"Marine Areas of Responsible Fishing": A Path Toward Small-Scale Fisheries Co-Management in Costa Rica? Perspectives from Golfo Dulce

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Abstract

This chapter analyzes participatory management processes of small-scale fisheries in two Pacific embayments of Costa Rica, a centralized state of Central America where fisheries management is traditionally "top-down", data deficient, and poorly adapted to local biological and socio-economic conditions. We provide an historical overview of coastal activities governance and fisheries national context, and describe different participative approaches to small-scale fishery management. The Marine Area of Responsible Fishing (Área Marina de Pesca Responsable, or AMPR), created in 2008, is a management tool developed by the Costa Rican government to effectively involve fishers organizations in small-scale fisheries management. In this paper, we compare participative management initiatives associated with AMPRs in the Golfo Dulce and Golfo de Nicoya (Palito and Tárcoles), and Marine Protected Areas (MPAs) in Cahuita and Marino Ballena National Parks. Based on our analysis, we recommend ten measures to improve the small-scale fisheries co-management process. Among these, five recommendations stand out: (1) increase the participation of artisanal fishers in the development of collective choice rules; (2) allocate costs and benefits of management measures among artisanal fishers; (3) improve local leadership; (4) improve understanding and transparency of the management process; and (5) formalize and implement strategic fisheries management plans.

Keywords

Small-scale fisheries · Marine area of responsible fishing · Co-management · Costa Rica · Tropical Eastern Pacific fisheries

10.1 Introduction

There are no universal definitions of small-scale or artisanal fisheries (hereby considered synonymous, for practical purposes), despite the fact that they are thought to represent over 90 % of all fishers and maritime workers across the globe and responsible for roughly half of the total catch for human consumption (FAO 2012; World Bank et al. 2010). The meanings of the terms vary according to chrono-geographical context and conceptual currents (Berkes et al. 2001b; Carvalho et al. 2011; Durand et al. 1991; FAO and World Fish Center 2008; Johnson 2006; Kurien 2003; Salas et al. 2007; Smith 1979; Staples et al. 2004; World Bank et al. 2010).

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After being neglected by decision makers for many decades, artisanal fisheries are increasingly recognized for their contribution to food security, poverty reduction, and local and national economies, especially in developing countries (Andrew et al. 2007; Béné et al. 2007; Evans et al. 2011; FAO 2007, 2009, 2011a, b, c, d; FAO and World Fish Center 2008).

In Central America, artisanal fisheries are especially difficult to encapsulate due to their heterogeneous and complex structure. Agüero (1992) and Salas et al. (2007, 2011) characterize them as follows: (1) a multi-species, multi-gear fishery that changes seasonally, targeting high-value commercial species for consumption, local sale, and/or export using low-technology gear requiring intensive labor and modest capital investment; (2) a poorly organized and marginalized professional sector, highly dependent on intermediaries in the supply chain and marketing component; (3) a population with limited access to capital, credit, education, health care, and other social benefits; (4) operating in many small, dispersed, and often isolated landing sites; and (5) a low-cost source of animal protein, a buffer against rural unemployment, and an economic stimulant, due in part to multiplier effects that accrue to fishing. Multiplier effects arise because fishing activities use inputs from other industries/businesses to generate their own products, which in turn become inputs to other economic sectors; this situation acknowledges the interdependency among sectors (FAO 2005). Overall, the multi-faceted nature of small-scale fisheries in Central America reflects the complex geophysical, bio-ecological, socio-economic and political realities of the region, rendering artisanal fisheries management intricate and delicate (Salas et al. 2011).

Following the international debt crisis of the 1980s and many Central American civil wars, fishing represents a "last frontier" for the rural unemployed sector in Central America (Elizondo Mora 2005; FAO 2011d; González Álvarez et al. 1993). The number of artisanal fishers in the region more than doubled between 1970 and 2000 (Agüero 1992; Chuenpagdee et al. 2006; FAO 1999; OSPESCA 2010). According to OSPESCA (2010), artisanal fisheries landings in all Central American countries, except Panama, are more important than industrial landings. However, these data are difficult to validate to date, as available publications neither specify census methodology, nor the type of fishing. Nevertheless, they confirm the economic importance of artisanal fishing in the region.

Gréboval (2007) identified six natural and anthropogenic factors that negatively affect coastal fisheries in Central America: (1) the absence of strong governance structures; (2) a poor understanding of coastal fisheries operations; (3) excessive fishing capacity; (4) a downward trend and increased variability in resource abundance due to overfishing, habitat degradation, and El Niño Southern Oscillation (ENSO) events; (5) increasing demand in the face of limited resources; and (6) poverty and lack of development alternatives in coastal areas.

The small-scale fisheries sector has generally been excluded from fisheries management due to its geographic, socio-economic, and political marginalization (Béné 2003, 2004; Jacquet and Pauly 2008; Jacquet et al. 2010; Pauly 1997, 2006; Pauly and Agüero 1992; Teh et al. 2011). Local traditions and socio-economic aspects of coastal fisheries are often not considered in management decisions (Martin 2001; Ruddle 2011; Ruddle and Hickey 2008; Ruddle and Satria 2010), despite evidence that the structure and dynamics of small-scale coastal fisheries in tropical developing countries are profoundly shaped by non-biological factors (Chauveau and Jul-Larsen 2000).

Evidence suggests that fisheries regulations and practices are much more likely to be successful if fishers and other stakeholders participate in the development of policies and regulations that affect them and the communities they live in (Jentoft 2006). Fisheries co-management has been identified as a realistic solution to many of the problems facing the world's small-scale fisheries (Gutiérrez et al. 2011). According to Evans et al. (2011), successful co-management involves the sharing of responsibility, authority, or possibly both, in varying degrees between resource users and another organization or entity (usually a government agency). This implies expansion of the typical fishers-government relationship to include other entities, such as non-governmental organizations (Nuñez Saravia 2000).

However, as Jentoft et al. (1998) indicated, "co-management is not so much about the rules per se as it is about the communicative and collaborative process through which these rules are formed". Stakeholder participation in small-scale fisheries co-management should be both quantitative (Béné and Neiland 2006; Béné et al. 2008; Neiland and Béné 2003; Sen and Raakjaer Nielsen 1996) and qualitative (Cohen and Uphoff 1980; Jentoft et al. 1998; Pinkerton 1989). Quantitative measures include the number of participants and degree of participation. Qualitative measures address questions such as: which part of the population participates (local population, local leaders, officials, external agents), when does participation occur (design and planning, implementation, monitoring phases), what kind of participation is allowed (instructive, consultative, cooperative, advisory, informative), and how does the process occur (its form, its extent and its local impacts)? From these elements, a typology of participation may be established, ranging from pseudo-participation to full-scale participation (Arnstein 1969; Pretty 1995).

Small-scale fisheries management in Central American countries has traditionally been imposed in "top-down" fashion by regulators who rely primarily on conventional management techniques, including species size limits, gear control, temporary fishing bans, zoning, fishing permits, and other management tools (Agüero 1992; Salas et al. 2007). All Central American states have laws that enable the participation of civil society in the management of protected areas,

with varying degrees and modes of participation (CBM 2003; Estado de la Nación 2008; Luna 1999). However, Costa Rican law allows only marginal public participation in protected-area management (DFOE-AM 2005; Fonseca-Borrás 2009); the State may not delegate the administration, management of public funds, police power, definition of policies, and approval of management plans for protected areas. As a result, Costa Rica offers fewer opportunities for public participation in environmental management compared to other Central American nations (DFOE-AM 2005; Fonseca-Borrás 2009). The vertical and complex nature of its legal and institutional framework for natural resource management likely hinders active stakeholder participation.

In order to improve the situation in Costa Rica, Marine Areas of Responsible Fishing (Área Marina de Pesca Responsable—AMPR), created in 2008, constitute one of the most recent management tools developed by the Costa Rican government to involve fishers organizations in small-scale fisheries management (Fargier 2012). Based on the premise that successful small-scale fisheries management relies on participatory approaches, this chapter collates key lessons to be learned in regards to (1) the conditions favoring successful small-scale fisheries co-management processes in Costa Rica; and (2) the potential of AMPRs to achieve their purpose. Our approach involves a review of the recent history of participatory processes in small-scale fisheries management in Costa Rica. We compare an AMPR created in the Golfo Dulce (AMPR-GD) with AMPRs situated in the Golfo de Nicoya (AMPR of Tárcoles and Palito) and with participative management initiatives previously established in two no-take Marine Protected Areas (Cahuita and Marino Ballena National Parks). Finally, we present a matrix evaluating co-management potential from a synthesis of case studies reported in the scientific literature to describe fisheries participative processes. The matrix highlights key conditions necessary for the success of the co-management approach. To facilitate our analysis, we chose an analytical framework titled "*Principles for Sustainable Governance of Common-Pool Resources",* developed by Elinor Ostrom (Ostrom 1990; Ostrom and Ostrom 2003; Ostrom et al. 1994, 1999, 2002). The complete matrix and list of papers from which it was developed are available in Appendix 1.

10.2 Geography and Socio-Economic Characteristics of Artisanal Fishing

10.2.1 Geography and Biodiversity

The 1,254-km long Pacific coast of Costa Rica features diverse habitats such as headlands, cliffs, peninsulas, bays, islands, coral reefs, beaches, sand spits, and estuaries with sandy-muddy coasts and mangrove wetlands (Allen and Robertson 1998; Bergoeing 1998; Robertson and Allen 2008; Wehrtmann and Cortés 2009). These geographic features are the product of past tectonic activity and erosive action of the many rivers that drain the central mountains. Species diversity in this area is the highest in the Eastern Pacific region. With a marine area representing only 0.16% of the world's ocean surface, Costa Rican waters harbor 3.5% of the known marine bio-diversity (Wehrtmann and Cortés 2009). At least 4,745 species have been recorded in Costa Rican marine waters (Wehrtmann and Cortés 2009) with more than 800 marine fish species present from 0 to 200 m depth (Bussing and López 2009). A high level of endemism is also present (Mora and Robertson 2005a, b).

The Nicoya and Osa peninsulas encompass two major gulfs, the Golfo de Nicoya, which dominates the central-northern Pacific sector and the Golfo Dulce in the South Pacific zone near the Panamanian border. Annual precipitation increases from north to south, from ca. 2,000 mm with a distinct seasonality in the northern part of the Golfo de Nicoya to 4,500 mm in Golfito (Golfo Dulce), where the dry season is comparatively shorter (Quesada-Alpízar and Cortés 2006; Waylen et al. 1996). Both Gulfs drain wet tropical catchment basins and function as meta-estuaries. Golfo Dulce is relatively smaller with steep shorelines, restricted fjord-like circulation, few mangroves and relatively low biological productivity. It is one of the four known 'tropical fjords' (Richards et al. 1971; Vargas and Wolff 1996; Wolff et al. 1996). Golfo de Nicoya is a complex, partially mixed estuary with varied topography, extensive mangroves and high productivity (Voorhis et al. 1983; Wolff et al. 1998) (Table 10.1).

In 2006, the Costa Rican Interdisciplinary Marine Coastal Commission of the Exclusive Economic Zone (Nielsen Muñoz and Quesada Alpízar 2006) named Golfo Dulce and Golfo de Nicoya as two of eight biodiversity "hotspots" requiring urgent conservation. Three years later, both were still identified as important geographic areas that were needed to maintain the integrity of marine and coastal biodiversity in Costa Rica (SINAC 2009).

