

AFS Policy Statement #3:
Nonpoint Source Pollution
(Full Text)

A. Issue Definition

Nonpoint source pollution is probably the most pervasive and ubiquitous water quality problem in North America. Nonpoint source pollution results from nearly every type of human activity and land use. In the United States a comprehensive program to control nonpoint sources of water pollution is defined and regulated through the Clean Water Act Amendments of 1977 administered by the U.S. Environmental Protection Agency. Nonpoint sources of pollution are defined by the Act as "...sources of pollution which enter surface or groundwaters through widely diffused small increments," and include:

- Urban and industrial stormwater runoff;
- Agriculturally related nonpoint sources of pollution including runoff from manure disposal areas, and from land use for livestock and crop production;
- Silviculturally-related nonpoint sources of pollution;
- Mine-related sources of pollution including new, current, and abandoned surface and underground mine runoffs;
- Construction-activity-related sources of pollution;
- Sources of pollution from disposal on land, in wells, or in subsurface excavations that affect ground and surface water quality;
- Saltwater intrusion into rivers, lakes, estuaries, and groundwater resulting from reduction of freshwater flow from any cause, including irrigation, obstruction, groundwater extraction, and diversion;
- Sources of pollution related to hydrologic modifications, including those caused by changes in the movement, flow, or circulation of any navigable waters or groundwaters due to construction and operation of dams, levees, channels, or flow diversion facilities;
- and Sources of pollution related to the disposal of municipal or industrial residual wastes and land disposal. Similar but less comprehensive legislation controlling nonpoint sources of pollution has been promulgated in Canada and Mexico.

B. Impacts on Aquatic Environments

The former head of U.S. EPA's nonpoint source program stated that the true size of our nonpoint source pollution "at least equals, if not exceeds, the total pollutant loadings contributed by all point sources" (Pisano 1976). The principal pollutants associated with

nonpoint sources are sediment, nutrients, biocides, natural organic wastes, wasted heat, acid mine drainage, salinity, radioactivity, microbial pollutants, and heavy metals. Acid precipitation represents a category of atmospheric or airborne nonpoint source pollutants that have adversely affected aquatic ecosystems by lowering the pH of lakes and ponds to levels lethal to fisheries. The magnitude of the discharge of most of these constituents is directly related to the area of lands in North America dedicated to land-use activities identified earlier as nonpoint source categories. For example, agriculture and silviculture together occupy 64%, 55% and 73% of the total land area in the United States (McElroy 1975). Canada (Canada Yearbook 1975), and Mexico (Wilkie 1976), respectively. In the United States, surface mining and construction together occupy 0.6% of the total land area and respectively affect 590,000 ha and 140,000 ha of land annually (McElroy 1975).

Nonpoint pollution will be the largest problem facing us after the 1977 municipal-and industrial -point-source control goals have been met. The United States Commission on Water Quality estimated future stream loading as follows:

"Of the total point and nonpoint source loadings of 158 million pounds per day of suspended solids, nonpoint source loads will account for 145 million pounds, or 92 percent.";

"Of the total daily nitrogen loading of 35.7 million pounds, nonpoint sources will contribute 28.3 million pounds, or 79 percent.";

"Of the 3.63 million pounds per day of phosphorus, nonpoint sources will provide 1.93 million pounds, or 53 percent.";

"For both fecal and total coliform counts, nonpoint sources will account for over 98 percent of the remaining national loadings.";

"Of the 119,000 pounds per day of zinc 51,000 pounds, or 43 percent, will derive from nonpoint sources" (McElroy 1975).

C. Effects on Fisheries and Aquatic Resources

The foregoing figures suggest that the magnitude and cumulative effects of nonpoint source pollutants impart a profound impact on aquatic resources. Herein lies a paradox that reflects the nature of nonpoint source pollution: i.e., the pollution typically occurs on an intermittent basis and in small increments from widely dispersed areas that may include many categories. Nonpoint sources generally cannot be monitored at their point of origin, and their source is not readily traceable. Furthermore, it is frequently impossible to distinguish man-induced from naturally occurring nonpoint-source pollution. As a consequence, few definitive data exist that quantitatively document the cause-and-effect relationships between nonpoint source pollutants and the degradation of fisheries and other aquatic resources.

The effects of individual nonpoint source components-such as nutrients, biocides, and acid mine drainage- on fishery resources are fairly well known and cut across most of the other American Fisheries Society Policy Issues (e.g. eutrophication, toxic substances, sedimentation, mining stream flow alteration). A reiteration of those effects will not be presented in detail here. In general sense, however, the effects of nonpoint-source pollutants would include such things as direct and indirect mortality, habitat modification or destruction, stream flow depletion or modification, reproductive and behavioral changes, and many others.

The most difficult and perplexing aspects of nonpoint source pollutants deal with effective control. The diffuse, intermittent nature of nonpoint pollutants makes traditional facilities oriented management and control impossible. The regulation of land use and associated land management practices has been identified as the only effective means of controlling nonpoint-source pollutants.

