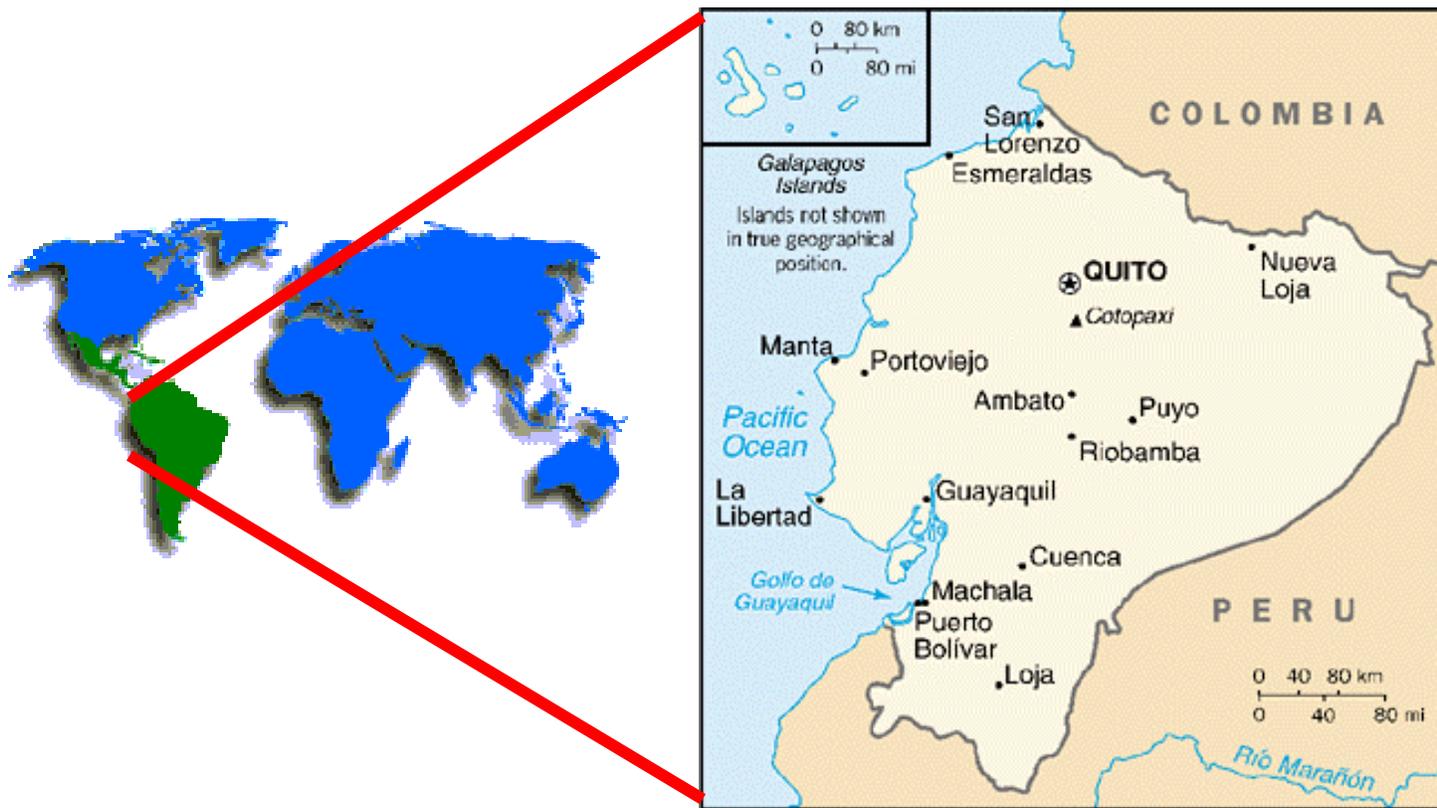


INCENTIVE MEASURES FOR CONSERVATION OF BIODIVERSITY AND SUSTAINABILITY: A CASE STUDY OF THE GALAPAGOS ISLANDS



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Incentive measures for conservation of biodiversity and sustainability: A case study of the Galapagos Islands

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1. Introduction

Ever since the days of Darwin, the Galapagos Islands have captured the imagination of the world. Galapagos is perhaps the only great natural paradise remaining in a near pristine condition. The unique and strange land and sea animals that live there have puzzled all of those who have passed through the isolated islands. Up to one-meter long dragon-like marine iguanas dive to nibble algae from submerged rocks; giant tortoises roam volcanic craters; and sea lions and endemic fur seals play gracefully in the archipelago's rough surf and tidal pools.

The Galapagos are active volcanic islands only a few million years old. They



Marine iguana resting
Galápagos Islands

emerged from a "hot spot" in the ocean floor and straddle the equator 600 miles west of South America. Composed of 15 main islands and over one hundred islets and rocks, the Galapagos became part of Ecuador in 1832. The larger islands range in size from 13 to 4,600 square kilometers. Four of them are populated: Santa Cruz, San Cristóbal, Isabela and Floreana. In the absence of continental predators and human settlement, the animals of the archipelago evolved without an instinct for fear and flight. Tomas de Berlanga, responsible for the first written account of Galapagos in 1535, described the presence of "many seals, turtles, iguanas and birds, but so silly they do not know how to flee" (de Roi, 1998: 30). Modern tourists relish the magical opportunity to watch sharks in the shallow waters, swim with sea lions, and sit next to sea birds carrying out their mating rituals.



In recent years, threats to these magnificent islands have mounted. Extensive migration from mainland Ecuador; the absence of a quarantine system to avoid the introduction of foreign species; illegal fisheries that apply great pressure on the islands' marine resources; and the lack of an adequate legal framework to ensure the long-term preservation of the archipelago have all taken their toll. Foreign plants and feral animals threaten native species and the evolutionary processes that gave rise to them. Sea lions, seabirds, marine turtles and other marine life species are caught in the gear of large-scale commercial fishing boats. Local fisheries for lobster and grouper have been depleted, and millions of sea cucumbers have been taken from the sea floor.

These threats have made conservation an enormous challenge. Conservation dates back to the establishment of the Charles Darwin Foundation in 1959, the start of World Wide Fund for Nature's involvement since 1961, and the creation of the Galapagos National Park Service in 1969. In the past, environmental work was focused mainly on terrestrial conservation. More recently growing pressure on the Islands' marine resources necessitated a shift in emphasis. This paper focuses on conservation efforts since early 1997 when a variety of complementary incentive measures were introduced to address threats to the archipelago's marine ecosystem. Together with the Galapagos community, a number of local, national and international partners initiated a combination of social, institutional and economic incentive measures. These incentive measures form the core of a system that seeks optimal cooperation from all stakeholders - to protect marine biodiversity, preserve endemic species and maintain the health of the marine ecosystem.

While success of incentive measures must be assessed over time, there are indications that they have reduced many of the direct and indirect pressures on Galapagos biodiversity. A social incentive to establish a mechanism for resolution of conflict in 1997 gave rise to a participatory revision of the Management Plan for the Galapagos Marine Reserve. The passage of the Galapagos Special Law in 1998 put in place institutional incentives that strengthen the administrative and regulatory capacity for managing terrestrial and marine resources. A variety of economic incentive measures, including enhancement of enforcement capacity for the Marine Reserve and the introduction of a certification and eco-labeling program for fishery products, have encouraged adherence to management regulations.

The following section describes the Galapagos marine ecoregion and identifies the most significant pressures on marine biodiversity in the Islands. The third section reviews the impacts of those pressures on the ecosystem as well as the economy and welfare of the Galapagos community. The fourth discusses the implementation and effects of the incentive measures used to address the threats to biodiversity. Finally, the conclusion discusses impediments to the implementation of incentive measures, some of the unintended consequences that emerged in the process, and policy recommendations based on the lessons learned from the experience in Galapagos.

