

Scarlet Macaw Species Recovery Workshop Guatemala

by Janice Boyd, Ph.D.



Photos courtesy of Janice Boyd, Ph.D.: (top & middle) After climbing a 300 ft high unexcavated Mayan temple at the Waka' site, we climbed this tower to get a view of the surrounding area and the San Pedro river. This would be a grand site from which to do morning and evening macaw counts—if it weren't so hard to get to!

(bottom) "Pirates of the San Pedro." Does anyone recognize the one on the far right?

One of the most lawless and ungovernable areas in the Americas is the borderland between Guatemala and Mexico. Fueled by drug money from narcotraffickers, the Guatemalan parks in the northern part of the country suffer from wildlife poaching, illegal timber extraction, illegal oil exploration, illegal colonization by paid invaders, and habitat destruction and purposely-set forest fires, so as to lead to removal of segments of territory from the park system. It is in this difficult environment that the Guatemala Program of the New York-based Wildlife Conservation Society (WCS) is trying to make a difference. (<http://www.wcs.org/international/latinamerica/mesoamerica/Guatemala>).

The Wildlife Conservation Society is one of the nation's oldest zoological and conservation societies. It was founded in 1895 by the state of New York as the New York Zoological Society (NYZS) to advance wildlife conservation, promote the study of zoology, and create a first-class zoological park. That first park, the "New York Zoological Park," later the Bronx Zoo, was opened in 1899. In 1902, NYZS took over management of the New York Aquarium, then located at Battery Park in Manhattan, and in the mid-1950's built a new aquarium at Coney Island, Brooklyn. Later, the organization was asked to manage and reinvigorate three city-run facilities in Manhattan, Brooklyn, and Queens. The redesigned Central Park Zoo opened in 1988, followed by the Prospect Park Zoo in 1992 and the Queens Zoo in 1993.

As well as being involved in creating and running zoological parks, the first director of the zoo did a survey of wildlife conditions

through the United States and publicized the decline of birds and mammals in the organization's annual reports. In 1897 a field biologist was hired to survey the state of wildlife in the territory of Alaska. On the basis of these studies, the organization campaigned for new laws to protect the wildlife there and the United States as a whole. Beginning in 1905, the organization was active in the ultimately successful move to reintroduce the nearly extinct American bison to various protected areas.

After World War II the organization expanded its programs in field biology and conservation. In 1946 it helped found the Jackson Hole Wildlife Park, which became part of the Grand Teton National Park in 1962. In the late 1950's the organizations began a series of wildlife surveys and projects in Kenya, Tanganyika (now Tanzania), Uganda, Ethiopia, Sudan, Burma, and the Malay Peninsula. It changed its name to the Wildlife Conservation Society in 1993 to reflect its presence throughout the world, not just in New York, and today it works in dozens of countries on every continent except Antarctica.

The WCS program in Guatemala began in the early 1990's out of a modest office in the northern Guatemalan town of Flores with one employee, American Roan Balas McNab (now director of a much larger initiative). While Guatemala has the largest population of any Central American country and much of the natural habitat is severely degraded (see figure), the northern part of the country, known as the Petén, has vast expanses of lowland tropical rainforests and wetlands as well as many archaeological ruins. In 1990 the multi-use Maya Biosphere

Reserve (MBR) was created to protect an area of the Petén twice the size of Yellowstone Park (see a map at the Parkswatch site: <http://www.parkswatch.org/parkprofile.php?l=spa&country=gua>). The MBR is the largest protected area in Mesoamerica and is home to more than 95 species of mammals and 400 species of birds, but it is protected largely only on paper because of the very unstable socio-political situation in the country. From 1960 to 1996, the longest running civil war in Latin America devastated the country, traumatized the population, and made lawlessness and violence a common solution to every conceivable problem. The country is only gradually recovering. In addition, the presence of drug traffickers and drug money in the Guatemala-Mexico border region makes working in some parts of the MBR very hazardous.

