Biodiversity Conservation at the Landscape Scale

A Program of the Wildlife Conservation Society
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Maya Biosphere Landscape Conservation Area, Guatemala
Annual Report
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I. Summary of Activity Status and Progress

a. Introduction/Summary:

As one of six programs dedicated to Biodiversity Conservation at the Landscape Scale (BCLS), the Maya Biosphere Landscape Conservation Program (MBLCP) aims to conserve wildlife species and their habitat while maintaining the economic productivity of the area's renewable natural resources. The Maya Biosphere Reserve (MBR) is the largest protected area complex in Mesoamerica, accounting for one-seventh of the surface area of Guatemala. Increasingly under threat, it forms the core of a tri-national system of protected areas in Guatemala, Belize, and Mexico, an area known as the "*Selva Maya*" (Maya Forest). To ensure conservation of the MBR's biological diversity, the BCLS program in Guatemala works with local and national organizations to develop adaptive and participatory strategies to reduce threats to wildlife, develop and monitor sustainable mechanisms to reduce threats to wildlife and ecosystems, and disseminate best practices for conservation of the MBR landscape and beyond.

The Maya Biosphere Landscape Conservation Program has made important progress towards accomplishing long-term conservation goals in the MBR landscape. We initiated a reduced set of activities in October of 2003, preferring to defer resources to years 2-5 of the BCLS program while WCS Guatemala finalized an extensive biological monitoring project funded by USAID Guatemala. This deferment allowed us to focus on finishing the biological monitoring project and build upon the momentum generated and lessons learned, while simultaneously reducing costs and continuing the employment of our most excellent field staff. As such, only $31,575 of GCP II funds was used during the first year. Nevertheless, adaptive management shaped by unforeseen "external conditions" and our monitoring of trends within the reserve propelled us to modify or eliminate some of our planned activities. Among the external conditions, severe political instability during the run-up to the presidential election, narcoactivity, and organized land invasions (but generally no forest fires) all converged to force us to reduce and revise our operational activities. This instability in the western section of our landscape (i.e. Laguna del Tigre) forced staff to expend vastly greater efforts on certain activities (i.e. macaw protection; Activity 2.1) while forgoing our work plan on other activities (i.e. white paper on investments; Activity 1.4). In general, staff became greatly preoccupied with monitoring and denouncing illegal land invasions threatening the principal scarlet macaw nesting areas. Despite these chaotic conditions, the results of MBLCP activities included significant and unexpected steps forward for the Maya Biosphere Reserve, as well as the preparation of a solid foundation for the subsequent years of the project.

b. Highlights:

- **Record breeding success for scarlet macaws in the Maya Biosphere Reserve**

More macaws fledged this year in Laguna del Tigre than in any other year during which there have been field monitoring efforts (7 years). Previously, the record for macaw fledging from the El Peru site was 5 chicks in one year. Whereas the 2003 breeding season only produced one successfully fledged chick in the El Peru area, this year we recorded 13 successful fledglings. In the greater Laguna del Tigre area we recorded 25 successful fledges (El Peru-13, El Burral-7, Lo Veremos-5 estimated), a significant contribution to a population maximally estimated to consist of some 300 individuals. No nesting trees were climbed by poachers and no chicks poached in the areas supported by protection activities, also a first for the region. A community-based control and vigilance plan was executed with the support of CONAP and

participants of the neighboring communities/management units including Paso Caballos, San Andres (AFISAP), and Carmelita. The activities of these community guardians were coordinated by WCS.

- **Passage of the "Emergency Law for the Protection, Restoration, and Conservation of Laguna del Tigre National Park" (not in FY04 plan)**

WCS spearheaded the remarkable passage of a new law designed to protect Laguna del Tigre from the onslaught of illegal land invasions and other nefarious activities. WCS staff coordinated LightHawk overflights of threatened areas with numerous organizations including representatives of the Guatemalan Congress, Tropico Verde/Parkswatch, Centro de Acción Legal Ambiental y Social de Guatemala (CALAS), National Park Service (CONAP), Instituto de Antropolog ae Historia de Guatemala (IDAEH), ProPeten, and Balam, in addition to the media (Prensa Libre, El Periodico, Guatevision). Photographs collected during the flights revealed extensive invasions advancing into the heart of focal macaw nesting areas, including timber thefts, new agricultural plots, and vast new land clearings. Flights were also used to map the distribution of households on the edge and outside of the recognized community polygons of the adjacent communities of Paso Caballos, Buen Samaritano and Mirador Chocop. At least 12 different narcotrafficking aircraft were also detected and the subsequent images publicized in the media. The leading newspaper of the country published a front page spread of the narcoactivity, and dedicated the first 3 pages of the paper to the lack of governance in Laguna del Tigre (Appendix 1). Timber thieves were apprehended red-handed as a result of emergency patrols coordinated in response to the information generated by overflights. A tractor, chainsaws, and other vehicles were confiscated, and the law breakers were apprehended. At least four significant land invasions were repelled. WCS subsequently shared the information compiled on threats facing the park with institutions based in Guatemala City, resulting in the development of an alliance to lobby for the rescue of the park. Groups involved in lobbying the Guatemalan Government for immediate action included CALAS (Appendix 2), Tropico Verde, FIPA/IRG, RED IARNA (Appendix 3), and Madre Selva, among others. These activities spurred the passage of the emergency law providing Q5 million ($630,000) for the park this year, and Q3 million annually there after (Appendix 4). Funds are scheduled to be made available in the fall of 2004.

- **Approval of support to develop an updated Master Plan for Laguna del Tigre National Park (not in FY04 plan)**

In conjunction with the K'ante'el Alliance, WCS and CONAP received approval for a proposal to the CEPF to develop an updated Master Plan for Laguna del Tigre National Park. The last management plan was made over 7 years ago, and is now outdated. A new plan is needed to reflect the drastically altered nature of the park. The development of the plan will be led by WCS with the participation of numerous stakeholders including communities, municipalities, NGOs, industry, and government institutions among others. Current knowledge regarding the important epicenters of landscape species within the Laguna del Tigre area will help to develop a triage approach to working with the local communities and prioritizing conservation efforts in the future. The project is expected to begin in October of 2004, and will take 10 months.

- **Strengthening of General Assembly of Uaxactún's (OMYC) community-based management efforts in Uaxactún**

Numerous management activities in the integrated forest concession of Uaxactún were advanced, including the testing of an experimental system for marketing xate (*Chamaedorea* spp.) palm fronds, a pilot harvest of "ramón" or breadnut (*Brosimum alicastrum*), a legal sport harvest of ocellated turkeys (*Meleagris ocellata*), and the continuity of other pilot projects including environmental education for secondary students, construction of a women's artisans building, and the consolidation of a community-based control and vigilance (C&V) group. Preliminary results of OMYC activities include the detection and removal of land invaders adjacent to the concession, and via a report by OMYC C&V personnel, the arrest of police detected smuggling parrots and monkeys out of Uaxactún for sale on the local pet market (Appendix 5).

