

## Five Ethical Challenges to Recreational Fishing: What They Are and What They Mean

ROBERT ARLINGHAUS\*

*Department of Biology and Ecology of Fishes  
Leibniz Institute of Freshwater Ecology and Inland Fisheries  
Müggelseedamm 310, Berlin 12587, Germany*

and

*Inland Fisheries Management Laboratory, Faculty of Agriculture and Horticulture  
Humboldt University of Berlin, Philippstrasse 13, Haus 7, Berlin 10115, Germany*

ALEXANDER SCHWAB

*Schwab & Sohn, Rohrstrasse 46, Biglen 3507, Switzerland*

*Abstract.*—Ever since fishing was called recreational fishing, a cruelty charge has hovered around somewhere in the background. In recent times, however, it has made it to the fore substantiated by anthropomorphic reasoning and fuelled by high-visibility papers claiming that fish can feel pain and suffer. Because some segments of the public perceive the infliction of these mental states to fish as abhorrent and not outweighing the costs imposed on the individual fish by appropriate benefits to the human, recreational fishing is coming under attack on moral grounds. Other challenges have also emerged that do not center on the issue of whether fish are sentient or not. In this paper, we describe five of the most prevalent moral challenges to recreational angling, two of which—animal welfare and wilderness-centered perspectives—can offer a constructive outlook by calling upon improved treatment of individual fish (animal welfare) and generally more sustainable management (wilderness perspective). In contrast, if one subscribes to animal liberation or animal rights philosophies, the outlook for recreational fishing is generally negative: it has to stop. A final challenge is associated with the motivations of anglers. The moral argument there is that the activity is carried out largely for angler pleasure rather than as a means of securing survival. The outlook of this ethical challenge sometimes leans towards only accepting one form of recreational fishing: catching, killing, and eating. Voluntary catch-and-release fishing and practices such as tournament fishing with a strict total catch-and-release policy would then not be ethically permissible. In this paper, we highlight the origin and background of each of the five ethical challenges and explain their implications for recreational fishing.

### Introduction

Philosophy in the popular meaning of the word has always been, and always will be, central to recreational fishing. For example, each angler has his or her own philosophy regarding the right or wrong weather conditions and the right or wrong bait and will also have ideas about “the one that got away.” In contrast to the meanderings of piscatorial contemplation, the

academic discipline of philosophy follows more rigorous procedures; it only recently graduated to recreational angling and did so mainly on the strength of ethical questions. However, within a very short time, its tentacles reached into every aspect of recreational angling. Presently, the demands of some contemporary academic philosophers as well as biologists with hidden or explicit agendas (e.g., de Leeuw 1996; Balon 2000; Webster 2005) command more and more attention in postindustrialized societies. The constraints on

\* Corresponding author: arlinghaus@igb-berlin.de

voluntary catch and release of legally sized fish from German and Swiss waters is a prime example of the combined persuasiveness of moral philosophy and science on the issue what fish might feel if captured by an angler (Arlinghaus et al. 2009). More and more, anglers find themselves under ethical scrutiny, for example being accused of being cruel to fish (de Leeuw 1996; Balon 2000; Drossé 2002, 2003). How can this development be explained?

Before the late 20th century, the ethical challenges to recreational fishing largely followed in the wake of various movements directly or indirectly concerned with human use of animals, indicated by calls for prevention of cruelty to animals, vegetarianism, and general social reform (Salt 1980). In substance, these challenges boil down to Lord Byron's (1788–1824) famous lines (Byron 1823):

And angling, too, that solitary vice,  
Whatever Izaak Walton sings or says:  
The quaint, old, cruel coxcomb in his  
gullet  
Should have a hook, and a small trout to  
pull it.

(Don Juan, Canto XIII, cvi)

The first angling philosopher of renown to take on this challenge was Arthur A. Luce (1959). His book *Fishing and Thinking* (Luce 1959) is now a classic. Luce implied the possibility of anglers being cruel if the angler went fishing without the intention to harvest fish. After Luce, it was the perspicacious and observant angler Bryn Hammond in his *Halcyon Days* (Hammond 1992) who addressed the questions of cruelty and voluntary catch and release, but it was not until *Hook, Line and Thinker* by Alexander Schwab (2003) that a philosophically trained angler, mushroomer, and hunter tried to put contemporary ethical challenges to recreational fishing into perspective to lay people. Soon thereafter, J. Claude Evans (2005), an angler and academic philosopher of international standing, followed Schwab (2003) by publishing an academically much richer book entitled *With Respect for Nature: Living as Part of the Natural World*. Evans was stimulated to write his book by reflecting on the ethics of voluntary catch and release, which follows on from the prominent ethical challenge introduced by Luce (1959) and which is relevant until today (Arlinghaus 2007; Arlinghaus et al. 2007a, 2007b,

2009). Evans' writing is of seminal importance because it deals with most of the burning ethical questions that contemporary recreational fishing increasingly faces, and he offers new and unexpected perspectives. For example, Evans (2005:220) writes in the context of catch and release that "we need more than ever to cultivate experiences and practices that connect us with integrity of wholeness....The practice of catch-and-release is most properly based on respect for the integrity of ecosystems and populations that are subjected to the pressures of human use and exploitation. Embedded in this practice is a specific respect for the individual fish one attempts to catch and then releases." Such a conclusion would be unthinkable for many that base ethical criteria on the potential ability of fish to suffer tremendously in the process of being caught and released, as will be detailed below.

By 2005, when Evans published his thoughtful analysis, the nature of the ballgame had already changed in comparison to 30 years earlier. Peter Singer's *Animal Liberation* (Singer 1990) and Tom Regan's *The Case for Animal Rights* (Regan 1983), and their academic supporters and disciples, placed recreational fishing in the wider context of the legitimacy of animal use. As we get closer to the present time, the specific attacks against recreational angling based on moral philosophy—with themes such as cruelty, suffering of fish, or the presumed superfluousness of the pursuit—increase (de Leeuw 1996; Balon 2000; Håstein et al. 2005; Webster 2005; Huntingford et al. 2006), and, in some countries, laws have been enacted to constrain recreational fishing on moral grounds (Arlinghaus 2007).

An example of the now rapidly emerging ethical debate is Sandøe et al. (2009), who call for a "genuine ethical debate" on fish welfare and a "framework for a discussion on fish ethics." The main reason given is "society's ongoing reflection" about the use of animals. A precondition of a sound or genuine ethical debate is, according to Sandøe et al. (2009), that the debate as such is seen as necessary. In this context, it is worthwhile to examine in detail five kinds of partly interrelated ethical challenges raised against recreational fishing and to investigate their implications. These challenges encompass three views that center on what happens to individual fish when targeted by anglers, the question of the intention of an angler (individual angler-centered

challenge), and the idea that anglers are a non-natural disturbance to wilderness and nature (wilderness-centered challenge).

In this contribution, we shed light on these ethical challenges that the recreational fishing sector faces by focusing on the perceived rights and wrongs of recreational fishing, or particular recreational fishing practices, as voiced in the primary literature or in the "real world." We shall focus on the increasingly important theme of suffering-defined fish welfare (Arlinghaus et al. 2007a, 2007b, 2009) but will place this specific concept also more broadly within the environmental debate that tends to be more concerned with the population of fish and other animals, including the entire biotic community, rather than with the individuals making up such communities. We conclude by sketching a hybrid ethical view that we feel to be the most constructive way to move forward.

