

AFS Policy Statement #30:
Responsible Use of Fish and Other Aquatic Organisms
(Full Text)

Issue Definition

The objectives of the American Fisheries Society (AFS), as cited in Article I, Part 2, of the Constitution, are to "promote the conservation, development, and wise use of fisheries," and to "promote and evaluate the development and advancement of all branches of fisheries science and practice." As inferred from its mission and objectives, the fundamental position of the AFS is that responsible human use of, and interaction with, fish and other aquatic organisms through management, research, and education is appropriate, desirable, and ethical.

Multiple interests in aquatic organisms and their use, however, may result in conflicting views about appropriate uses of specific fisheries. These interests may include those of commercial fishers, subsistence fishers, recreational anglers, trophy anglers, ceremonial users of fish and other aquatic organisms, naturalists, animal liberationists, and environmental activists as well as those who affect aquatic systems through industry and other forms of economic development. This wide range of perspectives leads to fundamental conflicts regarding the interaction of humans with fish and other aquatic organisms.

Conflicts over human interactions with aquatic organisms have the potential to hinder management efforts aimed at providing human benefits from fisheries and ensuring long-term ecological sustainability. These conflicts may lead to threatening confrontations. Congress passed the Animal Enterprise Protection Act of 1992 (P.L. 102-346) to protect persons engaged in almost any business related to animal industries from interference and damage from animal rights protests. Since then, participants in the animal rights movement in numerous states have pushed ballot initiatives, referenda, and statutes that pose the potential to significantly restrict all forms of fishing, conservation and fisheries management, and the use of fish and other aquatic animals in scientific research and education (Reiger 1997). Various anti-fishing protests have occurred in several countries around the world, consequently ending catch-and-release fishing in Germany and use of bait fish in Norway and the Netherlands (Spitler 1998). A review of the print media suggests that these protests have not yet posed a threat to fisheries management in North America that they have in Europe (Henson 1997; Spitler 1998). Here, we address this debate and concern (e.g., Wywiałowski and Reese 1991; Gasson and Kruckenburg 1993; Quinn 1995; Ott 1995) about the human use of fish and other aquatic organisms.

The AFS is committed to all branches of fisheries science and communication among fisheries professionals and between fisheries professionals and the public. The AFS recognizes the diversity of perspectives within our own membership and in the world but is committed to (a) making sustainability of the aquatic resources the common goal that brings together this diverse membership and (b) supporting diverse human uses of aquatic

organisms that are consistent with this goal. The purpose of this position statement is to affirm explicitly that the AFS supports the broad range of consumptive and nonconsumptive human interactions with aquatic organisms in a manner that ensures long-term ecological sustainability.

Background

Both the mission statement and the constitution of the AFS list the following objectives:

1. to promote the conservation, development, and wise use of fisheries;
2. to promote and evaluate the development and advancement of all branches of fisheries science and practice;
3. to gather and disseminate to Society members and the general public scientific, technical, and other information about fisheries science and practice through publications, meetings, and other forms of communication.

In this position statement, we review conventional and nonconventional uses of fish and other aquatic organisms, and importance of those uses; we summarize actions taken by the AFS and others to promote animal welfare in laboratory and field work; we examine the importance of sustainability and the need for management to maintain sustainable fisheries and ecosystems; we provide guidance on addressing conflict and finding collaborative ways to consider the diversity of stakeholder interests; we describe actions that should be taken by the AFS; and we provide eight policy guidelines on the use of fish and other aquatic organisms.

