

RECOMMENDATIONS TO ECE GOVERNMENTS ON WATER-QUALITY CRITERIA AND OBJECTIVES

as adopted by the Senior Advisers to ECE Governments on Environmental and Water Problems at their sixth session in March 1993

Many chemical substances emitted into the environment from anthropogenic sources pose a threat to the functioning of aquatic ecosystems and the utilization of water for various purposes. The need for strengthened measures to prevent and control the release of hazardous substances into the aquatic environment, and to abate the deterioration of water quality owing to these substances, as well as to an excessive release of nutrients and other conventional water pollutants, has led many countries to develop and implement water management strategies on the basis of, *inter alia*, water-quality criteria and objectives, taking into account water-quality requirements for water uses in the relevant catchment area.

Guidelines for developing water-quality objectives and criteria are given in annex III to the *Convention on the Protection and Use of Transboundary Watercourses and International Lakes* (Helsinki, 1992). With a view to providing further guidance in the elaboration of water-quality criteria and the formulation and setting-up of water-quality objectives for inland surface waters, and in order to strengthen international cooperation,

it is recommended that:

1. Water-quality requirements for different water uses, such as drinking-water, irrigation, livestock watering, fisheries, leisure activities, amenities, and maintenance of riverine flora and fauna should be clearly defined, taking into account in particular the adverse impact of the use of substances that are toxic, persistent, bio-accumulative, carcinogenic, mutagenic and teratogenic, or which cause eutrophication and acidification of aquatic ecosystems.
2. Special attention should be given to acquiring more information on the substance's behaviour in water, as well as to the fate and interaction of different substances and their mixtures (for example, synergistic effects) on both the biotic and abiotic components of aquatic ecosystems.
3. A methodology for the selection of water-quality parameters, including physical properties, chemical constituents and microbiological parameters of water, which are of relevance to water uses for various purposes, should be developed and harmonized, if possible, at an international level. Particular attention should be given to the development and harmonization, at the international

level, of methodological approaches for the selection of biological indicators relating to the conservation of flora and fauna and to other parameters suitable for characterizing the structural and/or functional integrity of aquatic ecosystems.

4. The precautionary principle should be applied when selecting water-quality parameters and establishing water-quality criteria to protect and maintain individual uses of waters. Water-quality criteria should be established as follows:

(a) Raw-water quality criteria for drinking-water supply should strive for attainment, as appropriate, of drinking-water criteria;

(b) Water-quality criteria for aquatic life should be aimed at the protection and maintenance of riverine flora and fauna in all its forms and life stages, taking into account, in particular, the protection of the functional integrity of aquatic ecosystems;

(c) Water-quality criteria for surface waters used for irrigation should not lead to any significant adverse effects on soil properties, salinization or accumulation of toxic substances or to the subsequent transfer of pollution from soil to surface water and groundwater;

(d) Quality criteria for sediment and suspended particulate matter should be aimed at the protection of aquatic organisms living in or on sediment, at the protection of aquatic ecosystems, and at the protection of soils and terrestrial ecosystems, if dredged sediment is to be disposed of.

5. Particular attention should be paid to the protection of the integrity of aquatic ecosystems and to specific requirements regarding sensitive and specially protected waters and their environment, such as wetland areas, and the surrounding areas of surface waters which serve as source of food and habitats for various species of flora and fauna. Special-use categories should be defined for that purpose. Quality criteria for these categories should be established on the basis of indicators relating to the conservation of flora and fauna and other information that characterizes the structural and/or functional integrity of aquatic ecosystems.

