Project 405
R&D Project Record
405/2/S

Catchment Management Issues : Use Related Standards

R&D Project Record
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Environmental Advisory Unit Ltd

May 1993

NRA
National Rivers Authority

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CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS

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GLOSSARY

Activity : In the context of this report, activity refers to any use-related process occurring in the catchment which does not depend directly on the aquatic environment, but nevertheless, has an impact upon it. It includes, for example, management of agricultural land, the built environment and infrastructure and communications.

Catchment : A catchment is a distinct hydrographic unit defined by a watershed usually comprising an inland river system and associated surface waters, groundwaters, estuarine and possibly coastal waters.

CMP : Catchment Management Planning (CMP) is a multifunctional approach to the management and protection of the aquatic environment on a catchment basis. Thus, policies for the management of individual catchments are developed and implemented.

Flow : Flow is the volume of water passing a given point in a given time, usually expressed as cubic metres per second (cumecs).

HABSCORE : HABitat SCORE - A model developed by Welsh NRA (Milner et al 1985) for the assessment of habitat for fish as a means of estimating fish production. This is being further developed within NRA National R&D.

Management : In the context of CMP, management is the effective control of catchment resources and demand, ensuring protection of catchment uses.

Objective : The aim, in environmental terms, of any use, activity or water user. The report concentrates on user objectives rather than the objectives of the catchment planner.

Parameter : A characteristic of a watercourse or water body, by which the requirements of different uses can be expressed, eg. flow, area, pH, BOD etc.

PHABSIM : Physical HABitat SIMulation is a model which incorporates hydraulic and physical habitat conditions to simulate stream conditions. Distinct habitat/hydraulic relationships can be derived for individual species on the basis of field data. The model then allows prediction of the biological changes likely to result from changes in, for example, the hydraulic regime.

Physical features : The characteristics of watercourses or water bodies which can be expressed in physical terms and do not relate to either the quantity or quality of water. It includes features such as channel morphology, water movements, substrate composition etc. For the purposes of this report, the physical features category also includes any relevant land or water management practices, such as maintenance of structures, weed clearance etc.

Requirements : The requirements of uses are the conditions that must persist to protect the use and permit user objectives to be achieved. In this report, use requirements have been expressed in terms of parameters for water quantity, water quality and physical features.

RIVPACS : The River InVertebrate Prediction and Classification Scheme is a technique for modelling the expected invertebrate community of any particular watercourse based on its physical and chemical characteristics.

Standard : A standard is a quantitative or qualitative level set for a given parameter, and which is used as a required level of achievement. In CMP, standards should define precisely the requirements of individual uses.

SWQO : Statutory Water Quality Objective.

Use : For the purposes of this report, a use refers to a directly water-dependent action or feature. This includes abstraction, effluent disposal, water-based recreation, fisheries, ecology and active river management, such as for flood defence.

Velocity : Velocity is the rate of movement of water, expressed as metres per second (m/s).

Water quality : Water quality is the condition of water as expressed in terms of chemical, microbiological or aesthetic characteristics. Water quality is commonly related to its suitability for particular purposes or uses.

Water resources (quantity) : Water resources refers to the quantity and availability of water. For the purposes of this report, it is expressed mainly as flow, volume or depth. It is usually considered in terms of sufficiency of water for particular purposes or uses.

EXECUTIVE SUMMARY

The overall objective of this project is to develop use-related standards relevant to each requirement in Catchment Management Plans. Phase I consists of a Project Definition Study to define terms of reference for Phase II, which involves the development of use-related standards for implementation in Catchment Management Planning (CMP). The NRA is developing CMP as a multi-functional approach to the management and protection of the water environment.

The objectives of Phase I are:

1. to identify all uses, current and future, of water and the water related environment within a catchment;
2. identify the environmental objectives required to protect the above uses;
3. identify and review existing standards relevant to 1. and 2. above;
4. to identify those uses where no current parameters/standards exist; and
5. formulate terms of reference for Phase II of the project.

Following a brief discussion of the background of the study Section 2. describes the methods used in compiling the information presented in this report. Section 3. discusses the responses to the project questionnaire and the analysis of the data derived from this source. All the questionnaire returns are included as Appendices.

Section 4. provides a list of uses and activities relevant to CMP. Existing use categories are discussed, and problems with an inconsistent approach are identified. The environmental objectives for each use described in Section 4. are presented in Section 5. The water resource, water quality and physical feature requirements of each use are described and reviewed according to different categories of use. Data derived from the questionnaire returns are used to illustrate the nature of the parameters relevant for expressing use-related environmental requirements.

Existing standards for the parameters identified in Section 5. are reviewed in the project R&D Note (R&D Note 161). This review resulted in the following recommendations for Phase II of the project.

The recommendations comprise seven areas of interest as follows:

1. a consistent approach to categorising uses;
2. a policy framework for making catchment-based decisions on priorities of uses;
3. the practicality of a two tier system of standards, "preferred" and "acceptable";
4. development of new standards and criteria for specific uses and requirements;
5. feasibility of deriving methods for setting catchment-specific standards;
6. evaluation methods to assess catchment use-potential and status; and
7. surrogate parameters and indicator groups.

KEYWORDS

Catchment Management Planning, Catchment Areas, Criteria, Environmental Quality, Physical Features, Standards, Water Quality, Water Quantity.

1. INTRODUCTION

The National Rivers Authority (NRA) is developing the concept and practice of Catchment Management Planning (CMP). The catchment management process integrates all the NRA core functions into a multi functional approach to management and protection of the water environment. It also provides opportunities for proactive action by the NRA in consultation with interested parties.

A standard method for producing Catchment Management Plans has been recommended within the NRA (NRA 1991b). This method is being implemented in the NRA regions. Catchment Management Plans describe the current status of all water related uses and activities in the catchment. The Plans provide proposals to protect those uses, to improve the quality of the catchment and to resolve problems and conflicts between uses. They will also communicate the NRA's activities to the public.

At present, there are no guidelines for identifying use-related environmental objectives and standards. Many uses have no formally agreed requirements or standards.

The overall objective of this project (NRA R&D Project 405) is to develop use-related standards in terms of water resources (quantity), water quality and physical features relevant to each requirement in Catchment Management Plans.

Phase I consists of a Project Definition Study, which will define the terms of reference for Phase II. Phase II will consist of the development of use-related standards for use in CMP.

Phase I comprises a series of objectives, leading to the formulation of the Phase II terms of reference. The objectives of this Phase I study are:

1. to identify all uses, current and future, of water and the water related environment within a catchment;

2. to identify the environmental objectives required to protect the uses as identified in (1) above;

3. to identify and review, for each use, the associated parameters which must be considered and the existence of current standards relating either to the uses or objectives identified in (1) and (2) above;

4. to identify those uses where no current parameters/standards exist; and

5. to formulate terms of reference for Phase II of the project, which will develop use-related standards with reference to water quality, water quantity and physical features.

This report addresses the objectives of the project in order. Following an explanation of the methods adopted in the study, uses are identified, their requirements and any existing standards are discussed and recommendations for future R&D are presented.

1.1 Catchment Management priorities

A recurrent feature of both Catchment Management Plans and discussions about CMP is the need to identify priorities. The NRA will, by necessity, include within CMP a priority of meeting its statutory obligations. These obligations, however, cover potentially conflicting interests, each of which needs to be protected. Thus, an important part of any Catchment Management Plan will be to clearly identify and justify priorities.

The priorities of CMP must be defined because CMP can be approached from different perspectives, not least by the different NRA core functions. Multi-functional Catchment Management Plans are relatively recent within the NRA. Single-function plans (e.g. water quality plan or flood defence plan) have been produced for much longer. They concentrate on a particular NRA function, often with an incomplete consideration of other functions.

There may also be external pressure to identify priorities in CMP. In a recent report prepared for English Nature, it is stated that,

> 'it is critical that Catchment Plans are environmentally-led with environmental considerations permeating all aspects of the plan' (English Nature 1992a).

Such an approach is to be expected from an organisation with statutory conservation responsibilities, but a business or agricultural organisation may adopt alternative priorities.

The perspective and priority of the NRA's multi-functional responsibilities are integral components of any Catchment Management Plan. Decisions on the priority of different catchment uses are not directly relevant to use-related standards but will be important in implementing them. Consequently, it is essential that standards are set within a clear policy framework.

1.2 Scope of study

The technical scope of the study is described in the project objectives, but difficulties arose during the project over the functional scope of the project. According to the NRA report "Catchment Management Planning" (NRA 1991b), a catchment is defined as,

> 'The catchment will include the appropriate inland river system, associated groundwater and estuarine waters, the exact boundaries of which should be defined in the CMP report. Information on sea defences and coastal water quality should be included where necessary.'

Consequently, this project was restricted to inland surface waters, groundwaters and estuaries. During consultation, however, two NRA regions questioned the absence of coastal waters from the report scope. In addition, Anglian Region recently published a Catchment Management Plan for the Louth Coastal Catchment, which includes some Lincolnshire coastal waters. Many factors discussed in this report, however, apply equally well to coastal as to inland and estuarine waters.

2. METHODS

Two main methods were employed to fulfil the objectives of the project as listed in Section 1.

These consisted of:
1. a desk study of existing information and publications and;
2. consultation within the NRA and with other interested parties.

2.1 Desk Study

The aim of the desk study was both to provide information necessary for meeting the objectives of Phase I and to identify relevant sources of information for subsequent stages. A variety of sources provided useful information, including:

1. NRA R&D programme;
2. existing Catchment Management Plans;
3. UK & EC legislation and guidelines;
4. NRA publications; and
5. other publications (eg. scientific journals, handbooks, conference proceedings etc.).

2.1.1 NRA R&D Programme

Several NRA National R&D projects, in a variety of functional and multi-functional areas, are directly relevant to this project. In view of the wide range and multi-functional nature of this project, it is particularly important that current NRA R&D is taken into account. It is clearly inefficient to undertake essentially similar work twice and one of the important roles of Phase I of the study is to identify areas of existing, current R&D.

In the Water Quality function, the R&D programme underlying the recommendations for setting Statutory Water Quality Objectives (SWQOs) is particularly important. Although many components of SWQOs are already well established, standards for other aspects, such as water sports and commercial harvesting of marine fish and shellfish are incomplete. Some R&D is already addressing such issues and further recommendations are included in the recently published NRA document describing its approach to setting SWQOs (NRA 1992a).

In the Water Resources function, there are several R&D projects examining flow requirements to protect different uses. These include studies of ecologically acceptable flows, incorporating fisheries and conservation needs, and required residual flows to estuaries, i.e. freshwater flows necessary to protect uses of tidal river stretches. In addition, the potential for the resource management strategy used in the Yorkshire Region to be applied throughout the UK will be investigated as a NRA national R&D project. The major R&D thrust for the future in Water Resources will be to derive a consistent means of setting Minimum Acceptable Flows (MAF) for rivers. These will form a very important component of CMP. Thus, co-ordination of these different R&D projects in the water resources function is highly important.

The NRA is developing and expanding its role in conservation. Consequently, the development of consistent and generally applicable nature conservation requirements in CMP is important. It is acknowledged (NRA 1992a) that water quality standards for sites of conservation interest need to be set on a site specific basis. An important current NRA R&D project is the investigation of conservation criteria related to low flows. The NRA

is also intending to develop its role in promoting the restoration and enhancement of wetland habitats (P. Raven pers.comm).

EAU is not aware of R&D projects related to CMP and use-related standards in other functions. Phase II of this project may well reveal additional R&D projects of importance for setting standards applicable to CMP.

2.1.2 Catchment Management Plans

There is a steadily increasing number of Catchment Management Plans being produced by various NRA regions. These are based on the pattern described in the NRA document "Catchment Management Planning" (NRA 1991b).

A summary of Catchment Plans produced both abroad and in the UK prior to 1990 are given in NRA reports (NRA 1990b, NRA 1991b). Since then, Catchment Management Plans have been produced for, among others, the River Test, River Medway (Southern Region), River Blackwater (Thames), River Ogmore (Welsh), River Louth (Anglian), Hampshire Avon (Wessex). These plans were used as major sources of information in the desk study.

2.1.3 UK and EC Legislation

A variety of legislative standards, particularly relating to water quality have been set in EC Directives and consequent UK Regulations. Relevant standards were consulted in the desk study.

2.1.4 Other publications

The desk study also included a literature search for other relevant reports and publications. These included official publications from statutory bodies such as NRA, Ministry of Agriculture, Fisheries and Food (MAFF), Department of the Environment (DoE) and Nature Conservancy Council (NCC), as well as non-statutory organisations such as Royal Society for Nature Conservation (RSNC) and Royal Society for the Protection of Birds (RSPB). Relevant scientific papers have also been consulted where possible. A list of documents is given in the References & Bibliography.

2.2 Consultation

In order to both supplement and complement the desk study, a wide ranging consultation process was conducted. This was achieved principally by the use of a questionnaire, circulated to catchment planning coordinators in all regions of the NRA. The questionnaire was compiled by EAU in consultation with NRA Core Function representatives.

The questionnaire was designed with a threefold purpose:

1. to confirm actual uses and activities in any catchment and the nature of waters to which those uses are related;

2. to identify whether the environmental requirements of each use or activity can be classified as either quantitative or qualitative in terms of water quality, water volume or flow (quantity) and physical features;

3. to provide details of any standards relating to such requirements which are applied on a local or regional basis.

The responses to the questionnaire are given in Appendix 1.

In addition, NRA Core Function representatives were consulted, initially by a meeting and subsequently by letter. Long-term policy in both R&D and CMP within the NRA Core Functions was discussed in order to provide a policy framework for this project.

The NRA Core Function representatives and CMP coordinators have thus provided information from within the NRA. In order to obtain a perspective from outside the NRA, a variety of external consultees were sent the questionnaire. A list of consultees was provided by the NRA Head Office and is included in Appendix 2.

The list of consultees covered a range of water users, regulatory bodies and other relevant organisations as follows:

1. strategic planning and statutory bodies (eg. Ministry of Agriculture Fisheries and Food (MAFF), Department of Environment (DoE), English Nature, Countryside Council for Wales (CCW), etc.);

2. water user groups
   - Water companies,
   - Agricultural organisations,
   - Industrial organisations,
   - Leisure and recreation bodies,
   - Countryside/environment/conservation groups;

3. scientific research establishments (eg. Institute of Terrestrial Ecology (ITE), Institute of Freshwater Ecology (IFE) etc.).

The responses received from external consultees are given in Appendix 2.

Responses identifying particular areas of interest were followed up by telephone and relevant reports or information were subsequently acquired.

3. ANALYSIS OF QUESTIONNAIRE RETURNS

3.1 Methods of analysis

The questionnaire sent to both internal NRA and external consultees is given as Figure 3.1 on the following pages.

The majority of information requiring analysis was derived from the responses to Questions 2 and 3:

- occurrence of particular uses and the nature of the associated water body or watercourse;
- the nature of the parameters suitable for expressing environmental use requirements in terms of water quantity, water quality or physical features, separated into qualitative and quantitative expressions.

Consultees were requested to respond only within the confines of their area of responsibility. Consequently, the majority of questionnaires were only completed for a restricted number of uses. This variable response prevented analysis of the proportion of positive responses for any given parameter or use. In addition, the variation in the total number of responses for any given use also prevented a direct comparison of the appropriate parameters between different uses.

These limitations on the data set derived from the questionnaire did not, however, severely limit its value to the project. The main aims of using the questionnaire were still fulfilled and the data were used to indicate the best means of expressing use-related environmental requirements. The questionnaire responses were intended to be used in the assessment of individual uses or use categories, so it was not significant that detailed comparisons between uses was not possible.

The total number of positive responses to any individual component of the questionnaire was recorded. The information was stored on a spreadsheet to permit manipulation of the data. Positive responses for use categories were calculated as the sum of responses from individual uses within those categories. These combined data for use categories were then presented as histograms. The histograms illustrate which use-related environmental requirements can be appropriately expressed in quantitative or qualitative terms.

Other information received from the questionnaire or from accompanying letters was recorded individually and incorporated into the review of existing and proposed environmental standards. Additional contact was made with respondees where appropriate, either to clarify particular responses or to obtain reference material.

3.2 NRA questionnaire returns

A summary of the level of response received from the ten NRA regions is given in Table 3.1. It clearly illustrates the variation in response between regions and between functional groups. Responses were particularly poor from Wessex and Southern Regions and from the Flood Defence (FD) and Fisheries, Conservation, Recreation and Navigation (FCRN) core functions.

The number of positive responses to individual components of the questionnaire received from NRA consultees is presented in Figure 3.2. The returned questionnaires are given in Appendix 1.

3.3 External consultee questionnaire returns

A full list of the organisations consulted is given in Appendix 2, together with the questionnaires returned. The number of positive responses to individual components of the questionnaire as received from non-NRA consultees is presented in Figure 3.3.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : Contact Address :

Telephone Number :

1. Please define your area of responsibility :

a) functional .....

b) region/area .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE			QUALITATIVE		
		Vol	WQ	Phys	Vol	WQ	Phys
1. Public water supply							
Water company abstraction	_____	O	O	O	O	O	O
Private supply	_____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	_____	O	O	O	O	O	O
Private discharge	_____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	_____	O	O	O	O	O	O
Spray irrigation	_____	O	O	O	O	O	O
Livestock watering	_____	O	O	O	O	O	O
Liquid waste disposal	_____	O	O	O	O	O	O
Fish farming	_____	O	O	O	O	O	O
Water cress growing	_____	O	O	O	O	O	O
Forestry	_____	O	O	O	O	O	O

Figure 3.1 Project questionnaire sent to NRA consultees

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	_____	O	O	O	O	O	O
Process effluent disposal	_____	O	O	O	O	O	O
Cooling water discharge	_____	O	O	O	O	O	O
Mine washings	_____	O	O	O	O	O	O
Mineral extraction	_____	O	O	O	O	O	O
Solid wastes (ie landfill)	_____	O	O	O	O	O	O
Power generation	_____	O	O	O	O	O	O
Commercial navigation	_____	O	O	O	O	O	O
Site drainage	_____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	_____	O	O	O	O	O	O
Shellfishing	_____	O	O	O	O	O	O
Migratory fishery (inc. eels)	_____	O	O	O	O	O	O
Salmonid fishery	_____	O	O	O	O	O	O
Cyprinid (coarse) fishery	_____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	_____	O	O	O	O	O	O
Nature conservation sites	_____	O	O	O	O	O	O
Landscape feature	_____	O	O	O	O	O	O
Heritage or archaeology value	_____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	_____	O	O	O	O	O	O
Ornamental/landscape use	_____	O	O	O	O	O	O
Game angling	_____	O	O	O	O	O	O
Coarse angling	_____	O	O	O	O	O	O
Wildfowling	_____	O	O	O	O	O	O
Birdwatching	_____	O	O	O	O	O	O
Pleasure boating	_____	O	O	O	O	O	O
Sailing (eg dinghies)	_____	O	O	O	O	O	O
Canoeing/Rowing	_____	O	O	O	O	O	O
Windsurfing	_____	O	O	O	O	O	O
Water-skiing	_____	O	O	O	O	O	O
Swimming and diving	_____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	_____	O	O	O	O	O	O
Transport links (road, rail etc.)	_____	O	O	O	O	O	O
9. Other uses							
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O

Figure 3.1 Project questionnaire sent to NRA consultees (page 2)

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

Figure 3.1 Project questionnaire sent to NRA consultees (Page 3)

Table 3.1 Summary of NRA responses to project questionnaire

NRA Region	Function FCRN	FD	WQ	WR
Thames	*	*	*	*
Anglian	-	-	*	*
Welsh (1)	*	*	*	*
Severn Trent	*	-	*	*
North West	-	*	*	-
Northumbrian	*	-	*	*
Southern	-	-	*	-
South West (2)	*	*	*	*
Wessex	-	-	-	-
Yorkshire	-	-	*	*

Notes

FCRN	Fisheries, Conservation, Recreation & Navigation
FD	Flood Defence
WQ	Water Quality
WR	Water Resources
*	Response received
-	No response received
(1)	Responses for FCRN, FD & WQ combined on one questionnaire
(2)	Responses for all functions combined on one questionnaire.

Figure 3.2 Summary of NRA responses to questionnaire

Water uses	Water body type						QUANTITATIVE			QUALITATIVE		
	R	C	D	L	E	G	Vol	WQ	Phys	Vol	WQ	Phys
1. Public Water Supply												
Water company abstraction	17	8	0	15	2	14	13	13	4	1	4	3
Private supply	12	5	1	8	5	13	11	9	4	1	4	3
2. Sewage effluent disposal												
Water company discharge	13	8	11	8	11	10	9	10	2	3	3	5
Private discharge	13	9	11	8	11	10	9	10	2	3	3	4
3. Agricultural uses												
Land drainage	10	6	9	4	5	4	6	2	2	2	1	3
Spray irrigation	15	11	8	11	5	10	9	12	2	1	1	1
Livestock watering	15	9	7	11	4	8	7	10	2	3	2	2
Liquid waste disposal	8	5	6	6	6	8	6	6	1	2	3	4
Fish farming	15	6	3	10	2	9	12	12	2	1	1	5
Water cress growing	8	2	2	3	0	5	6	7	1	0	0	1
Forestry	7	2	4	6	0	4	5	3	1	0	1	1
4. Industrial uses												
Industrial abstraction	17	13	7	12	14	13	15	12	1	2	3	2
Process effluent disposal	12	8	6	5	9	7	8	9	1	1	1	4
Cooling water discharge	13	8	2	3	10	2	9	9	1	2	1	3
Mine washings	11	6	3	4	2	8	9	7	2	2	1	3
Mineral extraction	13	6	5	7	6	10	10	8	2	1	2	3
Solid wastes (ie. landfill)	10	3	4	2	5	11	5	5	2	2	1	4
Power generation	13	5	3	5	10	5	10	8	2	2	1	3
Commercial navigation	11	7	1	2	6	0	3	1	2	3	2	3
Site drainage	12	8	11	8	8	8	4	7	1	2	2	1
5. Fisheries												
Commercial fishing	4	1	1	2	9	0	1	8	1	3	1	3
Shellfishing	0	0	0	0	7	0	1	7	1	2	1	2
Migratory fishery (inc. eels)	8	2	2	4	9	0	2	9	2	6	0	4
Salmonid fishery	10	1	0	8	4	0	3	10	1	6	0	5
Cyprinid (coarse) fishery	10	6	3	8	3	0	2	10	1	6	0	5
6. Conservation												
River corridor conservation	9	6	4	3	4	0	1	1	3	6	5	6
Nature conservation sites	9	8	7	7	7	2	1	3	1	6	4	5
Landscape feature	9	8	7	7	7	2	0	0	2	5	4	7
Heritage or archaeology value	9	8	6	6	6	2	0	0	1	6	4	6
7. Amenity and recreation												
General amenity (walking)	10	9	6	9	9	2	0	1	2	6	6	6
Ornamental/ landscape use	8	6	5	6	6	2	0	0	0	5	5	7
Game angling	10	4	2	9	6	0	3	7	1	5	2	6
Course angling	11	9	5	10	6	0	2	8	1	7	2	6
Wildfowling	5	4	4	6	7	0	1	3	1	5	4	4
Birdwatching	9	7	6	8	8	2	1	1	0	8	4	5
Pleasure boating	10	6	2	9	9	0	2	5	2	7	5	5
Sailing (eg. dinghies)	9	6	2	8	9	0	2	5	3	6	4	4
Canoeing/rowing	10	7	3	9	8	0	3	5	2	6	4	4
Windsurfing	7	3	2	9	9	0	1	6	3	6	4	2
Water-skiing	6	3	2	8	9	0	1	6	2	5	3	3
Swimming and diving	9	4	2	8	9	0	2	8	1	5	3	4
8. Other landuse features												
Urban land use (drainage etc.)	6	5	5	4	5	4	2	3	1	1	0	3
Transport links (road, rail etc.)	6	5	5	4	5	4	2	3	1	1	0	3

Notes

R = Rivers and streams
C = Canals
D = Drainage ditches etc.
L = Lakes and reservoirs
E = Estuaries
G = Groundwater

Vol = water flow/volume
WQ = water quality
Phys = physical features

Figure 3.3 Summary of non-NRA responses to questionnaire

Water uses	Water body type						QUANTITATIVE			QUALITATIVE		
	R	C	D	L	E	G	Vol	WQ	Phys	Vol	WQ	Phys
1. Public Water Supply												
Water company abstraction	11	5	0	10	2	9	13	11	6	5	7	4
Private supply	1	1	0	1	1	3	4	2	2	0	1	0
2. Sewage effluent disposal												
Water company discharge	5	2	1	3	3	0	3	3	1	1	1	1
Private discharge	4	2	2	2	3	0	1	2	0	2	2	1
3. Agricultural uses												
Land drainage	4	2	2	4	2	1	1	2	0	1	0	2
Spray irrigation	2	2	1	2	1	1	2	2	0	0	0	0
Livestock watering	1	2	0	1	1	0	0	1	0	0	0	0
Liquid waste disposal	1	1	1	2	2	0	0	0	0	1	1	1
Fish farming	2	2	1	2	1	0	1	2	0	0	0	0
Water cress growing	2	1	0	1	1	0	0	1	0	0	0	0
Forestry	2	1	1	1	1	0	0	1	0	0	0	0
4. Industrial uses												
Industrial abstraction	6	5	0	3	4	4	8	4	1	0	2	1
Process effluent disposal	5	5	0	2	6	0	5	5	2	2	1	1
Cooling water discharge	3	6	0	2	6	0	5	4	2	2	2	1
Mine washings	2	1	0	1	1	0	0	1	0	1	0	0
Mineral extraction	4	1	0	2	1	0	1	2	0	1	0	0
Solid wastes (ie. landfill)	1	1	1	1	2	2	2	3	1	0	0	0
Power generation	4	3	0	4	3	0	4	4	3	0	0	0
Commercial navigation	2	2	0	1	3	0	2	0	1	2	2	2
Site drainage	5	5	2	2	6	2	2	3	0	3	2	2
5. Fisheries												
Commercial fishing	0	0	0	0	0	0	0	0	0	0	0	0
Shellfishing	0	0	0	0	0	0	0	0	0	0	0	0
Migratory fishery (inc. eels)	4	2	1	3	2	1	1	2	2	1	1	2
Salmonid fishery	4	2	1	3	3	1	1	2	2	1	1	2
Cyprinid (coarse) fishery	6	4	1	3	3	2	2	3	3	2	2	3
6. Conservation												
River corridor conservation	7	5	4	4	3	1	1	3	2	5	4	5
Nature conservation sites	8	6	6	11	6	2	4	5	3	6	6	9
Landscape feature	5	4	3	4	3	3	2	1	2	5	4	5
Heritage or archaeology value	3	3	1	2	1	0	0	0	1	2	2	3
7. Amenity and recreation												
General amenity (walking)	7	7	4	6	4	1	1	2	3	2	6	5
Ornamental/ landscape use	3	2	1	2	1	1	1	0	2	1	2	2
Game angling	7	4	1	7	5	0	4	4	3	3	4	5
Course angling	9	7	3	9	6	0	3	5	4	4	5	6
Wildfowling	5	2	2	4	5	0	0	1	1	2	3	4
Birdwatching	1	2	1	4	2	0	1	1	2	1	1	3
Pleasure boating	7	6	1	5	4	0	3	2	3	4	6	6
Sailing (eg. dinghies)	4	3	0	7	5	0	2	4	2	5	4	6
Canoeing/rowing	6	4	0	4	4	0	1	3	2	4	3	5
Windsurfing	2	0	0	7	5	0	2	4	2	3	3	5
Water-skiing	2	1	0	3	3	0	1	1	1	2	2	3
Swimming and diving	3	2	0	3	3	0	1	1	1	3	3	3
8. Other landuse features												
Urban land use (drainage etc.)	1	2	0	0	0	0	0	0	0	1	1	1
Transport links (road, rail etc.)	3	1	3	0	2	2	1	1	0	2	2	0

Notes

R = Rivers and streams
C = Canals
D = Drainage ditches etc.
L = Lakes and reservoirs
E = Estuaries
G = Groundwater

Vol = water flow/volume
WQ = water quality
Phys = physical features

4. IDENTIFICATION OF WATER USES AND RELATED ACTIVITIES

4.1 Water-related uses and activities

Catchment Management Planning (CMP) is a "user-orientated" process. It incorporates both direct uses of water or the water environment, and land use or management which affects the water environment. There are potential difficulties with the word "use" because it suggests a direct physical use of the water resource. The word does not adequately incorporate those activities within a catchment which affect the water environment but do not actually make use of it. Consequently the terms "uses" and "activities" have been used in this report.

The term "use" refers to directly water-dependent action, whether for abstraction, effluent disposal or recreational activity. The ecology and fisheries aspects have also been included as a "use" because they are directly dependent on the water environment. Management of the water environment, particularly through flood defence, has also been included as a "use".

The term "activities" has been used to refer to other aspects of the catchment which may have an impact on the water environment, but are not necessarily directly water-dependent. These will predominantly be land-based, such as agricultural land use, the built environment and infrastructure and communications.

4.2 Identification of uses and activities

An initial checklist of uses and activities was derived from existing Catchment Management Plans and other reports, consultation with the NRA and internal professional experience. This list formed the basis of the questionnaire sent to the NRA regions and external consultees. The questionnaire also included allowance for the addition of any other uses identified by the respondees.

The final list of uses and activities including additions received during consultation is given in Table 4.1. The categories of use are arbitrary distinctions used in compiling the questionnaire and are discussed further below.

Table 4.1 List of current and future uses of water and water-related activities

Use category	Specific use/activity
1. Public water supply	
	Water company abstraction
	Private water supply
2. Sewage effluent disposal	
	Water plc discharge
	Private discharge
	Storm sewer overflows
3. Agricultural	
	Land drainage
	Wet fencing
	Spray irrigation
	Livestock watering
	Horticultural watering
	Disposal of liquid wastes
	Farm food processing
	Water cress farms
	Fish farms
	Seaweed harvesting
	Forestry
	Land management practices
4. Industrial and commercial	
	Industrial abstraction
	Disposal of process effluent
	Drainage of industrial sites
	Cooling water discharge
	Mineral extraction & treatment
	Mine washing and drainage
	Solid waste disposal to land
	Power generation
	Commercial navigation
	Water bottling
	Food processing (inc. dairies)
5. Fisheries	
	Commercial fishing
	Shellfishing
	Migratory fishery (inc. eels)
	Salmonid fishery
	Cyprinid fishery

Table 4.1 List of current and future uses of water and water-related activities (contd)

Use category	Specific use/activity
6. Conservation and ecology	
	General ecology
	Nature conservation sites
	Landscape features and value
	Heritage/archaeology feature
7. Amenity and recreation	
	General amenity and access
	Ornamental/landscape use
	Game angling
	Coarse angling
	Sea angling
	Wildfowling
	Birdwatching
	Recreational navigation
	Sailing/yachting
	Canoeing/rowing
	Windsurfing
	Water and jet-skiing
	Swimming and diving
	Caving
8. Water resource management	
	Compensation flows
	Flow augmentation
9. Flood defence	
	Flood defence works
	Flood alleviation
	Flood warning/response
	(Storm sewer overflows)
10. Other land use	
	Urban built environment
	Transport infrastructure
	Other infrastructure (eg. utilities)

NOTES

Following lengthy discussion, a sewage effluent disposal use was considered inappropriate by the Water Quality Survey Group of the NRA and was therefore not adopted. This use, however, has been included in this project because effluent disposal is consistently described as a "use" in existing Catchment Management Plans.

Navigation can be considered in either the industrial and commercial or amenity and recreation use categories and has therefore been divided into two types of navigation, although the NRA treats navigation as only one use.

4.3 Existing classification of uses and activities

There is an existing area of inconsistency in the categorisation of uses. Different Catchment Management Plans describe various use categories (or classes) and these also differ from the use classes recommended for Statutory Water Quality Objectives (SWQOs).

The original R&D projects for SWQOs identified fourteen Use Classes. In the consultation document (NRA 1991d), these were reduced to eleven, comprising:

- Basic amenity
- General ecosystem
- Special ecosystem
- Salmonid fishery
- Cyprinid fishery
- Migratory fishery
- Commercial harvesting of marine fish
- Commercial harvesting of shellfish
- Water contact activity
- Abstraction for potable water supply
- Abstraction for industrial and agricultural use

Following consultation, the NRA recently issued recommendations for SWQOs based on only six Use Classes (NRA 1992a). The Basic Amenity and General Ecosystem classes have been included in the new General Quality Assessment (GQA) scheme. The three fishery classes have been incorporated into a single hierarchical Fisheries Use Class. The two commercial harvesting classes have been combined into a single Use Class.

The resulting six Use Classes are:

- Fisheries Ecosystem
- Abstraction for Potable Supply
- Abstraction for Industrial and Agricultural Use
- Water Sport Activity
- Commercial Harvesting of Fish and Shellfish
- Special Ecosystem

The SWQO Use Classes are based on wide consultation and are therefore likely to receive general acceptance. They will not be sufficient to cover the full range of issues included in CMP because they relate specifically to water quality objectives. The uses listed in Table 4.1 above will not necessarily fit into the SWQO structure.

Nevertheless, the SWQO Use Classes will be the means of implementing the NRA's statutory water quality duties. These duties will be an integral part of any Catchment Plan. Consequently, it is important to integrate the SWQO Use Classes into CMP.

Formulation of consistent use categories, based on the SWQO Use Classes, will be important in the future development of CMP. These use categories will then provide a consistent framework for adopting use-related standards.

The General Quality Assessment (GQA) scheme will be used at periodic intervals throughout the NRA regions to provide chemical, biological, aesthetic and nutrient status classifications. The scheme will be compatible with the SWQO Use Classes, but it will not provide statutory standards. The components of GQA may, however, be suitable as a series of non-statutory standards, which could be used in CMP.

4.4 Description of specific uses/activities

Another aspect to be resolved is the level to which uses or activities are described. For example, in Table 3.1, some uses are described quite specifically (e.g. fish farming, windsurfing etc.), whereas others (e.g. industrial abstraction, mineral extraction) are described much more generally.

The extent to which uses should be described in CMP is not clear. Recreational uses are often considered individually, whereas industrial abstraction, which covers many uses, is not sub-divided any further. Given this discrepancy, a consistent approach to describing specific uses and activities is needed.

Existing Catchment Plans often include broad categories for different uses. A more detailed consideration of specific uses may be achieved by adding technical appendices to the Catchment Plan.

For the purposes of this report, the uses and activities identified in Table 3.1 will be adopted. The use categories correspond generally to those in the SWQO recommendations and in existing Catchment Management Plans, but also provide a broader and more detailed assessment of uses and activities.

5. ENVIRONMENTAL REQUIREMENTS FOR USES AND ACTIVITIES

5.1 Minimum and optimum environmental requirements

The concept of CMP incorporates both a consideration of the environmental requirements of uses and activities within catchments and the impacts of those activities on the catchment. In general, "uses" (as defined previously) would have both requirements and impacts, whereas "activities" may be considered in CMP only because of their impacts on the water environment.

This project is orientated towards identifying the environmental requirements of uses and developing standards to protect those uses. There is a clear distinction between the minimum standards required to maintain a particular use for any given water resource and the optimum conditions for that use. In many circumstances there is a tendency to maintain minimum acceptable standards. This is probably because a greater range and number of uses can be accommodated on any given water and enforcement is simpler and cheaper. The NRA, however, has a remit to improve and enhance the condition of controlled waters. This indicates a requirement to aim for optimal conditions for water users. CMP, because it is not constrained by the limits of statutory responsibility, which are usually minimum (or maximum) acceptable limits, provides an ideal means of meeting that area of NRA responsibility. It can set targets above and beyond statutory limits with the aim of improving the state of the catchment for all users.

Within CMP, therefore, there is room for a hierarchical system of user requirements, with use-related standards expressed as, for example "*acceptable*" (minimum) and "*preferred*" (optimal). This could operate similarly to the existing system of guide value and mandatory value water quality standards set by some EC Directives.

The hierarchical system would also potentially provide opportunities for resolving conflicts between different uses in a catchment. Optimal standards would obviously be the aim of any user and also of the Catchment Plan, but such preferences could be compromised in order to resolve conflicts between uses, as long as a sub-optimal but still acceptable standard was maintained. Thus, two uses may be protected by a compromise agreement to maintain acceptable standards, whereas the maintenance of optimal standards for either would exclude the other. Conflicts between almost mutually exclusive uses would require an alternative means of resolution.

Acceptable and preferred environmental requirements are not used at present and cannot therefore be included in any detail in this report. This report concentrates on currently defined use-related standards and requirements without distinguishing any hierarchical level. Such distinctions would readily form part of Phase II of this project.

5.2 Existing use-related environmental parameters

The scope of work for Phase I of this project required the definition of environmental objectives of different uses. In addition, use-related environmental requirements had to be identified and the parameters available for expressing those requirements were reviewed. Recently published Catchment Management Plans were used to identify the environmental objectives associated with different uses. They also provided some of the detailed environmental requirements. A variety of reports, both NRA publications and others, were also used to define detailed use-related environmental requirements.

Many of these requirements are only generally defined, illustrating the need for a project of this nature. The definitions used in existing Catchment Plans are mainly qualitative and rarely refer to any quantitative standard other than for water quality.

The questionnaire responses were also used to categorise the environmental requirements of each use group into either :

1. Quantitative
   - water flow or volume (quantity);
   - water quality; and
   - physical features;

or

2. Qualitative
   - water flow or volume (quantity);
   - water quality; and
   - physical features.

The total numbers of positive responses within each use category and with all uses combined are illustrated in Figures 5.1-5.17. The scales are variable because of variation in the level of response. Consultees were requested to reply only within their particular area of expertise, so there was variation in the number of people responding to any individual use category. Numbers are therefore comparative within uses, but do not indicate any variation in importance between use categories.

The total responses, irrespective of use (Fig. 5.1, 5.10), illustrate a high number of quantitative water flow/volume and water quality responses, but a low number of quantitative responses for physical features. Physical features were clearly perceived, by those who made a choice, to have mainly qualitative criteria.

Returns from sources outside the NRA were very limited. Consequently, for some use categories, the numbers of positive responses are so small that the information is not adequate to indicate any differences between water quantity, water quality and physical features. This is particularly so in the Sewage effluent disposal category (Fig 5.12) and the Fisheries category (Fig 5.15).

The following discussion (Section 5.2.1-5.2.10) identifies only the environmental parameters for which environmental standards may be set to protect uses. The parameter is the characteristic of the water course or water body under consideration, eg. water flow, area, pH, BOD etc., whereas the standard is the level set for any given parameter, eg. minimum flow 5 cumecs, depth 0.2-1.5m, pH 7-8 etc. Only parameters are considered in this section, standards are discussed in the R&D Note.

Parameters are considered in terms of water resources (flow/volume), water quality and physical features. Included in the physical features component will be any particular land or water management activity necessary to protect any given use. The environmental objectives expressed by the NRA in Catchment Management Plans may also include means of minimising the impacts of uses. For example, protection of the flow regime for other uses is given as an environmental objective of abstraction. This may be an objective of the regulator, but it may not necessarily be an objective of the abstractor, who wishes to be able to abstract within the terms of his licence as and when necessary. The following assessment will concentrate mainly on the environmental requirements of users and not the measures necessary to limit impacts on other uses.

5.2.1 Public (potable) water supply

The environmental objectives of this use can be expressed simply as maintaining a safe and adequate supply of suitable quality water to meet demand. This will include the safeguarding of resources to meet future as well as present demand.

The parameters relevant to protecting this use include the following. Water resource requirements, which can be expressed as total daily/weekly or annual volume of abstraction and possibly a maximum hourly or daily rate of abstraction, would usually be specified in the abstraction licence. A full range of water quality parameters, as defined in the SWQOs, mostly derived from the EC Directive on the quality of surface water abstracted for public supply (75/440/EEC) are required for protection of this use. Physical features and management requirements are principally to ensure and protect access to the resource, whether an aquifer or a surface water, which may require, for example, particular depths of surface water or pressures of groundwater. Such factors are likely to be site specific.

Questionnaire responses (Fig. 5.2, 5.11) indicated that quantitative water resource and water quality standards are appropriate to this use, with only a low response concerning physical features and any qualitative requirements.

5.2.2 Sewage effluent disposal

The environmental objectives of this use are to utilise the capacity of the catchment to accept effluent waste and thus meet the demand for disposal of sewage effluent, without adversely affecting the overall state of the catchment and other uses. This should be achieved through compliance with the discharge consent conditions set by the NRA.

Protection of this use relies on adequate quantities of water to provide sufficient dilution and treatment to limit any polluting effects, ie. not falling below the quantity assumed in setting the consent limits. Dilution effects will be dependent both on the individual catchment and the nature of the discharge and would be considered in setting the discharge consent. The water quality of receiving waters must be sufficient to dilute the polluting effects of the discharge so that SWQOs for the receiving waters are complied with. This will likewise depend on the catchment and the nature of the discharge. Physical features and management requirements are that outfalls must be sited to achieve a specific degree of mixing and must be accessible for maintenance. The channel morphology and size should be appropriate to the discharge and where relevant, should be capable of accepting storm overflows without causing flooding. The use of mixing coefficients for regular discharges and general multipliers for the capacity of channels receiving storm overflows may be appropriate.

The results of the questionnaire (Fig 5.3, 5.12) show that quantitative water quantity and quality parameters are appropriate for describing the requirements of this use. Physical parameters are perceived to be almost entirely qualitative.

5.2.3 Agricultural uses

The overall objective of agricultural uses is to maintain or improve the productivity of whichever form of agriculture is being practised. Both the uptake of water through abstraction and the removal of water in drainage or by discharge are important in achieving this objective. The requirements for abstraction and discharge may vary seasonally.

As there are a variety of uses and activities included in this section, most will be discussed separately. However, the questionnaire responses for all the uses in this category were combined. These show (Fig. 5.4 & 5.13) high responses for quantitative expressions of water quantity and water quality with a slight preference for a qualitative treatment of physical features. Non-NRA responses have a much lower perception of quantitative water flow/volume parameters relative to water quality than the NRA responses.

Land drainage

The objective of land drainage is to protect land use by managing the water table to prevent waterlogging during tillage, management and harvesting of the crop (including grass) and by speeding the drainage of water on the ground surface to prevent flooding.

Water quantity and quality parameters are not relevant to this use, but there are specific physical parameters which may be important. There are standard gradients for land drains with recommended heights of outfall above normal water level into ditches. CMP will be concerned primarily with the effectiveness of ditches and main channels to absorb land drainage. This will relate primarily to channel morphology and management of water courses to prevent obstruction. Maintenance of channel drainage structures such as weirs and sluices will be important.