Conventional Uses of Fish and Other Aquatic Organisms

Human use of fish, mollusks, and crustaceans for food is pervasive worldwide. According to the Food and Agriculture Organization of the United Nations (FAO 1994), 234 countries or geographical locales, occurring on all major continents, harvest fish and other aquatic organisms. A review of fisheries statistics of these countries indicates a broad spectrum of human societies, peoples, and ethnic groups who participate in fisheries-related activities. Fish harvested for food may be for commercial, subsistence, or ceremonial uses. The world harvest is comprised of 82.5% marine and 17.5% freshwater fishes. From 1950 to 1994, world fish harvest increased from 20 million metric tons (mmt) to 110 mmt. For all fish and fishery products during the 1983 to 1993 period, 71%–72.4% was for human consumption, and the remainder was for animal feed (FAO 1993). Numbers of aquatic species harvested ranged from 54 to 234, and import/export values of fishery products ranged from \$2 billion to \$14 billion for the top 6 ranked countries (FAO 1994).

Recreational fisheries also play a prominent role in human society in industrialized countries. In the United States in 1991, approximately 45.1 million people (nearly one-fifth of all residents) participated in fishing recreation and spent 511 million days, 454 million trips, and 24 billion dollars (USFWS and Bureau of the Census 1993). These anglers consisted of 72% males and 28% females from all age categories, all income

brackets, and all educational backgrounds. Twelve percent to 38 percent of the population in each of the 50 United States participated in fishing recreation. In contrast to commercial fishing, the majority of angler participation, time, effort, and dollars spent in and on recreational fishing occurred in freshwater rather than saltwater. Numerous studies have documented the central importance of aesthetic, psychological, spiritual, educational, and other non-catch values to recreational anglers (Moeller and Engelken 1972; Knopf et al. 1973; Driver and Knopf 1976; Martin 1976; Hendee and Bryan 1978; Harris and Bergersen 1985; Fedler and Ditton 1994; Malvestuto and Hudgins 1996).

Agencies that manage recreational fisheries often use catch-and-release regulations as a management tool to maintain fish population abundance, fish size, and fishing quality in important sport fisheries. Catch-and-release fishing as a conservation and management tool has been shown to be an effective approach for sustaining native cutthroat trout (*Oncorhynchus clarki* spp.), rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and black bass (*Micropterus* spp.) fisheries in Yellowstone Park, Colorado, Idaho, California, British Columbia, Oregon, Missouri, and Wisconsin (Barnhart and Roelofs 1977; Hunt 1981; Anderson and Nehring 1984; Espegren et al. 1990). In these cases catch-and-release regulations were implemented to conserve fish populations and fisheries by eliminating the harvest component of fishing. The results of this regulation, in terms of protecting fish population abundance and maintaining good-quality fishing through high catch rates and large fish size, have been so successful that the regulation has been incorporated widely in fisheries management. The application of catch-and-release regulations with respect to broader ecological management objectives and benefit to fisheries resources is consistent with the AFS position statement on special fishing regulations as a management tool (AFS 1995).

Cultural, Educational, Spiritual, and Other Nonconventional Uses of Aquatic Organisms

While primary objectives of fisheries management are considered to be catching and consuming fish, other values associated with the fishing experience have long been recognized. The justification for managing aquatic resources and fisheries is as much to provide fishing opportunities, and thus provide an array of nonharvest values/products, as it is to provide the more recognizable catch-related and other resource management products (Driver and Knopf 1976). Martin (1976) recognized the role of aesthetics as a contributing incentive to participate in fishing. Moeller and Engelken (1972), Driver and Knopf (1976), and Harris and Bergersen (1985) found non-catch, aesthetic, and psychological values often ranked above catch-related indices. In their study of understanding angler motivations, Fedler and Ditton (1994) suggested that the value of fishing for pleasure was prevalent in literature records from 300 B.C. to 1496 to 1953. These motivations or satisfactions, which are the basis for sociocultural values, vary among individuals and include a variety of factors (Knopf et al. 1973; Martin 1976; Hendee and Bryan 1978; Fedler and Ditton 1994; Malvestuto and Hudgins 1996). Temporary satisfactions and pleasures derived from fishing lead to enduring benefits that are personal, physical, psychological, and emotional (Hendee and Bryan 1978). From their reviews of human dimension factors in fisheries, Fedler and Ditton (1994) suggested

that a fuller recognition of the social, psychological, and physical benefits associated with sportfishing may be critical to the continued protection of fish stocks.

