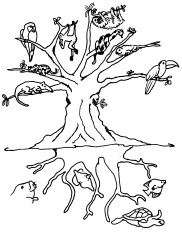


BALU UALA



**CENTRO DE INVESTIGACIÓN, EDUCACIÓN
Y MANEJO EN RECURSOS NATURALES**

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**ESTABLISHING NO-TAKE MARINE RESERVES AS A TOOL FOR
CONSERVATION, RESTORATION AND SUSTAINABLE USE OF MARINE
RESOURCES IN KUNA YALA, PANAMA**

Final Project Report

March 2005 - August 2006

for the National Oceanic and Atmospheric Administration

by Renate Sponer, project coordinator

for the CREA-Panama Foundation / Fundación BALU UALA

Panama City, 10th June, 2007

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SUMMARY

The objective of this project is to create awareness about the importance, ecology and vulnerability of coastal marine resources, and their current deterioration, among the local populations in the indigenous area of Kuna Yala, Panama, and at the same time promote Marine Protected Areas as an effective tool to conserve, restore and use these resources sustainably. We work in six communities, which are serving us to build up experience and may act as model communities for others to follow.

We adopt a methodology based upon local participation and ownership of the project which includes environmental education, using both scientific and traditional knowledge, as well as base-line socio-economic and biological surveys for decision-taking and future evaluation of the marine reserves. This project is part of a comprehensive plan for the sustainable development of the area and may act as a model for sustainable marine resource management throughout the region, particularly in indigenous areas.

During this first stage of the project, between March 2005 and August 2006, our focus was on environmental education, our aim being to provide education to all sectors of the communities, since we identified a strong need for basic information about the biology, ecology and conservation of marine resources. We believe that educating people about the degradation of coral reefs in the area, (its reasons and implications) is the necessary basis of any conservation action that might be taken. During the last six months of the project MPA commissions formed in all six participating communities. The actual creation of marine reserves has currently reached different levels in the different communities, whereby three reserves have already been approved in their local congress houses, are demarcated and functioning. Basic biological surveys have been conducted by BALU UALA personnel, with the participation of youth and other interested community groups, in order to study coral bleaching and spawning, and collect base line data for reserve design and long-term monitoring.

In addition to the points set out in our work plan for this project, the Foundation has initiated a fisheries management program in the six communities, in an attempt to make communities comply with the existing fisheries regulations set by the General Kuna Congress. Each community has an inspector who records and inspects all landings and has the faculty (conceded by the Kuna Congress and their local community) to confiscate any illegal catches. Apart from controlling fishing activities in this way, an important focus of this program is to create awareness among fishermen and the community at large about the importance of using these resources in a sustainable way.

Thanks to this project, the BALU UALA Foundation has not only been able to lay the foundation for future work on environmental conservation in Kuna Yala, it has also succeeded to progress as an organization: we now have a functioning and motivated board of directors who oversee our operations, as well as a well-prepared and organized team of collaborators with different backgrounds and strengths who make up an effective network of people working towards the conservation of natural resources in the area. Importantly, the organization is now effectively based in Kuna Yala, where more than 80% of our funds are destined and all but two of our staff are working on a daily basis, while our office in Panama City serves as a center of those tasks that cannot be carried out in Kuna Yala (i.e. administration and communication).

BACKGROUND

Project need

Kuna Yala (KY) is a semi- autonomous indigenous region in the North of Panama, encompassing approximately 200 km of Caribbean coastline. Shallow marine areas (<20m), including coral reefs and some 360 islands make up around 2,500 km². Marine ecosystems of KY are considered to be among the most pristine in the Caribbean, harboring a number of particularly complex and biologically diverse coral reefs. However, KY has not been exempt from major habitat degradation: a complex interplay of natural and anthropogenic factors (see below) has caused reefs in this region to change extensively. Most notably, there has been a substantial reduction in live coral cover, from approx 70% in the 1970s to a current 20%, and a conversion from coral to algae-dominated ecosystems. Reduced coral cover is causing increased exposure to waves, leading to the erosion of coral cays. Reduced coral cover also leads to a loss of habitat for a large variety of commercial and other species, many of which are now also threatened by over-exploitation.

At present there is virtually no threat to the reefs from land-based sources of marine pollution due to the lack of development on land. Throughout KY, land is presently only used for subsistence agriculture, using rotational cultivation. However, there is real threat that potential extensive agricultural practices, aquaculture and tourism development projects degrade the marine environment in the near future.

There is thus a real need for immediate action in order to mitigate severe environmental and social consequences (further reef degradation, increased poverty, loss in quality of life, and value of the reef ecosystems for harvesting, tourism, coastal protection, medicine, etc.). Real sustainable alternatives to the current and planned destructive uses of marine resources are urgently needed.

A recent study identified eight areas of particular conservation value within KY, which they recommend as sites for marine protected areas (MPAs). Several communities throughout KY have recognized the need for action and are willing to set up MPAs, as part of a comprehensive plan to conserve, restore and sustainably use marine resources in KY. BALU UALA is one of only two organizations that are officially recognized by General Kuna Congress (CGK, the highest political and administrative authority in KY) and works in close collaboration with it.

On a regional scale, Kuna Yala is part of a priority area for the establishment of marine protected areas and marine conservation and restoration, since few MPAs exist in the Central Caribbean Marine Eco-region to date (Panama, Columbia, Venezuela).

Specific reasons for marine ecosystem degradation in KY:

Reasons for the degradation of marine ecosystems in KY can be divided into two categories: local (i.e. linked to human activities and ecological processes at the scale of KY) and regional/global.

On a local level, the degradation of the natural environment is going hand in hand with the rapid change of the Kuna society, which is marked by a loss of traditional knowledge and societal values, as well as rapid population growth. The traditionally forest-dwelling Kuna people, like other native groups, developed and maintained sustainable harvesting practices of forest resources over hundreds of years. It was only within the last 100 years or so, that the Kuna occupied the many coastal islands of what is now KY. Overall, the new environment has provided a wealth of resources, which has allowed the Kuna to prosper, however several reasons can be identified that have contributed to the current state of over-exploitation of marine resources. (i) Compared to terrestrial ecosystems the Kuna lack much understanding of the ecological roles and links among the new (marine) species they now exploit; (ii) loss of cultural values that serve to appreciate natural systems; (iii) the recent and ongoing increase of the population of KY has led to a higher demand of marine products; as has (iv) the trading of resources for commercial return, with national markets.

Traditional practices of coral extraction for construction and landfill have increased and now include live coral colonies and sea grass. A comparison of aerial photographs of 15 KY communities from 1966 and 2001 found that the total land surface had increased by 62,284 m², due to filling with coral. In addition, it was estimated that 16,215 m³ of coral were extracted for construction of reinforcement walls, which altogether add up to a length of 20km.

Body sizes of the main target species, (e.g. lobster, groupers, snappers, parrot fish, conch, king crab) are steadily decreasing, indicating that many species are being over-exploited. Lobster catches consist of up to 80% immature animals. Many commercial fish species are important grazers, which keep algal growth low (e.g. parrot fish, surgeon fish, wrasses). The reduction of their population sizes has important negative effects on coral health, as it leads to algal overgrowth (see below). No data on abundance and biomass of exploited species, nor on fishing volume and effort are available, other than for spiny lobster.

KY also suffers from the lack of a waste-disposal scheme, causing massive pollution with organic household waste, wastewater (i.e. human feces, detergents, chlorine) wrapping materials and containers, batteries, gasoline, solvents, varnish, apparels, furniture, etc. This causes unacceptable health and environmental impacts, leading to skin and intestinal infections (especially in children), eutrophication (which further favors algal growth) and contamination of water and organisms with toxins. However, due to the geographical isolation and the dispersed nature of Kuna communities, waste removal remains a challenge.

Land and air-based tourism in KY is small due to a lack of infrastructure (difficult access, limited tourist accommodation, lack of organized activities, no dive facilities), however, a large number of people (20,000-30,000/year) visit KY aboard yachts and cruise ships every year. This sea-based tourism, particularly that from sail

boats, is under very little control by Kuna authorities, as illustrated by the fact that the majority of sail boats do not register upon arrival and thus the crews cannot be made aware of any existing environmental regulations. There is a general lack of information on marine resource use in KY (i.e. catch statistics), however, it is thought that due to the absence of catch limits, yacht-based tourists may have a significant impact on local fish and lobster stocks. In addition, sailboat crew commonly unload their waste on the islands before leaving KY. The current government has plans for a strong expansion of tourism in KY, particularly big-scale, high-end resorts, as expressed by the current government, who regards KY as the most important tourism resource to be exploited in Panama. However, traditionally, the CGK has prohibited any investment, land-ownership or commercial activities by foreigners or non-Kunas in KY.

