



The rise of seafood awareness campaigns in an era of collapsing fisheries

Jennifer L. Jacquet*, Daniel Pauly

The Sea Around Us Project, The Fisheries Centre, University of British Columbia, 2202 Main Mall, Vancouver, BC, Canada V6T 1Z4

Received 7 August 2006; accepted 14 September 2006

Abstract

The human appetite for seafood has intensified and so has overfishing and damage to marine ecosystems. Recently, the response to the fisheries crisis has included a considerable effort directed toward raising the seafood awareness of consumers in North America and Europe. The resulting campaigns aim to affect the seafood demand and to lead to a sustainable seafood supply. Though there are indicators of some regional successes, lack of support by the Asian market and the proliferation of self-serving seafood labels are but two of the many significant limitations of these campaigns. This contribution investigates the difficulties and successes of seafood awareness campaigns, as well as the need for indicators of campaign effectiveness.

© 2006 Elsevier Ltd. All rights reserved.

Keywords: Eco-label; Fisheries; Marine ecosystems; MSC; NGO; Seafood; Social marketing

1. Introduction

Atlantic halibut, now described as ‘America’s favorite whitefish,’ was considered unpalatable in the early 1800s. By the 1830s, tastes had changed and a market for halibut developed, which led to a vigorous fishery in New England and Nova Scotia [1]. In less than 20 years, inshore halibut stocks of the Western Atlantic collapsed and have not recovered since [2].

Likewise, until the 1930s, Atlantic bluefin tuna were discarded as trash fish in the waters around Denmark [3]. In 2001, a 200-kg Atlantic bluefin tuna sold for just under US\$175,000 at a Tokyo auction [4]. It is mainly to feed this market that the tuna fishery has depleted the Atlantic bluefin’s spawning biomass to 20% of 1970 levels [5].

Fish fillets and fish sticks were originally made mostly from cod. After cod was depleted nearly everywhere it occurred, these fish products were replaced by haddock, then redfish, and then, lately, by Pacific pollock [6]. The market for seafood may be dynamic, but its consequences are uncomfortably static and predictable. The rising global market demand for seafood has led to an increase in

industrial fishing coupled with fisheries mismanagement. The result has been overfishing, the collapse of innumerable fish populations (e.g., [7]) and the destruction of ocean habitat (e.g., [8]).

Fisheries have fully exploited more than half of the world’s fish stocks [9] and drastically altered ecosystems are left in their wake [10]. As human consumption of fish has doubled in the last 30 years [11], the world is now eating down the marine food web. Invertebrates and low-trophic level fish are replacing piscivorous species such as cod and swordfish. Rock and Jonah crab, at one time discarded as bycatch, are now marketed in spring rolls and crab congee. The change in public taste is essentially a reflection of the changes in marine ecosystems.

The expansion of bottom-trawl fishing during the 1980s devastated benthic communities and further altered ecosystems. After the removal of predators and competitors, jellyfish have flourished in the Bering, South China, and Black Seas [12]. The seafood market has adapted to these changes and the world harvest of jellyfish is now well over 250,000 tonnes annually, with consumption occurring primarily in Japan [13].

Jellyfish, however, do not appeal to the palate of consumers in the West, nor do they indicate healthy marine ecosystems. Thus, pressure has built to complement

*Corresponding author. Tel.: +1 604 822 2731.

E-mail address: j.jacquet@fisheries.ubc.ca (J.L. Jacquet).

the traditional methods of fisheries management (effort limitations; gear restrictions; quotas) with non-traditional methods (e.g., the establishment of marine protected areas). This is the context in which, in North America and the European Union, a number of awareness campaigns directed at seafood consumers have developed. This article examines the various limitations and successes of seafood awareness campaigns.

