



Avian Models for 3D Applications

Characters and Texture Mapping by Ken Gilliland

Songbird ReMix

BIRDS of PREY

Volume V: Falcons, Hawks & Eagles

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Songbird ReMix

BIRDS of PREY

Volume V: Falcons, Hawks & Eagles

Introduction

In creating the four base volumes of Songbird ReMix Birds of Prey (Falcons, Hobbys & Kestrels, Hawks of the Old World, Hawks of the New World and Eagles of the World), it was a very difficult choice on what species to keep and what to cut from the final list. I tried to choose a combination of popular, interesting and important species for those packages. With Birds of Prey Volume V, many of the species that didn't make the final cut as well as user requested species are included here.

This volume includes species from the major Birds of Prey families, *Falconidae* and *Accipitridae*, and as with many of the Songbird ReMix sets, birds from across the globe have been selected. From the Americas, there is the Laughing Falcon, the Ferruginous Hawk and the Black Collared Hawk. From Africa, the Pygmy Falcon, the Red-necked Falcon, the Scissor-tailed Kite, and the Bateleur. From Eurasia, the Red-headed Falcon, the Black Blaza, the Eastern Imperial Eagle and Stellar's Sea-eagle. From Australia, the Red Goshawk and the White-bellied Sea-Eagle and from the Palearctic, the Rough-legged Hawk.

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 Prey1 (Order Falconiformes)**
 - **Birds of Prey2 (Order Accipitriformes)**
- **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

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.

Where to find your birds

| Type Folder | Bird Species |
|---|--|
| Birds of Prey1 (Order Falconiformes) | Laughing Falcon African Pygmy Falcon Red-headed Falcon Red -necked Falcon |
| Birds of Prey2 (Order Accipitriformes) | Scissor-tailed Kite Black Baza Ferruginous Hawk Black-collared Hawk Red Goshawk Rough-legged Hawk Eastern Imperial Eagle Bateleur Steller's Sea Eagle White-bellied Sea Eagle |

Where to find your poses

| Type Folder | For what species? |
|---|-------------------|
| Birds of Prey1 (Order Falconiformes) | Falcons |
| Birds of Prey2 (Order Accipitriformes) | Hawks and Eagles |

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 (Morph availability depends on what model is used)

- **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 numbers 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.
 - Breast Out - Moves the breast out.

- **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.

- **Crest Controls** (these controls are only used with crested eagles and will be non-operational if none of the crest morphs in "Creation Morphs" are active.)

- CrestDown- Pulls the crest feathers down along the back of the head.
 - FeatherLength- Controls the length of the crest feathers.
 - FeatherWidth- Controls the width of the crest feathers.

- CrestDisplay- Fans the crest feathers
- MidFeatherLength- Lengthens the middle feathers of the crest.
- MidFeatherFwd- Pulls the middle feathers of the crest forward.
- TopFeatherAskew- Moves the middle feather of the crest askew.
- **Feather Fluff Controls**
 - **Head & Neck**
 - BlowBack- Pulls the fluff feathers from hip to head back.
 - FluffHead- Fluffs up all head feathers.
 - CrestFluffUp- Pulls the head feathers up/out.
 - CrestFluffLength- Controls the length of the head feathers.
 - CrestFluffHide- Hides the head feathers.
 - 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.
 - **Main Body**
 - 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).
 - RumpTopFluff- Controls the transparency feathers on the topside 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.
 - **Thighs**
 - 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.
 - ExpandAnkleBell- Expands the width of the ankle feathers. This control will only work when the "HideShinFeathers" morph in "Creation Morphs" is inactive.

- **Correction Morphs**

- ThighsIn4Flight - Reduces the thigh lumps caused when legs are brought fully back for flight. This morph should only be used if BOTH thighs are pulled backward for flight.
- lShinFluffFootUp & rShinFluffFootUp. Raises and lowers the ankle feathers to mitigate feather/foot intersections. These controls will only work when the “HideShinFeathers” morph in “Creation Morphs” is inactive.

- **Creation Morphs**

- **Common Controls**

- Sleeker- Thins the torso of the bird.
- AddBulkTorso- Adds bulk to the torso of the bird.
- AddBulkThighs- Adds bulk to the thighs 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 topside 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.
- MassiveTalons- Lengthens the talons.
- HideShinFluff- This removes the fluff from the shins for non-“booted” eagles. This morph also makes “ExpandAnkleBell” and the “ShinFluffFootUp” morphs inactive.

- **Species Crest Shapes**- These morphs create very specific looks to resemble certain species. Using any of these morphs will unlock the morphs found in “Crest Controls” in the “Actions Morphs” section.

- AfrCrownedUnhide- Used with the African Crowned eagle.
- AfrHarrierCrestUnhide- For use with the African Harrier-hawk.
- CrestedEagleUnhide-- Used with Crested eagles.
- HarpyCrestUnhide- Used with Harpy Crested-like eagles.
- LowCrestUnhide- Used with low-crested eagles.
- PhilippineEagleUnhide- Used with the Philippine eagle. It creates a lion’s mane-like crest.

- **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-PuffOutBHead- Adds to the width of the back portions of the head.
- Hd-ThickenUpperNeck- Adds bulk to the upper neck.
- Hd-ThickenNeckSides- Adds bulk to the sides of the upper neck.
- Hd-FillOutNeck- Adds bulk to the sides of the whole 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.
- HawkHead- Shapes the head for Hawks.
- 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-SeaEagle- Adds exaggerated height to the top 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.
 - Bk-TearDropNostril- makes the nostrils more of a comma-type shape.
 - Bk-VerticalNostril- makes the nostrils shape a vertical slit rather than it's default more horizontal shape.
- **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 V: Falcons, Hawks & Eagles

Field Guide

Falcons

Laughing Falcon
African Pygmy Falcon
Red -headed Falcon
Red -necked Falcon

Hawks

Scissor-tailed Kite
Black Baza
Ferruginous Hawk
Rough-legged Hawk
Black-collared Hawk
Red Goshawk

Eagles

Eastern Imperial Eagle
Bateleur
Steller's Sea Eagle
White-bellied Sea Eagle

Common Name: Laughing Falcon
Scientific Name: *Herpetotheres cachinnans*

Size: 18-22 inches (46-56 cm); **Wingspan:** 31-37 inches (79-94 cm)

Habitat: Central America and northern South America; it's range is from Mexico through Central and South America south to Amazonian Peru and Bolivia, practically all of Brazil, and northern Argentina and Paraguay.

It occupies varied habitats, usually including at least scattered trees. It prefers humid regions to arid ones and tends to avoid closed forest. It is found on coastal slopes at altitudes up to 1,500 m (4,900 feet), but it is absent from mountainous regions. It is generally not migratory, though in some areas it may make seasonal movements.

Status: Least Concern. **Global population:** 500,000-4,999,999 adult individuals with a decreasing population trend. The population has declined drastically in some areas but is still common in others.

Diet: Mostly snakes (including venomous ones such as coral snakes) and lizards. It will also hunt, to a lesser extent, small rodents, bats and centipedes.

It pounces on its prey from flight, often with an audible thud. Then, it bites it just behind the head, sometimes removing the head in the process. It carries the food to a perch to eat. It may carry small snakes in its bill and swallow them tail-first; big snakes may be carried head-forward in its claws, as an osprey carries a fish, and then torn to pieces.



