

▲ Herons and bitterns

(*Ardeidae*)

Class Aves
Order Ciconiiformes
Suborder Ardeae
Family Ardeidae

Thumbnail description

Medium to very large wading birds, typically with long legs and toes, long bills, and long necks, which are folded over the back when flying

Size

9.7–58.5 in (25–150 cm); 0.16–9.9 lb (73 g–4.5 kg)

Number of genera, species

16 genera; 62 species

Habitat

Inland and coastal wetlands, lakes and streams, grasslands, wet forests, coasts and estuaries, islands and agricultural areas such as rice fields and aquaculture ponds

Conservation status

Endangered: 3 species; Vulnerable: 5 species;
Near Threatened: 1 species



Distribution

Worldwide in tropical and temperate zones

Evolution and systematics

Herons, as far as is known, originated in the Eocene era about 60–38 million years ago. Specimens attributed to herons occur infrequently in later deposits. Herons are not well represented in the fossil record prior to the Pleistocene, probably owing to the slight structure of their bones. Missing from the record are birds clearly ancestral to what are now considered the more basal lineages of the heron family tree, the boat-billed heron (*Cochlearius cochlearius*), agami heron (*Agamia agami*), and the tiger herons. Therefore, the details of the evolutionary history of herons must be inferred primarily from modern species.

Present-day herons are a rather homogenous group of birds that have been lumped together taxonomically since Linnaeus's day. As part of the order Ciconiiformes, they are related most closely to storks, ibises, and spoonbills. They are related distantly to waterfowl, shorebirds, and pelicans, and even more distantly to such birds as loons, petrels, and albatrosses. The details of higher-level systematics among these birds may be amenable to modern molecular research techniques.

Over the decades, there has been much discussion about placement of a few relatively odd species, the shoebill (*Balaeniceps rex*), the hammerhead (*Scopus umbretta*), and the boat-billed heron. The first is most closely allied to storks, the second to pelicans, but the last is definitely a heron, but of a different sort. Together with the tiger herons, the boat-billed heron and agami heron appear to represent remnants of basal limbs of the heron evolutionary tree. In a recently proposed

taxonomic scheme, these species are considered to be representatives of distinct subfamilies—Cochleariinae, Agamiinae, and Tigrisomatinae.

The remaining herons encompass the typical herons and the bitterns. The bitterns, subfamily Botaurinae, appear to represent the herons most divergent from the primitive heron stock, a complete turnaround of systematic thinking of a few decades ago. Herons of the subfamily Ardeinae include the herons (tribe Ardeini), the egrets (tribe Egrettini) and the night herons (tribe Nycticoracini).

Within the five subfamilies and three tribes, about 62 currently recognized species are partitioned among 16 genera. Over the past several decades, anatomical and molecular studies have led to reassignment of species among infrafamilial categories, particularly among genera. Progress in heron systematics can be measured by noting that only a few decades ago, the large egrets were placed in the monotypic genus *Casmerodius* or in the genus *Egretta* and the terrestrial cattle egret was placed in a monotypic genus *Bubulcus* and later considered an *Ardeola* or an *Egretta*. It has recently been proposed that the yellow-crowned night heron (*Nyctanassa violacea*) is also more closely related to the egrets than to other birds called night herons, but additional study is called for.

Physical characteristics

Typical herons are relatively tall and thin, with relatively long necks and legs, large sharply pointed bills, large moveable



Black heron (*Egretta ardesiaca*) canopy feeding. (Illustration by Wendy Baker)

eyes, and broad wings. Their plumage is generally complex, featuring black, white, grays, or browns, and they have distinctive plumes. These fundamental heron features are primarily adaptations for wading in water in order to feed on fish and other aquatic prey and for communicating with other birds.

The long neck has 20–21 cervical vertebrae, the fifth through seventh having the articulation that gives the neck its characteristic kink. The neck is long enough to be folded over the back in an “S” shape when the bird is in prolonged flight, making a flying heron easily recognizable.

The long legs have feathers on the thighs but are otherwise featherless. The toes are long (including the back toe, which is on level with the rest) and slightly webbed. The claw of the middle toe has a serrated edge, which facilitates care of the plumage.

The heron bill is one of its defining characteristics. Most are elongated to effect the capture of quickly moving prey in a tweezer-like fashion following a rapid strike. Thin rapier-like bills are adaptations for fish eating, piercing through the water to capture fleeing prey. Bill color depends on species, and can vary with age and season. In some species bill color brightens and becomes more colorful during courtship.

Hérons have well-developed eyes with substantial capacity for movement. Typical herons have a tall but narrow field of binocular vision that is aimed forward and includes the zone under the bill down to the feet, to aid in sighting prey. The color of the iris of some species changes seasonally, or when agitated, and so is used for social signaling. The head is fully feathered and often distinctively marked by species, except for the area between the bill and eye, which often is featherless. These bare loreal patches are colored characteristically among the species, and their colors typically change during courtship and other interpersonal encounters.

Some herons are entirely white, gray, or black, while others have exceptionally complicated plumage. Plumage pattern is generally correlated with lifestyle. White-bodied herons are often highly social, feeding in flocks and nesting close together in colonies. Dark-plumaged herons tend to be more solitary, or have the capacity to be social or not as the situation requires. In other species the plumage is predominantly cryptic, featuring brown, white or buff stripes, speckles, or spots. This color scheme predominates among species that hide in reeds and bushes.

Heron plumage changes with age. The first downy plumage, which is generally gray or light brown, is immediately replaced

: first juvenal plumage. Generally an adult plumage is achieved by the time of first breeding. Pond herons change plumage seasonally.

As a general rule, the sexes are not distinguishable by the coloration of their plumage. During the breeding season, however, herons use feathers on the nape, back, crest, and wings as display plumes. These are particularly functional in aggressive encounters. Plumes also occur on the front of the upper neck, and back. The major types of heron plumes include filoplumes, which are elongated and hairy appearing; pinnules, which have long shanks and few barbs so that they are frayed; and lanceolate plumes, which are more like typical body feathers but with frayed edges.

Herons also have patches of friable downy feathers that provide a powder used for grooming. Most herons have three patches of down patches. The powder produced apparently keeps plumage water-repellent and probably cleans it as well.

The wings are broad, with nine to 11 primaries. The tail is short with 12 tail feathers in most species. Large herons appear to take flight with some difficulty, holding their head and legs dangling until they gain altitude. Smaller herons take flight more rapidly. Once in flight, herons fly well with endurance using slow, quiet wing beats and can travel long distances both on migration and to and from feeding grounds.

Distribution

Herons occur around the world, on all continents but Antarctica, and also on islands in all oceans. Herons occur in their greatest numbers and diversity in tropical zones. Many species range into the temperate zones, but their limits depend on the species-specific ability to nest in progressively shortened summer periods.

The herons (Ardeini) are found around the world. *Ardea* appears to be primarily an Old World genus, with 12 species there and only four in the New World, two of which are introduced. The three great herons, including the goliath heron, occur in Africa and Asia. *Butorides* herons also are widely distributed continentally, and also on many islands. Pond herons (*Ardeola*) also are Old World species, mostly Asian with two representatives in Europe and/or Africa.

The egrets (Egrettini) are worldwide, with no particular concentration area. Several *Egretta* are New World species, probably originating in South America and subsequently invading North America. The Chinese egret is the only Asian species. The night herons (Nycticoracini) likely are an Old World group. The bitterns (Botaurinae) also appear to be an Old World group, with only four of 11 species occurring in the New World. The tiger herons, agami heron, and boat-billed heron (Tigrisomatinae, Agamiinae, Cochleariinae) are tropical species, four from tropical Americas and one each from Africa and New Guinea.

Temperate-zone herons are generally migratory. Some species, such as the large herons, remain rather far north such as in Canada and Great Britain, although periodic severe win-



Tricolor herons (*Egretta tricolor*) mate in their nest. (Photo by M.H. Sharp. Photo Researchers, Inc. Reproduced by permission.)

ters can cause substantial mortality in these populations. Many species that breed in the tropics also migrate regularly according to the wet and dry seasons. Many species of herons tend to wander after nesting leading to a post breeding dispersal away from their nesting areas. Due to both postbreeding dispersal and overshoots on return migrations, herons often wander far from their normal range. As a result, herons stray to high latitudes, deserts, and mountains, as well as to far off islands and ships at sea.

The ranges of some species are changing. Some in the Northern Hemisphere are expanding their ranges northward. In contrast, the large bitterns are experiencing range contraction. Some species are changing their ranges transcontinentally.

Habitat

Herons are generally aquatic birds, and the typical heron is seen feeding by standing or walking in the shallow water of a marsh or pool. However, herons use a wide array of wet and dry habitats. They may be habitat specialists or habitat generalists.

Inland wetlands are typical habitats for herons. Tree swamps are particularly favored because they provide not only foraging habitat, but also trees and bushes for roosting and for nesting. Herbaceous marshes also are used by herons worldwide. Some species, such as bitterns and the purple heron, are specialists in living among dense emergent vegetation.

Herons also feed in more open areas, such as the shallow edges of lakes, ponds, pools, and lagoons, where they tend to feed along the edges in shallow water. In these situations it is not unusual to see species arranged out from shore according to leg length, with taller birds foraging in deeper water and shorter birds at shallower sites.



Great blue heron (*Ardea herodias*) breeding pair in courtship display in Venice, Florida. (Photo by C.K. Lorenz. Photo Researchers, Inc. Reproduced by permission.)

Running water is exploited by species that feed along the banks, either by perching on overhanging trees or by feeding from the bank itself. Herons also perch on rocks, and the larger herons can withstand current sufficiently to wade into running water, although within limits. Placid streams and ditches are more commonly used by many species.

Tidal environments are of critical importance for many species. Tidal creeks, tidal mudflats and bars, salt marshes, mangrove swamps, coastal lagoons, and beaches are all used by herons. The tidal cycle determines the daily schedule of species feeding in tidal environments. They feed when conditions are appropriate, usually around the outgoing tide, and then move to nontidal habitats to continue feeding or to roost during the high tide periods. Species depending on tidal flux, especially the night herons and large herons, may also feed at night.

Artificial environments have become essential habitats for many populations. Reservoirs, farm ponds, and ditches provide aquatic or semi-aquatic habitat. Lands designated for agriculture and aquaculture are of even more importance. Rice fields have become critical habitat for herons around the world. Aquaculture provides concentrated prey of the sort that herons customarily eat. Young birds particularly may be attracted by these sources.

Despite the aquatic origins of the group, herons also use terrestrial habitats either occasionally or predominantly. Some species, such as the cattle egret and black-headed heron (*Ardea melanocephala*), are predominantly terrestrial and inhabit natural grasslands and pasturelands. Many other species of herons and egrets feed on dry land at least occasionally.

Herons nest in many sorts of habitats that afford proximity to feeding areas and protection from predators. Colonial

herons use islands off shore and in lakes or rivers. Herons nest on islands of vegetation composed of trees or bushes surrounded by marsh or swamp. They also nest in tall trees, either within expansive forests or in coppices. On safely isolated islands, herons may nest on the ground, on rocks, on in cave entrances. Many species of herons nest in reed beds.