### Individual-Fish-Centered Ethical Challenges

Recreational fishing runs under the heading of animal use. When examining the morality of recreational fishing, some people do not look at the interaction between a population of anglers and a population of fish, but focus on what happens to an individual fish and if and when this happening is morally justified. Animal use can be scrutinized under three distinct headings: animal welfare, animal liberation, and animal rights (Arlinghaus et al. 2007a, 2007b; Arlinghaus 2008). This division is helpful in identifying the origins of certain ideas, concepts, and lines of argument from an ethical perspective. In reality, there are overlapping areas and complex hybrid views (Sandøe and Christensen 2008). A terminological note is needed at this point. In colloquial language, unless otherwise specified, the term "animal rights" covers both animal liberation and animal rights. However, from a philosophical perspective, a clear distinction is needed between animal welfare, animal liberation, and animal rights for better understanding as is described below.

#### Animal Welfare

In the context of fisheries, fish welfare, broadly speaking, means taking due account of the po-

tential impacts of our actions on the well-being, health, and fitness of individual fish and act in a way that minimizes these impairments. There is a wide variation in the definition of animal welfare, but the main concept is that the animal is in good health and is getting what it wants, if held in captivity (Dawkins 2008). To avoid misunderstanding and move towards practical solutions in an objective way, it is critical to distinguish a science-based, objectively measurable definition of animal welfare from the issue of suffering in the world of fish and from the ethics of animal welfare (Dawkins 2006; Arlinghaus et al. 2007a, 2009). Thus, we are critical of conjectural suffering-centered definitions of fish welfare in the spirit of Huntingford et al. (2006) and Sneddon (2006), *inter alia*, because this approach to fish welfare lacks objective, science-based means to quantify the impact of fishing on the welfare of fish (see Arlinghaus et al. 2007a, 2009 for detailed critique).

Generally speaking, taking an animal (fish) welfare perspective allows the use of animals. Of course, terms and conditions apply: the duty to care for animals, to reduce harm, and to improve or maintain animal welfare are the hallmarks. Animal welfare philosophers tend to be anthropocentric and confine the ethical culture to human beings (Arlinghaus et al. 2007b). The reasoning is that animals or plants cannot reasonably participate in the human ethical culture because they lack the necessary understanding of what is involved in human-defined ethics and morals. An extension of the ethical culture to animals, or the biota at large, would thus be meaningless to animals and plants. Not extending the ethical culture to animals and plants, however, does not mean that humans do not have obligations towards animals and plants. These obligations to care for animals, including of course fish, can originate, for example, in compassion, a sense of beauty, or considerations of utility and/or duty, but not out of the assumption that animals and plants are participants in the human ethical culture or have rights in the same sense as humans do.

The animal welfare point of view poses no fundamental problem to recreational fishing, and the welfare of fish can be efficiently, objectively, and unemotionally dealt with in recreational fisheries practices, as described, for example, in Arlinghaus (2008), Arlinghaus et al. (2007a), and

Arlinghaus et al. (2009) in the context of catch and release, or, more generally, in the recently published *Code of Practice for Recreational Fisheries* (EIFAC 2008) or in Cooke and Sneddon (2007). What is important to realize at this stage is that the concept of fish (animal) welfare is one that focuses on how the actions of anglers affect the individual fish. Animal welfare, however, does not question the fundamental legitimacy of recreational fishing (i.e., it is not anti-angling), but it might limit certain practices deemed unacceptable by decision makers or anglers in order to maintain or improve the welfare of fish (Arlinghaus et al. 2009). Depending on how the action of an angler affects the individual fish, there might be the ethical obligation to use, for instance, specific gear and handling methods that minimize and avoid fish welfare impairments. This might even entail abolition of certain angling practices that are considered unacceptable from a fish welfare perspective (EIFAC 2008). However, fish welfare, as we understand it, does not question the generic ethical legitimacy of recreational fishing and, to be effectively dealt with, does not depend on the existence of particular emotional, mental, and cognitive abilities of fish (Rose 2007; Arlinghaus et al. 2009). Because animal welfare can be defined objectively using physiological and behavioral metrics of impaired fish well-being, animal welfare perspectives allow scientists to state falsifiable hypotheses about the impacts of angling practices on fish, test those hypotheses, and provide scientifically supported advice to fisheries managers and anglers on how to improve contentious practices (Arlinghaus et al. 2009).

### Animal Liberation

The philosophy of animal liberation is a completely different kettle of fish; it also centers on individual fish. Animal liberation is a complex utilitarian philosophy that extends the ethical culture to everything that suffers. Peter Singer is the "inventor" and ardent promoter of animal liberation (Singer 1990). Utilitarians focus on the consequences of human actions (i.e., results count), and whichever action produces most happiness and least pain is the right one. Utilitarianism is therefore also referred to as consequentialism.

Utilitarians like Singer (1990) usually take it for granted that fish can feel pain and suffer, and that is why fish are supposed to possess interests in the utilitarian sense. However, there is considerable scientific uncertainty as to whether fish can actually consciously feel pain and suffer (Rose 2002, 2007; Newby and Stevens 2008a, 2008b). Despite this uncertainty, a small group of prominent writers in the fish welfare literature push the hypothesis that fish indeed (very likely) feel pain and suffer and have other higher-order mental states typically confined to mammals (Huntingford et al. 2006; Sneddon 2006; Braithwaite 2010). This hypothesis is scientifically problematic because it cannot be falsified in practical terms. To falsify it, one would need to investigate all fish on earth for their ability to consciously feel pain and suffer. By contrast, the scientifically correct hypothesis that fish neither do feel pain nor suffer is amendable to scientific analysis and falsification by finding one fish on earth with the ability to feel pain or suffer. However, by reversing the hypothesis and stating that fish can feel pain or suffer, the burden to test (i.e., falsify) the hypothesis is put on the angling community or the fisheries profession. Because pain and suffering cannot be measured objectively and because it is impossible to test all fish on earth for their ability to feel pain, this results in a "mission impossible"; it is nonetheless a very clever strategy to pull out of the creel and is called the "precautionary principle" or the "benefit of the doubt." Basically, the benefit of the doubt can neutralize everything, in particular common sense.

Irrespective of this fundamental scientific concern, this fish-feel-pain claim prepares the ground for utilitarians with animal liberation leanings who intend to weigh between the interests of the anglers and the interests of the fish. Why talk of interests in the first place? Singer notes, "The capacity for suffering and enjoyment is a prerequisite for having interests at all, a condition that must be satisfied before we can speak of interests in a meaningful way" (Singer 1990:7). In consequence, this means that if something does not suffer, it ceases to be morally relevant. However, if it does suffer and thus has interests, a utilitarian calculus to balance potential benefits flowing to the human that uses an animal must be conducted by balancing the benefits against

the potential costs experienced by the animal. From this line of reasoning, it is obvious why some scientists are preoccupied with the fish-feel-pain question.

While balancing the interest of fish against the interests of those intending to capture fish during leisure time can be seen as reasonable by some, it remains a mystery to others how exactly this calculus works and how it can exclude utter arbitrariness (Arlinghaus et al. 2009). The results of utilitarian calculi following suffering-centered approaches can indeed be surprising. While, according to Singer, infanticide (Singer 1999), euthanasia, and sex with animals (Singer 2001) can be permissible, recreational fishing is not because fish suffer in the act and their suffering is perceived to outweigh the pleasure of the angler (Singer 1990:172). The key role of suffering in animal liberation philosophies is why the scientifically hotly debated question as to whether fish may or may not have the ability to feel pain and consciously suffer is of paramount importance.

