**EARED QUETZAL** *Euptilotis neoxenus*

Although found almost throughout the mountains of western Mexico and even sporadically within Arizona and New Mexico, U.S.A., this trogon is locally distributed in montane pine and pine–oak forests, uncommon and poorly known ecologically, and threatened by the widespread destruction (or modification) of its habitat.

**DISTRIBUTION** The Eared Quetzal is distributed throughout the Sierra Madre Occidental, Mexico, records of the species coming from Sonora, Chihuahua, Sinaloa, Durango, Nayarit, and Zacatecas states. Away from the main sierra, the bird has been reported from Jalisco and Michoacán, with occasional records from Arizona and New Mexico in the U.S.A. Coordinates for Mexico are taken from OG (1956a).

**U.S.A.** The records of this species from the U.S.A. are almost certainly examples of sporadic, seasonal migrants (see Ecology), although a pair bred in 1991 (see below).

**Arizona** Eared Quetzals were first recorded in the U.S.A. when “considerable numbers” were observed at Warsaw Mills (untraced) in early December 1893 (van Rossem 1945). The species was not recorded again until four birds (two males, a female and an immature male) were found in the South Fork of Cave Creek Canyon in the Chiricahua mountains, the birds being observed between mid-October and early December 1977 (Zimmerman 1978). Subsequently, Eared Quetzals have been recorded from this area nearly every autumn/winter (Davis and Russell 1984), for example: one at lower Cave Creek Canyon in November 1978; one in the upper part of South Fork during August and October 1979 (Monson and Phillips 1981); and more recently, birds have been recorded there during June (two birds there 9-10 June, and one staying until 23 June 1991) and August (a female on 8 August 1991) (*Winging It* 3,7 [1991]: 3; 3,8 [1991]: 3; 3,9 [1991]: 3). West of this area, a bird was reported from Madera Canyon (Santa Rita Mountains) on 7 August 1991 (*Winging It* 3,9 [1991]: 3). In 1977, a male was found at Ramsey Canyon in the Huachucas (south-west of the Chiricahuas) in December 1977 (Zimmerman 1978), and up to five were reported there (upper Ramsey Canyon) from 6 August to 31 October 1991, during which period a failed nesting attempt was recorded (*Winging It* 3,12 [1991]: 3; *Amer. Birds* 46 [1992]: 12). A male bird was recorded at upper Carr Canyon (just south of Ramsey Canyon) on 9 August 1989 (*Winging It* 1,9 [1989]: 3).

**New Mexico** Zimmerman (1978) suggested that the Animas Mountains may well harbour this species, and indeed AOU (1983) reported a sight record for the locality, although no details are given.

**Mexico** Localities where this species has been recorded are generally from the Pacific side of the mountains (although occasionally on the eastern slope), the overall distribution being similar to that of the Imperial Woodpecker *Campephilus imperialis* (see relevant account).

**Sonora** There are just two records of the Eared Quetzal from Sonora, referring to a male (in AMNH) taken at El Puerto (see Remarks 1) at 1,920 m in December 1860, El Puerto apparently being close to or synonymous with Rancho La Arizona (at 40 km south-west of Nogales, although this area is a desert locality with no forest: J. T. Marshall *in litt*. 1992); and observations from Pinos Altos (1,420 m) in the Sierra de Nácori (see Remarks 2), during June and July 1899; Babicora (29°30'N 108°01'W), where eight birds were taken (three males and five females in FMNH and ROM) during June 1902; and Madera (29°12'N 108°07'W), where a female (in MCZ) was collected in October 1921. East from these northernmost Chihuahua localities the Eared Quetzal has been recorded in the Sierra del Nido (west of Carrizalillo), specimens (all in MVZ) coming from 2,440 m at Arroyo del Nido (29°36'N 106°38'W).
female taken in June 1957); Arroyo Mesteno (29°26′N 107°04′W), where at 2,315 m four males and three females were collected in July 1959, and at 2,745 m a male and female were taken here during August 1961; and Cañon del Alamo (29°27′N 106°47′W), where a female was collected at 2,225 m in June 1959.

