



Title: Hydromorphological Quality Index assessment and sensitivity analysis: a test in north-western Sicily

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Abstract

IDRAIM (System for Stream Hydromorphological assessment, analysis, and monitoring) is the multiparametric expert based approach for assessing the ecological status of the Surface Water Bodies (SWBs), which has been formally adopted by the Italian Institute for Environmental Protection and Research and explicitly included in the national technical standards.

In the framework of a collaboration between the University of Palermo and the Basin Authority of the Sicilian Region, an approach has been devised to evaluate the potential effects of variations in the assignment classes of each indicator. In particular, by iteratively modifying the assigned class for each indicator, new MQI values were obtained for each reach.

The results obtained for the five SWBs of the San Bartolomeo Basin (north-western Sicily) are presented: Sirignano, Freddo1, Caldo and Bartolomeo streams, having 0.73, 0.79 and 0.77 (good quality) MQIs, respectively, and the Freddo2 stream, with a 0.69 (moderate quality) MQI. The quality status of these streams is primarily influenced by the F1, F2, F11, F13, A1, A2, and A5 indicators.

By applying to the set of indicators almost 200 and 2000, for confined and semi- and unconfined reaches, respectively, effects on MQI values of individual reaches up to 80% confined, and 70% for semi- and unconfined were observed. The confined reaches shifted from an excellent to a good quality status, while the semi- and unconfined reaches transitioned from good to sufficient quality.

The sensitivity analysis is a mandatory procedure when adopting expert based multiparameter ranked approaches as it open a view on the real reliability of the quality estimation. At the same time, it furnishes useful indications regarding the more sensitive reaches and more influent factor changes which is an important tool to support management decision.

KEYWORDS: Morphological Quality Index, IDRAIM, sensitivity analysis, San Bartolomeo River, Sicily