

= Elfin woods warbler =

The elfin woods warbler (*Setophaga angelae*) is a bird endemic to Puerto Rico where it is a local and uncommon species . Discovered in 1968 and described in 1972 , it is the most recently described species of New World warbler (*Parulidae* family) . The species name , *angelae* , is a tribute to Angela Kepler , one of its discoverers . An insectivore , it feeds by gleaning small insects off leaves .

Due to its small populations and restricted habitats , conservation efforts were begun in 1982 to protect this species but , as of 2005 , the warbler was still in need of protection . The species is not in immediate danger as the majority of its habitat is protected forest , but introduced species , such as rats and small Asian mongooses , habitat reduction , and natural disasters represent potential threats to the population .

= = Discovery and naming = =

The elfin woods warbler is one of many species in the genus *Setophaga* of the New World warbler family *Parulidae* . It was first observed in 1968 by Cameron and Angela Kepler while they were conducting observations on two Puerto Rican endemic birds , the Puerto Rican amazon and the Puerto Rican tody . On May 18 , 1971 , a specimen was captured in El Yunque National Forest , which at the time was believed to be its only habitat . A year later Kepler and Parkes described and named the species making it the most recent warbler of the genus *Setophaga* discovered in the New World . Also , it is the first species described in the Caribbean since 1927 and the first Puerto Rican species described in the 20th century . The species name , *angelae* , is a tribute to Angela Kepler . Elfin @-@ woods warbler is an alternative spelling , and *Reinita de Bosque Enano* is the Spanish name . The species was initially placed in the genus *Dendroica* but in 2011 the American Ornithologists ' Union reorganized the classification of the *Parulidae* family and transferred species in the *Dendroica* genus into *Setophaga* . This revised classification was adopted by the International Ornithologists ? Union .

A phylogenetic analysis using mitochondrial DNA sequences from New World warblers has shown that within the genus *Setophaga* the elfin woods warbler is most closely related to the arrowhead warbler , a species which is endemic to Jamaica and the plumbeous warbler which is endemic to the islands of Dominica and Saint Lucia .

= = Description = =

The warbler 's upper body is predominantly black with white areas while its underparts are white with black streaks . Other identifying characteristics are dark brown eyes , white patches on its ears and neck , an incomplete white eyering , a white eyestripe , and two white spots on its outer tail feathers . Characteristic of Antillean warblers (*S. adelaidae* , *S. delicata* , *S. plumbea* and *S. pharetra*) , the species features a long bill and short , round wings (53 @.@ 8 mm or 2 @.@ 12 in average) . Among *Setophaga* spp . , only *S. adelaidae* has a shorter wing length average (50 mm or 2 @.@ 0 in) than the elfin woods warbler . Juveniles differ from adults , retaining a grayish @-@ green back for approximately a year and partially molting from July to October . The warbler 's average mature length is 12 @.@ 5 cm (5 in) and its average weight is 8 @.@ 4 g (0 @.@ 30 oz) . Sexual dimorphism is not present in this species .

= = = Identification = = =

The elfin woods warbler is often confused with the black @-@ and @-@ white warbler (*Mniotilta varia*) , a non @-@ breeding species in the Caribbean occurring in Puerto Rico from mid @-@ September to early May . The main physical distinction is in the eyes . The elfin woods warbler has an incomplete white eyering and the black @-@ and @-@ white warbler has a white band across the eye and a white lower half of the eyering . Another distinction is found in the crown , with the

elfin woods warbler 's being entirely black and the black @-@ and @-@ white 's having a white band across . The latter species forages on larger branches compared with the elfin woods warbler 's foraging in the canopy and on smaller branch tips .

= = = Voice = = =

The elfin woods warbler 's song and call are difficult to hear . The species has a subtle voice and its call and song resemble those of the bananaquit , the most abundant bird in Puerto Rico . The song is a series of " short , rapidly uttered , rather unmusical notes on one pitch , swelling in volume and terminating with a short series of distinct double syllables sounding slightly lower in pitch " while the call has been described as " a single , short , metallic chip " .

= = Behavior = =

= = = Breeding = = =

The elfin woods warbler breeds from March to June . Both parents are involved in the construction of the nest and in feeding the chicks . Nests are built close to the tree trunk within dry aerial leaf litter , usually *Cecropia* leaves (a material used by no other *Parulidae* species) , in *Bulbophyllum wadsworthii* trees . Nests are well @-@ concealed and located 1 @.@ 3 to 7 @.@ 6 metres (4 @.@ 3 to 24 @.@ 9 ft) above ground level . Nests are cup @-@ shaped and made from small roots and twigs , dry leaves of *Chusquea abietifolia* and *B. wadsworthii* , and dry *Panicum maximum* leaves . The interior is made from fibers of *C. abietifolia* , dry leaves and other plant matter . Females lay two or three white colored eggs with red @-@ brown spots . The chick 's diet consists of insects ? parents have been observed offering lepidopteran and orthopteran adults and lepidopteran larvae to hatchlings .

= = = Feeding = = =

The elfin woods warbler is commonly found foraging the middle canopy for insects . While searching for food it often flocks with other birds , such as black @-@ and @-@ white warblers , Puerto Rican tanagers and Lesser Antillean pewees . Three maneuvers used for catching prey ? gleaning , sally @-@ hovering and probing ? have been described . Gleaning is described as a hunting maneuver made by a standing or moving bird . Sally @-@ hovering is a hunting maneuver made by a bird in flight . Probing is a maneuver in which the bird , by digging with its beak , forages the substrate looking for food in a manner similar to chickens . Gleaning , especially off leaves , is the maneuver used with more frequency by the elfin woods warbler while probing is the least used .