Further south again, the species has been recorded (a male in April 1885, in MCZ) at Durasno (probably 28°45′N 107°58′W, and therefore on or close to the río Verde); río Verde (28°43′-23°N 107°57′-46′W), where a male (in WFVZ) was collected in May 1961; and Pinos Altos (from the map in Lumholtz 1903, this is Pinos Redondeados at 28°15′N 108°17′W: see Remarks 2), where a male and female (in MCZ) were collected in June 1888. Near Barranca del Cobre, at least three pairs and one individual were recorded in a canyon leading to (Cascada) Cusarare (south-west of Creel) during July 1991 (S. N. G. Howell in litt. 1991). In the far south of the state, localities include: Jesus María (probably at 26°52′N 107°39′W), where three specimens (in MCZ) were taken from 1883 to 1888; Laguna Juanota (26°30′N 106°29′W), represented by a male (in MLZ) taken during August 1937; and near Guadalupe y Calvo, where four males and three females (in USNM) were taken during August and September 1898. Untraced localities in Chihuahua include Rancho San Miguel (four males and two females in WFVZ, collected during October 1963), and “Mound valley” (a male and female in AMNH and MCZ, collected in September 1905).

Sinaloa In the north of the state, the Eared Quetzal has been collected 12 km north and 50 km east of Sinaloa (25°50′N 108°14′W), a male (in MNHUK) being taken at 1,675 m in April 1962. Further south, specimens (in AMNH, SWC, and YPM) have been collected at Rancho Carrizo, between 12 and 17 km west (by road) of El Palmito (along route 40, near the border with Durango at around km 201: Edwards 1985), with birds taken during February–April 1964 and December 1970, and a female from c.3 km north-west of El Palmito in May 1964. Other localities for sightings along route 40 are: Hortensia's Barranca, near km 212; and Rancho Liebre Barranca north of km 200 and El Palmito (Edwards 1985, J. F. Clements in litt. 1989, B. M. Whitney in litt. 1991). An untraced locality in Sinaloa is “Babizos”, where a male (in MLZ) was collected in December 1935.

Duran go Specimens have been collected at Coyotes (either 24°15′N 104°42′W, or 23°49′N 105°20′W), where a male and two females (in FMNH) were taken in August 1904; Mimbres (c.45 km west-south-west of Durango), where a pair was seen in perturbed pine-forest in July 1988 (A. G. Navarro in litt. 1991); c.10 km south-west of El Salto (a female in MLZ taken in October 1954); 6 km north-east of Las Adjuntas (23°44′N 105°31′W, also 21 km west of El Salto), where a male (in DMNH) was taken at 2,440 m in May 1972; also, 5 km east of Piedra Gorda (23°46′N 105°54′W, almost on the border with Sinaloa), where a male (in MLZ) was taken in March 1938. These last three localities are along or close to route 40, the main Mazatlan–Durango highway (see above). Further east, two pairs of Eared Quetzal were recorded in La Michilía Biosphere Reserve during July 1980 (A. M. Sada in litt. 1992).

Nayar it There are apparently just five specimens (in BMNH, USNM) from this state, four taken at Santa Teresa (apparently 22°28′N 104°44′W) in the north during August 1897, and a male taken in the Sierra Madre de Nayarit at 2,440 m in July 1889.

Zacatecas Specimens come from the south, with a female (in DMNH) taken 8 km west of Monte Escobedo in September 1955, and two males (in USNM) at Plateado (21°57′N 103°06′W) in September 1897. Specimens (in BMNH and MCZ) from the Sierra Valparaíso during July and August 1889 probably originated in this state (the MCZ specimen is labelled “Sierra Valparaíso, Zac”), although on the CETN (1976) map of the area the sierra is situated at c.22°40′N 103°55′W in northernmost Jalisco and south-western Zacatecas (as mentioned under Imperial Woodpecker).

Jalisco The birds collected in 1889 (in BMNH and MCZ) came from the Sierra Valparaíso which straddles the Jalisco–Zacatecas border, but are probably attributable to Zacatecas (see above). Two birds (in BMNH) taken in the mid-nineteenth century were originally believed to be from “Real del Monte” (apparently in Hidalgo), but were later thought to have come from near Bolaños in northern Jalisco (Salvin and Godman 1888-1904). Elsewhere in the state, specimens have been taken at La Barranca de Agua (untraced), 30 km south and 13 km west of Guadalajara, where a male (in MNHUK) was collected at 2,805 m in February 1949 (also Thompson 1962); Mascota (15 km west of Tepa), in the Sierra Juanacatlán, where a female (in AMNH) was taken in May 1892; Cerro Viejo, “Jojotetan” (both untraced), where a male (in AMNH) was taken six days prior to the Mascota bird, suggesting that this locality is also
in the Sierra Juanacatlán; near Talpa de Allende (20°23′N 104°51′W), with two birds (in MNHUK) taken 29 km south-east in March 1965, and a male taken “24 km south and 14 km east” (these two localities are presumably the same or very close) at 2,105 m in May 1964. An untraced locality apparently within this state is the Sierra del Alo (possibly “Olo”), where a female (in MNHN) was collected (date unknown).

