Avian Models for 3D Applications

Characters and Texture Mapping by Ken Gilliland

Songbird ReMix

Cool & Unusual Birds v1

Manual

Field Guide

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Introduction

Songbird ReMix 'Cool and Unusual' Birds is an eclectic collection of birds from North America and the Hawaiian Islands. 'Cool and Unusual' Birds adds many new colorful and specialized bird species such as the Red Crossbill, whose specialized beak that allow the collection of pine nuts from pine cones, or the Brown Creeper who can camouflage itself into a piece of bark and the Roadrunner who spends more time on foot than on wing. Colorful exotics are also included like the crimson red 'I'iwi, a Hawaiian honeycreeper whose curved beak is a specialized for feeding on Hawaiian orchids, the Orange and Black Baltimore Oriole, who has more interest in fruit orchards than baseball diamonds and the lemon yellow songster, the western meadowlark who could be coming soon to a field fence post in your imagery.

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):
  - **Cuckoos, Turacos and relatives (Order Cuculiformes)**
  - **Perching Birds (Order Passerines)**
    - Cardinals, Tanagers & their Allies
    - Chickadees, Tits & their Allies
    - Crows, Jays and their Allies
    - Finches, OW Sparrows & their Allies
    - Hawaiian Honeycreeper Finches
    - NW Sparrows & their Allies
    - Orioles, Blackbirds & their Allies
    - Thrushes, Oxpeckers & their Allies
    - Wrens, Nuthatches & their Allies
- **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. SBRM Cool and Unusual birds has two. 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).
    - **SBRM Base Model**- This model is for use with all Songbird Characters included in this package except the Roadrunner.
    - **SBRM Long-necked Zygodactyl Model (Z2)**- This Model is used for the Greater Roadrunner which has Zygodactyl feet.
- **Conforming Parts** (All Conforming Crests have alphabetical Icons in the lower right corners such as **"C10"**. This corresponds with characters in the Pose folders. All MAT/MOR files with the same icon use that particular Conforming Part. ***Be sure to read this:*** Most conforming parts are Crest which cover the head part. When posing the Base Model, the Conforming Part will follow any Bend, Twist or Rotate Commands. It will not obey any **SCALE** or **MORPH** commands you give the Base Model. You must manually scale the Conforming Part and with morphs such as "OpenBeak" you must also set it's counterpart in the head part of the Conforming Crest.

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.

Where to find your birds

Type Folder	Bird Species
Cuckoos, Turacos and relatives (Order Cuculiformes)	Greater Roadrunner
Perching Birds (Order Passeriformes) Cardinals, Tanagers & their Allies	Western Tanager
Perching Birds (Order Passeriformes) Chickadees, Tits & their Allies	Oak Titmouse
Perching Birds (Order Passeriformes) Crows, Jays and their Allies	California Scrub-Jay
Perching Birds (Order Passeriformes) Finches, OW Sparrows & their Allies	Red Crossbill
Perching Birds (Order Passeriformes) Hawaiian Honeycreeper Finches	‘I’iwi ‘Oma'o
Perching Birds (Order Passeriformes) New World Sparrows & their Allies	Spotted Towhee White Crowned Sparrow
Perching Birds (Order Passeriformes) Orioles, Blackbirds & their Allies	Baltimore Oriole
Perching Birds (Order Passeriformes) Thrushes, Oxpeckers & their Allies	Curve-billed Thrasher Western Meadowlark
Perching Birds (Order Passeriformes) Wrens, Nuthatches & their Allies	Brown Creeper Red-breasted Nuthatch

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

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.

Specific Bird Controls

There are several controls with the ***Action Controls*** section of the model that are specific to certain species of bird.

- Under ***Fluff Controls*** *(in Creation Controls)**:***
  - These controls move the feathers on each side of the cheek towards the bill.
- **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.

Transparency Layer Striping

With certain lighting and camera angles the seams where the transparency "Fluff" planes may become visible on renders. One of the easiest ways to resolve this is to simply hide the offending transparency section. This solution can be found in the Correction Controls options.

Another solution is to adjust the "Fluff" in "Fluff Controls" section of the "Action Controls" menu.

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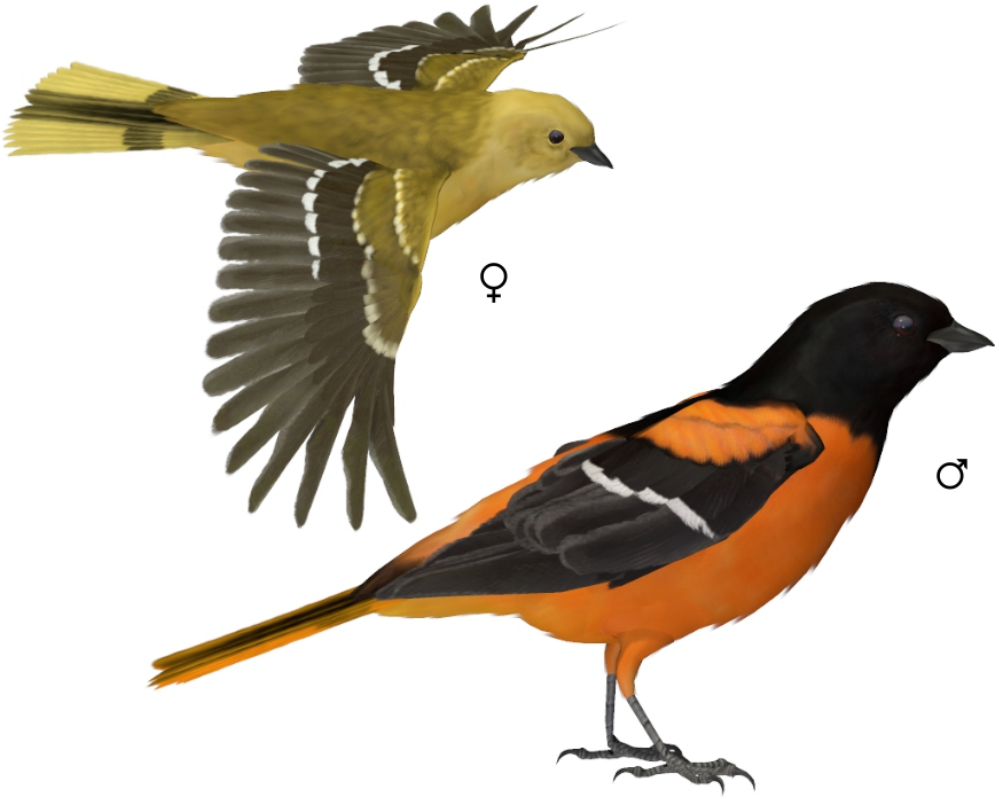
Field Guide

Baltimore Oriole
Brown Creeper
Curve-billed Thrasher
Greater Roadrunner
ʻIʻiwi
Oak Titmouse
ʻOmao
Red-breasted Nuthatch
Red Crossbill
Spotted Towhee
Western Meadowlark
California Scrub-Jay
Western Tanager
White-crowned Sparrow

Common Name: Baltimore Oriole
Scientific Name: *Icterus galbula*

Size: 6.8-7.4 inches Males; 6.6-6.9 inches females (17.3–18.8 cm Males; 16.8–17.0 cm females)

Habitat: North America; east of the Rockies and the Northern tip of South America. (winter migration).
It is found in diverse habitats, but it typically favors woodland edges (especially riparian) and open areas with scattered trees. There is a strong preference for deciduous over coniferous trees.



Status: Least Concern. **Global Population:** 6,000,000 Mature individuals. Populations showing slight decrease across range, but populations probably stable. In Great Plains, has moved into areas of cleared woodland or where trees have been planted. In Michigan, they are more abundant in northern portions of the state in 1990s than in 1950s, when it was almost unknown in Upper Peninsula. This increase in population may be due to the alteration of the dense coniferous forests typically found there. In Ontario, there is a slight increase in range and the abundance of birds seems to be due to clearing of land, particularly coniferous forest in the north

Diet: During breeding season, this oriole eats caterpillars, fruits, adult insects, and spiders. In the winter, it switches to nectar, small fruits, and insects (especially caterpillars). In Kansas, they eat mulberries only when ripe. In Niagara Peninsula region of Ontario, they take the blackest fruits available (white grapes and cherries that are pink or yellow when ripe are mainly ignored). Unlike

the American Robin (*Turdus migratorius*), which eats fruit all summer, orioles take grapes and cherries mainly in August, when ripe.

They forage insects from trees and flowers, generally in small flocks. They rarely preform flycatches or forage on ground.

Breeding: A medium-sized oriole which is sexually dimorphic in plumage and size. Females are slightly smaller than males. The adult male is strikingly plumaged with a black on the head, as well as the upper mantle, wings, and tail. Orange is on the remaining upper-parts and under-parts, shoulders, and distal portion of outer rectrices. There is a single white wingbar. The adult female can be highly variable, often similar to male, but a more subdued orange or yellowish in coloration, with head and mantle not solidly black or more dark brownish olive than black, and with paler orange underparts and rump, and plain brownish olive tail. Some females closely resemble adult males, and on average females appear to become more male-like with age. Immatures in fall and early winter are similar to the adult female, but paler overall, lacking the black on head and upper-parts. The immature males become more like adult males during spring of their second calendar year, but do not achieve fully adult plumage until their second Prebasic molt in the fall of their second calendar year (adults are similar in plumage throughout the year).

Breeding Season occurs from April to June. Males, including a few in their first breeding season (yearling males), generally arrive on breeding grounds first, followed two to four days later by majority of yearling males, and roughly a week later by most females. Pairs form rapidly thereafter. The nests are gourd-shaped and made with plant fibers, hair and synthetic fibers. The nest is usually hung from small branches or found in the fork of a tree. Four to five eggs are laid.

Cool Facts: The Baltimore Oriole was illustrated and described by Mark Catesby in the first volume of his Natural History of Carolina, Florida and the Bahama Islands, published in 1731. Catesby named this bird the "Baltimore-Bird," because black and orange were the colors of the Baltimores, the colonial proprietors of the Maryland colony. The American "orioles" were named after similarly-appearing birds in the Old World. The American orioles are not closely related to the true orioles in the family *Oriolidae*. They are more closely related to meadowlarks and blackbirds.

The Baltimore Oriole are known to hybridize Bullock's oriole where their ranges overlap in the Midwest.

Young male Baltimore Orioles plumage look like females when young. It isn’t until the second year when they get the more striking adult male colors.

Common Name: Brown or American Treecreeper
Scientific Name: *Certhia americana*

Size: 5-6 inches (12-13.5 cm)

Habitat: North America; Breeds primarily in coniferous forests throughout North America, from southeastern Alaska to Newfoundland and southward to Nicaragua.

It prefers late successional stages of coniferous, mixed, and deciduous forests; in particular undisturbed, old-growth stands. In the Pacific Northwest, primarily mesic conifer forests with high canopy cover. More likely to use ponderosa pine in the Southwest and deciduous forests in the Northeast. The consistent factor appears to be the need for large trees and snags (dead trees) for foraging and nesting microsites, respectively.

Status: Least Concern. **Global Population:** 24,600,000 Mature individuals with a stable population trend. It is widespread and abundant, but habitat loss and degradation is considered a threat to the species. Large trees, large snags, and old-growth forests are increasingly scarce in western North America and elsewhere in the breeding range. This is a cause of concern given the strong association of this species with large-diameter live trees for foraging sites and large-diameter, dead or dying trees with sloughing bark or

thick bark for nest sites are abundant due to natural processes. There is no federal listing for this species, but there is concern in some states: It is listed Endangered (Kentucky), Threatened (Illinois), Special Concern (Indiana, New Jersey, Ohio), and Protected (Idaho, Montana, New York). Partners in Flight rate it a priority species in Idaho and Montana and a focal species in the Sierra Nevada, California, and westside conifer forests and on the eastern slope of the Cascade Mtns. in Oregon and Washington due to the negative effects of logging, forest fires and forest fragmentation.

Diet: In winter: variety of insects and larvae, spiders and their eggs, ants and pseudoscorpions. It will eat a small amount of seeds and other vegetable matter. Breeding season: same as winter, but possibly no vegetable matter eaten. Nestlings appear to be fed only insects. Will visit seed and suet feeders in winter.

It forages on tree trunks; creeping and methodically spiraling upward.

Breeding: A very small tree-climbing passerine. Males and females look alike, although the females bill is about 1-2 mm shorter. The adult plumage has brown upper parts, extensively streaked with dull whitish on the head, back, scapulars, wings and with distinctive creamy-white supercilium. The under parts are whitish washed with cinnamon distally. The tail is long and stiff. Juveniles closely resemble adults but the upper parts are duller and with pale streaking and spotting. The pale wing markings are browner, and the under parts are spotted dusky. The plumage remains similar throughout year.

