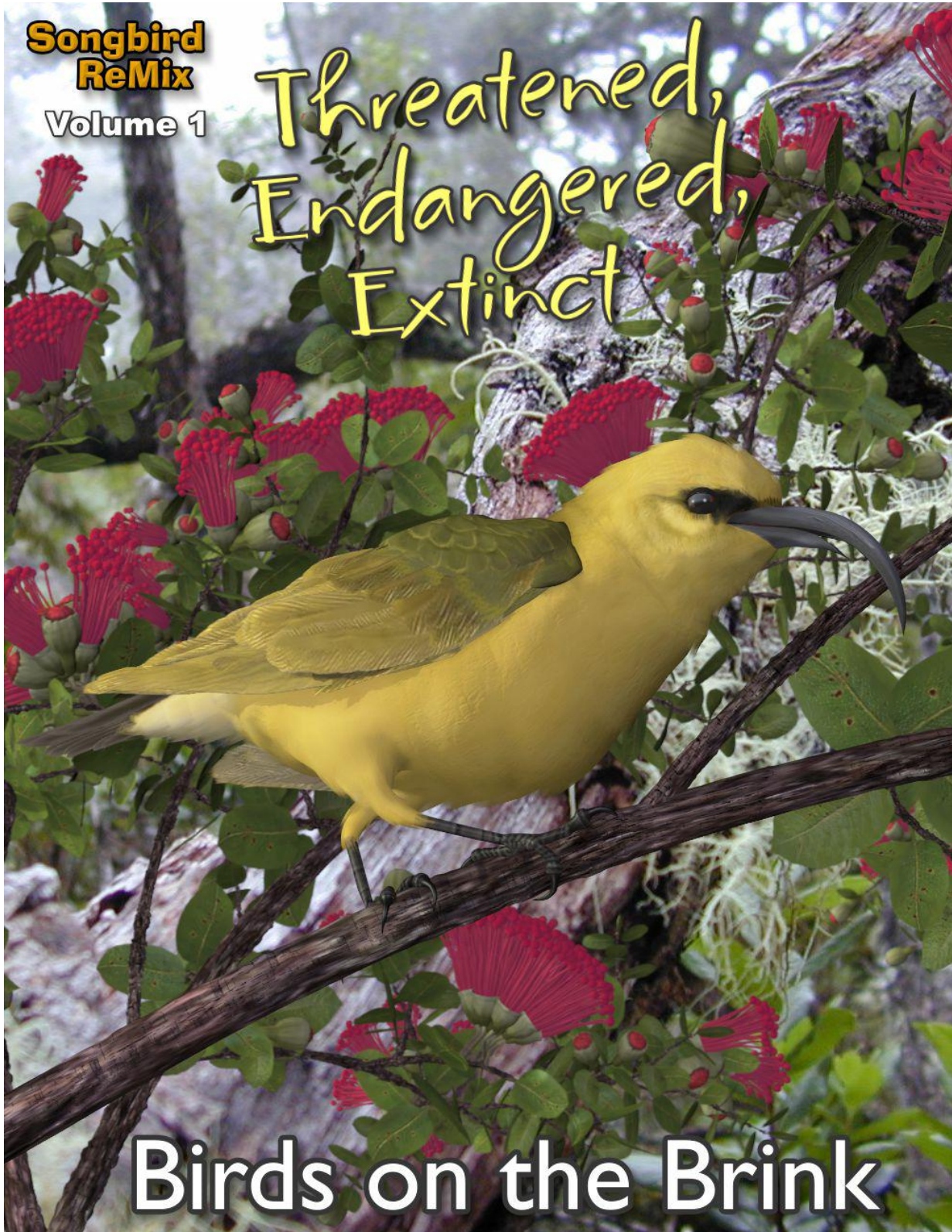


**Songbird
ReMix**
Volume 1

Threatened, Endangered, Extinct



Birds on the Brink

Avian Models for 3D Applications
Characters and Texture Mapping by Ken Gilliland

Songbird ReMix

Threatened, Endangered, Extinct

Manual

| | |
|---|---|
| Introduction | 3 |
| Overview and Use | 3 |
| Creating a Songbird ReMix Bird with Poser or DAZ Studio | 4 |
| One Folder to Rule Them All | 4 |
| Physical-based Rendering | 5 |
| Posing & Shaping Considerations | 5 |
| Where to Find Your Birds and Poses | 6 |

Field Guide

| | |
|--|---|
| List of Species | 7 |
| What Makes a Bird Endangered? | 8 |
| A Word About the Birds Featured in this Volume | 8 |

EXTINCT-EXTINCT in the WILD

| | |
|------------------------|----|
| Passenger Pigeon | 9 |
| Carolina Parakeet | 15 |
| Texas Henlow's Sparrow | 19 |
| Bachman's Warbler | 22 |

CRITICALLY ENDANGERED-ENDANGERED

| | |
|--------------------------------|----|
| 'Akipola'au | 26 |
| Palila | 28 |
| Least Bell's Vireo | 30 |
| Southwestern Willow Flycatcher | 33 |
| Florida Grasshopper Sparrow | 39 |

THREATENED

| | |
|----------------------------------|----|
| California Coastal Gnatcatcher | 41 |
| San Clemente Island Sage Sparrow | 44 |

VULNERABLE-NEAR THREATENED

| | |
|-----------------------|----|
| Golden-winged Warbler | 48 |
| Purple Martin | 50 |
| Loggerhead Shrike | 53 |

| | |
|-------------------------------|----|
| Resources, Credits and Thanks | 58 |
|-------------------------------|----|

Opinions expressed on this booklet are solely that of the author, Ken Gilliland, and may or may not reflect the opinions of the publisher.

Songbird ReMix

Threatened, Endangered, Extinct

Introduction

'Threatened, Endangered, Extinct' is a collection of bird characters for use with the Songbird ReMix packages. It incorporates the new morphs and textures that improve the accuracy and realism of the birds. It includes the legendary Passenger Pigeon, once the most populous bird on the planet, five billion strong. It was said that the day would turn to night when the pigeon flocks flew making a dense cloud two miles wide and sixty miles long. Within fifty years it went extinct due to hunting.

This particular package has a two-fold purpose; one, to provide high-quality digital birds for the purpose of animation and still imagery and two; to raise awareness for these and other species plights and in doing so, help to turn the tables on possible extinctions. In using these digital birds it is the author's hope that the users will also help to create public awareness through their art.

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):
 - **Pigeons and Doves (Order Columbiformes)**
 - **Parrots and Cockatoos (Order Psittaciformes)**
 - **Perching Birds (Order Passerines)**
- **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.

One Folder to Rule Them All

When I reworked the entire Songbird ReMix library starting in 2018, I decided to abandon the way the birds were sorted (by product name) and choose an Ornithological approach. All birds are found in the Bird Library folder and are arranged by type of bird. This approach is hopefully easier for most to find what bird they are looking for. Admittedly, it will take some getting use to for some longtime users, but I've always approached the Songbird ReMix series as a learning tool as well as a graphics tool, so hopefully some knowledge will rub off by seeing how birds are grouped.

Probably the most deceiving subfolder in the **Bird Library** is “**Perching Birds (Order Passeriformes)**”. This is folder you probably will end up “favoriting” because this one folder (Passeriformes) **holds more than 50% of all birds**. Perching birds range from cardinals and jays to chickadees, crow and swallows.



Finding the bird you want within the “**Perching Birds (Order Passeriformes)**” folder can be daunting, even for an experienced birder (such as myself), so I’ve included an online reference tool within this folder that helps to make your search easier. Click the “**Perching Birds Finder**” icon and when loaded, look at the first column and search for the type of bird you want. For example, I want a “manakin” (a bird common to Central and South America). Scroll down the first column alphabetically and stop on “manakin”. Looking across to the second column, you will now know that manakins can be found in the “Tyrant Flycatchers & their Allies” subfolder.

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.
- **Tongue poke-through** (especially when the beak is open). This can be easily solved by using the **Throat-Fuller1 & 2** morphs (*found in Creation Control/Head Shapes*).

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 birds

| Type Folder | Bird Species |
|--|---|
| Pigeons and Doves (Order Columbiformes) | Passenger Pigeon |
| Parrots and Cockatoos (Order Psittaciformes) | Carolina Parakeet |
| Perching Birds (Order Passeriformes) Butcherbirds & their Allies | Loggerhead Shrike |
| Perching Birds (Order Passeriformes) Hawaiian Honeycreeper Finches | Akiapola'au Palila |
| Perching Birds (Order Passeriformes) NW Warblers & their Allies | Bachman's Warbler Golden-winged Warbler |
| Perching Birds (Order Passeriformes) NW Sparrows & their Allies | Texas Henlow's Sparrow Florida Grasshopper Sparrow San Clemente Island Sage Sparrow |
| Perching Birds (Order Passeriformes) Swallows & their Allies | Purple Martin |
| Perching Birds (Order Passeriformes) Tyrant Flycatchers & their Allies | Southwestern Willow Flycatcher |
| Perching Birds (Order Passeriformes) Vireos, Whipbirds & their Allies | Least Bell's Vireo |
| Perching Birds (Order Passeriformes) Wrens, Nuthatches & their Allies | California Coastal Gnatcatcher |

Where to find your poses

| Type Folder | For what species? |
|---|-------------------|
| Perching Birds (Order Passeriformes) Poses can be found in "Universal Poses" & "type" folders | All Songbirds |

Songbird ReMix

Threatened, Endangered, Extinct

Field Guide

EXTINCT

Passenger Pigeon
Carolina Parakeet
Texas Henlow's Sparrow
Bachman's Warbler

ENDANGERED

'Akipola'au
Palila
Least Bell's Vireo
Southwestern Willow Flycatcher
Florida Grasshopper Sparrow

THREATENED

California Coastal Gnatcatcher
San Clemente Island Sage Sparrow

VULNERABLE

Golden-winged Warbler
Purple Martin
Loggerhead Shrike

What makes a bird endangered?

While it's easy to understand why a bird like the Florida Grasshopper Sparrow is endangered with about a dozen birds left on the planet, some other species may be harder to figure. So why is a bird such as the 'Akepa from Hawai'i (with an estimated population of 6,000) more endangered than the Yellow-breasted Bunting which has an estimated population >2,300?

The reason is that the number of birds, *while an important factor*, is only part of the consideration in endangerment. The easiest way to explain the criteria is to review the **R-E-D** system.

R-E-D stands for **R**ARITY - **E**NDANGERMENT - **D**IVERSITY. The total number of birds would relate to Rarity. The perils facing the birds would be Endangerment. Diversity relates to how far the species extend over physical terrain. For instance, a species limited to a single island would be more at risk than a species spread over a continent.

So let's take the case of the 'Akepa and Yellow-breasted Bunting and apply the R-E-D system. **Rarity:** The Bunting population is less than the 'Akepas. Chalk one up for the Buntings. **Endangerment:** The 'Akepa require old growth Koa forests that are almost extinct from the Hawaiian Islands. Also the 'Akepa has little to no immunity to avian malaria. The Buntings have issues with nesting and human populations which are much less immediate threats than the 'Akepa so the 'Akepa wins the "E" round. **Diversity:** The 'Akepa are on a secluded part of an island within a specific elevation. The Buntings are throughout North-eastern Europe and Asia. Diversity is clearly an issue with the 'Akepa. Chalk one up for the 'Akepa. While the Bunting won the "R" round, the 'Akepas decisively won the "E" and "D" rounds and that's why the 'Akepas are considered Endangered while having greater numbers.

A Word About the Birds Featured in this Volume

Since the initial publishing of "Threatened, Endangered, Extinct" in 2004, some birds' statuses in the R-E-D system have changed. Some birds have declined closer to extinction and others are on the road to recovery. Some birds with the advent of DNA analysis have new scientific names, and in one case, have been moved into different species. In other cases, battles with different scientific opinions (sometimes with heavy-handed political persuasion) have caused a species or subspecies to be non-existent (which is the case with the extinct Texas Henslow's Sparrow). Birds in those cases won't be removed from the set for two reasons. They're already created (and in the set) and there's always the chance the tide on scientific certainty may continue to ebb and flow.

The 2020 revision of this manual uses the most current science available.

Common Name: Passenger Pigeon
Scientific Name: *Ectopistes migartorus*

Size: 15-16.1 inches (38-41 cm)

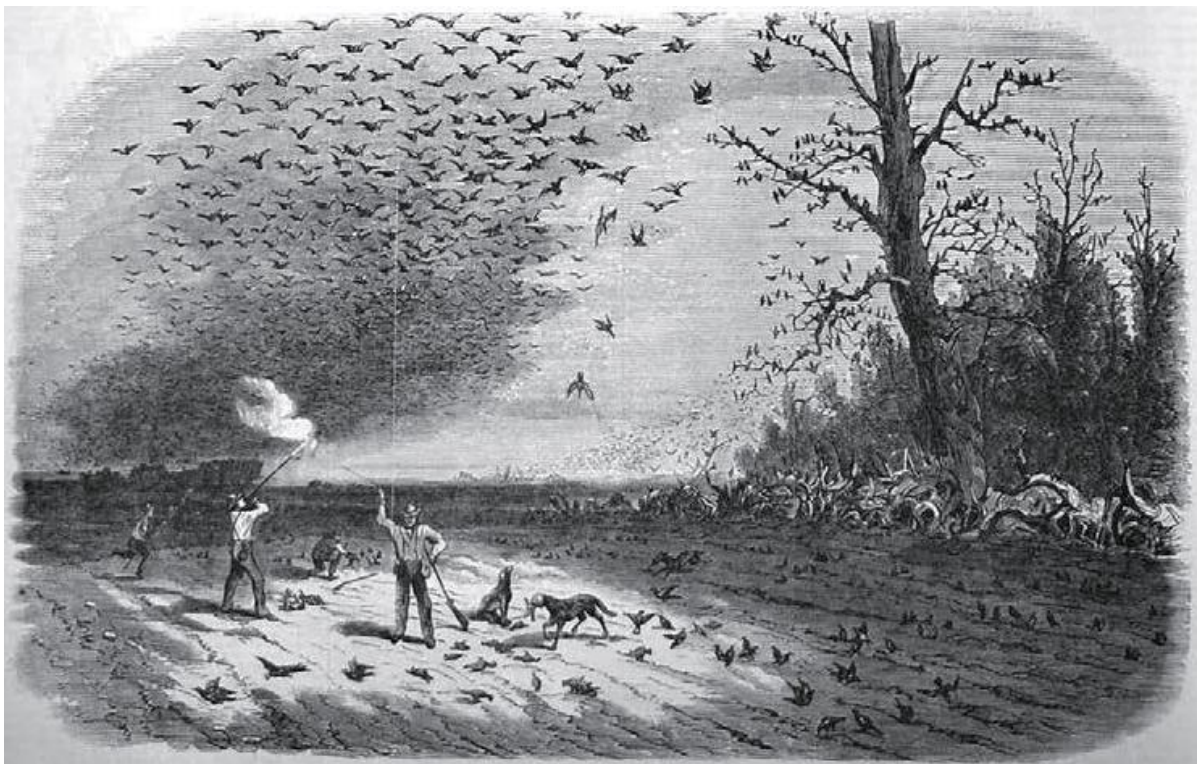
Habitat: North America; it bred in the extensive forest that covered what is now the eastern U.S. and southern Ontario around the Great Lakes to the Atlantic Ocean. Mostly, it bred in northern part of eastern deciduous forests where snow covered mast (fruiting trees) until spring. Because of species' colonial nature and



huge numbers, and the apparent necessity for mast during the breeding season, nesting colonies formed in contiguous forests of beech or oak during years when nuts and acorns were superabundant..

