

- Horwich, R. H. 1989. Cyclic development of contact behavior in apes and humans. *Primates* 30: 269-279.
- Horwich, R. H. 1995. Howler Research. Newsletter, *Community Conservation Consultants, Howlers Forever, Inc.* 6(2), Fall/Winter: 1.
- Horwich, R. H. and Gebhard, K. 1986. Relation of allomothering to infant age in howlers, *Alouatta pigra*, with reference to Old World monkeys. In: *Current Perspectives in Primate Social Dynamics*, D. Taub and J. King (eds.), pp.66-88. Van Nostrand Reinhold, New York.
- Horwich, R. H. and Manski, D. 1975. Maternal care and infant transfer in two species of colobus monkeys. *Primates* 16: 49-73.
- Horwich, R. H. and Wurman, C. 1978. Socio-maternal behaviors in response to an infant birth in *colobus guereza*. *Primates* 19: 693-713.
- Izawa, K. 1989. The adoption of an infant observed in a wild group of red howler monkeys (*Alouatta seniculus*). *Field Studies of New World Monkeys, La Macarena, Colombia* 2: 33-36.
- James, R. A., Leberg, P. L., Quattro, J. M. and Vrijenhoek, R. C. 1997. Genetic diversity in black howler monkeys (*Alouatta pigra*) from Belize. *Am. J. Phys. Anthropol.* 102: 329-336.
- Lancaster, J. B. 1971. Play-mothering: the relations between juvenile females and young infants among free ranging vervet monkeys (*Cercopithecus aethiops*). *Folia Primatol.* 15: 161-182.
- Thierry, B. and Anderson, J. A. 1986. Adoption in anthropoid primates. *Int. J. Primatol.* 7(2): 191-216.
- West-Eberhard, M.J. 1975. The evolution of social behavior by kin selection. *Quart. Rev. Biol.* 50: 1-33

BLACK HOWLER MONKEY (*ALOUATTA PIGRA*) REINTRODUCTION PROGRAM: POPULATION CENSUS AND HABITAT ASSESSMENT

Bruce Clark
Robin C. Brockett

Introduction

The Belize Forest Department has shown an interest in the reintroduction of confiscated howlers acquired via the illegal pet trade. This is a foundation project with far-reaching ramifications. A potential release site was identified as the Monkey Bay National Park (17°16'N, 88°32'W), Belize District, Belize, Central America where howlers are known to have occurred in the past. Monkey Bay National Park (MBNP) is a protected site of 911 ha. Government permits are necessary for entry. It is bordered to the north by the Monkey Bay Wildlife Sanctuary (BSWS), a 433-ha, privately-endowed property held in trust as a nature preserve. MBNP is bordered to the south by the large Manatee Forest Reserve which restricts access and encroachment.

The black howler monkey, *Alouatta pigra*, is a flagship species for Belize, representing the country's internationally-recognized, self-sustaining conservation

practices (Horwich, 1994). This species is considered "Lower risk" by the World Conservation Union (IUCN) (Rylands *et al.*, 1995; IUCN, 1996). However, Groombridge (1993) considered that *A. pigra* was possibly threatened and that there was insufficient data to determine their current population trends. The habitat and range of *A. pigra* is shrinking rapidly, especially in Mexico where it is not protected (Horwich and Johnson, 1986).

Howlers and spider monkeys, *A. geoffroyi*, ranged throughout the Monkey Bay region until a 1958 yellow fever epidemic and hurricanes in 1961 and 1978 decimated primate populations locally (Mahler and Wotkyns, 1995). Information from landowners gleaned during this study indicated that spider monkeys were last observed in 1993, and recent periodic sightings of howlers were claimed within Tiger Sandy Bay, a privately-owned citrus plantation bordering the east boundary of MBNP. In the late 1970's a howler family existed just east of Tiger Sandy Bay. This group was eventually shot, however, by locals (R. Foster and C. Farnetti-Foster, pers. comm. 1998). Tiger Sandy Bay's owner does not allow hunting on this property but it may well occur. The owner of MBWS heard howlers within MBNP until 1983 (M. Miller and J. Brown., pers. comm. 1998). A long-term local resident reported hearing howler vocalizations in the recent past (S. Young, pers. comm 1998).