Behavior

For most herons standing is a principal feeding behavior and they spend much of their day or night resting or roosting. Many herons are sit-and-wait predators that lie in wait for prey to make itself apparent. Waiting herons can keep quite still for many minutes. Depending on species and circumstance, they stand crouched, upright, or fully erect. Crouched postures lower visibility to prey and allow the strike to occur closer to the water. In the upright posture, the body and neck are angled above the water allowing more scanning for prey than the crouched posture.

Herons may walk in the water, on the ground, over grass, or in bushes and trees. Walking herons generally move about in search of prey or stalking individual prey. Walking may be very quick or so slow as to be nearly imperceptible. Some herons run and hop from place to place in search of better feeding opportunities.

In feeding, the heron makes maximal use of its head and neck. Fish and other prey are caught after a quick movement of the head and neck. The usual method is a bill stab in which the heron issues a downward or lateral strike with the head and neck. Shorter-necked herons capture prey by bill, thrusting forward the bill, head, neck, and body, in a sort of a head-first leap. Herons also feed by more subtle methods, such as probing into mud or vegetation, pecking the ground, or gleaning insects off plants.

In most species, herons need adequate vision to see their prey before stabbing it. Other than the challenge of identifying something in the water as edible, the heron's most substantive problem is refraction of light in the water, and they compensate for the fact that their underwater prey is not actually located where it appears to be. Herons also move their heads around to compensate for reflection off the water's surface. They move their heads side to side to better locate prey binocularly and also sway both the head and neck side to side or backward and forward, a behavior also used among land-dwellers.

Herons attract or startle prey in several ways. Several medium-sized egrets have yellow feet contrasting with dark legs. They stir, rake, and wiggle their feet to attract prey or stir it into movement. *Butorides* herons attract prey by placing food items (such as dog food or corn) or imitation food (such as sticks or feathers) in the water and catching prey that the bait attracts. Some egrets also attract fish by putting their bill in the water and opening and closing it quickly, creating ripples to attract fish.

Many herons are highly social. They tend to gather in feeding sites where prey is particularly available, forming multi-species aggregations that can number in the hundreds or eve

thousands of birds. Most herons, the bitterns being the primary exception, nest in colonies, often of mixed species. Other species are solitary or occur in more well-dispersed pairs. In a few instances family groups may occupy a single area. Many species choose between being solitary and aggregative depending on food availability.

All herons defend themselves and their immediate surroundings with ritualistic bill lunges called forward displays. Herons at a nest site will shake twigs vigorously. A bird may also attack another by running or flying at it to supplant it from its site. Herons fight with their bills, wings, and feet. When hundreds of herons of several species gather at feeding sites, they jockey for position, open their sharp beaks, spread their wings, and rush at their enemy. Individual fights can last half an hour.

Another behavioral interaction among herons is prey theft. Large herons steal prey from smaller ones, and other birds steal prey from herons. A heron with a large or uncooperative fish must subdue it by biting, bashing, or stabbing. This delays swallowing and allows other birds to steal the fish. The attacking heron runs or flies at a victim in its attempts to steal the prey. The threat of theft may even influence the choice of prey, and a heron may sometimes pass up a larger prey item in favor of a smaller one.

Feeding ecology and diet

Herons are primarily fish-eating birds. Most species wade about looking down into the water and capture fish they see by a rapid thrust of their long sharp bill. Given their feeding method, herons can catch fish at or near the water's surface. Fish must be visible and also shallow enough that they cannot swim away before the heron can get its beak around them. Large herons can capture large fish. Lungfish are an important prey for the largest herons. The mosquitofish (*Gambusia affinis*), introduced around the world, is taken by small and medium-sized herons in great numbers wherever it occurs. Overall, many fish species can be captured by herons.

The second most common type of prey for herons is crustaceans. Crabs occur primarily in marine and estuarine environments, although some occur well inland in the large rivers and on land. In freshwater, burrowing crayfish and small shrimp are important prey. Crayfish, shrimp, and prawns are farmed in many parts of the world; herons are attracted to these sites to partake of the easy feast.

Amphibians are another important prey for herons. Frogs and toads are frequently caught, as are their tadpoles. Salamanders are less common. Insects, especially aquatic insects, are an important food source for herons. Both adults and larval forms are picked up from the water or submerged plants and rocks. Terrestrial herons primarily eat insects. Flies, dragonflies, and similar insects are often taken. Other food may include snails, bivalves—both freshwater and marine—small mammals, birds, and reptiles. Reptiles are most often an important part of heron diet on islands.

Black-crowned night herons also feed on nesting gulls, terns, or other herons in colonies. Other herons are reported



Female (left) and male little bitterns (*Ixobrychus minutus*) with chicks at their nest. (Photo by J.C. Carton. Bruce Coleman Inc. Reproduced by permission.)

to take birds as they become available. As far as is known, herons are entirely carnivorous. However, there have been reports of herons purposefully eating fruits, and vegetation may be taken along with fish.

Many species of herons aggregate to forage for several reasons. Herons are adept at finding and then exploiting ephemeral patches of highly concentrated food. Therefore, aggregations develop at places where food supply is high. This sharing of food-finding information is called local enhancement. Feeding locations for social herons change hourly, daily, and seasonally.

In some cases of aggregate foraging, the participating herons gain an advantage in that the mass of birds stir up the prey, which makes the animals more vulnerable to capture. Herons also achieve commensal benefits from following the paths of other birds or mammals in search of prey those animals may have disturbed.

In contrast, some herons are always solitary or occur in pairs. The great herons and large herons (*Ardea*) tend to feed alone.



A black-crowned night heron (*Nycticorax nycticorax*) with a fish in Pima County, Arizona. (Photo by John H. Hoffman. Bruce Coleman Inc. Reproduced by permission.)

However, when the occasion presents itself, they will join mixed species aggregations. Birds that feed alone have freedom from the disturbance of their potential prey by other animals. These birds also defend their feeding areas from invasion.

Reproductive biology

Most species of herons are serially monogamous. Although some birds return to the same site to nest year after year, many birds tend to move nests or even change nesting areas from one season to the next. As a result, pair bonds tend to be formed anew each season. For social nesters, despite monogamous pairing, promiscuous mating behavior can be common. Extra-pair mating usually occurs among individuals nesting near each other.

Bitterns and tiger herons are generally solitary nesters. More species of herons are colonial, nesting in single-species or mixed-species aggregations that can number from a few birds to hundreds or even thousands of birds. Along with other herons, colonies may include pelicans, cormorants, ibises, spoonbills, storks, and also crows and raptors. Herons tend to partition the nesting habitat, often with the larger birds on the top of trees or bushes and the smaller species underneath. Nest defense by parents is essential in a colony. Some species, such as cattle egrets, are particularly aggressive and may take over nests of other species.

Males tend to arrive at colony sites first at the future colony and claim display sites, which they defend against other birds. They give spontaneous displays and calls that attract potential mates and defend the sites. During the advertising period, a stretch display is the most universal among typical herons and egrets. The display consists of lifting the head to vertical, perhaps calling, and then bringing it down again, perhaps with a snap of the bill. Later in the nesting season, this display is also used between the mating pair. With the snap display, the bird erects head and neck feathers and extends its neck with a snap of its bill. Herons may combine snaps and stretches, bow, shake twigs, fly about the colony in circles, flip their tails, shake their feathers loosely, preen, and mock preen. After pairing, the birds give landing calls and a greeting ceremony that permits the returning mate access to the nest site.

Following courtship, the pair builds the nest. Nests are made of sticks or reeds, depending on species and nesting site. The eggs are typically blue, but may be white, greenish, or olive-brown; a few species have spotted eggs. Clutch size can range up to 10, but for most species is three to five. Incubation lasts from two to four weeks depending on the species and size of the bird. Larger birds' eggs incubate longer. Except for large bitterns, both parents incubate, taking turns.

Newly hatched young are covered with sparse down, have closed eyes, and are unable to walk, but the birds grow quickly. Both parents tend the young. They bring food in their stomachs or throats to the nest and then regurgitate it first into the beaks of the young, and later onto the edge of the nest.

Because incubation begins before the clutch is completed, the young hatch at different times. The oldest get a head start and dominate the youngest siblings in competition for food, which the parents provide preferentially to the most persistent chick. Usually the younger chicks die, either by starvation or through harassment by older chicks. How many chicks die depends on the ability of adults to supply food and the health of older chicks.

One parent broods the young for one to two weeks and continues to guard them for a bit longer. While one parent is guarding, the other forages. Chicks learn to fly gradually within the colony. Colonial species do not feed young after they fledge.

Conservation status

Many heron species remain abundant, and some are expanding their ranges and populations. Large herons often occur in rural and even urban areas. Many species use rice paddies, farm ponds, and aquaculture facilities; in fact, some populations have become dependent on them. Herons nest in artificial lakes, urban parks, and zoos, and feed along roadside ditches. Reservoir construction has increased available habitat, especially in otherwise arid areas that are inhospitable to herons.

Some species or populations in certain areas, however, teeter on the verge of extinction. *The 2000 IUCN Red List of*

Threatened Species lists three species as Endangered (*Ardea insignis*, *Gorsachius goisagi*, and *G. magnificus*), five species as Vulnerable (*Ardea humbloti*, *A. idea*, *Egretta eulophotes*, *E. vinaceigula*, and *Botaurus poiciloptilus*), and one species as Near Threatened (*Zonerodius heliosylus*). The primary threat for all species is habitat destruction and alteration, in some cases exacerbated by hunting. The most important habitat alteration involves the widespread destruction of wetlands, lowland forests, and coastal swamps and lagoons. Hunters take eggs, chicks, or adults.

Protecting and managing habitat is by far the most critical issue in heron conservation. Colonial species require nesting substrate, usually bushes and trees. Because the nesting activity can stress the plants through breakage, defoliation, and excess nutrient deposition, colony sites degrade over time, requiring either active management or the provision of alternative sites. Most solitary nesting herons need relatively large patches of marsh or forest in which to nest, although some tiger herons nest in a single isolated tree. Herons need feeding habitat throughout the year. For migrating species, this means during nesting, migration, and wintering periods. Fortunately, the habitat needs of herons coincide with those of waterfowl and other aquatic birds, making it possible for heron habitat protection to be part of larger wetland and forest conservation strategies.

Hunting is an important issue in worldwide heron conservation. Hunting for food and for body parts continues in China and Madagascar. Herons are killed at fish farms and other aquacultural facilities. Herons are killed by accidents, sport shooting, and cases of acute chemical contamination.

Significance to humans

Humans have certainly always been aware of heronries, and were probably one of the few ground predators that could access them for easy food. Many colonies occurred in places that were relatively inaccessible to early humans. Official protection afforded herons in the recent years was probably the exception rather than the rule worldwide. Herons were seen along watercourses and other places where men fished, and in these circumstances humans fostered an attachment to the birds. This relationship probably has peaked with the people of Manchar, Pakistan, who for a thousand years or more have kept herons as honored pets.

Hérons have not figured in folklore to the extent that storks or some other birds have. Mention of herons nonetheless goes back to the Old Testament, ancient Egypt, and Hindu culture. The booming of the large bitterns has long been held as a bad omen in several cultures. But the graceful heron is often used



Snowy egret (*Egretta thula*) nestlings beg food from an adult. (Photo by M.H. Sharp. Photo Researchers, Inc. Reproduced by permission.)

