SLOVENSKI STANDARD
SIST EN 17123:2019

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Kakovost vode - Navodilo za določevanje stopnje spremenjenosti hidromorfoloških značilnosti somornic in obalnih morij

Water quality - Guidance on determining the degree of modification of the hydromorphological features of transitional and coastal waters

Wasserbeschaffenheit - Anleitung zur Bestimmung der Ausprägung hydromorphologischer Merkmale der Übergangs- und Küstengewässer

Qualité de l'eau - Document d'orientation sur la détermination du degré d'altération des caractéristiques hydromorphologiques des eaux de transition et des eaux côtières

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Water quality - Guidance on determining the degree of modification of the hydromorphological features of transitional and coastal waters

Qualité de l'eau - Guide pour la détermination du degré de modification des caractéristiques hydromorphologiques des eaux de transition et des eaux côtières

Wasserbeschaffenheit - Anleitung zur Bestimmung der Ausprägung hydromorphologischer Merkmale der Übergangs- und Küstengewässer

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 17123:2018) has been prepared by Technical Committee CEN/TC 230 “Water analysis”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

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Introduction

This document will enable broad assessments and comparisons to be made of the hydromorphological modifications of Transitional (estuaries, lagoons, etc) and Coastal waters (TraC waters) throughout Europe (e.g. for reporting by the European Environment Agency). These systems have been increasingly influenced by human activities over many centuries and hence the modifications relate to historical and recent developments that are superimposed over the natural and large-scale changes and variability experienced by these systems.

This document attempts to acknowledge the particular spatial and temporal heterogeneity of coastal and transitional systems. TraC systems are dominated by multi-directional processes (waves acting in different directions, as well as bi-directional tidal flows operating at differing tidal levels, which can be further complicated by variable wind orientation). As a result, the natural variability within coastal and transitional water bodies can often be significant in spatial and temporal scales, which need to be reflected during comparisons against natural baselines or reference conditions.

European Directives such as the Water Framework Directive (WFD)[ref 1] and the Marine Strategy Framework Directive (MSFD) [ref 2] require Member States to determine that hydromorphological and physico-chemical conditions should be suitable for supporting biological assemblages; the WFD and MSFD in turn require Member States to indicate, respectively, that good ecological status and good environmental status have been attained. The MSFD descriptors, criteria and indicators include hydromorphological features.

EN 16503 (*Water quality — Guidance standard on assessing the hydromorphological features of transitional and coastal waters*) describes a protocol for field survey and feature recording, whereas this standard gives guidance on assessing the modification of TraC hydromorphological features. It focuses especially on human pressures that affect TraC waters and thus will be valuable for implementing the WFD by indicating the extent to which these pressures will cause a departure from hydromorphological reference conditions.

Although the procedure described in this document enables the hydromorphological modification of TraC waters to be determined and described, it does not attempt either to describe methods for defining high status for hydromorphology under the WFD or to link broadscale hydromorphological classification to assessments of ecological status. In addition to its relevance to the WFD and MSFD, this standard has applications also for nature conservation, environmental impact assessment, river basin management, flood and erosion risk assessment (e.g. the EC Floods Directive) [ref 3] and setting targets for restoration. In addition, for the Habitats Directive [ref 4] there is a need to maintain certain “features” in favourable condition, which has also given rise to a focus on hydromorphological assessments.

(Note that in this standard, “assessment” is used as a broad term referring to the general description of features and the pressures affecting them. It is not used to imply the judgement of particular levels of “quality” or “value”, whether related to status under the WFD, MSFD or more generally.)

WARNING — Safety issues are paramount when surveying transitional and coastal waters. This European Standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to ensure compliance with any EU and national regulatory conditions or guidelines.

IMPORTANT — Persons using this document should be familiar with usual laboratory and fieldwork practice. It is absolutely essential that tests conducted according to this document be carried out by suitably trained staff.

1 Scope

This document provides guidance on characterizing the modifications of the hydromorphological features of TraC waters described in EN 16503, enabling consistent comparisons of hydromorphological modification between TraC waters within a country and between different countries in Europe. Its primary aim is to assess "departure from naturalness" as a result of human pressures on TraC hydromorphology, and it suggests suitable sources of information that may contribute to describing the modification of hydromorphological features. The procedures set out in this standard will encourage the objective assessment and reporting of the variability in transitional and coastal waters, and contribute to the work needed to implement the WFD and the MSFD; however, it does not replace methods that have been developed for local assessment and reporting.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the terms and definitions given and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
attribute
specific recorded element of a hydromorphological feature

EXAMPLE "Silt" and "boulders" are natural substrate attributes, "sheet piling" and "gabions" are attributes of engineered banks.