2. Background of seafood-related social marketing

Kotler and Zaltman [14] define social marketing as the application of marketing to the resolution of social problems. In the 1970s, the field of marketing underwent a major change and its use in changing social behavior was emphasized, though the results were not overwhelmingly successful. The most obvious proponents of social marketing for environmental change were government (e.g., ‘Keep America Beautiful’) and NGOs (e.g., ‘Save the Whales’). With the collapse of fish stocks and increase in concern for the oceans, NGOs have launched a variety of seafood-related social marketing campaigns, ranging from eco-labeling to the explicit boycott of certain products.

From a policy perspective, the eco-label aims to educate consumers about the environmental effects of the products’ production/consumption so as to catalyze a change in purchasing behavior and ultimately reduce negative environmental impacts. From a business perspective, companies are induced to use environmentally preferred production, distinguished by an eco-label, with the expectations of gaining a greater market share and higher profits.

The most famous and controversial seafood label, born in the 1990s with the first eco-labels, is perhaps the ‘dolphin safe’ logo on tuna cans. The best-established seafood label and most widely discussed (e.g., [15–18]) is that of the Marine Stewardship Council (MSC). The MSC was created in 1997 by WWF and Unilever, after the latter, one of the world’s largest seafood retailers, expressed its goal to source all fish from sustainable sources by 2005. The MSC designed a set of environmental criteria for sustainable and well-managed fisheries along with a label for fish products that receive MSC approval.

Aside from eco-labels, many NGOs and aquariums have launched campaigns to influence consumer behavior. Consumers can consult seafood wallet cards at the grocery or restaurant to determine which fish are ecologically best and worst to eat. The Smithsonian Institution published a cookbook of sustainable seafood dishes. The Incofish Project, funded by the European Commission, produced the ‘FisherMin,’ a ruler against which shoppers can measure their fish to ensure they are not buying juveniles (for rationale, see [19]). The fundamental goals of these campaigns are to encourage the public to eschew seafood caught unsustainably and, in so doing, help revive fish stocks on the brink of collapse.

3. Limitations of seafood awareness campaigns

3.1. The market

The main problems faced by seafood social marketing are the characteristics of the market itself, in terms of both consumers and producers. Asia consumes more than two-thirds of the world’s seafood [20]. Yet, to date, very few Asian consumers discriminate between products in the context of environmental issues and, therefore, are not targeted by groups like the MSC [16]. Furthermore, future expansion in demand for fish and fishery products is expected to arise not only in Asia, but in Latin America and Africa, where consumers are also likely not to be responsive to eco-labeling of fish [21]. Gardiner and Viswanathan [21] also worry that, in the future, high demand from markets not requiring eco-labels could marginalize approaches to eco-labeling, and make eco-labels suitable only for niche markets.

This is perhaps because, unless the program is mandatory, only fisheries that stand to benefit financially from adopting a product certification and label are likely to do so. Many developing countries are concerned that the promotion of eco-friendly products is happening in markets where food requirements have already been met and that small-scale fishers will be left to sell the unsustainable fish by default [15]. If eco-labeling cannot serve the needs of the small-scale fishers, i.e., the vast majority of fishers worldwide, how can it be considered in the global improvement of fisheries management? This argument is furthered by skepticism over the support of labeling programs by industrial fishing companies directly associated with the decline of fish population, such as Unilever [15].

Furthermore, in North America, the effect of eco-labels varies significantly between individuals with different levels of education or environmental involvement [22]. In terms of seafood eco-labels, Wessells et al. [23] found few statistically significant variables that affected consumption of eco-labeled seafood. However, their study did reveal that one of the only variables that influenced the choice of a certified product was if the purchaser belonged to an environmental organization. They also found that consumers who generally purchase frozen seafood are less likely to choose an eco-labeled product.

3.2. Lack of traceability

Social marketing may be further undermined by more insidious counter-marketing strategies by seafood traders. Because of the absence of traceability, many exporters and even domestic suppliers are able to sell their fish as eco-friendlier versions. For instance, seafood awareness campaigns as well as health and safety organizations have stressed the benefits of tilapia, a vegetarian farm-raised freshwater fish. As a result, the demand for tilapia has increased. In response, the Whitefish Association of

Ecuador now sells South Pacific hake, a pelagic, ocean-going fish caught with longlines, filleted and labeled as tilapia [24].

