



Biodiversity Conservation at the Landscape Scale

A Program of the Wildlife Conservation Society
Supported by the USAID/Global Conservation Program

Glover's Reef Living Seascape: Safeguarding Marine Resources and Rural Livelihoods in Belize

**Annual Report
October 2005 – September 2006**

Living Landscapes Program- Belize/Glover's Reef
Wildlife Conservation Society
30 September 2006

USAID EGAT/NRM/Biodiversity
Leader with Associates Cooperative Agreement Award LAG-A-00-99-00047-00



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I. Summary of Activity Status and Progress

a. Introduction/Summary

The Glover's Reef Living Seascape project aims to conserve the outstanding biodiversity and natural beauty of Glover's Reef Atoll. It is one of the globally significant landscapes included in WCS' GCPII/USAID portfolio of conservation sites, and the first coral reef site to be adopted under the WCS Living Landscapes Program. This program seeks to develop and test wildlife-focused strategies that will resolve conflicts between people and wildlife that threaten important wild places and the biodiversity they support. The approach is threats-based and highly participatory. Key threats to the Atoll's biodiversity include unsustainable fishing, lack of alternatives for fishermen, impacts of global climate change, eutrophication and high turbidity of the Atoll's lagoon, lack of support for the marine reserve by some stakeholders, insufficient information for strategic conservation management, and lack of long-term financing. The objectives of the project are specifically geared towards reducing these threats through the development and implementation of a multi-partner conservation strategy.

The Glover's Reef Living Seascape project remains on track for almost all the activities planned for this reporting period, with a focus on training, monitoring, strengthening support, and initiating our first alternative livelihood activity.

Training and capacity-building: Several training sessions were carried out. We held a workshop for the Glover's Reef Advisory Committee (GRAC) in project management and implementation. Training for the Committee in group dynamics will take place in October 2006. The Committee continued to meet on a quarterly basis, maintain quorum for all meetings, and supply valuable recommendations for improved management of the reserve. Working along with the GRAC and the reserve staff, we also completed a management effectiveness evaluation of the Glover's Reef Marine Reserve.

In partnership with The Nature Conservancy (TNC) and Friends of Nature, we led a training workshop at the Glover's Reef Research Station in the spawning aggregation monitoring protocol for reserve biologists. In September 2005, we joined with the National Fishermen Co-operative Society, the Belize Audubon Society, and the Fisheries Department to offer training in enforcement techniques and the use of radio and GPS to 18 fishermen. In August 2006, we had a training workshop for seven reserve biologists in the long-term atoll monitoring program (LAMP). Educational activities achieved included: the re-printing of the reserve brochure; completion and dissemination of two Spawning Aggregation newsletters; revision and airing of the TV 'spot' on spawning aggregations; and the printing and distribution of pamphlets on the Nassau grouper. Two fishermen from Hopkins who generally fish at Glover's were hired to assist in the monitoring of the Nassau grouper spawning site on the northeast point of Glover's Reef in December 2005 and January and February 2006. We also hired a part-time fisherman from Dangriga to assist with our fish tagging project at Glover's Reef.

Monitoring: We continued the fisheries catch data collection program with over 50 fishermen from Sarteneja and 19 from Hopkins participating. The end of January 2006 marked the completion of the first year of catch data collection. The data were analyzed and the results presented to officials in the Fisheries Department and the fishermen in Sarteneja. They were also presented to fishers in Hopkins in August 2006. The primary purposes of this participatory data collection are to foster a sense of responsibility amongst fishermen for sustaining fisheries, and to ultimately assess and demonstrate the benefits of the no-take or Conservation Zone of the Glover's Reef Marine Reserve in supporting their livelihood.

The first year of our LAMP data collection was also completed in late 2005, and the results of the analysis shared with the Fisheries Department and the GRAC. In addition, our results were presented at the first National Marine Science Symposium held in Belize City in January 2006 and at the Protected Areas Congress held in Panama in April 2006.

Alternative livelihood activity: We partnered with the GEF Small Grants Programme's COMPACT project and a local NGO in Sarteneja to help fund the training of fishermen in tour guiding. This is the first direct alternative livelihoods project that we have undertaken, and we hope that we will be able to help with other similar projects in the future.

Core strategy: Although we have not yet finalized the Conservation Strategy for Glover's Reef, the biological and human seascapes have been completed for the remaining four seascapes species: Caribbean reef shark, Nassau grouper, hawksbill turtle and the osprey. We are presently working towards developing and mapping the conservation seascapes for these species to complement those for the queen conch, star coral, and long-spined black sea urchin. We have also prepared an outline for the Conservation Strategy document.

We intended to prepare development guidelines for the cayes of the Atoll; however, progress on these has been delayed. We have, however, conducted surveys in Sarteneja, Dangriga and Hopkins in relation to our second socio-economic study, and the data analysis and comparison with the surveys carried out in 2004 are underway.

Sharing lessons: The threats assessment methodology developed by WCS' Living Landscape Program has now been adopted by the Belize National Protected Area Policy and System Plan as the official method to be used in management planning. This type of threats assessment has already been used for the development of the management plan for the Blue Hole Natural Monument on Lighthouse Reef.

b. Highlights

- **First Year of Data Analyzed for the Fisheries Catch Data Program and LAMP Monitoring Program**

The fisheries catch data collection program continued with over 60 fishermen from Sarteneja and Hopkins participating. With assistance from WCS' statistical expert in NY, the data were analyzed and interpreted. The results were formally presented to the Fisheries Department in May 2006, and copies of the database and the graphs developed were supplied to the Department. We then presented the results to fishermen in Sarteneja in June 2006. The National Fishermen Co-operative helped in organizing the meeting, and more than 20 fishermen participated. A similar meeting was held with fishermen in Hopkins in August 2006.

The LAMP monitoring program continued throughout the year, in partnership with reserve staff. First year data were analyzed in December and the results were shared with the Fisheries Department in January 2006. Copies of the database and graphs were also submitted to the Department. Project staff person Sergio Hoare presented the results of the study at the Belize National Marine Science Symposium also held in January, and at the Protected Areas Congress held in Panama in April 2006. A major finding of the monitoring program was that 18% of the population of conch were of legal size (> 7 inch shell length), but were juveniles (with no flared lip).

The Fisheries Department has indicated that they are considering this information with a view to possibly revising the current conch size limit regulation. Furthermore, the results of the fisheries catch data collection program showed that fishermen are taking mainly juvenile groupers. This was pointed out to officials at the Fisheries Department, with the recommendation that a size limit for Nassau grouper should be introduced.