10.2.2 Historical and Socio-Economic Background of Costa Rican Small-Scale Fisheries

In Costa Rica, a country of inland traditions, commercial fishing is a relatively recent phenomenon and therefore is not culturally rooted (Elizondo Mora 2005; González Álvarez et al. 1993). The government offered incentives for development of industrial and semi-industrial fisheries, particularly that of shrimp fishing, but neglected the artisanal sector (Chacón et al. 2007; Elizondo Mora 2005; Jiménez 2013). The latter became established only during the last 30 years as an "occupation of last resort" for surplus rural labor, but has

Table 10.1 Basic environmental characteristics of Golfo Dulce and Golfo de Nicoya. (Bergoeing 1998; Cortés et al. 2010; Lei 2002; Blanco and Mata 1994; Nielsen Muñoz and Quesada Alpízar 2006; Quesada-Alpízar and Cortés 2006; Svendsen et al. 2006; Voorhis et al. 1983; Wolff et al. 1998)

Characteristic	Golfo Dulce	Golfo de Nicoya
Coordinates	8°32'N, 83°15'W	10°02'N, 85°00'W
Dimension (length × mean width)	50 × 14 km	80 × 25 km
Surface area	680 km^2	1,340 km^2
Catchment basin (main rivers, mean precipitation)	3,200 km^2 (4,147 mm a^{-1})	9,844 km^2 (6,2450 mm a^{-1})
Topography, depth (z)	Fjord-like deep inner basin (z_{max} = 215 m) outer gulf (sill: z = 65 m) minor islands and pinnacles	Inner gulf, z ≤ 25 m outer gulf (no sill, z to > 200 m) several inhabited islands
Circulation	Fjord-like, with a deep (> 150 m) seasonally anoxic zone	Partially to well-mixed estuarine, complex features
Net phytoplankton production (trophic status)	27 to 263 gC m^{-2} a^{-1} (oligo-mesotrophic)	610 gC m^{-2} a^{-1} (meso-eutrophic)
Mangroves, wetlands	< 1,000 ha, few mudflats	15,200 ha, extensive mudflats (inner gulf)
Hard bottom	Rocky shores, submerged basalt reefs, pinnacles, degrading coral communities (inner basin)	Rocky shores and reefs, fewer pinnacles, very little coral growth
Sandy beaches	Along the outer gulf	Along the outer gulf

developed considerable socio-economic importance (Elizondo Mora 2005; González Álvarez et al. 1993; Béné 2003). International projects facilitated the development of artisanal fishing, notably by promoting cooperatives (González Álvarez et al. 1993; López-Estrada and Breton 1991) and aiming to diversify local techniques, such as artisanal nets for jumbo-shrimp fishing that were previously reserved for the semi-industrial fleet (Elizondo Mora 2005; Marín Alpízar 2002).

Commercial fishing centers became established in a few coastal towns, notably Puntarenas on the Pacific coast and Limón on the Caribbean coast, where the necessary support services and infrastructure were concentrated (González Álvarez et al. 1993). The absence of market access in rural areas limited the development of commercial fisheries in these areas. However, some rural small-scale fishing communities with a sense of tradition and cultural identity arose, especially in Golfo de Nicoya, which was the cradle of commercial fishing in Costa Rica and the subject of numerous development projects for artisanal fisheries (Barguil Gallardo 2009).

Between 1996 and 2005, reported national annual fisheries production averaged 21,414 t. The Pacific coast accounted for ~97% of the Costa Rican fisheries, and ca. 70% was landed in Golfo de Nicoya essentially by offshore commercial fisheries (Araya et al. 2007). The latterfishery primarily catches mahi-mahi (*Coryphaena hippurus*), tuna (Scombridae, mostly yellowfin *Thunnus albacares*), billfish (Istiophoridae, Xiphiidae), oceanic sharks (mainly silky shark (*Carcharhinus falciformis*), blue shark (*Prionace glauca*), bigeye thresher (*Alopias superciliosus*), oceanic whitetip shark (*Carcharinus longimanus*), scalloped hammerhead (*Sphyrna lewini*), and also smooth-hounds (*Mustelus* spp.), tiger shark (*Galeocerdo cuvieri*), shortfin mako (*Isurus oxyrinchus*) and bonnethead (*Sphyrna tiburo*) and deep-water shrimp (white shrimps *Litopenaeus* spp., pinky shrimp *Farfantepenaeus brevirostris*, brown shrimp *Farfantepenaeus californiensis*, carabalí shrimp *Trachypeneneaus byrdii*, camellón shrimp *Heterocarpus* spp.) (Araya et al. 2007). The semi-industrial sector operates with trawlers and purse seines that target shrimp and sardine, respectively (Araya et al. 2007). Artisanal fishers on Costa Rica's west coast have historically targeted snappers (Lutjanidae), groupers (Serranidae), sharks, mackerels (Scombridae), cusk eels (Brotulidae) and shrimps in Golfo Dulce (Campos 1989; Fargier 2012; Guzmán-Mora 2013; Lagunas Vázques 2004; Poirout 2007) and weakfish and croakers (Sciaenidae), snappers, grunts (Haemulidae), snooks (Centropomidae), cusk eels, pike-congers (Muraenesocidae), sardines and white shrimp in Golfo de Nicoya (Araya et al. 2007; Wolff et al. 1998). Sport/tourist fishers target snappers, groupers and offshore game fish, especially billfishes (Magnin 2004).

Management measures in both gulfs have included declarations of marine and coastal/estuarine protected areas (Estado de la Nación 2011), species-specific fishing bans, gear restrictions especially concerning shrimp trawling (Álvarez and Ross Salazar 2010; González Álvarez et al. 1993), multiple use and fisheries management areas (Alvarado et al. 2012; Nielsen Muñoz and Quesada Alpízar 2006; Salas et al. 2012).

In Costa Rica, as in other Central American countries, fishing occurs mainly on the Pacific coast. The geographic distribution of people along the Pacific coast, especially fishers, is heterogeneous due to local variation in landscape features and biological productivity (ECLAC 2011; OSPESCA 2010; PNUD 2011). According to the most recent survey (OSPESCA 2010), 13,850 artisanal fishers live and work in 75 communities on the Pacific coast, compared to only 950

fishers in 11 communities on the Caribbean coast. Most artisanal fishers (about 94%) are men (*ibid*). However, these estimates may be biased because neither the census methodology nor the types of fishing were specified (Fargier 2012).

The number of artisanal fishers in Golfo Dulce is relatively small due to the gulf's low productivity and geographic isolation. Less than 250 artisanal fishers live in a handful of isolated fishing communities on the Osa peninsula and in communties near the county capital of Golfito, a natural deep port formerly used for banana export (González Álvarez et al. 1993; Fargier 2012; Guzmán-Mora 2013). These fishers' communities include La Purruja, Puntarenitas de Golfito, Zancudo, Puerto Pilón, Cocal Amarillo, Río Claro de Pavones, as well as the Osa peninsula communities of Puerto Jiménez, La Palma-Playa Blanca and Rincón-Puerto Escondido. By contrast, roughly half of Costa Rica's artisanal fishers live in about thirty communities scattered around the Golfo de Nicoya (González Álvarez et al. 1993; OSPESCA 2010) that include the city of Puntarenas (Barrio el Carmen), as well as Tárcoles, Chomes, Costa de Pájaros, Puerto Níspero, Pochote, Palito and Montero (Chira Island), Isla Caballo, Isla Venado, Puerto Thiel and Paquera.

The term "community" can be defined geographically, politically or socially (Agrawal and Gibson 1999; Berkes et al. 2001a). Here, we use community as a village-type political unit where a group of fishers live. González Álvarez et al. (1993) identified three types of artisanal fishing communities in Costa Rica, each characterized by different development processes:

- Type A, a small community founded by squatters ("*precaristas*", small farmers or farm workers dismissed or evicted from elsewhere), for whom fishing is one of several sources of income;
- Type B, a bigger, older and more homogeneous community were artisanal fishing is the main commercial activity;
- Type C, a community where artisanal fishing is gradually being replaced by tourism activities.

Due to loss of employment caused by the departure of the banana industry in Golfo Dulce in the 1980s (United Fruit Company operated plantations on the coastal and inland plains of Costa Rica's South Pacific region between 1938 and 1984), a large number of former banana workers have joined the commercial fishing industry (Type A). Type C artisanal fishing communities have emerged in Puerto Jiménez, Río Claro de Pavones, Zancudo, and Golfito as bases for international sport fishers, surfers, National Park visitors, beach vacationers and, in the case of Golfito, duty-free shoppers. Fishing communities of Golfo de Nicoya are mostly Type A and Type B.

Small-scale fishing in Golfo Dulce ranks behind tourism in socio-economic importance, whereas in Golfo de Nicoya, it ranks well ahead of tourism (Marín Cabrera 2012). Indeed, tourism in Golfo Dulce exists in most communities, and supports about 60% of the population, while small-scale fishing is practiced in about 60% of the communities, and supports only 25% of the population (*ibid*.). Conversely, in Golfo de Nicoya, tourism is present in only 10% of the communities and supports less than 10% of the population. Fishing, on the other hand, is practiced in most communities and supports about 60% of the population (*ibid*.).

10.3 Coastal Activities Management: Integrating a Decentralized, Multi-Stakeholder Management System

Costa Rica, a centralized, land-oriented state, has historically focused on the management and conservation of its continental resources (SINAC 2009). The marine domain and its resources were only recently incorporated into the Costa Rican political agenda. The coastal theme has been integrated into national development plans of the last two consecutive governmental administrations (2006–2010 and 2010–2014) and into the initiative "Paz con la Naturaleza" (Peace with Nature) in 2007. Adoption of the "National Strategy for Integrated Management of Coastal Marine Resources" in 2007 marked the first major initiative, although hitherto inefficient, to regulate the use of coastal marine resources of the country. In 2012, a new Vice-Ministry of Waterand Seas was created under the Ministry of Environment and Energy (La Gaceta N° 162, 23 Aug 2012). Despite only recent initiatives to preserve them, marine-coastal resources are considered a national heritage and public property, and their exploitation is managed for public utility and social interest.

Three government agencies have jurisdiction over marine resources in coastal zones of Costa Rica: the Ministry of Environment, Energy, Waters, and Seas (MINAEM, as of 2013); the Costa Rican Institute of Fisheries and Aquaculture (Instituto Costarricense de Pesca y Acuicultura, INCOPESCA); and the Costa Rican Institute of Tourism (Instituto Costarricense de Turismo, ICT). In addition, the Coast Guard (Servicio Nacional de Guardacostas) and the Port Authority (Capitanía de Puertos) play supporting roles in enforcement.

Government policies and laws regulating marine fisheries in Costa Rica have been slowly evolving during the last decade. Despite the vertical structure, currently the management process involves multiple stakeholders including municipalities, non-governmental organizations (NGOs), universities, and community groups. The relative weight and role of each sector varies with the region, the issue at hand, and the target species under consideration (Marín Cabrera 2012).

10.3.1 Costa Rican Tourism Institute, ICT

The Institute of Tourism, created in 1955, monitors the Maritime-Terrestrial Zone (MTZ; Law N° 6043 of 1977), which is defined as "[…] the strip 200 meters wide along the entire

Atlantic and Pacific coasts of the Republic of Costa Rica, regardless of their nature, measured horizontally (landward) from the mean high tide level including areas and rocks uncovered by the sea at low tide". The MTZ is under the usufruct and administration of coastal municipalities. Nearly 45% of Costa Rica's 1,466-km coastline (about 550 km) are subject to this law (Quesada-Alpízar 2006). Since many artisanal fishing communities are established in the MTZ, conflicts involving municipality-supported development are common, usually with the mass-tourism industry that has developed on the Pacific coast since the 1970s (e.g., Honey et al. 2010).

