

Inter-Sectoral Conflict and Recreational Fisheries of the Developing World: Opportunities and Challenges for Co-Operation

— Shannon D. Bower^{1*}, Vivian M. Nguyen^{1*}, Andy J. Danylchuk², T. Douglas Beard Jr.³, and Steven J. Cooke¹

¹Fish Ecology and Conservation Physiology Laboratory, Department of Biology, Carleton University, 1125 Colonel By Dr., Ottawa, ON K1S 5B6, Canada

²Department of Environmental Conservation, University of Massachusetts Amherst, 160 Holdsworth Way, Amherst, MA, 01003-9285, USA

³United States Geological Survey, National Climate Change and Wildlife Science Centre, 12201 Sunrise Valley, VA, 20192, USA

* Lead author(s), Contact: Shannon.Bower@carleton.ca

ABSTRACT

The recreational fishing sector is growing rapidly in the developing world with the potential to realize economic benefits estimated at tens of billions of dollars annually. These opportunities are accompanied by numerous ecological risks such as overfishing and habitat disturbance. To date, there has been little focus on sociological issues surrounding the growth of recreational fisheries in these areas. This chapter examines sources of potential conflict among small-scale fishing sectors in the developing world with particular attention paid to identification of key issues constraining stewardship of recreational fisheries. We identified conflicts related to fisher competition for access to resources, socio-demographic change, cultural differences, and governance as areas of concern among small-scale fisheries, and offer examples of successful and failed attempts to reduce, mitigate or solve these conflicts. The reality of limited resource availability will require that communication, proactive management strategies and cooperation be encouraged among sectors to maximize resiliency of the social-ecological system and to promote sustainability of fishing practices. We recommend stewardship initiatives that include avenues for stakeholder participation and establishing adaptive management strategies, particularly for emerging recreational fisheries in the developing world.

Key words: Small-scale fisheries, recreational fisheries, social conflict, angler education, governance, fisheries management, conflict resolution, stewardship, fisheries development

INTRODUCTION

The UN FAO's 'Technical Guidelines for Responsible Recreational Fisheries' refers to recreational fisheries as "activities in which the fisher targets aquatic animals that do not make up the user's dominant source of protein and is not generally sold or traded at market" [1]. This definition separates the recreational sector from small-scale subsistence and commercial enterprises. Recreational fisheries represent the dominant use of fish stocks in inland water of industrialized nations and are growing swiftly in developing nations around the globe [2, 3]. Numerous examples of this growth are found in marine recreational fisheries, such as those targeting bonefish (*Albula vulpes*) and giant trevally (*Caranx ignobilis*) in tropical waters, and in inland systems such as the tigerfish (*Hydrocyrus vittatus*) fisheries of the Zambezi watershed (see [4]). Although under-reported and understudied at a

global scale [1], estimates based on known catch data suggest that recreational fisheries could account for as many as 47 billion fish caught and harvested or released each year [5]. Further to this, recreational fisheries contribute approximately US\$190 billion to the global economy [6], and have participation rates ranging from 220 million [6] to 700 million people worldwide [5].

In the developing world, recreational fisheries have been explored as an alternative livelihood strategy through ecotourism to generate revenue for local communities (e.g., island nations in the Pacific; [7]). It has also been explored as a conservation initiative and economic incentive to protect fish species and habitat in developing countries by earning potential revenue from non-destructive activities such as catch-and-release angling tourism (e.g., taimen (*Hucho taimen*) fishery in Mongolia, mahseer (*Tor* spp.) fishery in India, [8]). The growth of the recreational fishing sector in the developing world, however, will not occur without potential for negative consequences. Overfishing, population- and ecosystem-level impacts via directional selection, stocking, habitat loss and introduction of invasive species have all been identified as potential drivers of ecological change as a result of recreational fishing practices [9, 1], while social conflict within and among sectors has been documented in numerous studies as having a negative impact on the fishery social-ecological system (e.g., [10]).