- **Initiated Alternative Livelihood Activity**

We partnered with the GEF Small Grants Programme’s COMPACT project and a local NGO in Sarteneja, SWEET (Sarteneja Wildlife, Environment and Ecotourism Team) to help fund the training of fishermen in tour guiding, which included three field trips and training in First Aid. COMPACT provided funds for additional training in fly fishing and managing a small business, and for the purchase of some equipment. Based on agreed criteria, 25 participants from the community were chosen, and included 13 fishermen and 6 women. Eleven fishermen completed the entire course.

- **Training and Revitalizing the Glover’s Reef Advisory Committee**

The Glover’s Reef Advisory Committee (GRAC) continued to meet on a regular quarterly basis during this period, with quorum maintained at a reasonably high level. Members provided advice and recommendations on critical issues to the reserve management staff and the Fisheries Department. Topics discussed included mainly enforcement issues, in particular the recent concern about illegal fishing taking place at night, and the Committee has agreed to help draft an enforcement policy for consideration by the Fisheries Department. Members also recognize the need to limit access to fishing at Glover’s Reef. They feel that fishing effort must be reduced for sustainable fishing levels to occur at the Atoll, and the Committee made recommendations to the Fisheries Department to introduce a limit on the number of fishing licenses issued for Glover’s Reef. The Department has responded that such a measure will need a great deal of planning, will be very difficult to implement, and will also have to be carried out on a national level. Nevertheless, the topic is now under discussion, which is a vital first step in the process of introducing limited access to Belize. The GRAC is also concerned about the need to more adequately have the fishing communities and fishermen represented, and the Committee recently made recommendations to adjust its membership. The continued activity and engagement of the GRAC is highly significant, both for management of Glover’s Reef and as setting a precedent for management of Belize’s coastal zones.

c. Table of Activity Status

Activity Number	Activity Title	Status	Page number for more information
Objective 1	Develop and adopt a participatory strategy to reduce threats to marine life in the Glover’s Reef seascape		4
1.1	Complete threats and stakeholder analyses	Completed	4
1.2	Complete a Seascape Species Analysis	On track, with exception of completion of Conservation Strategy	5
1.3	Identify high priority interventions	On track	5
Objective 2	Develop and implement sustainable and adaptive mechanisms to strategically address threats across the seascape		6
2.1	Implement Seascape Conservation Strategy	On track	6
2.2	Provide technical support and training	On track, with exception of completion of development guidelines	7
2.3	Strengthen and expand stakeholder support for the Seascape Conservation Strategy	On track	8
2.4	Introduce innovative co-management arrangements	On track	9
2.5	Develop new and strengthen ongoing long-term monitoring programs	On track	10

c. Table of Activity Status, continued

Activity Number	Activity Title	Status	Page number for more information
Objective 3	Learn and teach best practices in the Glover’s Reef Seascape and beyond		11
3.1	Document the lessons learned	On track	11
3.2	Extract and share best practices	On track	11
Objective 4	New York Coordination Unit Strategy: Guide the design and testing of wildlife-focused planning, implementation, and evaluation tools for effective conservation at a landscape scale, and promote learning across sites and beyond		12
4.1	Provide technical assistance to site-based conservation	On track	12
4.2	Design, implementation, and testing of decision support tools	On track	12
4.3	Catalyze cross-site and cross-organizational learning, and communication	On track	13
4.4	Application of Living Landscapes Program tools beyond core sites	On track	14
4.5	Ensure coordination and communication services for the program	On track	15

II. Detailed Description of Progress

a. Key short and long-term program objectives for the reporting period (October 2005 – September 2006)

Glover’s Reef Atoll is an integral part of the Belize Barrier Reef system, one of the world’s outstanding coral reef systems. WCS has a long-term commitment to this site, having established a marine research station at the Atoll in 1995. The project is building on the in-depth practical conservation knowledge of WCS’ long-term field program at the site, facilitating the implementation of strategic site-based conservation tools developed through its Living Landscapes Program. We are also refining this planning approach in relation to its application to tropical marine areas.

During this reporting period we have continued to consolidate the information-gathering required to build the conservation strategy for the Atoll seascape. Activities have included collecting additional information on the biology of the seascape species and refining the biological seascapes. We next need to complete the models for the conservation seascapes, incorporating the latest information supplied by the GRAC for threats and management costs, and then finalize the Strategy document. Simultaneous to these planning activities, we also concentrated on strengthening and supporting the Glover’s Reef Advisory Committee, providing support for the marine reserve, training fishermen, and gathering management-related data on fisheries, reef health, and the status of the grouper spawning aggregation.

Over the longer term, in five years and beyond, our objective is to: carry out adaptive management, making necessary adjustments to the reserve’s management programs; complete development guidelines for the Atoll’s islands; put in place a sustainable financing program; and continue to monitor the status of our seascape species to assess the effectiveness of our conservation actions.

b. Activity Description

OBJECTIVE 1: Develop and adopt a participatory strategy to reduce threats to marine life in the Glover’s Reef Seascape.

Activity 1.1 Complete threats and stakeholder analyses through a series of focused meetings in consultation with the Glover’s Reef Reserve Advisory Committee.

This activity has been completed, as reported in our first annual report and the associated workshop report that was included as Appendix 1 to that report. The information from the threats assessment has been used to update our conceptual model and in turn to revise some of our proposed interventions or activities. The updated models can be seen in Appendix A1.

Activity 1.2 Create a “roadmap” for conservation intervention by completing a Seascape Species Analysis.

The focus of this activity during the year was on the collection of additional information on the ecology and biology of the remaining four seascape species: Caribbean reef shark, Nassau grouper, hawksbill turtle and osprey. We were also able to supply more detailed bathymetric data by conducting depth measurements at 1- km intervals (391 points) in the Atoll lagoon. This information was critical in refining the seascapes of the reef shark and Nassau grouper. Using GIS technology, the biological seascapes have been completed for all seven species by Dr. Caterina D’Agrosa (of the WCS NY-based support group). The next step is to overlay these biological seascapes with the human seascapes and, using MARXAN software, develop models of the conservation seascapes for each of the remaining four species. The human seascapes (areas of human influence), which were completed the previous year, include threats such as fishing, coral bleaching, chemical runoff, direct physical damage to coral, land development/habitat loss, introduced species, solid waste, liquid waste and sewage. Examples of the biological, human and conservation seascape maps can be seen in Appendix A2.

We have also drafted an outline for the Conservation Strategy document. It will be a straightforward publication, in the range of 12 pages long and geared towards a general audience, for which we hope that the GRAC will take ownership, as the members have been intimately involved in the entire planning process. We have also refined the four conceptual models for the Glover’s Reef Seascape; these include a master model for the entire system and three species-specific models. During this process, we updated the monitoring framework that is linked to targets, threats and interventions referred to in the conceptual models (see Appendix A1 for models).

