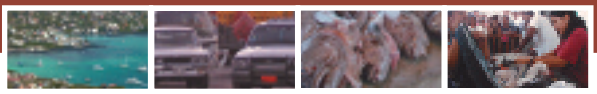

Social aspects of fisheries in Galapagos

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The Galapagos Marine Reserve (GMR), covering approximately 138,000 km^2, was established in 1998 as part of the Special Law for Galapagos. As a multi-use reserve, economic activities, including tourism and what is classified as 'artisanal' fishing, are permitted within its waters, while industrial fishing and the fleet from continental Ecuador are excluded. The law restricts fishing activities to members of local fishing cooperatives who carry artisanal fishing licenses (PARMA license – *Pesca Artesanal de la Reserva Marina Galápagos*) issued by the Galapagos National Park Service (GNPS). Basic information on the current composition of the fishing sector on the inhabited islands and an analysis of fishing effort for the spiny lobster, one of the primary fisheries, are presented.

The growth of the Sector and the overcapitalization of the fisheries have resulted in the collapse of the sea cucumber and decline of the spiny lobster populations.

The Fishing Register

The Galapagos fishing sector is made up of four cooperatives: COPESAN and COPESPROMAR in San Cristóbal; COPROPAG in Santa Cruz, and COPAHISA in Isabela. There are currently 1,006 fishers registered with the GNPS: 51.3% from San Cristóbal; 25.2% from Santa Cruz, and 23.5% from Isabela (Table 1).

The registration of new fishers in the GMR has decreased since 2002, when the Inter-Institutional Management Authority (IMA) closed the Fishing Register and established a five-year moratorium on new fishers. This coincided with the approval of the Five-Year Fishing Calendar. The small increase in the number of registered fishers in the last four years is a result of the incorporation of offspring of registered fishers from the different ports in the archipelago (Fig. 1). In December 2006, the IMA extended the moratorium for one more year. Over the last ten years, the activity of legally registered fishers varied depending on the season and the fishery (Fig. 1). For example, the sea cucumber fishery peaked at 1,229 fishers in 2000, when many members of the community who were not registered fishers were also observed harvesting sea cucumbers. In contrast, in 2001, only 597 fishers participated in this fishery. The spiny lobster fishery shows a similar pattern, with the number of active fishers rarely exceeding 700, except in 2000 and 2001. In almost every fishing season, fewer than 70% of the registered fishers participated.

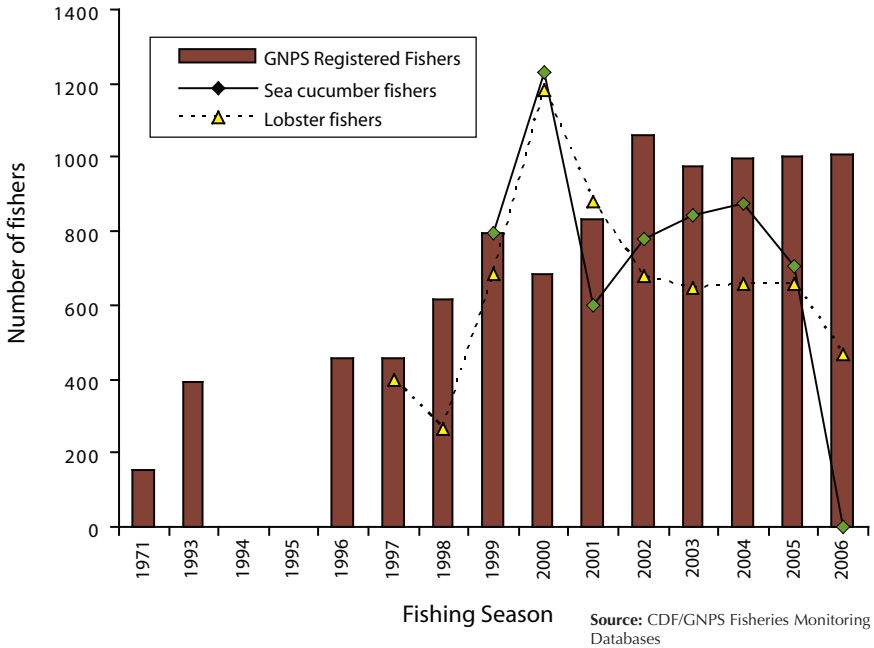
Most trips (75%) are carried out by a third of the registered fishers, suggesting that fishing effort is concentrated in about 250 of the 1,006 registered fishers.

