

## REVIEW PAPER

# Contrasting pragmatic and suffering-centred approaches to fish welfare in recreational angling

R. ARLINGHAUS\*†‡, A. SCHWAB§, S. J. COOKE|| AND I. G. COWX¶

\**Department of Biology and Ecology of Fishes, Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Müggelseedamm 310, 12587 Berlin, Germany*, †*Inland Fisheries Management Laboratory, Faculty of Agriculture and Horticulture, Humboldt-University of Berlin, Invalidenstrasse 42, 10115 Berlin, Germany*, §*Schwab & Sohn, Rohrstrasse 46, 3507 Biglen, Switzerland*, ||*Fish Ecology and Conservation Physiology Laboratory, Department of Biology and Institute of Environmental Science, Carleton University, 1125 Colonel By Drive, Ottawa, ON, K155B6 Canada* and ¶*University of Hull, International Fisheries Institute, Hull HU6 7RX, U.K.*

(Received 12 March 2009, Accepted 14 September 2009)

Two views dealing with fish welfare in recreational fishing are discussed in an effort to stimulate the current discourse on the topic. The pragmatic approach asks whether and how strongly recreational fishing compromises the health and fitness of individual fishes and what can be done to avoid or mitigate such effects. Its implementation rests on accepting recreational fishing as a principally legitimate activity. The second approach to fish welfare focuses on suffering and pain in fishes and is usually morally prescriptive. Its central tenet is that some or all recreational fishing practices may be unacceptable unless sufficient benefits to humans are created, which justify the supposedly cruel treatment of the fishes. The pragmatic approach to fish welfare is preferred because it relies on objectively measurable variables of impaired fish welfare (e.g. physiological, behavioural or fitness indicators) and does not question recreational fishing on moral grounds. Contrary to a suffering-centred approach to fish welfare, a pragmatic perspective emphasizes positive messages and facilitates constructive dialogue among stakeholders. In contrast, a suffering-centred approach to fish welfare tends to promote tension and enduring conflict that cannot be reconciled objectively and thus should be avoided.

© 2009 The Authors

Journal compilation © 2009 The Fisheries Society of the British Isles

Key words: angler; animal liberation; animal rights; cruelty; ethics; pain.

## INTRODUCTION

Contrasting opinions about the issue of fish welfare in recreational angling are becoming increasingly prevalent (Håstein *et al.*, 2005; Davie & Kopf, 2006; Huntingford *et al.*, 2006, 2007; Arlinghaus *et al.*, 2007*a, b*; Cooke & Sneddon, 2007). This paper describes two different views: the pragmatic, function-based approach and

‡Author to whom correspondence should be addressed. Tel.: +49 30 64181653; fax: +49 30 64181 750; email: [arlinghaus@igb-berlin.de](mailto:arlinghaus@igb-berlin.de)

the suffering-centred, feelings-based approach to fish welfare. While the pragmatic view relies on variables of impaired fish welfare amenable to objective scientific methods, the suffering-centred approach entails a plethora of imponderables that elicit ethical questions and considerable concern from scientific, social and possibly also fish welfare perspectives.

The objective of this contribution is to present the perspective of the authors about these two viewpoints and thereby contribute to an emerging debate that is reaching the highest political levels, *e.g.* European Union (EFSA, 2009). It is acknowledged that readers might have divergent opinions on some or all aspects discussed because the issue of fish welfare transcends the boundaries between science, ethics and advocacy. When summarizing the key features of a pragmatic and a suffering-centred approach to fish welfare, it is not implied that the cited authors share all the aspects and ethical viewpoints that are claimed to be characteristic of both concepts (Fig. 1). The authors do also not attempt to hide their discomfort with suffering or feelings-based variants of fish welfare perspectives that have dominated the recent discussion of this issue in the context of fisheries (Sneddon, 2006; EFSA, 2009). As a complementary perspective, a pragmatic approach to fish welfare is highlighted that aims at protecting the welfare of fish and at the same time does not discredit people for the pleasure they experience in an activity known as recreational fishing. The authors prefer this constructive perspective that seems to be suitable to avoid emotionally driven conflict and reach compromises that benefit fish welfare and recreational fisheries.

### THE PRAGMATIC APPROACH

The pragmatic approach to fish welfare (Fig. 1) assumes that recreational fishing is a natural, culturally evolved pursuit that is socially and legally accepted by the majority of societies all over the world (Arlinghaus *et al.*, 2007a). If this opinion is accepted, the questions to be addressed from a fish welfare perspective are: how does recreational fishing compromise the welfare of individual fishes and what can be done to avoid or mitigate fish welfare effects (Arlinghaus *et al.*, 2007a)? It is recognized that in addition to harvest, all forms of recreational fishing exert some degree of stress and injury to fishes (Arlinghaus *et al.*, 2007a, b; Cooke & Sneddon, 2007). At the very least, fishes need to be hooked and played, typically resulting in physical exertion (Cooke & Suski, 2005; Arlinghaus *et al.*, 2007b). This will induce naturally evolved adaptive responses (often labelled as stress) that allow the fishes to cope with the stressors (Iwama, 2007). Whether this is harmful to the fish, resulting in fitness impairment, disease or death, depends on the animal's condition, the type and frequency of the stressor and various exogenous conditions (*e.g.* water temperature and depth of capture), some of which are under the control of the angler (Arlinghaus *et al.*, 2007b). A large number of studies have shown that fishes exhibit a remarkable resiliency to many recreational angling-related stressors and often recover rapidly with no fitness impairments from most non-lethal recreational angling practices (Suski *et al.*, 2007; Arlinghaus *et al.*, 2008, 2009a; Wedemeyer & Wydoski, 2008), although it is recognized that this clearly is not always the case (Arlinghaus *et al.*, 2007a, b; Wilde, 2009). A pragmatic approach to fish welfare seeks to identify the factors and situations under which the welfare of fishes is