As was explained above, the interests of fish, which animal liberationists presume to be real, are based on the concept of suffering while the ecologist and evolutionary biologist would probably build an argument on the presumed interests of fish by looking at survival and reproductive output (i.e., biologically relevant attributes of fitness; EIFAC 2008). While it is not known with certainty whether and how fish might feel emotionally (Rose 2007), it is clear that all life has a fundamental interest in survival and reproduction. Note that some animal liberationist-driven utilitarian calculi would automatically collapse if one shifts the focus on what the interest of a fish comprises. For example, the suffering-centered perspective regards the infliction of pain and suffering in the process of catch and release generally as unacceptable, preferring to kill the fish rather than to release it (Webster 2005). If, on the other hand, one would base a utilitarian calculus on the biologically meaningful concepts of survival and reproduction, the result could certainly favor catch and release over catch and kill. That is supposing that recreational angling is permissible in the first place, which, of course, is not usually the case for many that write about the issue of whether fish feel pain and suffer in the context of recreational fishing

(Arlinghaus et al. 2009). These writers tend to hide their general discomfort with the practice of recreational fishing under lengthy treatises about the ability of fish to feel pain and suffer and the need for anglers to justify their treatment of sentient fish.

Some fish and fisheries scientists concerned with the political power of fish-feel-pain claims and with the associated anthropomorphic overload have published critiques of papers claiming to have found evidence for fish being able to experience pain and suffering (Rose 2002, 2003, 2007; Newby and Stevens 2008a, 2008b). Their main concern is with the scientific quality of a set of studies by Lynn Sneddon and colleagues (e.g., Sneddon 2003; Sneddon et al. 2003; Reilly et al. 2008). The findings of these studies are open to alternative interpretations and even completely opposing conclusions (see Rose 2007; Newby and Stevens 2008a, 2008b). It is thus inherently uncertain on scientific grounds if fish can consciously feel pain and suffer. While it is highly unlikely that a fish's emotional experience is anything near a human experience (Huntingford et al. 2006; Rose 2007), it is probable that the outcome of a purely emotional weighing procedure between the suffering-defined interests of individual fish and the individual angler will usually work against the accused (i.e., the angler) when the pleasure felt by the angler is assumed to count less than the negative mental states assumed to be experienced by the individual fish.

In contrast to many animal liberation sympathizers in the field of animal ethics, fisheries professionals acknowledge the wider benefits that angling brings to society and do not only weigh individual angler pleasure against individual fish pain. However, note that the utilitarian calculus often—clearly not always—operates by weighing the individual costs and benefits (i.e., it is irrelevant whatever wider benefits recreational fishing creates for society at large; Drossé 2003). This is a very important point to understand because it creates confusion among those who argue that the benefits of recreational fishing go beyond the mere pleasure felt by the individual anglers.

As we have shown, in the context of animal liberation philosophy, the ability to suffer takes center stage because without it, animal liberation constructs regarding recreational angling would collapse. What would it mean if fish did

not suffer? "Fish do not suffer" equals "fish have no interests"; "no interests" equals "no moral concern." If there is no moral concern, there is no subject for an ethical debate from an animal liberation perspective. But would fish welfare cease to be a subject if fish did not suffer? Clearly not (Rose 2007), and most fisheries stakeholders agree that taking due account of fish welfare is important irrespective of the question as to whether fish are sentient (Hasler et al. 2011). The focus on the presumed suffering of fish that is typical for animal liberationists and those who use such jargon (e.g., Sandøe et al. 2009; Sneddon 2009; Braithwaite 2010) thus cannot do justice to fish welfare issues and may even be detrimental to total fish welfare (Arlinghaus et al. 2009). The emphasis on suffering could be construed as being at the centre of a value-loaded perspective by giving the individual fish the same or more consideration than an individual human (i.e., the angler).

### Animal Rights

Peter Singer probably is the most influential living philosopher in the Western world. He is hailed as "the father of animal rights," although he does not believe in rights at all. Animal rights have been promoted by another philosopher, Tom Regan (1983). Note that for Regan, animal suffering is of secondary importance—instead, he is focused on rights. For Regan and many, if not all, animal rights supporters, all "subjects-of-a-life" (i.e., most animals and ourselves) have inherent (intrinsic) value. Inherent value does not come in degrees; all subjects-of-a-life possess it in the same way (Regan 1983). This sounds straightforward, but there are a couple of ifs and buts connected to the "subject-of-a-life" criterion. Not all that lives is necessarily a subject of a life. In order to be such a subject, you need, according to Regan (1983), among other things, the capacity to have interests, an idea of your own welfare, and an emotional life. These capacities come in degrees. Those who have them all, and in working order, are moral agents. The paradigmatic moral agent is a "normal" human adult (Regan 1983). Those who do not have them all, or have them all but to a lesser degree, are moral patients. Infants, young children, the "mentally deranged or enfeebled" (Regan 1983:153), and animals are

the paradigmatic moral patients (Regan 1983). According to Regan, moral patients are at the receiving end of the actions of moral agents. Beings with no consciousness are not subjects of a life, and there are, of course, borderline cases: frogs and fish, for example, about which we do not know as to whether they are conscious or not (Rose 2002, 2007). However, here, again, there are a number of fish scientists who, maybe unintentionally, feed anthropomorphism to the wider public, and political elites, by using terms from human psychology in the context of fish biology, such as cognition, mental state, emotion, fear, suffering, pain, complex learning abilities, and other concepts (Huntingford et al. 2006; Sneddon 2006; Braithwaite and Boulcott 2008). The result is that fish are made human-like, at least jargon-wise. The person on the street or the politician in a national parliament in charge of voting for a law that prohibits or largely constrains the use of fish by humans is unaware that a fish experience is probably nothing like a human or mammalian experience. He or she might equate the fish's emotional life with human or mammalian emotional capabilities because the fish experience is being described with terms borrowed from human psychology. While it is well known, accepted, and indeed fascinating that fish have astoundingly complex behavioral and potentially cognitive abilities, there is presently no possibility to measure mental abilities and consciousness objectively (Rose 2007). If we cannot measure mental states in fish, we cannot talk about them in a meaningful way. We can, however, give fish the benefit of the doubt (Sneddon 2006), which, in essence, is a subjective moral decision and very popular in certain circles.

This is usually not helpful for the recreational angler because what the anthropomorphizing jargon intentionally or unintentionally does is to feed Tom Regan's "subject-of-a-life" criterion. Fish are becoming moral patients and are included in the respect principle, which says that all subjects of a life have a *prima facie* right not to be harmed (Regan 1983). In many prosperous countries, scientists have practical experience of the pervasiveness of fish becoming moral patients: for every experiment that involves some degree of harming of a fish (e.g., hooking a fish or taking a blood

sample), an extensive proposal including justification must be put forward and approved by an ethics committee before the experiment can go ahead. This is not Regan's philosophy in practice because he would object to any type of experiment or use of animals, but it shows the degree of acceptance of the idea that an individual fish has intrinsic value such that any harsh treatment must be justified. This will sooner or later also affect recreational fishing in societies increasingly disconnected from wildlife, where fish and wildlife become of symbolic importance rather than a resource of use to humans (see Manfredo 2008).