2. The Galapagos marine ecoregion: status and threats

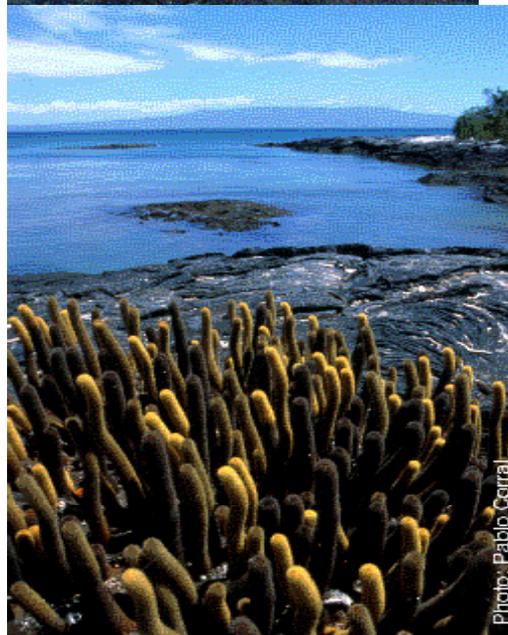
The Galapagos archipelago is situated at a point where major ocean currents converge, mixing nutrient rich cool waters from the south, warm currents from the north, and a deep cold current from the west. Climatic conditions are



Marine life of Galápagos

affected significantly by the “el Niño” phenomenon. The convergence of ocean currents has combined flora and fauna from contrasting environments and given rise to unique marine species and phenomena. Nearly one fourth of the Galapagos marine life is endemic - found nowhere else on earth. This level of endemic life is particularly rare for marine species, which tend to migrate and intermingle to a much larger degree than terrestrial species.

The Galapagos are home to the world's only marine iguana, the pink flamingos, and the only penguins occurring in tropical latitudes. Angelfish and moorish idols live alongside endemic fur seals, whose closest relatives live 3,000 miles away in “Tierra del Fuego”, the southern most point of South America. The Galapagos is one of the only places where one can see pelagic species such as tunas, manta rays and hammerhead sharks close to shore. Aggregations of hammerhead sharks and golden rays, visits from migratory whale-sharks, and an abundance of sea turtles make the underwater world of Galapagos truly exotic.



Cactus on lava field
Isabela Island, Galápagos, Ecuador

The uniqueness of the Galapagos life is the result of a number of factors. First, the volcanic islands of the Galapagos are geologically new. The oldest islands visible today are no more than 3 to 5 million years old. The shield volcanoes of Isabela and Fernandina are among the most active in the world, with eruptions frequently redesigning the contours of the islands and playing a role in ongoing evolutionary processes. Second, few species have arrived and established. Those animals, which did cross the ocean from the mainland, have remained relatively undisturbed, evolving in their own peculiar ways and adapting to the special climate and food sources. The fact that the Galapagos were the only island group in the tropical Pacific Ocean never colonized by early Polynesians meant that they did not suffer the waves of extinction of endemic species experienced in Hawaii, Easter Island, New Zealand and Tahiti. Significant human settlements of the Galapagos did not occur until the 1900s, making it possible for 97% of the Islands' original biodiversity to remain today.¹⁸

Within its Living Planet Campaign, the World Wildlife Fund (WWF), along with many local, national and international organizations, identified the Galapagos Islands as an international conservation priority. Using an assessment of global biodiversity carried out by a team of scientists, the Galapagos were categorized as a "Global 200 ecoregion," one of approximately 200 areas that need to be preserved in order to save a representative sample of the world's biodiversity. Ecoregions are broad geographical areas that contain related species, habitat types and ecological processes. As a WWF priority Global 200 ecoregion, the Islands are the focus of significant conservation investment.

2.1 Direct threats to Galapagos biodiversity prior to the introduction of incentive measures

A number of direct and indirect pressures threatened the health of the Galapagos marine environment prior to the introduction of incentive measures. Many of these threats persist. The discussion in this section focuses on the status

¹⁸ This figure indicates that only 3% of original Galapagos species have gone extinct, but does not reflect the fact that populations of many species have been severely reduced or lost from particular areas.

of the ecosystem and the causes and sources of pressures on it prior to the new incentive measures.

Fishing

Fishing is the single most important sectoral activity that directly impacts the marine biodiversity of Galapagos. Fishing is the oldest tradition in Galapagos, which is only fitting for semi-desert islands surrounded by prolific waters (de Roi, 1998:152). Prior to the 1980s, fishers targeted only a few species, using simple gear. Grouper was caught by hand-line and then salted and dried as “*bacalao*” to be eaten on the mainland during Lent. Other fish, such as mullet, were caught with small drag-nets. In the early 60s, free-divers caught abundant lobster by hand, and then relied on middle-men to export the frozen tails to the United States.

Until the early 1990s, only a few hundred fishers were involved but by 1999, over 600 were registered (Galapagos Report, 1999:44). As global over-fishing grew and Peruvian coastal fisheries collapsed, the Islands became a new source of seafood and specialty products. Markets for sea cucumbers and shark fins, goods never considered by Galapagos fishers, raised the exploitation of marine resources to new levels. Much of this fishing was illegal and remained uncontrolled.

In addition, large-scale commercial fleets from mainland Ecuador and elsewhere fish for tuna in Galapagos waters. Prior to the passage of the Galapagos Special Law in 1998, long-lining vessels from mainland Ecuador, Costa Rica, Japan and Taiwan often came within five hundred meters of the shore. This illegal fishing increased pressure on marine resources and impacted marine mammals and marine birds that were caught and drowned. Mainland and international fleets competed directly with local fishers for limited resources, catching large numbers of hammerheads and other sharks illegally, and damaging the habitat of the shallow southern areas of the archipelago.



Fishing boats anchored in Isabela Island harbour
Galápagos, Ecuador

Tourism

For many years, only the most fearless sailors and explorers made it to the shores of the Galapagos Islands. Strong oceanic currents that pass through the archipelago gave seafarers the perception that the islands were constantly shifting, earning them the name, “the Bewitched Islands.” After 1969, when charter flights began bringing small groups of adventure travelers to the Islands, tourism flourished. It has become the main economic activity of the archipelago (Cayot et al. 1996), employing almost 70% of the economically active population. In 1998, nearly 75 million US Dollars in revenue were generated from tourism in Galapagos, and the National Park raised over 5 million US Dollars in entrance fees. Out of these amounts, however, only around 1% returns to support conservation in the Islands (Galapagos Report, 1996-1997:21).

In 1970, approximately 5,000 people acquired tourist cards (CONADE-SEGEPLAN 1998), while in 1998, that number exceeded 64,000 (Galapagos National Park Service 1998a). The growth of hotel facilities and tourism boats has been similarly explosive. The capacity of the boats more than tripled between 1981 and 1999 from roughly 500 to 1,700 passengers per night (Galapagos Report, 1997-98: 46).

While strict measures have long been in place to control tourism, the sheer number of visitors increases pressure on the marine environment. The dumping of ships’ refuse or bilge oil into the sea pollutes the waters and poses the risk of introducing foreign species to the islands. Capture of seafood by crews on tour boats requires better regulation and education, and pressures to open the Reserve to sports fishing pose a potential threat to the marine environment if not properly managed.



Galápagos tourists - beach landers
Galápagos

2.2 Underlying sources of pressure on biological diversity

There are several underlying causes for pressure on Galapagos marine biodiversity. International markets, migration and the lack of a clear legal framework for conservation have been the major underlying sources of pressure.

International Markets

International demand for high-value marine products, such as shark fins and sea cucumbers, is one of the most significant underlying causes of illegal fishing. Both shark fins and sea cucumbers are delicacies in Asia, and fetch high prices on the international market. In 1992, the depletion of mainland sea cucumbers and the “discovery” of abundant sea cucumber populations in Galapagos triggered a gold rush mentality that increased migration from the Ecuadorian mainland, lured distant water fishing fleets, and altered the traditional practices of local fishers in the Islands. Large revenues generated from the sea cucumber fishery were used to pay off former debts and also stimulated capital investments (Galapagos Report, 1997: 23). Between 1993 and 1996, the number of fishing vessels utilizing the area increased by 267%.

Since aerial patrols made it possible to bring into force the regulations limiting sea cucumber fishing, many illegal fishers transferred their effort to the equally profitable, but less risky, illegal shark fin business. Sharks are fished by night from small boats. By dawn, there is no evidence of illicit activity. Both the illicit product and the equipment to catch it are easily hidden along the coastline, making control more difficult. In contrast, sea cucumber harvesting requires making encampments to process the sea cucumbers (adding the risk of introducing exotic species to pristine land areas of the park). With aerial patrols, these camps became relatively easy to locate and evacuate.



Shark fins on display at a market near Guayaquil, Ecuador

Missing markets

The absence of markets that favor sustainable caught fish left little economic incentive for rational resource exploitation. In addition, a lack of organization among local fishing cooperatives hampers their ability to reform self-defeating practices, such as spearing lobster, and precludes them from accessing more profitable markets. Meat from speared lobster tends to deteriorate more quickly than meat from whole lobsters, thus reducing the sale price.

