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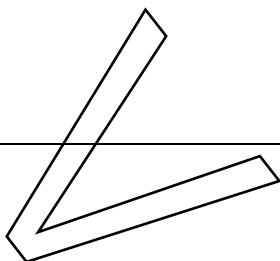
Water quality - Guidance standard for assessing the hydromorphological features of rivers

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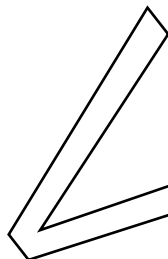
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ICS



English version

Water quality - Guidance standard for assessing the hydromorphological features of rivers

Qualité de l'eau - Guide pour l'évaluation des caractéristiques hydromorphologiques des rivières

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Preview
prEN 14614

Foreword

This document (prEN 14614:2003) has been prepared by Technical Committee CEN/TC 230 "Water analysis", the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

WARNING — Safety issues are paramount when surveying rivers. Surveyors should conform to EU and national Health and Safety legislation, and any additional guidelines appropriate for working in or near rivers.

Introduction

Historically, many countries in Europe have assessed river 'quality' simply in terms of the chemical or pollution status of the water flowing in river channels. A more comprehensive view of river habitats is needed, however, to answer pressing ecological questions such as those arising from the EC Water Framework Directive (WFD) (Commission of the European Communities, 2000) and the EC Habitats Directive, to underpin the International Convention on Biodiversity, or to assess proposed river engineering schemes and other catchment developments. In most European countries there are now pressures from statutory and voluntary environment and conservation agencies to see rivers returned to a more natural condition. This implies a need to evaluate areas deserving protection and those requiring rehabilitation, and to encourage better management of river systems throughout Europe.

1 Scope

This European Standard provides guidance on the features to be recorded when characterising and assessing the hydromorphology of rivers. It is based on methods developed, tested, and compared in Europe. Its main aim is to improve the comparability of hydromorphological survey methods, data processing, interpretation and presentation of results. Whilst it has particular importance in relation to the reporting requirements of the WFD, it also has considerably wider scope for other applications. Although hydromorphology is dependent on hydrology and underlying geology, this standard is focused on the structural features of rivers and on river continuity. In addition, whilst recognising the important influence of hydromorphology on plant and animal ecology and, conversely, the influence of plants and animals on hydromorphology, no attempt is made to provide guidance in this area.

2 Definitions

For the purpose of this European Standard, the following terms and definitions apply.

2.1

aquatic macrophytes

larger plants of fresh water which are easily seen with the naked eye, including all aquatic vascular plants, bryophytes, stoneworts (Characeae) and macro-algal growths

NOTE This definition includes plants associated with open water or wetlands with shallow water.

2.2

attribute

a specific recorded element of a hydromorphological feature (e.g. 'boulders' and 'silt' are substrate attributes; 'sheet piling' and 'gabions' are attributes of engineered banks)

2.3

backwater

area of low velocity or static water under dry-weather flows, most commonly former river channels or flood channels within the alluvial floodplain, connected to the river channel only in periods of high flow

2.4

bank

permanent side of a river or island, which is above the normal water level and only submerged during periods of high river flow

NOTE In the context of this European Standard, the top is marked by the first major break in slope, above which cultivation or development is possible.

2.5

bankfull

maximum point on banks at which floods are held within the channel before spilling over onto the floodplain

2.6

berm

natural or artificial shelf within a river that is exposed above water level during low flows, but is submerged during high flows

2.7

bog

a wetland, fed by atmospheric precipitation, in which the vegetation communities (frequently dominated by *Sphagnum* mosses) form peat over long periods of time

2.8

braiding

course of a river naturally divided by deposited sediment accumulations, characterised by at least two channels which often change their course regularly

2.9

bryophytes

a collective term for liverworts and mosses – plants which are often abundant on exposed boulders and bedrock of upland streams

2.10

compaction

consolidation of the river bed through physical, chemical or biological processes

2.11

contiguous survey

survey carried out along entire river reaches, with data collected from adjoining survey units

2.12

ecological status

an expression of the quality of the structure and functioning of aquatic ecosystems, expressed by comparing the prevailing conditions with reference conditions

NOTE As classified in accordance with Annex V of the EC Water Framework Directive.