In all seasons, the preferred habitat was forests; particularly deciduous forests that provided food. Large trees were often chosen for roosts and for nesting. Large swamps, particularly alder (*Alnus spp.*), were favored roost sites. Even if forest trees were nearby, colonies often roosted in alder shrubs up to <7 m high. Pines (*Pinus spp.*) were also favored roosting sites. It foraged in agricultural land, but returned to the forests to roost or nest. It often roosted in large swamp forests.

Status: Extinct. Global Population: 0. Human behavior were the ultimate cause for extinction, but the how and why have been subject of much speculation. It has been pointed out that there are 2 issues: habitat destruction and direct exploitation by humans for food. It is likely that the interplay of these factors, with habitat destruction reducing opportunities for nesting, and shooting (particularly at nesting colonies where in later years it caused abandonment of entire colonies), reduced the population size. Other explanations have been proposed, including climate, disease, and weather-related catastrophe, but there is no clear evidence for any of these.



Leslie's Illustrated Newspaper 1867

Every Passenger Pigeon colony that was accessible to humans was exploited. This includes the native people in eastern North America to European colonists, settlers and farmers. "When these roosts are first discovered, the inhabitants, from considerable distances, visit them in the night with guns, clubs, long poles, pots of sulphur, and various other engines of destruction. In a few hours, they fill many sacks and load their horses with them".

Commercial trade in pigeon meat, fat, and feathers began early in North American history. Professionals used massive nets to capture live pigeons for sale to be used in shooting matches and to capture birds to be killed for market.

Railroads allowed access to nesting colonies and the telegraph provided a way for scouts who located colonies to inform the professional pigeon trappers, who numbered some 600–1,200 men. “As settlement advanced, as railroads were built, spanning the continent, as telegraph lines followed them, as markets developed for the birds, an army of people, hunters, settlers, netters and Indians, found in the pigeons a considerable part of their means of subsistence, and the birds were constantly pursued and killed whenever they appeared, at all seasons of the year ”.

Often hundreds of thousands of adults and squabs were shipped from a single nesting. Large numbers of birds were destroyed by locals or otherwise killed but not transported. A million birds could be lost at a single nesting. Yet even these large numbers of birds killed were probably not sufficient to cause the precipitous decline in the population. Overhunting did not exterminate the Passenger Pigeon as is commonly believed. Rather, the disturbance of the nesting colonies led the birds to abandon the nestings prematurely. This, coupled with slaughter of nestlings as well as adults, largely eliminated replacement of the population.

Deforestation was also a major factor in the decline because it reduced the area available to the pigeons and thus reduced the opportunities for nesting and roosting colonies. Being nomadic, Passenger Pigeons needed enormous areas to find some conditions suitable for nesting. Another nineteenth-century technology, the portable saw mill introduced in 1870s, sped the destruction of what had once been a completely forested landscape. By 1880, about 80% of the original forest of New England had been cleared. Deforestation in the major nesting area of north-central Pennsylvania began in 1872, but did not reach full speed until 1892.

Deforestation, which occurred from east to west, reduced the available habitat. In the early eighteenth century, Wilson (1812) noted that although the species was sometimes very numerous in the Atlantic states, it never appeared in “such unparalleled multitudes” of “congregated millions” as in the “western forests” of Ohio, Kentucky, and Indiana. The last recorded mass nesting in Massachusetts was in 1850s, in New York in the 1870s.

After another 3 decades, there was essentially no sufficient forest left. But the pigeons were gone before the last deciduous forests. “The destruction of the forest was not yet complete; for, although great tracts of land were cleared, there remained and still remain vast regions more or less covered by coppice growth sufficient to furnish hosts of pigeons with food, and the cultivation of land and the raising of grain provided new sources of food supply. Therefore, while the reduction of the forest area in the east was a factor in the diminution of the

pigeons, we cannot attribute their extermination to the destruction of the forest” (Forbush, 1927).

Once the population reached a level of thousands, rather than billions, the species was unable to recover. Several factors may have been involved. Persecution continued, nearly to the end. In spring 1883, all of the young were reportedly taken. One man was said to have taken 60,000 and several others 10,000 young each. Over 5,000 birds were reportedly killed at a roost in Missouri the following winter. Over 1,000 carcasses were shipped to Boston in 1891. Market-hunting continued until at least 1893, and shooting was reported to the end.

By 1892, “the majority [were] no longer breeding in colonies, but scattering around the country and breeding in isolated pairs” (Bendire, 1892). Since the species lacked the numbers for predator satiation through mass nesting that had been responsible for its success and had no anti-predator adaptations for nesting, such as nest concealment, and since it laid only a single egg, nest success must have been insufficient to maintain the population.



The extinction of the Passenger Pigeon predated any conservation movement in America. The extinction of the once “limitless” flocks of pigeons, along with the near extermination of the American bison (*Bison bison*), introduced Americans to

the concept of human-induced extinction. Some states approved laws regulating the location of nets away from nesting colonies, prohibiting disturbance at the nesting colony (within 3.2 km in Michigan), but these laws were rarely enforced and were, for the most part, too late. The density and abundance of the pigeons were such that few people recognized that there were any risks to the species.



Arguments that there was no need for protection generally doomed any proposed legal protection.

“There will always be pigeons in books and museums, but these are effigies and images, dead to all hardships and to all delights. Book-pigeons can not dive out of a cloud to make the deer run for cover, or clap their wings in thunderous applause of mast-laden woods. Book-pigeons cannot breakfast on new-mown wheat in Minnesota, and dine on blueberries in Canada. They know no urge of seasons, no lash of wind and weather. They live forever by not living at all” (Leopold, 1947).

The last Passenger Pigeon, “Martha”, died at the Cincinnati Zoo in 1914.

Diet: Acorns, various types of nuts, some fruits, berries, grain and small insects.

It walked when foraging; rather awkward on the ground for a pigeon in “jerky, alert step” (Bryant, 1913).

The pace of the male was 12 or 13 steps in 5 seconds with a presumably “typical” pigeon gait with head extended forward as it walked.

It practiced communal roosting and communal breeding, and its extreme gregariousness may be linked with searching for food and predator satiation.

Evidently bathed in shallow water. A juvenile immersed itself and shook vigorously several times. After each shaking, lay on one side and lifted the wing on the other side, stretching it to full extent. When resting, slumped body onto limb, concealing feet. When sleeping, bill concealed by feathers in middle of breast, tail held at 45° angle. While “sunning,” made similar movements to bathing (Whitman, 1919).

Its flight speed, maneuverability, and flying ability were legendary. Quick, repeated flaps, bringing wings near to torso. The closer to the body, the greater velocity (Audubon, 1831). Often a clapping sound with wings as it landed. Prior to landing in a tree, dipped and rose again. It slowed by flapping repeatedly and raised its wings at moment of landing. It was known to fly through woods with similar speed and agility as in open habitats. While it is impossible to determine the flight speed, based on wing shape and body contours, it probably flew faster than most pigeon species. Schorger estimated normal flight speed during migration to be about 100 km/h (60 mph).

Breeding: It was sexually dimorphic in size and coloration. The male was 390 to 410 mm (15.4 to 16.1 in) in length, mainly gray on the upper-parts, lighter on the underparts, with iridescent bronze feathers on the neck, and black spots on the wings. The female was 380 to 400 mm (15.0 to 15.7 in), and was duller and browner than the male overall. The juvenile was similar to the female, but without iridescence.

Nests were loosely constructed of small sticks and twigs and approximately one foot in diameter. A single, white, elongated egg was laid per nesting. Both parents shared the duties of incubating the egg and feeding the young. The incubation period was from twelve to fourteen days.

Cool Facts: The pigeon migrated in enormous flocks, constantly searching for food, shelter, and breeding grounds, and was once the most abundant bird in North America, numbering around 3 billion, and possibly up to 5 billion (1850 estimate). Within sixty years, it would go extinct, almost entirely due to human intervention.

In written accounts given by those who actually saw the Passenger Pigeon flocks, “Beech tree limbs sagged as the colony crowded on slender branches. The largest colony that nested in Wisconsin as said to have at least 135 million adults and covered over 850 square miles. When the flock took off, the day would turn to night with a black cloud of birds, two to three miles across and forty miles long flew to its next destination at up to 60 mph.”

“Birds should be saved for utilitarian reasons; and, moreover, they should be saved because of reasons unconnected with dollars and cents...”

The extermination of the Passenger Pigeon meant that mankind was just so much poorer... And to lose the chance to see frigate-birds soaring in circles above the storm, or a file of pelicans winging their way homeward across the crimson afterglow of the sunset, or a myriad of terns flashing in the bright light of midday as they hover in a shifting maze above the beach— why, the loss is like the loss of a gallery of the masterpieces of the artists of old time.”

—Theodore Roosevelt, 1916

Common Name: Carolina Parakeet
Scientific Name: *Conuropsis Carolinensis*

Size: 12.6-13.4 inches (32-34 cm); **Wingspan:** 20.9-22.8 inches (53-58 cm)

Habitat: North America; occurred regularly in eastern states from southern Florida north to coastal North Carolina and more sporadically to Virginia, Pennsylvania, New Jersey, and New York. It was unknown in New England. Also

occurred throughout Gulf and mid-southern states from Florida to eastern Texas, and northward, especially along Missouri, Mississippi, and Ohio Rivers, as far as South Dakota, Iowa, Wisconsin, Michigan, Ohio, and West Virginia. It was also found along certain tributaries of Arkansas, Mississippi, and Missouri Rivers as far west as eastern Colorado. It was clearly distributed very patchily throughout its range, but sometimes seen in flocks of many hundreds to thousands, especially around salt licks in the midwestern states. Many of the most northerly records of the species were in mid-winter. Migrations are doubtful.



The species was closely associated with mature bottomland forests, especially cypress swamps in the Deep South and sycamore (*Platanus sp.*) woodlands in more northerly regions. Wilson in 1811 expressed consensus perceptions about the habitat preferences of the species when he referred to “certain peculiar features of country to which these birds are particularly and strongly attached; these are, low rich alluvial bottoms, along the borders of creeks, covered with a gigantic growth of sycamore trees or buttonwood—deep and almost impenetrable swamps, where the vast and towering cypress lift their still more majestic heads; and those singular salines, or as they are usually called licks, so generally interspersed over that country,

and which are regularly and eagerly visited by the Parakeets.”

The attraction of Carolina Parakeets to salt licks is well documented for many states of the Midwestern region, including Ohio, Indiana, Illinois, Kentucky, Tennessee, and Missouri. Here the parakeets once gathered in huge numbers, often in company with hordes of Passenger Pigeons (*Ectopistes migratorius*), to drink saline waters and ingest salty soils.

The specific biochemical function served by licks for the Carolina Parakeet was never studied. However, because saline springs did not exist in many large regions of the species' range, the licks can hardly have been an essential habitat feature for the species, however much the parakeets utilized them where they did occur.

Status: Extinct. Global Population: 0. The Carolina Parakeet disappeared

before any comprehensive conservation efforts were made on its behalf, either in the wild or in captivity. Extinction due to habitat loss and being considered an agricultural pest. They nested in riparian and deciduous forests and cypress swamps. Before widespread agriculture took hold in the area, it lived on seeds from grasses and trees. As the areas became developed the parakeet developed tastes for apples, oranges, grapes, dogwood flowers and mulberries. Unfortunately for the bird, most of these tasty treats were found in farms and gardens. Being a member of the parrot family, this parakeet was highly gregarious and traveled commonly in flocks of 30 individuals. Farmers and gardeners began to shoot the parakeets as crop pests. Hunters began to shoot them for “sport” and their feathers.



Parakeets being very social birds, would flock around shot and injured members to help them, making them easy targets and adding to the carnage.

The final extinction of the species in the early years of the 20th century is somewhat of a mystery, as it happened so rapidly. Vigorous flocks with many juveniles and reproducing pairs were noted as late as 1896, and the birds were long-lived in captivity, but they had virtually disappeared by 1904. Sufficient nest sites remained intact, so deforestation was not the final cause. American ornithologist Noel F. Snyder speculates that the most likely cause seems to be that the birds succumbed to poultry disease, although no recent or historical records exist of New World parrot populations being afflicted by domestic poultry diseases.

By 1900, the Carolina Parakeet was extinct in the wild. A breeding program at the Cincinnati Zoo, kept the parakeet from complete extinction until 1914 when the last individual died.

Diet: Fruit, nuts and grain

It probably moved along perches and on ground with alternate steps of both feet typically utilized by New World parrots. Climbing was evidently aided by the bill working as a "third leg" in opposition to the feet. Thomas in 1819 described birds successfully climbing up trees with both their wings and feet tied, "by striking their bills into the bark."

Bendire in 1895 reported, "Their flight, which is more or less undulating, resembles both that of the Passenger Pigeon and again that of the Falcons; it is extremely swift and graceful, enabling them, even when flying in rather compact flocks, to dart in and out of the densest timber with perfect ease." Wilson's description in 1811 was similar: "Their flight is sometimes in a direct line; but most usually circuitous, making a great variety of elegant and easy serpentine meanders, as if for pleasure." Audubon in 1831 wrote, "On reaching a spot which affords a supply of food, instead of alighting at once, as many other birds do, the Parakeets take a good survey of the neighbourhood, passing over it in circles of great extent, first above the trees, and then gradually lowering until they almost touch the ground, when suddenly re-ascending they all settle on the tree that bears the fruit of which they are in quest. . . . They usually alight extremely close together. I have seen branches of trees as completely covered by them as they could possibly be."

