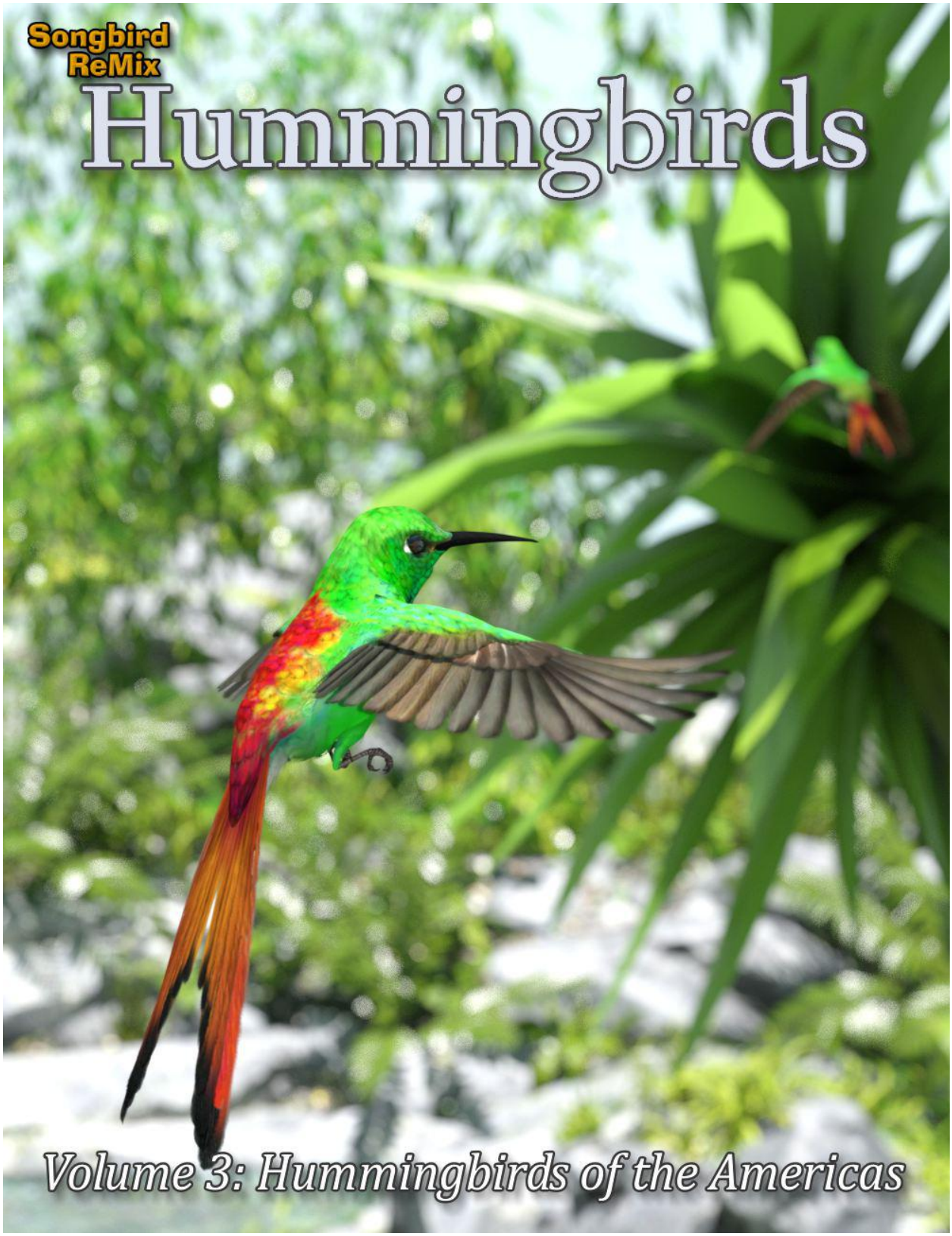

Avian Models for 3D Applications

by Ken Gilliland

Songbird ReMix

Hummingbirds of the Americas

Volume 3: Hummingbirds of the Americas

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Songbird ReMix

Hummingbirds of the Americas

Volume 3: Hummingbirds of the Americas

Introduction

“Hummingbirds v3” adds more of the smallest of birds to the Songbird ReMix series. While endemic to the Americas, they have been adopted worldwide as one of the most popular and belovedbirds. Hummingbirds have been a staple in both ancient and modern cultures as a sign of vigor, energy, and skill.

This collection focuses on hummingbirds found throughout the Americas, from the feeders of the America Southwest to the tip of the Argentina.

Included is some of the most interesting and visually stunning hummingbirds. There is the Red-tailed Comet whose long tail feathers equal the length of its body and the Horned Firecrest who has rainbow-like horns shooting out of the sides of its head. The Snowcap has a pure white head above its crimson body and the Green-crowned Plovercrest has the distinctive crest borrowed from its shorebird cousin.

Whether you choose to create art with a message or you are simply looking for realistic and attractive birds for your imagery, this package will easily fulfill those needs.

Overview and Use

The set is located within the **Animals : Songbird ReMix** folder. Here is where you will find a number of folders, such as **Bird Library**, **Manuals** and **Resources** . Let's look at what is contained in these folders:

- **Bird Library:** This folder holds the actual species and poses for the "premade" birds. Birds are placed into a "type" folder (such as "Birds of Prey (Order Falconiformes)" which for example would hold falcons, hawks and eagles). The birds for this set can be found in the following folder(s):
  - **Hummingbirds and Swifts (Order Apodiformes)**
- **Manuals:** Contains a link to the online manual for the set.
- **Props:** Contains any props that might be included in the set
- **Resources:** Items in this folder are for creating and customizing your birds
  - **Bird Base Models:** This folder has the blank, untextured model(s) used in this set. These models are primarily for users who wish to experiment with poses or customize their own species of bird. When using physical renderers such as Iray and Superfly, SubD

should be turned to at least “3”. For DAZ Studios 3Delight renders, the SubD must be turned from the “High Resolution” setting to the “Base” setting (otherwise some areas will render incorrectly transparent).

Poser Use

Select **Figures** in the **Runtime** Folder and go to the **Animals : Songbird ReMix** folder. Select the bird from the renderer *Firefly or Superfly*) folder you want and simply click it to load. Some birds in the Songbird ReMix series may load with attached parts (*Conformers*) such as tail or crest extensions. Some of these parts have specific morphs. You will need to click on the attached part to access those controls. Associated poses can be found in the same folder- **Bird Library : (Type) : Poses**.

DAZ Studio Use

Go to the **Animals : Songbird ReMix** folder. Select the bird from the renderer (*3Delight or Iray*) folder you want and simply click it to load. Some birds in the Songbird ReMix series may load with attached parts (*Conformers*) such as tail or crest extensions. Some of these parts have specific morphs. You will need to click on the attached part to access those controls. Associated poses can be found in the same folder- **Bird Library : (Type) : Poses**. **Note:** Using the "Apply this Character to the currently selected Figure(s)" option **will not** properly apply the correct scaling to the bird selected. It is better to delete the existing character first and load the one you want to use.

Physical-based Rendering

Iray and **Superfly** requires more CPU and memory horsepower than the legacy renderers because of ray-trace bounces and higher resolution meshes needed for displacement. Poser’s **Superfly** renderer will require that the “Min Transparent Bounces” be set to **at least 16** and that the “Max Transparent Bounces” be set to **at least 32** in render settings. Superfly renders may show artifacts in the head area. This is a known Poser issue and may be addressed in the future. Increasing the SubD may minimize this issue.

Posing & Shaping Considerations

This volume has various species, so when using generic poses not every pose will work perfectly with every bird. You may find that some minor alteration on the stock poses may be warranted.

Here are some of the most common alterations you may need to make:

- Birds will not be flat on the zero plane due to leg size and overall scale.

- Because of the numerous beak shapes, closing the beak may range from 0.5 to 1. Usually 0.8 is about right.
- **Raise Upper Beak** ***(in Action Controls):*** This morph is a “one size fits all” control. Because of the variety of beak shapes. It may not work with all birds.

IK Concerns

Some poses may go askew when IK is turned on. By default, Poser’s IK feature is turned off when loading a bird. To turn it on, select the “Figure” category from the main tool bar and “Use Inverse Kinematics” from the submenu.

By default, DAZ Studio’s IK feature is turned on when loading a bird. This will cause the thigh and shin rotations change when the character is moved. The **CTRL K** keypress will turn IK on and off in DAZ Studio. IK doesn’t work that well in Studio, so I suggest selecting the character in the **Scene tab** and simply deleting the two IK body parts to remove IK.

Where to find your poses and birds

Type Folder	For what species?
Hummingbirds and Swifts **(Order Apodiformes)**	Red-tailed Comet Purple-throated Mountain-gem Horned Sun-gem Garnet-throated Hummingbird Sparkling-tailed Hummingbird Chilean Woodstar Slender Sheartail Lucifer Hummingbird Xantus's Hummingbird Green-crowned Plovercrest Santa Marta Blossomcrown Snowcap

Songbird ReMix

Hummingbirds of the Americas

Field Guide

Volume 3: Hummingbirds of the Americas

Red-tailed Comet
Purple-throated Mountain-gem
Horned Sun-gem
Garnet-throated Hummingbird
Sparkling-tailed Hummingbird
Chilean Woodstar
Slender Sheartail
Lucifer Hummingbird
Xantus's Hummingbird
Green-crowned Plovercrest
Santa Marta Blossomcrown
Snowcap

Hummingbird Facts

Hummingbirds comprise the *Phaethornithinae* and *Trochilinae* families. There are 356 species of hummingbird with 51 species currently having an “endangered status”. They are among the smallest of birds, most species measuring in the 3–5 inches (7.5–13 cm) range. The smallest living bird species is the Bee Hummingbird (2 inches (5 cm)).

They can hover in mid-air by rapidly flapping their wings 12–90 times per second (depending on the species and can fly at speeds exceeding 34 mph (54 km/h). Hummingbirds are the only birds in the world that can fly backwards, but most are incapable of walking or hopping.

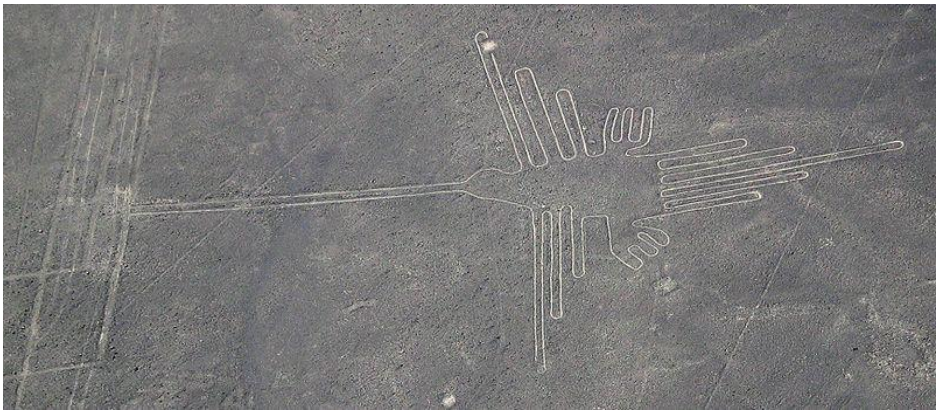
At rest, their heart beats an average of 480 beats per minute. On cold nights they go into torpor, and the heart rate drops to 45–180 beats per minute. Breathing rate when resting is 245 breaths per minute at 91 degrees Fahrenheit; this rises to 420 breaths per minute when the temperature drops to 55 degrees Fahrenheit. Torpid hummingbirds breathe sporadically.