There is potential for using a quantitative method to predict the quantity of water running off a catchment from land drainage and thus determining the necessary capacity of main channels. Catchment based water balance studies, incorporating rainfall, evapo-transpiration and the Winter Rainfall Acceptance Potential(WRAP) soil classifications such as used in the Flood Studies Report (NERC 1975), possibly updated by use of the new Hydrology of Soil Types (HOST) classes (Boorman & Hollis 1992) may be appropriate.

Wet fencing and non-abstraction livestock watering

The objective of wet fencing is to use watercourses, usually ditches, as constraints to the movements of stock. Requirements for this may include water quantity parameters such as a specific flow or depth of water and physical features including depth and width of channel and slope of banks. It is not clear whether specific recommendations for different stock are available.

Livestock watering at surface waters rather than in stock pens or dairies does not necessarily require a minimum flow, but may have a maximum flow, depth and velocity for safety reasons. Other requirements include acceptable water quality, for which a range of parameters have been used by Anglian Water for many years and which are now incorporated into the SWQO system, and specific physical features. Physical features include safe access, bank protection and bank height and slope, as well as maintenance of ditches. Although such features are not formally prescribed, they could be expressed quantitatively and, indeed, there are quantitative designs for livestock drinking bays available (LDCA 1986).

Agricultural abstraction (eg. for spray irrigation, livestock watering, horticultural watering and farm food processing)

The objective of all agricultural abstraction is to maintain an adequate supply of suitable quality water at the time it is needed (eg. for spray irrigation this is usually highly seasonal).

Water volume requirements are usually set quantitatively in abstraction licences and may be a total volume, irrespective of abstraction rate, over a specified time or may be a rate of abstraction per hour or per day. Licences may have restrictions according to time of year and river flow or groundwater level. In addition, however, there may be a variety of unlicensed abstractions such as for application of herbicide, pesticide or fertiliser to crops or land and the impact of these abstractions is difficult to account for.

Water balance studies may also be relevant in quantifying a predicted agricultural water resource requirement in a catchment. The water balance could be based on soil type, soil moisture deficit and crop type or land use. The catchment water balance could be calculated for a range of different year-climates. The range of water resource requirements derived could be useful in directing catchment-wide policy, through quantifying the catchment demand relative to resources.

A range of quantitative water quality parameters are required for all agricultural abstraction. Food processing etc. requires potable quality water, whereas alternative standards for spray irrigation and livestock watering are included in the SWQOs. Physical features relate primarily to the accessibility of the supply for abstraction.

Agricultural discharges (eg. disposal of liquid wastes, waste water from food processing)

As for other discharges, the objectives of this use are to dispose effectively of liquid wastes within the conditions imposed by discharge consents. The water quantity, quality and physical feature requirements are essentially the same as for sewage effluent disposal.

Aquatic agriculture (ie. water cress farms and fish farms)

The main objective of water cress and fish farms is to maintain high levels of productivity. To achieve this, they depend on a reliable and potentially large supply of high quality water. The volumes of water required and rates of abstraction are controlled by abstraction licences. Similar parameters to those identified previously for other agricultural abstractions are relevant. Water quality must be potable standard for water cress farms and sufficient to support salmonid fish for most fish farms. A range of water quality parameters relating to both these requirements are included within the proposals for SWQOs. Physical access to the abstraction point and/or abstraction structure is the main physical feature necessary. Some fish and watercress farms may also rely on structures, such as weirs, to provide pools from which water is abstracted and these structures would need to be maintained.

Such farms rely on water passing through their cress beds or fish ponds and consequently have significant discharges as well as abstractions. The water quantity, quality and physical feature requirements relating to discharges, as discussed above, apply equally to these farms. Relevant water resource and water quality factors are taken into account in determining discharge consents.

Agricultural land use, including forestry

The use of land for different agricultural purposes, with the objective of producing a commercially valuable crop, whether plant or animal, can have important impacts on catchments and watercourses draining those catchments. In the context of this report, these would consist of activities rather than uses. Although forestry land use may include some direct impoundment of water for fire fighting purposes, most land use is not directly dependent on the use of surface waters or groundwaters. CMP requirements with respect to such uses are, therefore, recommendations for sensitive management to limit impacts on

waters. The MAFF Code of Practice for Protection of Water (MAFF 1991) and the Forestry Commission's Forests and Water Guidelines (Forestry Commission 1991) are good examples of this approach.

5.2.4 Industrial and commercial uses

As with agriculture, there is a wide variety of water uses and activities within this category, some of which can be combined as abstractions and others as discharges. The overall aim of these uses is to protect the commercial viability of the industry or activity. This is achieved by protection of the water resources and quality on which they rely.

There is a clear preference towards quantitative standards for both water quantity and quality in the questionnaire responses. Physical features were recorded as a requirement less frequently and were more evenly split between quantitative and qualitative parameters.

Industrial and commercial abstractions (eg. industrial abstraction, mineral extraction and treatment, water bottling and food processing)

Industrial and commercial processes reliant on the use of water will aim to safeguard the quantity and quality of their supply to desired or permitted levels. Water quantity parameters as discussed previously for potable supply and agricultural abstractions will be specified in abstraction licences. Water quality requirements will vary depending on the industrial/commercial process. Water bottling and food processing will require potable quality, whereas other abstractions, such as for cooling water or site washing may be of lesser quality. Quality standards for industrial abstractions are not specified in the SWQOs, but will be protected under a policy of no deterioration, which is a common law right of the abstractor. The physical features required are as for other abstractions.

Industrial and commercial discharges (eg. disposal of process effluent, drainage of sites, cooling water discharge, mineral treatment and mine washing/drainage)

The acceptable disposal of liquid wastes and site drainage is an important component of many industrial and commercial activities. The objective of this use is to maintain the means of disposal without causing unacceptable damage to the receiving water system. This should be achieved by remaining within the consent limits, which are set with both water quantity and quality parameters in mind. The parameters relevant to sewage effluent discharges also apply to all industrial discharges.

Solid waste disposal

The objective of this land use is to provide a safe and acceptable means of disposing of solid waste. Landfill, however, may have significant impacts on surrounding surface and ground waters through the dispersal of leachate. Although not classed as a water use, this activity requires careful management to protect the water environment. Appropriate measures are included in Yorkshire NRA's guidelines on tip lining (see Yorkshire Region questionnaire response, Appedix 1) and in the national NRA Groundwater Protection Policy (NRA 1992i).

Power generation

The use of water for power generation, whether in large or small scale hydroelectric schemes, from waves, or by tidal barrages, is dependent on a reliable source of water to

turn the turbines. Water quantity and physical features are the most important requirements. The volume and flow of water required is dependent on the scale of the scheme, but there have been numerous feasibility studies into the different water power options conducted by the Energy Technology Support Unit (ETSU) of the Department of Energy over many years. Various ETSU publications address the requirements of both practically and economically feasible schemes. Environmental requirements include volume and flow of water, morphology of channels, gradient and depth, all of which are important in determining whether a sufficient head of water is available. There are no specific quality requirements, although the water should be of reasonable quality, eg. non-corrosive.

Commercial navigation

The maintenance of suitable conditions for commercial navigation is dependent on parameters such as water flow and depth, width and depth of channel, maintenance of locks and other structures, removal of obstacles and channel clearance, all of which are either water quantity or physical features. Measures such as depth, related to vessel draught, and width can be expressed quantitatively. There are no water quality requirements for this use, other than perhaps aesthetic criteria.

5.2.5 Fisheries

The environmental objective of all fisheries uses is essentially to protect and sustain a natural fish population appropriate to the geographical location and physico-chemical characteristics of the water body or watercourse.

Different fisheries uses will have different specific requirements, but these will simply be variations among the same set of parameters. Consequently, fisheries uses have been considered together.

The are definite requirements for water quantity, relating to flow, both quantity and velocity, in rivers and estuaries, as well as required depths and volumes in lakes and ponds. Numerous publications discuss the importance of flow to fisheries, although there do not seem to be agreed quantitative standards for desired flow for different fisheries. The classification of different flow regimes related to the physical features of width and gradient down a river, as developed by Huet (1949), is commonly used to predict the natural fish community expected in a stretch of river (Welcomme 1985).

Another important factor related to river flow is the passage of migratory fish, particularly salmon and sea trout. Passage is highly dependent on flows both in the estuary and in the river (Mills 1989). Movement of fish is often highly variable, and no precise quantitative requirement for migratory fish has yet been established. Some quantitative flow standards for migratory fisheries have been proposed following studies in North West England (Cragg-Hine 1985,1988). These standards consist of a minimum "survival" flow, a flow at which upstream migration starts, and a range of flows within which migration can occur. The draft methods developed in Severn Trent Region for the calculation of residual flows to estuaries (Wade 1992) also include a consideration of the requirements of migratory fish. Design criteria for fish passes include specific flow requirements and these may provide an indication of acceptable natural flows.

Water quality requirements of fisheries are well established for a wide range of parameters and have been discussed in detail in the process of developing SWQOs (NRA 1992d). The six level hierarchical system of water quality proposed by the NRA for SWQOs will cover the water quality requirements for fisheries. Gaps in existing standards, mainly in commercial and shell fishing will be addressed in future NRA R&D.

Physical features and management necessary for fisheries uses relate mainly to the protection of habitat for all life history stages, from spawning habitat to adult foraging habitat. The majority of these physical habitat features include descriptive features such as riffles, pools, weedbeds, gravels etc., but there may be a potential for quantifying either the extent or proportion of such habitats. Spawning gravels or other bed substrates could be quantitatively defined according to particle size assessment and area of bed. There are also fisheries requirements for the extent of vegetation, both aquatic and as bankside shade and cover. Management of physical features may relate to the maintenance of barriers and/or fish passes as well as control of stocking and the consideration of fish habitat requirements in river engineering schemes. Interactions with other biological components of the system would be included in the consideration of conservation uses.

NRA questionnaire responses for fisheries uses illustrate the issues described above, with water quality requirements clearly expressed quantitatively, but only qualitative expressions for water quantity and physical feature requirements (Fig 5.6). The number of responses from non-NRA consultees is inadequate to make any relevant judgment (Fig 5.15).

5.2.6 Conservation and ecology

The objectives of the conservation and ecology uses are twofold, to protect sites or features of particular ecological, landscape or cultural interest and to maintain and enhance the overall ecological, landscape and cultural value of the catchment.

Environmental requirements for the former objective are usually site specific and may include any water quantity, water quality or physical features and management requirements. Relevant parameters may include flow, volume and depth of water, seasonal flow regime, height of water table, a full range of water quality parameters, hydrological characteristics, size and nature of catchment, channel morphology, conservation of habitats, management of vegetation and protection from disturbance or development. Some of these parameters can be expressed quantitatively, whereas others can only be qualitative.

General conservation and ecology requirements would include the same parameters but would not have site specific standards developed. Watercourses and water bodies are valuable both as landscape features and as aquatic habitats. It may be possible within CMP to develop recommendations for particular parameters (eg. bankside vegetation, channel morphology, water depth etc.) that would enhance their landscape and ecological value.

There is considerable literature about both the environmental requirements of conservation and the means of improving aquatic ecology (eg. Boon *et al* 1991, BTCV 1976, Gardiner 1990, NCC 1983, NCC 1989). Water quality standards for general conservation and for sites of importance have been considered in the SWQO process (NRA 1992c). In addition, there are current NRA R&D projects investigating ecologically acceptable flow criteria (NRA 1992g) which may result in recommended quantitative or semi-quantitative flow criteria for different ecosystem components (eg. aquatic vegetation, invertebrates, fish).

The questionnaire responses confirmed the current status of conservation related requirements, almost all requirements were considered to be described qualitatively. Enforcement of qualitative standards through statutory means is very difficult, but CMP, because it has a wider remit than enforcing statutory standards, can address qualitative parameters and may thus be a very important means of fulfilling the NRA's conservation role. Nevertheless, there may be a potential for developing more quantitative standards for specific aspects of conservation uses.

5.2.7 Amenity and recreation

The objective for recreation and amenity uses is to provide a safe and aesthetically acceptable environment for the pursuit and enjoyment of recreational activities. These may include general activities, such as walking or picnicking, angling, land-based activities such as bird-watching and water-based activities (i.e. water sports).

The NRA responses to the questionnaire revealed a high proportion of qualitative requirements, as with the conservation uses. There was also a substantial number of positive responses describing quantitative water quality parameters. Non-NRA responses were more evenly distributed with both quantitative and qualitative requirements expressed for all parameters.

General amenity and access & ornamental uses

The principal environmental requirements for general amenity uses relate to the aesthetic conditions and environmental quality of the water body or watercourse. Water quantity and water quality may both influence appearance. Where appropriate, desired flow and water levels should be sufficient to cover dangerous or unsightly features (eg. muddy banks) and the aesthetic properties relating to water quality described in the SWQOs should be maintained. Important physical features and management techniques include requirements for safety provision, suitable access, footpaths and viewpoints, clearance of litter and management for conservation.

Angling (game, coarse and sea)

The objective of angling is obviously to catch fish and within the context of CMP, the objectives for protection of that use are to protect and enhance the fisheries (Section 5.2.5) and to provide suitable and safe conditions for angling. The fisheries requirements have been discussed earlier. Suitable and safe conditions for angling entail the following parameters :

- suitable flow velocities and water depths;
- adequate microbiological water quality to prevent risk of water-borne disease or infection;
- aesthetic acceptability as per SWQO recommendations;
- sufficient safe access and fishing points; and
- river management to maintain angling swims.

Shore or land-based activities (eg. wildfowling, birdwatching)

Although wildfowling and birdwatching appear contradictory, these two uses have essentially similar objectives, i.e. to protect and enhance the value of the water for birds. Wildfowlers require a healthy and abundant population of wildfowl and birdwatchers seek healthy populations of a range of birds. Both uses require the same parameters as described for conservation (Section 5.2.6), although they will be targeted to birds and bird habitat. In addition to conservation requirements, these uses also require adequate access and viewing/shooting points.

Caving

Caving is not an obvious recreational use of water, but there is the potential for considerable contact with underground water. The major requirement for caving would be

to protect groundwater quality, particularly microbiological quality, in order to reduce the health risk to those in contact with the water.

Water sports (eg. Recreational navigation, sailing, canoeing, rowing, windsurfing, water and jet skiing, swimming and diving)

All the water-based sports and activities have been included here as a single category, although it is recognised that there is current debate concerning the differences between "water-contact sports" and "immersion sports". There is a gradual variation in the degree of water contact in such sports rather than two distinct categories (Philipp 1991).

The environmental objective for water sport uses is to provide safe physical conditions for these activities to take place. All water sports rely an a certain availability of water and land. The water and land requirements of different water sports have been described in a report for the DoE discussing the uses of gravel pits (DoE 1992b). The report expresses requirements in terms of area of water, depth of water, shape of water body, slope of banks, area of banks and surrounding topography. Such parameters could undoubtedly be extended to cover other water bodies and watercourses. Water quality parameters have been discussed in detail in the process of formulating SWQOs (NRA 1992e) and in other forums (CCPR 1990, IWEM 1992). Relevant water quality criteria consist mainly of microbiological and aesthetic parameters. NRA R&D into a hierarchical system of water quality requirements for different activities is proposed. In addition to the physical features of the water body or watercourse described above, adequate ancillary facilities such as suitable access, slipways and changing and storage facilities may be necessary.

5.2.8 Water resource management

The principal objective of using water as compensation or augmentation flows is to regulate flow to meet other water resource demands. Environmental requirements for this use are difficult to define, but there must be an adequate supply of water, either from surface storage or groundwater. The water resource requirements may be expressed either as a total volume or a flow measure. Such water would also need to satisfy water quality criteria, but these criteria would be site or region specific in order to protect the individual character of the relevant catchment. Physical requirements consist mainly of storage capacity (eg. area of storage reservoir) and capability of the channel to accept the inputs of water.

5.2.9 Flood defence

The NRA's flood defence responsibilities are included as a separate use because they form an integral part of the CMP process. The objective of flood defence is the protection of people and property from flooding (NRA 1992f) and more than half the NRA's budget is spent on this function. The environmental requirements of flood defence will vary on a site specific basis, but will consist mainly of predicting and accommodating flood flows. They are, therefore, mainly physical parameters, such as control structures (weirs, groynes etc.), channel modification (widening, deepening, shaping), bank structures (berms, embankments) and removing obstacles (weed-cutting, dredging). A scheme for assessing the effectiveness of NRA's flood defence activities is included in the new NRA Flood Defence Standards of Service (NRA 1992f). This assessment process should be an important component of CMP.

The flood defence requirements may also have major implications for conservation and water quality. These impacts may need to be considered in assessing the requirements of flood defence.

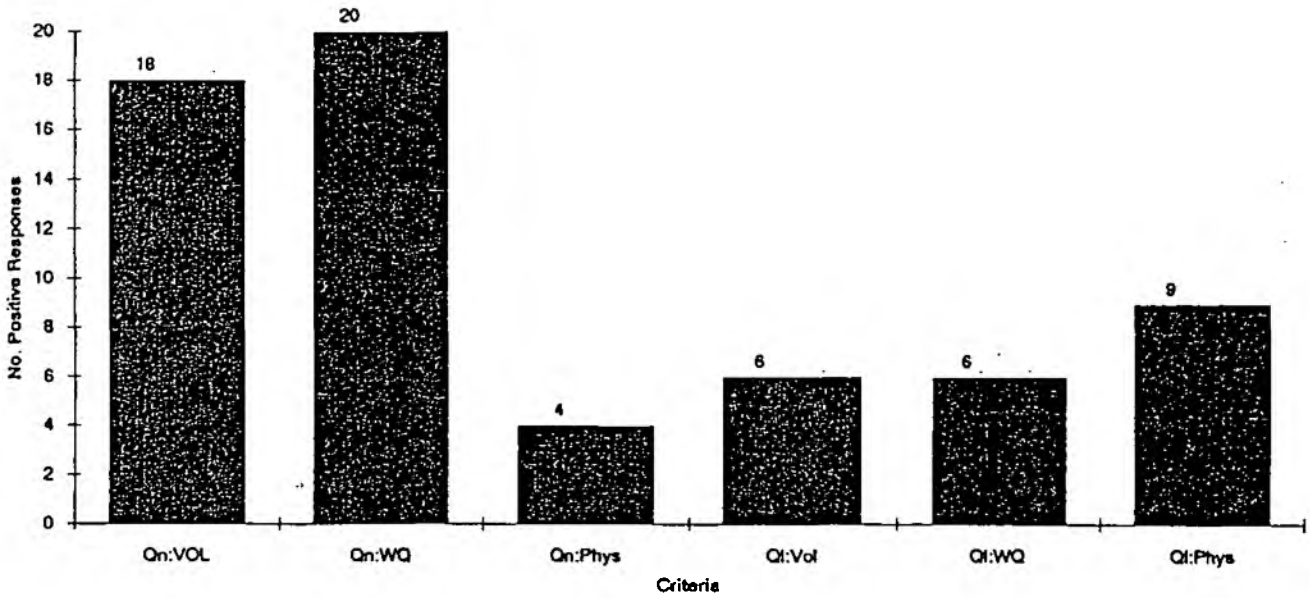

Figure 5.3 **NRA questionnaire responses, sewage effluent disposal use category Total number of positive responses**

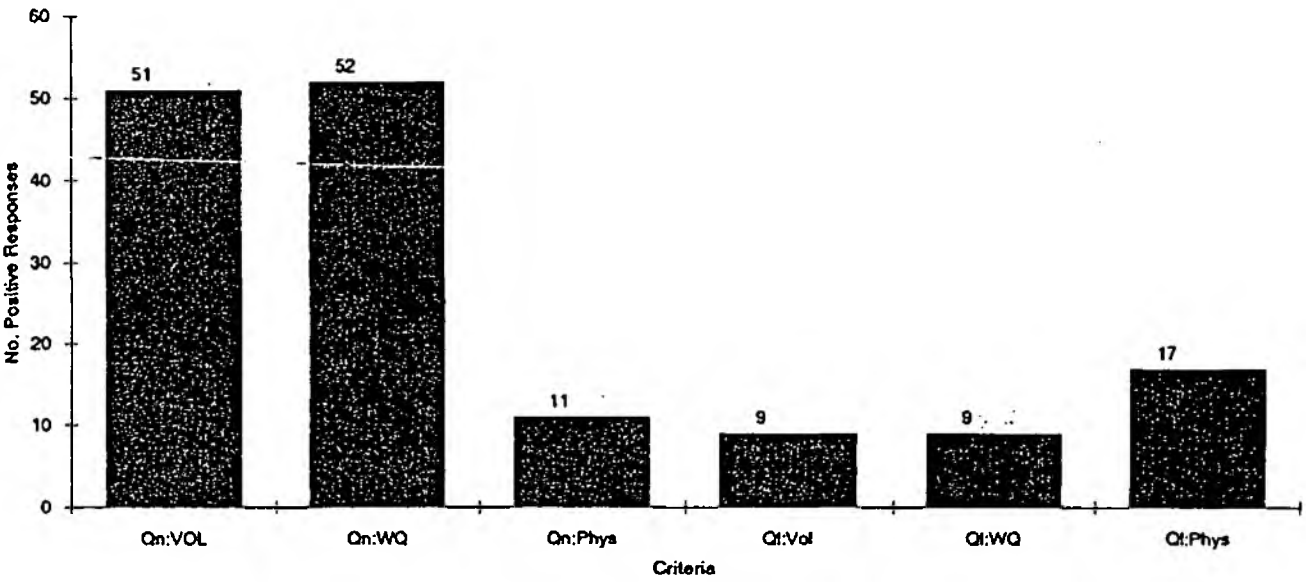

Figure 5.4 **NRA questionnaire responses, agricultural use category Total number of positive responses**

NOTES (Figures 5.3 & 5.4)

QN	Quantitative	VOL	Water quantity (flow/volume)
Ql	Qualitative	WQ	Water quality
		Phys	Physical features

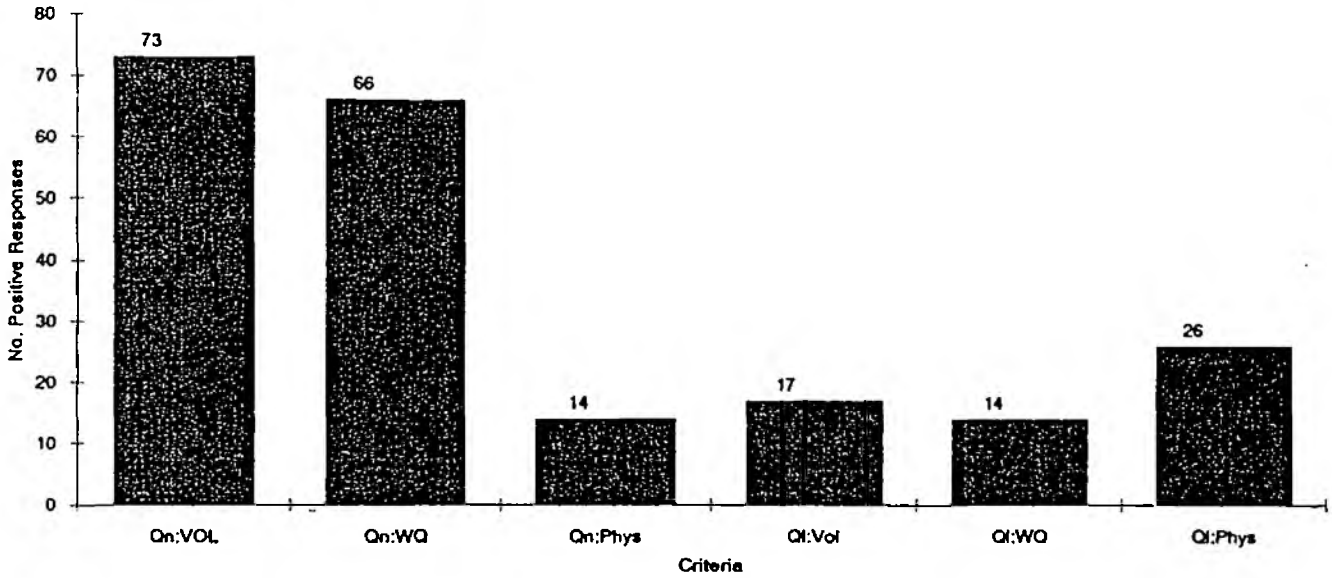

Figure 5.5 NRA questionnaire responses, industrial use category Total number of positive responses

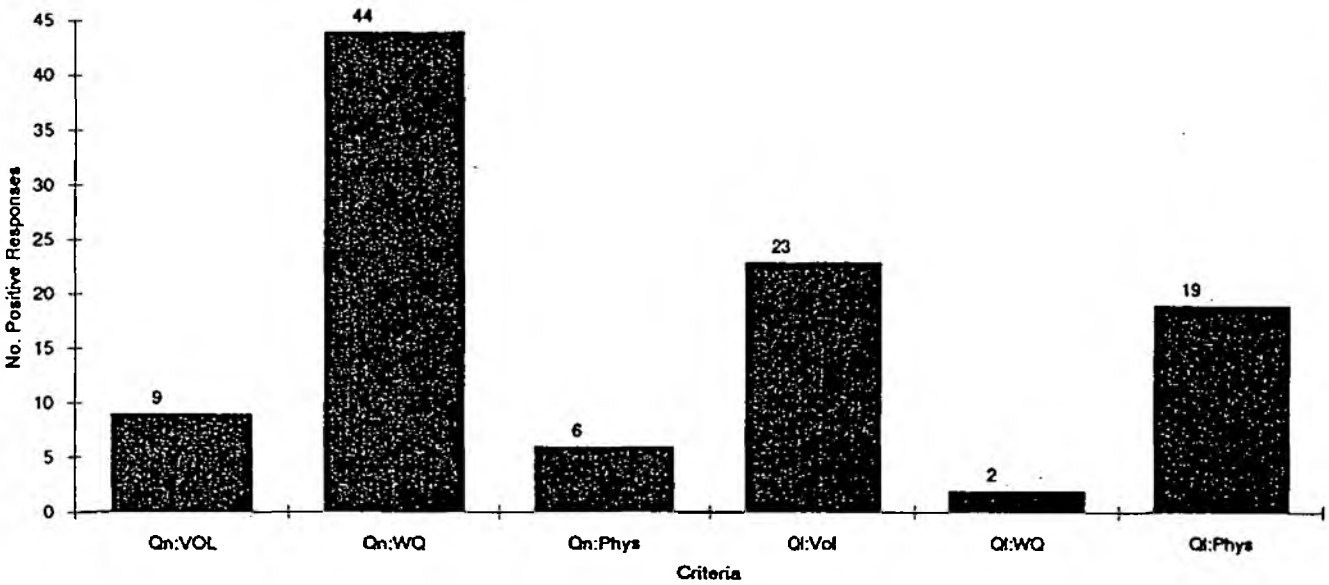

Figure 5.6 NRA questionnaire responses, fisheries use category Total number of positive responses

NOTES (Figures 5.5 & 5.6)

QN	Quantitative	VOL	Water quantity (flow/volume)
Ql	Qualitative	WQ	Water quality
		Phys	Physical features

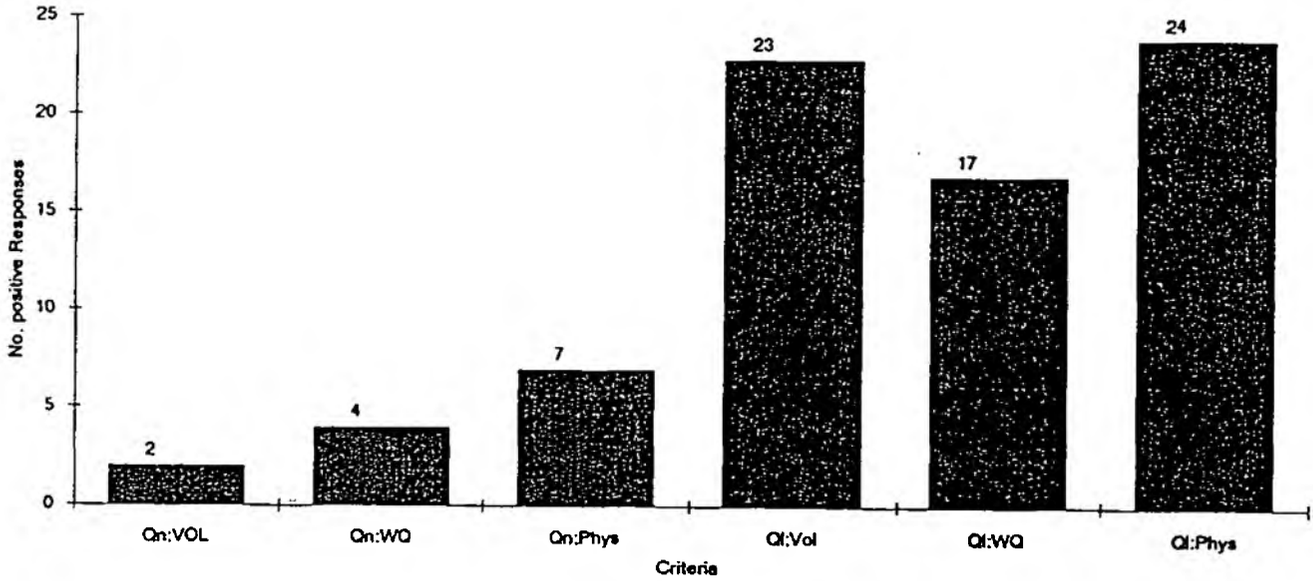

Figure 5.7 NRA questionnaire responses, conservation use category
Total number of positive responses

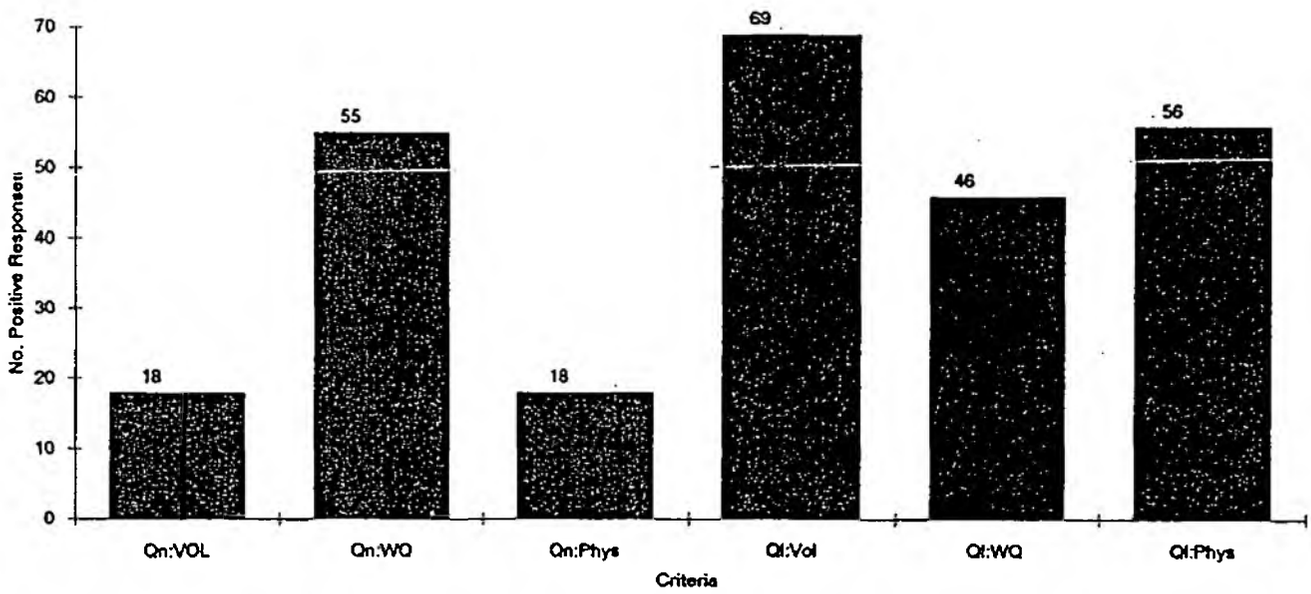

Figure 5.8 NRA questionnaire responses, amenity and recreation use category
Total number of positive responses

NOTES (Figures 5.7 & 5.8)

QN	Quantitative	VOL	Water quantity (flow/volume)
Ql	Qualitative	WQ	Water quality
		Phys	Physical features

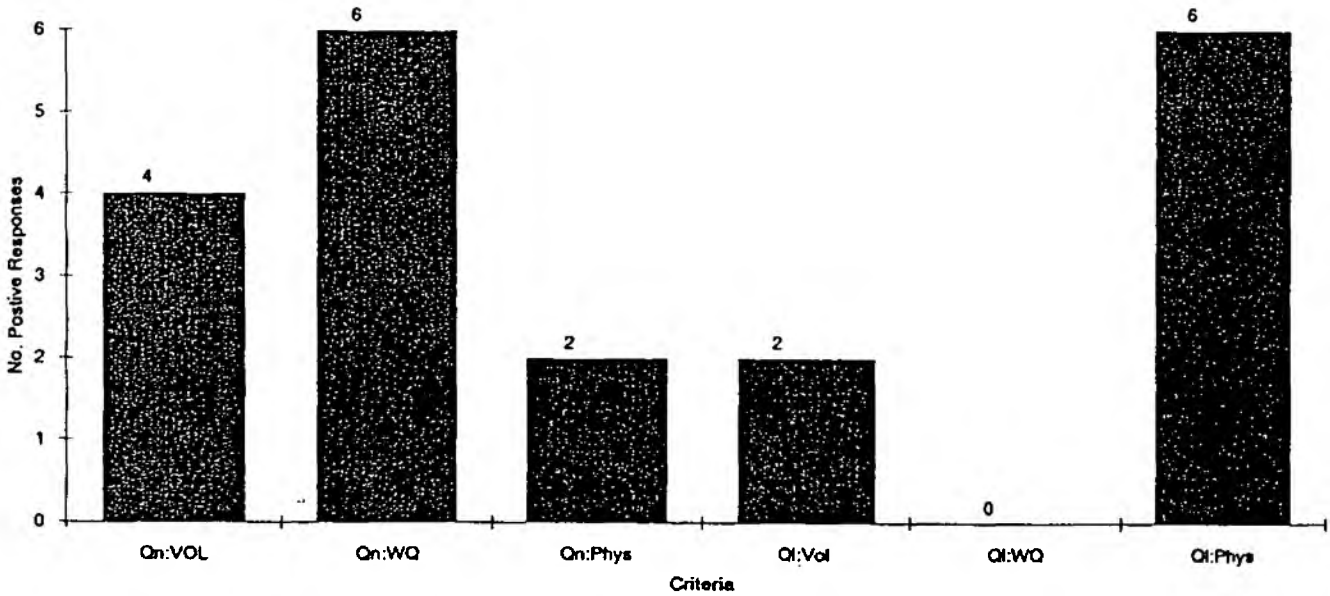

Figure 5.9 NRA questionnaire responses, other land use features category Total number of positive responses

NOTES (Figure 5.9)

QN	Quantitative	VOL	Water quantity (flow/volume)
Ql	Qualitative	WQ	Water quality
		Phys	Physical features

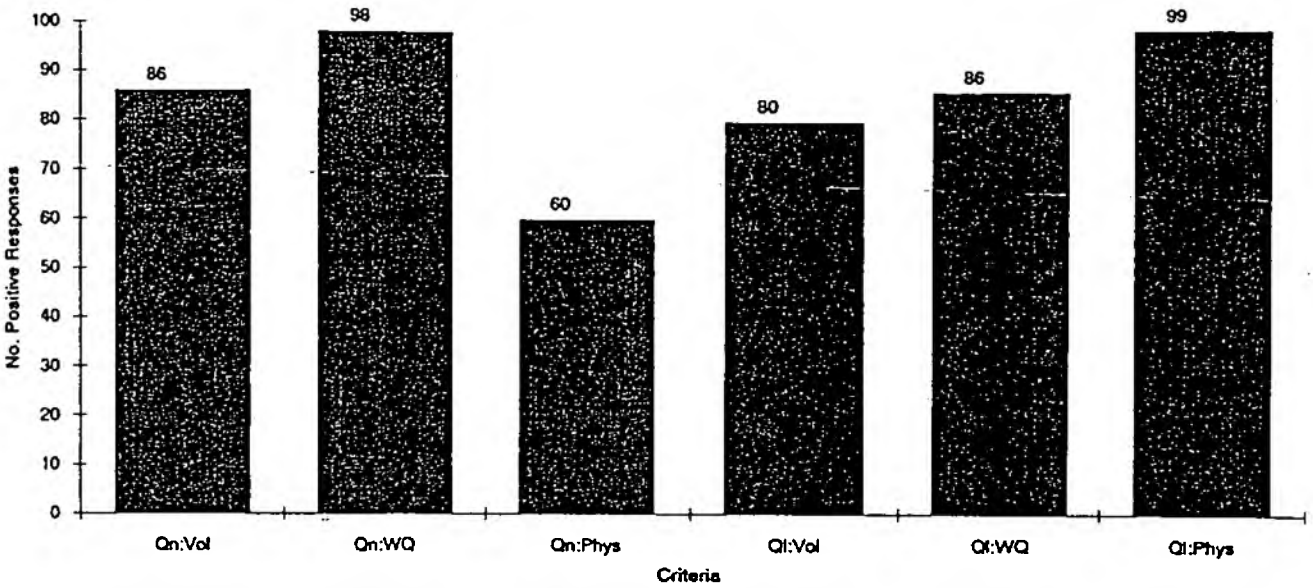

Figure 5.10 **Non-NRA questionnaire responses, all use categories combined**
Total number of positive responses

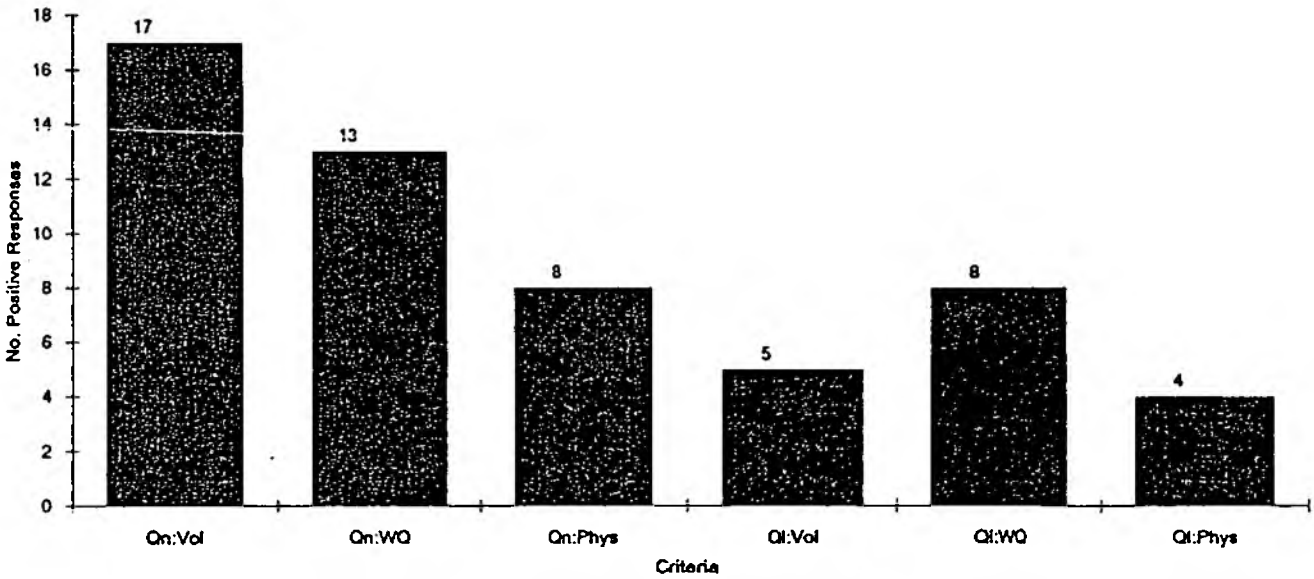

Figure 5.11 **Non-NRA questionnaire responses, public water supply use category**
Total number of positive responses

NOTES (Figures 5.10 & 5.11)

QN	Quantitative	VOL	Water quantity (flow/volume)
Ql	Qualitative	WQ	Water quality
		Phys	Physical features

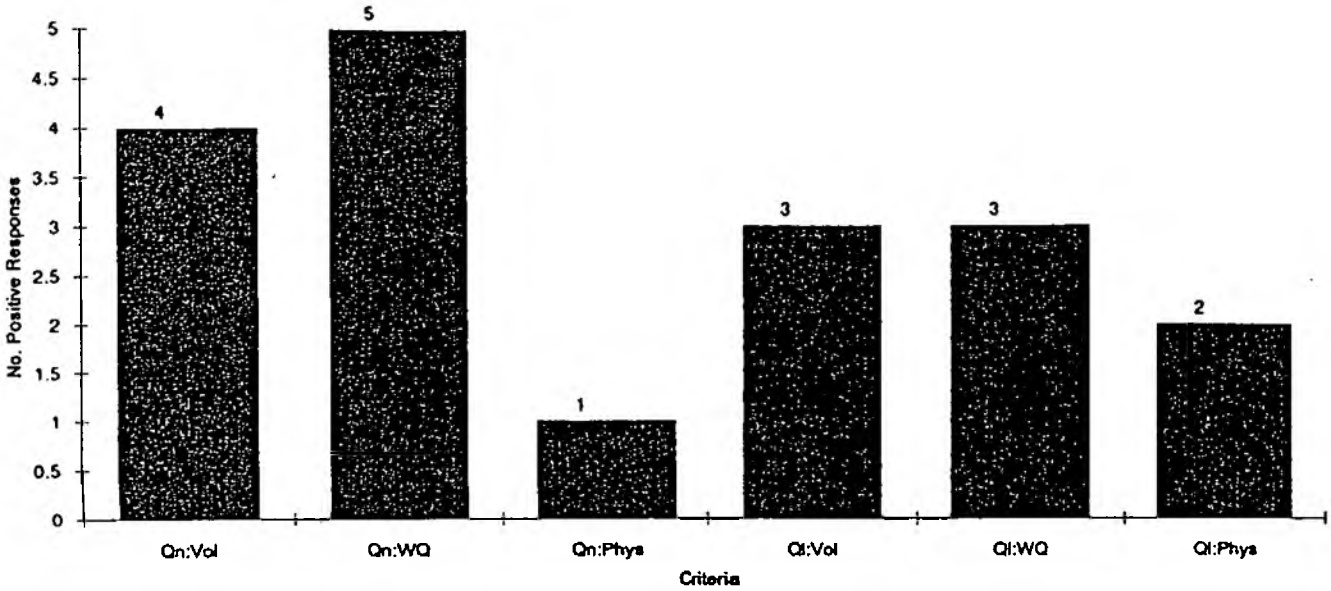

Figure 5.12 Non-NRA questionnaire responses, sewage effluent disposal use category Total number of positive responses

