COMMISSION OF THE EUROPEAN COMMUNITIES

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Amended proposal for a

COUNCIL DIRECTIVE

establishing a framework for Community action
in the field of water policy
(COM(97) 49 final)

(presented by the Commission pursuant to Article 189 a (2)
of the EC-Treaty)

EXPLANATORY MEMORANDUM

I. INTRODUCTION

1. The proposal for a Council Directive establishing a framework for Community action in the field of water policy contains, in its Annex V, a general outline for technical specification for definition, classification and monitoring of the ecological and chemical status of surface waters, and quantitative and chemical status of groundwaters. At the time of adoption of the proposal it was deemed premature, on technical and scientific grounds, to develop Annex V in further technical detail. A provision in the proposal empowers the Commission to lay down the required technical details in Annex V at a later stage, through Committee procedure.

2. Upon the reception of the proposal Council and Parliament requested that Annex V be developed in further detail as a condition for the adoption of the proposed Directive. Both institutions have since been preparing their own proposals for amendments which will establish Annex V with the degree of technical detail they request. During negotiations in the Council, the Luxembourg Presidency made excellent progress on the issue in the context of an experts working group established under the Environment Working Group, based on technical and scientific input partly from Member States, but mainly from the European Environment Agency and its Water Topic Centre. The last two agencies were involved in the role of providers of technical and scientific support to the Commission, which participated actively in the negotiations and liased extensively with the Presidency to ensure consistency with the Commission's original proposal. The result of the Luxembourg Presidency's work is fully satisfactory in this respect. The Rapporteur of the European Parliament, Mr Ian White MEP, is also doing considerable work on elaboration of the Annexes, and his amendments to the Proposal will include modifications to Annex V.

3. In view of the fact that work has now progressed to a stage where a consolidated Commission position is required, the present Proposal for modification of Annex V of the proposed Water Framework Directive is brought forward for that purpose.

II. PROPOSED MODIFICATIONS

II.1 SURFACE WATER STATUS

4. The division of surface waters into four classes (rivers, lakes, estuaries and coastal waters) proposed in COM(97)49 is retained. Ecological and chemical status are considered separately below.

Ecological surface water status

5. A schema for the identification of surface water status is proposed, comprising the following elements :

- the parameters to be considered in determining ecological status (biological, hydromorphological and physico-chemical);

- a set of normative definitions of ecological status based on these parameters. These definitions are based on the concept of departure from the conditions for an identical water body which is relatively unimpacted ('reference conditions') ;

- a set of criteria for the discrimination of surface water bodies into ecotypes, for the purposes of generating reference conditions ;

- a set of monitoring requirements ; and

- a system for the common presentation of results according to a harmonised European classification system.

6. Each of these is considered in detail below. The structure of the system proposed is exactly the same for each water type (rivers, lakes, estuaries and coastal waters) although obviously the detail of the parameters and definitions differ between types. Only relevant differences will be commented on below : the presentation concentrates on the common system structure.

Type parameters for classification of ecological status of surface waters

7. For each surface water type parameters from each of three categories are proposed : biological parameters (indicators of the presence and composition of particular organisms) ; hydromorphological parameters (conditions of flow and physical structure of the river, which can be distorted by canalisation, hydroelectric dams, flood defences etc) ; and physico-chemical parameters, including temperature, acidification, nutrient input and input of dangerous substances.

8. Biological parameters are indicators of ecological quality, the aim of the Directive. Hydromorphological parameters and physico-chemical parameters, on the other hand, indicate the status of those elements which affect the health of the biological community: physical distortion and pollution. For this reason these parameters are termed supporting parameters.

9. For rivers the parameters are as follows. For biological parameters, the indicators chosen are from each of the main biological groupings within an ecosystem : aquatic flora, benthic invertebrate fauna and fish fauna. For hydromorphological parameters, the elements relate to the main requisites for the functioning of the ecosystem : effects on the quantity and dynamics of

water flow, including connection to the groundwater body (the hydrological regime); river continuity; and the condition of the substrate and riparian zone (morphological elements). Physico-chemical elements are split into two classes : general parameters, comprising elements such as oxygen balance, acidification status and nutrient concentration ; and 'other substances under Annex VIII', comprising essentially dangerous substances. The latter is further subdivided into 'priority substances established under Article 21', and 'other substances', for reasons connected with monitoring explained in paragraph 38 below.

10. For lakes, estuaries and coastal waters the parameters are very similar.

Normative definitions of ecological surface water status

11. This section defines the three categories of surface water status crucial to the operation of the Directive. High status, important because it provides the level for the definition of reference conditions ; and good status and fair status, important because the difference between them is crucial for determining the goal of the Directive. For the quality classifications blow 'fair' the rationale for classification is simply to express the degree of divergence from the desired state of 'good'. Important as this is, it does not have operational implications in the same way as do the other definitions and can therefore be left for development by Committee procedure.

12. The central difficulty of this exercise is to arrive at a series of normative requirements which are capable of being applied to any body of water in Europe, no matter what its characteristics. The solution chosen is to express the definitions in terms of the deviation from what would be expected for the body of water in conditions of minimal impact. Conditions of minimal impact allow the identification of the type-specific biota, and the biological definitions can be expressed in terms of departure from this reference point. Thus the reference point is specific to the ecotype, but the degree of departure allowed from it under the normative definitions is the same for every body of water.

13. More detailed comments on each of the classifications are given below.

High status

14. The crucial factor for determining whether a body has high status is the condition of the supporting parameters, hydromorphology and physico-chemistry. The definitions for hydromorphological characteristics require conditions which have been subject to minimal anthropogenic alterations, and the requirements for chemical conditions require concentrations not above background concentrations for naturally-occurring substances, and not above the detection limit for synthetic substances. If all these conditions are fulfilled, the biology present will conform to the conditions set out in the tables for biological parameters : a species composition and abundance corresponding totally, or almost totally, to the type-specific conditions.

Good status

15. The key to the definition of good status is the identification of the point of sustainability : while the body may be subject to anthropogenic input, only slight changes in species composition and abundance compared to type-specific conditions should result, indicating that the modifications are sustainable. The definitions for the biological parameters are phrased accordingly. However, in order to ensure complete consistency with the objectives of the Nitrates and Urban Waste Water Treatment Directives, the definition in relation to the parameter phytoplankton (i.e. the target status of the water in relation to eutrophication) is made completely consistent with the target state implicit in the definition of eutrophication in those two Directives.

16. For hydromorphological parameters, the definition is expressed entirely in terms of its capacity to support the biological community. The rationale for this is that if the biological community which exists is very close to the type-specific community, there are two possible reasons : either the hydromorphology is unmodified, or the modifications have no impact on the biological community. Both scenarios must be allowed for : the crucial fact is that the biology is undisturbed.

17. For general chemical parameters, and in theory also for 'substances under Annex VIII', the situation is analogous. However the theory presupposes a biological monitoring regime sufficiently sensitive to detect all biological effects of chemical contamination, including non-lethal effects, which is not the case in practice. For this reason the definition for Annex VIII substances differs from those for hydromorphological and general chemical parameters in requiring compliance with a particular set of values (the no-effect concentration values) and in providing, in section 1.1.2.5 of the Proposal, a methodology for the identification of these values. This methodology is based on, and entirely consistent with, the methodology set out in the 'Technical guidance document in support of Commission Directive 93/67/EEC on risk assessment for new notified substances, and Commission Regulation (EC) no 1488/94 on risk assessment for existing substances'.

18. Some comment should be made on the relation between the standards thus established and the requirements of Community legislation on emissions, in particular the IPPC Directive. IPPC requires that Member States set values for installations based on BAT, but taking into account the needs of the local environment to produce an optimised environmental solution. In particular, any measures required to meet Community quality standards must be applied under Article 10 of IPPC. What this proposal does is to ensure that Member States establish the quality standards needed to ensure the protection of the aquatic component of the environment, for all substances of concern. This information can then be used, together with analogous information for air and soil, to determine the distribution of emissions across environmental media

which represents the optimised solution. This distribution must of course be consistent with the requirement to based emission limit values on BAT.

Fair status

19. For biological parameters the concept is that of a moderate deviation from the type-specific characteristics and the definitions all reflect this. As for good ecological status, definitions for hydromorphology and physico-chemical parameters are phrased in terms of their support of the biological community described. This is so even for Annex VIII parameters : clearly the no-effect concentration is being exceeded in these waters, and the classification question then becomes one of the extent of the effect of that exceedence on the biology. The Commission attempted to determine another set of numerical chemical standards which must be complied with at this boundary, but concluded that only an arbitrary condition could be used (for instance the use of an arbitrary multiple of the standard for 'good') which would serve no useful purpose.

Definition of reference conditions

20. As stated above, the only form of definition of the ecological status boundaries which will be applicable to all ecotypes, is one which expresses the state in terms of departure from what would be expected of that body in unimpacted ('reference') conditions. Thus in order to classify a particular body of water, the conditions expected of that body in a state of minimal impact must be determined. This can be done in two main ways

- using historical data for the site concerned ; or

- using historical or contemporary data from another site with very similar characteristics to the site concerned.

21. The data in question are then termed reference conditions.

Degree of anthropogenic impact allowed of reference conditions

22. For the system to function in a comparable way across Europe, specifications for the determination of reference conditions are key. The first issue is determination of the ecological quality at the reference point. This is fixed in section 1.1.3 .2 as that corresponding to high status, for the following reasons. In principle any level can be chosen and definitions of departure from it can be adjusted to maintain the same absolute standard (for instance, good status could be chosen as the reference point and the objective of the Directive defined as zero departure from reference conditions). In practice, we must choose as the reference point that state which it is easiest to identify. Zero anthropogenic impact conditions are the easiest to identify consistently, since once anthropogenic impact is allowed the question of ensuring that each site is subject to a strictly comparable impact becomes very difficult. However zero

impact conditions are rare in Europe. For reasons of practicability, therefore, 'high status' was chosen as the reference point, as the state closest to zero impact for which there exist a sufficient number of sites for the practical purposes of providing reference. This first consideration applies whether data for the site concerned are used for the reference, or data from a similar site are used ; in each case, the data must correspond to 'high status'.