Breeding: Adults were largely bright green to blue-green, except for pale pinkish-white bill and head that was yellow with an orange-red forehead, lores, and cheeks. Adults also had area of bare white skin around each eye and subsidiary yellow to orange feather patches at bend of the wing and thighs. Juveniles differed mainly in having head largely green, with a normally orange-

red forehead and lores, and in lacking obvious yellow-orange patches on wings and thighs.

Very little is known about breeding. There are accounts from 2-7 eggs be laid. It is believed, they nested in tree cavities made by woodpeckers and up to 50 nests could be in a single tree.

Cool Facts: It was also called the Carolina Conure. The earliest reference to these parrots was in 1583 in Florida reported by Sir George Peckham in A True Report of the Late Discoveries of the Newfound Lands of expeditions conducted by English explorer Sir Humphrey Gilbert who notes that explorers in North America "doe testifie that they have found in those countryes; ... parrots."

They were first scientifically described in English naturalist Mark Catesby's two volume Natural History of Carolina, Florida and the Bahama Islands published in London in 1731 and 1743.

The Carolina parakeet colonized North America about 5.5 million years ago. This was well before North America and South America were joined together by the formation of the Panama land bridge about 3.5 mya. Since the Carolina parakeets' more distant relations are geographically closer to its own historic range while its closest relatives are more geographically distant to it, these data are consistent with the generally accepted hypothesis that Central and North America were colonized at different times by distinct lineages of parrots – parrots that originally invaded South America from Antarctica some time after the breakup of Gondwana, where Neotropical parrots originated approximately 50 mya.

According to a study of mitochondrial DNA recovered from museum specimens, their closest living relatives include some of the South American Aratinga parakeets: The Nanday parakeet, the sun parakeet, and the golden-capped parakeet.

Carolina parakeets were probably poisonous—American naturalist and painter John J. Audubon noted that cats apparently died from eating them, and they are known to have eaten the toxic seeds of cocklebur.

Common Name: Henslow's Sparrow
Scientific Name: *Centronyx henslowii*

Targeted Subspecies: Texas Henslow's Sparrow (*C. h. houstonensis*)

Size: 4-5 inches (11-13cm)

Habitat: North America; Historically, they bred in Atlantic coastal marshes. They now use reclaimed surfaces in the Ohio River basin and seem disposed to use large fields of tall, dense grass away from trees or other woody vegetation. Their winter habitat is similar, though they seem more tolerant of trees. They are frequently found in fire-maintained pine savannahs. Race *houstonensis* was found in a farming area outside Houston, Texas.

Their breeding habitat is shrubby fields, often wet. It prefers habitats with tall, dense vegetation and thick litter, whereas the allied Grasshopper Sparrow (*Ammodramus savannarum*) and widespread Savannah Sparrow (*Passerculus sandwichensis*) usually select drier sites with shorter and less dense vegetation. They migrate to marshes and open pine woods in the southeastern United States. As native habitats disappeared they also moved into cultivated hayfields.



Status: Near Threatened to **Extinct**. **Global Population:** 410,000 individuals. Henslow's Sparrow populations have declined over the last half-century, and this

species has been identified as a high priority for grassland bird conservation in eastern and midwestern North America. This species' population decline appears to be attributable to the loss, draining, and degradation of grassland habitats throughout its range. More recently, conversion of hay fields and pastures to row crops and other intensively managed forage crops, such as alfalfa, have contributed to the population decline, an estimated decline of 1.5% per year from 1966–2015. Since the early 1990s, local population increases in some Midwestern states appear to be associated with the creation of grassland habitat by the [Conservation Reserve Program](#) (CRP). These local increases have been sufficient to reverse the range-wide population trend (2005–2015), although populations have failed to recover in many states.

The extinction of *C. h. houstonensis* was brought on by habitat loss.

Diet: Eats insects in summer, mostly grasshoppers, beetles, and caterpillars. In winter, forages on the ground for seeds including wiregrass, sedges, ragweed, smartweed, and some berries.

It is extremely secretive, spending much of their time foraging at the bases of grass stalks in dense weedy fields. They prefer to run or walk rather than fly, and when flushed their escape flights are short and erratic. When foraging, they walk and run. Walks are hunched forward, often peering between grass stems.

Breeding: A small, squat sparrow with a large, flat head, a large bill, and a short, spiky tail. They are tan and buff marked with sharp black streaks. They have a distinctly greenish-olive wash on the cheek, with a yellow spot between eye and bill. The breast has neat black streaks and the belly is whitish.

Territorial males will chase intruding males from territory, flying at intruders, lower head and move bill laterally, however actual contact between competing males is apparently infrequent

It nests in weedy fields or pastures, preferring moist areas. It built its nest in tall grass, often with a partial roof, which offers some seclusion. 2-5 eggs were laid.

Cool Facts: The Henslow's Sparrow has the simplest and shortest song of any North American songbird, a thin 'tze-lick' that David Sibley has described as a "feeble hiccup." It was named by John James Audubon for his friend, John Stevens Henslow, a botanist, a minister, and a teacher of Charles Darwin.

The complicated history of the Texas Henslow's Sparrow. This subspecies was first reported by Arnold in 1983 based its subspecies status on its location and plumage. It was found only on a 105 acre field near Houston, Texas.

Preservation of the species was complicated by the dispute on whether it was a "true" subspecies of the Henslow's Sparrow which was found 750 miles away in

the southern Missouri in 1973. While the debate continued in the court system, the Texas Henslow's sparrow's habitat encroached upon, and it slipped into extinction due to that. After a 10-year legal battle in 1983, the Texas Henslow sparrow was finally declared a "true" subspecies and awarded "Federally Endangered" posthumously.

The question whether the Texas Henslow's Sparrow is a true subspecies is still rages among academics due to its similar characteristics to its parent species. As of 2020, most now believe it was simply a variation on the nominate species. Either way, this sparrow no longer exists in Houston.

Today, the Henslow's Sparrow (the parent species), is approaching its chance for Federal protection. Hopefully more care and urgency will be given in saving the parent species.

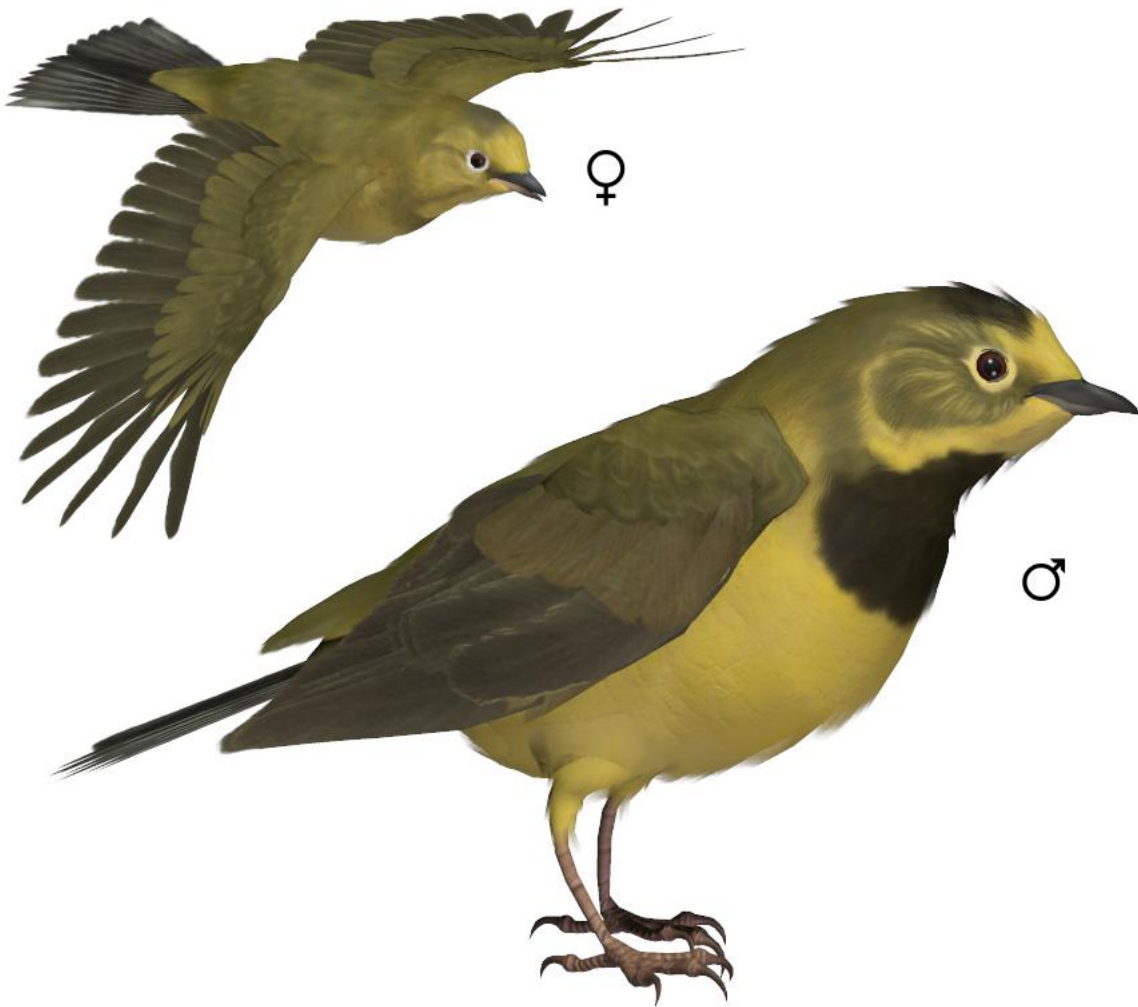
The color saturation of plumage varies across the species' breeding range, with birds becoming darker above and buffier (less white) below from west to east. Similarly, the bill becomes longer and deeper from west to east

- *C. h. henslowii*. First reported by John James Audubon in 1831. The nominate species includes *C. h. occidentalis* (Brewster, 1891), and *C. h. houstonensis* (Arnold, 1983). It breeds (or bred) from eastern South Dakota eastward to New York and southward from northeastern Oklahoma (formerly to eastern Texas) eastward to western West Virginia (Ohio River) and Kentucky. It winters from central Texas eastward to South Carolina southward to Florida. The ground color of mantle is pale chestnut, with the color restricted. The rump is dull chestnut; the ventrum whitish; the bill is short and slender (culmen < 12.2 mm, depth at nares < 6.4 mm; 16). *C. h. houstonensis* was report to be more yellowy chestnut than the nominate.
- *C. h. susurrans*. First reported by Brewster, 1918. It breeds (or bred) east of the Appalachians from southern New Hampshire southward through eastern New York to eastern North Carolina. It winters on coastal plain from South Carolina southward to central Florida. It is like *C. h. henslowii*, but the chestnut on mantle darker and more extensive, the chestnut on rump darker and richer, and the bill longer and deeper (culmen > 11.7 mm, depth at nares > 6.3 mm; 16). Birds of intermediate phenotype have been noted from New York southward to West Virginia; moreover, it is unknown if birds that breed sporadically east of the Appalachians are remnants of this subspecies or birds from farther west.

Common Name: Bachman's Warbler
Scientific Name: *Vermivora bachmanii*

Size: 4.25 inches (10.8 cm)

Habitat: North America; Southeastern United States and Western Cuba. It breeds primarily in two distinct regions, namely the southern Atlantic coastal plain and the Gulf Coast states north along the Mississippi River watershed to Kentucky. In the southern Atlantic coastal plain, the bird breeds in South Carolina near Charleston, though it is believed to have once bred as far north as Virginia and south into Georgia. The Gulf Coast breeding habitat is located primarily in central Alabama, though reports from northern Mississippi and Louisiana are known. It breeds north of Alabama along Arkansas's and Missouri's St. Francis River.



During migration, the species was primarily recorded in Florida and the Florida Keys, although a few birds migrated along the eastern Gulf Coast. Additionally, there is one spring migration record from the Bahamas in 1901. The species

primarily winters in Cuba. Additionally, it was recorded wintering on the Isle of Pines, and one wintering record is known from Florida. Unconfirmed reports of the species wintering in Georgia's Okefenokee Swamp exist.

It breeds in timbered bottomland swamps with pools of still water. These swampy forests are mainly composed of deciduous trees such as cypress, sweet gum, dogwood, red oak, hickory, black gum, and tupelo. It is believed that they prefer small edges created by fire or storms with a dense under-story of the cane species *Arundinaria gigantea* and palmettos. Some believe that this species may have been a cane specialist.

While migrating, the species still preferred bottomland forests, though it was reported in scrubby habitats when this was not available. During the Cuban winter, it seems to have broadened its habitat to include most forests, ranging from dry, semi-deciduous forests to urban parks to swamps. Hibiscus forests may have been important.

Status: Critically Endangered - Presumed Extinct. Global Population: unknown. The population declines started around 1900 and large drops by 1950. There have been no confirmed nest sightings since the 1960's although a few sightings were reported in Cuba in the mid-90's. The most probable cause of decline of this species is the direct effects of land clearing and the indirect effects of exposure to increased levels of potential predation and nest parasitism. In addition to natural catastrophes and decrease in gross habitat in geologic time, likely reduced this species to current status of possibly extinct.

Diet: Mostly insects (spiders and caterpillars) and other small arthropods in breeding season; probably insects in winter, although fruits, flowers, or other vegetation cannot be excluded.

Too few direct observations of food capture have been made to confirm a foraging strategy. Meanley wrote that this species "fed from heights varying from ground level at the base of trees to about 60 feet; the optimum feeding height was about 25 feet. Much time was spent feeding among the leaves and fruits of the terminal part of branches of River Birch (*Betula nigra*). In its forays near the ground it probed the growths of honeysuckle that enveloped some of the shrubs and grew at the base of some trees. It also foraged among flowers of Poison Ivy (*Rhus radicans*) that grew along the trunks of trees. It sometimes probed beneath the loose bark of a River Birch and into galls on oak leaves. On numerous occasions I saw it feeding on small green larva (caterpillars). It sang much of the time it was feeding. I was surprised to see it forage so close to the ground at the base of a tree, often virtually at ground level."

In 1891, the warbler was observed in Florida feeding in the dead clustered leaves of hackberry and ends of other tree branches. The feeding appeared slow and

deliberate, and with the birds sometimes hanging with the upside down while feeding.

This species did not frequently pump its tail. When alarmed, Bachman's warbler jerked its tail and raised its crown feathers.

Breeding: Bachman's warbler is a sexually dimorphic species and the adults have two distinct plumages, one for the spring and one for the fall. In the spring, adult males have a yellow forehead, supraloral, and supercilium. The area below the bird's eye is yellow, while the lores are a dusky olive. The bird's forecrown is black with gray at the edges, while the rear crown and nape are olive-gray. The rest of the bird's upperparts are an olive green, with the rump being the brightest. The chin and upper throat are yellow, while the center throat and upper chest are black. The belly is yellow, and the under tail coverts are white. Males in their first spring are nearly identical to the adult male, but have less black on their crown and chest.

