META Habitat Data Base is handled by the Botanic Research Institute. Information on the specific protected areas is gathered by regional National Parks. No centralised monitoring is operated for GWDTE. Harmonisation of the information and summary of the evaluation for RBMP is the responsibility of the National Institute for Environment.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

See Q4.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

- More accurate localisation of GWDTE. New methodology of mapping is developed and applied in a pilot area. It is based on the harmonisation of the CORINE LCD and the META Habitat Database. To be applied for the whole country.
- Mapping of status of the habitats (data are available from the regular habitat survey from META Habitat Database. The habitat map will allow using GIS facilities. .
- More accurate “bottom-up” estimation of the water demand of GWDTE. Methodology includes: determination of major habitat types (simplification of the 34 types), type specific criteria on required groundwater fluctuation and its conversion to surplus of transpiration from groundwater and finally the summation by GIS facilities (habitat maps in META database are already available for the whole country).

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

- Evaluation of significant damage of GWDTE. Clear separation of the problems related to decreased surface runoff or lower groundwater level.
- More accurate determination of type specific criteria on required groundwater fluctuation and its conversion to groundwater flux.
- Possible help/coordination: Harmonisation of methodology. Intercalibration of damage. Standardisation of GWDTE monitoring (not only groundwater level fluctuation.).

10. Iceland

The answers to your questions on GWDTEs as regards Iceland of course reflect that we are entering the first cycle of creating a RBMP, while others have completed their RBMPs and are entering the second cycle of a revision of these plans.

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

For the first RBMP (covering Iceland as one region) it has been decided to delineate GWDTEs according to sub-class 412 Peatbogs in the CORINE surface classification for Iceland. This subclass covers 6.3% of the surface area in Iceland. As for Natura 2000, the implementation of the Habitats Directive in Iceland is still at a preparatory stage, and therefore we can not rely on data from that. Last year our Parliament endorsed an application for IPA (Instrument for Pre-Accession Assistance) support for the work necessary to implement the Habitats Directive. While the application of Iceland to join the EU is on hold, it is not clear whether this work will proceed according to plan.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

It is based on expert knowledge that the very existence of peatbogs is dependent on a high groundwater table.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

No assessment has been made of damages to the present GWDTEs, as they are generally pristine. Some efforts are being made for reclaiming former wetlands that have been drained for agriculture in the past.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

This has not yet been decided.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

The coordination of data collection and monitoring is in the hands of the Environment Agency of Iceland. The hydrological monitoring network is run by the Icelandic Met. Office.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

Not applicable, we are still in the first cycle!

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

Lack of ecological and hydrological data on GWDTEs is a constraint; information and experience exchange on how to handle that would be very helpful and WG C and/or DG-Environment can certainly help in this regard.

11. Ireland

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

11 priority GWDTE types were prioritised from within the Annex I Habitats list listed as Natura 2000 habitat types. The 11 GWDTE types in Ireland are:

- Alkaline fen
- *Calcareous fen with *Cladium mariscus* and *Carex davalliana*
- *Petryfing springs with tufa formation (*Cratoneurion*)
- *Active Raised bog
- Transition mire (quaking bogs)
- Blanket bog (*if active) (FLUSHES ONLY)
- Northern Atlantic Wet heaths with *Erica tetralix* (FLUSHES ONLY)
- *Turloughs
- *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*
- Machair (*in Ireland)
- Humid dine slacks

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

Primarily GW dependency was determined using expert knowledge of the hydrodynamics of the generic wetland types, with some degree of dependency on the GWB assumed. The majority of the identified GWDTEs had been investigated by the Irish conservation authority under the Habitats Directive, although only a few sites have been studied in detail.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

“Damage” was identified from the original Habitats designation submissions i.e. the original appraisal of Habitat condition. This would have focused on the GW dependent flora/fauna and the condition may have been updated if more recent information was available (e.g. from further studies). Currently the assessment of ecological damage is one area that has not been addressed in a consistent manner in Ireland and we are working to address this during the current WFD cycle for the GWDTE identified during the 1st cycle.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

A number of site specific or wetland type specific studies have been undertaken in Ireland to satisfy the requirements of the Habitats Directive. These studies are in various stages of completion. Further to this, a number of national overview studies have now been undertaken to bridge the requirements of the WFD and Habitats Directive, and it is hoped that this work will enable WFD assessments to operate in parallel with Habitats assessments.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

Primarily the ecological aspects and Habitats obligations have been undertaken by Ireland's conservation Agency (National Parks and Wildlife Service), with hydrogeological, information gathered by the Geological Survey of Ireland and monitoring data by the EPA.

One of the primary sources of site specific information has been via academic studies or studies related to infrastructural development (through appropriate assessment reports). These have produced detailed ecological and hydrogeological data which has been supplemented by WFD regional monitoring data. The combination of information has been used to draw conclusions for the WFD.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

We now recognise that the GWDTE assessment process will take a long time and have switched emphasis to developing a common (ecological and hydrogeological) framework for their assessment. This will result in prioritisation of sites, but will also allow for new sites to be added to the list as more "Habitats" information becomes available.

In conjunction with the prioritisation process we've been gathering information on the current ecological condition and environmental supporting conditions for prioritised GWDTE's i.e. both tasks are undertaken at the same time, by the same group of people, with a view to determining which ones will require further studies (those that are at risk of failing the environmental objectives under WFD) and potentially will require mitigating measures.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

One of the biggest challenges has been trying (and we still aren't there yet) to bridge the Habitats objectives with those of the WFD. The emphasis for the Habitats Directive in Ireland has been to identify and designate as many existing pristine Habitats; Habitats that have the potential to be pristine; or Habitats that were once known to be pristine. This has presented obvious, if not impossible, challenges with regards to restoring some of the sites to pristine condition (which may have existed 50+ years ago) and satisfy the requirements under the Habitats Directive. Consequently it has also led to prioritisation and resource issues due to the sheer scale of the challenge.

Any guidance / steer from WG C / DG-Environment on a framework or approach to prioritisation of GWDTE assessments within their parent Habitats designation would help. As would a formal acknowledgement (it's certainly been indicated informally) that the assessment process and satisfying the environmental objectives for all GWDTE under WFD will take a long time, probably beyond the current 2027 deadline.

12. Luxemburg

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

To identify GWDTE's different available information were used. Search was limited on Natura 2000 sites though. According to the approach used by Austria investigations are currently on-going whether criteria like surface or representativeness of species should be considered to identify WFD relevant GWDTE's.

If available management plans containing information about biotopes of the appendix I of the "Habitats Directive" were used.

Additionally Luxembourg has defined several numbers of national biotopes² among which are being considered as GWDTE's (e.g. natural springs, large sedge communities, humid grasslands,...). A large number of these biotopes were identified through a national wide cartography realized between the years 2007 and 2012 within the agricultural landscape (Ministry of Sustainable Development and Infrastructures, 2007-2012)

² Protected by: Art.17 de la loi modifiée du 19 janvier 2004 concernant la protection de la nature et des ressources naturelles.

The cartography of the forest communities published in 2002 by the former Ministry of Environment and the Administration of Water and Forests is another tool being used. Finally the cartography of petrifying springs with tufa formation, realised for a specific region inside Luxembourg (Administration of Water and Forests, Service of Nature Conservation, 2001) was used. The following table shows all the biotopes which were considered of being GWDTE's. Some of the ecosystems may as well be influenced by surface water. In these cases groundwater data (geological-hydrogeological maps, information of nearby springs, wells or other monitoring points) as well as soil and topography may give more precise information on the origin of influence.

Biotope Code	Biotope	Comment
BK04	Large sedge communities	Can be influenced by groundwater or surface water
BK05	Natural springs	
BK10	Humid grasslands	Can be influenced by groundwater or surface water
BK11	Humid uncultivated land, bogs influenced by springs, fens, small sedge communities	The humid uncultivated land is mostly influenced by surface water whereas the small sedge communities can be influenced by both types of water supply.
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils	Can be influenced by groundwater or surface water
7140	Transition mires and quaking bogs	
7220	* Petrifying springs with tufa formation	
91D1	* Bog woodland	
91E0	* Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)	Can be influenced by groundwater or surface water
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the <i>Carpinion betuli</i>	

Currently criteria's like surface of the GWDTE's and representativity of the species are evaluated in order to be considered for final identification of relevant GWDTE.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependant; for example did you use expert knowledge or investigations?

To determine whether a biotope is influenced by groundwater, soil and topography maps as well as groundwater data (geological-hydrogeological maps, information of nearby springs, wells or other monitoring points) are used.

As example the occurrence of springs in an area where potential GWDTE's are located within a groundwater body is an indicator that other biotopes may also be influenced by groundwater. Biotopes found next to streams or rivers or lying below steep slopes are most likely influenced by surface water, as there is no significant occurrence of alluvial groundwater in Luxembourg. Biotopes found in the middle of slopes or above are most likely influenced by groundwater. This is especially true with the analysed forest types.

A mixed influence of both water types has to be considered in some cases.

A further open question is how to consider ecosystems which are exposed to seasonal variations (e.g. subsurface water flow limited winter months).

The identification is done in collaboration with (biological) experts, environmental associations and representatives of the Ministry of Environment.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

The investigated biotopes, excepted the forest communities were evaluated throughout a standardised questionnaire based on ecological criteria's.

Examples of occurring damages are: drainage, nutrient input from adjacent surfaces, type of agricultural use (uncultivated land or intensity of agriculture).

The presence of stinging nettle and thistles in GWDTE's are considered as an indicator of the presence of nutrient loaded groundwater.

Concerning springs, it has been considered whether their natural occurrence have been influenced/damaged by infrastructures or cattles.

In representative areas (e.g. natural springs located at the Our Valley in the Devonien groundwater body) the above mentioned observations are currently being verified by a campaign of groundwater quality analysis.

Additionally the water quality of groundwater points (spring catchment, borewells,...) located in an representative area (distances to be determined) around GWDTE's will be provide information of possible damages of GWDTE's an their magnitude.

These investigations started in 2013 and the first results are expected by the end of the year.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

The gathering of data has been done by existing information provided by the management plan based appendix I of the "Habitats Directive, national biotopes, cartography of the forest communities and the cartography of petrifying springs with tufa formation (cf. question 1).

Currently evaluations are on-going whether to determine if hydrogeological monitoring networks can also be used (cf. question 3).

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

The Water Management Agency (WMA) has contacted the representatives of the Ministry of Environment in order to gather the existing ecological information's mentioned under question 3. Through these informations WMA in collaboration with a specialized engineering firm in both geological an ecological aspects assessed site specific data collected by ecological organizations. The assessment of significant damage by using data from hydrogeological monitoring networks and water quality data will be started by end of 2013.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

The assessment of GWDTE according to the CIS technical guidance document started during the elaboration of the 2nd status assessment due to the end of 2013. GWDTE have been considered insufficiently during the first cycle due to a lack of knowledge.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

The main remaining constraints are the development of an assessment methodology in order to identify significant damage reflecting the national context. The critical size of GWDTE to be considered has also to be determined. Coordination and exchanges within Working Group C / DG-Environment are essential for a small MS with limited resource. As an example the identification of GWDTE will be done according to the CIS guidance and the Austrian methodology.

13. Malta

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

Malta is still in the process of identifying groundwater dependent terrestrial ecosystems. Identification of such dependent ecosystems was limited to those Natura 2000 sites which are characterised by habitats and/or species directly dependent on the presence of freshwater for a number of months during the year.

