Summary

AFS Policy Statement #4:
Sedimentation
(Abbreviated)

Ever since humans started tilling the soil, cutting trees for building material, building roads, and performing other development acts, soil erosion rates have increased and grossly affected the physical and biological character of freshwater and estuarine habitats. Increased sediment transport from the land to rivers and streams is not always obvious to the casual observer. Fluvial processes move different sized soil and rock particles at different rates for different stream gradients and flow volumes. When a stream's sediment-carrying capacity is exceeded, deposition takes place in lower-velocity reaches and aquatic habitat is frequently altered or destroyed for indigenous species. Dredging of navigation channels in rivers and estuaries has resulted in excessive sedimentation of river backwaters and estuarine bottoms, especially when dredged material is discharged into open water.

The rate of sedimentation may be so gradual that a human generation may pass before obvious physical changes take place in a stream, or changes can be dramatic. The perception problem is aggravated by a general inability to perceive phenomena whose periodicity is greater than one human lifetime. Too often by the time we see the effects on an economically important species, the damage has been done. Excessive deposition of alluvial sediments in a stream causes water depth to decrease and width to increase. Velocity decreases and the characteristic riffle-pool relationship is altered, decreasing the number and depth of pools Temperature gradients of the pools, so beneficial to some species, are eliminated. Further habitat modification results from public demands for channelization and spoil disposal, and the cycle is continued.

Deposition of silt and sand in gravel-bottom rivers and streams fills gravel interstices, reduces water flow velocity through gravels, and decreases dissolved oxygen content if much organic matter is present. If sedimentation is severe, gravels may be completely blanketed. In some cases the stream bottom becomes compacted and assumes the character of concrete. Sedimentation in estuaries can change current flows and disrupt salinity regimes. Productive bottoms can be altered or destroyed, and water depths decreased.

Sedimentation can be most damaging to species such as salmonids which deposit their eggs in stream gravels and rely on high gravel permeability and adequate flow velocity through the gravel to carry away metabolic waste products and furnish oxygen near saturation. Sedimentation is no less damaging to aquatic insect larvae that can inhabit gravel-bottomed streams to at least one meter in depth. The natural production of some fish species is largely dependent on an adequate aquatic insect food supply. Fish species(especially their newly emerging fry) that inhabit gravel streams utilize the voids among the gravel as cover and protection from predators and adverse physical conditions.

When streams become heavily laden with sediment, fish species dependent on gravel environments(many of them popular game fish) are replaced with other more tolerant species such as suckers, carp, and minnows. The latter species are generally bottom feeders that graze on detritus and prey on silt-tolerant families of midges and worms. It is important to note that while one life stage of an organism may be able to tolerate sedimentation, that organism may not necessarily be able to exist under such conditions for its entire life span.

High suspended solids in estuarine and marine environments can seriously hamper the setting of larval clams and oysters. Settleable materials can also smother benthic invertebrates, and submerged vegetation, destroying essential foods and habitat for

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juvenile fresh and marine species. Chronic suspended solids can reduce or eliminate photosynthetic plant growth.

The AFS policy regarding sedimentation is to:

1. Encourage control of nonpoint source pollution through improved land management practices at both state and local levels.

2. Insist that research and implementation of criteria or approaches for evaluating the condition of fishery habitat be included in water quality standards and nonpoint source pollution control programs. These criteria, appropriate to specific geographic areas, must at a minimum include a measure of stream morphology, riparian vegetation, bottom composition, and minimum flow.

3. Insist that aquatic habitat monitoring methodology be developed and included in implementation of state and provincial programs.

4. Encourage AFS members to become involved with their state or province in identifying nonpoint source fishery problems, particularly from sedimentation.

5. Encourage AFS members to become involved in policy advisory committees to develop solutions to nonpoint source pollution problems, lobby for passage of forest practice and sediment control laws, and alert the public to the need for their support for education of responsible groups and agencies and control of the land and water management problems.