

# Integrating sediments in the European Water Framework Directive

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**Introduction:** Since the publication of the Water Framework Directive (WFD) in December 2000, a debate have been generated within the scientific community on the development of new concepts, terminologies and tools to define the ecological quality status for the assessment of the quality of European transitional (estuarine) and coastal waters. One of the controversies arisen discusses the necessity to integrate or not integrate sediments in such status. Hence, some authors propose the incorporation of sediments in the assessment of the ecological quality status [1, 2]; while other authors discuss the problems of such integration [3].

This paper presents the methodology, which is used within the Basque Country estuaries and coasts, in assessing the WFD environmental quality, integrating water, sediment and biomonitors [4].

**Methods:** Data obtained from a 11 years (1995-2005) Environmental Monitoring Programme along the Basque Coast has been used to develop an integrative quality assessment methodology. 18 water masses have been distinguished and a total of 51 sampling stations have been characterised in terms of physico-chemical and biological parameters. Following the scheme proposed by the WFD, reference conditions were defined for different elements [4, 5] and pressures and impacts in transitional and coastal waters were identified [6]. The ecological status (bad, poor, moderate, good, high) is derived integrating the results of the quality assessment for physico-chemistry in waters and biological elements (phytoplankton, fishes, benthos and macroalgae) [2]. On the other hand the integration of chemical elements has been made by using a decision-tree, which integrates water, sediment and biomonitor pollutant concentrations [4]. We have used quality objective levels for metals and organic compounds, published in some European and Spanish legislations, in assessing the meet/do not meet chemical quality. Besides, we are using also background levels in assessing high quality status, within the WFD.

**Results and Discussion:** The WFD and European Marine Strategy define the chemical 'High Status', when concentrations of specific pollutants remain within the range normally associated with undisturbed conditions. Hence, the studies

undertaken in the Basque Country contribute to the assessment of regional undisturbed sediment conditions, based upon the methodologies which determine the metal background levels and the use of quality objective levels in assessing chemical status. This presentation will show also the results obtained in this area in using such methodologies, which provides a better understanding and knowledge of the environmental quality. Hence, we think that not only water should be incorporated into determining quality standards of the WFD, but also sediment and biomonitors must be included. Such a procedure would improve the final ecological quality determination, using pragmatic and scientifically understandable approaches, such as those presented here.

**Acknowledgements:** The results of this study are part of a Monitoring Programme financed by the Department of Land Action and Environment of the Basque Country.

**References:** [1] Crane M. (2003) *Toxicology Letters* **142**:195-206; [2] Borja et al. (2004b) *Marine Pollution Bulletin* **49(1-2)**:8-11; [3] Borja and Heinrich. (2005) *Marine Pollution Bulletin* **50(4)**:486-488; [4] Borja et al. (2004a) *Marine Pollution Bulletin* **48(3-4)**:209-218; [5] Bald et al. (2005) *Marine Pollution Bulletin* **50**:1508-1522; [6] Borja et al. (2006) *Estuarine, Coastal and Shelf Science* **66**:84-96;