During the spring, adult females are a light yellow in their forehead and supraloral, blending into the gray crown and nape. Its lores are a gray-olive and it has a white eye ring. The rest of the female's upperparts are an olive-green, which like the male is brightest on the rump. The chin and throat are also a light yellow, while the sides of the neck and the upper breast are gray. Older females have a few black upper breast feathers. The rest of the breast and the belly is light yellow, blending into white on the under tail coverts. The flanks are also washed with gray. First spring females resemble the adult female, but appear duller.

This warbler molts over the summer into its fall plumage. For adult males, the fall plumage is nearly identical to the spring, with the only difference being that the forecrown changes from black to gray. First year males also resemble their spring plumage, but have an olive forecrown and duller yellow under parts. Adult females possess the same plumage, though it looks fresher in the fall, while first year females have an olive-yellow forehead and a dull eyering.

Hatchlings obtain their first plumage in May and undergo their first molt in June. Juvenile warblers have a dusky brown head and upper parts and are a paler brown below, which transitions to dull white on the lower body and under tail.

It may be a colonial breeder. The nests were deep and bulky. Dead leaves, mosses, grasses, and weed stalks composed the exterior, while the interior cup was lined with fine fibers from Ramalina lichen and Spanish moss. These nests were made amongst blackberry brambles, cane stalks, and palmettos in bottomland forests 1 to 4 feet above the ground or, frequently, pools of water.[10] Unusually for a warbler, its eggs were pure white with occasional fine marks at the large end.

Cool Facts: Bachman's Warbler is one of the smallest warblers measuring under 4½ inches long and is considered the rarest bird in the United States. The reason for its rarity is that it has not been seen in more than a decade. Unfortunately, it will probably soon be added to the extinct list.

Audubon's folio renderings of a male and female Bachman's warbler were painted on top of an illustration of the *Franklinia* tree first painted by Maria Martin, Bachman's sister-in-law and one of the country's first female natural history illustrators.

In the comic strip *Doonesbury*, Dick Davenport, a bird watcher, died in 1986 of a massive coronary while observing and photographing this species. This death scene has been noted as a particularly memorable one in the history of comics.

Common Name: 'Akiapola'au
Scientific Name: *Hemignathus wilsoni*

Size: 6 inches (14 cm)

Habitat: Oceania; endemic to the Big Island of Hawai'i.

The 'akiapōlā'au occurs mainly in old-growth mesic and wet forests in Ka'ū and Hamakua. Koa (*Acacia koa*) and 'ōhi'a lehua (*Metrosideros polymorpha*) are dominant canopy species in its habitat. Disease-carrying mosquitoes have restricted it to elevations of between 1,300 and 2,100 m (4,300 and 6,900 ft). It formerly inhabited māmane (*Sophora chrysophylla*) -naio (*Myoporum sandwicense*) dry forests at elevations of 1,900 to 2,900 m (6,200 to 9,500 ft) on Mauna Kea, but this population was extirpated in 2002

Status: Endangered. **Global Population:** 910 mature individuals with a decreasing trend. Its declines started in 1900 with the development of Hawaii. It also suffers from the fate of many native Hawaiian birds; no resistance to avian malaria. Mosquitoes are an introduced insect to the Hawaiian Islands and now virtually none of the native Hawaiian birds live below the 1500' level (the mosquito line).



Preservation efforts have helped slow the rapid decline of this bird. In 1992, the population was estimated at 1,500 and has continued to lose 30% of its population since the first printing of this manual. The Hakalau National Forest Preserve was established to help protect this and other endangered Hawaiian birds.

Diet: Insects which are found hidden within the branches of the trees, along with the nectar of flowers shaped like its bill. It also looks for invertebrates at the floor of the forest where there is a large amount of natural growth. This bird uses its long bill to peck open the bark to reach the larvae; it then uses its thin upper bill to probe out the meal and its lower bill to crush its meal.

Breeding: This species is sexually dimorphic. A mid-sized honeycreeper with an upper mandible long and decurved; the lower mandible short and straight, with gonys roughly half as long as culmen. Males have upper parts yellowish green, face and under parts yellow, and lores black. Females and young variable but upper parts are generally olive-green and under parts are pale grayish yellow, with or without dull yellow on the throat. It differs from Nukupu'u by the lower mandible, which is straight rather than decurved, by larger size, and by proportionately shorter tail. Distinguishable from Hawai'i 'Amakihi (*Hemignathus virens*) by the much longer bill, larger size, and in males by the more orangish yellow face and under parts. The adult 'Akiapölä'au sometimes has a lion-headed look created by holding the feathers of the head fluffed out.

The nest Structure remarkable for its "picket fence" of bark around the rim, which is unique among honeycreeper nests. Females break off twigs and collect bark strips. Males do not participate but are nearby. Materials are gathered 8–35 m away from nest. "Twenty-one trips to the nest were made by the female as she carried bark strips in lengths ranging from 15 to 30 cm." The female obtained hanging bark strips by "grasping the bark with her bill, and jerking her head back quickly" and partially loose bark by "placing her lower, stouter mandible under the bark and prying upward." Bark obtained was from both the trunk and limbs of Koa trees. These materials incorporated into exterior wall of nest. Older Koa trees are excavated for nesting cavity.

Cool Facts: The 'Akiapola'au is found around the base of Mauna Kea, Hawaii. It lives in ancient Koa tree forests where it's primary nesting areas and food sources are found. Older Koa trees are excavated for nesting cavity. Insects and beetle larvae are the main food source for the bird as it creeps down tree limbs in the forest canopy. It has an unusual bill. The lower bill is shorter than the top—it's a specialized beak that allows the bird to hammer and drill into the wood with the lower "woodpecker-like" bill and then spear insects with the top portion of the beak.

The 'Akiapola'au was also known as Nukupu'u in early Hawaiian literature.

It is the only member of the subgenus *Heterorhynchus*, which has a woodpecker-like feeding habitat and exclusively preys on insects, in contrast to the nukupu'us, which were both insect-eaters and also hummingbird-like nectarivores.

Common Name: Palila

Scientific Name: *Loxioides bailleu*

Size: 7.5 inches (19 cm)

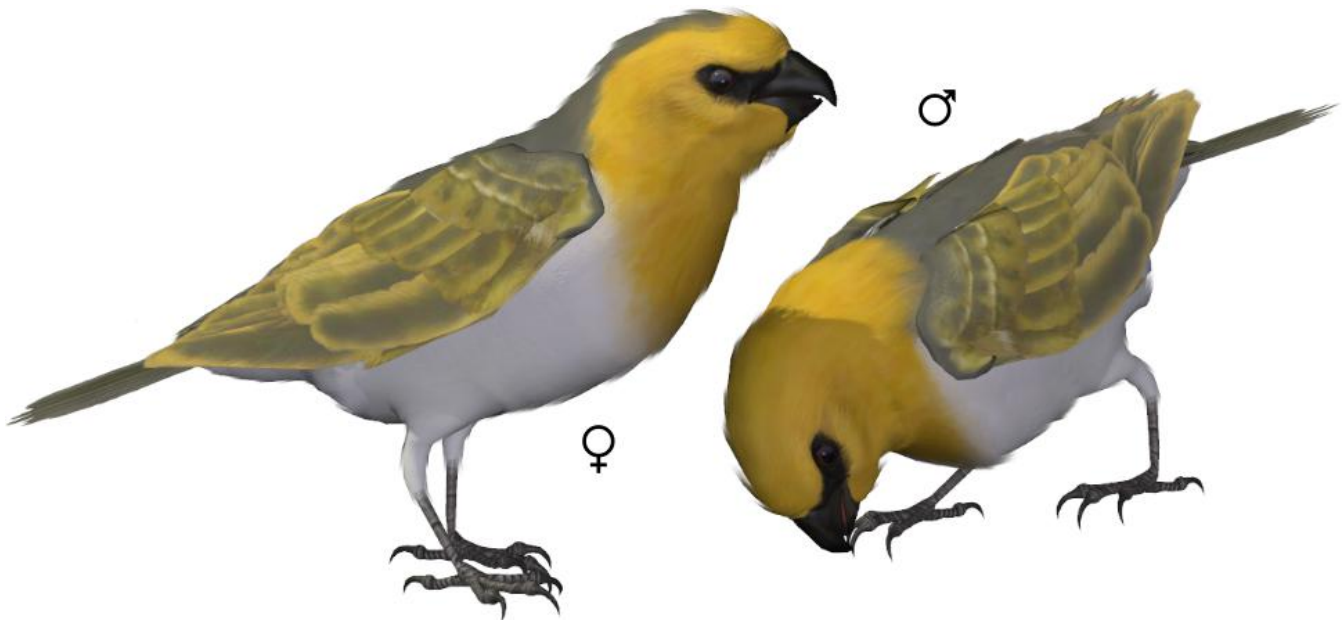
Habitat: Oceania; endemic to the slopes of Mauna Kea on Hawai'i.

It is only found in māmāne forests above the mosquito line.

Status: **Critically Endangered.** **Global Population:** 1000-2499 mature individuals with a decreasing population trend. It is endangered because its main source of food, the māmāne tree is also threatened. Cattle from nearby ranches trample the root systems of the trees and thereby, killing them.

Encroaching development also plays a role. In the mid-90's the remaining Palila population was moved to the base of Mauna Kea where a 100 acre grove of māmāne trees still remained and was fenced off from cattle grazing.

Unfortunately, invasive weeds and extremely flammable fountain grass surround the entire area. One wildfire could bring this bird to extinction and this author noted in a recent trip, numerous cigarettes butts were found scattered in the brush of its habitat.



Like most *drepanidines*, the Palila produces small clutches, usually only 2 eggs. However, Palila embryos and chicks develop slowly, so eggs and nestlings are threatened by storms and predators for a longer time than many other small passerine species.

Diet: The bulk of their diet is māmāne seeds. . In addition to seeds, small developing māmāne pods sometimes eaten whole without the seeds being

extracted. Māmane flower buds and reproductive parts (particularly anthers) are important foods, especially when seeds are less available. Naio fruit also frequently eaten when māmane foods are less abundant. *Lepidoptera* larvae are important to nestlings, but are also eaten year-round by adults and other age groups.

The Palila generally prefers large māmane trees but is highly selective with regard to individual trees in which it forages, nests, and roosts. Populations thrive in large tracts of forest arrayed along a gradient of elevation. Māmane flower and seed availability varies annually among trees, but the timing of production is strongly influenced by elevation. Thus, food resources are available year-round in forest tracts that extend broadly down and around mountain slopes, and small, loose flocks of these social birds track the availability of māmane pods up and down steep, volcanic slopes. However, in contrast to nectar-seeking birds that seasonally invade māmane forests, Palila are relatively sedentary and tend not to travel more than a few kilometers from their natal nests.

Breeding: It is a sexually dimorphic finch with yellow head and breast, gray back, white belly, greenish wings and tail, and black conical bill. The pale-gray rump noticeable in flight. Body characters similar in both sexes and all age classes. Distinct line separating gray color on back from yellow color on head distinguishes male from female. Separation between these colors on upper-parts of female indistinct, with varying amounts of gray feathers mixing with yellow feathers at the nape. Presence of complete or partial wing-bars on median and greater wing coverts distinguishes juveniles from adults. The bills of nestlings are yellow. The yellow tip fades to white in fledglings and the bill is entirely black in adults. The legs are black and the iris is dark brown in all Palila.

They nest in māmane trees. The first clutches are laid during February through July, depending on availability of māmane pods. The female selects the nest site. She also builds the nest with some contributions from the male. The composition of the nest base varies from entirely small, dead sticks, which are collected from nest tree. The cup is lined with lichens (*Usnea sp.*), fine grasses, and rootlets.

This species exhibits low rates of reproduction, laying fewer eggs and taking longer to raise its young compared with mainland songbirds.

Cool Facts: The Palila is one of the last surviving of the extraordinary “finch-billed” Hawaiian honeycreepers (*Drepanidinae*) and lives the big Island of Hawaii. The Palila is the largest of the Hawaiian honeycreepers and is probably the most studied.

Although the Palila has been known to eat some insects and naio berries, its primary diet comes from the Māmane tree. It eats seeds from its green pods, the flower petals and even the young leaves. The population numbers for the Palila are in direct proportion with the success of the Māmane’s blooming season.

Common Name: Bell's Vireo
Scientific Name: *Vireo bellii*

Targeted Subspecies: Least Bell's Vireo (*V. b. pusillus*)

Size: 4.75-5 inches (12.1-12.7 cm)

Habitat: North America; the nominate species is widespread in lowland central and southwest United States and northern Mexico (especially in states bordering the U.S). Historically, the least Bell's vireo was a common to locally abundant species in lowland riparian habitat, ranging from coastal southern California through the Sacramento and San Joaquin Valleys as far north as Red Bluff in Tehama County. Populations also occurred in the foothill streams of the Sierra Nevada and Coast Ranges, and in Owens Valley, Death Valley, and scattered



locations in the Mojave Desert. Least Bell's vireos winter in Baja California Peninsula. Unlike during the breeding season, they are not limited in winter to willow-dominated riparian areas, but occupy a variety of habitats including mesquite scrub within arroyos, palm groves, and hedgerows bordering agricultural and

residential areas. At the time of endangered species listing by the U.S. Fish and Wildlife Service in 1986, it had been extirpated from most of its historic range, and numbered just 300 pairs statewide. Populations were confined to eight counties south of Santa Barbara, with the majority of birds occurring in San Diego County. In the decade since listing, least Bell's vireo numbers have increased six-fold, and the species is expanding into its historic range. In 1998, the population size was estimated at 2,000 pairs. Nesting least Bell's vireos have recolonized the Santa Clara River in Ventura County, where 67 pairs nested in

1998, and the Mojave River in San Bernardino County. The northernmost reported sighting in recent years is of a nesting pair of least Bell's vireos near Gilroy in Santa Clara County in 1997. Roughly half of the current least Bell's vireo population occurs on drainages within Marine Corps Base Camp Pendleton in San Diego County, particularly in the lower Santa Margarita River. A colony has also been reported in the Big Tujunga Wash (north of Los Angeles near the author's home).

It is found in a wide variety of shrubs and small trees for habitat and nest-building. Usually attracted to dense, low, shrubby vegetation characteristic of early successional stages in riparian areas, brushy fields, young second-growth forest or woodland, scrub oak, coastal chaparral, and mesquite brushlands. It is found in natural ecosystems, often in riparian scrub along drainages or elsewhere near water, especially in arid environments and more northerly extremes and higher elevation states.