Activity 1.3 Identify high priority interventions

As mentioned in our first annual report, high priority interventions have been identified, as shown in our master conceptual model and also the models prepared for our suite of seascape species. When the conservation seascapes have been finalized for all species, we will then be able to make any necessary adjustments to the original interventions. In the meantime, however, we have been making progress in implementing many of these interventions, most of which we expect to remain as high priorities.

In June 2006, the biological seascape maps for all seven seascape species, along with the proposed ‘cost index’ map, were presented to the Glover’s Reef Advisory Committee for discussion. Members provided valuable input to the cost layer, which mapped the indicative cost of management across the atoll. Based on this input, which more accurately reflected the costs presently experienced, the ‘cost index’ map was revised and will be used in the MARXAN analysis to develop the final conservation seascape models for each species. A copy of the cost index map can be seen in Appendix A3. The final product of these analyses will be shared with the GRAC.

We continued development of a Glover’s Reef GIS database, in order to make available any spatially explicit data of past and current research activities carried out, thereby maximizing the impact of research by facilitating collaboration between researchers and communicating research to resource users and managers. Ultimately this will lead to improved management of the Glovers Reef Marine Reserve. The GIS database will subsequently be made available online to maximize its impact. The data currently available in the GIS database are herpetofauna surveys, fish surveys, base and habitat maps, invertebrate surveys, nutrient levels and water quality, bathymetry, water temperature, urchin, parrotfish and surgeon fish abundance, and algae biomass. At the moment, more data are being provided by researchers, which will be converted to a format suitable for the database over the next few months. In addition to the maps in the GIS database, an MS Access database is under development. This will be linked to the GIS database and will store non-spatial data, which provide information that complements the GIS. For instance, it will hold a list of published scientific articles, photographs to illustrate marine communities, species information and life histories, and lists of common species found around Glover’s Reef.

OBJECTIVE 2: Develop and implement sustainable and adaptive mechanisms to strategically address threats across the seascape.

Activity 2.1 Implement Seascape Conservation Strategy in cooperation with Glover's Reef Marine Reserve staff and Advisory Committee.

Although the Seascape Conservation Strategy is still under development, we have made good progress in many activities aimed at reducing threats and achieving our conservation targets.

Alternative livelihoods: We partnered with the GEF Small Grants Programme's COMPACT project and a local NGO in Sarteneja, SWEET (Sarteneja Wildlife, Environment and Ecotourism Team), to help fund the training of fishermen in the national tour guiding course developed by the Belize Tourism Board (BTB). SWEET is a grassroots community-based organization composed of villagers such as teachers and fishermen. Our support also covered the cost of manuals for participants, three course field trips, internships, and training in First Aid. COMPACT provided funds for additional training in fly fishing and managing a small business, and for the purchase of some equipment. Based on agreed criteria, 25 participants from the community were chosen and included 13 fishermen and 6 women. The results of our socio-economic survey carried out in 2004 indicated that the community of Sarteneja is particularly vulnerable as it relies very heavily on fishing; and since the fishing resources are declining, they will not be able to support the economy of the village for many more years. The majority of fishermen who fish at Glover's Reef are from Sarteneja.

In view of this, and in recognition that the fishermen lack training in other skills, we agreed to support SWEET in its efforts to provide training in the alternative field of tour guiding, an area that most fishermen expressed an interest in pursuing, according to our socio-economic survey results. Although the tourism industry in the village is in its infancy, guides from the area have successfully found employment in other locations in the country. Nevertheless, as Sarteneja has very good potential as a tourist destination and the BTB is providing some assistance in improving infrastructure and marketing, through this project we also funded meetings organized by SWEET to initiate discussions on a tourism development plan for the village. The report from SWEET (see Appendix A4) shows that the project has been very successful so far, although regrettably four persons did not complete the course. Of the 21 participants who completed the entire course, nine (43%) were fishermen and six (29%) were wives or daughters who were reliant on family members' fishing. Therefore 15 or 71% of the participants were directly or indirectly dependent on fishing. Six (29%) of the participants had other occupations.

This is the first direct alternative livelihoods project that we have undertaken, and we hope that we will be able to help with other similar projects in the future. As a possible follow-up project, we are considering the provision of a computer, and training in use of computers and the internet, to assist SWEET in the marketing of tourism services offered by the guides. In the long-term, we hope that by fishers pursuing alternative income-generating activities, the level of fishing effort will be reduced at Glover's Reef.

Two fishermen from Hopkins, who formerly fished the spawning site, were hired to assist with the spawning aggregation monitoring during the Nassau grouper season in December, January and February. They stayed with other team members at the WCS Research Station on Middle Caye, Glover's Reef. In addition to providing an alternative source of income to these fishermen during the spawning season, we hope that their direct involvement in the monitoring will help to discourage illegal fishing at the site and foster their support of its recovery.

Support to the Spawning Aggregation Working Group: Over the past year, the National Spawning Aggregation (SPAG) Working Group met eight times and we continued to act as the secretariat, arranging meetings, drafting agendas, and supplying minutes of the meetings. Main topics discussed included our database, dive safety, arrangements for monitoring teams, and our public awareness program. The Group has long recognized the need for a web-based database that members could access to input their monitoring data. The SPAG database developed earlier was problematic as it was not web-based, and each monitoring team was inputting data into individual databases that could not then be joined together into one master database. In March 2006 the Group drafted terms of reference for a consultancy to resolve this issue and provide a web-based database. The Nature Conservancy has hired a consultant to carry out this task, and a

training workshop for members in the use of the new database was successfully held in September 2006, with 10 members of the National Spawning Aggregation Working Group participating. The new web-based database is expected to be online in November and will be tested until April 2007, when it will be finalized. Once the database issue has been fully resolved, we will then be in a better position to provide assistance in data analysis.

Public Awareness and Education: This year we updated the television ‘spot’ that informs fishers of timely regulations, and it now includes a section on the education and awareness program of the Working Group. Sharing the costs with WWF, the ‘spot’ was shown on local television in December and January, shortly before the ‘moon’ in each month, to remind fishermen of the sites that are closed to fishing and those closed for four months from fishing for Nassau grouper. Working closely with Group members, we also led the production of the two newsletters that the Group published this year. The September 2005 newsletter provided an update on the maximum counts of Nassau groupers for the 2004/2005 spawning season at six priority sites. It also reported on peak counts for several other species. The June 2006 newsletter highlighted the efforts of the Working Group over the year, and also reported on the results of the 2005/2006 monitoring season. We printed more than 450 copies of the newsletters and distributed them to members of the Working Group, including the Fisheries Department and NGO co-managers, and to the fishing co-operatives and fishermen in Hopkins.