Nesting: Sexes are similar. Adults have a pale buff head, changeable between a more brownish and an almost white hue according to feather wear and individual variation. The broad black face mask stretches across the neck as a narrow collar, bordered with white. On the crown, the feather shafts are dark, producing a somewhat streaked effect. The upper wings and back are blackish brown. The upper tail coverts are whitish buff

again, and the rectrices are barred black and whitish, ending in white. The underside is uniformly pale buff; there may be a bit of dark speckling on the thighs, however. The underside of the wing is pale rufous-buff, sometimes with some dark spotting on the under wing coverts. The tips of the primary remiges are barred with pale gray below, their bases are quite rufous. The iris is dark brown, the bill is black with a pale yellow cere; the feet are also pale yellow.

Immature birds differ little from adults; they have lighter margins to the back feathers, producing a scalloped effect. The light parts of the plumage are almost white, paler than in adults; the unfeathered parts are also paler. Nestlings are covered in peculiarly dense down, reminiscent of a duckling's; they are generally brownish buff, darker above, and already show the blackish facial marks of the adults.

The laughing falcon breeds in rock crevices, tree cavities, or occasionally in abandoned nests of a Buteo hawk or caracara; in general however it does not even gather nesting material in significant quantities. It lays one or two eggs according to some sources, but according to others always just one. The eggs have heavy dark brown markings on a brown or whitish or pale buff background. The young are thought to leave the nest eight weeks after hatching. The breeding season has been given as April and May, though it may well vary across the large range of this species.

Cool Facts: The namesake call often rises sharply in pitch in the middle and sometimes falls sharply at the very end, changing from a "joyful" to a "sad" sound, and rendered as *ha-ha-ha har-her-her* or *haww harr herrer*. The call series may be introduced by faster hahahahahaha calls suggestive of maniacal laughter, particularly when the bird is startled. [Sound Link](#)

The flight is slow with quick, shallow wing beats interspersed with glides. They rarely, if ever, soar. When landing, it will jerk the tail forcefully just like a wagtail. A laughing falcon frequently, and often conspicuously, stays on a perch for hours, sitting upright and observing the ground alertly, sometimes flicking its tail or nodding, or moving around a bit on its perch with slow, cautious little steps. It is generally peaceful and unlike other falcons will not harm smaller birds.

The Laughing Falcon is sometimes referred to as the Snake Hawk.

Common Name: African Pygmy Falcon
Scientific Name: *Polihierax semitorquatus*

Size: 7.5-7.8 inches (19-20 cm); **Wingspan:** 14.6 inches (37 cm)

Habitat: Africa; Eastern and Southern Africa from South Sudan to Somalia and south to Uganda and Tanzania and from Angola to northern South Africa.

They inhabit dry, arid climates with sparse vegetation.

Status: Least Concern. **Global population:** 100,000-999,999 adult individuals with a stable population trend. African pygmy falcons are common birds within their range they are not considered threatened. Man made structures have increased the number of potential nesting sites for these animals. It is possible, however, that urbanization could someday threaten them with habitat loss.

Diet: Large insects, small reptiles and, occasionally, small birds and rodents.



They often hunt by perching on dead trees and scanning the surrounding area for potential prey. When they spot a target, African pygmy falcons can frequently be seen bobbing their heads and tails before swooping down to catch their prey. They may also hunt insects in flight.

Nesting: Sexes are dimorphic. Adult falcons are white below and on the face, gray above, and females having a chestnut back. There are white "eye spots" on the nape. Juveniles have a brown back, duller than adult females, and a rufous wash on the breast. The flight feathers of the wings are spotted black and white (more black above, more white below); the tail is barred black and white.

The main communication between members of this species are the songs sung during mating, which are used to attract potential mates. Some bodily communication is seen during the courtship ritual, as the female indicates her availability by crouching and raising her tail feathers. The movements made by the male during courtship can also be perceived as a form of communication.

In Kenya, pygmy falcons nest in white-headed buffalo weaver nests, and the ranges of the two birds coincide. In southern Africa, they are found around red-billed buffalo weaver nests but predominantly nest in the vacant rooms of sociable weaver nests, which are large and multi-chambered—even if the sociable weavers still have an active colony in the nest. Despite being bird-eaters and bigger than sociable weavers, the pygmy falcons largely leave the latter alone, though they do occasionally catch and eat nestlings and even adults. They will also use tree cavities.

Eggs are normally laid about three weeks after copulation. The female lays from two to four eggs which are incubated for 27 to 31 days. Females begin incubating with the first egg laid, so hatching is asynchronous. Since the young do not hatch at the same time, they may be different sizes. The young will leave their nests from 27 to 40 days after hatching. Both parents are very aggressive near their nest and their young do not usually fall victim to predators.

Cool Facts: The Pygmy Falcon is the smallest raptor in Africa. Pygmy falcons occasionally engage in polyandrous relationships, where there are more than two adults living together and tending nestlings. There are four potential reasons for this behavior: defense, co-operative polyandry, delayed dispersal of offspring, and thermo-regulation (warmth). Corroboration for the last is that in winter African pygmy falcons nest further inside the nest of sociable weavers, where there is better insulation. In the southwestern portion of their range, African Pygmy falcons may protect social weavers from predators such as snakes, while gaining a safe area to raise young. White-headed buffalo weavers, in the northeastern part of their range, are more powerful than African Pygmy falcons and receive no benefits from their presence.

The call is a high-pitched '*kikiKIK*', repeated (in Kenya) or a '*chip-chip*' and a '*kik-kik-kik-kik*' (in southern Africa). The flight is low and undulating. In size, pattern, and the habit of perching upright on an exposed branch or treetop, this species resembles some shrikes.

There are two subspecies:

- *P. s. castanonotus*. It occurs from South Sudan to Somalia and south to Uganda and Tanzania
- *P. s. semitorquatus*. The nominate species occurs from Angola to northern South Africa.

Common Name: Red-headed Falcon or Merlin
Scientific Name: *Falco chicquera*

Size: 11.8-14.2 inches (30-36 cm); **Wingspan:** 33.5 inches (85 cm)

Habitat: Asia; a widespread resident in India and Nepal.

It occupies semi-desert, palm savannas, areas with sparse vegetation and with some large trees, watercourses in desert, flood and coastal plains, and forest edges.

Status: Near Threatened. **Global population:** 10,000-30,000 adult individuals with a decreasing population trend. The population is suspected to be undergoing a moderately rapid population decline (approaching 30% over the last 19 years), owing to ongoing habitat degradation. Rapid urbanization and development may be the main cause of declines in parts of the range, for example around Bangalore city, where the population dwindled from five breeding pairs prior to the mid 1990s to only sporadic



recent sightings, presumably due to the conversion of habitat within their territories into densely packed bustling residential/built-up areas. In Nepal, there has been a sharp reduction in abundance in the Kathmandu Valley, from being very common in the 19th century to absent over at least the last 25 years. The cause of this decline is uncertain

but may relate to widespread and intensive pesticide use. At least historically, capture for the falconry trade may have posed an additional threat.

Diet: Mostly birds and bats in flight. It also consumes large insects taken on the ground. They often hunt in pairs. One of the falcons flies low above the ground and flushes up small birds, while the other follows the prey higher and catches it at the edge of the cover. They are more active at dawn and dusk.

Nesting: The sexes are similar except in size, males are smaller than females. It is a small, short-winged falcon with long tail. The crown, nape and hind neck are rich chestnut. Cheeks are pinkish-rufous to white. There is a black eyebrow and malar stripe. The bill is black, with yellow base and cere. The eyes are dark brown with yellow eye-ring. The upper parts are blue-gray, finely barred with dark gray to black. The flight feathers are black and the tail is gray with black bars, and a broad, black sub-terminal black band with a white tip. The under parts are two tones. The chin, throat and chest are pinkish-rufous or white. The rest of under parts, including wing coverts, belly, vent and thighs are white or pale gray, finely barred with black. The long, bare legs and talons are bright yellow. The Indian form of this species (*Falco chicquera*) has rufous malar stripes, and it is less heavily barred than African species (*Falco ruficollis*).