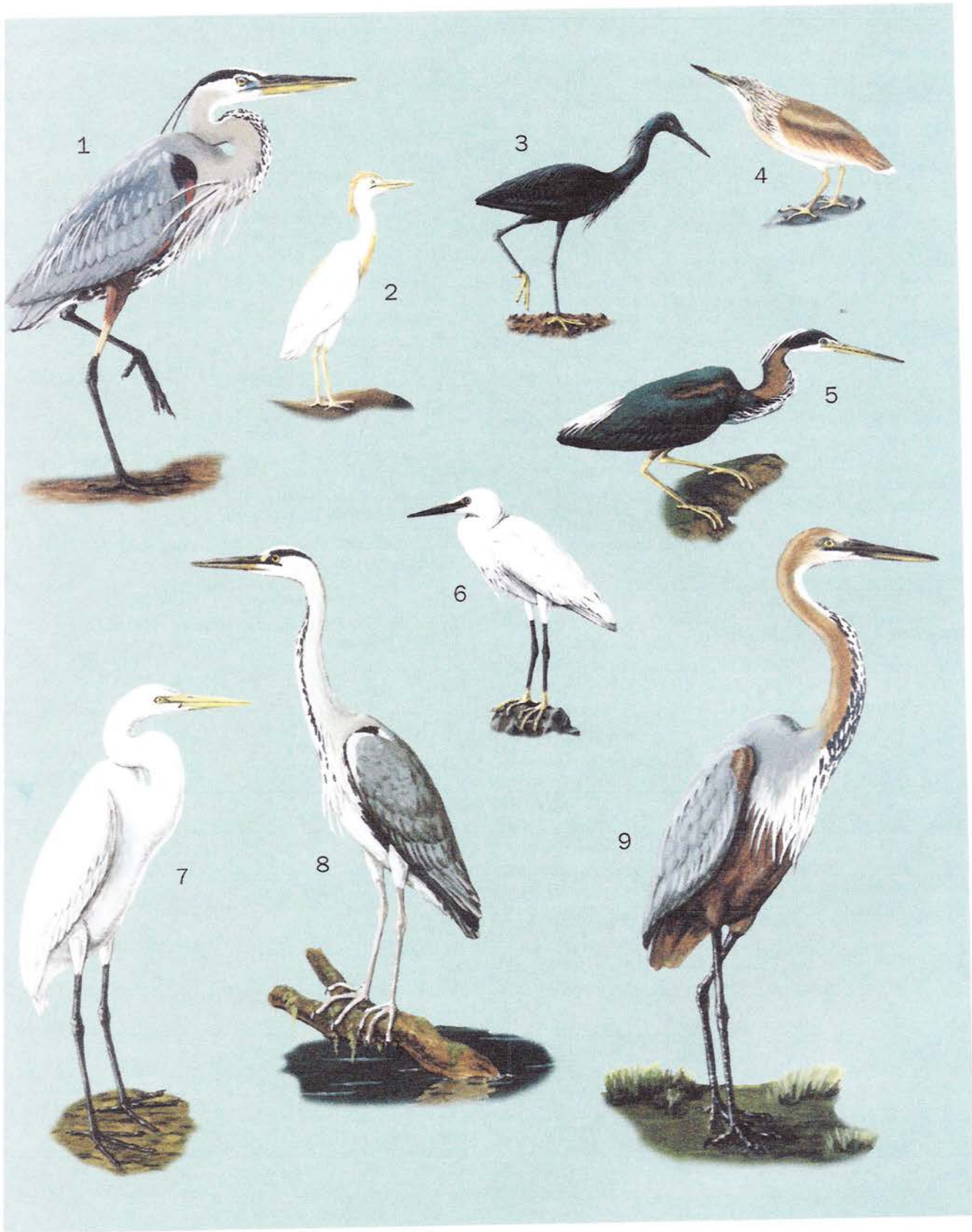
as a symbol of natural beauty and grace in contemporary societies, and so the bird is a subject of poems and books.

Humans have long appreciated and used heron feathers. The decorative plumes of the large white and little egrets served as expensive head decorations for the Hungarian nobility and the Turks in the Middle Ages. By the late 1800s and early 1900s, birds and their feathers were quite valuable and widely used in Europe and elsewhere for ornament, particularly on hats. London became the center of the European plume market, and colonies of birds on the Danube and Theiss Rivers were among those devastated by plume-collecting expeditions. Colonies were hunted in both southern North America and through tropical America. All birds with useful plumes were killed and their feathers plucked. Non-target birds nesting in the colonies were disrupted and orphaned young died. In 1902, 3,012 lb (1,366 kg) of egret plumes were sold in London. This meant that 192,960 egrets were killed to supply the demand.

Never in their history have herons been so dependent on another species as they are on humans today. Worldwide, colony sites are protected or threatened by people. Feeding sites are part of parks, refuges, and other protected environments. Elsewhere, human destruction of mature wet forests, wetlands, and coastal environments affect populations profoundly. It is likely that herons are more and more coming to depend on their relationships with humans for their continued survival.



1. Boat-billed heron (*Cochlearius cochlearius*); 2. Least bittern (*Ixobrychus exilis*); 3. Black-crowned night heron (*Nycticorax nycticorax*); 4. Eurasian bittern (*Botaurus stellaris*); 5. White-eared night heron (*Nycticorax magnificus*). (Illustration by Gillian Harris)



1. Great blue heron (*Ardea herodias*); 2. Cattle egret (*Egretta ibis*); 3. Black heron (*Egretta ardesiaca*); 4. Squacco heron (*Ardeola ralloides*); 5. Gami heron (*Agamia agami*); 6. Little egret (*Egretta garzetta*); 7. Great egret (*Ardea alba*); 8. Gray heron (*Ardea cinerea*); 9. Goliath heron (*Ardea goliath*). (Illustration by Brian Cressman)

Species accounts

Gray heron

Ardea cinerea

SUBFAMILY

Ardeinae

TAXONOMY

Ardea cinerea Linnaeus, 1758, Sweden. Four subspecies.

OTHER COMMON NAMES

French: Héron cendré; German: Graureiher; Spanish: Garza Real.

PHYSICAL CHARACTERISTICS

A large gray heron (35–39 in [90–98 cm]) with white and black accents, a white crown with black plumes, black belly, and white thighs. Weight is 2.2–4.6 lb (1–2.1 kg)

DISTRIBUTION

Most of the Old World, including Europe, Africa, Asia, East Indies islands.

HABITAT

Typically found in and around shallow water, generally along watercourses and shorelines, and usually in locations having roost trees nearby. They may occur in inland fresh waters, along estuaries, or in marine habitats.

BEHAVIOR

Stands or walks slowly in or around shallow water. Flies to and from roosts and nesting colonies.

FEEDING ECOLOGY AND DIET

Usually hunts solitarily, but may feed in loose aggregations or mixed species flocks. Eats mostly fish, but also small mammals and amphibians. Young birds often use fish farms.

REPRODUCTIVE BIOLOGY

Nests solitarily or in colonies. Time of nesting differs according to range. In temperate areas, breeding season is restricted

to spring and summer; in the tropics nesting is more flexible, usually in the wet season. Nest is a stick platform located high in a tall tree. Clutch size is normally four to five in Europe, three in the tropics. Incubation is 25–26 days (21 in tropics); chicks fledge in 50 days.

CONSERVATION STATUS

Not threatened. A rare light-colored population nesting in coastal Mauritania deserves special conservation attention.

SIGNIFICANCE TO HUMANS

Hunted in the Middle Ages, and well appreciated as falconry targets. In the present day, humans most frequently encounter the birds along rivers and at fish farms, where young birds occur frequently. They are killed in these situations in great numbers. ♦

Great blue heron

Ardea herodias

SUBFAMILY

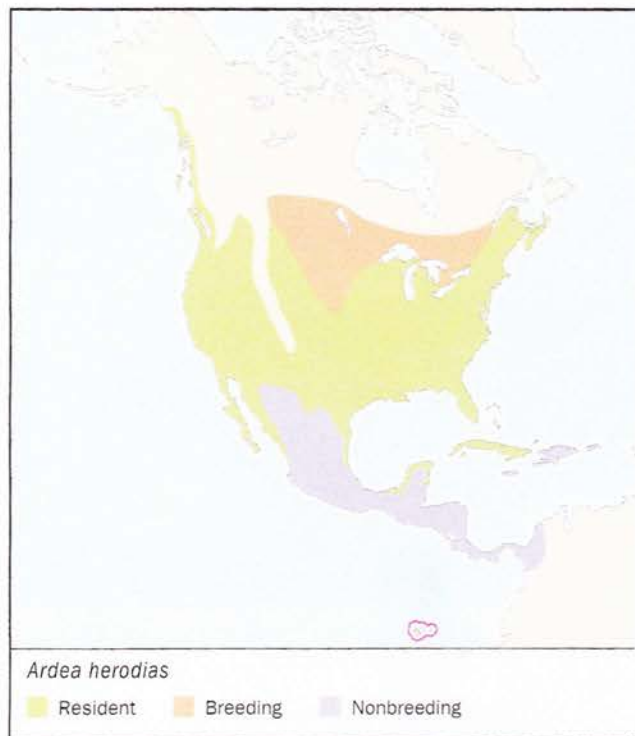
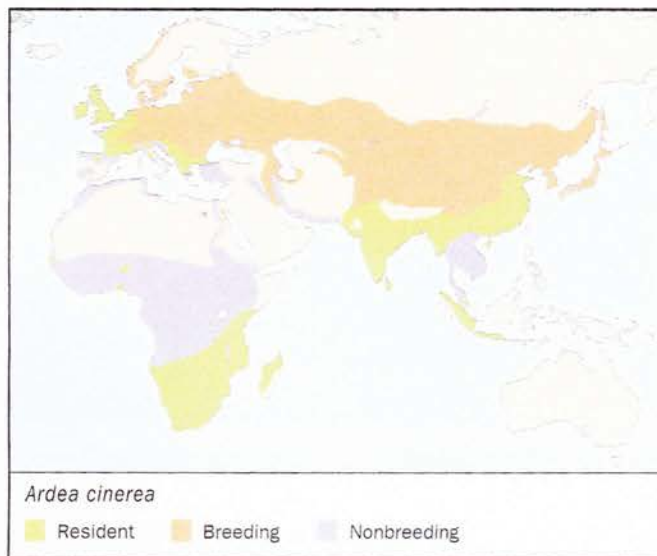
Ardeinae

TAXONOMY

Ardea herodias Linnaeus, 1758, Hudson Bay. Five subspecies.

OTHER COMMON NAMES

English: Great white heron (white birds), Würdemann's heron (dark-white intermediate); French: Grand héron; German: Kanadareiher; Spanish: Garza Azulada.



PHYSICAL CHARACTERISTICS

A large, dimorphic heron. Length is 36–54 in (91–137 cm); weight is 5–8 lb (2.3–3.6 kg). Dark gray heron has chestnut thighs and a white cap over a black eye stripe. Light birds are all white.

DISTRIBUTION

Breeds throughout much of North America except for high mountains and deserts; also in Central America and on certain islands in the Caribbean and Pacific. Nonbreeding range includes much of coastal and southern North America, West Indies, coastal Mexico, Central America, rarely to Panama and northern South America as far as Brazil.