Territorial singing by males takes place in February through early March. In most US and Canadian populations, nesting begins in April but peaks in May, June, and July. Both adults investigate several possible nesting sites. The nest is cup of spider silk and cocoon cases anchored behind a piece of loose tree bark. It is lined with mosses, feathers and leaves. Five to six eggs are laid. While the sexes look the same, male are slightly larger and have slightly longer beaks than females. Brown Creeper nests in Arizona often have two openings, one that serves as an entrance and the other as an exit. Entrances face downward and exits face upward.

Cool Facts: The Brown Creeper is a camouflage expert. By laying flat on the bark of a tree in patterning helps it to blend in with trees, thus hiding from predators.

While the Brown Creeper bears an extremely close physical resemblance to the Old world cousins, Eurasian Treecreeper or Short-toed Treecreeper, it is a separate species. At one time, the Brown Creeper considered the same species as the Eurasian Treecreeper. In studies, including experiments having the Eurasian and Brown sing to each other, it was found that they do not respond to each other's songs, thus supporting the theory of them being separate species.

- *C. a. americana.* First reported by Bonaparte in 1838. The nominate species breeds from northern Saskatchewan eastward to Newfoundland and southward to Minnesota eastward to West Virginia. It winters throughout breeding range but many northern breeders winter south of the breeding range, to southeastern Colorado, southeastern Coahuila, and Florida. It has occurred as a vagrant to California and Arizona. The ventrum is white to pale peach; crissum orange-buff; dorsal streaks whitish and broad; crown streaks buff; rump tawny; and bill short. Webster reported this subspecies to be weakly dichromatic, some individuals being paler and browner and others being darker and blacker.
- *C. a. nigrescens.* First reported by Burleigh in 1935. A resident or altitudinal migrant in the Great Smoky Mountains of eastern Tennessee and western North Carolina. It has strayed west, in autumn and winter, to Kansas and Texas. It appears like *americana*, but the dorsum is darker and distinctly reddish, with the pale streaks more brownish (less buff) and the rump brighter.
- *C. a. montana.* First reported by Ridgway in 1882. It breeds across Rocky Mountains and ranges from west-central British Columbia and central Alberta east to western South Dakota and southward to southern Arizona and western Texas. It descends to lower elevations in winter, when it has occurred west to California, south to northern Coahuila, and eastward to Wisconsin and Louisiana. It is similar to *americana*, but the crissum is pale buff to grayish buff, the dorsum is grayer with streaks narrow and gray, rump pale tawny, and the bill is long.
- *C. a. alascensis.* First reported by Webster in 1986. It breeds in south-central Alaska and winters from Idaho southward to southeastern Arizona and southwestern New Mexico and eastward to northwestern Arkansas. It is similar to *montana*, but the dorsum is paler and grayer still, the dorsal streaks are whitish and broad, and the bill averages shorter.
- *C. a. occidentalis*. First reported by Ridgway in 1882. A resident on the Pacific slope, west of the Coast Ranges and Cascades, from southeastern Alaska southward to nothwestern California. It has strayed eastward to south-central British Columbia and southward to west-central California. It is like *montana*, but the dorsum is browner, the dorsal streaks more buff, and the rump cinnamon. Birds in southern coastal Alaska are intermediates toward *montana*.
- *C. a. stewarti.* First reported by Webster in 1986. A resident on Queen Charlotte Island, British Columbia. It is like *occidentalis*, but the dorsum is orangish to reddish brown.
- *C. a. phillipsi.* First reported by Unitt and Rea in 1997. A resident in the outer Coast Ranges of central California from San Francisco (inland to Diablo Range, Santa Clara County.) southward to San Luis Obispo County. It is similar to *occidentalis*, but the ventrum is browner (less white), the dorsal streaks are smokier, and the rump is a golden cinnamon.
- *C. a. zelotes.* First reported by Osgood in1901. A resident east of the Cascades from southern Oregon southward through the Sierra Nevada,

Warner, and White mountain ranges to montane southern California, and in the inner Coast Ranges of nothern California. It descends to lower elevations in winter, and has strayed east to southwestern New Mexico. It is similar to *occidentalis*, but the dorsum is darker and browner, with streaking that is smoky white, and the rump is reddish.

- *C. a. leucosticta.* First reported by van Rossem in 1931. A resident in the Inter-mountain ranges of southern Nevada and west-central Utah. It is similar to *montana*, but the dorsal streaks are whiter and much broader.
- *C. a. albescens.* First reported by Berlepsch in 1888. A resident in Sierra Madre Occidental from southeastern Arizona and southwestern New Mexico southward to northeastern Nayarit, northwestern Jalisco, and western Zacatecas. It is similar to *zelotes*, but the dorsum is blacker and the dorsal streaks are whiter (less gray).
- *C. a. alticola.* First reported by Miller in 1895. A resident in Mexico from the Transvolcanic Belt to the Isthmus of Tehuantepec. It is similar to *albescens* but the dorsum is browner (less black) and the dorsal streaks are olivaceous (less white).
- *C. a. pernigra.* First reported by Griscom in 1935. A resident in highlands of southern Chiapas and adjacent Guatemala. It is similar to *alticola*, but the dorsum is more pure brown and the dorsal streaks are narrower. The dorsal coloration varies clinal from more orange in Chiapas to more fuscous in southern Guatemala.
- *C. a. extima.* First reported by Miller and Griscom in 1925. It is a resident in highlands from eastern Guatemala to northwestern Nicaragua. It is similar to *pernigra*, but the dorsum is blacker with the dorsal streaks being whiter, and the ventrum grayer (with less white).

Common Name: Curve-billed Thrasher
Scientific Name: *Toxostoma curvirostre*

Size: 11 inches (27 cm)

Habitat: North America; throughout the southwestern United States and northern and central Mexico.

It occurs in the broadest range of desert habitats where the areas have been least affected by the activities of people.

The highest densities of the Eastern Group are found in regions called "south Texas brushland". In southern Texas, it uses more open habitat than its cousins; the Brown Thrasher (winter resident) and Long-billed Thrasher (permanent resident). It often forages in recently cleared areas, nests at woodland edges or

in shrubs (i.e., yucca) in exposed locations. It is found in thorn scrub and thickets at edge of woodlands among prickly pear, yucca, and mesquite. In southeastern Colorado and adjacent states, it occurs in grasslands with cholla cactus. In New

Mexico, it is found in various vegetative communities, including pinyon and oak. In Mexico, it uses open and semi-open dry habitats with shrubs and cacti.

The highest densities of the Western Group are found in Sonoran Desert. In Arizona, it is found in creosote bush, in saguaro-palo verde community, in grassland where cholla cacti are present, and in thornscrub and towns. Nests are built in creosote-bush habitat only when cholla cacti are present.

Status: Least Concern. **Global Population:** 2,860,000 Mature individuals. Common within its area. Populations are decreasing due to habitat degradation. There has been considerable loss of the southern Texas brushland. In Arizona, rapid loss of habitat near expanding cities of Phoenix and Tucson has seriously affecting population. The conversion of grass and woodlands in Sonora, Mexico, to buffel grass (*Pennisetum cituare*) monoculture has already affected millions of hectares. Since Curve-billed Thrasher is not found in pure grassland or prairie habitats elsewhere, its future in buffel-grass habitats is questionable. This imported fire-tolerant grass has been planted as well in southern Texas and Arizona.

Diet: Mostly Insects, spiders and berries, in rare instances, some seed.

This forager pokes and probes in plant litter and digs holes in the soil with its long, decurved bill, searching for insects or seeds. It does not scratch with its feet. It also eats berries from bushes and fruit from cacti when these are available.

Breeding: Sexes are alike. A medium size bird about the size and shape of an American robin, but slimmer, and with a longer tail. The head and back are light grayish brown. The tail is long and slightly rounded with blunt tips, all except middle pair are light brown with broad white or buffy white tips. The middle pair of rectrices are completely clove brown. The wing is brown with the lesser coverts similar to the back. The median coverts and greaters are tipped with white, forming two rather inconspicuous wing bars. The sides of the neck and head are like the crown. The cheeks are more or less mixed with white or buffy white. The chin and middle of the throat are white or buffy white, bordered by an indistinct grayish brown submalar stripe. The flanks and crissum are cinnamon buff, and the rest of underparts dull buffy white. The chest, breast, and less commonly sides and flanks, have large, roundish, sometimes confluent spots of light brown. Thes ides of the body are brown. The under-wing coverts are buffy white spotted with brown,with the axillars being dull brown. Freshly molted birds are darker and browner. It has heavy legs and a long, slender, blackish, and decurved bill.

Courtship occurs February through August. Nesting differs across breeding range due to differences in temperature and rainfall patterns. In Texas, a slow rise in active nests peaking in May is followed by a slow decrease, with as many active nests in July as April. In Arizona, however, nesting starts in February with a broad March through May peak, and then a sharp drop in June. Three to five

eggs are laid in a deep cup shaped nest of twigs, which is usually found in cholla cactus or a thorny tree.

Cool Facts: While thrasher is generally secretive birds, the Curve-billed Thrasher has a bold and curious streak. It will often sneak up to picnic areas and it known for it's distinctive whistle-like call; an ascending "whit-weet."

There are 7 subspecies of the Curve-billed Thrasher. Two groups of subspecies are visually distinct: The Eastern group has a lighter breast resulting in more contrast with spots, pale to white wing-bars, and white tail corners, contrasting with dark outer rectrices. The Western group has a grayer breast (so the spots show less contrast), pale buffy or grayish inconspicuous wing-bars, if any, and tail spots. The elevational range of eastern group extends to 3,000 m, whereas the western group is found from sea level to about 1,400 m

Eastern Group (Curvirostre)

- *T. c. curvirostre.* First reported by Swainson in 1827. The nominate species is found in central and south-central Mexico (southward to Puebla and Oaxaca).
- *T. c. celsum.* This subspecies is found in southeastern Colorado, southwestern Kansas and extreme northwestern Oklahoma southward to southeastern Arizona, New Mexico and west Texas) and north-central Mexico (southward to Zacatecas).
- *T. c. oberholseri.* This subspecies is found in southern Texas southward to northeastern Mexico (southward to south-central Tamaulipas).

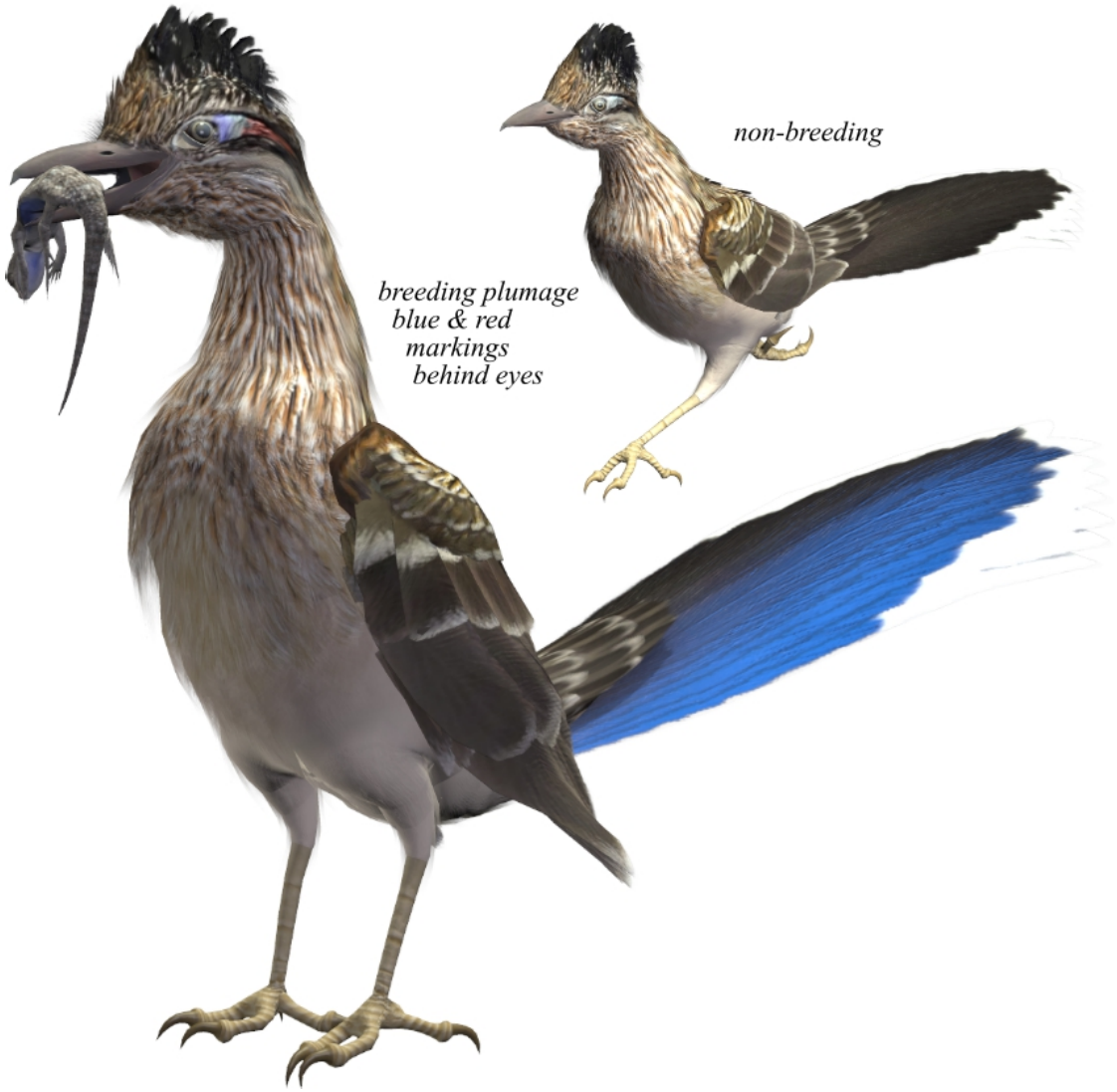
Western Group (Palmeri)

- *T. c. palmeri*. It is found in the American southwest (southwestern and central Arizona) southward to northwestern Mexico (southward to central Sonora). Definitive Basic plumage similar to *curvirostre* but duller, wing bars and breast spotting less distinct. Head and upperparts grayish-brown, underparts whitish to pale buff with dusky malar. The chest and flanks with markings below similar to those of *curvirostre* but paler and less distinct against grayer background.
- *T. c. occidentale.* It is found in west-central Mexico (Sinaloa southward to Jalisco).
- *T. c. maculatum.* It is found in northwestern Mexico (southern Sonora, north Sinaloa, and southwestern Chihuahua).
- *T. c. insularum.* It is endemic to Tiburón Island and San Esteban Island in the Gulf of California off the central Sonora coast (northeastern Mexico).