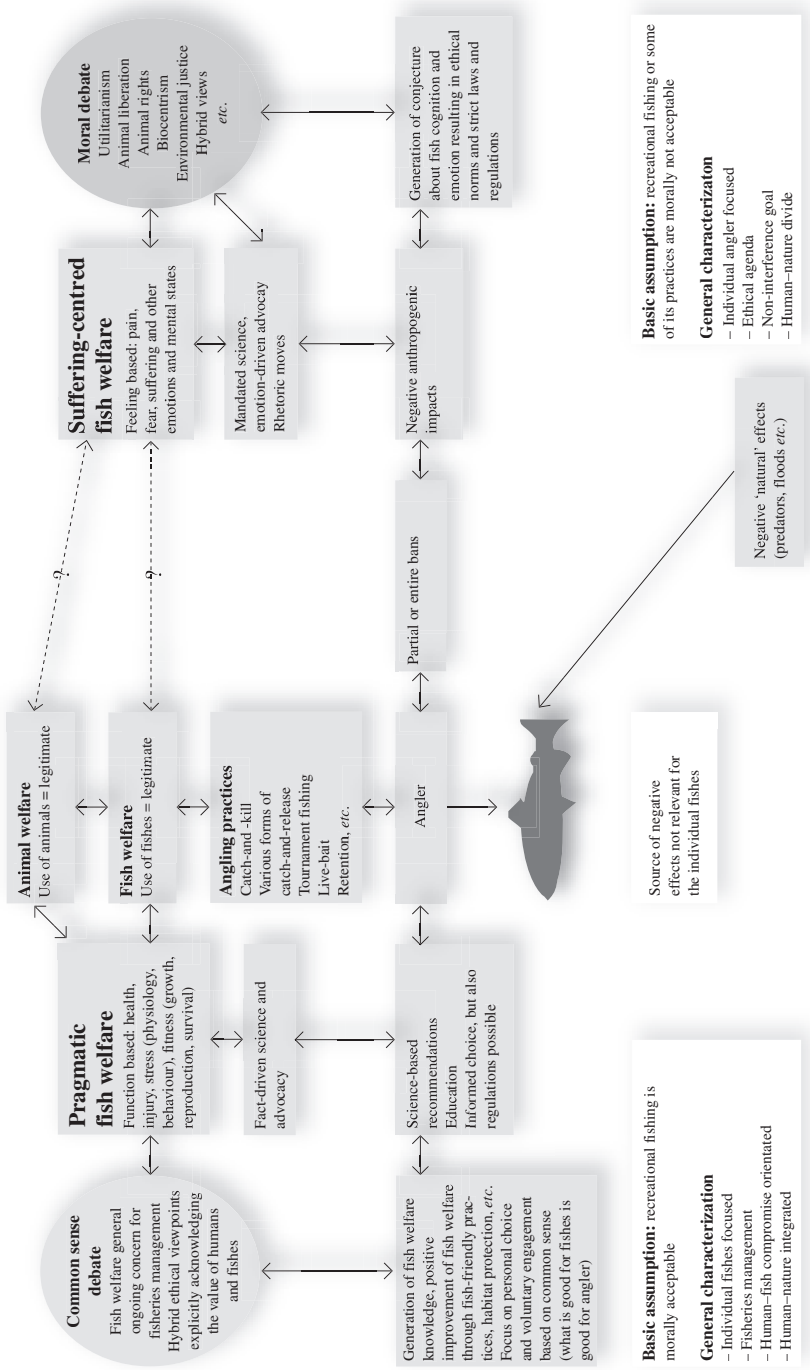


Fig. 1. Features of the pragmatic and the suffering-centred approach to fish welfare. Question marks indicate unclear relationships viewed differently by various authors.

compromised by recreational angling practices and derive scientifically defensible recommendations to mitigate or avoid such impacts.

Determining objectively how the effects of angling on the welfare of individual fishes can be reduced requires a definition of fish welfare that is amenable to scientific measurement. A function-based definition of fish welfare, as advocated by Arlinghaus *et al.* (2007a), Iwama (2007) and Rose (2007), meets this requirement and can be used to identify practices and conditions that compromise the welfare of fishes (Huntingford & Kadri, 2008). A sound and internationally accepted function-based definition in the context of recreational fishing is: 'good welfare means that an individual fish is in good health, with its biological systems functioning properly and with no impairment of fitness' (EIFAC, 2008).

Several reviews have compiled scientifically supported recommendations to address fish welfare issues arising from recreational fishing with respect to hooking, playing, landing, catch-and-release, retention, live baitfish and the slaughtering process (Cooke & Suski, 2005; Davie & Kopf, 2006; Arlinghaus *et al.*, 2007a, b; Cooke & Sneddon, 2007; Arlinghaus, 2008; EIFAC, 2008). The message in all of this work is that anglers and managers, through appropriate conduct, gear choice, landing and retention devices, and other practices, can minimize fish welfare impairments to a large extent.

This proactive and positive approach to managing fish welfare does not generally threaten recreational fishing but nor does it provide a charter justifying any type of treatment of fishes. Most importantly, however, the pragmatic approach to fish welfare does not criminalize anglers that, for example, voluntarily release a fish that was legal to be harvested or participate in a fishing tournament. Instead, the approach seeks to promote actions and practices other than abolition of recreational fishing that minimize and mitigate stress and damage to fishes. This encompasses accepting some, but not all, effects of recreational fishing on individual fishes as being inevitable and emphasizing the positive message that what is good for an individual fish from a welfare perspective is usually also good for the practitioner (Fig. 1). Clearly, education of anglers is needed to disseminate this common sense message in the recreational fishing sector because the consideration of fish welfare appears to be somewhat abstract to most anglers and fisheries managers (Cooke & Sneddon, 2007). Treating fishes in the best way possible, however, ultimately benefits the individual fishes, while simultaneously benefiting the sustainability of fish populations and fisheries (Cooke & Sneddon, 2007). For example, rapidly killing a fish that is to be harvested preserves flesh quality (Duran *et al.*, 2008), which is good for the consumer and also reduces the level of stress experienced by the fish in the slaughtering process (and thus benefits fish welfare; Davie & Kopf, 2006). Also, handling and releasing a fish in the best possible condition to allow rapid recovery of physiological homeostasis and resumption of normal behavioural patterns with no impairment of fitness (*e.g.* reproductive output and mortality) are obviously desirable for anglers and fisheries managers and are also good for the welfare of fishes (Arlinghaus *et al.*, 2007a; Cooke & Sneddon, 2007).