Social benefits also accrue from the educational use of data and information from management and research activities. Scientific information is translated to promote the intrinsic value of aquatic systems to users and the general public (Malvestuto and Hudgins 1996). Public education can enhance wise resource use and generate public appreciation of aquatic systems (Angermeier and Williams 1994). Assessing the economic value of nongame fishes and nonconsumptive uses of fishes by the public is difficult, but this assessment is recognized as an important component in the valuation of fishery resources (Gordon et al. 1973; Talhelm and Libby 1987). Loomis and White (1996) demonstrated that economic values can be expressed for the conservation of nongame fish species as well as for fish species with considerable commercial or recreational value, and this value is distinct from the species' use value.

Fisheries managers and researchers have tried to evaluate and maximize both the enjoyment of the sportfishing experience and the economic value of fish, fisheries, and aquatic ecosystems. Their observations and data repeatedly confirm the wide variety of important human values associated with fishing. Catching and consuming fish are only parts of the value, especially in recreational fishing. These other values and benefits should not be disregarded when assessing the ethics of human use of fishes and other aquatic organisms.

AFS Concerns for Animal Welfare

Concerns regarding the welfare and use of animals in medical laboratory research have resulted in laws, government policies, procedures, and protocols that require humane treatment of animals for all uses. Research projects, particularly those conducted in laboratories, are reviewed to ensure that projects using animals are necessary and conducted as humanely as possible. Examples of animal welfare protection laws, policies, and institutions include the Animal Welfare Act (7 U.S.C. 2131 et seq.), Guide for the Care and Use of Laboratory Animals by the National Institutes of Health (1985), and federally mandated "institutional animal care and use committees" (IACUC), which are in place at federally funded institutions to ensure that humane care is given to research animals.

To build on and extend these ethical guidelines to the field, thus promoting the conduct of all fisheries work in a humane manner that eliminates cruelty and minimizes suffering, the AFS, in cooperation with the American Society of Ichthyologists and Herpetologists, and the American Institute of Fishery Research Biologists—developed and subsequently published "Guidelines for Use of Fishes in Field Research" (Nickum 1988). This document responded to the 1985 amendment to the Animal Welfare Act that extended principles of humane laboratory animal care to field research activities. The AFS encourages its members to uphold public standards of humane treatment, both in the field and the laboratory.

Conservation Management and Ecological Sustainability

Recent assessments of the status of aquatic species, both worldwide and in North America, concluded that significant percentages of fish, amphibian, freshwater mussels, and crayfish are declining toward an imperiled status (Williams et al. 1989; Williams et al. 1993; Moyle and Yoshiyama 1994; Warren and Burr 1994; IUCN 1996; Taylor et al. 1996). Eipper (1995) concluded that the global human population of 5.6 billion people was overtaking fish production since declines were evident in 9 of 17 major ocean fisheries. From a habitat perspective, significant modifications to aquatic habitats have been documented by Benke (1990) for streams and rivers, by Meador (1996) for water storage and transfer projects, and by Armour et al. (1994) for western riparian and stream ecosystems. By any assessment during the last decade, there can be little doubt that humans have had, and are having, a significant negative impact on the diversity of aquatic organisms and the quality of aquatic habitats. Conservation management and research on fish and other aquatic organisms are beneficial and in some cases necessary to survival of the growing number of imperiled aquatic species (Williams et al. 1989; Angermeier and Williams 1994).

There is a growing movement in public land and water resource management away from the traditional paradigm based on maximum sustained yield toward an emerging paradigm based on ecosystem management (Cortner and Moote 1994; Gresswell and Liss 1995; Kellert 1996; Malvestuto and Hudgins 1996). Within the fisheries field, management and research continue to move from a single-species, single-product-oriented approach, to a multi-species, ecosystem-integrity-oriented approach based on principles of ecosystem-based management (MacCall 1986; Dombeck 1996; Malvestuto and Hudgins 1996; Schramm and Hubert 1996; Starnes et al. 1996; Wiley 1996; Wiley and Gregory 1996). Ecosystem-based management recognizes the intrinsic value of ecosystem health and integrity, and recognizes human society as part of the system. Ecosystem management includes consideration of human societies, technology, economies, needs, health values, and sociocultural values as well as environmental health, integrity, and biodiversity (Malvestuto and Hudgins 1996; Schramm and Hubert 1996).