Regional/global processes that contribute to the degradation of KY's marine environments include global warming, coral bleaching, outbreaks of coral diseases and region-wide destabilization of food-webs through over-fishing. The severe bleaching event of 1983 caused a massive coral die-off in the region. The fast-growing, branching corals *Acropora palmata* and *A. cervicornis*, originally the dominant species in the region have largely (95%) disappeared (due to white-band and other diseases) and have been replaced by the corals *Agaricia spp.*, *Porites astreoides* and *Diploria strigosa*, as well as algae and sponges. Large patches of both *Acropora* species are still found in certain areas of KY, however their extent, distribution and population trends are unknown. A recent analysis of coral cores in Belize showed that *A. cervicornis* dominated continuously for at least 3000 years prior to the recent events. *Agaricia spp.* occasionally grew in small patches, but no coral-to-coral replacement sequence occurred over the entire area until the late 1980s. Within a decade, the scale of species turnover increased from tens of square meters or less to hundreds of square kilometers or more. This unprecedented increase in the scale of turnover events is rooted in the accelerating pace of ecological change on coral reefs at the regional level. Following the massive coral die-off, recruitment and replenishment of corals has been hampered by competition with algae, sponges and other benthic organisms for space and light. Algae have become dominant because grazing species (many commercially important fish species) have decreased dramatically in abundance and biomass. The sea urchin *Diadema antillarum*, an important grazer, was reduced to 1% of its original numbers in 1983, due to an undetermined disease, and there is still no indication of recovery. Together these factors led to an ecosystem-switch, from coral to algal dominance. Today, 50% of the remaining coral reefs of KY are considered to be under high risk, given the various environmental pressures they are exposed to. Reduced coral cover is causing increased exposure to waves, leading to the erosion of coral cays. Reduced coral cover also leads to a loss of habitat for a large variety of commercial and other species, many of which are now also threatened by over-exploitation

Through their culture of subsistence agriculture, hunting and fishing, the Kuna people's livelihood depends directly and almost entirely on healthy ecosystems. It has been estimated that 80% of protein in the diet of the Kuna stems from fish and other seafood. If current trends of ecosystem deterioration (particularly decrease in coral cover) continue unchecked, it is likely to lead to disastrous consequences for Kuna communities, as they lack resources to afford costly ecosystem repair (e.g. artificial reefs, wave barriers). KY's marine ecosystems are still healthy enough to recover naturally, if managed wisely and promptly.

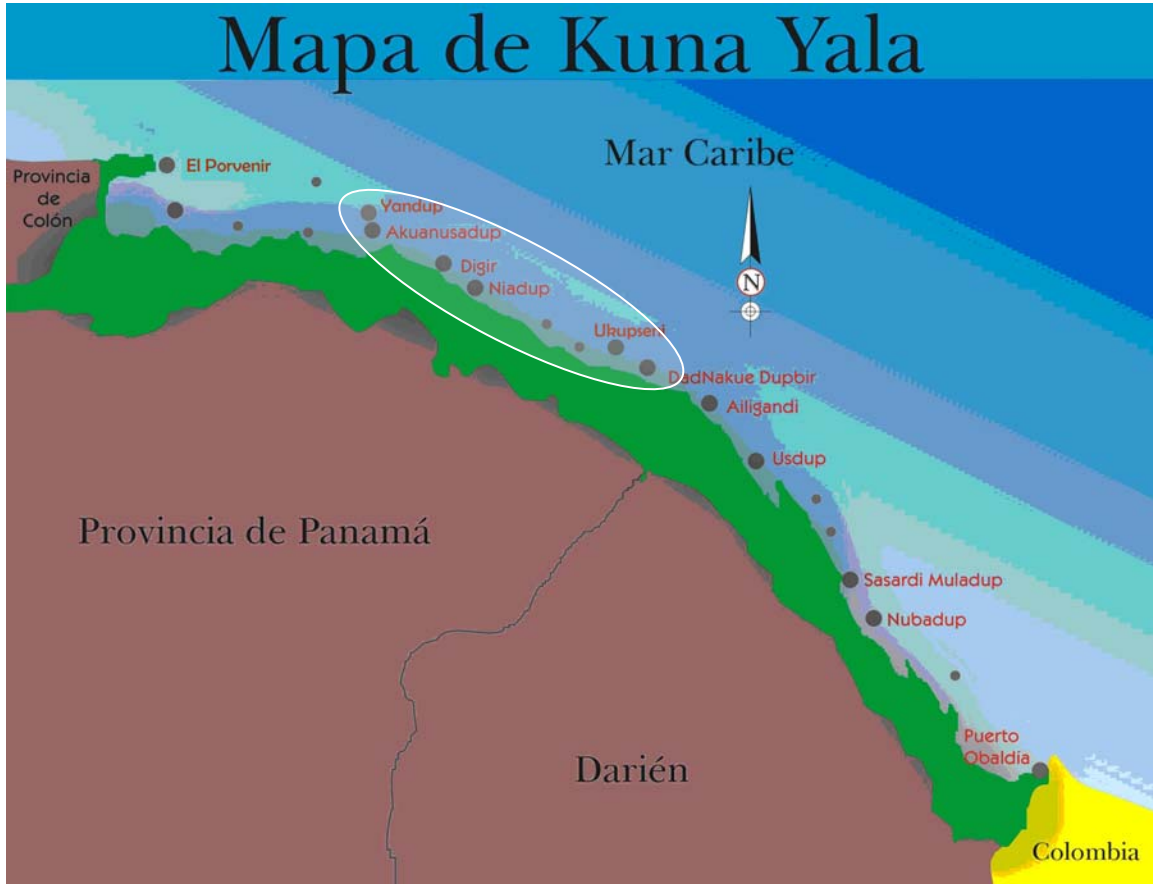
There is strong scientific evidence that protection from over-fishing is currently the best method to protect and restore coral reef ecosystems. In view of the multitude of modern regional and global effects (coral diseases, climatic warming, pollution, eutrophication), which may not be controlled locally, protecting and restoring intact food chains, particularly grazers (to prevent algal over-growth and ensure coral recruitment) may be the single most important insurance policy against severe degradation.

PROJECT OBJECTIVES & AIMS

The objectives of this project were to create awareness among the local population about the richness, importance and recent degradation of their local marine resources, particularly of coral reefs, and built upon such awareness, promote the creation of Marine Protected Areas as an effective tool to restore and conserve these ecosystems. We hoped that this project could serve as a model for other communities in Kuna Yala, or even outside the Comarca, who are concerned about their marine resources and want to take practical steps towards restoring and protecting them.

METHODOLOGY

Location: We selected six communities, based upon our previous experience and their geographical proximity: Yandup (Narganá), Akwanusadup (Corazón de Jesús), Digir (Río Tigre), Niadup (Tikantikí), Ukupseni (Playón Chico) and Dad Nakwe Dupbir (San Ignacio de Tupile), in the centre of the Comarca Kuna Yala (see map).



Map of the Comarca Kuna Yala, representing the location of some of the 49 communities. The white ellipse indicates the project area.

Work Program: The methodology of this project is based upon the principle of community participation and ownership, as well as three main topics:

I) Education, information and training: we believe that it is essential to invest time and effort in making the local people experience, learn and understand the problems, their reasons and possible solutions, in order to ensure that they truly take ownership of the project.

II) Research: it is indispensable to have a profound knowledge of the (web of) problems one wishes to address, including quantitative and qualitative data, in order to work efficiently and with a clear direction.

III) Action: once people are aware of the problems and understand what their causes and possible solutions are, it is important that action is taken, namely specific measures that the communities (and their advisors) consider to be the most convenient, efficient and effective.

Based upon these principles and the situation of marine resources in KY, we prepared the following work program:

- 1) Create awareness through environmental education, information and discussion of topics related to local marine resources
- 2) Form local committees to promote the creation of MPAs
- 3) Define MPA aims
- 4) Define MPA sites and regulations
- 5) Carry out ecological and socio-economic surveys
- 6) Select MPA sites
- 7) Design MPA management plans
- 8) Establish MPAs
- 9) Evaluate project success and MPA performance
- 10) Manage MPAs adaptively and seek financial independence

At the outset of the project we contemplated each step to consist of the following specific activities:

1) Education, information, discussion

·Run community workshops and seminars on basic marine biology, marine ecosystem functions and human impacts on marine ecosystems. These seminars shall act as a forum to make scientific information collected in years of research in KY (including this study) accessible to the general public.

·Marine Protected Areas (MPAs): what they can achieve, how they work, experiences and lessons from MPAs in the Caribbean.

·Produce educational material accessible to all ages and groups of KY society (booklets, posters, videos etc.), on themes including natural history of commonly used marine species, traditional knowledge, medicines and stories and legends of the marine environment and its species, as well as the degradation of the marine environment, its causes and possible solutions, in order to stimulate participation in the process of problem solving.