Methods

Trail-cutting and mapping within MBNP was carried out from 12-19 April 1998. Bruce Clark coordinated field activities and Robin Brockett supervised the systematic mapping of the trail system (see Fig. 1). A total of 4,650 m of trails were cleared, tagged at approximately 20 m intervals and subsequently mapped. Care was taken, as topography permitted, to stratify the habitat forest types to estimate the extent of their occurrence within the study area as has been suggested in previous studies (Chapman *et al.*, 1988; NRC, 1981).

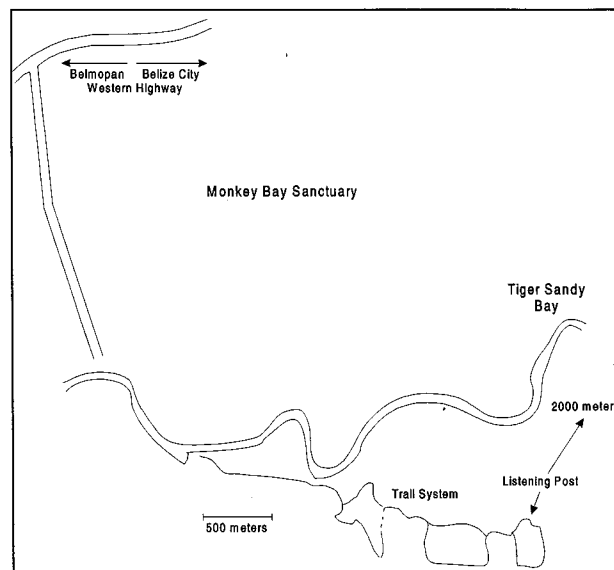


Figure 1. Trail systems within the study area and eventual release site at the Monkey Bay National Park, Belize.

A habitat survey and population census was carried out from 2-9 June 1998. Black howlers and spider monkeys were the target species. The census was carried out by the two authors and counted on the assistance of six Kansas City-based university workstudy students and Oscar Habet, Curator of the Belize Zoo. Ms. Brockett is a long-term resident in MBWS. A fruiting tree and forest structure survey was completed by Hector Mai, a Forest Guard of the Conservation Division, Belize Department of Forestry.

A total of 80 hours were spent quietly walking the trail systems, pausing about every 20 meters to watch and listen. Surveys included all times of the day, but with an emphasis on early mornings and late afternoons. Black howler monkeys are most likely to be inactive in the heat of the day (R. C. Brockett, pers. obs.). Walks were scheduled in a preplanned random pattern of either outgoing or incoming and through various habitats. Night camping was conducted deep within MBNP in order to maintain two continuous morning and evening listening posts. A two-hour evening vigil was conducted on the highest point within the surrounding landscape where an unobstructed view in all directions could be observed with binoculars. A late evening and early morning visit to Tiger Sandy Bay was conducted to listen for howler vocalizations known to have been in the area in the past. Brockett also carried out a canoe survey along the Sibun River - MBNP boundary one morning when howlers are known to be most active. In February 1998, Lighthawk, a volunteer pilot natural systems assessment organization, conducted a light plane aerial survey of MBNP. No deforestation within MBNP nor the Manatee Forest Reserve was observed.

Results and Discussion

If black howler monkeys occur in this area the population is sparse as no howlers were seen or heard. Anecdotal observations indicated a conspicuous lack of feeding fruit litter, and no howler feces were found. Based on the fruiting tree and forest structure survey, resources appeared to be adequate to support howlers, being similar to those for the Community Baboon Sanctuary (Silver *et al.*, 1998), an area supporting a large population of *A. pigra* although not as extensive or diverse. MBNP is believed to be an excellent reintroduction site because intraspecific competition would not complicate the process. Additionally, MBNP is relatively secure from illegal hunting. A young male-female pair is currently being held in a pre-release station at MBWS, maintained by Robin Brockett. These animals were provided by the Belize Forest Department. Preparations are underway for pre-release training following accepted standards (AZA Reintroduction Advisory Group, 1992; IUCN/SSC Reintroduction Specialist Group, 1998) and repatriation is expected to occur in early June 1999. The pre-release station consists of a 100 m solar-powered, 1 m-high electric mesh fence surrounding several native fruit and canopy trees. This cluster of trees and scrub is isolated within an 'island' surrounded by mowed grass. The site is located within MBWS. Ms. Brockett provisions them daily with native browse and fruits.