Sharks, considered undesirable in Ecuadorian city markets, are filleted, relabeled and sold instead as weak-fishes or even tuna [25]. Using DNA testing, Marko et al. [26] found that three-quarters of the fish sold in the US as ‘Red snapper’ belong to a species other than *Lutjanus campechanus*, ‘the’ Red snapper (in the US). Re-labeling not only deceives consumers but also provides them with the false sense that fish supply is keeping up with demand.

Lack of traceability and re-labeling of fish also undermines environmental regulations. The National Environmental Trust [27] published a report on Patagonian toothfish revealing that a considerable amount of illegal toothfish enters the US intermingled with other seafood or under the nondescript title ‘frozen fish fillet’ The same report cited the 2001 South African indictment of Hout Bay Fishing Industries, a company that attempted to smuggle 2 tonnes of toothfish beneath a thin layer of crayfish.

Shrimp suppliers operate similarly. There has been a widespread campaign in Europe to raise awareness of the negative effects of farm-raised shrimp. As a result, Thai shrimp, which account for nearly 30% of global production, are often exported as wild-caught rather than farm raised. In addition, due to EU tariffs on Thai shrimp, small producers simply smuggle Thai shrimp to Malaysia for processing [28].

Just as the inability to trace fish impedes the aims of consumer awareness campaigns, so does the inability to trace the industrial boats illegally catching those same fish. More than 1200 large-scale fishing vessels fly flags of convenience and more than 1400 fishing vessels operate under unknown flags, a drastic increase from the early 1990s [29]. These flags provide cover to globally roaming fishing fleets seeking to evade conservation and management policies.

Greenberg [30] writes of the pirate fishing boat caught illegally fishing for Patagonian toothfish in the South Georgia Strait. The boat was dynamited, but the owners were never found and the \$400,000 fine remains unpaid. Similar accounts of owner evasion are a common occurrence worldwide. These boats land their illegal catches in ports with relaxed import regulations [29].

3.3. *Mislabeling and renaming*

Financial incentives associated with marketing a product as ‘eco-friendly’ have the unforeseen effect of inspiring fishers and seafood companies to misrepresent their seafood product. Although the Food and Agriculture Organization (FAO) of the United Nations has no official label, Nile perch fillets from Lake Victoria are sold with a self-attributed eco-label claiming the fish were caught under the FAO’s code of conduct for responsible fisheries [31]. This type of misrepresentation is widespread. A study

conducted by Kangun et al. [32] found that more than 50% of environmental advertising is deceptive or misleading.

Financial incentives may also spur undesirable species to be renamed with more appetizing titles. Rock crab, once discarded as bycatch, is now marketed and sold as ‘peekytoe crab’. The Patagonian toothfish, an endangered species, is marketed as Chilean sea bass [33]. Slimeheads were opportunely renamed Orange roughy as the market developed [34]. Flesh of low value fish is used to make imitation ‘krab’. Dual names and name changes confuse consumers and complicate education efforts by seafood advocacy groups.

3.4. *Few efforts to measure campaign effectiveness*

In part due to the amount of manipulation in the seafood market, seafood wallet cards and other related tools have been ineffective in fulfilling their aims. After distributing over one million seafood wallet cards, the Monterey Bay Aquarium conducted a self-study that revealed no overall change in the market and that fishing pressures have not decreased for targeted species [35]. This is an unfortunate contradiction to Sproul’s [36, p. 146] assertion that ‘an informed consumer is a reformed abuser.’

Still, the Monterey Bay assessment documents a genuine concern for results. After more than 8 years of effort, the MSC annual reports [37,38] declare the number, value, and location of certified products but altogether ignore the certifications’ effectiveness (quantifiable or otherwise).