The priority habitats used to assist in this identification process were the *Salix alba* and *Populus alba* galleries, whilst freshwater dependent species included the *Elatine gussonei* and the *Discoglussus pictus pictus* C. The hydrogeological characteristics of these sites were also investigated, including geology and direction of groundwater flow.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

Field investigations guided by information regarding the location of water-sensitive ecosystems were carried out to establish the potential link between groundwater and terrestrial ecosystems. Additional field investigations are currently being carried out so that freshwater dependent habitats and species are mapped. Any existing literature sources, maps and data that shed light on the above mentioned parameters are being used.

The degree of dependency, i.e. whether the ecosystems present are critically dependent on groundwater flow and chemistry has however, not yet been established.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

One year monthly monitoring data of chemical, hydromorphological and biological parameters as established by the WFD was carried out, using standard methods of surveying. The extended biotic index was used to assess the ecological value of the watercourses dependent on inputs from groundwater sources. A list of observed pressures was also compiled. In this way the ecological quality of the surface water system is being assessed. However, the ecological quality of the GWDTE has not yet been established. Furthermore since pressures on surface water systems may originate from a number of different pathways, such as surface water flows, aerial deposition, direct disposal and indirect groundwater recharge, the actual determination of whether the pressure is directly related to groundwater quality and quantity is also yet to be established.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

Malta utilised the WFD monitoring network established for purposes of gathering baseline data at all inland surface water and transitional waters sites. This monitoring network is subject to revision following the outcome of the current study.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

To date the Malta Environment and Planning Authority has carried out water quality monitoring related to those surface water environments harbouring GWDTEs. On the other hand the Malta Resources Authority provides MEPA with any hydrogeological data that is available relevant to the selected GWDTE.

Malta is continuing to work, as part of a longer term strategy towards identifying what level of ecological and hydrogeological data is required to enhance current knowledge on the interactions between groundwater and surface water ecology. It is expected that the gaps identified in the baseline will help to carry this investigation a step forward.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

The hydrogeological and hydrochemical pathways between a suspected groundwater body and associated GWDTE will have to be further investigated. If it is the case that a high degree of dependency between the terrestrial ecosystem and groundwater body is established; and the GWDTE is assessed to be damaged; and any relevant threshold values of the linked groundwater body result in exceedances, further investigative monitoring will have to be called for.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

The process is ongoing and the main constraint is the length of the study to ensure a broad classification in order to assess both inter and intra-annual variability of these systems. Working Group C can help by collating experiences in different Member States and identifying characteristics/approaches specific to different climatic conditions.

14. The Netherlands

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

In the Netherlands we considered Natura 2000 areas as well as a list of most desiccated nature areas. Some provinces additionally included extra nature areas.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

We have used expert judgement in the first round and have started collecting data for the second round.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

See Q2.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

Data on these (Sense of urgency and Top list) areas were provided by Provinces and nature conservation organisations being responsible in the Netherlands for nature management (including N2000). Additional (specific) monitoring of GWDTE has not been carried out within the WFD-monitoring network. Currently, we are examining other available existing information about abiotic conditions needed to keep GWDTE in good condition.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

The Ministry of Infrastructure and Environment (being responsible for the implementation of the WFD in The Netherlands) has coordinated the gathering of information, which was carried out together with Provinces and Water Boards and the Ministry for Economic Affairs (being responsible for the implementation of Natura 2000 / Birds and Habitats Directive). Monitoring for the Groundwater Directive to assess the WFD Groundwater status occurs at 10 and 25 m deep. Next to that, several institutes have investigated and compiled information about different habitat-types including their abiotic requirements (mainly within the context of N2000 / the Birds and Habitats Directives). On a habitat basis, information about groundwater level, N, P and chloride is now available. This information refers generally to the top layers in the soil and the first few meters of the groundwater.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

For GWDTE's we will increase the use of information gathered within the context of the implementation of Natura 2000 / the Birds and Habitats Directive, in particular gathered within the context of setting up the Natura 2000 Management Plans.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

There are no issues to be resolved in the Netherlands that require support by WG C or DG ENV.

15. Poland

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

GWDTEs in Poland were selected within areas that are protected under national legislations within which selected types of habitats defined as dependent on water occur. Protected areas included Natura 2000 sites, special areas of conservations, special areas of protection, national parks and nature reserves. Types of habitats dependent on water were defined based on literature review and expert knowledge.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

To designate GWDTEs have been used data from project dealing with wetlands (2008) combined with the information provided from the General Directorate for Environmental Protection (2012) responsible for nature protection in Poland and expert knowledge in water regions.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

Standard method : Within the monitoring of species and habitats, including some wetland habitats assesses the state to protect them. Methodology monitoring that has been adapted to the requirements of the report on the implementation of the Habitats Directive. According to the level of each species and habitat type is assessed using data for the parameters status due to conservation, and based on their assessment received the conservation status (GWDTE status). The parameters evaluated for the species are: population, habitat and species protection perspective, and for the habitat type: surface, structure, functions, protection perspective. For the parameters of structure and functions of the natural habitats type and population and habitat of the species - are evaluated on the basic indicators specifically selected for a particular species and habitats, depending on their biology and ecology conditions.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

We rely on ecological data produced under the State Environmental Monitoring Programme and on hydrogeological data are combined.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

Ecological assessments, whether a GWDTE is damaged or not is mostly performed in the process of nature protection planning, using ecological data and hydrogeological data. This information, if available, is later used in assessment of groundwater status, based on groundwater monitoring data. To supplement groundwater monitoring data hydrogeological maps of Poland are used in the assessment. These include areas of groundwater depressions.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

We consider to run the methodology for the assessment of GWDTE in cooperation with General Directorate for Environmental Protection but in 3th cycle.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

Limitations: 1. Missing information on the exact localisations of groundwater depended terrestrial ecosystems. Help from WGC: 1. Giving technical support.

16. Portugal

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

Portugal hasn't yet identified GWDTE at a national level, although for some River Basin Districts some approaches were developed to identify GWDTE at the first River Basin Management Plans (RBMP).

The criteria used at most of the RBMP were NATURA 2000. The habitat categories selected were for instance "Mediterranean Temporary Ponds" (Habitat 3170) in the south of Portugal. For the RBMP

(Sado-Mira, Guadiana and Algarve) at the South of Portugal were also identified the summer pools on temporary rivers.

For the Tagus River Basin Management Plan was developed an approach based on geology and plants distribution that includes:

1st step - Based on the geological knowledge. The identification of the areas where the relationship between surface and ground waters provide conditions to support an ecosystem whose water supply is ensured, in whole or in part, from groundwater. In these areas are included NATURA 2000 habitats such as “Mediterranean Temporary Ponds” (Habitat 3170) in the south of Portugal.

2nd step – The information obtained at the 1st step was crossed with plants distribution, according to the National Herbaria, considering the plants that are present on areas where the relationship river-aquifer control water availability, in order to confirm the presence of GWDTE.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

See answer to question 1.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

Portugal didn't evaluate the GWDTE ecological quality.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

The GWDTE were identified applying the methodologies described in 1. There is no specific monitoring network for GWDTE.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

The Portuguese Environment Agency (Agência Portuguesa do Ambiente, I.P.) is the water authority in Portugal and is responsible for the water monitoring networks, including quantity and quality, despite the ecological monitoring of surface waters is very recent. This information is available at a national database.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

In the 2nd planning cycle we are planning to develop a methodology for the identification of GWDTE at the national level and for the evaluation of their ecological quality.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

Our main constraints are budget restrictions.

In terms of DG-Environment we think that will be important to have research projects concerning this subject. In terms of Group C, it will be important to have orientations concerning the criteria to determine the magnitude of damage in the GWDTE and to establish TV values in GWDTE.

17. Slovakia

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

Slovak republic (SR) suggests as main signification criteria of GWDTE's - the habitats classified in Habitats Directive 92/43/EEC at once – and belongs to the NATURA 2000 network in accordance with CIS Guidance No. 6 recommendation.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

For GWDTE's identification SR used synthesis of chosen habitats and quaternary GW bodies localized in river alluvial deposits or GW bodies dynamically linked with prequaternary GWB in spring areas.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

In addition, very important for efficiency of quantitative status GWBs evaluation is to make allowance for criteria – ratio of dimension of GWDTE's and GWB's. In general GWDTEs are small areas, which can not indicated conditions of the much larger areas of GWBs. Thereby, only the ecosystems, which occur in sufficient density within the frame GWB have been incorporated into the catalog. For better understanding of the relations between GWB and dependent GWDTE there is suggesting to create a geographical database, which should contain the following data about significant GWDTE (mode of groundwater from the nearest monitoring boreholes, geology, basic characteristics of soils, sorts of habitat, claims of particular habitat for water from groundwater units, identification of GW consumptions, the distance from a watercourse and location in river system, locality demarcation of drainage area, land use).

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

SR rely on national ecological and hydrogeological monitoring networks, hydrological network of SHMU, selected habitats of NATURA 2000, database of wetland.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

SHMI under supervising of Ministry of Environment coordinates the gathering of information. Until now first step - List of national GWDTE is working out.

Cooperating organizations:

- Institute of Landscape Ecology of Slovak Academy of Sciences (ILE SAS),
- State Nature Conservancy of Slovak Republic (SNC SR)
- DAPHNE, Institute of Applied Ecology.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

It is needed:

- to work off Methodology of chosen GWDTE's status evaluation
- results to incorporate into assessment of GWB's quantitative status

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

The assessment of qualitative status of GWDTEs is problematical.

18. Spain

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

In Spain several state and regional organizations have carried out mainly specific studies to identify and to establish the ecological characterization of wetlands, because they are the groundwater dependant terrestrial ecosystems most significant in Spain.

Although Spain has not carried out a specific study about identification of GWDTE for the whole country, for many years, there have been numerous research studies developed by organizations with responsibilities in water and environmental management, as well as Universities. These studies are our fundamental documents on which the specific identification of de GWDTE's will be assessed.

In all these studies carried out has been taken into account mainly:

- Natura Network 2000
- Ramsar Wetlands,
- Natural river Reserves
- Inventory of the Spanish Wetlands (in continuous updating)
- Regional inventories wetlands (in continuous updating)

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

GWDTE's has been identified through studies, inventories and national and regional catalogues of wetlands. As specific study of identifying GWDTE's, the best and most recent approach for its identification and characterization has been carried out by Administration Assignment between the General Direction of Water (DGA) and the Geological Survey of Spain (IGME, 2007). This identification and characterization was based on the National and Regional Inventories of Wetlands, Spanish White Book of Water, available studies and information on projects of different Spanish organizations. The main objective of this project was to identify the connection between GWB and locations within Natura Network 2000, rivers, wetlands and other natural ecosystems of special water interest. The name of this project was:

"Identification and characterization of the interaction that occurs among groundwater, streams, springs discharges, wetlands and other natural ecosystems with special water interest" (IGME, 2007).

Work carried out by Spain on the state management River basins only (formed by 9 River basins). The participation and knowledge provided by Spanish experts and researchers has been crucial for this work and also for their starting studies. It should be noted that the study cited above, IGME 2007, considering that it was based on existing research studies conducted by experts from various fields (ecologists, limnologists, hydrogeologists, geologists, biologists, engineers), state and regional agencies, also combined with advanced GIS tools.

A preliminary analysis of wetlands that are directly related to groundwater, among other objectives, has been carried out in this study.

