



This is a publication of PROARCA/APM, a project of Central American Commission for Environment and Development (CCAD), executed by The Nature Conservancy (TNC), the World Wildlife Fund (WWF) and the Rainforest Alliance (RA).



This publication is supported by the Regional Office for Sustainable Development, the Latin America/ Caribbean Division of the United States International Development Agency (USAID) and The Nature Conservancy, under the terms of Grant Agreement No. 596-A-00-01-00116-00. The opinions expressed here are those of the authors and do not necessarily reflect the views of USAID.



The World Wildlife Fund- WWF, is the largest and most experienced global conservation organization in the world. It has around 5 million members and a worldwide network that operates in more than 100 countries.

The mission of WWF is to halt the degradation of the planet's natural environment and forge a future in which human beings live in harmony with Nature:

- Conserving the world's biological diversity
- Guaranteeing the sustainable use of renewable natural resources
- Promoting the reduction of pollution and excessive consumption.

Communications Department  
WWF Central America.  
World Wildlife Fund  
**Telephone:** +506 234 8434  
**Fax:** +506 253 4927  
**Email:** info@wwfca.org  
**P. O.Box:** 629-2350  
San Francisco de Dos Rios, Costa Rica.

**Production:**  
Cinthy Flores and Laura Sequeira  
**Technical Revision:**  
Carlos Morales and Margarita de Jurado  
**Design and illustrations:**  
Rafael Esquivel Salgado  
**Printing:**  
© 2004 WWF Central America  
All rights reserved.

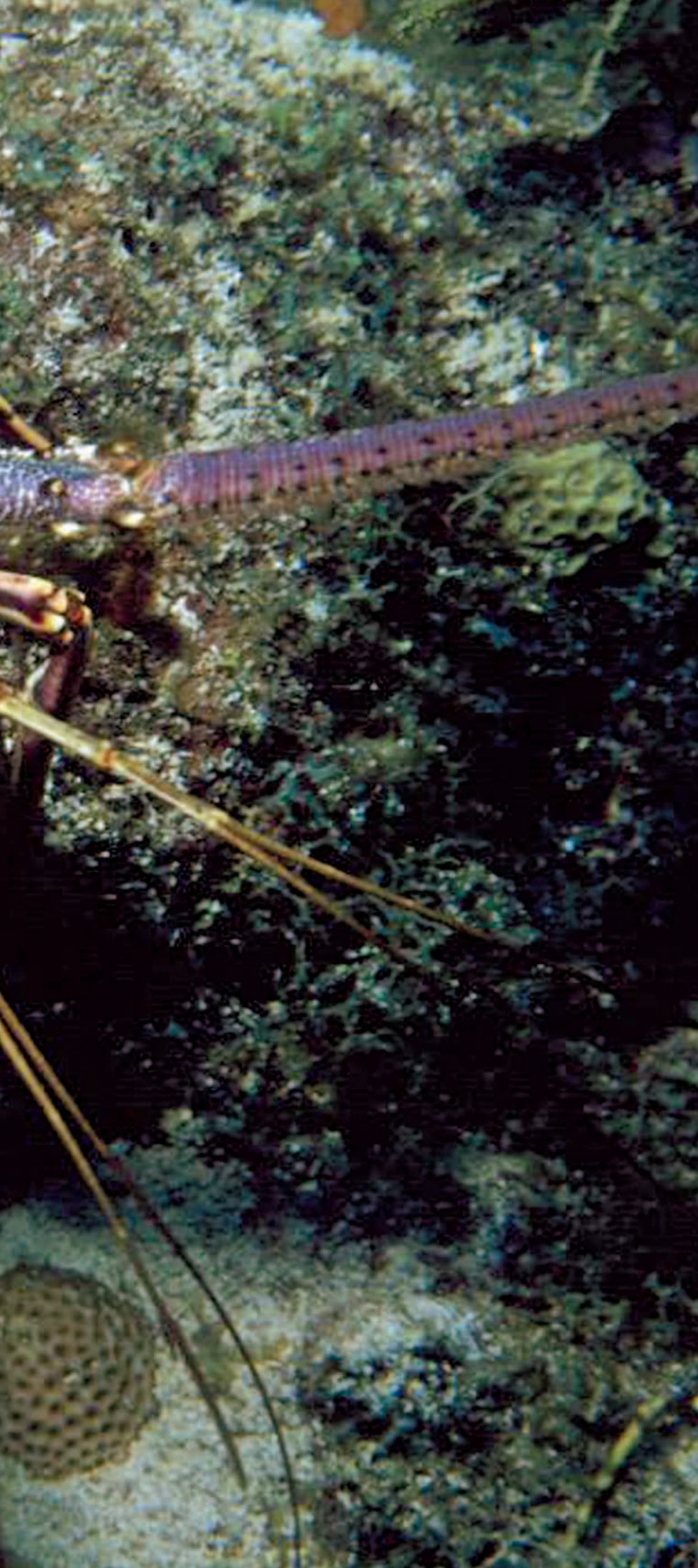


# Spiny lobster marketing chain



*This document is a summary of the research document entitled "Description of spiny lobster marketing chain in Central America", carried out by the PROARCA /APM Project with funding from USAID, in search of better management practices in harmony with the economy, society and the environment.*





# The Lobster Fisheries of the Caribbean

**T**he Spiny Lobster (*Panulirus argus*) fisheries stretch from Bermuda to Brazil, including the Caribbean islands and coastal countries. Most members of the Palinuridae family, with 8 genera and 47 species worldwide, are found in shallow waters and live in coral reefs or among rocks.