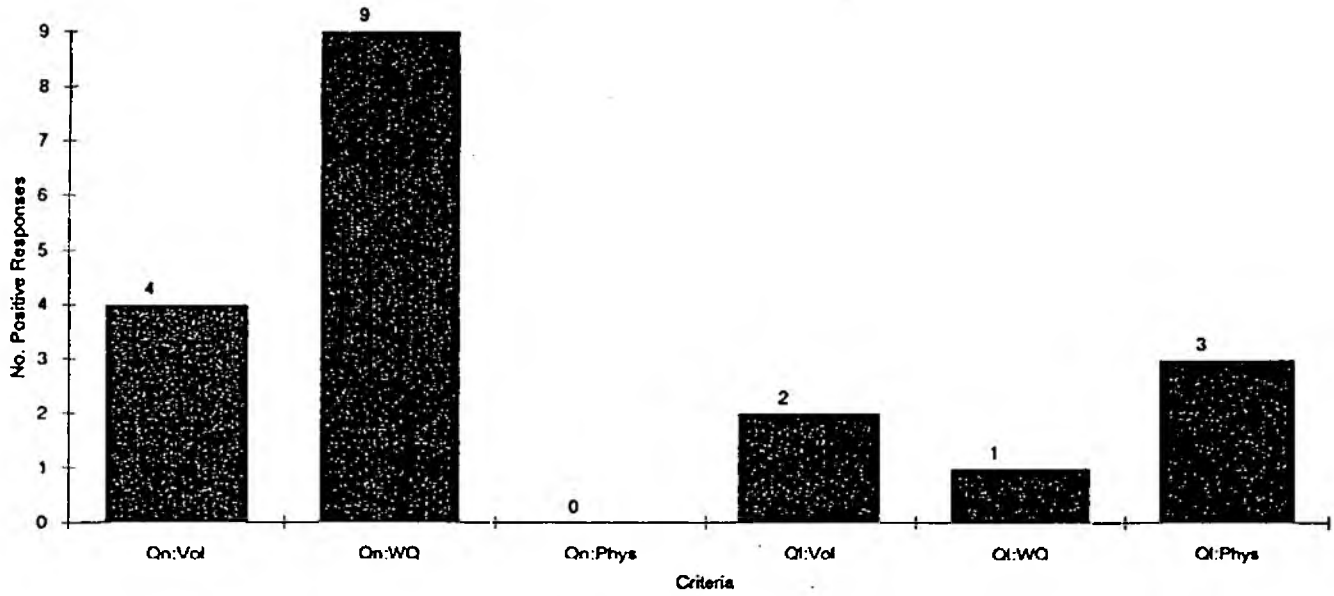

Figure 5.13 Non-NRA questionnaire responses, agricultural use category Total number of positive responses

NOTES (Figures 5.12 & 5.13)

QN	Quantitative	VOL	Water quantity (flow/volume)
Ql	Qualitative	WQ	Water quality
		Phys	Physical features

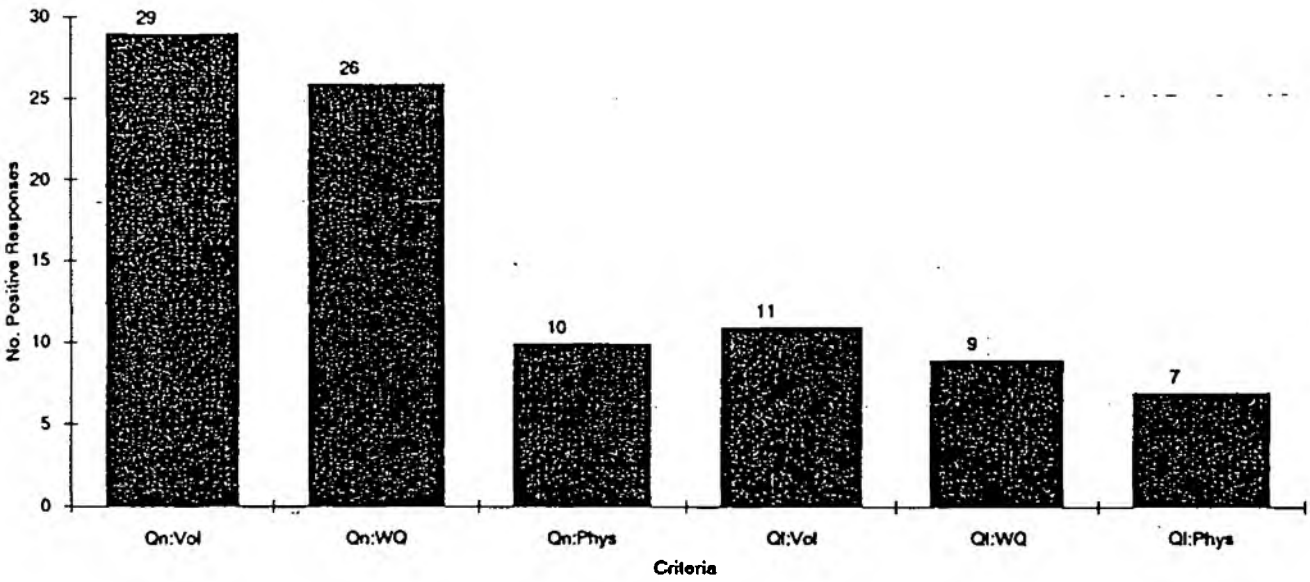

Figure 5.14 Non-NRA questionnaire responses, industrial use category Total number of positive responses

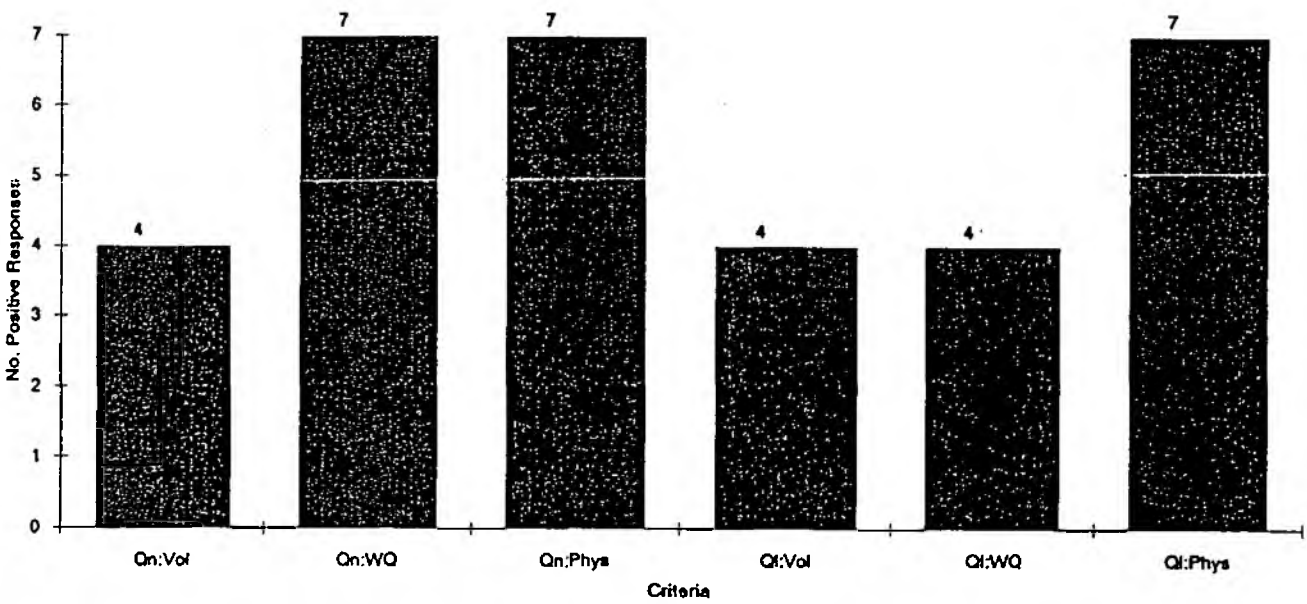

Figure 5.15 Non-NRA questionnaire responses, fisheries use category Total number of positive responses

NOTES (Figures 5.14 & 5.15)

QN	Quantitative	VOL	Water quantity (flow/volume)
Ql	Qualitative	WQ	Water quality
		Phys	Physical features

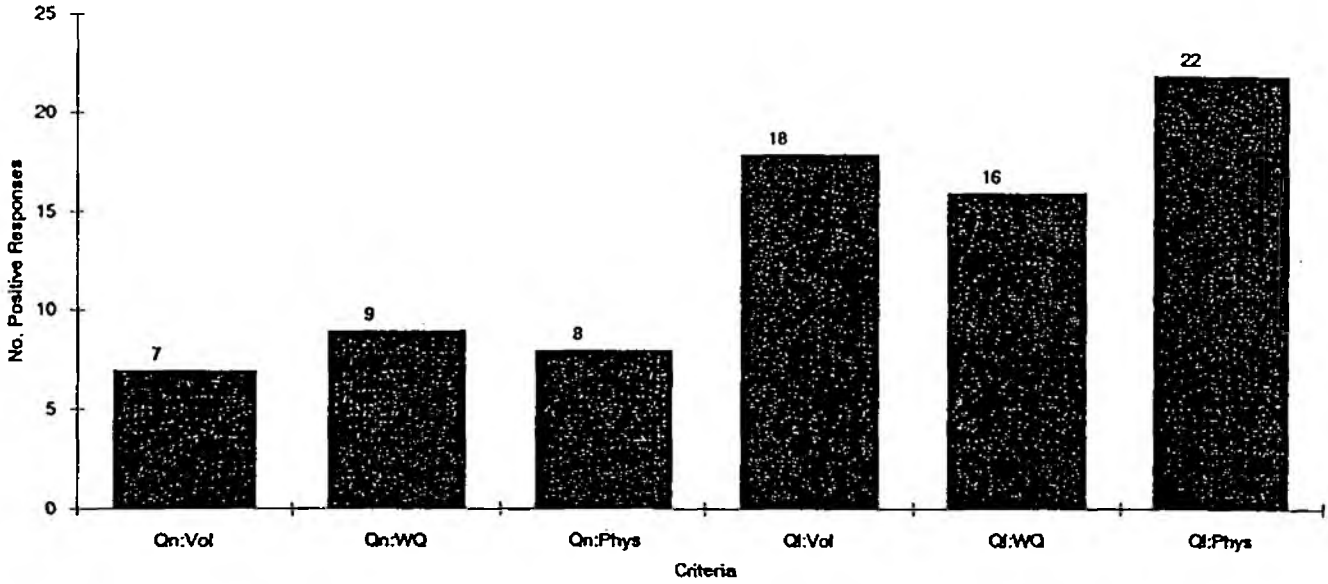

Figure 5.16 Non-NRA questionnaire responses, conservation use category Total number of positive responses

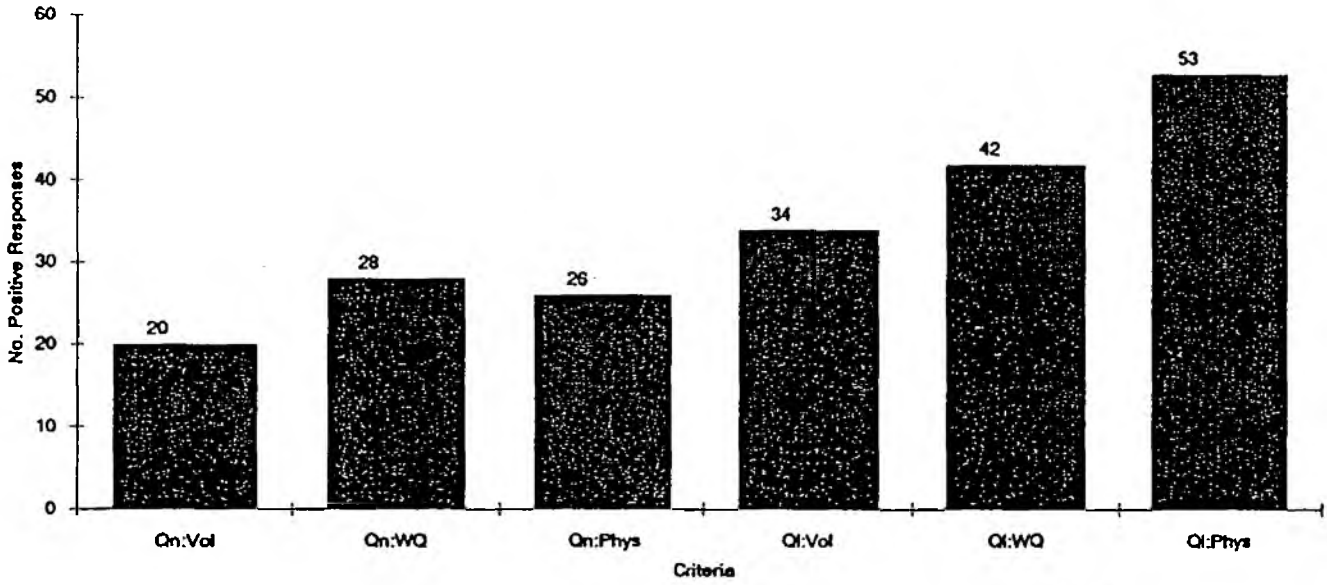

Figure 5.17 Non-NRA questionnaire responses, amenity and recreation use category Total number of positive responses

NOTES (Figures 5.16 & 5.17)

QN	Quantitative	VOL	Water quantity (flow/volume)
Ql	Qualitative	WQ	Water quality
		Phys	Physical features

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APPENDIX 1 : NRA RESPONSES TO PROJECT QUESTIONNAIRE

NRA

Mike Beard
Environmental Protection Manager
C.Chem MRSC MIWEM

Our ref.
Your ref.

National Rivers Authority
Southern Region

10th August 1992

Dear Sir

Catchment Management Issues - Use Related Standards, National R&D Project 405

The Catchment Management Planning Report (April 1991), produced by the Catchment Management Planning Group, identified the need for an R&D project to "develop use related criteria or standards relevant to each environmental requirement (water quality, water quantity and physical features)". The contract for Phase I of this project (a project definition study to develop terms of reference for further studies into the development of use related standards) has been awarded to the Environmental Advisory Unit Ltd. (EAU).

In order to develop terms of reference for any future work the strategy outlined below will be followed:

(a) Identify all possible uses of a controlled water and its associated environment, i.e. all uses for which standards may be required.

(b) Identify the requirements (environmental objectives) for the protection of the uses identified in (a).

(c) Review the existing and developing standards relating to water quantity, water quality and physical features for each use identified in (a).

(d) Identify uses or relevant parameters for which standards either do not exist or are inappropriate.

(e) Develop a strategy to address the issues raised in (d).

The project will NOT involve the formulation of any standards or any parameter or use, it is simply a review of the current situation. The intention is to identify any gaps or shortcomings in the existing system which could practically be addressed in a subsequent study.

Guildbourne House
Chatsworth Road
Worthing
Sussex
BN11 1LD
Telephone: (0903) 820692
Telex: 877340
Fax: (0903) 821832

The attached questionnaire has been devised in order to gather relevant information from the regions. I would be grateful if you could complete the questionnaire on behalf of your function/section and return by 1st September to:

Dr Stephen Birch
Environmental Advisory Unit Ltd.
Yorkshire House
Chapel Street
Liverpool, L3 9AG
Tel: 051 255 1115

If you have any queries regarding the project or the information required please do not hesitate to contact me.

Thank you for your assistance.

Yours sincerely

Jayne Lillywhite

Jayne Lillywhite
Project Leader

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : J. M. REDMOND Contact Address : THAMES Region
Kings Meadow House
Kings Rd
Reading RG1 8DQ

Telephone Number : 0734-535503

1. Please define your area of responsibility :

a) functional NAVIGATION

b) region/area R. THAMES, CRICKLADE - TEDDINGTON.

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R	✓	✓	✓	○	○	○
Private supply	R	✓	✓	✓	○	○	○
2. Sewage effluent disposal							
Water company discharge	R	✓	✓	✓	○	○	○
Private discharge	R	✓	✓	✓	○	○	○
3. Agricultural uses							
Land drainage	R	✓	✓	○	✓	○	○
Spray irrigation	R	○	✓	○	○	○	○
Livestock watering	R	○	○	○	✓	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	R	✓	✓	○	○	○	○
Process effluent disposal	R	✓	✓	○	○	○	○
Cooling water discharge	R	✓	✓	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation	R	✓	✓	○	○	○	○
Commercial navigation	R	○	○	✓	○	○	○
Site drainage	R	○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation	R	○	○	○	○	○	○
Nature conservation sites	R	○	○	○	○	○	○
Landscape feature	R	○	○	○	○	○	○
Heritage or archaeology value	R	○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)	R	○	○	✓	○	○	○
Ornamental/landscape use	R	○	○	✓	○	○	✓
Game angling		○	○	○	○	○	○
Coarse angling	R	○	✓	○	✓	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching	R	○	○	○	✓	✓	○
Pleasure boating	R	○	○	✓	✓	✓	○
Sailing (eg dinghies)	R	○	○	✓	✓	✓	○
Canoeing/Rowing	R	○	○	✓	✓	✓	○
Windsurfing	R	○	○	✓	✓	✓	○
Water-skiing	✗	○	○	○	○	○	○
Swimming and diving	R	○	○	✓	✓	✓	○
8. Other land use features							
Urban land use (drainage etc.)	R	○	○	○	○	○	✓
Transport links (road, rail etc.)	R	○	○	○	○	○	✓
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) Physical Water levels T.C. Act 1932 extract attached.

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

of supply or less suitable for the purpose of supplying water to any mill or other work whatsoever the owner or occupier whereof was at the seventeenth day of August one thousand eight hundred and ninety-four and for the time being shall be lawfully entitled to such supply.

73.—(1) Subject to the provisions of this Act the Conservators from time to time may for the purpose of determining the height or depth of water at any place in the Thames fix in or at any lock on the Thames head-water and low-water and such other marks as they may deem necessary and may regulate as they think fit the opening shutting and management of the locks and works on the Thames and the drawing down or keeping back of the water by means of any of those locks or works.

As to drawing down &c. of water.

(2) Provided that—

(a) The Conservators shall so regulate the said locks works and water as not to interfere in the case of any mill with the maintenance of as efficient a head of water for the purposes thereof as immediately before the sixth day of August one thousand eight hundred and sixty-six might lawfully be maintained for those purposes so long as all the rights of the owner lessee and occupier of such mill to require the maintenance of such head of water shall not have been acquired by the Conservators;

(b) One month at the least before they fix any head-water mark at any place where no such mark existed on the ninth day of May one thousand eight hundred and ninety-four or alter the level of any such mark which existed on that day the Conservators shall publish once in a newspaper published and circulating in the neighbourhood of the place where they propose to fix or alter such mark and shall set up and thereafter during one month at the least keep conspicuously displayed at such place a notice setting forth at what place it is proposed to fix or alter such mark and the level at which it is proposed that such mark shall be;

A.D. 1932.

(c) The powers of this section shall not be so exercised as to interfere with or prejudice the taking of water by the Water Board or by the South West Suburban Company at their respective intakes by gravitation or otherwise.

(3) The Conservators shall as far as reasonably practicable prevent the waters of the Thames being at any place above the level of any head-water mark for the time being fixed at such place.

(4) In case of any difference between the Conservators and the owner lessee or occupier of any mill relative to the exercise of the powers by this section vested in the Conservators or between the Conservators and the owner lessee or occupier of any land who shall within one month of the publication hereinbefore in this section mentioned have given notice in writing to the Conservators that he objects to the level at which they propose to fix any head-water mark on the ground that it is too high such difference shall be determined by an arbitrator to be appointed on the application of either party by the Minister of Transport.

(5) If any owner lessee or occupier of any land shall suffer any damage by reason of the Conservators not complying with the provisions of this section relating to the prevention of water being at any place above the level of any head-water mark for the time being fixed at such place the Conservators shall pay to him such compensation as in case of difference shall be determined by an arbitrator to be appointed on the application of either party by the Minister of Transport or where the amount of the compensation claimed does not exceed twenty pounds shall be determined by a court of summary jurisdiction.

(6) Notwithstanding anything in this Act but subject to any byelaws made thereunder any owner lessee or occupier of any mill may draw down the water to such extent and at such times as may reasonably be required for the repair of such mill or any flood-gates or water-works belonging thereto and for the purpose of cleansing the mill stream.

Power to

~~74. The Conservators may from time to time~~ [illegible] below which it

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : DA STOTT Contact Address : NRA READING.

Telephone Number : 0734 404786

1. Please define your area of responsibility :

a) functional ..... Water Resources / Quality Planning / Consents / Licences

b) region/area ..... Thames .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R.C.G	Ø	Ø	Ø	O	Ø?	O
Private supply	RC.G	Ø	Ø	Ø	O	O	Ø
2. Sewage effluent disposal							
Water company discharge	RCG DE L	Ø	Ø	O	O	O	Ø
Private discharge	RCGDG	Ø	Ø	O	O	O	O
3. Agricultural uses							
Land drainage	RCD	Ø	Ø	O	O	O	O
Spray irrigation	RCGL	Ø	Ø	O	O	O	O
Livestock watering	RLG.	Ø	Ø	O	O	O	O
Liquid waste disposal	RGE	Ø	Ø	O	O	O	O
Fish farming	RGL	Ø	Ø	O	O	O	O
Water cress growing	RG	Ø	Ø	O	O	O	O
Forestry	N/A	Ø	O	O	O	O	O

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	RCEGL	⊘	⊘	○	○	○	○
Process effluent disposal	RCE	○	⊘	○	○	○	○
Cooling water discharge	RCE	○	⊘	○	○	○	○
Mine washings	—	○	⊘	○	○	○	○
Mineral extraction	R,G,L	⊘	⊘	○	○	○	○
Solid wastes (ie landfill)	RG	○	○	○	○	○	○
Power generation	RCEG	○	⊘	○	○	○	○
Commercial navigation	RCE	○	○	○	○	⊘	○
Site drainage	RCEGDL	○	⊘	○	○	○	○
5. Fisheries							
Commercial fishing	E	○	⊘	○	⊘	○	○
Shellfishing	E	○	⊘	○	⊘	○	○
Migratory fishery (inc. eels)	RE	○	⊘	○	⊘	○	○
Salmonid fishery	R	○	⊘	○	⊘	○	○
Cyprinid (coarse) fishery	RE	○	⊘	○	⊘	○	○
6. Conservation							
River corridor conservation	RCE	○	○	⊘	⊘	○	○
Nature conservation sites	RCEL	○	⊘	○	⊘	○	○
Landscape feature	RCEL	○	○	○	⊘	⊘	⊘
Heritage or archaeology value	RCEL	○	○	○	⊘	⊘	⊘
7. Amenity and recreation							
General amenity (walking)	RCEL	○	○	○	⊘	⊘	○
Ornamental/landscape use	—	○	○	○	⊘	⊘	⊘
Game angling	R	⊘	⊘	○	⊘	○	○
Coarse angling	RLCE	⊘	⊘	○	⊘	○	○
Wildfowling	RLCE	○	⊘	○	⊘	⊘	○
Birdwatching	RLCE	○	○	○	⊘	⊘	○
Pleasure boating	RLCE	○	⊘	○	⊘	⊘	○
Sailing (eg dinghies)	RLCE	○	⊘	○	⊘	○	○
Canoeing/Rowing	RLCE	⊘	⊘	○	⊘	○	○
Windsurfing	RLE	○	⊘	○	⊘	○	○
Water-skiing	LE	○	⊘	○	⊘	○	○
Swimming and diving	RLCE	○	⊘	○	⊘	○	○
8. Other land use features							
Urban land use (drainage etc.)	all	○	⊘	○	⊘	○	○
Transport links (road, rail etc.)	all	○	⊘	○	⊘	○	○
9. Other uses							
.....	—	○	○	○	○	○	○
.....	—	○	○	○	○	○	○
.....	—	○	○	○	○	○	○
.....	—	○	○	○	○	○	○
.....	—	○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) Tidaway Quality Standards.

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

TIDEWAY OBJECTIVES AND INTERIM STANDARDS

Reach	Quality Objective	Chemical Standard (See notes 1 and 3)	Biological Standard (Guideline)
Teddington to Battersea (Estuary freshwater, EF)	Passable to migratory fish. Maintenance of a coarse fishery within the physical constraints of the estuary. Aesthetically pleasing appearance.	In any quarterly period the dissolved oxygen value to exceed 40% sat for 80% of the time and 10% sat for 95% of the time at all points. Minimum DO 5% sat. Maximum temperature 28°C.	Self supporting dace fishery as indicated by presence of fish of the year. BMWP score greater than 25.
		Compliance with the requirements of EC Directives as laid down in the appropriate Statutory Instruments.	
Battersea to Mucking (Estuary euryhaline, EE)	Passable to migratory fish. Maintenance of a euryhaline fish population consistent with the physical characteristics of the estuary. Maintenance of a commercial eel fishery. Aesthetically pleasing appearance.	In any quarterly period the dissolved oxygen value to 30% sat. for 80% of the time and 10% sat. for 95% of the time at all points. Min. DO 5% sat. Max. temperature 28°C.	Minimum of 9 species of fish to be idenfied during West Thurrock surveys. Data from commercial eel returns to be examined as a potential future standard.
		Compliance with the requirements of EC Directives as laid down in the appropriate Statutory Instruments.	
Mucking to Seaward Limit (Estuary Marine, EM)	Passable to migratory fish. Maintenance of a marine fishery consistent with the physical characteristics of the estuary. EC Designated Bathing Beaches to be satisfactory.	In any quarterly period the dissolved oxygen value to 60% sat. 80% of the time and 10% sat. for 95% of the time at all points. Min. DO 5% Maximum temperature 28°C.	Suitable standards to include measure of commercial fish catches and protection of marine nursery grounds to be evolved over the next 2 years.
	Aesthetically pleasing appearance.	Compliance with the requirements of EC Directives as laid down in the appropriate Statutory Instruments.	

Notes:
1. Dissolved oxygen to be assessed from automatic quality monitoring station data, half tide corrected.
2. The objectives and standards of creek waters are the same as those of the adjacent tideway.
3. Minimum DO and maximum temperatures may be exceeded by extreme natural events. They are set at the lethal limits to fish. Planning limits will be set within these limits to prevent both acute and chronic toxicity to aquatic life.

NRA - THAMES REGION
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08 SEP 1992
WALTHAM CROSS
THAMES REGION

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : D. JOWETT Contact Address : 6th FLOOR READING BRIDGE HOUSE
(on behalf of I. M. Adams, EQ Manager).

Telephone Number : 0734 535422

1. Please define your area of responsibility :

a) functional ENVIRONMENTAL QUALITY

b) region/area THAMES

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	RGL	✓	✓	○	○	○	○
Private supply	RGL	✓	✓	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	RCDEG	✓	✓	○	✓	✓	○
Private discharge	RCDEG	✓	✓	○	✓	✓	○
3. Agricultural uses							
Land drainage	____	○	○	○	○	○	○
Spray irrigation	RCL	○	✓	○	○	○	○
Livestock watering	RCL	○	✓	○	○	○	○
Liquid waste disposal	RCDLEG	✓	✓	○	○	✓	○
Fish farming	RCLEG	✓	✓	○	○	○	○
Water cress growing	RG	✓	✓	○	○	○	○
Forestry	____	○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	RCLEG	✓	✓	○	○	○	○
Process effluent disposal	RCDLEG	✓	✓	○	○	○	○
Cooling water discharge	RCE	✓	✓	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction	RCDLEG	✓	✓	○	○	○	○
Solid wastes (ie landfill)	G	○	✓	○	○	○	○
Power generation	RCE	✓	✓	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage	RCDLEG	✓	✓	○	○	○	○
5. Fisheries							
Commercial fishing	E	○	✓	○	○	○	○
Shellfishing	E	○	✓	○	○	○	○
Migratory fishery (inc. eels)	RCE	○	✓	○	○	○	○
Salmonid fishery	RCL	○	✓	○	○	○	○
Cyprinid (coarse) fishery	RCL	○	✓	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)	RLEC	○	✓	○	○	✓	✓
Ornamental/landscape use		○	○	○	○	○	○
Game angling	RCL	○	✓	○	○	○	○
Coarse angling	RCL	○	✓	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating	ERCL	○	✓	○	○	○	○
Sailing (eg dinghies)	ERCL	○	✓	○	○	○	○
Canoeing/Rowing	ERCL	○	✓	○	○	○	○
Windsurfing	ERCL	○	✓	○	○	○	○
Water-skiing	ERCL	○	✓	○	○	○	○
Swimming and diving	ERCL	○	✓	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) ..... N/A

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

NATIONAL RIVERS AUTHORITY
15 SEP 1992
WALTHAM CROSS
THAMES REGION

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CATCHMENT MANAGEMENT ISSUES AND RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : COLIN CANDISH (ON BEHALF OF REGIONAL FLOOD DEFENCE MANAGER)
Telephone Number : 0734 535210

Contact Address : N.R.A. Thames Region
Kings Meadow House
Kings Meadow Rd
Reading RG1 8DQ

1. Please define your area of responsibility :

a) functional ...FLOOD DEFENCE...

b) region/area ...REGION...

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

NOTE: NRA F.D. interested in Canal where this body is rated as "Main River" under legislation.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	⊘	O	⊘	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	R C D	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

F.D. Interests 1) Land Drainage Consents - Quantitative Phys.
2) " " Byelaws " " "
3) Planning Authority Consultation " " Vol " "

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		O	O	O	O	O	O
Process effluent disposal		O	O	O	O	O	O
Cooling water discharge		O	O	O	O	O	O
Mine washings	As (3)	O	O	O	O	O	O
Mineral extraction	above.	O	O	O	O	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage		O	O	O	O	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation	R C D	O	O	✓	O	O	✓
Nature conservation sites		O	O	O	O	O	O
Landscape feature	"	O	O	✓	O	O	✓
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)		O	O	O	O	O	O
Ornamental/landscape use		O	O	O	O	O	O
Game angling		O	O	O	O	O	O
Coarse angling		O	O	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching		O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)		O	O	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing		O	O	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
As (3) above — Urban land use (drainage etc.)	R C D	O	O	O	O	O	O
Transport links (road, rail etc.)		O	O	O	O	O	O
9. Other uses							
~~Flood~~ Alleviation	R C D	✓	O	✓	O	O	O
(through Capital &		O	O	O	O	O	O
maintenance Work)		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		✓	O	✓	✓	O	✓
Flood Warning & Emergency Response	R C D						

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) F.D. Standards of Service

b) F.D. Byelaws

c) A Guide for People living near rivers & streams.

d) Planning Guidance Notes (compiled by A. Brookes).

e) Thames Region - prepared for public.

f) - indicates responsibility

g)

h)

i)

Any other comments you may wish to make can be given below.

Since 60+% of Expenditure of NRA relates to Flood Defence it seems unreasonable that it is relegated to a position of one of 16 or so Physical Features in current Catchment Management Guidelines.

P Condrill
14/9/92.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

FILE

NATIONAL RIVERS AUTHORITY
15 SEP 1992
WALTHAM CROSS
THAMES REGION

NRA

National Rivers Authority
Thames Region

M E M O R A N D U M

TO: C. Woolhouse,
Catchment Planning Officer. (Waltham Cross)

FROM: Dr. B.D. Hughes,
Recreation and Conservation Manager. (Napier Court)

DATE: 14th September 1992

TELEPHONE: 0734 535504
FAX: 0734 587151

Our Ref: BDH/HK G27
Your Ref: CP2/A

Gaig,

Catchment Management Issues
Use-related standards - National R. & D. Project 405

Following our telephone conversation on Thursday 10th September I enclose the completed questionnaire.

I found it very difficult to understand what was expected. The opening sentence of paragraph 2 says "which of the following uses . . . occur or are proposed within your area of responsibility." Since my "area of responsibility" is to promote the conservation of and recreational use of all water and associated land I have an interest in all of the uses that are listed!! I have, however, restricted my ticks to those circles alongside the "Conservation" and "Amenity and Recreation" headings.

Having ticked the circles that seemed appropriate I then concluded that this was not really going to tell E.A.U. Ltd. anything very useful. The value for walking alongside a stretch of water is influenced by the amount and quality of the water and the physical characteristics. Ditto for all recreation activities. Very few activities are dependent on known numerical requirements in terms of volume, water quality or physical characteristics before they can be pursued and/or enjoyed.

The same applies to conservation. Volume, flow, depth, quality, physical characteristics etc. are all important but again it would be wrong to suggest that "river corridor conservation" (for example) was dependent on known numerical requirements in terms of volume, quality etc. Individual species and habitat types may require particular numerical standards but that is a more specific level of interest than the questions being posed.

I hope the above comments are helpful. They are not intended to be anything other than constructive and will hopefully help E.A.U. decide how best to approach Recreation and Conservation issues.

Enc.

Brian Hughes

68

Kings Meadow House
Kings Meadow Road
Reading
Berkshire
RG1 8DQ
Tel: Reading (0734) 535000
Telex: 849614 NRATHA G
Fax: (0734) 500388

TR 55

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : B. Hughes

Contact Address : NRA Thames, Kings Meadow House, Reading, Berks.

Telephone Number : 0734 535504

1. Please define your area of responsibility :

a) functional Recreation + Conservation

b) region/~~area~~ Thames

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation	RCDLE	○	○	○	✓	✓	✓
Nature conservation sites	"	○	○	○	✓	✓	✓
Landscape feature	"	○	○	○	✓	✓	✓
Heritage or archaeology value	"	○	○	○	✓	✓	✓
7. Amenity and recreation							
General amenity (walking)	"	○	○	○	✓	✓	✓
Ornamental/landscape use	"	○	○	○	✓	✓	✓
Game angling	"	○	✓	○	✓	✓	✓
Coarse angling	"	○	✓	○	✓	✓	✓
Wildfowling	"	○	○	○	✓	✓	✓
Birdwatching	"	○	○	○	✓	✓	✓
Pleasure boating	"	○	○	○	✓	✓	✓
Sailing (eg dinghies)	"	○	○	✓	✓	✓	✓
Canoeing/Rowing	"	○	○	○	✓	✓	✓
Windsurfing	"	○	○	✓	✓	✓	✓
Water-skiing	"	○	○	✓	✓	✓	✓
Swimming and diving	"	○	✓	○	✓	✓	✓
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : PETER GRANGE.

Contact Address : Kingfisher House
Goldhay Way
Orton Goldhay.
PETERBOROUGH. PE2 0ZR.

Telephone Number : 0733. 371811

1. Please define your area of responsibility :

a) functional WATER RESOURCES.

b) region/area ANGLIAN / REGIONAL HQ.

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	RLG	✓	✓	○	○	○	○
Private supply	RCDLEG	✓	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation	RCDLEG	✓	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	RCDLEG	✓	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mineral ~~Mine~~ washings	RG	✓	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

25 September 1992

NRA

National Rivers Authority
Anglian Region

Dr Stephen Birch
Environmental Advisory Unit Ltd
Yorkshire House
Chapel Street
Liverpool
L3 9AG

Our Ref: JC/CSP

Dear Dr Birch

Use-Related Standards, National R&D Project 405

Please find enclosed a completed questionnaire for the Water Quality function in Anglian Region, NRA, together with relevant documentation.

I apologise for the delay in returning the form but implementation was held up by absence of staff on leave.

The information provided is a summation of inputs by marine, freshwater, biology and water quality planning sections.

In view of the fact that the questionnaire includes many uses which have not been specifically recognised within the Anglian Scheme of River Quality Objectives, we have incorporated most amenity and recreation uses into the low, moderate and high amenity categories which have been adopted in the region.

Our staff felt that the questionnaire was ambiguous in certain aspects.

Paragraph 2 asked for uses of water and the water-related environment which 'occur or are proposed'. It is unclear as to whether this refers to uses formally identified, and forming the basis of river quality objectives, or in the more general sense, of current uses of water irrespective of whether they are designated or not.

Applying the latter interpretation, most uses are being made of one or more water body types, but few give rise to use-related catagories for water quality purposes.

The ones which do, are identifiable by quantitative and/or qualitative standards which are shown by ticks in the appropriate boxes.

ROGER HYDE
Regional General Manager

Kingfisher House
Goldhay Way
Orton Goldhay
Peterborough
PE2 5ZR
Tel: 0733 371811
Fax: 0733 231840

NRA

You should note that boating is not an activity for which environmental quality standards are presently in place. However, various boating activities have been included in the 'contact sports' category which is proposed.

No general marine quality objectives have been identified, but environmental quality standards are applied to the Humber Estuary. These are drawn up by the Humber Estuary Committee. In addition, the Marine Section use WRc recommendations and Humber Estuary Committee standards as informal quality standards for certain toxic substances.

Biological monitoring is a major plank of Anglian Region's water quality strategy. The 'Lincoln Index' is an internal reference standard which is correlated with river classes and is recognised in environmental quality standards.

I hope that this explanation is adequate, but do not hesitate to contact me if you have any queries.

Yours sincerely

John Cocker
Water Quality Officer

CHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
RA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : JOHN COCKER ON BEHALF OF M.J. PEARSON REGIONAL MANAGER (ENVIRONMENT) Contact Address : NRA ANGLIAN REGION, KINGFISHER HOUSE, GOLDHAY WAY, ORTON GOLDHAY, PETERBOROUGH.

Telephone Number : 0733 371811 x 4491.

1. Please define your area of responsibility :

a) functional WATER QUALITY.

b) region/area REGIONAL H.Q.

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
1. Public water supply							
Water company abstraction	R C L G	○	✓	○	○	○	○
Private supply	G	○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	R E D G C	○	○	○	○	○	○
Private discharge	R E D G C	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	ALL	○	○	○	○	○	○
Spray irrigation	R D C L	○	✓	○	○	○	○
Livestock watering	R D C L	○	✓	○	○	○	○
Liquid waste disposal	ALL	○	○	○	○	○	○
Fish farming	R L	○	○	○	○	○	○
Water cress growing	R	○	○	○	○	○	○
Forestry		○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	R E G C	○	○	○	○	○	○
Process effluent disposal	" "	○	○	○	○	○	○
Cooling water discharge	R E	○	○	○	○	○	○
Mine washings	—	○	○	○	○	○	○
Mineral extraction	R	○	○	○	○	○	○
Solid wastes (ie landfill)	ALL	○	○	○	○	○	○
Power generation	R E	○	○	○	○	○	○
Commercial navigation	E R	○	○	○	○	○	○
Site drainage	ALL	○	○	○	○	○	○
5. Fisheries							
Commercial fishing	E	○	✓	○	○	✓	○
Shellfishing	E	○	✓	○	○	✓	○
Migratory fishery (inc. eels)	R E L	○	✓	○	○	○	○
Salmonid fishery	R L	○	✓	○	○	○	○
Cyprinid (coarse) fishery	R L D	○	✓	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)	R C L E D	●	○	○	○	○	○
Ornamental/landscape use	"	○	○	○	○	○	○
Game angling	"	○	○	○	○	○	○
Coarse angling	"	○	○	○	○	○	○
Wildfowling	"	○	○	○	○	○	○
Birdwatching	"	○	○	○	○	○	○
Pleasure boating	"	○	✓	○	○	✓	○
Sailing (eg dinghies)	"	○	✓	○	○	✓	○
Canoeing/Rowing	"	○	✓	○	○	✓	○
Windsurfing	L "	○	✓	○	○	✓	○
Water-skiing	"	○	✓	○	○	✓	○
Swimming and diving	"	○	✓	○	○	✓	○
8. Other land use features							
Urban land use (drainage etc.)	ALL	○	○	○	○	○	○
Transport links (road, rail etc.)	ALL	○	○	○	○	○	○
9. Other uses							
Low Amenity	R D L C	○	✓	○	○	✓	○
Moderate Amenity	"	○	✓	○	○	✓	○
High Amenity	"	○	✓	○	○	✓	○
Protection e.g. Marine Life	E	○	✓	○	○	✓	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

WQ a) BIOLOGICAL MONITORING – LINCOLN QUALITY INDEX (PAPER ENCLOSED)

WQ b) HUMBER ESTUARY COMMITTEE – QUALITY OBJECTIVES.

WQ c) ANGLIAN WATER AUTHORITY – RIVER QUALITY OBJECTIVES, 1986.

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

ANGLIAN REGION HAS OPERATED A SET OF RIVER QUALITY OBJECTIVES SINCE THE MID-1980s – THESE INCORPORATE EC DIRECTIVE EQS, AS WELL AS EIFAC FISHERIES RECOMMENDATIONS FOR AMMONIA (UNIONISED) AND TEMPERATURE (FOR MIGRATORY FISH IN THE HUMBER.) DETAILED INFORMATION IS PROVIDED IN ACCOMPANYING DOCUMENTATION.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

ANGLIAN WATER AUTHORITY

WATER QUALITY CRITERIA

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5.	Amenity and Conservation	38

CLASSIFICATION OF RIVER USE

1. Potable water supply - direct to treatment.

   - via impoundment.

2. Salmonid fishery - F_1 - supporting a breeding population of trout/grayling.

   Cyprinid fishery - F_2 - supporting a breeding population of non-salmonid fish.

3. Industrial water supply.

4. Spray irrigation of field crops.

5. Livestock watering.

*6. Amenity and conservation - high amenity

   - moderate amenity

   - low amenity

* In designating waters as high or moderate amenity regard has been given to the following factors:-

(i) the extent to which a water is used for recreational purposes
(ii) the type of recreational use
(iii) the proximity of housing
(iv) the nature conservation importance.

