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Reintroduction of Parrots in the Greater Antilles and South America

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Introduction

This paper describes the impact that people have had on the Greater Antilles and South American parrots and presents efforts currently being conducted to restore wild populations of these birds. The first section of this paper discusses the reasons for the decline of the parrots. The second section discusses efforts to reintroduce parrots, using the examples of the Puerto Rican amazon parrot (*Amazona vittata*) and the Venezuelan yellow-shouldered amazon parrot (*Amazona barbadensis*). The final section offers recommendations for long term conservation of parrots in the wild.

Parrots occupy an important place in tropical ecosystems and have existed in some form since the Middle Eocene (Juniper and Parr, 1998). They are valuable seed dispersers and improve the fitness of a variety of plant species by digesting hard coats of the seeds they consume (Galetti, 1993). They show amazing diversity in color and are limited in range by a narrow belt of tropical forest that centers at the equator. There are currently about 350 extant species of parrots and seven species that are known to have gone extinct since 1844 (Low, 1994). Although the majority of parrot species remain, many populations are struggling to survive. The International Council for Bird Preservation announced in 1992 that more than 100 of the remaining species are either threatened or endangered (Low, 1994).

Paul and Anne Ehlrich (1982) describe four possible arguments for preservation of species that apply as well to parrots. First, compassion simply demands preservation; the needs and desires of human beings are not the only basis for ethical decisions. The second argument justifies saving species for their intrinsic value or aesthetics. Third, species should be preserved for their contributions to humankind, such as in the economic and medical benefits they have a potential to provide. Finally, it is argued that species must be preserved to complete their part in an ecological web that humans are a part of, although the full extent of their role may not be completely understood.

Reasons for the Decline of Parrots

There are several reasons why parrot populations have declined in recent years. The primary reason is the deforestation that can be seen throughout the ranges of many parrot species. The majority of parrots are forest-dwelling birds and rely upon the trees that are that are cut for timber. Because they eat fruit, seeds, leaves, and flowers that can only be found in the forest, loss of the forest results in loss of food resources. Two species that have been impacted by deforestation and the subsequent loss of food are the Puerto Rican amazon parrot (*Amazona vittata*) and the yellow-shouldered parrot (*Amazona barbadensis*). The Puerto Rican amazon parrot is a small member of the family Psittacidae. The number of these birds has diminished greatly in recent years. This species is presently part of a reintroduction program with the United States Fish and Wildlife. This parrot feeds primarily on the fruits of three species of trees;

Cupeillo (*Clusia grisebachiana*), sierra palm (*Prestoea montana*), and tabonuco (*Daeryodes excelsa*)(USFW,1982). The yellow-shouldered amazon parrot is one of the most endangered birds in Venezuela (Desenne and Strahl, 1991). A study by Sans and Grajal in 1996 showed that they will feed on a large variety of species of plants, but will most often select the stems, flowers, and fruits of cardon (*Stenocereus giseus*) and yaurero (*Subpilocereus repandus*).

The loss of nesting habitat can present an equally significant problem to parrot populations as the loss of available food. Four tree species that Puerto Rican parrots use for nesting have been logged for lumber since 1931 in the Languillo Mountains of Puerto Rico. The tabonuco, laurel sabino (*Magnolia splendars*), ausobo (*Manilkara bidentata*), and nuez moscada (*Ocotoa moschata*) have taken from the Caribbean National Forest that makes up a large part of the Puerto Rican parrot habitat (USFW, 1982). The primary nesting tree for the Puerto Rican parrot is the palo colorado (*Cyrilla racemiflora*) (USFW, 1982). Although not valued for timber, this tree is often cut for charcoal.

In addition to the direct effects, deforestation has indirect effects on parrot reproduction. The Puerto Rican Parrot Recovery Plan list the following three effects (USFW, 1982). First, if the loss of available nest sites is too great there will be a failure to attempt to breed. Second, there is a reduction in nesting success for the parrots that have initiated reproduction. Finally, higher rates of physical injury from aggressive competition for nest sites have been observed among parrot pairs.

Although not as detrimental to parrots as the loss of habitat, there are other factors that limit the success of the wild parrot. Natural predators of the Puerto Rican parrot include pearly eyed thrashers (*Margarups fuscatus*), red-tailed hawks (*Buteo jamaicensis*), roof rats (*Rattus rattus*), and boas (*Epicrates mornatus*). Although thrashers and hawks are responsible for the highest rates of predation upon parrots, warble flies (*Philornis pici*) are known parasites to eggs. Honeybees (*Apis mellifora*) are known to take over nest that are left open after the breeding season preventing parrots from returning (USFW,1982). Yellow-shouldered amazon parrots experience similar predation and are additionally attacked by Harris' Hawks (*Parabuteo unicinctus*)(Sanz and Grajal, 1996). Natural predation has increased with the loss of habitat.