Small-scale subsistence and commercial fisheries operating in the developing world are often highly marginalized and face numerous challenges related to governance and fish allocation rights [11]. Consequently, the growth of the recreational fishery sector in these regions may act as an alternative livelihood strategy yet may also result in heightened social conflict when management is lacking, especially when larger numbers of individuals (including fishers from afar) compete for access to the resource. Since communities in the developing world exhibit decreased resilience to economic and ecological shocks [12], the ramifications of social conflict resulting from such circumstances may be severe.

Understanding potential conflicts that arise from a growing recreational fishing industry in the developing world and exploring associated strategies to alleviate such conflicts is necessary for institutions to effectively prevent and/or deal with conflict, and for ensuring long-term stewardship and sustainability of their natural resources.

In this chapter, we discuss, in two parts, social conflicts associated with recreational fisheries in the developing world as a barrier to resource stewardship and long-term sustainability of the fisheries. In the first section, we explore conflict among small-scale recreational, commercial (including artisanal), and subsistence fisheries to identify key issues that may constrain both stewardship of aquatic resources and the sustainable growth of the recreational sector in the developing world. In the second section, we evaluate examples of successful and failed attempts to address these key issues and consider the roles of various top-down and bottom-up management strategies as support mechanisms for fostering stewardship.

SECTION I: KEY SOURCES OF INTER-SECTORAL CONFLICT IN RECREATIONAL FISHERIES

Conflict emerges when ‘the interests of two or more parties clash and at least one of the parties seeks to assert its interests at the expense of another party’s interests’ [13]. To date,

very little research and information exists that addresses potential social/fisheries conflict associated with existing and emerging recreational fisheries in developing countries. In this section, we identify and discuss potential causes and sources of conflict from a recreational fisheries perspective by drawing parallels from conflicts that have occurred among other fishing sectors. However, we grouped the sources of conflict because they share underlying circumstances and are closely linked; hence some unavoidable overlap between sections.

Competition and Access to Resources

Competition for a common and limited resource is inevitable, particularly with the demands of a rapidly growing human population. This 'common resource property' problem leads to challenges for sustainable development and resource stewardship as it creates conflict among user groups via disputes over resource and spatial access. In the developing world where millions depend on fisheries for nutrition, food security, and livelihoods [12], the potential ramifications of such conflicts are great.

Conflicts between industrialized and small-scale fisheries are common in developing countries, especially with users of different fishing technologies [14]. Fishers using passive gears (e.g., long-line and trap nets) often get caught and tangled with more active gear (e.g., trawls and purse seine nets) leading to conflict [10]. Similar gear differences between recreational fisheries and other sectors have been reported, such as fish hooks being caught in drift nets when both parties fish in the same space (i.e., spatial competition). In this circumstance, recreational fishers in developing countries may be viewed by traditional subsistence and commercial fishers as another competitor in the fight over a 'common property'. As reported in other areas when conflict among recreational fishers emerge from crowding and increased interaction of user groups [15], recreational fishers are also able to access remote fishing areas that may be traditionally fished by subsistence/artisanal fishers; thus becoming new competitors in inland waters. Socio-demographic differences such as wealth inequality among participants may serve to influence the capacity of fishers to access and exploit resources (for e.g., by purchasing gear allowing for effective harvest), which may heighten conflict related to competition.

Socio-Demographic Change and Cultural Differences

Globally, the number of fishers in coastal areas has doubled in two decades (from 12.5 million fishers in 1970 to 29 million in 1990), growing faster than the world's population [16]. In many communities, this increased immigration to coastal areas may strain resources, exacerbating existing cultural, ethnic and religious differences. In the developing world, such socio-demographic conflict may be further polarized by issues surrounding the distribution of wealth. For example, wealthier individuals may fish recreationally, while poorer individuals continue to pursue subsistence and/or commercial activities. Immigration of wealthier residents or foreigners to coastal communities could lead to income-based stratification and increased competition for common resources. Immigration of new resource users also often undermines the effectiveness of informal understandings about established users about resource allocation, and temporary users (e.g., tourist fisher) may have little interest in the long-term sustainability of the resource [17]. For example, in Bangladesh and Turks and Caicos, there was a high degree of blame placed on other ethnic or religious groups for gaining resource access at the local fishers' expense, and these groups were further blamed for a rise in conflicts and decline in fish stocks [18]. As such, potential for conflict exists when the socio-demography of a community changes (due to economic growth, birth rates,

immigration, societal trends), when there is an influx of 'newcomers', and when there is a stratification in cultures and ideologies [17].