Animal rights, as understood by Tom Regan, are absolutely uncompromising. While it is not impossible that some utilitarian calculus might yield a positive result for recreational fishing—it all depends on the consequences of actions—Regan's rights view takes no prisoners: all animal use has to cease, and about recreational fishing he says, "Even assuming birds and fish are not subjects-of-a-life, to allow their recreational or economic exploitation is to encourage the formation of habits and practices that lead to the violation of the rights of animals who are subjects-of-a-life" (Regan 1983:417). Regan's own words best encapsulate the mindset and outlook on wildlife and the role of humans. About wildlife management, he states that "the goal of wildlife management should be to defend wild animals in the possession of their rights, providing them with the opportunity to live their own life, by their own lights, as best they can, spared that human predation that goes by the name of 'sport.' We owe this to wild animals, not out of kindness, nor because we are against cruelty, but out of respect for their rights" (Regan 1983:357). What does this mean for recreational fishing? The stance is clear: it has to stop, immediately; it is ethically wrong.

In this section of individual fish-centered challenges, we have seen that recreational fishing is permissible if one subscribes to an animal welfare perspective. What matters is that harm to the individual fish is minimized through appropriate conduct. In contrast, assuming that fish can suffer, animal liberation reasoning may result in any type of outcome depending on the values set by the "utilitarian mathematician" on either side of the equation, weighing benefits to the individual hu-

man against cost to the individual fish. This is thus the most subjective view of all, and solving this in public discussion is only possible by convincing rhetoric. In addition, the main criterion that fish are indeed able to suffer and feel pain is not amenable to objective scientific falsification and is thus open to free speculations and a largely emotional debate. Finally, animal rights perspectives are, in contrast to suffering-centered perspectives, refreshingly clear: fish are moral patients because they are given the benefit of the doubt. Based on this perspective, recreational fishing must cease.

### Individual Angler-Centered Ethical Challenges

So far, we have examined prominent moral challenges to recreational fishing that originate from the perspective of what happens to the individual fish. However, there have also been some philosophical reflections on a different form of ethical challenge that centers on the intention of the angler to determine the ethical value of the act (Olsen 2003). The objection is quite common in informal context, and the critique claims that what is wrong is that recreational fishing is carried out for fun, largely irrespective of what a fish might feel. It is important to realize that the "for-fun" argument is even more persuasive if the fun is construed to be achieved by playing with sentient food for no reason. The basis of the argument is that recreational fishing is conducted during leisure time and does not serve essential survival needs of the angler. While catching fish for essential needs is seen as permissible by many, fishing for fun may be considered unethical. On this reading, the angler's motive is what counts for judging the ethical permissibility of the act (Olsen 2003).

This is a rather different approach from the utilitarianism or the rights theory as expounded above. Instead of focusing on the different amounts of pain caused by the actions of anglers or on what is required in order to respect the rights of fish, the emphasis is now on the person and his or her motivations and intentions. In this context, one important observation for judging the ethical permissibility of recreational fishing is the one by List (1997), Scruton (1998), Schwab (2003), and Olsen (2003): there

is probably no angler on earth who purposely enjoys inflicting pain and suffering on fish. For many, if not all, anglers, recreational fishing is a multidimensional experience that involves the catching and maybe the harvesting of fish (Felder and Ditton 1994). If this catch is killed and eaten, and thus the intention of the angler was to engage in a natural act of predation concomitant with a range of positive emotions, there seems to be no reasonable ethical objection (Olsen 2003), as long as eating animals is permissible for humans. However, this changes if we think of the practice of voluntary catch and release, which might be perceived by some as a nonnatural predator-prey interaction (Arlinghaus 2008). Thus, one might conclude, based on the ethical perspective of the individual angler and his or her intention, that harvest-oriented angling is ethical while angling that is not intended for the harvesting of fish and only provides angler pleasure is unethical (Olsen 2003). This would make tournament fishing, which involves intentional catch and release, unethical and maybe illegal, and this has indeed been judged to be so in at least one country (Meinelt et al. 2008).

On first sight, one might construe nonharvest-oriented recreational fishing as disrespectful to fish; as unnecessary, superfluous cruelty and possibly torture; and as something deeply wrong. However, what matters ethically from an intention-based perspective are the actions and emotional response of those who practice voluntary catch and release, and a careful analysis of these actions and emotions is indeed highly instructive. In the end, releasing a fish is not as goal-less, nonnatural, and unreflective as one might at a glance conclude (Evans 2005). Most importantly, releasing a fish contributes to conservation, which is good but perhaps only indirectly frees the angler from the ethical burden. However, those who practice catch and release on a regular basis also exhibit particular behaviors that might be considered ethically superior to those exhibited by the subsistence-type catch-and-harvest angler. For example, those who intentionally practice selective harvesting (i.e., releasing part or all of their catch) put self-imposed constraints on their fishing (e.g., they avoid fishing in deep waters or on very hot days); they make fishing harder by constraining themselves to techniques that limit the amount of injury to a fish (e.g., barbless hooks and flies rather than

natural bait), which can penalize catch rates; and they engage in spiritual rituals during the release event (Evans 2005; Arlinghaus 2007; Arlinghaus et al. 2007a). While intentional catch and release might be difficult to grasp for somebody not involved in this kind of fishing or in contemporary recreational fishing culture in general, it can thus be regarded as a visible demonstration of deep respect for the individual fish (Evans 2005). Even if the intention of the angler is not to harvest fish, one can therefore conclude that voluntary catch and release is ethically permissible, particularly if we accept the biological reality that most released fish recover quickly from the release event and survive largely unharmed without any long-term impacts on fitness (Arlinghaus et al. 2007b). Thus, catch and release conserves the most fundamental interest of any living being—survival. This, however, is not always the case and demands proper gear choice, handling techniques, and conduct by the angler (Arlinghaus et al. 2007b; Cooke and Sneddon 2007).

### Wilderness-Centered Ethical Challenges

A final challenge to recreational fishing is not centered on the individual angler but revolves around a nature-centered view that is typically driven by a biocentric view of the world. The competing philosophical viewpoints are biocentrism and ecocentrism, which extend the ethical culture to the nonhuman world. Biocentrism comprises the living world, and ecocentrists push the frontier still further to include the universe in the human moral culture (Arlinghaus et al. 2007b). What does this mean in practical terms for recreational fishing?

In much of the biocentric and ecocentric philosophical literature, humans and nature are treated as opposites and humans are seen as a nonnatural disturbance to the ideal, which is wilderness (Arlinghaus et al. 2007a, 2008). While this perspective is counterproductive to effectively dealing with the pressing environmental problems that the world faces because it divorces humans and their needs from the place which they intend to preserve, it is nevertheless a prominent one in certain circles. When humans generally are seen as a largely destructive external force to the ideal (i.e., human-free nature), the recreational angler, in particular, will



also be seen as a destructive force. In this light, recreational fishing may be perceived as destroying valuable properties of wilderness, such as native fish populations and the gene pool of autochthonous species. Some biocentric stakeholders might even object to the mere presence of anglers at the waterside on the grounds that waterfowl or other wildlife might be disturbed and shorelines trampled on and littered on and so forth, which is an undesirable component of human presence on earth, and recreational anglers are no exception (Lewin et al. 2006). This is reflected in trends among some conservation biologists and conservation-oriented nongovernmental organizations to opt for policies that exclude recreational anglers from habitats and landscapes perceived to be particularly valuable, sometimes incorrectly referred to as (human-free) nature. Note that here, the ethical disapproval of recreational fishing is based not on the presumed impact of angling on an individual fish, but rather on the assumption that humans in general, and anglers in particular, are a threat and an undesirable disturbance to wilderness that is to be avoided as much as possible.