ANGLIAN WATER AUTHORITY

WATER QUALITY CRITERIA

1. POTABLE WATER SUPPLY ABSTRACTION

(Values except pH in mg/l unless stated otherwise)

Determinand	Direct to Treatment (1)		Via Impoundment (2)	
	95 percentile	99 percentile	95 percentile	99 percentile
Colour(Hazen units)*	100	-	100	-
Taste/Odour (dilution number)	25	-	-	-
pH	6.0-9.0 (3)	5.5-9.5(4)	6.0-9.5(3)	5.5-10.0 (4)
Conductivity (us/cm)	1500	2000	2000	-
Temperature (°C)*	25	30	30	-
Dissolved Oxygen	5.0 (5%ile)	4.0(1%ile)	4.0(5%ile)	3.0(1%ile)
BOD_5 (ATU)	6.0	9.0	9.0	-
Kjeldahl Nitrogen (as N)	2.0	3.0	3.0	-
Free and Saline Ammonia (as N)*	1.0	1.6	1.5	-
Total Oxidised Nitrogen (as N)*(5)	19.0	22.6	25.0	-
Sodium	125	150	150	-
Potassium	18	22	22	-
Anionic Synthetic Detergents (as Manoxol O.T.)	0.25	0.4	0.4	-
Total Phosphorus (as P)	see Footnote (6)			
Boron	1.0	1.5	2.0	-
Fluoride	1.5	1.8	1.8	-
Chloride	250	300	300	-
Sulphate *	250	300	300	-
Iron*	2.0	3.0	3.0	-
Manganese	0.1	0.15	2.0	-
Zinc *	5.0	7.5	5.0	-
Copper	0.05	0.075	0.1	-
Nickel	0.1	0.15	0.15	-
Chromium *	0.05	0.075	0.075	-
Cadmium *+	0.005	0.0075	0.01	-
Mercury (ug/l)*+	1.0	1.5	1.5	-
Lead *	0.05	0.075	0.075	-
Arsenic *	0.05	-	0.05	-
Selenium *	0.01	-	0.01	-
Barium *	1.0	-	1.0	-
Cyanide *	0.05	-	0.1	-
Phenol *	0.001	-	0.01	-
Dissolved or Emulsified Hydrocarbons (ug/l)*	200	-	400	-
Chloroform Extractable Substances	see Footnote (7)			
"Total Pesticides" (ng/l)* (8)	2500	-	2500	-
Polycyclic Aromatic Hydrocarbons (ng/l)* (9)	200	-	400	-
Lindane (ng/l)+	200	300	200	300
Lincoln Quality Index (minimum)	C	C	D	D

1. POTABLE WATER SUPPLY ABSTRACTION

NOTES

* Determinands for which imperative values have been set in the EC Surface Water Directive; the PWS direct to treatment criteria adopted are compatible with the values in the directive.

\+ Determinands covered by specific "daughter" directives under the EC "Dangerous Substances" Directive (76/464/EEC).

(1) Treatment is assumed to be conventional and to correspond to the requirements for A2 treatment under the EC Surface Water Directive.

(2) Impoundment refers to extensive storage in certain designated reservoirs within the AWA. The criteria are relevant to the abstractions point from the river into the reservoir. They should not be used where short circuiting or other phenomena would result in the abstraction from the reservoir becoming non-compliant with the Surface Water Directive requirements

(3) 95 percentile range.

(4) 99 percentile range.

(5) A waiver will be sought for the EC Surface Water Directive imperative value of 11.3 mg (NO_3-N)/l. Nitrate values for impoundments may be varied according to local circumstances and knowledge of removal efficiencies.

(6) The EC Surface Water Directive proposes a guideline value of 0.31 mg P/l (as a 90 percentile). This figure is normally exceeded in potable water supply rivers in Anglia and consideration of phosphorous control to combat eutrophication problems associated with water supply may be necessary in some instances.

(7) The EC Surface Water Directive proposes a guideline value of 200ug/l as a 90 percentile, but insufficient data are available at present to assess whether such a figure is appropriate for Anglian rivers.

(8) "Total pesticides" should be regarded as the sum of parathion, HCH and dieldrin for the purposes of the EC Surface Water Directive. However, it should be recognised that the EC Drinking Water Directive specifies a mean concentration for all pesticides of 500 ng/l and for individual pesticides of 100 ng/l. These figures would not be compatible with the Surface Water imperative value of 2500 ng/l unless activated carbon treatment is employed.

(9) "Polycyclic aromatic hydrocarbons" should be regarded as the sum of the six standard compounds specified in the EC Surface Water Sampling and Analysis Directive.

(10) Bacteriological criteria have been excluded because the guideline values of the EC Surface Water Directive are inappropriate for Anglian rivers and no alternative values can be set at this stage.

(11) Dissolved aluminium is of growing concern because of public health implications but no criteria can be set at this stage.

2. FISHERIES

(Values except pH in mg/l unless stated otherwise)

Determinand	F_1(Salmonid dominated)		F_2(Cyprinid dominated	
	95 percentile	99 percentile	95 percentile	99 percentile
pH value *	6.0-9.0(1)	5.0-9.5(2)	6.0-9.0(1)	5.0-9.5(2)
Suspended Solids (3)	80	150	100	200
Temperature (°C)*	20	22	25	28
Dissolved Oxygen *	7.0(5%ile)	6.0(1%ile)	6.0(5%ile)	4.0 (1%ile)
BOD_5 (ATU)	4.0(4)	6.0	6.0(4)	9.0
Free and Saline ammonia (as N)(5)	0.75	1.25	1.5	2.5
Un-ionised Ammonia (as N)*(5)	0.021	0.04	0.021	0.08
Nitrite (as N)	0.15	0.25	0.45	1.0
Total Oxidised Nitrogen (as N)	75	90	75	90
Anionic Synthetic Detergents (as Manoxol OT)	0.2	0.4	0.2	0.4
Non-ionic Synthetic Detergents (as Lissapol NX)	0.2	0.4	0.2	0.4
Fluoride	1.5	1.8	1.5	1.8
Chloride (6)	1000	1200	1500	1800
Iron (7)	1.0	1.5	1.0	1.5
Manganese (7)	1.0	1.5	1.0	1.5
Zinc *	0.5	0.75	2.0	3.0
Copper *	0.11	0.17	0.11	0.17
Nickel	0.4	0.6	0.4	0.6
Chromium	0.1	0.15	0.5	0.75
Cadmium + (8)	0.03	0.045	0.0015	0.045
Mercury (ug/l) +	0.15	0.23	0.15	0.23
Lead	0.04	0.06	0.5	0.75
Arsenic	0.05	0.075	0.05	0.075
Cyanide	0.01	0.015	0.01	0.015
Phenols	0.7	1.0	0.7	1.0
Free Chlorine (as Cl)*	0.004	0.005	0.004	0.005
Lindane (ng/l)+	200	300	200	300
Lincoln Quality Index (mimimum)	B	B	D	D

2. FISHERIES

NOTES

* Determinands for which imperative values have been set in the EC Fisheries Directive; the criteria adopted are compatible with the values in the Directive.

\+ Determinands covered by specific "daughter" directives under the EC "Dangerous Substances" Directive (76/464/EEC)

(1) 95 percentile range.

(2) 99 percentile range.

(3) Normally occurring concentrations are more important in the protection of fisheries than occasional extreme values and if suspended solids criteria are used in determining consent conditions a mean river concentration of 25mg/l should be achieved.

(4) Higher values of BOD_5 ATU, up to 6.0 and 10.0 mg/l (95%ile), are known to occur in some good quality F_1 and F_2 fisheries respectively, indicating scope for local criteria in some cases.

(5) Ammonia criteria for fisheries:

	F_1 Salmonid 95%ile	F_2 - cyprinid 95%ile
A. EEC designated		
Free and Saline ammonia (as N)	0.78*	0.78*
Un-ionised ammonia (as N)	0.021*	0.021*
(*or such other values as may be granted by derogation)		
B. Non-EEC designated		
Free and saline ammonia		
(i) Where existing conc $\leqslant$ 0.75/1.5 (as N)	0.75	1.5
(ii) Where existing conc are between 0.75/1.5 and 3.0 (as N)	Maintain existing quality unless case can be made for improvement or relaxation	
(iii) Where existing conc $\geqslant$ 3.0 (as N)	3.0	3.0
Un-ionised ammonia (as N)	0.04	0.04

In all cases the most stringent of the above standards applicable to any given stretch of fishery shall be applied. Within the standard applicable, the Authority will not plan for a rise in ammonia concentration of more than 10% and will plan to ensure no downgrading of NWC Class.

(6) Little information is available on chloride and total dissolved solids. The chloride figures given are an indication of the dissolved solid levels which should not be exceeded but sudden changes in concentration are more likely to have a deleterious effect than a constant high concentration.

(7) Possible problems of precipitation and smothering of stream bed.

(8) In waters where carp breed the cadmium criteria should be 0.0015 mg/l (95 percentile) and 0.0023 (99 percentile).

ANGLIAN WATER AUTHORITY

Water Quality Criteria
(Revised September 1982)

3. SPRAY IRRIGATION OF FIELD CROPS

(Values except pH in mg/l unless stated otherwise)

Determinand	95 percentile	99 percentile
pH value	5.5 - 8.5 (1)	4.5 - 9.0 (2)
Conductivity (us/cm)	1500	1800
Total Dissolved Solids	1000	1200
Lithium	1.7	2.5
Sodium Adsorption Ratio(3)	10	15
Boron	1.0	1.2
Fluoride	1.0	1.2
Chloride	250	300
Iron	1.0	1.5
Manganese	0.7	1.0
Zinc	2.0	3.0
Copper	1.0	1.5
Nickel	0.3	0.45
Chromium	4.0	6.0
Cadmium +	0.01	0.015
Mercury (ug/l) +	1.3	2.0
Lead	4.0	6.0
Arsenic	0.8	-
Selenium	0.04	-
Cobalt	0.03	-
Vanadium	0.15	-
Aluminium	3.3	-
Molybdenum	0.06	-
Lindane (ng/l) +	200	300

+ Determinands covered by specific "daughter directives under the EC "Dangerous Substances" Directive (76/464/EEC)

(1) 95 percentile range
(2) 99 percentile range

(3) Sodium adsorption ratio (SAR) = $\left(\frac{Na}{Ca+Mg}\right)$ results expressed as meq/l

4. LIVESTOCK WATERING

(Values except pH in mg/l unless stated otherwise)

Determinand	95 percentile	99 percentile
pH Value	6.0 - 9.0 (1)	5.0 - 9.5 (2)
Conductivity (us/cm)	3000	4500
Dissolved Oxygen	3.0 (5%ile)	2.0 (1%ile)
Nitrite Nitrogen (as N)	8.5	10
Total Oxidised Nitrogen (as N)	85	100
Boron	5.0	7.5
Fluoride	2.0	3.0
Chloride	1000	1500
Manganese	6.0	10.0
Zinc	50	75
Copper	0.4	0.6
Nickel	2.0	3.0
Chromium	2.0	3.0
Cadmium +	0.01	0.015
Mercury (ug/l) +	2.0	3.0
Lead	0.2	0.3
Arsenic	0.4	-
Selenium	0.03	-
Cyanide	0.05	-
Cobalt	1.0	-
Vanadium	0.1	-
Aluminium	5.0	-
Lindane (ng/L) +	200	300

+ Determinands covered by specific "daughter" directives under the EC "Dangerous Substances" Directive (76/464/EEC)

(1) 95 percentile range

(2) 99 percentile range

ANGLIAN WATER AUTHORITY

Water Quality Criteria
(Revised September 1982)

5. AMENITY AND CONSERVATION

(Values except pH in mg/l unless stated otherwise)

Determinand	High Amenity(1)		Moderate Amenity		Low Amenity	
	95 %ile	99 %ile	95 %ile	99 %ile	95 %ile	99 %ile
Local Conservation Value	The particular conservation aspects of each river stretch should be considered and where appropriate criteria substantially different to those detailed below may be necessary to protect important local plant or animal species					
General appearance and odour	Visually unobjectionable and without offensive odour					
pH value	6.0–9.0 (2)	-	5.5–9.5 (2)	-	5.0–10.0 (2)	-
Conductivity (us/cm)	1500	-	3000	-	-	-
Suspended Solids	80	-	100	-	-	-
Temperature (°C)	25	-	28	-	30	-
Dissolved Oxygen	4.0 (5%ile)	3.0 (1%ile)	3.0 (5%ile)	2.0 (1%ile)	2.0 (5%ile)	1.0 (1%ile)
BOD_5 (ATU)	9(3)	-	12(3)	-	20(3)	-
Free and Saline Ammonia (as N)	1.5	-	5.0	-	-	-
Nitrite (as N)	1.0	-	-	-	-	-
Anionic Syndets (as Manoxol OT)	0.2	-	-	-	-	-
Non-ionic Syndets (as Lissapol NX)	0.2	-	-	-	-	-
Chloride	500	-	1000	-	-	-
Iron (4)	1.0	-	-	-	-	-
Manganese (4)	1.0	-	-	-	-	-
Zinc *	2.0	3.0	2.0	3.0	2.0	3.0
Copper *	0.11	0.17	0.11	0.17	0.11	0.17
Nickel *	0.4	0.6	0.4	0.6	0.4	0.6
Chromium *	0.5	0.75	0.5	0.75	0.5	0.75
Cadmium +	0.01	-	0.01	-	0.01	-
Mercury (ug/l) +	0.15	-	-	-	-	-
Lead *	0.5	0.75	0.5	0.75	0.5	0.75
Arsenic *	0.05	0.75	0.5	0.75	0.5	0.75
Cyanide	0.01	-	-	-	-	-
Phenols	0.7	-	-	-	-	-
Free Chlorine (as Cl)	0.004	-	-	-	-	-
Lindane (ng/l) +	200	300	200	300	200	300
Lincoln Quality Index (minimum)	C	C	E	E	G	G

NOTES

+ Determinands covered by specific "daughter" directives under the EC "Dangerous Substances" Directive (76/464/EEC)

* Determinands with limits specified by the Department of the Environment as List II national standards under the EC "Dangerous Substances" Directive (76/464/EEC)

(1) Where the high amenity classification is due to conservation interests (especially Sites of Special Scientific Interest) the particular quality requirements of the site may necessitate local criteria substantially from those shown.

(2) 95 percentile range.

(3) Local circumstances may require BOD_5 (ATU) criteria different from those shown to enable the dissolved oxygen criteria to be met.

(4) Possible problems of precipitation and smothering of stream bed.

wp/60/15

Humber Estuary

THE WATER QUALITY OF
THE HUMBER ESTUARY
1991

A Report from
The Humber Committee of the
National Rivers Authority

Comprising the Anglian, Severn-Trent and Yorkshire Regions of the NRA

91

NRA

Environmental Quality Standards

(Annual average in ug/l except where stated)

DETERMINAND	TIDAL RIVERS	ESTUARY	COMMENT
Temperature	25°C	25°C	95 percentile
Dissolved oxygen	40% saturation	55% saturation	5 percentile
pH	5.5 - 9.0	6.0 - 8.5	95 percentile
Ammonia	0.021 (mg/l)	0.021 (mg/l)	Unionised 95%ile
Mercury	1 total	0.3 dissolved	(1)
Cadmium	5 total	2.5 dissolved	(1)
Arsenic	50 dissolved	25 dissolved	(3)
Chromium (III+VI)	250 dissolved	15 dissolved	(3)
Copper (II)	28 dissolved	5.0 dissolved	(2)(3)
Lead	250 dissolved	25 dissolved	(3)
Nickel	200 dissolved	30 dissolved	(3)
Zinc	500 total	40 dissolved	(3)
Iron	1000 dissolved	1000 dissolved	(3)
HCH	0.1 total	0.02 total	(1)
DDT (all isomers)	0.025 total	0.025 total	(1)
DDT (pp isomer)	0.01 total	0.01 total	(1)
CCl4	12 total	12 total	(1)
PCP	2 total	2 total	(1)
TOTAL DRINS	0.03	0.03	Annual means of all Drins added together (max 0.005 endrin)

(1) Mandatory - Statutory Quality Objective laid down in the 1989 regulations (SI 2286)

(2) Higher values acceptable where acclimation expected or substance present in organic complexes.

(3) National List II Environmental Quality Standard

Notes:

(a) Standards for most of the metals in freshwater vary according to the water hardness. However, since the average hardness of the tidal rivers varies only between 290 and 350 mg/l, standards have been defined in relation to a hardness of 300mg/l.

(b) No standard has been set for suspended solids in the water column. Local control may be necessary to avoid excessive accumulation of sediment or the deposition of sewage solids.

[redacted] Nitio[redacted]a[redacted] [redacted]f [redacted] [redacted] [redacted] T[redacted] Saline [redacted]
WATERS.

Determinand	Freshwater	Units F/W	T/D	Marine Water	Units M/W	T/D	Drinking Water	Units D/W	T/D	Tidal Rivers	Units T/R	T/D	Estuary	Units EST.	T/D	Source	Comments
METALS																	
Marcury	1.000	ug/l	T	0.300	ug/l	D				1.000	ug/l	T	0.500	ug/l	D	HEC	
Cadmium	5.000	ug/l	T	2.500	ug/l	D				5.000	ug/l	T	5.000	ug/l	D	HEC	
Copper (II)				5.000	ug/l	D	3000	ug/l *	T	28.000	ug/l	D	5.000	ug/l	D	HEC	* MAC
Zinc				40.000	ug/l	D	5000	ug/l *	T	500.000	ug/l	T	40.000	ug/l	D	HEC	* MAC
Lead				25.000	ug/l	D	50	ug/l *	T	250.000	ug/l	D	25.000	ug/l	D	HEC	* MAC
Chromium (III +VI)				15.000	ug/l	D	50	ug/l *	T	250.000	ug/l	D	15.000	ug/l	D	HEC	* MAC
Nickel				30.000	ug/l	D	50	ug/l *	T	200.000	ug/l	D	30.000	ug/l	D	HEC	* MAC
Arsenic				25.000	ug/l	D	50	ug/l *	T	50.000	ug/l	D	25.000	ug/l	D	HEC	* MAC
Iron	1000.000	ug/l	T	1000.000	ug/l	D				1000.000	ug/l	D	1000.000	ug/l	D	HEC	
Boron	1000.000	ug/l	T	7000.000	ug/l	T	1000	ug/l	T	2000.000	ug/l	T				WRc	
PESTICIDES																	
Hexachlorocyclohexane	0.100	ug/l	T	0.020	ug/l	T				0.100	ug/l	T	0.020	ug/l	T	HEC	
DDT	0.025	ug/l	T	0.025	ug/l	T				0.025	ug/l	T	0.025	ug/l	T	HEC	
DDT(pp.isomer)	0.010	ug/l	T	0.010	ug/l	T				0.010	ug/l	T	0.010	ug/l	T	HEC	
Total `drins`	0.030	ug/l	T	0.030	ug/l	T				0.030	ug/l	T	0.030	ug/l	T	WRc	
Aldrin	0.010	ug/l	T	0.010	ug/l	T				0.010	ug/l	T	0.010	ug/l	T	WRc	
Dieldrin	0.010	ug/l	T	0.010	ug/l	T				0.010	ug/l	T	0.010	ug/l	T	WRc	
Endrin	0.005	ug/l	T	0.005	ug/l	T				0.005	ug/l	T	0.005	ug/l	T	WRc	
Isodrin	0.005	ug/l	T	0.005	ug/l	T				0.005	ug/l	T	0.005	ug/l	T	WRc	
Trifluralin	100.000	ng/l		100.000	ng/l		170.00	ug/l								WRc	
Hexachlorobenzene	0.030	ug/l	T	0.030	ug/l	T				0.030	ug/l	T	0.030	ug/l	T	WRc	
Hexachlorobutadiene	0.100	ug/l	T	0.100	ug/l	T				0.100	ug/l	T	0.100	ug/l	T	WRc	
Carbon Tetrachloride	12.000	ug/l	T	12.000	ug/l	T				12.000	ug/l	T	12.000	ug/l	T	HEC	
Chloroform	12.000	ug/l	T	12.000	ug/l	T				12.000	ug/l	T	12.000	ug/l	T	WRc	
Endosulfan	3.000	ng/l		3.000	ng/l		2.40	ug/l								WRc	
Dichlorvos	1.000	ng/l		40.000	ng/l		12.00	ug/l								WRc	
Fenitrothion	10.000	ng/l		10.000	ng/l		1.00	ug/l								WRc	
Malathion	10.000	ng/l		20.000	ng/l		7.00	ug/l								WRc	
Azinphos-Methyl	10.000	ng/l		10.000	ng/l		0.75	ug/l								WRc	
Atrazine	2.000	ug/l		2.000	ug/l		2.00	ug/l								WRc	
Simazine }	2.000	ug/l		2.000	ug/l		10.00	ug/l								WRc	DoE
}	2.000	ug/l		2.000	ug/l		17.00	ug/l								WRc	WHO
Pentachlorophenol	2.000	ug/l	T	2.000	ug/l	T				2.000	ug/l	T	2.000	ug/l	T	HEC	
1,2-Dichloroethane	1.000	mg/l *		1.000	mg/l *		10.00	ug/l								WRc	* 10 ug/l TAA 1989
Cyfluthrin	0.001	ug/l	T	0.001	ug/l	T				0.001	ug/l	T				WRc	95% ile eff. 1992
Flucofuron				1.000	ug/l	T				1.000	ug/l	T				WRc	95% ile eff. 1992 , poss. review
PCSDs & PADs				0.050	ug/l	T				1.000	ug/l	T				WRc	95% ile eff. 1992
Permethrin	0.010	ug/l	T	0.010	ug/l	T				0.010	ug/l	T				WRc	95% ile eff. 1992 , poss. review
Sulcofuron				25.000	ug/l	T				25.000	ug/l	T				WRc	95% ile eff. 1992 , poss. review
NUTRIENTS																	
Ammonia (unionised)				0.021	mgN/l					21	ug/l *		21	ug/l		HEC	* 95 % ile , M/W not agreed
MISCELLANEOUS																	
Temperature										25 C			25 C			HEC	
pH	5.5 - 9.0			6 - 8.5 *						5.5 - 9.0			6.0 - 8.5			HEC	*T95 eff. 1990
Dissolved Oxygen	7.00	mg DO		60%			70%			40%			55%			HEC	

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AQUATIC INVERTEBRATE SURVEYS AS A WATER QUALITY MANAGEMENT TOOL IN THE ANGLIAN WATER REGION

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ABSTRACT

The benefits of utilizing biological data in managing water quality are discussed, and the drawbacks and restrictions of traditional methods used to summarize and present biological results, are briefly outlined. Recent work in the Anglian Water region has led to the development of the Lincoln Quality Index, and this method overcomes some of these problems, enabling biological data to be usefully incorporated into environmental management programmes. Examples are given to show how the technique can assist in detecting and determining the significance of intermittent and shock pollution loads. The impact of deteriorating sewage effluent quality is also considered in some detail. The adoption of the Lincoln Quality Index method offers the opportunity for substantial cost savings, as well as allowing water quality surveillance programmes to be undertaken with increased flexibility. Areas where further work would be beneficial are finally identified.

KEY WORDS Macroinvertebrates Quality assessment Targeting Resource management

INTRODUCTION

Routine samples of macroinvertebrates have been used for many years by British Water Authorities, and their predecessors, to provide supplementary information on water quality. During this time chemical analysis of water has formed the mainstay of monitoring programmes, and the classification of inland waters has largely been based on chemical criteria. While it is essential that such work should continue, the particular advantages provided by monitoring macroinvertebrate communities should not be overlooked.

Invertebrate populations are in many ways ideal indicators of their environments, exhibiting as they do a range of response to both toxic and organic pollutants. In addition they are relatively sedentary, enabling pollution sources to be pinpointed, and most species have life cycles of sufficient length to enable a retrospective assessment of quality to be made. Their taxonomy is well understood, and the sampling and later identification of families and species is a relatively simple task.

Because of their ability to integrate the effects of episodic pollution events, macroinvertebrate communities can also be successfully utilized to monitor the impact of intermittent discharges on receiving streams. Communities will of course also respond to the more frequent entry of contaminants to rivers, and there will again be integration when pollution loads vary with time.

Most water quality problems involve organic pollutants, and many methods have been employed in the past by biologists to convert their raw data to some form of easily understood index, responsive to variations in organic load. Familiar examples are the Trent Biotic Index (Woodiwiss, 1964), the Saprobic Index (Zelinka and Marvan, 1966), the Chandler Score (Chandler, 1970), and the current method used in Britain for nationally reporting quality in biological terms, the Biological Monitoring Working Party

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(BMWP) Score (Chesters, 1980). In general these indices were derived at, and indeed perform satisfactorily at sites where flows are fast over a reasonably varied stoney/gravel bed, i.e. typical riffle stretches. If indices such as the BMWP score are applied to deep slow-flowing sites, so typical of parts of eastern England, or to riffles where the habitat is either very limited or very uniform, quality may be seriously underestimated. This is because such sites naturally tend to support a more facultative, or a more restricted, type of community.

A further shortfall in many of these methods is the lack of any formal standards above and below which quality can be respectively regarded as acceptable or not acceptable. Recent studies on British rivers have attempted to overcome some of these problems. One major area of research undertaken by the Freshwater Biological Association, has involved defining natural stream communites and relating these communities to physical and chemical variables in the environment (Armitage *et al.*, 1983; Wright *et al.*, 1984; Furse *et al.*, 1984; Moss *et al.*, 1987).

Table I. The BMWP score system

Families	Score
Siphlonuridae Heptageniidae Leptophlebiidae Ephemerellidae Potamanthidae Ephemeridae Taeniopterygidae Leuctridae Capniidae Perlodidae Perlidae Chloroperlidae Aphelocheiridae Phryganeidae Molannidae Beraeidae Odontoceridae Leptoceridae Goeridae Lepidostomatidae Brachycentridae Sericostomatidae	10
Astacidae Lestidae Agriidae Gomphidae Cordulegasteridae Aeshnidae Corduliidae Libellulidae Psychomyiidae Philopotamidae	8
Caenidae Nemouridae Rhyacophilidae Polycentropodidae Limnephilidae	7
Neritidae Viviparidae Ancylidae Hydroptilidae Unionidae Corophiidae Gammaridae Platycnemididae Coenagriidae	6
Mesoveliidae Hydrometridae Gerridae Nepidae Naucoridae Notonectidae Pleidae Corixidae Haliplidae Hygrobiidae Dytiscidae Gyrinidae Hydrophilidae Clambidae Helodidae Dryopidae Elminthidae Chrysomelidae Curculionidae Hydropsychidae Tipulidae Simuliidae Planariidae Dendrocoelidae	5
Baetidae Sialidae Piscicolidae	4
Valvatidae Hydrobiidae Lymnaeidae Physidae Planorbidae Sphaeriidae Glossiphoniidae Hirudidae Erpobdellidae Asellidae	3
Chironomidae	2
Oligochaeta (whole class)	1

In the Anglian region, which covers nearly 28 000 km^2 of eastern England from the River Thames to the River Humber, the need for a method that could summarize and equate biological data from a variety of river types, and which would enable performance to be judged against predefined standards, led to the development and use of the Lincoln Quality Index (LQI) (Extence *et al.*, 1987). The original LQI work was incorporated into an Anglian Water regional policy document (Clough, 1986), which now underpins practice.

METHODS

Extence *et al.* (1987) have provided full details of all aspects of the LQI method, which is based on the BMWP score system (shown in Table I).

After samples have been analysed, BMWP and Average Score Per Taxon (ASPT) values are calculated from Table I. BMWP scores are obtained by summing the individual scores of all families present in a sample. The ASPT is obtained by dividing this total by the number of taxa used to calculate the BMWP score. Sampling sites will previously have been categorized as either habitat rich riffles, or habitat poor riffles/pools, as defined in Extence *et al.*, 1987, Tables II and III, or alternatively Tables IV and V, are then used to obtain ratings X and Y from BMWP and ASPT values.

Overall quality ratings are next obtained from the formula:

$$\text{Overall Quality Rating} = \frac{X + Y}{2}$$

There ratings are finally associated with LQI scores (Table VI), the values of which range from A (Excellent) to I (Very Poor).

In order for the index to be of practical use to those responsible for water quality management, target LQIs for critical rivers and streams must be set. In the Anglian region, River Quality Objectives form the

Table II. Standard BMWP ratings for habitat rich riffles

BMWP score	Rating X
151+	7
121–150	6
91–120	5
61– 90	4
31– 60	3
15– 30	2
0– 14	1

Table III. Standard ASPT ratings for habitat rich riffles

ASPT	Rating Y
6·0+	7
5·5–5·9	6
5·1–5·4	5
4·6–5·0	4
3·6–4·5	3
2·6–3·5	2
0·0–2·5	1

Table IV. Enhanced BMWP ratings for habitat poor riffles and pools

BMWP score	Rating X
121+	7
101–120	6
81–100	5
51– 80	4
25– 50	3
10– 24	2
0– 9	1

Table V. Enhanced ASPT ratings for habitat poor riffles and pools

ASPT	Rating Y
5·0+	7
4·5–4·9	6
4·1–4·4	5
3·6–4·0	4
3·1–3·5	3
2·1–3·0	2
0·0–2·0	1

Table VI. Overall quality ratings, equivalent Lincoln Quality Index values and interpretation of results

Overall Quality rating	Index	Interpretation
6 or better	[A++	Excellent Quality
$5\frac{1}{2}$	A[A+	" "
5	[A	" "
$4\frac{1}{2}$	B	Good Quality
4	C	" "
$3\frac{1}{2}$	D	Moderate Quality
3	E	" "
$2\frac{1}{2}$	F	Poor Quality
2	G	" "
$1\frac{1}{2}$	H	Very Poor Quality
1	I	" " "

basis of all water quality management programmes (Anglian Water Authority, 1986), and the various categories are shown in Table VII, along with the minimum LQI required from routine biological samples to meet the target associated with different uses.

High targets are set for objectives such as salmonid fishery, and where a stretch of river has more than one River Quality Objective the most stringent LQI is used as a target.

Water quality may alternatively, or additionally, be managed by the derivation of National Water Council (NWC) classes (National Water Council, 1981). Although chemical criteria such as biochemical oxygen demand (BOD), ammoniacal nitrogen, and dissolved oxygen, are used to define NWC class, it is possible to check for compliance with NWC class by use of the LQI method, and the suggested relationship is shown in Table VIII. Using this approach a NWC class 2 stream would, for example, be routinely expected to obtain LQI scores of D or better.

Where chemical data are ambiguous, inadequate, or missing entirely, the LQI may also be used to obtain an inferred NWC class. For example, a stream not chemically monitored, but routinely achieving LQI scores of A+ or better, would be provisionally placed into NWC class 1A.

Table VII. LQI targets for River Quality Objectives

River Quality Objective*	Minimum LQI Required
	A
F_1	B
PWS (D), HA	C
PWS (I), F_2	D
MA	E
	F
LA	G
	H
	I

Key to River Quality Objectives

F_1	—	Salmonid Fishery
F_2	—	Cyprinid Fishery
PWS (D)	—	Potable Water Supply direct to Treatment
PWS (I)	—	Potable Water Supply via Impoundment
HA	—	High Amenity
MA	—	Moderate Amenity
LA	—	Low Amenity

Table VIII. LQI targets for NWC classes

NWC class	Minimum LQI Required
1A	A+
1B	B
2	D
3	F
X	G

RESULTS

To illustrate how the LQI technique can help in the day to day management of surface water quality, recent examples from Lincolnshire rivers and streams are presented below.

Pollution of Lincolnshire chalk streams

In the late summer/early autumn of 1987, silage liquor originating from a large cattle rearing unit situated on the Lincolnshire Wolds entered a small farm tributary (Tributary A) which then discharged into a larger stream (Stream B). This stream then runs for a short distance before joining River C. It is unfortunately not possible to identify the watercourses concerned at the present time, for legal reasons. The two larger watercourses contain important stocks of trout and both are considered to be high amenity waters. They are thus required to achieve LQI scores of B. Normally LQIs of A are obtained from streams in this catchment with little difficulty. Local waters have fast flows over stone/gravel beds and invertebrate communities are dominated by mayflies, stoneflies, and water shrimps. All sampling points, apart from the upstream site on Stream B and the two farm tributary sites, were classifed as habitat rich riffles. LQI scores recorded in September and November 1987 from the three watercourses affected by polluted discharges are shown in Table IX.

In September, farm discharges were clearly causing serious environmental contamination, resulting in the development of sewage fungus at downstream points, and the loss of pollution sensitive species. Below the confluence with the farm tributary, for example, Stream B's large water shrimp population, along with stoneflies and mayflies, (apart from *Baetis rhodani*), had completely disappeared, and a substantial population of pollution tolerant organisms such as bloodworms had developed. Although conditions gradually improved moving downstream, quality targets were not met for some distance down River C. Quite clearly, the use of LQI simplifies the presentation of biological data, while concurrently showing the magnitude and extent of any quality deficits.

Table IX. LQI values obtained from selected Lincolnshire chalk streams in the autumn of 1987

Station	LQI 23 September 1987	LQI 23 November 1987
Stream B u/s tributary A*	A+ (Excellent)	A++ (Excellent)
Tributary A d/s farm	I (Very Poor)	I (Very Poor)
Tributary A u/s stream B	I (Very Poor)	H (Very Poor)
Stream B d/s tributary A	H (Very Poor)	E (Moderate)
River C u/s stream B*	—	A (Excellent)
River C d/s stream B	G (Poor)	E (Moderate)
River C 1·5 kms below confluence with stream B	E (Moderate)	D (Moderate)
River C 2·5 kms below confluence with stream B	C (Good)	A (Excellent)
River C 5·5 kms below confluence with stream B	A++ (Excellent)	—

*Control sites. u/s = upstream d/s = downstream.

In order to determine how much recovery had occurred, and to see if any evidence could be found of ongoing discharges from the farm concerned, the survey was repeated two months later. An additional site on River C, upstream from Stream B, was substituted for the previously sampled lowermost site on River C.

Results obtained at this time (Table IX), suggest that pollutants were continuing to be discharged into the farm tributary. Improvements had occurred to a measurable extent at most downstream sites, however, indicating that organic loads had probably declined. The length of non-compliant river had also fallen, although overall the results were still far from satisfactory.

Deteriorating effluent quality at Binbrook Sewage Treatment Works (STW)

While episodic pollution events often occur suddenly and dramatically, the more insidious decline in quality is easier to miss. This is well illustrated by examining data from the upper reaches of the Waithe Beck in northern Lincolnshire for two consecutive years, 1986 and 1987.

The Waithe Beck is a fast flowing chalk stream which supports good populations of brown trout and pollution sensitive invertebrates such as stoneflies and non-baetid mayflies. The beck is also classified as a high amenity water. In order to maintain the high quality standards considered necessary for supporting a healthy game fishery, routine biological samples are required to obtain a LQI of B. The only input of any significance into the Becks headwaters is effluent originating from Binbrook STW. LQI scores obtained in 1986 and 1987, above and below the sewage works, are shown in Table X.

Until the end of 1986, sewage discharges appeared to be entirely satisfactory and no adverse environmental effects could be detected at downstream monitoring points (Coles *et al.*, in press). In February 1987, however, a marginal failure was noted at Swinhope (TF212958), although quality targets were still being met at Thorganby (TF209976) and Brigsley (TA253016). By June 1987 conditions had deteriorated further at Swinhope, and the length of stream failing to comply with quality targets had increased. An extra sample taken on 4 November 1987 at Thorganby showed some recovery, however, and recovery seemed to be complete by the end of the year here. At Swinhope non-compliant invertebrate communities persisted throughout 1987, despite the excellent results obtained concurrently above the works outfall (TF205948).

These data provide strong circumstantial evidence that discharges from Binbrook STW were having a far greater impact on the Waithe Beck in 1987 than in 1986, and chemical analysis of the final effluent (Table XI), bears this out.

These results plainly demonstrate that suspended solids, BOD, and ammoniacal nitrogen concentrations increased in 1987, while total organic nitrogen levels fell, as nitrification declined. (The works failed to comply with its consent for part of 1987). Chemical analyses of Waithe Beck samples indicated nothing untoward, possibly because monitoring points were too remote from Binbrook STW to be of any assistance. The recent failure of downstream sites to comply with LQI targets, has resulted in the amount of maintenance at the works being increased in 1988, and it is anticipated that this action should improve final effluent quality.

Table X. LQI scores obtained in 1986 and 1987 for samples taken from the Upper Waithe Beck, Lincolnshire

Site	Kms	1986 4/2	8/11	1987 10/2	24/6	4/11	8/12
u/s Binbrook STW	− 0·1	—	—	A+	A	—	A++
Swinhope	+ 1·25	A	—	C	E	—	E
Thorganby	+ 3·0	A	B	A	D	C	A
Brigsley	+11·75	B	A	A	B	—	A

All sites are classified as habitat rich riffles, and distances from the STW are shown, u/s = upstream.

Table XI. Chemical quality of Binbrook sewage treatment works effluent in 1986 and 1987

Determinand	1986 Mean	95% Percentile	Range	1987 Mean	95% Percentile	Range
Suspended solids	17·6	28·3	6 –34	22·0	47·7	7 –62
B.O.D.	14.9	26·0	3·3–33·0	16·4	34·2	5·1–40·2
NH_3	5·6	12·7	0·8–16·2	6·5	16·0	1·0–26·0
NO_2	0·5	1·2	0·2– 2·2	0·6	1·6	0·2– 2·4
T.O.N.	25·6	37·3	11·3–45·9	22·3	32·7	7·8–35·7

All figures are ppm

Detection of intermittent pollution

In many cases water quality managers need to know more about background conditions in rivers and streams than can be readily determined from a series of spot samples taken for chemical analyses. The upper Witham in Lincolnshire is an attractive trout fishery and high amenity water, and the watercourse above and below the town of Grantham has been reported for many years as belonging to NWC class 1B. The classification of this river into NWC class 1B conforms with guideline concentrations given in the NWC classification system for chemical parameters. Examination of biological data (Coles *et al.*, in press) and expanded in Table XII, suggests, however, that the intermittent or sporadic entry of pollutants from Grantham consistently lowers water quality to a measurable extent.

Little Ponton (SK929320) and Barkston (SK928414) are similar in terms of substratum and current velocity and both are classified as habitat rich riffles. Pollution-sensitive stoneflies, mayflies, and caddisflies are generally lost at Barkston, although populations of crayfish, which are fairly common in the upper Witham, are still able to survive here. Quite clearly, the Witham at Barkston is consistently non-compliant, assessed against both the River Quality Objective of trout fishery and the NWC class 1B target. There are no point discharges of sewage effluent that are likely to affect the Barkston site, but the river here is vulnerable to the casual entry of many pollutants or polluting discharges, such as storm sewage, coal dust, creosote and tar, oil, and urban run-off. Many British rivers of course suffer similar irregular inputs downstream from large towns or cities.

DISCUSSION

The examples provided show how the LQI method has been used to assist in the management of water quality at individual sites. Biologically assessing performance against fixed environmental standards undoubtedly provides a practical and inexpensive surveillance method, that can be used to great advantage in protecting aquatic resources. In this connection it should be noted that the total cost of routine biological monitoring in the Lincoln Division in 1986/87 (excluding reservoir work) was approximately £40 000. This figure includes staff salaries (Coles *et al.*, in press). Around 350 sites were

Table XII. Lincoln quality index scores recorded from the River Witham above and below the town of Grantham between 1984 and 1987

Station	Distance (kms)	LQI target	1984		1985		1986			1987			1988
Little Ponton	−3	B	A	A	B	B	B	B	A	A	B	B	A+
GRANTHAM													
Barkston	+4	B	D	D	C	C	D	C	D	D	B	D	D

visited during this period, and a total of 837 samples were processed and assessed as compliant or non-compliant using the LQI method.

A comprehensive biological sampling programme can also help managers establish priorities for making improvements and targeting capital expenditure over a wide area. The relative impact of sewage discharges, for example, can be assessed by initially assigning a factor to the receiving stream, based on water use or NWC class. By multiplying this factor by the degree of failure as indicated by LQI score deficits, it is possible to derive rankings showing which works are currently having the greatest environmental impact. In this case the LQI method provides a way of putting resources into precisely those areas where they are most needed. Methods are presently under investigation within Anglian Water to develop such techniques further.

The LQI method is not intended to replace the detailed study of species lists and their interpretation by trained and experienced biologists. The technique does, however, allow biological data, with all its inherent advantages, to be incorporated and used by water quality managers alongside more traditional methods. Ecological processes are complex and it is difficult to summarize them in a way that can be easily understood and used by non biologists. Results obtained to date suggest that the LQI method has been able to successfully bridge this gap.

ACKNOWLEDGEMENTS

The assistance of Anglian Water colleagues, both locally and regionally, in developing the techniques summarized in this paper is gratefully acknowledged. We particularly wish to thank Dr. S. Brierley and Mr. T. Hill, who undertook much of the field work and sample analysis. Thanks are also expressed to Ann Sommerville for technical support and to Mr. J. Simpsom, Director of Operations, for permission to publish this paper. The views expressed in the paper are those of the authors, and not necessarily those of Anglian Water.

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AAC

Awdurdod Afonydd Cenedlaethol
Rhanbarth Cymru

NRA

National Rivers Authority
Welsh Region

Our Ref: JWL/GPT

Dr. Stephen Birch.
Environmental Advisory Unit Ltd.,
Yorkshire House,
Chapel Street,
Liverpool.
L3 9HG.

Date: 11th September 1992

Dear Dr. Birch,

Catchment Management Issues - Use Related Standards
National R&D Project 405

In response to the recent request by Jayne Lillywhite, I enclose two completed questionnaire forms. One was completed by the Regional Water Quality Planner and has also received input form the Fisheries, Conservation Recreation section, and the Flood Defence Section. The second form was completed independently by Ian Barker, Regional Water Resources Officer.

Colin Strange, Water Quality Planner has queried the absence of a Coastal Water heading form the water body type which is an important point.

We are giving further consideration to the "other uses" heading in the context of our catchment plans in preparation and will advise you if we have any additional contribution under this heading.

I hope that this information is helpful.

Yours sincerely,

John Lambert

J.W. Lambert
Regional Technical Planning Officer

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CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : Colin Strange

Contact Address : NRA Welsh Region

Telephone Number : 0222 — 770088

WATER BODY TYPE
General Point :—
What about COASTAL area
NRA has WQ responsibilities out to 3 miles, future out to 6 miles!