We also supported the re-printing of 1,200 brochures for the Glover’ Reef Marine Reserve, which provides information on the reserve’s zones and regulations. We partnered with the Fisheries Department in preparing and printing 500 pamphlets on the life history of the Nassau grouper which we distributed via the members of the SPAG Working Group, the Fisheries Department, the fishing co-operatives, and our fisheries catch data collectors.

Other interventions, mentioned below, included the collection of fish catch and effort data, training, and monitoring activities. The involvement of reserve staff, fishermen, and GRAC members in these activities should also help to raise awareness through increased knowledge.

Activity 2.2 Provide technical support and training to the Glover’s Reef Marine Reserve staff, the Belize Fisheries Department, and the CZMAI to improve management of the reserve and enforcement of fisheries and land-use regulations

The Glover’s Reef Advisory Committee (GRAC) continued to meet on a regular quarterly basis during this period, in July and October 2005 and in February and June 2006. Two of these meetings were held in Dangriga and two in Belize City. Quorum was maintained at a reasonably high level (59%, 82%, 69%, and 75%, respectively). WCS serves as the secretariat to the Committee, supplying minutes of the meetings, arranging meeting logistics, covering travel costs for members, providing material required for the meetings, arranging training sessions, and generally keeping members updated on the progress and results of various projects related to the marine reserve.

GRAC members provided advice and recommendations on critical issues to the reserve management staff and the Fisheries Department. Topics discussed centered on enforcement issues, in particular the recent concern about illegal fishing taking place at night, and the Committee has agreed to help draft an enforcement policy for consideration by the Fisheries Department. Members also recognize the need to limit access to fishing at Glover’s Reef. They feel that fishing effort must be reduced for sustainable fishing levels to occur at the Atoll, and the Committee made recommendations to the Fisheries Department to introduce a limit on the number of fishing licenses issued for Glover’s Reef. The Department has responded that such a measure will need a great deal of planning, will be very difficult to implement, and will also have to be carried out on a national level. Nevertheless, the topic is now under discussion, which is a vital first step in the process of introducing limited access to Belize. The GRAC is also concerned about the need to more adequately have the fishing communities and fishermen represented, and the Committee recently made recommendations to the Fisheries Administrator to adjust its membership.

The October meeting was extended for a full day, with a training session held in the afternoon in Project Management and Implementation. The objectives of the training were to share basic ideas and principles about the project cycle and project implementation and to review the work of the GRAC. During the session, members identified the achievements of the Committee, its weaknesses, and the challenges it faces. During the February meeting, Dr. Samantha Strindberg from the Living Landscape Program at WCS-NY gave a presentation to members on the importance of monitoring, drawing

examples from the Living Seascape project for Glover's Reef. The GRAC has been intimately involved in this project, participating in the threats assessment and the selection of the seascape species. Mr. Sergio Hoare of the WCS Marine Program in Belize also gave a presentation to update members on the results of the Long-term Atoll Monitoring program (LAMP) at Glover's Reef. As mentioned earlier, Dr. Caterina D'Agrosa of the WCS Marine Program (NY) gave a presentation at the June meeting on the human and biological seascapes that have been developed for the seascape species, and we also reported on the results of the recently completed management effectiveness evaluation of the Glover's Reef Marine Reserve (see Appendix A5).

The continued involvement of the GRAC in the management of the reserve is extremely important in ensuring stakeholder participation and fostering both a sense of ownership of the protected area and a desire for it to successfully meet its objectives.

Under the requirements of the National Protected Area Policy and System Plan (NPAPSP) that was endorsed by the government in January 2006, the management plans for all protected areas need to conform to a standard format and content as described in the NPAPSP. As this format is significantly different from the current management plan for the Glover's Reef Marine Reserve that was revised in 2003, it is recommended that a new management plan be developed for the reserve instead of revising or updating the current one. This will be a major task and we hope to assist with its development in the coming year. It will provide the opportunity, however, to incorporate the findings of the threats assessment, as well as the recommendations of the recent management effectiveness evaluation and the proposed conservation strategy based on the Seascape Species analysis.

In August 2006, the terms of reference for the consultancy for preparing the development guidelines for the islands on the Atoll were finalized and advertised. We hope that the guidelines will be completed by the end of 2006 or early 2007.

Activity 2.3 Strengthen and expand stakeholder support for the Seascape Conservation Strategy – e.g. fishermen (divers for lobster, conch and finfish, as well as hand-line fishers), Atoll residents and tourism operators, as well as mainland communities that are highly dependent on the health of the reef (Hopkins, Sarteneja and Dangriga).

The Glover's Reef fisheries catch data collection program continued with over 60 fishermen from Sarteneja and Hopkins participating. Two former fishermen who are presently technical assistants to WCS collected data on lobster, conch, and finfish catches from fishermen on-site at Glover's Reef and at the landing beach in the village of Hopkins. Data collected include species, size and weight, gear type, effort, and area fished. The end of January 2006 marked the completion of one year's fisheries catch data collection. With assistance from WCS LLP's statistical expert in NY, Dr. Samantha Strindberg, the data were analyzed and interpreted. The results were formally presented to the Fisheries Department in May 2006, and copies of the database and the graphs developed were supplied to the Department. Some of the main points highlighted by the analysis were:

- Highest catch-per-unit-effort (CPUE) rates for conch were recorded in March and May and not at the opening of the season in October, as was expected.
- Highest CPUE for lobster was, as expected, at the opening of the season in June.
- Certain boats were particularly good at fishing for conch, and others at fishing for lobster.
- The peak months for finfish were August and September, when the conch season is closed.
- The boats from Hopkins catch finfish mainly with hand-lines; those from Sarteneja catch fish mainly by spear fishing.
- Many parrotfish are being caught; these are important herbivores on the reef and their removal is likely to cause an increase in growth of algae.
- Although not many Nassau grouper were caught, 50% of those taken were juveniles.

We then presented the results to fishermen in Sarteneja in June 2006. The National Fishermen Co-operative helped in organizing the meeting, and more than 20 fishermen participated. Our major partners, such as the Fisheries Department, Belize Audubon Society, the fishing co-operatives, Friends of Nature, Green Reef, the GEF Small Grants Programme, and SWEET (a local NGO in Sarteneja), were also invited. The report of the workshop, including the agenda and list of participants, is attached as Appendix A6. The fishermen were appreciative of the data and results shared; however, they remain wary of how the data will be used. We agreed to share all data with the two fishing co-operatives and to develop a

booklet for distribution to fishermen that depicts the graphs accompanied with the explanations and interpretations. A similar meeting was held with approximately 20 fishermen in Hopkins in August 2006, with the pamphlet completed in time for this meeting. The underlying purpose of this project is to show how important catch data are in managing fisheries and to demonstrate the benefits of the Conservation Zone to fishermen, thus garnering their support for the reserve and fostering a sense of responsibility in sustaining their fisheries.