However, if one breaks down the largely artificial barrier between humans and nature, or between culture and nature, and looks at recreational fisheries as a coupled social-ecological system (Arlinghaus et al. 2008), it becomes clear that recreational fishing can be relatively easily reconciled with the wilderness-centered ethical perspective. Clearly, recreational angling does, and necessarily will to some degree, impact natural processes (e.g., due to harvesting, littering, and illegal introduction of fish and other means, e.g. boating; Lewin et al. 2006, 2008). However, dealing with these issues simply requires better management, better compliance, and better education of anglers, and resolving these issues does not mean abolition of recreational fishing. Moreover, recreational anglers are among the most important social groups working voluntarily and often very effectively to preserve and restore fish and their habitats (Granek et al. 2008), which is all too often overlooked or not appreciated. They are also ardent advocates of the hidden fish biodiversity crises in many areas of the world (Granek et al. 2008). Thus, to reconcile wilderness-centered philosophies with contemporary recreational fisheries *only* requires jettisoning the idea of the angler as a nonnatural

disturbance and working towards the development of sustainable fisheries management strategies. In the end, recreational fishing is a natural activity involving a predator-prey interaction between a human and a fish with potential impacts on the biotic integrity of an exploited fish population or the aquatic ecosystem. However, negative impacts by any human activity interacting with aquatic ecosystems are to be expected and are even more pronounced as a consequence by nonangling anthropogenic activities compared to recreational fishing (Arlinghaus et al. 2002). Nonetheless, if recreational fishing is seen as impacting the biotic integrity of a population, it might be judged as impermissible by Leopold (1970). This would call for improved management to contain or remove negative impacts in such a way that the provision of ecological services provided by fish and aquatic ecosystems to society is sustainable (Carpenter et al. 2009). Thus, in contrast to some popular perceptions of some conservation-focused stakeholders, wilderness-centered philosophy can fairly easily come to terms with recreational fishing if humans and nature are viewed as integrated entities.

### Evidence of Moral Philosophy Affecting Recreational Fisheries Practice

From the five different ethical challenges outlined above, three stand out as particularly challenging for recreational fishing: the first, animal liberation, and the second, animal rights, threaten recreational fishing or some of its practices by abolition, and the third, angler-intention-based arguments, threatens popular recreational angling practices by only tolerating catch-and-kill type of fishing because this is often assumed to represent a morally justified, natural act of predation. In contrast, animal-welfare and wilderness-centered philosophies mainly demand altered management and angling practices and/or improved education and do not necessarily involve abolition of the entire activity or of popular practices. In the real world, it is likely that a mixture of various ingredients finds its way into policy, and this is indeed what has happened in some areas of the world. As has been pointed out above, animal welfare, animal liberation, and animal rights cannot be as neatly distinguished in practice as

they can be here on paper. In reality, ideas, perspectives, personal viewpoints, and arguments blend together and are given new meanings and impetus although certain key features are always discernible. The new Swiss welfare law is a case in point.

Until recently, a fish was a fish in Switzerland. A Swiss perch was like its Dutch, Polish, or Austrian counterpart, a perch. Since September 1, 2008, however, all Swiss fish are no longer plain fish: they are now fish with dignity. The dignity of fish and all other animals is an egalitarian Swiss invention and is part of the constitution and the corresponding animal welfare law. Article 1 of the Swiss Federal Act on Animal Protection states that "the purpose of this law is to protect the dignity and welfare of the animal." Dignity is defined as "the intrinsic value which has to be respected when dealing with the animal. The dignity of the animal is violated if the animal is subjected to stress that cannot be justified by higher interests." The letter of the law carries on and mentions "instrumentalisation" and "humiliation" as unacceptable strain factors. This law is a cocktail of animal liberation, animal rights, theological influences, animal protection, and social reform, and, in the case of recreational fishing, it draws heavily on the fish-feel-pain "science." Accordingly, and in contrast to scientific evidence, all Swiss fish are assumed to suffer when captured by a recreational angler. They are thus given the benefit of the doubt.

What can be more humiliating for a Swiss fish than to be caught by an angler—and worse still—to then be released. The poor thing is probably traumatized for the rest of its life and shall therefore be better off by being killed than released (Webster 2005). This is precisely what the Swiss animal welfare act prescribes. Those Swiss anglers and fisheries managers who are interested in promoting conservation practices such as selective harvesting are nowadays constrained in their management choices. For example, voluntary catch and release of legally harvestable fish is now an offense in Switzerland, and so is the intention of the angler to go fishing in order to practice catch and release voluntarily. Confusingly enough, there is still mandatory catch-and-release fishing of fish, which are protected by fishing regulations. Mainly small and im-

mature Swiss fish are therefore released, despite voluntary catch and release being a legal offense, which means that catch and release is everyday practice in Switzerland. The justification for the mandatory release, however, is the conservation of the fish population, while the prohibition of voluntary catch and release of legally harvestable fish is based on utilitarian calculi based on animal liberation reasoning coupled with the angler-intention ethical challenge. This means, in the instance of releasing legally harvestable fish, that moral considerations are given more weight than the benefits to fish conservation and fisheries quality. This violates basic interests of a fish—survival—which is irrelevant according to the Swiss animal welfare act because it is the intention of the angler argument that ethically matters more: you should only go fishing to harvest fish; if you catch fish that are harvestable, kill them; if you happen to catch a protected, immature fish, you must release it because it is important for conservation reasons. Precisely the same line of argument and legal interpretation has been in place in Germany since the 1980s (Arlinghaus 2007). In Germany, the situation is worse still for some angler groups, with a ban on fishing tournaments, which in the past involved voluntary catch and release (Meinelt et al. 2008), and most put-and-take fisheries are illegal as well. Why is this the case? Because it is perceived as torture to a fish to be released in a put-and-take fishery to be—immediately or soon after stocking—recaptured by anglers because the fish were already of a harvestable size prior to stocking and could have been consumed right away without going through an additional capture process.

As these examples show, the intention of the angler and the dignity and presumed suffering of fish captured by anglers may determine the ethical value of a fishing act. This is animal liberation/rights and angler-intention-based challenges implemented jointly in fisheries practice, and there are powerful forces at the level of the entire European Union to push forward similar lines of moral argument (Algers et al. 2009). For example, for some in the UK, the "German model" of dealing with anglers and fish from a suffering-centered fish welfare perspective is already on the agenda (Branson and Southgate 2008). Historically and philosophi-

cally speaking, there is nothing new under the sun: Henry Salt, the historical éminence grise of the animal rights movement, wrote more than a hundred years ago, "all that has been said of hunting ... is applicable also ... to the sports of shooting and fishing" (Salt 1980). The difference is that it is not on the papers of academics any more: it is a legal reality in some countries, and rapidly spreading in others, at least in Europe. Evidence for the saliency of animal welfare in contemporary political climates is that in at least one country (Netherlands), a party for animal welfare (i.e., animal rights) has already managed to enter the national parliament (Jacobs 2007).

