

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

## Songbird ReMix

# BIRDS of PREY

## Volume I: Kestrels, Hobbys & Falcons

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## Volume I: Kestrels, Hobbys & Falcons

### Introduction

This Songbird ReMix Birds of Prey volume contain species in the Falcon family. The Falcon family includes as well as Falcons; Kestrels, Hobbys, Gyrfalcons, Merlins, Falconets and Pygmy-falcons.

Falcons are one of the most successful evolutionary groups dating their lineage back to the Miocene-Pliocene boundary (about 2.4-8 million years ago). Falcons have exceptional powers of vision with their visual acuity measured at 2.6 times that of a normal human and are amongst the most intelligent of birds; on par with corvids. They are the fastest creature on the planet with Peregrine Falcons clocked at over 200mph (320km/h).

Throughout history, culture and myth, Falcons have symbolized superiority, spirit, light, freedom and aspiration. The Falcon is an emblem for success, victory and rising above a situation. Egyptian Gods, Ra and Horus, both had falcon heads.

### Overview

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):
  - **Birds of Prey (Order Falconiformes)**
- **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. With using physical renderers such as Iray and Superfly, SubD should be turned to at least "3".

### Poser Use

Select **Figures** in the **Runtime** Folder and go to the **Animals : Songbird ReMix** folder. Select the bird from the renderer (*Firefly* or *Superfly*) folder you want and simply click it to load. Some birds in the Songbird ReMix series may load with attached parts (*Conformers*) such as tail or crest extensions. Some of these parts have specific morphs. You will need to click on the attached part to

access those controls. Associated poses can be found in the same folder- **Bird Library : (Type) : Poses**.

## DAZ Studio Use

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

## Physical-based Rendering

Physical-based renderers such as **Iray** and **Superfly** require more CPU and memory horsepower than the legacy renderers for DAZ-Studio and Poser because of ray-trace bounces and higher resolution meshes needed for displacement. Superfly, in particular, may crash *especially* when using the GPU-based options. The best solution is to render using one of the CPU-based options. Limiting the number of ray-trace bounces by setting "Pixel Samples" to "2" or "1" will also reduce crashes and speed renders. Of course, upgrading memory and your CPU will also help.

## Where to find your birds

Type Folder	Bird Species
<b>Birds of Prey (Order Falconiformes)</b>	American Kestrel Common Kestrel Seychelles Kestrel Mauritius Kestrel Merlin or Pigeon Hawk Gyrfalcon Northern or Eurasian Hobby Australian Hobby Peregrine Falcon Aplomado Falcon Bat Falcon Pied Falconet Collared Forest-falcon White-rumped Pygmy-falcon

## Where to find your poses

Type Folder	For what species?
<b>Birds of Prey (Order Falconiformes)</b>	All Birds of Prey

# Morphs and their Use

All Songbird ReMix models have morphs that change the look of the loaded model to achieve additional movements and expressions that joint movements can't achieve. These are referred to in the Songbird ReMix model as "Action Morphs". Other morphs that are included can subtly or sometimes dramatically, alter the model to resemble specific species. These morphs are referred to as "Creation Morphs".

Here is a brief explanation of where the morphs are found and what they do:

## BODY section:

- **Action Morphs**

- **Common Controls**

- BeakOpenClose- Controls the opening and closing of the bill
- EyesFwdBack - Controls the forward and backward movement of the eyes
- EyesUpDown - Controls the up and down movement of the eyes
- EyeLidsCloseOpen - Controls the opening and closing of both eyelids. Dialing to -1 will give a rounded eye shape. The individual EyeWink controls should not be used in conjunction with this morph.
- WingsFold- Puts both Wings into a folded position. Dialing number between 0 and 1 sometimes will give geometry issues (intersections, odd shapes) due to the nature of the complex morph.
- TailFeathersSpread – Controls the tail feather fanning action.

- **Wing and Tail Controls**

- These controls allow both wings and each individual wing to perform numerous wing actions and also allows the Tail feather action of cupping.

- **Neck Bending**

- These controls allow global bending, twisting and moving side-to-side of the seven neck sections. Partial bending controls can also be found in each individual neck section. There is also a control to scrunch and stretch the neck.

- **Head Controls**

- Exp-Smile- Creates a smile expression.
- Exp-Frown- Creates a frown expression.
- **Eyelid Movement Section**- has individual controls for left and right EyeWink. These individual EyeWink controls will not work properly when the master EyeLidsCloseOpen morph is used.
- **Tongue Movement Section**- various morphs control the movement of the tongue.

- **Feather Fluff Controls**

- CrestFluffUp- Pulls the crest up/out.
- CrestFluffLength- Controls the length of the crest (top of bird's head).

- CrestFluffHide- Hides the crest.
- BackHdFluffUp- Pulls the back head feathers up/out.
- BackHdFluffLength- Controls the length of the back head feathers.
- BackHdFluffHide- Hides the back head feathers.
- JowlFluffOut- Pulls the feathers under the eye area (jowls) out.
- JowlFluffLength- Controls the length of the jowl feathers.
- JowlFluffHide- Hides the jowl feathers.
- ThroatFluffOut- Pulls the feathers on the throat area out.
- ThroatFluffLength- Controls the length of the throat feathers.
- ThroatFluffHide- Hides the throat feathers.
- NeckFluffLength- Controls the length of the neck feathers.
- NeckFluffOut- Pulls the neck feathers up/out.
- NeckFluffDroop- Droops the front facing neck feathers.
- BreastFeathersOut- Pulls the breast feathers out.
- BreastFluffSidesIn- Pulls the breast feathers sides in so they don't intersect with folded wings.
- RaiseBackFeathers- Ruffles the feathers on the back of the bird.
- FlankFluffLength- Controls the length of the flank feathers.
- FlankFluffOut- Pulls the flank feathers out (not recommended when wings are folded).
- ThighFluffBack- Pulls the thigh feathers back on the thighs.
- ThighFluffOut- Pulls the thigh feathers out to be more fluffy.
- ThighFluffLength- Controls the length of the thigh fluff.
- RumpTopFluff- Controls the transparency feathers on the topline rump/tail of the bird.
- RumpBtmFluff- Controls the transparency feathers on the underside rump/tail of the bird.
- RumpFluffSides-Reduces the Fluff on the sides of the rump. Useful when wings are folded.
- **Correction Morphs**
  - lThighIn4Flight and rThighIn4Flight - Reduces the thigh lumps caused when legs are brought fully back for flight or perching.

## • **Creation Morphs**

- Sleeker- Thins the trunk of the bird.
- BreastIn-- Reduces/Adds to breast shapes.
- BreastCrease- Creates a center crease on the breast.
- BackFlatter- Reduces the curve on the back.
- RumpAddBulk- Adds bulk to the lower portion of the rump.
- RumpSleeker- Streamlines the Hip-to-Tail Sections.
- RumpShorten- Reduces/adds to the length of the rump and tail sections.
- RumpTaper- Reduces the width of the rump and tail sections.
- RumpTopFluffWidth- Controls the width of the feathers on the topline rump/tail of the bird.

- RumpTopFluffExtend- Controls the length of the feathers on the topside rump/tail of the bird.
- RumpBtmFluffExtend- Controls the length of the feathers on the underside rump/tail of the bird.
- LegLength- Allows lengthening of the legs.
- LegThickness- Increases the girth of the shins.
- FootSize- Controls the size of the Feet.
- **Species Shapes**- These morphs create very specific looks to resemble certain species.
  - Crested Eagle and Shape Morphs- These are used with Crested eagles. Shaping morphs will only work if the CrestedEagleUnhide is active.
  - Harpy Crest Morphs- These are used with Harpy Crested-like eagles. Shaping morphs will only work if the HarpyCrestUnhide is active.
  - AfricanHarrierCrest- For use with the African Harrier Hawk.
  - HawkHead- Shapes the head for Hawks.
- **Head Shaping**
  - **Head Shapes**- These morphs control the shape of the head.
    - Hd-BigHead- Makes the head and neck parts around 30% larger
    - Hd-WedgeHead- Tapers the head from bill to back of head.
    - Hd-Rounder- Adds to the width of the head.
    - Hd-ThickenUpperNeck- Adds bulk to the upper neck.
    - Hd-ThickenNeckSides- Adds bulk to the sides of the neck.
    - Hd-FlattenCrown- Flattens the crown of the head.
    - Hd-RaiseCrown- Raises the crown of the head.
    - Hd-ForeheadLow- Reduces the forehead extending to the beak.
    - Hd-NoForehead- Reduces the forehead portion and expands the beak.
    - Hd-ForeheadOut- Adds to the forehead extending to the beak.
    - Hd-NostrilLump- Adds or subtracts from the forehead/beak area.
    - Hd-BackHeadDown- Reduces/slopes the back of the head to neck.
    - Hd-BackHeadUp- Expands/angles the back of the head to neck.
    - Hd-BigBrows- Expands the eyebrow area out.
    - Hd-BrowDownFront- Angles the front of the eyebrow area down.
    - Hd-BigBrowFwd- Expands the entire brow area forward.
    - Hd-ExpandJowls- Thickens the jowl/cheek area.
    - Hd-ForeheadSplit- Adds a center crease to the forehead area.
    - SuperOrbitalRidges- Makes Super-orbital Ridges (common in many Birds of Prey, especially eagles) more pronounced.
  - **Eye Shapes**- These morphs can change the appearance of the eyes.
    - Ey-Dilate- Controls the pupil size of the eyes.
    - Ey-BiggerEyes- Makes eyes about 20% larger.
  - **Beak Shapes**- These morphs can change the appearance of the bill.
    - Bk-Length- Controls the length of the beak.

- Bk-Height- Controls the height of the beak.
  - Bk-Width- Controls the width of the beak.
  - Bk-SidesIn- Controls the width of the mid-portion of the beak.
  - Bk-UpperRounder- Rounds the top of the upper beak.
  - Bk-UpperFlatter- Flattens/angles the top of the upper beak.
  - Bk-UpperBeakCurve- Adds some curving to the mouth edge of the upper beak.
  - Bk-UpperBeakRaiseEnd—Raise the end of the upper beak giving an eagle-like shape.
  - Bk-TomialTooth- Adds the tomial tooth found in the falcon family.
  - Bk-Notch- Adds a beak notch common in the hawk family.
  - Bk-Hook- Extends the hook on the upper beak.
  - Bk-CornersBack- Moves the corners of the beak forward or back.
- **Nostril Shapes**
  - Bk-MoveNostrils- Moves the nostrils on the bill forward and back.
  - Bk-ThinNostrils- thins the nostrils.
  - Bk-NostrilLength- makes the nostrils longer.
- **Tongue Shapes**
  - Tng-Length- Controls the length of the tongue.
  - Tng-Width- Controls the width of the tongue.
- **Wing Shapes**- These morphs control the shape of the wings.
  - WingSpan- Allows control of Wing Length.
  - WingWidth- Expands the width of the wings.
  - WingsPoint- Brings the tips of the wings to a point.
  - HawkWingShape1- Controls the shape of the leading primary flight feathers
  - HawkWingShape2- Controls the shape of the secondary flight feathers
- **Tail Shapes**- These morphs control the shape of the tail feathers.
  - TailFanStyle-Creates the shape of the tail spread. 1=Fan, 0=Wedge
  - Length- Controls the length of the tail feathers.
  - Width- Controls the width of the tail feathers.
  - Round- Rounds the tail feathers.
  - SplitTailFeathers- Creates a wedge-shape for the tail feathers.
  - GraduatedTail- Graduates the tail feathers length from short (outside) to long (inside).
  - SquareEnds- Makes tail feathers have square ends.
- **Scale**- Controls the size of the model. The scale is proportional to the standard human characters in Poser and DAZ Studio.



**Songbird ReMix**

# **BIRDS of PREY**

**Volume I: Kestrels, Hobbys & Falcons**

## **Field Guide**

American Kestrel  
Common Kestrel  
Seychelles Kestrel  
Mauritius Kestrel  
Merlin or Pigeon Hawk  
Gyrfalcon  
Northern or Eurasian Hobby  
Australian Hobby  
Peregrine Falcon  
Aplomado Falcon  
Bat Falcon  
Pied Falconet  
Collared Forest-falcon  
White-rumped Pygmy-falcon

**Common Name:** American Kestrel  
**Scientific Name:** *Falco sparverius*

**Size:** 8.7-12.2 inches (22-31 cm); **Wingspan:** 20.1-24 inches (51-61 cm)

**Habitat:** North America; its breeding range extends from central and western Alaska across northern Canada to Nova Scotia, and south throughout North America, into central Mexico and the Caribbean. It is a local breeder in Central America and is widely distributed throughout South America. Most birds breeding in Canada and the northern United States migrate south in the winter. It is an occasional vagrant to Western Europe.