A summary of the methodology applied are mentioned below in order of priority:

- a) Identification of wetlands geographically associated to groundwater bodies (GWB)
- b) Establishment a typology of wetland which depends on GWB. This typology was defined on a set of descriptors, such as: type of supply, type of drainage, and the hydro period.
- c) Attempt to apply that methodology to wetlands inventoried.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

Some specific studies have been carried out over the years in some of the most important wetlands of Spain such as Doñana, Las Tablas de Daimiel, La Albufera de Valencia, to quote a few, but it has not done this work uniformly nationwide.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

The information is distributed among different institutions, research centers and universities. Spain has a solid knowledge about this matter. The results of the studies mentioned above, undertaken by the DGA and IGME, and others studies from several public organism will be used in the future to complete and update the characterization of GWDTE. There has been a broad participation of experts in order to improve the characterization of these ecosystems. Even though, there has not been coordination at national level not even a compilation of data for this purpose.

Public organisms and principal studies are listed below:

- Ministry of Agriculture, Food and Environment. Biodiversity Division:
 1. Spanish Inventory of wetlands (2006), which has its origins in the study of Wetlands of the Spanish Peninsular: Inventory and Characterization (1990)
http://www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/inventario-nacional-de-zonas-humedas/index_invent_zonas_humedas.aspx
 2. Preliminary Ecological basis for the conservation of natural habitat types of Community interest in Spain. Baseline study with very few international precedents and none of this magnitude, which provides complete information from the best available scientific knowledge on Spanish ecosystem types, that are included in Annex I of the Habitats Directive. Through identification, adequate description of these habitats and the establishment of what we can consider a habitat as favourable conservation status, Spain has a definite image towards we need to guide our actions.
- Ministry of Public Works. Center for Hydrographic Studies (CEDEX).
Currently, a project consisting in the codification and the mapping of the Spanish hydrographic network 1:25000 developed by CEDEX is about to come to completion. This project will provide us a possible identification of unknown endorheic basins and a higher accuracy of the well-known endorheic basins, and it will help us to complement the GWDTE characterization.
- Ministry of Economy and Competitiveness. Geological Survey of Spain (IGME)
The IGME is currently working on the "Hydrogeological characterization of the Spanish wetlands included in Ramsar Convention" This paper identifies the possible relation between the GWB and the Ramsar wetlands declared after 2003 although this list is expanding.
- Officials catalogues and inventories of wetlands from the Autonomous Regions:
Monitoring programs in some wetlands exist in the various Autonomous Regions of Spain at different levels of advancement, these served as the basis for the creation and further development of the Spanish National Inventory.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which

organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

There is neither a monitoring network available nor coordination in this regard.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

Spain has a wide range of documented scientific knowledge about wetlands. Wetlands are the most numerous and significant terrestrial dependent ecosystems in Spain. Through a well-organized coordination this information could be integrated effectively in order to identify and characterize GWTE at national level. This coordination will have to be done for the second planning cycle. The Ministry of Agriculture, Food and Environment will play the role of coordinating this scattered information, which lies within different institutions at different political levels (National, Regional and Local). In carrying out this task, Spain will set the basis for the selection and categorization which GWDTE has priority interest in conservation and as a consequence which ones will be taken into account during the second planning cycle.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

Major limitations:

1. The information is scattered in different institutions / research centers, and it is necessary to standardize / centralize it.
2. Improve the analysis of the available information and extend the investigation to GWDTE which its hydrogeological processes are unknown.
3. Identification of management priorities, prioritize them by importance and coordinate different Government agencies involved in its management.

How will WG help Spain?

1. Providing guidelines for action in other countries.
2. Giving technical support.
3. Promoting the exchange of experiences, methodologies, working and management tools.
4. The use of case studies

19. Sweden

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

We use Natura 2000. During the last year the local water authorities have evaluated groundwater level dependency for all N2000 habitat categories. These categories have also been evaluated according to occurrence, i.e. if they are common or not. This study has helped in prioritising habitat categories (and in identifying N2000 sites with prioritised categories present).

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

We use expert knowledge or "desktop investigations". We have not undertaken any field investigations so far.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

We use the Natura 2000 classification as a starting point and are looking into the plans for updating the Natura 2000 management plans to see which information we can extract on habitat change or damage (conservation status). We have not fully developed the methodology for GWDTE classification. We have identified habitat categories that are sensitive to groundwater level change, but so far we have no results on chemical effects on GWDTEs. However, a literature study of the chemical aspect of the issue is scheduled this year.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

We rely on national networks and have not any site specific studies yet. Data is generally very scarce. We are in the process of running a GIS-analysis to identify groundwater bodies that are hydrologically connected to the N2000 sites in which any of the prioritised habitats are present.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

We are still in the beginning of this process. No monitoring has been done so far in GWDTEs. It has proven difficult to engage other disciplines than groundwater experts working with WFD in this. Natura 2000 sites are managed by the regional administrative agencies which are not always coordinated with the local water authorities.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

In this cycle we will identify terrestrial ecosystems with a probable dependency on groundwater. We are aiming to identify the dependency both from a quantitative (level) and qualitative (chemistry) perspective. But this we will do without targeted field investigations.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

WGC should keep prioritising this topic in mandate discussions and stress the need for further guidance on chemical aspects of damage on GWDTEs and on aquatic ecosystems.

The main challenge is to engage the different disciplines and explain why this is important. There is an abundance of groundwater dependent ecosystems in our country, both terrestrial and aquatic, and it is a challenge to prioritise which ecosystem to focus on. In situ waste water plants often use wetlands as a final treatment stage using the ecosystem service the wetland provides. Hydrogeologists have difficulties in prioritising from an ecological perspective and ecologists may have basic knowledge of hydrology or limnology but often lack awareness of groundwater and its interaction with the habitats they survey.

20. Switzerland

Q1. How has your country identified GWDTE's? For example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

Due to Switzerland's EU non-membership it is not subjected to the WFD and there is no obligation for the systematical assessment of GWDTE. National databases exist for specific groups of GWDTE, e.g. peat bogs.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

Where GWDTE are defined classification was made mainly by expert judgement and based on already existing studies.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

Not applied.

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

Not applied.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

A general overview of GWDTE types on a national scale is currently provided by the Swiss Federal Office for the Environment, i.e. the national environmental agency.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

Not applied.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

Consistent approaches for the identification of GWDTE on a national scale are still missing. Important input could come from experiences on screening criteria.

21. United Kingdom

The Environment Agency approach for assessing significant damage to groundwater dependent terrestrial ecosystems (GWDTEs) for England and Wales.

Q1. How has your country identified GWDTE's? for example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's

The selection of sites is based on the occurrence of vegetation assigned with a groundwater dependency rating by UKTAG Wetland Task Team (paper 5a-b, 2004), using the UK National Vegetation Classification (NVC). The list comprises mainly statutory International (Natura2000) and nationally (Sites of Special Scientific Interest) designated sites. A few non-statutory sites of local conservation importance were also included where data was available.

The Welsh sites comprise predominantly grassland and peatland type habitats. English sites represent a range of habitat types.

Q2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

The assessment of groundwater dependency considers both the connectivity of a site to the underlying groundwater body and the sensitivity of the flora to groundwater. This considered expert knowledge, UK National Vegetation Classification and geological data, modelling and investigations.

Q3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did your country use a standard method of surveying GWDTE ecological quality?

Ecological quality is assessed using condition data gathered using the UK Common Standards Monitoring (CSM) Scheme (JNCC, 2004) by the lead conservation agencies for the Habitats Directive. The magnitude of damage is assessed using chemical and hydrological monitoring data with reference to a series of eco-hydrological guidelines for wetland habitats, published by the Environment Agency in collaboration with the statutory conservation agencies and academic experts on each habitat. The approach is set out in the UKTAG (2007) Guidance on Groundwater Quantitative Classification for the purposes of the Water Framework Directive.

Additionally, a specific method was developed for identification of ecological damage due to nutrient enrichment, and tested during site specific investigations.

A paper is being prepared for publication (Gareth Farr et al., unpublished at present).

Q4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

The initial risk screening assessment is a desk-based approach using national hydrogeological data combined in a GIS. Expert judgement, local knowledge and site specific data are then used to refine the results in the subsequent stages. Resources are focussed on those sites known or thought to be at high risk initially. This has the advantage of making use of readily available data and reducing the number of sites requiring site specific investigations and expert assessment of significant damage described in Question 3.

Site specific ecological quality data used to assess significant damage is gathered by the statutory conservation agencies and is incorporated into a national dataset. Since these data were not collected for the purpose of the WFD they require interpretation by a suitably qualified eco-hydrologist. Some on-site monitoring of water levels and chemistry is carried out by the Environment Agency and conservation organisations at some sites.

Q5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined to assess significant damage to GWDTE's?

The Environment Agency is the lead organisation for collating data and carrying out the assessment of significant damage to GWDTEs from groundwater for the WFD in England and Wales, though Natural Resources Wales will be responsible for carrying out the assessment in Wales in the future. Much of the data used is collected and owned by the Environment Agency, with the exception of the ecological data which is provided by the conservation organisations at no cost to the Environment Agency. A small amount of GIS data is licensed from third parties.

The information is combined in a nationally prepared GIS for risk screening/characterisation, and quality reviewed by local technical experts. The classification is prepared by combining the risk screening information with ecological condition survey data from the statutory conservation agencies and any additional local data that is available. These data then required expert interpretation by an eco-hydrologist including direct discussion with local experts relating to specific sites, to reach a final status conclusion for the GWDTE test.

Q6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

- Holding face-to-face workshops with local technical specialist ecologists and hydro(geo)logists to facilitate the characterisation and classification work and resolve any outstanding site-specific and methodological issues.
- We are using nutrient trigger values developed by the UKTAG to assess chemical risk for the interim and 2nd cycle WFD results. These are based on nitrate concentrations in the groundwater body, and are linked to site condition rather than arbitrary thresholds for PO₄. Further details can be found in UKTAG (2013) Technical report on groundwater dependent terrestrial ecosystem (GWDTE) threshold values.
- We are currently exploring whether it is possible to include non-statutory sites (i.e. County wildlife sites, Local wildlife sites etc) in the classification process. This is a challenge as the information for these sites is not held centrally and amount of information and data quality are very variable.

Q7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

- Development of thresholds for other chemicals (e.g. PO₄)
- Comparison of thresholds with databases held by other EU Member States on specific habitats
- Expert knowledge/peer review of methods by WG-C members and contacts in other EU Member States
- Understanding fate of nitrate between groundwater body and the site
- Unpacking the altitude proxy (how NVCs in lowland compare with upland)
- Significance of atmospheric N deposition
- Measures, cost-effectiveness, response times, benefits.

Annex II. Contributions in tabular form per question

On the following pages, the member states' responses are given in tabular form

1. How has your country identified GWDTE's? for example did you use Natura 2000, and if so which habitat categories, or did you use another method to identify GWDTE's?