= = Distribution and habitat = =

When first discovered , the elfin woods warbler was believed to exclusively occur in the high elevation , from 640 to 1 @,@ 030 metres (2 @,@ 100 to 3 @,@ 380 ft) , dwarf or elfin forests of the El Yunque National Forest in eastern Puerto Rico . The wind @-@ clipped trees in these forests rarely exceed 5 metres (16 ft) height and are characterized by stiff , thick twigs , leathery leaves and impenetrable , dense undergrowth ideal for hiding from predators . Later studies showed that the species migrated altitudinally to lower elevations , between 370 and 600 metres (1 @,@ 210 and 1 @,@ 970 ft) , in Tabonuco and Palo Colorado forests . Three more populations were discovered in the Maricao State Forest (1972 , largest known population) , the Carite State Forest (1977) and the Toro Negro State Forest (late 1970s) .

Presently , the species is presumed extirpated from two locales , occurring only at El Yunque National Forest and the Maricao State Forest . The elfin forest at El Yunque National Forest is characterized by high rainfall and humidity , low temperatures and insolation , and constant winds . It

is found at mountain summits and is primarily composed of dense shrub and small trees with moss and epiphyte growth in its plants and floor . The species richness is low when compared to other types of forests (tabonuco , palo Colorado and palma sierra forests) found in the Luquillo Mountains . The elfin forest at the Maricao State Forest , located in western Puerto Rico , receives an annual average rainfall of 2 @, @ 250 millimetres (90 in) , a high amount considering that a rainforest , by definition , receives a minimum of 1 @, @ 700 millimetres (67 in) annually . However , since its soil has low water @-@ holding capacity its vegetation is more xeric than expected . The species 's highest density occurs in Podocarpus forests in the Maricao State Forest . Little information is available on the elfin forests at Toro Negro and Carite .

= = Status and conservation = =

= = = Population = = =

In September 1989 , Hurricane Hugo struck the central and eastern region of Puerto Rico affecting three (the El Yunque National Forest , Toro Negro and Carite populations) of the four known populations of the elfin woods warbler . A survey conducted two years later in the Toro Negro Forest , located in the Cordillera Central , did not find any individuals . Recent surveys suggest that , for reasons yet unknown , the populations at Carite and Toro Negro were likely extirpated . Continued monitoring of the elfin woods warbler populations is achieved through bird counts performed every 3 to 4 years by the Puerto Rican Breeding Bird Survey (PRBBS) . A survey conducted in 2001 found three individuals at the Maricao State Forest . An IUCN assessment of the elfin woods warbler , prepared in 2000 , estimated a stable population of 600 mature individuals . More recently the population has been estimated to comprise at least 1800 mature individuals , a figure which equates to at least 2700 individual birds .

= = = Threats = = =

The survival of the elfin woods warbler faces two main threats , predation and the destruction or alteration of suitable habitat . Confirmed native predators are the pearly @-@ eyed thrasher (*Margarops fuscatus*) , the Puerto Rican sharp @-@ shinned hawk (*Accipiter striatus venator*) and the extirpated white @-@ necked crow (*Corvus leucognaphalus*) while unconfirmed native predators include two endemic snakes and several carnivores (from fossil records) . Introduced species , such as cats (*Felis domesticus*) , dogs (*Canis lupus familiaris*) , black rats (*Rattus rattus*) and small Asian mongooses (*Herpestes javanicus*) are also potential nest predators . These species have proliferated due to the presence of human @-@ developed facilities , mainly for communication purposes , in the Maricao State Forest and El Yunque National Forest . Two factors contribute to the destruction of the elfin woods warbler 's habitat , humans and nature . Human @-@ related habitat destruction includes the construction of communication towers , acquisition of timber , and expansion of roads and trails . Nature 's contribution comes from natural disasters such as forest fires and hurricanes .

= = = Protection = = =

The elfin woods warbler was placed on the United States federal candidate list for the Endangered Species Act in 1999 and the announcement was published on the Federal Register of October 25 , 1999 , Volume 64 , No. 205 , pages 57535 ? 57547 . The USFWS started to consider the need to protect the elfin woods warbler in 1982 . In 2005 , a group of scientists , scholars , artists and environmentalists petitioned the Bush administration to admit 225 species , among these the elfin woods warbler , to the Endangered Species Act . Of these 225 species , more than one third have been on the candidate list for 20 or more years and half for 10 or more years . Recent (2004) studies also show that since the creation of the Endangered Species Act in 1973 , 114 United States

species have become extinct , many because of lack of habitat protection by the federal government

The IUCN first evaluated the status of the elfin woods warbler in 1988 . At the time it was given a classification of lower risk / least concern . In 1994 , its status was changed to lower risk / near threatened and in 2000 , its status was changed to vulnerable , where it remains . The justification for maintaining the species ' status as vulnerable is that " There are no direct or immediate threats , but the combination of a very small range and population may have important implications for its chances of long @-@ term survival , and this species consequently qualifies as vulnerable " .

= = = Cited references = = =