They nest in old stick nests that have been abandoned by other birds. The nest is generally at the top of an isolated tree, or in palm tree. They often reuse the same nest-site in the latter part of dry season. The female lays 3 to 4 eggs. The incubation period lasts about 32 to 35 days. The young leave the nest at about 5 to 6 weeks of age.

Cool Facts: The Red-headed and Red-necked falcons have had an unclear and troubled relationship in the ornithology world. The species was sometimes allied with the merlin or the African hobby, but others debated, believing that it might actually be distantly related to the peregrine falcon. Throughout its history in the birding world, the African and Indian forms had been considered subspecies. Birdlife International in 2014, declared them separate distinct species. The African species kept the common name, the Red-necked Falcon, and was given a new latin name *Falco ruficollis* (from its old subspecies name of *F. c. ruficollis*). The Indian species, while keeping its latin name, lost its common name and was renamed the Red-headed Falcon.

Common Name: Red-necked Falcon or Merlin
Scientific Name: *Falco ruficollis*

Size: 11.8-14.2 inches (30-36 cm); **Wingspan:** 33.5 inches (85 cm)

Habitat: Africa a widespread resident in sub-Saharan Africa.

It occupies semi-desert, palm savannas, areas with sparse vegetation and with some large trees, watercourses in desert, flood and coastal plains, and forest edges.



Status: Least Concern. **Global population:** <100,000 adult individuals with a decreasing population trend. The population is suspected to be decreasing at least in parts of the range; the population in Kenya is thought to have decreased by over 50% between the 1970s and 1990s.

Diet: Mostly birds and bats in flight. It also consumes large insects taken on the ground. They often hunt in pairs. One of the falcons flies low above the ground and flushes up small birds, while the other follows

the prey higher and catches it at the edge of the cover. They are more active at dawn and dusk.

Nesting: The sexes are similar except in size, males are smaller than females. It is a small, short-winged falcon with long tail. The crown, nape and hind neck are rich

chestnut. Cheeks are pinkish-rufous to white. There is a black eyebrow and malar stripe. The bill is black, with yellow base and cere. The eyes are dark brown with yellow eye-ring. The upper parts are blue-gray, finely barred with dark gray to black. The flight feathers are black and the tail is gray with black bars, and a broad, black sub-terminal black band with a white tip. The under parts are two tones. The chin, throat and chest are pinkish-rufous or white. The rest of under parts, including wing coverts, belly, vent and thighs are white or pale gray, finely barred with black. The long, bare legs and talons are bright yellow.

They nest in old stick nests that have been abandoned by other birds. The nest is generally at the top of an isolated tree, or in palm tree. They often reuse the same nest-site in the latter part of dry season. The female lays 3 to 4 eggs. The incubation period lasts about 32 to 35 days. The young leave the nest at about 5 to 6 weeks of age.

Cool Facts: The Red-headed and Red-necked falcons have had an unclear and troubled relationship in the ornithology world. The species was sometimes allied with the merlin or the African hobby, but others debated, believing that it might actually be distantly related to the peregrine falcon. Throughout its history in the birding world, the African and Indian forms had been considered subspecies. Birdlife International in 2014, declared them separate distinct species. The African species kept the common name, the Red-necked Falcon, and was given a new latin name *Falco ruficollis* (from its old subspecies name of *F. c. ruficollis*). The Indian species, while keeping its latin name, lost its common name and was renamed the Red-headed Falcon.

Common Name: Scissor-tailed Kite
Scientific Name: *Chelictinia riocourii*

Size: 13-15 inches (33-38 cm); **Wingspan:** 26.7-30 inches (68-76 cm)

Habitat: Africa; it is distributed across the breadth of the Afrotropics, but in a narrow band largely confined to 15°N to 8°N. This area includes Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Ivory Coast, Djibouti, Eritrea, Ethiopia, Gambia, Ghana, Kenya, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Somalia, Sudan, Togo, and Uganda. It is also found in Yemen.



It breeds within the Sahel zone and there is a small resident population in northern Kenya and Uganda. It is migratory, moving south (albeit remaining in the northern hemisphere) in November after breeding, coinciding with the start of the dry season. It returns north when the rains begin in February and the overall extent of migration fluctuates annually.

It occupies arid savanna and semi-desert habitats from sea level up to 500m.

Status: Least Concern. **Global population:** 670-6,700 adult individuals with a decreasing population trend. The species has declined over West Africa since the 1970s as a result of locust control, and it is vulnerable to pesticides. Given its reliance on the Sahel zone it is likely to be vulnerable to the on-going deterioration of this environment.

Diet: Mostly reptiles such as lizards and snakes, insects and

spiders, and occasionally small rodents. It is gregarious and will gather in groups at the edge of grass fires to capture grasshopper and crickets (*Orthoptera*) or near cattle herds to capture insects.

It hunts on the wing, by soaring and hovering before descending to hawk the flying prey or catch it on the ground.

Nesting: Adults have gray crowns and backs . The underside is uniformly white. There is a distinct black oblong shape on each of the under wings and a vertical black bar that extends from neck to rump on the wing tops. The iris is deep red with a black eye ring. The bill is black with a pale yellow/gray cere and the feet are yellow/orange.

The species constructs small stick nests (30-40cm diameter) in thorn trees often near to the nests of larger raptors such as Secretarybird and Snake-eagle, and sometimes, close to human settlement. Breeding occurs in May to September in the majority of its range, but in Senegal it occurs from December to February and in Kenya from March to June or from August onwards.

Cool Facts: This is a gregarious species, sleeping at communal roost at night and hunting in loose flocks. It may also nest in loose colonies.



Common Name: Black Baza
Scientific Name: *Aviceda leuphotes*

Size: 11.8-13.7 inches (30-35 cm); **Wingspan:** 26-31.5 inches (66-80 cm)

Habitat: Asia; found in Southeast Asia and parts of South Asia. They are migratory in parts of their range. Migratory birds may be seen in large numbers at some locations, such as Chumphon, in Thailand, where they account for nearly 40% of the raptors on passage. The species may be a regular winter visitor in the eastern part of peninsular India, and not just a passage migrant.

It occurs in open deciduous or evergreen tropical forest, often around clearings and near streams or rivers. This

species can be seen from sea-level up to 1500 m of elevation. This species breeds between 100 and 1200 m. They spend the night at communal roosts outside of the breeding season, and at this period, they often frequent orchards and gardens near villages, as well as hunt over the rice fields.

Status: Least Concern.

Global population: >10,000 adult individuals with a decreasing population trend. The population is suspected to be in decline owing to ongoing habitat destruction.

Diet: Mostly large insects such as grasshoppers. It also catches lizards and tree frogs, and occasionally small mammals, bats and birds.



It hunts from a concealed perch, but also in the open. It may briefly hover in front of vegetation to snatch prey from foliage. It performs short flights through the canopy, from perch to perch, and through insect swarms or passerine communal roosts.

The Black Baza will hunt occasionally in small flocks and it is more active at dusk.

Nesting: The adult male has a black head, neck and upper parts. There is a conspicuous long, black crest on the hind crown. The hooked bill is blackish with dark blue-gray cere with tomial teeth on both edges of the upper mandible. The eyes are reddish-brown. Legs and feet are dull grayish-black. Some variable chestnut markings are visible on lower back, scapulars and greater wing-coverts. The secondary flight feathers show chestnut and white patches. The tail is black.