Together with the masterly staged interplay between celebrity animal liberation/rights propaganda in an urbanized society, the developments described might relatively easily succeed in depicting the angler as a mentally ill killer and goal-less torturer (Schwab 2007). This is aided and abetted by high visible papers by some fish and animal scientists (e.g., Sneddon et al. 2003), mainly from veterinary science or fish neurobiology and ethology, who assure a trusting public and high-level politicians that fish indeed might be human-like creatures in terms of their capacity for a conscious experience (Huntingford et al. 2006; Braithwaite 2010). Then, by way of moral speculation, scientific uncertainty fades into the background and the moral question takes center stage. The lead author of many fish-feel-pain papers, Lynn Sneddon (UK) argues in an online article as follows, "If one accepts that animals experience some kind of suffering when they are injured, then it is inevitable that a fox during a hunt, or a fish during angling, is going to have some form of pain inflicted upon it. The question then is, does the hunter's or angler's enjoyment outweigh the cost to the animal? There may be other factors to consider. If the fish is eaten after being caught, for example, do the nutritional benefits make a difference?" (Sneddon 2009). This stands close to animal liberation-related utilitarian calculus. As the German and Swiss examples have shown, it does indeed make a difference to some legislative bodies and certain judges in charge of judging general clauses of animal welfare acts interpreted to the recreational fishing context (Drossé 2003), and the result was abolition of popular angling practic-

es. Thus, suffering-centered arguments backed up by seemingly objective science in the context of suffering-centered fish welfare tend to facilitate radical solutions that disfavor anglers and some of their practices, as the examples from Germany and Switzerland have shown. In the end, abolition of recreational fishing is on the agenda, and one should not be naively disregard this threat when anthropomorphic "science" meets an urban public largely disconnected from aquatic ecosystem and the use and management of fish populations.

### Is There a Value in Fish Ethics?

Sandøe et al. (2009) are advocates of a framework for discussing fish ethics. The question springs to mind, do we also need a framework for discussing, for example, worm ethics? After all, there are indicators that earthworms, crayfish, and other invertebrates can be stressed and may experience pain and fear (Dunayer 2004; Rollin 2006). Should we not give them the benefit of the doubt and explore the emerging ethical issues in connection with earthworms, which, of course, are also of relevance to recreational angling because these worms are popular angling bait and are typically used alive on a hook. Earthworms, therefore, matter to the angler, but does it matter to the earthworm whether it is cut in half by a plow or spiked on a hook? The earthworm might not be on the agenda at the moment, but the crayfish are, according to a recent draft of the European Commission's directive for research with animals (EC 2008). There, it is stated that there is "scientific evidence of the potential ability of such species [selected invertebrates] to experience pain, suffering, distress and lasting harm" (EC 2008). These invertebrates include, according the current text, decapods (e.g., crayfish) and cephalopods. A careful look at the scientific evidence yields very few papers that claim to have found evidence of crustaceans experiencing pain (e.g., Barr et al. 2008). This paper, along with all others on the topic, has the same share of problems previously identified in the fish-feel-pain papers, but that does not seem to matter. The supposed evidence is taken for granted in order to give crayfish the benefit of the doubt. Decapods and cephalopods will probably soon be protected by European legislation against use in scientific ex-

periments. It is only a matter of time before some national governments will ban the use of invertebrates as bait, and the worm will be the next on the agenda and be also given the benefit of the doubt. So, Sandøe et al.'s (2009) call for fish ethics will be extended to worms before long.

Let us go back to the worm's fate and the ethical challenges surrounding this. The worm can be cut in half by a plow or hooked by an angler. What is ethically more problematic? The obvious answer by some sympathizing with suffering-centered worm welfare perspectives is that the plow is a necessity for humans while the hook of the recreational angler is not because angling takes place during leisure time and is for fun. The pleasure of the angler, so it could be argued in a utilitarian balancing act, does not outweigh the harm inflicted on the potentially sentient worm and the fish that subsequently falls for the worm. Rhetorically, necessity clubs anything, especially practically all human pleasure. Keeping a cat, for example, looks harmless enough up to the moment in which you start to seriously enquire into the ecological pawprint. Apart from causing untold suffering in the world of rodents, birds, worms, butterflies, and other small critters, their indirect impact on the world of fish is devastating. According to one estimate, domestic cats feed on 2.48 million metric tons of fish each year (De Silva and Turchini 2008). Does the pleasure of the cat keeper warrant this? Is cat keeping a necessity? Do we need a framework for cat ethics? Or for mountain biking, watercolor painting, recreational angling, and all human activities that impact animal life directly or indirectly, intentionally or unintentionally? If we need a framework for fish ethics (Sandøe et al. 2009), we might also need a framework for mountain biking ethics because one might consider it unethical to kill critters on the way for fun.

We should take a breather and start thinking with common sense rather than being driven by a monolithic ethical outlook that superimposes one all-encompassing and all-pervading assumption (i.e., the suffering of fish is the only morally relevant criterion) on recreational angling. Common sense tells us that recreational angling has a fair share of issues that one has to deal with, for example overfishing or inappropriate catch-and-release events. Common sense also tells us that recreational fishing creates man-

ifold benefits to society and to individual anglers through something we tend to label "pleasure." This pleasure includes the harvest of wild fish. It may also include admiring the rare trophy fish. Common sense finally tells us that recreational fishing is important for conservation of individual fish and entire populations. We need better management, better education, and some directed management action, but we do not need to criminalize anglers and portray them as being cruel or superfluous based on one-dimensional ethical arguments (Arlinghaus et al. 2009). An integrative perspective with humans as part of nature and with individual fish as part of the biotic community is much more helpful and therefore preferred (Arlinghaus et al. 2009).

Just as humans are human-centered, fish are likely to be fish-centered, and what that means we do not know because humans are not fish. Nor do fish know what it is like to be human because they are fish (Marmeli and Bortolotti 2006). Humans, including anglers, though, can know about fish and their habitats: they can observe, measure, and compare, and they can act accordingly, and recreational anglers are of great importance in this regard (see Granek et al. 2008). On the basis of data, it has long ago been recognized, for example, what the problems of marine commercial fishing are and how they could be tackled. The facts are staring everybody in the face, and while ethicists weigh and debate needs and preferences of humans against fish (Sandøe et al. 2009), constructive forces—among them the recreational fishing sector—try their best to protect, improve, or restore saltwater and freshwater habitats that happen to improve fish welfare and fish populations. By the time an ethical framework on fish ethics is in place, however, we might already have reached the end of the line.

## Conclusion

Among the ethical challenges reviewed here, animal liberation, animal rights, and angler-intention-based critics have the most dramatic consequences for recreational fisheries practice. Utilitarians such as Sandøe et al. (2009) claim that there is a need for a wider ethical debate on fish ethics. We argue that there is probably no need for a wider ethical debate on something that is labeled fish ethics, but there is perhaps

an urgent need for a wider debate on the issue of just how much ethical and ideological ballast the fishery profession can take on board. Perhaps there already is an ethical overkill that blurs common sense.

One way of avoiding the ideologically overloaded suffering-centered fish welfare question in recreational angling could be a pragmatic approach acknowledging that humans, including recreational anglers, are part of the natural world and, as such, are entitled to interact with it (Arlinghaus et al. 2009). Part of that legitimate interaction is recreational fishing, provided that individual fish, fish populations, and their habitats are given appropriate consideration. The recreational angler goes fishing for pleasure, and that pleasure is a vital good for him or her, and for society as a whole, which benefits, for example, from angler expenditure, tourism, and other desirable effects, including improved health and reduction of negative human emotions (Pretty et al. 2006). All kinds of fishing, if properly conducted, give the angler pleasure and are generally good, and recreational angling also contributes to the preservation of diverse habitats and healthy fish populations. Clearly, there are also issues that need improved action and conduct. Nobody is denying this, not even those that question the scientific credibility of fish-feel-pain science (Rose 2007). To reiterate an important point, the well-being of individual fish deserves protection irrespective of whether fish are sentient or not. Common sense tells us that this is a suitable, compromising perspective. An integrated approach based on a hybrid ethical viewpoint that considers all these aspects ranging from the welfare of individual fish to the welfare of anglers and the health of fish populations and ecosystems, and also explicitly looks at critical issues of recreational fishing (e.g., inappropriately conducted catch-and-release events and overfishing) leaves plenty of room for various world views, debate, and, above all, science-based improvement of critical issues. However, this assumes one important prerequisite, that recreational fishing is a legitimate human activity (Arlinghaus et al. 2009). We have no problem making this general assumption explicit, while others seem to have problems with us being explicit (Huntingford et al. 2007).