Addressing Diversity and Conflict

The changing themes in fisheries management and science are reflected in statements from recent Fisheries documents. For example, the definition of a fishery has expanded from exclusively consumptive uses to encompass a diversity of nonconsumptive uses (Gresswell and Liss 1995; AFS 1996; Starnes et al. 1996). Not surprisingly, recent AFS position statements recognize the importance of consumptive and nonconsumptive uses, and emphasize the need to protect aquatic ecosystems with all their species and ecological processes (Armour et al. 1994; Starnes et al. 1996; Winter and Hughes 1997).

The trend toward multiple-species management was accompanied by societal recognition of the intrinsic value of fish in the 1950s and 1960s (Royce 1988; Wiley 1996). Environmental political action and environmental legislation, coupled with the decline of

the expansion era of world fisheries during the 1970s, led to the more recent increase of public involvement in resource policy and decision making (Royce 1988; Alverson 1995). Changes in the fisheries field continue today as demands on the resource increase (Frye and Gottschalk 1995) and diversify (Redmond 1994; Gresswell and Liss 1995; Kellert 1995, 1996). In light of this diversification, it is difficult to predict future demands on fisheries resources. However, we have found strong and clear guidance for dealing with confusing changes in fisheries in our own AFS literature.

The fisheries management charge states that management agencies are stewards of the entire fishery resource, including, but not limited to, sport or commercial fisheries. Ecosystem-based management requires sustaining nontarget fishes and aquatic species that are important components of aquatic ecosystems, in addition to sustaining species caught by people in consumptive fisheries (Wiley 1996). As part of fisheries management, we should ensure a diversity of consumptive and nonconsumptive opportunities for a wide range of public interests where consumptive uses might involve commercial, recreational, ceremonial, or subsistence fishing (Fraley 1996; Starnes et al. 1996).

Fisheries management policies ultimately are driven by a variety of factors, including scientific research and political, economic, aesthetic, and social values. Societal values are the raw materials from which fisheries management policies are forged (Wiley 1996). As primary stakeholders in the management of natural resources held in public trust such as fisheries and aquatic systems, the public directs their use and management by fishery professionals according to the public's needs for nutrition, recreation, employment, income, and a healthy human environment (Dochoda and Fetterolf 1987). Thus, "the resource professional's first priority should be to work with user and interest groups, academia, local communities, and others to develop shared goals for healthy ecosystems" (Dombeck 1996). Fisheries professionals represent the fishes and the people who use and appreciate them; they cannot make the choices among various stakeholders of watershed resources. "Only society can make the choices requiring such Solomon-like wisdom" (Wiley 1996).

As a Society, we recognize that diversity in decision-making processes is not an obstacle, but a strength (Coutant 1996; Keefe and Young-Dubovsky 1996). To draw on this strength, we must be able to understand and appreciate diverse views (Daigle et al. 1996). With respect to human interactions with animals, there is a continuum of interests and philosophies among different fisheries resource stakeholders, including fisheries professionals. The AFS membership itself is diverse, spanning 75 countries, which suggests a diversity of philosophies.