On the underparts, the throat is black. There is a conspicuous white breast band bordered below by narrow black stripe and variable chestnut bands. The belly is more or less rufous barred buff. The vent, under tail coverts and thighs are black. On the under wing, the coverts are black. The primary flight feathers are grayish, whereas secondaries and tertials are darker gray. The under tail feathers are grayish.

The female has white only on the scapulars and more chestnut bands on the underside unlike the few bands in the male.

The juvenile resembles adults but its plumage is duller and it has white streaks on the black throat, and brown streaks on the white breast band. The crest is slightly shorter than in adults.

The breeding season varies according to the range, but usually occurs between February and June. Both sexes build a small compact nest with twigs and thin sticks in a large tree in the forest, between 20 and 30 m above the ground and often near water. The shallow cup is lined with soft materials such as grass, plant fibers and green leaves. The female lays 2-3 eggs and the incubation is shared by both parents. The chicks are fed with insects.

Cool Facts: This raptor is often seen in pairs or in family groups, but this gregarious species occurs also in small groups of 4-5 birds perched in the same tree. During winter, they sleep at communal night-time roosts in groups of up to 25 birds.

There are three subspecies:

- *A. l. syama*, first reported by Hodgson, in 1837. It is found from eastern Nepal, northeastern India to south China which winters in Indo-China and the Malaya Peninsula. It lacks the chestnut bands on the breast and the white spots on the tertials.
- *A. l. leuphotes*, first reported by Dumont in 1820. The nominate species.
- *A. l. andamanica*, first reported by Abdulali & Grubb in 1970 is endemic to the Andaman Islands. It has completely white underparts lacking any chestnut bands.

Common Name: Ferruginous Hawk
Scientific Name: *Buteo regalis*

Size: 22-27.2 inches (56-69 cm); **Wingspan:** 52.4-56 inches (133-142 cm)

Habitat: North America; breeding range is from western North America from southern Canada between the Great Plains and Rocky Mountains. The year round range occurs in the areas of eastern Utah, Colorado, Arizona and New Mexico. The wintering range includes most of California, central and southwestern Colorado, southern Nevada, Arizona and New Mexico, southwestern Nebraska, western Kansas and Oklahoma and a good portion of Texas and down into Mexico.

Ferruginous Hawks are medium distance migrants that travel individually or in small groups. Northern populations tend to migrate more than southern populations, and migrants do not tend to follow leading or diversion lines. Instead, they demonstrate complex migration patterns such as loop migration. Fall migration begins in August and September and their migration from Alberta Canada takes them east of the Continental Divide and south through the Great Plains including Montana, North Dakota South Dakota and Nebraska following grassland habitat on their way to their wintering grounds in New Mexico .



An open-country species inhabiting semi-arid grasslands with scattered trees, rocky mounds or outcrops, and shallow canyons that overlook open valleys. They may occur along streams or in agricultural areas in migration.

Status: Least Concern to Threatened. **Global population:** Unknown amount of adult individuals with an increasing population trend. This species has undergone a large and statistically significant increase over the last 40 years in certain areas of North America (155% increase over 40 years, equating to a 26.3% increase per decade.) These population increases appear to be mostly in California. In almost every other state it is found, the species has declined significantly, causing it to be listed as a State Threatened Species. It also carries a federal "Species of Concern" label. Threats include cultivation, over-grazing and fire degrading habitat throughout its range, and the controlling of small mammal populations (prairie-dog towns and gopher populations) limiting food resources.

Diet: Primarily rodents including Richardson's ground squirrels, white-tailed jackrabbits, black-tailed jackrabbits, ground squirrels, pocket gophers, prairie dogs, and kangaroo rats. Other prey includes snakes, lizards, meadowlarks, grasshoppers, and crickets.

The birds hunt in the early morning or late afternoon. There are four distinct modes of attack; short distance strikes on prey from the ground, aerial hunting from low altitudes, aerial strikes from high altitudes (300 feet), and flying after prey from a perch. Hunting from the ground appears to be the more successful of the four methods. Since these birds inhabit open country, they can stand by a burrow and wait for prey to appear.

Like many raptors, prey is swallowed whole or torn into chunks. The Ferruginous Hawk then regurgitates a pellet of fur, feathers, bone, and other non-digestible material.

Nesting: Sexes are alike, females average just a bit larger than males. Two color morphs occur, with intermediates. Light morph: Rust colored back and shoulders; head paler, grayish and streaked, and white tail has pale rust wash on end. Undersides are white with limited streaking and rusty spots; leg feathers rust colored on adults, white on juveniles. Large, white crescent-shaped patches occur on the upper wing surface on the primaries. Beneath the wing, large dark comma-shaped patches occur at the wrists. Dark morph: Entire head and body and wing surfaces are dark brown to cinnamon-colored. The yellow gape (mouth) stripe is visible. Upper surface of wing at the base of the primaries shows the white "window", similar to light morphs.

Juveniles are similar to adult, but have lightly banded tail. The light form lacks rufous legs and back.

They select rocky outcrops, hillsides, rock pinnacles, or trees for nest sites. Nests can be built right on the ground and are built of large twigs or roots. The male collects most of the nesting materials, often tugging at roots or attached stems. The female arranges the material and molds the nest cup of grasses, twigs, old bones, and cow or horse dung. Females lay 3 to 4 white eggs, that are blotched with brown, between the months

of February and July. Both adults incubate the eggs which take about 28-32 days to hatch. Eggs are laid at two-day intervals; sometimes there is may be a two-week age difference between the oldest and youngest fledgling.

Young fledge from 38 to 50 days old. The smaller males may leave the nest 10 days earlier than their female siblings. The adults will continue to feed the fledged young, as well as the nestlings. The young remain with their parents for several weeks after fledgling (10-40 days) before dispersing on their own.

Cool Facts: The Ferruginous Hawk is the largest American hawk. Before the elimination of bison in the West, nests of the Ferruginous Hawk were often partially constructed of bison bones and wool.

Some observers have found a difference in the number of eggs laid in a ground nest versus a tree nest, with the tree nest having higher average numbers of eggs per clutch. The number of eggs laid, as well as the number of active nests in an area, may be tied to the abundance of prey. Low prey populations may mean lower reproductive success.

Common Name: Rough-legged Hawk or Buzzard
Scientific Name: *Buteo lagopus*

Size: 18.5-20.5 inches (47-52 cm); **Wingspan:** 52-54.3 inches (132-138 cm)

Habitat: Palearctic region;.breeds in tundra and taiga habitats of North America and Eurasia between the latitudes of 61° and 76° N. Rough-legged hawks occurring in North America migrate to the central United States for the winter, while Eurasian individuals migrate to southern Europe and Asia. During these winter months, from November to March, preferred habitats include marshes, prairies and agricultural regions where rodent prey is most abundant

Status: Least Concern. **Global population:** >500,000 adult individuals with a stable population trend. National population sizes outside the North America have been estimated at < 1,000 wintering individuals in Korea and c.100-10,000 breeding pairs in Russia.

Diet: Mostly small mammals with lemmings and voles comprising up to 80–90% of their prey, but this varies with seasonal availability. The rough-legged hawk will also supplement its diet with mice, rats, gerbils, pikas and insects. Besides mammals, birds are the second most favored type of prey, such as snow buntings (*Plectrophenax nivalis*), Lapland longspur (*Calcarius lapponicus*) and American tree sparrow (*Spizella arborea*).