·Regular workshops to develop, evaluate and update the work schedule and project priorities.

·Workshops on traditional knowledge of marine and coastal environments - by and for community members.

·Specialized workshops and seminars for school teachers on marine environmental issues.

·Workshops, seminars, theater play etc. for school and pre-school children, and teenagers.

·Specialized workshops for women, to strengthen the outstanding role of women in the passing on of knowledge and in implementing sustainable development and resource management.

·Seminars and workshops on sustainable and positive environmental practices (e.g. composting, avoidance of waste and pollutants, traditional low-impact agricultural practices, sustainable mangrove harvesting, etc.).

·Training in scientific methods for research and monitoring (for this study and future long-term monitoring).

2) Local MPA committees

·Form local MPA committees, which shall contain representatives of all local stakeholder groups (e.g. fishermen, lobster divers, intermediate buyers/sellers of sea food, teachers, young people, women, traditional specialists (traditional healers, shamans), community leaders, etc.). The committee's function shall be to represent the community in all meetings and to inform the community of the progress and course of the project. Committee members shall have the authority to take decisions in the name of the interest group they represent.

3) Define MPA aims

·Committee (see above) defines MPA aims: (e.g. to protect known areas of high biodiversity, to restore and conserve ecological processes, to protect spawning grounds of commercially important species, to allow populations of over-fished species to recover, to create sustainable fisheries in the long-term, to restore high live coral cover, to create an attraction with educational value for tourists, to act as a model/case study for other areas of KY).

4) MPA sites and regulations

·Committee (see above) defines MPA rules and suggests possible MPA sites. The committee shall define what uses are permitted/not permitted (e.g. a nested design with different zones-i.e. from no-take core zone to sustainable fishery zone), enforcement, administration and long-term financing of the MPAs, The 'Conservation Finance Guide' by the Conservation Finance Alliance (<http://guide.conservationfinance.org>) has been identified as a very useful tool for planning of management and financing.

5) Bio-physical and socio-economical surveys

·Conduct biological and socio-economic surveys to establish base-line information from which to select MPA sites and assess MPA performance.

·Many studies on the effects of MPAs in the past have suffered from lack of base-line data (before establishing the MPA) and of control sites (outside the MPA) as well as of a scarcity of spatial and temporal replicates. Assessing the ecological and socio-economic effects of MPAs is a vital part of their management, therefore we aim to invest significant time and resource in this kind of investigation: from the planning of data collection to analysis and interpretation.

·We propose to collect, summarize and interpret existing information pertaining to the ecology, use, state and conservation of marine ecosystems and particular marine resources of KY. There is a wealth of biological, anthropological and sociological studies from KY, published in scientific journals, books, theses and internal reports. We plan to gather and utilize this valuable resource for the purposes of research, management and education.

·The following studies will be carried out in proposed MPA sites and several representative control sites outside suggested MPA sites (where applicable):

Assess abundance, biomass, sex and distribution of economically important and ecological indicator species (e.g. butterfly fish), using transect and roving diver methods. This work will be carried out with the help of trained local people (e.g. lobster fishermen), who will be particularly helpful in locating cryptic species.

·Map habitats [in areas that have not previously been mapped by Guzman et al. (2003)], with a combination of aerial observation and transects using manta tows and video recording methods, standardized for comparative analysis within and between studies [as described in English et al. 1997 (eds); and Kvernevik et al. (2002)]. Habitats will be categorized as defined by Mumby & Harborne 1999) according to geomorphology (back reef, reef crest, relief and spur, fore reef, patch reef, lagoon) and dominant benthic class (bedrock, rubble, sand, mud, algae, gorgonians, corals, sponges, sea grass - including several subcategories). For each habitat, dominant species and percentage cover will be noted, along with depth and GPS coordinates. The mapping will be conducted with the assistance of local fishermen and other members of the community, who will be comprehensively trained for this purpose.

·Identify stakeholders of marine resources in the study area (using interviews and questionnaires).

·Assess fishing intensity and abundance/biomass of main commercial species.

·Assess catch biomass and size/sex of main commercial species (i.e. lobster, conch, octopus, king crab, groupers and snappers) and determine the percentage of locally consumed vs. exported product (through field observations, at sea and on shore).

·Identify the geographic distribution of harvesting activities.

·Assess economic value of harvest and distribution of income derived from such harvesting activities within the community and outside (e.g. commercial buyers and sellers).

·Record change in resource availability over the last 10-20 years, as perceived by local communities.

·Record traditional and currently used management practices (e.g. restrictions).

6) MPA site selection

·Committee (see above) and BALU UALA select 3 or more sites for MPAs based on surveys (6) and according to: aims, bio-physical criteria [habitats, biological diversity, state of conservation, uniqueness, important spawning or nursery areas; with particular reference to the recommendations of Guzman et al. (2003)] and socio-economic criteria (acceptance, existing uses and obligations, practical management constraints, enforceability, suitability for tourism activities, etc.)

7) Management plan

·Committee (see above) and BALU UALA develop a management plan for the MPAs to be submitted for discussion and vote at the CGK bi-annual meetings. This document will contain the information and decisions derived from all the above points (1-6)

8) Establish MPAs

·Formally establish MPAs when permission of CGK is obtained.

9) Evaluate project success and park performance

·Evaluate project success and park performance, according to established aims, criteria and methodology after 6, 12 and 18 months (see 'methodology for evaluation'). Future evaluation shall take place annually.

10) Adaptive management

·Adjust administration, rule enforcement, activities etc. so that aims can be met. If necessary re-define aims, criteria and methodology to reflect the communities' necessities and/or conservation needs.

Personnel: The project counts with 18 paid personnel and many volunteers. The paid personnel include: the project coordinator, secretary/accountant, promoters' coordinator, 9 promoters and 6 fisheries inspectors. The volunteers include the five local MPA commissions and many children and youth throughout the islands.

The project personnel interact and function in the following way:

Each community has 1-3 promoters, who are locals of their community. The promoters are personnel of the BALU UALA Foundation and trained, supervised and paid by the Foundation. Their task is to promote the project and the organization as such, through a variety of educational activities: e.g. snorkeling trips, seminars, presentation of documentaries, fun & educational activities for children, representation in the local and general congresses, collaboration with the local schools, etc. The promoters are also figures of support and motivation for all other local project personnel: the local MPA commissions, the fisheries inspectors and the youth and childrens' groups. They are thus the primary link with the organization at the community level.

The fisheries inspectors are personnel of their respective communities and the CGK, supervised by the communities, the CGK and the BALU UALA Foundation, who also trains and pays them. Their task is to inspect and register the daily seafood catch in their communities, and confiscate any animals that were illegally caught, according to CGK fisheries

regulations. The project did not originally contemplate working on fisheries issues, since another organization was carrying out that role. However, when that project terminated and the fisheries in KY remained in a state that lacked control and put the resource in danger of over-exploitation, the BALU UALA Foundation decided to take on the fisheries as an additional main work theme.

The promoters' coordinator is BALU UALA personnel and acts as an advisor and supervisor of the promoters and as their representative before the project coordinator. This figure is an important link between the local promoters and the project coordinator, assists with all aspects of monthly field visits, training activities and research, and is also responsible of the keeping and maintenance of any project materials or equipment (particularly the boat and motor), in our field center, Ukupseni.

The project coordinator is BALU UALA personnel and organizes, directs, supervises and manages the execution and administration of the project, supervises all project personnel, directs research and other scientific activities, interacts and co-ordinates work with any collaborators (CGK, schools, etc.), visits communities and local project personnel regularly to supervise and advise, adapts the work program to particular circumstances, and generally does everything to facilitate the education of local populations, their active participation in the project and the promotion of sustainable resource use in the communities.

The project coordinator and the coordinator of promoters complement each other in scientific, local and traditional knowledge.

The secretary/accountant is BALU UALA personnel and administers project funds, materials and equipment according to the project guidelines, the regulations of the BALU UALA Foundation and the decisions taken by the project coordinators. It is furthermore their responsibility to carry out all secretarial work, act as a link in Panama during monthly field trips, purchase project materials and equipment and assist in all aspects of the project.

Project duration: March 1st, 2005 - March 31st, 2007

Funding: NOAA: US\$ 30,000; The Lighthouse Foundation: US\$ 40,000.