Population growth – migration and subsidies

Population growth is considered one of the main problems for conservation in Galapagos. From 1982 to 1998, population growth was approximately 6%, principally due to in-migration (Galapagos Report, 1998: 30). The number of inhabitants on the Islands more than doubled in the last ten years and now exceeds 16,000 (Galapagos Report, 1999: 28). The growing mobility of people and materials between Galapagos and the mainland and among the islands themselves (by plane as well as by fishing, tourist and cargo boats) threatens the isolation of the Islands, the most important condition that has permitted the development of unique evolutionary processes. In addition, individuals migrating from the mainland to the Galapagos often bring attitudes that are incompatible with conservation.



Sacks of cement unloaded at the harbour of Isabela Island
Galápagos, Ecuador

Subsidies have played an important role in fueling migration to Galapagos. Fuel and transportation subsidies are the most obvious avenues through which the state has promoted migration. The state oil marketing enterprise, PETROCOMERCIAL, covers all costs for the transport of fuel to the islands. Even with this subsidy, the electric companies on the islands run a chronic deficit

(Galapagos Report, 1998: 35). In addition, airline companies subsidize nearly one million US Dollars in travel costs per year for Galapagos residents (Ibid:35). They more than recover this cost by increasing the charge to foreign tourists, generating over 5 million US Dollars per year, none of which returns to the Islands for conservation.

The Galapagos have received more public funds per average inhabitant than the Ecuadorian mainland, leading to better coverage of public and social services (Galapagos Report, 1997: 33). Furthermore, the possibility of greater pay in Galapagos and the expectation of finding employment in construction and tourism sectors have also encouraged migration (Ibid: 32).

Conflicts over user-rights

National and local conflict over the exploitation and management of marine resources diminished the potential for sustainable management of the Galapagos Marine Reserve. Conflicts occurred between fishers and tour operators, between conservation organizations and fishers, and between Galapagos-based interest groups and the mainland industrial fishing sector (Galapagos Report, 1998: 14). Some external interest groups, including international tour companies, mainland sea cucumber exporters, and national and international fishing fleets, exerted pressure on government institutions to open the Reserve to fishing and tourist development, without consideration for the environment or local community (Ibid: 14).

Prior to the 1998 Special Law for Galapagos, the majority of the waters around the Galapagos archipelago were primarily open-access. Local, small-scale fishers competed directly with large-scale commercial fleets from the mainland and abroad, and there was no incentive for self-regulation. The state controlled the waters, and local fishers did not participate in the management of marine resources. An analysis of stakeholder conflicts in 1997 concluded that the management difficulties at the time were largely based on an inability to acknowledge the community's role in the Marine Reserve and their rights to participate in shaping its future. The Galapagos community had a sense that it was being "marginalized" and that government regulations were "imposed from above and inappropriate" (Galapagos Report, 1998; 15).

Institutional failure

Prior to 1996, a lack of effective management and enforcement was an important indirect pressure on biodiversity. Several factors contributed to the inability of institutions to manage and control the Marine Reserve effectively (Zador 1995):

- Because the waters around the Islands were not legally defined as a Protected Area, there was an inability to coordinate objectives and

activities among the four institutions responsible for the administration of the Reserve. These institutions included: the Office of the Undersecretary of Fishery (under the Ministry of Industry), the National Institute of Forests and Natural Areas (INEFAN), the Galapagos National Park Service (NPS) and the Merchant Marine (DIGMER). Because these institutions competed and conflicted over conservation and development objectives, there was a lack of long-term planning for resource management. In particular, the mainland fishing sector was an important constituent of the Ministry of Industry and pressured the Ministry to pursue a policy of fishery development, while INEFAN was focused on implementing a system for biodiversity protection.

- The lack of sufficient and reliable funds hampered the capacity of institutions in charge of managing and administering the marine reserve. The Galapagos National Park Service had unreliable income and, in 1996, could only allot 5% of its total budget to the administration of the Marine Reserve (Galapagos Report, 1997:22). Institutions lacked infrastructure, personnel and equipment. For example, the National Park Service had only one patrol boat to cover the large area of the Marine Reserve, and planes were rarely available for aerial patrols because their primary use was as charter planes.
- Sparse data on fishery, ecological and sociological issues made it difficult to orient and justify management decisions.

Introduction of species

Another underlying pressure on biodiversity has been the introduction of foreign species that compete with or eat native flora and fauna. Fishing and tour boats originating outside of the islands bring rats and marine organisms that potentially compete with endemic animals. Camps for sea cucumber curing and drying have led to the introduction of other species, and the presence of feral cats and pigs threatens sea turtles, marine iguanas and sea birds.

3. Impacts of threats to biological diversity on ecosystem, economy and welfare

The direct and indirect pressures on marine biodiversity in the Galapagos impact the marine ecosystem, the economy, and the welfare of the Galapagos community. Prior to 1997, the large amount of valuable biological information gathered on the Islands was often disjointed, focused on particular species, and not systematized to support management activities or to construct broad-based indicators (Galapagos Report, 1997: x), making it difficult to identify the precise impacts of pressures on biological diversity. More recently, there have been more reliable indicators, thanks to the work of local, national and international scientists

working through the Charles Darwin Research Station (CDRS).¹⁹ The CDRS has played a crucial role in generating technical information on biodiversity and fishing that has formed the backbone of knowledge about the status of Galapagos terrestrial and marine ecosystems and the impacts on both. Since 1997, a joint monitoring effort supported by WWF and Fundacion Natura has been compiling much of this information into an annual publication, the Galapagos Report.

3.1 Ecosystem impacts

This study uses the Galapagos Reports and draws on data from the CDRS, the National Fishery Institute and various publications to identify some of the impacts on the marine ecosystem.

Sea cucumbers

In the Galapagos, the heavy fishing pressure on sea cucumbers has impacted population levels and densities in the archipelago with associated ecosystem effects. In the early to mid-1990s, conflicts between institutions responsible for managing the Reserve led to an inability to control illegal and excessive fishing. For example, an experimental sea cucumber fishery, opened in late 1994, had to be closed only half way through its planned period of operation owing to excessive harvest. In the end, more than six million sea cucumbers were taken, equivalent to 11 times the authorized number. Large camps were illegally set up on the previously untouched island of Fernandina. Boilers were fuelled by wood from mangrove forests, which serve as important refuges for juvenile fish, sea turtles and sharks and are also home to a rare species of Darwin's finch (de Roi, 1998:153).

Censuses taken between 1993 and 1996 indicate a population decline of sea cucumbers. (Galapagos Report, 1997: 23). The results of this analysis have led a number of scientists to raise concerns about the potential disappearance of sea cucumbers in Galapagos (Martinez and Bustamante, 1996:6). In many areas of Galapagos, population densities surveyed were below the minimum estimated level to ensure reproductive viability of the species (Paco, Hurtado, MacFarland, Martinez, Reck and Richard 1993: 10). Sea cucumbers are an important link in the marine ecosystem. They maintain the health of the sea floor in a similar way that earthworms care for the soil.

¹⁹ The Charles Darwin Research Station (CDRS) is the operational arm of the Charles Darwin Foundation, a foundation established in 1959 to help conserve the Galapagos islands and their unique flora and fauna. The CDRS is located in Puerto Ayora and has an extensive physical plant with terrestrial and marine laboratories, an herbarium, a tortoise and iguana rearing center, and a scientific library operated by a permanent staff of 70 scientists, educators and administrators.



Sea cucumber fishing
Isabela Island, Galápagos, Ecuador

Lobster

Lobster is no longer caught by free-divers at breath-holding depths as it was in the 1960s. Wet suits, air compressors, harpoons and night diving (when lobsters venture out from their shelters to feed) are now used and have vastly increased the divers' efficiency. In the late 1980s and early 1990s, a dramatic decline in lobster populations was evident. Rules were drafted to establish fishing seasons to a minimum length, as well as to prohibit spearing and collection of egg-bearing females. However, these regulations were often circumvented: egg clusters were scraped off of female lobsters before entering port, and frozen tails were shipped under layers of legal frozen fish during the closed season (de Roi, 1998:152). A recent study indicates that lobsters continue to be over-exploited. By measuring the lobster catch per fisher-day, it is possible to calculate catch per unit effort (CPUE). Since 1994, there has been a continued decline in the CPUE for lobster, indicating its over-exploitation (Galapagos Report:1999, 48).