Questions remain concerning the long-term development of a viable self-sustaining genetic population at this site and at what point is the program determined to be a success? The authors maintain an immediate and long-range view of the problem. The salvaging of animals from certain death within the pet trade is unarguably a goal, but with effective survival training, these animals can become founders for a new and genetically diverse population. It is believed that natural migration processes would eventually bring animals back into this area, and a reintroduction is merely hastening the process. Additional howlers from the pet trade are already known to exist, and are likely to be available in the near future. If after rehabilitation, these animals survive at least one year, this will be considered a primary success, although reproduction is the final goal. Ms. Brockett is documenting behavior during pre-release training and intends to track the animals once released.

Acknowledgments

Funding for this project was generously provided by the Margot Marsh Biodiversity Foundation, John Ball Zoological Society Wildlife Conservation Fund, Riverbanks Conservation Support Fund and Wildlife Preservation Trust International - Gerald Durrell Memorial Fund. Additionally, the Friends of the Zoo Kansas City Zoological Gardens Conservation Endowment Fund purchased materials for the pre-release training site and the American Association of Zoo Keepers CPR Grant provided a boat. The authors are grateful to Dr. Marcelo Windsor, Conservation Office In-Charge, Conservation Division, Belize Forest Department, for the approval of this project and all applicable permits. The aerial survey of MBNP by Lighthawk was kindly provided free of charge. Special recognition is owed Robin Brockett for her personal dedication and commitment to this effort.

Bruce Clark, Zoological Curator, Kansas City Zoological Gardens, 6700 Zoo Drive, Kansas City, Missouri 64132. *Present address:* Zoo Director, Roger Williams Park Zoo, 1000 Elmwood Avenue, Providence, Rhode Island 02907-3600, USA, e-mail: <bclark@rwpzoo.org>, and **Robin Brockett**, Wildlife Care Center, Monkey Bay, P.O. Box 187, Belmopan, Belize, Central America.

References

- American Zoo and Aquarium Association Reintroduction Advisory Group (Benjamin B. Beck, National Zoological Park, Washington, D. C., Chair). 1992. *Guidelines for Reintroduction of Animals Born or Held in Captivity*. AZA Conservation Center, Bethesda, Maryland.
- Brockett, R. C. Zoo Atlanta Conservation Affiliate, Community Conservation Consultants and Technical Associate living and working in Belize with four years experience studying black howler monkeys at Bermudian Landing and the Cockscomb Basin areas of Belize.
- Chapman, C., Fedigan, L. and Fedigan, L. 1988. A comparison of transect methods of estimating population densities of Costa Rican primates. *Brenesia* 30:67-80.
- NRC. 1981. *Techniques for the Study of Primate Population*