HABITAT

Deep water to dry land. Uses freshwater and salt marshes, mangrove swamps, estuaries, meadows, flooded agricultural fields and pastures, lake and seashores, river banks, dry land pastures, coastal lagoons, mangroves, tidal flats, and sea-grass flats.

BEHAVIOR

Stands in shallow water and roosts in nearby woody vegetation. Feeds in the water or at its edge. Flies with strong slow wing beats, with its head held back. When disturbed, it gives a harsh call.

FEEDING ECOLOGY AND DIET

Eats large fish, but takes small and large animals of all sorts. Feeds mostly by stalking prey; it also feeds by diving or swimming. Commonly seen near fishing boats and at aquacultural ponds. They feed by day or night. Along the coast, the feeding schedule depends on tides. Feeding sites are often defended.

REPRODUCTIVE BIOLOGY

Begin nesting in the late winter and spring. In tropical areas, they can nest nearly year round. They nest alone, or more commonly in small colonies. Nests are in tall trees with nearby

aquatic feeding areas, consisting of are stick platforms 20–39 in (0.5–1 m) across. Clutch size is two to seven, increasing from south to north. Incubation takes about 28 days. Mortality of chicks is often high; one to two are usually fledged.

CONSERVATION STATUS

Not threatened. A population found in southern Florida and the Caribbean consists of many all-white birds and is of conservation concern due to its limited range.

SIGNIFICANCE TO HUMANS

Probably the best known and appreciated heron in North America. However, it suffers conflict with aquaculture operations. Human disruption of habitat in Florida Bay has lowered the natural reproductive capacity of the highly localized white plumaged population. ♦

Great white egret

Ardea alba

SUBFAMILY

Ardeinae

TAXONOMY

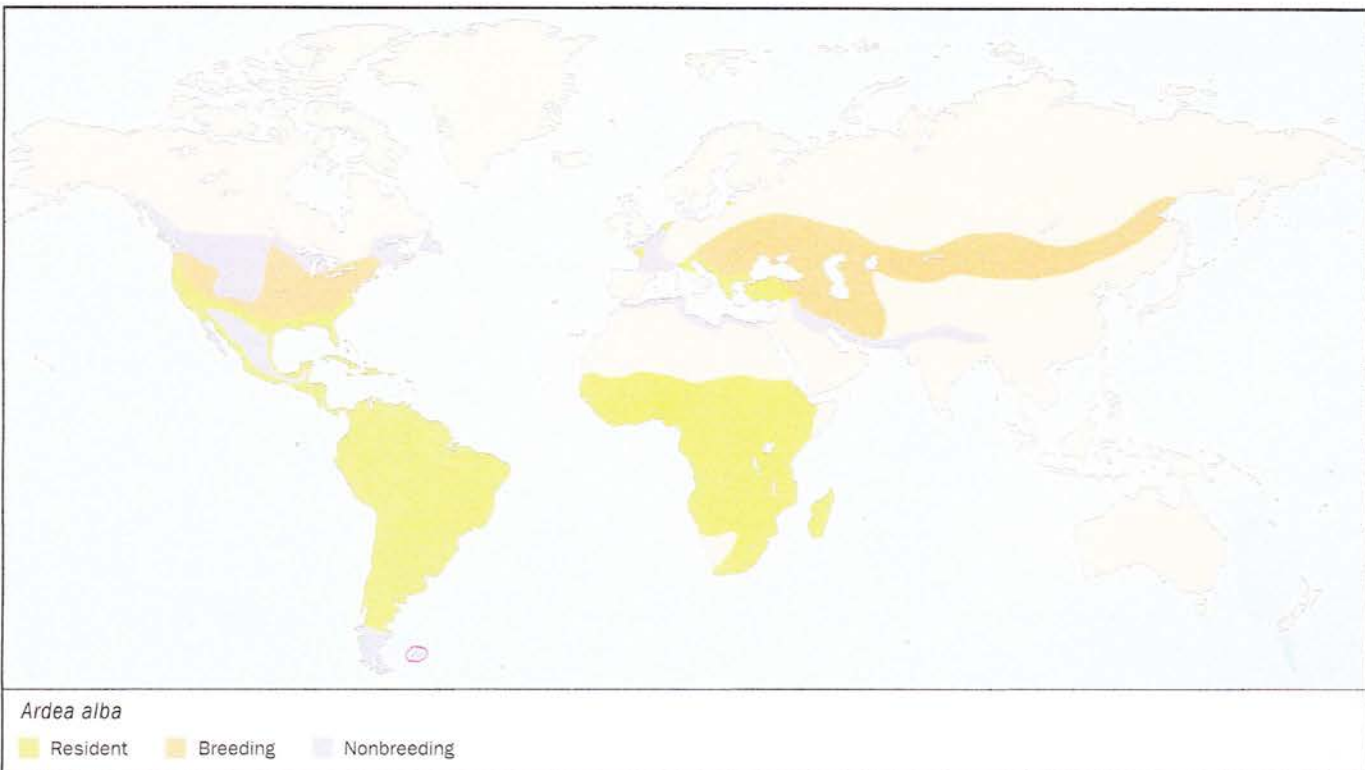
Ardea alba Linnaeus, 1758, Europe. Four subspecies.

OTHER COMMON NAMES

English: Great egret; French: Grande aigrette; German: Silberreiher; Spanish: Garceta Grande.

PHYSICAL CHARACTERISTICS

A large, slender, white heron, with long neck, dark legs, and long back plumes when breeding. Length is 31–41 in (80–104 cm); weight is 1.5–3.3 lb (0.7–1.5 kg).



DISTRIBUTION

Occurs through most of North, Central, and South America; east Europe, Africa, and north Asia.

HABITAT

Uses a variety of wet habitats, including marshes, swamps, river margins, lake shorelines, flooded grasslands, sea-grass flats, mangrove swamps, coastal lagoons, and offshore coral reefs. Also uses artificial sites such as drainage ditches, rice fields, crawfish ponds, and aquaculture ponds.

BEHAVIOR

Stands or walks about alone or in groups. Roosts in trees when not feeding and repairs to communal roosts at night.

FEEDING ECOLOGY AND DIET

Feeds in shallow to moderately deep water, on shore next to the water, or on dry ground. Feeds usually during the day, most actively near dawn and dusk; in tidal environments, feeds principally on outgoing tides day or night. Walks about slowly to feed, using its long neck and head to tilt, peer, and sway to better see fish. Also hops and flies, using its wings and feet to disturb prey. When feeding solitarily, it will vigorously defend its site. Highly aggressive in flocks, defending its feeding area using displays and attacking nearby birds, often stealing their prey. Principal food is fish, but in some situations insects or shrimp predominate. May also eat frogs, lizards, snakes, small mammals, and small birds.

REPRODUCTIVE BIOLOGY

Temperate birds breed in the local early spring and summer but in more tropical situations rains are more important than solar season and breeding varies from place to place and even from year to year. They usually nest in the part of the rain cycle in which food becomes maximally available. They nest in a variety of situations in trees, bushes, bamboo, reeds and other plants near water and on islands, sites that are protected from ground predators. The nest is 31–47 in (80–120 cm) wide. The eggs are pale blue and clutch size is usually three to five (range is 1–6), being smaller in the tropics. Incubation lasts about 25–26 days. Young leave the colony in 42–60 days. Brood reduction is the rule.

CONSERVATION STATUS

Not threatened. Breeding colonies are declining due to human plundering in Madagascar, however. Throughout its range the most critical conservation issue is identification, protection, and management of important nesting sites and associated feeding grounds.

SIGNIFICANCE TO HUMANS

Its long breeding plumes were some of the most sought after during the plume-hunting era. Currently it is coming into conflict with humans in aquacultural situations in North America and elsewhere. However, the species is well appreciated and has long been used as a symbol of bird conservation in North America. ♦

Goliath heron

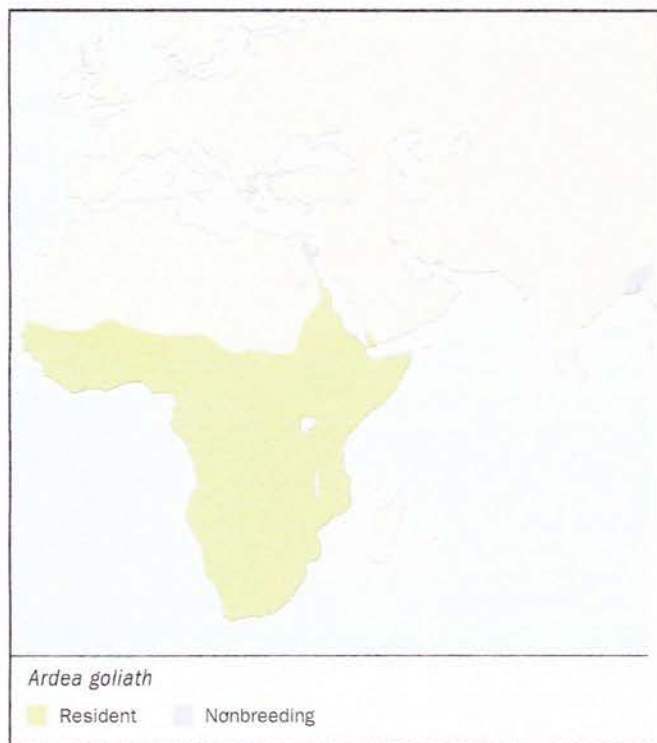
Ardea goliath

SUBFAMILY

Ardeinae

TAXONOMY

Ardea goliath Cretzchmar, 1826, Bahr el Abiad.

**OTHER COMMON NAMES**

French: Héron goliath; German: Goliathreiherr; Spanish: Gar. Goliath.

PHYSICAL CHARACTERISTICS

The largest modern heron, it is gray with chestnut head, neck and belly. Length is 53–55+ in (135–140+ cm).

DISTRIBUTION

Africa, the Middle East, and the Indian subcontinent.

HABITAT

Aquatic heron of both coastal and inland habitats, rarely wading far from water. Occurs along the shallow water margins of large lakes, lagoons, and large river systems; also in tidal estuaries, reefs, and occasionally mangrove creeks and water holes in woodland savanna.

BEHAVIOR

A solitary hunter that defends large feeding territories. Stands in or near the water, or walks slowly, waiting for prey to appear. Moves to new areas by walking quickly or hopping.

FEEDING ECOLOGY AND DIET

Because of its size, this heron can wade well away from shore. Fish are caught by a lunging bill thrust that captures the fish deep in the water. It often spears them, running both mandibles through the prey. The fish is placed on the top of floating plants and killed by restabbing, beating, and poking with the bill. One-quarter of prey may be lost by escape or through piracy by other fish predators. Diet consists almost entirely of fish; they also will eat prawns, frogs, lizards, snail and small mammals.