In Central America, the commercial lobster fishery has been active for more than 100 years, focusing mainly on *P. Aarhus* and, to a lesser extent, on *P. Guttatus* and *P. Laevicauda*. The region is one of the most important production areas in the Greater Caribbean, ranking third behind Cuba and the Bahamas, and ahead of the United States and Mexico.

*Panulirus argus*, the most commonly fished species, has the following characteristics:

- Grows to a total length of up to 45cm.
- Lives in shallow waters to a depth of 90m or more.
- Habitats include coral reefs, rocks, sea-grasses and mangroves.
- Is gregarious and migratory.
- Females move to deeper waters to lay their eggs, traveling by day in rows or lines of up to 50 individuals, moving together and maintaining contact with their antennae. Hatching usually takes place from April to October when the temperature is above 23° C.
- After settling in a crevice, lobsters reach a length of approximately 7.5 cm in the first year. They remain there from 3 and 4 years before being recruited into the fishery.



*Panulirus argus* is intensively fished in the region, both by small-scale fishermen and industrial fleets, using a variety of methods: free diving, gill nets, lobster traps, harpoons and aggregating devices.

Export earnings from lobster maintain a significant population of fishermen, boat operators, processing plant workers and related services in Belize, Honduras, Nicaragua, Costa Rica and Panama.

Over in the last 15 years, the total production exported by Central America to the United States increased from 1,908 Metric Tones (<sup>MT</sup>) to 3,646<sup>MT</sup>, with the annual average estimated at 2,944.1<sup>MT</sup>. Furthermore, the fisheries of Nicaragua and Honduras dominated the region's production, growing from a 65% share in 1989 to 87.5% in 2003.

Belize, Costa Rica and Panama, combined, have had a smaller share in the region's seafood production and exports to the United States. At the start of the period (1989), Panama occupied third place with 21%, followed by Belize with 9.8% and Costa Rica with 4%. From 1993 onwards, Belize has occupied third place, displacing Panama. In 2003, Belize continued to occupy third place in exports (8.3%), followed by Panama (3.7%) and Costa Rica (0.5%).

Nicaragua and Honduras currently contribute 87.5% of Central American exports to the United States. Of particular importance is the production obtained from the Miskito Coast, which generates around 40% of Nicaragua's production.

## Lobster scarcity

Lobster fisheries productivity is showing signs of decline throughout the region, particularly in terms of overall lobster catches and the performance of the fishing industry. Given this situation concerns about the fisheries sustainability, productivity and ecosystem health.

Taking the average annual yields per vessel in Nicaragua as a reference point, it can be concluded that a greater fishing effort using more vessels or more effective technology, such as diving with air-tanks, will not increase the profitability of individual fishing

operations. Furthermore, there is evidence that the total production of the fleets is beginning to decline.

It is necessary therefore to change certain fishing practices in the region and to implement others that will help improve management of the lobster resource, promoting its recovery in the mid to long term.

One of the most common problems with diving is the capture of juvenile lobsters and egg-bearing females. And diving is one of the most serious problems, both in terms of its impact on human health and lives, and on the vitality of the ecosystem since the social and environmental cost of this type of harvests is very high.

However, the high dependence of diving communities on the income earned from this activity suggests that, alongside its elimination, efforts to guarantee alternative income generation activities associated with fisheries must redoubled.

## Recommendations for better lobster management practices:

- Harmonize criteria on closed seasons, minimum legal catch sizes and permitted fishing gear as well as criteria for monitoring the fishing effort and the capacity of the fisheries.
- Develop a joint strategy among countries to create better conditions to guarantee recruitment into the lobster fisheries. Each country should increase its effort to determine which are the best settlement areas for lobster larvae and the critical areas for raising juveniles.
- Promote the establishment of marine protected areas and the implementation of management plans for those habitats.
- Collect reliable statistical information on catches, including data on population dynamics and natural history.
- Establish a regional working group for this fishery.
- Promote and disseminate better fishing practices, particularly to targeted populations in coastal communities.



PHOTO: CARLOS DREWS

**The establishment of marine protected areas is a good alternative for the conservation of lobster and other marine species**



What follows is a summary of the current situation, challenges and trends in the lobster value chain in the Caribbean Coast of Central America. In addition this section analyzes the critical points in the process of promoting the use of better management practices, or BMPs.

The research work on the Spiny Lobster (*Panulirus argus*) focused specifically on the following areas: Belize, Honduran and Nicaraguan Miskito Coast and the Cahuita–La Amistad–Rio Cañas region in Costa Rica and Panama.

The marine environment covers more than 75% of the surface area in these zones. Biological production of the richest coastal regions competes with the lushest tropical forests.

The seafood industry provides food for millions of people, but there is evidence that marine resources are declining due to unsustainable use. The PROARCA/APM project works to disseminate and promote the adoption of BMPs and to establish relationships with markets for differentiated products that offer better trading conditions. The objective is to reduce the threats to these natural resources and improve conditions for sustainability.

A value chain is defined as “the series of stages, from the production of the primary good to its purchase by the end consumer, in which the product or service is processed, packaged, transported and marketed, adding value at each stage”.

By knowing their position within this chain, producers and traders can identify the most critical activities for achieving competitive advantages and, simultaneously, those that are key to promoting changes in current practices, adopting others that are more sustainable.

