ANNEX II

1 SURFACE WATERS

1.1. Characterisation of surface water body types

Member States shall identify the location and boundaries of bodies of surface water and shall carry out an initial characterisation of all such bodies in accordance with the following methodology. Member States may group surface water bodies together for the purposes of this initial characterisation.

(i) The surface water bodies within the river basin district shall be identified as falling within either one of the following surface water categories — rivers, lakes, transitional waters or coastal waters — or as artificial surface water bodies or heavily modified surface water bodies.

(ii) For each surface water category, the relevant surface water bodies within the river basin district shall be differentiated according to type. These types are those defined using either ‘system A’ or ‘system B’ identified in section 1.2.

(iii) If system A is used, the surface water bodies within the river basin district shall first be differentiated by the relevant ecoregions in accordance with the geographical areas identified in section 1.2 and shown on the relevant map in Annex XI. The water bodies within each ecoregion shall then be differentiated by surface water body types according to the descriptors set out in the tables for system A.

(iv) If system B is used, Member States must achieve at least the same degree of differentiation as would be achieved using system A. Accordingly, the surface water bodies within the river basin district shall be differentiated into types using the values for the obligatory descriptors and such optional descriptors, or combinations of descriptors, as are required to ensure that type specific biological reference conditions can be reliably derived.

(v) For artificial and heavily modified surface water bodies the differentiation shall be undertaken in accordance with the descriptors for whichever of the surface water categories most closely resembles the heavily modified or artificial water body concerned.

(vi) Member States shall submit to the Commission a map or maps (in a GIS format) of the geographical location of the types consistent with the degree of differentiation required under system A.

1.2. Ecoregions and surface water body types

1.2.1. Rivers

SYSTEM A

Fixed typology	**Descriptors**
Ecoregion	Ecoregions shown on map A in Annex XI
Type	Altitude typology high : >800 m mid-altitude : 200 to 800 m

	lowland : <200 m Size typology based on catchment area small : 10 to 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

Alternative characterisation	**Physical and chemical factors that determine the characteristics of the river or part of the river and hence the biological population 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 acid neutralising capacity mean substratum composition chloride air temperature range mean air temperature precipitation

1.2.2. Lakes

SYSTEM A

Fixed typology	**Descriptors**
Ecoregion	Ecoregions shown on map A in Annex XI
Type	Altitude typology high : >800 m

	mid-altitude : 200 to 800 m lowland : <200 m Depth typology based on mean depth <3 m 3 to 15 m >15 m Size typology based on surface area 0,5 to 1 km^2 1 to 10 km^2 10 to 100 km^2 >100 km^2 Geology calcareous siliceous organic

SYSTEM B

Alternative characterisation	**Physical and chemical factors that determine the characteristics of the lake and hence the biological population structure and composition**
Obligatory factors	altitude latitude longitude depth geology size
Optional factors	mean water depth lake shape residence time mean air temperature air temperature range mixing characteristics (e.g. monomictic, dimictic, polymictic) acid neutralising capacity background nutrient status mean substratum composition water level fluctuation

1.2.3. Transitional Waters

SYSTEM A

Fixed typology	**Descriptors**
Ecoregion	The following as identified on map B in Annex XI: Baltic Sea

	Barents Sea Norwegian Sea North Sea North Atlantic Ocean Mediterranean Sea
Type	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 >4 m : macrotidal

SYSTEM B

Alternative characterisation	**Physical and chemical factors that determine the characteristics of the transitional water and hence the biological population structure and composition**
Obligatory factors	latitude longitude tidal range salinity
Optional factors	depth current velocity wave exposure residence time mean water temperature mixing characteristics turbidity mean substratum composition shape water temperature range

1.2.4. Coastal Waters

SYSTEM A

Fixed typology	**Descriptors**
Ecoregion	The following as identified on map B in Annex XI:

	Baltic Sea Barents Sea Norwegian Sea North Sea North Atlantic Ocean Mediterranean Sea
Type	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

Alternative characterisation	**Physical and chemical factors that determine the characteristics of the coastal water and hence the biological community structure and composition**
Obligatory factors	latitude longitude tidal range salinity
Optional factors	current velocity wave exposure mean water temperature mixing characteristics turbidity retention time (of enclosed bays) mean substratum composition water temperature range

1.3. Establishment of type-specific reference conditions for surface water body types

(i) For each surface water body type characterised in accordance with section 1.1, type-specific hydromorphological and physicochemical conditions shall be established representing the values of the hydromorphological and physicochemical quality elements specified in point 1.1 in Annex V for that surface water body type at high ecological status as defined in the relevant table in point 1.2 in Annex V. Type-specific biological reference conditions shall be established, representing the values of the

biological quality elements specified in point 1.1 in Annex V for that surface water body type at high ecological status as defined in the relevant table in section 1.2 in Annex V.

