12.0 WORKSHOP ACCOMPLISHMENTS AND FUTURE ACTIVITIES IN GUATEMALA

The Scarlet Macaw Species Recovery Workshop held 10-15 March 2008 in Guatemala City and Flores had a number of significant accomplishments. First, the backgrounds of some of the participants made for a broad based series of discussions that resulted in a number of practical conservation approaches that are documented in this report. They included personnel from the Wildlife Conservation Society (WCS)-Guatemala (Rony Garcia, Gabriela Ponce, WCS field assistants, volunteer Merlina Barnes, and vet student Melvin Mérida; with Jose Moreira, Victor Hugo Ramos, and Roan McNab for shorter periods) who had done enough field work on scarlet macaws in the Petén to be able to give a realistic assessment of conditions on the ground. Another participant (Dr. Don Brightsmith) had 8 years of experience working with scarlet macaws in Peru and is a worldwide recognized authority on macaws. One participant (Dr. Darrel Styles) was a world-recognized avian virologist, avian veterinarian, and aviculturist. Another from WCS-New York (Dr. Bonnie Raphael) was a zoo and wild animal veterinarian with extensive experience in a variety of animal taxa. A participant from WCS-NY (Dr. Nancy Clum) was familiar with population viability analysis and one of the commonly used mathematical models, VORTEX. Two participants (Kari Schmidt and Dr. George Amato) were beginning a study to identify the different genetic subtypes of scarlet macaws so that in the future, any macaws released from any captive breeding programs would be of the same genetic subtype(s) as are found in the Selva Maya.

One theme of the workshop was assessing the possibility of captive breeding macaws and releasing them in either the Petén where a scarlet macaw population persists or reintroducing them in El Salvador where the population was extirpated a number of decades ago. Guatemala is fortunate in having two potential source populations of captive bred macaws. One is in the southwestern part of the country near the border with El Salvador (Aviarios Mariana with Workshop participants owner Nini de Berger and Aviary Manager Scott McKnight). The second is in Flores near the Petén (ARCAS Wildlife Rescue Center with participants ARCAS Director Colum Muccio, Director of the Rescue Center, Fernando Martinez, and Rescue Center veterinarian Alejandro Morales). Those two aviaries could become sources of juvenile scarlet macaws for release without too much expense. Several of the participants had prior experience in aviculture, captive breeding for release, and releasing macaws into the wild (Dr. Darrel Styles, Dr. Janice Boyd, and Dr. Don Brightsmith), and were able to guide us in developing protocols for captive breeding and for releases into the wild.

There was a significant number of participants from the branch of the Guatemalan Government responsible for preserving the country's protected areas, CONAP or Consejo Nacional de Areas Protegidas (Kurt Duchez, Hiram Ordoñez, Julio Madrid). There were also participants from El Salvador: NGO SalvaNATURA (Dr. Robin Bjork), Parque Zoológico Nacional El Salvdor (Paola Tinetti), and a veterinarian and owner of an ecotour company (Americo Reyna).

The Workshop investigated a number of factors related to survival and recovery of the scarlet macaw population in Guatemala and by extension in Mexico and Belize. To investigate the feasibility of captive breeding of macaws for reintroduction or population augmentation, participants visited the two possible sources for captive bred juveniles and determined that, with

some changes, the aviaries could be used to supply young scarlet macaws for a release program. Protocols for socializing the young birds for release and then actually releasing them under several different sets of conditions were outlined in discussions. A list of serious psittacine diseases for which testing needs to be conducted before allowing any captive-raised macaws to be released into the wild was determined. The results of 5 years of monitoring the eastern MBR scarlet macaw population by WCS-Guatemala were summarized and used for some of the parameters for population viability analysis. VORTEX modeling was conducted on the tri-national scarlet macaw population (Mexico, Guatemala, Belize) using a series of different scenarios and parameters from the WCS field programs and from the knowledge-base of the expert participants. The modeling concluded that the populations were in a precarious but not hopeless state, with the most important parameter being the percentage of reproductive age females successfully breeding. A significant level of poaching reduces this percentage to the point where the population will go extinct. So does significant reduction in habitat. Disease issues did not appear to be a significant detrimental factor on the modeled populations. Release of 6 to 18 captive-raised juvenile scarlet macaws each year for 10 years could probably help the population recover from the effects of the presumed older-age biased population distribution, but would be ineffective if poaching and loss of habitat continued. This latter conclusion is the most important finding: The tri-national Maya Biosphere Reserve scarlet macaw population can survive and thrive only if poaching and habitat destruction are reduced to insignificant levels.

A work plan for future activities in Guatemala follows. A work plan is being developed for the much more recent El Salvador initiative.

