Common Intercalibration Metrics

FACT SHEET

TAXONOMIC COMPOSITION METRIC FOR LAKE EUTROPHICATION

ELLENBERG INDEX

GENERAL INFORMATION

BIOLOGICAL QUALITY ELEMENT

Macrophytes

WATER CATEGORY

Lakes

MAIN STRESSOR

Eutrophication

GEOGRAPHICAL INTERCALIBRATION GROUP

Mainly Central-Baltic and Nordic

COMMON INTERCALIBRATION TYPES

CB and N lake types

COUNTRIES PARTICIPATING IN INTERCALIBRATION EXERCISE

Countries from CB and N GIGs

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SPECIFICATION

COMMON METRIC DESCRIPTION (INCL. WFD'S INDICATIVE PARAMETERS)

Trophic score system for vascular plants of central Europe elaborated in 80-ties of XX century by Ellenberg was used as an trophic index alternative to ICM_LM. To calculate the Ellenberg Index (EI), macrophyte taxa indicator values for nitrogen were used (no scores for phosphorus were elaborated by Ellenberg). For all the lakes in the database the Ellenberg Index was calculated as an average N-score value, both using total number of taxa (EI_TT) and only submerged taxa (EI_ST).

COMBINATION RULE FOR MULTI-METRICS

Not applicable

SOFTWARE / (EXCEL) SPREADSHEET AVAILABLE FOR CALCULATING THE (INDIVIDUAL) COMMON METRIC(S)

Not applicable

AVAILABLE DOCUMENTS / ONLINE SOURCES REPORTING ON THE DEVELOPMENT OF COMMON METRIC(S)

Deliverable 3.2-3 Report on the most suitable lake macrophyte based assessment methods for impacts of eutrophication and water level fluctuations; available at: www.wiser.eu

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DESCRIPTION OF DATA SET TO ESTABLISH RELATIONSHIP TO PRESSURE / NATIONAL ASSESSMENT SYSTEMS[1]

The WISER common database includes macrophyte data from approximately 2000 lake-years from 16 countries. For testing the response of macrophyte metrics to eutrophication the TP concentration was used as a pressure proxy. Both biological and TP data for over 1500 lake-years from 12 countries were available. Database was dominated by FI, SE and NO lakes followed by PL, LV and IE ones. From FR, DE and DK only three or two lakes were available. All the lakes belong to four GIGs (CB, N, ATL and EC), however the EC and ATL GIG were represented by a very few lakes only (17 and 13 respectively). No data from MED and ALP GIG were available.

TYPE OF DOSE-RESPONSE-RELATIONSHIP[2]

Since EI:TP relationship was linear a log regression models was applied. The values of **R^2>0.30** and **R>0.55** were assumed as sufficient to accept a metric as a well performing one. In a pool of all the lakes the EI:TP relationship was sufficiently strong (R^2=0.47, R=0.68, p=0.000). In UK, NO, IE lakes a determination and correlation coefficients reached a suggested values R^2>0,3 and R>0.55, in remaining countries being below the threshold level. The metric performed best in moderate alkalinity lakes and weakest in high alkalinity lakes. The metric response to eutrophication was stronger when including helophytes compared to this when only submerged taxa were considered.

NATIONAL ASSESSMENT METHODS (OR PARTS THEREOF) RELATED TO THE COMMON METRIC(S)[3]

FEATURES OF THE RELATIONSHIP TO NATIONAL ASSESSMENT METHODS (OR PARTS THEREOF)[4]

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REMARKS

CONCLUDING REMARKS[1]

The Ellenberg Index was a relatively well performing metric, however its usefulness for detecting eutrophication in different countries and lake types was lower than as it was proved in the case of ICM_LM.

Although the EI was related to nitrogen and the ICM_LM to phosphorus the relationship between these two indices was very high (R^2=0.85, R=0.92, p=0.000). In countries where macrophyte-based assessment methods have not been developed yet and no trophic scores for local flora is available, the Ellenberg Index can be considered as taxonomic composition component at first.

When using EI it is recommended to include helophytes since the assessment of eutrophication seems to be more reliable when more scored taxa are considered (the higher the number of the species with an indicative value the more reliable the assessment).