With most hummingbirds, females average larger than males, and young birds average larger than their parents.

Hummingbirds consume about 1.6 to 1.7 times their body weight in nectar each day. Because hummingbirds sip from so many different flowers on any given day, they are integral to the process of pollination.

Their English name derives from the characteristic humming sound made by their rapid wing beats.

A group of hummingbirds has many collective nouns, including a “bouquet", "glittering", "hover", "shimmer", and "tune” of hummingbirds.



Hummingbirds play a strong role in Mesoamerican cultures. In Peru, one of the Nazca Lines depicts a hummingbird. The Nazca "drew" several hundred simple but huge curvilinear animal and human figures by this technique. In total, the earthwork project is huge and complex: the area encompassing the lines is nearly 500 square kilometers (190 sq. mi), and the largest figures can span nearly 270 meters (890 ft.). The lines were made by removing the reddish-brown iron oxide-coated pebbles that cover the surface of the Nazca desert. When the gravel is removed, it leaves a shallow trough

ranging from 10 centimeters (3.9 in) to 15 centimeters (5.9 in) deep and the light-colored earth beneath shows in lines of sharply contrasting color and tone. This sub-layer contains high amounts of lime which with the morning mist hardens forming a protective layer that shields the lines from winds therefore preventing erosion. The extremely dry, windless, and constant climate of the Nazca region has preserved the lines well.

Aztecs wore hummingbird talismans, the talismans being representations as well as actual hummingbird fetishes formed from parts of real hummingbirds: emblematic for their vigor, energy, and propensity to do work along with their sharp beaks that mimic instruments of weaponry, bloodletting, penetration, and intimacy.

The Aztec god Huitzilopochtli is often depicted as a hummingbird. The Nahuatl word huitzil (hummingbird) is an onomatopoeic word derived from the sounds of the hummingbird's wing-beats and zooming flight.

Hummingbirds captured the imagination of European settlers as well and by the middle of the nineteenth century there was a large market for hummingbird skins in Europe. Sadly, hundreds of thousands of hummingbirds were killed in South America and shipped to markets in London and other cities throughout Europe, where they were purchased for collections, to make artificial flowers, and other ornamental uses.

American bird artist, John James Audubon, referred to hummingbirds as "glittering garments of the rainbow." Emily Dickinson, after seeing a Ruby-Throated Hummingbird in her garden, she wrote:

He never stops, but slackens
Above the Ripest Rose --
Partakes without alighting
And praises as he goes,
Till every spice is tasted.

What's a Gorget?

A gorget is a patch of colored feathers found on the throat or upper breast of male hummingbirds. Gorgets are typically iridescent. The term is derived from the "gorget" used in military armor to protect the throat.

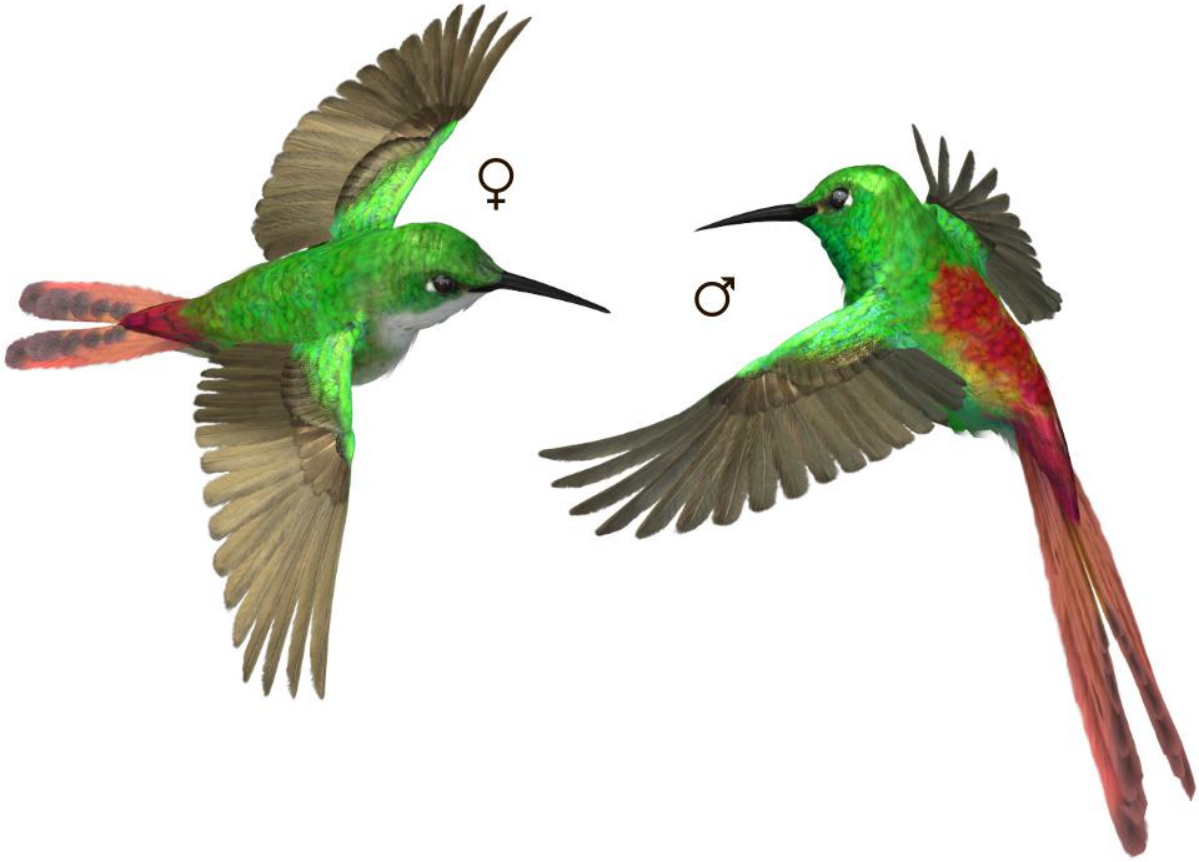
Feather wear and exposure to the sun can produce changes in the apparent color of iridescent gorget feathers. For example, fresh gorget feathers on the Anna's Hummingbird are rose red; these fade to a coppery bronzy color with age. A number of social functions have been suggested for the gorget. It may aid in mate attraction or in resource defense. It may signal social status or allow species to identify conspecifics. While gorgets are typically found only on male hummingbirds, in rare instances, females may have them; they appear to serve primarily for signaling threats.

Common Name: Red-tailed Comet
Scientific Name: *Sappho sparganurus*

Size: Male 7.5 - 7.9 inches (19-20 cm) (7-10 cm tail); Female 4.7-5.5 inches (12-14 cm)

Habitat: South America; it occurs in intermontane valleys and on the east slope of the Andes of Bolivia and Argentina, from La Paz south to Mendoza and northern Neuquén. it also occurs on isolated mountain ranges in Catamarca, San Luis, and Córdoba, as well in Chile, at Portillo Pass (but this locality is in Mendoza, Argentina).

Red-tailed Comet generally occupies arid montane scrub habitats. This includes dry slopes with scattered trees and some bushy cover, and in gorges with dense tangled scrub or semi-arid deciduous forests. It is also found in Polylepis woodland.



Status: Least concern. **Global Population:** 1,020,000 mature individuals and stable. Red-tailed Comet occupies areas in the Andes that have been settled by humans for thousands of years, and at least in the short term, seems to be little affected by human activities.

Diet: Flower nectar. Reported food plants include the flowers of Acnistus, Castilleja, Dunalia, Lamourouxia, Nicotiana, Psittacanthus, Salvia, Siphocampylus, and Tripodanthus.

It forages for nectar in hovering flight at flowers. It both hovers and perches with a very upright posture. It frequently bobs its long tail when perched or agitated, and when hovering. The tail often is fanned open. Insects are captured from the air in sallies, or sometimes gleaned from leaves.

Breeding: The adult male has an iridescent green head, with a golden green or emerald green gorget on the throat. The remaining under parts are green with buffy under tail coverts. The back and rump are a reddish purple. Its tail is quite long and deeply forked. The rectrices have blunt tips. The appearance of the tails upper surface varies with the incidence of the angle of light, varying from reddish purple to green. Each rectrices has a broad velvety black to dark purple tip. The female is similar in pattern to the male, but duller with shorter tail. It upper parts are iridescent green, with the reddish purple confined to the rump. Its under parts are a pale buff with a finely speckled with green on the throat and chest. The lower belly is unspotted. The edges of the outer tail rectrices are off-white. The juvenile is similar to the female, but has a duller back (bronze green), the rump is only slightly coppery, and the white of the outer rectrices also extending, distally, to the inner webs and along the shafts.

Breeding in Bolivia goes from April to June. Breeding season in Agentina goes from October to December in Argentina.

The nest is bulky cup, which tapers to a point (like an inverted pear). It is composed of moss, lichen and animal hair and is usually placed in the shade of a rocky gorge wall or in a tree. The clutch is two eggs and they are white and unmarked. Incubation and feeding of the chicks is solely performed by the female. The incubation period is 19-20 days and the nestlings fledge after 31-32 days. The nest may be re-used, and newly constructed nests often are placed very close to an abandoned nest.

Cool Facts: Red-tailed Comet presumably is solitary, as is typical of hummingbirds. Red-tailed Comets, especially males, frequently engage in intraspecific chases when multiple individuals aggregate at a clump of flowers.

- *S. s. sparganurus.* First reported by Shaw in 1812. The nominate race is found on the eastern slope of the Andes in northern Bolivia and in extreme south Peru.
- *S. s. sapho.* First reported by Lesson in 1829. The race occurs on the eastern slope from central Bolivia (Cochabamba) south to northern and western Argentina (Jujuy and Salta southward to Neuquén). It is similar to the nominate race, but paler. The reddish purple replaced (especially on the rectrices) by golden orange.