- **Awareness raising among communities/municipality regarding Asociación Balam and Mirador-Rio Azul National Park**

Awareness of Asociación Balam's work aimed at the protection and management of Mirador-Rio Azul National Park was raised in two sites of important influence over the park. Balam presented its objectives and personnel to OMYC, and received the support of the community as recorded in an official "acta" approved by the assembly. Balam repeated the presentation to the Laborantes del Bosque (a concession adjacent to the southeastern corner of the park), and obtained the Laborantes' written support (Appendix 6) to install the experimental road blocks at the park limit adjacent to their forest concession. Similar efforts with the Mayor and technical staff of the Municipality of Melchor resulted in the written approval for the road barrier (Appendix 7). These activities in combination provided a great boost to the awareness among

local villages, management units, and municipal official regarding the conservation and management efforts underway in Mirador-Rio Azul National Park.

- **National Park Service (CONAP) promotion of community participation in the protection of two biological corridors (Tikal-Rio Azul; Laguna del Tigre-Mirador) (not in FY04 plan)**

WCS Guatemala was appointed by CONAP to provide advice and support to a government plan to protect the two key biological corridors within the Maya Biosphere Reserve. CONAP subsequently approved a WCS plan to involve community members of management units adjacent to the Biological Corridors as the future park guards to be employed by CONAP. WCS contacted community members to recruit potential candidates for the positions, and CVs of the prospective resource guards were provided to CONAP. The project awaits final approval from the Ministry of Finance.

- **Development of human landscapes and preliminary biological landscapes of selected landscape species**

With the help of CEMEC mapping institute, a spatially explicit threats analysis was created to reflect the current state of pressures in the tri-national Selva Maya landscape. The following threats were included in the analysis: New roads, subsistence hunting, petroleum extraction, human settlements, forest fires, wildlife depredation, timber extraction, pollution, trophy hunting, commercial hunting. Preliminary biological landscapes based on current knowledge for the 5 selected species were also mapped. Landscape species included the jaguar (*Pantera onca*), scarlet macaw (*Ara macao*), white-lipped peccary (*Tayassu pecari*), Baird's tapir (*Tapirus bairdii*), and Morelet's crocodile (*Crocodylus moreletti*). Special elements included understory "parlor" palms (*Chamaedorea* spp.), and spiny-tailed iguana (*Ctenosaura alfredschmidtii*). Finally, we have developed preliminary conservation landscapes (joined biological and human landscapes) to develop a spatially explicit landscape species strategy that will highlight the priority areas for future conservation interventions. Future steps include the mapping of special elements, the improvement of biological landscapes as more becomes known about the ecological requirements of the selected species.

c. Table of Activity Status

Activity Number	Activity Title	Status	Page Number
Obj. 1	**Develop an adaptive and participatory strategy to address threats to the wildlife in the Maya Biosphere Landscape**		
1.1.	Develop an updated and participatory strategy for the conservation of macaws	On track	5
1.2.	Develop a landscape species strategy for the region	On track	5
1.3.	Facilitate improved zoning of communities and management units influencing conservation targets	Modified	6
1.4.	Estimate the financial investments needed to ensure the long-term conservation of the Maya Biosphere Reserve	Delayed	6
Obj. 2	**Develop, implement, and monitor sustainable mechanisms to reduce the threats to wildlife and ecosystems across the eastern Maya Biosphere Landscape**		
2.1.	Enforcement of protective regulations – macaw nest protection	On track	6
2.2.	Enforcement of protective regulations – road barriers	On track	7
2.3.	Surveys for macaw nests in timber concessions	On track	7
2.4.	Development of a tree substitution protocol for timber concessions	On track	8
2.5.	Increase nest availability for macaws in nesting sites	On track	8
2.6.	Test and evaluate xate management alternatives	On track	8
2.7.	Develop a cooperative agreement with ACOFOP as a foundation for sustainable resource management	Delayed	9
2.8.	Monitor trends in landscape cover	On track	9
2.9.	Monitor trends in macaw populations	On track	10
2.10.	Develop methodologies to monitor trends in selected landscape species	On track	10
2.11.	Initiate contact with the private sector to promote conservation initiatives	On track	11
Obj. 3	**Learn and teach best practices for conservation of the Maya Biosphere Landscape and beyond**		
3.1.	Evaluate the effectiveness of pilot projects promoted	On track	11
3.2.	Strengthen the Maya Biosphere and global conservation initiatives	On track	11

Obj.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**		
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 2003 – September 2004)

The overall goal of the MBLCP is to conserve wildlife species and their habitat in the Maya Biosphere Reserve while maintaining the economic productivity of renewable natural resources. With this goal in mind, project activities are geared towards the development of solutions to the conservation problems inherent in "sustainable use" initiatives, including activities such as tourism, NTFP harvesting, and logging. Community-based management efforts are seen as integral, if still developing, aspect of landscape conservation in this approach.

In this first year of MBLCP activities our principal short-term goal was to build upon the advances and lessons learned during our 3-year project focused on the biological monitoring of the Maya Biosphere Reserve. Many aspects of the biological monitoring project helped us to focus our work on significant threats and opportunities that have been identified. Numerous stakeholder groups including communities and forest concessionaires were contacted during these activities, thereby providing a base from which to extend our planned MBLCP activities. As previously mentioned, during this first year of the MBLCP we requested less than 40% of the GCP II funds made available by US AID Global to allow us to defer funds to following years. While our main short-term goal this year involved developing a solid base for the future years of the project, it also evolved to respond to critical conditions in the landscape. As a result, we prioritized our efforts to "rescue" the eastern, still intact part of Laguna del Tigre and its adjacent Biological Corridor. Due to its urgency, this work superceded all other efforts.

Additional short-term goals included the development of a landscape species strategy, including the selection of the most appropriate landscape species across the eastern Maya Biosphere Reserve, in conjunction with conservation colleagues working in the adjacent forests of Belize. Subsequent specific goals included the mapping of habitats for the landscape species using available data, as well as the mapping of threats across the landscape. In conjunction, these sub-goals will allow us to develop a complete landscape species conservation strategy, highlighting the areas where important efforts should be expended in the future, and the methods of addressing these threats.

Mid-term goals included the establishment of working relationships with other stakeholders, including communities, local organizations, international institutions, and the Guatemalan government. The forging of strategic relationships constituted a mid-term goal because the process of building confidence and lines of communication with other actors in the landscape requires time, and results are not easily attained in the short-term. Additional mid-term goals included the procurement of additional alliances and sources of support to allow more effective networks to be developed, and to increase the reach of project interventions.