American Kestrels occupy habitats ranging from deserts and grasslands to alpine meadows. They are most likely spotted perching on telephone wires along roadsides, in open country with short vegetation and few trees. In winter in many southern parts of the range, female and male American Kestrels use different habitats. Females use the typical open habitat, and males use areas with more trees. This situation appears to be the result of the females migrating south first and establishing winter territories, leaving males to the more wooded areas.

**Status:** Least Concern. **Global population:** 4,000,000 adult individuals. The American Kestrel is North America's most common and widespread falcon but populations have been declining everywhere except in the central United States. According to the North American Breeding Bird Survey, between 1966 and 2010 they declined by an estimated 1.5 percent per year, amounting to a cumulative decline of about 48 percent. *Partners in Flight* estimates the global breeding population at 4 million, with 13 percent breeding in Canada, 31 percent residing in the U.S., and 10 percent in Mexico. They rate an 11 out of 20 on the Continental Concern Score and are not on the 2012 Watch List. Current declines stem from continued clearing of land and felling of the standing dead trees these birds depend on for their nest sites. The American Kestrel is also losing prey sources and nesting cavities to so-called "clean" farming practices, which remove hedgerows, trees, and brush. An additional threat is exposure to pesticides and other pollutants, which can reduce clutch sizes and hatching success. For kestrels in North America, a larger problem with pesticides is that they destroy the insects, spiders, and other prey on which the birds depend.

**Diet:** Grasshoppers, lizards, mice, and small birds. It typically hunts by hovering in the air with rapid wing beats or perching, intensely scanning the ground for prey. Kestrels hide surplus kills in grass clumps, tree roots, bushes, fence posts, tree limbs, and cavities, to save the food for lean times or to hide it from thieves.

**Nesting:** Females are noticeably larger than males. They are one of the most colorful of all raptors. They are pale when seen from below and warm, rusty brown spotted with black above, with a black band near the tip of the tail. Males have slate-blue wings while the females' wings are reddish brown. Both sexes have pairs of black vertical slashes on the sides of their pale faces—sometimes called a "mustache" and a "sideburn." Juveniles resemble adults, although their breasts are whiter and have some streaked feather patterns as opposed to the adult black-dotted feather patterning.

American Kestrels nest in cavities, although they lack the ability to excavate their own. They rely on old woodpecker holes, natural tree hollows, rock crevices, and nooks in buildings and other human-built structures. The male searches for possible nest cavities. When he's found suitable possibilities, he shows them to the female, who makes the final choice. Typically, nest sites are in trees along wood edges or in the middle of open ground. American Kestrels will take readily to nest boxes. American Kestrels do not use nesting materials. If the cavity floor is composed of loose material, the female hollows out a shallow depression there. Females lay 4-5 white to yellowish eggs, mottled with violet-magenta, gray, or brown spots. Incubation lasts 26-32 days with nesting lasting approximately another 30 days. The chicks are born with sparse white down over pinkish skin and their eyes partially open by first or second day.

**Cool Facts:** It is the smallest falcon in North America and often called the "Sparrow Hawk". This "Sparrow Hawk" name is mistakenly connected with the Eurasian Sparrowhawk, which is in the genus *Accipiter*.

Although not as aggressive a hunter as many other larger falcons, it has with occasional success, hunted birds up to twice their own weight. It can be tough being one of the smallest birds of prey. Despite their fierce lifestyle, they end up as prey for larger birds such as Northern Goshawks, Red-tailed Hawks, Barn Owls, American Crows, and Sharp-shinned and Cooper's Hawks, as well as rat snakes, corn snakes, and even fire ants.

When nature calls, nestling kestrels back up, raise their tails, and squirt feces onto the walls of the nest cavity. The feces thus, stays off the nestlings. But the nest gets to be a smelly place, with feces dried on the cavity walls and uneaten parts of small animals on the floor.

Seventeen subspecies of the American kestrel are recognized, generally based upon plumage, size, and vocalizations:

- *F. s. sparverius*, described by Linnaeus in 1758, is the nominate subspecies. It is found in most of the United States, Canada, and Mexico.
- *F. s. paulus*, described by Howe and King in 1902, is found in the Southeast United States, from Louisiana to Florida.
- *F. s. peninsularis*, described by Mearns in 1892, is found in southern Baja California.
- *F. s. tropicalis*, described by Griscom in 1930, is found from southern Mexico to northern Honduras.
- *F. s. nicaraguensis*, described by Howell in 1965, is found in Honduras and Nicaragua.
- *F. s. sparveroides*, described by Vigors in 1827, is found in Cuba and the Isle of Youth, and southern to central Bahamas.
- *F. s. dominicensis*, described by Gmelin in 1788, is found in Hispaniola.
- *F. s. caribaeorum*, described by Gmelin in 1788, is found in Puerto Rico through the Lesser Antilles to Grenada.
- *F. s. brevipennis*, described by Berlepsch in 1892, is found in the Netherlands Antilles.
- *F. s. isabellinus*, described by Swainson in 1837, is found from Venezuela to northern Brazil.
- *F. s. ochraceus*, described by Cory in 1915, is found in eastern Colombia and northwest Venezuela.
- *F. s. cauae*, described by Chapman in 1915, is found in western Colombia.
- *F. s. aequatorialis*, described by Mearns in 1892, is found in northern Ecuador.
- *F. s. peruvianus*, described by Cory in 1915, is found in southwest Ecuador, Peru, and northern Chile.
- *F. s. fernandensis*, described by Chapman in 1915, is found on the Juan Fernández Islands off Chile.
- *F. s. cinnamominu*, described by Swainson in 1837, is found in Peru, Chile, and Argentina.

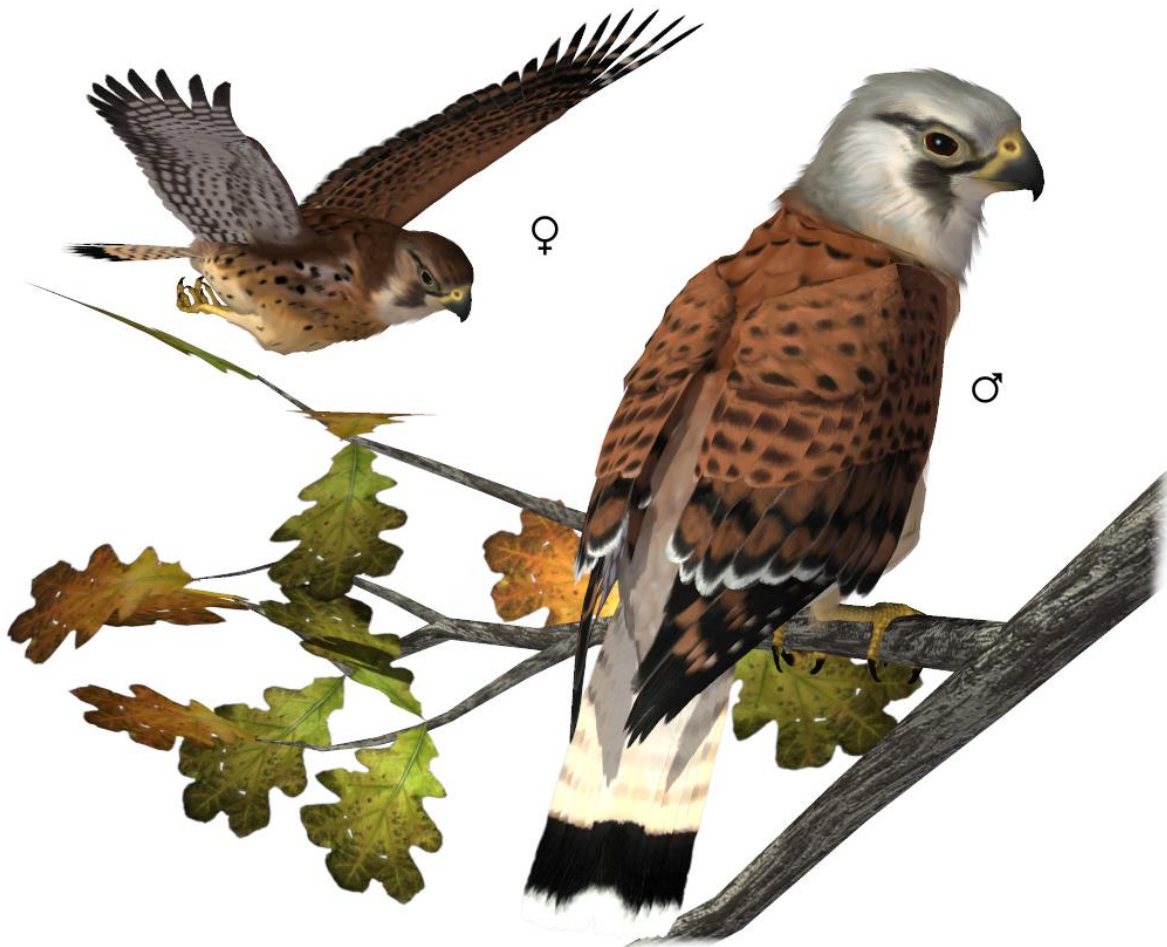
- *F. s. cearae*, described by Cory in 1915, is found from northeast Brazil south to eastern Bolivia.



**Common Name:** Common Kestrel  
**Scientific Name:** *Falco tinnunculus*

**Size:** 13-15 inches (32-39 cm); **Wingspan:** 20.1-24 inches (65-82 cm)

**Habitat:** Europe, Asia and Africa; it is widespread in Europe, Asia, and Africa, as well as occasionally reaching the east coast of North America. It has colonized a few oceanic islands, vagrant individuals are generally rare; in the whole of Micronesia for example, the species was only recorded twice each on Guam and Saipan in the Marianas. In the cool-temperate parts of its range, the common kestrel migrates south in winter; otherwise it is sedentary. However as juveniles mature they may wander around in search of a good place to settle down.



It prefers open habitat such as fields, heaths, shrub-land and marshland. It does not require woodland to be present as long as there are alternative perching and nesting sites like rocks or buildings. It will thrive in treeless steppe where there are abundant herbaceous plants and shrubs to support a population of prey animals.

The common kestrel readily adapts to human settlement, as long as sufficient swathes of vegetation are available, and may even be found in wetlands, moorlands and arid savanna.

**Status:** Least Concern. **Global population:** 5,000,000 adult individuals. In Europe, trends since 1980 show that populations have undergone a moderate decline, based on provisional data for 21 countries from the Pan-European Common Bird Monitoring Scheme. Past population declines had resulted from the heavy use of organochlorine and other pesticides in the 1950s-1960s. In Malta, the species was exterminated by shooting, though it has since returned. The population in much of the rest of Europe has shown a more recent steady decline, thought to be due to agricultural intensification. The species is vulnerable to the effects of potential wind energy development by striking the turbine propellers.

**Diet:** Mouse-sized mammals: typically voles, but also shrews and true mice supply up to three-quarters or more of its diet. On oceanic islands, where mammals are often scarce, small birds may make up the bulk of its diet. When mammals and birds are scarce, it will hunt small reptiles and large insects.

When hunting, it characteristically hovers about 33–66 feet (10–20 m) above the ground, searching for prey, either by flying into the wind or by soaring using ridge lift.

**Nesting:** Females are noticeably larger than males. Their plumage is mainly light chestnut brown with blackish spots on the upper-side and buff with narrow blackish streaks on the underside; the remiges are also blackish. Unlike most raptors, they display sexual color dimorphism with the male having fewer black spots and streaks, as well as a blue-grey cap and tail. The tail is brown with black bars in females, and has a black tip with a narrow white rim in both sexes. All common kestrels have a prominent black malar stripe like their closest relatives.

It starts breeding in spring and is a cavity nester; preferring holes in cliffs, trees or buildings. In general, common kestrels will usually tolerate conspecifics nesting nearby, and sometimes a few dozen pairs may be found nesting in a loose colony.