RESULTS

Notes on the project personnel:

The BALU UALA Foundation originally planned to carry out this project with its members as project personnel. At that time, the members were exclusively biologists or biology students. However, by the time we received funding for the project, most of our members had opted for other careers or jobs, and the project positions therefore had to be filled otherwise. Since we believed in the importance of local participation and ownership of the project, we did not hire other professionals, but rather employ local people as promoters in their respective communities (non-professionals). The thinking behind this is that local people have several key advantages over professionals: they live in the communities and therefore have all the important local knowledge (people, places, customs, etc.) that professionals from the city could not obtain in a short time. Locals also inherently care about their communities and their resources, they are known and respected in their communities and they are highly motivated to learn and advance. In turn, many past and present projects in KY have shown that professionals (the great majority of whom live in the city) often object to staying in KY for prolonged periods of time and do not have the same motivation to make the communities advance. We therefore decided to take this innovative (for KY) step to work directly with people from the communities. In our trip to the six communities, we searched for persons with experience as lobster divers (the only people who know the sea from below), who were also leaders in their communities (enjoy respect in their communities) and are highly communicative.

The local project promoters and their coordinator have been crucial for the success of our project, as they were the driving force in the communities. Their tasks were to inform, educate and create an interest in their communities about local marine resources and their conservation. They had to use their imagination and creativity to do so, but also apply the formal and scientific knowledge they had acquired, which in many cases they needed to translate into the vocabulary of particular interest groups (children, women, traditional leaders, etc.). Due to their important function in the project, promoters were chosen very carefully, during several days of interviews and practical tests, putting emphasis on: interest in and commitment to conservation issues, general knowledge, leadership qualities (recognition as local leader, assistance at local meetings, good speech, etc.), familiarity with and interest in traditional knowledge, knowledge of Kuna and Spanish language, and honesty. All promoters received training in basic marine biology, ecology, conservation, field research methods, and environmental education during a 3-week intensive course in Panama City, during April 3-20th, 2005. This course was organized by BALU UALA, with speakers from the Smithsonian Tropical Research Institute, the University of Panama, Fundación MARVIVA, Fundación ALBATROS, Peace Corps, and independent Kuna professionals in painting, film making and theater acting. Once completed the training course, promoters started work as environmental educators in their native communities. During the course of the project, they received additional practical and theoretical training, in the form of seminars, work shops, documentaries, field surveys, brochures and other literature, posters etc., on a monthly basis, usually imparted by the project coordinator. Every 3-4 months, all project personnel meet in order to evaluate, coordinate and program the upcoming work, as well as to exchange ideas and experiences. During these meetings, they receive further training, through seminars and workshops. After completing one and a half years of work in the project, promoters have managed to accumulate a wealth of practical and theoretical knowledge and experience, in western science, traditional Kuna knowledge and educational techniques.

Together with the project coordinator (a PhD in Marine Biology), the local personnel form a multidisciplinary team, versed in most aspects of ecology and conservation, that are needed to assist the local communities to manage their natural resources sustainably.

Throughout the project we put an emphasis on community participation and ownership, as well as the three main topics: Education, research and action.

a. General environmental education

After several months of work in the communities we found that there was a very strong need for basic education and information about the biology, ecology and conservation of marine resources, among communities in Kuna Yala. Educating people about the degradation of coral reefs in the area, the reasons and implications is the necessary basis of any conservation action that might be taken. The majority of communities lack this basic knowledge and particularly the conscience. We therefore saw ourselves forced to invest more time and effort in education than was originally planned,

particularly since building a conscience and changing habits are slow processes, which necessarily need to take their time and course. This meant a reduction of effort in other areas of action on the short term, however, we trusted that the investment would create a solid base for future action, and therefore pay off in the long term. A wide range of educational activities in the six communities, covered many different topics, using a large range of different techniques and strategies. Some of the many activities that were carried out include:

- Seminars on coral reef ecology for different community groups: community leaders, lobster divers, womens' groups, sports groups, students and children, school teachers, tourism committees, religious groups, etc.
- Formation of kids and youth groups for nature conservation (CLUB BALU UALA)
- Snorkeling trips with youth, students, lobster divers, school teachers, etc. to give a hands-on class on coral reef ecology.
- Night snorkeling with promoters and other interested persons (particularly to see polyps and coral reproduction)
- Video presentations on varied educational themes.
- Educational games, theater play, songs, painting etc. with childrens' groups.
- Collect used batteries to avoid contamination with toxic substances.
- Preparation of a video documentary on coral reefs in Ukupseni (interviews).
- Presentations of varied conservation topics in the local congress houses (seminars, video presentations)
- Conversation with traditional authorities on traditional knowledge on the marine environment
- Specialized workshops for local schools
- Creation of a board game on marine species in kuna (similar to "memory").
- Seminar and monitoring of coral bleaching.
- Seminar on the "State of the Planet" (state of the main ecosystems)
- Seminar on Global Climate Change.
- Training in marine species identification
- Participation at the assemblies of the CGK to inform of our activities and present educational videos on coral reefs.
- Sea Festival ("FESTIVAL DEL MAR")

AIMS AND ACTIVITIES DURING THE "SEA FESTIVAL" (9-28th October 2005)

The objective of the festival was to attract the communities' attention to our work and the topic of marine resource conservation, so as to capture peoples' interest and make them get actively involved - kids, youth and adults. The point was to get important conservation messages across to the public in general, in an interesting and fun way, as well as promote our organization and work at the same time.

The following activities were carried out throughout the 6 communities:

- **DRAWING CONTEST:** with OLOGUAGDI, Kuna painter
Contest for children, youth and adults on the theme of coral reefs. The best of the childrens' drawings in each community were selected to be printed on T-shirts. Best youth and adult drawings received prizes.
- **PRINTING ON T-shirts etc.:** with IBE, Kuna professional in printing
The selected childrens' drawings were copied, cut out and prepared for printing on T-shirts, shorts, etc. Children and youth were instructed on how to do every step of the procedure, so they could do the printing themselves.

- **PAINTING:** with OLOGUAGDI, Kuna painter

Children and youth painted underwater themes on cloth and/or community walls.

- **PUPPET THEATER:** with ILKA ARIS, Kuna teacher and actress

Children and youth performed their own stories about the lives and fates of coral reefs and their animals, with the help and guidance of the facilitator, Ilka Aris, their own school teachers and BALU UALA's promoters.

- **MARINE STORIES, SONGS AND THEATER**

Students, as well as BALU UALA's organized children and youth groups presented their own stories, songs and short acts, with the help and guidance of their school teachers and BALU UALA's promoters.

- **GAMES AND EDUCATIONAL VIDEOS**

Throughout the festival, there was an opportunity to watch nature documentaries and participate in different educational games.

- **PARTICIPATION AT THE DIGIR COMMUNITY FARE WITH OUR OWN INFO STAND**

Our visit at Digir coincided with the community's annual agricultural fair (13-16th October). BALU UALA participated with our own info stand where we presented a collection of corals and other typical local marine organisms, posters, brochures and nature documentaries. Kids and youth had the opportunity to print their own T-shirts, paint or draw, or participate in different games.

These and many more activities, carried out throughout the six communities, during the whole project period (1 ½ years) has made the general population aware of the mission and work of BALU UALA, as well as the importance of their local marine resources. We believe that through our consistent and hard work, our organization has been able to gain the trust and support of most sectors of the population in all six participating communities. Specifically, close ties with the traditional authorities have been formed, allowing us access to the local meeting houses (congress) for regular presentations on topics linked to marine resource conservation. Our relationship with the General Kuna Congress has been good, since we have made it one of our priorities to keep the authorities well informed of our work.

b. Marine Protected Areas

i. Introducing the idea

After many months of activities that were targeted at making communities understand the importance of coral reefs for their well being, protection and economy, and their present precarious situation, we introduced the idea of Marine Reserves as a way of restoring and preserving these resources. The efforts of general environmental education created the necessary condition (understanding, information, acceptance) to promote Marine Protected Areas in the communities. At the outset of the project, the promoters were afraid of talking about "marine reserves", since they knew that people would be extremely skeptical, or most probably fiercely opposed towards the idea of fencing off an area, when the communities have been extracting resources from the sea without any restrictions for generations. Interestingly, the western concept of "reserves" typically causes rejection by the kuna, despite their long tradition of conservation practice. It appears that their traditional way of preserving the environment is a function of several factors: their traditionally small population density, lack of modern tools that cause high impacts, a conscious knowledge of the importance of using resources sustainably for the benefit of future generations and cultural beliefs and taboos (superstitions). Fencing off reserves is often seen as an imposition of a foreign concept that is not useful nor welcome, since their traditional subsistence fishery has never endangered marine resources. We know that times and practices have changed in Kuna Yala, and nowadays several species are caught for exportation, such as lobster, king crab and octopus, and are clearly subject of over-fishing, and that pollution from liquid and solid waste are ever increasing and coral diseases and bleaching are adding to the many impacts on local reefs. However, it is of no help to state these facts in (most) public meetings, particularly with traditional leaders, as this is seen as an accusation and will cause opposition. Worst of all this argumentation will remind people of the destruction that has been caused with "things" that are not of their own culture, but rather imported, so it is really the outside world who is to blame... The most acceptable way of presenting the idea of reserves may be to affirm that it is not a new concept, but rather one that their own culture has been practicing for hundreds of years, it simply has a new name and a slightly new face. This

way people feel good about their own culture and themselves, and can see the project as something familiar and positive, not unknown and imposed.

ii. Forming commissions

We weren't sure if forming commissions to promote the creation of MPAs would be a feasible and viable methodology, since it appeared to be another western concept. In any case it had been clear from the beginning that we needed a group of local people (in addition to the promoter) who could explain and promote the project in their own communities. This group of people (commission) had to be a stable one, so that they would build up experience and knowledge over time and feel in charge of the task. After announcing that we would give workshops on the topic of MPAs, the actual formation of commissions and acceptance to create MPAs in several communities was extremely quick, and appeared to be a snowball effect when the community of Digir took the first step. Thereafter, Yandup, Akwanusadup and Niadup quickly followed suit.