The MSC’s first certification was of the Australian rock-lobster industry, a process that cost more than \$260,000 [39]. Despite the detailed process and indicators of responsible management, there is contention that this certification was done in error and that the rock-lobster industry may not be ecologically sustainable [40]. Similarly, the New Zealand hoki fishery, also certified by the MSC, reported significant stock declines in 2004 [30]. The MSC may create an incentive for industry to foster effective stock management, but has so far failed to demonstrably arrest the decline of fish stocks.

3.5. *Single species focus*

Many of the problems associated with fisheries do not only involve a negative impact on the species themselves, but also on the species that are caught incidentally and discarded as waste [41], as well as the destruction of habitat for a wide range of species (e.g., [8]). Another foreseeable problem is that encouraging the consumption of ‘sustainably caught’ fish puts excessive pressure on presently healthy fish stocks.

In an era where understanding that fishery management must be ecosystem based is growing [42], the rhetoric of seafood campaigns based on a species-specific approach may represent a step backward. As Pauly and Maclean [2] point out, low-trophic level, farmed fish such as tilapia may

be substitutable for high-trophic level, wild fish at dinnertime, but they cannot replace the function of wild fish in the ecosystems from which they were extracted.

4. Successes of seafood awareness campaigns

Unilever's goal to source all fish for their company from sustainable sources by 2005 was an admirable one, though it was unattained. By 2005, Unilever managed 46% of its European fish products from MSC certified fisheries, but the overwhelming bulk of this was Alaska pollock [43].

Meanwhile, the MSC has established itself as an independent organization and is gaining momentum [44]. It has now certified 40 fisheries (the equivalent of 3 million tonnes of seafood, just under 4% of global production) and labeled more than 300 seafood products. Indeed, the mammoth retailer, Wal-Mart, announced its ambition to source all of its wild caught fish from MSC certified fisheries within the next 5 years [45].

The absence of uniform standards, a former inadequacy of seafood labeling, was recently resolved with a set of standardized guidelines published by the FAO. The guidelines outline general (and voluntary) principles that should govern eco-labeling schemes and minimum requirements a fishery should meet to be awarded an eco-label [46]. The development made in the realm of seafood labeling over such a short time span may indeed confirm notable progress toward sustainable fishing practices (as Robinson [47] proposes labeling, standards and certification has done for sustainable development as a whole) though the question arises of whether this progress occurs swiftly enough.

Successes are also evident in some other seafood awareness campaigns. Tilapia (or fish labeled as such) is one of the most promoted eco-friendly fish and has moved up from to 9th most consumed fish in America in 2003 to 6th in 2004 [48]. However, it is possible the change in preference was price or health driven (due to tilapia's low mercury content).

Some localized campaigns, such as SeaWeb's 'Give Swordfish a Break' campaign, which encouraged restaurant owners to omit swordfish from their menus beginning in 1998, have seen a rebounding of the population. But the success might be attributable to the second goal of the campaign to close nursery areas in the US to fishing, which was achieved in 2000. There is also speculation that consumer concern over mercury levels reduced demand for swordfish.

Also, some NGOs focusing on seafood problems are, in their efforts, discovering the loopholes that prevent the efficacy of their programs and are then lobbying governments for legislative change. For instance, the National Environmental Trust (NET) [27] launched the 'Take a Pass on Chilean Sea Bass' campaign and, while conducting research, found that illegally caught Patagonian toothfish (their real name) would arrive at ports and, before the paperwork could be cleared by officials, the toothfish would make it to market. Therefore, consumers would not

know whether their fish is legally or illegally caught. NET successfully lobbied the US government to require that toothfish imports be pre-approved by the National Marine Fisheries Service before being landed [49].