Over the next 4 years, we intend to continue interventions that have yielded important conservation gains, such as macaw protection and monitoring, while initiating activities not yet tackled during this fiscal year. Specifically, we plan to continue refining our spatially explicit models for prioritizing conservation at the landscape scale as new information is gathered, amplify greatly our communications with community-based groups in the priority landscape areas, and begin the participatory process of developing conservation strategies (i.e. macaw conservation strategy; financing) for the Maya Biosphere Reserve. Based on these advances, we plan to identify and implement additional conservation interventions in the future, and measure their success. A final goal includes the sharing of lessons learned within the national context and beyond.

b. Activity Descriptions

OBJECTIVE 1: Develop an adaptive and participatory strategy to address threats to the wildlife in the Maya Biosphere Landscape

Activity 1.1. Develop an updated and participatory strategy for the conservation of macaws

Significant progress was made towards the development of this participatory strategy with our main efforts in year one being on the development of consensus on the scientific and technical aspects required for macaw conservation. Thus far, our main product is the development of a protocol for the release of wild birds confiscated from poachers, as well as captive bred macaws raised at ARCAS Rescue Center. Guacamayas Sin Fronteras (GSF) members who participated in the development of the release protocol included CONAP, ARCAS, Defensores de la Naturaleza, Propeten, and WCS. This protocol will eventually become a chapter in the holistic macaw conservation strategy. Other aspects of the strategy include the development of a draft budget for the conservation of macaws across the eastern MBR landscape that will later be shared with other stakeholders and evaluated. In addition, WCS field staff have begun designing a methodology for community outreach to educate local people about the plight and importance of macaws while simultaneously consulting them on their opinions. WCS staff have initiated contact with the village of Paso Caballos arguably the most important community affecting the future of macaws as Paso Caballos is a Queq'chí Maya community whose members are much more united behind their leadership than the majority of ladino communities located in the MBR. The mayor, Mr. Juan Genaro Sub Ochoa, is willing to convene a village meeting where WCS objectives are to be shared with the town council and the people of the village. WCS needs the major's support to conduct household interviews to inquire as to people's views on the importance of macaws, threats to macaws, and the role local people see for themselves in the conservation of macaws in the future. Plans have been made for this formal "first encounter" with the village of Paso Caballos to occur in September. Educational materials and methods currently being developed include the use of an active macaw nest found in the Paso Caballos polygon as a demonstrative nest for environmental education with the local youth, and a booklet in Spanish and Queq'chí describing the plight of the scarlet macaw and its potential as a source of income for local people in the future. Note: the villages of Buen Samaritano and Mirador Chocop were not approached due to the tension involved with the land invasions (ostensibly supported by some of these community members), and the clear role that WCS was playing in the protection of these areas. Apparently, narcotrafficking interests were also involved in some of the invasions, thereby making the environment too hostile for the time being. Assuming peace is restored in the region, WCS staff will begin to consult with these communities.

Activity 1.2. Develop a landscape species strategy for the region

From a pool of 17 candidate species, five species were selected to serve as the focus for conservation priority setting in the Maya Biosphere Reserve. These landscape species include: jaguar (*Panthera onca*), tapir (*Tapirus bairdii*), scarlet macaw (*Ara macao*), Morelet's crocodile (*Crocodylus moreletii*) and white-lipped peccary (*Tayassu pecari*). The selection process was undertaken using software developed by the Living Landscapes Program. These five species ranked high using the five selection criteria for landscape species (area demanding, habitat and socio-political heterogeneity, vulnerability to threats, ecological functionality, socio-economic significance) and are complementary to one another (Appendix 8).

Preliminary biological landscapes for the five landscape species were created. These draft models take into account the vegetation preferences of each species, the impact of access to water on its behavior, and its preference for different types of elevation or degree of slope. Biological landscapes were built using expert knowledge of each species' requirements to derive habitat associations. In consultation with WCS field staff and using relevant literature, five data layers went into creating habitat quality models: vegetation, distance to water, precipitation, slope, and elevation. Each data layer was individually evaluated for each species. These individualized data layers were then combined to produce a biological landscape for each species (Appendix 9).

Victor-Hugo Ramos of CEMEC worked with the WCS NY Coordination team to create a preliminary generalized human landscape based on the severity, urgency, probability of occurrence, and time for recovery post abatement for each of the following threats: subsistence hunting, petroleum extraction, new roads, human settlements, fire, poaching for the pet trade, logging, pollution, trophy hunting, and commercial hunting. Next, a matrix was created to express the effects of each threat on each of the five species, and threats maps for each species were created. Finally, the biological landscape was overlaid with the human landscape for each species, to create a conservation landscape. The final map for each

species spatially depicts both the biological importance and the level of threat of different areas for each species. Furthermore, the importance of each threat is expressed graphically for each area, allowing easy interpretation for possible conservation interventions (Appendix 10). The biological, human, and conservation landscapes will be improved in an iterative fashion as more data is gathered.

Activity 1.3. Facilitate improved zoning of communities and management units influencing conservation targets
Our original work plan to improve and update the zoning plans of the three communities adjacent to macaw nesting sites of El Peru and El Burral were modified after due to the approval of a USAID funded project "Fondos de Paz". The local NGO PROPETEN was selected by AID to execute a significantly more extensive effort to do as we proposed - revisit the zoning issue with these three local communities. The AID funding for this project, which in addition to zoning also focused on the identification of viable economic alternatives for these villages, consisted of approximately $80,000, more than twice our entire LLP work budget for this year. Given that many pressing needs existed in the Biosphere, we decided to focus our efforts on other critical activities that did not have any significant support, such as protection of the area. Nevertheless, WCS supported PROPETEN's efforts by sharing data sets of households, agricultural plots, and illegal invasions complied during overflights. Numerous illegal land invasions were identified outside of the previously recognized (and legal) community polygons. Our data helped to determine that there was a clear difference between the legally recognized households in the community polygons, and the vast land grabs of recent invaders, who in some cases had threatened the legal residents of the polygons. WCS also shared our information about the location of newly found key macaw nesting areas (El Burral). Lastly, we provided $1000 of support to PROPETEN to print maps at the CEMEC mapping center for community workshops and to raise awareness. A final report on the activities undertaken by PROPETEN as well as project results is due in late October 2004.

Activity 1.4. Estimate the financial investments needed to ensure the long-term conservation of the Maya Biosphere Reserve
This activity was postponed given the scale of threats to the western edge of the MBR and the need to focus on securing support for conservation of the Laguna del Tigre National Park. Furthermore, to ensure that this activity is completed in a comprehensive and participatory fashion, we propose further delay until the Laguna del Tigre National Park management plan is revised and WCS has completed initial awareness raising activities with the communities of Paso Caballos, Buen Samaritano and Mirador Chocop

OBJECTIVE 2: Develop, implement, and monitor sustainable mechanisms to reduce the threats to wildlife and ecosystems across the eastern Maya Biosphere Reserve

Activity 2.1. Enforcement of protective regulations – macaw nest protection
The protection of macaw nests was one of the most successful activities of the work plan. WCS based protection plans on the location of 77 active and potential macaw nests distributed across an area of approximately 50,000 hectares. With these conservation elements in mind, WCS staff subsequently administered funds provided by USAID Guatemala ($82,000) to strengthen the combined protection efforts of CONAP and the Environment Protection Service (SEPRONA), with participation of the Guatemalan army. Three key control bases were established (El Peru, El Burral, Guayacan) to stem the spread of invaders, and to permit access to remote areas by combined patrols. LightHawk overflights were used to identify threats, in addition to remote detection of fires via the CEMEC lab. WCS technicians familiar with the distribution of nesting sites across the landscape guided these combined forces on routine patrols as well as tactical patrols to capture detected culprits. Several captures were made of timber thieves, including the captures of tractors and vehicles, chainsaws, and in one instance wild animals were also confiscated. Patrols registered hundreds of kilometers of invasion lines ("brechas") chopped into the forest to demarcate large fincas that would become cattle ranches after clearing all the land. People encountered within the park who had not broken any laws were escorted outside, whereas others clearing land and trafficking contraband were put in jail. Reports of captures were publicized by the local TV stations, as well as the PrensaLibre (Appendix 10) and other written media.