Classification of ecotype

23. The second key issue applies only where data from a similar site are used. It is the question of determining 'similarity' in this context, which essentially involves sorting sites into classifications of ecotypes or habitat types. Thus two highland rivers might be very similar, but a highland river will be very different from a lowland river. Furthermore, a highland river in southern France may be similar to a highland river in Northern Spain, but very different from a highland river in Northern Sweden.

24. Thus there are two conditions. Similarity applies only within a certain geographic region (called an ecoregion in the proposal) and between bodies of water in such a region with similar characteristics (called ecotypes in the proposal). Thus a European methodology for establishing ecoregions and ecotypes is called for.

25. For classification into ecoregions, it is necessary to distinguish between inland waters on the one hand, and estuaries and coastal waters on the other. For inland waters, the Commission first considered the division of Europe into ecologically similar regions established for the purposes of Natura 2000. However this classification is based essentially on terrestrial soil type and vegetation and therefore the correlation with ecologically similar aquatic regions is not perfect. For this reason it was decided to base the classification into ecoregions on limnofauna – the identification of the geographic boundaries defining biologically similar aquatic fauna groupings, as described by Illies (1978) in Limnofauna Europaea. This yields 18 ecoregions for the Community territory. For estuaries and coastal waters, the obvious ecoregional classification method is to use the Community's major seas.

26. In identifying ecotypes, it is necessary to use certain parameters to discriminate bodies, and the proposed system concentrates on those with the greatest influence on the ecological characteristics. For rivers these are size, altitude and geology, for lakes the same with the addition of depth, and so on. Note that for rivers and lakes, a combination of the ecoregional classifications of Natura 2000 and Illies would integrate geology into the definition of ecoregion, and therefore would remove the need to use geology as a separate parameter for the identification of ecotypes. The European Environment Agency has agreed to attempt this integration and the Commission strongly supports this work.

27. However, discrimination based on these criteria will inevitably have a certain element of crudeness, and since the reason for making the discrimination is to identify similar bodies for the purposes of generating reference conditions, the finer the ecological match, the more accurate the assessment of ecological status. The match can be improved by using a wider range of parameters (e.g. for rivers, distance from river source, mean water slope, etc). But what is really required is a field exercise to correlate the parameters chosen with observed biological variations, thereby identifying those parameters which are most relevant for that region, and the boundaries for those parameters corresponding most closely to genuine shifts in ecological characteristics. In the limit, such a system can produce a quasi-continuous discrimination of ecotypes, and of course the greater that discrimination, the greater the accuracy of the reference conditions.

28. However given that such systems are relatively new in Europe it would not be appropriate at the moment to require such a methodology to be used by all Member States. Therefore the approach taken is to identify in the Directive a discrimination of ecotypes as described in paragraphs 25 and 26 above, but to provide Member States with the alternative of performing the correlation exercise, so long as at least the same degree of discrimination is achieved as would be by using the first system. This second exercise must use at least the parameters implicit in the Directive's system : for rivers, these would be latitude and longitude (implicit in the definition of ecoregions), size, altitude and geology. In this way, a simple system is provided which can be adopted by those Member States with less experience of ecotype discrimination, while at the same time providing a benchmark (in terms of discriminatory detail) for a more sophisticated option.

29. The two alternatives are presented in section 1.1.3.1 of the Proposal as System A (the Directive's discrimination) and System B (the continuum discrimination of ecotypes).

Identification of reference conditions

30. By this means, Member States can identify ecologically similar bodies of water, and can therefore use data from one body of water to provide reference conditions for another. Section 1.1.3.2 sets out the requirements for establishing reference conditions. The data used can be either historical data from the site concerned, gathered in the past or obtained in the present using palaeological methods ; or data from a site of the same ecotype, comprising either current monitoring data from a site of high status, or historical data from a site of lower status.

Monitoring of surface water status

31. The essence of the determination of ecological status is the comparison of the actual conditions for the parameters set out, with the reference conditions for those parameters. Reference conditions were dealt with above. Determining

actual conditions is a question of monitoring, guidelines on which are provided in Section 1.1.4. of the Proposal.

Selection of monitoring sites

32. The rationale behind the system proposed is that monitoring effort should be focused as much as possible on areas where susceptibility has been identified. Thus where lots of discharges into a water body are identified, that body should be subject to regular monitoring to check the impact of those discharges, while a body which is very unlikely to be impacted can be monitored less frequently.

33. For point source discharges this does not represent a problem. Member States are required to identify impacts under the inventory of anthropogenic pressures, and those bodies identified as being impacted must be monitored. For diffuse impacts the situation is more complicated because of the scale of the potential impact, and therefore the number of water bodies potentially involved. For these it is unreasonable to require monitoring of every water body. Therefore the Proposal requires monitoring of a selection of water bodies, representative both of the geographic extent of the potential impact and of the ecotypes contained within that geographic area. Similarly, where no anthropogenic pressure has been identified, Member States should also have the option to monitor a representative selection of bodies of water rather than every single one, and this is provided for.

34. Finally, significant bodies of water must be monitored. These are defined as bodies of water of a certain scale which discharge into the territory of another Member State, or discharge into the marine area. It is obviously extremely important to ensure that in these situations above all, an accurate picture of the water status is achieved. All the monitoring stations listed in Annex I of the Council Decision 77/795/EEC must be taken over, to ensure continuity of the long-timescale data deriving from them.

Selection of type parameters for monitoring

35. The type parameters to be monitored also depend on the reason for monitoring a particular water body. The different cases are described below.

36. For bodies selected on the grounds of susceptibility to anthropogenic impact on the basis of the inventory, the biology must be monitored, and also all supporting parameters identified in the inventory as being discharged (priority substances), being discharged in significant quantities (other substances), or impacting on the biology (hydromorphological parameters). Furthermore, where the biological monitoring identifies an impact, screening monitoring must be carried out to determine the cause, under Article 13(3)(d) of the Directive.

37. For those bodies not susceptible to impact which are selected for monitoring, all biological parameters must be monitored. Where these indicate disturbance, monitoring of supporting parameters must be carried out as required under Article 13(3)(d). In addition, monitoring of general parameters (physico-chemical parameters excluding dangerous substances) and hydromorphological parameters should be carried out on a representative set of sites, and the unimpacted sites chosen as reference sites suffice for this.

38. For significant bodies of water, again all biological parameters must be monitored, but over and above that the chemical composition of the water must be determined in detail. Thus all general parameters and priority substances must be measured, and all other substances indicated by the inventory as being discharged in that water system.

Selection of frequency

39. The question of monitoring frequency is a matter closely related to the degree of precision and confidence required of the monitoring result. For technical statistical reasons, the same requirements regarding precision and confidence will require different monitoring frequencies for different water bodies. For this reason it is very difficult to specify monitoring frequencies applicable to all situations. The approach taken here is to specify minimum monitoring frequencies for all parameters, but to require in addition that the monitoring frequency is such as to ensure that any changes in classification which occur over a three year period are detected with a 90% confidence.

Additional provisions on priority list substances

40. Three additional provisions are given here. The first is to ensure that bodies of water identified as subject to point source discharges continue to be monitored until 12 consecutive samples are below the relevant quality standard. The second provides a criterion for the distance from the source at which the quality objective should be met. The third requires that where an exceedence is discovered, the additional monitoring required should include monitoring at a range of distances from the source to determine the area of exceedence.

Monitoring of protected areas

41. For protected areas, the monitoring provisions established above must be supplemented as necessary to meet any additional monitoring requirements for those areas. For areas designated under existing legislation, those requirements are as specified in that legislation. For drinking water abstraction areas designated under Article 8 they are established here.

Monitoring in the event of accidental pollution

42. For bodies exposed to accidental pollution the same requirements should apply as those for bodies identified as subject to point source discharges.

Standards for monitoring of type parameters

43. While it is not possible to establish a completely uniform methodology for monitoring for all the parameters to be listed, those standards which are established at international level should be adhered to. This section provides a list of all the relevant standards ; the list shall be modified to technical progress as new standards are developed.

Monitoring of other marine waters

44. The modification of the Directive COM(97)614 extended the geographic scope to include marine waters, while imposing no obligations in relation to measures over and above those found in existing Community legislation. This Annex is in keeping with that in that it does not attempt to define any goal of good ecological status in relation to marine waters. The Commission has made clear that a further proposal would be required for any such move. However in order to identify the information necessary to determine whether any such extension should be made, monitoring of the marine environment on a consistent and systematic basis is necessary. Accordingly the Commission proposes here a basic set of monitoring obligations designed to be as consistent as possible with the obligations to which Member States are already subject under international conventions, and with the requirements of the European Environment Agency.

Presentation of monitoring results and harmonised classification of ecological status

Presentation of monitoring results and classification of ecological status

45. As seen above, the definitions of ecological status for biological parameters are expressed in terms of departure from a set of reference conditions, which are the conditions which would apply at that body under circumstances of minimal impact. A numerical way of expressing this difference is a concept called the environmental quality ratio (EQR), by which the parametric value derived for the body in question is expressed as a fraction of the value which would have been achieved in reference conditions. In theory, this should ensure that, for any single monitoring system, a value of the EQR which corresponds to good status for one body of water will be the value corresponding to good status for all other bodies (whatever their ecotype) for which that system is designed. It should be noted here that the aim is to assess the functioning of the ecosystem, and not the absolute physico-chemical status of the water body. Thus, the levels of physico-chemical inputs at which two different ecosystems retain 90% of the biota of their natural state will be different for each ecosystem, due to their different sensitivities (because a certain contamination level will cause a much more profound ecological disturbance to a sensitive ecosystem than to an insensitive one). However a deviation of 10% from the native **biota** will represent the same level of

ecological functioning for both ecosystems, to the best approximation possible at the moment.

46. Precise specifications for the presentation of results in the form of environmental quality ratios can be developed by Committee procedure. The text of this modification simply sets out the framework for the presentation of results in terms of the degree of numerical departure from minimal impact conditions.

47. For chemical parameters, the definitions of quality classes, at least for high and good, are expressed in terms of numerical standards to be established by the Member States. Compliance with a class boundary is then simply a question of compliance with this numerical standard. For hydromorphological parameters, the boundaries are expressed in terms of normative requirements for high ecological status, but for other boundaries they are defined simply in terms of their effect on the biology, for the same reasons as outlined in paragraph 16.