FUTURE ACTIVITIES GUATEMALA		Done in previous years?	Planned for:			Responsible			
			2009	2010	Beyond	CONAP	ARCAS	WCS	OTHER
G11.1 CONSERVATION									
Continue efforts at habitat preservation including:									
*	Suppress fire	Yes	Yes	Yes		x		x	x 1,2
*	Prevent illegal colonization	Yes	Yes	Yes		x		x	x 1,2
*	Prevent illegal logging	Yes	Yes	Yes		x		x	x 1,2
*	Prevent illegal clearing for agriculture	Yes	Yes	Yes		x		x	x 1,2
Prevention of poaching									
*	Monitor nests to detect poaching and use of anti-poaching patrols	Yes	Yes	Yes		x		x	x
Promote social support for macaw conservation									
*	Environmental education with local schools	Yes	Yes	Yes				x	
*	Environmental education with non-local schools						x		
*	Employment as macaw guards at key nesting foci	Yes	Yes	Yes		x		x	
*	Incentives program with adjacent communities linking scarlet macaw conservation to social investment								
*	Publicize the plight of macaws via popular articles, scientific papers, presentations	Yes	Yes	Yes		x	x	x	
*	Ensure governmental decision makers are kept abreast of the state of macaws	Yes	Yes	Yes		x	x	x	x 3
G11.2 MONITORING AND APPLIED RESEARCH									
Continue Vortex analyses									
*	Track life history parameters that have the greatest potential influence over the recovery / decline of the population	Yes	Yes	Yes		x	x	x	
	(a) Key life history parameters may include adult survival, chick survival post fledging, number of chicks fledged per nest, percent of the population breeding, nest predation, etc.								
	(b) Obtain local information about these key life history parameters								
	(c) Investigate ways to improve key life history parameters for the population							x	
	(d) Review previous analyses periodically to adjust the Vortex model based on lessons learned							x	
Conduct or continue annual population censuses									
*	Develop standardized protocols for estimating annual indices of abundance or population census	No	Yes	Yes				x	
*	Conduct annual active nest counts at key nesting foci based on verified reproductive activity (i.e. number of verified breeding pairs)	Yes	Yes	Yes				x	
*	Monitor the number of successful fledges produced annually	Yes	Yes	Yes				x	
*	Monitor the number of management units with active nests	Yes	Yes	Yes				x	
*	Emergent point count population monitoring techniques (i.e. tower counts)	No	Yes	Yes				x	

FUTURE ACTIVITIES GUATEMALA		Done in previous years?	Planned for:			Responsible			
			2009	2010	Beyond	CONAP	ARCAS	WCS	OTHER
Summarize and analyze data from previous years of the project									
*	Annual number of active nests per region	Yes	Yes	Yes				x	
*	Nest monitoring (date and nest contents of each check)	Yes	Yes	Yes				x	
*	Number of eggs or chicks, estimated egg/chick age, numbers or evidence of predation events, evidence of nest competition	Yes	Yes	Yes				x	
*	Nest characteristics (depth, width, height, tree species, number of openings, bottom substrate, evidence of habitation, presence/absence of bees or other competitors)	Yes	Yes	Yes				x	
Evaluate results									
*	Possible additional related data to collect in future	Yes	Yes	Yes				x	
*	Possible publication/dissemination	No	Yes	Yes		x		x	
Improve artificial nest box designs									
*	Document characteristics of acceptable natural nest cavities for use in box design	Yes	Yes	Yes				x	
*	Make new anti-predator designs (e.g., double-chambered)	Yes	Yes	Yes				x	
*	Investigate and refine: Materials, Mounting Techniques, Maintenance regimes, Nesting subtrates	Yes	Yes	Yes				x	
Continue anti-predator studies									
*	Continue development and use of in-nest IR cameras to identify other possible predators and reasons for poor nesting success at El Perú	Yes	Yes	Yes				x	
*	Consult with Ursula Valdez (Peru) on Micrastur behavior	No	Yes					x	
*	Investigate procedures / interventions to reduce forest-falcon predation	Yes	Yes	Yes				x	
Study effectiveness of anti-bee treatments of cavities									
*	Permetrin	Yes	Yes	Yes				x	
*	Carbaryl	No	No	?				x	
*	Evaluate using tests during non-breeding	Yes	Yes	Yes				x	
Joint ARCAS/WCS nest guarding program with volunteers at El Peru		No	No	Yes			x	x	
Attempt to understand reasons for decline of number of active nests at El Perú									
*	Examine population indices (is it due to a declining overall population?)	No	Yes	Yes				x	
*	Examine Micrastur abundance at comparative sites (El Perú-La Corona)	No	Yes	Yes				x	
*	Compare chick growth rates and nutrition to sites with higher fledging success rates in the MBR (El Perú-La Corona)	No	Yes	Yes			x	x	
*	Evaluate parental feeding time bouts at El Peru, and compare to sites with higher fledging success rates (i.e. La Corona)	No	Yes	Yes				x	
*	Evaluate time to cavity re-colonization by Africanized bees after treatment and compare to other sites in the MBR	No	Yes	Yes				x	
*	Evaluate comparative nest parasite loads at El Peru and La Corona	No	Yes	Yes			x	x	