With separate DOI funding ($11,300), we tested a pilot project to involve the members of adjacent communities in the conservation of macaw and their habitat. Ten members of the communities of San Andres, Carmelita, and Paso Caballos were employed to establish remote camps within the hearts of the three main macaw nesting sites (El Peru, El Burral, Lo Veremos). Community members subsequently patrolled critical areas led by WCS technicians in each site to ensure that goals were met, and key conservation elements were protected. Community members received training on the use of

GPS's and the biological monitoring of macaws, among other field activities which included the preparation of remote camps for patrols, the demarcation of the area to establish conservation presence, and the search of areas for new conservation elements including macaw nests, important wetlands, and archaeological sites. On several occasions the community guards repelled invaders. They also encountered several unknown macaw nests and a new focal macaw nesting area around the long lost Maya site of "La Corona". Upon detecting fresh lines cut by invaders into the Lo Veremos area, community guards advised WCS headquarters via satellite telephones, and WCS staff organized an expedition into the area with CONAP, IDAEH, the Guatemalan army, and with reporters from Guatemala's most popular television station in tow (Guatevisión). This expedition resulted in high profile coverage for the park and its plight, with motivational images of macaws, jabiru (*Mycteria jabiru*), and Maya sites poignantly balanced by the images of the chopped lines, camps of invaders, and forest burning in other areas of the park. After the report, Guatevisión polled the Guatemalan public as to their opinion regarding the importance of protecting Laguna del Tigre, and 92% of the public responded that it should be a national priority.

WCS also installed basic infrastructure in the El Burral and Lo Veremos areas to facilitate future protection efforts. Guard houses for CONAP, SEPRONA, and the military were built at El Burral. These basic facilities, including kitchens, toilets, sleeping areas, and bathing houses helped to maintain the commitment of protection staff to work hard under trying conditions. In Lo Veremos, we developed three remote camps distributed along a north-south gradient to facilitate the vigilance of the entire Laguna del Tigre Corridor section where macaw nests have been located. Trails between camps were cleared, marked, and maintained to help demonstrate presence. Lastly, WCS technicians developed a draft protection strategy based on field experiences that details their best estimates of the investments needed over the long-term to maintain protection efforts in the macaw nesting areas.

Activity 2.2. Enforcement of protective regulations – road barriers

The design for an unmanned road barrier was developed by a local architect with the support of WCS and Asociación Balam staff (Appendix 11). Upon attaining an adequate design, WCS and Balam staff contacted stakeholders responsible for two priority areas selected as the first sites for testing barrier effectiveness. In Laguna del Tigre, CONAP, PROPETEN, Proyecto El Peru-Waka', Paso Caballos, and AFISAP were all consulted regarding the placement of the barriers, and updated on the objectives of the project. Support for the construction of the barriers was unanimous. The site of the first barrier for the area will be the camp of Caobitas, where AFISAP personnel have a temporary forest camp to protect their forest concession at the limit between Laguna del Tigre National Park and the AFISAP concession. Construction of this barrier, however, has been delayed by the extremely wet rainy season that has impeded the transportation of heavy construction materials. Construction is planned for the beginning of the dry season.

The remaining road barrier is planned for a dirt road entering Mirador-Rio Azul National Park (MRANP) at an unmanned entrance in the easternmost section of Rio Azul (Chosquitan). Three field expeditions verified the need for the barrier due to evidence of passage of illegal migrants and wildlife poachers. A subsequent expedition was undertaken to locate the exact point for the construction of the barrier, with the site being located 300 meters inside the park boundary where natural features will help to prevent the installment of a detour to bypass the barrier. Following site identification, a significant effort was expended to raise awareness among local stakeholders about the need for increased protection in the area. WCS and Balam staff first met with a new association of land managers (Asociación Cuenca Holmul) formed to consolidate the conservation of the eastern Maya Biosphere. This group included representatives of all the community forest concessions in the area, Yaxha National Park, Mirador-Rio Azul National Park, CONAP, and the Municipality of Melchor. Following this, Balam staff and the CONAP Director of MRANP continued to meet with two key stakeholders; the Municipality of Melchor; and the community forest concession Laborantes del Bosque. After months of confidence building and information sharing, in May 2004 both stakeholder groups provided written support for the concept (Appendices 6 & 7). CONAP and Balam staff are planning to install this first road barrier during the month of September 2004. Routine monitoring of the area will be conducted after the installment to see if any damage to the barrier has occurred, or if traffickers have outwitted park staff by designing a circuitous route around the barrier.

Activity 2.3. Surveys for macaw nests in timber concessions

Search activities were focused on the AFISAP timber concession, currently the only forest concession known to contain active macaw nests. Two visits were conducted. The first was conducted during the nesting season in the timber extraction designated area (extraction planned for 2005). This area covered 1000 hectares, and results included two *potential* nests (not active) discovered near, but outside of the planned harvest area. One of the two potential nests appeared to have been

active earlier. Next year these potential nests will be revisited early in the nesting season to determine if they are active. In addition, AFISAP staff have agreed to help identify any other potential nests that may be encountered during field work and timber harvesting operations in the future.

The second, more extensive, area inspection was conducted shortly after the nesting season this year. The area inspected covered the 5000 hectares planned for harvest during the next 5 harvest years (1000 hectares each year). Methodology involved climbing emergent trees to look for potential nesting cavities, as well as to search the surrounding forest for other emergent trees, especially of the preferred type for nest ("cantemo"; *Acacia glomerosa*). In total, 26 lookout points were used during the search, placed at approximately 2 km apart. In general, staff noted that a majority of the area is "low forest", a forest type typically flooded during the rainy season, making much of this future area unsuitable for the presence of cantemo and macaw nests. No certain active nests were found, but all emergents were recorded, and now can be visited with precision during the nesting season next spring.