REPRODUCTIVE BIOLOGY

Breeding season coincides with the start of rains. Some populations breed year-round, and others may not breed every year.

ing is solitary, near colonies, and within single-species or d-species colonies. Solitary birds nest on riverbanks, shores, and small islands. Nest sites include sedge, reeds, l trees, low bushes, mangroves, and cliffs. On islands, any shrub, stone, or bare ground available can be used. The is a large platform made of sticks or reed stems at least 4.9 ft (1–1.5 m) in diameter. Eggs are pale blue, and the l clutch is three or four, ranging from two to five. Young e at about five weeks. Older young can trample younger rgs, leading to brood reduction. Production is one or two ig per successful nest.

CONSERVATION STATUS

threatened. However, the status of this species is currently own in south Iraq/Iran and the Indian subcontinent, ce birds are infrequently reported.

SIGNIFICANCE TO HUMANS

l known in its range, but little is understood of important cts of its biology. ♦

Little egret

Egretta ibis

FAMILY

Ardeidae

ONOMY

Egretta ibis Linnaeus, 1758, Egypt. Three subspecies.

OTHER COMMON NAMES

English: Buff-backed heron; French: Héron garde-boeufs; German: Kuhreiher; Spanish: Garcilla Bueyera.

PHYSICAL CHARACTERISTICS

A short-legged white egret. Has a relatively short yellow bill, and in breeding season attains a buff wash over much of its body. Length is 18–22 in (46–56 cm); weight is 12–14 oz (340–390 g).

DISTRIBUTION

Mid latitudes to warm temperate zone in North America and South America, Europe, Africa, Asia, and Australia.

HABITAT

Forages in native grasslands and in pastures alongside hoofed livestock. Also uses irrigated alfalfa fields, dumps, parks, athletic fields, golf courses, meadows, rice fields, lawns, and road margins. Nests in colonies with other wading birds, usually on islands over or surrounded by water.

BEHAVIOR

Walks slowly adjacent to moving cattle or other hoofed stock and may perch on these animals as they rest or move from place to place. Walks with the head alternately withdrawn and then pulled forward with each step, a gait characteristic of the species. Cattle egrets are among the most social of herons, forming small and large flocks on their feeding grounds. Feeds during the day, most actively in the morning and afternoon. During midday and at other times when grazing stock rest to ruminate, foraging flocks often loaf with other birds in trees or on the ground near the resting herd. At night, it roosts with other species, sometimes in the thousands.

FEEDING ECOLOGY AND DIET

Captures food made obvious by the movement of cattle, native large mammals, birds, or tractors. In Africa, its primary natural beater was probably the African buffalo (*Syncerus*) but also follows many other species. Locusts, grasshoppers, and crickets



Egretta ibis

Resident Breeding Nonbreeding

are the common element of its diet worldwide. Other insects also eaten include flies, beetles, caterpillars, dragonflies, mayflies, and cicadas.

REPRODUCTIVE BIOLOGY

Nesting season varies according to food availability. In the temperate north, it nests in spring and summer. In the tropics, nesting occurs at the end of the rainy season, as grasslands are drying out. The birds are highly colonial, breeding in mixed-species colonies of a few hundred pairs to several thousand pairs. The nest is made of reeds, twigs, or branches, 16 in (40 cm) wide. Eggs are white with a pale green or blue tinge, broad oval and somewhat pointed, lighter than most other medium-sized egrets. The clutch is usually four to five eggs. Incubation lasts about 24 days. Parents share care of the chicks. Young are guarded until day 10, leave the nest and climb in nearby branches at two weeks, fledge at 30 days, becoming fully independent in 15 more days. Nesting success is usually fairly high.

CONSERVATION STATUS

Probably the most abundant heron in the world.

SIGNIFICANCE TO HUMANS

Usually is easily recognized and not persecuted on its feeding ground in that it is perceived to be beneficial or neutral to cattle activities. However its tendency to develop large new colonies in and near towns and villages creates what may be perceived to be public nuisances. Efforts to control the populations can adversely impact other herons, whose conservation status may be more of a concern. ♦

Squacco heron

Ardeola ralloides

SUBFAMILY

Ardeinae

TAXONOMY

Ardea ralloides Scopoli, 1769, Carniola. Monotypic.

OTHER COMMON NAMES

French: Crabier chevelu; German: Rallenreihler; Spanish: Garcilla Cangrejera.

PHYSICAL CHARACTERISTICS

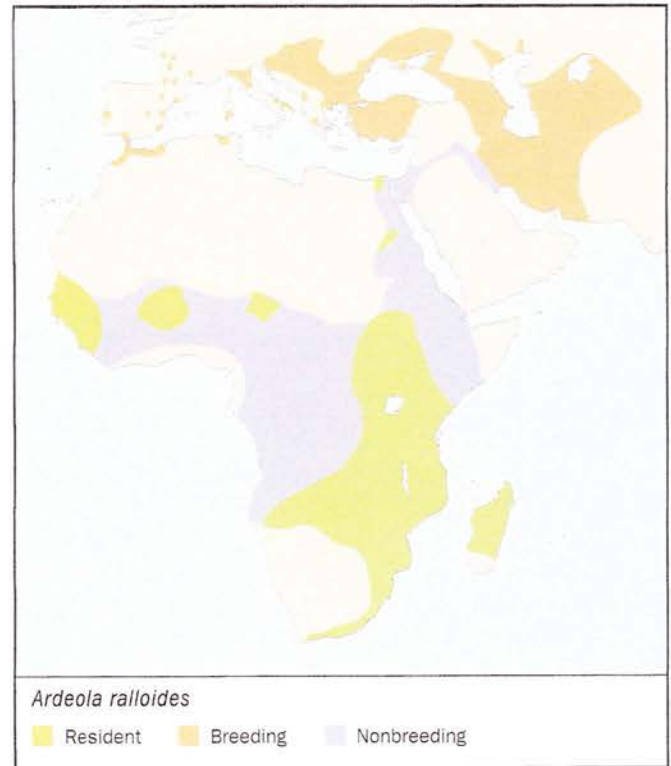
Tawny buff brown with a streaked head, crest, and back, and light belly. Length is 16.5–18.5 in (42–47 cm); weight is 8–13 oz (230–370 g). In breeding it develops a distinctive black and white mane. Immature birds are similar to adults in nonbreeding plumage, but drabber and lack crest and back plumes.

DISTRIBUTION

Occurs in Europe, Africa, Madagascar, and the Middle East to Iran.

HABITAT

Occurs in dense marshes—shallow fresh water with a cover of reeds and dense bushes. Its principal habitat throughout its range is now rice fields. It also occurs in ponds, canals, ditches, irrigated land, similar shallowly flooded areas. Seacoasts, reefs and islands are used on migration. For nesting, it tends to prefer dense trees and shrubs near its feeding areas.



BEHAVIOR

Often overlooked because it blends into dense vegetation. Roosts in groups, using sheltered woods or reed beds. The alarm and flight call given when disturbed or when flying to and from roosts is highly recognizable, giving the bird its name.

FEEDING ECOLOGY AND DIET

Typically feeds by searching for prey in a standing, crouched posture, either in the open or among the reeds. Usually feeds alone, defending its territory, although it also feeds in small groups or large flocks in winter and on migration. Feeding success is higher for solitary birds than those feeding in flocks. Feeds during the day, especially at twilight. Diet is relatively small prey, particularly fish, frogs, and tadpoles, as well as insects and insect larvae.

REPRODUCTIVE BIOLOGY

Hérons in Europe and North Africa nest from late spring to summer. In tropical Africa, it breeds primarily in the rainy season. Nests in dense bushes or small trees, near or overhanging water, and less frequently in reed beds and papyrus swamps, using either the reed or small trees. Typically nests colonially with other species, although sometimes solitarily. Nests are small, bulky, and compact, 7–11 in (17–27 cm) in diameter made of reeds, grass, and twigs. Eggs are greenish blue. The clutch is four to six eggs in Europe, three to four in Madagascar and southern Africa. Clutch sizes have decreased in southern Europe over several decades. Incubation is 22–24 days in Europe, 18 days in Madagascar. Young begin to clamber from the nest into branches at 14 days. They are fledged at 45 days (35 days in Madagascar). Young form groups at the colony site.

CONSERVATION STATUS

Not threatened, but its populations are variable. Historic declines appear to be due to a combination of hunting, habitat

change, and perhaps climate. In some areas, the bird has increased its range in recent decades, likely due to its concentrated use of rice fields.

SIGNIFICANCE TO HUMANS

Often occurs close to humans, living in rice fields and marshes adjacent to towns and villages. It is not often noticed, but its call is distinctive. ♦

Black heron

Egretta ardesiaca

SUBFAMILY

Ardeinae

TAXONOMY

Ardea ardesiaca Wagler, 1827, Senegambia. Monotypic.

OTHER COMMON NAMES

French: Aigrette ardoisée; German: Glockenreihler; Spanish: Garceta Azabache, Garceta Gorgirroja.

PHYSICAL CHARACTERISTICS

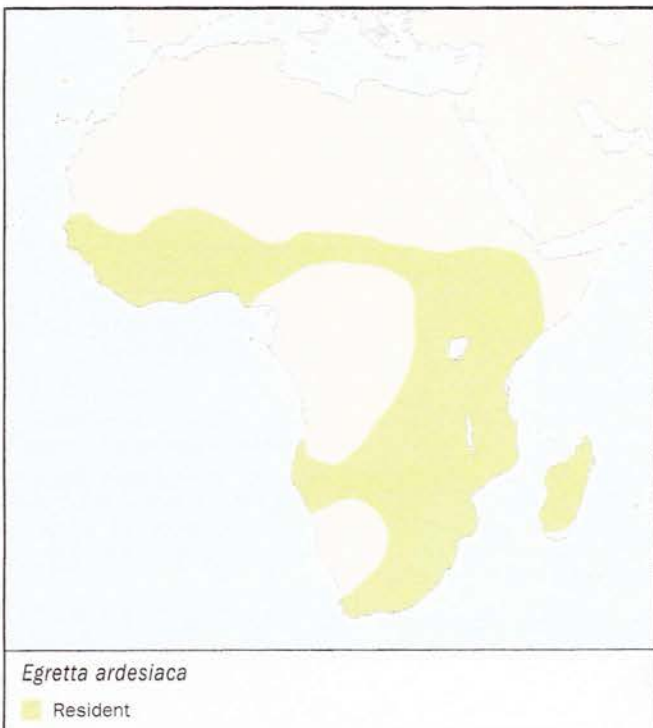
Medium-sized (17–26 in [42.5–66 cm]), all-black plumaged African heron with yellow feet, usually seen feeding in open shallow water.

DISTRIBUTION

Occurs in Madagascar and Africa south of the Sahara.

HABITAT

Prefers shallow open waters, especially margins of fresh water lakes and ponds. Also uses marshes, river edges, rice fields, and seasonally flooded grasslands. Along the coast it feeds along



tidal rivers and creeks, mangroves, alkaline lakes, and tidal flats.

BEHAVIOR

Exhibits distinctive feeding behavior called canopy feeding. It spreads its wings over its head in a full umbrella, with the tips of its primaries touching the water and erect nape plumes completing the canopy. The heron forms the canopy above the potential prey over the course of a few steps. It peers under the canopy for a few seconds, perhaps also stirring with its feet. The heron then moves on a few steps to form another canopy, usually within a few more seconds. It frequently pauses to shake itself.