Considerable effort is being made worldwide to disseminate these and other common sense messages to the recreational fishing sector from a pragmatic fish welfare perspective, and there is clearly a need for better conduct among some angler groups. Accordingly, the European Inland Fisheries Advisory Commission (EIFAC) of the United Nations Food and Agriculture Organization (FAO) has produced a Code of

Practice for Recreational Fisheries that tackles important fish welfare aspects in recreational fishing practice on a global scale (EIFAC, 2008; Arlinghaus *et al.*, 2009b). Article 9 of the code is devoted entirely to the issue of fish welfare, and fisheries management agencies are beginning to take due notice of its provisions (Hewlett *et al.*, 2009). It is anticipated that these initiatives aimed at managing and minimizing fish welfare impairments in recreational fisheries practice on a global scale will gain momentum so that recreational angling can be further developed to proceed with minimal invasiveness on the fishes to be harvested or released.

### THE SUFFERING-CENTRED APPROACH

One prominent alternative to the pragmatic approach is the suffering-centred approach to fish welfare (Fig. 1), which is also known as the feeling-based approach to fish welfare (Huntingford *et al.*, 2006, 2007; Arlinghaus *et al.*, 2007a). This focuses on the well-being of a fish from the perspective of suffering and pain experienced by the fish (Sneddon, 2006), defining welfare as the 'absence of suffering' (Huntingford *et al.*, 2006). The idea that a fish might suffer in the process of being hooked, handled and maybe retained by an angler can create discomfort among stakeholders. Indeed, humans seem to be biologically predisposed to anthropomorphize human traits to animals (Manfredo & Fulton, 2008). Accordingly, some assume that a hooked fish experience human-like mental states that are known to humans as pain, suffering, anxiety or fear. Because these are highly unpleasant experiences for humans, some stakeholders are inclined to judge the moral permissibility of a human action towards animals in terms of the degree of infliction of pain and suffering to the animal. Indeed, morally speaking, an animal is often perceived to cease to exist once it does not have the ability to consciously feel mental states that resemble those that humans label pain, suffering, fear, anxiety and the like. This perspective has been popularized academically by Singer (1990). It is known as animal liberation philosophy (to be distinguished from animal right philosophy; Arlinghaus *et al.*, 2007a, b) and is consciously or unconsciously also the guiding ethical framework of many suffering-centred perspectives to fish welfare published so far or inherent in public discussion.

While it is possible to define fish welfare in terms of the feelings of fishes and at the same time advocate studying fish welfare on the basis of scientific facts about physiological and behavioural disturbances resulting from recreational fishing (Huntingford *et al.*, 2007), it is paramount to acknowledge the considerable scientific uncertainty concerning the ability of fishes to experience pain and suffering in a human sense (Rose, 2007; Newby & Stevens, 2008). Thus, a suffering-centred definition of fish welfare currently only serves as a meta-definition of fish welfare because there is no scientific method available that allows quantifying pain and suffering in fishes, *i.e.* the concepts of pain and suffering in fishes lack construct validity (Rose, 2007). Irrespective of this ongoing discussion, believing that fishes hooked, handled and maybe retained by an angler experience human-like emotional states has prompted the question whether and when it is legitimate to inflict these states on fishes (de Leeuw, 1996; Balon, 2000; Håstein *et al.*, 2005; Webster, 2005). This question is moral in orientation and is largely driven by human imagination of what a fish might feel during and after a recreational angling event.

A relevant ethical question may then be to ask how to balance the interests of anglers with the interests of fishes (Sandøe *et al.*, 2009). By necessity, the interests of fishes in this balancing act are those ascribed to fishes by humans. This is a fundamental concern because the reading of an animal's mind along with its likely interests must be inaccurate, particularly for evolutionarily distant taxa such as fishes (Marmeli & Bortolotti, 2006). It is hence impossible to unambiguously read a fish's mind and it is equally challenging to determine its interests. Thus, from a strictly scientific perspective, every interpretation of physiological and behavioural reactions of fishes to an angling event must be conducted with care to avoid falsely ascribing human traits to fishes (Rose, 2007). What is important to realize at this stage, however, is that the outcome of any evaluation about the ethical permissibility of recreational fishing on the basis of the suffering-based approach to fish welfare will be determined by subjective value judgement, because the degree of suffering cannot be quantified objectively. This is in stark contrast to the pragmatic approach to fish welfare that focuses on factual science (Fig. 1).

Many engaged in, or sympathizing with, a suffering-centred perspective on fish welfare tend to put forward the following sequence of arguments. First, fish welfare is defined with reference to suffering or pain (Huntingford *et al.*, 2006; Sneddon, 2006). Second, the literature on pain and suffering in fishes, which is controversial in terms of its scientific rigour (Rose, 2003; Chandroo *et al.*, 2004; Newby & Stevens, 2008), is compiled to conclude that recreational fishing is (very likely) inflicting suffering and other mental states such as fear and anxiety on individual fishes (Huntingford *et al.*, 2006). This is then used by some to question the moral legitimacy of recreational fishing or certain recreational fishing practices (de Leeuw, 1996; Balon, 2000; Håstein *et al.*, 2005; Webster, 2005).

Suffering-centred arguments in the context of recreational fishing (and other types of fishing) are not just discussions within ivory towers of academic institutions, but have already influenced recreational fishing practice in selected countries (Arlinghaus *et al.*, 2007a). For example, Germany has implicitly prohibited the intentional release of fishes that could legally be retained (*e.g.* those exceeding minimum-size limits) based on the assumption that fishes can suffer (Arlinghaus, 2007). The rationale is that voluntarily releasing fishes as well as other critical practices, such as use of live baitfish and tournament fishing, do not provide essential (*i.e.* nutritional) benefits to the angler, and the 'non-essential' pleasure felt by the angler is judged to lack a 'reasonable reason' not justifying the infliction of prolonged or repeated suffering and pain on fishes (Arlinghaus, 2007; Meinelt *et al.*, 2008). Another example is Switzerland, which introduced a new animal welfare law in 2008, in which the intentional release of fishes and the use of barbed hooks is explicitly prohibited based on the prescription that sentient fishes have dignity. In these cases, the concepts of pain and suffering of fishes have become morally and legally relevant criteria on which to base decisions over what is and is not acceptable in recreational fishing. This indicates that the scientific uncertainty about the ability of fishes to consciously experience pain and suffering (Rose, 2007) is not acknowledged by political decision makers or fishes were given the benefit of the doubt (Sneddon, 2006). As a result, and because fishes are assumed to suffer tremendously in the process of recreational fishing, certain angling practices deemed to not justify the infliction of such supposedly negative mental states were prohibited. This clearly shows that suffering-centred fish welfare perspectives have substantially influenced the practice of recreational fishing



in some countries and have resulted in the imposition of bans of popular practices. This included the need imposed on each individual angler to provide justification for the intentional infliction of pain and suffering to fishes. In Germany, for example, such justification is currently given if anglers go fishing with the intention to catch fishes for personal consumption (Arlinghaus, 2007). It is unclear how stable this justification for recreational fishing is. In the future, political decision makers may engage in a 'genuine weighing of concerns' as advocated by Sandøe *et al.* (2009) and conclude that recreational fishing provides more harm to sentient fishes than good to the angler household and is thus to be further constrained, irrespective of whether anglers through harvesting fishes engage in a natural act of predation or not.