In the United States, control of nonpoint-source pollutants occurs pursuant to Sec. 208 and 304 of the Clean Water Act of 1977, which delegates wastewater management planning (point and nonpoint source) to state and local levels of government. This planning process must develop and incorporate "Best Management Practices (BMP)" for the control of nonpoint sources following guidelines established by the federal government (U.S. EPA). Best management practices summarize those land-use operating procedures, technologies, methods, and policies (such as land-use control) judged to be most effective and practical for reducing nonpoint-source pollutants sufficiently to achieve the national water quality goal. The overriding goal of the nonpoint source (BMP) guidelines and the state and local wastewater management plans is to achieve "water quality which provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation..." In order to insure adequate consideration and protection of North American fisheries and aquatic resources in nonpoint source control decisions it is imperative that fisheries scientists actively participate in land use and wastewater-management planning at all levels of government. Fisheries experts should play a key role in assessing and defining the magnitude of nonpoint source impacts on aquatic ecosystems and in determining the effectiveness of control strategies and practices.

D. Policy or Position Elements for Nonpoint Sources

1. Planning and R&D

a. Fisheries and aquatic scientists should be involved and consulted in early stages of resource or land-use planning-e.g., coastal zone management, water quality management planning, (208), zoning, site plan review, lake restoration, mining plans, and timber harvest planning-at the federal, state, provincial, and local levels to insure that designs that adequately protect fishery resources and aquatic habitat are incorporated for control of nonpoint-source pollutants. Emphasis should be placed also on the implementation of existing plans.

- b. Fisheries and aquatic scientists should play a key role in the identification and inventory of aquatic habitats or resources particularly sensitive to nonpoint-source pollutants associated with changes in land-use practices. Aquatic resource and fisheries impacts attributable to nonpoint sources need to be quantified and documented.
- c. Fisheries and aquatic scientists should focus research and development efforts on innovative land-use management guidelines and control practices designed to maximize aquatic habitat preservation, rehabilitation, or enhancement related to nonpoint source activities. The recycling, reuse, and /or treatment of point and nonpoint source wastewaters through various aquaculture projects should be encouraged.
- d. Fisheries and aquatic scientists should actively support and participate in the development of water quality criteria and standards that reflect the diffuse and intermittent nature of nonpoint-source pollutants and that clearly define and differentiate point source from nonpoint-source categories.
- e. Fisheries and aquatic scientists should research the direct and indirect impacts of diffuse source atmospheric pollutants-such as acid precipitation, fugitive dust, and heavy metals-on aquatic resources.
- f. The effectiveness of various recommended management and land-use practices, strategies, and procedures should be evaluated from the standpoint of their ability to provide for fisheries and aquatic resource protection. A vigorous monitoring program designed to measure the adequacy and effectiveness of BMP's from the fisheries perspective should be developed and implemented.
- g. Water quality management plans for the control of nonpoint-source pollutants should give ecological values and measures designed to protect them. Specifically, best management practices should be designed to incorporate fisheries restoration and enhancement features in addition to water pollution reduction.

2. Legislative

- a. The Society strongly supports and endorses efforts to coordinate and focus federal, state, provincial, and local participation and expertise on wastewater management, land-use planning and plan implementation designed to minimize negative impacts on fisheries resulting from point-and nonpoint-pollution sources.
- b. Those federal, state, and provincial government agencies responsible for fisheries management should be provided adequate staff, funds, and authority to participate effectively in the planning, inventory, and development of nonpoint-source control issues that affect aquatic resources.
- c. An environment assessment should be required for all major land use changes, such as

urbanization, mining, and agriculture, on both public and private lands that may significantly change or increase nonpoint-source discharge impacts on aquatic ecosystems.

d. Nonpoint-source waste load allocations combined with ecologically sound management practice strategies should be established and enforced on a watershed basis to prevent or minimize localized destruction of aquatic resources.

e. Land application and underground disposal techniques for industrial and municipal wastes should be closely evaluated and regulated to prevent surface and groundwater degradation and to avoid converting tightly regulated point-source pollution problems to nonpoint source problems. Land-based and deep-well waste-disposal strategies should recognize the rights of other downstream water users and instream fisheries requirements.

f. The application of chemical fertilizers and biocides should be regulated by guidelines to minimize or reduce nonpoint sources of these substances and the related adverse impact on aquatic resources.

g. The conversion of marginal wildlands in arid areas to irrigated agricultural use should be minimized and undertaken only after full consideration of the impacts of such action on aquatic resources from the standpoints of accelerated instream flow depletions and nonpoint-source pollution.

h. Incentives should be provided for the application of ecologically sound land-use practices in mining, agriculture, silviculture, construction, urban development, and other nonpoint source categories that reduce or minimize nonpoint-drainage, in order to maintain or enhance aquatic resources and provide for maximum water conservation.

i. The use of fisheries technology or aquaculture for the cleansing of waters derived from nonpoint sources, recycling of materials, and the production of beneficial sport and food fisheries should be encouraged as a means of utilizing wastes from nonpoint sources.

3. Enforcement

Rigorous enforcement of federal, state, provincial, and local laws, regulations, and standards pertaining to any phase of the nonpoint-source pollution problem--such as a wastewater management planning, coastal zone and wetlands, salinity control, and dredge and fill operations---should be diligently supported.

4. Education

a. Social, cultural, and institutional traditions often perpetuate outdated agricultural, silvicultural, construction, and mining methods that may contribute significantly to the nonpoint-source pollution problem. The educational process should provide for curriculum review, the retraining and/or updating of governmental personnel and the public and effective transfer of new and innovative information.

b. Educational programs designed to increase public awareness of the magnitude of nonpoint-source pollution problems and to demonstrate methods by which the general public can contribute to the solution of these problems should be vigorously supported. Studies designed to determine and apply the most effective means of increasing public involvement in wastewater management and land-use planning should be supported.

LITERATURE CITED

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