The clutch is normally 3–6 eggs. The buff colored eggs are abundantly patterned with brown spots to large almost-black blotches. Incubation lasts some 28 to 31 days. Only the female incubates the eggs. The male is responsible for provisioning her with food, and for some time after hatching this remains the same. Later, both parents share brooding and hunting duties until the young fledge, after 28 to 35 days. The family stays close together for a few weeks, up to a month or so, during which time the young learn how to fend for themselves and hunt prey. The young become sexually mature the next breeding season.

**Cool Facts:** It is also known as the European kestrel, Eurasian kestrel, or Old World kestrel. In Britain, where no other kestrel species occurs, it is generally just called "the kestrel".

A number of subspecies of the common kestrel are known, though some are hardly distinct and may be invalid. Most of them differ little, although tropical African forms have less grey in the male plumage.

- *F. t. tinnunculus*, described by Linnaeus in 1758. It is found in temperate areas of Europe, North Africa, the Middle East, and Asia north of the Hindu Kush-Himalaya mountain ranges to the NW Sea of Okhotsk region. Northern Asian populations migrate south in winter, apparently not crossing the Himalayas but diverting to the west.
- *F. t. rupicolus*, described by Daudin in 1800. Known as the “Rock kestrel”. It is found in NW Angola and S Zaire to S Tanzania, and south to South Africa. Probably a distinct species, but its limits with *F. t. rufescens* require further study. It differs markedly from the other subspecies of the *F. tinnunculus* complex. In particular, the females have what in other subspecies are typically male characteristics such as a grey head and tail, and spotted rather than barred upperparts. The rock kestrel has less heavily marked, brighter chestnut upperparts and its underparts are also a bright chestnut that contrasts with the



nearly unmarked white underwings. Females tend to have more black bands in



the central tail feathers than males. The open mountain habitat also differs from that of its relatives.

- *F. t. rufescens*, described by Swainson in 1837. It is found in Sahel east to Ethiopia, southwards around Congo basin to S Tanzania and NE Angola.
- *F. t. interstinctus*, described by McClelland in 1840. Breeds in East Asia from Tibet to Korea and Japan, south into Indochina. Winters to the south of its breeding range, from northeastern India to the Philippines. They are dark, heavily marked birds and have a foxed red phase, which is not reliably identified in the field.
- *F. t. rupicolaeformis*, described by C. L. Brehm in 1855. It is found in the Arabian Peninsula, except for in the desert and across the Red Sea into Africa.
- *F. t. neglectus*, described by Schlegel in 1873. It is found in the Northern Cape Verde Islands.
- *F. t. canariensis*, described by Koenig in 1890. It is found in Madeira and western Canary Islands and is considered the more ancient Canaries subspecies.
- *F. t. dacotiae*, described by Hartert in 1913. It goes by the local name: cernícalo. It is found in the Eastern Canary Islands (Fuerteventura, Lanzarote, Chinijo Archipelago). It is considered a more recently evolved subspecies than *canariensis*.
- *F. t. objurgatus*, described by Baker in 1929. It is found in Western, Nilgiris and Eastern Ghats in India, Sri Lanka. It is heavily marked, has rufous thighs with dark grey head in males.
- *F. t. archerii*, described by Hartert & Neumann in 1932. It is found in Somalia, coastal Kenya, and Socotra.
- *F. t. alexandri*, described by Bourne in 1955. It is found in the Southwestern Cape Verde Islands.

The kestrel is sometimes seen, like other birds of prey, as a symbol of the power and vitality of nature. In "Into Battle" (1915), the war poet Julian Grenfell invokes the superhuman characteristics of the kestrel among several birds, when hoping for prowess in battle:

*The kestrel hovering by day,  
And the little owl that call at night,  
Bid him be swift and keen as they,  
As keen of ear, as swift of sight.*

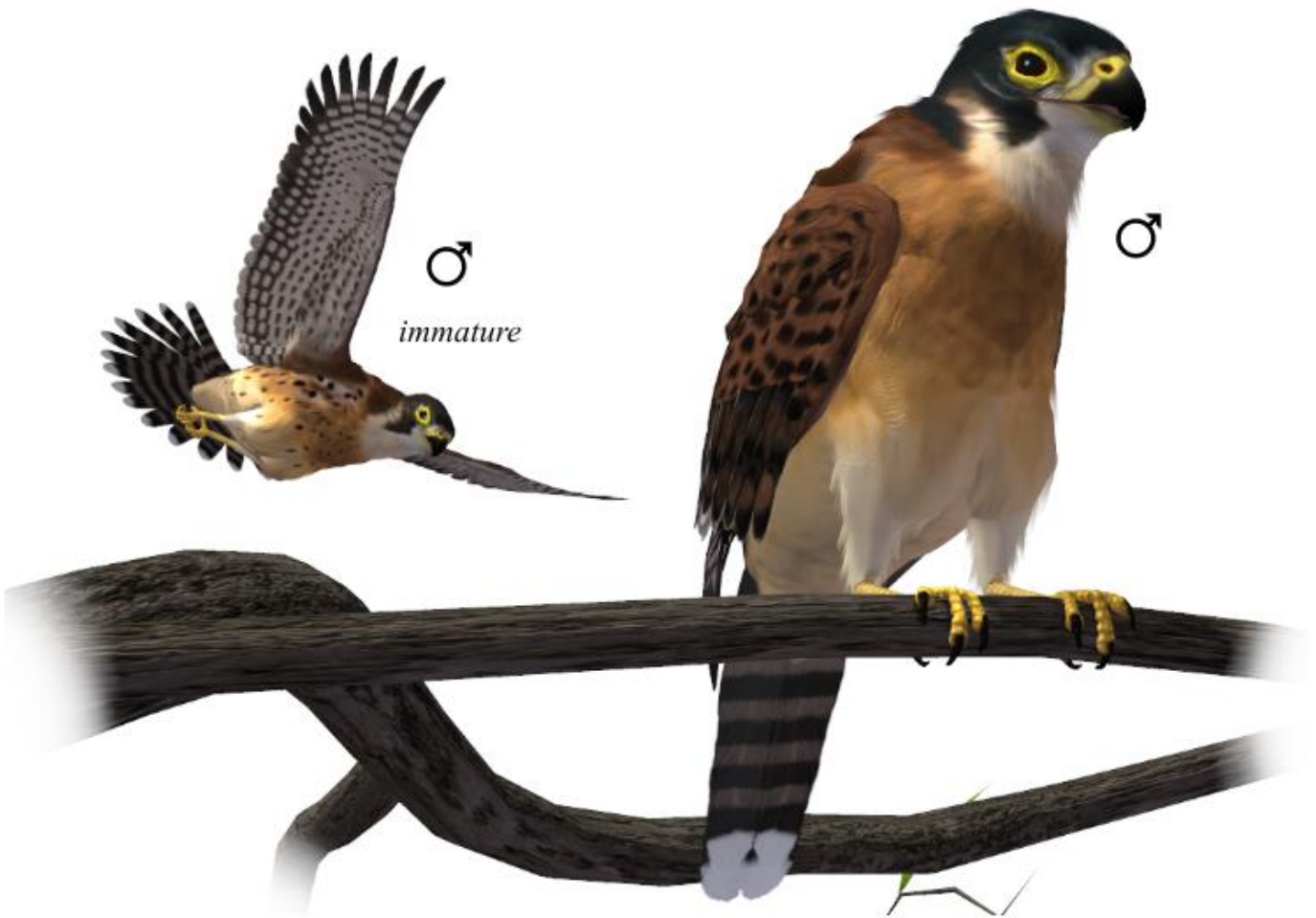
**Common Name:** Seychelles Kestrel

**Scientific Name:** *Falco araea*

**Size:** 7-9 inches (18-23 cm); **Wingspan:** 15.7-17.7 inches (40-45 cm)

**Habitat:** Africa; it is endemic to the Seychelles Islands, where it is the only breeding bird of prey.

It inhabits native, evergreen, upland forests, but is now found in secondary rainforest and coconut plantations on Mahé.



**Status:** Vulnerable. **Global population:** 800+/- individuals. Surveys in 2002, the Mahé population was considered stable. Considerable development and habitat alteration have taken place on Mahé since 2002, suggesting that the population may have decreased. The Praslin population declined from around 20 pairs in the 1980s to just a few pairs in the 1990s, and four pairs in late 2002. Thus, overall the population is judged to have experienced a small decline over the last ten years.

Reduced numbers in the 1960s and 1970s may have been due to pesticide use or to peaks in commercial cinnamon cultivation and logging, which reduced upland forest to its lowest extent at this time. Rats, cats and barn owls have reduced the lizard population on which the kestrels depend and they may take eggs and chicks. Barn owls and common mynas have occupied many suitable nest sites. Housing developments could be a threat, although the species breeds in urban areas. Fires, and possibly housing developments and alien predators, have nearly halved its population on Praslin in 10 years.

**Diet:** Indigenous lizards (primarily geckos; *Phelsuma spp.*), insects, small birds and mice.

When hunting, it rarely hovers as most kestrels do, instead feeding by sitting on an exposed perch and waiting for prey to pass, then swooping down to catch it

**Nesting:** Females are noticeably larger than males. The adult male's upperparts are reddish brown with black spots while the underparts are unspotted and buff. The head and rump are dark blue-grey. The tail is blue-grey with black bars. The bill is dark and the feet and cere are yellow. Females are similar to the males in appearance but are paler. Immature birds have a brown, streaked head, spots on the breast and a buff tip to the tail.

Nesting is predominantly on cliffs above 200 m, and less successful at lower elevations on buildings, in holes in trees and in old Common Myna nests. Lowland nests have a high failure rate of about 70-80% which is believed to be due to predation. Small territories are occupied year-round, but only one brood is reared per year.

Two or three eggs are laid; they are white with brown markings and are incubated for 28–31 days. The young birds fledge after 35–42 days and then remain with their parents for another 14 weeks.

**Cool Facts:** It is the smallest of the kestrels.

While persecution by humans is now rare, in the past, kestrels were killed because they were considered to be an omen of death.

**Common Name:** Mauritius Kestrel  
**Scientific Name:** *Falco punctatus*

**Size:** 7.8-10.2 inches (20-26 cm); **Wingspan:** 15.7 inches (40 cm)

**Habitat:** Africa; it is endemic to the Mauritius Island.

Its primary habitat was native, evergreen, subtropical forests, but captive-bred birds have shown greater tolerance for degraded and open areas. They are no longer considered obligate forest dwellers but also exploit grassland. Avoidance of agricultural areas may be partly due to a lack of isolated mature trees to use as vantage points.



**Status:** Endangered. **Global population:** 400+/- individuals. Deforestation by early colonists initiated declines, with less than 3% of original forest now remaining. More recent declines appear related to organochloride pesticide-use in the 1950s and 1960s in agriculture and to control malaria-carrying mosquitoes. Black rats, crab-eating macaques, small Indian mongooses and feral cats are all introduced predators of eggs, young or adults. Introduced plants, including traveler's palm, Chinese guava, *Ligustrum robustum* and the creeper have invaded much of the species' habitat, particularly in the north of the island. This may reduce the kestrel's hunting efficiency. Birds in suboptimal

habitat in the west have been lost when natural nest sites are absent. In addition, the species suffered an extreme loss of genetic variation and high rates of inbreeding, due to the population bottleneck, which are considered sufficient to affect the long-term viability of the population. Climate change may be affecting the species through the increase in wet days at the start of the breeding season, which has led to the laying date becoming later.

**Diet:** Indigenous lizards (primarily geckos), insects, small birds and mice.

It hunts by means of short, swift flights through forests.

**Nesting:** Females are noticeably larger than males. Small, chestnut-and-white falcon. Rich warm brown to chestnut upperparts, with black crescentic markings on wings and mantle. It has gleaming white underparts with bold, black heart-shaped blotchings. In flight, wings relatively rounded and long, thin tail. Females and juveniles have light blue eyelids and grayish-yellow talons.

It traditionally nests in volcanic rock-cavities, and probably tree-holes, within forest territories, but now even breeds in a few suburban areas.

Two or three eggs are laid; they are white with brown markings and are incubated for 28–31 days. The young birds fledge after 35–42 days and then remain with their parents for another 14 weeks.

**Cool Facts:** The Mauritius Kestrel has undergone a spectacular recovery from just four wild birds (including one breeding pair in 1974 to an estimated 222-286 birds by the end of 1994, thanks to a recovery program launched in 1973. At the end of the 1999-2000 seasons, the population was estimated at the time to number 145-200 breeding pairs in a total population of 500-800 individuals, divided into three sub-populations on mountain chains in the north, east and south-west of Mauritius.