At the end of this first stage of the project, four commissions are in place, formally recognized by their communities: the joint commission of Yandup/Akwanusadup (MPA Akwayandup), the commission of Digir (MPA Digirdupu), the commission of Niadup (MPA Dainyaa) and the commission of Ukupseni (MPA Mir Galu). In the remaining community, Dad Nakwe Dupbir a commission is in the process of being formed. The MPAs they promote and administer have been officially approved in their local congresses. The commissions are all recent, having formed between the months of February-June, and their training has therefore only just started. All commissions have been given at least one workshop on the theory and practice of MPAs, coral reef ecology, biodiversity and conservation. Commission members participated in bio-physical surveys of MPA areas (see below), as part of a long-term monitoring program and they have been given brochures and publications on diverse topics of coral reef ecology and conservation. Commission members in all communities will continue being trained monthly, through workshops, seminars, field trips, video documentaries and literature.

iii. Commissions at work

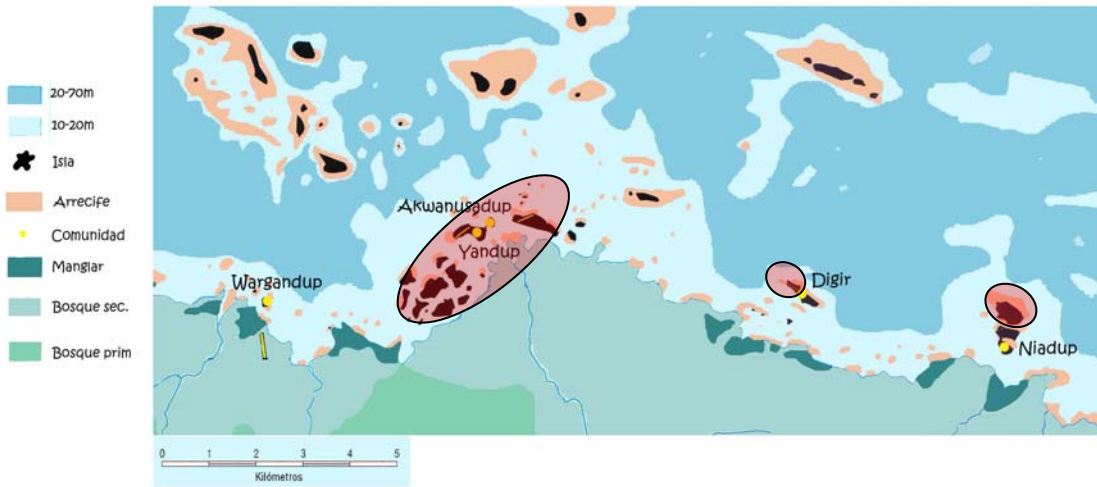
According to our work plan, once the commissions had formed, the following steps had to be taken:

- a) Define MPA aims
- b) Define MPA sites and regulations
- c) Carry out ecological and socio-economic surveys
- d) Select MPA sites
- e) Design MPA management plans
- f) Establish MPAs
- g) Evaluate project success and MPA performance
- h) Manage MPAs adaptively and seek financial independence

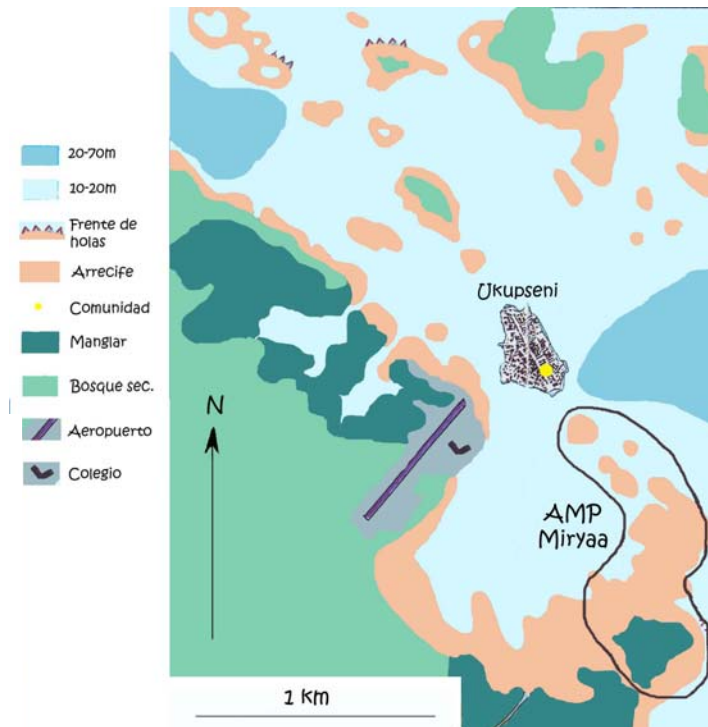
In general terms the steps were indeed followed: all commissions defined the aims or missions of their MPAs, which are generally to conserve the resources for future generations, both for educational purposes and in order to guarantee their food security. In all cases, different MPA sites were contemplated and studied. In fact, all MPAs that were created under this initiative are located in close proximity to the communities (see maps). This draws with it several advantages and disadvantages: being close to the communities, the local populations are more likely to learn about the reserve, and observe any effects of it; schools may easily make use of the reserve as an educational tool and site, and they are easy to police. On the other hand, the areas close to inhabited islands are subject to high impacts of pollution and over-exploitation (fishing, coral extraction, sand extraction, etc.). In fact, none of the MPAs include any of the eight areas of particularly high biodiversity, which are described and recommended as priority for conservation in a recent study. Both, the commissions and the BALU UALA team believe that at this early stage, when the concept of MPAs is only just starting to be mentioned and accepted by locals, it is more beneficial to have the reserve close to the communities, so that the population can observe, police and use it with ease. If this pilot project is indeed successful,

we highly recommend that some of the more pristine islands further offshore (e.g. Ordup and Maoki) be protected as well.

As mentioned above, all of the four MPAs have formally been approved by the local council (local congress) and are now at different stages of establishment: the reserves at Digir and Niadup have been fully marked with buoys and wooden signposts, while Yandup/Akwanusadup and Ukupseni are still in the process of demarcation. None of the MPAs have a formal management plan, or indeed regulations. At this point all reserves are being managed by their commissions, through the BALU UALA project, and regulations have been agreed on verbally in the congresses. All areas share the fact that all types of extraction are prohibited, except fishing with hand lines. The decision to permit the use of hand lines was actually one that marked a turning point in more than one communities, since the local people were strongly opposed to a reserve that did not allow them this very basic activity, which among other things marks the typical kuna way of life.



Map showing the location of four of the participating communities: Yandup, Akwanusadup, Digir and Niadup, and the approximate location of their MPAs.



Map showing the approximate location of the MPA of Ukupseni, "MPA Miryaa".

iv. Monitoring programs

Ecological surveys were carried out at the early stages of MPA creating, in Yandup/Akwanusadup, Digir and Niadup, but not yet in Ukupseni (this MPA was formally approved in September 2006). The surveys were carried out with the participation of promoters, fisheries inspectors, MPA committee members and interested youth. Four types of surveys were conducted: 1) manta tow, 2) point intercept transect, 3) line intercept transect for invertebrates, and 4) line intercept transect for fishes. Data sheets and details of the survey methods were specifically designed for use in Kuna Yala. We used underwater slates to take notes in the field. All participants were trained in all of the methods (in the boat and in the water), to ensure that the surveys can be carried out by the communities in the future.

c. Fisheries management program

Although not originally contemplated in our project, we have seen ourselves forced to respond to the necessity of helping the communities manage their fisheries (lobster, crab, octopus, conch etc.), due to the fact that a previous project on this topic was discontinued and left the fisheries in a state of lack of control.