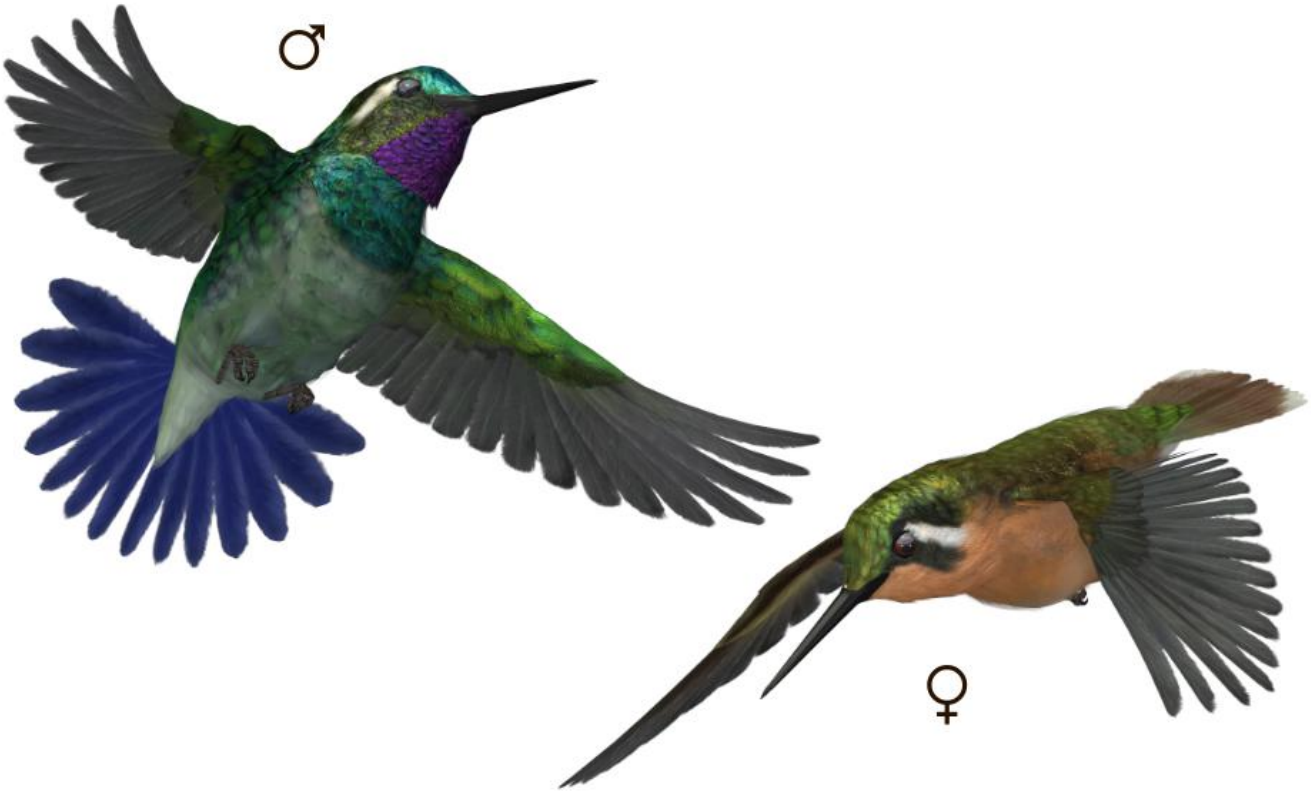
Common Name: Purple-throated Mountain-gem
Scientific Name: *Lampornis calolaemus*

Size: 4.1 inches (10.5 cm)

Habitat: Central America; a resident species of the highland cloud forests of southwestern Nicaragua, northwestern Costa Rica and central western Panama.

Occurs in humid montane evergreen forest. Specifically, occupies forested areas in steeply sloping, broken terrain.

Status: Least Concern. **Global Population:** 53,400 mature individuals with a declining population trend. The Purple-throated Mountain-gem is not threatened but is thought to be declining due to continuing deforestation. Small-scale disturbances in the highlands of Costa Rica and Panama due to human development have altered the habitat of this



species, although vast expanses of cloud forests within their range remain beyond human influence. Studies in the Monteverde Cloud Forest Reserve of Costa Rica revealed that the Purple-throated Mountain-gem is very successful in areas with patchy deforestation, including large clearings due to human influence and tree falls inflicted by natural mudslides. Although these disturbances introduce increased competition from

other hummingbird species, these studies attest to the strong resiliency of Purple-throated Mountain-gem populations in the face of habitat alteration.

Diet: Flower nectar from bushes and trees as well as small insects.

Breeding: The adult male has a forecrown and crown which are iridescent emerald green, varying to bluish green. The remaining upper parts are a metallic bronze-green, becoming more bluish or mediums green on upper tail coverts. There is a post-ocular white streak. The auriculars and suborbital area are a dusky bronze-green. The tail rectrices are dull blue-black. The remiges are dusky purplish brown with the inner secondaries being mostly bronze-greenish, especially on the outer webs. The primary coverts are dull black. The chin and throat gorget is a metallic violet or purple. The breast is bright metallic green with the flanks and belly duller, more bronze green or gray. The under tail coverts are a deep bronze gray, margined with paler gray feathers.

The female has its upper parts a bright metallic green, usually more bluish on the upper tail coverts and more bronzy proximally. The lores, subocular region and auricular regions are black with the auriculars bordered above by a whitish or pale buff post-ocular stripe. The central rectrices is duller metallic green or bronze-green. The basal half of remaining rectrices are similar, but blackish subterminally; the outer two or three pairs broadly tipped pale gray. The remiges are dusky, faintly glossed with violaceous. The throat, breast, and belly are rufous in color and the under tail coverts are dull white to pale tawny buff.

The immature males upper parts (including tail) as adult female. The chin and throat are dusky. The center of the throat has a few tawny-ochraceous feather. The throat shades into dull metallic bronze-green on lower throat and breast. The belly is tawny-ochraceous. The under tail coverts are brownish gray, broadly margined with dull white.

It breeds primarily during the rainy season from October to April. The nests are substantial, thick-walled, open cups, with incurved walls. They are made chiefly of buffy and tawny plant down, fern scales, and liverworts, with exteriors of moss and lichen. They are built 1.2-3.6 m above the ground. Nest are placed on bamboo sprays, on stems of coarse grass, and in small trees. The cluch is two eggs are which are white, unmarked, and highly elongated. Females incubate the eggs and feed the nestlings. The incubation period lasts 17-18 days and the fledging period is 22-23 days.

Cool Facts: Three subspecies currently recognized:

- *L. c. pectoralis*. First reported by Salvin in 1891. This race occurs in Nicaragua and in northwestern Costa Rica. It is similar to to the nominate but the gorget of male is a deeper purple, otherwise it is close to the color of race *homogenes*, but the green of the breast is restricted, the lower area is darker and more brown, the under tail coverts are darker, and the green of foreneck and upper tail coverts decidedly darker.
- *L. c. calolaemus.* First reported by Salvin in 1865. the nominate race occurs in northern and central Costa Rica.

- *L. c. homogenes.* First reported by in Wetmore in 1967. It occurs in southwestern Costa Rica and western Panama. The male similar to the nominate race, but its breast and abdomen are a darker gray. The under parts of the female are darker, more rufous, and the upper parts are darker as well with more bluish green feathers. The central rectrices are darker bronze-green and the white-tipping on the outer rectrices is reduced. The bluish black subterminal band is broader as well.

Common Name: Horned Sun-gem
Scientific Name: *Heliactin bilophus*

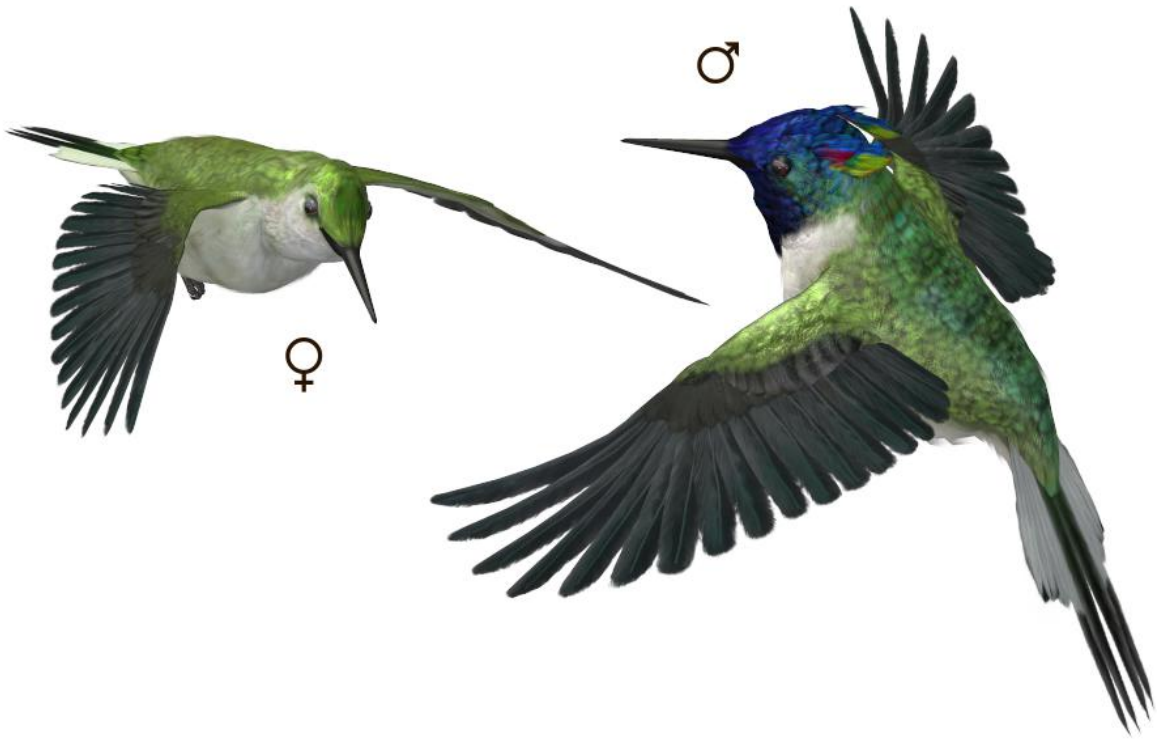
Size: 3.7 -4.3 inches (9.5-11 cm)

Habitat: South America; found in central and eastern Brazil and adjoining Bolivia with a disjunct population in south Surinam and north Brazil. Migratory in Central and East Brazil; sedentary elsewhere. Arrives March-May on breeding grounds, coinciding with flowering season.

It prefers fairly dry open or semi-open habitats, such as savanna and Cerrado. It avoids dense humid forest.

Status: Least Concern. **Global Population:** 6,490,000 mature individuals with an increasing population trend. It readily accepts man-made open habitats such as gardens and cultivated areas. It has recently spread to Espírito Santo (central eastern Brazil), probably due to deforestation.

This hummingbird was one of the most sought after species for the international bird trade in Brazil until the trade was outlawed in the late 1970s.



