

Developing Indicators of Stress in the Marine Benthos: the UNESCO/IOC Ad-Hoc Benthic Indicator Group

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A special international committee of marine scientists has been set up under UNESCO's Intergovernmental Oceanographic Commission (IOC) for the purpose of developing global indicators of stress in the marine benthos. Benthic fauna are important components of coastal ecosystems, playing vital roles in detrital decomposition, nutrient cycling, and energy flow to higher trophic levels. Moreover, because of their existence within bottom substrates, benthic organisms are especially susceptible to sediment-associated stressors and may serve as sensitive indicators of environmental disturbances to the seafloor. The committee, referred to as the UNESCO/IOC Ad-Hoc Benthic Indicator Group (BIG), at present includes representatives from France, United States, Crimea, Greece, Italy, Japan, India, and Great Britain. Primary objectives of this initiative are: (1) development of reliable indicators, including key ecological attributes as well as data-analysis techniques, for measuring the health of the benthos in relation to human and natural stressors; (2) presentation of results in reports, publications, scientific meetings, and web sites to help promote wide usage; and (3) coordination with other similar international efforts to develop consistent and comprehensive sets of indicators of coastal ecosystem health for broad regional to global applications. Some desirable features to consider in the development and application of such indicators include: (1) linkage to a conceptual stressor-response framework with corresponding thresholds for management action, (2) ease of measurement, (3) ability to convey information that is meaningful to decision making with respect to the risk of concern, (4) applicability over broad regions & environmental conditions, and (5) high predictive ability (i.e., indicative of stress where stress should be occurring). The committee's work supports goals of IOC's Science on Ocean Ecosystems and Marine Environmental Protection (SOEMEP) program, aimed at developing environmental-health criteria and indices that can serve as early-warning signals of change in the quality of the world's ocean environment. The work also supports related goals of the various committee members and their parent organizations, all aimed at developing reliable indicators of coastal ecosystem health and determining potential changes in the condition of coastal resources in relation to human and natural disturbances.