In 2005 the population was estimated at 800-1,000 individuals, but by 2008, dropped to an estimated at 500-600. By 2011-2012, the population was estimated to number c.300-400 individuals, with the small sub-population in the Moka Range in the north of the island apparently extinct. Declines have also been observed in the south-western population, particularly in suboptimal habitat on the periphery of its range, since 2007-2008 with c.40-50 pairs and a pre-breeding season population of c.120-150 birds estimated to be there now. The eastern population has grown and stabilized at c.45-50 pairs and a total of 130-150 birds in the pre-breeding season. The population data from the 1970s to 2010 are being re-analyzed to clarify what the peak population size was and what rate of decline has occurred. There is no record of dispersal to other locations despite intensive monitoring through banding.

Inbreeding does not appear to affect this Kestrel and the reason why lies in its history. It colonized its island home to evolve into a distinct species probably during the Gelasian (Late Pliocene). Mauritius is a volcanic island, and although the colonization of

the island by kestrels cannot be dated with high precision, it was almost certainly some time before volcanic activity died down. The Mauritius kestrel population seems to have survived a prolonged period of volcanic activity, which must have kept the population small and fluctuating as habitat, food, and kestrels were destroyed by volcanic eruptions time and again. As near-panmictic conditions were sustained for many generations, alleles that might cause inbreeding depression were steadily removed by means of natural selection. The phenomenon that effective population sizes as low as 4-5 can be tolerated without pronounced inbreeding depression is also known from other small-island birds, such as *Petroica traversi* or the Laysan duck.

**Common Name:** Merlin or Pigeon Hawk  
**Scientific Name:** *Falco columbarius*

**Size:** 9.4–13.0 inches (24–33 cm); **Wingspan:** 20–29 inches (50–73 cm)

**Habitat:** Northern Hemisphere (North America, Europe and Asia). Most of the Merlin populations are migratory, wintering in warmer regions. Northern European birds move to southern Europe and North Africa, and North American populations to the southern USA to northern South America. In the milder maritime parts of its breeding range, such as Great Britain, the Pacific Northwest and western Iceland, as well as in Central Asia, it will merely desert higher ground and move to coasts and lowland during winter. The



migration to the breeding grounds starts in late February, with most birds passing through the USA, Central Europe and southern Russia in March and April, and the last stragglers arriving in the breeding range towards the end of May. Migration to winter quarters at least in Eurasia peaks in August/September, while e.g. in Ohio, just south of

the breeding range, *F. c. columbarius* is typically recorded as a southbound migrant as late as September/October.

Merlins inhabit fairly open country, such as willow or birch scrub, shrubland, but also taiga forest, parks, grassland such as steppe and prairies, or moorland. They are not very habitat-specific and can be found from sea level to the treeline. In general, they prefer a mix of low and medium-height vegetation with some trees, and avoid dense forests as well as treeless arid regions. During migration however, they will utilize almost any habitat.

**Status:** Least Concern. **Global population:** 3,000,000 individuals. The overall trend is stable and appears to have increased between 1966 and 2010, according to the North American Breeding Bird Survey. This increase reflects their recovery from widespread declines in the 1960s due to pesticide contamination. Partners in Flight estimates the global breeding population at 3 million, with 44 percent spending some part of the year in Canada, 23 percent in the U.S., and 14 percent wintering in Mexico.

Starting in the late twentieth century, breeding Merlins have been colonizing an increasing number of cities and towns, where they take advantage of abundant House Sparrow population for food and old crow nests for breeding sites. They expanded into New York and northern New England starting in 1995 and now breed across Vermont, New Hampshire, and Maine. Their winter range spread into the northern Great Plains between 1960 and 1990. Their ability to colonize urban areas may be counteracting a decline from habitat loss in other parts of their breeding and wintering ranges.

**Diet:** Small to medium-sized birds in the 1–2 ounce range. Common prey include Horned Lark, House Sparrow, Bohemian Waxwing, Dickcissel, Least Sandpiper, Dunlin, and other shorebirds. Other prey can include large insects such as dragonflies, bats caught at cave openings, nestling birds, and small mammals. Merlins typically catch them in midair during high-speed attacks. They don't stoop on birds the way Peregrine Falcons do; instead they attack at high speed, horizontally or even from below, chasing the prey upwards until they tire.

**Nesting:** Females are noticeably larger than males. The male merlin has a blue-grey back, ranging from almost black to silver-grey in different subspecies. Its underparts are buff- to orange-tinted and more or less heavily streaked with black to reddish brown. The female and immature are brownish-grey to dark brown above, and whitish buff spotted with brown below. Besides a weak whitish supercilium and the faint dark malar stripe—which are barely recognizable in both the palest and the darkest birds—the face of the merlin is less strongly patterned than in most other falcons. Nestlings are covered in pale buff down feathers, shading to whitish on the belly.

Breeding occurs typically in May/June. Though the pairs are monogamous at least for a breeding season, extra-pair copulations have been recorded. Most nest sites have dense vegetative or rocky cover; the merlin does not build a proper nest of its own. Most will use abandoned crow, magpie or hawk nests which are in conifer or mixed tree



stands. In United Kingdom moorland, the female will usually make a shallow scrape in dense heather to use as a nest. Others nest in crevices on cliff-faces and on the ground, and some may even use buildings.

Three to six rusty brown eggs are laid. The incubation period is 28 to 32 days. Incubation is performed by the female to about 90%; the male instead hunts to feed the family. The young fledge after another 30 days or so, and are dependent on their parents for up to 4 more weeks. Sometimes first-year merlins (especially males) will serve as a "nest helper" for an adult pair. More than half—often all or almost all—eggs of a clutch survive to hatching, and at least two-thirds of the hatched young fledge. However, as noted above, in years with little supplementary food only one young in 3 may survive to fledging.

**Cool Facts:** Sexual dimorphism (such as females being larger than males) is common among raptors; it allows males and females to hunt different prey animals and decreases the territory size needed to feed a mated pair.

The name "Merlin" comes from *esmerillon*, the old French name for the species. Merlins used to be called "pigeon hawks" because in flight they look somewhat pigeon-like. Their species name, *columbarius*, is also a reference to pigeons.

Merlin pairs have been seen teaming up to hunt large flocks of waxwings: one Merlin flushes the flock by attacking from below; the other comes in moments later to take advantage of the confusion.



Merlins were popular with noblewomen from Catherine the Great to Mary Queen of Scots. They were used for sport to hunt skylarks. European and North American

falconers continue to work with Merlins, hunting quarry that ranges from sparrow-sized to dove-sized.

SpaceX named its Merlin rocket engine after the merlin.

There are numerous subspecies of Merlins:

### American

- *F. c. columbarius*, described by Linnaeus in 1758. Called the Taiga or Tundra merlin. Found in Canada and northernmost USA east of Rocky Mountains, except Great Plains. Migratory, winters in Southern North America, Central America, the Caribbean, and Northern South America from the Guyanas to the northern Andes foothills. Rarely winters in the northern USA
- *F. c. richardsoni*, described by Ridgway in 1871. Called the Prairie merlin. Found in the Great Plains from Alberta to Wyoming. It is a resident with some winter dispersal.
- *F. c. suckleyi*, described by Ridgway in 1873. Called the Coastal forest merlin or Black merlin. Found on the Pacific coast of North America, from Southern Alaska to Northern Washington state. It is a resident with some altitudinal movements.

### Eurasian

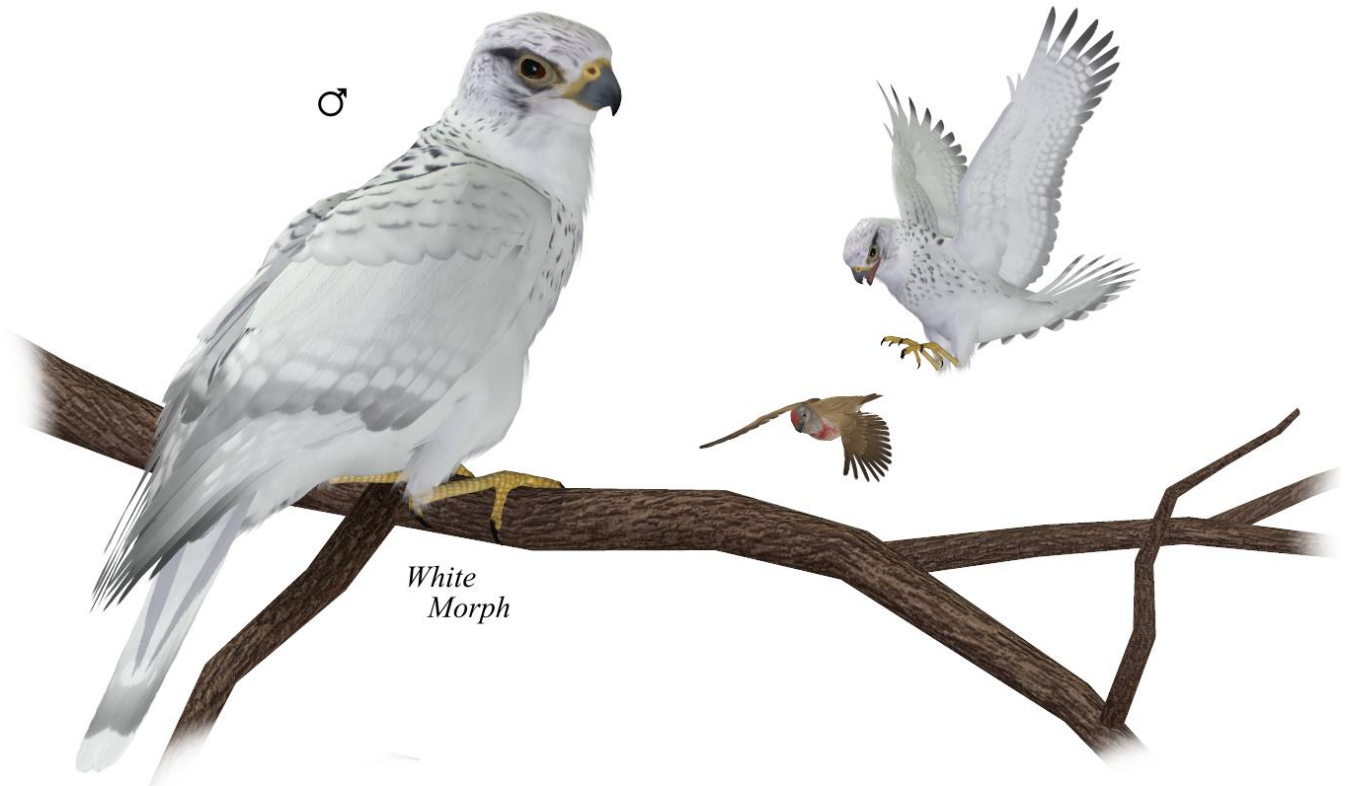
- *F. c. aesalon*, described by Tunstall in 1771. Found in Northern Eurasia from the British Isles through Scandinavia to central Siberia. The population of northern Britain shows evidence of gene flow from *F. c. subaeson*. The British Isles population is resident with the rest being migratory, wintering in Europe and the Mediterranean region to Iran.
- *F. c. subaeson*, described by C.L. Brehm in 1827. Called "smyril" (Faroese) or "smyrill" (Icelandic). Found in Iceland and Faroe Islands. The latter population has some gene flow with *F. c. aesalon*. It is a resident with some winter dispersal.
- *F. c. pallidus*, described by Sushkin in 1900. Found on the Asian steppes between Aral Sea and Altay Mountains. It is migratory, wintering in Southern Central Asia and Northern South Asia.
- *F. c. insignis*, described by Clark in 1907. Found in Siberia between Yenisei and Kolyma Rivers. It is migratory, wintering in continental East Asia.
- *F. c. lymani*, described by Bangs in 1913. Found in the mountains of eastern Kazakhstan and surrounding countries. It is a short-distance migrant.
- *F. c. pacificus*, described by Stegmann in 1929. Found in the Russian Far East to Sakhalin. It is migratory, wintering in Japan, Korea and nearby.