Diet: Flower nectar from bushes and trees as well as small insects. It prefers Stachytarpheta, Lantana, Citrus, Malvaviscus, Palicourea, Malvaceae and Urticaceae.

Small insects are mostly taken in the air by hawking, but also sometimes from the surfaces of leaves and flowers.

Breeding: This hummingbird has a short, straight bill. Males are easily identified by their long tail, bright blue caps, dark blue/purple gorgets, white chests and small iridescent “horns” of feathers above and behind the eyes. The tail feathers are narrow and pointed with the four central feathers being the longest. The central pair are green and the remainder are white. Females are similar to males, but lack the blue crowns/horns and the gorgets (have white throats). The lower tail coverts are tipped with dark green. Juveniles are similar to female adults.

The nest is a small cup made of soft plant material and cobweb which is usually in a fork of a small bush 1 meter above ground. Clutch size is 2 eggs incubated for about 13 days by female only. Young fledge after 20-23 days, first brood is laid in second adult year.

Cool Facts: It is the sole member of the genus, *Heliactin*. It can achieve 90 wingbeats per second when it's hovering to drink nectar from flowers. A wingbeat is one complete up-and-down movement, which means that the Horned Sungem moves its wing muscles at a rate of more than 10,000 times per minute.

Common Name: Garnet-throated Hummingbird
Scientific Name: *Lamprolaima rhami*

Size: 4.7-4.8 inches (12-12.4 cm)

Habitat: Central America; it is endemic to central and southern Mexico (Guerrero, Puebla and western Veracruz southward through Oaxaca to Chiapas) south to Guatemala, El Salvador and Honduras.

It prefers upper tropical forests, cloud forests, forest edges, pine-oak forests and scrub. It is found mostly at 1,500–2,300 m on the Atlantic and Pacific slopes. In Honduras, does not occur below 1600 m.

Status: Least Concern. **Global Population:** 471,000 mature individuals with a stable population trend. It readily accepts modification of habitat by man, if patches of forest remain. In Mexico, frequently recorded in Sierra de Atoyac (Guerrero), Cerro San Felipe (Oaxaca) and Lagos de Montebello (southern Chiapas).

Diet: Flower nectar from bushes and trees as well as small insects. It favors Ice Cream Bean (*Inga*) and Coral (*Erythrina*) tree flowers.

It forages 1–10 m above the ground. Insects are caught in the air by hawking. The male occupies feeding territories and defends them.

Breeding: The male has s short straight black bill. The upper parts are an iridescent green. The postocular spot is white. The throat is an electric rose-pink, the breast an iridescent violet-blue, and the rest of the under parts are blackish, with mottled green on the flanks. The remiges are rufous, tipped dark brown and the tail is a dark purple with the outer rectrices finely tipped with gray. The female has upper parts similar to the male. Its lower parts are a dusky gray and it usually pinkish dots on the throat. The tail is duller, with white tips to outer rectrices. The juvenile female is similar to the adult female, but with buff fringes on the head feathers. The juvenile male is similar to adult female but with darker underparts, buff fringes to bluish chest feathers, and rufous parts on the remiges smaller than in the adult male.

Breeding season occurs from April to May on the Atlantic slope and from December to March on the Pacific slope. The nest has a bulky cup-shaped form which is composed of moss, parts of leaves, and pine needles. It is lined with soft plant fibers and attached to roots in the banks of washed-out creek beds. Clutch is two white eggs which are incubation by the female. The female cares for the chicks throughout the fledging process.

Cool Facts: The song a soft, gruff, dry, crackling warble intermixed by nasal, gurgling notes. Calls include a nasal “*nyik*” and “*choiw*”, high-pitched chips and a sharp, slightly buzzy “*tis-i-tyu-tyu*”.

Some ornithologists believe that this hummingbird belongs in genus *Basilinna*. They proposed two subspecies, races *occidentalis* (Guerrero) and *saturatior* (Honduras and northern El Salvador), based on colour and size variation. Other ornithologists argue that both patterns are either age-dependent or clinal in character and thus unsuitable criteria for subspecific recognition.

Common Name: Sparkling-tailed Hummingbird
Scientific Name: *Tilmatura dupontii*

Size: 3.5-3.9 males: inches (9-10 cm) with tail; females: 2.6-2.8 inches (6.5-7.5 cm)

Habitat: Central America; it occurs from Mexico south to northern Nicaragua. The elevational distribution is from 750-2,500 m.

It prefers the edges of humid to semiarid pine-oak forests, as well as in second growth brush, and scrubby woods. It is often seen in woods with oaks,

Status: Least Concern to Threatened. **Global Population:** 1,000-2,499 mature individuals with a stable population trend (BirdLife International 2013). In Mexico, this hummingbird is considered a threatened species due its restricted distribution, and by the strong pressures that affect the distribution sites.

Diet: Flower nectar from bushes and trees as well as small insects.

It sallies for insects, with prolonged flights, from exposed perches. It forages from the understory to the canopy. When foraging, this hummingbird cocks the tail, and has a slow, bee-like flight.

Breeding: The adult males upper parts are a metallic bronze or bronze green, with a large white patch on each side of the rump behind the wing. It has a very long and deeply forked tail. The central two pairs of rectrices are metallic bronze green while the outer three pairs of the rectrices are a purplish black, broadly tipped with white. The two outer pairs of rectrices also are crossed by two adjacent bands; a basally chestnut or chestnut rufous and distally white, at about one third the distance from the tip. The remiges are dull brownish slate. Its gorget on the chin and throat are a metallic violet blue. The breast grayish white and the belly and flanks are dark metallic bronze green, some feathers narrowly tipped with pale grayish. The leg tufts are white.

The adult female has its upper parts a metallic bronze or bronze green, which is duller on the crown. As with the male, it has a large patch of pale cinnamon buff or buffy white on each side the rump behind the wings. Its tail is short and slightly forked. The central pair of rectrices metallic bronze green, with black tips or a black subterminal band. The remaining rectrices bronze green basally, with a broad black subterminal band and tipped with pale cinnamon rufous or white. The remiges dull brownish slate or dusky. The under parts buff or rufous cinnamon, with the color deepest on flanks and on the lower belly. Some immature males resemble the adult female, but with green mottling on the underparts, and the outer rectrices tipped with white. Other immature males (in First Basic plumage) resemble the adult female, but with a longer tail, with a white median band, and with blue mottling on the throat and green mottling on the belly.

The Sparkling-tailed Hummingbird presumably is polygynous, as are most if not all species of hummingbirds. Wetmore (in 1941) described an apparent courtship display: "The females rested on open twigs while the males poised in the air 5 or 6 inches [12.7-15.2 cm] distant, opening and closing the long fork in the tail, scissors fashion, while the light glistened from the blue throat". The nest and eggs of this hummingbird are undescribed.

Cool Facts: Sparkling-tailed Hummingbirds are perhaps best identified by the white patch on each side of the rump. These hummingbirds are not often heard while foraging, but males sing a high thin song from open perches. When feeding on scattered flowers, their flight is slow like that of a bee, and wing beats even sound insect-like.

Common Name: Chilean Woodstar
Scientific Name: *Eulidia yarrellii*

Size: 2.9-3.1 inches (7.5-8 cm)

Habitat: South America; only known to breed regularly in the Azapa, Chaca (Vítor) and Camarones valleys, the Arica department, and extreme northern Chile.

Status: Critically Endangered. Global Population: 210 mature individuals with a declining population trend. Evidence from surveys and anecdotal observations indicates that this species has undergone an extremely rapid decline. It was described as very common in the first half of the 20th century, with over 100 individuals seen feeding together. In the late 1980s, the species was noted as common in gardens in Arica and regular in the Lluta Valley; however, it has since disappeared from these

areas, and it is now rare in the Azapa Valley, where it was once regular and common. In 2003, the Azapa valley held around 75% of the total population, which was estimated at around 1,500 individuals, while in 2007 the total population was estimated at around 1,200 individuals (55% in Azapa and 45% in Chaca). Counts from 2010-2015, however, suggests that the population has since declined to around 500 individuals. Population estimates have shown that the Azapa and Chaca populations have reduced by 15.6% annually (81.6%) in 10 years. Population counts from between 2003 and 2015 and from 2017 indicate that the population is likely declining at a rate of >80% over three generations. It has been speculated that the species could be lost from the Azapa

Valley within a decade, and that the species could face extinction within two decades. Therefore, it is assumed that declines are continuing at the same rate into the future.

The remaining native habitat in the narrow and heavily cultivated valleys inhabited by the species is confined to small patches, and the indigenous plants favoured may be severely threatened. Dense thickets, possibly used as courtship territories, are now scarce due to the spread of agricultural activities in Azapa and Vítor. Although. it has adapted to use introduced plants, the presence of certain native species may still be a limiting factor. The chañar tree (*Geoffroea decorticans*) may be an important food resource, but is often destroyed by farmers who consider it invasive and believe it attracts mice. Pesticides began to be heavily used in the Azapa valley in the 1960s in order to control the Mediterranean Fruit-fly and other crop pests, but as the Peruvian Sheartail (*Thaumastura cora*) has not suffered similar declines, this may not be the primary cause of this species's decline. Competition with Peruvian Sheartail has been suggested as a potential threat. A recent study which examined interactions between the two species found that food niche overlap is relatively low but that the Sheartail dominates the Woodstar in male–male territorial interactions. Potentially increased energetic costs for Woodstar associated with frequent territorial chases and courtship displaying with Sheartails may exacerbate the effects of other threats on the Woodstar. Hybridization is also a potential threat. A male hybrid of the two species was found in the Azapa valley where Peruvian Sheartail is common and Chilean Woodstar rare, and a low level of hybridization has been found among the two species. The various threats of habitat destruction, pesticide use and competition with other hummingbirds are likely to be synergistic in their impacts on the species.

Diet: Flower nectar from bushes and trees as well as small insects. It prefers the nectar of flowering Lantana, Hibiscus, shrubs, cacti and Legumi-nosae trees such as Inga feulles. Recent surveys specifically targeting this species recorded it feeding at flowers of native trees and flowers such as *Geoffroea decorticans*, *Schinus molle* and *Calandrinia sp*., ornamentals such as Eucalyptus, *Lantana camara*, Pelargonium spp. and *Bougainvillea sp*., and crop plants such as alfalfa, garlic, onion and tomato.

Usually it is observed alone when feeding but, historically, large numbers were numbers were reported gathering at flowering trees.

Breeding: The Adult male has short black bill. Its upper parts iridescent olive green and its throat gorget is a shining violet-red. The under parts are white. Its tail feathers come to a sharp, scalloped point. The central tail feathers are very short and green with the outer ones longer and blackish-brown. Female like male above and white tinged buff below with no gorget. The central rectrices green and the outer tail feathers black. There is buff at the base with broad white tips. The rectrice ends are rounded. Juveniles are probably similar to females.