Common Name: Greater Roadrunner
Scientific Name: *Geococcyx californianus*

Size: 21 inches male, 20 inches female (54 cm male, 52 cm female)

Habitat: North America; Year-round resident throughout the American Southwest. From foothills of Sacramento Valley in northern California, Owens Valley in eastern California, and widespread in southern California, southern Nevada primarily south of Great Basin, extreme southwestern Utah, western, central, and southern Arizona , southern, central, and northeastern New Mexico,



southeastern Colorado, extreme southern Kansas, southwestern Missouri (range contracts after severe winters) southward to southern Baja California, Pacific slope of Mexico to northern Sinaloa, interior south to northern Michoacán and Hidalgo, and Atlantic slope to Tamaulipas, eastward to east-central Arkansas,northern and western Louisiana, and the Gulf Coast of Texas.

A resident year-round in typically semiarid and arid open country with scattered scrub (low to 50% cover). It most frequently is associated with brush layer 2–3 m high. It is mostly found in the lower Sonoran desert, but is common in the upper Sonoran, and can be found in the lower reaches of Transition Zone.

Status: Least Concern. **Global Population:** 4,530,000 Mature individuals. Populations are stable and its range has expanded eastward. Historically, the Greater Roadrunner has been persecuted by ranchers and hunters who believe that it consumes the young and eggs of popular game bird species. Despite the persistence of illegal hunting, the Greater Roadrunner faces no serious declines in population numbers and continues to expand its range northward and eastward into new habitats. They are generally susceptible to habitat fragmentation and will abandon nests that has been tampered with by humans.

Diet: Omnivorous and opportunistic. Its diet includes insects, spiders, scorpions, centipedes, millipedes, lizards, small snakes, adult birds and their young and eggs, rodents, frogs, carrion, plant material. During severe food shortages, it may eat its own young. Animal/insect food makes up about 90% of diet; fruit and seeds taken seasonally.

It runs very quickly and will occasionally fly short distances. It grasps prey with its bill. Prey capture and handling behaviors depend on food being consumed. Bird prey are fully or partially plucked of feathers first. Snails are hammered on rocks to break shell. Scorpions are seized by the tail. Small mammals may be killed by a blow from the bill to the base of the skull. Attack on small rattlesnakes begins with rapid circling and jumping or wing flapping followed by aggressive head pecking. It stuns or kills large prey, such as lizards and rodents, by hitting them against rock, stick, or ground. It swings prey item through vertical, extended, oval-shaped trajectory ending in a downward accelerating slam against the substrate. It swallows large prey by grasping head in bill and with rapid, repeated thrusting, moves open jaws forward to surround head and forebody of prey item. Horned lizards are swallowed head first and dorsal side up so that head horns face posteriorly and away from Greater Roadrunner's vital organs when swallowed. Fatality of juveniles has resulted from attempts to swallow large Texas horned lizard.

Breeding: Sexually monomorphic in plumage with the female slightly smaller than the male. It is a large bird with a long tail and shaggy crest. Adults have prominent blue-black erectile crest, dark blue orbital skin, and orange post orbital apteria that are usually obscured. There is a straw yellow ring in the iris. The bill is long and stout with hooked tip. The head (including the crest) and the nape are a blue-black, broadly spotted or streaked with russet, tawny, and buff. The back and scapulars are blue-black with broad edgings of russet, tawny, and buff. The the centers of feathers metallic dark olive or bronze. The rump hair is brown. The upper-tail coverts and middle rectrices are a bronze olive, narrowly margined with white. The remaining rectrices metallic blue-black on outer webs, bronze on inner

webs, and the outer three rectrices with broad tips of white. The remiges are dark brownish black glossed with metallic olive and edged with white. The greater and primary coverts broadly tipped white giving appearance of white crescents on wings in flight. The tertials are rufous bronze, margined with white and the remainder of secondaries and upper-wing coverts are like the back but with broader russet margins. The cheeks and chin are dull white while the throat, foreneck, and breast are cinnamon and buff with each feather making vertical streaks of black. The belly is unstreaked grayish white or pale buff. The lining of the under-wing is dark brownish black. Its powerful legs have zygodactyl feet that leave distinctive X-shaped track in soft substrates.

During breeding season, a blue and color patch develop behind the eye.

The juvenile plumage is similar, but generally duller with less distinct markings and lacking metallic bronze gloss of adult plumage.

Greater Roadrunners are monogamous, maintain a long-term pair bond, and mutually defend a large, multipurpose territory. Each spring and summer, they renew their pair bond through a series of elaborate courtship displays in which the male bows and prances, wags his tail, and offers nesting material and food items to his attending mate.

Four to five eggs in an open cup nest placed in the fork of a tree branch. Both male and female incubate the eggs and feed and protect the young through a breeding season that lasts several months.

Cool Facts: While the cartoon roadrunner is adept at getting away from Wyle E. Coyote, the real Greater Roadrunner can reach running speeds of 19 mph (30 kmh). To do so, it holds its head and tail flat and parallel to the ground.

It has also called called Paisano, Chaparral Cock, Snake Killer, and the Medicine Bird.

To prepare for cold nights, roadrunner will turn their backs to the sun and fluff their feathers. Their skin is black and acts as a solar collector, allowing the bird to stay warm.

Roadrunners eat many venomous prey, including rattlesnakes, scorpions and spiders. While generally solitary hunters. Several roadrunners may gain up on a snake. Roadrunners can also be opportunistic foragers, hiding at bird feeders and nest boxes, in hopes of catching small birds. Male roadrunners will parade their catch by females as part of courtship.

While roadrunners are able to survive on the water content in it’s food, it will drink water if available. It uses salt glands in front of its eyes to excrete excess salt from its blood.

Common Name: ’I’iwi
Scientific Name: Drepanis coccinea

Size: 6.5 inches (15 cm)

Habitat: Polynesia; found on above 1,500 m elevation on the islands of Hawai‘i, Maui, and Kaua‘I. They are also found islands of O‘ahu and Moloka‘I but in numbers less than 50. They are now extinct on Läna‘i Island.

It breeds and winters primarily in mesic and wet forests dominated by ‘öhi‘a and koa. Their range is restricted mostly to elevations >1,250 m because of loss and destruction of forests and presence of cold-intolerant Culex mosquitoes that

transmit avian diseases at lower elevations. The windward slopes of Hawai‘i, Maui, Moloka‘i, O‘ahu, and Kaua‘i Islands. receive 700–1,000 mm rainfall annually. The best habitat contains varying amounts of kölea (*Myrsine*

lessertiana), naio (*Myoporum sandwicense*), and tree ferns (*Cibotium spp.*) in under-story. Mämane is dominant in higher-elevation, dry forests used for foraging, but breeding there is uncommon.

Common birds in same forest habitat include ‘Apapane and introduced Japanese White-eye on all islands. Hawai‘i ‘Amakihi (*Chlorodrepanis virens*), Hawaii ‘Elepaio (*Chasiempis sandwichensis*), ‘Öma‘o (*Myadestes obscurus*), and introduced Red-billed Leiothrix (*Leiothrix lutea*) on Hawai‘I. On Maui, it is seen with the Hawai‘i ‘Amakihi, Maui ‘Alauahio (Maui Creeper) *(Paroreomyza montana*), and Red-billed Leiothrix and Kaua‘i ‘Amakihi (*Chlorodrepanis stejnegeri*), ‘Akikiki (Kaua'i Creeper) (*Oreomystis bairdi*), and ‘Anianiau (*Magumma parva*) on Kaua‘i.

Status: Vulnerable. **Global Population:** 250,000-500,000. 'I'iwis face many of the same threats facing other native Hawaiian forest birds: habitat loss, avian disease, and introduction of alien plant and animal species. Of these threats, avian diseases, combined with the possible introduction of temperate mosquitoes, may pose the greatest risk to 'I'iwi populations. 'I'iwis are extremely susceptible to avian malaria and avian pox, which are both transmitted by mosquitoes. When bitten just once by a malaria-carrying mosquito, nine of ten 'I'iwis tested died within 37 days; when bitten multiple times by infected mosquitoes, all ten ‘I’iwis died of malaria. The incidence of malaria in wild 'I'iwis is greatest during the times of year when birds move to lower-elevation forests where nectar is available, but mosquitoes are also present. Mosquito-transmitted avian diseases seem to have a greater impact on 'I'iwis than on other Hawaiian honeycreepers. Currently, mosquitoes are confined primarily to the lowlands of the Hawaiian Islands, allowing 'I'iwis relief from avian diseases at higher elevations, but if a temperate, cold-tolerant mosquito species is introduced, it could prove disastrous for ‘I’iwis and other native Hawaiian forest birds.

Diet: Flower Nectar and some insects. 'I'iwis spend most of their time foraging on 'ohi'a trees, feeding primarily on 'ohi'a nectar, but also catching butterflies, moths, and other insects. Mämane nectar is another major part of 'I'iwis' diets, and in some areas, the nectar of the introduced banana poka is also an important food source.

Breeding: Sexes look alike. Males larger than females in all measurements. Adult is brilliant vermilion; wings and tail black. Wings have contrasting white patch on inner secondaries. It has a long (25-28 mm), deeply decurved, peach or salmon-colored bill. There is a yellow eye-ring visible at close range. The legs are salmon pink to orange. The tarsi and toes are brown. Juveniles are dull yellow with black spots. Their bills are dusky brown, becoming brighter with age.

Two eggs are laid in a cup nest of twigs, mosses, and lichens high in the crown of an 'ohia-lehua tree.

Cool Facts: The long curved bill of the 'I'iwi has evolutionally adapted to sip nectar from the long tubular flowers of the native Hawaiian lobelioids. They will pierce a hole in the base of the flower and extract the nectar with their brushy tipped tongues. They are important pollinators for many species of native plants. They forage high up in the mid to upper canopy of forests and will often defend a territory with a heavily flowering tree in it.

As the lobelioids have declined through habitat loss and extinction, 'I'iwis have shifted to feeding more on other native flowers such as the 'ohia-lehua, koa, naio, and mamane. This dietary shift has been reflected in the slight reduction in average bill length seen over the past century.

'I'iwis can produce a wide variety of calls from rusty door hinge sound to clear flute-like sounds. Their wings in flight produce distinctive whirring noise.

Common Name: Oak Titmouse
Scientific Name: *Baeolophus inornatus*

Size: 5.75 inches (12 cm)

Habitat: North America; It breeds generally from southwestern Oregon (Rogue River valley and surrounding hills of Jackson County and Josephine County) southward through California (Coast, Transverse, and Peninsular ranges, and western foothills of the Sierra Nevada) to northwestern Baja California, Mexico (Sierra San Pedro Mártir, Sierra Juarez). There is a disjunct population in the Cape District of southern Baja California (Sierra de la Laguna, Victoria Mountains).

In California, it is absent from the humid northwestern coastal region and the San Joaquin Valley. It breeds locally in northern California in Siskiyou County (Shasta Valley) and Trinity County (south fork of Trinity River) and “probably . . . in intervening valleys”. It ranges eastward to the boundary between Siskiyou and Modoc counties (Lava Beds National Monument), where it occurs in limited secondary contact with the Juniper Titmouse. Unsuitable habitat separates these populations from those to the south of Mount Shasta (head of Sacramento Valley southward). An isolated breeding population occurs near the Pit River in northeastern Shasta County. At the southern end of the Sierra Nevada, breeds in the Kern River drainage eastward to Walker Pass and on eastern slope of mountains in at least 1 canyon (Walker Creek, southwest of Olancha, Inyo

County).