6. In setting water-quality criteria, particular attention should be paid to substances that cause acute and chronic toxic effects at low concentrations, as well as to substances that cause (or are suspected- of causing) carcinogenic, mutagenic and teratogenic effects.
7. Water-quality criteria should be used as a reference base for the assessment of the current water quality in water bodies and its suitability for different purposes.
8. In order to improve knowledge about the adverse impact of pollution on aquatic ecosystems, research should be continued on sensitive indicators and/or criteria that are capable of diagnosing early stages of stress to aquatic ecosystems. Particular attention should be paid to the further development and improvement of systems for water-quality assessment and classification that rely on biological information, as well as the combination of physico-chemical and biological assessment and classification systems. Efforts should be made by riparian countries to jointly develop and agree on water-quality assessment and classification systems for transboundary waters.
9. Water-management authorities in consultation, *inter alia*, with industries, municipalities, farmers' associations and the general public should agree on the water uses in a catchment area that are to be protected. Use categories, such as drinking-water supply, irrigation, livestock watering, fisheries, leisure activities, amenities, maintenance of aquatic life, and protection of the integrity of aquatic ecosystems, should be considered, if applicable.
10. In setting water-quality objectives for a given water body, both the water-quality requirements for water uses of the relevant water body, as well as downstream uses, should be taken into account. In transboundary waters, water-quality objectives should be set taking into account water-quality requirements in the relevant catchment area; as far as possible, water-quality requirements for water uses in the whole catchment area should be considered.
11. Water-quality objectives should be set, taking into account specific physico-chemical, biological and other characteristics of water bodies and their catchment area. Expert judgement should be sought for adjusting water-quality objectives to site-specific natural conditions, particularly natural excessive occurrence of some substances, such as heavy metals. Under no circumstances should the setting of water-quality objectives (or modification thereof to account for site-specific factors) lead to the deterioration of existing water quality.
12. Water-quality objectives for multipurpose uses of water should be set at a level that provides for the protection of the most sensitive use of a water body. Among all identified water uses, the most stringent water-quality criterion for a given water-quality parameter should be adopted as a water-quality objective.
13. Water-management authorities should be required to take appropriate advice from health authorities in order to ensure that water-quality objectives are appropriate to protect human health.
14. Water-quality objectives established should be considered as the ultimate goal, that is, as a target value which indicates a negligible risk of adverse effects on water uses and the ecological functions of waters.
15. The setting of water-quality objectives should be accompanied by the development of a time schedule for compliance with the objectives, taking into account action which is technically and financially feasible and legally implementable.
16. Where necessary, there should be a step-by-step approach to attain water-quality objectives, taking into account, *inter alia*, the current water quality, current and potential new water uses in the catchment area, available technical and financial means for pollution prevention, control and reduction, as well as the urgency of control measures. These objectives, which represent the result of a balance between what is desirable from an environmental point of view and what is feasible from a technical and economic point of view, should be regarded as a policy goal to be attained within a certain period of time.
17. The setting of emission limits on the basis of best available technology, the use of best environmental practices and water-quality objectives as integral instruments of prevention, control and reduction of water pollution, should be applied in an action-oriented way. Action plans covering both point and diffuse pollution sources should be designed, which permit a step-by-step approach and are both technically and financially feasible. In addition to action plans and measures implementing strategies and standards for emission limits, measures based on water-quality criteria and objectives should also be considered, where appropriate; the relative priorities of all these measures should also be considered. Preparatory and complementary administrative measures to these action plans should include, *inter alia*:
 - (a) Taking steps, such as emission inventories and catchment inventories, in order to ascertain where substances that are hazardous or otherwise likely to adversely affect water uses and aquatic ecosystems are manufactured, used, stored, disposed of or discharged into inland waters;
 - (b) Phasing out or prohibiting the use of hazardous substances when they pose a particular risk to sensitive or specially protected waters.
18. Monitoring programmes, including programmes for laboratory analyses, should be adapted to the water-quality objectives, particularly with regard to measurement parameters, range of concentrations and frequency of measurement, and should provide reliable information on whether water-quality objectives are met and what further reduction in emissions from both point and non-point sources in the catchment area is required to meet the objectives.
19. Both the water-quality objectives and the timetable for compliance should be subject to revision at appropriate time intervals in order to adjust them, *inter alia*, to new scientific knowledge on water-quality criteria, changes in water use in the catchment area, best available technology for point-source control, the establishment and implementation of rules of good agricultural practice for the control of agricultural sources, as well as

environmentally sound practices for the control of other non-point sources, which are technical and financially feasible, in addition to other factors that may have a bearing on the implementation of measures to prevent, control or reduce water pollution. The public should be

kept informed about water-quality objectives that have been established, and about measures taken to attain these objectives.