Pesca blanca, or "white fish"

The local white fish fishery includes a variety of coastal and pelagic fish, including grouper, snapper and mullet. Certain indirect indicators, such as changes in catch composition, imply that fishing pressure has affected fish populations and altered the marine ecosystem in Galapagos. For example, the local catch composition for white fish has changed dramatically. Species that were abundant in the 1970s are not as common in the catches of the 1990s (Galapagos Report, 1997:26). The use of spear guns has reduced the population of the larger and more mature grouper. This can have an impact on the reproductive capacity of the species if enough of the sexually mature individuals are taken, and also affect the balance of the ecosystem by removing animals at the top of the food chain (Galapagos Report, 1998:26).

Mainland and international fishing and its associated impacts

Long-line and purse-seine fishing by mainland and international fleets have impacted biodiversity within the Galapagos marine ecosystem. These boats are enormous compared to local fishing boats (Coello, 1996:80), and many operate in the most fragile parts of the archipelago. Shallow areas in the southeastern regions contain submerged sea-mounts that support large aggregations of seabirds, fish, mammals and reptiles. The extensive fishing gear of the boats accidentally catches marine turtles, sea lions, dolphins, seabirds and sharks. These animals die in the back of the nets of the purse-seiners, or on the hooks of the long-lining vessels. Scientists and small-scale fishers from Galapagos have complained that sea lions and seabirds eat the bait on the hooks of the long-lines, and in order not to lose the hooks, the crews of the mainland boats do not release the animals (Galapagos Report, 1998:22). According to data from the Inter-American Tropical Tuna Commission (IATTC), the large-scale tuna boats capture undersized tuna, removing fish before they are able to reproduce. The average weight of individual tuna caught in 1995 was 9 kg, which is significantly below the weight of sexually mature individuals, estimated at 14 kg to 20 kg (Moran, Rodriguez, and Oviedo 1996:15).

Threatened and endangered species

Since 1993, the explosion of the shark fin trade led registered catches of sharks and registered exports of shark fins to increase dramatically through 1997 (Ibid:22). In 1994, 38% of the total shark catch in Ecuador came from Galapagos waters. Many shark species are particularly vulnerable to over-exploitation, because they mature late in life and bear only a few live young. Capturing sharks removes top predators from the ecosystem, and affects the food chain.

Some seabirds and marine animals living in Galapagos are classified as threatened or endangered, including the flightless cormorant, the waved albatross, the Galapagos penguin, the blue whale and the fur seal. Introduced species have competed with or become predators to some of these animals. Feral cats, for example, eat young marine iguanas and attack the nests of seabirds. Pigs ravage the nests of marine turtles, eating both the eggs and the newborn.



Green sea turtle on beach
Galápagos Islands

3.2 Impacts on the economy and welfare of the Galapagos community

Direct pressures on Galapagos biodiversity and their underlying causes have the potential to affect tourism and fishery revenue, and the safety of the Galapagos community. This section illustrates how pressures on biodiversity have impacted, and may continue to impact, the Galapagos economy and community.

Changes in catch compositions, reductions in catch per unit effort, and the presence of certain destructive techniques threaten the long-term stability of traditionally exploited fish populations. If stocks continue to be over-exploited, there will be significant impacts on earnings and employment, particularly in the islands of Isabela and San Cristóbal, where larger proportions of the population are employed in the fishing sector. In addition, the removal of mature reef predators, such as sharks and grouper, affects the reproductive capacity of these animals and diminishes the *quality* of marine tourism, potentially reducing revenue (Galapagos Report, 1998:26). Because local revenue generated from the lucrative shark fin and sea cucumber fisheries are difficult to quantify, it is not clear whether such revenues would offset potential losses from the traditional fisheries over the long-term. Indicators of decline in sea cucumber numbers indicate that revenues from sea cucumber harvesting are unlikely to reach their previous levels for many years and are probably not sustainable in the long run.

In recent years, fishing has become more dangerous. Because fishers must go further and deeper to find their catch, they put themselves at greater risk. Fishers dive to depths of 30 meters in pursuit of lobsters, sea cucumbers and reef fish, using a compressor or “hookah” that provides compressed air from the surface through a long hose connected to a regulator. Divers also spend prolonged

periods at these depths. For all of these reasons, a number of fishers die each year.

Conflicts over illegal fishing impact biodiversity, the safety of personnel from the National Park Service and Charles Darwin Research Station, and the stability of revenue from tourism. The 1992 ban on extraction of declining sea cucumber populations heightened conflicts between fishers and the National Park Service. When the management authorities opened an experimental sea cucumber fishery at the end of 1994 in response to fishers' demands, excessive fishing ensued and authorities had to close the fishery half way through its planned season.

In April and June 1994, a fire and a tortoise slaughter on Isabela Island were attributed to fishers' unhappiness with the regulations. In January 1995, angry fishers took over the National Park Service and the Charles Darwin Research Station facilities, and caused an interruption in the flow of tourists to the Islands for one week (Galapagos Report, 1997:22). In 1997, a park ranger was shot and injured while trying to evacuate an illegal sea cucumber camp. Evidently, conflicts between user-groups of the Galapagos Marine Reserve have the potential to harm the welfare of individuals and directly affect tourism, the single most important source of revenue for the Islands.

Puerto Ayora, the Islands' primary town, was once a quiet fishing village and is now filled with hotels, discos, automobile traffic and restaurants. The steady stream of migrants has fueled business developments and sparked conflict between those members of Galapagos civil society committed to the sustainable use of the archipelago's resources and those who manifest resentment against attempts to uphold the preservation and future balance of the Islands. Civil unrest, crime and violence have become increasingly frequent.

4. Implementation and impacts of incentive measures

A variety of social, institutional and economic incentive measures were implemented to address the threats to marine biodiversity in the Galapagos. Many of these incentive measures have a long history, but were not implemented until recently due to a lack of social and political support, including the Galapagos Marine Reserve Management Plan and the Galapagos Special Law.

4.1 Social incentive measures – conflict resolution and participatory planning

In recognition of the supreme importance of resolving conflicts between fishers and management institutions, the Galapagos National Park Service (NPS)²⁰ and the Charles Darwin Research Station, initiated a conflict resolution and participatory planning process for the management of the Marine Reserve. This process included all local stakeholders of the Galapagos Marine Reserve: the tourism sector, the science education sector, and the fishing cooperatives. In effect, conflict resolution and participatory planning became a social incentive measures. The goals were to resolve conflicts between user-groups and to develop a shared vision for the future of the Marine Reserve. As the process unfolded, conflict resolution and participatory planning became the vehicles through which the stakeholders redrafted the Galapagos Marine Reserve Management Plan and provided local input for the Marine Reserve Chapter of the Galapagos Special Law.

In June 1997, NPS and CDRS held an initial workshop to discuss the status and use of marine resources in the archipelago. A team of facilitators, including an external expert in conflict resolution from Harvard University and two local facilitators, one a Galapagos citizen, the other a Galapagos resident, managed the workshop. Having local facilitators helped gain the interest of, and acceptance from, local stakeholders, who included the user-groups mentioned above. At the conclusion of the workshop, it was agreed that the management of the Galapagos Marine Reserve must include participation from local user-groups. One suggestion was that local stakeholders should participate in redrafting the management plan for the Marine Reserve through a formal and institutionalized process.

This conceptual agreement planted the seed of the “Grupo Nucleo,” a group of representatives from each of the four Galapagos fishing cooperatives, the Galapagos National Park Service, the tourism sector, and the Charles Darwin Research Station. The Grupo Nucleo is coordinated and monitored by a permanent team of two facilitators, who are available to advise and assist representatives. Although the concept of the Grupo Nucleo had not been envisioned prior to the

²⁰ The Galapagos National Park Service (NPS) was founded in 1964. It is part of the Ministry for the Environment and is responsible for the daily operation of the Galapagos National Park and the Galapagos Marine Reserve. The NPS has more than 100 park wardens and staff members working on all of the inhabited islands, and has offices on Santa Cruz, San Cristobal, Isabela and Floreana.

workshop, it was later given the mandate to represent local consensus on redrafting the Marine Reserve Management Plan and the Galapagos Special Law.