In addition, consumer awareness campaigns have distributed a large amount of information and, presumably, this is raising awareness and the profile of fish in society. The Monterey Bay Aquarium's study finds that seafood wallet cards do increase awareness [35] and a new ethical concern for the oceans is undeniably important. Many fishing nations are democracies, run by elected governments. Thus, citizens should be capable of reversing the trend of overfishing and consumer awareness campaigns may play a role in their decision-making.

5. Rethinking seafood and fisheries management

Despite the recent publicity of consumer awareness campaigns and the danger of mercury in seafood, US citizens consumed a pound more seafood per capita in 2004 than they did in 2002 (an increase from 7.1 to 7.5 kg; [48]). If the goal is to reduce pressure on wild stocks of fish, then perhaps consumer-oriented conservation strategies need to be reconsidered.

NGO donors may legitimately require measures and reports of campaign effectiveness. In their paper on fisheries eco-labeling, Gardiner and Viswanathan [21] cite criteria against which to judge different certification schemes. However, they do not mention criteria against which to judge the effectiveness of those certifications on the health of fish stocks. The majority of studies on seafood awareness campaign efficacy are of the *ex ante* variety about indications of willingness to pay or to use a label. Yet, *ex post* studies of seafood awareness campaigns' impacts on the seafood market are virtually nonexistent (except for some aspects in [35]). Without evidence of seafood awareness campaigns' efficacy, former recommendations to intensify eco-labeling and other market-based efforts to move the fishing industry toward sustainability should be reconsidered.

The proliferation of labels does not necessarily ensure that conservation goals will be met. Organic food labeling is widespread in grocery stores across North America and is considered the most successful eco-labeling program. The California Certified Organic Farmers' eco-label, the predecessor to the 2002 USDA organic food label, has existed since 1973. Yet, from 1991 to 1998, California increased pesticide use by 40% [50].

Considering the limitations of social marketing of seafood and the limited funding available, NGOs should reflect on the impacts of their programs. In the case of consumer awareness campaigns, they may consider shifting their conservation focus to other avenues. In analogy to the 'slow food' movement [51], Chuenpagdee and Pauly [52] suggest that NGOs try initiating a 'slow fish' movement, which would emphasize the need to slow the rate of fishing, reduce fishing capacity, and support small-scale over

industrial fishers. NGOs could encourage fisheries to join such campaigns on the premise that quality can be a more important and profitable attribute than quantity [53]. Perhaps NGOs should even consider a ‘no fish’ campaign that encourages boycotting fish altogether and distribute bumper stickers reading, ‘Save the Oceans! Eat a Chicken.’

Today there exists a tendency for environmental policy initiatives to be set outside the government sector, likely because the multinational companies affected by regulation are prominent and influential. Buttel [54] notes a trend in ‘NGOization,’ whereby NGOs have gained influence previously achievable only by governments; this phenomenon is partly explained by the loss of legitimacy by nation states and international institutions.

But the current faith in the magic of free-market mechanisms must be questioned; we will have to manage fisheries with our heads, not our stomachs. Consumers should not be misled that a system of management or conservation based on purchasing power alone will adequately address the present dilemma facing fisheries globally.

Fisheries are the last major world industry exploiting wild natural resources for food, yet we do not think of the industry in such terms. Consider the US National *Fish and Wildlife* Service, a name that implies fish are perceived and managed as something other than wildlife. NGOs can help people realize that fish are wildlife, and not only food. NGOs can also launch environmental education campaigns to alter the view of seas open to fishing with small exceptions (i.e., marine protected areas) to the reverse view, that the seas should be closed to fishing, with small exceptions [55]. Through these or other means, NGOs can encourage the public to rally behind the point of serious fisheries management.

Though fisheries regulations may need overhauling [56], they are needed, nonetheless. A citizen’s strongest influence is ultimately his/her engagement in the democratic process and the election of governments committed to fisheries management through curtailing overcapacity, abolishing flags of convenience, strengthening regulations, and ensuring traceability.