We partnered with the National Fishermen Co-operative and the Belize Audubon Society (BAS) in conducting a training workshop for fishermen in September 2005 in monitoring techniques, patrolling for biodiversity protection, and use of radio and GPS (Global Positioning System). We worked with these partners as well as the Fisheries Department, the Belize Fishermen Co-operative Association, and Northern Fishermen Co-operative. Trainers included: the Marine Protected Areas Coordinator from BAS, who conducted the training in radio use; the Assistant Conservation Scientist from WCS, who led the session on using a GPS; and two officers from the Fisheries Department, who carried out the training sessions on enforcement techniques and fisheries legislation. Following discussions with the Fisheries Department and the fishing co-operatives, we developed and agreed to criteria for choosing the participants for the training: candidates needed to be upstanding members of their respective co-operative; they had to have participated in our data collection program at Glover's Reef or in BAS' monitoring program at Lighthouse Reef; and they had to have a clean record with the Fisheries Department (i.e. no record of warnings or arrests for illegal fishing). A total of 18 fishermen were then chosen, six who fish at Glover's Reef (three from Hopkins and three from Sarteneja) and 12 who work at Lighthouse Reef (11 from Copperbank and one from Chunox). In November 2005, we provided two sets of equipment to the two fishermen captains from Hopkins. In June 2006, another set of equipment was provided to a captain from Sarteneja. The participating fishermen were required to contribute to the process by supplying their own battery for the radio. We also provided each fisherman with a logbook to record his reports on infractions. We developed a participation agreement that each fisherman captain signed when accepting his GPS and radio. The agreements were also signed by the respective fishing co-operative, the management authority or supporting NGO, and the Fisheries Department. As noted in the agreement, the equipment remains the property of the fishing co-operative. We plan to hold a second training session for additional fishermen later in 2006. These training sessions are equipping fishers to take a more active role in the management of the marine reserve, and hopefully encouraging them to accept the role of the no-take zone as benefiting their livelihoods over the long-term.

Working with our partners at the Fisheries Department, TNC and Friends of Nature, we helped organize and lead a two-day refresher course in December 2005 in the Spawning Aggregation Monitoring Protocol for the spawning site monitoring teams, which was held at the WCS research station at Glover's Reef. Ten team members participated.

Dr. Charles Acosta led a training session in the Long-term Atoll Monitoring Protocol (LAMP) in August 2006 for a group of seven reserve biologists and Fisheries Department personnel. The training was held at the WCS Station at Glover's Reef. This training builds on the previous training held for reserve biologists in 2005. As there is a constant turnover in reserve staff, this training needs to be repeated at regular intervals.

Using the methodology developed by NOAA, we repeated the socio-economic survey of the fishing communities of Sarteneja, Dangriga and Hopkins that we had carried out in 2004. We have given the Belize Audubon Society a small grant from USAID funds to conduct the survey and report on the results. This will help strengthen their capacity in carrying out such studies, which they are interested in conducting in communities that buffer the several protected areas that they manage. The surveys have been completed, the data entered in the specially-designed database, and the analysis is underway. We expect to receive the final report from Belize Audubon Society within the next few weeks. The results should reveal some trends over the past couple of years, in relation to the material style of life and attitudes and perceptions of the marine reserve by fishermen and tour guides in these communities.

Activity 2.4 Introduce innovative co-management arrangements with stakeholders to foster buy-in for conservation action.

Although the National Protected Area Policy and System Plan has been completed and endorsed by the government, the moratorium on all new co-management arrangements for protected areas is still in place. The new Policy, however, encourages the use of co-management agreements as the preferred arrangement for protected area management. The

findings of the study on governance for protected areas completed under the NPAPSP Project noted that the co-management approach has proved effective. The study also details the necessary elements of co-management agreements. The Ministry of Natural Resources has indicated that the moratorium will not be lifted until the management authorities have refined and endorsed the co-management agreement templates recommended by this study.

In view of the hold placed on the introduction of new co-management agreements, we have focused on strengthening the Glover's Reef Advisory Committee as the primary mechanism available for stakeholder participation in reserve management. As mentioned under Activity 2.2, we have continued to assist with the strengthening of the GRAC through supporting its meetings, offering training to its members, and involving members in the strategy planning process. The management effectiveness evaluation of the reserve revealed that members of the GRAC are concerned about the lack of follow up by the Fisheries Department in response to their recommendations and the need to have more authority delegated to the Committee. On the other hand, there was also the recognition that the Committee needs to become stronger before it can assume more responsibility, but with the training received and the willingness of members to participate, members felt the GRAC is steadily gaining strength.

Unfortunately, we have not been able to initiate other informal co-management agreements with Atoll residents such as for turtle nest monitoring. However, we hope to have a turtle expert visit later in the year to help set up the system and provide the necessary training for monitoring of both nests and in-water hawksbill turtles.

Activity 2.5 Develop new, and strengthen ongoing, sustainable long-term programs to track reef health (e.g. coral cover, algal abundance, and coral species diversity), water quality, and population status of commercially and ecologically important reef species (e.g. groupers, sharks, snappers) by Reserve staff and staff of key agencies such as the Fisheries Department, CZMAI, and other NGOs involved in reef management.

The LAMP monitoring program continued at quarterly intervals throughout the year, in partnership with reserve staff. First year data were analyzed in December and the results were shared with the Fisheries Department in a formal presentation held in January 2006. Copies of the database and graphs were also submitted to the Department. Sergio Hoare (WCS staff) presented the results of the study at the Belize National Marine Symposium also held in January, and at the Protected Areas Congress held in Panama in April 2006. The LAMP contributes to the monitoring of two of our seascape species, the queen conch and the Nassau grouper. A major finding of the monitoring program was that 18% of the population of conch were of legal size (> 7 inch shell length), but were juveniles (no flared lip- when conch become sexually mature they develop a flared lip on their shells). Therefore, a significant portion of the population is being extracted before it has a chance to reproduce. The Fisheries Department has indicated that they are considering this information with a view to possibly revising the current conch size limit regulation. The results of the fishery-independent monitoring by the LAMP program also demonstrated that most of the Nassau grouper observed were juveniles. Not many adult groupers that can reproduce, and hence replenish stocks, occur in the grouper population on the atoll. Furthermore, the results of the fisheries catch data collection program showed that fishermen are taking mainly juvenile groupers. This was pointed out to officials at the Fisheries Department, with the recommendation that a size limit for Nassau grouper be introduced. In addition, the LAMP monitoring data clearly demonstrated the benefit of the no-take area of the Glover's Reef Marine Reserve as a refuge for conch and lobster, in which the sizes and numbers of these species were significantly greater within the no-take zone than in the general use zone (see Appendix A7). The LAMP results were also shared with the Glover's Reef Advisory Committee at its February 2006 meeting.