Table 1. Fishers registered with the GNPS by island.

Island	Number of fishers
San Cristóbal	516
Santa Cruz	254
Isabela	236
TOTAL	**1,006**

Source: CDF/GNPS Fisheries Monitoring Databases

Figure 1. Number of fishers on the GNPS Fishing Register and the number actively participating in the spiny lobster and sea cucumber fisheries, 1971-2006



Source: CDF/GNPS Fisheries Monitoring Databases

Fishing effort: The lobster fishery – a case study

One of the prominent aspects of the lobster fishery, evident from the reports of individual fishers in their inspection certificates, is that during 2003-05, nearly half the fishers from both Isabela and Santa Cruz undertook fewer than 10 fishing trips per year (Table 2). In San Cristóbal, the figure was even higher, with 79% of fishers participating in fewer than 10 trips. The data do not discriminate between large and small boats, so the total number of trips from each island includes dinghies, fiberglass launches, and larger fishing boats. Another important fact is that inspection certificates indicate that the majority of trips (75%) were undertaken by only one third of the active fishers, suggesting that fishing effort is concentrated in only 250 registered fishers.

Table 2. Proportion of active fishers over the last three lobster fishing seasons, as a function of the number of registered trips between 2003 and 2005.

	Isabela	Santa Cruz	San Cristóbal
Fishers who carry out 50% of all fishing trips.	17 %	20 %	15 %
Fishers who carry out 75% of all fishing trips.	35 %	39 %	32 %
Fishers who register less than 10 trips in the last three years.	54 %	49 %	79 %

Source: CDF/GNPS Fisheries Monitoring Databases

Vessel capacities and activities

The total number of fishing vessels registered with the GNPS remained constant during the 2002-2006 Fishing Calendar, while the number of active vessels has fluctuated within each fishery. The largest number of registered vessels occurred in 2000, when 377 active vessels were recorded for the sea cucumber fishery and 328 vessels for the lobster fishery (Table 3).

Table 3. Number of fishing vessels registered with the GNPS that were active in the sea cucumber and spiny lobster fisheries, 1999–2005.

Year	Fishery	Large boats	Dinghies and launches	Total active vessels	No. Registered with GNPS
1999	Sea cucumber	52	170	222	222
	Lobster	No data	138	No data	
2000	Sea cucumber	54	323	377	417
	Lobster	42	286	328	
2001	Sea cucumber	31	199	230	426
	Lobster	36	287	323	
2002	Sea cucumber	45	230	275	446
	Lobster	28	276	304	
2003	Sea cucumber	42	271	313	446
	Lobster	20	228	248	
2004	Sea cucumber	42	284	326	446
	Lobster	29	280	309	
2005	Sea cucumber	28	243	271	446
	Lobster	27	245	272	

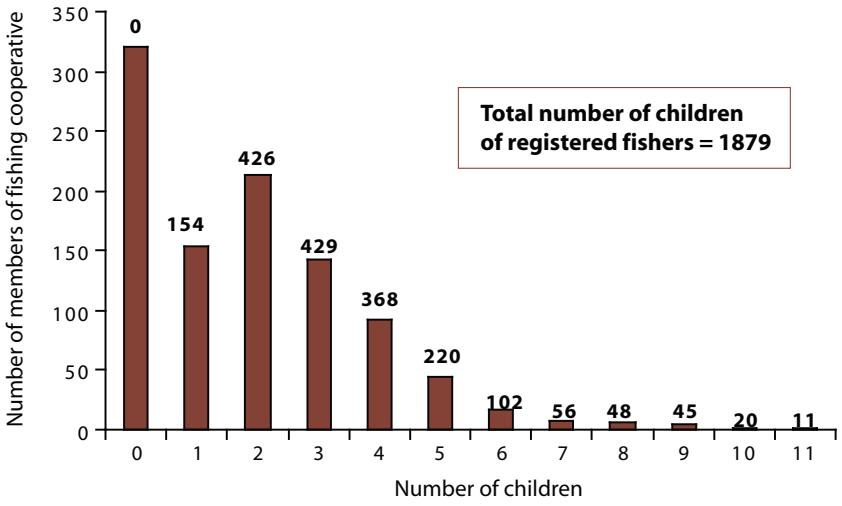
Source: CDF/GNPS Fisheries Monitoring Databases

Social aspects

Of the registered fishers, 983 are men (97.7%) and 23 are women. Over the last few years, none of the women have been recorded as having taken part in fishing activities. Most of the women on the register are vessel owners rather than active fishers.