Activity 2.4. Development of a tree substitution protocol for timber concessions
Since no active nests were found in areas slated for harvest in the near future, we did not proceed beyond the point of sharing the idea of developing a tree substitution protocol with CONAP. CONAP's director of wildlife in Petén considered that the idea was important, but he agreed that all institutions and organizations involved are currently occupied with work plans that it would be better to wait until a solution to a real problem was required. In general, he opined that a "setback" distance similar to the type used to protect archaeological sites might be the best solution in a majority of the cases, especially since a majority of macaw nests are not located in commercially valuable timber species. Aside from the original idea, WCS staff recently met with AFISAP planners, inquiring as to whether the commercial timber census they have planned for the 5000 hectare 5-year plot (see above) can include a tally of "cantemo" trees. The legal representative of AFISAP, Mr. Francisco Romero, indicated that it may be possible. We are hopeful that this can be negotiated as it would provide an important step forward towards the inclusion of scarlet macaws in the forest management plan of the AFISAP concession.

Activity 2.5. Increase nest availability for macaws in nesting sites
Nest availability was increased by constructing and improving a total of 36 nests. Fifteen new artificial nests were built. Ten of these consisted of PVC, with 5 based on a design provided by Dr. Donald Brightsmith, director of a successful scarlet macaw project in Tambopata, Peru, and 5 based on a WCS modification of the Tambopata design intended to make the chicks less vulnerable to depredation by falcons. Five artificial nests were constructed from the trunks of fallen "cantemo" trees. Previous to the construction of PVC nests, only nests made of "cantemo" were used in Peten, with the disadvantage of being very heavy and cumbersome, and requiring constant maintenance. Ten small natural tree cavities located in apt locations for macaw colonization were also amplified to permit nesting by macaws in the future. Of these, 6 were in "cantemo", and 4 in other tree species. The use and nesting success rates of all of these cavity designs will be compared in order to determine the most efficient manner of increasing nesting sites. Apart from the construction of new nests, 11 previously active nests were repaired and maintained. Africanized bees were removed from 4 natural cavities and seven existing artificial nests were repaired.

Activity 2.6. Test and evaluate xate management alternatives
A final report on the impact of xate harvests on wild populations in Uaxactún is under preparation by the WCS biological monitoring project, due to be terminated in Sept 2004. Preliminary results indicate that one species of xate (*Chamaedorea elegans*) has been slightly over harvested within the concession, while the most abundant species (*Chamaedorea oblongata*) is in good shape. Determinations of the sustainability of use were based on the recorded age class distributions as compared to normal expected distributions. Monitoring of the percentage of unmarketable fronds (waste) across the eastern MBR landscape was also terminated, and a final report is now in preparation. Preliminary results include the finding that 25% - 55% of the xate typically harvested at any time is waste, unfit for market. These results have helped to spur the development of the interventions detailed below.

In conjunction with OMYC, The Guatemalan Trust for Conservation (FCG), the experimental xate reforestation plot in Uaxactún increased the number of community children participating with their own plots from 20 to 30. Seed collection is planned for August/September of 2004, and permission for the collection of seed in Tikal from the rarest and most economically valuable species in Uaxactún (*C. elegans*) was granted by the technical staff of Tikal. Planting of seeds will occur shortly after collection, as quickly as possible. Previously established plots continue to do well, and the survival

success of transplants from the seeding beds to the reforestation plots has continued to be monitored by WCS staff in conjunction with the children. All of these activities in whole are considered a hands-on approach to environmental education for the children.

In conjunction with OMYC, Naturaleza Para la Vida (NPV), and the Rainforest Alliance, an experimental project to test alternative marketing methods for xate was initiated in Uaxactún. Working with Mr. Luis Miguel Ormeño, the OMYC "Xate Committee" and the OMYC leadership, WCS staff built a new xate warehouse with funding from the Rainforest Alliance. This "bodega" will hopefully function full time in the future as a site for the selection and storage of xate fronds before exportation outside of the community. The central operative principal of the operation is to pay only for fronds that are of market quality while offering an improved price. In theory, harvesters should win by harvesting the product in a more sustainable fashion, carrying less weight, and earning more money. A central impediment to this idea is the eventual elimination of the interests of those who earn on the transportation of xate based on weight, and middlemen who currently perform the sorting of good fronds in the central area of Petén. NPV, via another grant from the Rainforest Alliance, supported the project following the construction of the bodega with the objective of testing the bodega. As of now, four small test shipments of xate have been sent to Guatemala post sorting in Uaxactún, with improved prices being paid to the local harvesters. The exporter (purchaser) in Guatemala City involved in the project has responded that the quality of the xate sent from Uaxactún has been excellent. OMYC is attempting to negotiate an increase in volume with the exporter to allow the inclusion of more harvesters in the village, and thus allow the bodega to begin functioning at full capacity. Future steps include the training of local women as xate sorters to provide them with an opportunity for economic participation, and the attainment of OMYC-controlled transportation system to allow local harvesters to spread the impact across the concession and avoid over harvesting areas closest to the village.

Activity 2.7. Develop a cooperative agreement with ACOFOP as a foundation for sustainable resource management

This activity was postponed. This year we worked directly with four of the community concessions instead of with the Association of Forest Communities (ACOFOP). One reason for this was that WCS has been asked by a number of concessions to share the results of our biological monitoring study of the impacts of timber harvests in community forests directly with them (*see below*). Since these data are not ready, we focused our efforts on other projects such as the ocellated turkey management project (Uaxactún, Carmelita); macaw searches and protection, plans for barrier construction (AFISAP, Laborantes del Bosque); integrated management (Uaxactún); community-based protection (Uaxactún, Laborantes del Bosque). Upon having fully gathered and prepared the information on the impacts of timber harvests, we hope to approach ACOFOP to work cooperatively to help educate concessionaires about the impacts of extraction, and to re-visit the threats facing the biosphere from the collective perspective of the forest communities. In August 2004, WCS contacted ACOFOP indicating that we hope to be able to collaborate with them to disseminate the results of the study of the impacts of logging, and improve community-based forest management. Mr. Eric Cuellar (Interim Executive Director) responded that ACOFOP was open to the idea, and that we should advance the idea once the reports are ready.

Meanwhile, Smartwood, the certifier of a majority of the forest concessions in the area, has obligated all certified community concessions to incorporate the WCS timber impact report in the annual concession reports (thereby explaining community interest in the data), and to incorporate the conclusions within their operative plans to the extent that they are relevant. WCS intends to share the results with the leaders of each concession, in addition to ACOFOP. We also hope to find funding to permit a more personalized approach to each concession. The goal includes preparing reports that tease out the data from each concession, as well as providing these reports to concessionaires during workshops.

Activity 2.8. Monitor trends in landscape cover

Victor Hugo Ramos of CEMEC is in the process of finalizing the evaluation of trends in landscape cover across the MBR for the upcoming biological monitoring report. Preliminary estimates suggest that during the 12 months from October 2003 to September 2004 a record number of hectares was deforested across the reserve. Areas with the greatest amount of forest loss included the western and central parts of Laguna del Tigre National Park, Sierra del Lacandon National Park, and within the community forest concessions along the northbound road from San Andres. Nevertheless, encouraging news included the fact that very few forest fires occurred during this burning season. The final report on forest cover and areas affected by fires will be ready in late September 2004.