**Michoacán** The Eared Quetzal has been recorded from just two localities, both represented by specimens (in USNM) taken in 1903: Patamban (presumably the cerro, at 19°45′N 102°20′W), where three males and two females were collected on 1 February; and Cerro de Tancitaro (19°23′N 102°13′W), where a bird was taken in March.

**POPULATION** During the nineteenth century, references to the abundance of the Eared Quetzal indicated that it was relatively common: the label on a specimen (in MCZ) taken at Jesus María (see Distribution) in 1883 has “quite common” written on it, and 10 years later, in December 1893, “considerable numbers” were observed in Arizona (van Rossem 1945); Salvin and Godman (1888-1904) considered this species “one of the most characteristic birds” of the sierras, another being the Imperial Woodpecker, which at this time was also relatively abundant (see relevant account). Other examples of apparent past abundance are the collection of seven birds near Guadalupe y Calvo from 27 August to 1 September 1898; five at Patamban on 1 February 1903; six in August 1905 at Pacheco, and eight in June 1902 at Babicora (see Distribution).

Since 1905, the only significant numerical records of this species are of six birds taken at Rancho San Miguel in October 1963; seven taken at arroyo Mesteño, Chihuahua, in July 1959; and three pairs seen in 5 km during surveys in 1953 in the Sierra de Nácori (Marshall 1957: see Distribution), although particular birds (and pairs) were noted to range for at least 3 km along some valleys near Colonia García (J. T. Marshall *in litt.* 1992). Most recently, other than the U.S.A. sightings, records have been concentrated along route 40 near the Sinaloa–Durango border (see Distribution), many birdwatchers visiting Hortensia’s and Rancho Liebre Barrancas specifically to see the species (see Edwards 1985). Even at these well known sites, the Eared Quetzal is rare and occurs at low densities: thus J. F. Clements (*in litt.* 1989, 1991) observed it on just two out of seven visits to the Rancho Liebre Barranca (a female in August 1984, with a pair seen and several heard in May 1989), while S. N. G. Howell (*in litt.* 1987, 1991) has not seen it there despite many visits (all months from January to June, and August). However, B. M. Whitney (*in litt.* 1991) recorded one or more individuals at Rancho Liebre Barranca in November 1980, 1981, and 1982, and also in February 1981 and 1983, seven birds (one or two adults, the others possibly immature) having been seen in one tree along the lower part of the trail (above the highway) during February 1981.

Apart from the above observation at Rancho Liebre Barranca, the record of seven adults (at least three breeding pairs) at Cusarare, Chihuahua (a “known site” for this species), in July 1991, and two pairs nesting in La Michilia Biosphere Reserve (see Ecology) are the only other such records suggesting that the bird is common even locally (S. N. G. Howell *in litt.* 1991). Recent observers consider the bird to be rare to uncomon, existing at low densities in localized areas within its large range (Zimmerman 1978, D. A. Scott *in litt.* 1985, S. N. G. Howell *in litt.* 1987). This evidence suggests that the population has decreased during the twentieth century, although no survey has been undertaken (see Measures Proposed) and the seasonal or unpredictable movements of the bird (see Ecology) may well be masking the actual distribution and population.