Status: Endangered. **Global Population:** 2,000 pairs with an increasing population trend.

In 1978, the total population of Least Bell's Vireo (*Vireo bellii pusillus*) was estimated at 90 pairs. Least Bell's Vireo was Red-listed in 1986. Its preferred habitat is dense willow forests in riparian areas with lush under-story of vegetation. There was an estimated 385 pairs in 1992 and it is threatened because it's critical riparian habitat is quickly vanishing to make way for off-road recreation (vegetation destruction/disturbed areas) and golf courses herbicides, pesticides and loss of natural vegetation). In addition, periodic flooding of riparian areas are essential to the health of these areas. Water control projects hamper and halt this natural cycle. Cowbirds are also threats to the nesting cycle.

Due to conservation efforts through the Federal Endangered Species Act, this subspecies appears to be on the road to recovery.

Diet: Insects (including bugs, beetles, grasshoppers, moths, and particularly caterpillars and small spiders) in breeding season; winter foods unknown.

The birds will forage in high and low shrubs and along riparian areas. It often flicks or bobs its tail while foraging in dense thickets. The most common plant species used for foraging and nesting by Least's Bell Vireo are the California wild rose and the coastal live oak.

Breeding: It is a small vireo with short, rounded wings that make the tail look long. It has a short, straight, blunt-tipped bill that is somewhat compressed at base. The plumage color varies regionally; it is generally drab gray to green above, white to yellow below and the breast is unstreaked. There is a faint white eye ring. It has two pale wing bars with the lower bar being more prominent. Juvenile plumage resembles that of adults in worn summer plumage—essentially

white and gray, but it is whiter below with more distinct wingbars. Least Bell's Vireo juveniles have pale whitish cheeks and forehead with some green in wings and tail.

During nesting season, most of the foraging occurs in the vicinity of the nest site, which is predominately in willow trees. A dense shrub layer is considered essential for nesting. Nests are constructed about three feet off the ground and are usually made from willows. Most nest sites are located near the edges of thickets and males often reuse the nest in succeeding years.

Cool Facts: This bird was named by Audubon for John Graham Bell, who accompanied him on his trip up the Missouri River in the 1840s.

There are 4 subspecies:

- *V. b. bellii*. First reported by Audubon in 1844. The nominate species breeds from eastern Colorado, South Dakota, and northeastern Iowa southward to Arkansas, northwestern Louisiana, and central Texas. It likely winters in coastal southwestern Mexico (south of Isthmus of Tehuantepec) southward to northwestern Nicaragua. The crown and nape are grayish brown. The mantle is greenish olive with the sides and flanks being greenish yellow. The under tail coverts and axillars are sulphur-yellow.
- *V. b. medius*. First reported by Oberholser in 1903. It breeds from southwestern Texas southward to northern Zacatecas and western San Luis Potosí in central Mexico. Its winter range is unknown, but it is probably along the central Pacific coast of Mexico. It is similar to the nominate species but the brown crown and nape is grayer, the olive mantle is grayer, and the yellow flanks are paler. The under tail coverts and axillars are white or yellowish white and the tail averages longer.
- *V. b. arizonae*. First reported by Ridgway in 1904. It breeds in eastern California (Colorado River and apparently westward into the eastern Mojave Desert), southern Nevada, southwestern Utah southward and eastward to southern Sonora, western Texas, and Chihuahua. It likely winters in northwestern Mexico, but there is a single winter record for southern California. It is like *V. b. medius* but the crown, nape, and mantle are brownish gray, the flanks are pale grayish-yellow, and under tail coverts are white. The tail and legs average longer.
- *V. b. pusillus*. First reported by Coues in 1866. The endangered "Least Bell's Vireo" breeds from central California southward to northern Baja California. It winters in southern Baja California Sur, with some winter records northward to southwestern California. It is like *V. b. arizonae*, but the dorsum is largely gray, with only the rump and uppertail coverts washed olive, and the ventrum is nearly white, with only faint yellow on flanks. The wing and tail average longer.

Common Name: Willow Flycatcher
Scientific Name: *Empidonax traillii*

Targeted Subspecies: Southwestern Willow Flycatcher (*E. t. extimus*)

Size: 5.75 inches (15 cm)

Habitat: North America; It is the most widely distributed North American *Empidonax* Flycatcher. It breeds northward to the southern coast (east coast of Vancouver Island and Fraser Lowlands) and southern interior (Okanagan valley east to Alberta and north to Stum Lake) of British Columbia, extreme southwestern Alberta, southernmost Saskatchewan (Missouri River tributaries), southwestern Manitoba, western and southern Minnesota (mostly south of a line from Chicago to Stearns to Clay Counties), central and southern Wisconsin (south of a line from St. Croix Falls, to Waupaca, to Marinette, to Washington



Island), the lower peninsula of Michigan (most abundant southwest and southeast, and locally common in the northern Lower Peninsula), southeastern Ontario (common south of the Canadian Shield), southern Quebec (Central St. Lawrence Lowland), eastern New Brunswick, Prince Edward Island, and possibly Nova Scotia. It breeds southward to southern California, northwestern and

southeastern Arizona (south to Bill Williams and eastern Gila Rivers and locally along the Colorado River southward to confluence with western Gila River), all but eastern and southern-most New Mexico, southern Missouri, southern Illinois, western Kentucky, southern Tennessee, extreme northern Georgia and the mountains of western North Carolina, the mountains of western Virginia, central and western Maryland, and northern and coastal Delaware.

As their name implies, they occupy areas with willows or other shrubs near standing or running water. But in the Pacific Northwest, they may also breed in drier scrubby areas. In winter, they use shrubby clearings, pastures, and woodland edges often near water. In Amazonia, they occur on river islands with scrubby growth. In Mexico and northern Central America, they use scrubby fields and woodlands from sea level to about 8,000 feet elevation.

Status: Least Concern to Endangered. **Global Population:** 9,400,000 individuals with a declining population trend. Willow Flycatchers are still common in most parts of their range, though their populations declined by 46% from 1970 to 2014, according to Partners in Flight.

The known breeding population of Race *extimus* was estimated at between 300 and 500 pairs in 2000. Its primary threat to existence comes from cattle ranching. The cattle trampled and graze the riparian woodlands that the flycatcher lives in. The cattle also are accompanied by the dreaded "Cowbird". The cowbirds knock out a few of the flycatchers eggs, lay their own eggs in the flycatcher's nest and take off,... leaving the flycatcher to raise it's nestlings (children). The cowbird nestlings are larger and hungrier and cut down the survival rate of the flycatcher's true offspring. You'd think the flycatchers would be able to distinguish their offspring from cowbirds, but they don't. This subspecies has been listed as Endangered (U.S. Fish and Wildlife Service 1995c). The critical habitat for the subspecies was designated in 1997 in the 3 states (New Mexico, Arizona, and California) where largest populations are known to occur.

Diet: Flying insects (bees, wasps, ants, beetles, damselflies, butterflies, moths, and flies). In the fall they occasionally eat blackberries, raspberries, currants, and dogwood berries.

From atop a willow or other tall shrub, sounds of fitz-bew float through the air. Males sit upright, throw back their head, and flick their tail upward with each song. From these and other perches, they sally out to nab insects in midair or hover above leaves to pick off insects. If they feel threatened by an intruding Willow Flycatcher they often flick their tail, spread out their tail feathers, flick their wings, or give chase. Like other flycatchers, they tend to perch upright.

Breeding: They are small, slender flycatchers, but they are one of the larger members of the *Empidonax* genus. They have a fairly long, thin tail and wings. The bill is broad. They are brownish olive overall with a slight yellow wash to the

belly. They have 2 whitish wingbars and a white throat that contrasts with the brownish olive breast. The white eyering seen on most *Empidonax* flycatchers is very thin and nearly absent on Willow Flycatchers.

They are mostly monogamous, but males sometimes mate with more than one female. During courtship pairs chase each other around while calling. Males and females frequently return to the same or nearby territories in successive seasons, and some even re-pair with same mate.

Females pick a spot within low shrubs and bushes, often near the outer edge. Most nests are in willow, but she also builds her nest in box elder, dogwood, hawthorn, bracken fern, and tamarisk. She places the nest about 2–5 feet above the ground. The nest is built of cattail tufts, shredded bark and grasses, and lined with fine grasses and feathers. It is usually placed in a branch fork in a willow, near water. The eggs are buff with dark spots at one end. The typical clutch of 3–4 eggs is laid in May–June.

Cool Facts: The Southwestern Willow Flycatcher was red-listed in 1996. It closely resembles the parent species, Willow flycatcher. The easiest way to distinguish this flycatcher from other flycatcher species is surprisingly not to rely upon its appearance, but from its distinct “fitzbeu” song. The flycatcher, as its name suggests live off flying insects. It breeds and nests in dense riparian habitats along rivers, streams, or other wetlands. The most likely areas are amongst thick groves of willows and seep willow. Almost all flycatcher-breeding areas are within close proximity of water.

- *E. t. traillii*. First reported by Audubon in 1828. The nominate species' southern range limits fairly well known (southward to northern Arkansas [rare], northern Tennessee, South Carolina [rare], northern Georgia, western North Carolina, and east to central Virginia), but boundary abutting *E. t. campestris* to the north and east less certain (breeds Maine; New Hampshire; west to eastern New York; north to southern Pennsylvania, southern Ohio, southern Indiana, and southern Wisconsin; and west to western Illinois, central Missouri, and central Arkansas. It is darker, less greenish, and more brownish (back and crown) than *campestris*; greener above than *brewsteri*; much darker above than *extimus* and *adastus*. There is extensive overlap with *campestris* in wing morphology (both, $P_{10} \geq P_5$). Intergrades between *traillii* and *campestris* reported from Arkansas.
- *E. t. campestris*. First reported by Aldrich in 1951. Some synonymize this subspecies with *E. t. traillii*. The range boundaries with *E. t. traillii* is unclear. It breeds northward into southern Canada from southern Ontario and Quebec to southern Alberta and Saskatchewan. The western limit is near the eastern slope of the Rockies Mountains from Colorado to Montana. It is paler and greener on back, and with a paler crown and cheeks than *traillii*. The back is paler and greener than *adastus* but darker and greener than *extimus* (Browning 1993a).

- *E. t. adastus*. First reported by Oberholser in 1932: It breeds from southern British Columbia to eastern California (east of Cascades and Sierras), and in the Great Basin to the Rockies, north of extreme south Utah. It is paler and greener above, the upper breast is more grayish, and the edges of tertials and secondaries are paler than in *E. t. brewsteri*. It is darker above than *extimus*. It intergrades between *adastus* and *extimus* reported from central and southern Idaho, northern and central Utah, and the Rockies of Colorado.
- *E. t. brewsteri*. First reported by Oberholser in 1918. It occurs west of the Cascades and in the Sierra Nevada from southwestern California up to southwestern British Columbia; the boundary between *brewsteri* and *adastus* to the east uncertain. It is darker above than other western subspecies, browner-backed than *traillii*, and browner or more olive than *E. t. adastus*. It intergrades between *adastus* and *brewsteri* reported from western to central Oregon and in northern California.
- *E. t. extimus*. First reported by Phillips in 1948. It breeds in the Southwest, including southern California, Arizona, New Mexico west of the Rio Grande, southwestern Utah, southern Nevada, and possibly southwestern Colorado. It is paler on back and especially on head than either *E. t. adastus* or *E. t. brewsteri*. The breast-band less distinct and paler gray than in other subspecies. The northern extent of pure forms of *E. t. extimus* in New Mexico remains unclear, as does whether *E. t. extimus* occurs as far north as southwestern Colorado. The song forms intermediate to *adastus* and *extimus* occur in northern New Mexico and possibly in western Colorado.

Common Name: Grasshopper Sparrow
Scientific Name: *Ammodramus savannarum*

Targeted Subspecies: Florida Grasshopper Sparrow (*A. s. floridanus*)

Size: 3.9-5.5 inches (10-14 cm); **Wingspan:** 6.9 inches (17.5 cm)

Habitat: North America; their breeding habitat is open fields and prairie across southern Canada, the United States, Mexico and Central America, with a small endangered population in the Andes of Colombia and (perhaps only formerly) Ecuador. The northern populations migrate to the southern United States, Mexico, Central America and the Caribbean. Like many grassland birds, this bird's numbers have declined across many parts of its range, including a 98% drop in New York State.

Grasshopper Sparrows occur in grasslands, prairies, hayfields, and open pastures with little to no scrub cover and often with some bare ground. Birds in the western part of the range can tolerate some brushy habitat but avoid areas that are too overgrown. Winters primarily in grass-dominated fields.

Status: Endangered. **Global Population:** 32,000,000 individuals with a



declining population trend. Grasshopper Sparrow populations declined by about 2.5% per year between 1966 and 2015, resulting in a cumulative decline of 72% over that period, according to the North American Breeding Bird Survey. If

current rates of decline continue, the species will lose another half of its population by 2065. Grasshopper Sparrows are especially vulnerable to habitat loss through fragmentation and degradation, and the loss of native prairie habitat to intensive agriculture has reduced populations across its entire range. On the plus side, the species is very responsive to management including prescribed burns, light to moderate grazing, and delayed mowing of hayfields.

The federally endangered Florida subspecies of Grasshopper Sparrow has declined rapidly in recent decades despite an intensive recovery plan. The population counts tell the story: 1997 Population: 298, 2002 Population: 162 and the 2003 Population: 17. The majority of remaining sparrows live on a 5,000 acre (not used) parcel on the Avon Park United States Air Force bombing range. It was once widespread in Florida however the conversion of its native habitat to pasture lands has had devastating effects. Its nests are often inadvertently mowed down when machinery clears fields. The sparrow, left with no cover, is vulnerable to predators.

Diet: Spiders, grasshoppers, crickets, weevils, moth larvae and sedge seeds.

Grasshopper Sparrows tend to walk or run rather than fly, and spend much of their time seeking insects and seeds on bare ground near the cover of dense grasses. Their stealthy behavior and camouflaged plumage allow them to forage far from cover. Males on territory sit atop a grass stalk, often quivering their wings while singing. When flushed they fly a short distance with rapid fluttery wingbeats before dropping into the grass to evade threats on foot. Grasshopper Sparrows don't form flocks, though wintering birds can be fairly numerous on appropriate habitat.

Appropriately for this species, grasshoppers are the primary prey. Adults prepare grasshoppers for chicks by removing the legs of the insects, vigorously shaking them off pair by pair.