Status: Vulnerable. **Global Population:** 900,000 Mature individuals. Oak woodlands in California are under threat from various human activities, including clearing for agriculture, rangeland, and urbanization, as well as harvesting for fuel wood. Threats are exacerbated by explosive human population growth. Since 1900, population of California has increased from approximately 1.5 million to 39 million people, resulting in declines of 25–50% in acreage of oak woodlands. The greatest losses have occurred in southern California, the Central Valley, and western foothills of Sierra Nevada. Poor regeneration and establishment of oaks also are major problems in many areas.

Diet: Seeds and terrestrial invertebrates are consumed, with plant material constituting the majority of the diet in fall and winter.

They will wedge seeds in bark and hammer at them to open them. It actively moves from branch to branch and tree to tree and prefers to stay close to arboreal cover, flying between trees in shallow undulating motion. The flight from ground to elevated perches is more direct. Terrestrial locomotion is by hopping, either between arboreal perches or when foraging on ground.

Breeding: A medium-sized, drably colored bird with a short crest. It has olive-brownish gray upperparts and medium-gray or grayish-white underparts. Sexes are alike in color, but males are slightly larger than females, the difference ranging from 1.4% in bill length to 6.0% in body mass. Their plumage does not vary seasonally, except by wear. Coloration varies geographically, however. The northern race (*inornatus*) is smaller and paler and has a smaller bill, and birds of Little San Bernardino Mountains (*mohavensis*) are paler and grayer, than *affabilis* of southwestern California and northern Baja California. Interspecific differences between populations are more pronounced in some cases than in others,

Oak Titmice mate for life, and pairs defend year-round territories. Most titmice find a mate in their first fall. Those that do not are excluded from territories and must live in marginal habitat until they find a vacancy.

The female is largely responsible for nest-site selection. During this period, both members of pair range widely over territory, patrolling and sometimes expanding boundary while female inspects possible nest sites. Pairs nest primarily in natural tree cavities or in a woodpecker-excavated cavity. Cavities of either kind are found in main branches, secondary branches, or trunks.

Three to nine eggs are laid in a tree hole or nest box. The nest is generally lined with mosses, feathers and grasses.

Cool Facts: Titmice are acrobatic and often hang upside down. Unlike other titmice, the Oak Titmouse does not form flocks in winter.

Oak Titmice sleep in dense foliage or tree cavities.

The Oak Titmouse and the Juniper Titmouse were originally called the Plain Titmouse until it was decided that they were actually two separate subspecies.

There are four subspecies divided on the basis of plumage coloration, body size, and bill size and shape.

- *B. i. inornatus.* First reported by Gambel in 1845. The nominate species is a resident in the Coast and Transverse Ranges and western slope of the Sierra Nevada from southwestern Oregon and north-central California (Lava Beds National Monument, Siskiyou County) southward to central California (Santa Barbara County east of southwestern Inyo County). Its dorsum is brownish gray or olive brown, the ventrum is pale gray or grayish white and the flanks are tinged light brown. Its body size and bill are small. It introgresses with *affabilis* at the southern end of its range (Santa Barbara County and southern Sierra Nevada).
- *B. i. affabilis.* First reported by Grinnell and Swarth in 1926. A resident in southwestern California (generally south of the Transverse Ranges) coastally and through the Peninsular Ranges to northwestern Baja California. It occasionally wanders to the desert lowlands during winter. It is similar to *inornatus*, but duskier (darker) overall and averages larger.
- *B. i. mohavensis.* First reported by Miller in 1946. A resident in the Little San Bernardino Mountains of the western Mohave Desert, San Bernardino and Riverside counties, California, from Morongo Valley east to to vicinity of Little San Bernardino Mountain, although absent from nearby Eagle Mountain. It is similar to the nominate but grayer (less brown) overall. The size similar to *affabilis.*
- *B. i. cineraceus.* First reported by Ridgway in 1883. A resident in the mountains of southern Baja California (Victoria Mountains, Sierra de la Laguna). It is similar to the nominate, but grayer and paler. It averages smaller than the nominate.

Common Name: ‘Öma‘o
Scientific Name: *Myadestes obscurus*

Size: 7-8 inches (18-21cm)

Habitat: Polynesia; found on Hawaii in high elevation forests. The ‘oma‘o occur in mesic and wet montane forests above 1000 meters (3300’) in Hamakua, Ka‘u, and Kilauea districts of the Hawai‘i island.

It occupies ‘öhi‘a and mixed ‘öhi‘a and koa forests. It prefers foraging on tree branches, trunks, and downed logs often covered with moss.

Status: Vulnerable. **Global Population**: 170,000 mature individuals with a declining population trend. Residents of montane rain forests, the ‘Öma‘o once occupied mesic and wet forest habitats of wide elevational range. However, habitat destruction and the introduction of alien predators and diseases have

resulted in large range contractions and, in the case of the ‘Ämaui and Oloma‘o, species extinctions. Remaining populations of the ‘Öma‘o on the island of Hawai‘i, and the Käma‘o on Kaua‘i, are now restricted primarily to forested areas above 1,000 m elevation. The current range of the ‘Öma‘o comprises <30% of its former range, and since the Käma‘o has not been sighted since the early 1990s, its status remains highly uncertain.

Habitat destruction, introduced predators, and diseases have been implicated as significant factors leading to the decline of native thrushes in Hawai‘i. As a result, current conservation priorities include habitat preservation and restoration, predator control, captive propagation, and reintroduction efforts, with an ultimate goal of stabilizing existing populations and preventing further localized extinctions..

Diet: Primarily fruits and supplemented by invertebrates. Both native and introduced fruits are included in their diets, and the birds forage opportunistically for seasonally available food items. Invertebrate prey items include caterpillars, spiders, beetles, and land snails.

Feeding birds hop along branches when gleaning insects. Females hop on branches and the ground when gathering nest material. Birds in the high-elevation Mauna Loa 'Öma'o population frequently hop on lava formations on the ground. It is not known to walk, run, or climb.

Breeding: A medium-sized thrush. Sexes are alike in plumage but the unflattened wing chord and bill depth are slightly larger in some males.
The adults plumage is drab gray-brown above, with a lighter gray on the breast and flanks. The forehead is gray and there is no eye-ring. The bill and legs are dark. The bill short and broad with bristles at base. The juveniles plumage is browner above, heavily scalloped on the wing- and tail-coverts and the breast. The breast feathers are off-white, tipped with black. The coverts are brown, tipped with buff. Birds, in their second calendar year, are distinguishable from adults in January-May by the variable remnant scalloping on wing coverts and/or tertials.

‘Öma‘o are usually solitary, but individuals can be found in pairs throughout the year, with pair bonds lasting at least one breeding season. Courtship behavior is most often seen between January and March, with most breeding taking place between April and August. Females are responsible for both nest construction and incubation of one or two eggs. The nest are a woven mix of twigs and fiber. Incubation lasts for about 16 days, and the young remain in the nest for about 19 days before fledging. Both sexes feed nestlings, and both adults provide parental care for more than three weeks after young birds leave the nest.

Cool Facts: The `Öma‘o is also known as the Hawaiian thrush and is an accomplished songster. It is found throughout the native windward rainforests of the Island of Hawaii above 3,000 feet.

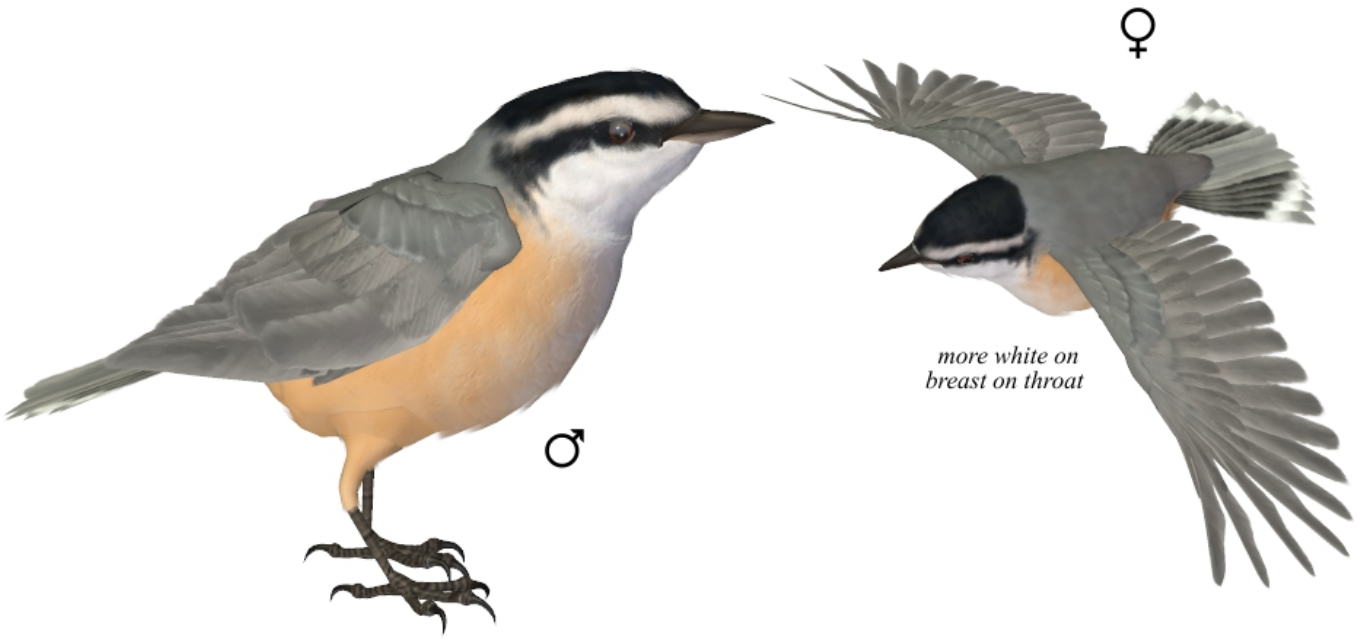
Hawaiian thrushes are prone to long bouts of silent, motionless perching. The ‘Öma‘o, however, exhibits a unique habit of frequent wing-quivering when perched silently. Although its songs are loud, unique in composition, and produced throughout the year, the sedentary habits of these birds result in observers detecting these thrushes by sound more frequently than by sight.

Common Name: Red-breasted Nuthatch
Scientific Name: *Sitta canadensis*

Size: 4.2 inches (11.5 cm)

Habitat: North America; populations are found throughout Canada and the Pacific Northwest, the Sierra Nevada and the Rocky Mountain ranges (southward to southern California and to northern New Mexico) and the eastern United States (east of the Mississippi and more common the closer to the Canada border).

It is a resident breeder in most temperate coniferous and mixed-coniferous forests, especially fir and spruce; less common in pure pine and hemlock forests. It breeds across a wide range of elevations from near sea level to high-elevation montane forests.



Status: Least Concern. **Global Population:** 18,000,000 mature individuals with an increasing population trend. Logging practices that reduce diversity of forest stand may also have negative impacts on populations. Typical forestry practices that consider needs of cavity-nesting birds by leaving some dead trees (snags) standing after logging in given area have historically focused on larger woodpecker species that are capable of excavating nests in variety of snags.

Diet: Mainly arboreal arthropods during breeding season and large number of conifer seeds outside breeding season. The nestling diet is made up exclusively of arthropods. Populations may vary in non-breeding diets depending on location; for example, northern populations appear to rely more heavily on cached conifer seeds during winter than southern populations do. Cached food items are either

extracted and eaten immediately or stored and eaten later. Nuthatches commonly visits bird feeders in winter.

Like other nuthatches, characteristically walks up or down tree trunks and large branches, probing crevices in bark for insects. Also commonly forages on small branches, probing beneath flakes of bark, at bases of needle clusters on conifer branches, and on conifer cones, where it extracts seeds. Less commonly forages in leaf litter on the ground for fallen seeds and arthropods, in rocky outcrops, and on undersides of leaves. Numerous casual observations of fly-catching, particularly during non-breeding season.

Breeding: A small nuthatch that is sexually dimorphic. In adult male plumage, the top of the head (forehead, crown, nape) is black, bordered below by white superciliary stripe and black stripe extending from base of bill through the eye to the nape. The remaining upper-parts are a bluish gray with the under-parts being a rufous-cinnamon. The adult female is similar, but the top of the head is dark gray-blue, not black as in the male. The eye-stripe is never as wide or black as on male and under-parts are much paler. Juveniles are similar to adults of their sex, but the head markings and under-parts are duller. The upper-parts may show some faint black fringes, and the wing coverts may be tipped buff. Plumages are similar throughout year, but the under-parts are more richly colored in the fall (“fresh” plumage). by the end of spring “worn” plumage), the under-parts are paler and may appear more dull white in color.