An important fact that may help to predict the increase in fisher numbers over the next few years is that the members of the fishing cooperatives have 1,879 children among them (Fig. 2). According to the Fishing Regulations, the children of fishers may join the Fishing Register without completing any major requirements. This must be considered when developing projects or plans for the optimization of the fishing sector.

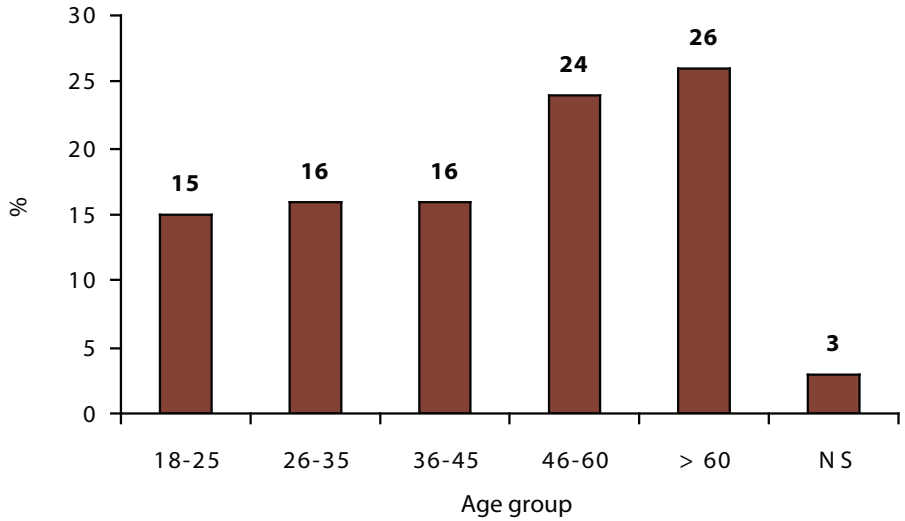
Figure 2. Number of children per fishing cooperative member. The numbers at the top of each bar indicate the total number of children represented by each column



Source: CDF/GNPS Fisheries Monitoring Databases

The age of fishers provides another indicator related to the performance and productivity of any fishing community. According to the Fishing Register, half of all members are over the age of 46 (Fig. 3), which suggests that few young fishers have joined the register in the last four years (potentially only 28 children of fishers).

Figure 3. Percentage of fishers by age group



Source: CDF/GNPS Fisheries Monitoring Databases

The future of fisheries in Galapagos

The Galapagos fishing sector experienced rapid growth in the latter half of the 1990s, primarily due to the boom in the sea cucumber fishery, which attracted a large number of immigrants, some of whom had experience with the sea cucumber fishery in continental Ecuador. The expansion of the sector and the over-capitalization of the fisheries have resulted in the collapse of the sea cucumber and decline of the spiny lobster populations. This has propelled a search for solutions for the sector. Among those being considered are a reduction and reorganization of fishing effort on current resources, the optimization of whitefish and open water fisheries, and new types of tourist-related activities.

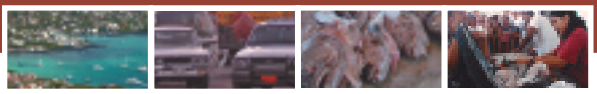
> Very few young people have joined the Fishing Register in the last four years.

First, however, it is important to identify the various interest groups within the sector, as it is unlikely that any one solution will satisfy everyone. Data from the lobster fishery, which indicate that apparently the majority of the fishing effort is concentrated in a few individuals, suggest that a large proportion of fishers have alternative sources of income.

> Among the solutions being considered for the Fishing Sector are the reduction and reorganization of fishing effort on current resources, the optimization of whitefish and open water fishing, and new types of tourist-related activities.