1. Please define your area of responsibility :

a) functional Reg WQ Planner

b) region/area Welsh Region NRA

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys	
1. Public water supply								
Water company abstraction	RLG	✓	○	○	○	✓	○	
Private supply	RG	✓	○	○	○	✓	○	
2. Sewage effluent disposal								
Water company discharge	RCDLEG	✓?	✓?	○	○	○	○	Consent
Private discharge	probably no. some	✓?	✓?	○	○	○	○	
3. Agricultural uses								
Land drainage	RCDLEG	✓	○	✓	○	○	○	
Spray irrigation	"	○	✓	○	○	○	○	
Livestock watering	"	○	✓	○	○	○	○	
Liquid waste disposal	"	✓?	✓?	○	○	○	○	Consent
Fish farming	RLG	✓	✓	○	○	○	✓	
Water cress growing		○	✓	○	○	○	○	
Forestry	RDL	○	○	○	○	✓?	✓	

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys	
4. Industrial uses								
Industrial abstraction	R,C,D,L,E,G	✓	○	○	○	✓	○	
Process effluent disposal	"	✓?	✓?	○	○	○	○	CONSENT
Cooling water discharge	R,E	○	○	○	✓	○	○	
Mine washings	R,C,L(?),G	○	○	○	✓	○	○	
Mineral extraction	R,C,L(?),G	○	○	○	○	○	○	
Solid wastes (ie landfill)	R,G,E	○	○	✓	○	○	○	
Power generation	E	○	○	○	✓	○	○	
Commercial navigation	R,E	○	○	✓	✓	○	✓	
Site drainage	All.	○	○	○	○	○	○	
5. Fisheries								
Commercial fishing	E,R	✓	✓	○	○	○	✓	
Shellfishing	E	○	✓	○	○	○	✓	
Migratory fishery (inc. eels)	RCDLE	✓	✓	✓	✓	○	✓	could be quantified
Salmonid fishery	ERL,	✓	✓	✓	✓	○	✓	
Cyprinid (coarse) fishery	R,L,D,C	✓	✓	✓	○	○	✓	
6. Conservation								
River corridor conservation	RCDLE	○	○	○	✓	✓	✓	could be quantified
Nature conservation sites	All	○	○	○	✓	✓	✓	
Landscape feature	All	○	○	○	✓	✓	✓	
Heritage or archaeology value	All	○	○	○	✓	✓	✓	
7. Amenity and recreation								
General amenity (walking)	All	○	○	○	✓	✓	✓	
Ornamental/landscape use	All	○	○	○	✓	✓	✓	
Game angling	R,L	✓	✓	✓	○	○	○	
Coarse angling	R,L,C,D	✓	✓	✓	○	○	○	
Wildfowling	R,D,L,E	○	✓	✓	✓	○	○	
Birdwatching	All	○	○	○	✓	○	✓	
Pleasure boating	R,E,L	✓	✓	✓	✓	○	✓	
Sailing (eg dinghies)	L,E	✓	✓	✓	○	○	○	
Canoeing/Rowing	R,L,E	✓	✓	✓	○	○	○	
Windsurfing	E,L	○	✓	✓	○	○	○	
Water-skiing	E,L	○	✓	✓	○	○	○	
Swimming and diving	R,L,E	○	✓	○	○	○	○	
8. Other land use features								
Urban land use (drainage etc.)	All	✓?	✓?	○	○	○	✓	CONSE[illegible]
Transport links (road, rail etc.)	All	✓?	✓?	○	○	○	✓	
9. Other uses								
.....		○	○	○	○	○	○	
.....		○	○	○	○	○	○	
.....		○	○	○	○	○	○	
.....		○	○	○	○	○	○	
.....		○	○	○	○	○	○	

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) Catchment Mngt Plans (Ogmore) Vol, WQ & Phys.

b) Regional UOS documents ?

c) Regional W.Q. standards database.

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

1) Every effort should be made to include quantitative standards if possible. In some cases this may be very difficult.

2) Also see comment at head of questionnaire on [illegible] [illegible] [illegible].

3) What covers the "General Ecosystem" — must consider??

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : Ian Barker Contact Address : N.R.A. Welsh Region

Telephone Number : 0222 — 770088

1. Please define your area of responsibility :

a) functional REGIONAL WATER RESOURCES PLANNER

b) region/area WELSH REGION

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	RLGC	✓	✓	✓	○	○	○
Private supply	RLGCE	✓	✓	✓	○	○	○
2. Sewage effluent disposal							
Water company discharge	____	○	○	○	○	○	○
Private discharge	____	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	____	○	○	○	○	○	○
Spray irrigation	RCLDEG	✓	✓	✓	○	○	○
Livestock watering	"	✓	✓	✓	○	○	○
Liquid waste disposal	____	○	○	○	○	○	○
Fish farming	RG	✓	✓	✓	○	○	○
Water cress growing	____	○	○	○	○	○	○
Forestry	____	○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	RCDLEG	✓	✓	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction	GR	○	○	○	○	○	○
Solid wastes (ie landfill)	RG	○	○	○	○	○	○
Power generation	ERL	✓	○	✓	○	○	○
Commercial navigation	RC	✓	○	✓	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

National Rivers Authority
Severn-Trent Region

NRA

Our Ref:

Your Ref:

From: R.P.Lidgett
Catchment Planning Co-ordinator
Severn-Trent Region

To: Dr S.Birch
Environmental Advisory Unit

Date: 07 September 1992

Catchment Management Planning - Use Related Standards, National R&D Project 405

The attached responses to the questionnaire for the above R&D project were completed by staff from each function involved in the production of the River Stour Catchment Management Plan. There is some duplication in the sections completed by the individual staff - as co-ordinator of this plan I have tried to give an overview.

One of the questions which has been asked by several staff in this region, is how are these standards related to the development of Statutory Water Quality Objectives ?

I appologise for missing the deadline - there has been a change in the regional contact and the forms were only forwarded at the beginning of the month. If you require any further information, please do not hesitate in contacting me.

Ext. 3031

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : R.P. Lidgett

Contact Address : NRA Severn-Trent Region
Sapphire East
550 Streetsbrook Road
Solihull
B91 1QT

Telephone Number : 021 711 2324 (3031)

1. Please define your area of responsibility :

a) functional Fisheries Catchment Planner / Catchment Planning Co-ordinator

b) region/area RHQ

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	RCLEG	✓	✓	○	○	✓	○
Private supply		✓	✓	○	○	✓	○
2. Sewage effluent disposal							
Water company discharge	RCEG	○	✓	○	✓	○	✓
Private discharge	RCEG	○	✓	○	✓	○	✓
3. Agricultural uses							
Land drainage	RD	○	○	○	✓	○	○
Spray irrigation	RG	✓	✓	○	○	○	○
Livestock watering	RL	✓	✓	○	○	○	○
Liquid waste disposal		○	✓	○	○	○	○
Fish farming	RDCG	✓	✓	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry	RLG	✓	✓	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	R C L G E	✓	✓	○	○	○	○
Process effluent disposal	R C L G E	○	○	○	○	○	✓
Cooling water discharge	R C E	✓	✓	○	○	○	○
Mine washings	R C G E L	✓	✓	○	○	○	○
Mineral extraction	R C G E L	✓	✓	○	○	○	○
Solid wastes (ie landfill)	R C G	✓	✓	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation	R C E	○	○	○	✓	✓	✓
Site drainage	R G D	✓	✓	○	○	○	○
5. Fisheries							
Commercial fishing	R E	○	✓	○	○	○	○
Shellfishing		○	○	○	○	○	○
overlap { Migratory fishery (inc. eels)	R E	○	✓	○	✓	○	✓
overlap { Salmonid fishery	R E L	○	✓	○	✓	○	✓
Cyprinid (coarse) fishery	R C L	○	✓	○	✓	○	✓
6. Conservation							
River corridor conservation	R	○	○	○	✓	✓	✓
Nature conservation sites	All	○	○	○	✓	✓	✓ ?
Landscape feature	All	○	○	○	○	○	✓
Heritage or archaeology value	All	○	○	○	✓	○	✓
7. Amenity and recreation							
General amenity (walking)	All	○	✓	○	✓	✓	✓
Ornamental/landscape use	All	○	○	○	○	○	○
Game angling	R L E	○	○	○	○	○	✓
Coarse angling	R C L	○	○	○	○	○	✓
Wildfowling		○	○	○	○	○	○
Birdwatching	All	○	○	○	○	○	○
Pleasure boating	R C E L	○	○	○	✓	○	○
Sailing (eg dinghies)	R C E L	○	○	○	✓	○	○
Canoeing/Rowing	R C L	○	○	○	✓	○	○
Windsurfing	R L E	○	○	○	✓	○	○
Water-skiing	R E L	○	○	○	✓	○	○
Swimming and diving	R E L	○	○	○	✓	○	○
8. Other land use features							
Urban land use (drainage etc.)	All	○	○	○	○	○	○
Transport links (road, rail etc.)	All	○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

How do these standards tie in with SWOOS?

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : D. Martin

Contact Address : NRA Severn-Trent RHQ

Telephone Number :

1. Please define your area of responsibility :

a) functional ...Planner - Environmental Quality...

b) region/area ...RHQ...

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R.C.L G	○	○	○	✓	✓	○
Private supply		○	○	○	✓	✓	○
2. Sewage effluent disposal							
Water company discharge	ALL	○	○	○	✓	✓	✓
Private discharge	ALL	○	○	○	✓	✓	✓
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	✓	✓	○
Livestock watering		○	○	○	✓	✓	○
Liquid waste disposal		○	○	○	✓	✓	✓
Fish farming		○	○	○	✓	✓	✓
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	_____	○	○	○	✓	✓	○
Process effluent disposal	_____	○	○	○	✓	✓	✓
Cooling water discharge	_____	○	○	○	✓	✓	✓
Mine washings	_____	○	○	○	✓	✓	✓
Mineral extraction	_____	○	○	○	✓	✓	○
Solid wastes (ie landfill)	_____	○	○	○	✓	✓	✓
Power generation	_____	○	○	○	✓	✓	✓
Commercial navigation	_____	○	○	○	✓	○	✓
Site drainage	_____	○	○	○	✓	✓	○
5. Fisheries							
Commercial fishing	_____	○	○	○	○	○	○
Shellfishing	_____	○	○	○	○	○	○
Migratory fishery (inc. eels)	_____	○	○	○	○	○	○
Salmonid fishery	_____	○	○	○	○	○	○
Cyprinid (coarse) fishery	_____	○	○	○	○	○	○
6. Conservation							
River corridor conservation	_____	○	○	○	○	○	○
Nature conservation sites	_____	○	○	○	○	○	○
Landscape feature	_____	○	○	○	○	○	○
Heritage or archaeology value	_____	○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)	_____	○	○	○	○	○	○
Ornamental/landscape use	_____	○	○	○	○	○	○
Game angling	_____	○	○	○	○	○	○
Coarse angling	_____	○	○	○	○	○	○
Wildfowling	_____	○	○	○	○	○	○
Birdwatching	_____	○	○	○	○	○	○
Pleasure boating	_____	○	○	○	○	○	○
Sailing (eg dinghies)	_____	○	○	○	○	○	○
Canoeing/Rowing	_____	○	○	○	○	○	○
Windsurfing	_____	○	○	○	○	○	○
Water-skiing	_____	○	○	○	○	○	○
Swimming and diving	_____	○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)	_____	○	○	○	○	○	○
Transport links (road, rail etc.)	_____	○	○	○	○	○	○
9. Other uses							
.....	_____	○	○	○	○	○	○
.....	_____	○	○	○	○	○	○
.....	_____	○	○	○	○	○	○
.....	_____	○	○	○	○	○	○
.....	_____	○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : NICKY SPEECH

Contact Address : NRA SEVERN TRENT REGION
SAPPHIRE EAST,
550 STREETSBROOK ROAD,
SOLIHULL, WEST MIDLANDS
B91 1QT

Telephone Number : ✓ 3233

1. Please define your area of responsibility :

a) functional PLANNER, CATCHMENT MANAGEMENT

b) region/area RHQ

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
✓ Water company abstraction	R,L,EG,C	⊘	⊘	○	○	⊘	○
✓ Private supply	R,L,EG,C	⊘	⊘	○	○	⊘	○
2. Sewage effluent disposal							
Water company discharge	____	○	○	○	○	○	○
Private discharge	____	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	____	○	○	○	○	○	○
✓ Spray irrigation	R,GC,L	⊘	⊘	○	○	○	○
✓ Livestock watering	R,C,L,G	⊘	⊘	○	○	○	○
Liquid waste disposal	____	○	○	○	○	○	○
✓ Fish farming	R,C,L,G	⊘	⊘	○	○	○	○
✓ Water cress growing	R,L	⊘	⊘	○	○	○	○
✓ Forestry	R,L,G	⊘	⊘	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	R,C,L,E,G	✓	✓	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge	R,C,L,E	✓	✓	○	○	○	○
Mine washings	R,C,G	✓	✓	○	○	○	○
Mineral extraction	R,C,L,E	✓	✓	○	○	○	○
Solid wastes (ie landfill)	G	○	○	○	○	○	○
Power generation	R,L,E	✓	✓	○	○	○	○
Commercial navigation	R,C,L,E	○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

None that I can think of.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Whilst use related standards for water quality are relatively well developed / developing, use related standards for quantity are in the very early stages and in need of developing. I will be interested to see what emerges!

Technical Appendix

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B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : C. MARSH

Contact Address : Sapphire Eco
550, Streetbrook Rd
Solihull
B91 1QT

Telephone Number :

1. Please define your area of responsibility :

a) functional .....Recreation.....

b) region/area .....Severn-Trent.....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction							
Process effluent disposal							
Cooling water discharge							
Mine washings							
Mineral extraction							
Solid wastes (ie landfill)							
Power generation							
Commercial navigation							
Site drainage							
5. Fisheries							
Commercial fishing							
Shellfishing							
Migratory fishery (inc. eels)							
Salmonid fishery							
Cyprinid (coarse) fishery							
6. Conservation							
River corridor conservation							
Nature conservation sites							
Landscape feature							
Heritage or archaeology value							
7. Amenity and recreation							
General amenity (walking)	RCDLE						
Ornamental/landscape use	R						
Game angling	R LE						
Coarse angling	RCDLE						
Wildfowling	LE						
Birdwatching	RCDLE						
Pleasure boating	RC LE						
Sailing (eg dinghies)	R LE						
Canoeing/Rowing	RCDLE						
Windsurfing	LE						
Water-skiing	R LE						
Swimming and diving	R LE						
8. Other land use features							
Urban land use (drainage etc.)							
Transport links (road, rail etc.)							
9. Other uses							
.....							
.....							
.....							
.....							
.....							

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....NONE.....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : ANDREW HEATON Contact Address : NRA SOLIHULL

Telephone Number : 021 - 711 - 5836

1. Please define your area of responsibility :

a) functional ..... CONSERVATION .....

b) region/area ..... SEVERN - TRENT REGION .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	_____	O	O	O	O	O	O
Private supply	_____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	_____	O	O	O	O	O	O
Private discharge	_____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	_____	O	O	O	O	O	O
Spray irrigation	_____	O	O	O	O	O	O
Livestock watering	_____	O	O	O	O	O	O
Liquid waste disposal	_____	O	O	O	O	O	O
Fish farming	_____	O	O	O	O	O	O
Water cress growing	_____	O	O	O	O	O	O
Forestry	_____	O	O	O	O	O	O

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation	RCDLE	○	○	○	✓	✓	✓
Nature conservation sites	RCLED	○	○	○	✓	✓	✓
Landscape feature	RCDLE	○	○	○	✓	○	✓
Heritage or archaeology value	RCDLE	○	○	○	✓	○	✓
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

* SEE OVER PAGE

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

(STANDARD NATIONAL GUIDANCE ONLY FOLLOWED).

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

* IN THEORY, ALL THESE QUALITATIVE REQUIREMENTS ("AN ADEQUATE SUPPLY OF WATER", ETC) COULD BE TRANSLATED INTO QUANTITATIVE MEASURES, BUT IN PRACTICE THIS HAS RARELY BEEN POSSIBLE.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

14 SEP 1992

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : D. Major Contact Address : Richard Fairclough House. Warrington.

Telephone Number :

1. Please define your area of responsibility :

a) functional .....Flood Defence.....

b) region/area .....North West.....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction		O	O	O	O	O	O
Private supply		O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge		O	O	O	O	O	O
Private discharge		O	O	O	O	O	O
3. Agricultural uses							
Land drainage	RD	✓	O	O	O	O	O
Spray irrigation		O	O	O	O	O	O
Livestock watering		O	O	O	O	O	O
Liquid waste disposal		O	O	O	O	O	O
Fish farming		O	O	O	O	O	O
Water cress growing		O	O	O	O	O	O
Forestry		O	O	O	O	O	O

NB Rivers / Stream / Ditches required to be suitable size to prevent flooding or deterioration in land drainage standards. No set standards dependent on what at risk and benefits provided by protection or drainage.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	_____	O	O	O	O	O	O
Process effluent disposal	_____	O	O	O	O	O	O
Cooling water discharge	_____	O	O	O	O	O	O
Mine washings	_____	O	O	O	O	O	O
Mineral extraction	_____	O	O	O	O	O	O
Solid wastes (ie landfill)	_____	O	O	O	O	O	O
Power generation	_____	O	O	O	O	O	O
Commercial navigation	_____	O	O	O	O	O	O
Site drainage	_____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	_____	O	O	O	O	O	O
Shellfishing	_____	O	O	O	O	O	O
Migratory fishery (inc. eels)	_____	O	O	O	O	O	O
Salmonid fishery	_____	O	O	O	O	O	O
Cyprinid (coarse) fishery	_____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	_____	O	O	O	O	O	O
Nature conservation sites	_____	O	O	O	O	O	O
Landscape feature	_____	O	O	O	O	O	O
Heritage or archaeology value	_____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	_____	O	O	O	O	O	O
Ornamental/landscape use	_____	O	O	O	O	O	O
Game angling	_____	O	O	O	O	O	O
Coarse angling	_____	O	O	O	O	O	O
Wildfowling	_____	O	O	O	O	O	O
Birdwatching	_____	O	O	O	O	O	O
Pleasure boating	_____	O	O	O	O	O	O
Sailing (eg dinghies)	_____	O	O	O	O	O	O
Canoeing/Rowing	_____	O	O	O	O	O	O
Windsurfing	_____	O	O	O	O	O	O
Water-skiing	_____	O	O	O	O	O	O
Swimming and diving	_____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	_____	O	O	O	O	O	O
Transport links (road, rail etc.)	_____	O	O	O	O	O	O
9. Other uses							
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Flood Defence are interested in many 'physical' features such as weirs, groynes etc that may be used for a variety of recreational purposes. The retention or removal of these physical structures is critical to both Flood defence and land drainage activities and are the subject to 'Consent' approval by the NRA. As is any other permanent or temporary works that may affect the flow of a river.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : T. C. GASKELL

Contact Address : NRA North West
Richard Fairclough House
Knutsford Road
Warrington WA4 1HG

Telephone Number : 0925 53999

1. Please define your area of responsibility :

a) functional ....EQ....

b) region/area ....Regional....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R C L	✓	✓	○	○	○	○
Private supply	___	○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	R D L E	○	○	○	○	○	○
Private discharge	R D L E	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	R C D L E	○	○	○	○	○	○
Spray irrigation	R	✓	✓	○	○	○	○
Livestock watering	R	○	✓	○	○	○	○
Liquid waste disposal	___	○	○	○	○	○	○
Fish farming	R L	✓	✓	○	○	○	○
Water cress growing	___	○	○	○	○	○	○
Forestry	R D L	○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	R L E	✓	✓	○	○	○	○
Process effluent disposal	R E	○	○	○	○	○	○
Cooling water discharge	R C L E	○	○	○	○	○	○
Mine washings	R	○	○	○	○	○	○
Mineral extraction	R	○	○	○	○	○	○
Solid wastes (ie landfill)	R E	○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation	R E	○	○	○	○	○	○
Site drainage	R C D L E	○	○	○	○	○	○
5. Fisheries							
Commercial fishing	E	○	✓	○	○	○	○
Shellfishing	E	○	✓	○	○	○	○
Migratory fishery (inc. eels)	R L E	✓	✓	○	○	○	○
Salmonid fishery	R L E	✓	✓	○	○	○	○
Cyprinid (coarse) fishery	R C L E	✓	✓	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

This form has been completed from a functional viewpoint. Areas left blank are either non-valid uses or the responsibility of other functions.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : R. CRESSWELL Contact Address :

Telephone Number :

1. Please define your area of responsibility :

a) functional ..... FISHERIES MANAGER .....

b) region/area ..... NORTHUMBRIA REGION .

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R L G ?)	○	○	○	○	○	○
Private supply	R L E G.	○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	____	○	○	○	○	○	○
Private discharge	____	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	____	○	○	○	○	○	○
Spray irrigation	____	○	○	○	○	○	○
Livestock watering	____	○	○	○	○	○	○
Liquid waste disposal	____	○	○	○	○	○	○
Fish farming	R ____	✓	✓	○	○	○	✓
Water cress growing	____	○	○	○	○	○	○
Forestry	____	○	○	○	○	○	○

to complete.

E G complete.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing	R D L E	○	○	○	○	✓	✓
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)	R D L E	○	✓	○	✓	○	✓
Salmonid fishery	R L E	○	✓	○	✓	○	✓
Cyprinid (coarse) fishery	R D L E	○	✓	○	✓	○	✓
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling	R L E	○	✓	○	✓	○	✓
Coarse angling	R D L E	○	✓	○	✓	○	✓
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : GM KERSHAW Contact Address :

Telephone Number :

1. Please define your area of responsibility :

a) functional Groundwater resources / water quality. Licensing of surface & groundwater abstractions

b) region/~~area~~ Northumbria

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R L G	✓	✓	○	○	○	○
Private supply	R L E G	✓	✓	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	G	✓	✓	○	○	○	○
Private discharge	G	✓	✓	○	○	○	○
3. Agricultural uses							
Land drainage	G	✓	✓	○	○	○	○
Spray irrigation	R L G	✓	✓	○	○	○	○
Livestock watering	R L G	✓	✓	○	○	○	○
Liquid waste disposal	G	✓	✓	✓	○	○	○
Fish farming	R L G	✓	✓	○	○	○	○
Water cress growing	R L G	✓	✓	○	○	○	○
Forestry	R L G	✓	✓	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	R L E G	✓	✓	○	○	○	○
Process effluent disposal	G	✓	✓	✓	○	○	○
Cooling water discharge	G	✓	✓	✓	○	○	○
Mine washings	G	✓	✓	✓	○	○	○
Mineral extraction	G	✓	✓	✓	○	○	○
Solid wastes (ie landfill)	G	✓	✓	✓	○	○	○
Power generation	R L E G	✓	✓	○	○	○	○
Commercial navigation		✓	✓	○	○	○	○
Site drainage	G	✓	✓	✓	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

NB - USES FOR WATER ABSTRACTION

Technical Appendix

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B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : MALCOLM HELM Contact Address : NRA NORTHUMBRIA

Telephone Number : 091 213 0266

1. Please define your area of responsibility :

a) functional ..WATER QUALITY OFFICER.....

b) region/area .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction		○	○	○	○	○	○
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	R D L E G	✓	✓	○	○	○	✓
Private discharge	R D L E G	✓	✓	○	○	○	✓
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal	R D L E G	✓	✓	○	○	○	✓
Fish farming	R L	✓	✓	○	○	○	✓
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	R D L E G	⊘	⊘	○	○	○	⊘
Process effluent disposal	R D L E G	⊘	⊘	○	○	○	⊘
Cooling water discharge	R D L E G	⊘	⊘	○	○	○	⊘
Mine washings	R D L E G	⊘	⊘	○	○	○	⊘
Mineral extraction	R D L E G	⊘	⊘	○	○	○	⊘
Solid wastes (ie landfill)	R D L E G	⊘	⊘	○	○	○	⊘
Power generation	R D L E G	⊘	⊘	○	○	○	⊘
Commercial navigation		○	○	○	○	○	○
Site drainage	R D L E G	⊘	⊘	○	○	○	⊘
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : R. B. EDMUNDS Contact Address : NRA SOUTHERN REGION
GUILDBOURNE HOUSE
CHATSWORTH RD.,
WORTHING,
EAST SUSSEX
BN 11 1LD

Telephone Number : 0903 820642

1. Please define your area of responsibility :

a) functional REGIONAL WATER QUALITY PLANNING OFFICER.

b) region/~~area~~ SOUTHERN

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R L G	Ø	Ø	Ø	O	O	Ø
Private supply	R L G	Ø	Ø	Ø	O	O	Ø
2. Sewage effluent disposal							
Water company discharge	R C D L E G	Ø	Ø	O	O	O	Ø
Private discharge	R C D L E G	Ø	Ø	O	O	O	Ø
3. Agricultural uses							
Land drainage	R C D L E G	Ø	O	O	O	Ø	Ø
Spray irrigation	R C D L E G	Ø	Ø	O	O	O	Ø
Livestock watering	R C D L E G	Ø	Ø	O	O	O	Ø
Liquid waste disposal	R C D L E G	Ø	Ø	O	O	O	Ø
Fish farming	R C L G	Ø	Ø	O	O	O	Ø
Water cress growing	~~R~~ G	Ø	Ø	O	O	O	Ø
Forestry		O	O	O	O	O	O

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	R C E G	⊘	⊘	○	○	○	⊘
Process effluent disposal	R C D L E G	⊘	⊘	○	○	○	⊘
Cooling water discharge	R E	⊘	⊘	○	○	○	⊘
Mine washings	R	⊘	⊘	○	○	○	⊘
Mineral extraction	R D E G	⊘	⊘	○	○	⊘	⊘
Solid wastes (ie landfill)	R D E G	⊘	⊘	○	○	○	⊘
Power generation	R E	⊘	⊘	○	○	○	⊘
Commercial navigation	~~R E~~	~~⊘~~	~~○~~	~~⊘~~	~~○~~	~~○~~	~~○~~
Site drainage	R C D L E G	○	○	○	⊘	○	⊘
5. Fisheries							
Commercial fishing	R C L E	○	⊘	○	⊘	○	⊘
Shellfishing	E	○	⊘	○	⊘	○	⊘
Migratory fishery (inc. eels)	R E	○	⊘	○	⊘	○	⊘
Salmonid fishery	R	○	⊘	○	⊘	○	⊘
Cyprinid (coarse) fishery	R	○	⊘	○	⊘	○	⊘
6. Conservation							
River corridor conservation	R C	○	○	○	⊘	⊘	⊘
Nature conservation sites	R C D L E	○	⊘	○	⊘	○	⊘
Landscape feature	R C D L E	○	○	○	⊘	⊘	⊘
Heritage or archaeology value	R C	○	○	○	⊘	⊘	⊘
7. Amenity and recreation							
General amenity (walking)	R C D L E	○	○	○	⊘	⊘	⊘
Ornamental/landscape use	R C D L E	○	○	○	⊘	⊘	⊘
Game angling	R C L E	○	⊘	○	⊘	○	⊘
Coarse angling	R C L E	○	⊘	○	⊘	○	⊘
Wildfowling	R C D L E	○	○	○	⊘	⊘	⊘
Birdwatching	R C D L E	○	○	○	⊘	○	⊘
Pleasure boating	R L E	⊘	○	○	○	○	⊘
Sailing (eg dinghies)	R C E	⊘	○	○	○	○	⊘
Canoeing/Rowing	R C L E	⊘	○	○	○	○	○
Windsurfing	C E	⊘	⊘	○	○	○	○
Water-skiing	E	⊘	⊘	○	○	○	○
Swimming and diving	E	⊘	⊘	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)	R C D L E G	○	○	○	○	○	⊘
Transport links (road, rail etc.)	R C D L E G	○	○	○	○	○	⊘
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

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Technical Appendix

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B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

NRA

National Rivers Authority
South West Region

When telephoning ask for:
Malcolm Newton
Extn: 2325

Date: 3 September 1992

Your Ref:
Our Ref: R&D Project 405

Dear Sir,

Catchment Management Issues - Use Related Standards, National R&D Project 405.

Please find enclosed copies of the Use Related Standards Questionnaire, reflecting the views of NRA South West. The questionnaire was passed among various senior managers representing the different core functions of the NRA. All managers expressed concern on the ambiguities in the questionnaire and the lack of clear guidance on what perspective to answer the questionnaire from.

In view of these problems it was decided, with the approval of Jayne Lillywhite (Project Leader), to make two separate returns reflecting the different perspectives of the "User" and the "NRA" (as a regulatory body).

Please note that:
(i) The water body class "D" was taken to include man made leats as well as drainage ditches, reens, etc.
(ii) Question 5 Fisheries, "commercial fishing" was identified as "commercial sea fishing."
(iii) In the South West, coastal waters are also addressed in catchment management terms and so a "Co" water body class has been used.

If you have any queries regarding the NRA South West's answers to the questionnaire or if there is any more information you require please do not hesitate to contact me.

Yours faithfully

Peter Grigorey
(Technical Assistant Freshwater Planning)
pp Malcolm Newton Freshwater Officer.

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : M.R.N. NEWTON

Contact Address : MANLEY HOUSE
KESTREL WAY
SOWTON
EXETER

Telephone Number :

1. Please define your area of responsibility :

a) functional ....WATER QUALITY....

b) region/area ....SOUTH WEST....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

ANSWERS FROM NRA PERSPECTIVE

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	RLGC	✓	✓	✓	○	○	○
Private supply	RLGC	✓	✓	✓	○	○	○
2. Sewage effluent disposal							
Water company discharge	RCDLEGCo	✓	✓	✓	○	○	○
Private discharge	RCDLEGCo	✓	✓	✓	○	○	○
3. Agricultural uses							
Land drainage	ECo	○	○	○	○	○	✓
Spray irrigation	RCDLEG	✓	✓	✓	○	○	○
Livestock watering	RCDLEG	✓	✓	✓	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming	RECDLG	✓	✓	✓	○	○	○
Water cress growing	RCDLG	✓	✓	✓	○	○	○
Forestry	RCDLG	✓	○	✓	○	○	○

1.B

D ALSO INCLUDES MANMADE ~~LEATS~~

Co COASTAL WATERS

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	RCDLEG	✓	✓	✓	○	○	○
Process effluent disposal	—	○	○	○	○	○	○
Cooling water discharge	—	○	○	○	○	○	○
Mine washings	RCDLG	✓	○	✓	○	○	○
Mineral extraction	RCDLEG	✓	○	✓	○	○	○
Solid wastes (ie landfill)	—	○	○	○	○	○	○
Power generation	RCDLEG	✓	○	✓	○	○	○
Commercial navigation	—	○	○	○	○	○	○
Site drainage	—	○	○	○	○	○	○
5. Fisheries							
SEA Commercial fishing	E, Co	○	✓	✓	✓	○	○
Shellfishing	E, Co	✓	✓	✓	○	○	○
Migratory fishery (inc. eels)	E	○	✓	✓	✓	○	○
Salmonid fishery	RL	✓	✓	○	○	○	✓
Cyprinid (coarse) fishery	RLC	○	✓	○	✓	○	✓
6. Conservation							
River corridor conservation	R	✓	✓	✓	○	○	○
Nature conservation sites	EGRLCD	✓	✓	✓	○	○	○
Landscape feature	EGoRLCD	○	○	✓	○	○	○
Heritage or archaeology value	EGoRLCD	○	○	✓	○	○	○
7. Amenity and recreation							
General amenity (walking)	EGoRLC	○	○	✓	○	○	○
Ornamental/landscape use	EGoRLC	○	○	○	○	○	✓
Game angling	RL	✓	✓	○	○	○	✓
Coarse angling	RLC	○	✓	○	✓	○	✓
Wildfowling	E	✓	✓	○	○	○	✓
Birdwatching	EGoRL	✓	✓	○	○	○	✓
Pleasure boating	EGoRL	○	✓	○	✓	○	✓
Sailing (eg dinghies)	EGoRL	○	✓	○	✓	○	✓
Canoeing/Rowing	EGoRL	○	✓	○	✓	○	✓
Windsurfing	EGoRL	○	✓	○	✓	○	✓
Water-skiing	EGoRL	○	✓	○	✓	○	✓
Swimming and diving	EGoRL	○	✓	○	✓	○	✓
8. Other land use features							
Urban land use (drainage etc.)	EGo	✓	✓	✓	○	○	○
Transport links (road, rail etc.)	EGo	✓	✓	✓	○	○	○
9. Other uses							
SEAWEED HARVESTING	Co	○	✓	○	○	○	○
SEA ANGLING	Co, E	○	✓	○	○	○	✓
WATER BOTTLING	G	✓	✓	✓	○	○	○
WET FENCING	RD	✓	○	✓	○	○	○
HORTICULTURAL WATERING	RCDLEG	✓	✓	✓	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : M.R.N. NEWTON Contact Address : MANKEY HOUSE
KESTREL WAY
SOWTON
EXETER

Telephone Number :

1. Please define your area of responsibility :

a) functional ..... WATER QUALITY .....

b) region/area ..... SOUTH WEST .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

ANSWERS FROM USER PERSPECTIVE

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	RLGC	✓	✓	✓	○	○	○
Private supply	RLGC	✓	✓	✓	○	○	○
2. Sewage effluent disposal							
Water company discharge	RCDLEGCo	✓	○	✓	○	○	○
Private discharge	RCDLEGCo	✓	○	✓	○	○	○
3. Agricultural uses							
Land drainage	ECo	○	○	○	○	○	✓
Spray irrigation	RCDLEG	✓	✓	✓	○	○	○
Livestock watering	RCDLEG	✓	✓	✓	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming	RECDLG	✓	✓	✓	○	○	○
Water cress growing	RCDLG	✓	✓	✓	○	○	○
Forestry	RCDLG	✓	○	✓	○	○	○

NB "D" ALSO INCLUDES MANMADE LEATS

Co = COASTAL WATERS

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	RCDLEG	✓	✓	✓	○	○	○
Process effluent disposal	—	○	○	○	○	○	○
Cooling water discharge	—	○	○	○	○	○	○
Mine washings	RCDLG	✓	○	✓	○	○	○
Mineral extraction	RCDLEG	✓	○	✓	○	○	○
Solid wastes (ie landfill)	—	○	○	○	○	○	○
Power generation	RCDLEG	✓	○	✓	○	○	○
Commercial navigation	—	○	○	○	○	○	○
Site drainage	—	○	○	○	○	○	○
5. Fisheries							
SEA Commercial fishing	ECo	○	✓	✓	✓	○	○
Shellfishing	ECo	✓	✓	✓	○	○	○
Migratory fishery (inc. eels)	ERCo	○	✓	✓	✓	○	○
Salmonid fishery	RL	○	✓	○	✓	○	✓
Cyprinid (coarse) fishery	RLC	○	✓	○	○	○	✓
6. Conservation							
River corridor conservation	R	○	✓	○	✓	○	✓
Nature conservation sites	ECoRLCD	○	✓	○	✓	○	✓
Landscape feature	ECoRLCD	○	○	○	○	○	✓
Heritage or archaeology value	ECoRLCD	○	○	○	○	○	✓
7. Amenity and recreation							
General amenity (walking)	ECoRLC	○	○	○	○	✓	✓
Ornamental/landscape use	ECoRLC	○	○	○	○	○	✓
Game angling	RL	○	✓	○	✓	○	✓
Coarse angling	RLC	○	✓	○	○	○	✓
Wildfowling	E	○	✓	○	✓	○	✓
Birdwatching	ECoRL	○	✓	○	✓	○	✓
Pleasure boating	ECoRL	○	○	○	✓	✓	✓
Sailing (eg dinghies)	ECoRL	○	✓	○	✓	✓	✓
Canoeing/Rowing	ECoRL	○	✓	○	✓	✓	✓
Windsurfing	ECoRL	○	✓	○	✓	✓	✓
Water-skiing	ECoRL	○	✓	○	✓	✓	✓
Swimming and diving	ECoRL	○	✓	○	✓	✓	✓
8. Other land use features							
Urban land use (drainage etc.)	ECo	✓	○	✓	○	○	○
Transport links (road, rail etc.)	ECo	○	○	✓	○	○	○
9. Other uses							
SEAWEED HARVESTING	Co	○	○	○	○	✓	○
SEA ANGLING	CoE	○	✓	○	✓	○	✓
WATER BOTTLING	C	✓	✓	✓	○	○	○
WET FENCING	RD	✓	○	✓	○	○	○
HORTICULTURAL WATERING (NOT SPRAY)	RCDLEG	✓	✓	✓	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

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c) .....

d) .....

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f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

NRA

National Rivers Authority
Yorkshire Region

Dr Stephen Birch
Enviornmental Advisory Unit Ltd
Yorkshire House
Chapel Street
Liverpool
L9 AG

Your Ref:
Our Ref :

20 October 1992

Dear Sir

CATCHMENT MANAGEMENT ISSUES: USE RELATED STANDARDS

With reference to the NRA Southern letter of 10th August 1992, I herewith return your questionnaire regarding the Catchment Management Issues Use Related Standards. I must first apologise for the delay and secondly state that we had great difficulty in understanding exactly what information you were requesting. Even after clarification with the project leader we are not totally convinced that the answers provided are those requested. Therefore if you wish to discuss the matter please do not hesitate to contact us and we will endeavour to clear up any misunderstandings.

Yours faithfully

J Ratcliffe

John Ratcliffe

For telephone enquiries contact Mr John Ratcliffe Ext 2051
LB272

Roger Hyde, Regional General Manager
Olympia House, Gelderd Road, Leeds, LS12 6DD Tel: Leeds (0532) 440191 Fax: Leeds (0532) 312116

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : JOHN RATCLIFFE

Contact Address : Yorkshire Region
Olympia House, Gelderd Rd
Leeds LS12 6DD

Telephone Number :

1. Please define your area of responsibility :

a) functional .....WATER RESOURCES.....

b) region/area .....Yorkshire.....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	RLG	✓	✓	○	○	○	○
Private supply	RG	✓	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	RDLE	✓	✓	○	○	○	○
Private discharge	RDLEC	✓	✓	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation	RCDLG	✓	○	○	○	○	○
Livestock watering	RCDLG	✓	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming	R	○	○	○	○	○	○
Water cress growing	RC(Springs)	✓	○	○	○	○	○
Forestry		○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	RCDLEG	✓	✓	○	○	○	○
Process effluent disposal	RCDE	✓	✓	○	○	○	○
Cooling water discharge	RCE	✓	○	○	○	○	○
Mine washings	RCE	✓	○	○	○	○	○
Mineral extraction	G	✓	○	○	○	○	○
Solid wastes (ie landfill)	R	✓	○	○	○	○	○
Power generation	RG	✓	○	○	○	○	○
Commercial navigation	RCL	✓	○	○	○	○	○
Site drainage	RDE	○	✓	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
COMPENSATION	L.G	✓	○	○	○	○	○
AUGMENTATION	L.G	✓	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) Management of Groundwater Abstraction - Howard Humphreys and Partners

b) Management of River Abstraction : North Yorkshire - " " "

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

NRA

National Rivers Authority
Yorkshire Region

Dr Stephen Birch
Environmental Advisory Unit Ltd.
Yorkshire House
Chapel Street
Liverpool
L3 9AG

3rd September 1992

Dear Stephen

I am sorry for the delay in returning this questionnaire but because of holidays I've been holding on to try to talk to as many relevant people as possible.

Generally the water quality section only uses statutory and nationally agreed standards, other standards used are enclosed and listed below;

1. Yorkshire Water Standards for Trace Substances (Water Quality Report) - These may be used to help set consents.

2. Yorkshire Water Biological Classifications - used in addition to Rivpacs and the NRA National Classification. (I was unsure whether this was relevant)

3. West Yorkshire Waste Management / NRA Agreement on Tip Lining.

4. WRc technical reports (not enclosed)

I hope this is the sort of information you required as we found the questionnaire rather vague. If you need any further information please let me know.

Amanda Rogers
Ext. 2370

Roger Hyde, Regional General Manager
Rivers House, 21 Park Square South, Leeds, LS1 2QG Tel: Leeds (0532) 440191 Fax: Leeds (0532) 461889.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire to Regional NRA Representatives

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : AMANDA ROGERS Contact Address : NRA - YORKSHIRE REGION
21 PARK SQUARE SOUTH
LEEDS

Telephone Number : 0532 440191

1. Please define your area of responsibility :

a) functional QUALITY PLANNING (QUESTIONNAIRE COMPLETED BY POLLUTION CONTROL STAFF)

b) region/area YORKSHIRE

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

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Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	L R	✓	✓	○	○	○	✓
Private supply	G	○	○	○	○	○	✓
2. Sewage effluent disposal							
Water company discharge	R D	✓	✓	○	○	✓	○
Private discharge	R D	✓	✓	○	○	✓	○
3. Agricultural uses							
Land drainage	R D	○	○	○	○	○	✓
Spray irrigation		○	○	○	○	○	○
Livestock watering	R	○	○	○	✓	✓	✓
Liquid waste disposal	G.R.L	○	○	○	✓	✓	✓
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	RC	✓	✓	○	✓	✓	○
Process effluent disposal	R	✓	✓	○	○	○	○
Cooling water discharge	RC	✓	✓	○	○	○	○
Mine washings	R	✓	✓	○	○	○	○
Mineral extraction	R	✓	✓	○	○	○	○
Solid wastes (ie landfill)	G	○	○	○	✓	○	✓
Power generation	RC	✓	✓	○	○	○	○
Commercial navigation	CR	○	○	○	○	○	○
Site drainage	RCDL	○	✓	○	✓	✓	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery	RL	○	✓	○	✓	○	○
Cyprinid (coarse) fishery	RLC	○	✓	○	✓	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
** STORM SEWAGE DISPOSAL	R	✓	✓	✓	○	○	✓
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

** UNLESS STORM SEWAGE IS CONSIDERED TO BE COVERED BY SEWAGE EFFLUENT

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) NEST YORKSHIRE WASTE MANAGEMENT/NRA AGREEMENT ON TIP LINING

b) YORKSHIRE WATER BIOLOGICAL CLASSIFICATION.

c) VARIOUS TECHNICAL REPORTS FROM WRC

d) WATER QUALITY MODELS ARE USED TO DETERMINE DISCHARGE STANDARDS WHERE FEASIBLE

e) .....

f) YORKSHIRE WATER - WATER QUALITY REPORT - STANDARDS FOR TRACE SUBSTANCES

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

STANDARD FOR THE LINING OF LANDFILL SITES

NRA Yorkshire Region : West Yorkshire Waste Management

Obligations of the Developer

In order to protect water resources and prevent pollution of the aquatic environment, the development of a waste disposal site must take into account the potential threat of any polluting leachates formed by the development. The broad principles below will apply.

1. Where it can be proven beyond reasonable doubt that the development of the site and any leachates formed will not have any deleterious effect on either water resources or the aquatic environment, then a principle of non containment of leachate will be allowed.

2. Where there is any doubt regarding the effects of any leachate from any disposal site, then a principle of leachate containment and removal will be necessary.

3. Where the development cannot be designed and implemented to ensure that there will be no detriment to either water resources or the aquatic environment, then the development of the site will be opposed.

The burden of proof with regard to (1) for future sites is considered to be the responsibility of the Developer.