Little is known about its breeding habits. It appears to nest in May, Aug and September. Most nests have been in olive (*Olea europaea*) trees, at a mean height of 2·3 m ± 0.4 m above ground, with a handful of nests found in native shrubs and ornamental trees.

Cool Facts: All exports of hummingbirds from Peru and Chile are controlled. A ten-year species recovery plan was approved in 2004 and included plans for a public awareness campaign, a study of competition between the Chilean Woodstar and Peruvian Sheartail, a permanent population monitoring program, restoration of natural vegetation in the Azapa and Lluta valleys, incorporation of its conservation into the agenda of the local Good Agricultural Practices committee, and a study of the feasibility of an ex-situ conservation project and reintroduction into suitable areas within the historical range. Attempts have been made to provide artificial feeders for the species; however, it proved reluctant to use them and other hummingbird species displaced the Woodstar through their monopolization of the new resource. There are plans to create a network of small reserves to protect the habitat used by the species for lekking and breeding. Two small reserves have now been created: the Chaca Biologic Station in the Valley of Vítor and El Rapido Biologic Station in the Azapa Valley. Trial habitat restoration at a site in the Chaca valley was successful, with the species using the restored habitat for breeding. Some work has been undertaken to raise awareness of the species's conservation among the public, particularly in schools. A "Ruta del Picaflor de Arica" has recently been established.

Conservation Actions Proposed: Research the genetic structure of the populations. Carry out habitat restoration in the Lluta, Chaca and Azapa valleys, ensuring that species whose flowers are visited regularly by the Woodstar are planted. Continue population monitoring, as detailed in the species recovery plan. Limit the amount of pesticides used in Azapa and Chaca valleys. Investigate the effects of territorial interactions between Chilean Woodstar and Peruvian Sheartail. Scale-up work to raise awareness of the species among the general public. Continue with the planning of a network of small reserves to protect the habitat used by the species.

Common Name: Slender Sheartail
Scientific Name: *Doricha enicura*

Size: Male: 4.3-4.9 inches (11-12.5 cm); Female: 3.1-3.5 inches (8-9 cm)

Habitat: Central America; it is endemic to the mountains and interior valleys of southern Mexico (Chiapas) to Guatemala, Honduras and northern El Salvador.

It is most often seen at openings in the forest, woodland, second growth and scrub, at 1000–3000 m elevations.

Status: Least Concern. **Global Population:** 50,000-104,000 mature individuals with a declining population trend. The population is suspected to be in decline owing to ongoing habitat degradation through agricultural conversion.

Diet: Flower nectar from bushes and trees as well as small insects.

It forages mainly in low to middle strata, and often near ground. When feeding on nectar, males hold their tails closed in an almost vertical position, but females quickly wag their tails while opening and closing them.

Breeding: The male has long, decurved black bill. Its head and upper parts are green. There is a white postocular spot. Its chin is blackish and its gorget is a pinkish purple. There is a white band on the lower breast, the belly is green with off-white center. It has a very long tail that is deeply forked. The central rectrices green with the remaining ones blackish. The female has its upper parts green with white postocular spot and a faint blackish ear-coverts stripe. The under parts are cinnamon-buff with the belly having an with off-white center. The tail is much shorter than in male and less forked. The central rectrices are green, while the outer rectrices are cinnamon with broad blackish band and white tips. The juvenile similar to the female.

Breeding habits are not well studied. There has been breeding recorded in October in Chiapas.

Cool Facts: Its calls while perched or feeding include fairly hard, rapid chips, often repeated steadily or slightly trilled.

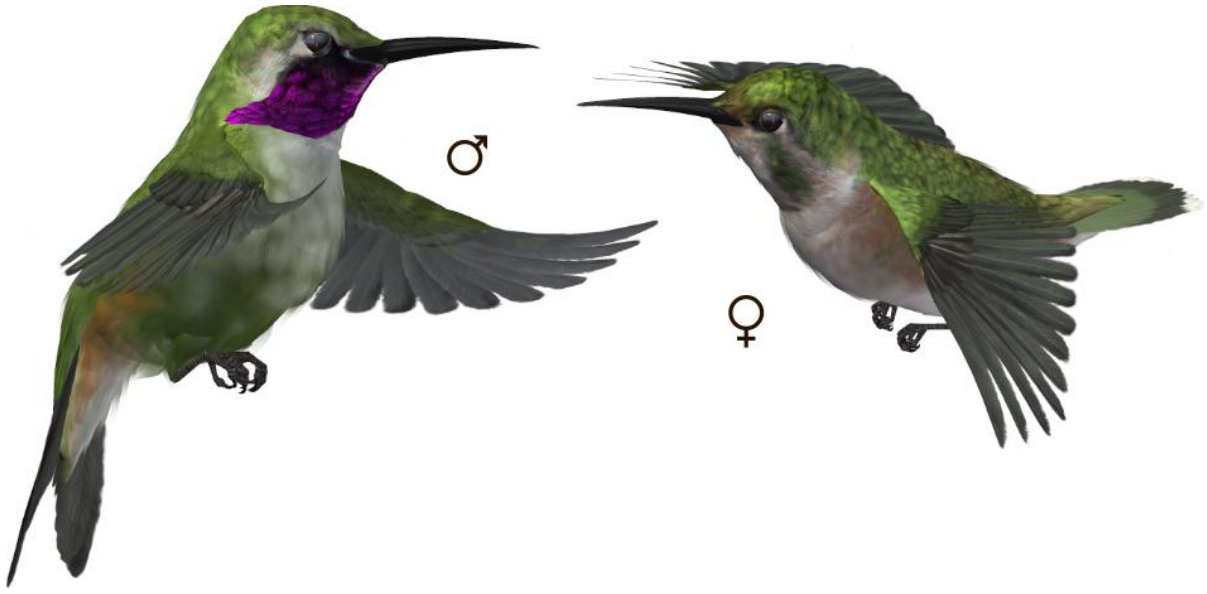
Common Name: Lucifer Hummingbird
Scientific Name: *Calothorax lucifer*

Size: 3.9 inches (10 cm)

Habitat: North America; Its habitat is in high-altitude areas of northern Mexico and southwestern United States. It winters in central Mexico.

Status: Least Concern. **Global Population:** 925,000 mature individuals with a stable population trend. Its use of arid, open, often rugged habitats (rather than riparian areas or forests) may protect Lucifer Hummingbird from human impacts.

Diet: Flower nectar from agave and cactus flowers as well as small insects.



Nectar usually taken during hovering flight, probing flower tube "legitimately" (not cutting base or side of flower). Occasionally, it perches and probes in shrubs (*anisacanth*) or sturdy inflorescences (*agave*). The number of flowers and plants visited in foraging session probably depends on many factors; the nectar reward level, sex of forager, breeding status, and the time of day. Males defend feeding areas from males, other females, and black-chinned hummingbirds.

Breeding: The adult male is a metallic bronze, bronze-green, or golden green (usually duller on pileum, especially on forehead) above. There is little or no iridescence on forehead or crown. The small postocular spot (sometimes also the rictal spot) is a dull white. The gorget (chin and throat) is a brilliant rose purple, changing to violet. The posterior feathers of both sides of the throat much elongated, bordered on side by contrasting white plumage. The chest is dull white with the sides and flanks, a mixed light cinnamon and metallic bronze or bronze-green. The median portion of breast and abdomen pale grayish or dull grayish white. The under tail coverts are dull white with

central area of pale brownish gray. The femoral tufts are white. The outer rectrices of the tail are much elongated and purplish or bronze dusky or blackish. The four middle retrices are shorter and a metallic green or bronze-green. The wings are dull brownish slate or dusky, faintly glossed with purplish.

The females upper parts are as the adult male, but tail much different. The lateral rectrices not elongated and much broader than in male. The three outermost (on each side) with basal half light cinnamon-rufous, then distally purplish black, 2 outermost broadly tipped with white, black terminal or subterminal area on second and third separated from cinnamon-rufous of basal portion by narrow space of metallic bronze-green. The fourth rectrix (from outside) mostly metallic bronze green, but terminal or subterminal portion blackish and outer web edged basally with light cinnamon-rufous. The postocular spot or streak is cinnamon-buff, and beneath this is a narrow auricular area of grayish green-brown. The chin and throat lack any iridescent feathers, instead these and the under parts are a dull light cinnamon or cinnamon-buff, passing into dull whitish on abdomen. The under tail coverts are mostly (sometimes almost wholly) whitish. The femoral tufts are white as well.

During courtship, males attract females by hovering high above the female, then diving with the wings or tail making a snap sound, then flying away with the tail feathers forked and making a different series of snapping sounds. The display lasts 30 to 45 seconds and may repeat several times an hour.

Females build nests on desert shrubs or cacti on steep, dry, rocky slopes, typically two to ten feet (0.61–3.05 m) above ground, sometimes on top of a previous nest. The female lays two white eggs in the small cup-like nest, having one or two broods per season. The egg incubation duration is about 15 days, and the chicks fledge after about 23 days.