10.3.2 Ministry of Environment, Energy, Waters, and Seas, MINAEM

Since its inception in 1988 (as Ministry of Natural Resources, Energy and Mines—MIRENEM, successively Ministry of Environment and Energy—MINAE, Ministry of Environment, Energy and Telecommunications—MINAET, and currently Ministry of Environment, Energy, Waters and Seas—MINAEM), one of this ministry's major functions is to ensure the promotion and enforcement of environmental legislation in the country. It is responsible for creating and administering the Costa Rican continental and marine protected areas, which have been governed since 1994 by the National System of Conservation Areas (SINAC). Out of 166 protected areas, SINAC encompasses 62 areas bordering or containing a marine section, covering 50% of the country's coastline (updated from Alvarado et al. 2012; Mora et al. 2006). While more than 25% of the land area of Costa Rica is protected, only about 1% of the marine area in the Exclusive Economic Zone (EEZ) is under some form of protection, corresponding to 17.5% (5,296.5 km^2) of the territorial waters (Alvarado et al. 2012; Estado de la Nación 2010; SINAC 2009). Although a relatively small proportion of Costa Rica's EEZ is protected, the level of protection is ten times greater than the average for other countries in Latin America (Alvarado et al. 2012; Estado de la Nación 2010; SINAC 2009).

Costa Rica currently has 20 protected areas with a marine component (MPAs). Three of those MPAs –the National Parks Marino Las Baulas and, Marino Ballena, and the Playa Blanca National Wetland—are exclusively marine. Only about a third of the areas have a management plan (Alvarado et al. 2012; Estado de la Nación 2010). Due to the appropriation and global redistribution of park fees by the government (Alvarado et al. 2012), most MPAs lack enough human, technical and financial resources required for long-term conservation. Nine of the 23 existing MPAs are no-take zones that preclude artisanal fishing from approximately 16% (3,000 km^2) of Costa Rica's coastal marine territory, which does not include Isla del Coco National Park (SINAC 2009). In addition, special restrictions on fishing are imposed by other MPA management plans in 15% (550 km^2) of the coastal marine territory.

The creation of MPAs in Costa Rica used to be synonymous with expropriation and prohibition of extraction of natural resources, including fish, which caused distrust towards MINAEM and opposition of the public to creating new MPAs (TNC 2011). Under a new approach of sustainable use and absolute resource protection developed by MINAEM in 2008, two new types of protected areas allow fishing: Marine Reserves (MR) and Marine Management Areas (MMA; amendment to Art. 70 Decrees N° 34433-MINAET, April 8, 2008 [Regulation of the Law of Biodiversity N° 7788] and 35369-MINAET, May 5, 2009). Marine Reserves are intended for near-exclusive use by artisanal and tourist fisheries (i.e., assumed to be selective and of low impact), as well as other eco-touristic activities of low environmental impact. A broader spectrum of fishing activities is tolerated in MMAs. Prohibited activities include semi-industrial and industrial fishing, and high-impact touristic activities (e.g., marinas). However, while small-scale fishing is permitted under these two new management categories, artisanal fishers are yet to be invited to participate in their management or creation of management plans. As of 2013, only one MMA encompassing a large uninhabited area (9,640 km^2) adjacent to Cocos Island National Park had been implemented: the Seamounts Marine Management Area (MarViva 2011).

In its *Costa Rica por Siempre* (Costa Rica Forever) initiative, the Interdisciplinary Marine Coastal Commission of the Exclusive Economic Zone called for tripling the total size of marine protected areas in Costa Rica by 2016. Due to this inititiative, at least 12 new MPAs would be created, resulting in an expanded network of marine protected areas that would conserve 25% of Costa Rica's EEZ (as stated in Executive decree 31832–MINAE). This level of protection would exceed the standard of 10% protection of each of the world's eco-regions established inthe *Programme of Work on Protected Areas* (POWPA) of the 7th Conference of Parties of the Biodiversity Convention (Alvarado et al. 2012; TNC 2011).

10.3.3 Costa Rican Institute of Fisheries and Aquaculture, INCOPESCA

INCOPESCA is responsible for administering the 2005 Fishing and Aquaculture Law (which replaced the Maritime Fishing and Hunting Law of 1948) and the National Development Plan for Fisheries and Aquaculture. Previously, under the name of General Directorate of Fisheries Resources and Aquaculture, INCOPESCA was a department of the Ministry of Agriculture (MAG). With the exception of MPAs, which fall under MINAEM's authority, the entire Costa Rican EEZ falls under the jurisdiction of INCOPESCA. It corresponds to

approximately 1,000 km of coastline. Mangrove forest areas are a special case in which INCOPESCA and MINAEM work together to create and implement management plans. Additionally, INCOPESCA is governed by a nine-member board of directors, five of whom are representatives of the fisheries sector. Decisions of the board only require simple majority, and quorum is achieved with at least five people. Directors are elected for 4 year terms, with no limit on the number of terms served. INCOPESCA's Executive Chairperson is appointed by the government.

In theory, this relatively balanced bipartisan composition of INCOPESCA could be interpreted as a special case of co-management of fisheries resources in Costa Rica. In reality, however, the fisheries interests on the board are represented by industrial, semi-industrial and large-to-medium scale fishing interests who may wield undue influence over board decisions. Small-scale artisanal fishers, despite making up more than 80% of Costa Rica's fishers, are absent from the board of directors. Their absence, and the potential for self interest and favoritism among standing board members, raises questions concerning the board's legitimacy as a fisheries management entity. Its critics consider INCOPESCA to be a de facto oligarchy that does little to protect the environment or public interest (Fargier 2012; Quesada-Alpízar 2006). While receiving government aid, semi-industrial fishing interests employ relatively few people, produce little wealth, and engage in fishing practices that degrade the environment (Álvarez and Ross Salazar 2010).

Although INCOPESCA administers a much larger marine area than MINAEM, it has significantly fewer resources, which limits its effectiveness (Barquero 2007; Caviedes 2013). Moreover, in 1995, just 1 year after INCOPESCA's creation, the Costa Rican Constitutional Court declared the article on sanctions in the Maritime Fishing and Hunting Law of 1948 unconstitutional. Thus, until the Fisheries and Aquaculture Law was enacted in 2005, INCOPESCA could not prosecute fishing violations. Making matters worse, the new law was not implemented until 2011.

Unfortunately, the prevalence, or at least the presumption of corruption, conflict of interest, and ineffectual decision-making combined with a lack of resources, capacity, and a clear legal mandate has undermined the authority of INCOPESCA since its inception (Guevara 1996; Defensoría de los Habitantes 2001, 2012). Its governance and operations have been repeatedly questioned by many, including the Comptrollership of the Republic (Contraloría General de la República[CGR]; DFOE-EC-IF 2012; DFOE-PGA 2006; DFOE-PGAA 2008), the Citizen's Ombudsman Office (Defensoría de los Habitantes 2001, 2012), and the Presidency of the Republic (Oviedo and Murillo 2013).

In response to an initiative from the Front For Our Seas (Frente Por Nuestros Mares, FNPM), which is a group of eight civil society organizations (Pretoma, Fundación Keto, Fundación Promar, International Student Volunteers Inc., Sea Save Foundation, The Leatherback Trust, UESPRA, Widecast) as well as interested citizens working to improve the administration and management of marine resources through a series of legal, scientific, political, and advocacy approaches, a Presidential Commission on Marine Governance was created in December 2011. This Commission is integrated by representatives of MINAEM, Public Security, MAG and the NGO Conservation International. The Commission has since publicly called for total reform of INCOPESCA (CPGM 2012), but at the time this chapter was written, had not completed its analysis of restructuring alternatives.

10.3.4 Institutional Coordination

Fisheries management in Costa Rica falls under the purview of multiple institutions with different and often conflicting goals, missions, and approaches, as well as some overlapping jurisdictions. For example, promotion of coastal tourism, including foreign investment by ICT, may clash with municipal coastal planning. Also, ICT and municipal development intiatives may conflict with efforts by MINAEM to conserve coastal marine resources. INCOPESCA's mandate to promote the fishing sector that uses these same resources, brings the two institutions into conflict. At other times, MINAEM and INCOPESCA join forces to create mangrove management plans and strengthen the existing MPA network.

Each agency pursues different interests in a common area of prime importance to coastal communities, in particular artisanal fishers. However, despite a few worthy exceptions, coordination and inter-agency cooperation is weak to non-existent, and small scale fishers are poorly considered (Caviedes 2013). To improve institutional coordination for the conservation of coastal marine resources, a nation-wide legal tool was created in 1995, the Multiple Use Marine Area (AMUM). Thirteen years later, in 2008, two Master plans were finally developed, AMUM *Golfo de Nicoya* and AMUM *Pacífico Sur* (which includes Golfo Dulce). As of today, neither has been implemented.

Meanwhile, the first formal national initiative for integrated coastal zone management took place in 2004 through the Interdisciplinary Marine Coastal Commission of the Exclusive Economic Zone (CIMC-ZEE). Restructured in 2005 as the National Marine Coastal Commission (CNMC), it published the *National Strategy for the Integrated Management of Coastal Marine Resources* in 2007 (Caviedes 2013). Likewise, INCOPESCA and MINAEM co-signed a directive for coordinating the development of MPA management plans in 2009. Other collegial bodies were created in 2010 with the goal of harmonizing coastal zone policies such as: the National Sea Council (CNM) and the Inter-institutional Commission for Marinas and Landing Sites (CIMAT).

Delimitation of jurisdictions among all these entities is pending resolution.

At a regional level, the MINAEM's *Osa Conservation Area* (ACOSA, which encompasses Golfo Dulce) manages several marine protected areas (three national parks, a national wetland heritage site and a wildlife reserve). In 2006, ACOSA instituted its own *Inter-institutional Marine Commission* (CIMC-ACOSA) following an initiative from NGOs and university researchers. It convenes diverse actors and stakeholders (e.g., natural resource users, municipalities, state institutions, universities, NGOs, community-based associations), on a monthly basis, to coordinate initiatives and debate projects related to the marine environment in the area. One of its major objectives is to establish a general management plan for the AMUM *Pacífico Sur*. According the AMUM decree (Decree N° 32801 MINAE, La Gaceta N° 241, 14 Dec 2005), the procedure for developing the plan must be participative.

A recent comparative study about stakeholder roles and interactions for AMUMs of Golfo de Nicoya and Pacífico Sur concluded that the networks of key actors in the Golfo Dulce region are dominated by NGOs, government institutions, and the National Federation of Artisanal Fishers Organizations and Affiliates (FENOPEA), the latter as a bridge actor controlling the information flow rather than being information emitters (Marín Cabrera 2012).

10.4 Evolution of National Policies for Participative Management

Costa Rica ratified the Convention on Biological Diversity (signed in Rio de Janeiro in 1992) in June 1994 (Law 7416), with the implicit commitment to encourage participation of the civil society in environmental management, particularly within protected areas. While this commitment is reflected in many Costa Rican legal texts from the second half of the 1990s (i.e. Article 50 of the Political Constitution, Article 6 of the Organic Law of the Environment, Articles 22, 29 and 101 of the Biodiversity Law and The Law of Citizen Participation), a national policy clearly defining the different forms of civic participation in environmental management was still lacking. Furthermore, the identification, development and implementation of strategies, plans and budgets concerning conservation areas are considered exclusive powers of the State by the Constitution (DFOE-AM 2005).