**ECOLOGY** Records of the Eared Quetzal come from high temperate zone pine-forests (specimen taken at 2,440 m near El Salto in May, in DMNH: this habitat was considered typical in Miller *et al.* 1957, and AOU 1983), pine–oak woodland (specimens in AMNH and DMNH), and apparently exceptionally in tropical evergreen forest (specimen in AMNH). Birds recorded by Marshall (1957) during June to August (1951-1953) in the mountains along the Sonora–Chihuahua border were found at c.2,050 m in an open-park woodland of apache pine *Pinus engelmannii*, some ponderosa pines *P. ponderosa* and Chihuahua pines *P. leiophylla*, all of which overshadowed the relatively small grey oaks *Quercus grisea*. At another locality in the same area (1,420 m at Pinos Altos), Marshall (1957) recorded the species in an area dominated by blue oak *Q. oblongifolia* and *P. durangensis*; and near Cusarare, the species was found (in July) in a broad rocky canyon with pines, a few oaks, and fewer madrones (S. N. G. Howell *in litt.* 1991).
At Rancho Liebre Barranca in May 1989, J. F. Clements (in litt. 1989, 1991) found a pair of birds in pine/pine-oak at the rim of the barranca, with several birds heard in the humid canyon just below true pine-oak forest, in woodland comprising broadleaf trees with oaks, sacred fir Abies sp., magnolias Magnolia sp., numerous Tillandsia species, arboreal orchids and other epiphytes. Near Durango, a pair was seen in perturbed but arid pine forest in July 1988 (A. G. Navarro in litt. 1991). In Arizona, the habitat at Cave Creek comprised oak thickets, cypress, sycamore and madrones, and was described by Zimmerman (1978) as xeric vegetation, with pine-oak woods above and well developed riparian forest below.

A bird that was “presumably feeding young” (see below) had been feeding primarily on caterpillars and beetles (specimen in DMNH), and the female seen at Rancho Liebre Barranca in August 1984 was consuming both insects and the berry-like fruit of madrones (madroña) Arbutus arizonica (J. F. Clements in litt. 1991). Marshall (1957) suggested that the species feeds on vegetable matter and arthropods taken from the crowns of pine trees. The bulk of the birds' diet in November in Arizona was found to be madrones – both insects and fruit being secured on the wing (Zimmerman 1978). In 1977, an insufficient food supply was deemed to have prevented the four birds from wintering at Cave Creek, although they may have been able to survive elsewhere in the Chiricahuas (Zimmerman 1978). The Elegant Trogon Trogon elegans was noted driving Eared Quetzals away from food trees at Cave Creek, interspecific competition from both this species and Mountain Trogon T. mexicanus possibly having some influence on the Eared Quetzal's localized distribution (Elegant Trogon and Eared Quetzel are sympatric in at least one Chihuahua locality; Mountain and Elegant Trogons and Eared Quetzal are sympatric in Durango and Sinaloa, where Mountain Trogon is widespread and common, Eared Quetzal generally rare and local) (Zimmerman 1978, J. F. Clements in litt. 1991).

A pair of birds were discovered nesting in a dead maple in Ramsey Canyon (Arizona) during October 1991: unfortunately, although the adults were feeding two young on 15 October, the attempt was unsuccessful (Winging It 3,12 [1991]: 3; Amer. Birds 46 [1992]: 12). In Michilia Biosphere Reserve, two pairs were nesting (in dead pines) in July 1980 (A. M. Sada in litt. 1992). Eared Quetzals singing and inspecting nest holes (one 7 m up) were recorded in June 1952 in Sonora and Chihuahua, with singing noted in the Sierra de Nacori during August 1951 (J. T. Marshall in litt. 1992); birds persistently singing, and apparently courting, were observed near Cusarare during July 1991 (one male singing from a perch c.12 m up, beside a suitable looking nest-hole, in a dead pine: S. N. G. Howell in litt. 1992); and TAP found breeding birds in Durango (feeding nestlings) in early September 1973; thus the breeding season is apparently from June to October in much of the species' range. However, specimens that were either about to lay or had just laid have been taken on 14 April (in YPM), 3 June (in MCZ) and 10-15 July (in MVZ). The specimen (in MNHUK) taken at 1,675 m on 16 April was apparently immature (“skull not ossified”) and seems particularly early, while the female taken on 20 September and deemed to have laid eggs “within a month” appears to be later than expected.

The Eared Quetzal is restricted to montane areas between 1,675 and 3,050 m, although the majority of records come from 2,100-2,800 m (see Distribution). The records from Sonora appear to be lower, with birds observed in June and August at 1,420 m in the Sierra de Nacori (in pines) (see Distribution). A record from Sinaloa is of a bird (in MNHUK), apparently a juvenile (“skull not ossified”; see below), taken at 1,675 m in April. The records suggest that: (1) birds in the northernmost breeding localities may live at lower altitudes; (2) young birds may wander away from the breeding area (and that this wandering could be altitudinal in nature); and (3) birds may exhibit (sporadic) autumn/winter migrations to lower altitudes, a conclusion reinforced by the unpredictable (although increasingly recorded) occurrence of the species in Arizona and New Mexico, primarily during the months of August–December (see Distribution). At least one immature was present in the Chiricahua mountains in 1977, and although this “influx” involved only five recorded individuals (Zimmerman 1978), considerable numbers were found in December 1893 (van Rossem 1945). Specimens (in AMNH, SWC) taken in December and mid-February at Rancho Carrizo, Sinaloa, were collected in a lush sub-tropical barranca and tropical evergreen woodland respectively: those collected in March and April (AMNH, SWC) at the same locality were found in pine–oak woodland, indicating a localized migration to lower more tropical habitats (in the barrancas or canyons) during the winter months, birds moving uphill again for breeding during late