48. The section requires that a map be produced of water quality, and sets out a colour coding system for expressing the quality. Separate classifications must be made for biological quality, hydromorphological quality and physico-chemical quality. There are two reasons for this. The first is to provide transparency as to which of the sets of supporting parameters (physico-chemical pollution or hydromorphological distortion) is causing a failure to achieve good biological status. The second is that, for physico-chemical parameters, it is possible, as stated above, that damage caused by pollution will not be registered by the biological monitoring, and thus a separate chemical classification is needed. The ecological status of the water body defaults to the lowest of the three. Certain provisions are made for the presentation of the results for heavily modified bodies of water ; these are explained in detail in paragraphs 55-57 below.

Comparability of biological monitoring results

49. It is clearly essential, for the implementation and enforcement of the Directive, to be able to say with confidence that the status classifications across Europe are comparable. If they are not – if there is no way of ensuring that all Member States place the same interpretation, in the same circumstances, on the normative definitions – then breaches of the Directive can simply not be identified consistently, and no coherent picture of the status of waters across Europe can be developed.

50. Comparability between the standards set for physico-chemical substances is relatively simple, as the monitoring regimes for physico-chemistry are largely standardised. For hydromorphological parameters, the classification is determined by the status of the biology. Therefore the task of comparability is essentially the task of ensuring comparability of biological monitoring results.

51. It is not possible to develop an EU wide monitoring and assessment system at the moment, but such a system would solve many of the problems of comparability, and the Commission is determined to ensure that the necessary research is taken forward in the medium term.

The comparability regime

52. As explained in paragraph 46 above, comparability of the biological monitoring results for different ecotypes from the same monitoring system is ensured by using the Environmental Quality Ratio. The remaining issue is the comparability of results from different monitoring systems : to make sure that a body classified as good under the French monitoring system would also be classified as good under the German system, the Italian system, and so on.

53. This is achieved by means of an intercalibration exercise, which essentially works as follows. A set of water bodies is identified, by means of an exchange of information between Member States and the Commission, corresponding to all the normative class boundaries (high, good and fair) for the range of ecotypes. This network is known as 'the intercalibration network'. Then each of the monitoring systems which will be used in practice is applied to all the bodies in the intercalibration network, and the EQR corresponding to each class boundary is derived. In this way, the standards for the division of classes at Member State level are derived from an agreed set of bodies corresponding to the normative definitions established at European level.

Heavily modified physical characteristics

54. Many of the water bodies in Europe are subject to extensive physical modification which is difficult to reverse. Article 4(4) of the Directive allows for derogation from good ecological status in cases where the required improvements are impossible or prohibitively expensive, which would cover these cases also. However we specify here, for the purposes of transparency, more detail on the criteria governing designation of bodies to which lower objectives can apply on the basis of their physical character, as well as specifications for the presentation of results for those bodies.

55. Section 1.1.6 of the Proposal sets out a list of criteria in respect of which physical aspects of a body of water can be designated as heavily modified. They are : technical possibility and economic feasibility ; the effects of action on the wider environment ; and the effects on other key activities : navigation, power supply, drinking water supply and flood protection being the main ones. The designation as heavily modified and the reasons for it must be set out in the River Basin Management Plan.

56. As regards presentation of results, there are two considerations : the need to give a clear indication of the actual status of the body of water ; and the need to make clear when that status is as good as can be expected given the heavily modified characteristics. The first is particularly useful in that it will allow the

public to identify the trade-off required (in terms of ecology) for the benefits of hydroelectric power, etc. The aims are combined by requiring that the water body be colour-coded according to its actual ecological status, but where the non-achievement of good ecological status is entirely due to heaviiy modified physical characteristics, a set of green dashes is superimposed on the appropriate colour code.

Chemical surface water status

57. Chemical status is simply the question of compliance with all quality standards established at EU level which are applicable to the body of water concerned. Where these are complied with the body achieves good chemical status ; where they are not, it does not. As regards monitoring, the requirements in the legislation establishing the standard concerned shall apply. Where no specific guidance is given in that legislation, the monitoring scheme in respect of priority list substances identified in section 1.1.4 of the Proposal shall apply.

II.2 GROUNDWATER STATUS

Quantitative groundwater status

58. Groundwater quantitative status is defined in terms of the effect of the groundwater level on associated surface ecosystems, whether surface water, wetlands or terrestrial ecosystems, and in terms of the sustainability of the water supply. This governs the choice of parameters and normative definitions set out below. Basic provisions on the identification, mapping and characterisation of groundwater bodies are provided, split into assessment of the characteristics of the body itself, and of the impact of human activity on it.

Type parameters and normative definitions for the classification of quantitative status for groundwater

59. There is only one parameter for quantitative status, which is the level of the groundwater resource. However it must meet a number of constraints. Essentially, the rate of abstraction shall not exceed the long term available resource of the body of water, which is the recharge rate minus the requirement for associated ecological systems. So water use must be sustainable in the long term, without leading to loss of quality in associated ecosystems and ensuring that the objectives of good ecological status for surface waters are met. There are additional provisions in relation to reversals of any anthropogenically induced trend, and to saltwater intrusion.

Monitoring of groundwater quantitative status

60. The monitoring regime has the following steps. First, all groundwater bodies are mapped and characterised at national, regional and local level as regards their hydrogeographic characteristics, anthropogenic impacts and vulnerability. Secondly, a set of monitoring sites are identified to provide a general overview

of groundwater quantitative status, with the sites such that the calculation of a groundwater balance will be possible, and with a sampling site density to be laid down in accordance with the specific properties of the body concerned. Thirdly, the indicators are selected. Fourthly, the frequency of the monitoring programme is determined by the criteria that it must provide sufficient information on short-term (yearly) variability as well as on long-term development. Fifthly, the balancing determinants must be identified from the monitoring : the natural and artificial recharge on the one hand, and the natural and artificial abstraction on the other, to yield the change in water storage.

Representation of quantitative status

61. For each groundwater body, aggregated data should be provided to give an overview of the quantitative status in the investigation period. There are two important parameters in particular : the ratio between the rate of recharge and the amount of abstraction, and the groundwater level itself.

Groundwater chemical status

Selection of monitoring sites

62. The principle behind the selection of groundwater monitoring sites is very similar to that for surface waters. The ban on direct discharges under the Groundwater Directive (80/68/EEC) is continued by Article 13(3)(g) of the Framework Directive, and thus the only potential cause of pollution is indirect discharge. Therefore, as for diffuse pressures for surface water, bodies identified as susceptible to indirect discharge via the inventory of anthropogenic activity shall be assessed, by monitoring at least a set of sites representative of the spatial distribution of the impact and (in the case that more than one body is covered) of the groundwater body types subject to the impact. For bodies which are identified as unimpacted, a set of monitoring points should be identified to give a representative picture of all groundwater body types. Those cases of significant groundwater flow across Member State boundaries shall be identified, and monitoring sites established at the point at which the flow crosses the border.

Selection of type parameters for monitoring

63. For the first category of bodies above, all substances identified from the inventory as potential contaminants of the body of water must be monitored. For the second category of bodies, a simple monitoring regime on a set of core parameters should be carried out. For bodies of the third type, all priority substances, as well as all other substances identified by the inventory as being discharged into the aquifer, must be monitored at the flow junction between Member States,.

Frequency

64. The monitoring frequency shall be such as to ensure that trends in the concentration of all pollutants are detected, and at any rate at a minimum frequency of once per annum.

Monitoring of protected areas

65. As for surface waters, where additional monitoring is required to meet the obligations for protected areas under other Directives, the monitoring set out above must be supplemented accordingly.

Presentation of monitoring results

66. As for surface water chemical status, presentation of chemical status is simply the presentation of compliance with all quality standards established at EU level which are applicable to the body of water concerned. However, in addition to those, there are two other obligations. The first is that the chemical conmposition of a groundwater body should not affect the achievement of good status of an associated surface water body. The second is that any negative anthropogenic trend in the concentration of any pollutant should be detected and reversed. A body complying with those standards has achieved the objectives of the Directive for good chemical status ; a body which does not requires action to ensure their achievement. Note in particular that this includes compliance with the standard established in the Nitrates Directive (91/676/EEC) of 50mg/l nitrates, and the standards for pesticide concentrations to be established under the Uniform Principles for Directive 91/414/EEC on plant protection products.

II.3 Legal basis

67 None of the amendments proposed affects the original choice of legal basis of Article 130s(1) of the Treaty.

III BUSINESS IMPACT ASSESSMENT

68. These measures are a set of essentially technical specifications for the presentation and monitoring of the ecological and chemical status of surface water, and the quantitative and chemical status of groundwater. As such, the burden of analysis, classification and reporting which they impose falls principally on Member States.