Breeding: Adults have upper-parts streaked with brown, gray, black and white. They have a light brown breast, a white belly and a short brown tail. Their face is light brown with an eye ring and a dark brown crown with a central narrow light stripe. There are regional variations in the appearance of this bird.

The "Florida Grasshopper Sparrow" is a subspecies that can be identified by its location (Florida) and its darker, almost black, streaks of its head and darker tail feathers.

Pairs are seasonally monogamous, maintaining a pair bond throughout the nesting season but splitting up afterward.

The sparrow builds its nest on the ground with a canopy of grass and leaves. It lays four to five eggs in the spring.

Cool Facts: Grasshopper Sparrows are one of the few North American sparrows that sing two different songs. The more common song is a dry insect-like buzz, but they also have a more musical series of squeaky notes that the male gives in flight.

Twelve subspecies are recognized. Differentiation weak for several subspecies; further study warranted.

- *A. s. pratensis*. First reported by Vieillot. It breeds from southern Maine (York and Cumberland counties), southern New Hampshire (possibly extirpated), northern Vermont, southwestern Quebec), and southern Ontario westward to Michigan and Wisconsin, southward to eastern Oklahoma, northeastern Texas, Arkansas, south-central Alabama, central Louisiana, southwestern Mississippi, south-central Alabama (Montgomery County), and along Atlantic coastal plain, to Georgia and South Carolina. It winters from Arkansas, Tennessee, Georgia, South Carolina, eastern North Carolina, coastal Virginia, and Maryland southward to Caribbean (Bahama Island, Cuba, including Isla de Juventad, and Bermuda), southern Mexico, Belize, Guatemala, Costa Rica (small numbers in Central Valley), and western Panama. It is rather small with a heavy bill and dark mantle color.
- *A. s. perpallidus*. First reported by Coues. It breeds from northwestern California, eastern Washington and northeastern and southwestern Oregon, southeastern British Columbia (endangered c1991), southern Alberta, southern Saskatchewan, southern Manitoba, western Ontario, and Minnesota southward to southwestern California, central Nevada, northern Utah, central Colorado, western Oklahoma, and central Texas and possibly east (at least irregularly) to Illinois and Indiana. It winters from western Oregon, central California, western and southeastern Arizona, central Oklahoma, southern Louisiana, southern Mississippi, and southwestern Georgia southward to south Baja California, Guerrero, and Veracruz, Mexico, and El Salvador. It is an accidental in winter in Virginia and Oregon, and a vagrant north to Minnesota, and in migration in Florida. It is separable from *A. s. pratensis* by somewhat paler coloration, long wing and tail, and more slender bill.
- *A. s. ammolegus*. First reported by Oberholser. It breeds from southeastern Arizona and southwestern New Mexico to northern Sonora, Mexico. Its winter range is poorly known, from southern Arizona southward to Sinaloa, Morelos, and Guatemala. It has bright rufous streaks on back and uppertail-coverts and much brighter than *A. s. perpallidus*.
- *A. s. floridanus*. First reported by Mearns. The "Florida Grasshopper Sparrow" was formerly more wide-spread in central Florida, now restricted to prairies north and west of Lake Okeechobee to central Osceola County. It is thought to be sedentary, but some winter movement possible. A specimen was collected in Everglades National Park, near Marathon, in 1968. It has darker, almost black, streaks of its head and darker tail feathers.

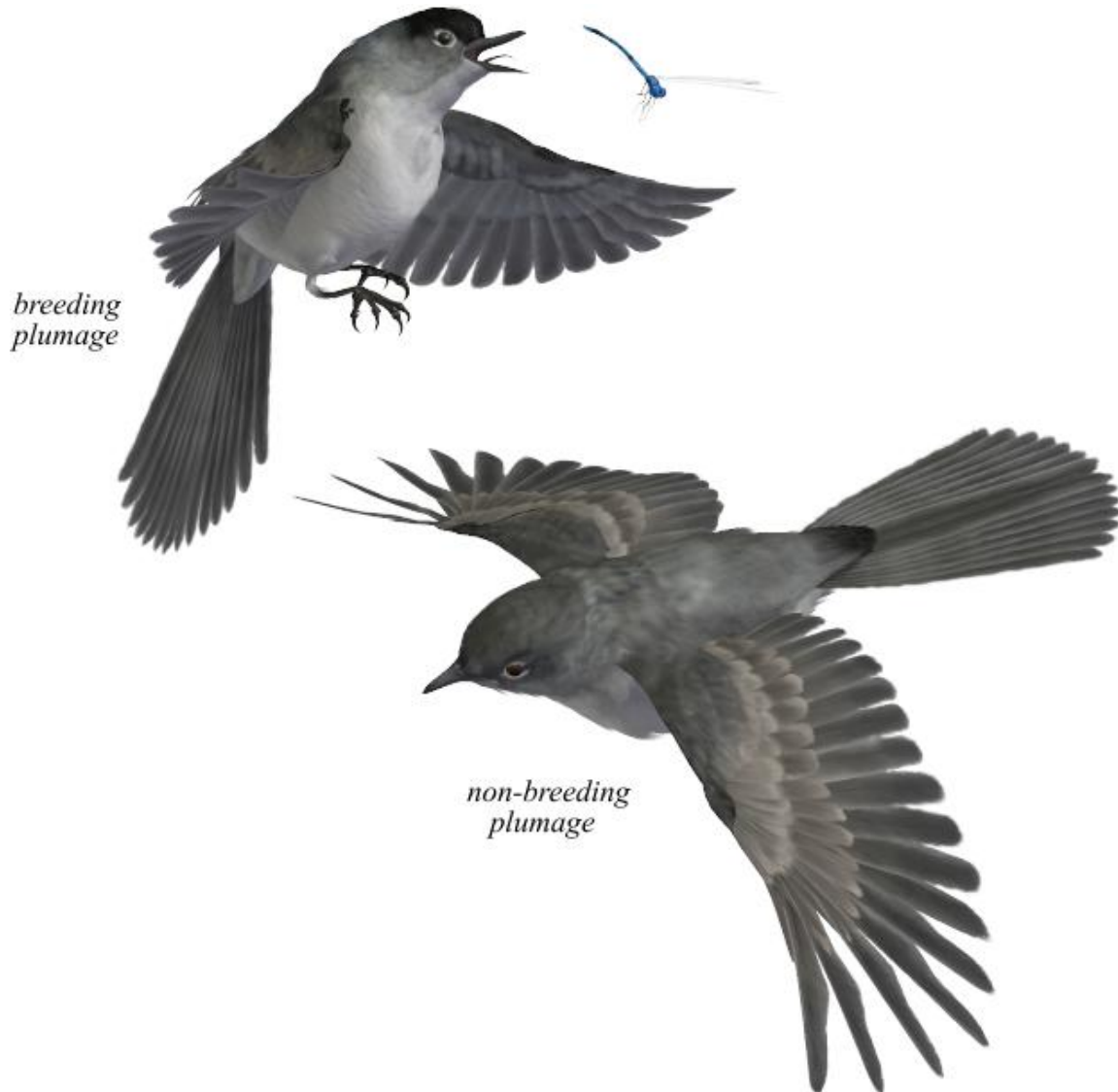
- *A. s. bimaculatus*. First reported by Swainson. It breeds disjunctly from southern Mexico (Chiapas), Guatemala, and central interior Honduras to northwestern Costa Rica, western Panama, and disjunctly to eastern Panama. It is paler than *A. s. cracens* but darker and more richly colored than *A. s. beatriceae*.
- *A. s. cracens*. First reported by Bangs and Peck. It is common in pine savanna of Belize, eastern Guatemala, and Honduras southward to northeastern Nicaragua. It has a very dark mantle and the breast is buffy.
- *A. s. beatriceae*. First reported by Olson. It is endemic to central Panama, known only from Pacific-slope savannas of southern Coclé province. It has a light gray dorsum and is palest of all subspecies.
- *A. s. caucae*. First reported by Chapman. It is endemic to Colombia (upper Cauca Valley) and northern Ecuador. It has a nape that is brownish black, generally darker than *A. s. beatriceae*.
- *A. s. savannarum*. First reported by Forbush in 1939. The nominate species is endemic to Jamaica. It has a paler back and blacker streaks on nape than *A. s. pratensis* or *A. s. perpallidus*.
- *A. s. borinquensis*. First reported by Leopold in 1963. It is endemic to Puerto Rico. It is smaller with brighter buff central crown stripe than *A. s. savannarum*.
- *A. s. intricatus*. First reported by Wetmore and Swales in 1931. It is found in the lowland savannas of Hispaniola and is similar to *A. s. borinquensis* but the sides of the head and upperparts are dull brown.
- *A. s. caribaeus*. First reported by Byers et al. In 1995. It is found on Curaçao and Bonaire islands and is paler than any other Caribbean race.

Common Name: California Gnatcatcher
Scientific Name: *Polioptila californica*

Size: 3.75 -4.5 inches (9.5-10.6 cm)

Habitat: North America; found only in Southern California from Ventura to Baja.

It prefers wetlands and grassy areas. In San Diego County, most forage in California sagebrush, California buckwheat, and laurel sumac (*Malosma laurina*), but other plant species also used according to abundance within territories. California sagebrush had higher arthropod densities than California buckwheat. It occasionally feeds in non-coastal sage scrub vegetation, especially during July and August when the quality and volume of drought-deciduous shrub foliage



declines. Many alternative vegetation types are more mesic than coastal sage scrub and may support higher prey densities

Status: Least Concern to Threatened. **Global Population:** 80,000 individuals with a declining population trend. The U.S. Fish and Wildlife Service estimated in 1999 that there were 6,000 individuals in the United States. Since the mid-1940s suburban sprawl has drastically reduced and fragmented coastal sage scrub that California Gnatcatchers rely on. For example, in the United States 70–90% of gnatcatcher habitat has been lost. Conservation efforts have focused on establishing standardized monitoring protocols, trapping Brown-headed Cowbirds (which lay their eggs in gnatcatchers' nests), and increasing research into the biology of California Gnatcatchers.

Diet: Leafhoppers (*Homoptera*), spiders (*Araneae*), beetles (*Coleoptera*), and true bugs (*Hemiptera*).

This species is almost never seen on the ground. It catches its meal in flight, usually flying a distance less than 2 m (6 ft). They pick insects from sagebrush and other shrubs and never seem to slow down. Their kittenlike harsh meow often comes from deep inside a shrub, although males sometimes call from exposed perches while flicking their tail.

Breeding: Very small, slender, long-tailed, gray songbird. Its bill is short and slender. The wings are short and rounded. The body-plumage coloration varies geographically from north (dark gray) to south (light gray) in both sexes. Tail graduated, mostly black. The outer 2 or 3 rectrices narrowly edged and tipped with white, more extensively so at southern end of range. There is slight sexual dimorphism in size (males 1–4% larger than females) and plumage coloration throughout year. Males are with gray underparts and head. The back and wings gray with brownish tinge. Females are more strongly washed with brown, especially on the back, flanks, belly, and crissum. Breeding males have a black cap. In Basic plumage, a short black line crosses over eye to base of bill. Both sexes have an indistinct white eye-ring in Basic plumage. The eye-ring on males in Alternate plumage is generally limited to area below eye, especially at northern end of range.

California Gnatcatchers are monogamous and maintain pair bonds and territories year-round. Males chase intruding males and juveniles out of their territory, but often tolerate lone females. Paired females also take part in territory defense, chasing out juveniles and females, but rarely lone males. Female Brown-headed Cowbirds often lay an egg in the nests of California Gnatcatchers. The gnatcatcher eggs are either kicked out by the cowbird or are smothered by the much larger cowbird nestling. Parasitized nests very rarely fledge gnatcatcher young.

Both parents build nest, incubate, and care for young. Nest site established by male who also initiates nest building. The cone-shaped nests are built in shrubs and first-brood eggs (2-5) are laid in late March. With a roughly 120 day breeding season, they may be able to have as many as three broods per season. A high rate of nest predation is compensated by up to ten re-nesting attempts over the long breeding season.

Cool Facts: “Extolled by conservationists for its ability to stop a bulldozer in its tracks and reviled by land developers as their worst enemy, the tiny California Gnatcatcher has become a symbol of the challenges of how to interpret and apply the U.S. Endangered Species Act.” (from Birds of the World). The contention has been so fierce that developers have groomed unethical biologists to argue before courts that the California Gnatcatcher isn’t a separate species at all, but an offshoot of the non-endangered blue-gray gnatcatcher. Their attacks have failed so far.

California Gnatcatchers haven't been observed bathing in standing water, instead they clean their feathers using water collected on leaves by rain or coastal fog..

Three subspecies recognized based on subtle morphological differences...

- *P. c. californica*. First reported by Grinnell in 1926. The nominate species occurs from southern California southward in northwestern Baja California to 30°N; *pontilis* in central Baja California.
- *P. C. margaritae*. First reported by Grinnell in 1926. It is found south of 27°N in southern Baja California; including islands of Santa Margarita, San José and Espíritu Santo.
- *P. C. pontillis*. First reported by Grinnell in 1926. It is found in Central Baja California.

Common Name: Bell's Sparrow
Scientific Name: *Artemisiospiza belli*

Targeted Subspecies: San Clemente Island Sage Sparrow (*A. b. clementae*)

Size: 5-6 inches (12.1-15 cm)

Habitat: North America; in breeding season, it is found in interior west-central Washington, Oregon east of Cascade Mountains but primarily in southern counties, southeastern and extreme southwest Idaho, portions of central and western Wyoming and very locally in northeast, throughout all but south. Nevada, locally throughout Utah, on mesas of western Colorado and in San Luis Valley of south-central Colorado, northwestern New Mexico, and northeastern Arizona). In California, it is found in the extreme northeast southward to Sierra County, in east-central California from Mono County southward around western rim of Mojave Desert to upper Kern River basin, in foothills of the western Sierra Nevada mountains from El Dorado Counties



southward to Mariposa County, on San Clemente Island, and in western California in the inner Coast Ranges from Trinity and Shasta Counties. southward to coastal Marin County and southward through San Joaquin Valley to southern California (west of the eastern deserts), and south through Baja California (except eastern coast) to about 26°N. It is rare during breeding season in western Washington, western Oregon, Montana, and British Columbia coast of California.

It is found throughout year in the southern California and Baja areas where its winter range overlaps with breeding range, except in northernmost portion of

inner Coast Ranges and in east-central California, where species does not typically winter. Elsewhere, it winters locally from southern Nevada, southwestern Utah, all but northeastern Arizona, west-central and southeastern New Mexico eastward to west Texas and southward to central Chihuahua (Mexico), northwestern Sonora to Kino Bay, southeastern California, and eastern Baja California Norte. Also, it is known to winter near Pyramid Lake and Fallon in western Nevada.