This line of reasoning is increasingly popular among certain philosophers and ethicists (many of whom serve on national committees on bioethics that consult political decision makers) since Singer's (1990) invention of the animal liberation philosophy, which is a version of utilitarianism known as preference utilitarianism. In utilitarianism, only the consequences, *i.e.* the results of actions count. Actions are right if they promote pleasure (happiness), and they are wrong if they produce the opposite (unhappiness, *e.g.* pain and suffering). Because from a suffering-centred perspective recreational fishing is thought to promote 'unhappiness' (pain) for the fishes, it is perceived by some as wrong (de Leeuw, 1996; Balon, 2000), unless there are benefits accrued by the angler that would justify the infliction of pain and suffering on the fishes. The suffering-centred approach then boils down to which reasons justify inflicting suffering on fishes by the recreational angler?

Note that by defining fish welfare based on suffering, the discussion has almost automatically shifted away from objective identification of factors that affect fish welfare and how to mitigate such effects (which is the main characteristic of a pragmatic approach to fish welfare). Instead, the issue is now about whether and when recreational fishing is ethically permissible. A prominent example in the scientific literature is de Leeuw (1996, 2004); he claimed that anglers are cruel because they enjoy inflicting suffering and pain on fishes. The argument extends to suggest that recreational fishing is to be regulated or abolished because angling does not fulfil essential needs and only generates angler pleasure (de Leeuw, 1996; Balon, 2000), *i.e.* recreational anglers are accused of committing acts of wanton cruelty (Webster, 2005).

Characterizing recreational anglers as cruel sadists that enjoy torturing sentient fishes for no good reason and describing the entire activity as cruel represent powerful rhetorical moves. They associate recreational anglers with an idea that is abhorrent to many, thereby attempting to persuade people to conclude that recreational angling is immoral (Olsen, 2003). From a philosophical perspective, it is important to reflect on whether it is acceptable to portray recreational anglers as cruel. Various authors have argued that this assertion is flawed because recreational anglers lack cruel intentions, which is true irrespective of whether fishes are able to experience pain and suffer or not (Chipeniuk, 1997; List, 1997; Olsen, 2003; Schwab, 2003).

If anglers *per se* are not cruel because they lack cruel intentions, there might be an inclination to ask the follow-up question of whether the activity of angling rather than the agent performing the activity can and should be considered cruel? To sort this out, the cruelty of the agent needs to be divorced from the cruelty of the act (Olsen, 2003). This opens a new challenge for the fishing ethicists concerned with angler-induced suffering in fishes: to what degree do the intentions of a recreational

angler determine the ethical value of an activity known as recreational fishing (Olsen, 2003)? Attempting to judge the ethical permissibility of recreational angling by analysing the intentions of the angler has to do with the fact that humans tend to attribute moral beliefs about causing pain and suffering to the human species while it is less widespread to attribute such beliefs to non-human animals, *e.g.* a dog or a cat (Olsen, 2003). A common perspective in circles sympathizing with a suffering-centred perspective on fish welfare in recreational fishing is then to introduce the following duality (Olsen, 2003): if a recreational angler goes fishing with the intention of catching fishes for personal consumption and thus engages in a natural act of predation (Arlinghaus *et al.*, 2007a), there is no moral issue, but if the fishing act does not involve the intention to harvest fishes it may be considered as unnatural and cruel, and hence unethical (Balon, 2000; Håstein *et al.*, 2005). This perspective is also inherent in public perception. More than 90% of the U.S. public, for example, agree that recreational fishing for food is morally acceptable (Duda & Young, 1998; T. L. Teel & M. J. Manfredi, unpubl. data), but about one-third of the public in Germany (Riepe & Arlinghaus, 2010) and a similar proportion in selected urbanized states in the U.S.A. feel that fishing recreationally without harvesting is morally unacceptable (T. L. Teel & M. J. Manfredi, unpubl. data). This indicates that a distinction between ethical and unethical recreational anglers can be constructed if the implications of a suffering-centred approach to fish welfare are carefully examined, with ethical anglers being exclusively harvest-oriented and unethical anglers being those who do not intend to harvest fishes. Of course, these two angler types are extreme cases, and in reality a continuum of motivations and behaviours of anglers exists. For the sake of clarity, however, assume that only two types of anglers exist: harvest-oriented anglers (ethical) and anglers not interested in harvesting fishes (unethical).

Is the solution to the ethical question on how to balance the interests of recreational anglers with the interests of fishes to discriminate, based on the intention of the angler, undesirable and desirable actors within a population of recreational anglers? From the ethical perspective concerned with the possibility that fishes might suffer, a suitable line of action could be to prohibit unethical angling that is not focused on harvesting fishes for subsistence. Indeed, this is what has happened in Germany and Switzerland following suffering-centred perspectives and is also being advocated elsewhere, with Germany serving as a role model on how to deal with recreational fishing in the future to minimize suffering in the world of fishes as much as possible (Branson & Southgate, 2008). Typically in these situations, a mix of regulations based on suffering-centred fish welfare reasoning (individual fish-centred) and fish population conservation concerns (fish population-centred) is implemented, which together can have substantial consequences for aggregated fish welfare in a region or country subjected to intensive recreational fishing pressure. For example, for fish population conservation reasons, most recreational fisheries worldwide are managed based on variants of minimum-size limits to protect juvenile fishes from harvest and allow successful reproduction at least once in a lifetime. Ethical angling as described above results in the situation that immature fishes must be released after capture but all legally sized or otherwise unprotected individuals are to be harvested (the German and Swiss examples; Arlinghaus, 2007). Undoubtedly, all legally sized fishes captured by ethical anglers in the course of an angling year are worse off because their welfare is reduced to zero through death relative to the welfare of these fishes if they would be captured by unethical anglers because these anglers



would release rather than kill their catch voluntarily. For legally protected fishes captured as incidental by-catch by ethical anglers, the situation would essentially not change because they still are to be released mandatorily whether captured by ethical, harvest-oriented anglers or unethical anglers not interested in harvest.