Various institutions recognized the value of this new tool for change and supported the Grupo Nucleo from the beginning. The Charles Darwin Foundation played a crucial role in coordinating vital technical support for the process, including training for representatives, advice from international experts, and support for targeted information gathering. Institutions that financially supported these efforts include World Wildlife Fund (WWF), the United States Agency for International Development (USAID), the German Technical Cooperation (DED), the Avina Foundation, the Global Environment Facility and the Packard Foundation. WWF, for example, contributed funds to employ two neutral facilitators for the Grupo Nucleo and covered the costs of transportation for representatives from the three main inhabited islands to Grupo Nucleo meetings. WWF, the Charles Darwin Research Station and the National Park Service worked together to produce educational materials for the Galapagos community, and to hold workshops to discuss the concerns of each sector with interests in the Marine Reserve.

Conflict resolution and participatory planning in the Galapagos transformed a situation of conflict among stakeholders into a consensus. This can be explained in part by the group's ability to bring about recognition of common ground between stakeholders. Stakeholders realized that through the Grupo Nucleo they could influence legal arrangements being developed, such as the Galapagos Special Law and the Marine Reserve Management Plan. Through ongoing dialogue, stakeholders articulated their common objectives:

- Ratification of the protected area status of the Marine Reserve with clearly defined jurisdictional responsibilities assigned to the Galapagos National Park Service;
- Definition and legitimization of a limited number of known users with long-term interest in the health of the Reserve;
- Access to real decision-making power for the users of the Reserve through the institutionalization of the Grupo Nucleo; and
- Exclusive fishing rights for local, small-scale fishers through the elimination of large-scale fishing within the Reserve (Informe Galapagos, 1997-98).

Members of the Grupo Nucleo recognized that, as a team, they could push for the incorporation of these common goals into the new regulatory structure.

The improved social cohesion and awareness brought about by the participatory planning process was manifest in a couple of concrete incidents. First, the communities of Galapagos have shown unity and commitment to address corruption and the threat of illegal fishing. When a local judge suspended the prosecution of an illegal fishing boat captured with a cargo of approximately 30,000

sea cucumbers, members of the Galapagos community formed a “Committee against corruption in the Galapagos courts” (INEFAN-NPS, press release #0197). The Committee documented complaints and irregularities committed by the courts. Evidence that the judge had accepted a bribe from the owners of the boat, led to a protest demonstration and his expulsion from the Islands. In addition, when a National Park Service agent was shot and wounded by illegal sea cucumber fishers in March, 1997, 300 community members held a demonstration in support of the National Park on Santa Cruz Island.

When the President of Ecuador partially vetoed the Galapagos Special Law on February 11, 1998, Galapagos civil society responded in unison. The President had vetoed articles that expanded the Marine Reserve to 40 miles and called for exclusive fishing rights for local, small-scale fishers. To demand that the Law be promulgated in its original form, the communities of Galapagos carried out a spontaneous mourning march in the three main inhabited islands. Residents walked silently through the streets of the main towns, dressed in black and carrying coffins that read, “The biodiversity of Galapagos” and “The Marine Reserve,” symbolizing the potential loss of these valuable resources. The march was broadcast on national and international television (Galapagos Report, 1997-98).

4.2 Institutional Incentive Measures – The Special Law for Galapagos and the Marine Reserve Management Plan

In August, 1996, efforts were renewed to produce a viable draft of the Galapagos Special Law. The Law would provide for the stewardship of the Galapagos ecosystems and contain a number of important institutional incentives for biodiversity conservation and sustainable resource use. Previously, three drafts of a Special Law for Galapagos were passed in the National Congress and vetoed by the President of Ecuador. Early drafts of the Law were criticized by environmental organizations that felt that the Law enabled political authorities to interfere in National Park management, that the Law had been approved of by

Congress without proper stakeholder consultation, and that it contained ambiguous provisions on migration control (Galapagos Report, 1997: 16).

Due to the failure to develop a legal framework for the stewardship of the Galapagos, the international community and the World Heritage Committee of UNESCO pressured the Ecuadorian government to resolve the situation. In 1997, the President of Ecuador rekindled the process by issuing an Executive Decree that amended the composition of the “Permanent Commission on the Galapagos”, the multi-stakeholder body responsible for writing and discussing a new draft of the Special Law. The Executive Decree placed the Ministry of Environment at the head of the Permanent Commission, and provided for the participation of representatives of the Galapagos fishery and tourism sectors, as well as the municipalities.

The Grupo Nucleo became the technical team responsible for driving local participation in the development of the Marine Reserve Chapter of the Special Law. The work the Grupo Nucleo had done on the revision of the Management Plan provided the text and background for the Special Law. In turn, the framework of the Special Law provided a legal basis for all proposed elements of the Management Plan, thus protecting the provisions from changes in personnel and policy within various institutions.

The Grupo Nucleo delineated three key priorities to include in the Law: 1) the ratification of the Protected Area status of the Marine Reserve under the jurisdiction of the Galapagos National Park Service; 2) the expansion of the Marine Reserve to 40 nautical miles with exclusive rights for local, small-scale fishers; and 3) the institutionalization of participatory management. Representatives advocated institutionalizing the Grupo Nucleo to form a Participatory Management Board, the “Junta de Manejo Participativo,” for ongoing administration and management of the Reserve.

When drafting was complete, the Law needed to be approved of by the National Congress. The Grupo Nucleo facilitators worked with an informal alliance of local, national and international organizations to coordinate an advocacy strategy with extensive media coverage for the approval of local priorities expressed in the Marine Reserve Chapter in the Special Law. This included radio programs and workshops to raise awareness within the Galapagos. In addition, the strategy included lengthy meetings and correspondence with members of Ecuador's National Congress to encourage them to support the Law.

In January 1998, the National Congress approved of the most controversial Article in the Law – the Article calling for the expansion of the Marine Reserve to 40 miles from the archipelago's baseline. The mainland-fishing sector went on strike, opposing the law and calling for a presidential veto. The president was in a difficult position, because the Ministry of Environment strongly supported the law, while the Ministry of Industry vehemently opposed it.

As resistance to the Special Law by strong mainland commercial fishing interests increased, WWF used its highly developed communications resources to mobilize its international membership in support of the Galapagos Special Law. On February 6, 1998, the Conservation Action Network (CAN), WWF's international electronic advocacy group, alerted all CAN activists around the world - "Galapagos Islands Need Your Help." The alert asked them to send a message to President Clinton requesting him to urge President Alarcón of Ecuador to sign legislation to protect the Galapagos. CAN participants and visitors to WWF's Web-site sent 2,128 messages to Clinton. On February 14, Vice President Gore phoned Ecuadorian President Alarcón and urged that he pass the Law.

In addition, WWF used its Gifts to the Earth Program to encourage the President to pass the Law. WWF recognizes corporations, governments and individuals that take an extraordinary action to protect biodiversity by acknowledging and publicizing their Gift to the Earth through international media.

WWF informed President Alarcón that the passage of the Galapagos Special Law qualified as a Gift to the Earth, and, if promulgated, would be featured in international press.

On March 6, 1998, the Galapagos Special Law was passed, and President Alarcón and Ecuador's National Congress were bestowed with a Gift to the Earth (see photo insert). The Law came into force as it was originally presented to the President, with the exception of one provision that declared the previous Management Plan valid until the new Management Plan was completed and approved by the Inter-Institutional Management Authority, the national body responsible for accepting and institutionalizing the Plan. This meant that until the Grupo Nucleo completed its Management Plan, large-scale fishing would be permitted within the 40-mile limit.

A Victory for the Galápagos

Six-hundred miles to the west of Ecuador lie the Galápagos Islands, an unmatched ecological treasure whose distinct array of species helped to shape the work of Charles Darwin and with it our understanding of the world around us. Home to the Galápagos giant tortoise, Darwin's Finches, and the world's only marine iguana, the Galápagos Islands in recent years have come under increasing human pressure, threatening the survival of their unique species and the fragile ecology on which they depend.

Ecuador's President Dr. Fabian Alarcón has recently approved a bold series of protective measures which will help safeguard the Galápagos as a living legacy for future generations around the world. The new Galápagos Special Law creates a marine sanctuary around the islands out to a 40-mile limit, ensures that tourist revenues will go to support island conservation, and combats the invasive species that today threaten the distinctive island wildlife found nowhere else on earth.

WWF congratulates President Alarcón and Ecuador's Congress for their farsighted action, which is truly a significant gift to the Earth.



World Wildlife Fund urges that the next 1,000 days before the millennium mark a turning point in worldwide efforts to protect endangered species, safeguard the habitats they need to survive, and address the global threats that put all living things in harm's way. We call on governments, institutions, and individuals to make "gifts to the Earth"—bold actions to preserve the web of life.