It is important to identify those fishers who are dedicated to artisanal fishing, that is, those who consider fishing more than just a source of employment but also a way of life, and who wish to find solutions within the fisheries. It is also important to identify those fishers who are open to employment away from fishing, either in tourism or in other areas. With this analysis completed, specific projects can be targeted to smaller interest groups.

During 2007, the extension or lifting of the moratorium on new fishers must be discussed. The decision must be consistent with strategic planning for the fishing sector. This is the only sector where children of members are given automatic access to the activity. This privilege, given the large number of children of existing fishers, should be carefully analyzed in the context of reducing the size of the cooperatives.



Declining profitability of fisheries in the Galapagos Marine Reserve

Alex Hearn[a], Juan Carlos Murillo[b] & Harry Reyes[b]

[a]Galapagos National Park Service, [b]Charles Darwin Foundation

Although management decisions for the Galapagos Marine Reserve (GMR) have often been based on perceptions related to socioeconomic aspects of fisheries, there has been a historical void of good socioeconomic information related to Galapagos fisheries. To begin to fill this void, expenses and gross earnings for Galapagos fisheries over several seasons have been estimated through the use of logbooks of fishery observers and surveys of fishers at the home docks[1]. Annual fisheries reports, produced by the Charles Darwin Foundation and the Galapagos National Park, include information on price trends for the most important products. This article presents this information and compares the gross income per fishery for 1997-2006. It also presents an analysis of the net income from the lobster fishery, as a case study, taking into account the associated operational costs.

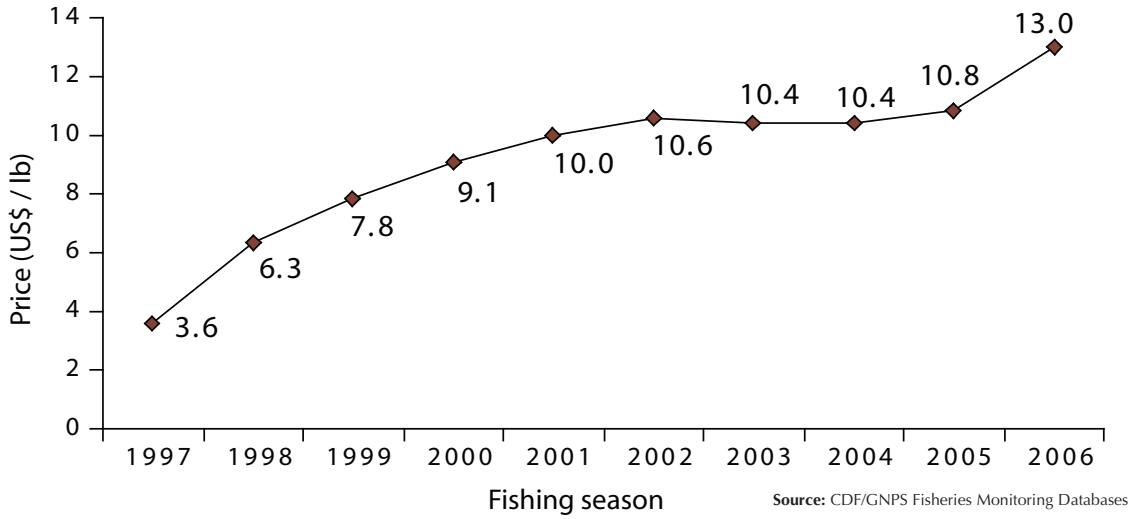
Price Trends

In 1997, the average price per pound of lobster tails was US$ 3.60. Since then, the price has steadily increased, nearly tripling in value by 2001 (Fig. 1). After that it remained relatively stable during 2002 to 2005, oscillating between US$ 10.40 and US$ 10.80 per pound. In 2006, the price reached its historical peak at US$ 14.00 per pound, while the average price was US$ 13.00.

During the same period, the price of sea cucumbers first declined then increased by a factor of five between 2002 and 2004 (from US$ 0.33 per individual to US$ 1.50 per individual) (Fig. 2), a much more rapid increase than that recorded for lobster tails. Due to the scarcity of the resource, the fishery was closed in 2006.

> Between 2002 and 2005, the price of sea cucumbers increased by 354%, while the catch declined by 83%; the price of lobster increased by only 2% and the catch declined by 43%.

Figure 1. Average lobster tail prices, 1997-2006



Source: CDF/GNPS Fisheries Monitoring Databases