The apparent solution of only allowing catch-and-harvest type anglers to fish recreationally may thus compromise total fish welfare in a region or country through total catch-and-kill. It is contended that in the course of an angling season ethical anglers would kill more fishes than if the same number of fishes would have been captured and released by unethical anglers because catch-and-release mortality can be very low in many situations (Arlinghaus *et al.*, 2007b). Intensive catch-and-kill recreational fishing would in turn put many fish populations at risk from overexploitation, and equally worrying are the potential indirect effects including all the undesirable population-level, food web level and genetic effects this might entail (Post *et al.*, 2002; Lewin *et al.*, 2006). A suffering-centred fishing ethicist might conclude that this now is a management problem in need of being addressed by management agencies because, from an angler intention-based ethical perspective, constraining anglers that do not fish for harvest is a satisfactory solution (Balon, 2000; Håstein *et al.*, 2005; Webster, 2005). In most recreational fisheries where largely uncontrolled fishing effort is typical, the management response would probably be tightening up of harvest regulations, for example, by increasing the minimum-size limits or implementing a ban on harvest of a particular threatened species or even limiting angler numbers so sustainable harvest is achieved (Berg & Rösch, 1998). Unfortunately, it is unlikely these actions will achieve the desired objective of maintaining ecosystem goods and services because total angling effort in a region or country is generally impossible to constrain unless draconian effort control measures are implemented (Cox & Walters, 2002). Furthermore, it is unlikely that these management actions can be effectively monitored and enforced because of the dispersed nature of recreational fisheries, potentially resulting in the now infamous 'invisible collapse' of recreationally exploited fish populations (Post *et al.*, 2002). Aggregated across all recreational fisheries in a region, this would result in even greater fish welfare losses in wild fish populations from largely uncontrolled overharvest. Hence, following moral-ethical perspectives to fish welfare based on suffering-centred reasoning exclusively may produce outcomes that actually defeat the underlying objective of introducing the dichotomy of ethical and unethical anglers, which is to enhance fish welfare.

There are additional concerns for fish welfare that should be mentioned in this context. Any type of stricter harvest regulation (*e.g.* larger minimum-size limits) to more sustainably manage harvest-oriented recreational fishing would indirectly increase mandatory release rates of non-target and undersized fishes, and it is the practice of catch-and-release that suffering-centred stakeholders are most concerned with (de Leeuw, 1996; Balon, 2000; Webster, 2005), possibly because it is perceived as visible demonstration of lack of intention to harvest or playing with food for no good reason (Aas *et al.*, 2002). Thus, introduction of ethical angling would not result in abolishment of catch-and-release angling because mandatory catch-and-release would continue to take place. Indeed, anglers unlike hunters do not know with certainty what species or size of fishes will be caught so that some form of mandatory catch-and-release is unavoidable in all recreational fisheries worldwide. It is important to realize that from a pragmatic welfare perspective, which does not focus on the intention of the angler, there is no distinction whatsoever between

mandatorily releasing an undersized or otherwise protected fish by an ethical angler or the voluntarily release of all or part of the catch by an unethical angler that fishes without the intention to catch fishes for food. Both release events should be conducted by adhering to the best standards of gear choice and handling practices so as to minimize or avoid any impairment of fish welfare in functional terms, *e.g.* impaired health and fitness (Cooke & Sneddon, 2007; EIFAC, 2008). The literature is full of examples that this goal can be achieved in many cases resulting in a healthy fish released in an optimal condition to reproduce in the future (Arlinghaus *et al.*, 2007a, b). If a fish would be captured by an 'ethical' angler, however, the possibility for future reproduction would be lost through death. It is contended that death is more detrimental to fish welfare than a largely reversible stress response and some physical injury that is experienced by fishes that are released after capture.

An alternative to stricter harvest limitations to regulate ethical angling and avoid large-scale overfishing and other undesirable effects of angling could be limiting angling pressure through input control measures. This, however, would be detrimental to those stakeholders that depend on angler participation (*e.g.* tackle industry), including most fisheries management agencies responsible for protecting wild fishes from an array of anthropogenic threats unrelated to recreational fishing because most fisheries agencies and fish conservation programmes depend on angling licence sales for existence. Reducing angler numbers would also erode the immense grass roots support for wild fish population conservation by anglers (Granek *et al.*, 2008), probably with further detrimental effects for fish welfare (Rose, 2007).

The various fallacies and practical difficulties associated with the distinction between ethical and unethical recreational anglers based on their intention to fish for sentient beings during leisure time could lead proponents of the suffering-centred approach to conclude that recreational angling itself is morally questionable (Håstein *et al.*, 2005; Würbel, 2007). For example, after reviewing evidence for pain and suffering in fishes and concluding that fishes can probably experience these mental states, Würbel (2007) stated that 'whether angling as recreational pleasure activity is to be further tolerated must now be re-negotiated at the societal scale'. Indeed, the abolition of recreational fishing may be perceived by some as the best approach for increasing fish welfare. What could be better for a fish than not be chased by an angler? Note that it is not implied that all scientists who use the term suffering in the context of fish welfare and recreational fishing have this underlying agenda, which is typical for animal liberation and animal rights lobby groups. The impression remains, however, that many of those who focus on feelings of fishes in recreational fishing discount the importance of the recreational fishing experience for the angler and also discount the manifold social, economic and ecological benefits of recreational fishing activity for society (Arlinghaus *et al.*, 2002, 2007a). What is often implied in value-driven utilitarian mathematics aimed at balancing the interests of anglers against the supposed interest of fishes (Sandøe *et al.*, 2009) is that a unit of suffering by fishes counts more than a unit of angler pleasure (Webster, 2005). Furthermore, there is also the noteworthy tendency to deny the individual angler the moral capacity and autonomy to make up his or her own mind on the basis of the available knowledge and angling experience on how to best treat and handle a fish, and instead prescribe in a top-down manner what is considered acceptable or not. The angler as a moral, autonomous individual as well as the concept of angler pleasure may not be of