Amended Proposal for a

COUNCIL DIRECTIVE

establishing a framework for Community action
in the field of water policy
(COM(97) 49 final)

16a

Annex V of the Water Framework Directive is replaced by the following:

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1.1.4.1 Selection of monitoring sites

1.1.4.2 Selection of type parameters for monitoring

1.1.4.3 Selection of frequency

1.1.4.4 Additional provisions on priority list substances

1.1.4.5 Monitoring of protected areas

1.1.4.6 Monitoring in the event of accidental pollution

1.1.4.7 Standards for monitoring of type parameters

1.1.5 Monitoring and assessment of other marine waters

1.1.6 Presentation of monitoring results and harmonised classification of ecological quality

1.1.6.1 Presentation of monitoring results and classification of ecological status

1.1.6.2 Comparability of biological monitoring results

1.1.7 Criteria for the designation of heavily modified physical characteristics

1.2 CHEMICAL SURFACE WATER STATUS

1.2.1 Selection of monitoring sites, and sampling and analysis frequencies

1.2.2 Presentation of chemical status

2. GROUNDWATER

2.1 ANALYSIS OF THE CHARACTERISTICS OF THE RIVER BASIN DISTRICT

2.2 GROUNDWATER QUANTITATIVE STATUS

2.2.1 Parameter for the classification of quantitative status of groundwater

2.2.2 Definition of good quantitative status

2.2.3 Monitoring of groundwater quantitative status

2.2.3.1 Groundwater level monitoring sites

2.2.3.2 Selection of frequency

2.2.3.3 Representation of quantitative status

2.3 GROUNDWATER CHEMICAL STATUS

2.3.1 Parameters for the classification of chemical status

2.3.2 Definition of good chemical status

2.3.3 Monitoring of groundwater chemical status

2.3.3.1 Identification of monitoring points

2.3.3.2 Selection of parameters

2.3.3.3 Selection of frequency

2.3.3.4 Representation of groundwater chemical status

1. SURFACE WATERS

1.1 ECOLOGICAL SURFACE WATER STATUS

1.1.1. Type Parameters for classification of ecological status of surface waters

1.1.1.1 Rivers

Biological parameters

- Composition and abundance of aquatic flora
- Composition and abundance of benthic invertebrate fauna
- Composition, abundance and age structure of fish fauna

Hydromorphological parameters supporting the biological parameters

- Hydrological regime (quantity and dynamics of water flow, including connection to the groundwater body)
- River continuity
- Morphological elements (river depth and width variation, structure and substrate of the river bed, structure of the riparian zone)

Chemical and physico-chemical parameters supporting the biological parameters

General parameters

- Water temperature
- Oxygen balance
- Salt content
- pH
- Acidification status
- Nutrient concentration

Other substances under Annex VIII

- All priority substances
- other substances identified as being discharged in significant quantities into the body of water by the inventory of point and diffuse sources of pollution

1.1.1.2 Lakes

Biological parameters

- Composition and abundance of aquatic flora (other than phytoplankton)
- Composition, abundance and biomass of phytoplankton
- Composition and abundance of benthic invertebrate fauna
- Composition, abundance and age structure of fish fauna

Hydromorphological parameters supporting the biological parameters

- Hydrological regime (quantity and dynamics of water flow, including residence time and connection to the groundwater body)
- Morphological elements (lake depth variation, quantity, structure and substrate of the lake bed, structure of the riparian zone)

Chemical and physico-chemical parameters supporting the biological parameters

General parameters

- Transparency
- Water temperature
- Oxygen balance
- Salt content
- pH
- Acidification status
- Nutrient concentration

Other substances under Annex VIII

- All priority substances
- Other substances identified as being discharged in significant quantities into the body of water by the inventory of point and diffuse sources of pollution

1.1.1.3 Estuaries

Biological parameters

- Composition and abundance of aquatic flora (other than phytoplankton)
- Composition, abundance and biomass of phytoplankton
- Composition and abundance of benthic invertebrate fauna
- Composition, abundance and age structure of fish fauna

Hydromorphological parameters supporting the biological parameters

- Tidal regime
- Continuity
- Morphological elements (depth variation, quantity, structure and substrate of the bed, structure of the riparian zone)

Chemical and physico-chemical parameters supporting the biological parameters

General parameters

- Temperature
- Oxygen balance
- Salinity
- pH
- nutrient concentration

Other substances under Annex VIII

- All priority substances
- Other substances identified as being discharged in significant quantities into the body of water by the inventory of point and diffuse sources of pollution

1.1.1.4 Coastal water

Biological parameters

- Composition and abundance of aquatic flora (other than phytoplankton)
- Composition, abundance and biomass of phytoplankton
- Composition and abundance of benthic invertebrate fauna
- Composition, abundance and age structure of fish fauna

Hydromorphological parameters supporting the biological parameters

- Morphological elements (freshwater flow, depth, sediment load, direction of dominant currents, structure and substrate of the coast, structure of the riparian zone)

Chemical and physico-chemical parameters supporting the biological parameters

General parameters

- Water temperature
- Oxygen balance
- Salinity
- pH
- Nutrient concentration

Other substances under Annex VIII

- All priority substances
- Other substances identified as being discharged in significant quantities into the body of water by the inventory of point and diffuse sources of pollution

1.1.2. Normative definitions of ecological status classifications

Table 1.1.2.1: Normative definitions for high, good and fair ecological status in rivers

Element	High quality	Good quality	Fair quality
General	No evidence, or only very minor evidence, of anthropogenic impacts on biological communities, and the physicochemical and physical environment. The composition and abundance of the biota reflect that normally associated with the ecotype under undisturbed conditions.	Detectable but low-level impacts on biological communities, and the physicochemical and physical environment. The biota shows signs of disturbance but deviates in terms of survival, reproduction and development only slightly from that normally associated with the ecotype under undisturbed conditions.	Significant impacts on biological communities and their physico-chemical and physical environment. The biota deviates moderately from that normally associated with the ecotype under undisturbed conditions.
Biological elements			
Aquatic flora: Phytoplankton	Species composition and abundance correspond totally or nearly totally to the type-specific conditions. The average biomass and/or chlorophyll-a concentration are at type-specific levels corresponding to the type-specific nutrient levels.	No accelerated growth of algae and higher forms of plant life such as to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned.	Species composition and abundance show significant/ moderate effects of impacts (e.g. eutrophication) due to anthropogenic activities. The average chlorophyll-a concentration is significantly different from the type-specific natural levels.
Macrophytes and phytobenthos	Species composition and abundance correspond totally or nearly totally to type-specific conditions. There are no changes (increase or decrease) in macrophytic and phytobenthic biomass due to anthropogenic activities.	Only slight changes in species composition and abundance compared to type-specific conditions. No significant changes (increase or decrease) in macrophytic and phytobenthic biomass due to anthropogenic activities (e.g. nutrient input). The phytobenthic community is not interfered with by bacterial tufts/coats due to anthropogenic activities.	Species composition and abundance differ significantly from type-specific conditions. Significant/moderate changes (increase or decrease) in macrophytic and phytobenthic biomass due to anthropogenic activities (e.g. nutrient input). The phytobenthic community is interfered/displaced by bacterial tufts/coats due to anthropogenic activities.
Fish fauna	Species composition, abundance, biomass and age structure correspond totally or nearly totally to type-specific conditions with the appropriate sensitive species present.	Few species of the type-specific community are missing. There is a slight change in species composition, abundance, biomass and age structure. Species untypical of the ecotype or stocked species can be found but do not significantly interfere with the autochthonous fish population.	Some species or a whole group of species are missing. There would be a significant/moderate change in species composition, abundance, biomass and age structure. A moderate proportion of the expected sensitive species would be absent or of very low abundance. Some species can not reproduce naturally. Species untypical of the ecotype or stocked species can be found which significantly interfere with the autochthonous fish population
Benthic invertebrate fauna	Species composition, abundance and share of sensitive species in comparison to tolerant species correspond totally or nearly totally to the type-specific conditions.	Species composition and abundance do not significantly differ from type-specific level. The major features of the type-specific community can develop and survive.	Species composition and abundance differ significantly from the type-specific level. The major features of the type-specific community cannot develop and survive.

Element	High quality	Good quality	Fair quality
Hydromorphological elements			
Hydrological regime	Quantity and dynamics of flow reflect totally or nearly totally the type specific natural conditions.	Such as to allow the occurrence of the type-specific biological communities specified above.	Such as to allow the quality of biological community specified above.
River continuity	Is specific for the type of river, not interrupted by anthropogenic activities and allows undisturbed migration of aquatic organisms and sediment transport.	Such as to allow the occurrence of the type-specific biological communities specified above.	Such as to allow the quality of biological community specified above.
Morphological elements	Channel patterns, width and depth variations, flow velocities, substrate conditions and structure/ condition of the riparian zones correspond totally or nearly totally to the natural type specific conditions.	Such as to allow the occurrence of the type-specific biological communities specified above	Such as to allow the quality of biological community specified above.
Chemical elements[1]			
General parameters	Physico-chemical parameters are at type-specific levels. Concentrations not in excess of background concentrations ($\leq$bgl).	Concentrations/levels not exceeding standards established so as to ensure the functioning of the ecosystem and the occurrence of the biological community specified above ($\leq$ eqs).	Such as to allow the quality of biological community specified above.
Substances under Annex VIII not included under general parameters	Concentrations not in excess of detection limit of most advanced analytical techniques or ubiquitous levels.	Concentrations not exceeding no effect concentration[2] for algae, Daphnia and fish, without prejudice to Directive 91/414/EC. The lowest value shall be used.($\leq$ eqs)	Such as to allow the quality of biological community specified above.

[1] The following abbreviations are used : bgl = background level, eqs = environmental quality standard)

[2] Established by the Member State for the specific body of water concerned according to the procedure established in Section 1.1.2.5.

Table 1.1.2.2: Normative definitions for high, good and fair ecological status for lakes

Element	High quality	Good quality	Fair quality
General	No evidence, or only very minor evidence, of anthropogenic impacts on biological communities and the physico-chemical and physical environment. The composition and abundance of the biota reflect that normally associated with the ecotype under undisturbed conditions.	Detectable but low-level impacts on biological communities and the physico-chemical and physical environment. The biota shows signs of disturbance but deviates in terms of survival, reproduction and development only slightly from that normally associated with the ecotype under undisturbed conditions.	Significant impacts on biological communities and the physico-chemical and physical environment. The biota deviates moderately from that normally associated with the ecotype under undisturbed conditions.
Biological elements			
Aquatic flora:			
Phytoplankton	Species composition and abundance correspond totally or nearly totally to type specific natural conditions. The average biomass and/or chlorophyll-a concentrations are at type-specific natural levels corresponding to the type-specific natural nutrient levels.	No accelerated growth of algae and higher forms of plant life such as to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned.	A significant/moderate change in species composition and abundance. The average biomass and/or chlorophyll-a concentration are significantly above type-specific natural levels.
Macrophytes and phytobenthos	Species composition and abundance correspond totally or nearly totally to type-specific conditions. No changes (increase or decrease) in macrophytic and phytobenthic biomass due to anthropogenic activities (e.g. nutrient input).	Only slight changes in the expansion and species composition and abundances compared to type-specific conditions. No significant changes (increase or decrease) in macrophytic and phytobenthic biomass due to anthropogenic activities (e.g. nutrient input).	Species composition and abundance significantly differ from type-specific conditions. Significant/moderate changes (increase or decrease) in macrophytic and phytobenthic biomass due to anthropogenic activities (e.g. nutrient input).
Benthic invertebrate fauna	Species composition and abundance correspond totally or nearly totally to the type-specific composition.	Only a slight change of species composition and abundance so that the type specific main features can develop and survive .	A significant/moderate change of species composition and abundance.
Fish fauna	Species composition, abundance and age structure totally or nearly totally corresponds to type-specific conditions with the appropriate share of sensitive species present.	Slight change in species composition, abundance, and age structure. A small proportion of the expected sensitive species would be absent or of very low abundance. Few species of the type-specific community are missing. Species untypical of the ecotype or stocked species can be found but do not significantly interfere with the autochthonous fish population .	Some species or a whole group of species are missing. There is a moderate change in species composition, abundance, biomass and age structure. A moderate proportion of the expected sensitive species is absent or of very low abundance. Some species can not reproduce naturally. Species untypical of the ecotype or stocked species can be found which significantly interfere with the autochthonous fish population