They hunt during the daytime. Like most hawks, they use two forms of hunting; still-hunting (watching for prey from a perch and then stooping) and watching for prey while



in flight. Unlike most other large raptors, they may engage in hovering flight above the ground while searching for prey.

Nesting: Sexes are alike with females being larger. The plumage is predominantly brown in color and often shows a high degree of speckling. A broad brown chestband is present in most plumages and a square dark carpal patch contrasting with the white under-wing is an easily identifiable characteristic in light morph individuals. There are a wide variety of plumage patterns are exhibited in light vs. dark morphs, males vs. females and adults vs. juveniles and they can easily be confused with the common buzzard (*Buteo buteo*) and the red-tailed hawk (*Buteo jamaicensis*). Distinguishing characteristics in all plumages include long white tail feathers with one or more dark subterminal bands. The wing tips are long enough to reach or extend past the tail when the animal is perched. The common buzzard can be similar-looking, with a similar long-tailed shape and can be notoriously variable in plumage. The rough-legged is longer-winged and more eagle-like in appearance. The red-tailed hawk is chunkier-looking and differs in its darker head, broader, shorter wings, barring on the wings and the tail, dark leading edge to the wings (rather than black wrist patch) and has no white base to the tail. The Ferruginous Hawk is larger, with a bigger, more prominent bill and has a whitish comma at the wrist and all-pale tail

Nests are built soon after arrival to breeding grounds and require 3–4 weeks to complete. Twigs, sedges and old feathers are used as building materials. They sometimes contains the bones of caribou along with sticks. Nests are 60–90 cm (24–35 in) in diameter and 25–60 cm (9.8–23.6 in) in height. Cliff ledges and rocky outcroppings are preferred nesting sites.

Females can typically lay 3–5 eggs. The incubation period is 31 days, provided almost exclusively by the female. The male feeds the female during this incubation period. After hatching, young require 4–6 weeks before fledging the nest. Fledglings depend on parents to provide food for 2–4 weeks after leaving the nest.

Cool Facts: The name "Rough-legged" Hawk refers to the feathered legs. It is the only member of its diverse genus found in both of the Northern continents and has a complete circumpolar distribution.

Common Name: Black-collared Hawk
Scientific Name: *Busarellus nigricollis*

Size: 21-23 inches (52-58 cm); **Wingspan:** 51-56 inches (130-143 cm)

Habitat: Central America and South America; it is found in Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, and Venezuela.

Its natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical swamps. They prefer dense, wooded, humid, vegetated area with an immense amount of water (rivers, ponds, and lakes with floating vegetation and easily accessible perches), such as forests, swamps, mangroves, and rice fields.

Status: Least Concern. **Global population:** 20,000-49,999 adult individuals with a

decreasing population trend. The population has declined markedly in some areas owing to drainage of wetlands and urban development.

Diet: Mostly fish; supplemented with water bugs and occasionally lizards, snails and rodents.

Typically, they perch above shallow pools or marshes and drop onto prey.

Nesting: The adult black-collared hawk

has a more or less white head, tinged with buff, and with black shaft streaks on the crown. The body, above and below, and the mantle are bright cinnamon-rufous, paler on the chest. There is a black crescent on the upper breast. The back has scattered black shaft stripes; the flight and tail feathers are black with the base of the tail barred with rufous. The eyes are bright reddish brown, the cere and bill black, and the legs bluish white.



Immatures are similar, but blotched with black, including on the crown, and the rufous barring on the tail is more extensive. The pale area on the chest is also more clearly marked. The upper surface of the wings is barred, and the eyes are brown.

The nest is usually placed in a large tree, frequently near water, but sometimes in shade trees in coffee plantations or suburban areas. The nest is lined with green leaves. The female lays three to five eggs, dull white, spotted with pale yellow-brown or red-brown and a few darker freckles.

Cool Facts: Generally the Black-collared Hawk is quite silent, but occasionally they makes high-pitched screams (*hi-iiiiiii*) and low groans (*earrrrrrrrr*) very similar to the Red-tailed Hawk and the Red-shouldered Hawk.

Common Name: Red Goshawk
Scientific Name: *Erythrorhynchus radiatus*

Size: 17.7-23.3 inches (45-60 cm); **Wingspan:** 39.4-53.2 inches (100-135 cm)

Habitat: Oceania; endemic to Australia. Historically, it ranged in northern and eastern Australia, north of c.33°S in the east, and 19°S in the west, but its range has contracted from south of 28°S in the east, and it is now virtually extinct in New South Wales. Recent surveys suggest breeding is continuous across northern Australia.

It lives in coastal and sub-coastal, tall, open forests and woodlands, tropical savannas traversed by wooded or forested rivers and along the edges of rain forests. In winter in eastern Australia, it appears to move from nest-sites in the ranges to coastal plains, where it often feeds on waterbirds taken from open wetlands.

Status: Endangered to Vulnerable. **Global population:** 1,400 adult individuals with a decreasing population trend. The population was estimated at 700 pairs in 2010, including 100 pairs on Tiwi Islands, probably a separate subpopulation, and 600 pairs elsewhere across northern Australia from the Kimberley through the Northern Territory and through Queensland to northern New South Wales. The population may be declining owing to habitat loss in at least eastern Queensland; the rate of decline has not been quantified but is not suspected to be rapid. Widespread clearance for agriculture probably caused the historical decline in north-eastern New South Wales and southern Queensland. Continuing clearance is affecting more northerly populations. Even if riparian strips are left uncleared, pairs usually nest in the tallest trees that are then exposed to storm damage and other disturbances. Clearing of forest for acacia plantations has rendered some territories on Melville Island unproductive. Egg-collecting may result in the failure of some nests as does the burning of nest trees or disruption of breeding by fire. Shooting by pigeon and poultry owners, and possibly pesticides, causes some mortality of individuals and may result in temporary local scarcity. Prey abundance may be reduced by loss or degradation of freshwater wetlands, loss of hollow-bearing trees in which prey breed, over-grazing by livestock and feral herbivores, and changed fire regimes.



The Red Goshawk is listed nationally as vulnerable under the federal Environmental Protection and Biodiversity Conservation Act 1999 EPBC and is listed as endangered in Queensland and New South Wales and vulnerable in the Northern Territory. It is also listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora CITES.

Diet: Mostly birds, especially parrots and pigeons; rarely they also prey on mammals, reptiles, and large insects.

Early and late in the day, they hunt from concealed perches in the trees. In the middle of the day, they use long transects, quartering through or above the canopy, or search from a high soaring position. They attack by a stealthy glide, direct chase, or may stoop from a height.

Nesting: Sexes are similar. The plumage is generally rufous and the head streaked with black and white, having more white on the face and throat. The body and upper wings are marked with black. Flight feathers and tail are barred gray, dark above and light below. The underside (belly and under wing coverts) are rufous with slight black ticking. The female has a paler belly than the male. Irises are yellow and the cere is pale gray. Legs and feet are yellow.

Juveniles (first year) have less streaking on the head, brown irises, blue-gray ceres and pale gray or creme feet and legs.

The nest is built in an exposed fork of a tall emergent. The nest is a stick platform lined with green leaves, 60–120 cm across and 30–50 cm deep. The emergent layer contains a small number of very large trees called emergents, which grow above the general canopy, reaching heights of 45–55 m, although on occasion a few species will grow to 70–80 m tall.