Tourism-based recreational fisheries may introduce foreign culture and differences into a community, which could result in conflict with resident subsistence fishers. The sources of this conflict may be multi-faceted, such as economic competition arising when fishers compete for jobs in the growing recreational fishing sector, or cultural conflict arising from disparate views on management strategies aimed at promoting conservation. For example, voluntary catch-and-release (i.e. live release of fish to the water after capture) could potentially cause conflict or animosity due to different views about this concept. Locals may view it as unethical and as "playing with fish for no good reason" [19]; a debate that is prevalent in Germany among recreational anglers and other groups (e.g. animal rights groups, general public). Thus, cultural and ideological differences can exacerbate conflict associated with recreational fisheries in developing countries.

Governance

Fisheries governance is a framework of institutions, rules and practices that set limits and provide incentives for the behaviour of individuals and organizations [20]. As such, governance has a strong influence over the emergence of conflicts as well as resolutions or exacerbations of conflicts (e.g., institutional capacity to deal with change, governance structures and priorities). Conflicts related to governance often centre on the use of different management approaches for different sectors, and mismatches in harvest rights, management responsibilities and objectives [21]. For instance, recreational fishers in most developed countries are not required to contribute to sustainable fisheries management (e.g., catch reporting, cost recovery, monitoring) to the same extent as the commercial sector, but do not receive the same harvest benefits either. Management inefficiencies and the imbalanced decisions when weighting economic, biological and social values and dimensions of aquatic resources may lead to conflict associated with resource access and competition (as indicated above). With recreational fishing as tourism, residents may also view losing allocations to non-residents as unfair and conflict may arise [1].

Fisheries management decisions are also often criticized as being political rather than based on long-term sustainability of the resource [22]. Developmental pressures such as changes in policy focus from livelihood protection to economic growth and gain may potentially lead to politicization of fisheries [23]. The recreational angling tourism industry in developing countries can push for change in market demands, economic and social forces associated with industrialization, and increase in alternative employment opportunities. The growth of the recreational fishing industry may ultimately displace resident subsistence and commercial fishers if governments favour decisions that promote the tourism fishery by allocating exclusive access rights to fishing areas, supporting and subsidizing costs, or allocating unequal harvest quotas. Recreational fishers are also often viewed as 'stewardship leaders' with a strong political voice. For this reason, they may exert a strong influence over decision makers. In Brazil, catch-and-release angling has been widely adopted and the rationale that 'a fish released is a fish alive' has led to the proposal of closure of some areas to commercial fishing with exclusive access for recreational fishers, which has led to severe conflicts [24].

Perceptions

A common theme that emerges from the aforementioned categories is that of perception. Often, conflicts between groups emerge when one group *perceives* another group as gaining at their expense [18] leading to competitive feelings and animosity. Furthermore, there exist pre-established beliefs surrounding the negative impacts of commercial fishing (i.e., overfishing caused by over efficient technologies) as opposed to considering the impacts of other influential factors external to the fishery (e.g., pollution via development, agriculture). Similarly, there may be pre-established beliefs surrounding recreational fishing (i.e., only tourists and wealthy people participate), which may contribute to the alienation of recreational fishers and serve to foster disagreement.

Additionally, conflict among stakeholder groups may be a matter of *perceived conflict* rather than *actual conflict*. Maynou et al. [25] documented that small-scale fishery participants reported high perception of conflict with recreational fishers and perceived them as competitors, while recreational fishers did not report conflict with small-scale fishers. Perceived conflict that spreads among user groups can engender actual conflict, and negative perceptions of fisheries governance can also lead to lack of cooperation and increased conflict. Thus, it is important to reconcile any pre-established beliefs and perceptions of fisheries resource users.