Activity 2.9. Monitor trends in macaw populations
More macaws fledged this year in Laguna del Tigre than any other year during which there have been field monitoring efforts (7 years). Previously, the record for macaw fledging from the El Peru site was 5 chicks in one year. Whereas the 2003 breeding season only produced a single successfully fledged chick in the El Peru area, this year we recorded 13 successful fledglings. In the greater Laguna del Tigre area (El Peru-13, El Burral-7, Lo Veremos-5 estimated) we recorded 25 successful fledges, a significant contribution to a population maximally estimated to consist of some 300 individuals. Future objectives include monitoring the population of scarlet macaws via tree-top surveys (see below) designed to provide a more reliable estimate of the number of macaws across the landscape.

An additional highlight includes the successful breeding of scarlet macaws in captivity by ARCAS rescue center. WCS NY field veterinarian Dr. Robert Moore visited Petén to take blood samples from wild and captive birds to develop a baseline about local diseases, and evaluate the health of the macaws in the breeding facility. This step is crucial to avoid contaminating wild populations with released birds. As of August 2004, 2 juvenile macaws born in the Spring are planned for release. WCS has attained radio-collars to be able to follow these birds upon release and monitor their movements, and probability of success. Release is planned for late August 2004.

Activity 2.10. Develop methodologies to monitor trends in selected landscape species
Advances were made with 4 landscape species. Dr. Samantha Strindberg of the Living Landscape Program of WCS NY visited the Guatemala Program to work with Jeremy Radachowsky on a number of issues, among them the development of sound methods for estimating populations of species over time. Highlights on each of the advances are provided below.

Scarlet Macaw surveys and statistical methods for estimating populations
A method was developed to improve the accuracy of population estimates across the eastern Maya Biosphere focal area. Future efforts will involve point count surveys from emergent trees distributed in a grid across the landscape. Field technicians will scale trees in strategic sections of the reserve, recording the number of individuals, time, distance, bearing, and hour of sighting. Repeated surveys will allow for increased statistical rigor. We expect to test this methodology for the first time in the upcoming work plan. WCS staff currently estimate the size of the population (300 max.) based on the number of known nests across the MBR.

Morelet's crocodile and closed water bodies
WCS Guatemala has arranged for a site visit by renowned crocodilian expert Dr. John Thorbjarnsen of WCS NY. Dr. Thorbjarnsen is interested in developing a methodology for the estimation of Morelet's crocodile in closed water bodies (small ponds and lakes). Currently, tested methodologies exist for estimating populations along riverbanks while good methods of estimating populations in closed water bodies have not been developed. Since rivers are scarce in the eastern MBR, most crocodiles inhabit ponds and lakes. Therefore, the monitoring of crocodiles in small bodies of water will be important for periodic evaluations of the stability of the species across the landscape.

Jaguar camera trapping in Rio Azul/Belize
A 2-month camera trapping effort led by Lic. Joe Soto was made in conjunction with WCS Belize in the extreme NE corner of the reserve. 11 trap stations were placed in Guatemala, while 30 were distributed in adjacent Belize. Data are currently being analyzed. Using a statistical method developed by Dr James Nichols and Dr Ullas Karanth, this effort will hopefully lead to the first sound estimate of the number of Jaguars in this well-protected section of the reserve, allowing us to later extrapolate the data to provide a baseline (hypothetical) estimate of the number of jaguars in the area given threats identified in the human landscape analysis.

"Xate" Understory Palms
As previously mentioned, the WCS biological monitoring project led by Jeremy Radachowsky developed a sound methodology to evaluate the sustainability of harvest of xate palms over time. Two ways to do this were identified. The first consisted of evaluating the age-class distributions of the species in harvested areas, as compared to a normal distribution found in areas with little or no harvest. The second involved the monitoring of the amount of unmarketable xate being harvested for market. While the second method does not give a direct measure of sustainability, it does provide a much less costly way to indirectly evaluate if xate plants are recuperating adequately after harvest. As a preliminary guideline, we propose that periodic evaluations of the "waste" should be done to evaluate individual

management units, while the age-class distributions should be evaluated in sites across the reserve approximately every 10 years.

Activity 2.11. Initiate contact with the private sector to promote conservation initiatives
Two advances were made in regard to linkages to the private sector. In conjunction with WCS partner SalvaNatura, the leading environmental NGO of El Salvador, a preliminary proposal was prepared for Grupo Taca for a regional scarlet macaw initiative. As Central America's largest airline, Grupo Taca not only has a vested interest in promoting ecotourism, but also proudly boasts the scarlet macaw as its corporate symbol. SalvaNatura has taken the lead on this activity due to Taca being based out of El Salvador. Recent news from SalvaNatura suggests that the proposal will be submitted to Grupo Taca in the early Autumn.

More locally, the largest grocery store in the Petén (*La Selecta*) has agreed to provide a 10% discount on food purchased for all WCS field activities promoting the conservation of the Petén. WCS invested $25 in the printing of an attractively framed poster thanking *La Selecta* for their support, using the scarlet macaw as the wildlife centerpiece of the poster. In return, the owners agreed to provide us with a savings of $1,000 over the course of a year. Preliminary advances have also been made towards working with a local restaurant (named "Las Guacamayas" or "the Macaws") to receive donations from the clientele in support of macaw conservation.

Objective 3: Learn and teach best practices for conservation of the Maya Biosphere Landscape and beyond

Activity 3.1. Evaluate the effectiveness of pilot projects promoted
The evaluation of a majority of the pilot projects is still at a premature stage. Nevertheless, the record year of breeding success in macaws demonstrated that protection activities can be effective if they are done seriously and consistently by dedicated field staff with resources available and political support.

The involvement of community members in the protection plan was generally an overwhelming success, offering an avenue for local participation, while also helping WCS to spread the word among local communities that macaws are nearing extinction in Guatemala and that poaching is a crime. For this reason, protection efforts are now being taken seriously.

A pilot test of the xate bodega in Uaxactún has raised expectations about the possibility of developing this new, improved system for paying for xate. It remains to be seen if a large volume exporter will be willing to take the risk of trying this new method over a significant time period.

Activity 3.2. Strengthen the Maya Biosphere and global conservation initiatives
WCS Guatemala staff participated in a Living Landscapes Program workshop held in Yellowstone in early January, 2004. The workshop offered the opportunity to share our approaches with colleagues while learning vast amounts about alternative approaches in other landscape sites. Thematic workshops such as "evaluating approaches to conservation with communities", "population modeling using PATCH", and "guidelines for developing conservation landscapes" helped WCS Guatemala staff to expand our views and methodologies, and to recommit to incorporating an exploratory approach to our future activities.

WCS Guatemala designed a survey to evaluate the importance of "protection" across the myriad landscapes within the program. This survey has been tested in a partial, preliminary distribution to evaluate and improve the survey instrument. Subsequent steps will include the distribution of this survey to a wider set of sites, the compilation of data, and the generation of a preliminary report.

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) of the program is designed to develop and test wildlife-based, landscape-scale approaches to biological conservation across multiple sites. To ensure the widespread utility of these new conservation

approaches, the program is testing them within landscapes that encompass a diverse array of land-uses, resource-use issues, and jurisdictional arrangements. To develop new approaches, facilitate and harmonize testing and implementation among these core sites, and capture the synergistic benefits of diverse experiences, a 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.