The egg-laying season is from May to October in the tropical north, and August to October in the east. Incubation takes 40 days, the nestling period 51–53 days, and juveniles remain dependent for 2–3 months

Cool Facts: The Red Goshawk used to be regarded as a very large member of the goshawk subfamily, *Accipitrinae*, but it is now believed that the resemblance to these other birds is convergent. Experts now group the Red Goshawk with the superficially dissimilar Black-breasted buzzard (*Hamirostra melanosternon*) and square-tailed kite (*Lophoictinia isura*) as one of the Australasian old endemic raptors. It is believed that the ancestors of these birds, possibly together with a handful of species from South-east Asia and Africa, occupied Gondwana and over millions of years have diverged into their current forms.

Common Name: Eastern Imperial Eagle

Scientific Name: *Aquila heliaca*

Size: 28-35 inches (72-90 cm); **Wingspan:** 70.8-85 inches (180-216 cm)

Habitat: Eurasia and Africa; it breeds in Austria, Azerbaijan, Bulgaria, China, Czech Republic, Macedonia, Georgia, Greece, Hungary, Kazakhstan, Russia, Serbia, Slovakia, Turkey and Ukraine. Breeding possibly also occurs in Afghanistan, Albania, Armenia, Bosnia and Herzegovina, Croatia, Iran, Kyrgyzstan, Moldova, Mongolia, Pakistan, Romania, Tajikistan, Turkmenistan and Uzbekistan. On passage and in winter, birds are found in the Middle East, east Africa south to Tanzania, the Arabian peninsula, the Indian Subcontinent and south and east Asia (from Thailand to Korea).

This is a lowland species that has been pushed to higher altitudes by persecution and habitat loss in Europe. In central and eastern Europe, it breeds in forests up to 1,000 m and also in steppe and agricultural areas with large trees, and nowadays also on electricity pylons. In the Caucasus, it occurs in steppe, lowland and riverine forests and semi-deserts. Eastern populations breed in natural steppe and agricultural habitats. Both adults and immatures of the eastern populations are migratory wintering in the Middle East, East Africa south to Tanzania, the Arabian peninsula, the Indian Subcontinent and south and east Asia; wintering birds have also been reported in Hong Kong (China). These birds make their southward migration between September and November, returning between February and May. Wetlands are apparently preferred on the wintering grounds. Birds are usually seen singly or in pairs, with small groups sometimes forming on migration or at sources of food or water. In exceptional cases large groups of up to 200 have been known to form on autumn



migration. Adults in central Europe, the Balkan peninsula, Turkey and the Caucasus are usually residents, whilst most immatures move south. Non-territorial birds often associate with other large eagles such as *Aquila clanga* and *Haliaeetus albicilla* on wintering and temporary settlement areas.

Status: Vulnerable. **Global population:** 3,500-15,000 adult individuals with a decreasing population trend. The European population comprises 1,800-2,200 pairs. There was a rapid decline in Europe and probably in Asia in the second half of the 20th century. Recently the central European population (177-192 pairs mostly in Hungary and Slovakia) appears to have been increasing as a result of conservation efforts, although the majority of the threats to the species persist. In the last six years, the occurrence of persecution incidents significantly increased, with more than 50 Eastern Imperial Eagles poisoned in Hungary. The Balkan population (76-132 pairs mostly in Bulgaria and Macedonia) is apparently stable (although the last proven breeding in Greece took place in 1993). Recent surveys in Azerbaijan found relatively high densities in the north-western plains, estimating 50-60 pairs within a 6,000 km² study area, and a total population size of 50-150 pairs. This suggests that the Caucasian population may have been underestimated (it was previously assumed that less than 50 pairs bred in Azerbaijan and Georgia). Populations in the Volga Region of Russia are relatively stable, but are suspected to decline in the future due to the presence of threats at breeding sites. At least half of the world population (and possibly more) breeds in Russia (900-1,000 pairs and Kazakhstan (750-800 pairs). Although these populations currently seem to be stable, the Russian population has been predicted to decline in the next three to five years.

Breeding sites are threatened primarily by intensive forestry in the mountains, and by the shortage of large indigenous trees in the lowlands (e.g. illegal tree cutting affected several pairs in Russia and Bulgaria). Other threats are loss and alteration of feeding habitats, shortages of small and medium-sized prey species (particularly ground-squirrels *Spermophilus spp.*), human disturbance of breeding sites, nest robbing and illegal trade, shooting, poisoning and electrocution by powerlines. An average of 450 Eastern Imperial Eagles were killed by powerlines during the 2009 breeding season in the Altai region – 25% of the total population of the region. Habitat alterations associated with agricultural expansion threaten historical and potential breeding sites in former range countries. Hunting, poisoning, prey depletion and other mortality factors are also likely to pose threats along migration routes and in wintering areas. Competition for nest sites with Greater Spotted Eagles has been reported in the Altai region, Russia.

Diet: Mostly small mammals such as susliks (ground squirrels), marmots, gerbils, hamsters, and hares. Prey also include reptiles (including tortoises), insects, carrion; and birds (such as goose, ducks, crows, pigeons, game birds, and even flamingos).

Nesting: Adults are almost entirely brown. The crown and sides of the neck are light gold, and the shoulders have white patches. The tail is dark gray with a black subterminal band tipped with white, and the wing coverts also have white edges. The

undertail is a pale rust to cream color. Eyes and feet are yellow and the beak is gray with a black tip. Their wings and tail are long, and the head is large, as are the feet.

Juveniles are light brown with dark brown streaks on the head, breast, scapulars, and wings. The wing coverts have white tips and the under parts are buff.

They mate for life, finding a partner at around age four. The breeding season is from February-July in Spain, and March-September in the rest of their range.

They build their nests out at the top of a tall tree, 10-20 m above the ground. A single pair may have several nests, which they use in rotation, repairing them when they need to. The nests are 1.2-1.5 m across and 60-70 cm deep, though they can grow to be 2.4 m or more across and 1.8 m deep. They weigh up to 100 kg and are lined with twigs, fur, grass, and debris, with fresh vegetation brought throughout the nest's use. 1-4 eggs are laid and incubated for 43-52 days by both parents. Cannibalism is common, and the older and stronger chick will usually kill the younger. Fledging takes 63-77 days, but young will remain at the nest and be fed by the female until they can hunt on their own, around 160 days later.

Cool Facts: *Aquila heliaca* (*Eastern Imperial Eagle*) was formerly considered to include *Aquila adalberti* (Spanish Imperial Eagle) as a subspecies, but they are now considered different species by some authorities due to morphological, ecological, and molecular differences.

The monarchy of Austria-Hungary once chose the Imperial Eagle to be its heraldic animal.

Common Name: Bateleur

Scientific Name: *Terathopius ecaudatus*

Size: 22-28 inches (55-70 cm); **Wingspan:** 73 inches (186 cm)

Habitat: Africa and the Middle East; it has extensive range across much of sub-Saharan Africa (from southern Mauritania, Senegal, southern Mali and Guinea east to southern Sudan, northern South Sudan, Ethiopia and west Somalia and south to

Namibia, Botswana and northern and north-eastern South Africa), and also occurs in south-west Arabia (south-west Saudi Arabia and Yemen).

It inhabits open country, including grasslands, savanna and sub-desert thornbush from sea level to 4,500 m but generally below 3,000 m. It is generally considered resident but some adults are nomadic.

Status: Near Threatened.

Global population:

10,000-99,999 adult individuals with a decreasing population trend. Declines have taken place across much of this species's range owing to habitat loss and incidental poisoning/pollution; the overall rate of decline is difficult to quantify but is suspected to have been moderately rapid over the past three generations (41 years). There have

been significant population declines and/or range contractions suspected in many regions, including Botswana, Côte d'Ivoire, Nigeria (an estimated decline of at least 50



% in 30 years and now essentially confined to protected areas), Somalia, South Africa, Sudan, parts of Zambia, Zimbabwe, and possibly parts of Tanzania.

