



Conservation of the Bahama Parrot

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Pair exits their nest after feeding their chick. Photograph/Noel Snyder.

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THE PARROT GENUS *Amazona* IS CONFINED to the Neotropical Region, from Mexico to Argentina. Of the 27 extant species, nine are endemic to the West Indies and five of these species and two subspecies are considered to be endangered or threatened (King 1977). The Cuban Parrot (*Amazona leucocephala*) is a polytypic species with five recognized subspecies: *leucocephala* (Cuba), *palmarum* (western Cuba and Isla de la Juventud), *caymensis* (Grand Cayman), *hesterna* (Cayman Brac), and *bahamensis* (Bahamas) (Bond 1956).

Historically, the Bahama Parrot (*A. I. bahamensis*) was recorded from Abaco, New Providence, San Salvador, Long Island, Crooked Island, Acklins, and Great Inagua, although it probably was present on all major islands in the Bahama archipelago.

Today, this subspecies is regarded as endangered and persists only on the islands of Abaco and Great Inagua, at the northern and southern ends of its former range (Figure 1). The Abaco population is the northernmost breeding population of any species in the genus *Amazona* (Snyder *et al.* 1982). In recent years this population has declined as a result of habitat destruction, logging activities, development, Hurricane Betsy in 1965, and hunting pressures (Attrill 1981; Snyder *et al.* 1982).

Early studies on the biology of the Bahama Parrot and its conservation status were done by Snyder *et al.* (1982). They estimated the then Bahama Parrot population on Abaco to be less than 1000 parrots and recommended further study of its biology and monitoring of the population.

Since 1985, I have been studying the breeding biology of this subspecies and its current status in the wild. Although my research efforts have largely concentrated on the Abaco population, I made two brief trips to Inagua in 1989. The overall objective of this project has been to develop a sound biological understanding of this parrot upon which an effective conservation program can be based.

Biology

The Abaco population of the Bahama Parrot is found in the Caribbean pine (*Pinus caribaea*) and mixed broadleaf coppice (native, evergreen hardwood) areas of southern Abaco. Current population estimates range from a well-defined minimum of 860–1142 parrots (actual birds counted) to a less well-defined maximum of 1300

Table 1. Productivity of the Bahama Parrot (*Amazona leucocephala bahamensis*) on Abaco Island, Bahamas, 1985–1988.

Year	No. of egg-laying pairs	No. of successful pairs	% egg-laying pairs successful	No. of young fledged	No. of young/egg laying pairs	No. of young/successful pairs
1985	10	6	60	12	1.20	2.00
1986	25	11	44	21	0.84	1.90
1987	32	19	59	28	0.88	1.47
1988	31	9	29	18	0.60	2.00
All	Total	Total	Average	Total	Average	Average
	98	45	46	79	0.81	1.76



Parrots on Abaco nest in limestone-solution cavities in the ground.
 Insert—A male inspects a potential nest cavity. Photographs/Rosemarie S. Gnam.

parrots (Gnam *et al.* in prep.).

Unlike the Inagua population and other subspecies of *leucocephala*, which nest in tree cavities, Bahama Parrots on Abaco nest in limestone-solution cavities beneath the ground. Although nesting in limestone holes in vertical cliffs is a relatively common habit in psittacids (Forshaw 1978) and Patagonian Conures (*Cyanoliseus patagonus*) excavate nest cavities in dirt banks, the Abaco population of the Bahama Parrot is the only New World parrot that nests in subterranean rock cavities. In the 70 nests which we found, nest depth ranged from 39.5 to 323 cm. and the mean nest depth was 124.2 ± 55.4 (s.d.) cm. Many of these nests have internal ledges or rocky overhangs to protect and conceal the eggs within.

A clutch of 2–4 eggs is laid in late May and early June. Eggs hatch asynchronously, approximately 26–28 days after the female begins incubation. During the years 1985–1987, the mean clutch size at hatching was 3.47, but the mean number of parrot chicks hatched per nest was 1.74 (Gnam, in press a). Forty-six percent of the eggs that were present in a clutch at hatching failed to hatch.

In contrast to other species of Caribbean parrots, Bahama Parrots on Abaco exhibit a low rate of reproductive success with less than 50 percent of egg-laying pairs fledging young (Table 1) (Gnam, in press a). Causes of nest failure in the Bahama Parrot are (in ascending order of importance): human disturbance (poaching of chicks); flooding of nest cavities during heavy rains; abandoned eggs; chick deaths from unknown causes; and predation by snakes, land crabs (*Cardisoma guanhumi*), rats (*Rattus rattus*) and feral cats (*Felis catus*).