As part of the WCS's Living Landscapes Program (<http://wclivinglandscapes.com>), the WCS-Guatemala office began in 2002 addressing conservation issues of 5 different important and charismatic species of the Petén: jaguars, white-lipped peccaries, Baird's tapirs, Mesoamerican river turtles, and Scarlet Macaws. The last remaining viable population of Scarlet Macaws in Guatemala live in the Petén, surrounded by other small and probably somewhat interlinked populations in Mexico and Belize. During the last 6 years, WCS and its national partners worked to implement habitat protection, fire suppression, monitoring of macaw nesting success, studies of macaw habitat use and distribution of nesting sites, construction of artificial nests, environmental education in local communities, and involvement of local community members in conservation efforts, as well as other activities directed towards other species such as jaguar camera traps. As of 2007, the interventions and research on the Scarlet Macaw were expanded to include pilot initiatives including testing insecticide (permethrin) treatments of nests to ward off Africanized bee infestation, and satellite collar telemetry. During 2008 they are testing the utility of remote camera technology to monitor chick predation and macaw activity within nesting cavities (see early results and the predation of a chick in the nest by a forest falcon at http://www.wildlandsecurity.org/el_peru.html).

As an outgrowth of the successes of the efforts not only with Scarlet Macaws, but with all the facets of the programs over the past years, WCS recently announced that it will invest \$3 million over the next five years in the Maya Biosphere Reserve. The funding is aimed at creating a conservation network called the "Mesa Multisectorial Para el Area Natural y Cultural de El Mirador-Rio Azul,"

which will span more than 3,800 square miles—an area larger than Yellowstone National Park—as well as provide funding for El Mirador-Rio Azul National Park.



To help provide guidance for the Scarlet Macaw part of this initiative, WCS-Guatemala convened a workshop on Scarlet Macaw conservation in El Salvador and Guatemala from 9 to 15 March, 2008. The workshop brought together a number of experts to discuss possible future directions for Scarlet Macaw conservation in the two countries. Participants included a number of persons familiar to AFA members, including Janice Boyd, Chair of the Conservation and Research Committee, Darrel Styles, now with the US Department of Agriculture, Donald Brightsmith, Tambopata Research Project and Texas A&M University, and Scott McKnight, former aviculturist with the Houston Zoo and now collections manager at Aviarios Mariana in Guatemala. Other participants were from the Guatemalan Government, ARCAS Wildlife Rescue Center in Guatemala, Aviarios Mariana (a large avicultural collection in Guatemala) SalvaNatura (a conservation NGO in El Salvador), the American Museum of Natural History Columbia University, and the Wildlife Conservation Society-New York.

One of the possible interventions being considered for the future in Guatemala and especially in El Salvador (where the macaw is extinct) is captive breeding and release of Scarlet Macaws in one or more areas where the conservation situation has stabilized sufficiently to allow this to be considered. Visits were conducted to two Guatemalan facilities that might be used to breed Scarlet Macaws to produce juveniles for reintroduction. One of these was Aviarios Mariana, located in the southern part of Guatemala close to the border with El Salvador. This is a private collection of more than 250 Scarlet Macaws plus many Amazons of various species and other Neotropical bird species. Scott McKnight, formerly of the Houston Zoo, is collections manager and gave a tour of the facilities. The aviary is located next to a somewhat surprising facility, Auto Safari Chapin (<http://www.autosafarichapin.com/>), an animal park and reserve owned by the same family,

Photos courtesy of Janice Boyd, Ph.D.: (left) This figure illustrates that much of Central America is heavily impacted by human influences (red and yellow). The arrow points to the general region within which the scarlet macaw conservation initiative is taking place – one of the lesser impacted areas.

(below top) Several active scarlet macaw nests were visited. Here a parent bird leaves one of the macaw nests, which one of the participants was allowed to climb to see the chicks inside. (Photo by participant Kurt Duche, CONAP)

(middle) Inside the nest were 3 chicks.

(bottom) Don Brightsmith was able to get the photo above using one of the participants' small cameras (belonging to Paola Tinetti, Parque Zoológico Nacional de El Salvador)



*Photos Courtesy of Janice Boyd, Ph.D.:
(top) The WCS macaw research field camp at El Peru has permanent but not luxurious facilities. Dinner at the field camp, in front of the men's dorm.*

(middle) The group met the last day at the WCS-Guatemala office in Flores, where project director Roan McNab briefed participants on the challenges of working in the region and led a discussion listing macaw conservation initiatives that could be considered in future years.