When whales were on the brink of extinction, the primary avenue of protection was not a campaign in opposition to using whale oil or against eating whales. Whaling ceased after the emergence and wide public acceptance of a ‘whale mythology’, which de-commodified them [57]. The moratorium on whaling, ratified by the International Whaling Commission (IWC), was a direct result of the revulsion toward whaling felt through most of the Western world. It is only when a similar revulsion is felt by the public about the wholesale destruction of fish populations and marine ecosystems that we can hope to save them from our management and our appetite.

Acknowledgments

The authors are grateful to Mark Stevens of the National Environmental Trust, John Robinson of the

University of British Columbia, and Michael Hirshfield of Oceana for their helpful comments. Thank you also to Jackie Alder of the University of British Columbia and to Jason Boyce of the Vancouver Aquarium for providing several useful references and to Rupert Howes, Chief Executive of the Marine Stewardship Council, for his enthusiasm and discussion.

References

- [1] Cushing DH. *The Provident Sea*. Cambridge: Cambridge University Press; 1988.
- [2] Pauly D, Maclean J. *In a perfect ocean: the state of fisheries and ecosystems in the North Atlantic Ocean*. Washington, DC: Island Press; 2003.
- [3] Pauly D. Anecdotes and the shifting baseline syndrome. *Trends in Ecology and Evolution* 1995;10:430.
- [4] Associated Press. Giant tuna sells for record \$173,600, 2001. Retrieved 24 October 2005, from <www.flmnh.ufl.edu/fish/inNews/GiantTuna.htm>.
- [5] Magnusson J, Safina C, Sissenwine M. Whose fish are they anyway? *Science* 2001;293:1267–8.
- [6] Kurlansky M. *Cod: a biography of the fish that changed the world*. Toronto: Alfred A. Knopf; 1997.
- [7] Myers RA, Worm B. Rapid worldwide depletion of predatory fish communities. *Nature* 2003;423:6937.
- [8] Watling L, Norse EA. Disturbance of the seabed by mobile fishing gear: a comparison to clearcutting. *Conservation Biology* 1998;12:1180–98.
- [9] FAO. *The state of world fisheries and aquaculture*. Rome: FAO Fisheries Department; 2004.
- [10] Pauly D, Christensen V, Dalsgaard J, Froese R, Torres Jr F. Fishing down marine food webs. *Science* 1998;279:860–3.
- [11] Delgado CL, Wada N, Rosegrant MW, Meijer S, Ahmed M. *Outlook for Fish to 2020: Meeting Global Demand*. Washington DC: International Food Policy Research Institute & The WorldFish Center; 2003.
- [12] Pitcher T, Pauly D. Rebuilding ecosystems, not sustainability, as the proper goal of fishery management. In: Pitcher T, Hart P, Pauly D, editors. *Reinventing fisheries management*. Dordrecht: Kluwer Academic Publishers; 1998. p. 311–29.
- [13] Edwards J, Naidoo R, Poole S. Making the best of the pets that clog the nets. SPC Women-in-Fisheries Information Bulletin #8, 2000. Retrieved 25 October 2005, from <<http://www.spc.int/coastfish/News/WIF/WIF8/WIF8-16-Region.htm>>.
- [14] Kotler P, Zaltman G. Social marketing: an approach to planned social change. *Journal of Marketing* 1971;35:3–12.
- [15] Constance DH, Bonanno A. Regulating the global fisheries: the World Wildlife Fund, Unilever, and the Marine Stewardship Council. *Agriculture and Human Values* 1999;17:125–39.
- [16] Phillips B, Ward T, Chaffee C. *Eco-labelling in fisheries: what is it all about?* Oxford: Blackwell Publishing; 2003.
- [17] Sumaila R, Pitcher T, Pauly, D. On eco-labeling, the MSC and us. *FishBytes* 2005; 11(6). Accessible online at: <<http://www.fisheries.ubc.ca/publications/fishbytes/>>.
- [18] Kaiser MJ, Edward-Jones G. The role of ecolabeling in fisheries management and conservation. *Conservation Biology* 2006;20(2):393–8.
- [19] Froese R. Keep it simple: three indicators to deal with overfishing. *Fish and Fisheries* 2004;5(1):86.
- [20] FAO products. *Fish and fishery products: world apparent consumption statistics based on food balance sheets*. FAO Fisheries Circular No. 821. Rome: FAO; 1999.
- [21] Gardiner PR, Viswanathan KK. Ecolabelling and fisheries management. *WorldFish Center Studies and Reviews* 2004;27(44).