Because of their ground-nesting habit, Bahama Parrots are extremely vulnerable to predation by feral cats. In 1988, Bahama Parrots on Abaco exhibited the lowest reproductive rate that I have observed in four years of study (Table 1), with only 29% of nests fledging young. The cause of this poor reproductive performance was increased nest predation by feral cats (Gnam, in press a). Feral cat predation was responsible for failure at 14 nests (45%) and the nesting female was injured in two (14%) and killed in seven (50%) of the 14 known attacks. Prior



Bahama Parrots feed on berries of wild guave. Photograph/Rosemarie S. Gnam.

to 1988, I had observed only four definite instances of nest predation by feral cats. The high level of cat predation continued in 1989, when 39% of the nests in one nesting area failed because of feral cat predation and only 42% of all nests fledged young. The reasons for this high level of cat predation remain unclear; but I believe learning of this predatory behavior by cats is involved.

Nest predation by feral cats thus affects the Bahama Parrot population in two ways: poor recruitment into the population as a result of low nesting success, and loss of breeding adult females, which can affect the future

reproductive potential of the population.

Throughout the nesting cycle, Bahama Parrots feed opportunistically on fruits of native shrubs. I observed parrots feeding on at least 15 plant species (Gnam 1988). Staples in their diet are seeds extracted from unripe cones of Caribbean pine and the fruits of poisonwood (*Metopium toxiferum*), pigeon berry (*Duranta repens*), wild guave (*Tetrazygia bicolor*) and gumbo-limbo (*Bursera simaruba*).

Conservation Status

Although Snyder *et al.* (1982) visited Great Inagua in 1979 and I made two exploratory trips there in 1989, too little is known of the Bahama Parrot's biology and population numbers on Inagua to provide an adequate understanding of their present status and conservation needs (Gnam, in press b). However, much of the habitat of the island is protected in a National Park which is administered by the Bahamas National Trust, a non-government organization.

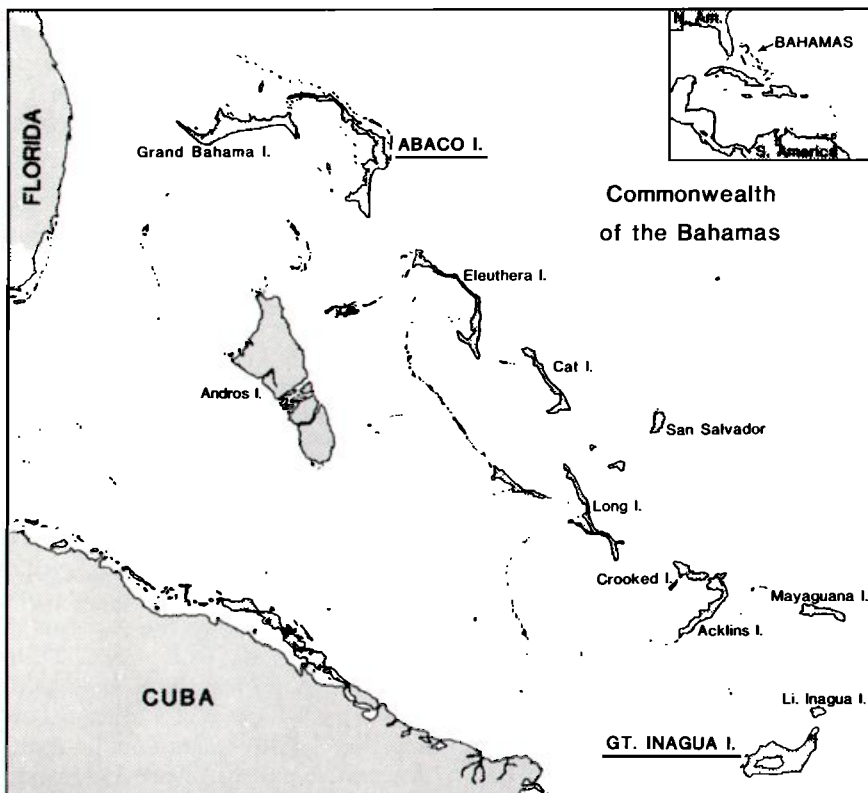
Despite comparable Bahama Parrot

population estimates for Abaco between 1976 and 1989 (Snyder *et al.* 1982; Gnam *et al.*, in prep.), the present population is under stress. Major threats to the Abaco population include: unprotected habitat, which is subject to increasing developmental pressures from agriculture and tourism; nest predation by feral cats; illegal poaching of parrots for the pet trade; and catastrophes such as hurricanes.