[SOURCE: EN 16039:2011, definition 3.2]

3.2
bathymetry
shape of the sea-bed as measured by the distribution of depth

3.3
beach nourishment
artificial process of replenishing the beach using marine sediment (e.g. sand) to increase the recreational value or to protect the beach against erosion

3.4
bedform pattern
morphology of the sea bed

Note 1 to entry: Refers to the morphology of soft bottoms. The bedform patterns may be simple or complex depending on the size and shape of the system and the nature of the local sediment transport processes. Deposition produces features such as sand and gravel bars, while erosion results in scour features.

[SOURCE: EN 16503:2014, definition 2.4]

3.5
biogenic reef
mass consisting of the hard parts of organisms, or of a biogenically constructed frame enclosing detrital particles, in a body of water

Note 1 to entry: Most biogenic reefs are made of corals or associated organisms.

[SOURCE: EN 16503:2014, definition 2.5]

3.6
biogenic structure
structure formed by organisms that when grouped together create physical habitats (e.g. reefs) or stabilize sediments (e.g. seagrass beds, mussel beds)

3.7
breakwater
artificial structure used in coast protection to reduce wave energy

3.8
coastal cell
length of coastline confined by natural or artificial barriers across which little or no sediment is transported

3.9
coastal water
surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters

Note 1 to entry: This definition from Article 2 of the EC Water Framework Directive (2000/60/EC) is one example of a definition of "coastal water" used for legal purposes.

3.10
connectivity
linkage within and between water bodies and between water and land through exchange of water, sediment and organisms

[SOURCE: EN 16503:2014, definition 2.9, modified]

3.11
delta
landform that forms from deposition of sediment carried by a river as the flow leaves its mouth and enters the sea

3.12
ecological status
expression of the quality of the structure and functioning of aquatic ecosystems, by comparing the prevailing conditions with reference conditions

Note 1 to entry: As classified in accordance with Annex V of the EC Water Framework Directive (2000/60/EC).

[SOURCE: EN 16039:2011, definition 3.15]

3.13
effective fetch
direct fetch, or distance in kilometres along which the wind blows from each direction, corrected by fetches in directions of less than 45°

3.14
fetch
fetch length
distance of open water over which the wind can blow and generate wind-driven waves

[SOURCE: EN 16039:2011, definition 3.19, modified — "fetch length" was added as synonym]

3.15
fjord
long, narrow and glacially eroded inlet with steep sides, created in a valley often with a shallow entrance at the mouth

[SOURCE: EN 16503:2014, definition 2.12]

3.16
groyne
coast protection structure built broadly perpendicular to the shoreline designed to reduce beach erosion and trap sediment

3.17
highest astronomical tide
HAT
highest tide that can be expected to occur under average meteorological conditions and at the spring and autumn equinox

[SOURCE: EN 16503:2014, definition 2.14]

3.18
hydromorphology
physical, hydrological and hydrodynamic characteristics of transitional and coastal waters including the underlying processes from which they result

[SOURCE: EN 16039:2011, definition 3.22, modified]

3.19
intertidal area
foreshore
zone between high and low tide lines

[SOURCE: EN 16503:2014, definition 2.16]

3.20
lagoon
expanse of shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand banks or shingle, or, less frequently, by rocks

[SOURCE: EN 16503:2014, definition 2.17]

3.21
land claim
conversion of submerged areas to increase the dry land available for agriculture or development

3.22
mixing
blending of waters of different characteristics (e.g. temperature, turbidity, salinity) by turbulence and diffusion, caused by tides, winds, waves, currents and river runoff

[SOURCE: EN 16503:2014, definition 2.19]

3.23
normal tidal limit
NTL
point at which the level of a river or stream ceases to be affected by the tidal flow

[SOURCE: EN 16503:2014, definition 2.20]

3.24
openness
P_{SEA}
potential influence of the sea on the general hydrology of a lagoon

3.25
physiography
prominent coastal landform features

[SOURCE: EN 16503:2014, definition 2.21]

3.26
planform
view of transitional or coastal water body from above

EXAMPLE E.g. sinuous, straight.

[SOURCE: EN 16503:2014, definition 2.22]

3.27
reef
ridge of rock, or other material, lying seawards of the low water line

[SOURCE: EN 16503:2014, definition 2.23]

3.28
reference condition
condition which is totally or nearly totally undisturbed by human activity

[SOURCE: EN 16503:2014, definition 2.24]

3.29
residence time
retention time
flushing rate
length of time it takes for a transitional water, sea loch, lagoon or fjord to exchange its water

Note 1 to entry: For enclosed bays “retention time” is the preferred term.

[SOURCE: EN 16503:2014, definition 2.25, modified]

3.30
ria
coastal inlet formed by partial submergence of a river valley

3.31
saltmarsh
area having characteristic vegetation adapted to saline soils and to periodic inundation by sea water

[SOURCE: EN 16503:2014, definition 2.26]

3.32
sandbank
low-energy feature created at the mouth of a river where it flows into the sea

Note 1 to entry: Sandbanks can also occur offshore, without the influence of rivers.