(ii) In applying the procedures set out in this section to heavily modified or artificial surface water bodies references to high ecological status shall be construed as references to maximum ecological potential as defined in table 1.2.5 of Annex V. The values for maximum ecological potential for a water body shall be reviewed every six years.

(iii) Type-specific conditions for the purposes of points (i) and (ii) and type-specific biological reference conditions may be either spatially based or based on modelling, or may be derived using a combination of these methods. Where it is not possible to use these methods, Member States may use expert judgement to establish such conditions. In defining high ecological status in respect of concentrations of specific synthetic pollutants, the detection limits are those which can be achieved in accordance with the available techniques at the time when the type-specific conditions are to be established.

(iv) For spatially based type-specific biological reference conditions, Member States shall develop a reference network for each surface water body type. The network shall contain a sufficient number of sites of high status to provide a sufficient level of confidence about the values for the reference conditions, given the variability in the values of the quality elements corresponding to high ecological status for that surface water body type and the modelling techniques which are to be applied under paragraph (v).

(v) Type-specific biological reference conditions based on modelling may be derived using either predictive models or hindcasting methods. The methods shall use historical, palaeological and other available data and shall provide a sufficient level of confidence about the values for the reference conditions to ensure that the conditions so derived are consistent and valid for each surface water body type.

(vi) Where it is not possible to establish reliable type-specific reference conditions for a quality element in a surface water body type due to high degrees of natural variability in that element, not just as a result of seasonal variations, then that element may be excluded from the assessment of ecological status for that surface water type. In such circumstances Member States shall state the reasons for this exclusion in the river basin management plan.

1.4. Identification of Pressures

Member States shall collect and maintain information on the type and magnitude of the significant anthropogenic pressures to which the surface water bodies in each river basin district are liable to be subject, in particular the following.

Estimation and identification of significant point source pollution, in particular by substances listed in Annex VIII, from urban, industrial, agricultural and other installations and activities, based, *inter alia,* on information gathered under:

(i) Articles 15 and 17 of Directive 91/271/EEC;

(ii) Articles 9 and 15 of Directive 96/61/EC[1];

and for the purposes of the initial river basin management plan:

(iii) Article 11 of Directive 76/464/EEC; and

(iv) Directives 75/440/EC, 76/160/EEC[(2)], 78/659/EEC and 79/923/EEC[(3)].

Estimation and identification of significant diffuse source pollution, in particular by substances listed in Annex VIII, from urban, industrial, agricultural and other installations and activities; based, *inter alia*, on information gathered under:

(i) Articles 3, 5 and 6 of Directive 91/676/EEC[(4)];

(ii) Articles 7 and 17 of Directive 91/414/EEC;

(iii) Directive 98/8/EC;

and for the purposes of the first river basin management plan:

(iv) Directives 75/440/EEC, 76/160/EEC, 76/464/EEC, 78/659/EEC and 79/923/EEC.

Estimation and identification of significant water abstraction for urban, industrial, agricultural and other uses, including seasonal variations and total annual demand, and of loss of water in distribution systems.

Estimation and identification of the impact of significant water flow regulation, including water transfer and diversion, on overall flow characteristics and water balances.

Identification of significant morphological alterations to water bodies.

Estimation and identification of other significant anthropogenic impacts on the status of surface waters.

Estimation of land use patterns, including identification of the main urban, industrial and agricultural areas and, where relevant, fisheries and forests.

1.5. Assessment of Impact

Member States shall carry out an assessment of the susceptibility of the surface water status of bodies to the pressures identified above.

Member States shall use the information collected above, and any other relevant information including existing environmental monitoring data, to carry out an assessment of the likelihood that surface waters bodies within the river basin district will fail to meet the environmental quality objectives set for the bodies under Article 4. Member States may utilise modelling techniques to assist in such an assessment.