There are two types of fisheries in Kuna Yala: 1) the traditional fishery for local consumption and sale within the village, and 2) a new kind of fishery, for sale to local hotels and restaurants, as well as export to Panama City and the coast of Colón. Local consumption is nowadays mainly based on fish, whereas the more valuable species, such as lobster (*Panulirus argus*, *Panulirus guttatus* and *Scyllarides aequinoctialis*), Caribbean king crab (*Mithrax spinosissimus*), Queen conch (*Strombus gigas*), octopus (*Octopus vulgaris* and other species) and in some communities snapper and grouper are destined for restaurants and export. Fish are caught using a number of different methods, the most common being the hand line, spear and gill net. All other seafood is captured by free diving to depths down to approx. 25m; the use of SCUBA is not allowed and no traps are employed. Despite the use of these relatively benign methods, there are clear signs of over-fishing: decreasing body size, abundance and catch per unit effort. However, this has not been corroborated scientifically, and no data are available, other than for spiny lobster. Apart from the complete prohibition of SCUBA throughout KY, several restrictions have been in use since 2002: a yearly fishing ban for all seafood other than fish, from March 1st - May 31st, as well as a prohibition to catch spiny lobster smaller than 8cm length (cephalothorax) and berried females, year-round. No quota or license system exist for any species and there are no size limits for species other than spiny lobster. These restrictions were set by the CGK, however, were not widely applied and respected until the putting in place of a program by the CGK, with funding from the Spanish Foreign Aid (AECI) in 2004, which was implemented in 8 communities and included inspection and registration of catches, as well as enforcement of the CGK fisheries regulations. This program improved compliance of fishermen and buyers, however, unfortunately, it only ran for one and a half years, then funding for the fisheries inspectors was cut and communities were told they had to raise a new fisheries tax in order to pay for the program themselves. However, none of the communities ever complied with these new rules and the program came to a stop, causing the fisheries to revert to a state of lack of control. While it is easy to understand why fishermen and their clients should chose not to respect the regulations, the marine resources of KY, one of the main pillars of Kuna economy, are being exploited in unsustainable ways, putting their ability to regenerate and thus the future of the fisheries themselves at serious risk. Already, fishermen are affected by over-fishing: while 10-20 years ago, lobsters used to be plentiful in the shallows surrounding the communities, nowadays divers have to travel several hours (by motor or paddling) and descend to 25m in order to catch a fraction of what used to be caught. Apart from these ecological considerations, divers are faced with several other (social, economical) problems: buyers offer low prices for their products (\$4.00/lb spiny lobster), they lack experience and basic knowledge of business administration, generally give up all agricultural activity (which traditionally is the basis of the Kuna way of life), making them entirely dependent on an income from diving, which in turn often causes much hardship during the yearly 3-month fishing ban. Besides, divers are the social group that is most affected by drugs (consumption and sale), and face high risks of physical injury. While fishing (from the canoe or shore) is a traditional, well-respected activity, diving is a relatively new (since 1960s) and often criticized life-style. Together, the above mentioned points make for the divers' low social status in the community, their poverty (despite relatively high incomes), drug and alcohol abuse and other health problems.

When BALU UALA became aware of this situation, we decided to help communities and the CGK, as much as possible (given this was not part of our work plan and budget): the fisheries management program has been re-initiated in the six communities (Yandup - Dad Nakwe Dupbir): inspectors, have been trained to a) raise awareness among fishermen and the population at large on the importance of sustainable resource use, b) collect catch statistics (see table below)

and c) enforce CGK regulations. Inspectors work for their local communities and the CGK, who support and evaluate them, while BALU UALA offers technical training and supervision, as well as their monthly salaries. So far this new program has been able to increase control significantly in the participating communities.

MONTHLY CATCH STATISTIC (example)
JUNE 2006

SEAFOOD EXPORT (daily means, in lbs, by species and community)

	<i>P. argus</i>	<i>P. guttatus</i>	king crab	octopus	queen conch	red snapper
Dad Nakwe Dupbir	75	13	56	14	0	0
Ukupseni	265	2	79	12	0	0
Digir	96	14	31	20	3	0
Akwanusadup	58	5	16	156	14	28
Yandup	75	1	32	54	3	0
Niadup	68	1	28	26	0	0
<u>TOTAL</u>	<u>637</u>	<u>36</u>	<u>243</u>	<u>282</u>	<u>20</u>	<u>28</u>

SEAFOOD EXPORT (daily means, by species and community; in US \$)

	<i>P. argus</i>	<i>P. guttatus</i>	king crab	octopus	queen conch	red snapper	TOTAL
Dad Nakwe Dupbir	\$320	\$16	\$42	\$14	\$0	0	\$392
Ukupseni	\$1,128	\$2	\$59	\$12	\$0	0	\$1,200
Digir	\$407	\$18	\$23	\$20	\$4	0	\$472
Akwanusadup	\$318	\$1	\$24	\$54	\$4	\$16.8	\$401
Yandup	\$247	\$6	\$12	\$156	\$17	0	\$438
Niadup	\$289	\$1	\$21	\$26	\$0	0	\$338
<u>TOTAL</u>	<u>\$2,709</u>	<u>\$45</u>	<u>\$182</u>	<u>\$282</u>	<u>\$25</u>	<u>\$16.8</u>	<u>\$3,241</u>

CONFISCATED ILLEGALLY CAUGHT LOBSTER (number of specimens):

	berried	smaller than 8 cm	total confiscated
Dad Nakwe Dupbir	1	23	24
Ukupseni	1	31	32
Niadup	0	33	33
Digir	0	3	3
Akwanusadup	1	28	29
Yandup	3	31	34
<u>TOTAL</u>	<u>6</u>	<u>116</u>	<u>122</u>

**MEAN BODY SIZE OF *P. argus*
(cephalothorax) by community June 06**

Dad Nakwe Dupbir	9.3 cm
Ukupseni	10.3 cm
Niadup	9.5 cm
Digir	9.6 cm
Akwanusadup	9.1 cm
Yandup	9.8 cm

July 06

Dad Nakwe Dupbir	8.9 cm
Ukupseni	9.9 cm
Niadup	10.2 cm
Digir	9.7 cm
Akwanusadup	9.4 cm
Yandup	10.2 cm

**MONTHLY CATCH STATISTIC
JULY 2006**

SEAFOOD EXPORT (daily means, in lbs, by species and community)

	<i>P. argus</i>	<i>P. guttatus</i>	king crab	octopus	queen conch
DAD NAKWE DUPBIR	73.75	22.4	64	23.8	0
UKUPSENI	145.7	0.4	75.6	1.9	0
NIADUP	55.9	31.3	51.3	22.2	0
DIGIR	70	35.9	40.7	12.4	0
YANDUP	50.3	0.3	13.9	19.5	1
AKWANUSADUP	27	3.3	12.5	20.5	3.2
<u>TOTAL PESO</u>	<u>422.7</u>	<u>93.6</u>	<u>258</u>	<u>100.3</u>	<u>4.2</u>

SEAFOOD EXPORT (daily means, by species and community; in US \$)

	<i>P. argus</i>	<i>P. guttatus</i>	king crab	octopus	queen conch	TOTAL
DAD NAKWE DUPBIR	\$313	\$28	\$48	\$24	\$0	\$413
UKUPSENI	\$619	\$1	\$57	\$2	\$0	\$678
NIADUP	\$238	\$39	\$38	\$22	\$0	\$337
DIGIR	\$298	\$45	\$31	\$12	\$0	\$385
YANDUP	\$214	\$0	\$10	\$20	\$1	\$245
AKWANUSADUP	\$115	\$4	\$9	\$21	\$4	\$153
<u>TOTAL</u>	<u>\$1,796</u>	<u>\$117</u>	<u>\$194</u>	<u>\$100</u>	<u>\$5</u>	<u>\$2,212</u>

CONFISCATED ILLEGALLY CAUGHT LOBSTER (number of specimens):

	berried	smaller than 8 cm	total confiscated
Dad Nakwe Dupbir	41	1	40
Ukupseni	32	1	33
Niadup	4	0	4
Digir	3	0	3
Akwanusadup	19	1	18
Yandup	9	0	9

d. Institutional development

BALU UALA believes that sustainability is of outmost importance, namely environmentally, economically and socially speaking. One of the reasons many projects in Kuna Yala led by NGOs in the past have failed in the long term is due to the fact that the organizations themselves were not sustainable in the long term. In order to succeed in making a community project sustainable, it is necessary that the community truly makes the project its own. It is also necessary that the organization itself be sustainable so that it may be seen as a stable group which communities can truly trust (rather than take advantage while it lasts).

While BALU UALA is very different from most of the other Kuna organizations that work and have worked in Kuna Yala, it is important to learn from their mistakes and problems. And of course we have to analyze our own specific problems and weaknesses in order to improve.