[SOURCE: EN 16503:2014, definition 2.27]

3.33
shore development
PSH
complexity of the perimeter of a lagoon

3.34
storm surge
change in water level as a result of meteorological forcing (wind, high or low barometric pressure) additional to the astronomic tide; it may be positive or negative

[SOURCE: EN 16503:2014, definition 2.28]

3.35
stratification
layering of water column due to density differences resulting from changes in temperature, turbidity or salinity with depth

[SOURCE: EN 16503:2014, definition 2.29]

3.36
substrate
rocky or sedimentary material making up the bed of a transitional or coastal water body

[SOURCE: EN 16503:2014, definition 2.30]

3.37
subtidal area
zone seawards below the low tide line

[SOURCE: EN 16503:2014, definition 2.31]

3.38
tidal prism
volume of water that flows into a tidal channel on the flood tide

[SOURCE: EN ISO 772:2011, definition 2.49]

3.39
tidal range
difference in level between high water and low water of a tide

[SOURCE: EN ISO 772:2011, definition 2.50]

3.40
tidal regime
parameters characterising tides including levels, periods, frequencies, harmonics, phases and spectra

[SOURCE: EN 16503:2014, definition 2.34]

3.41
transitional water
body of surface water in the vicinity of river mouths which is partly saline in character as a result of its proximity to coastal waters but which is substantially influenced by freshwater flows

Note 1 to entry: In accordance with Article 2 of the EC Water Framework Directive (2000/60/EC).

3.42
turbidity
reduction of transparency of a liquid caused by the presence of suspended particulate matter

[SOURCE: ISO 6107-2:2006, 145, modified]

3.43
wave exposure
wave energy environment of a shoreline

Note 1 to entry: An important variable, together with substrate composition and water depth, that influences the habitat characteristics of the shoreline.

[SOURCE: EN 16503:2014, definition 2.39]

4 Principle

A standard protocol is described for assessing the extent to which the hydromorphological features of TraC waters are modified by human activities; transitional waters include estuaries, lagoons, deltas, rias and fjords. These features have been divided into two groups — those that describe the static, structural features, i.e. shape, underlying geology, sediment patterns, etc., and the dynamic, functional processes, including water movements, sediment budgets and water characteristics. All of these are given as generic types but can be adjusted in a site-specific context and are used to determine any "departure from naturalness" as a result of human pressures on the hydromorphology of TraC waters. Those structural and functional attributes then provide the fundamental niches that are colonized by organisms and thus produce the biological assemblages characteristic of these areas.

The structural features often can be determined from easily available maps, charts, aerial photographs, databases, or by remote sensing. The functional processes, on the other hand, need to be determined within each water body and, given the high spatial and temporal variability in these features, usually require an intensive sampling campaign or modelling procedure and also detailed and specialized analysis and interpretation.

Given the difficulty in determining some functional attributes, both this European Standard and EN 16503 gives more attention to TraC structural features which can be regarded as surrogates for hydrodynamic processes. For example, the bed sediment grain size may reflect the hydrodynamic regime.

The main output from this standard is a method for the assessment of the modification of hydromorphological features of an entire estuary or other transitional water (TW), a part of it, or a length of a coast. This includes parts of the TraC water bodies requiring restoration because of recent or historical modification, or where near-natural conditions need to be protected.

5 Determining the hydromorphological modifications of transitional and coastal waters

5.1 Survey strategy

The scale of survey is important in hydromorphological assessment of TraC waters, especially with respect to resolution and connectivity, and in assessing the severity of impacts. Different survey techniques are scale-dependent. Different applications require different levels of detail. In some instances, survey may be extended beyond the hydromorphological units of interest to provide a complete picture of the relevant physical processes involved. (For further details on survey strategy, see EN 16503:2014, 4.2.)

Timing and frequency of survey will vary among the different TraC waters because of their individual dynamic behaviour, and will depend upon the reason for assessment. Hydrodynamic attributes should generally be recorded at a higher frequency than morphological attributes. The timing of survey will depend upon the objectives of the work and the methods used. To measure certain conditions and regimes in continuously changing dynamic systems, measurements should be continuous or periodic according to the dominant daily, tidal, seasonal, lunar, annual or other cycles. The frequency of survey should ideally be linked with the rate of hydromorphological change; this in turn is partly related to the resistance to change and the resilience of the system to recover from a specific set of pressures. Other survey frequencies may be dictated by specific monitoring requirements.

When comparing how a hydromorphological unit has changed, it is essential that these comparisons are made under equivalent conditions, both spatially and temporally.

To ensure consistency in approach, the main feature categories are the same as those in EN 16503. However, some minor adjustments have been made to the details to help facilitate scoring (Table 1).