For those bodies identified as being at risk of failing the environmental quality objectives, further characterisation shall, where relevant, be carried out to optimise the design of both the monitoring programmes required under Article 8, and the programmes of measures required under Article 11.

2. GROUNDWATERS

2.1. Initial characterisation

Member States shall carry out an initial characterisation of all groundwater bodies to assess their uses and the degree to which they are at risk of failing to meet the objectives for each groundwater body under Article 4. Member States may group groundwater bodies together for the purposes of this initial characterisation. This analysis may employ existing hydrological, geological, pedological, land use, discharge, abstraction and other data but shall identify:

— the location and boundaries of the groundwater body or bodies,

— the pressures to which the groundwater body or bodies are liable to be subject including:
  — diffuse sources of pollution
  — point sources of pollution
  — abstraction
  — artificial recharge,
— the general character of the overlying strata in the catchment area from which the groundwater body receives its recharge,
— those groundwater bodies for which there are directly dependent surface water ecosystems or terrestrial ecosystems.

2.2. Further characterisation

Following this initial characterisation, Member States shall carry out further characterisation of those groundwater bodies or groups of bodies which have been identified as being at risk in order to establish a more precise assessment of the significance of such risk and identification of any measures to be required under Article 11. Accordingly, this characterisation shall include relevant information on the impact of human activity and, where relevant, information on:

— geological characteristics of the groundwater body including the extent and type of geological units,
— hydrogeological characteristics of the groundwater body including hydraulic conductivity, porosity and confinement,
— characteristics of the superficial deposits and soils in the catchment from which the groundwater body receives its recharge, including the thickness, porosity, hydraulic conductivity, and absorptive properties of the deposits and soils,
— 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,
— sufficient data to calculate the long term annual average rate of overall recharge,
— characterisation of the chemical composition of the groundwater, including specification of the contributions from human activity. Member States may use typologies for groundwater characterisation when establishing natural background levels for these bodies of groundwater.

2.3. Review of the impact of human activity on groundwaters

For those bodies of groundwater which cross the boundary between two or more Member States or are identified following the initial characterisation undertaken in accordance with paragraph 2.1 as being at risk of failing to meet the objectives set for each body under Article 4, the following information shall, where relevant, be collected and maintained for each groundwater body:

(a) the location of points in the groundwater body used for the abstraction of water with the exception of:
  — points for the abstraction of water providing less than an average of 10 m^3 per day, or,
  — points for the abstraction of water intended for human consumption providing less than an average of 10 m^3 per day or serving less than 50 persons,

(b) the annual average rates of abstraction from such points,

(c) the chemical composition of water abstracted from the groundwater body,

(d) the location of points in the groundwater body into which water is directly discharged,

(e) the rates of discharge at such points,

(f) the chemical composition of discharges to the groundwater body, and

(g) land use in the catchment or catchments from which the groundwater body receives its recharge, including pollutant inputs and anthropogenic alterations to the recharge characteristics such as rainwater and run-off diversion through land sealing, artificial recharge, damming or drainage.

2.4. Review of the impact of changes in groundwater levels

Member States shall also identify those bodies of groundwater for which lower objectives are to be specified under Article 4 including as a result of consideration of the effects of the status of the body on:

(i) surface water and associated terrestrial ecosystems

(ii) water regulation, flood protection and land drainage

(iii) human development.

2.5. Review of the impact of pollution on groundwater quality

Member States shall identify those bodies of groundwater for which lower objectives are to be specified under Article 4(5) where, as a result of the impact of human activity, as determined in accordance with Article 5(1), the body of groundwater is so polluted that achieving good groundwater chemical status is infeasible or disproportionately expensive.

(**1**) OJ L 135, 30.5.1991, p. 40. Directive as last amended by Directive 98/15/EC (OJ L 67, 7.3.1998, p. 29).

(**2**) OJ L 31, 5.2.1976, p. 1. Directive as last amended by the 1994 Act of Accession.

(**3**) OJ L 281, 10.11.1979, p. 47. Directive as amended by Directive 91/692/EEC (OJ L 377, 31.12.1991, p. 48).

(**4**) OJ L 375, 31.12.1991, p. 1.