Element	High quality	Good quality	Fair quality
Hydromorphological parameters			
Hydrological regime	Quantity and dynamics of water flow corresponds totally or nearly totally to type specific natural conditions	Such as to allow the occurrence of the type-specific biological community specified above.	Such as to allow the quality of biological community specified above.
Morphological elements	Lake depth variation, quantity, structure and substrate of bed and the structure of the riparian zone correspond totally or nearly totally to the natural type specific conditions.	Such as to allow the occurrence of the type-specific biological community specified above.	Such as to allow the quality of biological community specified above.
Chemical elements[3]			
General parameters	Physico-chemical parameters are at type-specific levels. Concentrations not in excess of background concentrations (≤bgl).	Concentrations/levels not exceeding standards established so as to ensure the functioning of the ecosystem and the occurrence of the biological community specified above (≤ eqs).	Such as to allow the quality of biological community specified above.
Substances under Annex VIII not included under general parameters	Concentrations not in excess of detection limit of most advanced analytical techniques or ubiquitous levels.	Concentrations not exceeding no effect concentration[4] for algae, Daphnia and fish, without prejudice to Directive 91/414/EC. The lowest value shall be used. (≤ eqs)	Such as to allow the quality of biological community specified above.

[3] The following abbreviations are used : bgl = background level, eqs = environmental quality standard)

[4] Established by the Member State for the specific body of water concerned according to the procedure established in Section 1.1.2.5.

Table 1.1.2.3 Normative definitions for high, good and fair ecological quality for estuaries

Element	High quality	Good quality	Fair quality
General	No evidence, or only very minor evidence, of anthropogenic impacts on biological communities and the physico-chemical and physical environment. The composition and abundance of the biota reflect that normally associated with the ecotype under undisturbed conditions.	Detectable but low-level impacts on biological communities and the physico-chemical and physical environment. The biota shows signs of disturbance but deviates in terms of survival, reproduction and development only slightly from that normally associated with the ecotype under undisturbed conditions.	Significant impacts on biological communities and the physico-chemical and physical environment. The biota deviates moderately from that normally associated with the ecotype under undisturbed conditions.
Biological Aquatic flora: Phytoplankton	Species composition and abundance correspond totally or nearly totally to the type-specific conditions. The average biomass and/or chlorophyll-a concentration are at type-specific levels corresponding to the type-specific nutrient levels.	No accelerated growth of algae and higher forms of plant life such as to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned.	Species composition and abundance show significant/ moderate effects of impacts (e.g. eutrophication) due to anthropogenic activities. The average chlorophyll-a concentration is significantly different from the type-specific natural levels.
Macroalgae	There would be a normal (expected) abundance (cover) and biomass of macroalgae	Reduced but still relatively high abundance and biomass	Low abundance and biomass
Angiosperms	There would be a normal (expected) abundance (cover) and biomass of angiosperms	Reduced but still relatively high abundance and biomass	Low abundance and biomass
Benthic invertebrate fauna	The number of taxa would be high, total abundance low and biomass moderate. Typical/key indicator species of unimpacted state would be present	The number of taxa would be high, total abundance low and biomass high. Most typical/key indicator species of unimpacted state would be present.	The number of taxa, total abundance and total biomass would be moderate. Species indicative of impact (for example organic pollution) would be present.
Fish fauna	Composition, abundance and biomass typical of undisturbed hydrophysical conditions No hindrance to fish migration Recruitment of fish normal for ambient biotic and hydro-physical conditions	Sustainable resident fish populations with slightly reduced composition, abundance and biomass Some hindrance to fish migration but sustainable fisheries exist upstream Sustainable nursery fishery but below optimal recruitment	Resident fish population not sustainable, much reduced composition, abundance and biomass. Significant hindrance to fish migration, fisheries upstream not sustainable. Some fish breed successfully.

Hydromorphological factors			
Hydrological regime	Quantity and dynamic of flow reflects totally, or nearly totally the type-specific natural conditions. Thus tidal regimes (currents and height),freshwater flows into the estuary, sediment transport and deposition would not significantly be influenced by anthropogenic activities.	Such as to allow the occurrence of the type-specific biological communities specified above.	Such as to allow the quality of biological community specified above.
Estuary continuity	Specific for the type of estuary, not interrupted by anthropogenic activities and, for example, allows undisturbed migration of fish between rivers and the adjacent coastal waters..	Such as to allow the occurrence of the type-specific biological communities specified above.	Such as to allow the quality of biological community specified above.
Morphological elements	Channel patterns, width and depth variations, flow velocities, substrate conditions, inter-tidal areas and riparian conditions correspond totally or nearly totally to the natural type specific conditions.	Such as to allow the occurrence of the type-specific biological communities specified above.	Such as to allow the quality of biological community specified above.
Chemical elements[5] General parameters	Physico-chemical parameters are at type-specific levels. Concentrations not in excess of background concentrations ($\leq$bgl).	Concentrations/levels not exceeding standards established so as to ensure the functioning of the ecosystem and the occurrence of the biological community specified above ($\leq$ eqs).	Such as to allow the quality of biological community specified above.
Substances under Annex VIII not included under general parameters	Concentrations not in excess of detection limit of most advanced analytical techniques or ubiquitous levels.	Concentrations not exceeding no effect concentration[6] for algae, Daphnia and fish, without prejudice to Directive 91/414/EC. The lowest value shall be used. ($\leq$ eqs)	Such as to allow the quality of biological community specified above.

[5] The following abbreviations are used : bgl = background level, eqs = environmental quality standard)

[6] Established by the Member State for the specific body of water concerned according to the procedure established in Section 1.1.2.5.

Table 1.1.2.4 Normative definitions for high, good and fair ecological quality for coastal waters

Element	High quality	Good quality	Fair quality
General	No evidence, or only very minor evidence, of anthropogenic impacts on biological communities and their ecotype. The composition and abundance of the biota reflect that normally associated with the ecotype under undisturbed conditions.	Detectable but low-level impacts on biological communities and their ecotype. The biota shows signs of disturbance but deviates in terms of survival, reproduction and development only slightly from that normally associated with the ecotype under undisturbed conditions.	Significant impacts on biological communities and their ecotypes. The biota deviates moderately from that normally associated with the ecotype under undisturbed conditions.
Biological			
Phytoplankton	Concentration of Chlorophyll-a (µg/l), very low (for example in the Mediterranean < 1 µg/l) No exceptional phytoplanktonic blooms. High transparency, (for example in the Mediterranean >20m)	No accelerated growth of algae and higher forms of plant life such as to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned.	Concentration of Chlorophyll-a (µg/l), moderate (for example in the Mediterranean around 1 to 2 µg/l) Frequent phytoplanktonic blooms. Low transparency (for example in the Mediterranean <10 to 5 m)
Macroalgae and angiosperms	Presence of indicator species (of unimpacted conditions) with very high density.	Presence of indicator species (of unimpacted conditions) with high density.	Presence of indicator species (of unimpacted conditions) with medium density.
Hydromorphological parameters			
Hydrological regime	Quantity and dynamic of flow reflects totally, or nearly totally the type specific natural conditions. Thus tidal regimes (currents and height), freshwater flows into the coastal waters, sediment transport and deposition would not significantly be influenced by anthropogenic activities. Allows the occurrence of biological communities specific for the type of coastal water of the quality described above. Allows the occurrence of a biological community of the quality specified above	Such as to allow the occurrence of the type-specific biological communities specified above.	Such as to allow the quality of biological community specified above.
Continuity	Specific for the type of coastal water, not interrupted by anthropogenic activities and, for example, allows undisturbed migration and passage of fish and other biota to and from estuaries and rivers.	Such as to allow the occurrence of the type-specific biological communities specified above.	Such as to allow the quality of biological community specified above.
Morphological elements	Structure and substrate of the adjacent and hydrodynamically related coastal and inter-tidal areas, and riparian conditions correspond totally or nearly totally to the natural type specific conditions.	Such as to allow the occurrence of the type-specific biological communities specified above.	Such as to allow the quality of biological community specified above.

Chemical elements[7] General parameters	Physico-chemical parameters are at type-specific levels. Concentrations not in excess of background concentrations (≤bgl).	Concentrations/levels not exceeding standards established so as to ensure the functioning of the ecosystem and the occurrence of the biological community specified above (≤ eqs).	Such as to allow the quality of biological community specified above.
Substances under Annex VIII not included under general parameters	Concentrations not in excess of detection limit of most advanced analytical techniques or ubiquitous levels.	Concentrations not exceeding no effect concentration[8] for algae. Daphnia and fish, without prejudice to Directive 91/414/EEC. The lowest value shall be used.(≤ eqs)	Such as to allow the quality of biological community specified above.

[7] The following abbreviations are used : bgl = background level, eqs = environmental quality standard)

[8] Established by the Member State for the specific body of water concerned according to the procedure established in Section 1.1.2.5.

1.1.2.5 Procedure to be followed by Member States for the setting of chemical quality standards

1.1.2.5.1 Data requirements

Where possible, both acute and chronic data shall be obtained for the following taxa, collectively termed "the base set":

- Algae and/or macrophytes
- Daphnia
- Fish

Other taxa for which data are available may be taken into account as appropriate.