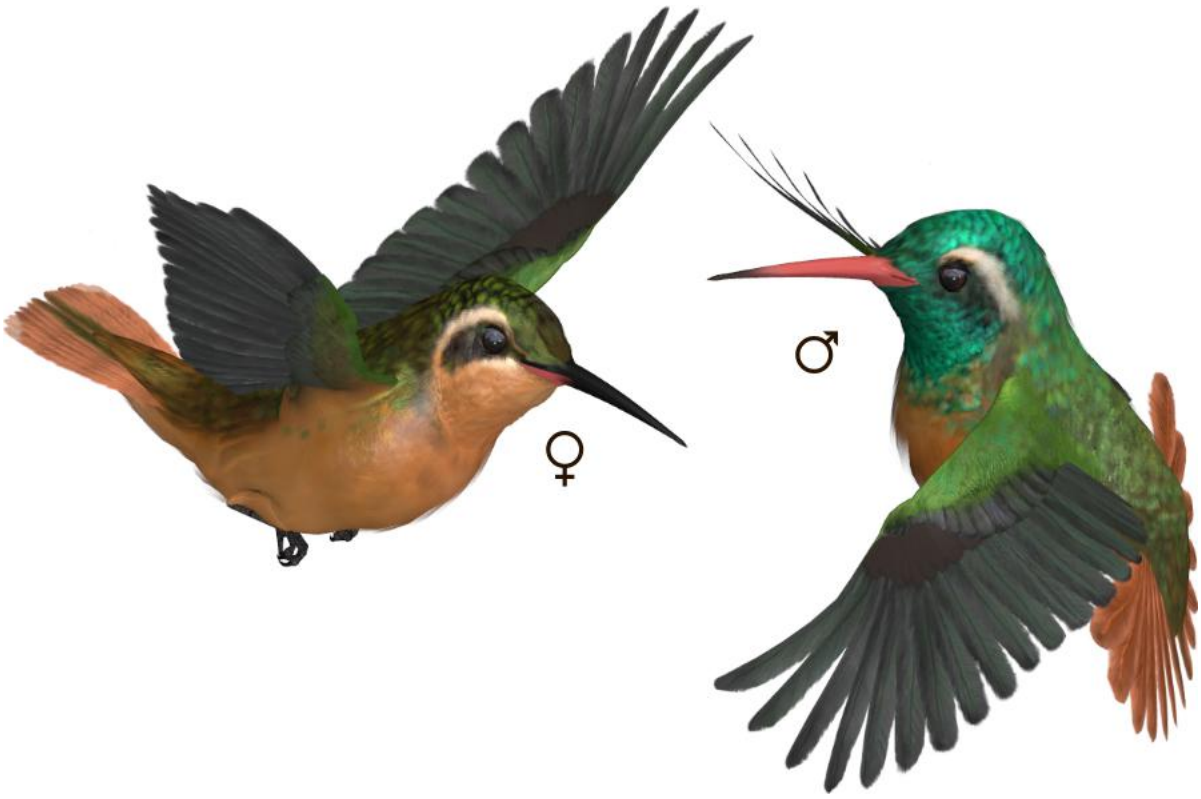
Cool Facts: Misidentification of the Lucifer hummingbird can be avoided with good view. The length and curvature of bill vary, and shorter-billed females might be confused with female Black-chinned Hummingbird (*Archilochus alexandri*) or Costa's Hummingbird (*Calypte costae*), whose bills are also slightly curved and almost as long. Care should be taken to ascertain that buff color on the under parts is not actually simply from dusting with pollen. The adult males can look similar to the Costa's Humming-bird males in size, hunched posture, and gorget color and shape, but the lack of the iridescence on the forecrown and show of its long pointed tail when perched spell a Lucifer sighting. The immature males developing gorget can resemble streaky gorget of adult male Calliope Humming-bird (*Stellula calliope*). The immature Lucifer hummingbird will be larger than the Calliope Hummingbird and have a longer bill and tail.

Common Name: Xantus's Hummingbird
Scientific Name: *Basilinna xantusii*

Size: 3.2-3.5 inches (8-9 cm)

Habitat: Central America; endemic to the south half of Baja California. It has been recorded as a vagrant up the Pacific coast of North America to British Columbia in Canada.

Breeds mainly in arid subtropical scrub, oak, and pine-oak woodlands from lower foothills and canyons to upper slopes of mountains. It is also reported in orchards. Its nests in the northern breeding areas are generally near water, but not in southern breeding areas. Within southern breeding areas, males are seen in open valleys and females in forests (near their nests).



Status: Least Concern. **Global Population:** 71,100 mature individuals with an unknown population trend. The most direct effect of human activity to be expected is overgrazing by cattle and goats (both range freely in mountains where Xantus's Hummingbirds breed), which could affect abundance and distribution of food plants. The relatively sparse human population of southern Baja California might suggest that grazing pressures (or other human impacts) are relatively light and more critical studies are needed.

Diet: Flower nectar from bushes and trees as well as small insects. They like nectar from madrone trees, indian paint brush (*Castilleja bryantii*), pitcher sage (*Lepechinia hastata*), *Behria tenuiflora*, *Lobelia laxiflora var. angustifolia*, *Calliandra peninsularis*, four-o'clock (*Mirabilis jalapa*), ocotillo (*Fouquieria splendens*), and tree tobacco (*Nicotiana glauca*)

While feeding, their tails are mostly closed and appears fairly broad, held rigid in or near body plane, and often quivered or flashed. The latter mainly when hovering in windy conditions. Also, they feed at times with their tail cocked above body plane and flipped about (again mainly when maneuvering in windy conditions). A commonly heard call is a fast, dry rattle.

Breeding: It is a fairly stocky, medium-sized hummingbird with medium-length, slightly curved bill which is broad across its base. Its broad tail is slightly notched/forked. The bill of male is bright red with black tip. The female and immature have restricted reddish color at the base of bill. All sex and age plumage classes have boldly contrasting white postocular-stripe, blackish auricular mask, cinnamon belly (whole under parts in female), and a mostly rufous tail.

The male has dull-greenish crown, blackish chin and black forehead and auriculars. Its gorget is a glittering green. The nape and back is greenish, transitioning to rufous-green on the rump. Its belly is rufous cinnamon with mottled green at sides of chest. The upper tail coverts are rufous-tipped. The tail is rufous-chestnut with central rectrices edged green. The female has a dull-greenish crown, dark auriculars, a green nape and upper parts with rufous-tipped upper tail coverts. The throat and under parts are pale cinnamon, and dark rufous tail with green central rectrices and outer rectrices with paler tips. The immature male is similar to female except for some male colors on head and gorget.

Breeding season occurs mainly July through April. The nest appears bulkier than many other hummingbird nests The nest is a regular or irregular cup shape, depending on attachment to nest substrate. The lining is a compactly felted mass often composed of raw cotton, but also of other plant fibers, leaves, fine plant down, dried flower heads, and small, soft feathers. The nest wrapped with spider webbing. The outside sometimes decorated with lichen, bark, or leaves. Eggs are incubated by the female for 15-16 days and chicks fledge after 20-22 days.

Cool Facts: This hummingbird was named after John Xantus de Vesey (Xantus János), a Hungarian zoologist.

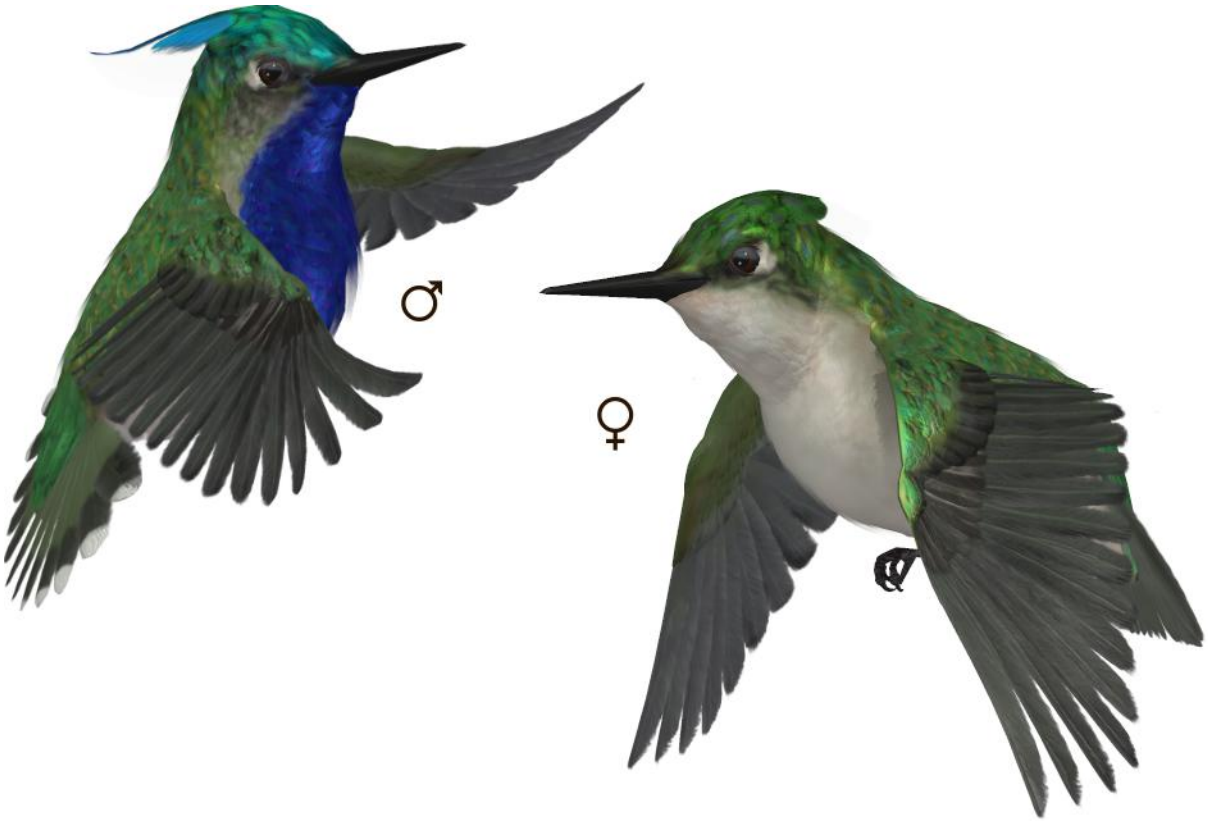
In the movie, “The Big Year” (2011), from Mark Obmasciks novel, Steve Martin and Owen Wilson travel to British Columbia to see a vagrant Xantus’s Hummingbird. While the film and book were fictional, the sighting is from a true event. In 1997, an exceptionally strong El Nino weather year actually brought the hummingbird the 2,500+ miles distance. The bird seemed to like Canada and stayed for 310 days from November 16, 1997 until Sept 21, 1998.

Common Name: Green-crowned Plovercrest
Scientific Name: *Stephanoxis lalandi*

Size: 3.4-3.5 inches (8.5-9 cm)

Habitat: South America; endemic to eastern Brazil from southeastern Minas Gerais and Espírito Santo to northeastern São Paulo and Rio de Janeiro.

It is found in the understory of forests, scrub vegetation and along watercourses from sea-level to 1500 m. It occasionally is seen at much higher altitudes (e.g. Serra do Caparão, Espírito Santo, 2900 m)



Status: Least Concern. **Global Population:** 336,000 mature individuals. Population size and trend have yet to be determined. Readily takes to man-made habitats such as farmland with scattered bushes and forest islands. Present in Tres Picos State Park, Serra do Caparaó, Serra dos Orgãos and Itatiaia National Parks (Brazil).

Diet: Flower nectar from bushes and trees as well as small insects. Forages for nectar at native and introduced flowers (*Vochysia, Salvia, Dombeya, Calliandra, Inga, Eucalyptus*), from near the ground to treetops.

Insects are caught in the air, also gleaned from leaves. Male establishes feeding territories mainly during reproductive period.

Breeding: The male has a straight black bill. Its has a long iridescent green crest, sometimes bluish green), with the longest crest feather being purplish black. The crest does resemble a plovers crest. The sides of head are grayish with a white postocular spot. Its upper parts are shining bronze-green. The chin to upper belly has a violet-blue gorget with the rest of the under parts being gray to off-white. The central tail feathers are green, while the outer ones are green with subterminal blackish band, tipped in a grayish white. The female is a shining green above, and gray to off-white below (withou the blue gorget). The head feathers (crest) are slightly elongated but lack the long plover-like central feathers. Juveniles look similar to the adult females.