Our Society encourages diversity (Coutant 1996; Keefe and Young-Dubovsky 1996); therefore, we must expect conflict and be prepared to manage it responsibly. To address conflicting demands, conflict management experts (such as those at the Center for Conflict and Change, Humphrey Institute, University of Minnesota) suggest applying one of various conflict management methods. Conflict management methods are significantly less expensive and time-consuming than litigation and various forms of political action

(e.g., legislation, ballot measures). By promoting conflict management approaches, AFS would help reduce exposure of fisheries professionals to more costly alternatives. In one example of collaborative decision making, a citizen task force was formed to determine goals for deer herd size and management strategies within a metropolitan area (Curtis et al. 1993). Conflict management methods that acknowledge diverse interests make all stakeholders feel their concerns have been considered, even if the outcome is not ideal for any single party (Richards and Krannich 1991; Wywiałowski and Reese 1991). Also, if decisions can be made based on the input of many different perspectives rather than one or two, they are likely to be more sound, imaginative, and inspired (Covey 1989).

Considering the changing context of fisheries resource management and the increasing diversity of AFS and its goals, we need to expect and accept conflicting interests among fisheries resource stakeholders. AFS First Vice-president Christine Moffitt (1996) cautioned, "We must provide leadership in bringing together the profession to help resolve disputes; the Society cannot become the arm of any one interest group and survive." Also, in a recent survey of managers and supervisors in all state fish and wildlife agencies nationwide, 82% reported they could use help solving management problems. Specifically, skills in conflict management were listed second in order of priority (Angus 1996).

Needed Actions

In developing and implementing actions to address social conflicts over fishing and other human interactions with aquatic organisms, AFS needs to simultaneously (a) support fishing and other uses of aquatic organisms within the bounds of ecosystem-based management and (b) uphold freedom of expression within legal boundaries, sincerely respecting diversity in peoples' perspectives. Thus, the policies described below encourage AFS members to "review their roles in the democratic social contract, both as public servants and as citizen advocates of their beliefs, so...they hold their own conduct and that of all participants in the debate to the highest standards of integrity" (Henson 1997).

The AFS should continue to raise member awareness of the various approaches to conflict management such as facilitation, mediation, or arbitration. Supporting the use of these approaches among members will help develop inclusive and just processes in which to address conflict about issues raised in this policy statement as well as future areas of conflict within AFS and between AFS and broader society. Because members may have limited time and resources available to deal with conflict, AFS should develop a resource base of experts and educational materials to provide the necessary support for its members, including continuing education workshops on conflict management skill building. The AFS also should exchange resources with other organizations facing similar challenges.

Policy

It is the position of the American Fisheries Society that:

1. Diverse forms of utilization of fish and other aquatic organisms are prominent around the world and will continue to be important for sustaining human societies. Thus, AFS supports and promotes fisheries management policies and practices that provide opportunities to consume fish and other aquatic organisms in a manner that ensures long-term ecological sustainability.

2. The consumptive and nonconsumptive uses of fish and other aquatic organisms by humans contribute to the social, cultural, economic, and spiritual well-being of many societies. Through traditional uses, fish and other aquatic organisms are culturally significant to those societies. For these reasons, fish and other aquatic organisms will continue to be important in sustaining human societies.

3. It is appropriate and often necessary for humans to manage fish and other aquatic organisms to sustain and protect their populations, communities, and habitats, and to maintain the integrity of evolutionary and ecological processes that create and support the diversity of aquatic organisms. As the species with the greatest capacity to affect aquatic environments due to the pervasive effects of human population growth, technology, and consumption, humans have an obligation to maintain and restore aquatic ecosystems and their biotic components.

4. It is appropriate for humans to use fish and other aquatic organisms in a responsible manner for scientific, commercial, educational, cultural, and recreational purposes to promote the quality of human life, promote the quality of aquatic ecosystems, and enhance the capacity of human societies to value and conserve these ecosystems.

5. Managers of recreational and commercial fisheries should use practices that do not threaten the viability of populations of native species of aquatic and terrestrial organisms, their habitats, and their ecosystems. Management decisions should be evaluated and justified a priority in a manner that ensures long-term ecological sustainability.