Attempting to amend this void, three separate initiatives took shape, but none was ever formalized or implemented. The first one was led by the MINAEM divisions *of Civil Society* and *Gender and Environment* between 1999 and 2002 (Fonseca-Borrás 2009). Secondly, the IUCN coordinated the *National Policy on Shared Management* between 2003 and 2006 (MINAE-SINAC 2006). The third attempt was the submission of a draft *Law on Protected Areas* at the Costa Rican Legislative Assembly in November 2008, but it was not adopted. Meanwhile, in 2005, the Comptrollership of the Republic issued a precedent-setting report concluding that the Costa Rican Constitution did not recognize the concept of co-management of protected areas (DFOE-AM 2005).

Concurrently, a decline in the participation of civil society in environmental management was observed mainly during the 2006–2010 Oscar Arias administration (Fonseca-Borrás 2009). Its National Development Plan omitted the definition of actions promoting the participation of civil society in environmental management. In late 2008, the President exercised the first veto of his mandate, precisely on articles of the *Law of Citizen Participation* concerning environmental management; he argued that they were unconstitutional (Fonseca-Borrás 2009). At the same time, regulations of the *Law of Biodiversity* were modified such that the "free, prior and informed consent" of communities was no longer required for the implementation of a project affecting their immediate environment. Thus, civil participation in environmental management is currently possible only at local councils and regional committees of the SINAC-governed Conservation Areas (Article 39 of the Biodiversity Law) but these have been characterized as politicized bodies and poor representatives of the communities (Solís-Rivera et al. 2012). According to Fonseca-Borrás (2009), such practices cannot be considered co-management. Some Costa Rican cooperative and political actors see this strategy reversal as one of the indicators of policy change in the country, that might be related to the ratification of the Free Trade Agreement (FTA) between the United States, Central America and the Dominican Republic in October 2007 (Fonseca-Borrás 2009).

10.5 Small-Scale Fishers' Participation in Coastal Fisheries Management

10.5.1 Experiences within MINAEM-Created MPAs

Although co-management is not legally recognized in Costa Rica, some forms of civic participation in environmental management have emerged that are associated with protected areas managed by SINAC. Due to the combination of increased pressure on natural resources, limited government capacity, devolution and decentralization of some central government functions, civil society has become pro-active in natural resource management. Most initiatives arose from informal local processes that were *de facto* institutionalized, some of which have benefitted from legal recognition that has allowed them to persist.

Examples of these experiences are seen in areas with less restrictive protection status, such as the National Wildlife

Fig. 10.1 Marine Protected Areas (*MPAs*) studied in this chapter. MPAs and National Wildlife Refuges and National Parks (*RNVS*) are the ones created by the Ministry of Environment, Energy, Waters, and Seas (*MINAEM*). Marine Areas of Responsible Fishing (*AMPR*) are the ones created by are the Costa Rican Institute of Fisheries and Aquaculture (*INCOPESCA*)

Refuges (RNVS). Two well-known cases are located on the Pacific Coast of the Nicoya peninsula: the participation of the Artisanal Fishers Association of Puerto Coyote (ASPECOY) in the creation of the Caletas-Ario National Wildlife Refuge; and, further north, the Integral Development Association of Ostional (ADIO) that sustainably harvests Olive Ridley turtle (*Lepidochelys olivacea*) eggs in the Ostional National Wildlife Refuge (Fig. 10.1). Two other cases concern National Parks: Cahuita National Park on the southern Caribbean coast (Weitzner and Fonseca-Borrás 2001) and Ballena Marine National Park on the South Pacific Coast (Fig. 10.1).

The government declared the coral reefs near Cahuita as a *National Monument* in 1970, without consulting the community. Local discontent arose following the associated use-restrictions (Girot et al. 2000), which in 1974 led to the creation of an *ad hoc* commission involving government officials and influential members of nearby communities. However, the commission's recommendations were disregarded during the designation of the Cahuita National Park in 1978: a combination of the banning of resource exploitation, expropriations and the increase of park entry fees for foreign visitors led to recurring serious conflicts with local communities between 1978 and 1994 (Girot et al. 2000; Weitzner 2000; Weitzner and Fonseca-Borrás 2001). Eventually, negotiations mediated by the Citizen's Ombudsman Office (*Defensoría de los Habitantes*) enabled legal recognition

of a Management Committee in charge of administering the entire park made up by local leaders and other stakeholders (Fonseca-Borrás 2009).

Likewise, the Ballena Marine National Park had a long history of conflicts. Created in 1989 as one of the first marine national parks in Latin America, local communities were not consulted in the process, giving rise to conflicts between local fishers and MINAEM officials over resource use restrictions (Fonseca-Borrás 2009). The Association for the Development of Ballena Marine National Park (ASOPARQUE, consisting of 22 local organizations) was finally established in 1997 (*ibid*.). Negotiations between MINAEM and local authorities began in 1998, through a liaison committee, with the objective of initiating a co-management process. In 2002, the liaison committee requested a external technical expert, CoopeSoliDar (a social-environmental consultancy organized as a cooperative) to develop a co-management plan for the park. As a result, ASOPARQUE participated *de facto* in the park's management. However, unlike Cahuita, this initiative was not legally recognized (Fonseca-Borrás 2009). The 2005 CGR's negative ruling on the co-management process (DFOE-AM 2005) focused on the lack of representativeness of ASOPARQUE, the illegality of fundraising and control of the park access by ASOPARQUE. The CGR report urged MINAEM to regain control of the park and to regularize the situation. In the aftermath, 10 years of efforts to establish a co-management for the Ballena Marine National Park were ended.

10.5.2 Experiences Related to Artisanal Fishers

Outside of marine protected areas, the government has developed various initiatives for small-scale fisher participation in coastal resource management: during the 1980s, through the cooperative movement and Local Committees of Artisanal Fishers (COLOPES); since 2008, by the creation of Marine Responsible Fishing Areas (AMPRs).

10.5.2.1 Cooperative Movement

In the 1980s, Central American artisanal fishers, traditionally suspicious of organizational structures, became interested in the cooperative movement, which had gained "virtually indestructible" institutional faith in Costa Rica (López-Estrada and Breton 1991). Beltrán (2005) explained this attitude change with three reasons:(1) enhanced local capacity achieved by training, (2) the need for alliances to improve the bargaining power of small-scale fishers in marketing, and above all, (3) the need to comply with the requirements of national and international aid.

However, despite the influx of international financial aid for developing countries, the cooperative initiative was short-lived in Costa Rica, due to a combination of conditions prevailing then: (a) the top-down nature of the cooperative creation process, promoting collective ownership of production means (contrary to the expectations and interests of artisanal fishers); (b) prioritization of fish production at the expense of social welfare; (c) little room for training; (d) unorganized increase in artisanal fishing effort, despite the signs of resource decline; (e) organizational problems; (f) financial opportunism of local leaders; and (g) cessation of external funds (Breton 1991; Chauveau and Jul-Larsen 2000; Elizondo Mora 2005; Villalobos-Chacón 2011, School of Biological Sciences, National University of Costa Rica, pers. comm.). Once the aid programs ended, out of the 20 cooperatives established in the early 1980s, only three remained at the end of the decade, including CoopeTárcoles, the Tárcoles' fishermen cooperative (Villalobos-Chacón 2011, pers.comm.).

10.5.2.2 Local Committees of Artisanal Fisheries

Local Committees of Artisanal Fishers (COLOPES) were created in 1989 (Decree N° 19141-MAG, La Gaceta N° 162, 28 Aug 1989) by the first Oscar Arias administration (1986–1990) to remedy the lack of organization of the artisanal fisher's sector and the failure of the fishing cooperatives. With ambitious goals, COLOPES were to function as a liaison between artisanal fishers and the former General Directorate of Fisheries Resources and Aquaculture (today's INCOPESCA). One COLOPES could be created per fishing community, with a minimum membership of 40 fishers.

Lack of realistic decree specifications and institutional and legal support brought about conflicts among artisanal fishers. Moreover, the following government (the 1990–1994 Rafael A. Calderón administration) did not support the initiative. By 1995, only five out of 40 COLOPES remained (González 2011, INCOPESCA, Golfito Regional Office, pers. comm.; Villalobos-Chacón 2011, pers.comm.).

In summary, Costa Rican government efforts to organize artisanal fisheries through "top-down" initiatives such as cooperatives and COLOPES may be understood as an attempt by the State to anchor its presence in these communities and/or to delegate its responsibilities. After two failed attempts in the 1980s, the disillusioned Costa Rican artisanal fishers would not try new forms of organization until the late 1990s, when they began creating Associations on their own, without state support. Nowadays, the most common types of artisanal fisher organizations are associations and cooperatives (OSPESCA 2010).

10.5.2.3 Marine Areas for Responsible Fishing (AMPRs)

In 2007, fishers of the CoopeTárcoles R.L. cooperative, with support of CoopeSoliDar, submitted to INCOPESCA a custom-made proposal for the creation of a fisheries management area, a "Community Marine Area for Responsible

Table 10.2 Data about the first seven Marine Areas of Responsible Fishing (AMPRs) officially established in Costa Rica. Acronyms and their definitions include: ASOPECUPACHI, the Association of Line-fishers of Palito de Chira; FENOPEA, the National Federation of Artisanal Fishers Organizations and Affiliates; CoopeTárcoles, Tárcoles' fishermen cooperative; ASOMM, the Mixed Association of Montero; and AJDIP, the Agreement of the Costa Rican Institute of Fisheries and Aquaculture (INCOPESCA) Governing Board

AMPR	Communities/fisher organizations involved	Size (km^2)	Date of creation	AJDIP
Palito de Chira	Palito/ASOPECUPACHI	0.01	10/22/2009	315-2009
Golfo Dulce	La Palma, Puerto Jiménez, Puerto Pilón, Río Claro de Pavones, Zancudo, Golfito, Puntarenitas de Golfito, La Purruja/FENOPEA	≈700	06/11/2010	191-2010
Tárcoles	Tárcoles/CoopeTárcoles	273.2	05/27/2011	193-2011
Palito-Montero	Montero/ASOMM	6.31[a]	03/29/2012	154-2012
Puerto Níspero	Puerto Níspero/Aso. pesc. local	2.6	03/29/2012	160-2012
Isla Caballo	Isla Caballo/Aso. pesc. local + tourism development	1.48	04/13/2012	169-2012
San Juanillo	San Juanillo, Lagarto, Punta Guiones, Playa Pelada, Nosara Asociación de Pescadores de San Juanillo	56.2	02/15/2013	068-2013

[a] Size of the combined Palito and Montero AMPR, datum provided by E Ross Salazar and M Castro 2013, pers. comm., Fundación MarViva

Fishing", that would recognize the efforts of the Tárcoles fishers for the sustainable exploitation of their resources. This prompted the appointment of a mixed government-cooperative-NGO commission (INCOPESCA, MINAE, CoopeTárcoles, CoopeSoliDar, and marine resource conservation NGOs) to develop a national proposal. However, during the negotiations, INCOPESCA dismissed the community role in management, characterizing it as an exclusive use of fisheries resources, which is a public good (CoopeSoliDar 2010a).

