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New nesting area of Puerto Rican Parrots.—The Puerto Rican Parrot (*Amazona vittata*) population has been isolated in a 11,300-ha tract of the Luquillo Mountains of northeastern Puerto Rico for ca 80 years and has been using only a small area of the forest for nesting since the 1950s. During the last 50 years, it was known to have nested only in cavities of old growth palo colorado (*Cyrilla racemiflora*) with one exception (Snyder et al. 1987). In 1974, an occupied cavity was found in a laurel sabino (*Magnolia splendens*). Three to six nests have been monitored annually for the last 20 years, often in the same cavity trees for up to 11 years (Snyder et al. 1987, Meyers et al. 1993). The almost exclusive use of palo colorado trees for nesting has been caused by the scarcity of cavities in other tree species (Snyder et al. 1987). A recent study (Meyers and Barrow, unpubl. report) indicates, however, that potential palo colorado nesting trees have declined up to 72% since 1976 because of lack of natural recruitment. Only 7% of palo colorado stems were <30 cm diameter breast height (dbh), which indicates that further declines are expected in the future.

Snyder et al. (1987) conducted interviews that revealed that earlier in this century, the Puerto Rican Parrot occasionally nested in tabonuco (*Dacryodes excelsa*) and caimitillo (*Micropholis chrysophylloides*) cavities in the Luquillo Mountains. In northwestern Puerto Rico, Río Abajo residents reported that parrots commonly nested in corcho (*Pisonia subcordata*), aguacate (*Persea americana*), jácana (*Pouteria multiflora*), Puerto Rico royalpalm (*Roystonea borinquena*), and pot holes in limestone cliffs. Gundlach (1878, cited in Snyder et al. 1987) also reported that parrots nested in palms in the coastal plain near Quebradillas. Clearly, the Puerto Rican Parrot used a diversity of nesting sites in the past and might do so again in the future if nesting sites were available. I report here the habitat of a new nesting area of the Puerto Rican Parrot and suggest procedures that may encourage further expansion and changes in nesting habits of this critically endangered species.

Methods.—I located parrot activity sites during evening and morning surveys from a tree platform (20 m high) and by plotting the location of breeding pairs on maps with a compass and rangefinder. Habitat data were collected from 0.05-ha and 0.20-ha concentric, circular plots centered at the nesting tree (nesting site) and at activity sites of the pair in the nesting area. Data collected in the 0.05-ha plot were (1) elevation (m), (2) slope (%), (3) aspect (compass direction), (4) canopy height (m) measured by a rangefinder or Haga tree altimeter, and (5) vegetative strata. Midstory cover from 5-12 m high and canopy cover >12 m high were estimated by three persons using a scale of 1 to 4 (1 ≤ 25%, 2 = 26–50%, 3 = 51–75%, 4 ≥ 76%). Small trees, >2 m high and ≤30 cm dbh, were identified to species and counted. Large trees, >30 cm dbh, were identified to species and measured for dbh and height (m). Cavity openings were categorized by diameter classes: ≤5.0 cm, 5.1–20.0 cm, 20.1–35.0 cm, 35.1–50.0 cm, >50 cm. Potential parrot nest trees (>49 cm dbh, see Snyder et al. 1987) were tallied, identified as to species, and measured for dbh and height in 0.2-ha plots.

Results.—W. Abréu (O. Carrasquillo, pers. comm.) found the new nesting cavity in 1991. These parrots nested successfully and fledged young in 1991 and 1992 at East Mountain (Meyers et al. 1993), but the male was presumed dead in 1993 when its mate was seen at the cavity with another male (B. Roberts, pers. comm.). East Mountain is 1.1 km northeast of East Fork, a traditional parrot nesting area at higher elevations (500 m) in the palo colorado forest of the Luquillo Mountains. The newly discovered nesting cavity was in a 21-m high tabonuco tree (73 cm dbh) at an elevation of 370 m in tabonuco forest. Steep northwest slopes (55%) were prominent at the nesting site. Seven of eight trees >49 cm dbh and surrounding the cavity tree (0.2-ha plot) were potential nest trees. The nest cavity opening was 35–50 cm. Two smaller cavities openings (5–20 cm) were found in palo colorado trees nearby. Density of trees >30 cm dbh was 220 stems/ha, of which 35 stems were potential nest trees. Forest canopy and midstory cover in the area surrounding the nest tree was sparse to moderate (25–50% cover). At the nesting site, many colonizing trees (1640 stems/ha), such as trumpet-tree (*Cecropia sheberiana*), had recently sprouted (<6 cm dbh) after passage of Hurricane Hugo.

Habitat used by the breeding pair in the nesting area (activity sites, N = 3) was within 150 m of the nest and was oriented towards the northwest with slopes of 8–44%. Fewer potential nesting trees were found at these sites (12 fewer trees/ha). Density of trees >30 cm dbh was 100 stems/ha, of which 21 stems were potential nest trees. Forest canopy was broken and sparse (25–50% cover) at heights of 17.4–26.4 m. *Palicourea riparia* (626 stems/ha), *Psychotria berteriana* (373 stems/ha), and *Tetrazygia urbanii* (387 stems/ha), all small trees or shrubs (<6 cm dbh), were the predominant cover in the understory where few trumpet-trees were found (347 stems/ha).