# Current status of lobster catches by areas

## 1 BELIZE

The country's location is ideal for rapid access to seafood markets in the United States, Mexico and Europe. In Belize, lobster fishing is the artisanal fishery that generates the highest proportion of earnings. This fishery represented 7.2% of GDP in the year 2001, with a total value of US\$33 million.

The resource is extracted from the coral banks that extend along the entire length of the Belizean continental shelf, some 50 kilometers offshore. The lobster is processed by plants located in *Belize City*, the country's main port and outlet for exports where the fishing cooperatives are also based.

Outboard motors were introduced in the 1980s, facilitating access to shallow fishing grounds and increasing the use of wooden traps. In a ten-year period the number of traps per fisherman increased from between 10 and 15, to 100 traps for boats with outboard motors. Nowadays, fisherman may have as many as 400 lobster traps.

At the same time, in southern Belize fishermen began to use trammel nets to catch lobster. Although this method produced high yields, similar to those obtained by lobster trappers in the North, it was not a very eco-friendly system resulting in bycatch and damage to coral reef. Currently,

this is a marginal problem but one that must be controlled to obtain certification.

These high yields leveled off after three years of abundance, prompting the authorities to conclude that lobster stocks were being exploited to the limit of their sustainability and that allowing fishing in deeper waters would further endanger lobster stocks.

Between 1999 and 2002 prices increased at a steady rate of 11%, rising from US\$11.25 per pound a US\$15.25 per pound. In 2003, prices fell by nearly one dollar per pound, and have remained between US\$14 and US\$14.25 per pound. The country's total lobster production stands at more than 600,000 pounds annually.

### Key points

- Application of more sustainable practices
- Producers organized in efficient and profitable cooperatives
- Compliance with legislation
- Use of wooden traps (“casitas”) and other fishing methods
- Quality certification
- Opportunity for technology transfer by cooperatives
- Differentiated marketing strategies

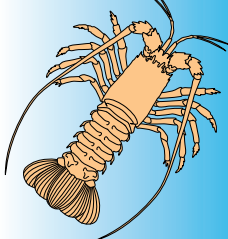


PHOTO: CENTRAL AMERICA





**Value Chain - Lobster Trap to Plant, U.S. Dollars per pound of lobster (tails)**

Trapper	Processing Plant	Processing Plant	Importer
Profit 68.00%	Profit 7%	Profit 25%	Profit 4.76%
Family 1.90%	Food 0.027%	Adm. Costs 10.22%	Total brokerage costs 6.35%
Food 2.95%	Fuel 5.09%	Salaries 0.94%	Costs 88.89%
Ice 1.58%	Boat payment 1.18%	Electricity 1.94%	
Boat rent 7.60%	Costs 86.00%	Taxes 0.72%	
Fuel 14%		Rent 0.05%	
Traps 4.27%		Costs 61.10%	

## 2 HONDURAN MISKITO COAST

Industrial lobster fishing began in this region during the 1970s. By 1999, there were 172 vessels measuring between 12 to 24 meters in length. Of these, 82 used traps and 90 employed divers. In addition to the licenses for each vessel, the industry also had another 47 licenses to fish in Nicaragua or Colombia. The Honduran Atlantic fleet currently includes 500 vessels.

Most fishing boats sail from the Bay Islands: Guanaja, Utila and Roatan. Only around 40 boats operate out of La Ceiba, on the mainland. The size of this fleet now implies the accelerated exploitation of natural resources.

In contrast with Belize, most lobster fishing in Honduras is carried out on an industrial scale (both trapper boats and the diving fleets).

Given the scarcity of this resource, it has become necessary to dive in deeper and deeper waters (to a depth of more than thirty meters) to find lobster, and increase the number of dives per day to more than ten. The depth and frequency of these dives exceeds the limits of safe diving, and therefore many divers end up suffering from decompression accidents, leading to permanent nerve damage (paralysis), and often to death.

The country's total lobster production stands at more than 2.5 million pounds per year.

**Relative prices of lobster (US\$/ Lb Tails)**

Boat owners Honduras / Nicaragua 11-12	Processing plants Honduras/Nicaragua 14-17
Wholesalers United States 17-20	Retailers United States 22-32
Importer Florida/United States 15.75-19	Food service United States 27-47

### Key points

- **Installed industrial capacity close to the fishing site**
- **A traditional market exists with the United States**
- **Fishing is mainly industrial, using lobster traps and divers**
- **Lobster fishing at greater depths**
- **Serious social problems stemming from permanent disabilities caused by diving**
- **There is an established closed season**
- **Extraction of gravid females and undersized individuals**
- **Intensive exploitation of the resource**
- **Limited governmental capacity for control**
- **Opportunity for sustainable use fostering the gradual shift from capture by deep sea diving to other less environmentally harmful practices through community-public-private sector alliances. Establishment of self-regulatory measures on the volume of extraction (fishing exclusion zones, respect of closed seasons, combating the sale of illegal under-sized catches).**

## 3 NICARAGUAN MISKITO COAST

At the end of the seventies, lobster fishing increased reaching 2.81 million pounds in 1978. However, the Miskito-Sandinista conflict of 1983-1989 paralyzed economic activity in the area. From 1990 onward, there was a resurgence in lobster fishing due to the establishment of three fish landing facilities. The country's total lobster production is more than 3 million pounds annually.

The ecological and social problems in this region are very similar to those of Honduran Miskito Coast: accelerated exploitation of the resource, increased costs in the fishing effort and serious social problems derived from permanent injuries caused by deep-sea diving.