Let's leave our children a living planet



To find out how you can help:

World Wildlife Fund
1250 Twenty-fourth Street, NW, Box 11, Washington, DC 20037
Call: 202/775-7755. On the World Wide Web, visit www.worldwildlife.org
and participate in our Conservation Action Network.

World Wildlife Fund (WWF) ad placed in international press to recognize President Alarcón's important decision to approve Galápagos Special Law

The Special Law provides an over-arching legal framework for the protection of the Galapagos and addresses many of the direct and indirect threats to conservation. While designing and implementing the regulations of the Special Law is a lengthy process, some measures have already been put in place.

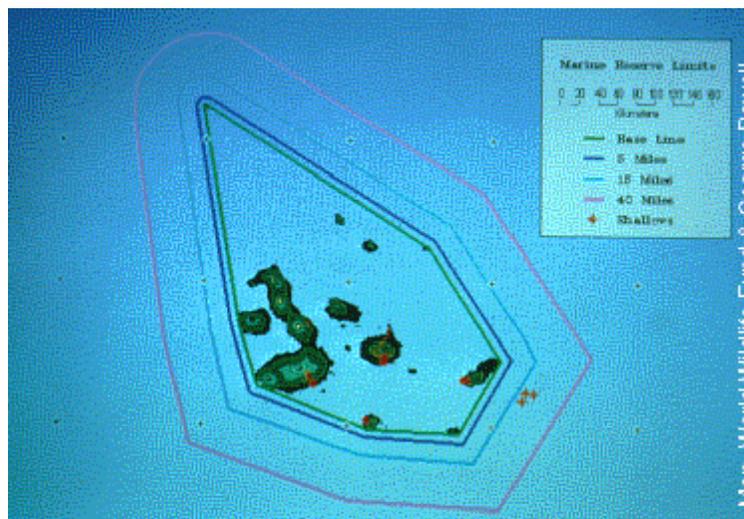
All new migration to the islands has been prohibited, with the exception of contracted employees and individuals who marry a Galapagos resident. In addition, visitors to all Galapagos airports must fill out forms that help authorities monitor the flow of people and verify that visitors do not stay on the Islands. While the legal framework is in place to address fuel and transportation subsidies that have encouraged migration, precise regulations are not yet established.

With respect to the long-term management of the Marine Reserve, the Special Law reflects the consensus of the Grupo Nucleo and puts a number of critical measures in place:

- The Galapagos Marine Reserve is defined as a Protected Area, affording protections through the National Forestry Law and the Law on the Conservation of Protected Areas and Wildlife;
- Institutional roles and responsibilities are clearly defined, enabling the development of coherent policies for the archipelago;
- The administration and management of the Galapagos Marine Reserve is delegated to the Galapagos National Park Service;
- The boundaries of the Marine Reserve are extended from an original 5 miles to 40 miles from the baseline, making the Galapagos Marine Reserve one of the largest in the world with an area of 140,000 square kilometers;
- Large-scale commercial fishing is prohibited within the Reserve to ensure long-term sustainable management;
- Stringent penalties are established for violators; and

- Participatory management of the Marine Reserve is institutionalized by officially incorporating the Grupo Nucleo into an institution, *the Junta de Manejo Participativo* (Participatory Management Board), mandated to provide permanent advisory services to the Inter-Institutional Management Authority, thus requiring joint implementation of the Galapagos Marine Reserve Management Plan.

In addition, the Law requires that 45 percent of the revenue generated from



Map showing new boundaries of Galapagos Marine Resources Reserve

Park entry fees be allocated to the National Park to enhance their capacity to monitor and control both the Marine Reserve and the terrestrial Park. Expanding the boundaries of the Marine Reserve to 40 miles and excluding large-scale fishing makes it easier to combat illegal fishing, protects the fragile shallow region in the southeast, and improves the willingness of local fishers to cooperate in the long-term management of marine resources.

The Marine Reserve Management Plan

Eight months after the promulgation of the Galapagos Special Law, the draft Marine Reserve Management Plan was completed. In November 1999, the Grupo Nucleo presented it before the Inter-Institutional Management Authority, after 74 meetings and nearly two years of work. The stated objective of the

Management Plan is to: “Protect and conserve the marine ecosystems of the archipelago and their biological diversity for the benefit of humanity, local populations, science and education.” The plan outlines nine principles of management, including responsibility, participation, adaptive management, the precautionary principle, integrity and sustainability. It also identifies activities permitted within the reserve, such as artisanal fishing, marine tourism, science, education, and military navigation.

The plan calls for zoning and normative regulations to minimize conflicts between users and negative impacts on the marine ecoregion. It identifies three principle types of zones: 1) multiple use zones; 2) limited use zones, including no-fishing zones; and 3) port zones. Finally, the Plan establishes a series of programs to facilitate its implementation and to strengthen participation and representation of the user-groups. These programs include administration, research and monitoring, enforcement and control, and environmental education and communication. In February 1999, the Inter-Institutional Management Authority formally accepted the Plan, bringing into force the provision of the Special Law that prohibits large-scale fishing in the Reserve.

4.3 Economic Incentive Measures – Enforcement, Fishery Certification and Conservation Funds

A variety of economic incentive measures have been introduced to support the overall objective of marine resource conservation and sustainable use in the Galapagos.

Enforcement Activities

When given jurisdiction over the Galapagos Marine Reserve at the end of 1996, the National Park Service established a Marine Resources Unit to patrol and control illegal fishing activities. By using disincentives in the form of fines and punishments aimed at transgressors, it was hoped that adherence to regulations

would increase. In 1996, 20 coastal-marine and three aerial patrols were conducted, while in 1997, 19 coastal-marine patrols were supported by 11 aerial patrols. In 1998, patrols were hampered by technical difficulties with the patrol boats and unavailability of planes for aerial patrols.

To aid in enforcement activities, the National Park Service established a Fishing Sighting Program in 1996. The program records information on the type of boat involved in an illegal fishing activity, the type of fishing undertaken, the vessel's flag, and its position when sighted. This information is integrated into a Geographic Information System, and used to focus control and surveillance activities on key areas and problems. Tour boats that travel through the archipelago have become increasingly involved in supporting the Fishing Sighting Program by contacting the National Park Service by radio when they observe illegal fishing.

In 1998 there was a decline in the number of sightings of illegal large-scale fishing boats in Galapagos waters compared to 1996 and 1997. This may indicate a reduction of illegal fishing due to the Special Law, or it may be due to a reduction in patrols carried out by the National Park Service due to disrepair of the patrol boats in the first months of 1998. Exports of shark fins have declined rapidly since their peak in 1995. Because shark fishing is prohibited in Galapagos waters but allowed in mainland waters, the export numbers may not reflect the illegal capture of sharks in Galapagos. Biologists think that the reduction of exports may be related to the decline of the resource and/or the temperature increase of surrounding waters due to "el Niño" in 1998.

To improve its enforcement presence, the National Park Service is raising funds to purchase its own plane for aerial patrols and plans to build a patrol base in the remote western part of the archipelago where illegal fishing is more common. In addition, a Fishery Monitoring Program has been collecting data in collaboration with the fishery sector since January 1997. Data on numbers of fishers and boats,

catches, and location of fishing activities will be used to rationalize management decisions within the Marine Reserve (Galapagos Report, 1999:43).

Fishery Certification

In cooperation with the National Park Service and the Charles Darwin Research Station, World Wildlife Fund (WWF) assisted in introducing the Marine Stewardship Council fishery certification program to stakeholders in Galapagos in 1998. The aim was to explore the potential for fishery certification and eco-labeling to act as an economic motivation to the fishery sector to pursue sustainable fishing activities within the Marine Reserve.

The Marine Stewardship Council (MSC) is an independent, non-governmental organization launched in 1997 by WWF and Unilever, one of the world's largest processors of frozen fish. The MSC's organizational mission is to support the development of sustainable, responsibly managed fisheries throughout the world. In this work, the MSC seeks to ensure that the benefits of adopting a responsible approach to fishery exploitation accrue to fishers, fish processors, traders, retailers and consumers.

At the center of the MSC's mission is a set of *Principles and Criteria for Sustainable Fishing*, which are used as the standard for a voluntary certification program conducted by an independent third party. The *Principles and Criteria* have been developed by means of an extensive, international consultative process through which the views of stakeholders in fisheries have been gathered from around the world.

