

The loss of its montane forest habitat threatens this undergrowth-dwelling bird in both Haiti and the Dominican Republic, although it occurs in up to four protected areas in the latter; nevertheless it requires fuller study and the implementation of existing plans for further key site conservation.

DISTRIBUTION The White-winged Warbler (see Remarks 1) is endemic to Hispaniola, being restricted to the main mountainous areas, in both Haiti and the Dominican Republic (Bond 1979). Unless otherwise stated, records at individual localities refer to single birds collected or observed, with coordinates taken from DMATC (1972, 1973).



Haiti Records are from:

Massif de la Hotte
Unspecified, June 1917 (three specimens in AMNH); around Pic Macaya¹ (18°23'N 74°02'W), April 1931 (six specimens in USNM); "Ridge of Macaya"² (see the map in Woods and Ottenwalder 1986), May 1977; "Ridge Formon"³ (18°20'N 74°02'W), January 1973 (Woods and Ottenwalder 1983); Pic Formon (c.18°22'N 74°02'W as read from the map in Woods and Ottenwalder 1986), December 1982 and January 1984 (M. A. McDonald *in litt.* 1986);

Massif de la Selle
Morne Malanga⁴ (18°24'N 72°25'W), where two birds were collected in January 1928

(Wetmore and Swales 1931); Morne Tranchant⁵ (untraced, but in the vicinity of Kenscoff and Furcy: see, e.g., the map in Wetmore and Swales 1931), where two birds were collected (Bond 1928a); Morne La Selle⁶ (18°22'N 71°59'W), April 1927 (two specimens in USNM; also Wetmore and Swales 1931) and June 1928 (two specimens in ANSP, YPM); La Visite plateau (a broad plateau on the ridge of the Massif de la Selle), May 1975 (Woods and Ottenwalder 1983); Forêt des Pins⁷, north-east of Marie Claire (18°18'N 71°49'W), March 1959 (two specimens in YPM).

Dominican Republic Records are from:

Sierra de Baoruco Zapotén⁸ (Zapotén, at 18°19'N 71°41'W), July 1986 (A. Stockton de Dod *in litt.* 1991); on the road up from Aguacate (a military post above Zapotén), where five birds were observed in March 1984 (D. A. Scott *in litt.* 1992); between Zapotén and Loma de Toro (a few kilometres to the west of Pueblo Viejo, 18°14'N 71°31'W), where small numbers (one or two at a time) were recorded in 1982 and 1984 (A. Stockton de Dod *in litt.* 1991); above Puerto Escondido⁹ (18°19'N 71°34'W), in Loma de Toro, where five to six birds were recorded in April 1984 and up to 30 in April 1987 (J. E. Pierson *in litt.* 1991); Pueblo Viejo¹⁰ (Stockton de Dod 1981); Loma Bretón¹¹ (18°02'N 71°18'W), where several birds were observed in December 1972 (Stockton de Dod 1978); near "La Lanza"¹² (18°02'N 71°11'W), where four or five birds were observed in 1971 (Stockton de Dod 1978); near Barahona¹³ (18°12'N 71°06'W), where a bird was collected in April 1984 at the unusual elevation of c.350 m (F. Sibley *per* A. Stockton de Dod *in litt.* 1991; see Ecology);

Sierra de Neiba the south side of the crest of the Sierra de Neiba, at elevations of c.1,500-1,750 m, where common (Bond 1978);