Unlike Honduras, the fishing fleet is composed of small-scale or artisanal fishermen who use lobster traps and to a lesser extent by free divers, representing approximately 50 % of the area's fishing activity. The rest of the activity is carried out by industrial vessels that employ divers to catch lobster in deeper waters using air tanks.

Divers for industrial fishing operations are recruited in different villages and sail together with their assistants or helpers. Fishing trips last approximately 11 days, during which each diver carries out more than 10 immersions per day at a great depth.



**Hyperbaric chamber for the treatment of impaired divers**

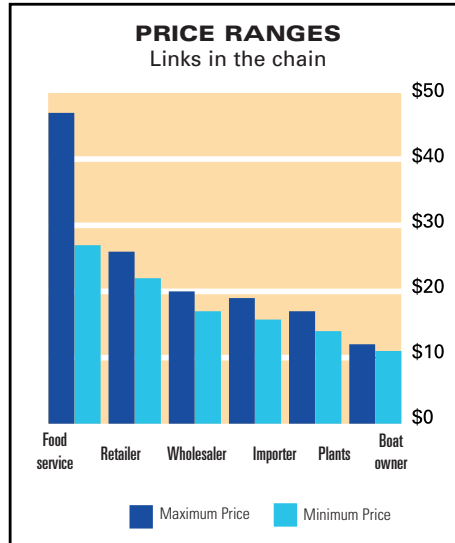
PHOTO: CINTHYA FORÉS

The communities of the Miskito Cays have their own dynamic, influenced by the zoning of fishing grounds within and outside the protected areas, closed seasons, the sale of undersized lobster to the local market and rejection by the processing plants for not complying with export quality standards.

In addition to the obvious problem of increased exploitation of lobster resources, the activity has serious impacts on the health of divers, who frequently extract lobster from deep waters. The situation is further complicated by drug use among fishermen. The ensuing decompression accidents have resulted in growing numbers of disabled divers and families having to cope with the death of their main bread-winners.

## Key important points

- Installed industrial capacity
- Traditional market in the United States
- Large proportion of small-scale fisheries
- Extraction in deep as well as shallow waters
- Major increase in the fishing effort
- Closed season established
- Intensive exploitation of the resource
- Extraction of breeding females and under-sized individuals
- Limited governmental control
- Complex social structure in the communities
- Ecological dynamics of the resource linked to the management of the Miskito Cays protected area
- Opportunity for sustainable use through the gradual shift from deep sea diving to other less harmful practices to the environment
- Opportunity for a commercial-community alliance that affords the possibility of offering wholesale buyers (importers) a community success story through "codes of conduct" for responsible fishing
- Required updating of regulations, quality standards and trapping technology, to minimize rejection, improve operational costs and take advantage of the "window" of opportunity for quality products from the Caribbean to improve sale conditions



ing efforts in the rest of the countries of the region.

The total production of Panama and Costa Rica represents approximately 50% of the production of Belize, reaching a total of just over 160,000 pounds annually.

Unlike most of the Central American countries, production in the year 2001 showed a slight increase. Costa Rica's catch and exports are small. If we consider the total national figures, the areas of interest for this study only represent a minimal proportion of the catch (20%). The usual method of catching lobster in this area is free diving.

## Key points

- Lobster fishing is dominated by artisanal (small-scale) fishermen
- Fewer than 300 people are involved in this activity
- 40% are exclusively engaged in lobster fishing, the rest combine it with other sea products.
- 90% of fishermen do not have fishing permits
- Mainly free diving
- Lobster fishing is very small-scale compared with the rest of the areas in the region.

## 4 LA AMISTAD-CAHUITA - RIO CAÑAS /COSTA RICA PANAMA

In the case of Panama, lobster fishing occurs in a relatively extensive area, most of which lies outside the boundaries of the areas of interest covered by this study.

Commercial lobster fishing in the Cahuita- La Amistad-Rio Cañas zone is very small-scale compared with the fish-



PHOTOS: CINTHYA FORÉS



Due to inappropriate diving practices, women and children suffer the loss of family members and friends in Central America's Caribbean coasts, especially in the Honduran and Nicaraguan Miskito Coast.



# Lobster and the market



PHOTO: CINTHYA FLORES.



PHOTO: PROARCA/SIGMA

In Florida, frozen lobster tails from Central America are sold in retail outlets starting at US\$22.00 per pound and US\$32.00 and up for larger lobsters.

Intermediaries sell these lobsters to restaurant chains and to retailers at prices ranging from US\$15.50 to US\$17.00.

The price to the end consumer is around US\$18.00, if the frozen lobster tails are purchased in a supermarket, and from US\$27.00 to \$47.00 per pound if the dish is prepared in a restaurant.

Given these circumstances, the utilization of lobster resources is a classic example of the theory of natural resource degradation, given three factors:

- 1) Free access to the resource.
- 2) Price of the resource is high in comparison to the cost of extraction.
- 3) Slow growth or replenishment of the resource.

These three premises are evident in the case of Nicaragua and Honduras, and could be starting to occur in Belize. This allows us to conclude, without any need for a complex analysis, that the resource is being over-exploited. At the same time, some

aspects of the regulations that govern the lobster fishing are not fully enforced due to lack of monitoring and control. For example, the law prohibits the extraction of egg-bearing females; but it is well known that many divers catch them. In addition, the minimum legal catch size is 14.5cm of tail, but this rule is ignored due to the existence of a market for illegal undersized lobster.