1.1.2.5.2 Setting the Environmental Quality Standard

The following procedure applies to the setting of a maximum annual average concentration.

i The lowest reliable and relevant effect concentration shall be determined from laboratory tests and the appropriate safety factor applied as set out in the table below:

	Safety factor
At least one short-term $L(E)C_{50}$ from each of three trophic levels of the base-set	1000
One long-term NOEC (either fish or Daphnia)	100
Two long-term NOECs from species representing two trophic levels (fish and/or Daphnia and/or algae)	50
Long-term NOECs from at least three species (normally fish, Daphnia and algae) representing three trophic levels	10
Field data or model ecosystems	Case by case assessment

Member States may adjust the factors indicated here in certain cases as indicated in section 3.3.1 of Part II of "Technical guidance document in support of Commission Directive 93/67/EEC on risk assessment for new notified substances and Commission Regulation (EC) no 1488/94 on risk assessment for existing substances.

ii where data on persistence and bioaccumulation are available, these should be taken into account in deriving the final value of the Environmental Quality Standard.

iii the standard thus derived should be compared with any evidence from field studies. Where anomalies appear the derivation should be reviewed.

iv the standard derived should be subject to peer review and public consultation within the Member State.

1.1.3 Classification of water body ecotype and identification of reference conditions

1.1.3.1 Classification of water body ecotype

Methodology

i. The surface water bodies within the river basin shall be discriminated into ecotypes.

ii. For this purpose, Member States may use either System A or System B identified below. If system A is used, the river basin must be discriminated into ecoregions according to the map set out in Annex X. The water bodies in each ecoregion must then be discriminated into ecotypes according to the criteria set out in the tables for System A.

iii. If System B is used, Member States must achieve at least the same degree of discrimination as would be achieved using System A.

iv. This exercise must be completed by 31 June 2001.

v. Member States shall submit a list of ecotypes distinguished, together with maps (GIS) of their geographical location, to the Commission at the latest by 31 December 2001.

vi. Where appropriate, Member States shall adjust the classification of water body type, inter alia in the light of the results of the monitoring required by article 13.

1.1.3.1.1 Classification into ecotypes for rivers

System A

Level	Type	Descriptors/parameters/factors
1	Ecoregion	18 ecoregions described by Illies (1978) in Limnofauna Europaea
2	Ecotype	Altitude typology • high > 800m • mid-altitude 200 to 800 m • lowland < 200 m Size typology based on catchment area • Small < 100 km^2 • Medium 100 to 1,000 km^2 • Large 1,000 to 10,000 km^2 • Very large >10,000 km^2 Geology • calcareous • siliceous • organic

System B

	Continuum of ecotypes/habitat types	Physical and chemical factors that in combination determine ecotype sand hence affect biological community structure and composition **Obligatory factors** • altitude • latitude • longitude • geology • size		
		Optional factors • distance from river source • energy of flow (function of flow and slope) • mean water width • mean water depth • mean water slope	• form and shape of main river bed • river discharge (flow) category • valley shape • transport of solids • alkalinity	• mean substratum composition • chloride • air temperature range • mean air temperature

1.1.3.1.2 Classification into ecotypes for lakes.

System A

Level	Type	Descriptors/parameters/factors
1	Ecoregion	18 ecoregions described by Illies (1978) in Limnofauna Europaea
2	Ecotype	Altitude typology • high > 800m • mid-altitude 200 to 800 m • lowland < 200 m Depth typology based on mean depth • < 3 m, • between 3 m and <15 m, • >15 m Size typology based on surface area ≥ 0.01 to 0.1 km^2 • > 0.1 to 1 km^2 • > 1 to 10 km^2 • > 10 to 100 km^2 • 100 km^2 Geology • calcareous • siliceous • organic

System B

	Continuum of ecotypes/habitat types	Physical and chemical factors that in combination determine ecotype and hence affect biological community structure and composition **Obligatory factors** • altitude • latitude • longitude • geology • size		
		Optional factors • mean water depth • lake shape • residence time • mean air temperature • air temperature range	• alkalinity • acidification sensitivity • mixing characteristics (e.g. monomictic, dimictic, polymictic)	• acid neutralising capacity • background nutrient status • mean substratum composition

1.1.3.1.3 Classification into ecotypes for estuaries.

System A

Level	Type	Descriptors/parameters/factors
1	Ecoregion	Based on the main sea areas of the EU as proposed by the EEA: • Baltic sea • Barents Sea • Norwegian Sea • North Sea • North Atlantic Ocean • Mediterranean Sea
2	Ecotype	Based on mean annual salinity • < 0.5 ‰ Freshwater • 0.5 to < 5 ‰ Oligohaline • 5 to < 18 ‰ Mesohaline • 18 to < 30 ‰ Polyhaline • 30 to < 40 ‰ Euhaline Based on mean tidal range • <2 m microtidal • 2 to 4 m mesotidal • > 4m macrotidal

System B

	Continuum of ecotypes/habitat types	Physical and chemical factors that in combination determine ecotype type and hence affect biological community structure and composition **Obligatory factors** • latitude • longitude • tidal range • salinity	
		Optional factors • depth • current velocity • exposure • residence time • mean water temperature	• mixing characteristics • turbidity • mean substratum composition • estuary shape • water temperature range

1.1.3.1.4 Classification into ecotypes for coastal waters

System A

Level	Type	Descriptors/parameters/factors
1	Ecoregion	Based on the main sea areas of the EU as proposed by the EEA: • Baltic sea • Barents Sea • Norwegian Sea • North Sea • North Atlantic Ocean • Mediterranean Sea
2	Ecotype	Based on mean annual salinity • < 0.5 ‰ Freshwater • 0.5 to < 5 ‰ Oligohaline • 5 to < 18 ‰ Mesohaline • 18 to < 30 ‰ Polyhaline • 30 to < 40 ‰ Euhaline Based on mean depth • shallow waters <30 m, • intermediate (30 to 200 m), • deep >200 m

System B

	Continuum of ecotypes/habitat types	Physical and chemical factors that in combination determine ecotype type and hence affect biological community structure and composition **Obligatory factors** • latitude • longitude • salinity • depth		
		Optional factors • current velocity • exposure • mean water temperature	• mixing characteristics • turbidity • retention time (of enclosed bays)	• mean substratum composition • water temperature range

1.1.3.2. Establishment of reference conditions

Methodology

i For each ecotype identified under Section 1.1.3.1, a set of reference conditions shall be established. These reference conditions shall be the values for the biological parameters which would be obtained for that ecotype at high status.

ii. The reference conditions may be spatially based and/or temporally based.

iii. For spatially-based reference conditions, Member States must develop a reference network of at least 5 reference sites of high status within each ecotype. Using this network, it shall then identify the values for the biological parameters listed in Section 1.1 corresponding to high ecological status, either by direct use of reference data or by of predictive models based on reference data.

iv. Temporally based reference conditions shall be identified using historical data at the site to identify the values for the biological parameters listed in Section 1.1 corresponding to high ecological status. Reference conditions may also be constructed using a combination of spatially and temporally-based reference conditions, for example by using historical data at a reference site. Historical values shall be determined by using either data collected in the past, or data collected in the present using palaeological methods.

v. Establishment of reference conditions shall be completed by 31 December 2001.

1.1.4 Monitoring of ecological status for inland and coastal waters

Monitoring programmes for surface water status, as required by Article 10, shall be instituted according to the following requirements, so as to provide a comprehensive overview of the surface water status in each River Basin. Such monitoring programmes shall be reviewed every three years.

1.1.4.1 Selection of monitoring sites

Member States shall separately identify all bodies of water in each River Basin District.

Member States shall designate monitoring sites to be included in the monitoring programme according to the following requirements:

1. Identify those bodies which are subject to point source pressures in accordance with Annex 3.2,
2. Identify those bodies which are subject to diffuse pressures in accordance with Annex 3.3,
3. Identify those bodies which are not subject to anthropogenic pressure,
4. Identify all significant[9] water bodies which cross a Member State boundary, and
5. Identify all significant bodies which discharge into territorial waters.

Bodies identified in 1. above shall be designated as monitoring sites.

Bodies identified in 2. above shall be assessed. This assessment shall be carried out by:

designating as a monitoring site each body that is subject to the pressure,
or
designating as monitoring sites a selection of water bodies which are both:
representative of the ecotypes[10] that are subject to the pressure
and
representative of the spatial variability of the pressure.

Bodies identified in 3. above shall be assessed. Such an assessment shall be carried out by:

designating as a monitoring site each body of water
or
designating as monitoring sites a selection of the water bodies which are representative of all the ecotypes present in the basin

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[9]Significant bodies are to be considered those which, on average, account for more than 20% of the annual discharge from a River Basin. Member States will designate all the monitoring stations listed in Annex I to Council Decision 77/795/EEC for this purpose.

[10]For the purpose of this requirement an ecotype is one of the types of water body identified under Section 1.1.3.1

Bodies identified in 4 and 5 above shall be monitored at the point of discharge into territorial waters or the territory of another state.

Member States shall designate additional monitoring sites as are necessary to ensure a comprehensive overview of surface water status for each River Basin.

1.1.4.2 Selection of type parameters for monitoring

Member States shall monitor each site identified in 1 to 5 above for those parameters listed in the table below:

Type Parameters	Biology	General Parameters	Hydromorphological	Priority List	Other Pollutants
Body type 1	All	Inventory + Investigation	Inventory + Investigation	Inventory	Inventory
Body type 2	All	Inventory + Investigation	Inventory + Investigation	Inventory	Inventory
Body type 3	All	Reference + Investigation	Reference + Investigation	Option	Option
Body type 4	All	All	Option	All	Inventory
Body type 5	All	All	Option	All	Inventory

Inventory" in the table above means: "monitor for those supporting parameters that indicate the level of those pressures, identified in the inventory of pollution sources required by Annex 3, that are being imposed upon the water body, and thus the biological community."

"Investigation" in the table above means: "monitor for supporting parameters in the event that the biological quality does not achieve good status."

"Reference" in the table above means: "monitor the condition of reference sites[11] for all supporting parameters to ensure that they are not subject to significant anthropogenic pressure."