The major cause of the decline seems to be almost entirely poisoning by a few large-scale commercial farmers, but poisoning is also a problem in tribal small-stock farming communities.

Diet: Mostly mammals and birds, but also some reptiles, carrion, insects and occasionally birds' eggs and crabs, foraging over a huge range (55-200 km²).

Nesting: Adults are a mid-sized, oddly-proportioned eagle, with very long pointed wings, 'tailless' appearance and bushy head. Wings held in a deep 'V' and flight fast with distinctive side to side tilting action. Males generally black but with chestnut from mantle to tail, brownish-gray shoulders, white under wing linings and bare red face and legs. Females have more extensive white under wings and gray secondaries.

Juveniles are all brown with blue-gray cere, face and legs and longer tail.

They breed from September-May in West Africa, throughout the year in East Africa and December-August in southern Africa. They construct a well-concealed nest in trees, laying a single egg which is incubated by the female for 42 to 43 days, with a further 90 to 125 days until fledging. Bateleurs pair for life, and will use the same nest for a number of years.

Unpaired birds, presumably from a previous clutch, will sometimes help at the nest.

Cool Facts: "Bateleur" is French for "Street Performer". This name implies the bird's characteristic habit of rocking its wings from side to side when gliding, as if catching its balance like a tight-rope walker.

The Bateleur is generally silent, but on occasions it produces a variety of barks and screams. The bird spends a considerable amount of time on the wing, particularly in low-altitude glides.

Common Name: Steller's Sea Eagle
Scientific Name: *Haliaeetus pelagicus*

Size: 33-41 inches (85-105 cm); **Wingspan:** 84-87 inches (213-220 cm)

Habitat: Asia; breeding range extends from the Kamchatka Peninsula, the coastal area around the Sea of Okhotsk, the lower reaches of the Amur River and on northern Sakhalin and the Shantar Islands, Russia. The majority of birds winter farther south, in the southern Kuril Islands, Russia and Hokkaidō, Japan. Vagrant eagles have been found in North America, at locations including the Pribilof Islands and Kodiak Island,

inland to as far as Peking in China and Yakutsk in Russia's Sakha Republic, and south to as far as Taiwan, but these are considered to be individual eagles that have strayed far from the species' typical range.



They prefer sea coasts and large rivers with mature trees. The timing, duration, and extent of migration depends on ice conditions and food availability. On Kamchatka, eagles overwinter in forests and river valleys near the coast, but are irregularly distributed over the peninsula. Most wintering birds there appear to be residential adults. Steller's sea eagles that do migrate fly down to winter in rivers and wetlands in Japan, but will occasionally move to mountainous inland areas as opposed to the sea coast. Each winter, drifting ice on the Sea of Okhotsk drives thousands of eagles south. Ice reaches Hokkaido in late January. Eagle numbers peak in the Nemuro Strait in late February. On Hokkaido, eagles concentrate in coastal areas and on lakes near the coast, along with substantial numbers of white-tailed eagles. Eagles depart between late March and late April, adults typically leaving before immatures. Migrants

tend to follow sea coasts and are usually observed flying singly. In groups, migrants are typically observed flying 100–200 m (330–660 ft) apart. On Kamchatka, most migrants

are birds in transitional plumages. They are also occasionally seen flying over the northern ocean or perching on sea ice during the winter.

Status: Vulnerable. **Global population:** 5,000 adult individuals with a decreasing population trend. Despite being legally protected, being classified as a National Treasure in Japan and mostly occurring in protected areas in Russia, many threats to their survival persist. These mainly include habitat alteration, industrial pollution, and over fishing, which in turn decrease their prey source. The current population is estimated at 5,000 and decreasing. It was observed that recent heavy flooding, which may have been an effect of global climate change, caused almost complete nesting failure for the eagles nesting in Russian rivers due to completely hampering the ability of the parents to capture the fish essential to their nestlings' survival. Persecution of the bird in Russia continues, due to its habit of stealing furbearers from trappers. Due to a lack of other accessible prey in some areas, increasingly, eagles on Hokkaido have moved inland and scavenged on sika deer carcasses left by hunters, exposing them to a risk of lead poisoning through ingestion of lead shot.

Diet: Mainly feeds on fish. Their favored prey in river habitats are salmon (*Oncorhynchus spp.*) and trout. Among these, pink salmon (*O. gorbuscha*) and chum salmon (*O. keta*) are favored, sometimes intensely supplemented by grayling (*Thymallus thymallus*) and three-spined stickleback (*Gastrossteus aculeatus*). Fish comprise about 80% of the diet of eagles; other prey consists largely of water-dwelling birds, including ducks, geese, swans, cranes, herons, and gulls.

Most often, Steller's sea eagles hunt from a perch in a tree or rocky ledge located 5–30 m (16–98 ft) above the water. When prey is spotted, the bird dives from its perch. Eagles may also hunt on the wing, while circling 6–7 m (20–23 ft) above the water. Again, prey is captured by diving. Eagles sometimes hunt by standing in or near shallow water on a sandbank, spit, or ice-flow, grabbing passing fish. Steller's sea eagles are more aggressive than their white-tailed and bald eagle relatives.

Nesting: The sexes are similar although females are significantly larger and heavier than males. Mature sea eagles are dark brown to black over the majority of their bodies, with strongly contrasting white on the lesser and median upper-wing coverts, under wing coverts, thighs, under-tail coverts and tail. Their wedge-shaped, white tails are relatively longer than those of the white-tailed eagle. The bold, pied coloration of adults may play some part in social hierarchies with other eagles of their own species during the non-breeding season. The eyes, the bill, and the feet of adults are all yellow in coloration.

The first down plumage of new nestlings is silky white, though they soon turn a smoky brown-gray. As in other sea eagles, remiges and retrices of the first-year plumage are longer than adults. Juvenile plumage is largely a uniform dark brown with occasional gray-brown streaking about the head and the neck, white feather bases, and light mottling on the retrices. The tail of the immature eagle is white with black mottling basally. The young Steller's sea eagle has a dark brown iris, whitish legs and blackish-

brown beak. Through at least three intermediate plumages, mottling in the tail decreases, body and wing feathering acquires a bronze cast, and the eye and bill lighten in color.

Courtship, which usually occurs between February and March, is reported to consist of a simple, soaring flight above the breeding area.

It builds several aeries, being bulky constructions of twigs and sticks, at a height up to 150 cm (59 in) and diameter up to 250 cm (98 in). They usually place such nests high up on trees and rock at 15 to 20 m (49 to 66 ft) above the ground, sometimes in trees up to 45 m (148 ft). Alternate nests are usually built within 900 m (3,000 ft) of each other. In one case, two active nests were found to have been located within 100 m (330 ft).

The Steller's sea eagle copulate on the nest after building it. They lay their first greenish-white eggs around April to May. Clutches can contain from one to three eggs, with two being the average. Usually, only one chick survives to adulthood, though in some cases as many as three will successfully fledge. Incubation begins with the first hatching, which occurs in mid-May to late June. After an incubation period which is approximately 39 – 45 days, the whitish-down covered chicks hatch. The eaglets fledge in August or early September. Adult plumage is attained at four years of age, but first breeding does not typically occur for another year or two.

Cool Facts: It has sometimes been referred to as the Pacific eagle or white-shouldered eagle. In Russian, the eagle has been called *morskoi orel* (sea eagle), *pestryi morskoi orel* (mottled sea eagle) or *beloplechii orlan* (white-shouldered eagle). In Japanese, it is called *O-washi* (large eagle or great eagle).