***Lobster is considered a high-value dish and market demand as well as price are "high end", compared with other seafood products***

Although a closed season is imposed between March 16 and July 31 (coinciding with the period of greatest reproductive activity), some divers continue to capture lobster illegally. Others join diving teams in countries where the closed season does not coincide with these dates. In fact, the closed season is different in Nicaragua, Honduras and Belize.

The scarcity of the resource is forcing fishermen to capture lobsters that have not reached the legal size. Eight small lobsters are needed to complete one pound of lobster tails and the local markets normally absorb undersized products.

Lobster extraction by deep-sea diving with air tanks should gradually be decreased until

it disappears, giving way to trapping or using other environmentally-friendly techniques.

Nevertheless, trap fishing needs regulation and modern technology to prevent damage to the environment and to the fishing grounds. This requires external financial support for technology development and technical assistance to stop over-exploitation of by existing fishing fleets the resource. In addition, strategies are required to provide employment in new production activities for individuals that would be left jobless.

In order to guarantee an adequate supply of raw material, the processing plants must also support this shift towards sustainable fisheries and, based on notions of efficiency, productivity and codes of conduct, gradually penetrate the specialized niche markets to obtain commercial benefits that could be partially transferred to the fishermen.

This could be linked to a quality assurance program to take advantage of the positioning of Caribbean lobster in the "Premium" product segment.

Lobbying efforts are also needed to ensure greater government presence and control, in order to prevent over-exploitation of lobster fisheries and improve diver security and social wellbeing.

It is important to develop a certification system or codes of conduct, with international technical and financial assistance, to identify commodities produced using environmentally and socially sustainable processes in the lobster marketing process.

This would be key for convincing corporate buyers and the food service to give preference to buying this "friendly" product.

East coast of the United States

# Commercial possibilities of live lobster



PHOTO: CINTHYA FLORES.



*The Following section describes the current dynamics of the lobster market including direct buyers, wholesale distributors, retailers and restaurants that sell lobster imported from the Caribbean Coast of Central America into the United States. It also assesses the level of awareness of the ecological and social conditions in the places of origin of the product. In addition, this section analyzes the attitudes of this market segment towards changes such as: certification of origin of products, establishment of codes of conduct and other measures to improve conditions for the population and the trade of live lobster.*

On the east coast of the United States, the lobster market consumes and trades different types of lobster, the most important being cold water lobster, mainly from the coasts of Boston or Maine (known as "Maine Lobster") and the Spiny Lobster (also known as "Rock Lobster"), from the coasts of Florida or imported from the Caribbean coast of Central America, South America and the Caribbean islands, except Cuba.

The US market regards Spiny Lobster as a superior product to Maine Lobster, because of its organoleptic characteristics and its consistency, which is reflected in its higher price.

## Consumption

Lobster is considered a "gourmet" commodity in the United States. It is not a food that is typically prepared in an American home, but instead is eaten in specialized

restaurants and is normally associated with the celebration of special occasions.

Lobster consumption has been growing steadily in recent years, though not at a very accelerated rate. There is no perfect substitute for live lobster in the gastronomic market at present, although the product may be imperfectly replaced by live langoustines or other crustaceans with similar qualities.

## Demand

Demand for lobster is very elastic as a function of consumer income, depending on the particular preferences and eating habits of the populations in the areas where it is sold. Since human beings have very firmly rooted eating habits, it is considered unlikely that demand for this product will decrease in the foreseeable future.



## Value chain

The value chain associated with lobster in Central America involves both industrial and artisanal fishermen (producers) and local processing plants, which receive the raw material, and process, pack and export it mainly to the United States, although they also supply other smaller markets.

In the case of frozen lobster, east coast importers in the United States maintain commercial relations with exporters through brokers (individual and corporate). The latter place the product with distributors who in turn sell to individual retailers such as supermarkets, seafood stores and restaurants; with large retailers who sell the product to the final consumer (supermarket chains or restaurants); with agents who in turn sell the product to retailers or repackaged for institutions (use and store).

The volume of lobster sold annually in the United States is on the order of 200 million pounds. The United States imports a total of 56 million pounds of frozen lobster annually, of which 6-7 million pounds (11-12%) originate in Central America.

## Consumers

There are two main types of consumers of live lobster in the states along the east-sea-board of the United States:

- 1) A small group of oriental immigrants who for cultural reasons prefer to select their seafood from live species, to maximize their freshness and quality. Consumers in this group prefer to choose the specific item of seafood that they wish to eat. They tend to be from middle to upper-middle socio-economic groups.
- 2) North Americans from western ethnic groups of upper-middle and upper economic brackets, professionals, business people and executives accustomed to eating regularly in restaurants, and who often enjoy seafood. They tend to be aged 25 years and over and

have an annual income of more than US\$30,000. Consumers in this group spend a substantial part of their income on entertainment and travel.

Lobster consumers in the United States are just now beginning to become aware of aspects related to the sustainability of the fisheries. Out of more than 300 people associated with a market chain who were interviewed for this study, only 8 (2.7%) showed interest in the subject.

Given that the US is the world's largest seafood consumer, major changes in attitude are required to avoid a crisis in the depletion of stocks in the mid-term.

Many participants in the different market chains for seafood products –except the final consumers– know that the growth of the world population and the demand for seafood is promoting the development of farmed products, as has occurred with shrimp.