By April 2008, the INCOPESCA Board of Directors approved the regulations for the establishment of Marine Areas for Responsible Fishing (AMPRs) at national level. This decision meant a positive step for participatory governance of natural resources in Costa Rica in contrast with the trends seen for national protected areas (see Sect. 10.4), even though it came from an institution concerned with resource exploitation rather from one focused on conservation. According to the Decree N° 35502-MAG, an AMPR has "significant biological, fisheries or socio-cultural characteristics" and well-defined geographic boundaries. Under this management regime, "fishing activity is regulated to ensure the use of fisheries resources for the long term and in which, for its conservation, use and management, INCOPESCA can count on the support of coastal communities and/or other institutions". Under this decree, INCOPESCA shall give priority to AMPR proposals from fishers' organizations. Requirements for submission include: (1) documents proving valid legal standing of the organizations requesting the AMPR; (2) biological, fisheries and socio-cultural characteristics justifying the AMPR creation; (3) socio-economic diagnoses of the organizations' members; and (4) a spatially-explicit management plan.

According to the Decree, the AMPR proposals are to be drafted in a participatory manner with the support of INCOPESCA, or any other institution or organization. Based upon the information provided, an *ad hoc* 6-member Working Group, made up of four representatives of INCOPESCA, one from MINAEM and two from local fishers' organizations, has 2 months to develop a fisheries management plan (Plan de Ordenamiento Pesquero, POP). The management plan implementation is overseen by a local Monitoring Commission (Comisión de Seguimiento), consisting of two INCOPESCA representatives and one member appointed by the fishing community, all with their corresponding substitutes. Access, fishing and other maritime and coastal activities including tourism are allowed for any stakeholder in good standing, as long as it is authorized by the POP. Seven AMPRs have been approved between 2009 and 2013, all of them located on the Costa Rican Pacific coast, in or surrounding Golfo de Nicoya and Golfo Dulce waters (Table 10.2). The first three AMPRs implemented are discussed here, with their histories analyzed and compared.

AMPR Tárcoles

Tárcoles, at the southern end of Golfo de Nicoya, is a Type B fishing community where artisanal activities form an important part of the community's business (*sensu* González Álvarez et al. 1993; cf. Sect. 10.2.2). The petitioning organization, CoopeTárcoles R.L. founded in 1985, is one of the three surviving from that decade's cooperative boom. Its members' commitment to the cooperative movement, along with some operative changes, preserved it from dissolution during the 1990s (Herrera-Ulloa et al 2011; Villalobos-Chacón 2011, pers. comm.).

Currently, Tárcoles is the only Costa Rican fishing group integrating the entire food chain, from production to marketing to selling. The cooperative strengthened since 2000 through its association with CoopeSoliDar. Focusing initially on the socio-economic benefits for its members from fish production and sales, it currently seeks to advance sustainable fishing, improve the quality of life of Tárcoles fishers and residents, promote the artisanal fisheries culture, and develop economic alternatives (Bowman 2011; CoopeSoliDar 2006, 2010b; López et al. 2007; Rodríguez Chaves 2008). Cooperation between both groups generated many

projects, e.g., Code of Responsible Fishing, community monitoring of landings, socio-economic diagnostic, cultural celebrations, product certification (CoopeSoliDar 2010b). Collaboration was consolidated in 2007 through the foundation of Por La Mar Consortium R.L., a small marine ecotourism business.

Following the publication of the AMPR decree, CoopeTárcoles, joined by CoopeSoliDar, was the first fishers' organization to submit an AMPR proposal in May 2008. Yet, instead of the 2 months stipulated in the decree, three more years passed until its official creation (May 2011) due to laborious negotiations to exclude the semi-industrial trawling fleet from the coast to the 15-m isobath. Meanwhile, the first AMPR was officially declared in *Palito*, followed thereafter by the AMPR *Golfo Dulce*.

AMPR Palito, Isla Chira

In the mid-1990s, hand-line fishers of Palito of Isla Chira (Golfo de Nicoya, Fig. 10.1) declared a zone of rocky reefs in front of the village as an "Area of Responsible Fishing". In this area, only hand-line fishing was allowed, and community members enforced it by patrolling. The community is classified as Type B, similar to Tárcoles (*sensu* González Álvarez et al. 1993). The initiative was not granted official recognition nor legal or technical support. In 1995, at the request of the fishers, the then newly created INCOPESCA declared the zone exclusive for hand line fishing.

Given insufficient government support, together with the Chira Ladies Ecotourism Association (AEDC, *Asociación Ecoturística Damas de Chira*), the Association of Hand-line Fishers of Palito, Chira Island was created (ASOPECUPACHI, *Asociación de Pescadores Cuerderos de Palito Isla Chira*). In 2003, the Global Environmental Fund Small Grants Programme (SGP-UNDP-GEF) funded the purchase of buoys to improve monitoring and protection of the zone (Hernández 2011). The establishment of the association and the visible boundaries of the area brought obvious benefits: (i) fishing from outsiders declined, (ii) Coast Guard surveillance, albeit sporadic, gradually increased, and (iii) artisanal fishing tours with the AEDC generated additional income.

Nevertheless, institutional support remained weak and the community surveillance of the zone left the fishers feeling unrewarded and disenfranchised. Eventually, Palito fishers' efforts received recognition nearly 15 years after declaring their protective zone, by becoming Costa Rica's first AMPR in October 2009, "only" 9 months after submitting their application to INCOPESCA. It was then visited by government dignitaries and received international attention (Babeu et al. 2012; Solís-Rivera et al. 2012).

Monitoring by INCOPESCA showed that conservation efforts of the Palito fishers since the mid 1990s resulted in (i) sustainable fish landings, (ii) increased abundances of spawners of large-size prime commercial species (*primera grande* category) and (iii) creation of secondary income (from tourism and associated benefits) (Marín Alpízar et al. 2010). In addition, artisanal fishers of Palito noticed anecdotal changes in 2011: "Before, there were only 8 days of fishing each month, four before and four after full moon. Now the situation has changed, fishing is good almost every day. You can almost hear the fish and shrimp breed" (María Eugenia Fernández, Esteban García and Gabriel Cruz, artisanal fishers of Palito, 2011, pers.comm.). This example inspired nearby fishing communities to propose their own AMPRs to the government. The AMPR Palito was extended to Montero on the north side of Chira Island in March 2012, while others were created elsewhere in the gulf (Puerto Níspero, Isla Caballo, Table 10.2).

AMPR Golfo Dulce

Artisanal fishers of Golfo Dulce have been organized in seven local associations since early 1990s. Notwithstanding, artisanal catches have been declining while sport, tourism, and above all, semi-industrial fishing were expanding. In 2007, following a decade of cooperation with NGOs and universities (Feutry et al. 2010; Germain 2004; Guzmán-Mora 2013; Guzmán-Mora and Molina Ureña 2008; Hartmann et al. 2002; Lagunas Vazques 2004; Magnin 2004; Poirout 2007; Silva and Carillo 2004; Stern-Pirlot and Wolff 2006), the collaboration between small-scale fishers and the Osa Socio-environmental Center (CSAO, a local grassroots group) gave rise to the Commission of Artisanal Fishers of Golfo Dulce (COMPESCA-Golfo Dulce, Gómez Quijano and Tavares Almeida 2007), with advisory support from consultants and researchers. COMPESCA consolidated the fishers opposition to a MINAEM-proposed extension of the marine portion of Piedras Blancas National Park, on the northeastern shores of Golfo Dulce (Fig. 10.1). It also voiced the fishers socio-economic concerns about other government conservation projects in the area, in particular, a management plan for the South Pacific Multiple-Use Marine Area (AMUM-Pacífico Sur) (Gómez Quijano and Tavares Almeida 2007). COMPESCA then multiplied initiatives (e.g., inter-agency meetings and workshops, integration into a national federation of small-scale fishers), submitted counter-proposals for resource conservation and addressed the decline in Gulf fisheries and conflicts of use with semi-industrial and sport-fishing fleets (Glénard 2008; OSPESCA 2008).

The Gulf's artisanal fishers regrouped in March 2009 as the National Federation of Artisanal Fishers Organizations and Affiliates (FENOPEA), with the aid of the National Workers' Union (CMTC) (Fargier 2009, pers. obs.). The same year, the Tourist Fishing Association of Costa Rica

(APTC) proposed to fund sustainable fishing in Golfo Dulce through foreign donations. APTC lobbied the Gulf's artisanal fishers to seek the creation of the AMPR Golfo Dulce under several management approaches and actions towards this sector. The proposed management approaches included exclusion of shrimp-trawler fleets from the Gulf, gill netting ban, grants and training for alternative selective gear, fishing licenses, exclusive access to fishery resources, and long-term financial assistance to each small scale fisher's association. FENOPEA accepted the proposal, while negotiating and expecting further terms, such as the development of new conservation projects, business options for small-scale fishing tourism, and a United States Dollar (USD) $ 40,000 compensation per fisher for the buy-back of gill nets and unrealized income (Fargier 2009, pers. obs., (Rocha 2009, FENOPEA President, pers. comm.)

The AMPR *Golfo Dulce* was officialized by INCOPESCA in June 2010, 10 months after the proposal submission. Comprising the entire gulf, it is the largest of its kind in Central America to date (Table 10.2). INCOPESCA issued new licenses to most local artisanal fishers (Cordero 2010) and the Costa Rican Touristic Fishing Federation (FECOPT, created in 2009) awarded a USD $ 20,000 grant to each of the participating Fishers Associations.

In 2012, FECOPT, including APTC among other country-wide sports fishing association, updated its name to FECOP (Costa Rican Federation of Fishing), accordingly with the expansion of its goals scope and interests.

Unlike the previous two areas (Palito and Tárcoles), this AMPR declaration process fulfilled none of the AMPR decree's application requirements, nor did it meet FENOPEA's expectations. The FECOPT-funded proposed management plan did not reflect the products of a collaborative process. The semi-industrial shrimp fleet was excluded from the Gulf before the formal declaration of the AMPR, by means of an undisclosed financial compensation process. As a result, the artisanal fishers took their disappointment to the regional INCOPESCA office in Golfito and street-protested to stop the AMPR declaration procedure (the "voice" response, as called by Hirschman 1970; PRETOMA 2009).

After the initial implementation of the AMPR regulations, the artisanal sector has retired twice from the Monitoring Commission (2012 and 2013). At the time of writing this chapter, artisanal fishers have no representation in the Commission. Furthermore, by the end of 2013, FENOPEA was showing evidence of disintegration, with its original associations regrouping under a different structure (Molina-Ureña, pers. obs.).

10.6 Comparative Analysis

We carried out a five-way comparative study of co-management processes for sustainable coastal activities among AMPRs Golfo Dulce, Palito and Tárcoles (Gulf of Nicoya) and the National Parks of Cahuita and Marino Ballena. The comparison was based on 32 conditions considered necessary for a successful co-management process, as detailed in Fargier (2012). A score of 100 % indicates that all 32 conditions were fulfilled. It must be noted that the list of conditions contributing to the decision matrix is not exhaustive, and all conditions do not need to be fulfilled to accomplish a successful co-management process. Nevertheless, most authors agree that the probability for a successful co-management process increases with the number of fulfilled key conditions (Gutiérrez et al. 2011; Pomeroy and Andrew 2011). Based on this comparison, the three top-scores, Tárcoles (85 %), Cahuita (76 %) and Palito (62 %) were clearly distinguished from those of Golfo Dulce (34 %) and Marino Ballena (29 %). We then identified ten key conditions to validate the development of a small-scale co-management fishery process in Costa Rica (Table 10.3).