Austria	The identification of WFD relevant GWDTEs in Austria started with Natura 2000 sites and followed a stepwise strategy: Identification of all national groundwater dependent <u>habitats</u> listed under the Habitats Directive. (see next question for the criteria) Identification of all national groundwater bound <u>species</u> listed under the Habitats Directive and the Birds Directive. (see next question for the criteria) Selection of all WFD relevant and GW dependent Natura 2000 sites based on the following criteria: <u>For habitats: 'representativeness' & 'area'</u> : A GWDTE is WFD relevant when the sum of all GW dependent habitats of representativeness classes A (excellent) and B (good) exceed 5 Hectare; with 2 exceptions: special sites and priority habitats. <u>For species: 'population rate'</u> : at least one species with a population value B (at least 2% of total national population) or at least ten species with a population value C (less than 2%) are present in the Natura 2000 site. The preliminary selection was verified and checked for plausibility by comparison with scientific literature and Austrian Red Lists and the estimation of the ecological status of ecosystems, special protection needs and the role of the sites in the improvement of water status. Finally, from the 204 Natura 2000 sites in
Belgium	<i>Brussels region</i> The GWDTE's have been identified on basis of Natura 2000 habitat typology localised for Habitats Directive (92/43/CEE) Our GWDTE's categories identified are : 6430 Hydrophilous tall herb fringe communities of plains 7220 * Petrifying springs with tufa formation (Cratoneurion) 9160 *Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli 91E0 * Alluvial forests with Alnus glutinosa and Fraxinus excelsior (AlnoPadion, Alnion incanae, Salicion albae) Other habitats could be identified on the knowledge provided by hydrogeological modeling of groundwaterbodies.
Bulgaria	<i>Black Sea River Basin Directorate</i> "The lists with protected areas, according to:the Protected Areas Act (Article 8 (1) The parks of national significance, listed in Annex 1 hereto, and the nature reserves, listed in Annex 2 hereto, which serve to meet public needs of nation-wide import) Biological diversity Act (Art.6 (1) Special areas of conservation shall be designated for: 1. conservation of natural habitats listed Annex1 hereto; 2. conservation of habitats of plants and animals (excluding birds) listed Annex 2 hereto; 3. conservation of habitats of birds listed Annex 2 hereto These lists were actual to 2008 - 2009. They were included the protected areas under Natura 2000. By using GIS analyses are covered the a.m. protected areas and the areas with shallow groundwater and thus the groundwater dependant protected areas have been identified." <i>East Aegean River Basin Directorate</i> GWDTE's have been identified on the basis of expert judgement, considering the specific habitats and species - subject to conservation in the protected areas and the aims of designation of a protected area in the territory of the EARBD. Second criteria for identification of GWDTE's is availability of shallow
Croatia	
Cyprus	
Czech Republic	The whole process is on-going now, but we know the main steps: Natura 2000 and relevant nature protection areas are the base for water (surface and groundwater) dependent ecosystems according natural characteristics and habitats categories (we do not know yet the precise approach). These protection areas will be included in the list of protected areas according WFD Art. 6. Then GWDTE's will be identified from this list by expert knowledge.
Denmark	We suppose to use both data from Natura 2000 and additional vegetation maps (2 nd cycle)
Estonia	
France	For the first WFD cycle, expert knowledge at river basin district level was used, taking into account Natura 2000 and other relevant nature protection area (wetlands defined as remarkable because of outstanding biodiversity). The identification needs to be improved based on national methodology and clear and shared definition of what is a terrestrial ecosystem and a GW dependent one. Hydrogeologists and ecologists do not always agree on definition. For the 2nd WFD cycle, first test of a national screening approach on Natura 2000 zones has been carried out by BRGM, based on the WGC technical report and British experience (water table depth/ecological list).
Finland	Finland used Natura 2000 areas. Mainly used habitat categories were "Fennoscandian springs and springfens" and "Oligotrophic waters containing very few minerals of sandy plains". Also one case with "Calcareous fens with Cladium mariscus and species of the Carex davallianae"
Germany	Natura 2000 sites (pursuant to Habitats Directive of 21 May 1992 and Birds Directive of 2 May 1979), nature conservation areas designated under national law and water body-related landscape reserves were taken into account. In some cases GWDTEs were determined based on current maps of biotopes or types of biotopes, pedological or vegetation maps that included limnological testing. The German Guidelines [1] on recommended procedures for taking into account GWDTEs in risk analyses are the basis for the methodological approach to identifying GWDTEs in Germany and part of the assessment on the status of groundwater bodies.
Greece	
Hungary	For the Art. 5 Report 34 habitat types have been identified as potentially groundwater dependent (GWD), i.e. groundwater may have a significant role in their water supply. The General National Habitat Classification System (Á-NÉR) was the background material for the selection. Regarding localisation, Natura2000 sites have been considered as basis only, since usually not all habitats are GWD inside a NATURA2000 site. On the other hand, important occurrence of the selected habitats is possible outside NATURA2000 areas as well. For the preparation of the RBMP a standard national habitat map was not available yet, making it impossible to produce a reliable GWDTE map. (Regional or local scale maps facilitated the evaluation.) From another approach, potential areas have been delineated where soil and groundwater conditions are suitable for GWDTEs. (According to criteria on mean gw depth depending on soil type and depth of root zone.) These areas should be considered in the estimation of the water demand of GWDTE, even if the
Iceland	For the first RBMP (covering Iceland as one region) it has been decided to delineate GWDTEs according to sub-class 412 Peatbogs in the CORINE surface classification for Iceland. This subclass covers 6.3% of the surface area in Iceland. As for Natura 2000, the implementation of the Habitats Directive in Iceland is still at a preparatory stage, and therefore we can not rely on data from that. Last year our Parliament endorsed an application for IPA (Instrument for Pre-Accession Assistance) support for the work necessary to implement the Habitats Directive. While the application of Iceland to join the EU is on hold, it is not clear whether this work will proceed according to plan.
Ireland	11 priority GWDTE types were prioritised from within the Annex I Habitats list listed as Natura 2000 habitat types. The 11 GWDTE types in Ireland are:
Italy	
Latvia	
Lithuania	
Luxembourg	To identify GWDTE's different available information were used. Search was limited on Natura 2000 sites though. According to the approach used by Austria investigations are currently on-going whether criteria's like surface or representativeness of species should be considered to identify WFD relevant GWDTE's. If available management plans containing information about biotopes of the appendix I of the "Habitats Directive" were used. Additionally Luxembourg has defined several numbers of national biotopes among which are being considered as GWDTE's (e.g. natural springs, large sedge communities, humid grasslands,...). A large number of these biotopes were identified through a national wide cartography realized between the years 2007 and 2012 within the agricultural landscape (Ministry of Sustainable Development and Infrastructures, 2007-2012) The cartography of the forest communities published in 2002 by the former Ministry of Environment and the Administration of Water and Forests is another tool being used. Finally the cartography of petrifying springs with tufa formation , realised for a specific region inside Luxembourg (Administration of Water and Forests, Service of Nature Conservation, 2001) was used. The following table shows all the biotopes which were considered of being GWDTE's. Some of the ecosystems may as well be influenced by surface water. In these cases groundwater data (geological-hydrogeological maps, information of nearby springs, wells or other monitoring points) as well as soil and topography m
Malta	Malta is still in the process of identifying groundwater dependent terrestrial ecosystems. Identification of such dependent ecosystems was limited to those Natura 2000 sites which are characterised by habitats and/or species directly dependent on the presence of freshwater for a number of months during the year. The priority habitats used to assist in this identification process were the Salix alba and Populus alba galleries, whilst freshwater dependent species included the Elatine gussonei and the Discoglussus pictus pictus C. The hydrogeological characteristics of these sites were also investigated, including geology and direction of groundwater flow.
Netherlands	In the Netherlands we considered Natura 2000 areas as well as a list of most desiccated nature areas. Some provinces additionally included extra nature areas.
Poland	GWDTEs in Poland were selected within areas that are protected under national legislations within which selected types of habitats defined as dependednt on water occur. Protected areas included Natura 2000 sites, special areas of conseravtions, special areas of protection, national parks and nature reserves. Types of habitats depended on water were defined based on literature review and expert knowledge.
Portugal	Portugal hasn't yet identified GWDTE at a national level, although for some River Basin Districts some approaches were developed to identify GWDTE at the first River Basin Management Plans (RBMP). The criteria used at most of the RBMP were NATURA 2000. The habitat categories selected were for instance "Mediterranean Temporary Ponds" (Habitat 3170) in the south of Portugal. For the RBMP (Sado-Mira, Guadiana and Algarve) at the South of Portugal were also identified the summer pools on temporary rivers. For the Tagus River Basin Management Plan was developed an approach based on geology and plants distribution that includes: 1st step - Based on the geological knowledge. The identification of the areas where the relationship between surface and ground waters provide conditions to support an ecosystem whose water supply is ensured, in whole or in part, from groundwater. In these areas are included NATURA 2000 habitats such as "Mediterranean Temporary Ponds" (Habitat 3170) in the south of Portugal. 2sd step – The formation obtained at the 1st step was crossed with plants distribution, according to the National Herbaria, considering the plants that are present on areas where the relationship river-aquifer control water availability, in order to confirm the presence of GWDTE .
Romania	
Slovakia	Slovak republic (SR) suggests as main signification criteria of GWDTE' s - the habitats classified in Habitats Directive 92/43/EEC at once – and belongs to the NATURA 2000 network in accordance with CIS Guidance No. 6 recommendation.
Slovenia	
Spain	In Spain several state and regional organizations have carried out mainly specific studies to identify and to establish the ecological characterization of wetlands, because they are the groundwater dependant terrestrial ecosystems most significant in Spain. Although Spain has not carried out a specific study about identification of GWDTE for the whole country, for many years, there have been numerous research studies developed by organizations with responsibilities in water and environmental management, as well as Universities. These studies are our fundamental documents on which the specific identification of de GWDTE's will be assessed. In all these studies carried out has been taken into account mainly: Natura Network 2000, Ramsar Wetlands, ,Natural river Reserves, Inventory of the Spanish Wetlands (in continuous updating), Regional inventories wetlands (in continuous updating
Sweden	We use Natura 2000. During the last year the local water authorities have evaluated groundwater level dependency for all N2000 habitat categories. These categories have also been evaluated according to occurrence, i.e. if they are common or not. This study has helped in prioritising habitat categories (and in identifying N2000 sites with prioritised categories present).
Switzerland	Due to Switzerland's EU non-membership it is not subjected to the WFD and there is no obligation for the systematical assessment of GWDTE. National databases exist for specific groups of GWDTE, e.g. peat bogs.
UK	The selection of sites is based on the occurrence of vegetation assigned with a groundwater dependency rating by UKTAG Wetland Task Team (paper 5a-b, 2004), using the UK National Vegetation Classification (NVC). The list comprises mainly statutory International (Natura2000) and nationally (Sites of Special Scientific Interest) designated sites. A few non-statutory sites of local conservation importance were also included where data was available. The Welsh sites comprise predominantly grassland and peatland type habitats. English sites represent a range of habitat types.

2. How has your country identified that the GWDTE's were groundwater (body) dependent; for example did you use expert knowledge or investigations?