If the new form of suffering-centered fish and fisheries science continues to follow fash-

ionable ethical opinion and bases its research and concluding statements on the underlying assumption that recreational angling is morally not acceptable, the ethical debate about fish welfare in recreational angling is a foregone conclusion. This also throws light on what some might mean by a "genuine ethical debate" (Sandøe et al. 2009): an ethical diktat.

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## References

- Algers, B., H. J. Blokhuis, A. Bøtner, D. M. Broom, P. Costa, M. Domingo, M. Greiner, J. Hartung, F. Koenen, C. Müller-Graf, D. B. Morton, A. Osterhaus, D. U. Pfeiffer, M. Raj, R. Roberts, M. Sanaa, M. Salman, J. M. Sharp, P. Vannier, and M. Wierup. 2009. Scientific opinion of the panel on animal health and welfare on a request from European Commission on general approach to fish welfare and the concept of sentience in fish. *The European Food and Safety Authority Journal* 954:1-12.
- Arlinghaus, R. 2007. Voluntary catch-and-release can generate conflict within the recreational angling community: a qualitative case study of specialised carp, *Cyprinus carpio*, angling in Germany. *Fisheries Management and Ecology* 14:161-171.
- Arlinghaus, R. 2008. The challenge of ethical angling: the case of C&R and its relation to fish welfare. Pages 223-236 in Ø. Aas, R. Arlinghaus, R. B. Ditton, D. Policansky and H. L. Schramm, Jr., editors. *Global challenges in recreational fisheries*. Blackwell Scientific Publications, Oxford, UK.
- Arlinghaus, R., T. Mehner, and I. G. Cowx. 2002. Reconciling traditional inland fisheries management with sustainability in industrialized countries, with emphasis on Europe. *Fish and Fisheries* 3:261-316.

- Arlinghaus, R., S. J. Cooke, A. Schwab, and I. G. Cowx. 2007a. Fish welfare: a challenge of the feelings-based approach, with implications for recreational fishing. *Fish and Fisheries* 8:57-71.
- Arlinghaus, R., S. J. Cooke, J. Lyman, D. Policansky, A. Schwab, C. Suski, S. G. Sutton, and E. B. Thorstad. 2007b. Understanding the complexity of catch-and-release in recreational fishing: an integrative synthesis of global knowledge from historical, ethical, social, and biological perspectives. *Reviews in Fisheries Science* 15:75-167.
- Arlinghaus, R., B. M. Johnson, and C. Wolter. 2008. The past, present and future role of limnology within freshwater fisheries science. *International Review of Hydrobiology* 93:541-549.
- Arlinghaus, R., A. Schwab, S. J. Cooke, and I. G. Cowx. 2009. Contrasting pragmatic and suffering-centred approaches to fish welfare in recreational angling. *Journal of Fish Biology* 75:2448-2463.
- Balon, E. K. 2000. Defending fishes against recreational fishing: an old problem to be solved in the new millennium. *Environmental Biology of Fishes* 57:1-8.
- Barr, S., P. A. Lamimg, J. T. A. Dick, and R. W. Elwood. 2008. Nociception or pain in a decapod crustacean? *Animal Behaviour* 75:745-751.
- Braithwaite, V. A. 2010. Do fish feel pain? Oxford University Press, Oxford, UK.
- Braithwaite, V. A., and P. Boulcott 2008. Can fish suffer? Pages 78-92 in E. J. Branson, editor. *Fish welfare*. Blackwell Scientific Publications, Oxford, UK.
- Branson, E. J., and P. J. Southgate 2008. Introduction. Pages 1-3 in E. J. Branson, editor. *Fish welfare*. Blackwell Scientific Publications, Oxford, UK.
- Byron. L. G. G. 1823. Canto the thirteenth. Available: [www.online-literature.com/view.php/don-juan/14?term=walton](http://www.online-literature.com/view.php/don-juan/14?term=walton) (October 2010).
- Carpenter, S. R., H. A. Mooney, J. Agard, D. Capistrano, R. DeFries, S. Diaz, T. Dietz, A. Duriappah, A. Oteng-Yeboah, H. M. Pereira, C. Perrings, W. V. Reid, J. Sarukhan, R. J. Scholes, and A. White. 2009. Science for managing ecosystem services: beyond the millennium ecosystem assessment. *Proceedings of the National Academy of Sciences of the United States of America* 106:1305-1312.
- Cooke, S. J., and L. U. Sneddon. 2007. Animal welfare perspectives on recreational angling. *Applied Animal Behaviour Science* 104:176-198.
- Dawkins, M. S. 2006. A user's guide to animal welfare science. *Trends in Ecology and Evolution* 21:77-82.
- Dawkins, M. S. 2008. What is good welfare and how can we achieve it? Pages 73-82 in M. S. Dawkins and R. Bonney, editors. *The future of animal farming: renewing the ancient contract*. Blackwell Scientific Publications, Oxford, UK.
- de Leeuw, A. D. 1996. Contemplating the interests of fish: the angler's challenge. *Environmental Ethics* 18:373-390.
- De Silva, S. S., and G. M. Turchini. 2008. Towards understanding the impacts of the pet food industry on world fish and seafood supplies. *Journal of Agricultural and Environmental Ethics* 21:459-467.
- Drossé H. 2002. Catch & release: eine angelfischereiliche Tierquälerei. [Catch & release: angling-induced cruelty to animals]. *Agrarrecht* 32:111-113.
- Drossé, H. 2003. Replik und mehr. [Rebuttal and more]. *Agrar- und Umweltrecht* 33:370-374.
- Dunayer, J. 2004. *Speciesism*. Ryce Publishing, Derwood, Maryland.
- EC (European Commission) 2008. Proposal for a directive of the European Parliament and of the Council on the protection of animals used for scientific purposes. EC, COM(2008) 543 final, Brussels, Belgium.
- EIFAC (European Inland Fisheries Advisory Commission). 2008. Code of practice for recreational fisheries. EIFAC, EIFAC/OP42, Rome.
- Evans, J. C. 2005. *With respect for nature: living as part of the natural world*. State University of New York Press, Albany.
- Fedler, A. J., and R. B. Ditton. 1994. Understanding angler motivations in fisheries management. *Fisheries* 19(4):6-13.
- Granek, E. F., E. M. P. Madin, M. A. Brown, W. Figueira, D. S. Cameron, Z. Hogan, G. Kristianson, P. de Villiers, J. E. Williams, J. Post, S. Zahn, and R. Arlinghaus. 2008. Engaging recreational fishers in management and conservation: global case studies. *Conservation Biology* 22:1125-1134.
- Hammond, B. 1992. *Halcyon days*. Swan Hill Press, Shrewsbury, UK.
- Hasler, C. T., A. H. Colotelo, T. Rapp, E. Jamieson, K. Bellehumeur, R. Arlinghaus, and S. J. Cooke. 2011. Opinions of fisheries researchers, managers, and anglers towards recreational fishing issues: an exploratory analysis for North America. Pages 51-74 in T. D. Beard, Jr., R. Arlinghaus, and S. G. Sutton, editors. *The angler in*

