

**FOREST REMNANTS IN THE TROPICAL LANDSCAPE:
BENEFITS AND POLICY IMPLICATIONS**

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TROPICAL FOREST FRAGMENTS AND BLACK HOWLER MONKEY CONSERVATION IN BELIZE

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In Belize, "baboon" is the local word for the black howler monkey. I began studying these monkeys in Belize in 1981 and found that the range of the black howler monkey was rapidly being depleted. To protect one of the prime howler monkey populations, I made a commitment to community conservation in the area in 1984. The Community Baboon Sanctuary, established in 1985 along a thirty-kilometer stretch of the Belize River, is a riparian corridor of lowland semideciduous rain forest interspersed with eight villages. With the help of landowners, the Sanctuary has mapped over one hundred individual land holdings and devised management plans for them.

We began the process of establishing the Sanctuary by talking with individuals to find out whether there was interest in a conservation project. The conversations led to a petition signed by local residents inviting me into the village of Bermudian Landing to investigate the potential of a community conservation effort. The first project was the development of voluntary land-management plans for twelve landowners. While the plans are not legally binding, social coercion has encouraged people to abide by the agreements. The plans have been successful, with compliance from approximately 90 percent of the landowners.

The land-management plans had three basic biogeographical goals: to connect existing forest fragments with corridors; to establish and protect riverine corridors; and to encourage the preservation of remnant trees in pastures and cleared areas. If the farmers followed the plans and farmed every bit of land not included in the corridors, there would still be a skeletal forest that connects the monkey populations with a forest along the river and the property boundaries of the Sanctuary.

We based the plans on general information about the degradation of the rainforest and specific findings about Belize. To preserve biological diversity, conservationists will have to focus increasingly on managing forest remnants as we exhaust the possibilities for creating national parks that are totally protected. At the same time, it is necessary to recognize that the remnants are not static and that they are limited in what they can sustain, including human use. The Community Baboon Sanctuary is an attempt to balance conservation goals with human use.

Land use in the area of the Sanctuary was a mosaic of small farms and ranches, along with successional forests ranging from five to seventy-five years of age. Clearing on the farms was done in a traditional manner; small plots are used for two to three years and then left fallow for fifteen to forty years. Approximately 41 percent of the forty-seven-square-kilometer area that contains the Sanctuary is cleared. Periodic logging has disturbed the forests for more than 300 years, and the Creole community has practiced subsistence farming for approximately one hundred years.

The most common type of forest remnant within the Sanctuary is highly disturbed, resulting in fragments containing many young trees and a few old trees. The second type of remnant is not as disturbed and contains more uniform age classes. Throughout the area, there are few tree species: twenty-five to thirty codominants and an additional ten to fifteen rarer species. The fragments are characterized by broken canopies, little stratification, and a low height of twenty to twenty-five meters. They may show any of three characteristics: 1) single-species dominance by the cohune palm; 2) a preponderance of vegetative reproduction, specifically, stump sprouting; and 3) remnant species, often climax species, reseeding and recolonizing like pioneer species.

The cohune palm has come to dominate the landscape for a number of reasons: It is hard to clear; it is used by the human community for thatching, heart of palm, cooking oil, and the manufacture of simple tools; it is resistant to fire and seeds fairly easily; and remnant trees act as recolonizing agents, providing a site for birds to perch and drop seeds. A number of strangler figs are established in this way as well. The figs provide food for the monkeys and other wildlife, which eat both fruit and leaves. In a survey of the palms and hardwoods, 42 to 86 percent of the cohunes had infestations of strangler figs, while 20 to 59 percent of hardwoods did.

Many tree species have been found to have the capacity to resprout. Out of 102 species on 38 research plots, 67 species have the capacity to resprout. This capacity produces a mixed forest of mixed successional series. The howlers appear to benefit from living in a forest with mid-, early, and late successional stages.

The following is a short list of what has been done or can be done to enhance land for the howler monkeys and other species. Note that these activities can be accomplished without large amounts of money or much physical outlay. These land-enhancement strategies may be applicable to the conservation of other types of wildlife.

1. Acclimate the monkeys. This had already been achieved in the area of the Baboon Sanctuary:
As the farmers did not hunt the monkeys, the monkeys became very tame.
2. Construct locally built artificial platforms for feeding or nesting sites.
3. Selectively remove invading foreign plant species for use as fuel wood to reduce competition with native plant species.
4. Plant "living fenceposts."
5. Replant locally extinct native tree species.
6. Seed farms and fields with native plants.
7. Construct aerial bridges or gateways to connect forest fragments.
8. Establish low-budget nurseries for native plants.

There is a museum in the village of Bermudian Landing. This, along with a system of trails, serves students and tourists who visit the area. A small pamphlet, begun as an informational project for farmers, has been expanded to a 400-page book given to teachers and sold to tourists. There is a low-budget bed-and-breakfast in the village, and some meals are available. Local farmers serve as guides. Tourism thus directly supports the local economy.