**Common Name:** Gyrfalcon  
**Scientific Name:** *Falco rusticolus*

**Size:** 20-25 inches (50-63 cm); **Wingspan:** 48-52 inches (120-130 cm)

**Habitat:** Northern Hemisphere (North America, Europe and Asia). The gyrfalcon is dispersed throughout much of the Northern Hemisphere, with populations in Northern America, Greenland, and Northern Europe. The gyrfalcon breeds on Arctic coasts and the islands of North America, Europe, and Asia. It is mainly a resident there also, but some gyrfalcons disperse more widely after the breeding season, or in winter. Individual vagrancy can take birds for long distances.

It is found in the tundra, often near rivers or coasts. During winters, it is found at lower latitudes, open country and especially near water.



**Status:** Least Concern. **Global population:** 110,000 individuals. While there is no evidence of long-term population changes in North America, commercial markets in falconry may pose a threat in Scandinavia and Russia. Falcons are known to be very susceptible to avian influenza.

**Diet:** Large birds including ptarmigan and waterfowl. They also eat rabbits, voles, small birds, and other mammals. They locate prey while perched or in flight and then pursue their prey in flight until overtaking them. The female Gyrfalcon regularly stores prey

during the breeding season, generally within 100 meters (328 feet) of the nest. Little is known of food-caching outside the breeding season; in one case, a Gyrfalcon was seen retrieving a frozen ptarmigan and chipping off pieces of meat to eat, in mid-winter in the Aleutian Islands.

**Nesting:** Females are noticeably larger with males being only about 65% the size of females. The plumage of the Gyrfalcon can take three main forms, white, gray, and dark, with many intermediate plumages. White adults have almost pure white breasts and bellies. The rest of their bodies are white mottled with brown. They have dark wingtips. Gray adults have gray upperparts with subtle darker mottling, and white underparts mottled with gray. Dark adults are dark-brownish overall above and brown streaked with white below.

Monogamous pairs nest on the ground or on cliff ledges, sometimes in old nests of other birds. They do not build a nest of their own. Both adults incubate the 3-4 eggs for about 35 days, although the female incubates more than the male. The female broods the young for the first few weeks after hatching, while the male brings food. After the brooding period is over, the female also hunts. The young begin to fly at 45-50 days and become independent shortly thereafter.

**Cool Facts:** The Gyrfalcon is the largest true falcon in the world. Gyrfalcon is pronounced as "JER-falcon." The name probably evolved from Old Norse, but linguists do not completely agree on the specific origin of the word.

Gyrfalcons have been highly regarded by falconers throughout falconry's history. The male gyrfalcon is called a "gyrkin" in falconry. In Viking culture, the gyrfalcon was a highly valued hunting bird and during the Middle Ages in many countries, only a king could hunt with a Gyrfalcon. The white falcon in the crest of the Icelandic Republic's coat of arms is a variety of Gyrfalcon.

There is some correlation between locality and color morph. Greenland gyrfalcons are lightest, with white plumage flecked with grey on the back and wings being most common. Other subpopulations have varying amounts of the darker morphs: the Icelandic birds tend towards pale, whereas the Eurasian populations are considerably darker and typically incorporate no white birds. Natural separation into regional subspecies is prevented by gyrfalcons' habit of flying long distances whilst exchanging alleles between subpopulations; thus, the allele distributions for the color polymorphism form clines and in darker birds of unknown origin, theoretically any allele combination might be present.

Male performs spectacular aerial displays with dives and 180° rolls. Uses four methods to pursue prey: 1) flying low and surprising prey on ground; 2) pursuing prey over long distances, forcing it low or high and exhausting it; 3) hovering and making short stoops to force prey out of cover; 4) flying straight up to strike at birds overhead. Strikes prey or drives it to the ground, rather than grasping it in the air. Dead prey typically have broken breast bone.

**Common Name:** Northern or Eurasian Hobby  
**Scientific Name:** *Falco subbuteo*

**Size:** 11.4-14.1 inches (29-36 cm); **Wingspan:** 29.1-33 inches (74-84 cm)

**Habitat:** Europe, Asia and Africa; most individuals of the species are migratory, with western birds wintering in Africa and others in southern Asia. Birds leave their breeding grounds between August and October, arriving at wintering quarters from late October onwards. The return journey begins in March and April, and breeding territories are occupied again in May and June. Birds are usually seen singly or in pairs or family groups, even on migration, with larger groups being rare except at roosts and especially rich feeding sites. It migrates in broad fronts and does not generally concentrate at narrow sea crossings as do many other migratory raptors. It is mainly diurnal although partly crepuscular and even nocturnal to some extent on migration.

It is found in the open country such as farmland, marshes, taiga and savannah. They are widespread in lowlands with scattered small woods.



**Status:** Least Concern. **Global population:** >400,000 individuals. The population trend is declining due to habitat loss. The cutting of old growth forest patches in Ukraine is thought to have caused local declines. Some are shot, notably in Malta where hunters

are thought to kill 500-1,000 individuals each year. A growing threat is human disturbance, which facilitates nest predation by crows and squirrels. Pesticide use has likely had only minor impacts, as has egg-collecting, which tends to be a local issue. The species is highly vulnerable to the effects of potential wind energy development.

**Diet:** Large insects (such as dragonflies), small birds, bats and small mammals.

**Nesting:** Females are noticeably larger than males. Adults are slate-grey above with a dark crown and 2 short black moustachial stripes. The throat is unstreaked white, thighs and under tail coverts are unstreaked rufous and rest of the underparts are whitish with black streaks. Close views enable the red "trousers" and vent to be seen. Sexes are similar. Juveniles are generally much browner, with scaled upper parts and streaked buffy thighs and under tail coverts. The hobby has a distinct first-summer plumage.

Hobbys nest in old nests of crows and other birds. The tree selected is most often one in a hedge or on the extreme edge of woods or small forest, whence the bird can observe intruders from a considerable distance. It lays 2–4 eggs. Incubation is said to take 28 days and both parents share in this duty, though the female does the greater part.

**Cool Facts:** Hobbys eat on the run, transferring large insects from talons to beak and eating while soaring slowly in circles.

Hobbys are used in falconry, trained to hawk birds like quails, larks, hoopoes and drongos.

There are two subspecies recognized:

- *F. s. subbuteo*, described by Linnaeus in 1758. This is the nominate race, resident in Africa, Europe and Central and East Asia, and wintering in Central and South Africa and South Asia.
- *F. s. streichi*, described by Hartert and Neumann in 1907. It is smaller in size and is found further east of *F. s. subbuteo*'s distribution range.

**Common Name:** Australian Hobby  
**Scientific Name:** *Falco longipennis*

**Size:** 11.8-14 inches (30-35.5 cm); **Wingspan:** 29.1-33 inches (74-84 cm)

**Habitat:** Oceania; Australia. It is found throughout mainland Australia, including off shore islands (such as Lord Howe Island), however their range is restricted in Tasmania. Migrating individuals have also been recorded on the islands of Indonesia and New Guinea.

They are most commonly seen in open habitats, including open woodland, water courses and vegetated urban areas, but are rarely recorded around cliffs or escarpments.



**Status:** Least Concern. **Global population:** Unknown number of adult individuals. The population is increasing in Tasmania, possibly owing to drought encouraging more migrant prey species to over winter in Tasmania. The species has adapted to

urbanization throughout much of its range. Since dichlorodiphenyltrichloroethane (DDT) was introduced to agriculture in 1946, egg shell thickness of some species of falcon including the Australian hobby, was significantly reduced. This led to some decline in local populations through egg breakage during incubation but did not eventuate in widespread population declines for the Australian hobby.

**Diet:** Large insects (such as dragonflies), small birds, bats and small mammals. Research suggests they tend to avoid large, dangerous, or agile species that forage close to cover, such as the common myna.

**Nesting:** Females are noticeably larger than males. The plumage varies in color depending on sex, age and environment with a darker form in humid areas and a lighter form in drier environments. In general, it has a black cap and mask with a whitish forehead and half-collar. Under parts can be blue-gray or rufous and streaked darker. The cere on adults is a pale yellowish-gray with the eye ring being a pale blue color. The feet are dull yellow.

Nesting usually occurs any time between August to January when old stick nests of other large birds are taken over. Three to four heavily blotched eggs are laid with incubation taking about 35 days. Successful broods usually comprise two to three young. The fledglings remain dependent for up to three months after which the young disperse or migrate widely. Research has shown that brooding is shared by both male and female hobbies however feeding of the nestlings after hatching becomes the responsibility of the female. Early on in the nestling period the male hunting rate increases to supplement the female with observations indicating food is brought to the nest every three hours, with a longer break in the middle of the day.

**Cool Facts:** The hobby is a widespread and common hunter that often hunts at dusk, diurnally and sometimes nocturnally by artificial light. Hobbies have been witnessed catching their prey in mid-air, by direct attack from a perch or in fast contour-flying above or between tree canopies. It is acrobatic in the pursuit of prey and attacks fleeing birds in a series of short shallow stoops.

Three subspecies of Australian Hobby:

- *F. l. longipennis*, described by Swainson in 1838.
- *F. l. hanieli*, described by Hellmayr in 1914. It is slightly smaller and paler below than *F. l. longipennis*
- *F. l. murchisonianus*, described by Mathews in 1912. It is paler blue-gray above with a dull blackish head, and paler reddish-brown below with less distinct markings.

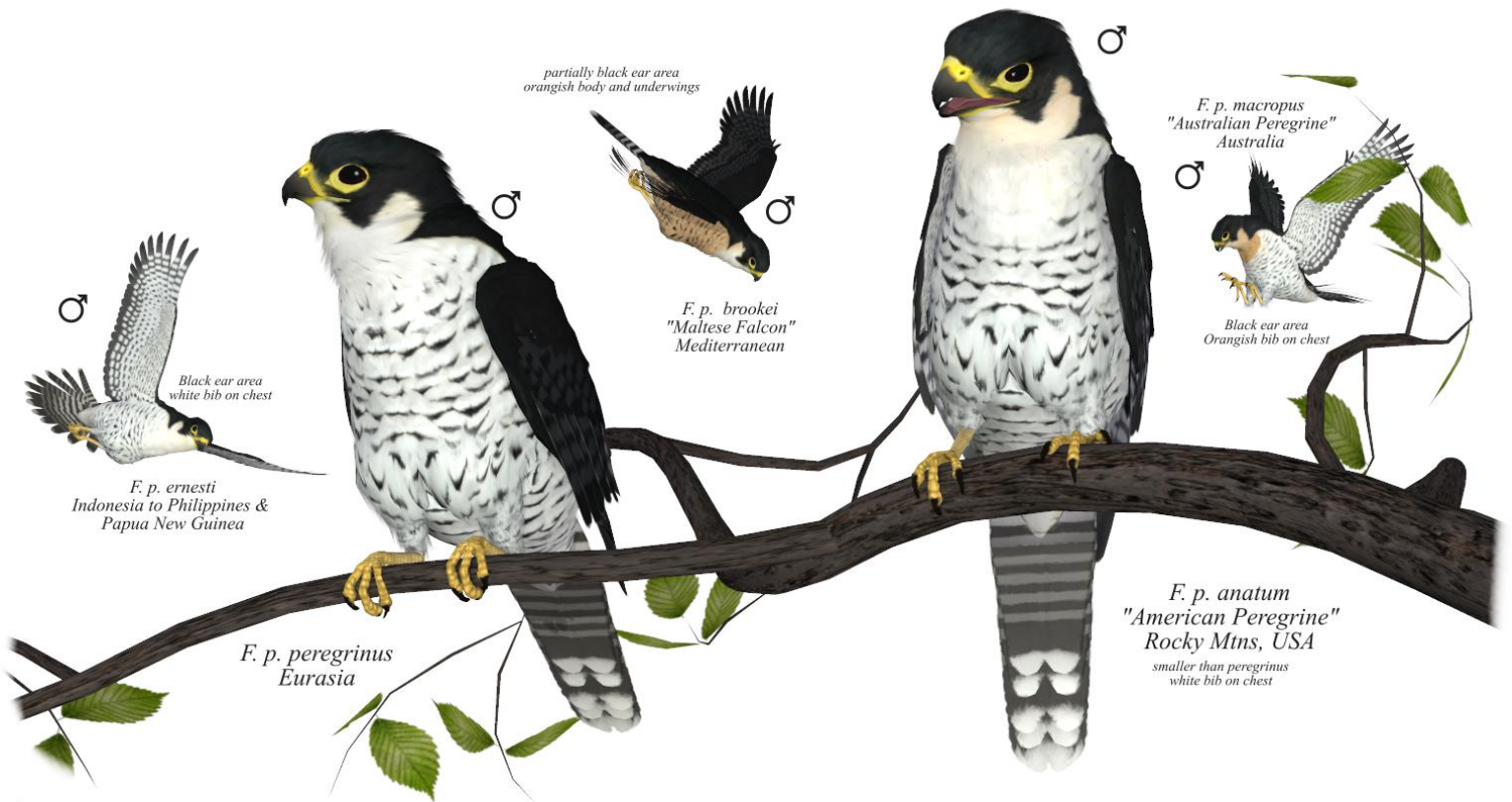


**Common Name:** Peregrine Falcon  
**Scientific Name:** *Falco peregrinus*

**Size:** 14.2-19.3 inches (36-49 cm); **Wingspan:** 39.4-43.3 inches (100-110 cm)

**Habitat:** Worldwide; Peregrines are highly migratory in the temperate and Arctic parts of its range, moving from North America to South America, Europe to Africa, and northern Asia to southern Asia and Indonesia. Those breeding at lower latitudes or in the Southern Hemisphere tend to be resident. Migrating birds leave their breeding sites between August and November, and return between March and May. Migrants readily fly over expanses of sea and ocean. Most birds travel singly or in pairs, even on migration.