Austria	Groundwater dependency was identified for habitats and for species. <u>For habitats – hydrological criteria:</u> Frequent (at least annual) raise of GW into the fine soil (covering layer); Groundwater table is permanently in fine soil (hydromorph soil); Special sites: Indirectly influenced by groundwater or located close to such waters (e.g. tuff springs). Explicit 'threshold values' for these criteria were not specified allowing for certain site specific flexibility. Finally, the application of these criteria led to the identification of 19 habitats under the Habitats Directive to be GW dependent. <u>For species:</u> Expert judgment based on the Birds Directive and Annex II of the Habitats Directive and scientific literature.
Belgium	<i>Brussels region</i> : Expert knowledge.
Bulgaria	<i>Black Sea River Basin Directorate</i> Under a Public Procurement the project 5 has been implemented with a subject: "Determination of threshold values of contamination of groundwater and development of a classification system for the chemical status of groundwater" (it has been implemented at the frame of the Operative Programme on environment) - the GWDTE's have been identified and attached to the corresponding GW bodies. The monitoring points have been included for them and all the information was included and reported in RBMP to the EC. <i>East Aegean River Basin Directorate</i> Under a Public Procurement the project 5 has been implemented with a subject: "Determination of threshold values of contamination of groundwater and development of a classification system for the chemical status of groundwater" (has been implemented at the frame of the Operative programme on environment) - the GWDTE's have been identified and attached to the corresponding GW bodies. <i>West Aegean River Basin Directorate</i> (empty) <i>Danube River Basin Directorate</i>
Croatia	
Cyprus	
Czech Republic	See Q1: The whole process is on-going now, but we know the main steps: Natura 2000 and relevant nature protection areas are the base for water (surface and groundwater) dependent ecosystems according natural characteristics and habitats categories (we do not know yet the precise approach). These protection areas will be included in the list of protected areas according WFD Art. 6. Then GWDTE's will be identified from this list by expert knowledge.
Denmark	The Assessment will presumably be based on a comparison of the location of GWDTE's, soils maps, results of hydrological model applications for current conditions, supplemented with additional analytical methods, if necessary and possible (2 nd cycle)
Estonia	
France	For the first WFD cycle, expert knowledge at river basin district level or a more local scale (GWB or site specific) was used for GW dependence. It has not been addressed in a consistent manner in France due to a lack of national methodology and the difficulty to define what is dependence to GW for a terrestrial ecosystem. Priorisation was based on pressures and vulnerability to select sites where more detailed characterisation is needed.
Finland	The river basin districts selected from the Natura 2000 areas the ones that were overlapping groundwater bodies and had groundwater related protection values. Groundwater flow directions, expert knowledge and groundwater dependent species (e.g. Cladium mariscus and Najas tenuissima) were also used as background information.
Germany	The method for identifying GWDTEs is to overlay parameters and data of nature conservation (ecology), water management and hydrogeology. Relevant areas are, for example, designated after overlaying the above-named spatial data with information about depth of groundwater levels. Potential GWDTEs were assumed for depths of groundwater levels between 0 and 5 metres under ground surface. In individual cases the ecological sensitivity of groundwater dependent areas and potential damages due to groundwater abstraction may be documented.
Greece	
Hungary	The above mentioned 34 habitat types have been selected by ecologists based on expert knowledge. (No specific investigation has been carried out.) Majority of these habitats needs supply from both surface and groundwater. The dominant source depends mainly on the habitat type but on the given location (occurrence) as well. So, except some obvious cases, significance of GWD is to be evaluated considering local circumstances and to decrease this lack of knowledge is one of the future tasks (see later).
Iceland	It is based on expert knowledge that the very existence of peatbogs is dependent on a high groundwater table.
Ireland	Primarily GW dependency was determined using expert knowledge of the hydrodynamics of the generic wetland types, with some degree of dependency on the GWB assumed. The majority of the identified GWDTEs had been investigated by the Irish conservation authority under the Habitats Directive, although only a few sites have been studied in detail.
Italy	
Latvia	
Lithuania	
Luxembourg	To determine whether a biotope is influenced by groundwater, soil and topography maps as well as groundwater data (geological-hydrogeological maps, information of nearby springs, wells or other monitoring points) are used. As example the occurrence of springs in an area where potential GWDTE's are located within a groundwater body is an indicator that other biotopes may also be influenced by groundwater. Biotopes found next to streams or rivers or lying below steep slopes are most likely influenced by surface water , as there is no significant occurrence of alluvial groundwater in Luxembourg. Biotopes found in the middle of slopes or above are most likely influenced by groundwater . This is especially true with the analysed forest types. A mixed influence of both water types has to be considered in some cases. A further open question is how to consider ecosystems which are exposed to seasonal variations (eg subsurface water flow limited winter months). The identification is done in collaboration with (biological) experts, environmental associations and representatives of the Ministry of Environment.
Malta	Field investigations guided by information regarding the location of water-sensitive ecosystems were carried out to establish the potential link between groundwater and terrestrial ecosystems. Additional field investigations are currently being carried out so that freshwater dependent habitats and species are mapped. Any existing literature sources, maps and data that shed light on the above mentioned parameters are being used. The degree of dependency, i.e. whether the ecosystems present are critically dependent on groundwater flow and chemistry has however, not yet been established.
Netherlands	We have used expert judgement in the first round and have started collecting data for the second round.
Poland	To designate GWDTEs have been used data from project dealing with wetlands (2008) combined with the information provided from the General Directorate for Environmental Protection (2012) responsible for nature protection in Poland and expert knowledge in water regions.
Portugal	See answer to question 1.
Romania	
Slovakia	For GWDTE's identification SR used synthesis of chosen habitats and quaternary GW bodies localized in river alluvial deposits or GW bodies dynamically linked with prequaternary GWB in spring areas.
Slovenia	
Spain	GWDTE's has been identified through studies, inventories and national and regional catalogues of wetlands. As specific study of identifying GWDTE's, the best and most recent approach for its identification and characterization has been carried out by Administration Assignment between the General Direction of Water (DGA) and the Geological Survey of Spain (IGME, 2007). This identification and characterization was based on the National and Regional Inventories of Wetlands, Spanish White Book of Water, available studies and information on projects of different Spanish organizations. The main objective of this project was to identify the connection between GWB and locations within Natura Network 2000, rivers, wetlands and other natural ecosystems of special water interest. The name of this project was: <u>"Identification and characterization of the interaction that occurs among groundwater, streams, springs discharges, wetlands and other natural ecosystems with special water interest" (IGME, 2007).</u> Work carried out by Spain on the state management River basins only (formed by 9 River basins).
Sweden	We use expert knowledge or "desktop investigations". We have not undertaken any field investigations so far
Switzerland	Where GWDTE are defined classification was made mainly by expert judgement and based on already existing studies.
UK	The assessment of groundwater dependency considers both the connectivity of a site to the underlying groundwater body and the sensitivity of the flora to groundwater. This considered expert knowledge, UK National Vegetation Classification and geological data, modelling and investigations.

3. How has your country assessed if the GWDTE's were damaged and what criteria did you use to determine the magnitude of the damage; for example did /your country use a standard method of surveying GWDTE ecological quality?

Austria	The definition of 'significant damage' according to the WFD is set in relation to the favorable conservation status under the Habitats Directive. A method for assessing the conservation status was developed and published based on indicators and threshold values – details are laid down in the following report: http://www.umweltbundesamt.at/fileadmin/site/umweltthemen/naturschutz/Berichte_GEZ/Band_3_FFH-Lebensraumtypen.pdf (in German). The assessment frequency is according to Art. 17 FFH Directive every six years, the latest report submitted in summer 2013, but the results are not yet published
Belgium	<i>Brussels region</i> : Since the GWDTE identification is based on Natura 2000 habitat typology, assessment of damage can be seen as a part of monitoring the conservation status of these habitats. A specific method has been developed for surveying and assessing the conservations status, hence ecological quality and eventual damage of Natura 2000 habitats. Parameters and criteria for determining the conservation status are currently taken from the publication "T'jollyn, F., Bosch, H., Demolder, H., DeSaeger, S., Leyssen, A., Thomaes, A., Wouters, J., Paelinckx, D. & Hoffmann, M. (2009). Criteria voor de beoordeling van de lokale staat van instandhouding van de NATURA 2000 habitattypen, versie 2.0. Rapporten van het Instituut voor Natuur en Bosonderzoek 2009 (46). Instituut voor Natuur- en Bosonderzoek, Brussel.)". You can also find it on the website (http://www.vlaanderen.be/nl/publicaties/detail/criteria-voor-de-beoordeling-van-de-lokale-staat-van-instandhouding-van-de-natura-2000-habitattypen). Specific ecological threshold values have been established for each habitat to assess the status of conservation.
Bulgaria	<i>Black Sea River Basin Directorate</i> Damaged GWDTE's have not been established in the first RBMP. <i>East Aegean River Basin Directorate</i> Damaged GWDTE's have not been identified, because of lack of assessment methodology. <i>West Aegean River Basin Directorate</i> (empty) <i>Danube River Basin Directorate</i> There has not been made an assessment whether GWDTE's are damaged and has not been used criteria to determine the extent of damages.
Croatia	
Cyprus	
Czech Republic	The damaged GWDTE's were identified from several specific studies (however, the studies were done for few sites only). No common approach was used for the identification, the possible damage was decided in the specific studies case by case.
Denmark	We intend to compare, on the one hand old topographic maps, and maps on soils types, particularly lowland soils to identify areas where GWDTE's previously have been abundant as well as results of hydrological model applications for pristine conditions, with, on the other hand current vegetation mapping results and results of hydrological model applications for current conditions. The main goal is then to identify the impacts from groundwater abstraction, which might be traced back to the related well field. (2 nd cycle)
Estonia	
France	No standard method of surveying GWDTE ecological quality exists in France. For the first WFD cycle, expert knowledge was used on some specific sites.
Finland	The impacts to GWDTE's need to be assessed on the permit process before the permit can be granted. This is mostly applied in water abstraction permits, but it is also applied in other activities that need a permit. Monitoring obligations are also included in the permit based on the possible impacts. This has been assessed in some cases, where enough data has been available. 85 GWB's are linked to Natura 2000 areas, of which 14 GWB's are at risk of failing to meet the objectives but GWDTE's were not found damaged. The status of the GWDTE's in these 14 GWB's has been more or less estimated by looking at the quantitative status of the GWB. Other criterion to evaluate the magnitude of the possible damage is yet lacking.
Germany	Impacts on the natural balance caused by groundwater abstraction can be identified on the basis of the results of regular hydrogeological and ecological landscape monitoring. In order to establish direct correlations, areas for ecological monitoring and hydrogeological monitoring stations are designated and operated in the same zones. In addition, reference areas in similar biotopes and habitats outside the area where groundwater abstraction has led to lower levels can be used for comparison. This allows for the identification and documentation of changes in the ecological status of GWDTEs. Generally hydrogeological monitoring focusses on determining and analysing impacts on GWDTEs through measuring groundwater levels and analysing the trend of groundwater levels at monitoring stations. Downward trends in the depths of groundwater levels are also indicators for potential negative effects. Individual assessments and reviews are then carried out for the specific case area.
Greece	
Hungary	According to a standard definition, damage can be stated if the habitat differs from its good status more than 30% in one growing period, or more than 20 % in general. However, this definition has not been applied in practice for the status assessment in RBMP; instead, damage of the ecosystems (not only GWDTE) have been characterised based on the expert judgement of the responsible persons of the National Park Directorates. In the next phase of planning the results of a regular survey (with standard methodology) can also be used. It is included in the recently developed habitat database (MÉTA, 1.0), which characterises the occurrence and the status of the habitats by hexagons of 35 ha. Of course, this generally available information cannot replace the local assessment and expert judgement still needed especially in damaged areas.
Iceland	No assessment has been made of damages to the present GWDTEs, as they are generally pristine. Some efforts are being made for reclaiming former wetlands that have been drained for agriculture in the past.
Ireland	"Damage" was identified from the original Habitats designation submissions i.e. the original appraisal of Habitat condition. This would have focused on the GW dependent flora/fauna and the condition may have been updated if more recent information was available (e.g. from further studies). Currently the assessment of ecological damage is one area that has not been addressed in a consistent manner in Ireland and we are working to address this during the current WFD cycle for the GWDTE identified during the 1 st cycle
Italy	
Latvia	
Lithuania	
Luxembourg	The investigated biotopes, excepted the forest communities were evaluated throughout a standardised questionnaire based on ecological criteria's . Examples of occurring damages are: drainage, nutrient input from adjacent surfaces, type of agricultural use (uncultivated land or intensity of agriculture) . The presence of stinging nettle and thistles in GWDTE's are considered as an indicator of the presence of nutrient loaded groundwater. Concerning springs, it has been considered whether their natural occurrence have been influenced/damaged by infrastructures or cattles. In representative areas (eg natural springs located at the Our Valley in the Devonien groundwater body) the above mentioned observations are currently being verified by a campaign of groundwater quality analysis. Additionally the water quality of groundwater points (spring catchment, borewells,...) located in an representative area (distances to be determined) around GWDTE's will be provide information of possible damages of GWDTE's an their magnitude.
Malta	One year monthly monitoring data of chemical, hydromorphological and biological parameters as established by the WFD was carried out, using standard methods of surveying. The extended biotic index was used to assess the ecological value of the watercourses dependent on inputs from groundwater sources. A list of observed pressures was also compiled. In this way the ecological quality of the surface water system is being assessed. However, the ecological quality of the GWDTE has not yet been established. Furthermore since pressures on surface water systems may originate from a number of different pathways, such as surface water flows, aerial deposition, direct disposal and indirect groundwater recharge, the actual determination of whether the pressure is directly related to groundwater quality and quantity is also yet to be established.
Netherlands	See Q2 (In the Netherlands we considered Natura 2000 areas as well as a list of most desiccated nature areas. Some provinces additionally included extra nature areas)
Poland	Standard method : Within the monitoring of species and habitats, including some wetland habitats assesses the state to protect them. Methodology monitoring that has been adapted to the requirements of the report on the implementation of the Habitats Directive. According to the level of each species and habitat type is assessed using data for the parameters status due to conservation, and based on their assessment received the conservation status (GWDTE status). The parameters evaluated for the species are: population, habitat and species protection perspective, and for the habitat type: surface, structure, functions, protection perspective. For the parameters of structure and functions of the natural habitats type and population and habitat of the species - are evaluated on the basic indicators specifically selected for a particular species and habitats, depending on their biology and ecology conditions.
Portugal	Portugal didn't evaluate the GWDTE ecological quality.
Romania	
Slovakia	In addition, very important for efficiency of quantitative status GWBs evaluation is to make allowance for criteria – ratio of dimension of GWDTE's and GWB's. In general GWDTEs are small areas, which can not indicated conditions of the much larger areas of GWBs. Thereby, only the ecosystems, which occur in sufficient density within the frame GWB have been incorporated into the catalog. For better understanding of the relations between GWB and dependent GWDTE there is suggesting to create a geographical database, which should contain the following data about significant GWDTE (mode of groundwater from the nearest monitoring boreholes, geology, basic characteristics of soils, sorts of habitat, claims of particular habitat for water from groundwater units, identification of GW consumptions, the distance from a watercourse and location in river system, locality demarcation of drainage area, land use).
Slovenia	
Spain	Some specific studies have been carried out over the years in some of the most important wetlands of Spain such as Doñana, Las Tablas de Daimiel, La Albufera de Valencia, to quote a few, but it has not done this work uniformly nationwide.
Sweden	We use the Natura 2000 classification as a starting point and are looking into the plans for updating the Natura 2000 management plans to see which information we can extract on habitat change or damage (conservation status). We have not fully developed the methodology for GWDTE classification. We have identified habitat categories that are sensitive to groundwater level change, but so far we have no results on chemical effects on GWDTEs. However, a literature study of the chemical aspect of the issue is scheduled this year.
Switzerland	Not applied.
UK	Ecological quality is assessed using condition data gathered using the UK Common Standards Monitoring (CSM) Scheme (JNCC, 2004) by the lead conservation agencies for the Habitats Directive. The magnitude of damage is assessed using chemical and hydrological monitoring data with reference to a series of eco-hydrological guidelines for wetland habitats, published by the Environment Agency in collaboration with the statutory conservation agencies and academic experts on each habitat. The approach is set out in the UKTAG (2007) Guidance on Groundwater Quantitative Classification for the purposes of the Water Framework Directive. Additionally, a specific method was developed for identification of ecological damage due to nutrient enrichment, and tested during site specific investigations. A paper is being prepared for publication (Gareth Farr et al., unpublished at present).