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Cordillera Central Loma Nalga de Maco¹⁴ (19°13'N 71°29'W), recently (SEA/DVS 1992); Loma Tina¹⁵ (18°47'N 70°44'W), where a good series including the type was collected from 12 January to 3 February 1917 (at least 24 specimens in six museums: AMNH, ANSP, BMNH, CM, FMNH and USNM); Monte Viejo (untraced, but in Azua province), August 1929 (Moltoni 1929); La Leonor¹⁶ (19°21'N 71°17'W), where several observations were made in February 1973 (A. Stockton de Dod *in litt.* 1991); mountains north of San Juan¹⁷ (18°50'N 71°15'W), 1929 (Wetmore and Swales 1931); Loma Rucilla¹⁸ (19°3'N 70°58'W), February 1917 (two specimens in AMNH and CM); La Cañita¹⁹ (Las Cañitas, 18°52'N 70°52'W; see Remarks 2), March 1917 (specimen in AMNH); Valle Nuevo²⁰ (18°48'N 70°41'W), undated (Stockton de Dod 1981); El Río²¹ (18°59'N 70°38'W), May 1919 (specimen in USNM) and May 1927 (Wetmore and Swales 1931); close to El Río in the vicinity of Constanza²² (18°55'N 70°45'W), where two birds were seen and two collected in May 1927 (Wetmore and Swales 1931); La Vega County²³ (c.1.5 km south of Constanza), July 1963 (specimen in FMNH); Casabito²⁴ (19°02'N 70°31'W), 1973 (Stockton de Dod 1978); Alto Bandera²⁵ (18°49'N 70°37'W) and Aguas Blancas²⁶ (18°51'N 70°41'W), undated (Stockton de Dod 1981).

POPULATION Since the White-winged Warbler was first discovered in 1917 (Chapman 1917b) its population has declined rapidly, apparently because of habitat destruction (see Threats), although its habit of joining mixed-species feeding flocks (and thus becoming patchily distributed within its habitat) could explain why it sometimes goes unrecorded (J. E. Pierson *in litt.* 1991).

Haiti It is now very rare, and regarded as the most endangered species of bird in the country (Woods 1987).

Massif de la Hotte At least nine birds were collected between 1917 and 1931, at a time when the species was reported to be fairly common (Wetmore and Lincoln 1933). Subsequently it was observed again at Ridge Formon in January 1973 and Ridge Macaya in May 1977 (Woods and Ottenwalder 1983), a bird was observed near Pic Macaya in December 1982, and one was netted in January 1984 (M. A. MacDonald *in litt.* 1986).

Massif de la Selle Early records referred to three birds (two taken and one seen) in April 1927 (Wetmore and Swales 1931); Bond (1928a) observed it in January 1928 “in small numbers” on Morne Malanga and on Morne Trenchant (*sic*), but reported it to be much more numerous on Morne La Selle, where it roughly equalled Green-tailed Warbler *Microligea palustris* in abundance. More recent records in May 1975 are from La Visite plateau (Woods and Ottenwalder 1983), these same authors commenting that the White-winged Warbler “is by far less common than the Ground [= Green-tailed] Warbler” when discussing the Morne la Visite region. Later, Woods and Ottenwalder (1986) regarded the species as “rare and possibly extirpated” from La Visite National Park.

Dominican Republic The species is considerably less critical than in Haiti.

Sierra de Baoruco Four or five birds were seen together near “La Lanza” in 1971 and several birds at Loma Bretón in December 1972 (A. Stockton de Dod *in litt.* 1991), where local people reported it to be common because of its association with the Cuba tree *Trema micrantha* (Stockton de Dod 1978); 5-6 birds in one flock with other species (see Ecology) were observed above Puerto Escondido in 8 April 1984, and up to 30 birds were recorded primarily in flocks with other species at the same locality in April 1987, when it was judged “the commonest passerine in the forest” that day (J. E. Pierson *in litt.* 1991).

Sierra de Neiba The species was reported “common” on the south side of the crest of Sierra de Neiba (Bond 1978).

Cordillera Central This is the part of its range where most individuals in museums come from (at least 30 specimens in AMNH, BMNH, CM, FMNH and USNM), owing in part to greater ornithological investigation, and to less population pressure (see Threats). It has been considered “fairly common” at high elevations in the Cordillera Central, being “particularly numerous” on the higher slopes of Loma Tina (Bond 1956b). From January to March 1917, R. H. Beck collected no fewer than 27 birds, and clearly from this evidence the species was not rare at the few localities where it was found (see Distribution). Later records from the Cordillera Central offer little information about population densities, except that in February 1973 at La Leonor up to three birds were frequently seen feeding around broadleaf trees (Stockton de Dod 1978, A. Stockton de Dod *in litt.* 1991); however, this author could only find the bird

once at Casabito (in 1972), even though she returned to the same area many times subsequently.