BALU UALA was formed some 5 years ago, by a group of mostly kuna and some non-kuna biologists. At the time the organization obtained legal status, it counted with 12 members, however through time its membership declined. By the time we received funding for our first project, most members had acquired other commitments, such as work and family, so they could not dedicate themselves to the project. At the beginning of 2006, all but one member of the board of directors had given up their function, and while the project itself was running quite successfully, the organization as a whole was non-functional. The organization and the project had become one and the same thing, and had to be directed by a single person, the project coordinator. Obviously, this wasn't a sustainable situation for an organization, particularly an organization that works in and for communities, as this requires functioning as a team. At that time the project was employing local people as promoters who represented and defended the organization in their communities, but were not members. Through time, however, they grew to appreciate the work and mission of BALU UALA and interest grew on both sides, the promoters and the organization (the members that were left over) to convert them into members. We considered that the future of BALU UALA lies in the communities, as it is with them and for them that we work, and they appreciate our support and the benefits from our work. We therefore called a general assembly at Dad Nakwe Dupbir in April of 2006, where we invited all promoters that had worked with us for at least a year. At that meeting a new Board of Directors was elected, the organization's vision and development strategy was discussed, and a workshop on administration and organization was given for us.

The new Board of Directors has been legally recognized and has taken on its function. Apart from working out the institutional development plan, internal regulations, contracts for the personnel, etc., one of their major challenges is to look for a small fund which is necessary for their own functioning, since all our funding is currently dedicated to the projects.

In general terms BALU UALA can be described as follows:

AIMS

To promote the ecologically, culturally and economically sustainable use of natural resources through education, research and management.

OBJECTIVES

Projects:

To assist communities in Kuna Yala, Panama, with the conservation, restoration and sustainable use of their natural resources, particularly focusing on marine ecosystems, by providing relevant information on the state of their resources, the threats they face, the deterioration they may have suffered and possible solutions or alternatives that can be taken; at the same time strengthen local (and) traditional organizations, traditional knowledge and customs.

To support the General Kuna Congress (Congreso General Kuna, CGK), the highest political and administrative organ in Kuna Yala, with advice in areas of our expertise, in an objective and professional way.

Institutional development:

To strengthen the Foundation and improve its services through training of its members in diverse areas (administration, organization, accounting, community development, biology, ecology, environmental conservation etc.).

To improve our internal organization through critical analysis of past and present operations, successes and failures, organizational strengths and weaknesses, also how well individual strengths are being used.

To grow as an organization and expand our operations in a sustainable, systematic and prepared way, so as to be able to assist a greater number of communities, while at the same time keeping control over our operations, keeping administration at a necessary minimum and assuring the quality of our personnel and services.

To assure open and honest work relationships within the Foundation, built upon the trust and good will of its members, where self- and mutual evaluation is routinely practiced and seen as a positive, constructive mechanism to grow and improve.

To support and collaborate with other relevant organizations (NGOs, governmental, community, local organized groups etc.) and co-ordinate our work with them so as to use resources most efficiently.

To promote the Foundation throughout Kuna Yala, based on our satisfactory work and real support to communities.

Finances:

To acquire sufficient funds in order to execute all planned projects for the period in question, in an efficient way and according to the highest standards, and to administer the Foundation itself; through donations, grants, both as goods and/or cash.

To administer our funds efficiently and transparently, complying with all the national and international (donors') requirements.

STRATEGIES

Projects:

To run environmental education programs for all sectors of Kuna communities;

To provide relevant environmental, social, cultural and political information to the communities for their critical analysis;

To carry out participatory research on the current state and use of communities' marine resources to provide the basis for decisions;

To stimulate discussion on environmental issues in the communities.

To promote the collective search for viable and sustainable alternatives which guarantee the conservation, restoration and sustainable use of resources;

To assist communities with concrete programs for nature conservation, such as: promote, create, maintain and evaluate marine protected areas, fisheries management programs, waste management, sustainable tourism, etc.

To communicate our work progress regularly to the CGK, inform the CGK on the situation of natural resources in Kuna Yala and provide possible solutions or alternatives. To provide a service of (free) advice on topics of our expertise to the CGK.

Institutional development:

To assist at workshops and seminars that are offered locally, nationally and internationally, and where necessary acquire funding in order to be able to have our staff well trained and well prepared with up to date knowledge in all fields that are relevant to our work, all the while investing time, resources and effort efficiently and in good quality courses, in order to balance training and work.

To carry out regular workshops for organization members and personnel, to evaluating the work and progress of the Foundation, as well as any projects that are being executed.

To attract new members and personnel, who are known to comply with the Foundation's technical, social and moral requirements and principles.

To actively promote an open and fair work atmosphere, characterized by honesty, constructiveness and tolerance, between all members and personnel, as part of the Foundations policies.

To regularly convoke meetings and organize workshops in order to communicate our aims, visions and work to the CGK, as well as other relevant organizations, in order to improve and maintain open and positive relationships with our colleagues and ensure efficient sharing of tasks and collaboration.

Finances:

To apply for national and international funds and grants, seek donations of goods or services and develop strategies of self-financing in order to secure sufficient resources for the execution of projects and the Foundation's administration.

To make sure the Foundation's administrative personnel is well trained and experienced, as well as of high moral standards in order to make sure that the administration of funds is done efficiently, transparently and in compliance with the donors' requirements.

RESOURCES

Human resources:

The Foundation currently counts with the following human resources:

BALU UALA, Board of Directors:

President	Mr. Remigio Morgan, ID 10-6-496 (community leader, lobster fisher, farmer)
Vice-president	Mr. Gricelio Grimaldo, ID 10-4-280 (manual worker at Ukupseni high school, community leader, farmer, environmentalist)
Secretary	Ms. Deidamia López, ID 8-419 (BSc. botany, biology teacher at Ukupseni high school, founding member of BALU UALA)
Treasurer	Mr. Violorio Ayarza, ID 10-29-462 (BSc. mathematics, teacher and headmaster at Ukupseni high school)

Executive Director: Renate Sponer, ID A-0448591 (marine biologist; founding member of BALU UALA)

Advisors: Fulgencio Johnson, CGK; economist (economics, politics)
Dr. Hector Guzman, STRI; marine biologist (ecology, biology, surveying)
José Colman, independent kuna actor and story teller (environmental education)
Ologuagdi, Ministry of Education; artist (illustration, environmental education)
Lic. Jorge Ventocilla, STRI; biologist (ecology, environmental education)
Dr. Xerardo Pereiro, Cebaldo de León (BSc) and Anita Rita Lopes (MSc), Universidade de Trás-os-Montes e alto Douro, Portugal; anthropologists (impacts of tourism on societies)
Various sailas (traditional authorities)

CONCLUSIONS

BALU UALA's approach to addressing the problems that affect marine ecosystems in KY is a comprehensive one, where we try to take into account the links between environment, culture (own and outside), and economy: our organization has been working for 1-2 years in the communities of Ukupseni, Dad Nakwe Dupbir, Niadup, Digir, Yandup and Akwanusadup, in the central part of the Comarca Kuna Yala. During the first year, our work was purely voluntary, and since then our operation has been slowly growing. Until recent months we have been focusing on environmental education, with the aim of providing information to all sectors of communities, starting with the project personnel itself (who are almost entirely local non-professionals, leaders in their communities, dedicated to farming, lobster diving, etc.) and who have since become well versed in the fields of coral reef ecology, basic field research and environmental education, earning them respect, and the organization as such trust from the communities. Specifically, throughout this project we carried out numerous workshops and seminars in all six communities on the topics of coral reef ecology, deterioration and conservation, marine protected areas (MPAs), global warming, the state of the planet, etc. We have taken groups snorkeling for practical experience, presented environmental documentaries and films to fishermen, divers, school

teachers, students, traditional authorities, womens' groups, at CGK biannual assemblies, etc. We organized a one-week summer course on KY's natural resources for teachers, through the Ministry of Education, and a three-week "Sea Festival" - an interesting and fun experience of marine biology for children and youth. During the June-September 05 episode of coral bleaching, we conducted basic surveys to investigate and monitor the effects on local reefs, with the participation of the local population. In addition we are building up children and youth groups for nature conservation, in order to form the next generation of environmental leaders. Given the lack of quality educational material specifically designed for the use in Kuna Yala, we produced a documentary video, several information brochures, a board game and several slide shows for seminars/workshops. Altogether, these activities and efforts are meant to teach local communities about basic marine biology: "what is it that surrounds them, why is it important, and why and how have these resources been deteriorating". Through this process of learning and getting to know, we hoped that people would start to understand, question and most importantly, care about the conservation and restoration of their local natural treasures. Apparently, the methodology is working, as five of the six communities have created their own MPAs, during February-May 2006, through their own initiatives and directed by their own local MPA commissions. We are currently putting in place long-term monitoring programs to evaluate MPA performance. Local BALU UALA personnel, MPA commissions and youth groups are being trained in the collection and interpretation of the data, so that in the future, basic monitoring can be done by the communities themselves.