It inhabits an extreme variety of habitats, tolerating wet and dry, hot and cool climates, from sea level up to 4,000 m (13,000 ft).



**Status:** Least Concern. **Global population:** 1,200,000 individuals. The overall trend is likely to be stable. This species has undergone a large and statistically significant increase over the last 40 years in North America, in part due to the banning of dichlorodiphenyltrichloroethane (DDT). Historically, the species was affected by shooting in the U.K., notably during the Second World War. Persecution throughout its range was the major threat in the 19th and early 20th centuries (Snow and Perrins 1998). Severe population declines in the 1960s-1970s were driven by eggshell

breakage and mortality of adults and embryos from the hydrocarbon contamination associated with pesticides of that time. The species is used extensively in falconry, although the population-level impacts of this are uncertain. It is highly vulnerable to the effects of potential wind energy development.

**Diet:** Mostly birds, of an enormous variety—450 North American species have been documented as prey, and the number worldwide may be as many as 2,000 species. They have been observed killing birds as large as a Sandhill Crane, as small as a hummingbird, and as elusive as a White-throated Swift. Typical prey include shorebirds, ptarmigan, ducks, grebes, gulls, storm-petrels, pigeons, and songbirds including jays, thrushes, longspurs, buntings, larks, waxwings, and starlings. Peregrine Falcons also eat substantial numbers of bats. They occasionally steal prey, including fish and rodents, from other raptors.

The Peregrine Falcon is a very fast flier, averaging 40-55 km/h (25-34 mph) in traveling flight, and reaching speeds up to 112 km/h (69 mph) in direct pursuit of prey. During its spectacular hunting stoop from heights of over 1 km (0.62 mi), the peregrine may reach speeds of 320 km/h (200 mph) as it drops toward its prey.

**Nesting:** Females are noticeably larger than males. The back and the long pointed wings of the adult are usually bluish black to slate grey with indistinct darker barring depending on subspecies type. The wingtips are black. The white to rusty underparts are barred with thin clean bands of dark brown or black. The tail, colored like the back but with thin clean bars, is long, narrow, and rounded at the end with a black tip and a white band at the very end. The top of the head and a "moustache" along the cheeks are black, contrasting sharply with the pale sides of the neck and white throat. The cere is yellow, as are the feet, and the beak and claws are black. The upper beak is notched near the tip, an adaptation which enables falcons to kill prey by severing the spinal column at the neck. The immature bird is much browner with streaked, rather than barred, underparts, and has a pale bluish cere and orbital ring.

Peregrine Falcons nest on cliffs from about 25–1,300 feet high (and higher, including on the rim of the Grand Canyon). On these cliffs they choose a ledge that is typically around a third of the way down the cliff face. Other sites include electricity transmission towers, quarries, silos, skyscrapers, churches, and bridges. In places without cliffs, Peregrines may use abandoned Common Raven, Bald Eagle, Osprey, Red-tailed Hawk, or cormorant nests. In the Pacific Northwest, they may nest among or under Sitka spruce tree roots on steep slopes. Males typically select a few possible nest ledges at the beginning of each season and the female chooses from these. The birds do no nest building beyond a ritualized scraping of the nest ledge to create a depression in the sand, gravel or other substrate of the nest site. Scrapes are about 9 inches in diameter and 2 inches deep.

**Cool Facts:** The name "peregrine" means wanderer, and the Peregrine Falcon has one of the longest migrations of any North American bird. Tundra-nesting falcons winter in South America, and may move 25,000 km (15,500 mi) in a year. Historically, the Peregrine Falcon was called the "Duck Hawk".

There are 19 subspecies of Peregrine:

- *F. p. anatum*, described by Bonaparte in 1838. This is known as the American peregrine falcon, or "Duck Hawk"; its scientific name means "duck peregrine falcon". At one time, it was partly included in *F. p. leucogenys*. It is mainly found in the Rocky Mountains today. It was formerly common throughout North America between the tundra and northern Mexico, where current reintroduction efforts seek to restore the population. Most mature *F. p. anatum*, except those that breed in more northern areas, winter in their breeding range. Most vagrants that reach Western Europe seem to belong to the more northern and strongly migratory *F. p. tundrius*, only considered distinct since 1968. It is similar to *F. p. peregrinus* but is slightly smaller; adults are somewhat paler and less patterned below, but juveniles are darker and more patterned below. Males weigh 500 to 700 grams (1.1–1.5 lb), while female weigh 800 to 1,100 grams (1.8–2.4 lb). It has become extinct in eastern North America, and populations there are hybrids as a result of reintroductions of birds from elsewhere.
- *F. p. babylonicus*, described by P.L. Sclater in 1861. It is found in eastern Iran along the Hindu Kush and Tian Shan to Mongolian Altai ranges. A few birds winter in northern and northwestern India, mainly in dry semi-desert habitats. It is paler than *F. p. pelegrinoides*, and somewhat similar to a small, pale lanner falcon (*Falco biarmicus*). Males weigh 330 to 400 grams (12 to 14 oz), while females weigh 513 to 765 grams (18.1 to 27.0 oz).
- *F. p. brookei*, described by Sharpe in 1873. It is also known as the Mediterranean peregrine falcon or the Maltese falcon. It includes caucasicus and most specimens of the proposed race punicus, though others may be pelegrinoides, barbary falcons, or perhaps the rare hybrids between these two which might occur around Algeria. They occur from the Iberian Peninsula around the Mediterranean, except in arid regions, to the Caucasus. They are non-migratory. It is smaller than the nominate subspecies, and the underside usually has rusty hue. Males weigh around 445 grams (0.981 lb), while females weigh up to 920 grams (2.03 lb).
- *F. p. calidus*, described by John Latham in 1790. It was formerly called *leucogenys* and includes *caeruleiceps*. It breeds in the Arctic tundra of Eurasia, from Murmansk Oblast to roughly Yana and Indigirka Rivers, Siberia. It is completely migratory, and travels south in winter as far as South Asia and sub-Saharan Africa. It is often seen around wetland habitats. It is paler than *F. p. peregrinus*, especially on the crown. Males weigh 588 to 740 grams (1.296–1.631 lb), while females weigh 925 to 1,333 grams (2.039–2.939 lb).
- *F. p. cassini*, described by Sharpe in 1873. It is also known as the Austral peregrine falcon. It includes *kreyenborgi*, the pallid falcon, a leucistic morph occurring in southernmost South America, which was long believed to be a

distinct species. Its range includes South America from Ecuador through Bolivia, northern Argentina, and Chile to Tierra del Fuego and the Falkland Islands. It is non-migratory. It is similar to nominate, but slightly smaller with a black ear region. The variation *kreyenborgi* is medium grey above, has little barring below, and has a head pattern like the saker falcon, but the ear region is white.

- *F. p. ernesti*, described by Sharpe in 1894. It is found from Indonesia to Philippines and south to Papua New Guinea and the nearby Bismarck Archipelago. Its geographical separation from *nesiotes* requires confirmation. It is non-migratory. It differs from the nominate subspecies in the very dark, dense barring on its underside and its black ear coverts.
- *F. p. furuitii*, described by Momiyama in 1927. It is found on the Izu and Ogasawara Islands south of Honshū, Japan. It is non-migratory. It is very rare, and may only remain on a single island. It is a dark form, resembling *pealei* in color, but darker, especially on tail.
- *F. p. japonensis*, described by Gmelin in 1788. It includes *kleinschmidti*, *pleskei*, and *harterti*, and seems to refer to intergrades with *calidus*. It is found from northeast Siberia to Kamchatka (though it is possibly replaced by *pealei* on the coast there) and Japan. Northern populations are migratory, while those of Japan are resident. It is similar to *peregrinus*, but the young are even darker than those of *anatum*.
- *F. p. macropus*, described by Swainson in 1837. It is the Australian peregrine falcon. It is found in Australia in all regions except the southwest. It is non-migratory. It is similar to *brookei* in appearance, but is slightly smaller and the ear region is entirely black. The feet are proportionally large.
- *F. p. madens*, described by Ripley and Watson in 1963. It is unusual in having some sexual dichromatism. It is found in the Cape Verde Islands, and is non-migratory. It is endangered with only six to eight pairs surviving. Males have a rufous wash on crown, nape, ears, and back; underside conspicuously washed pinkish-brown. Females are tinged rich brown overall, especially on the crown and nape.
- *F. p. minor*, described by Bonaparte in 1850. It was formerly often *perconfusus*. It is sparsely and patchily distributed throughout much of sub-Saharan Africa and widespread in Southern Africa. It apparently reaches north along the Atlantic coast as far as Morocco. It is non-migratory and dark colored. This is the smallest subspecies of peregrine, with smaller males weighing as little as approximately 300 g.
- *F. p. nesiotes*, described by Mayr in 1941. It is found in Fiji and probably also Vanuatu and New Caledonia. It is non-migratory.
- *F. p. pealei*, described by Ridgway in 1873. It is also known as Peale's falcon, and includes *rudolfi*. It is found in the Pacific Northwest of North America, northwards from the Puget Sound along the British Columbia coast (including the Queen Charlotte Islands), along the Gulf of Alaska and the Aleutian Islands to the far eastern Bering Sea coast of Russia, and may also occur on the Kuril Islands and the coasts of Kamchatka. It is non-migratory. It is the largest subspecies, and it looks like an oversized and darker *tundrius* or like a strongly barred and large *anatum*. The bill is very wide. Juveniles occasionally have pale

crowns. Males weigh 700 to 1,000 grams (1.5–2.2 lb), while females weigh 1,000 to 1,500 grams (2.2–3.3 lb).

- *F. p. pelegrinoides*, first described by Temminck in 1829. It is found in the Canary Islands through north Africa and the Near East to Mesopotamia. It is most similar to *brookei*, but is markedly paler above, with a rusty neck, and is a light buff with reduced barring below. It is smaller than the nominate subspecies; females weigh around 610 grams (1.34 lb).
- *F. p. peregrinator*, described by Sundevall in 1837. It is known as the Indian peregrine falcon, black shaheen, Indian shaheen or shaheen falcon. It was formerly sometimes known as *Falco atriceps* or *Falco shaheen*. Its range includes South Asia from Pakistan across India and Bangladesh to Sri Lanka and Southeastern China. In India, the shaheen is reported from all states except Uttar Pradesh, mainly from rocky and hilly regions. The Shaheen is also reported from the Andaman and Nicobar Islands in the Bay of Bengal. It has a clutch size of 3 to 4 eggs, with the chicks fledging time of 48 days with an average nesting success of 1.32 chicks per nest. In India, apart from nesting on cliffs, it has also been recorded as nesting on man-made structures such as buildings and cellphone transmission towers. A population estimate of 40 breeding pairs in Sri Lanka was made in 1996. It is non-migratory, and is small and dark, with rufous under parts. In Sri Lanka this species is found to favor the higher hills while the migrant *calidus* is more often seen along the coast.
- *F. p. peregrinus*, described by Tunstall in 1771. This is the nominate species and breeds over much of temperate Eurasia between the tundra in the north and the Pyrenees, Mediterranean region and Alpine belt in the south. It is mainly non-migratory in Europe, but migratory in Scandinavia and Asia. Males weigh 580 to 750 grams (1.28–1.65 lb), while females weigh 925 to 1,300 grams (2.039–2.866 lb). It includes *brevirostris*, *germanicus*, *rhenanus*, and *riphaeus*.
- *F. p. radama*, described by Hartlaub in 1861. It is found in Madagascar and Comoros. It is non-migratory.
- *F. p. submelanogenys*, described by Mathews in 1912. It is the Southwest Australian peregrine falcon. It is found in southwest Australia and is non-migratory.
- *F. p. tundrius*, described by C.M. White in 1968. It was at one time included in *leucogenys*. It is found in the Arctic tundra of North America to Greenland, and migrates to wintering grounds in Central and South America. Most vagrants that reach western Europe belong to this subspecies, which was previously united with *anatum*. It is the New World equivalent to *calidus*. It is smaller than *anatum* and paler; most have a conspicuous white forehead and white in ear region, but the crown and "moustache" are very dark (unlike in *calidus*). Juveniles are browner, and less grey, than in *calidus*, and paler, sometimes almost sandy, than in *anatum*. Males weigh 500 to 700 grams (1.1–1.5 lb), while females weigh 800 to 1,100 grams (1.8–2.4 lb).