relevance to the fundamental critics of recreational angling but the activity undoubtedly adds to the quality of life of millions of anglers worldwide (Arlinghaus *et al.*, 2002). Moreover, by reducing recreational fishing to one dimension, the pleasure of the angler, the myriad of aggregated economic, social, physiological and ecological benefits associated with recreational fishing activity for society are disregarded (Arlinghaus *et al.*, 2002), some of which actually provide essential benefits to society (*e.g.* tackle industry depending on anglers for survival) and benefit fish welfare. For example, important benefits of angling participation from a fish welfare perspective include, amongst others, angler support for fish conservation and rehabilitation projects, angler expenditure feeding fisheries management and conservation activities, angler awareness of environmental problems, cultivation of respect for nature through direct interaction with it and introduction of younger age groups to pro-environmental societal norms and behaviours (Bate, 2001; Arlinghaus *et al.*, 2002; Evans, 2005; Rose, 2007; Granek *et al.*, 2008). It would be advisable to develop a holistic perspective on recreational fishing as natural social-ecological systems rather than pushing a reductionistic perspective that reduces the angling experience to the interaction between an individual sentient animal (fish) and a non-natural disturbance to be avoided (angler).

There is a final aspect that deserves being mentioned in the context of grand ethical questions raised against the morality of recreational fishing based on suffering-centred fish welfare reasoning. The high morals imposed on recreational anglers to either refrain from interaction with fishes entirely or to avoid such interaction as much as possible to minimize infliction of suffering in the world of fishes are usually not normatively guiding for the life styles and activities of the non-angling part of society. Imposing similarly high moral standards on the rest of contemporary society as currently claimed by some for anglers based on suffering-centred fish welfare grounds, however, would bring into question many other popular human activities, because most of them are unnecessary to sustain a basic level of human survival. The majority of human actions have, directly or indirectly, however, substantial effects on ecosystems, fishes and wildlife. If recreational angling is wrong, and to be abolished or heavily curtailed to reduce suffering of fishes, many other human activities that do not serve essential needs are also wrong and are to be abolished or curtailed, irrespective of the implications for human welfare. Examples include navigation of water bodies for pleasure (because pleasure boating may affect individual fish welfare negatively; Wolter & Arlinghaus, 2003) or abstract issues such as flood control measures (because natural processes are compromised, which may have effects on fish welfare; Huntingford *et al.*, 2006; Peirson *et al.*, 2008). The ethicist might argue that there is a difference because it is not the intention of the water engineer, for example, to interfere with sentient beings by channelizing a river. For fish welfare, however, the intention of the practitioner is irrelevant (Fig. 1). What matters is the degree of impairment of the animal's welfare, and from a pragmatic fish welfare perspective: how can human effects on fish welfare be minimized or avoided without generally abolishing popular activities that create human pleasure, or more generally, substantial benefits to human societies? The suffering-centred approach tends to leave little room for such compromise solutions in the context of recreational fishing, and instead arrives at the conclusion that particular recreational fishing practices or the entire activity are to be banned because they are cruel or unnecessary, or both, and thus unethical. It should be recognized, however, that in

contrast to most other human activities, recreational angling, through expenditure and voluntary engagement, supports manifold activities and actions to improve the natural state of ecosystems, which benefits fish welfare. Recreational angling thus, without doubt, affects the welfare of fishes, not least because many fishes are killed, but at the same time recreational fishing communities are among the few social groups that voluntarily engage in actions to protect fish populations (Bate, 2001; Rose, 2007; Granek *et al.*, 2008).

## CONCLUSIONS

The pragmatic approach to fish welfare as described in the present paper holds that recreational fishing is a morally acceptable pursuit. It cultivates an integrated view of humans being part of nature and not a non-natural disturbance to be avoided (Arlinghaus *et al.*, 2007a). The pragmatic approach to fish welfare relies on objectively measurable variables and seeks to improve fish welfare through science-based recommendations to anglers and fishery managers (Fig. 1). It relies on the notion that all components of the coupled social-ecological system of recreational fishing are valuable, namely individual fishes, fish populations and the people that enjoy fishing during leisure time. It also invites regulation, on a scientific basis, of selected recreational fishing practices, even if they are popular, if considered necessary by decision makers to maintain or enhance fish welfare. Generally, the consideration given to the vulnerabilities and reactivity of fishes should not depend on whether fishes are assumed to have the ability for suffering and pain or other conscious awareness (Rose, 2007). This perspective is in stark contrast to the suffering-centred approach that takes suffering and other mental states of a fish as the most important criteria for moral judgement. In this vein, a pragmatic approach to fish welfare may even be considered more encompassing than a suffering-centred one, because it acknowledges that all interactions with individual fishes are relevant from a fish welfare perspective, *i.e.* physiological stress responses or behavioural impairments. Contrary to the suffering-centred approach to fish welfare, however, the pragmatic approach does not explicitly or implicitly ask fundamental questions as to the ethical permissibility of recreational fishing practices that are popular and enjoyed.

By contrast, the suffering-centred approach to fish welfare is built on scientifically uncertain concepts of pain and suffering in fishes and is inextricably interwoven with grand ethical schemes (Fig. 1). The monothematic feelings-based approach to fish welfare usually is moral in orientation rather than science oriented. It argues that recreational fishing causes suffering to fishes, which is considered unacceptable unless it can be properly justified. For many sympathizing with a suffering-centred approach to fish welfare, the only accepted justification for recreational fishing is, maybe, to meet essential physiological needs through harvesting of fishes. Implementation of this principle into practice by abolition of any type of recreational fishing that is not exclusively directed at harvesting may be detrimental to total fish welfare because the total number of dead fishes probably increases in a region or country. The suffering-centred approach to fish welfare might thus become a caricature of the principal ideals of fish welfare, not least because the self-interest of angling communities to invest time, money and political effort to protect nature and natural fish populations is defeated. Clearly, not all authors that use the term suffering in

the context of fish welfare have an underlying agenda of banning some or even all types of recreational angling that are not exclusively directed at harvest of fishes, but the history in Germany and Switzerland has clearly shown that this outcome is to be expected in legal terms in many situations when a suffering-centred perspective gains political support.