6. Human interaction with aquatic organisms is governed largely by cultural mores, and different human cultures place different values on fish and other aquatic organisms. It is each individual's right to choose (within the bounds imposed by his or her society) whether or not to engage in consumptive or nonconsumptive use of aquatic organisms. It is the role and responsibility of fisheries professionals to inform societies about the implications and consequences of use of, or actions affecting, fish and other aquatic organisms.

7. All fisheries-related activities involving use of fish and other aquatic organisms, including resource management, research, administration, education, and law enforcement, should be developed within and justified by conservation principles and philosophies. Any use should be conducted in accordance with the best scientific and professional information available and consistent with humane practices, including those outlined in "Guidelines for Use of Fishes in Field Research" (Nickum 1988) and Guide for the Care and Use of Laboratory Animals (National Institutes of Health 1985).

8. Fishery professionals should support and promote conflict management methods to address disagreements over fishing and other human interactions with aquatic organisms. These methods should include facilitation, mediation, arbitration, negotiation, or

collaborative decision making. The success of various approaches should be evaluated so fisheries professionals can recommend ways to resolve future conflicts and determine how approaches could be altered to increase their effectiveness.

References

Alverson, D. L. 1995. Fisheries management. *Fisheries* 20(8):6–7.

AFS (American Fisheries Society). 1995. Special fishing regulations for managing freshwater sport fisheries: an American Fisheries Society Position Statement. *Fisheries* 20(12):32–34.

1996. Social and economic contributions of fish viewing and festivals to resource and community sustainability. Annual Meeting symposium, Dearborn, MI.

Anderson, R. M., and R. B. Nehring. 1984. Effects of a catch-and-release regulation on a wild trout population in Colorado and its acceptance by anglers. *N. Am. J. Fish. Manage.* 4:257–265.

Angermeier, P. L., and J. E. Williams. 1994. Conservation of imperiled species and reauthorization of the Endangered Species Act of 1973. AFS policy statement. *Fisheries* 19(1):26–29.

Angus, S. 1996. Build it and they will come—then what? *Fisheries* 21(1):30.

Armour, C., D. Duff, and W. Elmore. 1994. The effects of livestock grazing on western riparian and stream ecosystems. AFS position statement. *Fisheries* 19(9):9–12.

Barnhart, R. A., and T. D. Roelofs, eds. 1977. Catch-and-release fishing as a management tool. Proceedings of a national sportfishing symposium. Humboldt State University, California Cooperative Fishery Research Unit, and California Trout, Inc., Arcata.

Benke, A. C. 1990. A perspective on America's vanishing streams. *J. N. Am. Benthol. Soc.* 91:77–88.

Cortner, H. J., and M. A. Moote. 1994. Trends and issues in land and water resources management: setting the agenda for change. *Environ. Manag.* 18(2):167–173.

Coutant, C. C. 1996. Interfaces. *Fisheries* 21(10):40.

Covey, S. R. 1989. The seven habits of highly effective people: restoring the character ethic. Simon and Schuster, New York.

Curtis, P. D., R. J. Stout, B. A. Knuth, L. A. Myers, and T. M. Rockwell. 1993. Selecting deer management options in a suburban environment: a case study from Rochester, New York. *Trans. 58th N. Am. Wildl. Nat. Resour. Conf.* 58:102–116.