FEEDING ECOLOGY AND DIET

The functioning of the canopy feeding behavior remains unclear, although the canopy reduces reflection and provides better visibility in addition to obscuring the silhouette of the heron. Fish are likely attracted to the shadow or are attracted to or flee the foot stirring. Some resident black herons feed solitarily in well-defended feeding territories. They also feed in groups of up to 50 individuals, with over 200 being reported. Feeds by day, especially around dusk. Roosts communally at night and, on the coast, at high tides. Eats small fish, but also takes aquatic insects and crustaceans.

REPRODUCTIVE BIOLOGY

The nest is a solid structure of twigs placed over water in trees, bushes, and reed beds. Nests at the start of the rainy season, in single or mixed-species colonies that may number in the hundreds. Eggs are dark blue and the clutch is two to four eggs.

CONSERVATION STATUS

Threatened on Madagascar, where human interference and habitat change have led to massive population reductions. Elsewhere, the heron is patchily distributed but not uncommon. Its greatest threats are human disturbance, predation at nest sites, and threats to aquatic habitats.

SIGNIFICANCE TO HUMANS

The distinctive feeding behavior and its feeding in open areas makes it easily noticed where it occurs. ♦

Little egret

Egretta garzetta

SUBFAMILY

Ardeinae

TAXONOMY

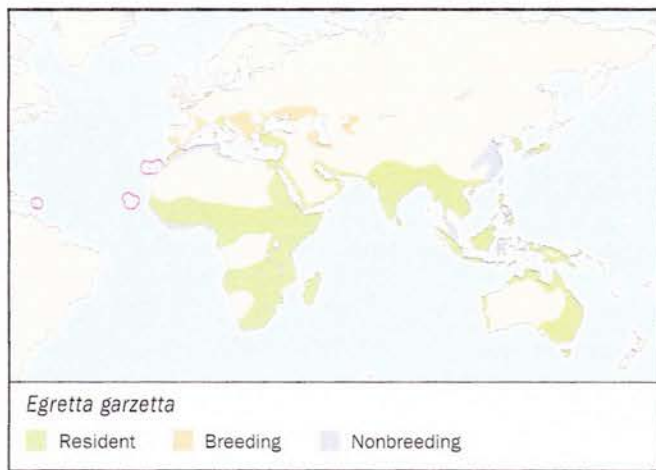
Ardea garzetta Linnaeus, 1766, Malalbergo, Italy. Six subspecies.

OTHER COMMON NAMES

English: Lesser egret; French: Aigrette garzette; German: Seidenreihler; Spanish: Garceta Común.

PHYSICAL CHARACTERISTICS

A thin, medium-sized heron, with a long thin neck and bill, dark legs and yellow feet (in most forms). Length is 22–25.5 in (55–65 cm); weight is 10–22.5 oz (280–638 g). In breeding it has distinctive head, chest and back plumes, and red lores. Some populations are dimorphic, having both dark and white birds.

**DISTRIBUTION**

Occurs in Europe, Africa, Madagascar, Asia, East Indies, Australia, Pacific Ocean islands. It has recently colonized the West Indies.

HABITAT

Typically uses open or sparsely vegetated shallow to very shallow water for feeding. Frequently uses artificial feeding habitats, including rice fields, fish ponds, and irrigation pools. Occasionally feeds in pasture and other dry land situations, and is known to feed communally with cattle or other ungulates. Nests in trees, bushes, or islands that offer protection and isolation.

BEHAVIOR

Highly social, usually seen in groups, either feeding in or at the edges of shallow water bodies, roosting at midday or on high tides, or nesting. Highly aggressive and territorial when feeding. Runs or hops between feeding sites, opening its wings to startle and chase down fish. Also uses such feeding behaviors as using floating bread or their bills to attract fish, following cattle, or riding bathing water buffalo. Birds roost when not feeding, and in the evening fly in small flocks to communal roosts.

FEEDING ECOLOGY AND DIET

Feeds in shallow, open, and unvegetated sites where water levels and dissolved oxygen are fluctuating (tidally, seasonally, or daily), where fish are concentrated in pools or at the water's surface. Typically feeds by walking slowly with the neck stretched out through the water in search of fish or other prey, stirring the substrate with its feet. Feeds in deeper water by flying above the surface, dipping its bill into the water to catch fish, or dragging its feet at the surface to frighten them into movement. Switches habitats through the year, and feeds alone or in groups. Follows other birds closely, frequently robs them of prey, and is robbed in turn. Diet is mainly small fish, generally only 0.4–2.4 in (1–6 cm) long. Also takes small birds, lizards, snakes, frogs, toads and tadpoles, insects, prawns, amphipods, crayfish, crabs, and many other invertebrates.

REPRODUCTIVE BIOLOGY

Breeding season varies across its range, spring in temperate areas and most often at the peak or after the peak of the rainy season in the tropics. Nests colonially, sometimes in mixed-species colonies that can number in the thousands. Coastal birds tend to nest in smaller colonies or alone. Nests are small platforms, 12–14 in (30–35 cm) wide. The eggs are variable greenish blue, fading to off-white. Clutch size varies geograph-

ically, with a range of two to eight. Incubation period is 25–30 days. Parents attend young for 10–15 days. Nestlings call for food, and the youngest birds typically die. Young leave nest at 35–50 days.

CONSERVATION STATUS

Not threatened. Loss of inland and coastal wetlands has occurred throughout its range.

SIGNIFICANCE TO HUMANS

A well-known species because it occurs near and with human populations. ♦

Black-crowned night heron

Nycticorax nycticorax

SUBFAMILY

Ardeinae

TAXONOMY

Ardea nycticorax Linnaeus, 1758, Europe. Four subspecies

OTHER COMMON NAMES

English: Night heron; French: Bihoreau gris; German: Nachtreiher; Spanish: Martinete.

PHYSICAL CHARACTERISTICS

A stocky dark gray and white heron with a distinctive glossy black bill, crown, and back. Length is 22–25.5 in (56–65 cm). Weight is 18.5–28 oz (525–800 g). During breeding it develops white head plumes that may reach 10 in (25 cm) long. It has relatively short legs that do not extend much beyond the body when in flight. Juveniles are cryptic gray-brown with buff white spots above and stripes below.

DISTRIBUTION

Occurs across the temperate and tropical world from North to South America, Europe, Africa, and Asia to the East Indies.

HABITAT

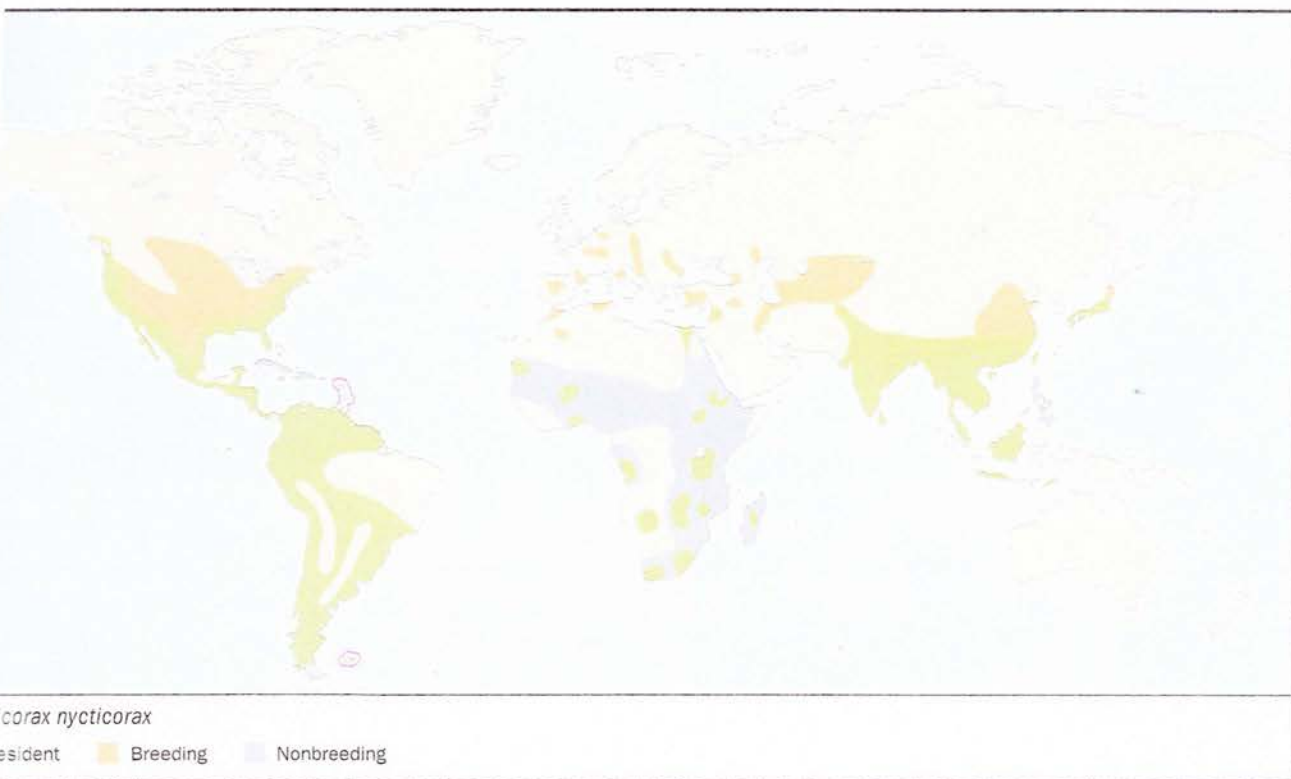
Typically found along the vegetated margins of shallow freshwater or brackish rivers, streams, ponds, lakes, marshes, swamps, mangroves, and mud flats. Also uses grasslands and coastal wetlands, especially on migration, and unlike most herons occurs at high altitudes. Uses pastures, ponds, reservoirs, canals, fishponds, rice fields, wet-crop fields, and dry grasslands. Nests in bushes and trees but also in reeds, sedge, grass tufts on the ground in protected areas like islands, and in protected locations in urban areas. Large nesting colonies especially to be associated with protected sites in large wetlands.

BEHAVIOR

A noisy bird having a raucous "quawk" call. Also has a rattling call that is like the sound of a rubber band being plucked and followed by a buzz or hiss. It flies with wing beats faster than most herons. Roosts by day in trees and bushes and is most often seen flying to roost in the morning and in the evening, giving the quawk call. Roosts commonly at rural areas and within towns.

FEEDING ECOLOGY AND DIET

Typically feeds at night, locating prey by sight and sound. Feeds during the day when nesting. Usual method is standing in a crouched posture and making a lunging strike at prey. During daylight, it may run, dive into the water from trees,



er, swim, or use its wings to startle prey. Also attracts fish vibrating its bill or using baits. Mostly a solitary forager, maintaining territories that it defends vigorously. Also feeds in regations when prey is highly concentrated. Fish, frogs, and aquatic insects predominate in the diet. Often eats the young of other colonial nesting waterbirds.

PRODUCTIVE BIOLOGY

In temperate areas, nesting occurs in spring, often early, but in tropical and subtropical areas nesting is more variable. The species often nests in rural, suburban, and urban settings, particularly in zoos. Nesting is usually colonial, in single-species or mixed-species colonies that number sometimes the thousands. Nests are a platform of sticks and reeds, 18–21 in (30–45 cm) wide. Eggs are green to pale blue-green. Clutch size is two to five eggs with an overall range of one to seven. Incubation averages 23 days. Parents brood the young for 10 days. The young clamber out of the nest by three weeks and fledge in six or seven weeks. Nesting success often high.