[11] Reference sites are defined in section 1.1.3 of this Annex

1.1.4.3 Selection of Frequency

Member States shall carry out monitoring at such a frequency as is envisaged as necessary to ensure that any changes in classification that occur are detected with a 90% degree of confidence between three year periods, but in any event Member States shall, where required to do so by Table 1.1.4.2 above, monitor the relevant quality elements at the minimum frequency detailed below.

Type Parameter	Minimum Frequency
Biological	
Aquatic Flora	1 / 3 year
Macro invertebrates	1 / 3 year
Fish	1 / 3 year
Hydromorphological	
Continuity	1 / 3 year
Hydrology	continuous
Morphology	1 / 3 year
Physico-Chemical	
Temperature	1 / 3 months
Oxygen Balance	1 / 3 months
Salt Content	1 / 3 months
pH	1 / 3 months
Nutrients	1 / 3 months
Acidification Status	1 / 3 months
Priority Substances	1 / month
Other Pollutants	1 / 3 months

The level of confidence and precision reached by the monitoring system used shall be stated in the River Basin Management Plan.

1.1.4.4 Additional provisions on Priority List Substances

i Type 1 bodies of water which have been subject to inputs of Priority List substances shall continue to be monitored until such time as twelve consecutive samples are measured to be below the relevant EQS for the substances in question.

ii Monitoring points shall be chosen such as to determine whether the relevant quality objectives are being consistently achieved sufficiently close to the input, so as to be representative of the quality of the receiving water in the area affected by the input, allowing for a reasonable mixing zone.

iii Additional monitoring required in the event of an EQS for a Priority List Substance being breached should include monitoring at a range of distances from the input in order to identify the extent of the area of exceedence.

1.1.4.5 Monitoring of Protected Areas

The monitoring required under sections 1.1.4.1 to 1 .1.4.4 shall be supplemented according to the following requirements:

(i) - Drinking Water Abstraction Points

Areas designated under Article 8 (Drinking Water Abstraction) shall be designated as monitoring sites and shall be monitored for all parameters for which Environmental Quality Standards have been set pursuant to Article 8. Monitoring shall be carried out in accordance with the frequencies detailed below:

Minimum annual frequency of sampling and analysis for each parameter for which an EQS has been set under Article 8.

Population served	Frequency
< 10 000	1/3 months
> 10 000 to < 30 000	1/ 6 weeks
> 30 000 to < 100 000	1/month
> 100 000	1/month

(ii) - Bathing Waters

Monitoring shall be carried out for these areas in accordance with the requirements of Directive 76/160/EEC

(iii) - Nutrient Sensitive Areas

Monitoring shall be carried out for these areas in accordance with the requirements of Directives 91/271/EEC and 91/676/EEC

(iv) - Habitat and Species Protection Areas
Monitoring for these areas shall be carried out as for bodies of type 1. as referred to above, and such further monitoring as is considered necessary to ensure the condition of these areas satisfy the requirements of the measure under which they are designated.

1.1.4.6 - Monitoring in the event of Accidental Pollution

In the event of accidental pollution, as referred to in Article 19, monitoring shall be carried out as for a body of type 1 above in order to assess the impact of the accidental pollution on the receiving water body.

1.1.4.7 Standards for Monitoring of Type Parameters

Macroinvertibrate Sampling

ISO 5667-3 1995	Water Quality - Sampling - Part 3: Guidance on the preservation and handling of samples
EN 27828: 1994	Water Quality - Methods for biological sampling - Guidance on hand net sampling of benthic macroinvertebrates
EN 28265: 1994	Water Quality - Methods of biological sampling - Guidance on the design and use of quantitative samplers for macroinvertebrates on stony substrata in shallow waters
ISO 9391: 1995	Water Quality - Sampling in deep waters for macroinvertebrates - Guidance on the use of colonisation, qualitative and quantitative samplers.

ISO/CD 8689.1	Biological Classification of Rivers PART I: Guidance on the Interpretation of Biological Quality Data from Surveys of Benthic Macroinvertebrates in Running Waters
ISO/CD 8689.2	Biological Classification of Rivers PART I: Guidance on the Presentation of Biological Quality Data from Surveys of Benthic Macroinvertebrates in Running Waters

Macrophyte Sampling

CEN / ISO Standards under development

Fish Sampling

CEN / ISO Standards under development

Diatom Sampling

CEN / ISO Standards under development by CEN

Standards for Physico-Chemical Parameters

Standards for Hydromorphological Parameters

1.1.5 Monitoring and assessment of other marine waters

Table 1.1.5

	Main anthropogenic effects to be considered
1	**Discharges of substances in Annex VIII (with the exception of nutrients) and in particular Cd, Hg, Pb, TBT, PCBs[12], PAHs[13], chlorinated dioxins, dibenzofurans and oil;**
2	**Nutrients**
3	**Discharges of litter;**
4	**Fisheries and mariculture**

Methodology

1. Each Member State shall identify, according to the methodology established under Annex III:

   (a) those substances or contaminants in section 1 or 2 of table 1.1.5 which are input in significant quantities to the marine environment, from the atmosphere, from rivers and estuaries, from direct discharges, in the vicinity of shipping lanes and in the vicinity of offshore installations. They shall include in particular those substance inputs for which there is evidence that they are contributing significantly to pollution of the marine waters of any other Member State.

   (b) significant occurences of litter at the sea surface, on the seabed and along shorelines.

   (c) significant instances of fishing and mariculture activities.

2. For each substance or contaminant in section 1 of table 1.1.5 identified under paragraph 1(a), Member States shall:

   (a) Undertake monitoring of marine concentrations in sediments and biota

   (b) Establish background concentrations

[12] These are as follows: CB 28, CB 52, CB 101, CB 118, CB 138, CB 153 and CB 180.

[13] These are as follows: phenanthrene, anthracene, fluoranthene, pyrene, benzo[*a*]anthracene, chrysene, benzo[*a*]pyrene, benzo[*ghi*]perylene, indeno[*1,2,3-cd*]pyrene.

(c) Compare concentrations with ecotoxicological assessment criteria.

For important groups of pollutants so identified, Member States shall establish biological effects monitoring regimes.

3. For significant inputs of nutrients identified under paragraph 1(a), Member States shall:

(a) establish a monitoring programme to identify where elevated nutrient concentrations or fluxes from anthropogenic sources cause an increase in any of frequency, magnitude or duration of phytoplankton blooms, or a change in species composition; and

(b) monitor to detect and assess the extent to which any of increased phytoplankton abundance, changed phytoplankton species composition, and the presence of toxic phytoplankton species result in ecological disturbance.

4. For occurences of litter identified under paragraph 1(b), Member States shall:

(a) establish and assess sources, composition, occurrence and quantities of litter; and

(b) assess information on stomach contents of birds and marine organisms in relation to health.

5. For instances of fishing and mariculture activities identified under paragraph 1(c), Member States shall:

(a) for fishing activities

- monitor fisheries discards and discards of offal;

- monitor by-catches and establish biological effects monitoring to quantify effects on stocks of non-target species and benthic communities;

(b) for mariculture activities:

- establish and monitor the genetic composition of wild stocks to identify any impacts;

- monitor disease and parasites in wild stocks and undertake risk assessments of potential introduction from mariculture;

- survey concentrations/biological effects of pesticides and antibiotics.

6. With a view to achieving a global assessment of ecological health in order to determine the extent of human impact, Member States shall develop ecological quality objectives, identify suitable indicator species and define a biological monitoring system in relation to their ecological quality objectives.

7. The technical specifications and quality assurance provisions required to ensure the reliability and comparability of the data and to clearly record the procedures used for monitoring, assessment and analysis for the activities in paragraphs 2-6 shall be adopted by the Commission by 31 December 2001 at the latest, in accordance with the procedure laid down in Article 25. The Commission shall ensure the maximum of consistency between the obligations established and those under the international conventions covering territorial and other marine waters.

1.1.6 Presentation of monitoring results and harmonised classification of ecological quality

1.1.6.1 Presentation of monitoring results and classification of ecological status

i. For biological monitoring, Member States shall present the monitoring results for each site in terms of deviation from the reference conditions for that site. This deviation shall be expressed by a single figure representing numerically the degree of departure.

ii. For each chemical parameter, the monitoring result shall be expressed as an absolute numerical value and translated into a quality classification as provided for in Section 1.2.

iii. For hydromorphological parameters, the monitoring result shall be expressed as a quality classification as provided for in Section 1.2.

iv. Member States shall classify the ecological quality for each body of water according to the following scheme:

High A - blue

Good B - green

Fair C - yellow

Poor D - orange

Bad E - red

A map shall be provided of biological quality, colour-coded as indicated above.

Where failure to achieve good ecological status is entirely due to heavily modified physical characteristics, a set of green dashes shall be superimposed on the appropriate colour code.

v. The ecological quality classification for the body of water shall be presented by three letters in juxtaposition. The first letter shall represent the classification for biological parameters, the second the classification for hydromorphological parameters, and the third the classification for chemical parameters. The overall ecological status of the water body shall be the lowest of the three.

1.1.6.2 Comparability of biological monitoring results

i. The Commission shall ensure an exchange of information between Member States leading to the identification across the Community of a set of bodies of water, of a representative selection of ecotypes, of qualities corresponding to the normative definitions of quality classes established in Section 1.2. This group of sites shall be collectively known as "the intercalibration network". A register of the sites comprising the intercalibration network shall be prepared and made available for comment by 31 March 2001.

ii. Establishment of the intercalibration network for good ecological status shall be completed by 31 December 2001.

iii. The Commission shall co-ordinate an intercalibration exercise. Every biological monitoring system to be used by a Member State for the purposes of Article 10 shall be tested on the intercalibration network. This testing shall take the following form:

(i) Each biological monitoring system shall be applied to every site in the intercalibration network which is of an ecotype for which it shall be used in practice. The intercalibration network shall include at least 5 sites at each of the 5 quality levels for every such ecotype.

(ii) Environmental quality ratios for each national monitoring system shall be established for each of the five quality classes. Member States shall classify the ecological status of the water body for the purposes of this Directive by reference to the ratios so established.

iv. The intercalibration exercise outlined in paragraph 4 shall be completed by 31 December 2002 at the latest. A table of all the values so established shall be published by the Commission by 30 June 2003.