- Daigle, C. P., D. K. Loomis, and R. B. Ditton. 1996. Procedural justice in fishery resource allocations. *Fisheries* 21(11):18–23.
- Dochoda, M. R., and C. M. Fetterolf, Jr. 1987. Public purpose of Great Lakes fishery management: lessons from the management experience. *Trans. Am. Fish. Soc.* 116:302–308.
- Dombeck, M. 1996. Ecosystem management: successes within the Bureau of Land Management. *Fisheries* 21(3):30–31.
- Driver, B. L., and R. C. Knopf. 1976. Temporary escape. One product of sportfisheries management. *Fisheries* 1(2):21–29.
- Eipper, A. W. 1995. Our quiet crisis. *Fisheries* 20(9):22–23.
- Espegren, G. D., D. D. Miller, and R. B. Nehring. 1990. Modeling the effects of various angling regulations on trout populations in Colorado streams. Special Report No. 67. Colorado Division of Wildlife, Fort Collins.
- FAO (Food and Agriculture Organization of the United Nations) Yearbook. 1993. Fishery statistics. Commodities. Vol. 77. Food and Agriculture Organization of the United Nations, Rome.
1994. Fishery statistics. Catches and landing. Vol. 78. Food and Agriculture Organization of the United Nations, Rome.
- Fedler, A. J., and R. B. Ditton. 1994. Understanding angler motivations in fisheries management. *Fisheries* 19(4):6–13.
- Fraley, J. 1996. Cooperation and controversy in wilderness fisheries management. *Fisheries* 21(5):16–21.
- Frye, M. R., and J. S. Gottschalk. 1995. The American Fisheries Society: the last 25 years. *Fisheries* 20(8):8–13.
- Gasson, W., and L. L. Kruckenburg. 1993. Hunting, with or without a future? *Wyoming Wildlife* September: 36–41.
- Gordon, D., D. W. Chapman, and T. C. Bjornn. 1973. Economic evaluation of sport fisheries—what do they mean? *Trans. Am. Fish. Soc.* 102:293–311.
- Gresswell, R. E., and W. J. Liss. 1995. Values associated with management of Yellowstone cutthroat trout in Yellowstone National Park. *Conserv. Biol.* 9(1):159–165.

Harris, C. C., and E. P. Bergersen. 1985. Survey on demand for sport fisheries: problems and potentialities for its use in fishery management planning. *N. Am. J. Fish. Manage.* 5(3A):400–410.

Hendee, J. C., and H. Bryan. 1978. Social benefits of fish and wildlife conservation. Pages 234–254 in *Western proceedings, 58th Annual Conference of the Western Association of Fish and Wildlife Agencies*, San Diego, CA.

Henson, F. G. 1997. Summary report on the results of a search for print media accounts of anti-fishing protests, confrontations, or interference with fisheries management activities. Unpublished report submitted to AFS Task Force on Human Use of Fish and Other Aquatic Organisms. American Fisheries Society, Bethesda, MD.

Hunt, R. L. 1981. A successful application of catch-and-release regulations on a Wisconsin trout stream. Technical Bulletin No. 119. Wisconsin Department of Natural Resources, Madison.

IUCN (International Union for Conservation of Nature and Natural Resources). 1996. 1996 IUCN Red List of threatened animals. Island Press, Covelo, CA.

Keefe, M. L., and C. Young-Dubovsky. 1996. Promoting diversity in the fisheries profession. *Fisheries* 21(1):14–15.

Kellert, S. R. 1995. Managing for biological and sociological diversity, or ‘deja vu all over again. *Wildl. Soc. Bull.* 23 (2):274–278.

1996. *The value of life: biological diversity and human society*. Island Press, Washington, DC.

Knopf, R. C., B. L. Driver, and J. R. Bassett. 1973. Motivations for fishing. *Trans. 38th N. Am. Wildl. Nat. Resour. Conf.* 38:191–204.

Loomis, J. B., and D. S. White. 1996. Economic values of increasingly rare and endangered fish. *Fisheries* 21(11):6–10.

MacCall, A. D. 1986. Rethinking research for fishery and ecosystem management. *Rethinking fisheries management*. Center for Ocean Management Studies, University of Rhode Island, Kingston.

Malvestuto, S. P., and M. D. Hudgins. 1996. Optimum yield for recreational fisheries management. *Fisheries* 21(6):6–17.

Martin, R. G. 1976. Philosophy of sportfisheries management. *Fisheries* 1(6):8–10, 29–30.

Meador, M. R. 1996. Water transfer projects and the role of fisheries biologists. *Fisheries* 21(9):18–23.

Moeller, G. H., and J. H. Engelken. 1972. What fishermen look for in a fishing experience. *J. Wildl. Manage.* 36(4):1,253–1,257.