In the particular case of lobster, however, this technology is not yet available commercially. Although various institutions have already managed to experimentally complete a full lobster production cycle in 18 months, this system is still not very efficient to be considered as a profitable alternative.

Live lobster is a product with a high price tag. In the value chain, the greatest profit margins are earned during the extraction phase. For this reason, the industry

seems to be attractive to new investors who wish to venture into the market of primary sector products.

Analyzing current market prices, it is clear that in this industry those with the negotiating power are the companies that capture the lobster at the beginning of the chain and, at the end of the chain, the retailers related with the final consumer, since they are the ones that enjoy the largest profit margins in their prices. In the marketing chain, the lobster end consumers have a strong interest in aspects related to the quality of the product, its appearance and the texture and flavor of the meat.

In general, since lobster is a luxury food item, its price is not a barrier for the end consumers. However, price is an important variable in other links of the chain. Given the high extraction costs, the intermediation profits have gradually declined, leading importers or larger buyers now to compare prices before they buy.

The origin of the product also affects prices, as lobster from some countries is perceived to be of better quality than lobster from others. Intermediaries argue that as long as the final consumers do not have specific demands related to environmental concerns, they are not going to change their practices. They believe that only very aggressive marketing campaigns will make the public aware of this situation and demand some change.



PHOTO: PROARCA SIGMA





# The live lobster trade

**Clients in the US market are considered to have high level of bargaining power, since they are the ones who decide what type of lobster they are willing to buy and determine the specifications of quality, nutritional content and size. In some cases, companies that have been unable to meet client requirements have been forced to apply reimbursement policies. In the case of live lobster shipments sent to intermediary clients, the lobsters that die in the process are not paid for.**

The live lobster trade appears to offer an interesting solution to the problem of over-exploitation and the health hazards that affect lobster divers, since it involves the use of lobster traps. However, at present most live lobster transactions involve cold water lobster from the coasts of Boston and Maine, a natural substitute for spiny lobster for two main reasons:

- 1) Prices are lower than those of spiny lobster
- 2) Faster logistics in process in transportation, storage and delivery processes.

In addition, certain characteristics of Spiny Lobster, such as the difficulty in taking them live from the tank with bare hands and the fact that they remove some of their own body parts (such as antennae) as a form of defense, make them less attractive to live lobster clients, in comparison with Maine lobster.

This suggests that the prospect of exporting live lobsters from Central America to the United States is not a viable alternative at the moment, since it would be very difficult to equal the production costs and delivery logistics of the Maine lobsters.

Although the Asian market appears interesting because of the prices it pays,

Central America does not yet have the technological conditions or the fishing methods to undertake this task in a competitive way (transportation costs and mortality rates).

Market research leads us to the conclusion that conditions are not yet ripe for the successful export of live Spiny Lobster from Central America's Caribbean coast to the eastern seaboard of the United States. Currently, we do not recommend this activity given the problems of resource over-exploitation and the injuries to Miskito divers.

However, in the course of this study, we have discovered opportunities and interest among those involved in the marketing chain, in particular the following:

- 1) Introduce pilot tests throughout the range where lobster are being captured in areas where unsustainable methods are being used. This will make it possible to determine feasibility and the appropriate commercial scales.
- 2) Support the creation of a success story in some small community by promoting private sector -industry-community alliances; position the product in the "responsible product" niche (in California, probably) and share the benefits to improve the community's livelihood.
- 3) In the medium term, promote the use of the installed processing capacity for other seafood products such as fin fish in Miskito Coast regions of Nicaragua and Honduras.

This process requires technical cooperation, advisory services, training and the availability of credits under special conditions, in order to facilitate the formation of



cooperatives in which ex-divers participate and benefit.

It is also important to design and implement a consumer information plan, in conjunction with the National Fisheries Institute and some of the larger lobster distribution chains, to jumpstart a market for the consumption of products that are caught with lobster traps or come from a certified or sustainable production process.

Another recommendation is to implement special programs with famous chefs in some of the major cities in the United States (New York, San Francisco, Chicago). The idea is that their restaurants would promote the distribution and sale of lobsters that come from environmentally friendly and people-friendly processes. This effort should be complemented by providing clients with information, either printed on menus or posted on websites. Lobbying and public relations campaigns will be necessary, as well as publicity and other promotional techniques.



PHOTO: MARCO BOLANOS





## Trade chain for the spiny lobster

# Coast of Belize

**Belize is located in the northern part of Central America, with an area slightly larger than 22,000 square kilometers, including numerous small islands (cays) near the coast. The fishing industry is the country's third largest foreign exchange generator, and as such a very important activity for the Belizean economy.**



Small-scale or artisanal lobster fishing generates the largest incomes within Belize's fishing industry, and has led to the successful organization of two large fishing cooperatives, the *Northern* and the *National* Cooperatives. These enter price are responsible for the processing, packing and export of lobster tails; however, they also satisfy the local market, since Belizean law requires them to sell 5% of their total production inside the country.

Belize does not have industrial fishing fleets, given that the offshore waters are shallow with a large number of cayes and coral reefs. The area's geographic conditions, which make it difficult for medium-sized and large vessels to navigate, favor the government's strategy to prohibit fishing methods that could damage or destroy the coral reefs.

More than 60% of lobster fishing is carried out by fishermen using traps. The rest of the production is extracted by snorkelers or "free divers".

Although these lobster-fishing methods have helped the country gain a reputation for high quality in the Florida market, several problems threaten the sustainability of the lobster fishery. The lack of harmonization of closed fishing seasons among the Central American countries and the use of air tanks for diving in deep waters are two examples.