From the outset of the project there has been a focus on project evaluation, as we believe that evaluation is vital for success. Evaluation is made easier when a well defined work schedule and clear goals exist. A special emphasis was therefore put on elaborating the project with a clear vision of aims, objectives, methods, time schedules and goals, and was a priority of this program to have regular communication among partners to be able to evaluate program success, and when necessary adapt to problems, changing circumstances, in order to use resources in the most efficient way and address the most pressing problems. During this project 3 general evaluations were conducted, where the whole personnel was called to meetings in order to give their reports, conduct self and mutual evaluations and adapt and plan their work accordingly. The BALU UALA personnel has become accustomed to making self- and mutual evaluation part of their work routine, thus promoting adaptive and efficient program execution. For this policy to function, it is most important that relationships within the project team are built upon trust and honesty.

Unfortunately, we were not able to receive much external evaluation (the communities, the CGK, other organizations), due to a lack of opportunities for meetings, lack of exposure by others to our work, unfamiliarity with the process of evaluation, and to some extent the worry that criticism would be taken as an offence.

We must however keep in mind that many projects in Kuna Yala have come and gone, flourishing during a certain period, but the majority have failed in the long term, when funding ceased or organizations stopped supporting programs. In order not to incur the same fate, it is fundamental to ensure that this effort is truly accepted and owned by the local people, so as to secure the human resources for the future. Also, in order for MPAs to be sustainable on the long run, they must be self-financing, a point that needs to be stressed and discussed to see how it can be achieved.

FUTURE OUTLOOK

Everybody associated with BALU UALA and the project has made a very big effort in order to make this project a success. Through everybody's commitment, belief and hard work we have achieved a movement which now needs to be sustained. In our choice of topics for the next stage of the project we guide ourselves by the following principles: a) to strengthen our organization (particularly the human resources) and build on the successes obtained, b) follow-up on the initiatives developed during the first stage of the project; c) evaluate the state of the marine resources and the efficiency of our work; d) assist the local communities in environmental issues with information and advice; e) strengthen our co-ordination with the local and regional authorities and other organizations.

Specifically, we have identified the following points as priority topics to be addressed during the second stage of this project:

- Maintain, strengthen and evaluate the MPAs established during the 1st stage
- Establish additional MPAs
- Strengthen the BALU UALA Foundation as an organization
- Follow up on the environmental education programs in the communities, with all sectors of society

- Strengthen and expand the fisheries management program (education, inspection and registry)
- Follow up on the training of the BALU UALA personnel
- Develop teaching material for environmental education
- Strengthen the childrens' and youth movements for conservation
- Establish scientific and community-type ecological monitoring programs
- Promote the creation of local laws on the use of natural resources in communities
- Promote best practices for the prevention and management of waste
- Promote sustainable tourism in the communities
- Study the possibility of establishing a sea urchin (*Diadema antillarum*) breeding and re-introduction program in order to speed up macro-algal control and facilitate coral recruitment

For the follow-up on the first stage, we count with financial support from the Lighthouse Foundation and UNEP, for the period of October 1st 2006 - September 30th 2007

ANNEX

Project Equipment:

MAJOR EQUIPMENT

- 1 Wooden dugout canoe for max. 30 persons
- 1 YAMAHA outboard engine, 15 hp
- 1 TOSHIBA Satellite, Pentium 4, 3.06 GHz, laptop computer
- 1 HP Pavilion, w5000la, desktop computer
- 1 CANON Pixma ip 1500 bubble jet printer
- 1 CANON powershot 85A digital camera
- 1 PHILIPS 21", 21PT3005 television
- 1 CANON LjDE scanner
- 1 CANON WS-2224 calculator
- 1 CANON waterproof case for digital camera
- 2 SONY VHS video cassette recorders
- 11 complete snorkel gears (fins, masks, snorkels)
- 68 masks & snorkels
- 20 protective footwear for snorkeling
- 1 brief case
- 1 SONY tape recorder
- 5 dive lights
- 2 AA battery chargers
- 8 AA rechargeable batteries
- 1 CASIO waterproof wrist watch
- 1 CABLE & WIRELESS ADSL 128K modem for internet access
- 1 GPS
- 1 water ski towing rope (used for manta tow monitoring)
- 12 weighing scales
- 1 book shelf
- 1 office desk

PRINT MATERIAL (not exhaustive)

- Guía didáctica de educación ambiental; el ambiente marino. República de Panamá, Ministerio de Educación, Autoridad Nacional del Ambiente. 2002.
- Coral reef poster: comparison of Pacific Ocean and Caribbean
- The 5 aims of environmental education (Peace Corps brochure)
- Games in environmental education (Peace Corps)
- Games in environmental education (Smithsonian Tropical Research Institute)
- 30 sheets for coloring
- El Mangle. Colección Ecológica, Tercer Milenio.
- Las Tortugas Marinas. Colección Ecológica, Tercer Milenio.
- Reservas marinas totalmente protegidas: una guía.. Callum M. Roberts and Julie P. Hawkins. WWF. 2000.
- Guía impermeable de Corales y Peces de La Florida, las Bahamas y el Caribe. Idaz y Jerry Greenberg. Seahawk Press, 1992.
- Guía del cuidado de los arrecifes. (incomplete reference)
- UNESCO, 2003. Miradas Fugaces sobre el Azul Caribe. Océanos, costas y mares, y cómo influyen sobre nosotros. Documentos regiones costeras e islas pequeñas 5. UNESCO, Paris, x + 73pp.
- Guía del maestro para escuelas secundarias. Infusión d las Temáticas del SAM en el Currículum Educativo del Nivel Secundario. Proyecto para la conservación y el uso sostenible del Sistema Arrecifal Mesoamericano (SAM). Belice - Guatemala - Honduras - México. Belice City, Mayo, 2003.
- Monthly newspaper clippings on environment-related topics, from "La Prensa", Panamanian newspaper.

VIDEOS

- Varied documentaries on topics of environmental problems and conservation in Panama. Albatros Media. 2004.
- Finding Nemo
- El Planeta Azul. BBC.
- Océanos Vivos. Documentary on Marine Biology and Ecology.
- Entre dos océanos. Documentary on the evolution, ecology and cultures of the Isthmus of Panama
- Corales en Kuna Yala y sus problemas. Documentary produced by BALU UALA. 2005.
- Varied documentaries on reefs, manatees, dolphins, rubbish disposal, climate change, pesticides, bilingual education, etc.

Project Personnel:

Key salaried project personnel during 1st stage

Project coordinator	Dr. Renate Sponer, ID A-0448591 (marine biologist)
Secretary/accountant	Ms. Adiola Campos, ID 10-10-737 (secretary, accountancy)
Coordinator of promoters	Mr. Remigio Morgan, ID 10-6-496 (community leader, lobster fisher, farmer)
Promoter in Dad Nakwe Dupbir	Mr. Javier Morris, ID 10-7-2021 (community leader, farmer)
Promoters in Ukupseni	Mr. Atelino Herrera, ID 10-25-103 (community leader, lobster fisher, farmer) Mr. Crispulo Sajel (community judge, lobster fisher)
Promoter in Niadup	Mr. Galerio Grimaldo, ID 10-704-1194 (formerly priest, community leader, farmer)
Promoters in Digir	Mr. Laurentino Martínez, ID 10-31-783 (community leader, lobster fisher, farmer) Mr. Edilberto Martínez, ID 10-14-707 (community leader, lobster fisher, farmer)
Promoter in Akwanusadup	Mr. Alexis González, ID 8-289-834 (community leader, farmer)
Promoter in Yandup	Mr. Jacinto Campos, ID 10-5-513 (lobster fisher)
Fisheries inspector in Dad Nakwe Dupbir	Mr. Mauricio Nuñez, ID 10-7-2474 (community leader, farmer)
Fisheries inspector in Ukupseni	Ms. Ananigdili Guillén, ID 10-705-416
Fisheries inspector in Niadup	Mr. Merencio Harris, ID 10-703-1798 (farmer)
Fisheries inspector in Digir	Mr. Fernando Romero Salazar, ID 10-26-986 (community leader, farmer)
Fisheries inspector in Akwanusadup	Mr. Denisterio Mendoza, ID 10-704-1746
Fisheries inspector in Yandup	Mr. Luperio Mojica, ID 10-3-636 (community leader, treasurer, farmer)

Key voluntary project collaborators during 1st stage

MPA commissions:	Community leaders of the villages of Akwanusadup, Yandup, Digir, Niadup, Ukupseni and Dad Nakwe Dupbir
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