CONSERVATION STATUS

Not threatened. However, nesting is limited to few areas in some regions, such as in Europe, so conservation of these sites is crucial. In North America, populations declined due to pesticides, particularly up to the 1960s.

SIGNIFICANCE TO HUMANS

Fairly tolerant of human activities, and often nest and roost near humans. Night herons are often killed at fish hatcheries and are still hunted for food in some places. Most human interaction has been positive for the species. ♦

White-eared night heron

Nycticorax magnificus

SUBFAMILY

Ardeinae

TAXONOMY

Nycticorax magnifica Ogilvie-Grant, 1899, Hainan. Monotypic.

OTHER COMMON NAMES

English: Magnificent night heron; French: Bihoreau superbe; German: Hainanreiher; Spanish: Martinete Magnifico.

PHYSICAL CHARACTERISTICS

A medium-brown heron with a brown streaked breast and a white patch on the side of the head. Length is about 21 in (54 cm). Juvenal plumage has brown-black feathering spotted with buff or white.

DISTRIBUTION

Occurs in Southeast Asia.

HABITAT

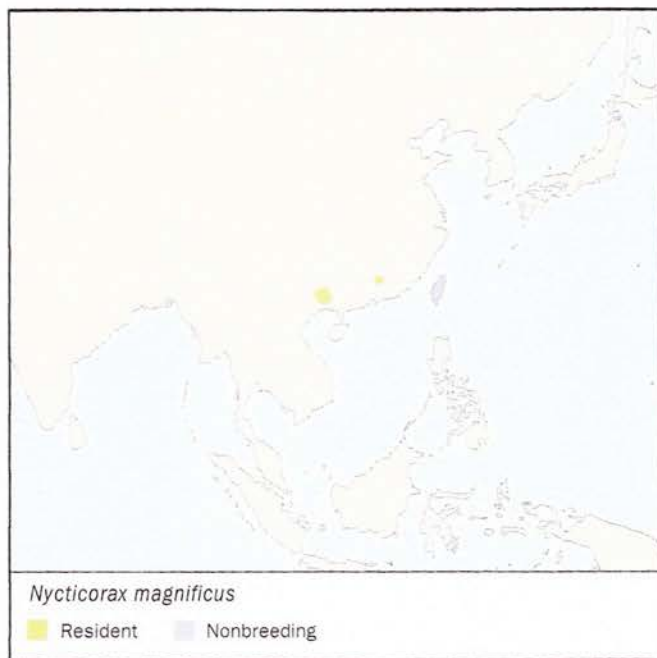
Occurs in dense, primary forests with streams and adjacent marshes. It currently is found only in mid-altitude mountains, but was likely originally also a lowland species.

BEHAVIOR

A poorly known species, with few having been observed in the wild. Feeds at night and roosts high in trees during the day. Has been reported as feeding singly or in isolated pairs.

FEEDING ECOLOGY AND DIET

Diet includes fish, shrimp, and insects.

**REPRODUCTIVE BIOLOGY**

Nearly nothing is known about the breeding biology of this species. Nests in tall trees and perhaps bamboo. May nest in mixed colonies.

CONSERVATION STATUS

Endangered. Only two breeding sites are known, a third was submerged by a reservoir. The principal threat to the species is habitat loss caused by deforestation, reforestation with pine monoculture, reservoir construction, and gold mining. Hunting is also a threat, even in nature reserves. The species is nationally protected in China, but the ability of local people to save the birds may be limited unless education and local conservation initiatives are undertaken.

SIGNIFICANCE TO HUMANS

This species is severely threatened due to human habitat alteration and hunting. Local people eat herons, and young herons of several species are captured for the market. Balancing the needs of the local population for food with conservation of this species is a huge challenge. ♦

Eurasian bittern

Botaurus stellaris

SUBFAMILY
Botaurinae

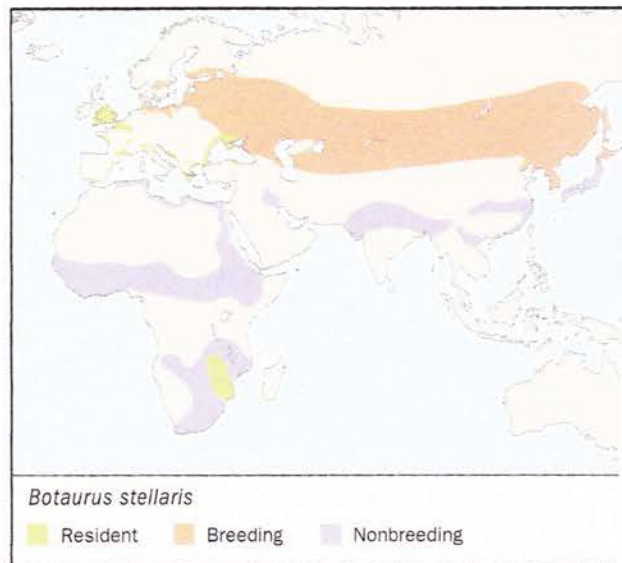
TAXONOMY
Ardea stellaris Linnaeus, 1758, Sweden. Two subspecies.

OTHER COMMON NAMES

English: Great bittern, common bittern; French: Butor étoilé
German: Rohrdommel; Spanish: Avetoro Común.

PHYSICAL CHARACTERISTICS

A thick-necked, medium-sized, golden brown heron with a black head and moustache. Length is 25–31 in (64–80 cm);



weight is 1.9–4.3 lb (0.9–1.9 kg). Its back is cryptic mottled and mottled. It is the largest of the four species of large bitterns. Males are significantly larger than females.

DISTRIBUTION

Occurs in the Old World temperate and tropical zones of rope, Asia, and Africa.

HABITAT

Occurs in densely vegetated wetlands. During the breeding season, it is found only in reed beds characterized by dense plants, stable shallow flooding, and with intermittent clear or channels. During the nonbreeding season, it uses more varied and open aquatic habitats such as small ponds, gravel wet grassy meadows, ditches, tall rice fields, fish ponds, floating leafed plant beds, and sewage lagoons.

BEHAVIOR

Hunts by walking with stealth in a crouched posture, the pointed forward, and the feet lifted high with each step. It is about by climbing over the emergent stems, using long toes to grasp the stems. Can hold a concealing behavior, called the bittern posture, for hours. In this posture, it raises its bill to the sky and peers directly forward, swaying as if in the breeze and turning slowly to keep eyes on a moving intruder.

A solitary feeder that fiercely defends its feeding and nesting area during breeding using its booming call. The call consists of two to four deep, resonant booms preceded by a short grunts or pumps, sometimes accompanied by clapping the bill. It is aggressive in physically defending its site, and it flies to supplant intruders and fights in the air, even to the death.

FEEDING ECOLOGY AND DIET

Feeds at the edge of emergent reeds and open water, such as along a pool, channel, or ditch, avoiding unflooded ground. Primarily feeds in the morning and evening but is known to hunt during the day and at night. Fish, amphibians, and usually dominate the diet. Small mammals, birds, and snails are also taken.

REPRODUCTIVE BIOLOGY

Nests solitarily in spring and summer or in the rainy season in the tropics. Non-migrating birds begin to call as early as

winter. Nest is a pad of matted reeds and other marsh vegetation that is built by the female. A polygamous species, males may have up to five mates, each of which has a nest within the male's territory. Eggs are olive brown with spotting. The normal clutch is four to five eggs; range is three to seven. Incubation begins immediately, and the range of hatching dates for a large clutch may stretch over two weeks. Only the female incubates, lasting 25–26 days. Young can leave the nest after about two weeks and fledge at 50–55 days.

CONSERVATION STATUS

The Eurasian bittern was formerly widespread and abundant, but suffered significant population changes. In Europe, it declined steadily since as early as the nineteenth century, being extirpated from England in 1868. It began a comeback through Europe in early 1900s, increased into the 1960s and then began a second decline, in some cases very rapidly. It is now regionally Vulnerable in Europe. The southern African population is even more at risk, given its rapid decline over the past several decades.

SIGNIFICANCE TO HUMANS

The Eurasian bittern occurs in reed beds and marshes throughout its range. It is a skulking species that stays hidden, at least during the day. It nonetheless is well known owing to its booming call. This call has entered into folklore wherever large bitterns occur, generally as a harbinger of evil. ♦

Least bittern

Ixobrychus exilis

SUBFAMILY

Botaurinae

TAXONOMY

Ardea exilis Gmelin, 1789, Jamaica. Five subspecies.

OTHER COMMON NAMES

English: Nitlin, gaulin; French: Petit blongios; German: Amerikanische Zwergdommel; Spanish: Avetorillo Panamericano.

PHYSICAL CHARACTERISTICS

The least bittern is the smallest heron (11–14 in [28–36 cm]), a pale buff bird with a dark crown and back and buff-colored wing patches. The female averages larger than the male. It has chestnut, rather than black, upperparts, a less prominent crown, darker neck stripes, dark brown chest streaks, and paler wing patch. Juveniles are similar to females.

DISTRIBUTION

The least bittern occurs in North America, Central America, West Indies, and north, west and east South America.

HABITAT

The habitats typically are very dense marsh vegetation in water with both woody growth and open water patches. These include fresh water marshes, lake edges, salt marshes in temperate areas, and mangroves in the tropics.

BEHAVIOR

The least bittern feeds by stalking through the reeds or along the edge of dense reed stands or on branches over the water. It walks in very crouched posture, with its neck extended and its bill nearly touching the water. It may also feed by standing in



one place and may build feeding platforms. The bittern posture is often assumed as a defensive display. The least bittern is very vocal, giving a low pitched, dove like advertising call and a rattling disturbance call.

FEEDING ECOLOGY AND DIET

It feeds within dense emergent vegetation. The principal prey is small fish, but its overall diet is much broader including crabs, crayfish, insects, frogs, tadpoles, salamanders, small mammals, and even small birds.

REPRODUCTIVE BIOLOGY

In the north, it nests in the spring and summer and at more varied times in the tropics. Nests are placed in thick herbaceous marshes, most commonly in cattail. It nests solitarily or in small groups. The male constructs the nests and advertises with a distinctive cooing call and defends its territory. The eggs are white. Clutch size is four or five eggs, with fewer in the tropics. Unlike in the large bitterns, both sexes incubate and care for young. Chicks develop quickly, being able to leave the nest temporarily by day five, wandering by two weeks. They fledge in about three or four weeks.

CONSERVATION STATUS

Not threatened. Conservation of this species depends on marsh preservation. Water impoundments and wetland construction for various purposes increase the potential habitat for the species as it often nests in cattail marshes created by human activities.

SIGNIFICANCE TO HUMANS

None known. Least bitterns are seldom noticed, due to their small size and secretive ways. They are charming small birds that well deserve additional attention. ♦

Agami heron

Agamia agami

SUBFAMILY

Agamiinae

TAXONOMY

Ardea agami Gmelin, 1789, Cayenne. Monotypic.