Breeding birds typically excavate their own nest cavities in tree snags and only rarely use existing cavities or nest boxes. Five to six eggs are laid in cavities in trees and branches of a conifer.

Cool Facts: The Red-breasted Nuthatch is the only North American Nuthatch with an eye stripe. It has been formerly called the Canada Nuthatch or the Red-bellied Nuthatch.

Nuthatches are very aggressive towards many other bird species during nesting season. It will chase away nest hole competitors. The nuthatch's aggressive tendencies subside after the nest is finished, although it remains aggressive towards potential predators and competitors.

Nuthatches apply sticky conifer resin to the entrance of its nest hole. It carries the resin in its bill or on pieces of bark and the bill or bark as an applicator. Males apply the resin to the outside of the hole while the female do the interior. It is believed that the resin helps to keep out predators. The host nuthatches avoid the resin by diving directly through the hole.

Red-breasted Nuthatches migrate southward earlier than most other species. They may begin in early July and may reach their southernmost point by September or October.

Common Name: Red Crossbill
Scientific Name: *Loxia curvirostra*

Size: 6-8 inches (14-20 cm)

Habitat: North America, Eurasia, and Northern Africa.

It breeds in lowland to submontane mature conifer forests, generally avoiding dense forests. It is most common wherever large cone crops have been produced by spruce, Douglas-fir, western hemlock, eastern hemlock, western larch and many other species of pine

In Palearctic, northern populations mostly in taiga forests of spruce and southern

breeders (southern Britain south to Mediterranean region) in pines (including Scots pine). Subspecies *guillemardi* is mostly found in black pine and *corsicana* in cultivated areas. Subspecies *larico* breeds mostly in Aleppo pine in Africa and in the Himalayas mostly in high-altitude hemlocks, spruce, fir, and pine forests.

Status: Least Concern. **Global Population:** 30,000,000 - 100,000,000 mature individuals. Populations appear to be stable to declining in most areas. May be declining in Pacific Northwest rainforests where deforestation is rapid. Formerly common in Newfoundland; now rare, possibly extinct because of competition with the introduced Red Squirrel.

Diet: Conifer seeds, especially spruce, pine, Douglas fir and hemlock.

Red Crossbill usually forages for seeds in cones still attached to branches, although in spring and summer especially may forage on fallen cones. Closed cones of spruce, hemlock, and Douglas-fir are usually removed from the branches, whereas closed cones of most pines and open cones of all conifers are generally left attached to the branch. To extract seeds, crossbills generally hold the cone with the foot that is on the side opposite to which the lower mandible crosses, and use their mandibles to separate the cone scales, thereby exposing the seeds at the base.

Breeding: A medium-sized finch with distinctive mandibles are curved and crossed at the tip. This species is sexually dimorphic. The adult male is deep brick-red to reddish yellow with uniformly dark brown flight feathers, and short, deeply notched dark brown tail. The male coloration is dependant on the molt timing. The female is uniformly olive to grayish yellow with greenish yellow breast and rump; typically with pale grayish to whitish throat. The immature male may resemble the adult male or adult female, or exhibit plumage intermediate between male and female. The immatures of both sexes is generally distinguished from adults by buffy edgings on wing coverts. Underparts of juvenile are heavily streaked dark brown. No regular seasonal changes in plumage, although males may replace red feathers with yellow or greenish feathers or the reverse during annual molt.

Most nesting in North America occurs at two times during the year: July–September when seed crops are developing and maturing, and January–April where ample seed remains in the cones from the previous year's seed crop. The prevalence of late summer nesting in North America is probably due to the fact that cones of most North American conifers used by crossbills open and seeds become most accessible in late summer and autumn, unlike in Eurasia where many conifer species' cones open in spring. Breeding occurs when feeding rates are sufficient to meet the demands of nesting, although nesting regularly ceases in some and perhaps all populations in autumn, apparently even when intake rates might be sufficient for continued breeding. Presumably autumn nesting is disfavored by both a need to complete molt in a timely manner and by the fact that young fledged later in fall may have reduced chances of survival.

An open cup nest made of twigs, mosses and grasses. Well concealed in dense cover on branches of coniferous tree. Three eggs are laid.

Cool Facts: The Red Crossbills are so dependent upon conifer seeds that it even feeds them to its young. Consequently this allows the Crossbill to breed any time it finds a sufficiently large cone crop even in the coldest of winters.

A crossbill's odd bill shape is an evolutionary design to open tightly closed conifer cones. The bird's biting muscles are stronger than the muscles used to open the bill, so the Red Crossbill places the tips of its slightly open bill under a cone scale and bites down. The crossed tips of the bill push the scale up, exposing the seed inside. Some Red Crossbills show a great deal of variation in bill shape and voice and it may in fact be different subspecies. It is believed these subspecies have slightly differently shaped bills to mirror the indigenous conifer tree species with its specific sized cones.

There are 21 subspecies of Red Crossbill currently recognized:

- *L. c. corsicana.* First reported by Tschusi in 1912. This subspecies is endemic to Corsica. The bill on average is longer, deeper broader than nominate. The male is duller or slightly darker red than nominate, and the female is grayer and less olive on crown, mantle and back. The juvenile is more broadly streaked.
- *L. c. balearica.* First reported by Homeyer in 1862. It is endemic to Mallorca. It is similiar to *curvirostra*, but smaller overall with shorter bill.
- *L. c. poliogyna.* First reported by Whitaker in 1898. It is a resident in the Atlas Mountains in northwestern Africa. The bill is shorter and deeper and the wing are shorter than inthe nominate. The male is more pinkish red, with the head variably mottled gray in both sexes. The females head and body are gray (olive lacking or greatly reduced), the under-parts are grayish with a green tinge on the breast.
- *L. c. guillemardi.* First reported by von Madarász in 1903. It is found in the Eastern Balkans, Turkey, Troödos Mountains (Cyprus), Crimea, and the Caucasus. It is similar to *curvirostra*, but larger overall with a larger bill. The male ia a paler red and generally grayer and the females dorsum is dark gray (less olive).
- *L. c. mariae.* First reported by Dementiev in 1932. It is found on the Southwestern Crimean Peninsula.
- *L. c. altaiensis.* First reported by Sushkin in 1925. It is a resident in mountains in northern and western Mongolia; some birds move south in winter.It is similar to *himalayensis*, but the male is a deeper and darker blood red nearly throughout and the female is browner (less gray).
- *L. c. tianschanica.* First reported by Laubmann in 1927. A resident around the Tien Shan Mountains in central Asia. It is similar to *himalayensis* but paler overall, with male tending to be yellow (not red, but if so a rather pale hue) and female dull yellow (less olive or brown).

- *L. c. himalayensis.* First reported by Blyth in 1845. It is a resident from northern India and Nepal east to south-central China (northern Yunnan). It is the smallest Red Crossbill and also the darkest race. The male is dark cherry-red or brownish-red and the female is sooty gray with brown or olive tinge.
- *L. c. meridionalis.* First reported by Robinson and Kloss in 1919. It is a resident in mountains of south-central Vietnam. The dorsum mottled with dark brown. It has the deepest bill of the Red Crossbills (only Parrot Crossbill [*Loxia pytyopsittacus*] is larger).
- *L. c. japonica.* First reported by Ridgway, 1884. It breeds in eastern Russia and northern and central Japan; winters south to southern Japan, the Korean Peninsula, and eastern China. It is similar to *L. c. tianschanica*, but the male is generally more orange-red.
- *L. c. luzoniensis.* First reported by Ogilvie-Grant in 1894. A resident in the northern mountains on Luzon, Philippines. It is among the smallest-billed subspecies (only *L. c. himalayensis* and *L. c. minor* are smaller).
- *L. c. curvirostra.* First reported by Linnaeus in 1758. The nominate subspecies is a resident in southern Great Britain and continental Europe and eastward to Siberia and Amurland. Its bill is larger than all New World crossbills (other than *L. c. stricklandi)*.
- *L. c. bendirei.* First reported by Ridgway in 1884. It is found in Southern Yukon and northern British Columbia to the western United States east of the Cascades. It winters southward to the southwestern and the southern United States. It is similar to *minor*, but slightly larger, the wing and bill are longer, the male is a brighter scarlet and gray tones darker.
- *L. c. sitkensis.* First reported by Grinnell in 1909. It is found in coastal southern Alaska to northwestern California; winters to northeastern United States. It is small in size with a stubby bill.
- *L. c. pusilla.* First reported by Gloger in 1834. It is the most widespread Red Crossbill in North America. It occurs in Appalachian Mountains, but most common in southern Rocky Mountains of Intermountain West, and southern Cascades and Sierra Nevada south to the Transverse Ranges of southern California. It is large billed and bodied, but smaller than the Cassia Crossbill (*Loxia sinesciuris*) and subspecies *stricklandi* found in the western United States.
- *L. c. benti.* First reported by Griscom, 1937. It is found in the mountains of southeastern Montana and northeastern Wyoming to southwestern United States; winters to southern Texas. It is similar to *bendirei* or slightly smaller with the bill being medium-large. The male has red plumage variable but paler on average.
- *L. c. minor.* First reported by Brehm in 1846. t is a resident in Pacific Northwest from south-central Alaska south to Washington and Oregon; more than any other call type, regularly wanders irruptively to the East. It is smaller and paler than *pusilla*, with a slender bill.
- *L. c. percna.* First reported by Bent in 1912. It is resident on Newfoundland, where formerly common, but now rare. There has been recent breeding on

Anticosti Island, Quebec. It is the second largest crossbill in New World. The male is deep red and the female is a dark green.

- *L. c. grinnelli.* First reported by Griscom in 1937. It is found in the mountains of southwestern United States. It is *s*imilar to *bendirei* or slightly smaller with the bill being medium-large. The males red plumage is variable but paler on average.
- *L. c. stricklandi.* First reported by Ridgway in 1885. It is resident in mountains from southeastern Arizona and southwestern New Mexico south to El Salvador. It is slightly larger than other North American subspecies (except *pusilla*) with large bill, male variable in reddish tones but averaging rather deep or less orange.
- *L. c. mesamericana.* First reported by Griscomin 1937. It is resident in highlands from Guerrero (Mexico) and Belize south to northern Nicaragua. The combination of smaller bill depth and wing length distinguish *mesamericana* from *stricklandi*.

Common Name: Spotted Towhee
Scientific Name: *Pipilo maculatus*

Size: 6.9-8.4 inches (17.5-21.3 cm)

Habitat: North America; western Canada, the western United States (west of the Mississippi) and Mexico.

It breeds in a wide variety of plant associations, all characterized by dense, broadleaf shrubby growth (variously described as brush, thickets, or tangles) only a few meters tall, with or without emergent trees. That combination provides a deep, sheltered, semishaded litter and humus on ground, and screen of twigs and foliage close overhead.

In the mountains, it occupies mid-elevation habitats. In the interior West, these altitudes lie above the desert and below the subalpine conifer forest. In the northern Great Plains, it occupies shrubby thickets along prairie coulees, streams and rivers, and brushy undergrowth in woodlands. In interior mountain and high plateau districts. It also found in riparian thickets, on the open south-facing slopes of higher ridges, and in the lower reaches of canyon bottoms. Along the Pacific Coast in California, it occupies chaparral associations in the coastal ranges and rose-blackberry thickets near the ocean. In Pacific Northwest, coastal

birds are sometimes common urban gardens, and sometimes occur in shrub-forest edges.

Status: Least Concern. **Global population:** 14,000,000 Mature individuals. Widespread and abundant, increasing in some areas. Island forms vulnerable. Most adverse affects that humans have on bird populations are cumulative over time, arising from decisions on land use made by individuals on local parcels of land, and from government land use policies and economic factors that promote indiscriminate or widespread development. However, human impacts on towhees often have mixed effects, some detrimental and others beneficial, through increase or decrease in areas of brush and undergrowth that they favor. Typically, such effects are little noticed when they occur, especially in remote areas.

Diet: Omnivore; with seasonal variability in dietary composition. Animal matter most prevalent in breeding season and plant matter in non-breeding period. Insects (mainly beetles, true bugs, hymenopterans, crickets, grasshoppers, caterpillars and moths) and litter arthropods (e.g., millipedes, sowbugs, spiders) most frequent in animal component, whereas small seeds, acorns, and fleshy fruits common plant elements in diet.

It forages on the ground, scratching in a two-footed, backwards-scratching hop called a "double-scratch".