SECTION II: KEY COMPONENTS OF RECREATIONAL FISHERIES CONFLICT RESOLUTION

The successful mitigation or resolution of social conflict will be a key component of aquatic stewardship in developing recreational fisheries. Successful conflict resolution can cultivate stronger relationships and increase voluntary adherence to the rules and regulations surrounding resource use and extraction [26]. Like the sources of conflict themselves, attributes of potential solutions are wide-ranging, inter-connected, and their success will vary according to the dynamics of the individual fishery socio-ecological system and circumstances surrounding the conflict. In this section, we examine the implementation of successful and unsuccessful conflict resolution strategies among fishing sectors according to three areas: communication, empowerment and management, though it will be seen that successful solutions include aspects of all three categories and can be applied to all aforementioned sources of conflict. We define ‘successful resolution’ here as those circumstances in which the devised solutions result in both a decreased level of conflict and the on-going sustainability of local fish populations.

Communication

Adequate communication among stakeholders has been identified as a key component of successful conflict resolution in fisheries systems [27]; however, the nature and timing of communication strategies are essential to their success and include components such as consultation, education and research.

Consultation

The need for consultation is particularly relevant to conflicts involving growing recreational fisheries in the developing world, where perceived socio-demographic and cultural differences can lead to aggravated competition and access conflicts. The development of balanced stakeholder networks and consultation prior to, during, and after resolution actions

can assist to identify key areas of concern related to possible conflict solutions, encourage communication among sectors throughout the conflict, and serve as a channel for guiding adaptation in the future. In New South Wales, Australia, conflict between recreational and commercial fishers occurred as a result of perceived decline in stocks and led to a ban on commercial fishing in a target area in spite of research indicating no decline had occurred [27]. Consultations that favoured one party over another and occurred irregularly throughout the resolution process resulted in confusion and dissatisfaction among fishers. Conversely, when competition and access conflicts arose among subsistence, commercial and agricultural users of inland waters of Bangladesh, a communication framework was established to ensure that key stakeholders were consulted throughout the resolution process which resulted in a significant decrease in the number of conflicts in the target areas and an improvement in fisher attitudes regarding the outcomes [28]. Adequate consultation and stakeholder engagement may also play a key role in addressing access, governance and perception-based conflicts stemming from issues of equity [29].

Education and Research

Once consultation has identified the source(s) of conflict, education and research may be used as tools to bring fishers and other stakeholders to a collective understanding and serve as a focal point for resolving cultural and perception differences related to fishing practices. For example, in the rockfish (*Sebastes* spp.) fisheries of British Columbia, Canada, recreational fishers blamed commercial fishers for decreasing stocks and believed that their own methods did not contribute to the decline. Research indicated, however, that the practice of catch-and-release used in the recreational fishery resulted in a high level of barotrauma-related mortality in key habitat zones. As a result of this education, recreational fishers ceased blaming commercial fishers for the stock decline and formed a coalition to address the problem by altering their own practices. This adaptation, along with the voluntary protection of key habitat zones by both sectors, has served to contribute to the recovery of the target species [30].

An alternate outcome can be seen in the recreational mahseer (*Tor* spp.) fishery of the Cauvery River, India. After noting a decline in mahseer abundance in the 1970's several angling groups that advocated for conservation of the threatened genus began working to encourage catch-and-release practices, decrease poaching and support employment alternatives that would enable a sustainable fishery in the area. A partial closure of the fishery in 2009 led to subsequent access conflict between local angling groups and government officials, in spite of preliminary research indicating that these user-driven initiatives had resulted in increased community involvement and increases in catch rate. This decision continues to impede efforts for continued conservation of mahseer and greatly reduces the income generated by the fishery on a regional basis [31].