ECOLOGY The White-winged Warbler is resident in the mountainous regions of Hispaniola, generally above 1,200 m (Stockton de Dod 1981) and most numerous from 1,300 to 1,800 m (Wetmore and Lincoln 1933, Woods 1987), but three observations fall below this range: in January 1973 at La Leonor (875 m), in December 1972 near “La Lanza” at c.925 m (Stockton de Dod 1978) and in April 1984 near Barahona at c.350 m (A. Stockton de Dod *in litt.* 1991). Although the species can live in pine habitats (Stockton de Dod 1981), it is most often found in dense stands of broadleaved vegetation (Wetmore and Lincoln 1933, Woods and Ottenwalder 1986), including, e.g., low trees, open thickets or the edges of clearings (Wetmore and Swales 1931, Bond 1979, Woods and Ottenwalder 1986) and humid shrubbery, either alone or as an understorey component among pines or other tall trees (J. E. Pierson *in litt.* 1991).

Stockton de Dod (1978) pointed out the importance of seeds of *Trema micrantha* for feeding purposes, and remarked that, because of this, local people at Polo call the White-winged Warbler “cubera”, although the species has also been observed searching for insects in broadleaf trees. It is seldom found high above the ground, but does not forage as low as the related Green-tailed Warbler (Wetmore and Swales 1931). It has been observed in mixed feeding flocks with other species such as Green-tailed Warbler and Flat-billed Vireo *Vireo nanus* (J. E. Pierson *in litt.* 1991).

Breeding is thought to occur in April and May (Woods and Ottenwalder 1986), but to date there have been no unequivocal records of nesting and the fact that 5-6 birds were observed in mixed flocks on 8 April 1984 and on 23 April 1987 (J. E. Pierson *in litt.* 1991) may indicate that they, at least, were not then breeding. One of three birds collected on the Massif de la Hotte on 20 and 22 June 1917 was a juvenile moulting into first fall dress (Wetmore and Swales 1931). The birds are found alone, in pairs or in mixed flocks (Wetmore and Swales 1931, Stockton de Dod 1978, J. E. Pierson *in litt.* 1991).

THREATS Habitat destruction on a major scale has been the cardinal threat to the White-winged Warbler throughout Hispaniola.

Haiti The ecological situation is disastrous, in part owing to high human population densities, resulting in deforestation for farming and for the provision of timber for firewood and house construction (Wright 1988; also Woods and Ottenwalder 1986). The country's agriculture cannot feed six million people, and the population may double in another 25 years (Kurlasky 1988); this increase suggests that deforestation would be complete by the year 2000 (Paryski *et al.* 1989); the country is reported to be the worst case of desertification in the Western Hemisphere and there has been a complete lack of governmental interest in the environment (Pellek 1988). The country's tropical rainforest was largely destroyed by the end of the nineteenth century, and by 1954 it was estimated that only 8-9% of the land remained under forest (Lewis and Coffey 1985). After a visit to the country, Bond (1928a) commented: “there has been considerable deforestation, and one encounters virgin forest only about the tops of the higher mountains”. The White-winged Warbler also faces serious threats because hillsides have recently come under cultivation (Pellek 1988), with deforestation rates significantly increasing after 1986 (Paryski *et al.* 1989). Habitat loss in the important wildlife area of the Massif de la Hotte is evident from transects which revealed only 2.4% of the region consisted of virgin forest (Cohen 1984). Deforestation has been almost total on the western ridges of Pic Macaya and the southern margin of Pic Formon (Woods and Ottenwalder 1986), while Lewis and Coffey (1985) pointed out an accelerating land and vegetation degradation in the Morne Macaya, one of the “most remote and inaccessible areas in the country”. In La Visite National Park in the Massif de la Selle, the habitat has also been modified in the past by extensive cutting of stands of large pines, and the scrubby broadleaf forest is being rapidly cut as peasant farmers pick new places for gardens; deforestation is also occurring on the north slope of the Massif de la Selle between Morne La Visite and Morne Cabaio; to the west of Morne La Visite is Morne d'Enfer, which forms the most westerly terminus of the high ridges of the Massif de la Selle, this mountain having been almost completely denuded, with severe habitat loss since 1977 (Woods and Ottenwalder 1983). Bond (1942) noted a decrease in the birds of the Massif de la Selle and associated it with the introduction in 1934 of the mongoose *Herpestes*, which would soon have reached the massif; he believed that the ground warblers (both *Microligea* and *Xenoligea*) would particularly have suffered.