- [22] Teisl MF, Roe B, Levy AS. Eco-certification: why it may not be a “field of dreams”. *American Journal of Agricultural Economics* 1999;81(5):1066–71.
- [23] Wessells CR, Johnston RJ, Donath H. Assessing consumer preferences for ecolabeled seafood: the influence of species, certifier, and household attributes. *American Journal of Agricultural Economics* 1999;81(5):1084–9.
- [24] Martinez-Ortiz J. White fish handbook of Ecuador: 45 species of commercial interest. Quito: Asoexpebla; 2005.
- [25] Bostock T, Herdson D. La pesca y utilizacion del tiburón en el Ecuador. Guayaquil: Instituto Nacional de Pesca. Boletín Científico y Técnico 1985;8(10):21–8.
- [26] Marko PB, Lee SC, Rice AM, Gramling JM, Fitzhenry TM, McAlister JS, et al. Fisheries: mislabelling of a depleted reef fish. *Nature* 2004;430:309–10.
- [27] National Environmental Trust (NET). Black market for white gold: the illegal trade in Chilean sea bass, 2004. Retrieved 10 October 2005 from <http://www.net.org/reports/csb_report.pdf>.
- [28] Miller P. Investigation of the shrimp industry in Thailand for the Swedish market. Final report for the Swedish Society for Nature Conservation, 1999. Retrieved 19 October 2005 from <<http://hagforsbygden.krets.snf.se/pdf/rap-jatterakor-thailand.pdf>>.
- [29] Gianni M, Simpson W. Changing nature of high seas fishing: how flags of convenience provide cover for illegal, unreported, and unregulated fishing. A report for the Australian Department of Agriculture, Fisheries, and Forestry, International Transport Workers’ Federation, and WWF International, 2005. Retrieved 31 October 2005 from <http://www.daff.gov.au/corporate_docs/publications/pdf/fisheries/iuu_flags_of_convenience.pdf>.
- [30] Greenberg P. The catch. New York: New York Times Magazine; 23 October 2005.
- [31] Pitcher T. Selling the code of conduct? *FishBytes*, 2003; 9(4). Accessible online at: <<http://www.fisheries.ubc.ca/publications/fishbytes/>>.
- [32] Kangun N, Carlson L, Grove SJ. Environmental advertising claims: a preliminary investigation. *Journal of Public Policy and Marketing* 1991;10(2):47–59.
- [33] Knecht B. Hooked: pirates, poaching, and the perfect fish. New York: Rodale Books; 2006.
- [34] Pauly D, Alder J, Bennett E, Christensen V, Tyedmers P, Watson R. The future for fisheries. *Science* 2003;302:1359–61.
- [35] Seafood Watch Evaluation: Summary Report. Saltspring Island: Quadra Planning Consultants Ltd. & Galiano Institute for Environmental and Social Research, 30 June 2004.
- [36] Sproul JT. Green fisheries: certification as a management tool. In: Pitcher T, Hart P, Pauly D, editors. *Reinventing fisheries management*. Dordrecht: Kluwer Academic Publishers; 1998. p. 137–47.
- [37] Marine Stewardship Council (MSC). Annual report, 2004. Retrieved 21 October 2005 online from <http://www.msc.org/html/content_460.htm>.
- [38] Marine Stewardship Council (MSC). Annual report, 2005. Retrieved 22 July 2006 online from <http://www.msc.org/html/content_460.htm>.
- [39] Rogers P, Gould R, McCallum B. What certification has meant to the department of fisheries and the industry. In: Phillips W, Chaffee, editors. *Eco-labelling in fisheries: what is it all about?* Oxford: Blackwell Science Limited; 2003.