Using the data from my research to date, the Forestry Section of the Bahamian Department of Lands and Surveys proposed the creation of a 6880-hectare (17,000-acre) parrot reserve as part of a larger 21,854-hectare (54,000-acre) forest reserve for southern Abaco. The forest reserve would be logged on a rotational and selective scheme. However, this management plan would take into consideration the parrot's needs for sufficient stands of pine in which to feed and roost. Since the Bahama Parrot is not dependent on old-aged Caribbean pines for nest cavities, it can coexist with a logging effort that does not clear cut large tracts of forest and allows for regeneration. Legislative approval is still pending for this proposal. Recently, the Department of Agriculture in the Bahamian Ministry of Trade and Industry requested a loan from the Inter-American Development Bank to develop agriculture on southern Abaco. Such development would jeopardize the parrot reserve proposal, and if implemented, would surely accelerate the loss of parrot habitat.

Given their subterranean nesting habits, Bahama Parrots on Abaco will continue to be vulnerable to nest predation by feral cats. An investigation of the feral cat population and a long-term cat control program are urgently needed.

The Bahama Parrot is protected by the Wild Birds Protection Act of the Bahamas and by international legislation such as CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and the U.S. Endangered Species Act. While most residents of Abaco are aware of these laws and respect them, illegal poaching of parrots could rapidly decimate the population. In 1987, poachers raided four of our study nests and six Bahama Parrot chicks were taken. We recovered three of



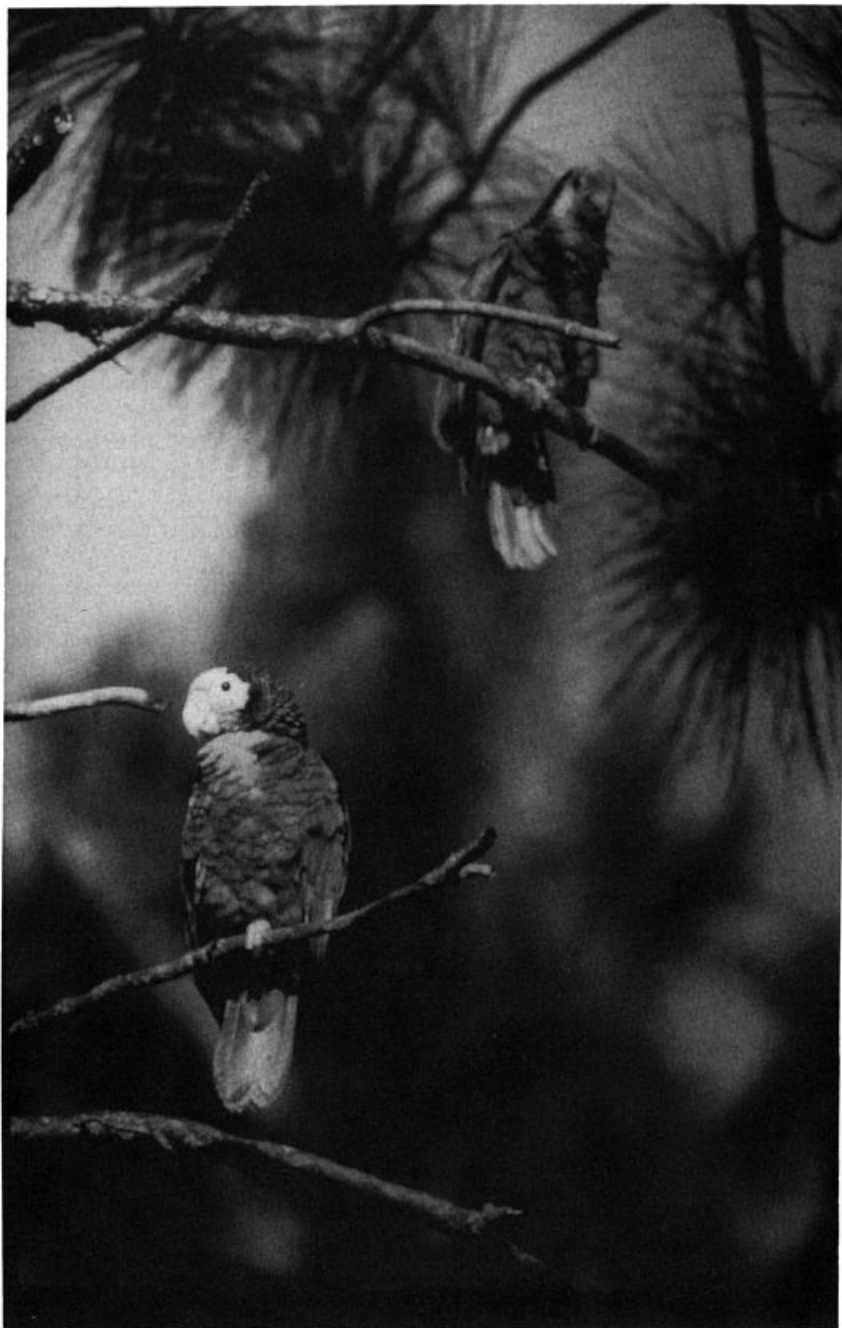
The Bahama Parrot survives on the islands of Abaco and Great Inagua. Map/Stephen Nash and Wildlife Preservation Trust International.