Fisheries that conform to these *Principles and Criteria* will be eligible for certification by independent MSC-accredited certifiers. Products from certified fisheries are eligible to display an MSC logo, which is promoted internationally by the MSC. The labeling program will allow consumers to select fish products with the confidence that they come from sustainable, well managed sources. It will also benefit responsible fishers and the fishing industry, both of which depend on the abundance of fish stocks. In some cases, sustainably caught fishery products may command higher prices from wholesalers and consumers who prefer the eco-label.

In February 1998, WWF and Grupo Nucleo facilitators held meetings with fishing cooperatives and members of other stakeholder groups to discuss the concept of fishery certification in the archipelago. In response to the interest expressed by diverse stakeholders, WWF held a workshop in May 1998, in collaboration with the Grupo Nucleo, the Charles Darwin Research Station and the

National Park Service. The aim of the workshop was to provide information on the Marine Stewardship Council and the certification process, and to explore with stakeholders the potential benefits of and challenges posed by fishery certification



Fisheries certification workshop in Puerto Ayora,
Santa Cruz, Galápagos

in the Galapagos.

Workshop participants noted that many of the principles described in the MSC standard were already being considered in discussions about the draft Management Plan, making the Galapagos fisheries good candidates for certification. Participants encouraged the Grupo Nucleo to incorporate the MSC Principles and Criteria into the Galapagos Marine Reserve Management Plan and to pursue the certification process further. With facilitation from the Grupo Nucleo, stakeholders have become involved in identifying potential fisheries for certification.

To promote awareness of fishery certification throughout the fishing community, WWF worked with the fishing cooperative presidents and a communications specialist from the Charles Darwin Research Station to design an educational cartoon pamphlet. In addition, MacAlister Elliott and Partners, a fishery consulting group, conducted a study, in collaboration with a local fishery engineer. Using available data from the Charles Darwin Research Station and elsewhere, the study assessed the biological status, current marketing structure and commercialization process for key fishery products coming from Galápagos, including lobster and grouper. The study noted some impediments to certification and identified potential economic benefits.

Through the study, it became apparent that some changes in fishing practices are needed to assure sustainability. Some of these changes would *also*

result in economic benefits. If, for example, lobster fishers consistently employed a more selective gear (rather than spearing), they could reduce the number of egg-bearing females and undersized individuals taken, and bring the fishery in closer conformity with certification requirements. In addition, this could significantly increase the value of lobster by improving the quality of the meat. Meat from lobsters that have been speared tends to deteriorate more quickly than meat from whole individuals. To identify market opportunities for certified products, WWF representatives and hired consultants carried out dialogue with potential buyers of certified products from the Galapagos, including locally based tour boats and seafood importers in the United States.



Local press for fisheries certification workshop
Puerto Ayora, Santa Cruz, Galápagos

While fishery products from the Galapagos have not yet been certified, the introduction of certification and eco-labeling as an economic incentive for sustainable resource use in Galapagos has had some clear impacts nonetheless. Local markets, such as tour boats and hotels, are interested in the purchase of certified products. In particular, Linblad Special Expeditions, an eco-friendly cruise line with an 80-passenger boat based in the archipelago, played a leadership role within the Galapagos tour industry by declaring its support of fishery certification and its commitment to buy certified products. Similarly, ETICA, the operational arm of Metropolitan Touring, Ecuador's largest tour company, endorsed the concept of certification and expressed its interest in buying certified fish for its four large tour boats in Galapagos.

The fishery certification process played an important role in the development of the Management Plan by giving fishers an economic incentive to support a strict, conservation-oriented plan. For example, Grupo Nucleo members plan to draw upon the Marine Stewardship Council certification standard to refine the

Management Plan. In addition, the certification process provided one incentive to incorporate no-fishing zones into the Management Plan. Initially opposed to closed areas, cooperative leaders agreed to include them. This was, in part, due to the recognition that no-fishing zones are one of the criteria within the MSC standard.

Conservation Funds

Many have argued that a greater proportion of revenue generated from tourism should return to pay for conservation in the Galapagos. Airlines subsidize the flights of Galapagos residents by one million US Dollars per year, but then shift the cost of this subsidy to the fares paid by foreign tourists, obtaining more than five million US Dollars per year. None of this profit returns to Galapagos. Prior to the Special Law, only a small percentage of Park fees returned to the National Park Service to support its activities.

In the past couple of years, members of the tourism sector have created economic incentive measures for Galapagos conservation through the establishment of two Conservation Funds. In May 1997, Linblad Special Expeditions created the Galapagos Conservation Fund (GCF). Their aim is “to develop a strong partnership and link between the visitor, the tourism industry, and defined conservation institutions of Galapagos.” Special Expeditions engages their passengers and inspires their support of conservation priorities in the Galapagos. Passenger contributions are allocated by the Board of GCF in the interest of the entire region rather than for one organization or cause. Special Expeditions covers all administrative costs, so 100% of contributions go to the projects designated by the Board.

Similarly, in January 1999, Metropolitan Touring Company established a Conservation Fund in partnership with World Wildlife Fund. Metropolitan raises funds for conservation from its passengers and has agreed to a floor of \$100,000 per year. An Advisory Board with representation from institutions active in the Islands determines allocation of the funds, which are channeled through WWF.

The conservation funds have supported projects to eradicate feral pigs from Santiago Island, to establish environmental education centers for local populations, to create a small grant fund that encourages locally-initiated conservation projects, and to establish an emergency fund for unforeseen needs. In addition, one project hired local fishers to remove waste from the archipelago's beaches, while another provided funds for the National Park's patrol boat.

5. Discussion and conclusion

Because all of the incentive measures are connected, it is difficult to isolate the effects of each measure. For example, in bringing together formerly conflicting groups, participatory planning and conflict resolution not only facilitated dialogue and greater social cohesion, but also became the vehicle for local participation, and therefore buy-in, in the institutional and legislative frameworks being developed. Challenges remain that will affect the successful implementation of the incentive measures. In particular, pressure from the mainland fishing sector, the arduous process of implementing the Special Law through new regulations, and the difficulties of ensuring ongoing participation and cooperative decision-making may test the security of the Marine Reserve and health of the Galapagos marine ecoregion. While long-lasting effects of the incentive measures will be known only in time, several interesting lessons have emerged.

Winners and Losers

With any incentive measure, there will be winners and losers. Incentive measures that support the conservation and sustainable use of biological diversity, by realizing its true public and private value, contribute to the maximization of societal welfare. However, this does not mean that everybody profits from the implementation of the incentive measure. Rather, it implies that the benefits from an appropriately chosen and implemented incentive measure outweigh the costs.

The Marine chapter of the Galapagos Special Law creates some clear losers. Large-scale national and international fishing fleets are excluded from the Galapagos Marine Reserve, an area extending from a baseline out to 40 nautical miles around the Islands. These provisions of the Law continue to be challenged by the economically and politically powerful continental fishing sector.

The tuna fleet promotes an economic argument for gaining access to the Galapagos Marine Reserve, emphasizing the importance of Galapagos as a fishing

ground. However, it is unclear how much of the total national catch of tuna actually comes from the waters around the Galapagos. Some reports suggest that 5% of the yellowfin and skipjack, and nearly 40% of the bigeye tuna catches come from the Islands (Marin and Pacheco, 1992; Moran, Rodriguez and Oviedo, 1996), but there is much disagreement over these numbers and their corresponding financial significance. The long-lining fleet, which targets a variety of white fish, has formed a strong alliance with the tuna fleet to exert pressure on government agencies, such as the Ministry of Environment, to reform the Law. Transgressions of the Marine Reserve regulations continue to occur, and the National Park Service has captured mainland boats.

Maintaining Participation and Representation

One important lesson that emerged from incentive measures in Galapagos is that dialogue and participation were perhaps the most important prerequisite to improved conservation and sustainable use of biodiversity. The social incentive measures which brought conflicting groups together were critical to the articulation of common objectives and to the development of a will to cooperate across the user-groups of the Reserve.

By using a consensus-based, participatory process for the development and implementation of the Marine Reserve Management Plan, stakeholders developed a sense of collective accountability. This brought about a norm of social responsibility that served to encourage individuals to choose the socially optimal option, that of conservation and sustainable use of marine biodiversity. However, because the community on the Islands is culturally diverse, heavily influenced by migrants, and dispersed, the use of voluntarism as a strategy was not sufficient, as voluntarism tends to work best among small groups with strong communication networks (Wade, 1988).