- Ecology*. National Research Council (NRC), Subcommittee on Conservation of Natural Populations, Committee on Nonhuman Primates, National Academy Press, Washington, D.C.
- Foster, R. and Farnetti-Foster, C. 1998. Wildlife film-makers working extensively within Tiger Sandy Bay located along the east boundary of Monkey Bay National Park from the mid-1971 to the present. Personal communication.
- Groombridge, B. 1993. *The 1994 IUCN Red List of Threatened Animals*. The World Conservation Union (IUCN), Gland, World Conservation Monitoring Centre (WCMC), Cambridge.
- Horwich, R. 1994. Catalysts for rural conservation. *Neotropical Primates* 2(2):24-25.
- Horwich, R. and Johnson, E. 1986. Geographical distribution of the black howler (*Alouatta pigra*) in Central America. *Primates* 27(1): 53-62.
- IUCN. 1996. *The 1996 Red List of Threatened Animals*. The World Conservation Union (IUCN), Gland, World Conservation Monitoring Centre (WCMC), Cambridge.
- IUCN/SSC Re-introduction Specialist Group. 1998. *IUCN Guidelines for Re-Introductions*. IUCN Publications, Gland.
- Mahler, R. and Wotkyns, S. 1995. *Belize: A Natural Destination*. John Muir Publications, Santa Fe, New Mexico.
- Miller, M. and Brown, J. 1998. Co-owners of Monkey Bay Wildlife Sanctuary and Field Station and long-term residents directly north of Monkey Bay National Park. Personal communication.
- Rylands, A. B., Mittermeier, R. A. and Rodríguez-Luna, E. 1995. A species list for the New World primates (*Platyrrhini*): Distribution by country, endemism, and conservation status according to the Mace-Lande system. *Neotropical Primates* 3 (suppl.):104-164.
- Silver, S., Ostro, L., Yeager, C. and Horwich, R. 1998. The feeding ecology of the black howler monkey (*Alouatta pigra*) in northern Belize. *Am. J. Primatol.* 45:263-279.
- Young, S. 1998. Long-term local tenant and pasture caretaker until 1998 residing 500 m north of Monkey Bay National Park. Personal communication.
- form (Type 1) entails an individual, almost always an adult female, sitting still in a normal, non-ritualized, position in a given direction in an apparent solicitation to other group members to follow. The second form (Type 2, Figure 1) is a ritualized posture described in the present note. It is similar to carnivore pointing behavior described by Morris (1986), Ewer (1973), and others (e.g., Shaler, 1895; Scott and Fuller, 1965; Arkwright, 1902; Whitman, 1899; Rine, 1973).
- As described for pointing dogs and wolves by Morris (1986), "The behavior of the pointer on a hunt seems highly artificial, but it is not. When wolves first scent a prey, the leading members of the pack freeze in their tracks and point themselves rigidly in the direction of the scent. There is a pause, until they have all fixated on the odor of the prey, and then they begin the next phase of their hunting operation. It is this wolf-pause that the pointer is performing. The only thing that is strange about the dog example is the way the animal extends the 'frozen moment'." (pp.67).
- I have observed the "frozen moment" in mantled howlers on nine occasions in riparian habitat at Hacienda La Pacifica, Cañas, Guanacaste, Costa Rica. All occurrences took place between 5-7 August 1976 (n= 3) and between 21 February and 10 March 1977 (n= 6). Adult females exhibited Type 2 pointing eight times, a young male, once. In all instances, animals appeared to be searching for food, and changes in direction occurred in group movement, sometimes leading to the formation of subgroups when non-posturing individuals followed females pointing in different directions. Positions of non-posturing individuals often shifted from subgroup to subgroup as they appeared to "decide" which pointer to follow. Males and females generally vocalized continuously during this process which was reminiscent of avian "information centres" described by Ward and Zahavi (1973).
- Ewer (1973) suggested that "vegetarian species" (such as mantled howlers) may be responsive to plant, especially flower, odors, suggesting a relationship between olfactory

POINTING BEHAVIOR IN MANTLED HOWLING MONKEYS, *ALOUATTA PALLIATA*

Clara B. Jones

Stereotyped and ritualized action patterns may produce visual signals oriented to potential receivers (Bradbury and Vehrencamp, 1998). These postures may transmit information to conspecifics and may exhibit "typical intensity" whereby the posture appears "unambiguous" and varies little within and between (closely related) species (Eibl-Eibesfeldt, 1970). Visual signals, thus, tend to be highly conservative evolutionarily (Bradbury and Vehrencamp, 1998).

In this note I report ritualized "pointing" behavior in mantled howler monkeys (*Alouatta palliata* Gray). Pointing in mantled howlers occurs in two forms during foraging. One

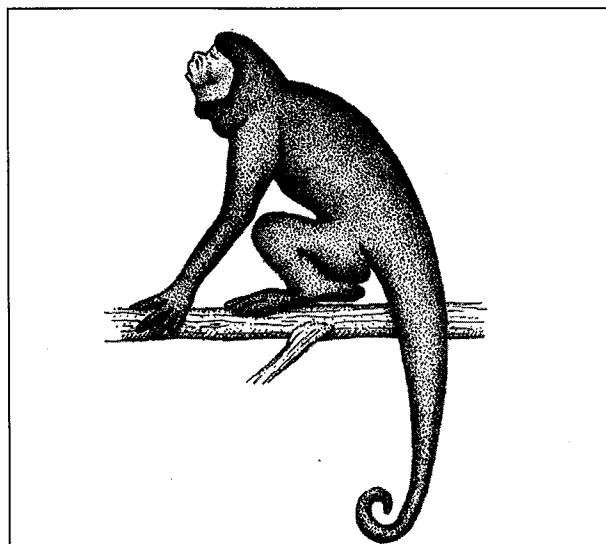


Figure 1. Approximate representation of the ritualized pointing posture (Type 2, see text) of an adult female mantled howler.