2.13

embankment (levee)

artificial bank built to raise the natural bank level thereby reducing the frequency of flooding of adjacent land

2.14

floodplain

the valley floor adjacent to a river that is (or was historically) inundated periodically by flood waters

2.15

fluvial features

features shaped by sedimentation and erosion

2.16**gabion**

wire basket containing stones, used for river-bed or bank protection

2.17**glide**

moderately-flowing water with undisturbed surface other than occasional swirls or eddies (*cf.* 'run')

2.18**hydromorphology**

the hydrological characteristics of rivers together with the physical structure that they create

2.19**lateral connectivity**

the freedom for water to move between the channel and the floodplain

2.20**lateral movement**

the freedom for a river channel to migrate across a floodplain

2.21**levee**

see 'embankment'

2.22**planform**

view of river pattern from above (e.g. sinuous, straight)

2.23**point bar**

bar of river sediment formed on the inside of a bend in a river (*cf.* *side bar*)

2.24**pool**

a distinct feature of deeper water that does not exceed three channel widths in length, where depth is sustained through fluvial scour and where river flow may be imperceptible in dry weather conditions

2.25**reach**

a major sub-division of a river, defined by physical, hydrological, and chemical character that distinguishes it from other parts of the river system upstream and downstream

2.26**reference conditions**

conditions representing a totally undisturbed state, lacking human impact, or near-natural with only minor evidence of distortion

NOTE

For waters not designated as heavily modified or artificial, synonymous with 'high ecological status' in the Water Framework Directive.

2.27**revetment**

facing built to reinforce a bank

2.28**riffle**

fast-flowing shallow water with distinctly broken or disturbed surface over gravel/pebble or cobble substrate

2.29**riparian zone**

for small rivers, this comprises the bank face and a strip of land on the bank top capable of exerting physical, hydrological and ecological impacts on the aquatic ecosystem (e.g. shading, leaf litter input). For large rivers, the riparian zone usually ends at the bankfull level.

NOTE In this European Standard, the term 'riparian zone' does not include the wider floodplain.

2.30

riparian zone vegetation structure

physical character of the vegetation that creates habitat on the banks and land immediately adjacent to the river; e.g. 'complex' – mixture of trees or scrub, herbaceous vegetation, etc. or 'simple' – e.g. only herbaceous vegetation

2.31

river rehabilitation

partial return of a river to a pre-disturbance condition (e.g. by dredging backwaters that have filled with sediment, changing the platform of channelised reaches, or planting riparian vegetation)

2.32

river type

a group of rivers that can be broadly differentiated from other groups on the basis of their physical and chemical characteristics (e.g. lowland chalk streams; upland ultra-oligotrophic rivers)

2.33

run

fast-flowing water with a disturbed, but not broken, surface (cf. 'glide')

2.34

sheet piling

material used for vertical bank protection (e.g. corrugated metal sheets)

2.35

side bar

discrete sediment deposit made by the river along the sides of relatively straight reaches (cf. *point bar*)

2.36

sinuosity

degree of deviation from a straight line, usually defined as channel length/valley length

2.37

stream ordering

methods for classifying rivers and streams related to the complexity of the drainage basin, with progressively higher order numbers usually assigned to streams with greater discharge lower down the catchment

2.38

survey unit

length of river from which data are collected during field survey; this may be a fixed length (e.g. 500 m) or variable, according to the method used, but must always be defined and recorded

2.39

submerged vegetation

plants rooted to the bed and either completely submerged or with only part of their shoots floating or emergent

2.40

substrate/substratum

material making up the bed of a river

2.41

weir

a flow-control device

2.42

wetlands

habitats (e.g. marsh, fen, shallow temporary water) occupying the transitional zone between permanently inundated, and generally dry, environments

3 Principle

A standard assessment protocol is described for recording the physical features of river channels, banks, riparian zones and floodplains. The range of features surveyed, and the methods used for survey, may vary according to river character and the objectives of the study. This standard provides a common framework for these different methods, details of which can be found in the references cited in the Bibliography. Guidance is given on data analysis and interpretation so that the hydromorphological characteristics of river reaches can be assessed through comparison with reference conditions.

4 Survey requirements

4.1 River 'types'

Describing and identifying river 'types' enables the results of hydromorphological surveys from similar types to be compared. In addition, defining 'high status', type-specific, reference conditions in rivers is a requirement of the WFD, allowing the quality of rivers to be compared in an equitable and ecologically meaningful way.

Some hydromorphological assessment methods are not linked to river types but can still provide useful information for better river management; this standard therefore includes consideration of such methods.

The core information required to define river types can usually be derived from maps or catchment-wide databases. Types may be refined by using information gathered during field surveys, or through input from expert opinion.

It is recommended that as a minimum the following factors should be used in the definition of river types:

Size:	e.g. stream order, catchment size, distance from source;
Gradient:	channel slope;
Geology:	a minimum of three categories, preferably more – e.g. siliceous, calcareous, mixed, organic;
Geographical location:	latitude and longitude;
Altitude:	altitude of source within the catchment, altitude of the reach being assessed;
Hydrological regime:	e.g. mean annual discharge, minimum and maximum discharge, seasonality of flow variations (if intermittent).

Table 1 provides an example of the way in which physical and chemical features are used to derive river types in the legislative context of the WFD. In this example, rivers are 'typed' either according to geographic location (ecoregions) together with a set of obligatory 'descriptors' (System A), or using an equivalent approach based on 'obligatory and optional factors' (System B).

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