Breeding season occurs from October through March in Brazil. Males generally gather at leks during the reproductive period, but lone singing males are occasionally seen. A cup-shaped nest of soft plant or seed fibers, with small fragments of moss and leaves, and bound with cobweb is placed on forked branch in sheltered shrub or a bamboo thicket. The female lays usually two eggs and incubates them for 14–16 days. The chicks fledge after about 24–28 days. The young remain with their mother for about three weeks. There is only one brood per year and their first breeding period occurs into their second year.

Cool Facts: There are two species of plovercrest which occur in the Atlantic Forest region of eastern South America, but they do not overlap geographically: the Green-crowned Plovercrest is restricted to southeastern Brazil (from southern Minas Gerais and Espírito Santo south to northeastern São Paulo), whereas Purple-crowned Plovercrest (*Stephanoxis loddigesii*) occurs from eastern Paraguay and northeastern Argentina to southern Brazil (north to central São Paulo). .

Common Name: Santa Marta Blossomcrown
Scientific Name: *Anthocephala floriceps*

Size: 3.3 inches (8.4 cm)

Habitat: South America; it is endemic to the Santa Marta Mountains in northeast Colombia.

This species inhabits humid forest and older second growth, at elevations of 400–1700 m in the Sierra Nevada de Santa Marta National Park.

Status: Vulnerable. **Global Population:** 500-2,500 mature individuals with a declining population trend. This species has a very small population and range, both of which are thought to be declining due to the loss and conversion of habitat. In conjunction with small range, species may be vulnerable to habitat destruction. It is not known to accept man-made habitats. In Santa Marta, forests are cleared specifically for narcotics farming. It was considered “Near Threatened” until 2000, when was uplisted to “Vulnerable” because it was known from so few localities and its range and population was thought

to be contracting, and this was prior to recognizing Tolima Blossomcrown (*Anthocephala berlepschi*) as a separate species. Currently , it is listed as globally and nationally, “Vulnerable”. The Santa Marta Blossomcrown is at least nominally protected by Sierra Nevada de Santa Marta National Park and El Congo reserve (owned by Fundación Pro-Sierra Nevada de Santa Marta).

Diet: Flower nectar from bushes and trees as well as small insects.

Adults of both sexes tend to forage close to the ground in the understory. Males aggregate in leks during breeding season.

Breeding: The male has straight, black bill, a forecrown which is buffy white, and a hindcrown which is rufous chestnut. The rest of its upper parts are iridescent green, transitioning to chestnut on the rump. It is a white postocular spot. The underparts are a gray-buff color. Its tail is squared. The central pair of rectrices are bronzy-green, transitioning to a rufous chestnut on the outer rectrices. The outer rectrices are tipped pale buffy, with a black subterminal bar, which is lacking on the central pair of rectrices. The female similar to the male. The fore and hind crown are brownish. The back more green-yellowish. The throat and upper breast are more buff than the male as there is a dark patch below the postpcular spot extending along the sides of the head. The Immature resembles the adult female.

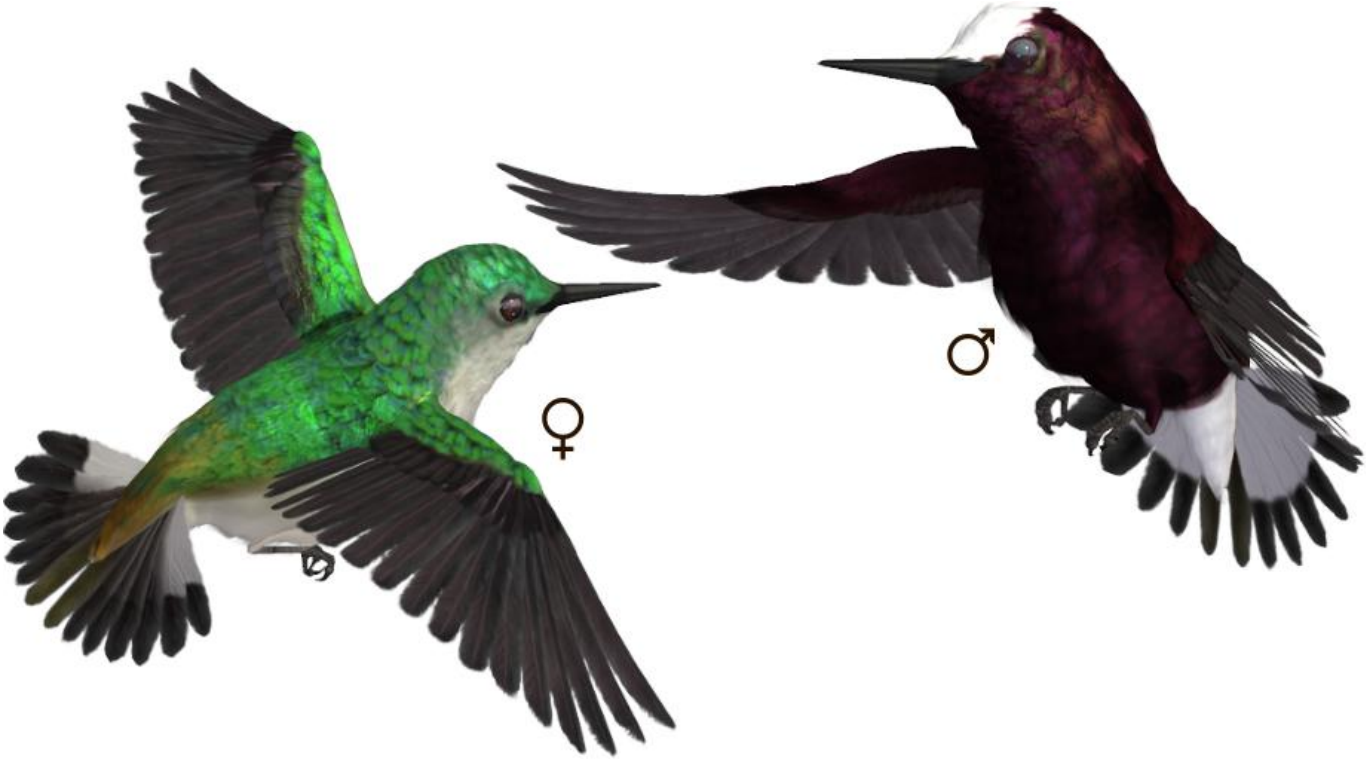
Cool Facts: The Santa Marta Blossomcrown is very similar to Tolima Blossomcrown (*Anthocephala berlepschi*),and was previously though to be conspecific. It differs by having the yellowish instead of the white tail feather tips of the Tolima Blossomcrown. Recently, ornithologists found that these two taxa are reciprocally monophyletic for mitochondrial and nuclear loci, and that their divergence occurred about 1.4 million years ago. Additionally, ecological niche models suggested that there is a high degree of climatic niche divergence between the two, leading to the elevation of each taxon to species rank.

Common Name: Snowcap
Scientific Name: *Microchera albocoronata*

Size: 2.6 inches (6.5 cm)

Habitat: Central America; it is a resident from southern Honduras south to western Panama, to as far east as western Panama province. This species primarily occurs on the Caribbean slope, but occurs locally on the Pacific slope of the Cordillera de Guancaste in Costa Rica, and also locally on the Pacific slope in western Panama. The Snowcap is most common, in Costa Rica, in the Cordillera Central, and is uncommon to rare in the Cordillera de Talamanca.

In Costa Rica, it primarily breeds at 300-800 m. After breeding, most of the population descends to the lowlands. In Panama, occurs at 600-1650 m and occupies humid forest, both lowland forest and humid montane forests, as well as adjacent semi-open forests and second growth.



Status: Vulnerable. **Global Population:** 239,000 mature individuals with a decreasing population trend. Due to ongoing habitat loss, it is believed to be declining locally. In Costa Rica, severe deforestation threatens many parts of its range, though, remains locally common in other areas.

Diet: Flower nectar from bushes and trees as well as small insects. Favored flowers include (*Warscewiczia, Sickingia, Inga, Pithecellobium*), vines (*Gurania*), shrubs

(*Sabicea, Besleria, Hamelia, Cephaelis, Psychotria*), and epiphytes (*Columnea, Norantea, Cavendishia*).

It also visit hedges of *Stachytarpheta* in gardens adjacent to forests. It usually is solitary, as is typical of most hummingbirds, except when males congregate in singing groups during the breeding season,

Breeding: The adult male has a white crown. The nape is purplish black, shading to metallic reddish purple on the back and the wing coverts. It is brighter on the rump and upper tail coverts. The central rectrices are metallic bronze, the remaining rectrices are white at their base, and with terminal third being black. The remiges are dull black with a purplish sheen. The sides of the head and under parts are black, glossed with a reddish purple. The under tail coverts are white.

The adult female upper parts are metallic green changing to bronze on upper tail coverts and central rectrices. The outer tail feathers are white at their bases, broadly black at end, tipped with white. It has pale grayish white under parts.

The immature male is like the female, but with a narrow line of white above the eye and under-surface changing early to purplish black as the bird matures.

In Costa Rica, it breeds from January to May. The nest is a small cup, composed of tree fern scales, plant down, and cobwebs, and is lightly decorated with green moss and some green lichen around the rim. The nest is placed 2-3 m above the ground, on a lower twig of a tree or on a vine hanging from a tree. The female lays two eggs.

Cool Facts: There are two subspecies are recognized:

- *M. a. parvirostris.* First reported by Lawrence in 1865. This subspecies occurs on the Caribbean slope from southern Honduras south to southern Costa Rica, possibly extending into western Panama. It is similar to the nominate, but the white at base of lateral rectrices more restricted and less sharply defined. Also, the adult male with the general color brighter coppery purple.
- *M. a. albocoronata.* First reported by Lawrence in 1855. It occurs on both slopes of western Panama.

Special Thanks to…

….my beta team (FlintHawk, Linda, Jan, Kelvin, Rhonda and Sandra)

Species Accuracy and Reference Materials

Many birds of the same species do vary considerably in color. This package tries to emulate the colors and markings in the most commonly found variants.

The author-artist has tried to make these species as accurate to their real life counterparts as possible. With the use of one generic model to create dozens of unique bird species, some give and take is bound to occur. The texture maps were created in Painter with as much accuracy as possible. Photographic references from photographs from various Internet searches and several field guides were used.

