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## **IMPLEMENTING EUROPEAN WATER FRAMEWORK DIRECTIVE: UNCERTAINTY DEGREE OF METRICS FOR MACROINVERTEBRATES IN TRANSITIONAL WATERS**

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### **Abstract**

A key step of European Water Framework Directive (WFD) implementation is the ecological status classification and the achievement of 'good water status' for all waters, by 2015. Macroinvertebrates are key quality elements, and many metrics have so far been proposed for ecological status classification with benthic invertebrates. In transitional waters, the changing environmental niche induces responses in the macroinvertebrate guilds and macroinvertebrate responses induce uncertainty in the metrics. In this case, the sources of uncertainty in the ecological classification with benthic macroinvertebrates, is addressed by focusing on two major potential sources: spatial heterogeneity and temporal heterogeneity. To this aim, we have studied relative pristine lagoons within protected areas – Le Cesine (Italy) and Sinoe (Romania) - that are characterized by a different degree of component of transitional water internal heterogeneity, i.e. habitat patchiness.

Benthic macroinvertebrates were sampled with the same methodology at the two stations, with two sites per station and five replicates, in different seasonal periods and at three different habitats. On the collected data different metrics were computed and compared. The variability between ecosystems, seasons, habitat types and replicates, was quantified and compared among metrics. Taxonomically based metrics showed a higher variability than non-taxonomic ones, highlighting that the latter better fulfill the requirement of low uncertainty.

*Key words:* benthic macroinvertebrates, metrics, transitional waters, uncertainty, water monitoring

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