Sites Where Liners Are Considered Necessary

Various 'waste types' can be easily identified.

UNCONTAMINATED SOILS AND SUBSOILS - Except under very extreme circumstances, sites taking exclusively these waste types would be considered not to require any form of containment.

HOUSEHOLD, COMMERCIAL AND INDUSTRIAL WASTES - Except where the specific waste streams can be identified, segregated and proven by laboratory testing that no detrimental leachates are formed, sites taking these waste categories will require a practice of leachate containment and removal.

SPECIAL WASTES - Leachate containment will be required at sites taking these wastes.

DEMOLITION AND CONSTRUCTION - The potential to produce a detrimental leachate from these sites is recognised, however since the leachates generally do not have the same polluting load as other wastes, the method of development and measures taken for leachate control will remain at the discretion of the Authorities.

Cont'd .....

Leachate Containment Measures

Where it has been identified that containment measures are necessary, generally the following engineering requirements will be sought:

1. A leachate barrier of either natural or synthetic materials on the base and sides of the void.

2. A leachate level monitoring system within the waste void, together with provisions for active leachate collection, extraction and disposal.

3. A method of monitoring the performance of the liner to give early warning of any leakage, together with arrangements for dealing with any leakage through the containment layer. Any under-drainage of the liner for leak detection etc. on the base and sides of the void should specify the permeability of the drainage media and the underlying material on the base and sides of the site, together with the gradient of the drainage layer, which should not be shallower than 1 in 50.

A statement on the leachate containment measures will be sought from the Developer, however the following MINIMUM requirements must be addressed.

Natural Leachate Barriers for Example Re-worked Clays, Silts and Shales

A layer of the material at least 1 metre thick must be constructed to meet a permeability of not greater than 1×10^{-9} metres/sec as determined by standard laboratory tests. The statement should identify the material to be used, the design and operational methods of emplacement, and the quality assurance and testing to be employed before, during and after emplacement, to ensure the liner thickness and quality.

·nthetic and Composite Leachate Barriers for Example Employing HDPE

The liner Manufacturer and Contractor undertaking emplacement should be identified. Methods of emplacement, quality assurance, testing and liner protection will be required. The design should include a secondary liner/collection system. Synthetic liners must have a permeability as laid, equivalent to 1 metre of clay of permeability no greater than 1 x 10-9 metres/sec. It is unlikely that a single layer of a synthetic liner alone, will meet this specification.

Leachate Management

The engineering specification of the leachate collection and method of extraction system must be addressed. The proposed disposal route for leachate should be identified. The maximum level of leachate within the site should be kept to a minimum and must not be greater than 1 metre at any point. Any deviation from this principle must be compensated for by an appropriate decrease in the permeability of the liner.

Cont'd .....

Capping

Proposals for placing a low permeability capping layer on top of the final layer of waste deposited. This should be a minimum of 1 metre depth and consist of material of similar characteristics to the liner, laid by using a similar method.

System Performance

A method of determining the performance of the liner will be sought in terms of early detection of leakage to the immediate environs. Together with this must be provisions for dealing with the leakage. The installation of any leachate barrier should be supervised at each stage and certified by an independent chartered engineer who should be nominated prior to the start of site works.

Ground Water Monitoring

In addition to leakage detection in the immediate environs of the site, boreholes should be placed down the ground water gradient from the site. Ground water quality data from sampling these boreholes should be obtained for a period of approximately 12 months before landfilling of waste commences, as well as during and after the filling of the site. The results obtained should be submitted to the NRA and West Yorkshire Waste Management.

DISCLAIMER - The above statements refer to the minimum requirements which any Developer must achieve regarding a landfill proposal in the administrative area of West Yorkshire Waste Management. It is the responsibility of the Developer to make firm proposals which should INCLUDE the above, addressing other points as necessary. Certainly further exact details will be required with regard to the individual site. It should also be noted that, even though the Developer may fulfil the above, and any other requirements deemed necessary, this does not exclude the Developer from prosecution should subsequent pollution of the aquatic environment occur. IT IS THE RESPONSIBILITY OF THE DEVELOPER TO PREVENT POLLUTION.

NB. The guidance given in this document may be updated from time to time to reflect developing standards of landfill site design. This version was issued in January 1991.

73OS

Y.W.
BIOLOGICAL SCIENCES

BIOLOGICAL INDEX (INTERPRETED)
(Revision date 240686)

INTRODUCTION

Pollution events, whether continuous or intermittent, affect the life inhabiting the beds of rivers. The effects remain noticeable in biological samples for relatively long periods of time after the event, varying from a few days up to a year or more depending on circumstances.

Chemical analyses of rivers cannot hope to monitor all the substances which may be present in sufficient quantity to impair the use of that water for drinking, recreation, fish life, industry etc., but many of these substances will have detectable effects on the aquatic life.

The biological results are summarised in a simple index which parallels the existing chemical index and is based on samples of aquatic invertebrate animals.

Although guidelines for both indices are given here they are independant and must be assessed independantly. Both indices have an element of subjective interpretation.

BIOLOGICAL INDEX		CHEMICAL INDEX
B1A	Means the aquatic life indicates no pollution	1A
B1B	" " " " " slight pollution	1B
B2	" " " " " mild pollution	2
B3	" " " " " moderate pollution	3
B4	" " " " " gross pollution	4

This index forms a simple statement for those wishing only to be informed and is not a substitute for the more detailed technical interpretations required by others.

In order to be of maximum value the index must:-

1) Permit easy communication of the quality of the water in the river, pond, etc., as indicated by the animal life found.

2) Be free from influence of factors other than water quality, e.g. dredging, flow regulation etc. (separate indices can be derived for "environmental" damage if required).

3) Be at least 90% reliable, i.e. properly indicate the truth of the water quality in 9 cases out of ten. This includes the statement " Nc Classified" (N/C) to be used if you cannot be sure that the sample is representative, or if you have other doubts eg on which reference fauna t use.

NB 100% reliability must be our target within two years given the FBA system and a satisfactory method of data storage.

DERIVATION

Every piece of water has its own characteristic fauna which, in the case of rivers, changes with distance downstream. Pollutants vary greatly in their effects on animal life, depending on local circumstances e.g. pH, temperature, life

stage of the animals and presence of other substances. Indices derived from a small number of localised observations will therefore not be reliable when applied elsewhere.

The only practical way of accurately determining biological quality is by assessing the degree to which the animal community found differs from that expected in the absence of pollution. This approach demands a high degree of skill and experience, backed up by a suitable data base system capable of providing comparisons.

METHODS

1) How to assess the "natural fauna"

In the ideal case this can be done by taking samples upstream of the polluted region, ensuring that the habitats are otherwise similar. When this is not possible reference may be made to sites with the same characteristics on other, unpolluted, river systems. The results used for comparison should have been obtained by similar methods, to avoid any possible bias, and the past results from each laboratory would form the primary source of such information. Reference to other information should only be made when it can be shown that the methods are comparable.

A database system like the Biological Archive will make this task more straightforward, and it is intended that such a system would include reference data from studies such as the FBA River Communities Project.

There is a serious shortage of data on unpolluted ponds and tidal waters making interpretation of results from such localities paricularly difficult.

There are some useful summaries in the literature and in previous YWA reports, e.g. the collation of YWA records (1976), R. Wharfe (1972-82), West Beck/R. Hull (1974-82), FBA acid streams (51 FBA Annual Report), etc.

2) Classification

The index value will relate the fauna found to that which would be expected in the absence of pollution.

The degree of pollution will be designated according to the chemical quality that would be EXPECTED from the faunal results.

The observed chemical quality is not consulted except to compare with the Biological quality.

pollution will be detected as any unnatural occurrence which changes the natural community e.g. discharges of pesticides, sediments, heat, ammonia, organic matter. The effects of physical stresses (e.g. dredging), natural acidity, and other factors not attributable to pollution should be discounted if possible but may be estimated separately if required.

A cluster analysis programme is available for use on the ICL computer to help in proposing relationships between samples. The techniques (e.g. indicator sp. analysis) arising out of the FBA River Communities Project will help to propose the type of river and its natural fauna.

The interpretations may be qualified by the addition of one or two words to express particular aspects of the rivers' quality e.g. B1A (acid stream), B3 (organic), B4 (storm sewage), etc. If the results are ambiguous it is recommended that no classification is given (N/C) and a resample taken.

Sometimes it is possible to subdivide a class, expressing it as B3(good), and B3(poor) for example.

Two RAPID METHODS may be used; the more reliable one involving 10 minutes bankside sorting of 10 standard kicks or equivalent to be classified B1A(F), B2(F) etc., and the less reliable one involving cursory inspection of net contents stones etc to be classified "OK", "POLL", "N/C".

3) Reliability

The interpretations may be used to reduce expenditure by YWA as well as to guide staff in planning sewage treatment strategies, court cases etc. It is imperative that spurious interpretations are not allowed to pass to this level and lead to waste of money.

It has been shown by the FBA that the level to which animals are identified has a strong influence on the resolution of differences between samples of invertebrates. It follows that the reliability of interpretations will also be influenced. As identification level increases so the number of points of comparison is also increased, leading to more accurate interpretation. There is obviously scope for the tailoring the level of identification to the needs of the particular investigation in the interst of economy, but the need for full identification to expand the data base may be of overriding importance. (eg the FBA system demands rather more detailed family level identification than is currently the practice.)

The RAPID METHODS will obviously be less reliable than detailed field surveys but are attractive due to the saving of 50% or more staff time and the immediate availability of results. They will be most reliable when previous results of polluted and unpolluted sites on the particular watercourses are consulted for interpretation in the field. The faunal reference lists will need to be modified to line up with the level of identification that can be achieved in the field. The rapid methods will be least reliable, and NOT recommended except in emergency, on watercourses for which no background data are available. The FBA techniques will be of critical importance in the latter case.

4) Fisheries examples

The examples of fisheries relate mainly to organic pollution in rivers. They are the best that generally would be expected in each class. Trout may be present naturally or due to stocking; they may be absent for ecological reasons and be replaced by a good variety of coarse fish. Stocking of fish [illegible]

CLASSES

B1A (unpolluted)

There is a very diverse range of faunal types, from plecoptera dominated upland waters through mixed populations of Ephemeroptera-Plecoptera-Trichoptera in many rivers, to mollusc dominated lowland rivers and Asellus dominated ponds.

Generally there will be a variety of families, usually with several taxa in each. There is rarely a dominance of known pollution tolerant taxa. The fish population may be salmonids or a mixed fishery, where the development of fish is possible.

Eutrophic lowland rivers cause problems since algal and plant growths may increase the organic content of the water. This affects the water chemistry but might reasonably be called a natural occurence.

Examples:	R. Wharfe Burnsall	clean	upland
	R. Nidd Pately Bridge	"	"
	Collingham Beck at Collingham S Div	"	beck
	R Ouse York	"	lowland
	Gunthwaite Dam W Div.	"	pond
	Leeds + Liverpool canal Shipley	"	canal

Chemical standards for 1A (95%iles): DO >80%
BOD <3mgl-1
NH4-N <0.4mgl-1

B1B (slightly polluted)

The fauna indicates minor differences from the unpolluted state. For example a barely significant reduction in number or abundance of existing pollution sensitive taxa may be found. The first signs of organic pollution may be increased numbers of Oligochaets and/or Chironomidae.
The fish population is usually a mixed fishery, where the development of fish is possible.

Examples:	Cod Beck below Thirsk sewage works	upland
	R. Ouse Nether Poppleton	lowland
	Cragg Brook W Div.	upland beck
	R Wharfe Tadcaster since 1984 S Div	middle reach

Chemical standards for 1B (95%iles): DO >60%
BOD <5mgl-1
NH4-N <0.9mgl-1

B2 (mildly polluted)

Clearly detectable pollution induced deviations from the normal state will be apparent, for example: increase in number and abundance of pollution tolerant taxa and/or loss of or decrease in abundance of pollution sensitive taxa. However, several pollution sensitive taxa will generally remain.
This class includes the lowest qualities in which reasonable coarse fisheries are supported, where the development of fish is possible

Examples:	R. Worth Mytholmes	upland
	West Beck Wansford Bridge	chalk
	R Went Wentbridge	middle
	S Div	

Chemical standards for 2 (95%iles): DO >40% sat. and never below 3mgl-1
BOD<5-7mgl-1 depending on channel characteristics
Unionised ammonia <.04mgl-1
Median SS <25mgl-1, and other standards as in the YWA Water Quality sub-group December 1982 report.

B3 (moderately polluted)

The biological communities are generally restricted to pollution tolerant taxa. The presence of certain sensitive taxa like Gammarus and Ephemerella needs careful interpretation in the light of the rest of the community, suspected nature of pollutants etc. This is especially true of riffles, where conditions might be exceptional due to rapid transfer of oxygen, prevention of sediment deposition and other factors.

Single specimens of several sensitive taxa may occur at times due to downstream drift, attempted recolonisation, and sidestream immigration. If the fauna indicates B4 but includes 10 or more Baetis rhodani then it should be classified B3. These generally aerobic waters may support a few fish other than sticklebacks but cannot normally be classed as fisheries.

Examples:	R. Aire Keighley to Esholt	middle
	R Wiske Howdon Bridge	middle
	R Aire Milford Place	middle
	S Div	

Chemical standards for 3 (95%iles): DO >10% and not anaerobic
BOD probably <17mgl-1.

B4 (grossly polluted)

The invertebrate life is restricted to a small proportion of the pollution tolerant taxa that might colonise the site. Normally no more four taxa will be found , of which one or two probably occur in very large numbers (eg Oligochaeta and Chironomidae).
Some very tolerant fish like sticklebacks may occur.

Examples:	R. Doe Lea Bolsover to R. Rother	middle
	Bradford Beck Shipley 608A	middle beck
	R Calder below Huddersfield	lowland
	Willow Beck 50m above Wiske	upland

Chemical standards for 4 : worse than class 3

Dr. P.D. Hiley
For Yorkshire Water.

file BIOIND

Table 1 Standards for trace substances
(All concentrations in µg l⁻¹. For key to symbols, see explanatory notes)

		FRESHWATER								FRESHWATER					SALTWATER			
				Surface water intended for abstraction for drinking water supply						Protection of salmonid freshwater fish	Protection of coarse freshwater fish	Protection of other freshwater life	Irrigation of crops	Watering of livestock	Protection of bathers		Protection of fish	Protection of other life
										For details of variation with hardness see Table 3								
		Drinking Water (8)		A1 treatment		A2 treatment		A3 treatment										
		G	MAC	G	I	G	I	G	I						G	I		
		90P		90P	95P	90P	95P	90P	95P						90P	95P		
		T	T	T	T	T	T	T	T	AA D	AA D	AA D	AA T	AA T	T	T	AA D	AA D
Metals and metaloids																		
Aluminium	as Al	50	200															
Antimony (1)	as Sb		10															
Arsenic (1)	as As		50	10	50		50	50	100	50	50	130 150	400	200			25	25
Barium	as Ba	100			100		1000		1000									
Cadmium (1)	as Cd		5	1	5	1	5	1	5	5(21)	5(21)	5(21)	5	5	2.5(29) 5(30)	2.5(29) 5(30)	2.5(29) 5(30)	2.5(29) 5(30)
Chromium (1, 2)	as Cr		50		50		50		50	5 50	150 250	5 50	2000	1000			15	15
		(100)(9)								1 28(22)	1 28(22)							
Copper	as Cu	(3000)(10)		20	50(20)	50		1000		5 112(23)	5 112(23)	1 28(23)	500	200			5(28)	5(28)
Iron (3)	as Fe	50	200	100	300	1000	2000	1000										
Lead (1)	as Pb		50(12)		50		50		50	4 20	50 250	5 60	2000	100			25	25
Manganese	as Mn	20	50	50		100		1000										
Mercury (3)	as Hg		1	0 5	1	0 5	1	0 5	1	1(24)	1(24)	1(24)	1(24)	1(24)	0 3(31) 0 5(32)	0 3(31) 0 5(32)	0 3(31) 0 5(32)	0 3(31) 0 5(32)
Nickel (1)	as Ni		50							50 200	50 200	8 100	150	1000			30	30
Silver	as Ag		10(13)															
		(100)(9)								10 125(25)	75 500(25)							
Zinc	as Zn	(5000)(10)		500	3000	1000	5000	1000	5000	30 500(26)	300 2000(26)	100	1000	2500			40	40
Inorganic anions																		
Boron	as B	1000		1000		1000		1000										
Cyanide (1)	as CN		50		50		50		50									
		(1500)(14)		1000(14)		700(14)		700(14)										
Fluoride	as F	(1500)	700(15)	700(15)	1500	700(15)		700(15)										
Hydrogen sulphide	as S		(16)															
Selenium (1)	as Se		10		10		10		10									
Organic substances																		
Dissolved or emulsified hydrocarbons			10		50		200	500	1000	(27)	(27)				300	(33)		(36)
Hexachlorocyclohexane										0.1(21)	0.1(21)	0 1(21)	0 1	0 1			0 1(21)	0 1(21)
Organochlorine (excluding pesticides)		(1000)(3)																(37)
Pesticides (1, 4, 5)		(1)	0 1(17)															
		(1)	0 5(18)		1		25		5									
Phenols	as C_6H_5OH		0 5(19)		(1)	1	5	10	100	(27)	(27)				5	50(34)		
Polycyclic aromatic hydrocarbons (1, 6)			0 2		0 2		0 2		1									
Substances extractable in chloroform		100		100		200		500										
Surfactants (7) as lauryl sulphate			200	200		200		500							300	(36)		
Carbontetrachloride										12(21)	12(21)	12(21)	12	12			12(21)	12(21)
p,p' DDT										0.01(21)	0.01(21)	0 01(21)	0.01	0.01			0 01(21)	0 01(21)
Total DDT										0 025(21)	0.025(21)	0.025(21)	0 025	0 025			0 025(21)	0 025(21)
Pentachlorophenol										2(21)	2(21)	2(21)	2	2			2(21)	2(21)

Explanatory notes to Table 1

Key to symbols

G · guide value, to be observed if possible
MAC · maximum admissable concentration
I · mandatory value
90P · standard defined as a 90 percentile, i.e. 90% of measured values should conform to the standard quoted
95P · standard defined as a 95 percentile, i.e. 95% of measured values should conform to the standard quoted
AA · standard defined as an annual average, i.e. the mean of the measured values over a 12-month period should conform to the standard quoted
T measured as total, i.e. dissolved plus particulate
D measured as dissolved, i.e. usually involving filtration of the sample through a 0.45 μm membrane filter before analysis

Footnotes

1. Under the Water for Human Consumption Directive (Section 3) this parameter is classified as toxic and the standards given in the first two columns (plus those for microbiological parameters, see Table 2, and any other parameters chosen by national authorities) apply to water used in food processing.
2. Defined as total chromium (i.e. Cr III and Cr VI). (In the Water for Human Consumption Directive no definition is given, but total chromium is assumed)
3. Defined as dissolved iron in the directive concerning abstraction for drinking water.
4. Defined under the Water for Human Consumption Directive as insecticides, (i.e. persistent organochlorine compounds, organophosphorus compounds and carbamates) herbicides, fungicides, PCBs and PCTs.
5. Defined under the directive concerning abstraction for drinking water as 'total pesticides (parathion, BHC, dieldrin)'.
6. Reference substances given as: (a) fluoranthene; (b) 3,4-benzofluoranthene; (c) 11,12-benzofluoranthene; (d) 3,4 benzopyrene; (e) 1,10 benzoperylene and (f) indeno (1,2,3-cd) pyrene (see Reference 12). In the Water for Human Consumption Directive (a) and (d) are omitted, (b) is given twice, (c) is as in the foregoing list, (e) is replaced by 1,12 benzopyrene and (f) is replaced by perylene/indeno (1,2,3-cd) pyrene.
7. Substances reacting with methylene blue.
8. The Water for Human Consumption Directive also applies to water used in food processing.
9. In water leaving the water processing plant.
10. In water at the consumer's tap which has been standing for 12 hours in piping.
11. Haloform concentrations must be as low as possible.
12. In running water. Where lead pipes are present, the lead content should not exceed 50 μg/l in a sample taken after flushing. If the sample is taken either directly or after flushing and the lead content either frequently or to an appreciable extent exceeds 100 μg/l, suitable measures must be taken to reduce the exposure to lead on the part of the consumer. (This is a direct quotation from the directive).
13. A MAC value of 80 μg/l is allowed where silver is used non-systematically to process the water.
14. At 8 to 12°C } The Water for Human Consumption Directive gives these temperatures numerically; the
15. At 25 to 30°C } abstraction directive states 'low' or 'high' temperatures.

16. Undetectable organoleptically.
17. Individually.
18. In total.
19. Excluding natural phenols which do not react with chlorine.
20. May be waived under exceptional climatic or geographical conditions.
21. Total concentration, i.e. dissolved plus particulate.
22. Applies in waters not specifically designated under the appropriate directive, (i.e. the directive concerning the quality of water required to support fish life). A higher value may be acceptable where acclimation is expected or copper is present in organic complexes.
23. Applies only in waters specifically designated under the appropriate directive, (i.e. the directive concerning the quality of water required to support fish life). This is a guide value, defined as a 95 percentile.
24. Applies to all waters affected by discharges likely to contain mercury and refers to the total concentration (dissolved plus particulate) defined as an annual average.
25. Applies in waters not specifically designated under the appropriate directive (i.e. the directive concerning the quality of water required to support fish life).
26. Applies only in waters specifically designated under the appropriate directive (i.e. the directive concerning the quality of water required to support fish life). This is a mandatory value, referring to the total zinc concentration (dissolved plus particulate) and defined as a 95 percentile.
27. Must not adversely affect fish flavour. This is a mandatory standard applying only in waters specifically designated under thee directive on the quality of water required to support fish life. Hydrocarbons must not form a film on the water surface or bed and must not produce harmful effects in fish.
28. A higher value may be acceptable where acclimation is expected or copper is present in organic complexes.
29. Applies in 'territorial waters and internal coastal waters other than estuary waters'. Refers to dissolved concentrations and defined as an annual average.
30. Applies in estuary water. Refers to dissolved concentration and defined as an annual average.
31. Applies in those 'territorial waters and internal coastal waters other than estuary water' which are affected by discharges from the chlor-alkali electrolysis industry. Refers to dissolved concentration and defined as an annual average.
32. Applies to estuary waters affected by a discharge from the chlor-alkali electrolysis industry. Refers to dissolved concentration and defined as an annual average.
33. No film visible on the surface of the water and no odour.
34. No specific odour.
35. No lasting foam.
36. In waters specifically designated under the directive as being for the support of shellfish, hydrocarbons must not produce a visible film on the surface or have a harmful effect on the shellfish (mandatory standard).
37. In waters specifically designated under the directive as being for the support of shellfish, the concentration of each substance in shellfish flesh must be so limited that it contributes to the high standard of shellfish products (guide standard) and the concentration of each substance in the water or flesh must not reach or exceed a level which has a harmful effect on the shellfish or larvae (mandatory standard).

Table 2 Standards for trace substances
(All concentrations in ug/l. For key to symbols, see explanatory notes)

				FRESHWATER						FRESHWATER					SALTWATER			
				Surface Water intended for abstraction for drinking water supply														
		Drinking water		A1 treatment		A2 treatment		A3 Treatment		Protection of salmonid freshwater fish	Protection of coarse freshwater fish	Protection of other freshwater life	Irrigation of crops	Watering of livestock	Protection of bathers		Protection of fish	Protection of other life
		G	MAC	G	I	G	I	G	I						G	I		
		90P		90P	95P	90P	95P	90P	95P	AA	AA	AA	AA	AA	90P	95P	AA	95P
		T	T	T	T	T	T	T	T	D	D	D	T	T	T	T	D	T
Metals etc																		
Calcium	as Ca	100	200															
Magnesium	as Mg	30	50															
Total hardness	as $CaCO_3$	(3)																
Potassium	as K	10	12															
Sodium	as Na	20	175 (7)															
	as Cr		150 (8)															
Dry residues			1500															
Anions etc																		
Chloride	as Cl	25	200 (9)	200		200		200										
Phosphate (1)	ug/as P	87	1091	87		153		153		65(17,18)	131(17,18)							
Silica	as SiO_2	(4)	(4)															
Sulphate	as SO_4	25	250	150	250	150	250(14)	150	250(14)									12 38(19,20)
Salinity	g/kg																	40(20,28,29)
Nitrogen compounds																		
Ammonia (total)	as N	0 038	0 38	0 038		0 78	1 17	1.58	3.11(34)	0.031(17,19)	0 16(17,19)							
Free (unionised) NH_3	ug/as N									0.78(17,20,21)	0.78(17,20,21)							
Nitrite	ug/as N		30							4.12(27,19)	4 12(17 19)							
Nitrate	as N	5 65	11 3	5 65	11 3(14)		11.3(14)		11.3(14)	20.6(17,20)	20 6(17 20)							
Kjeldahl nitrogen	as N	1	1	1		2		3		3(17,13)	9(17 19)							
Oxygen demand etc																		
BOD	as O_2			3		5		7		3(17,19,22)	6(17 19 22)							
COD	as O_2							30										
Permanganate value	as O_2	2	5															
TOC	as C	(5)	(5)															
Dissolved gases etc																		
Residual chlorine	ug/as Cl_2	(4)	(4)							6.8(17,20)	6 8(17,20)				60 120			80(19 20)
Dissolved oxygen	% saturated			> 70		> 50		> 30		(23)	(24)							70(20,28 30)
Miscellaneous																		
Colour	Pt/Co scale	1	20	10	20(14)	50	100(14)	50	200							(26)		(31)
Conductivity at 20°C	uS/cm	400		1000		1000		1000										
Odour	dilution no	0	2(10) 3(11)	3(11)		10(11)		20(11)										
Taste	dilution no	0	2(10) 3(11)															
pH		6 5 8 5	9 5	6 5 8 5		5.5 8		5 5 8		6 8(14,17,20)	6 8(14,17,20)							
Temperature	°C	12	25	22	25(14)	22	25(14)	22	25	21.5(14,17,25)	28(14,17,25)					6 8(14)		
Suspended solids		0		25						25(14,17,19)	25(14,17,19)							(32)
	as SiO_2	1	10															(32)
Turbidity	Jackson units	0 4	4															
	Secchi depth, m	6	2												2	1(14)		
Microbiological																		
Total bacteria, 37°C	MPN/1ml	10(6)																
Total bacteria 22°C	MPN/1ml	100(6)																
Faecal coliforms at 40°C	MPN/100ml		< 1(12)	20		2000		20000							100(27)	2000(27)		300(19,28,34)
Total coliforms at 37°C	MPN/100ml		< 1(12)	50		5000		50000							500(27)	10000(27)		
Sulphite reducing clostridia	MPN/20ml		< 1 (13)	(15)		(16)										0		
Salmonella	MPN/1l																	
Faecal streptococci	MPN/100ml		< 1(12) (13)	20		1000		10000							100			
Entero viruses	MPN/10l															0		

Explanatory notes to Table 2

Key to symbols

G - guide value, to be observed if possible
MAC - maximum allowable concentration
I - mandatory value
90P - standard defined as a 90 percentile, i.e. 90% of measured values should conform to the standard quoted
95P - standard defined as a 95 percentile, i.e. 95% of measured values should conform to the standard quoted
AA - standard defined as an annual average, i.e. the mean of the measured values over a 12 month period should conform to the standard quoted
T - measured as total, i.e. dissolved plus particulate
D - measured as dissolved, i.e. usually involving filtration of the sample through a 0.45 µm membrane filter before analysis

Footnotes

1 This parameter was included in the directive concerned with abstraction for drinking water to satisfy the ecological requirement of certain types of environment.
2 Five day biochemical oxygen demand at 20°C without nitrification (i.e. with the addition of ATU OR equivalent) except where stated.
3 The directive stipulates that softened water intended for human consumption should have a minimum hardness of 150 mg/l as $CaCO_3$.
4 Article 8 of the Drinking Water Directive applies, i.e. 'Member states shall take all the necessary measures to ensure that any substances used in the preparation of water for human consumption do not remain in concentrations higher than the maximum admissible concentration relating to these substances in water made available to the user, and that they do not, either directly or indirectly, constitute a public health hazard'.
5 The reason for any increase in the usual concentration must be investigated.
6 For disinfected water, corresponding values should be considerably lower at the point where water leaves the processing plant. If this guide value is consistently exceeded a check should be carried out. Separate standards apply to water in closed containers: at 37°C G value 5, MAC value 20; at 22°C G value 20, MAC value 100. The MAC values should be measured within 12 hours of bottling, with a constant temperature being kept during that period. The MAC values may be exceeded under certain conditions defined in the directive
7 Value applies from 1984 as a 90 percentile over a reference period of three years
8 Value applies from 1987 as an 80 percentile over a reference period of three years
9 This is an approximate MAC value. It is given in the comments column in the original directive and presumably is not intended to have the same force as the other MAC values.
10 At 12°C
11 At 25°C.
12 The corresponding MAC value if the membrane filter method is in use is 0
13 Should be absent, as should also pathogenic staphylococci, faecal bacteriophages, parasites, algae and other organisms. However, analysis for these parameters need not necessarily be included.
14 May be waived in the event of exceptional meteorological or geographical conditions.
15 Not present in 5000 ml
16 Not present in 1000 ml.
17 Applies only in waters specifically designated under the directive concerned with the protection of waters supporting freshwater fish

18. In lakes of average depth between 18m and 300m the following formula may be applied:

$$L < \frac{10Z}{T}(1 + \sqrt{T})$$

where L is the loading expressed as mg P per square metre of lake surface per year; Z is the mean depth of the lake in metres and T is the theoretical renewal time of the lake water in years. The values given are approximate guidelines.

19. Guide value.
20. Mandatory value.
21. In particular geographical or climatic conditions, particularly in cases of low water temperatures and reduced nitrification, a higher value may be fixed.
22. Applies to BOD test without inhibition of nitrification.
23. 50% of all values should be >9 mg O_2/l
    All values should be >7 mg O_2/l } G values
    The I value is also that 50% of all values must be >9 mg O_2/l and in addition when the concentration falls below 6 mg O_2/l, competent authorities must establish whether this is a result of chance, a natural phenomenon or pollution, and take appropriate action.
24. 50% of all values should be >8 mg O_2/l
    All values should be >5 mg O_2/l } G values
    50% of all values must be >7 mg O_2/l (I value), and in addition when the concentration falls below 4 mg O_2/l, competent authorities must establish whether this is a result of chance, a natural phenomenon or pollution, and take appropriate action.
25. Thermal discharges must not cause the temperature at the edge of the mixing zone to rise above the value given in the table, and must not cause a rise in temperature of more than 1.5°C (salmonid fish waters) or 3°C (coarse fish water). Footnote 14 does not apply. During breeding periods of species requiring cold water for reproduction, the temperature must not exceed 10°C (salmonid and coarse fish waters). These are all I values, but temperature limits may be exceeded for 2% of the time.
26. No abnormal change in colour. Footnote 14 applies.
27. No incubation temperature specified.
28. Applies only in waters designated under the Shellfish Directive.
29. In waters designated for shellfisheries, a discharge must not cause the salinity to exceed by more than 10% the salinity of water not so affected.
30. Average value. If an individual measurement is less than 70% it should be repeated. An individual measurement should not be less than 60% unless there are no harmful consequences for the development of shellfish colonies.
31. In waters designated for shellfisheries, a discharge must not cause the colour of the water to exceed by more than 10 mg Pt/l the colour of water not so affected (mandatory value, 75 percentile).
32. In waters designated for shellfisheries, a discharge must not cause the temperature of the water to exceed by more than 2°C the temperature of water not so affected (guide value, 75 percentile).
33. In waters designated for shellfisheries, a discharge must not cause the suspended solids content of the water to exceed by more than 30% the suspended solids content of the water not so affected (mandatory value, 75 percentile).
34. The directive states that this value (which is a 75 percentile) applies to shellfish flesh and intervalvular fluid and that pending the adoption of a directive on the protection of consumers of shellfish products, it is essential that this value be observed in waters in which live shellfish directly edible by man.

Table 3. Standards for trace substances - dependence on hardness of standards for protection of freshwater fish and other freshwater life

(All concentrations in µg/l. Standards expressed as dissolved concentration, relative to annual average, except where stated).

	Protection of salmonid freshwater fish at hardness (mg/l $CaCO_3$)						Protection of other freshwater fish at hardness (mg/l $CaCO_3$)						Protection of coarse freshwater fish at hardness (mg/l $CaCO_3$)					
	<50	50-100	100-150	150-200	200-250	>250	<50	50-100	100-150	150-200	200-250	>250	<50	50-100	100-150	150-200	200-250	>250
as As	50	50	50	50	50	50	130	150	150	150	150	150	50	50	50	50	50	50
as Cd	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)	5 (2)
as Cr	5	10	20	20	50	50	5	10	20	20	50	50	150	175	200	200	250	250
as Cu	1 (3) 5 (4)	6 (3) 22 (4)	10 (3) 40 (4)	10 (3) 40 (4)	10 (3) 40 (4)	28 (3) 112 (4)	1 (8)	6 (8)	10 (8)	10 (8)	10 (8)	28 (8)	1 (3) 5 (4)	6 (3) 22 (4)	10 (3) 40 (4)	10 (3) 40 (4)	10 (3) 40 (4)	28 (3) 112 (4)
as Pb	4	10	10	20	20	20	5	60	60	60	60	60	50	125	125	250	250	250
as Hg	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)	1 (5)
as Ni	50	100	150	150	200	200	8	20	50	50	100	100	50	100	150	150	200	200
as Zn	10 (6) 30 (7)	50 (6) 200 (7)	75 (6) 300 (7)	75 (6) 300 (7)	75 (6) 300 (7)	125 (6) 500 (7)	100	100	100	100	100	100	75 (6) 300 (7)	175 (6) 700 (7)	250 (6) 1000 (7)	250 (6) 1000 (7)	250 (6) 1000 (7)	500 (6) 2000 (7)

Explanatory notes to Table 3

1. Defined as total chromium (i.e. Cr III + Cr VI)
2. Total concentration (i.e. dissolved plus particulate)
3. Applies in waters not specifically designated under the appropriate directive (i.e. the directive concerning the quality of water required to support fish life). A higher value may be acceptable where acclimation is expected or copper is present in organic complexes.
4. Applies only in waters specifically designated under the appropriate directive (i.e. the directive concerning the quality of water required to support fish life). This is a guide value, defined as a 95 percentile. The 112 µg/l standard only applies at a hardness in excess of 300 mg/l as $CaCO_3$.
5. Applies to all waters affected by discharges likely to contain mercury. Refers to the total concentration (dissolved plus particulate) defined as an annual average.
6. Applies in waters not specifically designated under the appropriate directive (i.e. the directive concerning the quality of water required to support freshwater fish life).
7. Applies only in waters specifically designated under the appropriate directive (i.e. the directive concerning the quality of water required to support freshwater fish life). This is a mandatory value, referring to the total zinc concentration (dissolved plus particulate) defined as a 95 percentile. The 500 and 2000 µg/l standards, for salmonid and coarse fish waters respectively, only apply at a hardness in excess of 500 mg/l as $CaCO_3$.
8. A higher value may be acceptable where acclimation is expected or copper is present in organic complexes.

APPENDIX 2 : RESPONSES TO PROJECT QUESTIONNAIRE FROM EXTERNAL CONSULTEES

Questionnaires were sent to the following list of consultees, derived from the NRA's national database. Questionnaire responses were received from those marked '**'. Additional and secondary responses have been appended to the list.

The questionnaire returns are also included.

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BN21 1EP

Mr J R Harris **
Chairman
South Staffordshire
Water Company
Green Lane
Walsall
West Midlands BS2 7PD

Mr Derek Casey **
Sports Council
16 Upper Woburn Place
London
WC1H 02P

Mr O Wheatley **
Chairman
Sports Council for Wales
Sophia Gardens
Cardiff CF1 9SW

Mr Mark Farrer
Chairman
Suffolk Water plc
163 High Street
Lowestoft
Suffolk NR32 1HT

Lord Elliott of Morpeth
Chairman
Sunderland and South Shields
Water plc
29 John Street
Sunderland BT1 1JT

Mr Andrew Kennedy **
Chairman
Sutton District Water plc
59 Gander Green Lane
Cheam
Sutton
Surrey SM1 2EW

Mr Charles Docwra **
Chairman
Tendring Hundred Waterworks
Company
Mill Hill
Manningtree
Essex CO11 2AZ

Mr James McGowan **
Chairman
Three Valley Water Services plc
P O Box 48
Bishop's Rise
Hatfield
Herts AL10 9HL

Mr Adrian Webb
Deputy Director
Town and Country Planning
Association
17 Carlton House Terrace
London SW1Y 5AS

Mr G S Podmore
Welsh Office
Agriculture Department
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Cardiff CF1 3NQ

Mr P Francombe
Welsh Office
Environment Division
Cathays Park
Cardiff CF1 3NQ

Mr G H Roberts
Welsh Salmon & Trout Angling
Association
Belmullet
Rhayader
Powys LD6 5BY

Brenda Gamwell
Information officer
Woodland Trust
Autumn Park
Grantham
Lincs NG31 6LL

Mr Brian Jenkins
Chairman
Wrexham and East Denbighshire
Water Company
21 Egerton Street
Wrexham
Clywd L11 1ND

Mr Albert Norton **
Chairman
York Waterworks plc
Lendal Tower
York YO1 2DL

Head of Environment Section **
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Harwell
Oxfordshire
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Head of Environment Section
North West Water Group Plc
Dawson House
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Warrington WA5 3LW

Head of Environment Section
Severn Trent plc
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Birmingham
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Head of Environment Section
Southern Water plc
Southern House
Yeoman Road
Worthing
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Head of Environment Section
South West Water plc
Peninsula House
Rydon Lane
Exeter EX2 7HR

Head of Environment Section
Thames Water plc
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London W1M 8DJ

Head of Environment Section
Welsh Water plc
Play - Y - Ffynnon
Cambrian Way
Brecon
Powys LD3 7HP

Head of Environment Section
Wessex Water plc **
Wessex House
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Bristol
Avon BS2 OJQ

Head of Environment Section
Yorkshire Water plc
2 The Embankment
Leeds
LS1 4BG

Head of Environment Section
Northumbrian Water Group plc
P O Box 4
Regent Centre
Gosforth
Newcastle upon Tyne NE3 3PX

Head of Environment Section
Anglian Water plc
Anglian House
Ambury Road
Huntingdon
Cambridgeshire PE18 6NZ

ICI Chemicals & Polymers Ltd
P O Box 1
Billingham
Cleveland TS23 1LB

(Forwarded by CIA)

Monsanto plc
Ruabon Works
Cefn Mawr
Wrexham
Clwyd LL14 3SL

(Forwarded by CIA)

environmental advisory unit limited

Founded in 1974 in the University of Liverpool

Yorkshire House, Chapel Street, Liverpool L3 9AG
Telephone: 051-255 1115 Fax: 051-258 1511

7th October 1992

Dear Sir/Madam,

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

The Catchment Management Planning Group of the National Rivers Authority (NRA) identified the need for a R&D project to "*develop use related criteria or standards relevant to each environmental requirement (water quality, water quantity and physical features)*" for application in the formulation and implementation of catchment management plans. The Environmental Advisory Unit Ltd. (EAU) has been commissioned by the NRA to undertake Phase I of this project, which consists of a project definition study for further studies into the development of use related standards.

The main aim of Phase I is to develop terms of reference for studies into the development of use-related standards applicable in catchment management plans. These standards are to incorporate water volume parameters and physical characteristics of the water course, water body or river corridor as well as the more well established water quality parameters. The project is also serving as a review of the current status of catchment management planning schemes and the ongoing NRA research into developing appropriate standards for different uses.

In order to develop the terms of reference for any future work, the strategy outlined below will be followed.

(i) Identify all possible uses of a controlled water and its associated environment, i.e. all uses for which standards may be required.

(ii) Identify the requirements (environmental objectives) for protection of each of the uses identified in (i).

(iii) Review the existing and developing standards relating to water volume, water quality and physical features for each of the uses identified in (i).

(iv) Identify uses or relevant parameters for which standards either do not exist or are inappropriate.

(v) Develop a strategy to address the issues raised in (iv).

Member of the SGS Group (Société Générale de Surveillance)

Other offices at: Unit 17, Pebble Close, Amington, Tamworth, Staffordshire B77 4RD
Commodore House, 51 Conway Road, Colwyn Bay, Clwyd LL29 7AW
Ivor House, Bridge Street, Cardiff CF1 2EE
Analytical Services, Merseyside Innovation Centre, 131 Mount Pleasant, Liverpool L3 5TF

Registered in England No. 1995411. Registered Office: SGS House, 217-221 London Road, Camberley, Surrey GU15 3EY.

This phase of the project will not involve the formulation of any standards for any parameter or use, it is simply a review of the current situation. The intention is to identify any gaps or shortcomings in the existing system which could practically be addressed in a subsequent study.

The attached questionnaire has been devised in order to gather relevant information from within the NRA and from external organisations with interests in the management of water and the water-related environment. Names and addresses of all external consultees have been supplied to EAU from the national NRA database of consultees.

We would be very grateful if you could complete the enclosed questionnaire and return it in the stamped, addressed envelope provided, if possible, by the end of October.

Your reply will be valuable in providing a perspective of water-related uses and requirements from outside the NRA, which will be very important in ensuring the adequacy of scope and reliability of our review.

Please do not hesitate to contact me if you have any queries regarding the project or the information required.

Thank you for your assistance.

Yours sincerely,

Dr. Stephen Birch,
Senior Environmental Officer
EAU Liverpool

Association of County Councils

Speaking for Counties

Our Ref: AM/jpc/ENV 11/8

Your Ref:

Date: 19 October 1992

This matter is being dealt with by

Abigail Melville

Secretary: ROBIN WENDT DL.
Deputy: LEN ROBERTS

EATON HOUSE · 66a EATON SQUARE
LONDON SW1W 9BH

Telephone: 071-235 1200
Fax only: 071-235 8458

Dr Stephen Birch
Senior Environmental Officer
EAU Liverpool University
Yorkshire House
Chapel Street
LIVERPOOL
L3 9AG

Dear Dr Birch

CATCHMENT MANAGEMENT ISSUES: USE RELATED STANDARDS
NRA NATIONAL F&D PROJECT 405

As discussed on the phone I am afraid that the ACC do not hold information on water use in the form that you require. I am sorry that we are unable to be of assistance to you with this project but I wish you good luck with it.