4. How has your country organised the gathering of GWDTE data for WFD purposes; did you use site specific studies, or did you rely on national ecological and hydrogeological monitoring networks?

Austria	An inventory of the Austrian riparian wetlands provides an overview of the most important areas. http://www.lebensministerium.at/wasser/wasser-oesterreich/fluesse-und-seen/aueninventar.html However, as most of our GWDTEs are wetlands, former wetlands or riverside forests along our rivers and thus located within our porous groundwater bodies, quite a comprehensive set of data on the physical and chemical environment of those groundwater bodies is gathered within our national networks monitoring groundwater and surface water quality, groundwater tables, temperature and precipitation. The competent institution for physical data (groundwater levels, temperature and precipitation) is the "Central Hydrological service", unit VII 3 of the Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna. The competent institutions for chemical data are the "Unit National Water management", unit VII 1 of the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Environment Agency Austria, both in Vienna.
Belgium	<i>Brussels region</i> : For GWDTE's, groundwater quality/quantity data and ecological data are collected in two departments within the same regional organisation (IBGE_BIM) for the purposes of WFD and Habitats Directive. These monitoring networks are regional and are implemented by a multidisciplinary team (ecologists and hydrogeologists).
Bulgaria	<i>Black Sea River Basin Directorate</i> The GWDTE data (Incl. for the First RBMP) have been gathered from the implementing plans for management of the protected areas and from the national ecological and hydrogeological monitoring networks. <i>East Aegean River Basin Directorate</i> No specific monitoring programme for GWDTE's are available. We rely mainly on the national monitoring programmes. <i>West Aegean River Basin Directorate</i> (empty) <i>Danube River Basin Directorate</i> We are going to collect data from: 1) The current Management plans for protected areas and established there long-term monitoring for conservation and maintenance of biodiversity in the relevant protected area; 2) The current management plans of protected areas under Natura 2000 network and 3) The developed national groundwater monitoring plan
Croatia	
Cyprus	
Czech Republic	No specific gathering GWDTE data for WFD were organised in the CR.
Denmark	To start with, we will rely on national ecological and hydrogeological monitoring networks (2 nd cycle)
Estonia	
France	There is no specific GWDTE monitoring network in France. We rely on site specific studies, expert knowledge, national survey of 150 wetlands every 10 years (6 categories: alluvial, plain, interior wetlands, atlantic swamps and estuaries, mediterranean lagoons and deltas), results of other inventories and hydrogeological network: quality and quantity (national website with all the GW monitoring results: http://www.adeseaufrance.fr)
Finland	In the GWDTE data gathering Finland has relied on ecological and hydrogeological monitoring networks but there is still need to further develop the level of monitoring in order to get better level of knowledge about the GWDTE in Finland and to develop the assessment
Germany	Data is gathered from landscape ecological and hydrogeological monitoring networks. In certain cases, monitoring is supplemented with specified monitoring stations within and beyond the area of impact of groundwater abstraction (representative areas, unburdened reference areas for comparison or permanent monitoring areas and activities).
Greece	
Hungary	CORINE habitat map (major categories), results/maps of regional or local studies, potential GWDTE areas were/are available at the national institute responsible for RBMP. META Habitat Data Base is handled by the Botanic Research Institute. Information on the specific protected areas is gathered by regional National Parks. No centralised monitoring is operated for GWDTE. Harmonisation of the information and summary of the evaluation for RBMP is the responsibility of the National Institute for Environment.
Iceland	This has not yet been decided.
Ireland	A number of site specific or wetland type specific studies have been undertaken in Ireland to satisfy the requirements of the Habitats Directive. These studies are in various stages of completion. Further to this, a number of national overview studies have now been undertaken to bridge the requirements of the WFD and Habitats Directive, and it is hoped that this work will enable WFD assessments to operate in parallel with Habitats assessments.
Italy	
Latvia	
Lithuania	
Luxembourg	The gathering of data has been done by existing informations provided by the management plan based appendix I of the "Habitats Directive, national biotopes, cartography of the forest communities and the cartography of petrifying springs with tufa formation (cf. question 1) Currently evaluations are on-going whether to determine if hydrogeological monitoring networks can also be used (cf. Question 3).
Malta	Malta utilised the WFD monitoring network established for purposes of gathering baseline data at all inland surface water and transitional waters sites. This monitoring network is subject to revision following the outcome of the current study
Netherlands	Data on these (Sence of urgency and Top list) areas were provided by Provinces and nature conservation organisations being responsible in the Netherlands for nature management (including N2000). Additional (specific) monitoring of GWDTE has not been carried out within the WFD-monitoring network. Currently, we are examining other available existing information about abiotic conditions needed to keep GWDTE in good condition.
Poland	We rely on ecological data produced under the State Environmental Monitoring Programme and on hydrogeological data are combined.
Portugal	The GWDTE were identified applying the methodologies described in question 1. There is no specific monitoring network for GWDTE.
Romania	
Slovakia	SR rely on national ecological and hydrogeological monitoring networks, hydrological network of SHMU, selected habitats of NATURA 2000, database of wetland.
Slovenia	
Spain	in the future to complete and update the characterization of GWDTE. There has been a broad participation of experts in order to improve the characterization of these ecosystems. Even though, there has not been coordination at national level not even a compilation of data for this purpose. Public organisms and principal studies are listed below: Ministry of Agriculture, Food and Environment. Biodiversity Division: 1. - Spanish Inventory of wetlands (2006), which has its origins in the study of Wetlands of the Spanish Peninsular: Inventory and Characterization (1990) " http://www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/inventario-nacional-de-zonas-humedas/index_invent_zonas_humedas.aspx 2 - Preliminary Ecological basis for the conservation of natural habitat types of Community interest in Spain. Baseline study with very few international precedents and none of this magnitude, which provides complete information from the best available scientific knowledge on Spanish ecosystem types, that are included in Annex I of the Habitats Directive. Through identification, adequate description of these habitats and the establishment of what we can consider a habitat as favourable conservation status, Spain has a definite image towards we need t
Sweden	We rely on national networks and have not any site specific studies yet. Data is generally very scarce. We are in the process of running a GIS-analysis to identify groundwater bodies that are hydrologically connected to the N2000 sites in which any of the prioritised habitats are present.
Switzerland	Not applied.
UK	The initial risk screening assessment is a desk-based approach using national hydrogeological data combined in a GIS. Expert judgement, local knowledge and site specific data are then used to refine the results in the subsequent stages. Resources are focussed on those sites known or thought to be at high risk initially. This has the advantage of making use of readily available data and reducing the number of sites requiring site specific investigations and expert assessment of significant damage described in Question 3. Site specific ecological quality data used to assess significant damage is gathered by the statutory conservation agencies and is incorporated into a national dataset. Since these data were not collected for the purpose of the WFD they require interpretation by a suitably qualified eco-hydrologist. Some on-site monitoring of water levels and chemistry is carried out by the Environment Agency and conservation organisations at some sites.

5. How has your country coordinated the gathering of the right level of ecological and hydrogeological information by the various organisations in your country – e.g. which organisations has carried out the various aspects of the monitoring and how were they combined it to assess significant damage to GWDTE's?