these. The illegal capture of parrots for trade has been a major factor in the decline of other Caribbean amazons, such as the Puerto Rican Parrot, (*Amazona vittata*) (Snyder *et al.* 1987), the St. Vincent Parrot (*A. guildingi*) and the Imperial Parrot (*A. imperialis*) (Paul Butler, pers. comm.). The creation and management of a well-protected and patrolled parrot reserve could help thwart illicit poaching of parrots.

I have worked on a Bahama Parrot conservation awareness program for Abaco with Jill Weech of the Forestry Section, who in 1989 started an environmental education program in the primary schools of Abaco. In these grass roots efforts, we give public lectures, show an educational video on the parrot, and distribute educational pamphlets. The Abaco Chapter of the Bahamas National Trust has assisted us in this and other conservation efforts.

Since the extant Bahama Parrot population on Abaco is small and localized, it is highly vulnerable to extinction from catastrophes (Ewens *et al.* 1987). When the population was larger and more widespread on Abaco, parrot populations could survive the stress of hurricanes because devastated areas could be repopulated from surviving refugia.

Previous workers recommended re-establishing the Bahama Parrot on other Bahamian islands to increase its probability of surviving catastrophes (Attrill 1981; Snyder *et al.* 1982). Although captive-raised individuals are commonly used in reintroduction and restocking programs, a better alternative exists with the Bahama Parrot—the translocation of wild-caught individuals. There are compelling reasons for favoring this approach. Captive breeding programs are very expensive, time consuming, and labor intensive. Judging from other such programs, such as the Puerto Rican Parrot (Snyder *et al.* 1987), it may take years to establish a self-sustaining population which is capable of supplying significant numbers of birds for release. Also, they often distract resources and funding from the real problems which face the species in the wild and may not be easily solvable (Imboden 1987). The Bahamas National Trust initiated a captive breeding program for the Inagua population in 1977, but



Nesting pair of Bahama Parrots resting in Caribbean Pine. Photograph/Rosemarie S. Gnam.

the program has had very limited success and only four parrots still survive in captivity (Low 1989).

In addition, captive-raised parrots are at best much less likely than wild-caught parrots to survive in release efforts because of behavioral problems (Snyder *et al.* 1989). Finally, the existing wild populations of Bahama Parrots are clearly large enough to safely donate the few dozen parrots

that should be required in relocation efforts, and such efforts can be made at comparatively small expense. The Forestry Section has recommended that Andros, which is the largest island in the Bahamas, be considered as a release site for the relocation of Bahama Parrots from Abaco. In 1989, I visited Andros; preliminary habitat surveys showed that a relocation there could have merit and be feasible.

Recommendations

A multi-faceted approach is necessary if progress is to be made in addressing the threats to the Bahama Parrot and implementing its recovery:

1. The Forestry Section and the Department of Agriculture should formally commit themselves to the conservation and recovery of both extant Bahama Parrot populations in the wild. Since the Forestry Section manages Crown Lands (parrot habitat) and the Department of Agriculture is responsible for conservation and the enforcement of wildlife laws, a cooperative effort between these agencies will be required to insure the long-term stability of parrot populations.

2. The proposed parrot reserve and forest reserve on Abaco should be established immediately.

3. The above agencies should seek long-term solutions to the feral cat problem on Abaco. If possible, technical and operational assistance from the Pest Control Division of the U.S. Department of Agriculture should be requested.

4. A recovery team should be formed to offer recommendations to the responsible government agencies in the Bahamas. This team could be set up under the sponsorship of ICBP and should include a number of biologists with expertise in the field study of parrots as well as government representatives from the Bahamas and a representative from the Bahamas National Trust.

5. Research efforts on Abaco should be continued and expanded. Other aspects of the ecology of Abaco, such as the role of fire in the Caribbean pine and coppice ecosystem, need to be addressed.

6. A comprehensive study of the Inagua population, including census efforts, should be initiated.

7. Environmental education efforts by the government and the Bahamas National Trust should be expanded to a national level.

8. Translocation efforts to establish new populations on other Bahamian islands should be initiated.

Unless a long-term conservation management plan for this parrot is implemented now, the survival of the Bahama Parrot is questionable. Too often, conservation efforts begin only when populations have declined to such low levels that they may no

longer be genetically or ecologically viable. (Soule 1987).

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