Compared with the production from other Central American countries, Belizean lobster has very superior characteristics in terms of the environmental and social practices under which it is extracted. In fact, the



PHOTO: WWF CENTRAL AMERICA

US market, currently the leading consumer, essentially prefers Belizean lobster for its price and quality.

Of particular importance is small-scale lobster extraction using traps known as "casitas" (little houses) or shades. These are rectangular structures consisting of a wooden frame to which a sheet of zinc, measuring approximately 1m x 1.5 m, is nailed. The traps are placed on the sea floor, providing a shelter that recreates the crevices where lobsters naturally hide during their growth phase. When the fisherman dives to inspect the traps, it is easy to lift the lid and select the lobsters with the appropriate characteristics.

It is important to encourage a more generalized use of these traps, since they provide a suitable environment for lobsters, allow fishermen to extract them selectively and offer the additional benefit of protecting the coral reefs. Nevertheless, the more widespread use of this tool and its impact on the ecosystem's dynamics should also be evaluated by the scientific community.



PHOTO: PHOTOSTOGO





## Trade chain of the spiny lobster

# La Amistad-Cahuita-Rio Cañas Costa Rica/Panama



PHOTO: NESTOR WINDENVOHEL

**The Caribbean coast along the border between Costa Rica and Panama is characterized by agricultural activities (banana, cacao, coffee) and as a focal point for tourism development. This study covers the area stretching from Cahuita and Rio Cañas, in Costa Rica, to the area of influence of Isla Bastimiento Marine Park, including the Bocas del Toro Archipelago in Panama. Less than 1% of the area's 30,000 inhabitants are involved in fishing, and of these only a fraction is engaged in lobster fishing.**

Commercial lobster fishing in the Cahuita-La Amistad-Rio Cañas area is very small, compared with the fishing efforts in the other countries of the region. In Cahuita, fishing accounts for less than 5% of the country's fishing effort, representing less than 1% of fishing activity in Central America.

In the area around the islands of Colon and Bastimento, in Bocas del Toro Province, there is more lobster-fishing activity than in the Cahuita-La Amistad-Rio Cañas area. Lobster is sold through a local company to a processing and export plant in Panama City. The lobster catches are collected in small centers on the islands of the Bocas del Toro

Archipelago. The production is flown to Panama City.

Lobster fishermen belong to the Ngöbe and Bugle indigenous communities whose economy has traditionally been linked to agriculture and fishing. The main method used to catch lobster is free diving and hardly any fishermen have official permits or keep fishing records. Dives take place three or four times a week or on a daily basis.

According to the experience of local fishermen, lobsters are "not abundant". About 60% of the lobster fishermen earn a daily income of US\$16.00 to US\$30.00, while the remaining 40% receive less than US\$15.00 a day.



PHOTO: CENTRAL AMERICA



Problems affecting the sustainability of this resource include:

- 1) Catches of undersized lobsters (3 ounces or less) in the first links of the chain.
- 2) No closed season has been established.
- 3) Absence of fishing regulations in the area.

This region generates less than 20% of the total lobster production of Panama and Costa Rica together, around 160,000 pounds annually. It is important to involve the entire fishing sector and the processing industries in efforts to ensure compliance with current legislation in this region, in





## Trade chain of the spiny lobster

# Honduran Miskito Coast

**The Miskito Coast, in northwestern Honduras, is located in the Department of Gracias a Dios, where 27% of the population is dependent on income generated by underwater fishing.**



In this area lobster fishing is carried out on an industrial scale, including both lobster trapping fleets and dive boats. Small-scale or artisanal lobster fishing is not well developed, since the offshore waters are very deep and there are fewer coral reefs and cays in the coastal areas.

The lobster is extracted from coral reefs that lie between the Miskito coast and the edge of the continental shelf. It is then taken to La Ceiba and the Bay Islands, where it is processed for export.



### Two lobster fishing methods are used in Honduras:

- 1) Fishing with traps, in which boat owners with a crew of 10 to 15 people place around 3.000 lobster traps in the lobster banks.
- 2) Using divers to catch lobster. This operation is more complex and involves more people: in addition to the boat captain (who may also be the owner of the vessel) there is a foreman or "sacabuzos" whose task is to recruit Miskito divers and their assistants, known as "cayuceros" or canoemen, to do the work.

Divers typically earn between US \$600.00 to US \$1000.00 for 12 workdays per month, a figure considerably higher than the average per capita income in Honduras, which is below US \$2500.00 annually. The high salaries make it difficult to implement alternative fishing methods that are more environmentally sound and people-friendly. Nevertheless, these earnings do not compensate for the high price –in terms of health– paid by Miskito divers, many of whom end up with severe disabilities.

None of the lobster fishing methods applied in the Honduran Miskito Coast ensure that the bulk of the population

shares in the economic benefits from this activity. The benefits are limited to the income received by divers, boat owners and other people associated with extraction in the first links of the value chain.

The absence of packing and processing facilities in the area makes it difficult to obtain greater added value for local inhabitants.

The processing and packing plants are concentrated in the Bay Islands of Guanaja, Roatan and Utila. From here, the lobster is exported to the United States and to other markets, where it is considered a "Premium" or "high end" dish.

The external trade of lobster should seek out wholesale "niche market" buyers who offer better trading conditions, making it possible to share the benefits with the fishermen as an incentive to adopt better practices.