Austria	As already mentioned under question 4, a considerable amount of physical and chemical data on precipitation, groundwater and surface water is gathered by national monitoring networks of the Federal Ministry of Agriculture, Forestry, Environment and Water Management. Although the networks are not always tailored to the specific GWDTEs, these data are available at regional level are a valuable basis for the assessment of GWDTEs. Geological and hydrogeological information is available at a national level as well, provided by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, the Environment Agency Austria and the Geological Survey of Austria. To fulfil the reporting obligation according to Art. 17 of the Habitat Directive Austrian provinces have in 2012 started a monitoring for a selection of habitats and species.
Belgium	<i>Brussels region</i> : There aren't real collaborations in our country to gather and exchange ecological and hydrogeological informations between regions and Belgian federal state but it exists a working group who coordinate the European reporting for WFD and Directive Habitats.
Bulgaria	The gathered data are as follows: 1. provided for this purpose monitoring points in the surveillance monitoring programme for the chemical status of groundwater under the Order N-182 / 26.02.2013 of the Minister of Environment and Water. 2. The self-monitoring , carried out by the holders of the permits for water use from groundwater or from surface water , including data of the rates of water abstraction; 3. Agricultural data - use of fertilizers and plant protection chemicals (pesticides), livestock breeding etc. 4. The data have been gathered in RBMP according to the ecological assessment; 5. Data gathering from the new plans for management of the protected areas and draft stage plans for management of the protected areas; 6. Other information that has been included in the hydrological and hydrogeological reports attached to the documentation of water abstraction permit and also to the reports for investment intentions. BSRBD expects to receive from the MoEW in future: - hydrological data from the National Institute of Meteorology and Hydrology (precipitation, groundwater levels, evapotranspiration, river flow) - these all data are needed for determination of the groundwater part in the water balances. These data are receiving by MoEW in compliance with the Water Act and the Contract between MoEW and the NIMH. - Data from the Nature Protection Servise Directorate from the project" Mapping and identification of the conservation status of habitats and species"., where are available data on the status of organisms and needs of protection of the GWDTE's.
Croatia	
Cyprus	
Czech Republic	See Q3 and Q4: The damaged GWDTE's were identified from several specific studies (however, the studies were done for few sites only). No common approach was used for the identification, the possible damage was decided in the specific studies case by case./ No specific gathering GWDTE data for WFD were organised in the CR.
Denmark	Most probably much of the works will involve cooperation between the Ministry of the Environment, Universities and the geological survey (2 nd cycle)
Estonia	
France	For the first WFD cycle, coordination between ecologists and hydrogeologists and combination of ecological and hydrogeological information was done at RBD or more local level on specific sites. Hydrogeological information is well structured with national organisation (dataset dictionaries, etc) and all monitoring results online. Unlike for hydrogeological information, there is no shared data structure at national level for ecological information. The coordination, combination of information and working with different experts at a national level still needs to be organised for the next cycles.
Finland	Site specific habitat data from springs and springfens with evaluations are in the database of Metsähallitus ("Forrest Administration"). Hydrogeological data is in the database of Finnish Environment Institute (SYKE). Combining this data needs to be developed. SYKE has the habitat sites (without evaluations) and this data can be used in recognising possible GWDTE's.
Germany	The competent water authorities of the Länder carry out the review of landscape ecological and hydrogeological parameters. Nature conservation authorities have to be included in the procedures under water law for groundwater abstraction. Water and nature conservation authorities aim to realise environmentally sound and sustainable groundwater abstraction that allows the conservation of wetlands and groundwater dependent terrestrial ecosystems. Potential for regeneration of damaged GWDTE's can be determined in the course of procedures under water law, taking into account the principle of proportionality and decisions taken on tapping that potential. The technical and enforcement authorities of the Länder assess the results and coordinate the reviews.
Greece	
Hungary	See Q4.(CORINE habitat map (major categories), results/maps of regional or local studies, potential GWDTE areas were/are available at the national institute responsible for RBMP. META Habitat Data Base is handled by the Botanic Research Institute. Information on the specific protected areas is gathered by regional National Parks. No centralised monitoring is operated for GWDTE. Harmonisation of the information and summary of the evaluation for RBMP is the responsibility of the National Institute for Environment.
Iceland	The coordination of data collection and monitoring is in the hands of the Environment Agency of Iceland. The hydrological monitoring network is run by the Icelandic Met. Office.
Ireland	Primarily the ecological aspects and Habitats obligations have been undertaken by Irelands conservation Agency (National Parks and Wildlife Service), with hydrogeological, information gathered by the Geological Survey of Ireland and monitoring data by the EPA. One of the primary sources of site specific information has been via academic studies or studies related to infrastructural development (through appropriate assessment reports). These have produced detailed ecological and hydrogeological data which has been supplemented by WFD regional monitoring data. The combination of information has been used to draw conclusions for the WFD
Italy	
Latvia	
Lithuania	
Luxembourg	The Water Management Agency (WMA) has contacted the representatives of the Ministry of Environment in order to gather the existing ecological information's mentioned under question 3. Through these informations WMA in collaboration with a specialized engineering firm in both geological an ecological aspects assessed site specific data collected by ecological organizations . The assessment of significant damage by using data from hydrogeological monitoring networks and water quality data will be started by end of 2013.
Malta	To date the Malta Environment and Planning Authority has carried out water quality monitoring related to those surface water environments harbouring GWDTEs. On the other hand the Malta Resources Authority provides MEPA with any hydrogeological data that is available relevant to the selected GWDTE. Malta is continuing to work, as part of a longer term strategy towards identifying what level of ecological and hydrogeological data is required to enhance current knowledge on the interactions between groundwater and surface water ecology. It is expected that the gaps identified in the baseline will help to carry this investigation a step forward.
Netherlands	The Ministry of Infrastructure and Environment (being responsible for the implementation of the WFD in The Netherlands) has coordinated the gathering of information, which was carried out together with Provinces and Water Boards and the Ministry for Economic Affairs (being responsible for the implementation of Natura 2000 / Birds and Habitats Directive). Monitoring for the Groundwater Directive to assess the WFD Groundwater status occurs at 10 and 25 m deep. Next to that, several institutes have investigated and compiled information about different habitat-types including their abiotic requirements (mainly within the context of N2000 / the Birds and Habitats Directives). On a habitat basis, information about groundwater level, N, P and chloride is now available. This information refers generally to the top layers in the soil and the first few meters of the groundwater
Poland	Ecological assessments, whether a GWDTE is damaged or not is mostly performed in the process of nature protection planning, using ecological data and hydrogeological data. This information, if available, is later used in assessment of groundwater status, based on groundwater monitoring data. To supplement groundwater monitoring data hydrogeological maps of Poland are used in the assesment. These include areas of groundwater depressions.
Portugal	The Portuguese Environment Agency (Agência Portuguesa do Ambiente, I.P.) is the water authority in Portugal and is responsible for the water monitoring networks, including quantity and quality, despite the ecological monitoring of surface waters is very recent. This information is available at a national database.
Romania	
Slovakia	SHMI under supervising of Ministry of Environment coordinates the gathering of information. Until now first step - List of national GWDTE is working out. Cooperating organizations: Institute of Landscape Ecology of Slovak Academy of Sciences (ILE SAS), State Nature Conservancy of Slovak Republic (SNC SR) DAPHNE, Institute of Applied Ecology.
Slovenia	
Spain	There is neither a monitoring network available nor coordination in this regard.
Sweden	We are still in the beginning of this process. No monitoring has been done so far in GWDTEs. It has proven difficult to engage other disciplines than groundwater experts working with WFD in this. Natura 2000 sites are managed by the regional administrative agencies which are not always coordinated with the local water authorities.
Switzerland	A general overview of GWDTE types on a national scale is currently provided by the Swiss Federal Office for the Environment, i.e. the national environmental agency.
UK	The Environment Agency is the lead organisation for collating data and carrying out the assessment of significant damage to GWDTEs from groundwater for the WFD in England and Wales, though Natural Resources Wales will be responsible for carrying out the assessment in Wales in the future. Much of the data used is collected and owned by the Environment Agency, with the exception of the ecological data which is provided by the conservation organisations at no cost to the Environment Agency. A small amount of GIS data is licensed from third parties. The information is combined in a nationally prepared GIS for risk screening/characterisation, and quality reviewed by local technical experts. The classification is prepared by combining the risk screening information with ecological condition survey data from the statutory conservation agencies and any additional local data that is available. These data then required expert interpretation by an eco-hydrologist including direct discussion with local experts relating to specific sites, to reach a final status conclusion for the GWDTE test.