Yours sincerely

Alison Miller

pp. ABIGAIL MELVILLE

P:\Miller\Julie\Birch.let

The ACC represents the interests of 46 County Councils in England and Wales

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : D Wood

Contact Address : Association of District Councils
26 Chapter St
London.

Telephone Number :

1. Please define your area of responsibility : As a local authority association we would not be able to answer the technical detail required

a) functional .....

b) region/area .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	_____	O	O	O	O	O	O
Process effluent disposal	_____	O	O	O	O	O	O
Cooling water discharge	_____	O	O	O	O	O	O
Mine washings	_____	O	O	O	O	O	O
Mineral extraction	_____	O	O	O	O	O	O
Solid wastes (ie landfill)	_____	O	O	O	O	O	O
Power generation	_____	O	O	O	O	O	O
Commercial navigation	_____	O	O	O	O	O	O
Site drainage	_____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	_____	O	O	O	O	O	O
Shellfishing	_____	O	O	O	O	O	O
Migratory fishery (inc. eels)	_____	O	O	O	O	O	O
Salmonid fishery	_____	O	O	O	O	O	O
Cyprinid (coarse) fishery	_____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	_____	O	O	O	O	O	O
Nature conservation sites	_____	O	O	O	O	O	O
Landscape feature	_____	O	O	O	O	O	O
Heritage or archaeology value	_____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	_____	O	O	O	O	O	O
Ornamental/landscape use	_____	O	O	O	O	O	O
Game angling	_____	O	O	O	O	O	O
Coarse angling	_____	O	O	O	O	O	O
Wildfowling	_____	O	O	O	O	O	O
Birdwatching	_____	O	O	O	O	O	O
Pleasure boating	_____	O	O	O	O	O	O
Sailing (eg dinghies)	_____	O	O	O	O	O	O
Canoeing/Rowing	_____	O	O	O	O	O	O
Windsurfing	_____	O	O	O	O	O	O
Water-skiing	_____	O	O	O	O	O	O
Swimming and diving	_____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	_____	O	O	O	O	O	O
Transport links (road, rail etc.)	_____	O	O	O	O	O	O
9. Other uses							
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : J.R. LITTLE Contact Address : BMTH & WH WATER ~~co~~ plc
WATERMILL ROAD
CHRISTCHURCH, DORSET, BH 23 2LU

Telephone Number : 0202 499000

1. Please define your area of responsibility :

a) functional ENGINEERING

b) region/area COMPANY AREAS

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R L G	✓	✓	✓	○	✓	○
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)	R	○	○	✓	○	○	✓
Salmonid fishery	R E	○	○	✓	○	○	✓
Cyprinid (coarse) fishery	R	○	○	✓	○	○	✓
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling	R	○	○	✓	○	○	✓
Coarse angling	R E	○	○	✓	○	○	✓
Wildfowling	R E	○	○	✓	○	○	✓
Birdwatching	E	○	○	✓	○	○	✓
Pleasure boating	R E	○	○	✓	○	○	✓
Sailing (eg dinghies)	E	○	○	✓	○	○	✓
Canoeing/Rowing	R E	○	○	✓	○	○	✓
Windsurfing	E	○	○	✓	○	○	✓
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : P.C. HODGE Contact Address : BRISTO WATER plc
P.O. BOX 218

Telephone Number :

1. Please define your area of responsibility :

a) functional ..... RESOURCE PLANNING/MANAGEMENT

b) region/area ..... BRISTOL (AVON, SOM, WILTS)

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply		342Ml/d D.Wrgs					
Water company abstraction	R C L E	⊘ C.R	⊘ C.R	○	○	○	○
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		O	O	O	O	O	O
Process effluent disposal		O	O	O	O	O	O
Cooling water discharge		O	O	O	O	O	O
Mine washings		O	O	O	O	O	O
Mineral extraction		O	O	O	O	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage		O	O	O	O	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation		O	O	O	O	O	O
Nature conservation sites	L	O	O	O	O	O	O
Landscape feature	L	O	O	O	O	O	O
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	L	O	O	O	O	O	O
Ornamental/landscape use		O	O	O	O	O	O
Game angling	L	O	O	O	O	O	O
Coarse angling	L	O	O	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching	L	O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)	L	O	O	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing	L	O	O	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)		O	O	O	O	O	O
Transport links (road, rail etc.)		O	O	O	O	O	O
9. Other uses							
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : BRITISH ASSOCIATION OF LANDSCAPE INDUSTRIES Contact Address : JOHN TOPPING,MBA

Telephone Number : 0535-606139

1. Please define your area of responsibility :

a) functional .....LANDSCAPE.....

b) region/area .....NATIONAL.....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature	RG	✓	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use	RG	✓	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Secondary water from bore holes, streams or treated sources are used subject to NRA approval when main supplies are not available for whatever reason.

In recent years our members will normally only use secondary water in the event of a drought order being applied in the area where they are working.

The use of secondary water from treated sources is subject to local environmental authority approval, when the landscaped areas are subject to public access.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : HANNAH CLARKE Contact Address : MARFORD MILL
BRITISH ASSOCIATION FOR SHOOTING & CONSERVATION ROSSETT
CLWYD LL12 0HZ

Telephone Number : 0244 570881

1. Please define your area of responsibility :

a) functional ...CONSERVATION...

b) region/area ...WHOLE UNITED KINGDOM...

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction							
Process effluent disposal							
Cooling water discharge							
Mine washings							
Mineral extraction							
Solid wastes (ie landfill)							
Power generation							
Commercial navigation							
Site drainage							
5. Fisheries							
Commercial fishing							
Shellfishing							
Migratory fishery (inc. eels)							
Salmonid fishery							
Cyprinid (coarse) fishery							
6. Conservation							
River corridor conservation							
Nature conservation sites	RDLE					✓	✓
Landscape feature							
Heritage or archaeology value							
7. Amenity and recreation							
General amenity (walking)							
Ornamental/landscape use							
Game angling							
Coarse angling							
Wildfowling	RDLE					✓	✓
Birdwatching							
Pleasure boating							
Sailing (eg dinghies)							
Canoeing/Rowing							
Windsurfing							
Water-skiing							
Swimming and diving							
8. Other land use features							
Urban land use (drainage etc.)							
Transport links (road, rail etc.)							
9. Other uses							
.....							
.....							
.....							
.....							
.....							

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

BASC is the representative Body for sporting shooting. It has set codes of conduct for sporting shooting including wildfowling and provides conservation & shooting mgt. advice. The association works with both statutory and voluntary organisations to integrate wildfowling & conservation on the UKs estuaries.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : The Director
Major General John
Hopkinson CB

Contact Address : BFSS
59 Kennington Road
London
SE1 7PZ

Telephone Number : 071 928 4742

1. Please define your area of responsibility :

a) functional .... ✓

b) region/area ..... ✓

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R C L E	O	O	O	O	O	O
Private supply	R C L E	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	R C L E D	O	O	O	O	O	O
Private discharge	R C L E D	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	R C L E D	O	O	O	O	O	O
Spray irrigation	R C L E	O	O	O	O	O	O
Livestock watering	R C L E	O	O	O	O	O	O
Liquid waste disposal	R C L E D	O	O	O	O	O	O
Fish farming	R C L E D	O	O	O	O	O	O
Water cress growing	R C L E	O	O	O	O	O	O
Forestry	R C L E D	O	O	O	O	O	O

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	RCLE	○	○	○	○	○	○
Process effluent disposal	RCLE	○	○	○	○	○	○
Cooling water discharge	RCLE	○	○	○	○	○	○
Mine washings	RCLE	○	○	○	○	○	○
Mineral extraction	RCLE	○	○	○	○	○	○
Solid wastes (ie landfill)	RCLE	○	○	○	○	○	○
Power generation	RCLE	○	○	○	○	○	○
Commercial navigation	RCLE	○	○	○	○	○	○
Site drainage	RCLE	○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)	RCLE	○	○	○	○	○	○
Salmonid fishery	RCLE	○	○	○	○	○	○
Cyprinid (coarse) fishery	RCLE	○	○	○	○	○	○
6. Conservation							
River corridor conservation	RCLED	○	○	○	○	○	○
Nature conservation sites	"	○	○	○	○	○	○
Landscape feature	"	○	○	○	○	○	○
Heritage or archaeology value	"	○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling	RCLE	○	○	○	○	○	○
Coarse angling	"	○	○	○	○	○	○
Wildfowling	"	○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Our interest lies in the quality and quantity of flows and containment in relation to all water areas that support fish and wildfowl.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

British Rail
research

British Rail Research
Scientific Services
Environmental Team
105 Faraday House
PO Box 2
London Road
Derby
DE24 8YB

Tel: 0332-263727/263355
Fax: 0332-262319

Dr Stephen Birch
Senior Environmental Officer
Environmental Advisory Unit
Yorkshire House
Chapel Street
Liverpool L3 9AG

16 November 1992

Dear Dr Birch,

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Please find enclosed questionnaire returns from three of the four British Rail, English Regional Laboratories. I will forward the outstanding fourth questionnaire as soon as I receive it.

My apologies for not meeting the end of October deadline.

Yours sincerely,

John Harding
Environmental Co-ordinator

A Division of British Railways Board. International Railway Research, Consultancy and Testing

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : A.J. PLATTS

Contact Address : BRITISH RAIL ER&D
SCIENTIFIC SERVICES SWINDON
BRISTOL ST, SWINDON SN1 5ET.

Telephone Number : 0793 515048

1. Please define your area of responsibility :

a) functional ..... RAIL TRANSPORT. .....

b) region/area ..... WEST OF ENGLAND, SOUTH WALES. .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	L	✓	✓	O	O	O	O
Private supply	BORE HOLES	✓	✓	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	R.L	✓	✓	O	O	O	O
Private discharge	R	✓	✓	O	O	O	O
3. Agricultural uses							
Land drainage		O	O	O	O	O	O
Spray irrigation		O	O	O	O	O	O
Livestock watering		O	O	O	O	O	O
Liquid waste disposal		O	O	O	O	O	O
Fish farming		O	O	O	O	O	O
Water cress growing		O	O	O	O	O	O
Forestry		O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	R	✓	○	○	○	○	○
Process effluent disposal	R.E	✓	✓	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction	R	✓	✓	○	○	○	○
Solid wastes (ie landfill)	D	○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage	R.D.C.E.	✓	✓	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)	R.D.C.E	✓	✓	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) ..... All statutory and National Standards.

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name :

Contact Address : SCIENTIFIC SERVICES
CREWE LABORATORY
ROOM 1214
GRESTY ROAD
CREWE 6EA

Telephone Number : 0270 5 32370

1. Please define your area of responsibility :

a) functional ..... RAIL TRANSPORT .....

b) region/area ..... East & West Midlands / North Wales / N.N. England

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	R, D	O	O	O	✓	✓	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	R,C,E,G	✓	O	O	O	✓	O
Process effluent disposal		O	O	O	O	O	O
Cooling water discharge	C,E	O	O	O	✓	✓	O
Mine washings	R	O	✓	O	✓	O	O
Mineral extraction	R	O	✓	O	✓	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage	R,D,E,G	O	✓	O	✓	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation		O	O	O	O	O	O
Nature conservation sites		O	O	O	O	O	O
Landscape feature		O	O	O	O	O	O
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)		O	O	O	O	O	O
Ornamental/landscape use		O	O	O	O	O	O
Game angling		O	O	O	O	O	O
Coarse angling		O	O	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching		O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)		O	O	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing		O	O	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)		O	O	O	O	O	O
Transport links (road, rail etc.)	(D),E,G	O	O	O	✓	✓	O
9. Other uses							
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Approx 40 consents to discharge trade effluent are held together with an indeterminate number of discharges from septic tanks (at least 200).
The nature of the business means there are many diffuse discharges of drainage from tanks and disposal sites.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : D. E. WILKINSON Contact Address : B.R. RESEARCH
4 HEXTHORPE RD
DONCASTER
DN4 0AE

Telephone Number : 0302 362516

1. Please define your area of responsibility :

a) functional SCIENTIFIC SUPPORT - BRITISH RAIL

b) region/area AREA COVERED BY OLD B.R EASTERN REG.

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		O	O	O	O	O	O
Process effluent disposal		O	O	O	O	O	O
Cooling water discharge		O	O	O	O	O	O
Mine washings		O	O	O	O	O	O
Mineral extraction		O	O	O	O	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage		O	O	O	O	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation		O	O	O	O	O	O
Nature conservation sites		O	O	O	O	O	O
Landscape feature		O	O	O	O	O	O
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)		O	O	O	O	O	O
Ornamental/landscape use		O	O	O	O	O	O
Game angling		O	O	O	O	O	O
Coarse angling		O	O	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching		O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)		O	O	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing		O	O	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)		O	O	O	O	O	O
Transport links (road, rail etc.)	RDG	O	O	O	O	O	O
9. Other uses							
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) RAILWAY DEPOT DISCHARGE CONSENTS

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

British Rail
research

British Rail Research
Scientific Services
Environmental Team
105 Faraday House
PO Box 2
London Road
Derby
DE24 8YB

Tel: 0332-263727/263355
Fax: 0332-262319

Dr Stephen Birch
Senior Environmental Officer
Environmental Advisory Unit
Yorkshire House
Chapel Street
Liverpool L3 9AG

11 December 1992

Dear Dr Birch,

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Please find enclosed the outstanding fourth questionnaire to complete the input from British Rail, English Regional Laboratories. I look forward to receiving any results that may be forthcoming from your work.

Again, my apologies for not meeting the end of October deadline.

Yours sincerely,

John Harding

John Harding
Environmental Co-ordinator

A Division of British Railways Board. International Railway Research, Consultancy and Testing

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : M. HANDY

Contact Address :

BRITISH RAIL
Network Laboratory
The Avenue
Muswell Hill
LONDON N10 2QJ

tel.BT 081-444 9891
FAX 081-444 8312

Telephone Number :

1. Please define your area of responsibility :

a) functional RAIL TRANSPORT

b) region/area SOUTH EAST ENGLAND

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction		O	O	O	O	O	O
Private supply	G	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	R L D	O	O	O	O	✓	O
Private discharge		O	O	O	O	O	O
3. Agricultural uses							
Land drainage		O	O	O	O	O	O
Spray irrigation		O	O	O	O	O	O
Livestock watering		O	O	O	O	O	O
Liquid waste disposal		O	O	O	O	O	O
Fish farming		O	O	O	O	O	O
Water cress growing		O	O	O	O	O	O
Forestry		O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	C	✓	O	O	O	O	O
Process effluent disposal		O	O	O	O	O	O
Cooling water discharge		O	O	O	O	O	O
Mine washings		O	O	O	O	O	O
Mineral extraction		O	O	O	O	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage		O	O	O	O	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation		O	O	O	O	O	O
Nature conservation sites		O	O	O	O	O	O
Landscape feature		O	O	O	O	O	O
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)		O	O	O	O	O	O
Ornamental/landscape use		O	O	O	O	O	O
Game angling		O	O	O	O	O	O
Coarse angling		O	O	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching		O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)		O	O	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing		O	O	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)		O	O	O	O	O	O
Transport links (road, rail etc.)		✓	O	O	O	O	O
9. Other uses							
Rail Velocity Vistry		✓	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

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B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : DAVID JURY

Contact Address : BRITISH WATERWAYS
ENVIRONMENTAL + SCIENTIFIC SERVICES
LLANTHONY WAREHOUSE
GLOUCESTER DOCKS
GLOUCESTER GL1 2EJ

Telephone Number :

1. Please define your area of responsibility :

a) functional WATER QUALITY FOR BRITISH WATERWAYS

b) region/area GREAT BRITAIN

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	C	✓	✓	○	○	○	○
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	C R	✓	○	○	○	○	○
Private discharge	C	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	C R	○	○	○	○	○	✓
Spray irrigation	C	✓	✓	○	○	○	○
Livestock watering	C	○	✓	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming	C	✓	✓	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	CRG	✓	✓	○	○	○	○
Process effluent disposal	CR	○	○	○	✓	○	○
Cooling water discharge	CR	✓	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation	CR	✓	○	✓	○	○	○
Site drainage	CR	○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery	CRL	✓	✓	✓	○	○	○
6. Conservation							
River corridor conservation	CR	○	✓	○	✓	○	✓
Nature conservation sites	CRL	○	✓	○	✓	○	✓
Landscape feature	CR	○	○	○	✓	✓	✓
Heritage or archaeology value	CR	○	○	○	✓	✓	✓
7. Amenity and recreation							
General amenity (walking)	CRL	○	○	✓	○	✓	○
Ornamental/landscape use	CRL	○	○	✓	○	✓	○
Game angling		○	○	○	○	○	○
Coarse angling	CRL	✓	✓	✓	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching	C L	○	○	✓	○	○	○
Pleasure boating	CRL	✓	○	✓	○	✓	○
Sailing (eg dinghies)	C L	○	○	○	○	○	○
Canoeing/Rowing	CRL	○	✓	○	○	○	○
Windsurfing	L	○	✓	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)	CR	○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) BRITISH WATERWAYS "WATERWAY STANDARDS" – An internal document covering a range of factors including depth + width of a channel used for navigation. Details can be provided in response to specific requests.

b)

c)

d)

e)

f)

g)

h)

i)

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

Confederation of British Industry
Centre Point
103 New Oxford Street
London WC1A 1DU
Telephone 071-379 7400
Facsimile 071-240 1578
Telex 21332

Director General
Howard Davies

Deputy Director-General and Secretary
Maurice Hunt

CBI

Dr S P Birch
Envtal. Advisory Unit Ltd
Yorkshire House
Chapel Street
Liverpool
L3 9AG

27 November 1992
Ref: ms/ph/124

Dear Dr Birch

Re: NRA National R & D Project 405

Thank you for your letter regarding the project you are undertaking. Unfortunately we cannot respond directly but as the questions relate to aspects of our members' business, I will endeavour to make them aware of the questionnaire.

I hope this is satisfactory,

Yours sincerely

Paul Horton
Advisor
Environment Policy Group

CHEMICAL INDUSTRIES ASSOCIATION

Our Ref: DEB/general/ltr.eau

Dr S P Birch
Environmental Advisory Unit Ltd
Yorkshire House
Chapel Street
Liverpool
L3 9AG

27 October 1992

Dear Dr Birch

CATCHMENT MANAGEMENT ISSUES: USE RELATED STANDARDS: NRA NATIONAL R&D PROJECT 405

Thank you for sending details of the above project. As a member of staff of a trade association, I think that it would be inappropriate for me to complete the questionnaire. However, I have passed on details to members of our Environment Advisory Group, who may or may not wish to fill in the form. In any event it seems unlikely that you will get a response before the end of October.

Yours sincerely

Mrs D E Brown
Senior Executive
Environment

Kings Buildings, Smith Square, London SW1P 3JJ Telephone: 071-834 3399 Telex: 916672 Fax: 071-834 4469

Director General: John C L Cox, *General Secretary:* C R Brooks
Directors: T D Culpin (Business Development), R J Grainger (Product & Regulatory Affairs), J S Foulds (Employment Affairs) G F Liardet CB CBE (Public Affairs)
Chemical Industries Association Limited Registered Office as above Registered in England No. 860702

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : D Chatwin

Contact Address : Corby (Northants) & District Water Co
Geddington Road, Corby,
Northants, NN18 8ES

Telephone Number : (0536) 404299

1. Please define your area of responsibility :

a) functional Managing Eyebrook Reservoir. Supplying British Steel Tubeworks at Corby

b) region/area .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	L	✓	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	✓	○	✓
Landscape feature		○	○	○	✓	○	✓
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		✓	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	✓
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

COUNTRY LANDOWNERS ASSOCIATION

Our Ref: AW/tg/A.32/8

2nd November 1992

Dr Stephen Birch,
EAU,
Yorkshire House,
Chapel Street,
Liverpool,
L3 9AG.

Dear Mr Birch,

CATCHMENT MANAGEMENT ISSUES: USE RELATED STANDARDS

Thank you for your letter of 7th October. I regret that I feel it would make very little sense for me to complete your questionnaire from a national viewpoint.

What I suspect you really need is to a set of responses based on practical experience from many different users of water across the country. National consultees can only ever give a general view which ignores specific circumstances.

Have you considered circulating the questionnaire to a sample of those who hold abstraction licences? This could surely provide a much better body of information on which to work.

I am sorry that I cannot be more helpful.

Yours sincerely,

Alan Woods

ALAN WOODS
Environment and Water Adviser

16 Belgrave Square, London SW1X 8PQ Tel. 071 235 0511 Fax 071 235 4696 Director-General: Julian A. Anderson

CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES

Dr S.P. Birch,
Environmental Advisory Unit Ltd.,
Yorkshire House,
Chapel Street,
Liverpool,
L3 9AG.

28 October 1992

Catchment Management Issues : Use Related Standards

Dear Dr. Birch,

Just a brief note to assure you that we intend completing the questionnaire mentioned above. I need to consult a number of colleagues in order to give a comprehensive reply and it has just come to my attention that our head of planning, land use and landscape designations is unavailable for the remainder of this week. However I will forward the completed form as soon as possible.

Yours sincerely,

Catherine Duigan
Dr. Catherine A. Duigan
Freshwater Ecologist

Uwch Adran, Gwyddoniaeth a Datblygiad Polisi/Directorate of Science and Policy Development.
Plas Penrhos, Ffordd Penrhos, Bangor Gwynedd LL57 2LQ Tel: 0248 370444 Fax: 0248 372342

CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES

Dr. Stephen Birch,
Senior Environmental Officer,
Environmental Advisory Unit Limited,
Yorkshire House,
Chapel Street,
Liverpool,
L3 9AG

13 November 1992

Catchment Management Issues: Use Related Standards

Dear Dr. Birch,

Enclosed please find the completed questionnaire on Catchment Management Issues.

It was completed after consultation with **E. Hughes** (Head of Planning, Land Use & Landscape Designation) and **G. Roberts** (Head of Recreation and Community Action).

With apologies for being a little late.

Yours sincerely,

Catherine Duigan

Dr. Catherine A. Duigan
Freshwater Ecologist

Uwch Adran, Gwyddoniaeth a Datblygiad Polisi/Directorate of Science and Policy Development.
Plas Penrhos, Ffordd Penrhos, Bangor Gwynedd LL57 2LQ Tel: 0248 370444 Fax: 0248 372342

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : DR. CATHERINE A. DUIGAN

Contact Address : COUNTRYSIDE COUNCIL FOR WALES
PLAS PENRHOS, FFORDD PENRHOS,
BANGOR, GWYNEDD LL57 2LQ

Telephone Number : 0248 – 370444

1. Please define your area of responsibility :

a) functional .....FRESHWATER ECOLOGIST.....

b) region/area .....WALES.....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation	R	○	○	○	⊗	⊗	⊗
Nature conservation sites	R,C,D,L	○	○	○	⊗	⊗	⊗
Landscape feature		○	○	○	⊗	⊗	⊗
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)	RCD LE	○	○	○	○	✓	○
Ornamental/landscape use		○	○	○	✓	✓	✓
Game angling	RLE	○	○	○	✓	✓	✓
Coarse angling	RCLE	○	○	○	✓	⊗	⊗
Wildfowling	RCDLE	○	○	○	✓	⊗	⊗
Birdwatching	RCDLE	○	○	○	✓	⊗	⊗
Pleasure boating	RCLE	○	○	○	✓	⊗	⊗
Sailing (eg dinghies)	LE	○	○	○	✓	✓	⊗
Canoeing/Rowing	RLE	○	○	○	✓	⊗	⊗
Windsurfing	LE	○	○	○	✓	○	⊗
Water-skiing	LE	○	○	○	✓	○	⊗
Swimming and diving	RLE	○	○	○	✓	✓	✓
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : Contact Address : DoE Directorate of Rural Affairs

Telephone Number :

1. Please define your area of responsibility :

a) functional .....policy related evaluation of impacts of land use change on landscape & wildlife.

b) region/area .primarily England, but some GB remits.

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		O	O	O	O	O	O
Process effluent disposal		O	O	O	O	O	O
Cooling water discharge		O	O	O	O	O	O
Mine washings		O	O	O	O	O	O
Mineral extraction		O	O	O	O	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage		O	O	O	O	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation	AU	O	✓	✓	O	O	O
Nature conservation sites	AU	O	✓	✓	O	O	O
Landscape feature	AU.	O	O	✓	O	O	✓
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	AU	O	O	✓	O	O	✓
Ornamental/landscape use	AU	O	O	✓	O	O	✓
Game angling		O	O	O	O	O	O
Coarse angling		O	O	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching		O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)		O	O	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing		O	O	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)		O	O	O	O	O	O
Transport links (road, rail etc.)		O	O	O	O	O	O
9. Other uses							
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) RIVPACS (River Invertebrate
b) Prediction and Classification Scheme) — Contact, for details:
c)
d) Institute of Freshwater Ecology
e) River Laboratory
f) East Stoke
g) Wareham
h) Dorset BH20 6BB
i) Tel. 0929 462314

Any other comments you may wish to make can be given below.

Within DoE's Directorate of Rural Affairs, our main interest in the water bodies listed in your questionnaire is in terms of evaluating the consequences of land use change on the quality of watercourses in terms of our policy interests in wildlife and landscape.

Although many of the specific objectives in relation to

P.T.O.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

These are covered by DoE agencies e.g. English Nature, JNCC (wildlife, conservation), Countryside Commission (landscape) and the NRA — and no doubt you have already made contact with these organisations — DRA has a general interest in the wider countryside which over-arches many of these 'narrower' interests.

Our major survey of the countryside (Countryside Survey 1990 — jointly funded by NERC) measures some of the parameters of these water courses which are of interest to us, particularly in relation to the quality of the vegetation and freshwater invertebrate communities they support.

Although we are some way from developing standards for most of these parameters, we do make use of the IFE, RIVPACS system for assessing river quality in terms of freshwater invertebrate communities. If you need to find out more about RIVPACS, a contact address is given overleaf.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : D.E. TRY

Contact Address : EAST SURREY WATER plc
LONDON ROAD
REDHILL RH1 1LJ

Telephone Number :

1. Please define your area of responsibility :

a) functional ..... PUBLIC WATER SUPPLY .....

b) region/area ..... EAST SURREY / WEST KENT .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R, G	110 Ml/d	○	○	○	○	○
Private supply		~~○~~ CR.	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	____	O	O	O	O	O	O
Process effluent disposal	____	O	O	O	O	O	O
Cooling water discharge	____	O	O	O	O	O	O
Mine washings	____	O	O	O	O	O	O
Mineral extraction	____	O	O	O	O	O	O
Solid wastes (ie landfill)	____	O	O	O	O	O	O
Power generation	____	O	O	O	O	O	O
Commercial navigation	____	O	O	O	O	O	O
Site drainage	____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	____	O	O	O	O	O	O
Shellfishing	____	O	O	O	O	O	O
Migratory fishery (inc. eels)	____	O	O	O	O	O	O
Salmonid fishery	____	O	O	O	O	O	O
Cyprinid (coarse) fishery	____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	____	O	O	O	O	O	O
Nature conservation sites	____	O	O	O	O	O	O
Landscape feature	____	O	O	O	O	O	O
Heritage or archaeology value	____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	____	O	O	O	O	O	O
Ornamental/landscape use	____	O	O	O	O	O	O
Game angling	____	O	O	O	O	O	O
Coarse angling	____	O	O	O	O	O	O
Wildfowling	____	O	O	O	O	O	O
Birdwatching	____	O	O	O	O	O	O
Pleasure boating	____	O	O	O	O	O	O
Sailing (eg dinghies)	____	O	O	O	O	O	O
Canoeing/Rowing	____	O	O	O	O	O	O
Windsurfing	____	O	O	O	O	O	O
Water-skiing	____	O	O	O	O	O	O
Swimming and diving	____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	____	O	O	O	O	O	O
Transport links (road, rail etc.)	____	O	O	O	O	O	O
9. Other uses							
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : DR. J.H. CLARKE

Contact Address : Energy Technical Support Unit
Bldg 154, Harwell Laboratories, Didcot
Oxon OX11 0RA

Telephone Number : 0235-433487

1. Please define your area of responsibility :

a) functional Programme Manager for DTI R&D & Technology Transfer in hydropower

b) region/area England & Wales for Technology Transfer (with Scottish Office for Scotland).
UK for R&D

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	○	○	○	○	○	○
Private supply	____	○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	____	○	○	○	○	○	○
Private discharge	____	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	____	○	○	○	○	○	○
Spray irrigation	____	○	○	○	○	○	○
Livestock watering	____	○	○	○	○	○	○
Liquid waste disposal	____	○	○	○	○	○	○
Fish farming	____	○	○	○	○	○	○
Water cress growing	____	○	○	○	○	○	○
Forestry	____	○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation	RCL	⊗	⊗	⊗	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

My colleague Dr R Paine
ETSU Bldg 154
Harwell Didcot Oxon OX11 0RA
Labs.
has responsibility for Tidal Power
which is owned by Estuarine
Power Generation

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : Graham Fairclough Contact Address : Rm. 305 ; FORTRESS HOUSE
ENGLISH HERITAGE SAVILE ROW
Telephone Number : 071 - 973 - 3121 LONDON
W1 C.

1. Please define your area of responsibility :

a) functional EH Countryside and

b) region/area Landscape policy areas (national)

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction							
Process effluent disposal							
Cooling water discharge							
Mine washings							
Mineral extraction							
Solid wastes (ie landfill)							
Power generation							
Commercial navigation							
Site drainage							
5. Fisheries							
Commercial fishing							
Shellfishing							
Migratory fishery (inc. eels)							
Salmonid fishery							
Cyprinid (coarse) fishery							
6. Conservation							
River corridor conservation							
Nature conservation sites							
Landscape feature							
Heritage or archaeology value	AL			✓			✓
7. Amenity and recreation							
General amenity (walking)							
Ornamental/landscape use							
Game angling							
Coarse angling							
Wildfowling							
Birdwatching							
Pleasure boating							
Sailing (eg dinghies)							
Canoeing/Rowing							
Windsurfing							
Water-skiing							
Swimming and diving							
8. Other land use features							
Urban land use (drainage etc.)							
Transport links (road, rail etc.)							
9. Other uses							
.....							
.....							
.....							
.....							
.....							

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Some professional publication of a general nature covering historic + archaeological conservation, but nothing related to water uses in particular other than the Water Act Code of Practice. It is an area which requires research.

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : DR PATRICK DENNY for English Nature

Contact Address : English Nature Northminster House, Peterborough PE1 1UA

Telephone Number : 0733-318-326
0733 340-345

1. Please define your area of responsibility :

a) functional statutory, ~~and~~ guidelines and advisory.

b) region/area England

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		O	O	O	O	O	O
Process effluent disposal		O	O	O	O	O	O
Cooling water discharge		O	O	O	O	O	O
Mine washings		O	O	O	O	O	O
Mineral extraction		O	O	O	O	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage		O	O	O	O	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation	RCDL	✓	✓	✓	✓	✓	✓
Nature conservation sites	all	✓	✓	✓	✓	✓	✓
Landscape feature	all	✓	✓	✓	✓	✓	✓
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)		O	O	O	O	O	O
Ornamental/landscape use		O	O	O	O	O	O
Game angling		O	O	O	O	O	O
Coarse angling		O	O	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching		O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)		O	O	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing		O	O	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)		O	O	O	O	O	O
Transport links (road, rail etc.)		O	O	O	O	O	O
9. Other uses							
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

The questionnaire is difficult to answer as English Nature's responsibilities and interests cover all aspects of "conservation in the natural environment".

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : D. J. HEATHER Contact Address : FERTILISER MANUFACTURERS ASSOCIATION, GREENHILL HOUSE, THORNEY WOOD PETERBOROUGH PE3 6GF

Telephone Number : 0733 331 303

1. Please define your area of responsibility :

a) functional COMPANY SECRETARY

b) region/area UK

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	RL	✓	○	○	○	✓	○
Private supply	G	✓	○	○	○	✓	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge	R	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	RDLG	✓	✓	○	○	○	○
Spray irrigation	RDLG	✓	✓	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal	CE	✓	✓	✓	✓	✓	✓
Cooling water discharge	CE	✓	✓	✓	✓	✓	✓
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage	GEG	○	○	○	○	○	○
	C.R(CEG?)						
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : C.A. Cross

Contact Address : Folkestone + Dover Water Services Ltd
Cherry Garden Lane
F/S

Telephone Number : 0303 276951

1. Please define your area of responsibility :

a) functional ..... Public Water Supply .....

b) region/area ..... S.E. Kent .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	G.	✓	✓	○	✓	✓	○
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		O	O	O	O	O	O
Process effluent disposal		O	O	O	O	O	O
Cooling water discharge		O	O	O	O	O	O
Mine washings		O	O	O	O	O	O
Mineral extraction		O	O	O	O	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage		O	O	O	O	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation		O	O	O	O	O	O
Nature conservation sites	L	✓	O	✓	O	✓	✓
Landscape feature		O	O	O	O	O	O
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)		O	O	O	O	O	O
Ornamental/landscape use		O	O	O	O	O	O
Game angling		O	O	O	O	O	O
Coarse angling		O	O	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching		O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)		O	O	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing		O	O	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)		O	O	O	O	O	O
Transport links (road, rail etc.)		O	O	O	O	O	O
9. Other uses							
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

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Any other comments you may wish to make can be given below.

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B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : DR T. R. NISBET Contact Address : FORESTRY AUTHORITY RESEARCH DIVISION
ALICE HOLT LODGE
FARNHAM
SURREY GU10 4LH

Telephone Number : 0420 22255 x220

1. Please define your area of responsibility :

a) functional ....HYDROLOGIST....

b) region/area ....G.B.....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

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Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

FORESTRY HAS FEW SPECIFIC USES OF WATER - ONE EXAMPLE WOULD BE THE PROVISION OF PONDS ~~FOR~~ FOR FIRE-FIGHTING OR CONSERVATION (SEE ENCLOSED GUIDELINES).

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	_____	O	O	O	O	O	O
Process effluent disposal	_____	O	O	O	O	O	O
Cooling water discharge	_____	O	O	O	O	O	O
Mine washings	_____	O	O	O	O	O	O
Mineral extraction	_____	O	O	O	O	O	O
Solid wastes (ie landfill)	_____	O	O	O	O	O	O
Power generation	_____	O	O	O	O	O	O
Commercial navigation	_____	O	O	O	O	O	O
Site drainage	_____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	_____	O	O	O	O	O	O
Shellfishing	_____	O	O	O	O	O	O
Migratory fishery (inc. eels)	_____	O	O	O	O	O	O
Salmonid fishery	_____	O	O	O	O	O	O
Cyprinid (coarse) fishery	_____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	_____	O	O	O	O	O	O
Nature conservation sites	_____	O	O	O	O	O	O
Landscape feature	_____	O	O	O	O	O	O
Heritage or archaeology value	_____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	_____	O	O	O	O	O	O
Ornamental/landscape use	_____	O	O	O	O	O	O
Game angling	_____	O	O	O	O	O	O
Coarse angling	_____	O	O	O	O	O	O
Wildfowling	_____	O	O	O	O	O	O
Birdwatching	_____	O	O	O	O	O	O
Pleasure boating	_____	O	O	O	O	O	O
Sailing (eg dinghies)	_____	O	O	O	O	O	O
Canoeing/Rowing	_____	O	O	O	O	O	O
Windsurfing	_____	O	O	O	O	O	O
Water-skiing	_____	O	O	O	O	O	O
Swimming and diving	_____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	_____	O	O	O	O	O	O
Transport links (road, rail etc.)	_____	O	O	O	O	O	O
9. Other uses							
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

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Forwarded by CIA

Chemicals & Polymers

ICI Chemicals & Polymers Limited
PO Box 1
Billingham
Cleveland TS23 1LB
Telephone (0642) 553601
Telex 587443
Fax (0642) 522622

Dr Stephen Birch
EAU Liverpool
Yorkshire House
Chapel Street
Liverpool L3 9AG

Your ref	Our ref	Direct line	Tel ext	Date
	SA/MJSM/JB	523694		13 Nov 1992

Dear Dr Birch

NRA R & D PROJECT 405

Further to our telephone conversation earlier this week, I enclose a completed questionnaire for the above project. The questionnaire arrived via the CIA.

If I can be of further help, please get in touch.

Yours sincerely

Jean Bonner

pp M J S Moss
ENVIRONMENT ADVISER

S47502

Registered in England No 358535 Registered Office The Heath Runcorn Cheshire WA7 4QF A subsidiary of ICI

B

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : M. MOSS

Contact Address : ENVIRONMENT DEPT, ICI CHEMICALS & POLYMERS PO BOX 1 RILLINGHAM CLEVELAND TS23 1LB

Telephone Number : 0642 523694

1. Please define your area of responsibility :

a) functional CHEMICAL MANUFACTURE

b) region/area C = CLESTON CANAL / WEAVER / MAN. SHIP CANAL / MERSEY ESTUARY
E = TEES, SEVERN, WYRE

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction		O	O	O	O	O	O
Private supply		O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge		O	O	O	O	O	O
Private discharge	E	O	Ø	O	O	O	O
3. Agricultural uses							
Land drainage		O	O	O	O	O	O
Spray irrigation		O	O	O	O	O	O
Livestock watering		O	O	O	O	O	O
Liquid waste disposal		O	O	O	O	O	O
Fish farming		O	O	O	O	O	O
Water cress growing		O	O	O	O	O	O
Forestry		O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
						floating solids, litter etc	
4. Industrial uses							
Industrial abstraction	C, G	✓	○	○	○	✓	○
Process effluent disposal	C, E	✓	✓	○	○	○	○
Cooling water discharge	C, E	✓	✓	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation	C	✓	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage	C E	○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites	E, L	✓	✓	○	○	○	✓
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)	C	✓	✓	○	○	○	✓
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Please let me have a copy of any published report. Thank you.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : J. W. BAYLIS Contact Address : INLAND WATERWAYS ASSN
114 REGENTS PARK ROAD
LONDON NW1 8UQ

Telephone Number : 0602 493143

1. Please define your area of responsibility : Chair. IWA Navigation Technical & Amenity Committee

a) functional Navigation, Angling, Heritage Environment

b) region/area ENGLAND & WALES

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

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Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery	R C	○	○	○	✓	✓	✓
6. Conservation							
River corridor conservation	R C	○	○	○	✓	✓	✓
Nature conservation sites	R C	○	○	○	✓	✓	✓
Landscape feature	R C	○	○	○	✓	✓	✓
Heritage or archaeology value	R C	○	○	○	✓	✓	✓
7. Amenity and recreation							
General amenity (walking)	R C	○	○	○	✓	✓	✓
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling	R C	○	○	○	✓	✓	✓
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating	R C	○	○	○	✓	✓	✓
Sailing (eg dinghies)	R	○	✓	○	✓	○	✓
Canoeing/Rowing	R C	○	✓	○	✓	○	✓
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)	C	○	○	○	✓	✓	✓
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

A number of uses in Sections 1-4 have beneficial or detrimental effects on navigation or recreation. Too much extraction causes problems of navigation, in other cases flood drainage water causes siltation and local short term problems. Some canals are dependent on a supply of water from Water Reclamation Works, given satisfactory standards of WQ there should be no problems with this continued use.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : Miss K Atkinson Contact Address : INSTITUTE of FRESHWATER ECOLOGY WINDERMERE LABORATORY FAR SAWREY, AMBLESIDE Cumbria LA22 0LP

Telephone Number : 05394 42468

1. Please define your area of ~~responsibility~~ : research interest

a) functional ....N/A....

b) region/area .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction		○	○	○	○	○	○
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	R L E	○	✓	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage	R L	○	✓	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming	R L	○	✓	○	○	○	○
Water cress growing	R	○	✓	○	○	○	○
Forestry	R	○	✓	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction	RL	○	✓	○	○	○	○
Solid wastes (ie landfill)		○	✓	○	○	○	○
Power generation	RL	○	✓	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)	RL	○	✓	○	○	○	○
Salmonid fishery	RL	○	✓	○	○	○	○
Cyprinid (coarse) fishery	RL	○	✓	○	○	○	○
6. Conservation							
River corridor conservation	R	○	✓	○	○	○	○
Nature conservation sites	RL	○	✓	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)	R	○	○	○	○	✓	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling	RL	○	✓	○	○	○	○
Coarse angling	RL	○	✓	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
PIPELINES	R	○	✓	○	○	○	○
BARRAGES	RE	○	✓	○	○	○	○
FISH PASS	R	✓	✓	✓	○	○	○
		○	○	○	○	○	○
PESTICIDES	RL	○	✓	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) RIVPACS - NRA Contract

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters **(probably water quality parameters), but not for others (e.g. physical characteristics).**

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

From the Director
Dr T M Roberts
Professor T M Roberts

Institute of Terrestrial Ecology

Monks Wood Experimental Station

Administrative Headquarters

Abbots Ripton, Huntingdon
Cambridgeshire PE17 2LS
United Kingdom

Telephone (04873) 381/8
Telex 32416 MONITE G
Facsimile (04873) 590
JANET

Your ref

Our ref

Dr S Birch
Senior Environmental Officer
Environmental Advisory Unit Limited
Yorkshire House
Chapel Street
LIVERPOOL L3 9AG

14 October 1992

Dear Dr Birch

CATCHMENT MANAGEMENT ISSUES - USE RELATED STANDARDS

I note that you are carrying out a survey for NRA on a contracted basis. As you may know, ITE now largely operates as a contract research organisation. We are frequently approached by consultants for "informal" advice which often turns out to be extremely time-consuming. We now have a standard charge of £100 for dealing with enquiries of the sort you have made.

If you wish the Institute to respond on the above basis, I would be grateful for your written confirmation.

Yours sincerely

T M Roberts
Director

cc: Dr S Dobson
Dr M G Morris
Dr J E G Good
Dr B K Wyatt

environmental advisory unit limited

Founded in 1974 in the University of Liverpool

Yorkshire House, Chapel Street, Liverpool L3 9AG
Telephone: 051-255 1115 Fax: 051-258 1511

Professor T M Roberts
Director
Institute of Terrestrial Ecology
Monks Wood Experimental Station
Abbots Ripton
Huntingdon
Cambridgeshire
PE17 2LS

21 October 1992

Our ref: 2337/AEP

Dear Professor Roberts

CATCHMENT MANAGEMENT ISSUES – USE RELATED STANDARDS

Thank you for your letter of 14th October 1992.

I regret that we cannot respond to your request for payment of £100 for filling in the NRA questionnaire. As I am sure you are aware, if we made a contribution to every person or organisation who NRA requested us to approach for this sort of information, the costs would be prohibitive. For your information, we have sent out over 100 questionnaires and, so far, you are the only organisation to request payment.