Empowerment

Small-scale commercial and subsistence fishery activities are often undervalued economically and socially [11], leading to a perceived lack of empowerment when negotiating conflict resolutions between sectors, and increasing fears of fishing restrictions or closures. Strategies for empowerment should therefore include communication regarding the alignment of conflicting and mismatched objectives of different sectors [32], and encouraging consideration of factors such as well-being, equity and social contribution when conducting economic evaluations of the sectors [33]. The community-based coastal

resource management programs (CCBRMs) instituted in the Philippines, for example, have been described as a system that facilitates empowerment through the use of co-management regimes. In this process, local resource users were encouraged to influence, participate in and control management decisions, including the establishment of marine protected areas. Participants reported increased empowerment, reduced conflict (a result of increased immigration to coastal regions from farming communities) and minimal impacts on fish abundance [34]. It should be noted that the success of this resolution process is based on fisher perceptions, including those related to environmental impacts; therefore, research regarding abundance, distribution and catch are necessary to support these perspectives, and empowerment-based solutions must take into account the ecological limitations of the fishery system. Facilitating compromise between sectors to promote empowerment at the expense of maintaining sustainable fish populations will likely result in heightened competition and conflict in the future.

Management

Conflict management regimes themselves can potentially cultivate conflict if mechanisms are not implemented successfully [17], yet aspects of 'bottom-up' and 'top-down' management systems are essential for supporting successful outcomes of conflict resolution in fisheries. Many researchers suggest that 'bottom-up' strategies such as co-management and traditional resource management better support local fishing communities. The 'bottom-up' strategy supports sustainable local resource management by fostering social capital and improving compliance with accepted rules and regulations, regardless of their incorporation into law [26]. In addition, this type of regime allows for management at fine scales, as it is argued that broader arrangements are unable to adequately address local issues [35]. Others note that while these strategies may serve for local communities, some 'top-down' management in the form of legislation and enforcement is required to clearly identify access rights and prevent poaching, such as in marine protected areas [18]. 'Top-down' legislation that includes stakeholder consultation may also be better-suited to addressing conflict arising from unequal political influence and a lack of delineation among sectors (e.g., establishing distinctions between subsistence and recreational fisheries). Both structures benefit from incorporating adaptive management responses into the conflict resolution process to address the dynamic and ongoing nature of conflict situations [36].

The growth of recreational fisheries in many areas of the developing world may support the need for 'top-down' management in the form of legislation and enforcement. Recreational fisheries research outcomes have supported the use of enforceable management strategies such as seasonal, size, slot and bag limits, licensing and/or the promotion of catch-and-release practices in order to reduce the likelihood of over-fishing. There exist a number of cooperative cases between government, managers and fishers of all sectors which highlight potential benefits of 'top-down' partnerships, such as the successful establishment of a replacement recreational fishery targeting native species instead of invasive species in the Orange Vaal River, South Africa [30]. The inability of the localized co-management system in San Salvador, Philippines to solve conflicts that extended beyond the fishery community is an additional example that further supports the suitability of 'top-down' management strategies in similar circumstances [37]. However, rules, regulations and local enforcement may also be implemented successfully as a 'bottom-up' strategy, such as in the taimen (*Hucho taimen*) recreational fishery of northern Mongolia, where little official enforcement is needed as a result of voluntary public involvement and investment in the success and

sustainability of the fishery (for a description of the fishery, see [38]). The adoption of 'bottom-up' strategies may also relieve conflict related to wealth distribution and political influence. As discussed earlier, recreational fishers are often perceived as having different socio-economic status and greater lobbying power [17], attributes that can exacerbate conflict when considered alongside the belief that government actions in response to conflict situations are often motivated by politics rather than legitimate need (for example related to commercial/recreational sector conflicts, see [27]; for value of social capital, see [26]). Regardless of the management strategies implemented, successful conflict resolution will rely heavily on the adoption of mechanisms appropriate to the conflict and locality, and on the appropriate use of communication and empowerment strategies to identify and explore them.

CONCLUSION

The growth of recreational fisheries in the developing world will likely lead to increased conflict related to competition, access, socio-demographic differences, and issues of governance. While a unilaterally successful resolution to any conflict situation is likely to be rare, there exist a wealth of tools at our disposal that can facilitate positive outcomes through effective communication, empowerment and proper institution of management strategies. These processes can bring about better understanding, communication and co-operation among sectors, which we believe will advance collective stewardship of local aquatic resources.