**THREATS** Specific threats to the Eared Quetzal are difficult to assess owing to a lack of information about its seasonal movements and true distribution. The main threat is logging and the removal of potential nest-site trees (S. N. G. Howell in litt. 1987); in many parts of the Sierra Madre Occidental, logging operations have spread to a large number of previously inaccessible areas (see Thick-billed Parrot Rhynchopsitta pachyrhyncha and Imperial Woodpecker accounts). Although logging has been selective, the removal of large and dead trees almost invariably reduces the availability of nest-sites (see Thick-billed Parrot account), and often leads to the eventual clear-cutting of forest (J. T. Marshall in litt. 1992). It has been found that Elegant Trogons are particularly susceptible to even slight disturbance during the breeding season (Zimmerman 1978), and if Eared Quetzals react in the same way, the disturbance from logging activities and the resultant increase in human population within these remote parts may possibly be a cause of the species's declining population. Along route 40 towards Rancho Liebre Barranca there has recently (since 1984) been development with towns, hotels and restaurants being built (J. F. Clements in litt. 1991). Also along this road at around km 200-210, cattle are found roaming through the forest which in turn is being constantly encroached upon by the destructive practice of slash-and-burn agriculture, a consequence of which is that many of the streams are drying up as the pristine forest is gradually destroyed (J. F. Clements in litt. 1991). Clearly, the combination of logging, agricultural encroachment and development is collectively threatening most of the forest areas where this species still exists.

**MEASURES TAKEN** The Eared Quetzal has been recorded in La Michilía Biosphere Reserve, Durango (S. N. G. Howell in litt. 1991, A. M. Sada in litt. 1992), which covers an area (from 1,700 to 3,000 m) of 35,000 ha (Anon. 1989). Apart from this, there are no other protected areas within the immediate range of the species, although the failed nesting attempt in Ramsey Canyon (see Ecology) was within the Nature Conservancy's Mile Hi–Ramsey Canyon preserve (Nature Conservancy January/February 1992: 6).

**MEASURES PROPOSED** The priority action for this species is the preservation of some substantial tracts of pine and pine–oak forest before it all becomes modified. There is also a need to assess the species's precise ecological needs throughout the annual cycle, ideal areas for such studies being La Michilía Biosphere Reserve, where the bird appears to be common, and to a certain extent the Huachuca and Chiricahuas in southern Arizona (where it may now be breeding). These studies should be followed up with surveys in other suitable areas so that a clearer picture of the bird's distribution can be determined and new areas, suitable for protection, identified. Any distributional, and to a certain extent, ecological work, should be combined with the measures proposed for the other threatened species within its range, namely the Imperial Woodpecker and Thick-billed Parrot (see relevant accounts); indeed, the need to preserve several extensive areas of intact forest in the quetzal's range is indicated in the equivalent section under Thick-billed Parrot, and the urgent need to survey certain remote areas is stressed in that under Imperial Woodpecker.

**REMARKS** (1) An (immature: Allen 1893) male specimen (in AMNH) collected in December 1890 is labelled from “El Pineta, N. Sonora”, the locality subsequently changed to “El Puerto”; Allen (1893) and Salvin and Godman (1888-1904) recorded this specimen from “El Pinita, in the state of Chihuahua”, van Rossem (1945) finally indicating that in fact it was collected at El Puerto, Sonora. (2) Marshall (1957) mapped his study site of Pinos Altos in the Sierra de Nácori, Sonora, although the Lummoltz (1903) locality is further south and in Chihuahua (apparently the same as Pinos Redondedos at 28°15′N 108°17′W), hence Pinos Altos is treated here as two localities, records prior to Lummoltz (1903) referring to the Chihuahua site, and those from the 1950s to Sonora.