1.1.7 Criteria for the designation of heavily modified physical characteristics

The Member State may designate physical characteristics of a body as heavily modified on the basis of consideration of the following:

i whether it is technically possible and economically feasible to make modifications

ii the effects of such modifications on the wider environment

iii the effects on navigation

iv the effects on activities for the purposes of which water is stored (power generation, drinking-water supply, etc...)

v the effects on water regulation and flood protection.

Where characteristics of a body of water are so designated, that designation and the reasons for it shall be stated in the River Basin Management Plan.

1.2 CHEMICAL SURFACE WATER STATUS

1.2.1 Selection of monitoring sites, and sampling and analysis frequencies

These shall be selected as specified in the legislation laying down the environmental quality standard. Where no specific guidance is given the scheme for priority list substances set out in section 1.1.4.3 shall be adopted.

1.2.2 Presentation of chemical status

Where a body meets all the environmental quality standards with which compliance is required under Article 13(3)(a) or 13(3)(h), it shall be recorded as achieving good chemical status. If not, the body shall be recorded as failing to achieve good chemical status.

2. GROUNDWATER

2.1 ANALYSIS OF THE CHARACTERISTICS OF THE RIVER BASIN DISTRICT

Identification, Mapping and Characterisation of Groundwater Bodies

Member states shall identify, map and characterise all groundwater bodies at a national, regional and local level.

In characterising groundwater bodies the following information shall be collected where relevant for each groundwater body:

- boundaries and area of the groundwater body;
- geological characteristics of the groundwater body including extent and type of geological units;
- hydrogeological characteristics of the aquifer including hydraulic conductivity, porosity and confinement;
- characteristics of the superficial deposits and soils overlying the aquifer including their thickness, porosity, hydraulic conductivity, and absorptive properties;
- stratification characteristics of the groundwater within the groundwater body;
- an inventory of associated surface systems, including terrestrial ecosystems and bodies of surface water, with which the groundwater body is dynamically linked;
- estimates of the directions and rates of exchange of water between the groundwater body and associated surface systems; and
- sufficient data to calculate the long term annual average rate of overall recharge.

In characterising the impact of human activity, the following information shall be collected and maintained for each groundwater body:

- location of points in the groundwater body from which water is abstracted;
- the annual average rates of abstraction from such points;
- the chemical composition of water abstracted from the groundwater body;
- location of points in the groundwater body into which water is directly discharged;
- the rates of discharge at such points;
- the chemical composition of waters discharged to the groundwater body;
- land use in the catchment for the groundwater body including anthropogenic alterations to the recharge characteristics of the groundwater body including rainwater and run-off diversion through land sealing, artificial recharge, damming and drainage; and
- areas of human development which may be susceptible to damage as a result of changes in groundwater level.

Sufficient information shall be provided to allow a reliable water balance calculation to be made for each groundwater body such as to identify the net change in water storage in the body resulting from the total volumes of water entering and leaving the body.

2.2 GROUNDWATER QUANTITATIVE STATUS

2.2.1 PARAMETER FOR CLASSIFICATION OF QUANTITATIVE STATUS OF GROUNDWATER

- Groundwater level regime

2.2.2 DEFINITION OF GOOD QUANTITATIVE STATUS

Elements	Good status
Groundwater level	*The level of groundwater in the groundwater body is consistent with the achievement of good quantitative status as defined in Article 2.* *The level of groundwater is not subject to anthropogenic alterations such as would result in failure to achieve the ecological quality objectives specified under Article 4 for associated surface waters or any significant diminution in the ecological quality of such waters or any significant damage to associated terrestrial ecosystems.* *The level of groundwater does not exhibit an anthropogenically induced trend liable to result in such alterations to the groundwater level.* *Alterations to flow direction resulting from level changes may occur temporarily, or continuously in a spatially limited area, but such reversals do not cause saltwater or other intrusion, and do not indicate an anthropogenically induced trend in flow direction likely to result in such intrusions.*

2.2.3. MONITORING OF GROUNDWATER QUANTITATIVE STATUS

2.2.3.1 Groundwater Level Monitoring Sites

Each competent authority shall establish a groundwater monitoring network in accordance with the requirements of Article 10. The monitoring network shall be designed so as to provide a reliable estimate of the quantitative status of all groundwater bodies.

Member States shall:

1. Identify those groundwater bodies from which waters are abstracted and ensure sufficient monitoring points are provided to assess the impact of the abstraction upon the groundwater level within the groundwater body.

2. Identify those groundwater bodies which are subject to direct or indirect discharges and ensure sufficient monitoring points are provided to assess the impact of the discharge upon the groundwater level within the groundwater body.

3. Identify all significant groundwater bodies where groundwater flows across a Member State boundary and ensure sufficient monitoring points are provided to estimate the direction and rate of groundwater flow across the Member State boundary.

4. Identify those groundwater bodies not included in 1., 2., or 3. above and ensure sufficient monitoring points are provided to estimate the groundwater level including dynamic elements such as seasonal variations, and long term natural fluctuations within the groundwater body.

2.2.3..2 Selection of frequency

Monitoring of groundwater levels shall be carried out so as to identify both short-term and long-term trends in groundwater levels. Monitoring shall be sufficient for the identification of such trends despite the presence of climatically induced variation as a result of factors such as rainfall events and long term climatic change.

The frequency of observations of the groundwater level in each body of groundwater shall permit assessment of trends in groundwater level as a result of both anthropogenic and non-anthropogenic influences on the body.
The frequency of observations shall permit the calculation of the available groundwater resource.

2.2.3.3 Representation of quantitative status

For each groundwater level monitoring point, observations of groundwater level shall be analysed to assess trends in the level of groundwater in the groundwater body. The detection or prediction of anthropogenic trends liable to give rise to a reduction in the ecological status of associated surface systems shall be considered as a failure to achieve good quantitative status.

2.3 GROUNDWATER CHEMICAL STATUS

2.3.1 PARAMETERS FOR CLASSIFICATION OF CHEMICAL STATUS

- Conductivity
- Concentrations of Priority List Substances
- Concentrations of Annex VIII Pollutants

2.3.2 DEFINITION OF CHEMICAL STATUS

Elements	Good status
General	*The chemical composition of the groundwater body is such that the concentrations of pollutants:* *- as specified below, do not exhibit the effects of saline or other intrusions* *- do not exceed the environmental quality standards specified below* *-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 associated terrestrial ecosystems* *and monitoring data do not exhibit any trend likely to result in the exceedance of such environmental quality standards, failure to achieve such environmental objectives, such loss of ecological or chemical quality in associated surface waters or such damage to associated terrestrial ecosystems.*
Conductivity	*is not indicative of saline or other intrusion into the groundwater body*
Priority List Pollutants	*any environmental quality standards established under Article 21(6) or under other relevant Community legislation*
Other Pollutants	*any environmental quality standards established by the Member State under Article 8 or Article 21(6) or those applicable under other relevant Community legislation*

2.3.3 MONITORING OF GROUNDWATER CHEMICAL STATUS

2.3.3.1 Identification of Monitoring Points

Member States shall assess, where relevant, the inherent susceptibility of each groundwater body to pollution by reference to relevant available monitoring data or by reference to the characteristics of the groundwater body determined in accordance with Annex II and in particular:

- the thickness, hydraulic conductivity, absorptive and reactive properties of materials overlying the geological unit in which the groundwater is located;
- the thickness, hydraulic conductivity, absorptive and reactive properties of the solid geological strata in the unsaturated zone; and
- the depth below ground of the uppermost portion of aquifer associated with the groundwater body.

Member States shall:

1. Identify those bodies of groundwater which are subject to point sources of pollutants and ensure sufficient monitoring points are provided to assess the impact of the point source input upon the groundwater body given its inherent susceptibility.

2. Identify those bodies of groundwater which pollutants enter other than from point sources and ensure sufficient monitoring points are provided to assess the impact of such sources upon the groundwater body given its inherent susceptibility.

3. Identify those bodies which are susceptible to saline or other intrusion as a result of groundwater abstraction and ensure sufficient monitoring points shall be provided to detect the rate of intrusion of saline or other intrusion into the groundwater body.

4. Identify all significant bodies of groundwater where groundwater flows across a Member State boundary and ensure at least one monitoring point is provided and such further points as are considered necessary to be representative of the variability of chemical composition across the member state boundary.

5. Designate such additional monitoring sites as are necessary in order to ensure a comprehensive overview of groundwater chemical status for each body of groundwater.

Groundwater bodies designated as waters used for the abstraction of water intended for human consumption under Article 8 shall be monitored at the point of abstraction in order to ensure achievement of the environmental quality standards set by the Member State in accordance with Article 8.

2.3.3.2 Selection of Parameters

Monitoring and analysis shall be carried out for those parameters specified in the table below:

Type Parameters	Conductivity	Priority List Substances	Other Pollutants
Body type 1 - Diffuse Input	Option	Inventory	Inventory
Body type 2 - Point Source Impact	Option	Inventory	Inventory
Body type 3 - Intrusion Sensitive	All	Inventory	Inventory
Body Type 4 - Trans Boundary	Option	All	Inventory
Body Type 5 - Unimpacted	Option	Selection	Selection

"Inventory" in the table above means: "monitor for those pollutants which are identified in the inventory of sources of pollutants that are liable to enter the groundwater body, as identified in the review of human impacts detailed in 2.3.1 above."

"Selection" in the table above means: "monitor a selection of unimpacted sites for the presence of pollutants which are liable to be widespread, so as to obtain values for the background concentration of such pollutants."

"Option" in the table above means: "may be monitored at the discretion of the Member State."

2.3.3.3 Selection of frequency

Member States shall carry out monitoring, where required to do so by Table 2.3.2.2 above, at such a frequency as is envisaged necessary to ensure that trends in the concentration of all pollutants are detected. In any event monitoring shall be carried out at a minimum frequency of once per annum.

The level of confidence and precision achieved by the monitoring system used shall be stated in the River Basin Management Plan.

2.3.3.4 Representation of Groundwater Chemical Status

Failure to achieve the standards set out in 2.2.2 shall be judged as a failure to achieve good groundwater chemical status.

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