

# Summary

AFS Policy Statement #6:  
Effects of Toxic Substances in  
Surface Waters  
(Abbreviated)

Most waste waters contain small amounts of chemical substances that with inadequate dilution or treatment may significantly impair survival potential of resident aquatic life. The capacity of rivers, lakes, and oceans to assimilate these wastes and toxic materials is not infinite, and serious water quality degradation is the inevitable result of the misuse and mismanagement of chemical resources. The 20th century witnessed substantial growth of the chemical industry. Millions of known chemical compounds exist, and an estimated 250,000 new compounds are synthesized each year. Of this number, it is estimated that approximately 1,000 new chemicals find their way into the environment annually as the end result of marketing, use, and disposal. The persistence and accumulation of hazardous substances such as pesticides and recalcitrant organics have resulted in the need for new and useful manufacturing containment and waste treatment procedures that will help protect aquatic life.

In defining the use of toxic substances, we must recognize that there exist degrees of risk or safety for all chemicals, since even the most innocuous chemicals can create distinctly harmful environmental effects when present in high concentrations. In contrast, even the most toxic chemical substances can be assimilated by the aquatic environment provided that concentrations are sufficiently low. It is evident that all chemical substances can be considered to have potential for toxic effects on surface water communities, but the degree of risk or safety of a chemical substance is related to the amount potentially reaching the aquatic environment and to its relative toxicity and persistence. Toxic substances need not be present in acutely toxic concentrations to significantly impact the aquatic environment. Even low chemical concentrations can either directly or indirectly impact survival, growth, reproduction, or behavior of aquatic organisms. Specific impacts of toxic substances vary widely depending on the environment, the chemical, and the species involved.

In order to adequately assess the effects of any chemical, testing and evaluation must consider the numerous interactions of pollutants with each other such as synergisms and antagonisms, and interactions with natural environmental variables such as temperature, water hardness, pH, and salinity, all of which can significantly alter the impact of chemicals in surface waters. Adequate assessment of the effects of toxic substances in surface waters requires that methodology to predict the fate and effects of chemical substances in the aquatic environments be developed before the chemicals are manufactured, distributed, and used.

The AFS policy regarding the effects of toxic substances in surface waters is to:

1. Support the review and establishment of adequate government, industry, and private sector policies for the manufacture, control, and use of chemicals in order to ensure the protection and enhancement of fishery resources.
2. Support the on-going development and application of risk assessment programs by competent researchers as part of premanufacturing notification and review processes.
3. Encourage aquatic scientists to become familiar with existing and evolving programs for risk assessment of new and expanded use of chemical substances.
4. Expand and support the AFS Water Quality Section as a forum for fisheries and aquatic scientists who are interested in the relationships between water quality

# Summary

and aquatic resources through increased membership, support of relevant publications, and furtherance of its policies.

5. Encourage well-designed research programs to develop:

- an overall better understanding of physical, chemical, and biological environmental processes and their interactive effects on the distribution and removal of chemical substances;
- cost-effective methods to predict the concentration of chemical substances that will have no chronic effects on exposed aquatic species in receiving waters;
- cooperative programs and an overall higher degree of coordinated research to ensure that the impact of limited funds for environmental research into toxic substances is maximized. Interdisciplinary efforts to characterize physicochemical kinetics and biological effects of chemical substances will ensure early positioning of environmental concerns for new chemicals.

6. Encourage the AFS Water Quality Section to initiate an education program to provide the public a balanced, realistic assessment of current water quality issues and their potential impact on aquatic resources.

7. Encourage development of water quality standards for toxic chemicals which reflect the need for maintenance of healthy aquatic ecosystems.