United States
Environmental Protection Agency

Office of Water
Office of Research & Development

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# Fact Sheet:
# Framework for Developing Suspended and Bedded Sediment (SABS) Water Quality Criteria

The U.S. Environmental Protection Agency (EPA) is sending to the Regional Water Programs the document *Framework for Developing Suspended and Bedded Sediment (SABS) Water Quality Criteria*. SABS occur naturally in all types of waterbodies. In appropriate amounts, sediments are essential to aquatic ecosystems. They can contribute to essential habitat for aquatic species' growth and reproduction. However, imbalanced sediment supply has repeatedly ranked high as a major cause of waterbody impairment. States, tribes, and territories want tools for developing SABS standards and criteria. The *Framework*, a joint effort by the EPA's Office of Water and Office of Research and Development, presents an integrative process and technical methods that can be used to develop SABS criteria.

### *Ecological Effects of Excessive SABS*

| Suspended Sediments | Bedded Sediments |
|---|---|
| Decreased light penetration reduces primary productivity. | In large amounts, bedded sediments can bury and smother infaunal or epibenthic organisms and demersal eggs. |
| Increased turbidity reduces visual acuity and capture success for predators and foragers, stimulates drifting behavior in macroinvertebrates, reduces habitat suitability and habitat range for organisms that require clear water. | In smaller amounts, excess fine sediments can fill in gaps between larger substrate particles, embedding the larger particles and eliminating interstitial spaces that would otherwise be used as habitat for reproduction, feeding, and refugia for invertebrates and fish. |
| At high levels, suspended sediment can clog and abrade filtration and respiratory organs. | |

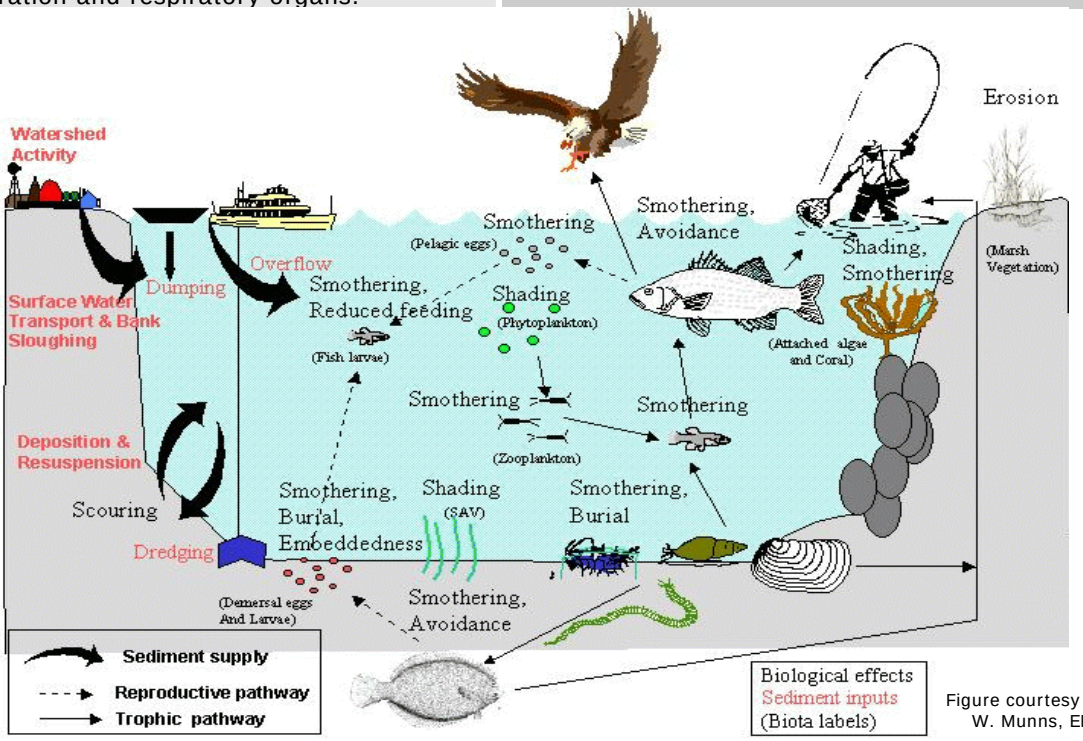
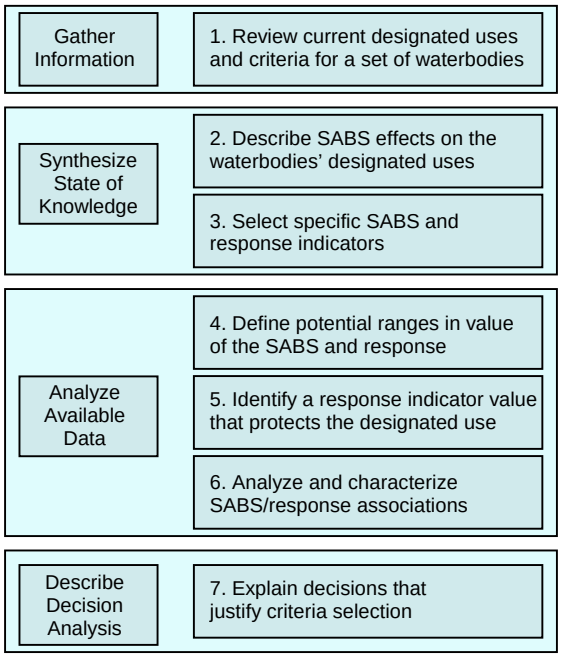



Figure courtesy of W. Munns, EPA

### *Major Elements of the Framework*




➢ **Integrative Process**: The *Framework* consists of a stepwise process for developing criteria for SABS. It includes gathering information, synthesizing the state of knowledge, analyzing available data, gathering more data if needed, and selecting criteria values. SABS criteria can then be implemented within a comprehensive management plan. The process engages stakeholders, develops several lines of scientific evidence, and documents the decision analysis process while also accommodating regional differences. The process is flexible and robust, allowing resource managers to customize the criteria development process to meet their unique regulatory and programmatic needs. Water Quality Standards based on criteria developed with this process will support a range of pollution control activities while simultaneously providing technical tools to routinely develop protection and restoration plans (for example, in calculating total maximum daily loads).

➢ **Technical Methods:** The *Framework* includes technical methods for measuring, classifying, and associating various levels of SABS with designated uses. Methods include those for selection of appropriate indicators of water resource impairment due to SABS imbalances. We suggest various types of indicators including direct measures of SABS, their effects on biota and sources of SABS imbalances. Another main activity is classification based on designated uses and the natural variability associated with different types of waterbodies, regional, and other natural factors. The rationale for selecting criteria values depends on demonstrating associations between levels of SABS and their impact on designated uses. We describe several statistical methods for developing associations that will support decision making. This framework will be of use to states, regions, and tribes who are developing SABS criteria and standards. It should also be useful for developing criteria for other stressors (such as nutrients).

### *Additional Information*

For more information about EPA's *Framework for Developing SABS Water Quality Criteria,* contact Bob Cantilli in the Health and Ecological Criteria Division, 1200 Pennsylvania Avenue, N.W., Washington, DC 20460 (telephone: 202-566-1091 or e-mail: cantilli.robert@epa.gov). You can also contact Robert Spehar at the National Health and Environmental Effects Research Laboratory in Duluth, Minnesota at 218-529-5123 or e-mail: spehar.robert@epa.gov).