As reported earlier, we have mapped areas that may be resilient or resistant to coral bleaching based on various criteria. In June 2006, the WCS Glover's Reef Station Managers conducted a rapid assessment using the Atlantic and Gulf Rapid Reef Assessment (AGRRA) method at several sites on the Atoll to assess reef health. Once these data have been analyzed and mapped, we will be able to relate reef health to our proposed resilient or resistant areas and thus test our hypothesis. We can then determine what implications the results may have in relation to modifying the current management zones. WCS staff members were also trained to conduct monitoring of coral bleaching and disease using a new technique developed by Dr. Tim McClanahan, which is being used at several sites around the globe. This will enable us to monitor any bleaching event that may occur in the future at Glover's.

We led teams comprised of marine reserve staff, two former spawning site fishermen from Hopkins whom we hired, and the WCS research station managers in December 2005, and January and February of 2006 to monitor the Nassau grouper spawning aggregation site at Northeast Pt., Glover's Reef. Mass spawning of the Nassau groupers was observed during the January season when the highest numbers were also observed: 3,000 groupers. The numbers at this site, which was fully protected in 2002, are showing a steady increase from 1,700 groupers in 2004 to 2,240 in 2005 to 3,000 in 2006. The monitoring data have been entered in the national spawning aggregation database that is shared with our partners in the National Spawning Aggregation Working Group.

OBJECTIVE 3: Learn and teach best practices in the Glover's Reef Seascape and beyond.

Activity 3.1 Document the lessons learned from the application of the Living Landscapes approach to priority setting within a marine site.

The lack of knowledge and the wide range of habitat requirements due to the varied stages of the life history of most marine species continue to present a challenge when designing their conservation seascapes. These lessons are informing the Landscape (Seascape) Species Approach as it is being applied in other marine systems around the world.

Our conceptual model for the Glover's Reef Living Seascape project was instrumental in helping with our strategic planning process for the entire Belize marine program, which we initiated in November 2005. We are in the process of developing a similar conceptual model for the country program. The conceptual model has also been used to develop our annual work plans for FY 06 and FY 07. This has allowed for enhanced streamlining and focus of our activities, and has also helped in reporting.

Aside from Seascape approach lessons, one lesson we have learned is an appreciation of the importance of timely input of data into the respective databases. In one activity, a backlog of data sheets had accumulated and a major effort was required to enter the data for timely analysis to take place. Another important lesson learned was the need to ensure that the results of our data analyses are presented in a way that is readily understood by fishermen: it is useful to have relevant hand-outs to distribute at the time of meetings and presentations.

Activity 3.2 Extract and share best practices, in terms of management and monitoring.

The threats assessment process used at Glover's Reef, developed as part of the Living Landscape Program, was formally adopted as part of the protected area management planning process by the National Protected Area Policy and System Plan. It is included in the consultant's report, *Guidelines for Developing a Management Plan*, that has been endorsed as part of the Policy and System Plan and which describes in detail the steps in the threats assessment process. Furthermore, this method was used in the development of the recently completed management plan on behalf of the Belize Audubon Society for the Blue Hole Natural Monument at Lighthouse Reef.

We had shared our fisheries catch data collection program manual with our various partners in early 2005, including Friends of Nature (FoN) who is responsible for the management of the Laughing Bird Caye National Park and the Gladden Spit and Silk Cayes Marine Reserve. A representative from FoN attended our meeting in Sarteneja where we presented the catch data results to fishermen and he was very interested in applying the same data collection program to the Gladden Spit site. He requested copies of our amended data collection sheets, which we subsequently sent to FoN. We hope that this organization will also initiate a similar program in the protected areas it manages.

A summary of the experience of the Glover's Reef Advisory Committee has been documented in the governance section of the management effectiveness evaluation of the reserve completed in early 2006. This evaluation has been shared with members of the GRAC, the Fisheries Department, and our partners. We plan to have further discussions on the outcome of the evaluation with the Department and the Committee, with a view to implementing the recommendations and addressing the concerns raised.

Objective 4: New York Coordination Unit Strategy: Guide the design and testing of wildlife-focused planning, implementation, and evaluation tools for effective conservation at a landscape scale, and promote learning across sites and beyond

The NY-based Coordination Unit (CU, also known as the Living Landscapes Program: LLP) of the program is designed to develop and test wildlife-focused, landscape-scale approaches to biological conservation across multiple sites. To ensure the widespread utility of these new conservation approaches, the program is testing them in landscapes that encompass a diverse array of ecological features, land-uses, resource-use issues, and jurisdictional arrangements. To develop new approaches, facilitate and harmonize testing and implementation among these core sites, and to capture the synergistic benefits of diverse experiences, the central coordination unit is charged with designing and managing the program. This unit guides development of landscape-scale conservation strategies, tools and techniques; assists in the design and development of cost-effective intervention and monitoring programs at these sites; promotes cross-site learning; and ensures communication among the sites, WCS staff (central and field), USAID (DC and missions), and the larger conservation community.

During FY06, the Coordination Unit continued working with field sites to further develop their conservation landscapes, and provided assistance to the process of building monitoring frameworks from conceptual models. We have now refined and simplified the process for selecting landscape species, including revisions of landscape species selection software as a decision-support tool for analysis, and have drafted an accessible ‘how to’ quick reference guide that will complement the more comprehensive online help system that accompanies the selection software. We have also formally compared the Landscape Species Approach with landscape planning approaches of other international conservation organizations, with support from the Learning component of the USAID/GCP LWA. In addition, with complementary support, we assessed our field staff’s strategies for identifying and promoting effective local actors in conservation.

Activity 4.1 Provide technical assistance to site-based conservation

Members of NY Coordination Unit worked closely with field sites to provide targeted technical input (punctual advice and informal and formal training in conservation planning, monitoring, geographic and quantitative analysis, and specific conservation issues) throughout the year. In a number of cases this involved trips to sites as reported in the previous sections of this and the other three site-specific reports: Madidi (Bolivia), Maya (Guatemala), Glovers (Belize), and Eastern Steppe (Mongolia).