Breeding: Adults exhibit variable but moderate sexual dichromatism, females tend to be paler and browner than males. Both sexes are similarly patterned, with a dark hood, dorsum, tail, and wings. The color is variable depending on population and sex, from black, dark gray, brownish black, dusky brown, to olivaceous. They have a clear white abdomen with reddish-brown sides and flanks and a cinnamon crissum. The scapulars and tertials variably streaked with white or yellow-white (Mexico), while spotting on tips of greater and median secondary coverts form two wing bars. The tail moderately long, rounded, with white patches in outer corners. In males, and often in females (fall–early winter), post-juvenile ages (hatch-year, second-year) are distinguishable by color contrast between dull brown upper primary coverts and darker (black–slaty gray) secondary coverts. Adults exhibit variable but moderate sexual dichromatism, female paler and browner than male. Both sexes similarly patterned, with dark hood, dorsum, tail, and wings (color variable depending on population and sex, from black, dark gray, brownish black, dusky brown, to olivaceous); clear white abdomen; reddish brown sides and flanks; cinnamon crissum. Scapulars and tertials variably streaked with white or yellow-white (Mexico), while spotting on tips of greater and median secondary coverts form two wing bars. The tail moderately long, rounded, with white patches in outer corners.

The juvenile plumage, which is retained only for a few weeks, is yellowish brown to buffy brown above, dull bronzy buff below. The dorsum and breast are broadly streaked with dusky brown to blackish. The buffy white streaks on scapulars and

spots on tips of greater and median secondary coverts distributed as in adults. Tail as in adults.

Spotted Towhees are monogamous and territorial, with parental care roles typical of those in other emberizines. Two to six eggs are laid in a Nest on ground or in low vegetation. Nest made of strips of bark, dead leaves, dry grass and plant stems and lined with softer materials.

Cool Facts: The Spotted Towhee and Eastern Towhee were once thought to be the same species and called the Rufous Towhee. The Spotted hybridizes with the Eastern in the Great Plains. There are 21 different subspecies of Spotted Towhee; three on islands off the Pacific Coast. The race from Isla Guadalupe off Baja California is extinct. The small race on the island of Socorro off Baja California and the larger race on Santa Catalina Island off southern California are vulnerable to extinction because of their restricted ranges. The Santa Catalina form formerly was found on San Clemente Island, but disappeared from there by 1976.

How determined is a towhee in using its “Double-scratch” foraging technique? In a reported account, “one Spotted Towhee with an unusable, injured foot was observed hopping and scratching with one foot”.

Oregonus Group:

- *P. m. oregonus.* First reported by Bell in 1895. It is found in extreme southwestern Canada (southwestern British Columbia) southward in the western United States to southwestern Oregon; non-breeding southward to southern California. The darkest subspecies—the dorsum is largely black; the white at base of the primaries is absent. The white spots and streaks on scapulars and wing coverts are reduced. The white tail spots are small and the rufous flanks are bright. The hallux (big toe) is short.
- *P. m. falcifer.* First reported by McGregor in 1900. It is found in coastal northern California (south to Santa Cruz and San Benito Counties). Like *oregonus*, but the white markings on the remiges and rectrices are more extensive. The rufous flanks are paler, and the hallux averages longer.
- *P. m. megalonyx.* First reported by Baird in 1858. It is found in coastal southern California from Monterey and Kern Counties south, including Santa Cruz Island, to extreme northwestern Mexico (northwestern Baja California southward to 32° N). It is like *falcifer*, but the white markings even more extensive and the hallux is longer. The feet also average larger.
- *P. m. clementae.* First reported by Grinnell in 1897. It is found on Santa Rosa, Santa Catalina and San Clemente Islands, off southwestern California.
- *P. m. umbraticola.* First reported by in . It is found in northern Baja California (32° N S to 30° N). It is similar to *megalonyx*, but duller overall, the rump is grayish (not black), and the bill and feet average larger.

- *P. m. consobrinus. .* First reported by Ridgeway in 1876. It is found on Guadalupe Island, off Western Baja California. It is similar to *oregonus*, but the male is sooty (not black) and smaller overall.
- *P. m. magnirostris.* First reported by Brewster in 1891. It is found in Sierra de la Laguna, southern Baja California Sur, Mexico. It is similar to *megalonyx*, but the sides and flanks are paler, the bill is heavier, and the white tail spots are larger. The hallux averages longer.

Arcticus Group:

- *P. m. arcticus.* First reported by Swainson in 1831. It breeds in the northern Great Plains, from south-central British Columbia eastward to southeastern Saskatchewan and south from central Idaho east to southwestern Nebraska and central South Dakota. The dorsum is dark gray, the white spots and streaks on dorsum are extensive. The white tail spots are large and the rufous flanks are pale.

Maculatus Group:

- *P. m. maculatus.* First reported by Swainson in 1827. The nominate subspecies is a resident in the southern Sierra Madre Oriental of Hidalgo and Puebla. It is like *vulcanorum*, but the dorsum is olive (less green) and spots and streaks are whiter (less yellow). It averages smaller overall.
- *P. m. curtatus*. First reported by Grinnell in 1911. It is found in the northern end of the Great Basin, northeastern California, central Nevada and southeastern Idaho); non-breeding southward to southeastern California and southeastern Arizona. It is similar to *arcticus*, but the dorsum is darker, the dorsal markings are moderately reduced, and the tail spots are smaller.
- *P. m. falcinellus.* First reported by Swarth in 1913. It is found in the interior and southwestern Oregon southward to California (western and southeastern slopes of the Sierra Nevada range). It is like *megalonyx*, but the rump is olive-gray (not black) and the white markings are even more extensive. The hallux averages shorter.
- *P. m. montanus.* First reported by Swarth in 1905. It is found in the southern Great Basin and Rocky Mountains region from southeastern California eastward to southeastern Nevada, northern Utah, north-central Colorado, northeastern New Mexico and western Oklahoma, southward to south-central Arizona and northern Mexico (northeastern Sonora and northwestern Chihuahua). Non-breeding goes southward to northern Sonora, central Chihuahua and central and southern Texas. It is similar to *curtatus*, but it averages longer wings and hallux and the female is paler and grayer (less brown).
- *P. m. gaigei.* First reported by Van Tyne and Sutton in 1937. It is found in the southern United states (eastern and southeastern New Mexico and western Texas) and adjacent northern Mexico (northern Coahuila). It is similar to *montanus*, but the rufous flanks are paler, the white on the dorsum and wings

is less extensive, and the rump is grayer (less dusky). It averages smaller overall.

- *P. m. griseipygius.* First reported by van Rossem in 1934. It is found in the Sierra Madre Occidental from southwestern Chihuahua (29° N) southward through eastern Sinaloa and western Durango to northeastern Nayarit and western Zacatecas (western Mexico). It is like *montanus,* but the rump is dark grayish olive (not black).
- *P. m. orientalis.* First reported by Sibley in 1950. It is found in the Sierra Madre Oriental of Mexico from southeastern Coahuila, central Nuevo León and southwestern Tamaulipas southward to northeastern Guanajuato, Querétaro and north Hidalgo (eastern Mexico). It is like *gaigei,* but the rump is blacker (less gray), the rufous flanks are darker, and the dorsum is a deeper black.
- *P. m. sympatricus.* It is found in the mountains of eastern Mexico (Sierra de Tuxtla of Veracruz)
- *P. m. vulcanorum.* First reported by Sibley in 1950. It is found in the mountains on southeastern side of Valley of Mexico (in México, northeastern Morelos, southwestern Tlaxcala and western Puebla). It is similiar to *macronyx*, but there is less dorsum green and the black shaft streaks are wider and bolder.
- *P. m. oaxacae.* First reported by Sibley in 1950. It is found in the highlands of northern and central Oaxaca, in southern Mexico. It is similar to *maculatus,* but the dorsum is browner and paler, the rump is browner (less olive), and the white markings on the dorsum are more extensive.
- *P. m. chiapensis.* First reported by van Rossem in 1938. It is found in the mountains of central Chiapas, in southeastern Mexico. It is like subspecies *oaxacae*, but it is darker overall, with white dorsal markings clouded with a buff-brown.
- *P. m. repetens.* First reported by Griscom in 1930. It is found in southeastern Chiapas (Volcán Tacaná) and Pacific cordillera of Guatemala. It is like *chiapensis*, but the rufous flanks are paler, the dorsum is blackish olive (less brown), and the dorsal markings are whiter (less buff).

Olive-backed Group:

- *P. m. macronyx.* First reported by Swainson in 1827. It breeds in the mountains on the western and southwestern sides of Valley of Mexico (in eastern Michoacán, México, northwestern Morelos and Distrito Federal). It is similar to *griseipygius*, but the dorsum is greener, the white spots and streaks are less extensive, and the white spots are infused with yellow and with narrow black streaks on shaft.

Socorro Group:

- *P. m. socorroensis.* It is endemic to Socorro Island, off western Mexico.

Common Name: Western Meadowlark
Scientific Name: *Sturnella neglecta*

Size: 6-10 inches (16-26 cm)

Habitat: North America. It breeds from central British Columbia, north-central Alberta, central Saskatchewan, southern Manitoba, western Ontario, northeastern Minnesota, northern Wisconsin, northern Michigan, and southern Ontario southward to northwestern Baja California, southern California, northwestern Sonora, central Arizona, in the Mexican highlands to eastern Jalisco, Guanajuato, San Luis Potosí, southern Nuevo León, and western Tamaulipas, and to west-central Texas,southeastern Kansas, northwestern Missouri, central Illinois, northern Indiana, northwetsern Ohio and extreme northwestern New York. It winters from southern British Columbia, central Idaho,

central Utah, central Colorado, southern South Dakota, southern Wisconsin, and northern Indiana south to southern Baja California, Michoacán, the state of México, Veracruz, and the Gulf Coast eastward to northwestern Florida, occurring eastward to central Kentucky, eastern Tennessee, and eastern Alabama. The eastern limits of ts winter range are unknown because of the difficulty separating this species from Eastern Meadowlark in winter.

Western Meadowlarks inhabit a wide range of grassland habitats but are most common in native grasslands and lands converted from cropland to perennial grassland cover.

Status: Least Concern. **Global Population:** 32,000,000 Mature individuals. Though widespread, populations are declining. Cultivation of grassland habitat directly affects breeding populations as species is uncommon in cropland habitat. For individuals nesting in cultivated lands, surface tillage for spring weed control destroys all nests and flightless young and kills or injures many incubating adults; undercutting wheat stubble in spring saves nests and lives .

Diet: Diet consists largely of vegetable (grain and weed seeds) and animal matter (insects). Its favorite insect foods include beetles, weevils, wireworms, cutworms, grasshoppers, and crickets. There is a marked seasonal differences in main staples with grain being taken during winter and early spring, and insects in late spring and summer, then weed seeds in fall. Pebbles taken to aid in digestion of grain.

Food is foraged on the ground, also by probing beneath the soil and by searching under clods, manure, etc. When probing, closed awl-like bill is inserted into ground or beneath object, then the mandibles are spread apart, a behavior (gaping) found in many blackbirds. In feeding on sprouting grain, the bird's bill bores into soil, grips a kernel of grain, and pulls it up. Kernels are occasionally eaten, but is more often crushed in the bill to obtain milk and is then dropped.

Foraging birds walk or run on the ground. When approaching a nest, birds walk more stealthily with body closer to the ground. Their flight similar to that of a quail and grouse, alternating periods of gliding with wings held stiff and periods of rapid wing beats below the horizontal.

Breeding: It is a medium-sized terrestrial songbird with long, slender bill, short tail with rather rigid rectrices, and long legs and toes. The nostrils ovate, overhung by prominent horny operculum. The crown is dark with a light median stripe. There is a light line over the eye that becomes bright yellow from the eye to the bill. The upper parts are with intricate concealing pattern of buffs, browns, and black streaks and bars. The under parts are a bright yellow while the sides, flanks, and under tail-coverts are a dull white, broadly streaked and spotted with dusky black markings. The outer wing and tail feathers are barred with black and brown. The outer rectrices is partly white. The adult has a black shield-shaped or crescentic patch on chest. Sexes similar in coloration and pattern, but the female is smaller and slightly less strongly marked.

Juveniles are similar to the adult, but the yellow under-parts are paler and there is dusky streaking on breast instead of black “V”. Sexes indistinguishable at this age.

Pairing occurs immediately upon arrival from migration. Males are polygamous, usually has two mates at the same time. Female chooses nest site and builds the nest. The nest of the Western Meadowlark usually is partially covered by a grass roof. It may be completely open, however, or it may have a complete roof and an entrance tunnel several feet long.

Three to six eggs are laid in a open cup nest on the ground generally woven into shrubs. The females do all caring for the eggs and feeding of the fledglings.

Cool Facts: Although the Western Meadowlark was known to explorers Lewis and Clark, John James Audubon was impressed with the degree to which it had subsequently been overlooked and gave the bird its latin name, S*turnella neglecta*.