Bell's Sparrows breed in coastal sagebrush, chaparral, and other open, scrubby habitats. In chaparral, they tend toward younger, less dense stands that are growing back from recent fires; they are less common in older, taller stands that have remained unburned. In mountains of Southern California they also occur in big sagebrush (*Artemisia tridentata*). In the Mojave, Bell's Sparrows use low scrub including big sagebrush, saltbush, bitterbrush, shadscale, and creosote bush. During migration and winter, Bell's Sparrows often form loose flocks with other sparrow species, including Sagebrush Sparrows. They use dry shrublands or grasslands, including creosote and saltbush-dominated desert scrub, yucca, honey mesquite, and greasewood.

Status: Least Concern to Endangered. **Global Population:** 1,020,000 individuals with a declining population trend. While Bell's Sparrow as a whole is considered not endangered, some of its subspecies are. The San Clemente subspecies of Bell's Sparrow is on the 2014 State of the Birds Watch List, which lists species most in danger of extinction without significant conservation action. Bell's Sparrows depend on fairly open shrubby communities that tend to be maintained by natural fire regimes. Fire suppression can lead to altered, communities with denser shrubs and lower numbers of Bell's Sparrows. In densely populated Southern California Bell's Sparrows has also faced habitat loss as suburban development creeps into their attractive coastal sagebrush habitat. The sparrow was listed as threatened in 1977 because of its limited distribution and habitat destruction by introduced goats and pigs to San Clemente Island. In addition, feral cats preyed upon the birds and fuel-modification to prevent fires destroyed their habitat. It was also found that human disturbance played a big role in nesting success. The more disturbed the area, the smaller the number of sparrows. The population of this subspecies has increased an order of magnitude from the low of 38 individuals in 1984 to a population estimate of 539 adults (USFWS 2009) thanks to the Federal endangered subspecies program and smart management.

Provisions taken to protect nesting areas as well as the removal of pigs, goats and cats have resulted in a stabilization of the current populations.

Diet: A ground-foraging omnivore during breeding season, and as a ground-gleaning granivore during its non-breeding period. Foods taken during breeding season include adult and larval insects, spiders, seeds, small fruits, and

succulent vegetation. Fall, winter, and early-spring foods include small seeds, plant material, and insects when available.

It generally hops or walks on ground while foraging. Holding tail vertical, usually runs across open areas from protection of one shrub to another. It frequently jerks its tail up when standing on ground or perched in shrub. Usually, it approaches its nest by slowly walking and/or hopping on ground. It is more likely to run than fly when alarmed.

Breeding: Sexes are alike, although males is slightly larger. It's a medium-sized sparrow that is generally brownish gray above, the head somewhat grayer, the back and wings browner. Its upper-parts are dark gray and gray-brown in some parts of range, its comparatively pale, with distinct dark streaking elsewhere (for details, see subspecies, below). There is a white spot in front of the eye (over the lores; sometimes also a narrow white streak in the middle of the forehead), a thin eye-ring, and a broad white sub-moustachial stripe coupled with mostly white underparts and a dark spot on the chest. There is a blackish malar stripe at the sides of throat. This stripe is sometimes merely a coalesced series of dark streaks (interior and northern subspecies). The sides and flanks are light buffy gray, with dusky streaking. There is a yellowish patch on underside edge of wing at "wrist." The tail is contrastingly dark blackish brown, sometimes showing a paler outer web and tip of outer tail feathers. It has a habit of nervously jerking its tail upward and gives light, metallic 'tink' call.

Juveniles are streaked below; similar to juvenile Black-throated Sparrow (*Amphispiza bilineata*), but Sage Sparrow lacks the white supercilium and has slightly heavier streaking below, especially on the flanks.

The Sage Sparrow breeds in sagebrush over 90% of the time. It breeds in large patches brush, with a minimum requirement of about 320 acres of continuous habitat. Unlike its mainland relatives that live in sagebrush habitats, the San Clemente Island sage sparrow has adapted to live in boxthorn, cactus, and saltbush. Nests are typically placed low to the ground in a boxthorn shrub and use grasses and leaf litter as a canopy.

Cool Facts: Taxonomy can be confusing, even for the experts. In the nineteenth century all the "sage" sparrows from the Rocky Mountains west to the Pacific Coast were known as Bell's Sparrow, although ornithologists noted there were several regional forms. By 1910, they had split Bell's Sparrow into the two distinct species we know today; the Sagebrush Sparrow and Bell's Sparrow. A revision in 1957 lumped them together as the Sage Sparrow. In 2013, they were split back into two species, now known as the Sagebrush Sparrow and Bell's Sparrow.

The majority of the San Clemente Island Sage sparrows live on the western shore and northern end of the island.

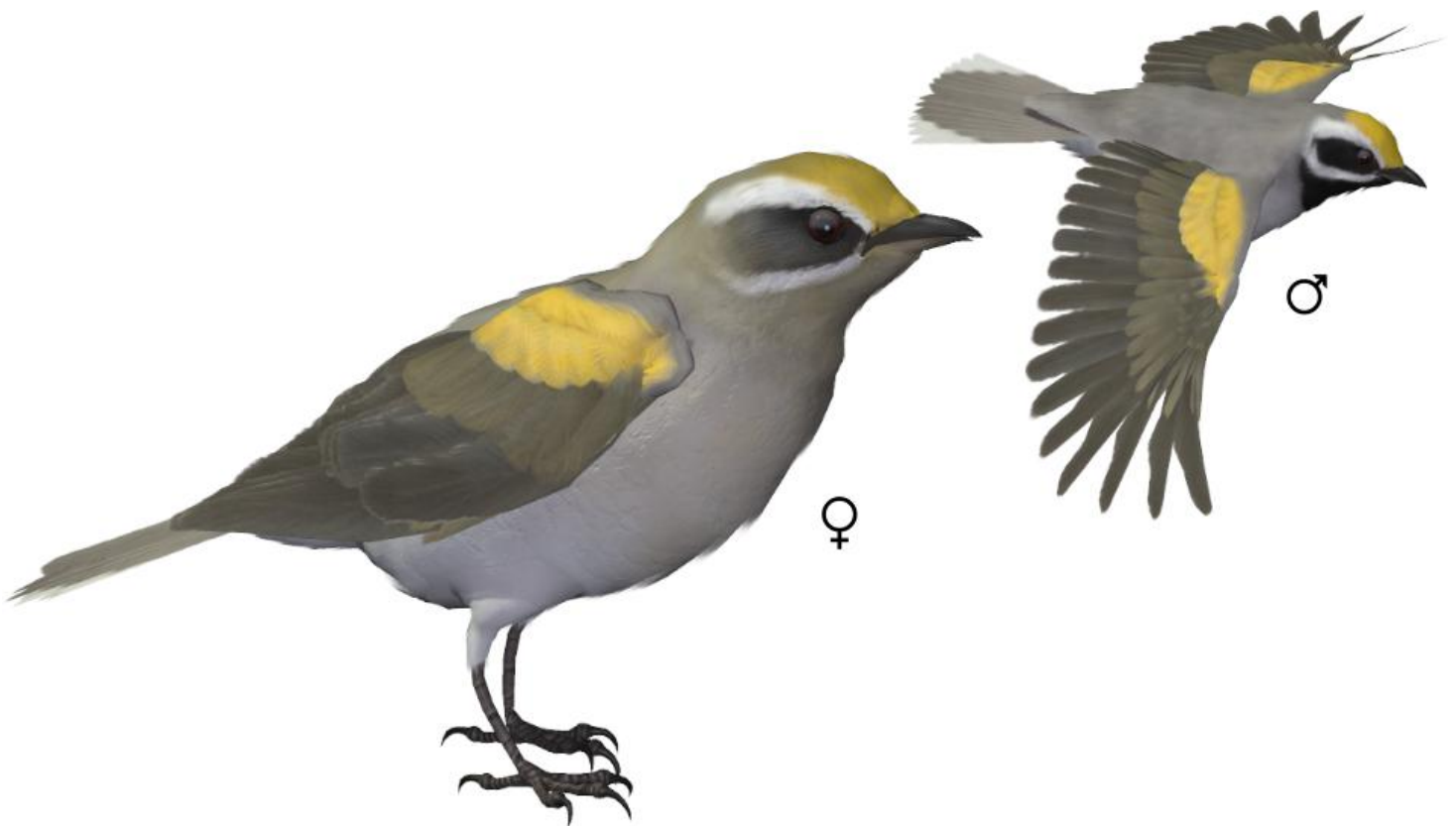
- *A. b. belli*. First reported by Cassin in 1850. The nominate species is a resident in California in the Coast Ranges from the north San Francisco Bay region and western slope of the Sierra Nevada southward to northwestern Baja California. Its head is dark gray; the wings dark gray-brown with black back streaks obscure. The black malar streak is thick and continuous; edges to outermost rectrices deep beige. It is small overall.
- *A. b. canescens*. First reported by Grinnell in 1905. It breeds inland in southern California from the south San Joaquin Valley through the west Mojave Desert to Owens Valley. Individuals move upslope after breeding and many migrate south to the Colorado Desert in winter. It is similar to the nominate, but paler dorsally, the black back streaks are distinct, the black malar streak is narrow and composed of coalesced streaks, and edge to outermost rectrices light beige. It averages larger in size.
- *A. b. clementae*. First reported by Ridgway in 1898. The “San Clemente Island Sage sparrow” is endemic to San Clemente Island (off the southern California coast). It is very similar to nominate, but with a larger bill, perhaps a paler coloration, and with an eyering and the supraloral spot being buffy.
- *A. b. cinerea*. First reported by Townsend in 1890. A resident on the west-central Baja California peninsula from Rosarito southward to Bahía de Ballenas. It is similar to *A. b. canescens*, but smaller in size and paler overall, with back sandy brown and often unstreaked or with dark streaks rudimentary. The pale buff wingbars often disappear from wear.

Common Name: Golden-winged Warbler
Scientific Name: *Vermivora chrysoptera*

Size: 5.1 inches (13 cm)

Habitat: North and South America; Northeastern United States to the Yucatan Peninsula and South America. Breeds in open deciduous woodland, secondary growth, brushy pastures and bogs, apparently favoring a particular stage in woodland succession. When the habitat passes this stage, birds move on.

They breed in tangled, shrubby habitats such as regenerating clearcuts, wet thickets, and tamarack bogs. They often move into nearby woodland when the young have fledged. They spend winters in open woodlands and shade-coffee plantations of Central and South America. All kinds of woodland and scrub are used during migration, and birds generally winter in secondary growth forest or forest edge with a good under-story.



Status: Near Threatened. **Global Population:** 410,000 Mature individuals with a declining population trend. Golden-winged Warblers have declined sharply and now have one of the smallest populations of any bird not on the endangered species list. The North American Breeding Bird Survey estimates a decline of almost 2.5% per year between 1966 and 2014—amounting to an overall decline of 68%. In 2012, the U.S. Fish and Wildlife Service took the species under

consideration for listing as an endangered species. As numbers have fallen, the species' range has also shifted northwest. The breeding range is now largely split into two distinct regions, with 95% of the population in the Upper Great Lakes (mostly Wisconsin, Minnesota, and Manitoba) and the other 5% in the Appalachians from New York to Georgia. Minnesota now has the highest remaining density of Golden-winged Warblers, with about half the global population. The Appalachian mountains population has nearly been extirpated (down 98 percent). Causes of the bird's decline include habitat loss and hybridization and competition with the closely related Blue-winged Warbler (in which the Golden-winged tends to lose out). Breeding between the species has created a hybridized warbler known as the Brewster's or Lawrence's Warbler.

Wetland habitats seem to be a stronghold for Golden-winged Warblers, but invasive Phragmites is making the birds' preferred tussock-sedge nesting sites harder to find. Clearcutting, burning, and grazing can improve habitat for Golden-winged Warblers, although new evidence points to the importance of keeping mature forest nearby. Loss of open forests on the wintering grounds is also a problem, and bird-friendly or shade-grown coffee and cacao plantations can help retain habitat for the species. The [Golden-winged Warbler Working Group](#), a consortium including the Cornell Lab of Ornithology and 38 other universities, agencies, and conservation groups, has released a conservation plan to improve the species' prospects by 2050.

The habitat of the Golden-winged warbler is also threatened by development and deforestation. There is current pressure from certain sectors and Federal level to open its remaining habitat to surface mines and clear-cut programs. This will ensure that this bird becomes extinct in the next few decades.

Diet: Insects such as caterpillars, moths and other insects, and spiders. Leafroller caterpillars appear to be an important food source.

They forage among the leaves and branch tips of their low, shrubby habitat. Male golden-wings are extremely bold and vocal during the 3 to 4 weeks at the start of their breeding season, prone to prolonged and exuberant bouts of singing. They also engage in a variety of postures and behavior in order to demarcate their territory, including chasing and flying past rival males, spreading their tails in face-offs, and sometimes actually physically fighting.

Breeding: A small songbirds with fairly slim bodies and short tails. They have a thin, straight bill that is sharply pointed. They are sexually dimorphic. Adult males are silvery gray with a strong black-and-white face pattern, yellow crown, and large yellow patches on the wings. Females are similar but lack the male's black mask and bib. Hybrids with the Blue-winged Warbler can produce a mostly light gray form ("Brewster's") or a mostly golden form ("Lawrence's").

Males chase after females during courtship, raise their crowns and flick their tails when approaching a potential mate, and perform flight displays with slow, deep wingbeats. But after territories are established and mates are selected, they become very secretive during nesting and raising young. Golden-wing males are mostly monogamous, though there are a few reports of them having multiple mates.

The well-hidden nest is usually on or close to the ground, and breeding takes place in May and June. It nests in clumps of grass or at the base of trees, making a rough-looking cup of bark and grasses. The female builds the nest, usually on the ground, over the course of 1–3 days. She often places the nest at the base of a plant such as goldenrod or blackberry, using the a tall, thick plant stem as a support (adults often land on this when arriving at the nest). She makes a base from up to 30 leaves and then adds grapevine or arrowwood bark and other long strips of plant material. Finished nests measure about 3.5 to 6 inches across and 1 to 2.5 inches deep. Females are very sensitive to disturbance and may abandon nests even after the first eggs have been laid.

Cool Facts: Minnesota has the highest remaining density of Golden-winged Warblers, with about half the global population.

Golden-winged parents may use trickery to protect their young from predators. Adults feeding nestlings have been observed repeatedly carrying food down other plant stems away from the nest, possibly as a decoy, when they detected humans nearby.

Golden-winged Warblers often hybridize with the closely related Blue-winged Warbler. The Blue-winged Warbler has been expanding its range, and hybridization has been one element in the sharp decline of Golden-winged Warblers.