Remarkably, the ranking of the five case studies remained unchanged when restricting the co-management analysis to these ten key conditions (Table 10.3). The analysis matrix also revealed that few conditions were favorable to the success of a co-management process in Golfo Dulce. Below we discuss and analyze the factors leading to this apparent lack of success.

10.6.1 Size, Complexity and Support

The size and geographic diversity of Golfo Dulce, the number of communities involved, and fluctuating support throughout the process are important factors that could explain the poor potential for small-scale fisheries co-management in the area. Indeed, defining clear and appropriate spatial boundaries of the area to be managed is considered a key factor in the success of the co-management process, that should also take into account ecological factors (e.g., common pool resources), management considerations, and the local fishing communities (Carlsson and Berkes 2005; Govan 2008; Jentoft et al. 1998; Noble 2000; Ostrom 1990; Pomeroy et al. 2003, 2011). However, the AMPR Golfo Dulce is vast (about 70,000 ha), almost three times larger than Tárcoles (27,320 ha), and more than 60,000 times larger than AMPR Palito (1.14 ha). Currently, AMPR Golfo Dulce is the largest marine area of its kind in Central America (Cordero 2010). Thus, while the people living around Golfo Dulce, especially fishers, have recognized its ecological and heritage value (van den Hombergh 1999), the majority of them do not know it entirely. Additionally, although the boundaries of the

Table 10.3 Key conditions required for the realization of a small-scale fisheries co-management process in Costa Rica. *Green*: Condition fulfilled. *Yellow*: Condition partially fulfilled. *Red*: Condition not fulfilled. Case studies definitions are: *GD* Marine Area of Responsible Fishing (AMPR)—Golfo Dulce, *T* AMPR—Tárcoles, *P* AMPR—Palito, *C* Cahuita National Park, *MB* Marino-Ballena National Park

Key conditions	GD	T	P	C	MB
1. Clearly defined boundaries					
2. Pre-existing local organisations (legitimate & representative)					
3. Good local & political will					
4. Creation of an adequate management commission with legal backing					
5. Participation to decision making (collective choice arrangements)					
6. Technical support (external agent: non-governmental organization (NGO), barefoot ecologist, etc.)					
7. Congruence in the distribution of costs & benefits rules					
8. Transparency and trust					
9. Leadership					
10. Territorial identity					

AMPR-GD are precisely and formally defined, fishers that did not participate in their creation do not know them well.

The hasty creation of the very large AMPR Golfo Dulce differs from the slower and more gradually established, smaller AMPRs in the Gulf of Nicoya (Fig. 10.2). A slower process facilitates better adaptation to the local socio-economic and environmental conditions and fosters ownership by the local fishers' communities (Marín Cabrera 2012). The complexity, size and fast creation of the AMPR-GD arguably let to difficulty in its management, monitoring, and a sense of "topophilia" (i.e., people's identification with the geographical area including their sense of belonging and cultural roots; Fonseca-Borrás 2009; Pinkerton 2005). A contributing factor is that most fishing communities in Golfo Dulce are Type A (i.e., recently established after the arrival of squatters; *sensu* González Álvarez et al. 1993). The latter aspect may also hinder "ownership" (i.e., the engagement and participation of fishers in the management process (Govan et al. 2008; Pomeroy et al. 2001, 2011).

Due to Golfo Dulce's geography, the dispersal of fishing communities and the deficient public transportation infrastructure, a fisher requires 1–3 days to attend a meeting anywhere along the Gulf. This travel time represents a loss in fishing days, which complicates the ability to assemble members of the co-management group. Thus, the Gulf's artisanal fishers meet less frequently than those of Tárcoles, Palito, Cahuita and MarinoBallena. Moreover, most meetings are attended only by the association presidents. At the community level, in Palito or Tárcoles, where only one local organization is involved, fishers may speak for themselves and legitimacy is not an issue. However, for Golfo Dulce, where FENOPEA represents nine fisher's organizations, representatives speak for their peers and legitimacy might be a problem (Jentoft 2000).

Legitimacy issues at the grass-roots level come about regularly within fisheries co-management of Costa Rica (Quintero et al. 2009). For Golfo Dulce, it primarily concerns trust toward FENOPEA's delegates and the legitimacy of their decisions, especially in the face of existing conflicts within and among the member organizations (Fargier 2012; Fonseca-Borrás 2009; Jentoft 2000; Jentoft et al. 1998). In Marino-Ballena National Park, the lack of representativeness of ASOPARQUE, composed of 22 organizations, was one of the reasons given by the Comptrollership of the Republic to put an end to its co-management process (DFOE-AM 2005).

Unlike CoopeTárcoles, Golfo Dulce artisanal fishers' associations have not benefitted from long-term and steady external assistance. External support is considered another key factor in the success of a co-management process (Carlsson and Berkes 2005; CBM 2003; Chuenpagdee and Jentoft

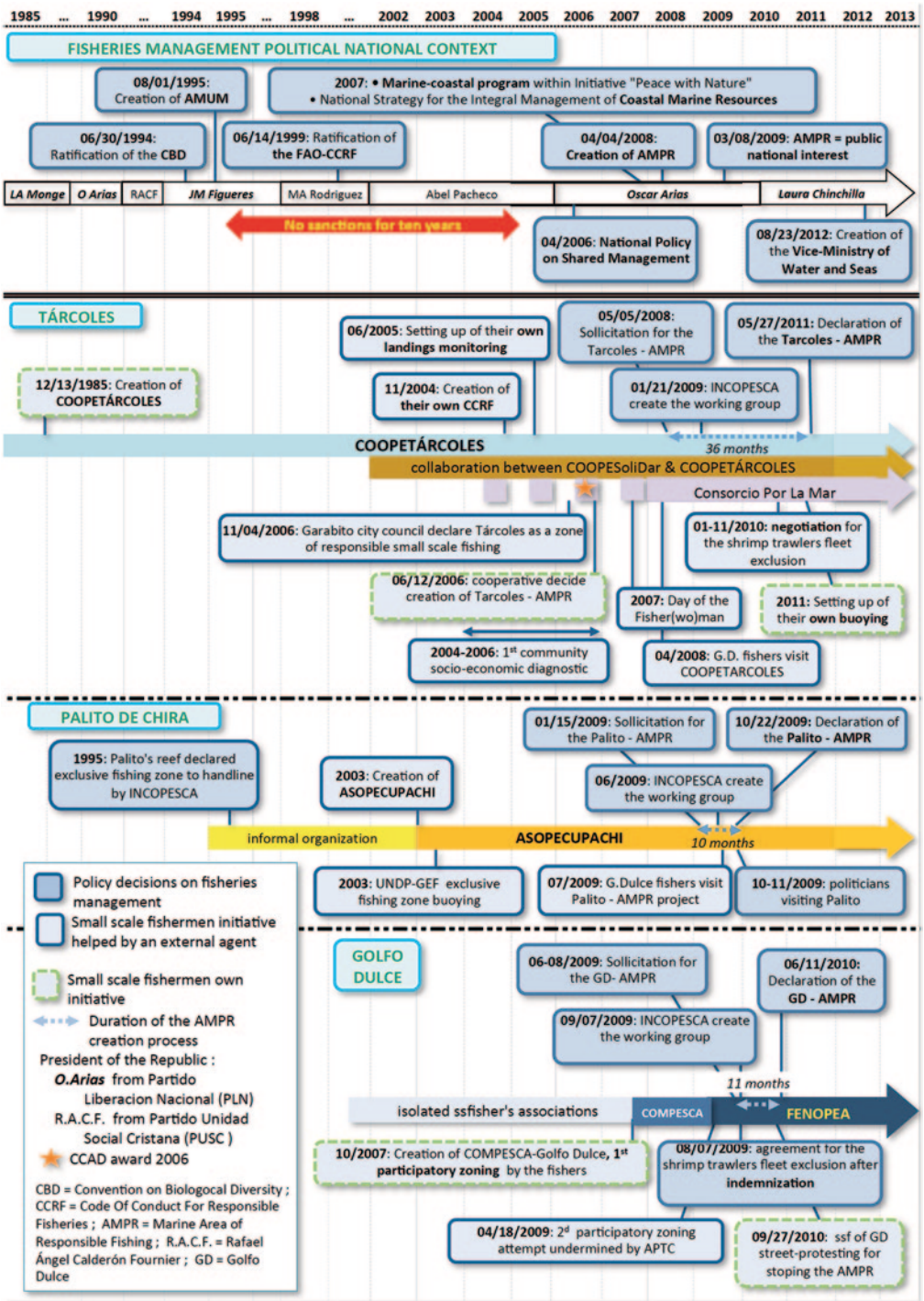

Fig. 10.2 Timeline of the declarations of the Marine Areas of Responsible Fishing (AMPRs) of Palito, Tárcoles and Golfo Dulce

2007; Govan 2008; Luna 1999; McConney and Baldeo 2007; Nuñez Saravia 2000; Pomeroy and Berkes 1997; Pomeroy et al. 2001, 2004, 2011). The type of support varies and it can include organization of meetings and workshops, initial site assessments, appraisals, environmental education and training, facilitating and mediating dialogue between resource users and government to aid the search for partners and financial aid. In Central America, external organizations commonly provide such assistance (i.e., an NGO, development agency, sponsor, foundation, university or other institution; Nuñez Saravia 2000).

The social service cooperative CoopeSoliDar has been working with the Tárcoles community for more than a decade, showcasing particularly its cooperation with CoopeTárcoles (CoopeSoliDar 2010a; Rodríguez Chaves 2008). What began as a pilot project received recognition and diversified to become a full-fledged and continued engagement. The cooperation between the two organizations obtained in

2006 the Prize of Technological Innovation from the Central American Commission for Environment and Development. In 2007, the Por La Mar Consortium was founded, a micro-enterprise facilitating local eco-tourism. Through this process, CoopeSoliDar seemingly passed from a simple external agent to a leading party in the co-management process of the AMPR Tárcoles.

In Golfo Dulce, despite regular initiatives by NGOs and universities (Feutry et al. 2010; Germain 2004; Guzmán-Mora 2013; Guzmán-Mora and Molina Ureña 2008; Hartmann et al. 2002; Lagunas Vazques 2004; Magnin 2004; Poirout 2007; Silva and Carillo 2004), long-term and continued assistance to small-scale fishing communities has been deficient. The support of the Centro Socio-ambiental de Osa (CSAO) for the creation of COMPESCA and its proposed marine spatial planning for Golfo Dulce by participatory mapping, are the only ones to date involving most artisanal fishers of the Gulf (Gómez Quijano and Tavares Almeida 2007). The CSAO was an organization for conservation and local development run by a single person assisted temporarily by specialists, situated at La Palma, a relatively isolated community of the inner Golfo Dulce. With only minimal financial support, this cooperation ended in 2009 with the creation of the federation FENOPEA.