(bottom) Much of the Maya Biosphere Reserve is lawless and dangerous territory. When the work is in progress at the archaeological site of Waka, armed Guatemalan army guards protect the archaeologists – conveniently located not far from the macaw research field camp.



that is one of the popular attractions in the region. The park features a drive-through area with many species of African animals, a pedestrian area and a recreation area with restaurants and a swimming pool.

The second possible breeding location visited was the ARCAS Wildlife Rescue Center (<http://www.arcasguatemala.com/>) in Flores, capital of the Petén and location of the WCS-Guatemala office. ARCAS rescues 300-600 animals of many different species each year, including many parrots and occasionally Scarlet Macaws. They have a collection of several dozen Scarlet Macaws, four pairs of which have been set up for breeding and that are beginning to successfully fledge young. Researchers from Columbia University and the American Museum of Natural History are doing genetic analyses on macaws from these two facilities and from wild macaws and macaw skins in museums to identify the different races of Scarlet Macaws and to investigate whether there really are two subspecies, as is usually claimed. Their analyses may help in selecting the most regionally typical but genetically diverse breeding pairs to supply juveniles for reintroduction, if that is one of the interventions selected.

ARCAS also provided facilities and lunch for two days of workshop meetings. When things got slow during discussions, eyes could wander over to watch the monkeys in a large nearby cage. But going up to see the monkeys more closely during breaks was hazardous, as they liked to urinate on you if you got within spraying distance.

During one session at ARCAS, we discussed the use of the simulation model VORTEX (<http://www.vortex9.org/vortex.html>) to do what is called population viability analysis (PVA). PVA in this case is predicting the likely fate of Scarlet Macaw populations on Guatemala, based upon demographic (births, deaths, population age structure), genetic, environmental, and catastrophic events. As with any model, how realistic the predictions are depends heavily upon what sorts of values are assigned to important input parameters. We held extensive and sometimes heated discussions on such topics as what are the likely sizes of the remaining Scarlet Macaw populations in Guatemala, as well as Mexico and Belize and how much genetic interchange occurs? Are they isolated or well interconnected populations? What fraction of females breed each year? What fraction of attempted breedings is successful and what is the usual number of chicks fledged? When do wild Scarlet Macaws start breeding and for how many years do they continue? What is the present

age structure of the populations? Many of these parameters are hard to determine, but we had a good number of experts there who could give their best guess for the right answers. Scientists with WCS-New York will do VORTEX model runs under various assumptions to see whether the macaw populations are likely to persist or to go extinct, and what would be the impact of such interventions as reintroducing juveniles into the populations or decreasing predation or increasing the number of chicks fledged.

Another session covered disease testing of Scarlet Macaws prior to any reintroduction effort. A potential problem with introducing any outside animals into a population is that those outsiders might carry diseases that could severely impact the resident population. Some commentators even maintain that the risk is so severe and the possible testing so inadequate that reintroductions should rarely, if ever, be considered. Dr. Darrel Styles' input here was invaluable, because as an avian virologist plus veterinarian plus experienced aviculturist, he was able to supply a wealth of specialized information that probably could be obtained nowhere else. After considerable discussion, the group came up with the following testing recommendations for any Guatemala macaw reintroductions and also specified the technique(s) to be used for the testing:

- Polyoma – PCR – high priority
- Pacheco's disease – PCR – high priority
- Chlamydia – PCR – recommended
- Avian Influenza – RT-PCR – consider defensive testing in case questions are raised
- PMV-1 (Newcastle's disease) – RT-PCR or consistent serology negatives – consider defensive testing because Newcastle's is such an important poultry disease, not because clinically healthy psittacines are likely to have it
- Salmonella – consider testing
 - » *S. pullorum* via serology
 - » *S. typhimurium* – most reliable is via culture
- Psittacine beak and feather disease – PCR – not necessary for this project because rarely crosses over into wild New World populations

The PCR testing can be done easily with choanal / cloacal swabs. Up to 5 birds can be screened with one swab in order to reduce costs, but individual testing would be required if any positives were detected.