Moffitt, C. 1996. Vision statement. *Fisheries* 21(3):24.

Moyle, P. B., and R. M. Yoshiyama. 1994. Protection of biodiversity in California: a five-tiered approach. *Fisheries* 19(2):6–18.

National Institutes of Health. 1985. Guide for the care and use of laboratory animals. NIH Pub. 85–23, Bethesda, MD.

Nickum, J. G. 1988. Guidelines for use of fishes in field research. *Fisheries* 13(2):16–23.

Ott, R. S. 1995. The natural wrongs about animal rights and animal liberation. *Forum. J. Am. Vet. Med. Assoc.* 207(8):1,023–1,030.

Quinn, S. 1995. Effects of the "animal rights" movement on the future of fishing. Pages 151–155 in R. Barnhart, B. Shala, and R. H. Hamre, eds. *Wild Trout V: Wild trout in the 21st century*. Trout Unlimited, Arlington, VA.

Redmond, L. C. 1994. Satisfying our diverse stakeholders. *Fisheries* 19(11):28.

Reiger, G. 1997. I feel; therefore, I am. *Conservation. Field and Stream* C1(11):20–22.

Richards, R. T., and R. S. Krannich. 1991. Ideology of the animal rights movement. *Trans. 56th N. Am. Wildl. Nat. Resour. Conf.* 56:363–371.

Royce, W. F. 1988. The historical development of fishery science and management. *Marine Fisheries Review* 50(4):30–39.

Schramm, Jr., H. L., and W. A. Hubert. 1996. Ecosystem management: implications for fisheries management. *Fisheries* 21(12):6–11.

Spitler, R. J. 1998. The animal rights movement and fisheries: they're heeeeere! *Fisheries* 23(1):21–22.

Starnes, L. B., G. Compean-Jiminez, D. Dodge, G. Huntsman, P. Janek, J. Lloyd, N. Prosser, W. Royce, and W. W. Taylor. 1996. North American fisheries policy. *Fisheries* 21(3):26–29.

Talhelm, D. R., and L. W. Libby. 1987. In search of a total value assessment framework: SAFR symposium overview and synthesis. *Trans. Am. Fish. Soc.* 116:293–301.

Taylor, C., M. L. Warren, Jr., J. F. Fitzpatrick, Jr., H. H. Hobbs III, R. F. Jezerinac, W. L. Pflieger, and H. W. Robison. 1996. Conservation status of crayfishes of the United States and Canada. *Fisheries* 21(4):25–38.

USFWS (U.S. Fish and Wildlife Service) and Bureau of the Census. 1993. 1991 national survey of fishing, hunting and wildlife-associated recreation. U.S. Government Printing Office, Washington, DC.

Warren, Jr., M. L., and B. M. Burr. 1994. Status of freshwater fishes of the United States: overview of an imperiled fauna. *Fisheries* 19(1):6–18.

Wiley, R. W. 1996. Ecosystem integrity vs fisheries management: the 1994–1995 point-counterpoint debates. *Fisheries* 21(3):22–23.

Wiley, R. W., and R. W. Gregory. 1996. Whom do we serve? *Fisheries* 21(1):19.

Williams, J. D., M. L. Warren, Jr., K. S. Cummings, J. L. Harris, and R. J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. *Fisheries* 18(9):6–22.

Williams, J. E., J. E. Johnson, D. A. Hendrickson, S. Contreras-Balderas, J. D. Williams, M. Navarro-Mendoza, D. E. McAllister, and J. E. Deacon. 1989. Fishes of North America—endangered, threatened, or of special concern: 1989. *Fisheries* 14(6):2–20.

Winter, B. D., and R. M. Hughes. 1997. Biodiversity. American Fisheries Society position statement. *Fisheries* 22(3):16–23.

Wywiałowski, A. P., and K. P. Reese. 1991. Challenges from animal rightists: Can we identify common goals? *Trans. 56th N. Am. Wildl. Nat. Resour. Conf.* 56:359–362.