- [40] Sutton M. An unsatisfactory encounter with the MSC—a conservation perspective. In: Phillips W, Chaffee, editors. *Eco-labelling in fisheries: what is it all about?* Oxford: Blackwell Science Limited; 2003.
- [41] Kelleher K. Discards in the world’s marine fisheries: an update. FAO fisheries technical paper no.470, Rome, 2005. 131p.
- [42] Pikitch EK, Santora C, Babcock EA, Bakun A, Bonfil R, Conover DO, et al. Ecosystem-based fishery management. *Science* 2004;305:346–7.
- [43] Unilever. Unilever environmental and social report, 2005. Retrieved 21 July 2006 online from <http://www.unilever.com/ourvalues/environmentandsociety/env_social_report/default.asp>.
- [44] Howes R. Five years on—an update on the Marine Stewardship Council. *FishBytes* 2005;11(6). Accessible online at: <<http://www.fisheries.ubc.ca/publications/fishbytes/>>.
- [45] Wal-Mart. Wal-Mart takes lead on supporting sustainable fisheries, 2006. Retrieved 20 April 2006 from <<http://www.walmartfacts.com/articles/1737.aspx>>.
- [46] FAO. Guidelines for the ecolabelling of fish and fisheries products from marine capture fisheries. Rome: FAO; 2005. Retrieved 6 July 2006, from <<ftp://ftp.fao.org/docrep/fao/008/a0116t/a0116t00.pdf>>.
- [47] Robinson J. Squaring the circle? Some thoughts on the idea of sustainable development. *Ecological Economics* 2004;48:369–84.
- [48] Cox R. Seafood consumption up to 16.6 pounds per capita, 2005. Fisheries Information Service. Retrieved 15 November 2005 from <<http://www.fis.com>>.
- [49] National Oceanic and Atmospheric Administration (NOAA). New rules enhance US ability to monitor Chilean sea bass imports, 2006. Retrieved 18 July 2006 from <http://www.nmfs.noaa.gov/press_releases/CSB.pdf>.
- [50] Kegley S, Orme S, Neumeister L. Hooked on poison: Pesticide use in California, 1991–1998, 2000. Retrieved 1 July 2006 from <<http://www.panna.org/resources/documents/hookedAvail.dv.html>>.
- [51] Petrini C. Slow food: the case for taste. New York: Columbia University Press; 2003.
- [52] Chuenpagdee R, Pauly D. Slow fish: creating new metaphors for sustainability. In *overcoming factors of unsustainability in fisheries: selected papers on issues and approaches*. In: FAO fisheries report no. 782, International workshop on the implementation of the international fisheries instruments and factors of unsustainability and overexploitation in fisheries, Rome: FAO; 2005. p. 69–82.
- [53] Martinez-Garmendia J, Anderson J. Conservation, markets, and fisheries policy: the North Atlantic bluefin tuna and the Japanese sashimi market. *Agribusiness* 2005;21(1):17–36.
- [54] Buttel FH. Environmentalization: origins, processes, and implications for rural social change. *Rural Sociology* 1992;57(1):1–27.
- [55] Walters C. Designing fisheries management systems that do not depend on accurate stock assessments. In: Pitcher T, Hart P, Pauly D, editors. *Reinventing fisheries management*. Dordrecht: Kluwer Academic Publishers; 1998. p. 278–88.
- [56] Pitcher T, Hart P, Pauly D. *Reinventing fisheries management*. Dordrecht: Kluwer Academic Publishers; 1998.
- [57] Pauly D. On reason, mythologies, and natural resources. In: Pauly D, editor. *On the sex of fish and the gender of scientists*. London: Chapman & Hall; 1994. p. 118–22.