6. Lessons learnt: What changes will your country make to assessing GWDTE going forward in the 2nd cycle?

Austria	The inventory which was reported in the first cycle will be updated by the Federal provinces. The selection criteria and method will not be changed for the 2 nd cycle.
Belgium	<i>Brussels region</i> : The methodology to assessment ecological quality of habitats would be improved to take in account the urban specificities of Brussels area and the criteria to determine the magnitude of the ecological damage would be developed. The cause-effect-relationships between changes of quality/quantity of groundwater dependent and ecological damage would be investigated. The groundwater quality/quantity monitoring networks GWDTE's would be extended. Specific groundwater threshold values for each categorie of GWDTEs concerned would be established and a hydrogeological model to study the link between groundwaterbodies and GWDTEs would be finalised to improve knowledge in hydrogeologic characterisation.
Bulgaria	Measures and monitoring points will be included in the second RBMP, on the base of results from TE's status and GW status analyses. East Aegean River Basin Directorate The following activites have to be carried out: 1. To develop and to approve methodology for identification of GWDTE's. To implement this methodology and update the list with GWDTE's in RBMP. 2. To develop and approved methodology for assessment of status of GWDTE's.3. To develop programmes and methodologies for monitoring of the parameters needed for assessment of the status of GWDTE's. West Aegean River Basin Directorate The identification of GWDTE's will be one of the main tasks in the project under a Public Procurement with a subject: "Exploration and evaluation of quality status of groundwater bodies". The following activities have to be implemented under the project: 1. To identify the GWDTE's , which have a high ecological and socioeconomic importance in compliance with the requirements and procedures in the european technical report. 2. To evaluate that maximum decrease in the groundwater level in the relevant GWB, which will not have negative effects on GWDTE's. 3. To assess if even the groundwater level changes do not have negative effects on GWDTE's, nevertheless the related GWB is identified to be in bad status.
Croatia	
Cyprus	
Czech Republic	The main change is the identification of GWDTEs – no systematic identification of GWDTEs was prepared in the 1 st cycle. However, the assessment of GWDTEs and their monitoring were not changed yet.
Denmark	Since we did not gather experience form the first cycle, there were no "lessions learnt".
Estonia	
France	For next cycles, we will try to develop discussions and share objectives and definitions with experts on ecosystems in order to work on methodologies and data organisation to include better WFD purposes in implementation of nature directives and in works on wetlands (inventories, indicators, monitoring...). We need shared definitions of what a dependence to GW is for a TE and how it is characterised, what significant damage to GWDTE is and a method of surveying GWDTE ecological quality. It is also necessary to make sure that ecological inventories include WFD and GW items so that they can be used for WFD purposes
Finland	Hopefully more site specific research can be done in the 2 nd cycle. In the future new methods and indicators should be developed and in addition to Natura 2000 areas include other areas as well. Preliminary status assessment for the 2 nd cycle is almost done so very little changes can be made in this schedule although the status assessment can be updated after this if new information is available.
Germany	In some cases the network of monitoring stations and the integration of landscape ecological data (historical data, soil data, limnological data etc.) need to be improved. Exchange of information and data between the different authorities and institutions can generally be further improved and automated.
Greece	
Hungary	More accurate localisation of GWDTE. New methodology of mapping is developed and applied in a pilot area. It is based on the harmonisation of the CORINE LCD and the META Habitat Database. To be applied for the whole country. Mapping of status of the habitats (data are available from the regular habitat survey from META Habitat Database. The habitat map will allow using GIS facilities. . More accurate "bottom-up" estimation of the water demand of GWDTE. Methodology includes: determination of major habitat types (simplification of the 34 types), type specific criteria on required groundwater fluctuation and its conversion to surplus of transpiration from groundwater and finally the summation by GIS facilities (habitat maps in META database are already available for the whole country).
Iceland	Not applicable, we are still in the first cycle !
Ireland	We now recognise that the GWDTE assessment process will take a long time and have switched emphasis to developing a common (ecological and hydrogeological) framework for their assessment. This will result in prioritisation of sites, but will also allow for new sites to be added to the list as more "Habitats" information becomes available. In conjunction with the prioritisation process we've been gathering information on the current ecological condition and environmental supporting conditions for prioritised GWDTE's i.e. both tasks are undertaken at the same time, by the same group of people, with a view to determining which ones will require further studies (those that are at risk of failing the environmental objectives under WFD) and potentially will require mitigating measures.
Italy	
Latvia	
Lithuania	
Luxembourg	The assessment of GWDTE according to the CIS technical guidance document started during the elaboration of the 2 nd status assessment due to the end of 2013. GWDTE have been considered insufficiently during the first cycle due to a lack of knowledge.
Malta	The hydrogeological and hydrochemical pathways between a suspected groundwater body and associated GWDTE will have to be further investigated. If it is the case that a high degree of dependency between the terrestrial ecosystem and groundwater body is established; and the GWDTE is assessed to be damaged; and any relevant threshold values of the linked groundwater body result in exceedances, further investigative monitoring will have to be called for.
Netherlands	For GWDTE's we will increase the use of information gathered within the context of the implementation of Natura 2000 / the Birds and Habitats Directive, in particular gathered within the context of setting up the Natura 2000 Management Plans.
Poland	We consider to run the methodology for the assessment of GWDTE in cooperation with General Directorate for Environmental Protection but in 3th cycle
Portugal	In the 2nd planning cycle we are planning to develop a methodology for the identification of GWDTE at the national level and for the evaluation of their ecological quality.
Romania	
Slovakia	It is needed:to work off Methodology of chosen GWDTE's status evaluation results to incorporate into assessment of GWB's quantitative status
Slovenia	
Spain	Spain has a wide range of documented scientific knowledge about wetlands. Wetlands are the most numerous and significant terrestrial dependent ecosystems in Spain. Through a well-organized coordination this information could be integrated effectively in order to identify and characterize GWTE at national level. This coordination will have to be done for the second planning cycle. The Ministry of Agriculture, Food and Environment will play the role of coordinating this scattered information, which lies within different institutions at different political levels (National, Regional and Local). In carrying out this task, Spain will set the basis for the selection and categorization which GWDTE has priority interest in conservation and as a consequence which ones will be taken into account during the second planning cycle.
Sweden	In this cycle we will identify terrestrial ecosystems with a probable dependency on groundwater. We are aiming to identify the dependency both from a quantitative (level) and qualitative (chemistry) perspective. But this we will do without targeted field investigations.
Switzerland	Not applied.
UK	Holding face-to-face workshops with local technical specialist ecologists and hydro(geo)logists to facilitate the characterisation and classification work and resolve any outstanding site-specific and methodological issues. We are using nutrient trigger values developed by the UKTAG to assess chemical risk for the interim and 2 nd cycle WFD results. These are based on nitrate concentrations in the groundwater body, and are linked to site condition rather than arbitrary thresholds for PO4. Further details can be found in UKTAG (2013) Technical report on groundwater dependent terrestrial ecosystem (GWDTE) threshold values. We are currently exploring whether it is possible to include non-statutory sites (i.e. County wildlife sites, Local wildlife sites etc) in the classification process. This is a challenge as the information for these sites is not held centrally and amount of information and data quality are very variable.

7. What are the remaining constraints to GWDTE assessment in your country and how do you think that Working Group C / DG-Environment can help?

Austria	There is a need that ecologists identify the GW related needs of GWDTEs for achieving favorable conservation status in order to e.g. enable the derivation of groundwater threshold values or favorable groundwater levels and to enable the correct assessment of groundwater quantitative and chemical status. The establishment of GWDTE types could relieve the administrative burden in the consideration of GWDTEs in the WFD implementation, especially when deriving groundwater threshold values. Main shortcoming in the status assessment procedure is the lack of identifying cause-effect-relationships. What are the effects on GWDTEs caused by changes of quality/quantity of groundwater and what is the contribution of human activity to such changes? What is the baseline of the assessment and hence a target for remediation
Belgium	<i>Brussels region</i> : Exchange of experiences between states members.
Bulgaria	<i>Black Sea River Basin Directorate</i> (empty) <i>East Aegean River Basin Directorate</i> The main problem is the lack of developed and approved methodologies for monitoring and assessment of GWDTE and consequently impossibility to carry out the real activities for implementation of monitoring and assessment. <i>West Aegean River Basin Directorate</i> (empty) <i>Danube River Basin Directorate</i> "1. Constraints: - Lack of methodology, including approved criteria for assessment of GWDTE's; - Lack of methodology to assess whether the GWDTE's are damaged and the extent of damages; - Lack of scientific works for the evaluation of groundwater dependent terrestrial ecosystems; 2. Proposal to DG "Environment": - Provide scientific works, sharing the experience of other countries on approaches to determine the groundwater dependent terrestrial ecosystems
Croatia	
Cyprus	
Czech Republic	The systematic monitoring of GWDTEs and assessment of damaged GWDTEs (systematic approach and criteria) and monitoring) are the main gaps. We appreciate every guidance focused on these issues.
Denmark	Scaling problems: It's a dilemma that the assessment has to be performed nationwide on a scale which on the one hand is rather detailed with respect to the location of the GWDTE and where impact assessments should be based on modelling. The models to be applied, however, are comparably coarse scale. It would be perfect, if the Working Group C / DG-Environment can contribute to the development and test of a catalogue on methods to be applied by the national and regional authorities in Europe.
Estonia	
France	GW impacts on terrestrial ecosystems are not always considered as an important issue for ecosystems and wetlands in France, so efforts are diverted to other topics by ecologists (change in land use, drainage, definition of compensation...) WFD requirement for GWDTE is seen as theoretical and filling in of a reporting table and is not fully understood by ecologists or wetland experts on site Lack of shared definition, practical methodology, specific monitoring and data structure (GWDTE, data and monitoring required, GW dependence, assessment criteria, deterioration due to GW...) Lack of general water quantity requirements of GWDTEs
Finland	Co-operation with groundwater experts and ecologists should be developed in the future. Also species and habitat specified data, criteria and methods need to be developed. Co-operation especially with countries that have similar geological conditions (such as Sweden and Norway) would be beneficiary but also any material or information concerning criteria and methods from WG C/DG-Environment is welcome.
Germany	The current CIS guidelines are sufficient. The national Guidelines and recommendations for action [1] already take into account the relevant CIS documents such as the Technical Report on Groundwater Dependent Terrestrial Ecosystems of 2011. <i>Reference:[1] □ Handlungsempfehlungen zur Berücksichtigung grundwasserabhängiger Landökosysteme bei der Risikoanalyse und Zustandsbewertung der Grundwasserkörper. LAWA-Ausschuss Grundwasser und Wasserversorgung (29.02.2012).</i> <i>The technical report only addresses GWDTEs. A consideration of groundwater dependent aquatic ecosystems is lacking.</i>
Greece	
Hungary	Evaluation of significant damage of GWDTE. Clear separation of the problems related to decreased surface runoff or lower groundwater level. More accurate determination of type specific criteria on required groundwater fluctuation and its conversion to groundwater flux. Possible help/coordination: Harmonisation of methodology. Intercalibration of damage. Standardisation of GWDTE monitoring (not only groundwater level fluctuation.).
Iceland	Lack of ecological and hydrological data on GWDTEs is a constraint; information and experience exchange on how to handle that would be very helpful and WG C and/or DG-Environment can certainly help in this regard.
Ireland	One of the biggest challenges has been trying (and we still aren't there yet) to bridge the Habitats objectives with those of the WFD. The emphasis for the Habitats Directive in Ireland has been to identify and designate as many existing pristine Habitats; Habitats that have the potential to be pristine; or Habitats that were once known to be pristine. This has presented obvious, if not impossible, challenges with regards to restoring some of the sites to pristine condition (which may have existed 50+ years ago) and satisfy the requirements under the Habitats Directive. Consequently it has also led to prioritisation and resource issues due to the sheer scale of the challenge. Any guidance / steer from WG C /DG-Environment on a framework or approach to prioritisation of GWDTE assessments within their parent Habitats designation would help. As would a formal acknowledgement (it's certainly been indicated informally) that the assessment process and satisfying the environmental objectives for all GWDTE under WFD will take a long time, probably beyond the current 2027 deadline.
Italy	
Latvia	
Lithuania	
Luxembourg	The main remaining constraints are the development of an assessment methodology in order to identify significant damage reflecting the national context. The critical size of GWDTE to be considered has also to be determined. Coordination and exchanges within Working Group C / DG-Environment are essential for a small MS with limited resource. As an example the identification of GWDTE will be done according to the CIS guidance and the Austrian methodology.
Malta	The process is ongoing and the main constraint is the length of the study to ensure a broad classification in order to assess both inter and intra-annual variability of these systems. Working Group C can help by collating experiences in different Member States and identifying characteristics/approaches specific to different climatic conditions.
Netherlands	There are no issues to be resolved in the Netherlands that require support by WG C or DG ENV.
Poland	Limitations: 1. Missing information on the exact localisations of groundwater depended terrestrial ecosystems. Help from WGC: 1. Giving technical support
Portugal	Our main constraints are budget restrictions. In terms of DG-Environment we think that will be important to have research projects concerning this subject. In terms of Group C, it will be important to have orientations concerning the criteria to determine the magnitude of damage in the GWDTE and to establish TV values in GWDTE.
Romania	
Slovakia	The assessment of qualitative status of GWDTEs is problematical
Slovenia	
Spain	Major limitations: 1. The information is scattered in different institutions / research centers, and it is necessary to standardize / centralize it. 2. Improve the analysis of the available information and extend the investigation to GWDTE which its hydrogeological processes are unknown. 3. Identification of management priorities, prioritize them by importance and coordinate different Government agencies involved in its management. How will WG help Spain? 1. Providing guidelines for action in other countries. 2. Giving technical support. 3. Promoting the exchange of experiences, methodologies, working and management tools. 4. The use of case studies
Sweden	WGC should keep prioritising this topic in mandate discussions and stress the need for further guidance on chemical aspects of damage on GWDTEs and on aquatic ecosystems. The main challenge is to engage the different disciplines and explain why this is important. There is an abundance of groundwater dependent ecosystems in our country, both terrestrial and aquatic, and it is a challenge to prioritise which ecosystem to focus on. In situ waste water plants often use wetlands as a final treatment stage using the ecosystem service the wetland provides. Hydrogeologists have difficulties in prioritising from an ecological perspective and ecologists may have basic knowledge of hydrology or limnology but often lack awareness of groundwater and its interaction with the habitats they survey.
Switzerland	Consistent approaches for the identification of GWDTE on a national scale are still missing. Important input could come from experiences on screening criteria. Development of thresholds for other chemicals (e.g. PO4) Comparison of thresholds with databases held by other EU Member States on specific habitats Expert knowledge/peer review of methods by WG-C members and contacts in other EU Member States
UK	Understanding fate of nitrate between groundwater body and the site Unpacking the altitude proxy (how NVCs in lowland compare with upland) Significance of atmospheric N deposition Measures, cost-effectiveness, response times, benefits.