- the environment: social, economic, biological, and ethical dimensions. Proceedings of the fifth world recreational fishing conference. American Fisheries Society, Symposium 75, Bethesda, Maryland.
- Håstein, T., A. D. Scarfe, and V. L. Lund. 2005. Science-based assessment of welfare: aquatic animals. *Revue Scientifique et Technique (International Office of Epizootics)* 24:529–547.
- Huntingford, F. A., C. Adams, V. A. Braithwaite, S. Kadri, T. G. Pottinger, P. Sandøe, and J. F. Turnbull. 2006. Current issues in fish welfare. *Journal of Fish Biology* 68:332–372.
- Huntingford, F.A., C. Adams, V. A. Braithwaite, S. Kadri, T. G. Pottinger, P. Sandøe, and J. F. Turnbull. 2007. The implications of a feelings-based approach to fish welfare: a reply to Arlinghaus et al. *Fish and Fisheries* 8:277–280.
- Jacobs, M. 2007. Wildlife value orientations in the Netherlands. *Human Dimensions of Wildlife* 12:359–365.
- Leopold, A. 1970. *A Sand County almanac*. Ballantine Books, New York.
- Lewin, W.-C., R. Arlinghaus, and T. Mehner. 2006. Documented and potential biological impacts of recreational fishing: insights for management and conservation. *Reviews in Fisheries Science* 14:305–367.
- Lewin, W.-C., D. McPhee, and R. Arlinghaus. 2008. Biological impacts of recreational fishing resulting from exploitation, stocking and introduction. Pages 75–92 in Ø. Aas, R. Arlinghaus, R. B. Ditton, D. Policansky and H. L. Schramm, Jr., editors. *Global challenges in recreational fisheries*. Blackwell Scientific Publications, Oxford, UK.
- List, C. J. 1997. On angling as an act of cruelty. *Environmental Ethics* 19:333–334.
- Luce, A. A. 1959. *Fishing and thinking*. Swan Hill Press, Shrewsbury, UK.
- Manfredo, M. J. 2008. *Who cares about wildlife?* Springer, New York.
- Marmeli, M., and L. Bortolotti. 2006. Animal rights, animal minds, and human mindreading. *Journal of Medical Ethics* 32:84–89.
- Meinelt, T., K. Jendrusch, and R. Arlinghaus. 2008. Competitive fishing in Germany: an overview. Pages 254–258 in Ø. Aas, R. Arlinghaus, R. B. Ditton, D. Policansky, and H. L. Schramm, Jr., editors. *Global challenges in recreational fisheries*. Blackwell Scientific Publications, Oxford, UK.
- Newby, N. C., and E. D. Stevens. 2008a. The effects of the acetic acid “pain” test on feeding, swimming, and respiratory responses of rainbow trout (*Oncorhynchus mykiss*). *Applied Animal Behaviour Science* 114:260–269.
- Newby, N. C., and E. D. Stevens. 2008b. The effects of the acetic acid “pain” test on feeding, swimming, and respiratory responses of rainbow trout (*Oncorhynchus mykiss*): a critique on Newby and Stevens (2008)—response. *Applied Animal Behaviour Science* 116:97–99.
- Olsen, L. 2003. Contemplating the intentions of anglers: the ethicist’s challenge. *Environmental Ethics* 25:267–277.
- Pretty, J., R. Hine, and J. Peacock. 2006. Green exercise: the benefits of activities in green places. *The Biologist* 53:143–146.
- Reilly, S. C., J. P. Quinn, A. R. Cossins, and L. U. Sneddon. 2008. Novel candidate genes identified in the brain during nociception in common carp (*Cyprinus carpio*) and rainbow trout (*Oncorhynchus mykiss*). *Neuroscience Letters* 437:135–138.
- Regan, T. 1983. *The case for animal rights*. University of California Press, Berkeley and Los Angeles.
- Rollin, B. E. 2006. *Animal rights and human morality*. Prometheus Books, Amherst, New York.
- Rose, J. D. 2002. The neurobehavioral nature of fishes and the question of awareness and pain. *Reviews in Fisheries Science* 10:1–38.
- Rose, J. D. 2003. A critique of the paper: “Do fish have nociceptors: evidence for the evolution of a vertebrate sensory system” published in *Proceedings of the Royal Society: Biological Sciences*. 270(1520):1115–1121, 2003 by Sneddon, Braithwaite and Gentle. Pages 49–51 in H. E. Erickson, editor. *Information resources on fish welfare 1970–2003*. U.S. Department of Agriculture, Agricultural Research Service, National Agricultural Library, Animal Welfare Information Center, Animal Information Resources No. 20, Beltsville, Maryland.
- Rose, J. D. 2007. Anthropomorphism and the ‘mental welfare’ of fishes. *Diseases of Aquatic Organisms* 75:139–154.
- Salt, H. 1980. *Animals’ rights*. Society for Animal Rights, Inc., Clarks Summit, Pennsylvania.
- Sandøe, P., and S. B. Christiansen. 2008. *Ethics and animal use*. Blackwell Scientific Publications, Oxford, UK.
- Sandøe, P., C. Gamborg, S. Kadri, and K. Millar. 2009. Balancing the needs and preferences of humans against concerns for fish: exploring emerging ethical issues. *Proceedings of the Fifth World*

- Fisheries Conference 2008, October 20–24, 2008, Yokohama, Yokohama, Japan (available as CD Rom). TERRAPUB, Tokyo.
- Schwab, A. 2003. Hook, line and thinker: angling and ethics. Merlin Unwin Books, Ludlow, UK.
- Schwab, A. 2007. Vorwärts zur Natur: Ökophilosophie für Jäger und Angler. [Forward to nature: environmental philosophy for hunters and anglers]. Salm Verlag, Bern, Switzerland.
- Scruton, R. 1998. On hunting. Yellow Jersey Press, London.
- Singer, P. 1990. Animal liberation. Avon Books, New York.
- Singer, P. 1999. Practical ethics. Cambridge University Press, Cambridge, UK.
- Singer, P. 2001. Heavy petting. Available: [www.nerve.com/content/heavy-petting](http://www.nerve.com/content/heavy-petting) (September 2010).
- Sneddon, L. U. 2003. The evidence for pain in fish: the use of morphine as an analgesic. *Applied Animal Behaviour Science* 83:153–162.
- Sneddon, L. U. 2006. Ethics and welfare: pain perception in fish. *Bulletin of the European Association of Fish Pathologists* 26:6–10.
- Sneddon, L. U. 2009. Can animals feel pain? Available: [www.wellcome.ac.uk/en/pain/microsite/culture2.html](http://www.wellcome.ac.uk/en/pain/microsite/culture2.html) (October 2010).
- Sneddon, L. U., V. Braithwaite, and M. J. Gentle. 2003. Do fish have nociceptors? Evidence for the evolution of a vertebrate sensory system. *Proceedings of the Royal Society of London B* 270:1115–1121.
- Webster, J. 2005. Animal welfare: limping towards Eden. Blackwell Scientific Publications, Oxford, UK.