Paradoxically, more NGOs have been present in Golfo Dulce than elsewhere along Costa Rica's Pacific coast (i.e., about 15 active organizations, more than for Isla del Coco National Park and for the Golfo de Nicoya; TNC 2011). A recent comparative study about stakeholder roles and interactions for AMUMs of Golfo de Nicoya and the South Pacific zone indicates that the stakeholder network in the Golfo Dulce region is controlled by NGOs. Most of them are based outside the local region, suggesting a lack of local leadership (Marín Cabrera 2012). Nevertheless, leadership is considered by Gutiérrez et al. (2011) as the most important attribute contributing to success of co-management. Until now, many NGOs have preferred specific-target projects over a long-term strategy. Often lacking informed consent, data have been collected without restitution of results to the involved parties and without leading to tangible benefits for the locals. Fishers feel that they have been taken advantage of, or that the information that they provided was used against them. This situation can lead to distrust (Silver and Campbell 2005), as the following quotations from a local artisanal fisher reflect:

> The fisher is never incorporated into the project, he is only invited to workshops and meetings and at the end he signs the assistance sheet used as a validation to what has been said, but in reality the fisher doesn't participate in the project.
>
> They make us to give all sort of information, but afterwards none of the organizations [of fishers] has control over the information it has provided, it has no authority over it.
>
> This has led to a distrust of organizations, because we have collaborated but in exchange our [fishing] space has been reduced.
>
> The biological studies should not only look at the resources but also the effects of the resource use limitations on the fishers. It is not possible that fishers collaborate and that then the information becomes a string around their own neck! .
>
> -Juan, artisanal fisher, Río Claro, 2011 pers. comm.

Because of distrust by local fishers, FENOPEA became an important actor for Golfo Dulce and has been trying to position itself since 2009 as a "development broker" (Chauveau and Jul-Larsen 2000; Olivier de Sardan 1995). FENOPEA appears as a meeting and coordination entity but it doesn't carry out concrete actions or strong alliances. In order to obtain external resources and redistribute them to local fisher's organizations, the federation continuously tries to expand collaborations with NGOs (e.g., MarViva, PRONATURE, Tsikita Foundation), national institutions (e.g., Mixed Institute of Social Aid [IMAS], National Institute of Vocational Training [INA] and Ministry of Agriculture–[MAG]), as well as international institutions (e.g., UNDP-GEF and FAO), although with little success. Instead of concentrating on the affiliated Associations' necessities, this strategy of diversifying activities and pursuing alliances weakens the federation and fosters dependence on NGOs and institutions (Marín Cabrera 2012).

10.6.2 Manipulation of the Golfo Dulce Artisanal Fishers

10.6.2.1 Participation

Participation of all parties, and particularly resource users, is an essential ingredient of a co-management process (Carlsson and Berkes 2005; Fonseca-Borrás 2009; Pomeroy et al. 2001, 2003, 2011; Pomeroy and Carlos 1997). However, the recommended period of intervention during the process varies according to the authors. Many authors believe that the earlier the involvement of the resource users, the higher the probability of a successful outcome (Chuenpagdee and Jentoft 2007; Pomeroy and Carlos 1997; Pomeroy et al. 2001, 2011). In addition, neither an endogenous (originating from the resource users) nor an exogenous (originating from an external agent or government) initiative will ensure the success of a co-management process (Weigel et al. 2007).

The idea for proposing the AMPR Golfo Dulce arose externally from the local tourism fishing sector. Even though artisanal fishers quickly embraced it and got involved in the early stages, their perception is that their sector was manipulated from the outset of the AMPR process. Larger monetary compensation was provided to the Puntarenas-based semi-industrial shrimp trawler owners, while local artisanal associations were compensated to a much lesser extent, thus making apparent that the tourism fishing sector had its own agenda.

Particularly, many FENOPEA associates feel that the creation of the AMPR was a means for tourism fishing operators to advance lobbying efforts and assert their claims at a national scale. Case in point, previously agreed gear restrictions aiming at the conservation of game fish and their prey within the Gulf were unilaterally changed at the last minute before being submitted to the INCOPESCA board, at the potential expense of the livelihood of artisanal fishers.

> The AMPR Golfo Dulce was not an initiative of the fishers, but of foreign institutions. We fishers backed it up to be able to fish more, eliminate gillnets, regulate hooks and longlines, fish with handlines and fish for subsistence, but now they pressed and squeezed us until they hardly still let us fish.
> Chichi, artisanal fisher, Puerto Pilón, 2011, pers. comm.

Moreover, collective choice rights, i.e., the possibility to participate in modifying operational rules that structure day-to-day management activities—also called "right of management" (Ostrom 1990) or "first order governance" (Kooiman 2003), are particularly important for achieving good governance of a common resource. For example, fishers in Tárcoles and Palito proposed zoning and associated operational rules to the corresponding AMPR working groups. Tárcoles incorporated balanced numbers of CoopeTárcoles fishers, government officials, unassociated local fishers, municipality, and Coast Guard representatives, with CoopeSoliDar as observers. This relatively broad representation favored transparency and improved the chance of success for the co-management process. Besides, the CGR's Cahuita study welcomed the opening of the Management Committee to other groups in the community, fostering transparency in the park's management, and thus increasing the confidence and sense of belonging of the community to it (Fonseca Borrás 2009).

Similarly, the composition of the AMPR Tárcoles Monitoring Commission appears balanced, with an equal number of fishers and INCOPESCA representatives. Thus, fishers participated fully in the development of "collective-choice rules" and could be classified as "proprietors" (*sensu* Schlager and Ostrom 1999). Furthermore, since CoopeTárcoles' fishers participated in the development of their community fishing proposal leading to the national AMPR decree, we can consider that they also participated in the "supreme" level of Schlager and Ostrom's (1999) property rights classification, namely the development of constitutional rules determining how the collective choice rules are designed (or "second order governance", Kooiman 2003). In Palito, the AMPR Monitoring Commission is less balanced, as small-scale fishers are in the minority. Here, the latter may be classified as *authorized users,* holding only operational rights of access and withdrawal (Schlager and Ostrom 1999).

By contrast, in Golfo Dulce only one artisanal fisher participated in the 8-member AMPR *ad hoc* Working group. Fishers did not participate in the zoning process despite various participative zoning workshops backed up by university researchers (Fargier 2009, 2012; Glénard 2008; Poirout 2007) nor did they in the elaboration of the associated operational rules. Moreover, the Monitoring Commission consisted of 11 members (instead of the decree-specified three members), including two sport-fishing representatives and only one artisanal fisher, who was not systematically convoked to all meetings. Thus, the artisanal sector may be classified as *authorized users* who did not participate in the development of zoning and operational rules.

> The fishers ought to be part of the management actions of an area of responsible fishing. But for the AMPR Golfo Dulce, fishers don't participate in management decisions. As I see it, it's the MINAEM, MarViva and the tourism sector who manage it.
> -Elvis, artisanal fisher, Puerto Pilón, 2011, pers. comm.

In summary, the role of small-scale fishers in the AMPR Golfo Dulce process could be characterized as manipulative, according to Pretty's (1995) typology of participation. Participation is then considered as a pretense and users do not have any power, whereas fishers should take part in joint analysis (interactive participation, *ibid*.). As CoopeSoliDar advocated since its inception of collaboration with CoopeTárcoles, participation should be seen as a right, and not just as a means (Solís and Madrigal 2004).

10.6.2.2 Economic Incentives

In Golfo Dulce, promises concerning the development of economic alternatives and improving the quality of life of artisanal fish workers were not honored. Yet, it is essential that the resident populations involved in the process of declaring a protected area are not prejudiced, given their dependence on access to natural resources for livelihood, especially in remote rural areas, where peoples' welfare are intimately linked to nature (Weigel et al. 2007).

> The fishers have supported the creation of the AMPR to get the shrimp trawlers out [of the Gulf] and to improve the fishing. But this was done with commitments that never were met. These included, among others, the payment for our fishing nets, but since we did not have licenses, they said they could not pay us.
> -Santos, artisanal fisher, Puerto Pilón, 2011, pers. comm.

One of Ostrom's eight principles (Ostrom 1990; Pomeroy et al. 2011) stresses the balance between benefits and costs of management measures for the fishing households. If management measures are to be sustainable, profits must be higher than the costs they generate. While in the long term, resource conservation will be beneficial to all fishers, the short-term goal of any resource user involved in a process of co-management is to maintain or improve his/her quality of life (Nuñez Saravia 2000). Analyzing Southeast Asian fisheries co-management, Evans et al. (2011) revealed that the best indicators for evaluating success of a co-management process were revenue and well-being, rather than resource

status. The authors attribute such improvements to the development of economic alternatives and accompanying measures (e.g., micro-credits).

Thus, in Palito and Tárcoles, fishing household benefits outweighed costs due to the creation of coastal ecotourism projects. Conversely in Golfo Dulce, the new AMPR management measures were not accompanied by alternative economic projects. As a result, Fargier (2012) observed that the socio-economic situation of most fishers had degraded, less selective and environmentally more damaging bottom gear was introduced, disobeying rules (notably, introduction of illegal small artisanal bottom trawls, which represent a form of "exit response" as defined by Hirschman 1970).

10.6.3 Transparency of Procedure

From its beginning, the procedure for the creation of the AMPR in Golfo Dulce lacked transparency. For example, the preparatory working group was formed with only three of the seven legally required conditions of the decree for establishing an AMPR. INCOPESCA accepted the application as soon as two conditions had been met: an *a priori* acceptance for establishing the AMPR from the artisanal fishers, and a commitment to cease fishing in Golfo Dulce from the semi-industrial shrimp-trawling sector. Both were negotiated with financial compensation.

As written, the Golfo Dulce fisheries management plan (POP), ostensibly funded through the sport and tourism fishery sector (APTC-FECOPT), appears largely copied from previous reports (Fargier 2012; Gómez Quijano and Tavares Almeida 2007; Morera Quesada and Vargas Bonilla 2009). Artisanal fishers did not participate in its elaboration and were not informed about its progress. Moreover, an INCOPESCA high ranking officer was given a leave of absence for a consulting job with FECOPT to elaborate the POP, raising the question of conflict of interests.

Finally, the issue of legitimacy of the monetary compensation process to shrimpers has been raised by several sectors of stakeholders, leading to distrust by civil society and artisanal fishers in particular (Constitutional Court Resolution No. 2010-1315, July 20, 2010). Given the tenure of the semi-industrial fishing sector in the INCOPESCA Board of Directors, the apparent fast-track completion of declaration of the AMPR-GD skipped other alternatives, such as specific legislative or executive decisions, as was the case in the Golfo de Nicoya and the National Parks.

Indeed, if we compare the three AMPRs examined in this study, Golfo Dulce is undoubtedly the most complex (the largest, with more professional groups, and one of the least studied), though the declaration procedure lasted only 10 months, not longer than for the AMPR Palito, 60,000 times smaller and involving only one fisher's association (Fig. 10.1). The declaration of the AMPR Golfo Dulce in June 2010 certainly recognized the 10-year effort of artisanal fishers for a sustainable use of its coastal resources. However, their participation in management during conception and implementation of the AMPR appears fictitious, revealing a diversion from the original purpose of this protected-area category.

Being major users of the in-gulf fishery resources, the artisanal sector's *de facto* absence from the AMPR-GD Monitoring Commission defeats the purpose of the participatory management approach designed by INCOPESCA for AMPRs. It also endangers the basis of consented enforcement: if the fishers feel strongly about the perceived lack of legitimacy to the regulations, it is nearly impossible to ensure they will respect them. Up to now, no concerted effort has been explicitly expressed by government agencies regarding the reincorporation of the small-scale fishing associations to the Commission. This neglect exerts a negative influence on the mindset of a sector that already feels outcast and marginalized by the state and the civil society.