OTHER COMMON NAMES

English: Chestnut-bellied heron; French: Héron agami; German: Speerreiher; Spanish: Garza Agamí.

PHYSICAL CHARACTERISTICS

The agami heron is a strikingly colored medium-sized heron. The rapier-like bill averages 5.5 in (140 mm) but sometimes

reaches 6.4 in (163 mm), about one-fifth the bird's total length (24–30 in [60–76 cm]). The neck is very long and snake-like. Its back is bottle green, upper neck is chestnut with a central white stripe bordered by black contrasting with a gray lower neck, which sports a distinctive mat of shaggy, light gray feathers. The belly is chestnut. In the breeding season it has ribbon-like light blue crest feathers, up to 5 in (125 mm) long, and also broad slaty blue plumes on the lower back.

DISTRIBUTION

The agami heron occurs in Central and northern South America, especially in the Orinoco and Amazon basins.

HABITAT

This heron occurs in dense tropical lowland forest along margins of streams, small rivers, and swamps. They are also found less commonly along the margins of pools, oxbow lakes, and other small bodies of water.

BEHAVIOR

The agami heron typically is seen standing in crouched posture on banks, dykes, bushes, or branches overhanging the water. It also walks slowly in shallow water at the edge of streams or ponds. It has a distinctive, low-pitched, rattling alarm call.

FEEDING ECOLOGY AND DIET

The agami heron is a specialized bank fisher. Its short legs and long neck permit a long lunging strike. It feeds alone, with individuals scattered along water courses. With its long neck and bill, it is primarily a fish-eating heron.

REPRODUCTIVE BIOLOGY

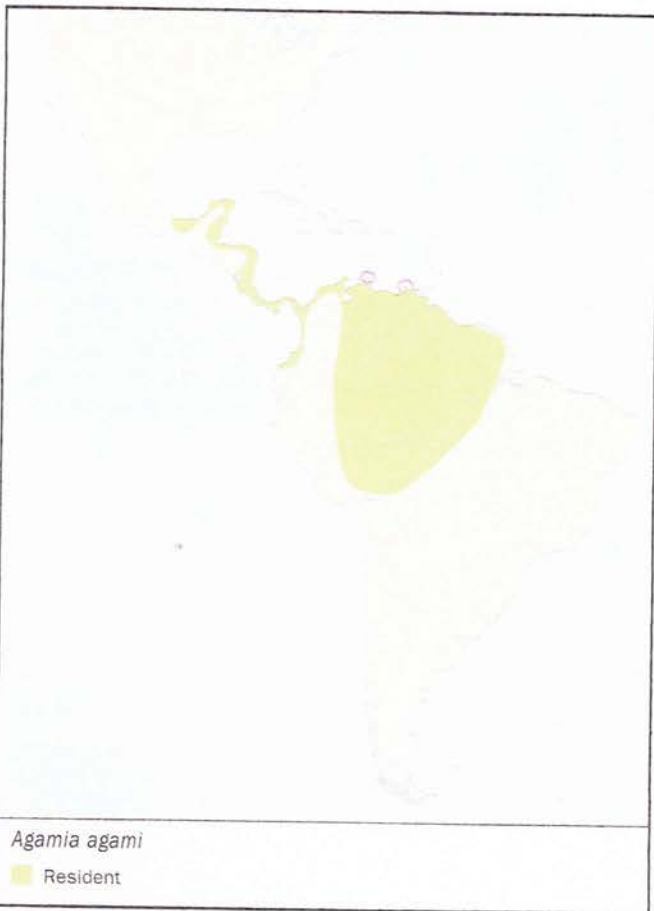
Nesting is during the wet season. It nests in small single species or mixed-species colonies. Nests are in isolated clump of mangroves, dead branches of drowned trees in an artificial lake, trees standing in water, and bushes within marshes, well hidden within the vegetation. The nest is a loose, thick platform of sticks or twigs, rather deeply cupped. The eggs are pale blue-green or dull blue. Clutch size is two to four eggs. Nothing is reported on incubation. Young gain weight quickly more than doubling in the first week.

CONSERVATION STATUS

It is likely not at risk over the entirety of its large range and readily seen along rivers and streams in certain parts of its range. Given its known habits, it would be threatened by deforestation and damming of rivers.

SIGNIFICANCE TO HUMANS

None known. This is a little known, highly specialized species of the deep tropical forest. It is infrequently seen. ♦

**Boat-billed heron**

Cochlearius cochlearius

SUBFAMILY

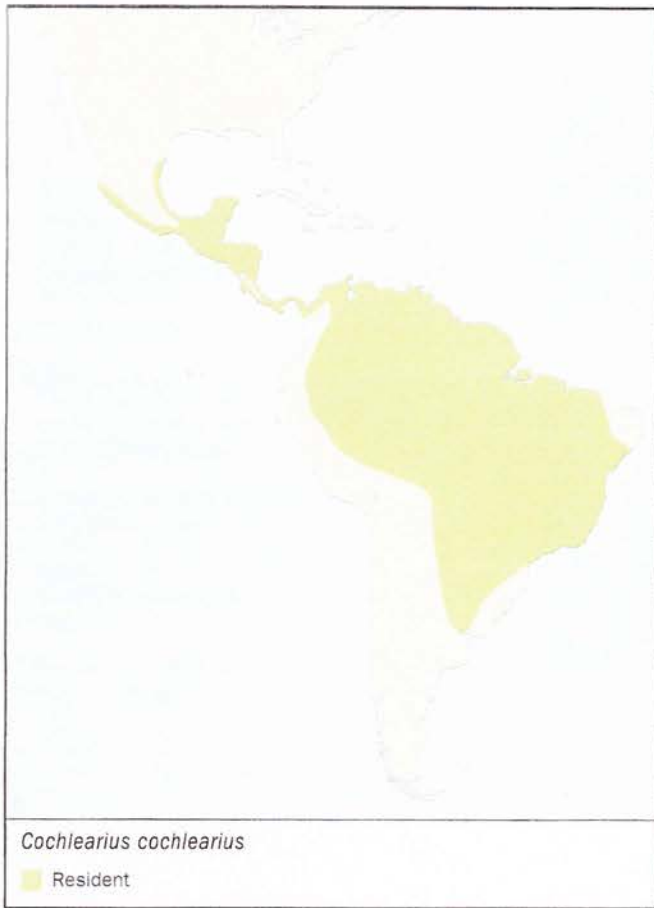
Cochleariinae

TAXONOMY

Cancroma cochlearius Linnaeus, 1766, Cayenne. Five subspecies.

OTHER COMMON NAMES

French: Savacou huppé German: Kahnschnabel; Spanish: Martinete Cucharón, Pato Pico de Barco.



PHYSICAL CHARACTERISTICS

The boat-billed heron is a stocky, medium-sized (18–20 in [45–51 cm]) mostly black and white and sometimes buff heron, with a huge black bill. The head is black, with a crest of long, black, lanceolate plumes that are most extravagant during the nesting season. The huge eyes bulge out from the face. The upper back is black, the rest of the back and upper wings are gray. The underparts are a rich rufous. During breeding the mouth lining, lores, and gular area turn black.

DISTRIBUTION

The boat-billed heron occurs in South and Central America.

HABITAT

It primarily uses wooded or mangrove fringes of freshwater creeks, lakes and marshes. It roosts in the day time in bushes or trees overhanging water.

BEHAVIOR

Despite its great bill, this species for the most part feeds like a typical heron by standing, sometimes for many minutes, usually in a crouched posture. It also walks in its crouched, hunched-backed posture with very slow deliberate steps on the ground or along branches and roots. It sometimes uses a rhythmic movement of the body but not the head. It sometimes walks very quickly or runs about. It also feeds non-visually by wading along with its bill partially submerged thrusting it forward in a scooping motion with each step. During the day it perches in dense trees and bushes, and also retreats there when disturbed. When roosting, its large bill rests on its breast or under a wing. It uses its crest for communication, raising it in response to disturbance and as a greeting display. This is a noisy heron, having a raucous laughing call that is a commonly heard sound along the tropical mangroves and inland forests. Also makes a popping noise with its bill.

FEEDING ECOLOGY AND DIET

It feeds nocturnally and crepuscularly although it occasionally feeds during the day. It feeds alone, flying from the communal roost to independent, probably defended, feeding areas. Occasionally it will feed in aggregations. The diet is broad and includes insects, shrimps, fish, amphibians, and small mammals.

REPRODUCTIVE BIOLOGY

Breeding timing is variable, generally in the rainy season. The heron nests solitary or in small groups of a few to a dozen pairs but also joins mixed heronries. The eggs are pale blue to green, often with spotting. Clutch size is usually three eggs, range one to four eggs. Incubation is 26 days. The young are at first fed entirely at night. The adult is aggressive in defending the young from all intruders, a behavior not typical of herons.

CONSERVATION STATUS

Not threatened. The species is widespread and found in suitable habitat throughout its range. There is little information available on population sizes and status, but it is not rare.

SIGNIFICANCE TO HUMANS

This is the most unusual of the herons, with its huge bill, unusual behaviors, and evolutionary distinctiveness from other herons. It is well known locally where it occurs, especially due to its calls from nesting colonies. ♦

Resources

Books

- Brown, Leslie. *The Birds of Africa*. Vol. 1. San Diego: Academic Press, 1983.
- del Hoyo, J., A. Elliot, and J. Sargatal, eds. *Handbook of the Birds of the World*. Vol. 1, *Ostrich to Ducks*. Barcelona: Lynx Edicions, 2001.
- Hancock, J.A. *Birds of the Wetlands*. London: Academic Press, 1999.
- Hancock, J.A., J.A. Kushlan, and M.P. Kahl. *Storks, Ibises and Spoonbills of the World*. London: Academic Press, 1992.

Kushlan, J.A., and H. Hafner. *Heron Conservation*. London: Academic Press, 2001.

Kushlan, J.A., and J.A. Hancock. *The Herons*. Oxford: Oxford University Press, 2002.

Periodicals

- Draulans, D., and J. van Vessem. "Some Aspects of Population Dynamics and Habitat Choice of Gray Herons (*Ardea cinerea*) in Fish-pond Areas." *Gerfault* 77 (1987): 43–61.

Resources

- Kushlan, J.A. "Feeding Behavior of North American Herons." *Auk* 93 (1976): 86-94.
- Kushlan, J.A. "Feeding Ecology of Wading Birds." *Wading Birds, National Audubon Society Research Report 7* (1978): 249-297.
- Maddock, M., and G.S. Baxter. "Breeding Success of Egrets Related to Rainfall, A Six Year Australian Study." *Colonial Waterbirds* 14 (1991): 133-139.
- Marion, L. "Territorial Feeding and Colonial Breeding are Not Mutually Exclusive: The Case of the Gray Heron (*Ardea cinerea*)." *Journal of Animal Ecology* 58 (1989): 693-710.

Organizations

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Web site: <<http://www.tour-du-valat.com>>
- Waterbird Society. National Museum of Natural History, Smithsonian Institution, Washington, DC 20560 USA.
Web site: <<http://www.nmnh.si.edu/BIRDNET/cws>>

Other

- Kushlan, J.A., and L. Garrett. *A Bibliography of Herons*. <<http://www.pwrc.usgs.gov/library/bibs.htm>>

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