Activity 4.2 Design, implementation, and testing of decision support tools

Activity 4.2.1 Living Landscapes Program technical manuals

Based on field work to date, the Living Landscapes Program (LLP) continued to generate brief how-to guides, called Technical Manuals, after field testing and fine-tuning the methods at several WCS field sites. In FY06, we finalized and disseminated three technical manuals: *Measuring our Effectiveness- A Framework for Monitoring*; *Household Surveys- a Tool for Conservation Design, Action and Monitoring*; and *Building Biological and Threats Landscapes from Ecological First Principles, a Step-by-Step Approach* (see Appendices B1-B3) We also produced a further technical manual on selecting landscape species that is currently in review (see Appendix B4). These manuals are designed to provide to field practitioners clear and practical instructions on implementing a number of conservation tools. The manuals will also be translated into Spanish and French, and disseminated to WCS projects, partners (government, NGO and local), and other conservation colleagues.

In FY06 we also produced a WCS Working Paper based on a field staff “writers’ workshop” that was conceived and organized by LLP and supported, in part, by a grant from the Tinker Foundation. The working paper is titled *Castling for Conservation Actors: People, Partnerships and Wildlife* and characterizes a framework developed through adaptive management by our field staff to identify the most appropriate mix of actions and institutions needed to effect

conservation within any landscape or seascape (currently in production, for draft see Appendix B5). Lastly, in FY06 we produced two new LLP bulletins stimulated by the field work of our GCP portfolio: 1) *Setting Population Target Levels for Wildlife Conservation: How Many Animals Should We Save?* (Appendix B6), and 2) *Sharing Valued Landscapes: Conservation Through the Eyes of Wildlife* (Appendix B7).

Activity 4.2.2 Landscape Species Approach progress

4.2.2.1 Building Conservation Landscapes

LLP staff working at several sites in our portfolio continued to refine methods for setting geographic conservation priorities within a landscape, a process known as designing conservation landscapes. Design elements that were completed this year included: (1) using existing decision-support software such as Marxan, Sites, and C-plan to facilitate priority setting; (2) including the impact of potential future threats on conservation planning; (3) building potential activity costs into conservation landscape design, thereby leading to realistic and efficient strategies for conservation; and (4) developing a logic for setting wildlife population targets (i.e., how many animals do we want to conserve?) and incorporating these targets into geographic priority setting to assure that landscapes are large enough to conserve population targets. For this latter design element, we have developed a 4-tier system for setting population targets (for more on this approach, see Appendix B6).

We have reached the end of the design stage for building conservation landscapes, and are now pushing for sites to implement the procedures and produce products. Overall lessons learned from pilot tests at the GCP sites are being compiled into a technical manual that will be published early in FY07.

4.2.2.2 Review of the Landscape Species Approach

A preliminary review of the utility of the Landscape Species Approach (LSA) for conservation priority-setting was completed (for an excerpt from the conclusions of the review, see Appendix B8). Findings are being used to better adapt our program and LSA tools for the practice of site-based planning and implementation.

Activity 4.2.3 Develop monitoring frameworks at sites

Creation of monitoring frameworks from project conceptual models continues to expand within LLP test sites and more broadly across WCS. A relational database that integrates conceptual modeling, monitoring, workplan, budgets, and reporting has been drafted by LLP and will be tested in FY07.

Activity 4.2.4. Develop rules of thumb for intervention planning

Based on further input from LLP field sites, the LLP coordination unit reassessed the need for an intervention prioritization tool. Field staff felt that the challenge was not so much in choosing among intervention options; rather, it was in identifying interventions that had a high probability of success in a given context. Field staff asked LLP central staff to explore how to make available a catalog of best-practice conservation interventions cross-referenced with indirect and direct threats and ecological and socio-political systems. To move this activity forward, LLP staff worked with the Conservation Measures Partnership to finalize a typology of conservation actions and to explore with The Nature Conservancy how using a standard approach to describe conservation projects might help create a distributed database that could be used as a catalog of cross-referenced actions and threats. This work will continue to evolve in FY07.

Activity 4.3 Catalyze cross-site and cross-organizational learning, and communication

Activity 4.3.1 CMP: leadership, design, writing and audits

LLP/CU staff continued to play a leadership role in the identification, design, and implementation of Conservation Measures Partnership (CMP) activities. This was particularly important this year as there were several changes in organizations' representatives to the CMP. We continued to work closely with Foundations of Success to identify best-practice tools to use as models for development of eAdaptive-Management modules. We also continued to provide

technical input for specifying measurable Global Indicators of Biodiversity status both within CMP and more broadly in support of CBD through collaboration with the Zoological Society of London and the Cambridge Conservation Forum. In FY06 we completed a brief analysis of WCS experience with activity-based accounting (see Appendix B9). Drs. David Wilkie and Craig Groves participated in the first CMP meeting (in Gland) that included IUCN as a member. This meeting provided a valuable opportunity to share CMP lessons learned with a large number of conservation practitioners. Drs. Wilkie and Groves also participated in a ½ day presentation of CMP products to WWF International staff.

LLP also participated in another USAID GCP supported learning project to compare the landscape planning approaches of 5 conservation NGO's. We participated in 2 workshops, which compared how the conservation target selection procedures of the organization worked in a case-study landscape. We played a central role in producing and editing the report from the workshop, and are now working closely with a smaller group to produce a publishable manuscript.

Activity 4.3.2 Local engagement in conservation survey

LLP conceived and organized a 5-day writers' retreat for several senior WCS field staff. The retreat was designed to capture experience integrating local people into the successful practice of landscape scale conservation. This retreat followed up a more widely distributed questionnaire that was used to frame the theoretical and practical issues associated with effectively integrating local people into the practice of conservation. The report generated during the writers' retreat is being published as a WCS International Program Working Paper and will soon be available both as a PDF on our website and as a hard-copy document (see Appendix B5).

Activity 4.3.3 Preliminary assessment of the human welfare impacts of establishing national parks

LLP staff, in collaboration with the WCS Gabon program, the Gabon National Parks Authority, and Boston College, conducted the baseline household welfare survey. This was supported by the John and Catherine T. MacArthur Foundation and the National Science Foundation. LLP staff surveyed 1,000 households with traditional claims to natural resources within 4 national parks in Gabon and an additional 1,000 control households living outside the influence of the parks. This survey is the first of three planned over the next 5 years to assess the impacts of establishing protected areas on local families' income, health, consumption, natural resource use, and family function.. An extensive cross-sectional survey of over 2,000 households was completed in FY06, as was the first of two intensive surveys of household consumption. The 2nd household consumption survey will be completed in the first half of FY07 and will be analyzed soon thereafter. A manuscript from the project was published (Wilkie, D. S., Morelli, G. A., Demmer, J., Starkey, M., Telfer, P. & Steil, M. (2006) *Parks and People: assessing the human welfare effects of establishing protected areas for biodiversity conservation*. **Conservation Biology**, 20, 247-249, see Appendix B10). Detailed methods with a blank database and data dictionary were made available to the public (see Appendix B11). A second article on the topic of human welfare impacts of establishing protected areas is in press (Wilkie, D. S., Redford, K. H. & McShane, T. O. (2006) *Taking of rights for natural resource conservation: a discussion about compensation*. **Journal of Sustainable Forestry**, in press, see Appendix B12). With the leadership of our LLP staff, the Wildlife Conservation Society is in the process of drafting a "Code of ethics for the practice and science of conservation" and a policy statement on physical and economic displacement associated with conservation actions.