10.7 The AMPR Golfo Dulce: What Lessons can be Learned?

10.7.1 The AMPR, a Tool for Small-Scale Fisheries Co-Management in Costa Rica?

As noted by the Estado de la Nación (2008) report, Costa Rica is the country with the lowest proportion of co-managed protected areas in Central America. This statistic concerns mainly terrestrial areas, since conservation of the marine environment historically was neglected in Costa Rica and in the rest of the region. Given this precedent, we may ask: Would the AMPR current figure allow the participation of small-scale fishers' organizations in coastal fisheries co-management?

The original intention of the "AMPR—Decree" (N° 35502 MAG) was to recognize the efforts of artisanal fishing communities and to formulate a path towards sustainable use of coastal marine resources. The decree prompted fishing organizations to initiate the creation of an AMPR (Art. 2, *ibid*.) in a national political context where the idea of civil society participation in environmental management was losing ground. In other words, a bottom-up approach was established in a country where top-down policy has dominated environmental management.

According to the AMPR decree, through participative methods, fishers define their "Maritory" (Parrain 2012) and propose appropriate zoning and management measures justified on biological, fisheries and socio-cultural grounds (Art. 2, *ibid*.). The decree invites them to participate in the surveillance of the AMPR (Art. 7, *ibid.)*. Finally, the artisanal

fishers are supposed to participate in the Monitoring Commission, albeit as a minority (1/3 artisanal fishers against 2/3 INCOPESCA members (Art. 11, *ibid*.).

Under this procedure, the current AMPR would allow co-management as defined by Evans et al. (2011). In addition, our analysis shows that this system is best classified as *advisory co-management*, where users advise government on decisions to be made and government endorses or adapts these decisions (Sen and Raakjaer Nielsen 1996; Berkes et al. 2001a). Indeed, while fishers' organizations propose a management plan, INCOPESCA alone validates, modifies, or rejects it while maintaining a clear majority in the Montoring Commisssion. The three AMPR cases analyzed here reveal that the type of co-management implemented locally varied *de facto* according to the application of the decree texts, as evidenced by the difference in the process for establishing the management plan (participative or not) and by the different composition of their respective *ad hoc* Working Groups and Monitoring Commissions.

The feeling of empowerment for local communities usually improves their sense of stewardship, thus facilitating the achievement of a sustainable activity. Conversely, it would be expected that a perception of being powerless, manipulated, or under an illegitimate and repressive regulatory process, would bring about unsuccessful outcomes for sustainable fishing (Jentoft 2006). Thus, on the continuum of power sharing of authority and responsibility between government and community as described by Berkes et al. (2001a), we considered the co-management process in Tárcoles as *advisory* while it could be classified as *cooperative* in Palito, where users have some input into management and *informative* in the Golfo Dulce, where users are informed about decisions that the government had already made.

10.7.2 What is the Future for the AMPR in Costa Rica?

The AMPR declarations of Palito, Golfo Dulce and Tárcoles caused great interest among Costa Rican artisanal fishing communities and are now acclaimed by a number of them. Four new AMPRs have been declared, including three more AMPRs in Golfo de Nicoya: *Puerto Níspero, Montero-Chira* and *Isla Caballo*; the fourth, *San Juanillo,* is along the outer Nicoya Peninsula (Table 10.2). Additional AMPRs are being planned.

For interested communities, the AMPR would be a means to appropriate management of resources they exploit, and empower themselves in the stewardship structure; assure conservation of these resources, in particular through exclusion of the semi-industrial fleet from their maritory; develop non-extractive economic alternatives such as ecotourism; and validate their community efforts to organize themselves and apply good practices for sustainable fishing. Moreover, many see the AMPR accreditation process more streamlined than those of MINAEM's Marine Reserves (MR) and Marine Management Areas (MMA). In fact, the MINAEM categories require more constraints and steps along the way and need to be declared through legislative or executive processes.

Notwithstanding, the apparent AMPR success exacerbates two institutional problems, already mentioned previously. First, INCOPESCA lacks the institutional capacity and means to properly process all of the new AMPR applications. Second, the apparent success of AMPR overshadows MINAEM's efforts, including its *Costa Rica por Siempre* initiative, and accentuates the long-standing interagency conflicts for jurisdiction between both institutions (Cicin-Sain and Knecht 1998). Despite the two new marine management categories allowing artisanal fishing (MR and MMA), a majority of the artisanal fishers continue to mistrust MINAEM and oppose new protected areas it proposes. To complicate matters, AMPRs would not qualify as a management category contributing to the objectives of POWPA (TNC 2011).

A new conflict has arisen between INCOPESCA and MINAEM for administering MINAEM's new management categories. Currently it is unclear whether MRs and MMAs could superpose AMPRs and how they would be administered in detail. MINAEM would be responsible for overall management of the MPAs while INCOPESCA would define the respective fisheries management plans (e.g., zoning, gear, boats, access, etc.) in collaboration with the artisanal fishers organizations.

The implementation of MRs and more MMAs would help test these mechanisms of inter-institutional coordination. Two artisanal fisher's associations of communities on the outer coast of the Nicoya Peninsula (Coyote and Bejuco, north of the Caletas Ario Wildlife Refuge, Fig. 10.1), assisted by a national NGO, participate in a proposal for creating the *Nanyadure* MMA (Arauz 2013, PRETOMA, pers. comm.). If created, it would be the first MMA involving fishing communities. Furthermore, a pilot project extending south from Golfo Dulce to Punta Burica near the Panamanian border is being considered (TNC 2011). If successful, it could set the stage for a transboundary MPA, originally proposed in 2011 at an international regional participative workshop involving artisanal fishers, NGOs and institutions from both countries (Hartmann et al. 2012; Documentary "Si el mar me da, yo le doy", https://vimeo.com/33205185 last accessed 23 Apr 2014).

One last aspect could put the declaration of some AMPRs at risk, despite their current success: financial compensation to shrimp-trawlers for the creation of the AMPR-Golfo Dulce. As other artisanal fisher groups also want to exclude trawlers from their areas, the Golfo Dulce case could set a precedent that may inhibit the creation of an AMPR that is

not able to rely on an external donator, as was the case for Golfo Dulce.

10.8 Conclusions

The AMPR management category represents a legal framework that formalizes, for the first time, small-scale fishing activities and co-management in Costa Rica. Based on the experience with Costa Rica's first AMPRs, this management figure appears beneficial to small-scale fishers (see 10.5.2) and constitutes a step to recognize over 10 years of efforts for the conservation of the marine coastal resources they exploit. The type of co-management developed locally, from advisory to cooperative or even informative, according to the 'quality' of participation, appears to depend essentially on the actors and interested parties involved.

In the case of Golfo Dulce, fishers were deprived of proper initiatives including their right to participation in the process, and felt manipulated by other actors. Unlike Tárcoles and Palito, Golfo Dulces' fishers short-term economic situation declined, partly due to a lack of economic alternatives. However, over the long term, exclusion of shrimp trawling from gulf waters, *a priori* could assure better resource conservation by artisanal fishers, by reducing fishery conflicts and better applying good fishing practices. The AMPR-GD creation also legalized for the first time the activities and lives of many artisanal fishers (licenses and relocation of illegal precarious housing).

Concerning environmental effects, it is still too soon to evaluate them precisely. Resource assessment studies are undergoing at all three sites, in cooperation with universities, NGOs and the government that will allow comparisons with historical data (Campos 1989; CoopeSoliDar 2006, 2010a, b; Fargier 2012; Guzmán-Mora 2013; Lagunas Vazques 2004; Marín Alpízar et al. 2010; Molina-Ureña, unpubl. data; Poirout 2007). Currently, MPAs on the Pacific side are separated, on average, by 22.4 km and have a median size close to 54 km^2. When compared to those presented by Halpern (2003) and proposed by Shanks et al. (2003), Costa Rica is above average with good conditions for an incipient network of MPAs that would allow exchange between marine organisms populations (Alvarado et al. 2011). Notwithstanding, lack of buffer zones and unknown by catch of target fish species by shrimp trawlers operating around current AMPRs' boundaries make some observers skeptical about demonstrating scientifically sound ecosystem benefits (Arauz 2013, PRETOMA, pers. comm.).

Based on our comparative analysis along with recent publications about stakeholders in Costa Rica's Pacific AMUMs (Marín Cabrera 2012) and social dimensions of MPA management in four countries of Central America (Solís-Rivera et al. 2012), we propose five key recommendations for small-scale fishing co-management improvement in the region:

1. Increase the participation of artisanal fishers in the collective choice rules development process. In particular, the AMPR-Monitoring Commissions should balance the weight of the members. Tárcoles Commission could be used as a model.
2. Improve distribution of costs and benefits of management measures for artisanal fishers, in particular by introducing legal alternative fishing gear or economic options such as ecotourism.
3. Provide conditions fostering positive leadership skills, emphizising Golfo Dulce artisanal fishing groups. Appeal to recognized leaders to set up a group of stakeholders with a vision of community welfare.
4. Ensure transparency of actions (e.g., official invitations, committee minutes, prompt and open communication channels, decision-making process, etc.), in order to create a climate of trust and respect, which is currently lacking in the process.
5. In the Golfo Dulce case study: formalize the elaboration of an agreed strategic plan (mission, vision, objectives) that would provide guidance to establish strong alliances and prevent manipulation or dependence of FENOPEA on NGOs or other institutions.

As better biological data become available, additional recommendations include reformulating AMPR boundaries and creation of buffer zones set by biological criteria, to minimize the deleterious effects of external fishing and resource extraction (e.g. by catch, low water quality) on target species.

The future of the AMPRs, together with MINAEM's MR and MMA, will depend on the efficacy of inter-institutional collaboration among INCOPESCA, MINAEM, ICT, Coast Guard, Port Authority, Municipalities, Universities, NGOs, grass-roots groups, as well as the ability to coordinate their respective coastal resources conservation projects and visions (Alvarado et al. 2011, 2012). In August 2013, a precedent-setting ruling from Costa Rica's Constitutional Chamber of the Supreme Court banned shrimp bottom trawling in Costa Rican waters, until a significant by-catch reduction method could be demonstrated by scientifically sound studies (Sala Constitucional 2013). This judgment constitutes a keystone incentive for improving collaboration towards responsible marine coastal management.

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Appendix

Co-management potential evaluation matrix from a literature synthesis of case studies analyzing fisheries participative processes. Numbers in the references column correspond to the following publications: 1, Chuenpagdee and Jentoft (2007); 2, Carlsson and Berkes (2005); 3, Govan (2008); 4, Nielsen et al. (2004); 5, McConney and Baldeo (2007); 6, Geoghegan and Renard (2002); 7, Geoghegan et al. (1999); 8, Renard (2001); 9, Cumberbatch (2001); 10, Mahon and Mascia (2003); 11, Ravndal (2002): 12, Renard (1991); 13, Govan (2003); 14, Brown and Pomeroy (1999); 15, CARICOM-CFRAMP (1995); 16, Almerigi et al. (1999); 17, White et al. (1994); 18, McConney (1999); 19, Begossi and Brown (2003); 20, (Renard, 1991); 21, Pomeroy et al (2003); 22, Pomeroy et al. (2001); 23, Pomeroy and Carlos (1997); 24, Jentoft et al. (1998); 25, Noble (2000); 26, Fonseca-Borrás (2009); 27, Luna (1999); 28, Nuñez Saravia (2000); 29, (2003); 30, Ostrom (1990); 31, Nuñez Saravia (2005); 32, Pinkerton (2005); 33, Pomeroy et al. (2011); 34, Gutiérrez et al.

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