Sources for this Volume and Field Guide

Books, Magazines and Papers

- **Birds of Venezuela (2nd Edition)** by Steven L. Hilty
- **Ecology and Behavior of the Buff-Tailed Sicklebill** (Paradisaeidae: Epimachus Albertisi) by Bruce M. Beehler, published in "*The Auk"*
- "**The Sibley Guide to Birds**" by David Allen Sibley.
- "**A Guide to the Birds of Mexico and Northern Central America**" by Steve N. G. Howell and Sophie Webb
- **"Birds of Peru"** by Thomas S. Schulenberg, Douglas F. Stotz, Antonio Brack Egg, Daniel F. Lane, John P O'Neill, Theodore A. Parker, III
- **"Birds of the West Indies"** by Herbert Raffaele, James Wiley, Orlando H. Garrido, Allan Keith, and Janis I. Raffaele (Princeton University Press)

Websites

- Wikipedia (http://www.wikipedia.com)
- Birds of North America online (http://bna.birds.cornell.edu)
- All About Birds (www.allaboutbirds.org/)
- Cornell Lab of Ornithology Neotropical Birds (http://neotropical.birds.cornell.edu)
- PBS Nature (http://www.pbs.org/)
- What Bird? (http://www.whatbird.com)
- Hummingbirds.net (www.hummingbirds.net)
- Boston University (http://www.bu.edu/)
- Bahamas National Trust (http://www.bnt.bs/)
- Juan Fernández Island Conservancy (http://www.oikonos.org/projects/firecrown.htm)

Rendering & Posing Tips

Motion Blurring for Hummingbird Wings

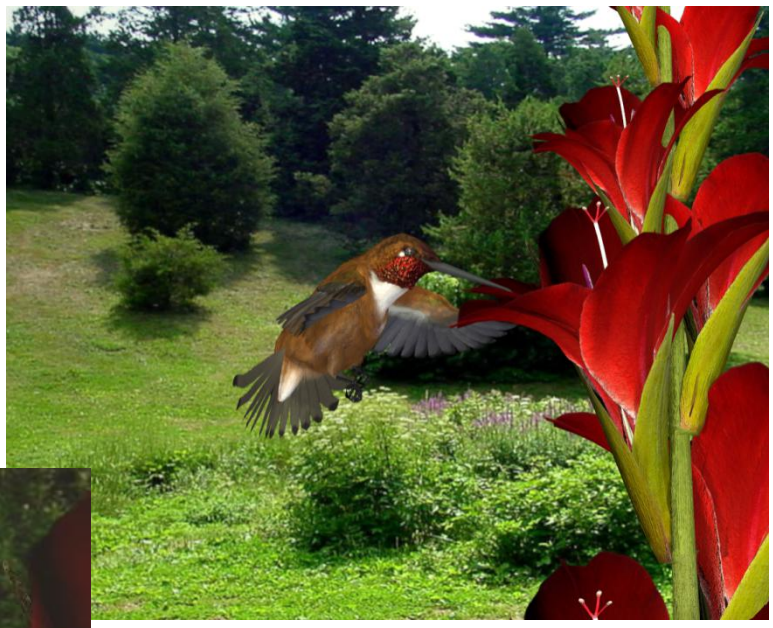
As we all know, it's rare when a bird sits still. In photography, we can capture birds in flight and provided the exposure and f-stop are set correctly, even freeze them in time. We accept this moment captured in time because it is a photograph, and photographs don't lie.

As for non-photographic art, traditional or digital, the bird frozen in time just doesn't look quite right, so the viewer assumes the artist has made a mistake-- because we all know, artists do, in fact, lie...

So, here are the secrets to making a bird in flight believable.

There are two approaches for creating the wing blur hummingbirds make. The first way, and most obvious, is to blur them with post work using smudge tools or motion blur filters. The second way and much easier is to let your 3D application do it using animation (even on a still image). The tutorial included in this manual will provide a step-by-step procedure to do both.

Post work Motion Blur



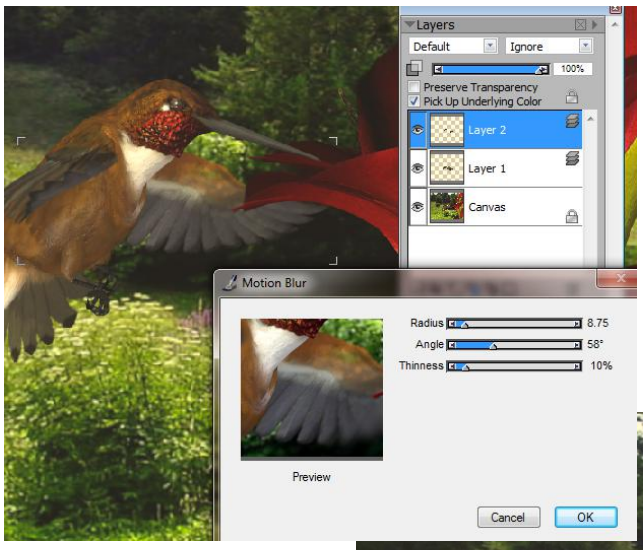
1. Load the picture into your favorite 2D art program. *(For the tutorial, we're using Corel Painter, but Photoshop or Paintshop Pro will work)*

2. Using the freeform SELECT tool, outline the wing area, Copy and Paste it directly over the existing wings and a new layer.

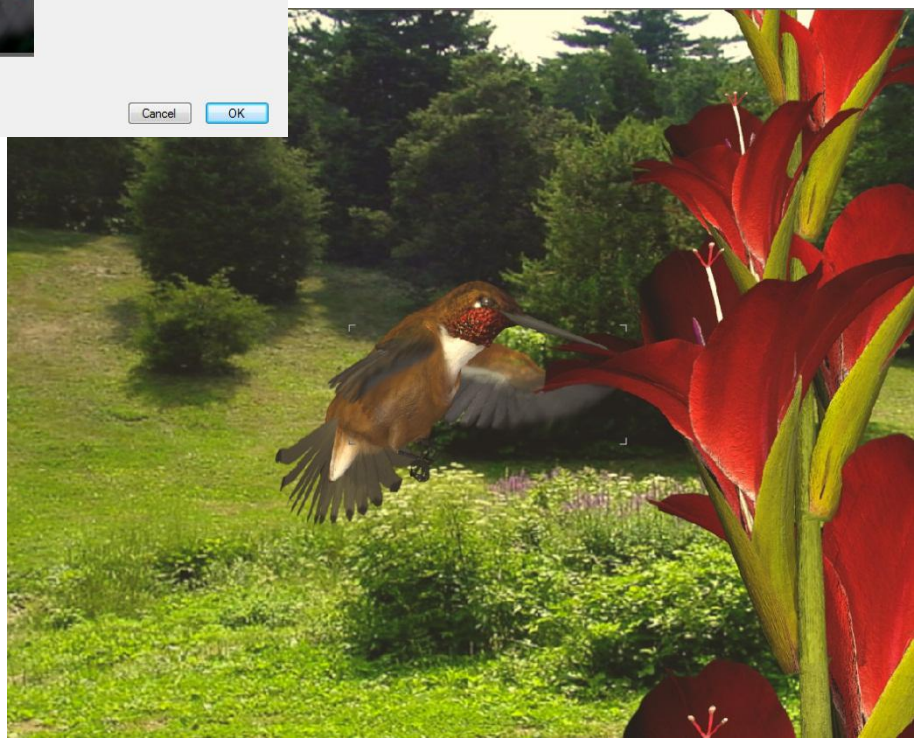
3. Select Motion Blur. It's found under Focus in Painter (or Blur in Paintshop Pro or Filters->Blur->MotionBlur in Photoshop).

4. Set the amount of blur, the angle and thinness (in Painter). Since we've outline the whole wing, we're barely going to blur it with a setting of 1.58. I've also adjusted the angle to be more in-line with the feather movement.

5. Now freeform SELECT the wing again on the wing layer, but this time only select the outer extremities of the wing. Now Motion Blur it again-- that's why we went easy the first time!



6. You could depending on the result you want repeat the process again with just the wing tips...



Using Motion Blur in Poser

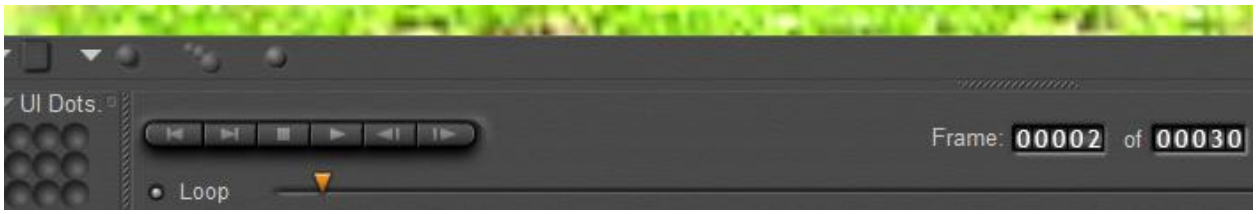
This tutorial will work with any version of Poser or can be adapted to Vue. DAZ Studio does not currently have motion blur capabilities.

1. Load the Hummingbird Base Model and select a species MAT/MOR preset (for this tutorial I'm using the Rufous hummingbird, but any species will work).

2. Create your scene with the hummingbird in flight using a prebuilt pose or adjusting it manually. Go ahead and do everything you normally would do before the final render (tweaking poses, adjusting lights, etc)

3. Now that your scene is set, you will need to decide how much wing blur you want. First, the way we are going to create wing blur is by slightly animating the wings; the more movement you create, the more blur you will get.

4. I'll use a couple different settings and show how much blur you can expect from certain types of wing movements. To show maximum blurring effects, we'll first move the **Animation slider to Frame 2.**



5. Select the Left Wing, add or subtract about 30 from **UpDown** in the parameter dials**.** Do the same with the Right Wing. **Make sure you do not move any other dials or items in the scene or they will blur too**.

6. Go back to **Frame 1 on the Animation slider**. In Render settings, check the Motion Blur Box and render. As you can see from my example to the right or from your render, the wings are so blurred they almost don't exist. While most hummingbirds beat their wings 40-90 times a second, we don't need that type of movement to create a still image --- in fact, doing the 30 point movement up and down over the

normal 30 frames a second animation will give you a believeable animated hummingbird (though it's only going 15 wingbeats a second).

7. For a still image, I'd suggest only making 2-3 point moves up or down. In Frame 1, Copy the Left Wings settings (CTRL+C). Select the Frame 2 and copy the settings (CTRL+V). Now add or subtract 2 or 3 from the **UpDown Dial** in the Parameter Dials. Do the same with the Right Wing. **Make sure you do not move any other dials or items in the scene or they will blur too**.

8. Go back to **Frame 1 on the Animation slider**. In Render settings, check the Motion Blur Box and render. Remember still image motion blur always looks to the next animation frame. If you render on frame 2, the render engine will compare frame 3 with frame 2 for blur information. Since we did nothing to frame 3, there won't be any blur and that's why we need to return to Frame 1 before rendering.

9. You can experiment with moving the tail or moving the entire bird. Just remember a little movement goes a long way in a still motion blur image. One thing I often do is just slightly move the wing parts (+/- 1) and then move the feather controller parts more significantly (+/- 8). This make the wing tips blur significantly but the actual wing much less.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