Instead, a variety of incentives were needed to keep stakeholders at the negotiating table. The user-groups stayed involved because of what the process

could offer them: 1) a legal basis for participation in resource management; 2) improved credibility in decision-making for the fishery sector by changing their public image and showing their willingness for dialogue; and 3) clear administration and control of the Reserve, where rules agreed upon locally could be enforced (Heylings, personal communication, June 1999).

By improving communication between representatives of all user-groups and their constituents, the Grupo Nucleo was able to develop accountability and transparency. This gave individuals some assurance that their sacrifices would be rewarded by the cooperation of others. Ensuring the level of participation and communication necessary for building trust required significant funding and organization. WWF flew representatives from various islands to all Grupo Nucleo meetings to provide continual face-to-face meetings during which trust could develop across and within the user-groups.

Maintaining communication and true representation across the three main populated islands is the greatest challenge to the participatory process (see Heylings, 1998). Representatives from the tour sector and fishing cooperatives sometimes have not acted as true representatives, but have taken decisions without consulting their constituents. Among all the islands, the participation from Isabela presents the greatest challenge. The Isabela fishers have been accused of supporting ongoing illegal fishing activities locally. While they have participated in the Grupo Nucleo meetings, evaluation has shown that there is little feedback or discussion of issues by the representative once back on the Island. It is possible that with the greater unification of the fishing sector through a Chamber of Artisanal Fishery, participation and dissemination of information will be enhanced.

The drafting and revision of the Management Plan was the first step in a much longer process defined by successful participatory implementation of the Plan. There is an important transition stage between the consensus-building process of the Grupo Nucleo and that of successful negotiations within the

Participatory Management Board, the “Junta de Manejo Participativo.” Some of the most contentious issues lie ahead, including the delineation of the size and location of no-fishing zones. The three sectors – fishery, tourism, and science and education – will be able to undertake their shared responsibilities within the Participatory Management Board, only through continued capacity-building, training, and cohesion.

Complementarity of Incentive Measures

An important lesson emerging from the Galapagos is that a complementary set of incentive measures, using different motivational underpinnings, may be the most effective strategy for achieving cooperation. The need for cooperation and conformity of behavior underpins the overall objective of conservation and sustainable use of biodiversity. Each incentive measure contributes to engendering this necessary cooperative behavior, by eliciting different motivating forces.

Social incentive measures help develop trust and norms of social responsibility that bring about higher rates of cooperation. Institutional incentive measures help communicate clear rules and expectations of behavior that compensate for the inability of social incentive measures to work if communication and information transfer fail due to group size or other limiting factors. Nonetheless, achieving cooperation often requires more than norms of social responsibility and the delineation of clear rules.

Economic incentive measures play a complementary role in strengthening the motivation to cooperate. Market-based incentive measures, such as certification and eco-labeling, use the desire for profit as a motivational underpinning, aiming to increase the expected level of compliance by offering positive rewards in the form of reduced costs or increased revenues. By rewarding cooperation as opposed to penalizing defection, positive economic incentives tend to engender higher cooperation rates than economic disincentives, such as fines and enforcement. (Komorita, 1987; Komorita and Barth, 1985). Under command-

and-control policies, everyone has an incentive to “free-ride,” thus everyone must be monitored. With market-based approaches, the potential for higher revenues gives all participants an incentive to comply.

However, financial incentives can rarely alter the incentive structure enough to make cooperation clearly optimal. Rather than obviating the need for regulatory oversight, market-based policies reduce some of the regulatory burden that undermines command-and-control mechanisms. By encouraging cooperation from a wider segment of producers, financial incentives can leave command-and-control systems to capture random, flagrant deviants, rather than ticket the masses (Karp and Gaulding, 1995:460).

In the Galapagos, incentive measures proved to be complementary and mutually reinforcing. The social incentive measure which brought conflicting groups together was critical to forming the foundation for the effectiveness of other measures. In turn, institutional incentive measures embodied in the Galapagos Special Law and the Marine Reserve Management Plan provide the legal framework for other incentive measures. By delineating clear responsibilities for institutions and user-groups, they enable mechanisms that help appropriate organizations communicate and enforce the rules. Allocating 45% of revenues generated from Park entrance fees to the National Park Service is one clear example of a measure that facilitates institutional effectiveness. To put the legal framework into action, fishery certification is important in creating positive economic incentives for adherence to the legal framework, while fines and other forms of enforcement work to limit the number of transgressors.

Adaptive Management and Measures of Success

Promoting conservation and sustainable use of biodiversity requires working in and responding to dynamic situations. In Galapagos, unintended consequences and unanticipated events occurred during the implementation of incentive measures. In 1999, for example, the national management authorities opened the

sea cucumber fishery for two months, fulfilling a previous commitment to the fishing cooperatives. The Charles Darwin Research Station and the National Park Service worked closely together to ensure that the fishery was managed more effectively than during previous open-seasons. The CDRS and NPS strictly defined permitted campsites for processing the sea cucumbers and collaborated with fishers to collect data from all fishing areas. This collaborative effort improved the management and enforcement of the short sea cucumber fishery and is testament to the success of conflict resolution and participatory planning in building relationships and trust among stakeholders.

Maintaining the effectiveness of the incentive measures and staying on track requires ongoing adaptive management. In the Grupo Nucleo process, for example, it was necessary for the facilitators to monitor the cohesion and actual ability of the group to serve as a conduit for the opinions of the sectors represented. When it became apparent that the tourism sector representative was failing to consult with his constituents, the Grupo Nucleo invited an additional representative to participate to increase accountability and representation of members of the Chamber of Tourism. Similarly, when fishing cooperatives underwent unanticipated changes in leadership, the Grupo Nucleo adapted, allowing for changes in representatives, while maintaining continuity and consistency of the process.

The success of adaptive management is contingent upon the ability to monitor and evaluate the impact of incentive measures. Without indicators of success or failure, it is unclear how to adapt to address failings and reinforce successes. In the Galapagos, the CDRS, NPS and others use a variety of indicators to monitor the success of the incentive measures. For example, monitoring the process and outcome of difficult negotiations related to the regulations of the Management Plan, such as the delineation of no-fishing zones, will provide information to assess the effectiveness of the participatory and consensual process.

In addition, surveys of public opinion on conservation and institutional performance in Galapagos are conducted annually to monitor changes in attitudes. These surveys investigate community opinion regarding fishery management measures, conservation issues, immigration restrictions, and effectiveness of Galapagos institutions, such as the municipal authorities, the NPS and CDRS (Fundacion Natura, 1997). This information facilitates the evaluation of both social and institutional incentive measures. In addition, the CDRS and the NPS monitor fish catches, patrol activities, and seizures of vessels and illegal cargo. These monitoring efforts will guide the adaptive management of the economic incentive measures, including certification and enforcement activities, by measuring the health of fish stocks and transgressions of the Management Plan and Special Law over time.

Transferring the Experience

While there are many complicating factors and gaps in information that remain, a combination of social, institutional and economic incentive measures has succeeded in building a supportive platform for conservation of marine resources. Despite the unique characteristics of an isolated archipelago such as the Galapagos, the lessons discussed are transferable to other places where people are engaged in using incentive measures to enhance biodiversity conservation and sustainable use. In almost any context, the importance of conflict resolution, participation, and a voluntary desire for the achievement of common objectives is paramount. Yet without complementary incentive measures, including institutional and financial incentives and disincentives, participation and other social incentive measures are unlikely to work, particularly in an ever more globalized world where small communities are affected by global markets and international actors. Monitoring the success of interventions and practicing adaptive management are crucial in any context as a way of guiding incentive measures through a dynamic terrain of unintended consequences and unanticipated events.

One of the greatest challenges to conservation and sustainable use of marine biodiversity in Galapagos and elsewhere is reconciling short-term needs with long-term benefits. All user-groups benefit if resources are sustained for the long-term; however, individuals such as fishers, whose livelihoods depend upon immediate resource extraction, are often driven to meet their short-term needs before concentrating on maintaining biodiversity in the long-term.

Finding a way to honor both private and public values of biological diversity requires dialogue between stakeholders and consideration of values that cannot be quantified. Given the current, insufficient state of knowledge about biological processes, a certain margin of safety, in accordance with the precautionary principle, is critical. Galapagos is not only valuable for its fishery resources and the tourism revenue it generates, it is a treasured and unique part of our world heritage that gives us pleasure through the pure knowledge of its existence. As we look to the future, we must evaluate our efforts and be ready to adapt and innovate to meet new and old forces that threaten the preservation of the enchanted Galapagos Islands and other world treasures.



Bartolome Island
Galapagos

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