**Common Name:** Aplomado Falcon  
**Scientific Name:** *Falco femoralis*

**Size:** 12-16 inches (30-40cm); **Wingspan:** 36 inches (90 cm)

**Habitat:** The Americas; the species' largest contiguous range is in South America, but not in the deep interior Amazon Basin. It ranges from northern Mexico and Trinidad locally to southern South America, but has been extirpated from many places in its range, including all of northern and central Mexico except for a small area of Chihuahua. Until the 1950s it was found in the extreme southwestern United States, and reintroduction efforts are under way in Western and Southern Texas. It began to reoccupy its former range in West Texas and southern New Mexico in the 1990s.

The habitat is dry grasslands, savannahs, and marshes.



**Status:** Least Concern to Endangered. **Global population:** Unknown amount of adult individuals. While the population trend is increasing in the United States following reintroductions, the overall global declines outweigh the increases and are likely owing to habitat loss and degradation elsewhere across its large range. The Aplomado Falcon

was placed on the Endangered Species List in 1986 and is the last falcon in the United States currently on this list.

**Diet:** Large invertebrates, small vertebrates and small birds. Aplomado Falcons will hunt together as pairs or in family groups, working together to pursue or flush out their prey.

**Nesting:** Females are noticeably larger than males. In adult birds, the upperparts are dark blue-grey, as is much of the head, with the usual falcon "moustache" contrasting sharply with the white throat and eye stripe. The upper breast continues the white of the throat; there are black patches on each side of the lower breast that meet in the middle; the belly and thighs, below the black patches, are light cinnamon. The tail is black with narrow white or grey bars and a white tip. The cere, eye-ring, and feet are yellow or yellow-orange. Juvenile birds are very similar to adults, but their upperparts and belly band are blackish brown, the chest is streaked with black, the white on the head and breast is buffy, and the cinnamon on the under parts is paler, as are the feet.

Like most falcons, they do not build their own nests. They use abandoned nests built by other birds such as ravens, jays, and kites. They can be found nesting at the tops of power poles and in trees, yuccas, and low bushes or even on the ground. They normally lay one to three eggs. Both the male and the female will incubate, or sit on, the eggs, though the female does most of it. The male is in charge of finding food for himself and his mate. After about five weeks, young chicks will hatch from these eggs.

There is a 40-day period from hatching to fledging. Chicks weigh about an ounce when they emerge from their shells, yet they will be full-grown when they leave the nest. By the time they fledge, they will be 12 inches tall and have a wingspan of up to 3 feet.

The young falcons tend to stay in their parents' territory for one to two months. It is a relatively easy time for them, with their parents bringing them food and defending them against predators, but they still face many risks. As they learn to hunt, they sometimes accidentally crash into fences or are hit by cars. If they spend too much time on the ground, they are vulnerable to predators, such as bobcats and coyotes. Even up in a tree, they might fall prey to snakes. When flying, they are vulnerable to capture by Red-tailed Hawks, Great Horned Owls, and other birds of prey. If a young falcon can survive the first year of its life, chances are good that it will be able to survive into adulthood and raise young of its own.

**Cool Facts:** The Aplomado falcon will chase after game such as small birds and quail, by pursuit flight, which is flying after quarry flushed out. It is mainly acquired from breeders because of its scarcity in the United States, and many falconers in Europe will buy a pair for about £4000. It's admired for its accipiter-like hunting style, which has made the bird famous for being more like an accipiter than a falcon.

The Peregrine Fund is actively involved in the [Aplomado falcon reintroduction](#) into the United States.

**Common Name:** Bat Falcon  
**Scientific Name:** *Falco ruficularis*

**Size:** 9-12 inches (23-30.5 cm); **Wingspan:** 17.7-24 inches (45-61 cm)

**Habitat:** The Americas; It occurs from Mexico south to northwestern Peru and, east of the Andes, northern Argentina.

The Bat Falcon is a widespread small falcon of forest and clearings in the Neotropics. They perch conspicuously on high open snags, from which they launch aerial attacks on their prey.

**Status:** Least Concern. **Global population:** 500,000-5,000,000 individuals. The population is declining owing to habitat loss and degradation.



**Diet:** Bats, small birds and large insects such as dragonflies.

They generally hunt around dawn and dusk at forest edge or over the canopy, often along rivers or road cuts, or at the edges of small crop fields.

**Nesting:** Females are noticeably larger than males. Their heads and backs are dark slate gray, with an obvious white throat, black-and-white barred breast, and orange lower belly and thighs. The cere, eye-ring and feet are yellow to yellow-orange.



In Mexico, the courtship begins in February and March and eggs are laid in April. It nests in natural tree cavities, holes dug by parrots, old nests of trogons on termite colonies, cliffs, nests have been observed even in pre-Hispanic ruins and human construct. Nests are unlined.

It lays 2–3 brown eggs. During incubation, the couple is constantly vocalizing and is very territorial around the nest, even chasing other raptors up to 1 km away from the nest. The male is the one who brings virtually all the food to the nest.

**Cool Facts:** Sexual dimorphism affects hunting choices; the smaller male hunts mostly insects while the much larger female, mostly birds and bats. This difference in hunting choices allows more diversity in diet and lessens the risks in the pair overhunting their territory.

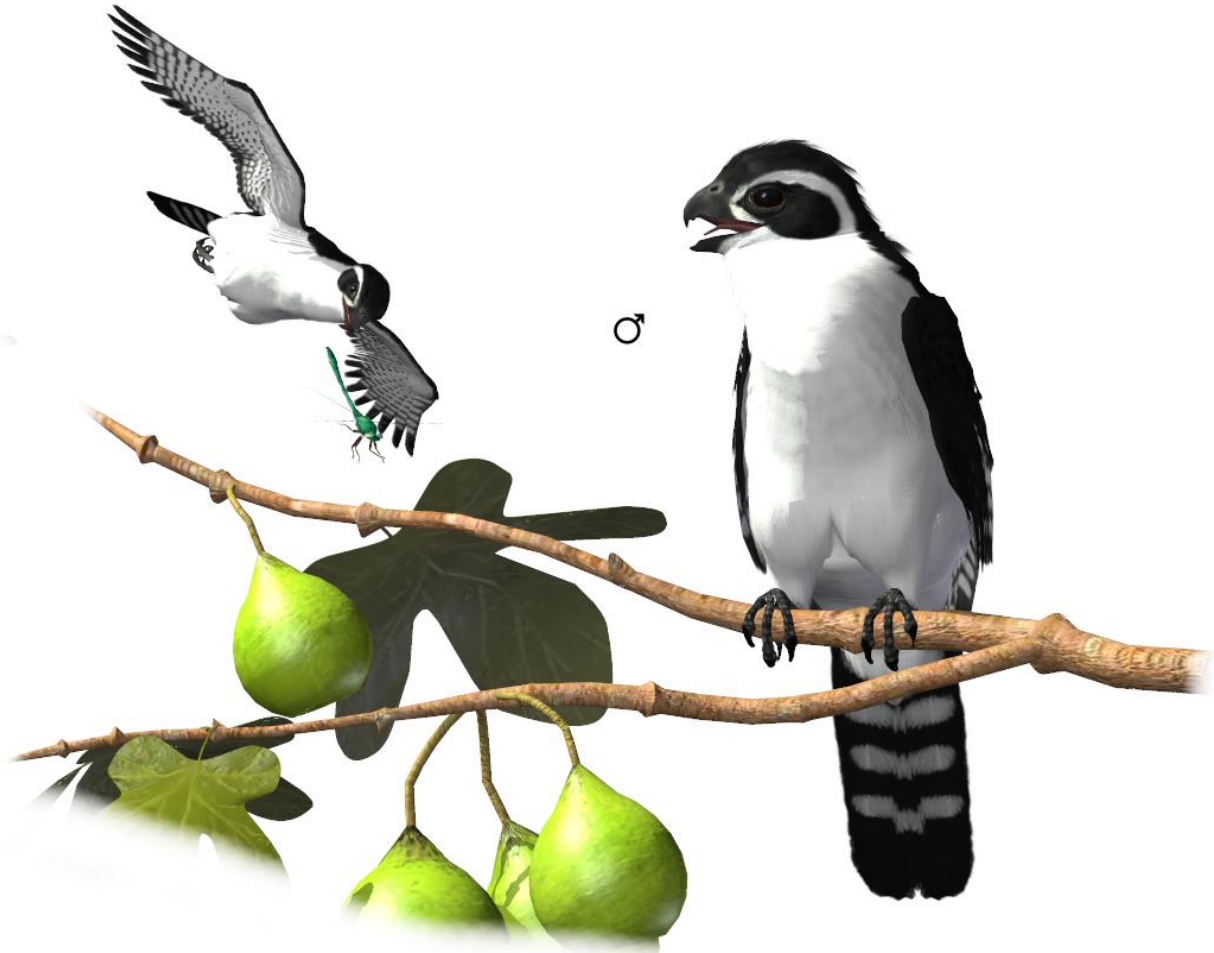


**Common Name:** Pied Falconet

**Scientific Name:** *Microhierax melanoleucos*

**Size:** 7-7.8 inches (18-20 cm); **Wingspan:** 13.7-14.5 inches (35-37 cm)

**Habitat:** Asia; Northeast India to South China and Central Vietnam. The Pied Falconet is found in the forests of the Assam region of India and South-eastern China, Laos and surrounding areas.



Its natural habitat is deep deciduous and evergreen forest. It prefers areas with some clearings at altitudes of between 3,000 and 5,000 feet. Old cultivation, tea gardens and stream banks are its favored spots, where it can be seen perched in the tops of trees, making occasional forays hunting flying insects. It is often seen in pairs, or in family groups of up to five.

**Status:** Least Concern. **Global population:** 1,000-10,000 individuals. The population is suspected to be stable in the absence of evidence for any declines or substantial threats.

**Diet:** Mostly insects, but also on small birds to the size of a thrush, and small ground mammals and reptiles. Insects and birds are taken in flight. Prey is seized either from the ground or in flight.

**Nesting:** Females are noticeably larger than males. The upper portions and sides are mostly glossy black. Some individuals have a thin white line across the base of the cere, over the eyes and down to the breast giving the appearance of a white face with large black eye patches. There are also some white spots on the inner wing and narrow white bars on the inner part of the tail. Below it is white, with some black mottling on the breast. The eyes are bright brown, the cere and feet black to brownish black.

It breeds in abandoned holes in dead trees, usually at a height of 100 feet or more which is inaccessible to most egg predators. The holes are used for more than one year, and are usually full of insect remains. Three or four white eggs are laid in early March. The young generally fledge in mid-May.