Parrots are also poached for trade. Parrots are vulnerable to nest predation by humans in habitats outside the deep forest. Birds are captured and exported to countries were it is still legal to sell them. The major portion of parrots that make up the legal quotas in Guyana are filled by birds which were illegally exported from Venezuela (Low, 1994). According to Desenne and Strahl (1991), 65,000-75,000 parrots are exported annually from the Orinoco delta of Venezuela.

A final factor in the reduction of wild parrot nest sites and food supply is the negative affects of natural disasters such as hurricanes and volcanic eruptions (Wiley and Wunderle, 1993). Natural disasters can disrupt parrot feeding and nesting. Starvation weakens them making them easy prey. After Hurricane David in 1979, parrots that normally feed high in the canopy were seen feeding on small shoots 3-4 meters above the ground (Christian et al., 1996).

Reintroduction Efforts

This section examines two efforts to reintroduce parrots to the wild. One is in Puerto Rico and is under the direction of the United States Fish and Wildlife Service. This effort focused on the Puerto Rican parrot, which is protected under the U. S. Endangered Species Act (ESA). The second effort is in Venezuela and focused on the yellow-shouldered amazon parrot. This was a joint project between PROVITA, the Wildlife Conservation Society, and PROFAUNA, the Venezuelan National Wildlife Service, representing the Venezuelan Environment Ministry (MARNR). Although deforestation is stated as the major reason for decline of parrot populations, both of these reintroduction efforts occurred in areas where habitat was not a limiting factor and therefore the reintroductions were not limited by habitat availability.

The Puerto Rican effort used captive breeding by establishing a local site where the effort took place. The captive breeding program began in 1969. Closely-related non-endangered Hispaniolan amazons are used as surrogate parents to Puerto Rican amazons chicks. This has proven more effective than allowing inexperienced Puerto Rican amazon parrots to raise chicks Chicks raised by humans are apparently unable to attain the weight gains and development rates of wild-raised chicks (Wiley, 1980). Upon release, chicks are placed into Puerto Rican amazon's nests that exist already in the wild. Chicks that have been exposed to Hispanolian amazons react with less fright to the adult Puerto Rican amazons (Wiley, 1980). Breeding efforts have been successful. The captive parrot population of Puerto Rico in recent years has been larger than the wild population. In 1991, it was estimated that there were 41 parrots in the wild and 56 in captivity (Christian et al; 1996). In addition to fostering chicks and eggs into wild nests, research continues to determine methods for successfully integrating the released birds into the wild populations, techniques for conditioning birds for release, and best ages for release of birds (Wiley, 1980).

The current Puerto Rico conservation effort has created a reversal in the declining trend of the Puerto Rican amazon. This is due, in part, to the reintroduction program and partly to the efforts of the U.S. Fish and Wildlife Service, U.S. Forest Service, and Puerto Rico's Department of Natural Resources (Wiley, 1991). Elements of the conservation effort include specially designed nest boxes to prevent/reduce predation and competition, the improvement and manipulation of natural nest cavities, expansion of the captive breeding program, control of predation and competition, continued ecological research, monitoring all known parrot nests in the wild, and the reintroduction of parrots to traditional nesting grounds (Wiley, 1991).

The Puerto Rican conservation plan also protects the parrots from natural predators by using rat poison, putting metal guards around the stems of nest trees, and temporarily sealing nests after the breeding season to protect them from honeybees (Christian et al., 1996). The recovery plan adopted by the U.S. Fish and Wildlife service in 1982 will continue until full recovery, which is defined as two separate populations of 250 breeding the Puerto Rican amazon. Creating two separate populations insures against the effects of natural disaster on one of the populations (USFW, 1982). Christian et al. (1996) reported over 80 parrots bred in captivity at the Puerto Rican facility. The cost for this effort is quite high, over 100,000 U.S. dollars a year. Expensive species conservation programs like this are not feasible on other Caribbean islands (Wiley, 1991).