I would be interested in the policy which ITE would adopt if it were contracted to gather data in a similar manner.

Whilst I respect your decision, it seems a pity that you will be unable to respond to this NRA survey of national importance. However, should you decide to change your position, we would be most happy to incorporate your response.

Yours sincerely,

Dr Stephen Birch
Senior Environmental Officer

cc Ms J Lillywhite, Project Manager, NRA Southern Region
Dr D M Parker, Director, EAU

Member of the SGS Group (Société Générale de Surveillance)

Other offices at: Unit 17, Pebble Close, Amington, Tamworth, Staffordshire B77 4RD
Commodore House, 51 Conway Road, Colwyn Bay, Clwyd LL29 7AW
Ivor House, Bridge Street, Cardiff CF1 2EE
Analytical Services, Merseyside Innovation Centre, 131 Mount Pleasant, Liverpool L3 5TF

Registered in England No 1995411 Registered Office SGS House, 217-221 London Road, Camberley, Surrey GU15 3EY

Ministry of Agriculture, Fisheries and Food
Nobel House, 17 Smith Square, London SW1P 3JR
Tel: 071-238 3000 Direct line: 071-238
GTN: 238 Telex: 21271 Fax: ext. 6591 or

Dr S P Birch
Environmental Advisory Unit Ltd
Yorkshire House
Chapel Street
Liverpool
L3 9AG

15 October 1992

Dear Dr Birch

Thank you for your letter of the 7 October and the enclosed questionnaire. I assume that this was sent to us for information rather than action. I am grateful for this and would appreciate being kept informed of further progress. Meanwhile, if there is any useful information which I can provide, please let me know.

Yours sincerely

M J DWYER
Science Division, CSG (A)

cc Dr Costigan)
Mr Richardson) with copies of the attached

OCT/birch.md

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : W. J. SCRIVEN

Contact Address : Salmon, Whaling and Inland Fisheries Division
Ministry of Agriculture, Fisheries & Food
Nobel House
17 Smith Square
London SW1P 3JR.

Telephone Number : 071 238 5934

1. Please define your area of responsibility :

a) functional Salmon & Freshwater Fisheries (Policy)

b) region/area England & Wales

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	○	○	○	○	○	○
Private supply	____	○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	____	○	○	○	○	○	○
Private discharge	____	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	____	○	○	○	○	○	○
Spray irrigation	____	○	○	○	○	○	○
Livestock watering	____	○	○	○	○	○	○
Liquid waste disposal	____	○	○	○	○	○	○
Fish farming	____	○	○	○	○	○	○
Water cress growing	____	○	○	○	○	○	○
Forestry	____	○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	____	O	O	O	O	O	O
Process effluent disposal	____	O	O	O	O	O	O
Cooling water discharge	____	O	O	O	O	O	O
Mine washings	____	O	O	O	O	O	O
Mineral extraction	____	O	O	O	O	O	O
Solid wastes (ie landfill)	____	O	O	O	O	O	O
Power generation	____	O	O	O	O	O	O
Commercial navigation	____	O	O	O	O	O	O
Site drainage	____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	____	O	O	O	O	O	O
Shellfishing	____	O	O	O	O	O	O
Migratory fishery (inc. eels)	____	O	O	O	O	O	O
Salmonid fishery	____	O	O	O	O	O	O
Cyprinid (coarse) fishery	____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	____	O	O	O	O	O	O
Nature conservation sites	____	O	O	O	O	O	O
Landscape feature	____	O	O	O	O	O	O
Heritage or archaeology value	____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	____	O	O	O	O	O	O
Ornamental/landscape use	____	O	O	O	O	O	O
Game angling	____	O	O	O	O	O	O
Coarse angling	____	O	O	O	O	O	O
Wildfowling	____	O	O	O	O	O	O
Birdwatching	____	O	O	O	O	O	O
Pleasure boating	____	O	O	O	O	O	O
Sailing (eg dinghies)	____	O	O	O	O	O	O
Canoeing/Rowing	____	O	O	O	O	O	O
Windsurfing	____	O	O	O	O	O	O
Water-skiing	____	O	O	O	O	O	O
Swimming and diving	____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	____	O	O	O	O	O	O
Transport links (road, rail etc.)	____	O	O	O	O	O	O
9. Other uses							
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

The Ministry is not a user of controlled waters or their associated environments. The questions asked are not relevant to our activities.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

forwarded to CPA

B

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : J. D. EDWARDS

Contact Address : MONSANTO plc.
RUABON WORKS
CEFN MAWR
WREXHAM
CLWYD LL14 3SL

Telephone Number : 0978 812100

1. Please define your area of responsibility :

a) functional ENVIRONMENTAL CONTROL

b) region/area DEE CATCHMENT. · NORTH WALES. ([redacted])(GLYNDWR)

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	○	○	○	○	○	○
Private supply	____	○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	____	○	○	○	○	○	○
Private discharge	____	○	○	○	○	○	○
3. Agricultural uses							
Land drainage	____	○	○	○	○	○	○
Spray irrigation	____	○	○	○	○	○	○
Livestock watering	____	○	○	○	○	○	○
Liquid waste disposal	____	○	○	○	○	○	○
Fish farming	____	○	○	○	○	○	○
Water cress growing	____	○	○	○	○	○	○
Forestry	____	○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	R	✓	✓	O	O	O	O
Process effluent disposal	R	O	O	O	O	O	O
Cooling water discharge		O	O	O	O	O	O
Mine washings		O	O	O	O	O	O
Mineral extraction		O	O	O	O	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage		O	O	O	O	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation		O	O	O	O	O	O
Nature conservation sites		O	O	O	O	O	O
Landscape feature		O	O	O	O	O	O
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)		O	O	O	O	O	O
Ornamental/landscape use		O	O	O	O	O	O
Game angling		O	O	O	O	O	O
Coarse angling		O	O	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching		O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)		O	O	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing		O	O	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)		O	O	O	O	O	O
Transport links (road, rail etc.)		O	O	O	O	O	O
9. Other uses							
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Industrial abstraction from river is possible because the river quality is acceptable for the use made & also volume required is available. Maximum annual abstraction set and max^m volume flow rate.

Process effluent disposal after biological treatment includes bleed from cooling water system plus collected surface waters. Quality of treated discharge meets the requirements of the water quality standards of the receiving water determined by the N.R.A.

Leachate discharge from a small licensed landfill is discharged to the local sewage works.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : Contact Address :

The National Association of Local Councils

Dear Dr. Birch,

This Association cannot helpfully reply to your questionnaire. We are not a body controlling or using water supplies.

(Secretary)

With Compliments

108 Great Russell Street, London, WC1B 3LD
Tel. No. 071 637 1865
Fax. No. 071 436 7451

t occur or are proposed
ther the use is or would
age ditches, reens etc.,
e associated with more
which are not included,

e described in terms of
e watercourse or water
can be objectively and
g/l, ha etc.) and those

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

E111
N123

National Federation of Anglers

Headquarters:
Halliday House, 2 Wilson Street, Derby DE1 1PG
Tel. Derby (0332) 362000

NATIONAL FEDERATION
RECEIVED
14 OCT 1992
OF ANGLERS

Ref: PEB.QA688.E111.N123

Dr Stephen Birch
Senior Environmental Officer
Environmental Advisory Unit Ltd.
Yorkshire House
Chapel Street
Liverpool L3 9AG

14 October 1992

Dear Dr Birch

Catchment Management Issues - Use Related Standards

I refer to your letter dated 7 October 1992, to the enclosed questionaire and to our telephone conversation on 12 October 1992.

As I mentioned, I felt that the questionaire did not really relate comfortably with a national governing body for a sport, but, following our conversation, I have completed it to the best of my ability and the completed form is enclosed herewith.

Although our members have only one actual use for all controlled waters - fishing - this can only be successful if the fisheries resource is in good condition. This means that:-

a) there must be sufficient water in the fishery, either in terms of level or fluvial discharge according to the type of water;

b) the water must be of an adequate chemical and physical quality;

c) if a flowing water, the bed configuration must be such that fish can find adequate supplies of food and shelter, in terms of current velocity variation and plant growth. That is, in practice, that the river must not be channelised with flow uniformity over long stretches.

Because every water is different, generalisations are not possible, hence the need for Catchment Management Plans, in which every case will have to be considered on its own merit.

In relation to standards, those for water quality currently in use have been based upon the work carried out by EIFAC and put forward by them as "Tentative Standards". The EC used these as the best evidence available upon which to base the standards in Directive 78/659/EEC, but it must be recognised that these are not necessarily perfect. Further work was commissioned by DoE after that Directive was made, but I am not aware of the results. Most water quality standards have been based on the extrapolation of acute LC50 tests and I have always felt that this is rather an inadequate procedure, because we are not only concerned with the death of fish, but also with fecundity, egg and fry survival etc.

We are very interested in the recommendations to DoE recently published by the NRA in relation to the classification of rivers by use or potential use and by a general scheme in which the biological condition will be taken into account. We think that this is a good way ahead in the management of catchments and commend it to you.

You will note that in my reply to question 3.5, I have bracketed groundwater. This is because the use, or misuse, of groundwater can have a significant impact on the fisheries contained in surface waters. Over-abstraction for prolonged periods (several decades) has, in many cases, caused the drying up of springs and, in at least 40 cases identified by the NRA, the streams themselves. Furthermore, if groundwater is used in significant quantities to augment river flows for abstraction further downstream, unseasonal temperature and flow regimes will occur in the tributaries augmented to the detriment of the fisheries.

Another important point in producing a catchment management plan is that adequate regard must be had for the quantity and quality of water entering river estuaries to preserve migratory fish runs and to maintain the general environmental quality of the estuary.

In regard to question 3.7, you will note that I have marked a series of boating activities and bird watching. Whilst the NFA has no desire to stop any of these activities, they do need proper management in order to preserve the rights of anglers, who, in many cases pay substantial sums of money to riparian owners for the legal right to fish. Boaters, especially some canoeists make no such payment and often trespass on private waters. This subject therefore needs to be addressed in any catchment management plans produced.

I hope that these comments, in addition to the form will be of assistance to you in your task.

Yours sincerely

Dr P E Battomley
Scientific Advisor

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : NATIONAL FEDERATION OF ANGLERS

Contact Address : HALLIDAY HOUSE
2 WILSON STREET,
DERBY, DE1 1PG

Telephone Number : OFFICE: 0332 362000
SCIENTIFIC ADVISOR : 021 705 5248

1. Please define your area of responsibility :

a) functional Governing Body for the sport of Coarse (Cyprinid) Fishing

b) region/area England & Wales (Primarily)

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

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Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)	RCDLE (G)	✓	✓	✓	✓	✓	✓
Salmonid fishery	RCDLE (G)	✓	✓	✓	✓	✓	✓
Cyprinid (coarse) fishery	RCDLE (G)	✓	✓	✓	✓	✓	✓
6. Conservation							
River corridor conservation	RCDLE	○	○	○	✓	✓	✓
(River Corridor) Nature conservation sites	RCDLE	○	○	○	✓	✓	✓
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling	RCDLE	✓	✓	✓	✓	✓	✓
Coarse angling	RCDLE	✓	✓	✓	✓	✓	✓
Wildfowling		○	○	○	○	○	○
ϕ Birdwatching		○	○	○	○	○	○
* Pleasure boating		○	○	○	○	○	○
* Sailing (eg dinghies)		○	○	○	○	○	○
* Canoeing/Rowing		○	○	○	○	○	○
* Windsurfing		○	○	○	○	○	○
* Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) Water quality standards are basically National, EC or EIFAC but discharge consents conditions must be tailored to suit each case, depending on dilution factors, rate of repurification etc., so that physical volume if the river/water channel, gradient etc are important, as is the quantity of water licensed for abstraction.

b) There are no water quality standards for general applications each situation has to be assessed individually.

Any other comments you may wish to make can be given below.

See covering letter.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : ALISON COLE

Contact Address : REGULATORY AFFAIRS
NATIONAL POWER
SENATOR HOUSE
QUEEN VICTORIA ST
LONDON
EC4V 4DP.

Telephone Number :

1. Please define your area of responsibility :

a) functional ....Interaction with regulatory bodies....

b) region/area ....entire UK.....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	GRCE	✓	✓	○	○	○	✓
Process effluent disposal	RCE	✓	✓	○	○	○	○
Cooling water discharge	RCE	✓	✓	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)	G	✓	✓	○	○	○	○
Power generation	RE	✓	✓	✓	○	○	○
Commercial navigation	?	✓	○	○	○	○	○
Site drainage	RCE	✓	✓	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

WE ARE KEEN TO BE INVOLVED IN THE CATCHMENT PLANNING PROGRAMME AND LOOK FORWARD TO MORE DETAILED FUTURE CONSULTATION

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name :

Contact Address :

Millis House
The Causeway
Staines
Middlesex
TW18 3BX

Telephone Number : 0784 455464

1. Please define your area of responsibility :

a) functional .....Public Water Supply.....

b) region/area .....Surrey, East Berkshire, West London/Thames

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R L G	✓	✓	✓	✓	✓	✓
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	_____	O	O	O	O	O	O
Process effluent disposal	_____	O	O	O	O	O	O
Cooling water discharge	_____	O	O	O	O	O	O
Mine washings	_____	O	O	O	O	O	O
Mineral extraction	_____	O	O	O	O	O	O
Solid wastes (ie landfill)	_____	O	O	O	O	O	O
Power generation	_____	O	O	O	O	O	O
Commercial navigation	_____	O	O	O	O	O	O
Site drainage	_____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	_____	O	O	O	O	O	O
Shellfishing	_____	O	O	O	O	O	O
Migratory fishery (inc. eels)	_____	O	O	O	O	O	O
Salmonid fishery	_____	O	O	O	O	O	O
Cyprinid (coarse) fishery	_____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	_____	O	O	O	O	O	O
Nature conservation sites	_____	O	O	O	O	O	O
Landscape feature	_____	O	O	O	O	O	O
Heritage or archaeology value	_____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	_____	O	O	O	O	O	O
Ornamental/landscape use	_____	O	O	O	O	O	O
Game angling	_____	O	O	O	O	O	O
Coarse angling	_____	O	O	O	O	O	O
Wildfowling	_____	O	O	O	O	O	O
Birdwatching	_____	O	O	O	O	O	O
Pleasure boating	_____	O	O	O	O	O	O
Sailing (eg dinghies)	_____	O	O	O	O	O	O
Canoeing/Rowing	_____	O	O	O	O	O	O
Windsurfing	_____	O	O	O	O	O	O
Water-skiing	_____	O	O	O	O	O	O
Swimming and diving	_____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	_____	O	O	O	O	O	O
Transport links (road, rail etc.)	_____	O	O	O	O	O	O
9. Other uses							
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : CJL TAYLOR

Contact Address : Loc 106, Nuclear Electric, Barnett Way, Barnwood, Gloucester GL4 7RS

Telephone Number : 0452 652383

1. Please define your area of responsibility :

a) functional All aspects of marine ecology, water quality and aquatic regulatory affairs as they affect Nuclear Electric. Direction of appropriate research.

b) region/area UK

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list. M: Marine.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G) M	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	G R L C	✓	✓	✓	○	○	○
Private supply	G	✓	✓	✓	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	✓	✓	✓
Private discharge	L E M	○	○	○	✓	✓	✓
3. Agricultural uses							
Land drainage	L E M	○	○	○	✓	○	✓
Spray irrigation	—	○	○	○	○	○	○
Livestock watering		○	○	○	✓	✓	✓
Liquid waste disposal	L E M	○	○	○	✓	✓	✓
Fish farming	—	○	○	○	○	○	○
Water cress growing	—	○	○	○	○	○	○
Forestry	—	○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	LEM	✓	✓	✓	○	○	○
Process effluent disposal	LEM	✓	✓	✓	○	○	○
Cooling water discharge	LEM	✓	✓	✓	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)	EMG	✓	✓	✓	○	○	○
Power generation	LEM	✓	✓	✓	○	○	○
Commercial navigation	EM	○	○	○	✓	✓	✓
Site drainage	LEM	○	○	○	✓	✓	✓
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) ..... Ref. to NRA. .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Primary requirement is for large volumes of clean seawater with minimal interference from inputs of organic compounds, solids and enhanced temperature.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

Royal Yachting Association
RYA House
Romsey Road, Eastleigh
Hampshire SO5 4YA
Tel: 0703 629962
Fax: 0703 629924

ROYAL YACHTING ASSOCIATION

Patron
Her Majesty The Queen
President:
HRH The Princess Royal, GCVO

Dr S Birch
Senior Environmental Officer
Environmental Advisory Unit Ltd
Yorkshire House
Chapel Street
Liverpool
L3 9AG

20 November 1992

Dear Dr Birch

CATCHMENT MANAGEMENT ISSUES: USE RELATED STANDARDS
NRA NATIONAL R&D PROJECT 405

Thank you for your circular letter of 7 October and questionnaire which you have prepared on behalf of the National Rivers Authority. I return this completed to show the water uses which are of concern to the Royal Yachting Association. I apologise for the late return of the questionnaire and hope nevertheless that you will be able to incorporate our comments in the terms of reference which you are developing.

Following a meeting with the Head of Water Quality at NRA Headquarters last year, we agreed that we would attempt to provide the NRA with detailed information on the use of coastal and estuarine waters for those water sports which we represent. This work is currently going on and I hope that we will be able to produce some data early next year. I will let you have a copy of our report when it is available.

Yours sincerely

J M EARDLEY
Secretary, Coastal Planning and Environmental Panel

Encs.

year of youth sailing 1993

Secretary General:
Robin Duchesne, OBE

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CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : ROYAL YACHTING ASSOCIATION

Contact Address : RYA HOUSE
ROMSEY ROAD
EASTLEIGH
HANTS SO5 4YA
(Contact person Mr J. M. EARSLEY)

Telephone Number : 0703 629962 (tel)
(0703 629924 (fax)

1. Please define your area of responsibility :

a) functional NATIONAL GOVERNING BODY FOR RECREATIONAL BOATING

b) region/area WHOLE OF BRITISH ISLES
(RYA HAS CENTRAL AND REGIONAL ADMINISTRATION)

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling		○	○	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating	R, C, D*, L, E	⊗	⊗	○	⊗	⊗	⊗
Sailing (eg dinghies)	R, L, E	⊗	⊗	○	⊗	⊗	⊗
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing	R, L, E	⊗	⊗	○	⊗	⊗	⊗
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

*if navigable

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

WE NOTE THAT YOUR QUESTIONAIRE DOES NOT COVER USES FOR COASTAL WATERS OTHER THAN ESTUARIES, EVEN THOUGH NRA RECOMMENDATIONS FOR THE SQWO SCHEME (PARA. 3.2) WOULD APPLY TO ALL CONTROLLED WATERS, AND TABLE 1 CONTAINS A CATEGORY FOR BOTH ESTUARIES AND COASTAL WATERS.

WE ARE PARTICULARLY CONCERNED WITH HEALTH RISKS ASSOCIATED WITH THE USE OF COASTAL WATERS CONTAMINATED WITH UNTREATED OR PARTIALLY TREATED SEWAGE.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may bq that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

Rural Development Commission
11 Cowley Street, London SW1P 3NA
Telephone: 071-276 6969
Fax: 071-276 6940
Direct Line: 071-276

RURAL DEVELOPMENT COMMISSION

19 October 1992

Dr. Stephen Birch
Senior Environmental Officer
Environmental Advisory Unit Limited
Yorkshire House
Chapel Street
Liverpool L3 9AG

Dear Doctor Birch

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R & D Project 405

I write in reply to your letter of the 7 October in which you enclosed a questionnaire in respect of Catchment Management Issues on behalf of the National Rivers Authority.

Unfortunately, the Rural Development Commission has no contribution to make to the survey as we have no responsibilities for the management of water or water-related environments. I am therefore unable to complete your questionnaire and it is returned to you attached to this letter.

Yours sincerely

Elizabeth Goulding
Rural Economy Branch

A body corporate established by Act of Parliament as the Development Commission

Promoting jobs and communities in rural England

SDIA

THE SOAP & DETERGENT INDUSTRY ASSOCIATION
P.O. Box No. 9 Hayes Gate House, Hayes, Middlesex UB4 0JD
Telephone 081-573 7992 Fax No. 081-561 5077
VAT Registered No. 243 7044 77

BKC/AB

2 November 1992

Dr S P Birch
Environmental Advisory Unit Ltd
Yorkshire House
Chapel Street
Liverpool L3 9AG

Dear Dr Birch

NRA R&D Project 405

Your questionnaire was directed to "point source" users of water and thus its categories are not meaningful for our industry, apart from the relatively minor uses at production sites.

Our industry's major involvement with water use is the diffuse use by consumers using washing machines and the used washing water going via sewage works into the river systems. As you know, the industry has devoted considerable resource over many years to ensure its formulations, after use, do not cause environmental problems.

The industry has also helped sponsor research in the Norfolk Broads, primarily on eutrophication, with the work being led by your colleague at Liverpool University, Professor Brian Moss.

We would be happy to discuss the issues directly with you, if this should be relevant to your project.

Yours sincerely

B K Chesterton
Director General

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : SARAH MILTON Contact Address : ENGINEERING DEPT
SOUTH STAFFORDSHIRE WATER PLC

Telephone Number : 0922 38282 x2410

1. Please define your area of responsibility :

a) functional AQUIFER PROTECTION / NEW RESOURCE DEVELOPMENT / ENVIRONMENTAL IMPACT ASSESSMENTS

b) region/area SOUTH STAFFS / WEST MIDLANDS

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	RLG	✓	○	✓	○	○	○
Private supply	G	✓	○	✓	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	____	O	O	O	O	O	O
Process effluent disposal	____	O	O	O	O	O	O
Cooling water discharge	____	O	O	O	O	O	O
Mine washings	____	O	O	O	O	O	O
Mineral extraction	____	O	O	O	O	O	O
Solid wastes (ie landfill)	____	O	O	O	O	O	O
Power generation	____	O	O	O	O	O	O
Commercial navigation	____	O	O	O	O	O	O
Site drainage	____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	____	O	O	O	O	O	O
Shellfishing	____	O	O	O	O	O	O
Migratory fishery (inc. eels)	____	O	O	O	O	O	O
Salmonid fishery	____	O	O	O	O	O	O
Cyprinid (coarse) fishery	____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	____	O	O	O	O	O	O
Nature conservation sites	____	O	O	O	O	O	O
Landscape feature	____	O	O	O	O	O	O
Heritage or archaeology value	____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	____	O	O	O	O	O	O
Ornamental/landscape use	____	O	O	O	O	O	O
Game angling	____	O	O	O	O	O	O
Coarse angling	____	O	O	O	O	O	O
Wildfowling	____	O	O	O	O	O	O
Birdwatching	____	O	O	O	O	O	O
Pleasure boating	____	O	O	O	O	O	O
Sailing (eg dinghies)	____	O	O	O	O	O	O
Canoeing/Rowing	____	O	O	O	O	O	O
Windsurfing	____	O	O	O	O	O	O
Water-skiing	____	O	O	O	O	O	O
Swimming and diving	____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	____	O	O	O	O	O	O
Transport links (road, rail etc.)	____	O	O	O	O	O	O
9. Other uses							
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) Only those outlined above.

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Only filled in the areas relating directly to my responsibility. However many other areas are dealt with indirectly eg private sewage discharges, spray irrigation, industrial abstraction, discharges, landfill all of which could probably have use related standards developed for them.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : SUE O'NEIL Contact Address : 16 UPPER WOBURN PLACE
THE SPORTS COUNCIL LONDON WC1H 0QP

Telephone Number : 071 - 388 - 1277

1. Please define your area of responsibility :

a) functional National - countryside and water sport and active recreation

b) region/area .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)	RCDLE	○	○	○	✓	✓	✓
Ornamental/landscape use		○	○	○	○	○	○
Game angling	RL(E)	○	○	○	✓	✓	✓
Coarse angling	RCDLE	○	○	○	✓	✓	✓
Wildfowling	RLE	○	○	○	✓	✓	✓
Birdwatching		○	○	○	○	○	○
Pleasure boating	RCL	○	○	○	✓	✓	✓
Sailing (eg dinghies)	RCLE	○	○	○	✓	✓	✓
Canoeing/Rowing	RCLE	○	○	○	✓	✓	✓
Windsurfing	RLE	○	○	○	✓	✓	✓
Water-skiing	RLCE	○	○	○	✓	✓	✓
Swimming and diving	RCLE	○	○	○	✓	✓	✓
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
CAVING	G	○	○	○	○	✓	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

The Sports Council has responsibility for sport and active recreation in general terms. No detailed research has been carried out by the Sports Council into this subject, although our concerns were strongly voiced during the NRA's consultation on water quality standards. Some specific governing bodies of sport have been involved with specific research, including: British Canoe Union, National Federation of Angling and Royal Yachting Assn. It may be worthwhile contacting them direct.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : SPORTS COUNCIL FOR WALES

Contact Address : JOHN HARRISON
SCW, WELSH INSTITUTE OF SPORT
SOPHIA GARDENS
CARDIFF
CF1 9SW

Telephone Number : 0222 397571 x 221

1. Please define your area of responsibility :

a) functional SPORT AND RECREATION

b) region/area WALES

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list. S. Sea

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	____	O	O	O	O	O	O
Private supply	____	O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge	____	O	O	O	O	O	O
Private discharge	____	O	O	O	O	O	O
3. Agricultural uses							
Land drainage	____	O	O	O	O	O	O
Spray irrigation	____	O	O	O	O	O	O
Livestock watering	____	O	O	O	O	O	O
Liquid waste disposal	____	O	O	O	O	O	O
Fish farming	____	O	O	O	O	O	O
Water cress growing	____	O	O	O	O	O	O
Forestry	____	O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites		○	○	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)	RCLEDS	○	✓	✓	✓	✓	✓
Ornamental/landscape use		○	○	○	○	○	○
Game angling	RCLE	✓	✓	✓	○	✓	✓
Coarse angling	RCLED	✓	✓	✓	○	✓	✓
Wildfowling		○	○	○	○	○	○
Birdwatching		○	○	○	○	○	○
Pleasure boating	RCLES	✓	✓	✓	○	✓	✓
Sailing (eg dinghies)	RCLES	✓	✓	✓	✓	✓	✓
Canoeing/Rowing	RCLES	✓	✓	✓	✓	✓	✓
Windsurfing	LES	✓	✓	✓	✓	✓	✓
Water-skiing	RLES	✓	✓	✓	○	✓	✓
Swimming and diving	RCLES	✓	✓	✓	✓	✓	✓
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

1. For most outdoor sport + recreation the experience has an aesthetic as well as a physical dimension to it. Even in non immersible sports water will be preferred which is clear, lacks litter etc.

2. It is hard to define non-contact and non-immersible. With increasing ability, ~~some becomes~~ contact becomes infrequent but is still possible or occasional.

3. For recreation, the same standards are needed for sea and freshwater. Sea water quality obviously affects estuarine quality.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2–1.5m, min. area 5 ha, pH 7–8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : A. J. SMITH

Contact Address : SUTTON DISTRICT WATER PLC
59 GANDER GREEN LANE
CHEAM, SUTTON,
SURREY

Telephone Number : 081 643 8050

1. Please define your area of responsibility :

a) functional ..... WATER SUPPLY .....

b) region/area ..... THAMES .....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	G	✓	✓	✓	✓	✓	✓
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	____	O	O	O	O	O	O
Process effluent disposal	____	O	O	O	O	O	O
Cooling water discharge	____	O	O	O	O	O	O
Mine washings	____	O	O	O	O	O	O
Mineral extraction	____	O	O	O	O	O	O
Solid wastes (ie landfill)	____	O	O	O	O	O	O
Power generation	____	O	O	O	O	O	O
Commercial navigation	____	O	O	O	O	O	O
Site drainage	____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	____	O	O	O	O	O	O
Shellfishing	____	O	O	O	O	O	O
Migratory fishery (inc. eels)	____	O	O	O	O	O	O
Salmonid fishery	____	O	O	O	O	O	O
Cyprinid (coarse) fishery	____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	____	O	O	O	O	O	O
Nature conservation sites	____	O	O	O	O	O	O
Landscape feature	____	O	O	O	O	O	O
Heritage or archaeology value	____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	____	O	O	O	O	O	O
Ornamental/landscape use	____	O	O	O	O	O	O
Game angling	____	O	O	O	O	O	O
Coarse angling	____	O	O	O	O	O	O
Wildfowling	____	O	O	O	O	O	O
Birdwatching	____	O	O	O	O	O	O
Pleasure boating	____	O	O	O	O	O	O
Sailing (eg dinghies)	____	O	O	O	O	O	O
Canoeing/Rowing	____	O	O	O	O	O	O
Windsurfing	____	O	O	O	O	O	O
Water-skiing	____	O	O	O	O	O	O
Swimming and diving	____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	____	O	O	O	O	O	O
Transport links (road, rail etc.)	____	O	O	O	O	O	O
9. Other uses							
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : TENDRING HUNDRED WATER SERVICES

Contact Address : MILL HILL
MANNINGTREE
ESSEX CO11 2AZ

Telephone Number : 0206 - 392155

MRS L.M. MORGAN

1. Please define your area of responsibility :

a) functional ....WATER SUPPLY COMPANY....

b) region/area ....ANGLIAN / NORTH EAST ESSEX....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R L G	O	O	O	Ø	Ø	Ø
Private supply		O	O	O	O	O	O
2. Sewage effluent disposal							
Water company discharge		O	O	O	O	O	O
Private discharge		O	O	O	O	O	O
3. Agricultural uses							
Land drainage		O	O	O	O	O	O
Spray irrigation		O	O	O	O	O	O
Livestock watering		O	O	O	O	O	O
Liquid waste disposal		O	O	O	O	O	O
Fish farming		O	O	O	O	O	O
Water cress growing		O	O	O	O	O	O
Forestry		O	O	O	O	O	O

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		O	O	O	O	O	O
Process effluent disposal		O	O	O	O	O	O
Cooling water discharge		O	O	O	O	O	O
Mine washings		O	O	O	O	O	O
Mineral extraction		O	O	O	O	O	O
Solid wastes (ie landfill)		O	O	O	O	O	O
Power generation		O	O	O	O	O	O
Commercial navigation		O	O	O	O	O	O
Site drainage		O	O	O	O	O	O
5. Fisheries							
Commercial fishing		O	O	O	O	O	O
Shellfishing		O	O	O	O	O	O
Migratory fishery (inc. eels)		O	O	O	O	O	O
Salmonid fishery		O	O	O	O	O	O
Cyprinid (coarse) fishery		O	O	O	O	O	O
6. Conservation							
River corridor conservation		O	O	O	O	O	O
Nature conservation sites		O	O	O	O	O	O
Landscape feature		O	O	O	O	O	O
Heritage or archaeology value		O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)		O	O	O	O	O	O
Ornamental/landscape use		O	O	O	O	O	O
Game angling		O	O	O	O	O	O
Coarse angling	L	O	Ø	O	O	O	O
Wildfowling		O	O	O	O	O	O
Birdwatching		O	O	O	O	O	O
Pleasure boating		O	O	O	O	O	O
Sailing (eg dinghies)	L	O	Ø	O	O	O	O
Canoeing/Rowing		O	O	O	O	O	O
Windsurfing	L	O	Ø	O	O	O	O
Water-skiing		O	O	O	O	O	O
Swimming and diving		O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)		O	O	O	O	O	O
Transport links (road, rail etc.)		O	O	O	O	O	O
9. Other uses							
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O
.....		O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

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Name : SUSANNAH MOSS

Contact Address : ENGINEERING & PLANNING DEPT, THREE VALLEYS WATER SERVICES PLC, PO BOX 48, HATFIELD, HERTS AL10 9HL

Telephone Number : (0707) 277 340

1. Please define your area of responsibility :

a) functional WATER RESOURCES

b) region/area THREE VALLEYS WATER SERVICES STATUTORY AREA

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	G,L	✓	✓	○	○	○	○
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction		○	○	○	○	○	○
Process effluent disposal		○	○	○	○	○	○
Cooling water discharge		○	○	○	○	○	○
Mine washings		○	○	○	○	○	○
Mineral extraction		○	○	○	○	○	○
Solid wastes (ie landfill)		○	○	○	○	○	○
Power generation		○	○	○	○	○	○
Commercial navigation		○	○	○	○	○	○
Site drainage		○	○	○	○	○	○
5. Fisheries							
Commercial fishing		○	○	○	○	○	○
Shellfishing		○	○	○	○	○	○
Migratory fishery (inc. eels)		○	○	○	○	○	○
Salmonid fishery		○	○	○	○	○	○
Cyprinid (coarse) fishery		○	○	○	○	○	○
6. Conservation							
River corridor conservation		○	○	○	○	○	○
Nature conservation sites	L	✓	✓	○	○	○	○
Landscape feature		○	○	○	○	○	○
Heritage or archaeology value		○	○	○	○	○	○
7. Amenity and recreation							
General amenity (walking)		○	○	○	○	○	○
Ornamental/landscape use		○	○	○	○	○	○
Game angling	L	✓	✓	○	○	○	○
Coarse angling		○	○	○	○	○	○
Wildfowling		○	○	○	○	○	○
Birdwatching	L	✓	✓	○	○	○	○
Pleasure boating		○	○	○	○	○	○
Sailing (eg dinghies)		○	○	○	○	○	○
Canoeing/Rowing		○	○	○	○	○	○
Windsurfing		○	○	○	○	○	○
Water-skiing		○	○	○	○	○	○
Swimming and diving		○	○	○	○	○	○
8. Other land use features							
Urban land use (drainage etc.)		○	○	○	○	○	○
Transport links (road, rail etc.)		○	○	○	○	○	○
9. Other uses							
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○
.....		○	○	○	○	○	○

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) NONE

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

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TCPA

Town and Country Planning Association

17 Carlton House Terrace, London SW1Y 5AS. Tel: 071-930 8903/4/5. Fax: 071-930 3280

Planning for People and Places

Our ref: AW:JW

5th November 1992

Dear Dr. Birch,

Catchment Management Issues: Use Related Standards

NRA National R and D Project 405

Thank you for your letter of 7th October. I very much regret, however, that the Association is neither a major user of water nor in possession of statistics useful for your purpose. I am not, therefore, in a position to complete your questionnaire and I can only repeat my regret that I cannot assist you on this occasion.

Yours sincerely,

Adrian Webb

Adrian Webb
Deputy Director.

Dr. S P Birch,
Environmental Advisory Unit Ltd.,
Yorkshire House,
Chapel Street,
Liverpool, L3 9AG.

President: Rt. Hon. Lord Rippon of Hexham PC, QC Director: David Hall MA MRTPI FRSA

The TCPA is committed to improving the environment through effective planning, public participation and sustainable development

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CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : J G. JONES
DIRECTOR of SCIENCE & QUALITY

Contact Address : WESSEX HOUSE
PASSAGE ST
BRISTOL
BS 2 0JQ

Telephone Number : 0272 - 290611.

1. Please define your area of responsibility :

a) functional ....WATER SUPPLY + SEWAGE TREATMENT

b) region/area ....WESSEX WATER

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R+G	✓	✓	✓	✓	✓	✓
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge	R+C	✓	✓	✓	✓	✓	✓
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	WQ	Phys	QUALITATIVE Vol	WQ	Phys
4. Industrial uses							
Industrial abstraction	_____	O	O	O	O	O	O
Process effluent disposal	_____	O	O	O	O	O	O
Cooling water discharge	_____	O	O	O	O	O	O
Mine washings	_____	O	O	O	O	O	O
Mineral extraction	_____	O	O	O	O	O	O
Solid wastes (ie landfill)	_____	O	O	O	O	O	O
Power generation	_____	O	O	O	O	O	O
Commercial navigation	_____	O	O	O	O	O	O
Site drainage	_____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	_____	O	O	O	O	O	O
Shellfishing	_____	O	O	O	O	O	O
Migratory fishery (inc. eels)	_____	O	O	O	O	O	O
Salmonid fishery	_____	O	O	O	O	O	O
Cyprinid (coarse) fishery	_____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	_____	O	O	O	O	O	O
Nature conservation sites	_____	O	O	O	O	O	O
Landscape feature	_____	O	O	O	O	O	O
Heritage or archaeology value	_____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	_____	O	O	O	O	O	O
Ornamental/landscape use	_____	O	O	O	O	O	O
Game angling	_____	O	O	O	O	O	O
Coarse angling	_____	O	O	O	O	O	O
Wildfowling	_____	O	O	O	O	O	O
Birdwatching	_____	O	O	O	O	O	O
Pleasure boating	_____	O	O	O	O	O	O
Sailing (eg dinghies)	_____	O	O	O	O	O	O
Canoeing/Rowing	_____	O	O	O	O	O	O
Windsurfing	_____	O	O	O	O	O	O
Water-skiing	_____	O	O	O	O	O	O
Swimming and diving	_____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	_____	O	O	O	O	O	O
Transport links (road, rail etc.)	_____	O	O	O	O	O	O
9. Other uses							
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O
.....	_____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

i) .....

Any other comments you may wish to make can be given below.

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A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.

CATCHMENT MANAGEMENT ISSUES : USE RELATED STANDARDS
NRA National R&D Project 405

Questionnaire

Prepared by the Environmental Advisory Unit Ltd. on behalf of the National Rivers Authority

---

Name : York Waterworks PLC (CA. WILFORD) Contact Address : Lendal Tower, York.

Telephone Number : 0904-622171.

1. Please define your area of responsibility :

a) functional ....water supply....

b) region/area ....York and District....

2. Which of the following uses of water and the water related environment occur or are proposed within your area of responsibility ? Please indicate in the first column whether the use is or would be associated with any of R = Rivers and streams, C = Canals, D = Drainage ditches, reens etc., L = Lakes and reservoirs, E = Estuaries or G = Groundwater (uses may be associated with more than one category of water body). Any other uses you may identify but which are not included, may be added to the list.

3. Which of the uses you identify have specific requirements, which can be described in terms of water flow/volume (Vol), water quality (WQ) or the physical features of the watercourse or water body used (Phys). Please distinguish between those requirements which can be objectively and clearly defined as a specific quantitative standard (e.g. cumecs, Ml, mg/l, ha etc.) and those which, by necessity are more subjective and descriptive, i.e. qualitative.

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
1. Public water supply							
Water company abstraction	R	○	✓	○	○	○	○
Private supply		○	○	○	○	○	○
2. Sewage effluent disposal							
Water company discharge		○	○	○	○	○	○
Private discharge		○	○	○	○	○	○
3. Agricultural uses							
Land drainage		○	○	○	○	○	○
Spray irrigation		○	○	○	○	○	○
Livestock watering		○	○	○	○	○	○
Liquid waste disposal		○	○	○	○	○	○
Fish farming		○	○	○	○	○	○
Water cress growing		○	○	○	○	○	○
Forestry		○	○	○	○	○	○

PTO

Water uses	Water body type (R,C,D,L,E,G)	QUANTITATIVE Vol	QUANTITATIVE WQ	QUANTITATIVE Phys	QUALITATIVE Vol	QUALITATIVE WQ	QUALITATIVE Phys
4. Industrial uses							
Industrial abstraction	____	O	O	O	O	O	O
Process effluent disposal	____	O	O	O	O	O	O
Cooling water discharge	____	O	O	O	O	O	O
Mine washings	____	O	O	O	O	O	O
Mineral extraction	____	O	O	O	O	O	O
Solid wastes (ie landfill)	____	O	O	O	O	O	O
Power generation	____	O	O	O	O	O	O
Commercial navigation	____	O	O	O	O	O	O
Site drainage	____	O	O	O	O	O	O
5. Fisheries							
Commercial fishing	____	O	O	O	O	O	O
Shellfishing	____	O	O	O	O	O	O
Migratory fishery (inc. eels)	____	O	O	O	O	O	O
Salmonid fishery	____	O	O	O	O	O	O
Cyprinid (coarse) fishery	____	O	O	O	O	O	O
6. Conservation							
River corridor conservation	____	O	O	O	O	O	O
Nature conservation sites	____	O	O	O	O	O	O
Landscape feature	____	O	O	O	O	O	O
Heritage or archaeology value	____	O	O	O	O	O	O
7. Amenity and recreation							
General amenity (walking)	____	O	O	O	O	O	O
Ornamental/landscape use	____	O	O	O	O	O	O
Game angling	____	O	O	O	O	O	O
Coarse angling	____	O	O	O	O	O	O
Wildfowling	____	O	O	O	O	O	O
Birdwatching	____	O	O	O	O	O	O
Pleasure boating	____	O	O	O	O	O	O
Sailing (eg dinghies)	____	O	O	O	O	O	O
Canoeing/Rowing	____	O	O	O	O	O	O
Windsurfing	____	O	O	O	O	O	O
Water-skiing	____	O	O	O	O	O	O
Swimming and diving	____	O	O	O	O	O	O
8. Other land use features							
Urban land use (drainage etc.)	____	O	O	O	O	O	O
Transport links (road, rail etc.)	____	O	O	O	O	O	O
9. Other uses							
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O
.....	____	O	O	O	O	O	O

4. Please provide a list of any regionally based standards and other guidelines (other than statutory and national standards such as EC Directives, UK Legislation, DoE Circulars, NRA Guidelines, NCC criteria etc.) that you already use in applying standard requirements to any of the uses you have identified. Please also indicate whether these are related to flow/volume (Vol), water quality (WQ) or physical features (Phys). If these are documented and readily available, please append a copy of the documentation to this questionnaire.

a) Water abstracted from the river needs to be suitable
b) for conventional water treatment and result in a
c) treated water which meets the standards set in
d) the Water Quality Regulations.
e) Raw water also needs to meet the surface
f) Water Directive requirements.
g) No documented standards other than the above.
h)
i)

Any other comments you may wish to make can be given below.

Technical Appendix

A. It is important to draw the distinction between parameter and standard. The parameter i the characteristic of the water course or water body under consideration, e.g rate of flow, are, pH, BOD etc. The standard is the level set for any particular parameter by appropriate legislation or guidelines, e.g. min. flow 5 cumecs, depth 0.2-1.5m, min. area 5 ha, pH 7-8, BOD < 3 mg/l. It may be that the project identifies some uses which have set standards for some parameters (probably water quality parameters), but not for others (e.g. physical characteristics).

B. It is also important to consider how to deal with flow and volume. In some situations a rate of flow (m/sec) may be important, in others a volume of flow (m^3/sec) may be appropriate, whereas in others, the absolute volume (m^3) or total annual volume over a catchment may need to be specified. A combination of these parameters may be used to give a preferred flow regime over the year.