Dominican Republic Although the situation is not so extreme as in Haiti, similar deforestation problems exist. A land survey by the Secretaria de Estado de Agricultura in 1979 indicated that 14% of the land was covered by forest and, again, peasant farms constitute an increasing pressure on the forest (Wright 1988), with slash-and-burn methods of farming still being used (A. Stockton de Dod *in litt.* 1986). Forests in the Cordillera Central and Sierra de Baoruco have almost disappeared, except for remnants contained in the national park that surrounds Pico Duarte (J. W. Terborgh *in litt.* 1989).

MEASURES TAKEN Haiti and the Dominican Republic are members of the Organization of American States (OAS), which in 1986 designated two projects to be of the highest priority in achieving regional development in Hispaniola: training, and the development of marine and terrestrial parks.

Haiti Legislation exists that protects natural areas and regulates the cutting, transport and selling of wood (Wright 1988), but obviously enforcement has been negligible (see Threats). In 1983 a decree led to the establishment of La Visite and Pic Macaya National Parks (Wright 1988), whose areas certainly once held White-winged Warblers (see Distribution), but where human population pressure is apparently still a major problem: and the species may have disappeared from the former (Woods and Ottenwalder 1986). The U.S. Agency for International Development (USAID) oversees a reforestation programme that has handed out 22 million tree seedlings to 40,000 peasants (Kurlasky 1988), but about 30 million trees were cut down in 1986 alone, merely for charcoal production (Wright 1988).

Dominican Republic Legislation concerned with forests and wildlife management exists, but the primary focus of the forest law of 1962 is forest production (Wright 1988) and there is a lack of enforcement (J. A. Ottenwalder *in litt.* 1992). At present, three of the country's nine national parks and one of its four scientific reserves are set up in both the Cordillera Central and the Sierra de Baoruco, namely the contiguous (and in conjunction massive) Armando Bermúdez and José del Carmen Ramírez National Parks and the Valle Nuevo Scientific Reserve in the Cordillera Central, and the Sierra de Baoruco National Park; from the map and information in Hoppe (1989) and the information under Distribution it is clear that the White-winged Warbler occurs in all four.

MEASURES PROPOSED More studies are needed to clarify the real situation of the White-winged Warbler in Hispaniola. An overview of the importance of conserving the island's mountain forests is in Measures Proposed under Chat-tanager *Calypophilus frugivorus*.

Haiti The prospects of the White-winged Warbler would be enhanced by the implementation of proposals, made for other reasons, by Woods and Ottenwalder (1983, 1986), namely (1) the cessation of all cutting of the broadleaved forest above the Plain of Formon and Pic Macaya National Park in the Massif de la Hotte; (2) the incorporation into the Pic Macaya National Park of 1,000 ha of habitat between Caye Formon and Sou Bois on the plateau south of the Ridge of Formon; (3) the preservation of the habitats on the cliffs of La Visite between Morne La Visite and Tête Opaque; (4) the inclusion in La Visite National Park of the area west of Morne La Visite as far as and including Morne d'Enfer.

Dominican Republic Hartshorn *et al.* (1981) mentioned moves to develop new wildlife legislation to be administered by the Departamento de Vida Silvestre and aimed at establishing wildlife management as a goal in itself. The creation of a first protected area in the Sierra de Neiba and a second in the Sierra de Baoruco (see Measures Taken) is long overdue and most important for the conservation of the species.

REMARKS (1) The White-winged Warbler is the sole representative of its genus. (2) Wetmore and Swales (1931) referred to both La Cañita and Las Cañitas, but these appear to be identical as both are described as on the río del Medio (see, e.g., IGU 1979).