The New York CU team consists of a program director, two landscape ecologists, an outreach/communications coordinator, socio-economic monitoring specialist, biological monitoring specialist, two geographic information systems (GIS) analysts, program coordinator, and administrative assistant. Four of these positions are new WCS investments to the program this year, indicating increased WCS commitment to the development and use of landscape tools for site-based conservation. These new positions also indicate a shift in responsibilities, increasing our ability to extend the tools we are developing to a larger array of conservationists.

During FY 2004, the Coordination Unit in New York achieved most of its objectives for the year. Although the majority of the CU work is embedded in objectives 1-3 of this and other site-specific reports, the following section highlights some of those achievements that are not fully captured in these sections.

Activity 4.1 Provide technical assistance to site-based conservation

Coordination Unit support to field site operation has been reported in detail in previous sections of this report.

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

Activity 4.2.1 Living Landscapes Program Technical Manuals

The Living Landscapes Program promotes the implementation of effective conservation projects by encouraging practitioners to: (1) be explicit about what we want to conserve, (2) identify the most important threats and where they occur within the landscape, (3) strategically plan our interventions such that we are confident that they will help abate the most critical threats, and (4) put in place a process for measuring the effectiveness of our conservation actions, and using this information to guide our decisions. Towards this end, LLP has launched a series of manuals that provides guidelines and step-by-step instructions for field practitioners. These will cover topics that include how to: select landscape conservation targets (landscape species), identify and map key threats, prepare a conservation strategy (conceptual model), and develop a monitoring framework. The manuals will be available in English, Spanish, and French.

To date, we've designed and piloted two manuals: one concerning participatory spatial assessments of human activities, and another focusing on how to build conceptual models for a project Belize (see Appendices 13 & 14 for latest versions[1]) [2]. We've distributed these within our GCP sites, and more broadly within WCS. In the next few months, after final revision, the manuals will be distributed more widely to our GCP partners and the wider conservation and development community. The threats assessment and mapping manual has already attracted external attention and is the basis for LLP providing technical assistance to the Coastal Zone Management Authority and Institute of Belize, the Belize Audubon Society, and World Wildlife Fund to conduct threats assessments of, respectively, the Turneffe Atoll, Lighthouse Reef and the barrier reef system in. Manuals on building monitoring frameworks, selecting conservation targets, and on intervention priority-setting are currently in draft form and will be field tested and finalized within the next six months.

Activity 4.2.2 Landscape species approach (LSA) progress

Based on the experience of the several WCS sites that have selected Landscape Species as strategic conservation targets, the landscape ecologist and the biological monitoring specialist are coordinating the revision of the logic for selecting species and the accompanying selection software. We expect to complete a major revision of the software (version 2.0) in November 2004 and distribute it to all sites planning to select landscape species.

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1 These are also available by email from llp@wcs.org or on our website www.wcslivinglandscapes.org.

The program has made significant progress in implementing the Landscape Species Approach, and a number of sites have generated biological and human landscapes, and developed a strategic monitoring program. There is still work to be done most importantly to develop a defensible process for setting population targets and combining this with estimated area requirements and habitat preferences to characterize the size and configuration of landscapes sufficient to conserve each landscape species – and thus the other species that they represent.

Finally, the assumptions underlying the LSA have yet to be tested from a theoretical standpoint. Towards this end, the Landscape Ecologist and other program staff tackled the question as part of the Annual meeting (See Activity 4.3.1). The results from the exercise that selected landscape species from a 30-year enforcement data set collected in Ghana were presented to the group. As mentioned in the last annual report, the preliminary results suggest that landscape species are among the most vulnerable to human threats, and that successful conservation of landscape species will protect other, less sensitive and less area-demanding species. The meeting participants proposed a number of additional tests and they will be further fleshed out and will form part of the ongoing LSA design process.

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

Activity 4.3.1 The third Living Landscapes Program Annual Meeting

The Third Annual Meeting of the Wildlife Conservation Society Living Landscapes Program took place at Chico Hot Springs, MT from January 10-18 2004, bringing together expanded LLP staff from the field and New York. The number of core sites for the Living Landscapes Program has expanded from three sites to the current twelve (which includes the six USAID/GCP-funded sites): Yasuni in Ecuador; Ndoki-Likouala in Congo; Madidi in Boliva; Maya Biosphere Reserve in Guatemala; the Eastern Steppe of Mongolia; Glover's Atoll in Belize; Greater Yellowstone in USA; Northern Plains of Cambodia; the Adirondacks in USA; San Guillermo in Argentina; and Coastal Patagonia. Each site (with exception of Ecuador and Patagonia) was represented by one or two staff members.

The program has done significant design and implementation work on selected conservation planning tools (conceptual models for projects, threats analyses, landscape species analyses, monitoring frameworks), and the meeting provided a venue for all the projects to share experiences and weigh in on the development of the remaining conservation tools (setting priorities within our "conservation landscapes" and/or determining target levels for "healthy, functioning populations"; sorting out priorities for interventions; determining how to operationalize monitoring programs). Proceedings of the meeting were compiled and distributed to participants. A copy is available upon request.

Activity 4.3.2 CMP: leadership, design, writing and audits

WCS continues to play a leadership role in the direction and activities of the Conservation Measures Partnership. WCS is working with CMP on: (1) piloting conservation audits, (2) evaluating the challenges to and benefits from accounting systems that allocate spending to conservation actions and not simply goods and services purchased, (3) developing a user-friendly system for identifying appropriate indicators for measuring conservation impacts, and (4) pilot testing tools that help project's implement the CMP open standards for the practice of conservation. Craig Groves (part-time CU staffer) participated in the design and implementation of two multi-partner pilot conservation audits (led by WWF International) and David Wilkie (the socio-economic monitoring specialist) is organizing a pilot multi-partner, peer-review audit of the GCP Glover's Reef project in FY05.

Activity 4.3.3 Cross-organizational Learning Initiative

David Wilkie chaired the GCP Cross-organizational Learning panel during the first year of its implementation. Funded through a separate Associate Award under the current Cooperative Agreement, the initiative gives GCP partners the opportunity to plan and implement joint activities that promote learning.

Activity 4.3.4 Synthesis of Lessons from site-based conservation

4.3.4.1. Analysis of the ecological risks and the economic and administrative feasibility of legalizing the commercial trade in bushmeat

In response to the Government of Gabon's stated interest in legalizing the commercial trade in wildlife as a way to regulate the trade and generate tax revenues, LLP staff in collaboration with WCS Gabon and the Ministry of Wildlife and Hunting undertook an analysis of the ecological risks and the economic and administrative feasibility of such a proposal. Results, based on a comprehensive national survey of bushmeat trade and consumption, showed that even a 25% tax on the sale of bushmeat would be insufficient to cover tax collection costs, let alone the additional costs of enforcing the new tax laws. A paper describing the analysis is in press in the Journal of International Wildlife Law and Policy.