Discussion.—These were the first Puerto Rican Parrots reported nesting in a natural cavity of a tabonuco tree since intensive research began in the 1950s (Rodríguez-Vidal 1959, Snyder et al. 1987). Old-growth tabonuco forest at East Mountain was selected for nesting by this pair in contrast with old growth palo colorado forest used in the past (Snyder et al. 1987, Meyers 1994). Few large trees (25 stems/ha >60 cm dbh) surrounded the nesting tree, which was considerably less than reported for the nearby East Fork nesting area (73 stems/ha >60 cm dbh) for palo colorado forest by Snyder et al. (1987) before Hurricane Hugo. The hurricane, however, reduced the number of potential nesting trees (>49 cm dbh) at East Fork to 23 stems/ha (Meyers and W. C. Barrow, Jr, unpubl. report). Preserving old-growth tabonuco forest in the Luquillo and other mountains of Puerto Rico may be important for the recovery of the species.

The high density of colonizers (e.g., trumpet-tree) at the nest site used by parrots at East Mountain was the consequence of extensive canopy openings caused by Hurricane Hugo. Parrot nesting areas at East Mountain and East Fork received significantly more hurricane damage than nesting areas on western slopes, where young trumpet-trees were almost nonexistent (0–20 stems/ha) in nesting plots (Meyers and Barrow, unpubl. report). This change in habitat, without the loss of large nest-trees, may have little effect on the parrot. Habitat damage, even from a severe storm, may not be detrimental to parrots and may actually stimulate the population growth rate (Meyers et al. 1993). To understand this effect, however, forest habitat simulation models may prove valuable in predicting potential effects of hurricanes and availability of potential nest-trees and food.

Although 47 cavities in palo colorado trees were enhanced for Puerto Rican Parrots in 1990, only one has been used in five years (E. García, pers. comm.). The site selection for enhancing cavities was based on parrot activity in the area which was determined by qualitative surveys. A recent study, however, revealed that parrot activity sites, based on quantitative surveys, are different from nesting sites for an important habitat characteristic. Nesting sites have 16–20 more potential nesting trees/ha than activity sites of parrots (Meyers and Barrow, unpubl. report). It may be beneficial to create clusters of cavities in potential nesting trees (palo colorado, tabonuco, caimitillo, and laurel sabino) in habitat similar to that used by the parrot for nesting, i.e. with a high density of potential nesting trees.

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LITERATURE CITED

MEYERS, J. M. 1994. Old growth forests and the Puerto Rican Parrot. Endangered Species Tech. Bull. 29:12.

———, F. J. VILELLA, AND W. C. BARROW, JR. 1993. Positive effects of Hurricane Hugo: record years for Puerto Rican Parrots nesting in the wild. Endangered Species Tech. Bull. 28:1–10.

RODRÍGUEZ-VIDAL, J. A. 1959. Puerto Rican Parrot (*Amazona vittata vittata*) study. Commonwealth of Puerto Rico, Dept. of Agric. and Commerce, San Juan, Puerto Rico.

SNYDER, N. F. R., J. W. WILEY, AND C. B. KEPLER. 1987. The parrots of Luquillo: natural history and conservation of the Puerto Rican Parrot. West. Found. Vertebr. Zool., Los Angeles, California.

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Neotropical migrants in marginal habitats on a Guatemalan cattle ranch.—Recent studies of migratory birds overwintering in Central America and the Caribbean have focused on bird communities in particular types of disturbed habitats, such as citrus orchards (Rogers et al. 1982, Mills and Rogers 1992) or agricultural fields in varying stages of succession after human abandonment (Waide 1980, Kricher and Davis 1989), while others have attempted to discern broader patterns of species occurrence across a wide variety of habitat types (Waide et al. 1980, Leck 1985, Lynch 1989, Robbins et al. 1992, Wunderle and Waide 1995). Although a few in the latter category have included a small amount of data from cattle ranches, Central American cattle ranches have received little attention in the ornithological literature. This is unfortunate because conversion to cattle ranching is the single largest threat to the remaining undisturbed lands in Central America (Myers 1980, Buschbacher 1986, Lynch 1989). Given the amount of land already used for cattle ranching in Central America and the amount likely to be converted in the near future, knowledge of patterns of species occurrence on land modified for cattle ranching is critical for formulating future conservation strategies.

We mist netted birds on an active cattle ranch in the Pacific lowlands of Guatemala to investigate the extent to which narrow riparian corridors and other marginal habitat set in a matrix of open cattle pasture serve as usable habitat for overwintering migratory birds.

Study area and methods.—We conducted the study from 2 February to 2 March 1995 on Finca Caobanal, a working cattle ranch in the Pacific lowlands of Guatemala. The region is characterized by relatively flat topography with elevation ranging from sea level to approximately 200 m. The average annual temperature is 25°C, and annual rainfall averages 200 cm, with a pronounced dry season between November and April (Universidad Rafael Landívar 1987). Although the native vegetation type is subtropical humid forest, the vast majority of the region has been converted to agricultural land, particularly cattle pasture, and more recently, sugar cane.