Over the past several years, PCR and serology testing of some birds at both Aviarios Mariana and ARCAS had been done, with

unclear results. The group reviewed these findings and concluded that they suggested no great likelihood of any disease problems within the two aviaries, but that a proper screening for the identified diseases was still necessary if a captive breeding and release program were to be implemented.

Two days were spent visiting the field location known as El Perú, one of the WCS-Guatemala Scarlet Macaw research sites and a potential site for initial implementation of any of the conservation interventions that might be decided upon. (In fact, the week after the conference, our conference leaders Rony Garcia and Gabriela Ponce returned to El Perú with a consultant to install five nest monitoring video cameras to identify predators and to collect data for understanding wild macaw breeding behavior.) Besides being a macaw research site, it is also an important Mayan archaeological site also known as Waka' (<http://en.wikipedia.org/wiki/Waka'>). A useful outcome of this being an active archaeological site is that there are often Guatemalan Army guards posted around the site to protect the archaeologists...and also the macaw researchers.

At the field facilities at El Perú we were briefed by the WCS field staff (most from the nearby village of Paso Caballos) on their environmental education and anti-poaching efforts and their macaw nest monitoring activities. We visited several Scarlet Macaw nests, including one containing three chicks. After a visit to the archaeological dig at Waka', we climbed an unexcavated Mayan pyramid (100 meters straight up!) and a tower on top of that to get a view of the whole surrounding area: a great place to do macaw point counts, if you could stand doing the climb twice a day several times a week.

The last day was spent back at the WCS office in Flores where Roan McNab led the group in a summarization of the interventions that are presently used or that could be used in the future for Scarlet Macaw conservation. Some of them need further research. The interventions included:

- Artificial nest boxes, including new designs
- Preventing Africanized bee infestations in natural and artificial nests
- Predator identification and mitigation, including the use of nest cameras for identification, doubled bottomed nests to prevent predation by visual predators, or metal skirting around tree trunks or branches

- Expanding anti-poaching efforts, especially expansion of productive community relationships
- Increasing protection of habitat
- Natural history studies to better understand Scarlet Macaw habitat needs
- Point counts to get a picture of population structure and, over time, population trends
- Microchipping chicks for future identification if poached and recovered
- Increasing the number of chicks fledged, possibly through feeding chicks in the nest; pulling, feeding, and replacing; or pulling, feeding, and releasing post-weaning
- Restocking with captive raised juveniles

The last afternoon the group discussed issues surrounding increasing the number of chicks fledged per nest and the restocking with captive bred juveniles. One of the confounding factors is that macaws are in the El Perú area only during the breeding season. They leave the area in September, with breeding birds returning around January. Eggs are first laid around February or March and the chicks fledge in June through August. From fledging to migration in September the fledglings learn survival skills from the parents and develop to the point where they can participate in the migration. It is not known if pre-reproductive birds return to the area the next or subsequent years or not, but reproductive-age pairs do. Any reintroduction would have to take this timing into account and consider the possibility that the new birds would not migrate properly if they were not effectively assimilated into the population. Follow-up and follow-through from the workshop is continuing. Among the issues being pursued at this point are:

- Key research questions
- Summarization of all the information collected
- Roles of the various group members
- Evaluation, prioritization and selection of interventions
- Implementation plans for selected interventions, including timing and funding sources

After the follow-through discussions are completed and a report of recommendations is produced, the recommendations will be used to help guide macaw conservation activities in the expanded WCS efforts in the Petén over the next 5 years. 🐦



Photos courtesy of Janice Boyd, Ph.D.:

The field site is located down river from the village of Paso Caballos, the last point that can be reached on roads that are fairly good and generally passable. Transportation to the field site after that was by boat down the San Pedro river

One aviary being considered as a possible supplier of young scarlet macaws for reintroduction is Aviaros Mariana in the SW part of Guatemala. This figure shows a number of pairs of non-breeding scarlets at that aviary.

The ARCAS Rescue Center in the town of Flores is another potential source of young scarlet macaws for reintroduction. The director (left) and veterinarian are here in front of the macaw breeding setup discussing the breeding program. Two of the four breeding cages are visible behind them