There are two subspecies of Stellers' Sea Eagle:

- *H. p. pelagicus*. The relatively widespread nominate.
- *H. p. niger*. This subspecies lacks white feathers except for the tail and supposedly was resident all year in Korea. Last seen in 1968 and long believed to be extinct, a female matching *H. p. niger* in appearance was born in captivity in 2001. Both its parent were "normal" in appearance, indicating that *H. p. niger* might be an extremely rare morph rather than a valid subspecies.

Common Name: White-bellied Sea Eagle
Scientific Name: *Haliaeetus leucogaster*

Size: 26-36 inches (66-90 cm); **Wingspan:** 68-86 inches (178-220 cm)

Habitat: Asia and Australia; it is found regularly from Mumbai (sometimes north to Gujarat, and in the past in the Lakshadweep Islands) eastwards in India, Bangladesh, and Sri Lanka in southern Asia, through all of coastal Southeast Asia including Burma, Thailand, Malaysia, Indonesia, Indochina, the main and offshore islands of the Philippines, and southern China including Hong Kong, Hainan and Fuzhou, eastwards through New Guinea and the Bismarck Archipelago, and Australia. In the northern Solomons it is restricted to Nissan Island, and replaced elsewhere by Sanford's sea eagle. In Victoria, where it is otherwise scarce, it is locally more common at Corner Inlet and Gippsland Lakes. Similarly in South Australia, it is most abundant along the north

coast of Kangaroo Island. The range extends to the islands of Bass Strait and Tasmania, and it is thought able to move between the islands and the mainland. There is one unconfirmed record from Lord Howe Island and several from New Zealand.

Status: Least Concern. **Global population:** 10,000-100,000 adult individuals with a declining population trend. They have become rare in Thailand and some other parts of southeast Asia. A field study on Kangaroo Island in South Australia has shown that nesting pairs in areas of high human disturbance (as defined by clearing of landscape and high human activity) had lower breeding success rates.

The white-bellied sea eagle is listed under the marine and migratory categories which give it protected status under Australia's federal Environment Protection and Biodiversity Conservation Act 1999. As a mainly coastal species, it is vulnerable to habitat destruction in Australia's increasingly populated and urbanized coastal areas, particularly in the south and east of the country, where it appears to have declined in numbers. However, there may have been an



increase in population inland, secondary to the creation of reservoirs, dams and weirs, and the spread of the introduced common carp (*Cyprinus carpio*). However, it is rare along the Murray River where it was once common. It is also listed as Threatened under Victoria's Flora and Fauna Guarantee Act (1988), with possibly fewer than 100 breeding pairs remaining in the state. On the 2007 advisory list of threatened vertebrate fauna in Victoria, the white-bellied sea eagle is listed as vulnerable.

There are fewer than 1000 adult birds in Tasmania, where the species is listed as Vulnerable under Schedule 3.1 of the Tasmanian Threatened Species Protection Act 1995. In Tasmania it is threatened by nest disturbance, loss of suitable nesting habitat, shooting, poisoning, trapping, and collision with power lines and wind turbines, as well as entanglement and environmental pollution. Estuaries are a favored habitat, and these are often subject to environmental disturbance. White-bellied sea eagles have been observed to increase their hunting ranges to include salmon fish farms, but the effect of this on breeding success is unknown.

Diet: Mainly aquatic animals, such as fish, turtles and sea snakes, but it takes birds, such as little penguins, Eurasian coots and shearwaters, and mammals as well. They may even steal food from their own species, including their mates.

It usually catches a fish by flying low over the water and grasping it in its talons. It prepares for the strike by holding its feet far forward (almost under its chin) and then strikes backwards while simultaneously beating its wings to lift upwards. Only one foot is used to seize prey.

The white-bellied sea eagle may also dive at a 45 degree angle from its perch and briefly submerge to catch fish near the water surface. While hunting over water on sunny days, it often flies directly into the sun or at right angles to it, seemingly to avoid casting shadows over the water and hence alerting potential prey.

Nesting: The sexes are similar with females being slightly larger. Adults have a white head, rump and underparts, and dark or slate-gray back and wings. In flight, the black flight feathers on the wings are easily seen when the bird is viewed from below. The large, hooked bill is a leaden blue-gray with a darker tip, and the irides are dark brown. The cere is also lead gray. The legs and feet are yellow or gray, with long black talons (claws). Unlike those of eagles of the genus *Aquila*, the legs are not feathered. The sexes are similar. The molting pattern of the white-bellied sea eagle is poorly known. It appears to take longer than a year to complete, and can be interrupted and later resumed from the point of interruption. A young white-bellied sea eagle in its first year is predominantly brown, with pale cream-streaked plumage on their head, neck, nape and rump areas. The plumage becomes more infiltrated with white until it acquires the complete adult plumage by the fourth or fifth year. The species breeds from around six years of age onwards. The lifespan is thought to be around 30 year.

The breeding season varies according to location. A pair of white-bellied sea eagles performs skillful displays of flying before copulation: diving, gliding and chasing each

other while calling loudly. They may mirror each other, flying 2–3 m (7–10 ft) apart and copying each other swooping and swerving. A talon-grappling displays where the pair will fly high before one flips upside down and tries to grapple the other's talons with its own. If successful, the two then plunge cartwheeling before separating as they approach the ground. This behavior has also been recorded as an aggressive display against a wedge-tailed eagle.

They usually choose tall trees or man-made pylons to nest in with good visibility to survey the surrounding area. The nest is a large deep bowl constructed of sticks and branches, and lined with such materials as grass or seaweed. Yearly renovations result in nests getting gradually bigger. Nests are built in the forks of large trees overlooking bodies of water. Old nests of wedge-tailed eagles or whistling kites have been renovated and used. Cliffs are also suitable nesting sites, and on islands nests are sometimes built directly on the ground. A breeding pair, with the male being more active, spends three to six weeks building or renovating the nest before laying eggs. Normally a clutch of two dull, white, oval eggs are laid and are incubated over six weeks before hatching. The young are semi-altricial, and covered in white down when they emerge from the egg. Initially, the male brings food and the female feeds the chicks, but both parents feed the chicks as they grow larger. Although two eggs are laid, it is unusual for two young to be reared successfully to fledging. One of the eggs is sometimes infertile or the second chick dies before fledging. If the first clutch is lost, the parents may attempt a second brood. Nestlings fledge when 70 to 80 days old, and remain around the parents' territory for up to six months or until the following breeding season.

Cool Facts: The white-bellied sea eagle was important to different tribes of indigenous people across Australia. The guardian animal of the Wreck Bay aboriginal community, it is also the official emblem of the Booderee National Park and Botanic Gardens in the Jervis Bay Territory. Known as *Manulab* to the people of Nissan Island, the white-bellied sea eagle is considered special and killing it is forbidden. Its calls at night are said to foretell danger, and seeing a group of calling eagles flying overhead is a sign that someone has died. Local Malay folk tales tell of the white-bellied sea eagle screaming to warn the shellfish of the turning of tides, and a local name *burung hamba siput* translates as "slave of the shellfish". Called *Kaulo* in the recently extinct Aka-Bo language, the white-bellied sea eagle was held to be the ancestor of all birds in one Andaman Islands folk tale.

The white-bellied sea eagle is also featured on the \$10,000 Singapore note and is the emblem of the Manly-Warringah Sea Eagles rugby league team.

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:

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- **"Illustrated Checklist of the Birds of the World. Volume 1: Non-passerines"** by HBW and BirdLife International
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- **Arkive.org** (<http://www.arkive.org>)

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