FUTURE ACTIVITIES GUATEMALA		previous years?	Planned for:			Responsible			
			2009	2010	Beyond	CONAP	ARCAS	WCS	OTHER
G11.3 NATURAL HISTORY RESEARCH									
Increase understanding of macaw habitat use									
*	Document observations of foraging macaws (feeding bouts) recording food species if known, food type (fruit, flower, etc.), or collect a sample of species if unknown	Yes	Yes	Yes				x	
*	Document food resource availability through an annual phenological inventory of known food plants (particularly at El Perú to better understand the timing of suspected macaw "migrations")	No	No	?				x	
*	When appropriate technology exists, continue satellite collar deployment to determine landscape movements and habitat use throughout the year	Yes	?	?		x	x	x	
Monitor chick growth and development where feasible									
*	Weigh, measure (wing, and beak) and photograph wild chicks regularly	No	Yes	Yes			x	x	
Evaluate diet and chick nutrition via crop sampling									
*	Develop technique at ARCAS - sample at El Perú	No	No	?			x	x	
*	Compare results with data from Tambopata, Peru	No	No	?			x	x	
Collect any dead chicks and/ or adults for necropsy to determine cause of death									
*	Develop protocol for field sampling	No	Yes	Yes			x	x	x 4
*	Identify veterinarian willing to conduct necropsies	Yes	Yes	Yes			x	x	x 4
*	Develop a protocol for necropsy	No	Yes	Yes			x	x	x 4
Evaluate possibility and utility of banding and/or micro-chipping chicks		Yes (chicks banding)	Yes	Yes				x	
	(a) Because window of opportunity for applying closed bands is so short, open bands probably advisable								
	(b) Microchips require special reader and must be injected under the skin								
	(c) Bands can be cut off; microchips can't be removed								
Co									
*	Determine the degree of subpopulation isolation between Belize, Mexico, and Guatemala	No	Yes					x	x 5
*	Use information to adjust Vortex models, and better estimate susceptibility of the Guatemalan population	Yes	Yes					x	x 5
*	Identify if concentrations of nests at significant nesting foci (i.e. El Perú, La Corona, El Burral) are related to family groups or share genetic affinities of some kind	Yes	Yes					x	x 5
G11.4 *EX-SITU* MANAGEMENT									
Conduct regular health assessments of Aviarios Mariana and ARCAS macaws		Yes	Yes				x	x	
Biosecurity analysis for ARCAS, Aviarios Marianas, and El Perú & test susceptibility to disease		No	Yes				x	x	
Conduct genetic analyses of ARCAS birds		Yes	Yes				x	x	x 5
Apply genetics results at both aviaries to identify most appropriate breeders		No	Yes	Yes			x	x	

FUTURE ACTIVITIES GUATEMALA		Done in previous years?	Planned for:			Responsible			
			2009	2010	Beyond	CONAP	ARCAS	WCS	OTHER
G11.5 POPULATION AUGMENTATION PROJECTS									
Determine from Vortex modeling the impacts of different types of population augmentations		Yes	Yes	Yes		x	x	x	
Evaluate the feasibility of the different types of population augmentations, based on:		Yes	Yes	Yes		x	x	x	
(a) Cost, (b) Logistics, (c) Timing, (d) Manpower needed vs manpower available, (e) Participants									
Evaluate the risks to the natural wild populations of each population augmentation									
*	Determine acceptable level of risk	No	Yes	Yes		x	x	x	
*	Ensure governmental entities legally responsible for macaws are aware of risks and tradeoffs of each option	No	Yes	Yes		x	x	x	
Compare the potential impact on the population to the feasibility and risk and choose which if any population augmentation procedures to conduct		No	Yes	Yes		x	x	x	
Identify field locations for population augmentation activities		Yes	TBD *	TBD *		x	x	x	
*	El Perú								
	(a) Wild releases								
	(b) Precision releases								
*	Las Guacamayas Biological Station								
	(a) Managed (semi-wild) releases								
Evaluate use of in-situ management options cited in Chapter 10		No	TBD	TBD		x	x	x	

1	Guatemalan Army	TBD = To Be Determined	
2	DIPRONA (]Guatemalan Natural Resourse Police)	* Need a MOU between CONAP, ARCAS, Balam & WCS	
3	Asociación Balam		
4	Universidad de San Carlos de Guatemala		
5	American Museum of Natural History (New York)		
?	= Possible Activity in the Future		