REFERENCES

1. FAO (Food and Agriculture Organization). 2012. Recreational fisheries, technical guidelines for responsible fisheries. No. 13. Rome: FAO 176.
2. Arlinghaus, R., T. Mehner, and I. Cowx. 2002. Reconciling traditional inland fisheries management and sustainability in industrialized countries, with emphasis on Europe. *Fish and Fisheries* 3 (4): 261-316.
3. Cowx, I.G. 2002. Recreational fisheries In Handbook of Fish Biology and Fisheries, Vol. II, ed. P.B.J Hart and J.D. Reynolds, 367-390. Oxford: Blackwell Science.
4. Naesje, T.F., C.J. Hay, S. Kapirika, O.T. Sandlund, and E.B. Thorstad. 2001. Some ecological and socio-economic impacts of an angling competition in the Zambezi River, Namibia. NINA-NIKU Project Report 14:1-31.
5. Cooke, S.J. and I.G. Cowx. 2004. The role of recreational fishing in the global fish crisis. *BioScience* 54 (9): 857-859.
6. World Bank. 2012. Hidden harvest: The global contribution of capture fisheries. Report # 66469-GLB. Washington, D.C.: World Bank, 2012, 69.
7. Wood, A.L., J.R.A. Butler, M. Sheaves, and J. Wani. 2013. Sport fisheries: Opportunities and challenges for diversifying coastal livelihoods in the Pacific. *Marine Policy* 42:305-314.
8. Cooke, S.J., Z.S. Hogan, P.A. Butcher, M.J.W. Stokesbury, R. Raghavan, A.J. Gallagher, N. Hammerschlag, and A.J. Danylchuk. 2014. Angling for endangered species: Conservation problem or conservation action? *Fish and Fisheries* (2014): 1-17.
9. Post, J.R., M. Sullivan, S. Cox, N.P. Lester, C.J. Walters, E.A. Parkinson, A.J. Paul, L. Jackson, and B.J. Shuter. 2002. Canada's recreational fisheries: The invisible collapse. *Fisheries* 27(1): 6-17.
10. Pomeroy, R., J. Parks, R. Pollnac, T. Campson, E. Genio, C. Marlessy, E. Holle, M. Pido, A. Nissapa, S. Boromthanarat, and N.T. Hue. 2007. Fish wars: Conflict and collaboration in fisheries management in Southeast Asia. *Marine Policy* 31:645-656.