As in Nicaragua, the economic stimulus of lobster fishing is present in the first links of the chain. Nevertheless, it is essential to find mechanisms to encourage more environmentally and socially friendly extraction methods, such as the use of lobster pots in controlled areas.

In addition, governments and the industry should be urged to adopt measures to control and reduce the illegal trade of this species.







## Trade chain of the spiny lobster

# Nicaraguan Miskito Coast

In Nicaragua, lobster fishing is carried out in the Northern Atlantic Autonomous Region (RAAN), specifically around the Miskito Cays Biological Reserve and its adjacent areas. This is one of the regions with the greatest biodiversity in Central America and with the lowest indices of development in Latin America.



PHOTO: ONITHA FLORES

The large concentrations of coral reefs around the Miskito Cays form part of the coastal area, formally protected by the Nicaraguan government in 1991. In terms of productivity, the greatest wealth in the Caribbean is associated with the presence of coral reefs, mangroves and other important ecosystems, on which the regional fisheries depend.

Coral reefs interspersed with sea-grasses are key lobster habitats. In 1999, lobster fishing experienced an increase of 3.5 million pounds in the volume of catch landed, 20% higher than the catch recorded in 1998. This was due to a 40% increase in the number of fishing vessels in operation. In the years 2002 and 2003, the volume of the lobster catch totaled more than 3 million pounds.

About 50% of the lobster fishing is carried out by small-scale fishermen from coastal villages, particularly Miskito Indians. The lobster-fishing sector is represented by artisanal fishermen and divers. Most artisanal fishermen use wooden traps that allow smaller lobsters to escape, through free-diving.

The industrial fleet catches lobster by employing divers who work with air tanks and dive in the deeper waters outside the protected area, to depths of up to 30-40 meters.

Nearly 22,000 people from Nicaragua's Miskito region are associated with the lobster fishing industry. Although lobster is not a traditional Miskito subsistence foods, the

Miskito's relationship with this resource is based on the salaries earned by the divers that extract lobster for the processing plants and the people who work in these frozen food plants.

Many lobster trappers are former divers or the sons of injured divers who are well aware of the dangers of diving. For this reason, they prefer to risk their capital and invest in the use of lobster traps rather than work as divers. Five vessels of the deep-sea diving fleet belong to independent operators and 20 belong to packing firms. The deaths of divers due to decompression sickness and the growing number of disabled divers are creating a negative image of lobster fishing in Nicaragua's Moskitia region.

There are four frozen plants in Puerto Cabezas, each with the capacity to process on average more than 40,000 pounds of lobster per month. There is also a trade in illegal undersized lobster, which is transported by land or by air to Managua, or is consumed locally. At present, the Central Bank of Nicaragua sets the export price at \$18.00 per pound.

The economic incentive that encourages lobster fishing is present in the first links of the chain. It is important to find mechanisms to promote more eco-friendly and people-friendly extraction methods, such as the use of lobster traps in controlled areas. The Government, with support from the industry, should also adopt measures to reduce the illegal trade in undersized lobster.





# Better management practices for farmed shrimp

PHOTO: CINTHIA FLORES.

**A series of better management practices, or BMP's, for application in shrimp farming have been designed and implemented around the world. These practices share the same basic principles and approaches, but vary in accordance with the particular characteristics of the countries or regions where they have been created.**

Better management practices (BMP's) may be grouped in three categories, covering social aspects, environmental aspects and those related to food safety:

## **1) Social aspect include:**

- Compliance with current legislation and environmental regulations.
- Community relations allowing free access to mangroves, fishing grounds or other public resources.
- Respect for workers' rights and occupational health standards, including the application of local labor codes, social security and labor regulations regarding minors.

## **2) Environmental factors to consider include:**

- Aspects related to conservation and prevention, mitigation or compensation for damage to the environment. This includes site selection and construction of industrial infrastructure, environmental impact studies and their respective environmental management plans, and special regulations, such as land use plans.
- Regulations such as a ban on mangrove clearing for new aquaculture operations, or reforestation when it



PHOTO: © WWF-CANON/OLGA SHEEAN.

***Better management practices in shrimp farming aim to prevent, mitigate or compensate for the negative environmental impacts generated by the activity, while developing an environmentally and socially responsible shrimp industry.***

is strictly necessary to remove some part of the mangrove.

- Appropriate management of effluents from farms, processing plants and laboratories, including definition of the quantity and the quality of allowable effluents and compliance with minimum water quality standards
- Appropriate management of sediments to prevent problems in water bodies and land adjacent to the shrimp farms.
- Appropriate management of ponds, including aspects such as feeding, sowing density, aeration, water exchange rates, leak prevention to protect water quality and minimize the discharge of nutrients and suspended solids.



PHOTO: MARCO BOLAÑOS.

- Compliance with local and national laws concerning seed imports. For example, sources of post-larvae, the rule of not using wild larvae should be followed.
- On-site disease management should be carried out in accordance with pre-established protocols and, as much as possible, in conjunction with national health authorities.
- Appropriate management of the storage and disposal of supplies from laboratories, farms and processing plants, such as fuels, lubricants, chemicals, fertilizers, plastics and waste.

## **3) BMP's to guarantee food safety, include:**

- Appropriate management of medicines and chemicals, preventing the use of drugs that are banned nationally or internationally.
- Bio-safety, such as the management and treatment of sewage, residues and food waste.
- Quality control during the harvesting and transportation of the shrimp, to prevent contamination and decomposition. The use of preservatives should be indicated.