Instead of going to extremes in moral debates with surprisingly counterintuitive outcomes for fish welfare, what is needed to move forward is better education of recreational anglers to apply the manifold ways by which fish welfare can, and should, be increased in recreational fisheries practice (Arlinghaus *et al.*, 2007a, 2009b). The pragmatic approach to fish welfare serves this aim and provides positive messages for a constructive dialogue. Conversely, attempts to morally incapacitate recreational anglers and disqualify their activity as unnecessary, or anglers as cruel and playing with food for no reason, creates enduring conflict that cannot be solved objectively and is thus to be avoided. Responsible fish and fisheries scientists should refrain from further feeding these conflicts by objectively interpreting study findings, avoiding using jargon from human psychology to describe how fishes might feel and be very careful when choosing to associate with ethicists in advocacy efforts because the realm of objective science might be lost. This potentially has severe consequences for the welfare of recreational anglers and all stakeholders that depend on recreational fishing activity.

R.A. thanks the Fisheries Society of British Isles for the invitation to the Fish Welfare Symposium at the 4th World Fisheries Congress, Yokohama, Japan, and the e-conference. Comments on a previous version of this paper by J. Rose, H. Browman, C. Riepe and two reviewers are acknowledged.

## References

- Aas Ø., Thailing, C. E. & Ditton, R. B. (2002). Controversy over catch-and-release recreational fishing in Europe. In *Recreational Fisheries: Ecological, Economic and Social Evaluation* (Pitcher, T. J. & Hollingworth, C. E., eds), pp. 95–106. Oxford: Blackwell Science.
- 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. In *Global Challenges in Recreational Fisheries* (Aas, Ø., Arlinghaus, R., Ditton, R. B., Policansky, D. & Schramm, H. L. Jr, eds), pp. 223–236. Oxford: Blackwell Science.
- Arlinghaus, R., Mehner, T. & Cowx, I. G. (2002). Reconciling traditional inland fisheries management with sustainability in industrialized countries, with emphasis on Europe. *Fish and Fisheries* **3**, 261–316.
- Arlinghaus, R., Cooke, S. J., Schwab, A. & Cowx, I. G. (2007a). Fish welfare: a challenge of the feelings-based approach, with implications for recreational fishing. *Fish and Fisheries* **8**, 57–71.
- Arlinghaus, R., Cooke, S. J., Lyman, J., Policansky, D., Schwab, A., Suski, C., Sutton, S. G. & Thorstad, E. B. (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., Klefoth, T., Gingerich, A. J., Donaldson, M. R., Hanson, K. C. & Cooke, S. J. (2008). Behaviour and survival of pike, *Esox lucius*, with a retained lure in the lower jaw. *Fisheries Management and Ecology* **15**, 459–466.



- Arlinghaus, R., Klefoth, T., Cooke, S. J., Gingerich, A. & Suski, C. J. (2009a). Physiological and behavioural consequences of catch-and-release angling in northern pike (*Esox lucius*). *Fisheries Research* **97**, 223–233.
- Arlinghaus, R., Cooke, S. J. & Cowx, I. G. (2009b). Providing context to the global code of practice for recreational fisheries. *Fisheries Management and Ecology* (in press).
- 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.
- Bate, R. (2001). *Saving Our Streams: the Role of the Anglers' Conservation Association in Protecting English and Welsh Rivers*. London: The Institute of Economic Affairs and Profile Books.
- Berg R. & Rösch R. (1998). Animal welfare and angling in Baden-Württemberg, Germany. In *Recreational Fisheries: Social, Economic and Management Aspects* (Hickley, P. & Tompkins, H., eds), pp. 88–92. Oxford: Blackwell Science.
- Branson, E. J. & Southgate, P. J. (2008). Introduction. In *Fish Welfare* (Branson, E. J., ed.), pp. 1–3. Oxford: Blackwell Publishing.
- Chandoo, K. P., Yue, S. & Moccia, R. D. (2004). An evaluation of current perspectives on consciousness and pain in fishes. *Fish and Fisheries* **5**, 281–295.
- Chipeniuk, R. (1997). On contemplating the interests of fish. *Environmental Ethics* **19**, 331–332.
- Cooke, S. J. & Sneddon, L. U. (2007). Animal welfare perspectives on recreational angling. *Applied Animal Behaviour Science* **104**, 176–198.
- Cooke, S. J. & Suski, C. D. (2005). Do we need species-specific guidelines for catch-and-release recreational angling to conserve diverse fishery resources? *Biodiversity and Conservation* **14**, 1195–1209.
- Cox, S. P. & Walters, C. (2002). Maintaining quality in recreational fisheries: how success breeds failure in management of open-access sport fisheries. In *Recreational Fisheries: Ecological, Economic and Social Evaluation* (Pitcher, T. J. & Hollingworth, C. E., eds), pp. 107–119. Oxford: Blackwell Science.
- Davie, P. S. & Kopf, R. K. (2006). Physiology, behaviour and welfare of fish during recreational fishing and after release. *New Zealand Veterinary Journal* **54**, 161–172.
- Duda, M. D. & Young, K. C. (1998). American attitudes toward scientific wildlife management and human use of fish and wildlife: implications for effective public relations and communications strategies. *Transactions of the 63rd North American Wildlife and Natural Resources Conference* **63**, 589–603.
- Duran, A., Erdemli, U., Karakaya, M. & Yilmaz, M. T. (2008). Effects of slaughter methods on physical, biochemical and microbiological quality of rainbow trout *Oncorhynchus mykiss* and mirror carp *Cyprinus carpio* filleted in pre-, in- or post-rigor periods. *Fisheries Science* **74**, 1146–1156.
- EFSA (2009). General approach to fish welfare and to the concept of sentience in fish. Scientific opinion of the Panel on Animal Health and Welfare. *The EFSA Journal* **954**, 1–27.
- EIFAC (2008). Code of practice for recreational fisheries. *EIFAC Occasional Paper EIFAC/OP42*.
- Evans, J. C. (2005). *With Respect for Nature – Living as Part of the Natural World*. Albany, NY: State University of New York Press.
- Granek, E. F., Madin, E. M. P., Brown, M. A., Figueira, W., Cameron, D. S., Hogan, Z., Kristianson, G., de Villiers, P., Williams, J. E., Post, J., Zahn, S. & Arlinghaus, R. (2008). Engaging recreational fishers in management and conservation: global case studies. *Conservation Biology* **22**, 1125–1134.
- Håstein, T., Scarfe, A. D. & Lund, V. L. (2005). Science-based assessment of welfare: aquatic animals. *Revue scientifique et technique (International Office of Epizootics)* **24**, 529–547.
- Hewlett, N. R., Snow, J. & Britton, J. R. (2009). The role of management practices in fish kills in recreational lake fisheries in England and Wales. *Fisheries Management and Ecology* **16**, 248–254.
- Huntingford, F. A. & Kadri, S. (2008). Welfare and fish. In *Fish Welfare* (Branson, E. J., ed.), pp. 19–31. Oxford: Blackwell Publishing.