11. Chuenpagdee, R. 2011. Thinking big on small-scale Fisheries. In *Ecosystem Approach to Fisheries: A Global Perspective*, ed. V. Christensen and J. Maclean, 226-240. Cambridge: Cambridge Univ. Press.
12. FAO (Food and Agriculture Organization). 2010. State of the world fisheries and aquaculture, 197. Rome: FAO.
13. Scialabba, N. 1998. Integrated coastal area management and agriculture, forestry and fisheries. In *FAO Guidelines, Environment and Natural Resources Services*, 256. Rome: FAO.
14. Charles, A. T. 1992. Fishery conflicts: A unified framework. *Marine Policy* 16 (5): 379-393.
15. Arlinghaus, R. 2005. A conceptual framework to identify and understand conflicts in recreational fisheries systems, with implications for sustainable management. *Aquatic Resources, Culture and Development* 1:145-174.
16. Tietze, U., G. Groenewold, and A. Marcoux. Demographic change in coastal fishing communities and its implications for the environment. FAO Fisheries Technical Paper No. 403, 151. Rome: FAO.
17. Johnson, J.C., and D.C. Griffith. 2010. Finding common ground in the commons: Intracultural variation in users' conceptions of coastal fisheries issues. *Society & Natural Resources: An International Journal* 23:837-855.
18. Bennett, E., A. Neiland, E. Anang, P. Bannerman, A.A. Rahman, S. Huq, S. Bhuiya, M. Day, M. Fulford-Gardiner, and W. Clerveaux. 2001. Towards a better understanding of conflict management in tropical fisheries: Evidence from Ghana, Bangladesh, and the Caribbean. *Marine Policy* 25:365-376.
19. Arlinghaus, R. 2007. Voluntary catch-and-release can generate conflict within the recreational angling community: A qualitative case study of specialized carp, *Cyprinus carpio*, angling in Germany. *Fisheries Management and Ecology* 14:161-171.
20. FAO (Food and Agriculture Organization). Fisheries and Aquaculture Topics. Fisheries governance, topics, fact sheets. In: FAO Fisheries and Aquaculture Department [online]. Rome. Last updated September 27, 2001. <http://www.fao.org/fishery/topic/2014/en>.
21. Mackenzie, C.J.A., and S.P. Cox. 2013. Building legitimacy of the recreational fishing sector in mixed commercial-recreational fisheries. *Ocean & Coastal Management* 75:11-19.
22. Smith, C. L. 1980. Management provoked conflict in fisheries. *Environmental Management* 4:7-11.
23. Warner, M. 2000. Conflict management in community-based natural resource projects: experiences from Fiji and Papua New Guinea, Working Paper 135, 42. London: Overseas Development Institute, Portland House.
24. Freire, K.M.F., M.L. Machado and D. Crepaldi. 2012. Overview of inland recreational fisheries in Brazil. *Fisheries* 37:484-501.
25. Maynou, F., B. Morales-Nin, M. Cabanellas-Reboredo, M. Palmer, E. Garcia, and A.M. Grau. 2013. Small-scale fishery in the Balearic Islands (W Mediterranean): A socio-economic approach. *Fisheries Research* 139: 11-17.
26. Grafton, R.Q. 2005. Social capital and fisheries governance. *Ocean & Coastal Management* 48: 753-766.
27. Momtaz, S., and W. Gladstone. 2008. Ban on commercial fishing in the estuarine waters of New South Wales, Australia: Community consultation and social impacts. *Environmental Impact Assessment Review* 28:214-225.
28. Murshed-e-Jahan, K., N.D. Salayo, and U. Kanagaratnam. 2009. Managing fisheries conflicts through communication planning: Experience from inland fisheries of Bangladesh. *Fisheries Research* 99:112-122.
29. Cochrane, K. 2001. Reconciling sustainability, economic efficiency and equity in fisheries: The one that got away? *Fish and Fisheries* 1:3-21.
30. 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 (5):1125-1134.
31. Pinder, A.C., and R. Raghavan. 2013. Conserving the endangered Mahseers (Tor spp.) of India: The positive role of recreational fisheries. *Current Science* 104 (11):1472-1475.
 32. Hilborn, R. 2007. Defining success in fisheries and conflicts in objectives. *Marine Policy* 31:153-158.
 33. Weeraratunge, N., C. Béné, , S. Rapti, A. Charles, D. Johnson, E.H. Allison, P.K. Nayak, and M.C. Badjeck. 2013. Small-scale fisheries through the wellbeing lens. *Fish and Fisheries* 15:255-279.
 34. Maliao, R.J., R.S. Pomeroy and R.G. Turingan. 2009. Performance of community-based coastal resource management (CBCRM) programs in the Philippines: A meta-analysis. *Marine Policy* 33:818-825.
 35. Guillemot, N., M. Léopold, M. Cuif, and P. Chabanet. 2009. Characterization and management of informal fisheries confronted with socio-economic changes in New Caledonia (South Pacific). *Fisheries Research* 98:51-61.
 36. Folke, C., T. Hahn, P. Olsson, and J. Norberg. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources* 30:441-473.
 37. Wilson, D.C., M. Ahmed, S.V. Siar, and U. Kangaratnam. 2006. Cross-scale linkages and adaptive management: Fisheries co-management in Asia. *Marine Policy* 30:523-533.
 38. Jensen, O.P., D.J. Gilroy, Z. Hogan, B.C. Allen, T.R. Hrabik, B.C. Weidel, S. Chandra, and M.J. Vander Zanden. 2009. Evaluating recreational fisheries for an endangered species: A case study of taimen, Hucho taimen, in Mongolia. *Can J Fish Aquat Sci* 66:1707-1718.