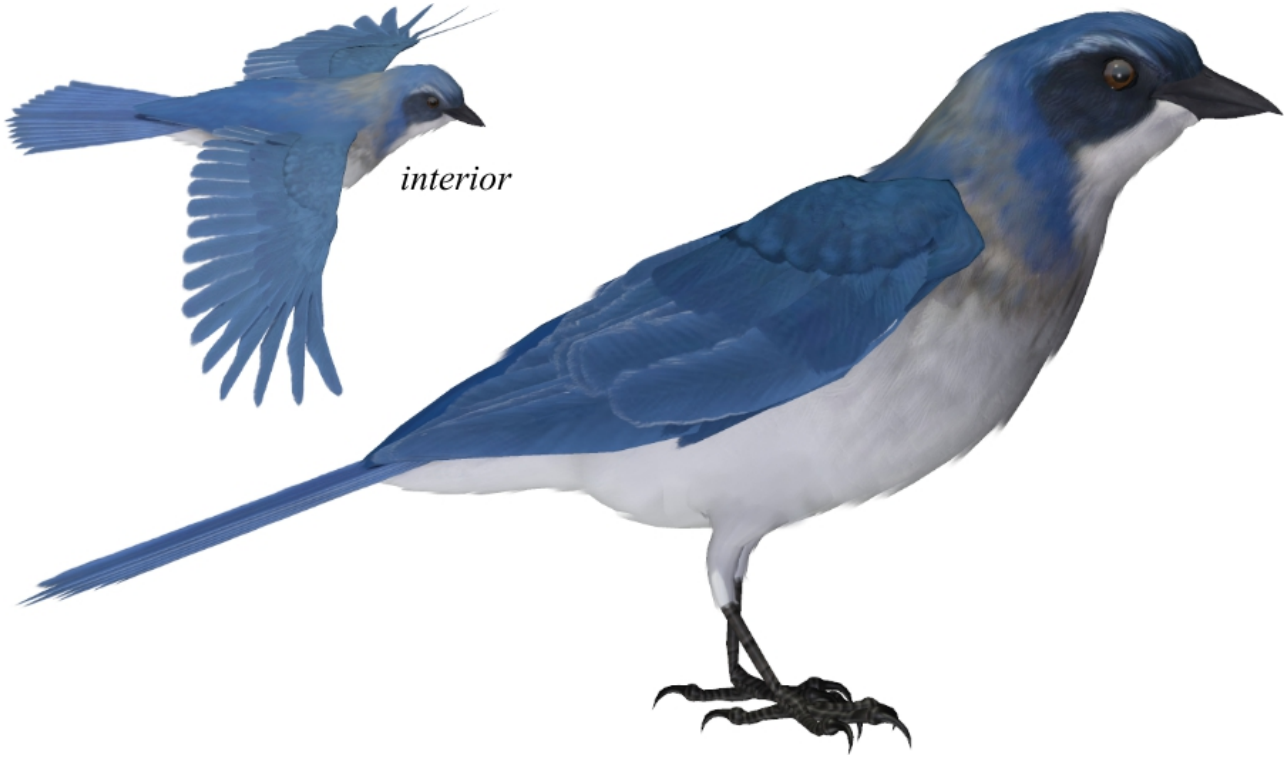
While the Western and Eastern Meadowlark is close to identical, the two species rarely hybridize. Captive breeding experiments found that hybrid meadowlarks were fertile, but produced few eggs that hatched.

The Western Meadowlark uses a "chase" display during mating season with the male chasing the female. The female usually starts the display, and she determines the speed of the chase. However, males with two mates choose to be discrete, following only one female at a time.

Common Name: California Scrub-Jay
Scientific Name: *Aphelocoma californica*

Size: 11-12 inches (28-30 cm)

Habitat: North America; a resident in coastal states of the western United States from Washington to California, south to the southern Baja California. In southwestern Washington, a common resident in southern Puget Trough and the lower Columbia River and upstream into the Gorge and Klickitat valleys to south-central Washington, south through western slopes of Cascades and adjacent interior valleys of Oregon (not extending to Pacific Coast except along Columbia River and in Curry County), but extending east along Columbia River to northern portions of Hood River, Wasco, and Sherman counties; and occasionally or locally (but increasing) to Deschutes and Crook counties and other portions of north-central Oregon, northern, central, and southwestern California, extreme west-central Nevada, south to southernmost Baja California.



The majority of populations abound in rich oak woodlands or oak–pine woodlands. A few *californica* populations live in relict patches of single-leaf pinyon along western edge of Mojave Desert. Together, these two habitats support the vast majority of populations.

Status: Least Concern. **Global Population:** 3,400,000 Mature individuals. Common, populations may be increasing. The isolated subspecies found only in

the Eagle Mountains of southeastern California is potentially vulnerable to disturbance, and is listed as a species of special concern in California.

Diet: Omnivorous and opportunistic, the diet is predominately arthropods and fruit in spring and summer and seeds of masting trees, especially oaks and pines, in autumn and winter.

Most food items gleaned by hopping on ground or branches of trees and shrubs. It also pounces on terrestrial animals from perches and fly-catches aerial insects. Seeds and acorns are carefully inspected visually and by handling in the bill, and selected based on multiple cues that indicate food quality, including size, mass, and other features. Up to 5,000 acorns may be cached/individual in one season. In California, acorns stored principally September–February and recovered from January to May, peaking in February through March. California Scrub-jays have been reported to remember the cache locations of over 70% the food it hides. They also are purported to be important agents for dispersal of several oak species (the acorns they forgot about).

Breeding: A medium-sized jay, crestless and long-tailed. Adults are easily recognized by dull blue upper-parts and dull whitish underparts, contrasting with brownish back, dusky ear coverts, whitish supercilium, and a band of dark-bluish streaks extending onto sides of the breast. Adults show no pronounced plumage differences between sexes. The bill, legs, and feet are black and the iris is brown.

Juvenile plumage differs markedly from that of adults (more gray/brownish), but show no differences between sexes.

Most pairs form through replacement of established breeder that dies. Once pairs form, breeders remain together on territories defended year-round. Replacement involving adult floater can occur at any time. The formation of new pairings involving yearling floaters can form as early as September but usually closer to next breeding season.

Either sex can select the nest site and initiates the nest construction. Potential nest site indicated to mate by making undulating flight to site while producing loud flight vocalizations, often while carrying nest material. A wheeze vocalization produced upon approach to site. Once both pair members participate in nest construction, which usually begins late winter, nest display flights terminate. Two to six eggs are laid in open cup style nest in shrub, vine or low tree. Only the female incubates the eggs. The male occasionally feeds the female on the nest. The pair breed without participation by “helpers”. There is no cooperative behavior as there is in other jay species.

Cool Facts: This jay was originally known as the “Western Scrub-jay” but was renamed along with the Gray Jay (now, Canada Jay) by the American Ornithological Society.

Scrub-Jays are very intelligent. Often getting humans to do their biding. In one account, a pair of scrub-jays directed a homeowner across a yard to scare off a cat in a tree close to their nest. They have also been known to have funerals for their deceased compatriots. On encountering a dead jay, prostrate on the ground, jays flew into a tree and began a series of loud, screeching calls that attracted other jays. The summoned birds perched on trees and fences around the body and joined in the calling. These cacophonous gatherings could last from a few seconds to as long as 30 minutes. Some scientists debate whether this is simply a warning call but others believe the fact that all jays in particular are drawn to the call, rather than flying away from danger, indicates a more specific purpose.

Scrub-Jays have been used in laboratory studies of its ability to hide and remember seeds. Jays that had stolen the caches of other jays noticed if other jays were watching them hide food. If they had been observed, they would dig up and hide their food again. Jays that had never stolen food did not pay any attention to whether other jays were watching them hide their food. Scrub-jay have formed a symbiotic relationship with mule deer. They hop over the body and head of the deer to eat parasites. The deer often help the jays by standing still and holding their ears up.

Scrub-Jays in areas where acorns are abundant have deep, stout, slightly hooked bills while those in areas with lots of pinyon pine have long, shallow, pointed bills. This evolutionary change has created the right bill for the right food source.

There are seven subspecies:

- *A. c. californica.* First reported by Vigors in 1839. The nominate subspecies is a resident west of the Cascades and Sierra Nevada from the southern Puget Sound southward to the vicinity of Point Concepcion. It is also inland in south-central Oregon and northeastern California to the Klamath region and in the Virginia Mountains of western Nevada. The dorsum is violaceous blue, with the mantle grayish brown suffused with bluish gray; throat white, variably streaked gray and framed by a violaceous blue collar broken posteriorly. The ventrum is pale gray, slightly darker on sides and lighter toward the crissum. The under-tail coverts are white, variably tinged with pale blue. The bill is generally deep and hooked. It interbeeds with Woodhouse's Scrub-jay (*A. woodhouseii suttoni)* where ranges meet in southeastern Oregon, eastern California, and western Nevada.
- *A. c. obscura.* First reported by Anthony in 1889. A resident in from the Transverse and Peninsular ranges of southwestern California south to Bahía Todos Santos in northern Baja California, including inland to the Little San Bernardino Mountains and isolated ranges in the western Mojave Desert of California and the Sierra de Juárez and Sierra San Pedro Mártir of Baja California. It is similar to the nominate, but the dorsum is darker and more

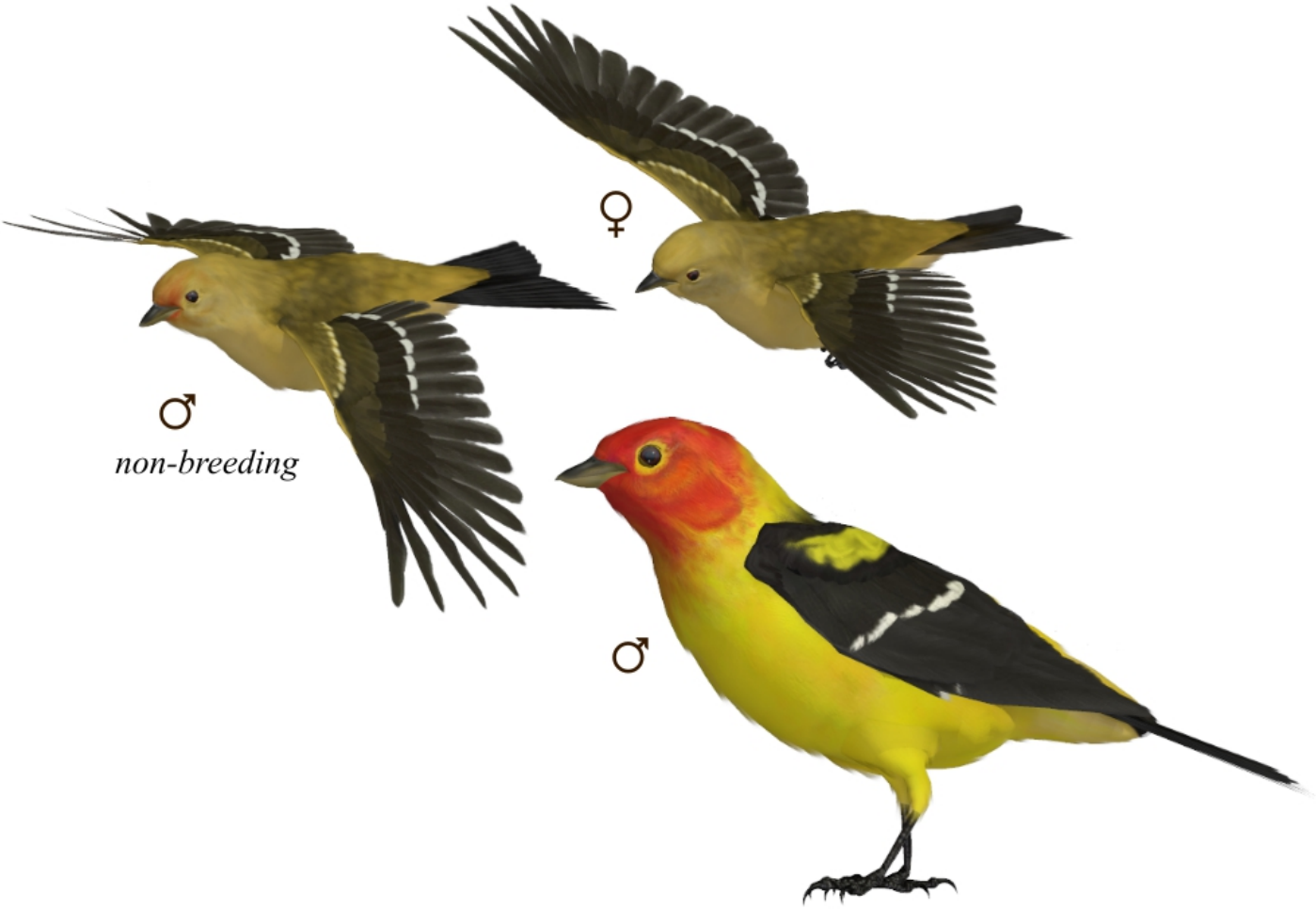
purple, the mantle is browner, the gray throat streaks are heavier and darker, and the ventrum is washed smoky brown. The body size averages smaller.