- Huntingford, F. A., Adams, C., Braithwaite, V. A., Kadri, S., Pottinger, T. G., Sandøe, P. & Turnbull, J. F. (2006). Current issues in fish welfare. *Journal of Fish Biology* **68**, 332–372.
- Huntingford, F. A., Adams, C., Braithwaite, V. A., Kadri, S., Pottinger, T. G., Sandøe, P. & Turnbull, J. F. (2007). The implications of a feelings-based approach to fish welfare: a reply to Arlinghaus *et al.* *Fish and Fisheries* **8**, 277–280.
- Iwama, G. K. (2007). The welfare of fish. *Diseases of Aquatic Organisms* **75**, 155–158.
- de Leeuw, A. D. (1996). Contemplating the interests of fish: the angler's challenge. *Environmental Ethics* **18**, 373–390.
- de Leeuw, A. D. (2004). Angling and sadism: a response to Olson. *Environmental Ethics* **26**, 441–442.
- Lewin, W.-C., Arlinghaus, R. & Mehner, T. (2006). Documented and potential biological impacts of recreational fishing: insights for management and conservation. *Reviews in Fisheries Science* **14**, 305–367.
- List, C. J. (1997). On angling as an act of cruelty. *Environmental Ethics* **19**, 333–334.
- Manfredo, M. J. & Fulton, D. C. (2008). The biological context of wildlife values: are there etchings on the slate? In *Who Cares about Wildlife* (Manfredo, M. J., ed.), pp. 29–48. New York, NY: Springer.
- Marmeli, M. & Bortolotti, L. (2006). Animal rights, animal minds, and human mindreading. *Journal of Medical Ethics* **32**, 84–89.
- Meinelt, T., Jendrusch K. & Arlinghaus, R. (2008). Competitive fishing in Germany: an overview. In *Global Challenges in Recreational Fisheries* (Aas, Ø., Arlinghaus, R., Ditton, R. B., Policansky, D. & Schramm, H. L. Jr., eds), pp. 254–258. Oxford: Blackwell Science.
- Newby, N. C. & Stevens, E. D. (2008). 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.
- Olsen, L. (2003). Contemplating the intentions of anglers: the ethicist's challenge. *Environmental Ethics* **25**, 267–277.
- Peirson, G., Bolland, J. D. & Cowx, I. G. (2008). Lateral dispersal and displacement of fish during flood events in lowland river systems in the UK – implications for sustainable floodplain management. *Ecology and Hydrology* **8**, 363–373.
- Post, J. R., Sullivan, M., Cox, S., Lester, N., Walters, C. J., Parkinson, E. A., Paul, A. J., Jackson, L. & Shuter, B. J. (2002). Canada's recreational fisheries: the invisible collapse? *Fisheries* **27**, 6–17.
- Riepe, C. & Arlinghaus, R. (2010). Einstellungen der Bevölkerung in Deutschland zu Fragen des Tierschutzes in der Angelfischerei. *Berichte des IGB* (in press).
- 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 B* **270**, 1115–1121, 2003 by Sneddon, Braithwaite and Gentle. In *Information Resources on Fish Welfare 1970–2003* (Erickson, H. E., ed.), pp. 49–51. Beltsville, MD: U. S. Department of Agriculture.
- Rose, J. D. (2007). Anthropomorphism and the ‘mental welfare’ of fishes. *Diseases of Aquatic Organisms* **75**, 139–154.
- Schwab, A. (2003). *Hook, Line and Thinker – Angling and Ethics*. Ludlow: Merlin Unwin Books.
- Singer, P. (1990). *Animal Liberation*. New York, NY: Avon Books.
- Sneddon, L. U. (2006). Ethics and welfare: pain perception in fish. *Bulletin of the European Association of Fish Pathologists* **26**, 6–10.
- Suski, C. D., Cooke, S. J., Danylchuk, A. J., O'Connor, C., Gravel, M.-A., Redpath, T., Hanson, K. C., Gingerich, A., Murchie, K., Danylchuk, S. E. & Goldberg, T. L. (2007). Physiological disturbance and recovery dynamics of bonefish (*Albula vulpes*), a tropical marine fish, in response to variable exercise and exposure to air. *Comparative Biochemistry and Physiology A* **148**, 664–673.
- Webster, J. (2005). *Animal Welfare: Limping towards Eden*. Oxford: Blackwell Publishing.
- Wedemeyer, G. A. & Wydoski, R. S. (2008). Physiological response of some economically important freshwater salmonids to catch-and-release fishing. *North American Journal of Fisheries Management* **28**, 1587–1596.

- Wilde, G. R. (2009). Does venting promote survival of released fish? *Fisheries* **34**, 20–28.
- Wolter, C. & Arlinghaus, R. (2003). Navigation impacts on freshwater fish assemblages: the ecological relevance of swimming performance. *Reviews in Fish Biology and Fisheries* **13**, 63–89.
- Würbel, H. (2007). Biologische Grundlagen zum ethischen Tierschutz. In *Tierrechte* (Interdisziplinäre Arbeitsgemeinschaft Tierethik Heidelberg, ed.), pp. 11–30. Erlangen: Harald Fischer Verlag.

### Electronic Reference

- Sandøe, P., Gamborg, C., Kadri, S. & Millar, K. (2009). Balancing the needs and preferences of humans against concerns for fish: exploring emerging ethical issues. *Proceedings of the 5th World Fisheries Congress 2008, October 20–24, 2008, Yokohama Japan* (available as CD Rom). Tokyo: TERRAPUB. Available at <http://www.terrapub.co.jp/proceedings/wfc>