Activity 4.4 Application of Living Landscapes Program tools beyond core sites

Activity 4.4.1 Training workshops in the use of LLP tools

With WCS and other non-USAID support, a number of workshops were undertaken throughout the year to train field practitioners in the use of conservation tools that have been developed by WCS/GCP field sites and LLP/CU staff. We feel that GCP should be proud of increasing adoption of these tools across the globe.

- The LLP associate director held a 3-day workshop to train Zoological Society of London program staff in the use of LLP conservation planning tools.
- In January of 2006, we helped local and international partners in the Samburu-Laikipia Landscape in north-central Kenya to use LLP Landscape Species planning tools to come to a common vision for wildlife conservation in this complex dry savanna landscape.

- In December 2005, the LLP program director organized and facilitated a workshop for reserve staff, government authorities, and university experts on conservation planning for Huai Kha Khaeng/Thung Yai Biosphere Reserve in Thailand. A conceptual model was designed by the group, based on landscape species targets, and a monitoring framework design initiated. The work was completed and recently presented by Thai staff to a large wildlife conference, at which the Director of Thai Wildlife Services indicated an interest that all his departmental programs use the techniques.
- In March 2006, an LLP staff member traveled to Lao PDR to facilitate a successful Landscape Species selection workshop using the custom landscape species selection software. The process was completed during a three day Biodiversity Conservation Strategy meeting in Paxsan, the capital of Bolikhamxay Province, in collaboration with provincial counterparts. The goal of the subsequent visit of another LLP staff member in May was to continue the implementation of LSA tools by training WCS Lao staff in concepts and methodology of building biological and human landscapes and initiating their development for the selected species. Preliminary results of the landscape analysis were received with great enthusiasm during the meeting with provincial stakeholders. Landscapes will be finalized in Fall 2006 and will guide a new management plan for the Nam Kading National Protected Area in Bolikhamxay Province. The government of Lao counterparts expressed an interest in using LSA tools to guide their conservation planning at other sites. This activity therefore demonstrates both local and national interest in adopting LLP tools derived with support from GCP.
- Four LLP staff conducted a 5-day training workshop in Brazil to support adoption of conceptual models and monitoring frameworks by landscape scale projects in Brazil (Mamiraua, and Piagacu Purus), Peru (Yavari Mari), Ecuador (Yasuni), and Bolivia (Gran Chaco). These projects are supported by funds from The Gordon and Betty Moore Foundation.
- In July 2005, the LLP program director held a training workshop for conservation projects as part of the WCS Marine Regional Program Meeting. These projects are adopting conceptual models as the basis for their strategic planning.

Activity 4.4.2. Technical Manuals

We continue to make our series of technical manuals available to conservation practitioners and decision makers on our website, as hard-copy booklets and on CD. Manuals are available in English, French and Spanish (see 4.2.1 above).

Activity 4.5 Ensure coordination and communication services for the program

The LLP program director and program coordinator regularly meet staff from the core sites and other WCS large-scale conservation sites to discuss the development of the program, on-the-ground implementation of the Landscape Species Approach, and further development of tools relevant to the approach. Program staff also met with collaborators, NGOs, governmental officers, and representatives of other stakeholder groups to promote use of the strategies and tools.

Throughout FY06, the LLP Coordination Unit assisted field staff in completing annual Implementation Plans, reporting on Performance Monitoring forms, and submitting Annual Reports. The program coordinator attended quarterly USAID/EGAT meetings in Washington DC and ensured regular reporting and updates to USAID. The program coordinator and associate director attended the GCP annual meeting organized by WCS at Cool Font, West Virginia. During the meeting, LLP staff gave presentations on: proposed learning topics for FY07, progress with FY06 learning activities, and Evaluations and Conservation Audits.

Branding and Marking

WCS followed USAID's most recent guidance on new branding requirements for documents and materials funded in all or in part with USAID assistance (see Technical Manuals, Bulletins, and Working Paper, in Appendices B1-B7 as examples). WCS also ensured that all LLP staff and sites gave proper recognition to USAID for its critical support to all LLP-related workshops.

III. Appendices

- A1. Revised Conceptual Models
- A2. Biological, Human, and Conservation Seascapes
- A3. Cost Index Map
- A4. Report: National Tour Guide Training Programme
- A5. Management Effectiveness Evaluation of the Glover's Reef Marine Reserve
- A6. Proceedings of the Presentation of the Results of the Glover's Reef Fisheries Catch Data Collection Project
- A7. Preliminary Results of a Long-term, Fishery-Independent Monitoring Program at Glover's Reef Marine Reserve
- B1. LLP Technical Manual 3- *Measuring our Effectiveness- A Framework for Monitoring*
- B2. LLP Technical Manual 4- *Household Surveys- a Tool for Conservation Design, Action and Monitoring*
- B3. LLP Technical Manual 6- *Building Biological and Threats Landscapes from Ecological First Principles, a Step-by-Step Approach*
- B4. LLP Technical Manual 5 (DRAFT)- *A Quick Reference Guide to the Landscape Species Selection Software version 2.1*
- B5. WCS International Program Working Paper- *Casting for Conservation Actors: People, Partnerships and Wildlife.*
- B6. LLP Bulletin 8- *Setting Population Target Levels for Wildlife Conservation: How Many Animals Should We Save?*
- B7. LLP Bulletin 9- *Sharing Valued Landscapes: Conservation Through the Eyes of Wildlife*
- B8. Excerpt from the Conclusions of the Review of the Landscape Species Approach
- B9. *Activity-based cost accounting - two brief case studies within WCS*
- B10. Wilkie, D. S., Morelli, G. A., Demmer, J., Starkey, M., Telfer, P. & Steil, M. (2006) *Parks and People: assessing the human welfare effects of establishing protected areas for biodiversity conservation. Conservation Biology*, 20:247-249
- B11. Detailed methods, a blank database and data dictionary for *Parks and People*
- B12. Wilkie, D. S., Redford, K. H. & McShane, T. O. (2006) *Taking of rights for natural resource conservation: a discussion about compensation. Journal of Sustainable Forestry*, in press.