4.3.4.2. Local engagement in conservation survey
The design for surveying a suite of WCS projects in the hope of teasing out guiding principles for engaging local people to promote effective conservation of wildlife and wildplaces is largely complete. A survey instrument has been drafted, and a review of the literature to determine what guidance is offered to conservation practitioners to engage local people in wildlife conservation is in progress. The survey work should be complete within the next six months. Analysis of the survey results and literature will produce a set of principles that other WCS project staff can use as a decision support tool to guide how they might engage local people in conservation at their site.

Activity 4.4 Application of Living Landscapes Program tools beyond core sites

As we highlighted in the last Annual Report, the initial work supported by USAID/GCP continues to provide the foundation for a growing number of sites using WCS/Living Landscapes Program tools around the world, and the multiplier effect of USAID/GCP support has been significant.

4.4.1 Training workshops in the use of LLP tools
Over the past few months, we have conducted a number of workshops at various field sites around the world that have centered on the use of conservation tools developed by the program. Adrian Treves (the outreach coordinator), and Kart Didier (the Landscape Ecologist) ran threats assessment workshops in Madagascar and Patagonia, Argentina. Adrian Treves also ran a joint landscape species selection workshop for field practitioners in Democratic Republic of Congo, Uganda, and Rwanda. Each of the above workshops included participants from national governments and NGOs of each of the countries cited. In each case, we have been gratified by the interest and commitment shown to the use of these tools by conservationists from other institutions, and look forward to conservation results that will stem from their use.

David Wilkie ran a workshop that entailed a spatially explicit threats assessment of Glover's Reef, Belize with local fishers, city council representatives, tour operators, fisheries cooperative members, biologists, government staff and NGO staff. Based on the results of this successful workshop, the Belize Audubon Society, WWF, and Belize Coastal Zone Management Authority and Institute have requested that we lead similar workshops for two other atolls in the Belize Reef system - Turneffe and Lighthouse Reefs, and the Barrier Reef as a whole. Outside funding has now been secured for these workshops and they will be run jointly by WCS, Belize Audubon Society, WWF, and CZMAI during September and October, 2004.

Similarly, Amy Vedder (program director) and David Wilkie led a workshop in Tefe, Brazil during April, with a series of eight Amazonian-Andes projects focusing on design of conceptual models and monitoring frameworks for their projects (six projects in addition to 2 GCP sites, two of which are managed by Brazilian NGOs). The approach was highlighted in an article published in the Economist (June 17 2004) (see Appendix 15 for a copy of the article).

4.4.2 Gap Analysis in Bolivia
The Bolivian Government has embarked on a national level GAP analysis exercise to determine the effectiveness of the country's protected area system and to see if other vital areas should be set aside to ensure comprehensive conservation. In addition to an analysis of representation of different vegetation types in the protected area system, as well as an identification of biodiversity and endemism areas to be carried out by a consortium led by FAN, a leading Bolivian

NGO, collaboration with the WCS Bolivia program will strengthen the focus on Landscape Species which are not valued by models based on diversity.

The exercise will involve the use of WCS's Landscape Species Approach for two different, but related purposes. First, existing protected areas will be evaluated to determine if they require further connectivity to ensure that wildlife needs are met. Second, an overall analysis will be done to identify national-scale Landscape Species and the scale of conservation activities necessary for their conservation (combinations of new protected areas, enlarged protected areas, functional corridors, regulation outside these reserves that promote conservation of the identified species, and international cooperation as determined necessary). The involvement of the WCS Bolivia Program in this important exercise and the application of the Landscape Species Approach by the government represents a significant endorsement of the utility of the Landscape Species Approach that WCS-Bolivia and the Living Landscapes Program have developed. Already there is interest expressed by conservationists in Argentina and Canada in using these national-scale techniques.

4.4.3. Sharing of conservation tools among conservation NGOs

We are pleased to see that many elements of conservation planning tools being used or proposed by other conservation organizations are similar to those developed by the Landscape Species Approach. A number of our bulletins have been cited in a recent publication of the World Wildlife Fund: *From the Vision to the Ground: A guide to implementing ecoregion conservation in priority areas*[3] that outlines steps for conservation planning at priority sites within ecoregions. Our LSA concept of spatially mapping biological landscapes and human (social) landscapes, and then integrating the two to create a conservation landscapes is very much in line with those proposed by WWF as a means to identify conflicts and priorities for conservation action. Similarly, Conservation International in their proposed strategy for designing biodiversity conservation strategies - *Conserving the Earth's Living Heritage* - note the importance of "Landscape Species" as important tools for conservation planning and targets for conservation action, and advocate for the use of "conceptual models" to explicitly demonstrate how conservation actions are designed to abate key threats and thus conserve the targets of our conservation actions. These examples are further indication of the value of developing strategic wildlife-based tools for planning and implementing large scale, site-based programs, and sharing these tools both within WCS and more broadly across the conservation community.

Activity 4.5 Ensure coordination and communication services for the program

During this reporting period, all USAID reporting deadlines were met in a timely fashion. Annual Performance Monitoring Plans were prepared by field staff, and submitted by the program coordinator. Yemi Tessema (program coordinator), Amy Vedder, and David Wilkie collaborated in the preparation and attendance of annual GCP meeting in March.

Hard copies of the bulletins, resource CDs, and other information on sites and the program were distributed upon request as well as at workshops led and attended by program staff. Electronic
copies of the materials were also made available on our website.

III. Success Stories and Appendices

- Record breeding success for scarlet macaws in the Maya Biosphere Reserve (see Highlights)

- The "Emergency Law for the Protection, Restoration, and Conservation of Laguna del Tigre National Park" has been passed (see Highlights)

Appendices

1. PrensaLibre Cover Page, April 17 2004, www.prensalibre.com
2. Centro para Acción Legal (CALAS) editorial, March 27-30, 2004, www.calas.org.gt/beacalas/vol5/300304/editorial

[3] http://www.worldwildlife.org/science/pubs/vision_to_ground.pdf

3. RED IARNA Newsletter, April 02, 2004
4. Centro para Acción Legal (CALAS) editorial, July 28-30, 2004, www.calas.org.gt/beacalas/vol5/300704/editorial
5. Cover Page, Decree 16-04, Emergency Law for the Protection, Restoration, and Conservation of Laguna del Tigre National Park.
6. Laborantes del Bosque letter of support for Melchor road barrier
7. Municipality of Melchor letter of support for road barrier
8. Maya Biosphere landscape species selection report
9. Advances on preliminary biological landscapes
10. Advances human landscapes and preliminary conservation landscapes
11. PrensaLibre, Captures in Laguna del Tigre, May 19 & June 18, 2004, www.prensalibre.com
12. Road barrier design, Asociación Balam
13. LLP Technical Manual 1: Participatory spatial assessment of human activities-a tool for conservation planning
14. LLP Technical Manual 2: Creating conceptual models-a tool for thinking strategically
15. Economist Article – Peering at the future