These hybrids tend to develop into one of two distinctive plumages, which early naturalists at first thought were separate species: "Brewster's Warbler" (which looks like a Blue-winged Warbler with a white chest), and "Lawrence's Warbler" (which looks like an all-yellow Golden-winged Warbler).

Hybrids do not sing intermediate songs but sing either normal Blue-winged Warbler or Golden-winged Warbler songs. Some birds sing both. Occasionally pure-looking parental types sing the "wrong" song.

Common Name: Purple Martin
Scientific Name: *Progne subis*

Size: 8 inches (20 cm)

Habitat: North America; throughout the United States except the west coast.

They forage over towns, cities, parks, open fields, dunes, streams, wet meadows, beaver ponds, and other open areas. In eastern North America, they used to breed along forest edges and rivers, where dead snags offered woodpecker holes to nest in. But since humans began supplying nest boxes for them, eastern martins have become urbanites, living almost exclusively near cities and towns. In the West, martins have stuck with woodpecker holes in mountain forests or Pacific lowlands. Purple Martin wintering grounds are savannas and agricultural fields in Bolivia, Brazil, and elsewhere in South America. At night, wintering martins flock into cities and towns to roost, often in the trees of village plazas.

Status: Least Concern. **Global Population:** 7,000,000 mature individuals with a



declining population trend. Purple Martins are fairly common birds (especially in the Southeast), but their numbers declined by almost 1% per year between 1966 and 2015, resulting in a cumulative decline of 37%. Once listed as “Vulnerable”, the Purple Martin has been down listed to “Least Concern”. Humans have helped counteract declines somewhat by putting up nest boxes, and people now provide virtually all nest sites for Purple Martins in the East. However, introduced species such as European Starlings and House Sparrows often take over martin houses and injure or kill eggs and nestlings. Purple Martins are also sensitive to cold snaps; bad weather kills more birds than all other sources of mortality combined. When unseasonably cold temperatures last more than three or four days, the birds starve for lack of insects. In the West, logging practices that remove dead trees can reduce nesting habitat for martins. Reduction of pesticide use on South American wintering grounds and protection of large winter roosts in Brazil is also important to the conservation of this species.

Diet: Flying insects (beetles, flies, dragonflies, damselflies, leafhoppers, grasshoppers, crickets, butterflies, moths, wasps, bees, caddisflies, spiders, cicadas, termites, and mayflies). Though a rare occurrence, it has been seen eating ants on the ground.

The Purple Martin not only gets all its food in flight, it gets all its water that way too. It skims the surface of a pond and scoops up the water with its lower bill. They feed during the day, rarely in groups but often in pairs (probably so the male can guard the female from mating with other males).

Purple Martins fly with quick flaps and glides, outlining big circles in the sky as they hunt insects. They rarely land on the ground except to collect nesting material and pick up grit to help them digest insect exoskeletons.

Breeding: A very large, broad-chested swallow that is sexually dimorphic. They have stout, slightly hooked bills, short, forked tails, and long, tapered wings. Adult males are iridescent, dark blue-purple overall with brown-black wings and tail. Females and immatures are duller, with variable amounts of gray on the head and chest and a whitish lower belly.

Both males and females visit several cavities before choosing a site (a female chooses her mate largely based on the nest site he occupies). It nests in open country—rural areas and especially around water. It builds its nest from leaves, grass, feathers and mud in small cavities and tree snags. It also favors man-made “Martin Houses” on the Eastern portion of its range.

Cool Facts: The Purple Martin is the largest swallow found in the Americas. It was at one time found throughout the United States, but now is now rarely found on the west coast. It spends summers in North America and winters in South America.

It eats flying insects at altitudes higher than other swallows, often exceeding 150 feet and sometimes 500 feet or more off the ground. While it usually is airborne for its meals, though has been known to eat ants on the ground. Some towns have actually installed "Martin Houses" as their insect control measures.

Its decline has been due to forestry policies of eliminating standing dead trees (which provide nesting areas). Also, there is competition for nesting sites from two introduced birds, the House Sparrow and the European Starling. Starlings have been especially aggressive. The solution have been "Martin Houses" which are too small for the starlings to enter, allowing the Purple martin to stage a comeback.

Despite the term "scout" used for the first returning Purple Martins, the first arriving individuals are not checking out the area to make sure it is safe for the rest of the group. They are the older martins returning to areas where they nested before. Martins returning north to breed for their first time come back several weeks later. The earlier return of older individuals is a common occurrence in species of migratory birds.

- *P. s. subis*. First reported by Linnaeus in 1758. The nominate species breeds across eastern North America westward to the Rocky Mountains. and south, locally, to Mexico's transvolcanic belt. Montane birds in the "sky islands" of southwestern New Mexico and southern Arizona have traditionally been classified as *P. s. subis* despite being intermediate in many respects. The female is dusky ventrally, with the lower ventrum less extensively white and often obscured by slight wash of tan, although on some females (older ones?) the entire ventrum is dark brown or dark gray. The body size is intermediate.
- *P. s. arboricola*. First reported by Behle in 1968. It breeds throughout the Rocky Mountains south to west Texas and southern Nuevo León, and probably into the Pacific Northwest. It is similar to the nominate but the female is whiter below and on the forehead. The body size is large (wing chord: male > 146 mm, female > 141 mm).
- *P. s. hesperia*. First reported by Brewster in 1889. It breeds in deserts of the southern Baja California peninsula and southern Arizona south to at least south-central Sonora. This subspecies possibly occurs south to extreme northern Sinaloa and on islands in Gulf of California, and birds on the Pacific slope north of the central Baja California peninsula (north of 31°N latitude). Moreover, this subspecies may extend upslope into the "sky islands" of southern Arizona and southwestern New Mexico (see above). It is like *P. s. arboricola* but the body size is smaller (wing chord: male < 146 mm, female < 141 mm; Behle 1968).

Common Name: Loggerhead Shrike
Scientific Name: *Lanius ludovicianus*

Size: 7.9-9.1 inches (20-23 cm); **Wingspan:** 11.0-12.6 in (28-32 cm)

Habitat: North American; once widely distributed across southern Canada, the contiguous USA and Mexico.

It prefers open country with scattered shrubs and trees, but can also be found in



more heavily wooded habitats with large openings and in very short habitats with few or no trees.

Status: Near Threatened to Endangered. **Global Population:** 5,800,000 Mature individuals. Between 1966 and 2015, the species declined by almost 3% per year, resulting in a cumulative decline of 76%, according to the North American Breeding Bird Survey. 82% of the population spends some part of the year in the U.S., 30% in Mexico, and 3% breeding in Canada. . It became "Threatened" in Canada in 1986 and "Endangered" in 1991. It has been proposed for an endangered species listing in the United States (the subspecies that nests on San Clemente Island, California, is listed as "endangered"). The species is declining continent-wide and no longer occurs in most of the northeastern United States. The species' decline coincides with the introduction and increased use of chemical pesticides between the 1940s and the 1970s, and may result in part from the birds' ingestion of pesticide-laced prey from treated fields. Other likely causes of population decline include collision with vehicles, urban development, conversion of hayfields and pastureland, decimation of hedgerows, habitat destruction by surface-coal strip-mining, and altering of prey populations by livestock grazing. Given this bird's potentially high reproductive rate, and provided that adequate habitat continues to be available,

Loggerhead Shrike populations may be able to recover if the causes of the bird's decline can be identified and eliminated. A captive population was established at the Toronto Zoo and McGill University in 1997. In 2001, an experimental field breeding and release program managed by Wildlife Preservation Canada was established. "Field breeding" refers to moving captive pairs from their wintering cages at the Toronto Zoo and McGill to large enclosures within shrike habitat in Ontario where the pairs nest and raise their young. The young then are released to the wild when they'd naturally disperse from their parents. Since 2004, over 90 young have been released annually and between 2% and 6.5% of young released have successfully migrated and returned to breed in the subsequent year.

Diet: Large insects, but can include small birds and mice.

Loggerhead Shrikes sit on low, exposed perches and scan for rodents, lizards, birds, and insects. They eat smaller prey (such as ground beetles) right away, but they are famous for impaling larger items on thorns or barbed wire to be eaten later. The species often hovers. When flying it uses bursts of very rapid wingbeats. Loggerhead Shrikes sometimes go hunting on cold mornings, when insect prey are immobilized by low temperatures.

Breeding: A thick-bodied songbird with a large, blocky head and a thick bill with a small hook. The tail is fairly long and rounded. It is mostly gray bird with a black mask and white flashes in the black wings. The gray head contrasts with the wide, black mask, black bill, and white throat. The tail is black with white corners; the

wings are black with white at the base of the primaries that form a small “handkerchief” spot when the wing is closed and larger white patches in flight.

It is difficult to discern sexes in adult loggerhead shrikes in the field as they are sexually monochromatic, however several recent studies have reported sexual dimorphism in plumage and size traits (females appear to have browner primaries and gray vermiculations on the chest-males have none in Alberta, Canada). Juveniles have darker barring above and below.

Shrikes from eastern North America have pale to medium-gray rumps. Loggerhead Shrikes from the Interior West have white rumps similar to those of Northern Shrikes. Loggerhead Shrikes breeding in southern California are slightly darker above and much darker below. An endangered subspecies of Loggerhead Shrike from San Clemente Island, in southern California, is the darkest gray of all.

These are monogamous birds and pairs will raise 2-3 broods of 4-8 eggs each during each nesting season. Both the male and female Shrikes into a cup shape construct its nest of woven twigs and strips of bark. The nest is found on a large branch of a tree or shrub from three to thirty feet off the ground.

Cool Facts: The name “Loggerhead,” is a synonym for “blockhead,” and refers to the unusually large size of this bird’s head in relation to its body.

The Loggerhead Shrike is found throughout North America. The Shrike’s diet consists mostly of large insects, but can include small birds and mice. It makes its kills by a sharp blow from its beak. This unusual form of attack is because it lacks the sharp talons found on raptors. The food is then cached on barbed wire or thorned shrubs, earning the shrike the nickname “butcher bird”. Noxious prey such as monarch butterflies and eastern narrow-mouthed toads are impaled with the shrike waiting for up to three days to eat them. This delay in eating allows time for the poisons to break down. These shrikes also eat the heads and abdomens of toxic lubber grasshoppers, while discarding the insect’s poisonous thorax.

Newly fledged Loggerhead Shrikes perform exaggerated, misdirected versions of adult hunting behavior. They peck at inanimate objects, fly about with leaves or sticks in their beaks, practice aerial chases without a target, or chase after their parents. They also perform rudimentary impaling gestures, grasping objects in the tip of their bill and repeatedly touching them to a branch or perch as if trying to get them to stick.

Eastern And Central Subspecies

- *L. l. excubitorides*. First reported by Swainson in 1832. It breeds from southeastern Alberta and southern Saskatchewan southward through the Great Plains to central Texas and west from northeastern Idaho southward to southeastern California, western Texas, and northern Durango. It winters in

the southwestern United States. northward to Utah and Colorado, eastward to southern Louisiana, and southward to southern Sinaloa and southern Veracruz. It is rarely seen in southeastern Oaxaca and west-central Chiapas. It is pale gray above with conspicuously white on the upper tail-coverts and scapulars. It is whiter below than *L. l. migrans*.

- *L. l. migrans*. First reported by W. Palmer in 1898. It is found from southeastern Manitoba eastward to the Maritime Provinces and southward to eastern Texas, central Louisiana, and western North Carolina and Virginia. There are isolated populations in western and northeastern Lower Peninsula of Michigan, southern Ontario, and south-central Pennsylvania. It no longer breeds in New England or the Maritime Provinces. It winters in southern half of breeding range. It is medium gray above and distinguished from the nominate species by wings longer than tail, a gray wash below, and a smaller bill.
- *L. l. ludovicianus*. First reported by Linnaeus in 1766. The nominate species is a resident from southern Louisiana to central North Carolina and southward (east of Appalachian Mtns.) to central Florida. It is dark gray above, more or less pure white below with a heavy bill.
- *L. l. miamensis*. First reported by Bishop in 1933. A resident in southern Florida, except the Keys. It is the palest gray above of subspecies, more white on scapulars and secondary-tips than *L. l. migrans*. The bill is heavy.

Western And Mexican Subspecies

- *L. l. gambeli*. First reported by Ridgeway. It breeds from south-central Washington and southern Idaho south to southwestern California (west of *L. l. excubitorides*). A resident from north-central California south. It winters over much of breeding range southward to southern Baja California and Michoacán. It is medium gray above, whitish on the upper tail-coverts, the chest is often with more or less distinct undulations.
- *L. l. mexicanus*. First reported by C. L. Brehm in 1854. A resident in western Mexico from Nayarit and central Coahuila southward to central Oaxaca and the southern half of Baja California. It is moderately dark gray above with the white uppertail-coverts and flanks tinged gray.
- *L. l. anthonyi*. First reported by Mearns in 1898. A resident on Santa Rosa, Santa Cruz, and Santa Catalina Islands. off southern California. It is dark gray above with scapulars, rump, uppertail-coverts, and flanks extensively or wholly gray. The forehead is grayish white.
- *L. l. mearnsi*. First reported by Ridgway in 1903. A resident on San Clemente Island off southern California. It is a darker gray above than any other subspecies, but with white scapulars and upper tail-coverts, and whiter below than *L. l. anthonyi*.
- *L. l. grinnelli*. First reported by Oberholser in 1919. A resident from San Diego County in California, southward to north-central Baja California Norte. It is dark gray above with reduced white in scapulars, rump, and upper tail-coverts and no white in forehead or supercillium. It is less white on tail tips than any other subspecies.

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Species Accuracy & 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. Also, there are many subspecies of most of the birds represented. Subspecies in a particular area may be significantly different than the one depicted in this set. As a rule, subspecies will be labeled on the bird icon. Usually the nominate (main species) and/or the Southern California subspecies (where the author's home is) is chosen as the represented species. In some cases, additional subspecies, dimorphic females or juveniles will appear in Songbird ReMix "freebie" section (found in the SongbirdReMix.com store area).

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 hundreds of unique bird species, some give and take is bound to occur. The goal is to give a somewhat believable approximation of the bird species rather than a scientifically accurate depiction.

Field Guide Sources:

- "The Sibley Guide to Birds" by David Allen Sibley
 - <https://www.sibleyguides.com/>
- Wikipedia (<https://www.wikipedia.com>)
- BirdGuides.com (<https://www.birdguides.com>)
- BirdLife International (<https://www.birdlife.org>)
- Birds of the World (<https://birdsoftheworld.org>)
- All About Birds (<https://www.allaboutbirds.org>)

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