

AFS Policy Statement #10:
Protection of Threatened and Endangered Aquatic Species
(Full Text)

A. Issue Definition

A significant portion of the tremendous increase in species extinctions in Canada and the United States since 1600 has been attributed to human activities. Habitat modification and destruction are the most pressing problems confronting those interested in protecting and restoring aquatic species now threatened with extinction. The variety of anthropogenic factors that can disturb freshwater and marine environments makes the protection of habitat vital to the preservation of rare aquatic flora and fauna.

Any protection afforded a threatened or endangered species must reflect first the successful identification by biologists of significant habitat elements that such a species needs for survival and then the capabilities and willingness of lawmakers and citizens at the appropriate levels to institute adequate procedures for protection of those habitat elements. Future success of species now threatened by critically low population levels depends on the continued efforts of these groups.

Protection of aquatic habitat assumes a prior commitment to the conservation of threatened and endangered organisms. Passage of various legislative actions in both the United States and Canada not only revealed a growing sense of public responsibility to our environment but also stressed the realization that without strict protection many species will become extinct as a result of human activities. The list of extinct or presumably extinct species is growing rapidly and does not include the uncounted species that have vanished without our knowledge of their existence. A major tragedy is that the loss of aquatic organisms is occurring without any knowledge of the effects on the dynamics of the ecosystems they inhabit (i.e., the interdependency of the species and its habitat, the functional role of the species in relationship to other biota within the system, and the ability of the ecosystem to maintain its structure, function, and productivity without some component of its natural diversity). Considerable rhetoric has been devoted to the justification of the efforts required to save threatened and endangered species, and though many of the arguments based on agricultural, genetic, and pharmaceutical value are valid, in actuality we are unable to judge accurately the value of an organism; we simply lack the knowledge required for such an evaluation. It is precisely this lack of knowledge that presents the strongest case for rare species conservation.

It is obvious that in most cases determination of threatened or endangered status for a species provides only minimal protection without the concurrent protection of those habitats that are necessary for survival. Although legislative actions have incorporated into law realizations of the uniqueness of our environment and the need to protect the biological structure of natural systems, the responsibility for habitat protection is shared among Federal, State, Provincial, and local management authorities.

However, adequate data to define crucial habitat requirements are not currently available for many important species. A need clearly exists to characterize the many habitat-species interactions that are necessary for successful growth, reproduction, and survival of rare and endangered organisms.

There are three aspects crucial to habitat protection for endangered aquatic species. First, there must be an adequate biological database for the species concerned. Habitat characteristics critical to the existence of a threatened aquatic species must be identified. One example is the extensive work on threatened and endangered species of the Colorado River System (Behnke and Benson 1980) although even these efforts at habitat characterization may be inadequate when specific data on minimum flow needs, spawning requirements, and other ecological criteria are needed to assess the potential impacts of proposed developments. Furthermore, preservation of threatened and endangered species will depend not only on a thorough description of the ecology of those species, but also on our ability to incorporate these data into alternatives to destructive habitat modification that are both economically feasible and socially and politically acceptable.

Second, habitat areas of sufficient size and diversity must be identified that provide those requirements essential to the conservation of the proposed species. Identification of habitat important to the perpetuation of threatened and endangered aquatic species requires consideration of the essential physiological, behavioral, ecological, and evolutionary requirements of the species, broadly grouped into five categories:

1. Space for individual and population growth and for normal behavior.
2. Food, water, air, light, minerals, or other nutritional or physiological requirements.
3. Cover or shelter.
4. Sites for breeding, reproduction, or rearing of offspring.
5. Habitats that are protected from disturbance or alteration and that are representative of the historic geographical and ecological distribution of the species.

Third, after essential habitat has been identified, any activity potentially dangerous to a threatened or endangered species must be avoided. Previous draft policies on point (Cairns 1980) and nonpoint (Ischinger 1979) pollution, introduction of toxic substances (Maki 1979), sedimentation (Rulifson 1979), acid precipitation (Haines 1980), and habitat modification (Panek 1979) demonstrate the increasingly severe impacts of man's activities on our aquatic habitats. Although the above problems are not peculiar to endangered species, many are related to the modification of aquatic and riparian habitats by industry, agriculture, road construction and recreation. Every alternative must be explored when irresolvable conflicts between development and species conservation seem imminent. The use of species transplants may be employed, but the impacts of transplantation on the biota inhabiting the receiving sites must be carefully assessed so

that additional problems are not created. These choices must be judged carefully, for habitats lost to development will rarely be restored, and species dependent on these habitats will likely be lost forever.

B. Needed Actions

Our commitment to the preservation of the biotic diversity inherent in most aquatic systems must go beyond the bounds of existing legislation. We must work not only to conserve but also to study and understand the functional relationships within these systems. If the impacts of human activity on aquatic environments are to be assessed, the intricate interactions that determine the stability and productivity of these systems must be studied, and protection of the biotic components that have evolved within these habitats must be achieved.

The American Fisheries Society urges the following actions be taken to protect further the many aquatic species now threatened with extinction:

1. A coordinated effort by the States and Provinces must be undertaken to initiate or broaden their respective nongame and endangered species programs. This effort must be directed at formation of jurisdictional listing procedures, public education, and generation of programs for research and habitat acquisition. Federal funding in both Canada and the United States must be continued at a significant level to provide necessary research support.
2. Individual jurisdictional programs must be coordinated with Federal Programs if rare and endangered species are to receive rational, priority attention according to their relative chances for successful population recovery. It is an unfortunate reality that future habitat destruction and modification will eliminate many rare aquatic organisms. Action must be taken to channel efforts toward preservation of those species most likely to respond to protection. Application of a priority sorting process will be difficult; indeed it would be unrealistic to assume that we have sufficient knowledge to determine those species that could profit most from conservation efforts. Since some species undoubtedly could continue their decline to extinction regardless of any human intervention, we at least must direct efforts in research and habitat protection to those species that have the greatest chance of avoiding this fate.
3. Upon a preliminary determination that the recovery of a species may be possible, interdisciplinary research efforts must be initiated to determine the habitat requirements of the species, the causes of population decline, the unique characteristics of the critical habitat necessary for survival of the species, and those activities potentially detrimental to the species and its habitat. The most difficult task is perhaps the most crucial to protection of rare organisms, for all decisions regarding the fate of these species will, to a great extent, reflect the knowledge obtained through research and rehabilitation initiatives.

4. Captive breeding programs must be considered and, based on field data concerning the reproductive biology and habitat requirements of each life state of the species, efforts should be taken to investigate the potential for propagation and reintroduction of rare aquatic organisms into historically occupied or otherwise suitable habitats.

5. Efforts must be made to expand and expedite the identification of species approaching critically low population levels. In many cases, minimal effort and expense would serve to protect a species and its habitat, and we should not decrease the chance for the survival of any species simply because legislative recognition was inadequate.

The alarming rate of aquatic habitat modification and destruction signals a tremendous threat not only to the natural biotic diversity of the world's aquatic ecosystems but also to the ability of those ecosystems to support a rapidly expanding human population. It is through the administration of an effective endangered species conservation program that we can hope to preserve and understand the structure and dynamics of these systems and to provide the basis for responsible use and development of aquatic resources throughout the United States and Canada.

LITERATURE CITED

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