**Cool Facts:** Members of the genus *Microhierax* are the smallest of falcons.

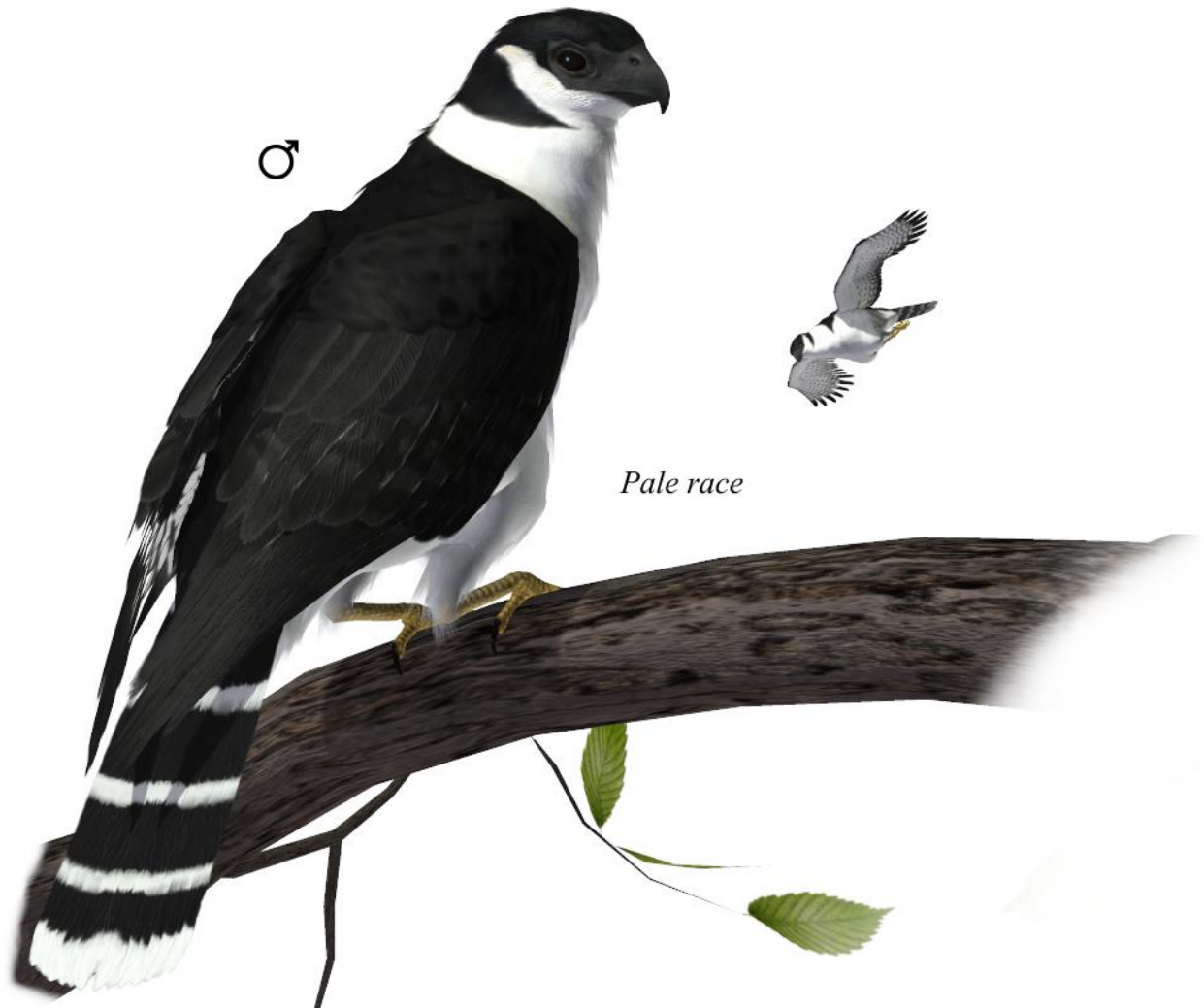


**Common Name:** Collared Forest-falcon  
**Scientific Name:** *Micrastur semitorquatus*

**Size:** 18.1-22 inches (46-56 cm); **Wingspan:** 31 inches (79 cm)

**Habitat:** Central and South America; Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname and Venezuela.

It prefers humid lowland rainforest but can be found in semi-deciduous, deciduous and riparian forests in the more arid parts of its range. It often occurs in pairs, regardless of the season. It is inactive when not hunting and may rest lengthwise on a branch similar to a nightjar.



**Status:** Least Concern. **Global population:** 500,000-5,000,000 individuals. The population is declining owing to habitat loss and degradation.

**Diet:** Large lizards, snakes, rodents, birds (up to the size of guans and ibises), and large insects. This species reportedly preys on domestic chickens.

It hunts by ambush from a concealed perch, by flying from perch to perch, by running along large branches, or even running on the ground with amazing speed and agility. It hunts at dawn and dusk, made possible by its large eyes and possibly a well-developed sense of hearing.

**Nesting:** Females are noticeably larger than males. It is a distinctive species, with three color morphs: pale, dark and tawny. The pale and tawny morphs exhibit the pale collar across the back of the neck for which the species is named; this collar contrasts strongly with the black upperparts. All have yellow legs and feet, bare facial skin is dull green-grey and iris is brown.

They are cavity nesters and the nests have usually more than one entrance. Nest 12-20 meter above ground in large mature trees. One brood with a clutch of 2-3 eggs, incubated for about 46 days. The young fledge after about 48 days and are fed for one more month. After this month other adults start feeding the young and the natural parents disappear.

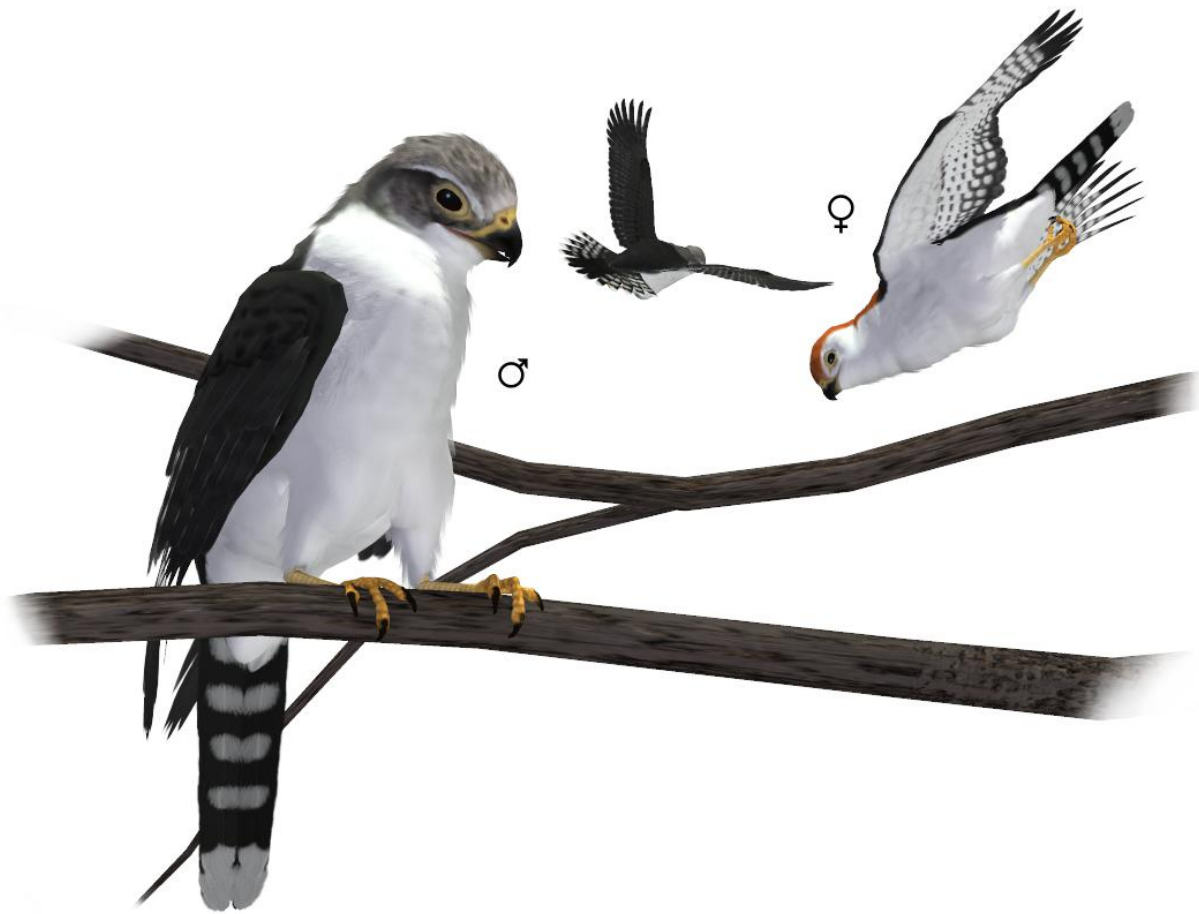
**Cool Facts:** This Forest-falcon has been known to follow swarms of army ants to capture invertebrates flushed by the ants.



**Common Name:** White-rumped Pygmy-falcon  
**Scientific Name:** *Polihierax insignis*

**Size:** 9-11 inches (23-28 cm); **Wingspan:** 16.5-19.2 inches (42-49 cm)

**Habitat:** Asia; found in Myanmar (previously widespread and locally abundant; it now appears scarce or uncommon, although the large quantity of suitable habitat remaining suggests that healthy populations may survive), Thailand (distributed through north, north-east and western provinces south to Ratchaburi, once widespread and fairly common but now scarce throughout after an apparent decline due to clearance of open deciduous forest habitat), Laos (historically very common and locally widespread in the south, but now apparently local and scarce), Cambodia (fairly widespread, chiefly in



north, with large areas of suitable habitat remaining) and Vietnam (previously very common locally in south, now scarce; only present in any numbers in Dak Lak province). Populations in Myanmar, Laos and Cambodia are potentially large, but little data is available due to a lack of fieldwork in suitable habitat.

It is resident in wooded grasslands and open forest, chiefly deciduous dipterocarp and mixed deciduous forest of the plains and foothills up to 915 m, where it uses holes in trees for nesting and roosting.

**Status:** Near Threatened. **Global population:** 10,000-19,999 individuals with a decreasing population trend. Although dry dipterocarp forest has generally suffered less degradation than evergreen forest in many areas, it is increasingly cleared and disturbed, through wood collection and burning. Given the high levels of hunting in much of its range, and the ease with which this species is shot, persecution presumably poses an additional threat.

**Diet:** Mainly lizards, which are often captured on tree trunks and foliage. Insects, small birds and mice are also prey when available.



**Nesting:** Females are noticeably larger than males. Large slate grey-and-white with a conspicuous white rump and uppertail-coverts. The sexes are quite different in color; the females have bright chestnut on the head and/or back while the male has a grey streaked head and back. Their wings are rather short, but quite pointed; the tail rounded to strongly graduated.

Breeds February through April. This falcon is a cavity nester, often using old woodpecker nests. 1-2 unmarked white eggs are laid. The female incubated during the day, and both the male and female roosted in the nest hole at night.

**Cool Facts:** Members of the *Polihierax* genus are all small to very small falcons.

## *Special Thanks to...*

....my betatesters (FlintHawk and Jan Wilson)

...and Nerd3D (for his invaluable help in special Poser coding)

## *Species Accuracy and Reference Materials*

The author-artist has tried to make these species as accurate to their real life counterparts as possible. Birds of the same species vary considerably, just as all others do in nature. The birds were created using the correct field markings and the most common similarities.

With the use of one generic model to create dozens of unique bird species, some give and take is bound to occur. In addition, 3D-models have many technical challenges, which make exact representations difficult, if not impossible. It's best to think of these birds represented as resembling the particular species, and they may not, in some cases, be 100% scientifically accurate.

The model and morphs were created using Luxology's Modo. The texture maps were created in Corel's Painter. The model was rigged in Smith-Micro's Poser and adapted for use in DAZ's DAZ Studio.

### *Field Guide Sources:*

- **"The Sibley Guide to Birds"** by David Allen Sibley.
- **"Raptors of the World"** by James Ferguson-Lees and David A. Christie
- **"Illustrated Checklist of the Birds of the World. Volume 1: Non-passerines"** by HBW and BirdLife International
- **"Birds of Europe"** by Killian Mullarney, Lars Svensson, Dan Zetterstorm and Peter J. Grant.
- **"Birds of East Asia"** by Mark Brazil.
- **"Birds of South Africa"** by Ian Sinclair, Phil Hockey and Warwick Tarboton
- **"Handbook of Australian, New Zealand and Antarctic Birds"** by S. Marchant and P. J. Higgins

### *Internet Sources:*

- **Cornell Lab of Ornithology** (<http://www.birds.cornell.edu>)
- **Wikipedia** (<http://www.wikipedia.com>)
- **Birdlife International** (<http://www.birdlife.org>)
- **Planet of the Birds** (<http://www.planetofbirds.com>)
- **The Peregrine Fund** (<http://www.peregrinefund.org>)



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