The Venezuelan effort took place on Macanao Peninsula of Margarita Island, which is off the North Coast of the mainland(Sanz and Grajal, 1996). The area provided a suitable location for a research project of this magnitude, with an area that was large enough to integrate the captive Yellow-shouldered amazon, but with a small enough population to allow for the captive-raised individuals to significantly reduce the chances of extinction. Sanz and Grajal raised 14 Yellow-shouldered amazon parrots obtained as orphans of various ages (20 to 50 days when received) from two original locations (seven from Margarita and seven from Blanquilla) on Margarita Island (Sanz and Grajal, 1996). Chicks were raised following a protocol designed by K. Silvius and F. Rojas (Sanz and Grajal, 1996), which began with syringe feeding and eventually (around 55 days) offering chunks of fruit. In the subsequent three weeks the chicks were able to feed themselves and were gradually put into larger cages that resembled their natural environment.

As part of a community outreach program, local assistants with knowledge of natural history and habitat were hired and trained to use the telemetry equipment for monitoring parrots after release. The food was purchased from local providers whenever possible (Sanz and Grajal, 1996). The parrots were checked for health and released in October of 1992. Four of the parrots had radio collars and were tracked for about one year. Data collected included number of parrots in group, vocalizations, joint flights, common use of feeding sites, allopreening, copulation attempts, nest exploration, and reproduction (Sanz and Grajal, 1996).

The results showed that at least 10 out of the 12 parrots released (two of the original 14 were killed by predators while in captivity) survived the first year. Although released together, the group dispersed after the release. All parrots were observed feeding on the same food as wild parrots. Although difficult to determine definitively, two of the parrots released appear to have been successful in pairing with wild parrots and displaying ritual mating behavior. None of the parrots reproduced the first year. In April of 1995, three years after the release, a young male raised in captivity was observed attending a nest with three eggs. Two of the eggs hatched and both chicks fledged from this nest (Sanz and Grajal, 1996).

Reintroduction efforts for parrots are not always successful. For example, reintroduced thick-billed parrots (*Rynchopsitta pachychyncha*) in Arizona encountered heavy predation by raptors and had poor food-processing ability (Derrickson and Snyder, 1992). Considering the limited success of the thick-billed parrot reintroduction, the Venezuelan effort appears to be a success. The estimated overall expenditure for this recovery is approximately 2, 827 U.S. dollars per introduced parrot. This does not include additional cost associated with the environmental education and outreach program that will accompany the long term success of the program (Sanz and Grajal, 1996).

Recommendations

The reintroduction effort in Puerto Rico is not close to completion and recommendations have not been formally put together at this time. The Venezuelan reintroduction is complete to the point of the initial reintroduction and Sanz and Grajal (1996) provide the following six recommendations in the concluding remarks which they suggest be used to increase the chances for success in a parrot reintroduction program.

(1) The reintroduction program should be a part of a conservation program that provides basic natural history information on the ecological requirements of the species, public awareness, and habitat protection.

(2) The origin of the confiscated animals should be known, so that the animals can be reintroduced in their natural range.

(3) Reintroductions of birds originating from the international pet trade should be carefully evaluated (and usually avoided) because these birds probably have been in direct contact with lethal diseases carried by exotic birds or domestic animals.

(4) Reintroductions should be made in areas with some degree of protection, or at least the initial causes for the population decline should be addressed in the release area (Caughley, 1994).

(5) Reintroductions have the side benefit of contributing to the environmental education goals and increasing the general awareness of the conservation needs of a species.

(6) Under critical situations (e.g. extremely small population sizes), reintroductions can be used to increase sub-adult recruitment rates and therefore the genetic variability of a wild population (Franklin, 1980).

One key item that indirectly increases the chances for success of the reintroduced parrots is the education and public outreach associated with each of the programs (Sanz and Grajal, 1996) (USFW, 1982). The Puerto Rican program does not allocate a great deal of time or money to environmental education as is the practice in some areas of the Lesser Antilles (Christian et al., 1996), although the recovery plan does call for the development and implementation of this provision (USFW, 1982). The enormous cost of both time and money in reintroducing these animals can be lost quickly if the local public is not aware of their potential impact on the reintroduction effort. Because poaching and removal of nesting trees are the primary ways that locals negatively affect parrot populations, education programs must focus on these behaviors. Developing public appreciation of parrots as unique features of the rainforest will also be important. Ecotourism may be a way of bringing money into countries that have a parrot community present. There are hundreds of web sites that offer information about parrots, demonstrating the interest that humans have in these unique creatures. It is possible that this interest might translate into willingness to travel for the purpose of viewing parrots in their native habitat.

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