- *A. c. hypoleuca.* First reported by Ridgway in 1887.It is a resident in central and southern Baja California north to Magdalena Bay on the Pacific coast, to Sierra de Calamajué inland, and to Loreto on the Gulf coast. It is similar to the nominate, but paler overall, with the blue areas being purer (less purple) and the breast and belly whiter (less gray). The body size is smaller, although the bill is proportionately longer.
- *A. c. cactophila*. It is found in central Baja California (latitude 29º30' to Bahía Magdalena)
- *A. c. cana*. It is found on Eagle Mountain in Joshua Tree National Park (southeastern California).
- *A. c. oocleptica*. It is found in south-central Oregon southward to interior central California (including Sacramento and San Joaquin Valleys and adjacent Coast Ranges south to San Francisco Peninsula), Sierra Nevada foothills and eastward to western Nevada.
- *A. c. caurina*. It is found from coastal southern Oregon southward to California (Napa and Sonoma Counties, and eastward to inner Coast Ranges).
- *A. c. immanis*. It is found in the northwestern United States (Western Washington, coastal and interior Oregon).

Common Name: Western Tanager
Scientific Name: *Piranga ludoviciana*

Size: 6-7 inches (16.5–19.5 cm)

Habitat: North America; It is found throughout western North America (west of the Rockies). It breeds north to southeastern Alaska, northern British Columbia, the extreme southern portion of the Yukon Territory, south-central Mackenzie,



northwestern Saskatchewan, southward through Washington State (except Columbia Basin, and higher elevations in Olympic Peninsula, Oregon, Idaho, Wyoming, Utah, Nevada, and California.

It winters in coastal southern California and middle America from Mexico to Costa Rica, mostly in the highlands, but also on the Pacific slope.

It favors open woodlands, but occasionally extends into fairly dense forests. It is common in forests with Douglas fir, ponderosa pine, lodgepole pine, mixed-

conifer (spruce-fir, true fir, temperate rain, pine-fir, etc.), and mixed coniferous-deciduous forests of western North America.

Status: Least Concern. **Global Population:** 8,900,000 mature individuals with a stable population trend. The Western Tanager is not particularly sensitive to selective harvesting and other logging practices, short of clear-cutting.

Diet: Mostly insects, some fruit. Among insects taken are wasps and ants, termites, stinkbugs, cicadas, beetles (including wood borers, click beetles and nut weevils), grasshoppers, crane flies, dragonflies, caterpillars, scale insects and sawflies. It also eats fruits-hawthorn apples, wild cherries, elderberries, blackberries, mulberries, serviceberries, cultivated cherries and buds of greasewood bushes.

It spends most time in canopy of trees and shrubs, occasionally feeding on the ground. It seeks insects mostly among larger twig and branch masses, as well as in air and foliage by fly-catching.

Breeding: Sexes are dichromatic. The adult male in breeding plumage is unmistakable. Its back, scapulars, wings, and tail are black. The median coverts (anterior wing-bar), rump, upper tail-coverts, hindneck, and under parts are a bright yellow. The tips of greater coverts (posterior wing-bar) are whitish. The anterior portion of the head or sometimes the entire head are reddish. The bill is a dull grayish yellow.legs and the feet are bluish gray. Adult male in non-breeding plumage is similar, but plumage is largely veiled by olive-yellow and dusky, with at most only a wash of red on the face. The adult female has olive-green upper-parts (becoming grayish on the back and scapulars, and yellowish on rump and upper tail-coverts). The under parts can be highly variable; from a bright yellow (palest on belly) to grayish white with a yellow restricted to under tail-coverts.The wings are grayish dusky, with 2 yellowish white wing-bars. The tail is grayish brown or olive and the anterior portion of head in brighter individuals can sometimes tinged with red. Adult female in non-breeding plumage is similar, but the plumage is more veiled by olive and grayish.

Fall immatures are similar to the adult female, but the male is brighter overall, with a greener back and yellower under parts and rump. The female immature is duller, with little yellow in plumage. The upper parts are more brownish olive, with little or no contrast between rump and back; underparts much obscured by light brownish olive and the wing-bars are much narrower, and a pale yellowish buff instead of yellow. Spring immatures are similar to the breeding adults of their sex, but average duller overall.

It appear to be monogamous. The female is often accompanied by the paired male during nest-building and egg-laying phases, and is almost always seen with him when not on nest during incubation and brooding periods. The male brings food items to the female at or outside of the nest. The female usually then

flutters her wings, at least early in breeding season. Sometimes mates approach each other and even touch each other with their bills. Occasionally male or female opens their bill in direction of mate and flutters their wings. Four white eggs are laid in a flimsy open cup nest on an outer branch of a tree.

Cool Facts: The Western Tanager breeds farther north than any other member of its mostly tropical family, breeding to nearly 60° N in the Northwest Territories.

The red pigment in the face of the Western Tanager is rhodoxanthin and is acquired through diet. This pigment rare in birds is not the same red pigment found in other red tanagers such as the Scarlet Tanager. The redder the male, the more attractive he is to the females. It is known to hybridize with Flame-colored Tanager (*Piranga bidentata*)

Common Name: White-crowned Sparrow
Scientific Name: *Zonotrichia leucophrys*

Size: 6 inches (15-16 cm)

Habitat: North America; breeds from northern Alaska, the northern Yukon, north Mackenzie, central Keewatin (casual on Brooks, Victoria, Somerset, Bathurst, and Bafffin islands) southward to the Alaska Peninsula (casual or accidental on islands in Bering Sea), northern Ontario, northern Manitoba, northern Saskatchewan, and northern Alberta, and from western British Columbia (absent from coastal range and Queen Charlotte Island) and western Alberta (Rocky Mountains and foothills) southward to Hart's Pass, Washington, west and central

Montana, western Idaho (excluding southwestern areas) northwestern Oregon, Wyoming (excluding northeastern areas), western Colorado, north-central New Mexico, Utah (excluding southwestern areas),northern Nevada, and in California in the Cascade Range, the Warner Mountains, and the Sierra Nevada from Plumas County southward to Tulare County. It also breeds from central

Vancouver Island and extreme southwestern British Columbia southward, in a narrow band along the Pacific Coast, to Santa Barbara County, CA.

In eastern Canada, it breeds in northern Quebec, Labrador, and northwestern Newfoundland.

There is a disjunct populations breed in the White Mountains of northeastern California and San Bernadina Mountains of southwestern California, the San Francisco Mountains of north-central Arizona, and Cypress Hills of southern Alberta and Saskatchewan.

It winters casually to central Alaska, very locally on Kodiak Island, the Kenai Peninsula, Alaska and western British Columbia, regularly from south-central British Columbia, western and southern Idaho, northern Wyoming, southwestern South Dakota,south-central Nebraska, southeastern South Dakota, central Iowa, southeastern Wisconsin, southern Michigan, southwestern Ontario, Ohio, and southwestern Pennsylvania southward to southern Baja California and to Nayarit, northern Michoacán, and Tamaulipas, Mexico, the Gulf Coast, and the panhandle ofwestern Florida. East of the Appalachian Mountains. It also winters from Connecticut, southeastern New York, eastern and central Pennsylvania, and eastern and southwestern West Virginia southward to central Georgia, South Carolina, North Carolina, Virginia, the western Delmarva Peninsula, and southwestern and northeastern New Jersey. It is found in very small numbers at coastal locations from New Jersey south, and from central Pennsylvania and Massachusetts north to southern Quebec and Nova Scotia (casual to Prince Edward Island). It winters locally within the Florida peninsula, particularly in Polk County and casually southward to southern Florida, the Bahamas, Cuba, and Jamaica. It is a rare to uncommon winter visitor tothe northern Yucatán Peninsula.

Populations differ remarkably in habitat features of breeding territories, from boreal forest and tundra in northern Manitoba, to alpine meadows in Rocky Mountains of Alberta and the United States, to the margins of shopping center parking lots and ferry terminals in British Columbia and Washington.

Necessary habitat features of breeding territories include grass, either pure or mixed with other plants, plus bare ground for foraging and a mix of dense shrubs or small conifers thick enough to provide a roost and conceal a nest. Standing or running water on or near territory are desirable. The first 3 features seem characteristic of nesting habitat of all populations, and the territories look similar throughout range, despite the local variation. The site is most suitable if bare ground/grass and shrubs are distributed patchily.

Status: Least Concern. **Global Population:** 70,000,000 Mature individuals. Widespread; May be declining in some areas in western United States.

Diet: In winter, seeds, buds, grass, fruits, and arthropods, when available. During breeding season, the diet consists of arthropods (principally insects) and seeds.

They feed primarily on ground, hoping along and performing the “double-scratch” movement.

Breeding: A small sparrow that is sexually monomorphic in plumage but geographically variable. The top of head has two broad black stripes, separated by a broad median white stripe. The eyebrow-stripe is white, cut off at lore by black crown-stripe in some subspecies. The narrow black line extends from the eye to the back of the nape. The remainder of the face, the sides of the neck, and the breast is gray, fading to white on the throat and abdomen. The back and scapulars are light gray streaked with brown. The rump and upper-tail coverts are pale brownish. The wings have two white wing-bars and the tail is dark brown. The legs are brown to flesh-pink.The iris are brown. The bill color varies with subspecies, pinkish brown to yellowish.

The juvenile plumage is similar to the adult plumage, but is more brown and less gray with brown head-stripes rather than black. The buffy median head-stripe rather than white, the streaks on the back and scapulars are black rather than brown.

Territorial male flies toward conspecific intruder, erects crown feathers, puffs chest, and sings loudly. Aggressor may then adopt a threatening posture, sleeking its body feathers, orienting its body to the horizontal, and pointing its open bill toward the intruder. This may be accompanied by a Wing-flutter Display in which male crouches, lowers and flutters its wings, and raises its head and tail slightly.

They are socially monogamous and rarely polygynous. Three to seven eggs are laid in a loose cup nest found in a low shrub or on the ground.

Cool Facts: In the first formal treatment of the White-crowned Sparrow in 1772, J. R. Forster described it as an "elegant little species."

A young male White-crowned Sparrow learns the basics of the song it will sing as an adult during the first two or three months of its life. It does not learn directly from its father, but rather from the generalized song environment of its natal neighborhood. Because male White-crowned Sparrows learn the songs they grew up with and do not travel far from where they were raised, song dialects frequently form. Males on the edge of two dialects may be bilingual and able to sing both dialects.

Four of the five subspecies of White-crowned Sparrows are migratory. The sedentary race lives in a very narrow band along the California coast. The most

widespread race, breeding across northern Canada and wintering in the eastern United States, is the least-studied and least well known of all the races.

- *Z. l. leucophrys.* First reported by Forster in 1772. It breeds in north tier east of Hudson Bay, in Rocky Mountain ranges from south-central Canada southward through northern New Mexico, in various inter-mountain ranges southward to central Nevada and southern Utah, and in Cascade-Sierra Nevada axis southward to southern California. It winters in lowlands across southern tier of United States, generally rarer westward. The bill is pink, the lores are black (dark brown in immature) and the bend of the wing is white. The mantle feathers are light gray with purplish or reddish brown centers and the rump averages paler. The adult crown stripes are bright white and the wing is long (♂ > 75 mm, ♀ > 71 mm).
- *Z. l. gambelii.* First reported by Nuttall in 1840. It breeds across the northern tier from Alaska to the Hudson Bay. It winters south through central Mexico, generally rarer eastward. The size and plumage similar to the nominate but the bill is orange or pinkish orange and the lores are white (tan in immature).
- *Z. l. pugetensis.* First reported by Grinnell in 1928. It breeds coastally from southwestern British Columbia, including Vancouver Island, southward to the northwestern-most California, with population inland in Willamette Valley, Oregon. It winters coastally south through southern California. The bill is yellow and the lores are white (tan in immature). The bend of the wing is yellow and the mantle feathers are light brown with blackish centers. The adult crown stripes are dull white and the rump averages darker. The wings appear short (♂ < 73.5 mm, ♀ < 70.5 mm).
- *Z. l. nuttalli.* First reported by Ridgway in 1899. A resident in coastal California from Cape Mendocino southward to Point Conception. It is like *pugetensis* but heavier.
- Z. l. oriantha. It is found in the mountains of southwestern Canada (Southeastern British Columbia, southern Alberta and extreme southwestern Saskatchewan) and the western United States (north Idaho southward through south-central Oregon to central and eastern California and south-central Nevada, eastward to Wyoming, Utah, Colorado, central-east Arizona and northern New Mexico). It winters to the southwestern United States (southern California and southern Arizona eastward to central Texas) and Mexico (southward to southern Baja California, Jalisco, Michoacán, Querétaro, San Luis Potosí and Nuevo León).

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- **2006 "SBRM2" Re-release:** Jan, Rhonda and Sandra
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- **2020 "SBRM4" Re-release:** Alisa, FlintHawk and Tparo

Species Accuracy & Reference Materials

The author has tried to make these species as accurate to their real life counterparts as possible. 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.

With the use of one generic model to create dozens of unique bird species, some give and take is bound to occur.

The model was created in Modo. The model rigs in Poser and DAZ Studio. The texture maps were created in Painter.

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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